USER MANUAL

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Introduction

1 Introduction

Introduction

AJ45EEH HELPFILE

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Machine Details

2 Machine Details

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2.1 CAN Layout

JCB

CAN Layout

Machine Details 26 > CAN Layout

A45E

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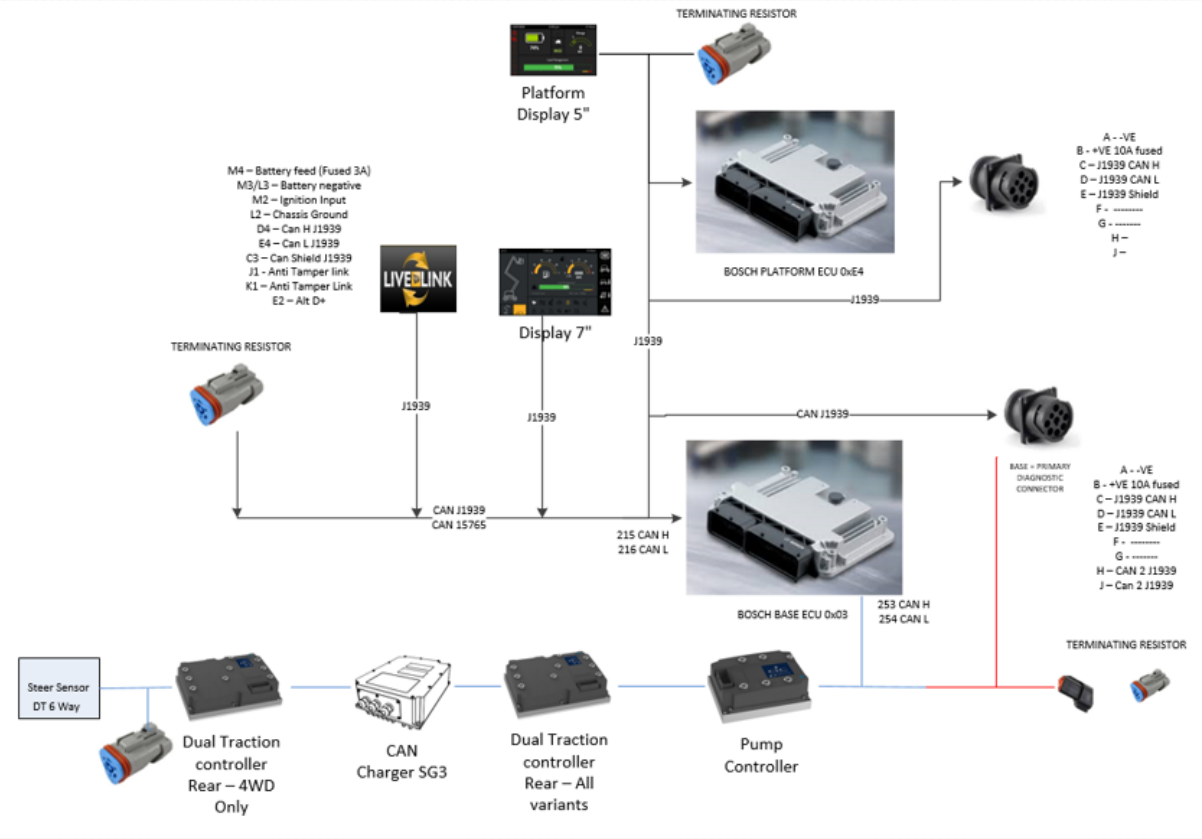

A45E

A45EH

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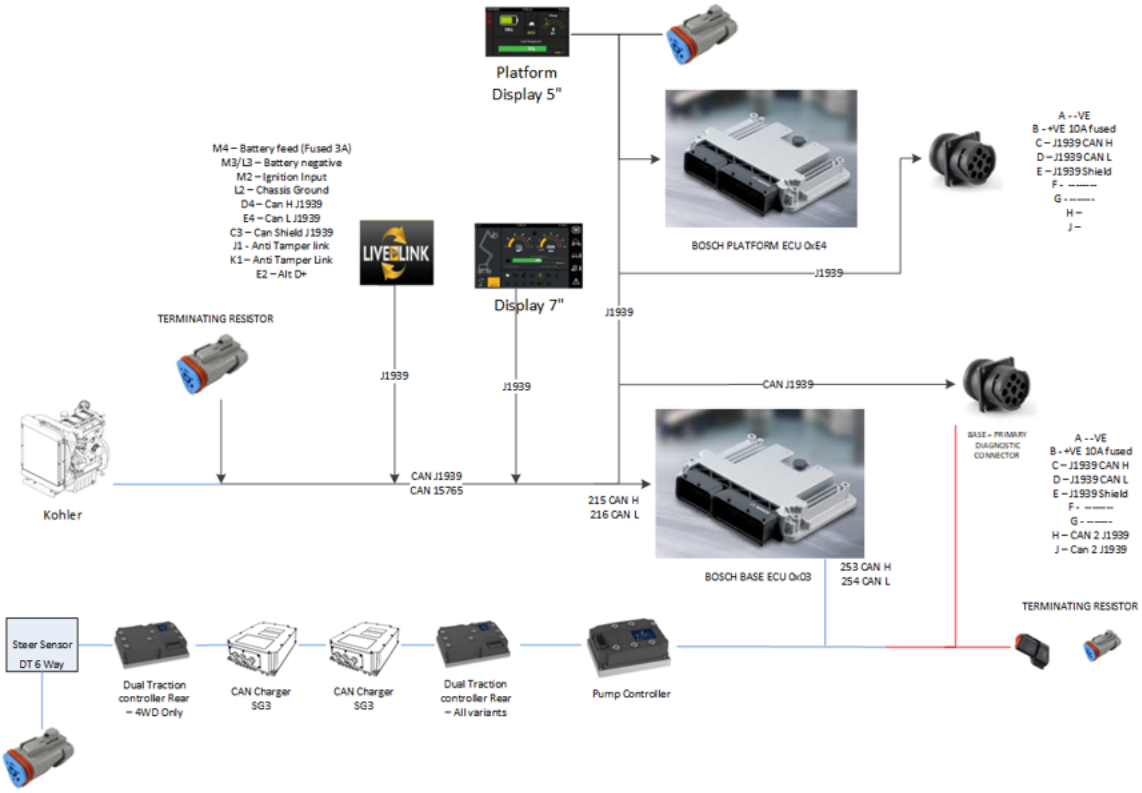

A45H

2.2 Harness Layout

Machine Details 26 > Harness Layout

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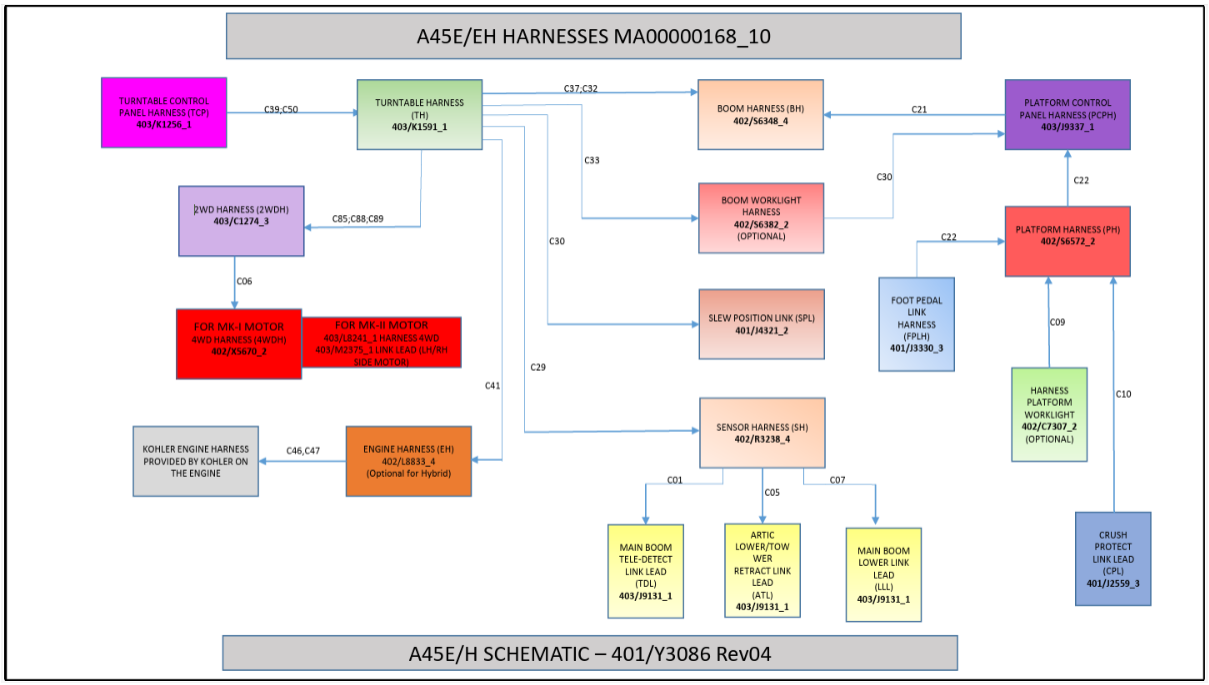

2.3 Auto Start Stop for Hybrid

Machine Details 28 > Auto Start Stop for Hybrid

Engine Auto-Start /Stop

Auto engine start feature is enabled in the machine at every key cycle.

•The engine will start automatically when the battery charge level drops below 50%.it shall flash the auto engine start icon (Yellow Colour) at both the display and also buzzer will beep for 5 sec. (he engine will turn OFF automatically when the battery charge level reaches 80%.)

•When we press engine start push button, glow plug icon shall pop up at both display until engine starts.

The engine auto start feature can be disabled either from the base display menu or by pressing the auto engine start push button on the platform control panel.

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•When auto start option is enabled and engine is started, auto engine icon will be solid yellow.

•When auto start option is enabled and engine is not running (BDI is > than 50%), auto engine icon will be Solid white

•When auto start option is disabled through platform Control panel or display, auto engine icon will be solid white with crossed.

2.4 Battery Lead Layout

Battery Lead Layout

Machine Details 26 > Battery Lead Layout

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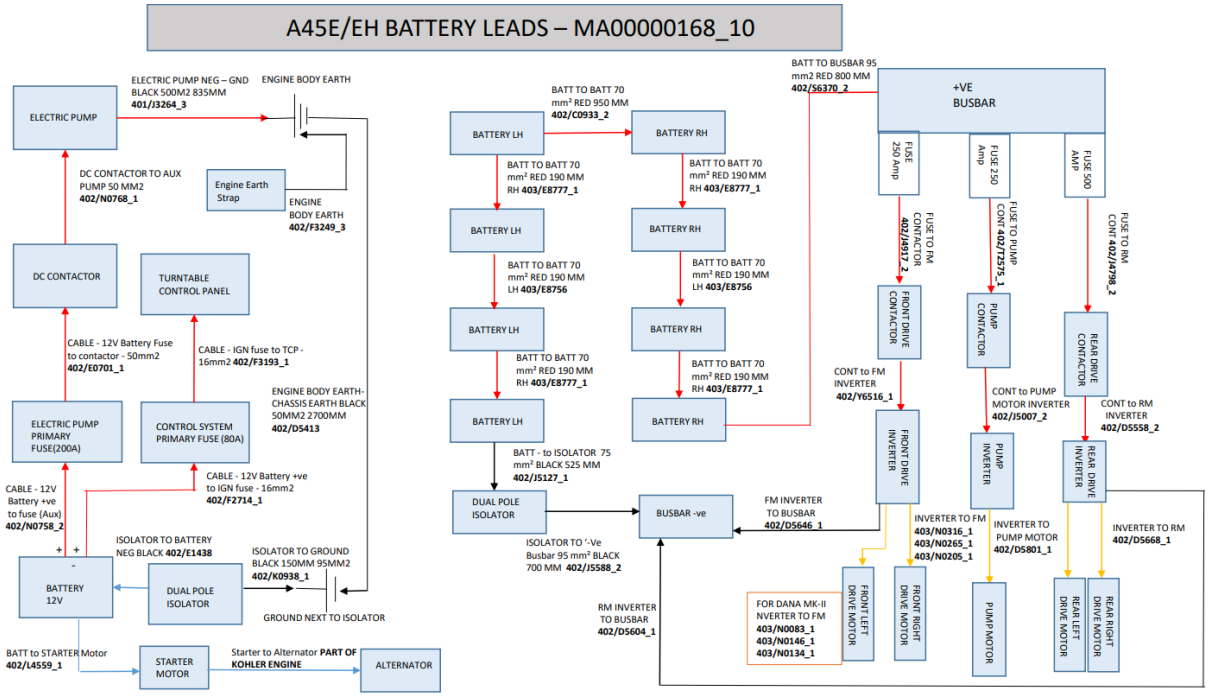

2.5 Earth Point Locations

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2	Earth Point Turn Table 34

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2.5.1 Earth Point Platform

Earth Point Platform

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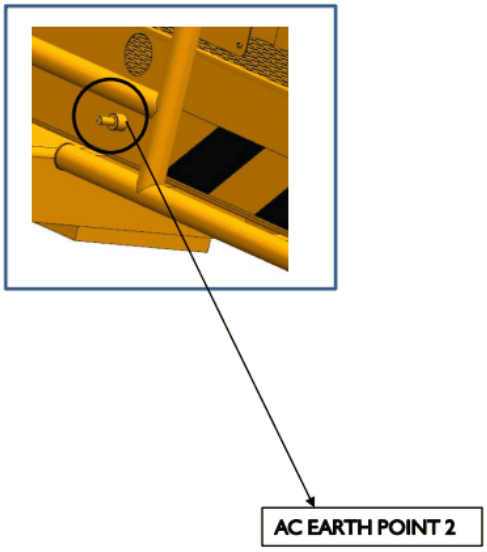
Function

Earth Points - locate the electrical earth points on the machine. make sure that the wires terminals are correctly fitted. Make sure that the earth point is free from contamination paint and corrosion.

Note - Earth Position is common for A45E & H

Location- Fitted on the Platform



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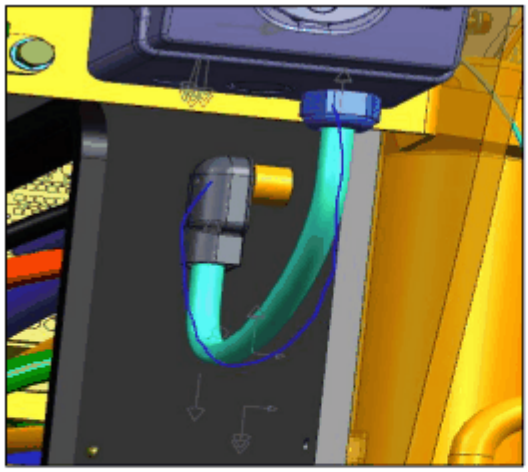

This connection comes only in case of power to platform electric

2.5.2 Earth Point Turntable

Earth Point Turntable

Machine Details 20 > Earth Point Locations 32 > Earth Point Turntable

Function - Earth Points - locate the electrical earth points on the machine. make sure that the wires terminals are correctly fitted. Make sure that the earth point is free from contamination paint and corrosion.

Note - Earth Position is common for A45E & H

Location -

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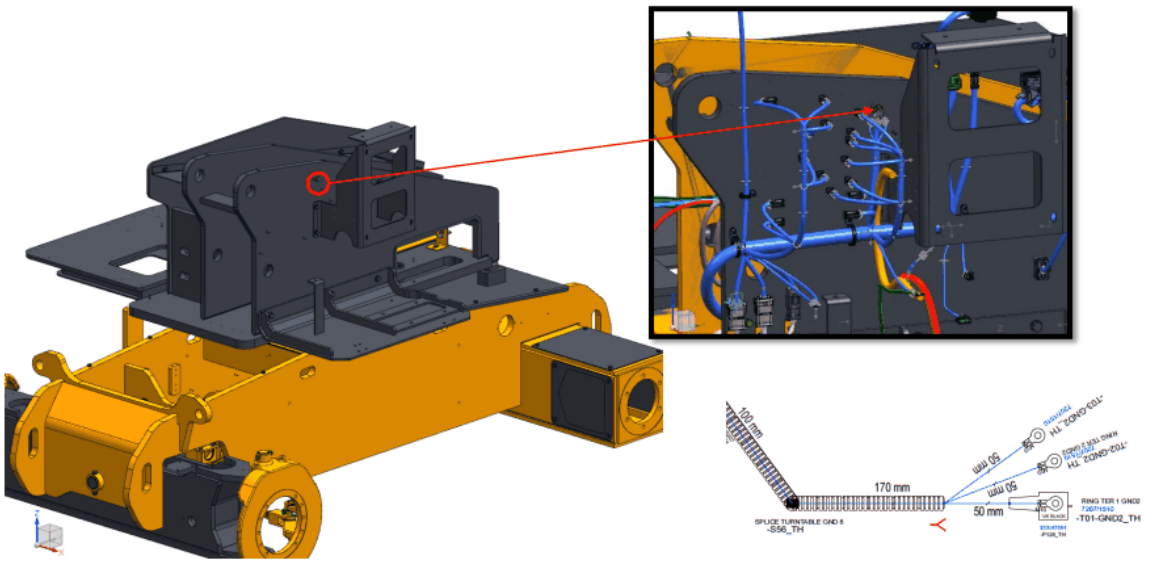

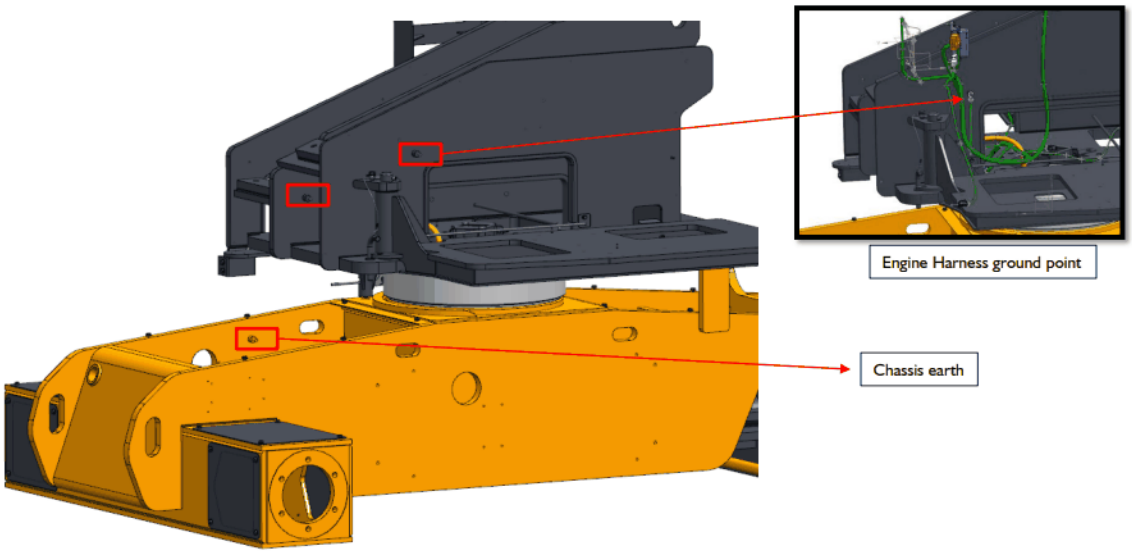

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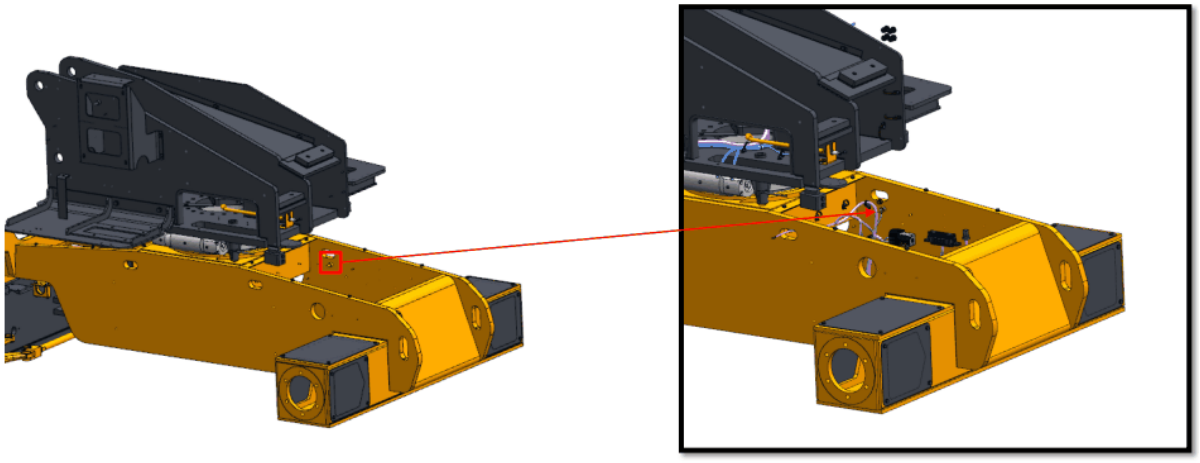
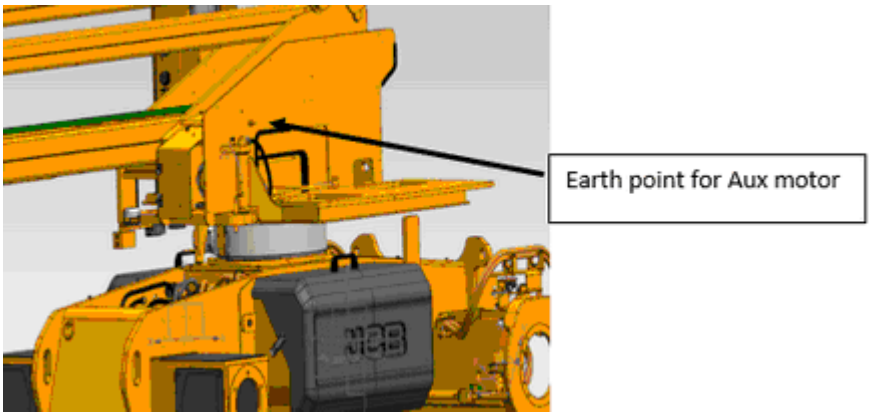
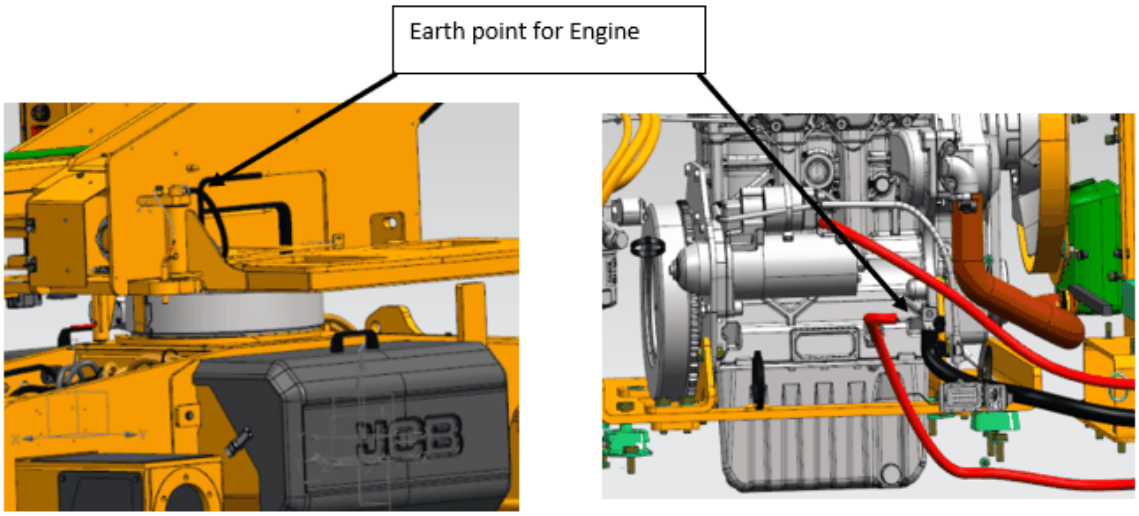


2wd Harness earthing point





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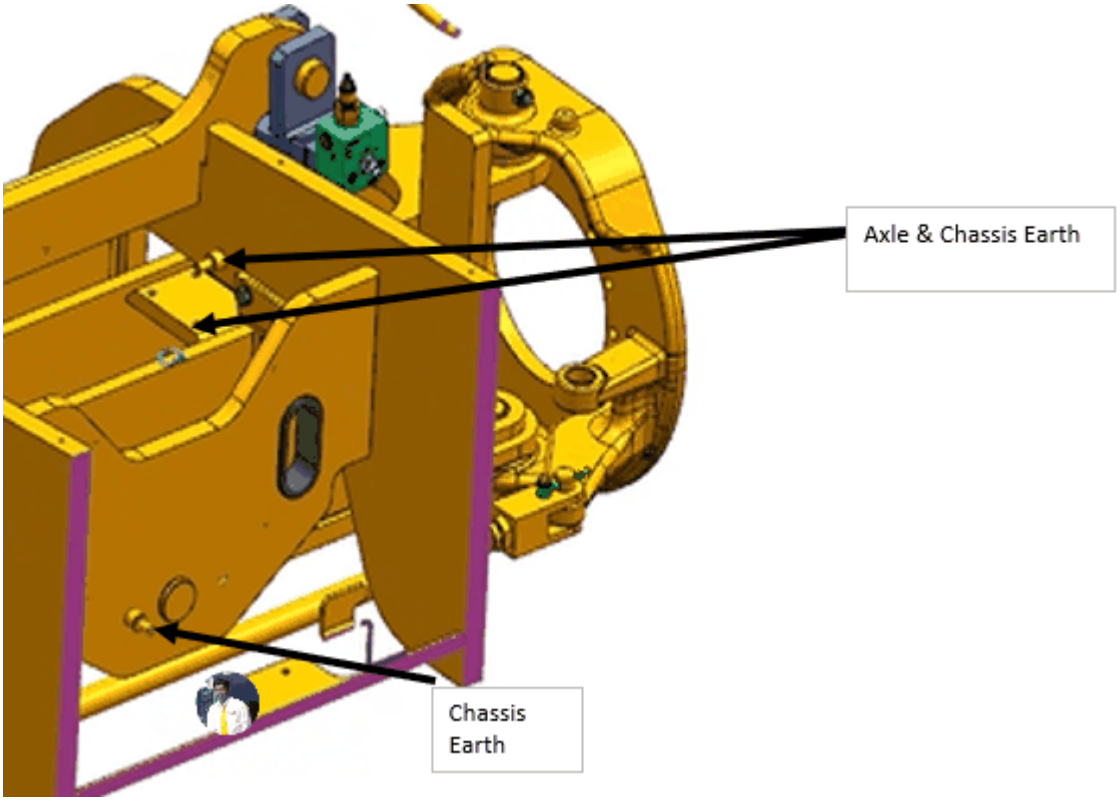

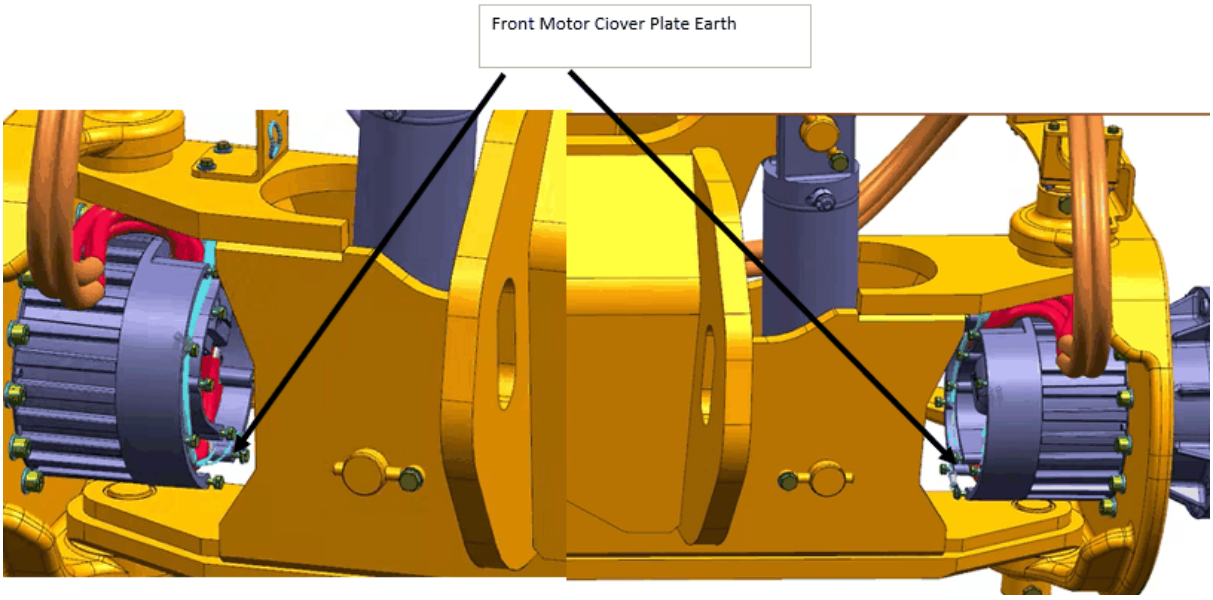

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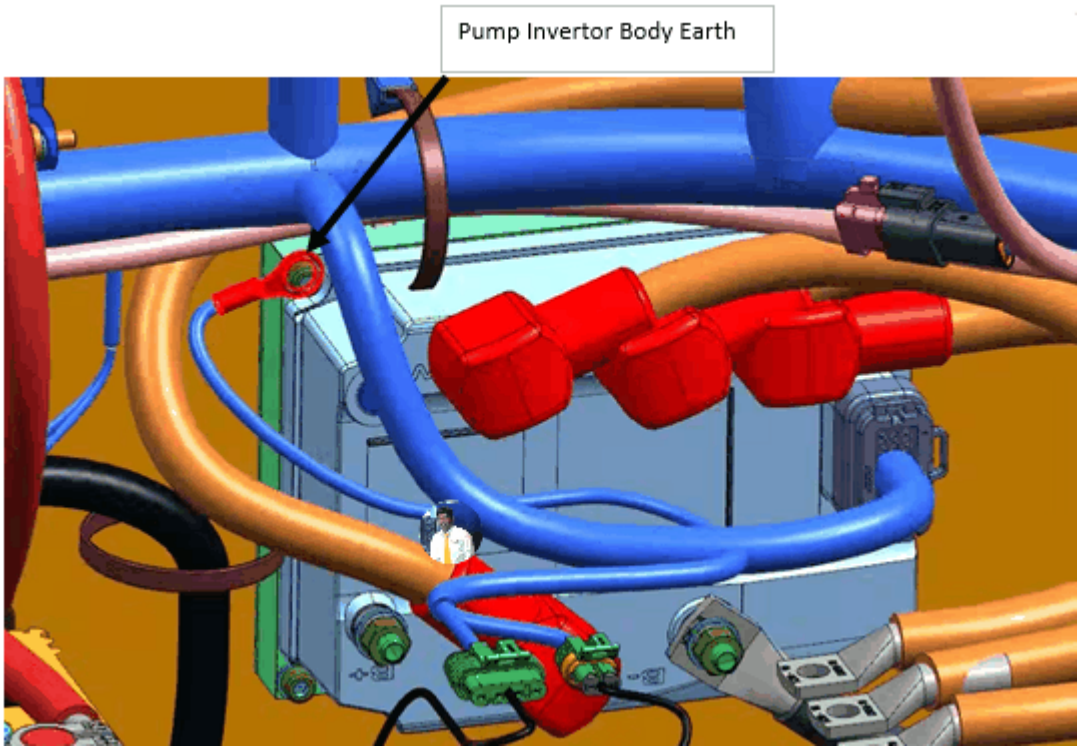

2.6 Fuse and Relays

Fuse and Relays

Machine Details 26 > Fuse & Relays

List of Fuses & Relays 38

Number	Component
1	PF01 - Electric Pump 39
2	PF02 - Control System Primary 39
3	DC Contactor 41

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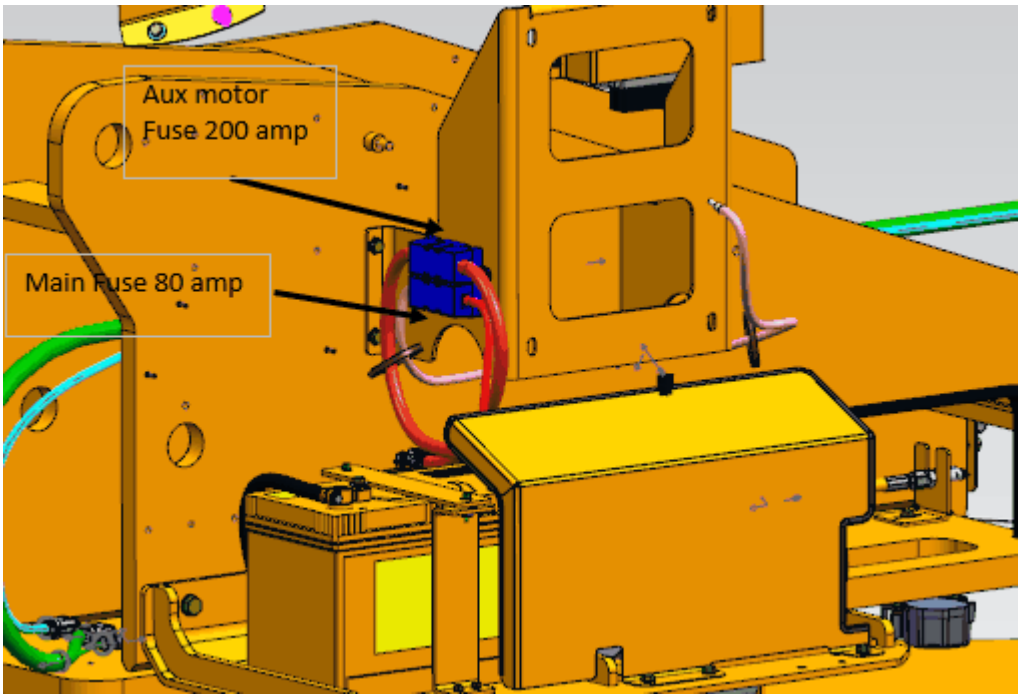
2.6.1 PF01 - Electric Pump

PF01 - Electric Pump

Machine Details 26 > Fuse and Relays 38 > PF01 - Electric Pump

The primary function of fuse is to keep the high voltage supply away from electric pump. It will brake the circuit in case of too much current flow & any fault in component.



2.6.2 PF02 - Control System Primary

PF02 - Control System Primary

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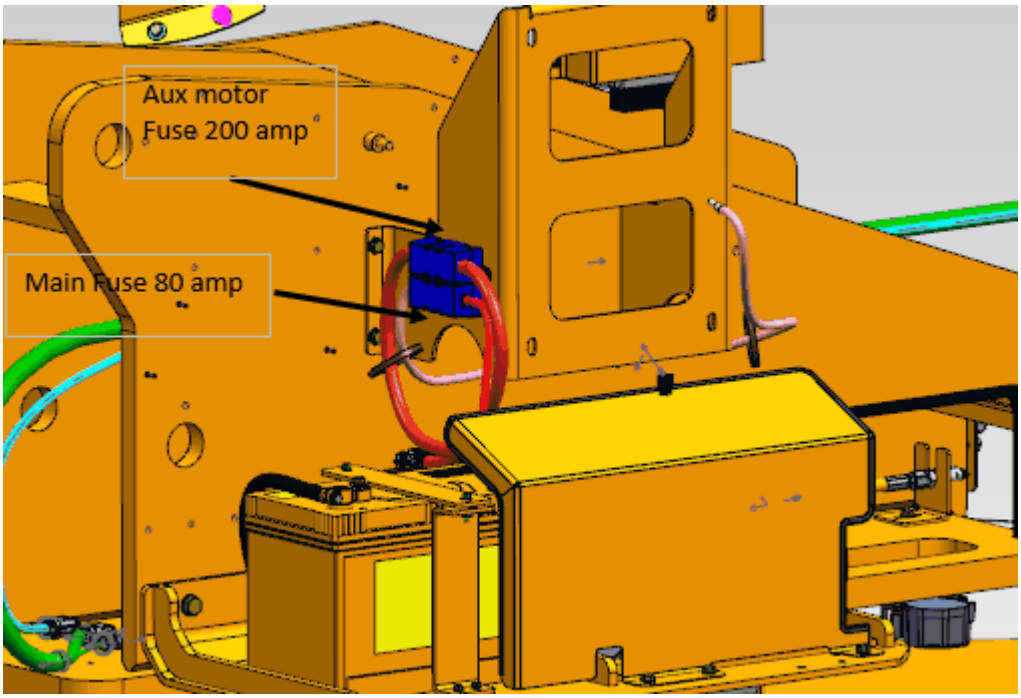
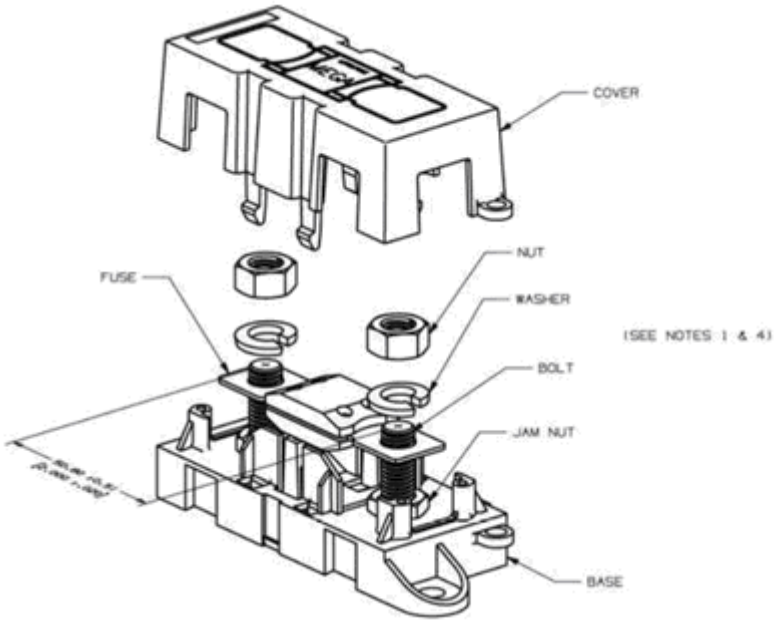
Machine Details 26 > Fuse and Relays 38 > PF02 - Control System Primary

Control system primary 80amp fuse is used for protection to control panel in case of over current. This Fuse is the main fuse for 12V control system.





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2.6.3 DC Contactor

DC Contactor

Machine Details 26 > Fuse and Relays 38 > DC Contactor

The DC Contactor is used as a large relay to turn power on and off to the electric pump. The contactor is controlled via the Bosch base ecu.

The electric pump will not work when the engine is running.

Always be careful when fitting the coil terminals. If they are fitted the wrong way around the diode will blow across the front of the terminals and the part will not work.

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System Level Function

3 System Level Function

System Level Function

List of System Level Function 44

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26	Livelink 108
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28	Fuel Sender 111
29	Base Buzzer 113
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31	Display Function 117

3.1 Ignition

System Level Function 44 > Ignition

Function

- The ignition turns on and off the main power of the machine.
- The system diagram is assuming the isolator key is fitted and 'ON'
- The diagram below shows the main components that will turn on when the ignition is cycled 'ON'
- When the key is turned on there should be 3 beeps from the base and platform buzzers

Signal

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• The main power is fed from the battery into the lower control box through an 80A primary fuse and into the large din rail terminal S11-21.

• The din rail terminals are connected together with large jumper bars to S11-24, which then fed FU16_TCP (7.5A) Fuse.

• FU16_TCP then feds power to the ignition key. This signal is a permanent fed as long as there is power in the batteries and no fuse is blown.

• From the ignition key feds S11-9 din rail terminal that feeds out to the 4 ignition relays.

• **Parts in Circuit**

- Ignition Switch 383
- Base Bosch ECU 237
- Platform ECU 279
- Large Jumper Bar 379
- Large Din Rail Terminal 400
- PF02 - Control System Primary 39

System diagram
Below shows an overview on what the operator should see when the ignition key is set to the 'ON' position.

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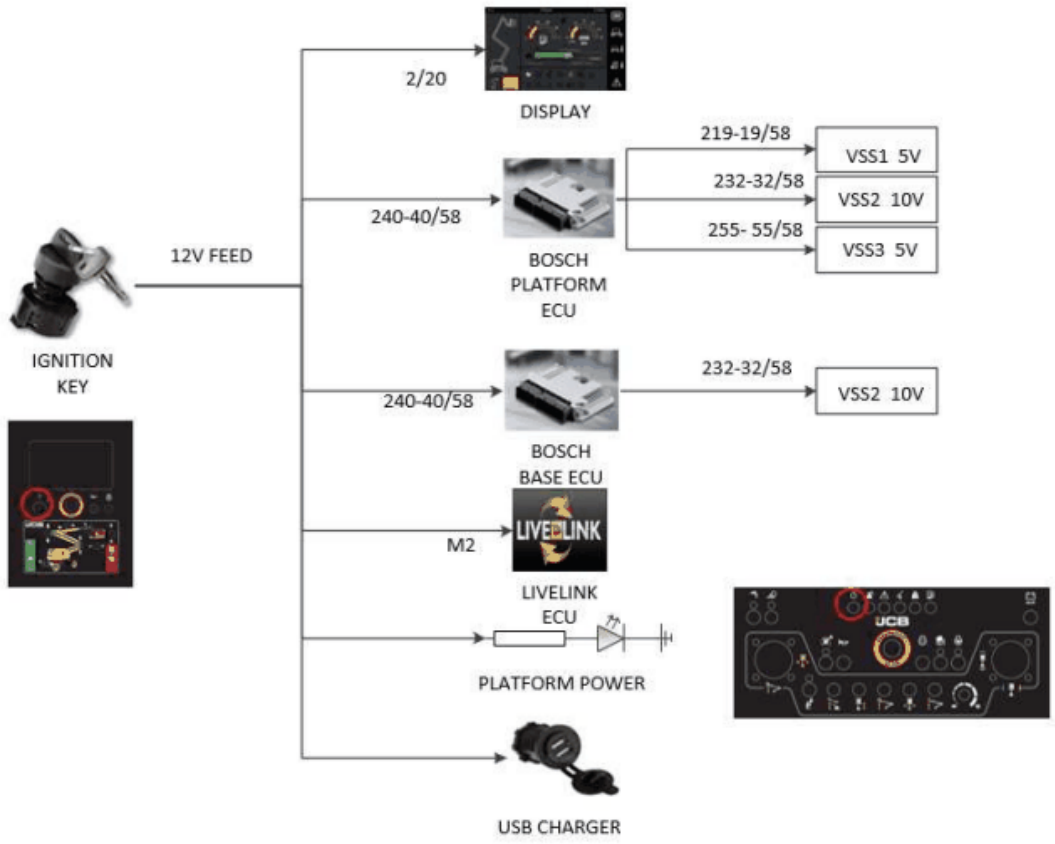

Related Fault Codes

Fault Code	Description
B1353-16 887	ENGINE IGNITION Short Circuit to Low
B1354-13 888	ENGINE IGNITION Open Circuit OR Short Circuit to High

3.2 Load Cell Troubleshooting Flow Chart

Load Cell Troubleshooting Flow Chart

System Level Function 44 > Load Cell Troubleshooting Flow Chart

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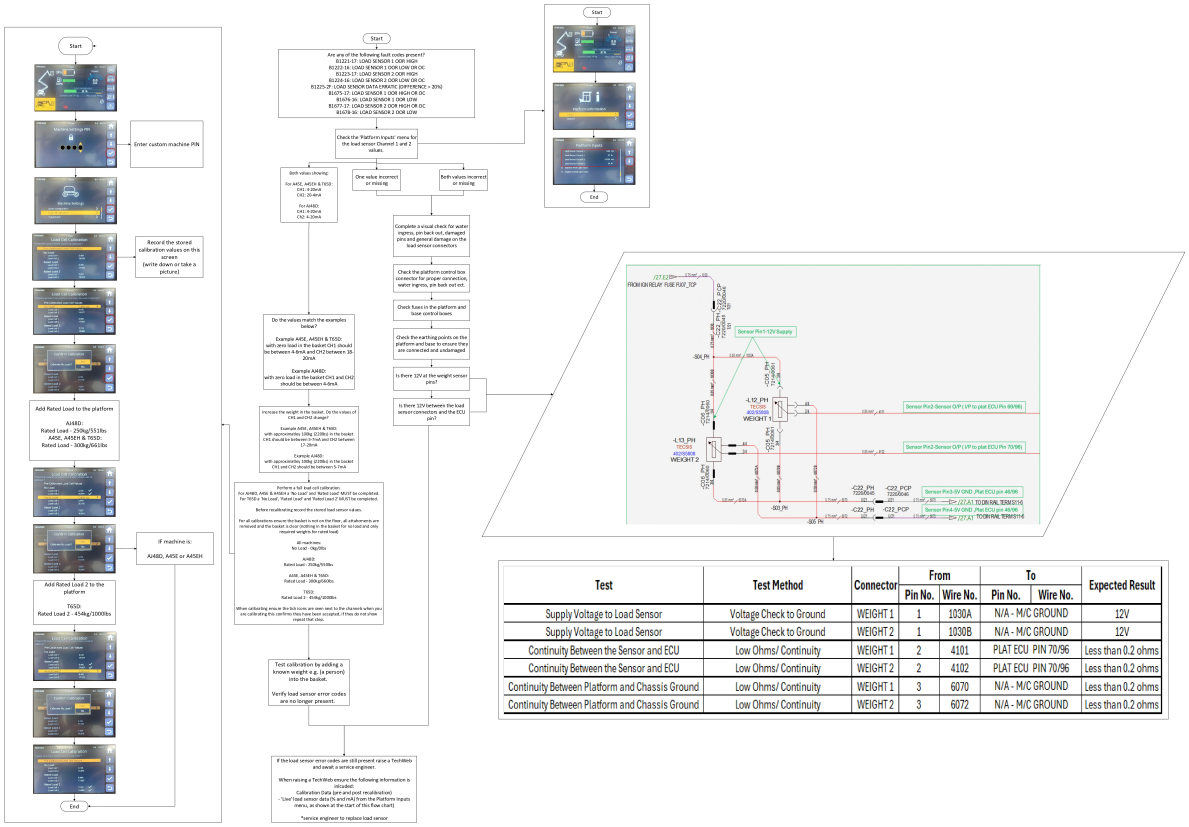

Test	Test Method	Connector	From		To		Expected Result
			Pin No.	Wire No.	Pin No.	Wire No.	
Supply Voltage to Load Sensor	Voltage Check to Ground	WEIGHT 1	1	1030A	N/A - M/C GROUND		12V
Supply Voltage to Load Sensor	Voltage Check to Ground	WEIGHT 2	1	1030B	N/A - M/C GROUND		12V
Continuity Between the Sensor and ECU	Low Ohms/ Continuity	WEIGHT 1	2	4101	PLAT ECU PIN 70/96		Less than 0.2 ohms
Continuity Between the Sensor and ECU	Low Ohms/ Continuity	WEIGHT 2	2	4102	PLAT ECU PIN 70/96		Less than 0.2 ohms
Continuity Between Platform and Chassis Ground	Low Ohms/ Continuity	WEIGHT 1	3	6070	N/A - M/C GROUND		Less than 0.2 ohms
Continuity Between Platform and Chassis Ground	Low Ohms/ Continuity	WEIGHT 2	3	6072	N/A - M/C GROUND		Less than 0.2 ohms

3.3 Horn

Horn

System Level Function 44 > Horn

Function

- The horn can be pressed from the Base or Platform control station. There is only one horn output which is below the base control box.
- The horn must be working correctly for safe machine operation.
- The horn can be operated from the platform and base control panel. The horn is located under the turntable. An improperly functioning horn may prevent the operator from alerting the ground personnel of hazards or unsafe conditions.
- Use the horn wherever necessary, particularly at blind corners.
- **Parts in system**

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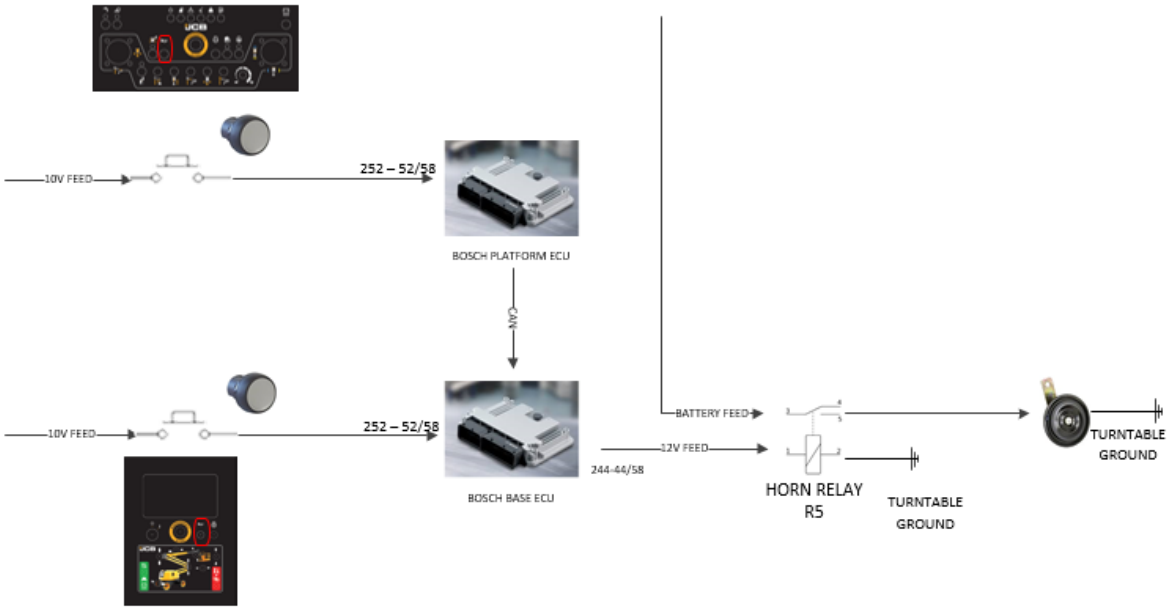
- Base Bosch ECU 237
- Platform ECU 279
- Horn Switch(TCP) 396
- Horn Switch(PCP) 327
- Horn Relay 363
- Horn 169

System Diagram



Related Fault Codes

Fault Code	Description
B1181-16 742	Horn - Horn High Side Short Circuit to Low.
B1182-13 743	Horn - Horn High Side Open Circuit.
B1206-17 752	Horn - Base Horn Button Short Circuit to High.
B1207-16 753	Horn - Base Horn Button Short Circuit to Low.
B1208-24 754	Horn - Base Horn Button Stuck >10s.

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B1273-17 817	Horn - Platform Horn Button Short Circuit to High
B1274-16 818	Horn - Platform Horn Button Short Circuit to Low.
B1275-24 819	Horn - Platform Horn Button Stuck >10s.

3.4 Potentiometer

Function

- The potentiometer is used to control the speed of each function from the platform control panel.
- The output from potentiometer is from 0V min – 5.15V max
- The ECU Shall convert the voltage output from the potentiometer to a 0 – 100 percentage value. Low speed = 0V, High speed = VSS_1(5V)

- The potentiometer shall only affect the controls at the platform except steer. The functions affected shall be:

1.Jib up/down (Raise/Lower)

2.Platform level

3.Platform rotate

4.Telescope extend / retract

5.Drive forward/ Reverse

6.Slew

7.Telescopic Boom Up/down

8.Articulated Boom [up/down]

System diagram

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BOSCH PLATFORM ECU

Signal

- The 5V supply is an output from the platform controller also known as VSS1 Pin 19/58
- The ground for the potentiometer also feeds back into the ECU Pin 45/96.
- This supply is separated from the rest of the control system.
- The potentiometer provides a voltage which is altered between these voltages based on the position of the knob.
- This is fed back into the ECU on pin 39/96.

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Parts in Circuit

- Potentiometer 322
- Platform ECU 279

Related Fault Codes

Fault Code	Fault Description
B1067-17 605	Potentiometer - Circuit short to high (5.5v)

3.5 Electric Pump

System Level Function 44 > Electric Pump

Function

- The electric pump is there for recovering an operator or very low usage of the booms. Using the recovery system will be explained in override procedure
- The isolator and ignition key must both be in the 'ON' position.It is advised that only one function at a time should be used.

To use the electric pump from the base control station.

- The engine should not be running,

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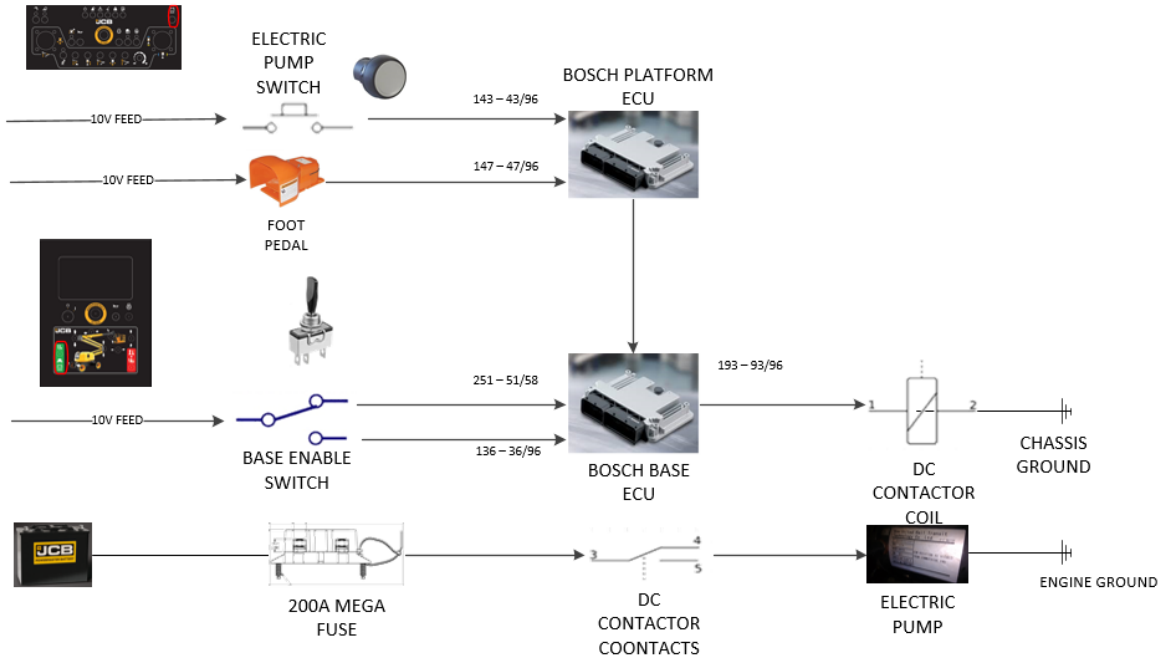
- Press and hold base enable switch
- Operate function button while keeping the base enable pressed
- Only one function may be operated at a time
- To use the electric pump from the platform
- Platform enable button on base control station (default position)
- Press the foot pedal and hold
- Press the AUX button and hold
- Press required function

The following functions will not work with the electric pump:

- Drive
- Steer
- Hydraulic Generator

System Diagram



- **Parts in system**
- Electric Pump 52

- Base ECU 237
- Platform ECU 279
- Foot Switch 266
-
- DC Contactor 41

- **Related Fault Codes**

Fault Code	Description
B1055-17 593	AUX / Overload override button pressed condition - Circuit short to high (10v)
B1056-16 594	AUX / Overload override button pressed condition - Circuit short to low
B1414-17 916	AUX Pump output - Circuit open or circuit short to high (12v)
B1415-16 917	AUX Pump output - Circuit short to low
B1694-17 1046	AUX / Overload override button unpressed condition - Circuit short to high (10v)
B1695-16 1047	AUX / Overload override button unpressed condition - Circuit short to low
B1696-13 1048	AUX / Overload override button both conditions - Signal plausibility failure (Circuit open)
B1697-92 1049	AUX / Overload override button both conditions - Signal plausibility failure (10v)

3.6 Emergency Stop

System Level Function 44 > Emergency Stop

Function

- The emergency stop is the for the operator to stop all machine movement immediately.
- This will not turn power on the machine off and only disable outputs from the machine controllers.

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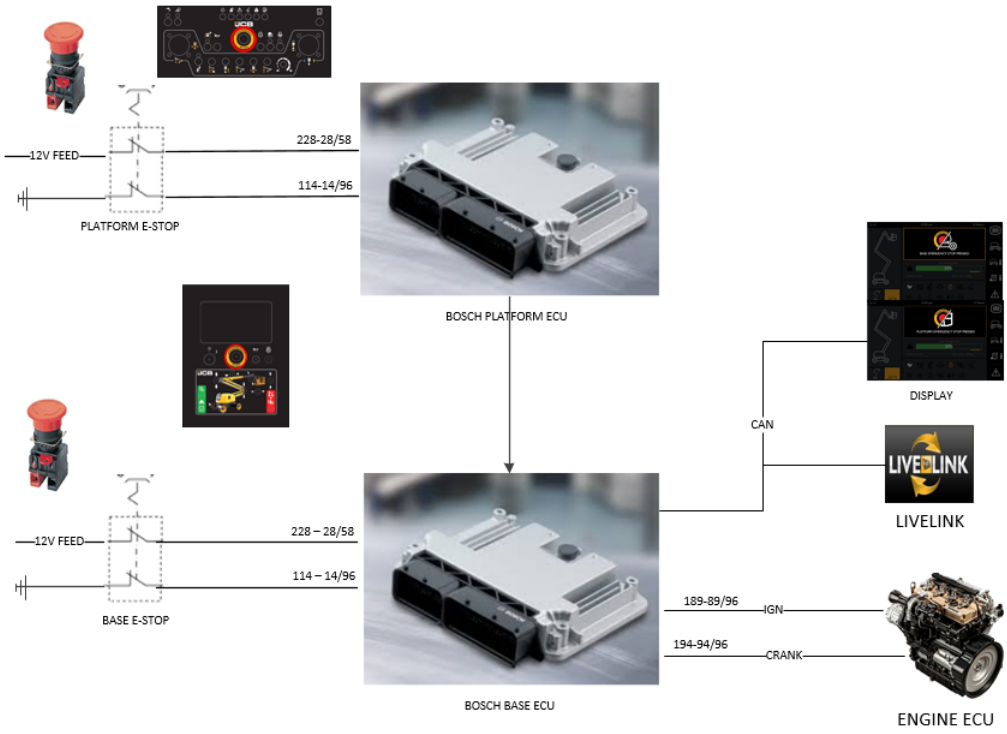
System Diagram



- **Signal**

There are 2 signals used by the control system.

A 12V signal and a Ground signal.

For the control system to operate both signals need to be on at the same time, if either is incorrect the control system will be blocked.

- **Parts in Circuit**

- E-Stop Base 388
- E-Stop Platform 330
- Platform ECU 279
- Base ECU 237

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- Ignition Relays 360
- Ignition Switch 383

- **Related Fault Codes**

Fault Code	Description
B1001-17 540	E-stop turntable button - Signal plausibility failure
B1235-17 774	E-stop platform button - Signal plausibility failure

3.7 Crush Protection System

System Level Function 44 > Crush Protection System

Function

- The crush protection system is to avoid an operator from being pressed into the platform control panel.
- The crush protection system is x2 NC switches.
- The system can only be engaged if the wire rope is fitted and torqued up correctly. Have no torque in rope is the same effect as the switch being pressed
- The system may need adjusting at times via the quick tension pulley.
- when the system is engaged correctly (not pressed):
- The full system should operate as normal
- When the system is disengaged (pressed)
- The system will stop all raise and extend controls
- The engine will return to idle
- The buzzer from both control stations will sound
- The xxx light at the platform will become active

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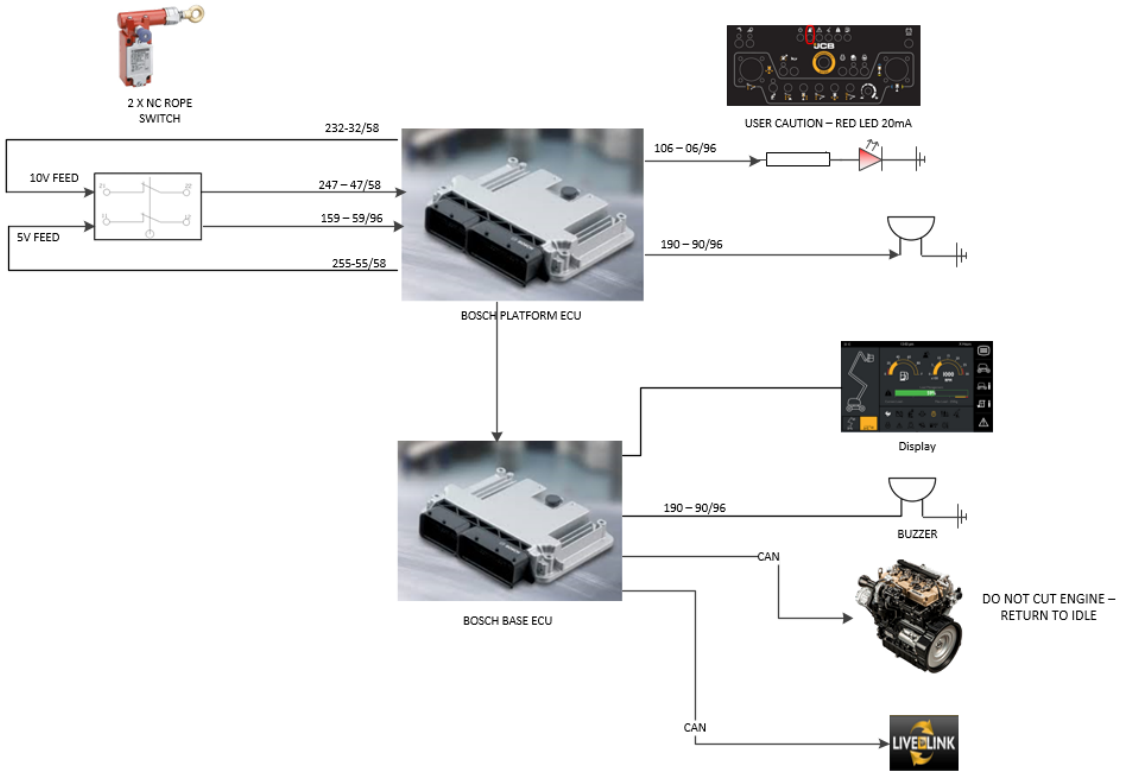
- The crush protection icon will become active on the display
- Once the system has been pressed it will need to be reset via the pull level on the front of the switch.

System Diagram



- **Signal**

- The crush protection switch has 2 different switches inside. Each switch runs on a different voltage.
- Switch 1 is fed from a 5V feed from the Bosch controller. Pin 36/58
- Switch 2 is fed from a 10V feed from the Bosch controller Pin 47/58
- The switch is normally closed and the switch opens when the crush protection wire is pressed.

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1. With crush protection system set and unpressed

Pin 47/58 will be 10V

Pin 36/58 will be 5V

2. When the crush protection system has been pressed

Pin 47/58 will be 0V

Pin 36/58 will be 0V

- **Parts in Circuit**
- Crush Protection Switch 270
- Platform ECU 279
- Base ECU 237

Related Fault Codes

Fault Code	Description
B1025-13 571	Crush protection position switch - Signal plausibility failure
B1026-17 572	Crush protection position switch 1 - Circuit short to high (5v)
B1027-16 574	Crush protection position switch 1 - Circuit short to low
B1028-16 575	Crush protection position switch 2 - Circuit short to low
B1029-17 576	Crush protection position switch 2 - Circuit short to high (10v)

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3.8 Steering

System Level Function 44 > Steering

Function

- The Steer function allows the machine to change direction of the front axle wheels in the left and right direction
- The speed of the steer is fixed. Steering is only available from the platform control station.
- Steering is controlled via the buttons on the top of the joystick, this is fed into the Platform Controller and sent to the base controller via CAN.
- The base controller controls the steer solenoids on the main valve block and also controls the brakes as discussed below.
- The foot pedal must be pressed for the steering function to operate
- Steer is not available via the AUX pump
- If steer is activated without drive the front brakes will be released.
- When drive is operated both front and rear brakes will be released.
- During steer the White Noise Alarm and the Beacon(s) will be active

1) Steer Left/Right

1) Steer shall be operated from the Platform control panel in both left and right directions.

2) There shall be NO Steer controls from the base control station.

3) Steer direction shall be controlled by an on/off solenoids at the base (2 x solenoid contacts) (1 solenoid will control left, 1 solenoid will control right).

2) Differential Steering

1) While turning, the speed for right and left traction wheel shall be adjusted to avoid skidding and tearing of the rubber tires.

2) While steering in right direction, speed of left traction wheel will be more than speed of right traction wheel.

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3) While steering in left direction, speed of right traction wheel will be more than speed of left traction wheel

3) Steering Sensitivity

1) There shall be no change in Steer speed while in Raised Mode.

2) When drive speed is more than 50% of the max. speed, then Steer speed shall be a factor at 1 to the steering speed in Stowed Mode.

3) When drive speed is More than 50% of the max speed, then Steer speed shall be a factor at 0.6 to the steering speed in Stowed Mode.

4) Impact of Steer Angle on Drive Speed limit

1.Drive speed shall be decreased proportionally with increase in steering angle

2.All wheels are Center Aligned, Machine Shall Attain Maximum Allowed Speed.

3.The master traction module creates left and right command speed based on Accel Throttle Position, derived Command Speed Reference and the True Vehicle Angle (calculated from steering angle sensor which is mounted on the right front steered wheel)

4.Drive along with steer full left, Machine Should get Slower as compared to wheels are Center Aligned & Right Side Wheel Speed will be more as compared to Left Side Wheel.

5.Drive along with steer full right, Machine Should get Slower as compared to wheels are Center Aligned & Left Side Wheel Speed will be more as compared to Right Side Wheel.

System Diagram

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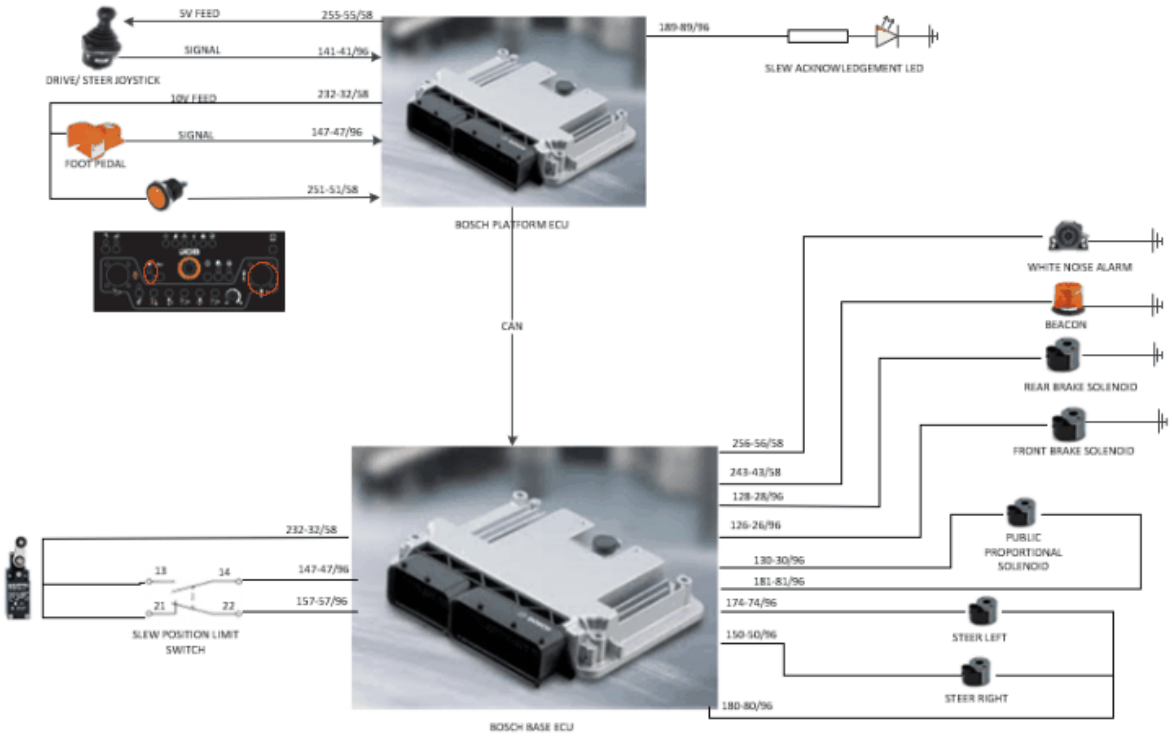

Signal

- The 5V supply is an output from the Bosch platform ecu Pin 55/58
- The 5V ground is returned to Bosch platform ecu Pin 46/96
- The signal from the joystick is 0.5 - 4.5V depending on joystick position 41/96
- Foot pedal signal is 10V when the foot pedal is pressed and open circuit when unpressed pin 47/96
- The Front and Rear brakes will be powered off when the drive command is active.
- The left solenoid is a proportional output from the base controller pin 74/96
- The right solenoid is a proportional output from the base controller pin 50/96
- The forward and reverse both share a negative return path back to the base controller Pin 80/96

Parts in Circuit

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- Joystick - Drive/Steer 297
- Platform ECU 279
- Base ECU 237
- Front Brake 489
- Main Control Valve

Related Fault Codes

Fault Code	Description
B1088-17 633	Steer solenoid high side both functions - Circuit short to high (12v)
B1089-16 635	Steer solenoid high side both functions - Circuit short to low
B1090-13 636	Steer solenoid high side and low side both functions - Circuit open
B1091-17 638	Steer solenoid both functions - Valve fault
B1146-17 715	Steer joystick - Circuit short to high (5v)
B1147-16 716	Steer joystick - Circuit open or short to low
B1344-17 877	Steer solenoid low side both functions - Circuit short to high (12v)
B1345-16 878	Steer solenoid low side both functions - Circuit short to low
B1389-13 907	Steer solenoid both functions - Circuit open
B1417-13 918	Steer solenoid both functions - Valve fault

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3.9 Slew

Slew

System Level Function 44 > Slew

Function

- The Slew function allows the turntable to rotate from the base or platform control panel.
- From the platform, the control is via an On/Off/ON switch, the foot pedal must be pressed for the function to operate from the platform
- From the base the operation is via an On/Off/ON switch, the base enable switch must be pressed to operate from the base.
- The Potentiometer position will effect the Slew speed

System Diagram

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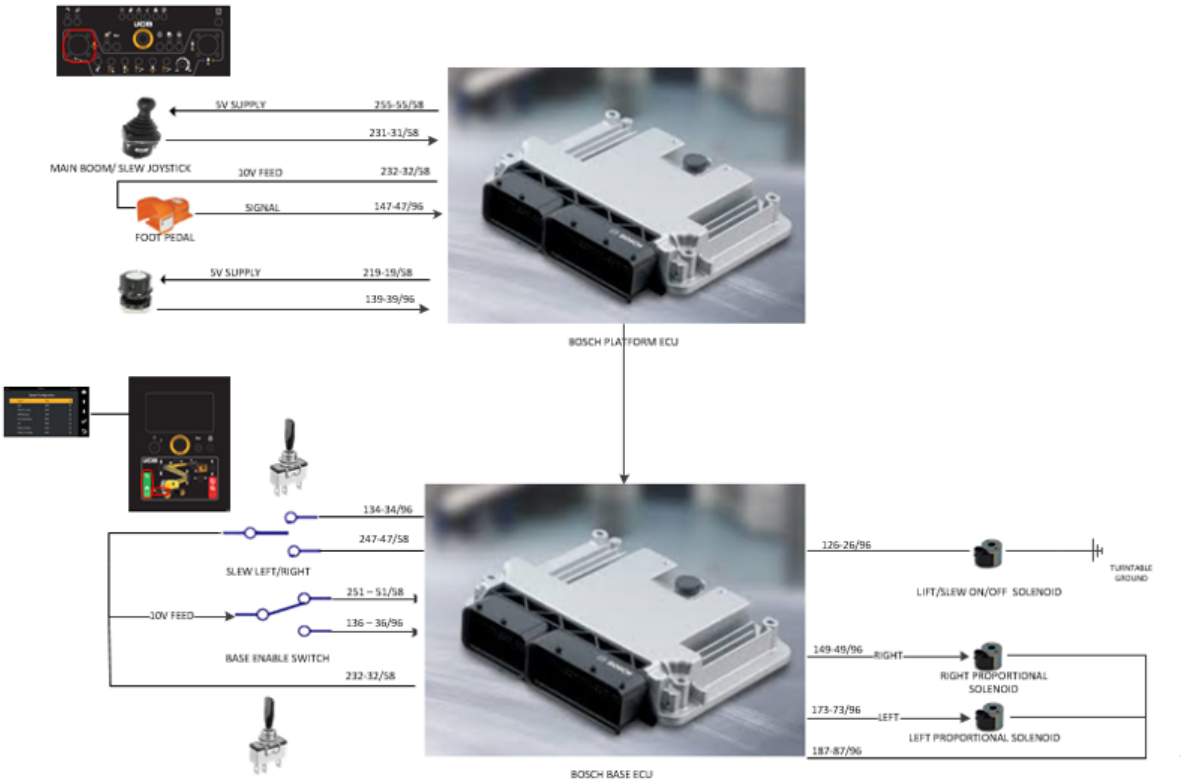

Signal

Platform control

- The platform Joystick is fed from the 5V output from the base ECU. (pin 55/58)
- The joystick is in the center position the signal will be around 2.5V
- Dependent on the direction in which the joystick is pressed the voltage will vary between 0.5V and 4.5V

Base Input

- The base input switch is a toggle switch ON-OFF-ON configuration
- The base input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The switch outputs will be open circuit when the switch is un-pressed
- For slew left the base controller will see 10V on pin 47/58
- For slew right the base controller will see 10V on pin 36/96

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Outputs from base controller

- The outputs for platform are on the main valve control valve. These are proportional solenoids.
- Platform rotate left is fed from 49/96
- Platform rotate right is fed from 73/96
- Slew left and right share the negative feed back to the ecu on Pin 87/96

Parts in Circuit

- Toggle switch ON-OFF-ON 392
- Main boom/ Slew joystick - Platform 301
- Platform ECU 279
- Base ECU 237
- Main Control Valve 202
- Platform Control Valve 183

Related Fault Codes

Fault Code	Description
B1080-17 622	Slew solenoid high side both functions - Circuit short to high (12v)
B1081-16 624	Slew solenoid high side both functions - Circuit short to low
B1082-13 625	Slew solenoid high side both functions - Circuit open
B1083-17 627	Slew solenoid both functions - Valve fault.
B1121-17 683	Slew turntable switch right function - Circuit short to high (10v)
B1122-17 685	Slew turntable switch left function - Circuit short to high (10v)
B1123-92 686	Slew turntable switch both functions - Circuit short to high (10v)
B1124-16 688	Slew turntable switch right function - Circuit short to low

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B1125-16 689	Slew turntable switch left function - Circuit short to low
B1150-17 720	Slew joystick - Circuit short to high (5v)
B1151-16 721	Slew joystick - Circuit open or short to low
B1338-17 869	Slew solenoid low side both functions - Circuit short to high (12v)
B1339-16 871	Slew solenoid low side both functions - Circuit short to low
B1340-13 872	Slew solenoid low side both functions - Circuit open

3.10 Limit Switch Position

System Level Function 44 > Limit Switch Position

System Diagram

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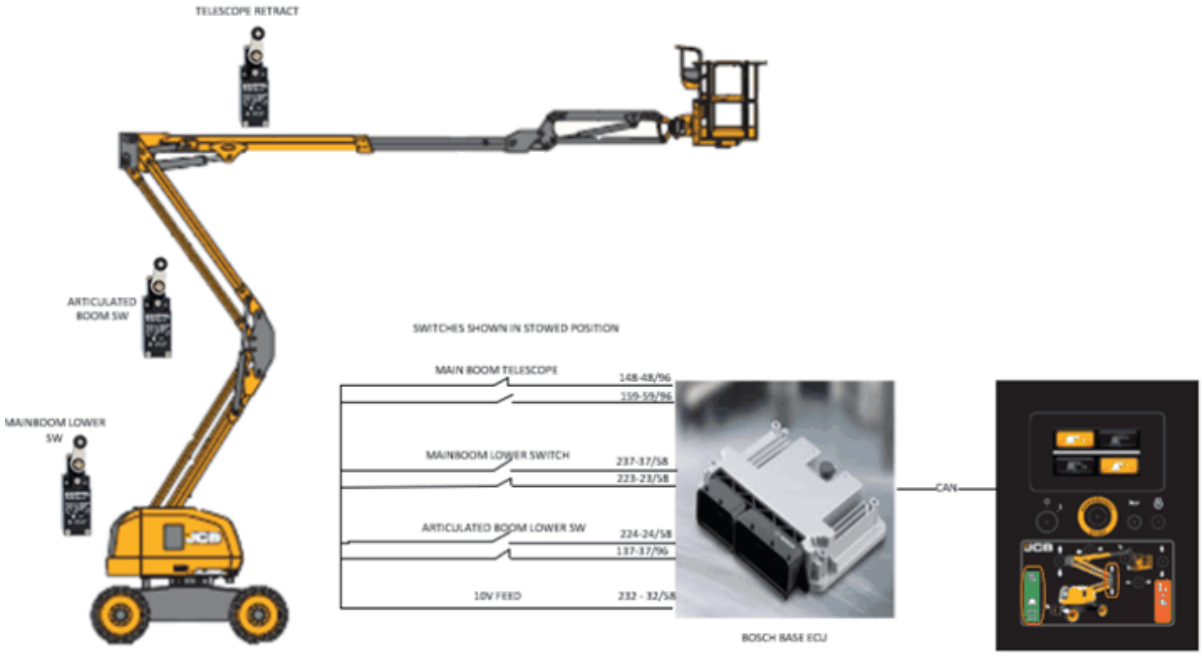

3.11 Platform Rotate

Platform Rotate

System Level Function 44 > Platform Rotate

Function

- The Platform rotate function allows the platform to rotate from the base or platform control panel.
- From the platform, the control is via an On/Off/ON switch, the foot pedal must be pressed for the function to operate from the platform
- From the base the operation is via an On/Off/ON switch, the base enable switch must be pressed to operate from the base.
- The Potentiometer position will effect the platform rotate speed

System Diagram

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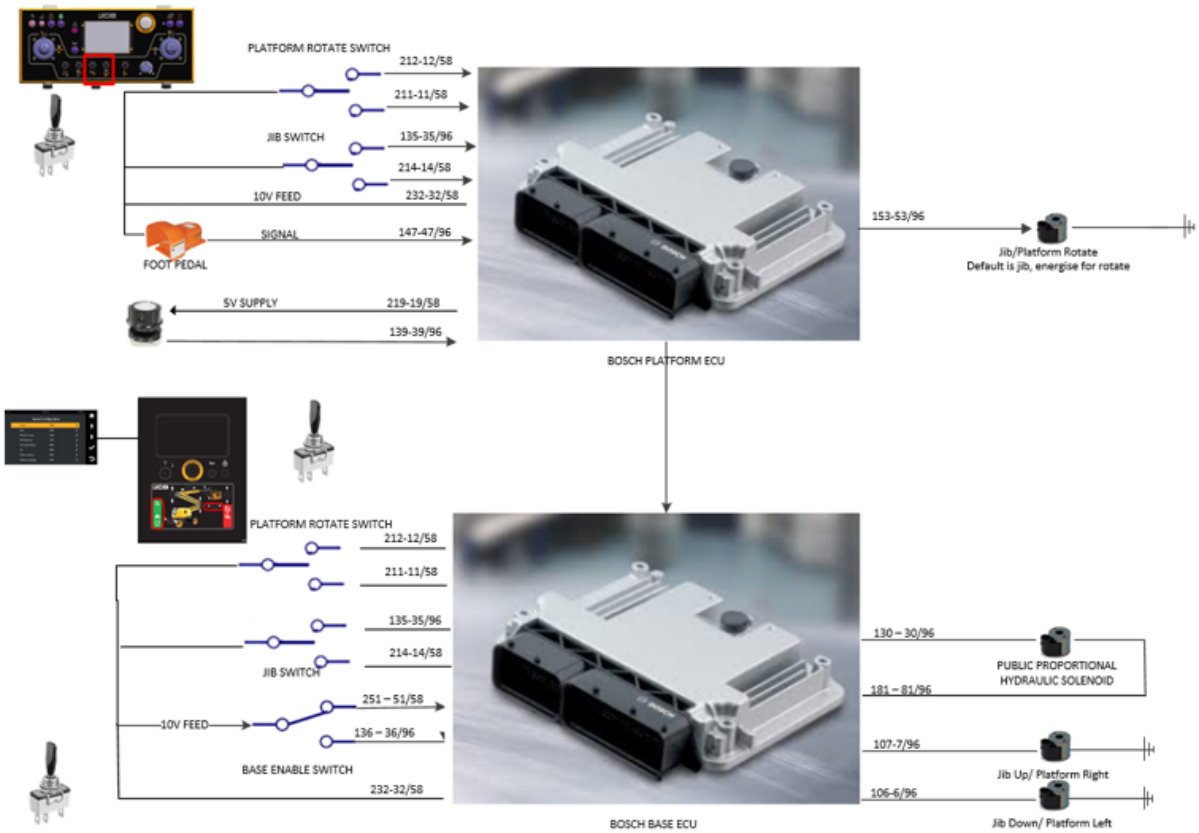

Signal

Platform control

- The platform input switch is a toggle switch ON-OFF-ON configuration
- The platform input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The switch outputs will be open circuit when the switch is un-pressed
- For Platform rotate left the base controller will see 10V on pin 12/58
- For Platform rotate right controller will see 10V on pin 11/58

Base Input

- The base input switch is a toggle switch ON-OFF-ON configuration
- The base input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The switch outputs will be open circuit when the switch is un-pressed

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- For Platform rotate left the base controller will see 10V on pin 12/58
- For Platform rotate right the base controller will see 10V on pin 14158

Outputs from base controller

- The outputs for platform are on the main valve control valve. These are proportional solenoids.
- Platform rotate left is fed from 53/96
- Platform rotate right is fed from 77/96
- Jib raise and lower share the negative feed back to the ecu on Pin 83/96

Output from the platform controller

- Platform rotate solenoid high side is 53/96
- Platform rotate solenoid low side is 83/96

Parts in Circuit

- Toggle switch ON-OFF-ON 427
- Platform ECU 279
- Base ECU 237
- Main Control Valve 202
- Platform Control Valve 183

Related Fault Codes

Fault Code	Description
B1106-17 660	Platform rotate turntable switch right function - Circuit short to high (10v)
B1107-17 662	Platform rotate turntable switch left function - Circuit short to high (10v)
B1108-92 663	Platform rotate turntable switch both functions - Signal plausibility failure (10v)
B1109-16 665	Platform rotate turntable switch right function - Circuit short to low

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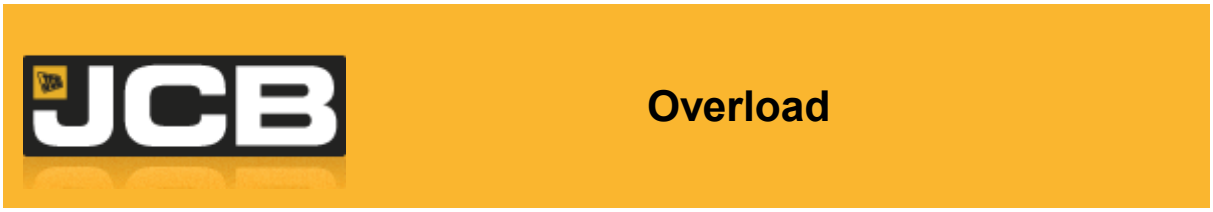
B1110-16 666	Platform rotate turntable switch left function - Circuit short to low
B1167-13 723	Platform rotate solenoid left function - Circuit open or short to high (12v)
B1168-16 724	Platform rotate solenoid left function - Circuit short to low
B1169-13 725	Platform rotate solenoid right function - Circuit open or short to high (12v)
B1170-16 727	Platform rotate solenoid right function - Circuit short to low
B1257-17 799	Platform rotate platform switch right function - Circuit short to high (10v)
B1258-17 800	Platform rotate platform switch left function - Circuit short to high (10v)
B1259-92 801	Platform rotate platform switch both functions - Signal plausibility failure (10v)
B1260-16 802	Platform rotate platform switch right function - Circuit short to low
B1261-16 803	Platform rotate platform switch left function - Circuit short to low

3.12 Overload



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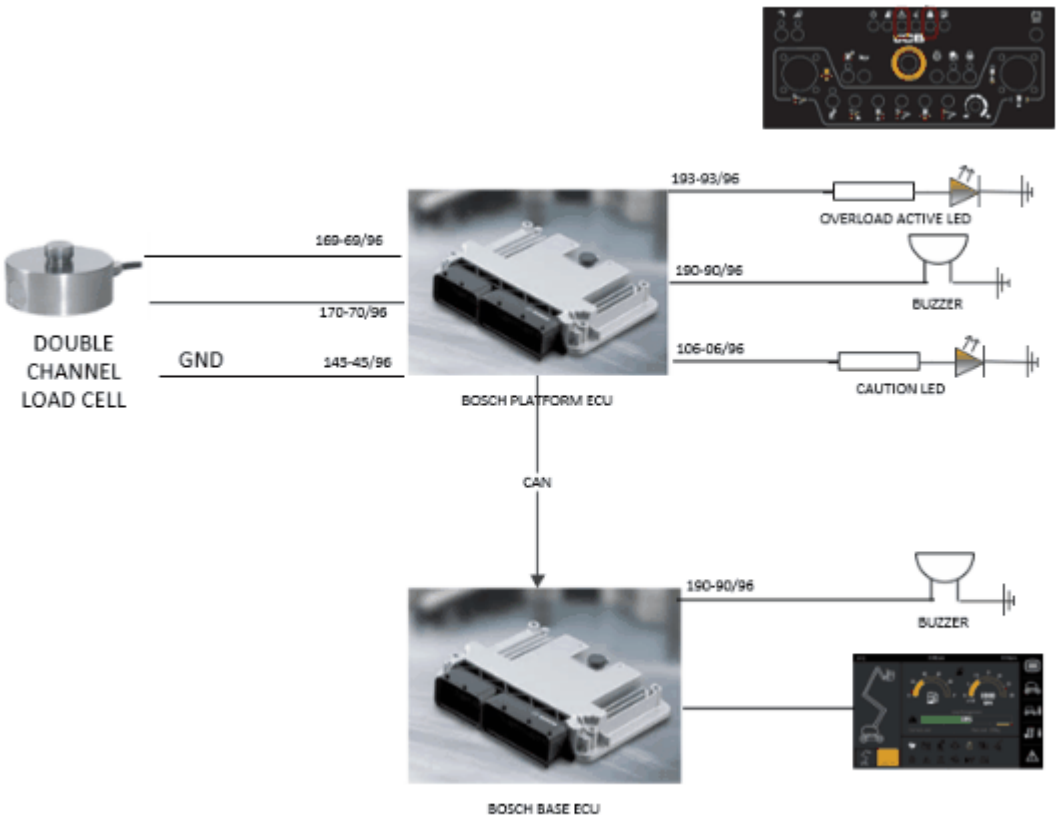
System Level Function 44 > Overload

Function

- The overload system is to stop an operator from overloading the platform and creating an unsafe movement.
- On the A60E/EH machine there is 2 weight zones. This allows different maximum weights in each area.
- The load cell is located at the top of the boom where the platform is connected.
- The platform presses down onto the cell which has 2 channels and is fed into the platform ecu.
- The base ECU will report to the displays the correct weight % is in the platform according to the applicable zone the booms are in.
- The 2 zones are rated as 454Kg and 300KG as shown on the diagram below.

System Diagram



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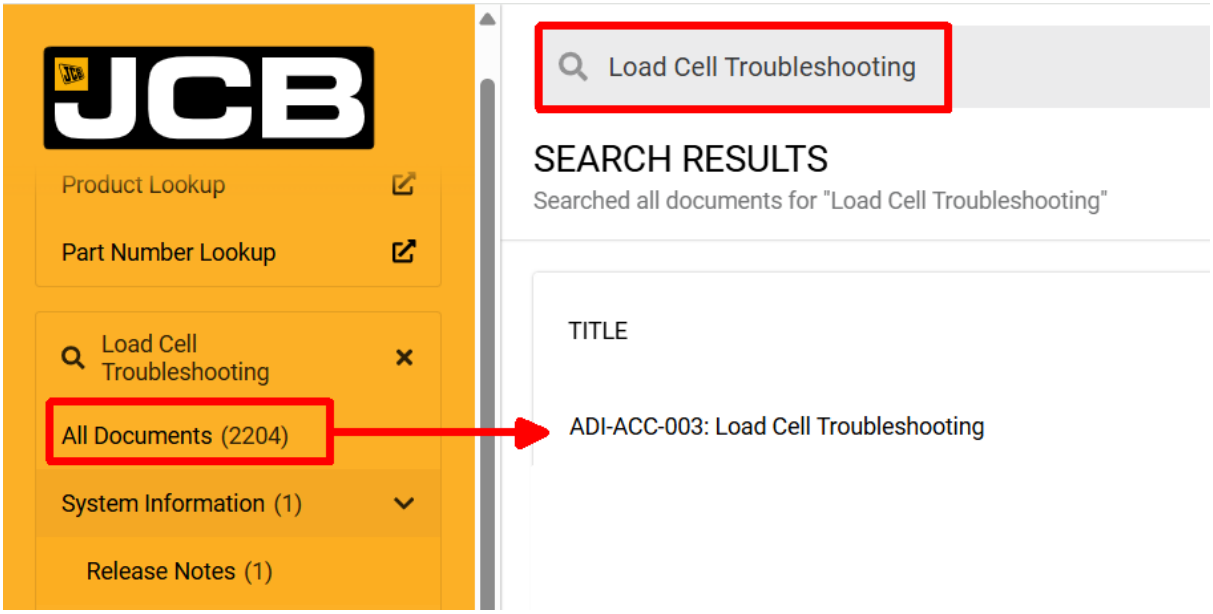
Load Cell Troubleshooting Flow Chart 47

Please refer ADI - ADI-ACC-003 - Load Cell Troubleshooting



Signal

- The load cell is dual channel and has 2 output feeds.
- Feed 1 is 4-20mA
- Feed 2 is 20-4mA
- So these are X channel
- Each feed is split over 2 ecu pins.
- Feed 1 goes to pins 68/96 & 69/96
- Feed 2 goes to pins 70/96 & 71/96
- This is fed into the base ecu over CAN1. CAN H is 15/58 CAN L is 16/58

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Calibration

Load cell Calibration

1.There is 2 different methods for calibrating the load cell.

- Calibration through the display 1145
- Calibration through service master 1143
- Known Load Calibration 1146

Parts in Circuit

- Load cell 188
- Platform ECU 279
- Base ECU 237

Related Fault Codes

Fault Code	Description
B1221-17 759	Overload sensor 1 - Out of range (High)
B1222-16 761	Overload sensor 1 - Circuit open or out of range (Low)
B1223-17 763	Overload sensor 2 - Out of range (High)
B1224-16 765	Overload sensor 2 - Circuit open or out of range (Low)
B1225-2F 767	Overload sensor - Signal erratic
B1365-17 894	Overload Sensor 1 - Out of range (High)
B1366-16 896	Overload sensor 1 - Circuit open or out of range (Low)
B1367-17 898	Overload sensor 2 - Out of range (High)
B1368-16 900	Overload sensor 2 - Circuit open or out of range (Low)
B1675-17 1035	Overload sensor 1 - Circuit open or out of range (High)
B1676-16 1037	Overload sensor 1 - Out of range (Low)

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B1677-17 1039	Overload sensor 2 - Circuit open or out of range (High)
B1678-16 1041	Overload sensor 2 - Out of range (Low)

3.13 Main Boom

System Level Function 44 > Main Boom

Function

- The Main Boom Function allows the main boom to be operated from the base or platform control panel.
- The foot pedal must be pressed for the function to operate from the platform
- The base enable switch must be pressed to operate from the base.
- The Potentiometer position will effect the boom speed.
- During downwards boom movement the White Noise Alarm and the Beacon(s) will be active

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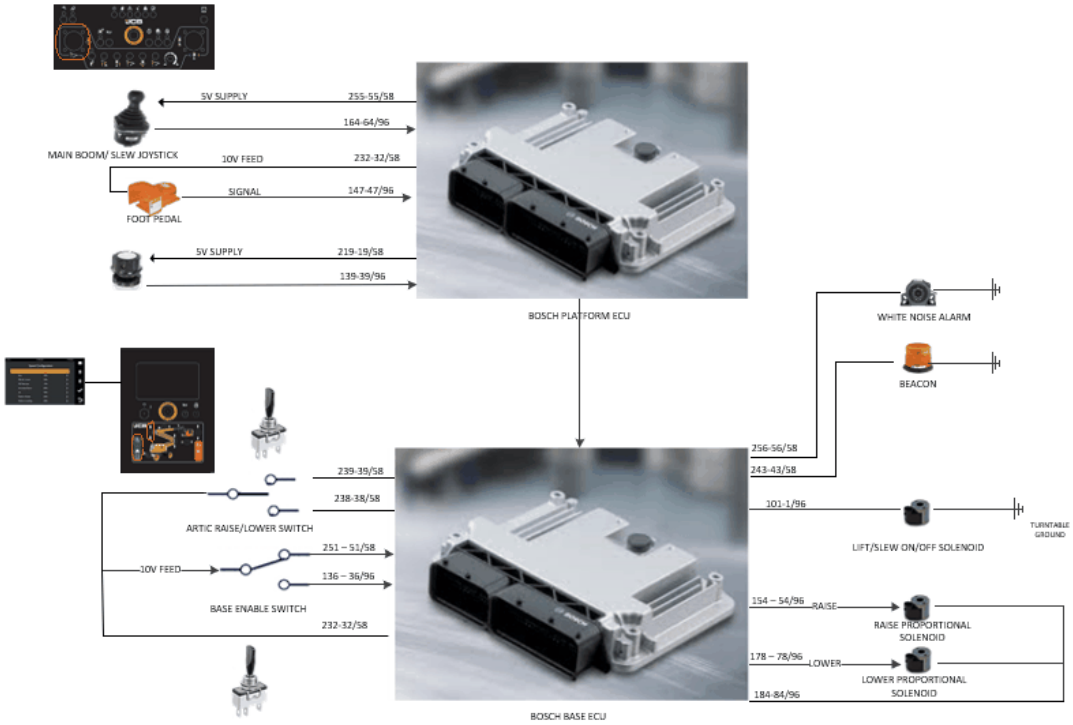
System Diagram



Main Boom Cushioning

Function

1) When main boom is lowered and reaches the main boom limit switch position (main boom limit switch pressed) then main boom should be ramped down in speed to the minimum cushioning current parameter (this will be hard coded).

2) If the main boom is already in the limit switch pressed condition and main boom down switch is pressed, the minimum cushioning current parameter should be used. E.g, do not ramp up to maximum to then ramp down.

Signal

Platform control

- The 5V supply is an output from the Base platform ecu Pin 55/58
- The 5V ground is returned to Base platform ecu Pin 46/96
- The signal from the joystick is 0.5 - 4.5V depending on joystick position 64/96

Base Input

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- The base input switch is a toggle switch ON-OFF-ON configuration
- The base input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The switch outputs will be open circuit when the switch is un-pressed
- For main boom raise the base controller will see 10V on pin 39/58
- For main boom lower the base controller will see 10V on pin 38/58

Outputs

- The outputs for Main boom are on the main valve control valve. These are proportional solenoids.
- Main boom raise is fed from 54/96
- Main boom lower is fed from 78/96
- Main boom raise and lower share the negative feed back to the ecu on Pin 84/96

Parts in Circuit

- Toggle Switch ON-OFF-ON 413
- Joystick Main Boom/Slew 301
- Base ECU 237
- Platform ECU 279
- Main Control Valve 202

Related Fault Codes

Fault Code	Description
B1076-17 616	Main boom solenoid high side both functions - Circuit short to high (12v)
B1077-16 618	Main boom solenoid high side both functions - Circuit short to low
B1078-13 619	Main boom solenoid high side both functions - Circuit open
B1079-17 621	Main boom solenoid both functions - Valve fault
B1116-17 675	Main boom turntable switch raise function - Circuit short to high (10v)
B1117-17 677	Main boom turntable switch lower function - Circuit short to high (10v)

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B1118-92 678	Main boom turntable switch both functions - Signal plausibility failure (10v)
B1119-16 680	Main boom turntable switch raise function - Circuit short to low
B1120-16 681	Main boom turntable switch lower function - Circuit short to low
B1148-17 718	Main boom joystick - Circuit short to high (5v)
B1149-16 719	Main boom joystick - Circuit open or short to low
B1335-17 865	Main boom solenoid low side both functions - Circuit short to high (12v)
B1336-16 866	Main boom solenoid low side both functions - Circuit short to low
B1337-13 868	Main boom solenoid low side both functions - Circuit open

3.14 Leveling

System Level Function 44 > Leveling

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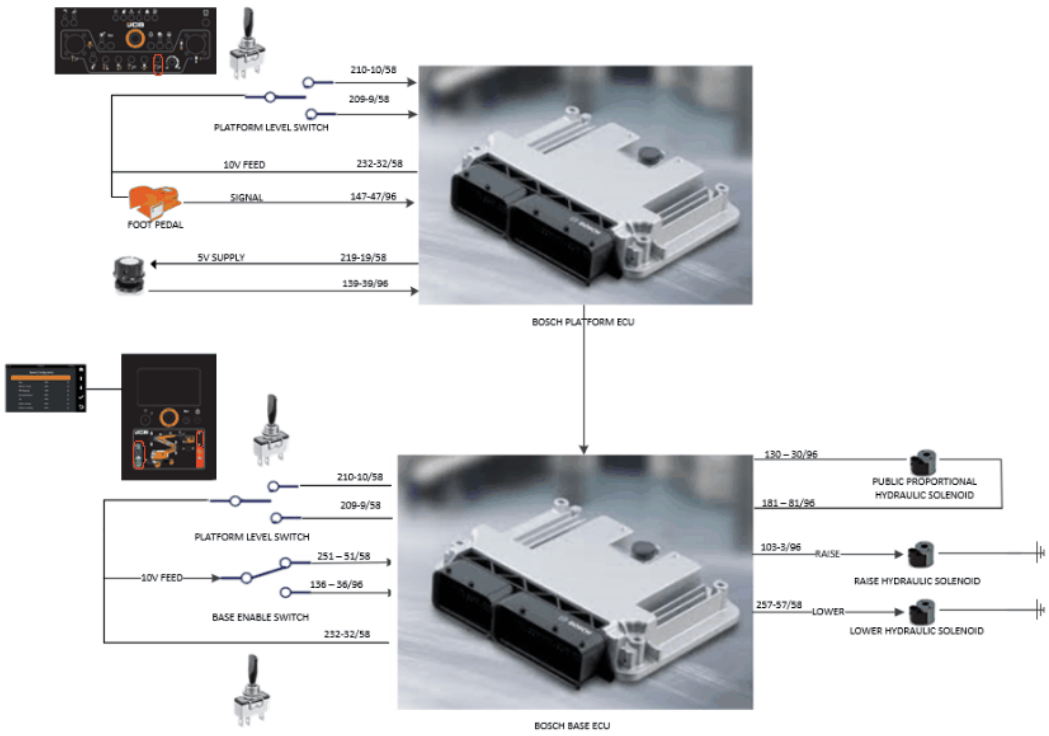
Function

- The level function allows the platform to be manually leveled up or down from the base or platform control station.
- From the platform, the control is via an On/Off/ON switch, the foot pedal must be pressed for the function to operate from the platform
- From the base the operation is via an On/Off/ON switch, the base enable switch must be pressed to operate from the base.
- The Potentiometer position will effect the level speed

System Diagram



Signal

Platform control

- The platform input switch is a toggle switch ON-OFF-ON configuration
- The platform input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The switch outputs will be open circuit when the switch is un-pressed

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- For level Raise the base controller will see 10V on pin 10/58
- For level Lower the base controller will see 10V on pin 9/58

Base Input

- The base input switch is a toggle switch ON-OFF-ON configuration
- The base input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The switch outputs will be open circuit when the switch is un-pressed
- For level raise the base controller will see 10V on pin 10/96
- For level lower the base controller will see 10V on pin 9/58

Outputs from base controller

- The outputs for Main boom are on the main valve control valve. These are proportional solenoids.
- Level raise is fed from 25/96
- Level lower is fed from 29/96
- Level raise and lower share the negative feed back to the ecu on Pin 79/96

Parts in Circuit

- Toggle switch ON-OFF-ON 430
- Platform ECU 279
- Base ECU 237
- Main Control Valve 202

Related Fault Codes

Fault Code	Description
B1071-17 609	Platform level turntable switch raise function - Circuit short to high (10v)
B1072-17 610	Platform level turntable switch lower function - Circuit short to high (10v)

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B1073-92 612	Platform level turntable switch both functions - Signal plausibility failure (10v)
B1074-16 613	Platform level turntable switch raise function - Circuit short to low
B1075-16 615	Platform level turntable switch lower function - Circuit short to low
B1242-17 781	Platform level platform switch raise function - Circuit short to high (10v)
B1243-17 783	Platform level platform switch lower function - Circuit short to high (10v)
B1244-92 784	Platform level platform switch both functions - Signal plausibility failure (10v)
B1245-16 785	Platform level platform switch raise function - Circuit short to low
B1246-16 786	Platform level platform switch lower function - Circuit short to low
B1393-17 909	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL High Side Short Circuit to high
B1394-16 909	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL High Side Short Circuit to low
B1395-13 910	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL High Side Open Circuit
B1396-17 911	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL Low Side Short Circuit to high
B1397-16 912	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL Low Side Short Circuit to low
B1398-13 912	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL Low Side Open Circuit
B1418-13 920	PLATFORM LEVEL RAISE\LOWER Solenoid Both Function - Valve Failure

3.15 Jib

System Level Function 44 > Jib

Function

- The Jib function allows the Jib to raise and lower from the base or platform control panel.
- From the platform, the control is via an On/Off/ON switch, the foot pedal must be pressed for the function to operate from the platform

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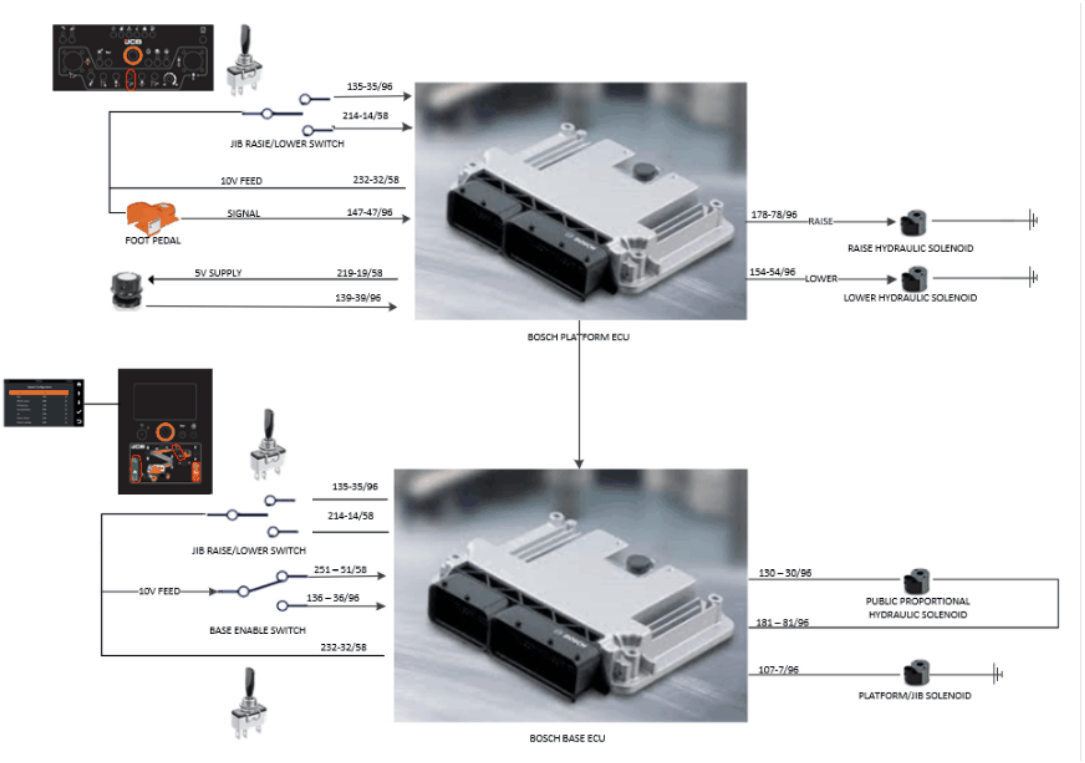
- From the base the operation is via an On/Off/ON switch, the base enable switch must be pressed to operate from the base.
- The Potentiometer position will effect the Jib speed

System Diagram



Signal

Platform control

- The platform input switch is a toggle switch ON-OFF-ON configuration
- The platform input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The switch outputs will be open circuit when the switch is un-pressed
- For Jib Raise the base controller will see 10V on pin 35/96
- For Jib Lower the base controller will see 10V on pin 14/58

Base Input

- The base input switch is a toggle switch ON-OFF-ON configuration

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- The base input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The switch outputs will be open circuit when the switch is un-pressed
- For Jib raise the base controller will see 10V on pin 35/96
- For Jib lower the base controller will see 10V on pin 14/58

Outputs from base controller

- The outputs for Jib are on the main valve control valve. These are proportional solenoids.
- Jib raise is fed from 53/96
- Jib lower is fed from 77/96
- Jib raise and lower share the negative feed back to the ecu on Pin 83/96

Parts in Circuit

- Toggle Switch ON-OFF-ON 420
- Platform ECU 279
- Base ECU 237
- Main Control Valve 202

Related Fault Codes

Fault Code	Description
B1111-17 668	Jib boom turntable switch raise function - Circuit short to high (10v)
B1112-17 669	Jib boom turntable switch lower function - Circuit short to high (10v)
B1113-92 671	Jib boom turntable switch both functions - Signal plausibility failure (10v)
B1114-16 672	Jib boom turntable switch raise function - Circuit short to low
B1115-16 674	Jib boom turntable switch lower function - Circuit short to low
B1171-13 728	Jib boom solenoid raise function - Circuit open or short to high (12v)
B1172-16 729	Jib boom solenoid raise function - Circuit short to low

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B1173-13 731	Jib boom solenoid lower function - Circuit open or short to high (12v)
B1174-16 732	Jib boom solenoid lower function - Circuit open or short to low
B1262-17 804	Jib boom platform switch raise function - Circuit short to high (10v)
B1263-17 805	Jib boom platform switch lower function - Circuit short to high (10v)
B1264-92 807	Jib boom platform switch both functions - Signal plausibility failure (10v)
B1265-16 808	Jib boom platform switch raise function - Circuit short to low
B1266-16 809	Jib boom platform switch lower function - Circuit short to low

3.16 Tilt

Tilt

System Level Function 44 > Tilt

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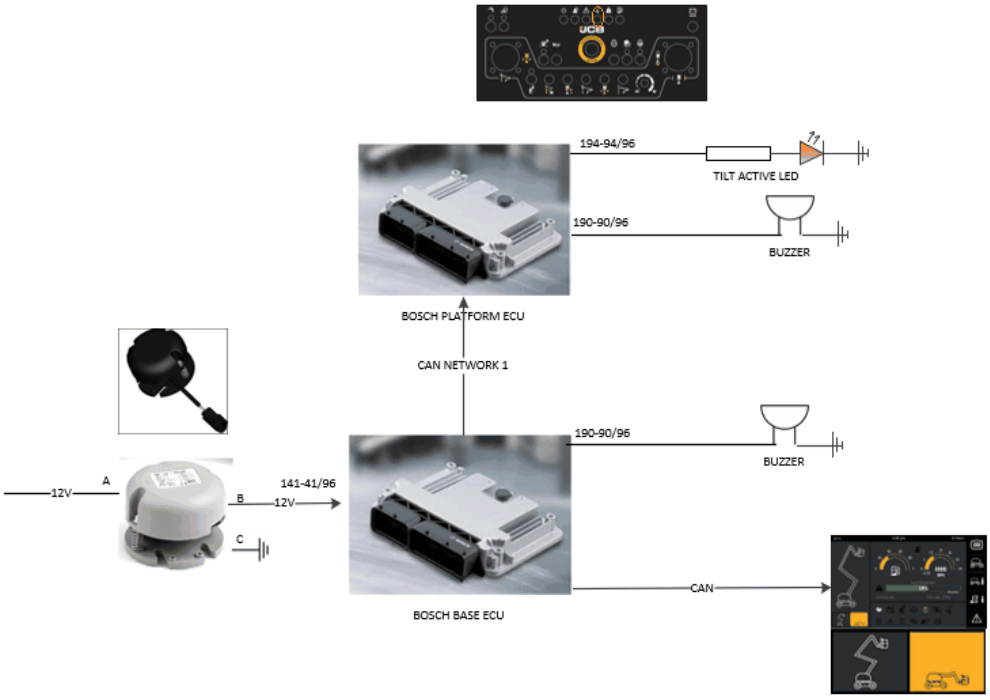
Function

- The tilt sensor is for monitoring of the inclination of the turntable to ensure the machine stability is maintained.
- The tilt sensor will be calibrated at the Zero position and will allow 5 degrees in the X and Y position.
- All functions will operate when the machine is in the stowed condition and just give the operator a warning that the machine is over 5 degrees of tilt.
- In the raised condition the drive and boom up and slew functions will be blocked.

System Diagram



Signal

- The ECU will receive x2 CAN inputs from the sensor in channel 1 and channel 2.

Parts in Circuit

- Tilt Sensor 194

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Related Fault Codes

Fault Code	Fault Description
B1017-17 559	TILT Sensor SC to High (not possible to detect until sensor connected to 10V)
B1018-16 561	Tilt Sensor short circuit to low

3.17 Telescope

System Level Function 44 > Telescope

Function

- The Telescope function allows the main boom to extend and retract from the base or platform control panel.

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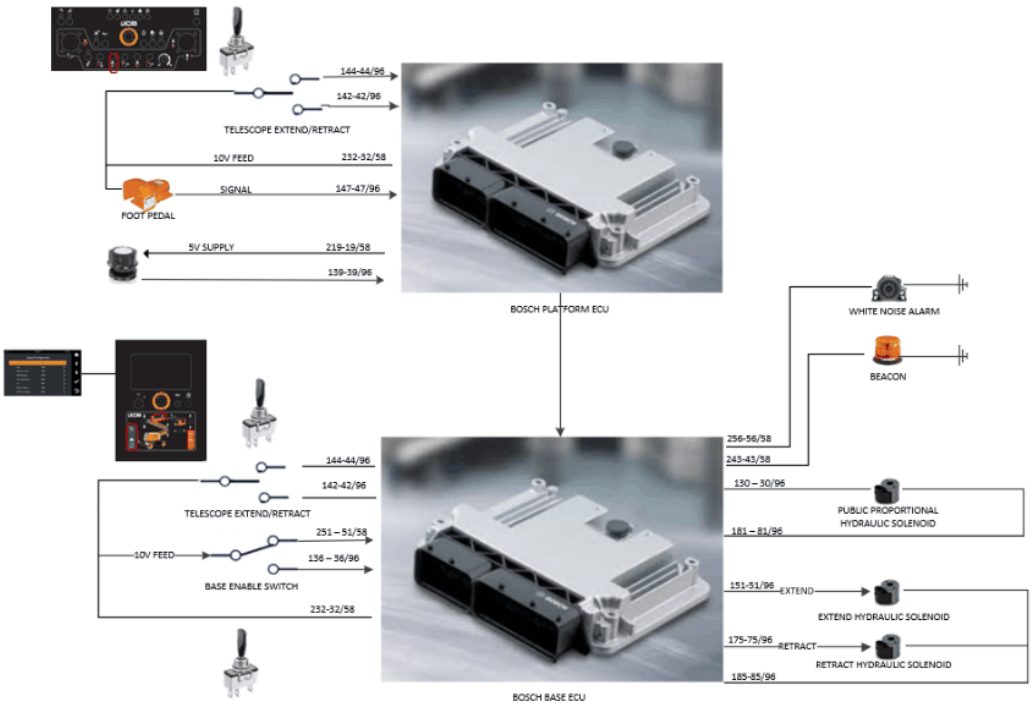
- From the platform, the control is via an On/Off/ON switch, the foot pedal must be pressed for the function to operate from the platform
- From the base the operation is via an On/Off/ON switch, the base enable switch must be pressed to operate from the base.
- The base enable switch must be pressed to operate from the base.
- The Potentiometer position will effect the boom speed
- During retract boom movement the White Noise Alarm and the Beacon(s) will be active

System Diagram



Signal

Platform control

- The platform input switch is a toggle switch ON-OFF-ON configuration
- The platform input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The switch outputs will be open circuit when the switch is un-pressed
- For telescopic extend the base controller will see 10V on pin 44/96

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- For telescopic retract the base controller will see 10V on pin 42/96

Base Input

- The base input switch is a toggle switch ON-OFF-ON configuration
- The base input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The switch outputs will be open circuit when the switch is un-pressed
- For telescope extend the base controller will see 10V on pin 44/96
- For telescope retract the base controller will see 10V on pin 42/96

Outputs

- The outputs for Main boom are on the main control valve. These are proportional solenoids.
- Telescope extend is fed from 51/96
- Telescope retract is fed from 75/96
- Telescope extend and retract share the negative feed back to the ecu on Pin 85/96

Parts in Circuit

- Toggle Switch ON-OFF-ON 423
- Platform ECU 279
- Base ECU 237
- Main Control Valve 202

Related Fault Codes

Fault Code	Fault Description
B1084-17 628	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve High Side Short Circuit to High OR Short Circuit
B1086-13 630	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve High Side & Low Side Open Circuit
B1087-17 632	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve Fault
B1138-17 705	Main boom telescopic retract limit switch 1 short circuit to high

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B1139-17 706	Main boom telescopic retract limit switch 2 short circuit to high
B1140-16 707	Main boom telescopic retract limit switch 1 short circuit to low
B1141-13 708	Main boom telescopic retract limit switch 1 and 2 are both open circuit
B1142-16 710	Main boom telescopic retract limit switch 2 short circuit to Low
B1143-92 711	Main boom telescopic retract limit switch 1 and 2 Short to 10V

3.18 Articulate

System Level Function 44 > Articulate

Function

- The Articulated Boom Function allows the main boom to be operated from the base or platform control panel.

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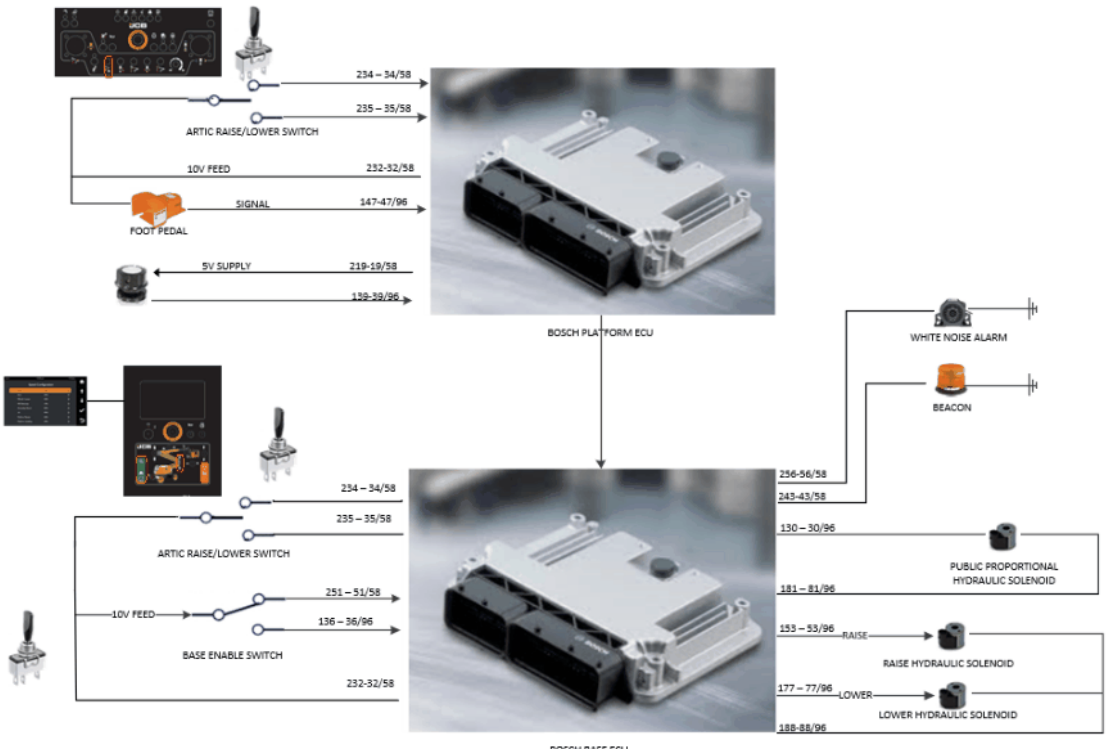
- The foot pedal must be pressed for the function to operate from the platform
- The base enable switch must be pressed to operate from the base.
- The Potentiometer position will effect the boom speed
- During retract boom movement the White Noise Alarm and the Beacon(s) will be active

System Diagram



Signal

Platform control

- The platform input switch is a toggle switch ON-OFF-ON configuration
- The platform input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The switch outputs will be open circuit when the switch is un-pressed
- For arctic boom raise the platform controller will see 10V on pin 34/58
- For arctic boom lower the platform controller will see 10V on pin 35/58

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Base Input

- The base input switch is a toggle switch ON-OFF-ON configuration
- The base input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The switch outputs will be open circuit when the switch is un-pressed
- For arctic boom raise the base controller will see 10V on pin 34/58
- For arctic boom lower the base controller will see 10V on pin 35/58

Outputs

- The outputs for Arctic boom are on the main control valve. These are proportional solenoids.
- Arctic boom raise is fed from 26/96
- Arctic boom lower is fed from 1/96
- Arctic boom raise and lower share the negative feedback to Base ECU on pin 81/96

Parts in Circuit

- Toggle Switch ON-OFF-ON 308
- Platform ECU 279
- Base ECU 237
- Main Control Valve 202

Related Fault Codes

Fault Code	Fault Description
B1011-17 551	Artic Boom Lower Limit Switch 1 Short Circuit to High
B1012-17 552	Artic Boom Lower Limit Switch 2 Short Circuit to High
B1013-16 553	Artic Boom Lower Limit Switch 1 Short
B1014-13 555	Artic Boom Lower Limit Switch 1 AND Switch 2 Open Circuit
B1015-16 556	Artic Boom Lower Limit Switch 2 Short Circuit to Low

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B1016-92 557	Artic Boom Lower Limit Switch 1 AND Switch 2 short to 10V
B1092-17 639	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve High Side Short Circuit to High
B1093-16 641	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve High Side Short Circuit to Low
B1094-13 642	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve High Side & Low Side Open Circuit
B1095-92 644	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve Fault
B1096-17 645	ARTICULATED BOOM RAISE Switch Short Circuit to High
B1097-17 647	ARTICULATED BOOM LOWER Switch Short Circuit to High
B1098-92 648	ARTICULATED BOOM RAISE & LOWER Switches both activated (5 - 10V)
B1099-16 650	ARTICULATED BOOM RAISE Switch Short Circuit to Low
B1100-16 651	ARTICULATED BOOM LOWER Switch Short Circuit to Low
B1247-17 787	ARTICULATED BOOM RAISE Switch Short Circuit to High
B1248-17 788	ARTICULATED BOOM LOWER Switch Short Circuit to High
B1249-92 790	ARTICULATED BOOM RAISE & LOWER Switches both activated (5 - 10V)
B1250-16 791	ARTICULATED BOOM RAISE Switch Short Circuit to Low
B1251-16 792	ARTICULATED BOOM LOWER Switch Short Circuit to Low
B1350-17 884	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve Low Side Short Circuit to High
B1351-16 885	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve Low Side Short Circuit to Low

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3.19 Oscillating Axle

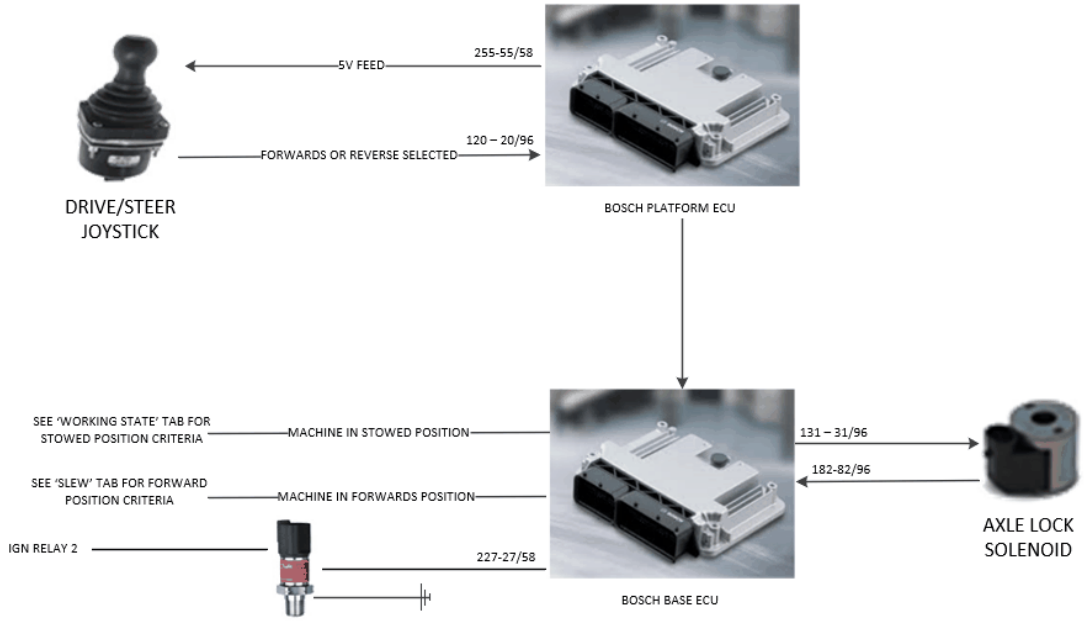
Oscillating Axle

System Level Function 44 > Oscillating Axle

Function

- The Oscillating axle is a function that the allows the front axle to float to allow a better drive control on rough terrain.
- The function is controlled via the software which allows the axle to float in the stowed drive conditions.
- The axle will remained locked in all other conditions.

System Diagram



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Signal

Platform control

- The drive joystick must be in a drive condition for the unlock to happen
- Base Input
- The pressure sensor is 0.5-5V signal that varies by the pressure and is fed into the base ECU in pin 27/58
- The position control position is also read to understand the stowed or raised position of the machine.
- Outputs from base controller
- The Oscillating Axle solenoid is on the Chassis control valve
- The high side out is from pin 31/96 and return path to pin 82/96
- The solenoid is activated to float the axle, stowed condition and driving.

Parts in Circuit

- Pressure Sensor 179
- Chassis Control Valve 202
- Platform ECU 279
- Base ECU 237
- Oscillating Axle Solenoid 434

Related Fault Codes

Fault Code	Fault Description
B1043-17 584	Oscillating axle solenoid high side - Circuit short to high (12v)
B1044-16 585	Oscillating axle solenoid high side - Circuit short to low
B1045-13 586	Oscillating axle solenoid high - Circuit open

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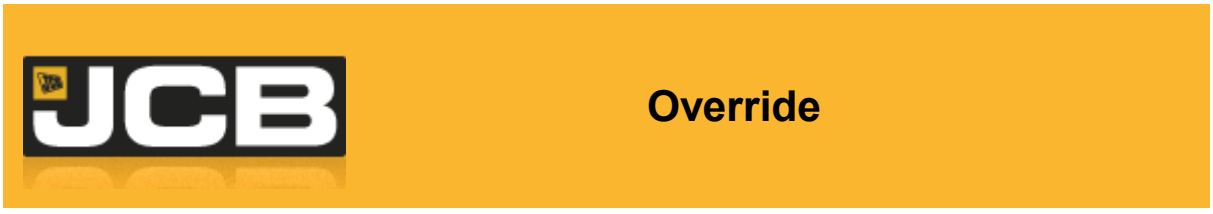
B1227-17 769	Oscillating axle lock pressure sensor - Circuit short to high (12v)
B1228-16 770	Oscillating axle lock pressure sensor - Circuit open or short to low
B1236-2F 775	Oscillating axle lock pressure sensor - Failure
B1238-2F 777	Oscillating axle lock pressure sensor - Output is less than 1v when it should be greater than 1v
B1272-2F 815	Oscillating axle lock pressure sensor - Output is greater than 1v when it should be less than 1v
B1347-17 880	Oscillating axle solenoid low side - Circuit short to high (12v)
B1348-16 881	Oscillating axle solenoid low side - Circuit short to low
B1349-13 882	Oscillating axle solenoid - Valve fault

3.20 Override



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System Level Function 44 > Override

Machine Override system - Base Control

- The machine override safety system will allow operator to rescue in case of any fault activated during working from platform (i.e. platform overload, Crush protection fault, Platform start lock fault etc).
- If this emergency feature is used by operator a fault tell-tale will be displayed at base display which will be reset by JCB service Engineer.

Steps to activate Override system-

- From Base control Panel, make the IGN switch off then press the override toggle switch.
- With holding override toggle switch in pressed condition, make ignition switch ON.
- Override window will appear at base display.
- Perform the desired boom operations from base control Panel (Boom/jib lowering, retraction operations etc.) to rescue the operator.

Machine Override system - Platform Control

The override function from the platform control station is very similar to the AUX function.

The difference is:

- Functions will only operate one at a time,
- Faults with the weight sensor will be ignored
- Overload Warning will be ignored
- Pop up on display screen

System Diagram

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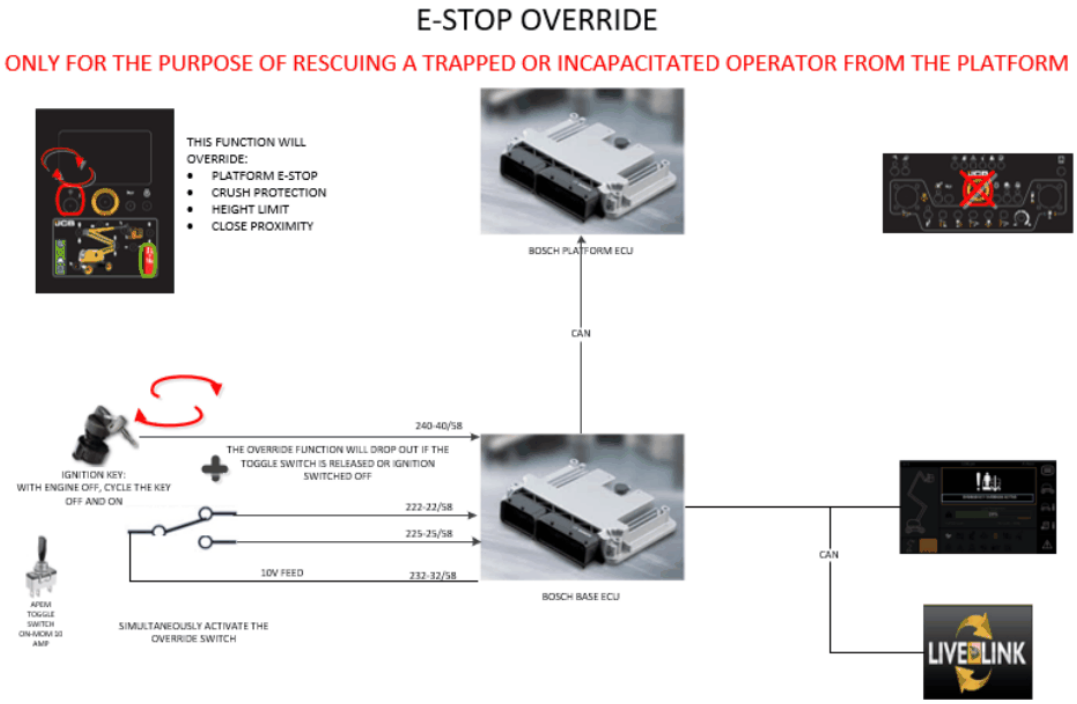

3.21 Drive

Drive

System Level Function 44 > Drive

Function

- The drive function allows the machine to travel forwards and backwards.
- The speed of the drive operation will be reduced when the machine is in the raised condition.
- The stowed or raised condition will be considered in Position Control
- The drive can also be effected by the Slew Acknowledgment depending on the slew position of the machine.
- The Potentiometer position will effect the drive speed.
- To Operate drive, the foot pedal pressed with the direction command via Joystick on Platform control panel.

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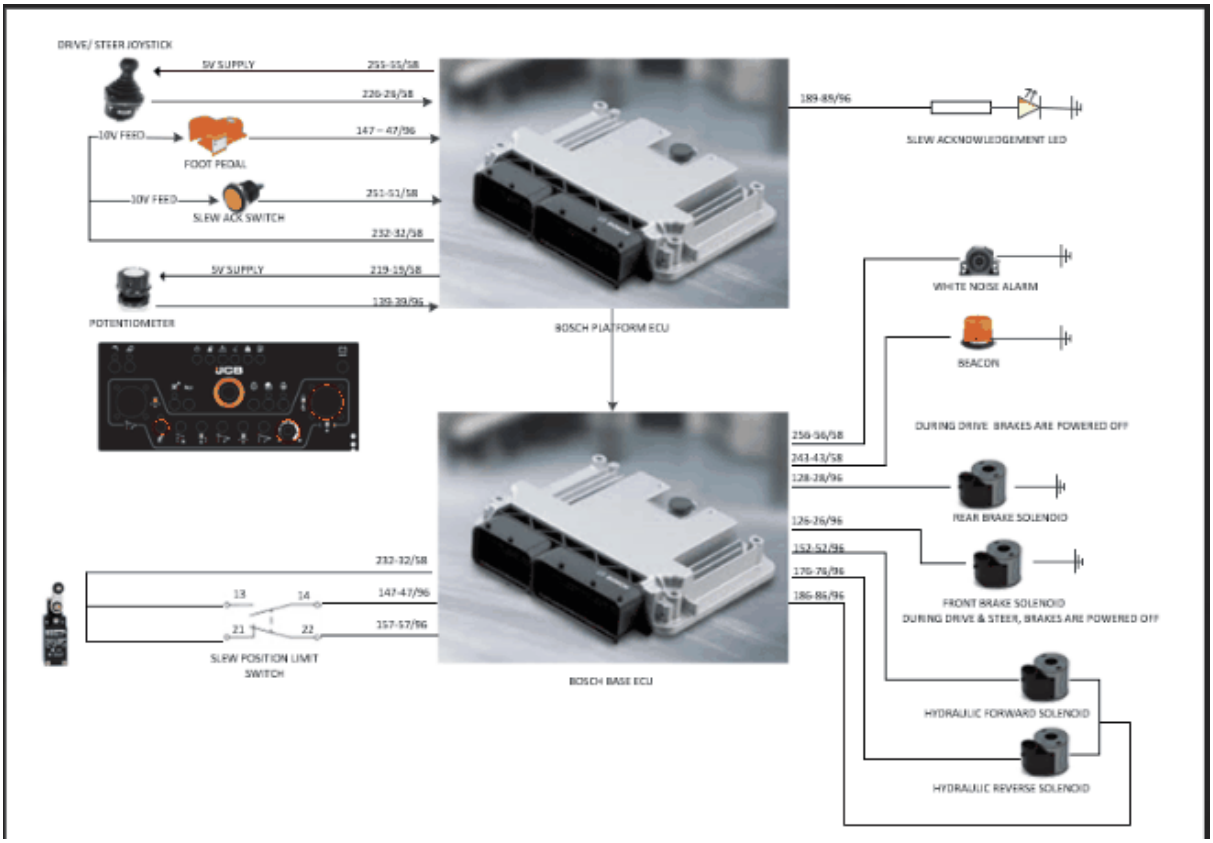
- There is no Drive available with AUX pump
- The brakes on the machine will be released when a drive command is active.
- During travel the White Noise Alarm and the Beacon(s) will be active.

System Diagram



Signal

- The 5V supply is an output from the Bosch platform ecu Pin 55/58
- The 5V ground is returned to Bosch platform ecu Pin 46/96
- The signal from the joystick is 0.5 - 4.5V depending on joystick position 26/58
- Foot pedal signal is 10V when the foot pedal is pressed and open circuit when unpressed
- The Front and Rear brakes will be powered off when the drive command is active. These are a 12V output from the base controller (Front brakes pin 28/96, Rear brakes 26/96)
- The forward solenoid is a proportional output from the base controller pin 52/96

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- The reverse solenoid is a proportional output from the base controller pin 76/96
- The forward and reverse both share a negative return path back to the base controller Pin 86/96

Parts in Circuit

Joystick - Drive/Steer 297

Base ECU 237

Platform ECU 279

Front Brake 494

Rear Brake 489

Related Fault Codes

Fault Code	Fault Description
B1069-17 606	Drive joystick - Circuit short to high (5v)
B1070-16 607	Drive joystick - Circuit open or short to low

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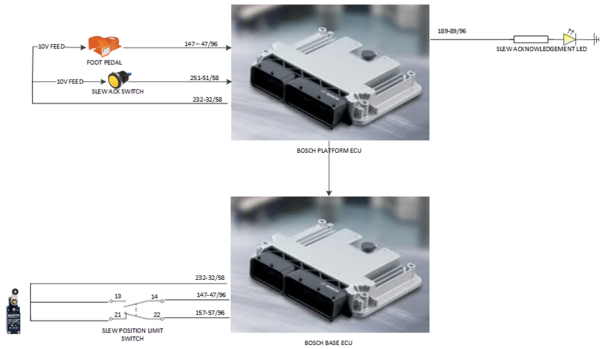
3.22 Slew Acknowledgement

Function

- The slew Acknowledgment function is implemented to block the drive function when the machine is slewed around. This is so the operator has to acknowledge the fact the controls may move the opposite direction than expected to to the slew turntable to the chassis of the machine
- The machine can either be slewed back to the front location and the driving will be allowed as normal. Outside of the forward condition the drive will be blocked and the slew acknowledgment led will flash. The foot pedal and the slew acknowledgment button will be need to be pressed to accept the function, this will make the LED light solid and enable the drive function. When the foot pedal is released the function will reset and will need to be accepted if outside of the forward position.
- There is a slew switch which determines the position of the boom. The switch is pressed when the boom is in the forward position and unpressed when the machine is slewed around.

System diagram



The forward position is classed as 25 degrees either side of the center position. Anything outside of this range will need the slew acknowledgment to be accepted with a button press to enable drive.

Signal

Platform Input

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- The platform input switch is fed from the 10V output from the base ECU. (pin 32/58)
- The Slew Acknowledgment switch is a push button
- This is open circuit when not pressed
- When the switch is pressed this is 10V

Base Input

- This is a dual pole limit switch.
- In the forward position the switch is pressed
- Pin 47/96 will be 10V
- Pin 57/96 will be open circuit

Out of the forward position

- Pin 47/96 will be open circuit
- Pin 57/96 will be 10V

Platform output

- The LED 12V is driven by the pin 89/96. This will be 12V on and off when flashing, out of forward position
- The LED will be 12V when the slew acknowledgment button has been pressed and accepted and drive is re-enabled

Parts in Circuit

- Slew Acknowledgment Platform Switch 324
- Slew Acknowledgment LED 324
- Slew Acknowledgment Limit Switch 146

Related Fault Codes

Fault Code	Fault Description
B1019-17 563	Slew position switch 1 - Circuit short to high (12v)
B1020-17 564	Slew position switch 2 - Circuit short to high (12v)

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B1021-16 566	Slew position switch 1 - Circuit short to low
B1022-13 567	Slew position switch - Signal plausibility failure (Circuit open)
B1023-16 568	Slew position switch 2 - Circuit short to low
B1024-92 570	Slew position switch - Signal plausibility failure (12v)
B1064-17 600	Slew acknowledgment button - Circuit short to high (10v)
B1065-16 602	Slew acknowledgment button - Circuit short to low
B1066-24 604	Slew acknowledgment button - Signal stuck high
B1198-16 749	Slew acknowledgment LED - Circuit short to low
B1199-17 751	Slew acknowledgment LED - Circuit short to high (12v)

3.23 Emergency Stop

Function

- The E-stop is to stop any function under an emergency. The E-stop function will stop the engine and turn off the ignition circuit and turn of the machine displays.
- This may bring the machine to a harsh stop if moving at speed.

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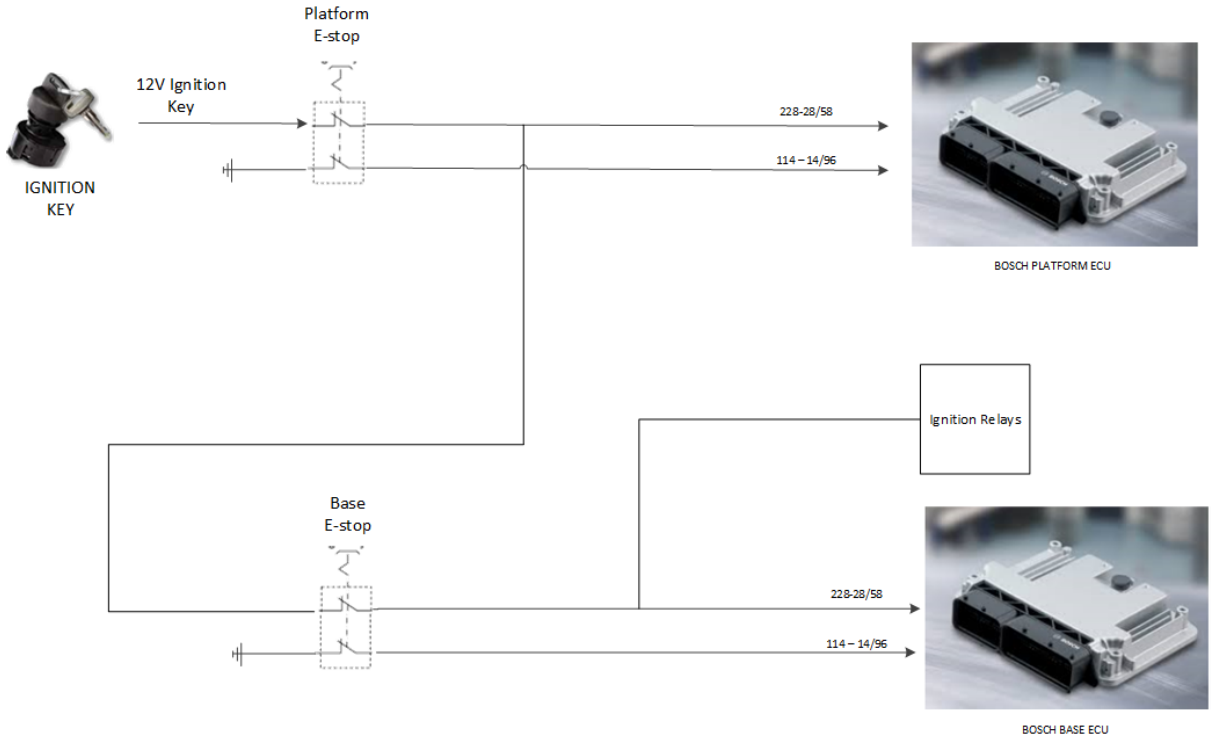
System diagram



Please view schematic for true wiring diagrams.

Signal

- There are 2 signals used by the control system.
- A 12V signal and a Ground signal.
- For the control system to operate both signals need to be on at the same time, if either is incorrect the control system will be blocked.

Parts in Circuit

- E-Stop Base 388
- E-Stop Platform 330
- Platform ECU 279

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- Base ECU 237
- Ignition Relays 360
- Ignition Switch 383

Related Fault Codes

Fault Code	Fault Description
B1001-17 540	E-stop turntable button - Signal plausibility failure
B1235-17 774	E-stop platform button - Signal plausibility failure

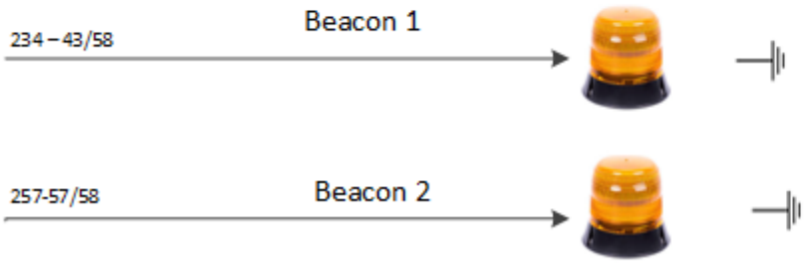
3.24 Beacon

Function

- There is a single beacon fitted to a machine with a option of a second beacon that can be added.
- The second beacon will need to be activated in service-master to enable the use.
- The beacon will be active when the machine drive, steer, main boom lower, Artic boom down, telescopic retract or slew functions are operated.

System diagram

BOSCH BASE ECU



Signal

- Beacon 1 is connected to the base ecu Pin 43/58 and is 12V

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- Beacon 2 is connected to the base ecu Pin 57/58 and is 12V

Service-master

- To turn on the second beacon, go to service-master setup tool, options tab,
- Read the current configuration, check the second beacon box and then press the write button

Parts in Circuit

- Beacon 159
- Base ECU 237

Related Fault Codes

Fault Code	Fault Description
B1135-13 702	Beacon 2 - Circuit open or short to high (12v)
B1136-16 703	Beacon 2 - Circuit short to low
B1179-13 739	Beacon 1 - Circuit open or short to high (12v)

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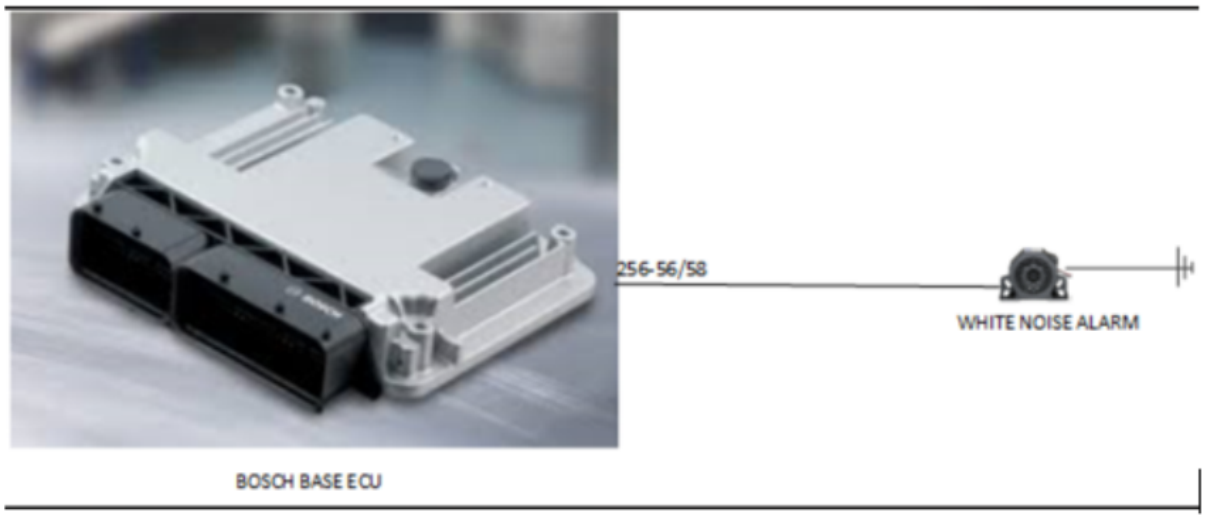
B1180-16 741	Beacon 1 - Circuit short to low

3.25 Travel Alarm

Function

- The white noise alarm is fitted to every machine to warn of a moving vehicle.
- The white noise alarm will be active when the drive, steer, main boom lower, telescopic retract or slew functions are operated
- The white noise alarm may be enabled or disabled via the display or service-master setup tool.

System diagram



Signal

- The white noise alarm is connected the the base ecu Pin 56/58 and is 12V when active

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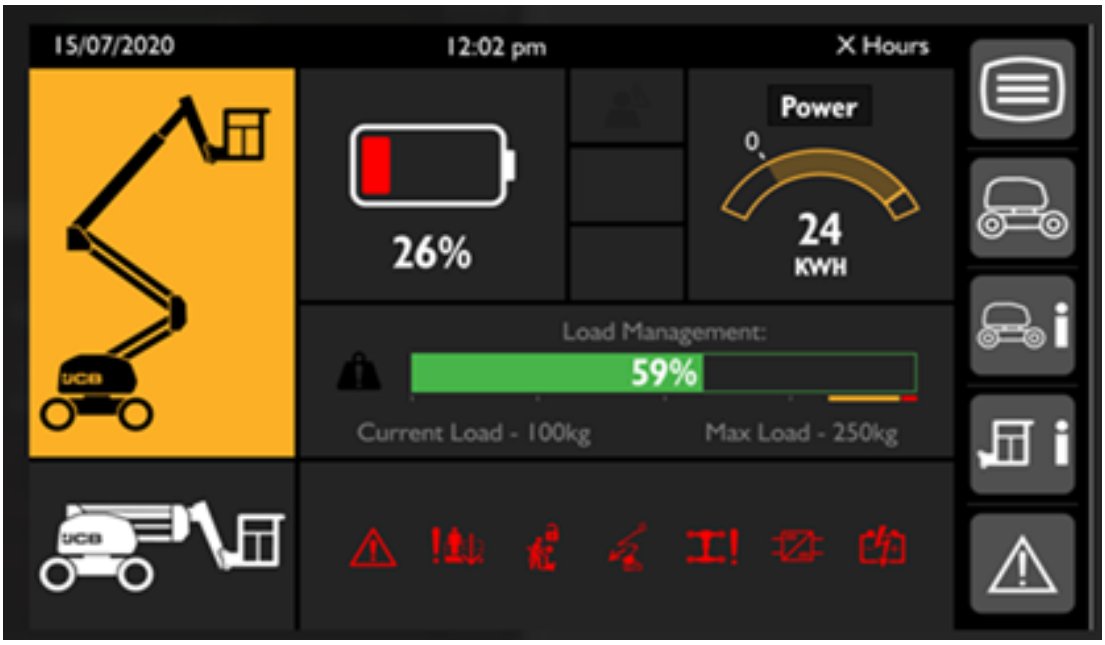
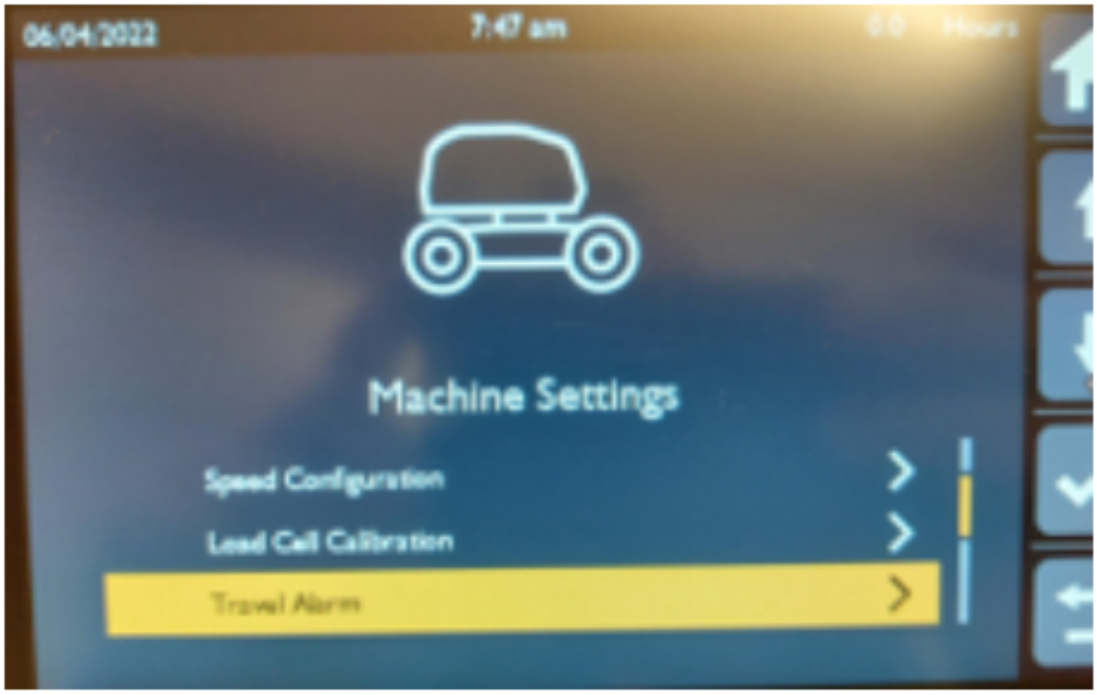
Enable and disable through Display screen



Enter machine settings and apply the password



In this menu the travel alarm can be enable or disabled

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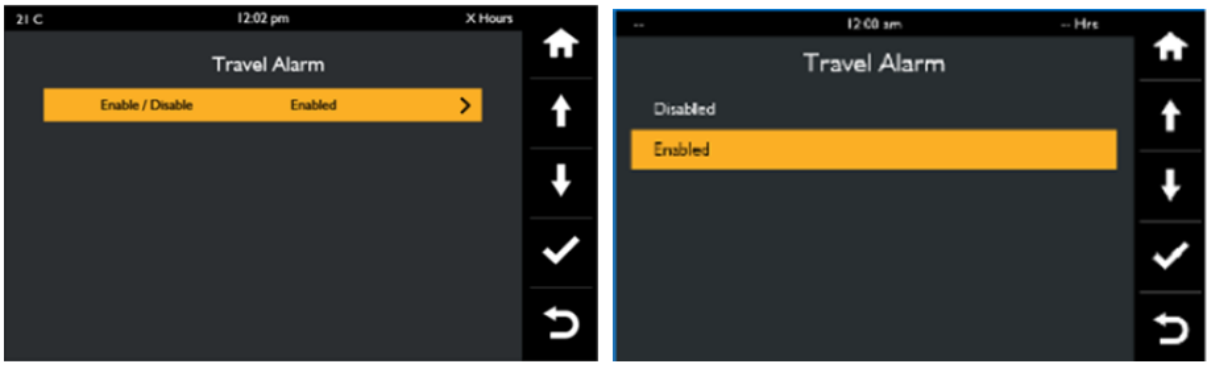

Enable and disable through Service-master

- Go to service master setup tool, options tab,
- Read the current configuration, check the white noise alarm box to enable, un-check to disable, press write

Parts in Circuit

White Noise Alarm 156

Base ECU 237

Related Fault Codes

Fault Code	Fault Description

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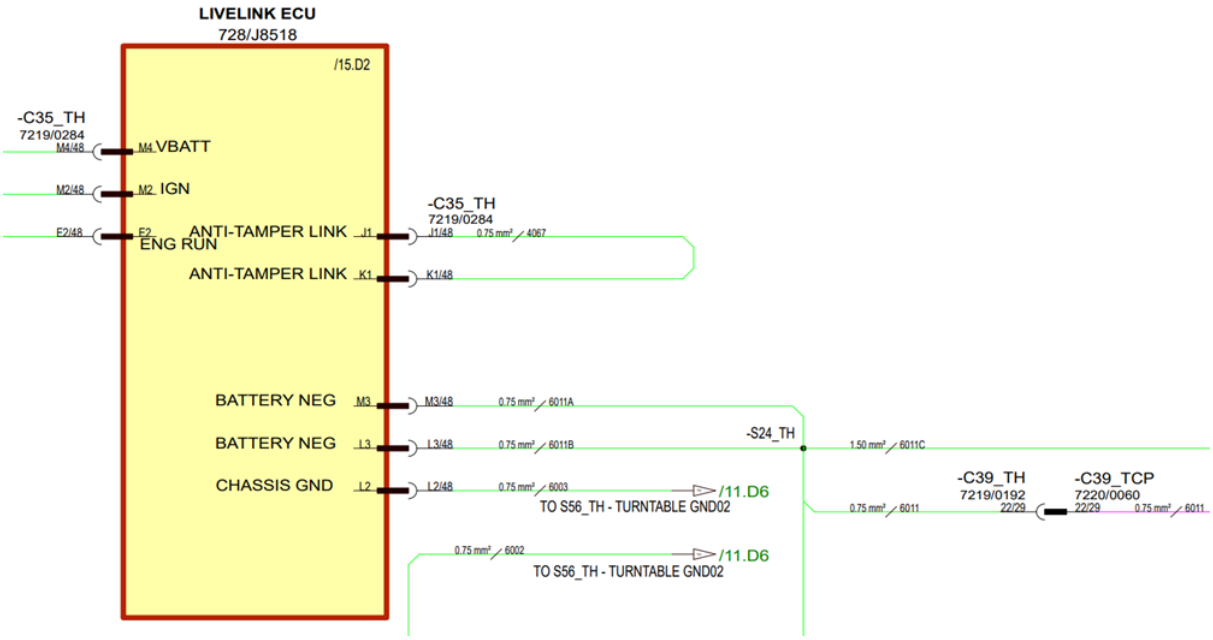
B1183-16 745	White noise alarm - Circuit short to low
B1184-13 746	White noise alarm - Circuit open or short to high (12v)

3.26 Livelink

Function

- Livelink is a telematic system used by the JCB group and is common on most JCB machines.
- The customer can register and view data gathered by the machine.
- This is standard fit in all boom machines.
- The Livelink has a permanent wire, ignition wire, engine run signal, isolator open/closed. All other data is given over CAN messages.

System diagram



Parts in Circuit

Livelink 233

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Related Fault Codes

Fault Code	Fault Description
U1900-16 1080	LIVELINK - VEHICLE VOLTAGE BELOW NORMAL
U1901-16 1081	LIVELINK - INTERNAL VOLTAGE BELOW NORMAL
U1904-85 1082	LIVELINK - ECU ABOVE TEMPERATURE THRESHOLD
U1905-84 1082	LIVELINK - ECU BELOW TEMPERATURE THRESHOLD
U1906-96 1083	LIVELINK - ACCELEROMETER INTERNAL FAILURE
U1907-09 1083	LIVELINK - MODEM JAMMED
U1908-09 1084	LIVELINK - GPS ANTENNA NOT OK
U1909-96 1085	LIVELINK - NO COMMS WITH GPS MODULE
U190A-96 1086	SIM Card Failure
U190B-96 1087	LIVELINK - NO COMMS WITH GSM MODULE
U190C-86 1088	LIVELINK - GSM NETWORK REGISTRATION FAILED

3.27 AUX

Function

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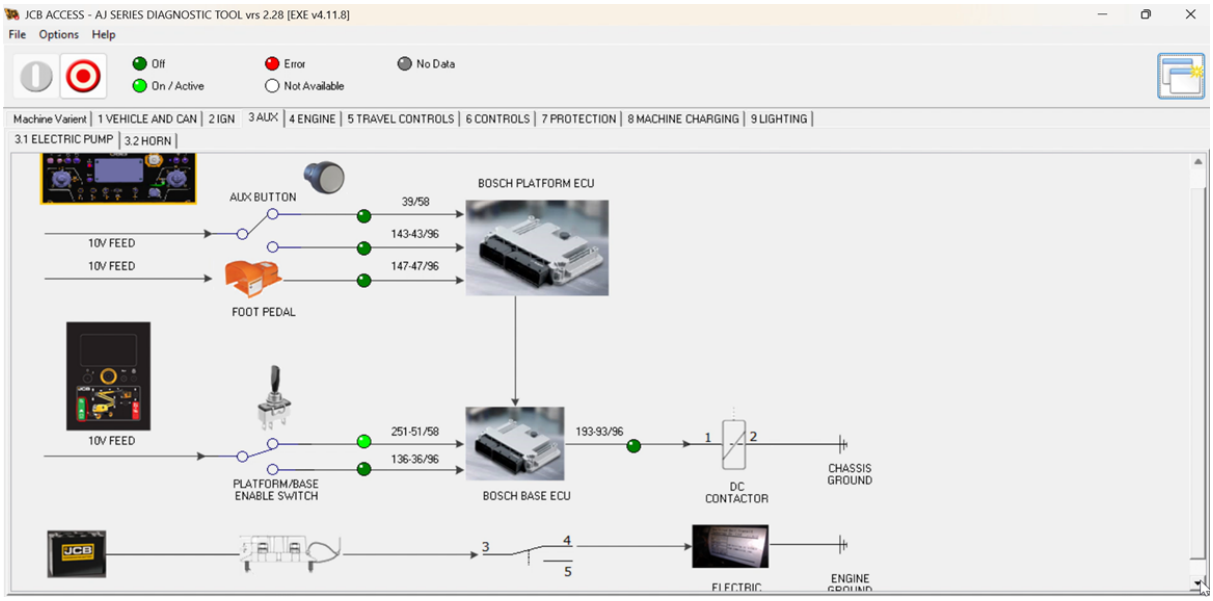
- It can be operated from the base or platform control station.
- From the platform the foot pedal must be pressed along with the AUX switch.
- The system will then operate the electric backup pump. This should not be used to often to avoid damage with the batteries.
- This system may operate at slower speeds than with the Pump running. The electric pump should not operate until a function is pressed.

System diagram



Signal

Base input

- 10V when the switch is pressed

Platform Input

- 10V when the switch is pressed

Base output

- 12V to AUX DC contactor when electric pump + function are pressed.

Parts in Circuit

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- AUX Pump 216
- Base Enable Switch 410
- Foot Pedal 266
- AUX DC Contactor
- Base ECU 237
- Platform ECU 279

Related Fault Codes

Fault Code	Fault Description
B1055-17 593	AUX / Overload override button pressed condition - Circuit short to high (10v)
B1056-16 594	AUX / Overload override button pressed condition - Circuit short to low
B1414-17 916	AUX Pump output - Circuit open or circuit short to high (12v)
B1415-16 917	AUX Pump output - Circuit short to low
B1694-17 1046	AUX / Overload override button unpressed condition - Circuit short to high (10v)
B1695-16 1047	AUX / Overload override button unpressed condition - Circuit short to low
B1696-13 1048	AUX / Overload override button both conditions - Signal plausibility failure (Circuit open)
B1697-92 1049	AUX / Overload override button both conditions - Signal plausibility failure (10v)

3.28 Fuel Sender

Function

- Fuel sender indicates how much fuel present In the fuel tank of the machine.

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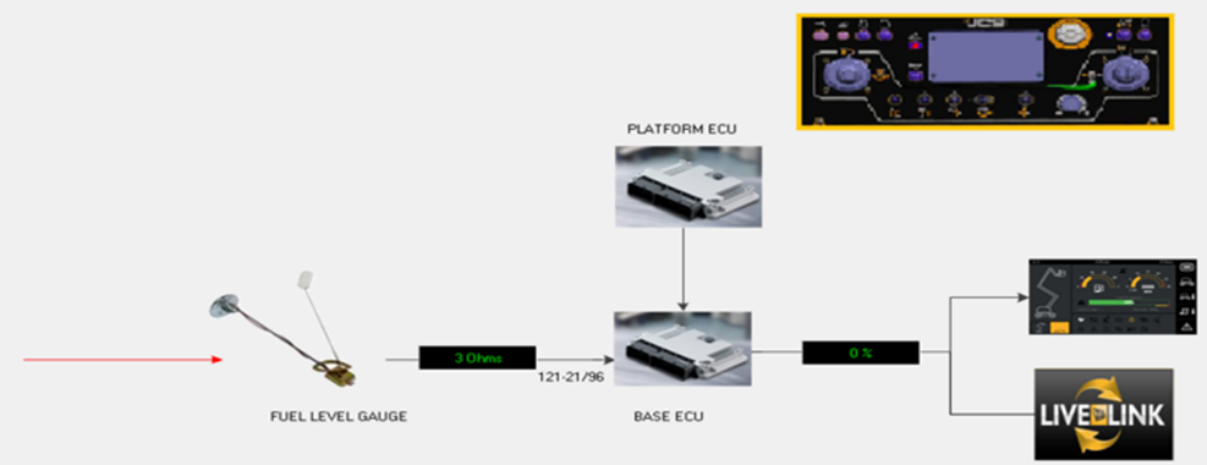
- Low fuel warning shall turn on the low fuel icon at the display and at the platform control station after 30 seconds when the Fuel level is between 25% and 10%.

System diagram



Signal

Pin	Description	Connector Number	Wire Number	Signal
1	12V input	C28_TH	4033	Resistance to GND based on the level of fuel
2	GND	C28_TH	6033	

Internal Electric Schematic IMG

Testing

1. Turn the ignition ON.

2. Keep the Fuel level between 25% to 10%, verify the Fuel sensor led on display

3. Keep the Fuel level less than 10%, verify the Fuel sensor led on display

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Expected Values:

- Fuel sensor Led :- On
- Fuel sensor Voltage :- 3.3V

Related Fault Codes

Fault Code	Fault Description
B1232-17 772	Fuel level - Signal above allowable range
B1233-16 773	Fuel level - Signal below allowable range
B1287-2F 829	Fuel level - Erratic signal

3.29 Base Buzzer

Function

- Base Buzzer at Base control panel is to indicates the operator about any fault any warning.
- It is located at inside of the Base control panel.

Internal Electric Schematic

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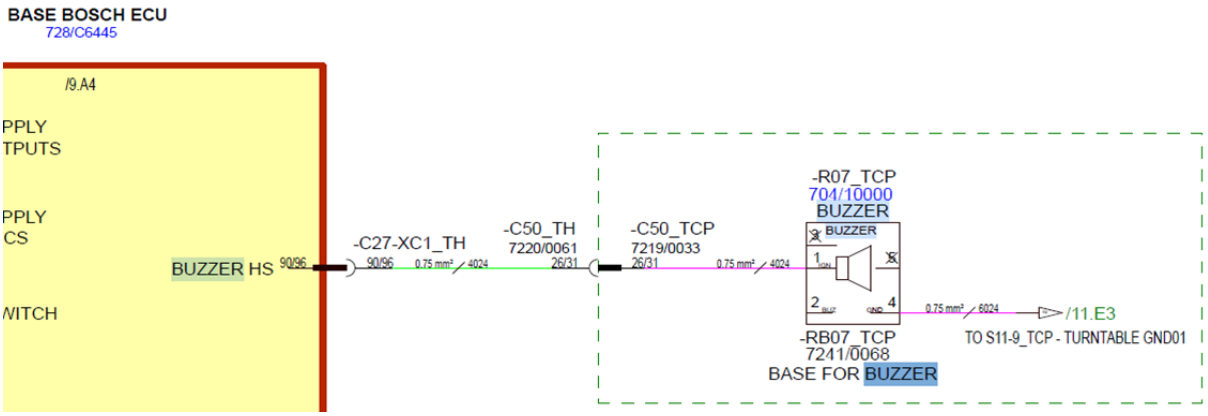

Parts in Circuit -

- Base Buzzer 440
- Base ECU 237

Related Fault Codes

Fault Code	Fault Description
B1177-16 737	Buzzer turntable - Circuit short to low
B1178-13 738	Buzzer turntable - Circuit open or short to high (12v)

3.30 Platform Buzzer

Function

- Platform Buzzer at platform control panel is to indicates the operator about any fault or any warning.
- It is located at inside of the Platform control panel

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Internal Electric Schematic

Parts in Circuit -

- Platform Buzzer 294
- Platform ECU 279

Related Fault Codes

Fault Code	Fault Description
B1269-16 813	Buzzer platform - Circuit short to low
B1270-17 814	Buzzer platform - Circuit open or short to high (12v)

3.31 Water In Fuel

Function

- Water in fuel telltale, indicated by the below symbol on the Display, means that the vehicle's system has detected water within the fuel system.

Water in Fuel sensor	

System diagram

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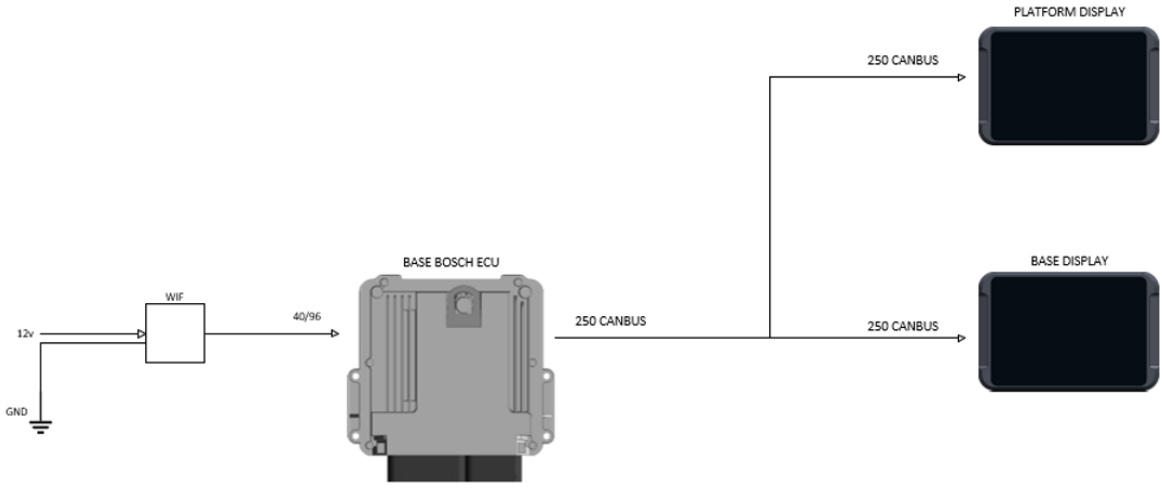
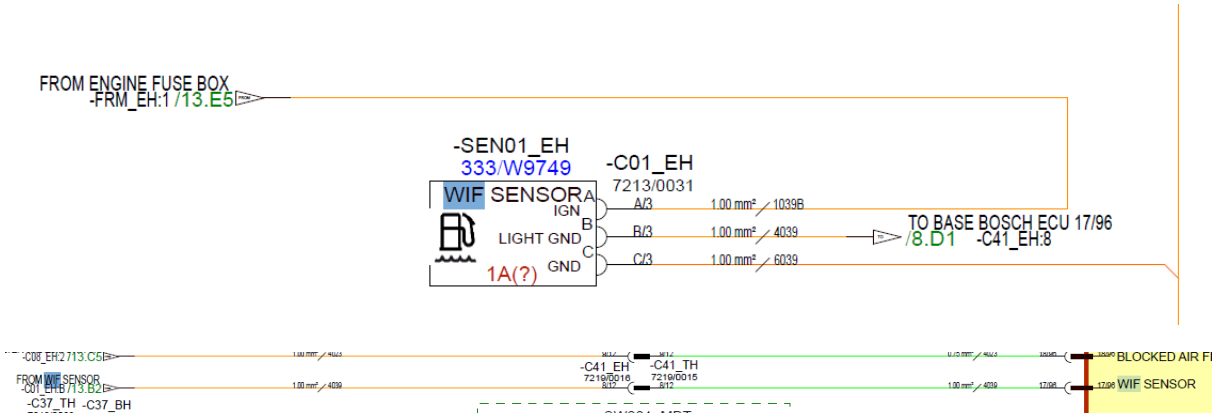


Signal

Pin	Description	Connector Number	Wire Number	Signal
1	Signal	-C27-XC1_TH	4039	Output signal from Water in Fuel Sensor

Internal Electric Schematic



Parts in Circuit -

- Water in Fuel Sensor 262
- Base Display 444
- Base ECU 237

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Related Fault Code

Fault Code	Fault Description
B1282-13 824	Water in fuel OC during engine startup: (Transition from GND to OC is expected within 2 secs of engine ignition ON)
B1286-16 828	Water in fuel Short to Ground

3.32 Display Functions

System Level Function 44 > Display Functions

List of Display Function 117

Sr No.	Description
1	Setting Time 117
2	Setting Date 119
3	Setting Unit 120
4	Setting Brightness 121
5	Speed Configuration 123
6	Setting Travel Alarm 125
7	Setting Language 126
8	Setting Load Cell Calibration 128

3.32.1 Setting Time

System Level Function 44 > Display Functions 117 > Setting Time

To Set the time in the display menu

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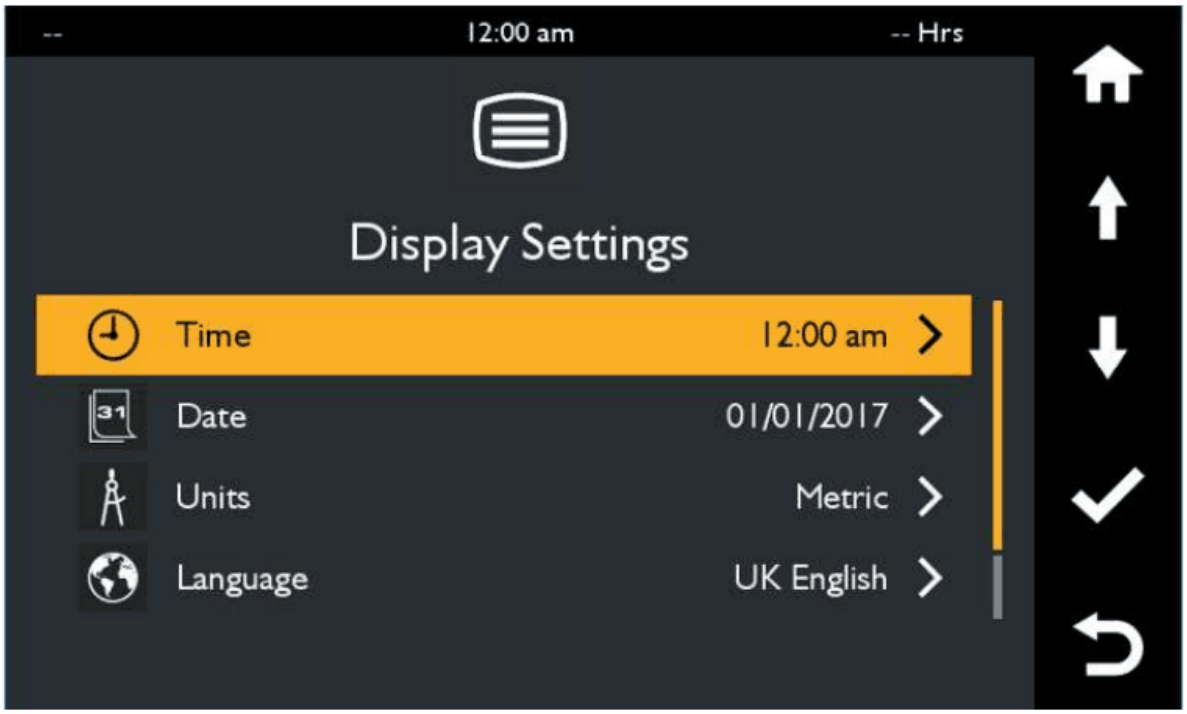
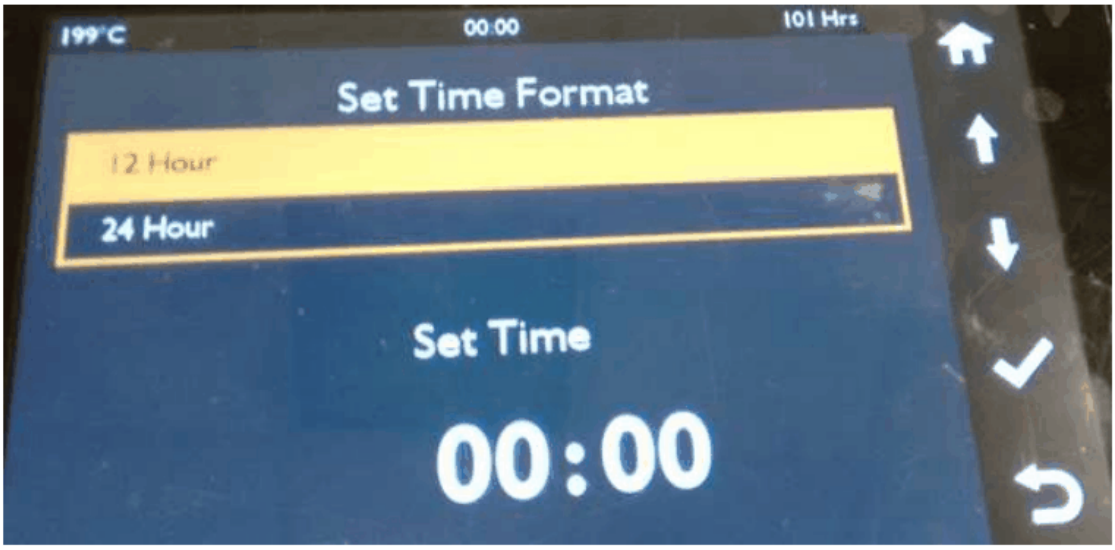
1. Select Display settings
2. Select 'Time' using the arrows and tick button



3.This screen allows the operator to select between 12/24Hr clock and also to set the time.



Use the arrow keys to select up and down and the tick button to set.

Use the arrow keys to select up and down and the tick button to set.

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3.32.2 Setting Date

Setting Date

System Level Function 44 > Display Functions 111 > Setting Date

To Set Date in the display menu

1. Select display settings.
2. Select 'Date' from the menu using the arrow keys and the tick to select.

3. This screen allows to set the format and date to the machine.

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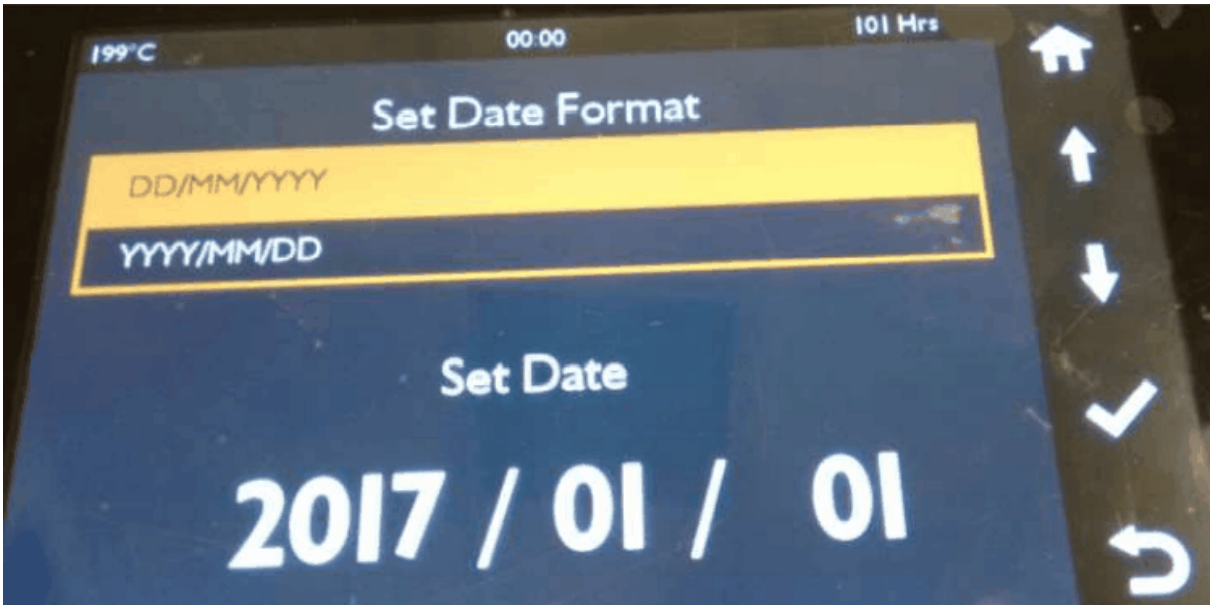

Using the arrows keys to navigate up and down the the tick button to select.

3.32.3 Setting Units

System Level Function 44 > Display Functions 117 > Setting Units

Setting units in the display menu

1. Select Display settings
2. Select 'Units' using the arrows and tick button

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3. Using the arrow keys the operator can select between 'Metric' and 'Imperial'

3.32.4 Setting Brightness

System Level Function 44 > Display Functions 117 > Setting Brightness

To Set the 'Brightness' in the display menu

1. Select Display settings
2. Select 'Brightness' using the arrows to scroll down and tick to select

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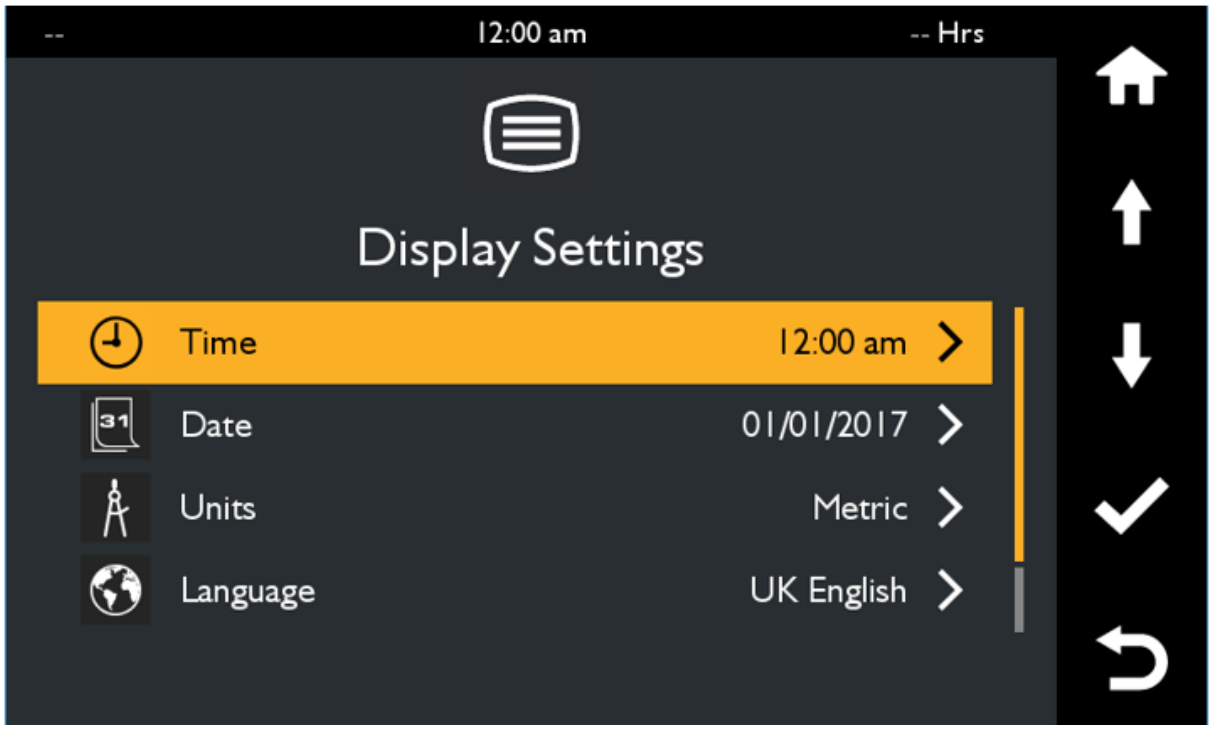

3. Use the arrow keys to select required brightness.

4. Use the tick to confirm selection.

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3.32.5 Speed Configuration

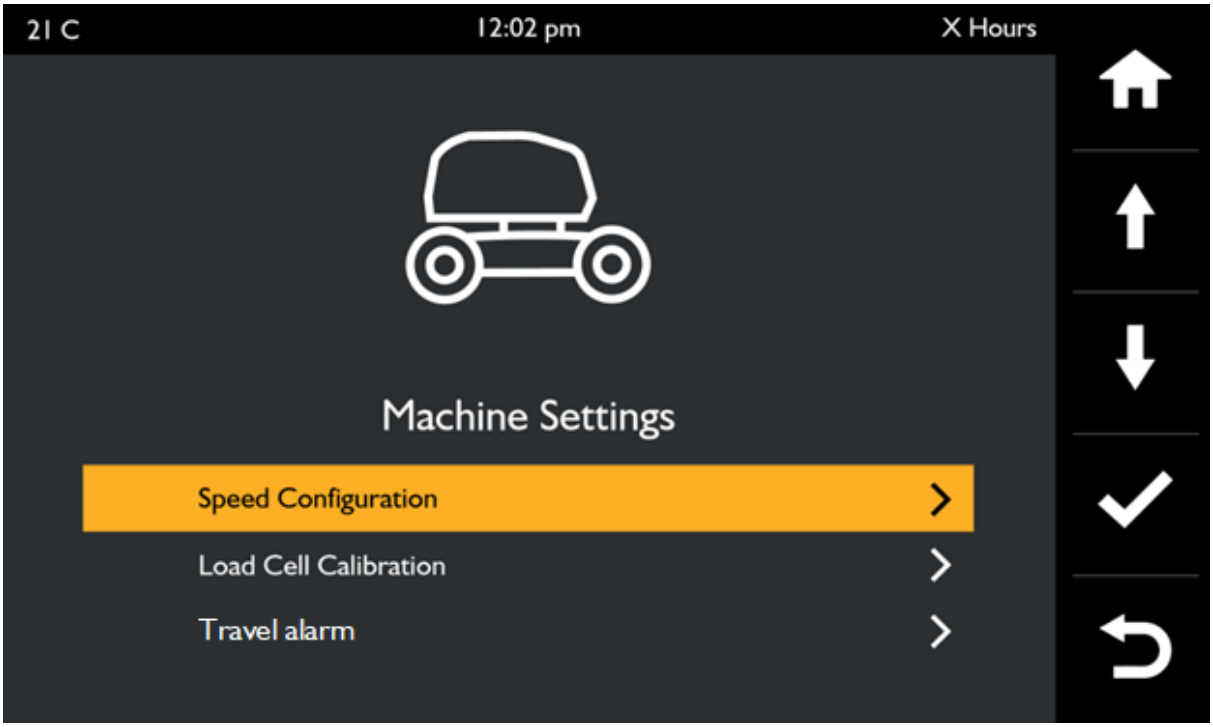
System Level Function 44 > Display Functions 111 > Speed Configuration

To Set the configure speeds in the display menu

This allows an operator to adjust machine speeds per function. The machine will be set at 100% as it leaves the factory but may be slowed down for new operators or un-familiar operators or even block a function off. For example if you didnt want to allow slew this function could be set to 0%

1. Select 'machine settings'

2. Select 'Speed configuration' using the arrows and tick button



3. Using the arrow buttons then select the desired function and use the tick to select

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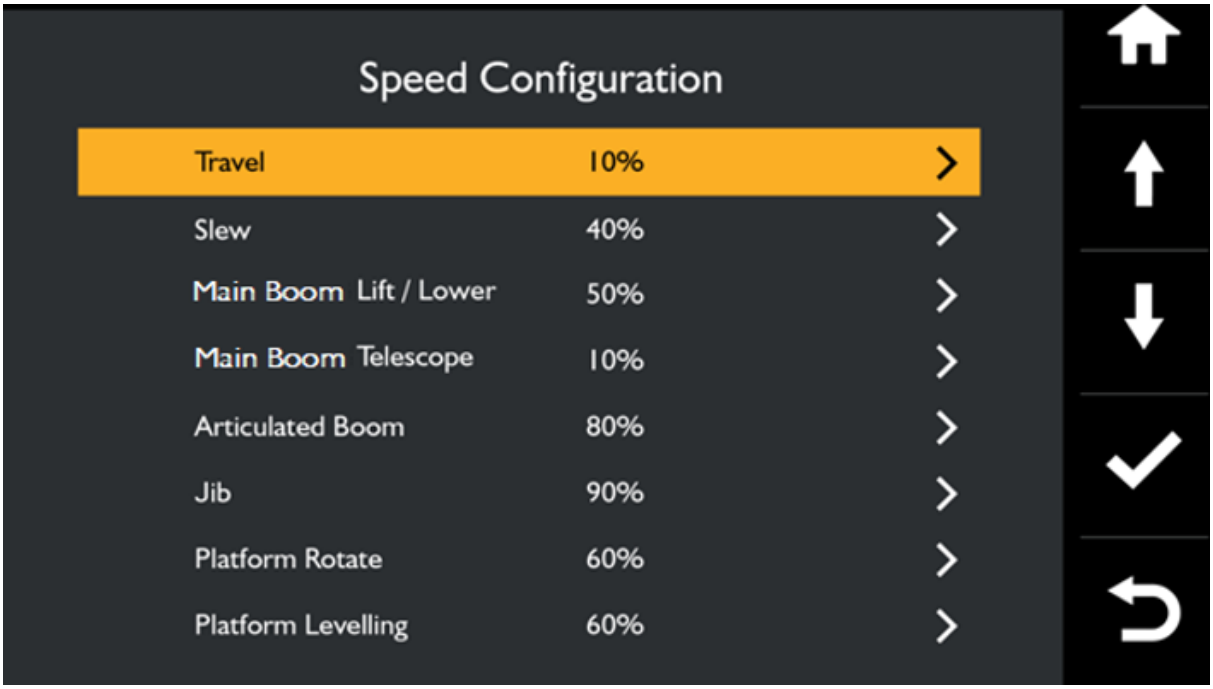
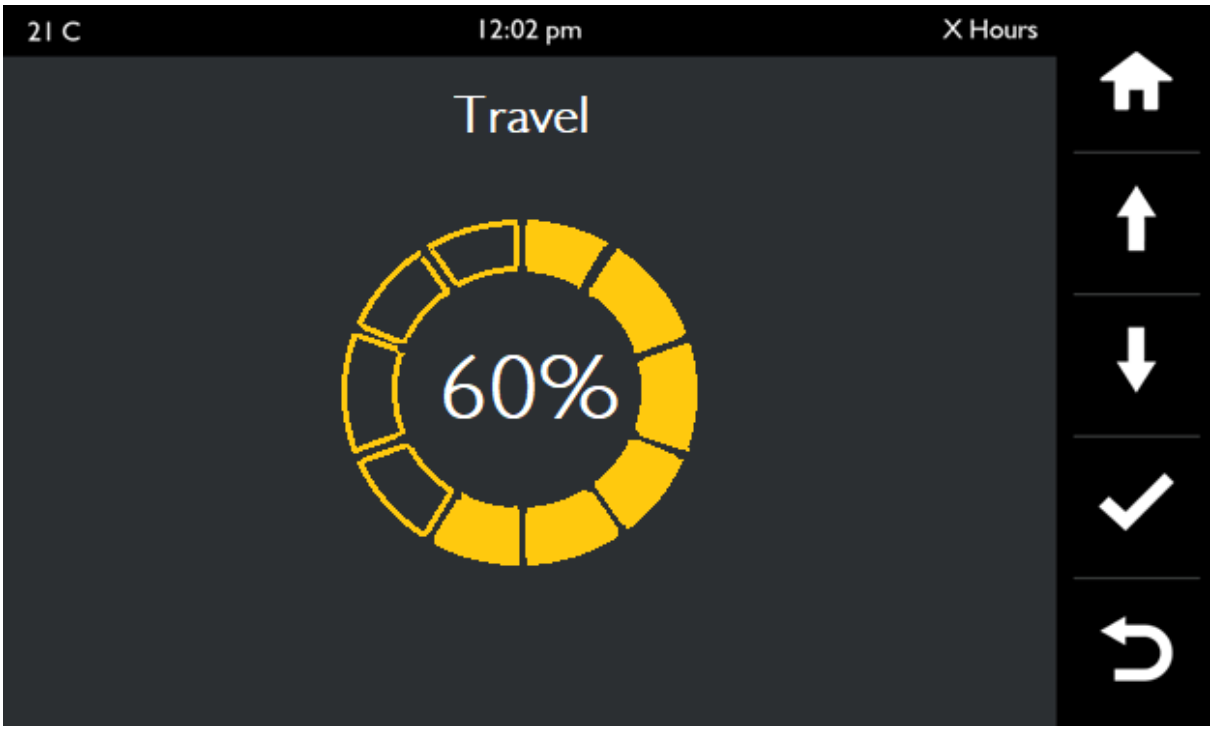


4. Use the up and down arrows to adjust the % speed allowed



5. Use the tick around to confirm

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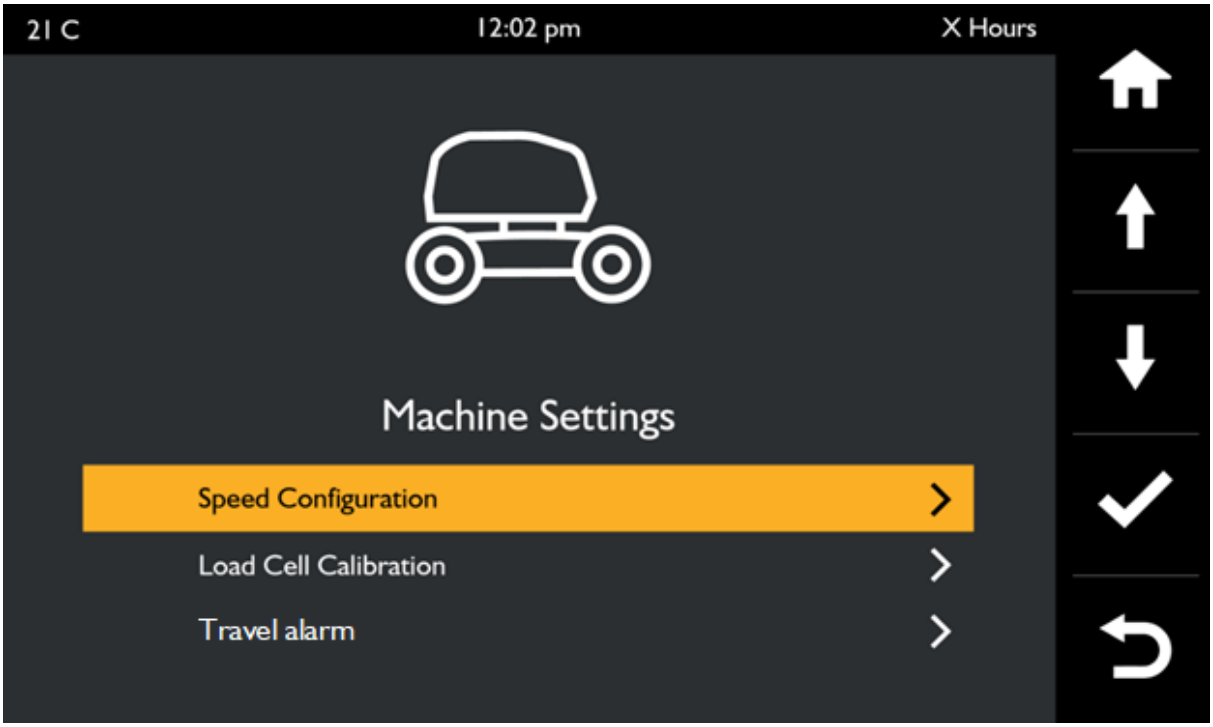
3.32.6 Setting Travel Alarm

System Level Function 44 > Display Functions 111 > Setting Travel Alarm

1. Go to machine settings in the display



2. Using the arrow keys select travel alarm and use the tick button to confirm
3. The right hand side shows current status, to change use the tick button

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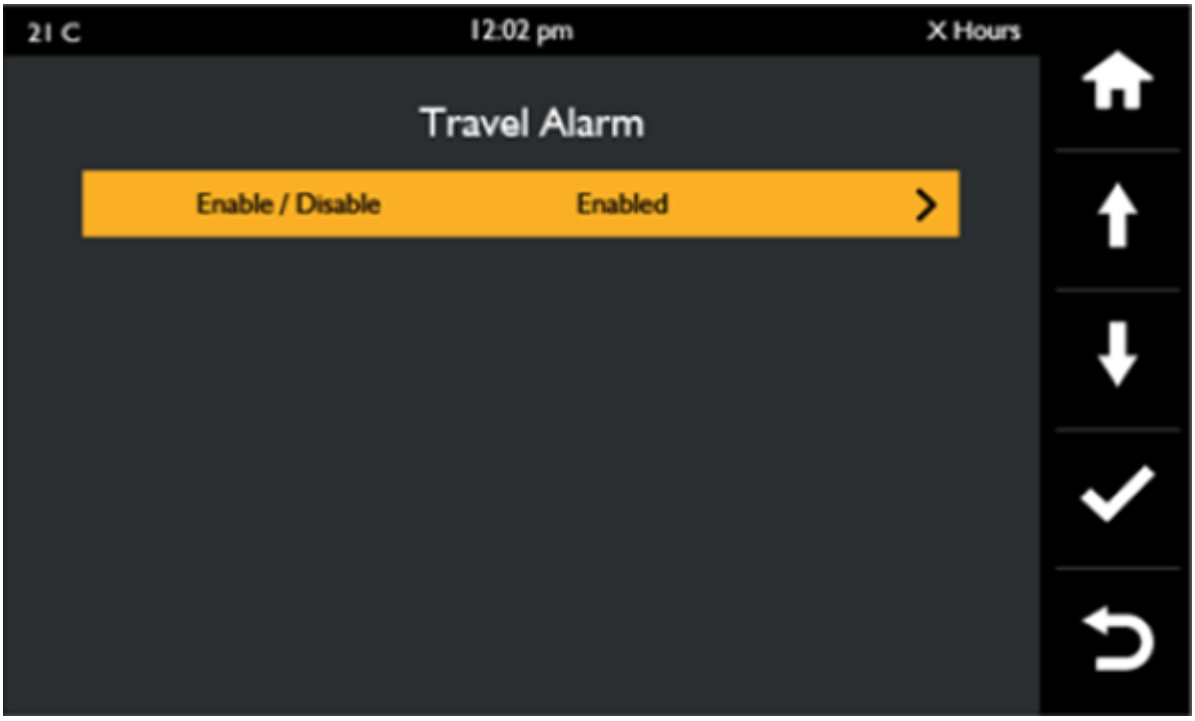
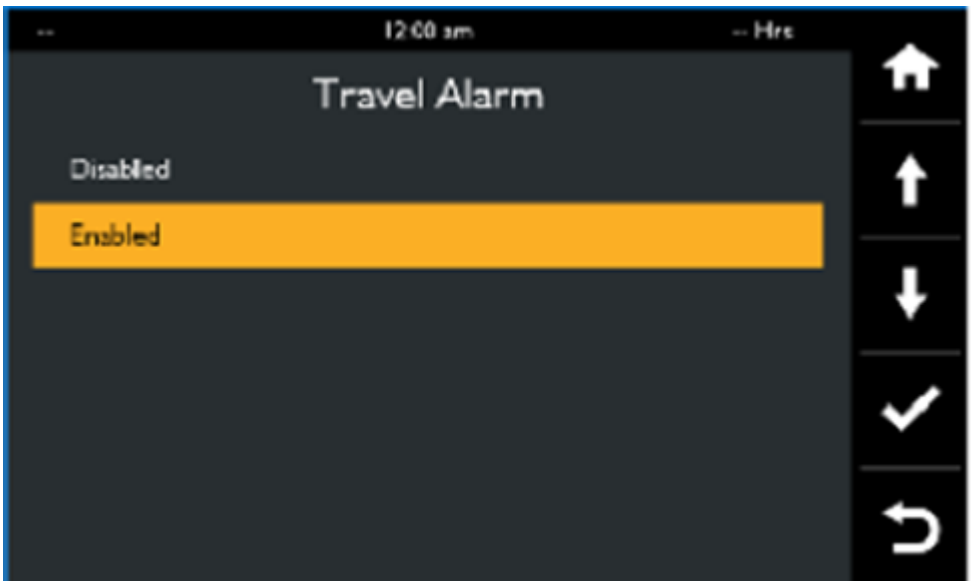


4. Use the arrows keys to select required state and tick to select



3.32.7 Setting Language

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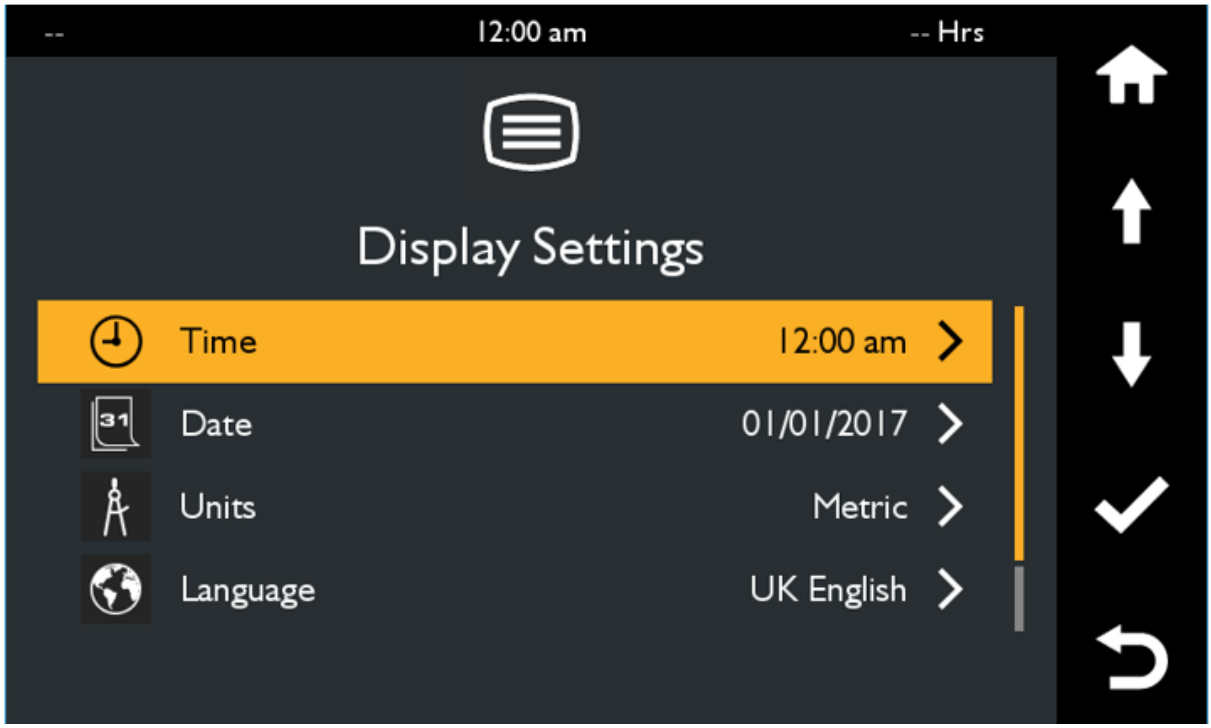
System Level Function 44 > Display Functions 117 > Setting Language

To Set the 'Language' in the display menu

1. Select Display settings
2. Select 'Language' using the arrows and tick button



3. Using the arrow keys select the correct language from the drop down menu

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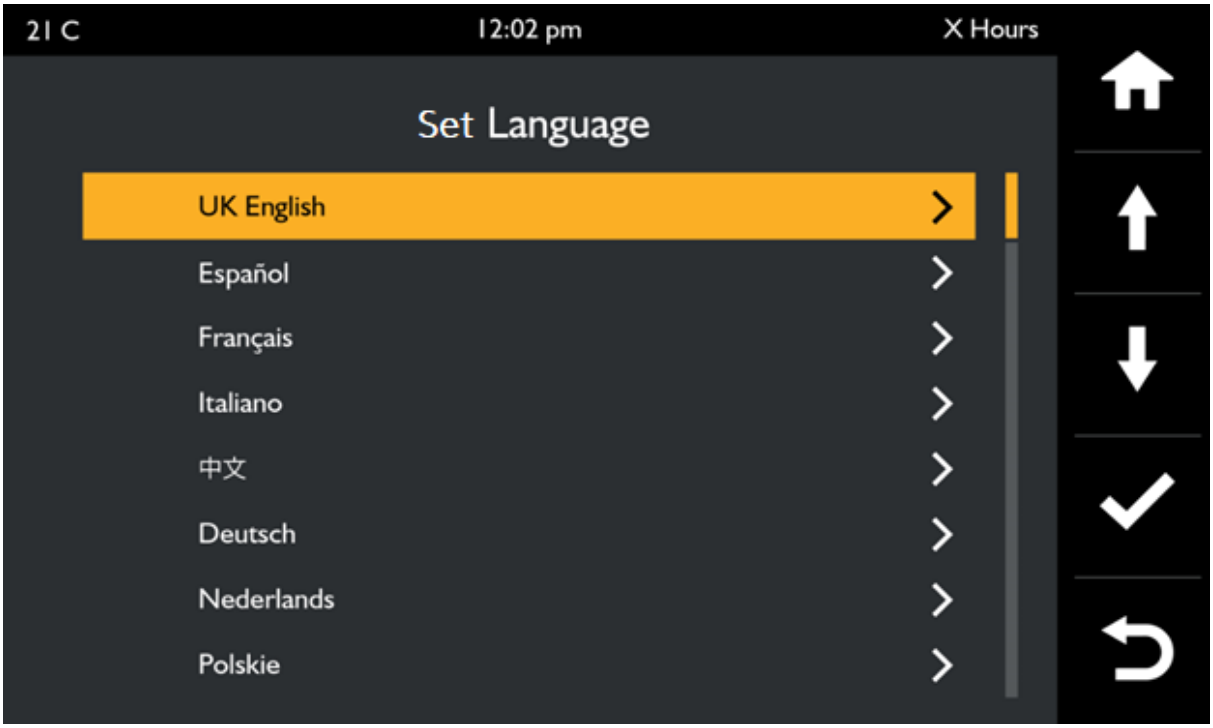
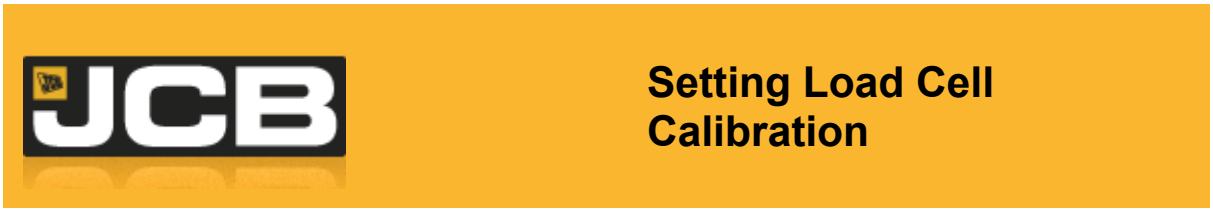


4. Use the tick button to confirm language selection

3.32.8 Setting Load Cell Calibration



System Level Function 44 > Display Functions 117 > Setting Load Cell Calibration

Load cell Calibration

1. Select 'machine settings on the display screen
2. Select load cell calibration and use the tick to confirm

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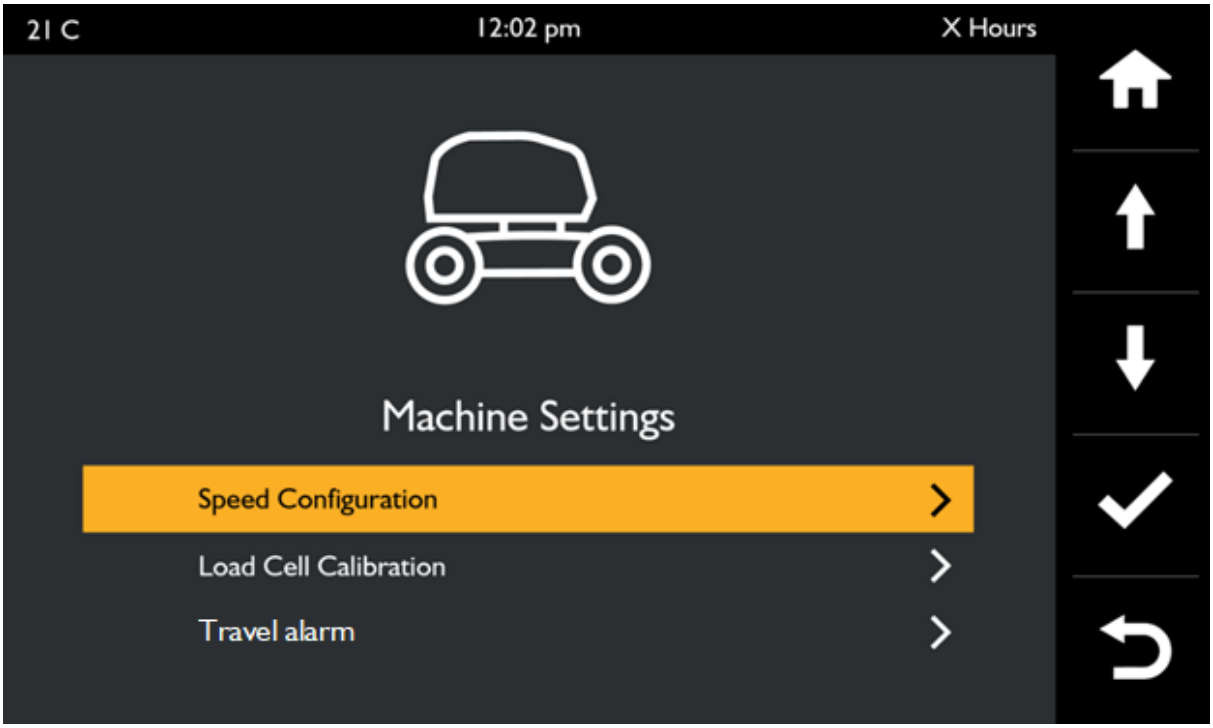

3. Use the arrow keys and select the 'NO load' or 'Rated load' depending on the calibration to be carried out.

Ensure their is nothing in the platform when the 'NO load' is selected

Ensure 250Kg is in the platform to set the 'rated load'

4. When the machine has the correct loading, use the tick arrow to confirm setting.

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Machine Components

4 Machine Components

Components

List of Machine Component 132

Sr No.	Component
1	Main Boom Lower Limit Switch 133
2	Main Boom Telescope retract Limit switch 137
3	Articulated Boom Lower Limit Switch 142
4	Slew Position Limit Switch 146
5	Work Light (Optional Fit) 151
6	White Noise Alarm 156
7	Beacon 159
8	Isolator 164
9	Horn 169
10	Steering Sensor 174
11	Axle Lock Pressure Sensor 179
12	Platform and Jib Valve Block 183
13	Weight Sensor 188
14	Tilt Sensor 194
15	Slew Limit Switch 198
16	Main Valve Block 202
17	Electric Pump 216
18	AC Connector 220
19	Diagnostic Connector 223
20	Customer Telematics 229
21	LiveLink ECU 233
22	Base Bosch ECU 237
23	Battery Charger 250
24	AC Generator 255
25	CAN Network 257
26	Platform & Control Panel 265
27	Base Control Panel 359

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4.1 Main Boom Lower Limit switch

Main Boom Lower Limit switch

Components 132 > Main Boom Lower Limit switch

Component :	Main Boom Lower Limit switch
Function:	•The main boom lower limit switch is to detect when the main boom is fully lowered. •This is also part of the machine mode that indicates whether the machine is in the Stowed or Raised mode.
Location:	The switch is located on the rear side of the boom front knuckle cover plate

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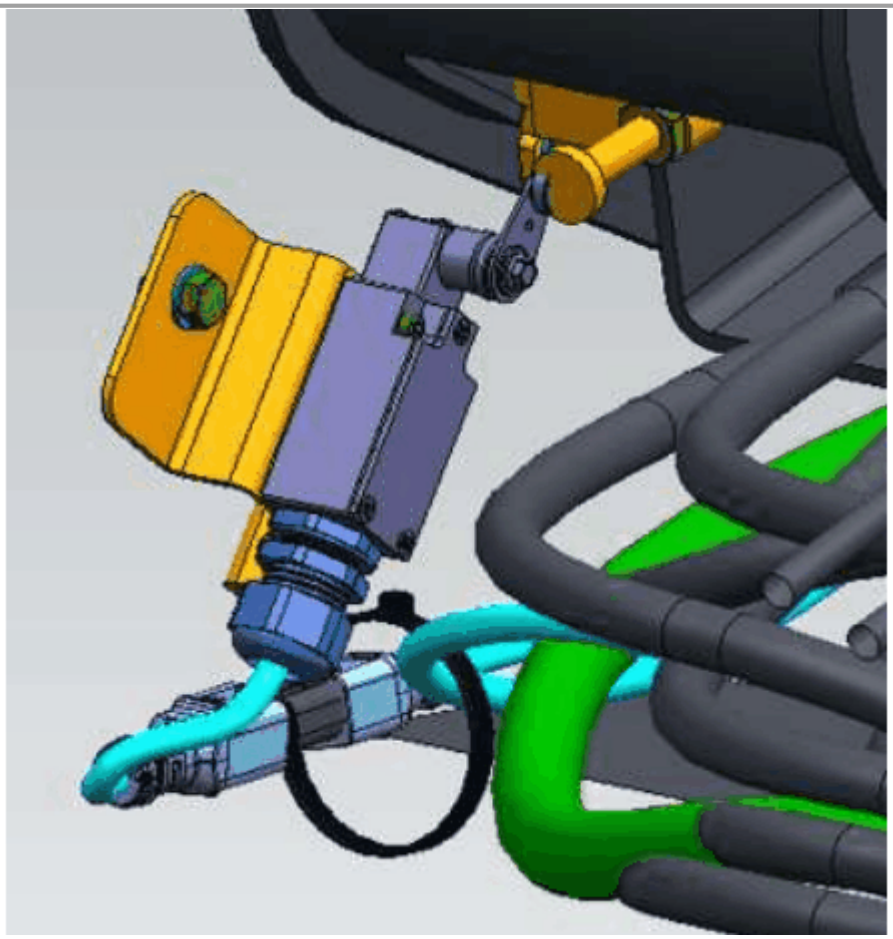
Location

Image:



Signal:

Pin Number	Description	Wire Number
13 (1)	10V Feed	1046EA
14 (2)	Switch Signal 1	4013
21 (3)	10V Feed	1046EB
22 (4)	Switch Signal 2	4105

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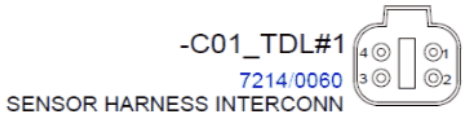
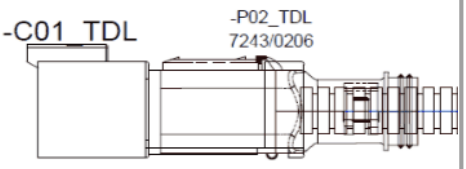
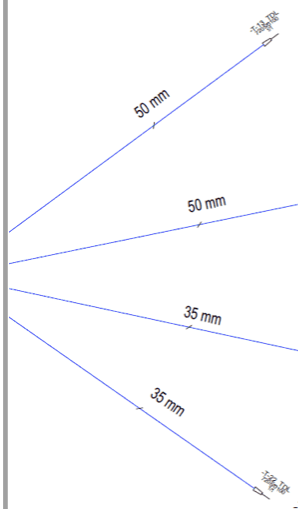
Wires & Connectors :







-T-13_TDL BOOTLACE FERRULE 13

ID	Wire ID	Size	Destination	Terminal / Plug	Colour	Cable
1	1 - 13	1.00 mm²	-C01_TDL:1		Yellow	-W01_TDL

7205/0100 1.0mm2 Red Bootlace Ferrule

Additional Components

-T-14_TDL BOOTLACE FERRULE 14

ID	Wire ID	Size	Destination	Terminal / Plug	Colour	Cable
1	2 - 14	1.00 mm²	-C01_TDL:2		Yellow	-W01_TDL

7205/0100 1.0mm2 Red Bootlace Ferrule

Additional Components

-T-21_TDL BOOTLACE FERRULE 21

ID	Wire ID	Size	Destination	Terminal / Plug	Colour	Cable
1	4 - 21	1.00 mm²	-C01_TDL:4		Yellow	-W01_TDL

7205/0100 1.0mm2 Red Bootlace Ferrule

Additional Components

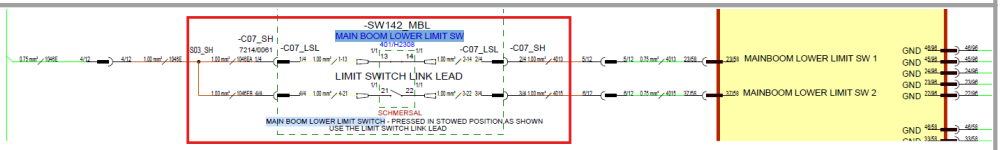
-T-22_TDL BOOTLACE FERRULE 22

ID	Wire ID	Size	Destination	Terminal / Plug	Colour	Cable
1	3 - 22	1.00 mm²	-C01_TDL:3		Yellow	-W01_TDL

7205/0100 1.0mm2 Red Bootlace Ferrule

Additional Components

Internal Electrical Schematic:



Testing:

Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins.

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	1. Check the gland nut tightened properly there should be no water ingress 2. Check the switch position pressed or undressed. 3. It should be pressed In stowed state 4. Check the continuity between pin 13 and 14 it should be open circuit 5. Check the continuity between pin 21 and 22 it should be close circuit 6. When switch is pressed then Pin 13 & 14 should be closed circuit and 21 & 22 should be open circuit
Expected Values:	See Signal
Related Fault Codes:	

Fault Code	Fault Description
B1126-17 691	Main boom position switch 1 - Circuit short to high (10v)
B1127-17 692	Main boom position switch 2 - Circuit short to high (10v)
B1128-16 693	Main boom position switch 1 - Circuit short to low
B1129-13 695	Main boom position switch - Signal plausibility failure (Circuit open)
B1130-16 696	Main boom position switch 2 - Circuit short to low
B1131-2F 698	Main boom position switch - Signal plausibility failure (10v)

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4.2 Main Boom Telescope retract Limit switch

Main Boom Telescope retract Limit switch

Components 132 > Main Boom Telescope retract Limit switch

Component:	Main Boom Telescope retract Limit switch
Function:	•The main boom telescopic retract switch is to detect when the telescopic section of the main boom is fully retracted. •This is also part of the machine mode that indicates whether the machine is in the Stowed or Raised mode in conjunction.
Location:	The switch is located on the side of the boom under the cover

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Location

Image:

Signal:

Pin Number	Description	Wire Number
13 (1)	10V Feed	1024A
14 (2)	Switch Signal 1	4105
21 (3)	10V Feed	1024GB
22 (4)	Switch Signal 2	4106

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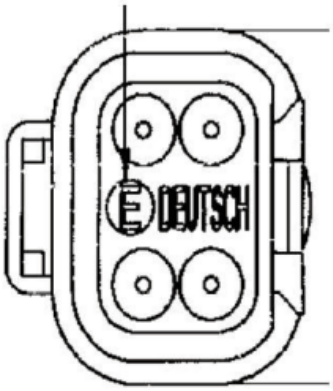
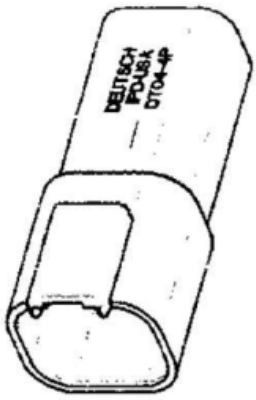
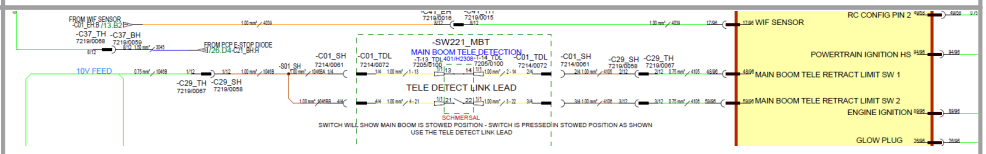
Wires & **Connectors:**	  
Internal **Electrical** **Schematic:**	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. Check the gland nut tightened properly there should be no water ingress

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	2. Check the switch position pressed or undressed. 3. It should be un-pressed In natural state 4. Check the continuity between pin 13 and 14 it should be open circuit 5. Check the continuity between pin 21 and 22 it should be close circuit 6. When switch is pressed then Pin 13 & 14 should be closed circuit and 21 & 22 should be open circuit 7. Switch position is at 0 degree when is not pressed

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	  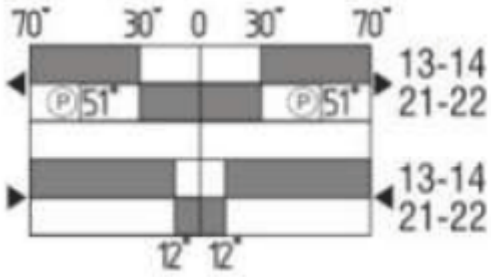 8. Switches changes at 30 degrees going from center and 12 degrees on the way back towards center
Expected Values:	See Signal

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Related Fault Codes:	Fault Code	Fault Description
	B1138-17 705	Main boom telescopic retract limit switch 1 short circuit to high
	B1139-17 706	Main boom telescopic retract limit switch 2 short circuit to high
	B1140-16 707	Main boom telescopic retract limit switch 1 short circuit to low
	B1141-13 708	Main boom telescopic retract limit switch 1 and 2 are both open circuit
	B1142-16 710	Main boom telescopic retract limit switch 2 short circuit to Low
	B1143-92 711	Main boom telescopic retract limit switch 1 and 2 Short to 10V

4.3 Articulated Boom Lower Limit Switch

Articulated Boom Lower Limit Switch

Components 132 > Articulated Boom Lower Limit Switch

Component:	Articulated Boom Lower Limit Switch
Function:	•Articulated boom limit switch is to detect when the arctic boom sections fully lowered •This is also part of the machine mode that indicates whether the machine is in the Stowed or Raised mode.

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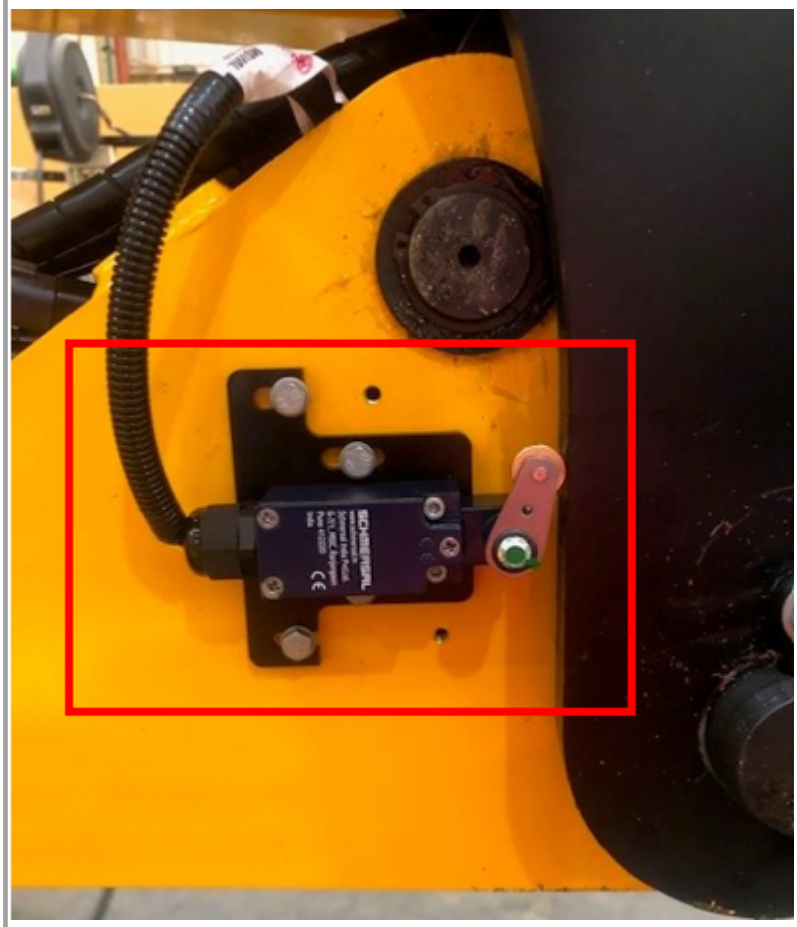
Location:	The switch is located on the side of the boom under the cover
Location Image:	
Signal:	

Pin Number	Description	Wire Number
13 (1)	10V Feed	1046A
14 (2)	Switch Signal 1	4009
21 (3)	10V Feed	1046GB
22 (4)	Switch Signal 2	4011

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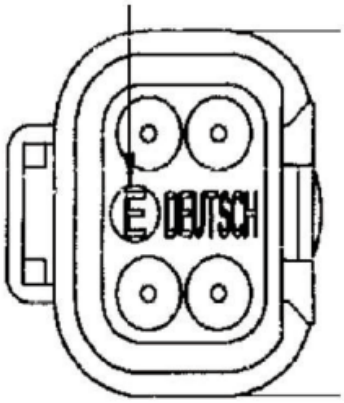
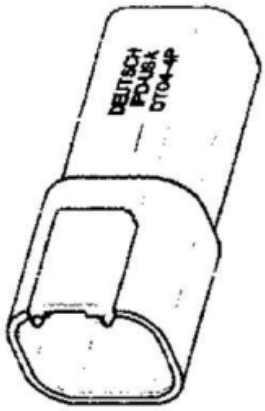
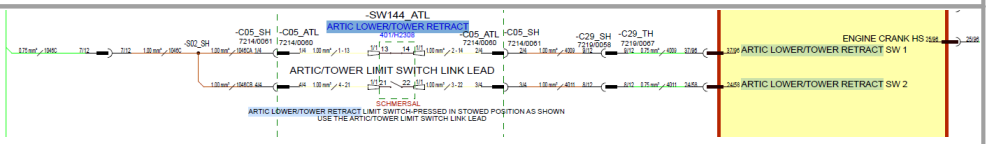
Wires & Connectors :	 
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. Check the gland nut tightened properly there should be no water ingress 2. Check the switch position pressed or undressed.

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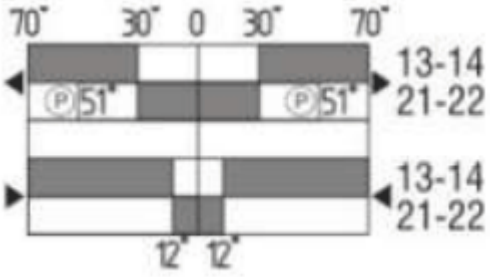
3. It should be un-pressed In natural state

4. Check the continuity between pin 13 and 14 it should be open circuit

5. Check the continuity between pin 21 and 22 it should be close circuit

6. When switch is pressed then Pin 13 & 14 should be closed circuit and 21 & 22 should be open circuit

7. Switch position is at 0 degree when is not pressed



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	8. Switches changes at 30 degrees going from center and 12 degrees on the way back towards center
Expected Values:	See Signal
Related Fault Codes:	

Fault Code	Fault Description
B1011-17 551	Artic Boom Lower Limit Switch 1 Short Circuit to High
B1012-17 552	Artic Boom Lower Limit Switch 2 Short Circuit to High
B1013-16 553	Artic Boom Lower Limit Switch 1 Short
B1014-13 555	Artic Boom Lower Limit Switch 1 AND Switch 2 Open Circuit
B1015-16 556	Artic Boom Lower Limit Switch 2 Short Circuit to Low
B1016-92 557	Artic Boom Lower Limit Switch 1 AND Switch 2 short to 10V

4.4 Slew Position Limit Switch

Components 132 > Slew Position Limit Switch

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Component :	Slew Position Limit Switch
Function:	•The Slew position limit sensor is to understand the slew position of the machine and operator. •As the machine is slewed round out of the forward position, the machine will pause any drive conditions until the operator has pressed the slew acknowledgment switch. This is so the operator is sure of the direction that the machine will operate in.
Location:	On Turntable

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Location

Image:

Signal:

Pin Number	Description	Wire number
13	10V	A-13 1046D
14	Slew position Sw 1	B-14 4022
21	10V	A-21 1046D
22	Slew position Sw 2	C-22 4021

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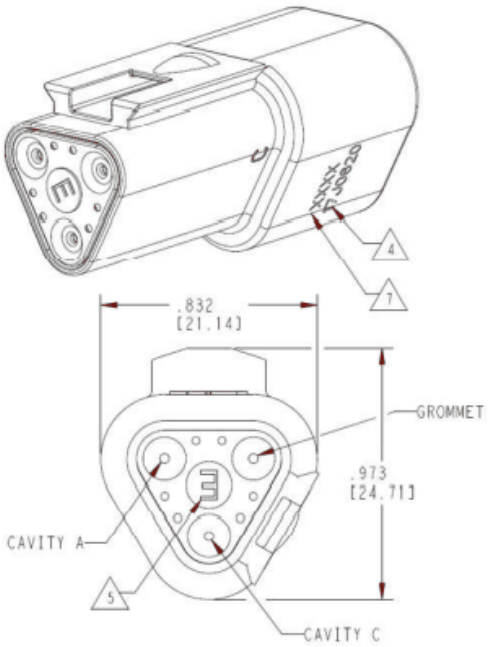
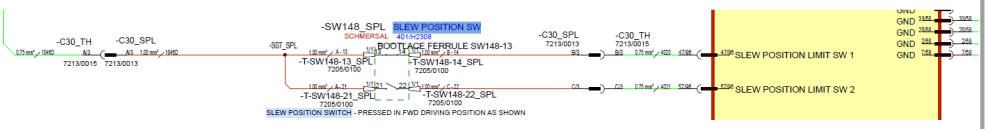
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. Check the gland nut tightened properly there should be no water ingress 2. Check the switch position pressed or undressed. 3. It should be un-pressed In natural state

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	4. Check the continuity between pin 13 and 14 it should be open circuit 5. Check the continuity between pin 21 and 22 it should be close circuit 6. When switch is pressed then Pin 13 & 14 should be closed circuit and 21 & 22 should be open circuit 7. Switch position is at 0 degree when is not pressed 8. Switches changes at 30 degrees going from center and 12 degrees on the way back towards center
Expected Values:	
Related Fault Codes:	**Fault Code** / **Fault Description** B1019-17 563 — Slew position switch 1 - Circuit short to high (12v) B1020-17 564 — Slew position switch 2 - Circuit short to high (12v) B1021-16 566 — Slew position switch 1 - Circuit short to low B1022-13 567 — Slew position switch - Signal plausibility failure (Circuit open) B1023-16 568 — Slew position switch 2 - Circuit short to low B1024-92 570 — Slew position switch - Signal plausibility failure (12v)

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4.5 Work Light (Optional Fit)

Work Light (Optional Fit)

Components 132 > Work Light (Optinal Fit)

Component:	Work Light (Optional Fit)
Function:	•The work-light is LED and is optional fit. •It will only operate when the engine is running. •A work light is a high-intensity light fixture which is used to illuminate the stage for the benefit of technicians
Location:	On Platform Rail

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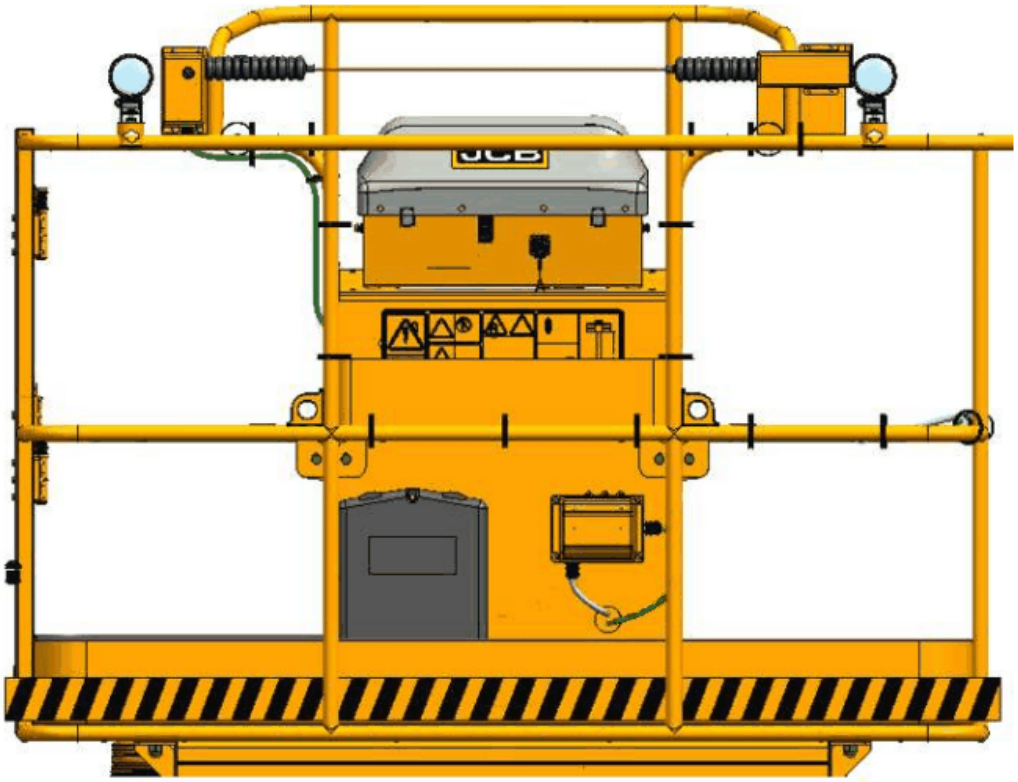
Location **Image:**	

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Signal:

C02_LWH		
Pin Number	Description	Wire Number
1	D+ Supply	8079B
2	GND	6079B
C03_LWH		
Pin Number	Description	Wire Number

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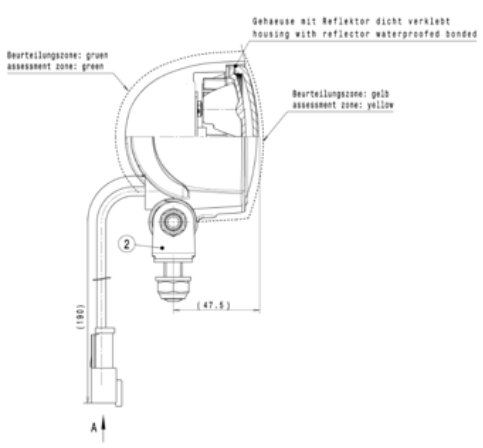
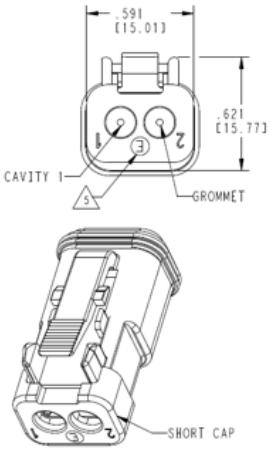
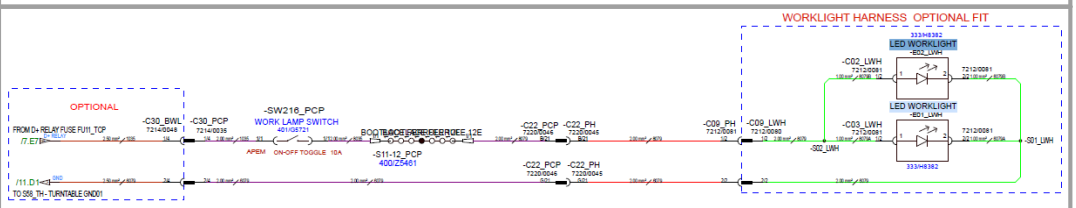
	1	D+ Supply	8079B
	2	GND	6079B
Wires & Connectors:	 		
Internal Electrical			

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Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1.Disconnect the electrical connector from the beacon. 2. With the ignition on, and the work light button selected, check using a multimeter if there is 12V present at pin 1 and at pin 2 the earth resistance . 3 If there is 12V present and the earth resistance is within range, replace the work light
Expected Values:	12V

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Related Fault Codes:	N/A

4.6 White Noise Alarm

White Noise Alarm

Components 132 > White Noise Alarm

Component:	White Noise Alarm
Function:	The travel white noise alarm will sound when the machine is traveling or steering to make people around the machine aware or machine movement. The travel white noise alarm will only come on when command from the platform control station for drive or steer is applied The travel alarm may be turned off through the display or service-master

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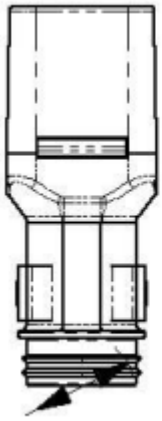
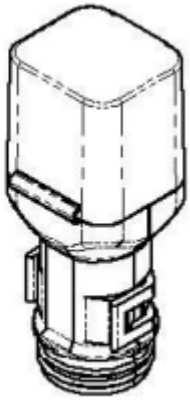
Location :	On Turntable RHS
Location Image:	

Signal:

Pin Number	Description	Wire Numbers
1	12V	4036C
2	GND	6022

Wires & Connectors:





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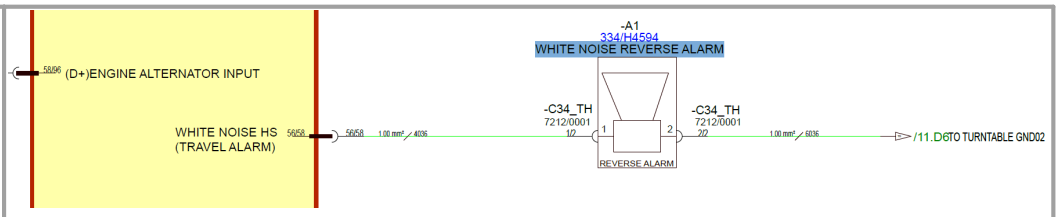
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pin **Before fault finding on the white noise alarm ensure that it is enabled in the software.** To check the white noise alarm, go to the platform control station and press the foot pedal and use drive joystick for either drive forwards and backwards or steer functions. 1.The foot pedal is fed from 10V ECU pin (232-32/58) platform ECU 2.Foot pedal input (147-47/96) on the platform ECU 3.The joystick feed is via a 5V ECU pin (255-55/58) platform ECU

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	4.Joystick drive pin (120-20/96) platform ECU 5.Steer joystick pin (141-41/96) platform ECU 6.White noise alarm output (256-56/58) turntable ECU
Expected Values:	See Signal
Related Fault Codes:	**Fault Code** / **Fault Description** B1183-16 745 — White noise alarm - Circuit short to low B1184-13 746 — White noise alarm - Circuit open or short to high (12v)

4.7 Beacon

Components 132 > Beacon

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Component:	Beacon
Function:	•The travel beacon will flash when the machine is traveling or steering to make people around the machine aware or machine movement. •The beacon will only come on when command from the platform control station
Location:	Top side of Counter Weight

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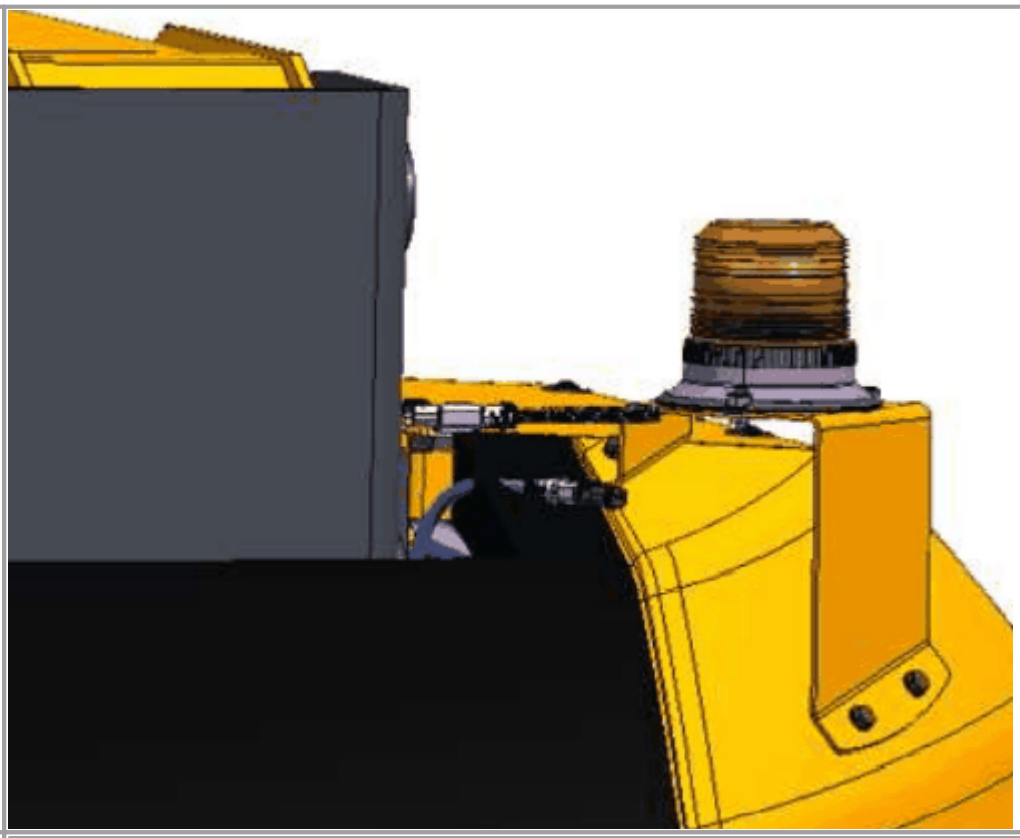
Location

Image:



Signal:

Pin Number	Description	Wire number
1	Beacon positive from 43/58 turntable ECU	4036
2	Negative - turntable GND	6063K

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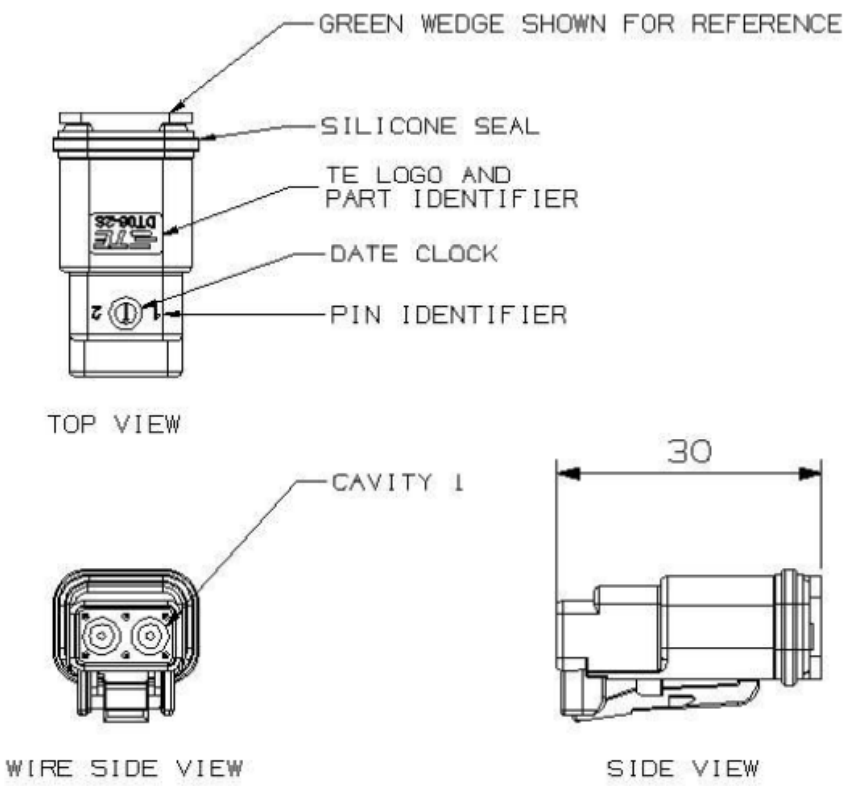
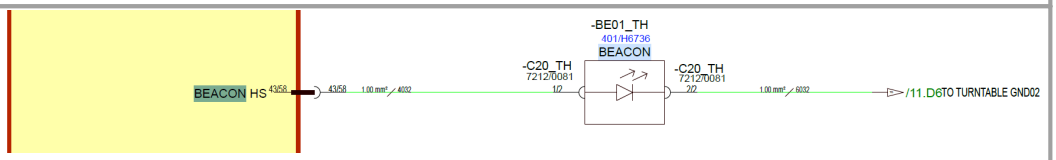
Wires & Connectors:	
Internal Electrical Schematic:	

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Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. Disconnect the electrical connector from the beacon. 2. With the ignition on, and the beacon button selected, check using a multimeter if there is 12V present at pin 1 and at pin 2 the earth resistance (harness side). 3. If there is 12V present and the earth resistance is within range, replace the beacon/beacon socket. 4. If there is not 12V present check fuse FU19 and the beacon relay , if the resistance is outside the range specified in step 2, check the continuity of the wire and condition of the earth stud
Expected Values:	12 V

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Related Fault Codes:	Fault Code	Fault Description
	B1135-13 702	Beacon 2 - Circuit open or short to high (12v)
	B1136-16 703	Beacon 2 - Circuit short to low
	B1179-13 739	Beacon 1 - Circuit open or short to high (12v)
	B1180-16 741	Beacon 1 - Circuit short to low

4.8 Isolator

Isolator

Components 132 > Isolator

Component:	Isolator
Function:	•The isolator is fitted to isolate the machine for maintenance. •This should not be used to cut power while the engine is on. •Always take care when working on machine isolator

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	•Always ensure cables are wired to schematic as there is cables to both sides of the isolator, this is to allow permanent connections when the key is out such as display clock and Livelink.
Location:	On Turntable LHS

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Location Image:	

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	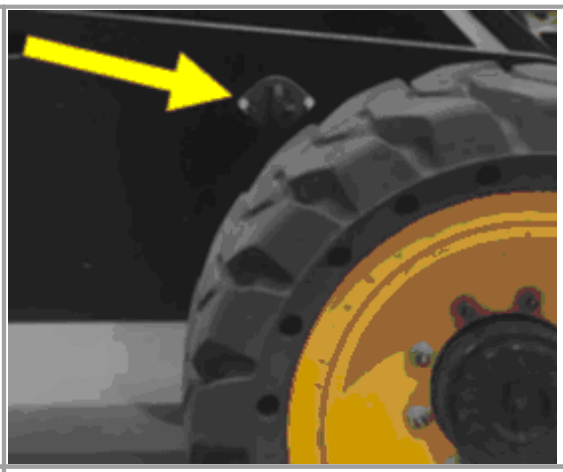
Signal:	12 V
Wires & Connectors:	Connections to the isolator are M10 Ring terminals The thickest cable should always be put on to isolator first and thinnest at the top.

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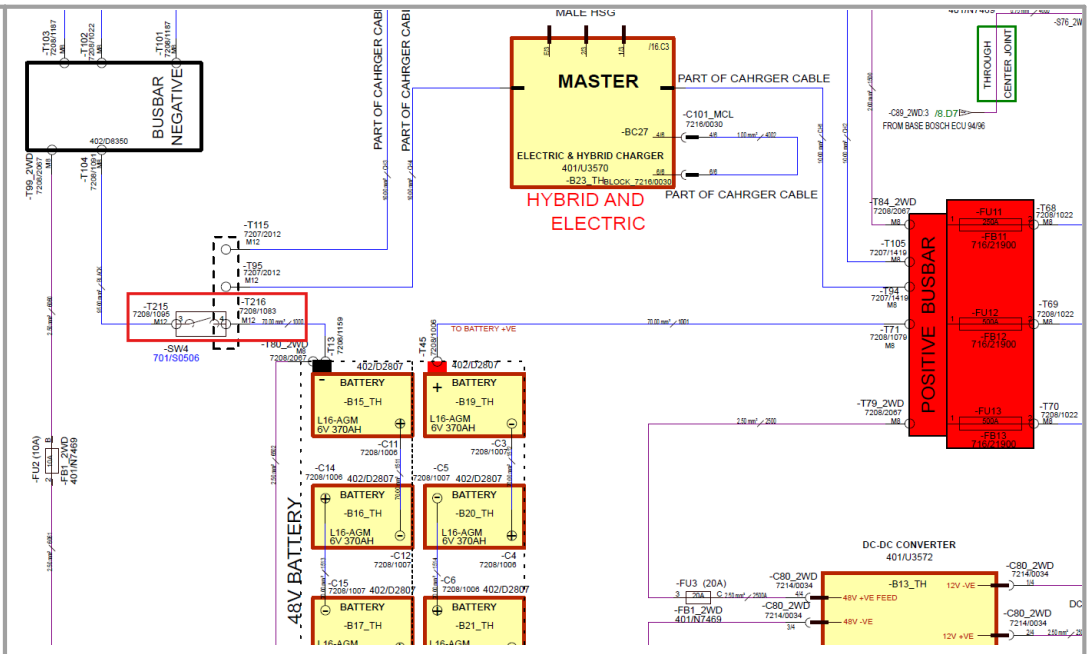
Internal Electrical Schematic:	
Testing:	**Identify the issue** 1. Test the isolator using a multimeter across the back of the 2 terminals. 2. With the key removed this should show open circuit across the switch 3. When the key is inserted and turned to the ON position the multimeter should show closed circuit. If the isolator does not show this then replace the part or contact JCB Service department

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Expected Values:	12 V
Related Fault Codes:	N/A

4.9 Horn

Horn

Components 132 > Horn

Component:	Horn

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Function:	•The horn can be pressed from the Base or platform control station. There is only one horn output which is below the base control box. •The horn input buttons are fed from a 10V feed on the Bosch ECU (Pin 32/58 - VSS2). •Once the button is pressed the 10V will pass through to the Horn input pin on the ECU (Pin 52/58) •The platform ECU will communicate to the base ECU over CAN communication. •The output for the Horn is from the base ECU, (Pin 44/58) •When an input signal is received the horn output (Pin 44/58) will output 12V's and then enable the Horn relay. •As the relay pulls in the horn will sound.
Location:	On Turntable LHS

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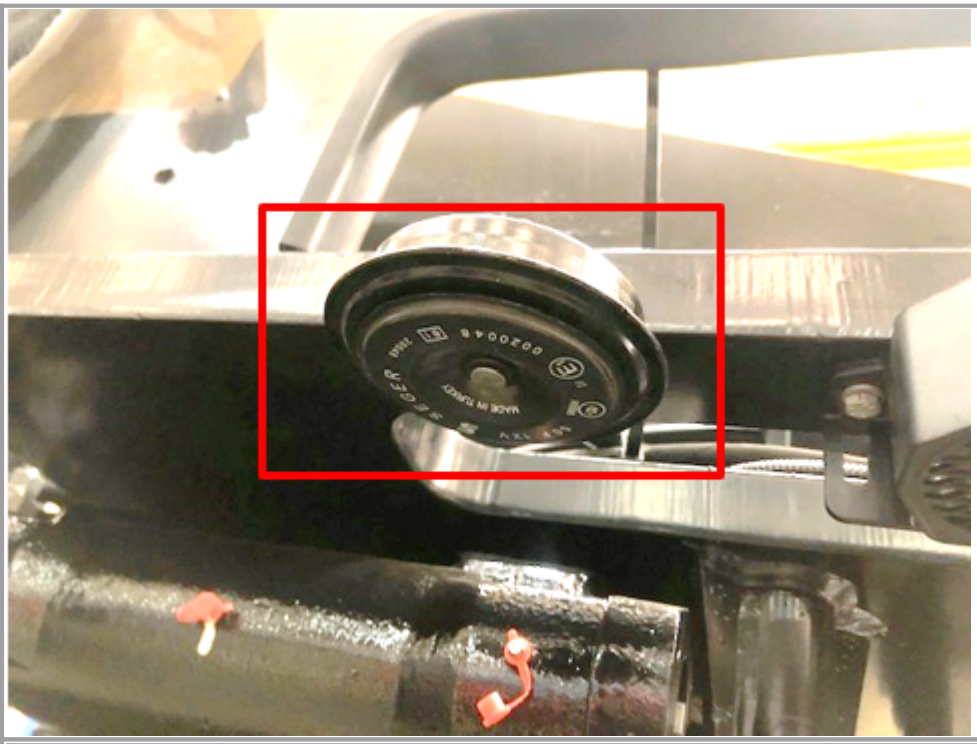
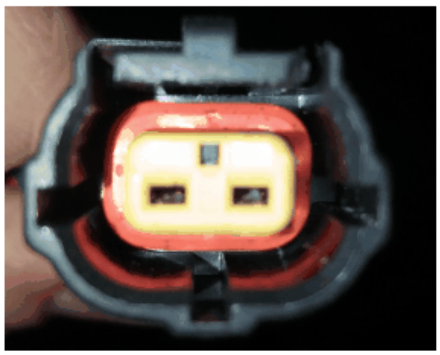
Location Image:

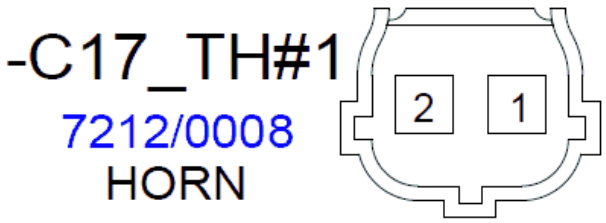


Signal:

Pin Number	Description	Wire Number
1	Horn relay to Horn output positive	77
2	Horn ground	6077

Wires & Connectors:





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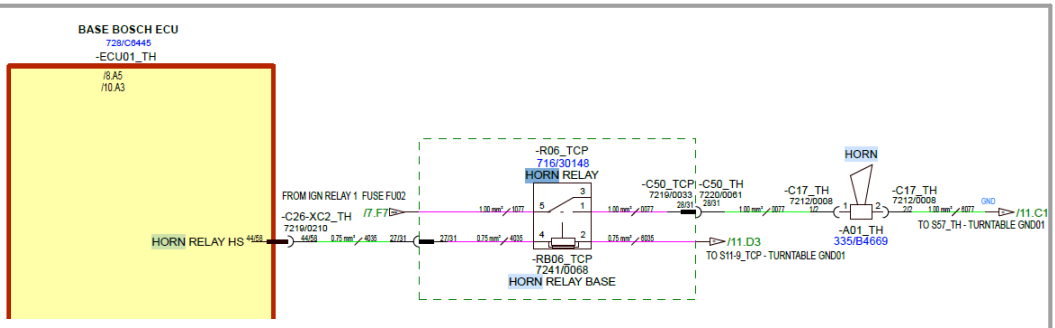
Internal Electrical Schematic:	
Testing:	**Identify the issue** 1. Visual check around machine and visual check of horn. 2. Turn the ignition on and wait for 3 beeps from control panel to ensure ECU start up. 3. Check for error codes on the display - see fault code list to resolve, if not move to next step.

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	4. Navigate through the display to inputs (turntable or platform depending on button being pressed) or connect service-master diagnostic tools and go to the horn page. 5. Press the horn button (turntable or platform) and check if input is received by ECU. 6.If the input is received then repeat with the output menu to identify which side is failing. **Outcome** 1.If the input is not received then check voltage at input switch (should be 10V), switch logic and then wire between switch and ecu pin (52/58). 2.If both input is received and output is activated, check the voltage at the horn connector, if voltage is available, check the horn. 3.if no voltage at the horn connector, check relay R05, & 10A fuse at FU02 in turntable control panel. 4.If no voltage at FU02 then check ignition relay 1 (R01_TCP). 5.If the input is received with no output, contact JCB Service team as likely software issue.

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Expected Values:	12V

Related Fault Codes:

Fault Code	Fault Description
B1181-16 742	Horn relay - Circuit short to low
B1182-13 743	Horn relay - Circuit open
B1206-17 752	Horn turntable button - Circuit short to high (10v)
B1207-16 753	Horn turntable button - Circuit short to low
B1208-24 754	Horn turntable button - Signal stuck high
B1273-17 817	Horn platform button - Circuit short to high (10v)
B1274-16 818	Horn platform button - Circuit short to low
B1275-24 819	Horn platform button - Signal stuck high

4.10 Steering Sensor

Components 132 > Steering Sensor

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Component :	Steering Sensor
Function:	The Steer Angle sensor measures the rear axle steer angle.This is CAN based sensor to measure the steer angle of the wheels & angle of measure shall be 360 degrees. The sensor is wired into the MECU, which normalizes the steer angle to +180° to -180° and broadcasts the steer angle on CAN. The Master Traction Inverter then uses this steer angle to speed up,slow down or reverse the drive wheels accordingly to help the machine spin turn. The Sensor can be calibrated using the JCB Servicemaster Set-up tool.
Location:	The Steer Angle Sensor is mounted on top of the rear axle on the right hand side. It is protected by a metal cover.

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Location

Image:

Signal:

Pin Number	Description	Wire N
1	Ground	65
2	Supply	10
5	CAN L	
6	CAN H	

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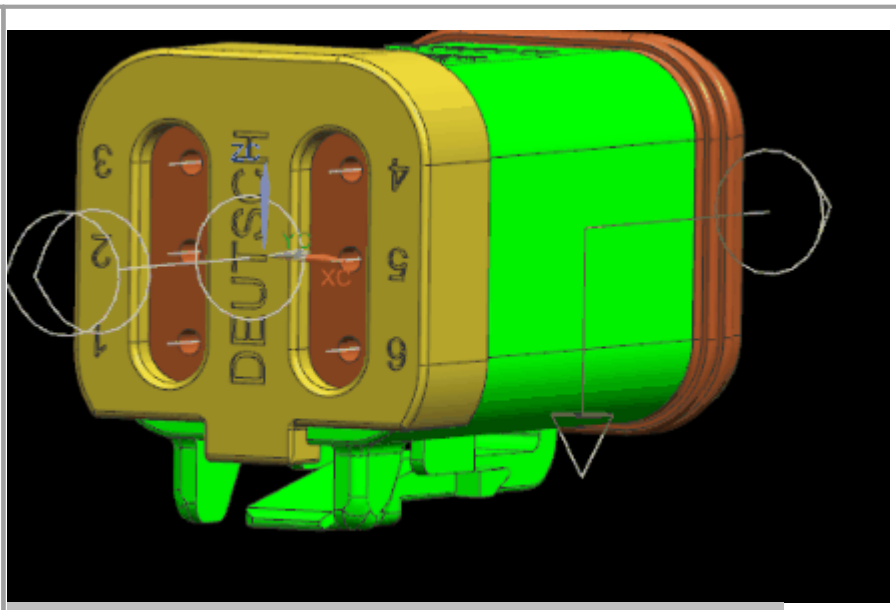
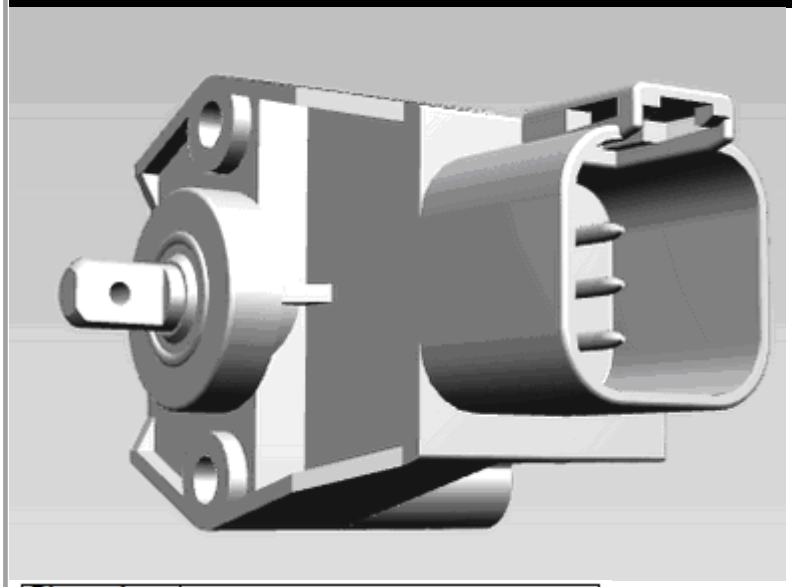
Wires & Connectors :





Plug pins	Function
1	OV (GND)
2	+ Vs (+9 - 36 Vdc)
3	NC
4	NC
5	CAN-L
6	CAN-H

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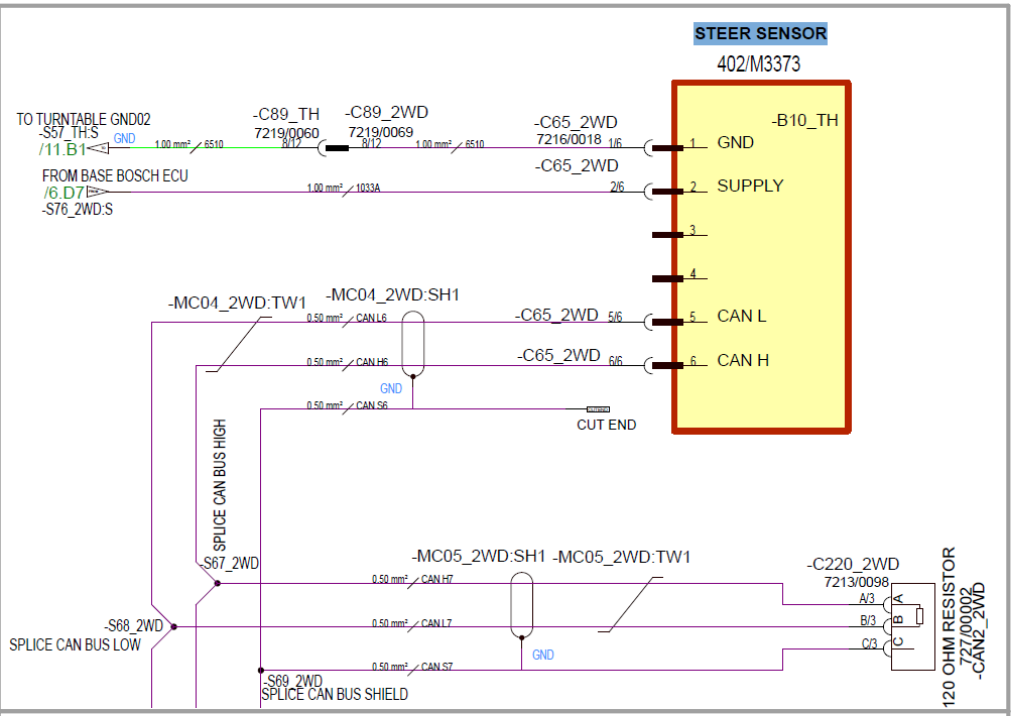
Internal

Electrical

Schematic:



Testing:

Important: Use the multi-meter on the harness connector pins. DO NOT use the meter on the ECU pins

1.Using a multimeter, check the continuity between the two pins on the Fuse. value should be 0 Ω

2.If there is no continuity then replace the Fuse

3. Check 12 volt on pin 1and 2

Expected Values:

12V

Related Fault

Fault Code	Fault Description
B1464-17 928	Steer Angle Sensor Output SC to High (5v or greater)
B1556-17 968	Steer Angle Sensor Output SC to High (5v or greater)

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Codes:	

4.11 Axle Lock Pressure Sensor

Axle Lock Pressure Sensor

Components 132 > Axle Lock Pressure Sensor

Component:	Axle Lock Pressure Sensor
Function:	The Axle lock pressure sensor is there to ensure the control system has locked the axle correctly and to give feedback to the machine control system
Location:	Rear Side of Chassis

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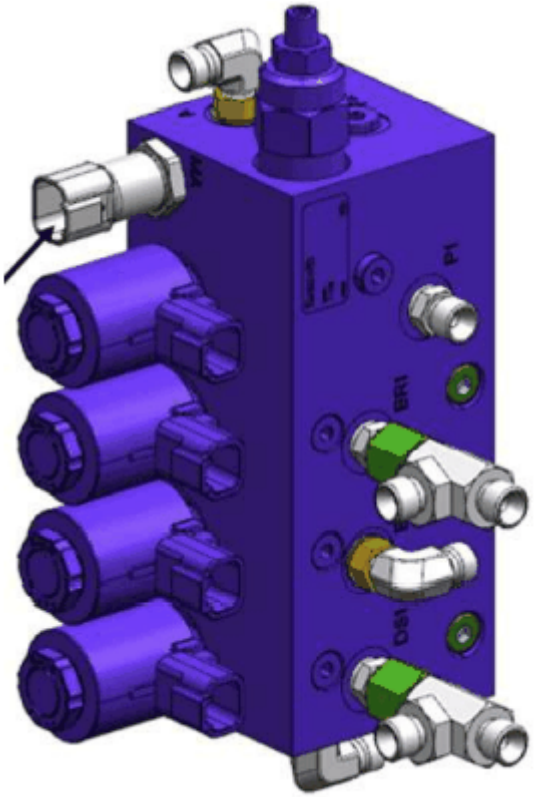
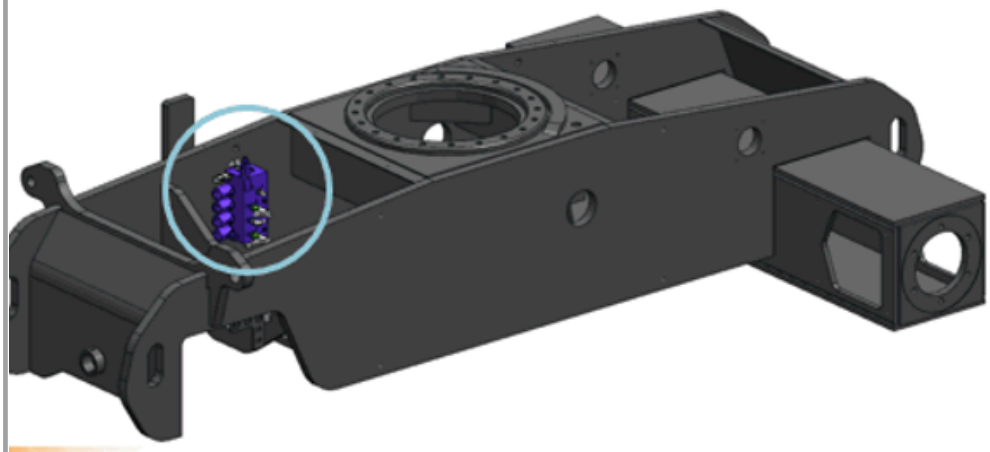
Location

Image:





Signal:

Pin Number	Description	Wire nur
1	GND	6063I

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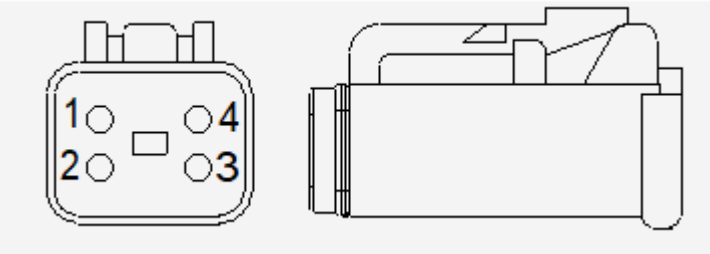
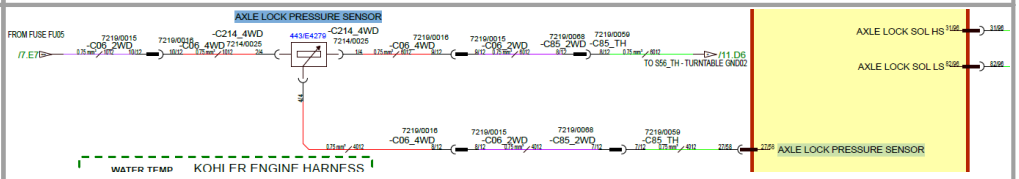
	2	12V from ignition relay 2	1024/
	3	NOT USED	NOT US
	4	Signal output to Bosch ecu	4034
Wires & Connectors :			
Internal Electrical Schematic:			
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. Axle lock pressure sensor measure pressure and convert to voltage 2. Ensure no water ingress inside sensor		

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	3. Check out put signal at connector C214_TH Pin no 4/4. This should read 0.5V to 4.5V 4. If there is no out put check input voltage at connector C214_TH (Pin 1 & 2) this should read 12V 5. If there is no 12V then investigate wiring as per schematic 6. If there is 12V inputs available but no out put signal then it might internal damage to sensor, Replace it
Expected Values:	12 V
Related Fault Codes:	

Fault Code	Fault Description
B1227-17 769	Oscillating axle lock pressure sensor - Circuit short to high (12v)
B1228-16 770	Oscillating axle lock pressure sensor - Circuit open or short to low
B1236-2F 775	Oscillating axle lock pressure sensor - Failure
B1238-2F 777	Oscillating axle lock pressure sensor - Output is less than 1v when it should be greater than 1v
B1272-2F 815	Oscillating axle lock pressure sensor - Output is greater than 1v when it should be less than 1v
B1288-2F 830	OSCILLATING AXLE PRESSURE SENSOR SOFTWARE Failure
B1301-2F 832	Oscillating axle lock pressure sensor - Failure

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4.12 Platform and Jib Valve Block

Platform and Jib Valve Block

Components 132 > Platform and Jib Valve Block

Component :	Platform and Jib Valve Block
Function:	•This valve block is used to divert oil between the Jib and Platform rotate functions. •When the platform rotate or Jib switch is pressed this enables the correct solenoid to energize. •This is used in conjunction with the Public proportional solenoid and platform flow solenoid from the turntable valve block
Location:	Near Platform Rotator

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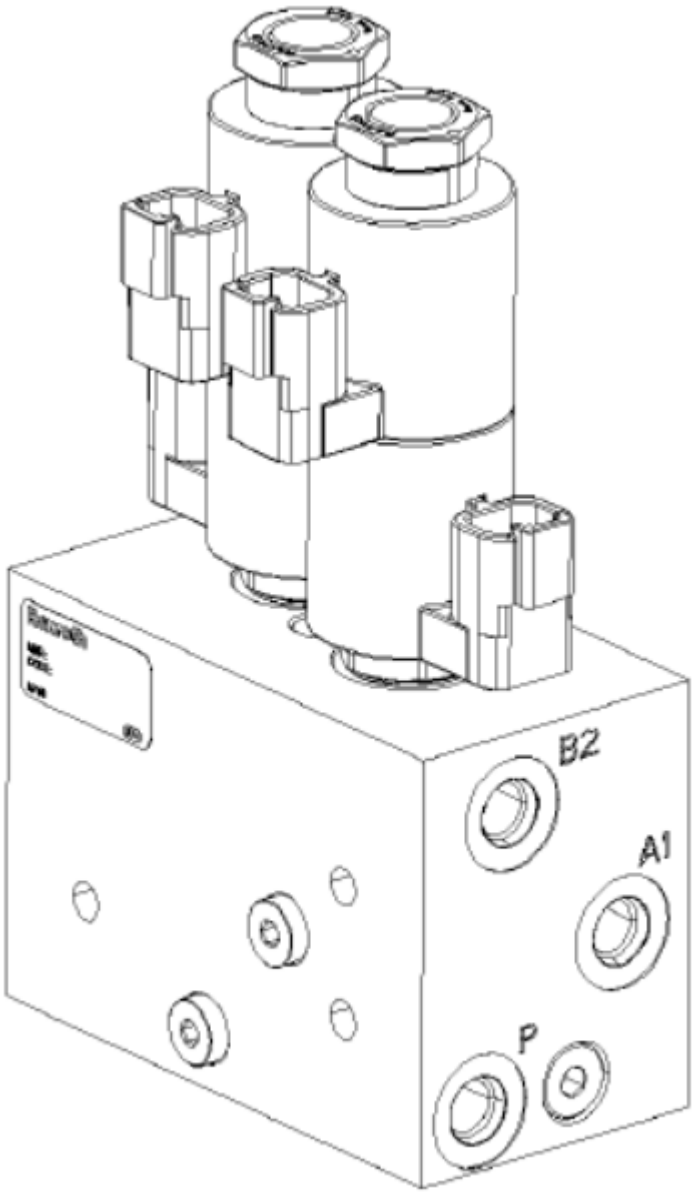
Location **Image:**	

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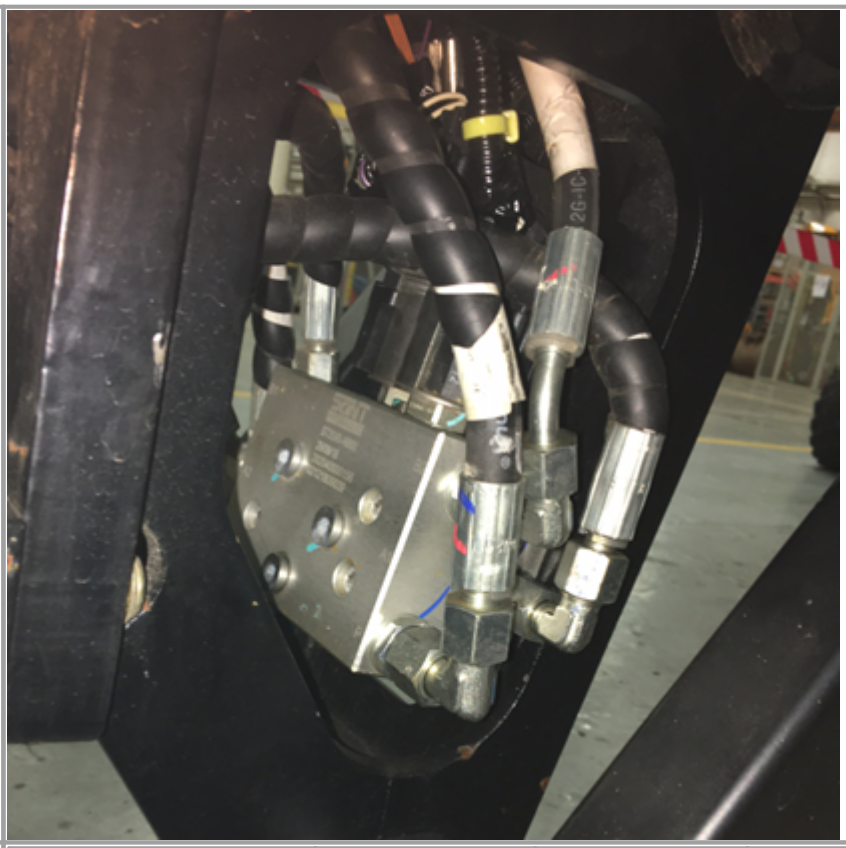

Signal:

Solenoid	Pin Number	Description	Wire Number on Harness
Platform Rotate Right	1	Feed	4083
Platform Rotate Right	2	GND	6050C
Platform Rotate Left	1	Feed	4084
Platform Rotate Left	2	GND	6050G
Jib Down	1	Feed	4081
Jib Down	2	GND	6050A
Jib Up	1	Feed	4082

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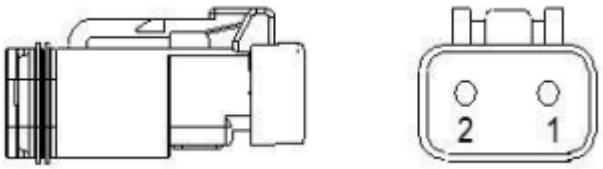
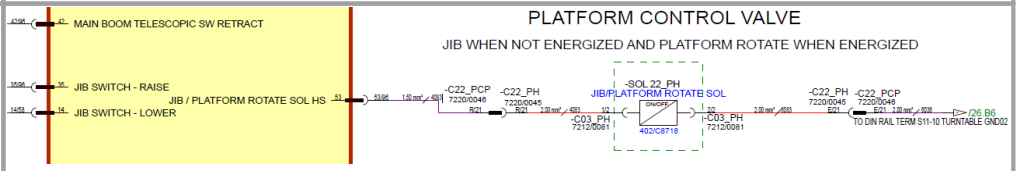
	Jib Up	2	GND	6050B
Wires & Connectors :				
Internal Electrical Schematic:				
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins.. 1. Using a solenoid pen, check to see if the solenoid is powered when the function is in use. 2. If the solenoid pen shows no power, disconnect the harness from the solenoid.			

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	3. Check the resistance across the solenoid. The reading should as per specification as mentioned in below table 4. If readings are incorrect, replace the solenoid. If correct disconnect the harness at the ECU and check harness continuity, repair/replace if necessary 5. If the harness continuity is OK, replace the solenoid
Expected Values:	12V
Related Fault Codes:	

Fault Code	Fault Description
B1329-13 857	Jib boom / Platform rotate flow solenoid - Circuit open or short to high (12v)
B1330-16 859	Jib boom / Platform rotate flow solenoid - Circuit short to low
B1401-13 913	Jib boom / Platform rotate solenoid - Circuit open
B1404-13 915	Jib boom / Platform rotate solenoid low side - Circuit open
B1419-13 920	Jib boom / Platform rotate selection solenoid - Valve fault
B1420-13 921	Jib boom / Platform rotate solenoid - Valve fault
B1437-17 922	Jib boom / Platform rotate solenoid raise / right functions - Circuit open or short to high (12v)
B1438-16 923	Jib boom / Platform rotate solenoid raise / right functions - Circuit short to low
B1439-13 924	Jib boom / Platform rotate solenoid lower / left functions - Circuit short to low
B1440-17 925	Jib boom / Platform rotate selection solenoid - Circuit short to high (12v)

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	B1441-16 926	Jib boom / Platform rotate selection solenoid - Circuit short to low
	B1442-13 927	Jib boom / Platform rotate selection solenoid - Circuit open
	B1670-17 1032	Jib boom / Platform rotate solenoid lower / left fucntions - Circuit open or short to high (12v)

4.13 Weight Sensor

Components 132 > Weight Sensor

Component :	Weight Sensor
Function:	•The load cell is to understand the load in the platform. •This is 2 channel and is part of the machines safety functions
Location:	The load cell is located near the platform control station

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Location

Image:

Signal:

Sensor 1		
Pin Number	**Description**	**Wire number**
A	12V Feed	1075R
B	Signal output (4-20mA)	4101
C	GND	6048C
Sensor 2		
Pin Number	**Description**	**Wire number**
A	12V Feed	1075T
B	Signal output (4-20mA)	4102
C	GND	6048B

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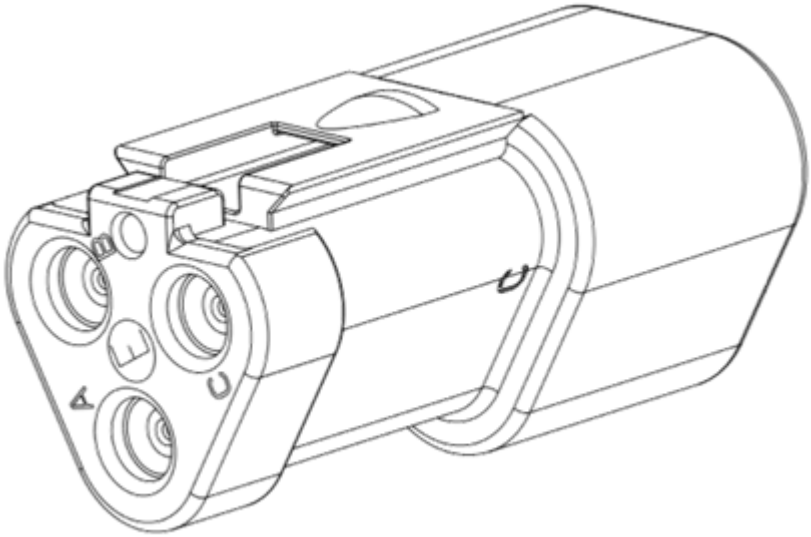
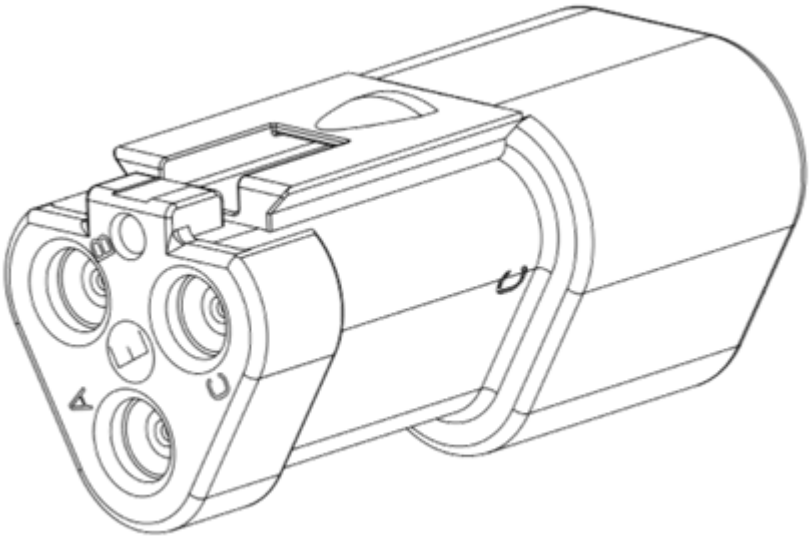
Wires & Connectors :	Harness side connectors Sensor side connector  

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Internal **Electrical** **Schematic:**	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. The weight sensor fitted on machine have two channels 2. Double channel load cell which is fitted at the point the platform is connected. 3. Each channel is connected with 3 Pins A for power supply (12V) Pin C for ground Pin B for output (analogue) 4. Make sure assembly of load cell is done as per SOP mentioned below (143/E0110)

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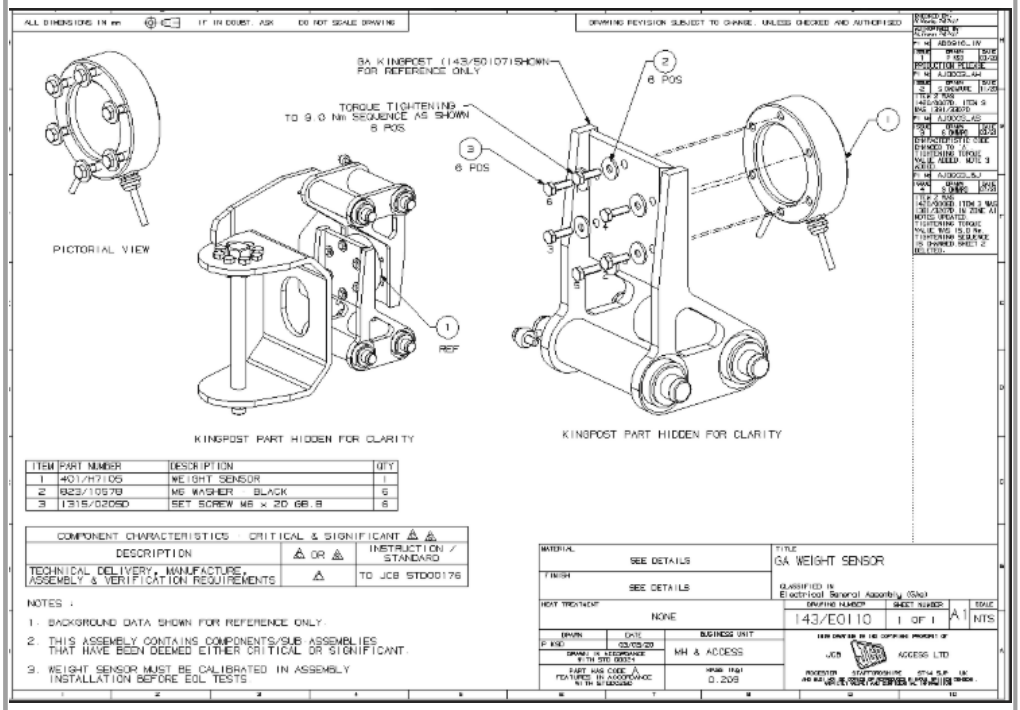

5 Check the current shown at both the channel out put it should be more then 4000 mAmp (with platform connected)

6 If any channel showing less then 4000 mAmp check the assembly tightening of weight cell,

7 If still issues persists check the load cell bracket flatness (should be within tolerance as mentioned in drawings)

8 Check the voltage at Pin A (should read 12V) if no voltage need to investigate as per schemetic

9 If voltage is there & no out put then it might be the internal damage to components , replace the load cell

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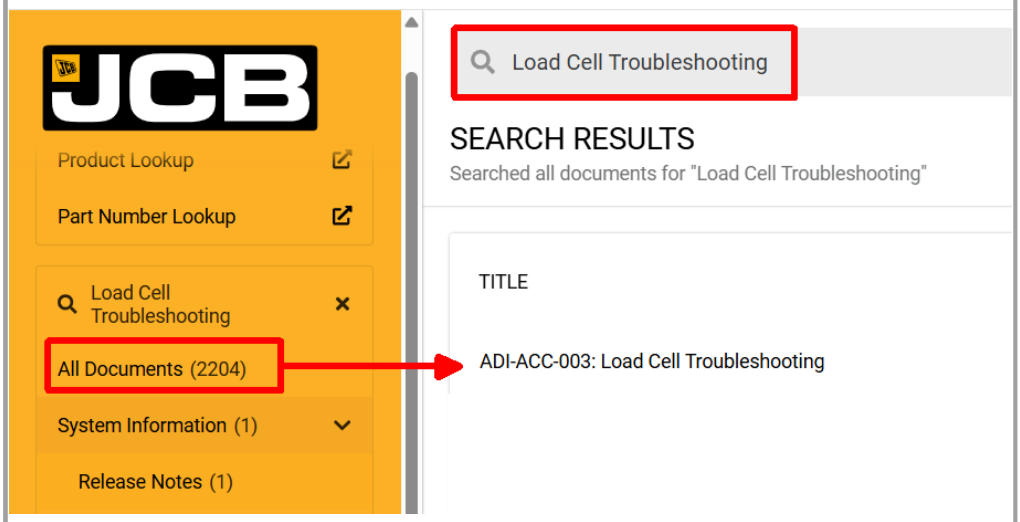
[Load Cell Troubleshooting Flow Chart](#) 47

Please refer ADI - ADI-ACC-003 - Load Cell

Troubleshooting



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Expected Values:	12V

Related Fault Codes:

Fault Code	Fault Description
B1221-17 759	Overload sensor 1 - Out of range (High)
B1222-16 761	Overload sensor 1 - Circuit open or out of range (Low)
B1223-17 763	Overload sensor 2 - Out of range (High)
B1224-16 765	Overload sensor 2 - Circuit open or out of range (Low)
B1225-2F 767	Overload sensor - Signal erratic
B1365-17 894	Overload Sensor 1 - Out of range (High)
B1366-16 896	Overload sensor 1 - Circuit open or out of range (Low)
B1367-17 898	Overload sensor 2 - Out of range (High)
B1368-16 900	Overload sensor 2 - Circuit open or out of range (Low)
B1675-17 1035	Overload sensor 1 - Circuit open or out of range (High)
B1676-16 1037	Overload sensor 1 - Out of range (Low)
B1677-17 1039	Overload sensor 2 - Circuit open or out of range (High)
B1678-16 1041	Overload sensor 2 - Out of range (Low)

4.14 Tilt Sensor

Components 132 > Tilt Sensor

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Component :	Tilt Sensor
Function:	•The tilt sensor is so the machine can understand the inclination of the machine. •The AJ48D tilt sensor will be open circuit when the inclination reaches >5° in the X or Y axis.
Location:	On Turntable
Location Image:	

Signal:

Pin Number	Description	Wire Nu
A	12V feed	1028

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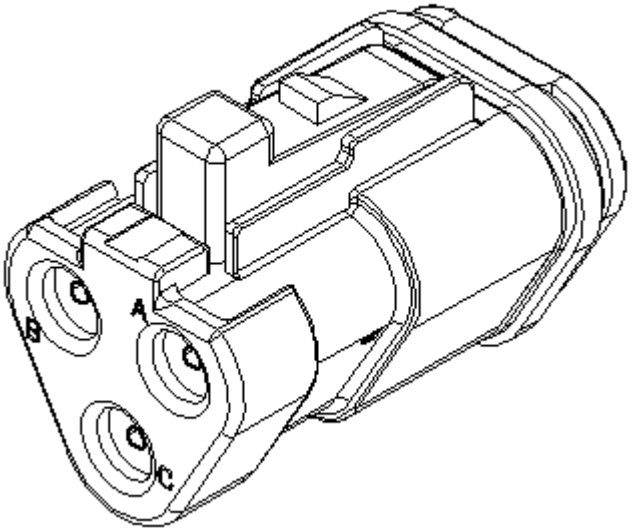
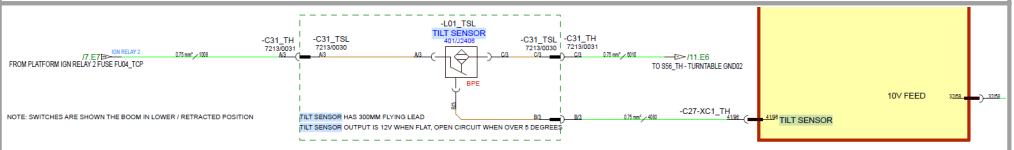
	B	Output Signal	4022
	C	GND	6063M
Wires & Connectors :			
Internal Electrical Schematic:			
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT use the meter on the ECU pins. 1. Check the tilt angle of the chassis with a level gauge 2. Re-set tilt sensor at zero degree position. Refer to the Service Manual		

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	3. Drive the machine 5° level & check the tilt alarm icon at display & tilt alarm LED at platform 4. If machine is stow mode it will allow all operation but if the machine is in raised mode it would not allow raise & drive operation 5. Check the voltage at Pin A (should read 12V) if no voltage need to investigate as per schemetic 6. If voltage is there & no out put then it might be the internal damage to components , replace the tilt censor. **Calibration** 1. Ensure the machine is made safe on flat level ground in both X and Y axis. 2. Turn on machine ignition 3. Below the tilt sensor there is a red lead 4. Use lead number 400/J2673 5. Connect crocodile clip side to the battery positive 6.press the terminal into the red lead below tilt sensor for between 3 - 7 seconds and remove 7. Below the tilt sensor there will be a green light that flashes very quickly to show the calibration has been accepted.

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Expected Values:	12V
Related Fault Codes:	**Fault Code** / **Fault Description** B1017-17 559 — TILT Sensor SC to High (not possible to detect until sensor connected to 10V) B1018-16 561 — Tilt Sensor short circuit to low

4.15 Slew Limit Switch

Slew Limit Switch

Components 132 > Slew Limit Switch

Component:	Slew Limit Switch
Function:	•The Slew position limit sensor is to understand the slew position of the machine and operator.

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	•As the machine is slewed round out of the forward position, the machine will pause any drive condition until the operator has pressed the slew acknowledgment switch. This is so the operator is sure of the direction that the machine will operate in.
Location:	On Turntable
Location Image:	
Signal:	**Pin Number** / **Description** / **Wire Numl**

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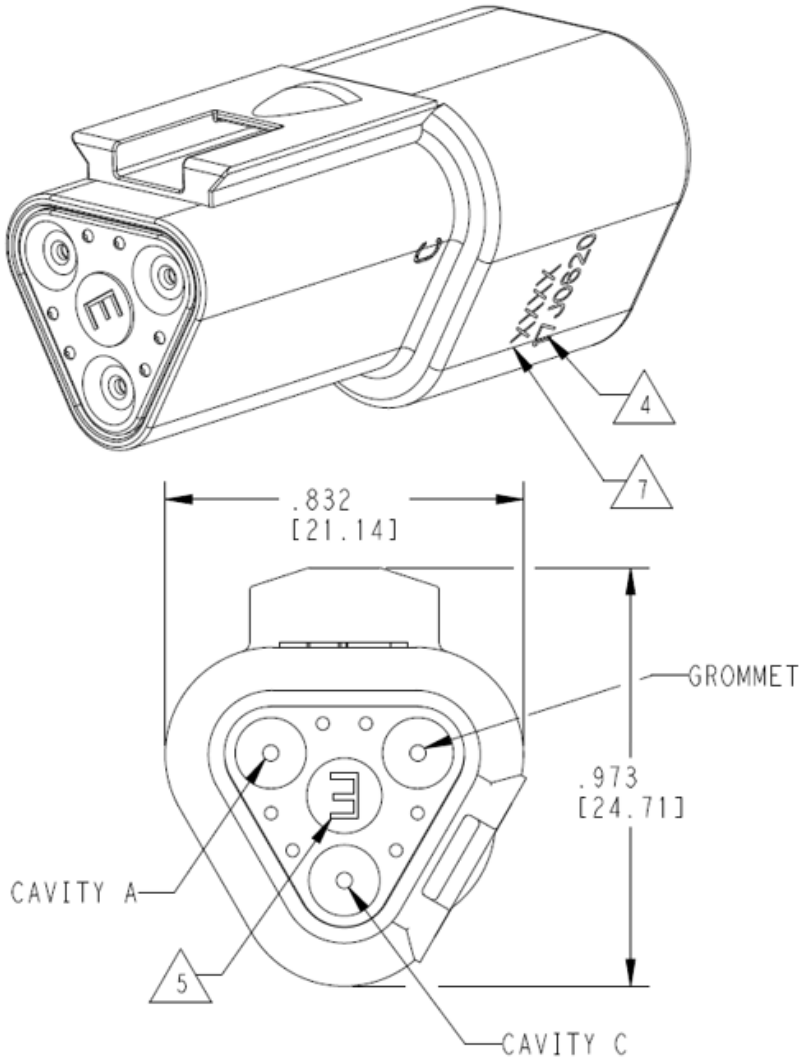
	A	10V feed	1046D
	B	Input Signal	4020
	C	Input Signal	4021

Wires & Connectors:



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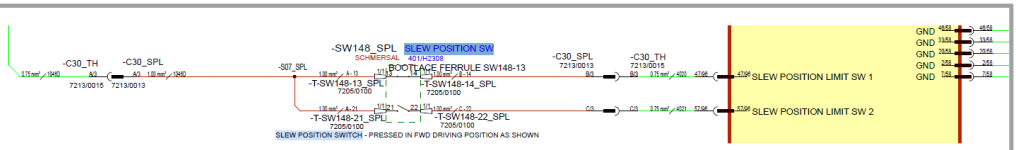
Internal Electrical Schematic:	
Testing:	Check Continuity on contact block terminal.
Expected Values:	12V
Related Fault Codes:	

Fault Code	Fault Description
B1019-17 563	Slew position switch 1 - Circuit short to high (12v)
B1020-17 564	Slew position switch 2 - Circuit short to high (12v)
B1021-16 566	Slew position switch 1 - Circuit short to low
B1022-13 567	Slew position switch - Signal plausibility failure (Circuit open)
B1023-16 568	Slew position switch 2 - Circuit short to low
B1024-92 570	Slew position switch - Signal plausibility failure (12v)

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4.16 Main Valve Block

Main Valve Block

Components 132 > Main Valve Block

Component :	Main Valve Block
Function:	The main valve block is used to control the hydraulic flow around the machine.
Location:	On Turntable near Fuel Tank

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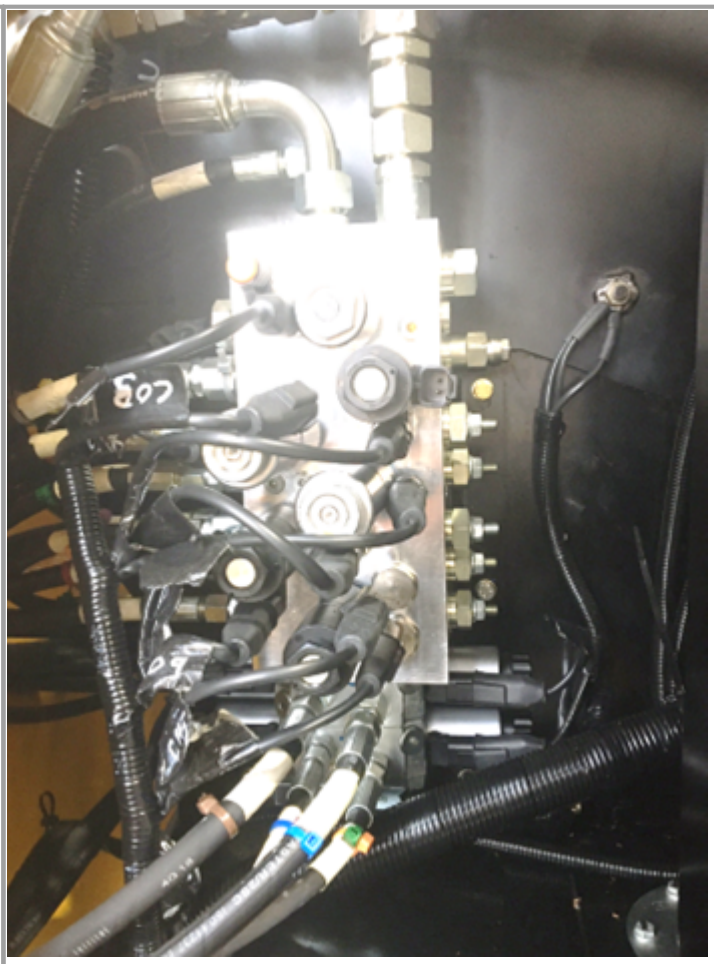
Location **Image:**	

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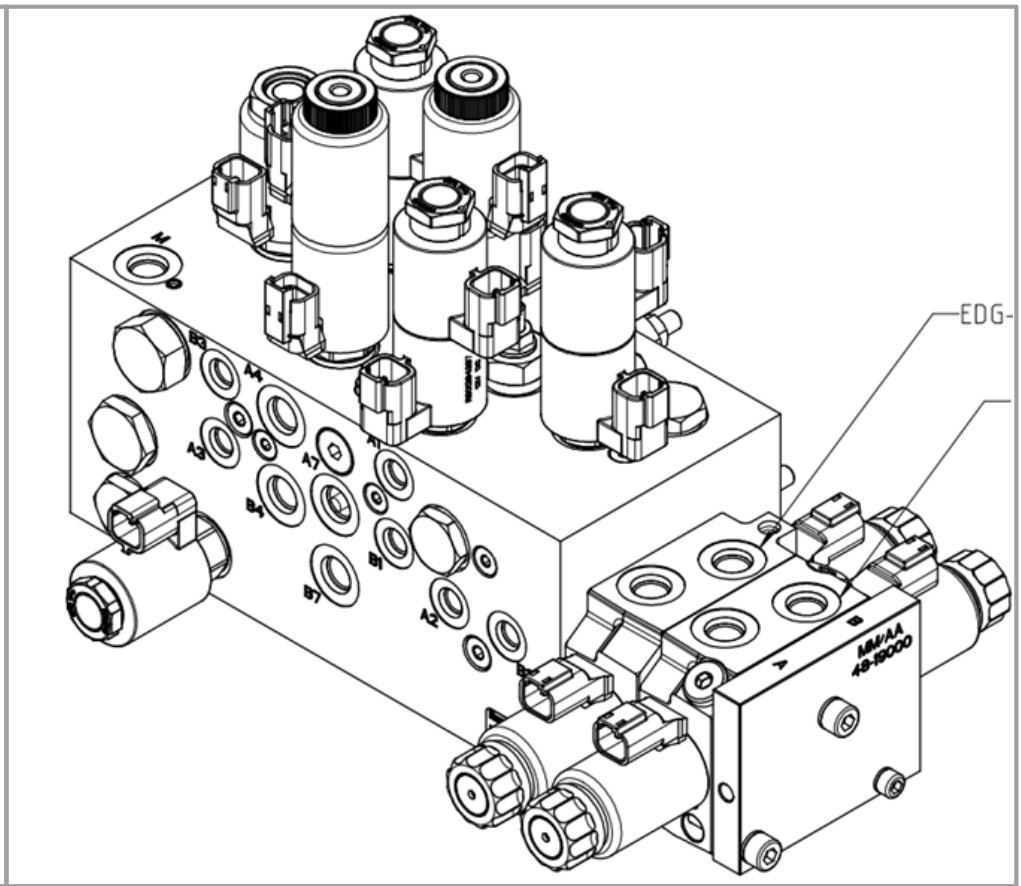

Signal:

C01_TH Articboom lower			
Pin Number	**Description**	**Wire Harness Numbers**	**Pin Number on ECU**
1	Artic boom lower	4043	77/96
2	Shared low side with Artic boom raise	4044B	89/96
C02_TH Articboom raise			

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Pin Number	Description	Wire Harness Numbers	Pin Number on ECU
1	Artic boom raise	4042	53/96
2	Shared low side with Artic boom lower	4044B	89/96
C03_TH Main boom Telescopic Retract			
Pin Number	**Description**	**Wire Harness Numbers**	**Pin Number on ECU**
1	telescopic retract	4049	75/96
2	Shared low side with telescopic extend	4050B	85/96
C04_TH Main boom telescopic Extend			
Pin Number	**Description**	**Wire Harness Numbers**	**Pin Number on ECU**
1	telescopic extend	4043	51/96

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2	Shared low side with telescopic retract	4044C	85/96
C05_TH Main boom raise			
Pin Number	**Description**	**Wire Harness Numbers**	**Pin Number on ECU**
1	main boom lower	4045	54/96
2	Shared low side with main boom raise	4047A	84/96
C06_TH Main boom lower			
Pin Number	**Description**	**Wire Harness Numbers**	**Pin Number on ECU**
1	main boom lower	4043	78/96
2	Shared low side with main boom raise	4047A	84/96
C07_TH Slew left proportional			

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Pin Number	Description	Wire Harness Numbers	Pin Number on ECU
1	Steer left	4054	7396
2	Shared low side with right proportional	4056C	87/96
C08_TH Slew right proportional			
Pin Number	**Description**	**Wire Harness Numbers**	**Pin Number on ECU**
1	Steer left	4055	49/96
2	Shared low side with left proportional	4056B	87/96
C09_TH Steer Left			
Pin Number	**Description**	**Wire Harness Numbers**	**Pin Number on ECU**
1	Steer left	4051	7496

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2	Shared low side with Steer right	4053C	80/96
C10_TH Steer Right			
Pin Number	**Description**	**Wire Harness Numbers**	**Pin Number on ECU**
1	Steer right	4052	50/96
2	Shared low side with Steer left	4053B	80/96
C11_TH Public proportional			
Pin Number	**Description**	**Wire Harness Numbers**	**Pin Number on ECU**
1	High Side	4057	30/96
2	Lowside	4058	81/96
C13_TH Lift & Slew flow valve			

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Pin Number	Description	Wire Harness Numbers	Pin Number on ECU
1	lift and slew flow	4062	Jan-96
2	GND	6064L	GND
C14_TH Platform level raise			
Pin Number	**Description**	**Wire Harness Numbers**	**Pin Number on ECU**
1	Level Raise	4059	Mar-96
2	GND	6064P	GND
C15_TH Platform level lower			
Pin Number	**Description**	**Wire Harness Numbers**	**Pin Number on ECU**
1	Level lower	4060	57/58
2	GND	6064N	GND
C16_TH Platform rotate/jib flow valve			

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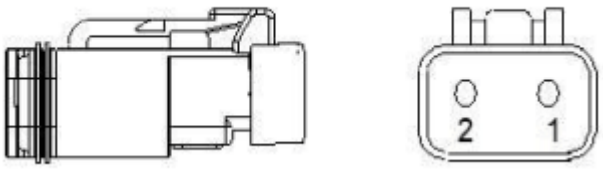
	Pin Number	Description	Wire Harness Numbers	Pin Number on ECU
	1	Platform flow valve	4061	Jul-96
	2	GND	6064M	GND
Wires & Connectors :	The image below shows a Deutsch 2 way connector. This is used for each solenoid on the valve block. 			

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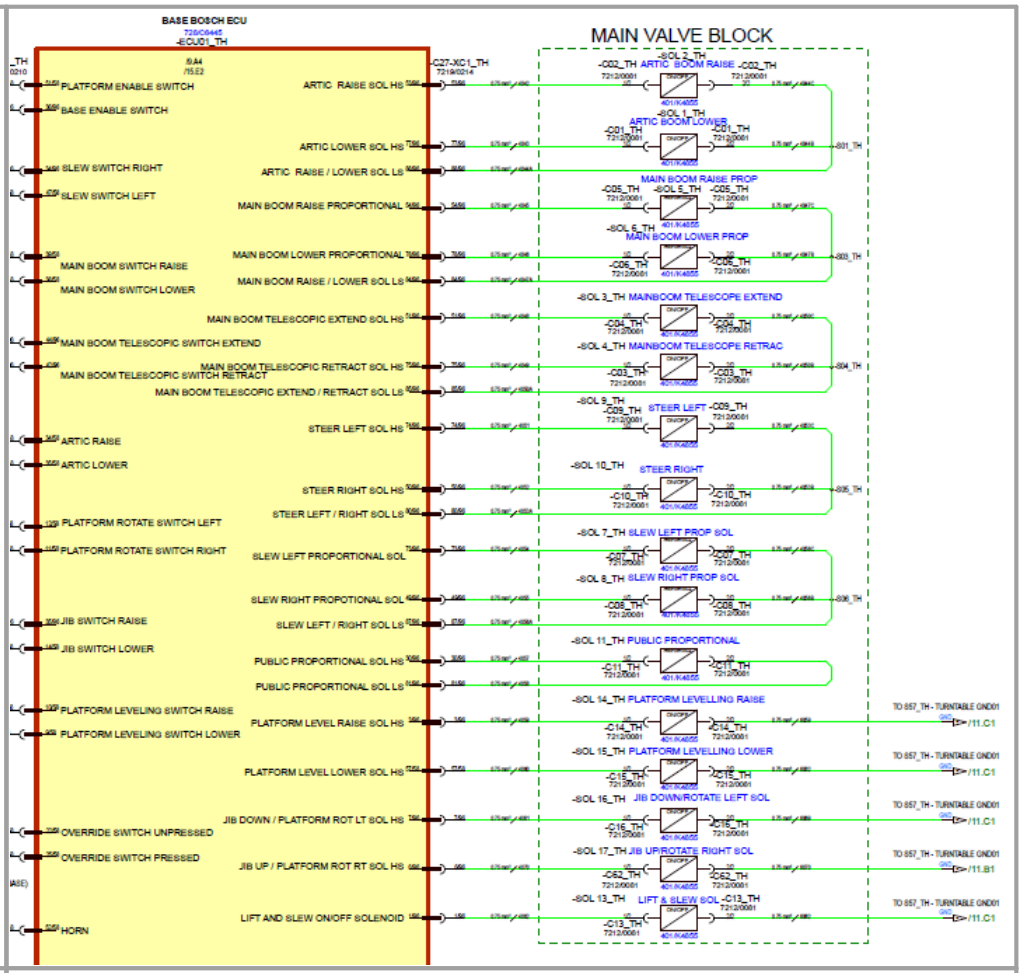
Internal

Electrical

Schematic:



Testing:

Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins.

1. Using a solenoid pen, check to see if the solenoid is powered when the function is in use.

2. If the solenoid pen shows no power, disconnect the harness from the solenoid.

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3. Check the resistance across the solenoid. The reading should as per specification as mentioned in below table

4. If readings are incorrect, replace the solenoid. If correct disconnect the harness at the ECU and check harness continuity, repair/replace if necessary

5. If the harness continuity is OK, replace the solenoid.

ELECTRICAL CHARACTERISTICS COIL POS: 31 - 32	
Connections	DEUTSCH DT 04-2PA
Voltage	12V ±15%
Coils Protection	IP69K
Insulation Class of Coil	H 180°C (356°F)
Current	Imax 1760 mA
Resistance at 20°C (68°F)	3.71 Ohm ±7%

ELECTRICAL CHARACTERISTICS COIL POS: 18	
Connections	DEUTSCH DT 04-2PA
Voltage	12V ±15%
Coils Protection	IP69K
Insulation Class of Coil	H 180°C (356°F)
Ambient temperature range	-40°C / +110°C (-40°F / +230 °F)
Current	Imax 1760 mA
Resistance at 20°C (68°F)	2.3 Ohm ±5%

ELECTRICAL CHARACTERISTICS COIL POS NO: 2.1 - 2.2	
Connections	DT04-2PA DEUTSCH
Voltage	12V ±10%
Coils Protection	IP69K
Circuit	Standard
Insulation Class of Coil	H 180°C (356°F)
Ambient temperature range	-40°C / +110°C (-40°F / +230 °F)
Power	22 W
Resistance at 20°C (68°F)	6.4 Ohm ±5%

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Expected Values:	12V

Related Fault Codes:

Fault Code	Fault Description
B1036-17 577	Public proportional output solenoid short circuit to high (>10.5V)
B1037-16 578	Public proportional output solenoid short circuit to low
B1038-13 579	PUBLIC Proportional Solenoid Valve High Side & Low Side Open Circuit
B1039-17 580	PLATFORM LEVELING DIRECTIONAL Solenoid Valve Raise High Side Short Circuit to High OR Open Circuit
B1040-16 581	DIRECTIONAL Solenoid Valve Raise High Side Short Circuit to Low
B1041-17 582	PLATFORM LEVELING DIRECTIONAL Solenoid Valve Lower High Side Short Circuit to High OR Open Circuit
B1042-16 583	PLATFORM LEVELING DIRECTIONAL Solenoid Valve Lower High Side Short Circuit to Low
B1076-17 616	Main boom solenoid high side both functions - Circuit short to high (12v)
B1077-16 618	Main boom solenoid high side both functions - Circuit short to low
B1078-13 619	Main boom solenoid high side both functions - Circuit open
B1079-17 621	Main boom solenoid both functions - Valve fault
B1080-17 622	Slew solenoid high side both functions - Circuit short to high (12v)
B1081-16 624	Slew solenoid high side both functions - Circuit short to low
B1082-13 625	Slew solenoid high side both functions - Circuit open
B1083-17 627	Slew solenoid both functions - Valve fault.
B1084-17 628	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve High Side Short Circuit to High OR Short Circuit
B1086-13 630	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve High Side & Low Side Open Circuit
B1087-17 632	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve Fault
B1088-17 633	Steer solenoid high side both functions - Circuit short to high (12v)

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B1089-16 635	Steer solenoid high side both functions - Circuit short to low
B1090-13 636	Steer solenoid high side and low side both functions - Circuit open
B1091-17 638	Steer solenoid both functions - Valve fault
B1092-17 639	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve High Side Short Circuit to High
B1093-16 641	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve High Side Short Circuit to Low
B1094-13 642	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve High Side & Low Side Open Circuit
B1095-92 644	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve Fault
B1133-17 699	JIB/PLATFORM FLOW High Side Solenoid Short Circuit to High
B1134-14 700	JIB/PLATFORM FLOW High Side Solenoid Short Circuit to Low
B1167-13 723	Platform rotate solenoid left function - Circuit open or short to high (12v)
B1168-16 724	Platform rotate solenoid left function - Circuit short to low
B1169-13 725	Platform rotate solenoid right function - Circuit open or short to high (12v)
B1170-16 727	Platform rotate solenoid right function - Circuit short to low
B1171-13 728	Jib boom solenoid raise function - Circuit open or short to high (12v)
B1172-16 729	Jib boom solenoid raise function - Circuit short to low
B1173-13 731	Jib boom solenoid lower function - Circuit open or short to high (12v)
B1174-16 732	Jib boom solenoid lower function - Circuit open or short to low
B1175-13 733	BOOM LIFT/SLEW DIRECTIONAL Solenoid Valve Short Circuit to High or Open Circuit
B1176-16 735	MAIN BOOM LIFT/SLEW DIRECTIONAL Solenoid Valve Short Circuit to Low
B1329-13 857	Jib boom / Platform rotate flow solenoid - Circuit open or short to high (12v)
B1330-16 859	Jib boom / Platform rotate flow solenoid - Circuit short to low
B1332-17 860	PUBLIC Proportional Solenoid Valve Low Side Short Circuit to High
B1333-16 862	PUBLIC Proportional Solenoid Valve Low Side Short Circuit to Low
B1334-13 863	PUBLIC Proportional Solenoid Valve Fault

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B1335-17 865	Main boom solenoid low side both functions - Circuit short to high (12v)
B1336-16 866	Main boom solenoid low side both functions - Circuit short to low
B1337-13 868	Main boom solenoid low side both functions - Circuit open
B1338-17 869	Slew solenoid low side both functions - Circuit short to high (12v)
B1339-16 871	Slew solenoid low side both functions - Circuit short to low
B1340-13 872	Slew solenoid low side both functions - Circuit open
B1341-17 873	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve Low Side Short Circuit to High
B1342-16 875	TEND OR RETRACT DIRECTIONAL Solenoid Valve Low Side Short Circuit to Low
B1344-17 877	Steer solenoid low side both functions - Circuit short to high (12v)
B1345-16 878	Steer solenoid low side both functions - Circuit short to low
B1350-17 884	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve Low Side Short Circuit to High
B1351-16 885	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve Low Side Short Circuit to Low
B1389-13 907	Steer solenoid both functions - Circuit open
B1401-13 913	Jib boom / Platform rotate solenoid - Circuit open
B1404-13 915	Jib boom / Platform rotate solenoid low side - Circuit open
B1417-13 918	Steer solenoid both functions - Valve fault
B1419-13 920	Jib boom / Platform rotate selection solenoid - Valve fault
B1420-13 921	Jib boom / Platform rotate solenoid - Valve fault
B1437-17 922	Jib boom / Platform rotate solenoid raise / right functions - Circuit open or short to high (12v)
B1438-16 923	Jib boom / Platform rotate solenoid raise / right functions - Circuit short to low
B1439-13 924	Jib boom / Platform rotate solenoid lower / left functions - Circuit short to low
B1440-17 925	Jib boom / Platform rotate selection solenoid - Circuit short to high (12v)
B1441-16 926	Jib boom / Platform rotate selection solenoid - Circuit short to low
B1442-13 927	Jib boom / Platform rotate selection solenoid - Circuit open

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	B1670-17 1032 Jib boom / Platform rotate solenoid lower / left fucntions - Circuit open or short to high (12v)

4.17 Electric Pump

Electric Pump

Components 132 > Electric Pump

Component :	Electric Pump
Function:	Electric pump is used in case of emergency to get the basket down when the primary supply (Engine) fails.
Location:	On Turntable rear side

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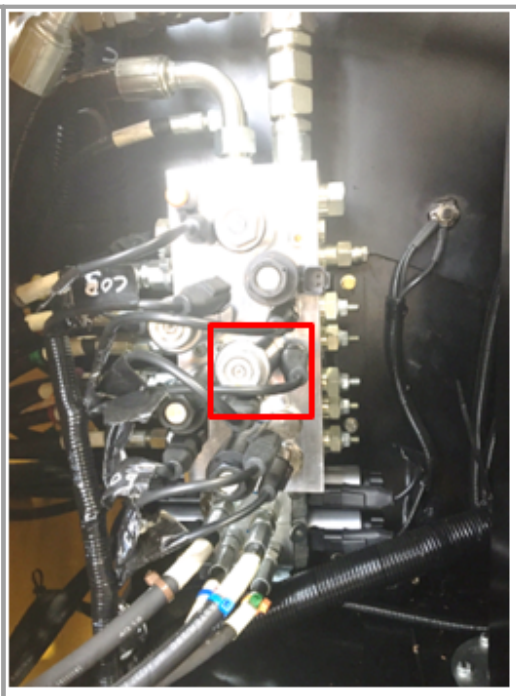
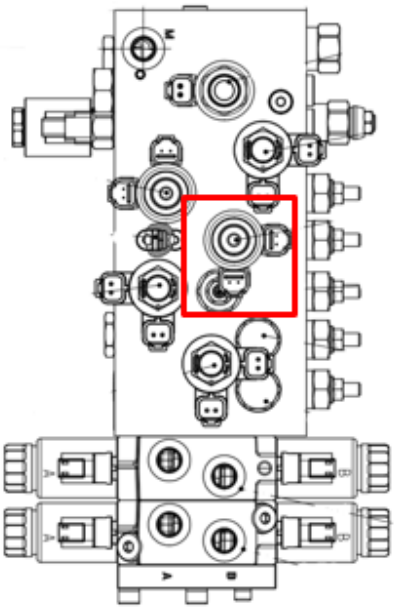
Location

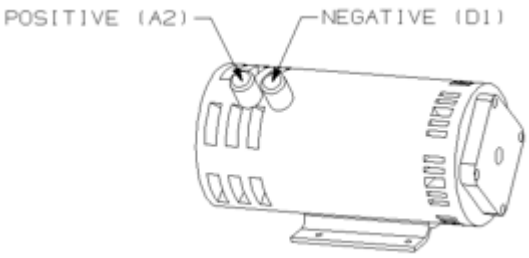
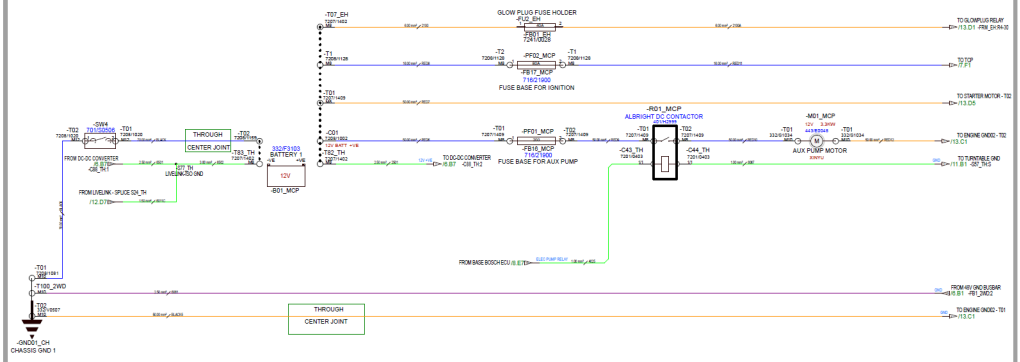
Image:





Signal:

Pin	Battery Cable Connected to
+VE	Red
-VE	Black

Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1.There is a 3.3KW DC motor fitted inside turntable. 2.Check the terminal properly connected at motor . Red (positive) cable should be connected at A2 & Black (negative) cable should be connected at B1 3.Visually inspect the motor winding, bushes & commutator

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	4.Check the voltage at DC contactor power contacts. This should read 12V 5.If there is no 12V then check DC contactor coil supply & investigate wiring as schematic 6.If there is 12V supply then there may be internal damage to motor , replace it.
Expected Values:	12V
Related Fault Codes:	

Fault Code	Fault Description
B1055-17 593	AUX / Overload override button pressed condition - Circuit short to high (10v)
B1056-16 594	AUX / Overload override button pressed condition - Circuit short to low
B1414-17 916	AUX Pump output - Circuit open or circuit short to high (12v)
B1415-16 917	AUX Pump output - Circuit short to low
B1694-17 1046	AUX / Overload override button unpressed condition - Circuit short to high (10v)
B1695-16 1047	AUX / Overload override button unpressed condition - Circuit short to low
B1696-13 1048	AUX / Overload override button both conditions - Signal plausibility failure (Circuit open)
B1697-92 1049	AUX / Overload override button both conditions - Signal plausibility failure (10v)

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4.18 AC Connector

AC Connector

Components 132 > AC Connector

Component :	AC Connector
Function:	The GFCI is the power outlet 110V AC Supply it is fitted on Platform of the machine when Hydraulic generator option is used.
Location:	In Platform near Manual Box

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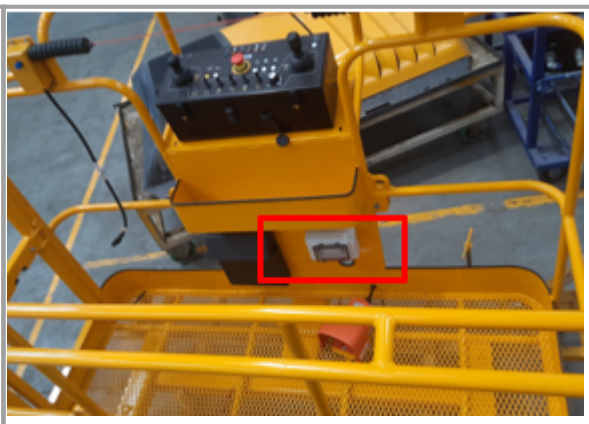
Location

Image:



Signal:

Pin Number	Description	Wire Number
T4 (Terminal)	Line	2.5mm2 Brown
T5 (Terminal)	Neutral	2.5mm2 Blue
T6 (Terminal)	Earth	2.5mm2 YE-GN
T7 (Terminal)	GND	6004

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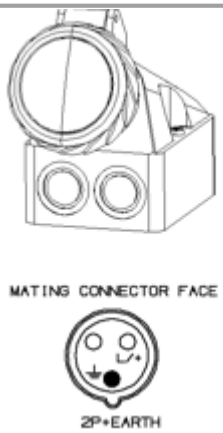
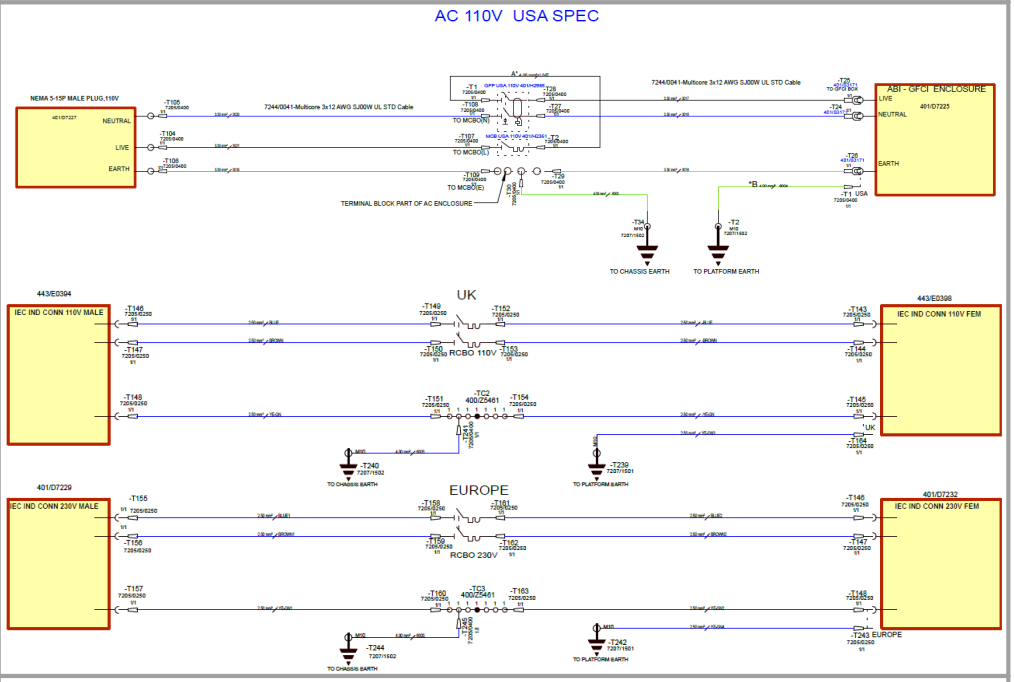
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1.Visually inspect the connectors should not be broken 2.Check for the live neutral and earth connection it should be correctly fitted 3.Check for the continuity as per the PAT guide for live earth and neutral

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Expected Values:	110V
Related Fault Codes:	N/A

4.19 Diagnostic Connector

Diagnostic Connector

Components 132 > Diagnostic Connector

Component:	Diagnostic Connector
Function:	•The diagnostic connectors are to allow for a laptop connection to the machine.There are 2 connectors and they both have the same access to the

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	machine but in 2 locations to assist various tasks. •The base connection also has a second CAN installed that is for the engine.
Location:	One available on Base Control and One available in Platform Control box.

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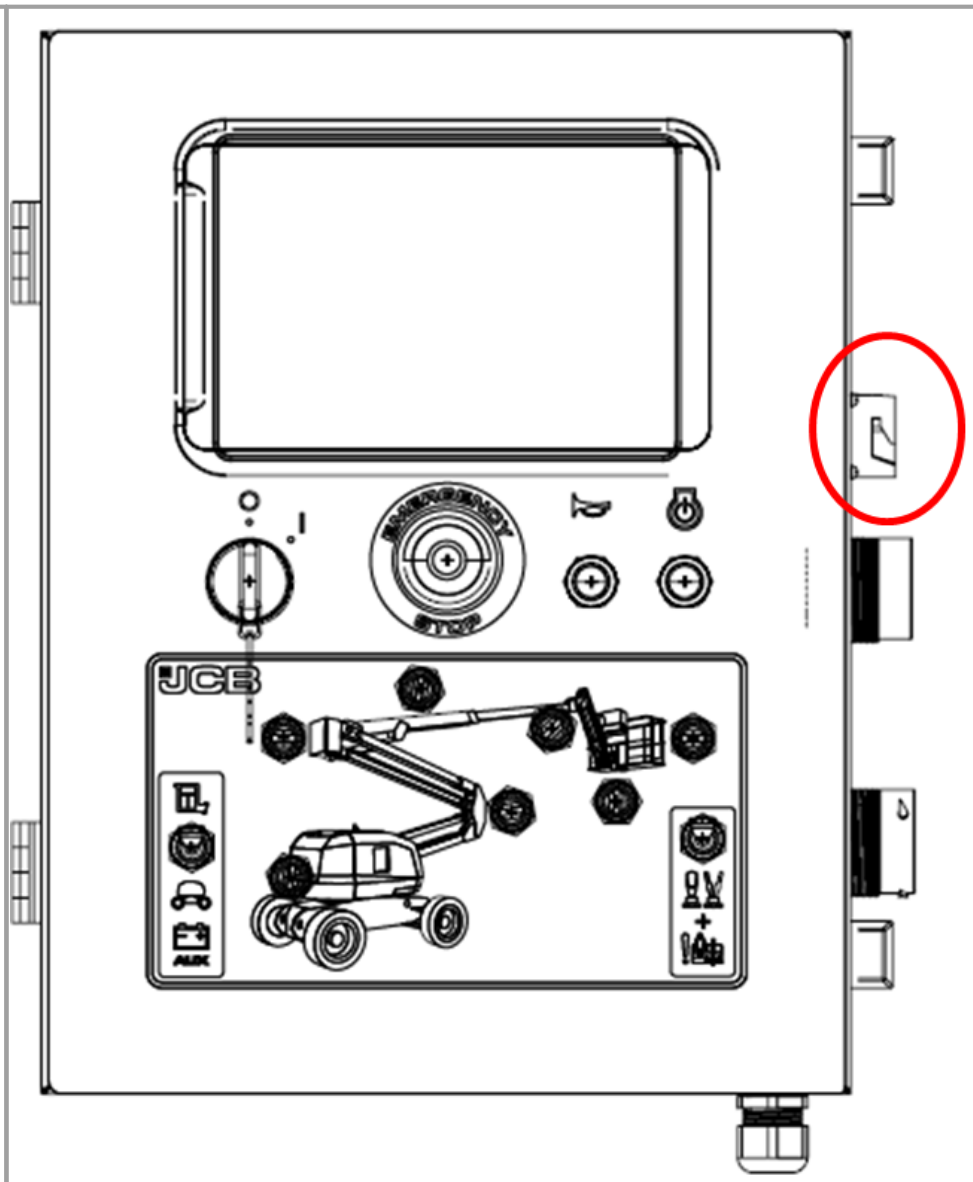
Location **Image:**	

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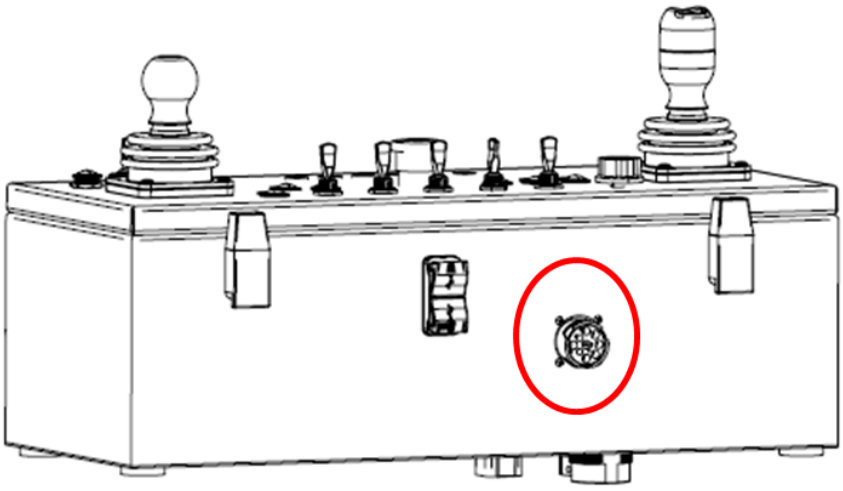

Signal:

Pin Number	Description	Wire Number/ Colour
A	GND	6063T
B	12V	1016
C	CAN H	Yellow
D	CAN L	Green
E	Shield	Bare Shield
F	NOT IN USE	NOT IN USE
G	NOT IN USE	NOT IN USE
H	15765 CAN H (Only in base connection)	Yellow
J	15765 CAN L (Only in base connection)	Green

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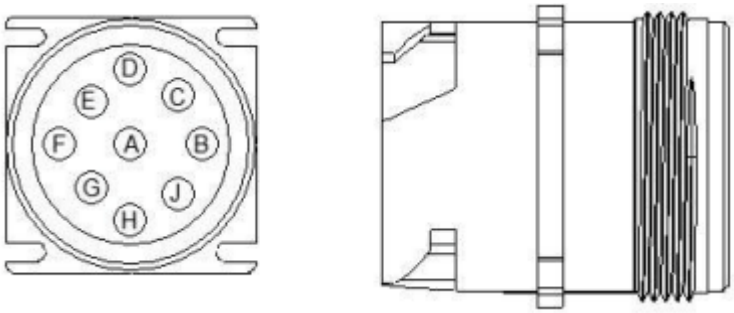
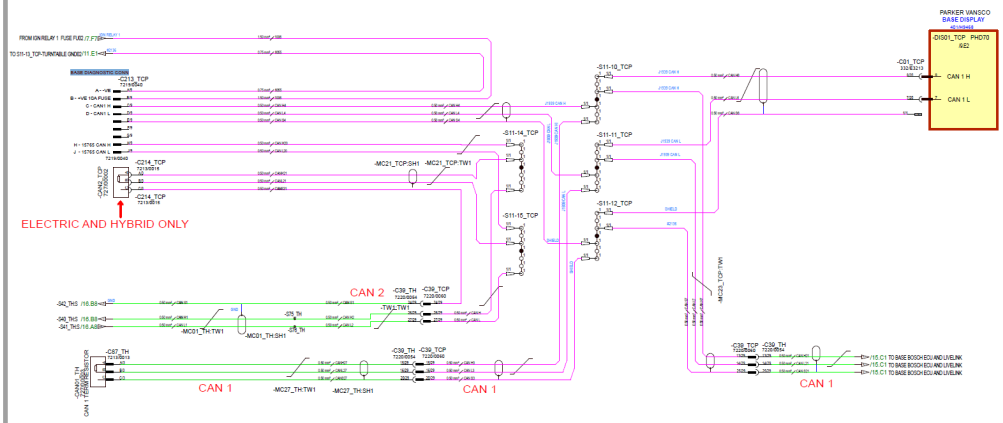
Wires & Connectors:	7219/0040 Diagnostic Connector 
Internal Electrical Schematic:	**Base Diagnostic**  Platform Diagnostic

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	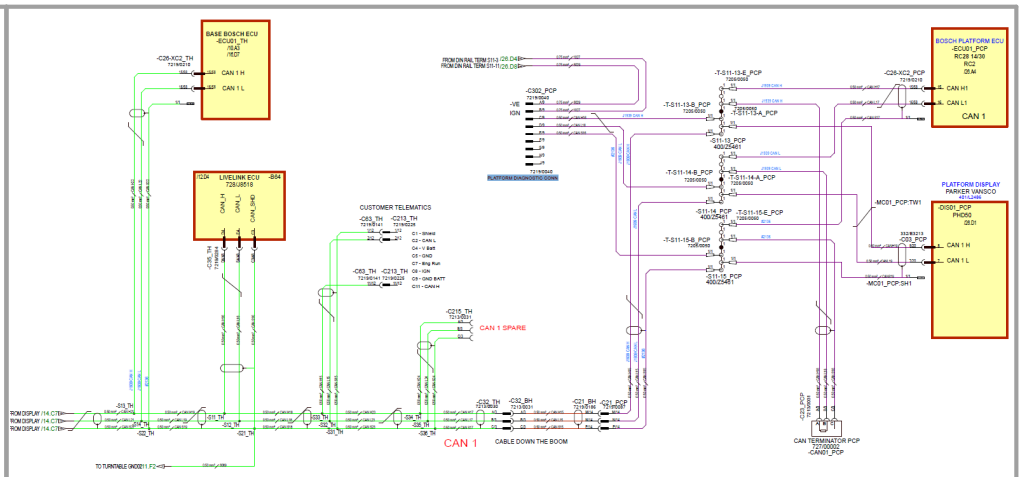
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. Ensure the machine is switched off. 2. Measure CAN1 resistance between pin 'C' and 'D 3. This should read 60 ohms. 4. If this isn't the case the DLA connector is faulty.
Expected Values:	See Signal

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Related Fault Codes:	N/A

4.20 Customer Telematics

Customer Telematics

Components 132 > Customer Telematics

Component :	Customer Telematics
Function:	•Customer Telematics connector is a point that customers can connect up there own Telematics system. •This is done by some of the large rental fleets that do not use JCB Livelink and have their own solution in place.

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Location:

The Telematics ecu is mounted on the rear of the base control panel box the plug should just be visible from the top of the control panel.

Location Image:

Signal:

PIN NUMBER	DESCRIPTION	WIRE NUMBER
1	SHIELD	BARE
2	CAN L	GREEN
3		
4	V-BATT	3002C
5	GND	6022DD

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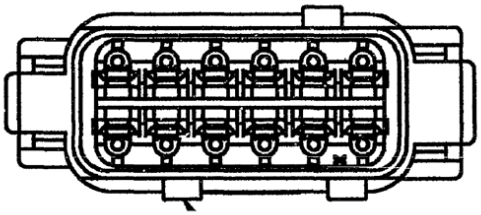
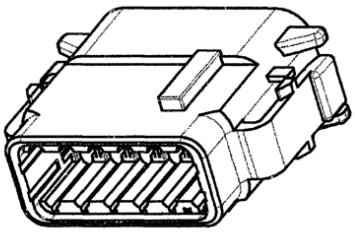
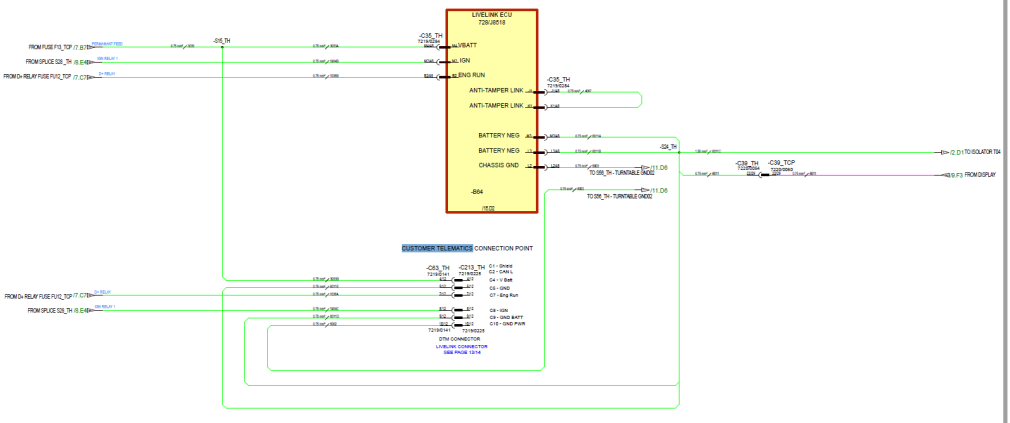
	6		
	7	ALTERNATOR RUN SIGNAL	1032D
	8	IGNITION	0040D
	9	GND BATT	6022C
	10	GND POWER	6063G
	11	CAN H	YELLOW
	12		
Wires & Connectors :	 		
Internal Electrical Schematic:			

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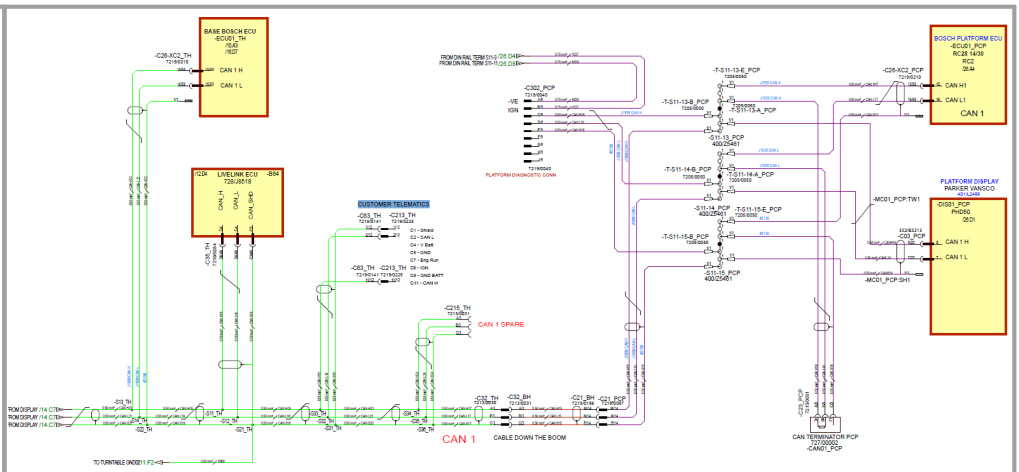

Testing: Refer existing Live Link ECU help file for testing procedure

Expected Values: 12V

Related Fault Codes:

Fault Code	Fault Description
U1900-16 1080	LIVELINK - VEHICLE VOLTAGE BELOW NORMAL
U1901-16 1081	LIVELINK - INTERNAL VOLTAGE BELOW NORMAL
U1904-85 1082	LIVELINK - ECU ABOVE TEMPERATURE THRESHOLD
U1905-84 1082	LIVELINK - ECU BELOW TEMPERATURE THRESHOLD
U1906-96 1083	LIVELINK - ACCELEROMETER INTERNAL FAILURE
U1907-09 1083	LIVELINK - MODEM JAMMED
U1908-09 1084	LIVELINK - GPS ANTENNA NOT OK
U1909-96 1085	LIVELINK - NO COMMS WITH GPS MODULE
U190A-96 1086	SIM Card Failure

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	U190B-96 1087 LIVELINK - NO COMMS WITH GSM MODULE
	U190C-86 1088 LIVELINK - GSM NETWORK REGISTRATION FAILED

4.21 LiveLink ECU

Livelink ECU

Components 132 > LiveLink ECU

Component :	Livelink ECU
Function:	The Live-link ECU is used for remote monitoring of machine operation, location, health and critical parameters.
Location:	The Livelink ecu is mounted on the rear of the base control panel box the plug should just be visible from the top of the control panel.

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Location

Image:

Signal:

12 WAY DTM FEM KEY C HSG

PIN NUMBER	DESCRIPTION	WIRE NUMBER
M4	V_Batt	3033A
M2	V_IGN	1904B
E2	ENG _RUN	1036B
H1	CH1_INPUT	-
G1	CH2_INPUT	-
F1	CH3_INPUT	-

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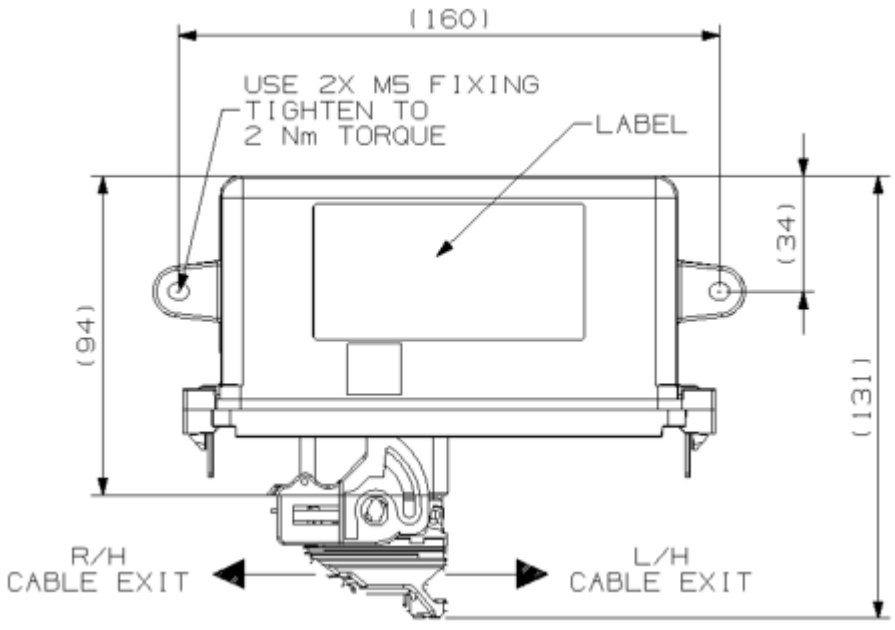
	C1	CH4_INPUT	1036A
	D4	IGN	1904C
	E4	CAN_L	6011D
	C3	CAN_SHD	6002
	L2	CHASSIS GND	CANH12
	L3	BATT_NEG	6011B
	M3	BATT_NEG	6011A
	K1	ANTI_TAMPER LINK	4067
	J1	ANTI_TAMPER LINK	4067
Wires & Connectors :			

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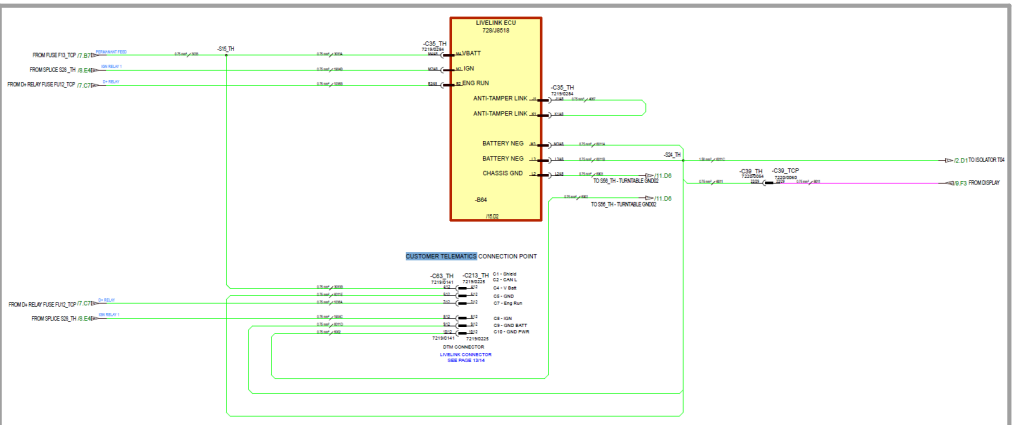
Internal

Electrical

Schematic:



Testing:

Refer existing Live Link ECU help file for testing procedure.

Expected Values:

12V

Related Fault Codes:

Fault Code	Fault Description
U1900-16 1080	LIVELINK - VEHICLE VOLTAGE BELOW NORMAL
U1901-16 1081	LIVELINK - INTERNAL VOLTAGE BELOW NORMAL
U1904-85 1082	LIVELINK - ECU ABOVE TEMPERATURE THRESHOLD
U1905-84 1082	LIVELINK - ECU BELOW TEMPERATURE THRESHOLD
U1906-96 1083	LIVELINK - ACCELEROMETER INTERNAL FAILURE
U1907-09 1083	LIVELINK - MODEM JAMMED
U1908-09 1084	LIVELINK - GPS ANTENNA NOT OK
U1909-96 1085	LIVELINK - NO COMMS WITH GPS MODULE

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	U190A-96 1086	SIM Card Failure
	U190B-96 1087	LIVELINK - NO COMMS WITH GSM MODULE
	U190C-86 1088	LIVELINK - GSM NETWORK REGISTRATION FAILED

4.22 Base Bosch ECU

Base Bosch ECU

Components 132 > Base Bosch ECU

Component :	Base Bosch ECU
Function:	•When the ECU turns on, there is a check in the Bosch software to ensure the ECU is in a safe state to turn on and enable. •After the Bosch boot block check there should be a check in the software to check for status of inputs to ensure the software is in a safe condition before allowing all functions. •The base Bosch ECU perform all the functions of machine.
Location:	On Chassis near Hydraulic Tank

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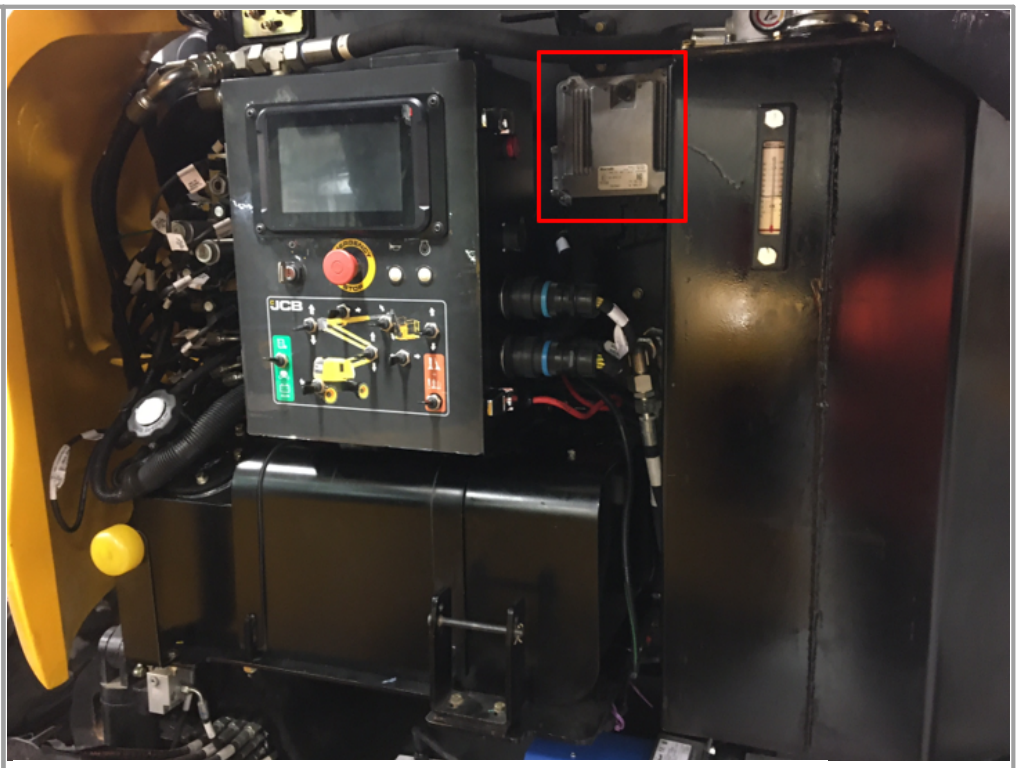
Location

Image:



Signal:

58 Way connector		
Pin Number	**Description/ Signal**	**Wire Number**
1	Power Supply - 12V	1023C

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2	GND	6060M
3	Power Supply - 12V	1023D
4	Power Supply - 12V	1023E
5	Power Supply - 12V	1018C
6	Power Supply - 12V	1018G
7	GND	6060L
8	NOT USED	NOT USED
9	Platform leveling Switch input - Lower (10V when pressed)	61
10	Platform leveling Switch input - Raised (10V when pressed)	60
11	Platform rotate switch input - right (10V when pressed)	57
12	Platform rotate switch input - left (10V when pressed)	56
13	NOT USED	NOT USED
14	Jib Switch input - Lower (10V when pressed)	59
15	CAN H1 (yellow)	yellow

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16	CAN L1 (Green)	green
17	NOT USED	NOT USED
18	NOT USED	NOT USED
19	NOT USED	NOT USED
20	GND	6060N
21	NOT USED	NOT USED
22	Override switch unpressed (10V when not pressed)	62
23	NOT USED	NOT USED
24	Boom rest switch input 2	4011
25	Override switch pressed (10V when pressed)	63
26	NOT USED	NOT USED
27	Axle lock pressure sensor (0.5-4.5)	4034
28	E-stop positive (12V when unpressed)	41
29	NOT USED	NOT USED
30	NOT USED	NOT USED
31	NOT USED	NOT USED
32	10V output from ECU	1030C

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33	GND	6060P
34	Artic boom input switch - raise (10V when pressed)	54
35	Artic boom input switch - lower (10V when pressed)	55
36	NOT USED	NOT USED
37	NOT USED	NOT USED
38	main boom switch input - lower (10V when pressed)	51
39	main boom switch input - raise (10V when pressed)	50
40	ignition switch input (12V)	0040B
41	Hydraulic generator solenoid output (12V)	4041
42	high torque solenoid output (12V)	4040
43	beacon output (12V)	4032
44	horn relay output (12V)	4035
45	power electronics input (12V)	1029C
46	GND	6060R

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47	slew switch input - left (10V when pressed)	49
48	NOT USED	NOT USED
49	RC Config 2 (GND)	6060K
50	Engine start switch input (10V when pressed, momentary)	66
51	Platform enable switch (10V when switch at platform)	46
52	Horn input switch (10V when pressed, momentary)	65
53	NOT USED	NOT USED
54	NOT USED	NOT USED
55	NOT USED	NOT USED
56	White noise alarm output	4036C
57	Platform level lower solenoid output	4060
58	Power electronics supply (12V)	1029B

96 Way connector		

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Pin Number	Description/ Signal	Wire Number
1	Lift & slew on/off solenoid output	4062
2	NOT USED	NOT USED
3	Platform level solenoid output - Raise	4059
4	NOT USED	NOT USED
5	NOT USED	NOT USED
6	NOT USED	NOT USED
7	Platform rotate/ Jib flow solenoid	4061
8	NOT USED	NOT USED
9	NOT USED	NOT USED
10	NOT USED	NOT USED
11	NOT USED	NOT USED
12	NOT USED	NOT USED
13	NOT USED	NOT USED
14	E-Stop -ve (GND when unpressed)	42
15	NOT USED	NOT USED
16	NOT USED	NOT USED

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17	NOT USED	NOT USED
18	Blocked air filter signal (GND when blocked)	4023
19	NOT USED	NOT USED
20	NOT USED	NOT USED
21	NOT USED	NOT USED
22	GND	6060C
23	GND	6060D
24	GND	6060G
25	NOT USED	NOT USED
26	Front brake solenoid output	26/96
27	NOT USED	NOT USED
28	Rear brake solenoid output	4039
29	NOT USED	NOT USED
30	Public proportional solenoid output Highside	4057
31	Axle lock solenoid output Highside	4037
32	NOT USED	NOT USED
33	NOT USED	NOT USED

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34	Slew switch input - right (10V when pressed)	48
35	Jib Switch input - raise (10V when pressed)	58
36	Base enable switch (10V when pressed)	47
37	Boom Rest Input switch 1	4009
38	NOT USED	NOT USED
39	Fuel sender input (resistance to gnd)	39/96
40	NOT USED	NOT USED
41	Tilt sensor input	4022
42	main boom telescope input switch - retract	53
43	NOT USED	NOT USED
44	main boom telescope input switch - extend	52
45	GND	6060H
46	GND	6060J
47	Slew position switch input switch 1	4020
48	main boom telescope limit switch input sw1	4105
49	Slew right proportional output solenoid	4055
50	Steer right solenoid highside output	4052

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51	main boom telescope extend solenoid output	4048
52	forward drive solenoid output highside	4064
53	Artic boom raise highside output	4042
54	main boom raise solenoid output	4045
55	NOT USED	NOT USED
56	NOT USED	NOT USED
57	Slew position limit switch input sw2	4021
58	Engine alternator input signal	1032B
59	main boom telescope retract limit sw2	4106
60	NOT USED	NOT USED
61	NOT USED	NOT USED
62	NOT USED	NOT USED
63	NOT USED	NOT USED
64	NOT USED	NOT USED
65	NOT USED	NOT USED
66	NOT USED	NOT USED
67	NOT USED	NOT USED

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68	NOT USED	NOT USED
69	NOT USED	NOT USED
70	NOT USED	NOT USED
71	NOT USED	NOT USED
72	NOT USED	NOT USED
73	slew left proportional solenoid highside	4054
74	Steer left highside output	4051
75	main boom telescope retract hs output	4049
76	reverse highside solenoid output	4065
77	Articboom lower highside output	4043
78	main boom lower proportional highside output	4046
79	NOT USED	NOT USED
80	Steer left/right lowside	4053A
81	Public proportional Lowside	4058
82	Axle lock solenoid lowside	4038
83	NOT USED	NOT USED
84	main boom raise/lower lowside	4047A

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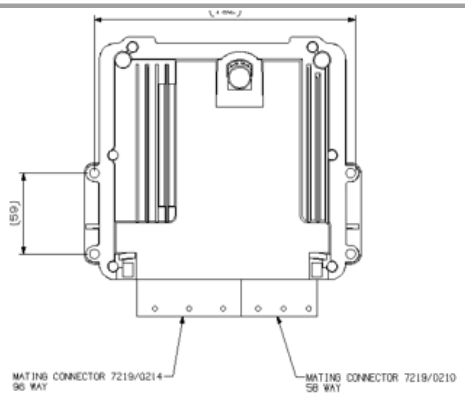
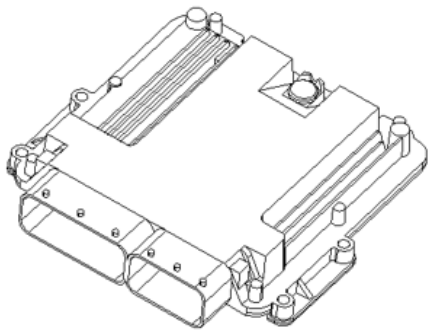
	85	Main boom telescope output lowside	4050A
	86	Forward/ Reverse output lowside	6015C
	87	Slew left/ right output lowside	4065A
	88	Artic raise/ lower lowside	4044A
	89	Engine ignition output (12V)	4027
	90	buzzer highside output	4024
	91	NOT USED	NOT USED
	92	NOT USED	NOT USED
	93	electric pump relay highside output	4025
	94	Engine start (crank signal)	4028
	95	NOT USED	NOT USED
	96	NOT USED	NOT USED
Wires & Connectors :	 		

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Internal **Electrical** **Schematic:**	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. Connect machine to the Servicemaster diagnostic tool using the DLA Connector. 2. Ensure LED's change state when the corresponding function is selected and ensure a CAN message is being sent from the ECU on the network tab. 3. If faulty replace the MECU.
Expected **Values:**	

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Related Fault Codes:	Refer PLM doc.AC00001178 for all ECU related fault codes. (Fault code start from B relates to ECU)

4.23 Battery Charger

Battery Charger

Components 132 > Battery Charger

Component :	Battery Charger
Function:	•For A45E-There is only one Battery Charger used to charge 48V batteries using a mains power source. Main supply can be connected to the port given at chassis

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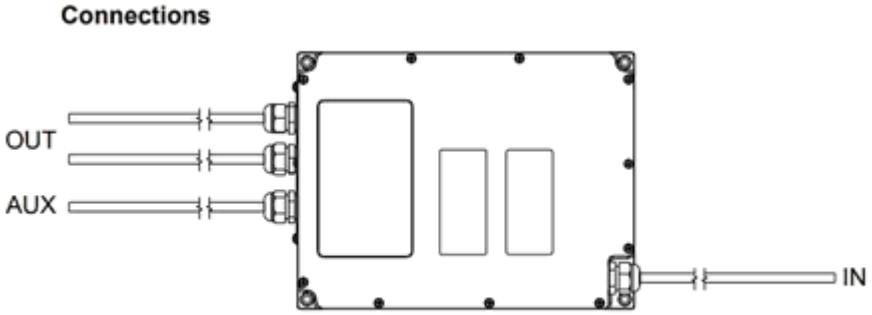
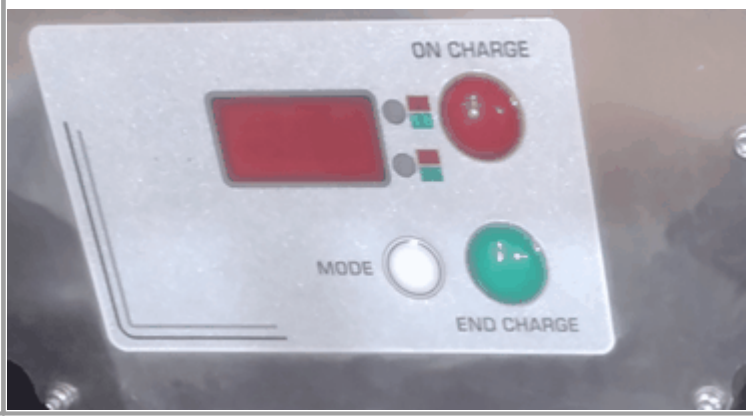
	•For A45H- There are two battery chargers used to chard 48V batteries. when engine is ON (power to platform is not pressed at platform), 48V batteries will be charged through both the charger •In case engine is not running operator can charge these batteries through main power source , but in that case only one charger (Master) will be running.
Location:	•The battery Charger is located at Chassis covered with plate, •Charger post will be located in front of the chassis
Location **Image:**	 

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Signal:

Auxiliary inputs and outputs cable

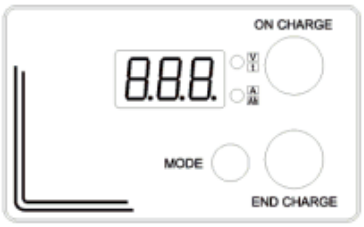
Super seal 6 ways Female connector		
PIN	**Colore filo**	**Descrizione**
1	White	AUX1 COM
2	Brown	AUX1 NO
3	Violet	AUX1 NC
4	Grey	AUX2 COM
5	Pink	AUX2 NO
6	Red/Blue	AUX2 NC

Super seal 5 ways Male Connector		
PIN	**Colore filo**	**Descrizione**
1	Grey/Pink	Thermal sensor PT100
2	White/Yellow	Thermal Sensor NPT100
3	Yellow/Brown	Remote Led COM
4	Black	Remote Led Green
5	Red	Remote Led Red

Super-seal 5 ways Female connector		
PIN	**Colore filo**	**Descrizione**
1	Blue	CAN NEG
2	Yellow	CAN H
3	Green	CAN L
4	Brown / Green	CAN L
5	White/ Green	CAN HT: 120Ω termination resistor internally connected to CAN H

Visualization

Digital instrument (display version)



From the starting the digital instrument will display the string of the following parameters:

- **BATTERY VOLTAGE** (two-tone red upper led).
- **CURRENT** provided by the charger (two-tone red lower led).
- **TIME** in hours lacking to the end of charge (two-tone green upper led).
- **Ah** supplied (two-tone green lower led).

By pressing the MODE button, the parameters' sequence is blocked and it will be kept the last value displayed. By pressing again on the MODE button the sequence of parameters restarts.

BIG LED indicators (display version)

Colour	Description
Red	Constant or Max current phase (IUIa).
Blinking red (4s ON – 1s OFF)	Voltage control phase (IUIa).
Red and blinking green (4s ON – 1s OFF)	Overcharging phase (IUIa).
Blinking green (4s ON – 1s OFF)	Wait phase (for equalization) (IUIa).
Green	End charge (only for CU1 BA2)
Blinking green (4s ON – 1s OFF)	Equalization pulse and floating
Green and red blinking together	Connection with CanConsolle or S/S HW-SW.

BI-COLOR LED indicator (version without display)

Colour	Description
Red	Constant or Max current phase (IUIa).
Blinking red (4s ON – 1s OFF)	Voltage control phase (IUIa).
Orange	Overcharging phase (IUIa).
Blinking green (4s ON – 1s OFF)	Wait phase (for equalization) (IUIa).
Blinking Orange (1s ON – 1s OFF)	Allarm.
Green	End charge
Blinking green (4s ON – 1s OFF)	Equalization pulse and floating
Green red alternated	Connection with CanConsolle or S/S HW-SW.

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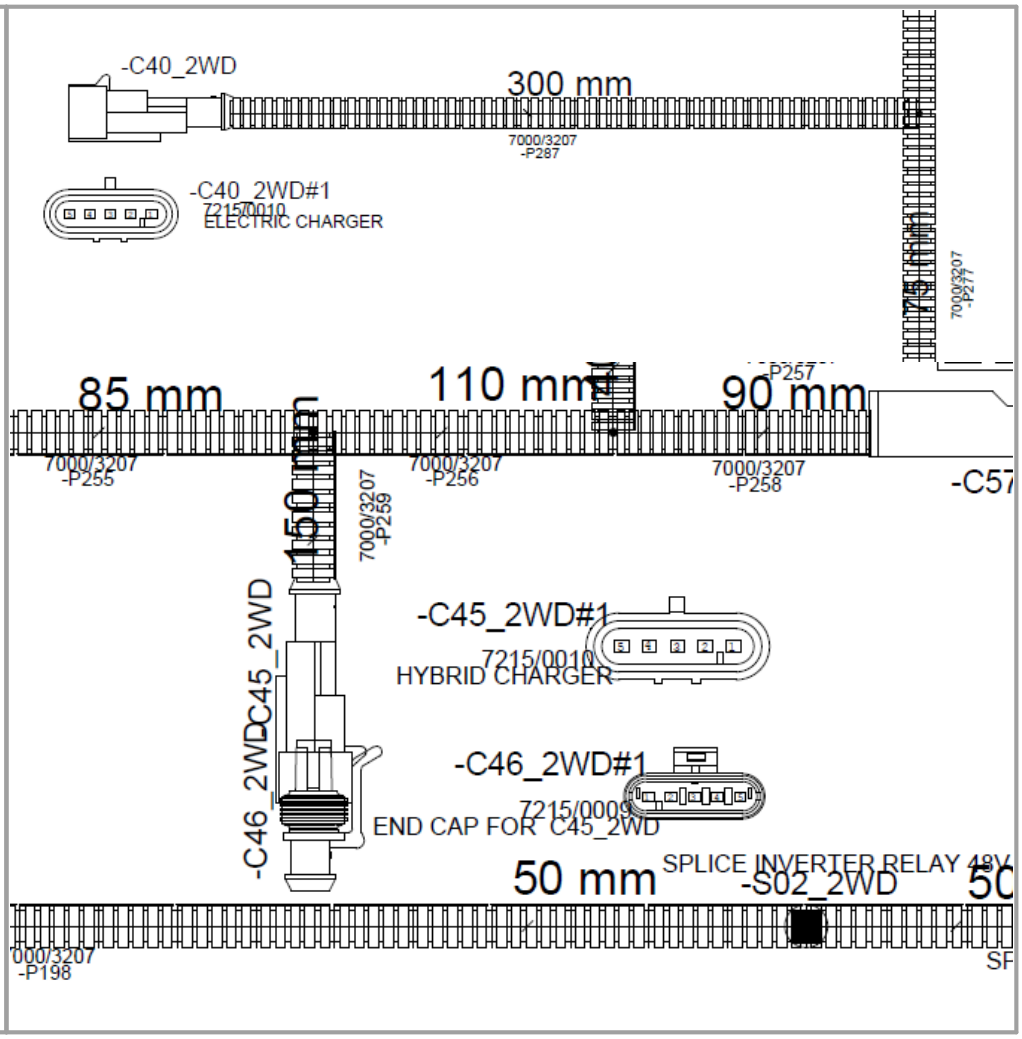
Wires &

Connectors

:



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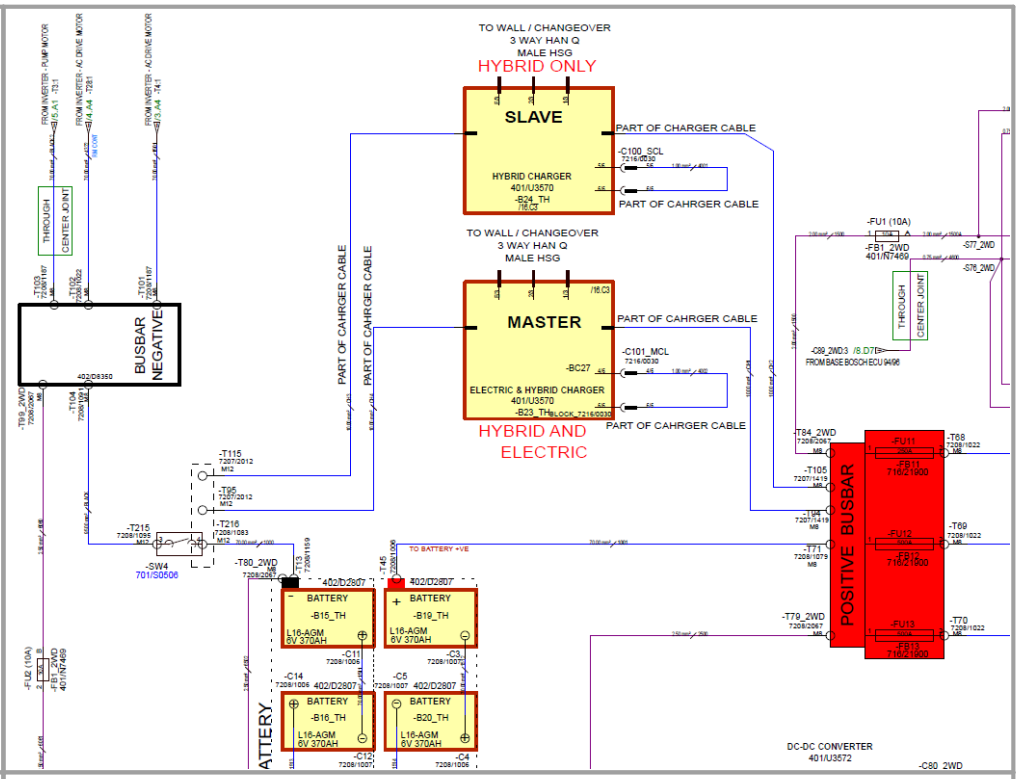
Internal **Electrical** **Schematic:**	
Testing:	Check out put Voltage
Expected **Values:**	See Signal
Related **Fault** **Codes:**	N/A

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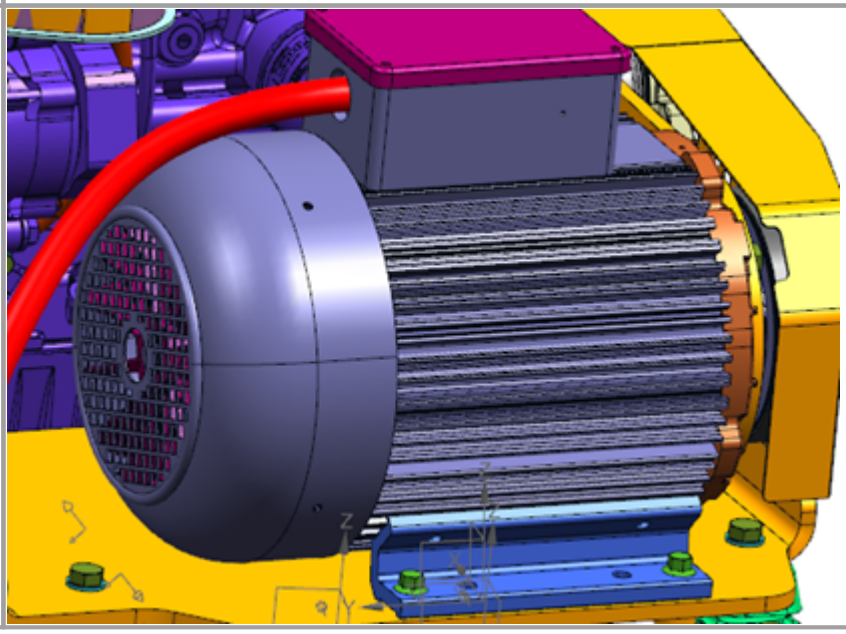
4.24 AC Generator

AC Generator

Components 132 > AC Generator

Component :	AC Generator
Function:	AC generator (or alternator) converts mechanical energy from the engine into electrical energy in the form of alternating current (AC), which is then used for either power to platform feature or for charging the 48V battery pack.
Location:	On Engine Tray
Location Image:	

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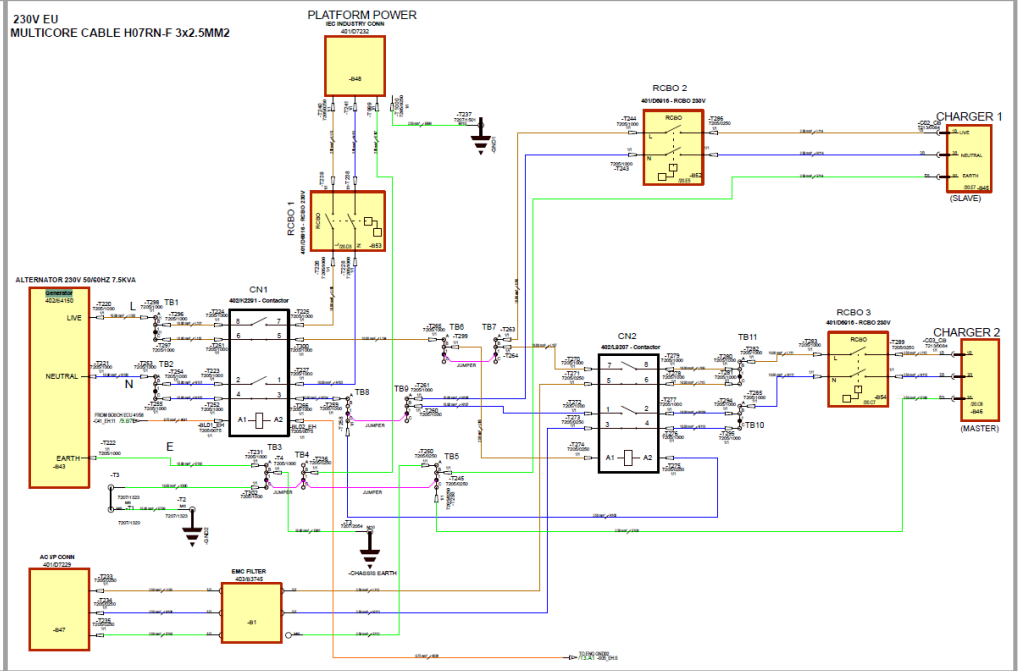
Signal:	
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	The generator should be checked for the correct voltage and frequency.

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Expected Values:	230V should be at connector
Related Fault Codes:	

Fault Code	Fault Description
B1215-17 756	Hydraulic generator button - Circuit short to high (10v)
B1216-16 757	Hydraulic generator button - Circuit short to low
B1217-24 758	Hydraulic generator button - signal stuck high
B1355-16 889	Hydraulic Generator - Solenoid - Circuit short to low
B1356-13 890	Hydraulic Generator - Solenoid high side - Circuit open or short to high (12v)

4.25 CAN Network

Component:	CAN
Function:	CAN allows the communication between the multiple controllers. There are 2 types of CAN - 1. CAN 1 2. CAN 2
Location:	CAN Harness routed from Base Controller to Platform Controller
Location Image:	N/A
Signal:	The data signals are sent through 2 pins - CAN-High and CAN-Low. The signals are differential and so it is the difference between the 2 signals that matters. The messages are sent to all devices on the same network and the receiving device decides whether it is meant for them or not.

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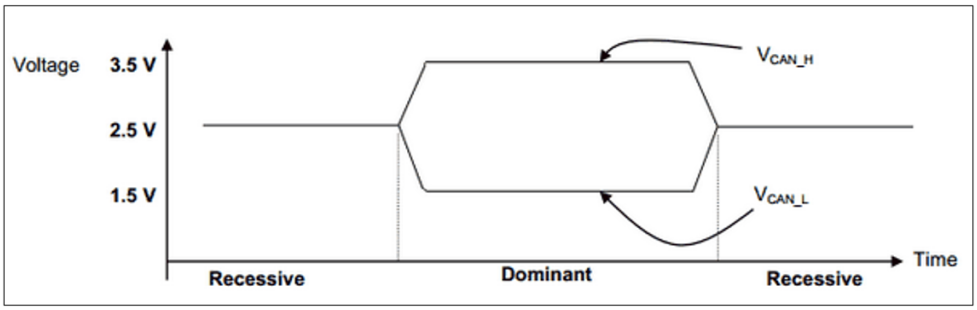
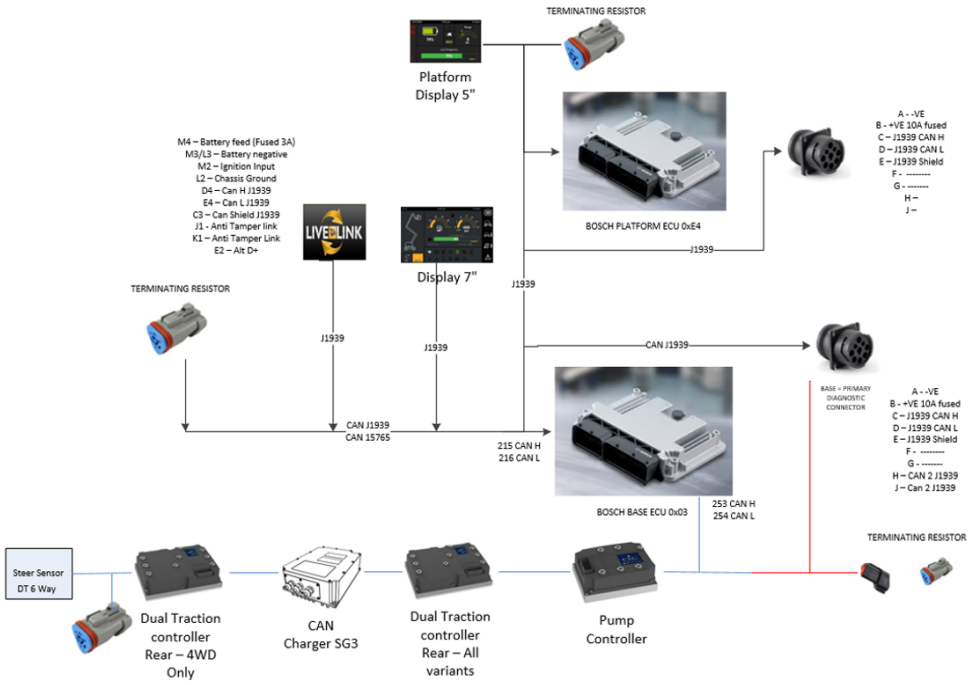
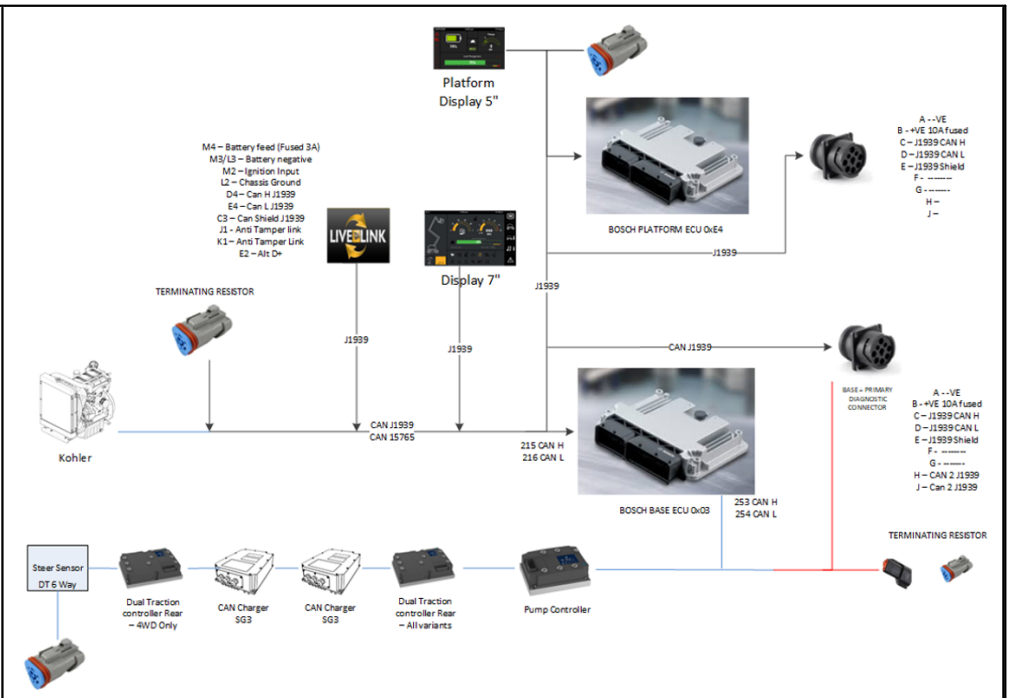


Wires & Connectors :

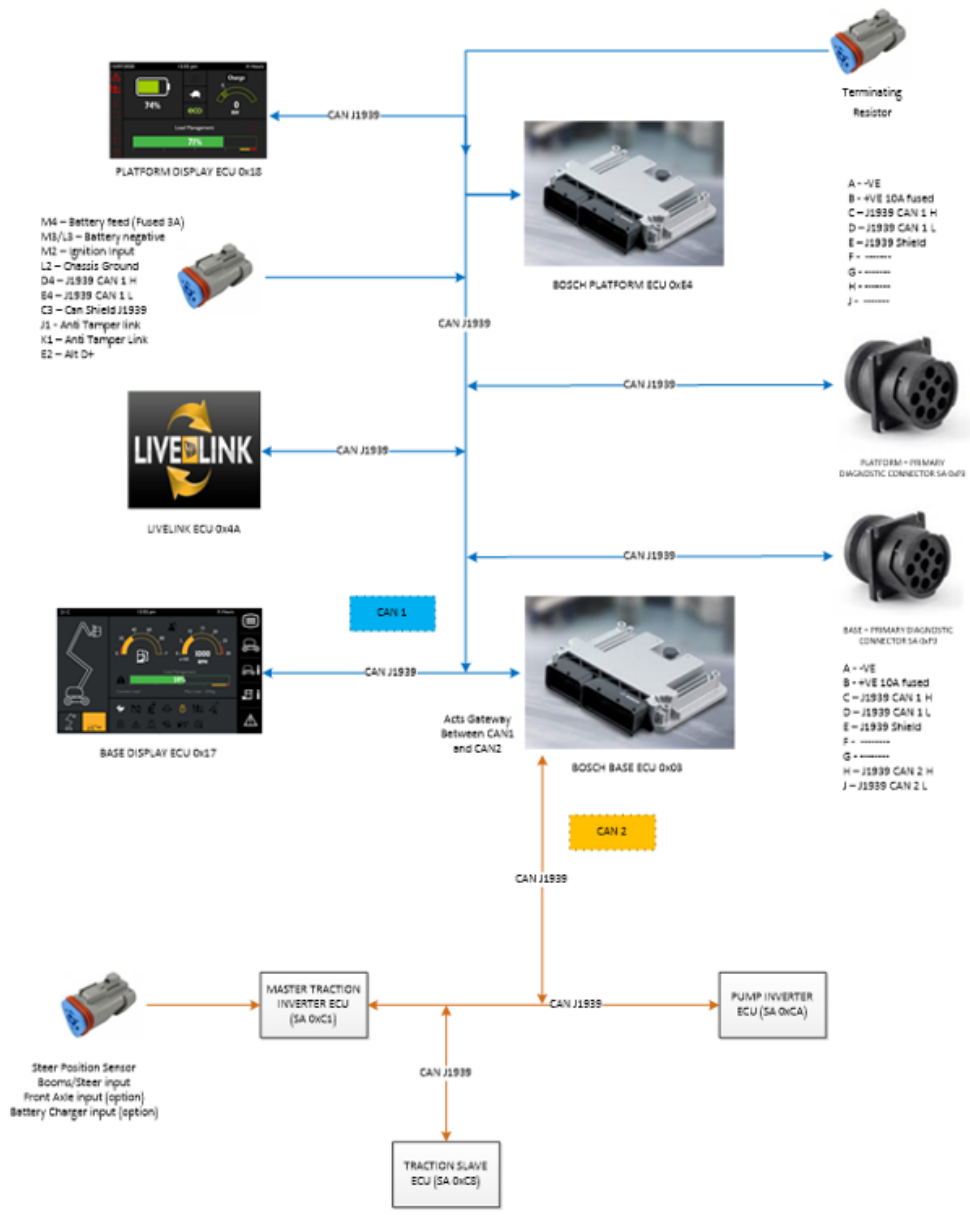
A45E



A45EH


Platform
Display 5"
M4 – Battery feed (Fused 3A)
M3/L3 – Battery negative
M2 – Ignition Input
L2 – Chassis Ground
D4 – Can H J1939
E4 – Can L J1939
C3 – Can Shield J1939
J1 – Anti Tamper link
K1 – Anti Tamper Link
E2 – Alt D+
LIVELINK
Display 7"
BOSCH PLATFORM ECU 0xE4
A - -VE
B - +VE 10A fused
C – J1939 CAN H
D – J1939 CAN L
E – J1939 Shield
F - -------
G - -------
H –
J –
J1939
TERMINATING RESISTOR
J1939
J1939
J1939
CAN J1939
Kohler
CAN J1939
CAN 15765
215 CAN H
216 CAN L
BOSCH BASE ECU 0x03
253 CAN H
254 CAN L
BASE - PRIMARY DIAGNOSTIC CONNECTOR
A - -VE
B - +VE 10A fused
C – J1939 CAN H
D – J1939 CAN L
E – J1939 Shield
F - -------
G - -------
H – CAN 2 J1939
J – Can 2 J1939
TERMINATING RESISTOR
Steer Sensor
DT 6 Way
Dual Traction controller Rear – 4WD Only
CAN Charger SG3
CAN Charger SG3
Dual Traction controller Rear – All variants
Pump Controller

CAN Network



Internal Electrical Schematic:

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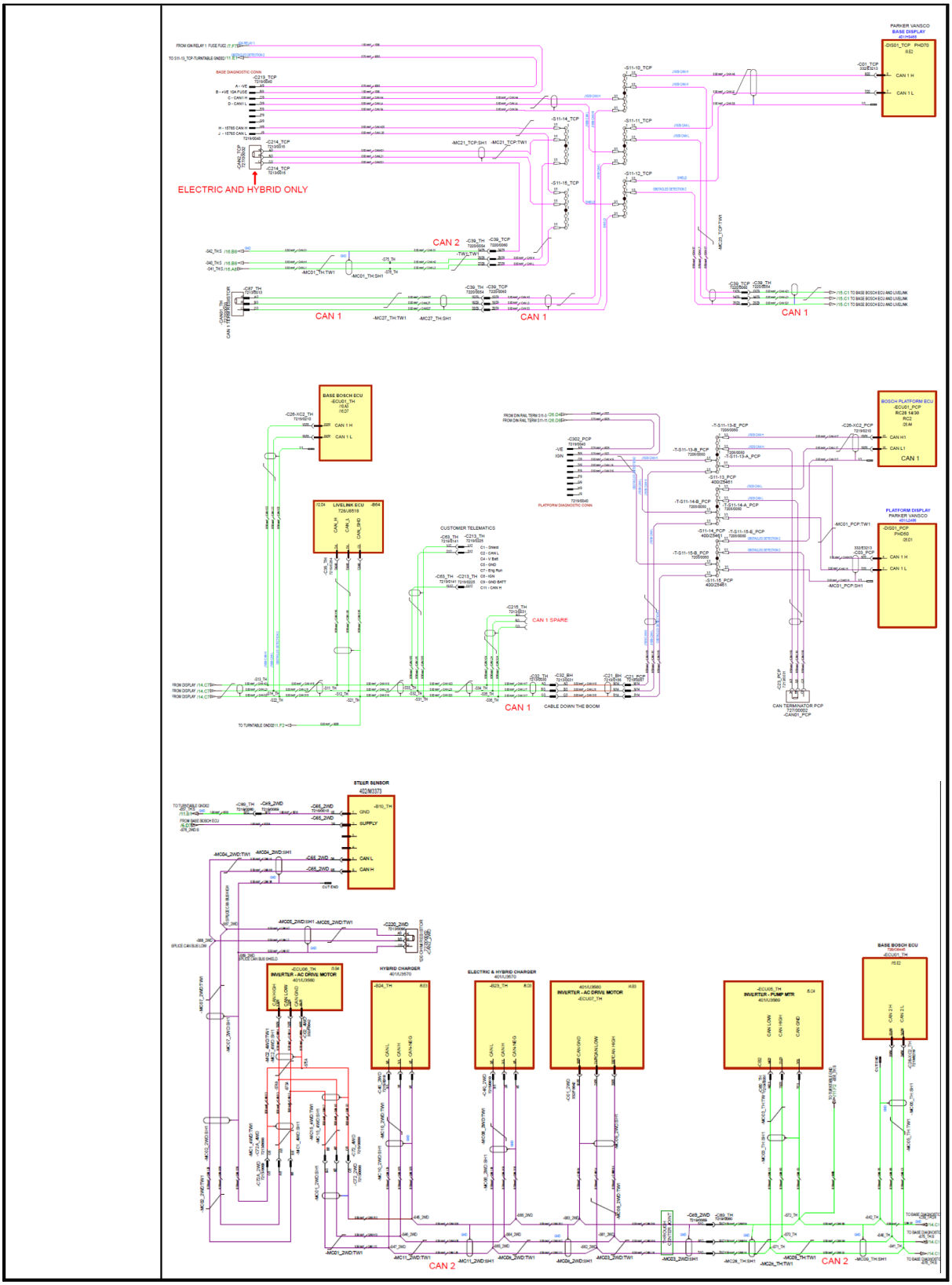

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Testing:	1.Turn the Ignition ON 2.check the connection of CAN H & CAN L 3. Check the 120 Ohm terminator resister are connected 4.Operate any Function from platform or Base 5. check the operation Turn ignition off - also ensure live link is removed or asleep. There should be 60 Ohms measured at any point on the network between CAN High and CAN L
Expected Values:	No CAN communication Fault
Related Fault Codes:	

4.26 Water In Fuel Sensor

Component :	Water In Fuel Sensor
Function:	The water in fuel sensor is to ensure the quality of fuel is sufficient for the kohler engine. The bowl may require draining when the sensor is triggered .It also detects the water content in the fuel before it goes to the fuel rail.
Location:	Near Fuel Tank

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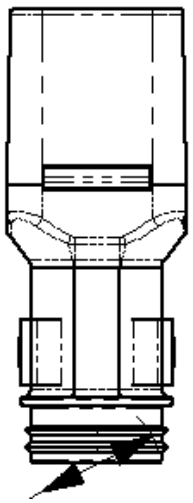
Location

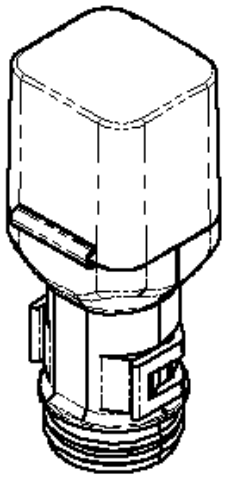
Image:

Signal:

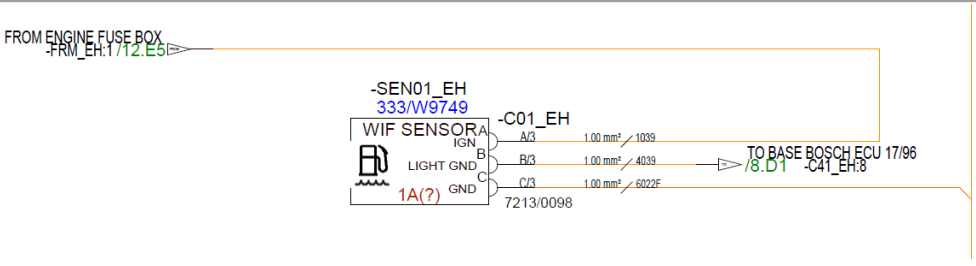
Number	Description	Wire Number	Signal
A	Ignition	1039	12 V
B	Signal	4039	12V when active
C	GND	6022F	0 V

Wires & Connectors:





Internal Electrical



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Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT use the meter on the ECU pins. Note- There should be beep if water in fuel If water is detected in the fuel water separator filters while the engine is running or with the ignition in the on run position the water in fuel indicator light will illuminate - Check bowl for water and empty. If if empty and cant see now water in fuel then check wiring as follows : 1. Sensor supply voltage fault-Check the presence of electrical supply on water sensor .If sensor supply voltage is OK, proceed to Step 2 2. Sensor connection faulty-Check condition of sensor to harness connection, make sure the seals are in place.Check for signs of corrosion or Contamination.Repair/replace as necessary.If no fault is found, proceed to Step 3. 3. Sensor failure-Remove the water sensor to fuel filter. Move the water sensor float to full stroke and control with a multimeter if the internal sensor switch works correctly.Change the switch if is needed. If no fault is found, proceed to Step 4 4. Wiring fault-Check the harness continuity, and machine and earth contacts. Repair/replace as necessary.If no fault is found, proceed to Step 5 5. ECU fault-Disconnect the harness from the ECU and inspect.Check seals are in place, check for signs of corrosion and pin damage. If harness is damaged repair/replace as necessary. If ECU pins are damaged, replace ECU and Reflash, see section on ECU flashing.If no fault is found, raise a Kohler Help desk Call.Sensor supply voltage is OK, proceed to Step 2nd.
Expected Values:	See Signal

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Related Fault Codes:	Fault Code	Fault Description
	B1282-13 824	Water in fuel OC during engine startup: (Transition from GND to OC is expected within 2 secs of engine ignition ON)
	B1286-16 828	Water in fuel Short to Ground

4.27 Platform & Control Panel

Platform & Control Panel

Components 132 > Platform & Control Panel

List of Platform & Control Panel 265

Sr No.	Component
1	Foot Pedal Switch 266
2	Crush Protection 270
3	Platform Control Panel 275
4	Platform ECU 279
5	Platform Buzzer 294
6	Drive and Steer Joystick 297
7	Slew & Main Boom Up/Down Joystick 301
8	Main Boom Telescope Extend/Retract Switch(PCP) 304
9	Articulated Raise/Lower Switch(PCP) 308
10	Jib Up/Down Switch(PCP) 312
11	Platform Rotate Left/Right Switch(PCP) 315
12	Platform Leveling Up/Down Switch(PCP) 319
13	Potentiometer 322
14	Slew Acknowledgment Switch with LED 324
15	Horn Switch(PCP) 327

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16	Emergency Stop Switch(PCP) 330
17	Electric Pump Switch (AUX) 332
18	Worklights Switch 336
19	Fault LED 339
20	PCP Interface Connectors 342
21	Jumper Bars 345
22	Din Rail Terminals - Small 348
23	USB Connection 357

4.27.1 Foot Pedal Switch

Foot Pedal Switch

Components 132 > Platform & Control Panel 265 > Foot Pedal Switch

Component :	Foot Pedal Switch
Function:	•The foot pedal is used as an enable button for the platform control station in most cases. •The exception to this is engine start and hydraulic generator.
Location:	The foot pedal is located on the platform floor. When depressed and held,it activates the controls on the platform control console.

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Location

Image:

Signal:

Pin Number	Description	Wire Numbers
C	Common feed in 10V	1075H
N/O	Foot Pedal pressed Signal	4096
N/C	Not Used	Not Used

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Wires & Connectors :	

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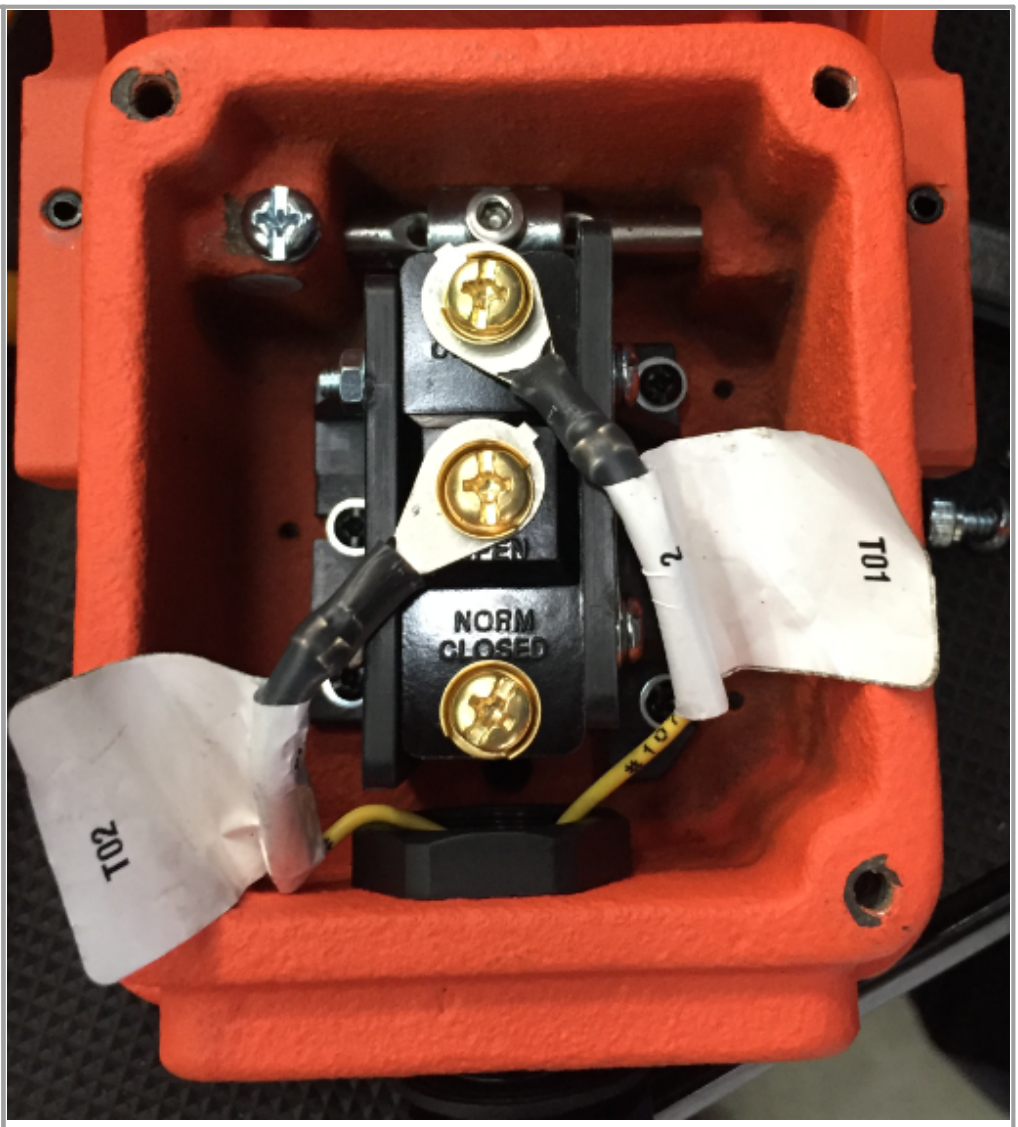

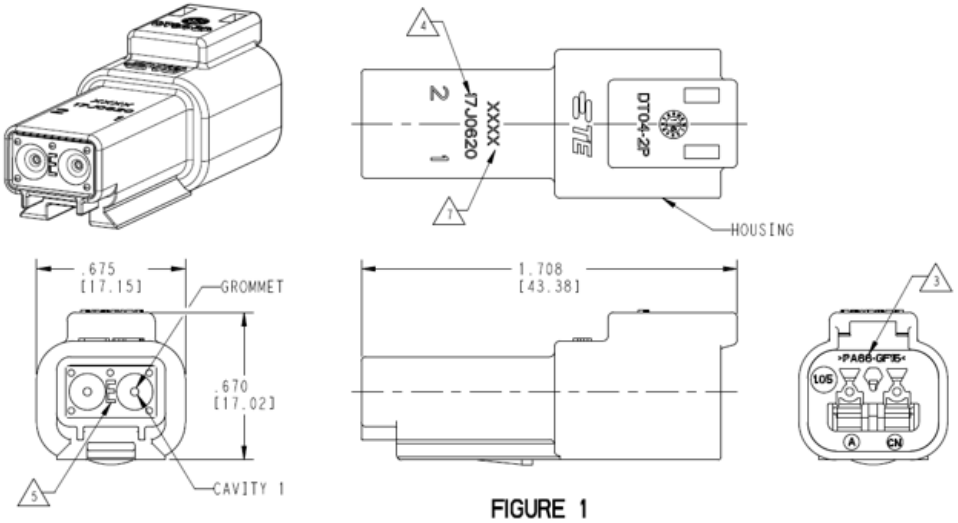

FIGURE 1

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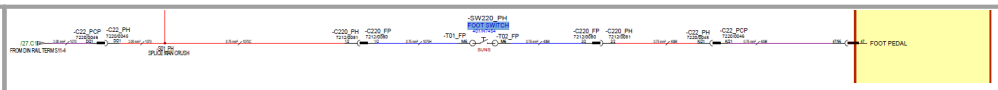
Internal **Electrical** **Schematic:**	
Testing:	1. Turn the Ignition On. 2. Press the Foot pedal from platform 3. Validate the voltage at foot pedal
Expected **Values:**	Foot pedal pressed:- 10V unpressed:-0V
Related **Fault** **Codes:**	**Fault Code** / **Description** B1053-17 590 — Foot Pedal Short Circuit to High B1054-16 591 — Foot Pedal Short Circuit to Low B1319-24 852 — Startlock failure - Foot pedal input enabled during startup

4.27.2 Crush Protection

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Components 132 > Platform & Control Panel 265 > Crush Protection

Component:	Crush Protection
Function:	•The crush protect rope switch is to protect the operator from being crushed onto the controls. •This will automatically limit the permitted movement of the platform so that only downward and/or inward movement (i.e. away from an obstacle) is available, following detection of a crush. In other words, tripping the crush sensor automatically triggers the system to limit the available movement of the platform so that only movement away from the obstacle is possible. •No override mechanism is provided at either the base or the platform; the permitted movement is automatically restricted upon detection of a crush. •A reset switch is provided to enable full movement. An operator would actuate this reset switch once they determine it is safe to do so.
Location:	On Platform near Platform Control Box

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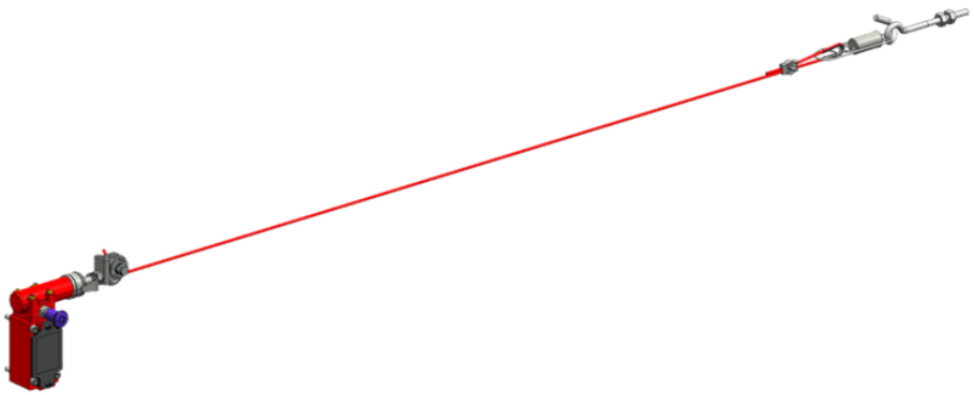
Location Image:	

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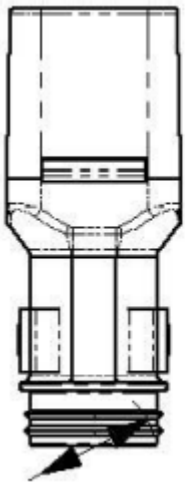
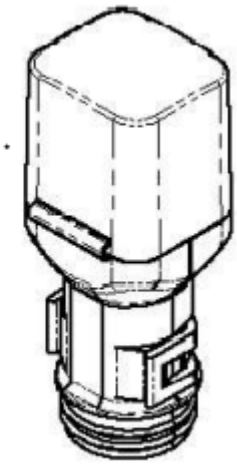
Signal:

Pin Number	Description	Wire Number
11	5V Feed In	4085
12	Signal	4094
21	10V Feed In	1075TT
22	Signal	4093

Wires & Connectors:





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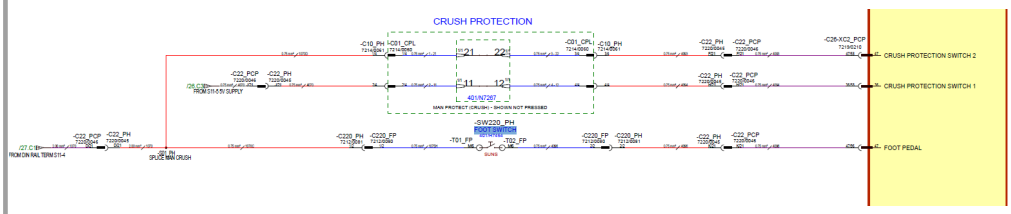
Internal Electrical Schematic:	The crush protection is shown with the switch reset and the rope not pressed. If there is no tension on the rope switch or the rope switch has been pressed both switches will open circuit. 
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT use the meter on the ECU pins Turn on the machine ignition 1. Press on the rope 2. Crush protection Icon should be shown on the display with buzzer 3. User Caution LED at the platform will light up with buzzer. 4. Pull the blue knob out on the switch to reset, Alarms/ icons should go off.
Expected Values:	1. Pressed / Active Crush protection Condition switch1:-OC switch2:-OC 2.Un-Pressed /Inactive crush protection Condition switch1:-5v switch2:-10v
Related Fault Codes:	

Fault Code	Description
B1025-13 571	Crush protection position switch - Signal Plausibility failure
B1026-17 572	Crush protection position Switch 1 Short Circuit to 5v
B1027-16 574	Crush protection position Switch 1 Short Circuit to Low
B1028-16 575	Crush protection position Switch 2 Short Circuit to Low
B1029-17 576	Crush protection position Switch 2 Short Circuit to 10v

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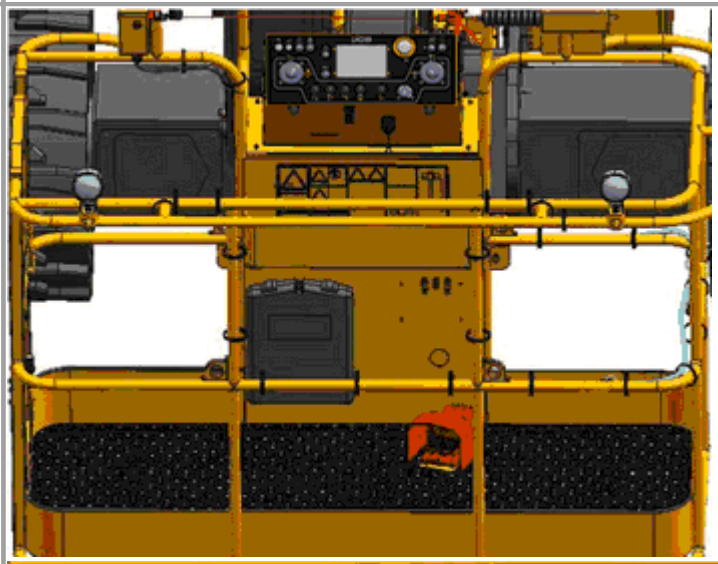
4.27.3 Platform Control Panel

Platform Control Panel

Components 132 > Platform & Control Panel 265 > Platform Control Panel

Component:	Platform Control Panel
Function:	The platform control panel is used for the machine operations.
Location:	On Platform
Location Image:	
Signal:	

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-C30_PCP PLATFORM WORKLIGHTS CONN

ID	Tag	Size	Colour	Destination	Cable	Cavity Seal
1	1035	2.00 mm²	YE	-C216-1_PCP:1	-W01_PCP	
2	6079	2.00 mm²	YE	-C22_PCP:G	-W01_PCP	
3						7210/0030
4						7210/0030

7214/0035 4 Way DTP04 Pin Housing Flange Mount

Additional Components

7214/0031;1 # 4 Way DTP04 Wedge

-C22_PCP PLATFORM INTERCONNECT

ID	Tag	Size	Colour	Destination	Cable	Cavity Seal
A	4091	0.75 mm²	YE	-C26-XC2_PCP:22	-W01_PCP	
B	8079	2.00 mm²	YE	-T-S11-12-F_PCP:1	-W01_PCP	
C	4092	0.75 mm²	YE	-C27-XC1_PCP:57	-W01_PCP	
D	1070	2.00 mm²	YE	-T-S11-4-F_PCP:1	-W01_PCP	
E	6036	2.00 mm²	YE	-T-S11-10-E_PCP:1	-W01_PCP	
F	4093	0.75 mm²	YE	-C26-XC2_PCP:47	-W01_PCP	
G	6079	2.00 mm²	YE	-C30_PCP:2	-W01_PCP	
H	4094	0.75 mm²	YE	-C26-XC2_PCP:36	-W01_PCP	
J	4070	0.75 mm²	YE	-T-S11-5-D_PCP:1	-W01_PCP	
K	4096	0.75 mm²	YE	-C27-XC1_PCP:47	-W01_PCP	
L	4097	0.75 mm²	YE	-C27-XC1_PCP:37	-W01_PCP	
M	4098	0.75 mm²	YE	-C26-XC2_PCP:24	-W01_PCP	
N	4081	0.75 mm²	YE	-C27-XC1_PCP:54	-W01_PCP	
P	4082	0.75 mm²	YE	-C27-XC1_PCP:78	-W01_PCP	
R	4083	0.75 mm²	YE	-C27-XC1_PCP:53	-W01_PCP	
S	4084	0.75 mm²	YE	-C27-XC1_PCP:77	-W01_PCP	
T	1030	0.75 mm²	YE	-T-S11-2-F_PCP:1	-W01_PCP	
U	6072	0.75 mm²	YE	-T-S11-6-B_PCP:1	-W01_PCP	
V	6070	0.75 mm²	YE	-T-S11-6-D_PCP:1	-W01_PCP	
W	4101	0.75 mm²	YE	-C27-XC1_PCP:69	-W01_PCP	
X	4102	0.75 mm²	YE	-C27-XC1_PCP:70	-W01_PCP	

7220/0046 21 Way HDP Bulkhead Pin Housing (Receptacle)

Additional Components

7210/0047;1 # Size 24 Lockwasher

7210/0048;1 # Size 24 Plastic Jam Nut

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-C21_PCP BOOM HARNESS CONN

ID	Tag	Size	Colour	Destination	Cable	Cavity Seal
A	1014	2.00 mm²	YE	-T-S11-1-E_PCP:1	-W01_PCP	
B	1015	2.00 mm²	YE	-T-S11-2-E_PCP:1	-W01_PCP	
C						7204/0028
D	6078	2.00 mm²	YE	-T-S11-7-B_PCP:1	-W01_PCP	
E	6040	2.00 mm²	YE	-T-S11-10-F_PCP:1	-W01_PCP	
F	6028	2.00 mm²	YE	-T-S11-11-D_PCP:1	-W01_PCP	
G						7210/0030
H						7210/0030
J						7210/0030
K						7210/0030
L						7210/0030
M	CAN H15	0.50 mm²	YE	-T-S11-13-F_PCP:1	-MC11_PCP	
N	CAN L15	0.50 mm²	GN	-T-S11-14-F_PCP:1	-MC11_PCP	
P	CAN S15	0.50 mm²	N/A	-T-S11-15-F_PCP:1	-MC11_PCP	

7219/0087 14 Way HDP Bulkhead Pin Housing (Receptacle) Size 18

Additional Components

7210/0119;1 # Size 18 Plastic Jam Nut
7210/0120;1 # Size 18 Lockwasher
7243/0606;1 # Gasket - TE/HDP Series

Wires & Connectors:

Boom Harness connector C21: Platform interconnection C22:
Platform work light interconnection C31:

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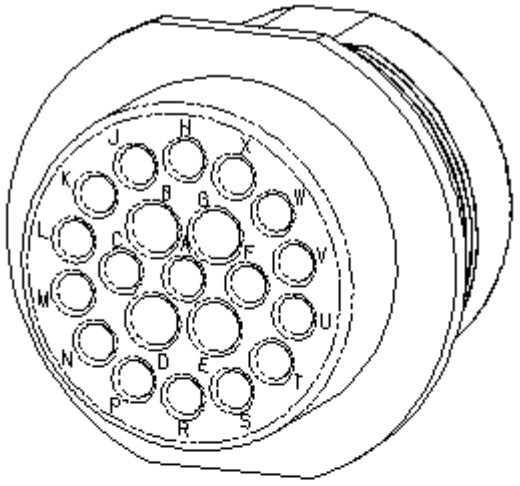

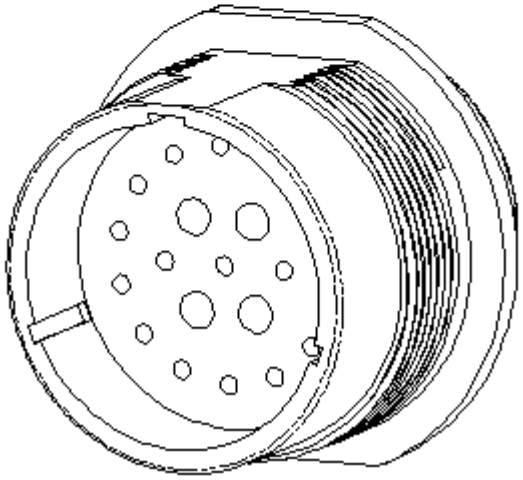

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	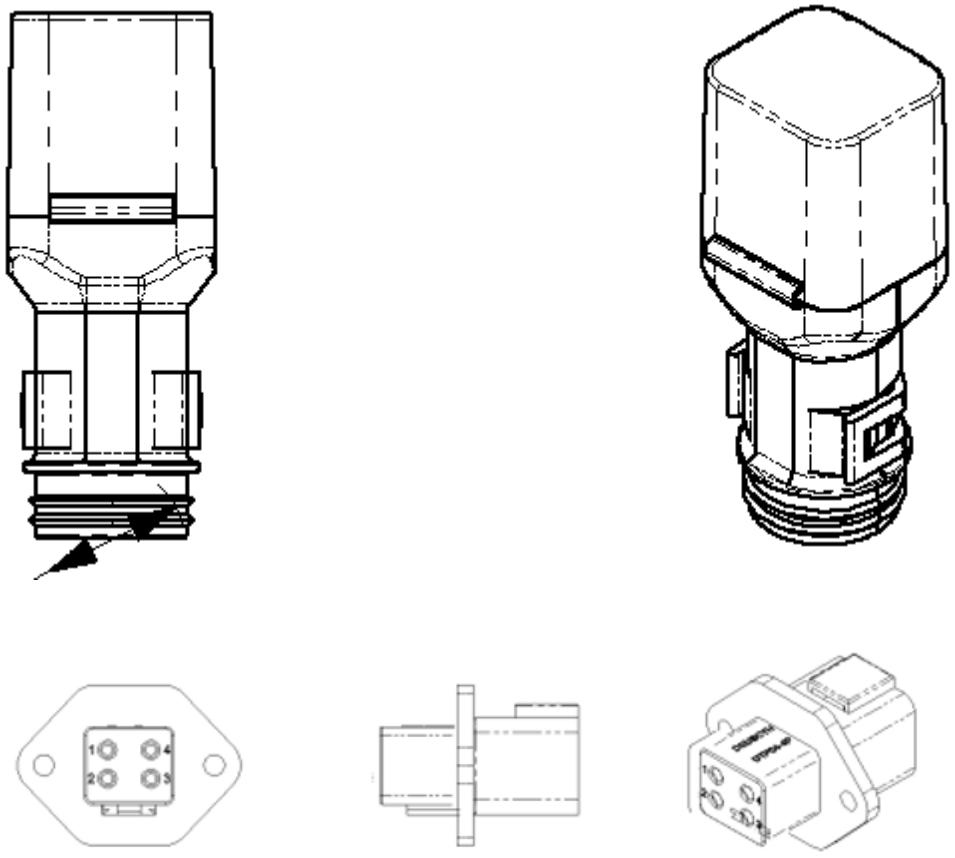
Internal Electrical Schematic:	Refer A45E Boom Schematic Part No : 401/Y3086
Testing:	N/A
Expected Values:	N/A
Related Fault Codes:	N/A

4.27.4 Platform ECU

Platform ECU

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Components 132 > Platform & Control Panel 265 > Platform ECU

Component :	Platform ECU
Function:	• When the ECU turns on, there is a check in the Platform software to ensure the ECU is in a safe state to turn on and enable. • After the Bosch boot block check there should be a check in the software to check for status of inputs to ensure the software is in a safe condition before allowing all functions. • The Platform Bosch ECU perform all the functions of machine.
Location:	The platform ECU is located inside the control box.

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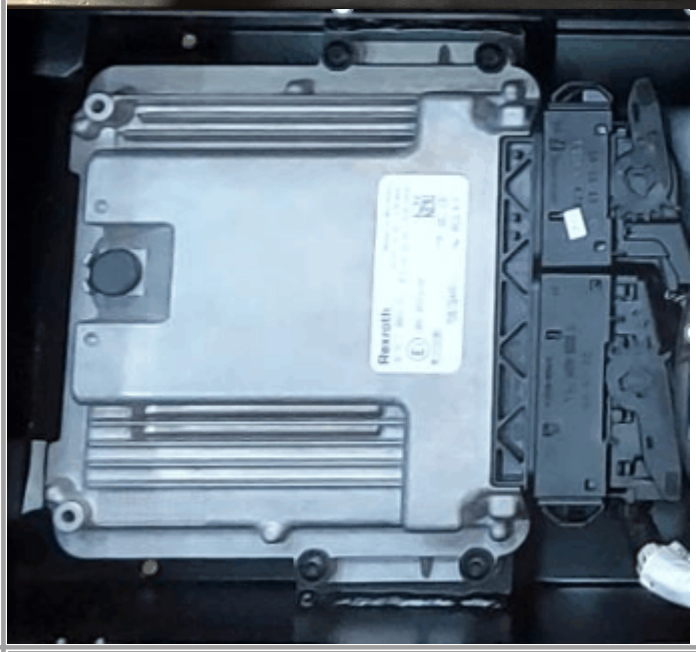
Location

Image:



Signal:

58 Way Connector		
Pin Number	**Description/Signal**	**Wire Number**
1	Power Supply 12V input	1017
2	GND Signal	6031

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3	Power Supply 12V input	1018
4	Power Supply 12V input	1019
5	Power Supply 12V input	1020
6	Power Supply 12V input	1021
7	GND Signal	6032
8	NOT USED	NOT USED
9	Platform level lower switch input (10V when pressed)	81
10	Platform level raise switch input (10V when pressed)	80
11	Platform rotate right switch input (10V when pressed)	79
12	platform rotate left switch input (10V when pressed)	78
13	NOT USED	NOT USED
14	Jib Lower switch input (10V when pressed)	77
15	CAN H1 J1939	Yellow
16	CAN L1 J1939	Green

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17	NOT USED	NOT USED
18	NOT USED	NOT USED
19	5V Supply potentiometer (5V)	4074
20	GND	6033
21	NOT USED	NOT USED
22	NOT USED	NOT USED
23	Auto start switch input to ECU	88
24	NOT USED	NOT USED
25	Power to Platform switch input (10V when pressed, momentary)	82
26	Drive joystick input (0.5-2.5-4.5)	4073
27	NOT USED	NOT USED
28	E-Stop Positive (12V when un-pressed)	28
29	NOT USED	NOT USED
30	NOT USED	NOT USED
31	Slew joystick input (0.5-2.5-4.5)	4065
32	10V ECU Output (10V)	1068
33	GND	6034

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34	Artic boom switch raise (10V when pressed)	73
35	Artic boom switch lower (10V when pressed)	72
36	Crush protection (5V when not pressed and reset)	4094
37	NOT USED	NOT USED
38	NOT USED	NOT USED
39	NOT USED	NOT USED
40	Ignition feed (12V with key on)	1029
41	Fault LED Output (12V when fault)	4071
42	NOT USED	NOT USED
43	NOT USED	NOT USED
44	NOT USED	NOT USED
45	Power supply input (12V)	1022
46	GND	6035
47	Crush protection (10V when not pressed and reset)	4093
48	NOT USED	NOT USED
49	RC Config 2 open circuit	NOT USED

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50	Engine start switch input (10V when pressed, momentary)	86
51	Slew acknowledgment switch input	83
52	Horn switch input	85
53	NOT USED	NOT USED
54	NOT USED	NOT USED
55	5V Feed to Joysticks via din rail S11-5 (5V output from ecu)	4069
56	NOT USED	NOT USED
57	NOT USED	NOT USED
58	power supply electronics (12V)	1023

96 Way connector		
Pin Number	**Description/Signal**	**Wire Number**
1	NOT USED	NOT USED
2	NOT USED	NOT USED
3	NOT USED	NOT USED

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4	NOT USED	NOT USED
5	NOT USED	NOT USED
6	NOT USED	NOT USED
7	NOT USED	NOT USED
8	NOT USED	NOT USED
9	NOT USED	NOT USED
10	NOT USED	NOT USED
11	NOT USED	NOT USED
12	NOT USED	NOT USED
13	NOT USED	NOT USED
14	E-Stop -ve feed (GND when unpressed)	6048
15	NOT USED	NOT USED
16	NOT USED	NOT USED
17	NOT USED	NOT USED
18	NOT USED	NOT USED
19	NOT USED	NOT USED
20	NOT USED	NOT USED
21	NOT USED	NOT USED

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22	GND	6037
23	GND	6038
24	GND	6039
25	NOT USED	NOT USED
26	NOT USED	NOT USED
27	NOT USED	NOT USED
28	NOT USED	NOT USED
29	NOT USED	NOT USED
30	NOT USED	NOT USED
31	NOT USED	NOT USED
32	NOT USED	NOT USED
33	NOT USED	NOT USED
34	NOT USED	NOT USED
35	Jib Switch input - raise (10V when pressed)	76
36	High Torque switch input (10V when pressed, momentary)	90
37	NOT USED	NOT USED
38	NOT USED	NOT USED

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39	Potentiometer signal (0-5V)	4075
40	NOT USED	NOT USED
41	Steer Joystick signal	4072
42	Main boom telescope input switch - retract (10V when pressed)	75
43	electric pump switch input (10V when pressed, momentary)	89
44	Main boom telescope input switch - extend (10V when pressed)	74
45	5V GND potentiometer	6074
46	5V GND joysticks, potentiometer	6069
47	Foot pedal input (10V when pressed)	4096
48	NOT USED	NOT USED
49	NOT USED	NOT USED
50	NOT USED	NOT USED
51	NOT USED	NOT USED
52	NOT USED	NOT USED

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53	Platform rotate right solenoid output (12V when active)	4083
54	NOT USED	NOT USED
55	NOT USED	NOT USED
56	NOT USED	NOT USED
57	NOT USED	NOT USED
58	NOT USED	NOT USED
59	NOT USED	NOT USED
60	NOT USED	NOT USED
61	NOT USED	NOT USED
62	NOT USED	NOT USED
63	NOT USED	NOT USED
64	Main boom joystick input signal (0.5-2.5-4.5)	4066
65	NOT USED	NOT USED
66	NOT USED	NOT USED
67	NOT USED	NOT USED
68	NOT USED	NOT USED
69	Load cell sensor 1	4101

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70	Load cell sensor 2	4102
71	NOT USED	NOT USED
72	NOT USED	NOT USED
73	NOT USED	NOT USED
74	NOT USED	NOT USED
75	NOT USED	NOT USED
76	NOT USED	NOT USED
77	NOT USED	NOT USED
78	NOT USED	NOT USED
79	NOT USED	NOT USED
80	NOT USED	NOT USED
81	NOT USED	NOT USED
82	NOT USED	NOT USED
83	NOT USED	NOT USED
84	NOT USED	NOT USED
85	NOT USED	NOT USED
86	NOT USED	NOT USED
87	NOT USED	NOT USED

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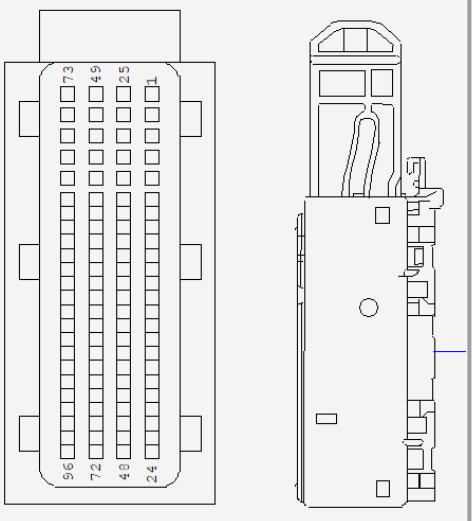
	88	NOT USED	NOT USED
	89	Slew acknowledgment LED output	4086
	90	Buzzer output	4076
	91	NOT USED	NOT USED
	92	NOT USED	NOT USED
	93	NOT USED	NOT USED
	94	NOT USED	NOT USED
	95	NOT USED	NOT USED
	96	RC Config pin 1 (GND)	6027

Wires & Connectors :

-C27-XC1_PCP#1

7219/0214

PLATFORM ECU 96PIN CONN



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	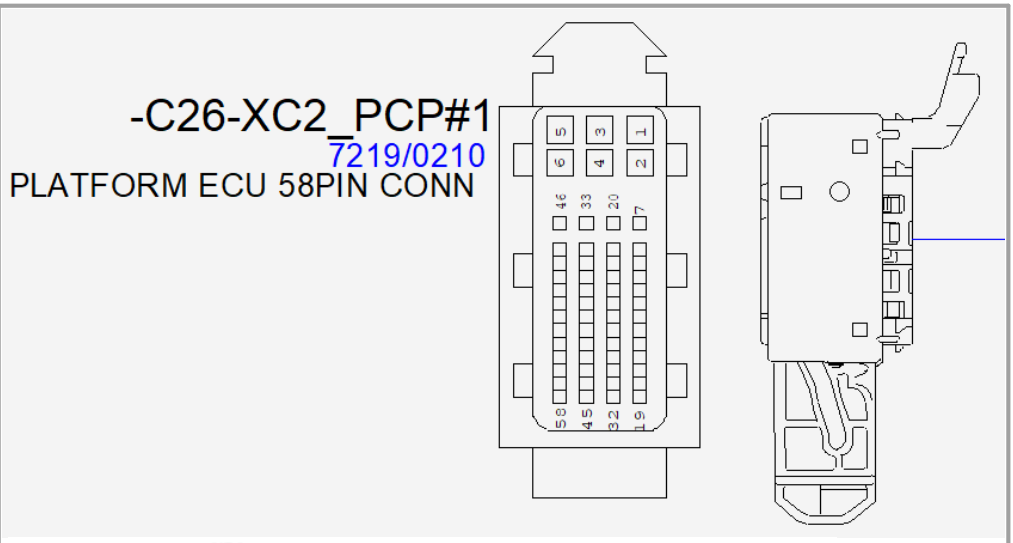 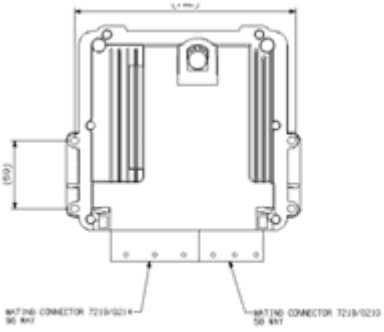 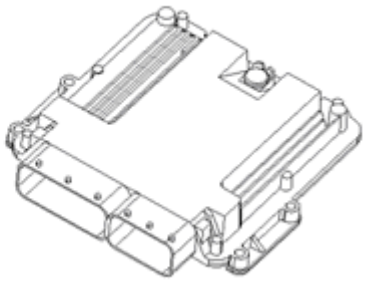
Internal **Electrical** **Schematic:**	Refer A45E Boom Electrical schematic:-Part No: 401/Y3086.
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins

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	1. Connect machine to the Servicemaster diagnostic tool using the DLA Connector. 2. Ensure LED's change state when the corresponding function is selected and ensure a CAN message is being sent from the ECU on the network tab. 3. If faulty replace the MECU.
Expected Values:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. Connect machine to the Servicemaster diagnostic tool using the DLA Connector. 2. Ensure LED's change state when the corresponding function is selected and ensure a CAN message is being sent from the ECU on the network tab. 3. If faulty replace the MECU.
Related Fault Codes:	

Fault Code	Description
U1299-87 1061	CAN Signal pairing failure

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4.27.5 Platform Buzzer

Platform Buzzer

Components 132 > Platform & Control Panel 265 > Platform Buzzer

Component:	Platform Buzzer
Function:	•The buzzer is there to warn the operator when either an fault or error has happened with the machine or to warn of machine is awaiting for operator action. •For example, if the foot pedal is pressed for longer than 10 seconds without a function being pressed, this will time out and make the buzzer sound. •The platform buzzer and the base buzzer should be a repeat of each other. •If 1 buzzer is working and the other is not then there is issue with the buzzer
Location:	Inside the Platform Control Box

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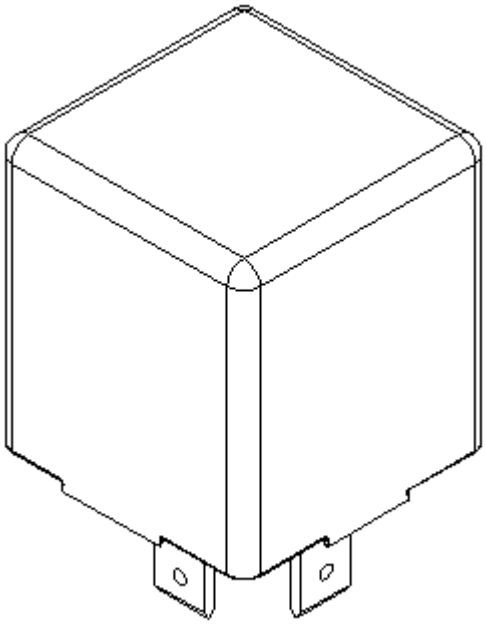
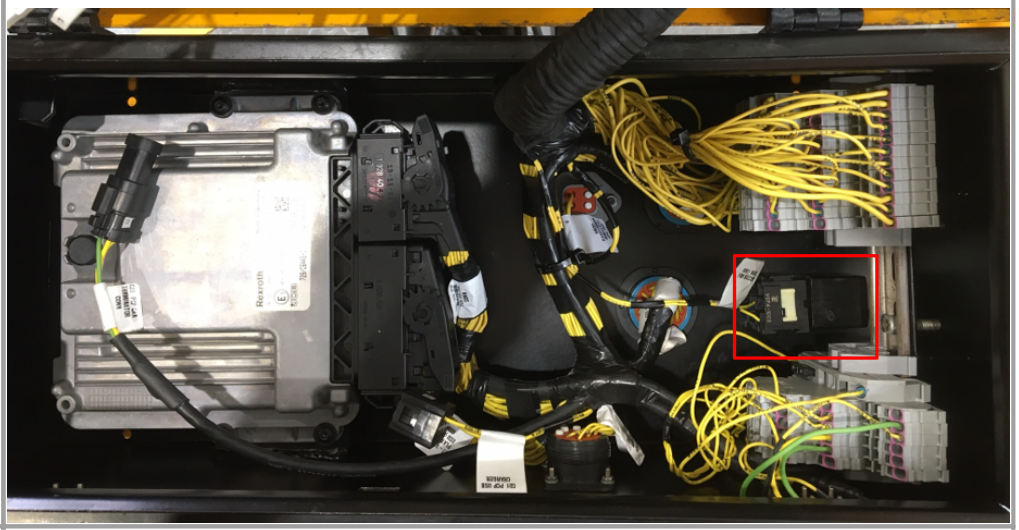
Location Image:





Signal:

Pin Number	Description	Wire number
1	IGN	4076
2	BUZZ	
3		
4	GND	6076
5		

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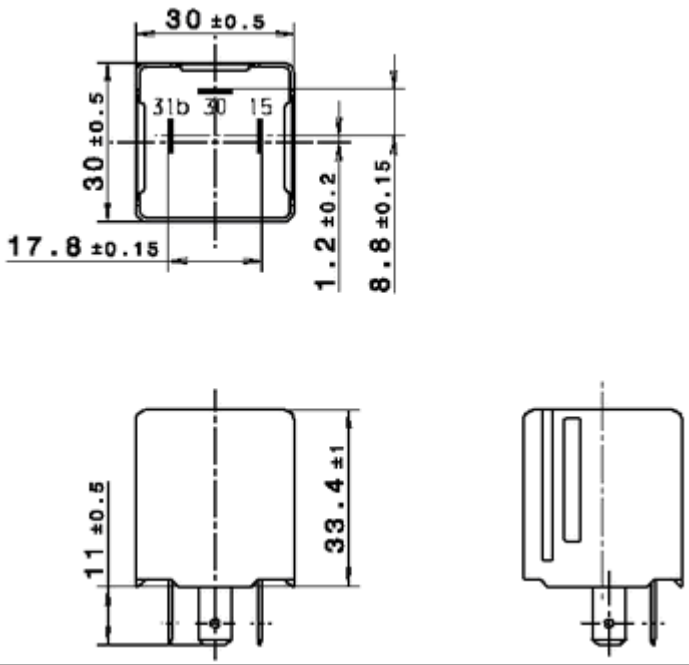
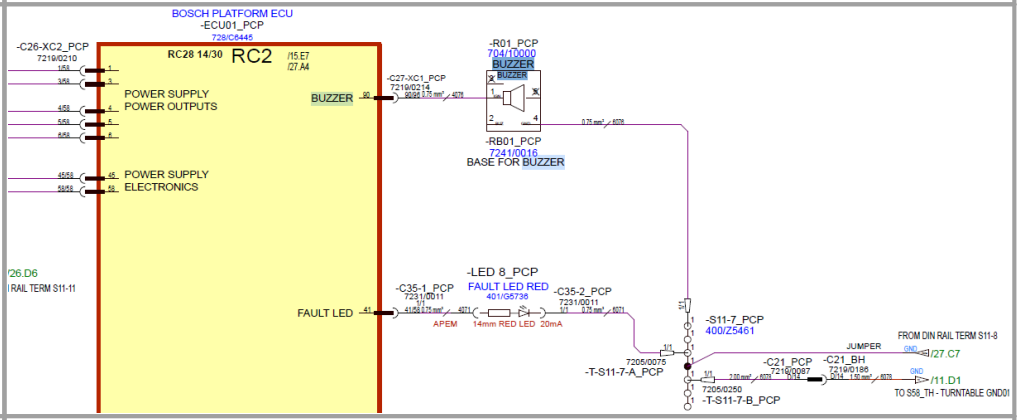
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. There are two buzzer fitted on machine one is inside base control panel and another is inside platform control panel. Ensure no water ingress 2. Check supply at connector R01_TCP pin no 1 & 4 This should read 12V 3. If there is no supply check wiring as per the schematic 4. If there is supply on harness there may be internal damage to buzzer Note-Remove the buzzer from its holder and wire to 12V and GND signals and the buzzer should sound
Expected Values:	12V

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Related Fault Codes:	Fault Code	Description
	B1269-16 813	Buzzer platform - Circuit short to low
	B1270-17 814	Buzzer platform - Circuit open or short to high (12v)

4.27.6 Drive and Steer Joystick

Components 132 > Platform & Control Panel 265 > Drive and Steer Joystick

Component:	Drive and Steer Joystick
Function:	•This Joystick is used for Drive and Steer functions. •This is a proportional Single axis joystick with additional buttons on top •Y axis = Drive forward and backward control •Buttons on top - Left and Right steer control
Location:	The Drive joystick is located RHS on the platform control panel

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Location

Image:

Signal:

Pin Number	Description	Wire Number
1	GND	6068
2	+5V	4068
3	Not Used	Not Used
4	Drive Signal	4073
5	Steer Signal	4072

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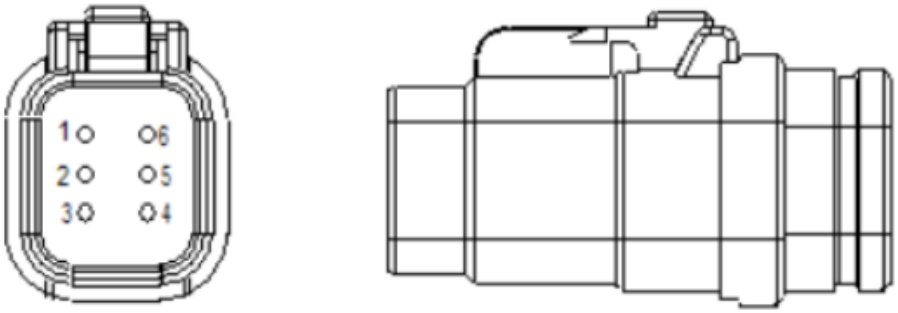
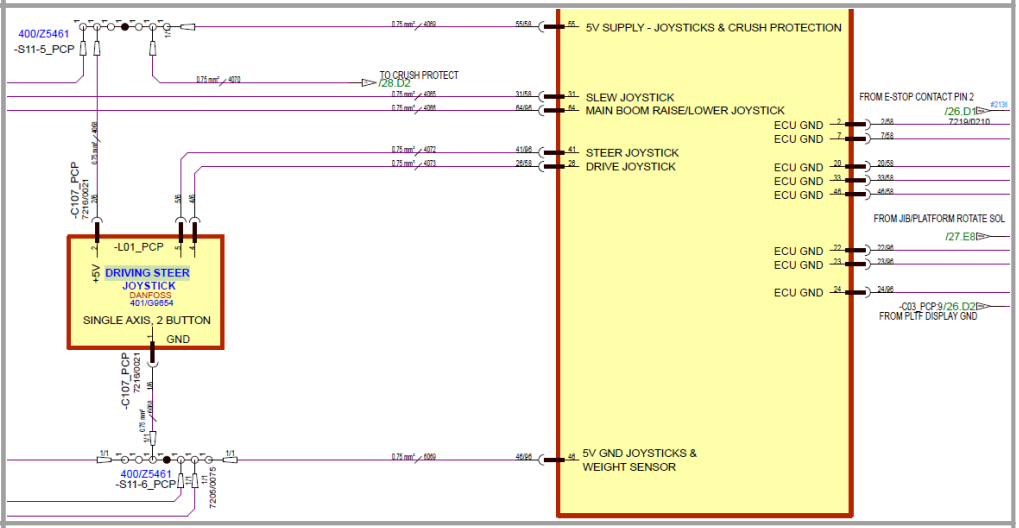
Wires & Connectors :	 7216/0021 6 Way Connector
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1.Note- Drive and steer is a single axis joystick with 2 buttons on the top for steer. This switch is of 5V hence be careful there is no protection on this input if over 5v goes it will break and

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	damage beyond repair. 1. There are 4 wires, 2 input and 2 output, 2 inputs are 5V and 5V ground 2. The 2 outputs are one for steer and one for drive. 3. Make sure joystick is fitted properly so no water ingress. 4. Check supply at C107 (Pin 1 & 2). It should read 5V. If there is no 5V then investigate wiring as per schematic. 5. Joystick on center position. Check voltage on connector C107 (Pin 5) & also at C107 (Pin4). It should read 2.5V. There is 8% tolerance deadband at centre position. 6. Voltage changes from 0.5V to 4.5 V after moving joystick. 7. If Input voltage OK then it may be internal damage inside the joystick. 8. Replace it
Expected Values:	0.5-4.5 Volt

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Related Fault Codes:	Fault Code	Description
	B1069-17 606	Drive joystick - Circuit short to high (5v)
	B1070-16 607	Drive joystick - Circuit open or short to low
	B1146-17 715	Steer joystick - Circuit short to high (5v)
	B1147-16 716	Steer joystick - Circuit open or short to low

4.27.7 Slew & Main Boom Up/Down Joystick

Components 132 > Platform & Control Panel 265 > Slew & Main Boom Up/Down Joystick

Component:	Slew & Main Boom Up/Down Joystick
Function:	•This joystick is for Main Boom Lift and Slew control of the machine •The joystick gives proportional control of the functions of 2 Axis •X Axis = Slew control •Y Axis = Main boom control
Location:	The joystick is located on the LHS of the platform control panel.

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Location Image:

Signal:

Pin Number	Description	Wire Number
1	GND	6067
2	+5V	4067
3	Slew Signal	4065
4	Main Boom Signal	4066
5	Not Used	Not Used
6	Not Used	Not Used

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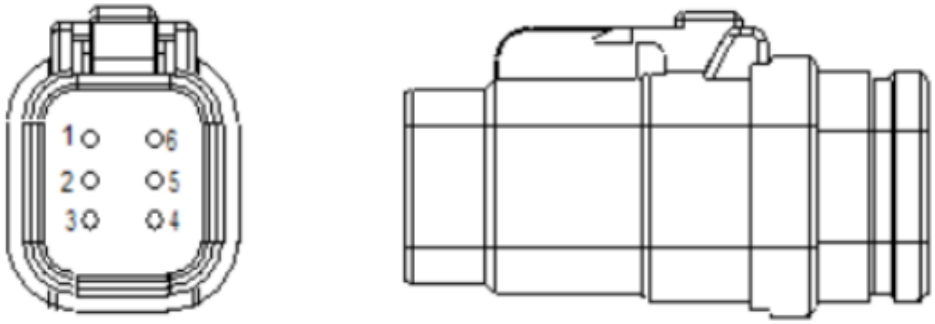
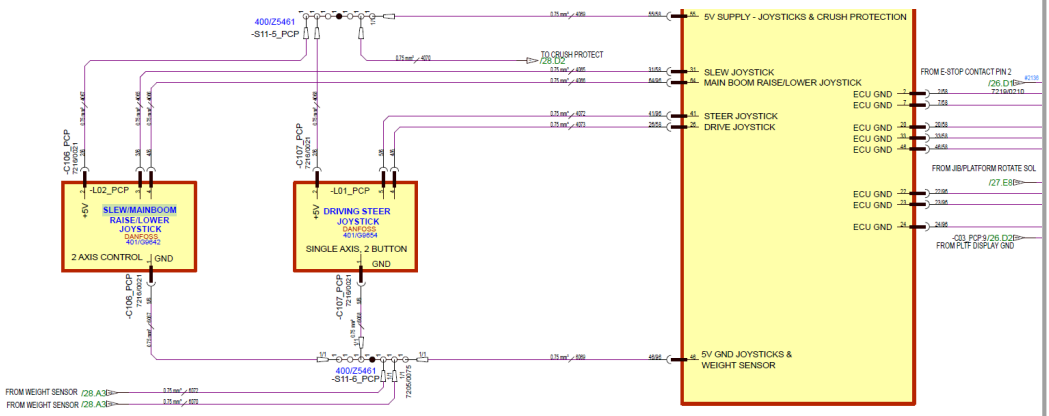
Wires & Connectors:	 7216/0021 6 Way Connector
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. Note- Slew & main boom raise and lower joystick is double axis joystick. 5V hence be careful there is no protection on this input if over 5v goes it will break and damage beyond repair. 1. There are 4 wires, 2 input and 2 output, 2 inputs are 5V and 5V ground 2. The 2 outputs are one for slew & one for main boom. 3. Make sure joystick is fitted properly and there is no water ingress. 4. Check supply at C106 (Pin 1 & 2). It should read 5V. If there is no 5V then investigate wiring as per schematic. 5. Joystick on center position. Check voltage on connector C106 (Pin 3) & also at C106 (Pin4). It should read 2.5V. 6. Voltage changes from 0.5V to 4.5 V after moving joystick. 7. If Input voltage OK then it may be internal damage inside the joystick.

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	8. Replace it
Expected Values:	0.5-4.5 Volt
Related Fault Codes:	

Fault Code	Description
B1148-17 718	Main boom joystick - Circuit short to high (5v)
B1149-16 719	Main boom joystick - Circuit open or short to low
B1150-17 720	Slew joystick - Circuit short to high (5v)
B1151-16 721	Slew joystick - Circuit open or short to low

4.27.8 Main Boom Telescope Extend/Retract Switch(PCP)

Main Boom Telescope Extend/Retract Switch(PCP)

Components 132 > Platform & Control Panel 265 > Main Boom Telescope Extend/Retract Switch(PCP)

Component:	Main Boom Telescope Extend/Retract Switch(PCP)
Function:	•This switch is to operate the main boom telescope in either extend or retract positioning from the platform control station. •This switch is and on-off-on switch.

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	•The foot pedal is required to enable operation
Location:	On Platform Control Box
Location Image:	

Signal:

Pin Number	Description / Signal	Connector number	Wire number(s)	Voltage with switch unpressed	Voltage with switch pressed
1	Telescope Retract	C300-1_PCP	0075	2.7 V	10V
2	Power in (10V)	C300-2_PCP	1074, 1072	10V	NA
3	Telescope Extend	C300-3_PCP	0074	2.7V	10V

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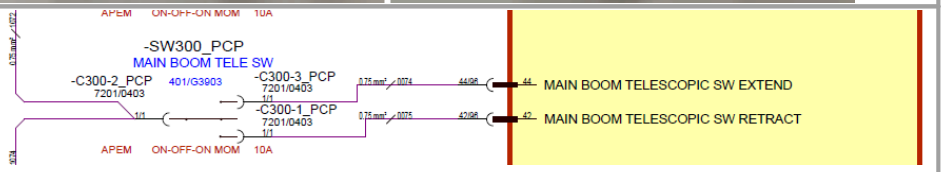
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. There are 3 contact on the back of switch.

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	2. Check terminal 1, 2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively. 3. Terminal 2 is for incoming supply 4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should not buzz 5. When switch is pressed up. Terminal 2 should buzz with bottom terminal & when switch is pressed down. Terminal 2 should buzz with up terminal. 6. Check supply at terminal 2. It should read 10V. 7. If there is no 10V then investigate wiring as per schematic. 8. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it
Expected Values:	12V

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	Fault Code	Description
Related Fault Codes:	B1252-17 793	MAIN BOOM TELESCOPE EXTEND Switch SC to High
	B1253-17 794	MAIN BOOM TELESCOPE RETRACT Switch SC to High
	B1254-92 795	MAIN BOOM TELESCOPE EXTEND & RETRACT Switches both activated (5 - 10V)
	B1255-16 796	MAIN BOOM TELESCOPE EXTEND Switch SC to Low
	B1256-16 798	MAIN BOOM TELESCOPE RETRACT Switch SC to Low

4.27.9 Articulated Raise/Lower Switch(PCP)

Articulated Raise/Lower Switch(PCP)

Components 132 > Platform & Control Panel 265 > Articulated Raise/Lower Switch(PCP)

Component:	Articulated Raise/Lower Switch(PCP)
Function:	•This switch is to operate the Articulated boom in either raise or lower positioning. •This switch is and on-off-on switch. •The foot switch is required to enable operation

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Location:	On Platform Control Box
Location Image:	

Signal:

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage with switch unpressed	Voltage with switch pressed
1	Artic boom raise	C201-1_PCP	73	3.4 V	10V
2	Power in (10V)	C201-2_PCP	1072	10V	NA
3	Artic boom lower	C201 -3_PCP	72	2.7V	10V

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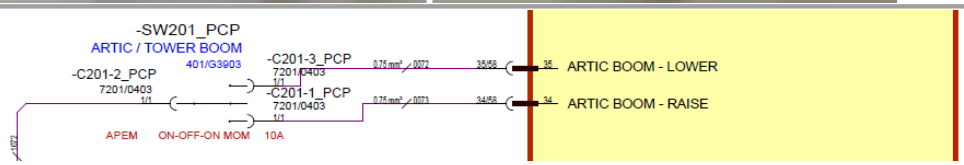
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. There are 3 contact on the back of switch.

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	. 2Check terminal 1, 2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively. 3. Terminal 2 is for incoming supply 4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should not buzz 5. When switch is pressed up. Terminal 2 should buzz with bottom terminal & when switch is pressed down. Terminal 2 should buzz with up terminal. 6. Check supply at terminal 2. It should read 10V. 7. If there is no 10V then investigate wiring as per schematic. 8. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it.
Expected Values:	12 V

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	Fault Code	Description
Related Fault Codes:	B1096-17 645	ARTICULATED BOOM RAISE Switch Short Circuit to High
	B1097-17 647	ARTICULATED BOOM LOWER Switch Short Circuit to High
	B1098-92 648	ARTICULATED BOOM RAISE & LOWER Switches both activated (5 - 10V)
	B1099-16 650	ARTICULATED BOOM RAISE Switch Short Circuit to Low
	B1100-16 651	ARTICULATED BOOM LOWER Switch Short Circuit to Low
	B1247-17 787	ARTICULATED BOOM RAISE Switch Short Circuit to High
	B1248-17 788	ARTICULATED BOOM LOWER Switch Short Circuit to High
	B1249-92 790	ARTICULATED BOOM RAISE & LOWER Switches both activated (5 - 10V)
	B1250-16 791	ARTICULATED BOOM RAISE Switch Short Circuit to Low
	B1251-16 792	ARTICULATED BOOM LOWER Switch Short Circuit to Low

4.27.10 Jib Up/Down Switch(PCP)

Jib Up/Down Switch(PCP)

Components 132 > Platform & Control Panel 265 > Jib Up/Down Switch(PCP)

Component:	Jib Up/Down Switch(PCP)
Function:	•This switch is to operate the jib in either raise or lower positioning from the platform control station. •This switch is and on-off-on switch. •The foot pedal is required to enable operation
Location:	On Platform Control Box

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Location Image:

Signal:

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage with switch unpressed	Voltage with switch pressed
1	Jib Lower	C203-1_PCP	0077	2.7 V	10V
2	Power in (10V)	C203-2_PCP	1076, 1074	10V	NA
3	Jib Raise	C203-3_PCP	0076	2.7V	10V

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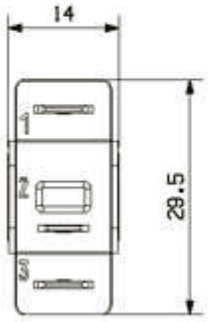
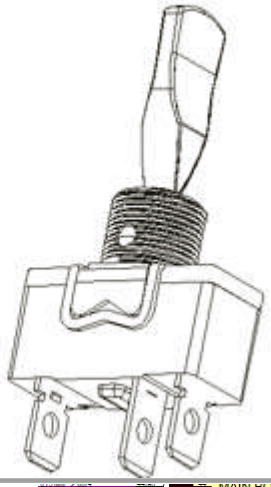
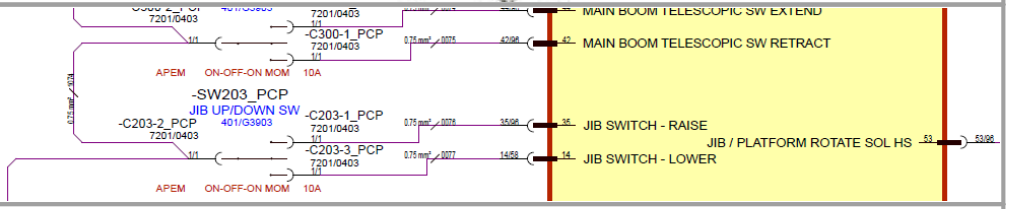
Wires & Connectors :	 
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. There are 3 contact on the back of switch. 2. Check terminal 1, 2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively. 3. Terminal 2 is for incoming supply

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	4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should not buzz 5. When switch is pressed up. Terminal 2 should buzz with bottom terminal & when switch is pressed down. Terminal 2 should buzz with up terminal. 6. Check supply at terminal 2. It should read 10V. 7. If there is no 10V then investigate wiring as per schematic. 8. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it.
Expected Values:	12V
Related Fault Codes:	

Fault Code	Description
B1262-17 804	Jib boom platform switch raise function - Circuit short to high (10v)
B1263-17 805	Jib boom platform switch lower function - Circuit short to high (10v)
B1264-92 807	Jib boom platform switch both functions - Signal plausibility failure (10v)
B1265-16 808	Jib boom platform switch raise function - Circuit short to low
B1266-16 809	Jib boom platform switch lower function - Circuit short to low

4.27.11 Platform Rotate Left/Right Switch(PCP)

Platform Rotate Left/Right Switch(PCP)

Components 132 > Platform & Control Panel 265 > Platform Rotate Left/Right Switch(PCP)

Component :	Platform Rotate Left/Right Switch(PCP)

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Function:	•This switch is to operate the platform rotate in either left or right positioning from the platform control station. •This switch is and on-off-on switch. •The foot pedal is required to enable operation
Location:	On Platform Control Box
Location Image:	

Signal:

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage with switch unpressed	Voltage with switch pressed
1	platform rotate right	C202-1_PCP	0079	2.7 V	10V
2	Power in (10V)	C202-2_PCP	1078, 1080	10V	NA

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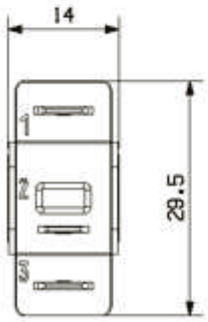
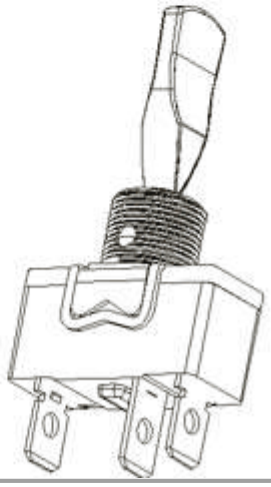
	3	platform rotate left	C202- 3_PCP	0078	3.4 V	10V

Wires &

Connectors

:





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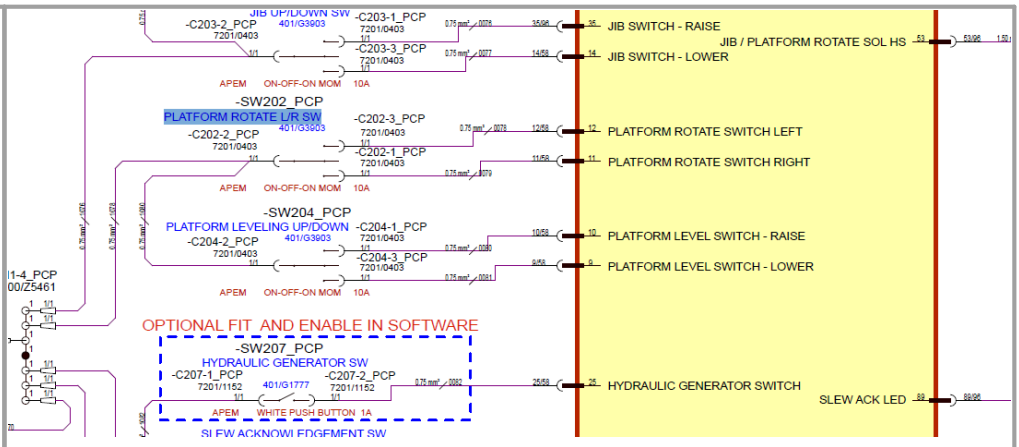
Internal

Electrical

Schematic:



Testing:

Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins

1. There are 3 contact on the back of switch.

2. Check terminal 1, 2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively.

3. Terminal 2 is for incoming supply

4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should not buzz

5. When switch is pressed up. Terminal 2 should buzz with bottom terminal & when switch is pressed down. Terminal 2 should buzz with up terminal.

6. Check supply at terminal 2. It should read 10V.

7. If there is no 10V then investigate wiring as per schematic.

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	8. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it
Expected Values:	12V
Related Fault Codes:	**Fault Code** / **Description** B1262-17 804 — Jib boom platform switch raise function - Circuit short to high (10v) B1263-17 805 — Jib boom platform switch lower function - Circuit short to high (10v) B1264-92 807 — Jib boom platform switch both functions - Signal plausibility failure (10v) B1265-16 808 — Jib boom platform switch raise function - Circuit short to low B1266-16 809 — Jib boom platform switch lower function - Circuit short to low

4.27.12 Platform Leveling Up/Down Switch(PCP)

Components 132 > Platform & Control Panel 265 > Platform Leveling Up/Down Switch(PCP)

Component:	Platform Leveling Up/Down Switch(PCP)
Function:	•This switch is to operate the platform leveling in either raise or lower positioning from the platform control station. •This switch is and on-off-on switch. •The foot pedal is required to enable operation.

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Location:	On Platform Control Box
Location Image:	

Signal:

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage with switch unpressed	Voltage with switch pressed
1	Leveling raise	C204-1_PCP	0080	2.7 V	10V
2	Power in (10V)	C204-2_PCP	1080	10V	NA
3	Leveling lower	C204-3_PCP	0081	2.7V	10V

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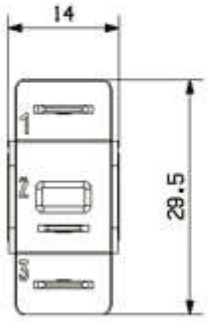
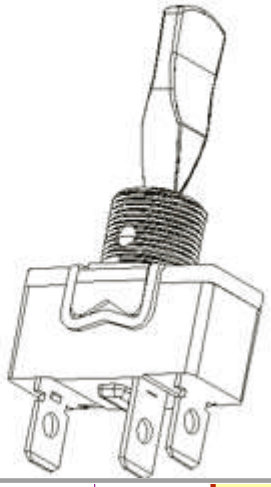
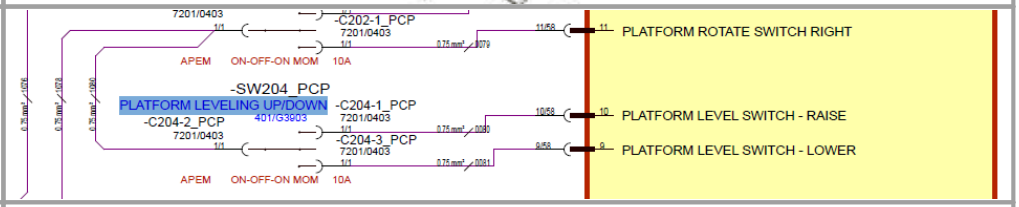
Wires & Connectors:	 
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. There are 3 contact on the back of switch. 2. Check terminal 1, 2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively. 3. Terminal 2 is for incoming supply

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	4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should not buzz 5. When switch is pressed up. Terminal 2 should buzz with bottom terminal & when switch is pressed down. Terminal 2 should buzz with up terminal. 6. Check supply at terminal 2. It should read 10V. 7. If there is no 10V then investigate wiring as per schematic. 8. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it.
Expected Values:	12V
Related Fault Codes:	

Fault Code	Description
B1242-17 781	Platform level platform switch raise function - Circuit short to high (10v)
B1243-17 783	Platform level platform switch lower function - Circuit short to high (10v)
B1244-92 784	Platform level platform switch both functions - Signal plausibility failure (10v)
B1245-16 785	Platform level platform switch raise function - Circuit short to low
B1246-16 786	Platform level platform switch lower function - Circuit short to low

4.27.13 Potentiometer

Components 132 > Platform & Control Panel 265 > Potentiometer

Component:	Potentiometer
Function:	•The potentiometer is used to alter the speeds of the machine functions by the operator. •This will only effect controls at the platform control panel.
Location:	On Platform Control Box

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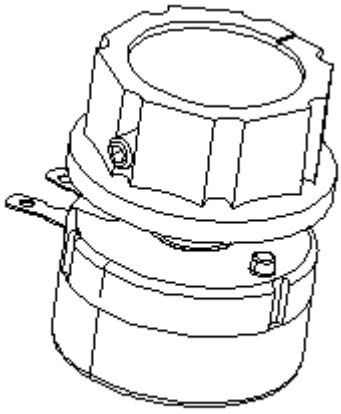
Location Image:

Signal:

Pin Number	Description	Wire Number
1	5V SUPPLY	4074
2	Signal output	4075
3	5V GND	6074

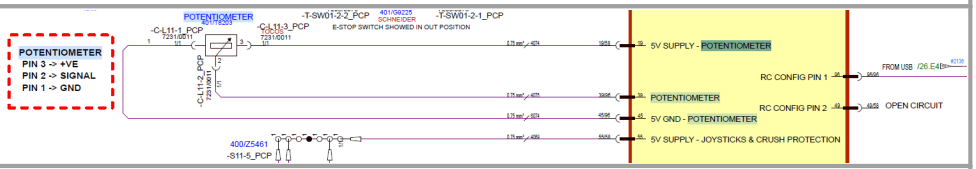
Wires & Connectors:

The potentiometer has 3 fully insulated push on terminals that mate with the potentiometer connections



ISO VIEW

Internal Electrical Schematic:



Testing:

Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins

1. Ensure no water ingress inside the potentiometer fitted on platform control panel plate

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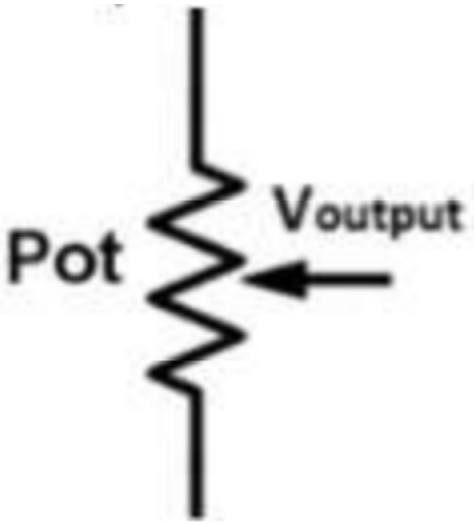
	2. Check Pin3 (C-L11-3) for positive, Pin 2 (C-L11-2) signal , Pin 1 C-L11-1) is input ground  3. Check the voltage at Pin 2 (C-L11-2) & Pin 1 (C-L11-1) it should vary by rotating the potentiometer knob (should be between 0.5V to 4.5V) 4. If it is not varying check the supply voltage between Pin C-L11-1 Pin 1 C-L11-3. This should read 5V 5. If there is no input voltage then investigate wiring as per schematic 6. If input voltage is available and out put voltage is not , it might be internal damage to potentiometer , replace it.
Expected Values:	5V
Related Fault Codes:	**Fault Code** / **Fault Description** B1067-17 605 / Potentiometer - Circuit short to high (5.5v)

4.27.14 Slew Acknowledgement Switch with LED

Slew Acknowledgement Switch with LED

Components 132 > Platform & Control Panel 265 > Slew Acknowledgement Switch with LED

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<table>
<tr><td>Component:</td><td>Slew Acknowledgment Switch with LED</td></tr>
<tr><td>Function:</td><td>•The push button is so the operator can acknowledge that the machine has been slewed around and the drive/ steer directions may be reverse.
•All drive operation will be cut until the operator has enabled this button.
•The LED above the switch will flash to show the operator that it is required
•The button is a momentary push button.</td></tr>
<tr><td>Location:</td><td>On Platform Control Box</td></tr>
<tr><td>Location Image:</td><td>
</td></tr>
<tr><td>Signal:</td><td>
<table>
<tr><th>Pin Number</th><th>Description</th><th>Connector number</th><th>Wire number</th><th>Voltage unpressed</th><th>Voltage pressed</th></tr>
<tr><td>1</td><td>10V Feed In</td><td>C205-1</td><td>1084, 1082</td><td>10V</td><td>NA</td></tr>
<tr><td>2</td><td>Signal to ECU (10V when pressed)</td><td>C205-2</td><td>0083</td><td></td><td>10V</td></tr>
</table>
</td></tr>
</table>

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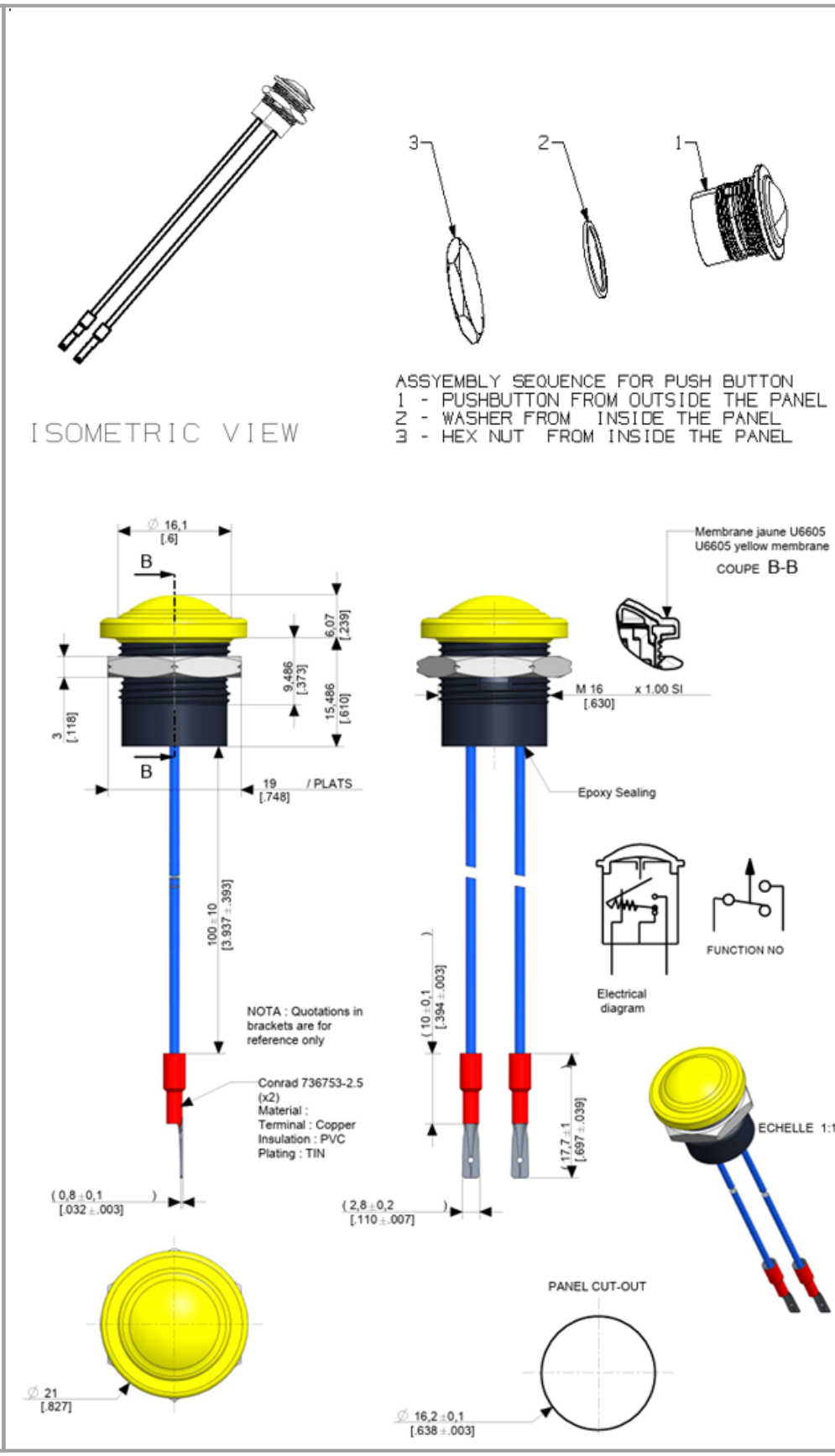
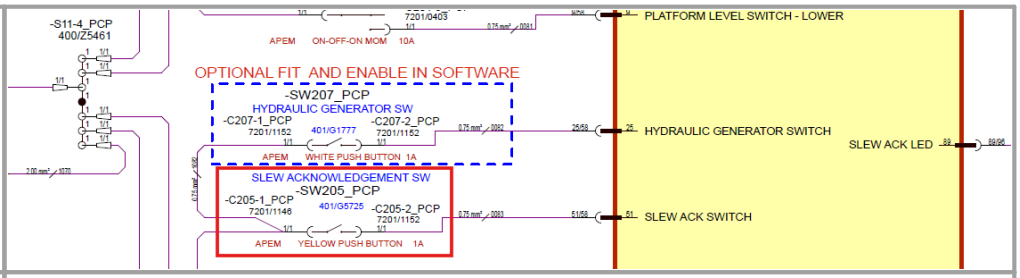
Wires & Connectors :



Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. Note-All the bush button fitted on machine are 10V ,normally open and closed when pressed Diagnostic feedback on push button are coming from ECU 1. Check supply at wiring harness terminal-1 with (respect to ground) on push button (when not pressed). It should read 10V. 2. Check the voltage at wiring harness terminal-2 on push button (When not pressed). It should read 2-3V 3. Check the continuity between terminal 1 & 2 after pressing the push button. It should buzz. 4. If there is continuity and we are getting 10V supply then it may be internal damage to push button. 5. If issue still there replace the push button.
Expected Values:	12V
Related Fault Codes:	

Fault Code	Fault Description
B1064 -17 600	Slew acknowledgment button - Circuit short to high (10v)
B1065 -16 602	Slew acknowledgment button - Circuit short to low
B1066 -24 604	Slew acknowledgment button - Signal stuck high

4.27.15 Horn Switch(PCP)

Components 132 > Platform & Control Panel 265 > Horn Switch(PCP)

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Component:	Horn Switch(PCP)
Function:	•Horn switch is for audible warning that the operator can use •The horn is located at the base of the machine.
Location:	On Platform Control Box
Location Image:	

Signal:

Pin Number	Description	Connector number	Wire number(s)	Voltage unpressed	Voltage pressed
1	10V input	C206-1_PCP	1085, 1084	10V	NA
2	Signal output to ECU (10V when pressed)	C206-2_PCP	0085		10V

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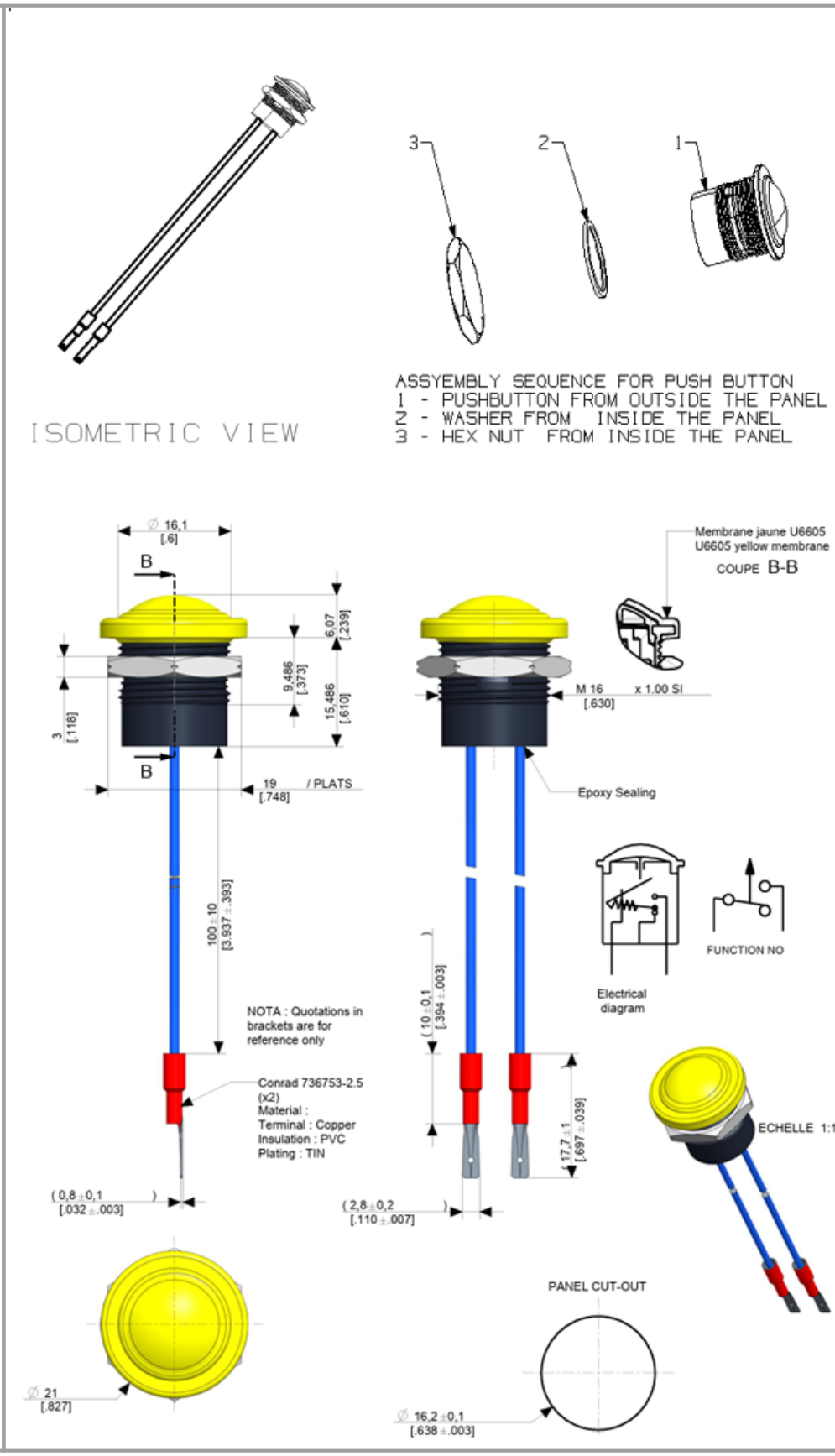
Wires & Connectors :



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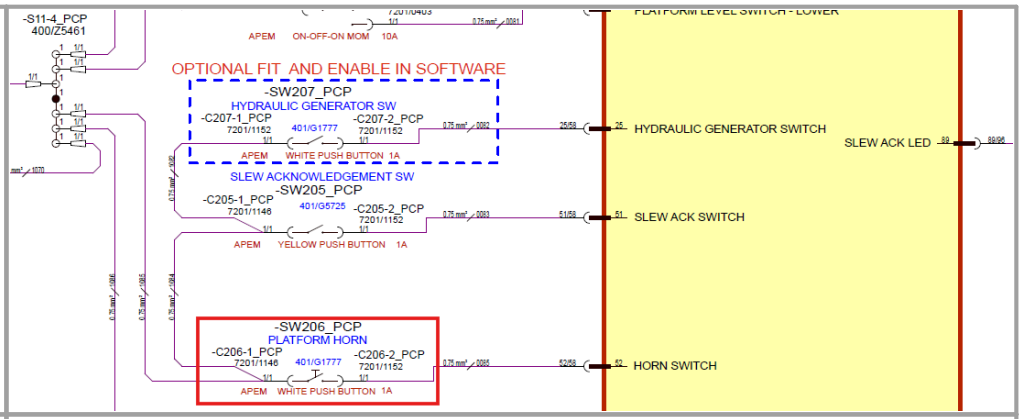
Internal Electrical Schematic:	
Testing:	1. Check horn button in platform is not stuck on remove horn button and check continuity. 2. Check wire code 0085 for voltage.
Expected Values:	12V
Related Fault Codes:	**Fault Code** / **Fault Description** B1273-17 817 — Horn platform button - Circuit short to high (10v) B1274-16 818 — Horn platform button - Circuit short to low B1275-24 819 — Horn platform button - Signal stuck high

4.27.16 Emergency Stop Switch(PCP)

Emergency Stop Switch(PCP)

Components 132 > Platform & Control Panel 265 > Emergency Stop Switch(PCP)

Component:	Emergency Stop Switch(PCP)
Function:	•The E-stop is there for the operator to stop any functioning with immediate action. •This will stop all functions at the base and platform controls stations. •The E-stop will cut the engine but it is not to be used to power down the machine. The machine is still powered on with the E-stop pressed.

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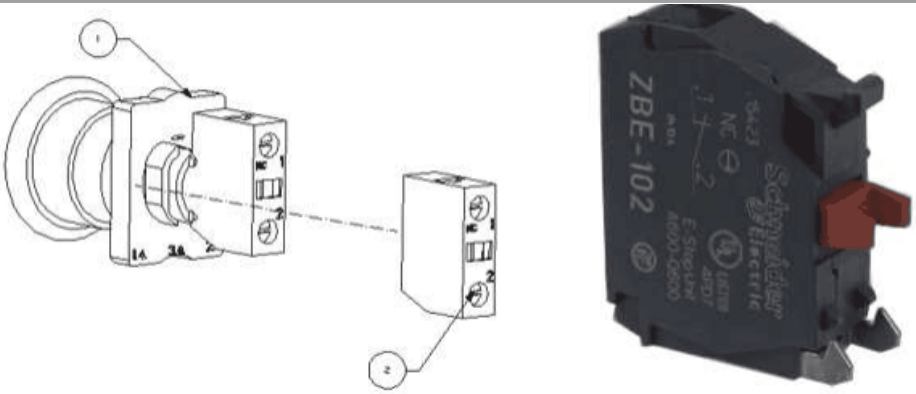
	•The E-stop uses x2 NC contacts that open when pressed.
Location:	On Platform Control Box
Location Image:	

Signal:

Pin Number and contactor block	Description	Connector number	Wire number	Voltage unpressed	Voltage pressed
contact 1 NC pin 1	12V feed	T-SW-01-1-1_PCP	1028	12V	NA
contact 1 NC pin 2	Output to platform ECU	T-SW-01-1-2_PCP	0028		12V
contact 2 NC pin 1	GND feed	T-SW-01-2-2_PCP	6030	GND	NA
contact 2 NC pin 2	Output to ECU	T-SW-01-2-1_PCP	6048		GND

Wires & Connectors:



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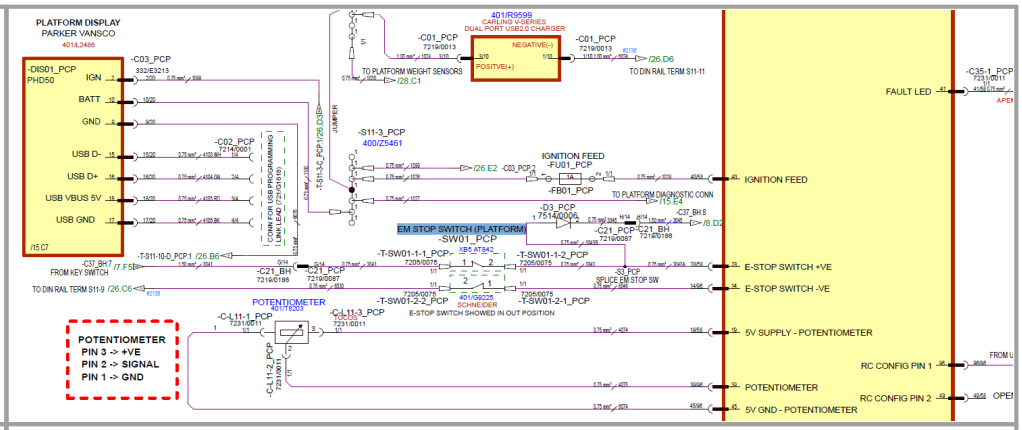
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. Do the below steps for both contacts separately. 2. Take multimeter and check the multi meter is working 3. Set the multimeter in continuity mode (Sound wave or Diode or both) 4. Place the red probe on one of the terminal on the switch and black probe on other terminal on the switch 5. In E-Stop switch in PUSHED IN state, Multimeter should read as 'OL' (open circuit) 6. In E-Stop switch in OUT state, Multimeter should read as '1' or less. 7. Operate the switch in PUSHED IN and OUT state in few more times. Multimeter reading should change while operating from PUSHED IN to OUT. If the reading doesn't change means E-Stop switch is defective 8. Replace the defective E-Stop switch with same type and size, please contact JCB Service department.
Expected Values:	12V
Related Fault Codes:	**Fault Code** / **Fault Description** B1235-17 774 — E-stop platform button - Signal plausibility failure

4.27.17 Electric Pump Switch (AUX)

Electric Pump Switch (AUX)

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Components 132 > Platform & Control Panel 265 > Electric Pump Switch (AUX)

Component:	Electric Pump Switch (AUX)
Function:	•This button is used to activated the Auxiliary Pump. All Boom functions shall be operated from the Platform control panel with 12V battery (when Auxiliary/Electric pump is requested).
Location:	On Platform Control Box
Location Image:	
Signal:	

Pin Number	Description	Connector number	Wire number(s)	Voltage unpressed	Voltage pressed
1	10V input	C209-1_PCP	1089	10V	NA
2	Signal output to ECU (10V when pressed, momentary)	C209-2_PCP	0089		10V

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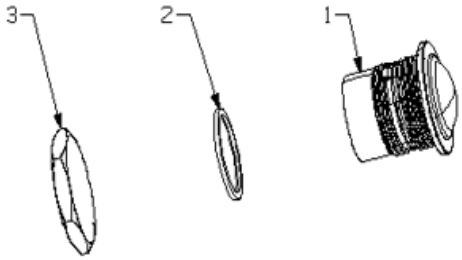
Wires & Connectors :

ISOMETRIC VIEW



ASSYEMBLY SEQUENCE FOR PUSH BUTTON
1 - PUSHBUTTON FROM OUTSIDE THE PANEL
2 - WASHER FROM INSIDE THE PANEL
3 - HEX NUT FROM INSIDE THE PANEL

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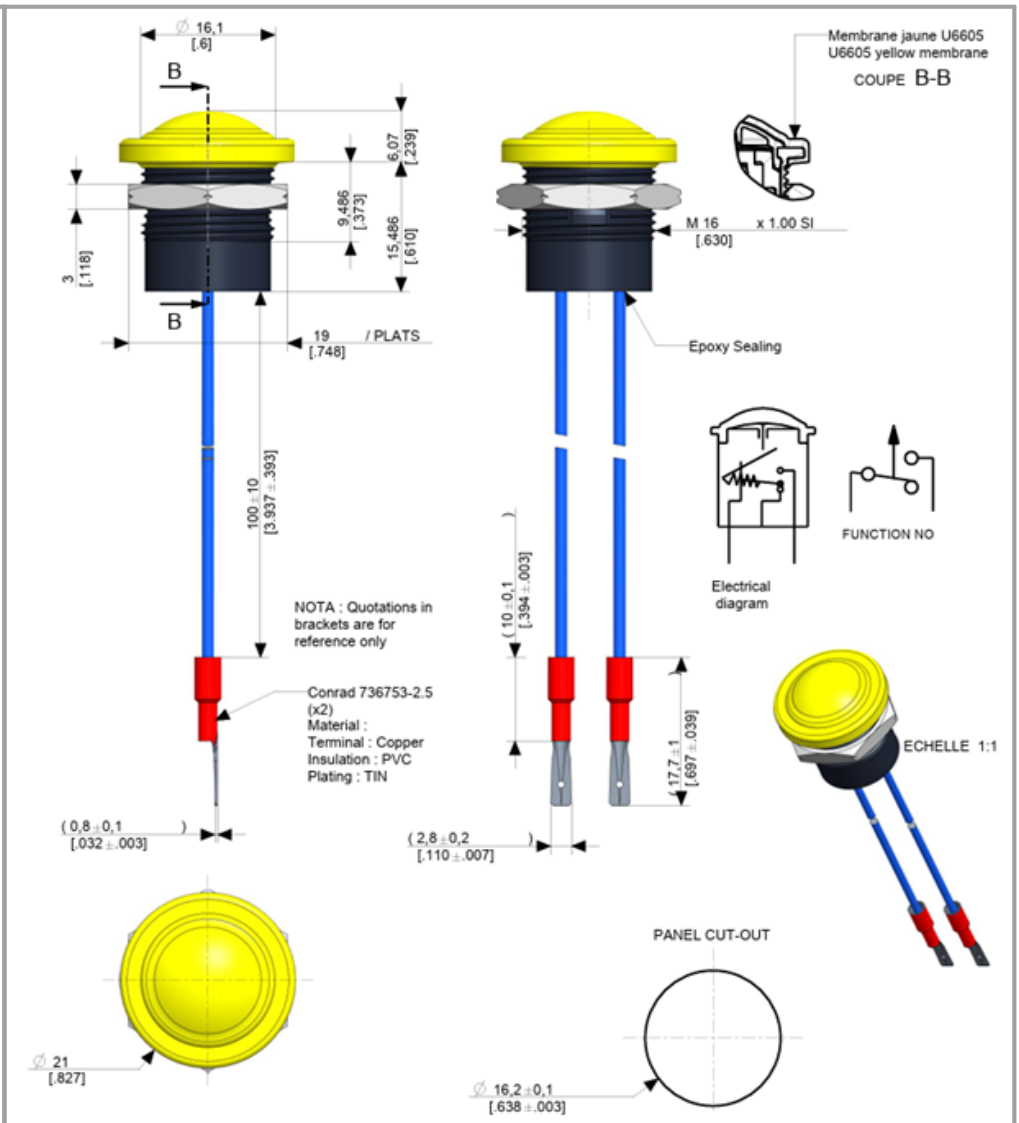
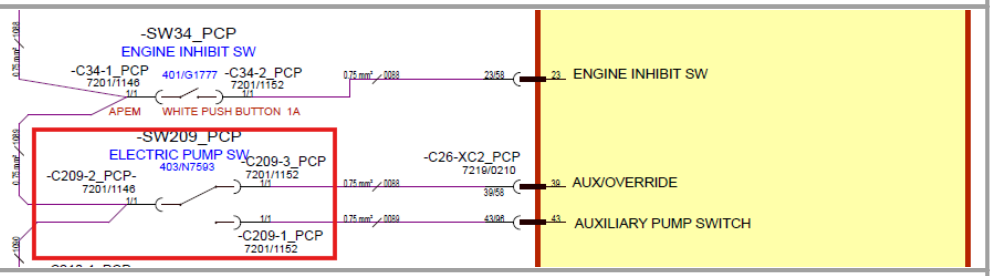


Internal Electrical Schematic:



Testing:

1. Check the continuity between terminal 1 & 2 after pressing the push button. It should buzz.

2. Check Wire no. 1089 and 0089.

Expected Values:

12V

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Related Fault Codes:	Fault Code	Fault Description
	B1055-17 593	AUX / Overload override button pressed condition - Circuit short to high (10v)
	B1056-16 594	AUX / Overload override button pressed condition - Circuit short to low

4.27.18 Worklight Switch

Work light Switch

Components 132 > Platform & Control Panel 265 > Worklight Switch

Component:	Work light Switch
Function:	•This switch is optional fit and may not be fitted to all machines. •The Switch will turn on LED work lights at the platform. •The Lights will only work when the engine is running to avoid a battery drain condition and being stuck up in the air. •The LED will be active when the work lights are turned on.
Location:	On Platform Control Box
Location Image:	

Signal:

Switch wiring					
Pin Number	Description	Connector number	Wire number(s	Voltage unpressed	Voltage pressed

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			)		
1	12V input	C216-1_PCP	1035	12V	NA
2	Signal output	C216-2_PCP	8035	0V	12V

LED wiring			
Pin Number	**Description**	**Connector number**	**Wire number(s)**
1	12V input from switch	C225-1_PCP	8079
2	GND	C225-2_PCP	6079

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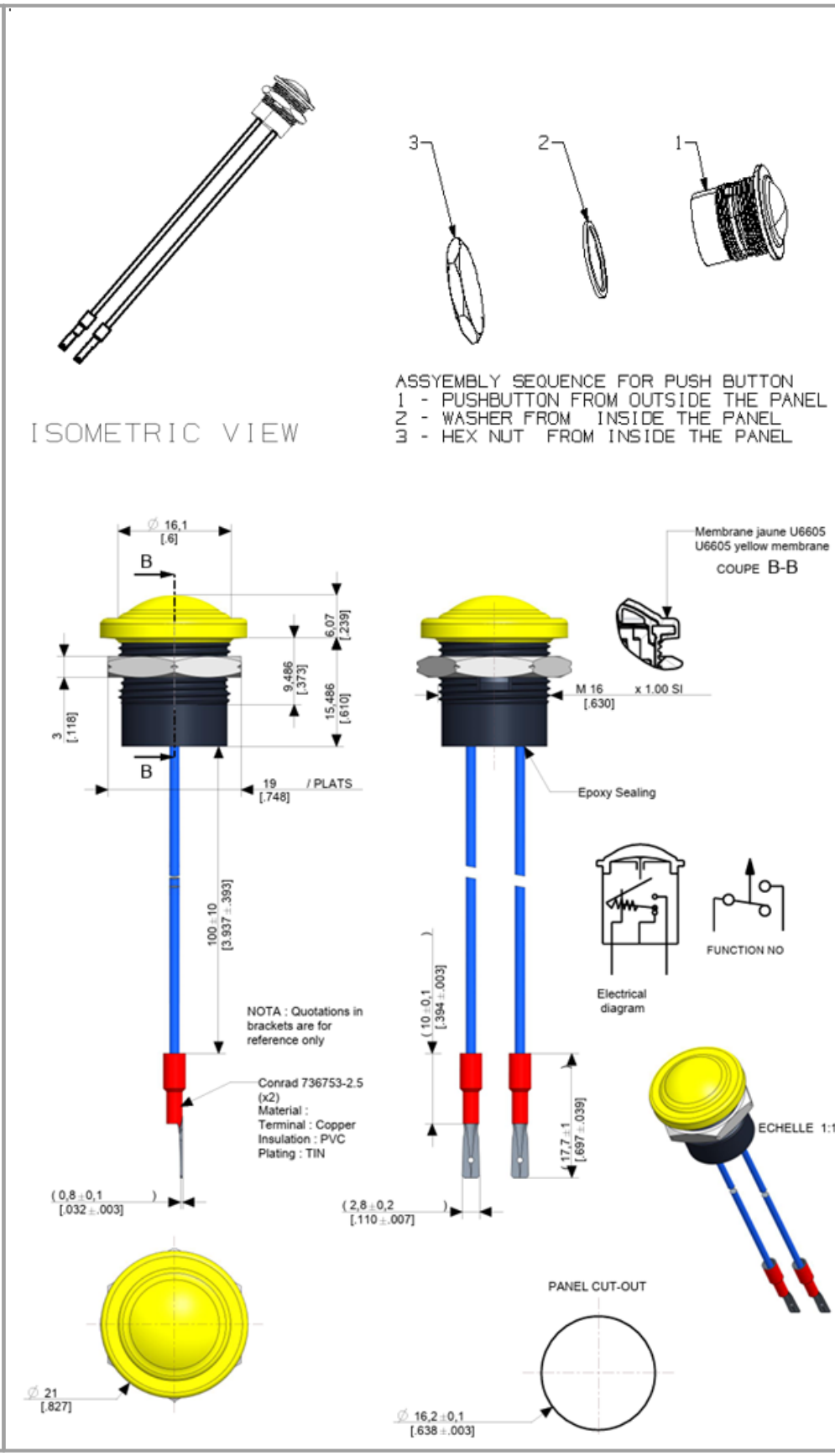
Wires & Connectors :



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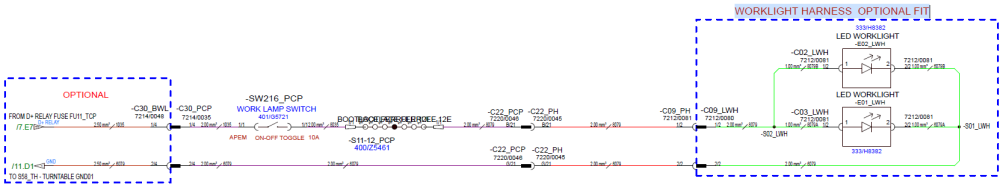
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. Note-All the bush button fitted on machine are 10V ,normally open and closed when pressed Diagnostic feedback on push button are coming from ECU 1. Check supply at wiring harness terminal-1 with (respect to ground) on push button (when not pressed). It should read 10V. 2. Check the voltage at wiring harness terminal-2 on push button (When not pressed). It should read 2-3V 3. Check the continuity between terminal 1 & 2 after pressing the push button. It should buzz. 4. If there is continuity and we are getting 10V supply then it may be internal damage to push button. 5. If issue still there replace the push button.
Expected Values:	12V
Related Fault Codes:	N/A

4.27.19 Fault LED

Fault LED

Components 132 > Platform & Control Panel 265 > Fault LED

Component:	Fault LED

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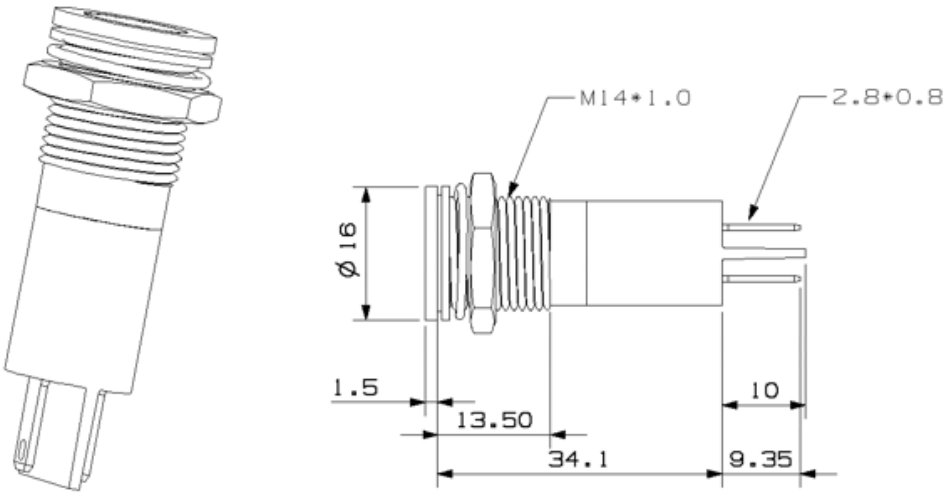
Function:	•The Fault LED shall be in the platform control station and also displayed on the display. •Due to the display being at the base and not as much information being shown in the platform to the operator the fault LED shall indicate there is an issue with the machine and the operator should return to the base and take a look at the screen to understand the actual reason of the fault.
Location:	On Platform Control Box
Location Image:	

Signal:

Pin Number	Description	Colour of pin	Connector number	Wire number
1	Input	Gold	C35-1_PCP	4071
2	GND	Silver	C35-2_PCP	6071

Wires & Connectors :



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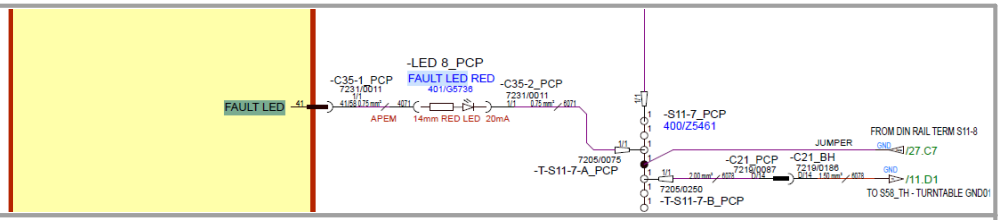
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. All LED fitted on machines are 12V 2. Gold terminal is positive & silver terminal is negative 3. Check LED should not be broken 4. IF LED light up it could be the wiring issues 5. Check the continuity on gold (positive) terminal & silver (negative) terminal of LED 6. If continuity is there on both terminal then 7. Check 12volt supply by using a multi meter 8. Connect the live terminal to the positive multi meter probe and the negative probe directly to the a main earth point on the machine or the negative terminal of the battery. 9. If this shows voltage below 12 volts then follow the schematic and investigate where the break in the wire/ circuit is. 10. If 12 volt feed is coming next check the earth by placing the positive probe of the multi meter on the live feed of the led and the negative probe onto the earth feed to the led. 11. if this again reads 12 volts this indicate LED failure , replace with new LED.
Expected Values:	12V
Related Fault Codes:	<table><tr><th>Fault Code</th><th>Fault Description</th></tr><tr><td>B1190-16 747</td><td>Fault LED - Circuit short to low</td></tr><tr><td>B1191-17 748</td><td>Fault LED - Circuit short to high (12v)</td></tr></table>

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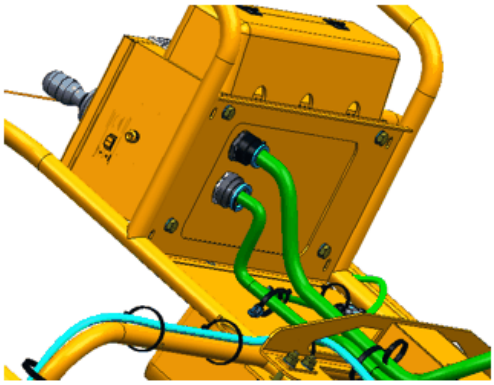
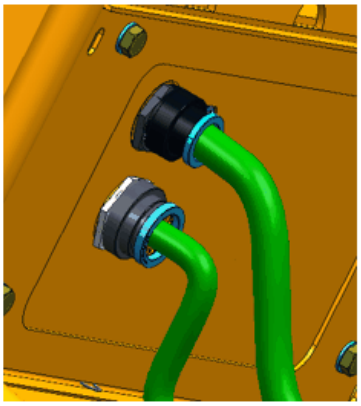
4.27.20 PCP Interface Connectors

PCP Interface Connectors

Components 132 > Platform & Control Panel 265 > PCP Interface Connectors

Component:	PCP Interface Connectors
Function:	•There is 2 connectors that interface with the machine. •1 feeds the platform harness around the platform C21_PCP •2. feed and return to the base of the machine C22_PCP
Location:	On Platform Control Box bottom side
Location Image:	 

Signal:

C21_PCP_BOOM HARNESS CONN. :

Pin Number	Description	Wire Number
A	IGN	1014
B	IGN	1015
C	-	-
D	GND	6078
E	GND	6040

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F	GND	6028
G	-	-
H	-	-
J	-	-
K	-	-
L	-	-
M	CAN HIGH	CANH15
N	CAN LOW	CANL15
P	CAN SHIELD	CANS15

C22_PCP_PLATFORM INTERCONNECT		
Pin Number	Description	Wire Number
A	-	-
B	WORK LIGHT INPUTS	8079
C	-	-
D	10V FEED	1070
E	GND	6036
F	CRUSH PROTECTION SIGNAL 10V	4093
G	GND	6079
H	CRUSH PROTECTION SIGNAL 5V	4094
J	CRUSH PROTECTION SWITCH 5VV	4070
K	FOOT PEDAL SIGNAL	4096
L	-	-
M	-	-
N	-	-
P	-	-

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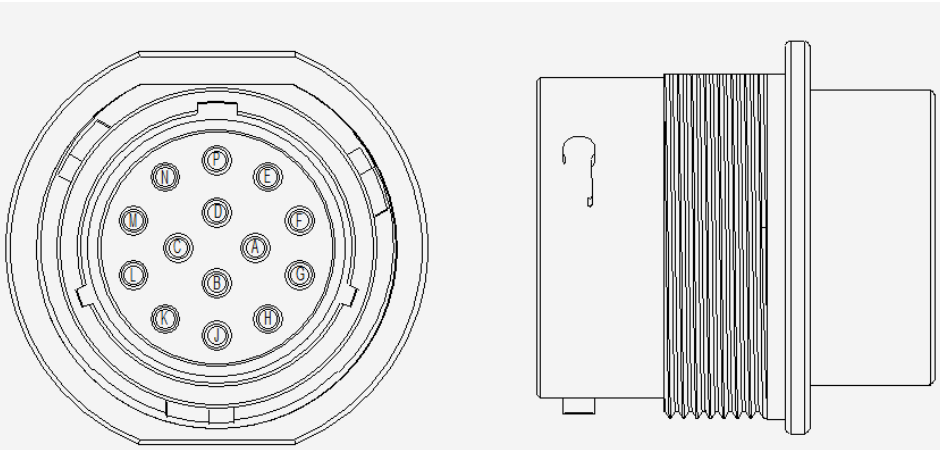
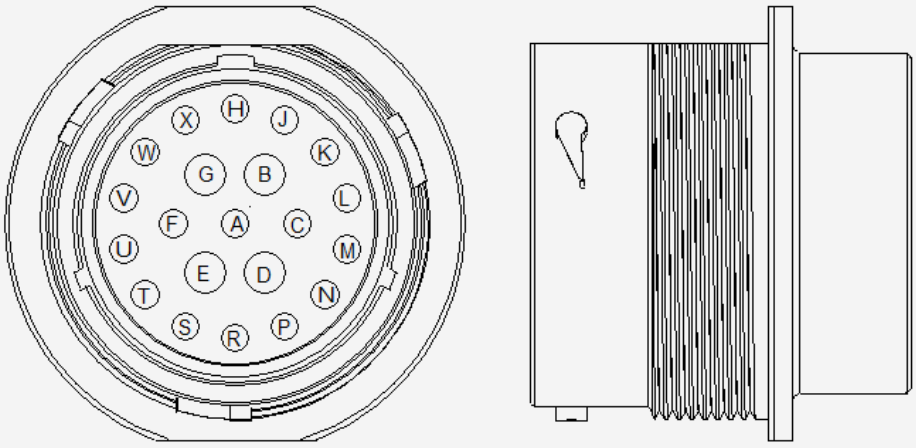
R	PLATFORM ROTATE RIGHT SOL HS	4083
S	-	-
T	IGN	1030
U	GND	6072
V	GND	6070
W	LOAD SENSOR SIGNAL -1	4101
X	LOAD SENSOR SIGNAL -2	4102

Wires & Connectors :

C21_PCP Boom harness connection
C22_PCP Platform interconnect from base





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Internal Electrical Schematic:	Refer Schematic: 401/Y3086
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. Check all the wire and connecter are fitted correctly. No wire should be backed out 2. Check male & female connector are mating properly.
Expected Values:	See Signal
Related Fault Codes:	N/A

4.27.21 Jumper Bars

Components 132 > Platform & Control Panel 265 > Jumper Bars

Component:	Jumper Bars
Function:	•The jumper bars are used for connecting the din rail terminals together. This allows for the same signals to be connected together. •Always ensure they are wired to schematic wiring otherwise damage to components could be caused.
Location:	Inside the Platform Control Box

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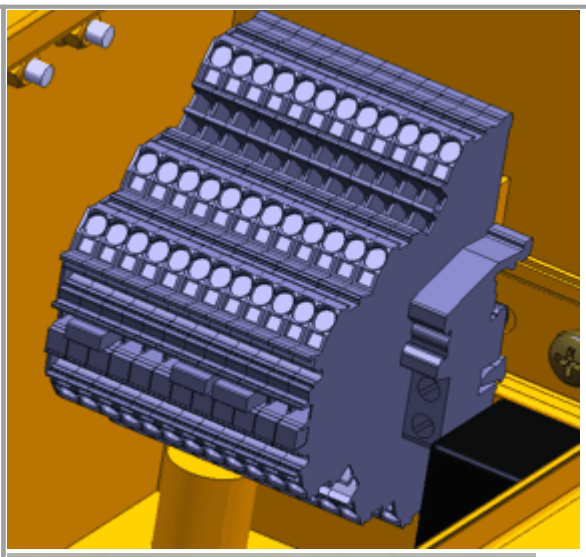
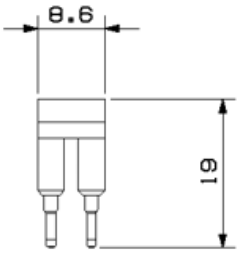
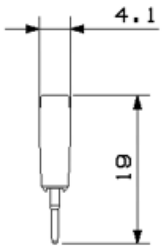
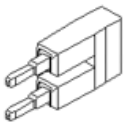
Location Image:	
Signal:	See din rail terminals for location of fitting
Wires & Connectors :	The jumper bars fit into the top of the din rail terminals. Ensure they are fully pushed in and flush with top of din rail terminal for a good connection.   

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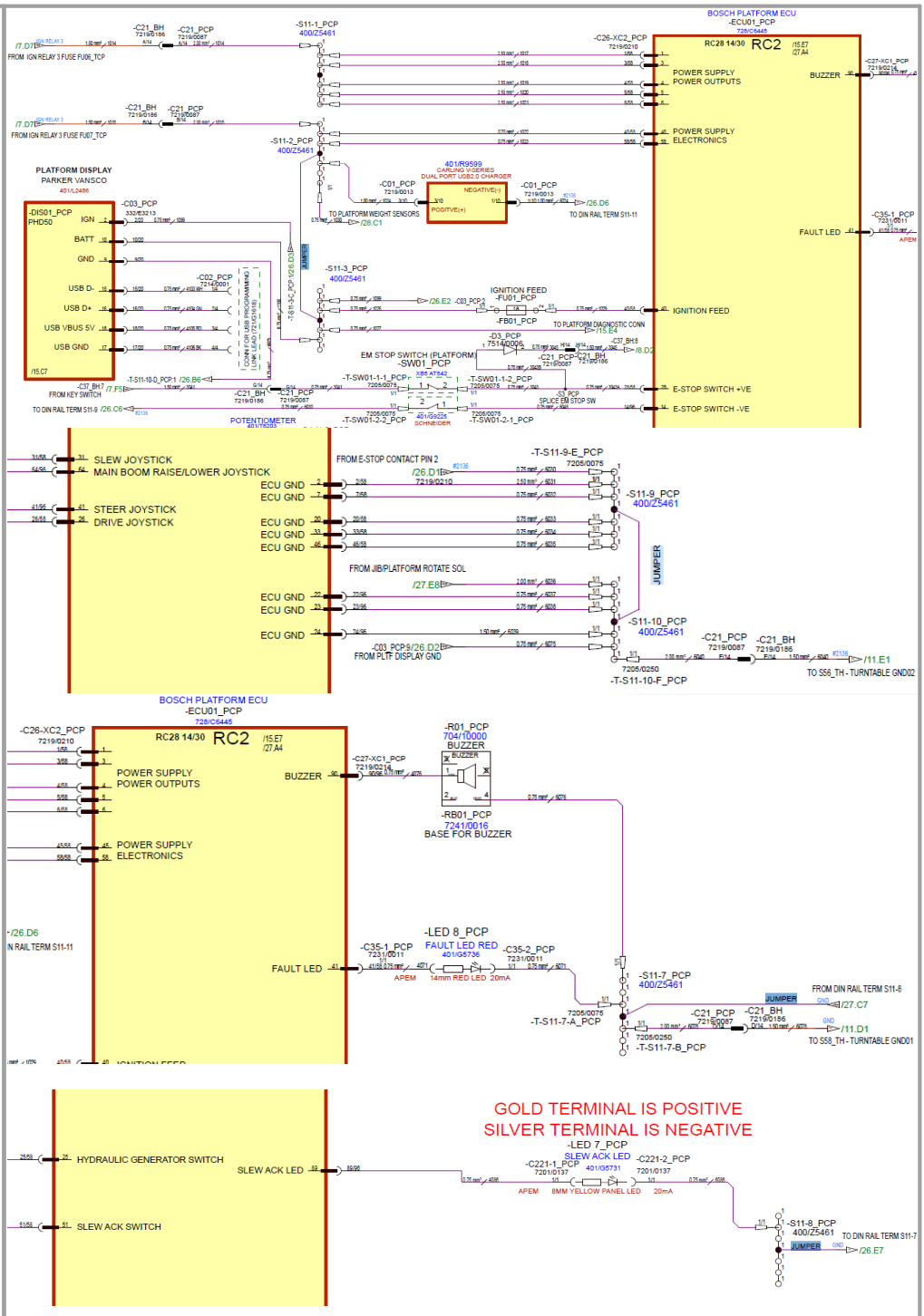
Internal Electrical Schematic:



Testing:

Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins

1. Check jumper bar is inserted properly inside din rail terminals

2. Check continuity between din rail terminals where jumper is fitted it should buzz.

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Expected Values:	
Related Fault Codes:	N/A

4.27.22 Din Rail Terminals - Small

Din Rail Terminals - Small

Components 132 > Platform & Control Panel 265 > Din Rail Terminals - Small

Component:	Din Rail Terminals - Small
Function:	•The din rail terminals work live bus bars and allow connections of wires of the same signal. •The din rail terminals can also be joined together using jumper bars. •Each din rail is capable of holding 6 individual wires. •There should always be a bootlace ferrule on the wire before inserting. •There should only be 1 wire per terminal. •A screw driver is required to remove terminals.
Location:	The din rail terminals are located in the platform control panel on the right hand side.
Location Image:	They clip onto the din rail fixed on the inside of the control box.

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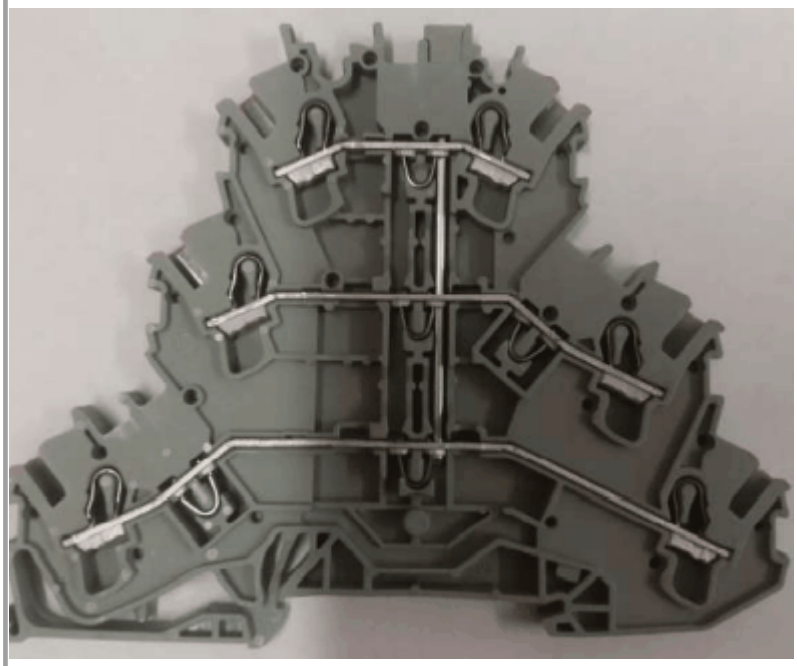

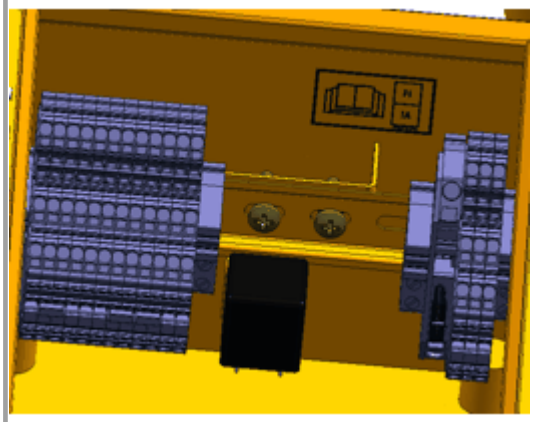

Signal:

The din rail terminals are not marked with numbering. Because they are a bus bar the wires can be inserted into any slot in the correct din rail terminal.

They may not be in the order described below depending on assembly

S11-1_PCP - main power		
Pin Ident	**Wire number**	**Description**
1	1018	Bosch power supply input
2	1019	Bosch power supply input
3	1017	Bosch power supply input
4	1020	Bosch power supply input

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5	1014	Ignition relay feed input
6	1021	Bosch power supply input
S11-2 - main power		
Pin Ident	**Wire number**	**Description**
1	1023	Bosch ecu power supply
2	1024	USB power supply
3	1022	Bosch ecu power supply
4		
5	1015	Ignition relay feed input
6	1030	Weight Sensor Supply
Jumper bar	Jumper to S11-3	
S11-3 - main power		
Pin Ident	**Wire number**	**Description**
1	1026	Ignition feed to Bosch ECU
2	1027	Platform diagnostic connector
3	1099	Parker (Platform) Display Input
4	1100	Parker (Platform) Display ECU
5		
6	1028	E-Stop positive feed
Jumper bar	Jumper to S11-2	

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S11-4 - 10V feed		
Pin Ident	**Wire number**	**Description**
1	1068	10V input from ECU
2	1085	Feed to horn, slew acknowledgment switch, power to platform switch (Optional for Hybrid)
3	1078	Feed to platform rotate switch, platform leveling switch
4	1086	Feed to engine start (Optional for Hybrid) switch, Auto start/stop switch (Optional for Hybrid, electric pump switch
5	1076	Feed to artic boom , main boom tele & Jib switch
6	1070	Crush protection switch 2, foot pedal switch
S11-5 - 5V feeds		
Pin Ident	**Wire number**	**Description**
1		
2		
3	4068	feed to Drive/ steer joystick
4	4070	feed to Crush protection Switch 1
5	4067	feed to slew/ mainboom joystick
6	4069	5V feed from ECU
7		
S11-6 - 5V GND		
Pin Ident	**Wire number**	**Description**
1	6068	5V GND for Drive/Steer joystick
2	6072	5V GND for weight sensor
3		

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4	6070	5V GND for weight sensor
5	6067	5V GND for slew/ mainboom joystick
6	6069	5V GND ECU Connection
S11-7 - GND terminal block		
Pin Ident	**Wire number**	**Description**
1	6071	GND for fault LED
2	6078	Feed to turntable ground
3		
4		
5	6076	Buzzer GND
6		
7	Jumper to S11-8	
S11-8 GND		
Pin Ident	**Wire number**	**Description**
1		
2		
3	6086	Slew Acknowledgment LED ground
4		
5		
6		
7	Jumper to S11-7	

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S11-9 GND		
Pin Ident	**Wire number**	**Description**
1	6032	Bosch ECU GND
2	6033	Bosch ECU GND
3	6031	Bosch ECU GND
4	6034	Bosch ECU GND
5	6030	GND to Platform E-Stop
6	6035	Bosch ECU GND
7	Jumper to S11-10	
S11-10 GND		
Pin Ident	**Wire number**	**Description**
1	6038	Bosch ECU GND,
2	6039	Bosch ECU GND
3	6037	Bosch ECU GND
4	6075	Platform display ECU GND
5	6036	GND for platform rotate solenoids
6	6040	Turntable GND
7	Jumper to S11-9	
S11-11 - GND		
Pin Ident	**Wire number**	**Description**
1		
2	6024	GND for USB

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3	6029	GND to diagnostic connector
4	6028	GND feed to base harness
5		
6	6027	RC config pin on Bosch Platform ECU (GND)
S11-12 - Worklight		
Pin Ident	**Wire number**	**Description**
1		
2		
3		
4		
5	8035	Work light Feed from switch
6	8079	Work light LED feed
S11-13 CAN H J1939		
Pin Ident	**Wire number**	**Description**
1	CAN H18	CAN High Channel 1
2	CAN H16	CAN High Channel 1
3		
4	CAN H19	CAN High Channel 1
5	CAN H17	CAN High Channel 1
6	CAN H15	CAN High Channel 1
S11-14 - CAN L J1939		

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Pin Ident	Wire number	Description
1	CAN L18	CAN Low Channel 1
2	CAN L16	CAN Low Channel 1
3		
4	CAN L19	CAN Low Channel 1
5	CAN L17	CAN Low Channel 1
6	CAN L15	CAN Low Channel 1
S11-15 - CAN S J1939		
Pin Ident	**Wire number**	**Description**
1	CAN S18	CAN Shield Channel 1
2	CAN S 16	CAN Shield Channel 1
3		
4	CAN S 19	CAN Shield Channel 1
5	CAN S17	CAN Shield Channel 1
6	CAN S 15	CAN Shield Channel 1

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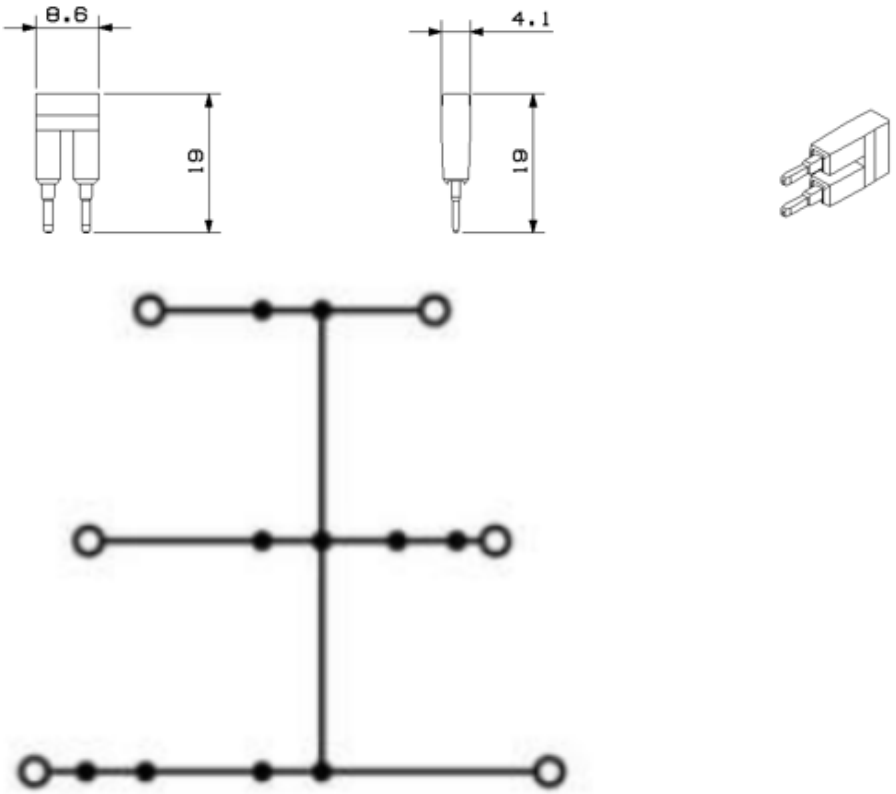
Wires & Connectors:	
Internal Electrical Schematic:	Refer Schematic: 401/Y3086
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT use the meter on the ECU pins 1. Each din rail is capable of holding 6 individual wires. 2. Ensure no water ingress inside the din rail terminals 3. Check ferrule is inserted properly inside din rail 4. Check din rail terminal are placed & locked properly over din rail 5. Check end stops are fitted correctly 6. Check all wires fitted on one din rail terminal should have continuity
Expected Values:	See Signal
Related Fault Codes:	N/A

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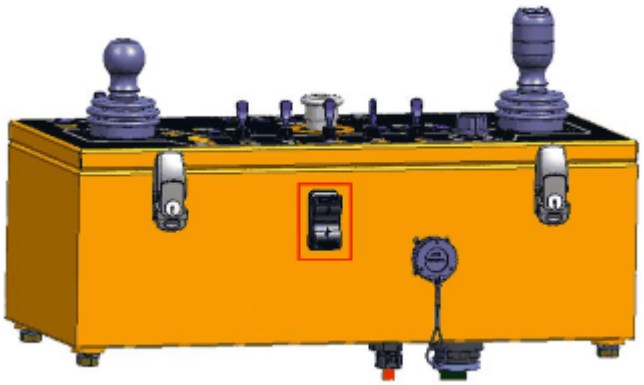
4.27.23 USB Connection

USB Connection

Components 132 > Platform & Control Panel 265 > USB Connection

Component:	USB Connection
Function:	•There is a twin port USB connection at the platform for use as a charger device. •There is no data transfer in either direction and this will make no effect to the machine.
Location:	The USB connection is located on the front of the platform control box
Location Image:	
Signal:	

Pin Number	Description	Wiring Number
1	Negative feed	6024
3	Positive feed	1024

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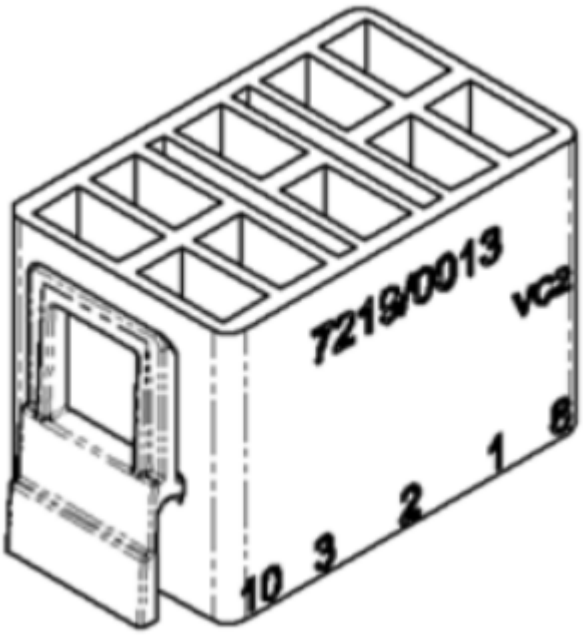
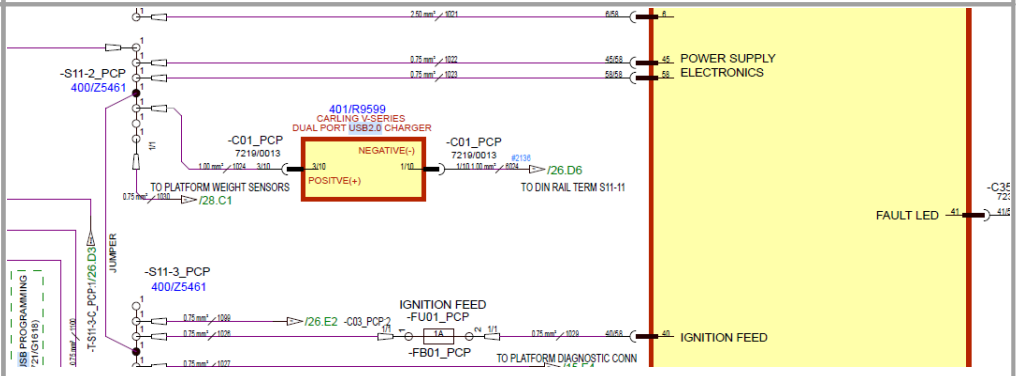
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins Note-USB connector is fitted on platform control panel to charge the mobile accessories 1. Check if there is any water ingress inside USB 2. Check the supply at connector C01 (Pin 1 and 3). It should read 12V. 3. If there is no 12V supply then need to investigate wiring as per schematic. 4. If there is 12V supply then it may be internal damage to USB. Replace it
Expected Values:	12V

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Related Fault Codes:	N/A

4.28 Base Control Panel

Components 132 > Base Control Panel

List of Base Control Panel 359

Sr No.	Component
1	Ignition Relay 360
2	Horn Relay 363
3	D+ Relay 366
4	Fusing Turntable Control Panel 370
5	Large Jumper Bar 379
6	Ignition Switch 383
7	Emergency STOP Switch(TCP) 388
8	Slew Switch(TCP) 392
9	Horn Switch(TCP) 396
10	Large Din Rail Terminal 400
11	Engine Start Switch(TCP) 406
12	Base/Platform Enable Switch 410
13	Main Boom Raise/Lower Switch(TCP) 413
14	Articulated Boom Raise/Lower switch(TCP) 417
15	Jib Raise/Lower Switch(TCP) 420
16	Main Boom Telescope Extend/Retract Switch(TCP) 423
17	Platform Rotate Left/Right Switch(TCP) 427
18	Platform Leveling Raise/Lower Switch(TCP) 430
19	Oscillating Axle Solenoid 434
20	Over Ride Switch 436
21	Buzzer Relay(TCP) 440
22	Display 7" 444
23	TCP Interface Connector 448

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4.28.1 Ignition Relay

Ignition Relay

Components 132 > Base Control Panel 359 > Ignition Relay

Component :	Ignition Relay
Function:	Ignition Relay is responsible for providing power to the vehicle ignition system, and some of the fuel systems components.
Location:	Ignition Relay is located in Base control panel.Relay R1 is the Ignition Relay

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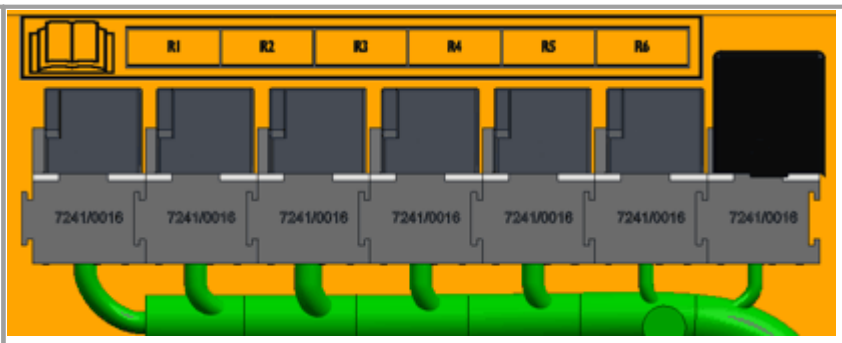
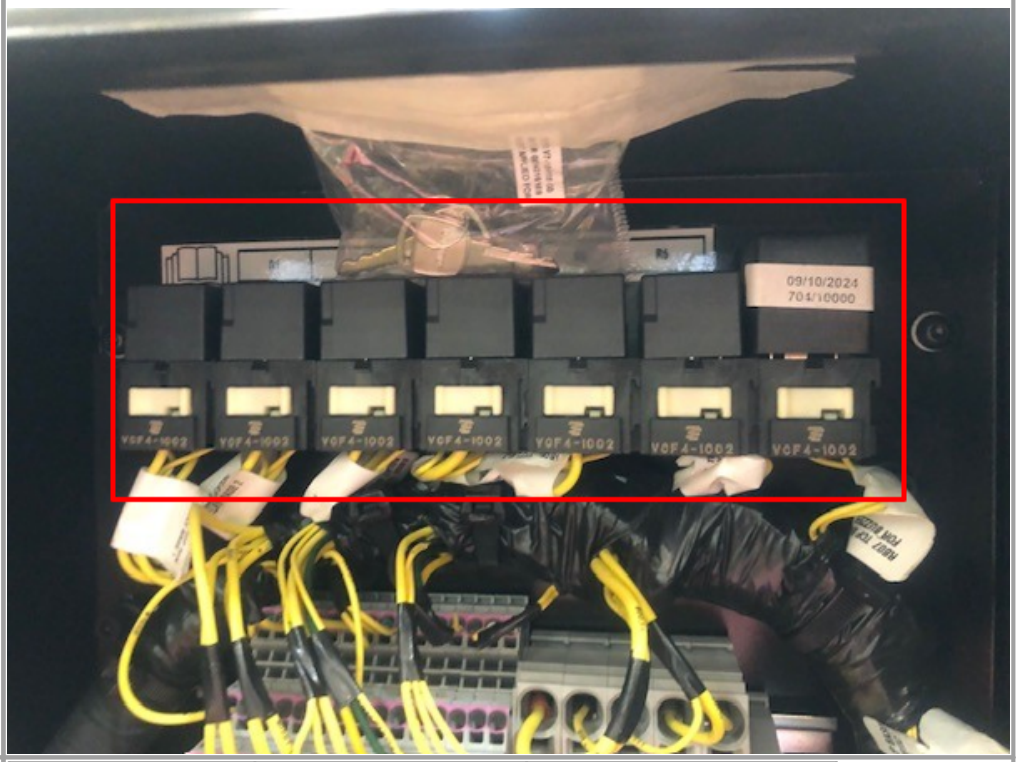
Location

Image:





Signal:

Pin Number	Description	Wire Number
1	High Current	0001
2	Ground	6001
3	High Current	-
4	12V	3001
5	12V	2001

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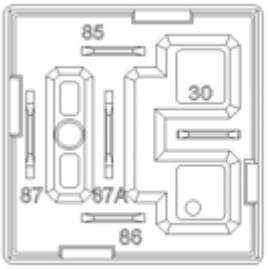
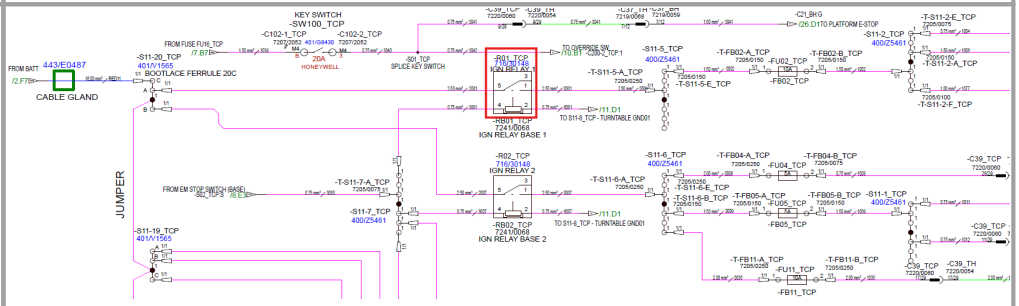
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. Remove the relay & use multi meter to measure the resistance between Pin 85 and 86 on the relay 2. Resistance should read 90+/- 10 Ω 3. If reading are incorrect replace the relay if correct check the harness as per schematic

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	4. If harness continuity is OK replace the relay
Expected Values:	12V
Related Fault Codes:	N/A

4.28.2 Horn Relay

Horn Relay

Components 132 > Base Control Panel 359 > Horn Relay

Component :	Horn Relay

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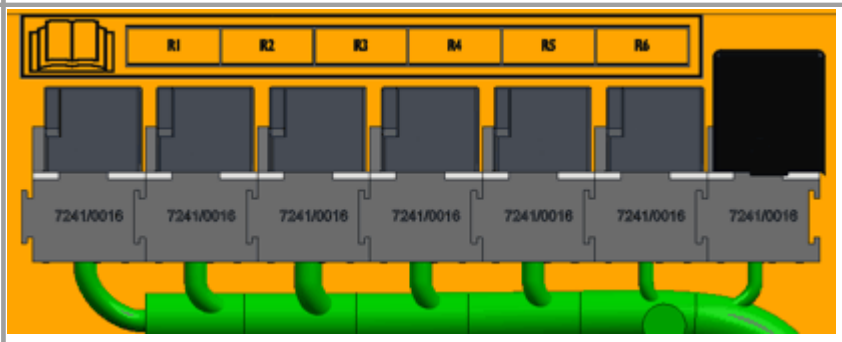
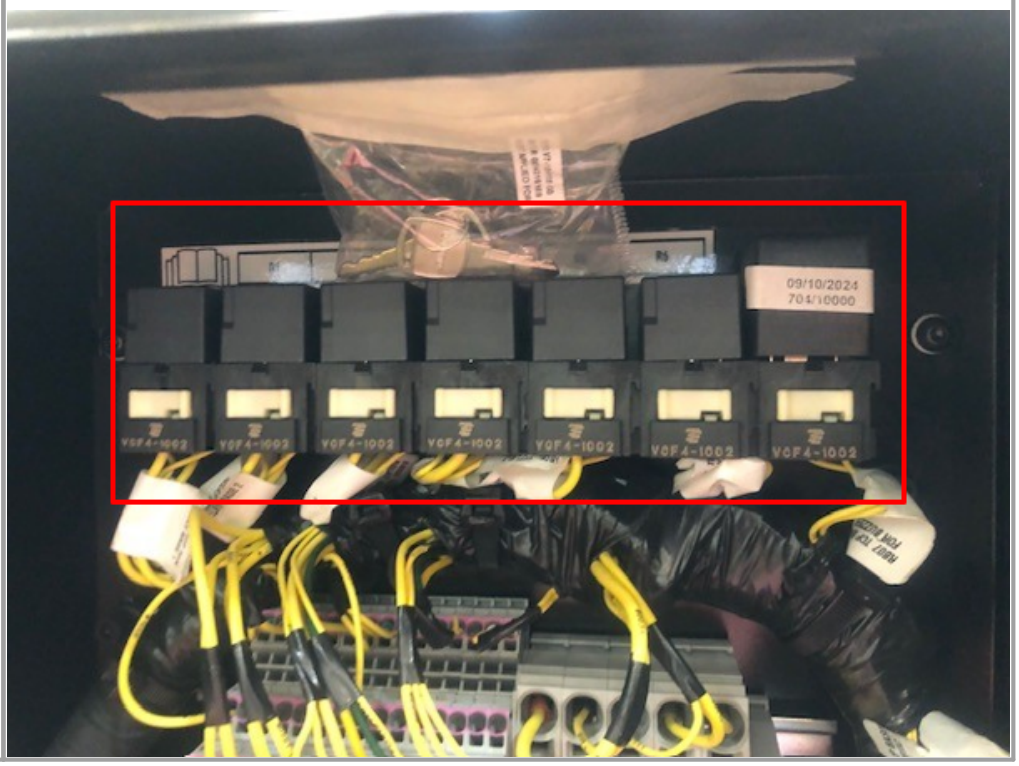
Function:	It serves as the relay that controls power to the vehicle's horn. When current is applied to the relay, the horn's power circuit is completed, allowing the horn to function and ring.
Location:	Horn Relay is located in Base control panel.
Location Image:	 

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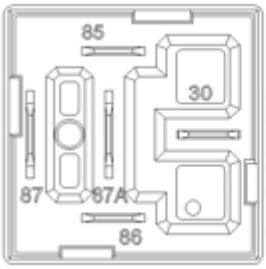
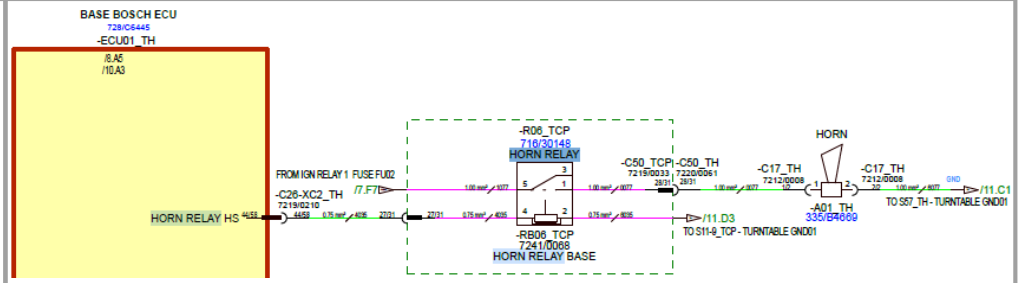
Signal:

Pin Number	Description	Wire Number
1	High Current	0077
2	Ground	6035
3	High Current	-
4	12V	4035
5	12V	1077

Wires & Connectors:



Internal Electrical Schematic:



Testing:

Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins.

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	1.Remove the relay & use multi meter to measure the resistance between Pin 85 and 86 on the relay 2. Resistance should read 90+/- 10 Ω 3. If reading are incorrect replace the relay if correct check the harness as per schematic 4. If harness continuity is OK replace the relay.
Expected Values:	Check relay coil resistance. Should be around 90Ω
Related Fault Codes:	**Fault Code** / **Fault Description** B1181-16 742 — Horn relay - Circuit short to low B1182-13 743 — Horn relay - Circuit open

4.28.3 D+ Relay

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Components 132 > Base Control Panel 359 > D+ Relay

Component :	D+ Relay
Function:	•The base ECU shall receive a 12V alternator signal feed when the alternator is working from D+ relay. •If there is a 12V input from D+ relay and the engine is off the alternator icon should be lit. •If there is no 12V feed from D+ relay but engine is running then identify as fault and turn icon on display, fault led at platform and buzzer in both locations.
Location:	D+ Relay is located in Base control panel. Relay R5 is the D+ Relay

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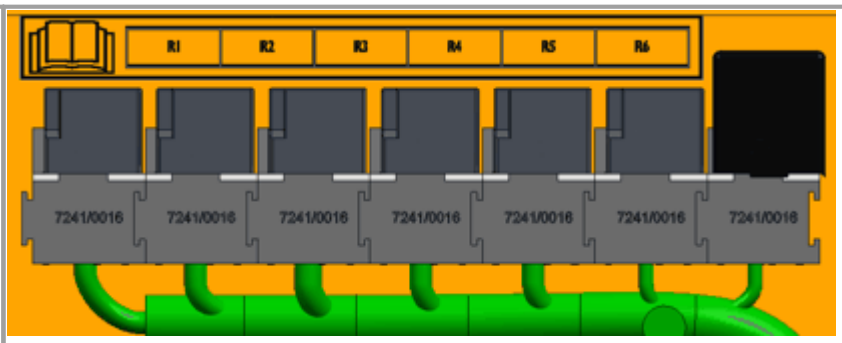
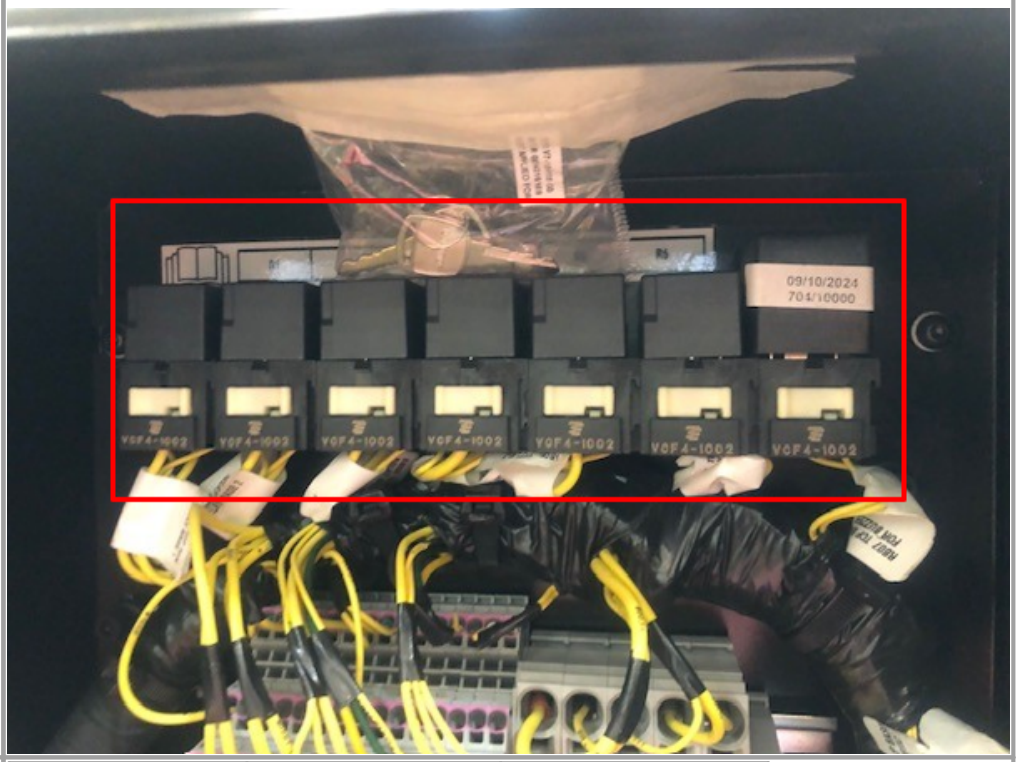
Location

Image:





Signal:

Pin Number	Description	Wire Number
1	High Current	0034
2	Ground	6034
3	High Current	-
4	12 V	4034
5	12 V	2034

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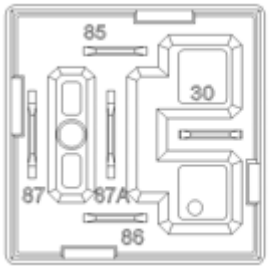
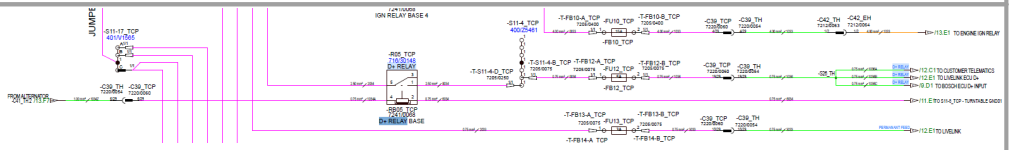
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. Remove the relay & use multi meter to measure the resistance between Pin 85 and 86 on the relay 2. Resistance should read 90+/- 10 Ω 3. If reading are incorrect replace the relay if correct check the harness as per schematic

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	4. If harness continuity is OK replace the relay.
Expected Values:	Check relay coil resistance. Should be around 90Ω
Related Fault Codes:	N/A

4.28.4 Fusing Turntable Control Panel

Components 132 > Base Control Panel 359 > Fusing Turntable Control Panel

Component :	Fusing Turntable Control Panel

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Function:	The Fuses are to provide power to the controllers and devices of the machine.
Location:	The Fuses are fitted into Din Rail Fuse Holder

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Location **Image:**	

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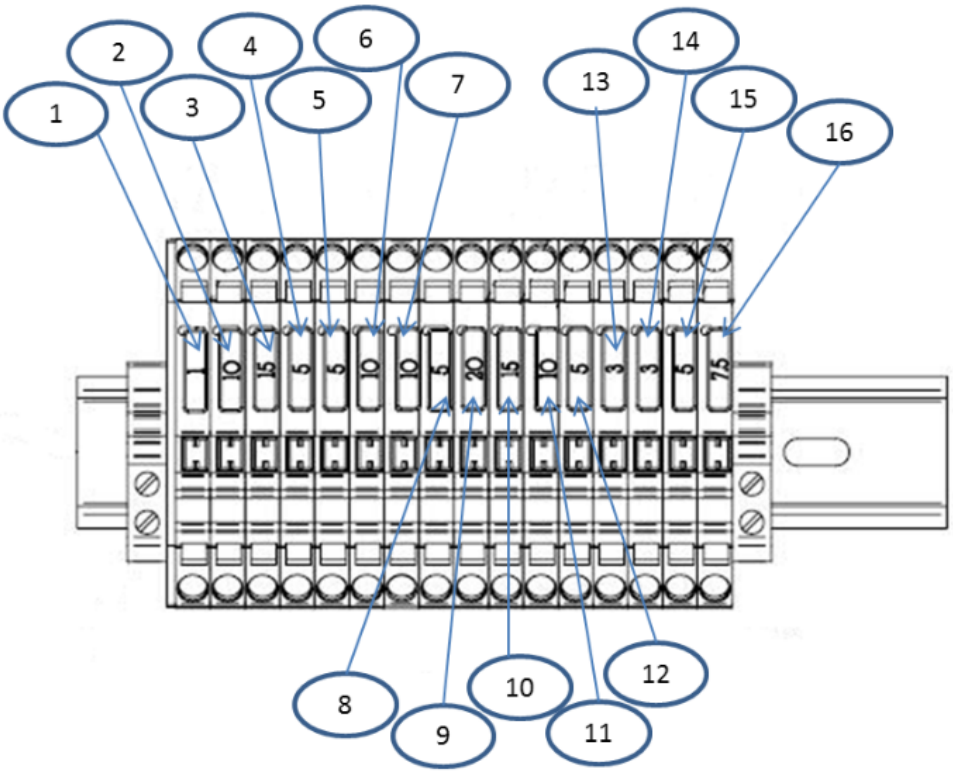

Shows the Fuse Ratings for Turntable control panel

Number	Fuse Rating	Description	Schematic Ident
1	1A	Ignition Fuse	FU1_TCP
2	10A	Base E-Stop, Horn Relay, Diagnostic connector	FU2_TCP
3	15A	Bosch ECU Base	FU3_TCP
4	5A	Platform weight sensor, Tilt Sensor	FU4_TCP

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	5	5A	Display, Axle Lock pressure Sensor	FU5_TCP
	6	10A	Bosch ECU Platform supply	FU6_TCP
	7	10A	Bosch ECU Platform supply	FU7_TCP
	8	5A	Bosch ECU Base supply	FU8_TCP
	9	20A	Engine Pod box Power hold relay	FU9_TCP
	10	15A	Engine Pod box Starter Relay	FU10_TCP
	11	10A	Work light (Optional)	FU11_TCP
	12	5A	Engine run signal for Telematics and Bosch ECU base	FU12_TCP
	13	3A	Livelink	FU13_TCP
	14	3A	Display	FU14_TCP
	15	5A	Engine Pod box power hold coil	FU15_TCP
	16	7.5A	Key Switch	FU16_TCP

Signal:

Fuse	Wire in	Wire out
FU01_TCP Ignition Fuse	1013 from ignition relay 1	0040 to Bosch ecu, Livelink, customer Telematics
FU02_TCP Ignition Fuse	0024 from S11-7_TCP	1012 to S11-4_TCP

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FU03_TCP Ignition Fuse	0025 from S11-7_TCP	1018 to Bosch ECU
FU04_TCP Ignition Fuse	0028 from S11-8_TCP	1083 to S11-1_TCP
FU05_TCP Ignition Fuse	0029 from S11-8_TCP	1084 to S11-3_TCP
FU06_TCP Ignition Fuse	0032 from S11-5_TCP	1025 to platform ecu supply
FU07_TCP Ignition Fuse	0033 from S11-5_TCP	1026 to platform ecu supply
FU08_TCP Ignition Fuse	0036 from S11-5_TCP	1029 to Bosch base ecu
FU09_TCP Ignition Fuse	0034 from S11-2_TCP	0034 to pod box power hold relay
FU10_TCP Ignition Fuse	0035 from S11-2_TCP	0035 to pod box starter relay
FU11_TCP Ignition Fuse	0039 from S11-6_TCP	1031 Work light (optional fit)

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	FU12_TCP Ignition Fuse	0038 from S11-6_TCP	1032 customer Telematics, Livelink D+ and Bosch ecu D+ input
	FU13_TCP Permanent Fuse	2005 from S11-23_TCP	3004 Livelink
	FU14_TCP Permanent Fuse	2006 from S11-23_TCP	3003 to Display
	FU15_TCP Permanent Fuse	2007 from S11-23_TCP	3002 to pod box power hold coil
	FU16_TCP Permanent Fuse	2008 from S11-23_TCP	3001 to key switch

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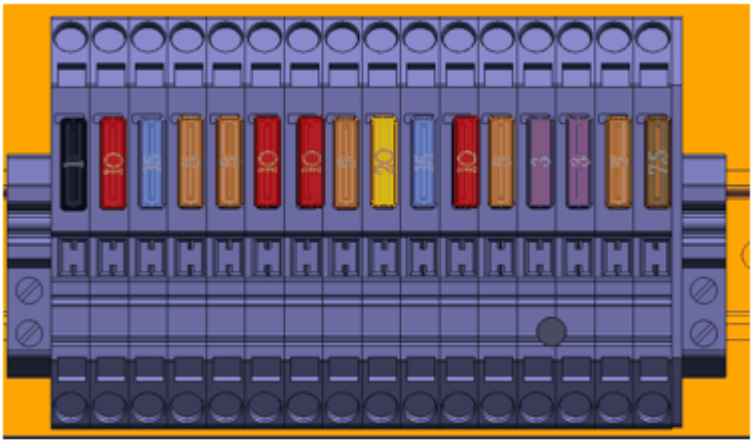
Wires & Connectors :	
Internal Electrical Schematic:	Refer Schematic: 401/Y3086
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. To test the fuse terminal block set a multiple to continuity

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	2. remove fuse and check one side of block to the other there should be no connection 3. insert a fuse and then test one end of terminal block to the other side and now there should be continuity.
Expected Values:	See Signal
Related Fault Codes:	N/A

4.28.5 Large Jumper Bar

Components 132 > Base Control Panel 359 > Large Jumper Bar

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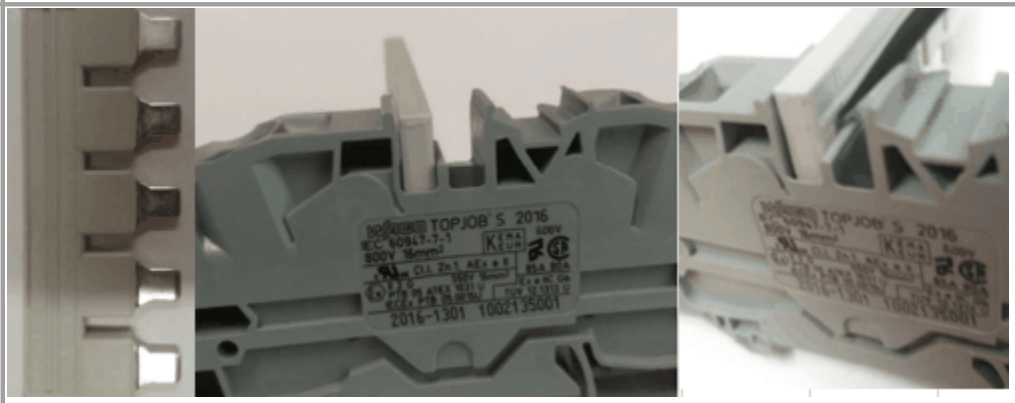
Component:	Large Jumper Bar
Function:	•The jumper bars are to make electrical connection between the din rail terminals. •This allows for connections to be made from one din rail terminal to another. •There is 2 different sizes of Jumper bar dependent on the terminal block size they fit into and multiple configurations dependent on number of ways are available.
Location:	Below shows an image of a 5 Way Large Jumper Bar. This is for example only.
Location Image:	

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	The large jumper bars are connecting the main power in on the large terminal blocks in the turntable control panel.
Signal:	The Large jumper bars in the turntable control panel will connect up the 12V Permanent power. Always take care when working with permanent feed.
Wires & Connectors:	The Jumper bar connects S11-21_TCP, S11-22_TCP, S11-23_TCP, S11-24_TCP
Internal Electrical	A 3 way version of the large jumper bar is used in the turntable control panel

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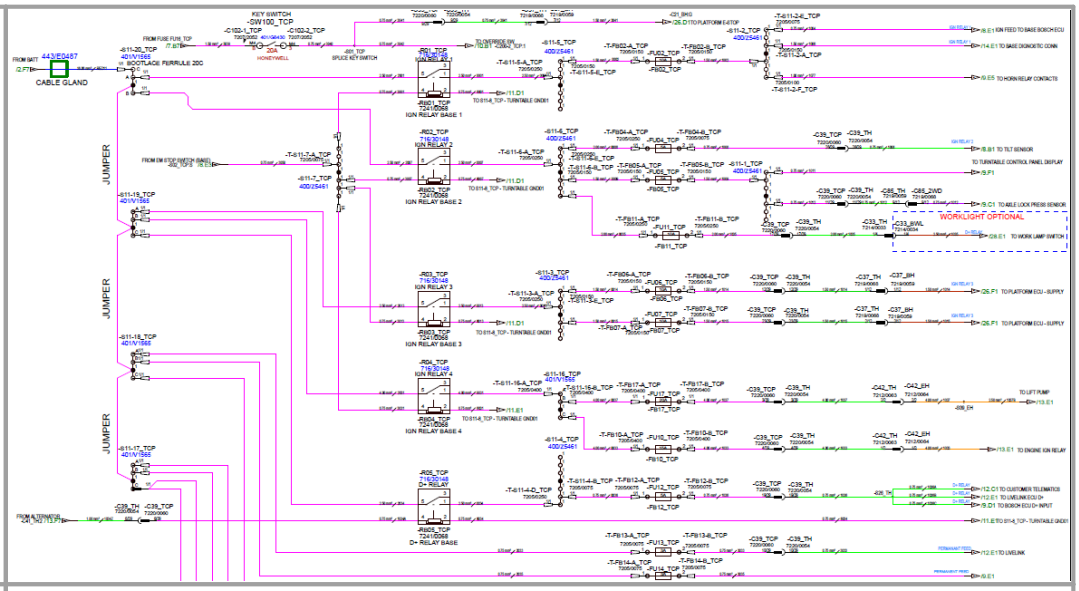
Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1.Ensure power of the machine is turned off. Do not work live. 2.Test continuity from one terminal block to another, If no continuity remove jumper bar and test in isolation. 3.Failure of continuity will need the jumper bar replacing.
Expected	See Signal

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Values:	
Related Fault Codes:	N/A

4.28.6 Ignition Switch

Components 132 > Base Control Panel 359 > Ignition Switch

Component :	Ignition Switch
Function:	•Ignition switch is used for Turn ON / OFF the machine power (Ignition signal).The key is not removable in the ON position. Base Bosch ECU controls the Engine ignition feed.

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<table>
<tr><td></td><td>•The Key is a 455 industry standard Key and not a JCB machine key.</td></tr>
<tr><td>Location:</td><td>Key switch located at base, on the Turntable control panel.</td></tr>
<tr><td>Location Image:</td><td>
</td></tr>
<tr><td>Signal:</td><td>
<table>
<tr><th>Pin Number</th><th>Description</th><th>Wire Number</th></tr>
<tr><td>B</td><td>Feed</td><td>3001</td></tr>
<tr><td>3</td><td>Switched Output</td><td>0018</td></tr>
</table>
</td></tr>
<tr><td>Wires & Connectors :</td><td>The connections are ring terminal on the harness and screw terminals into the ignition switch.

The ignition has numbers impressed into the molding at the bottom, they are small and some are on the outer ring.</td></tr>
</table>

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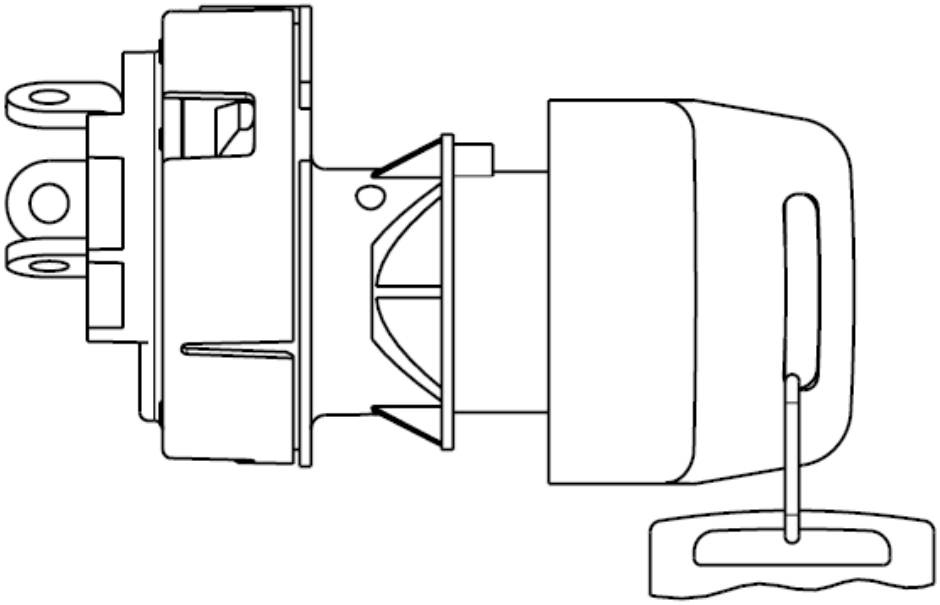
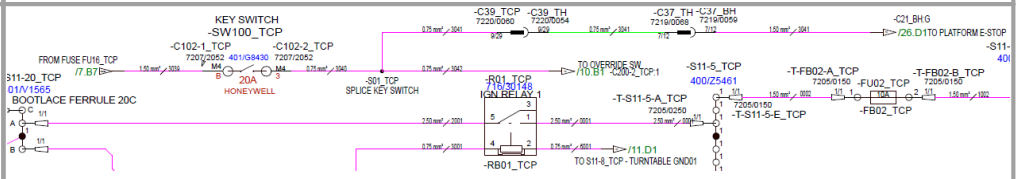


The screws are provided with the ignition key barrel. Be careful they do not get lost.

Internal

Electrical

Schematic:



Testing:

Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins.

1.Take multimeter and Check the multimeter is working

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	2.Set the multimeter in continuity mode (Sound wave or Diode or both) 3.Place the red probe on one of the terminals on the switch and black probe on other terminal on the switch. 4.In Key switch in OFF position, Multimeter should read as 'OL' (open circuit) 5.In Key switch in ON position, Multimeter should read as '1' or less. 6.Operate the switch in ON and OFF in few more times. Multimeter reading should change while operating from ON to OFF. If the reading doesn't change means key switch is defective 7.Replace the defective key switch with part number.

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Expected Values: 12V

Related Fault Codes:

Fault Code	Fault Description
B1353-16 887	Engine ignition - Circuit short to low
B1354-13 888	Engine ignition - Circuit open or short to high (12v)

4.28.7 Emergency STOP Switch(TCP)

Emergency STOP Switch(TCP)

Components 132 > Base Control Panel 359 > Emergency STOP Switch(TCP)

Component :	Emergency STOP Switch(TCP)
Function:	Emergency stop switch will cut off the Engine and all ECU outputs except CAN. Display and Bosch ECU are remain in the ON. It is equipped with 2 normally closed contacts, one has +12V and other one has GND signals.
Location:	E-STOP switch located in Base, on the Turntable control panel.
Location Image:	

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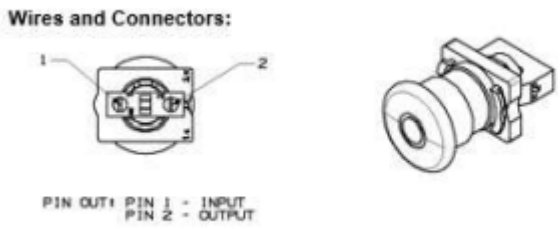
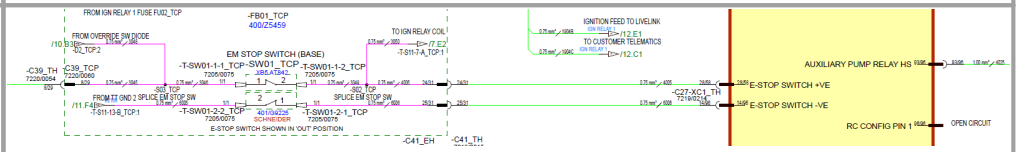
Signal:

Pin Number and contactor block	Description	Connector number	Wire number
contact 1 NC pin 1	12V feed	T-SW-01-1-1_TCP	1014
contact 1 NC pin 2	Output to platform ECU	T-SW-01-1-2_TCP	0041
contact 2 NC pin 2	GND feed	T-SW-01-2-2_TCP	6005
contact 2 NC pin 1	Output to ECU	T-SW-01-2-1_TCP	0042

Wires & Connectors:



Internal Electrical



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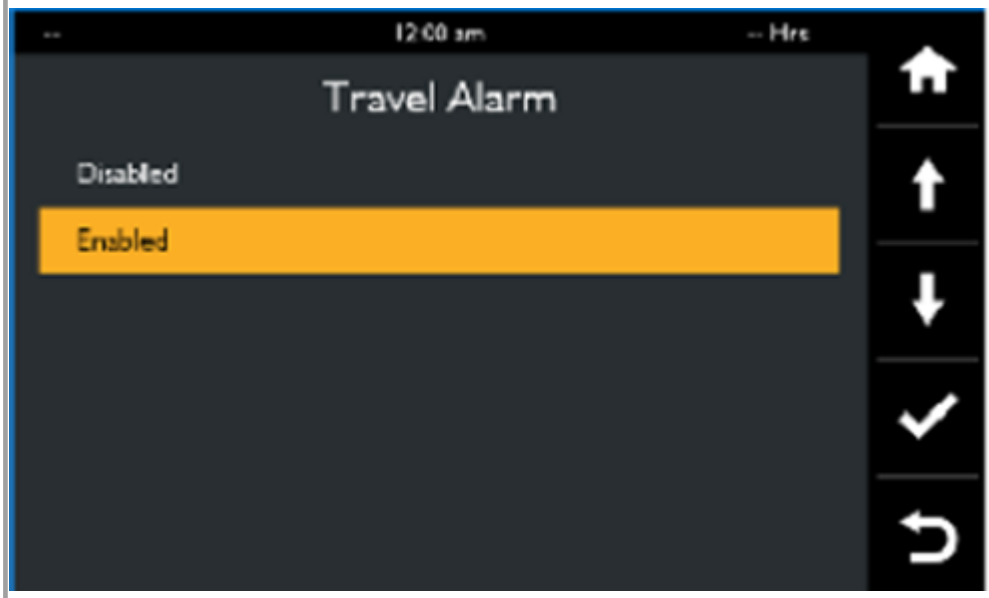
Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. Do the below steps for both contacts separately. 2. Take multimeter and check the multi meter is working 3. Set the multimeter in continuity mode (Sound wave or Diode or both) 4. Place the red probe on one of the terminal on the switch and black probe on other terminal on the switch.  5. In E-Stop switch in PUSHED IN state, Multimeter should read as 'OL' (open circuit)

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6. In E-Stop switch in OUT state, Multimeter should read as '1' or less.

7. Operate the switch in PUSHED IN and OUT state in few more times.

Multimeter reading should change while operating from PUSHED IN to OUT.

If the reading doesn't change means E-Stop switch is defective

8. Replace the defective E-Stop switch with same type and size, please contact JCB Service department.

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Expected Values:	12V
Related Fault Codes:	**Fault Code** / **Fault Description** B1235-17 774 / E-stop platform button - Signal plausibility failure

4.28.8 Slew Switch(TCP)

Components 132 > Base Control Panel 359 > Slew Switch(TCP)

Component:	Slew Switch(TCP)
Function:	Slew switch is for slew the Machine i.e. Chassis part stays standstill and the upper portion of the machine slew either right or left.

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Location:	Slew switch located at base, on the Turntable control panel.
Location Image:	

Signal:

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage with switch unpressed	Voltage with switch pressed
1	Slew Right	C110-1_TCP	0048	2.7 V	10V
2	Power in (10V)	C110-2_TCP	1034, 1035	10V	NA
3	Slew Left	C110-3_TCP	0049	3.4 V	10V

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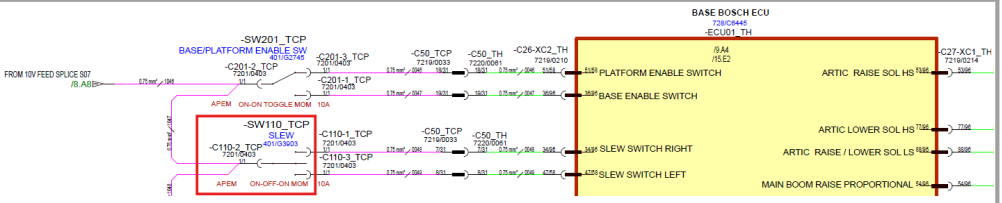
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. There are3 contact on the back of switch. 2. Check terminal 1,2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively. 3. Terminal 2 is for incoming supply

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	4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should buzz for one combination and should not buzz for other. When switch is pressed, it should buzz vice verse. 5. Check supply at terminal 2. It should read 10V. 6. If there is no 10V then investigate wiring as per schematic. 7. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it.
Expected Values:	12V
Related Fault Codes:	

Fault Code	Fault Description
B1121-17 683	Slew turntable switch right function - Circuit short to high (10v)
B1122-17 685	Slew turntable switch left function - Circuit short to high (10v)
B1123-92 686	Slew turntable switch both functions - Circuit short to high (10v)
B1124-16 688	Slew turntable switch right function - Circuit short to low
B1125-16 689	Slew turntable switch left function - Circuit short to low

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4.28.9 Horn Switch(TCP)

Horn Switch(TCP)

Components 132 > Base Control Panel 359 > Horn Switch(TCP)

Component :	Horn Switch(TCP)
Function:	Horn switch is for audible warning that the operator can use.
Location:	Horn switch located at base, on the Turntable control panel.
Location Image:	
Signal:	

Pin Number	Description	Connector number	Wire number(s)	Voltage unpressed	Voltage pressed

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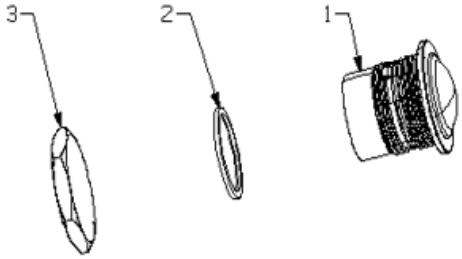
	1	10V input	C101-2_TCP	1030B, 1043		
	2	Signal output to ECU (10V when pressed)	C101-1_TCP	0065		10V
Wires & Connectors :	ISOMETRIC VIEW  ASSYEMBLY SEQUENCE FOR PUSH BUTTON 1 - PUSHBUTTON FROM OUTSIDE THE PANEL 2 - WASHER FROM INSIDE THE PANEL 3 - HEX NUT FROM INSIDE THE PANEL					

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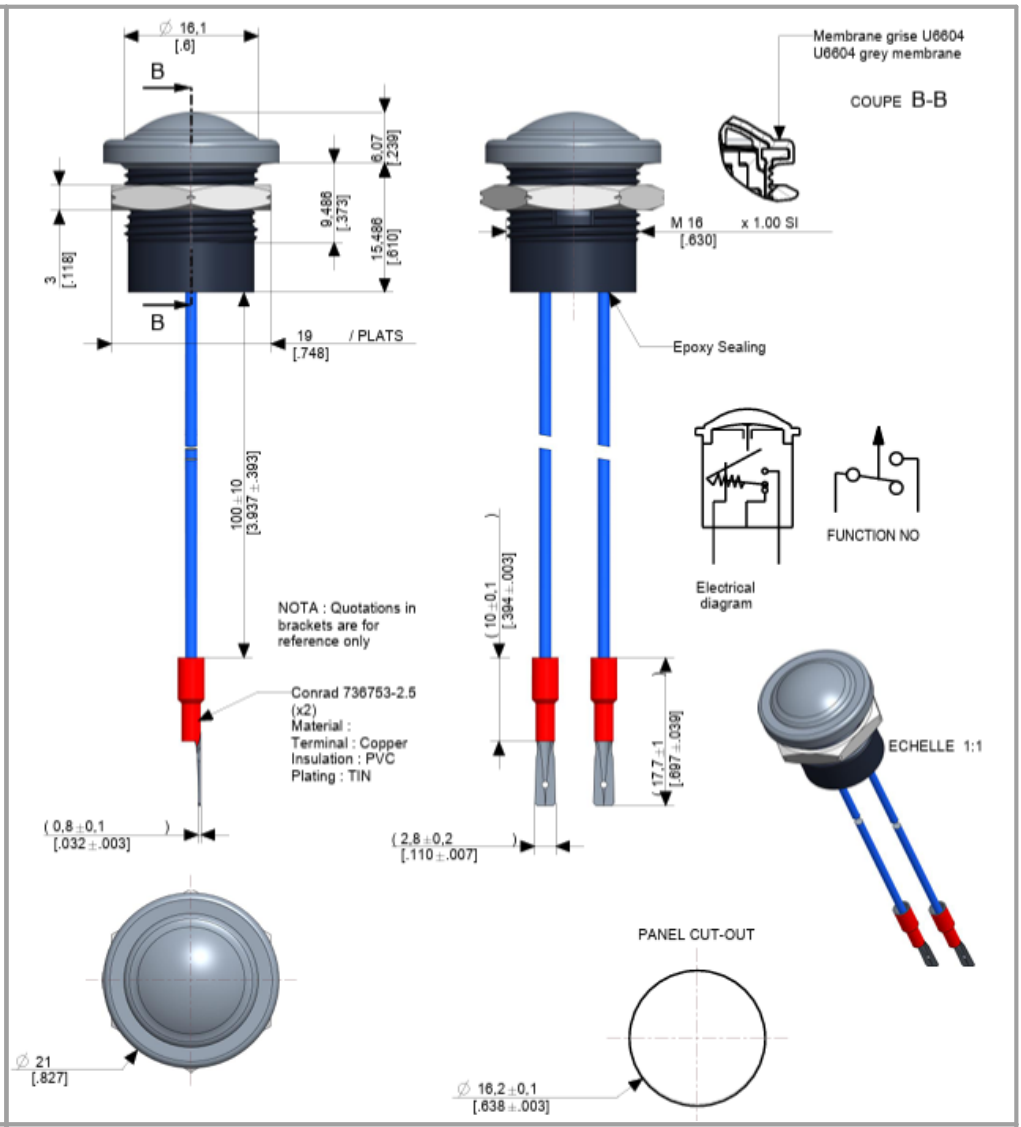
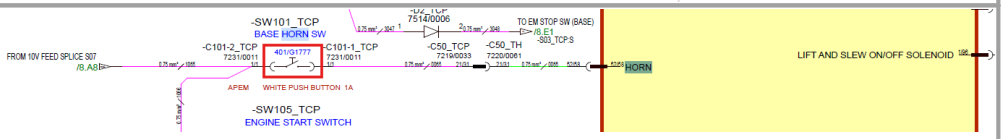


Internal

Electrical

Schematic:



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Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins Refer Test the Push Button Note-All the bush button fitted on machine are 10V ,normally open and closed when pressed Diagnostic feedback on push button are coming from ECU 1. Check supply at wiring harness terminal-1 with (respect to ground) on push button (when not pressed). It should read 10V. 2. Check the voltage at wiring harness terminal-2 on push button (When not pressed). It should read 2-3V 3. Check the continuity between terminal 1 & 2 after pressing the push button. It should buzz. 4. If there is continuity and we are getting 10V supply then it may be internal damage to push button. 5. If issue still there replace the push button.

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Expected Values:	10V when pressed
Related Fault Codes:	**Fault Code** / **Fault Description** B1206-17 752 — Horn turntable button - Circuit short to high (10v) B1207-16 753 — Horn turntable button - Circuit short to low B1208-24 754 — Horn turntable button - Signal stuck high

4.28.10 Large Din Rail Terminal

Large Din Rail Terminal

Components 132 > Base Control Panel 359 > Large Din Rail Terminal

Component:	Large Din Rail Terminal
Function:	•The Terminal blocks are to allow for connections of signal to a common feed.

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	•In the turntable control panel these are used to distribute the main 12V permanent feed in. •Always ensure bootlace ferrules are fitted to wire ends before inserting into a terminal block
Location:	Inside the Base Control Box

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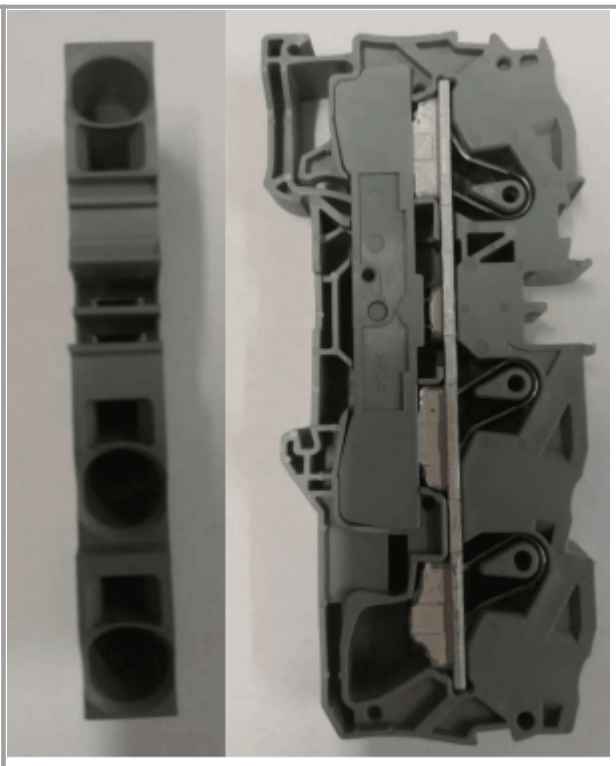
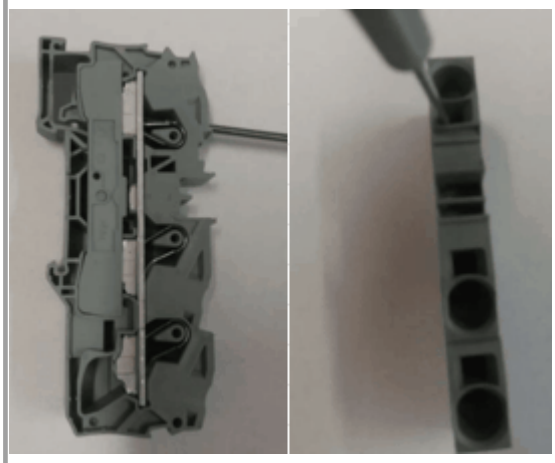
Location **Image:**	 

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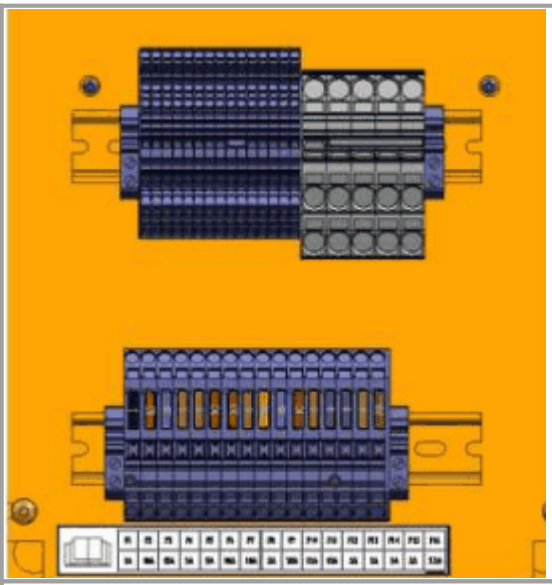

Signal:

The signal from all of the above terminal blocks is 12V permanent feed to provide power to the ignition relays.

Wires & Connectors :

S11-21_TCP		
Signal	**Wire Number**	**Wir**
Main Feed in	Battery lead feed in	16
12V to Ign Relay 1 Contacts	2000	2.5
12V to Ign Relay 2 Contacts	2001	2.5
S11-22_TCP		
Signal	**Wire Number**	**Wir**
12V to Ign Relay 3 Contacts	2002	2.5

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	12V to Ign Relay 4 Contacts	2003	2.5
	12V to Ign D+ Relay Contacts	2004	2.5
	S11-23_TCP		
	Signal	**Wire Number**	**Wir**
	12V to FU13_TCP Fuse	2005	0.75
	12V to FU14_TCP Fuse	2006	0.75
	12V to FU15_TCP Fuse	2007	1.00
	S11-24_TCP		
	Signal	**Wire Number**	**Wir**
	12V to FU16_TCP Fuse	2008	1.5
	Spare		
	Spare		
Internal **Electrical**			

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Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. Each din rail is capable of holding 3 individual wires. 2. Ensure no water ingress inside the din rail terminals. 3. Check ferrule is inserted properly inside din rail. 4. Check din rail terminal are placed & locked properly over din rail. 5. Check end stops are fitted correctly. 6. Check all wires fitted on one din rail terminal should have continuity.
Expected Values:	See Signal
Related Fault	N/A

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Codes:	

4.28.11 Engine Start Switch(TCP)

Engine Start Switch(TCP)

Components 132 > Base Control Panel 359 > Engine Start Switch(TCP)

Component :	Engine Start Switch(TCP)
Function:	Engine start switch is to start / Crank the engine. Engine crank only possible if Ignition signal available at Engine (Key switch should be turned ON).
Location:	Engine start switch located at base, on the Turntable control panel.
Location Image:	

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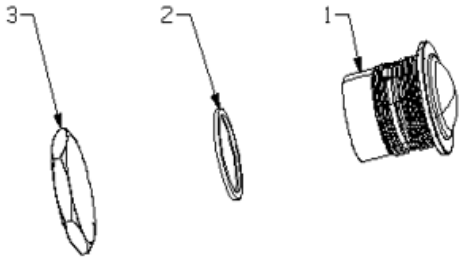
Signal:

Pin Number	Description	Connector number	Wire number(s)	Voltage unpressed	Voltage pressed
1	10V input				
2	Signal output to ECU (10V when pressed)				10V

Wires & Connectors:

ISOMETRIC VIEW



ASSYEMBLY SEQUENCE FOR PUSH BUTTON
1 - PUSHBUTTON FROM OUTSIDE THE PANEL
2 - WASHER FROM INSIDE THE PANEL
3 - HEX NUT FROM INSIDE THE PANEL

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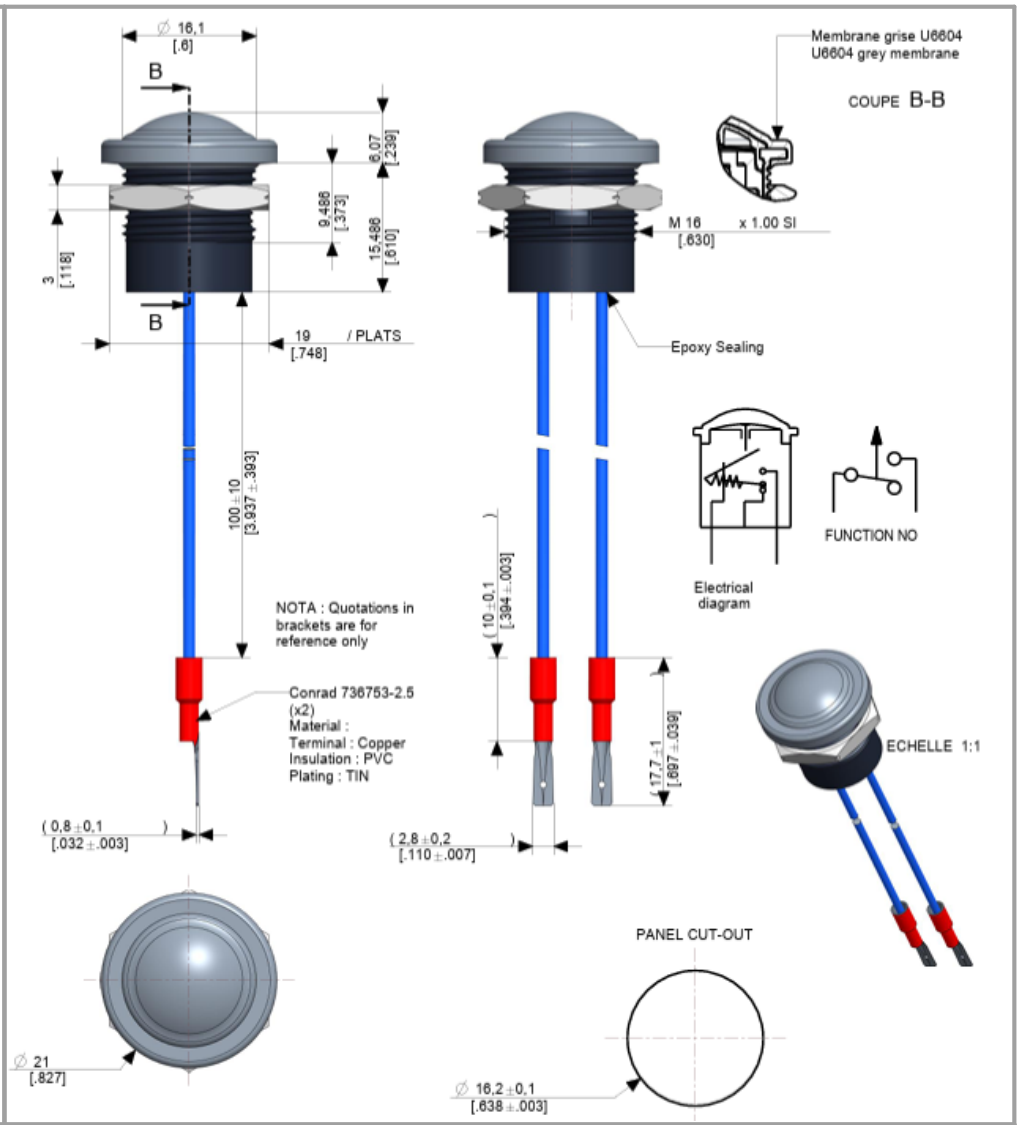
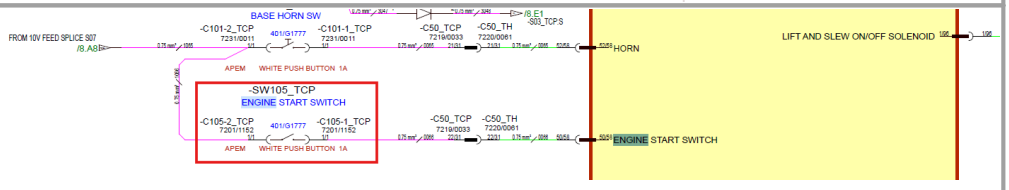


Internal

Electrical

Schematic:



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Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. Refer Test the Push Button Note-All the bush button fitted on machine are 10V ,normally open and closed when pressed. Diagnostic feedback on push button are coming from ECU. 1. Check supply at wiring harness terminal-1 with (respect to ground) on push button (when not pressed). It should read 10V. 2. Check the voltage at wiring harness terminal-2 on push button (When not pressed). It should read 2-3V. 3. Check the continuity between terminal 1 & 2 after pressing the push button. It should buzz. 4. If there is continuity and we are getting 10V supply then it may be internal damage to push button. 5. If issue still there replace the push button.

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Expected Values:	12V
Related Fault Codes:	**Fault Code** / **Fault Description** B1050-17 587 — Engine start / stop turntable button - Circuit short to high (10v) B1051-16 588 — Engine start / stop turntable button - Circuit short to low B1052-24 589 — Engine start / stop turntable button - Signal stuck high

4.28.12 Base/Platform Enable Switch

Base/Platform Enable Switch

Components 132 > Base Control Panel 359 > Base/Platform Enable Switch

Component:	Base/Platform Enable Switch
Function:	Base / Platform Enable switch is for Indication that Machine is moving or coming, so that the place will be clear for safety.

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Location:

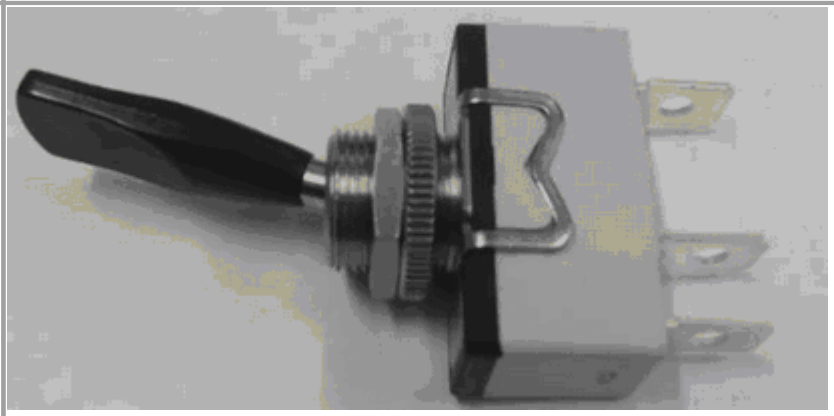
Base / Platform Enable switch located at base, on the Turntable control panel.

Location Image:

Signal:

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage unpressed	Voltage pressed
1	Base Enable	C201-1_TCP	47		10V
2	Power in (10V)	C201-2_TCP	1046	10V	NA
3	Platform enable	C201-3_TCP	46		10V

Wires & Connectors:



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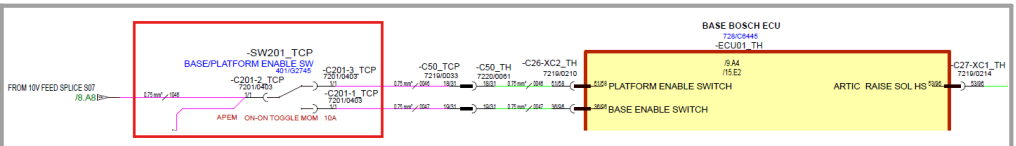
Internal **Electrical** **Schematic:**	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. Note- Override switch and the base/ platform enable are the same switch at the base control panel. There are NO in state 1. There are3 contact on the back of switch. 2. Check terminal 1,2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively. 3. Terminal 2 is for incoming supply 4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should buzz for one combination and should not buzz for other. When switch is pressed, it should buzz vice verse. 5. Check supply at terminal 2. It should read 10V.

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	6. If there is no 10V then investigate wiring as per schematic. 7. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it.
Expected Values:	12V
Related Fault Codes:	**Fault Code** / **Fault Description** B1005-24 542 — Base Enable Switch SC to High B1006-16 544 — Platform Enable Switch SC to High B1007-16 545 — Platform Enable Switch AND Base Enable Switch both activated (5 - 10V) B1008-16 546 — Base Enable SC to Low B1009-16 548 — Platform Enable SC to Low B1010-13 549 — Base Enable Switch OC AND Platform Enable Switch OC

4.28.13 Main Boom Raise/Lower Switch(TCP)

Main Boom Raise/Lower Switch(TCP)

Components 132 > Base Control Panel 359 > Main Boom Raise/Lower Switch(TCP)

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Component :	Main Boom Raise/Lower Switch(TCP)
Function:	Main boom lift switch is for to lift the main boom in up or down directions.
Location:	Main boom lift switch located at base, on the Turntable control panel.
Location Image:	

Signal:

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage unpressed	Voltage pressed
1	Main boom Lower	C109-1_TCP	0050	2.7V	10V
2	Power in (10V)	C109-2_TCP	1048	10V	NA
3	Main boom Raise	C109-3_TCP	0051	3.4V	10V

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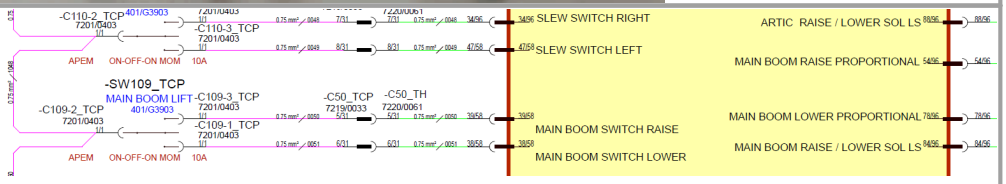
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. Refer ' Test OFF-ON-OFF Momentary Toggle switch' 1. There are 3 contact on the back of switch. 2. Check terminal 1, 2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively.

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	3Terminal 2 is for incoming supply 4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should not buzz 5. When switch is pressed up. Terminal 2 should buzz with bottom terminal & when switch is pressed down. Terminal 2 should buzz with up terminal. 6. Check supply at terminal 2. It should read 10V. 7. If there is no 10V then investigate wiring as per schematic. 8. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it.
Expected Values:	12V
Related Fault Codes:	

Fault Code	Fault Description
B1116-17 675	Main boom turntable switch raise function - Circuit short to high (10v)
B1117-17 677	Main boom turntable switch lower function - Circuit short to high (10v)
B1118-92 678	Main boom turntable switch both functions - Signal plausibility failure (10v)
B1119-16 680	Main boom turntable switch raise function - Circuit short to low
B1120-16 681	Main boom turntable switch lower function - Circuit short to low

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4.28.14 Articulated Boom Raise/Lower switch(TCP)

Articulated Boom Raise/Lower switch(TCP)

Components 132 > Base Control Panel 359 > Articulated Boom Raise/Lower switch(TCP)

Component :	Articulated Boom Raise/Lower switch(TCP)
Function:	Articulated boom switch is for to lift the articular boom in up or down directions.
Location:	Articulated boom switch located at base, on the Turntable control panel.
Location Image:	
Signal:	

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage unpressed	Voltage pressed

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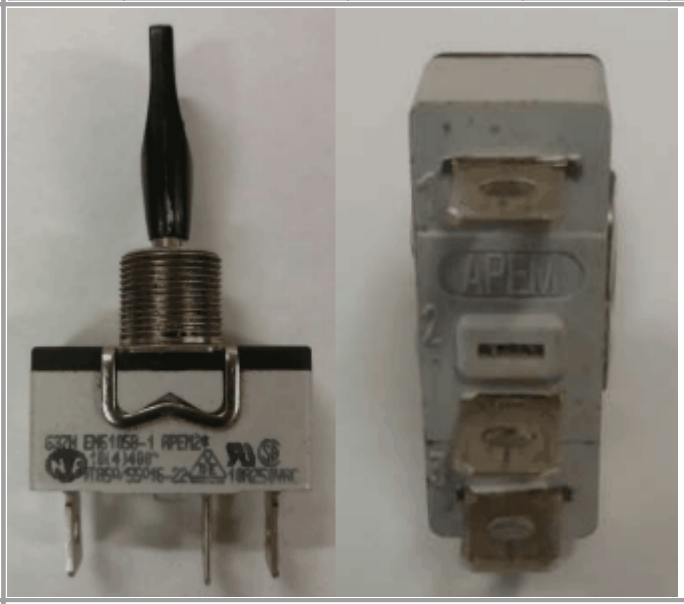
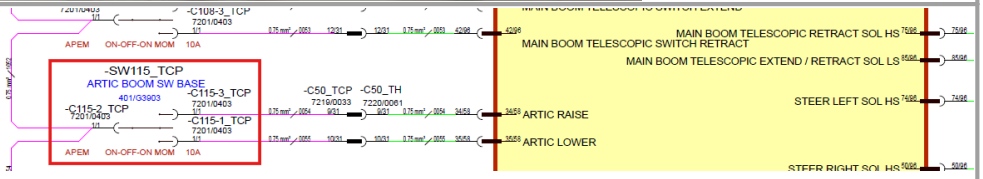
	1	Artic Lower	C115-1_TCP	55	2.7V	10V
	2	Power in (10V)	C115-2_TCP	1052	10V	NA
	3	Artic Raise	C115-3_TCP	54	3.4V	10V
Wires & Connectors :						
Internal Electrical Schematic:						
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. Refer ' Test OFF-ON-OFF Momentary Toggle switch'					

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	1. There are 3 contact on the back of switch. 2. Check terminal 1, 2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively. 3. Terminal 2 is for incoming supply 4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should not buzz 5. When switch is pressed up. Terminal 2 should buzz with bottom terminal & when switch is pressed down. Terminal 2 should buzz with up terminal. 6. Check supply at terminal 2. It should read 10V. 7. If there is no 10V then investigate wiring as per schematic. 8. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it.
Expected Values:	12V

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Related Fault Codes:	Fault Code	Fault Description
	B1096-17 645	ARTICULATED BOOM RAISE Switch Short Circuit to High
	B1097-17 647	ARTICULATED BOOM LOWER Switch Short Circuit to High
	B1098-92 648	ARTICULATED BOOM RAISE & LOWER Switches both activated (5 - 10V)
	B1099-16 650	ARTICULATED BOOM RAISE Switch Short Circuit to Low
	B1100-16 651	ARTICULATED BOOM LOWER Switch Short Circuit to Low

4.28.15 Jib Raise/Lower Switch(TCP)

Jib Raise/Lower Switch(TCP)

Components 132 > Base Control Panel 359 > Jib Raise/Lower Switch(TCP)

Component:	Jib Raise/Lower Switch(TCP)
Function:	Jib switch is for to lift the Jib in up or down directions.
Location:	Jib switch located at base, on the Turntable control panel.

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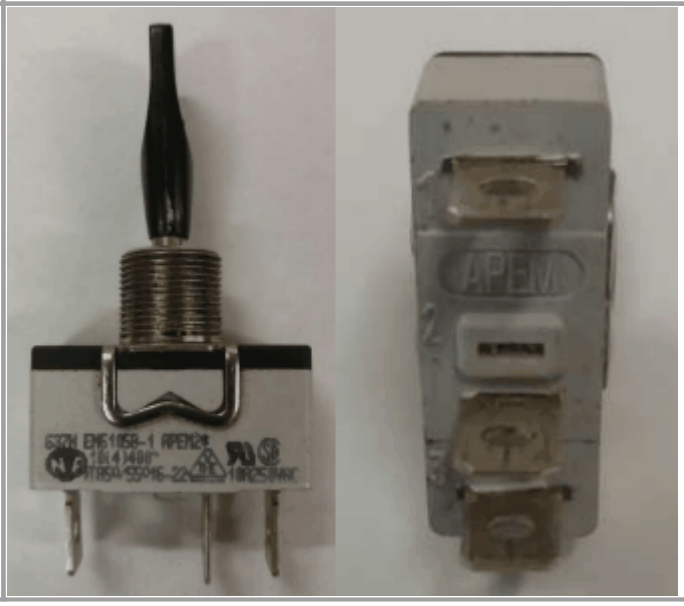
Location Image:

Signal:

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage unpressed	Voltage pressed
1	Jib Lower	C113-1_TCP	59	2.7V	10V
2	Power in (10V)	C113-2_TCP	1056	10V	NA
3	Jib Raise	C113-3_TCP	58	2.7V	10V

Wires & Connectors:



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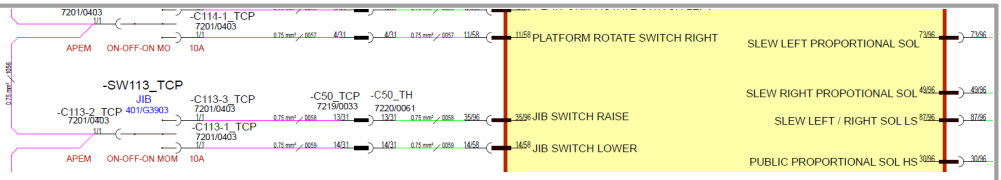
Internal **Electrical** **Schematic:**	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. There are 3 contact on the back of switch. 2. Check terminal 1, 2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively. 3. Terminal 2 is for incoming supply 4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should not buzz 5. When switch is pressed up. Terminal 2 should buzz with bottom terminal & when switch is pressed down. Terminal 2 should buzz with up terminal. 6. Check supply at terminal 2. It should read 10V. 7. If there is no 10V then investigate wiring as per schematic.

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	8. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it.
Expected Values:	12V
Related Fault Codes:	**Fault Code** / **Fault Description** B1111-17 668 — Jib boom turntable switch raise function - Circuit short to high (10v) B1112-17 669 — Jib boom turntable switch lower function - Circuit short to high (10v) B1113-92 671 — Jib boom turntable switch both functions - Signal plausibility failure (10v) B1114-16 672 — Jib boom turntable switch raise function - Circuit short to low B1115-16 674 — Jib boom turntable switch lower function - Circuit short to low

4.28.16 Main Boom Telescope Extend/Retract Switch(TCP)

Main Boom Telescope Extend/Retract Switch(TCP)

Components 132 > Base Control Panel 359 > Main Boom Telescope Extend/Retract Switch(TCP)

Component:	Main Boom Telescope Extend/Retract Switch(TCP)

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Function:	Main boom telescope switch is for to lift the articular boom in up or down directions.
Location:	Main boom telescope switch located at base, on the Turntable control panel.
Location Image:	

Signal:

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage unpressed	Voltage pressed
1	Telescopic Extend	C108-1_TCP	0052	2.7V	10V
2	Power in (10V)	C108-2_TCP	1050	10V	NA
3	Telescopic Retract	C108-3_TCP	0053	2.7V	10V

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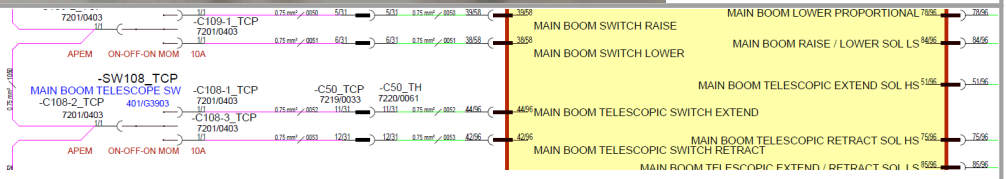
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins 1. There are 3 contact on the back of switch. 2. Check terminal 1, 2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively. 3. Terminal 2 is for incoming supply

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	4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should not buzz 5. When switch is pressed up. Terminal 2 should buzz with bottom terminal & when switch is pressed down. Terminal 2 should buzz with up terminal. 6. Check supply at terminal 2. It should read 10V. 7. If there is no 10V then investigate wiring as per schematic. 8. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it.
Expected Values:	12V
Related Fault Codes:	**Fault Code** / **Fault Description** B1101-17 652 — MAIN BOOM EXTEND Switch Short Circuit to High B1102-17 654 — MAIN BOOM RETRACT Switch Short Circuit to High B1103-92 656 — MAIN BOOM EXTEND & RETRACT Switches both activated (5 - 10V) B1104-16 657 — MAIN BOOM EXTEND Switch Short Circuit to Low B1105-16 659 — MAIN BOOM RETRACT Switch Short Circuit to Low

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4.28.17 Platform Rotate Left/Right Switch(TCP)

Platform Rotate Left/Right Switch(TCP)

Components 132 > Base Control Panel 359 > Platform Rotate Left/Right Switch(TCP)

Component:	Platform Rotate Left/Right Switch(TCP)
Function:	Platform rotate switch is for to rotate the Basket in left or right directions.
Location:	Platform rotate switch located at base, on the Turntable control panel.
Location	

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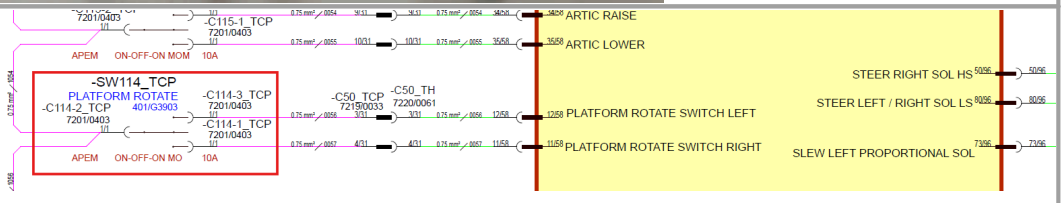
Image:

Signal:

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage unpressed	Voltage pressed
1	Platform Rotate Right	C114-1_TCP	0057	2.7V	10V
2	Power in (10V)	C114-2_TCP	1054	10V	NA
3	Platform Rotate Left	C114-3_TCP	0056	3.4V	10V

Wires & Connectors:

Internal Electric



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al Schema tic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. Refer ' Test OFF-ON-OFF Momentary Toggle switch' 1. There are 3 contact on the back of switch. 2. Check terminal 1, 2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively. 3. Terminal 2 is for incoming supply 4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should not buzz 5. When switch is pressed up. Terminal 2 should buzz with bottom terminal & when switch is pressed down. Terminal 2 should buzz with up terminal. 6. Check supply at terminal 2. It should read 10V.

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	7. If there is no 10V then investigate wiring as per schematic. 8. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it.
Expected Values:	12V
Related Fault Codes:	**Fault Code** / **Fault Description** B1106-17 660 — Platform rotate turntable switch right function - Circuit short to high (10v) B1107-17 662 — Platform rotate turntable switch left function - Circuit short to high (10v) B1108-92 663 — Platform rotate turntable switch both functions - Signal plausibility failure (10v) B1109-16 665 — Platform rotate turntable switch right function - Circuit short to low B1110-16 666 — Platform rotate turntable switch left function - Circuit short to low

4.28.18 Platform Leveling Raise/Lower Switch(TCP)

Components 132 > Base Control Panel 359 > Platform Leveling Raise/Lower Switch(TCP)

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Component :	Platform Leveling Raise/Lower Switch(TCP)
Function:	Platform leveling switch is for to raise the Platform in up or down directions.
Location:	Platform leveling switch located at base, on the Turntable control panel.
Location Image:	

Signal:

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage unpressed	Voltage pressed
1	Platform Leveling Lower	C112-1_TCP	61	2.7V	10V
2	Power in (10V)	C112-2_TCP	1058	10V	NA
3	Platform Leveling Raise	C112-3_TCP	60	2.7V	10V

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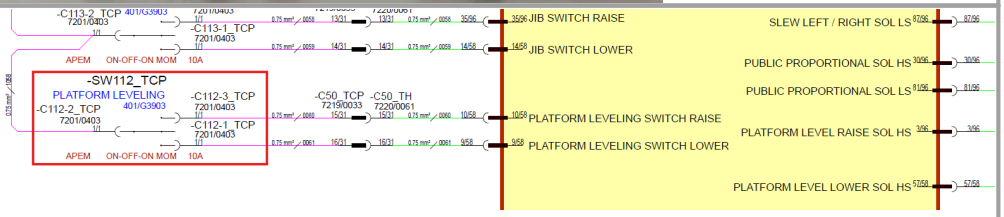
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. There are 3 contact on the back of switch. 2. Check terminal 1, 2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively. 3. Terminal 2 is for incoming supply

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	4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should not buzz 5. When switch is pressed up. Terminal 2 should buzz with bottom terminal & when switch is pressed down. Terminal 2 should buzz with up terminal. 6. Check supply at terminal 2. It should read 10V. 7. If there is no 10V then investigate wiring as per schematic. 8. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it.
Expected Values:	12V
Related Fault Codes:	

Fault Code	Fault Description
B1071-17 609	Platform level turntable switch raise function - Circuit short to high (10v)
B1072-17 610	Platform level turntable switch lower function - Circuit short to high (10v)
B1073-92 612	Platform level turntable switch both functions - Signal plausibility failure (10v)
B1074-16 613	Platform level turntable switch raise function - Circuit short to low
B1075-16 615	Platform level turntable switch lower function - Circuit short to low

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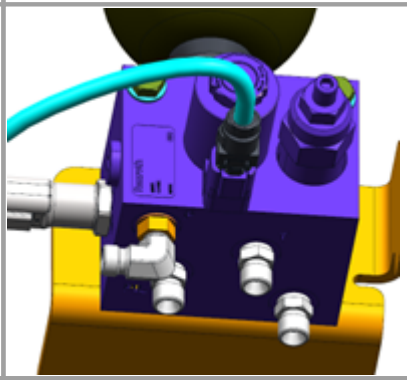
4.28.19 Oscillating Axle Solenoid

Oscillating Axle Solenoid

Components 132 > Base Control Panel 359 > Oscillating Axle Solenoid

Component :	Oscillating Axle Solenoid
Function:	Oscillating Axle solenoid will be powered to allow the axle to float.
Location:	On Chassis
Location Image:	

Signal:

Pin	Description	Connector Number	Wire Number	Released	Locked

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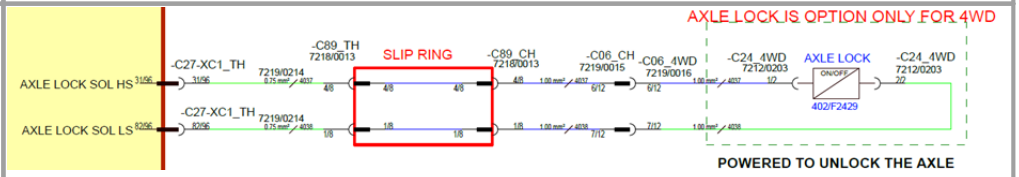
	1	Axle +ve from ecu	C24_CH	4037	12V	0V
	2	GND return to ecu	C24_CH	4038	GND	Open Circuit
Wires & Connectors :	-C24_4WD#1 7212/0203 AXLE LOCK SOL CONN					
Internal Electrical Schematic:						
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins.					

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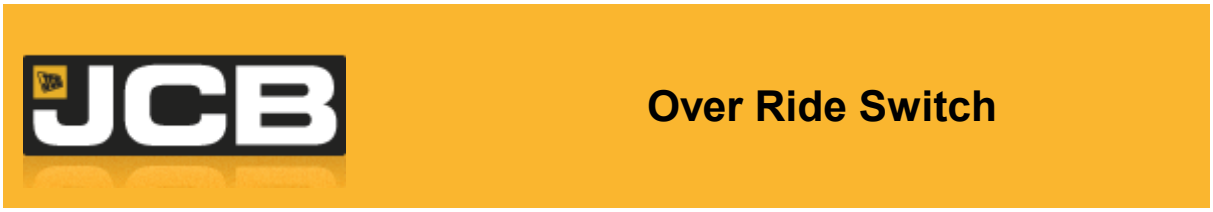
	When the machine is static the axle will be locked. The solenoid will receive 0V When the axle is floating is should receive 12V This will need to be checked with the solenoid plugged in otherwise it will fault.
Expected Values:	12V
Related Fault Codes:	

Fault Code	Fault Description
B1043-17 584	Oscillating axle solenoid high side - Circuit short to high (12v)
B1044-16 585	Oscillating axle solenoid high side - Circuit short to low
B1045-13 586	Oscillating axle solenoid high - Circuit open
B1347-17 880	Oscillating axle solenoid low side - Circuit short to high (12v)
B1348-16 881	Oscillating axle solenoid low side - Circuit short to low
B1349-13 882	Oscillating axle solenoid - Valve fault

4.28.20 Over Ride Switch



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Components 132 > Base Control Panel 359 > Over Ride Switch

Component :	Over Ride Switch
Function:	•The override switch is used for emergency purposes to allow someone to rescue incapacitated operated. •The switch needs to be held with the ignition cycle while switch is still pressed, on start up this will then allow one function at a time to be operated via the electric pump to bring the operator down. •As soon as the switch is released then override function will drop out. •If override is operated the machine will need to be checked over and the reset via service master tool. •This switch is an on - on switch. •Both contacts should always be on/off at opposite times otherwise the ecu will detect a fault

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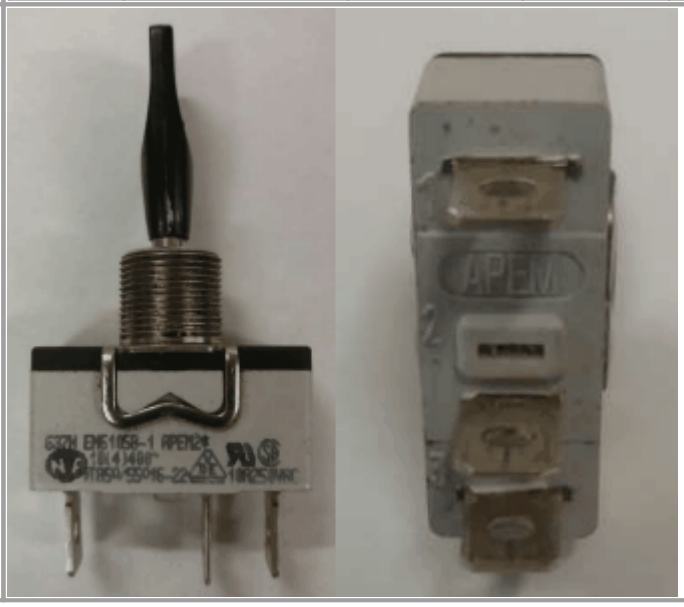
Location:	Override switch located at base, on the Turntable control panel.
Location Image:	

Signal:

Pin Number	Description/ Signal	Connector number	Wire number(s)	Voltage unpressed	Voltage pressed
1	Pressed Contact	C200-1_TCP	63	3.4V	10V
2	Power in (10V)	C200-2_TCP	3042	10V	NA
3	Unpressed Contact	C200-3_TCP	62		10V

Wires & Connectors:



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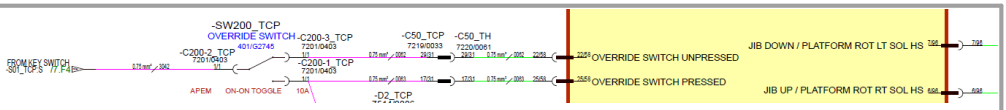
Internal **Electrical** **Schematic:**	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. Note- Override switch and the base/ platform enable are the same switch at the base control panel. There are NO in state 1. There are 3 contact on the back of switch. 2. Check terminal 1, 2 & 3 connected correctly with wiring harness terminal 1,2 & 3 respectively. 3. Terminal 2 is for incoming supply 4. Check continuity between terminal 2 & terminal 3 and terminal 2 & terminal 1. It should not buzz 5. When switch is pressed up. Terminal 2 should buzz with bottom terminal & when switch is pressed down. Terminal 2 should buzz with up terminal.

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	6. Check supply at terminal 2. It should read 10V. 7. If there is no 10V then investigate wiring as per schematic. 8. If there is 10V available and continuity is OK then it should be internal damage to switch. Replace it.
Expected Values:	12V
Related Fault Codes:	

Fault Code	Fault Description
B1058-17 595	Override switch pressed short circuit to high
B1059-16 596	Override switch pressed state - Circuit short to low
B1060-13 597	Override switch - Signal plausibility failure (Circuit open)
B1061-17 597	Override switch unpressed short circuit to high
B1062-16 598	Override switch unpressed state - Circuit short to low
B1063-92 599	Override switch - Signal plausibility failure (12v)

4.28.21 Buzzer Relay(TCP)

Buzzer Relay(TCP)

Components 132 > Base Control Panel 359 > Buzzer Relay(TCP)

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Component :	Buzzer Relay(TCP)
Function:	•The buzzer is there to warn the operator when either an fault or error has happened with the machine or to warn of machine is awaiting for operator action. •For example, if the foot pedal is pressed for longer than 10 seconds without a function being pressed,this will time out and make the buzzer sound. •The platform buzzer and the base buzzer should be a repeat of each other. •If 1 buzzer is working and the other is not then there is issue with the buzzer.
Location:	Inside the Base Control Box

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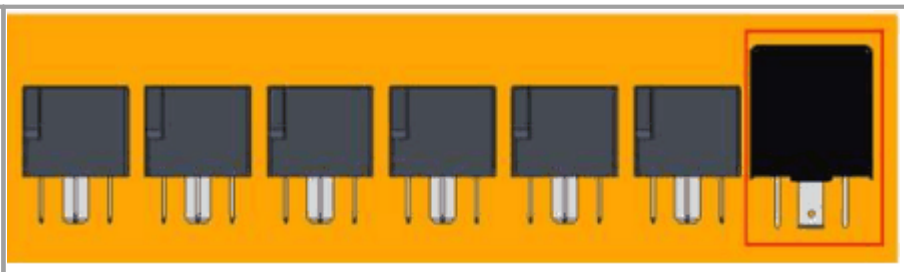
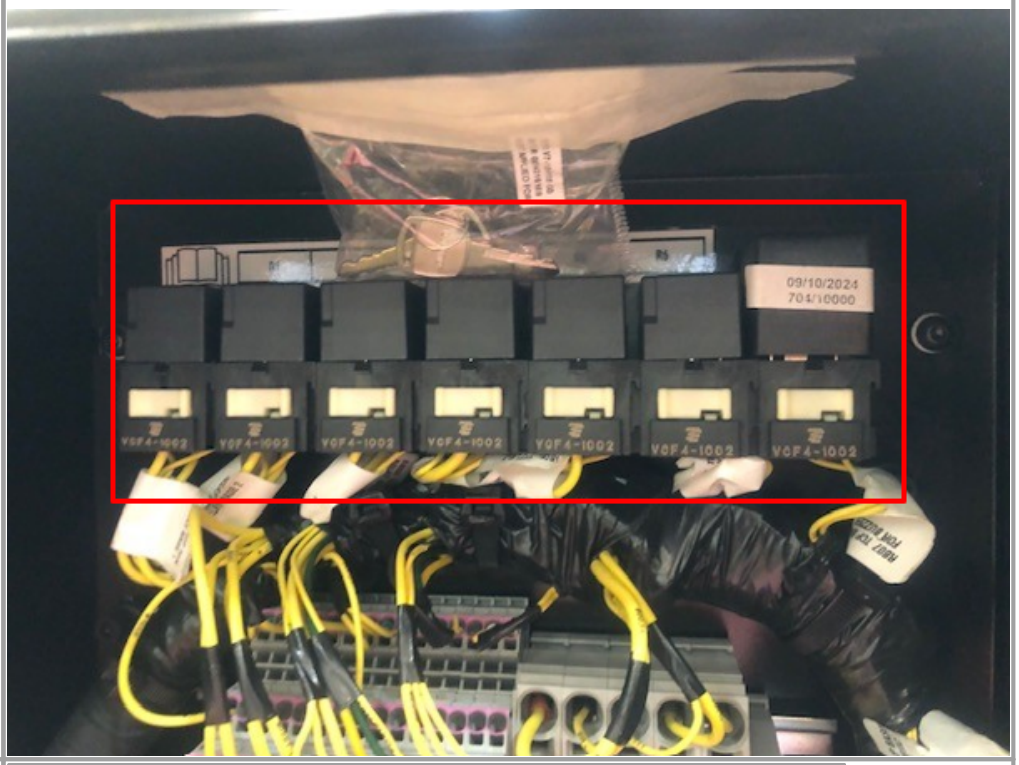
Location

Image:





Signal:

Pin Number	Description	Wire Number
1	Buzzer HS	4024
2	Buzzer HS	-
3	-	-
4	GND	6024
5	-	-

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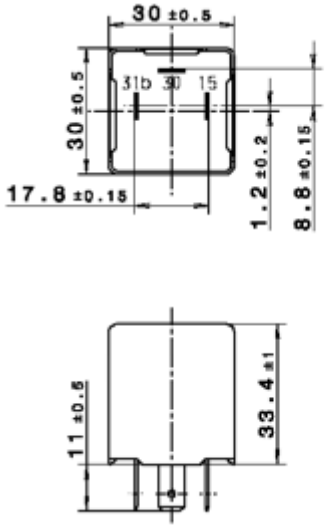
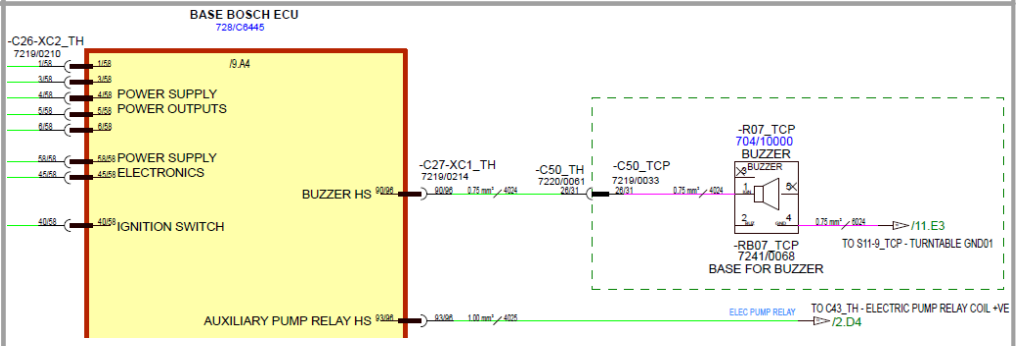
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. There are two buzzer fitted on machine one is inside base control panel and another is inside platform control panel. Ensure no water ingress 2. Check supply at connector RB07_TCP pin no 1 & 4 This should read 12V 3. If there is no supply check wiring as per the schematic

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	4. If there is supply on harness there may be internal damage to buzzer 5. If harness continuity is OK replace the Buzzer Note-Remove the buzzer from its holder and wire to 12V and GND signals and the buzzer should sound.
Expected Values:	12V
Related Fault Codes:	**Fault Code** / **Fault Description** B1177-16 737 — Buzzer turntable - Circuit short to low B1178-13 738 — Buzzer turntable - Circuit open or short to high (12v)

4.28.22 Display 7"

Display 7"

Components 132 > Base Control Panel 359 > Display 7"

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Component :	Display 7"
Function:	The display is there to the operator information and also assist with machine maintenance.
Location:	The display is located in the turntable control panel.
Location Image:	

Signal:

Connector J1		
Pin Number	**Signal**	**Wire number in harness**
1		

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2	Ignition wire	1011
3		
4		
5		
6		
7	CAN L	Green CAN cable
8	CAN H	Yellow CAN cable
9	GND	6011
10	Battery +ve	3035
11		
12		
13		
14		
15	USB D-	4100 WH
16	USB D+	4101 GN
17	USB GND	4103 BK
18	USB 5V	4102 RD

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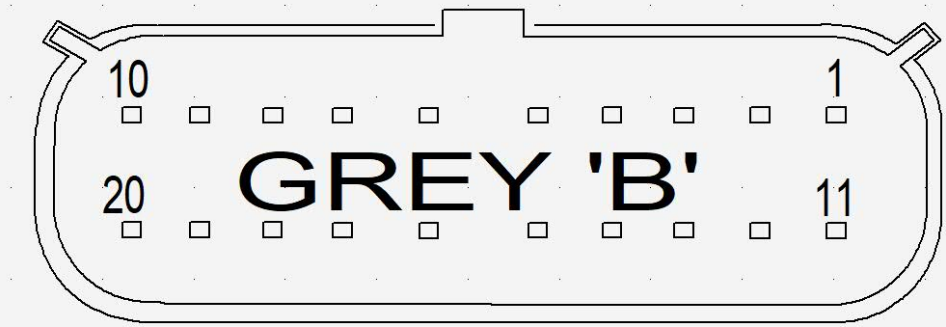
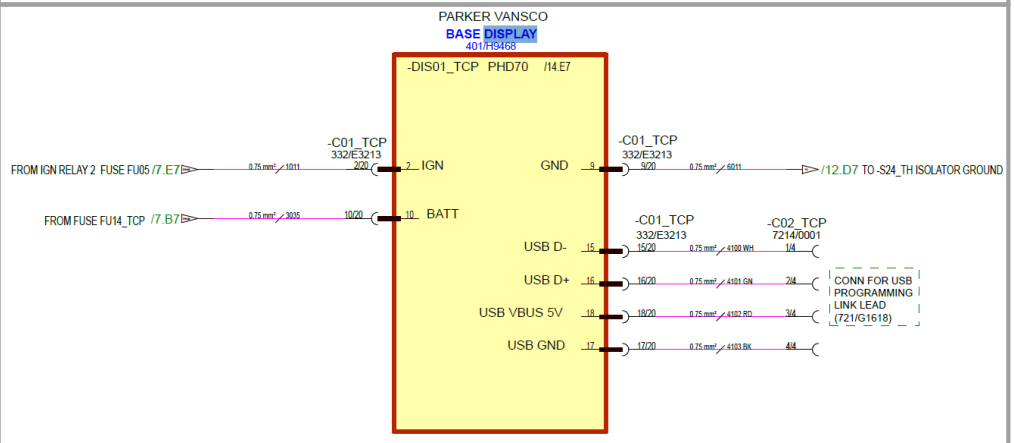
	19 | | | 20 | | | Connector J2 - not used
Wires & Connectors :	 J1 - 332/E3213
Internal Electrical Schematic:	
Testing:	1. Check IGN RELAY 2 FUSE FU05 and wire 1011.

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	2. Check FUSE FU14 and wire 3035. 3. Check Ground cable 6011. 4. Check connector and wire for any damage or loose connection.
Expected Values:	• The should be 12V on pin 10 at all times, • There should be 12V at pin 2 when the key is in the on position • There should be GND at pin 9 regardless of isolator position. • All data will be provided via CAN.
Related Fault Codes:	N/A

4.28.23 TCP Interface Connector

Components 132 > Base Control Panel 359 > TCP Interface Connector

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Component :	TCP Interface Connector
Function:	There is 2 connectors that interface with the machine. Feed the Turntable harness around the base Control panel C39_TH and C50_TH.
Location:	On Base Control Box RHS

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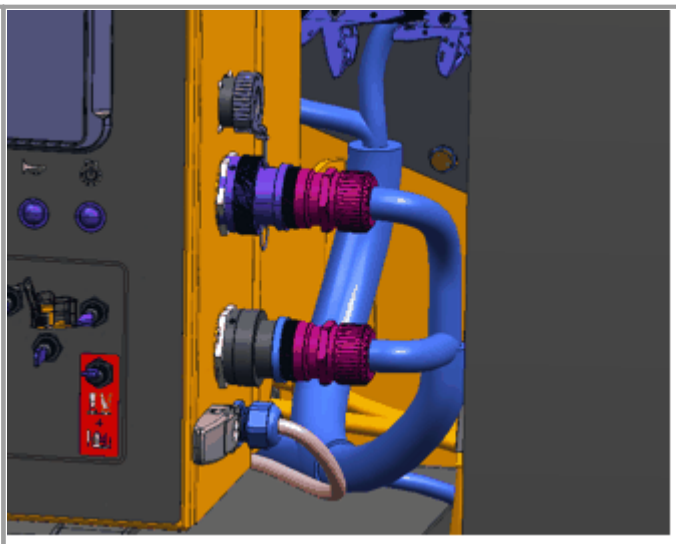
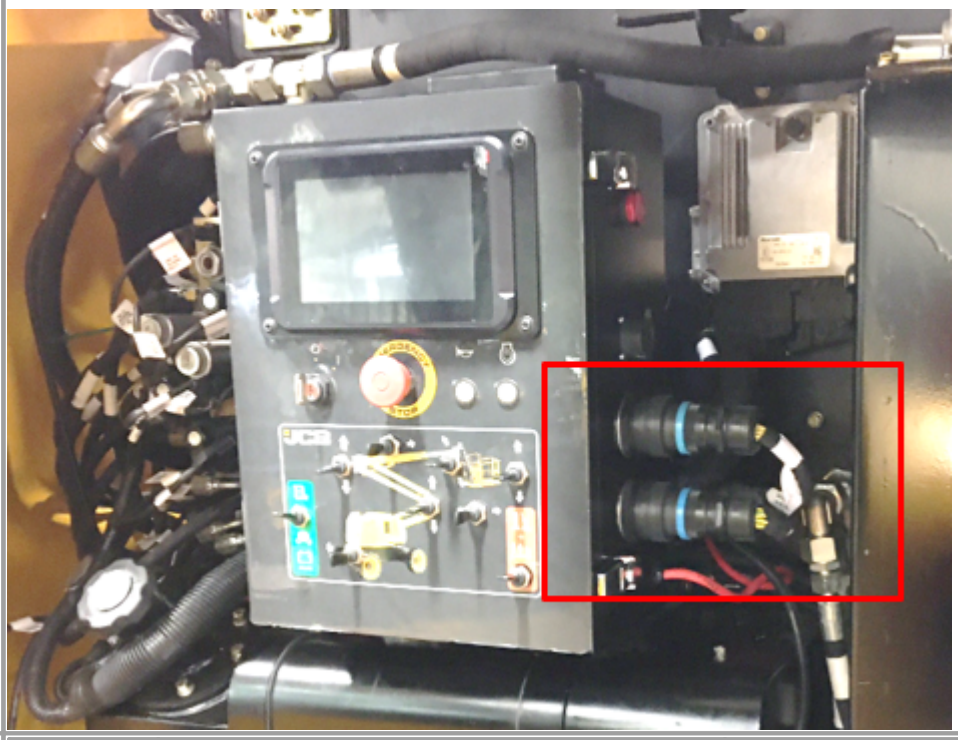
Location

Image:





Signal:

C39 pin out		
Pin Number	**Description**	**Wire number**

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1	FU03_TCP to Bosch ECU power supply	1018
2	FU09_TCP to podbox power hold relay	34
3	NOT USED	NOT USED
4	FU10_TCP to podbox starter relay	35
5	NOT USED	NOT USED
6	Alternator D+ to D+ relay	4005C
7	FY15_TCP to podbox power hold coil	3002
8	NOT USED	NOT USED
9	NOT USED	NOT USED
10	FU13_TCP to Livelink	3004
11	S11-3 Din rail terminal to Axle lock pressure sensor	1024A
12	FU06_TCP to platform ecu power supply	1025
13	CAN H J1939 to Livelink and platform	
14	CAN L J1939 to Livelink and platform	
15	CAN H J1939 to kohler engine	
16	CAN L J1939 to kohler engine	
17	FU11_TCP to worklights	1031

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18	S11-18_TCP Terminal block to turntable earth	6063U
19	D+ signal to Livelink and Bosch base ECU	1032
20	CAN Shield J1939 to kohler engine	
21	S11-11 terminal block to turntable ground	6061H
22	Display GND	6011
23	FU07_TCP to platform ecu supply	1026
24	S11-1_TCP to platform weight sensors	1027
25	CAN Shield to Livelink and platform	
26	CAN H 15765 to kohler engine	
27	CAN L 15765 to Kohler engine	
28	S11-1_TCP to Tilt sensor	1028K
29	FU08_TCP to Bosch base ecu	1029A
C50 Pin out		
Pin Number	**Description**	**Wire number**
1	NOT USED	NOT USED

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2	NOT USED	NOT USED
3	Platform rotate left sw to base ecu	56
4	Platform rotate right sw to base ecu	57
5	main boom raise sw to base ecu	50
6	main boom lower sw to base ecu	51
7	Slew right switch to base ecu	48
8	Slew left switch to base ecu	49
9	Artic boom raise sw to base ecu	54
10	Artic boom lower sw to base ecu	55
11	main boom telescope extend sw to base ecu	52
12	main boom telescope retract sw to base ecu	53
13	Jib Raise sw to base ecu	58
14	Jib Lower sw to base ecu	59
15	platform level raise sw to base ecu	60
16	platform level lower sw to base ecu	61
17	override ride sw pressed signal to base ecu	63
18	platform enable switch to base ecu	46

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	19	base enable switch to base ecu	47
	20	NOT USED	NOT USED
	21	horn switch to base ecu	65
	22	engine start switch to base ecu	66
	23	FU01_TCP ignition signal to base ecu	40
	24	E-Stop +ve signal to base ecu	41
	25	E-Stop -ve to base ecu	42
	26	ECU Buzzer output to buzzer	4024
	27	base ecu horn output to horn relay	4035
	28	Horn relay output to horn	43
	29	Override unpressed switch to base ecu	62
	30	base ecu 10V feed to panel switches	1030A
	31	base ecu 10V feed to panel switches	1030B
Wires & Connectors	**Turntable Interconnect C39** **Turntable Interconnect C50**		

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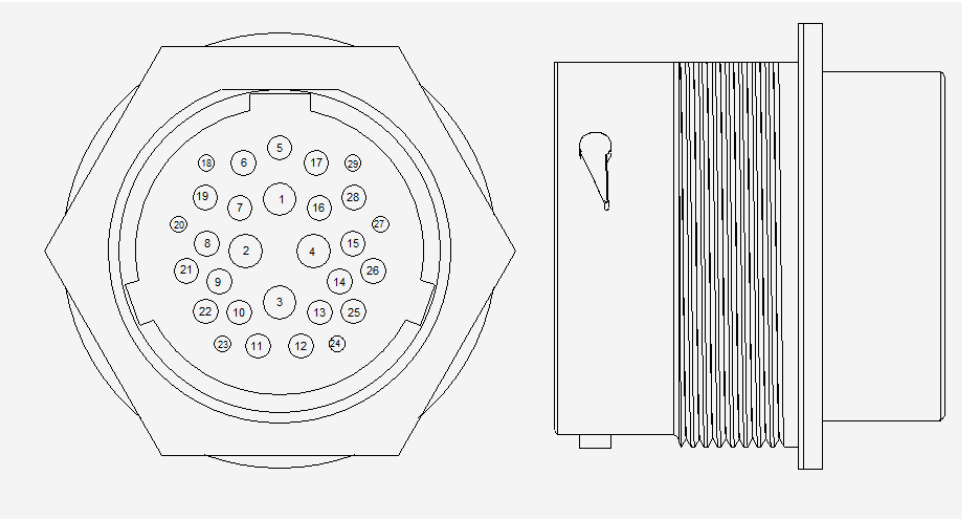
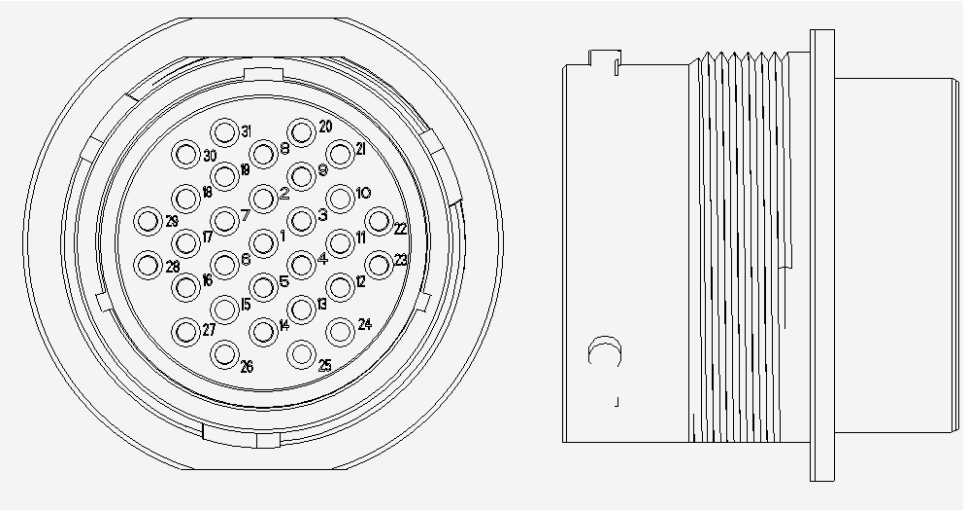
:

Connector C39_TCP:

Connector C50_TCP: 31 way Deutsch Inline connector HDP24-24-31P





Connector C50_TCP Pin out information:

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	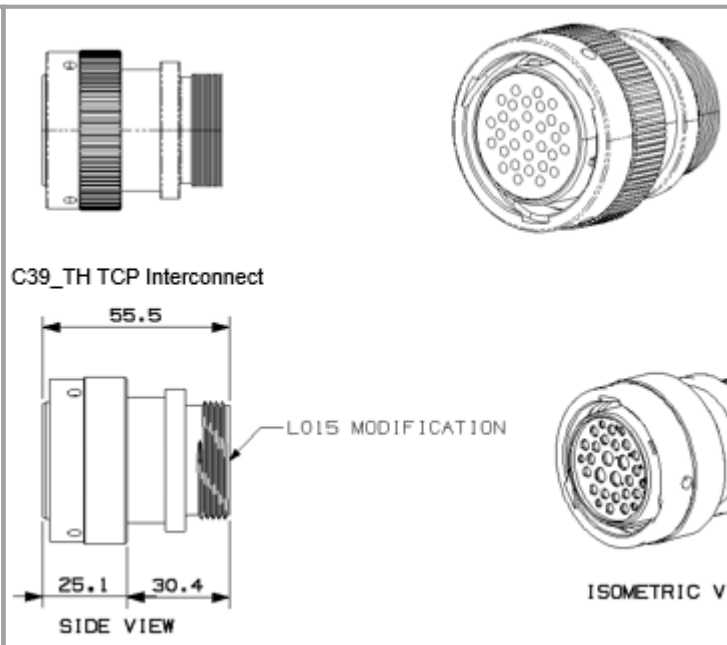
Internal **Electrical** **Schematic:**	
Testing:	Important: Use the multi-meter on the harness connector pins. DO NOT USE the meter on the ECU pins. 1. Check all the wire and connecter are fitted correctly. No wire should be backed out 2.Check male & female connector are mating properly.

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Expected Values:	See Signal
Related Fault Codes:	N/A

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template if you want it completely blank.

HV Component

5 HV Component

List of HV Component 460

Sr No.	Description
1	48V Contactor 460
2	Battery 12V 466
3	Battery 48V 469
4	Voltage Convertor 12V to 5V 475
5	High Voltage Fuse 478
6	DC Convertor 480
7	Hydraulic Pump Motor 484
8	Traction Motor Rear Drive 489
9	Traction Motor Front Drive 494
10	Pump Invertor 500
11	Front Traction Invertor 504
12	Rear Traction Invertor 511

5.1 48V Contactor

HV Component 460 > 48V Contactor

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Component:	48V Contactor
Function:	•Contactor is used to supply 48V to inventor (front rear & pump). •There are 3 separate contactor for each l inventors (For Electric Boom). •Contactor coil is controlled by inverter to switch on & off.
Location:	On Chassis Rear RHS

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Location	
Image:	

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Signal:

Pin Number	Description	Wire Number
C60	Pump Contactor coil high side	4545
C53	Pump Contactor coil low side	6507
C55	Front invertor Contactor coil high side	4540
C56	Front invertor Contactor coil low side	6505
C57	Rear invertor Contactor coil high side	4536
C58	Rear invertor Contactor coil low side	6506

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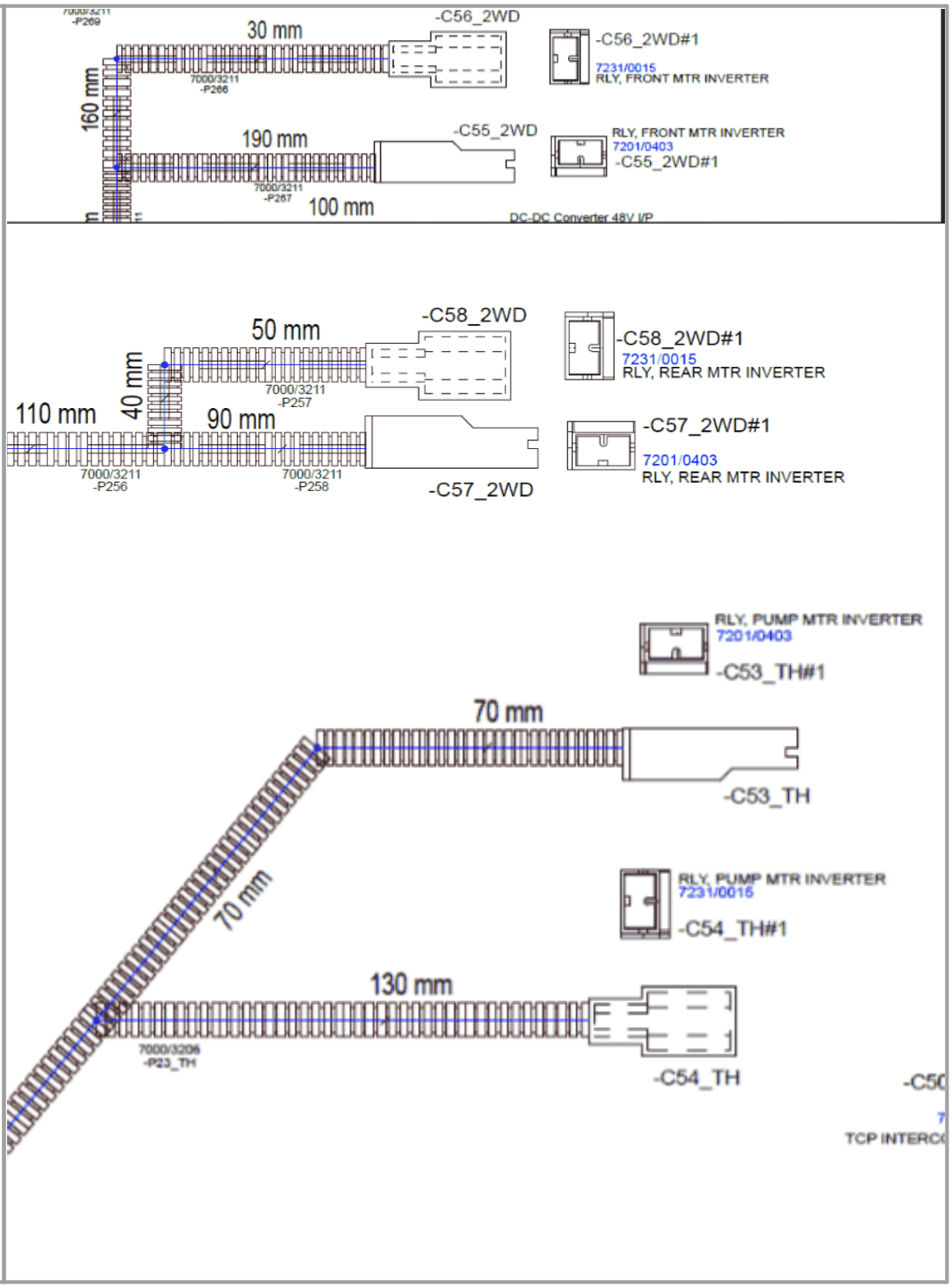
Wires & Connectors:	

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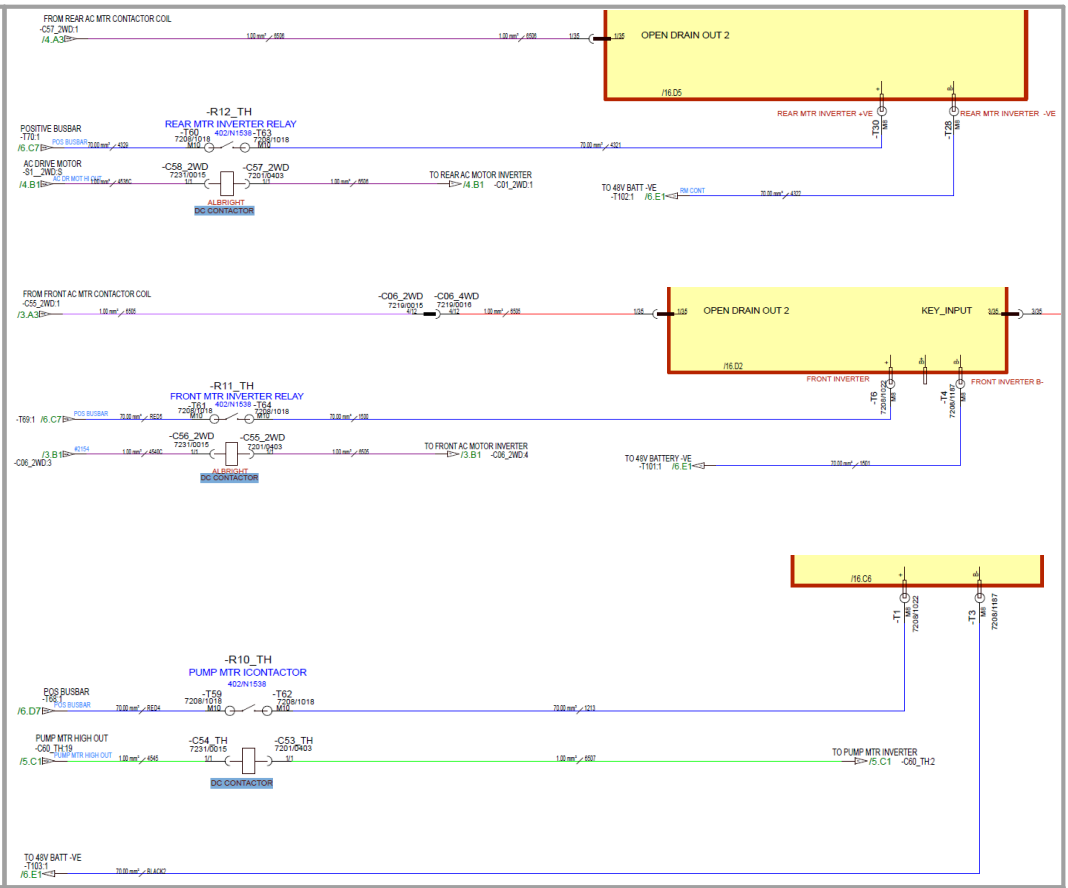
Internal Electrical Schematic:	
Testing:	•Check Resistance on respective DC contactor coil
Expected Values:	48V

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Related Fault Codes:	N/A

5.2 Battery 12V

Battery 12V

HV Component 460 > Battery 12V

Component :	Battery 12V
Function:	All Boom functions shall be operated from Base & Platform control panel with 12V battery (when Auxiliary/Electric pump is requested).
Location:	12v Battery is location near to BCP

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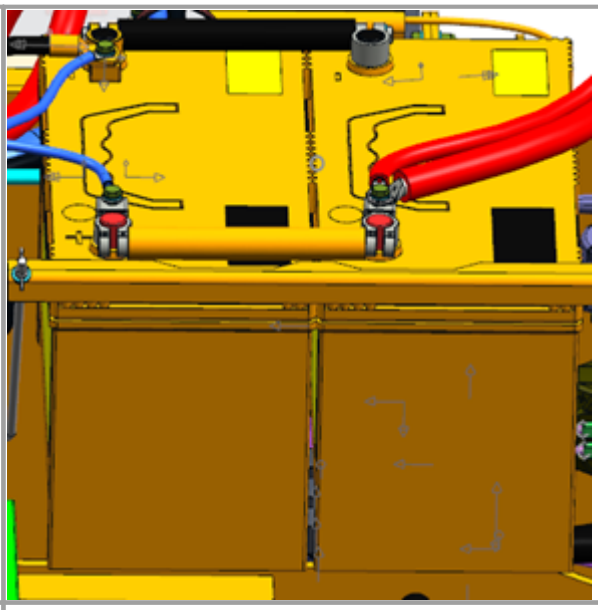
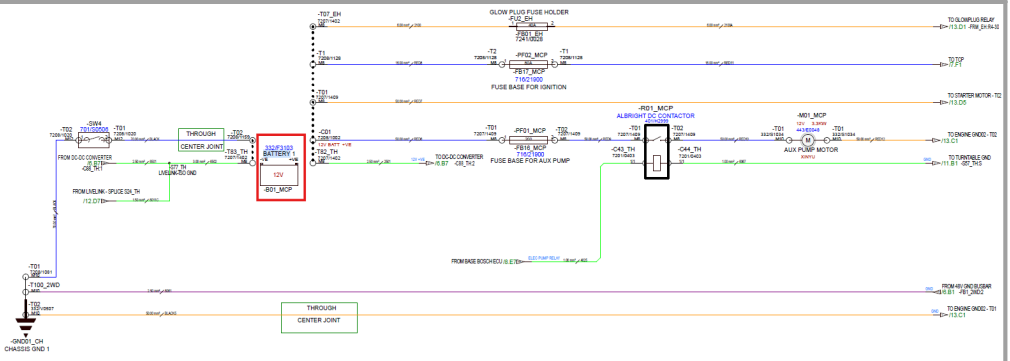
Location **Image:**	
Signal:	12V
Wires & **Connectors** **:**	
Internal **Electrical** **Schematic:**	

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Testing:	Battery Discharged- Ensure the battery has sufficient charge to power the machine. • Measure the voltage should be more the 12V If battery has sufficient charge or fault remains, proceed to step 2. • Battery connection fault-Check the electrical connectors from the battery for signs of damage/corrosion, clean the terminals and apply a suitable electrically conductive grease to the connections. Repair/replace battery or connectors as necessary. If the fault remains, proceed to Step 3. • Poor Earth-Check battery earth and machine earth(s) for signs of damage/corrosion, clean the terminals and ensure bolts are tighten to the appropriate torque (see machine service manual for torque value).
Expected Values:	12V

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Related Fault Codes:	N/A

5.3 Battery 48V

Battery 48V

HV Component 460 > Battery 48V

Component:	Battery 48V
Function:	•6V batteries to be connected in series to make 48V system to be used for Electric drive & hydraulic pump drive. •The 6V Vision Make (VRLA) maintenance free, non spill able , high capacity (400 AH @ 20-H)

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Location:	•The 2X4 batteries are located on both side of chassis. •Access to batteries for battery removal is through the covers.

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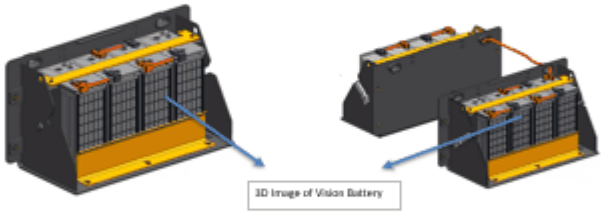
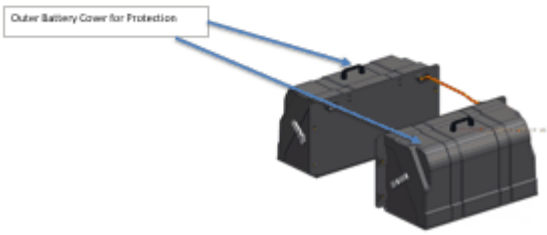
Location **Image:**	  

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Signal:	48V
Wires **&**	

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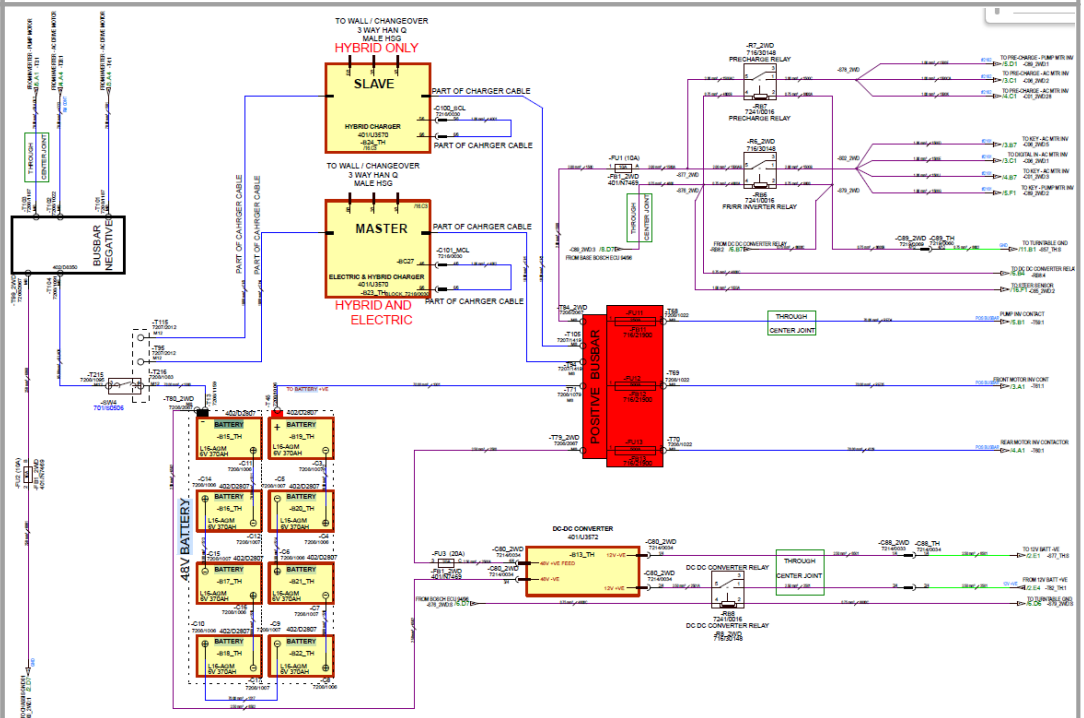
Connectors:	
Internal Electrical Schematic:	
Testing:	Battery Discharged- •Ensure the battery has sufficient charge to power the machine. Test state of charge using a battery charger/conditioner. Recharge/replace as required.If battery has sufficient charge or fault remains, proceed to step 2.

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	•Battery connection fault-Check the electrical connectors from the battery for signs of damage/corrosion, clean the terminals and apply a suitable electrically conductive grease to the connections. Repair/replace battery or connectors as necessary. If the fault remains, proceed to Step 3. •Poor Earth-Check battery earth and machine earth(s) for signs of damage/corrosion, clean the terminals and ensure bolts are tighten to the appropriate torque (see machine service manual for torque value).If the fault remains, proceed to Step 4. •Battery fault-Test battery voltage and power hold relay voltage at the ECU. Compare these 2 values. If values do not match, follow the relay testing procedure below: A. Repair or replace as required. B. With the relay installed, apply 5V across the relay. If the relay does not click, replace the relay. If the fault is still active proceed to step 5. C. Check continuity back to power supply - especially around the pins and coils. Turn on the ignition and check for 5V at the power hold fuse, Podbox connector, inside the Podbox at the power hold relay base power in terminal. Repair or replace as required. If the fault remains, proceed to Step 5.

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	•Battery charging circuit-Check the battery charge circuit (see engine service manual for alternator diagnosis and repair).Repair/replace as necessary.
Expected Values:	48V
Related Fault Codes:	N/A

5.4 Voltage Convertor 12V to 5V

HV Component 460 > Voltage Convertor 12V to 5V

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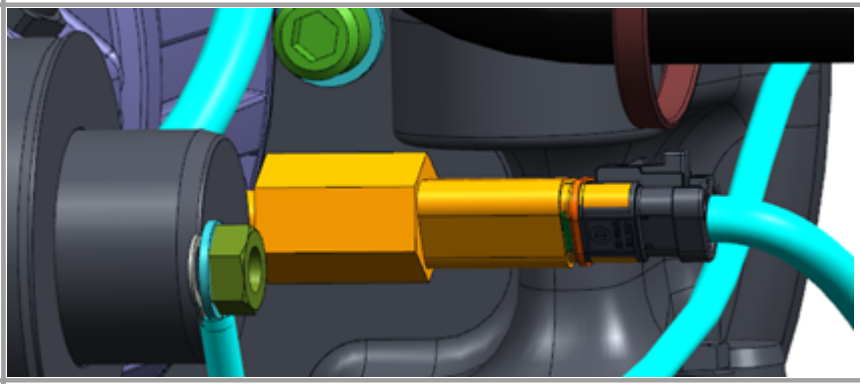
Component:	Voltage Convertor 12V to 5V
Function:	5V converter provided to convert 12 V output to 5V for Front wheels.
Location:	
Location Image:	

Signal:

Pin Number	Description	Wire Number
A/3	12V	4512B
C/3	Ground	4513B
B/3	OP	4512T

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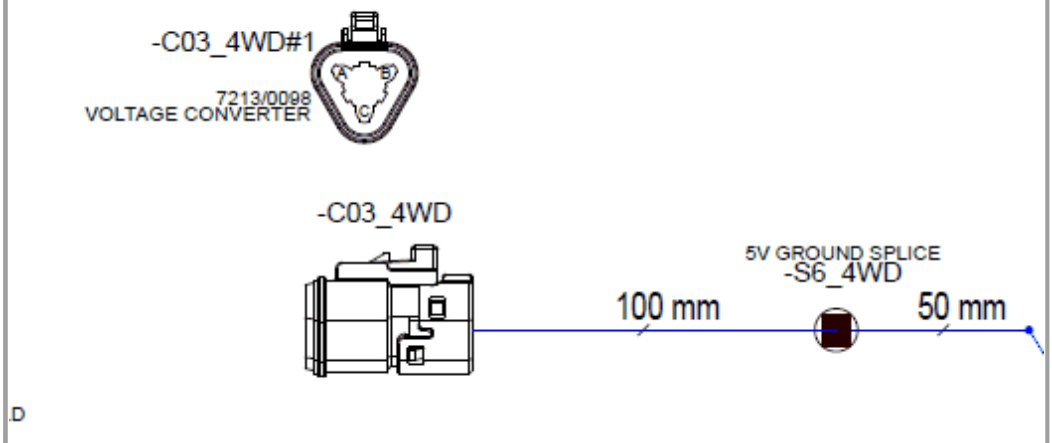
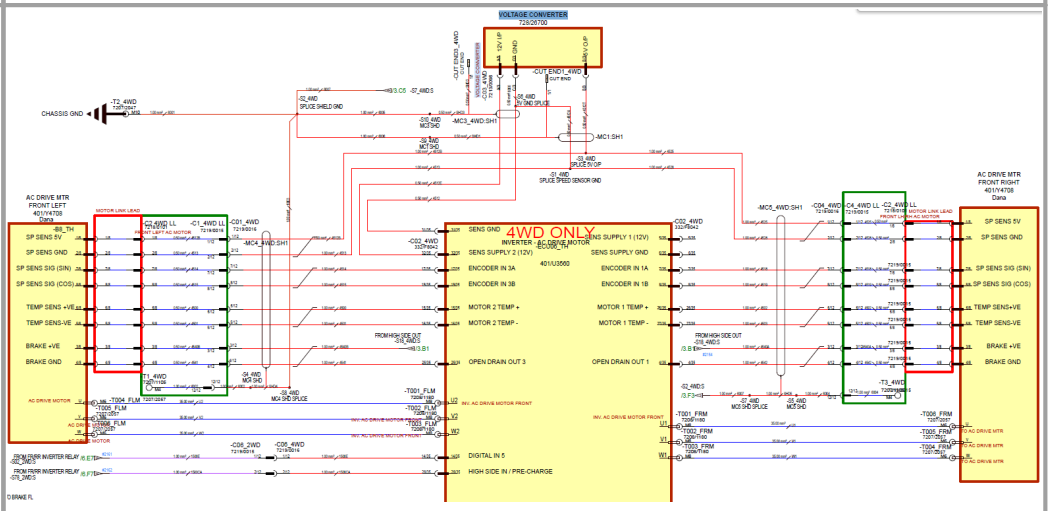
Wires & Connectors:	
Internal Electrical Schematic:	
Testing:	Check 12 Volt between Pin A and C and output voltage 5V in Pin B
Expected Values:	See Signal

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Related Fault Codes:	N/A

5.5 High Voltage Fuse

High Voltage Fuse

HV Component 460 > High Voltage Fuse

Component:	High Voltage Fuse
Function:	•High Voltage fuses are used to protect front invert , rear inverter & pump inverter from over current & short circuit. •500amp used for front and rear drive inverter each 250 amp used for pump.
Location:	

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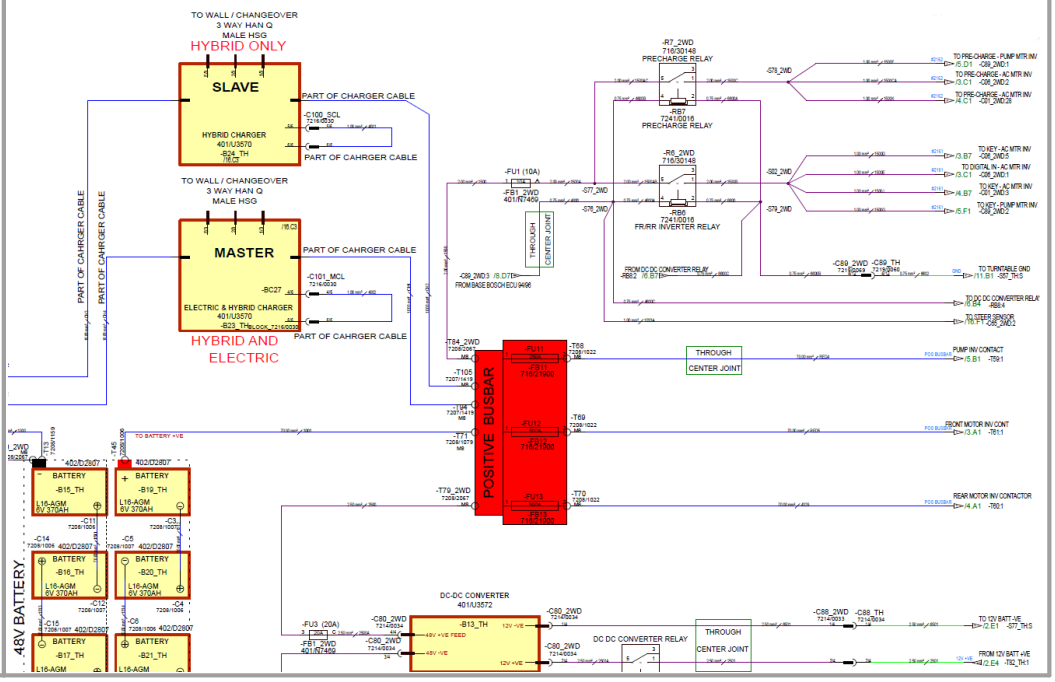
Location **Image:**	
Signal:	
Wires & Connectors:	N/A
Internal Electrical Schematic:	

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Testing:	Check Continuity between fuse terminal by Multimeter
Expected Values:	Multimeter Beep sound should be when check Continuity between fuse terminal by Multimeter
Related Fault Codes:	N/A

5.6 DC Convertor

HV Component 460 > DC Convertor

Component:	DC Convertor

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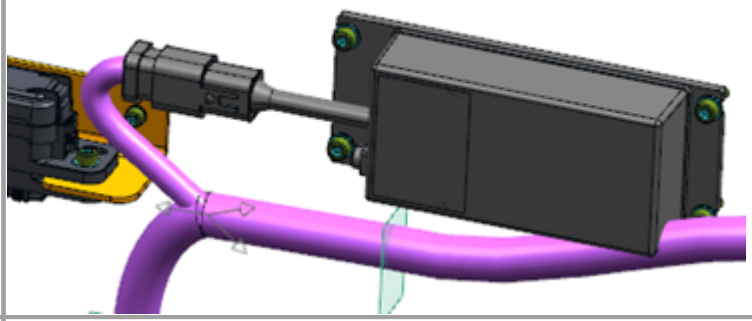
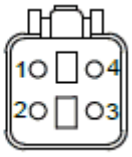
Function:	•DC converter shall charge the 12V battery from 48V when Isolator is closed. •The 2 DC DC Converters convert 480V DC input, into the 12V DC Output to power the 12V electrics . •The 2 DC DC Converters are wired in parallel to provide a total output of 48Amps @ 12v. If1 DC DC Fails, the 12v electrics will still work •providing the maximum current draw is less than 24Amps.
Location:	On Chassis
Location Image:	
Signal:	The DC Converters receive 48v and output 12v.
Wires & Connecto	-C80_2WD#1 7214/0034 DC-DC CONVERTER 

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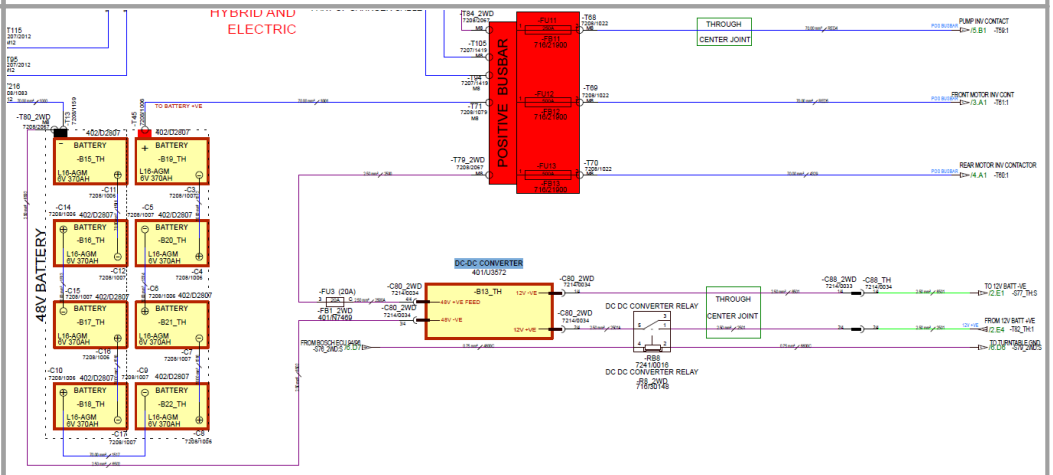
rs:	
Internal **Electrical** **Schemati** **c:**	
Testing:	**Identify the issue** •Connect DC-DC Converter to Charging point •Check voltage on Battery using Multimeter •Check Voltage on Display also •Disconnect DC-DC Converter to Charging point •Open Isolator •Connect DC-DC Converter to Charging point •Check voltage on Battery using Multimeter

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	•Check Voltage on Display also **Expected Result** At Step 2,3,8 and 9 Check Battery are getting charged, check on Multimeter Voltage should be 48V Note: After disconnect DC/DC-12.78 V After connect DC /DC converter-13.72 V For additional information, refer to the relevant service manual.
Expected Values:	1. Check 12 Volt between Pin 1/4 and 2/4 2. Check 48 Volt between Pin 3/4 and 4/4
Related Fault	N/A

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Codes:	

5.7 Hydraulic Pump Motor

Hydraulic Pump Motor

HV Component 460 > Hydraulic Pump Motor

Component:	Hydraulic Pump Motor
Function:	The Hydraulic Motor run the hydraulic for the all the hydraulic control operation except Drive.
Location:	The AC Hydraulic motor is located near base control panel.

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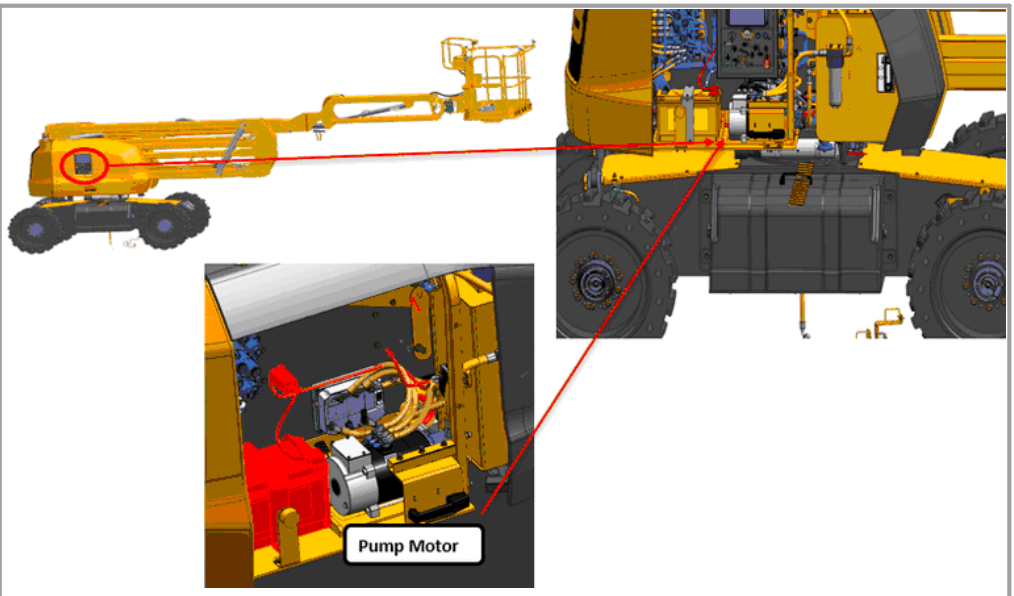
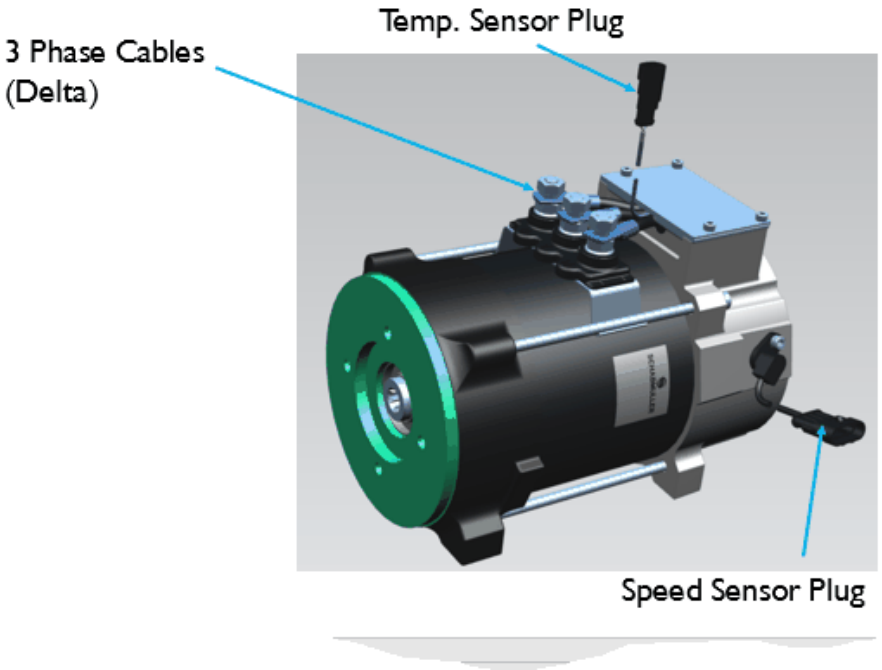
Location

Image:





Signal:

The Hydraulic AC Motor is powered by a 3 phase supply from the MLS unit.

Pin	Description	Connector Number	Wire Nu
1	SPEED SENS SUPPLY 2 (12V)	C71_TH	452

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2	SENS SUPPLY SIGNAL(Encoder 1A)	C71_TH	453
3	SENS SUPPLY SIGNAL(Encoder 1B)	C71_TH	453
4	SPEED SENS SUPPLY GND	C71_TH	453
2	Temp Sensor +ve	C70_TH	451
1	Temp Sensor -ve	C70_TH	450

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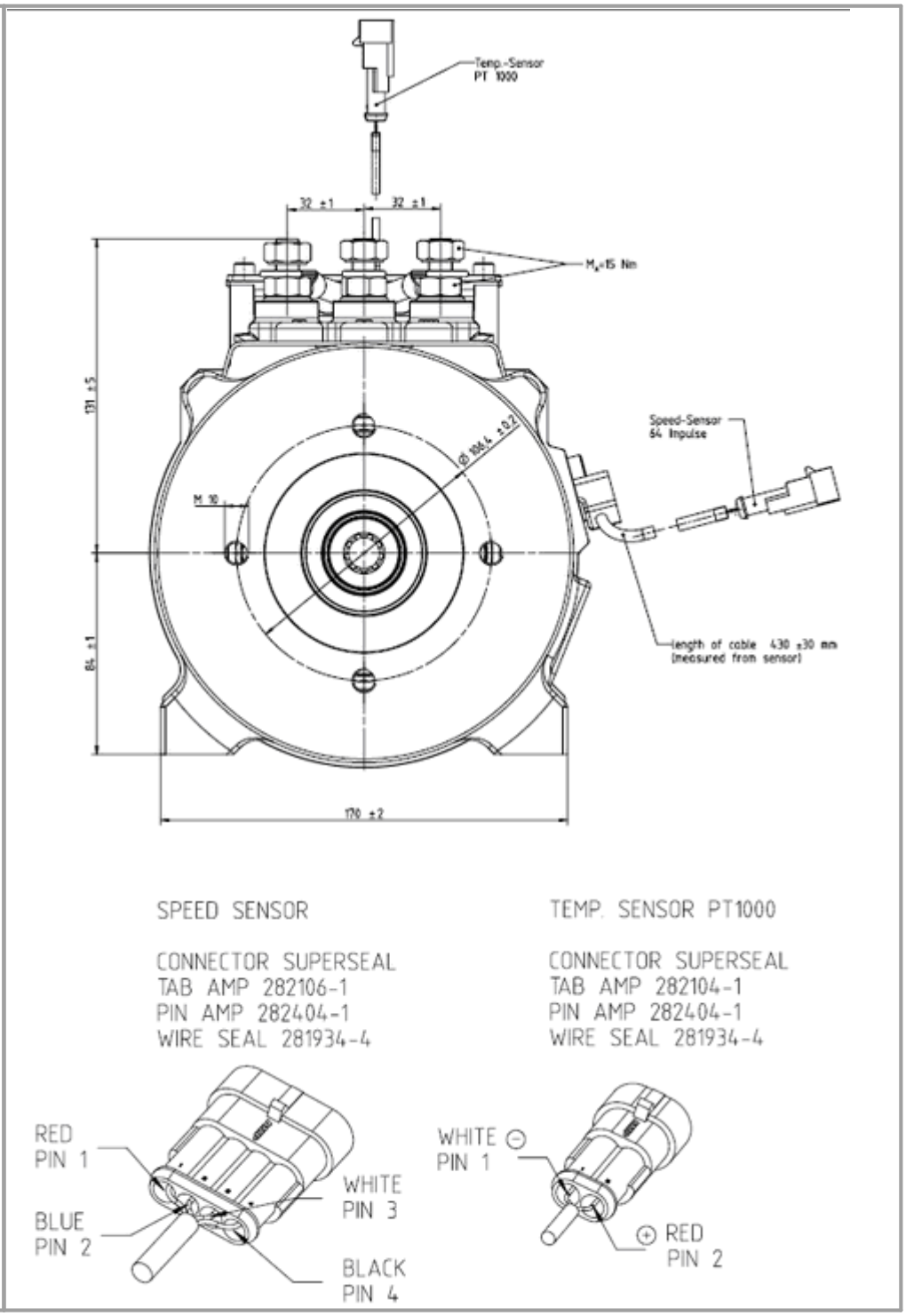
Wires & Connectors:



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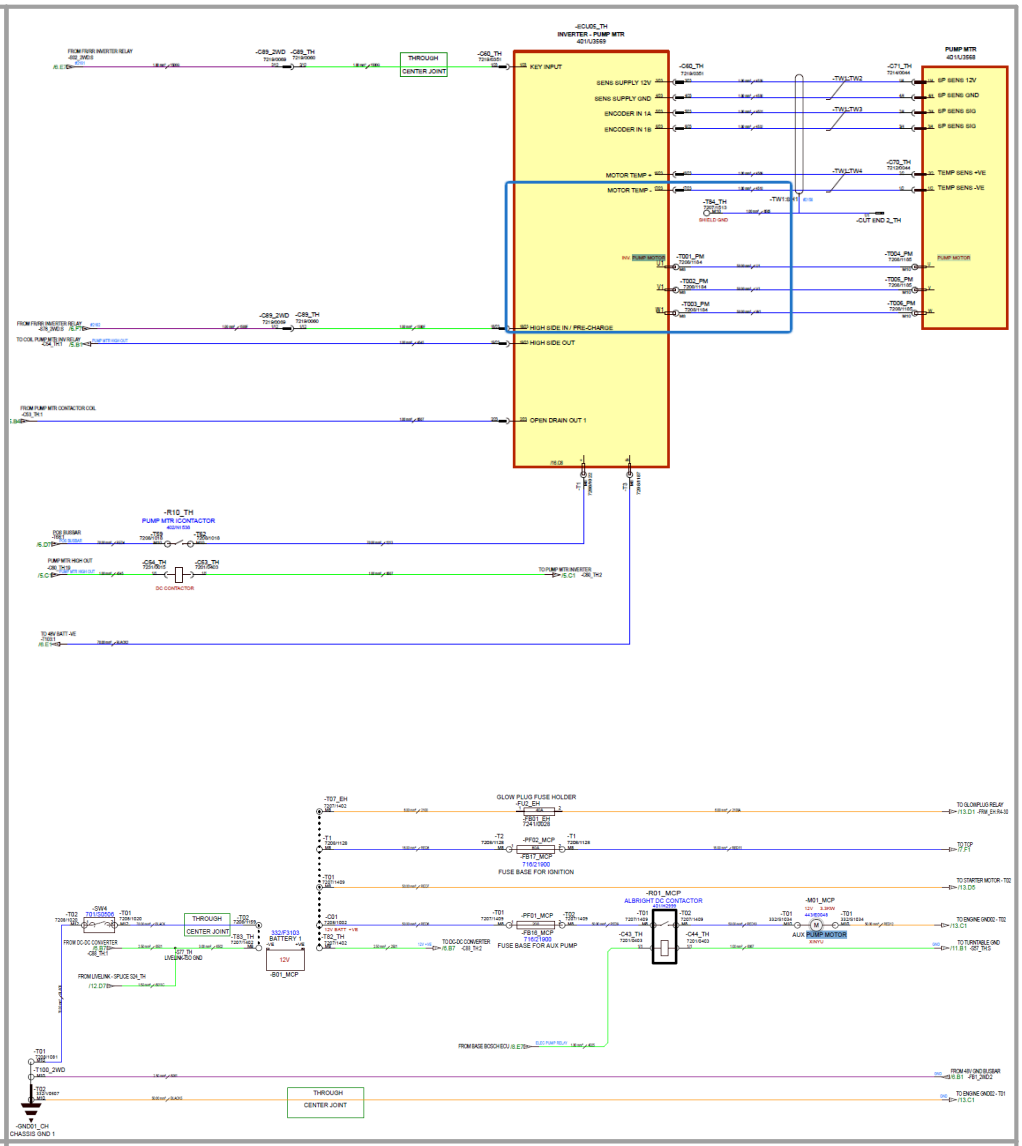
Internal

Electrical

Schematic:



Testing:

Check Voltage on motor terminal

Expected Values:

Supply Voltage 48V

Pump Motor	
Motor Voltage	32V AC

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	Current Rating: 240A Speed: 1920 RPM Ingress Protection: IP 54
Related Fault Codes:	N/A

5.8 Traction Motor Rear Drive

Traction Motor Rear Drive

HV Component 460 > Traction Motor Rear Drive

Component :	Traction Motor Rear Drive

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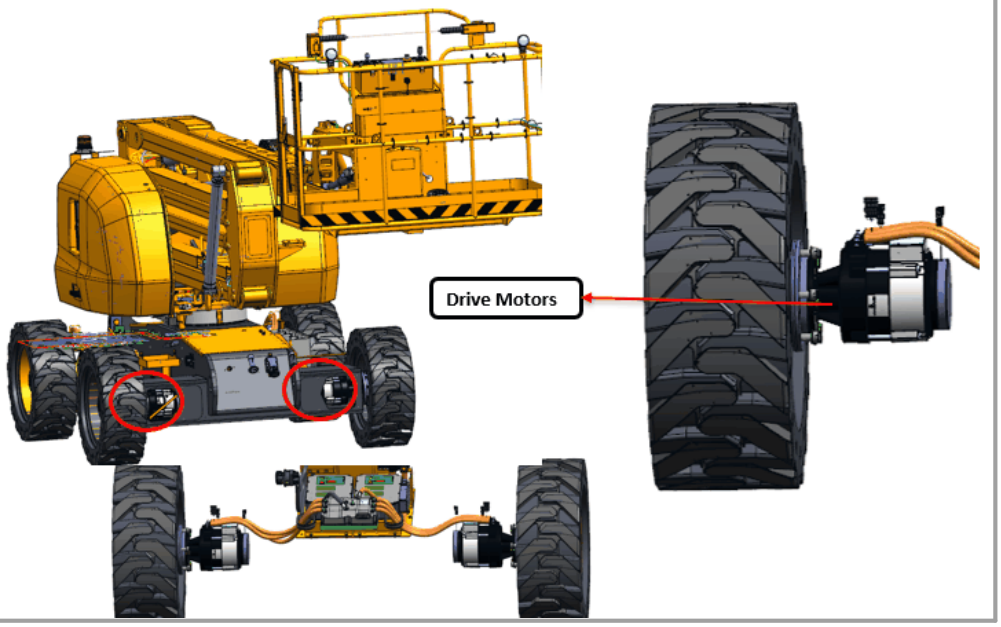
Function:	•Traction motor is a type of electric motor that is specifically designed for providing propulsion or generate the driving of the machine •It delivers torque to drive the wheels or axles of the vehicle, providing the necessary traction to power the vehicle's movement.
Location:	The traction motors are mounted onto the chassis wheel motor plates.Mounted to the other side is the Torque Hub.
Location Image:	

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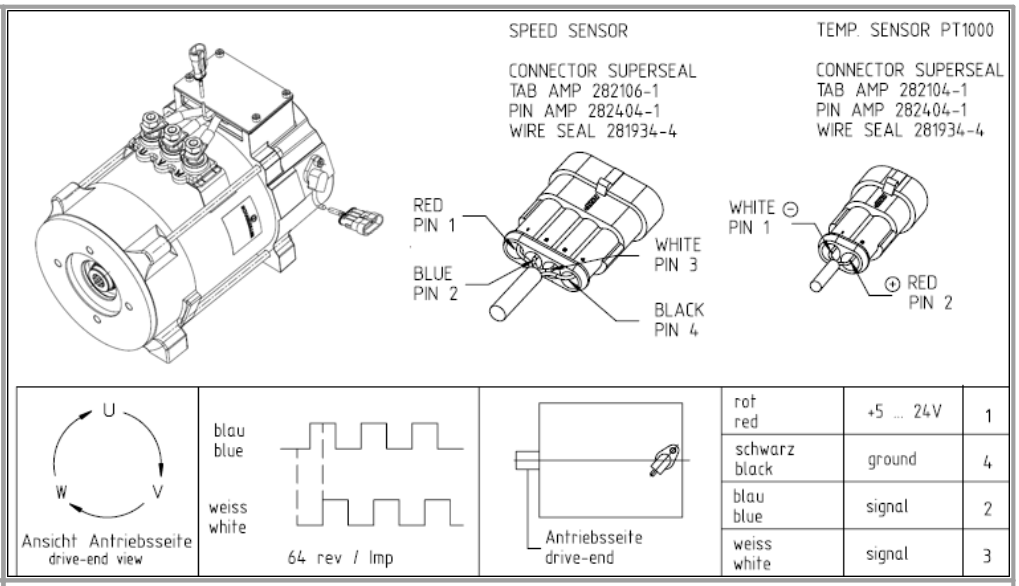
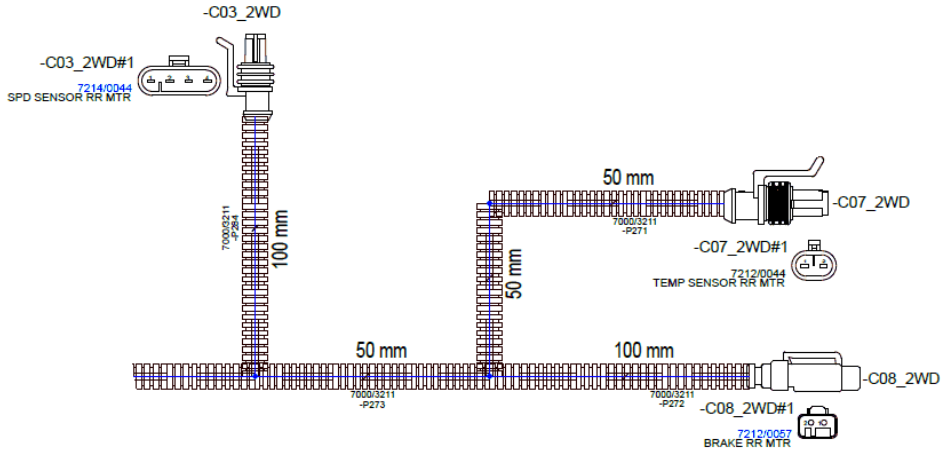
Signal:



rot red	+5 ... 24V	1
schwarz black	ground	4
blau blue	signal	2
weiss white	signal	3

Wires & Connectors:



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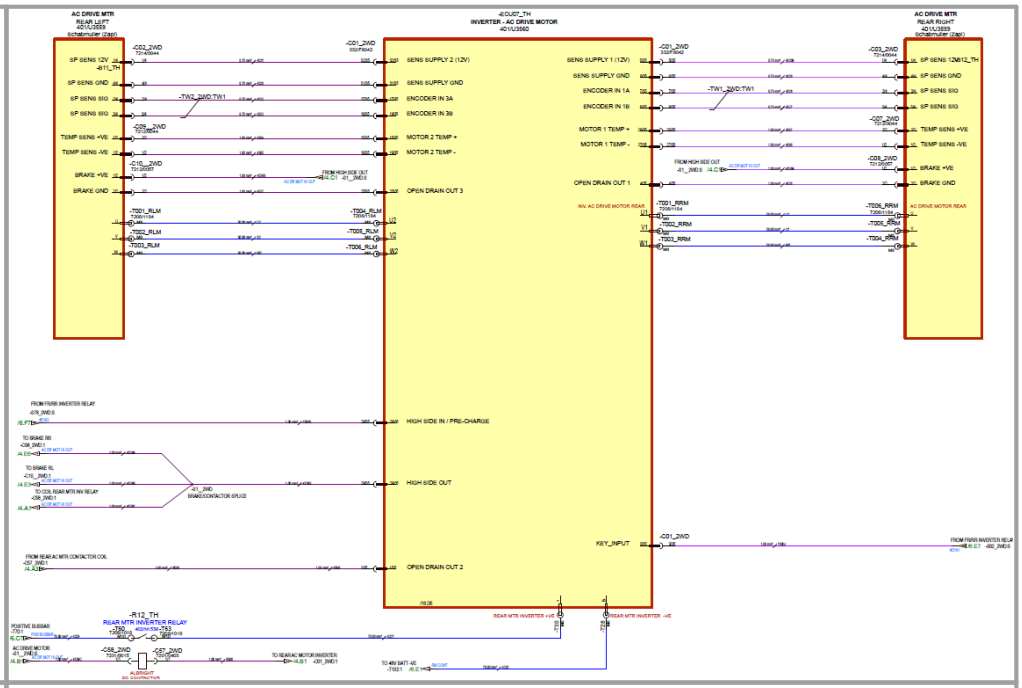
Internal

Electrical

Schematic:



Testing:

Check Input Voltage

Expected Values:

AC Drive Motor	
Motor Voltage	32V AC
Motor Current	87A
Speed	3230 RPM
Ingress Protection	IP 54
Supply Voltage	48V DC

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Related Fault Codes:

Fault Code	Description
B1514 - 13 947	Rear inverter / Rear left brake / Rear motor inverter relay.
B1515 - 13 949	Rear left brake fault.
B1517 - 13 950	Rear AC Motor inverter / Rear left AC Drive motor temperature.
B1518 - 13 951	Rear left motor / Inverter temperature high.
B1519 - 13 952	Rear left motor temperature low.
B1522 - 13 953	Rear left motor inverter at 85^C.
B1523 - 13 954	Rear left motor Inverter temperature low.
B1524 - 13 954	Rear left motor speed above normal.
B1525 - 13 955	Rear left AC Motor sensor supply out of range.
B1528 - 13 957	Rear left motor battery voltage spike.
B1530 - 13 959	Rear left motor - Speed encoder feedback sensor fail.
B1533 - 13 961	Rear left motor speed high (Above 6,500rpm).
B1537 - 13 963	Rear left motor current draw mismatch.
B1570 - 13 969	Rear Left Wheel Abnormal Deceleration Detected
B1571 - 13 970	Rear Left Motor Invalid or out of range speed signal
B1640 - 13 1014	Rear AC Motor Inverter / Rear Right AC Drive Motor Temp.
B1642 - 13 1015	Rear AC Motor Inverter Internal Temp Sensor
B1643 - 13 1015	Rear Right Motor
B1644 - 13 1016	Rear Right Motor
B1645 - 13 1016	Rear Right Motor Inverter registering low voltage
B1646 - 13 1017	Rear Right Motor Inverter at 85 Deg C
B1647 - 13 1017	Rear Right Motor / Inverter Temp Low
B1648 - 13 1018	Rear Right Motor / Inverter Temp High

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	B1649 - 13 1019	Rear Right Motor Temperature Low
	B1650 - 13 1019	Rear Right Wheel Abnormal Deceleration Detected
	B1651 - 13 1020	Rear Right Motor Invalid or out of range speed signal
	B1652 - 13 1021	Rear Right AC Motor Sensor Supply out of range
	B1653 - 13 1021	Rear Right Motor - Speed Encoder Feedback Sensor Fail
	B1655 - 13 1023	Rear Right Motor exceeding temperature limit (165 Celsius)
	B1660 - 13 1026	Rear Right Motor Speed High
	B1664 - 13 1028	Rear Right Motor Current Draw Mismatch

5.9 Traction Motor Front Drive

Traction Motor Front Drive

HV Component 460 > Traction Motor Front Drive

Component:	Traction Motor Front Drive
Function:	•Traction motor is a type of electric motor that is specifically designed for providing propulsion or generate the driving of the machine

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	•It delivers torque to drive the wheels or axles of the vehicle, providing the necessary traction to power the vehicle's movement.
Location:	The traction motors are mounted onto the chassis wheel motor plates.Mounted to the other side is the Torque Hub.

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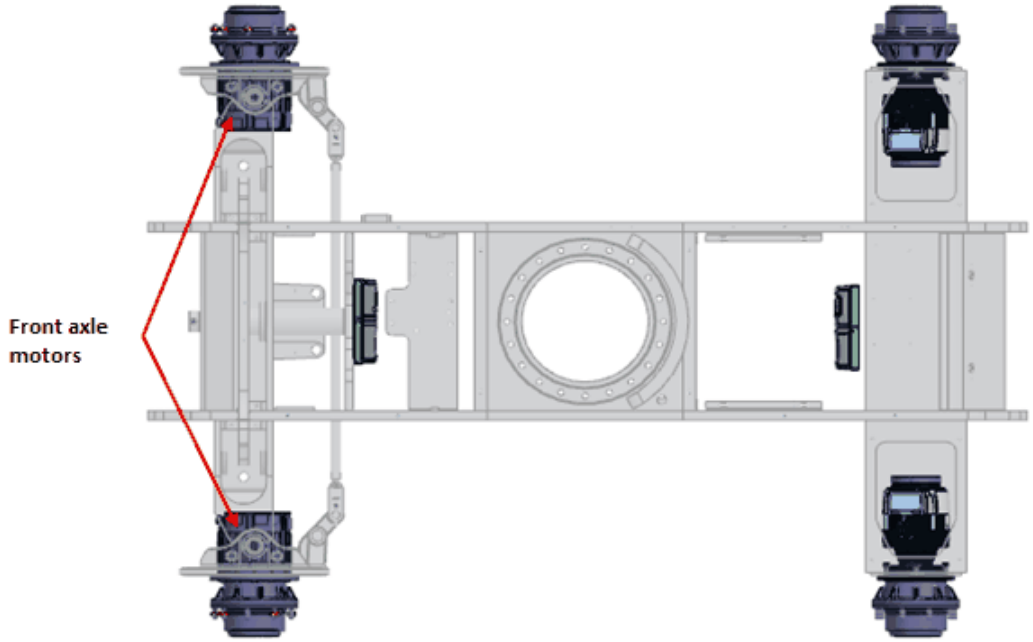
Location **Image:**	

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Signal:	

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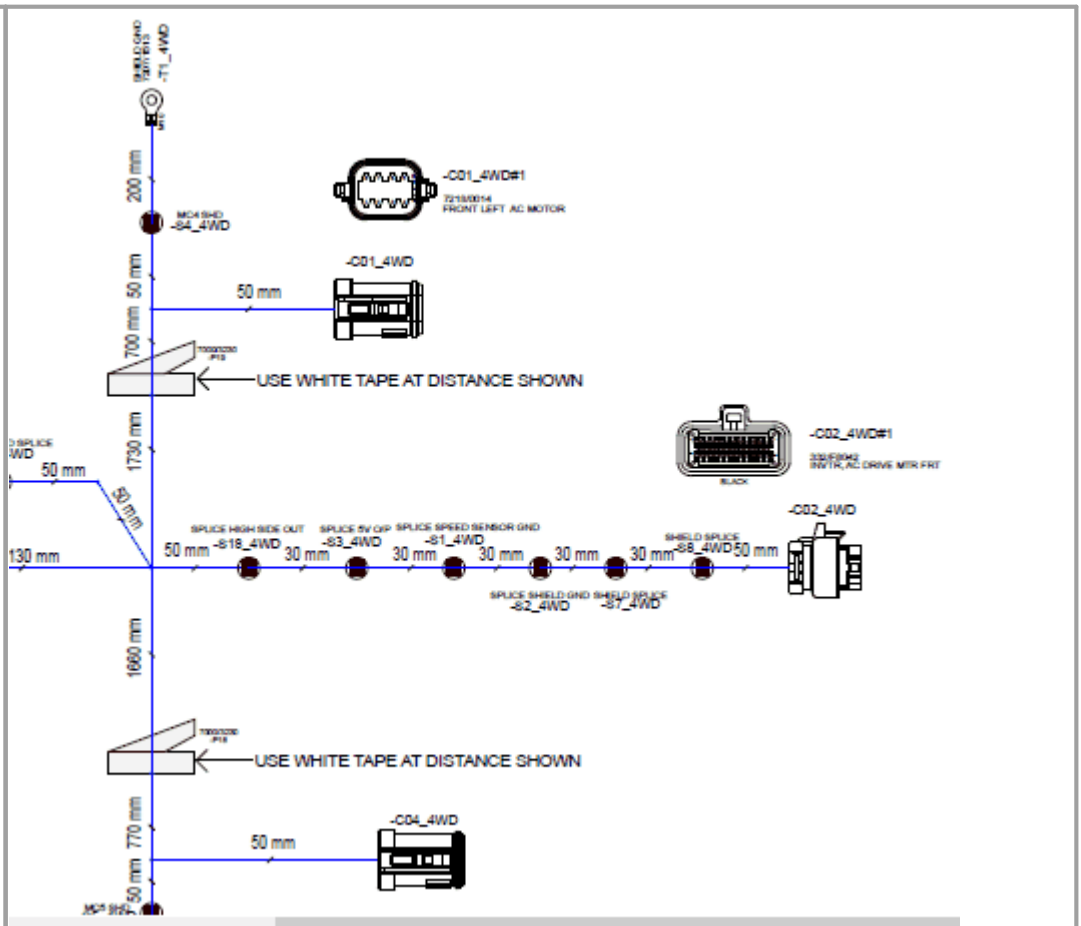
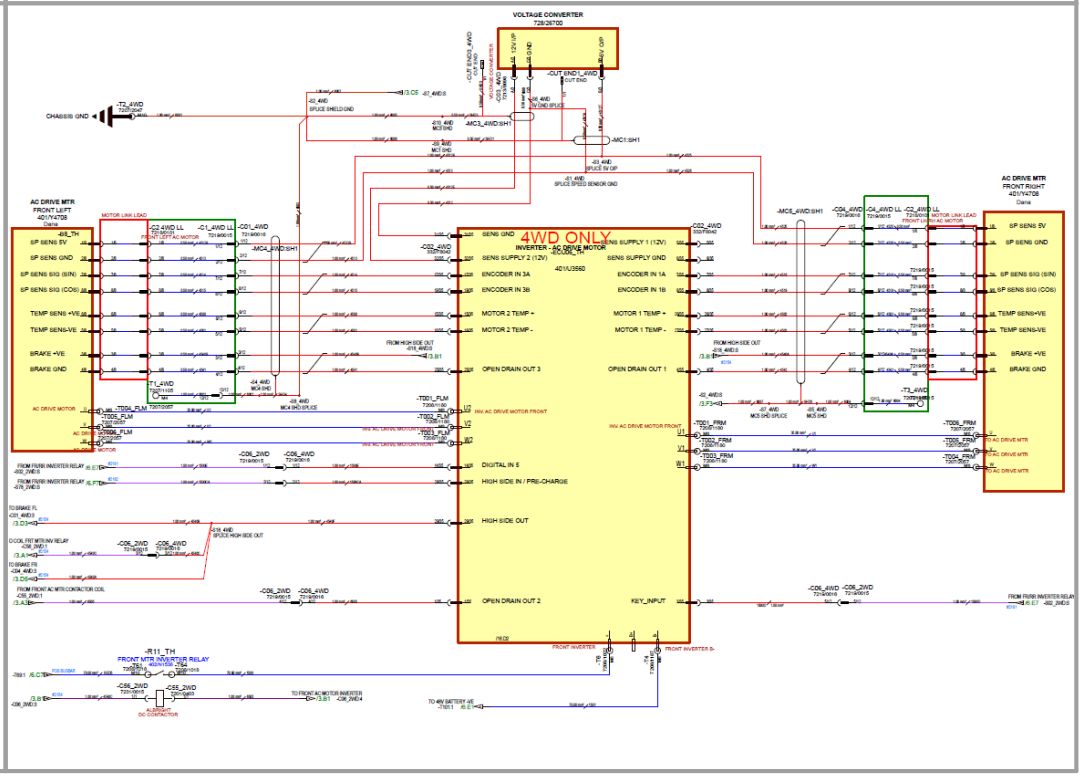
Wires & Connectors:



Internal Electrical Schematic:



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Testing: Check Input Voltage

Expected Values:

Motor Type	IPM
Speed	6750 RPM Max.
No. of Poles	8
IP Class	IP67
Speed Sensor	SIN/COS Encoder (4 Per Revolution)
Temperature Sensor	PT1000

Related Fault Codes:

Fault Code	Description
B1516 - 13 949	Front left motor exceeding temperature limit (165^C).
B1578 - 13 974	Front AC Motor inverter / Front right AC Drive motor temperature.
B1580 - 13 976	Front right motor speed above normal.
B1581 - 13 976	Front right motor battery voltage spike.
B1582 - 13 977	Front right motor inverter registering low voltage.
B1583 - 13 977	Front right motor inverter at 85^C.
B1584 - 13 978	Front right motor / Inverter temperature low.
B1585 - 13 978	Front right motor / Inverter temperature high.
B1586 - 13 979	Front right motor temperature low.
B1587 - 13 980	Front right wheel abnormal deceleration detected.
B1588 - 13 980	Front right motor invalid or out of range speed signal.

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B1589 - 13 981	Front right AC Motor sensor supply out of range.
B1590 - 13 982	Front Right Motor - Speed Encoder Feedback Sensor Fail
B1592 - 13 984	Front Right Motor exceeding temperature limit (165 Celsius)
B1597 - 13 987	Front Right Motor Speed High
B1601 - 13 989	Front Right Motor Current Draw Mismatch
B1608 - 13 994	Front Left Brake Fault
B1609 - 13 994	Front AC Motor Inverter / Front Left AC Drive Motor Temp.
B1611 - 13 996	Front Left Motor
B1612 - 13 997	Front Left Motor
B1613 - 13 997	Front Left Motor Inverter registering low voltage
B1614 - 13 998	Front Left Motor Inverter at 85 Deg C
B1615 - 13 998	Front Left Motor / Inverter Temp Low
B1616 - 13 999	Front Left Motor / Inverter Temp High
B1617 - 13 1000	Front Left Motor Temperature Low
B1618 - 13 1000	Front Left Wheel Abnormal Deceleration Detected
B1620 - 13 1002	Front Left AC Motor Sensor Supply out of range
B1621 - 13 1003	Front Left Motor - Speed Encoder Feedback Sensor Fail
B1628 - 13 1007	Front Left Motor Speed High
B1632 - 13 1009	Front Left Motor Current Draw Mismatch

5.10 Pump Invertor

Pump Invertor

HV Component 460 > Pump Invertor

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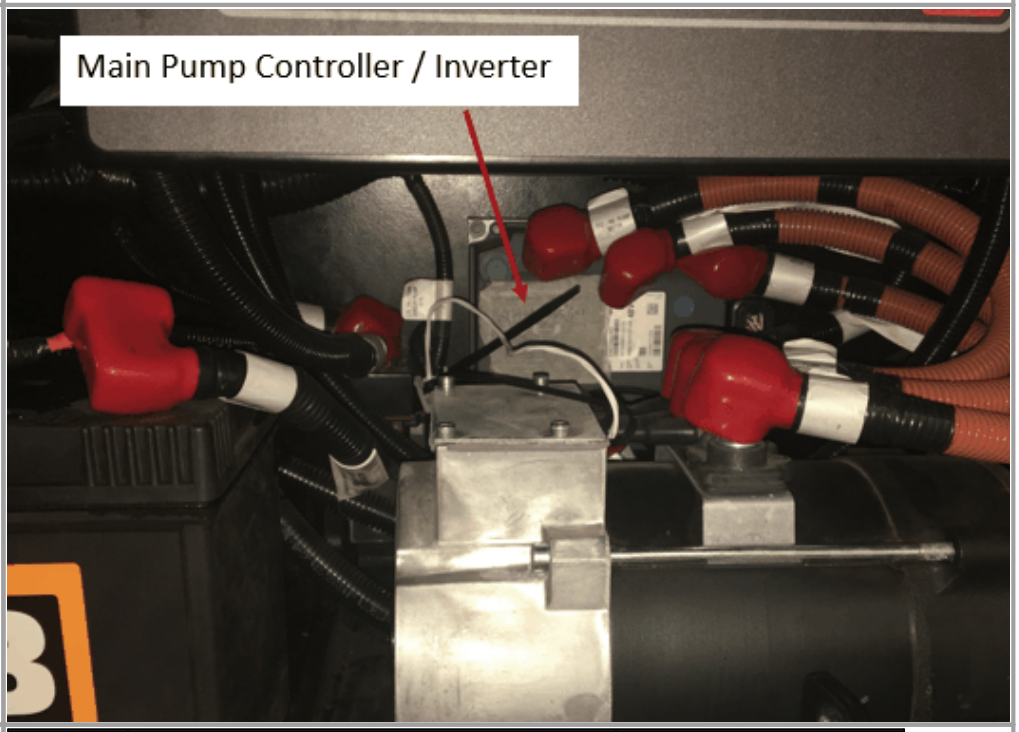
Component :	Pump Invertor
Function:	Inventor is converting DC supply to AC supply to run the AC motor and controlling the Motors.
Location:	On Turntable near 12V Battery, LHS canopy
Location Image:	

Signal:

Number	Description/ Signal	Wire Number
1	KEY INPUT	1500G
2	OPEN DRAIN OUT 1	6507
3	SENS SUPPLY 12V	4529
4	SENS SUPPLY GND	4530
5	ENCODER IN 1A	4531

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6	ENCODER IN 1B	4532
7	CAN GND	CAN S3
8	NOT USED	NOT USED
9	NOT USED	NOT USED
10	OPEN DRAIN OUT 2	
11	ENCODER IN 1C	
12	ID PIN 1	
13	ID GND	
14	CAN LOW	CAN L3
15	NOT USED	NOT USED
16	MOTOR TEMP +ve	4509
17	MOTOR TEMP - ve	4510
18	HIGH SIDE IN / PRE-CHARGE	1500F
19	HIGH SIDE OUT	4545
20	ID PIN 2	
21	ID GND	
22	CAN HIGH	CAN H3
23	NOT USED	NOT USED

TERMIAL NAME	DESCRIPTION
B +	TERMINAL FOR ON-BOARD FUSE (OPTIONAL) . THERE IS NO CONNECTION TO INTERNAL CIRCUITARY FROM THIS TERMINAL
+	POSITIVE SUPPLY TO THE POWER STAGE . WHEN EXTERNAL FUSE IS USED CONNECTION IS MADE DIRECTLY TO THIS TERMINAL
B-	BATTERY NEGATIVE TERMINAL
U , V , W	MOTOR U , V , W - PHASE TERMINAL

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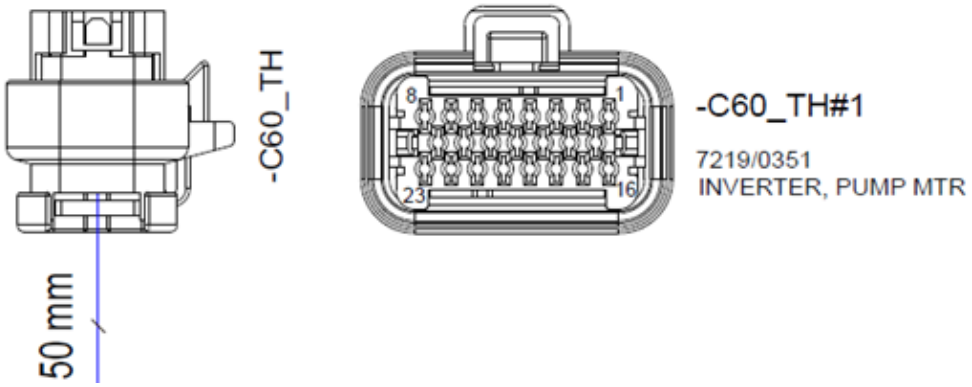
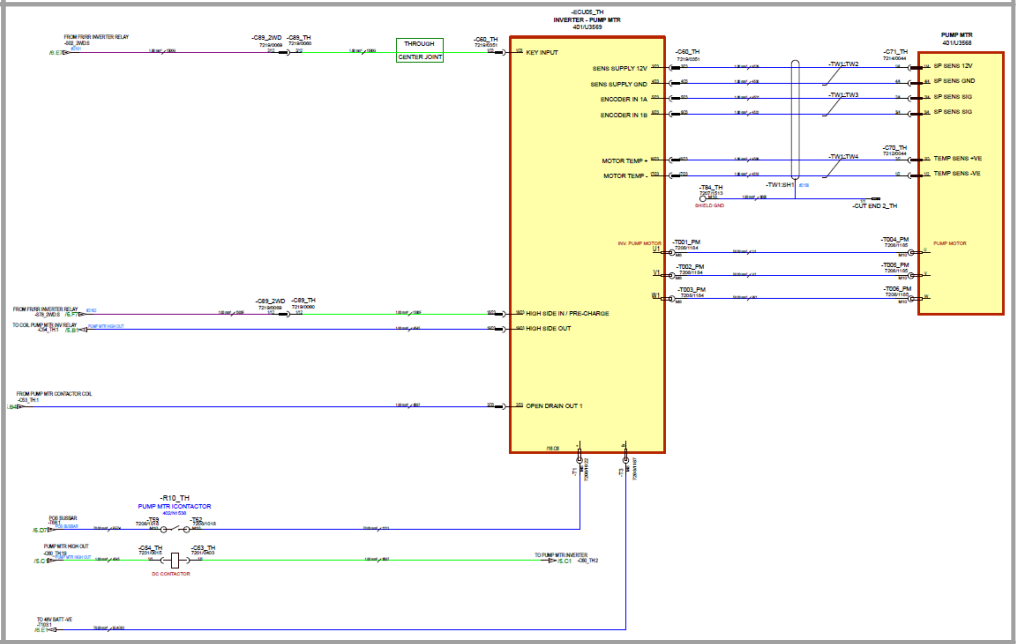
Wires & Connectors :	
Internal Electrical Schematic:	
Testing:	N/A
Expected Values:	See Signal

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Related Fault Codes:	Fault Code	Description
	B1487 - 13 930	Pump inverter / Pump motor inverter relay.
	B1490 - 13 932	Pump inverter / Pump motor temperature.
	B1493 - 13 935	Pump inverter exceeding temperature limit (110^C).
	B1499 - 13 938	Pump inverter reading 67v DC supply.
	B1504 - 13 941	Pump inverter internal power supply out of range error.
	B1507 - 13 943	Pump inverter power stage fault.
	B1508 - 13 944	Pump inverter incorrect parameter / Software setup
	B1509 - 13 944	Pump inverter internal circuit short detected.
	B1511 - 13 945	Pump inverter Precharge fail.
	B1513 - 13 947	Pump inverter CAN Timeout error.
	B1574 - 13 972	Pump Inverter Safety Fault Active

5.11 Front Traction Invertor

Front Traction Invertor

HV Component 460 > Front Traction Invertor

Component :	Front Traction Invertor

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Function:	Inventor is converting DC supply to AC supply to run the AC motor and controlling the Motors.
Location:	On Chassis near axle

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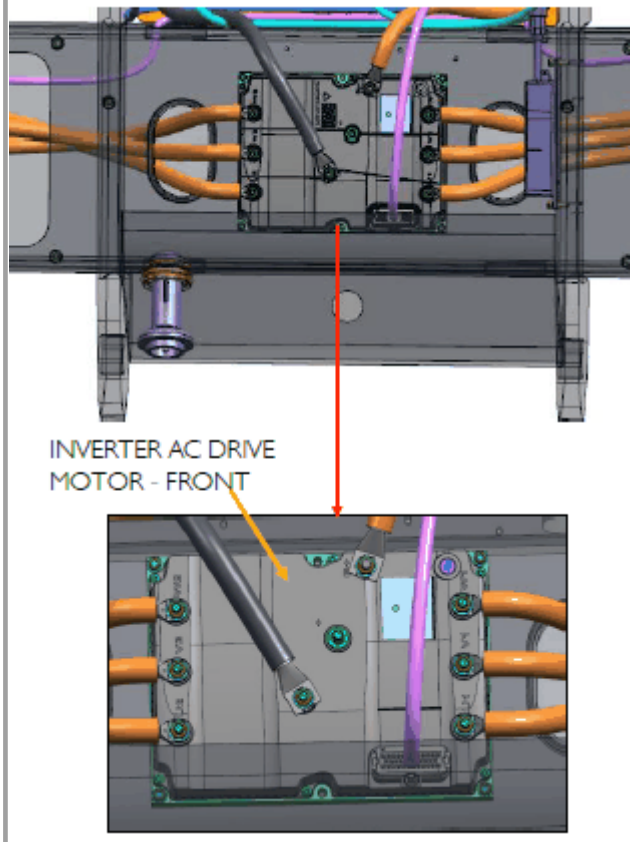
Location **Image:**	

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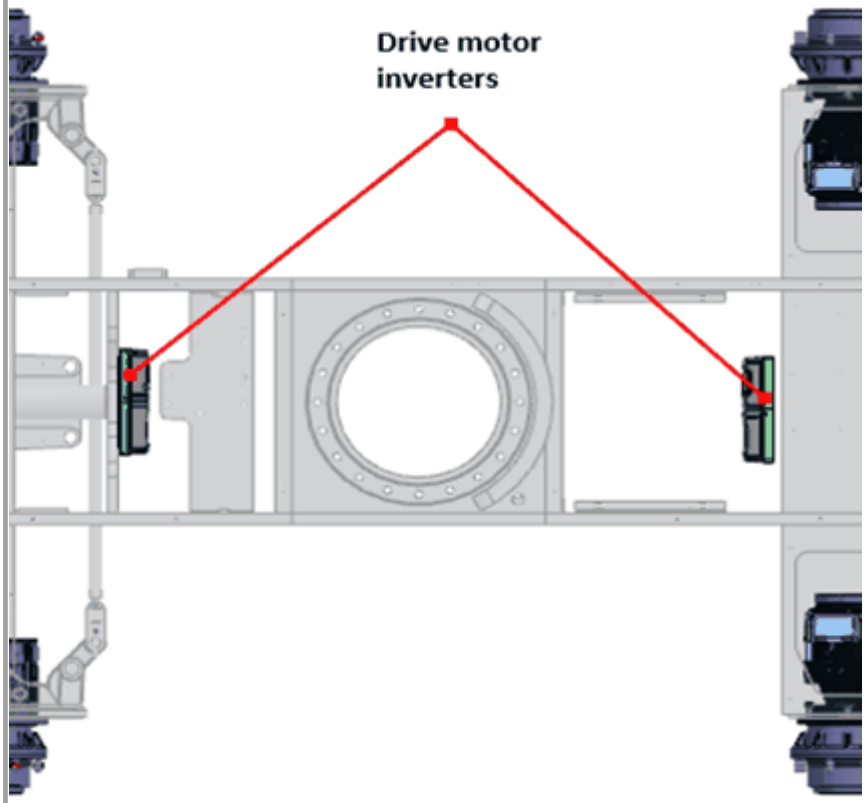

Signal:

Pin Number	Description	Wire Number	S
1	OPEN DRAIN OUT 2	6505	
2	NOT IN USE		
3	KEY_INPUT	1500D	
4	OPEN DRAIN OUT 1	4542	
5	SENS SUPPLY 1 (12V)	N/A	
6	SENS SUPPLY GND	N/A	
7	ENCODER IN 1A	4518	
8	ENCODER IN 1B	4519	
9	ENCODER IN 2A / 1C	N/A	
10	NOT IN USE		
11	NOT IN USE		
12	NOT IN USE		
13	NOT IN USE		
14	DIGITAL IN 5	1500E	
15	MOTOR 2 TEMP +	4500	
16	MOTOR 2 TEMP -	4501	
17	ENCODER IN 3A	4514	

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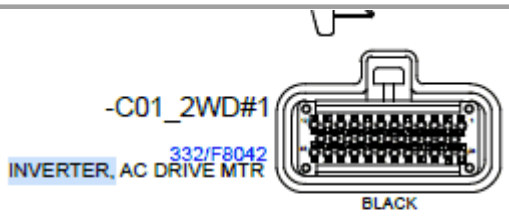
18	NOT IN USE		
19	ENCODER IN 3B	4515	
20	ENCODER IN 2B	N/A	
21	NOT IN USE		
22	NOT IN USE		
23	NOT IN USE		
24	OPEN DRAIN OUT 4	N/A	
25	OPEN DRAIN OUT 3	4541	
26	MOTOR 1 TEMP +	4502	
27	MOTOR 1 TEMP -	4503	
28	HIGH SIDE IN / PRE-CHARGE	1500CA	
29	HIGH SIDE OUT	4540F	
30	ENCODER IN 4A / 3C	N/A	
31	SENS SUPPLY GND	4512	
32	SENS SUPPLY 2 (12V)	4512E	
33	NOT IN USE		
34	NOT IN USE		
35	NOT IN USE		

TERMINAL NAME	DESCRIPTION
B+	TERMINAL FOR ON-BOARD FUSE (OPTIONAL). THERE IS NO CONNECTION TO INTERNAL CIRCUITRY FROM THIS TERMINAL
+	POSITIVE SUPPLY TO THE POWER STAGE. (WHEN EXTERNAL FUSE IS USED CONNECTION IS MADE DIRECTLY TO THIS TERMINAL
B-	BATTERY NEGATIVE TERMINAL
U1, V1, W1	MOTOR U, V, W - PHASE TERMINAL
U2, V2, W2	MOTOR U, V, W - PHASE TERMINAL

Wires & Connectors



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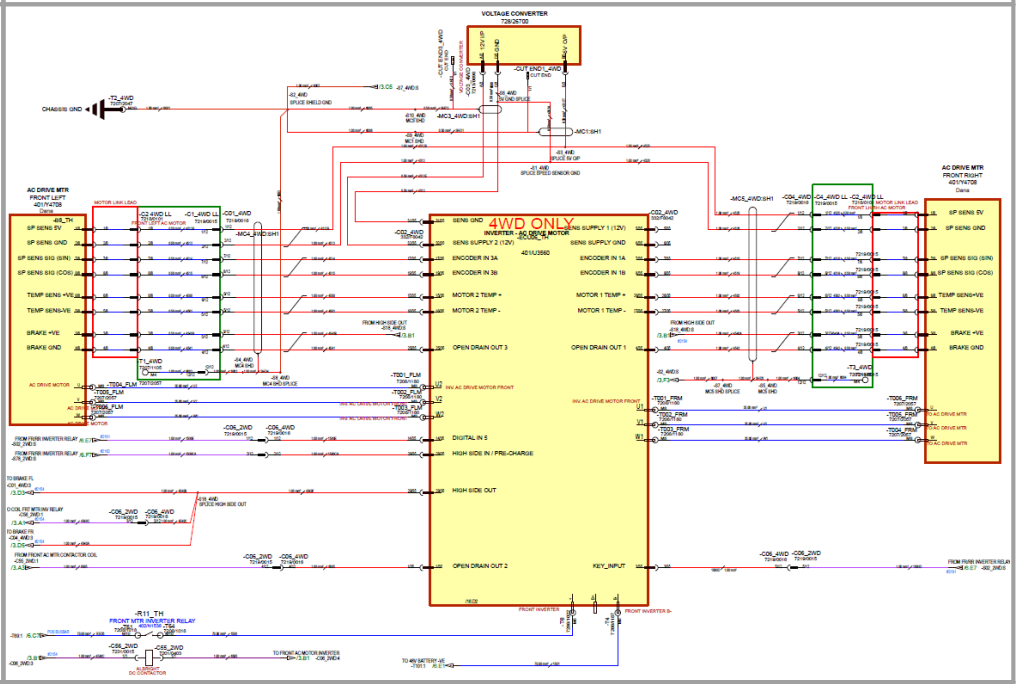
:	
Internal **Electrical** **Schematic:**	
Testing:	1. Check 48 Volt on B+ve and B -ve Inverter Terminal. 2. Check 48 volt in Pin 3 on Inverter 35 pin Connector C01_CH 3. Check 12 volt in Pin 32 on Inverter 35 pin Connector C01_CH 4. Check 48 volt in Pin 14 on Inverter 35 pin Connector C01_CH
Expected **Values:**	See Signal

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Related Fault Codes:

Fault Code	Description
B1500 - 13 939	Front inverter reading 36v DC.
B1575 - 13 972	Front inverter / Front right brake / Front motor inverter relay.
B1591 - 13 983	Front inverter internal power supply out of range error.
B1593 - 13 984	Front Inverter exceeding temperature limit (110 Celsius)
B1595 - 13 985	Front Inverter Reading 67 V DC supply
B1596 - 13 986	Front Inverter Reading 36 V DC
B1598 - 13 987	Front Inverter Power stage Fault
B1599 - 13 988	Front Inverter Incorrect Parameter / Software Setup
B1600 - 13 988	Front Inverter Internal Short Circuit Detected
B1602 - 13 989	Front Inverter Precharge Fail
B1604 - 13 990	Front Inverter CAN Timeout Error
B1605 - 13 991	Front Inverter 2WD/4WD Config Missing
B1606 - 13 992	Front Inverter Safety Fault Active
B1607 - 13 992	Front Inverter / Front Left Brake / Front Motor Inverter Relay
B1622 - 13 1004	Front inverter internal power supply out of range error.
B1624 - 13 1004	Front Inverter exceeding temperature limit (110 Celsius)
B1626 - 13 1005	Front Inverter Reading 67 V DC supply
B1627 - 13 1006	Front Inverter Reading 36 V DC
B1629 - 13 1007	Front Inverter Power stage Fault
B1630 - 13 1008	Front Inverter Incorrect Parameter / Software Setup
B1631 - 13 1008	Front Inverter Internal Short Circuit Detected
B1633 - 13 1009	Front Inverter Precharge Fail
B1635 - 13 1010	Front Inverter CAN Timeout Error

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	B1637 - 13 1011 Front Inverter 2WD/4WD Config Missing

5.12 Rear Traction Invertor

Rear Traction Invertor

HV Component 460 > Rear Traction Invertor

Component :	Rear Traction Invertor
Function:	Inventor is converting DC supply to AC supply to run the AC motor and controlling the Motors.
Location:	On Chassis Near axle

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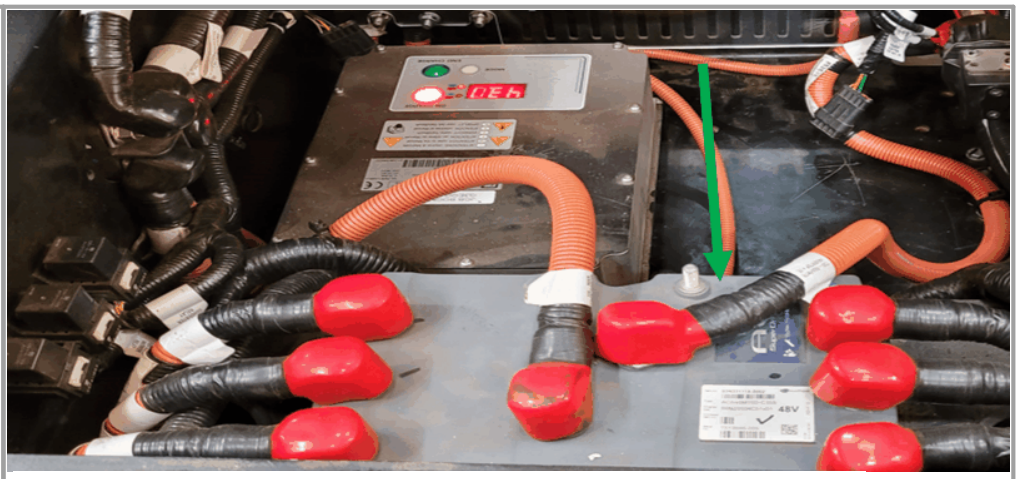
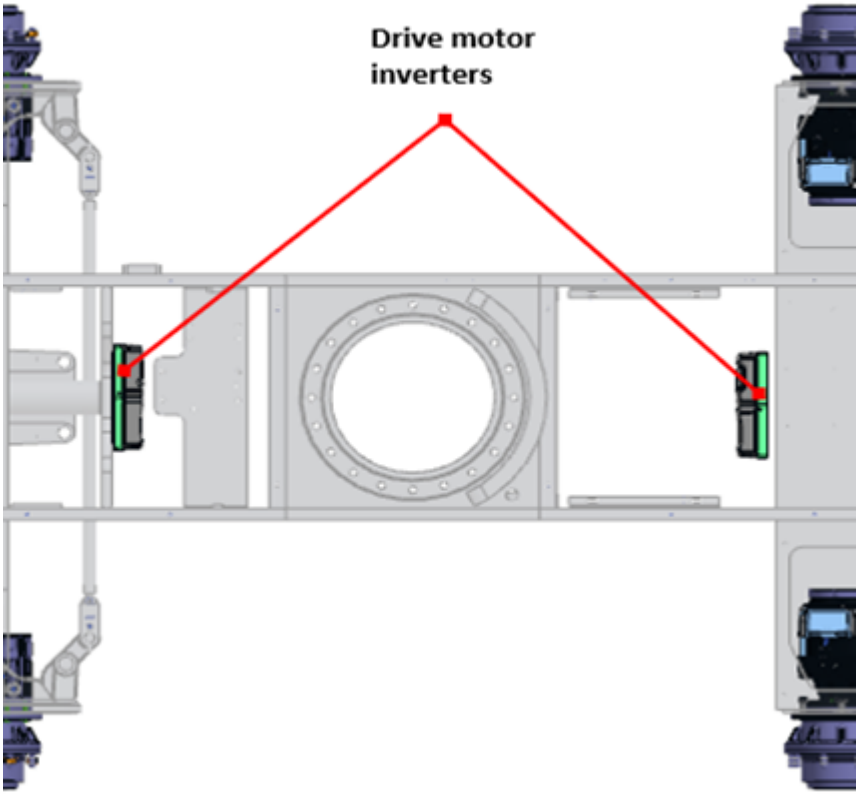
Location

Image:





Signal:

Pin Number	Description	Wire Number	S
1	OPEN DRAIN OUT 2	6506	
2	DIGITAL IN 3	N/A	
3	KEY_INPUT	1500J	
4	OPEN DRAIN OUT 1	4538	
5	SENS SUPPLY 1 (12V)	4520B	
6	SENS SUPPLY GND	4528	

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7	ENCODER IN 1A	4526	
8	ENCODER IN 1B	4527	
9	ENCODER IN 2A / 1C	N/A	
10	NOT IN USE		
11	NOT IN USE		
12	DIGITAL IN 1	N/A	
13	DIGITAL IN 6	N/A	
14	DIGITAL IN 5	N/A	
15	MOTOR 2 TEMP +	4504	
16	MOTOR 2 TEMP -	4505	
17	ENCODER IN 3A	4522	
18	DIGITAL IN 4B	N/A	
19	ENCODER IN 3B	4523	
20	ENCODER IN 2B	N/A	
21	NOT IN USE		
22	NOT IN USE		
23	DIGITAL IN 2	N/A	
24	NOT IN USE		
25	OPEN DRAIN OUT 3	4537	
26	MOTOR 1 TEMP +	4507	
27	MOTOR 1 TEMP -	4508	
28	HIGH SIDE IN / PRE-CHARGE	1500K	
29	HIGH SIDE OUT	4536E	
30	ENCODER IN 4A / 3C	N/A	
31	SENS SUPPLY GND	4520	
32	SENS SUPPLY 2 (12V)	4521	
33	NOT IN USE		
34	NOT IN USE		
35	NOT IN USE		

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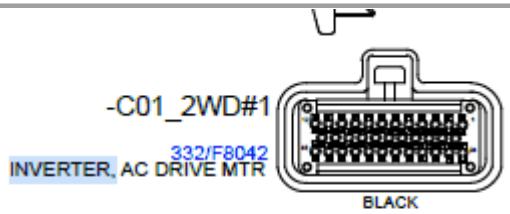
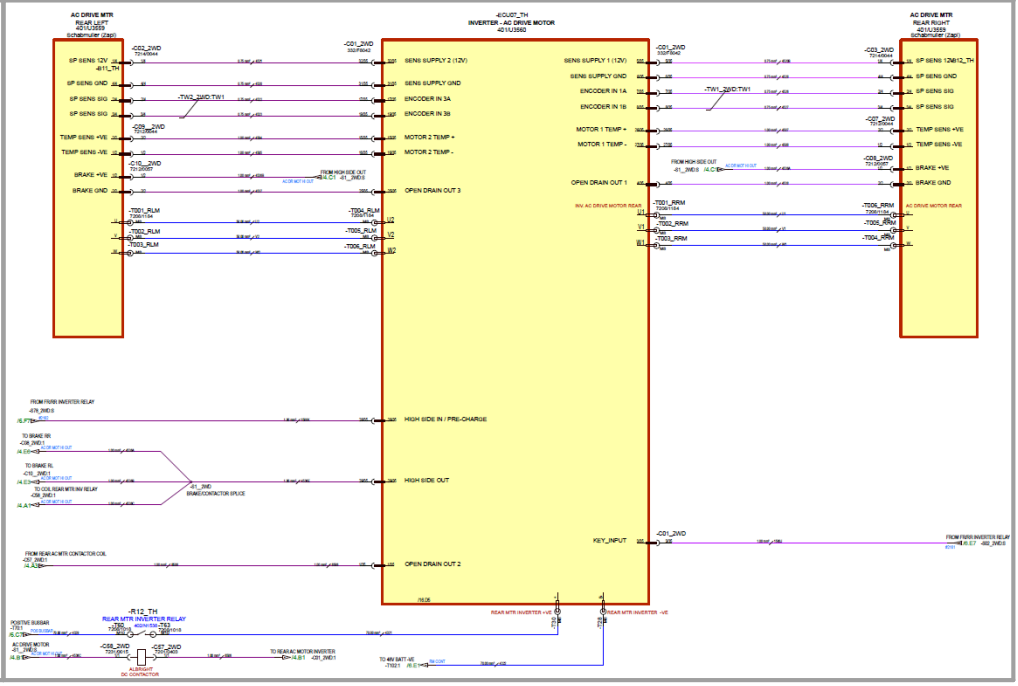
TERMINAL NAME	DESCRIPTION
B+	TERMINAL FOR ON-BOARD FUSE (OPTIONAL). THERE IS NO CONNECTION TO INTERNAL CIRCUITRY FROM THIS TERMINAL
+	POSITIVE SUPPLY TO THE POWER STAGE. (WHEN EXTERNAL FUSE IS USED CONNECTION IS MADE DIRECTLY TO THIS TERMINAL
B-	BATTERY NEGATIVE TERMINAL
U1, V1, W1	MOTOR U, V, W - PHASE TERMINAL
U2, V2, W2	MOTOR U, V, W - PHASE TERMINAL

Wires & Connectors :



Internal Electrical Schematic:



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Testing:	1. Check 48 Volt on B+ve and B -ve Inverter Terminal. 2. Check 48 volt in Pin 3 on Inverter 35 pin Connector C01_CH 3. Check 12 volt in Pin 32 on Inverter 35 pin Connector C01_CH 4. Check 48 volt in Pin 14 on Inverter 35 pin Connector C01_CH
Expected Values:	See Signal

Related Fault Codes:

Fault Code	Description
B1514 - 13 947	Rear inverter / Rear left brake / Rear motor inverter relay.
B1520 - 13 952	Rear inverter exceeding temperature limit (110^C).
B1526 - 17 956	Rear inverter reading 67v DC Supply.
B1527 - 13 957	Rear inverter reading 36v DC.
B1531 - 13 960	Rear inverter internal power supply out of range error.
B1534 - 13 962	Rear inverter power stage fault.
B1535 - 13 962	Rear inverter incorrect parameter / Software setup.
B1536 - 13 963	Rear inverter internal circuit short detected.
B1538 - 13 964	Rear inverter Precharge fail.
B1540 - 13 965	Rear inverter CAN Timeout error.
B1572 - 13 971	Rear inverter 2WD / 4WD Configuration missing.
B1573 - 13 971	Rear Inverter Safety Fault Active
B1638 - 13 1012	Rear Inverter / Rear Right Brake / Rear Motor Inverter Relay
B1654 - 13 1022	Rear inverter internal power supply out of range error.

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B1656 - 13 1023	Rear Inverter exceeding temperature limit (110 Celsius)
B1658 - 13 1025	Rear Inverter Reading 67 V DC supply
B1659 - 13 1025	Rear Inverter Reading 36 V DC
B1661 - 13 1026	Rear Inverter Power stage Fault
B1662 - 13 1027	Rear Inverter Incorrect Parameter / Software Setup
B1663 - 13 1027	Rear Inverter Internal Short Circuit Detected
B1665 - 13 1029	Rear Inverter Precharge Fail
B1667 - 13 1030	Rear Inverter CAN Timeout Error
B1668 - 13 1031	Rear Inverter 2WD/4WD Config Missing
B1669 - 13 1031	Rear Inverter Safety Fault Active

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Machine Fault Codes

6 Machine Fault Codes

Machine Fault Codes

List of Machine Fault Codes 518

Sr No.	Description
1	DTC Error Code 519
2	General Sensor Fault Table 1089

Troubleshooting and Repair Work shall be completed by a person trained and qualified on the repair of this machine
Immediately tag and remove from service a damaged or malfunctioning machine. Repair any machine damage or malfunction before operating the machine.
Unless otherwise specified, perform each procedure with the machine in the following configuration:
Machine parked on a level surface
Key switch should be off position with the key removed
The E -Stop button should be off position at both the Base and Platform controls
Wheels should be locked
AC power supply disconnected from the machine
Boom in the stowed position
Turntable rotation should be lock
All external hand tool disconnected from the machine

Before Start work on machine:
Read, understand the SOP and Operating Procedure in the appropriate operator's and Service manual on your machine.
Be sure that all necessary tools and test equipment are available and ready for use.
Read each appropriate fault code thoroughly.
Be aware of the following hazards and follow generally accepted safe workshop practices.

Electric and burn hazard - 1. Contact with electrically charged circuits could result in death or serious injury.
2. Remove all Metal wearing like rings, watches and other jewelry.

Note: Two persons will be required to safely perform some troubleshooting procedures.

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6.1 DTC ERROR CODE

DTC Error Code

Machine Fault Codes 518 > DTC Error Code

DTC Error Codes

NOTE - Please Refer Engine Helpfile for Engine 'P' & 'U' Error Codes

List of DTC Error Code 551

Fault Code	Fault Description
B1001-17 540	E-stop turntable button - Signal plausibility failure
B1005-24 542	Controls enable switch turntable enable function - Circuit short to high (10v)
B1006-16 544	Controls enable switch platform enable function - Circuit short to high (10v)
B1007-16 545	Controls enable switch both functions - Signal plausibility failure (10v)
B1008-16 546	Controls enable switch turntable enable function - Circuit short to low
B1009-16 548	Controls enable switch platform enable function - Circuit short to low
B1010-13 549	Controls enable switch both functions - Signal plausibility failure (Circuit open)
B1011-17 551	Artic Boom Lower Limit Switch 1 Short Circuit to High
B1012-17 552	Artic Boom Lower Limit Switch 2 Short Circuit to High
B1013-16 553	Artic Boom Lower Limit Switch 1 Short
B1014-13 555	Artic Boom Lower Limit Switch 1 AND Switch 2 Open Circuit
B1015-16 556	Artic Boom Lower Limit Switch 2 Short Circuit to Low
B1016-92 557	Artic Boom Lower Limit Switch 1 AND Switch 2 short to 10V
B1017-17 559	TILT Sensor SC to High (not possible to detect until sensor connected to 10V)
B1018-16 561	Tilt Sensor short circuit to low

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B1019-17 563	Slew position switch 1 - Circuit short to high (12v)
B1020-17 564	Slew position switch 2 - Circuit short to high (12v)
B1021-16 566	Slew position switch 1 - Circuit short to low
B1022-13 567	Slew position switch - Signal plausibility failure (Circuit open)
B1023-16 568	Slew position switch 2 - Circuit short to low
B1024-92 570	Slew position switch - Signal plausibility failure (12v)
B1025-13 571	Crush protection position switch - Signal plausibility failure
B1026-17 572	Crush protection position switch 1 - Circuit short to high (5v)
B1027-16 574	Crush protection position switch 1 - Circuit short to low
B1028-16 575	Crush protection position switch 2 - Circuit short to low
B1029-17 576	Crush protection position switch 2 - Circuit short to high (10v)
B1036-17 577	Public proportional output solenoid short circuit to high (>10.5V)
B1037-16 578	Public proportional output solenoid short circuit to low
B1038-13 579	PUBLIC Proportional Solenoid Valve High Side & Low Side Open Circuit
B1039-17 580	PLATFORM LEVELING DIRECTIONAL Solenoid Valve Raise High Side Short Circuit to High OR Open Circuit
B1040-16 581	DIRECTIONAL Solenoid Valve Raise High Side Short Circuit to Low
B1041-17 582	PLATFORM LEVELING DIRECTIONAL Solenoid Valve Lower High Side Short Circuit to High OR Open Circuit
B1042-16 583	PLATFORM LEVELING DIRECTIONAL Solenoid Valve Lower High Side Short Circuit to Low
B1043-17 584	Oscillating axle solenoid high side - Circuit short to high (12v)
B1044-16 585	Oscillating axle solenoid high side - Circuit short to low
B1045-13 586	Oscillating axle solenoid high - Circuit open
B1050-17 587	Engine start / stop turntable button - Circuit short to high (10v)
B1051-16 588	Engine start / stop turntable button - Circuit short to low
B1052-24 589	Engine start / stop turntable button - Signal stuck high

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B1053-17 590	Foot pedal - Circuit short to high (12v)
B1054-16 591	Foot pedal - Circuit short to low
B1055-17 593	AUX / Overload override button pressed condition - Circuit short to high (10v)
B1056-16 594	AUX / Overload override button pressed condition - Circuit short to low
B1058-17 595	Override switch pressed short circuit to high
B1059-16 596	Override switch pressed state - Circuit short to low
B1060-13 597	Override switch - Signal plausibility failure (Circuit open)
B1061-17 597	Override switch unpressed short circuit to high
B1062-16 598	Override switch unpressed state - Circuit short to low
B1063-92 599	Override switch - Signal plausibility failure (12v)
B1064-17 600	Slew acknowledgment button - Circuit short to high (10v)
B1065-16 602	Slew acknowledgment button - Circuit short to low
B1066-24 604	Slew acknowledgment button - Signal stuck high
B1067-17 605	Potentiometer - Circuit short to high (5.5v)
B1069-17 606	Drive joystick - Circuit short to high (5v)
B1070-16 607	Drive joystick - Circuit open or short to low
B1071-17 609	Platform level turntable switch raise function - Circuit short to high (10v)
B1072-17 610	Platform level turntable switch lower function - Circuit short to high (10v)
B1073-92 612	Platform level turntable switch both functions - Signal plausibility failure (10v)
B1074-16 613	Platform level turntable switch raise function - Circuit short to low
B1075-16 615	Platform level turntable switch lower function - Circuit short to low
B1076-17 616	Main boom solenoid high side both functions - Circuit short to high (12v)
B1077-16 618	Main boom solenoid high side both functions - Circuit short to low
B1078-13 619	Main boom solenoid high side both functions - Circuit open

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B1079-17 621	Main boom solenoid both functions - Valve fault
B1080-17 622	Slew solenoid high side both functions - Circuit short to high (12v)
B1081-16 624	Slew solenoid high side both functions - Circuit short to low
B1082-13 625	Slew solenoid high side both functions - Circuit open
B1083-17 627	Slew solenoid both functions - Valve fault.
B1084-17 628	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve High Side Short Circuit to High OR Short Circuit
B1085-92 630	Low battery voltage warning
B1086-13 630	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve High Side & Low Side Open Circuit
B1087-17 632	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve Fault
B1088-17 633	Steer solenoid high side both functions - Circuit short to high (12v)
B1089-16 635	Steer solenoid high side both functions - Circuit short to low
B1090-13 636	Steer solenoid high side and low side both functions - Circuit open
B1091-17 638	Steer solenoid both functions - Valve fault
B1092-17 639	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve High Side Short Circuit to High
B1093-16 641	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve High Side Short Circuit to Low
B1094-13 642	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve High Side & Low Side Open Circuit
B1095-92 644	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve Fault
B1096-17 645	ARTICULATED BOOM RAISE Switch Short Circuit to High
B1097-17 647	ARTICULATED BOOM LOWER Switch Short Circuit to High
B1098-92 648	ARTICULATED BOOM RAISE & LOWER Switches both activated (5 - 10V)
B1099-16 650	ARTICULATED BOOM RAISE Switch Short Circuit to Low
B1100-16 651	ARTICULATED BOOM LOWER Switch Short Circuit to Low
B1101-17 652	MAIN BOOM EXTEND Switch Short Circuit to High
B1102-17 654	MAIN BOOM RETRACT Switch Short Circuit to High

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B1103-92 656	MAIN BOOM EXTEND & RETRACT Switches both activated (5 - 10V)
B1104-16 657	MAIN BOOM EXTEND Switch Short Circuit to Low
B1105-16 659	MAIN BOOM RETRACT Switch Short Circuit to Low
B1106-17 660	Platform rotate turntable switch right function - Circuit short to high (10v)
B1107-17 662	Platform rotate turntable switch left function - Circuit short to high (10v)
B1108-92 663	Platform rotate turntable switch both functions - Signal plausibility failure (10v)
B1109-16 665	Platform rotate turntable switch right function - Circuit short to low
B1110-16 666	Platform rotate turntable switch left function - Circuit short to low
B1111-17 668	Jib boom turntable switch raise function - Circuit short to high (10v)
B1112-17 669	Jib boom turntable switch lower function - Circuit short to high (10v)
B1113-92 671	Jib boom turntable switch both functions - Signal plausibility failure (10v)
B1114-16 672	Jib boom turntable switch raise function - Circuit short to low
B1115-16 674	Jib boom turntable switch lower function - Circuit short to low
B1116-17 675	Main boom turntable switch raise function - Circuit short to high (10v)
B1117-17 677	Main boom turntable switch lower function - Circuit short to high (10v)
B1118-92 678	Main boom turntable switch both functions - Signal plausibility failure (10v)
B1119-16 680	Main boom turntable switch raise function - Circuit short to low
B1120-16 681	Main boom turntable switch lower function - Circuit short to low
B1121-17 683	Slew turntable switch right function - Circuit short to high (10v)
B1122-17 685	Slew turntable switch left function - Circuit short to high (10v)
B1123-92 686	Slew turntable switch both functions - Circuit short to high (10v)
B1124-16 688	Slew turntable switch right function - Circuit short to low
B1125-16 689	Slew turntable switch left function - Circuit short to low
B1126-17 691	Main boom position switch 1 - Circuit short to high (10v)

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B1127-17 692	Main boom position switch 2 - Circuit short to high (10v)
B1128-16 693	Main boom position switch 1 - Circuit short to low
B1129-13 695	Main boom position switch - Signal plausibility failure (Circuit open)
B1130-16 696	Main boom position switch 2 - Circuit short to low
B1131-2F 698	Main boom position switch - Signal plausibility failure (10v)
B1133-17 699	JIB/PLATFORM FLOW High Side Solenoid Short Circuit to High
B1134-14 700	JIB/PLATFORM FLOW High Side Solenoid Short Circuit to Low
B1135-13 702	Beacon 2 - Circuit open or short to high (12v)
B1136-16 703	Beacon 2 - Circuit short to low
B1138-17 705	Main boom telescopic retract limit switch 1 short circuit to high
B1139-17 706	Main boom telescopic retract limit switch 2 short circuit to high
B1140-16 707	Main boom telescopic retract limit switch 1 short circuit to low
B1141-13 708	Main boom telescopic retract limit switch 1 and 2 are both open circuit
B1142-16 710	Main boom telescopic retract limit switch 2 short circuit to Low
B1143-92 711	Main boom telescopic retract limit switch 1 and 2 Short to 10V
B1144-17 712	10v Feed turntable system - Circuit short to high (>10v)
B1145-16 714	10v Feed turntable system - Circuit short to low
B1146-17 715	Steer joystick - Circuit short to high (5v)
B1147-16 716	Steer joystick - Circuit open or short to low
B1148-17 718	Main boom joystick - Circuit short to high (5v)
B1149-16 719	Main boom joystick - Circuit open or short to low
B1150-17 720	Slew joystick - Circuit short to high (5v)
B1151-16 721	Slew joystick - Circuit open or short to low
B1167-13 723	Platform rotate solenoid left function - Circuit open or short to high (12v)

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B1168-16 724	Platform rotate solenoid left function - Circuit short to low
B1169-13 725	Platform rotate solenoid right function - Circuit open or short to high (12v)
B1170-16 727	Platform rotate solenoid right function - Circuit short to low
B1171-13 728	Jib boom solenoid raise function - Circuit open or short to high (12v)
B1172-16 729	Jib boom solenoid raise function - Circuit short to low
B1173-13 731	Jib boom solenoid lower function - Circuit open or short to high (12v)
B1174-16 732	Jib boom solenoid lower function - Circuit open or short to low
B1175-13 733	BOOM LIFT/SLEW DIRECTIONAL Solenoid Valve Short Circuit to High or Open Circuit
B1176-16 735	MAIN BOOM LIFT/SLEW DIRECTIONAL Solenoid Valve Short Circuit to Low
B1177-16 737	Buzzer turntable - Circuit short to low
B1178-13 738	Buzzer turntable - Circuit open or short to high (12v)
B1179-13 739	Beacon 1 - Circuit open or short to high (12v)
B1180-16 741	Beacon 1 - Circuit short to low
B1181-16 742	Horn relay - Circuit short to low
B1182-13 743	Horn relay - Circuit open
B1183-16 745	White noise alarm - Circuit short to low
B1184-13 746	White noise alarm - Circuit open or short to high (12v)
B1190-16 747	Fault LED - Circuit short to low
B1191-17 748	Fault LED - Circuit short to high (12v)
B1198-16 749	Slew acknowledgment LED - Circuit short to low
B1199-17 751	Slew acknowledgment LED - Circuit short to high (12v)
B1206-17 752	Horn turntable button - Circuit short to high (10v)
B1207-16 753	Horn turntable button - Circuit short to low
B1208-24 754	Horn turntable button - Signal stuck high

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B1215-17 756	Hydraulic generator button - Circuit short to high (10v)
B1216-16 757	Hydraulic generator button - Circuit short to low
B1217-24 758	Hydraulic generator button - signal stuck high
B1221-17 759	Overload sensor 1 - Out of range (High)
B1222-16 761	Overload sensor 1 - Circuit open or out of range (Low)
B1223-17 763	Overload sensor 2 - Out of range (High)
B1224-16 765	Overload sensor 2 - Circuit open or out of range (Low)
B1225-2F 767	Overload sensor - Signal erratic
B1227-17 769	Oscillating axle lock pressure sensor - Circuit short to high (12v)
B1228-16 770	Oscillating axle lock pressure sensor - Circuit open or short to low
B1232-17 772	Fuel level - Signal above allowable range
B1233-16 773	Fuel level - Signal below allowable range
B1235-17 774	E-stop platform button - Signal plausibility failure
B1236-2F 775	Oscillating axle lock pressure sensor - Failure
B1238-2F 777	Oscillating axle lock pressure sensor - Output is less than 1v when it should be greater than 1v
B1239-17 778	Engine start / stop platform button - Circuit short to high (10v)
B1240-16 779	Engine start / stop platform button - Circuit short to low
B1241-24 780	Engine start / stop platform button - signal stuck high
B1242-17 781	Platform level platform switch raise function - Circuit short to high (10v)
B1243-17 783	Platform level platform switch lower function - Circuit short to high (10v)
B1244-92 784	Platform level platform switch both functions - Signal plausibility failure (10v)
B1245-16 785	Platform level platform switch raise function - Circuit short to low
B1246-16 786	Platform level platform switch lower function - Circuit short to low
B1247-17 787	ARTICULATED BOOM RAISE Switch Short Circuit to High

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B1248-17 788	ARTICULATED BOOM LOWER Switch Short Circuit to High
B1249-92 790	ARTICULATED BOOM RAISE & LOWER Switches both activated (5 - 10V)
B1250-16 791	ARTICULATED BOOM RAISE Switch Short Circuit to Low
B1251-16 792	ARTICULATED BOOM LOWER Switch Short Circuit to Low
B1252-17 793	Telescope - Platform Rotate Switch Extend Short Circuit to High.
B1253-17 794	Telescope - Platform Rotate Switch Retract Short Circuit to High.
B1254-92 795	Telescope - Platform Rotate Switch Extend & Retract Both Activated (5 - 10v).
B1255-16 796	Telescope - Platform Rotate Switch Extend Switch Short Circuit to Low.
B1256-16 798	Telescope - Platform Rotate Switch Retract Switch Short Circuit to Low.
B1257-17 799	Platform rotate platform switch right function - Circuit short to high (10v)
B1258-17 800	Platform rotate platform switch left function - Circuit short to high (10v)
B1259-92 801	Platform rotate platform switch both functions - Signal plausibility failure (10v)
B1260-16 802	Platform rotate platform switch right function - Circuit short to low
B1261-16 803	Platform rotate platform switch left function - Circuit short to low
B1262-17 804	Jib boom platform switch raise function - Circuit short to high (10v)
B1263-17 805	Jib boom platform switch lower function - Circuit short to high (10v)
B1264-92 807	Jib boom platform switch both functions - Signal plausibility failure (10v)
B1265-16 808	Jib boom platform switch raise function - Circuit short to low
B1266-16 809	Jib boom platform switch lower function - Circuit short to low
B1267-17 810	10v Feed platform system - Circuit short to high (>10v)
B1268-16 811	10v Feed platform system - Circuit short to low
B1269-16 813	Buzzer platform - Circuit short to low
B1270-17 814	Buzzer platform - Circuit open or short to high (12v)
B1272-2F 815	Oscillating axle lock pressure sensor - Output is greater than 1v when it should be less than 1v

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B1273-17 817	Horn platform button - Circuit short to high (10v)
B1274-16 818	Horn platform button - Circuit short to low
B1275-24 819	Horn platform button - Signal stuck high
B1276-24 820	Startlock failure - Turntable ECU Power supply less than 8.5v
B1277-24 821	Startlock failure - Platform ECU Power supply less than 8.5v
B1281-16 822	Startlock failure - VSS2 Low Voltage less than 9.5v
B1282-13 824	Water in fuel OC during engine startup: (Transition from GND to OC is expected within 2 secs of engine ignition ON)
B1283-16 825	Startlock failure - VSS1 Low Voltage less then 4.5v
B1284-16 826	Startlock failure - VSS2 Low Voltage less than 9.5v
B1285-16 827	Startlock failure - VSS3 Low Voltage less than 4.5v
B1286-16 828	Water in fuel Short to Ground
B1287-2F 829	Fuel level - Erratic signal
B1288-2F 830	OSCILLATING AXLE PRESSURE SENSOR SOFTWARE Failure
B1301-2F 832	Oscillating axle lock pressure sensor - Failure
B1302-2F 833	CAN RC CONFIG - Signal plausibility failure
B1303-2F 834	CAN RC CONFIG - Signal plausibility failure
B1304-24 835	Startlock failure - Turntable ECU Internal 5v voltage supply (VSS_1) circuit short to low
B1305-24 836	Startlock failure - Turntable ECU Internal 10v voltage supply (VSS_2) circuit short to low
B1306-24 837	Startlock failure - Turntable ECU Internal 5v voltage supply (VSS_3) circuit short to low
B1307-24 838	Startlock failure - Turntable ECU Internal hardware monitor 1 fault
B1308-24 839	Startlock failure - Turntable ECU Proportional outputs circuit short to high (12v)
B1309-24 840	Startlock failure - Turntable ECU Switch outputs circuit short to high (12v)
B1310-24 842	Startlock failure - Controls enable switch input enabled during startup
B1311-24 843	Startlock failure - Turntable ECU Internal hardware monitor 2 fault

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B1312-24 843	Startlock failure - Turntable ECU 10v input enabled during startup
B1313-24 844	Startlock failure - Platform ECU Internal 5v voltage supply (VSS_1) circuit short to low
B1314-24 845	Startlock failure - Platform ECU Internal 10v voltage supply (VSS_2) circuit short to low
B1315-24 846	Startlock failure - Platform ECU Internal 5v voltage supply (VSS_3) circuit short to low
B1316-24 847	Startlock failure - Platform ECU Internal hardware monitor 1 fault
B1317-24 848	Startlock failure - Platform ECU Proportional outputs circuit short to high
B1318-24 850	Startlock failure - Platform ECU Switch outputs circuit short to high
B1319-24 852	Startlock failure - Foot pedal input enabled during startup
B1320-24 854	Startlock failure - Platform ECU Internal hardware monitor 2 fault
B1321-24 856	Startlock failure - Platform ECU 10v input enabled during startup
B1329-13 857	Jib boom / Platform rotate flow solenoid - Circuit open or short to high (12v)
B1330-16 859	Jib boom / Platform rotate flow solenoid - Circuit short to low
B1332-17 860	PUBLIC Proportional Solenoid Valve Low Side Short Circuit to High
B1333-16 862	PUBLIC Proportional Solenoid Valve Low Side Short Circuit to Low
B1334-13 863	PUBLIC Proportional Solenoid Valve Fault
B1335-17 865	Main boom solenoid low side both functions - Circuit short to high (12v)
B1336-16 866	Main boom solenoid low side both functions - Circuit short to low
B1337-13 868	Main boom solenoid low side both functions - Circuit open
B1338-17 869	Slew solenoid low side both functions - Circuit short to high (12v)
B1339-16 871	Slew solenoid low side both functions - Circuit short to low
B1340-13 872	Slew solenoid low side both functions - Circuit open
B1341-17 873	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve Low Side Short Circuit to High
B1342-16 875	TEND OR RETRACT DIRECTIONAL Solenoid Valve Low Side Short Circuit to Low
B1344-17 877	Steer solenoid low side both functions - Circuit short to high (12v)

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B1345-16 878	Steer solenoid low side both functions - Circuit short to low
B1347-17 880	Oscillating axle solenoid low side - Circuit short to high (12v)
B1348-16 881	Oscillating axle solenoid low side - Circuit short to low
B1349-13 882	Oscillating axle solenoid - Valve fault
B1350-17 884	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve Low Side Short Circuit to High
B1351-16 885	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve Low Side Short Circuit to Low
B1353-16 887	Engine ignition - Circuit short to low
B1354-13 888	Engine ignition - Circuit open or short to high (12v)
B1355-16 889	Hydraulic Generator - Solenoid - Circuit short to low
B1356-13 890	Hydraulic Generator - Solenoid high side - Circuit open or short to high (12v)
B1357-16 891	Engine crank signal - Circuit short to low
B1358-13 892	Engine crank signal - Circuit open or short to high (12v)
B1364-13 893	Charger Over Current
B1365-17 894	Overload Sensor 1 - Out of range (High)
B1366-16 896	Overload sensor 1 - Circuit open or out of range (Low)
B1367-17 898	Overload sensor 2 - Out of range (High)
B1368-16 900	Overload sensor 2 - Circuit open or out of range (Low)
B1370-13 902	LOGIC FAILURE #2
B1374-13 904	WRONG INPUT MAINS
B1377-13 905	NO MAINS
B1389-13 907	Steer solenoid both functions - Circuit open
B1393-17 909	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL High Side Short Circuit to high
B1394-16 909	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL High Side Short Circuit to low
B1395-13 910	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL High Side Open Circuit

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B1396-17 911	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL Low Side Short Circuit to high
B1397-16 912	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL Low Side Short Circuit to low
B1398-13 912	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL Low Side Open Circuit
B1401-13 913	Jib boom / Platform rotate solenoid - Circuit open
B1404-13 915	Jib boom / Platform rotate solenoid low side - Circuit open
B1414-17 916	AUX Pump output - Circuit open or circuit short to high (12v)
B1415-16 917	AUX Pump output - Circuit short to low
B1417-13 918	Steer solenoid both functions - Valve fault
B1418-13 920	PLATFORM LEVEL RAISE\LOWER Solenoid both Function - Valve Failure
B1419-13 920	Jib boom / Platform rotate selection solenoid - Valve fault
B1420-13 921	Jib boom / Platform rotate solenoid - Valve fault
B1437-17 922	Jib boom / Platform rotate solenoid raise / right functions - Circuit open or short to high (12v)
B1438-16 923	Jib boom / Platform rotate solenoid raise / right functions - Circuit short to low
B1439-13 924	Jib boom / Platform rotate solenoid lower / left functions - Circuit short to low
B1440-17 925	Jib boom / Platform rotate selection solenoid - Circuit short to high (12v)
B1441-16 926	Jib boom / Platform rotate selection solenoid - Circuit short to low
B1442-13 927	Jib boom / Platform rotate selection solenoid - Circuit open
B1464-17 928	Steer Angle Sensor Output SC to High (5v or greater)
B1480-13 929	Electric Subsystem Ignition SC OC
B1487-13 930	Pump inverter / Pump motor inverter relay.
B1488-13 931	Pump AC Motor contactor coil.
B1489-13 932	Pump motor exceeding temperature limit (165^C).
B1490-13 932	Pump inverter / Pump motor temperature.
B1491-13 933	Pump motor / Inverter temperature high.

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B1492-13 934	Pump motor temperature low.
B1493-13 935	Pump inverter exceeding temperature limit (110^C).
B1494-13 935	Pump AC Motor inverter internal temperature sensor.
B1495-13 936	Pump motor inverter at 85^C.
B1496-13 936	Pump motor / Inverter temperature low.
B1497-13 937	Pump motor speed above normal.
B1498-13 937	Pump motor sensor supply out of range.
B1499-13 938	Pump inverter reading 67v DC supply.
B1500-13 939	Front inverter reading 36v DC.
B1501-13 939	WARNING ONLY !! Battery voltage spike above 65v.
B1502-13 940	Pump motor inverter registering low voltage.
B1503-13 940	Pump motor speed encoder feedback sensor failure.
B1504-13 941	Pump inverter internal power supply out of range error.
B1505-13 942	AC Drive current above limit (350Amps).
B1506-13 943	Pump motor speed high (Above 6,500rpm).
B1507-13 943	Pump inverter power stage fault.
B1508-13 944	Pump inverter incorrect parameter / Software setup
B1509-13 944	Pump inverter internal circuit short detected.
B1510-13 945	Pump motor current draw mismatch.
B1511-13 945	Pump inverter Precharge fail.
B1512-13 946	System restart required.
B1513-13 947	Pump inverter CAN Timeout error.
B1514-13 947	Rear inverter / Rear left brake / Rear motor inverter relay.
B1515-13 949	Rear left brake fault.

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B1516-13 949	Front left motor exceeding temperature limit (165^C).
B1517-13 950	Rear AC Motor inverter / Rear left AC Drive motor temperature.
B1518-13 951	Rear left motor / Inverter temperature high.
B1519-13 952	Rear left motor temperature low.
B1520-13 952	Rear inverter exceeding temperature limit (110^C).
B1521-13 953	Rear AC Motor inverter internal temperature sensor.
B1522-13 953	Rear left motor inverter at 85^C.
B1523-13 954	Rear left motor Inverter temperature low.
B1524-13 954	Rear left motor speed above normal.
B1525-13 955	Rear left AC Motor sensor supply out of range.
B1526-17 956	Rear inverter reading 67v DC Supply.
B1527-13 957	Rear inverter reading 36v DC.
B1528-13 957	Rear left motor battery voltage spike.
B1529-13 958	Rear left motor inverter registering low voltage.
B1530-13 959	Rear left motor - Speed encoder feedback sensor fail.
B1531-13 960	Rear inverter internal power supply out of range error.
B1532-13 960	AC Drive current above limit (350Amps).
B1533-13 961	Rear left motor speed high (Above 6,500rpm).
B1534-13 962	Rear inverter power stage fault.
B1535-13 962	Rear inverter incorrect parameter / Software setup.
B1536-13 963	Rear inverter internal circuit short detected.
B1537-13 963	Rear left motor current draw mismatch.
B1538-13 964	Rear inverter Precharge fail.
B1539-13 964	System restart required.

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B1540-13 965	Rear inverter CAN Timeout error.
B1541-13 966	Weight Sensor - No Calibration data available for Load Cell
B1556-17 968	Steer Angle Sensor Output SC to High (5v or greater)
B1570-13 969	Rear Left Wheel Abnormal Deceleration Detected
B1571-13 970	Rear Left Motor Invalid or out of range speed signal
B1572-13 971	Rear inverter 2WD / 4WD Configuration missing.
B1573-13 971	Rear Inverter Safety Fault Active
B1574-13 972	Pump Inverter Safety Fault Active
B1575-13 972	Front inverter / Front right brake / Front motor inverter relay.
B1576-13 974	Front right brake fault / AC Motor contactor coil.
B1578-13 974	Front AC Motor inverter / Front right AC Drive motor temperature.
B1579-13 975	Front AC Motor inverter internal temperature sensor.
B1580-13 976	Front right motor speed above normal.
B1581-13 976	Front right motor battery voltage spike.
B1582-13 977	Front right motor inverter registering low voltage.
B1583-13 977	Front right motor inverter at 85^C.
B1584-13 978	Front right motor / Inverter temperature low.
B1585-13 978	Front right motor / Inverter temperature high.
B1586-13 979	Front right motor temperature low.
B1587-13 980	Front right wheel abnormal deceleration detected.
B1588-13 980	Front right motor invalid or out of range speed signal.
B1589-13 981	Front right AC Motor sensor supply out of range.
B1590-13 982	Front Right Motor - Speed Encoder Feedback Sensor Fail
B1591-13 983	Front inverter internal power supply out of range error.

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B1592-13 984	Front Right Motor exceeding temperature limit (165 Celsius)
B1593-13 984	Front Inverter exceeding temperature limit (110 Celsius)
B1594-13 985	AC Drive Current Above Limit (350 Amperes)
B1595-13 985	Front Inverter Reading 67 V DC supply
B1596-13 986	Front Inverter Reading 36 V DC
B1597-13 987	Front Right Motor Speed High
B1598-13 987	Front Inverter Power stage Fault
B1599-13 988	Front Inverter Incorrect Parameter / Software Setup
B1600-13 988	Front Inverter Internal Short Circuit Detected
B1601-13 989	Front Right Motor Current Draw Mismatch
B1602-13 989	Front Inverter Precharge Fail
B1603-13 990	System Restart Required
B1604-13 990	Front Inverter CAN Timeout Error
B1605-13 991	Front Inverter 2WD/4WD Config Missing
B1606-13 992	Front Inverter Safety Fault Active
B1607-13 992	Front Inverter / Front Left Brake / Front Motor Inverter Relay
B1608-13 994	Front Left Brake Fault
B1609-13 994	Front AC Motor Inverter / Front Left AC Drive Motor Temp.
B1610-13 995	Front AC Motor Inverter Internal Temp Sensor
B1611-13 996	Front Left Motor
B1612-13 997	Front Left Motor
B1613-13 997	Front Left Motor Inverter registering low voltage
B1614-13 998	Front Left Motor Inverter at 85 Deg C
B1615-13 998	Front Left Motor / Inverter Temp Low

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B1616-13 999	Front Left Motor / Inverter Temp High
B1617-13 1000	Front Left Motor Temperature Low
B1618-13 1000	Front Left Wheel Abnormal Deceleration Detected
B1619-13 1001	Front Left Motor Invalid or out of range speed signal
B1620-13 1002	Front Left AC Motor Sensor Supply out of range
B1621-13 1003	Front Left Motor - Speed Encoder Feedback Sensor Fail
B1622-13 1004	Front inverter internal power supply out of range error.
B1624-13 1004	Front Inverter exceeding temperature limit (110 Celsius)
B1625-13 1005	AC Drive Current Above Limit (350 Amperes)
B1626-13 1005	Front Inverter Reading 67 V DC supply
B1627-13 1006	Front Inverter Reading 36 V DC
B1628-13 1007	Front Left Motor Speed High
B1629-13 1007	Front Inverter Power stage Fault
B1630-13 1008	Front Inverter Incorrect Parameter / Software Setup
B1631-13 1008	Front Inverter Internal Short Circuit Detected
B1632-13 1009	Front Left Motor Current Draw Mismatch
B1633-13 1009	Front Inverter Precharge Fail
B1634-13 1010	System Restart Required
B1635-13 1010	Front Inverter CAN Timeout Error
B1637-13 1011	Front Inverter 2WD/4WD Config Missing
B1638-13 1012	Rear Inverter / Rear Right Brake / Rear Motor Inverter Relay
B1639-13 1013	Rear Right Brake Fault / AC Motor Contactor Coil
B1640-13 1014	Rear AC Motor Inverter / Rear Right AC Drive Motor Temp.
B1642-13 1015	Rear AC Motor Inverter Internal Temp Sensor

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B1643-13 1015	Rear Right Motor
B1644-13 1016	Rear Right Motor
B1645-13 1016	Rear Right Motor Inverter registering low voltage
B1646-13 1017	Rear Right Motor Inverter at 85 Deg C
B1647-13 1017	Rear Right Motor / Inverter Temp Low
B1648-13 1018	Rear Right Motor / Inverter Temp High
B1649-13 1019	Rear Right Motor Temperature Low
B1650-13 1019	Rear Right Wheel Abnormal Deceleration Detected
B1651-13 1020	Rear Right Motor Invalid or out of range speed signal
B1652-13 1021	Rear Right AC Motor Sensor Supply out of range
B1653-13 1021	Rear Right Motor - Speed Encoder Feedback Sensor Fail
B1654-13 1022	Rear inverter internal power supply out of range error.
B1655-13 1023	Rear Right Motor exceeding temperature limit (165 Celsius)
B1656-13 1023	Rear Inverter exceeding temperature limit (110 Celsius)
B1657-13 1024	Drive Current Above Limit (350 Amperes)
B1658-13 1025	Rear Inverter Reading 67 V DC supply
B1659-13 1025	Rear Inverter Reading 36 V DC
B1660-13 1026	Rear Right Motor Speed High
B1661-13 1026	Rear Inverter Power stage Fault
B1662-13 1027	Rear Inverter Incorrect Parameter / Software Setup
B1663-13 1027	Rear Inverter Internal Short Circuit Detected
B1664-13 1028	Rear Right Motor Current Draw Mismatch
B1665-13 1029	Rear Inverter Precharge Fail
B1666-13 1029	System Restart Required

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B1667-13 1030	Rear Inverter CAN Timeout Error
B1668-13 1031	Rear Inverter 2WD/4WD Config Missing
B1669-13 1031	Rear Inverter Safety Fault Active
B1670-17 1032	Jib boom / Platform rotate solenoid lower / left functions - Circuit open or short to high (12v)
B1671-17 1033	GLOW PLUG HS SC to High or OC
B1673-17 1034	LOW OIL PRESSURE Switch SC to >5V
B1675-17 1035	Overload sensor 1 - Circuit open or out of range (High)
B1676-16 1037	Overload sensor 1 - Out of range (Low)
B1677-17 1039	Overload sensor 2 - Circuit open or out of range (High)
B1678-16 1041	Overload sensor 2 - Out of range (Low)
B1679-17 1043	COOLANT TEMP SENSOR OOR High or LOW
B1680-16 1043	2ND CHARGER MISSING
B1681-13 1044	Unexpected Alternator input fault Short to low (When engine is started / Engine running)
B1682-13 1045	Unexpected low oil pressure input Short to Low / GND (When engine is started / Engine running)
B1694-17 1046	AUX / Overload override button unpressed condition - Circuit short to high (10v)
B1695-16 1047	AUX / Overload override button unpressed condition - Circuit short to low
B1696-13 1048	AUX / Overload override button both conditions - Signal plausibility failure (Circuit open)
B1697-92 1049	AUX / Overload override button both conditions - Signal plausibility failure (10v)
U0073-87 1050	CAN1 node error
U0411-87 1051	EGR no transmission/not received failure (for CAN)
U1293-87 1052	CAN TIME OUT ERROR
U1294-56 1053	CAN CAN RC ERROR - Rolling counter for platform input signal1 message
U1295-41 1055	CAN CHECK SUM ERROR
U1296-87 1056	CAN TIME OUT ERROR

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U1297-56 1058	CAN RC ERROR
U1298-41 1059	CAN CHECK SUM ERROR
U1299-87 1061	CAN Signal pairing failure
U1323-56 1063	CAN CAN RC ERROR - Rolling counter for platform output signal1 message
U1324-56 1064	CAN RC ERROR
U1325-56 1066	CAN RC ERROR
U1326-41 1067	CAN CHECK SUM ERROR
U1327-41 1069	CAN CHECK SUM ERROR
U1328-41 1070	CAN CHECK SUM ERROR
U1329-56 1072	CAN2 status message RC & Check sum error from RL
U1330-56 1073	CAN2 status message RC & Check sum error from RR
U1331-56 1074	CAN2 status message RC & Check sum error from FR
U1332-56 1075	CAN2 status message RC & Check sum error from FL
U1334-56 1077	CAN2 status message timeout from any of traction motor
U1335-56 1078	CAN2 status message RC & Check sum error from Pump
U1900-16 1080	LIVELINK - VEHICLE VOLTAGE BELOW NORMAL
U1901-16 1081	LIVELINK - INTERNAL VOLTAGE BELOW NORMAL
U1904-85 1082	LIVELINK - ECU ABOVE TEMPERATURE THRESHOLD
U1905-84 1082	LIVELINK - ECU BELOW TEMPERATURE THRESHOLD
U1906-96 1083	LIVELINK - ACCELEROMETER INTERNAL FAILURE
U1907-09 1083	LIVELINK - MODEM JAMMED
U1908-09 1084	LIVELINK - GPS ANTENNA NOT OK
U1909-96 1085	LIVELINK - NO COMMS WITH GPS MODULE
U190A-96 1086	SIM Card Failure

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U190B-96 1087	LIVELINK - NO COMMS WITH GSM MODULE
U190C-86 1088	LIVELINK - GSM NETWORK REGISTRATION FAILED

6.1.1 B1001-17

B1001-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1001 17

Error code:	B1001-17
ECU	Base ECU
Description:	E-Stop Plausibility Check
Component:	E-Stop(s)
Vehicle reaction:	Disable all outputs except CAN (Emergency stop pressed) Default to E-Stop pressed condition
Possible Cause:	1. A short circuit within the wiring harness 2. A poor connection or damaged terminal within the connector(s) 3. A damaged or broken wire within the wiring harness 4. Component is damaged
Service Action:	1. Check no short in wiring harness between E-STOP SWITCH +VE to GND or E-STOP -VE to GND on Base E-Stop terminals. 2. Check terminals for damage at E-stop terminals, -SW01_TCP(terminals 24/31 and 25/31), -SW01_TCP(terminals 24/31 and 25/31) and on Base Bosch ECU Connector (-C27-XC1_TH, Pin 14/96 and -C27-XC2_TH, Pin 28/58). 3. Check Continuity of wire #4005-#3049 and #6006 between Bosch Base ECU and E-Stop terminals. 4. Check operation of E-Stop switch to ensure correct switching. Contacts should be normally closed during normal operation (Unpressed) and Open contacts when switch is pressed. Switch terminal attached to wire #3049 should be 12V (unpressed) and 0V (pressed). Switch terminal attached to wire #6006 should be 0V (GND) (Unpressed) and open circuit to GND when pressed. IF fault found, check operation of switch with multimeter, checking the closed and open conditions.

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6.1.2 B1005-24

B1005-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1005□24

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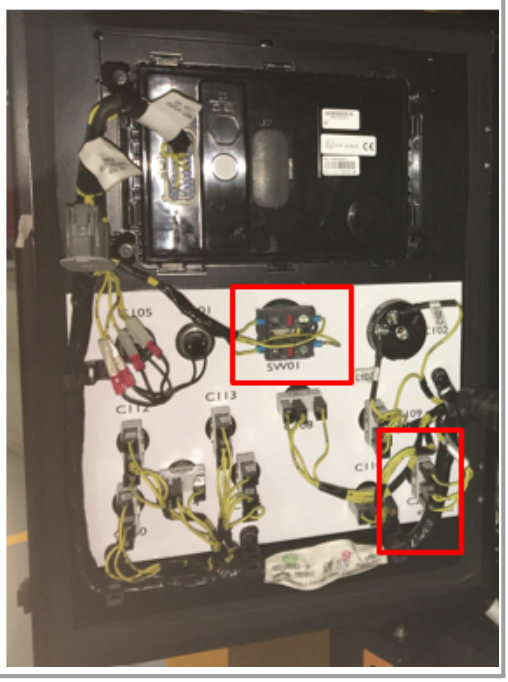
Error code:	B1005-24
ECU	Base ECU
Description:	Base Enable Switch Short Circuit to High(10V)
Component:	Base Enable Switch
Vehicle reaction:	Before operation: Default to platform controls Allow base enable After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between Base enable Switch and Base Bosch ECU. Check interconnect connector. Check wiring and diode between override switch and e-stop switch. 2. Disconnect connector to Bosch ECU, check continuity between Base Enable switch terminals -C201-3 & -C201-1. This should be 'Open Circuit'. Investigate if testing does not concur. 3. Check connectors are dry and free of any debris. Check for damaged pins on the Bosch connectors. 4. Check operation of Base Enable Switch. 

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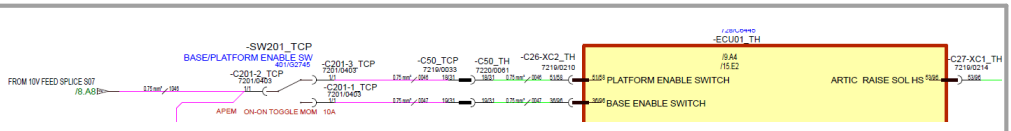

6.1.3 B1006-16

B1006-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1006 16

Error code:	B1006-16
ECU	Platform ECU
Description:	Platform Enable Switch SC to High
Component:	Platform Enable Switch
Vehicle reaction:	Before operation: Disable engine and default to platform controls Allow base override After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between Platform Enable Switch and Platform Bosch ECU. 2. Disconnect connector to Bosch ECU, check continuity between Platform Enable Switch terminals -C201-1 & -C201-2. This should be 'Open Circuit'. Investigate if testing does not concur. 3. Check connectors are dry and free of any debris. Check for damaged pins on the Bosch connectors. 4. Check operation of Platform Enable Switch.

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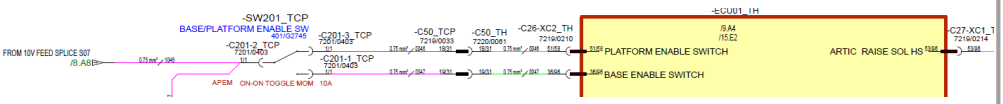

6.1.4 B1007-16

B1007-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1007-16

Error code:	B1007-16
ECU	Platform ECU
Description:	Platform Enable & Base Enable Selector both activated (5 - 10V)
Component:	Base Enable Switch
Vehicle reaction:	Disable engine and default to platform controls Allow base override

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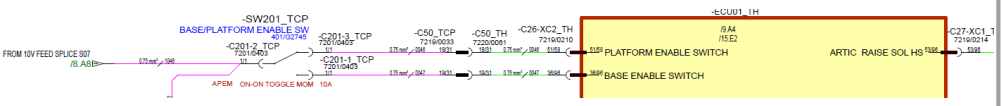
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between Platform Enable Switch and Platform Bosch ECU. 2. Disconnect connector to Bosch ECU, check continuity between Enable Switch terminals -C201-3 & -C201-1. This should be 'Open Circuit'. Investigate if testing does not concur. 3. Check connectors are dry and free of any debris. Check for damaged pins on the Bosch connectors. 4. Check operation of Enable Switch. 

6.1.5 B1008-16

B1008-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1008 16

Error code:	**B1008-16**

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ECU	Base ECU
Description:	Base Enable Switch Short Circuit to Low
Component:	Base Enable Switch
Vehicle reaction:	Before operation: Disable engine and default to platform controls Allow base override After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check wiring between Base Enable Switch and Base Bosch ECU. Check interconnect connector. 2. Check the wiring has not been shorted to the chassis of the vehicle (caused perhaps by pinching or abrasion). 3. Disconnect connector to Bosch ECU, check continuity between Base Enable switch terminals -C201-3 & -C201-1. This should be 'Open Circuit'. Investigate if testing does not concur. 4. Check connectors are dry and free of any debris. Check for damaged pins on the Bosch connectors. 5. Check operation of Override Switch. Check for any physical damage to the switch, connectors or harness components.

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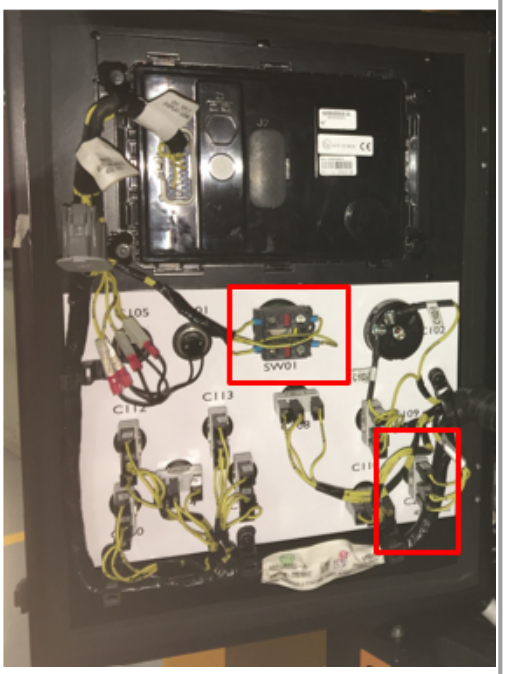

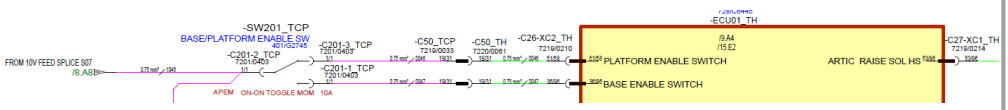

6.1.6 B1009-16

B1009-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1009 16

Error code:	B1009-16
ECU	Platform ECU
Description:	Platform Enable Switch Short Circuit to Low
Component:	Platform Enable Switch
Vehicle reaction:	Before operation: Disable engine and default to platform controls Allow base override After operation: Refer to 10V System Short Circuit Fault reaction

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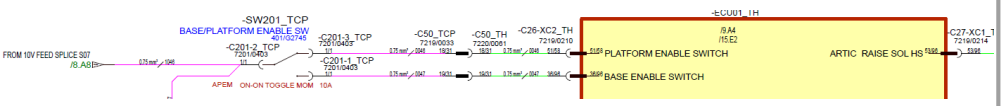
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check wiring between Platform Enable Switch and Platform Bosch ECU. 2. Check the wiring has not been shorted to the chassis of the vehicle (caused perhaps by pinching or abrasion). 3. Disconnect connector to Bosch Platform ECU, check continuity between Enable switch terminals -C201-3 & -C201-1. This should be 'Open Circuit'. Investigate if testing does not concur. 4. Check connectors are dry and free of any debris. Check for damaged pins on the Bosch connectors. 5. Check operation of Enable Switch. Check for any physical damage to the switch, connectors or harness components. 

6.1.7 B1010-13

B1010-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1010 13

Error code:	**B1010-13**
ECU	Base ECU
Description:	Base Enable Switch Open Circuit AND Platform Enable Switch Open Circuit
Component:	Base Enable Switch
Vehicle reaction:	Disable engine and default to platform controls. Allow base override
Possible Cause:	1. A poor connection or damaged terminal within the connector(s) 2. A damaged or broken wire within the wiring harness 3. Component is damaged

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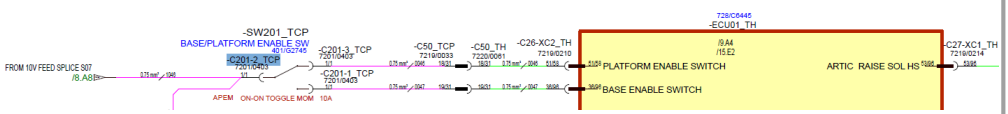
Service Action:	1. At Base Control Panel, measure voltage at Base/Platform Enable Switch Terminal -C201-2_TCP (Measure between Terminal and Turntable Ground). If voltage is not present, Check interconnect -C50_TH (31-way HDP). Measure Voltage at pin 30/31 (Wire #1046). If voltage not present, Check continuity from -C50_TH Pin 30 to Bosch Base ECU Pin 32/58 (Wire #1046A) (Disengage Bosch ECU connector to perform this test). If no continuity - Check Continuity from Bosch Base ECU Pin 32/58 to -C50_TH pin 31/31 (Wire #1065). Note, this should be the same voltage and continuity as Pin 30/31. If Pin -C50_TH Pin 31 has continuity and voltage is present, Consider wire break of Wire #1046 between Splice -S07_TH and -C50 Pin 30/31. 2. Check Interconnects -C50_TH and -C50_TCP. Check for backed out pins or wire damage to pins. Check interconnects -C50_TCP Pins 18/31 and 19/31. Check Continuity from Base/Platform Enable Switch -C201-3 to Base Bosch ECU Pin 51/58 and also from -S201-1 to Base Bosch ECU Pin 36/96. 3. Confirm correct operation of Base/Platform Enable Switch -SW201_TCP. Check all wiring is intact. 

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6.1.8 B1011-17

B1011-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1011-17

Error code:	B1011-17
ECU	Base ECU
Description:	Artic Boom Lower Limit Switch 1 Short Circuit to High
Component:	Artic Boom Lower Limit Switch
Vehicle reaction:	Default to raised position so machine is at slow speed, prevent main boom raise, articulated boom raise and telescopic extend functions
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Remove switch cover lid. 2. Check for water ingress/corrosion. 3. Check inputs on pin 13 and 21 for 10volt input. 4. Check Ground cable 1046C for and cut or damage. 5. Check Base ECU pin 37/96 and 24/58 for bent or loose connection. 6. Check wire from limit switch to Base ECU connector 4009 and 4011. 7. Check if valve is mechanically jammed 8. Check switch function with multi-meter. 9. Turn machine ignition on and off to clear code.

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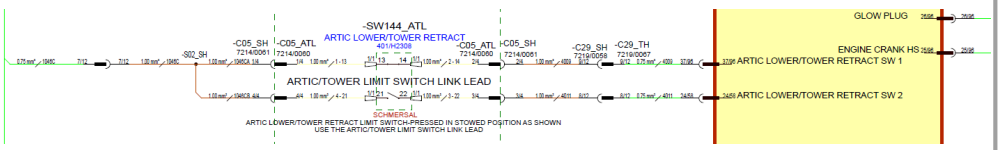

6.1.9 B1012-17

B1012-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1012-17

Error code:	B1012-17
ECU	Base ECU
Description:	Artic Boom Lower Limit Switch 2 Short Circuit to High
Component:	Artic Boom Lower Limit Switch
Vehicle reaction:	Default to raised position so machine is at slow speed, prevent main boom raise, articulated boom raise and telescopic extend functions
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors

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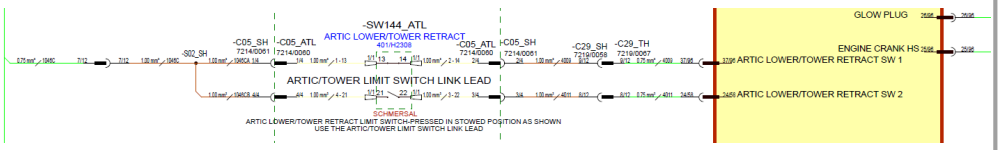
	4. Damaged component
Service Action:	1. Remove switch cover lid. 2. Check for water ingress/corrosion. 3. Check inputs on pin 13 and 21 for 10volt input. 4. Check Ground cable 1046C for and cut or damage. 5. Check Base ECU pin 37/96 and 24/58 for bent or loose connection. 6. Check wire from limit switch to Base ECU connector 4009 and 4011. 7. Check if valve is mechanically jammed 8. Check switch function with multi-meter. 9. Turn machine ignition on and off to clear code. 

6.1.10 B1013-16

B1013-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1013□16

Error code:	**B1013-16**

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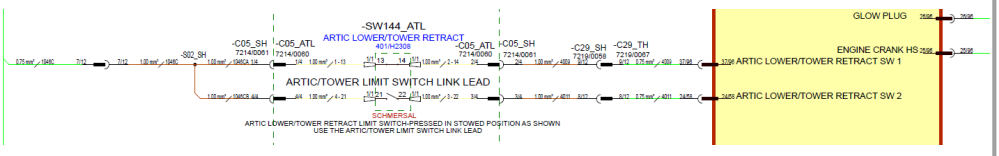
ECU	Base ECU
Description:	Artic Boom Lower Limit Switch 1 Short Circuit to Low
Component:	Artic Boom Lower Limit Switch
Vehicle reaction:	Default to raised position so machine is at slow speed, prevent main boom raise, articulated boom raise and telescopic extend functions
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Remove switch cover lid. 2. Check for water ingress/corrosion. 3. Check inputs on pin 13 and 21 for 10volt input. 4. Check Ground cable 1046C for and cut or damage. 5. Check Base ECU pin 37/96 and 24/58 for bent or loose connection. 6. Check wire from limit switch to Base ECU connector 4009 and 4011. 7. Check if valve is mechanically jammed 8. Check switch function with multi-meter. 9. Turn machine ignition on and off to clear code. 

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6.1.11 B1014-13

B1014-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1014-13

Error code:	B1014-13
ECU	Base ECU
Description:	Artic Boom Lower Limit Switch 1 AND Switch 2 Open Circuit
Component:	Limit Switch
Vehicle reaction:	Default to raised position so machine is at slow speed, prevent main boom raise, articulated boom raise and telescopic extend functions.
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in switch 4. Broken switch
Service Action:	1. Remove switch cover lid. 2. Check for water ingress/corrosion. 3. Check inputs on pin 13 and 21 for 10volt input. 4. Check Ground cable 1046C for and cut or damage. 5. Check Base ECU pin 37/96 and 24/58 for bent or loose connection. 6. Check wire from limit switch to Base ECU connector 4009 and 4011. 7. Check if valve is mechanically jammed 8. Check switch function with multi-meter. 9. Turn machine ignition on and off to clear code.

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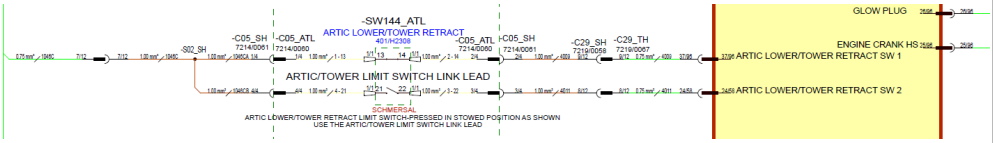

6.1.12 B1015-16

B1015-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1015-16

Error code:	B1015-16
ECU	Base ECU
Description:	Artic Boom Lower Limit Switch 2 Short Circuit to Low
Component:	Artic Boom Lower Limit Switch
Vehicle reaction:	Default to raised position so machine is at slow speed, prevent main boom raise, articulated boom raise and telescopic extend functions
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component

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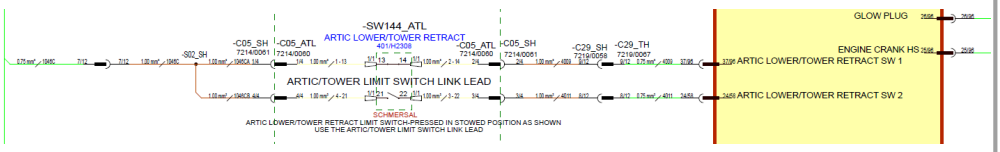
Service Action:	1. Remove switch cover lid. 2. Check for water ingress/corrosion. 3. Remove switch cover, Check if pin 22 as continuity to ground 4. Check inputs on pin 13 and 21 for 10volt input. 5. Check Ground cable 1046C for and cut or damage. 6. Check Base ECU pin 37/96 and 24/58 for bent or loose connection. 7. Check wire from limit switch to Base ECU connector 4009 and 4011. 8. Check if valve is mechanically jammed 9. Check switch function with multi-meter. 10. Turn machine ignition on and off to clear code. 

6.1.13 B1016-92

B1016-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1016-92

Error code:	**B1016-92**

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ECU	Base ECU
Description:	Artic Boom Lower Limit Switch 1 AND Switch 2 short to 10V
Component:	Artic Boom Lower Limit Switch
Vehicle reaction:	default to raised position so machine is at slow speed, prevent main boom raise, articulated boom raise and telescopic extend functions.
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in switch 4. Broken switch
Service Action:	1. Remove switch cover lid. 2. Check for water ingress/corrosion. 3. Check inputs on pin 13 and 21 for 10volt input. 4. Check Ground cable 1046C for and cut or damage. 5. Check Base ECU pin 37/96 and 24/58 for bent or loose connection. 6. Check wire from limit switch to Base ECU connector 4009 and 4011. 7. Check if valve is mechanically jammed 8. Check switch function with multi-meter. 9. Turn machine ignition on and off to clear code.

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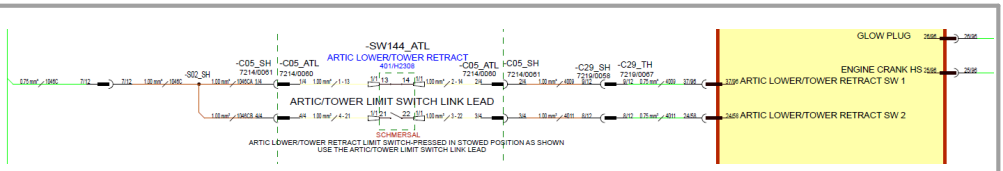

6.1.14 B1017-17

B1017-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1017-17

Error code:	B1017-17
ECU	Base ECU
Description:	TILT Sensor SC to High (not possible to detect until sensor connected to 10V)
Component:	Tilt Sensor
Vehicle reaction:	Implement tilt alarm, when in raised position: prevent travel, prevent main boom and articulated boom raise and telescopic extend blocked
Possible Cause:	1. Tilt Sensor not connected correctly 2. A short circuit within the wiring harness 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged or Faulty component
Service Action:	1. Check connections to tilt sensor 2. Check the voltage at Pin A (should read 12V) if no voltage need to investigate as per schemetic 2. Check wiring at tilt sensor connector 3. Recalibrate Til Sensor 4. Replace the tilt sensor if damage or Faulty

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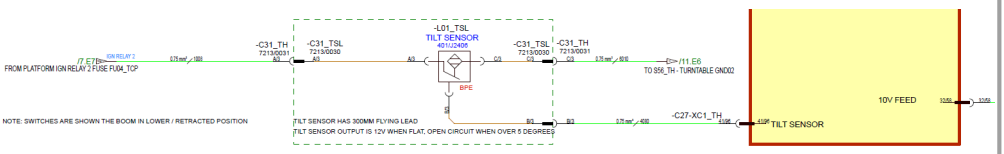

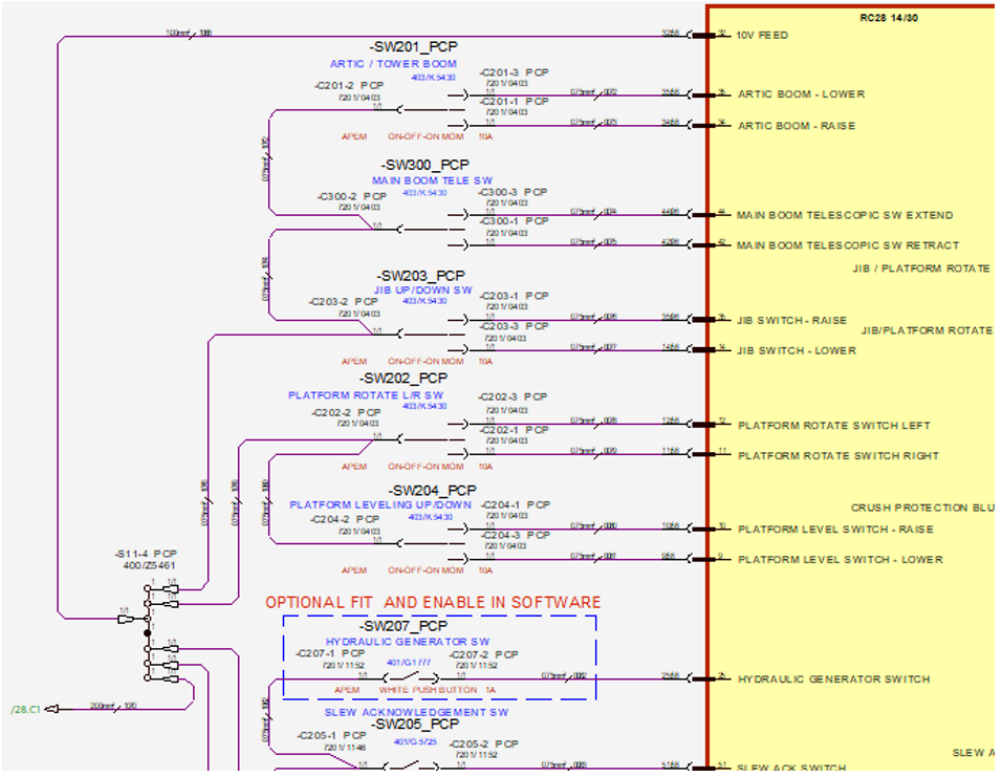

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6.1.15 B1018-16

B1018-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1018-16

Error code:	B1018-16
ECU	Base ECU
Description:	Tilt Sensor short circuit to low
Component:	Tilt Sensor
Vehicle reaction:	Implement tilt alarm, when in raised position: prevent travel, prevent main boom and articulated boom raise and telescopic extend blocked
Possible Cause:	1. Tilt Sensor not connected correctly 2. A short circuit within the wiring harness 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged or Faulty component
Service Action:	1. Check connections to tilt sensor 2. Check the voltage at Pin A (should read 12V) if no voltage need to investigate as per schemetic 2. Check wiring at tilt sensor connector 3. Recalibrate Til Sensor 4. Replace the tilt sensor if damage or Faulty

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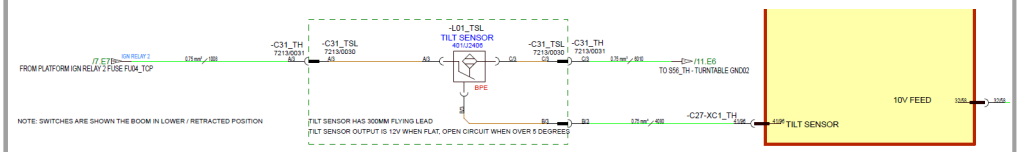

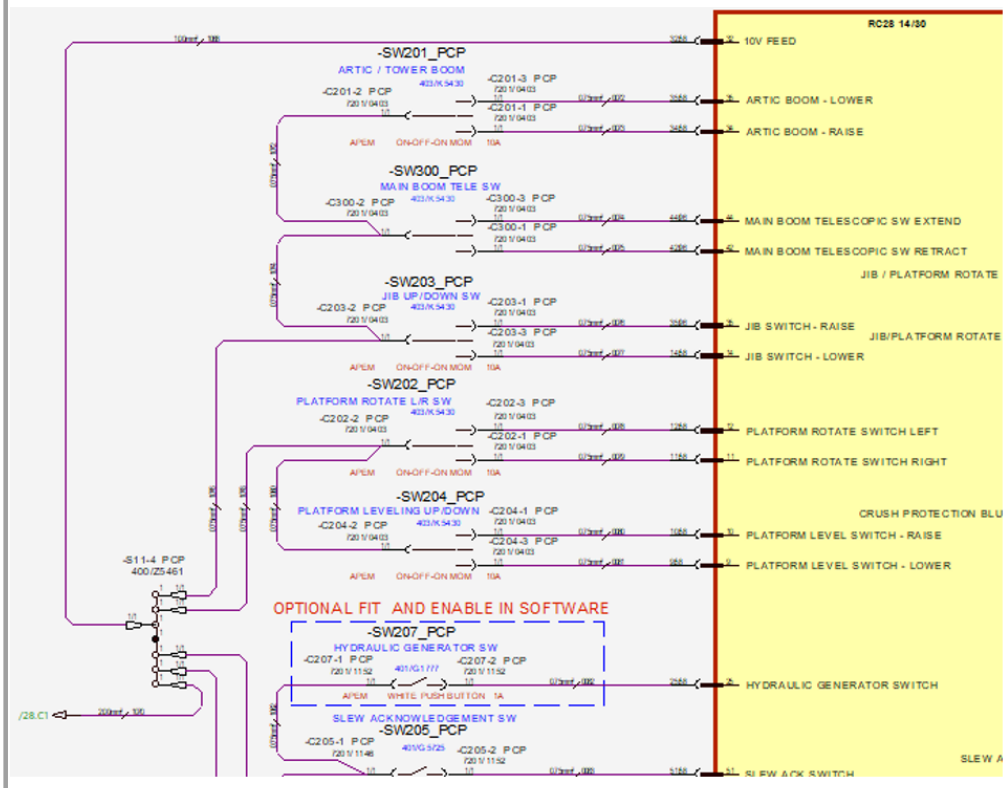

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6.1.16 B1019-17

B1019-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1019□17

Error code:	B1019-17
ECU	Base ECU
Description:	SLEW POSITION Limit Switch 1 Short Circuit to High
Component:	Slew Limit Switch 1
Vehicle reaction:	Default to Slew position Implement slew acknowledge safety function (SF#10) in all positions Implement axle lock in all positions (axle is locked)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage of Slew Position Switch -SW148_SPL Pin 14. Actuate the switch to check that the voltage level changes between 10V and 0V. If this does not happen, check operation of switch. Check Interconnect -C30_SPL / -C30_TH. Check pins at Base Bosch ECU connector. Observe harness, Check for any pinching / damage. 2. Disconnect terminal from Pin 14, measure voltage of wire. If voltage is high 10V (or Higher) then there is a short circuit to high within the harness. 3. Check for water ingress at the switch terminals, The interconnects and at the Base Bosch ECU connectors. 4. Check the Switch, Interconnects, Base Bosch ECU and harnessing connectors for any damage. Pay particular attention to ECU pins as these could be bent.

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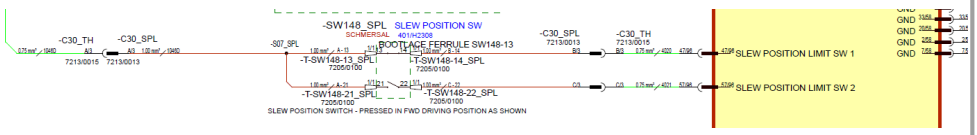

6.1.17 B1020-17

B1020-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1020□17

Error code:	B1020-17
ECU	Base ECU
Description:	SLEW POSITION Limit Switch 2 Short Circuit to High
Component:	Slew Limit Switch 1
Vehicle reaction:	Default to Slew position Implement slew acknowledge safety function (SF#10) in all positions

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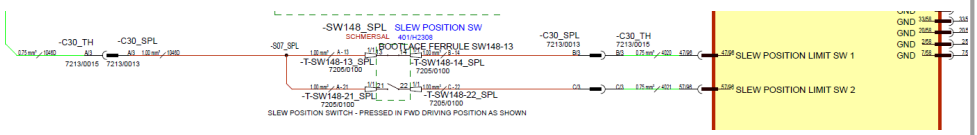
	Implement axle lock in all positions (axle is locked)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage of Slew Position Switch -SW148_SPL Pin 14. Actuate the switch to check that the voltage level changes between 10V and 0V. If this does not happen, check operation of switch. Check Interconnect -C30_SPL / -C30_TH. Check pins at Base Bosch ECU connector. Observe harness, Check for any pinching / damage. 2. Disconnect terminal from Pin 14, measure voltage of wire. If voltage is high 10V (or Higher) then there is a short circuit to high within the harness. 3. Check for water ingress at the switch terminals, The interconnects and at the Base Bosch ECU connectors. 4. Check the Switch, Interconnects, Base Bosch ECU and harnessing connectors for any damage. Pay particular attention to ECU pins as these could be bent. 

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6.1.18 B1021-16

B1021-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1021□16

Error code:	B1021-16
ECU	Base ECU
Description:	SLEW POSITION Limit Switch 1 Short Circuit to Low
Component:	Slew Limit Switch 1
Vehicle reaction:	Default to Slew position Implement slew acknowledge safety function (SF#10) in all positions Implement axle lock in all positions (axle is locked)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage of Slew Position Switch -SW148_SPL Pin 14. Actuate the switch to check that the voltage level changes between 0V and 10V. If this does not happen, check operation of switch. Check Interconnect -C30_SPL / -C30_TH. Check pins at Base Bosch ECU connector. Observe harness, Check for any pinching / damage. 2. Disconnect terminal from Pin 14, measure voltage of switch output at this pin. If voltage remains at 0V when switch is actuated then there is a short circuit to ground within the switch or the input to the switch. 3. Check for water ingress at the switch terminals, The interconnects and at the Base Bosch ECU connectors. 4. Check the Switch, Interconnects, Base Bosch ECU and harnessing connectors for any damage. Pay particular attention to ECU pins as these could be bent.

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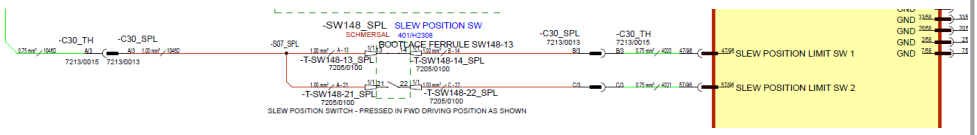

6.1.19 B1022-13

B1022-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1022-13

Error code:	B1022-13
ECU	Base ECU
Description:	SLEW POSITION Limit Switch 1 and SLEW POSITION Limit Switch 2 Open Circuit
Component:	Slew Limit Switch(es)
Vehicle reaction:	1. Default to Slew position 2. Implement slew acknowledge safety function (SF#10) in all positions 3. Implement axle lock in all positions (axle is locked)

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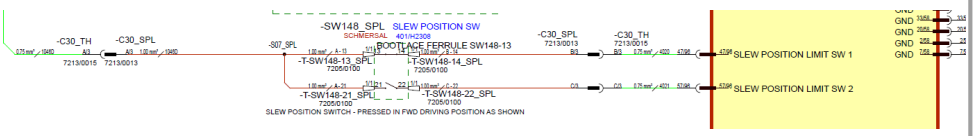
Possible Cause:	1. A poor connection or damaged terminal within the connector(s) 2. A damaged or broken wire within the wiring harness 3. Component is damaged
Service Action:	1. Check Terminals at Slew Position Switch -SW148_SPL. Check Terminals at interconnects -C30_SPL / -C30_TH. Check terminals at Base Bosch ECU Connectors. Ensure all connectors are fully seated. 2. Check continuity with resistance meter between -C30_TH to Slew Position Switch -SW148_SPL terminals. Check from -C30_TH Pins B and C to Base Bosch ECU Connector Pins 47/96 and 57/96 respectively. 3. Check Operation of Slew Position Switch. Observe all parts for damage. Check terminals no9t backed out in Base Bosch ECU Connector. Check Terminals within -C30_TH and -C30_SPL, 

6.1.20 B1023-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1023□16

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Error code:	B1023-16
ECU	Base ECU
Description:	SLEW POSITION Limit Switch 2 Short Circuit to Low
Component:	Slew Limit Switch 2
Vehicle reaction:	Default to Slew position Implement slew acknowledge safety function (SF#10) in all positions Implement axle lock in all positions (axle is locked)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage of Slew Position Switch -SW148_SPL Pin 22. Actuate the switch to check that the voltage level changes between 0V and 10V. If this does not happen, check operation of switch. Check Interconnect -C30_SPL / -C30_TH. Check pins at Base Bosch ECU connector. Observe harness, Check for any pinching / damage. 2. Disconnect terminal from Pin 22, measure voltage of switch output at this pin. If voltage remains at 0V when switch is actuated then there is a short circuit to ground within the switch or the input to the switch. 3. Check for water ingress at the switch terminals, The interconnects and at the Base Bosch ECU connectors. 4. Check the Switch, Interconnects, Base Bosch ECU and harnessing connectors for any damage. Pay particular attention to ECU pins as these could be bent.

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	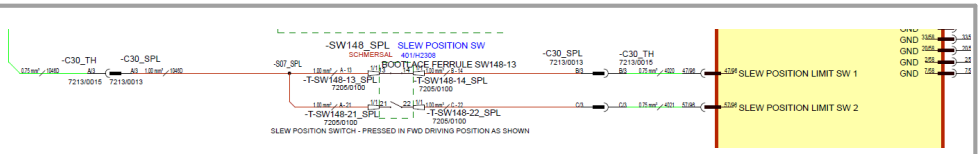

6.1.21 B1024-92

B1024-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1024-92

Error code:	B1024-92
ECU	Base ECU
Description:	SLEW POSITION Limit Switch 1 and SLEW POSITION Limit Switch 2 Short Circuit to 10V or 12V
Component:	Slew Limit Switch(es)
Vehicle reaction:	Default to Slew position Implement slew acknowledge safety function (SF#10) in all positions Implement axle lock in all positions (axle is locked)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect interconnect connectors from each other (-C30_SPL and -C30_TH). Measure continuity on -C30_SPL Terminal B and C. This should be 'Open Circuit'. Actuate the switch, The measurement should remain 'Open Circuit'. If the measurements do not concur with this, then check wiring terminals at Slew Position Switch -SW148_SPL and check wiring from Switch to connector. 2. With Interconnects disconnected from each other, Check wires 4020 and 4021 are not shorted together. 3. Check Bosch Base ECU Connectors for Damage, Bent pins and water ingress. 4. Check Switch or harness for damage.

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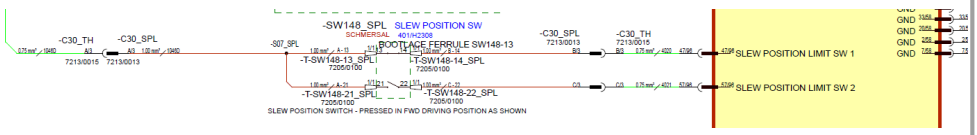

6.1.22 B1025-13

B1025-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1025-13

Error code:	B1025-13
ECU	Platform ECU
Description:	Crush Protection - Plausibility Check
Component:	Crush Protection Switch(es)
Vehicle reaction:	Detect failure mode and activate Crush protection functionality; Also includes Short Circuit to Low

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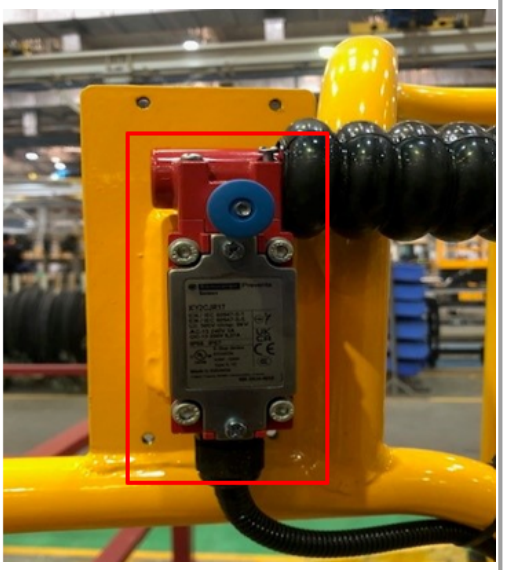
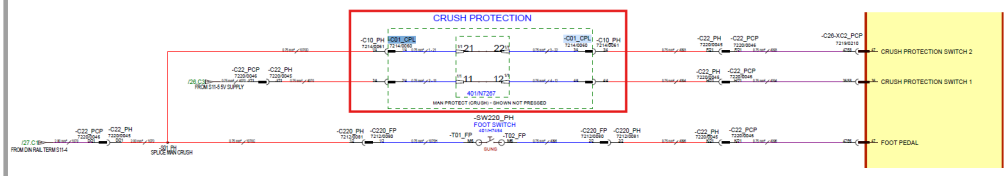
Possible Cause:	1. A short or open circuit within the wiring harness 2. A short to the Chassis or other signal 3. Water damage to the component, connectors or harness 4. Damaged component
Service Action:	1. Check voltages at Crush Protection Switch. Pin 21 and 22 should measure 10V. Pin 11 and 12 should measure 5V. 2. Disconnect Crush Protection Connector -C01_CPL from -C10_PH. Check resistance between Pin 22 and Pin 12. Value should be open Circuit.Check operation of switch by actuating the device. Check continuity from Crush Protection switch to Platform Bosch ECU connector, Terminals 47/58 and 36/58. 3. Check for water damage at Crush Protection Connector, Interconnects -C22_PH / -C22_PHP and Platform Bosch ECU connectors 4. Visually inspect wiring harness, Switch and all connectors for any damage or for mis-seated components. Check connectors for bent or backed out terminals.  

6.1.23 **B1026-17**

B1026-17

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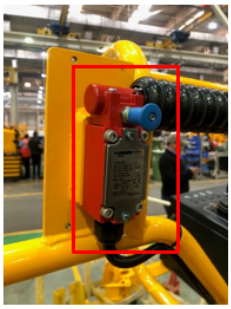
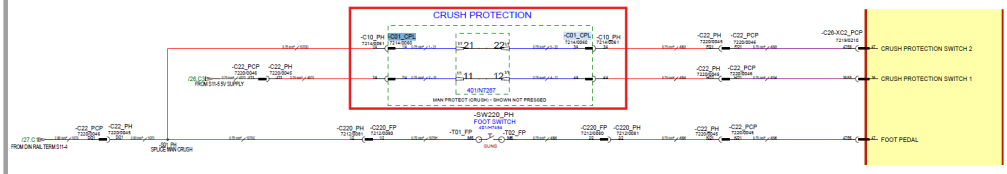
Machine Fault Codes 518 > DTC ERROR CODE 519 > B1026□17

Error code:	B1026-17
ECU	Platform ECU
Description:	Crush Protection - Switch 1 Short Circuit to >5v
Component:	Crush Protection Switch 1
Vehicle reaction:	Detect failure mode and activate Crush protection functionality
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check voltages at Crush Protection Switch. Pin 21 and 22 should measure 10V. Pin 11 and 12 should measure 5V. 2. Disconnect Crush Protection Connector -C01_CPL from -C10_PH. Check resistance between Pin 22 and Pin 12. Value should be open Circuit.Check operation of switch by actuating the device. Check continuity from Crush Protection switch to Platform Bosch ECU connector, Terminals 47/58 and 36/58. 3. Check for water damage at Crush Protection Connector, Interconnects -C22_PH / -C22_PHP and platform Bosch ECU connectors 4. Visually inspect wiring harness, Switch and all connectors for any damage or for mis-seated components. Check connectors for bent or backed out terminals.  

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6.1.24 B1027-16

B1027-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1027 16

Error code:	B1027-16
ECU	Platform ECU
Description:	Crush Protection - Switch 1 Short Circuit to low
Component:	Crush Protection Switch 1
Vehicle reaction:	Detect failure mode and activate Crush protection functionality
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check voltages at Crush Protection Switch. Pin 21 and 22 should measure 10V. Pin 11 and 12 should measure 5V. 2. Disconnect Crush Protection Connector -C01_CPL from -C10_PH. Check resistance between Pin 22 and Pin 12. Value should be open Circuit.Check operation of switch by actuating the device. Check continuity from Crush Protection switch to Platform Bosch ECU connector, Terminals 47/58 and 36/58. 3. Check for water damage at Crush Protection Connector, Interconnects -C22_PH / -C22_PHP and platform Bosch ECU connectors 4. Visually inspect wiring harness, Switch and all connectors for any damage or for mis-seated components. Check connectors for bent or backed out terminals.

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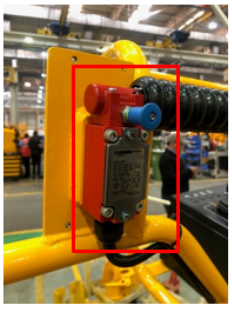

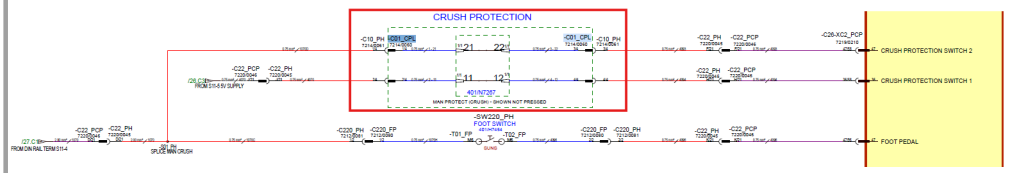

6.1.25 B1028-16

B1028-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1028 16

Error code:	B1028-16
ECU	Platform ECU
Description:	Crush Protection - Switch 2 Short Circuit to low
Component:	Crush Protection Switch 2
Vehicle reaction:	Detect failure mode and activate Crush protection functionality
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check voltages at Crush Protection Switch. Pin 21 and 22 should measure 10V. Pin 11 and 12 should measure 5V.

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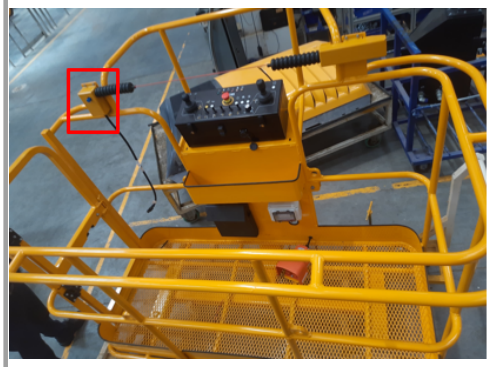
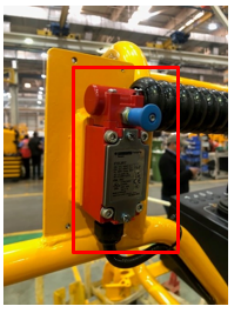
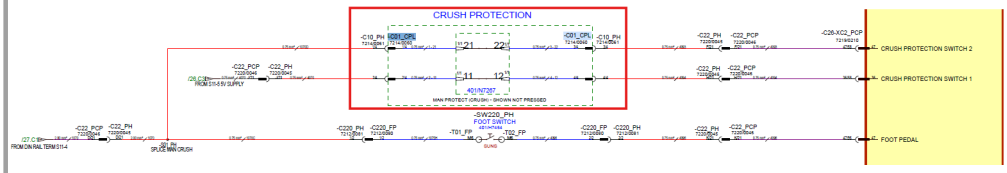
	2. Disconnect Crush Protection Connector -C01_CPL from -C10_PH. Check resistance between Pin 22 and Pin 12. Value should be open Circuit.Check operation of switch by actuating the device. Check continuity from Crush Protection switch to Platform Bosch ECU connector, Terminals 47/58 and 36/58. 3. Check for water damage at Crush Protection Connector, Interconnects -C22_PH / -C22_PHP and platform Bosch ECU connectors 4. Visually inspect wiring harness, Switch and all connectors for any damage or for mis-seated components. Check connectors for bent or backed out terminals.   

6.1.26 B1029-17

B1029-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1029 17

Error code:	**B1029-17**
ECU	Platform ECU
Description:	Crush Protection - Switch 2 Short Circuit to >10.5v
Component:	Crush Protection Switch 2
Vehicle reaction:	Detect failure mode and activate Crush protection functionality

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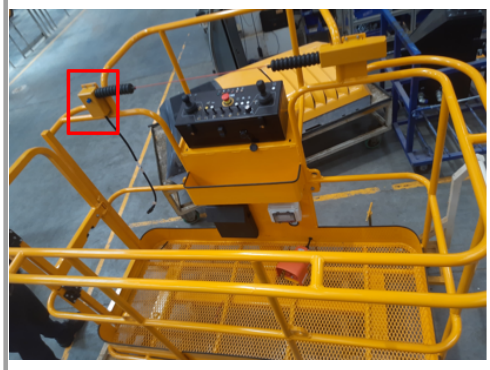
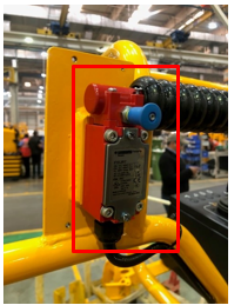
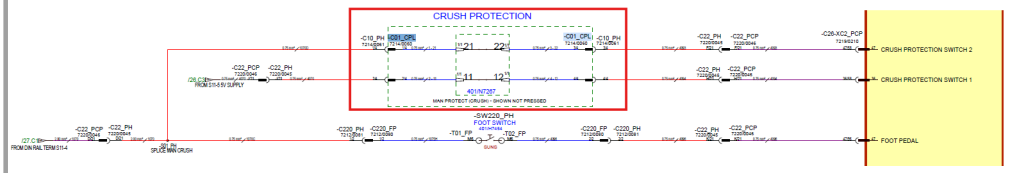
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check voltages at Crush Protection Switch. Pin 21 and 22 should measure 10V. Pin 11 and 12 should measure 5V. 2. Disconnect Crush Protection Connector -C01_CPL from -C10_PH. Check resistance between Pin 22 and Pin 12. Value should be open Circuit.Check operation of switch by actuating the device. Check continuity from Crush Protection switch to Platform Bosch ECU connector, Terminals 47/58 and 36/58. 3. Check for water damage at Crush Protection Connector, Interconnects -C22_PH / -C22_PHP and Platform Bosch ECU connectors 4. Visually inspect wiring harness, Switch and all connectors for any damage or for mis-seated components. Check connectors for bent or backed out terminals.   

6.1.27 B1036-17

B1036-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1036-17

Error code:	**B1036-17**
ECU	Base ECU

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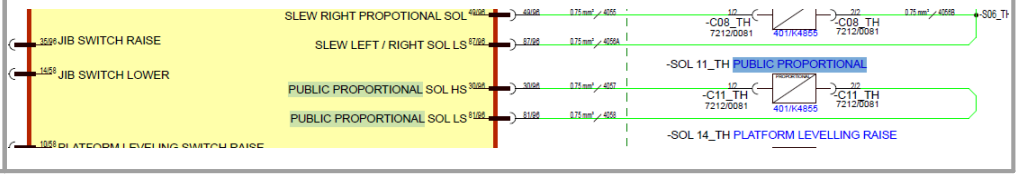
Description:	Public proportional output solenoid short circuit to high (>10.5V)
Component:	Public proportional output solenoid
Vehicle reaction:	Public proportional solenoid will be switched off, this will effect:Articulated boom, steer, leveling, jib, platform rotate, telescopic boom.
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from ECU to the coil 3. Turn machine ignition on/off to clear code 4. Check wire on solenoid connector C11_TH Pin 1 and 2. 5. Check wire no. 4057 and 4058 for any loose connection, cut or any damage. 6. Check if valve is mechanically jammed 

6.1.28 B1037-16

B1037-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1037-16

Error code:	**B1037-16**
ECU	Base ECU

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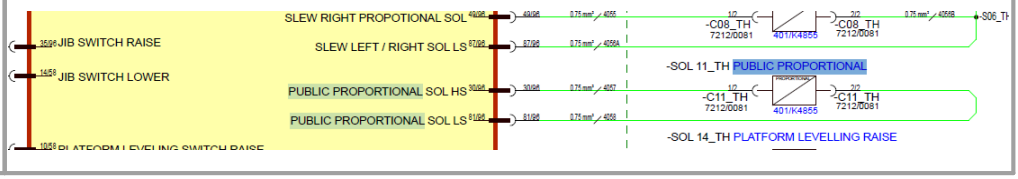
Description :	Public proportional output solenoid short circuit to low.
Component :	Public proportional output solenoid
Vehicle reaction:	Public proportional solenoid will be switched off, this will effect:Articulated boom, steer, leveling, jib, platform rotate, telescopic boom.
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from ECU to the coil 3. Turn machine ignition on/off to clear code 4. Check wire on solenoid connector C11_TH Pin 1 and 2. 5. Check wire no. 4057 and 4058 for any loose connection, cut or any damage. 6. Check if valve is mechanically jammed 

6.1.29 B1038-13

B1038-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1038-13

Error code:	**B1038-13**
ECU	Base ECU

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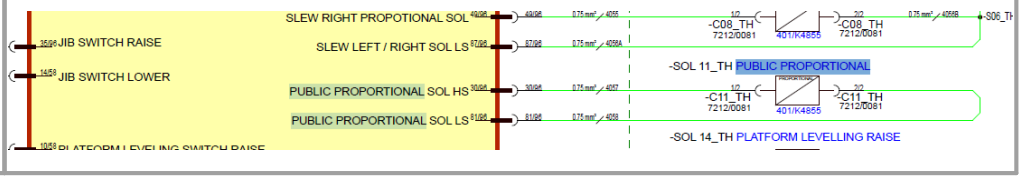
Description:	PUBLIC Proportional Solenoid Valve High Side & Low Side Open Circuit
Component:	PUBLIC Proportional Solenoid Valve
Vehicle reaction:	Public proportional solenoid will be switched off, this will effect:Articulated boom, steer, leveling, jib, platform rotate, telescopic boom
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from ECU to the coil 3. Turn machine ignition on/off to clear code 4. Check wire on solenoid connector C11_TH Pin 1 and 2. 5. Check wire no. 4057 and 4058 for any loose connection, cut or any damage. 6. Check if valve is mechanically jammed 

6.1.30 B1039-17

B1039-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1039-17

Error code:	**B1039-17**
ECU	Base ECU

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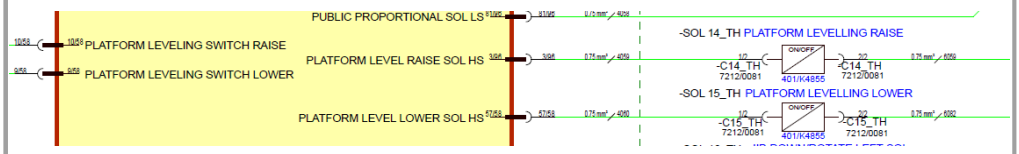
Description :	PLATFORM LEVELING DIRECTIONAL Solenoid Valve Raise High Side Short Circuit to High OR Open Circuit
Component :	PLATFORM LEVELING DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input Note: Before Ignition ON, POST Fail (stuck in startup logic) and Generic output fault.
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from ECU to the coil wire no 4059 3. Check Ground wire 6059 4. Check wire on solenoid connector C14_TH Pin 1 and 2. 5. Check wire no. 4047 and 4058 for any loose connection, cut or any damage 6. Check Base ECU pin 3/96 for bent or loose connection. 7. Check if valve is mechanically jammed 8. Turn machine ignition on/off to clear code 

6.1.31 B1040-16

B1040-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1040-16

Error code:	**B1040-16**

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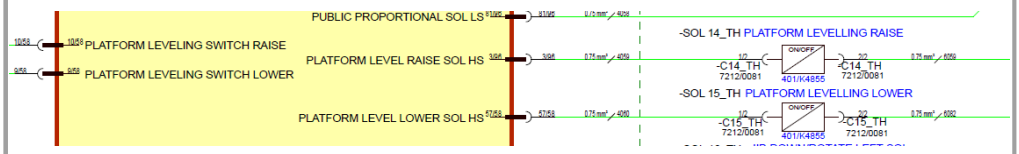
ECU	Base ECU
Description:	PLATFORM LEVELING DIRECTIONAL Solenoid Valve Raise High Side Short Circuit to Low
Component:	PLATFORM LEVELING DIRECTIONAL Solenoid Valve Raise
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from ECU to the coil wire no 4059 3. Check Ground wire 6059 4. Check wire on solenoid connector C14_TH Pin 1 and 2. 5. Check Base ECU pin 3/96 for bent or loose connection. 6. Check if valve is mechanically jammed 7. Turn machine ignition on/off to clear code 

6.1.32 B1041-17

B1041-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1041-17

Error code:	**B1041-17**

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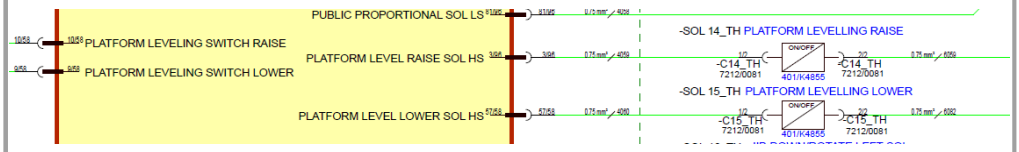
ECU	Base ECU
Description :	PLATFORM LEVELING DIRECTIONAL Solenoid Valve Lower High Side Short Circuit to High OR Open Circuit
Component :	PLATFORM LEVELING DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input Note: Before Ignition ON, POST Fail (stuck in startup logic) and Generic output fault.
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from ECU to the coil wire no 4060 3. Check Ground wire 6082 4. Check wire on solenoid connector C15_TH Pin 1 and 2. 5. Check Base ECU pin 57/58 for bent or loose connection. 6. Check if valve is mechanically jammed 7. Turn machine ignition on/off to clear code 

6.1.33 B1042-16

B1042-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1042-16

Error code:	**B1042-16**

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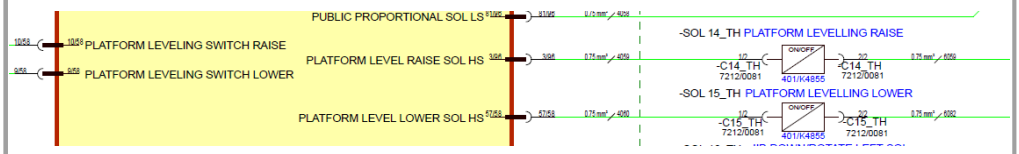
ECU	Base ECU
Description:	PLATFORM LEVELING DIRECTIONAL Solenoid Valve Lower High Side Short Circuit to Low
Component:	PLATFORM LEVELING DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from ECU to the coil wire no 4060 3. Check Ground wire 6082 4. Check wire on solenoid connector C15_TH Pin 1 and 2. 5. Check Base ECU pin 57/58 for bent or loose connection. 6. Check if valve is mechanically jammed 7. Turn machine ignition on/off to clear code 

6.1.34 B1043-17

B1043-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1043□17

Error code:	**B1043-17**

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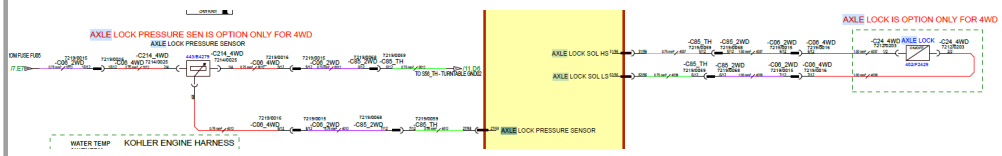
ECU	Base ECU
Description:	OSCILLATING AXLE Solenoid Valve High Side Short Circuit to High
Component:	Oscillating Axle Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Axle Lock output to off; Before Ignition ON, POST Fail (stuck in startup logic) and Generic output fault
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check harness from Base Bosch ECU through interconnect -C24_TH / -C24_TH and through to -C06_CH (Axle Lock Solenoid connector). Disconnect connectors and check for short circuit to high (12V) 2. Check condition of all connectors, especially for bent pins and shorts within the connectors. 3. Check for any water ingress inside the connector housings, ECU built in connector and Solenoid connector. 4. check harness for damage, especially abrasions and pinching and check all connectors, solenoid valve and ECU for any visual defects. 

6.1.35 B1044-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1044 16

Error code:	**B1044-16**
ECU	Base ECU

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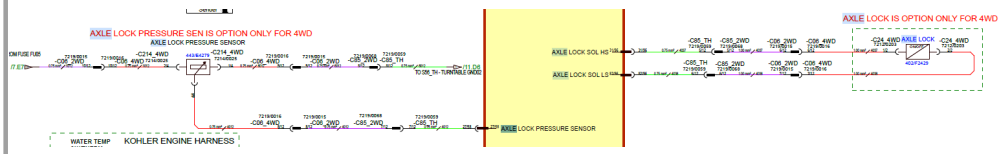
Description:	OSCILLATING AXLE Solenoid Valve High Side Short Circuit to Low
Component:	Oscillating Axle Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Axle Lock output to off;
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check harness from Base Bosch ECU through interconnect -C24_TH / -C24_TH and through to -C06_CH (Axle Lock Solenoid connector). 2. Disconnect connectors and check for short circuit to GND 3. Check condition of all connectors, especially for bent pins and shorts within the connectors. 4. Check for any water ingress inside the connector housings, ECU built in connector and Solenoid connector. 5. check harness for damage, especially abrasions and pinching and check all connectors, solenoid valve and ECU for any visual defects. 

6.1.36 B1045-13

B1045-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1045-13

Error code:	**B1045-13**
ECU	Base ECU
Description:	OSCILLATING AXLE Solenoid Valve High Side & Low Side Open Circuit

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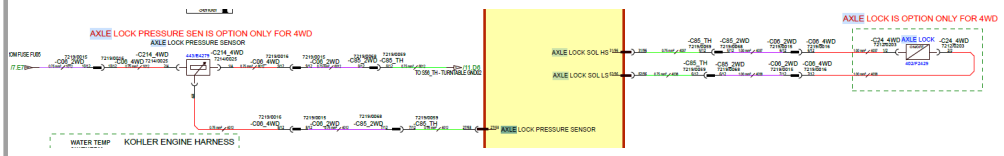
Component:	Oscillating Axle Solenoid
Vehicle reaction:	Detect failure mode with Safe out method - Switch Axle Lock output to off;
Possible Cause:	1. A poor connection or damaged terminal within the connector(s) 2. A damaged or broken wire within the wiring harness 3. Component is damaged
Service Action:	1. Check harness from Base Bosch ECU through to Brake Control Valve - C24_TH and -C24_TH(Wire 4037 and 4038). 2. Ensure connectors are fully seated. Check all terminals are present and not backed out inside connectors. Ensure wire is correctly terminated at terminals. Perform continuity tests on the harness. 3. check no damage to Base Bosch ECU connectors, Brake Control Valve connectors or and visible damage to harness including abrasion and pinching 

6.1.37 B1050-17

B1050-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1050 17

Error code:	**B1050-17**
ECU	Base ECU
Description:	Engine Start/Stop - Base Engine Start/Stop Button Short Circuit to High.
Component:	Engine Start/Stop Button
Vehicle reaction:	Detect failure mode; Ignore input (switch off engine)

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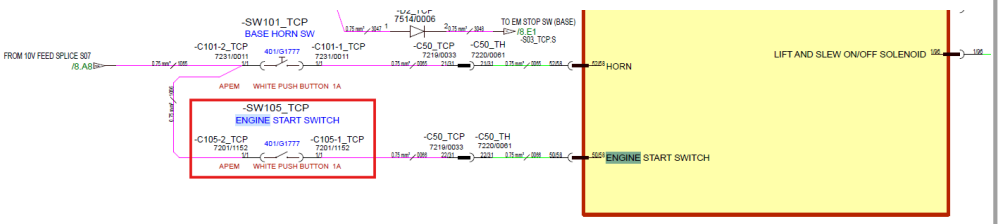
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Inspect Engine Start Switch -SW105_TCP. Inspect wiring to Switch. With switch unpressed - Pin 1 should measure +10V, Pin 2 should measure 0V. Check wire #0066 from switch to interconnects -C50_TCP pin 21/31, -C50_TH Pin 22/31 and through to the Base Bosch ECU pin 50/58. 2. Check Interconnect terminals and Bosch ECU terminals for damage or bent pins. Check wire connections to terminals. 3. Check all connectors for water ingress. 4. Check harness especially for abrasions and pinching. Check condition of connectors, checking especially for backed out or bent pins. 

6.1.38 B1051-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1051□16

Error code:	**B1051-16**
ECU	Base ECU
Description:	Engine Start/Stop - Base Engine Start/Stop Button Short Circuit to Low.
Component:	Engine Start/Stop Button
Vehicle reaction:	Detect failure mode; Ignore input (switch off engine)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis

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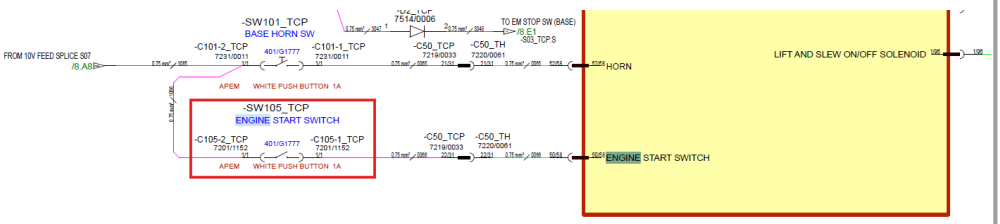
	3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Inspect Engine Start Switch -SW105_TCP. Inspect wiring to Switch. With switch unpressed - Pin 1 should measure +10V, Pin 2 should measure 0V. When pressed, Pin 2 should measure +10V. Check wire #0066 from switch to interconnects -C50_TCP pin 21/31, -C50_TH Pin 22/31 and through to the Base Bosch ECU pin 50/58. 2. Check wire #0066 is not shorted to GND 3. Check Interconnect terminals and Bosch ECU terminals for damage or bent pins. Check wire connections to terminals. 4. Check all connectors for water ingress. 5. Check harness especially for abrasions and pinching. Check condition of connectors, checking especially for backed out or bent pins. 

6.1.39 B1052-24

B1052-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1052-24

Error code:	**B1052-24**
ECU	Base ECU
Description:	Engine Start/Stop - Base Engine Start/Stop Button Stuck for >10s.
Component:	Engine Start/Stop Button
Vehicle reaction:	Detect failure mode; Ignore input (switch off engine)

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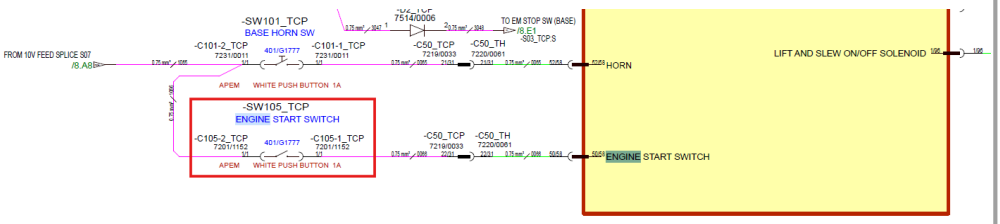
Possible Cause:	1. Button failure / Damage 2. Short circuit within the harness 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connectors -C105-1_TCP and -C105-2_TCP from the Engine Start Switch -SW105_TCP. Use a multimeter to test the operation of the switch. 2. Check wire #0066 is not shorted to +10V. Check wire #0066 from switch to interconnects -C50_TCP pin 22/31, -C50_TH Pin 22/31 and through to the Base Bosch ECU pin 50/58. 3. Check all connectors for water ingress. 4. Check harness especially for abrasions and pinching. Check condition of connectors, checking especially for backed out or bent pins 

6.1.40 B1053-17

B1053-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1053 17

Error code:	**B1053-17**
ECU	Platform ECU
Description:	Platform 10v Output - Foot Pedal Short Circuit to High
Component:	Foot Pedal
Vehicle reaction:	Before operation: Detect fault and ignore the input (allow base operation) After operation: Refer to 10V System Short Circuit Fault reaction

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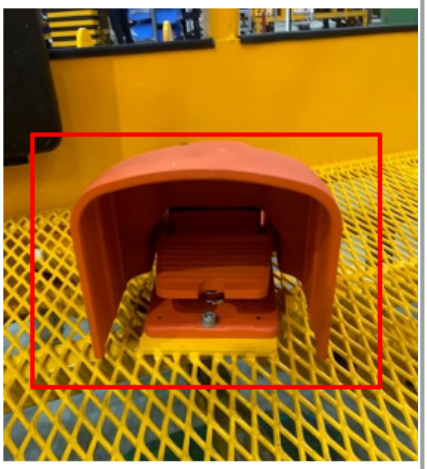
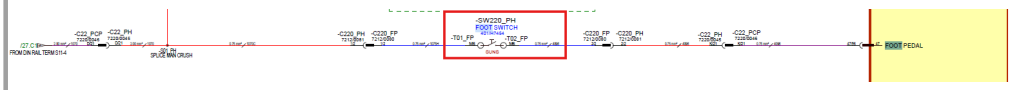
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect the foot switch connector from the platform harness connector -C220_PH. Measure voltage at -C220_PH Pin 2. Voltage should read 2.5 - 3.0V. If voltage is above 10V then there is a short to High (12VDC) in wire #4096. Check wiring through interconnects-C22_PH / -C22_PCP pin K back to the Platform ECU pin 47/96. 2. Check no shorts exist within the Foot switch connector, Interconnects and Platform ECU Connector. Check ECU for bent pins. 3. Check no water ingress in any of the connectors. 4. check operation of the switch pedal. Check all connectors and harness for visible damage, especially abrasions and pinching.  

6.1.41 B1054-16

B1054-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1054 16

Error code:	**B1054-16**

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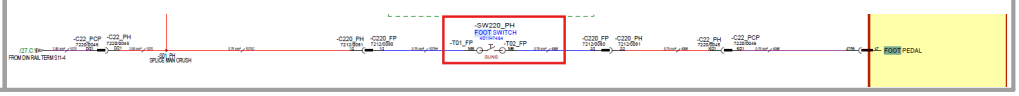
ECU	Platform ECU
Description:	Platform 10v Output - Foot Pedal Short Circuit to Low
Component:	Foot Pedal
Vehicle reaction:	Before operation: Detect fault and ignore the input (allow base operation) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect the foot switch connector from the platform harness connector -C220_PH. Measure voltage at -C220_PH Pin 2. Voltage should read 2.5 - 3.0V. If voltage is 0V (or close to 0V compared to 2.5V) then there is a short to GND in wire #4096. Check wiring through interconnects-C22_PH / -C22_PCP pin K back to the Platform ECU pin 47/96. 2. Check no shorts exist within the Foot switch connector, Interconnects and Platform ECU Connector. Check ECU for bent pins. 3. Check no water ingress in any of the connectors. 4. check operation of the switch pedal, ensuring no short exists between the foot switch connector terminals and GND. Check all connectors and harness for visible damage, especially abrasions and pinching. 

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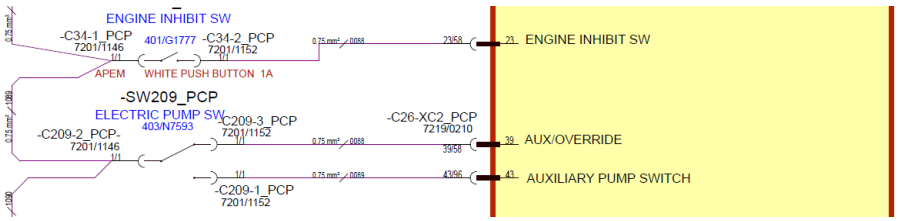
6.1.42 B1055-17

B1055-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1055 17

Error code:	B1055-17
ECU	Platform ECU
Description:	Aux Pump Switch - Pressed - Short Circuit to High
Component:	Platform Aux Switch
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check switch Aux Pump Switch -SW209_PCP. Check Wire #0088 from Aux Switch connector -C209-2_PCP to Platform Bosch ECU Pin 43/96. Voltage should be +10V 2. Check Voltage a Aux Pump Switch Pin 2 at -C209-2_PCP. This should be +10V 3. Check Operation of switch 4. Check all connectors for water ingress. 5 Check harness especially for abrasions and pinching. Check condition of connectors, checking especially for backed out or bent pins 

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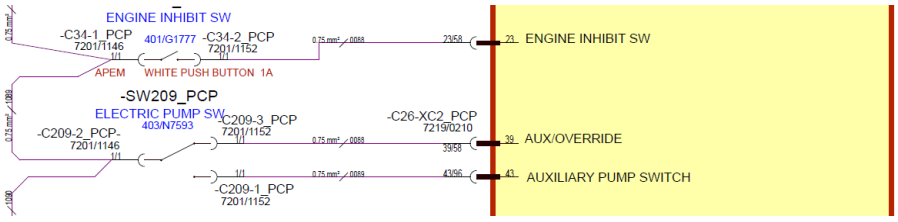
6.1.43 B1056-16

B1056-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1056-16

Error code:	B1056-16
ECU	Platform ECU
Description:	Aux Pump Switch - Pressed - Short Circuit to Low
Component:	Platform Aux Switch
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check switch Aux Pump Switch -SW209_PCP. Check Wire #0089 from Aux Switch connector -C209-3_PCP to Platform Bosch ECU Pin 43/96. Voltage should be +0V 2. Check Voltage a Aux Pump Switch Pin 2 at -C209-2_PCP. This should be +10V 3. Check Operation of switch 4. Check all connectors for water ingress. 5. Check harness especially for abrasions and pinching. Check condition of connectors, checking especially for backed out or bent pins 

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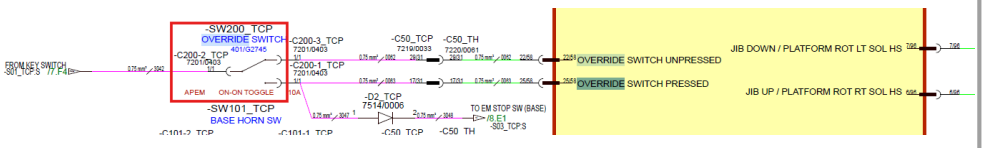
6.1.44 B1058-17

B1058-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1058-17

Error code:	B1058-17
ECU	Base ECU
Description:	Override switch pressed short circuit to high
Component:	Override switch
Vehicle reaction:	Input will be ignored
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between Override Switch and Base Bosch ECU for Voltage greater than 10.5 volts. Check interconnect connector. Check wiring and diode between override switch and e-stop switch. 2. Disconnect connector to Bosch ECU, check continuity between override switch terminals -C200-3 & -C200-1. This should be 'Open Circuit'. Investigate if testing does not concur. 3. Check connectors are dry and free of any debris. Check for damaged pins on the Bosch connectors. 4. Check operation of Override Switch. 

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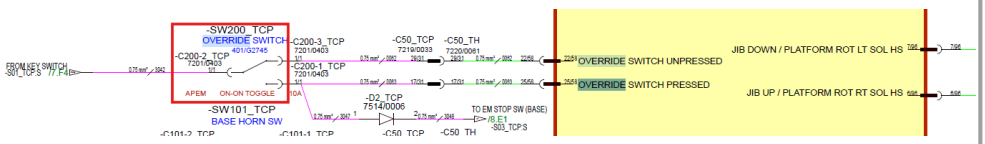
6.1.45 B1059-16

B1059-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1059□16

Error code:	B1059-16
ECU	Base ECU
Description:	E-Stop & Base Override - Override Switch Pressed Short Circuit to Low
Component:	Base Override Switch
Vehicle reaction:	Detect failure mode; Ignore input Default to Override unpressed state
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check wiring between Override Switch and Base Bosch ECU. Check interconnect connector. Check wiring and diode between override switch and e-stop switch. 2. Check the wiring has not been shorted to the chassis of the vehicle (caused perhaps by pinching or abrasion). 3. Disconnect connector to Bosch ECU, check continuity between override switch terminals -C200-3 & -C200-1. This should be 'Open Circuit'. Investigate if testing does not concur. 4. Check connectors are dry and free of any debris. Check for damaged pins on the Bosch connectors. 5. Check operation of Override Switch. Check for any physical damage to the switch, connectors or harness components. 

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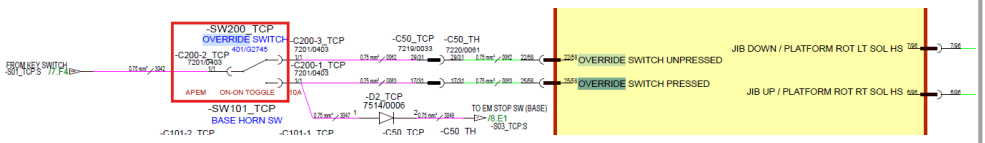
6.1.46 B1060-13

B1060-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1060-13

Error code:	B1060-13
ECU	Base ECU
Description:	E-Stop & Base Override - Override Switch Pressed and Override Switch Unpressed Open Circuit
Component:	Base Override Switch
Vehicle reaction:	1. Detect failure mode; Ignore input 2. Default to Override unpressed state
Possible Cause:	1. A poor connection or damaged terminal within the connector(s) 2. A damaged or broken wire within the wiring harness 3. Component is damaged
Service Action:	1. Check for broken wires at terminals of Override switch, Interconnect and Base Bosch ECU connectors. Check for 'backed out' terminals on Bosch connectors. Check Connectors were engaged or plugged in correctly. 2. Check continuity from Override switch to interconnect and from interconnect to Bosch ECU. 3. Check operation of Override Switch. Check for any physical damage to the switch, connectors or harness components. 

6.1.47 B1061-17

B1061-17

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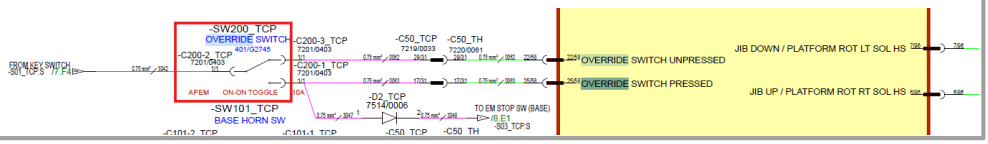
Machine Fault Codes 518 > DTC ERROR CODE 519 > B1061-17

Error code:	B1061-17
ECU	Base ECU
Description:	Override switch unpressed short circuit to high
Component:	Override switch
Vehicle reaction:	Input will be ignored
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between Override Switch and Base Bosch ECU for Voltage greater than 10.5 volts. Check interconnect connector. Check wiring and diode between override switch and e-stop switch. 2. Disconnect connector to Bosch ECU, check continuity between override switch terminals -C200-3 & -C200-1. This should be 'Open Circuit'. Investigate if testing does not concur. 3. Check connectors are dry and free of any debris. Check for damaged pins on the Bosch connectors. 4. Check operation of Override Switch. 

6.1.48 B1062-16

B1062-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1062 16

Error code:	B1062-16

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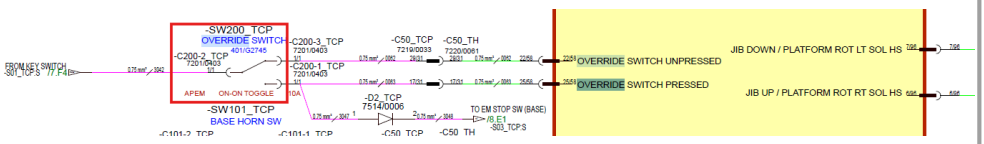
ECU	Base ECU
Description:	E-Stop & Base Override - Override Switch Unpressed Short Circuit to Low
Component:	Base Override Switch
Vehicle reaction:	Detect failure mode; Ignore input Default to Override unpressed state
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check wiring between Override Switch and Base Bosch ECU. Check interconnect connector. Check wiring and diode between override switch and e-stop switch. Disconnect Bosch Base ECU and check continuity between override switch terminals -C200-3 & -C200-1 2. Check the wiring has not been shorted to the chassis of the vehicle (caused perhaps by pinching or abrasion). 3. Disconnect connector to Bosch ECU, check continuity between override switch terminals -C200-3 & -C200-1. This should be 'Open Circuit'. Investigate if testing does not concur. 4. Check connectors are dry and free of any debris. Check for damaged pins on the Bosch connectors. 5. Check operation of Override Switch. Check for any physical damage to the switch, connectors or harness components. 

6.1.49 B1063-92

B1063-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1063□92

Error code:	**B1063-92**

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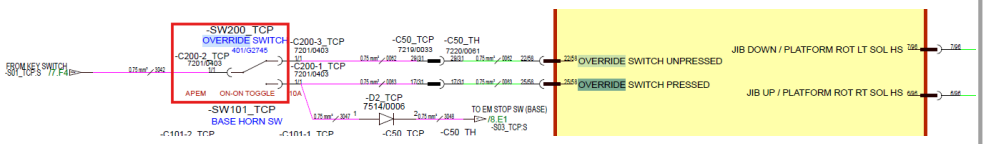
ECU	Base ECU
Description:	E-Stop & Base Override - Override Switch Pressed and Override Switch Unpressed Both activated (5-10V)
Component:	Base Override Switch
Vehicle reaction:	Detect failure mode; Ignore input Default to Override unpressed state
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between Override Switch and Base Bosch ECU. Check interconnect connector. Check wiring and diode between override switch and e-stop switch. 2. Disconnect connector to Bosch ECU, check continuity between override switch terminals -C200-3 & -C200-1. This should be 'Open Circuit'. Investigate if testing does not concur. 3. Check connectors are dry and free of any debris. Check for damaged pins on the Bosch connectors. 4. Check operation of Override Switch. 

6.1.50 B1064-17

B1064-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1064 17

Error code:	**B1064-17**
ECU	Platform ECU
Description:	SLEW ACK SWITCH Short Circuit to High

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Component:	Slew Acknowledgment Button
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect -C205-2_PCP from the Slew Acknowledgment Switch. Measure voltage at -C205-2_PCP. If voltage is high (>5V) then there is a short circuit to high between the wiring from the terminal to the Platform Bosch ECU pin 51/58. 2. Check Platform Bosch ECU Connectors for any bent terminals or stray wiring. 3. Check all connectors / terminals for any water ingress. 4. Check operation of the Slew Acknowledgment switch. Check wiring for damage, especially abrasion or pinching.

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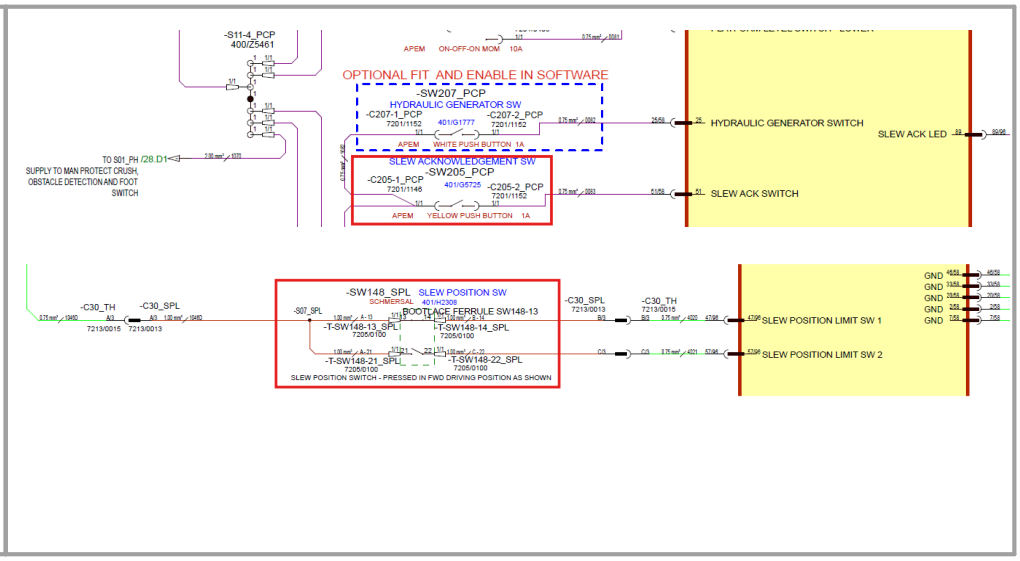

6.1.51 B1065-16

B1065-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1065□16

Error code:	B1065-16
ECU	Platform ECU
Description:	SLEW ACK SWITCH Short Circuit to Low
Component:	Slew Acknowledgment Button
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect -C205-2_PCP from the Slew Acknowledgment Switch. Measure voltage at -C205-2_PCP. If voltage is Low (<2V) then there is a

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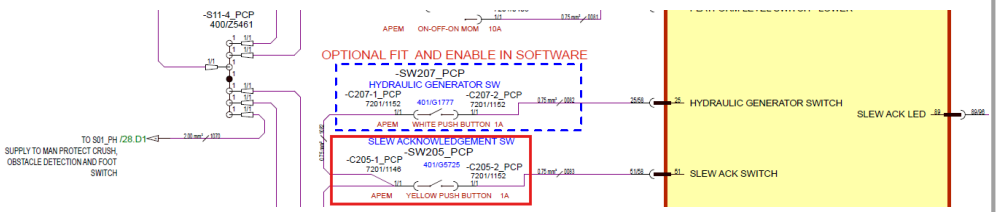
short circuit to Low between the wiring from the terminal to the Platform Bosch ECU pin 51/58.
2. Check no exposed wiring near switch that may be touching metalwork.
3. Check Platform Bosch ECU Connectors for any bent terminals or stray wiring.
4. Check all connectors / terminals for any water ingress.
5. Check operation of the Slew Acknowledgment switch. Check wiring for damage, especially abrasion or pinching.



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	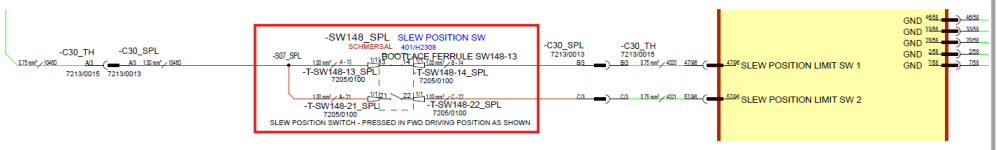

6.1.52 B1066-24

B1066-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1066-24

Error code:	B1066-24
ECU	Platform ECU
Description:	SLEW ACK SWITCH Short Circuit Stuck for >= 10 seconds
Component:	Slew Acknowledgment Button
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connectors -C205-1_PCP and -C205-2_PCP from the Slew Acknowledgment Switch. Use a multimeter to test the operation of the switch. 2. Check wire #0083 is not shorted to +10V. 3. Check all connectors for water ingress. 4. Check harness especially for abrasions and pinching. Check condition of connectors, checking especially for backed out or bent pins

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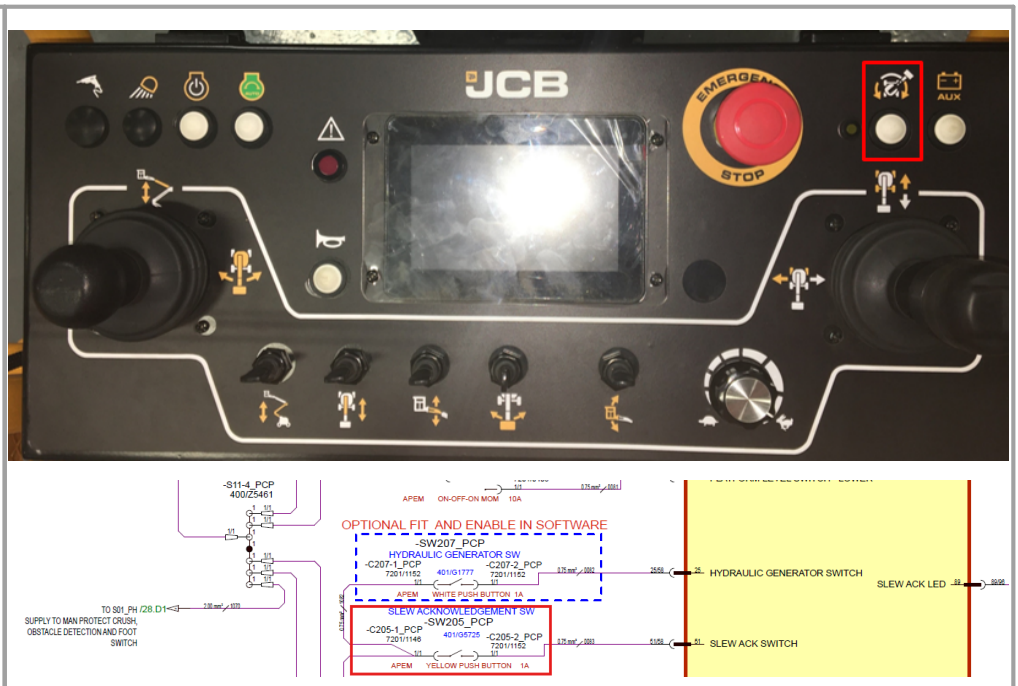

6.1.53 B1067-17

B1067-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1067□17

Error code:	B1067-17
ECU	Platform ECU
Description:	Potentiometer Selector Short Circuit to High (>5.5V)
Component:	Potentiometer
Vehicle reaction:	Detect failure mode - Set Potentiometer to 10%

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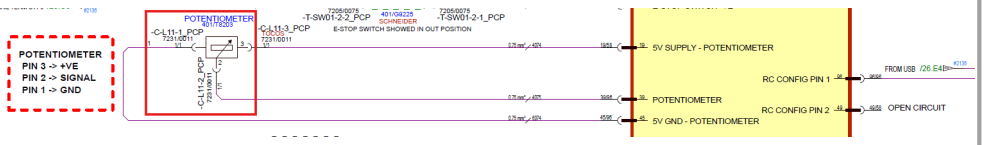
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at pin 2 of speed selector potentiometer. The voltage should range from 0V - 5V as the knob is turned. If voltage stays at 5V, then it is likely the potentiometer has failed. If the voltage is above 5.5V then it is likely to be a short circuit to high within the wiring from potentiometer to Platform Bosch ECU pin 39/96. 2. Check wire #4075 from Potentiometer to Platform Bosch ECU pin 39/96. 3. Check for water ingress at Platform Bosch ECU Connectors. 4. Check Wiring for any abrasions or pinching. Check function of potentiometer. Resistance value from pin 1 to pin 3 = 5000ohms. Check resistance from pin 1 to pin 2 - should change value from 0 to 5000 ohms depending on knob position. 

6.1.54 B1069-17

B1069-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1069□17

Error code:	**B1069-17**

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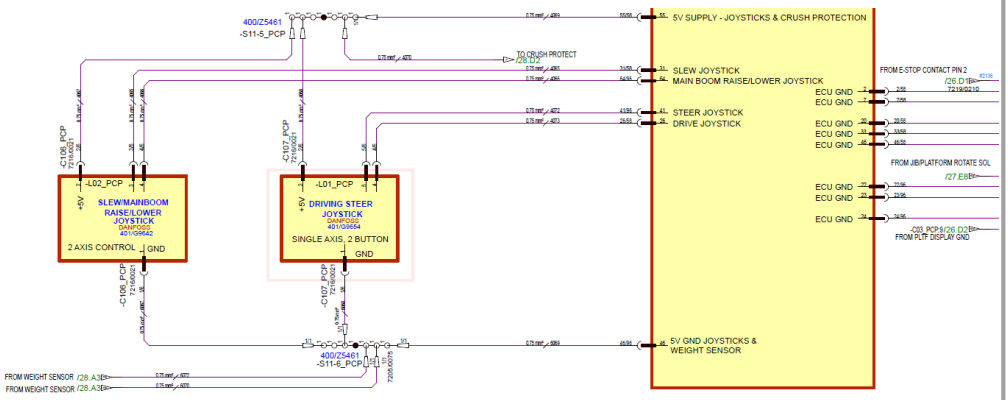
ECU	Platform ECU
Description:	Drive JOYSTICK Short Circuit to High (>4.75V)
Component:	Drive Joystick
Vehicle reaction:	Detect failure mode - Ignore drive & Steer input (machine stops immediately)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage between pin 1/6 (GND) and pin 4/6 (Drive) on joystick connector. Voltage should measure between 0.25 - 4.75V depending on position of Joystick. If value is above 4.75V then there is likely a short circuit to high either within the joystick or wiring back to the Platform Bosch ECU Pin 26/58. 2. Check Connectors at joystick and Platform Bosch ECU, check for bent pins or stray wires potentially causing a short circuit. 3. Check Connectors at joystick and Platform Bosch ECU for water ingress. 4. Check joystick for damage. Check all wiring for potential damage, especially abrasions and pinching. 

6.1.55 B1070-16

B1070-16

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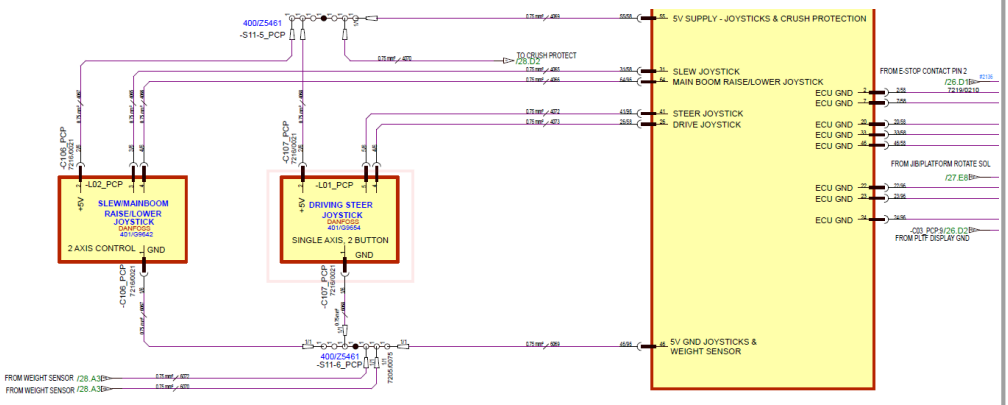
Machine Fault Codes 518 > DTC ERROR CODE 519 > B1070-16

Error code:	B1070-16
ECU	Platform ECU
Description:	Drive JOYSTICK Short Circuit to Low (<0.25V) or Open Circuit
Component:	Drive Joystick
Vehicle reaction:	Detect failure mode - Ignore drive & Steer input (machine stops immediately)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component 6. A damaged or broken wire within the wiring harness
Service Action:	1. Measure voltage between pin 1/6 (GND) and pin 4/6 (Drive) on joystick connector. Voltage should measure between 0.25 - 4.75V depending on position of Joystick. If value is below 0.25V then there is likely a short circuit to GND either within the joystick or wiring back to the Platform Bosch ECU Pin 26/58. 2. Check Connectors at joystick and Platform Bosch ECU, check for bent pins or stray wires potentially causing a short circuit. 3. Check Connectors at joystick and Platform Bosch ECU for water ingress. 4. Check joystick for damage. Check all wiring for potential damage, especially abrasions and pinching.



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6.1.56 B1071-17

B1071-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1071□17

Error code:	B1071-17
ECU	Base ECU
Description:	PLATFORM LEVELING RAISE Switch Short Circuit to High (Base Control)
Component:	Platform Level Switch
Vehicle reaction:	Before operation: Ignore the input (but not o/p as it can be operated from where there is no fault) After operation (in case of STto12V): Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Platform Leveling Raise terminal, -C112-3 TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is high, remove -C112-2_PCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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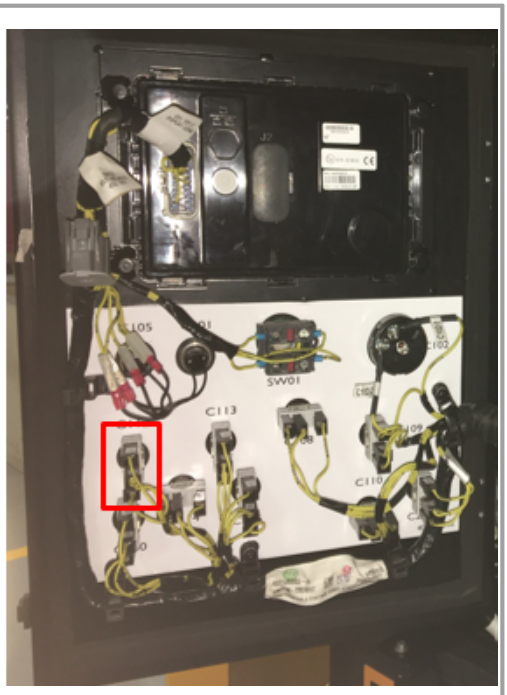

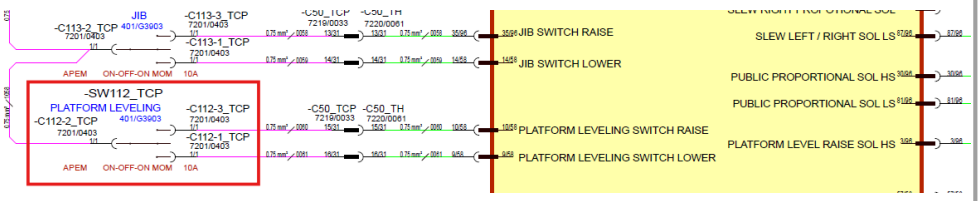

6.1.57 B1072-17

B1072-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1072□17

Error code:	B1072-17
ECU	Base ECU
Description:	PLATFORM LEVELING LOWER Switch Short Circuit to High (Base Control)
Component:	Platform Level Switch

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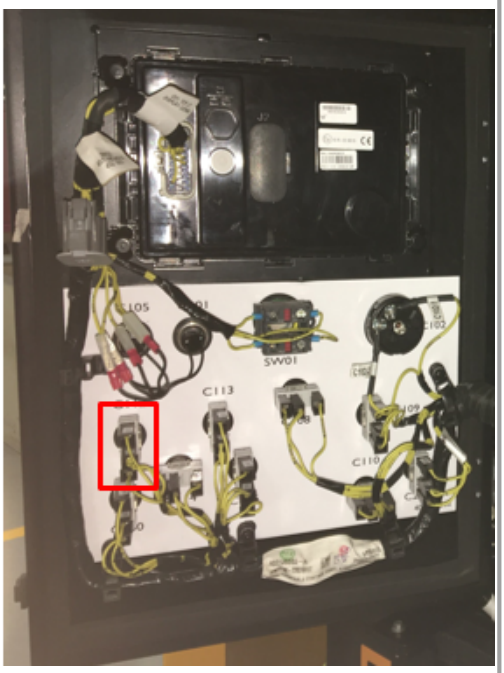
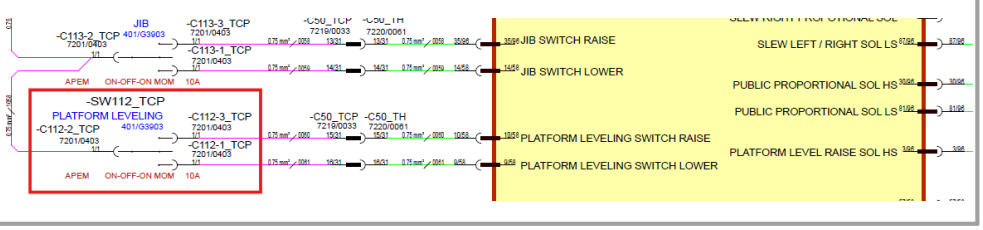
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Platform Leveling Lower terminal, -C112-1_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is high, remove -C112-2_PCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.





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6.1.58 B1073-92

B1073-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1073□92

Error code:	B1073-92
ECU	Base ECU
Description:	PLATFORM LEVELING RAISE and LOWER Switches both activated (5 - 10V) (Base Control)
Component:	Platform Level Switch
Vehicle reaction:	Ignore the input (but not output as it can be operated from where there is no fault)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Platform Leveling Raise &Lower terminals, -C112-1_PCP & -C112-3_PCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors (Pins 9/58 & 10/58). If voltage is high, remove -C112-2_PCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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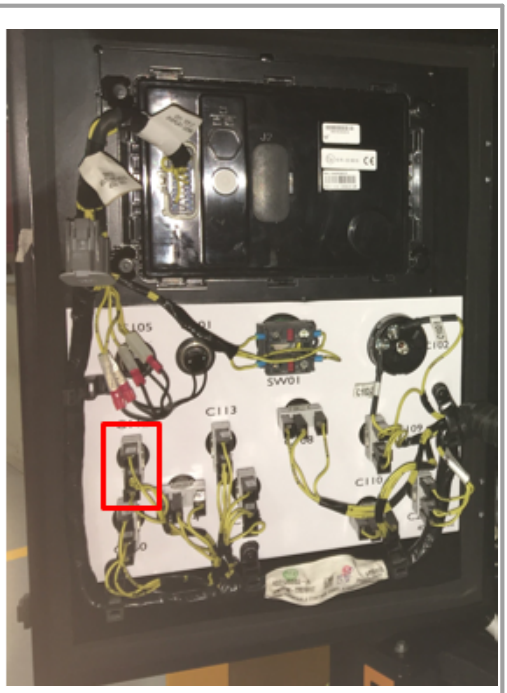

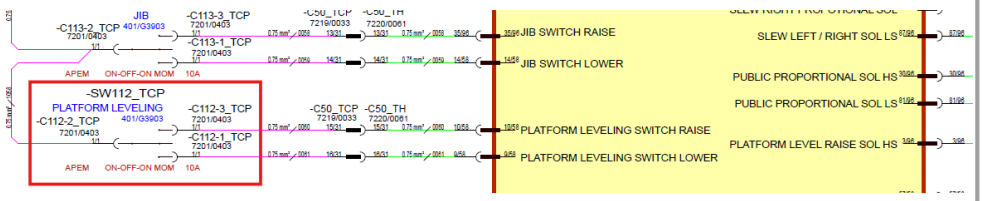

6.1.59 B1074-16

B1074-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1074□16

Error code:	B1074-16
ECU	Base ECU
Description:	PLATFORM LEVELING RAISE Switch Short Circuit to Low (Base Control)
Component:	Platform Level Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault)

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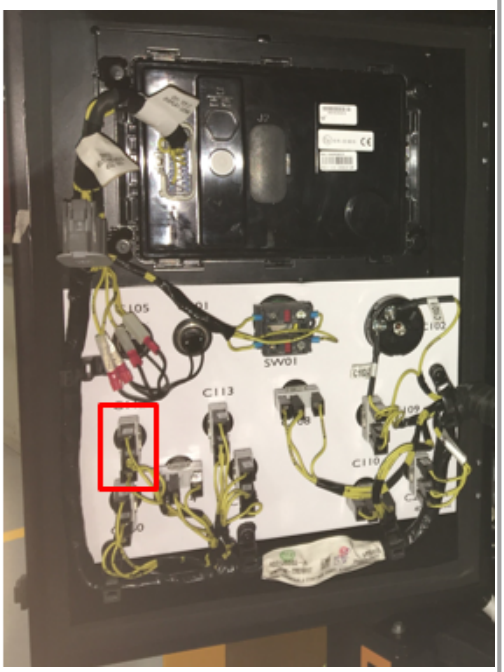
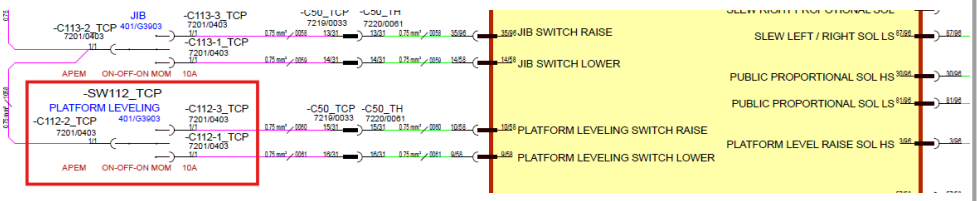
	After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage at Platform Leveling Raise terminal, -C112-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constantly <2.4V or lower, then there is a short to GND either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is Low, remove -C112-2_PCP, if voltage now rises to ~2.5V, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check there are no visible defects in the wiring causing a short circuit to chassis / GND 3. Check Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 4. Check connectors for any sign of water ingress. 5. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.  

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6.1.60 B1075-16

B1075-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1075 16

Error code:	B1075-16
ECU	Base ECU
Description:	PLATFORM LEVELING LOWER Switch Short Circuit to Low(Base Control)
Component:	Platform Level Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage at Platform Leveling Lower terminal, -C112-1_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constantly <2.4V or lower, then there is a short to GND either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is Low, remove -C112-2_TCP, if voltage now rises to ~2.5V, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check there are no visible defects in the wiring causing a short circuit to chassis / GND 3. Check Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 4. Check connectors for any sign of water ingress. 5. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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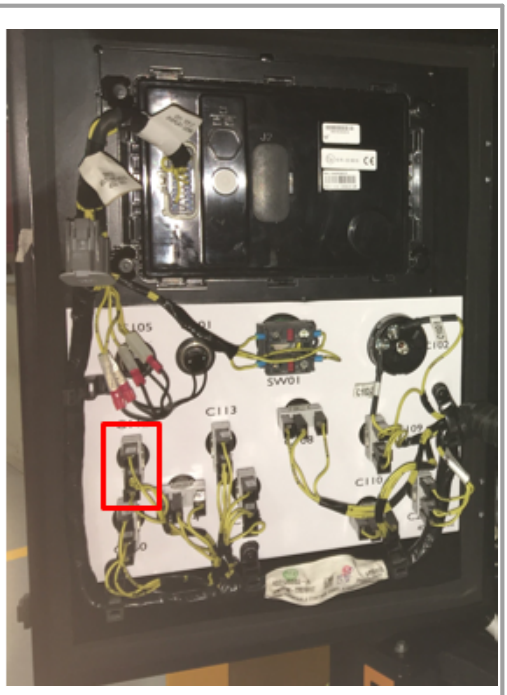

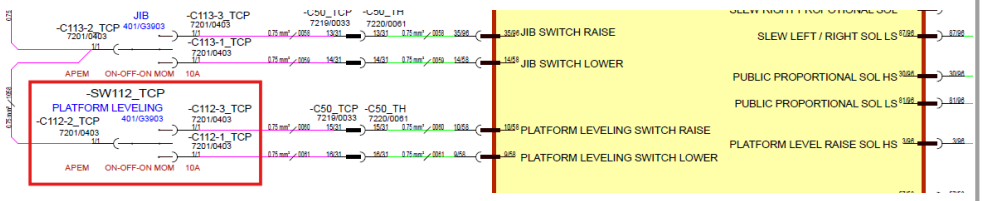

6.1.61 B1076-17

B1076-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1076-17

Error code:	B1076-17
ECU	Base ECU
Description :	MAIN BOOM RAISE OR LOWER PROPORTIONAL Solenoid Valve High Side Short Circuit to High
Component :	MAIN BOOM RAISE OR LOWER PROPORTIONAL Solenoid Valve

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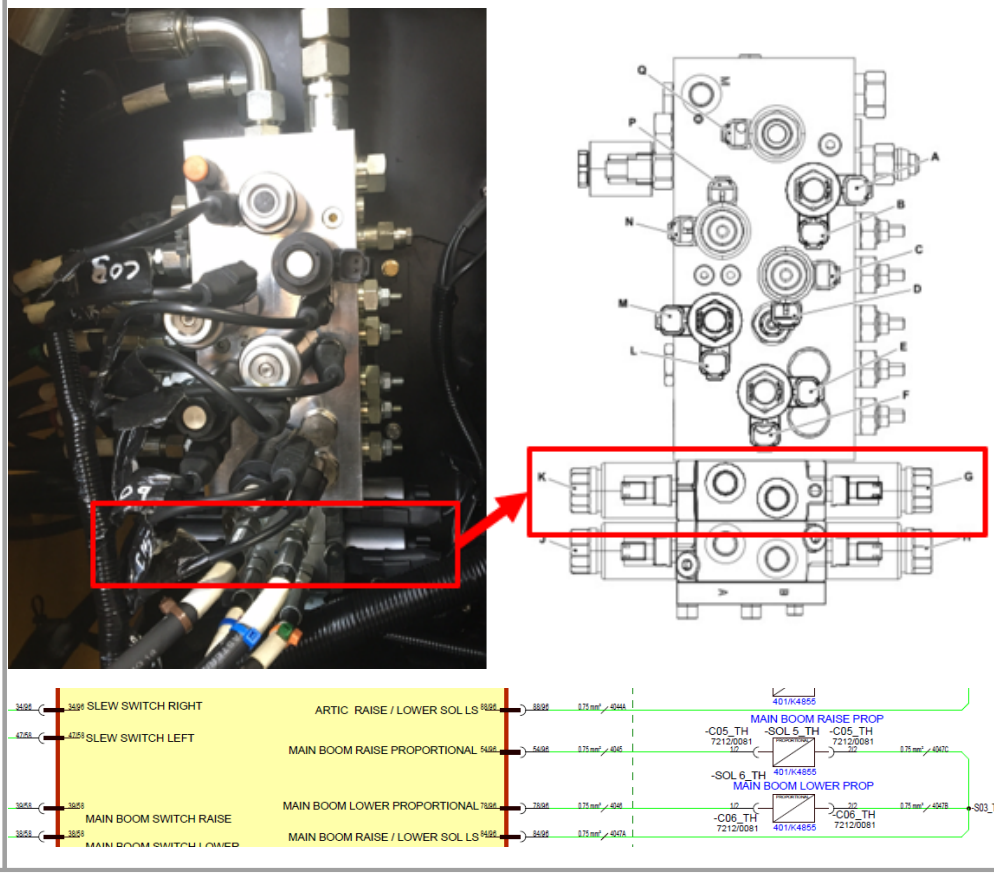
Vehicle reaction:	Disable main-boom raise and lower outputs
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from coil to ECU wire 4045,4046 & 4047A, 4047B, 4047C for cut, pinch or and damage. 3. Check ECU Pin 54/96, 78/96, 84/96 for bend or back out or any damage. 4. Check solenoid connector C05_TH and C06_TH for loose connection or any damage. 5. Check if valve is mechanically jammed 6. Turn machine ignition on/off to clear code. 

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6.1.62 B1077-16

B1077-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1077-16

Error code:	B1077-16
ECU	Base ECU
Description:	MAIN BOOM RAISE OR LOWER PROPORTIONAL Solenoid Valve High Side Short Circuit to Low
Component:	MAIN BOOM RAISE OR LOWER PROPORTIONAL Solenoid Valve
Vehicle reaction:	Disable main-boom raise and lower outputs
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from coil to ECU wire 4045,4046 & 4047A, 4047B, 4047C for cut, pinch or and damage. 3. Check ECU Pin 54/96, 78/96, 84/96 for bend or back out or any damage. 4. Check solenoid connector C05_TH and C06_TH for loose connection or any damage. 5. Check if valve is mechanically jammed 6. Turn machine ignition on/off to clear code.

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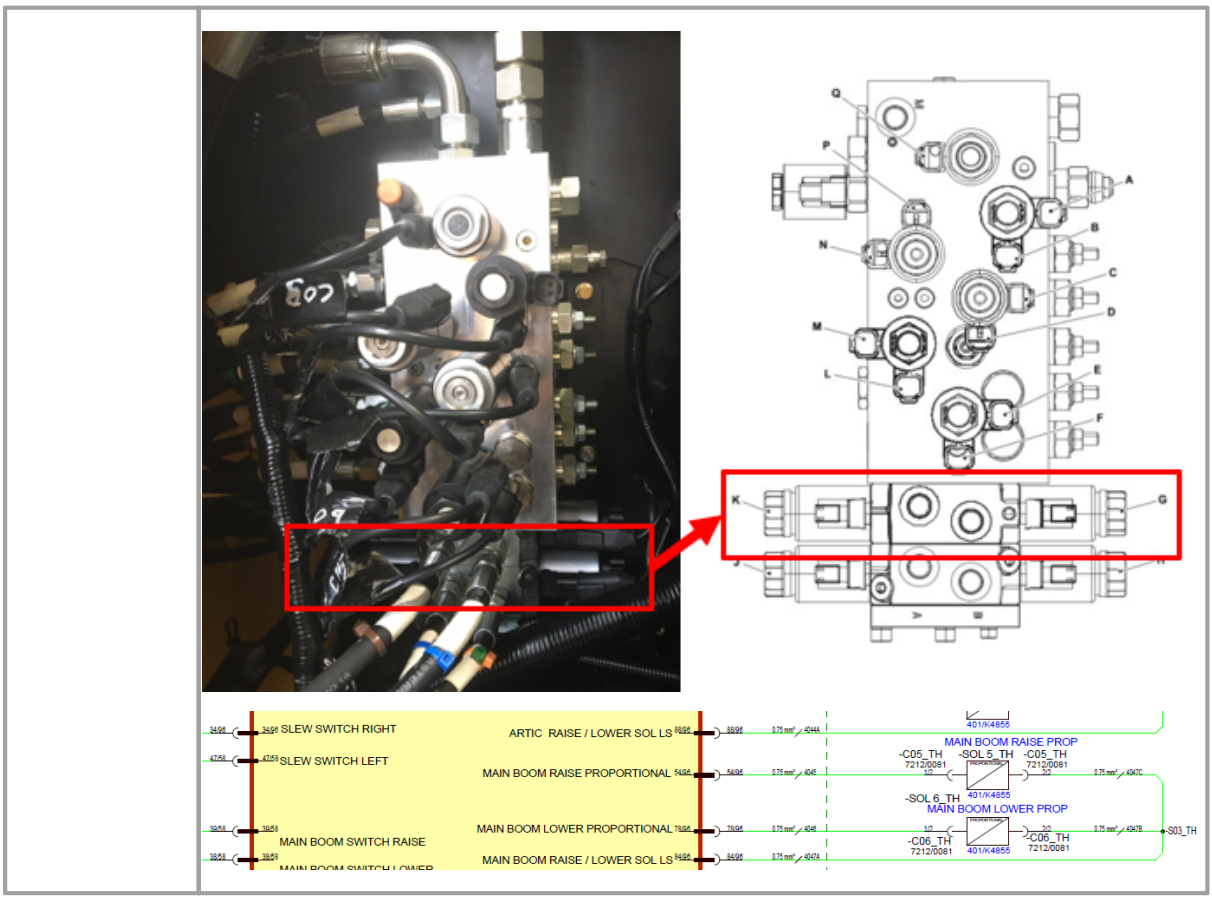

6.1.63 B1078-13

B1078-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1078-13

Error code:	B1078-13
ECU	Base ECU
Description:	MAIN BOOM RAISE OR LOWER PROPORTIONAL Solenoid Valve High Side Open Circuit
Component:	MAIN BOOM RAISE OR LOWER PROPORTIONAL Solenoid Valve
Vehicle reaction:	Disable main-boom raise and lower outputs

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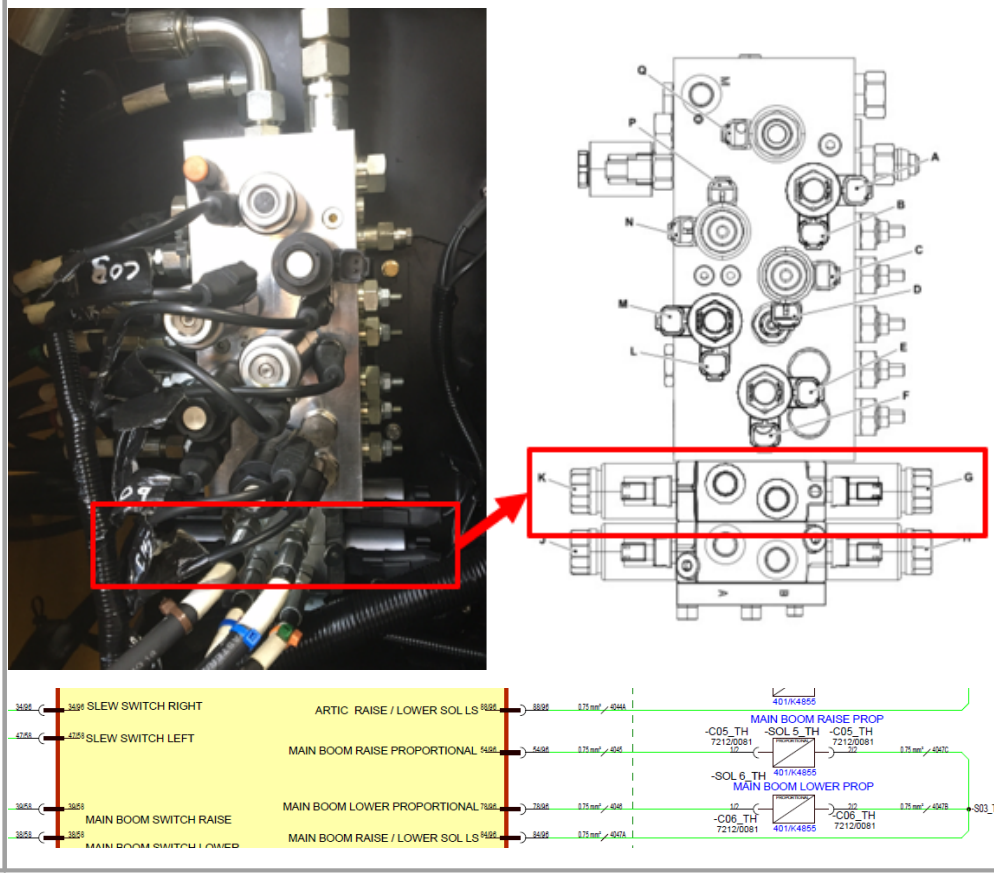
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from coil to ECU wire 4045,4046 & 4047A, 4047B, 4047C for cut, pinch or and damage. 3. Check ECU Pin 54/96, 78/96, 84/96 for bend or back out or any damage. 4. Check solenoid connector C05_TH and C06_TH for loose connection or any damage. 5. Check if valve is mechanically jammed 6. Turn machine ignition on/off to clear code. 

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6.1.64 B1079-17

B1079-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1079-17

Error code:	B1079-17
ECU	Base ECU
Description:	MAIN BOOM RAISE OR LOWER PROPORTIONAL Solenoid Valve Fault
Component:	MAIN BOOM RAISE OR LOWER PROPORTIONAL Solenoid Valve
Vehicle reaction:	Disable main boom lower solenoid
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from coil to ECU wire 4045,4046 & 4047A, 4047B, 4047C for cut, pinch or and damage. 3. Check ECU Pin 54/96, 78/96, 84/96 for bend or back out or any damage. 4. Check solenoid connector C05_TH and C06_TH for loose connection or any damage. 5. Check if valve is mechanically jammed 6. Turn machine ignition on/off to clear code.

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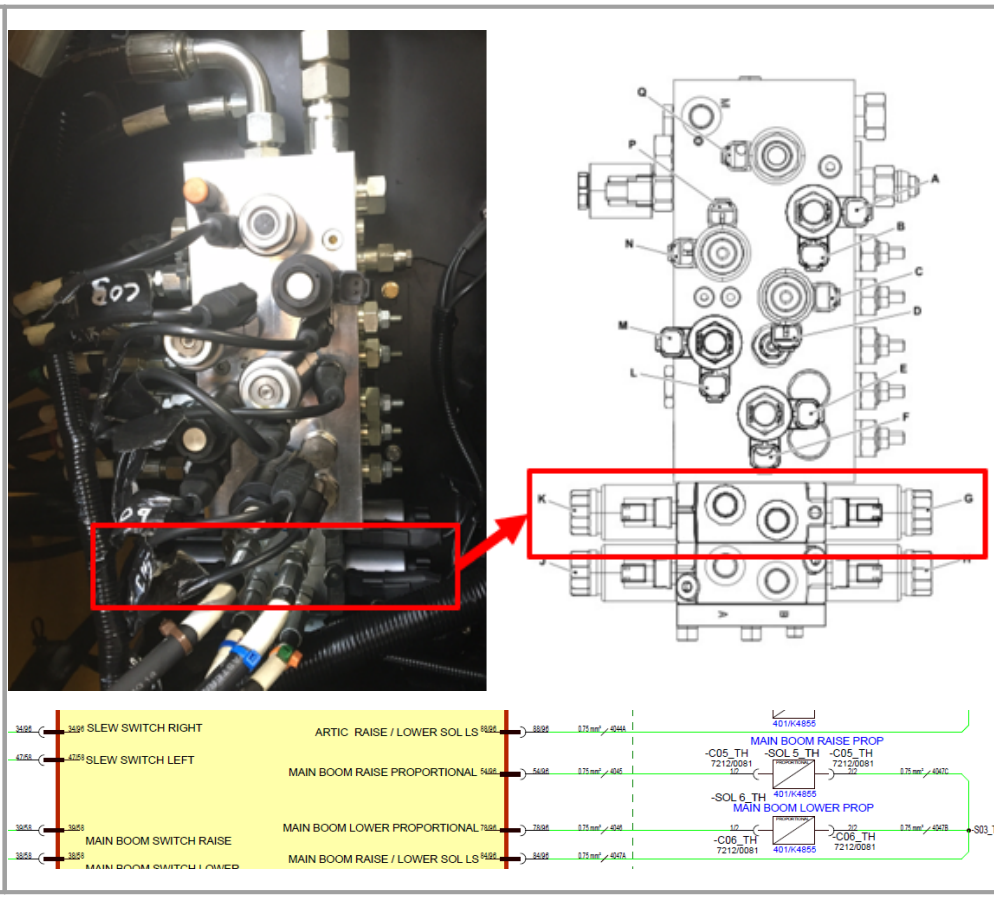

6.1.65 B1080-17

B1080-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1080-17

Error code:	B1080-17
ECU	Base ECU
Description:	SLEW RIGHT OR LEFT PROPORTIONAL Solenoid Valve High Side Short Circuit to High
Component:	SLEW RIGHT OR LEFT PROPORTIONAL Solenoid Valve
Vehicle reaction:	Disable slew outputs

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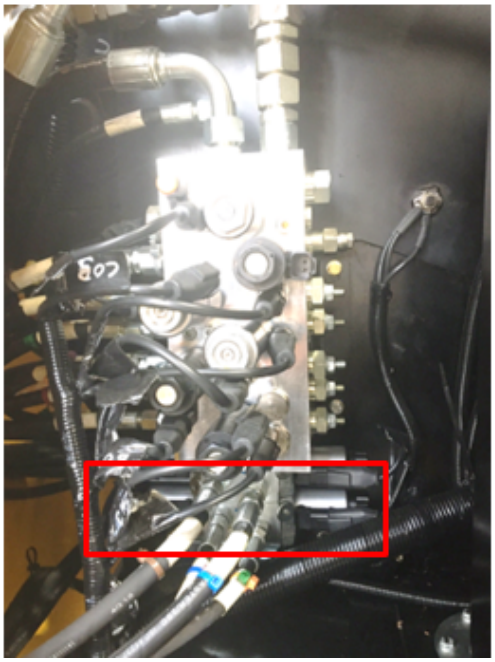
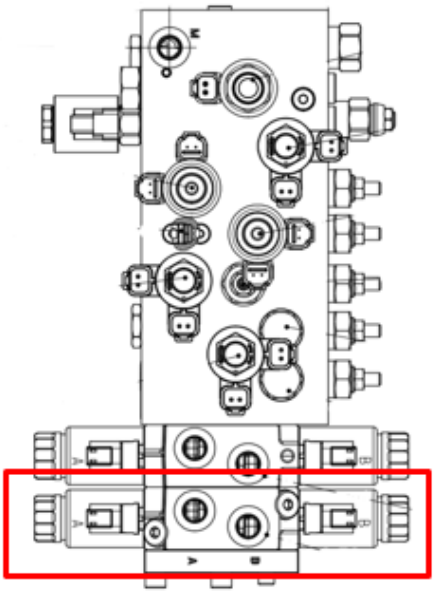
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check harness connector is fully inserted into solenoid connector 2. Check resistance of coil 5-10 ohms. 3. Check no shorts to GND, check for abrasions and pinching in harness and stray wires 4. Check wiring from coil to ECU wire 4054,4055 & 4056A, 4056B, 4056C for cut, pinch or and damage. 5. Check ECU Pin 73/96, 49/96, 87/96 for bend or back out or any damage. 6. Measure continuity at Pin 1 to GND of both connectors to determine which wire is shorted to GND. 7. Check solenoid connector C07_TH and C08_TH for loose connection or any damage. 8. Check if valve is mechanically jammed 9. Turn machine ignition on/off to clear code.  

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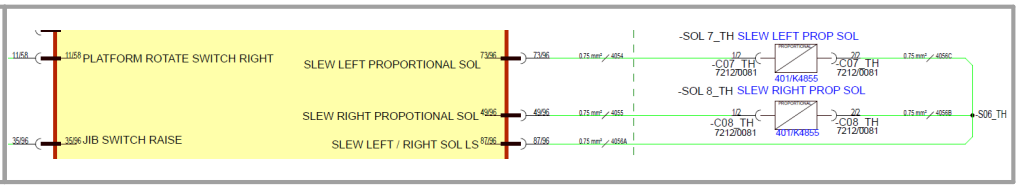

6.1.66 **B1081-16**

B1081-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1081-16

Error code:	B1081-16
ECU	Base ECU
Description:	SLEW RIGHT OR LEFT PROPORTIONAL Solenoid Valve High Side Short Circuit to Low
Component:	SLEW RIGHT OR LEFT PROPORTIONAL Solenoid Valve
Vehicle reaction:	Disable slew outputs
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check harness connector is fully inserted into solenoid connector 2. Check resistance of coil 5-10 ohms. 3. Check no shorts to GND, check for abrasions and pinching in harness and stray wires 4. Check wiring from coil to ECU wire 4054,4055 & 4056A, 4056B, 4056C for cut, pinch or and damage. 5. Check ECU Pin 73/96, 49/96, 87/96 for bend or back out or any damage. 6. Measure continuity at Pin 1 to GND of both connectors to determine which wire is shorted to GND.

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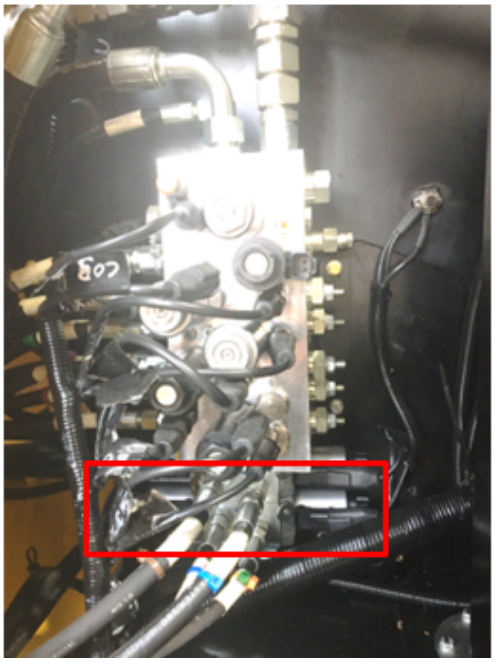
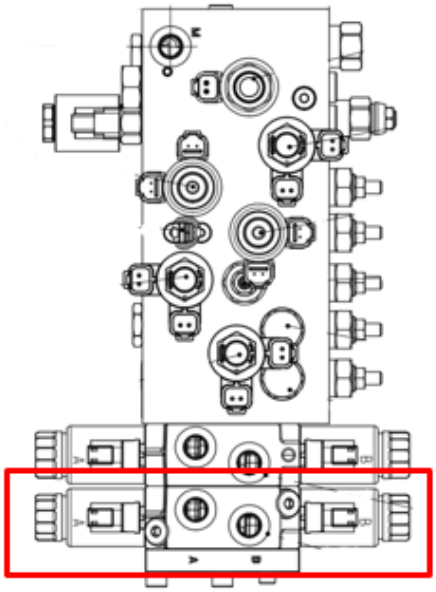
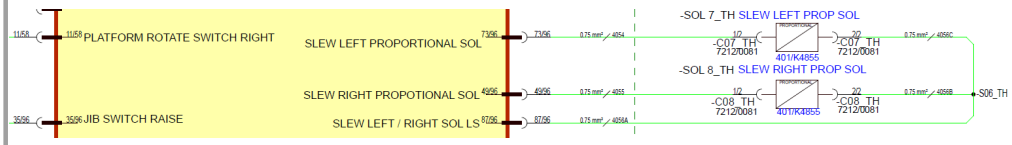
	7. Check solenoid connector C07_TH and C08_TH for loose connection or any damage. 8. Check if valve is mechanically jammed 9. Turn machine ignition on/off to clear code.   

6.1.67 B1082-13

B1082-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1082-13

Error code:	**B1082-13**
ECU	Base ECU
Description :	SLEW RIGHT OR LEFT PROPORTIONAL Solenoid Valve High Side Open Circuit

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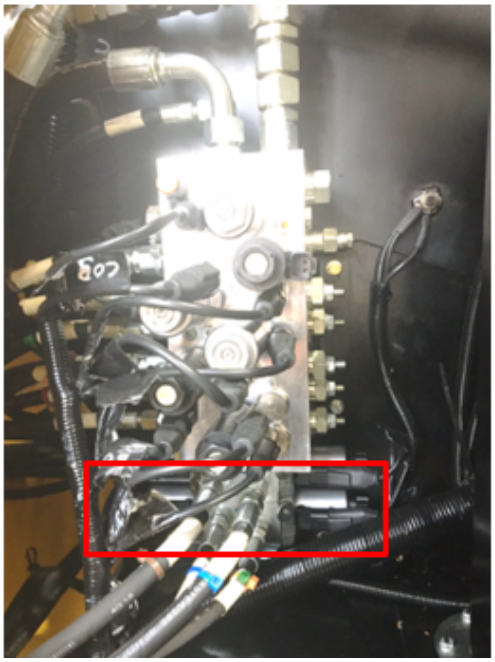
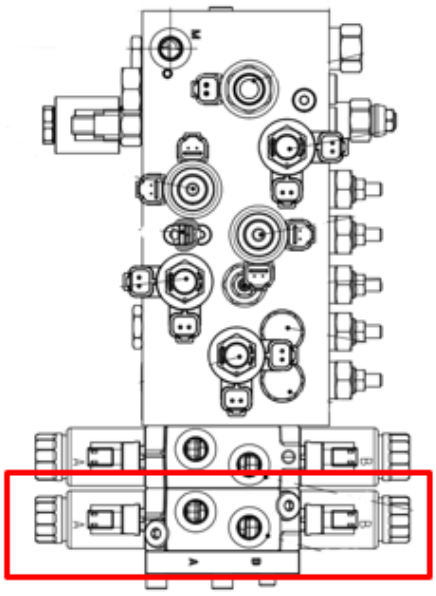
Component :	SLEW RIGHT OR LEFT PROPORTIONAL Solenoid Valve
Vehicle reaction:	Disable the slew outputs
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1. Check resistance of coil 5-10 ohms 2. Check wiring from coil to ECU wire 4054,4055 & 4056A, 4056B, 4056C for cut, pinch or and damage. 3. Check ECU Pin 73/96, 49/96, 87/96 for bend or back out or any damage. 4. Check solenoid connector C07_TH and C08_TH for loose connection or any damage. 5. Check if valve is mechanically jammed 6. Turn machine ignition on/off to clear code.  

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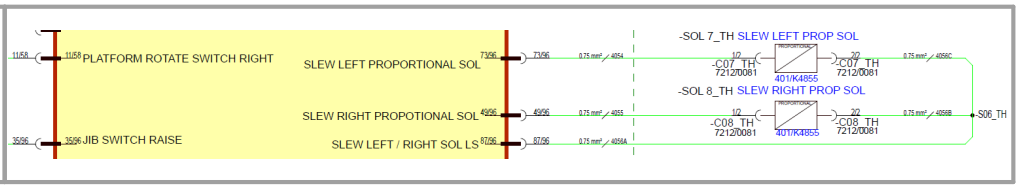

6.1.68 **B1083-17**

B1083-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1083-17

Error code:	B1083-17
ECU	Base ECU
Description:	SLEW RIGHT OR LEFT PROPORTIONAL Solenoid Valve Fault
Component:	SLEW RIGHT OR LEFT PROPORTIONAL Solenoid Valve
Vehicle reaction:	Disable slew outputs
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check harness connector is fully inserted into solenoid connector 2. Check resistance of coil 5-10 ohms 3. Check wiring from coil to ECU wire 4054,4055 & 4056A, 4056B, 4056C for cut, pinch or and damage. 4. Check ECU Pin 73/96, 49/96, 87/96 for bend or back out or any damage. 5. Check solenoid connector C07_TH and C08_TH for loose connection or any damage. 6. Check if valve is mechanically jammed

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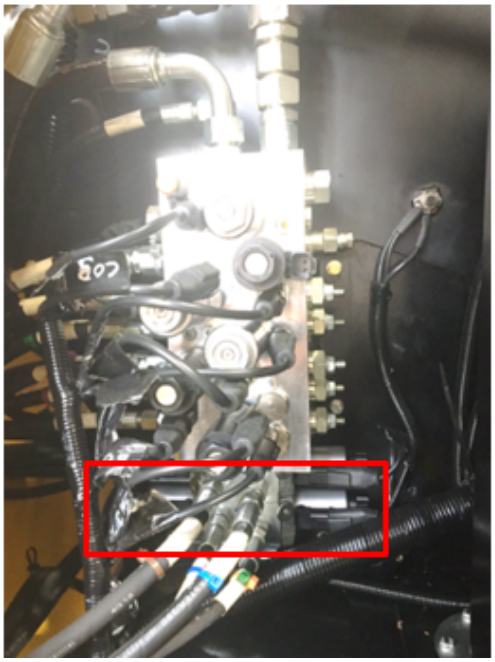
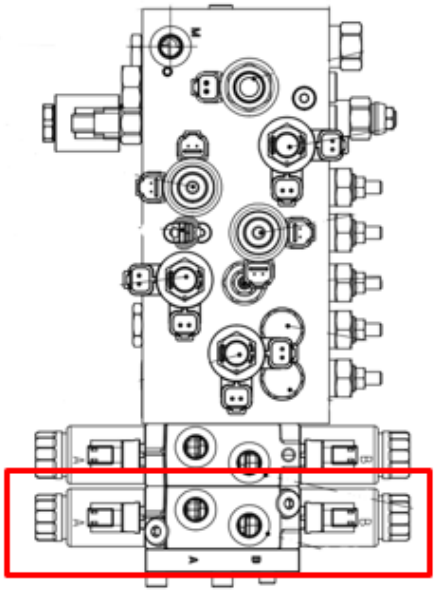
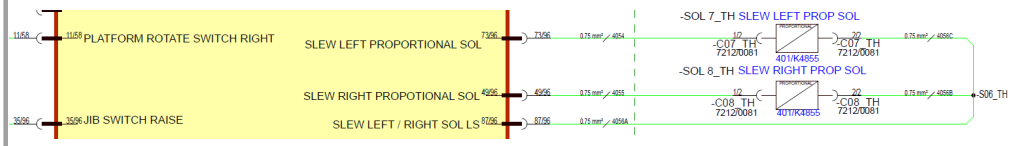
7. Turn machine ignition on/off to clear code.







6.1.69 B1084-17

B1084-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1084-17

Error code:	B1084-17
ECU	Base ECU
Description:	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve High Side Short Circuit to High OR Short Circuit to Low
Component:	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve

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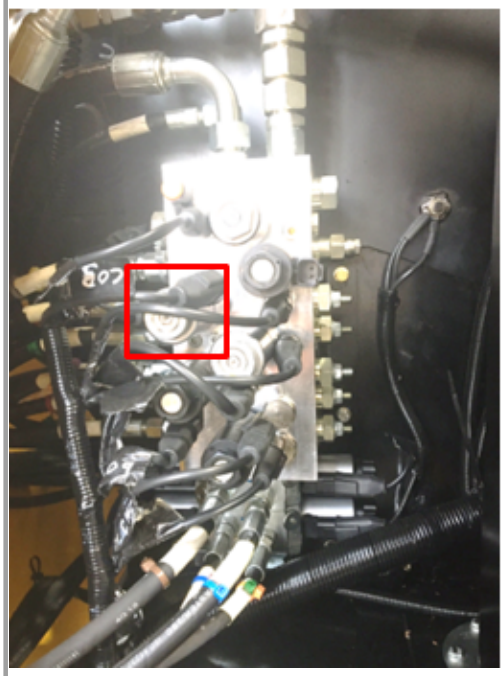
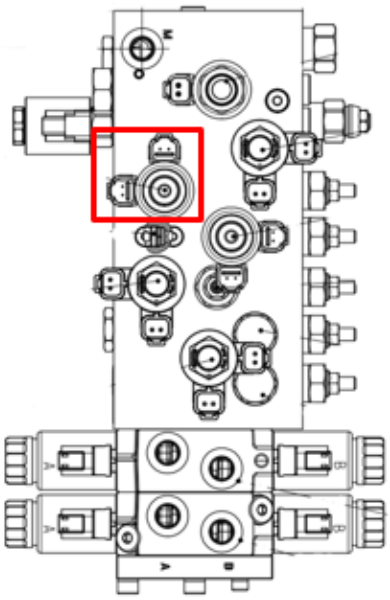
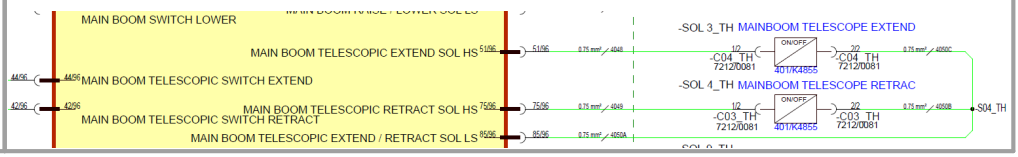
Vehicle reaction:	Detect failure mode with Safout method - Switch this output to off Before Ignition ON, POST Fail (stuck in startup logic) and Generic output fault
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between ECU and solenoid for voltage greater than 10.5 volts. 2. check for continuity to ground. 3. Check wiring from coil to ECU wire 4048,4049 & 4050A, 4050B, 4050C for cut, pinch or and damage. 4. Check ECU Pin 51/96, 75/96, 85/96 for bend or back out or any damage. 5. Check solenoid connector C04_TH and C03_TH for loose connection or any damage. 6. Check if valve is mechanically jammed 2. Turn machine ignition on/off to clear code.







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6.1.70 B1085-92

Error code:	B1085-92
ECU	Base ECU
Description:	Low Battery Voltage Warning
Component:	Battery and Charger
Vehicle reaction:	Detect failure mode with safe out method, Block all functions including Drive & Steer
Possible Cause:	1. Faulty Battery 2. Faulty Charger 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check Battery cable connection for any loose or damage 2. Check Battery condition, Voltage drop and Specific gravity or any external damamge 3. Check Charger connection for any loose or damage connector 4. Check Charger Output 5. Replace battery, If faulty 6. Replace Charger if Faulty.

6.1.71 B1086-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1086-13

Error code:	B1086-13
ECU	Base ECU
Description:	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve High Side & Low Side Open Circuit

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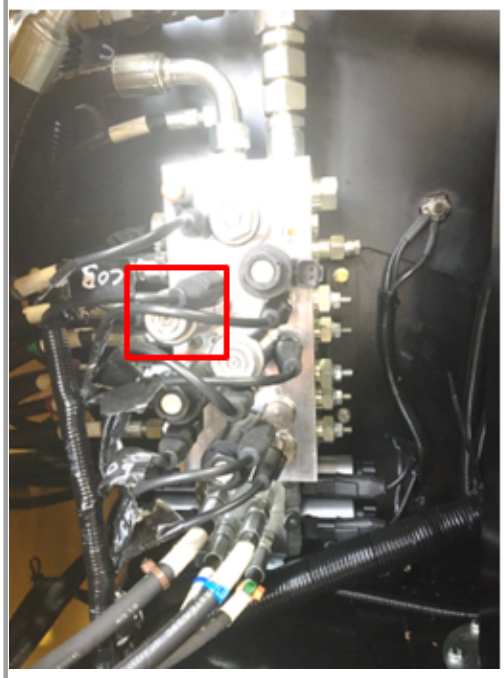
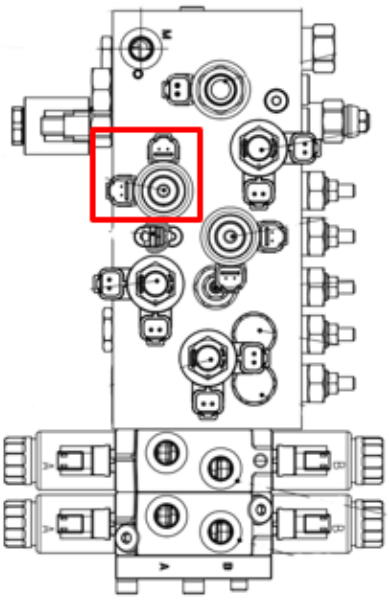
Component :	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve
Vehicle reaction:	Disable main boom outputs
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component. 5. Break in wiring, poor connection at solenoids
Service Action:	1. Check wiring between ECU and solenoid for voltage greater than 10.5 volts. 2. check for continuity to ground. 3. Check wiring from coil to ECU wire 4048,4049 & 4050A, 4050B, 4050C for cut, pinch or and damage. 4. Check ECU Pin 51/96, 75/96, 85/96 for bend or back out or any damage. 5. Check solenoid connector C04_TH and C03_TH for loose connection or any damage. 6. Check if valve is mechanically jammed 7. Turn machine ignition on/off to clear code.  

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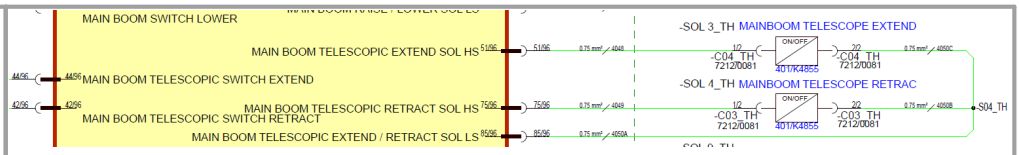

6.1.72 B1087-17

B1087-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1087-17

Error code:	B1087-17
ECU	Base ECU
Description:	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve Fault
Component:	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure mode with Safout method - Switch Main Boom output to off (High Side & Low Side Short Circuit to Low or Open Circuit)
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1. Check wiring between ECU and solenoid for voltage greater than 10.5 volts. 2. Check wiring from coil to ECU wire 4048,4049 & 4050A, 4050B, 4050C for cut, pinch or and damage. 3. Check ECU Pin 51/96, 75/96, 85/96 for bend or back out or any damage.

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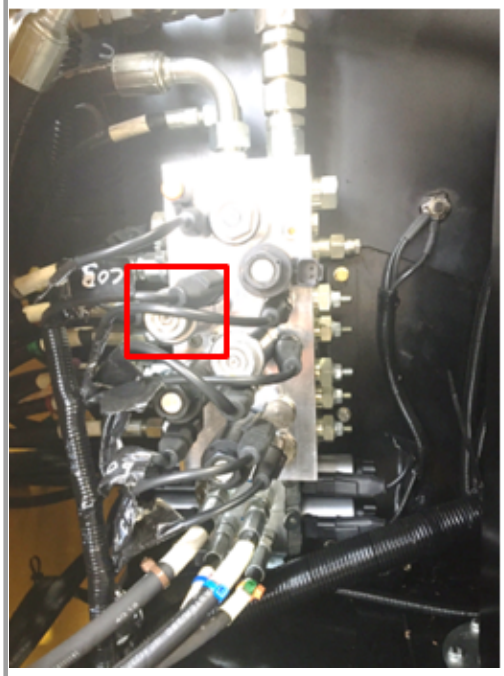
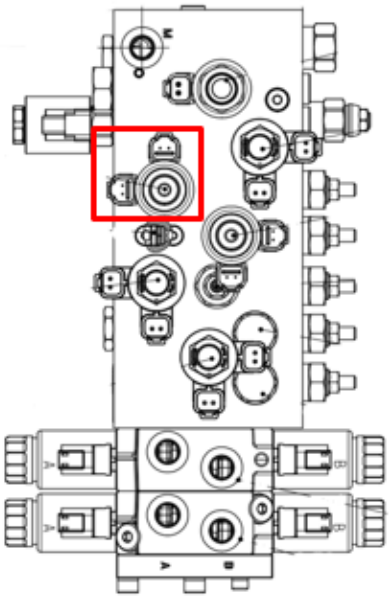
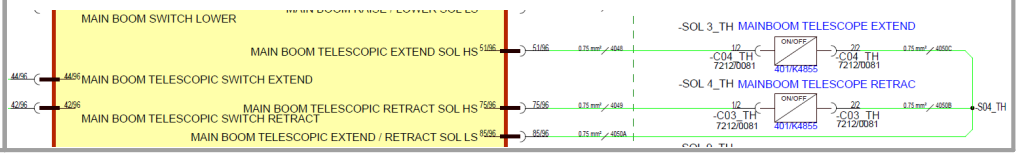
4. Check solenoid connector C04_TH and C03_TH for loose connection or any damage.

5. Check if valve is mechanically jammed

6. Turn ignition on off to clear code







6.1.73 B1088-17

B1088-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1088-17

Error code:	**B1088-17**
ECU	Base ECU
Description :	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve High Side Short Circuit to High

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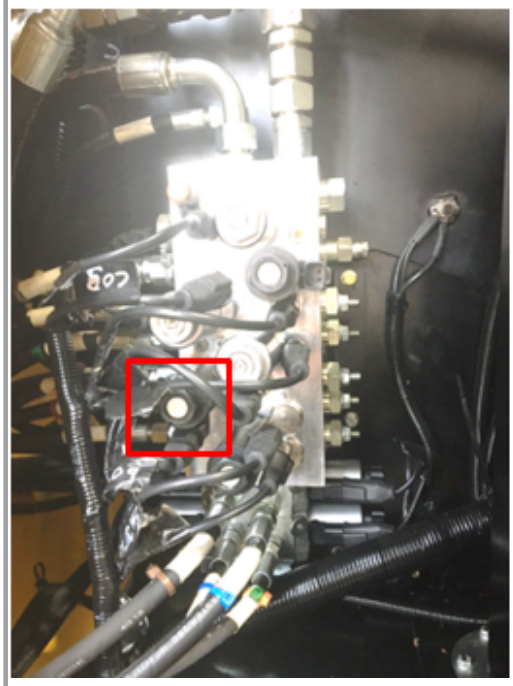
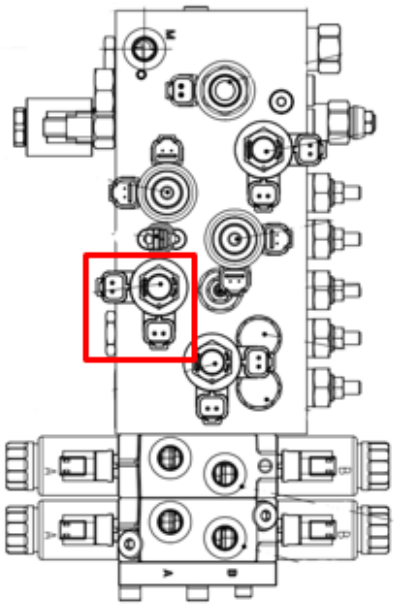
Component :	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure mode with Safout method - Switch Steer output to off
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1.Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4051,4052 & 4053A, 4053B, 4053C for cut, pinch or and damage. 3. Check ECU Pin 74/96, 50/96, 80/96 for bend or back out or any damage. 4. Check solenoid connector C09_TH and C10_TH for loose connection or any damage. 5. Check if valve is mechanically jammed. 6 Turn ignition on off to clear code.  

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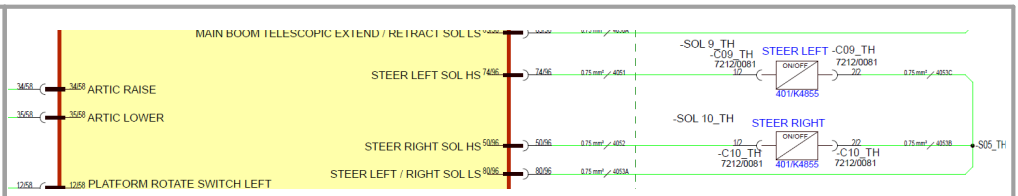

6.1.74 B1089-16

B1089-16

Error code:	B1089-16
ECU	Base ECU
Description :	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve High Side Short Circuit to Low
Component :	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure mode with Safout method - Switch Steer output to off
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1.Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4051,4052 & 4053A, 4053B, 4053C for cut, pinch or and damage. 3. Check ECU Pin 74/96, 50/96, 80/96 for bend or back out or any damage. 4. Check solenoid connector C09_TH and C10_TH for loose connection or any damage. 5. Check if valve is mechanically jammed. 6 Turn ignition on off to clear code.

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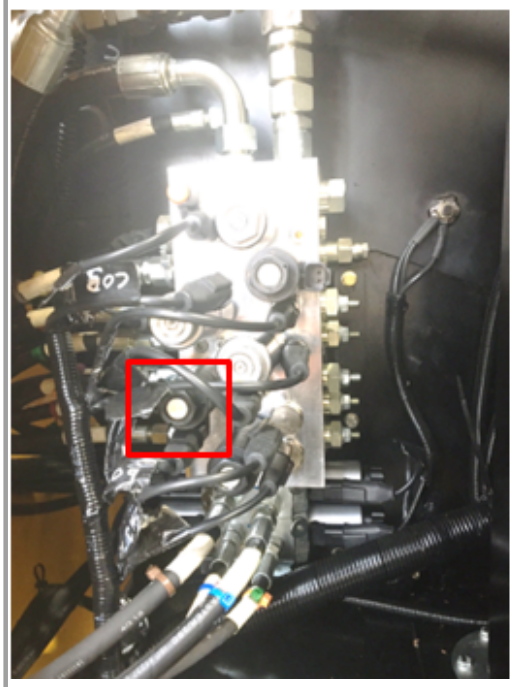

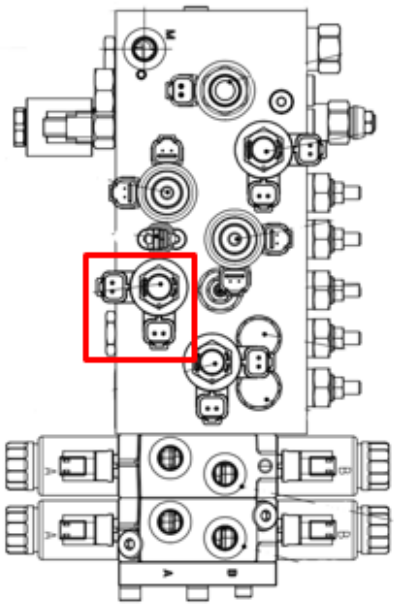

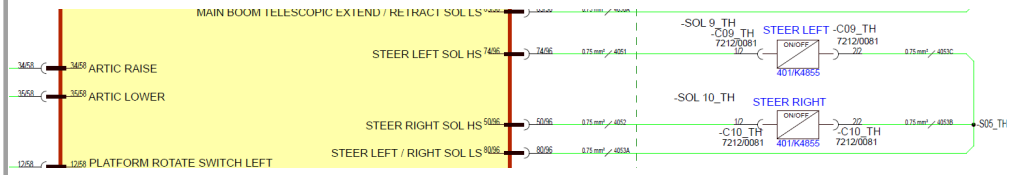

6.1.75 B1090-13

B1090-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1090-13

Error code:	B1090-13
ECU	Base ECU
Description:	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve High Side & Low Side Open Circuit
Component:	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve

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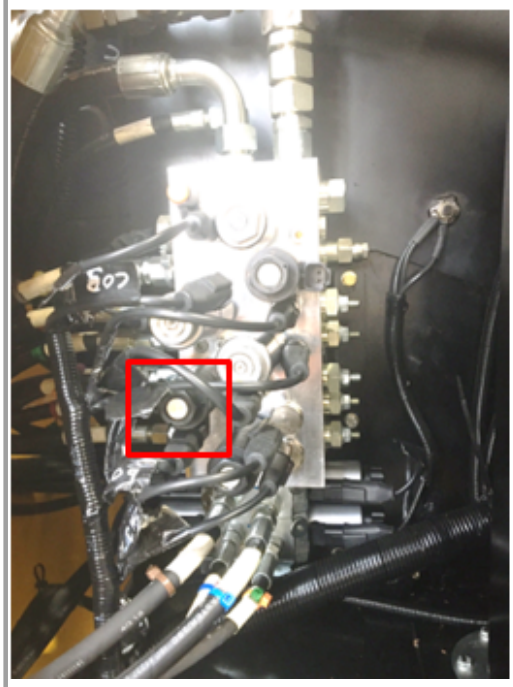
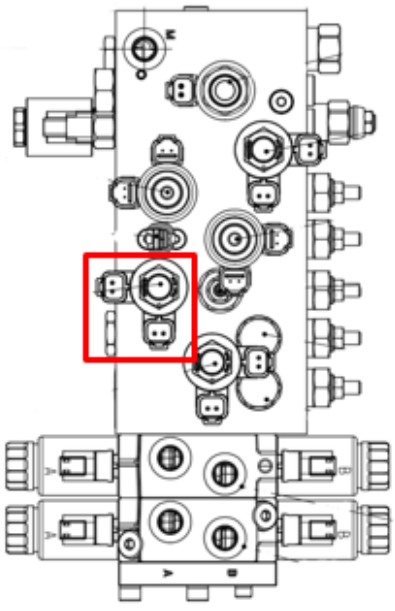
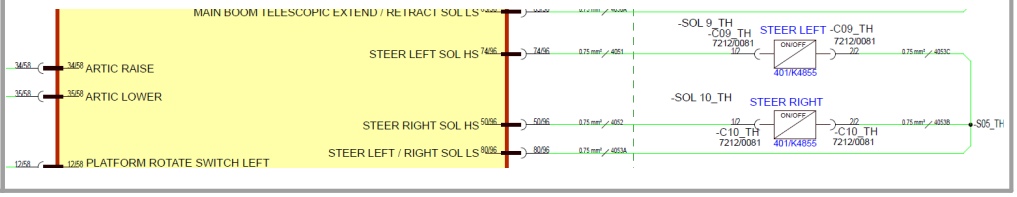
Vehicle reaction:	Detect failure mode with Safout method - Switch Steer output to off
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1.Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4051,4052 & 4053A, 4053B, 4053C for cut, pinch or and damage. 3. Check ECU Pin 74/96, 50/96, 80/96 for bend or back out or any damage. 4. Check solenoid connector C09_TH and C10_TH for loose connection or any damage. 5. Check if valve is mechanically jammed. 6 Turn ignition on off to clear code.   

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6.1.76 B1091-17

B1091-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1091-17

Error code:	B1091-17
ECU	Base ECU
Description:	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve Fault.
Component:	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure mode with Safout method - Switch Steer output to off
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1.Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4051,4052 & 4053A, 4053B, 4053C for cut, pinch or and damage. 3. Check ECU Pin 74/96, 50/96, 80/96 for bend or back out or any damage. 4. Check solenoid connector C09_TH and C10_TH for loose connection or any damage. 5. Check if valve is mechanically jammed. 6 Turn ignition on off to clear code.

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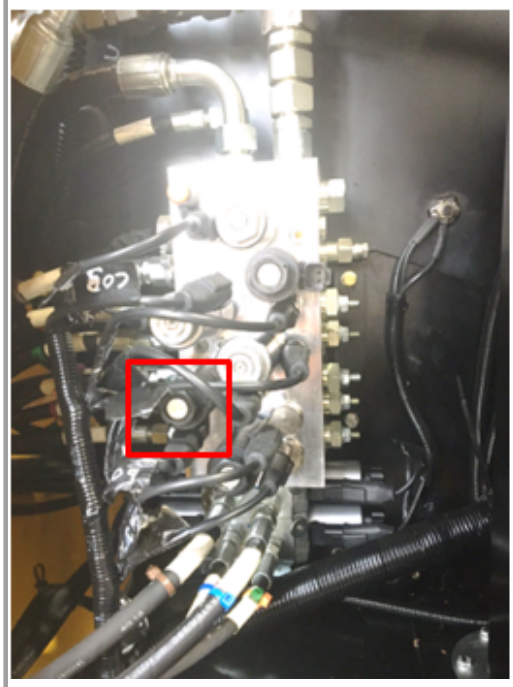

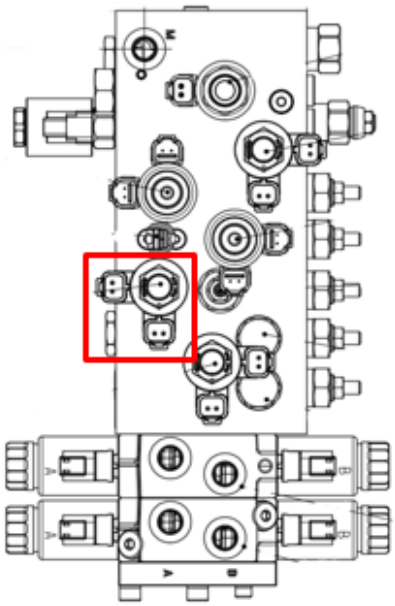

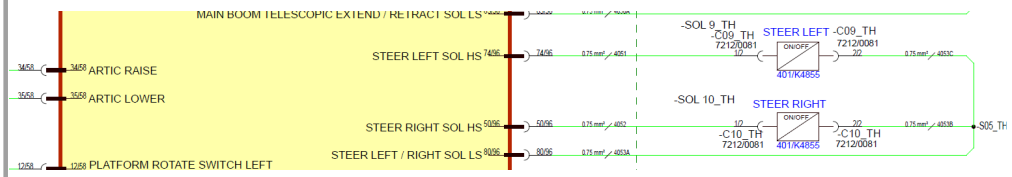

6.1.77 B1092-17

B1092-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1092-17

Error code:	B1092-17
ECU	Base ECU
Description:	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve High Side Short Circuit to High
Component:	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve

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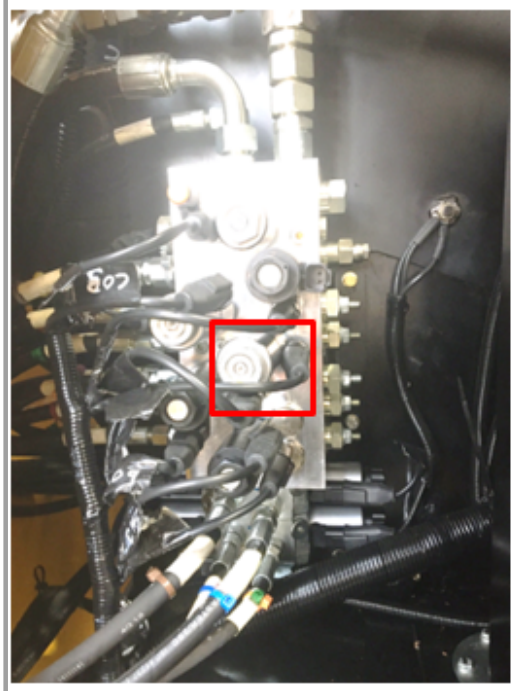
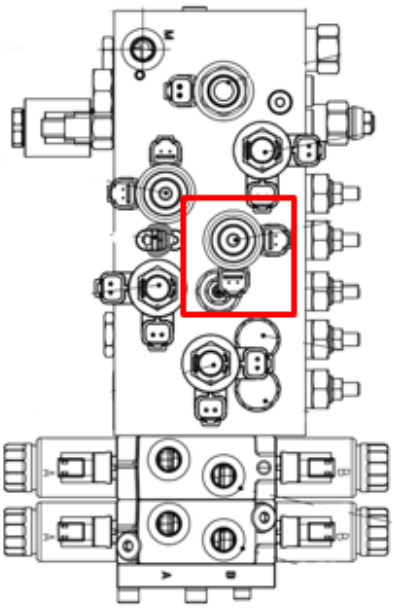
Vehicle reaction:	Disable articulated boom outputs
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1. Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4042,4043 & 4044A, 4044B, 4044C for cut, pinch or and damage. 3. Check ECU Pin 53/96, 77/96, 88/96 for bend or back out or any damage. 4. Check solenoid connector C01_TH and C02_TH for loose connection or any damage. 5. Check if valve is mechanically jammed 6.Turn ignition on off to clear code  

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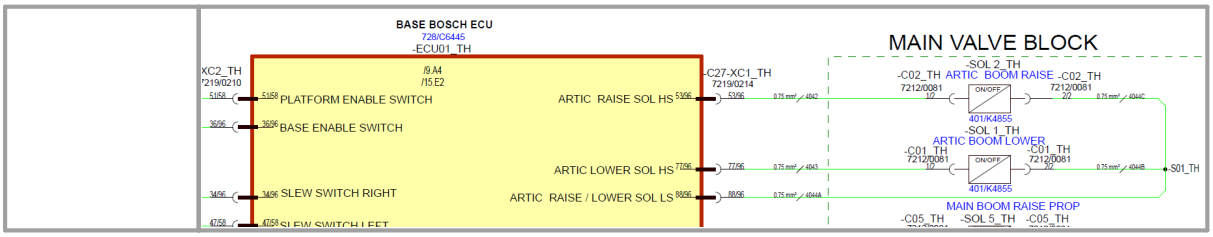

6.1.78 B1093-16

B1093-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1093-16

Error code:	B1093-16
ECU	Base ECU
Description:	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve High Side Short Circuit to Low
Component:	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve
Vehicle reaction:	Disable articulated boom outputs
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1. Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4042,4043 & 4044A, 4044B, 4044C for cut, pinch or and damage. 3. Check ECU Pin 53/96, 77/96, 88/96 for bend or back out or any damage. 4. Check solenoid connector C01_TH and C02_TH for loose connection or any damage. 5. Check if valve is mechanically jammed

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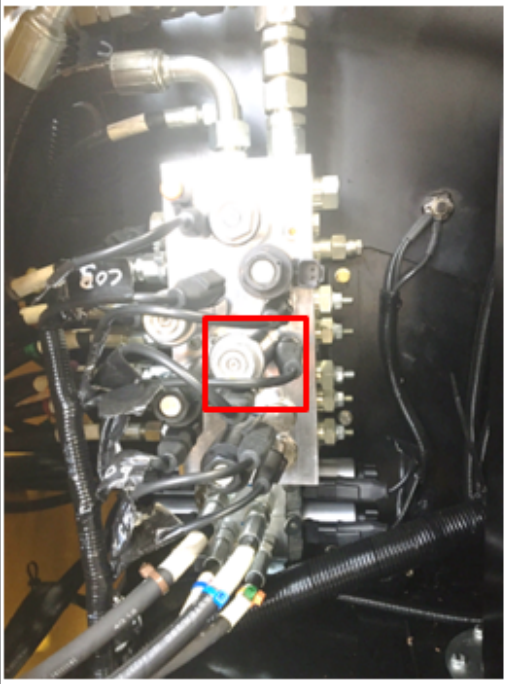
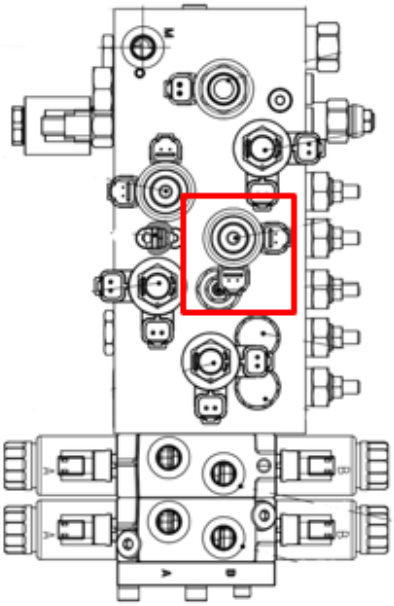
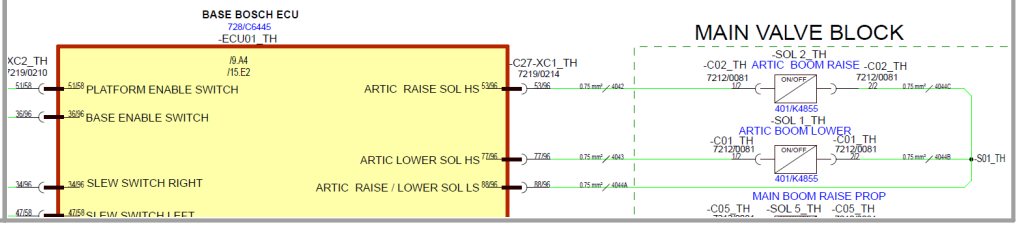
6.Turn ignition on off to clear code







6.1.79 B1094-13

B1094-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1094-13

Error code:	**B1094-13**
ECU	Base ECU
Description:	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve High Side & Low Side Open Circuit

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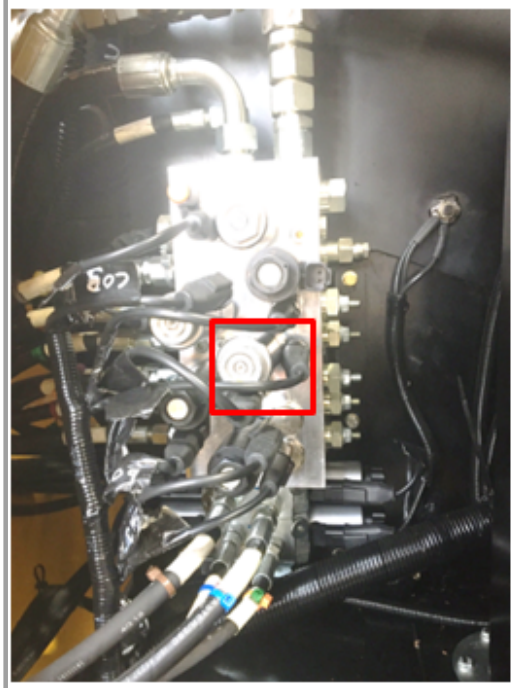
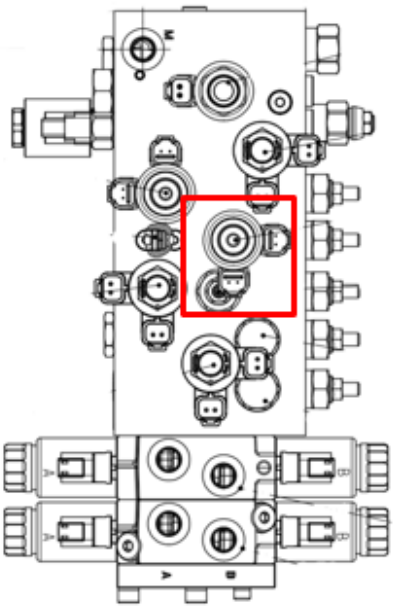
Component :	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve
Vehicle reaction:	Disable articulated boom outputs
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1. Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4042,4043 & 4044A, 4044B, 4044C for cut, pinch or and damage. 3. Check ECU Pin 53/96, 77/96, 88/96 for bend or back out or any damage. 4. Check solenoid connector C01_TH and C02_TH for loose connection or any damage. 5. Check if valve is mechanically jammed 6.Turn ignition on off to clear code  

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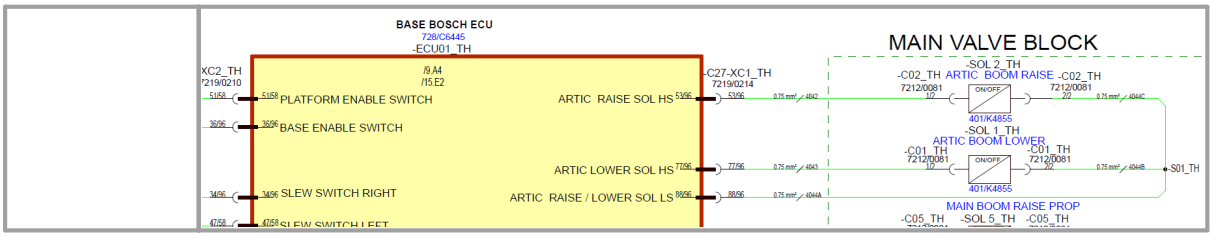

6.1.80 B1095-92

B1095-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1095-92

Error code:	B1095-92
ECU	Base ECU
Description:	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve Fault
Component:	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve
Vehicle reaction:	Disable articulated boom outputs
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1. Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4042,4043 & 4044A, 4044B, 4044C for cut, pinch or and damage. 3. Check ECU Pin 53/96, 77/96, 88/96 for bend or back out or any damage. 4. Check solenoid connector C01_TH and C02_TH for loose connection or any damage. 5. Check if valve is mechanically jammed

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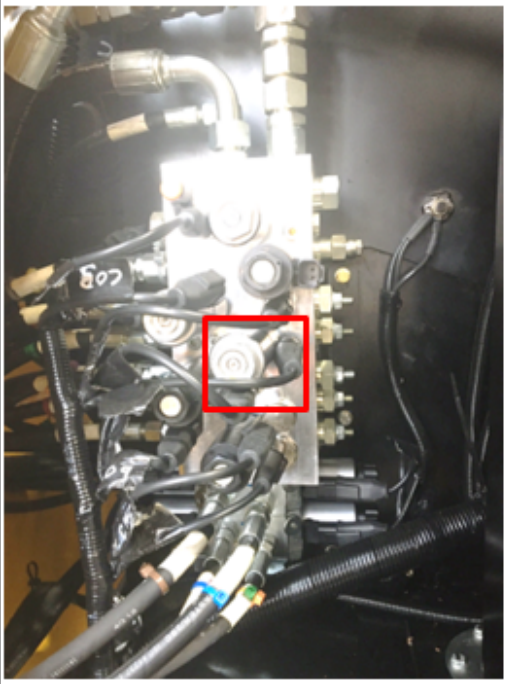
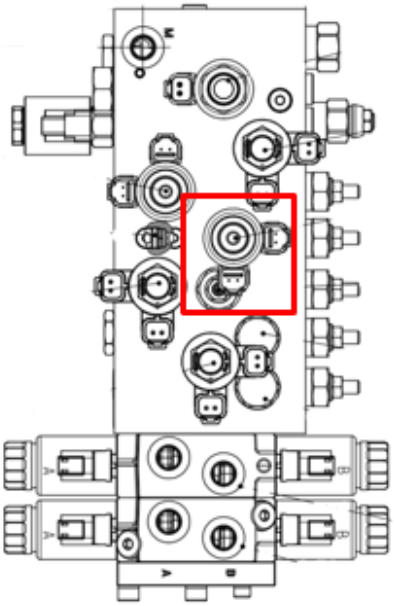
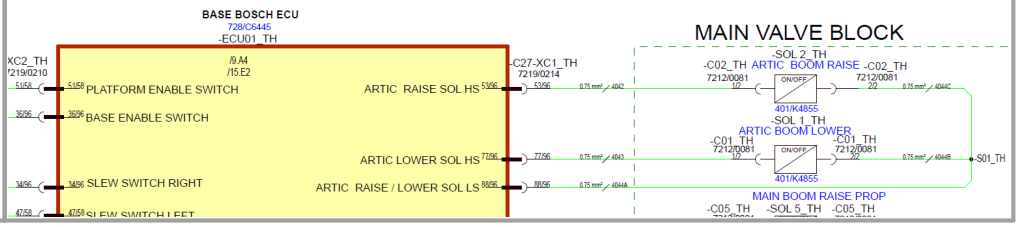
6.Turn ignition on off to clear code







6.1.81 B1096-17

B1096-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1096-17

Error code:	**B1096-17**
ECU	Base ECU
Description:	ARTICULATED BOOM RAISE Switch Short Circuit to High

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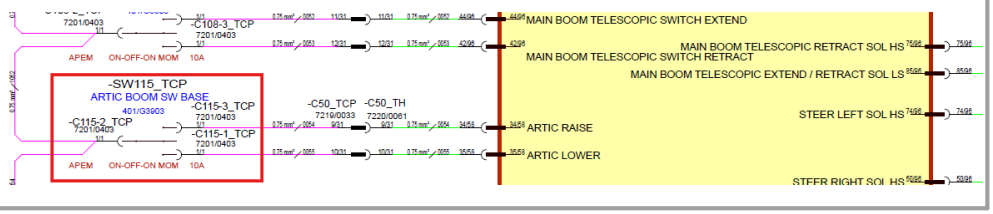
Component:	ARTICULATED BOOM RAISE Switch
Vehicle reaction:	Input from base control station will be disabled, output can still be operated from platform control station.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C115-2_TCP from the rear of the ARTICULATED BOOM RAISE Switch on the Base Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0054 to Base Bosch ECU pin 34/58. 2. Check Wire #0054 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C115-3_TCP 

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6.1.82 B1097-17

B1097-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1097-17

Error code:	B1097-17
ECU	Base ECU
Description:	ARTICULATED BOOM LOWER Switch Short Circuit to High
Component:	ARTICULATED BOOM LOWER Switch
Vehicle reaction:	Input from base control station will be disabled, output can still be operated from platform control station.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C115-2_TCP from the rear of the ARTICULATED BOOM RAISE Switch on the Base Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0055 to Base Bosch ECU pin 35/58. 2. Check Wire #0055 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C115-1_TCP

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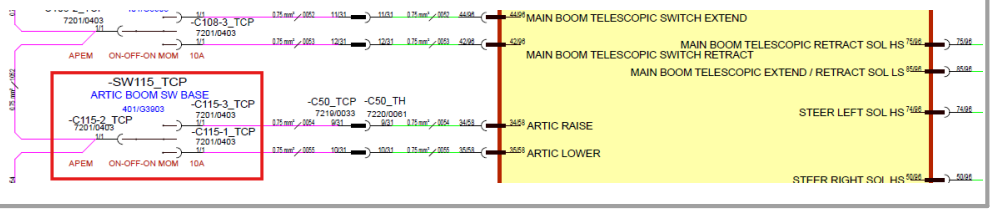

6.1.83 B1098-92

B1098-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1098-92

Error code:	B1098-92
ECU	Base ECU
Description:	ARTICULATED BOOM RAISE & LOWER Switches both activated (5 - 10V)
Component:	ARTICULATED BOOM RAISE & LOWER Switches
Vehicle reaction:	Input from base control station will be disabled, output can still be operated from platform control station.

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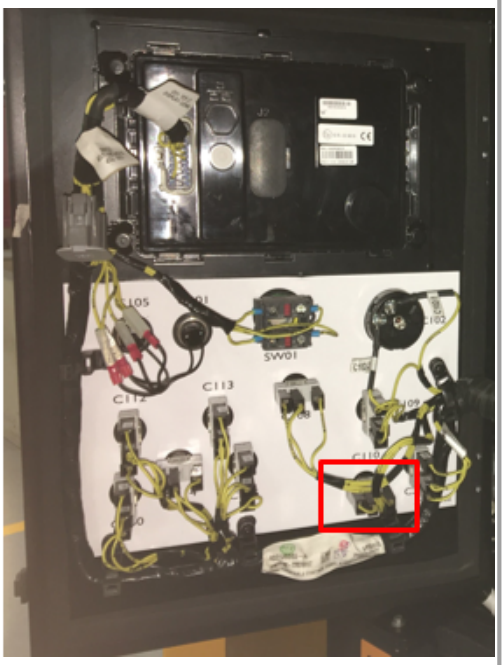
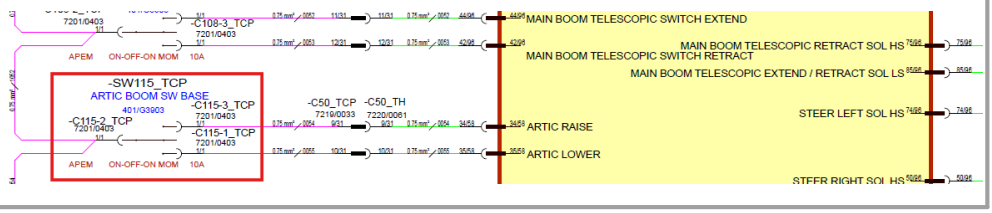
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C115-2_TCP from the rear of the ARTICULATED BOOM RAISE Switch on the Base Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0054 to Base Bosch ECU pin 34/58. 2. Check Wire #0054 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Disconnect connector -C115-2_TCP from the rear of the ARTICULATED BOOM RAISE Switch on the Base Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0055 to Base Bosch ECU pin 35/58. 4. Check Wire #0055 is not shorted to GND / Chassis. Check for abrasions and pinching. 5. Check condition of pins in Base Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 6. Check for water ingress in the Base Bosch ECU Connectors. 7. Check Switch for damage or shorting to connector -C115-1_TCP  

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6.1.84 B1099-16

B1099-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1099-16

Error code:	B1099-16
ECU	Base ECU
Description:	ARTICULATED BOOM RAISE Switch Short Circuit to Low
Component:	ARTICULATED BOOM RAISE Switch
Vehicle reaction:	Input from base control station will be disabled, output can still be operated from platform control station.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C115-2_TCP from the rear of the ARTICULATED BOOM RAISE Switch on the Base Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0054 to Base Bosch ECU pin 34/58. 2. Check Wire #0054 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Base Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Base Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C115-3_TCP

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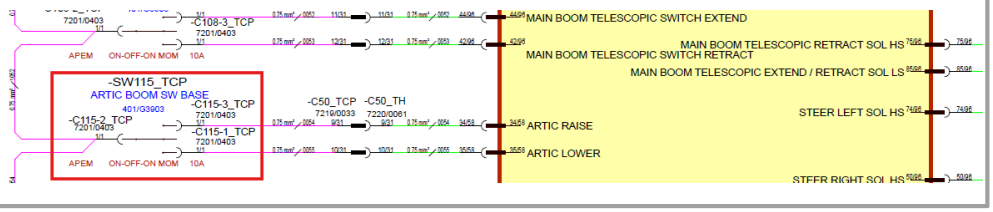

6.1.85 B1100-16

B1100-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1100-16

Error code:	B1100-16
ECU	Base ECU
Description:	ARTICULATED BOOM LOWER Switch Short Circuit to Low
Component:	ARTICULATED BOOM LOWER Switch
Vehicle reaction:	Input from base control station will be disabled, output can still be operated from platform control station.

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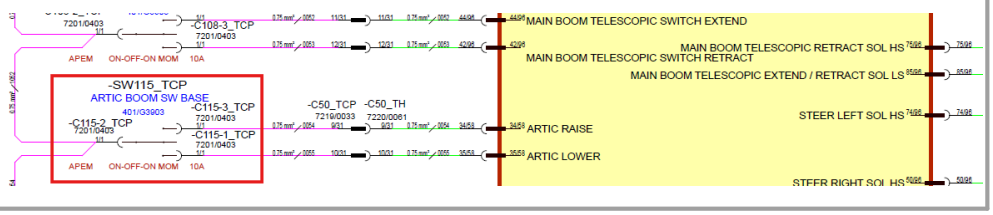
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C115-2_TCP from the rear of the ARTICULATED BOOM RAISE Switch on the Base Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0055 to Base Bosch ECU pin 35/58. 2. Check Wire #0055 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Base Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Base Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C115-3_TCP 

6.1.86 B1101-17

B1101-17

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Machine Fault Codes 518 > DTC ERROR CODE 519 > B1101 17

Error code:	B1101-17
ECU	Base ECU
Description:	MAIN BOOM EXTEND Switch Short Circuit to High
Component:	Telescopic Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Main Boom Telescope Extend terminal, -C108-1_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is high, remove -C108-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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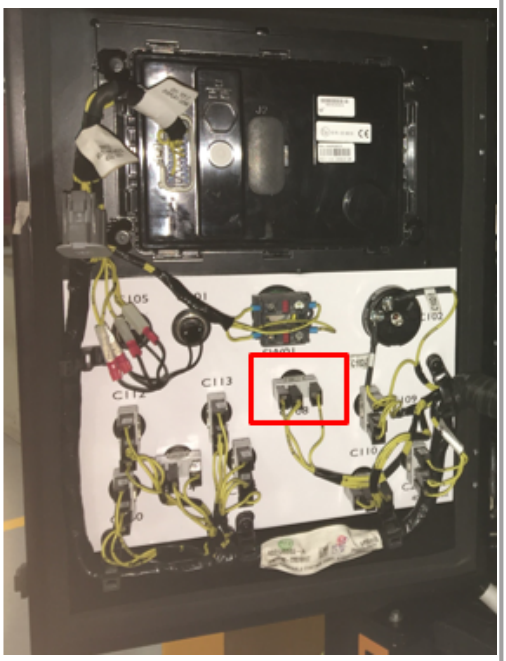

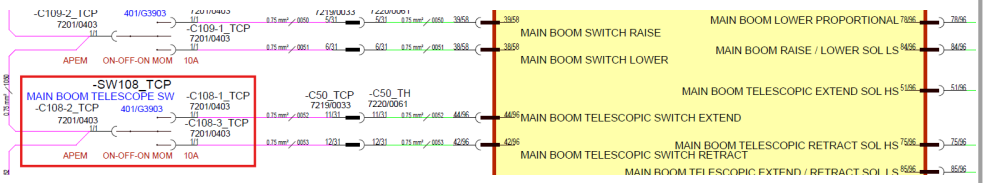

6.1.87 B1102-17

B1102-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1102□17

Error code:	B1102-17
ECU	Base ECU
Description:	MAIN BOOM RETRACT Switch Short Circuit to High
Component:	Telescopic Switch

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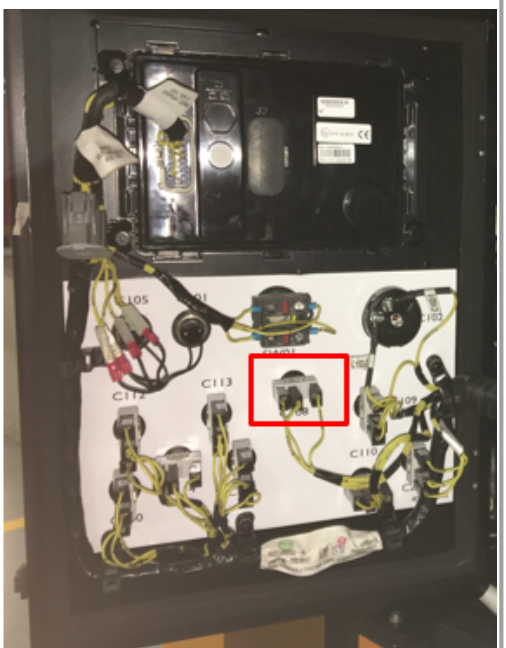
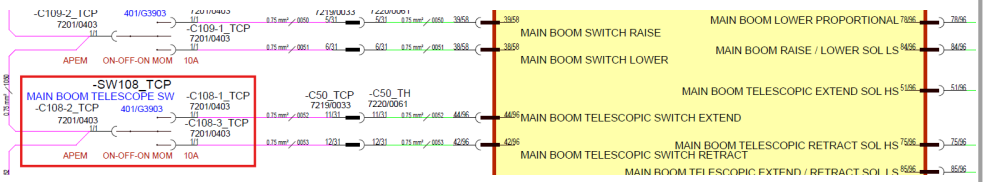
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Main Boom Telescope Retract terminal, -C108-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is high, remove -C108-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.  

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6.1.88 B1103-92

B1103-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1103□92

Error code:	B1103-92
ECU	Base ECU
Description:	MAIN BOOM EXTEND & RETRACT Switches both activated (5 - 10V)
Component:	Telescopic Switch
Vehicle reaction:	Ignore the input (but not output as it can be operated from where there is no fault)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Main Boom Telescope Extend/Retract &Lower terminals, -C108-1_TCP & -C108-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors (Pins 44/96 & 42/96). If voltage is high, remove -C108-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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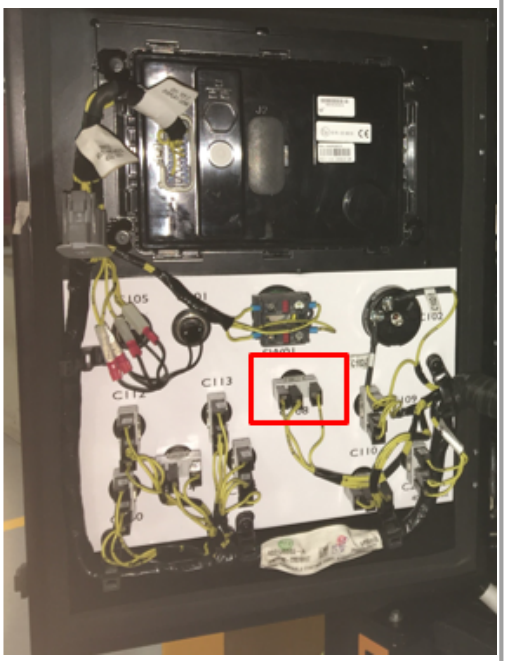

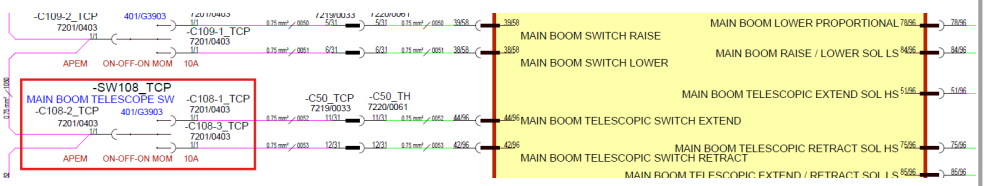

6.1.89 B1104-16

B1104-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1104□16

Error code:	B1104-16
ECU	Base ECU
Description:	MAIN BOOM EXTEND Switch Short Circuit to Low
Component:	Telescopic Switch

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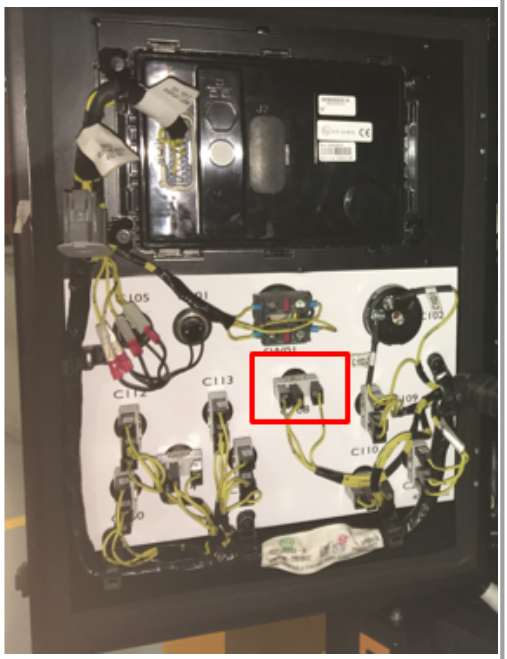
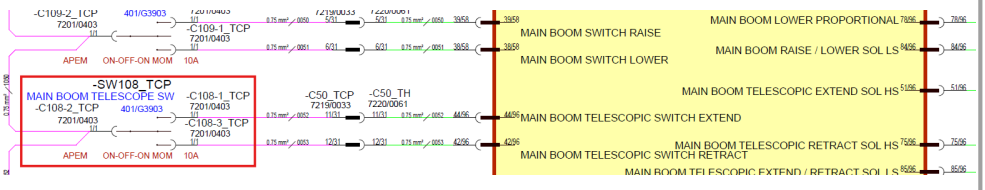
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage at Base Main Boom Telescope Extend terminal, -C108-1_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constantly <2.4V or lower, then there is a short to GND either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is Low, remove -C108-2_TCP, if voltage now rises to ~2.5V, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check there are no visible defects in the wiring causing a short circuit to chassis / GND 3. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 4. Check connectors for any sign of water ingress. 5. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.  

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6.1.90 B1105-16

B1105-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1105□16

Error code:	B1105-16
ECU	Base ECU
Description:	MAIN BOOM RETRACT Switch Short Circuit to Low
Component:	Telescopic Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage at Base Main Boom Telescope Retract terminal, -C108-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constantly <2.4V or lower, then there is a short to GND either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is Low, remove -C108-2_TCP, if voltage now rises to ~2.5V, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check there are no visible defects in the wiring causing a short circuit to chassis / GND 3. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 4. Check connectors for any sign of water ingress. 5. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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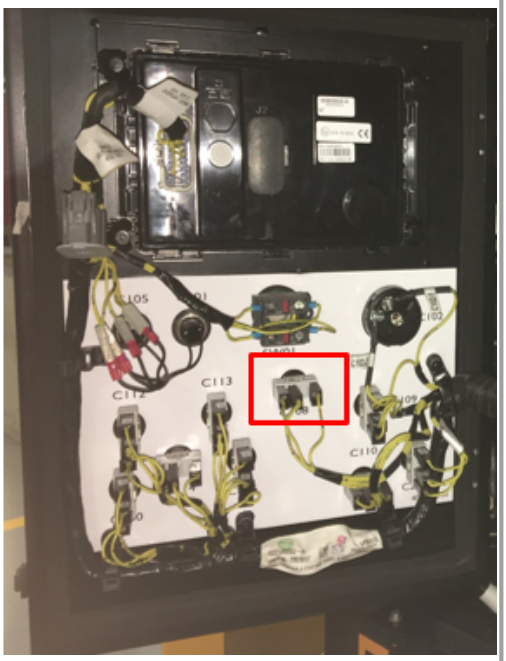

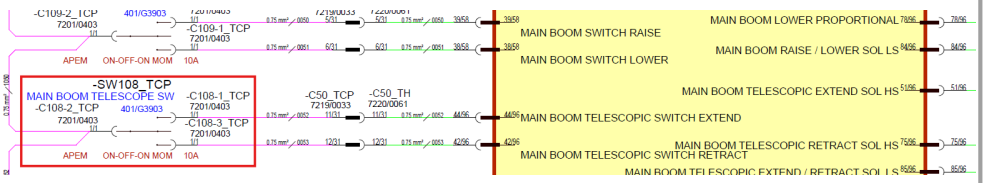

6.1.91 B1106-17

B1106-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1106 17

Error code:	B1106-17
ECU	Base ECU
Description:	PLATFORM ROTATE RIGHT Switch Short Circuit to High
Component:	Platform Rotate Switch

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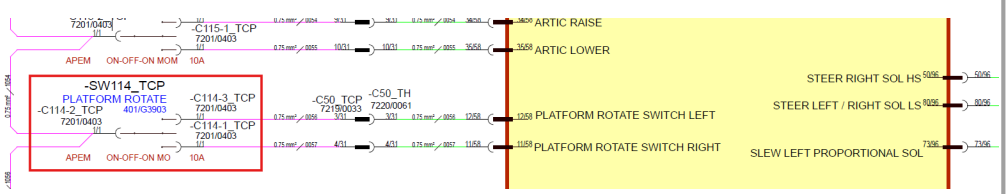
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Platform Rotate terminal, -C114-1_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is high, remove -C114-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.



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6.1.92 B1107-17

B1107-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1107 17

Error code:	B1107-17
ECU	Base ECU
Description:	PLATFORM ROTATE LEFT Switch Short Circuit to High
Component:	Platform Rotate Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Platform Rotate terminal, -C114-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is high, remove -C114-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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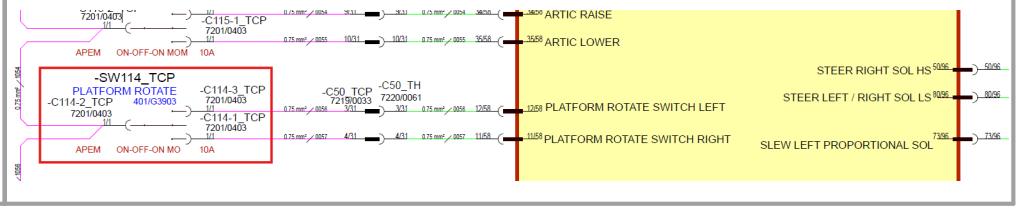

6.1.93 B1108-92

B1108-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1108□92

Error code:	B1108-92
ECU	Base ECU
Description:	PLATFORM ROTATE RIGHT & LEFT Switches both activated (5 - 10V)
Component:	Platform Rotate Switch
Vehicle reaction:	Ignore the input (but not output as it can be operated from where there is no fault)

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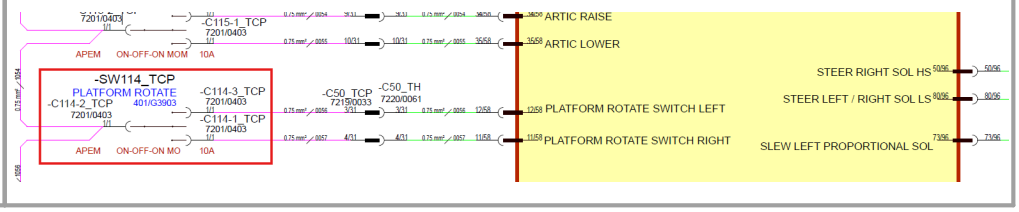
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Platform Rotate terminals, -C114-1_TCP & -C114-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors (Pins 11/58 & 12/58). If voltage is high, remove -C114-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage. 

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6.1.94 B1109-16

B1109-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1109□16

Error code:	B1109-16
ECU	Base ECU
Description:	PLATFORM ROTATE RIGHT Switch Short Circuit to Low
Component:	Platform Rotate Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage at Base Platform Rotate terminal, -C114-1_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constantly <2.4V or lower, then there is a short to GND either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is Low, remove -C114-2_TCP, if voltage now rises to ~2.5V, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check there are no visible defects in the wiring causing a short circuit to chassis / GND 3. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 4. Check connectors for any sign of water ingress. 5. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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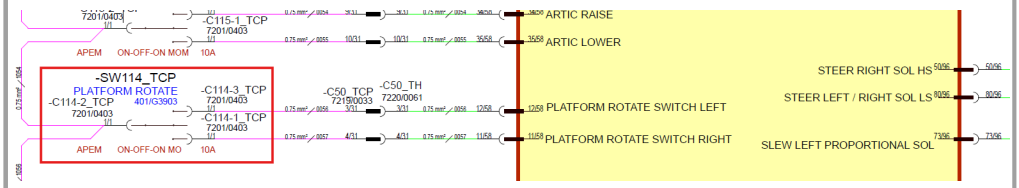

6.1.95 B1110-16

B1110-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1110 16

Error code:	B1110-16
ECU	Base ECU
Description:	PLATFORM ROTATE LEFT Switch Short Circuit to Low
Component:	Platform Rotate Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault)

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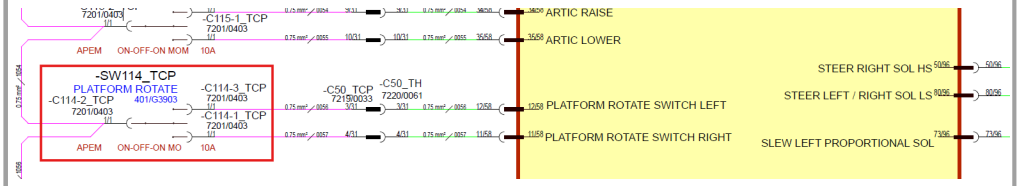
	After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage at Base Platform Rotate terminal, -C114-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constantly <2.4V or lower, then there is a short to GND either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is Low, remove -C114-2_TCP, if voltage now rises to ~2.5V, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check there are no visible defects in the wiring causing a short circuit to chassis / GND 3. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 4. Check connectors for any sign of water ingress. 5. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage. 

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6.1.96 B1111-17

B1111-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1111□17

Error code:	B1111-17
ECU	Base ECU
Description:	JIB RAISE Switch Short Circuit to High
Component:	Jib Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Jib Raise terminal, -C113-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is high, remove -C113-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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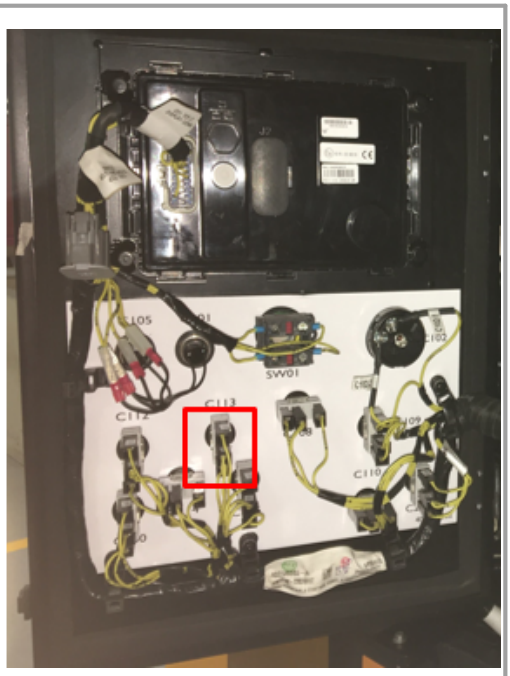

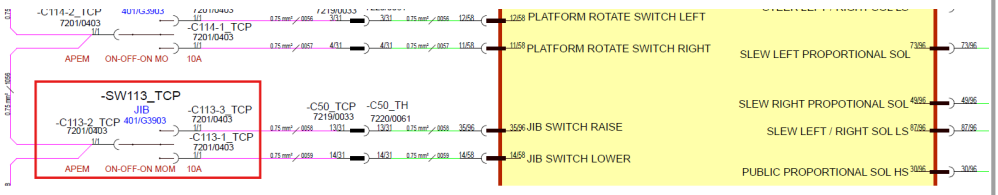

6.1.97 B1112-17

B1112-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1112□17

Error code:	B1112-17
ECU	Base ECU
Description:	Jib Lower Switch Short Circuit to High
Component:	Jib Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault)

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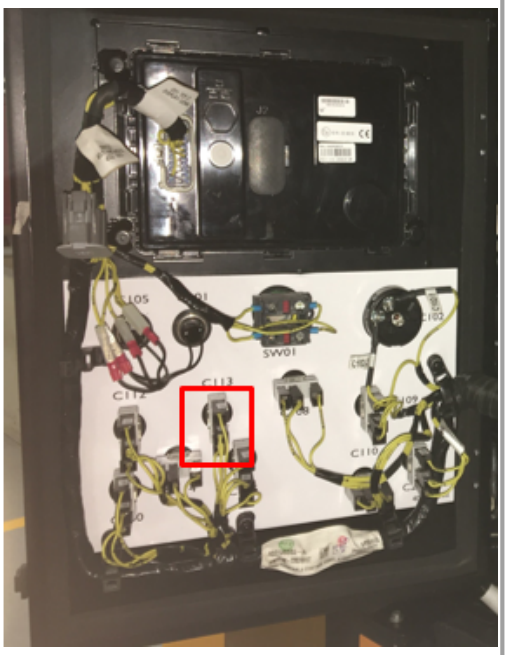
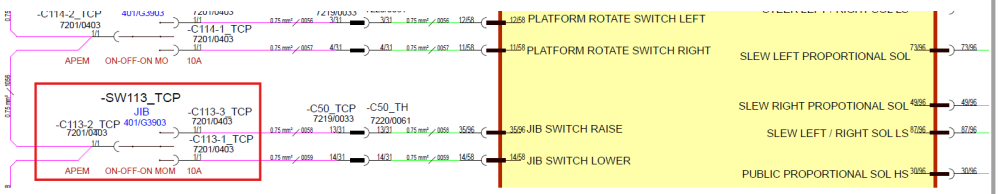
	After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Jib Lower terminal, -C113-1_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is high, remove -C113-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage  

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6.1.98 B1113-92

B1113-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1113□92

Error code:	B1113-92
ECU	Base ECU
Description:	JIB RAISE & LOWER Switches both activated (5 - 10V)
Component:	Jib Switch
Vehicle reaction:	Ignore the input (but not output as it can be operated from where there is no fault)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Jib Switch terminals, -C113-1_TCP & -C113-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors (Pins 35/96 & 14/58). If voltage is high, remove -C113-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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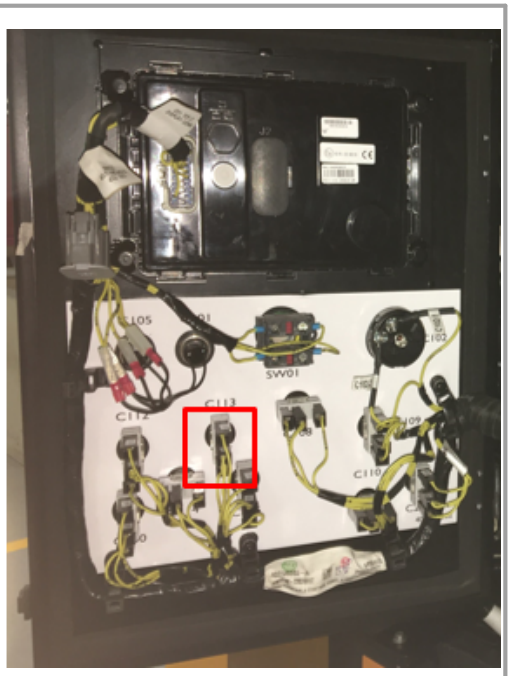

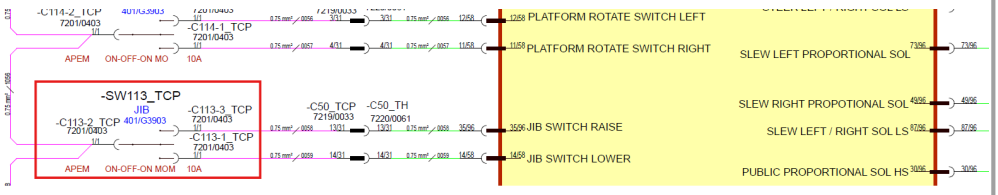

6.1.99 B1114-16

B1114-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1114□16

Error code:	B1114-16
ECU	Base ECU
Description:	Jib Raise Switch Short Circuit to Low
Component:	Jib Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault)

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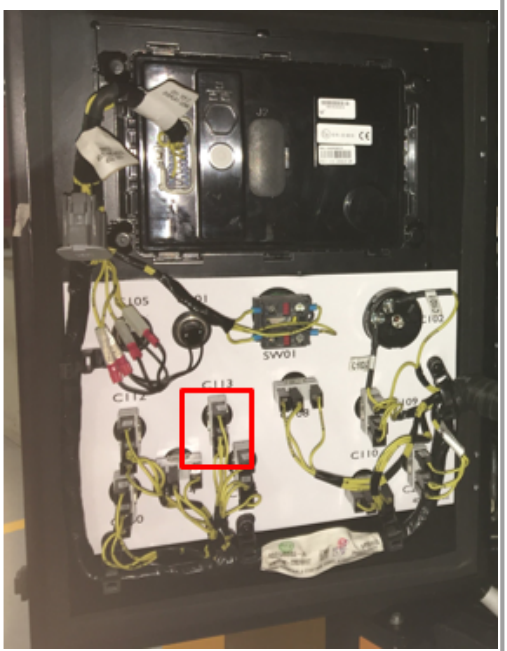
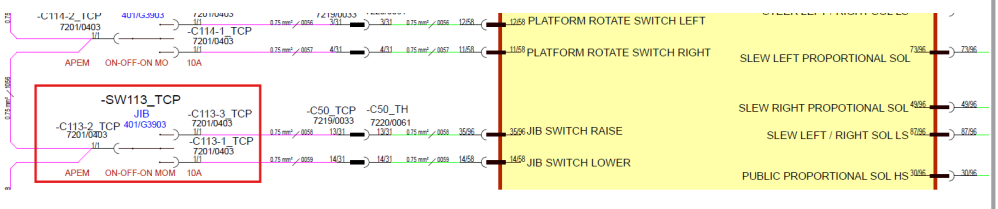
	After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage at Base Jib Raise terminal, -C113-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constantly <2.4V or lower, then there is a short to GND either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is Low, remove -C113-2_TCP, if voltage now rises to ~2.5V, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check there are no visible defects in the wiring causing a short circuit to chassis / GND 3. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 4. Check connectors for any sign of water ingress. 5. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.  

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6.1.100 B1115-16

B1115-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1115□16

Error code:	B1115-16
ECU	Base ECU
Description:	Jib Lower Switch Short Circuit to Low
Component:	Jib Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage at Base Jib Lower terminal, -C113-1_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constantly <2.4V or lower, then there is a short to GND either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is Low, remove -C113-2_TCP, if voltage now rises to ~2.5V, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check there are no visible defects in the wiring causing a short circuit to chassis / GND 3. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 4. Check connectors for any sign of water ingress. 5. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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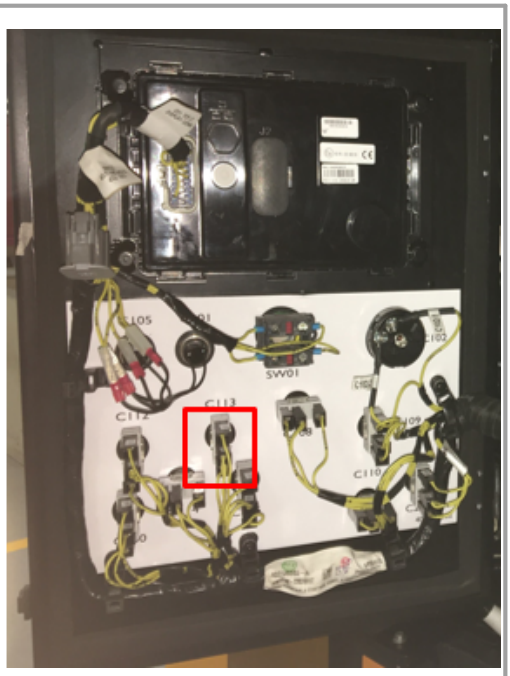

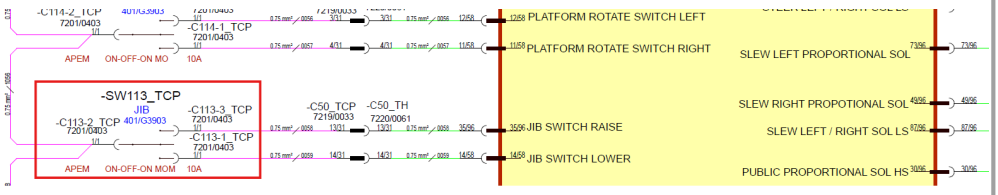

6.1.101 B1116-17

B1116-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1116□17

Error code:	B1116-17
ECU	Base ECU
Description:	MAIN BOOM RAISE (BASE) Switch Short Circuit to High
Component:	Main Boom Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault)

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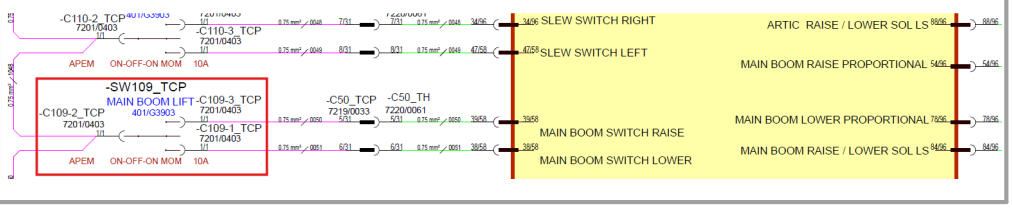
	After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Main Boom Raise terminal, -C109-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is high, remove -C109-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage. 

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6.1.102 B1117-17

B1117-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1117 17

Error code:	B1117-17
ECU	Base ECU
Description:	MAIN BOOM LOWER (BASE) Switch Short Circuit to High
Component:	Main Boom Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Main Boom Lower terminal, -C109-1_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is high, remove -C109-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage

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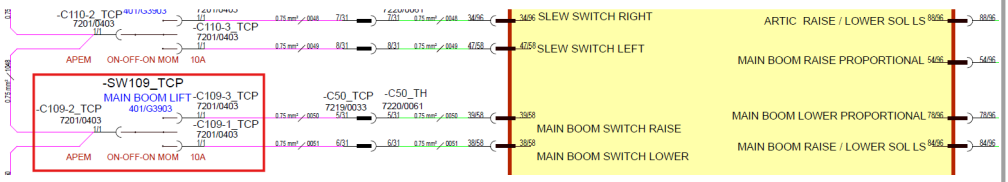

6.1.103 B1118-92

B1118-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1118-92

Error code:	B1118-92
ECU	Base ECU
Description:	MAIN BOOM RAISE & LOWER (BASE) Switches both activated (5 - 10V)
Component:	Main Boom Switch

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Vehicle reaction:	Ignore the input (but not output as it can be operated from where there is no fault)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Main Boom Raise/Lower Switch terminals, -C109-1_TCP & -C109-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors (Pins 39/58 & 38/58). If voltage is high, remove -C109-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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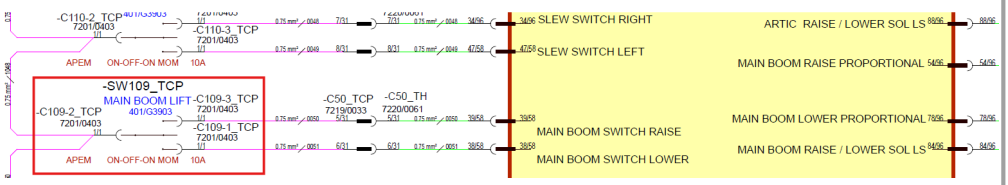

6.1.104 B1119-16

B1119-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1119 16

Error code:	B1119-16
ECU	Base ECU
Description:	MAIN BOOM RAISE (BASE) Switch Short Circuit to Low
Component:	Main Boom Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage at Base Main Boom Raise terminal, -C109-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constantly <2.4V or lower, then there is a short to GND either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is Low, remove -C109-2_TCP, if voltage now rises to ~2.5V, then switch is faulty, else, the fault is at the harness to the Bosch ECU.

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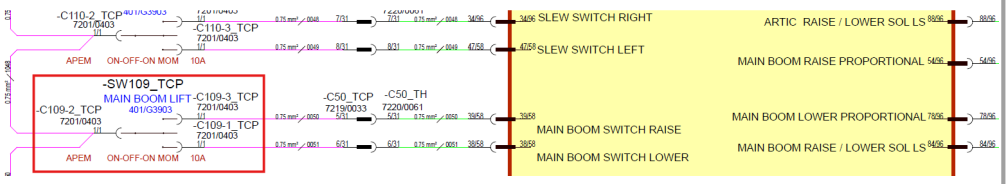
	2. Check there are no visible defects in the wiring causing a short circuit to chassis / GND 3. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 4. Check connectors for any sign of water ingress. 5. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage



6.1.105 B1120-16

B1120-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1120-16

Error code:	B1120-16

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ECU	Base ECU
Description:	MAIN BOOM LOWER (BASE) Switch Short Circuit to Low
Component:	Main Boom Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage at Base Main Boom Raise terminal, -C109-1_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constantly <2.4V or lower, then there is a short to GND either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is Low, remove -C109-2_TCP, if voltage now rises to ~2.5V, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check there are no visible defects in the wiring causing a short circuit to chassis / GND 3. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 4. Check connectors for any sign of water ingress. 5. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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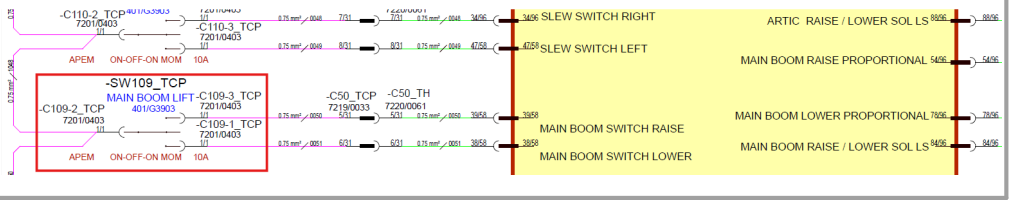

6.1.106 B1121-17

B1121-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1121□17

Error code:	**B1121-17**
ECU	Base ECU
Description:	SLEW RIGHT (BASE) Switch Short Circuit to High
Component:	Slew Switch

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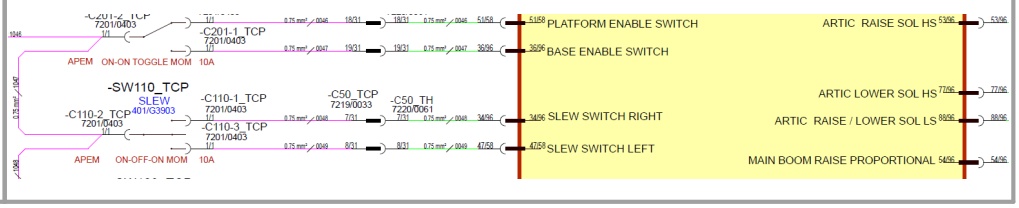
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Slew Right terminal, -C110-1_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is high, remove -C110-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage. 

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6.1.107 B1122-17

B1122-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1122 17

Error code:	B1122-17
ECU	Base ECU
Description:	SLEW LEFT (BASE) Switch Short Circuit to High
Component:	Slew Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3.Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Slew Left terminal, -C110-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is high, remove -C110-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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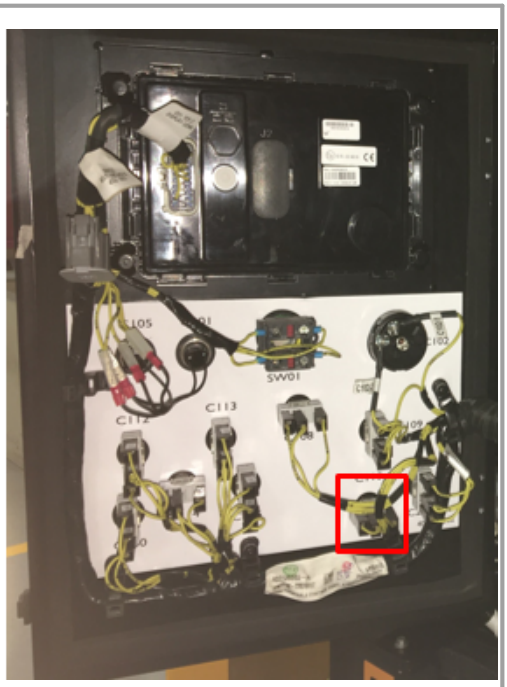

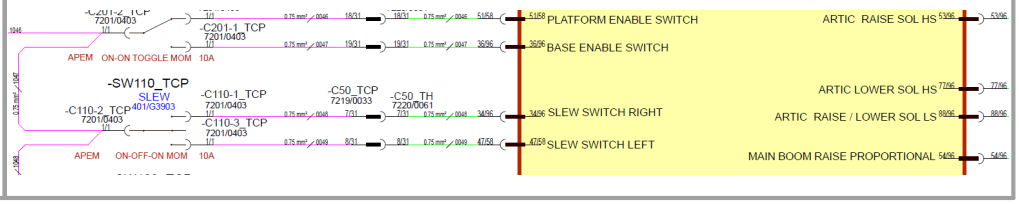

6.1.108 B1123-92

B1123-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1123-92

Error code:	B1123-92
ECU	Base ECU
Description:	SLEW RIGHT & LEFT (BASE) Switches both activated (5 - 10V)
Component:	Slew Switch
Vehicle reaction:	Ignore the input (but not output as it can be operated from where there is no fault)

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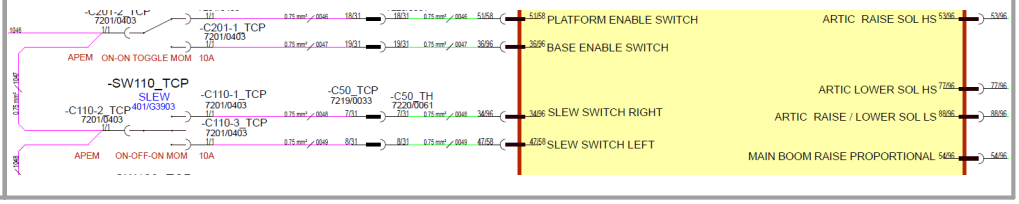
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage at Base Slew Right/Left Switch terminals, -C110-1_TCP & -C110-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Base Bosch ECU connectors (Pins 34/58 & 47/58). If voltage is high, remove -C110-2_TCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage. 

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6.1.109 B1124-16

B1124-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1124 16

Error code:	B1124-16
ECU	Base ECU
Description:	SLEW RIGHT (BASE) Switch Short Circuit to Low
Component:	Slew Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage at Base Slew Right terminal, -C110-1_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constantly <2.4V or lower, then there is a short to GND either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is Low, remove -C110-2_TCP, if voltage now rises to ~2.5V, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check there are no visible defects in the wiring causing a short circuit to chassis / GND 3. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 4. Check connectors for any sign of water ingress. 5. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.

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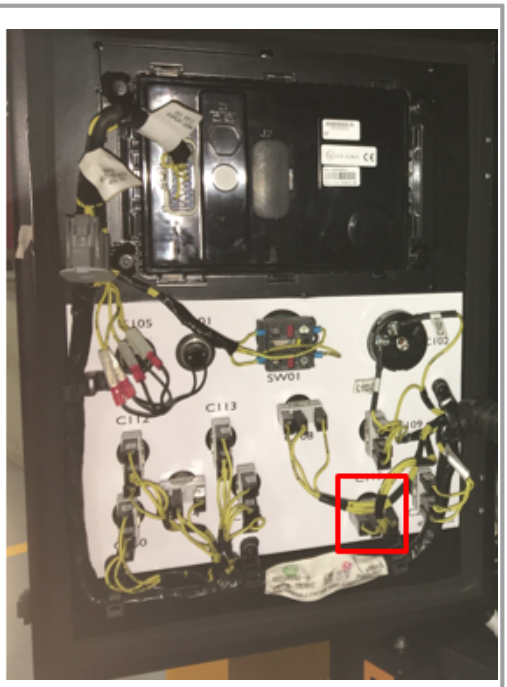

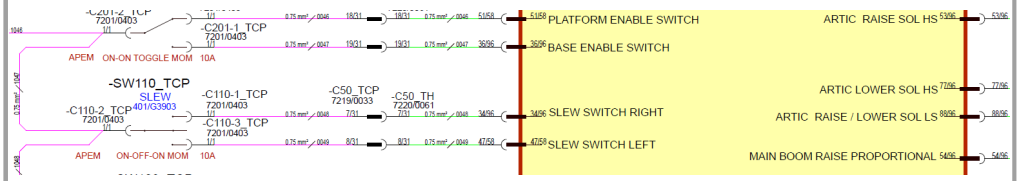

6.1.110 B1125-16

B1125-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1125□16

Error code:	B1125-16
ECU	Base ECU
Description:	SLEW LEFT (BASE) Switch Short Circuit to Low
Component:	Slew Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault)

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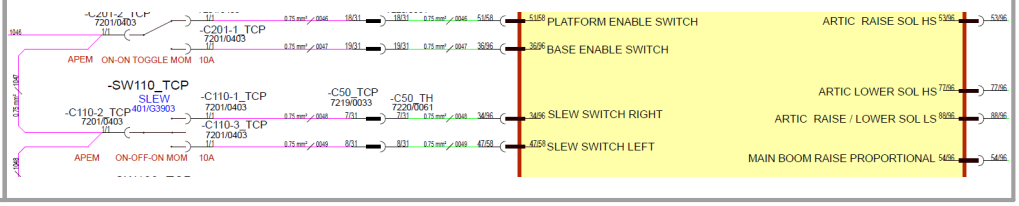
	After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage at Base Slew Left terminal, -C110-3_TCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constantly <2.4V or lower, then there is a short to GND either at the switch, wiring harness or at the Base Bosch ECU connectors. If voltage is Low, remove -C110-2_TCP, if voltage now rises to ~2.5V, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check there are no visible defects in the wiring causing a short circuit to chassis / GND 3. Check Base Base Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 4. Check connectors for any sign of water ingress. 5. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage. 

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6.1.111 B1126-17

B1126-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1126 17

Error code:	B1126-17
ECU	Base ECU
Description:	MAIN BOOM Lower Limit Switch 1 Short Circuit to High
Component:	Main Boom Limit Switch 1
Vehicle reaction:	Default to raised position Prevent main boom raise & extend
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage of Boom Down Limit Switch -SW142_MBL Pin 2. Actuate the switch to check that the voltage level changes between 10V and 0V. If this does not happen, check operation of switch. Check pins at Base Bosch ECU connector. Observe harness, Check for any pinching / damage. 2. Disconnect terminal from Pin 2, measure voltage of wire. If voltage is high 10V (or Higher) then there is a short circuit to high within the harness. 3. Check for water ingress at the switch terminals, The interconnects and at the Base Bosch ECU connectors. 4. Check the Switch,Base Bosch ECU and harnessing connectors for any damage. Pay particular attention to ECU pins as these could be bent.

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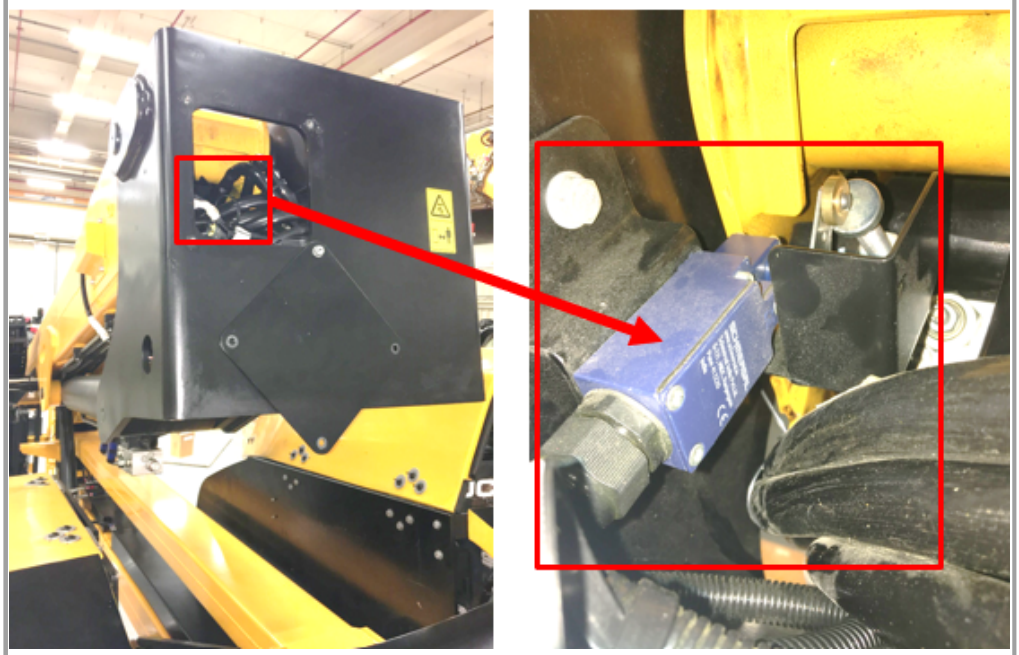

6.1.112 B1127-17

B1127-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1127□17

Error code:	B1127-17
ECU	Base ECU
Description:	MAIN BOOM Lower Limit Switch 2 Short Circuit to High
Component:	Main Boom Limit Switch 2
Vehicle reaction:	Default to raised position Prevent main boom raise & extend

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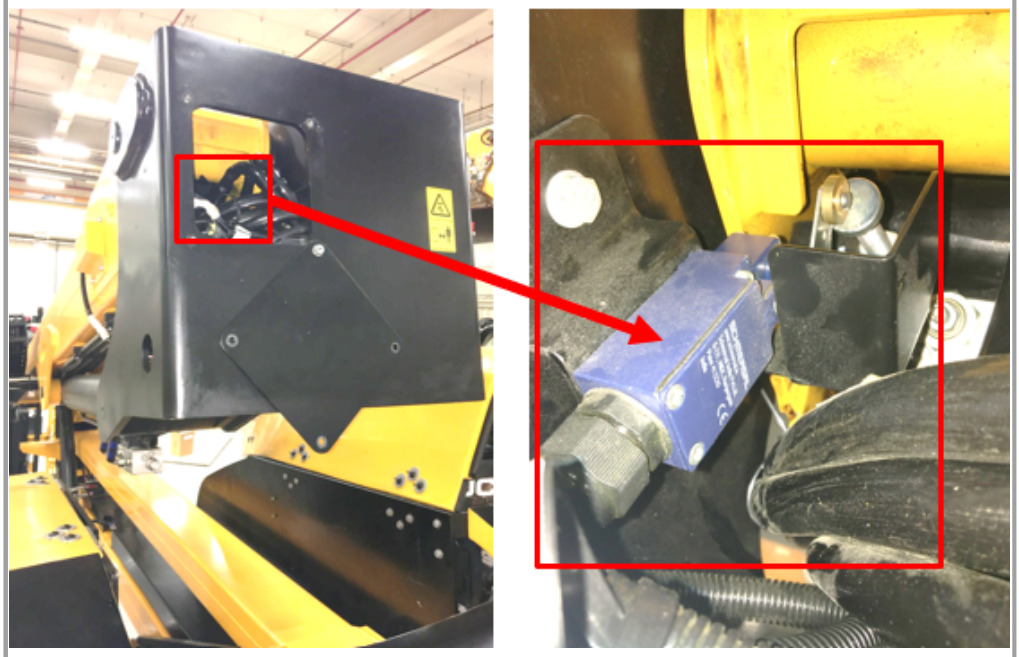
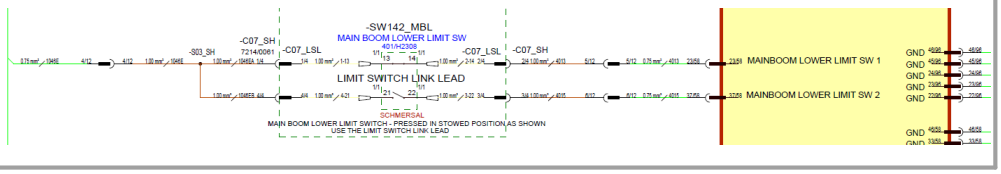
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage of Boom Down Limit Switch -SW142_MBL Pin 4. Actuate the switch to check that the voltage level changes between 10V and 0V. If this does not happen, check operation of switch. Check pins at Base Bosch ECU connector. Inspect harness, check for any pinching / damage. 2. Disconnect terminal from Pin 4, measure voltage of wire. If voltage is high 10V (or Higher) then there is a short circuit to high within the harness. 3. Check for water ingress at the switch terminals and at the Base Bosch ECU connectors. 4. Check the Switch, Base Bosch ECU and harnessing connectors for any damage. Pay particular attention to ECU pins as these could be bent.  

6.1.113 B1128-16

B1128-16

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Error code:	B1128-16
ECU	Base ECU
Description:	MAIN BOOM Lower Limit Switch 1 Short Circuit to Low
Component:	Main Boom Limit Switch 1
Vehicle reaction:	Default to raised position Prevent main boom raise & extend
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage of Boom Down Limit Switch -SW142_MBL Pin 2. Actuate the switch to check that the voltage level changes between 0V and 10V. If this does not happen, check operation of switch. Check pins at Base Bosch ECU connector. Inspect harness, Check for any pinching / damage. 2. Disconnect terminal from Pin 2, measure voltage of switch output at this pin. If voltage remains at 0V when switch is actuated then there is a short circuit to ground within the switch or the input to the switch. 3. Check for water ingress at the switch terminals and at the Base Bosch ECU connectors. 4. Check the Switch, Base Bosch ECU and harnessing connectors for any damage. Pay particular attention to ECU pins as these could be bent.

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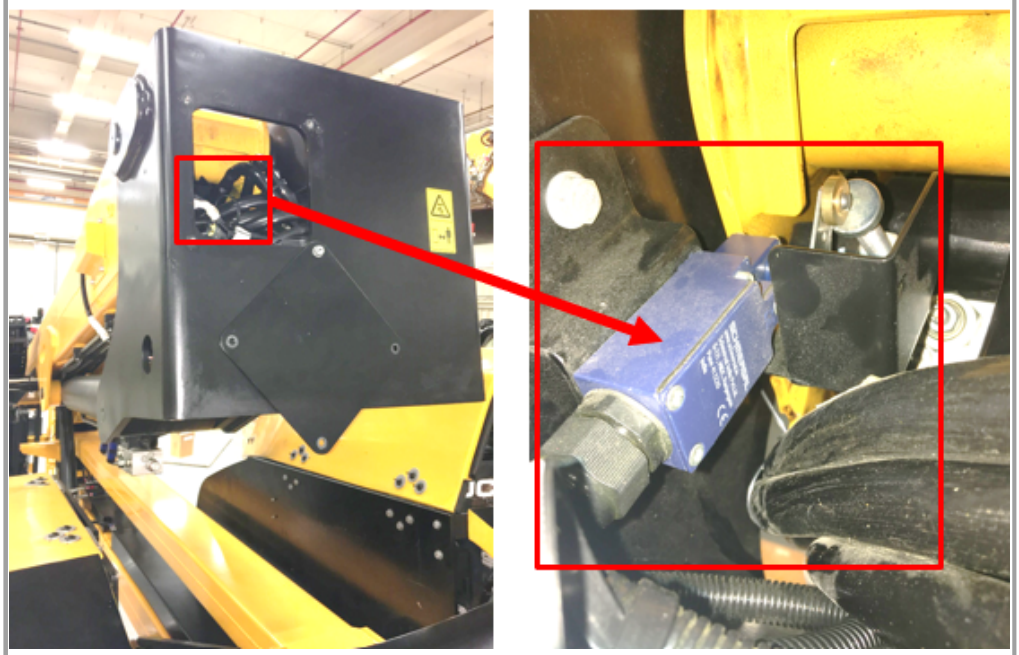

6.1.114 B1129-13

B1129-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1129-13

Error code:	B1129-13
ECU	Base ECU
Description:	MAIN BOOM Lower Limit Switch 1 AND Switch 2 Open Circuit
Component:	Main Boom Limit Switch(es)
Vehicle reaction:	Default to raised position Prevent main boom raise & extend

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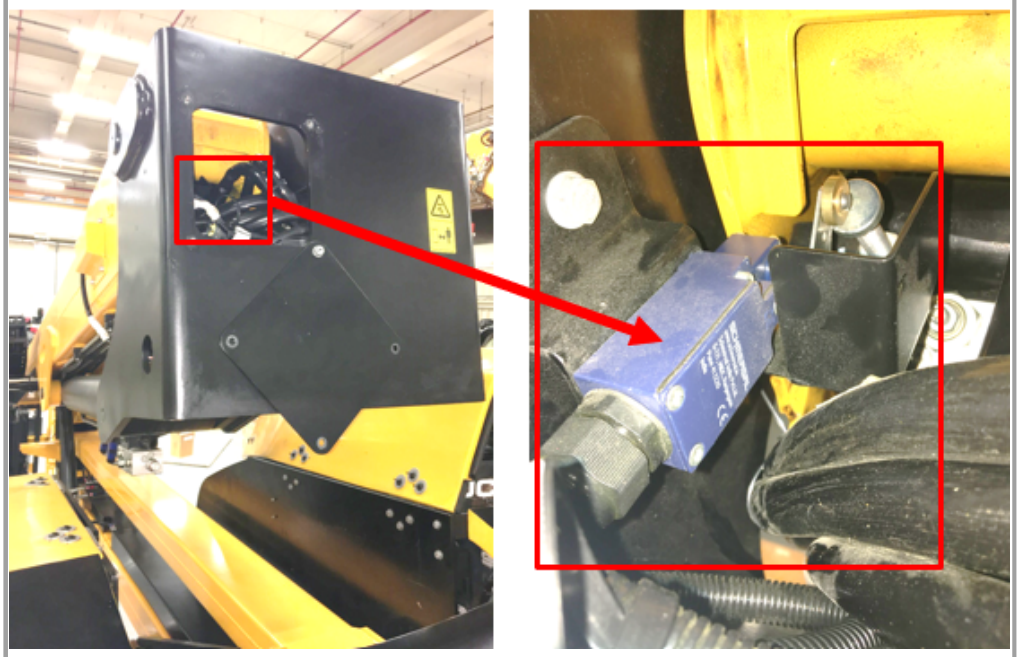
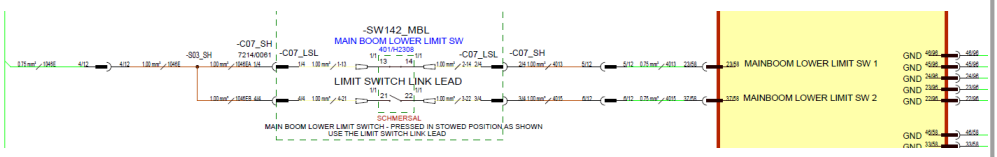
Possible Cause:	1. A poor connection or damaged terminal within the connector(s) 2. A damaged or broken wire within the wiring harness 3. Component is damaged
Service Action:	1. Check Terminals at Boom Down Limit Switch -SW142_MBL. Check terminals at Base Bosch ECU Connectors. Ensure all connectors are fully seated. 2. Check continuity with resistance meter between ECU to Boom Down Limit Switch -SW142_MBL terminals. 3. Check Operation of Main Boom Limit Switch. Observe all parts for damage. Check terminals not backed out in Base Bosch ECU Connector.  

6.1.115 **B1130-16**

B1130-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1130-16

Error code:	**B1130-16**

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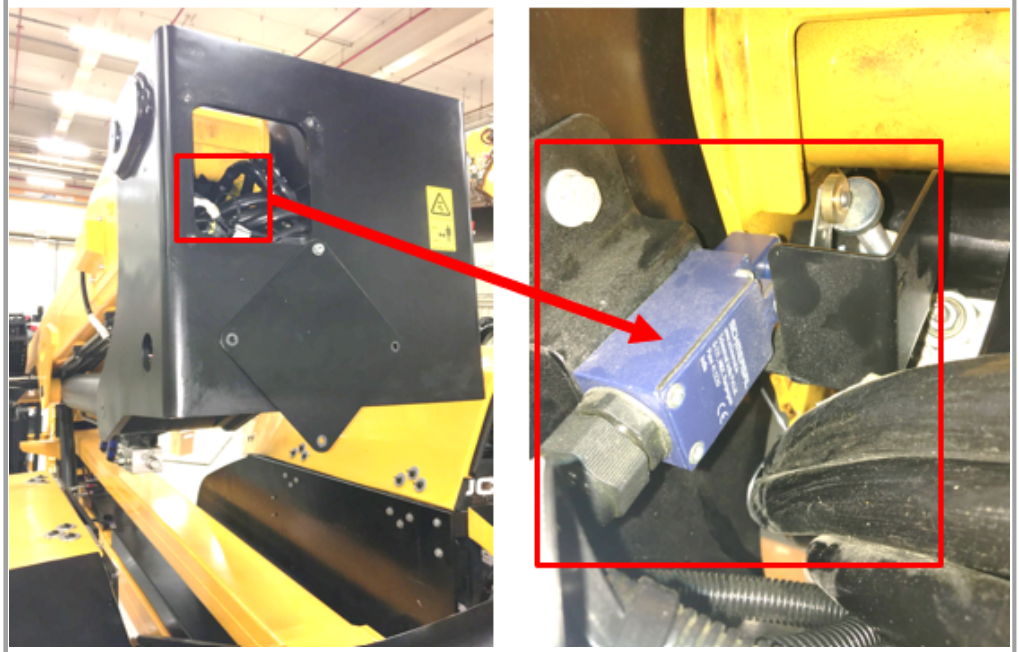
ECU	Base ECU
Description:	MAIN BOOM Lower Limit Switch Short Circuit to Low
Component:	Main Boom Limit Switch
Vehicle reaction:	Default to raised position Prevent main boom raise & extend
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage of Boom Down Limit Switch -SW142_MBL Pin 4. Actuate the switch to check that the voltage level changes between 0V and 10V. If this does not happen, check operation of switch. Check pins at Base Bosch ECU connector. Observe harness, Check for any pinching / damage. 2. Disconnect terminal from Pin 4, measure voltage of switch output at this pin. If voltage remains at 0V when switch is actuated then there is a short circuit to ground within the switch or the input to the switch. 3. Check for water ingress at the switch terminals and at the Base Bosch ECU connectors. 4. Check the Switch, Base Bosch ECU and harnessing connectors for any damage. Pay particular attention to ECU pins as these could be bent. 

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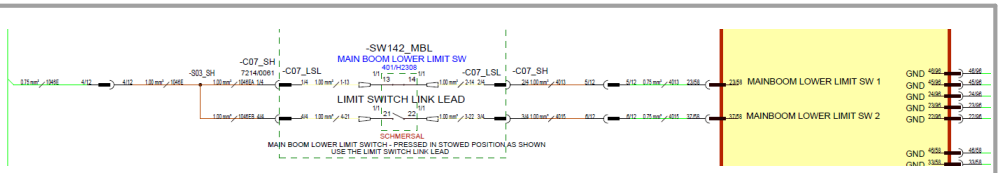

6.1.116 B1131-2F

B1131-2F

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1131-2F

Error code:	B1131-2F
ECU	Base ECU
Description:	Position Control - Main Boom Lower Limit Switch Short Circuit to High
Component:	Main Boom Limit Switch
Vehicle reaction:	Default to raised position Prevent main boom raise & extend
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring terminals at Boom Down Limit Switch -SW142_MBL and check wiring from Switch to connector. 2. Check none of the wires to the switch connector are not shorted together 3. Check Bosch Base ECU Connectors for Damage, Bent pins and water ingress. 4. Check Switch or harness for damage.

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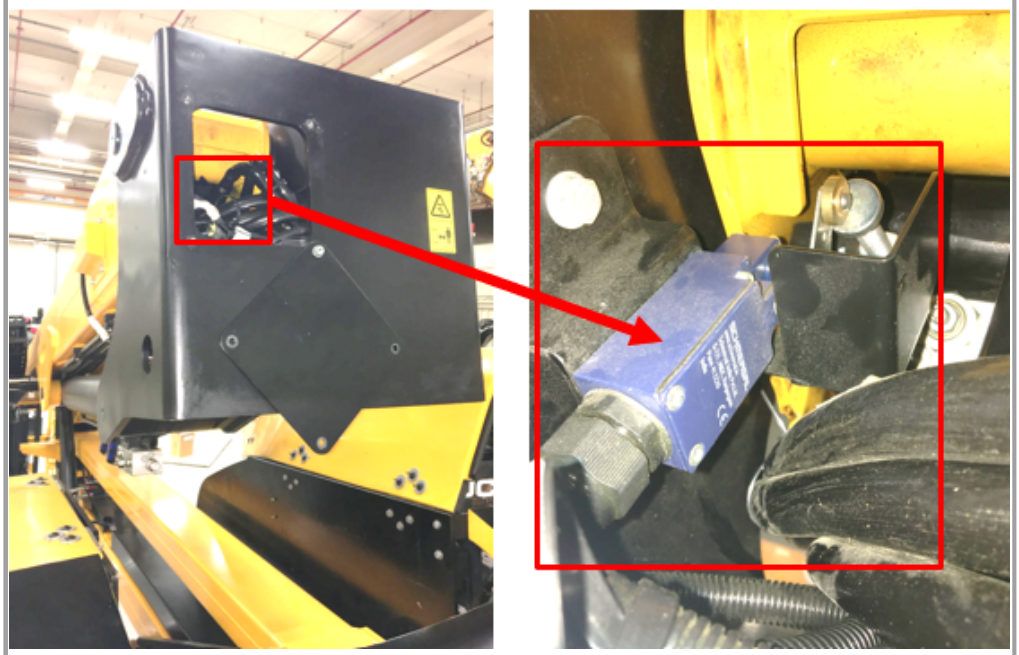

6.1.117 B1133-17

B1133-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1133-17

Error code:	B1133-17
ECU	Base ECU
Description:	JIB/PLATFORM FLOW High Side Solenoid Short Circuit to High
Component:	JIB/PLATFORM FLOW Solenoid
Vehicle reaction:	Detect failure mode for Short Circuit to High and disable platform rotate and allow Jib functions

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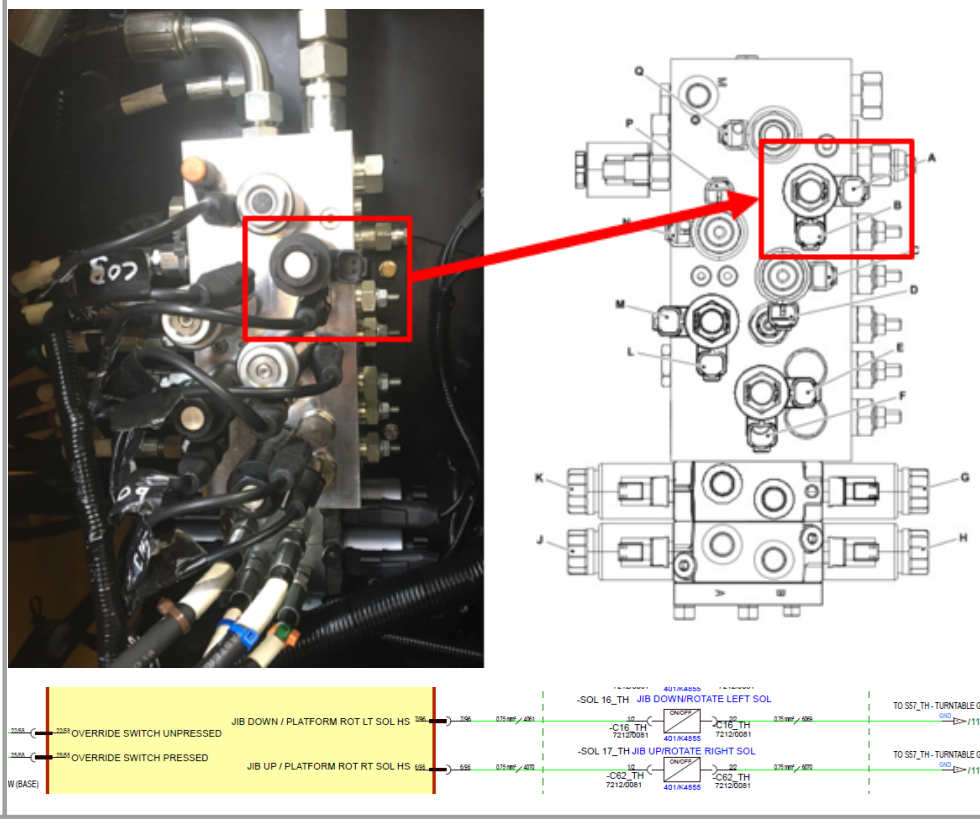
	Note: Before Ignition ON, POST Fail (stuck in startup logic for Short Circuit to High only) and Generic output fault.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Locate Jib Up / Platform Right solenoid connector -C62_TH. Disconnect connector and measure voltage at pin 1/2. If voltage is high, check harness and Base Bosch ECU Connector terminal 7/96 for short to high. 2. Measure voltage at -C62_TH pin 2/2. If voltage is high, check return path for short to high. 3. Check -C62_TH and Base Bosch ECU Connector for water ingress, damage, debris or stray wires that may cause short circuit. 4. Check for any damage to the harness or components that may cause short circuit. 

6.1.118 **B1134-16**

B1134-16

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Machine Fault Codes 518 > DTC ERROR CODE 519 > B1134-16

Error code:	B1134-16
ECU	Base ECU
Description:	JIB/PLATFORM FLOW High Side Solenoid Short Circuit to Low
Component:	JIB/PLATFORM FLOW Solenoid
Vehicle reaction:	Detect failure mode for Short Circuit to Low and disable platform rotate and allow Jib functions
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Locate Jib Up / Platform Right solenoid connector -C62_TH. Disconnect connector and test pin 1/2 for short to GND. Check harness and Base Bosch ECU Connector terminal 7/96 for short to GND. 2. Test for short to GND at -C62_TH pin 2/2. Check return path for short to GND. 3. Check -C62_TH and Base Bosch ECU Connector for water ingress, damage, debris or stray wires that may cause short circuit. 4. Check for any damage to the harness or components that may cause short circuit.

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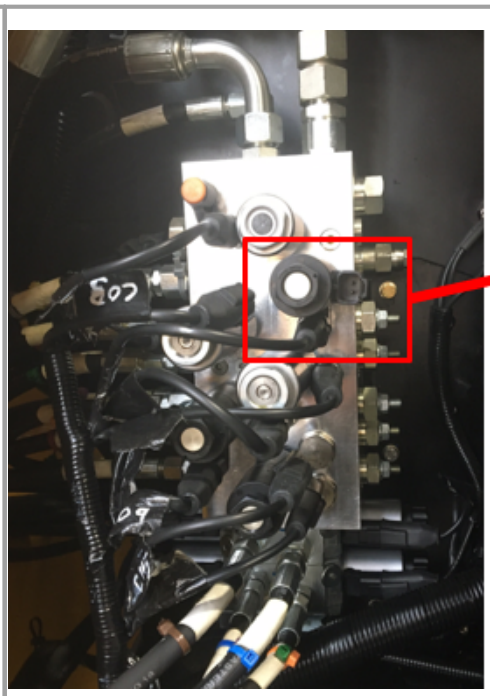

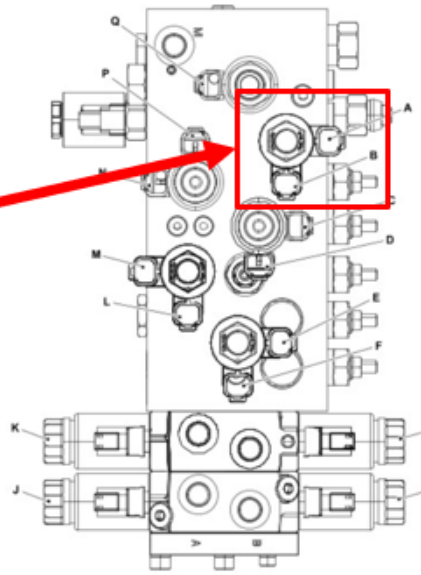

6.1.119 B1135-13

B1135-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1135-13

Error code:	B1135-16
ECU	Base ECU
Description:	Beacon(s) - Beacon Open Circuit or Short Circuit to High.
Component:	Beacon
Vehicle reaction:	Detect failure mode.

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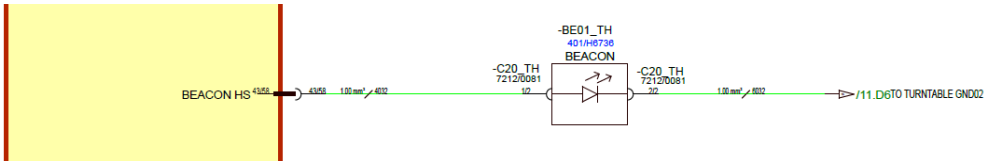
Possible Cause:	1. A short or open circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check continuity between Beacon connector -C20_TH pin 1/2 and Base Bosch ECU -C26-XC2_TH Pin 43/58 (Wire #4032). Check Wire #4032 not short circuit to high. 2. Check Beacon connector and ECU Connectors. Ensure no bent pins or stray wire causing short circuit. Ensure wires correctly terminated. 3. Check Beacon connector and ECU Connectors for any water ingress. 4. Check Beacon for any damage. 

6.1.120 B1136-16

B1136-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1136-13

Error code:	**B1136-16**

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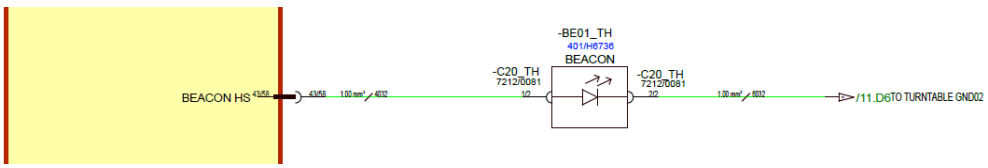
ECU	Base ECU
Description:	Beacon(s) - Beacon Short Circuit to Low.
Component:	Beacon
Vehicle reaction:	Detect failure mode.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check continuity between Beacon connector -C20_TH pin 1/2 and Base Bosch ECU -C26-XC2_TH Pin 43/58 (Wire #4032). 2. Check Wire #4032 not short circuit to GND. Check for abrasions and pinching of the harness. 3. Check Beacon connector and ECU Connectors. Ensure no bent pins or stray wire causing short circuit. Ensure wires correctly terminated. 4. Check Beacon connector and ECU Connectors for any water ingress. 5. Check Beacon for any damage. 

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6.1.121 B1138-17

B1138-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1138-17

Error code:	B1138-17
ECU	Base ECU
Description:	Main boom telescopic retract limit switch 1 short circuit to high
Component:	Main boom telescopic retract limit switch
Vehicle reaction:	Default to raised position Prevent main boom raise & extend, and articulated boom raise Allow main boom retract at cushioning speed only Allow slew speed * 50%
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage of Boom telescopic retract Limit Switch -SW221_MBT Pin 2. Actuate the switch to check that the voltage level changes between 10V and 0V. If this does not happen, check operation of switch. Check pins at Base Bosch ECU connector. Observe harness, Check for any pinching / damage. 2. Disconnect terminal from Pin 2, measure voltage of wire. If voltage is high 10V (or Higher) then there is a short circuit to high within the harness. 3. Check for water ingress at the switch terminals, The interconnects and at the Base Bosch ECU connectors. 4. Check the Switch,Base Bosch ECU and harnessing connectors for any damage. Pay particular attention to ECU pins 48/96 & 59/96 as these could be bent.

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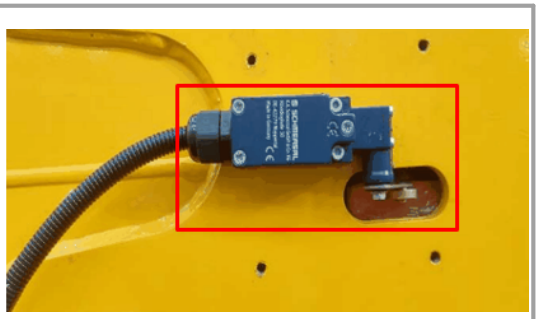

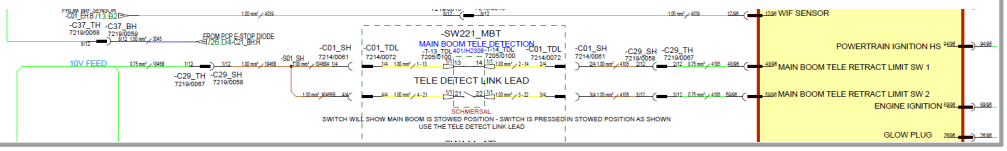

6.1.122 B1139-17

B1139-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1139-17

Error code:	B1139-17
ECU	Base ECU
Description:	Main boom telescopic retract limit switch 2 short circuit to high
Component:	Main boom telescopic retract limit switch
Vehicle reaction:	Default to raised position Prevent main boom raise & extend, and articulated boom raise Allow main boom retract at cushioning speed only Allow slew speed * 50%
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component

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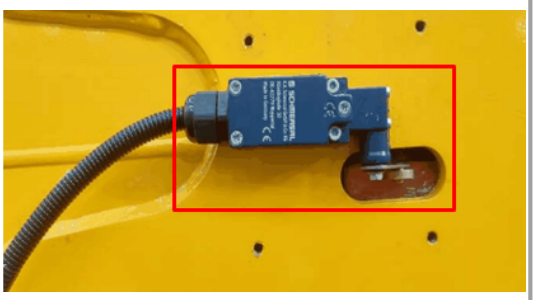
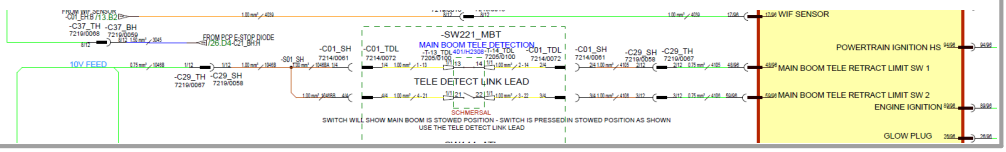
Service Action:	1. Measure voltage of Boom telescopic retract Limit Switch -SW221_MBT Pin 4. Actuate the switch to check that the voltage level changes between 10V and 0V. If this does not happen, check operation of switch. Check pins at Base Bosch ECU connector. Inspect harness, check for any pinching / damage. 2. Disconnect terminal from Pin 4, measure voltage of wire. If voltage is high 10V (or Higher) then there is a short circuit to high within the harness. 3. Check for water ingress at the switch terminals and at the Base Bosch ECU connectors. 4. Check the Switch, Base Bosch ECU and harnessing connectors for any damage. Pay particular attention to ECU pins 48/96 & 59/96 as these could be bent.  

6.1.123 B1140-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1140-16

Error code:	**B1140-16**
ECU	Base ECU
Description:	Main boom telescopic retract limit switch 1 short circuit to low
Component:	Main boom telescopic retract limit switch
Vehicle reaction:	Default to raised position Prevent main boom raise & extend, and articulated boom raise

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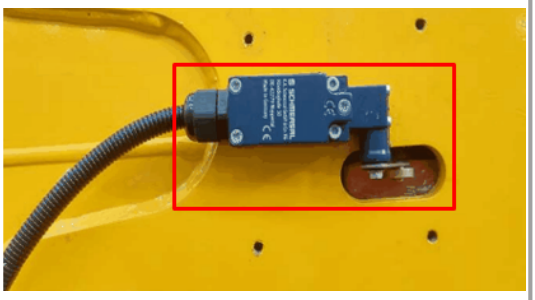
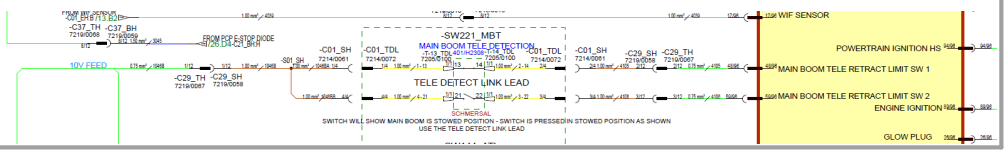
	Allow main boom retract at cushioning speed only Allow slew speed * 50%
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage of Boom telescopic retract Limit Switch -SW221_MBT Pin 2. Actuate the switch to check that the voltage level changes between 10V and 0V. If this does not happen, check operation of switch. Check pins at Base Bosch ECU connector. Observe harness, Check for any pinching / damage. 2. Disconnect terminal from Pin 2, measure voltage of wire. If voltage is high 10V (or Higher) then there is a short circuit to high within the harness. 3. Check for water ingress at the switch terminals, The interconnects and at the Base Bosch ECU connectors. 4. Check the Switch,Base Bosch ECU and harnessing connectors for any damage. Pay particular attention to ECU pins 48/96 & 59/96 as these could be bent.  

6.1.124 B1141-13

B1141-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1141-13

Error code:	**B1141-13**

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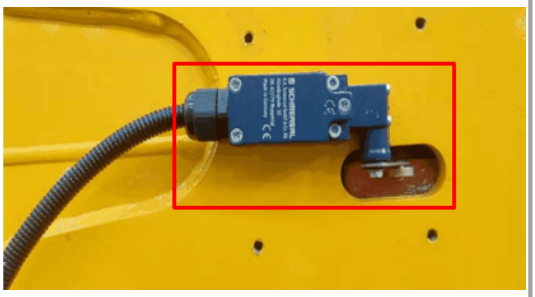
ECU	Base ECU
Description:	Main boom telescopic retract limit switch 1 and 2 are both open circuit
Component:	Main boom telescopic retract limit switch
Vehicle reaction:	Default to raised position •Prevent main boom raise & extend, and articulated boom raise •Allow main boom retract at cushioning speed only •Allow slew speed * 50%
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in switch 4. Broken switch
Service Action:	1. Check wiring between switch and ECU for continuity 2. Check switch function with multi-meter. 3.Check switch functionality 4.Check for water ingress 5. Check for water ingress/corrosion. 6. Check wire from limit switch to Base ECU connector 4105 and 4016. 7. Check inputs on pin 13 and 21 for 10volt input. 8. Check wire 1046B for and cut or damage. 9. Check Base ECU pin 48/96 and 59/96 for bent or loose connection. 10. Check connector C29_TH and C01_TH for loose connection or any damage. 11.Turn ignition on off to clear code 

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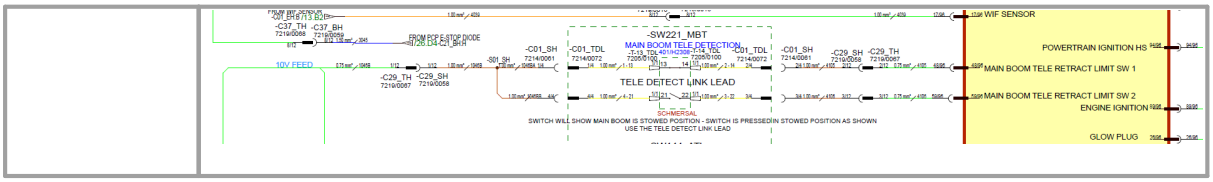

6.1.125 **B1142-16**

B1142-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1142-16

Error code:	B1142-16
ECU	Base ECU
Description:	Main boom telescopic retract limit switch 2 short circuit to Low
Component:	Main boom telescopic retract limit switch
Vehicle reaction:	Default to raised position Prevent main boom raise & extend, and articulated boom raise Allow main boom retract at cushioning speed only Allow slew speed * 50%
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Measure voltage of Boom telescopic retract Limit Switch -SW221_MBT Pin 4. Actuate the switch to check that the voltage level changes between 10V and 0V. If this does not happen, check operation of switch. Check pins at Base Bosch ECU connector. Inspect harness, check for any pinching / damage. 2. Disconnect terminal from Pin 4, measure voltage of wire. If voltage is high 10V (or Higher) then there is a short circuit to high within the harness. 3. Check for water ingress at the switch terminals and at the Base Bosch ECU connectors.

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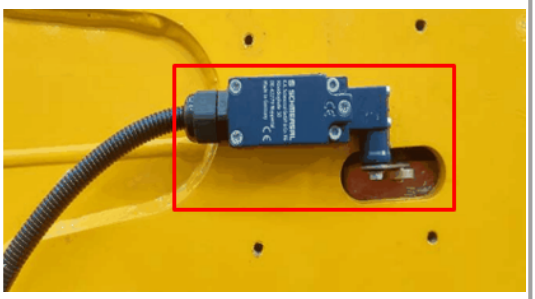
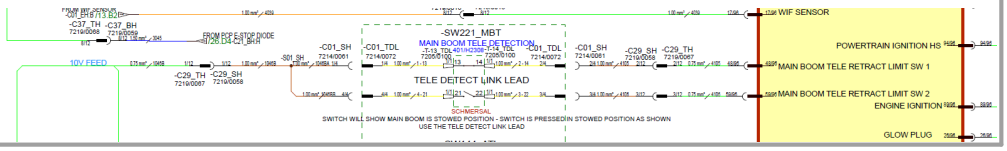
	4. Check the Switch, Base Bosch ECU and harnessing connectors for any damage. Pay particular attention to ECU pins 48/96 & 59/96 as these could be bent.  

6.1.126 **B1143-92**

B1143-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1143-92

Error code:	**B1143-92**
ECU	Base ECU
Description:	Main boom telescopic retract limit switch 1 and 2 Short to 10V
Component:	Main boom telescopic retract limit switch
Vehicle reaction:	Default to raised position •Prevent main boom raise & extend, and articulated boom raise •Allow main boom retract at cushioning speed only •Allow slew speed * 50%
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in switch

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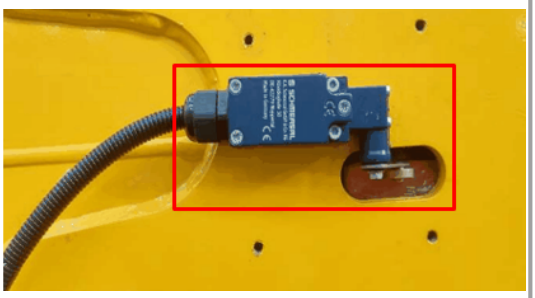
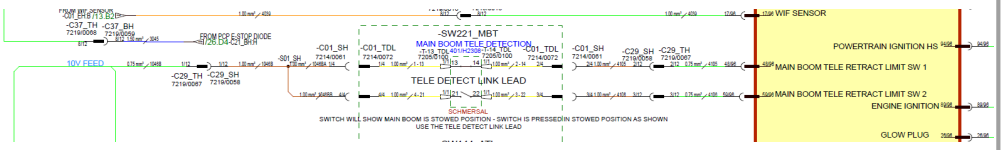
	4. Broken switch
Service Action:	1.Check wiring between switch and ECU for continuity 2. Check switch function with multi-meter. 3.Check switch functionality 4.Check for water ingress 5. Check for water ingress/corrosion. 6. Check wire from limit switch to Base ECU connector 4105 and 4016. 7. Check inputs on pin 13 and 21 for 10volt input. 8. Check wire 1046B for and cut or damage. 9. Check Base ECU pin 48/96 and 59/96 for bent or loose connection. 10. Check connector C29_TH and C01_TH for loose connection or any damage. 11.Turn ignition on off to clear code  

6.1.127 B1144-17

B1144-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1144 17

Error code:	**B1144-17**
ECU	Base ECU

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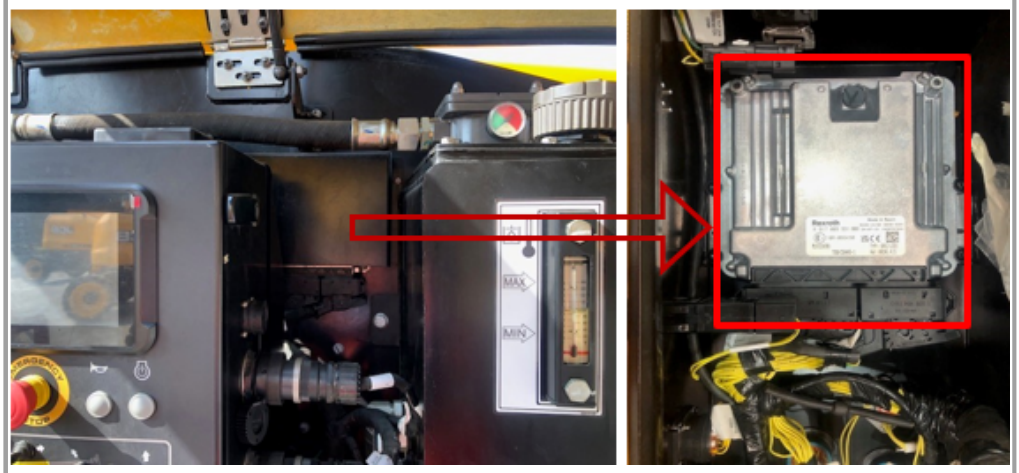
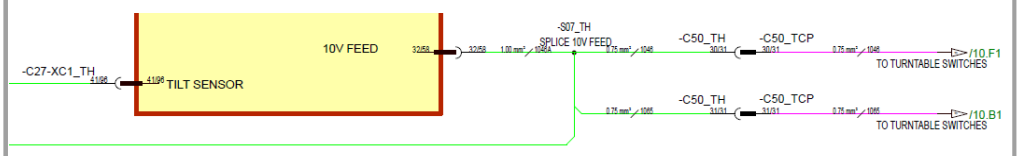
Description:	Base 10v Output - 10v Input System Short Circuit to High
Component:	Base ECU
Vehicle reaction:	Block all inputs connected to 10V present on the respective control panel.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Fault indicates the 10V output from the Base Bosch ECU (Terminal 32/58) has shorted to +12V. To narrow down fault location, Disconnect Interconnection HDP Connector -C50_TH. Measure Voltage at pin 30 and 31 of -C50_TH. If voltage is +10V, then fault is within Turntable Control Panel (else, it is the feed to the turntable limit switches). The 10V feed runs to terminal 1 on all Control Panel Switches. Check Wiring and look for shorts, abrasions and pinching within harness. 2. Check for any damage or wiring faults either at the Base Bosch ECU, Turntable Control Panel, Boom Down Limit Switch or Slew Position Switch. Check all wiring and interconnects (Control Panel Only). 3. Check all connectors above for water damage 4. Check operation of switches and all connectors for any damage.  

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6.1.128 B1145-16

B1145-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1145-16

Error code:	B1145-16
ECU	Base ECU
Description:	Base 10v Output - 10v Input System Short Circuit to Low
Component:	Base ECU
Vehicle reaction:	Block all inputs connected to 10V present on the respective control panel.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Fault indicates the 10V output from the Base Bosch ECU (Terminal 32/58) has shorted to GND. To narrow down fault location, Disconnect Interconnection HDP Connector -C50_TH. Measure resistance to GND on -C50_TCP (Control Panel mounted connector). If a short to GND exists, them fault lies within Turntable Control Panel (Else, check the Turntable Harness to the Limit switches). The 10V feed runs to terminal 1 on all Control Panel Switches. Check Wiring and look for shorts, abrasions and pinching within harness. 2. Check for any damage or wiring faults either at the Base Bosch ECU, Turntable Control Panel, Boom Down Limit Switch or Slew Position Switch. Check all wiring and interconnects (Control Panel Only). 3. Check all connectors above for water damage 4. Check operation of switches and all connectors for any damage.

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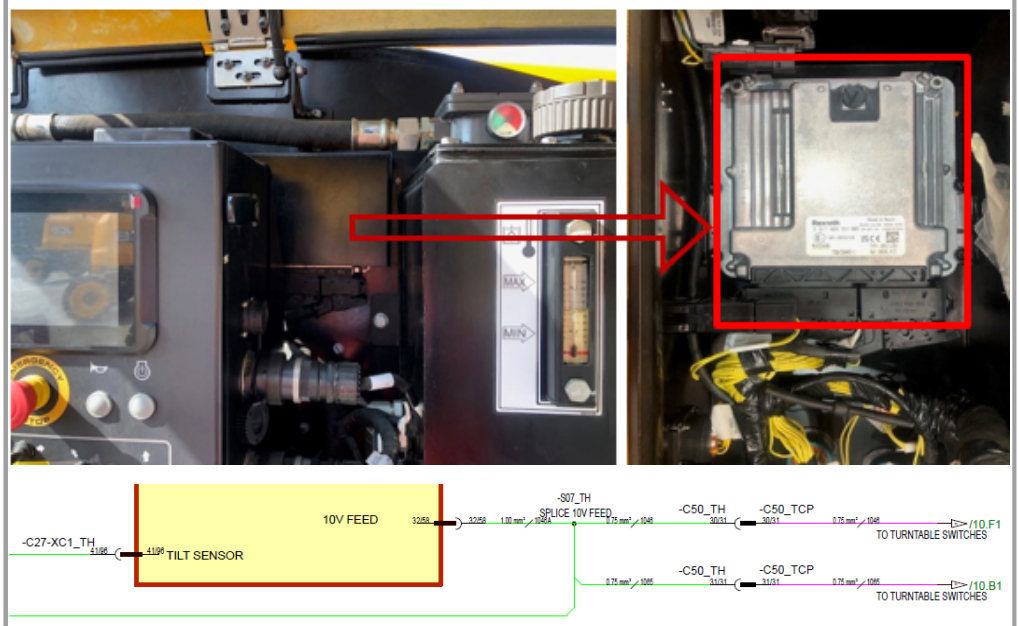

6.1.129 B1146-17

B1146-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1146-17

Error code:	B1146-17
ECU	Platform ECU
Description:	STEER JOYSTICK Short Circuit to High (>4.75V)
Component:	Steer Joystick
Vehicle reaction:	Detect failure mode - Ignore steer input (machine stops immediately)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component

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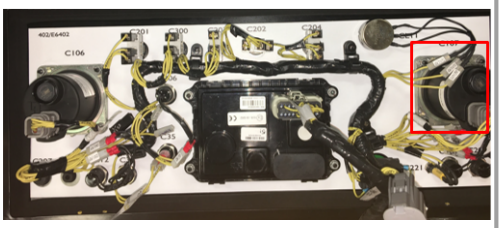
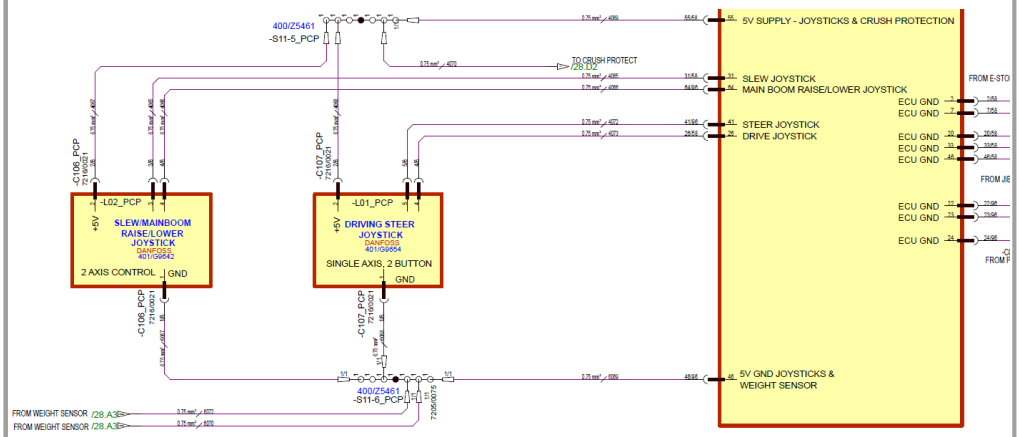
Service Action:	1. Measure voltage between pin 1/6 (GND) and pin 5/6 (Steer) on joystick connector. Voltage should measure between 0.25 - 4.75V depending on position of Joystick. If value is above 4.75V then there is likely a short circuit to high either within the joystick or wiring back to the Platform Bosch ECU Pin 41/96. 2. Check Connectors at joystick and Platform Bosch ECU, check for bent pins or stray wires potentially causing a short circuit. 3. Check Connectors at joystick and Platform Bosch ECU for water ingress. 4. Check joystick for damage. Check all wiring for potential damage, especially abrasions and pinching.  

6.1.130 B1147-16

B1147-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1147-16

Error code:	**B1147-16**
ECU	Platform ECU
Description:	STEER JOYSTICK Short Circuit to Low (<0.25V) or Open Circuit

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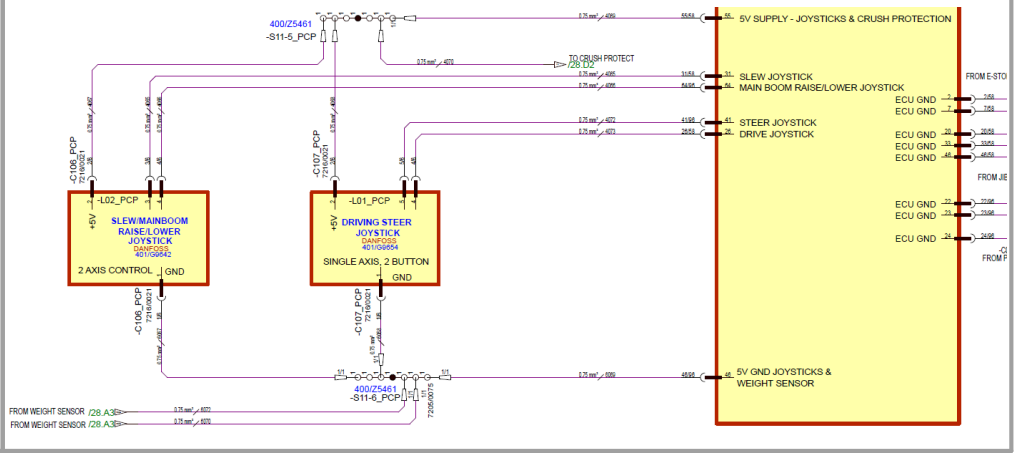
Component :	Steer Joystick
Vehicle reaction:	Detect failure mode - Ignore steer input (machine stops immediately)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component 6. A damaged or broken wire within the wiring harness
Service Action:	1. Measure voltage between pin 1/6 (GND) and pin 5/6 (Steer) on joystick connector. Voltage should measure between 0.25 - 4.75V depending on position of Joystick. If value is below 0.25V then there is likely a short circuit to GND either within the joystick or wiring back to the Platform Bosch ECU Pin 41/96. 2. Check Connectors at joystick and Platform Bosch ECU, check for bent pins or stray wires potentially causing a short circuit. 3. Check Connectors at joystick and Platform Bosch ECU for water ingress. 4. Check joystick for damage. Check all wiring for potential damage, especially abrasions and pinching. 

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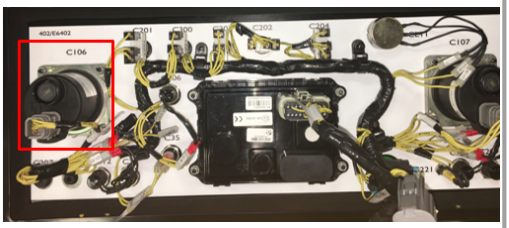
6.1.131 B1148-17

B1148-17

Error code:	B1148-17
ECU	Platform ECU
Description:	Joystick Boom Raise/Lower Short Circuit to High (>4.75V)
Component:	Main Boom Joystick
Vehicle reaction:	Detect failure mode - Ignore lift input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage between pin 1/6 (GND) and pin 4/6 (Main Boom Raise/Lower) on joystick connector. Voltage should measure between 0.25 - 4.75V depending on position of Joystick. If value is above 4.75V then there is likely a short circuit to high either within the joystick or wiring back to the Platform Bosch ECU Pin 64/96. 2. Check Connectors at joystick and Platform Bosch ECU, check for bent pins or stray wires potentially causing a short circuit. 3. Check Connectors at joystick and Platform Bosch ECU for water ingress. 4. Check joystick for damage. Check all wiring for potential damage, especially abrasions and pinching. 

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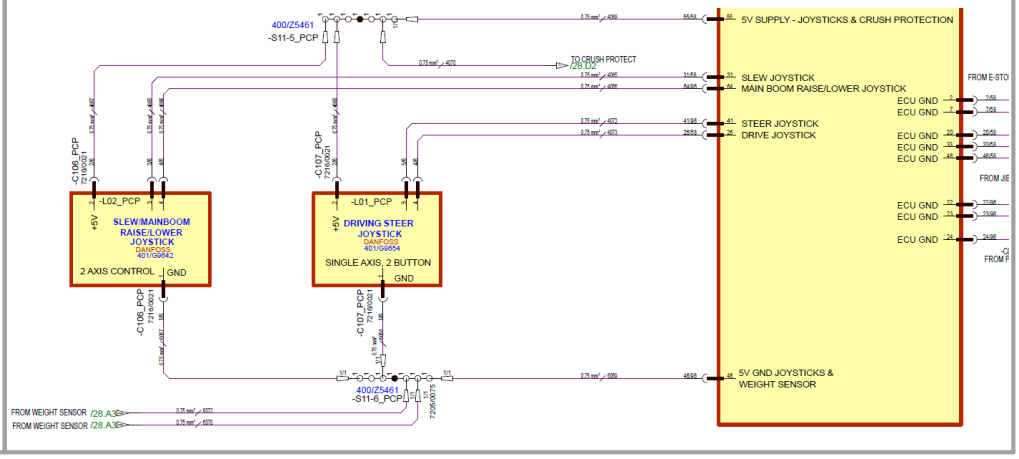

6.1.132 B1149-16

B1149-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1149-16

Error code:	B1149-16
ECU	Platform ECU
Description:	Joystick Boom Raise/Lower Short Circuit to Low (<0.25V) or Open Circuit
Component:	Main Boom Joystick
Vehicle reaction:	Detect failure mode - Ignore lift input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component 6. A damaged or broken wire within the wiring harness
Service Action:	1. Measure voltage between pin 1/6 (GND) and pin 4/6 (Main Boom Raise/Lower) on joystick connector. Voltage should measure between 0.25 - 4.75V depending on position of Joystick. If value is below 0.25V then there is likely a short circuit to GND either within the joystick or wiring back to the Platform Bosch ECU Pin 64/96.

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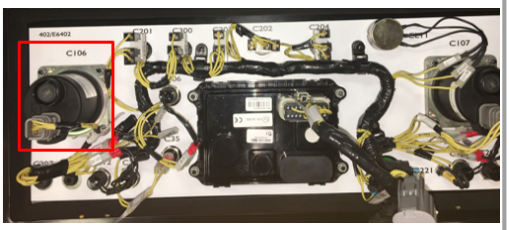
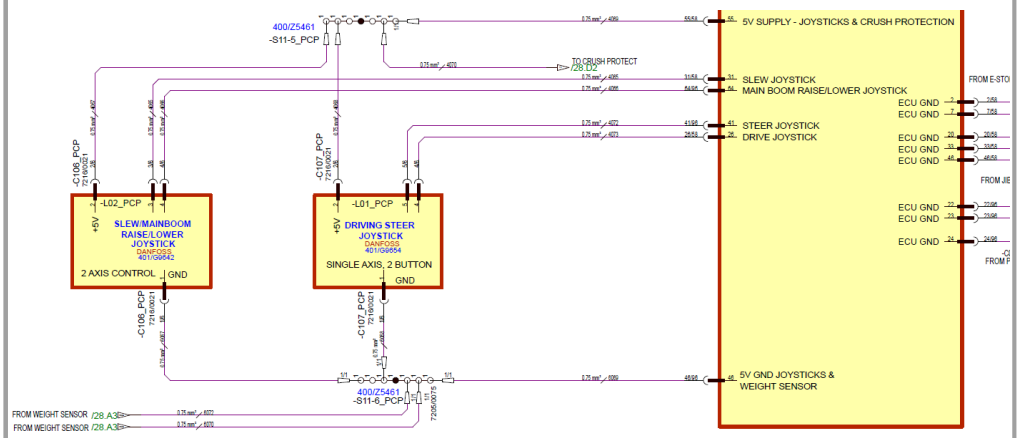
	2. Check Connectors at joystick and Platform Bosch ECU, check for bent pins or stray wires potentially causing a short circuit. 3. Check Connectors at joystick and Platform Bosch ECU for water ingress. 4. Check joystick for damage. Check all wiring for potential damage, especially abrasions and pinching.  

6.1.133 **B1150-17**

B1150-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1150 17

Error code:	B1150-17
ECU	Platform ECU
Description:	SLEW JOYSTICK Short Circuit to High (>4.75V)
Component:	Slew Joystick
Vehicle reaction:	Detect failure mode - Ignore slew input

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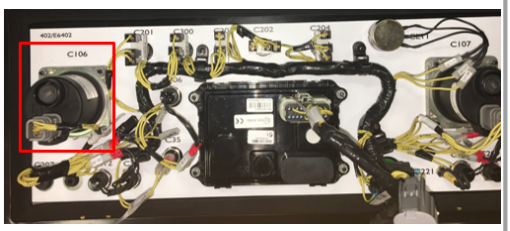
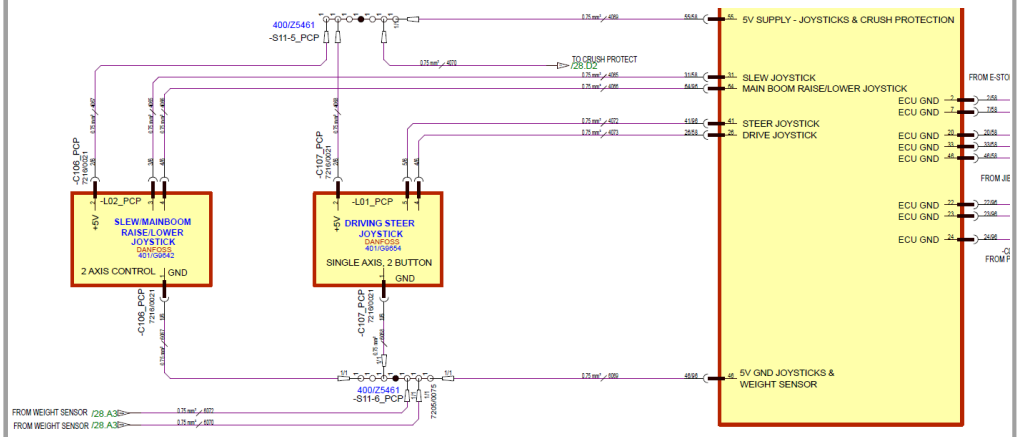
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Measure voltage between pin 1/6 (GND) and pin 3/6 (Slew) on joystick connector. Voltage should measure between 0.25 - 4.75V depending on position of Joystick. If value is above 4.75V then there is likely a short circuit to high either within the joystick or wiring back to the Platform Bosch ECU Pin 31/58. 2. Check Connectors at joystick and Platform Bosch ECU, check for bent pins or stray wires potentially causing a short circuit. 3. Check Connectors at joystick and Platform Bosch ECU for water ingress. 4. Check joystick for damage. Check all wiring for potential damage, especially abrasions and pinching.





6.1.134 B1151-16

B1151-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1151-16

Error code:	**B1151-16**

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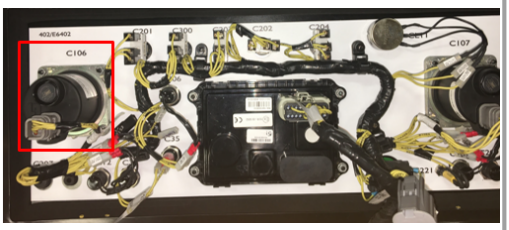
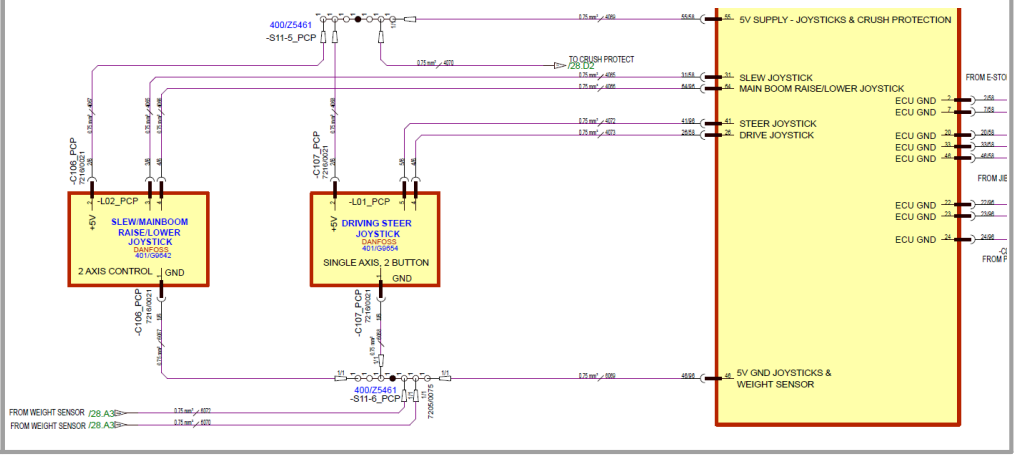
ECU	Platform ECU
Description:	SLEW JOYSTICK Short Circuit to Low (<0.25V) or Open Circuit
Component:	Slew Joystick
Vehicle reaction:	Detect failure mode - Ignore slew input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component 6. A damaged or broken wire within the wiring harness
Service Action:	1. Measure voltage between pin 1/6 (GND) and pin 3/6 (Slew) on joystick connector. Voltage should measure between 0.25 - 4.75V depending on position of Joystick. If value is below 0.25V then there is likely a short circuit to GND either within the joystick or wiring back to the Platform Bosch ECU Pin 31/58. 2. Check Connectors at joystick and Platform Bosch ECU, check for bent pins or stray wires potentially causing a short circuit. 3. Check Connectors at joystick and Platform Bosch ECU for water ingress. 4. Check joystick for damage. Check all wiring for potential damage, especially abrasions and pinching.





6.1.135 B1167-13

B1167-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1167-13

Error code:	B1167-13
ECU	Platform ECU
Description:	Platform rotate left output solenoid short circuit to high or open circuit
Component:	Platform rotate left output solenoid
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Fault indicates short to high or open circuit to Platform rotate left Solenoid. Check voltage at solenoid connector -C03_PH pin 1/2 greater than 10.5 volt and check coil resistance.. 2. Check continuity of GND path from Solenoid connector -C03_PH pin 2/2 to Turntable GND & Check Ground wire 6083. 3. Check Interconnect -C22_PCP / -C22_PH pin R/21. Check bent / backed out pins, debris, shorts or water ingress. 4. Check Platform ECU terminal 53/96. Check Connector for bent / backed out pins, debris, shorts or water ingress. 5. Check wire #4083 for continuity from Platform ECU pin 53/96 to Platform rotate left Solenoid connector -C03_PH pin 1/2. 6. Check the harness for any abrasions, pinching or any other damage that may lead to a fault. 7. Check if valve is mechanically jammed

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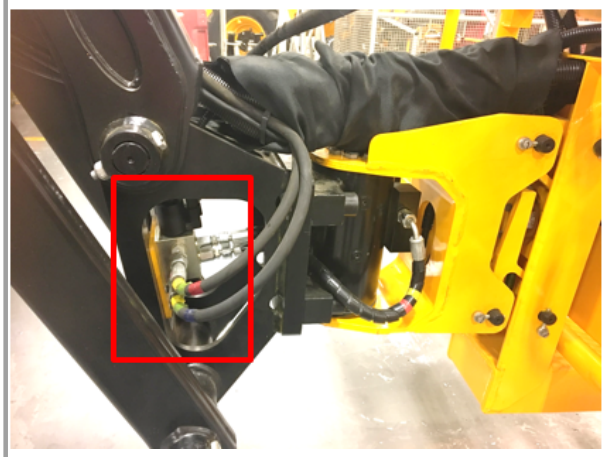

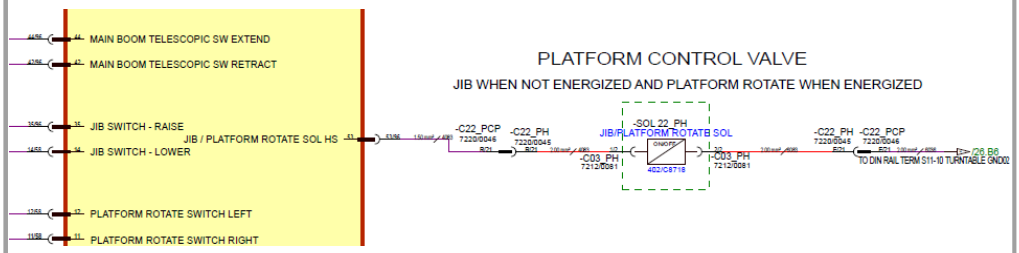

6.1.136 B1168-16

B1168-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1168-16

Error code:	B1168-16
ECU	Platform ECU
Description:	PLATFORM ROTATE LEFT Solenoid Valve Short Circuit to Low
Component:	Platform rotate left solenoid
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors

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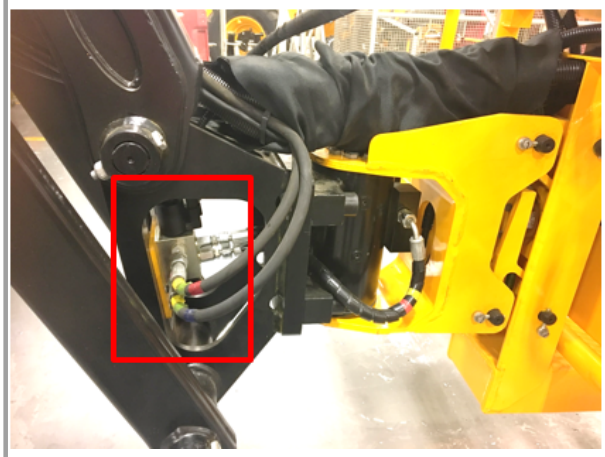
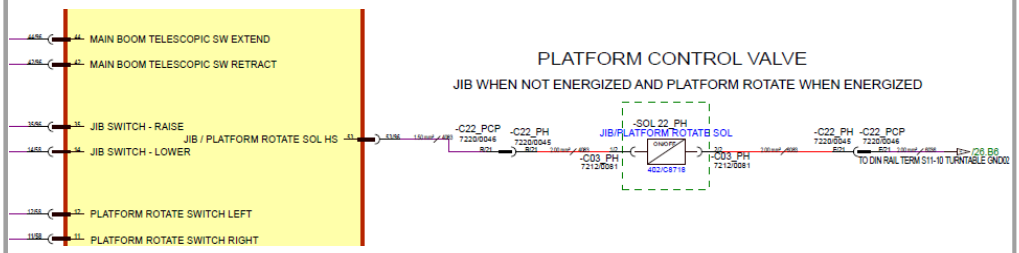
	5. Damaged component
Service Action:	1. Fault indicates short to high or open circuit to Platform rotate left Solenoid. Check voltage at solenoid connector -C03_PH pin 1/2 greater than 10.5 volt and check coil resistance.. 2. Check continuity of GND path from Solenoid connector -C03_PH pin 2/2 to Turntable GND & Check Ground wire 6083. 3. Check Interconnect -C22_PCP / -C22_PH pin R/21. Check bent / backed out pins, debris, shorts or water ingress. 4. Check Platform ECU terminal 53/96. Check Connector for bent / backed out pins, debris, shorts or water ingress. 5. Check wire #4083 for continuity from Platform ECU pin 53/96 to Platform rotate left Solenoid connector -C03_PH pin 1/2. 6. Check the harness for any abrasions, pinching or any other damage that may lead to a fault. 7. Check if valve is mechanically jammed  

6.1.137 B1169-13

B1169-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1169-13

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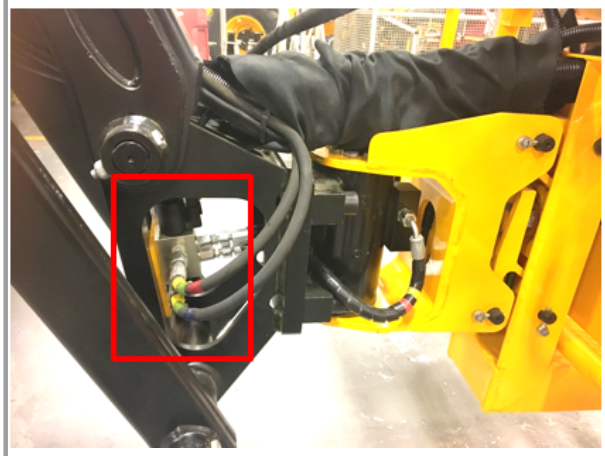
Error code:	B1169-13
ECU	Platform ECU
Description:	Platform rotate right output solenoid short circuit to high or open circuit
Component:	Platform rotate right output solenoid
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input
Possible Cause:	1 A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Fault indicates short to high or open circuit to Platform rotate right Solenoid. Check voltage at solenoid connector -C03_PH pin 1/2 greater than 10.5 volt and check coil resistance. 2. Check continuity of GND path from Solenoid connector -C03_PH pin 2/2 to Turntable GND & Check Ground wire 6083. 3. Check Interconnect -C22_PCP / -C22_PH pin R/21. Check bent / backed out pins, debris, shorts or water ingress. 4. Check Platform ECU terminal 53/96. Check Connector for bent / backed out pins, debris, shorts or water ingress. 5. Check wire #4083 for continuity from Platform ECU pin 53/96 to Platform rotate right Solenoid connector -C03_PH pin 1/2. 6. Check the harness for any abrasions, pinching or any other damage that may lead to a fault. 7. Check if valve is mechanically jammed 

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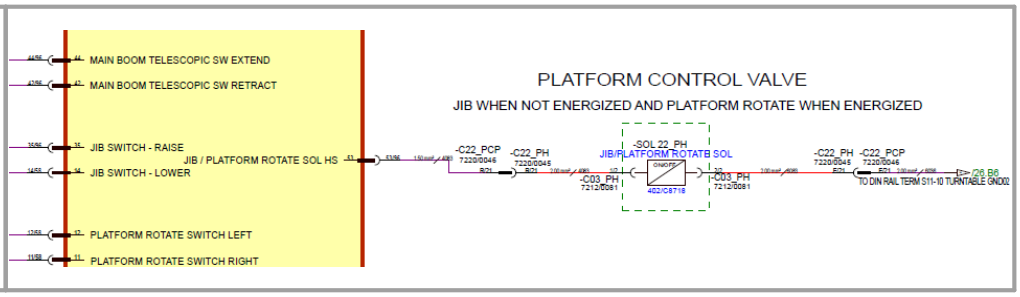

6.1.138 B1170-16

B1170-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1170-16

Error code:	B1170-16
ECU	Platform ECU
Description:	PLATFORM ROTATE RIGHT Solenoid Valve Short Circuit to Low
Component:	Platform rotate right solenoid
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input
Possible Cause:	1 A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Fault indicates short to high or open circuit to Platform rotate right Solenoid. Check voltage at solenoid connector -C03_PH pin 1/2 greater than 10.5 volt and check coil resistance. 2. Check continuity of GND path from Solenoid connector -C03_PH pin 2/2 to Turntable GND & Check Ground wire 6083. 3. Check Interconnect -C22_PCP / -C22_PH pin R/21. Check bent / backed out pins, debris, shorts or water ingress. 4. Check Platform ECU terminal 53/96. Check Connector for bent / backed out pins, debris, shorts or water ingress. 5. Check wire #4083 for continuity from Platform ECU pin 53/96 to Platform rotate right Solenoid connector -C03_PH pin 1/2.

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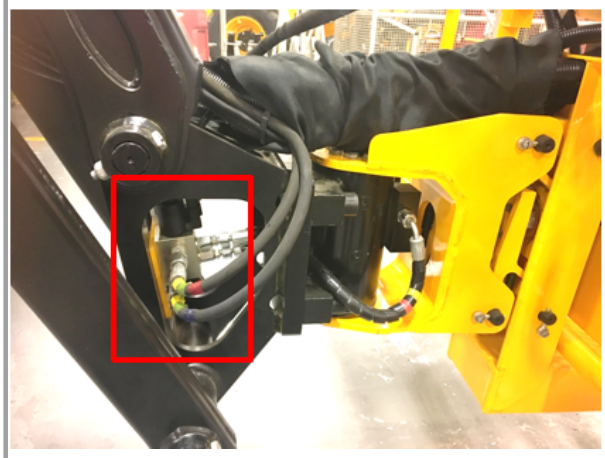
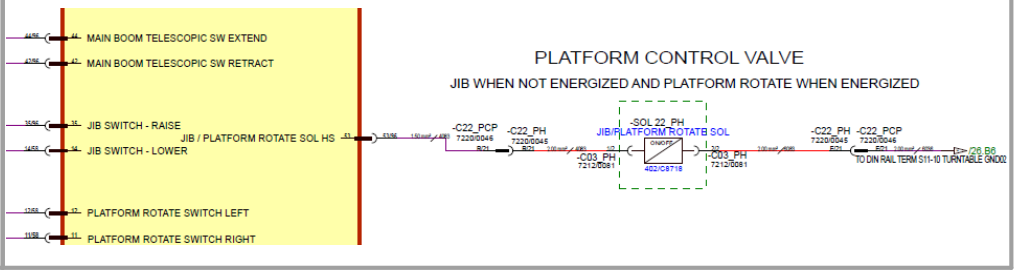
	6. Check the harness for any abrasions, pinching or any other damage that may lead to a fault. 7. Check if valve is mechanically jammed  

6.1.139 B1171-13

B1171-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1171-13

Error code:	B1171-13
ECU	Platform ECU
Description:	JIB RAISE Solenoid Valve short circuit to high or open circuit
Component:	JIB RAISE Solenoid Valve
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input

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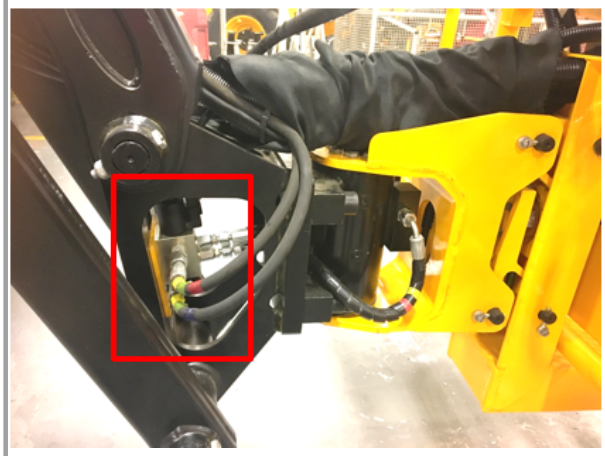
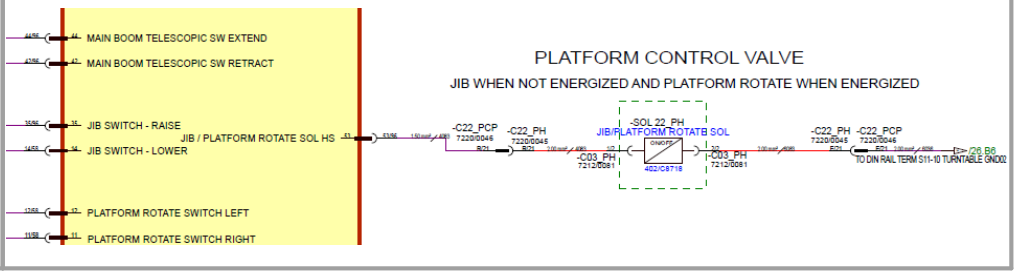
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Fault indicates short to high or open circuit to JIB RAISE Solenoid. Check voltage at solenoid connector -C03_PH pin 1/2 greater than 10.5 volt and check coil resistance. 2. Check continuity of GND path from Solenoid connector -C03_PH pin 2/2 to Turntable GND & Check Ground wire 6083. 3. Check Interconnect -C22_PCP / -C22_PH pin P/21. Check bent / backed out pins, debris, shorts or water ingress. 4. Check Platform ECU terminal 53/96. Check Connector for bent / backed out pins, debris, shorts or water ingress. 5. Check wire #4083 for continuity from Platform ECU pin 53/96 to JIB RAISE Solenoid connector -C03_PH pin 1/2. 6. Check the harness for any abrasions, pinching or any other damage that may lead to a fault. 7. Check if valve is mechanically jammed  

6.1.140 **B1172-16**

B1172-16

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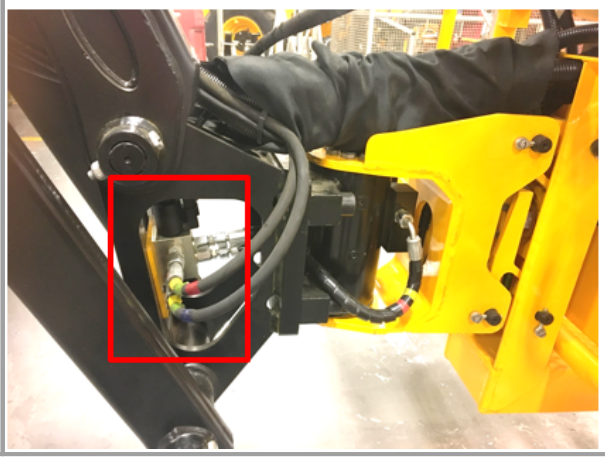
Machine Fault Codes 518 > DTC ERROR CODE 519 > B1172-16

Error code:	B1172-16
ECU	Platform ECU
Description:	JIB RAISE Solenoid Valve Short Circuit to Low
Component:	JIB RAISE Solenoid Valve
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Fault indicates short to high or open circuit to JIB RAISE Solenoid. Check voltage at solenoid connector -C03_PH pin 1/2 greater than 10.5 volt and check coil resistance. 2. Check continuity of GND path from Solenoid connector -C03_PH pin 2/2 to Turntable GND & Check Ground wire 6083. 3. Check Interconnect -C22_PCP / -C22_PH pin P/21. Check bent / backed out pins, debris, shorts or water ingress. 4. Check Platform ECU terminal 53/96. Check Connector for bent / backed out pins, debris, shorts or water ingress. 5. Check wire #4083 for continuity from Platform ECU pin 53/96 to JIB RAISE Solenoid connector -C03_PH pin 1/2. 6. Check the harness for any abrasions, pinching or any other damage that may lead to a fault. 7. Check if valve is mechanically jammed 

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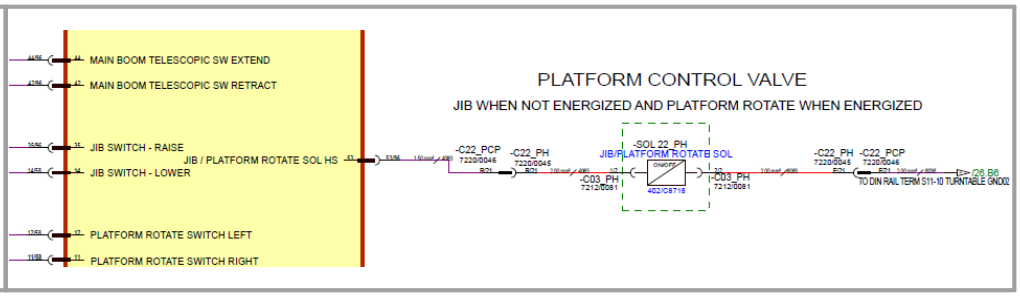

6.1.141 B1173-13

B1173-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1173-13

Error code:	B1173-13
ECU	Platform ECU
Description:	JIB LOWER Solenoid Valve short circuit to high or open circuit
Component:	JIB LOWER Solenoid Valve
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Fault indicates short to high or open circuit to JIB RAISE Solenoid. Check voltage at solenoid connector -C03_PH pin 1/2 greater than 10.5 volt and check coil resistance. 2. Check continuity of GND path from Solenoid connector -C03_PH pin 2/2 to Turntable GND & Check Ground wire 6083. 3. Check Interconnect -C22_PCP / -C22_PH pin P/21. Check bent / backed out pins, debris, shorts or water ingress. 4. Check Platform ECU terminal 53/96. Check Connector for bent / backed out pins, debris, shorts or water ingress. 5. Check wire #4083 for continuity from Platform ECU pin 53/96 to JIB RAISE Solenoid connector -C03_PH pin 1/2.

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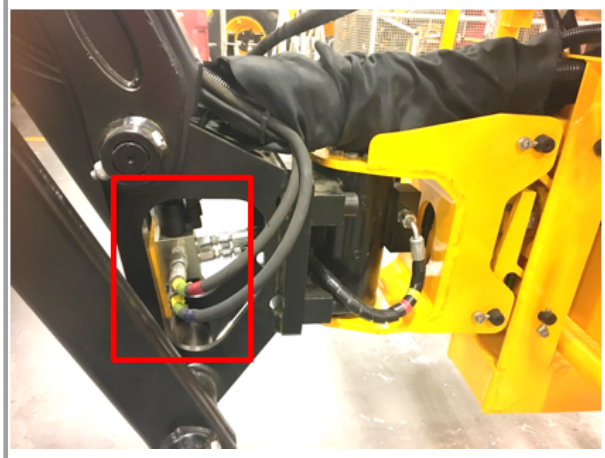
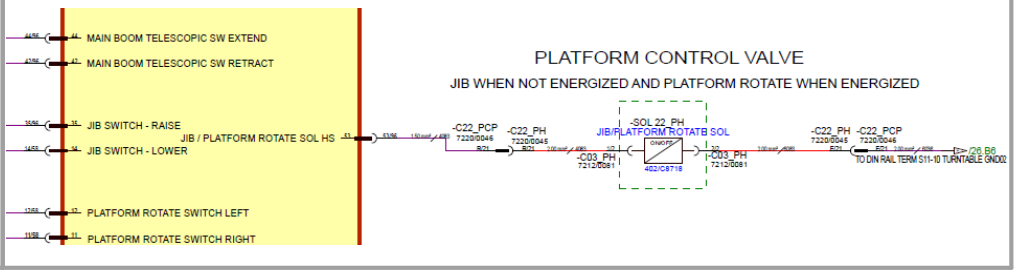
	6. Check the harness for any abrasions, pinching or any other damage that may lead to a fault. 7. Check if valve is mechanically jammed  

6.1.142 B1174-16

B1174-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1174-16

Error code:	B1174-16
ECU	Platform ECU
Description:	JIB LOWER Solenoid Valve Short Circuit to Low
Component:	JIB LOWER Solenoid Valve
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input

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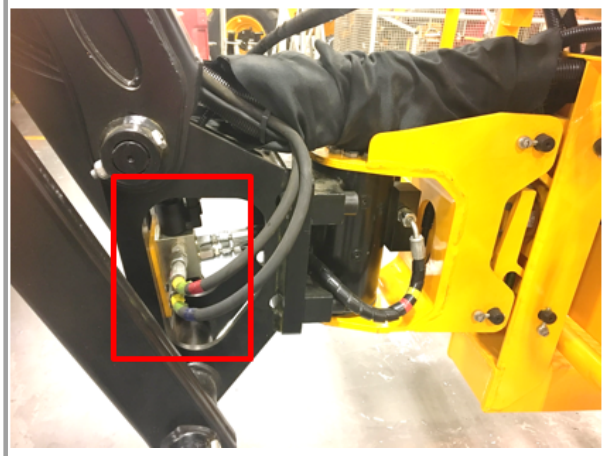
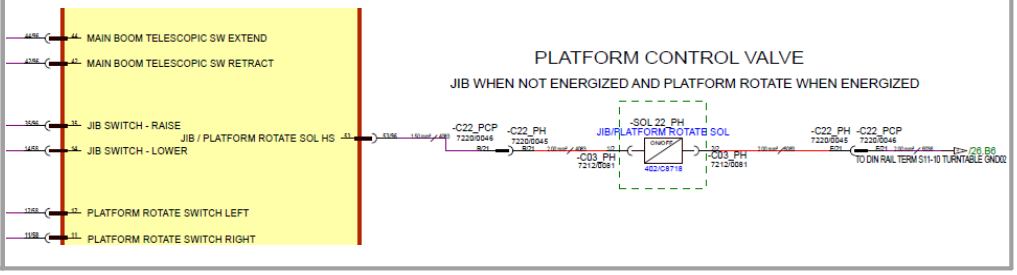
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Fault indicates short to high or open circuit to JIB RAISE Solenoid. Check voltage at solenoid connector -C03_PH pin 1/2 greater than 10.5 volt and check coil resistance. 2. Check continuity of GND path from Solenoid connector -C03_PH pin 2/2 to Turntable GND & Check Ground wire 6083. 3. Check Interconnect -C22_PCP / -C22_PH pin P/21. Check bent / backed out pins, debris, shorts or water ingress. 4. Check Platform ECU terminal 53/96. Check Connector for bent / backed out pins, debris, shorts or water ingress. 5. Check wire #4083 for continuity from Platform ECU pin 53/96 to JIB RAISE Solenoid connector -C03_PH pin 1/2. 6. Check the harness for any abrasions, pinching or any other damage that may lead to a fault. 7. Check if valve is mechanically jammed  

6.1.143 **B1175-13**

B1175-13

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Machine Fault Codes 518 > DTC ERROR CODE 519 > B1175-13

Error code:	B1175-13
ECU	Base ECU
Description:	MAIN BOOM LIFT/SLEW DIRECTIONAL Solenoid Valve Short Circuit to High or Open Circuit
Component:	MAIN BOOM LIFT/SLEW DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Fault indicates short to high or open circuit to MAIN BOOM LIFT/SLEW DIRECTIONAL Solenoid. Check voltage at solenoid connector -C13_TH pin 1/2 greater than 10.5 volt and check coil resistance. 2. Check continuity of GND path from Solenoid connector -C13_TH pin 2/2 to Turntable GND & Check Ground wire 6062. 3. Check bent / backed out pins, debris, shorts or water ingress. 4. Check Base ECU terminal 1/96. Check Connector for bent / backed out pins, debris, shorts or water ingress. 5. Check wire #4062 for continuity from Base ECU pin 1/96 to MAIN BOOM LIFT/SLEW DIRECTIONAL Solenoid connector -C13_PH pin 1/2. 6. Check the harness for any abrasions, pinching or any other damage that may lead to a fault. 7. Check if valve is mechanically jammed.

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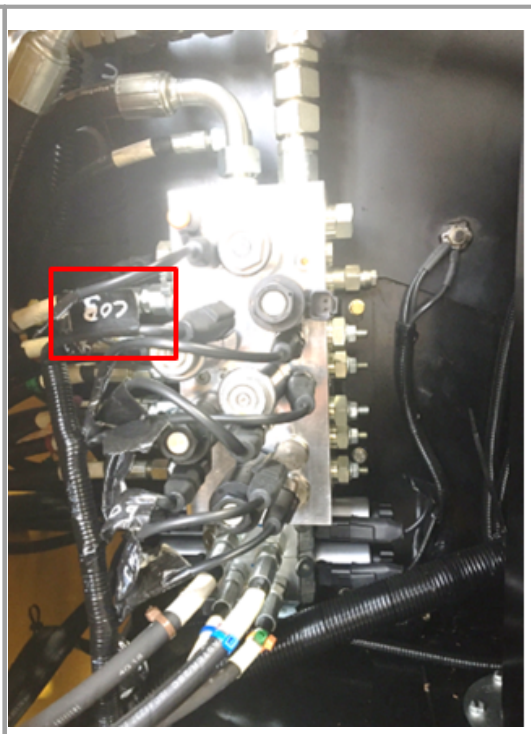

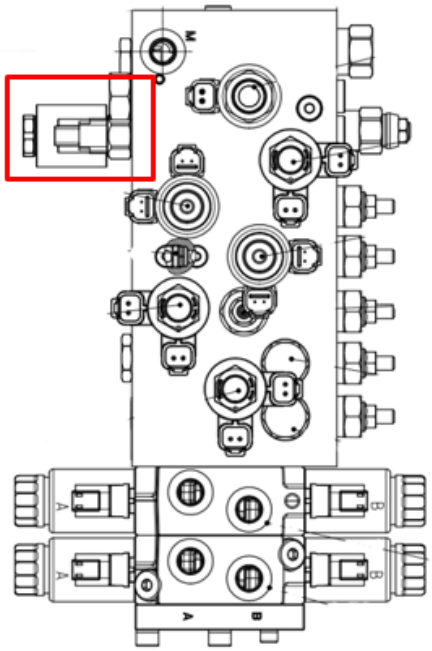

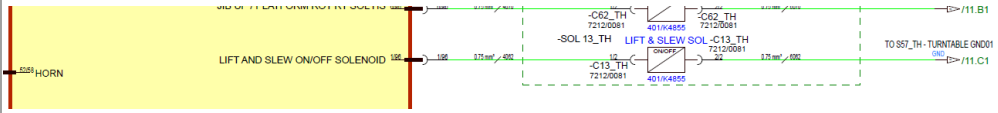

6.1.144 B1176-16

B1176-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1176-16

Error code:	B1176-16
ECU	Base ECU
Description:	MAIN BOOM LIFT/SLEW DIRECTIONAL Solenoid Valve Short Circuit to Low
Component:	MAIN BOOM LIFT/SLEW DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure modes. Dont disable any output and dont ignore any input

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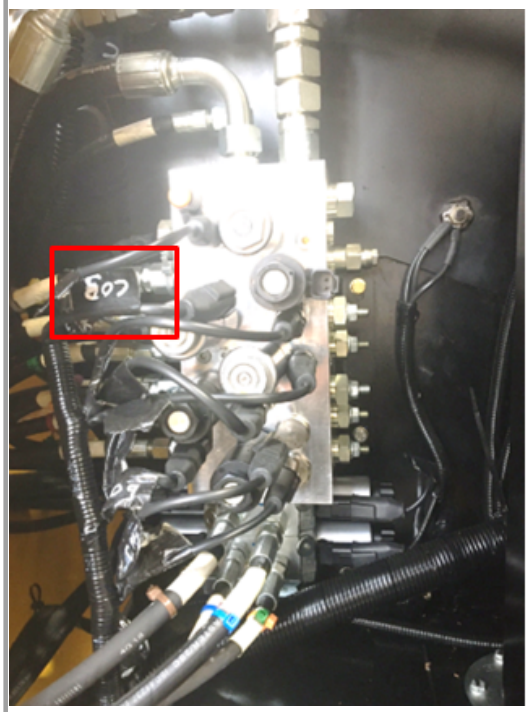
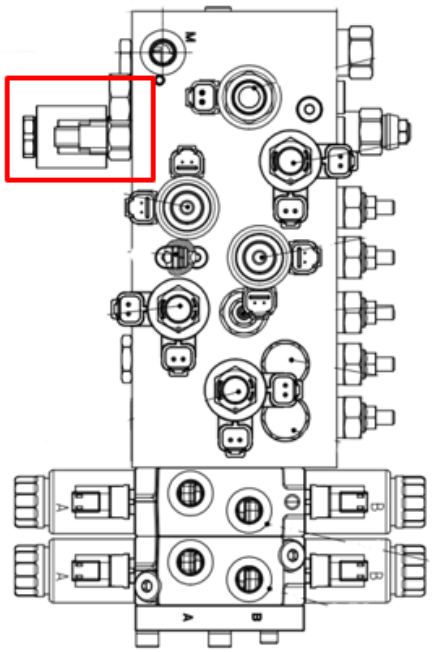
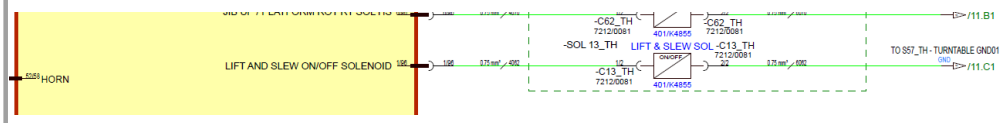
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Fault indicates short to high or open circuit to MAIN BOOM LIFT/SLEW DIRECTIONAL Solenoid. Check voltage at solenoid connector -C13_TH pin 1/2 greater than 10.5 volt and check coil resistance. 2. Check continuity of GND path from Solenoid connector -C13_TH pin 2/2 to Turntable GND & Check Ground wire 6062. 3. Check bent / backed out pins, debris, shorts or water ingress. 4. Check Base ECU terminal 1/96. Check Connector for bent / backed out pins, debris, shorts or water ingress. 5. Check wire #4062 for continuity from Base ECU pin 1/96 to MAIN BOOM LIFT/SLEW DIRECTIONAL Solenoid connector -C13_PH pin 1/2. 6. Check the harness for any abrasions, pinching or any other damage that may lead to a fault. 7. Check if valve is mechanically jammed.   

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6.1.145 B1177-16

B1177-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1177 16

Error code:	B1177-16
ECU	Base ECU
Description:	BUZZER Short Circuit to Low
Component:	Buzzer
Vehicle reaction:	Detect failure mode.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check condition of Wire #4024 from Base Bosch ECU Pin 90/96 to Panel Interconnect -C50_TH. Check condition of wire 4024 from Panel interconnect -C50_TCP to Buzzer holder -RB07_TCP pin 1. 2. Check above wires for any shorts to GND / Chassis. Look for damage to harness, especially abrasions and pinching. 3. Check the interconnects for debris or stray wire etc that may cause short circuit. Check Buzzer holder -RB07_TCP. Check Bosch ECU connectors for bent pins or debris / stray wires. 4. Check all above connectors for water damage. 5. Remove buzzer and check wire resistance again, check buzzer for damage.

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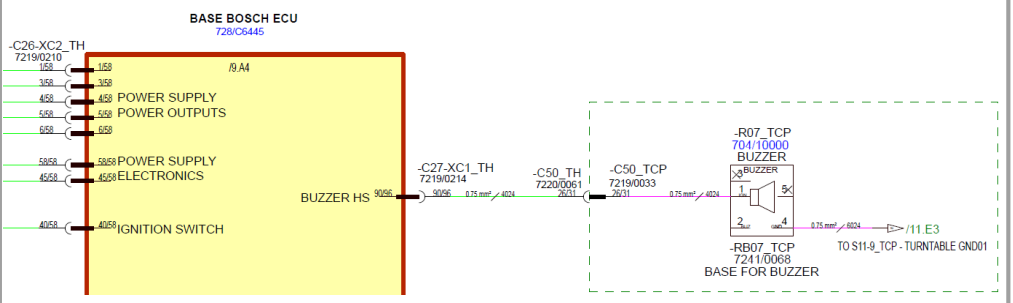

6.1.146 B1178-13

B1178-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1178-13

Error code:	B1178-13
ECU	Base ECU
Description:	BUZZER Open Circuit OR Short Circuit to High
Component:	Buzzer
Vehicle reaction:	Detect failure mode.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors

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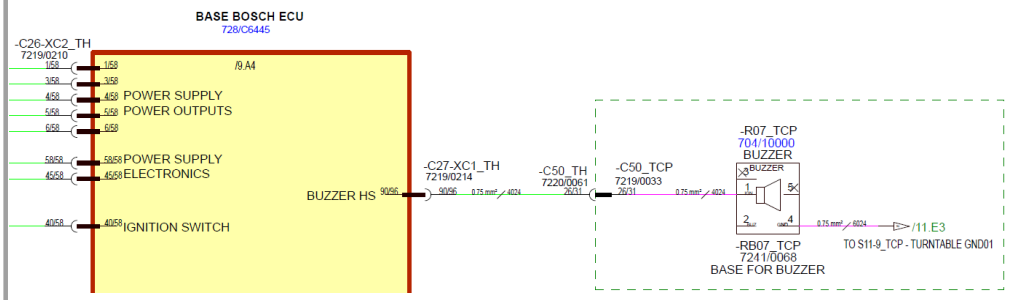
	4. Damaged component
Service Action:	1. Check condition of Wire #4024 from Base Bosch ECU Pin 90/96 to Panel Interconnect -C50_TH. Check condition of wire 4024 from Panel interconnect -C50_TCP to Buzzer holder -RB07_TCP pin 1. 2. Check the interconnects for debris or stray wire etc that may cause short circuit. Check Buzzer holder -RB07_TCP. Check Bosch ECU connectors for bent pins or debris / stray wires. 3. Check all above connectors for water damage. 4. Check above wires for any shorts to High (>10V). Look for damage to harness, especially abrasions and pinching. Remove buzzer and check wire resistance again, check buzzer for damage. 

6.1.147 B1179-13

B1179-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1179-13

Error code:	**B1179-13**
ECU	Base ECU

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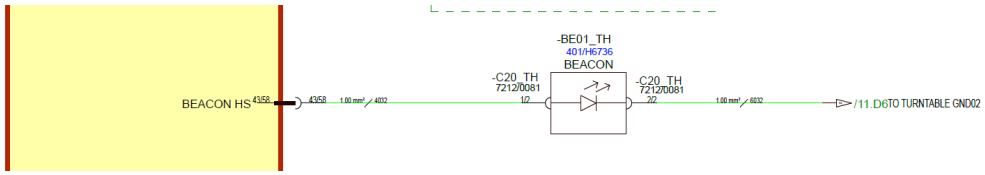
Description:	Beacon(s) - Beacon Open Circuit or Short Circuit to High.
Component:	Beacon
Vehicle reaction:	Detect failure mode.
Possible Cause:	1. A short or open circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check continuity between Beacon connector -C20_TH pin 1/2 and Base Bosch ECU -C26-XC2_TH Pin 43/58 (Wire #4032). Check Wire #4032 not short circuit to high. 2. Check Beacon connector and ECU Connectors. Ensure no bent pins or stray wire causing short circuit. Ensure wires correctly terminated. 3. Check Beacon connector and ECU Connectors for any water ingress. 4. Check Beacon for any damage. 

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6.1.148 B1180-16

B1180-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1180 16

Error code:	B1180-16
ECU	Base ECU
Description:	Beacon(s) - Beacon Short Circuit to Low.
Component:	Beacon
Vehicle reaction:	Detect failure mode.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check continuity between Beacon connector -C20_TH pin 1/2 and Base Bosch ECU -C26-XC2_TH Pin 43/58 (Wire #4032). 2. Check Wire #4032 not short circuit to GND. Check for abrasions and pinching of the harness. 3. Check Beacon connector and ECU Connectors. Ensure no bent pins or stray wire causing short circuit. Ensure wires correctly terminated. 4. Check Beacon connector and ECU Connectors for any water ingress. 5. Check Beacon for any damage.

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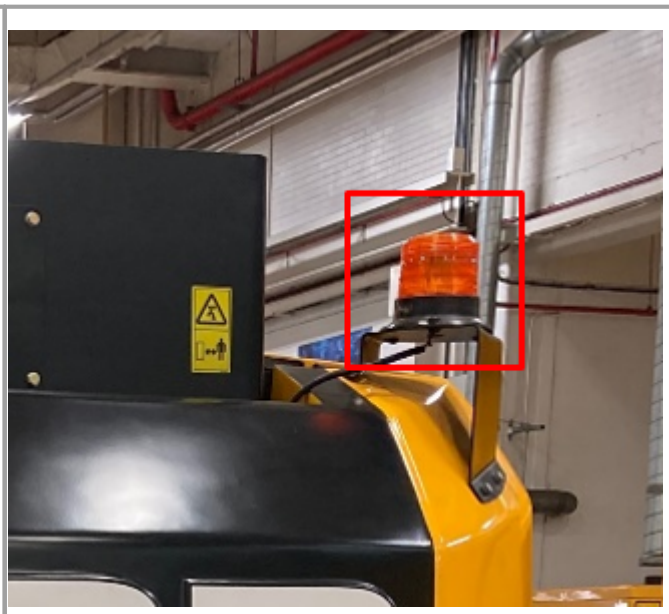

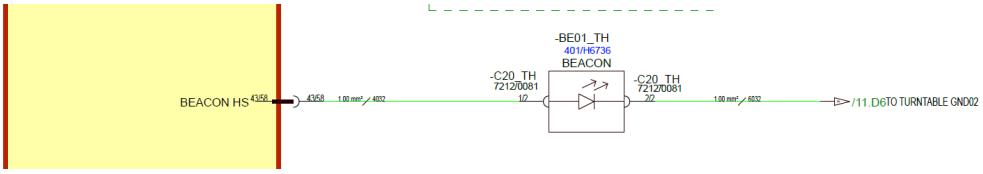

6.1.149 B1181-16

B1181-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1181 16

Error code:	B1181-16
ECU	Base ECU
Description:	Horn - Horn High Side Short Circuit to Low.
Component:	Horn Relay
Vehicle reaction:	Detect failure mode.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis

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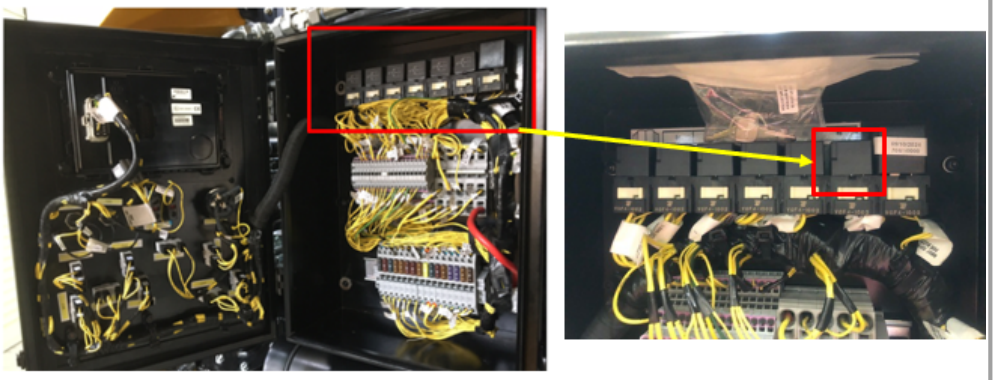
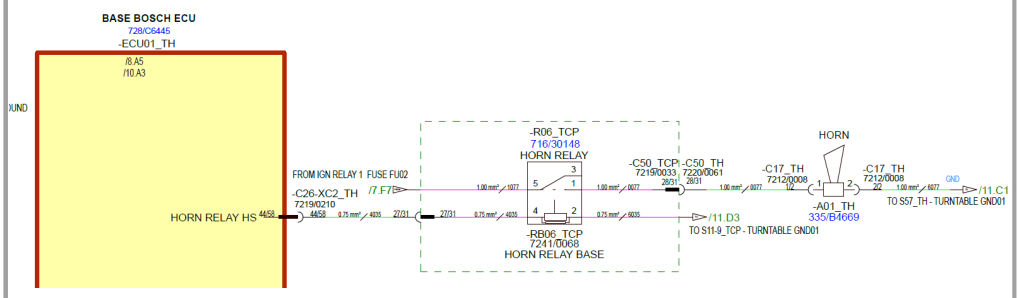
	3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check wiring between 'C26-XC2_TH Pin 44/58 on the Bosch Base ECU Connector' and 'Pin 4 on the Horn Relay Base'. 2. Check the wiring has not shorted to the chassis of the machine (caused perhaps by pinching or abrasion). 3. Disconnect 'C26-XC2_TH Bosch Base ECU Connector' and check terminal 44/58 ensuring that nothing is touching it. Same with Pin 4 at the Horn Relay Base. 4. Check connectors are dry and free of debris. Check for damaged pins on the 'C26-XC2_TH Bosch Base ECU Connector'. 5. Check operation of the system. Check for physical damage to the Horn Relay, connectors and other harness components.  

6.1.150 B1182-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1182-13

Error code:	**B1182-13**

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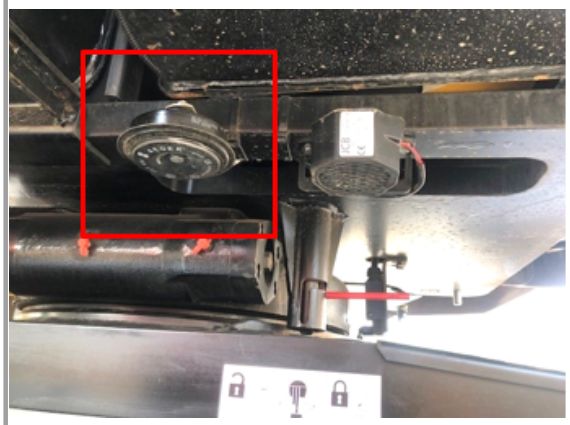
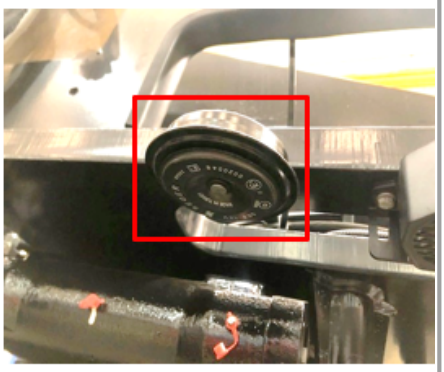
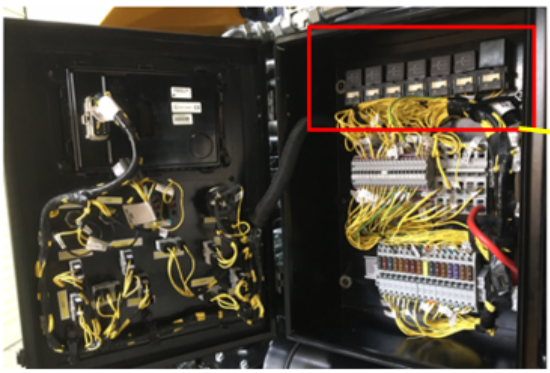
ECU	Base ECU
Description:	Horn - Horn High Side Open Circuit.
Component:	Horn Relay
Vehicle reaction:	Detect failure mode.
Possible Cause:	1. A poor connection or damaged terminal within the connector(s) 2. A damaged or broken wire within the wiring harness 3. Component is damaged
Service Action:	1. Ensure all terminals are seated correctly with no damage at 'C26-XC2_TH Pin 44/58 on the Bosch Base ECU Connector' and 'Pin 4 on the Horn Relay Base'. 2. Check for continuity with a multimeter between 'C26-XC2_TH Pin 44/58 on the Bosch Base ECU Connector' and 'Pin 4 on the Horn Relay Base'. 3. Check operation of the system. Check for physical damage to the Horn Relay, connectors and other harness components.   

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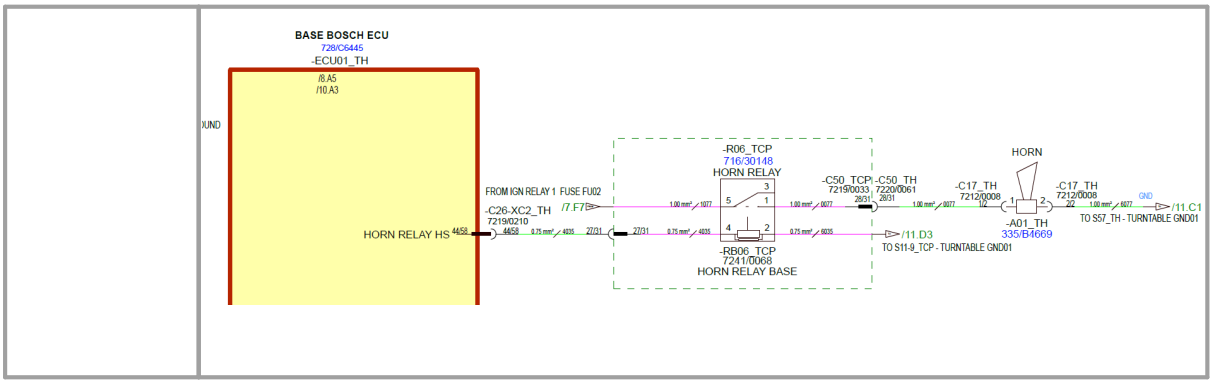

6.1.151 B1183-16

B1183-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1183 16

Error code:	B1183-16
ECU	Base ECU
Description:	White Noise Alarm - White Noise Alarm Short Circuit to Low.
Component:	White Noise Alarm
Vehicle reaction:	Detect failure mode.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check wiring (#4036) between 'C26-XC2_TH Pin 56/58 on the Bosch Base ECU Connector' and 'C34_TH on the White Noise Alarm'. 2. Check the wiring (#4036) has not shorted to the chassis of the machine (caused perhaps by pinching or abrasion). 3. Disconnect 'C26-XC2_TH Bosch Base ECU Connector' and check terminal 56/58 ensuring that nothing is touching it. Same with 'C34_TH on the White Noise Alarm'. 4. Check connectors are dry and free of debris. Check for damaged pins on the 'C26-XC2_TH Bosch Base ECU Connector'.

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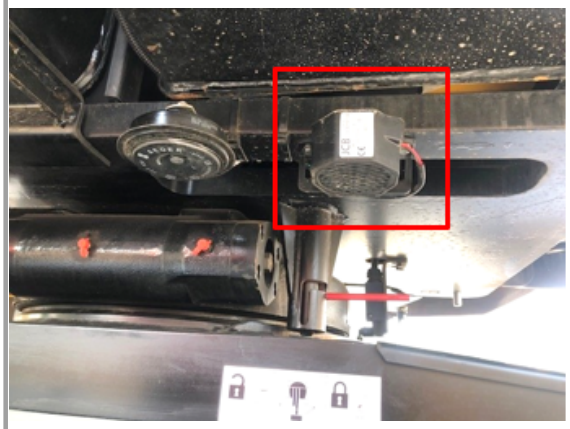
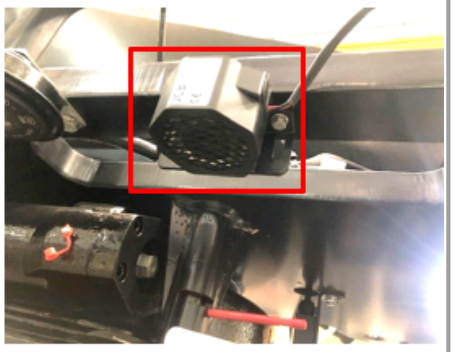
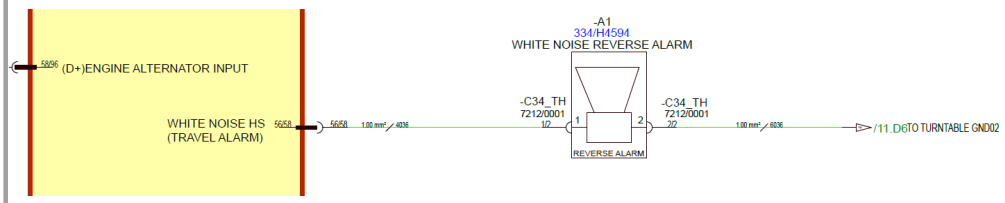
	5. Check operation of the system. Check for physical damage to the White Noise Alarm, connectors and other harness components.   

6.1.152 B1184-13

B1184-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1184-13

Error code:	B1184-13
ECU	Base ECU
Description:	White Noise Alarm - White Noise Alarm Open Circuit or Short Circuit to High.
Component:	White Noise Alarm
Vehicle reaction:	White Noise Alarm Disable
Possible Cause:	1. A short or open circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors

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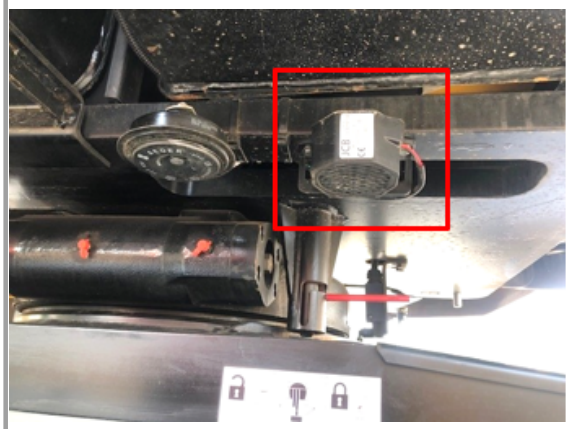
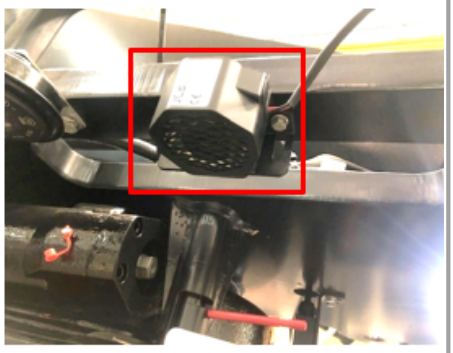
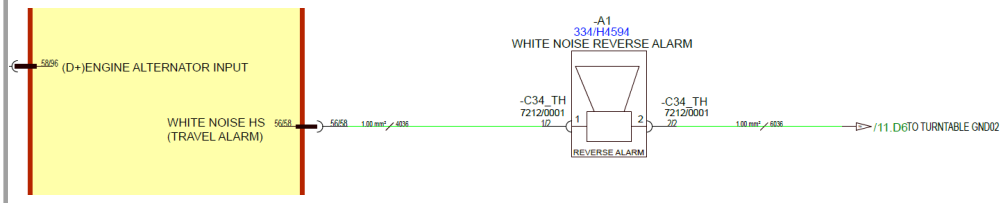
	4. Damaged component
Service Action:	1. Check continuity between White Noise Alarm C34_TH pin 1/2 and Base Bosch ECU -C26-XC2_TH Pin 56/58 (Wire #4036). Check Wire #4036 not short circuit to high and check Ground cable #6036. 2. Check White Noise Alarm connector and ECU Connectors. Ensure no bent pins or stray wire causing short circuit. Ensure wires correctly terminated. 3. Check White Noise Alarm connector and ECU Connectors for any water ingress. 4. Check White Noise Alarm for any damage.   

6.1.153 **B1190-16**

B1190-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1190□16

Error code:	**B1190-16**
ECU	Platform ECU
Description:	Fault Indicator - Fault LED Short Circuit to Low.

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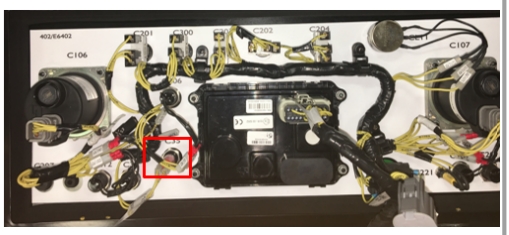
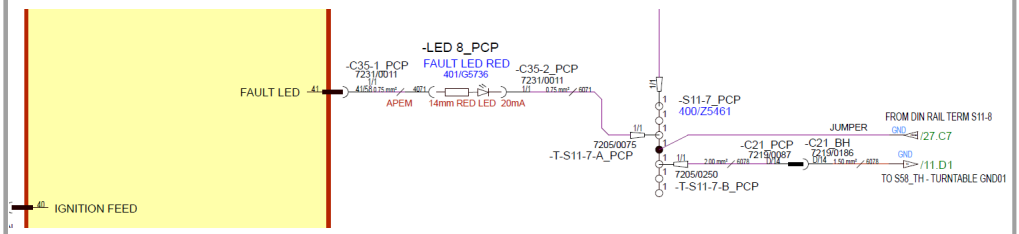
Component :	Fault LED
Vehicle reaction:	Detect failure mode.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check wiring between 'C35-1_PCP Pin 41/58 on the Bosch Platform ECU Connector' and 'C35-2_PCP on the Fault LED'. 2. Check the wiring has not shorted to the chassis of the machine (caused perhaps by pinching or abrasion). 3. Disconnect 'C35-1_PCP Bosch Platform ECU Connector' and check terminal 41/58 ensuring that nothing is touching it. Same with 'C35-1_PCP on the Fault LED'. 4. Check connectors are dry and free of debris. Check for damaged pins on the 'C35-2_PCP Bosch Platform ECU Connector'. 5. Check operation of the system. Check for physical damage to the Fault LED, connectors and other harness components.





6.1.154 B1191-17

B1191-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1191 17

Error code:	**B1191-17**

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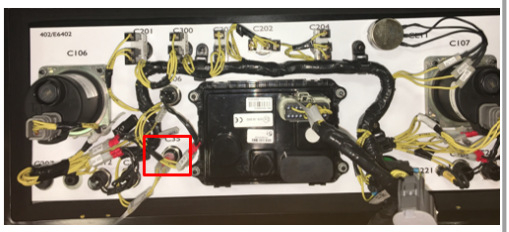
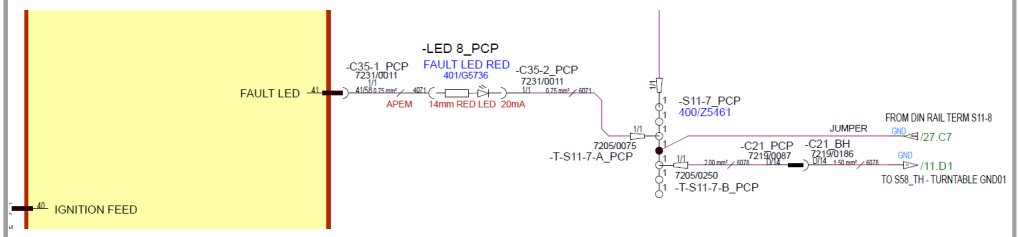
ECU	Platform ECU
Description:	Fault Indicator - Fault LED Short Circuit to High.
Component:	Fault LED
Vehicle reaction:	Detect failure mode.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between 'C35-1_PCP Pin 41/58 on the Bosch Platform ECU Connector' and 'C35-2_PCP on the Fault LED'. 2. Disconnect 'C35-1_PCP Bosch Platform ECU Connector' and check terminal 41/58 ensuring that nothing is touching it. Same with 'C35-1_PCP on the Fault LED'. 3. Check connectors are dry and free of debris. Check for damaged terminals on the 'C35-2_PCP Bosch Platform ECU Connector'. 4. Check operation of the system. Check for physical damage to the LED, connectors and other harness components.  

6.1.155 B1198-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1198 16

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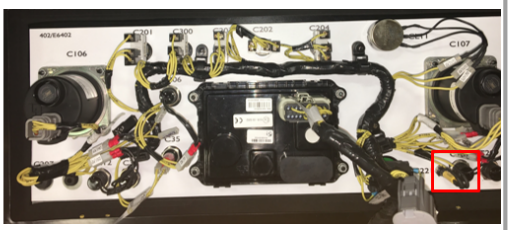
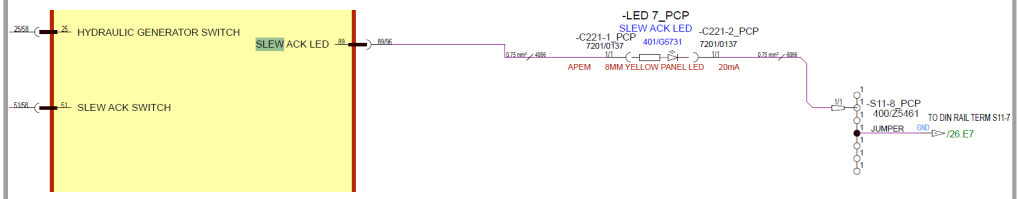
Error code:	B1198-16
ECU	Platform ECU
Description:	Slew Acknowledgment - Slew Acknowledgment LED Short Circuit to Low.
Component:	Slew Acknowledgment LED
Vehicle reaction:	Detect failure mode
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C221-1_PCP from the rear of the Slew Acknowledge LED on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #4086 to Platform Bosch ECU pin 89/96. 2. Check Wire #4086 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check LED for damage or shorting to connector -C221-2_PCP  

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6.1.156 B1199-17

B1199-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1199□17

Error code:	B1199-17
ECU	Platform ECU
Description:	Slew Acknowledged - Slew Acknowledgment LED Short Circuit to High.
Component:	Slew Acknowledgment LED
Vehicle reaction:	Detect failure mode.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C221-1_PCP from the rear of the Slew Acknowledge LED on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #4086 to Platform Bosch ECU pin 89/96. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check LED for damage or any loose wiring in the control panel.

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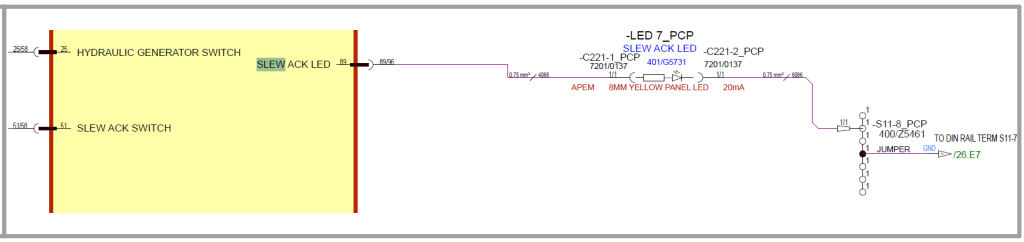

6.1.157 B1206-17

B1206-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1206 17

Error code:	B1206-17
ECU	Base ECU
Description:	Horn - Base Horn Button Short Circuit to High.
Component:	Horn Button
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between Pin 52/58 on the Bosch Base ECU Connector' and 'C101-1_TH on the Base Horn Button'. 2. Disconnect 'C50_TH Bosch Base ECU Connector' and check terminal 52/58 ensuring that nothing is touching it. Same with 'C101-1_TH on the Base Horn Button'. 3. Check connectors are dry and free of debris. Check for damaged terminals on the 'C50_TH Bosch Base ECU Connector'. 4. Check operation of the Base Horn Button. Check for physical damage to the Horn Button, connectors and other harness components.

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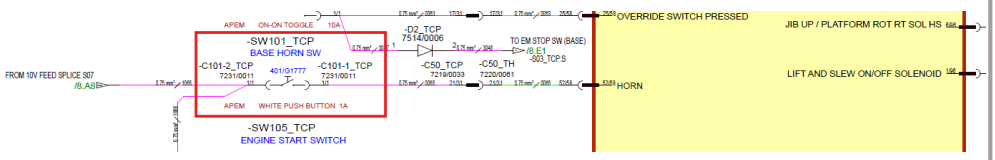

6.1.158 B1207-16

B1207-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1207 16

Error code:	B1207-16
ECU	Base ECU
Description:	Horn - Base Horn Button Short Circuit to Low.
Component:	Horn Button
Vehicle reaction:	Detect failure mode; Ignore input

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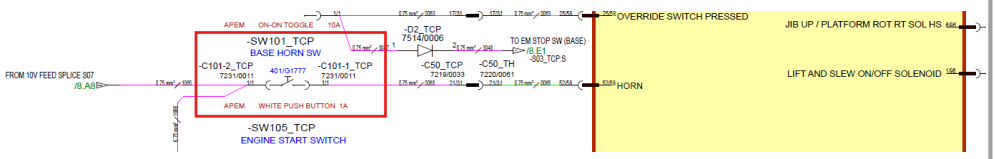
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check wiring between 'C50_TH Pin 52/58 on the Bosch Base ECU Connector' and 'C101-1_TCP on the Base Horn Button'. 2. Check the wiring has not shorted to the chassis of the machine (caused perhaps by pinching or abrasion). 3. Disconnect 'C50_TH Bosch Base ECU Connector' and check terminal 52/58 ensuring that nothing is touching it. Same with 'C101-1_TCP on the Base Horn Button'. 4. Check connectors are dry and free of debris. Check for damaged terminals on the 'C50_TH Bosch Base ECU Connector'. 5. Check operation of the Base Horn Button. Check for physical damage to the Horn Button, connectors and other harness components. 

6.1.159 **B1208-24**

B1208-24

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Machine Fault Codes 518 > DTC ERROR CODE 519 > B1208-24

Error code:	B1208-24
ECU	Base ECU
Description:	Horn - Base Horn Button Stuck >10s.
Component:	Horn Button
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between 'C50_TH Pin 52/58 on the Bosch Base ECU Connector' and 'C101-1_TCP on the Base Horn Button'. 2. Disconnect 'C50_TH Bosch Base ECU Connector' and check terminal 52/58 ensuring that nothing is touching it. Same with 'C101-1_TCP on the Base Horn Button'. 3. Check connectors are dry and free of debris. Check for damaged terminals on the 'C50_TH Bosch Base ECU Connector'. 4. Check operation of the Base Horn Button. Check for physical damage to the Horn Button, connectors and other harness components.

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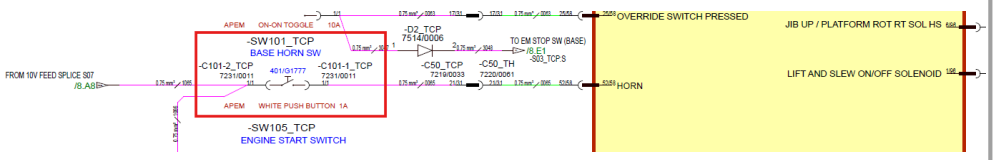

6.1.160 B1215-17

B1215-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1215-17

Error code:	B1215-17
ECU	Platform ECU
Description:	Hydraulic Generator - Hydraulic Generator Button Short Circuit to High.
Component:	Power to Platform Button
Vehicle reaction:	Detect failure mode; Ignore input

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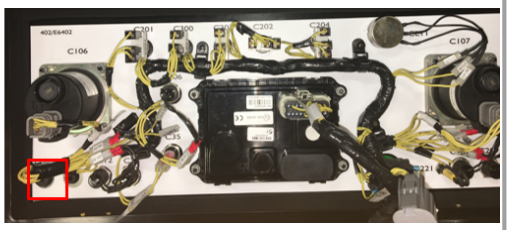
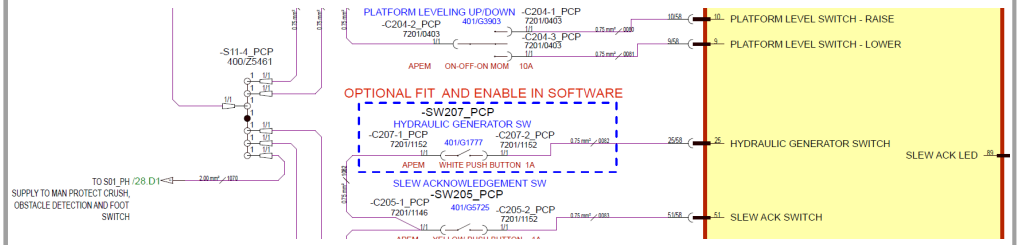
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C207-2_PCP from the rear of the Hydraulic Generator Button on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #0082 to Platform Bosch ECU pin 25/58. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel.   </td></tr></table>

6.1.161 B1216-16

B1216-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1216 16

Error code:	**B1216-16**
ECU	Platform ECU
Description:	Hydraulic Generator - Hydraulic Generator Button Short Circuit to Low.
Component:	Power to Platform Button

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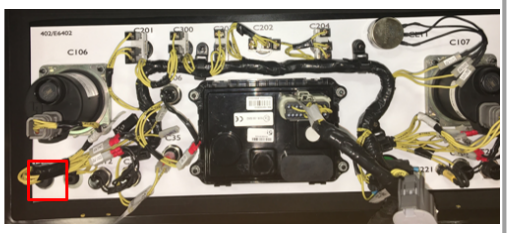
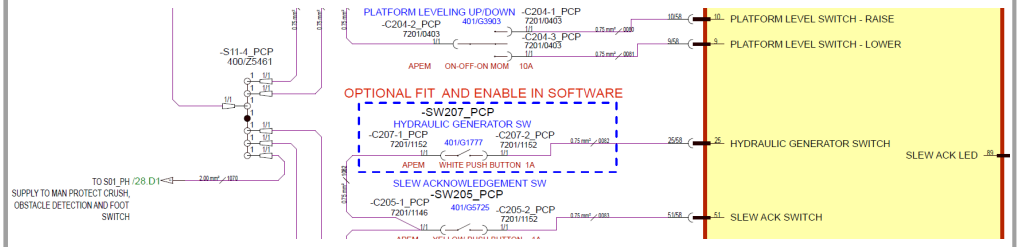
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C207-2_PCP from the rear of the Hydraulic Generator Button on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0082 to Platform Bosch ECU pin 25/58. 2. Check Wire #0082 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C207-2_PCP.  

6.1.162 B1217-24

B1217-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1217-24

Error code:	**B1217-24**
ECU	Platform ECU

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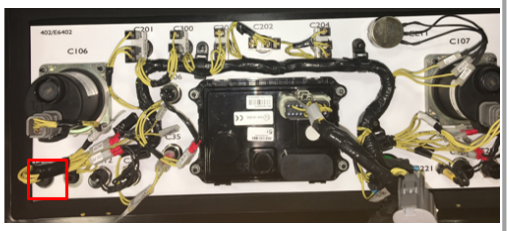
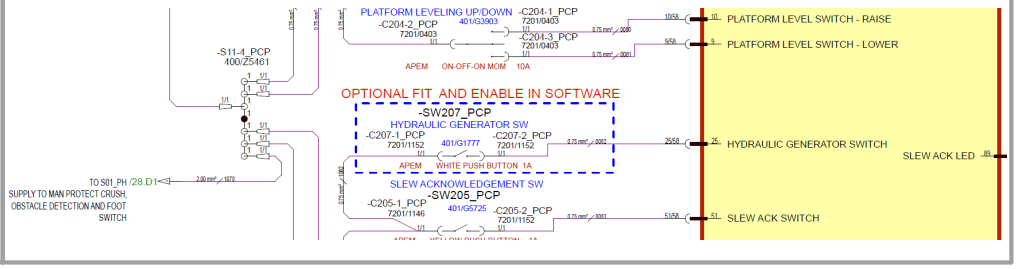
Description:	Hydraulic Generator - Hydraulic Generator Button Stuck >10s.
Component:	Power to Platform Button
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C207-2_PCP from the rear of the Hydraulic Generator Button on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #0082 to Platform Bosch ECU pin 25/58. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check operation of the system. Check for physical damage to the Hydraulic Generator Button, connectors and other harness components.





6.1.163 B1221-17

B1221-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1221□17

Error code:	**B1221-17**

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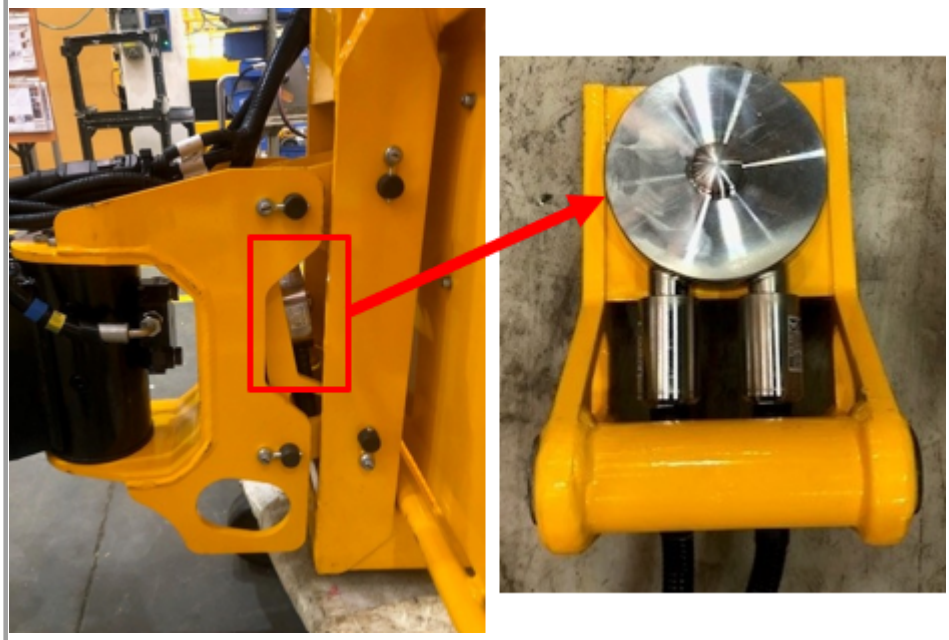
ECU	Base ECU
Description:	Overload - Overload Sensor 1 Out of Range (High).
Component:	Overload Sensor 1
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED
Possible Cause:	1. Load sensor is not calibrated 2. Load sensor is faulty 3. Short Circuit to High 4. Water ingress
Service Action:	1. Perform weight sensor calibration from display screen. 2. Check condition of weight sensor and connectors, replace if faulty 3. Check condition of wiring from Weight Sensor. Check Interconnects -C05_PH and -C05_PH. Check connections to DIN Rail terminal (Wires #6070 and #6072). Check inputs to Platform Bosch ECU on pins 69/96 through to 70/96. Check platform connector -C22_PH terminals W/21 and X/21. Check for bent or backed out terminals or debris within connectors. Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damamge on wiring harness. Perform continuity checks if neccesary and check resistance to +12V and +10V on -C22_PH terminals W/21 and X/21, checking for shorts to High. 4. Check all connectors for water ingress. 

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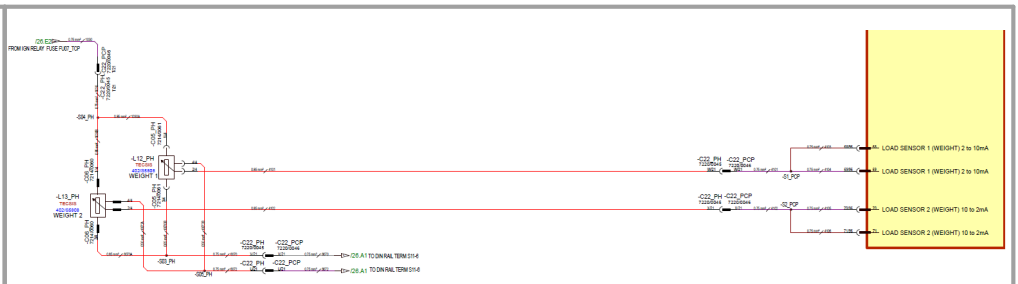
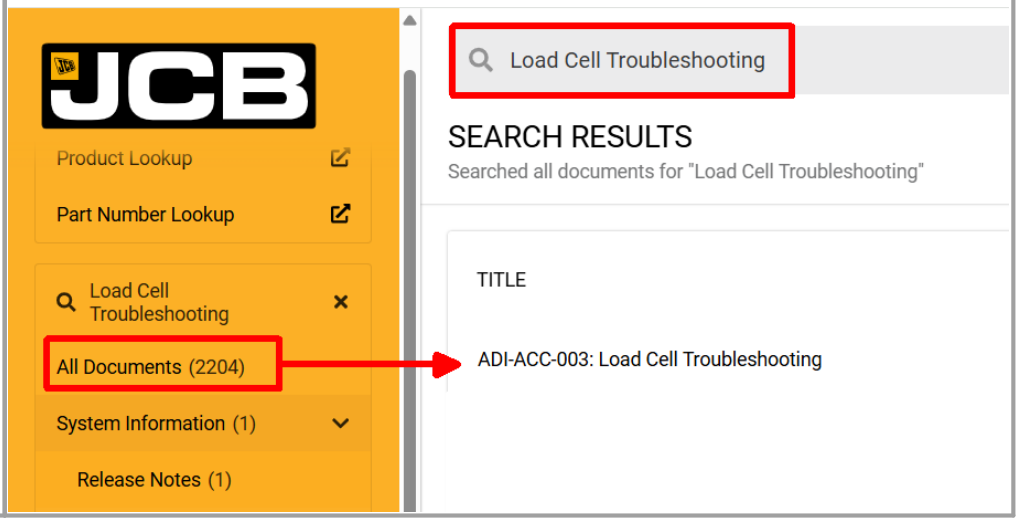


[Load Cell Troubleshooting Flow Chart](#) 47

Please refer ADI - ADI-ACC-003 - Load Cell Troubleshooting



6.1.164 B1222-16

B1222-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1222-16

Error code:	B1222-16
ECU	Base ECU
Description :	Overload - Overload Sensor 1 Out of Range (Low) or Open Circuit.

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Component :	Overload Sensor 1
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED NOTE:- The Fault code in case of Open Circuit is detected only when fault is detected on both pins(68,69)of load sensor 1
Possible Cause:	1. Load sensor is not calibrated 2. Connectors not fully inserted. 3. Load sensor is faulty 4. Short Circuit to Low 5. Water ingress
Service Action:	1. Perform weight sensor calibration from display screen. 2. Check condition of weight sensor and connectors -C05_PH and -C06_PH, Ensure connectors are fully inserted. Check platform connector -C22_PH. Check for backed out terminals. 3. Replace weight sensor if faulty 4. Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damamge on wiring harness. Perform continuity checks if neccesary and check resistance to GND on -C22_PH terminals W/21 and X/21, checking for shorts to Low. 5. Check all connectors for water ingress.

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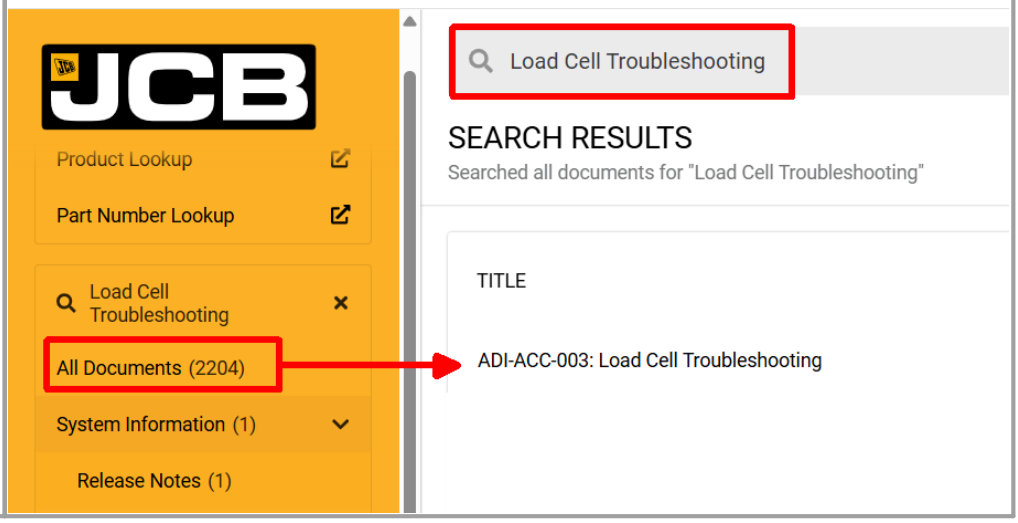
	Load Cell Troubleshooting Flow Chart 47 **Please refer ADI - ADI-ACC-003 - Load Cell Troubleshooting** 

6.1.165 B1223-17

JCB

B1223-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1223 17

Error code:	**B1223-17**
ECU	Base ECU
Description:	Overload - Overload Sensor 2 Out of Range (High).
Component:	Overload Sensor 2
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED
Possible Cause:	1. Load sensor is not calibrated 2. Load sensor is faulty

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	3. Short Circuit to High 4. Water ingress
Service Action:	1. Perform weight sensor calibration from display screen. 2. Check condition of weight sensor and connectors, replace if faulty 3. Check condition of wiring from Weight Sensor. Check Interconnects -C06_PH and -C06_PH. Check connections to DIN Rail terminal -S11-6 (Wires #6070 and #6072). Check inputs to Platform Bosch ECU on pins 69/96 through to 70/96. Check platform connector -C22_PH terminals W/21 and X/21. Check for bent or backed out terminals or debris within connectors. Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damamge on wiring harness. Perform continuity checks if neccesary and check resistance to +12V and +10V on -C22_PH terminals W/21 and X/21, checking for shorts to High. 4. Check all connectors for water ingress. Load Cell Troubleshooting Flow Chart 47 **Please refer ADI - ADI-ACC-003 - Load Cell Troubleshooting**

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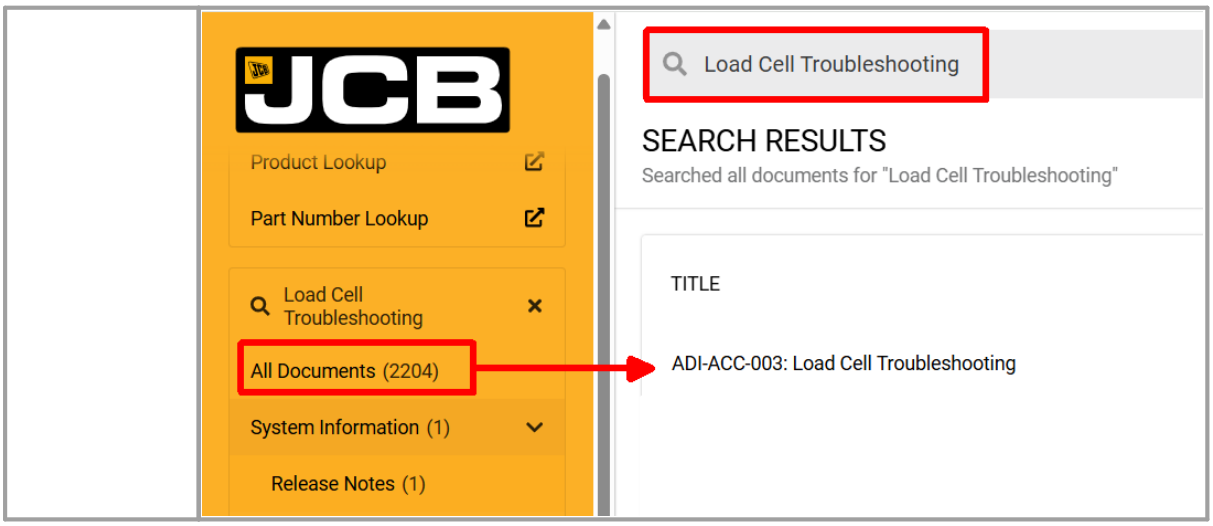

6.1.166 B1224-16

JCB

B1224-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1224-16

Error code:	B1224-16
ECU	Base ECU
Description:	Overload - Overload Sensor 2 Out of Range (Low) or Open Circuit.
Component:	Overload Sensor 2
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED NOTE:- The Fault code in case of Open Circuit is detected only when fault is detected on both pins(70,71)of load sensor 2.
Possible Cause:	1. Load sensor is not calibrated 2. Connectors not fully inserted. 3. Load sensor is faulty 4. Short Circuit to Low 5. Water ingress
Service Action:	1. Perform weight sensor calibration from display screen.

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2. Check condition of weight sensor and connectors -C05_PH and -C06_PH, Ensure connectors are fully inserted. Check platform connector -C22_PH. Check for backed out terminals.
3. Replace weight sensor if faulty
4. Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damamge on wiring harness. Perform continuity checks if neccesary and check resistance to GND on -C22_PH terminals W/21 and X/21, checking for shorts to Low.
5. Check all connectors for water ingress.

Load Cell Troubleshooting Flow Chart 47

Please refer ADI - ADI-ACC-003 - Load Cell Troubleshooting

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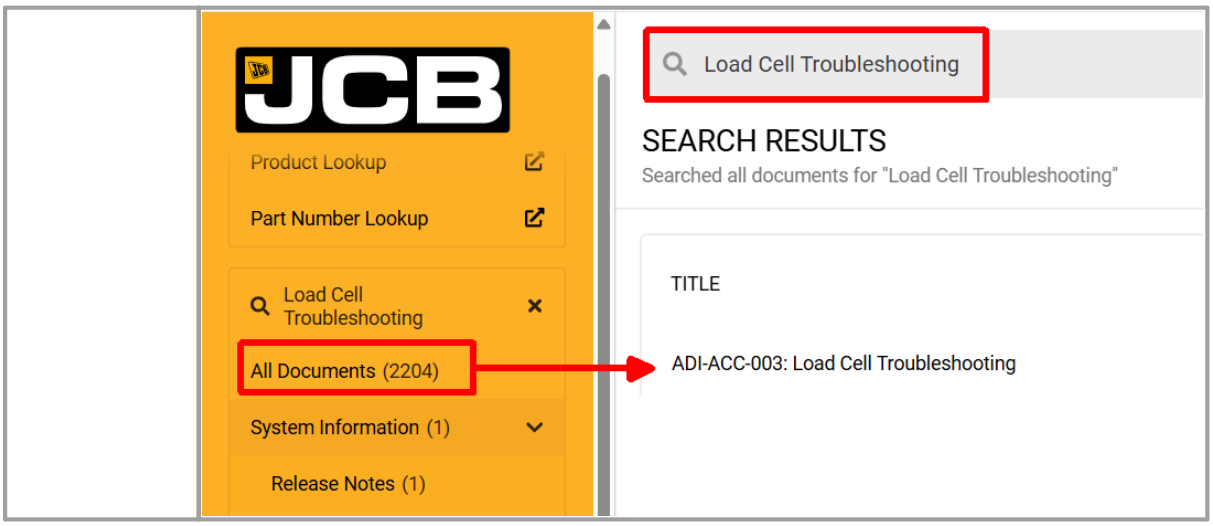

6.1.167 B1225-2F

JCB

B1225-2F

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1225-2F

Error code:	B1225-2F
ECU	Base ECU
Description:	Overload - Overload Sensor Data Erratic (Difference >20%).
Component:	Overload Sensor(s)
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED
Possible Cause:	1. Load sensor is not calibrated 2. Load sensor is not secured correctly 3. Wiring fault to load sensor 4. Water ingress
Service Action:	1. Check mounting of Sensor, check for damage to both sensor and platform basket. Check no debris. 2. Check condition of wiring to sensor. Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damage on wiring harness. check inputs to Platform Bosch ECU - Check terminals 68/96 through to 71/96. Note Load sensor 2 signals are in opposite to Load sensor

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1. Check condition of platform connector -C22_PH, checking terminals T/21, V/21, W/21 and X/21. Check weight sensor connectors -C05_PH and -C06_PH for damage. Ensure all connectors fully inserted. Check DIN rail terminal -S11-6. Check wiring inserted correctly. Check FU07_TCP.
3. Check all connectors for water ingress.
4. Perform weight sensor calibration from display screen.

[Load Cell Troubleshooting Flow Chart](#) 47

Please refer ADI - ADI-ACC-003 - Load Cell Troubleshooting

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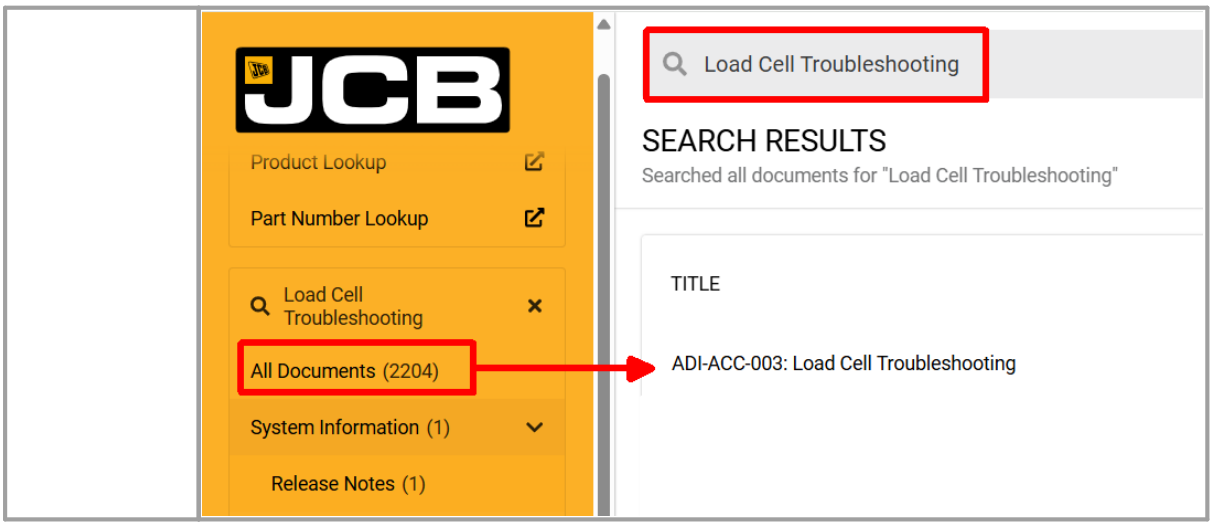

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6.1.168 B1227-17

JCB

B1227-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1227 17

Error code:	B1227-17
ECU	Base ECU
Description:	Oscillating Axle - Axle Lock Pressure Sensor Short Circuit to High.
Component:	Oscillating Axle Pressure Sensor
Vehicle reaction:	Detect failure mode; Prevent all Raise, Extend and Slew; In Raised or Slew position - prevent drive & steer; In Stowed and Forward position - allow drive
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Output voltage of pressure sensor is 0.5 - 4.5VDC. Disconnect interconnect connectors -C214_TH and -C214_TH. Measure voltage at pin 4/4 (Wire #4012) on both connectors. If one of the measurements is above

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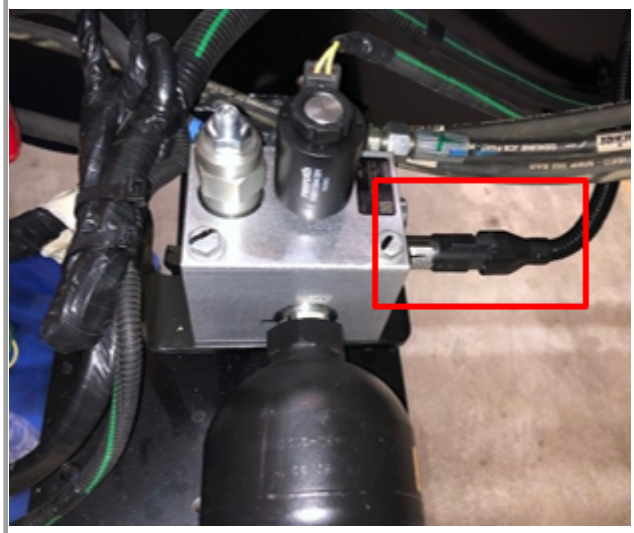
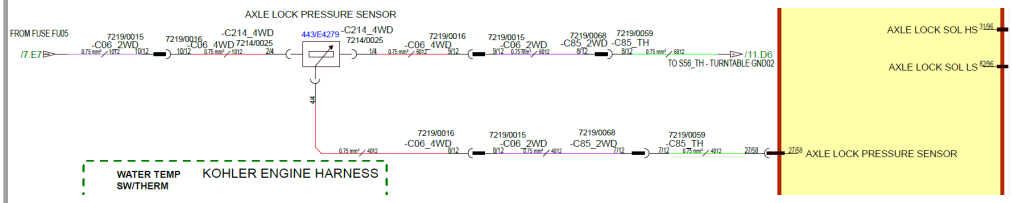
	4.5VDC then there is a short to high on that connection. Trace the fault back to where there is a short circuit to high. 2. Check interconnects -C214_TH and -C214_TH for any damage, shorts, debris or stray wire. Check the Base Bosch ECU connector (58-way) for any damage, bent pins debris etc. Check pin 27/58. 3. Check all above connectors for any water ingress. 4. Check the pressure sensor for damage or malfunction. Replace component.  

6.1.169 B1228-16

B1228-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1228-16

Error code:	**B1228-16**
ECU	Base ECU
Description:	Oscillating Axle - Axle Lock Pressure Sensor Short Circuit to Low or Open Circuit.

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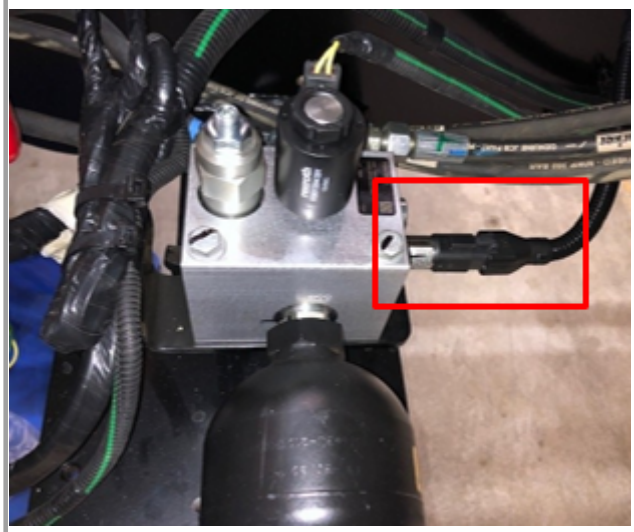
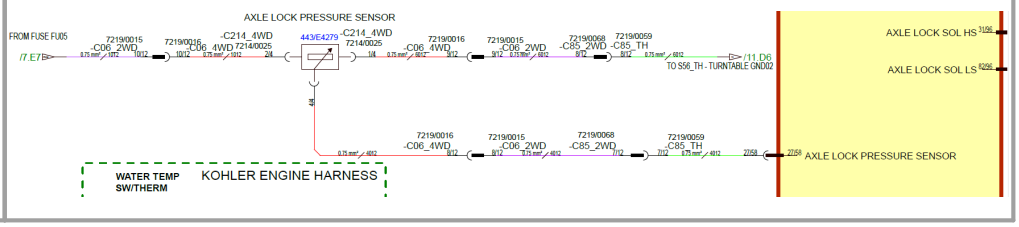
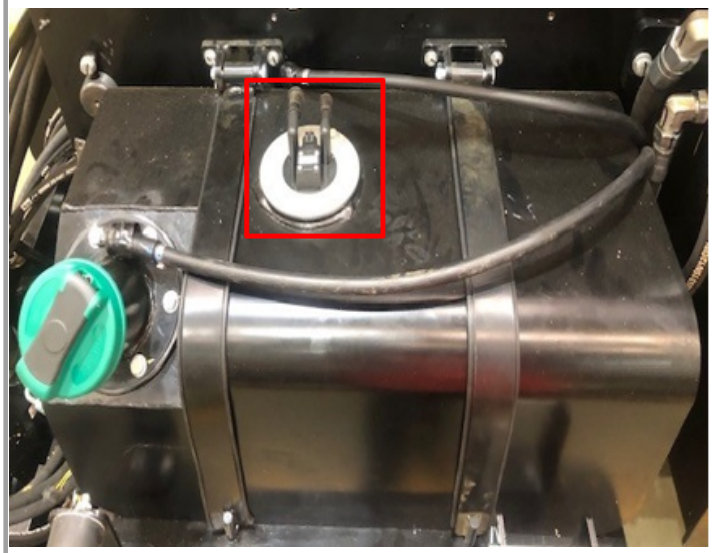
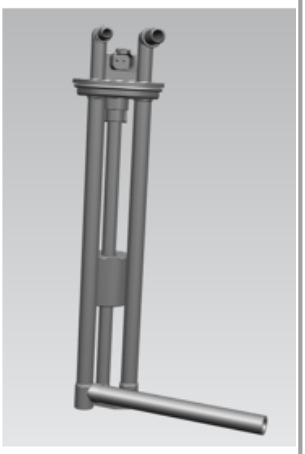
Component:	Oscillating Axle Pressure Sensor
Vehicle reaction:	Detect failure mode; Prevent all Raise, Extend and Slew; In Raised or Slew position - prevent drive & steer; In Stowed and Forward position - allow drive
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Output voltage of pressure sensor is 0.5 - 4.5VDC. Disconnect interconnect connectors -C214_TH and -C214_TH. Measure voltage at pin 4/4 (Wire #4012) on both connectors. If one of the measurements is below 0.5VDC then there is a short to low on that connection. Trace the fault back to where there is a short circuit to Low. Check for abrasions or pinching on the wire harness. 2. Check interconnects -C214_TH and -C214_TH for any damage, shorts, debris or stray wire. Check the Base Bosch ECU connector (58-way) for any damage, bent pins debris etc. Check pin 27/58. 3. Check all above connectors for any water ingress. 4. Check the pressure sensor for damage or malfunction. Replace component.  

6.1.170 B1232-17

B1232-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1232-17

Error code:	B1232-17
ECU	Base ECU
Description:	Fuel Sender - Fuel Sender out of Range (High).
Component:	Fuel Sender
Vehicle reaction:	Detect failure mode; Resistance reads more than 183 ohms
Possible Cause:	1. Open Circuit 2. Faulty Component
Service Action:	1. Resistance reads above 183 Ohms to GND. Check for open Circuit between Fuel Level Sensor connector -C28_TH Pin 1/2 and Base Bosch ECU pin 21/96. 2. Check resistance across Fuel Level Sender, replace if value reads above 183 Ohms.  

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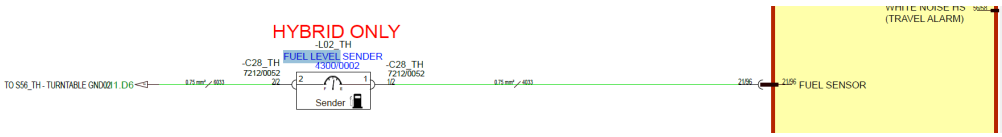

6.1.171 B1233-16

B1233-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1233-16

Error code:	B1233-16
ECU	Base ECU
Description:	Fuel Sender - Fuel Sender out of Range (Low).
Component:	Fuel Sender
Vehicle reaction:	Detect failure mode; Resistance reads less than 5 ohms
Possible Cause:	1. Short Circuit 2. Faulty Component
Service Action:	1. Resistance reads below 5 Ohms to GND. Check for Short Circuit between Fuel Level Sensor connector -C28_TH Pin 1/2 (Wire #4033) and GND. 2. Check resistance across Fuel Level Sender, replace if value reads below 0 Ohms.

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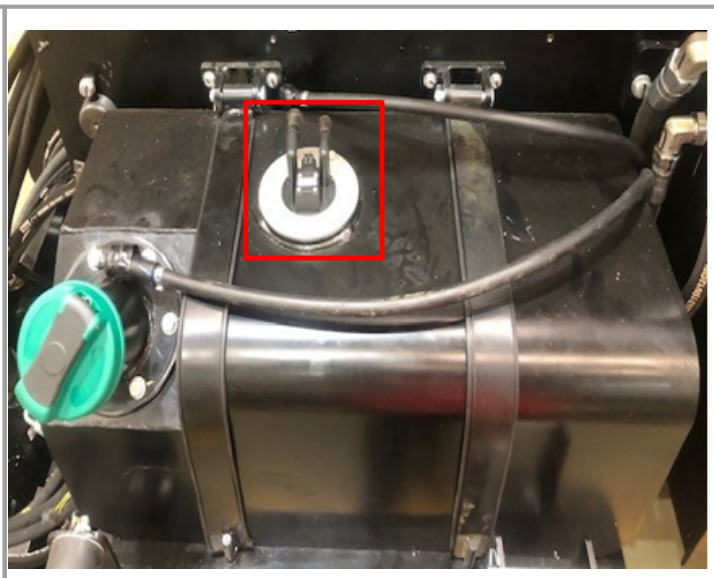

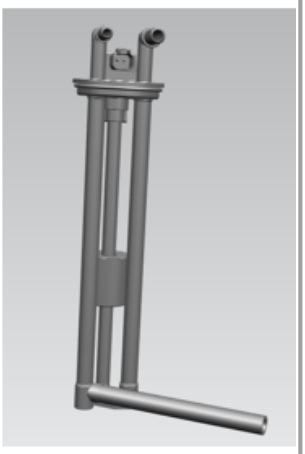

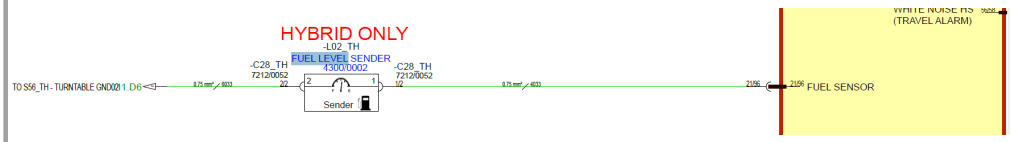

6.1.172 B1235-17

B1235-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1235-17

Error code:	B1235-17
ECU	Platform ECU
Description:	E-Stop Plausibility Check - Signal plausibility failure
Component:	E-Stop(s)
Vehicle reaction:	1. Disable all outputs except CAN (Emergency stop pressed) 2. Default to E-Stop pressed condition
Possible Cause:	1. A short circuit within the wiring harness 2. A poor connection or damaged terminal within the connector(s)

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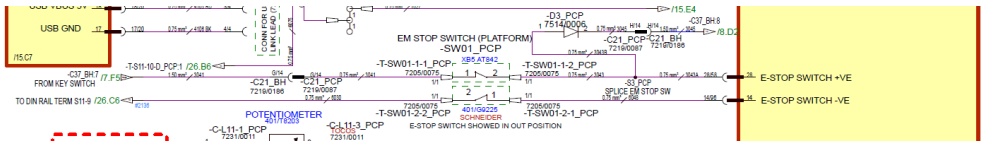
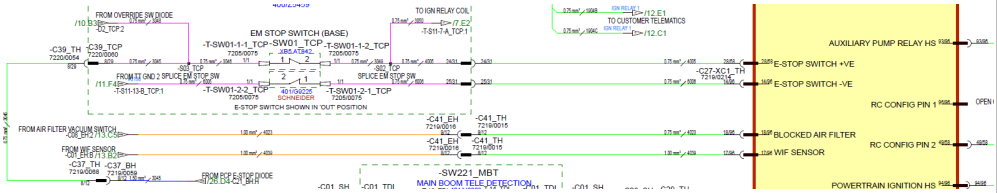
	3. A damaged or broken wire within the wiring harness 4. Component is damaged
Service Action:	1. Check no short in wiring harness between E-STOP SWITCH +VE to GND or E-STOP -VE to GND on Base E-Stop terminals. 2. Check terminals for damage at E-stop terminals, and on Base Bosch ECU Connector (-C27-XC1_PCP, Pin 14/96 and -C27-XC2PCP, Pin 28/58). 3. Check Continuity of wire #3043A-#3043 and #6048 between Bosch Base ECU and E-Stop terminals. 4. Check operation of E-Stop switch to ensure correct switching. Contacts should be normally closed during normal operation (Unpressed) and Open contacts when switch is pressed. Switch terminal attached to wire #3043 should be 12V (unpressed) and 0V (pressed). Switch terminal attached to wire #6048 should be 0V (GND) (Unpressed) and open circuit to GND when pressed. IF fault found, check operation of switch with multimeter, checking the closed and open conditions.  

6.1.173 B1236-2F

B1236-2F

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1236□2F

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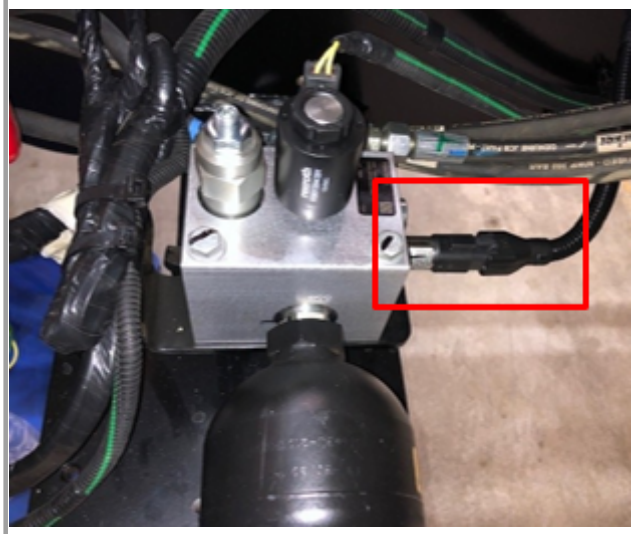
Error code:	B1236-2F
ECU	Base ECU
Description:	Oscillating Axle - Axle Lock Pressure Sensor Failure.
Component:	Oscillating Axle Pressure Sensor
Vehicle reaction:	Detect failure mode; Prevent all Raise, Extend and Slew; In Raised or Slew position - prevent drive & steer; In Stowed and Forward position - allow drive
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Output voltage of pressure sensor is 0.5 - 4.5VDC. Disconnect interconnect connectors -C214_TH and -C214_TH. Measure voltage at pin 4/4 (Wire #4012) on both connectors. If one of the measurements is above 4.5VDC then there is a short to high on that connection. Trace the fault back to where there is a short circuit to high. 2. Check interconnects -C214_TH and -C214_TH for any damage, shorts, debris or stray wire. Check the Base Bosch ECU connector (58-way) for any damage, bent pins debris etc. Check pin 27/58. 3. Check all above connectors for any water ingress. 4. Check the pressure sensor for damage or malfunction. Replace component. 

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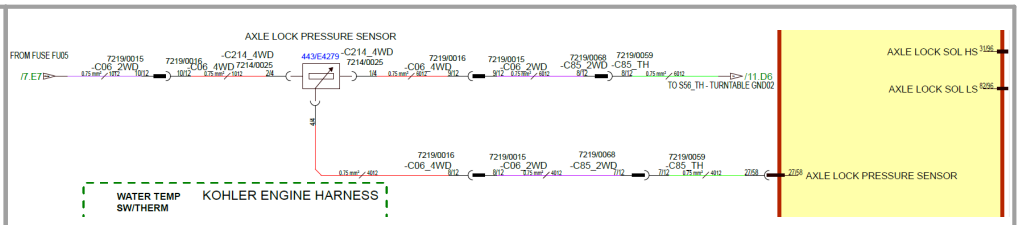

6.1.174 B1238-2F

B1238-2F

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1238□2F

Error code:	B1238-2F
ECU	Base ECU
Description:	Oscillating Axle - Axle Lock Pressure Sensor Output is less than 1v when it should be greater than 1v.
Component:	Oscillating Axle Pressure Sensor
Vehicle reaction:	Detect failure mode; Prevent all Raise, Extend and Slew; In Raised or Slew position - prevent drive & steer; In Stowed and Forward position - allow drive
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Output voltage of pressure sensor is 0.5 - 4.5VDC. Disconnect interconnect connectors -C214_TH and -C214_TH. Measure voltage at pin 4/4 (Wire #4012) on both connectors. If one of the measurements is above 4.5VDC then there is a short to high on that connection. Trace the fault back to where there is a short circuit to high. 2. Check interconnects -C214_TH and -C214_TH for any damage, shorts, debris or stray wire. Check the Base Bosch ECU connector (58-way) for any damage, bent pins debris etc. Check pin 27/58. 3. Check all above connectors for any water ingress. 4. Check the pressure sensor for damage or malfunction. Replace component.

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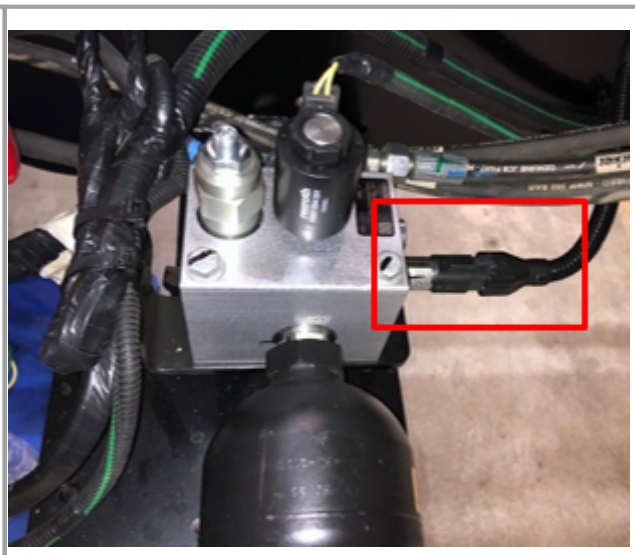

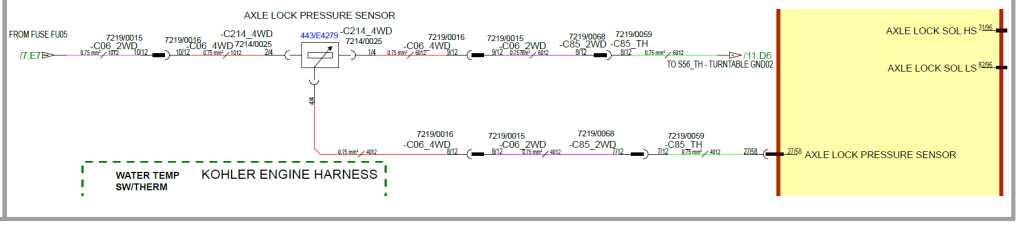

6.1.175 B1239-17

B1239-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1239 17

Error code:	B1239-17
ECU	Platform ECU
Description:	Engine Start/Stop - Platform Engine Start/Stop Button Short Circuit to High.
Component:	Engine Start/Stop Button
Vehicle reaction:	Detect failure mode; Ignore input (switch off engine)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors

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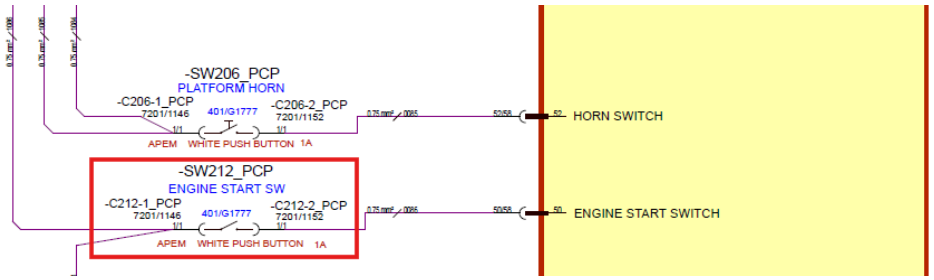
	4. Damaged component
Service Action:	1. Disconnect connector -C212-2_PCP from the rear of the Engine Start/Stop Button on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #0086 to Platform Bosch ECU pin 50/58. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel. 

6.1.176 B1240-16

B1240-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1240 16

Error code:	**B1240-16**
ECU	Platform ECU
Description:	Engine Start/Stop - Platform Engine Start/Stop Button Short Circuit to Low.
Component:	Engine Start/Stop Button

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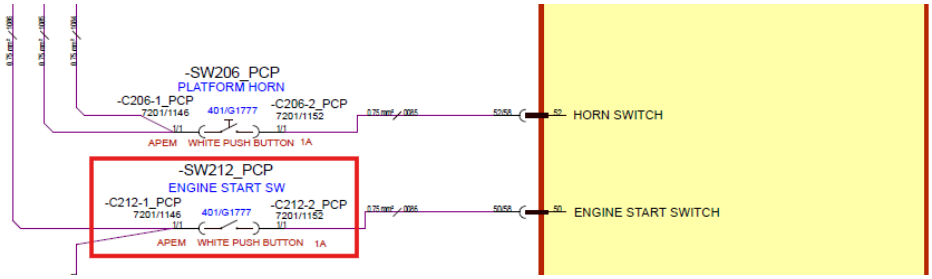
Vehicle reaction:	Detect failure mode; Ignore input (switch off engine)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C212-2_PCP from the rear of the Engine Start/Stop Button on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0086 to Platform Bosch ECU pin 50/58. 2. Check Wire #0086 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C212-2_PCP. 

6.1.177 B1241-24

B1241-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1241-24

Error code:	**B1241-24**

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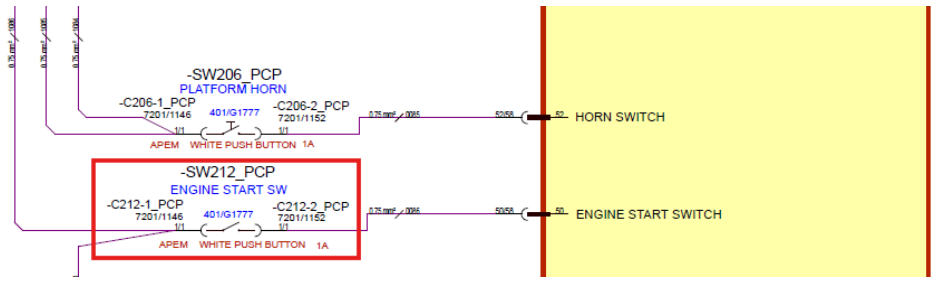
ECU	Platform ECU
Description:	Engine Start/Stop - Platform Engine Start/Stop Button Stuck for >10s.
Component:	Engine Start/Stop Button
Vehicle reaction:	Detect failure mode; Ignore input (switch off engine)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C212-2_PCP from the rear of the Engine Start/Stop Button on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #0086 to Platform Bosch ECU pin 50/58. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check operation of the system. Check for physical damage to the Engine Start/Stop Button, connectors and other harness components.



6.1.178 **B1242-17**

B1242-17

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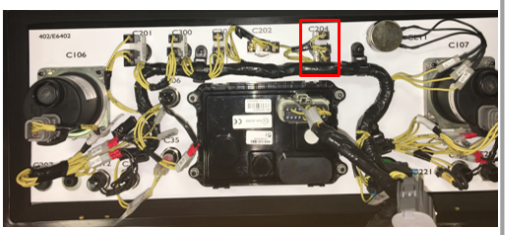
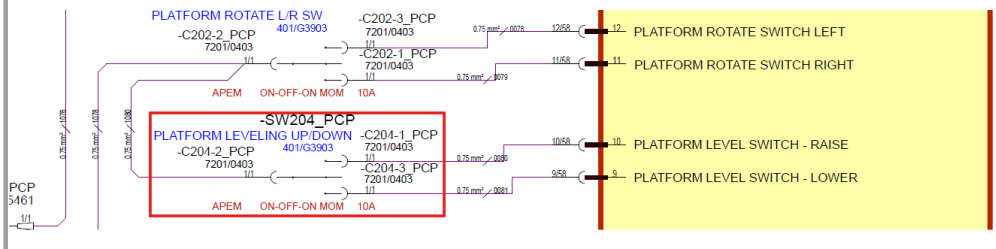
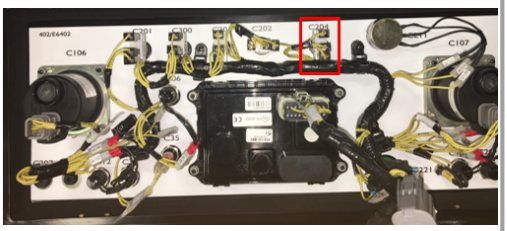
Error code:	B1242-17
ECU	Platform ECU
Description:	Platform Level - Platform Level Switch Raise Short Circuit to High.
Component:	Platform Level Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C204-1_PCP from the rear of the Platform Level Switch on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #0080 to Platform Bosch ECU pin 10/58. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel.   </td></tr></table>

6.1.179 B1243-17

B1243-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1243 17

Error code:	B1243-17
ECU	Platform ECU
Description:	Platform Level - Platform Level Switch Lower Short Circuit to High.
Component:	Platform Level Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C204-3_PCP from the rear of the Platform Level Switch on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #0081 to Platform Bosch ECU pin 9/58. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel. 

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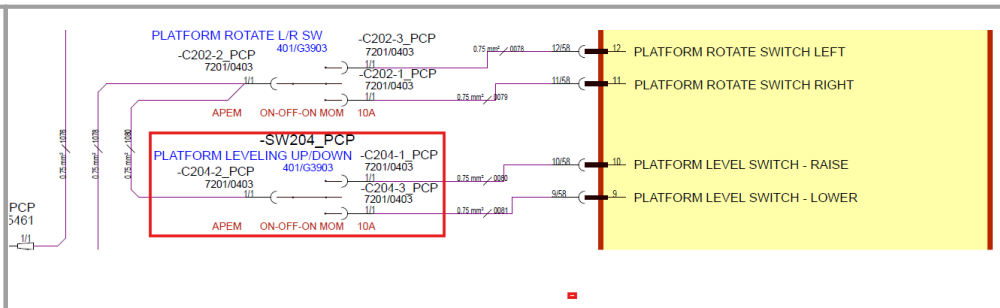

6.1.180 B1244-92

B1244-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1244 92

Error code:	B1244-92
ECU	Platform ECU
Description:	Platform Level - Platform Level Switch Raise & Lower Both Activated (5-10v).
Component:	Platform Level Switch
Vehicle reaction:	Ignore the input (but not output as it can be operated from where there is no fault)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C204-1_PCP and -C204-3_PCP from the rear of the Platform Level Switch on the Platform Control Panel. Measure voltage at both terminals. If voltage is high >12V, check wires #0080 & #0081 to Platform Bosch ECU pin 10/58 & pin 9/58. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel.

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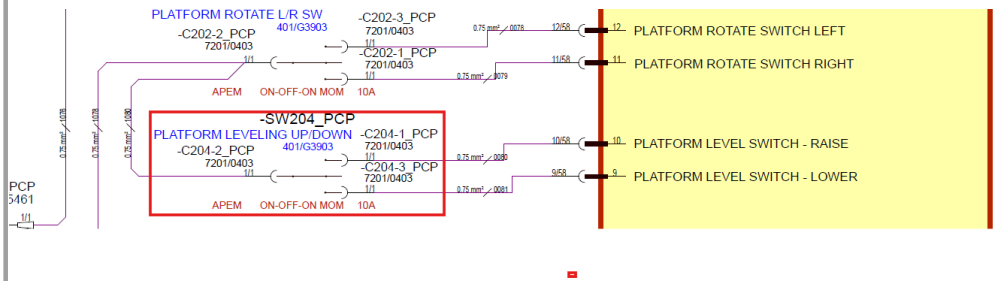

6.1.181 B1245-16

B1245-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1245 16

Error code:	B1245-16
ECU	Platform ECU
Description:	Platform Level - Platform Level Switch Raise Short Circuit to Low.
Component:	Platform Level Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component

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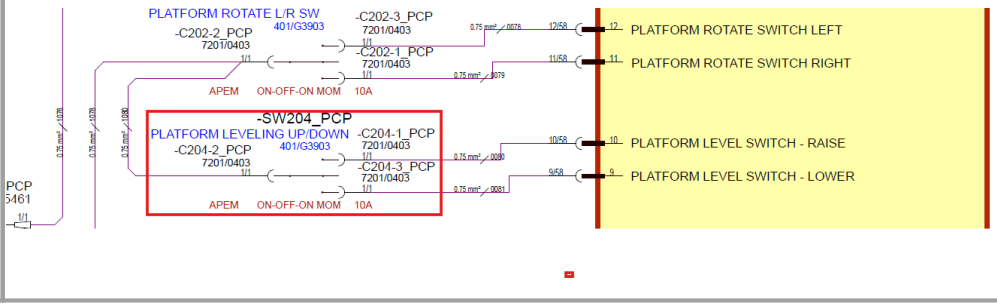
Service Action:	1. Disconnect connector -C204-1_PCP from the rear of the Platform Level Switch on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0080 to Platform Bosch ECU pin 10/58. 2. Check Wire #0080 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C204-1_PCP 

6.1.182 B1246-16

B1246-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1246 16

Error code:	B1246-16
ECU	Platform ECU
Description:	Platform Level - Platform Level Switch Lower Short Circuit to Low.
Component:	Platform Level Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault)

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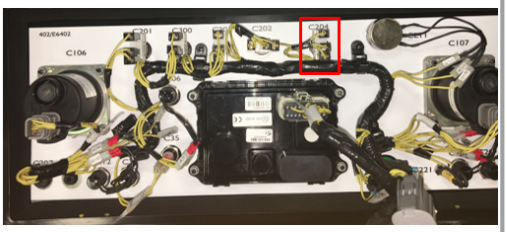
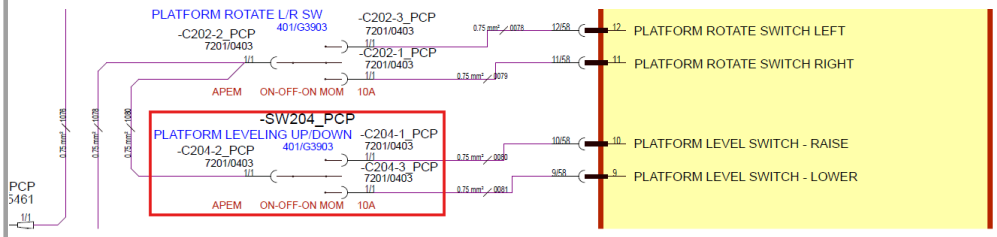
	After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C204-3_PCP from the rear of the Platform Level Switch on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0081 to Platform Bosch ECU pin 9/58. 2. Check Wire #0081 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C204-3_PCP  

6.1.183 B1247-17

B1247-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1247-17

Error code:	**B1247-17**
ECU	Platform ECU

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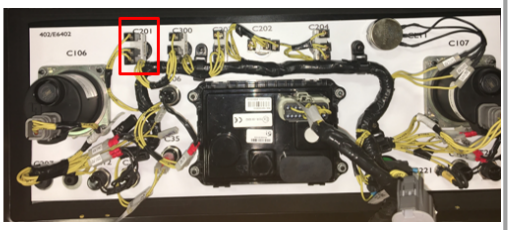
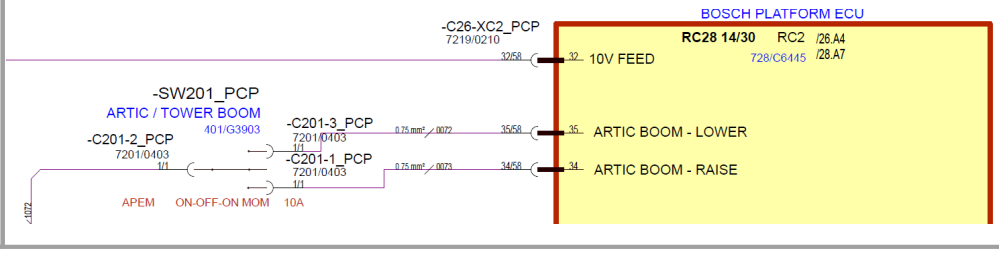
Description :	ARTICULATED BOOM RAISE Switch Short Circuit to High
Component :	ARTICULATED BOOM RAISE Switch
Vehicle reaction:	Input from Platform control station will be disabled, output can still be operated from platform control station.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C201-2_PCP from the rear of the ARTICULATED BOOM RAISE Switch on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0073 to Platform Bosch ECU pin 34/58. 2. Check Wire #0073 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C201-1_PCP  

6.1.184 **B1248-17**

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1248-17

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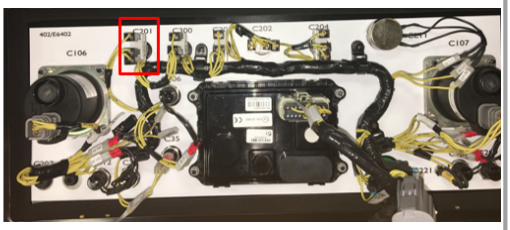
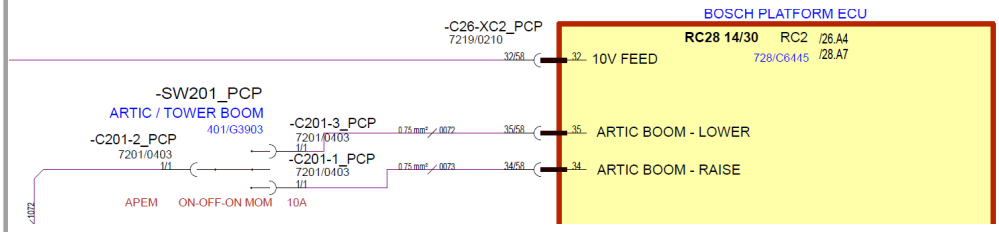
Error code:	**B1248-17**
ECU	Platform ECU
Description :	ARTICULATED BOOM LOWER Switch Short Circuit to High
Component :	ARTICULATED BOOM LOWER Switch
Vehicle reaction:	Input from Platform control station will be disabled, output can still be operated from platform control station.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C201-3_PCP from the rear of the ARTICULATED BOOM Lower Switch on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0073 & #0072 to Platform ECU pin 34/58 & 35/58. 2. Check Wire #0073 & #0072 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C201-1_PCP & -C201-3_PCP  

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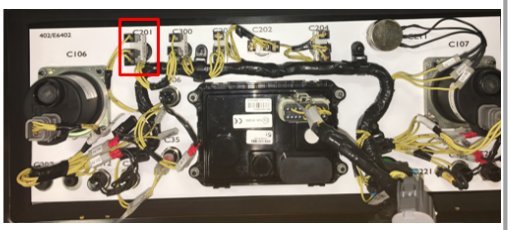
6.1.185 B1249-92

B1249-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1249-92

Error code:	B1249-92
ECU	Platform ECU
Description:	ARTICULATED BOOM RAISE & LOWER Switches both activated (5 - 10V)
Component:	ARTICULATED BOOM RAISE & LOWER
Vehicle reaction:	Input from Platform control station will be disabled, output can still be operated from platform control station.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C201-2_PCP from the rear of the ARTICULATED BOOM RAISE Switch on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0073 & #0072 to Base Bosch ECU pin 34/58 & 35/58. 2. Check Wire #0073 & #0072 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C201-1_PCP & -C201-3_PCP 

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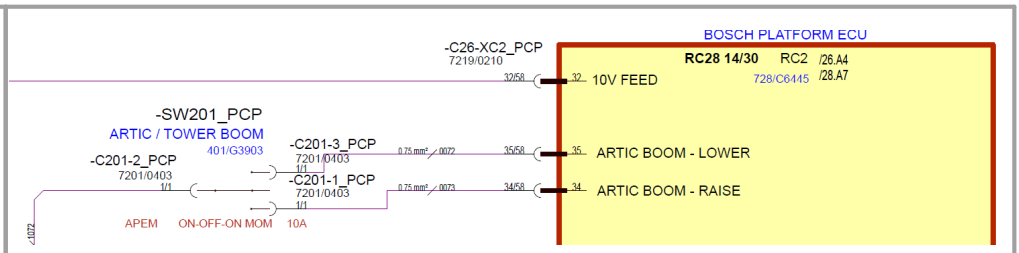

6.1.186 B1250-16

B1250-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1250-16

Error code:	B1250-16
ECU	Platform ECU
Description:	ARTICULATED BOOM RAISE Switch Short Circuit to Low
Component:	ARTICULATED BOOM RAISE Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C201-2_PCP from the rear of the ARTICULATED BOOM RAISE Switch on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0073 to Platform Bosch ECU pin 34/58. 2. Check Wire #0073 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C201-1_PCP

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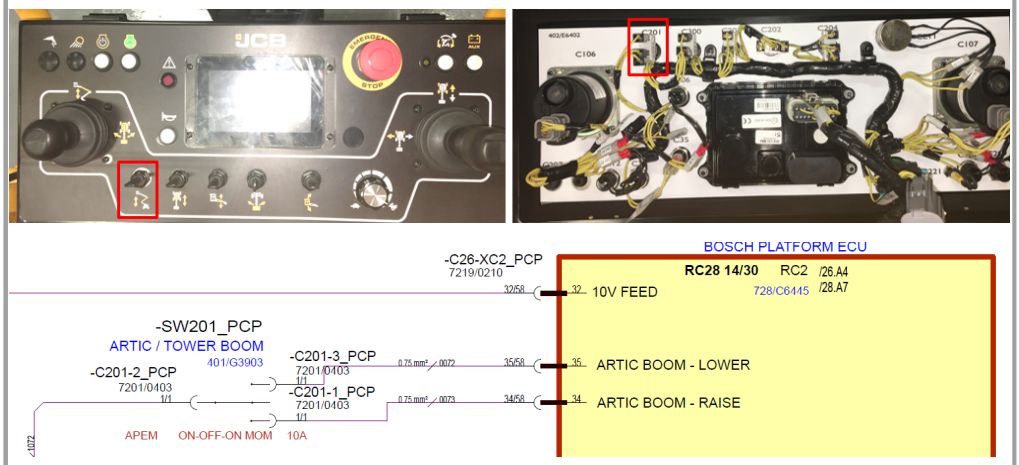

6.1.187 B1251-16

B1251-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1251-16

Error code:	B1251-16
ECU	Platform ECU
Description:	ARTICULATED BOOM LOWER Switch Short Circuit to Low
Component:	ARTICULATED BOOM LOWER Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C201-2_PCP from the rear of the ARTICULATED BOOM LOWER Switch on the Platform Control Panel. Measure resistance

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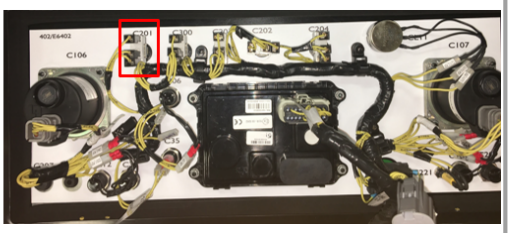
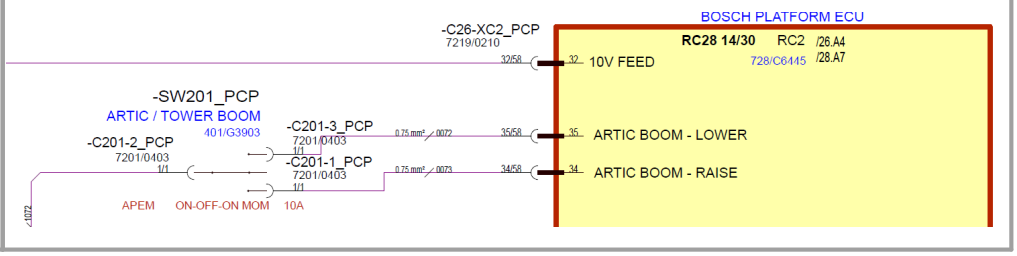
	from Terminal to GND. If a short exists, check wire #0072 to Platform Bosch ECU pin 35/58. 2. Check Wire #0072 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C201-3_PCP   </td>

6.1.188 B1252-17

B1252-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1252 17

Error code:	B1252-17
ECU	Platform ECU
Description:	MAIN BOOM TELESCOPE EXTEND Switch SC to High.
Component:	MAIN BOOM TELESCOPE EXTEND
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction

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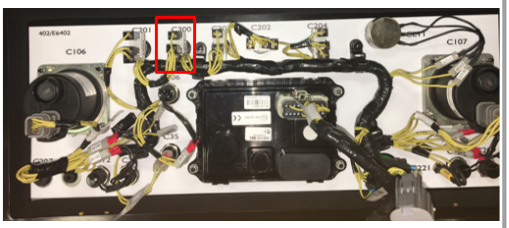
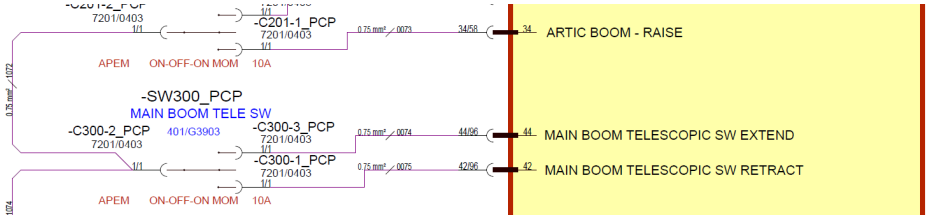
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C300-3_PCP from the rear of the Main Boom Telescopic Switch on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #0074 to Platform Bosch ECU pin 44/96. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel.  

6.1.189 B1253-17

B1253-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1253□17

Error code:	**B1253-17**
ECU	Platform ECU
Description:	MAIN BOOM TELESCOPE RETRACT Switch SC to High.
Component:	MAIN BOOM TELESCOPE RETRACT Switch

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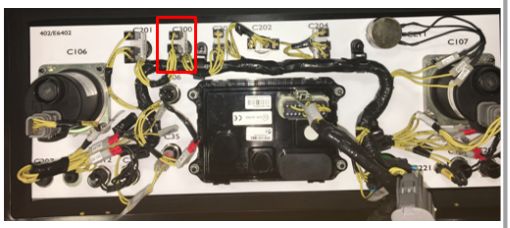
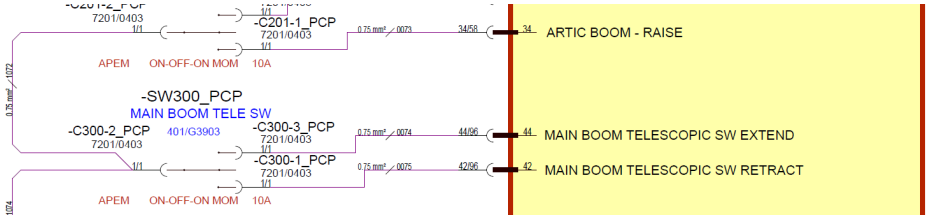
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C300-1_PCP from the rear of the Main Boom Telescopic Switch on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #0075 to Platform Bosch ECU pin 42/96. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel.  

6.1.190 B1254-92

B1254-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1254-92

Error code:	**B1254-92**
ECU	Platform ECU

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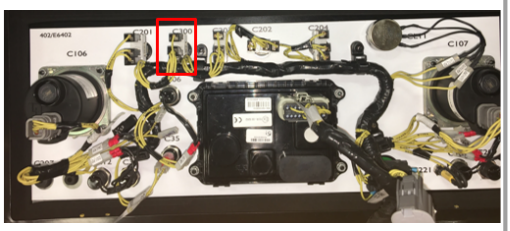
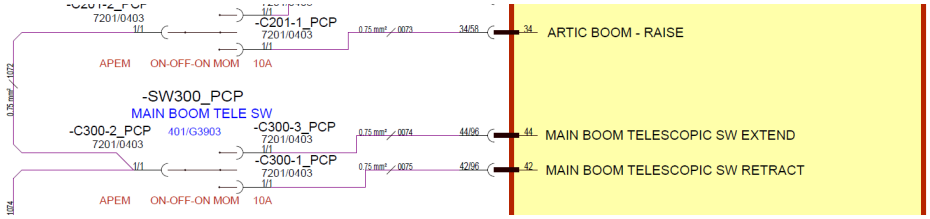
Description:	MAIN BOOM TELESCOPE EXTEND & RETRACT Switches both activated (5 - 10V).
Component:	MAIN BOOM TELESCOPE EXTEND & RETRACT Switches
Vehicle reaction:	Ignore the input (but not output as it can be operated from where there is no fault)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C300-3_PCP and -C300-1_PCP from the rear of the Platform Rotate Switch on the Platform Control Panel. Measure voltage at both terminals. If voltage is high >12V, check wires #0074 & #0075 to Platform Bosch ECU pin 44/96 & pin 42/96. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel.





6.1.191 B1255-16

B1255-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1255 16

Error code:	**B1255-16**

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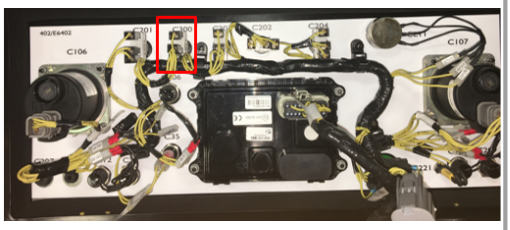
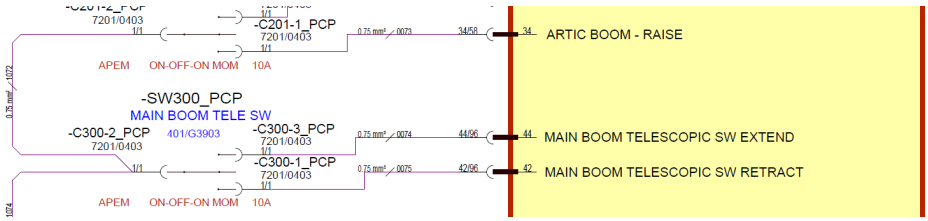
ECU	Platform ECU
Description:	MAIN BOOM TELESCOPE EXTEND Switch SC to Low.
Component:	MAIN BOOM TELESCOPE EXTEND
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C300-3_PCP from the rear of the Main Boom Telescopic Switch on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0074 to Platform Bosch ECU pin 44/96. 2. Check Wire #0074 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C202-1_PCP  

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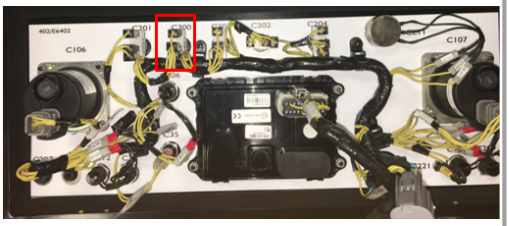
6.1.192 B1256-16

B1256-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1256-16

Error code:	B1256-16
ECU	Platform ECU
Description:	MAIN BOOM TELESCOPE RETRACT Switch SC to Low.
Component:	MAIN BOOM TELESCOPE RETRACT Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C300-1_TCP from the rear of the Platform Rotate Switch on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0075 to Platform Bosch ECU pin 42/96. 2. Check Wire #0075 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C300-1_PCP 

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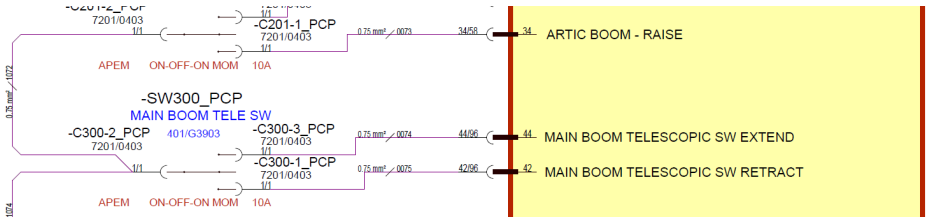

6.1.193 B1257-17

B1257-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1257 17

Error code:	B1257-17
ECU	Platform ECU
Description:	Platform Rotate Switch Right Short Circuit to High.
Component:	Platform Rotate Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C202-1_PCP from the rear of the Platform Rotate Switch on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #0079 to Platform Bosch ECU pin 11/58. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel.

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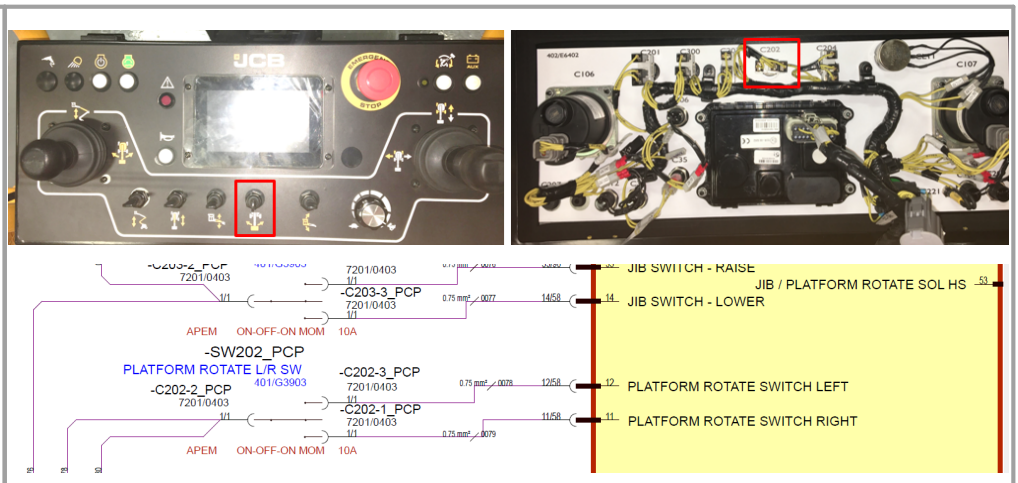

6.1.194 B1258-17

B1258-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1258 17

Error code:	B1258-17
ECU	Platform ECU
Description:	Platform Rotate Switch Left Short Circuit to High.
Component:	Platform Rotate Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C202-3_PCP from the rear of the Platform Rotate Switch on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #0078 to Platform Bosch ECU pin 12/58.

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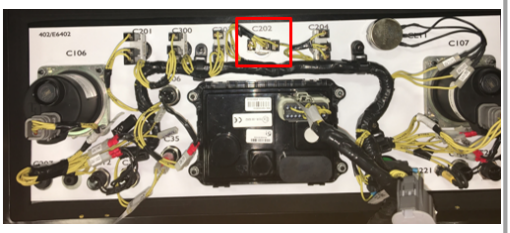
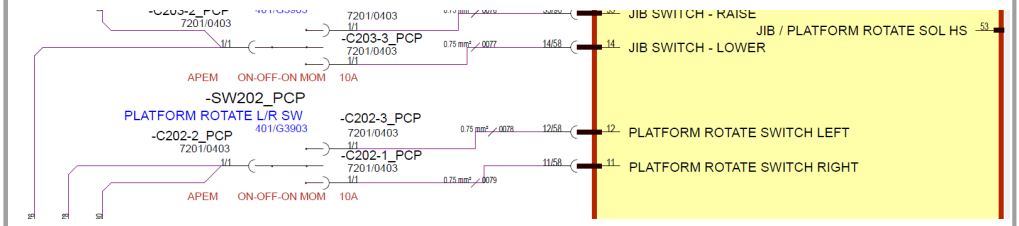
	2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel.  

6.1.195 **B1259-92**

B1259-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1259-92

Error code:	**B1259-92**
ECU	Base ECU
Description:	PLATFORM ROTATE RIGHT & LEFT Switches both activated (5 - 10V)
Component:	PLATFORM ROTATE RIGHT & LEFT Switches
Vehicle reaction:	Ignore the input (but not output as it can be operated from where there is no fault)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component

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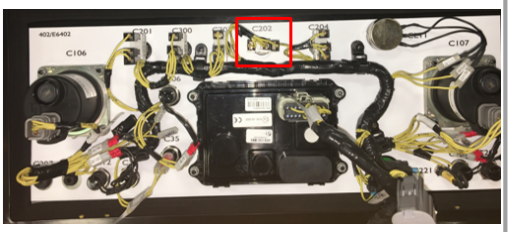
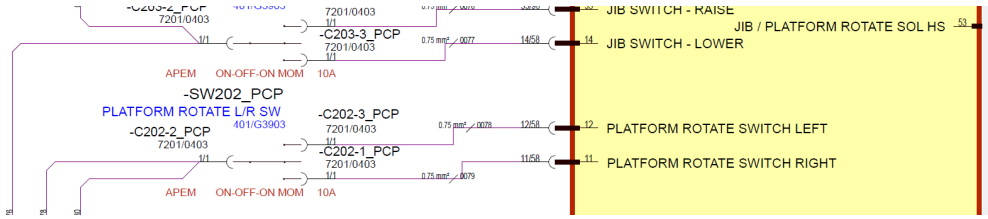
Service Action:	1. Measure voltage at Platform Rotate Left and Right terminals, -C202-1_PCP & -C202-3_PCP. With switch not pressed, terminal voltage should be approx 2.5-3.0V. With switch pressed, voltage should rise to 10V. If Voltage at terminal is constant 10V or higher, then there is a short to high either at the switch, wiring harness or at the Platform Bosch ECU connectors (Pins 11/58 & 12/58). If voltage is high, remove -C202-2_PCP, if voltage now drops, then switch is faulty, else, the fault is at the harness to the Bosch ECU. 2. Check Platform Bosch ECU Connectors for bent pins or stray wires that are potentially causing a short circuit. 3. Check connectors for any sign of water ingress. 4. Check function of switch, check wiring from switch to ECU, checking for abrasions and pinching or any form of damage.  

6.1.196 B1260-16

B1260-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1260 16

Error code:	**B1260-16**
ECU	Platform ECU
Description:	Platform Rotate Switch Right Short Circuit to Low.
Component:	Platform Rotate Switch

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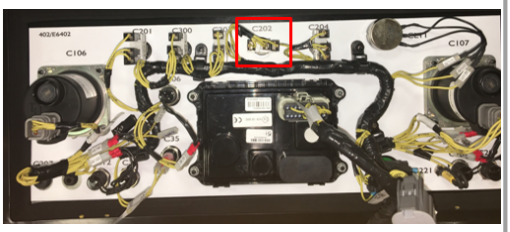
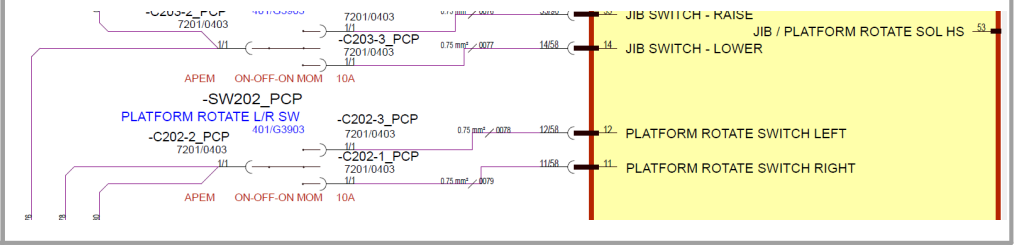
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C202-1_PCP from the rear of the Platform Rotate Switch on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0079 to Platform Bosch ECU pin 11/58. 2. Check Wire #0079 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C202-1_PCP  

6.1.197 B1261-16

B1261-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1261 16

Error code:	**B1261-16**
ECU	Platform ECU

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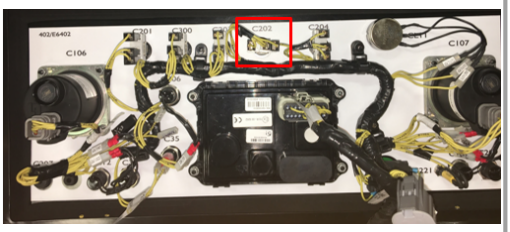
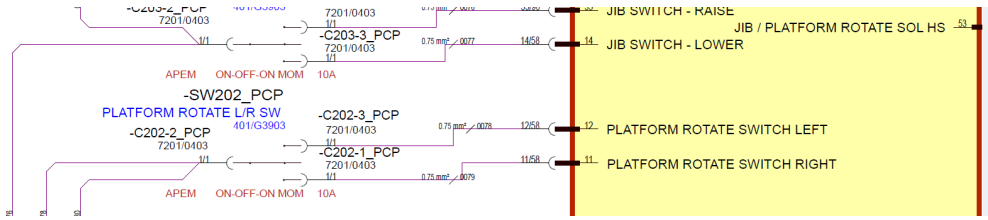
Description :	Platform Rotate Switch Left Short Circuit to Low.
Component :	Platform Rotate Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C202-3_PCP from the rear of the Platform Rotate Switch on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0078 to Platform Bosch ECU pin 12/58. 2. Check Wire #0078 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C202-3_PCP  

6.1.198 B1262-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1262 17

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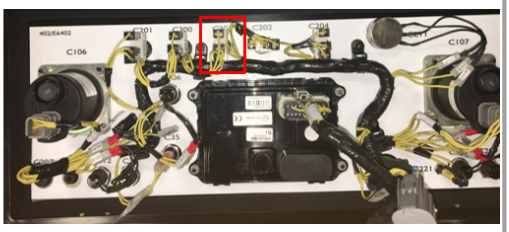
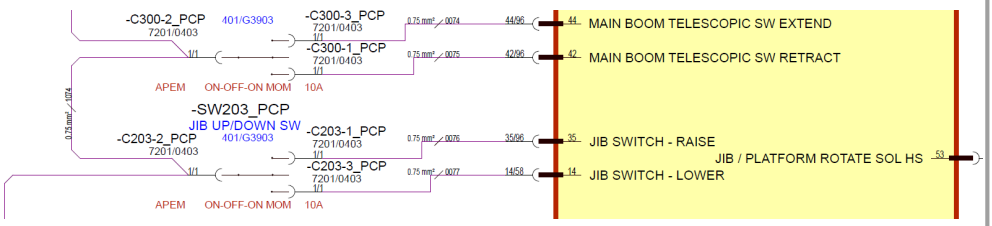
Error code:	B1262-17
ECU	Platform ECU
Description:	Jib - Jib Switch Raise Short Circuit to High.
Component:	Jib Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C203-1_PCP from the rear of the Jib Switch on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #0076 to Platform Bosch ECU pin 35/96. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel.  

6.1.199 **B1263-17**

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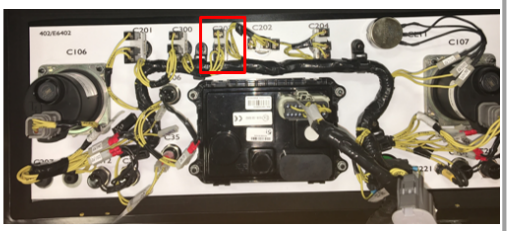
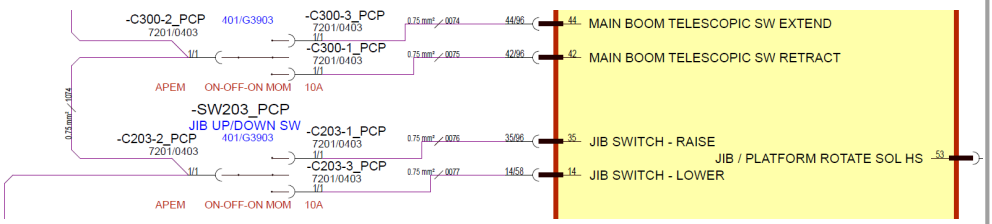
Error code:	B1263-17
ECU	Platform ECU
Description:	Jib - Jib Switch Lower Short Circuit to High.
Component:	Jib Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C203-3_PCP from the rear of the Jib Switch on the Platform Control Panel. Measure voltage at terminal. If voltage is high >12V, check wire #0077 to Platform Bosch ECU pin 14/58. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel.  

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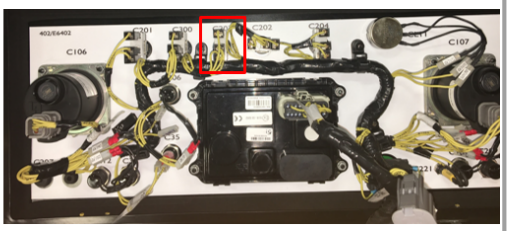
6.1.200 B1264-92

B1264-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1264 92

Error code:	B1264-92
ECU	Platform ECU
Description:	Jib - Jib Switch Raise & Lower both Activated (5 - 10v).
Component:	Jib Switch
Vehicle reaction:	Ignore the input (but not output as it can be operated from where there is no fault)
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Disconnect connector -C203-1_PCP and -C203-3_PCP from the rear of the Jib Switch on the Platform Control Panel. Measure voltage at both terminals. If voltage is high >12V, check wires #0076 & #0077 to Platform Bosch ECU pin 35/96 & pin 14/58. 2. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 3. Check for water ingress in the Platform Bosch ECU Connectors. 4. Check Switch for damage or any loose wiring in the control panel. 

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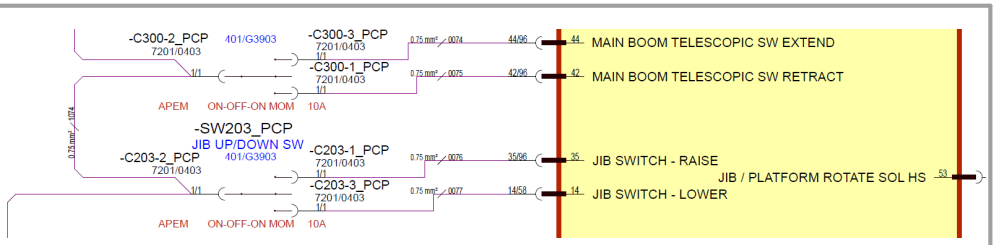

6.1.201 B1265-16

B1265-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1265-16

Error code:	B1265-16
ECU	Platform ECU
Description:	Jib - Jib Switch Raise Short Circuit to Lower.
Component:	Jib Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C203-1_PCP from the rear of the Jib Switch on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0076 to Platform Bosch ECU pin 35/96. 2. Check Wire #0076 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C203-1_PCP

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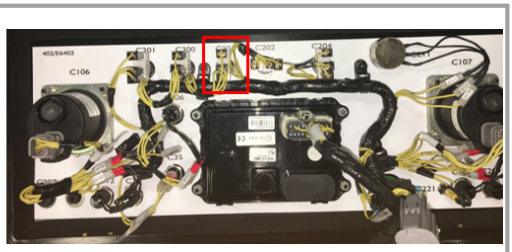

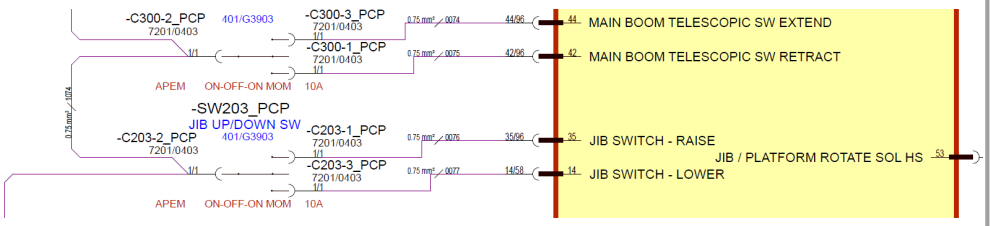

6.1.202 B1266-16

B1266-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1266 16

Error code:	B1266-16
ECU	Platform ECU
Description:	Jib - Jib Switch Lower Short Circuit to Lower.
Component:	Jib Switch
Vehicle reaction:	Before operation: Ignore the input (but not output as it can be operated from where there is no fault) After operation: Refer to 10V System Short Circuit Fault reaction
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Disconnect connector -C203-3_PCP from the rear of the Jib Switch on the Platform Control Panel. Measure resistance from Terminal to GND. If a short exists, check wire #0077 to Platform Bosch ECU pin 14/58.

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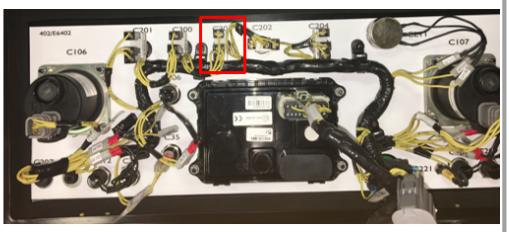
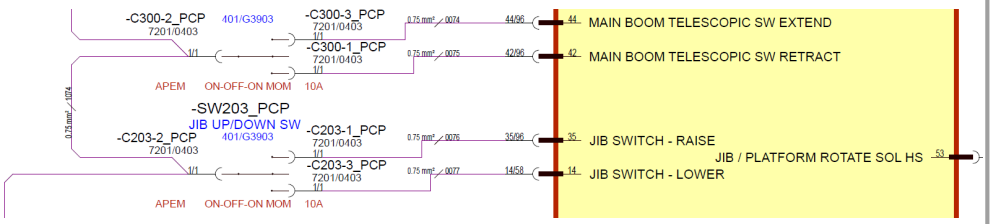
	2. Check Wire #0077 is not shorted to GND / Chassis. Check for abrasions and pinching. 3. Check condition of pins in Platform Bosch ECU. Check for Bent pins, debris or stray wires causing a short. 4. Check for water ingress in the Platform Bosch ECU Connectors. 5. Check Switch for damage or shorting to connector -C203-3_PCP  

6.1.203 B1267-17

B1267-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1267-17

Error code:	B1267-17
ECU	Platform ECU
Description:	10V FEED System Short Circuit to High - Platform
Component:	Platform ECU
Vehicle reaction:	Block all inputs connected to 10V present on the respective control panel.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component

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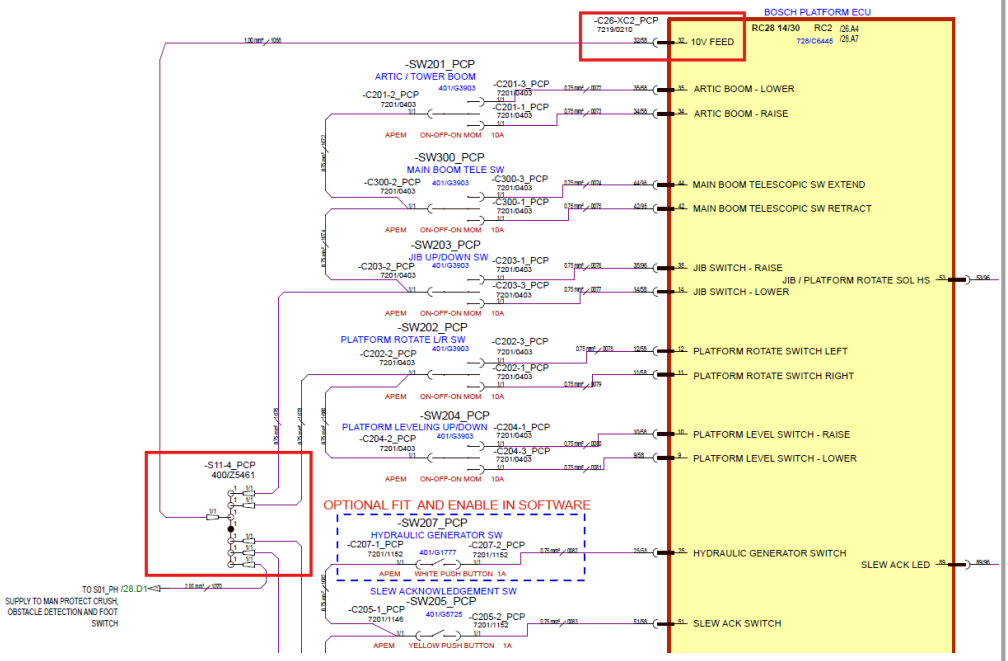
Service Action:	1. At platform control panel, measure voltage at DIN rail terminal -S11-4_PCP (Contains wires: #1068, #1070 #1076, #1078, #1085, #1086). Voltage should be +10VDC. If voltage is >+10VDC then there is likely a short circuit to High. To narrow down fault location, remove each wire one at a time and re-measure voltage until the problem circuit has been identified. Wire #1068 is the +10V Feed from the Platform ECU - If this circuit is >+10V, then the fault my be within the Platform Bosch ECU connector. Check Pin 32/58 and surrounding pins for shorts, bent pins, debris or water ingress. 2. Check the wiring harness for any abrasions, pinching or any other sign of damage that may lead to a short circuit. 

6.1.204 B1268-16

B1268-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1268-16

Error code:	**B1268-16**
ECU	Platform ECU
Description:	Platform 10v Feed - Platform 10v Feed Short Circuit to Low.

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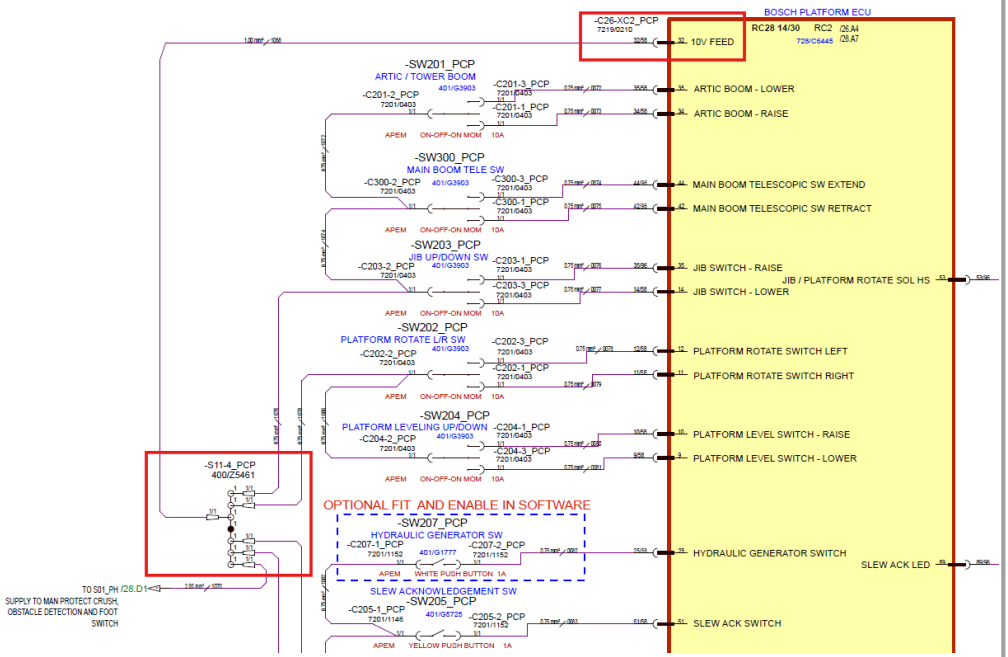
Component:	Platform ECU
Vehicle reaction:	Block all inputs connected to 10V present on the respective control panel.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. At platform control panel, measure voltage at DIN rail terminal -S11-4_PCP (Contains wires: #1068, #1070 #1076, #1078, #1085, #1086). Voltage should be +10VDC. If voltage is less than +10VDC then there is likely a short circuit to GND / Chassis. To narrow down fault location, remove each wire one at a time and re-measure voltage until the problem circuit has been identified. Wire #1068 is the +10V Feed from the Platform ECU - If this circuit is less than +10V, then the fault my be within the Platform Bosch ECU connector. Check Pin 32/58 and surrounding pins for shorts, bent pins, debris or water ingress. 2. Check the wiring harness for any abrasions, pinching or any other sign of damage that may lead to a short circuit to other wires or chassis. 

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6.1.205 B1269-16

B1269-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1269 16

Error code:	B1269-16
ECU	Platform ECU
Description:	Buzzer - Buzzer Short Circuit to Low.
Component:	Buzzer
Vehicle reaction:	Detect failure mode. Disable output
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. In platform Control Panel, Check wire #4076 to Buzzer base -RB01_PCP Pin 1. 2. Check for short circuit to GND / Chassis. 3. Check terminals of Buzzer base for any damage, debris, water ingress etc 4. Check buzzer has not malfunctioned, test with new buzzer.

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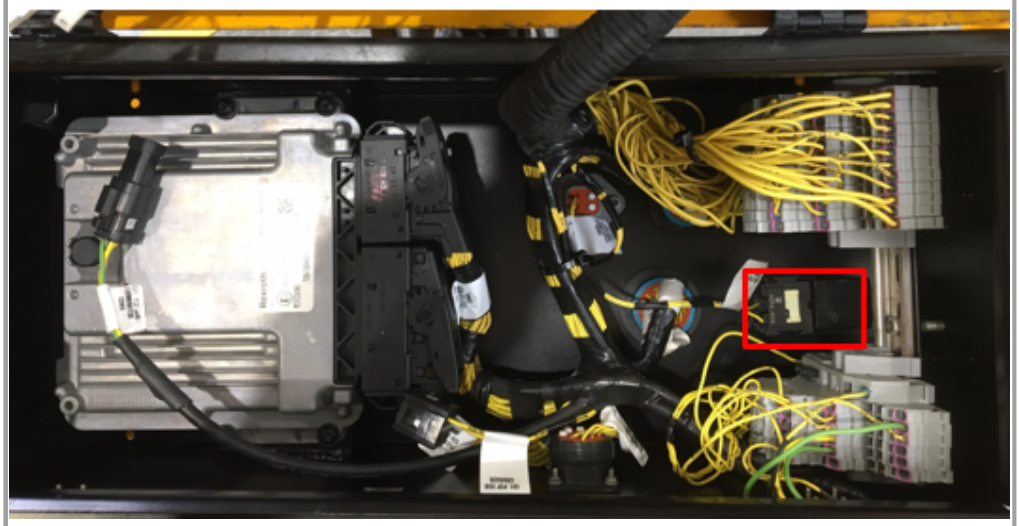

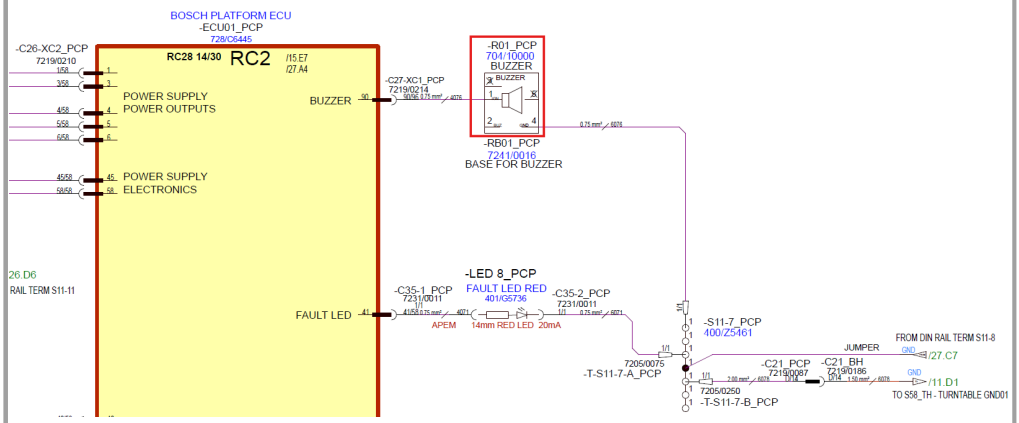

6.1.206 B1270-17

B1270-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1270□17

Error code:	B1270-17
ECU	Platform ECU
Description:	Buzzer - Buzzer Short Circuit to High.
Component:	Buzzer

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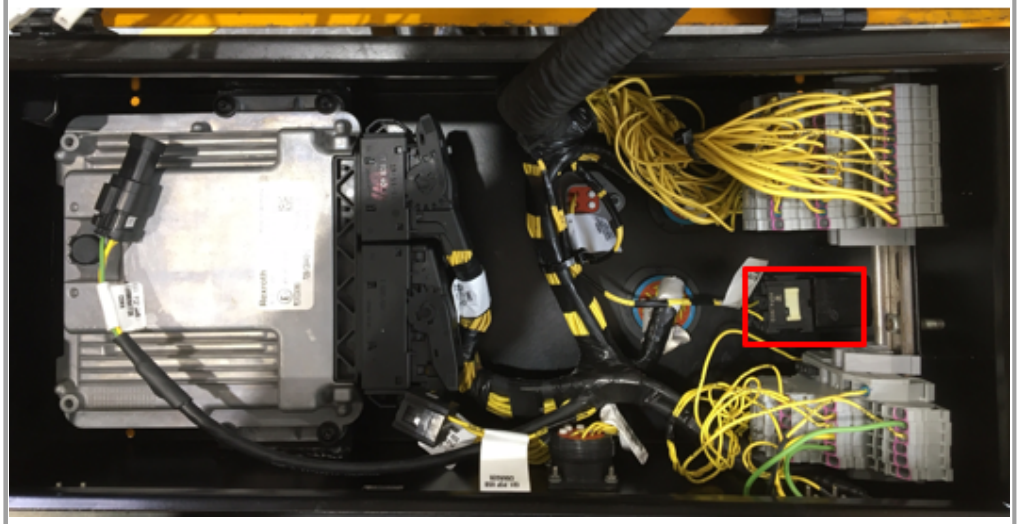
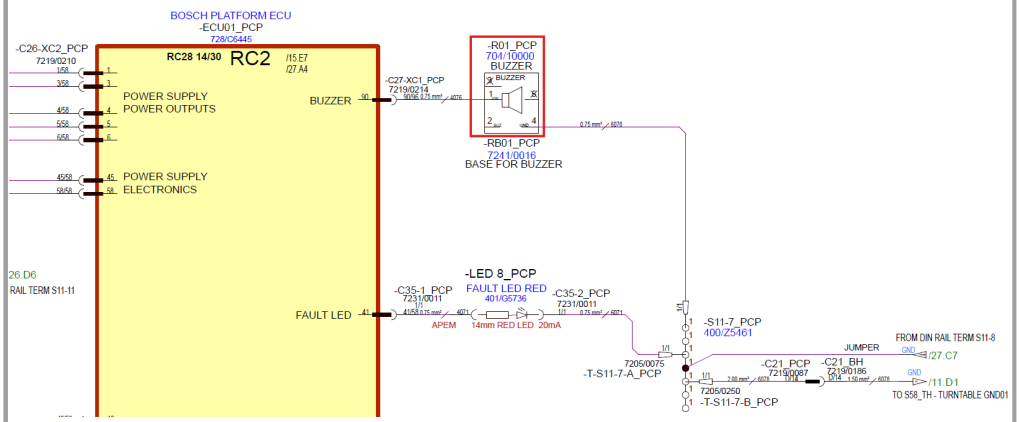
Vehicle reaction:	Detect failure mode. Disable output
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. In platform Control Panel, Check wire #4076 to Buzzer base -RB01_PCP Pin 1. 2. Check for short circuit to High. 3. Check terminals of Buzzer base for any damage, debris, water ingress etc 4. Check buzzer has not malfunctioned, test with new buzzer.





6.1.207 B1272-2F

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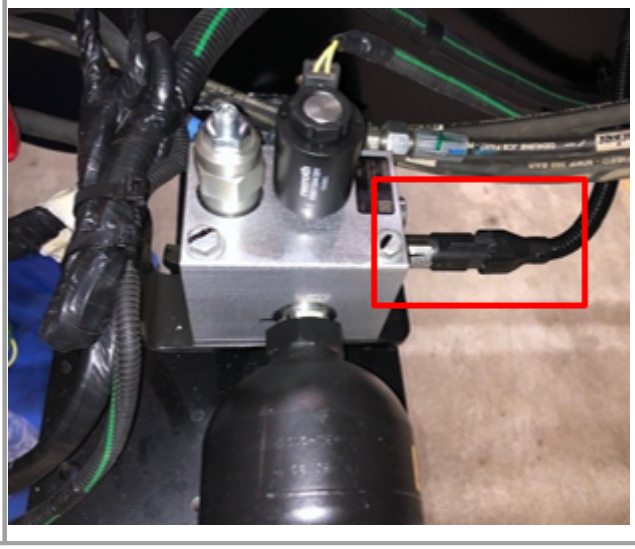
Error code:	B1272-2F
ECU	Base ECU
Description:	Oscillating Axle - Axle Lock Pressure Sensor Output is less than 1v when it should be greater than 1v.
Component:	Oscillating Axle Pressure Sensor
Vehicle reaction:	Detect failure mode; Prevent all Raise, Extend and Slew; In Raised or Slew position - prevent drive & steer; In Stowed and Forward position - allow drive
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Output voltage of pressure sensor is 0.5 - 4.5VDC. Disconnect interconnect connectors -C214_TH and -C214_TH. Measure voltage at pin 4/4 (Wire #4012) on both connectors. If one of the measurements is above 4.5VDC then there is a short to high on that connection. Trace the fault back to where there is a short circuit to high. 2. Check interconnects -C214_TH and -C214_TH for any damage, shorts, debris or stray wire. Check the Base Bosch ECU connector (58-way) for any damage, bent pins debris etc. Check pin 27/58. 3. Check all above connectors for any water ingress. 4. Check the pressure sensor for damage or malfunction. Replace component. 

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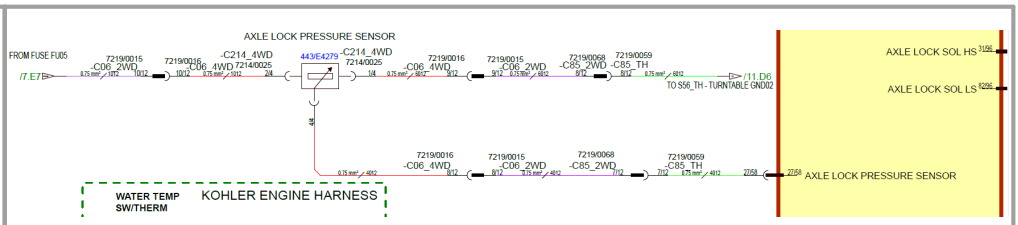

6.1.208 **B1273-17**

B1273-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1273□17

Error code:	B1273-17
ECU	Platform ECU
Description:	Horn - Platform Horn Button Short Circuit to High.
Component:	Horn Button
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between 'C26-XC2_PCP Pin 52/58 on the Bosch Platform ECU Connector' and 'C206-2_PCP on the Platform Horn Button'. 2. Disconnect 'C26-XC2_PCP Bosch Platform ECU Connector' and check terminal 52/58 ensuring that nothing is touching it. Same with 'C206-2_PCP on the Platform Horn Button'. 3. Check connectors are dry and free of debris. Check for damaged terminals on the 'C26-XC2_PCP Bosch Platform ECU Connector'. 4. Check operation of the Platform Horn Button. Check for physical damage to the Horn Button, connectors and other harness components.

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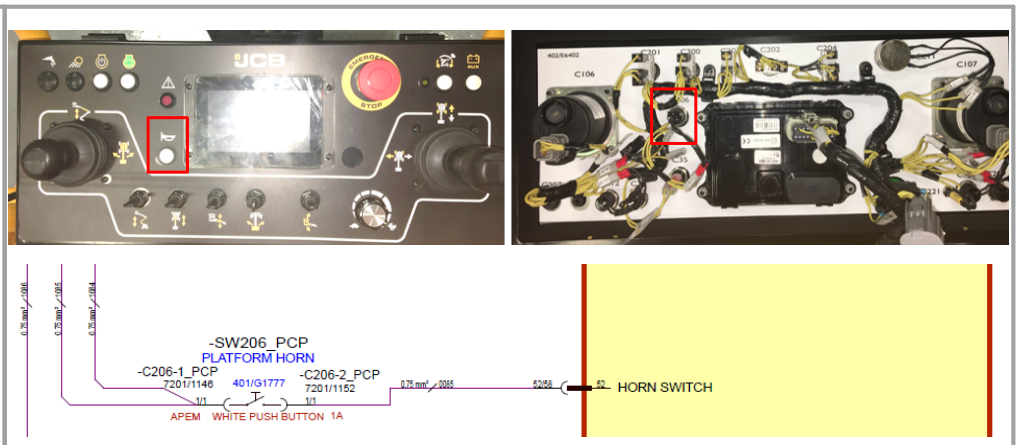

6.1.209 B1274-16

B1274-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1274□16

Error code:	B1274-16
ECU	Platform ECU
Description:	Horn - Platform Horn Button Short Circuit to Low.
Component:	Horn Button
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check wiring between 'C26-XC2_PCP Pin 52/58 on the Bosch Platform ECU Connector' and 'C206-2_PCP on the Platform Horn Button'. 2. Check the wiring has not shorted to the chassis of the machine (caused perhaps by pinching or abrasion).

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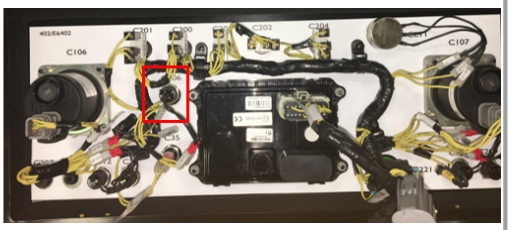
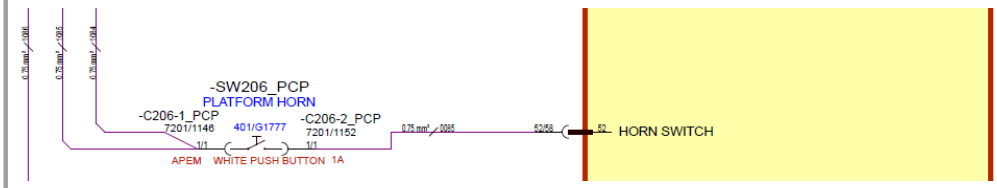
	3. Disconnect 'C26-XC2_PCP Bosch Platform ECU Connector' and check terminal 52/58 ensuring that nothing is touching it. Same with 'C206-2_PCP on the Platform Horn Button'. 4. Check connectors are dry and free of debris. Check for damaged terminals on the 'C26-XC2_PCP Bosch Platform ECU Connector'. 5. Check operation of the Platform Horn Button. Check for physical damage to the Horn Button, connectors and other harness components.  

6.1.210 **B1275-24**

B1275-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1275-24

Error code:	B1275-24
ECU	Platform ECU
Description:	Horn - Platform Horn Button Stuck >10s.
Component:	Horn Button
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component

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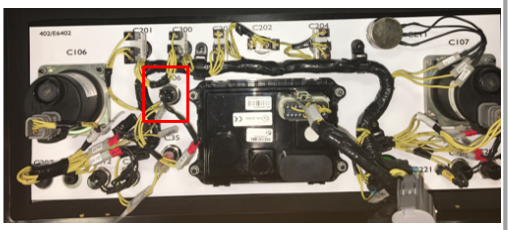
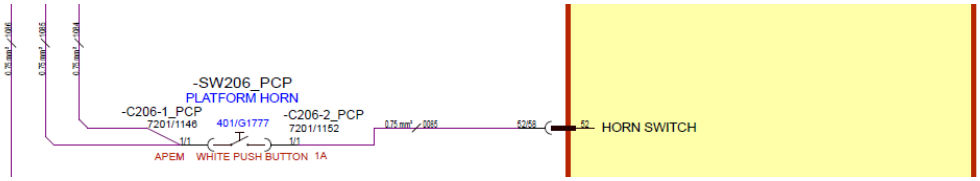
Service Action:	1. Check wiring between 'C26-XC2_PCP Pin 52/58 on the Bosch Platform ECU Connector' and 'C206-2_PCP on the Platform Horn Button'. 2. Disconnect 'C26-XC2_PCP Bosch Platform ECU Connector' and check terminal 52/58 ensuring that nothing is touching it. Same with 'C206-2_PCP on the Platform Horn Button'. 3. Check connectors are dry and free of debris. Check for damaged terminals on the 'C26-XC2_PCP Bosch Platform ECU Connector'. 4. Check operation of the Platform Horn Button. Check for physical damage to the Horn Button, connectors and other harness components.  

6.1.211 B1276-24

B1276-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1276□24

Error code:	**B1276-24**
ECU	Base ECU
Description:	Base Start lock Stuck (VBATT <8.5VDC)
Component:	ECU
Vehicle reaction:	Base ECU Software execution terminated. ECU does not run. Machine disabled.
Possible Cause:	1. A open circuit within the harness connectors 2. Water damage/ingress within the harness connectors

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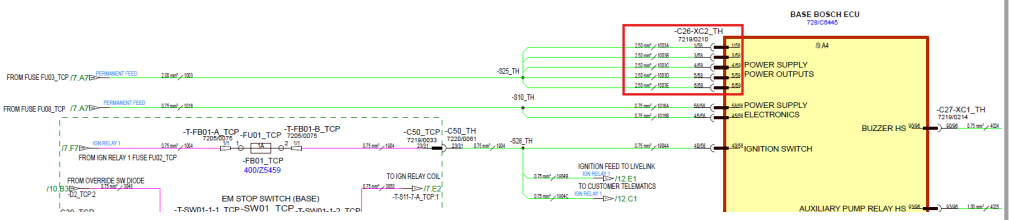
	3. Damaged component
Service Action:	1. Check voltage at Base ECU pins 1/58, 3/58, 4/58, 5/58 and 6/58. Voltage can be measured at ECU feed fuse FU03_TCP. 2. Check continuity of GND pin 2/58 to Turntable Ground. 3. Check connectors for water ingress, bent or backed out pins, debris or any damage to the wiring harness. 4. If no fault found, replace ECU 

6.1.212 B1277-24

B1277-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1277□24

Error code:	**B1277-24**
ECU	Platform ECU
Description:	Platform Startlock Stuck (Generic o/p fault) - Turntable ECU Power supply less than 8.5v
Component:	ECU
Vehicle reaction:	Base ECU Software execution terminated. ECU does not run. Machine disabled.
Possible Cause:	1. A open circuit within the harness connectors 2. Water damage/ingress within the harness connectors 3. Damaged component
Service Action:	1. Check voltage at Platform ECU pins 1/58, 3/58, 4/58, 5/58 and 6/58. Voltage can be measured at DIN Rail Terminal -S11-1_PCP. Check all wires are fully inserted.

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2. Check interconnect -C21_BH / -C21_PCP. Ensure wires not damaged, pins not backed out or no water ingress.

3. Check interconnect -C37_TH / -C37_BH. Ensure wires not damaged, pins not backed out or no water ingress.

4. Check interconnect -C39_TCP / -C39_TH. Ensure wires not damaged, pins not backed out or no water ingress.

5. Check voltage at fuse -FU06_TCP

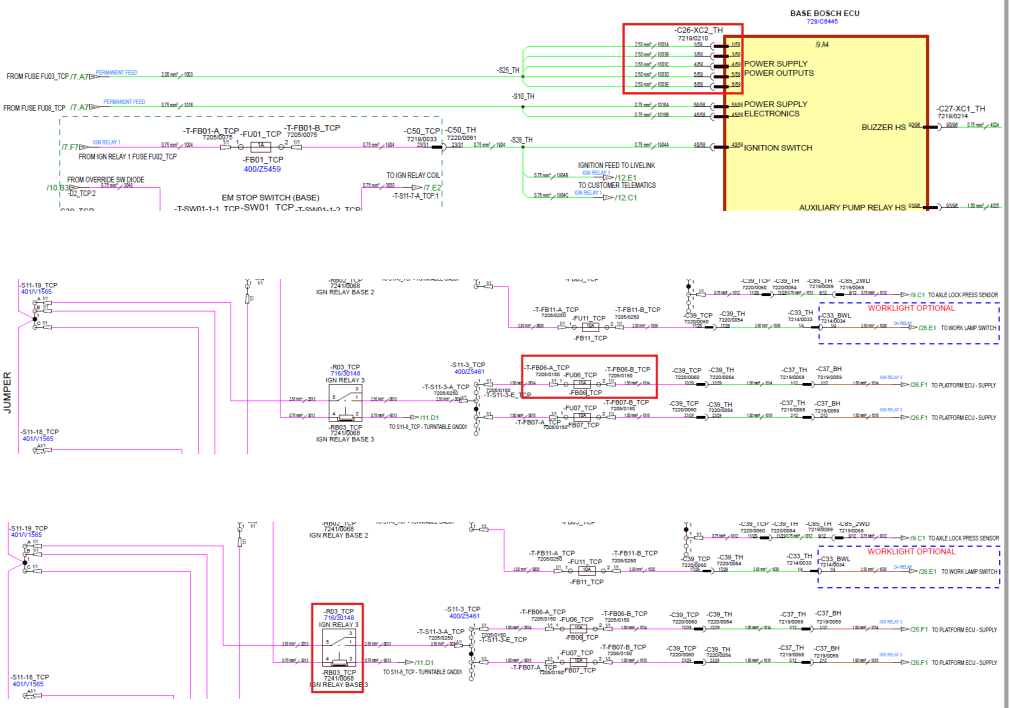
6. Check Relay output of IGN RELAY 3 (Wire #0013) to DIN Rail terminal -S11-3_TCP

7. Check voltage at DIN Rail Terminal -S11-19_TCP (Wire #2013)

8. Check continuity of GND pin 2/58 to Turntable Ground.

9. Check connectors for water ingress, bent or backed out pins, debris or any damage to the wiring harness.

10. If no fault found, replace ECU



6.1.213 B1281-16

B1281-16

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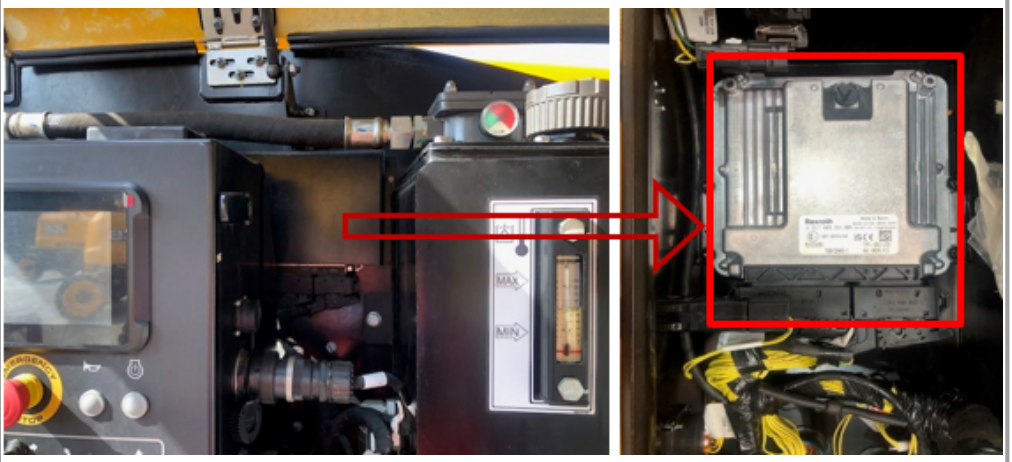
Error code:	B1281-16
ECU	Base ECU
Description:	Startlock Failure - VSS2 Low Voltage (<= 9.5V)
Component:	ECU
Vehicle reaction:	Detect failure mode; Disable all Disable output and ignore input
Possible Cause:	1. Short Circuit 2. Excessive load 3. Water Ingress
Service Action:	1. VSS 2 (+10V) Voltage at Pin 32/58 on the Base Bosch ECU is equal to or below +9.5V. There is no circuitry attached to this pin. Check Connector for bent pins, debris, water ingress or any other reason a short to ground may exist. If fault remains, change the ECU. 2. Check System voltage 

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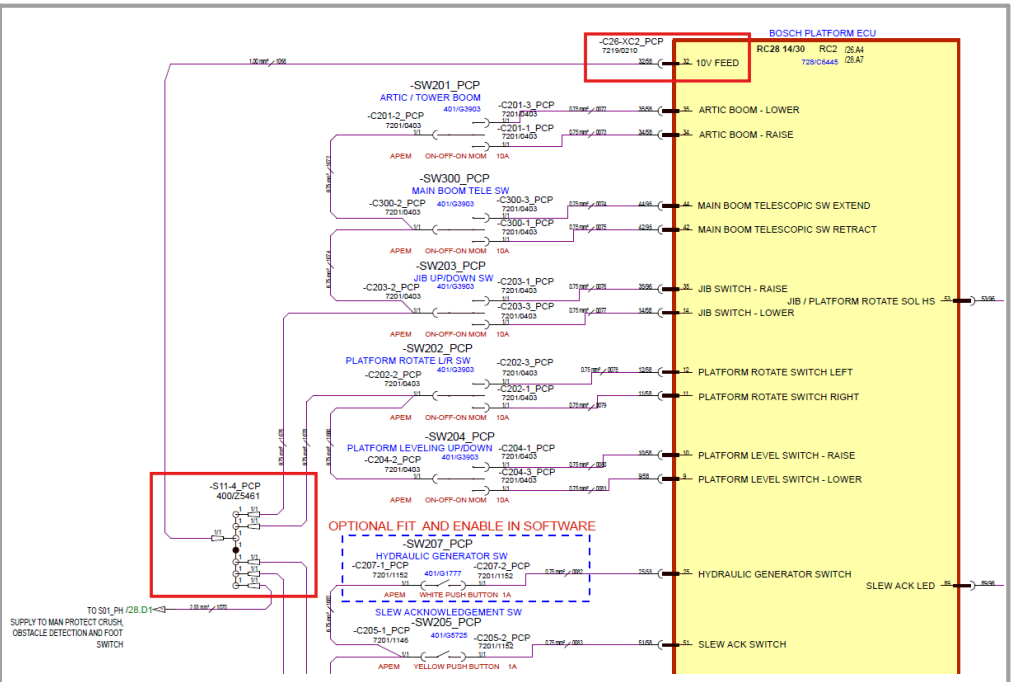

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6.1.214 B1282-13

Error code:	B1282-13
ECU	Base ECU
Description:	Water in fuel OC during engine startup: (Transition from GND to OC is expected within 2 secs of engine ignition ON)
Component:	Water in Fuel Sensor
Vehicle reaction:	Reduced Torque (40% Torque De-rate):-YES
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check the harness is securely fitted to the sensor and clean the surrounding area around the sensor. 2. (The sensor is securely connected when clicked into place).

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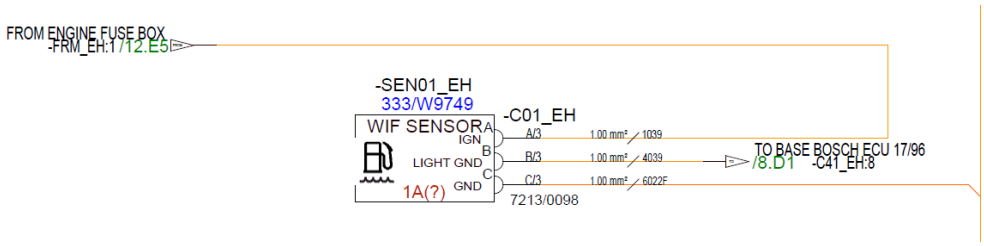
	3. Disconnect the electrical connector from the sensor and inspect the sensor and harness connector pins. 4. If the pins are pushed back, damaged or corroded repair or replace as required. 5. Check 12 Volt in wire no. 1039 and 6022F 

6.1.215 B1283-16

B1283-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1283 16

Error code:	B1283-16
ECU	Platform ECU
Description:	Startlock Failure - VSS1 Low Voltage (<= 4.5V)
Component:	ECU
Vehicle reaction:	Detect failure mode; Disable all Disable output and ignore input of Platform Panel
Possible Cause:	1. Short Circuit 2. Excessive load 3. Water Ingress
Service Action:	1. VSS 1 (+5 V) Voltage at Pin 19/58 on the Platform Bosch ECU is equal to or below +4.5V. This voltage can be measured at the speed potentiometer terminal -C-L11-3_PCP. Check no short or damage at potentiometer. Check Connector for bent pins, debris, water ingress or any other reason a short to ground may exist. If fault remains, change the ECU.

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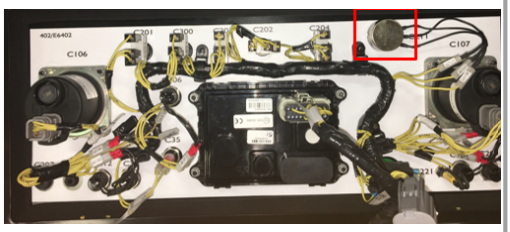
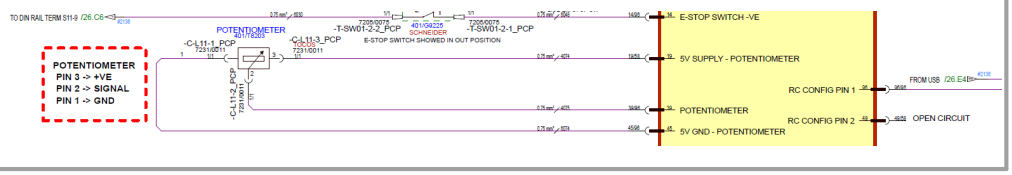
	2. Check System voltage.  

6.1.216 B1284-16

B1284-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1284□16

Error code:	B1284-16
ECU	Platform ECU
Description:	Startlock Failure - VSS2 Low Voltage (<= 9.5V)
Component:	ECU
Vehicle reaction:	Detect failure mode; Disable all Disable output and ignore input of Platform Panel
Possible Cause:	1. Short Circuit 2. Excessive load 3. Water Ingress
Service Action:	1. VSS 2 (+10V) Voltage at Pin 32/58 on the Platform Bosch ECU is equal to or below +9.5V. Voltage can be measured at DIN Rail Terminal -S11-4_PCP. Check other wires coming from this DIN Rail Terminal (#1070, #1076, #1078, #1085, #1086) Try removing these wires one at a time to narrow down fault location.If no fault found, check platform ECU Connector for bent pins, debris, water ingress or any other reason a short to ground may exist. If fault remains, change the ECU.

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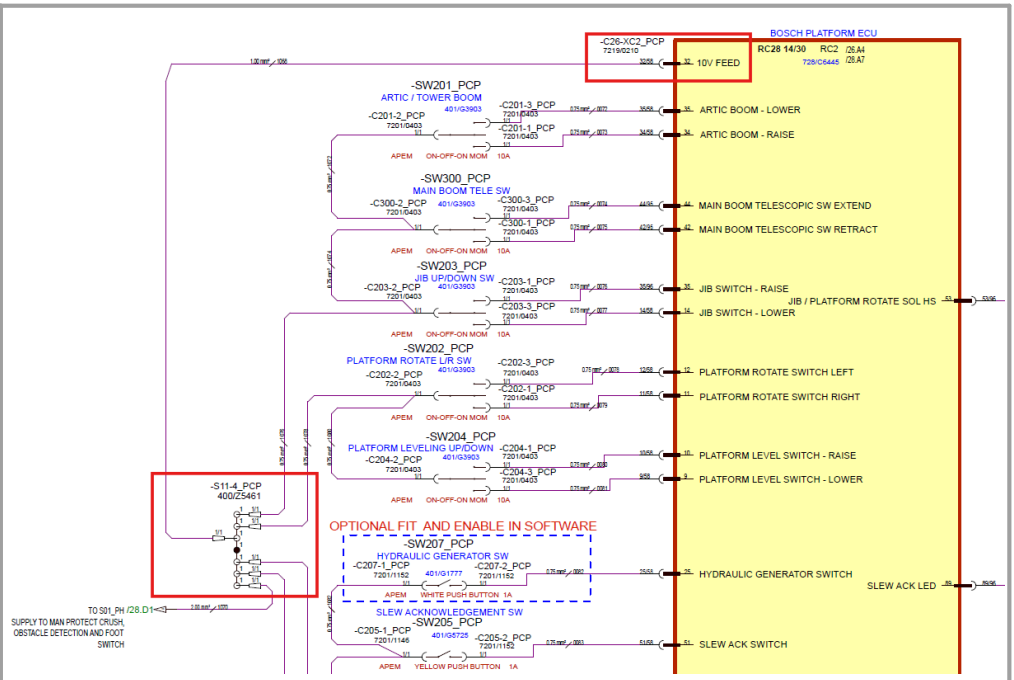

6.1.217 B1285-16

B1285-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1285 16

Error code:	B1285-16
ECU	Platform ECU
Description:	Startlock Failure - VSS3 Low Voltage (<= 4.5V)
Component:	ECU
Vehicle reaction:	Detect failure mode; Disable all Disable output and ignore input of Platform Panel
Possible Cause:	1. Short Circuit 2. Excessive load

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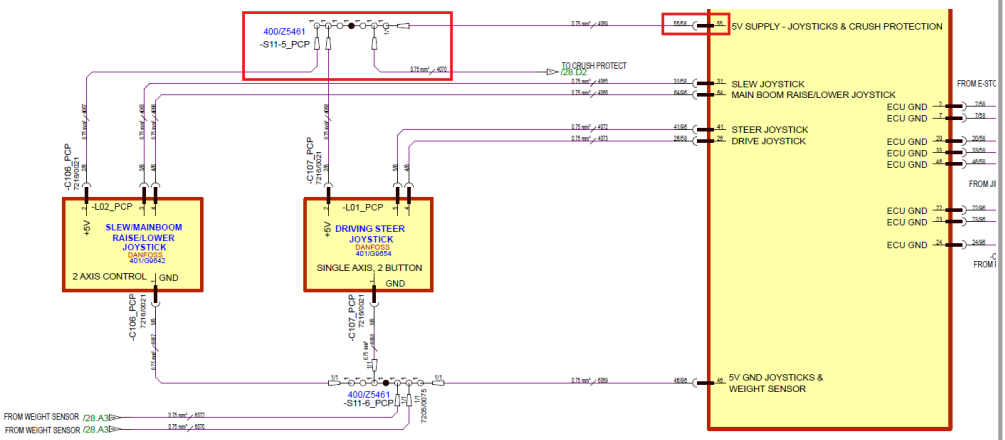
	3. Water Ingress
Service Action:	1. VSS 3 (+5 V) Voltage at Pin 55/58 on the Platform Bosch ECU is equal to or below +4.5V. This voltage provides supply to Joysticks and Crush Protection. The voltage can be measured at DIN Rail Terminal -S11-5_PCP (Wire #4069). Check all wires at DIN Rail Terminal (#4067, #4068, #4070). Remove one wire at a time and measure voltage from ECU to see if it raises back to +5V. If no fault found, check platform ECU Connector for bent pins, debris, water ingress or any other reason a short to ground may exist. If fault remains, change the ECU. 2. Check System voltage. 

6.1.218 B1286-16

Error code:	**B1286-16**
ECU	Base ECU
Description:	Water in fuel Short to Ground
Component:	Water in Fuel Sensor
Vehicle reaction:	Reduced Torque (40% Torque De-rate):-YES
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check the harness is securely fitted to the sensor and clean the surrounding area around the sensor.

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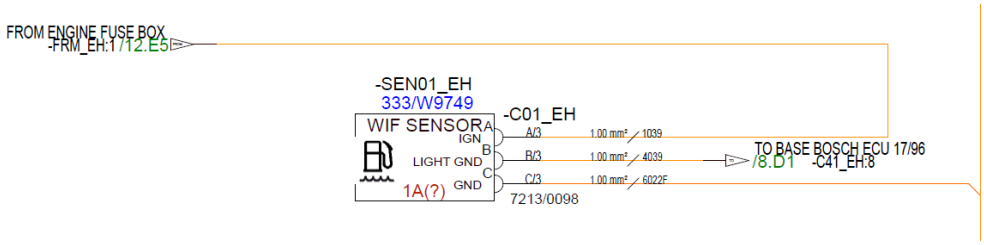
	2. (The sensor is securely connected when clicked into place). 3. Disconnect the electrical connector from the sensor and inspect the sensor and harness connector pins. 4. If the pins are pushed back, damaged or corroded repair or replace as required. 5. Check 12 Volt in wire no. 1039 and 6022F 

6.1.219 B1287-2F

B1287-2F

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1287□2F

Error code:	B1287-2F
ECU	Base ECU
Description:	Fuel Sender - Fuel Sender Data Erratic.
Component:	Fuel Sender
Vehicle reaction:	Detect failure mode; Dont send any value to Display
Possible Cause:	1. Short Circuit 2. Open Circuit 3. Poor Connection 4. Water Ingress 5. Damaged Component

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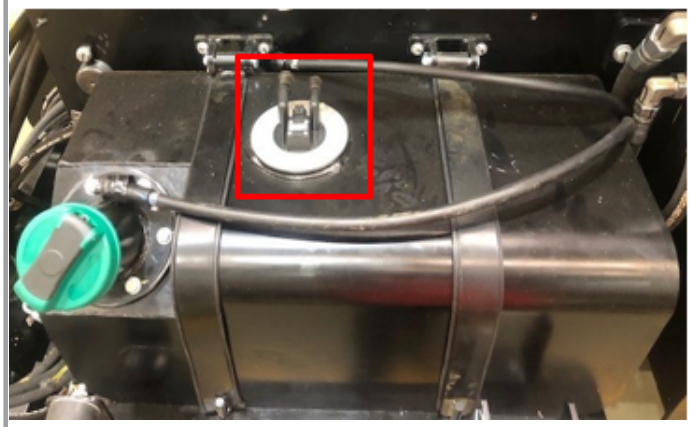
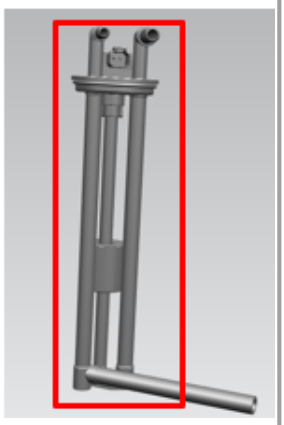
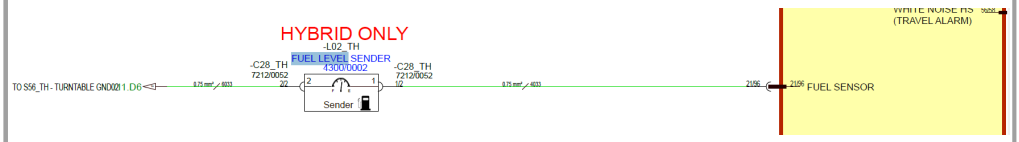
Service Action:	1. Check connections of Fuel Level Sender -C28_TH. Ensure connections are well made, free of contaminant. Check terminals are seated correctly. Disconnect connector from fuel level sender and measure resistance. Resistance should measure between 10 and 178 Ohms (depending on quantity of fuel in tank). Check fuel level sender connector is undamaged. 2. Check continuity of GND from -C28_TH pin 2/2 to Turntable Ground (Wire #6033). 3. Check continuity of Fuel Level Signal from -C28_TH pin 1/2 to Base Bosch ECU pin 21/96 (Wire #4033) 4. Check condition of Base Bosch ECU connector, check for bent or backed out pins, water ingress, debris or any other fault. 5. Check condition of wiring harness between fuel level sender and ECU 6. Replace fuel level sender.   

6.1.220 B1288-2F

B1288-2F

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1288 2F

Error code:	**B1288-2F**
ECU	Base ECU
Description:	OSCILLATING AXLE PRESSURE SENSOR SOFTWARE Failure

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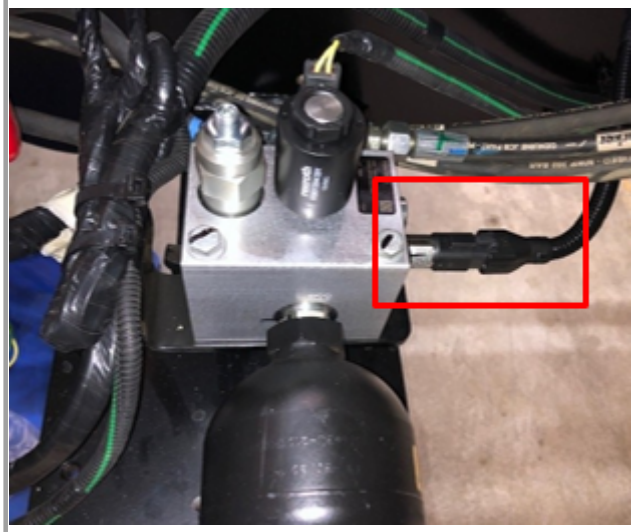
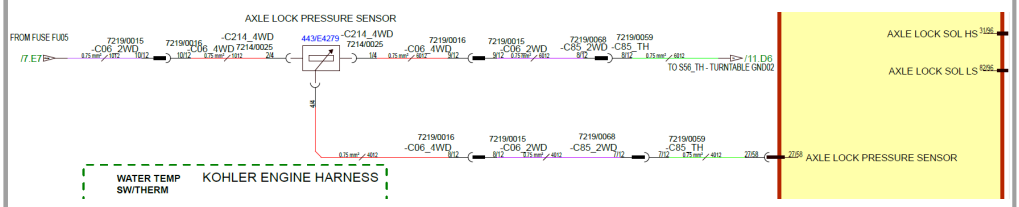
Component :	OSCILLATING AXLE PRESSURE SENSOR
Vehicle reaction:	Detect failure mode with Safout method - Switch Axle Lock o/p to off; Base disables Lift Main Boom and Artic Boom, Extend Main Boom, Slew and Drive functions (in slew position and Raised mode)
Possible Cause:	1. Short Circuit 2. Open Circuit 3. Poor Connection 4. Water Ingress 5. Damaged Component
Service Action:	1. Check connections to Pressure sensor 2. Check the voltage at Connector C214_TH 2/4, if no voltage need to investigate as per schemetic 2. Check wiring at Pressure sensor connector 4. Check Base ECU Pin 27/58 for any damage, bent or back out. 5. Check wire 1012, 6012 and 4012 for any cut, short or damage. 6. Replace the Pressure sensor if damage or Faulty. 7. If Sensor is OK, Reflash the software with latest Version.  

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6.1.221 B1301-2F

B1301-2F

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1301□2F

Error code:	B1301-2F
ECU	Base ECU
Description:	Oscillating Axle - Oscillating Axle Pressure Sensor Failure.
Component:	Oscillating Axle Pressure Sensor
Vehicle reaction:	Detect failure mode; Prevent all Raise, Extend and Slew; In Raised or Slew position - prevent drive & steer; In Stowed and Forward position - allow drive
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Output voltage of pressure sensor is 0.5 - 4.5VDC. Disconnect interconnect connectors -C214_TH and -C214_TH. Measure voltage at pin 9/12 (Wire #4012) on both connectors. If one of the measurements is above 4.5VDC then there is a short to high on that connection. Trace the fault back to where there is a short circuit to high. 2. Check interconnects -C214_TH and -C214_TH for any damage, shorts, debris or stray wire. Check the Base Bosch ECU connector (58-way) for any damage, bent pins debris etc. Check pin 27/58. 3. Check all above connectors for any water ingress. 4. Check the pressure sensor for damage or malfunction. Replace component.

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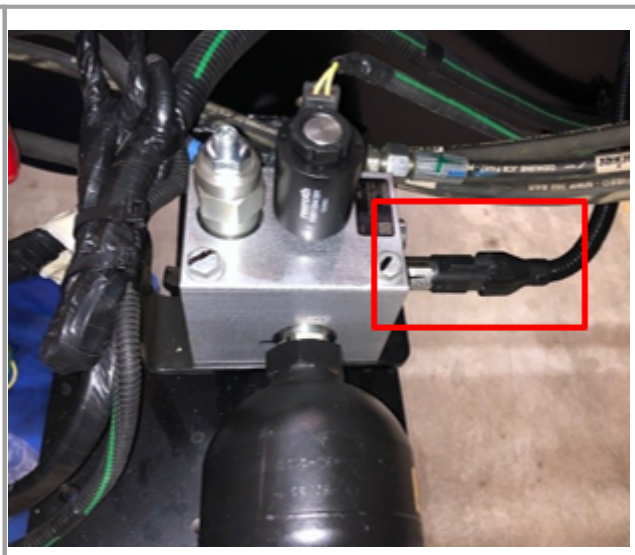

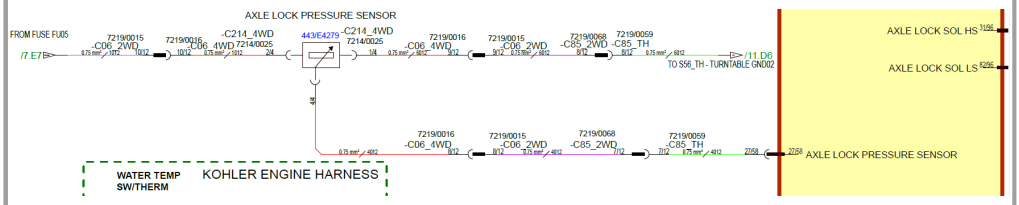

6.1.222 B1302-2F

B1302-2F

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1302-2F

Error code:	B1302-2F
ECU	Base ECU
Description:	RC CONFIG Short Circuit Plausibility Check
Component:	ECU
Vehicle reaction:	After ignition: Detect failure mode; Disable all functionalities of respective controller; Before ignition: check in start lock logic and control will be stuck in start lock mode; Detect failure mode.

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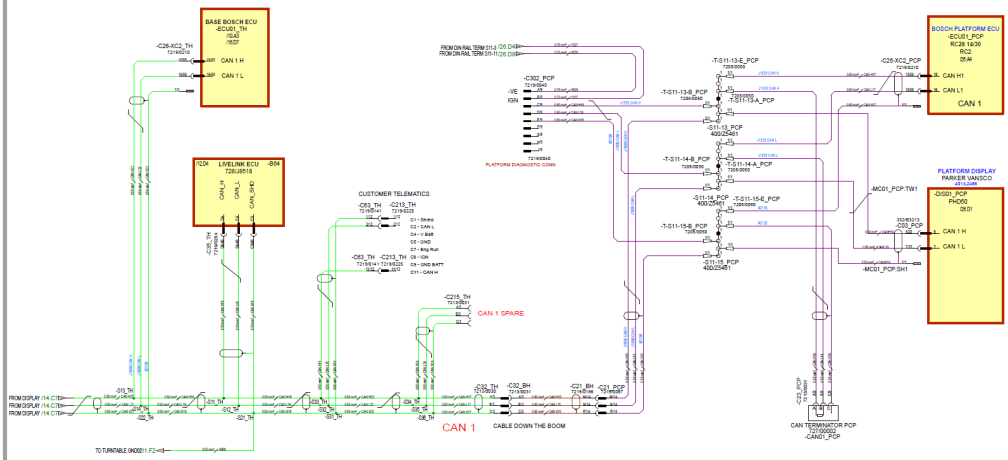
Possible Cause:	1. Short or Open Circuit on CAN Bus network 2. Water ingress on CAN Bus connector / device 3. Harness damage
Service Action:	1. Check CAN Bus terminators at both ends of CAN Network (Platform and Base Control Panels) 2. Remove one CAN Bus terminator and measure resistance of CAN-H to CAN-L. Should be 120 Ohms. If value is low, check CAN Bus for short circuits, If value is High, Check for open circuits (including interconnects) 3. Check for water ingress, short or open circuits in all connectors of devices attached to CAN Bus. 4. Connect Service Master via diagnostic connector, User CAN diagnostics to check which devices are connected and operating correctly. 

6.1.223 B1303-2F

B1303-2F

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1303□2F

Error code:	**B1303-2F**
ECU	Platform ECU
Description:	RC CONFIG Short Circuit Plausibility Check
Component:	ECU

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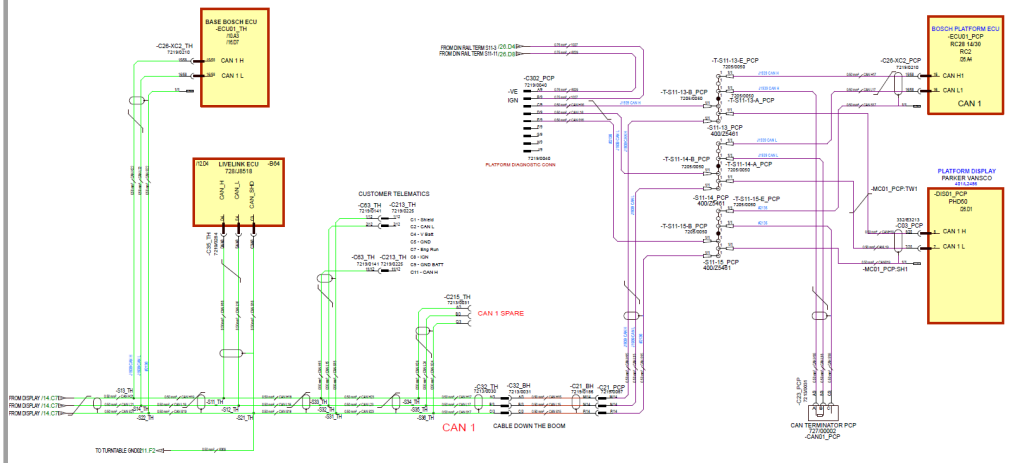
Vehicle reaction:	After ignition: Detect failure mode; Disable all functionality of respective controller; Before ignition: check in startlock logic and control will be stuck in Startlock mode; Detect failure mode.
Possible Cause:	1. Short or Open Circuit on CAN Bus network 2. Water ingress on CAN Bus connector / device 3. Harness damage
Service Action:	1. Check CAN Bus terminators at both ends of CAN Network (Platform and Base Control Panels) 2. Remove one CAN Bus terminator and measure resistance of CAN-H to CAN-L. Should be 120 Ohms. If value is low, check CAN Bus for short circuits, If value is High, Check for open circuits (including interconnects) 3. Check for water ingress, short or open circuits in all connectors of devices attached to CAN Bus. 4. Connect Service Master via diagnostic connector, User CAN diagnostics to check which devices are connected and operating correctly. 

6.1.224 B1304-24

B1304-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1304□24

Error code:	**B1304-24**
ECU	Platform ECU

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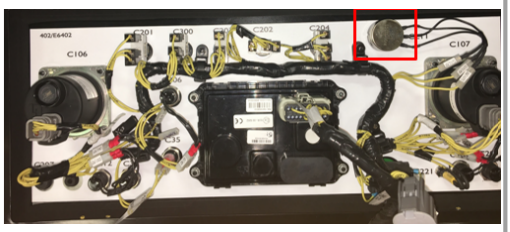
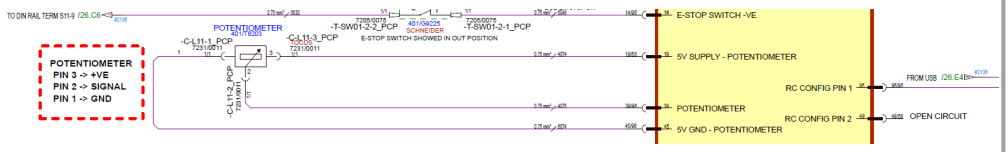
Description :	Base ECU - VSS1 Low Voltage (<= 4.5V)
Component :	ECU
Vehicle reaction:	Tx DM1
Possible Cause:	1. Short Circuit 2. Excessive load 3. Water Ingress
Service Action:	1. VSS 1 (+5 V) Voltage at Pin 19/58 on the Platform Bosch ECU is equal to or below +4.5V. There is no circuitry attached to this pin. Check Connector for bent pins, debris, water ingress or any other reason a short to ground may exist. If fault remains, change the ECU. 2. Check System voltage  

6.1.225 B1305-24

B1305-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1305-24

Error code:	**B1305-24**
ECU	Base ECU
Description :	Base ECU - VSS2 Low Voltage (<= 9.5V)

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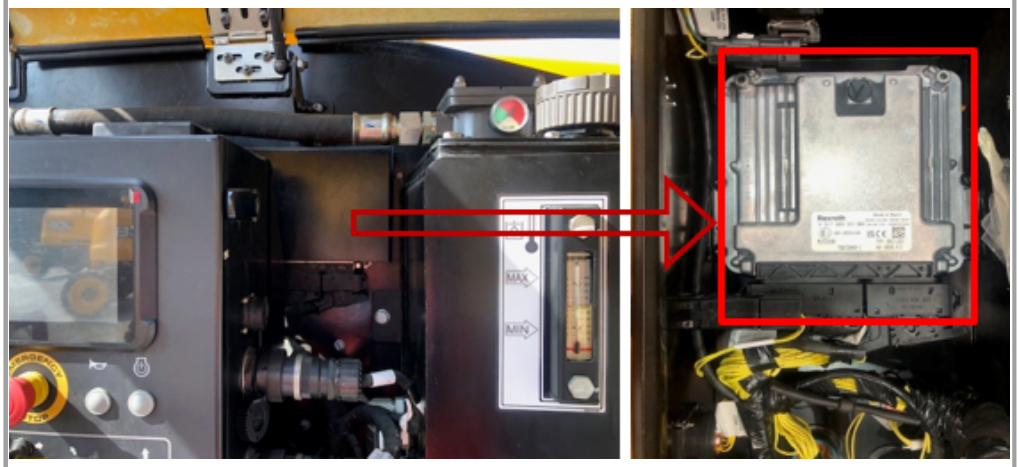
Component :	ECU
Vehicle reaction:	Tx DM1
Possible Cause:	1. Short Circuit 2. Excessive load 3. Water Ingress
Service Action:	1. VSS 2 (+10V) Voltage at Pin 32/58 on the Base Bosch ECU is equal to or below +9.5V. There is no circuitry attached to this pin. Check Connector for bent pins, debris, water ingress or any other reason a short to ground may exist. If fault remains, change the ECU. 2. Check System voltage 

6.1.226 **B1306-24**

B1306-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1306-24

Error code:	**B1306-24**

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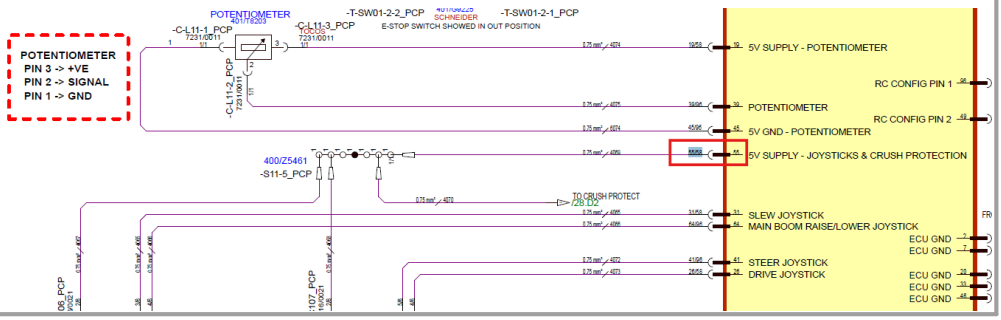
ECU	Base ECU
Description:	Base ECU - Turntable ECU Internal 5v voltage supply (VSS_3) circuit short to low
Component:	ECU
Vehicle reaction:	Tx DM1
Possible Cause:	1. Short Circuit 2. Excessive load 3. Water Ingress
Service Action:	1) VSS 3 (+5 V) Voltage at Pin 55/58 on the Base Bosch ECU is equal to or below +4.5V. There is no circuitry attached to this pin. Check Connector for bent pins, debris, water ingress or any other reason a short to ground may exist. If fault remains, change the ECU. 2) Check System voltage 

6.1.227 B1307-24

B1307-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1307-24

Error code:	**B1307-24**
ECU	Base ECU
Description:	Base Startlock Stuck (Generic o/p fault)

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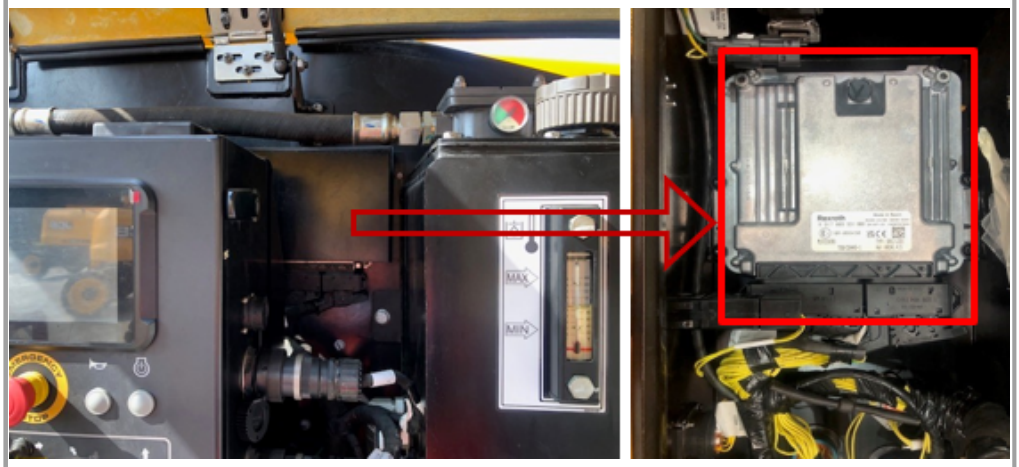
Component :	ECU
Vehicle reaction:	Base ECU Software execution terminated. ECU does not run. Machine disabled.
Possible Cause:	1. Short Circuit 2. Low system voltage 3. Faulty ECU
Service Action:	1) Test system voltage of machine - ensure not flat batteries 2) Replace ECU 

6.1.228 **B1308-24**

B1308-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1308-24

Error code:	**B1308-24**
ECU	Base ECU
Description :	Startlock failure - Turntable ECU Proportional outputs circuit short to high (12v)
Component :	ECU

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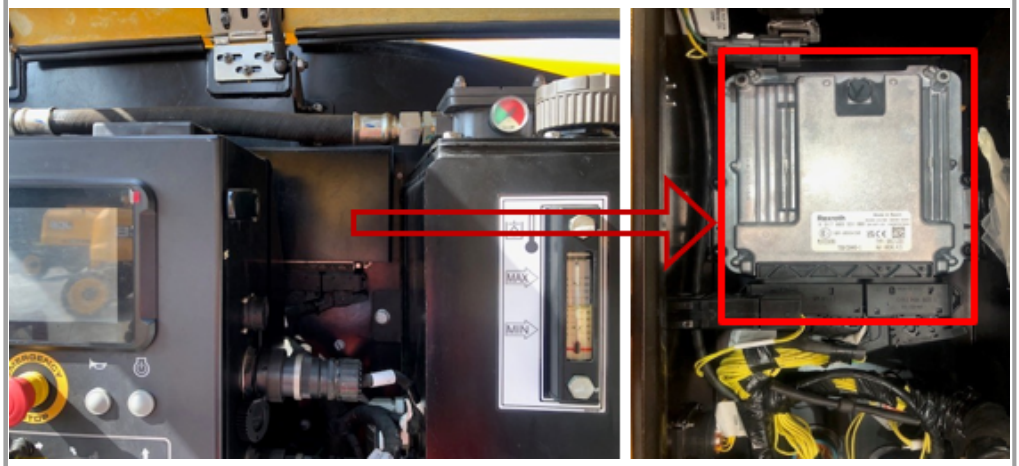
Vehicle reaction:	Base ECU Software execution terminated. ECU does not run. Machine disabled.
Possible Cause:	1. Short Circuit 2. Excessive load 3. Water Ingress
Service Action:	1) A short-circuit to high fault exists on the proportional outputs (Solenoids) from the Base Bosch ECU. 2) Check Fuse_03 has not blown at the turntable control panel. 3) Check voltage supply up to turntable ECU connector, pins: 1/58, 3/58, 4/58, 5/58, 6/58. 4) The following pins are potential causes: VP_1 (All on 96 way connector) Pins 1/96, 2/96, 3/96, 4/96, 5/96, 25/96, 26/96, 27/96, 28/96, 29/96, 30/96, 31/96, 49/96, 50/96, 51/96, 52/96, 53/96, 54/96, 73/96, 74/96, 75/96, 76/96, 77/96, 78/96 (Only marked pins are connected) 5) Disconnect 96-way connector from Base Bosch ECU and check pins for damage, debris or water ingress. 6) If voltage supply is okay, check I/O page in the turntable display to see which output is on. 7) Measure voltage at the pins shown above, looking for a high voltage. Trace fault back along path when found. 

6.1.229 **B1309-24**

B1309-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1309-24

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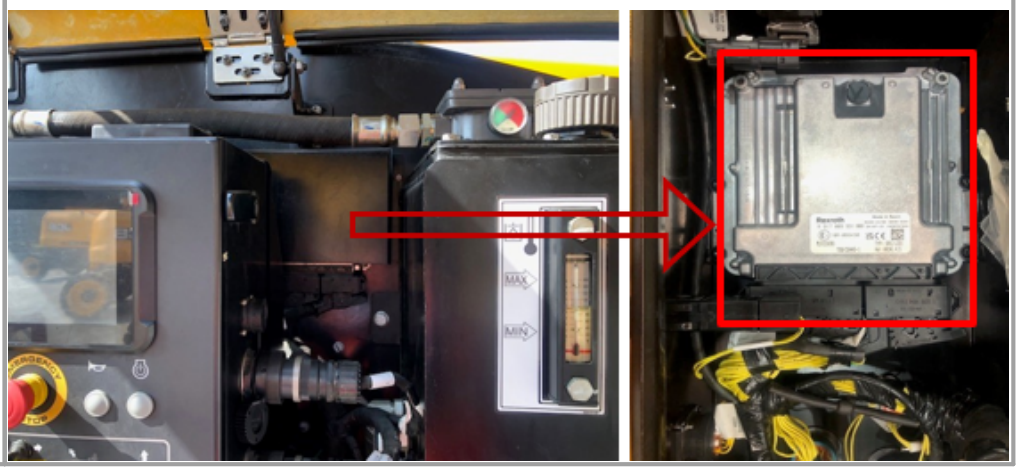
Error code:	B1309-24
ECU	Base ECU
Description:	Startlock failure - Turntable ECU Switch outputs circuit short to high (12v)
Component:	ECU
Vehicle reaction:	Base ECU Software execution terminated. ECU does not run. Machine disabled.
Possible Cause:	1. Short Circuit 2. Excessive load 3. Water Ingress
Service Action:	1) A short-circuit to high fault exists on the proportional outputs (Solenoids) from the Base Bosch ECU. 2) Check Fuse_03 has not blown at the turntable control panel. 3) Check voltage supply up to turntable ECU connector, pins: 1/58, 3/58, 4/58, 5/58, 6/58. 4) The following pins are potential causes: VP_1 (All on 96 way connector) Pins 1/96, 2/96, 3/96, 4/96, 5/96, 25/96, 26/96, 27/96, 28/96, 29/96, 30/96, 31/96, 49/96, 50/96, 51/96, 52/96, 53/96, 54/96, 73/96, 74/96, 75/96, 76/96, 77/96, 78/96 (Only marked pins are connected) 5) Disconnect 96-way connector from Base Bosch ECU and check pins for damage, debris or water ingress. 6) If voltage supply is okay, check I/O page in the turntable display to see which output is on. 7) Measure voltage at the pins shown above, looking for a high voltage. Trace fault back along path when found. 

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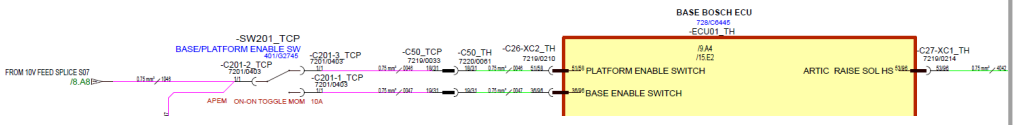
6.1.230 B1310-24

B1310-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1310-24

Error code:	B1310-24
ECU	Base ECU
Description:	Base Startlock Stuck (Base Enable Switch enabled during startup)
Component:	Base ECU
Vehicle reaction:	All Turntable Control Panel controls disabled. Base enable switch must be reset before base controls can be used.
Possible Cause:	Base Enable Switch set to active during start-up
Service Action:	1. The Base Enable switch on the Turntable Control Panel is enabled during startup. 2. Check switch not held active during startup. 3. Check for short circuit at rear of switch. 4. Check voltage at Base Bosch ECU pin 36/96. Pin should be 10V when enabled and less than 3v when disabled. If Switch is unpressed at startup and value is 10V or higher, check Wire #0047 for short to 10V or High. 5. Check function of switch. 

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6.1.231 B1311-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1311-24

Error code:	B1311-24
ECU	Base ECU
Description:	Base Startlock Stuck- Turntable ECU Internal hardware monitor 2 fault
Component:	ECU
Vehicle reaction:	Base ECU Software execution terminated. ECU does not run. Machine disabled.
Possible Cause:	1) Internal EVU Fault.
Service Action:	1) Hardware monitor detected fault in internal VSS supplies. Replace ECU

6.1.232 B1312-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1312-24

Error code:	B1312-24
ECU	Base ECU
Description:	Startlock failure - Turntable ECU 10v input enabled during startup

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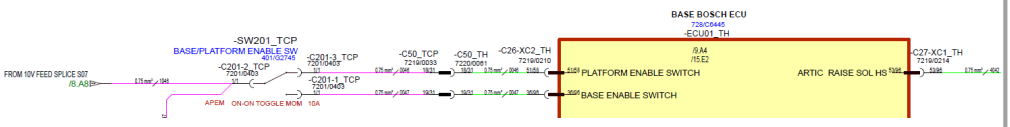
Component:	ECU
Vehicle reaction:	Incorrectly enabled switch on Turntable Control Panel is disabled. All other functions operate as normal. Switch must be reset before function can operate.
Possible Cause:	Base Input enable at start-up
Service Action:	1) An input to the Base ECU has been enabled during startup. 2) Check no switches physically held on during startup. 3) Check inputs on Display to see which input is held high 4) Visually Check wiring to all switches in base control panel. 

6.1.233 B1313-24

B1313-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1313-24

Error code:	**B1313-24**
ECU	Platform ECU
Description:	Startlock failure - Platform ECU Internal 5v voltage supply (VSS_1) circuit short to low
Component:	ECU
Vehicle reaction:	Platform ECU Software execution terminated. ECU does not run. Machine disabled.
Possible Cause:	1) Short Circuit 2) Excessive load

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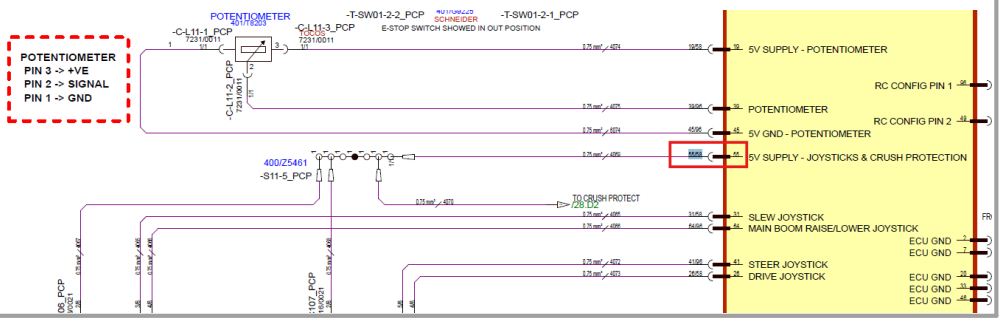
	3) Water Ingress
Service Action:	1) VSS 1 (+5 V) Voltage at Pin 19/58 on the Platform Bosch ECU is equal to or below +4.5V. This voltage can be measured at the speed potentiometer terminal -C-L11-3_PCP. Check no short or damage at potentiometer. Check Connector for bent pins, debris, water ingress or any other reason a short to ground may exist. If fault remains, change the ECU. 2) Check System voltage 

6.1.234 B1314-24

B1314-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1314-24

Error code:	**B1314-24**
ECU	Platform ECU
Description:	Startlock failure - Platform ECU Internal 10v voltage supply (VSS_2) circuit short to low
Component:	ECU
Vehicle reaction:	TxDM1
Possible Cause:	1. Short Circuit 2. Excessive load 3. Water Ingress

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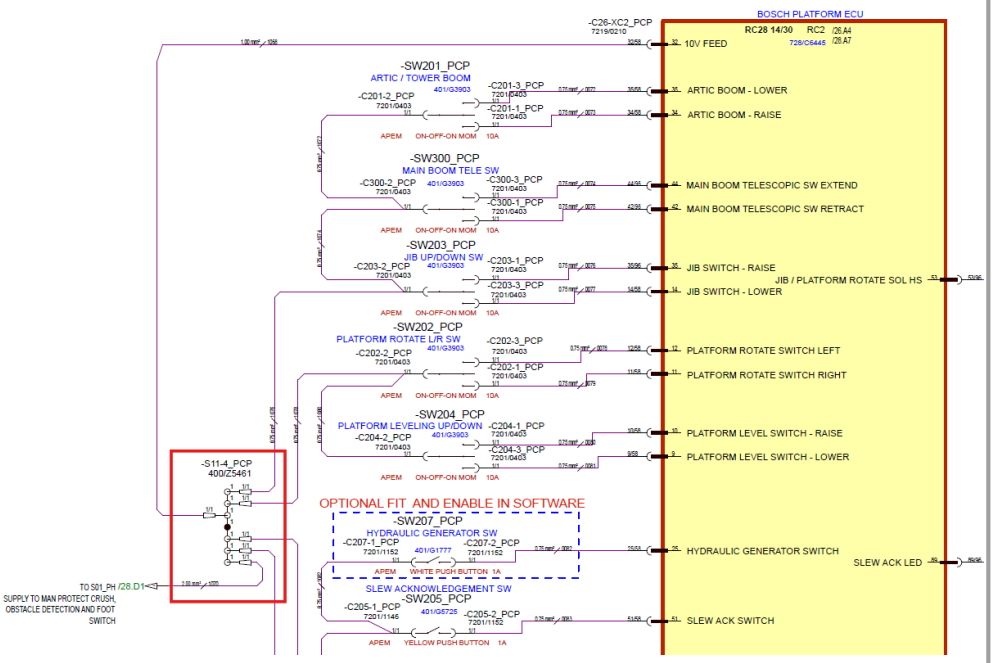
Service Action:	1) VSS 2 (+10V) Voltage at Pin 32/58 on the Platform Bosch ECU is equal to or below +9.5V. Voltage can be measured at DIN Rail Terminal -S11-4_PCP. Check other wires coming from this DIN Rail Terminal (#1070, #1076, #1078, #1085, #1086) Try removing these wires one at a time to narrow down fault location.If no fault found, check platform ECU Connector for bent pins, debris, water ingress or any other reason a short to ground may exist. If fault remains, change the ECU. 2) Check System voltage 

6.1.235 B1315-24

B1315-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1315-24

Error code:	**B1315-24**
ECU	Platform ECU
Description:	Startlock failure - Platform ECU Internal 5v voltage supply (VSS_3) circuit short to low

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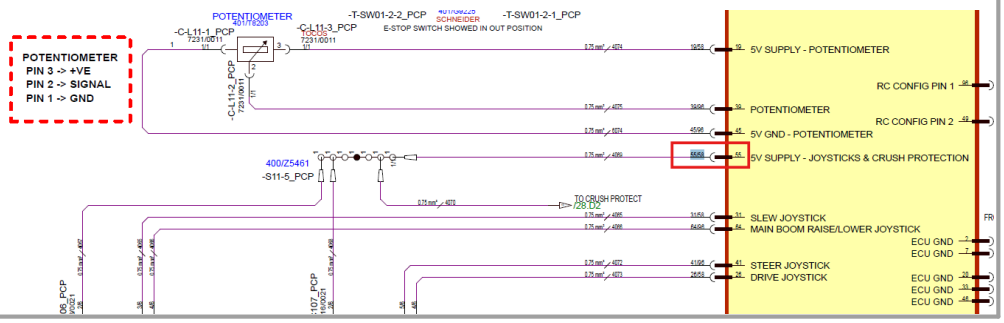
Component :	ECU
Vehicle reaction:	Platform ECU Software execution terminated. ECU does not run. Machine disabled.
Possible Cause:	1) Short Circuit 2) Excessive load 3) Water Ingress
Service Action:	1) VSS 3 (+5 V) Voltage at Pin 55/58 on the Platform Bosch ECU is equal to or below +4.5V. This voltage provides supply to Joysticks and Crush Protection. The voltage can be measured at DIN Rail Terminal -S11-5_PCP (Wire #4069). Check all wires at DIN Rail Terminal (#4067, #4068, #4070). Remove one wire at a time and measure voltage from ECU to see if it raises back to +5V. If no fault found, check platform ECU Connector for bent pins, debris, water ingress or any other reason a short to ground may exist. If fault remains, change the ECU. 2) Check System voltage 

6.1.236 B1316-24

B1316-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1316-24

Error code:	**B1316-24**
ECU	Platform ECU
Description :	Startlock failure - Platform ECU Internal hardware monitor 1 fault

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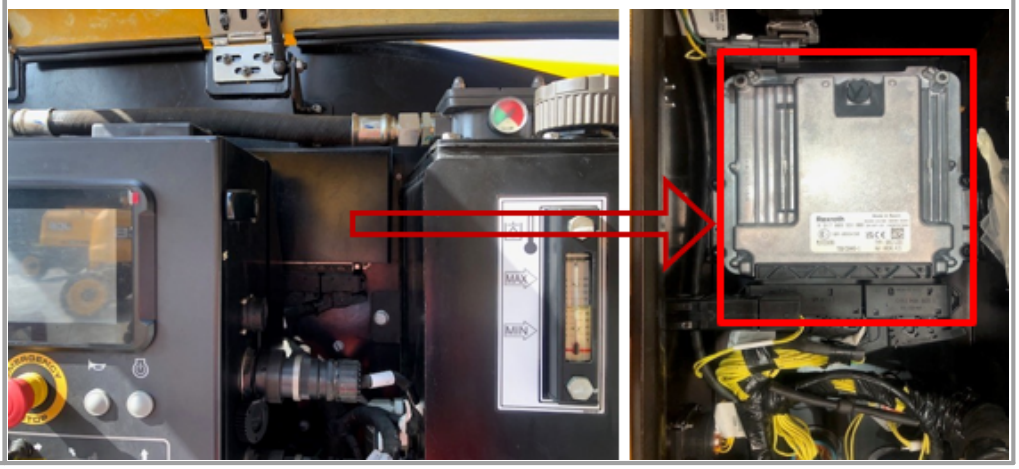
Component:	ECU
Vehicle reaction:	Platform ECU Software execution terminated. ECU does not run. Machine disabled.
Possible Cause:	1) Low system voltage 2) Faulty ECU
Service Action:	1) Test system voltage of machine - ensure not flat batteries 2) Replace ECU 

6.1.237 B1317-24

B1317-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1317-24

Error code:	**B1317-24**
ECU	Platform ECU
Description:	Startlock failure - Platform ECU Proportional outputs circuit short to high
Component:	ECU
Vehicle reaction:	Platform ECU Software execution terminated. ECU does not run. Machine disabled.

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Possible Cause:	1) Short Circuit to high 2) Water Ingress 3) Faulty ECU
Service Action:	1) A short-circuit to high fault exists on the proportional outputs (Solenoids) from the Platform Bosch ECU. 2) Check voltage supply up to platform ECU connector, pins: 1/58, 3/58, 4/58, 5/58, 6/58. 3) Check Fuse_06 has not blown at the turntable control panel. 4) The following pins are potential causes: VP_1 (All on 96 way connector) Pins 1/96, 2/96, 3/96, 5/96, 4/96, 25/96, 26/96, 27/96, 28/96, 29/96, 30/96, 31/96, 49/96, 50/96, 51/96, 52/96, 53/96, 54/96, 73/96, 74/96, 75/96, 76/96, 77/96, 78/96 (Only pin 53 is connected) i.e. all proportional outputs. 5) Check Platform Interconnect -C22_PCP pin R, Check Jib/Platform Rotate Solenoid connector -C03_PH. Check Solenoid -SOL 22_PH. 6) Check all interconnector for damage, water ingress or any pushed back pins. 7) Disconnect 96-way connector from Platform Bosch ECU and check pins for damage, debris or water ingress. 8) Measure voltage at the pins shown above, looking for a high voltage. Trace fault back along path when found..

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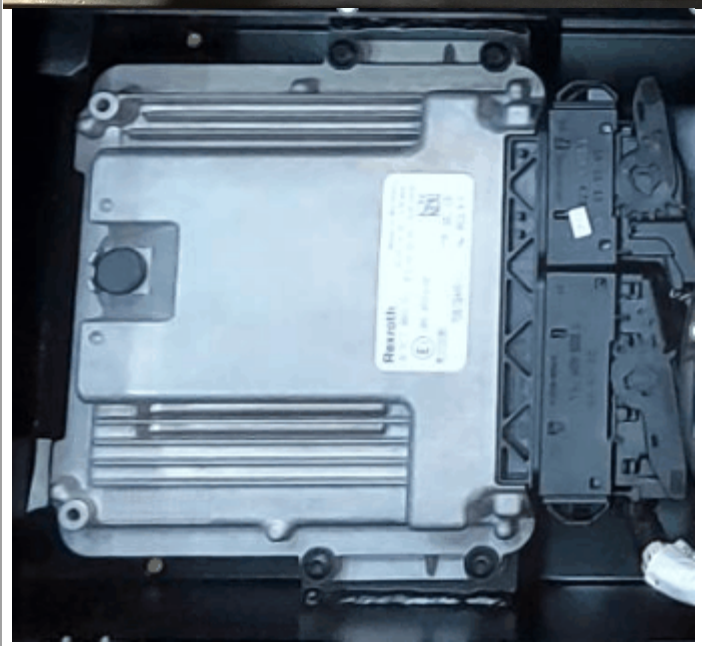

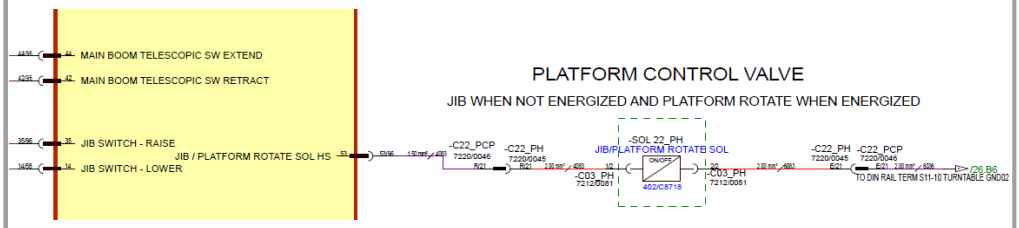

6.1.238 B1318-24

B1318-24

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Machine Fault Codes 518 > DTC ERROR CODE 519 > B1318-24

Error code:	B1318-24
ECU	Platform ECU
Description:	Startlock failure - Platform ECU Switch outputs circuit short to high
Component:	ECU
Vehicle reaction:	Platform ECU Software execution terminated. ECU does not run. Machine disabled.
Possible Cause:	1) Short Circuit to high 2) Water Ingress 3) Faulty ECU
Service Action:	1) A short-Circuit to high fault exists on the switch outputs. 2) Check Fuse_06 has not blown at the turntable control panel. 3) Check voltage supply up to platform ECU connector, pins: 1/58, 3/58, 4/58, 5/58, 6/58. 4) The following are potential causes: VP_2 (96 way Connector) Pins: 6/96, 7/96, 89/96, 90/96, 93/96, 94/96. (i.e. all switch outputs. The short to high is back feeding the ECU and making unsafe to start up) or (58 way Connector) Pins: 41/58, 41/58, 43/58, 56/58, 57/58 (only Pin 41 connected - Fault LED). Check all connected components for damage or wiring faults. 5) If voltage supply is okay, check I/O page in the turntable display to see which output is on. 6) Disconnect 58-way and 96-way connector from Platform Bosch ECU and check pins for damage, debris or water ingress. 7) Measure voltage at the pins shown above, looking for a high voltage. Trace fault back along path when found..

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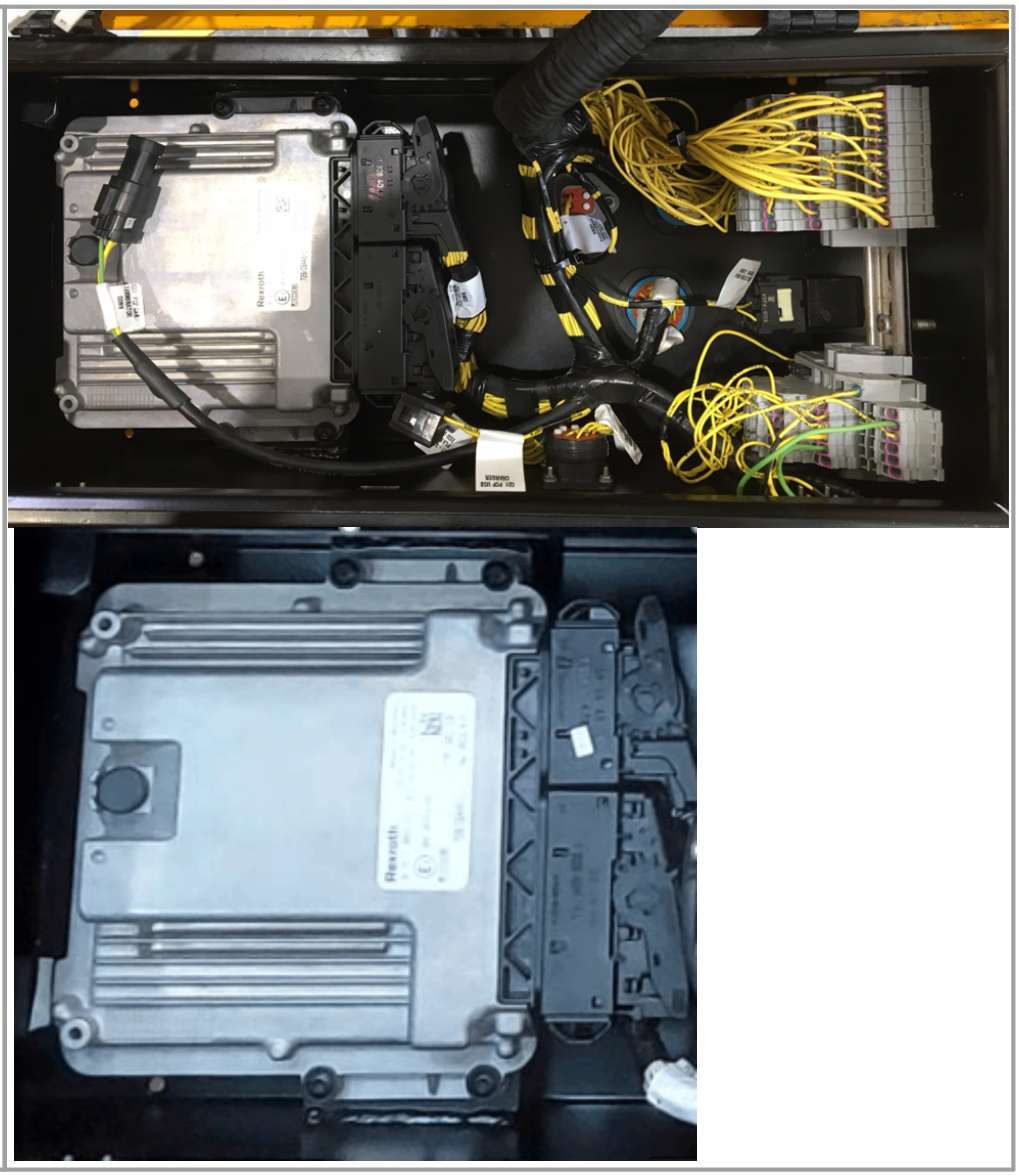

6.1.239 B1319-24

B1319-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1319-24

Error code:	B1319-24
ECU	Platform ECU

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Description:	Startlock failure - Foot pedal input enabled during startup
Component:	ECU
Vehicle reaction:	All Platform Control Panel controls disabled. Foot switch must be reset before platform controls can be used.
Possible Cause:	Base input enabled at startup.
Service Action:	1) The Foot switch at the Platform is pressed during startup. 2) Check switch not held active during startup. 3) Check for short circuit at rear of switch or at Interconnect -C220_FP. Contacts should be closed when switch pressed, Open when switch is not pressed. 4) Check voltage at Platform Bosch ECU pin 47/96. Pin should be 10V when enabled and less than 3v when disabled. If Switch is unpressed at startup and value is 10V or higher, check Wire #4096 for short to 10V or High. 5) Check function of switch. Check for water ingress or damage to Harness.

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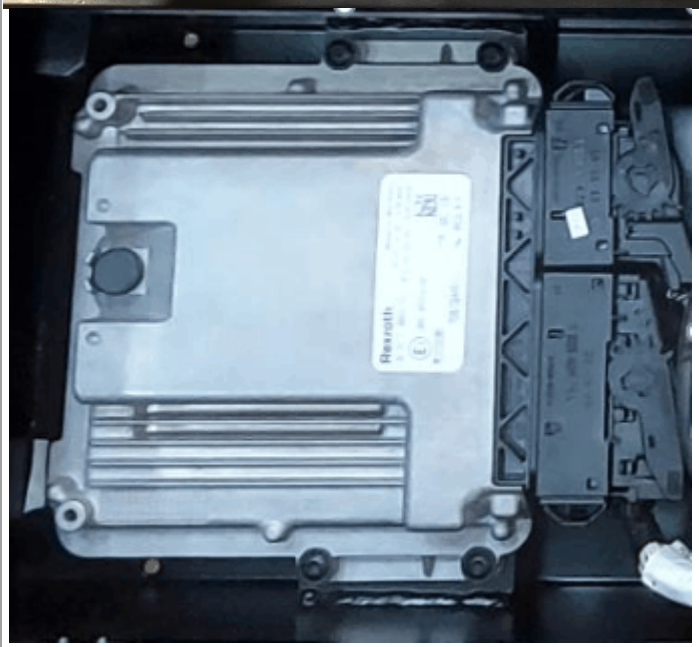

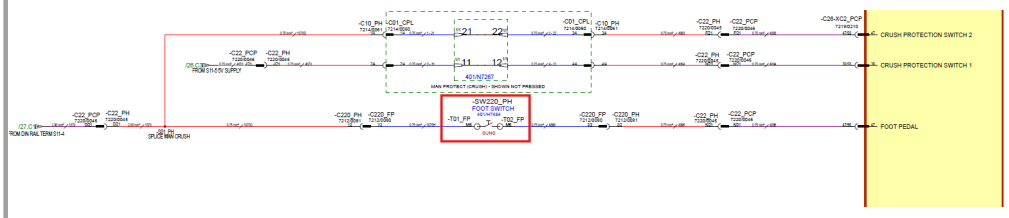

6.1.240 **B1320-24**

B1320-24

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Machine Fault Codes 518 > DTC ERROR CODE 519 > B1320-24

Error code:	B1320-24
ECU	Platform ECU
Description:	Startlock failure - Platform ECU Internal hardware monitor 2 fault
Component:	ECU
Vehicle reaction:	Platform ECU Software execution terminated. ECU does not run. Machine disabled.
Possible Cause:	Internal ECU Fault.
Service Action:	Hardware monitor detected fault in internal VSS supplies. Replace ECU.

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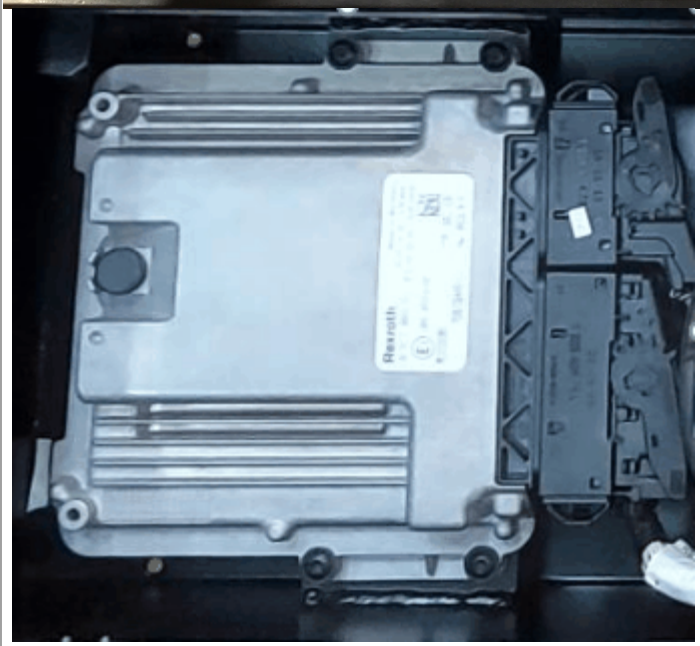

6.1.241 B1321-24

B1321-24

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1321-24

Error code:	B1321-24
ECU	Platform ECU

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Description:	Startlock failure - Platform ECU 10v input enabled during startup
Component:	ECU
Vehicle reaction:	Incorrectly enabled switch on Platform Control Panel is disabled. All other functions operate as normal. Switch must be reset before function can operate.
Possible Cause:	Base input enabled at startup.
Service Action:	1) An input to the Platform ECU has been enabled during startup. 2) Check all switches physically should not held on during startup. 3) Check inputs on Display to see which input is held high 4) Visually Check wiring to all switches in base control panel. 5) Check all interconnector for damage, water ingress or any pushed back pins.

6.1.242 B1329-13

B1329-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1329 13

Error code:	**B1329-13**
ECU	Base ECU

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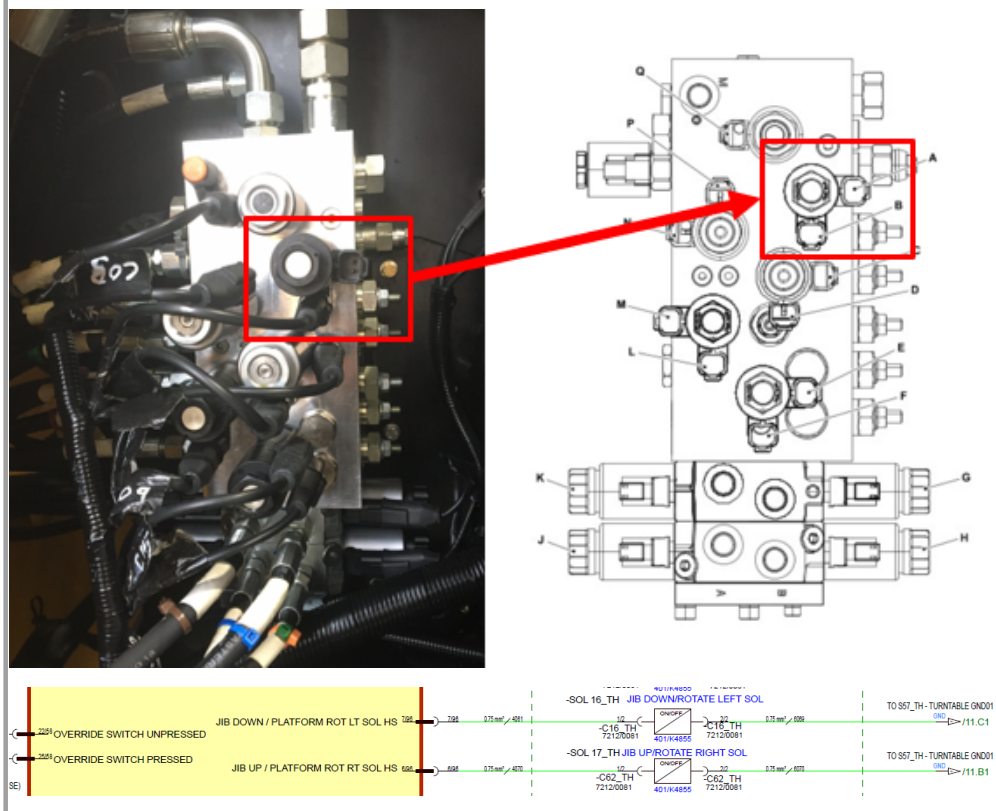
Description:	JIB/PLATFORM FLOW High Side Sol Short Circuit to High
Component:	Jib/Platform Solenoid
Vehicle reaction:	Detect failure mode for Short Circuit to High and disable platform rotate and allow Jib functions Note: Before Ignition ON, POST Fail (stuck in startup logic for Short Circuit to High only) and Generic Disable output fault.
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Locate Jib Up / Platform Right solenoid connector -C16_TH. Disconnect connector and measure voltage at pin 1/2. If voltage is high, check harness and Base Bosch ECU Connector terminal 7/96 for short to high. 2. Measure voltage at -C16_TH pin 2/2. If voltage is high, check return path for short to high. 3. Check -C16_TH and Base Bosch ECU Connector for water ingress, damage, debris or stray wires that may cause short circuit. 4. Check for any damage to the harness or components that may cause short circuit. 

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6.1.243 **B1330-16**

B1330-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1330 16

Error code:	**B1330-16**
ECU	Base ECU
Description:	JIB/PLATFORM FLOW High Side Solenoid Short Circuit to Low
Component:	Jib/Platform Solenoid
Vehicle reaction:	Detect failure mode for Short Circuit to Low and disable platform rotate and allow Jib functions
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Locate Jib Up / Platform Right solenoid connector -C16_TH. Disconnect connector and test pin 1/2 for short to GND. Check harness and Base Bosch ECU Connector terminal 7/96 for short to GND. 2. Test for short to GND at -C16_TH pin 2/2. Check return path for short to GND. 3. Check -C16_TH and Base Bosch ECU Connector for water ingress, damage, debris or stray wires that may cause short circuit. 4. Check for any damage to the harness or components that may cause short circuit.

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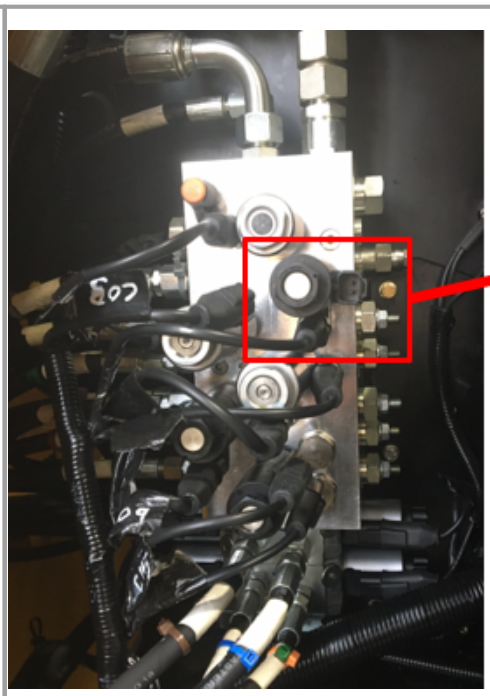

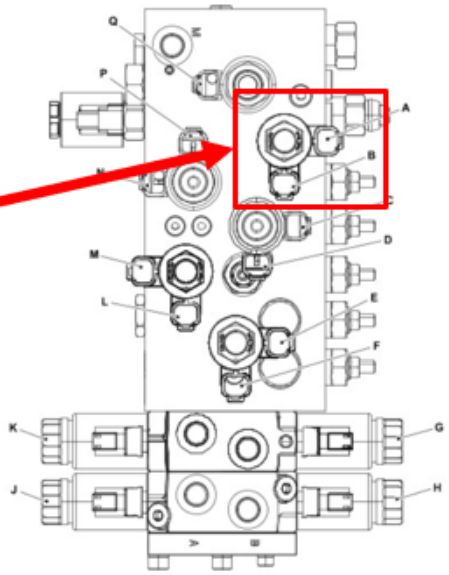

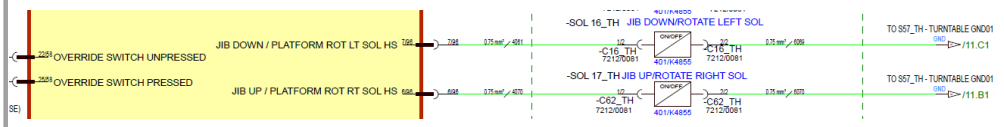

6.1.244 B1332-17

B1332-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1332-17

Error code:	B1332-17
ECU	Base ECU
Description:	PUBLIC Proportional Solenoid Valve Low Side Short Circuit to High
Component:	PUBLIC Proportional Solenoid Valve
Vehicle reaction:	Public proportional solenoid will be switched off, this will effect:Articulated boom, steer, leveling, jib, platform rotate, telescopic boom.

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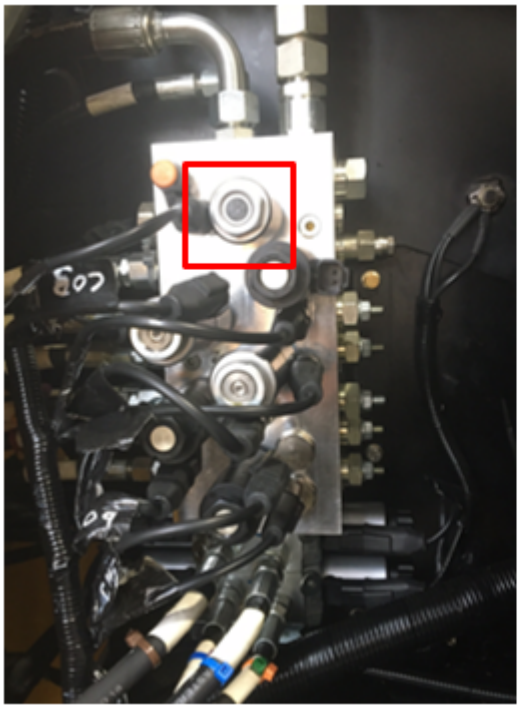
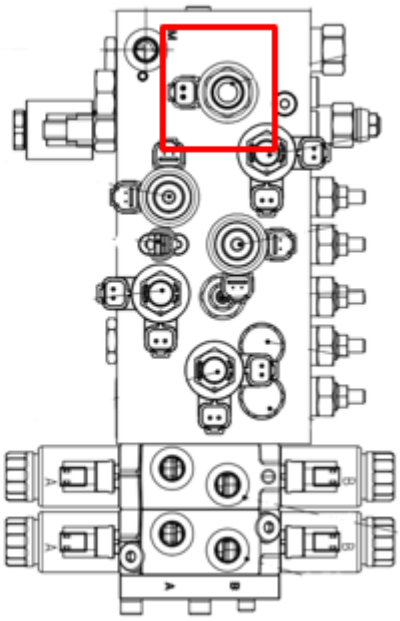
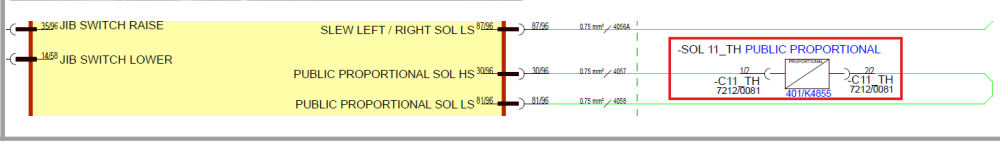
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from ecu to the coil 3. Turn machine ignition on/off to clear code 4. Check wire on solenoid connector C11_TH Pin 1 and 2. 5. Check wire no. 4047 and 4058 for any loose connection, cut or any damage. 6. Check if valve is mechanically jammed   

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6.1.245 B1333-16

B1333-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1333-16

Error code:	B1333-16
ECU	Base ECU
Description:	PUBLIC Proportional Solenoid Valve Low Side Short Circuit to Low
Component:	PUBLIC Proportional Solenoid Valve
Vehicle reaction:	Public proportional solenoid will be switched off, this will effect:Articulated boom, steer, leveling, jib, platform rotate, telescopic boom.
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from ecu to the coil 3. Turn machine ignition on/off to clear code 4. Check wire on solenoid connector C11_TH Pin 1 and 2. 5. Check wire no. 4047 and 4058 for any loose connection, cut or any damage. 6. Check if valve is mechanically jammed

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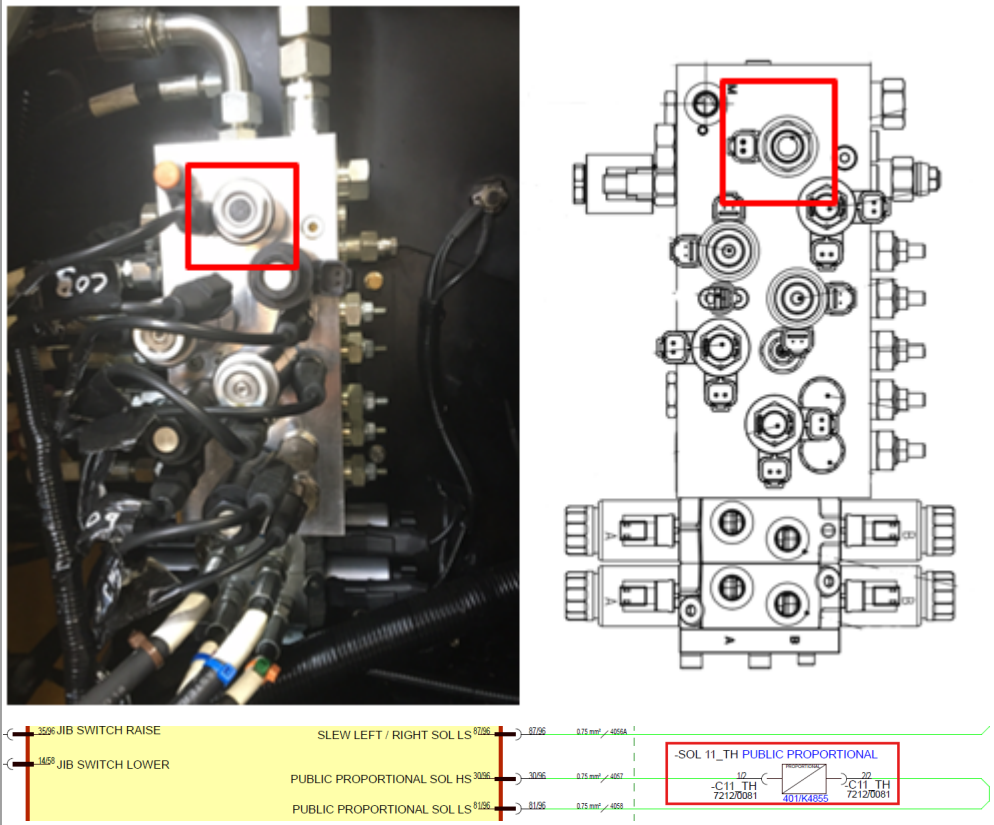

6.1.246 **B1334-13**

B1334-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1334-13

Error code:	B1334-13
ECU	Base ECU
Description:	PUBLIC Proportional Solenoid Valve Fault
Component:	PUBLIC Proportional Solenoid Valve
Vehicle reaction:	Detect failure mode with Safout method - Switch Public Prop. output (related to all switch functions) to off

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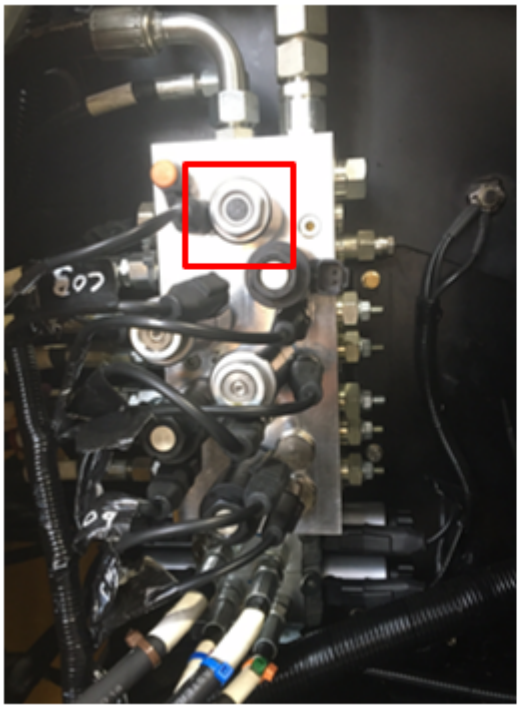
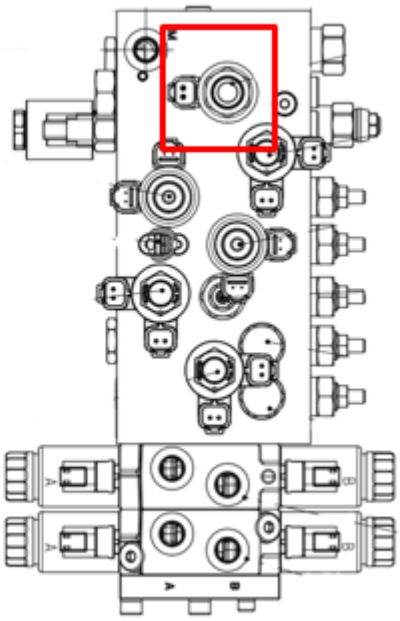
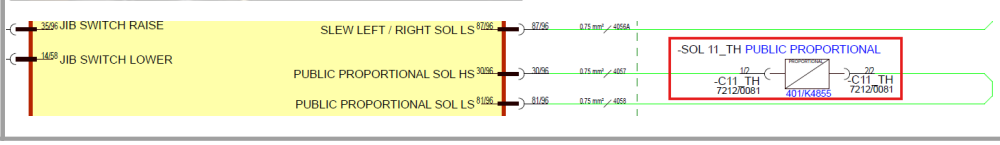
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from ECU to the coil 3. Turn machine ignition on/off to clear code 4. Check wire on solenoid connector C11_TH Pin 1 and 2. 5. Check wire no. 4047 and 4058 for any loose connection, cut or any damage. 6. Check if valve is mechanically jammed   

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6.1.247 B1335-17

B1335-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1335-17

Error code:	B1335-17
ECU	Base ECU
Description:	Main Boom - Main Boom Solenoid Valve Low Side Short Circuit to High.
Component:	Main Boom Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Main Boom output to off Before Ignition ON, POST Fail (stuck in start up logic) and Generic output fault
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Base Bosch ECU terminal 84/96 measuring short circuit to high (12V). Locate and disconnect Main Boom Lower Solenoid Connector -C06_TH and measure voltage at Pin 2/2. If High, Locate and disconnect the Main Boom Raise Connector -C05_TH and measure voltage again at -C06_TH Pin 2/2. If voltage remains high, inspect return path back to ECU terminal 84/96 (Wire #4047A). If voltage drops when either connector is removed, then check the high side to the solenoid connectors back to the ECU (Wires #4045 and #4046). Check the Coil resistance and Check resistance between pin 54/96 and 84/96 & pin 78/96 and 84/96. 2. Check the harness for any faults, abrasions or pinching that may cause short circuit. 3. Check all connectors (above) for any water ingress, short circuits, damage or stray wires that may cause a short. 4. Check solenoid connector for any damage.

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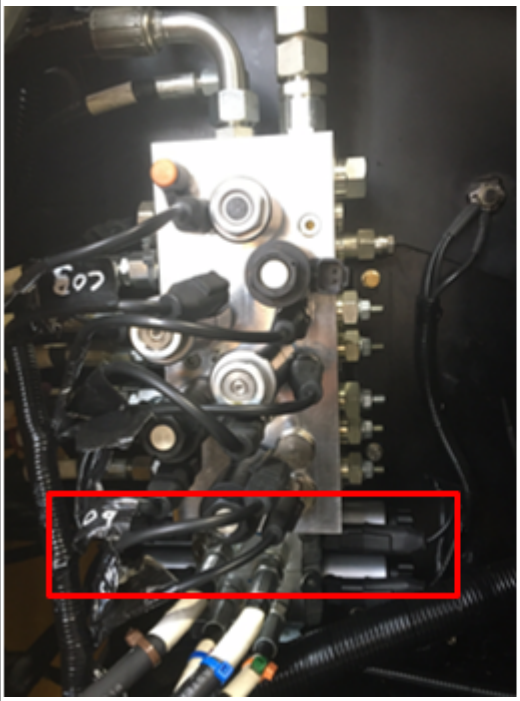

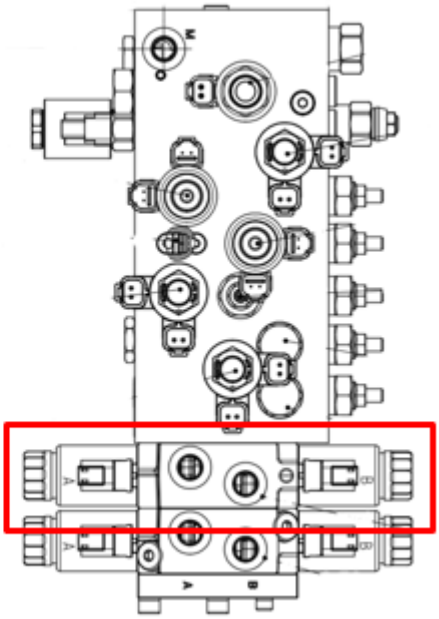

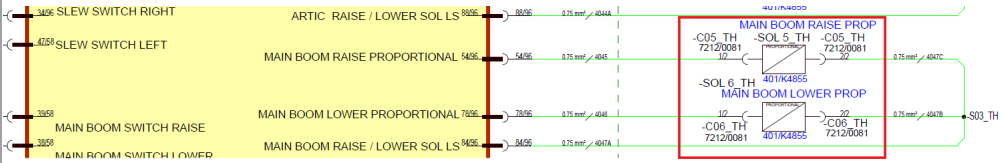

6.1.248 B1336-16

B1336-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1336-16

Error code:	B1336-16
ECU	Base ECU
Description:	MAIN BOOM RAISE OR LOWER PROPORTIONAL Solenoid Valve Low Side Short Circuit to Low
Component:	MAIN BOOM RAISE OR LOWER PROPORTIONAL Solenoid Valve

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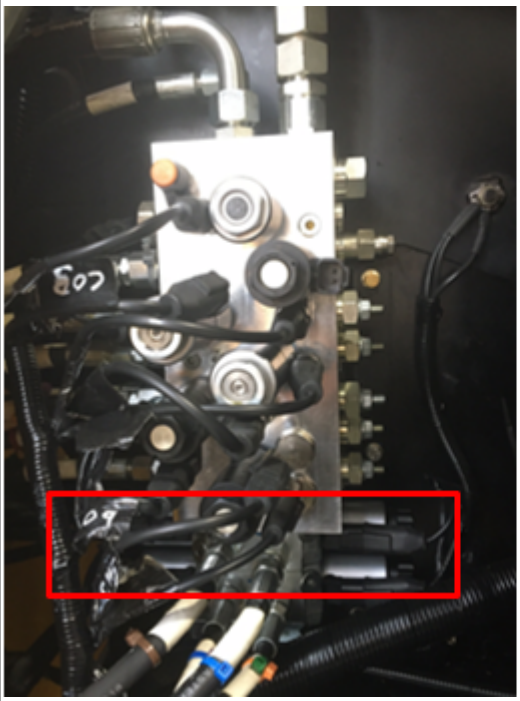
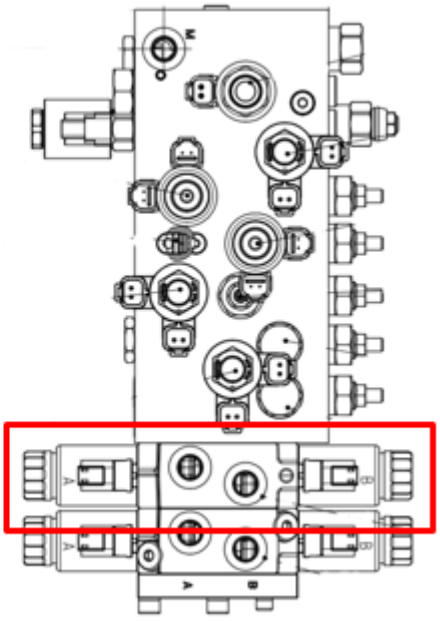
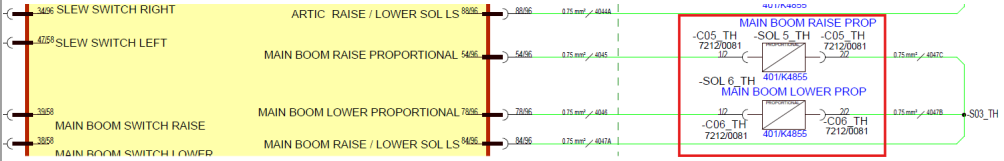
Vehicle reaction:	Disable main-boom raise and lower outputs
Possible Cause:	1. Poor connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Damage solenoid
Service Action:	1. Check resistance of the coil 5-10 ohms 2. Check wiring from coil to ECU wire 4045,4046 & 4047A, 4047B, 4047C for cut, pinch or and damage. 3. Check ECU Pin 54/96, 78/96, 84/96 for bend or back out or any damage. 4. Check solenoid connector C05_TH and C06_TH for loose connection or any damage. 5. Check if valve is mechanically jammed 6. Turn machine ignition on/off to clear code.   

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6.1.249 B1337-13

B1337-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1337 13

Error code:	B1337-13
ECU	Base ECU
Description:	Main Boom - Main Boom Solenoid Valve Low Side Open Circuit.
Component:	Main Boom Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Main Boom output to off
Possible Cause:	1. A poor connection or damaged terminal within the connector(s) 2. A damaged or broken wire within the wiring harness 3. Component is damaged
Service Action:	1. Locate Main Boom Raise/Lower Solenoid Connectors -C05_TH and -C06_TH. Ensure both connectors are fully seated. 2. Check wiring and terminations at both connectors 3. Check continuity from both connectors pin 2/2 back to the Base Bosch ECU terminal 84/96. 4. Check ECU terminal is not backed out or damaged.

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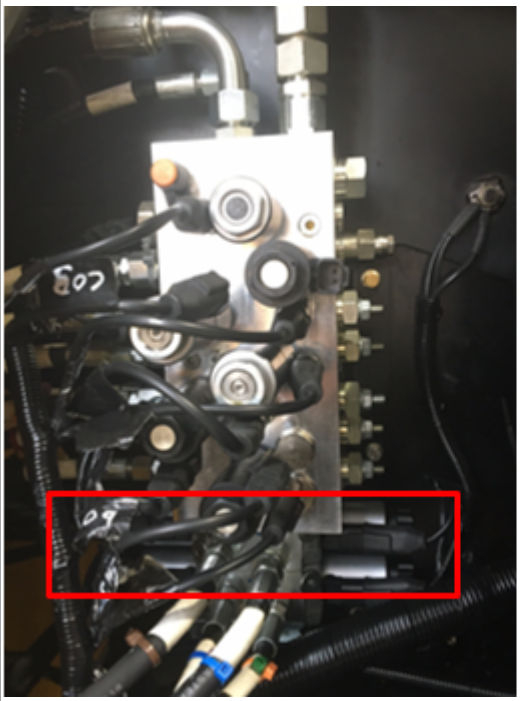

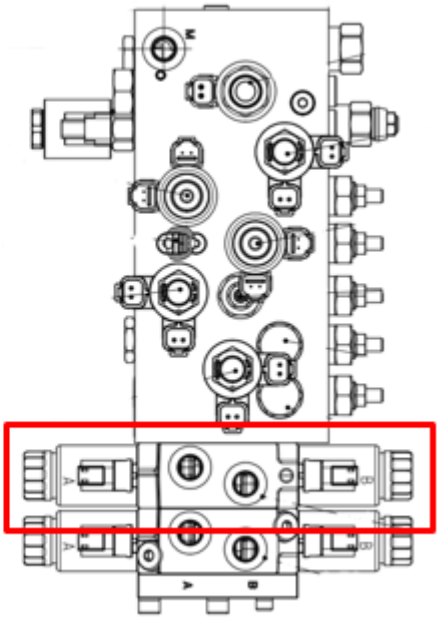

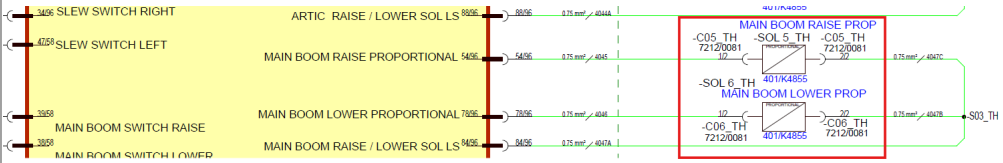

6.1.250 B1338-17

B1338-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1338-17

Error code:	B1338-17
ECU	Base ECU
Description:	Slew - Slew Solenoid Value Low Side Short Circuit to High
Component:	Slew Solenoid

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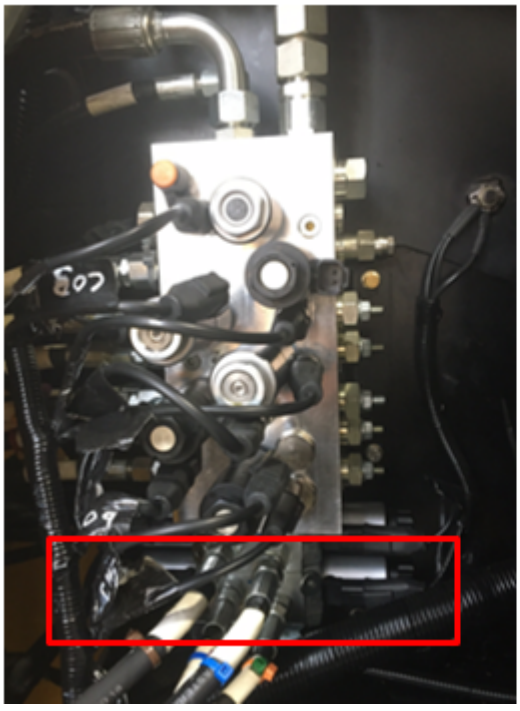
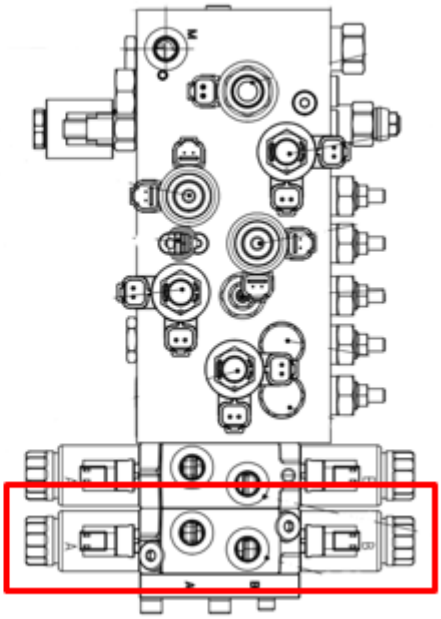
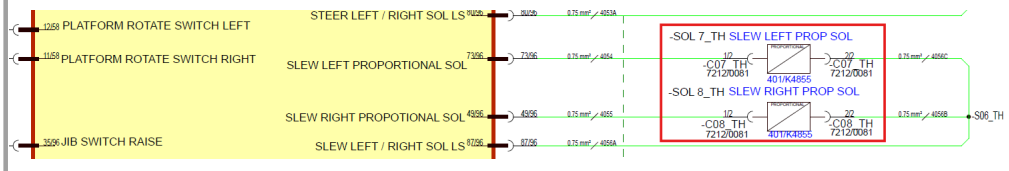
Vehicle reaction:	Detect failure mode with Safout method - Switch Slew output to off Note: Before Ignition ON, POST Fail (stuck in start up logic) and Generic output fault
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Base Bosch ECU terminal 87/96 measuring short circuit to high (12V). Locate and disconnect Slew Right Solenoid Connector -C08_TH and measure voltage at Pin 2/2. If High, Locate and disconnect the Slew Left Connector -C07_TH and measure voltage again at -C08_TH Pin 2/2. If voltage remains high, inspect return path back to ECU terminal 87/96 (Wire #4056A). If voltage drops when either connector is removed, then check the high side to the solenoid connectors back to the ECU (Wires #4054 and #4055). 2. Check the harness for any faults, abrasions or pinching that may cause short circuit. 3. Check all connectors (above) for any water ingress, short circuits, damage or stray wires that mau cause a short. 4. Check solenoid connector for any damage.   

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6.1.251 B1339-16

B1339-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1339 16

Error code:	B1339-16
ECU	Base ECU
Description:	Slew - Slew Solenoid Value Low Side Short Circuit to Low.
Component:	Slew Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Slew output to off
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Base Bosch ECU terminal 87/96 measuring short circuit to GND. Locate and disconnect Slew Right Solenoid Connector -C08_TH and measure resistance at Pin 2/2 to GND. if short circuit, Locate and disconnect the Slew Left Connector -C07_TH and measure resistance again at -C08_TH Pin 2/2. If short remains, inspect return path back to ECU terminal 87/96 (Wire #4056A). If short to GND disappears when either connector is removed, then check the high side to the solenoid connectors back to the ECU (Wires #4054 and #4055). 2. Check the harness for any faults, abrasions or pinching that may cause short circuit. 3. Check all connectors (above) for any water ingress, short circuits, damage or stray wires that may cause a short. 4. Check solenoid connector for any damage.

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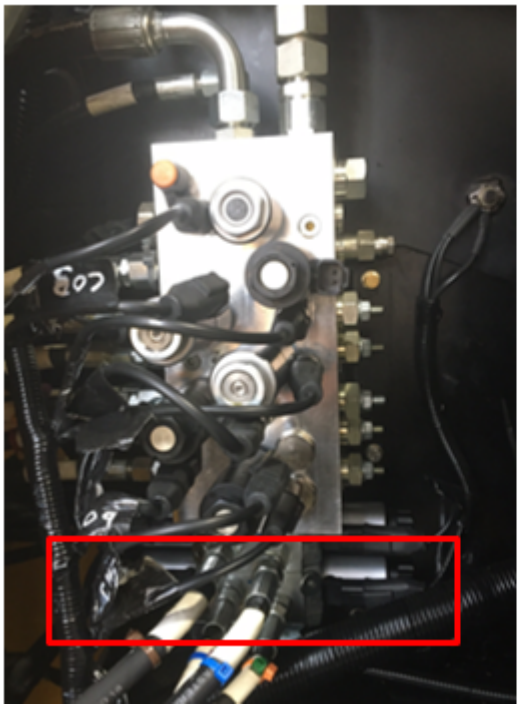

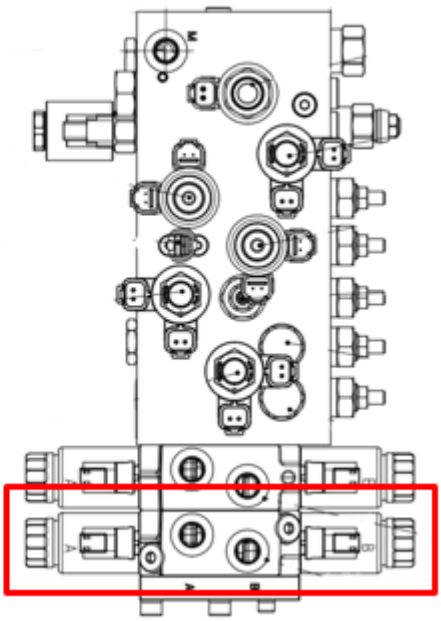

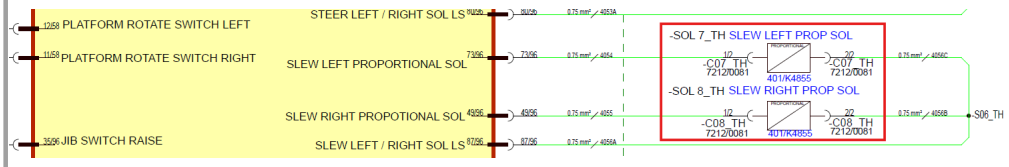

6.1.252 B1340-13

B1340-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1340 13

Error code:	B1340-13
ECU	Base ECU
Description:	Slew - Slew Solenoid Value Low Side Open Circuit.
Component:	Slew Solenoid

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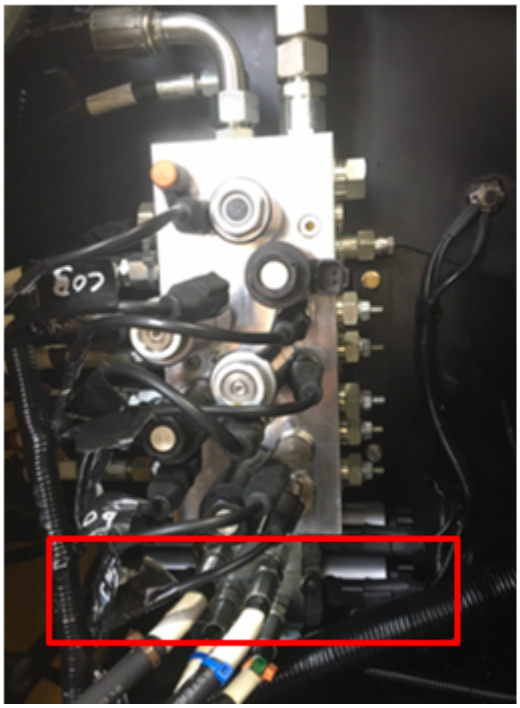
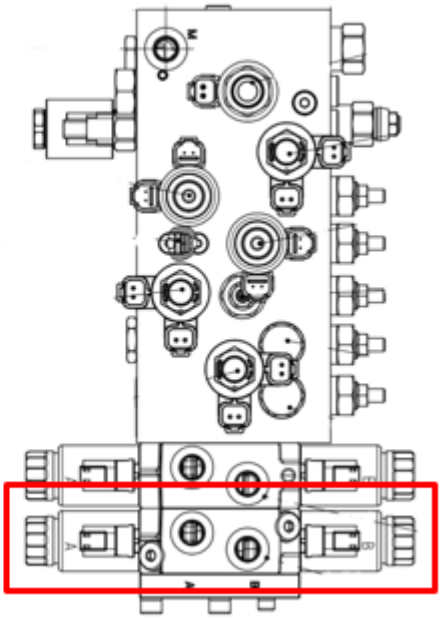
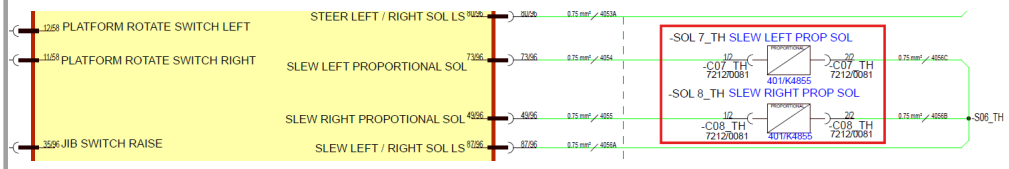
Vehicle reaction:	Detect failure mode with Safout method - Switch Slew output to off
Possible Cause:	1. A poor connection or damaged terminal within the connector(s) 2. A damaged or broken wire within the wiring harness 3. Component is damaged
Service Action:	1. Locate Slew Left/Right Solenoid Connectors -C07_TH and -C08_TH. Ensure both connectors are fully seated. 2. Check wiring and terminations at both connectors 3. Check continuity from both connectors pin 2/2 back to the Base Bosch ECU terminal 87/96. 4. Check ECU terminal is not backed out or damaged.   

6.1.253 B1341-17

B1341-17

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Error code:	B1341-17
ECU	Base ECU
Description:	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve Low Side Short Circuit to High
Component:	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure mode with Safout method - Switch this output to off Before Ignition ON, POST Fail (stuck in startup logic) and Generic output fault
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between ECU and solenoid for voltage greater than 10.5 volts. 2. check for continuity to ground. 3. Check wiring from coil to ECU wire 4048,4049 & 4050A, 4050B, 4050C for cut, pinch or and damage. 4. Check ECU Pin 51/96, 75/96, 85/96 for bend or back out or any damage. 5. Check solenoid connector C04_TH and C03_TH for loose connection or any damage. 6. Check if valve is mechanically jammed 7. Turn machine ignition on/off to clear code.

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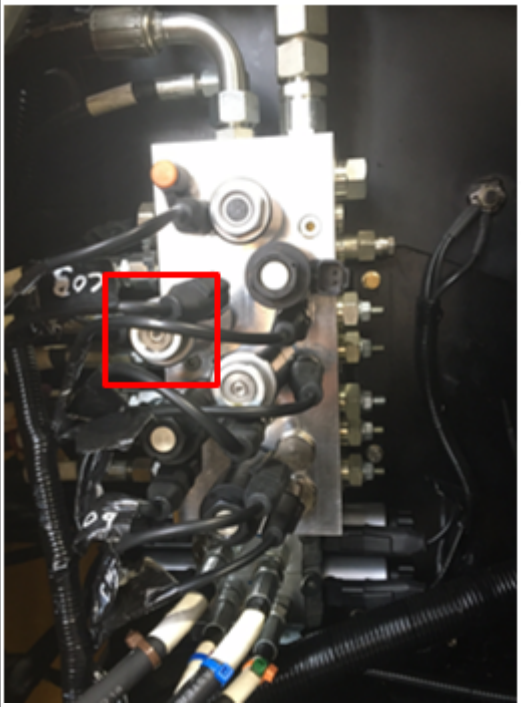

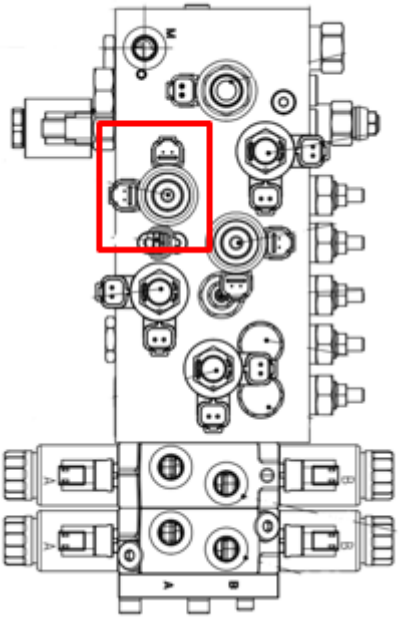

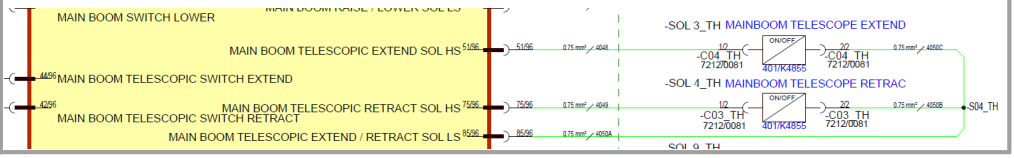

6.1.254 B1342-16

B1342-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1342-16

Error code:	B1342-16
ECU	Base ECU
Description:	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve Low Side Short Circuit to Low
Component:	MAIN BOOM EXTEND OR RETRACT DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure mode with Safout method - Switch this output to off Before Ignition ON, POST Fail (stuck in startup logic) and Generic output fault

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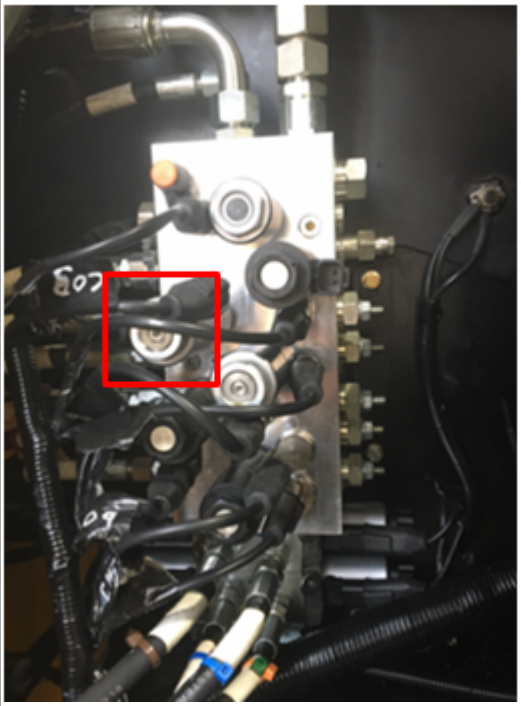
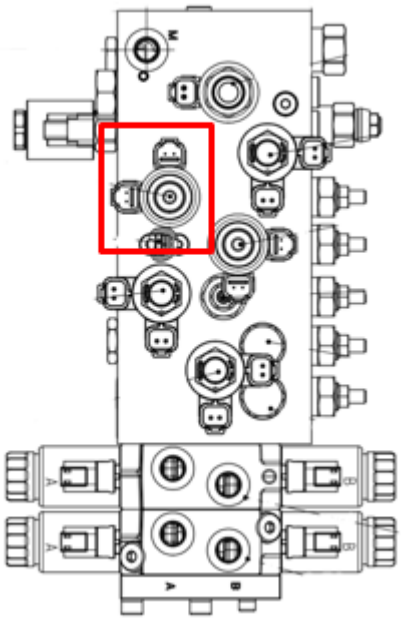
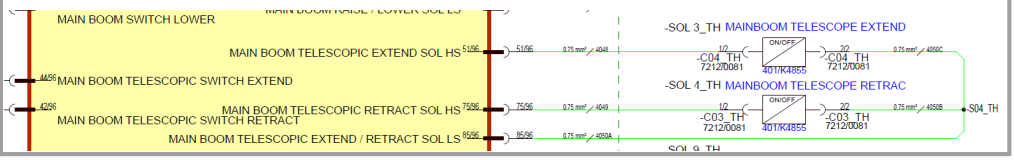
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check wiring between ECU and solenoid for voltage greater than 10.5 volts. 2. check for continuity to ground. 3. Check wiring from coil to ECU wire 4048,4049 & 4050A, 4050B, 4050C for cut, pinch or and damage. 4. Check ECU Pin 51/96, 75/96, 85/96 for bend or back out or any damage. 5. Check solenoid connector C04_TH and C03_TH for loose connection or any damage. 6. Check if valve is mechanically jammed 7. Turn machine ignition on/off to clear code.   

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6.1.255 B1344-17

B1344-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1344-17

Error code:	B1344-17
ECU	Base ECU
Description:	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve Low Side Short Circuit to High
Component:	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure mode with Safout method - Switch Steer output to off
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1.Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4051,4052 & 4053A, 4053B, 4053C for cut, pinch or and damage. 3. Check ECU Pin 74/96, 50/96, 80/96 for bend or back out or any damage. 4. Check solenoid connector C09_TH and C10_TH for loose connection or any damage. 5. Check if valve is mechanically jammed. 6 Turn ignition on off to clear code.

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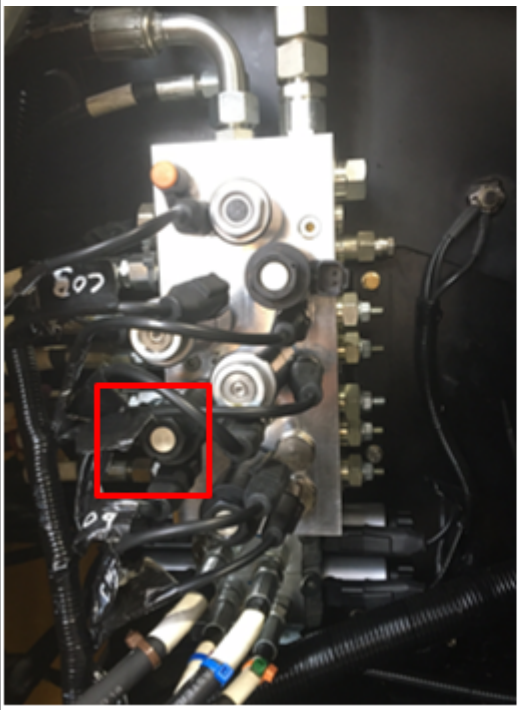

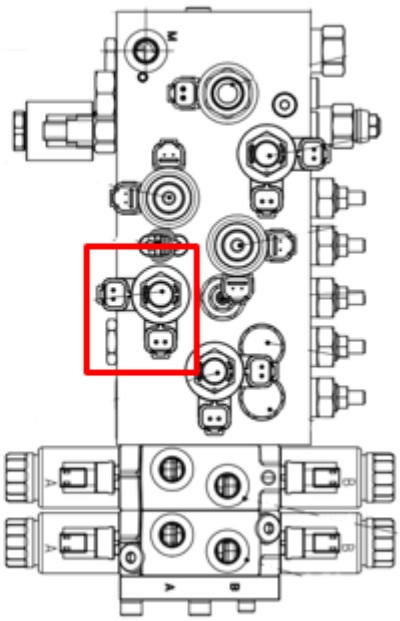

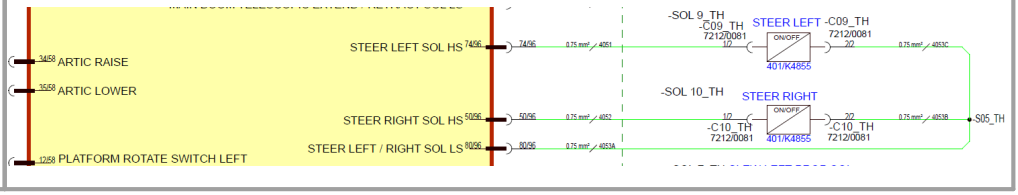

6.1.256 B1345-16

B1345-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1345-16

Error code:	B1345-16
ECU	Base ECU
Description:	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve Low Side Short Circuit to Low
Component:	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve

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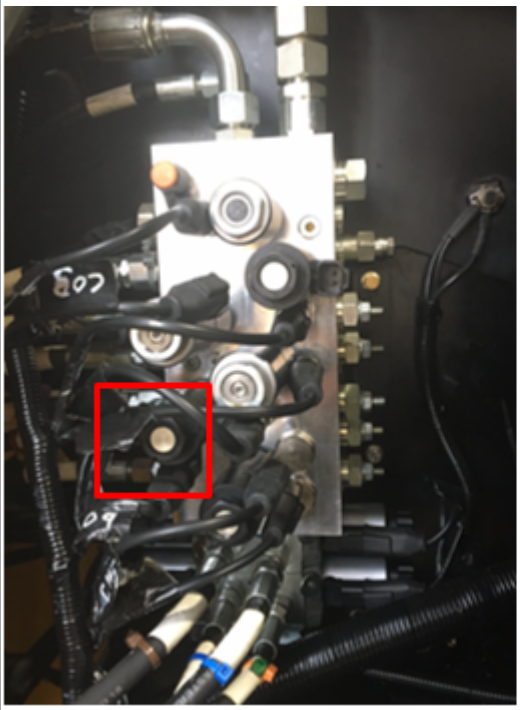
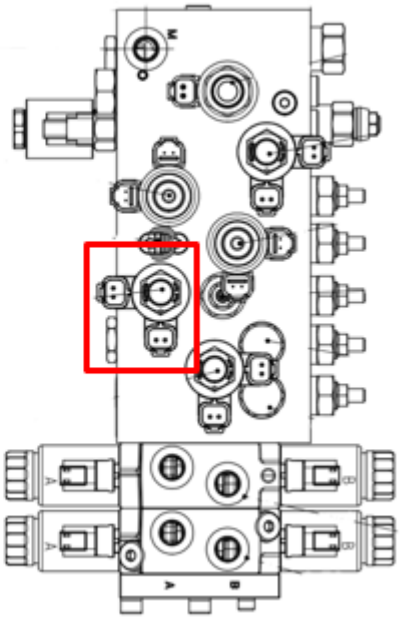
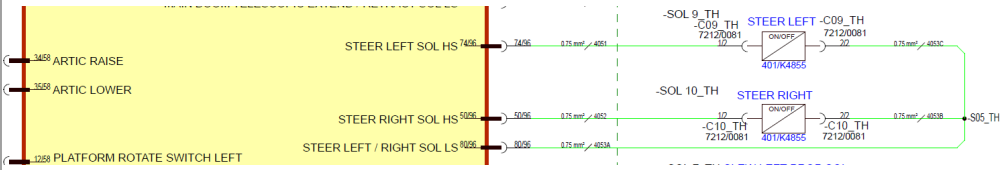
Vehicle reaction:	Detect failure mode with Safout method - Switch Steer output to off
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1.Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4051,4052 & 4053A, 4053B, 4053C for cut, pinch or and damage. 3. Check ECU Pin 74/96, 50/96, 80/96 for bend or back out or any damage. 4. Check solenoid connector C09_TH and C10_TH for loose connection or any damage. 5. Check if valve is mechanically jammed. 6 Turn ignition on off to clear code.   

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6.1.257 B1347-17

B1347-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1347 17

Error code:	B1347-17
ECU	Base ECU
Description:	Oscillation Axle - Oscillating Axle Solenoid Value Low Side Short Circuit to High.
Component:	Oscillating Axle Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Axle Lock output to off; Before Ignition ON, POST Fail (stuck in startup logic) and Generic output fault
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Locate Axle Lock Solenoid connector -C06_CH and disconnect from the valve block. Measure voltage at pin 2/2. If voltage is high, disconnect interconnect -C24_TH / -C24_TH and measure pin 2/12 on both connectors. Trace the fault back to high from the connector measuring high. 2. Check Base Bosch CU connector. Examine Pin 82/96 & 31/96 - check for bent pins, debris, stray wires, water ingress. 3. Check all connectors for water ingress 4. Check harness for damage, especially abrasions, pinching. Check all connectors for damage. Check solenoid valve connector for any water ingress, debris etc.

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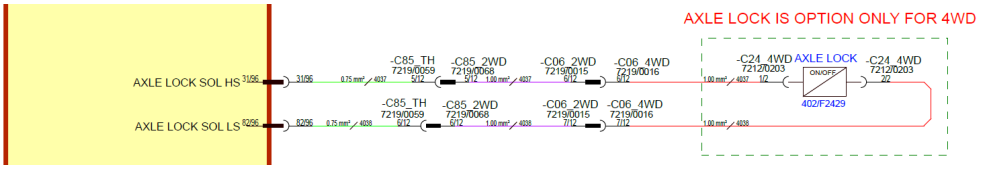

6.1.258 B1348-16

B1348-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1348 16

Error code:	B1348-16
ECU	Base ECU
Description:	Oscillation Axle - Oscillating Axle Solenoid Value Low Side Short Circuit to Low.
Component:	Oscillating Axle Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Axle Lock output to off;

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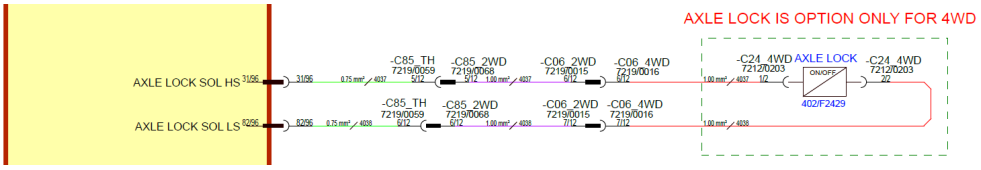
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Locate Axle Lock Solenoid connector -C06_CH and disconnect from the valve block. Measure resistance to GND / Chassis at pin 2/2. If resistance is low, disconnect interconnect -C24_TH / -C24_TH and measure pin 2/12 on both connectors. Trace the fault back to GND Short from the connector measuring Low. 2. Check Base Bosch CU connector. Examine Pin 82/96 & 31/96 - check for bent pins, debris, stray wires, water ingress. 3. Check all connectors for water ingress 4. Check harness for damage, especially abrasions, pinching. Check all connectors for damage. Check solenoid valve connector for any water ingress, debris etc. 

6.1.259 **B1349-13**

B1349-13

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Machine Fault Codes 518 > DTC ERROR CODE 519 > B1349-13

Error code:	B1349-13
ECU	Base ECU
Description:	Oscillating Axle - Oscillating Axle Solenoid Value Fault.
Component:	Oscillating Axle Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Axle Lock output to off;
Possible Cause:	1. A short or open circuit within the wiring harness 2. A short or open circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Locate Axle Lock Solenoid Connector -C06_TH. Disconnect the connector and inspect. Check for backed out pins, water ingress, broken or poorly terminated wires, damaged terminals. Inspect Solenoid valve connector also, checking for any damage, debris, water ingress etc. 2. Perform continuity checks. Check Pin 1/2 to Base Bosch ECU terminal 31/96 (Wire #4037). Check Pin 2/2 to Base Bosch ECU terminal 82/96 (Wire #4038). 3. Check Interconnects -C85_TH / -C85_CH. ensure seated correctly. Check for damage, backed out pins, water ingress, damaged wires etc. 4. Check Base Bosch ECU connector (96-way) for any damage, bent pins, backed out pins, water ingress or any other damage that may cause issue.

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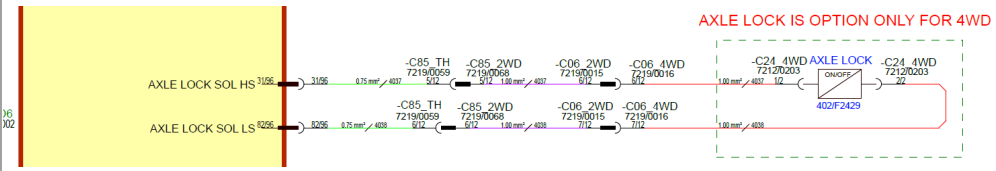

6.1.260 **B1350-17**

B1350-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1350□17

Error code:	B1350-17
ECU	Base ECU
Description:	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve Low Side Short Circuit to High
Component:	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve
Vehicle reaction:	Disable articulated boom outputs
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1. Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4042,4043 & 4044A, 4044B, 4044C for cut, pinch or and damage. 3. Check ECU Pin 53/96, 77/96, 88/96 for bend or back out or any damage. 4. Check solenoid connector C01_TH and C02_TH for loose connection or any damage. 5. Check if valve is mechanically jammed 6.Turn ignition on off to clear code

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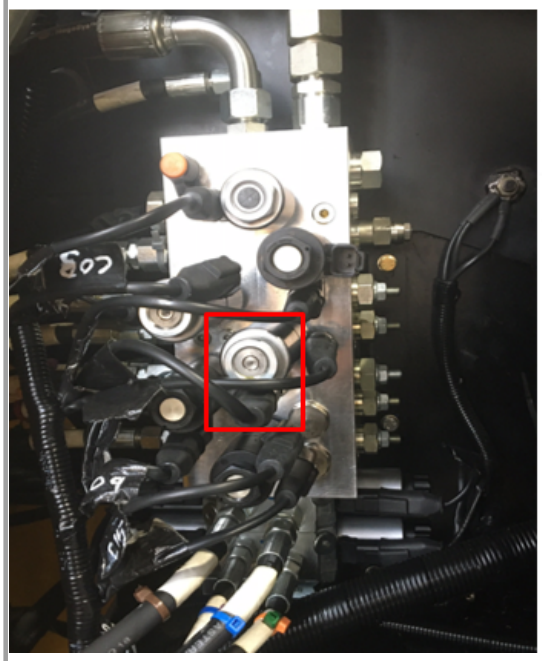

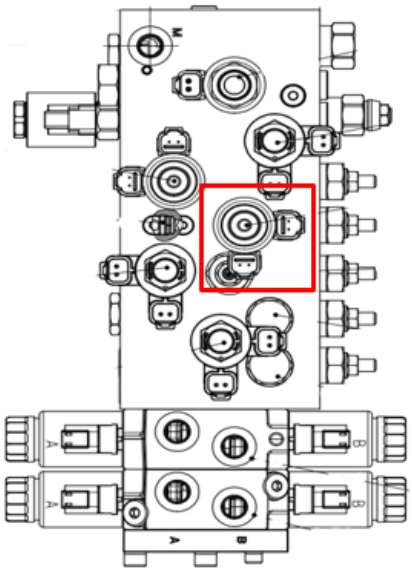

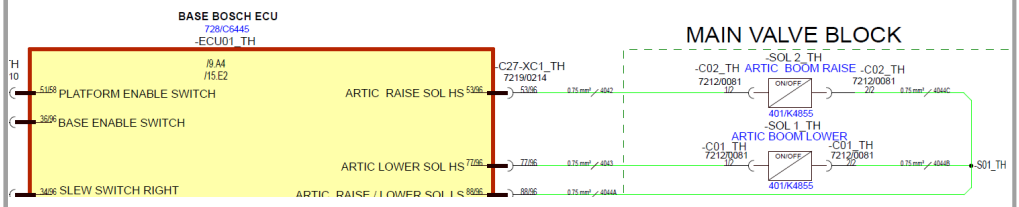

6.1.261 B1351-16

B1351-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1351-16

Error code:	B1351-16
ECU	Base ECU
Description:	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve Low Side Short Circuit to Low
Component:	ARTICULATED BOOM RAISE OR LOWER DIRECTIONAL Solenoid Valve

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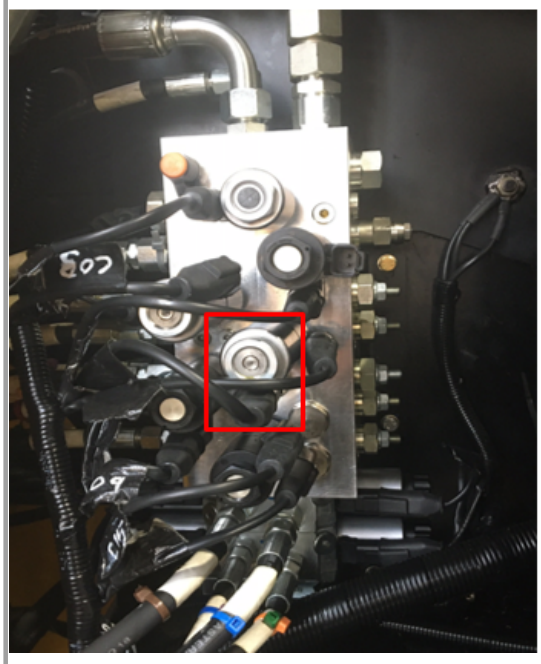
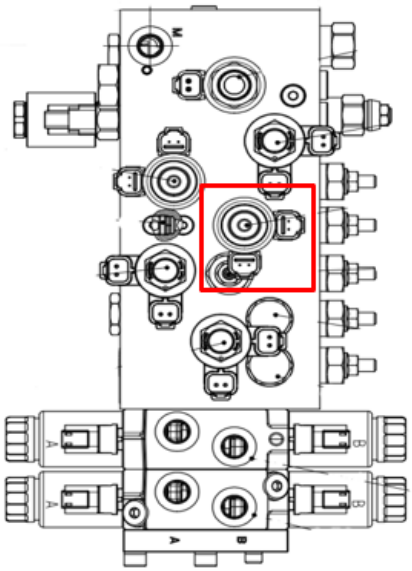
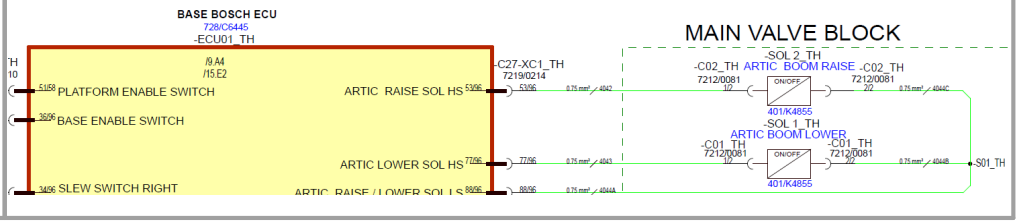
Vehicle reaction:	Disable articulated boom outputs
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1. Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4042,4043 & 4044A, 4044B, 4044C for cut, pinch or and damage. 3. Check ECU Pin 53/96, 77/96, 88/96 for bend or back out or any damage. 4. Check solenoid connector C01_TH and C02_TH for loose connection or any damage. 5. Check if valve is mechanically jammed 6.Turn ignition on off to clear code   

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6.1.262 B1353-16

B1353-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1353-16

Error code:	B1353-16
ECU	Base ECU
Description:	Ignition - Engine Ignition Short Circuit to Low.
Component:	Engine Ignition
Vehicle reaction:	Detect failure mode. Switch output to off
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Locate wire #4201 from Base Bosch ECU pin 89/96. Check wire through to interconnect -C41_TH / -C41_EH pin 1/12. Test for short to GND. Disconnect Interconnects and test for short to GND again on both connectors Pin 1/12 2. Locate wire #4021 from interconnect -C41_EH Pin 1/12 and check wire through to Engine ECU Connector -C05_EH Pin 44/62. Check for shorts to GND 3. Check Base Bosch ECU, Interconnects and Engine ECU Connectors for water ingress, damage, bent pins, debris or stray wires. 4. Check harness between Base Bosch ECU to Interconnects and Engine ECU Connectors for any damage

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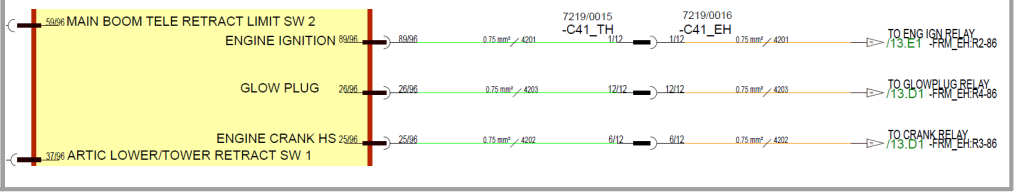

6.1.263 B1354-13

B1354-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1354 13

Error code:	B1354-13
ECU	Base ECU
Description:	Ignition - Engine Ignition Open Circuit or Short Circuit to High.
Component:	Engine Ignition
Vehicle reaction:	Detect failure mode. Switch output to off
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors

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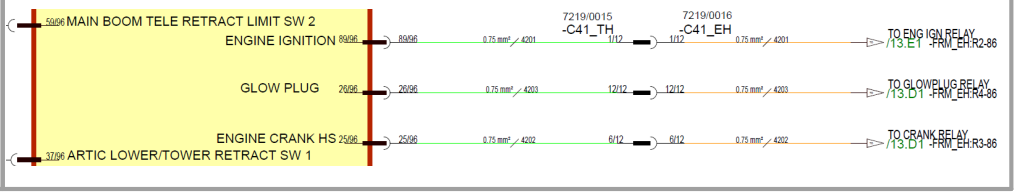
	3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Locate wire #4201 from Base Bosch ECU pin 89/96. Check wire through to interconnect -C41_TH / -C41_EH pin 1/12. Test for short to high. Disconnect Interconnects and test for short to high again on both connectors Pin 1/12 2. Locate wire #4201 from interconnect -C41_EH Pin 1/12 and check wire through to Engine ECU Connector -C05_EH Pin 44/62. Check for shorts to High. 3. Check Base Bosch ECU, Interconnects and Engine ECU Connectors for water ingress, damage, bent pins, debris or stray wires. 4. Check harness between Base Bosch ECU to Interconnects and Engine ECU Connectors for any damage. 

6.1.264 B1355-16

Error code:	**B1355-16**
ECU	Platform ECU
Description:	Hydraulic Generator - Solenoid - Circuit short to low
Component:	Hydraulic Generator Valve

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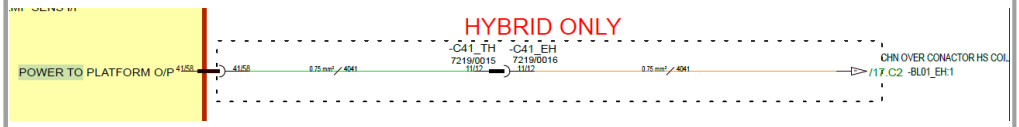
Vehicle reaction:	Detect failure mode. Switch o/p to off
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1) Locate wire #4041 from Base Bosch ECU to Hydraulic Generator Solenoid connector -C241_TH. Disconnect -C41_TH and measure resistance to GND on Pin 1/2. If value low then check wire back to Base Bosch ECU. 2) Check Bosch ECU pin 41/58 for any damage, bent pins, debris, water ingress. 3) Check Wire #4041 for abrasions, pinching or any other reason to create short to GND / Chassis 

6.1.265 B1356-13

Error code:	**B1356-13**
ECU	Platform ECU
Description:	Hydraulic Generator - Solenoid high side - Circuit open or short to high (12v)
Component:	Hydraulic Generator Valve
Vehicle reaction:	Detect failure mode. Switch o/p to off
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1) Locate wire #4041 from Base Bosch ECU to Hydraulic Generator Solenoid connector -C41_TH. Disconnect -C41_TH and measure voltage at Pin 1/2. If value high (>10.7V) then check wire back to Base Bosch ECU. 2) Check Bosch ECU pin 41/58 for any damage, bent pins, debris, water ingress.

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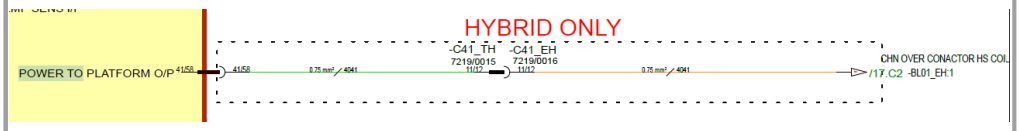
	3) Check Wire #4041 for abrasions, pinching or any other reason to create short to GND / Chassis. 

6.1.266 **B1357-16**

B1357-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1357 16

Error code:	**B1357-16**
ECU	Base ECU
Description:	Engine Start (Crank) High Side Signal (Base ECU to Engine ECU) Short Circuit to Low
Component:	Engine Crank
Vehicle reaction:	Detect failure mode. Switch output to off
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Locate wire #4202 from Base Bosch ECU pin 25/96 to interconnect -C41_TH. Disconnect -C41_TH from mating half -C41_EH. Measure voltage at pin 2/12 on both interconnect connectors. If one is stuck high, then trace to fault. 2. Check continuity from interconnect pins 2/12 back to Base Bosch ECU pin 25/96 and to engine ECU on connector -C05_EH pin 39/62. 3. Check all connectors mentioned above for damage, backed out pins, short circuits and water ingress 4. Check wire #4202 back through the harness, checking for breaks, abrasions, pinching or any other damage.

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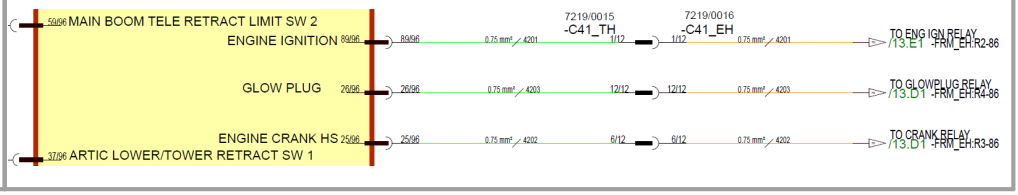

6.1.267 B1358-13

B1358-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1358 13

Error code:	B1358-13
ECU	Base ECU
Description:	Engine Start (Crank) High Side Signal (Base ECU to Engine ECU) Short Circuit to High or Open Circuit
Component:	Engine Crank
Vehicle reaction:	Detect failure mode. Switch output to off
Possible Cause:	1. A short or open circuit within the harness. 2. A short or open circuit within the harness connectors.

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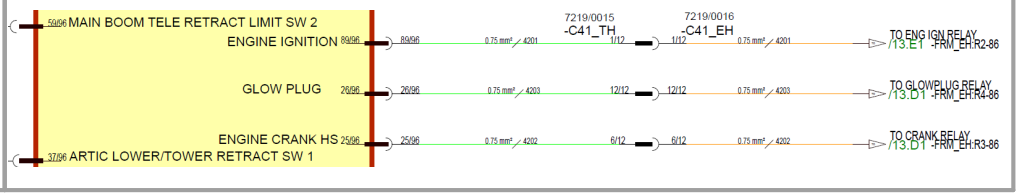
	3. Water damage/ingress within the harness connectors. 4. Damaged component(s).
Service Action:	1. Check continuity between Base Bosch ECU Pin 25/96 and Engine ECU Pin 39/92 (Wire #408). Check Wire #4202 is not short circuit to high. 2. Check ECU Connectors and inter connector -C41. Ensure no bent pins or stray wires causing short circuit. Ensure wires are correctly terminated. 3. Check ECU Connectors and inter connector -C41 for any water damage or water ingress. 4. Check connectors and harness between Base ECU pin 25/96 and Engine ECU pin 39/92 for any damage. 

6.1.268 B1364-13

Error code:	**B1364-13**
ECU	Base ECU
Description:	OVER CURRENT
Component:	Battery Charger
Vehicle reaction:	charge is temporary interrupted

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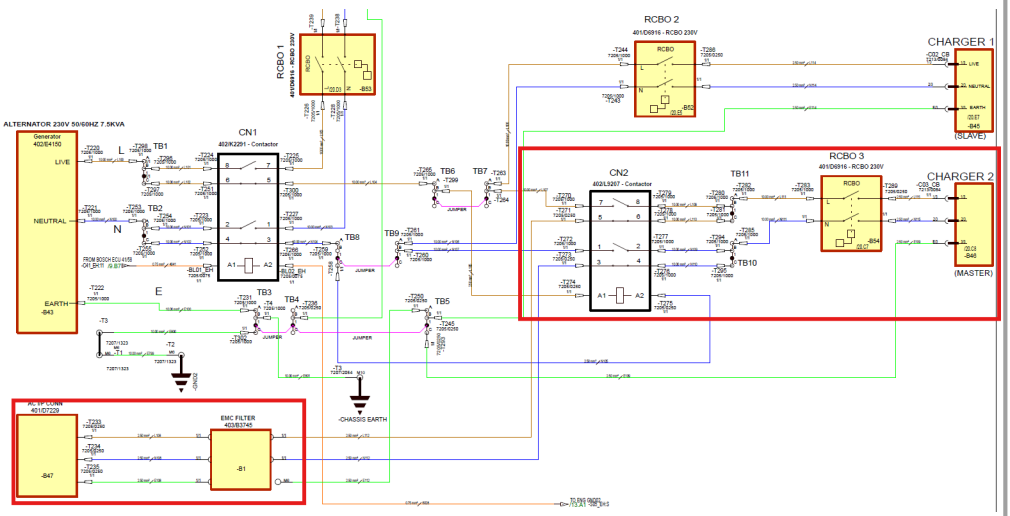
Possible Cause:	Abnormal input current.
Service Action:	1. Check the voltage going into the charger. Either from the generator or the wall. 2. Check AC input cable and plug for any cut or damage, Replace plug if damage or defective. 3. Check EMC Filter, Replace if defective. 4. Check RCBO 3, Replace if Defective. 5. If Still error code persist, Replace Charger. 

6.1.269 B1365-17

B1365-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1365-17

Error code:	**B1365-17**
ECU	Platform ECU
Description:	Overload - Load Sensor 1 Out of Range (High).

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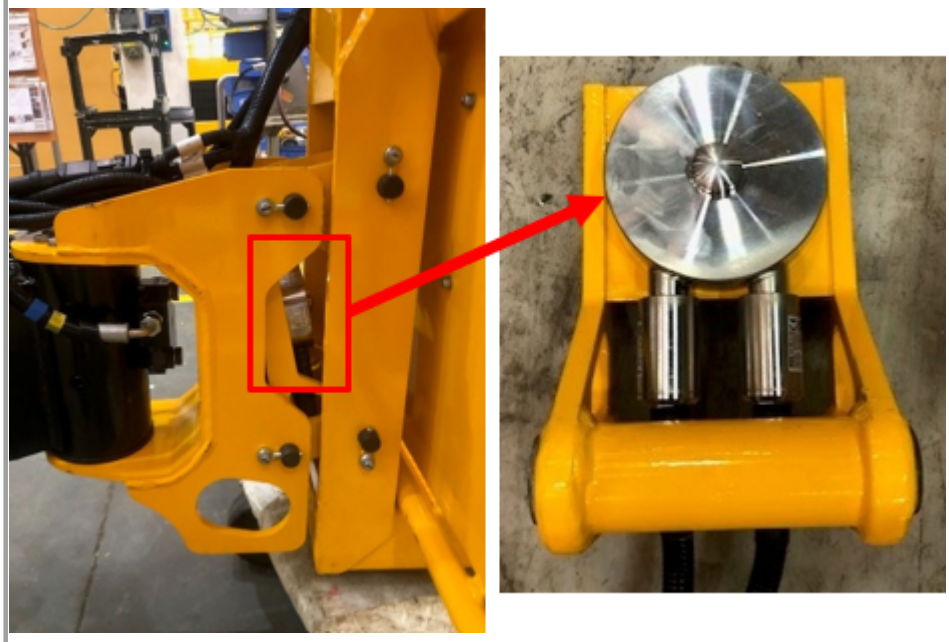
Component:	Overload Sensor 1
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED
Possible Cause:	1) Load sensor is not calibrated 2) Load sensor is faulty 3) Short Circuit to High 4) Water ingress
Service Action:	1) Perform weight sensor calibration from display screen. 2) Check condition of weight sensor and connectors, replace if faulty 3) Check condition of wiring from Weight Sensor. Check Interconnects -C05_PH and -C06_PH. Check connections to DIN Rail terminal -S11-6 (Wires #6070 and #6072). Check inputs to Platform Bosch ECU on pins 68/96 through to 71/96. Check platform connector -C22_PH terminals W/21 and X/21. Check for bent or backed out terminals or debris within connectors. Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damamge on wiring harness. Perform continuity checks if neccesary and check resistance to +12V and +10V on -C22_PH terminals W/21 and X/21, checking for shorts to High. 4) Check all connectors for water ingress. 

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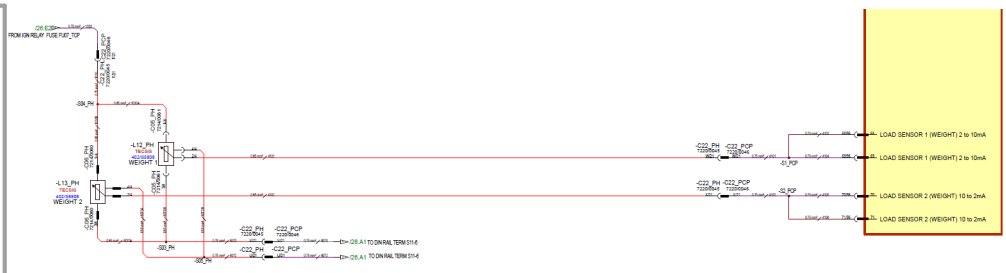

Load Cell Troubleshooting Flow Chart

6.1.270 **B1366-16**

B1366-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1366-16

Error code:	B1366-16
ECU	Platform ECU
Description:	Overload - Load Sensor 1 Out of Range (Low) or Open Circuit.
Component:	Overload Sensor 1

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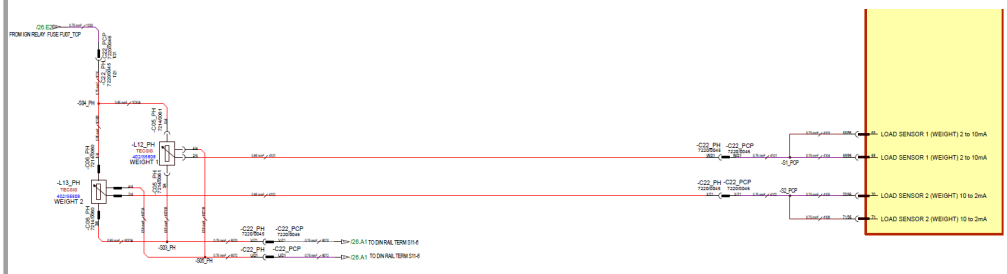
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED NOTE:- In case of Open Circuit, the above machine reaction is applicable only when fault is detected on both pins(68,69) of load sensor 1
Possible Cause:	1) Load sensor is not calibrated 2) Connectors not fully inserted. 3) Load sensor is faulty 4) Short Circuit to Low 5) Water ingress
Service Action:	1) Perform weight sensor calibration from display screen. 2) Check condition of weight sensor and connectors -C05_PH and -C06_PH, Ensure connectors are fully inserted. Check platform connector -C22_PH. Check for backed out terminals. 3) Replace weight sensor if faulty 3) Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damamge on wiring harness. Perform continuity checks if neccesary and check resistance to GND on -C22_PH terminals W/21 and X/21, checking for shorts to Low. 4) Check all connectors for water ingress.  **Load Cell Troubleshooting Flow Chart**

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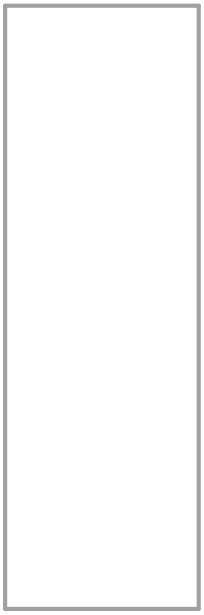

6.1.271 **B1367-17**

B1367-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1367-17

Error code:	B1367-17
ECU	Platform ECU
Description:	Overload - Load Sensor 2 Out of Range (High).
Component:	Overload Sensor 2
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED
Possible Cause:	1) Load sensor is not calibrated 2) Load sensor is faulty 3) Short Circuit to High 4) Water ingress
Service Action:	1) Perform weight sensor calibration from display screen. 2) Check condition of weight sensor and connectors, replace if faulty

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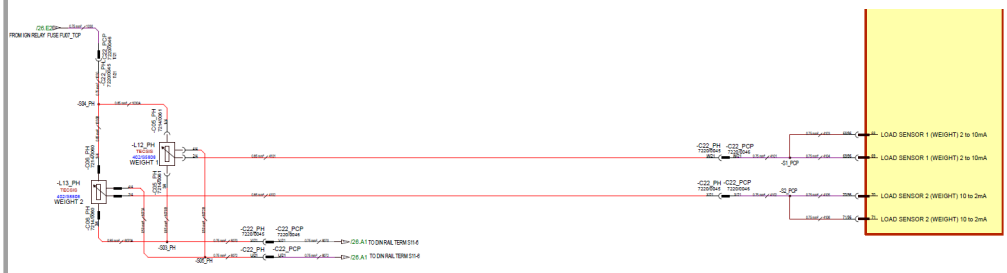
3) Check condition of wiring from Weight Sensor. Check Interconnects -C05_PH and -C06_PH. Check connections to DIN Rail terminal -S11-6 (Wires #6070 and #6072). Check inputs to Platform Bosch ECU on pins 70/96 through to 71/96. Check platform connector -C22_PH terminals W/21 and X/21. Check for bent or backed out terminals or debris within connectors. Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damamge on wiring harness. Perform continuity checks if neccesary and check resistance to +12V and +10V on -C22_PH terminals W/21 and X/21, checking for shorts to High.
4) Check all connectors for water ingress.



Load Cell Troubleshooting Flow Chart

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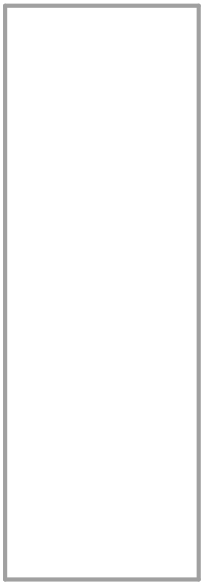

6.1.272 B1368-16

B1368-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1368-16

Error code:	B1368-16
ECU	Platform ECU
Description:	Overload - Load Sensor 2 Out of Range (Low) OR Open Circuit.
Component:	Overload Sensor 2
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED NOTE:- In case of Open Circuit, the above machine reaction is applicable only when fault is detected on both pins(70,71) of load sensor 2
Possible Cause:	1) Load sensor is not calibrated 2) Connectors not fully inserted. 3) Load sensor is faulty 4) Short Circuit to Low 5) Water ingress

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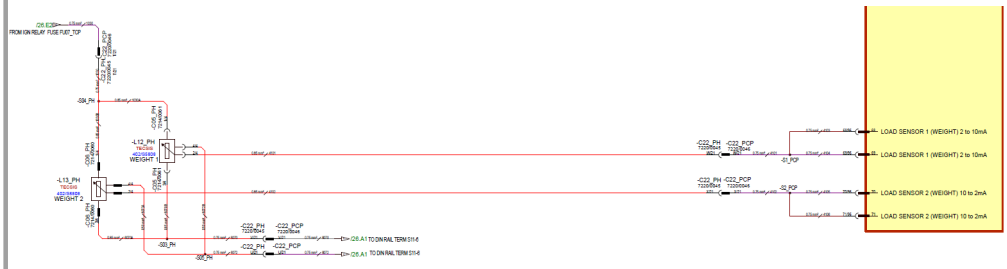
Service Action:	1) Perform weight sensor calibration from display screen. 2) Check condition of weight sensor and connectors -C05_PH and -C06_PH, Ensure connectors are fully inserted. Check platform connector -C22_PH. Check for backed out terminals. 3) Replace weight sensor if faulty 3) Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damamge on wiring harness. Perform continuity checks if neccesary and check resistance to GND on -C22_PH terminals W/21 and X/21, checking for shorts to Low. 4) Check all connectors for water ingress.  **Load Cell Troubleshooting Flow Chart**

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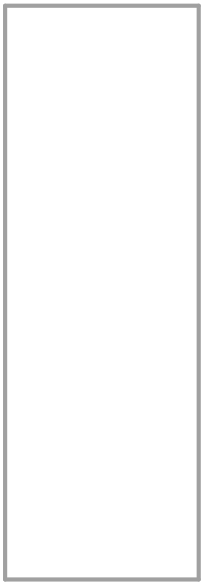

6.1.273 B1370-13

Error code:	B1370-13
ECU	Base ECU
Description:	LOGIC FAILURE #2
Component:	Battery Charger
Vehicle reaction:	Charge is interrupted
Possible Cause:	1. No power going into the charger 2. Poor or loose connection 3. Break in wiring 4. Water in connector 5. Broken pin or connector
Service Action:	1. Check the voltage going into the charger. Either from the generator or the wall. 2. Check AC input cable and plug for any cut or damage, Replace plug if damage or defective. 3. Check CAN H, CAN L and CAN Negative Cable for any cut or damage. 4. Check EMC Filter, Replace if defective.

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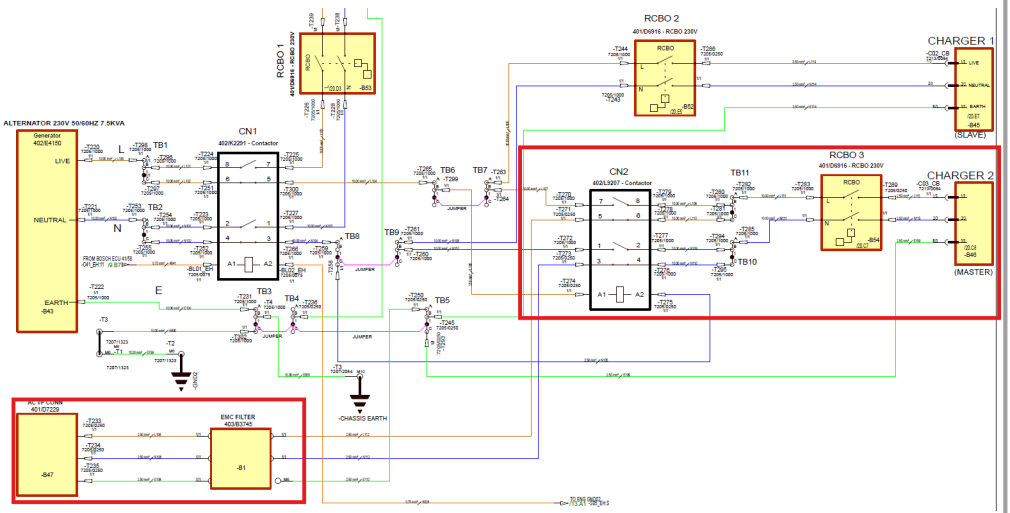
5. Check RCBO 3, Replace if Defective.

1. Complete the full procedure for testing the CAN Network 257 the component information page.



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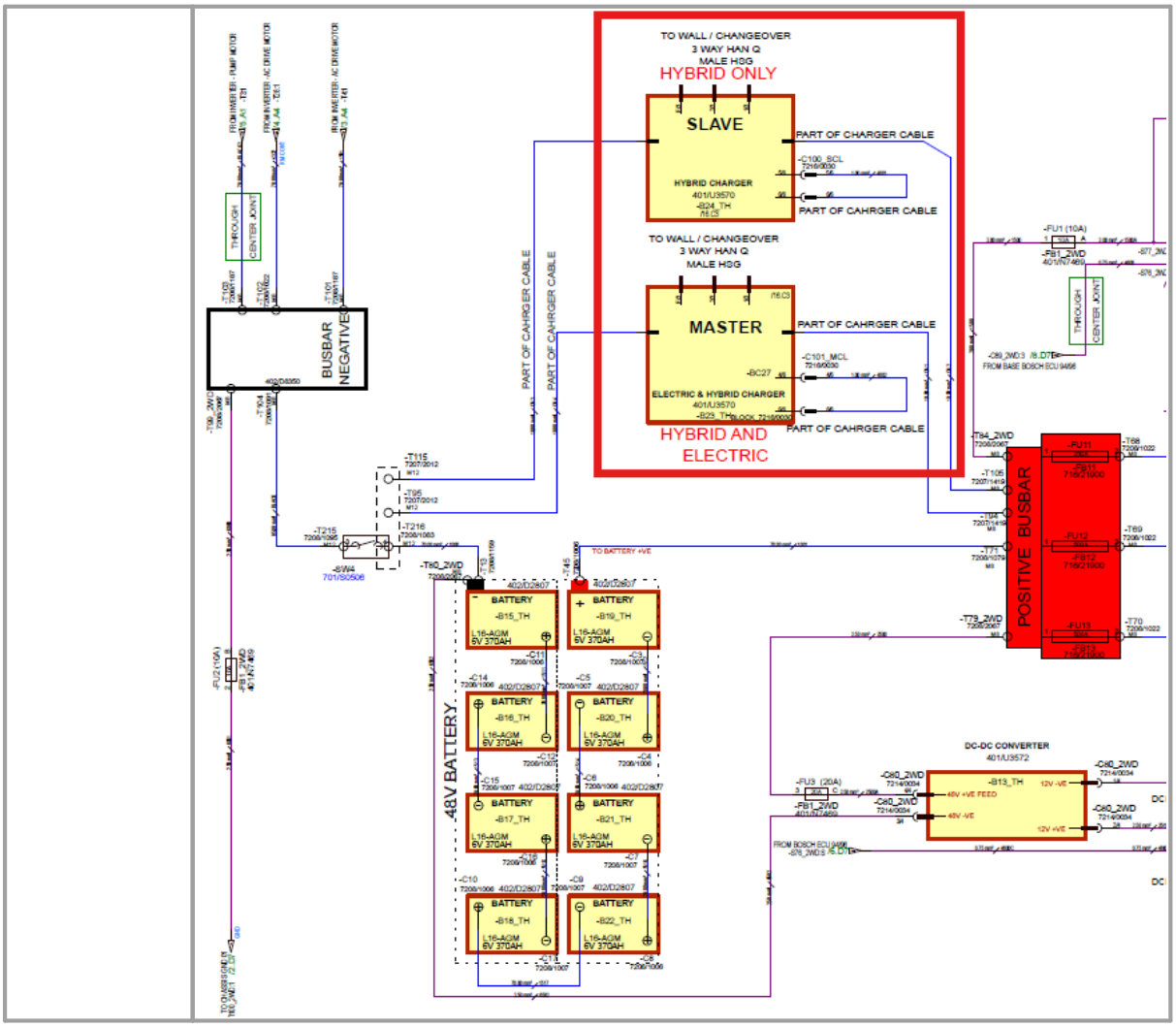

6.1.274 B1374-13

Error code:	B1374-13
ECU	Base ECU
Description:	WRONG INPUT MAINS
Component:	Battery Charger
Vehicle reaction:	Charge is interrupted
Possible Cause:	1. No power going into the charger 2. Poor or loose connection 3. Break in wiring

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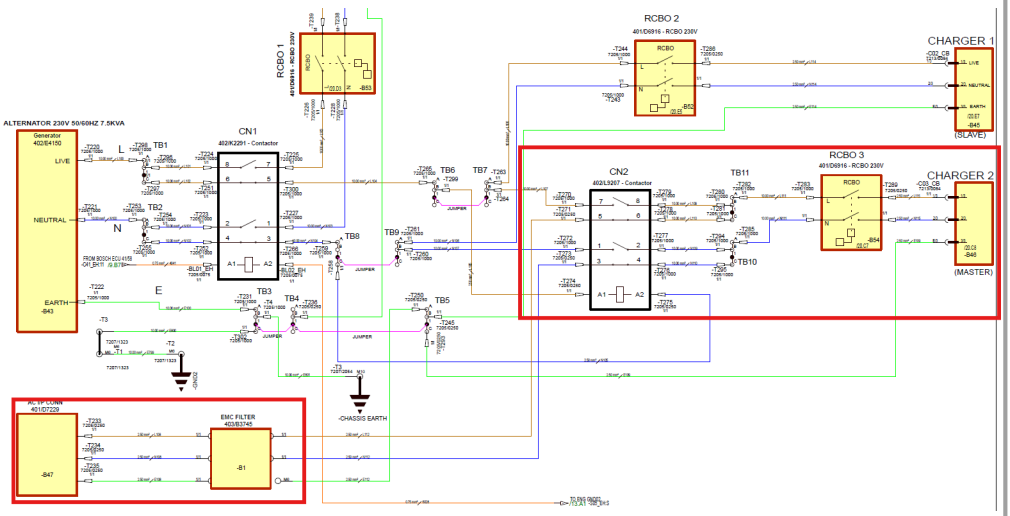
	4. Water in connector 5. Broken pin or connector
Service Action:	1. Check the voltage going into the charger. Either from the generator or the wall. 2. Check AC input cable and plug for any cut or damage, Replace plug if damage or defective. 3. Check EMC Filter, Replace if defective. 4. Check RCBO 3, Replace if Defective. 

6.1.275 B1377-13

Error code:	**B1377-13**
ECU	Base ECU
Description:	NO MAINS
Component:	Battery Charger
Vehicle reaction:	Charge is interrupted
Possible Cause:	1. No power going into the charger 2. Poor or loose connection 3. Break in wiring

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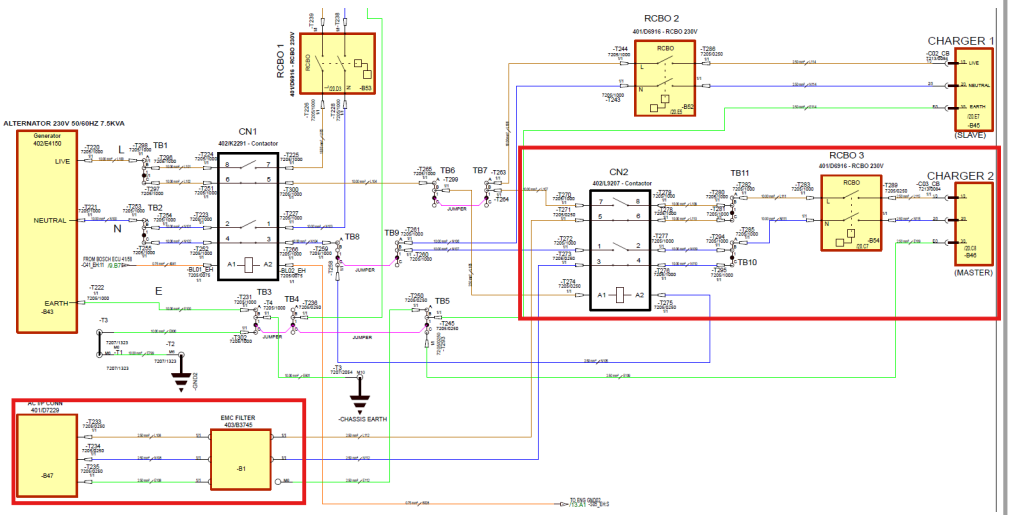
	4. Water in connector 5. Broken pin or connector
Service Action:	1. Check the voltage going into the charger. Either from the generator or the wall. 2. Check AC input cable and plug for any cut or damage, Replace plug if damage or defective. 3. Check CAN H, CAN L and CAN Negative Cable for any cut or damage. 4. Check EMC Filter, Replace if defective. 5. Check RCBO 3, Replace if Defective. 

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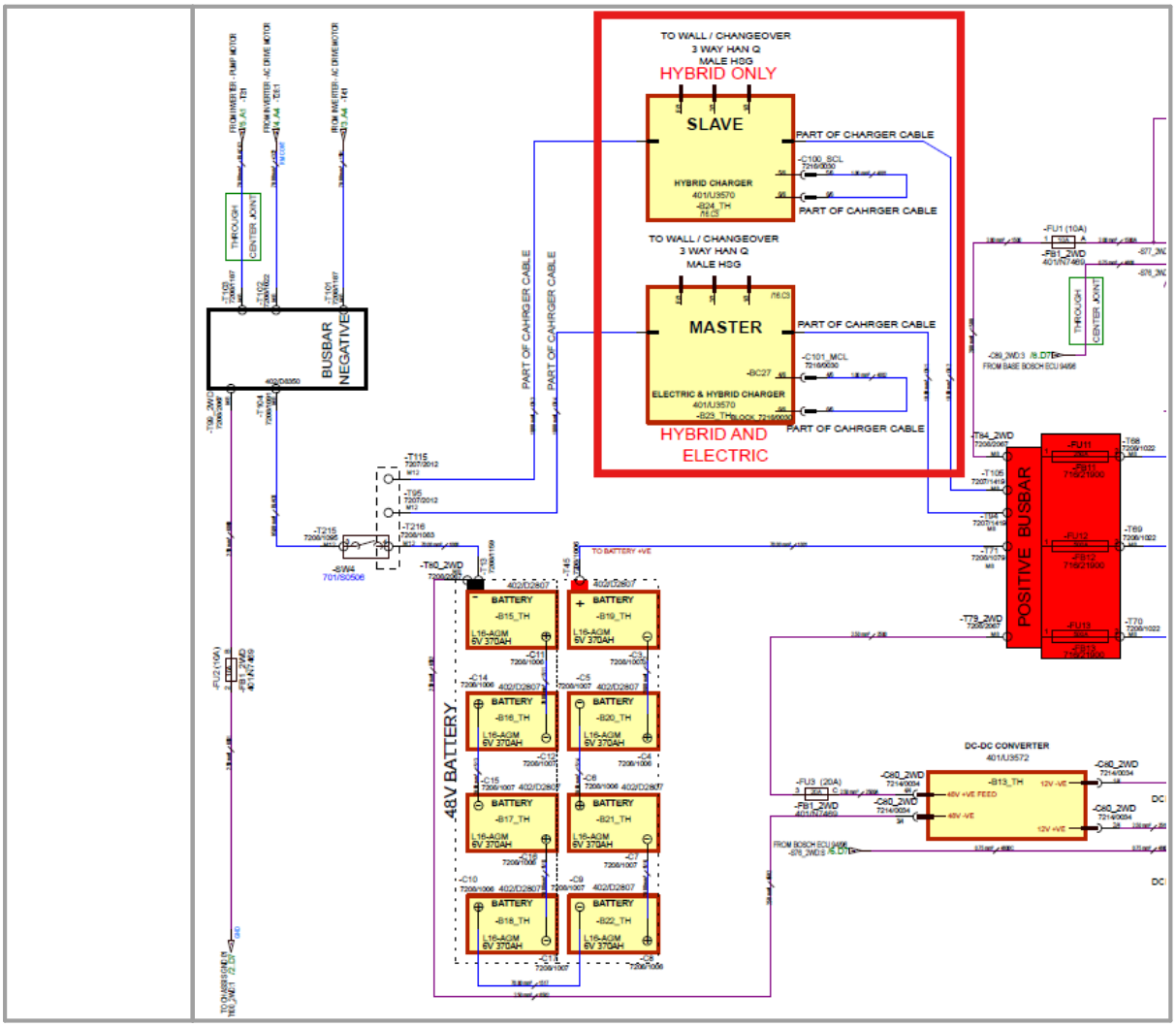

6.1.276 B1389-13

B1389-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1389-13

Error code:	B1377-13
ECU	Base ECU
Description :	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve High Side & Low Side Open Circuit

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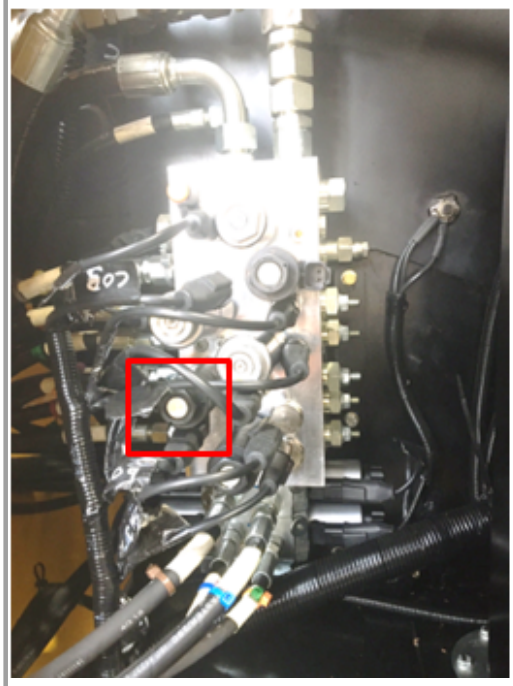
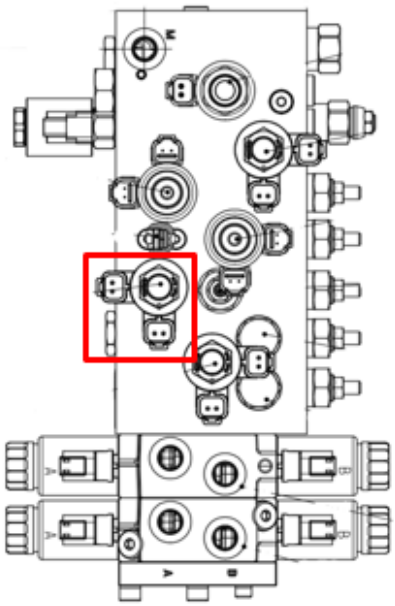
Component :	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure mode with Safout method - Switch Steer output to off
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1.Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4051,4052 & 4053A, 4053B, 4053C for cut, pinch or and damage. 3. Check ECU Pin 74/96, 50/96, 80/96 for bend or back out or any damage. 4. Check solenoid connector C09_TH and C10_TH for loose connection or any damage. 5. Check if valve is mechanically jammed. 6 Turn ignition on off to clear code.  

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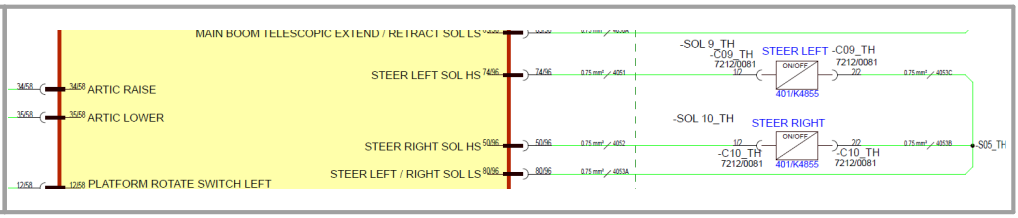
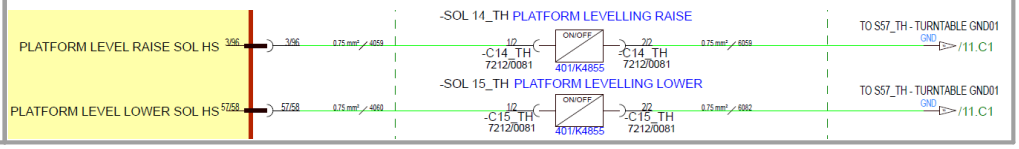


6.1.277 B1393-17

Error code:	B1393-17
ECU	Base ECU
Description:	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL High Side Short Circuit to high (12v)
Component:	Platform Level Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Platform Level o/ps to off "Note: Before Ignition ON, POST Fail (stuck in startup logic) and Generic o/p fault"
Possible Cause:	1) A short circuit within the wiring harness 2) A short circuit within the harness connectors 3) Water damage/ingress within the harness connectors 4) Damaged component
Service Action:	1) Disconnect the Platform Level Raise/Lower connectors -C14_TH and -C15_TH from the solenoid connector. Measure voltage at pin 1 on either connector. If value is high (>10V) then there is likely a short circuit to +12V on the high side input. Check the wiring for damage, abrasions and pinching. 2) Check the wiring harness for damage, abrasions or pinching. 3) Check all connectors including the Bosch ECU connectors for water ingress. 4) Check all connectors including the Bosch ECU connectors for any bent pins, debris or stray wires that may be causing a short circuit.



6.1.278 B1394-16

Error code:	B1394-16
ECU	Base ECU

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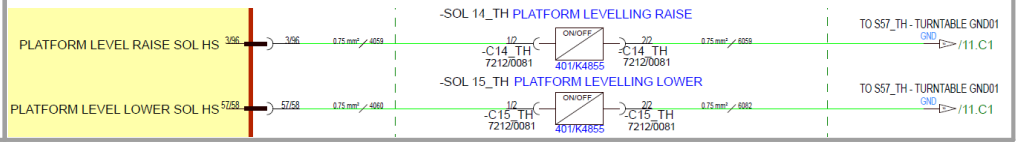
Description:	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL High Side Short Circuit to Low
Component:	Platform Level Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Platform Level o/ps to off "Note: Before Ignition ON, POST Fail (stuck in startup logic) and Generic o/p fault"
Possible Cause:	1) A short circuit within the wiring harness 2) A short circuit to the chassis 3) A short circuit within the harness connectors 4) Water damage/ingress within the harness connectors 5) Damaged component
Service Action:	1) Disconnect the Platform Level Raise/Lower connectors -C14_TH and -C15_TH from the solenoid connector. Measure voltage at pin 1 on either connector. If value is 0V then there is likely a short circuit to GND on the high side input. Check the wiring for damage, abrasions and pinching. 2) Check the wiring harness for damage, abrasions or pinching. 3) Check all connectors including the Bosch ECU connectors for water ingress. 4) Check all connectors including the Bosch ECU connectors for any bent pins, debris or stray wires that may be causing a short circuit. 

6.1.279 B1395-13

Error code:	**B1395-13**
ECU	Base ECU
Description:	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL High Side Short Open Circuit
Component:	Platform Level Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Platform Level o/ps to off "Note: Before Ignition ON, POST Fail (stuck in startup logic) and Generic o/p fault"
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged

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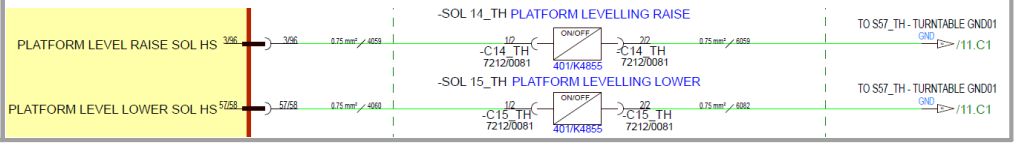
Service Action:	1. Check continuity from Base Bosch ECU pin 3/96 to Platform Level Raise solenoid connector -C14_TH pin 1. Check continuity from Base Bosch ECU pin 57/58 to Platform Level Lower solenoid connector -C15_TH pin 1. Check continuity from Base Bosch ECU pin 3/96 to Platform Level Raise solenoid connector -C14_TH pin 2 and Platform Level Lower solenoid connector -C15_TH pin 2. All values should read 0 ohms. Check for open circuit wires or connections if values read high. 2. Check wiring between solenoids and Bosch ECU. Check for breaks, abrasions and pinching. 3. Check resistance of solenoid coil, resistance value should be approximately 5 - 15 ohms. If value is significantly higher than this, then consider faulty solenoid coil. 

6.1.280 **B1396-17**

Error code:	**B1396-17**
ECU	Base ECU
Description:	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL Low Side Short Circuit to High(12v)
Component:	Platform Level Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Platform Level o/ps to off "Note: Before Ignition ON, POST Fail (stuck in startup logic) and Generic o/p fault"
Possible Cause:	1) A short circuit within the wiring harness 2) A short circuit within the harness connectors 3) Water damage/ingress within the harness connectors 4) Damaged component
Service Action:	1) Disconnect the Platform Level Raise/Lower connectors -C14_TH and -C15_TH from the solenoid connector. Measure voltage at pin 2 on either connector. If value is high (>10V) then there is likely a short circuit to +12V in the ground path. Check the wiring for damage, abrasions and pinching. If measured value is 0V, check pin 1 on both connectors to locate the short to high. 2) Check the wiring harness for damage, abrasions or pinching. 3) Check all connectors including the Bosch ECU connectors for water ingress. 4) Check all connectors including the Bosch ECU connectors for any bent pins, debris or stray wires that may be causing a short circuit.

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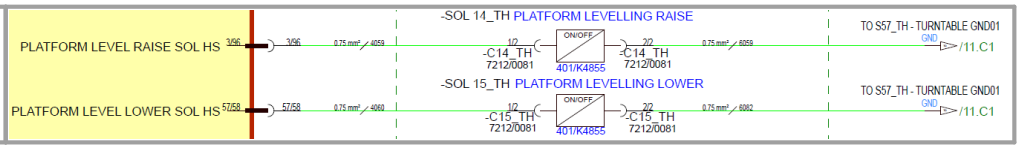
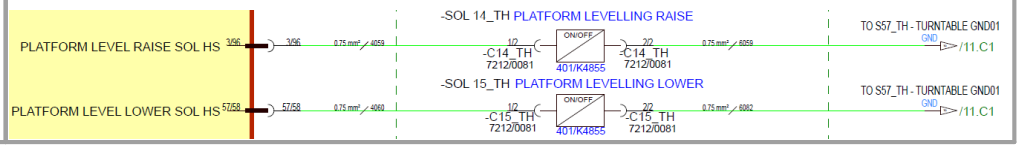


6.1.281 B1397-16

Error code:	B1397-16
ECU	Base ECU
Description:	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL Low Side Short Circuit to Low
Component:	Platform Level Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Platform Level o/ps to off "Note: Before Ignition ON, POST Fail (stuck in startup logic) and Generic o/p fault"
Possible Cause:	1) A short circuit within the wiring harness 2) A short circuit to the chassis 3) A short circuit within the harness connectors 4) Water damage/ingress within the harness connectors 5) Damaged component
Service Action:	1) Disconnect the Platform Level Raise/Lower connectors -C14_TH and -C15_TH from the solenoid connector. Measure voltage at pin 2 on either connector. If value is 0V then there is likely a short circuit to GND in the return path. Check the wiring for damage, abrasions and pinching. If measured value is 0V, check pin 1 on both connectors to locate the short to GND. 2) Check the wiring harness for damage, abrasions or pinching. 3) Check all connectors including the Bosch ECU connectors for water ingress. 4) Check all connectors including the Bosch ECU connectors for any bent pins, debris or stray wires that may be causing a short circuit. 

6.1.282 B1398-13

Error code:	B1398-13
ECU	Base ECU

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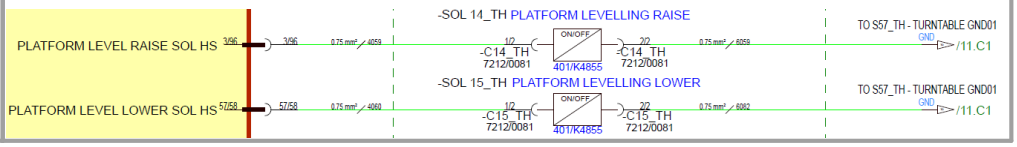
Description:	PLATFORM LEVEL RAISE\LOWER PROPORTIONAL Low Side Open Circuit
Component:	Platform Level Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Platform Level o/ps to off "Note: Before Ignition ON, POST Fail (stuck in startup logic) and Generic o/p fault"
Possible Cause:	1) A short circuit within the wiring harness 2) A short circuit to the chassis 3) A short circuit within the harness connectors 4) Water damage/ingress within the harness connectors 5) Damaged component
Service Action:	1) Disconnect the Platform Level Raise/Lower connectors -C14_TH and -C15_TH from the solenoid connector. Test continuity from Pin 2 of either connector to Pin 79/96 of the Bosch ECU. Repeat for other solenoid connector. Test continuity from pin of -C14_TH to pin 2 of -C15_TH. These results will determine location of fault. If both connectors have continuity from pin 2 - pin 2, then the fault lies on wire #6059 or the Bosch ECU pin 79/96. If wire #6059 is not faulty, test the inputs (continuity) to both solenoids from the Bosch ECU. 2) Check the wiring harness for damage, abrasions or pinching. 3) Check all connectors including the Bosch ECU connectors for any bent or backed-out pins, debris or cut wires that may be causing an open circuit. 

6.1.283 B1401-13

B1401-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1401-13

Error code:	**B1378-13**
ECU	Base ECU
Description:	JIB RAISE\LOWER PLATFORM RIGHT\LEFT PROPORTIONAL High Side Open Circuit

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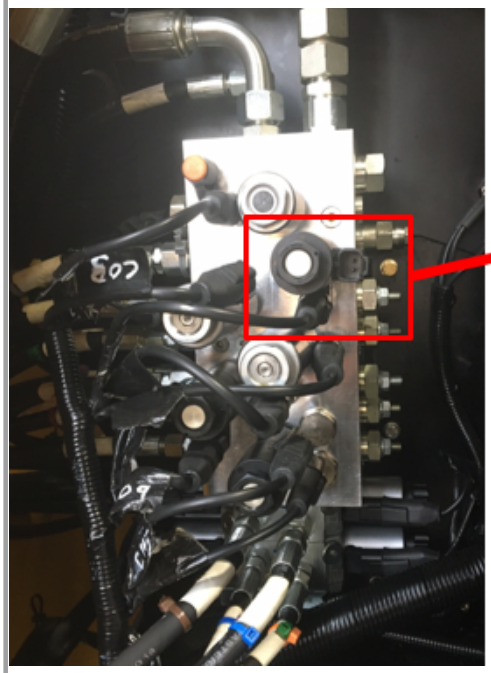
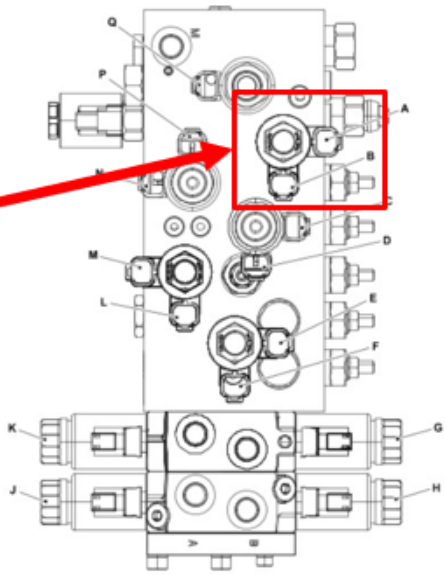
Component :	JIB\PLATFORM PROPORTIONAL Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Jib\Platform Rotate o/ps to off Note:During operation , refer to JIB RAISE\LOWER PLATFORM RIGHT\LEFT PROPORTIONAL Low Side Open Circuit Fault code
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged
Service Action:	1) Locate Jib/Platform Rotate Solenoid connectors -C16_TH and -C13_TH. Disconnect connectors from valve block. Check both connectors for backed out pins, short circuits, water ingress or short circuits. 2) Check wires #4061 and #4062 (Pin 1/2 on both connectors) for shorts to high, open circuits or any other damage. Check continuity back to Base Bosch ECU pins 53/96 and 77/96. 3) Check Bosch Connector (96 way) for any damage, backed out pins, short circuits, water ingress, debris etc. 4) Check Jib/Rotate return wires from pin 2/2 on both connectors for short or open circuits. 5) Check valve block connector for water ingress, damage, bent pins etc. 6) Check Wiring harness for any abrasions, pinching or any other damage between Base Bosch ECU and Main Valve Block.  

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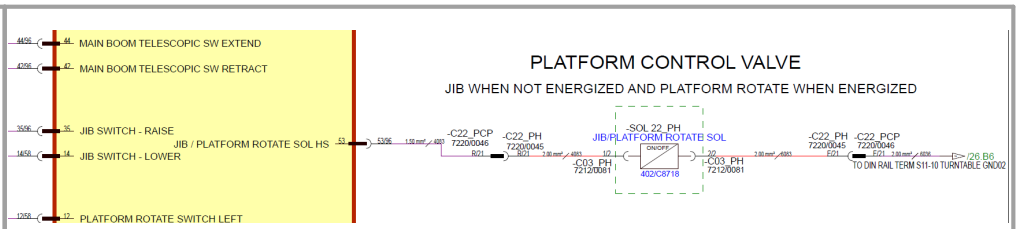

6.1.284 **B1404-13**

B1404-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1404-13

Error code:	B1379-13
ECU	Base ECU
Description:	JIB\PLATFORM PROPORTIONAL Low Side Open Circuit
Component:	JIB\PLATFORM PROPORTIONAL Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Jib\Platform Rotate o/ps to off
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged
Service Action:	1) Locate Jib/Platform Rotate Solenoid connectors -C16_TH and -C13_TH. Disconnect connectors from valve block. Check both connectors for backed out pins, short circuits, water ingress or short circuits. 2) Check wires #4061 and #4062 (Pin 1/2 on both connectors) for shorts to high, open circuits or any other damage. Check continuity back to Base Bosch ECU pins 53/96 and 77/96. 3) Check Bosch Connector (96 way) for any damage, backed out pins, short circuits, water ingress, debris etc. 4) Check Jib/Rotate return wires from pin 2/2 on both connectors for short or open circuits. 5) Check valve block connector for water ingress, damage, bent pins etc. 6) Check Wiring harness for any abrasions, pinching or any other damage between Base Bosch ECU and Main Valve Block.

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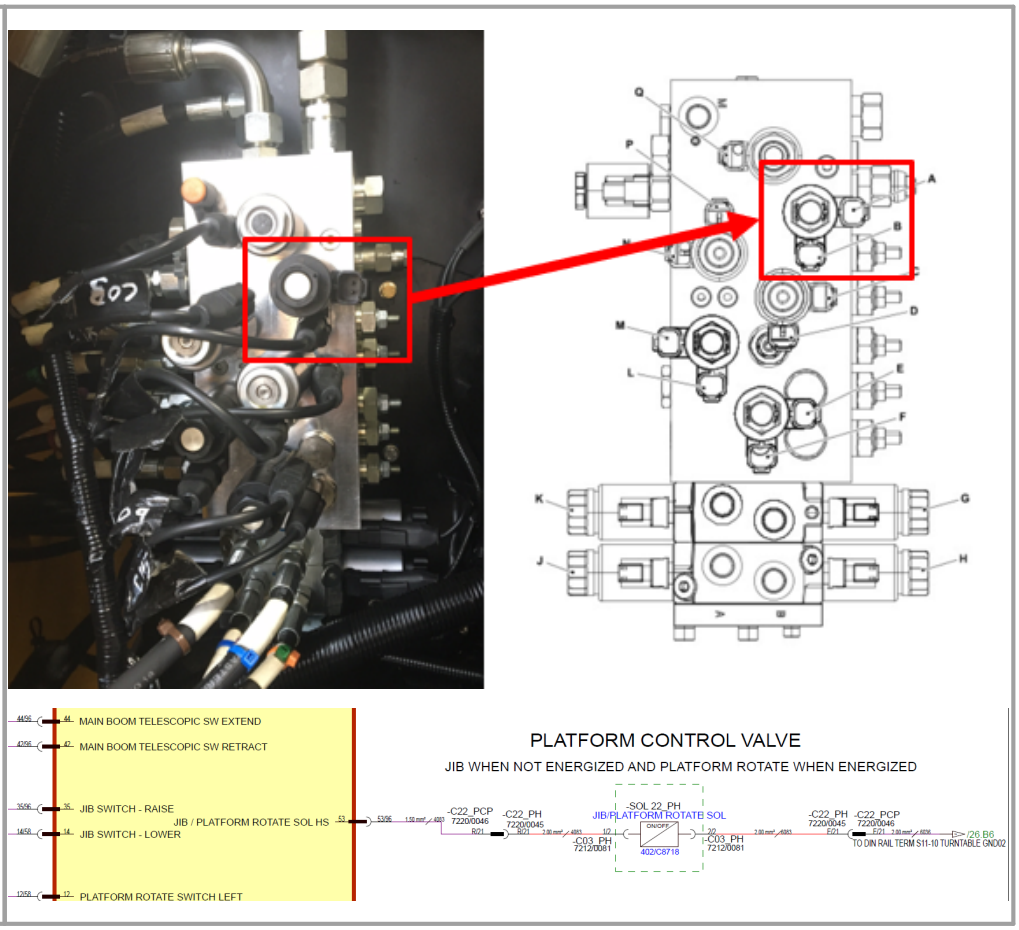

6.1.285 B1414-17

B1414-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1414-17

Error code:	**B1414-17**
ECU	Base ECU
Description:	ELECTRIC PUMP OUTPUT Short Circuit to High OR Open Circuit
Component:	Electric Pump
Vehicle reaction:	Detect failure mode for Short Circuit to High and Base will report the Fault

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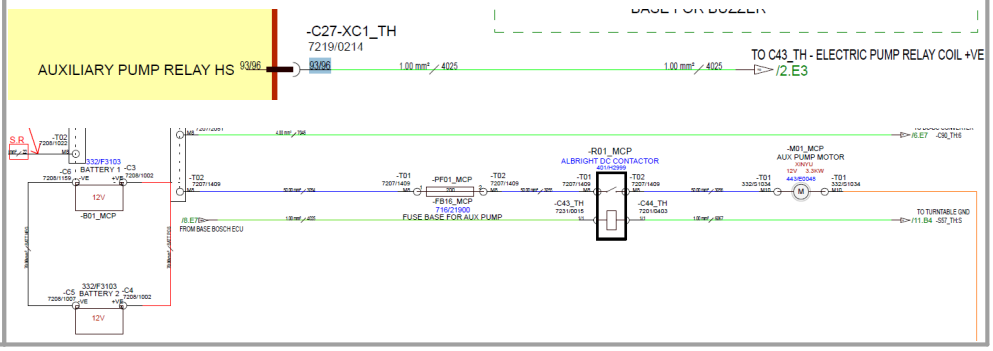
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged
Service Action:	1) Locate wire #4025 between Base Bosch ECU pin 93/96 and Albright DC Contactor connector -C43_TH. Check for short to high or open circuit. Check termination at the Contactor. 2) Check the condition of the Base Bosch ECU 96-way connector, checking for backed out pins, bent pins, water ingress or any other form of damage. 3) Check other side of the contactor solenoid at connector -C44_TH (Wire #6067). Check there is good connection to GND at -T04-GND02_TH. 4) Check condition of Albright DC Contactor, replace if neccesary. 5) Check the wire harness for any abrasions, pinching or any other form of damage. 

6.1.286 B1415-16

B1415-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1415-16

Error code:	**B1415-16**
ECU	Base ECU
Description:	ELECTRIC PUMP OUTPUT Short Circuit to Low
Component:	Electric Pump
Vehicle reaction:	Detect failure mode for Short Circuit to High and Base will report the Fault

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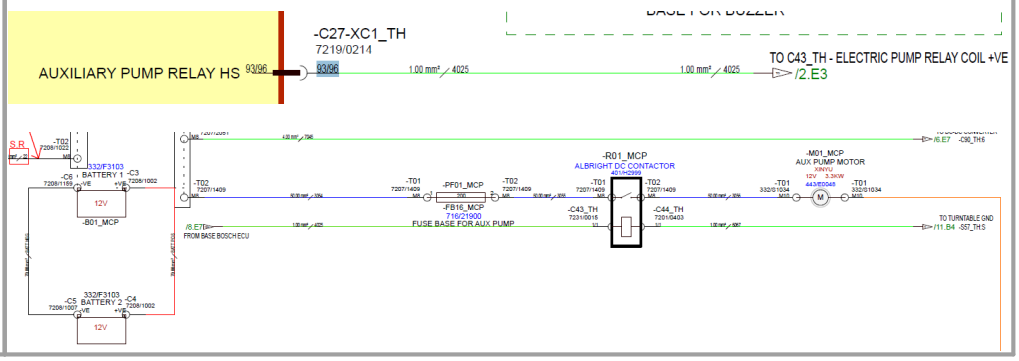
Possible Cause:	1) A short circuit within the wiring harness 2) A short circuit to the chassis 3) A short circuit within the harness connectors 4) Water damage/ingress within the harness connectors 5) Damaged component
Service Action:	1) Locate wire #4025 between Base Bosch ECU pin 93/96 and Albright DC Contactor connector -C43_TH. Check for short to GND or open circuit. Check termination at the Contactor. 2) Check the condition of the Base Bosch ECU 96-way connector, checking for backed out pins, bent pins, water ingress or any other form of damage. 3) Check other side of the contactor solenoid at connector -C44_TH (Wire #6067). Check there is good connection to GND at -T04-GND02_TH. 4) Check condition of Albright DC Contactor, replace if neccesary. 5) Check the wire harness for any abrasions, pinching or any other form of damage. 

6.1.287 B1417-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1151-16_2_3_2_2_87

Error code:	**B1417-13**
ECU	Base ECU
Description:	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve High Side & Low Side Open Circuit
Component:	STEER RIGHT OR LEFT DIRECTIONAL Solenoid Valve
Vehicle reaction:	Detect failure mode with Safout method - Switch Steer output to off

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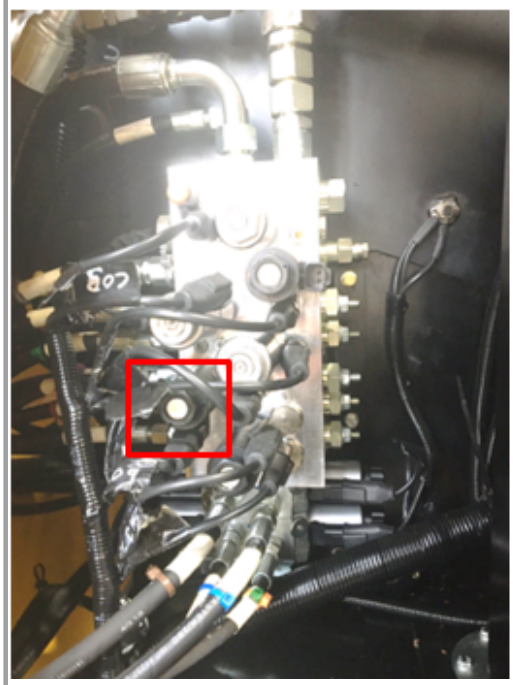
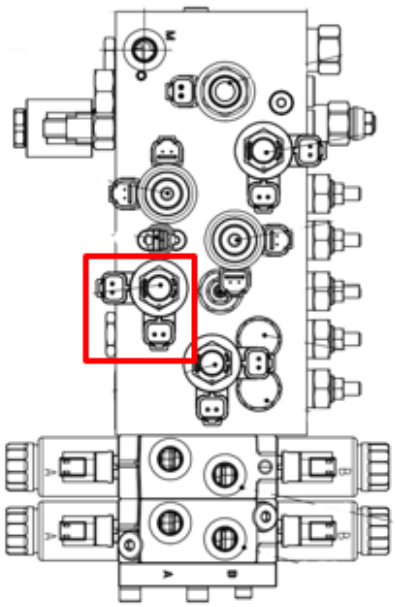
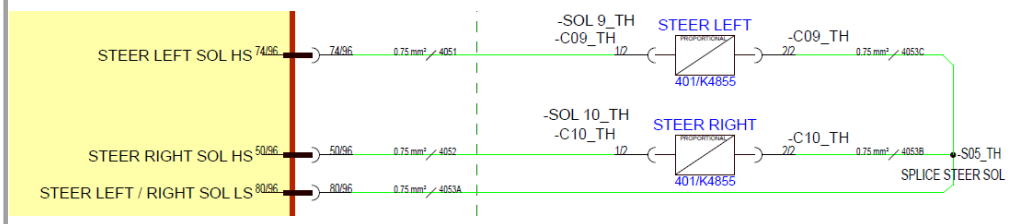
Possible Cause:	1. Poor or loose connection 2. Break in wiring 3. Water in connector 4. Broken pin or connector 5. Faulty or Damage solenoid
Service Action:	1.Check coil resistance 5-10 ohms 2. Check wiring from coil to ECU wire 4051,4052 & 4053A, 4053B, 4053C for cut, pinch or and damage. 3. Check ECU Pin 74/96, 50/96, 80/96 for bend or back out or any damage. 4. Check solenoid connector C09_TH and C10_TH for loose connection or any damage. 5. Check if valve is mechanically jammed. 6 Turn ignition on off to clear code.   

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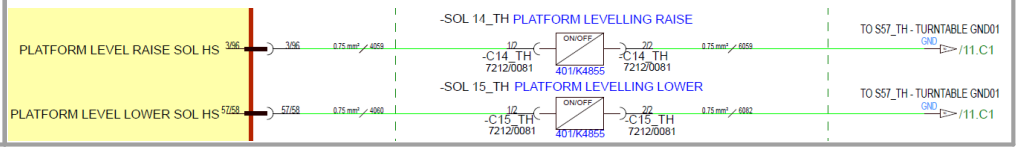
6.1.288 B1418-13

Error code:	B1418-13
ECU	Base ECU
Description:	PLATFORM LEVEL RAISE\LOWER solenoid both functions - Valve failure
Component:	Platform Level Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Platform Level o/ps to off
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged
Service Action:	1) Disconnect the Platform Level Raise/Lower connectors -C14_TH and -C15_TH from the solenoid connector. Test continuity from Pin 2 of either connector to Turntable Ground. Repeat for other solenoid connector. These results will determine location of fault. If both connectors have continuity from pin 2 - pin 2, then the fault lies on wire #6059 or the Bosch ECU pin 3/96. If wire #6059 is not faulty, test the inputs (continuity) to both solenoids from the Bosch ECU. 2) Check the wiring harness for damage, abrasions or pinching. 3) Check all connectors including the Bosch ECU connectors for any bent or backed-out pins, debris or cut wires that may be causing an open circuit. 

6.1.289 B1419-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1419-13

Error code:	B1419-13
ECU	Base ECU

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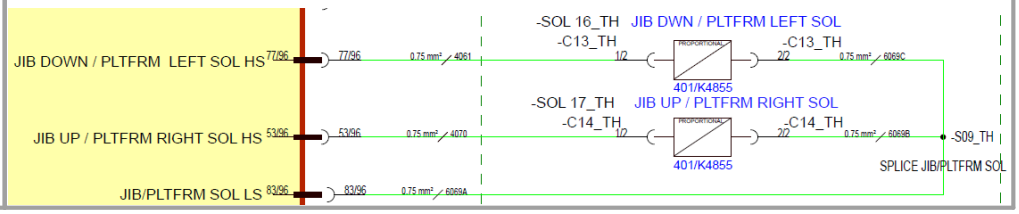
Description:	JIB\PLATFORM ROTATE Solenoid Valve Fault
Component:	Platform Solenoid
Vehicle reaction:	Detect failure mode with Safout method - Switch Jib\Platform Rotate o/ps to off
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged
Service Action:	1) Indicates a fault with the solenoid valve. The failure mode is undetermined. 2) Check the connectors to the solenoid valves, checking for backed out pins, bent pins, water ingress or any other form of damage. 3) Check the connectors to the Bosch ECU, checking for backed out pins, bent pins, water ingress or any other form of damage. 4) Check the harness between the solenoids and the Bosch ECU for any abrasions, pinching or any other form of damage. 5) Perform continuity checks between Bosch ECU and Solenoid valve connector pins. 6) Check for unintended shorts to GND or HIGH on any of the wires associated with the solenoid valve. 7) See related fault codes for further diagnostic information. 

6.1.290 B1420-13

B1420-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1420-13

Error code:	**B1420-13**
ECU	Platform ECU
Description:	JIB/PLATFORM FLOW Solenoid Valve Fault

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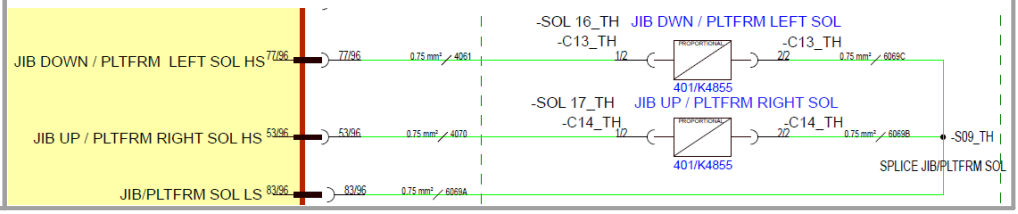
Component:	Platform Solenoid
Vehicle reaction:	Disable platform rotate and allow Jib functions
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged
Service Action:	1) Indicates a fault with the solenoid valve. The failure mode is undetermined. 2) Check the connectors to the solenoid valves, checking for backed out pins, bent pins, water ingress or any other form of damage. 3) Check the connectors to the Bosch ECU, checking for backed out pins, bent pins, water ingress or any other form of damage. 4) Check the harness between the solenoids and the Bosch ECU for any abrasions, pinching or any other form of damage. 5) Perform continuity checks between Bosch ECU and Solenoid valve connector pins. 6) Check for unintended shorts to GND or HIGH on any of the wires associated with the solenoid valve. 7) See related fault codes for further diagnostic information. 

6.1.291 B1437-17

B1437-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1437-17

Error code:	**B1437-17**
ECU	Platform ECU
Description:	JIB/PLATFORM FLOW Solenoid raise / right functions - Circuit open or short to high (12v)
Component:	Platform Solenoid

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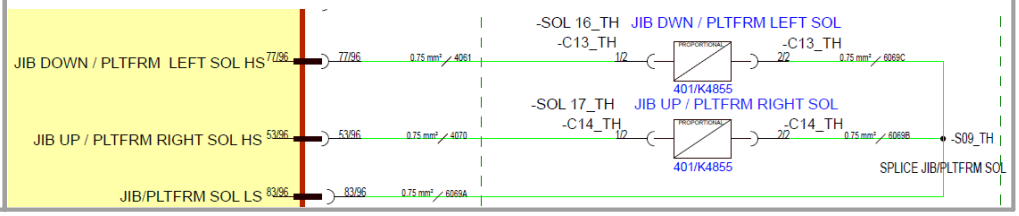
Vehicle reaction:	Disable platform rotate and allow Jib functions
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged
Service Action:	1) Indicates a fault with the solenoid valve. The failure mode is undetermined. 2) Check the connectors to the solenoid valves, checking for backed out pins, bent pins, water ingress or any other form of damage. 3) Check the connectors to the Bosch ECU, checking for backed out pins, bent pins, water ingress or any other form of damage. 4) Check the harness between the solenoids and the Bosch ECU for any abrasions, pinching or any other form of damage. 5) Perform continuity checks between Bosch ECU and Solenoid valve connector pins. 6) Check for unintended shorts to GND or HIGH on any of the wires associated with the solenoid valve. 7) See related fault codes for further diagnostic information. 

6.1.292 B1438-16

B1438-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1438-16

Error code:	**B1438-16**
ECU	Platform ECU
Description:	JIB/PLATFORM FLOW Solenoid raise / right functions - Circuit short to low
Component:	Platform Solenoid
Vehicle reaction:	Disable platform rotate and allow Jib functions

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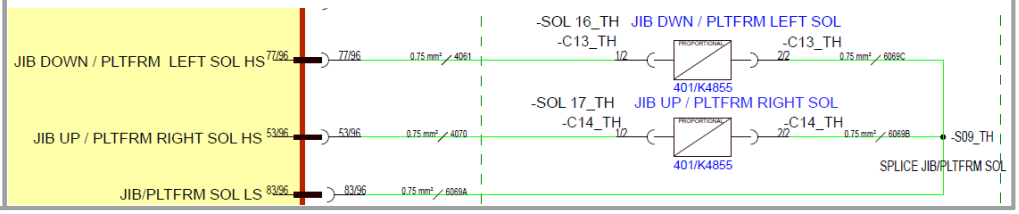
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged
Service Action:	1) Indicates a fault with the solenoid valve. The failure mode is undetermined. 2) Check the connectors to the solenoid valves, checking for backed out pins, bent pins, water ingress or any other form of damage. 3) Check the connectors to the Bosch ECU, checking for backed out pins, bent pins, water ingress or any other form of damage. 4) Check the harness between the solenoids and the Bosch ECU for any abrasions, pinching or any other form of damage. 5) Perform continuity checks between Bosch ECU and Solenoid valve connector pins. 6) Check for unintended shorts to GND or HIGH on any of the wires associated with the solenoid valve. 7) See related fault codes for further diagnostic information. 

6.1.293 **B1439-13**

B1439-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1439-13

Error code:	**B1439-13**
ECU	Platform ECU
Description:	JIB/PLATFORM FLOW Solenoid lower / left functions - Circuit short to low
Component:	Platform Solenoid
Vehicle reaction:	Disable platform rotate and allow Jib functions
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged

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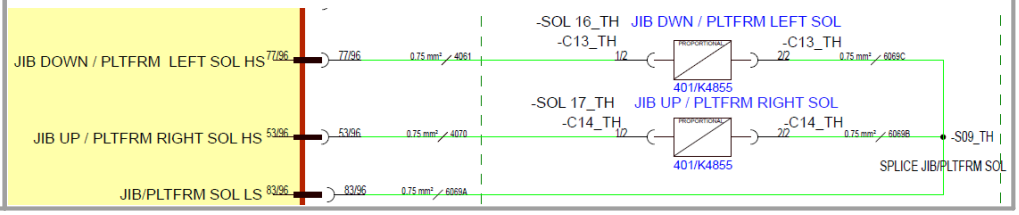
Service Action:	1) Indicates a fault with the solenoid valve. The failure mode is undetermined. 2) Check the connectors to the solenoid valves, checking for backed out pins, bent pins, water ingress or any other form of damage. 3) Check the connectors to the Bosch ECU, checking for backed out pins, bent pins, water ingress or any other form of damage. 4) Check the harness between the solenoids and the Bosch ECU for any abrasions, pinching or any other form of damage. 5) Perform continuity checks between Bosch ECU and Solenoid valve connector pins. 6) Check for unintended shorts to GND or HIGH on any of the wires associated with the solenoid valve. 7) See related fault codes for further diagnostic information. 

6.1.294 B1440-17

B1440-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1440-17

Error code:	**B1440-17**
ECU	Platform ECU
Description:	JIB/PLATFORM FLOW Solenoid - Circuit short to high (12v)
Component:	Platform Solenoid
Vehicle reaction:	Disable platform rotate and allow Jib functions
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged
Service Action:	1) Indicates a fault with the solenoid valve. The failure mode is undetermined. 2) Check the connectors to the solenoid valves, checking for backed out pins, bent pins, water ingress or any other form of damage.

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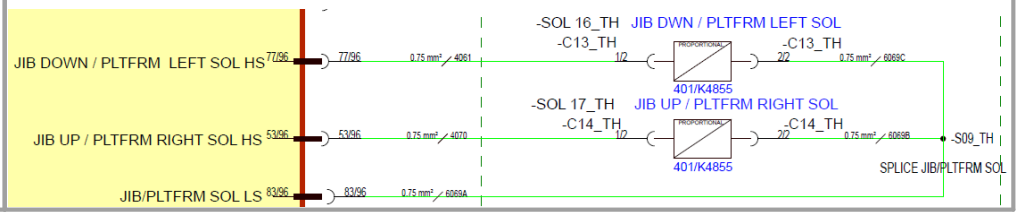
	3) Check the connectors to the Bosch ECU, checking for backed out pins, bent pins, water ingress or any other form of damage. 4) Check the harness between the solenoids and the Bosch ECU for any abrasions, pinching or any other form of damage. 5) Perform continuity checks between Bosch ECU and Solenoid valve connector pins. 6) Check for unintended shorts to GND or HIGH on any of the wires associated with the solenoid valve. 7) See related fault codes for further diagnostic information. 

6.1.295 B1441-16

B1441-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1151-16_2_3_2_2_81

Error code:	B1441-16
ECU	Platform ECU
Description:	JIB/PLATFORM FLOW Solenoid - Circuit short to low
Component:	Platform Solenoid
Vehicle reaction:	Disable platform rotate and allow Jib functions
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged
Service Action:	1) Indicates a fault with the solenoid valve. The failure mode is undetermined. 2) Check the connectors to the solenoid valves, checking for backed out pins, bent pins, water ingress or any other form of damage. 3) Check the connectors to the Bosch ECU, checking for backed out pins, bent pins, water ingress or any other form of damage. 4) Check the harness between the solenoids and the Bosch ECU for any abrasions, pinching or any other form of damage.

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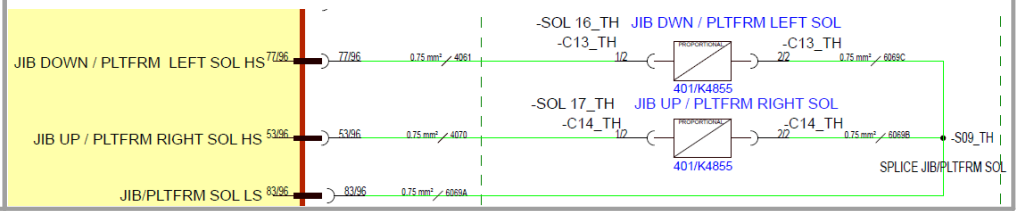
	5) Perform continuity checks between Bosch ECU and Solenoid valve connector pins. 6) Check for unintended shorts to GND or HIGH on any of the wires associated with the solenoid valve. 7) See related fault codes for further diagnostic information. 

6.1.296 B1442-13

B1442-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1442-13

Error code:	B1442-13
ECU	Platform ECU
Description:	JIB/PLATFORM FLOW Solenoid - Circuit open
Component:	Platform Solenoid
Vehicle reaction:	Disable platform rotate and allow Jib functions
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged
Service Action:	1) Indicates a fault with the solenoid valve. The failure mode is undetermined. 2) Check the connectors to the solenoid valves, checking for backed out pins, bent pins, water ingress or any other form of damage. 3) Check the connectors to the Bosch ECU, checking for backed out pins, bent pins, water ingress or any other form of damage. 4) Check the harness between the solenoids and the Bosch ECU for any abrasions, pinching or any other form of damage. 5) Perform continuity checks between Bosch ECU and Solenoid valve connector pins. 6) Check for unintended shorts to GND or HIGH on any of the wires associated with the solenoid valve.

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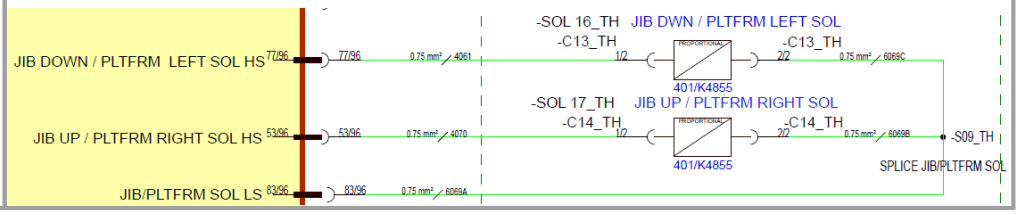
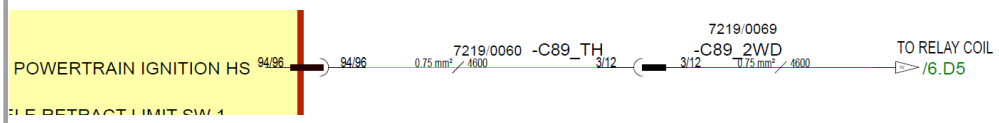
	7) See related fault codes for further diagnostic information. 

6.1.297 **B1464-17**

Error code:	**B1464-17**
ECU	Base ECU
Description:	Steer Angle Sensor Output SC to High (5v or greater)
Component:	Steer Angle Sensor
Vehicle reaction:	CAN 2 fault - detect failure mode - disable all drive motors
Possible Cause:	1. A poor connection or damaged terminal within the connector(s) 2. A damaged or broken wire within the wiring harness 3. Component is damaged
Service Action:	1. Check Base ECU Pin 94/96 and Wire # 4600 and 1033A for and cut or damage. 2. Check Turntable Ground connection and wire # 6510 for any cut or damage. 3. Check Steer Sensor pin 1,2,5and 6 for bent or any damage. 4.Check CAN H and CAN L wire. 5. Complete the full procedure for testing the CAN Network 257 the component information page. 6. Check Steer sensor condition,Replace if defective. 

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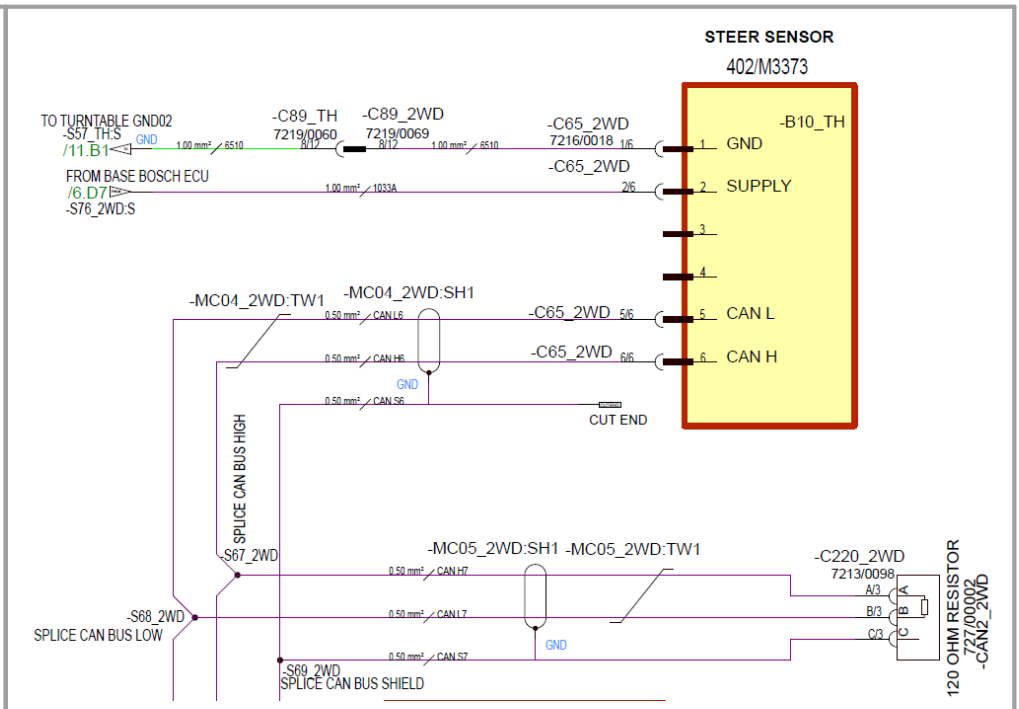

6.1.298 B1480-13

Error code:	B1480-13
ECU	Base ECU
Description:	Electric Subsystem Ignition SC OC
Component:	Battery 48V pack
Vehicle reaction:	Motor controller to detect CAN failure mode. - detect failure mode - disable all 48V motors
Possible Cause:	1. Broken wire 2. unplugged connector 3. Faulty Battery 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check Battery 48V pack for voltage drop and any damage. 2. Check 10A fuse FU1 and FR/RR Inverter Relay, Replace if defective. 3. Check Turntable Ground connection 4. Check Drive motor Inverter pin 3/35 for any bent or damage.

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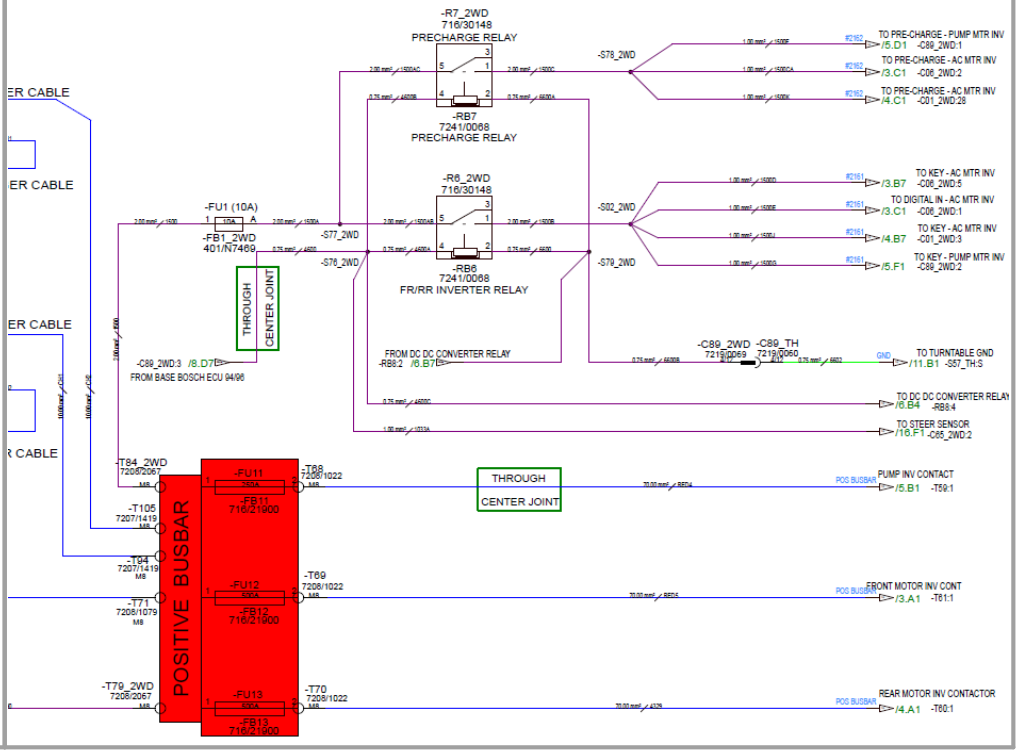
	5. Check Connector C06 and wire #1500D. 6. Check Drive motor Inverter pin 14/35 for any bent or damage. 7. Check Connector C06 and wire #1500E. 8. Check Drive motor Inverter pin 1/23 for any bent or damage. 9. Check Connector C06 and wire #1500G. 10. Complete the full procedure for testing the CAN Network 257 the component information page. 

6.1.299 B1487-13

Error code:	B1487-13
ECU	
Description:	Pump Inverter / Pump Motor Inverter Relay
Component:	Motor Inverter/Relay
Vehicle reaction:	Disable system, restart needed to clear

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Possible Cause:	
Service Action:	Area Affected - High Side Input/Output, Open Drain Out 1, 2 & 3 On the Pump Inverter check continuity from -C60_TH pin 19/23 (wire #4545) to the Pump Motor Inverter Relay, connector -C54_TH, pin 1/1 If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Pump Inverter check continuity from Connector -C60_TH pin 2/23 (Wire #6507) to Pump Motor Inverter Relay, connector -C53_TH pin 1/1. If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Rear Inverter, check continuity from -C60_TH pin 18/23 (Wire #1500F) to Precharge Relay -R7_2WD pin 1 (Wire #1500C). Note: Relay -R7_2WD provides pre-charge voltage to all 3 inverters. Check Function of Relay -R7_2WD. Check Continuity from -FU1_2WD pin A to -R7_2WD pin 5. Check Fuse -FU1_2WD (10A Fuse). If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Pump Inverter check for a Short Circuit fault from B- Terminal to the following: (1) -C60_TH pin 18/23 (2) -C60_TH pin 19/23 If Short Circuit or Low Reading (<100 Ohms) Inspect wiring for fault in respective area. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Pump Inverter check for a Short Circuit fault from + Terminal to -C60_TH pin 2/23 If Short Circuit or Low Reading (<100 Ohms) Inspect wiring for fault in respective area. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. Test condition and function of Coil and Switch of Relay -R10_TH (Albright DC Contactor) Consider replacement/swap of Pump Motor, Pump Inverter or Relay -R10_TH

6.1.300 B1488-13

Error code:	**B1488-13**
ECU	
Description:	Pump AC Motor Contactor Coil
Component:	AC Motor Contactor Coil
Vehicle reaction:	Disable system, restart needed to clear

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Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Check Rear Inverter connector -C60_TH pin 2/23 is seated correctly and for damage. Check Pump Motor Inverter Relay -R10_TH for damage. Check connector -C53_TH is connected correctly. Measure resistance from Relay connector -C53_TH (Wire #6507) to Inverter connector -C60_TH pin 2/23. Expected value < 2.0 Ohms.

6.1.301 B1489-13

Error code:	**B1489-13**
ECU	
Description:	Rear Left Motor exceeding temperature limit (165 Celsius)
Component:	Rear Left Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Check Motor connector is fully engaged and no damage is visible. Check cable is damage free from Motor to Inverter. Check sensor is returning correct values in Service Master. Check brakes are not partially or fully stuck on. Check for damage to Motor. Allow motor to cool down and re-check. Replace motor if necessary.

6.1.302 B1490-13

Error code:	**B1490-13**
ECU	

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Description:	Pump Inverter / Pump Motor Temp.
Component:	Motor Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Area Affected - Motor Temp +/-, Temp Sens +VE/-VE. On Pump Inverter, check condition and seating of -C60_TH. On Pump Motor, check condition and seating of -C01_4WD. On Pump Inverter check resistance from -C60_TH pin 16/23 (Wire #4500) to Pump Motor -C70_TH pin 2/2. Expect < 2 Ohms. On Pump Inverter check resistance from -C60_TH pin 17/23 (Wire #4501) to Pump Motor -C70_TH pin 1/2. Expect < 2 Ohms. On Pump Inverter check resistance from -C60_TH pin 16/23 to B+. Expect > 200 Ohms. On Pump Inverter check resistance from -C60_TH pin 17/23 to B-. Expect > 200 Ohms. If fault(s) found, isolate components to identify faulty component.

6.1.303 B1491-13

Error code:	**B1491-13**
ECU	
Description:	Pump Motor / Inverter Temp High
Component:	Motor Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness

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Service Action:	Indicates that the motor is operating above the predefined operating temperature limits. Motor performance will be reduced. Allow the motor to cool down before continuing to operate. Check via Service Master that correct / expected temperature values are being read from the AC Motor. Check connectors and harness between motor and inverter for damage. Replace motor if issue persists.

6.1.304 B1492-13

B1492-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1492-13

Error code:	**B1492-13**
ECU	
Description:	Pump Motor Temperature Low
Component:	Pump Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the minimum operating temperature has been exceeded. Check via Service Master that correct / expected temperature values are being read from the Traction Motors. Allow machine to warm up to correct operating temperature range. Check connectors and harness between motor and inverter for damage.

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6.1.305 B1493-13

Error code:	B1493-13
ECU	
Description:	Pump Inverter exceeding temperature limit (110 Celsius)
Component:	Pump Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates the the Inverter internal temperature has reached 110 Celcius. This is measured at the inverter heatsink. Check movement of wheels is not impaired. May be caused by prolonged use in high ambient temperatures. Allow Inverter to cool and check fault clears after power cycle. If fault continues, replace Inverter.

6.1.306 B1494-13

Error code:	B1494-13
ECU	
Description:	Pump AC Motor Inverter Internal Temp Sensor
Component:	Motor Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness

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Service Action:	This is an internal fault to the Pump Inverter Module. Check for any obvious damage to the connectors and power supply terminals. Replace Inverter module.

6.1.307 B1495-13

Error code:	**B1495-13**
ECU	
Description:	Pump Motor Inverter at 85 Deg C
Component:	Motor Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Fault indicates the Motor Inverter internal temperature has risen above nominal operating range. Acceleration current is reduced. Turn off machine and allow to cool before continuing to drive vehicle. If issue persists, Check motor, pump harness or connectors related to the fault area are not damaged. If no faults found - replace Inverter

6.1.308 B1496-13

Error code:	**B1496-13**
ECU	
Description:	Pump Motor / Inverter Temp Low
Component:	Motor Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD

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Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the machine is operating below the predefined safe operating temperature limits. Allow the machine to warm up before continuing to operate. Check via Service Master that correct / expected temperature values are being read from the Pump Motor. Check connectors and harness between motor and inverter for damage.

6.1.309 B1497-13

Error code:	**B1497-13**
ECU	
Description:	Pump Motor speed above normal
Component:	Pump Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Motor speed is above normal operating conditions. Power to motor is reduced. If problem persists, check via SM that Pump rotation is at predicted values

6.1.310 B1498-13

Error code:	**B1498-13**
ECU	
Description:	Pump Motor Sensor Supply Out of Range
Component:	Pump Motor Sensor

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Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates the following issues: - Sensor supply current is too low (lower limit 0.006A) - Sensor supply Current is too high (Higher limit 0.068A) - Sensor readings are out of nominal readings - Sensor supply voltage is out of range (11-16VDC) Check Pump Motor and rear Inverter connectors are seated correctly and no damage visible. On Pump Inverter, disconnect -C60_TH connector and check no short circuit between pins 3, 4, 5 and 6. On Pump Inverter, disconnect -C60_TH connector and measure resistance of the following pins to the Pump Motor Connector -C71_TH: - -C60_TH pin 3 to -C71_TH pin 1 - -C60_TH pin 4 to -C71_TH pin 4 - -C60_TH pin 5 to -C71_TH pin 2 - -C60_TH pin 6 to -C71_TH pin 3 On Pump Inverter, disconnect -C60_TH connector and measure resistance of the following pins to the Pump Motor Connector -C70_TH: - -C60_TH pin 16 to -C70_TH pin 2 - -C60_TH pin 17 to -C70_TH pin 1 Check cable shield is connected and grounded at T-84_TH Speed Sensor may be faulty. Temp Sensor may be faulty.

6.1.311 B1499-13

Error code:	**B1499-17**
ECU	
Description:	Pump Inverter Reading 67 V DC supply
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear

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Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting the supply battery voltage reached 67 V DC. The system is shutdown This happens if the machine is trying to regen particularly when the battery is full and the current produced that has nowhere to go Check batteries are not over swelled or damaged Restart machine and re-test

6.1.312 B1500-13

Error code:	**B1500-16**
ECU	
Description:	Front Inverter Reading 36 V DC
Component:	Front Motor Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting the +48 V DC supply battery voltage has reduced to a lower limit of +36 V DC Check the B+, X and B- terminals on the Inverter for damage or discoloration. Check Terminals are seated correctly. Recharge battery pack. Check battery voltages to ensure there is not a damaged battery in the pack. Replace batteries or cables as required.

6.1.313 B1501-13

Error code:	**B1501-13**
ECU	

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Description:	Warning Only - Battery Voltage Spike above 65V
Component:	Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	WARNING! During REGEN Battery voltage spiking above 65V. Warning Only. Fault will clear when battery voltage has stabilized. Cycle ignition to clear fault. If fault persists, Check Motor connectors, battery health. Seek advice from Access Engineering Team.

6.1.314 B1502-13

Error code:	**B1502-13**
ECU	
Description:	Pump Motor Inverter registering low voltage
Component:	Motor Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Supply voltage has dropped below 36 V DC. Recharge is required.

6.1.315 B1503-13

Error code:	**B1503-13**

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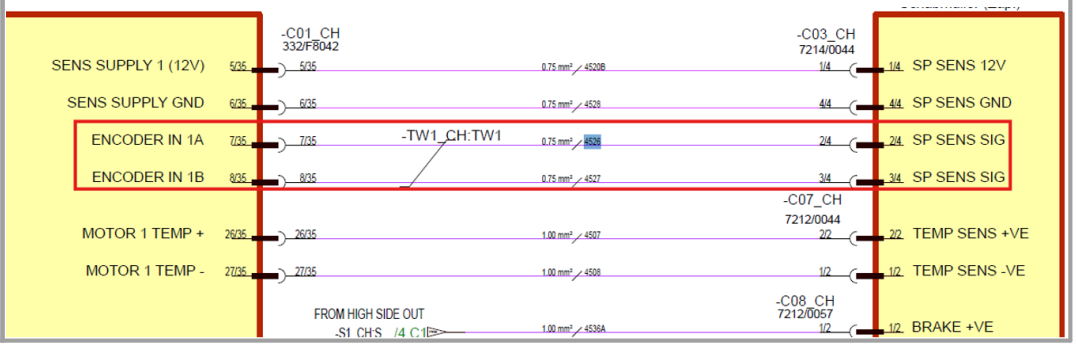
ECU	
Description:	Pump Motor - Speed Encoder Feedback Sensor Fail
Component:	Speed Sensor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	The Speed Encoders are enclosed within the motor housing. It provides Speed and Direction feedback to the Inverter. The front motors require a 12V to 5V voltage regulator to provide a 5V supply to the speed sensors. This is not required on the rear motors or pump motor. Check connectors at pump motor and inverter. Check for correct seating, termination and damage. On the motor connector, measure voltage at -C71_TH pin 1/4 (+12V) (Wire #4529) to pin 4/4 (GND) (Wire #4530). Expected value, 12V DC. Measure resistance from Rear Inverter Connector -C60_TH pin 5/23 (Wire #4526) to Rear Left Motor Connector -C71_TH pin 2/4. Expected value <2.0 Ohms. Measure resistance from Rear Inverter Connector -C60_TH pin 6/23 (Wire #4527) to Rear Left Motor Connector -C71_TH pin 3/4. Expected value <2.0 Ohms. 

6.1.316 **B1504-13**

Error code:	**B1504-13**
ECU	

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Description:	Pump inverter internal power supply out of range error.
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This fault indicates there has been an internal fault to the inverter. Replace the Inverter

6.1.317 B1505-13

Error code:	**B1505-13**
ECU	
Description:	AC Drive Current Above Limit (350 Amperes)
Component:	Drive Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting that the U,V,W terminals on the motor are drawing to much current from the invertor above 150% of allowed. Current can be checked through diagnostic tool. Need to know what normal current is. Check U,V,W cables from invertor to motor and ensure there is no damage or short circuit from other phases or to ground and B+. Check terminal tightness to correct torque values

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6.1.318 B1506-13

Error code:	B1506-13
ECU	
Description:	Pump Motor Speed High
Component:	Pump Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Motor speed is above 6500RPM. Check electrical connections to motor and Inverter and seated correctly and no damage found. Check U, V & W cables are correctly fastened and no damage visible. Reset machine and check via Service Master that Pump rotation speed is within predicted values. Check condition of Pump.

6.1.319 B1507-13

Error code:	B1507-13
ECU	
Description:	Pump Inverter Power stage Fault
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors

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Cause:	3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is an internal power stage fault within the inverter. The torque current to the AC motor has been lost or intermittant. Replace the affected Inverter.

6.1.320 B1508-13

Error code:	**B1508-13**
ECU	
Description:	Pump Inverter Incorrect Parameter / Software Setup
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Reflash SW via CAN2 (Diag Socket). See Help File for information on how to re-flash inverters. Restart machine - If no change, Replace Inverter

6.1.321 B1509-13

Error code:	**B1509-13**
ECU	
Description:	Pump Inverter Internal Short Circuit Detected
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear

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Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates the Inverter has checked its internal power stage and detected a short-circuit to the MOSFETs. Check no obvious fault at B+ and U.V & W terminals. Check for damage. Replace Inverter

6.1.322 B1510-13

Error code:	**B1510-13**
ECU	
Description:	Pump Motor Current Draw Mismatch
Component:	Motor Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is an internal current measurement made within the inverter. Expected current draw does not meet tolerance for measured current draw. System will be disabled. Check phasing of U,V, W cables from inverter to motor are correct. I.e. Inverter 'U' is attached to Motor 'U'. Check no damage to Motor connections for U, V, W. If no issues found, replace Pump Inverter.

6.1.323 B1511-13

Error code:	**B1511-16**
ECU	
Description:	Pump Inverter Precharge Fail

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Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates at start-up that +48 V DC was not present at the pre-charge input to the inverter. Check function of pre-charge relay -R7_2WD. If relay not switching, Check continuity of Relay coil GND from Pin 2 to Turntable GND2, Terminal -T03-GND_TH. Check Continuity from Relay Pin 4 (via centrejoint) to Base Bosch ECU pin 94/96. Check presence of 48 V DC at -R7_2WD pin 5. If not present, check condition of fuse -FU1_2WD (10A). If fuse is not blown, Check Wire #1500 is correctly terminated at positive busbar via terminal -T84_2WD. Check Continuity from -R7_2WD to the pre-charge input of Front Inverter at connector -C89_TH pin 18/23.

6.1.324 B1512-13

Error code:	**B1512-13**
ECU	
Description:	System Restart Required
Component:	Motor Inverter
Vehicle reaction:	Restart needed to clear limitation
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the system must be restarted after the fault has been cleared to remove stored fault.

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6.1.325 B1513-13

Error code:	B1513-13
ECU	
Description:	Pump Inverter CAN Timeout Error
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates an issue on the CAN 2 network. Refer to schematic sheet named CAN 2 Network. Inspect ALL connectors on the CAN 2 Network. IMPORTANT! Isolate machine before commencing any further testing. Check CAN terminator is in place -CAN2_2WD (Near Front Right Wheel) and -CAN2_TCP (found inside base display enclosure) Remove -CAN2_TCP and measure resistance between pin A & B. Should measure 120 Ohm. If resistance measurement is significantly higher than this, recheck -CAN2_2WD is connected. Perform a continuity check of the CAN 2 Network by first checking continuity of CAN 2 LOW signals (GREEN) and Then CAN 2 HIGH signals (YELLOW) Perform a continuity check of the CAN 2 SHIELD. These tests must be performed to all devices on the CAN 2 Network. Check center joint interconnect -C89_2WD / -C89_TH is seated correctly and not damaged. Remember to replace -CAN2_TCP If still failing, disconnect all devices from the CAN 2 Network and check no short circuit between the CAN 2 HIGH and CAN 2 LOW signals. If a short is discovered, disconnect the center joint interconnect connectors and repeat the test to narrow down the search area for the fault. Remember to check all Connections have been re-made after rectifying fault.

6.1.326 B1514-13

Error code:	B1514-13
ECU	

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Description:	Rear Inverter / Rear Left Brake / Rear Motor Inverter Relay
Component:	Inverter/Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Area Affected - High Side Input/Output, Open Drain Out 1, 2 & 3 On the Rear Inverter check continuity from -C01_2WD pin 29/35 (wire #4536E) to the following: (1) RL AC Drive Motor, connector -C10_2WD, pin 1/2 (wire #4536B) (2) Rear Motor Inverter Relay Coil, connector -C56_2WD, pin 1/1 (wire #4536C) If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Rear Inverter check continuity from connector -C01_2WD pin 25/35 (Wire #4537) to Rear Left Motor, connector -C10_2WD pin 2/2. If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Rear Inverter check continuity from Connector -C01_2WD pin 1/35 (Wire #6506) to Front Motor Inverter Relay, connector -C57_2WD pin 1/1. If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Rear Inverter, check continuity from -C01_2WD pin 28/35 (Wire #1500K) to Precharge Relay -R7_2WD pin 1 (Wire #1500C). Note: Relay -R7_2WD provides pre-charge voltage to all 3 inverters. Check Function of Relay -R7_2WD. Check Continuity from -FU1_2WD pin A to -R7_2WD pin 5. Check Fuse -FU1_2WD (10A Fuse). If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Rear Inverter check for a Short Circuit fault from B- Terminal to the following: (1) -C01_2WD pin 28/35 (2) -C01_2WD pin 29/35 If Short Circuit or Low Reading (<100 Ohms) Inspect wiring for fault in respective area. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Rear Inverter check for a Short Circuit fault from + Terminal to the following: (1) -C01_2WD pin 1/35 (2) -C01_2WD pin 4/35 (3) -C01_2WD pin 28/35 (4) -C01_2WD pin 29/35 If Short Circuit or Low Reading (<100 Ohms) Inspect wiring for fault in respective area. If fault found: Replace as necessary. Cycle Ignition and check fault cleared.

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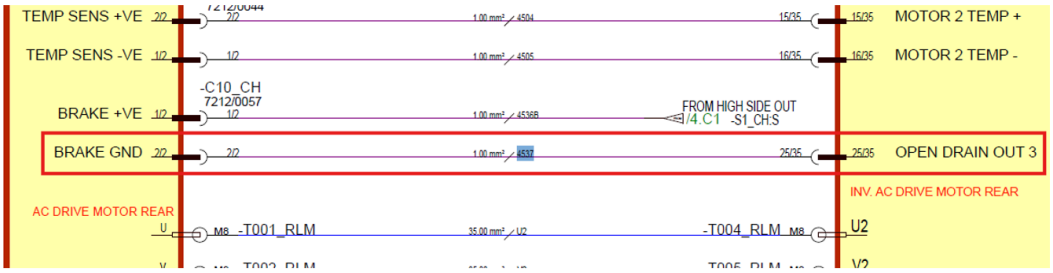
	Test condition and function of Coil and Switch of Relay -R12_TH (Albright DC Contactor) Consider replacement/swap of Rear Left Motor, Rear Inverter or Relay -R12_TH

6.1.327 B1515-13

Error code:	B1515-13
ECU	
Description:	Rear inverter / Rear left brake / Rear motor inverter relay.
Component:	Inverter/ Left Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Fault detected on Rear Left Motor Brake. Check Rear Motor connector -C10_2WD is seated correctly and for damage. Check pin 2/2 (Wire #4537) is inserted correctly and for damage. Check Rear inverter connector -C01_2WD is seated correctly and for damage. Check pin 25/35 (Wire #4537) is inserted correctly and for damage. Measure resistance between -C10_2WD pin 2/2 and -C01_2WD pin 25/35. Expected value < 2.0 Ohms. Check condition of harness between Rear Motor and Inverter. 

6.1.328 B1516-13

Error code:	B1516-13
ECU	

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Description:	Front left motor exceeding temperature limit (165 Celsius).
Component:	Front left motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Check Motor connector is fully engaged and no damage is visible. Check cable is damage free from Motor to Inverter. Check sensor is returning correct values in Service Master. Check brakes are not partially or fully stuck on. Check for damage to Motor. Allow motor to cool down and re-check. Replace motor if necessary.

6.1.329 B1517-13

Error code:	**B1517-13**
ECU	
Description:	Rear AC Motor inverter / Rear left AC Drive motor temperature.
Component:	Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Area Affected - Motor2 Temp +/-, Temp Sens +VE/-VE. On Rear Inverter, check condition and seating of -C01_2WD. On Rear Left AC Drive Motor, check condition and seating of -C02_2WD. On Rear Inverter check resistance from -C01_2WD pin 15/35 (Wire #4500) to Rear Left AC Motor -C02_2WD pin 6/8. Expect < 2 Ohms.

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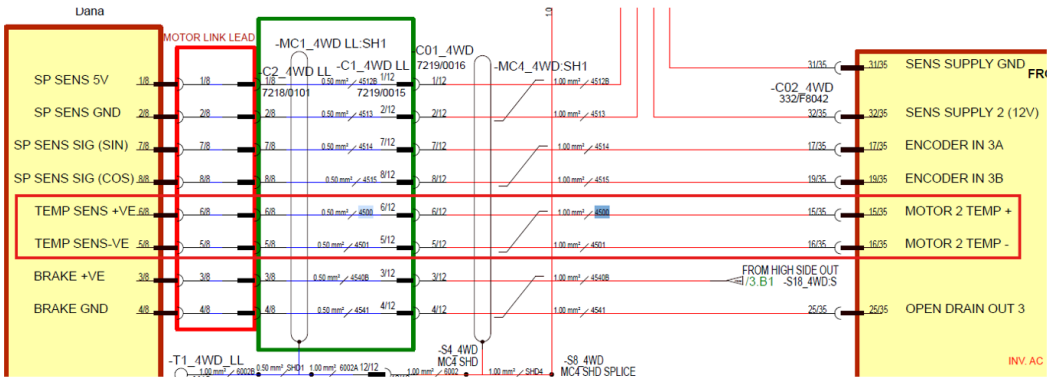
	On Rear Inverter check resistance from -C01_2WD pin 16/35 (Wire #4501) to Rear Left AC Motor -C02_2WD pin 5/8. Expect < 2 Ohms. On Rear Inverter check resistance from -C01_2WD pin 15/35 to B+. Expect > 200 Ohms. On Rear Inverter check resistance from -C01_2WD pin 16/35 to B-. Expect > 200 Ohms. If fault(s) found, isolate components to identify faulty component. 

6.1.330 B1518-13

Error code:	**B1518-13**
ECU	
Description:	Rear left motor / Inverter temperature high.
Component:	Inverter/ Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the motor is operating above the predefined operating temperature limits. Issue may be caused by extended current requirements i.e. driving long distance uphill, erratic driving or damage to the wheel. Motor performance will be reduced. Allow the motor to cool down before continuing to operate. Check via Service Master that correct / expected temperature values are being read from the AC Motor. Check connectors and harness between motor and inverter for damage.

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	Replace motor if issue persists.

6.1.331 B1519-13

Error code:	B1519-13
ECU	
Description:	Rear left motor temperature low.
Component:	Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the minimum operating temperature has been exceeded. Check via Service Master that correct / expected temperature values are being read from the Traction Motors. Allow machine to warm up to correct operating temperature range. Check connectors and harness between motor and inverter for damage.

6.1.332 B1520-13

Error code:	B1520-13
ECU	
Description:	Rear inverter exceeding temperature limit (110 Celsius).
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors

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Cause:	3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates the the Inverter internal temperature has reached 110 Celcius. This is measured at the inverter heatsink. Check movement of wheels is not impaired. May be caused by prolonged use in high ambient temperatures. Allow Inverter to cool and check fault clears after power cycle. If fault continues, replace Inverter.

6.1.333 B1521-13

Error code:	**B1521-13**
ECU	
Description:	Rear AC Motor inverter internal temperature sensor.
Component:	Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is an internal fault to the Rear Inverter Module. Check for any obvious damage to the connectors and power supply terminals. Replace Inverter module.

6.1.334 B1522-13

Error code:	**B1522-13**
ECU	
Description:	Rear left motor inverter at 85 Celsius.
Component:	Inverter

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Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Fault indicates the Motor Inverter internal temperature has risen above nominal operating range. Acceleration current is reduced.Turn off machine and allow to cool before continuing to drive vehicle. If issue persists, Check motor, wheel harness or connectors related to the fault area are not damaged. Check brakes are not partially or fully engaged. If no faults found - replace Inverter

6.1.335 B1523-13

Error code:	**B1523-13**
ECU	
Description:	Rear left motor/Inverter temperature low.
Component:	Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the machine is operating below the predefined safe operating temperature limits. Allow the machine to warm up before continuing to operate. Check via Service Master that correct / expected temperature values are being read from the Traction Motors. Check connectors and harness between motor and inverter for damage.

6.1.336 B1524-13

Error	**B1524-13**

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code:	
ECU	
Description:	Rear left motor speed above normal.
Component:	Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Motor speed is above normal operating conditions. Power to motor is reduced. If problem persists, check via SM that wheel rotation is at predicted values

6.1.337 B1525-13

Error code:	B1525-13
ECU	
Description:	Rear left AC Motor sensor supply out of range.
Component:	Rear Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates the following issues: - Sensor supply current is too low (lower limit 0.006A) - Sensor supply Current is too high (Higher limit 0.068A) - Sensor readings are out of nominal readings - Sensor supply voltage is out of range (11-16VDC)

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	Check Rear Left AC Motor and rear Inverter connectors are seated correctly and no damage visible. On Rear Inverter, disconnect -C01_2WD connector and check no short circuit between pins 31/35 (Wire #4520) and 32/25 (Wire #4521). Measure resistance of these pins to Rear Left AC Motor -C02_2WD Pins 4/4 and 1/4 respectively. Expect <2.0 Ohms. Speed Sensor may be faulty. On Rear Inverter, disconnect -C01_2WD connector and check no short circuit between pins 15/35 and 16/35. On Rear Inverter measure resistance from -C01_2WD pin 15/35 (Wire #4504) to Rear Left AC Motor -C09_2WD pin 2/2. Expect < 2 Ohms. On Rear Inverter measure resistance from -C01_2WD pin 16/35 (Wire #4505) to Rear Left AC Motor -C09_2WD pin 1/2. Expect < 2 Ohms. If fault(s) found, isolate components to identify faulty component. Motor Temp Sensor may be faulty

6.1.338 **B1526-13**

Error code:	B1526-17
ECU	
Description:	Rear inverter reading 67V DC Supply.
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors

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Cause:	3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting the supply battery voltage reached 67 V DC. The system is shutdown This happens if the machine is trying to regen particularly when the battery is full and the current produced that has nowhere to go Check batteries are not over swelled or damaged Restart machine and re-test

6.1.339 B1527-13

Error code:	**B1527-16**
ECU	
Description:	Rear inverter reading 36V DC.
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting the supply battery voltage reached 67 V DC. The system is shutdown This happens if the machine is trying to regen particularly when the battery is full and the current produced that has nowhere to go Check batteries are not over swelled or damaged Restart machine and re-test

6.1.340 B1528-13

B1528-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1528-13

Error code:	**B1528-13**

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ECU	
Description:	Rear left motor battery voltage spike.
Component:	Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	WARNING! During REGEN Battery voltage spiking above 65V. Warning Only. Fault will clear when battery voltage has stabilized. Cycle ignition to clear fault. check all the battery and inverter terminals are tight If fault persists, Check Motor connectors, battery health. Seek advice from Access Engineering Team.

6.1.341 B1529-13

B1529-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1529-13

Error code:	**B1529-13**
ECU	
Description:	Rear left motor inverter registering low voltage.
Component:	Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors

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	4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Supply voltage has dropped below <44 V DC. Recharge is required. Check all 48V and 12V battery health condition and battery cable for any loose connection or cut or any damage.

6.1.342 B1530-13

Error code:	**B1530-13**
ECU	
Description:	Rear left motor - Speed encoder feedback sensor fail.
Component:	Rear Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	The Speed Encoders are enclosed within the motor housing. It provides Speed and Direction feedback to the Inverter. The front motors require a 12V to 5V voltage regulator to provide a 5V supply to the speed sensors. This is not required on the rear motors or pump motor. Check connector at motor, voltage regulator (front motors only) and inverter. Check for correct seating, termination and damage. On the motor connector, measure voltage at -C02_2WD pin 1/4 (+12V) (Wire #4521) to pin 4/4 (GND) (Wire #4520). Expected value, 12V DC. Measure resistance from Rear Inverter Connector -C01_2WD pin 17/35 (Wire #4522) to Rear Left Motor Connector -C02_2WD pin 2/4. Expected value <2.0 Ohms. Measure resistance from Rear Inverter Connector -C01_2WD pin 19/35 (Wire #4523) to Rear Left Motor Connector -C02_2WD pin 3/4. Expected value <2.0 Ohms. The machine ignition will require a power cycle (Key Off-Key On) to reset any errors. Note: extra errors may have been created during fault finding process, i.e. removing connectors.

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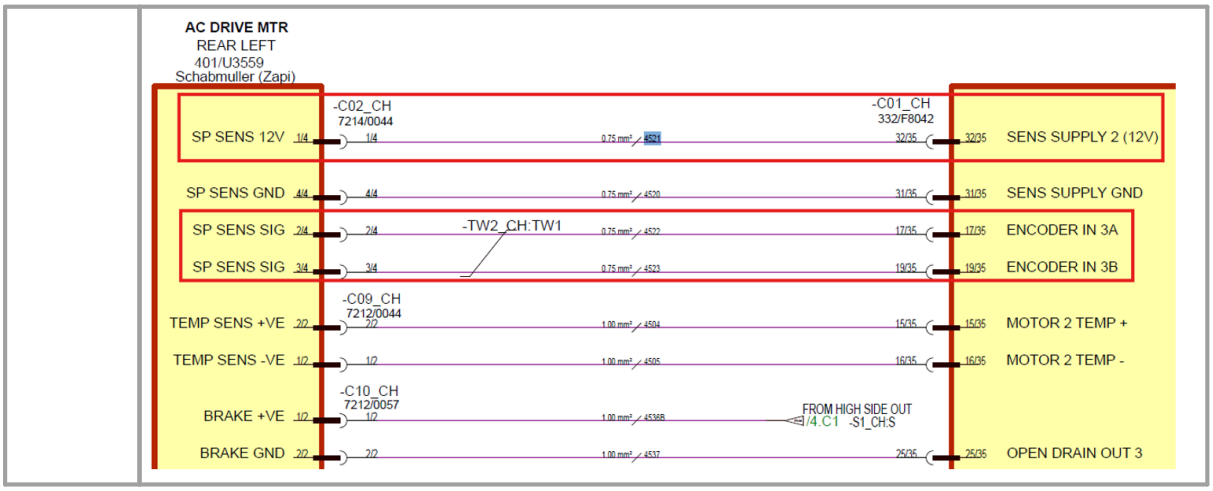

6.1.343 B1531-13

Error code:	B1531-13
ECU	
Description:	Rear inverter internal power supply out of range error.
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This fault indicates there has been an internal fault to the inverter. Replace the Inverter

6.1.344 B1532-13

Error code:	B1532-13
ECU	
Description:	AC Drive current above limit (350Amps).

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Component:	Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting that the U,V,W terminals on the motor are drawing to much current from the invertor above 150% of allowed. Current can be checked through diagnostic tool. Need to know what normal current is. Check U,V,W cables from invertor to motor and ensure there is no damage or short circuit from other phases or to ground and B+. Check terminal tightness to correct torque values

6.1.345 B1533-13

Error code:	**B1533-13**
ECU	
Description:	Rear left motor speed high (Above 6,500rpm).
Component:	Rear Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Motor speed is above 6500RPM. Check electrical connections to motor and Inverter and seated correctly and no damage found. Check U, V & W cables are correctly fastened and no damage visible. Reset machine and check via Service Master that wheel rotation speed is within predicted values. Check condition of wheel.

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6.1.346 B1534-13

Error code:	B1534-13
ECU	
Description:	Rear inverter power stage fault.
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is an internal power stage fault within the inverter. The torque current to the AC motor has been lost or intermittant. Replace the affected Inverter.

6.1.347 B1535-13

Error code:	B1535-13
ECU	
Description:	Rear inverter incorrect parameter / Software setup.
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Reflash SW via CAN2 (Diag Socket). See Help File for information on how to re-flash inverters. Restart machine - If no change, Replace Inverter

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6.1.348 B1536-13

Error code:	B1536-13
ECU	
Description:	Rear inverter internal circuit short detected.
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates the Inverter has checked its internal power stage and detected a short-circuit to the MOSFETs. Check no obvious fault at B+ and U.V & W terminals. Check for damage. Replace Inverter

6.1.349 B1537-13

Error code:	B1537-13
ECU	
Description:	Rear left motor current draw mismatch.
Component:	Inverter/Motor
Vehicle reaction:	
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is an internal current measurement made within the inverter. Expected current draw does not meet tolerance for measured current draw. System will be disabled.

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	Check phasing of U,V, W cables from inverter to motor are correct. I.e. Inverter 'U' is attached to Motor 'U'. Check no damage to Motor connections for U, V, W. If no issues found, replace Rear Inverter.

6.1.350 B1538-13

Error code:	B1538-16
ECU	
Description:	Rear inverter Precharge fail.
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates at start-up that +48 V DC was not present at the pre-charge input to the inverter. Check function of pre-charge relay -R7_2WD. If relay not switching, Check continuity of Relay coil GND from Pin 2 to Turntable GND2, Terminal -T03-GND_TH. Check Continuity from Relay Pin 4 (via center joint) to Base Bosch ECU pin 94/96. Check presence of 48 V DC at -R7_2WD pin 5. If not present, check condition of fuse -FU1_2WD (10A). If fuse is not blown, Check Wire #1500 is correctly terminated at positive busbar via terminal -T84_2WD. Check Continuity from -R7_2WD to the pre-charge input of Front Inverter at connector -C01_2WD pin 28/35.

6.1.351 B1539-13

Error code:	B1539-13
ECU	
Description:	System restart required.
Component:	Inverter

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Vehicle reaction:	Restart needed to clear limitation
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the system must be restarted after the fault has been cleared to remove stored fault.

6.1.352 B1540-13

Error code:	**B1540-13**
ECU	
Description:	Rear inverter CAN Timeout error.
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates an issue on the CAN 2 network. Refer to schematic sheet named CAN 2 Network. Inspect ALL connectors on the CAN 2 Network. IMPORTANT! Isolate machine before commencing any further testing. Check CAN terminator is in place -CAN2_2WD (Near Front Right Wheel) and -CAN2_TCP (found inside base display enclosure) Remove -CAN2_TCP and measure resistance between pin A & B. Should measure 120 Ohm. If resistance measurement is significantly higher than this, recheck -CAN2_2WD is connected. Perform a continuity check of the CAN 2 Network by first checking continuity of CAN 2 LOW signals (GREEN) and Then CAN 2 HIGH signals (YELLOW) Perform a continuity check of the CAN 2 SHIELD. These tests must be performed to all devices on the CAN 2 Network. Check center joint interconnect -C89_2WD / -C89_TH is seated correctly and not damaged. Remember to replace -CAN2_TCP

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	If still failing, disconnect all devices from the CAN 2 Network and check no short circuit between the CAN 2 HIGH and CAN 2 LOW signals. If a short is discovered, disconnect the centerjoint interconnect connectors and repeat the test to narrow down the search area for the fault. Remember to check all Connections have been re-made after rectifying fault.

6.1.353 B1541-13

Error code:	**B1541-13**
ECU	Base ECU
Description:	Weight sensor - No Calibration data available for Load Cell.
Component:	Overload Sensor 2
Vehicle reaction:	When there is no load cell calibrated initially after flashing ECU first time
Possible Cause:	1. Load sensor is not calibrated 2. Load sensor is faulty 3. Short Circuit to High 4. Water ingress
Service Action:	1. This Error Code is due to the new weight sensor calibration. It will need a fresh calibration. 2. Ensure the latest display software's are flashed to the display and you now have the option called known load calibration. 3. It will need a fresh calibration. The zero load cal and max load cal will require to be carried out. 4. Zero load is as it was before and an empty basket. 5. Full load is the maximum allowed for the machine, this will give the maximum allowed, but if this is not available then a known load may be put into the basket and the value changed to match this on the display. e.g. 100 kg. the weight sensor will predict the load up to the maximum but it will apply a de rate of around 5-20% dependent on the machine. 6. If there is an error or weight sensor calibration fails to enter or fails on completion then we need to look into the sensor values in the display.

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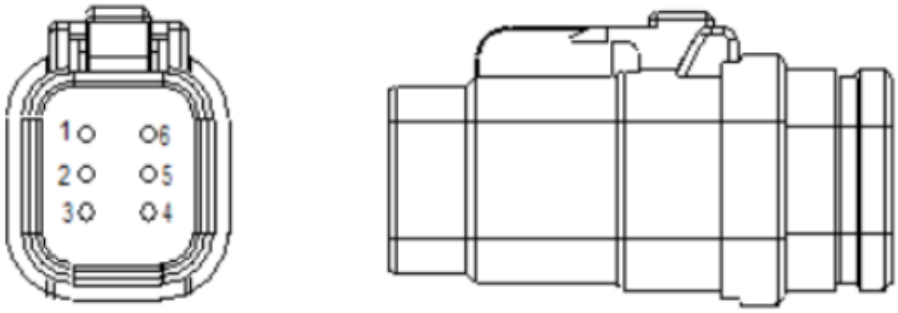
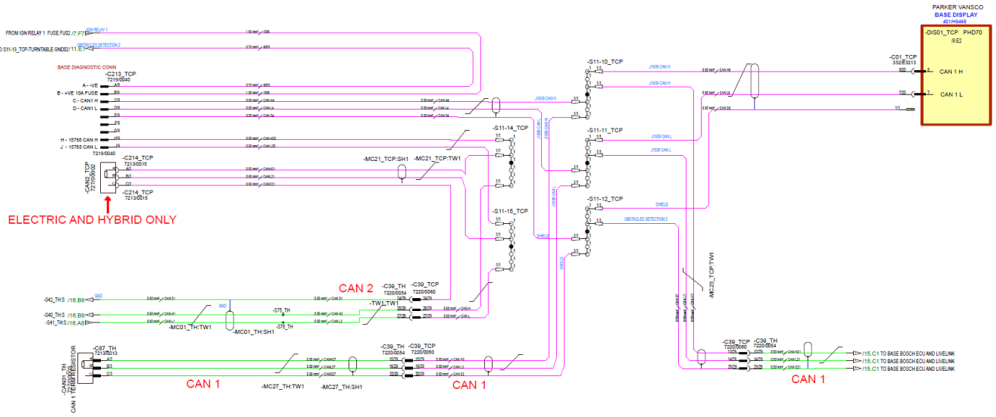
7. Flashing ecus, and ecu replacement should be very last action after everything has been investigated.



7216/0021 6 Way Connector



Load Cell Troubleshooting Flow Chart

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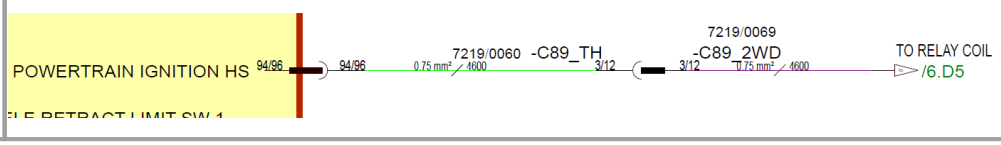
6.1.354 B1556-17

Error code:	B1556-17
ECU	Base ECU
Description:	Steer Angle Sensor Output SC to High (5v or greater)
Component:	Steer Angle Sensor
Vehicle reaction:	CAN 2 fault - detect failure mode - disable all drive motors
Possible Cause:	1. A poor connection or damaged terminal within the connector(s) 2. A damaged or broken wire within the wiring harness 3. Component is damaged
Service Action:	1. Check Base ECU Pin 94/96 and Wire # 4600 and 1033A for and cut or damage. 2. Check Turntable Ground connection and wire # 6510 for any cut or damage. 3. Check Steer Sensor pin 1,2,5and 6 for bent or any damage. 4.Check CAN H and CAN L wire. 5. Complete the full procedure for testing the CAN Network 257 the component information page. 6. Check Steer sensor condition,Replace if defective. 

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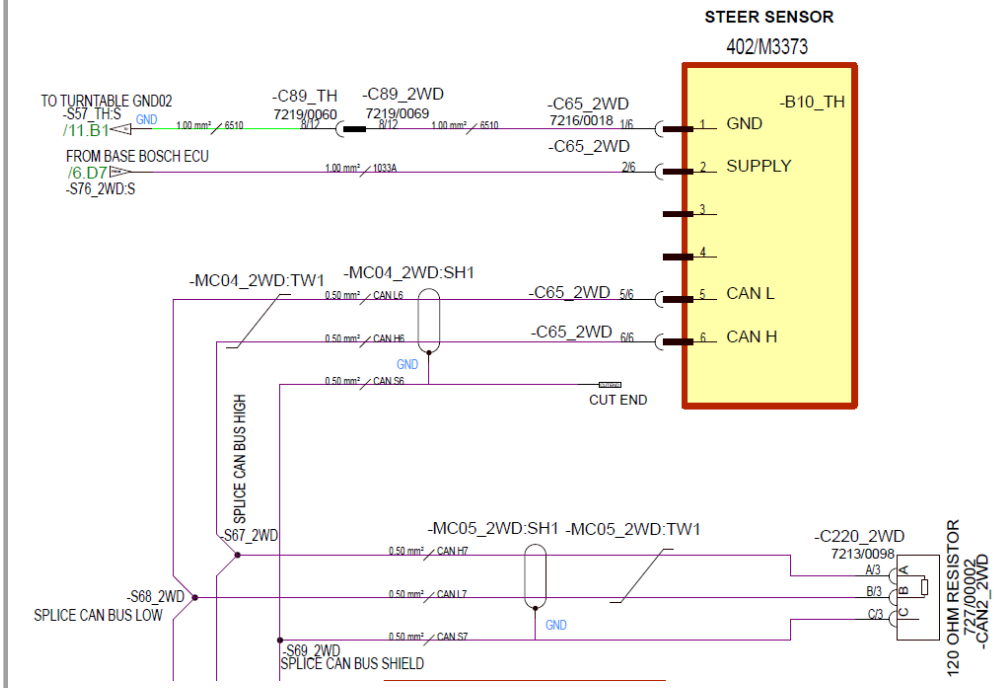

6.1.355 B1570-13

Error code:	B1570-13
ECU	
Description:	Rear Left Wheel Abnormal Deceleration Detected
Component:	Rear Wheel
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that an extreme deceleration has been detected from the motor. Potential causes include loss of an encoder channel. Extreme driving behaviour. Partially Stuck or Stuck Brakes Poor signal being returned from speed sensor. Check connectors on the motor for correct seating and damage. Check connector on inverter for for correct seating and damage.

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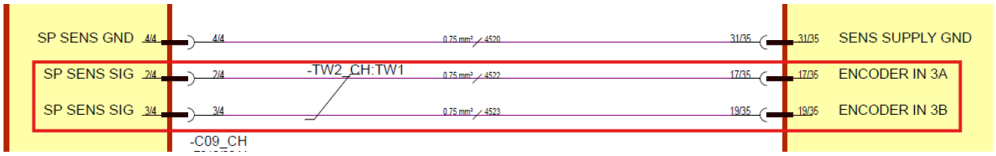
	Check continuity of Speed Sense Signal: Check continuity between Wheel Motor -C02_2WD pin 2/4 (Wire #4522) to Inverter -C01_2WD pin 17/35 Check continuity between Wheel Motor -C01_4WD pin 3/4 (Wire #4523) to Inverter -C01_2WD pin 19/35 Check no short circuit between above pins. Power will need to be cycled to inverter to clear faults. 

6.1.356 B1571-13

Error code:	B1571-13
ECU	
Description:	Rear Left Motor Invalid or out of range speed signal
Component:	Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicated that the amplitude of the speed sensor input to the inverter (sin / cos) is too high or the RPM value is too high. Possible causes to this can be due to: Sensor failure; Poor connection to the motor or inverter connectors; Electromagnetic interference; Damaged shielding of motor to inverter harness. Check connectors on the motor for correct seating and damage. Check connector on inverter for for correct seating and damage. Check continuity of Speed Sense Signal: Check continuity between Wheel Motor -C02_2WD pin 2/4 (Wire #4522) to Inverter -C01_2WD pin 17/35 Check continuity between Wheel Motor -C01_4WD pin 3/4 (Wire #4523) to Inverter -C01_2WD pin 19/35 Check no short circuit between above pins. Power will need to be cycled to inverter to clear faults.

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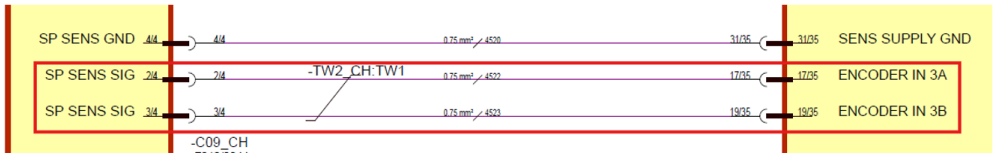

6.1.357 B1572-13

Error code:	B1572-13
ECU	
Description:	Rear inverter 2WD / 4WD Configuration missing.
Component:	Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the 2WD/4WD config has not been setup in SM. Follow correct Service Master procedure to configure device(s).

6.1.358 B1573-13

Error code:	B1573-13
ECU	
Description:	Rear Inverter Safety Fault Active
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors

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	4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates a Safety Critical Fault is active. This fault code will be displayed In conjunction with active fault e.g. with Speed Sensor error / Brake / CAN.

6.1.359 B1574-13

Error code:	**B1574-13**
ECU	
Description:	Pump Inverter Safety Fault Active
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates a Safety Critical Fault is active. This fault code will be displayed In conjunction with active fault e.g. with Speed Sensor error / Brake / CAN.

6.1.360 B1575-13

Error code:	**B1575-13**
ECU	
Description:	Front inverter / Front right brake / Front motor inverter relay.
Component:	Inverter/Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors

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	4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Area Affected - High Side Input/Output, Open Drain Out 1, 2 & 3 On the Front Inverter check continuity from -C02_4WD pin 29/35 (wire #4540F) to the following: (1) FR AC Drive Motor, connector -C04_4WD, pin 3/8 (wire #4540A) (2) Front Motor Inverter Relay Coil, connector -C56_2WD, pin 1/1 (wire #4540C) If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. Check interconnect connectors (-C06_2WD and -C06_4WD). If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Front Inverter check continuity from connector -C02_4WD pin 4/35 (Wire #4542) to Front Right Motor, connector -C04_4WD pin 4/8. If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Front Inverter check continuity from Connector -C02_4WD pin 1/35 (Wire #6505) to Front Motor Inverter Relay, connector -C55_2WD pin 1/1. If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. Check interconnect connectors (-C06_2WD and -C06_4WD). If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Front Inverter, check continuity from -C02_4WD pin 28/35 (Wire #1500CA) to Precharge Relay -R7_2WD pin 1 (Wire #1500C). Note: Relay -R7_2WD provides pre-charge voltage to all 3 inverters. Check Function of Relay -R7_2WD. Check Continuity from -FU1_2WD pin A to -R7_2WD pin 5. Check Fuse -FU1_2WD (10A Fuse). If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Front Inverter check for a Short Circuit fault from B- Terminal to the following: (1) -C02_4WD pin 28/35 (2) -C02_4WD pin 29/35 If Short Circuit or Low Reading (<100 Ohms) Inspect wiring for fault in respective area. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Front Inverter check for a Short Circuit fault from + Terminal to the following: (1) -C02_4WD pin 1/35 (2) -C02_4WD pin 4/35 (3) -C02_4WD pin 28/35 (4) -C02_4WD pin 29/35 If Short Circuit or Low Reading (<100 Ohms) Inspect wiring for fault in respective area. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. Test condition and function of Coil and Switch of Relay -R11_TH (Albright DC Contactor) Consider replacement/swap of Front Right Motor, Front Inverter or Relay -R11_TH

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6.1.361 B1576-13

Error code:	B1576-13
ECU	
Description:	Front right brake fault / AC Motor contactor coil.
Component:	Motor brake/coil
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Fault detected on Front Right Motor Brake or AC Motor Contactor Coil. Check Front Motor connector -C04_4WD is seated correctly and for damage. Check pin 4/8 (Wire #4541) is inserted correctly and for damage. Check Front inverter connector -C02_4WD is seated correctly and for damage. Check pin 4/35 (Wire #4541) is inserted correctly and for damage. Measure resistance between -C04_4WD pin 4/8 and -C02_4WD pin 4/35. Expected value < 2.0 Ohms. Check condition of harness between Front Motor and Inverter. Check multicore shield is connected to GND at -T1_4WD. Check Front Inverter connector -C02_4WD pin 1/35 is seated correctly and for damage. Check Front Motor Inverter Relay -R11_TH for damage. Check -C55_2WD is connected correctly and for damage. Measure resistance from Relay connector -C55_2WD (Wire #6505) to Inverter connector -C02_4WD pin 1/35. Expected value < 2.0 Ohms.

6.1.362 B1578-13

Error code:	B1578-13
ECU	
Description:	Front AC Motor inverter / Front right AC Drive motor temperature.
Component:	Motor

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Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Area Affected - Motor1 Temp +/-, Temp Sens +VE/-VE. On Front Inverter, check condition and seating of -C02_4WD. On Front Right AC Drive Motor, check condition and seating of -C04_4WD. On Front Inverter check resistance from -C02_4WD pin 26/35 (Wire #4500) to Front Right AC Motor -C04_4WD pin 6/8. Expect < 2 Ohms. On Front Inverter check resistance from -C02_4WD pin 27/35 (Wire #4501) to Front Right AC Motor -C04_4WD pin 5/8. Expect < 2 Ohms. On Front Inverter check resistance from -C02_4WD pin 26/35 to B+. Expect > 200 Ohms. On Front Inverter check resistance from -C02_4WD pin 27/35 to B-. Expect > 200 Ohms. If fault(s) found, isolate components to identify faulty component.

6.1.363 B1579-13

Error code:	**B1579-13**
ECU	
Description:	Front AC Motor inverter internal temperature sensor.
Component:	Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is an internal fault to the Front Inverter Module. Check for any obvious damage to the connectors and power supply terminals. Replace Inverter module.

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6.1.364 B1580-13

Error code:	B1580-13
ECU	
Description:	Front right motor speed above normal.
Component:	Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Motor speed is above normal operating conditions. Power to motor is reduced. If problem persists, check via SM that wheel rotation is at predicted values

6.1.365 B1581-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1581-13

Error code:	B1581-13
ECU	
Description:	Front right motor battery voltage spike.
Component:	Motor/Battery
Vehicle reaction:	Continue normal operation, also check for system reactions in OD

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Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	WARNING! During REGEN Battery voltage spiking above 65V. Warning Only. Fault will clear when battery voltage has stabilized. Cycle ignition to clear fault. check all the battery and inverter terminals are tight If fault persists, Check Motor connectors, battery health. Seek advice from Access Engineering Team.

6.1.366 B1582-13

Error code:	**B1582-13**
ECU	
Description:	Front right motor inverter registering low voltage.
Component:	Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Supply voltage has dropped below <44 V DC. Recharge is required.

6.1.367 B1583-13

Error code:	**B1583-13**
ECU	
Description:	Front right motor inverter at 85 Celsius.
Component:	Inverter

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Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Fault indicates the Motor Inverter internal temperature has risen above nominal operating range. Acceleration current is reduced.Turn off machine and allow to cool before continuing to drive vehicle. If issue persists, Check motor, wheel harness or connectors related to the fault area are not damaged. Check brakes are not partially or fully engaged. If no faults found - replace Inverter

6.1.368 B1584-13

Error code:	**B1584-13**
ECU	
Description:	Front right motor / Inverter temperature low.
Component:	Front Motor/Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the machine is operating below the predefined safe operating temperature limits. Allow the machine to warm up before continuing to operate. Check via Service Master that correct / expected temperature values are being read from the Traction Motors. Check connectors and harness between motor and inverter for damage.

6.1.369 B1585-13

Error code:	**B1585-13**
ECU	

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Description:	Front right motor / Inverter temperature high.
Component:	Front Motor/ Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the motor is operating above the predefined operating temperature limits. Issue may be caused by extended current requirements i.e. driving long distance uphill, erratic driving or damage to the wheel. Motor performance will be reduced. Allow the motor to cool down before continuing to operate. Check via Service Master that correct / expected temperature values are being read from the AC Motor. Check connectors and harness between motor and inverter for damage. Replace motor if issue persists.

6.1.370 B1586-13

Error code:	**B1586-13**
ECU	
Description:	Front right motor temperature low.
Component:	Front Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the minimum operating temperature has been exceeded. Check via Service Master that correct / expected temperature values are being read from the Traction Motors. Allow machine to warm up to correct operating temperature range.

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	Check connectors and harness between motor and inverter for damage.

6.1.371 B1587-13

Error code:	B1587-13
ECU	
Description:	Front Right Wheel Abnormal Deceleration Detected
Component:	Front Wheel
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that an extreme deceleration has been detected from the motor. Potential causes include loss of an encoder channel. Extreme driving behaviour. Partially stuck or Stuck Brakes. Poor signal being returned from speed sensor. Check connectors on the motor for correct seating and damage. Check connector on inverter for for correct seating and damage. For front wheels check 12V - 5V voltage converter is operating correctly, Connector is seated correctly and no damage. Check continuity of Speed Sense Signal: Check continuity between Wheel Motor -C04_4WD pin 7/8 (Wire #4518) to Inverter -C02_4WD pin 7/35 Check continuity between Wheel Motor -C04_4WD pin 8/8 (Wire #4519) to Inverter -C02_4WD pin 8/35 Check no short circuit between above pins. Power will need to be cycled to inverter to clear faults.

6.1.372 B1588-13

Error code:	B1588-13
ECU	
Description:	Front Right Motor Invalid or out of range speed signal

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Component:	Front Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicated that the amplitude of the speed sensor input to the inverter (sin / cos) is too high or the RPM value is too high. Possible causes to this can be due to: Sensor failure; Poor connection to the motor or inverter connectors; Electromagnetic interference; Damaged shielding of motor to inverter harness. Check connectors on the motor for correct seating and damage. Check connector on inverter for for correct seating and damage. For front wheels check 12V - 5V voltage converter is operating correctly, Connector is seated correctly and no damage. Check continuity of Speed Sense Signal: Check continuity between Wheel Motor -C04_4WD pin 7/8 (Wire #4518) to Inverter -C02_4WD pin 7/35 Check continuity between Wheel Motor -C04_4WD pin 8/8 (Wire #4519) to Inverter -C02_4WD pin 8/35 Check no short circuit between above pins. Power will need to be cycled to inverter to clear faults.

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6.1.373 B1589-13

Error code:	**B1589-13**
ECU	
Description:	Front right AC Motor sensor supply out of range.
Component:	Front Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors

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	4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates the following issues: - Sensor supply current is too low (lower limit 0.006A) - Sensor supply Current is too high (Higher limit 0.068A) - Sensor readings are out of nominal readings - Sensor supply voltage is out of range (11-16VDC) For front motors, check 12V - 5V Voltage converter. Check connector is seated correctly and no damage visible. Check Front Right AC Motor and Front Inverter connectors are seated correctly and no damage visible. On Front Inverter, disconnect -C02_4WD connector and check no short circuit between pins 31/35 (Wire #4512) and 32/25 (Wire #4512E). Measure resistance of these pins to voltage converter connector -C03_4WD pins A/3 and C/3 respectively. Expect <2.0 Ohms. On Front Right AC Motor, disconnect -C04_4WD connector and check no short circuit between pins 1/8 (Wire #4525) and 2/8 (Wire #4528). Measure resistance of these pins to voltage converter connector -C03_4WD pins B/3 and C/3 respectively. Expect <2.0 Ohms. Speed Sensor may be faulty. Voltage converter may be faulty. On Front Inverter, disconnect -C02_4WD connector and check no short circuit between pins 7/35 and 8/35. On Front Inverter measure resistance from -C02_4WD pin 7/35 (Wire #4518) to Front Left AC Motor -C04_4WD pin 6/8. Expect < 2 Ohms. On Front Inverter measure resistance from -C02_4WD pin 8/35 (Wire #4519) to Front Left AC Motor -C04_4WD pin 5/8. Expect < 2 Ohms. If fault(s) found, isolate components to identify faulty component. Motor Temp Sensor may be faulty

6.1.374 B1590-13

Error code:	**B1590-13**
ECU	
Description:	Front Right Motor - Speed Encoder Feedback Sensor Fail
Component:	Speed Encoder
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors

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	4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	The Speed Encoders are enclosed within the motor housing. It provides Speed and Direction feedback to the Inverter. The front motors require a 12V to 5V voltage regulator to provide a 5V supply to the speed sensors. This is not required on the rear motors or pump motor. Check connector at motor, voltage regulator (front motors only) and inverter. Check for correct seating, termination and damage. On the motor connector, measure voltage at -C01_4WD pin 1/8 (+5V) (Wire #4525) to pin 2/8 (GND) (Wire #4528). Expected value, 5V DC. Follow back to inverter via voltage regulator in case of voltage loss. Measure resistance from Front Inverter Connector -C02_4WD pin 7/35 (Wire #4518) to Front Right Motor Connector -C04_4WD pin 7/8. Expected value <2.0 Ohms. Measure resistance from Front Inverter Connector -C02_4WD pin 8/35 (Wire #4519) to Front Right Motor Connector -C04_4WD pin 8/8. Expected value <2.0 Ohms. The machine ignition will require a power cycle (Key Off-Key On) to reset any errors. Note: extra errors may have been created during fault finding process, i.e. removing connectors.

6.1.375 B1591-13

Error code:	**B1591-13**
ECU	
Description:	Front inverter internal power supply out of range error.
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This fault indicates there has been an internal fault to the inverter. Replace the Inverter

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6.1.376 B1592-13

Error code:	B1592-13
ECU	
Description:	Front Right Motor exceeding temperature limit (165 Celsius)
Component:	Front Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Check Motor connector is fully engaged and no damage is visible. Check cable is damage free from Motor to Inverter. Check sensor is returning correct values in Service Master. Check brakes are not partially or fully stuck on. Check for damage to Motor. Allow motor to cool down and re-check. Replace motor if necessary.

6.1.377 B1593-13

Error code:	B1593-13
ECU	
Description:	Front Inverter exceeding temperature limit (110 Celsius)
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness

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Service Action:	Indicates the the Inverter internal temperature has reached 110 Celsius. This is measured at the inverter heat sink. Check movement of wheels is not impaired. May be caused by prolonged use in high ambient temperatures. Allow Inverter to cool and check fault clears after power cycle. If fault continues, replace Inverter.

6.1.378 B1594-13

Error code:	**B1594-13**
ECU	
Description:	AC Drive Current Above Limit (350 Amperes)
Component:	Drive Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting that the U,V,W terminals on the motor are drawing to much current from the invertor above 150% of allowed. Current can be checked through diagnostic tool. Need to know what normal current is. Check U,V,W cables from invertor to motor and ensure there is no damage or short circuit from other phases or to ground and B+. Check terminal tightness to correct torque values

6.1.379 B1595-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1595-13

Error code:	**B1595-13**
ECU	

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Description:	Front Inverter Reading 67 V DC supply
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting the supply battery voltage reached 67 V DC. The system is shutdown This happens if the machine is trying to regen particularly when the battery is full and the current produced that has nowhere to go Check batteries are not over swelled or damaged Check Main Contactor Restart machine and re-test

6.1.380 B1596-13

Error code:	**B1596-13**
ECU	
Description:	Front Inverter Reading 36 V DC
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting the +48 V DC supply battery voltage has reduced to a lower limit of +36 V DC Check the B+, X and B- terminals on the Inverter for damage or discoloration. Check Terminals are seated correctly. Recharge battery pack. Check battery voltages to ensure there is not a damaged battery in the pack. Replace batteries or cables as required.

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6.1.381 B1597-13

Error code:	B1597-13
ECU	
Description:	Front Right Motor Speed High
Component:	Front Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Motor speed is above 6500RPM. Check electrical connections to motor and Inverter and seated correctly and no damage found. Check U, V & W cables are correctly fastened and no damage visible. Reset machine and check via Service Master that wheel rotation speed is within predicted values. Check condition of wheel.

6.1.382 B1598-13

Error code:	B1598-13
ECU	
Description:	Front Inverter Power stage Fault
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness

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Service Action:	This is an internal power stage fault within the inverter. The torque current to the AC motor has been lost or intermittant. Replace the affected Inverter.

6.1.383 B1599-13

Error code:	**B1599-13**
ECU	
Description:	Front Inverter Incorrect Parameter / Software Setup
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Reflash SW via CAN2 (Diag Socket). See Help File for information on how to re-flash inverters. Restart machine - If no change, Replace Inverter

6.1.384 B1600-13

Error code:	**B1600-13**
ECU	
Description:	Front Inverter Internal Short Circuit Detected
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness

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Service Action:	Indicates the Inverter has checked its internal power stage and detected a short-circuit to the MOSFETs. Check no obvious fault at B+ and U.V & W terminals. Check for damage Replace Inverter

6.1.385 B1601-13

Error code:	**B1601-13**
ECU	
Description:	Front Right Motor Current Draw Mismatch
Component:	Front Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is an internal current measurement made within the inverter. Expected current draw does not meet tolerance for measured current draw. System will be disabled. Check phasing of U,V, W cables from inverter to motor are correct. I.e. Inverter 'U' is attached to Motor 'U'. Check no damage to Motor connections for U, V, W. If no issues found, replace Front Inverter.

6.1.386 B1602-13

Error code:	**B1602-13**
ECU	
Description:	Front Inverter Precharge Fail
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear

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Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates at start-up that +48 V DC was not present at the pre-charge input to the inverter. Check function of pre-charge relay -R7_2WD. If relay not switching, Check continuity of Relay coil GND from Pin 2 to Turntable GND2, Terminal -T03-GND_TH. Check Continuity from Relay Pin 4 (via centrejoint) to Base Bosch ECU pin 94/96. Check presence of 48 V DC at -R7_2WD pin 5. If not present, check condition of fuse -FU1_2WD (10A). If fuse is not blown, Check Wire #1500 is correctly terminated at positive busbar via terminal -T84_2WD. Check Continuity from -R7_2WD to the pre-charge input of Front Inverter at connector -C02_4WD pin 28/35.

6.1.387 B1603-13

Error code:	**B1603-13**
ECU	
Description:	System Restart Required
Component:	Motor/Inverter/Battery
Vehicle reaction:	Restart needed to clear limitation
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the system must be restarted after the fault has been cleared to remove stored fault.

6.1.388 B1604-13

Error code:	**B1604-13**
ECU	

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Description:	Front Inverter CAN Timeout Error
Component:	Inverter/CAN Harness
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates an issue on the CAN 2 network. Refer to schematic sheet named CAN 2 Network. Inspect ALL connectors on the CAN 2 Network. IMPORTANT! Isolate machine before commencing any further testing. Check CAN terminator is in place -CAN2_2WD (Near Front Right Wheel) and -CAN2_TCP (found inside base display enclosure) Remove -CAN2_TCP and measure resistance between pin A & B. Should measure 120 Ohm. If resistance measurement is significantly higher than this, recheck -CAN2_2WD is connected. Perform a continuity check of the CAN 2 Network by first checking continuity of CAN 2 LOW signals (GREEN) and Then CAN 2 HIGH signals (YELLOW) Perform a continuity check of the CAN 2 SHIELD. These tests must be performed to all devices on the CAN 2 Network. Check centerjoint interconnect -C89_2WD / -C89_TH is seated correctly and not damaged. Remember to replace -CAN2_TCP If still failing, disconnect all devices from the CAN 2 Network and check no short circuit between the CAN 2 HIGH and CAN 2 LOW signals. If a short is discovered, disconnect the center joint interconnect connectors and repeat the test to narrow down the search area for the fault. Remember to check all Connections have been re-made after rectifying fault.

6.1.389 B1605-13

Error code:	**B1605-13**
ECU	
Description:	Front Inverter 2WD/4WD Config Missing
Component:	Inverter

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Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the 2WD/4WD config has not been setup in SM. Follow correct Service Master procedure to configure device(s).

6.1.390 B1606-13

Error code:	**B1606-13**
ECU	
Description:	Front Inverter Safety Fault Active
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates a Safety Critical Fault is active. This fault code will be displayed In conjunction with active fault e.g. with Speed Sensor error / Brake / CAN.

6.1.391 B1607-13

Error code:	**B1607-13**
ECU	
Description:	Front Inverter / Front Left Brake / Front Motor Inverter Relay
Component:	Inverter/Motor

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Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Area Affected - High Side Input/Output, Open Drain Out 1, 2 & 3 On the Front Inverter check continuity from -C02_4WD pin 29/35 (wire #4540F) to the following: (1) FL AC Drive Motor, connector -C01_4WD, pin 3/8 (wire #4540B) (2) Front Motor Inverter Relay Coil, connector -C56_2WD, pin 1/1 (wire #4540C) If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. Check interconnect connectors (-C06_2WD and -C06_4WD). If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Front Inverter check continuity from connector -C02_4WD pin 25/35 (Wire #4541) to Front Left Motor, connector -C01_4WD pin 4/8. If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Front Inverter check continuity from Connector -C02_4WD pin 1/35 (Wire #6505) to Front Motor Inverter Relay, connector -C55_2WD pin 1/1. If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. Check interconnect connectors (-C06_2WD and -C06_4WD). If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Front Inverter, check continuity from -C02_4WD pin 28/35 (Wire #1500CA) to Precharge Relay -R7_2WD pin 1 (Wire #1500C). Note: Relay -R7_2WD provides pre-charge voltage to all 3 inverters. Check Function of Relay -R7_2WD. Check Continuity from -FU1_2WD pin A to -R7_2WD pin 5. Check Fuse -FU1_2WD (10A Fuse). If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Front Inverter check for a Short Circuit fault from B- Terminal to the following: (1) -C02_4WD pin 28/35 (2) -C02_4WD pin 29/35 If Short Circuit or Low Reading (<100 Ohms) Inspect wiring for fault in respective area. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Front Inverter check for a Short Circuit fault from + Terminal to the following: (1) -C02_4WD pin 1/35 (2) -C02_4WD pin 4/35

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	(3) -C02_4WD pin 28/35 (4) -C02_4WD pin 29/35 If Short Circuit or Low Reading (<100 Ohms) Inspect wiring for fault in respective area. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. Test condition and function of Coil and Switch of Relay -R11_TH (Albright DC Contactor) Consider replacement/swap of Front Left Motor, Front Inverter or Relay -R11_TH

6.1.392 B1608-13

Error code:	B1608-13
ECU	
Description:	Front Left Brake Fault
Component:	Front Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Fault detected on Front Left Motor Brake. Check Front Motor connector -C01_4WD is seated correctly and for damage. Check pin 4/8 (Wire #4541) is inserted correctly and for damage. Check Front inverter connector -C02_4WD is seated correctly and for damage. Check pin 25/35 (Wire #4541) is inserted correctly and for damage. Measure resistance between -C01_4WD pin 4/8 and -C02_4WD pin 25/35. Expected value < 2.0 Ohms. Check condition of harness between Front Motor and Inverter. Check multicore shield is connected to GND at -T1_4WD.

6.1.393 B1609-13

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Error code:	B1609-13
ECU	
Description:	Front AC Motor Inverter / Front Left AC Drive Motor Temp.
Component:	Inverter/Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Area Affected - Motor2 Temp +/-, Temp Sens +VE/-VE. On Front Inverter, check condition and seating of -C02_4WD. On Front Left AC Drive Motor, check condition and seating of -C01_4WD. On Front Inverter check resistance from -C02_4WD pin 15/35 (Wire #4500) to Front Left AC Motor -C01_4WD pin 6/8. Expect < 2 Ohms. On Front Inverter check resistance from -C02_4WD pin 16/35 (Wire #4501) to Front Left AC Motor -C01_4WD pin 5/8. Expect < 2 Ohms. On Front Inverter check resistance from -C02_4WD pin 15/35 to B+. Expect > 200 Ohms. On Front Inverter check resistance from -C02_4WD pin 16/35 to B-. Expect > 200 Ohms. If fault(s) found, isolate components to identify faulty component.

6.1.394 B1610-13

Error code:	B1610-13
ECU	

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Description:	Front AC Motor Inverter Internal Temp Sensor
Component:	Motor Temp Sensor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is an internal fault to the Front Inverter Module. Check for any obvious damage to the connectors and power supply terminals. Replace Inverter module.

6.1.395 B1611-13

Error code:	**B1611-13**
ECU	
Description:	Front Left Motor
Component:	Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Motor speed is above normal operating conditions. Power to motor is reduced. If problem persists, check via SM that wheel rotation is at predicted values

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6.1.396 B1612-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1612-13

Error code:	B1612-13
ECU	
Description:	Front Left Motor battery voltage spike.
Component:	Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	WARNING! During REGEN Battery voltage spiking above 65V. Warning Only. Fault will clear when battery voltage has stabilized. Cycle ignition to clear fault. check all the battery and inverter terminals are tight If fault persists, Check Motor connectors, battery health. Seek advice from Access Engineering Team.

6.1.397 B1613-13

Error code:	B1613-13
ECU	
Description:	Front Left Motor Inverter registering low voltage
Component:	Inverter

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Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Supply voltage has dropped below <44 V DC. Recharge is required.

6.1.398 B1614-13

Error code:	**B1614-13**
ECU	
Description:	Front Left Motor Inverter at 85 Deg C
Component:	Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Fault indicates the Motor Inverter internal temperature has risen above nominal operating range. Check Acceleration current is reduced.Turn off machine and allow to cool before continuing to drive vehicle. If issue persists, Check motor, wheel harness or connectors related to the fault area are not damaged. Check brakes are not partially or fully engaged. If no faults found - replace Inverter

6.1.399 B1615-13

Error code:	**B1615-13**
ECU	
Description:	Front Left Motor / Inverter Temp Low

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Component:	Motor/Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the machine is operating below the predefined safe operating temperature limits. Allow the machine to warm up before continuing to operate. Check via Service Master that correct / expected temperature values are being read from the Traction Motors. Check connectors and harness between motor and inverter for damage.

6.1.400 B1616-13

Error code:	**B1616-13**
ECU	
Description:	Front Left Motor / Inverter Temp High
Component:	Motor / Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the motor is operating above the predefined operating temperature limits. Issue may be caused by extended current requirements i.e. driving long distance uphill, erratic driving or damage to the wheel. Motor performance will be reduced. Allow the motor to cool down before continuing to operate. Check via Service Master that correct / expected temperature values are being read from the AC Motor. Check connectors and harness between motor and inverter for damage. Replace motor if issue persists.

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6.1.401 B1617-13

Error code:	B1617-13
ECU	
Description:	Front Left Motor Temperature Low
Component:	Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the minimum operating temperature has been exceeded. Check via Service Master that correct / expected temperature values are being read from the Traction Motors. Allow machine to warm up to correct operating temperature range. Check connectors and harness between motor and inverter for damage.

6.1.402 B1618-13

Error code:	B1618-13
ECU	
Description:	Front Left Wheel Abnormal Deceleration Detected
Component:	Front Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness

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Service Action:	Indicates that an extreme deceleration has been detected from the motor. Potential causes include loss of an encoder channel. Extreme driving behaviour. Intermittent Brakes Poor signal being returned from speed sensor. Check connectors on the motor for correct seating and damage. Check connector on inverter for for correct seating and damage. For front wheels check 12V - 5V voltage converter is operating correctly, Connector is seated correctly and no damage. Check continuity of Speed Sense Signal: Check continuity between Wheel Motor -C01_4WD pin 7/8 (Wire #4514) to Inverter -C02_4WD pin 17/35 Check continuity between Wheel Motor -C01_4WD pin 8/8 (Wire #4515) to Inverter -C02_4WD pin 19/35 Check no short circuit between above pins. Power will need to be cycled to inverter to clear faults.

6.1.403 B1619-13

Error code:	**B1619-13**
ECU	
Description:	Front Left Motor Invalid or out of range speed signal
Component:	Front Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicated that the amplitude of the speed sensor input to the inverter (sin / cos) is too high or the RPM value is too high. Possible causes to this can be due to: Sensor failure; Poor connection to the motor or inverter connectors; Electromagnetic interference; Damaged shielding of motor to inverter harness. Check connectors on the motor for correct seating and damage. Check connector on inverter for for correct seating and damage. For front wheels check 12V - 5V voltage converter is operating correctly, Connector is seated correctly and no damage. Check continuity of Speed Sense Signal:

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	Check continuity between Wheel Motor -C01_4WD pin 7/8 (Wire #4514) to Inverter -C02_4WD pin 17/35 Check continuity between Wheel Motor -C01_4WD pin 8/8 (Wire #4515) to Inverter -C02_4WD pin 19/35 Check no short circuit between above pins. Power will need to be cycled to inverter to clear faults.

6.1.404 B1620-13

Error code:	**B1620-13**
ECU	
Description:	Front Left AC Motor Sensor Supply out of range
Component:	Front Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates the following issues: - Sensor supply current is too low (lower limit 0.006A) - Sensor supply Current is too high (Higher limit 0.068A) - Sensor readings are out of nominal readings - Sensor supply voltage is out of range (11-16VDC) For front motors, check 12V - 5V Voltage converter. Check connector is seated correctly and no damage visible. Check Front Left AC Motor and Front Inverter connectors are seated correctly and no damage visible. On Front Inverter, disconnect -C02_4WD connector and check no short circuit between pins 31/35 (Wire #4512) and 32/25 (Wire #4512E). Measure resistance of these pins to voltage converter connector -C03_4WD pins A/3 and C/3 respectively. Expect <2.0 Ohms. On Front Left AC Motor, disconnect -C01_4WD connector and check no short circuit between pins 1/8 (Wire #4512B) and 2/8 (Wire #4513). Measure resistance of these pins to voltage converter connector -C03_4WD pins B/3 and C/3 respectively. Expect <2.0 Ohms. Speed Sensor may be faulty. Voltage converter may be faulty. On Front Inverter, disconnect -C02_4WD connector and check no short circuit between pins 15/35 and 16/35.

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	On Front Inverter measure resistance from -C02_4WD pin 15/35 (Wire #4500) to Front Left AC Motor -C01_4WD pin 6/8. Expect < 2 Ohms. On Front Inverter measure resistance from -C02_4WD pin 16/35 (Wire #4501) to Front Left AC Motor -C01_4WD pin 5/8. Expect < 2 Ohms. If fault(s) found, isolate components to identify faulty component. Motor Temp Sensor may be faulty

6.1.405 B1621-13

Error code:	B1621-13
ECU	
Description:	Front Left Motor - Speed Encoder Feedback Sensor Fail
Component:	Motor Encoder
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	The Speed Encoders are enclosed within the motor housing. It provides Speed and Direction feedback to the Inverter. The front motors require a 12V to 5V voltage regulator to provide a 5V supply to the speed sensors. This is not required on the rear motors or pump motor. Check connector at motor, voltage regulator (front motors only) and inverter. Check for correct seating, termination and damage. On the motor connector, measure voltage at -C01_4WD pin 1/8 (+5V) (Wire #4512B) to pin 2/8 (GND) (Wire #4513). Expected value, 5V DC. Follow back to inverter via voltage regulator in case of voltage loss. Measure resistance from Front Inverter Connector -C02_4WD pin 17/35 (Wire #4514) to Front Left Motor Connector -C01_4WD pin 7/8. Expected value <2.0 Ohms. Measure resistance from Front Inverter Connector -C02_4WD pin 19/35 (Wire #4514) to Front Left Motor Connector -C01_4WD pin 8/8. Expected value <2.0 Ohms. The machine ignition will require a power cycle (Key Off-Key On) to reset any errors. Note: extra errors may have been created during fault finding process, i.e. removing connectors.

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6.1.406 B1622-13

Error code:	B1622-13
ECU	
Description:	Front inverter internal power supply out of range error.
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This fault indicates there has been an internal fault to the inverter. Replace the Inverter

6.1.407 B1624-13

Error code:	B1624-13
ECU	
Description:	Front Inverter exceeding temperature limit (110 Celsius)
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates the the Inverter internal temperature has reached 110 Celcius. This is measured at the inverter heatsink. Check movement of wheels is not impaired. May be caused by prolonged use in high ambient temperatures.

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	Allow Inverter to cool and check fault clears after power cycle. If fault continues, replace Inverter.

6.1.408 B1625-13

Error code:	B1625-13
ECU	
Description:	AC Drive Current Above Limit (350 Amperes)
Component:	Drive Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting that the U,V,W terminals on the motor are drawing to much current from the invertor above 150% of allowed. Current can be checked through diagnostic tool. Need to know what normal current is. Check U,V,W cables from invertor to motor and ensure there is no damage or short circuit from other phases or to ground and B+. Check terminal tightness to correct torque values

6.1.409 B1626-13

B1626-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1626-13

Error code:	B1626-13
ECU	
Description:	Front Inverter Reading 67 V DC supply

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Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting the supply battery voltage reached 67 V DC. The system is shutdown This happens if the machine is trying to regen particularly when the battery is full and the current produced that has nowhere to go Check batteries are not over swelled or damaged Check Main Contactor Restart machine and re-test

6.1.410 B1627-13

Error code:	**B1627-13**
ECU	
Description:	Front Inverter Reading 36 V DC
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting the +48 V DC supply battery voltage has reduced to a lower limit of +36 V DC Check the B+, X and B- terminals on the Inverter for damage or discoloration. Check Terminals are seated correctly. Recharge battery pack. Check battery voltages to ensure there is not a damaged battery in the pack. Replace batteries or cables as required.

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6.1.411 B1628-13

Error code:	B1628-13
ECU	
Description:	Front Left Motor Speed High
Component:	Front Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Motor speed is above 6500RPM. Check electrical connections to motor and Inverter and seated correctly and no damage found. Check U, V & W cables are correctly fastened and no damage visible. Reset machine and check via Service Master that wheel rotation speed is within predicted values. Check condition of wheel.

6.1.412 B1629-13

Error code:	B1629-13
ECU	
Description:	Front Inverter Power stage Fault
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness

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Service Action:	This is an internal power stage fault within the inverter. The torque current to the AC motor has been lost or intermittant. Replace the affected Inverter.

6.1.413 B1630-13

Error code:	**B1630-13**
ECU	
Description:	Front Inverter Incorrect Parameter / Software Setup
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Reflash SW via CAN2 (Diag Socket). See Help File for information on how to re-flash inverters. Restart machine - If no change, Replace Inverter

6.1.414 B1631-13

Error code:	**B1631-13**
ECU	
Description:	Front Inverter Internal Short Circuit Detected
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness

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Service Action:	Indicates the Inverter has checked its internal power stage and detected a short-circuit to the MOSFETs. Check no obvious fault at B+ and U.V & W terminals. Check for damage. Replace Inverter

6.1.415 B1632-13

Error code:	**B1632-13**
ECU	
Description:	Front Left Motor Current Draw Mismatch
Component:	Front Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is an internal current measurement made within the inverter. Expected current draw does not meet tolerance for measured current draw. System will be disabled. Check phasing of U,V, W cables from inverter to motor are correct. I.e. Inverter 'U' is attached to Motor 'U'. Check no damage to Motor connections for U, V, W. If no issues found, replace Front Inverter.

6.1.416 B1633-13

Error code:	**B1633-13**
ECU	
Description:	Front Inverter Precharge Fail
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear

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Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates at start-up that +48 V DC was not present at the pre-charge input to the inverter. Check function of pre-charge relay -R7_2WD. If relay not switching, Check continuity of Relay coil GND from Pin 2 to Turntable GND2, Terminal -T03-GND_TH. Check Continuity from Relay Pin 4 (via centrejoint) to Base Bosch ECU pin 94/96. Check presence of 48 V DC at -R7_2WD pin 5. If not present, check condition of fuse -FU1_2WD (10A). If fuse is not blown, Check Wire #1500 is correctly terminated at positive busbar via terminal -T84_2WD. Check Continuity from -R7_2WD to the pre-charge input of Front Inverter at connector -C02_4WD pin 28/35.

6.1.417 B1634-13

Error code:	**B1634-13**
ECU	
Description:	System Restart Required
Component:	Inverter/Motor/Battery
Vehicle reaction:	Restart needed to clear limitation
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the system must be restarted after the fault has been cleared to remove stored fault.

6.1.418 B1635-13

Error code:	**B1635-13**
ECU	

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Description:	Front Inverter CAN Timeout Error
Component:	Inverter/CAN Harness
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates an issue on the CAN 2 network. Refer to schematic sheet named CAN 2 Network. Inspect ALL connectors on the CAN 2 Network. IMPORTANT! Isolate machine before commencing any further testing. Check CAN terminator is in place -CAN2_2WD (Near Front Right Wheel) and -CAN2_TCP (found inside base display enclosure) Remove -CAN2_TCP and measure resistance between pin A & B. Should measure 120 Ohm. If resistance measurement is significantly higher than this, recheck -CAN2_2WD is connected. Perform a continuity check of the CAN 2 Network by first checking continuity of CAN 2 LOW signals (GREEN) and Then CAN 2 HIGH signals (YELLOW) Perform a continuity check of the CAN 2 SHIELD. These tests must be performed to all devices on the CAN 2 Network. Check center joint interconnect -C89_2WD / -C89_TH is seated correctly and not damaged. Remember to replace -CAN2_TCP If still failing, disconnect all devices from the CAN 2 Network and check no short circuit between the CAN 2 HIGH and CAN 2 LOW signals. If a short is discovered, disconnect the center joint interconnect connectors and repeat the test to narrow down the search area for the fault. Remember to check all Connections have been re-made after rectifying fault.

6.1.419 B1637-13

Error code:	**B1637-13**
ECU	
Description:	Front Inverter Safety Fault Active or Front Inverter 2WD/4WD Config Missing
Component:	Inverter

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Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates a Safety Critical Fault is active. This fault code will be displayed In conjunction with active fault e.g. with Speed Sensor error / Brake / CAN. Or Indicates that the 2WD/4WD config has not been setup in SM. Follow correct Service Master procedure to configure device(s).

6.1.420 B1638-13

Error code:	**B1638-13**
ECU	
Description:	Rear Inverter / Rear Right Brake / Rear Motor Inverter Relay
Component:	Inverter/Motor Relay
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Area Affected - High Side Input/Output, Open Drain Out 1, 2 & 3 On the Rear Inverter check continuity from -C01_2WD pin 29/35 (wire #4526E) to the following: (1) RR AC Drive Motor, connector -C08_2WD, pin 1/2 (wire #4536A) (2) Rear Motor Inverter Relay Coil, connector -C56_2WD, pin 1/1 (wire #4536C) If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Rear Inverter check continuity from connector -C01_2WD pin 4/35 (Wire #4537) to Rear Right Motor, connector -C08_2WD pin 2/2.

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	If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Rear Inverter check continuity from Connector -C02_4WD pin 1/35 (Wire #6505) to Rear Motor Inverter Relay, connector -C55_2WD pin 1/1. If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault.. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Rear Inverter, check continuity from -C01_2WD pin 28/35 (Wire #1500K) to Precharge Relay -R7_2WD pin 1 (Wire #1500C). Note: Relay -R7_2WD provides pre-charge voltage to all 3 inverters. Check Function of Relay -R7_2WD. Check Continuity from -FU1_2WD pin A to -R7_2WD pin 5. Check Fuse -FU1_2WD (10A Fuse). If Open Circuit or High Reading (>2 Ohms) Inspect wiring for fault. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Rear Inverter check for a Short Circuit fault from B- Terminal to the following: (1) -C02_4WD pin 28/35 (2) -C02_4WD pin 29/35 If Short Circuit or Low Reading (<100 Ohms) Inspect wiring for fault in respective area. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. On the Rear Inverter check for a Short Circuit fault from + Terminal to the following: (1) -C02_4WD pin 1/35 (2) -C02_4WD pin 4/35 (3) -C02_4WD pin 28/35 (4) -C02_4WD pin 29/35 If Short Circuit or Low Reading (<100 Ohms) Inspect wiring for fault in respective area. If fault found: Replace as necessary. Cycle Ignition and check fault cleared. Test condition and function of Coil and Switch of Relay -R12_TH (Albright DC Contactor) Consider replacement/swap of Rear Right Motor, Rear Inverter or Relay -R12_TH

6.1.421 B1639-13

Error code:	**B1639-13**
ECU	
Description:	Rear Right Brake Fault / AC Motor Contactor Coil
Component:	Motor Contactor

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Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Fault detected on Rear Right Motor Brake or AC Motor Contactor Coil. Check Rear Motor connector -C08_2WD is seated correctly and for damage. Check pin 2/2 (Wire #4538) is inserted correctly and for damage. Check Rear inverter connector -C01_2WD is seated correctly and for damage. Check pin 4/35 (Wire #4541) is inserted correctly and for damage. Measure resistance between -C08_2WD pin 2/2 and -C01_2WD pin 4/35. Expected value < 2.0 Ohms. Check condition of harness between Rear Motor and Inverter. Check Rear Inverter connector -C01_2WD pin 1/35 is seated correctly and for damage. Check Rear Motor Inverter Relay -R12_TH for damage. Check connector -C57_2WD is connected correctly. Measure resistance from Relay connector -C57_2WD (Wire #6505) to Inverter connector -C01_2WD pin 1/35. Expected value < 2.0 Ohms.

6.1.422 B1640-13

Error code:	**B1640-13**
ECU	
Description:	Rear AC Motor Inverter / Rear Right AC Drive Motor Temp.
Component:	Inverter/Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Area Affected - Motor1 Temp +/-, Temp Sens +VE/-VE. On Rear Inverter, check condition and seating of -C01_2WD. On Rear Right AC Drive Motor, check condition and seating of -C03_2WD.

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	On Rear Inverter check resistance from -C01_2WD pin 26/35 (Wire #4500) to Rear Right AC Motor -C03_2WD pin 6/8. Expect < 2 Ohms. On Rear Inverter check resistance from -C01_2WD pin 27/35 (Wire #4501) to Rear Right AC Motor -C03_2WD pin 5/8. Expect < 2 Ohms. On Rear Inverter check resistance from -C01_2WD pin 26/35 to B+. Expect > 200 Ohms. On Rear Inverter check resistance from -C01_2WD pin 27/35 to B-. Expect > 200 Ohms. If fault(s) found, isolate components to identify faulty component.

6.1.423 B1642-13

Error code:	B1642-13
ECU	
Description:	Rear AC Motor Inverter Internal Temp Sensor
Component:	Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is an internal fault to the Rear Inverter Module. Check for any obvious damage to the connectors and power supply terminals. Replace Inverter module.

6.1.424 B1643-13

Error code:	B1643-13
ECU	
Description:	Rear Right Motor
Component:	Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD

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Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Motor speed is above normal operating conditions. Power to motor is reduced. If problem persists, check via SM that wheel rotation is at predicted values

6.1.425 B1644-13

Error code:	**B1644-13**
ECU	
Description:	Rear Right Motor
Component:	Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	WARNING! During REGEN Battery voltage spiking above 65V. Warning Only. Fault will clear when battery voltage has stabilized. Cycle ignition to clear fault. If fault persists, Check Motor connectors, battery health. Seek advice from Access Engineering Team.

6.1.426 B1645-13

Error code:	**B1645-13**
ECU	
Description:	Rear Right Motor Inverter registering low voltage
Component:	Inverter

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Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Supply voltage has dropped below <44 V DC. Recharge is required.

6.1.427 B1646-13

Error code:	**B1646-13**
ECU	
Description:	Rear Right Motor Inverter at 85 Deg C
Component:	Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Fault indicates the Motor Inverter internal temperature has risen above nominal operating range. Acceleration current is reduced.Turn off machine and allow to cool before continuing to drive vehicle. If issue persists, Check motor, wheel harness or connectors related to the fault area are not damaged. Check brakes are not partially or fully engaged. If no faults found - replace Inverter

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6.1.428 B1647-13

Error code:	**B1647-13**
ECU	
Description:	Rear Right Motor / Inverter Temp Low

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Component:	Inverter/Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the machine is operating below the predefined safe operating temperature limits. Allow the machine to warm up before continuing to operate. Check via Service Master that correct / expected temperature values are being read from the Traction Motors. Check connectors and harness between motor and inverter for damage.

6.1.429 B1648-13

Error code:	**B1648-13**
ECU	
Description:	Rear Right Motor / Inverter Temp High
Component:	Motor / Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the motor is operating above the predefined operating temperature limits. Issue may be caused by extended current requirements i.e. driving long distance uphill, erratic driving or damage to the wheel. Motor performance will be reduced. Allow the motor to cool down before continuing to operate. Check via Service Master that correct / expected temperature values are being read from the AC Motor. Check connectors and harness between motor and inverter for damage. Replace motor if issue persists.

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6.1.430 B1649-13

Error code:	B1649-13
ECU	
Description:	Rear Right Motor Temperature Low
Component:	Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the minimum operating temperature has been exceeded. Check via Service Master that correct / expected temperature values are being read from the Traction Motors. Allow machine to warm up to correct operating temperature range. Check connectors and harness between motor and inverter for damage.

6.1.431 B1650-13

Error code:	B1650-13
ECU	
Description:	Rear Right Wheel Abnormal Deceleration Detected
Component:	Rear Motor/ Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness

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Service Action:	Indicates that an extreme deceleration has been detected from the motor. Potential causes include loss of an encoder channel. Extreme driving behaviour. Partially Stuck or Stuck Brakes Poor signal being returned from speed sensor. Check connectors on the motor for correct seating and damage. Check connector on inverter for for correct seating and damage. Check continuity of Speed Sense Signal: Check continuity between Wheel Motor -C03_2WD pin 2/4 (Wire #4526) to Inverter -C01_2WD pin 7/35 Check continuity between Wheel Motor -C03_4WD pin 3/4 (Wire #4527) to Inverter -C01_2WD pin 8/35 Check no short circuit between above pins. Power will need to be cycled to inverter to clear faults.

6.1.432 B1651-13

Error code:	**B1651-13**
ECU	
Description:	Rear Right Motor Invalid or out of range speed signal
Component:	Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicated that the amplitude of the speed sensor input to the inverter (sin / cos) is too high or the RPM value is too high. Possible causes to this can be due to: Sensor failure; Poor connection to the motor or inverter connectors; Electromagnetic interference; Damaged shielding of motor to inverter harness. Check connectors on the motor for correct seating and damage. Check connector on inverter for for correct seating and damage. Check continuity of Speed Sense Signal: Check continuity between Wheel Motor -C03_2WD pin 2/4 (Wire #4526) to Inverter -C01_2WD pin 7/35 Check continuity between Wheel Motor -C03_4WD pin 3/4 (Wire #4527) to Inverter -C01_2WD pin 8/35 Check no short circuit between above pins.

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	Power will need to be cycled to inverter to clear faults.

6.1.433 B1652-13

Error code:	B1652-13
ECU	
Description:	Rear Right AC Motor Sensor Supply out of range
Component:	Rear Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates the following issues: - Sensor supply current is too low (lower limit 0.006A) - Sensor supply Current is too high (Higher limit 0.068A) - Sensor readings are out of nominal readings - Sensor supply voltage is out of range (11-16VDC) Check Rear Right AC Motor and rear Inverter connectors are seated correctly and no damage visible. On Rear Inverter, disconnect -C01_2WD connector and check no short circuit between pins 6/35 (Wire #4520) and 5/25 (Wire #4521). Measure resistance of these pins to Rear Right AC Motor -C03_2WD Pins 4/4 and 1/4 respectively. Expect <2.0 Ohms. Speed Sensor may be faulty. On Rear Inverter, disconnect -C01_2WD connector and check no short circuit between pins 26/35 and 27/35. On Rear Inverter measure resistance from -C01_2WD pin 26/35 (Wire #4504) to Rear Right AC Motor -C07_2WD pin 2/2. Expect < 2 Ohms. On Rear Inverter measure resistance from -C01_2WD pin 27/35 (Wire #4505) to Rear Right AC Motor -C07_2WD pin 1/2. Expect < 2 Ohms. If fault(s) found, isolate components to identify faulty component. Motor Temp Sensor may be faulty

6.1.434 B1653-13

Error code:	B1653-13

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ECU	
Description:	Rear Right Motor - Speed Encoder Feedback Sensor Fail
Component:	Rear Motor Speed Encoder
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	The Speed Encoders are enclosed within the motor housing. It provides Speed and Direction feedback to the Inverter. The front motors require a 12V to 5V voltage regulator to provide a 5V supply to the speed sensors. This is not required on the rear motors or pump motor. Check connector at motor, voltage regulator (front motors only) and inverter. Check for correct seating, termination and damage. On the motor connector, measure voltage at -C03_2WD pin 1/4 (+12V) (Wire #4520B) to pin 4/4 (GND) (Wire #4528). Expected value, 12V DC. Measure resistance from Rear Inverter Connector -C01_2WD pin 7/35 (Wire #4526) to Rear Left Motor Connector -C03_2WD pin 2/4. Expected value <2.0 Ohms. Measure resistance from Rear Inverter Connector -C01_2WD pin 8/35 (Wire #4527) to Rear Left Motor Connector -C03_2WD pin 3/4. Expected value <2.0 Ohms. The machine ignition will require a power cycle (Key Off-Key On) to reset any errors. Note: extra errors may have been created during fault finding process, i.e. removing connectors.

6.1.435 B1654-13

Error code:	**B1654-13**
ECU	
Description:	Rear inverter internal power supply out of range error.
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear

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Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This fault indicates there has been an internal fault to the inverter. Replace the Inverter

6.1.436 B1655-13

Error code:	**B1655-13**
ECU	
Description:	Rear Right Motor exceeding temperature limit (165 Celsius)
Component:	Rear Motor
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Check Motor connector is fully engaged and no damage is visible. Check cable is damage free from Motor to Inverter. Check sensor is returning correct values in Service Master. Check brakes are not partially or fully stuck on. Check for damage to Motor. Allow motor to cool down and re-check. Replace motor if necessary.

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6.1.437 B1656-13

Error code:	**B1656-13**
ECU	
Description:	Rear Inverter exceeding temperature limit (110 Celsius)

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Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates the the Inverter internal temperature has reached 110 Celcius. This is measured at the inverter heatsink. Check movement of wheels is not impaired. May be caused by prolonged use in high ambient temperatures. Allow Inverter to cool and check fault clears after power cycle. If fault continues, replace Inverter.

6.1.438 B1657-13

Error code:	**B1657-13**
ECU	
Description:	AC Drive Current Above Limit (350 Amperes)
Component:	Drive Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting that the U,V,W terminals on the motor are drawing to much current from the invertor above 150% of allowed. Current can be checked through diagnostic tool. Need to know what normal current is. Check U,V,W cables from invertor to motor and ensure there is no damage or short circuit from other phases or to ground and B+. Check terminal tightness to correct torque values

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6.1.439 B1658-13

B1658-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1658-13

Error code:	B1658-13
ECU	
Description:	Rear Inverter Reading 67 V DC supply
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting the supply battery voltage reached 67 V DC. The system is shutdown This happens if the machine is trying to regen particularly when the battery is full and the current produced that has nowhere to go Check batteries are not over swelled or damaged Check Main Contactor Restart machine and re-test

6.1.440 B1659-13

Error code:	B1659-13
ECU	
Description:	Rear Inverter Reading 36 V DC
Component:	Inverter

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Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is detecting the +48 V DC supply battery voltage has reduced to a lower limit of +36 V DC Check the B+, X and B- terminals on the Inverter for damage or discoloration. Check Terminals are seated correctly. Recharge battery pack. Check battery voltages to ensure there is not a damaged battery in the pack. Replace batteries or cables as required.

6.1.441 B1660-13

Error code:	**B1660-13**
ECU	
Description:	Rear Right Motor Speed High
Component:	Rear Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Motor speed is above 6500RPM. Check electrical connections to motor and Inverter and seated correctly and no damage found. Check U, V & W cables are correctly fastened and no damage visible. Reset machine and check via Service Master that wheel rotation speed is within predicted values. Check condition of wheel.

6.1.442 B1661-13

Error code:	**B1661-13**

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ECU	
Description:	Rear Inverter Power stage Fault
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is an internal power stage fault within the inverter. The torque current to the AC motor has been lost or intermittant. Replace the affected Inverter.

6.1.443 B1662-13

Error code:	**B1662-13**
ECU	
Description:	Rear Inverter Incorrect Parameter / Software Setup
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Reflash SW via CAN2 (Diag Socket). See Help File for information on how to re-flash inverters. Restart machine - If no change, Replace Inverter

6.1.444 B1663-13

Error code:	**B1663-13**

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ECU	
Description:	Rear Inverter Internal Short Circuit Detected
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates the Inverter has checked its internal power stage and detected a short-circuit to the MOSFETs. Check no obvious fault at B+ and U.V & W terminals. Check for damage. Replace Inverter

6.1.445 B1664-13

Error code:	**B1664-13**
ECU	
Description:	Rear Right Motor Current Draw Mismatch
Component:	Rear Motor
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	This is an internal current measurement made within the inverter. Expected current draw does not meet tolerance for measured current draw. System will be disabled. Check phasing of U,V, W cables from inverter to motor are correct. I.e. Inverter 'U' is attached to Motor 'U'. Check no damage to Motor connections for U, V, W. If no issues found, replace Rear Inverter.

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6.1.446 B1665-13

Error code:	B1665-13
ECU	
Description:	Rear Inverter Precharge Fail
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates at start-up that +48 V DC was not present at the pre-charge input to the inverter. Check function of pre-charge relay -R7_2WD. If relay not switching, Check continuity of Relay coil GND from Pin 2 to Turntable GND2, Terminal -T03-GND_TH. Check Continuity from Relay Pin 4 (via centrejoint) to Base Bosch ECU pin 94/96. Check presence of 48 V DC at -R7_2WD pin 5. If not present, check condition of fuse -FU1_2WD (10A). If fuse is not blown, Check Wire #1500 is correctly terminated at positive busbar via terminal -T84_2WD. Check Continuity from -R7_2WD to the pre-charge input of Front Inverter at connector -C01_2WD pin 28/35.

6.1.447 B1666-13

B1666-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1666-13

Error code:	B1666-13
ECU	

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Description:	System Restart Required
Component:	Inverter/ Motor/Battery
Vehicle reaction:	Restart needed to clear limitation
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the system must be restarted after the fault has been cleared to remove stored fault. Usual when a safety reaction is locked until key cycle Check all 48V and 12V Battery health condition and battery cable for loose connection Check Earth cable from lower chassis to upper chassis. **Note - B1666-13 is a code to indicate an error is present the code to focus on is the one or ones displayed behind this**

6.1.448 B1667-13

Error code:	**B1667-13**
ECU	
Description:	Rear Inverter CAN Timeout Error
Component:	Inverter/ CAN Harness
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates an issue on the CAN 2 network. Refer to schematic sheet named CAN 2 Network. Inspect ALL connectors on the CAN 2 Network.

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	IMPORTANT! Isolate machine before commencing any further testing. Check CAN terminator is in place -CAN2_2WD (Near Front Right Wheel) and -CAN2_TCP (found inside base display enclosure) Remove -CAN2_TCP and measure resistance between pin A & B. Should measure 120 Ohm. If resistance measurement is significantly higher than this, recheck -CAN2_2WD is connected. Perform a continuity check of the CAN 2 Network by first checking continuity of CAN 2 LOW signals (GREEN) and Then CAN 2 HIGH signals (YELLOW) Perform a continuity check of the CAN 2 SHIELD. These tests must be performed to all devices on the CAN 2 Network. Check center joint interconnect -C89_2WD / -C89_TH is seated correctly and not damaged. Remember to replace -CAN2_TCP If still failing, disconnect all devices from the CAN 2 Network and check no short circuit between the CAN 2 HIGH and CAN 2 LOW signals. If a short is discovered, disconnect the center joint interconnect connectors and repeat the test to narrow down the search area for the fault. Remember to check all Connections have been re-made after rectifying fault.

6.1.449 B1668-13

Error code:	**B1668-13**
ECU	
Description:	Rear Inverter 2WD/4WD Config Missing
Component:	Inverter
Vehicle reaction:	Continue normal operation, also check for system reactions in OD
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates that the 2WD/4WD config has not been setup in SM. Follow correct Service Master procedure to configure device(s).

6.1.450 B1669-13

Error code:	**B1669-13**
ECU	

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Description:	Rear Inverter Safety Fault Active
Component:	Inverter
Vehicle reaction:	Disable system, restart needed to clear
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	Indicates a Safety Critical Fault is active. This fault code will be displayed In conjunction with active fault e.g. with Speed Sensor error / Brake / CAN.

6.1.451 B1670-17

B1670-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1670-17

Error code:	**B1670-17**
ECU	Platform ECU
Description:	JIB/PLATFORM FLOW Solenoid lower / left functions - Circuit open or short to high (12v)
Component:	Platform Solenoid
Vehicle reaction:	Disable platform rotate and allow Jib functions
Possible Cause:	1) A poor connection or damaged terminal within the connector(s) 2) A damaged or broken wire within the wiring harness 3) Component is damaged
Service Action:	1) Indicates a fault with the solenoid valve. The failure mode is undetermined. 2) Check the connectors to the solenoid valves, checking for backed out pins, bent pins, water ingress or any other form of damage.

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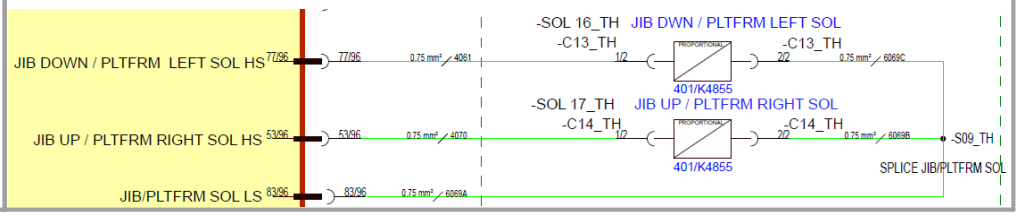
	3) Check the connectors to the Bosch ECU, checking for backed out pins, bent pins, water ingress or any other form of damage. 4) Check the harness between the solenoids and the Bosch ECU for any abrasions, pinching or any other form of damage. 5) Perform continuity checks between Bosch ECU and Solenoid valve connector pins. 6) Check for unintended shorts to GND or HIGH on any of the wires associated with the solenoid valve. 7) See related fault codes for further diagnostic information. 

6.1.452 B1671-17

Error code:	B1671-17
ECU	Base ECU
Description:	GLOW PLUG HS SC to High or OC
Component:	Glow Plug
Vehicle reaction:	Fault occurs before engine start - Ignore engine start Fault occurs during engine start (Crank is over) - Continue normal operation, Ignore new engine start sequence. Fault occurs during engine start (Before Cranking) - No detection of fault
Possible Cause:	1. Wiring short circuit to another wire. 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	1. Check the glow plug output is being turned ON on the Base Outputs display page. 2. Check the voltage going to the glow plug is 12V and 40A fuse FU02_EH. If not check wiring. If it is replace glow plug.

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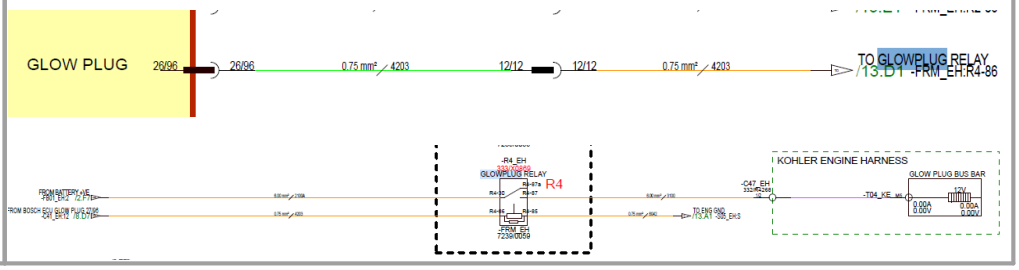
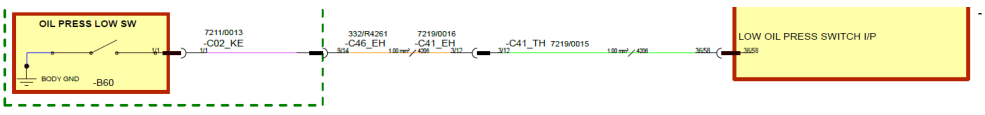
	3. Check Base ECU pin 26/96 and Wire #4203 for any cut and damage. 4. Check Glow Plug relay R4_EH, Replace if defective. 

6.1.453 B1673-17

Error code:	B1673-17
ECU	Base ECU
Description:	LOW OIL PRESSURE Switch SC to >5V
Component:	Oil Pressure Sensor
Vehicle reaction:	Detect failure modes, don't ignore any i/p
Possible Cause:	1. Wiring short circuit to another wire. 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component and damaged or broken wire within the wiring harness
Service Action:	1. Check Base ECU pin 36/58 for any bent or damage 2. Check Connector C41 and wire #4206 3. Check Ground wire for any cut or damage 4. Check Oil pressure sensor condition, Replace if defective. 

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6.1.454 B1675-17

B1675-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1675-17

Error code:	B1675-17
ECU	Platform ECU
Description:	Overload - Load Sensor 1 Out of Range (High).
Component:	Overload Sensor 1
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED
Possible Cause:	1) Load sensor is not calibrated 2) Load sensor is faulty 3) Short Circuit to High 4) Water ingress
Service Action:	1) Perform weight sensor calibration from display screen. 2) Check condition of weight sensor and connectors, replace if faulty 3) Check condition of wiring from Weight Sensor. Check Interconnects -C05_PH and -C06_PH. Check connections to DIN Rail terminal -S11-6 (Wires #6070 and #6072). Check inputs to Platform Bosch ECU on pins 68/96 through to 71/96. Check platform connector -C22_PH terminals W/21 and X/21. Check for bent or backed out terminals or debris within connectors. Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damamge on wiring harness. Perform continuity checks if neccesary and check resistance to +12V and +10V on -C22_PH terminals W/21 and X/21, checking for shorts to High. 4) Check all connectors for water ingress.

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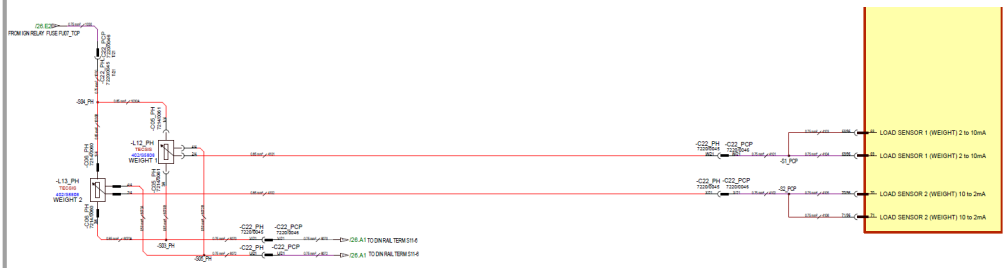

Load Cell Troubleshooting Flow Chart

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6.1.455 B1676-16

B1676-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1676-16

Error code:	B1676-16
ECU	Platform ECU
Description:	Overload - Load Sensor 1 Out of Range (Low) or Open Circuit.
Component:	Overload Sensor 1
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED NOTE:- In case of Open Circuit, the above machine reaction is applicable only when fault is detected on both pins(68,69) of load sensor 1
Possible Cause:	1) Load sensor is not calibrated 2) Connectors not fully inserted. 3) Load sensor is faulty 4) Short Circuit to Low 5) Water ingress
Service Action:	1) Perform weight sensor calibration from display screen. 2) Check condition of weight sensor and connectors -C05_PH and -C06_PH, Ensure connectors are fully inserted. Check platform connector -C22_PH. Check for backed out terminals. 3) Replace weight sensor if faulty 3) Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damamge on wiring harness. Perform continuity checks if neccesary and check resistance to GND on -C22_PH terminals W/21 and X/21, checking for shorts to Low. 4) Check all connectors for water ingress.

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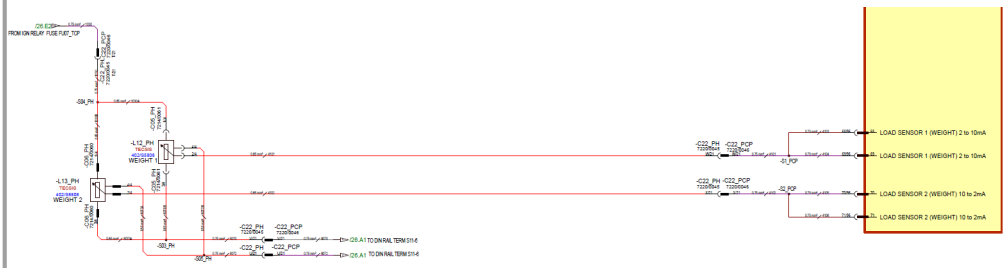

Load Cell Troubleshooting Flow Chart

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6.1.456 B1677-17

B1677-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1677-17

Error code:	B1677-17
ECU	Platform ECU
Description:	Overload - Load Sensor 2 Out of Range (High).
Component:	Overload Sensor 2
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED
Possible Cause:	1) Load sensor is not calibrated 2) Load sensor is faulty 3) Short Circuit to High 4) Water ingress
Service Action:	1) Perform weight sensor calibration from display screen. 2) Check condition of weight sensor and connectors, replace if faulty 3) Check condition of wiring from Weight Sensor. Check Interconnects -C05_PH and -C06_PH. Check connections to DIN Rail terminal -S11-6 (Wires #6070 and #6072). Check inputs to Platform Bosch ECU on pins 70/96 through to 71/96. Check platform connector -C22_PH terminals W/21 and X/21. Check for bent or backed out terminals or debris within connectors. Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damamge on wiring harness. Perform continuity checks if neccesary and check resistance to +12V and +10V on -C22_PH terminals W/21 and X/21, checking for shorts to High. 4) Check all connectors for water ingress.

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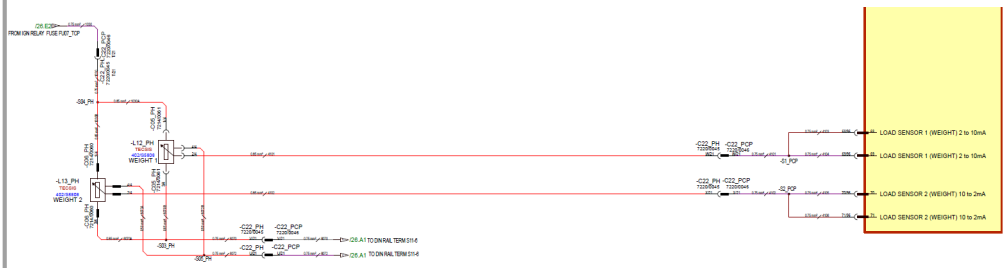

Load Cell Troubleshooting Flow Chart

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6.1.457 B1678-16

B1678-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1678-16

Error code:	B1678-16
ECU	Platform ECU
Description:	Overload - Load Sensor 2 Out of Range (Low) OR Open Circuit.
Component:	Overload Sensor 2
Vehicle reaction:	Detect failure mode; Implement Overload alarm and switch on Fault LED NOTE:- In case of Open Circuit, the above machine reaction is applicable only when fault is detected on both pins(70,71) of load sensor 2
Possible Cause:	1) Load sensor is not calibrated 2) Connectors not fully inserted. 3) Load sensor is faulty 4) Short Circuit to Low 5) Water ingress
Service Action:	1) Perform weight sensor calibration from display screen. 2) Check condition of weight sensor and connectors -C05_PH and -C06_PH, Ensure connectors are fully inserted. Check platform connector -C22_PH. Check for backed out terminals. 3) Replace weight sensor if faulty 3) Check wiring for any breaks, abrasions or pinching. Observe for any obvious fault or damamge on wiring harness. Perform continuity checks if neccesary and check resistance to GND on -C22_PH terminals W/21 and X/21, checking for shorts to Low. 4) Check all connectors for water ingress.

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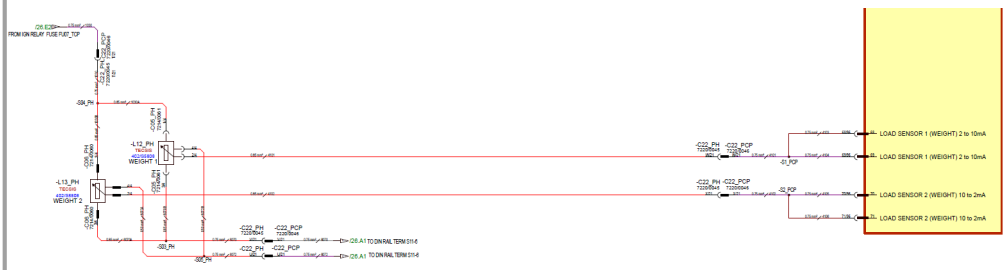

Load Cell Troubleshooting Flow Chart

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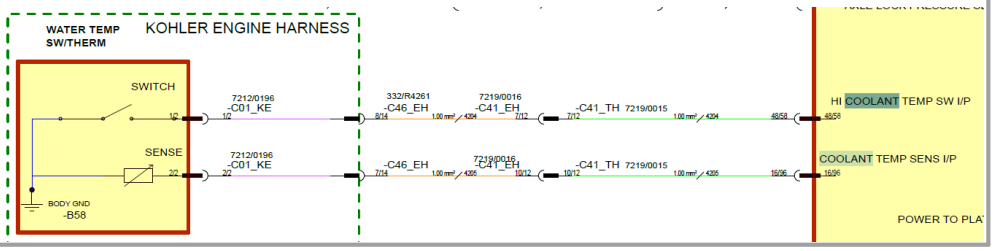
6.1.458 B1679-16

Error code:	B1679-16
ECU	Base ECU
Description:	COOLANT TEMP SENSOR OOR High or LOW
Component:	COOLANT TEMP SENSOR
Vehicle reaction:	Block engine start
Possible Cause:	1. Faulty Sensor 2. Wiring short circuit. 3. Base ECU reading the resistance out of range.
Service Action:	1. Check Base ECU pin 16/96 and wire #4205 2. Check Connector C41_EH & C41_TH for any damage. 3. Check Sensor pin 2/2 for ant damage or bent. 4. Check Ground cable. 5. Check sensor condition, Replace if defective. 

6.1.459 B1680-16

Error code:	B1680-16
ECU	Base ECU
Description:	2ND CHARGER MISSING
Component:	Battery Charger
Vehicle reaction:	Detect failure mode When Engine is running

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Possible Cause:	1. Charger Connection not connected correctly 2. A short circuit within the wiring harness 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged or Faulty component
Service Action:	1.Check Change Over Box - For any MCB trip 2.Check Charger connectors connected properly. 3.Check Connector and Pins for any damage or backout 4.Check cable and harness for any cut damage or pinch. 5. Check connections, wires, circuit breakers. 6. Run the generator and check the lights are coming ON on the front of the charger if not check the power supply.

6.1.460 B1681-16

Error code:	**B1681-16**
ECU	Base ECU
Description :	Unexpected Alternator input fault Short to low (When engine is started / Engine running)
Component :	Alternator
Vehicle reaction:	Continue Operation
Possible Cause:	1. A short circuit to the chassis 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check Base ECU pin 89/96 and wire #4201. 2. Check 12A fuse FU10_TCP and Wire #1033. 3. Check Engine ignition relay R2,replace if defective. 4. Check D+ relay, replace if defective.

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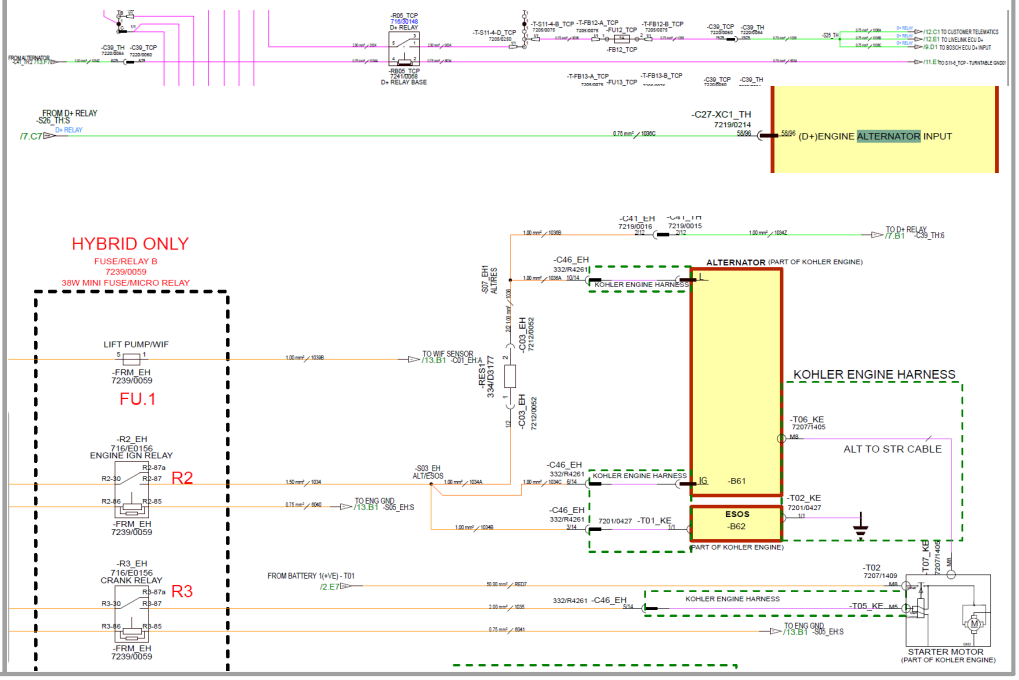
	5. Check 5A fuse FU12_TCP and wire #1036, 1036C and Base ECU pin 58/96. 6. Check alternator condition, replace if defective. 

6.1.461 B1682-16

Error code:	B1682-16
ECU	Base ECU
Description :	Unexpected low oil pressure input Short to Low / GND (When engine is started / Engine running)
Component :	Oil Pressure Switch
Vehicle reaction:	Continue Operation
Possible Cause:	1. A short circuit to the chassis 2. A short circuit within the harness connectors 3. Water damage/ingress within the harness connectors

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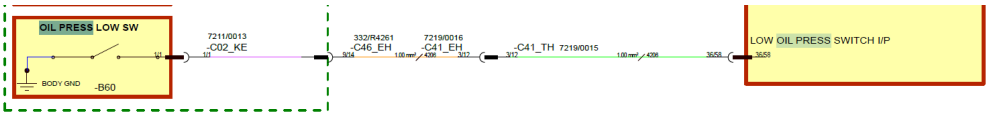
	4. Damaged component
Service Action:	1. Check connections and wires for short circuits 2. Check for any debris or water inside the connector terminals. 3. Check the harness is not damaged and is routed correctly. 4. The oil pressure switch is connected directly to engine ECU. There is only 1 wire and is ground returned through the engine block - open or closed circuit. 5. Oil pressure below 0.6bar - Switch closed (to ground). Oil pressure higher than 0.6 bar - Switch open. 6. Check when the Fault code is being raised, i.e when cranking or when switching off the machine. 7. Check the oil pressure switch and measure the signal for the when the engine is OFF and when the engine is ON. 

6.1.462 B1694-17

B1694-17

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1694-17

Error code:	**B1694-17**
ECU	Platform ECU
Description:	AUX / Overload override button unpressed condition - Circuit short to high (10v)
Component:	Platform Aux Switch
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit within the harness connectors

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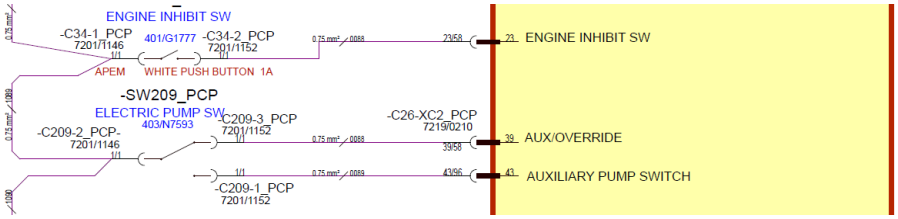
	3. Water damage/ingress within the harness connectors 4. Damaged component
Service Action:	1. Check switch Aux Pump Switch -SW209_PCP. Check Wire #0088 from Aux Switch connector -C209-2_PCP to Platform Bosch ECU Pin 43/96. Voltage should be +10V 2. Check Voltage a Aux Pump Switch Pin 2 at -C209-2_PCP. This should be +10V 3. Check Operation of switch 4. Check all connectors for water ingress. 5 Check harness especially for abrasions and pinching. Check condition of connectors, checking especially for backed out or bent pins 

6.1.463 B1695-16

B1695-16

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1695-16

Error code:	**B1695-16**
ECU	Platform ECU
Description:	AUX / Overload override button unpressed condition - Circuit short to low
Component:	Platform Aux Switch
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors

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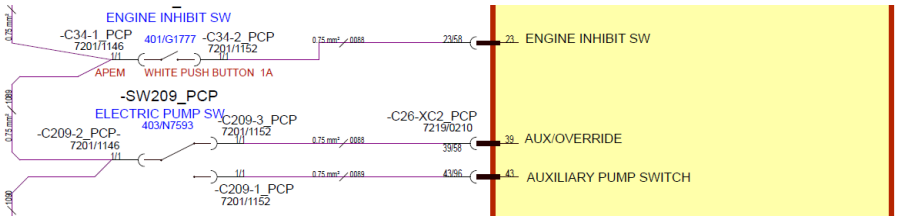
	5. Damaged component
Service Action:	1. Check switch Aux Pump Switch -SW209_PCP. Check Wire #0089 from Aux Switch connector -C209-3_PCP to Platform Bosch ECU Pin 43/96. Voltage should be +0V 2. Check Voltage a Aux Pump Switch Pin 2 at -C209-2_PCP. This should be +10V 3. Check Operation of switch 4. Check all connectors for water ingress. 5. Check harness especially for abrasions and pinching. Check condition of connectors, checking especially for backed out or bent pins 

6.1.464 B1696-13

B1696-13

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1696-13

Error code:	**B1696-13**
ECU	Platform ECU
Description:	AUX / Overload override button both conditions - Signal plausibility failure (Circuit open)
Component:	Platform Aux Switch
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component

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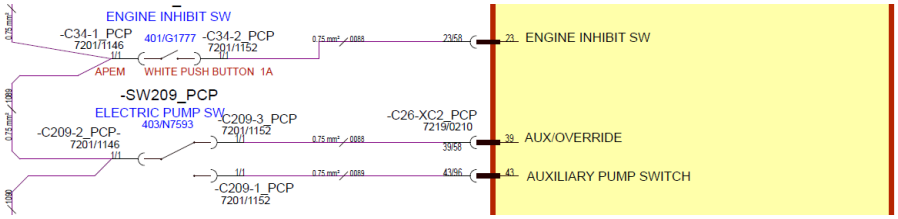
Service Action:	1. Check switch Aux Pump Switch -SW209_PCP. Check Wire #0089 from Aux Switch connector -C209-3_PCP to Platform Bosch ECU Pin 43/96. Voltage should be +0V 2. Check Voltage a Aux Pump Switch Pin 2 at -C209-2_PCP. This should be +10V 3. Check Operation of switch 4. Check all connectors for water ingress. 5. Check harness especially for abrasions and pinching. Check condition of connectors, checking especially for backed out or bent pins 

6.1.465 **B1697-92**

B1697-92

Machine Fault Codes 518 > DTC ERROR CODE 519 > B1697-92

Error code:	**B1697-92**
ECU	Platform ECU
Description:	AUX / Overload override button both conditions - Signal plausibility failure (10v)
Component:	Platform Aux Switch
Vehicle reaction:	Detect failure mode; Ignore input
Possible Cause:	1. A short circuit within the wiring harness 2. A short circuit to the chassis 3. A short circuit within the harness connectors 4. Water damage/ingress within the harness connectors 5. Damaged component
Service Action:	1. Check switch Aux Pump Switch -SW209_PCP. Check Wire #0089 from Aux Switch connector -C209-3_PCP to Platform Bosch ECU Pin 43/96.

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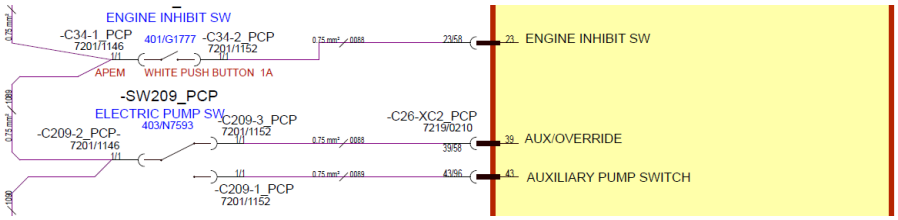
	Voltage should be +0V 2. Check Voltage a Aux Pump Switch Pin 2 at -C209-2_PCP. This should be +10V 3. Check Operation of switch 4. Check all connectors for water ingress. 5. Check harness especially for abrasions and pinching. Check condition of connectors, checking especially for backed out or bent pins 

6.1.466 U0073-87

Error code:	**U0073-87**
ECU	Base ECU
Description:	CAN1 node error
Component:	EGR
Vehicle reaction:	This fault code indicates the ECU has detected a fault on the CAN Communication.
Possible Cause:	Wiring Fault ECU Fault CAN System Fault
Service Action:	1. Check if other fault codes detected are found: - Yes: Refer also to the other fault codes before going to step 2 - NO: Proceed to Step 2 2. Check the harness continuity, and machine and earth contacts.Repair/replace as necessary 3. Disconnect the harness from the ECU and inspect. Check seals are in place, check for signs of corrosion and pin damage. 4. If harness is damaged repair/replace as necessary. If ECU pins are damaged, replace ECU and Reflash, see section on ECU flashing.

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	5. Check CAN BUS wiring, connectors and resistors See vehicle electrical schematic for details. 6. Check for any debris or water inside the ECU, EGR, Machine connection connector terminals 7. This may be as a consequence of pressure washing the engine, loose connectors or poor connector sealing. 8. Check the harness is not damaged and is routed correctly. 9. Complete the CAN testing procedure described in the help page CAN Network 257.

6.1.467 U0411-87

U0411-87

Machine Fault Codes 518 > DTC ERROR CODE 519 > U0411-87

Error code:	U0411-87
ECU	Base ECU
Description:	EGR no transmission/not received failure (for CAN)
Component:	EGR
Vehicle reaction:	This error code will display an red warning light on the DECU as well as an red warning prompt.
Possible Cause:	1. Damaged harness or harness connectors. 2. Faulty EGR
Service Action:	1. Check that the electrical connector is plugged into the component. 2. Check for any debris or water inside the ECU, EGR, Machine connection connector terminals.This may be as a consequence of pressure washing the engine, loose connectors or poor connector sealing.

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	3. Check the harness is not damaged and is routed correctly. 4. Check the harness continuity, and machine earth contacts. 5. Check the tension on the EGR wiring connector, If under 8,0 volts verify the machine electric circuits. 6. If the error Still persists, replace the component.

6.1.468 U1293-87

U1293-87

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1293-87

Error code:	U1293-87
ECU	Base ECU
Description:	CAN TIME OUT ERROR
Component:	ECU
Vehicle reaction:	1. Recipient transmits DM1 with SPN field = PGN of missing CAN message and FMI = 9 2. Recipient resets RC (rolling counter) to 0 3. Recipient disables all outputs 4. Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1. Incorrect software or mis configured device 2. A poor connection or damaged terminal within the connector(s) 3. A damaged or broken wire within the wiring harness 4. Component is damaged
Service Action:	1. Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully. 2. Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Live link Connector from Live link ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms.

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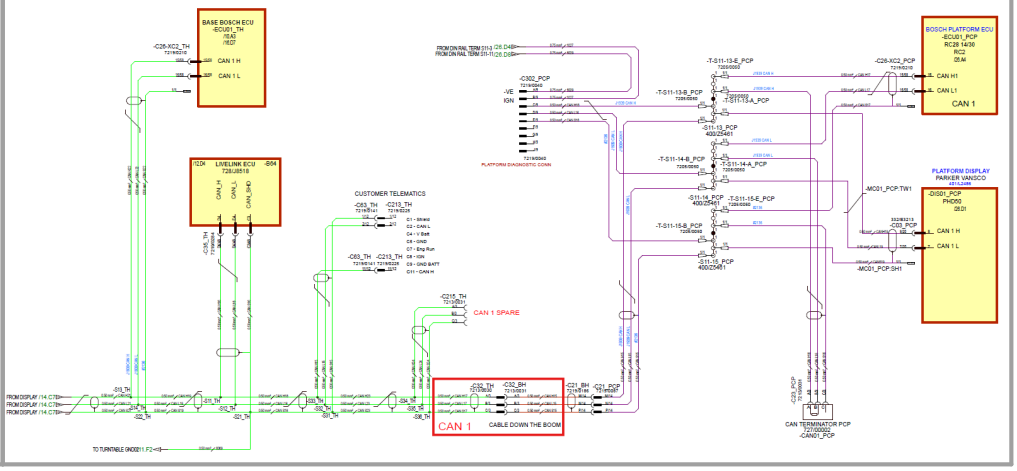
	Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section. 3. Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 4. Ensure all interconnects and device connectors are fully inserted. 5. Ensure all interconnects and device connectors have no water ingress issues. 6. Complete the full procedure for testing the CAN Network 257 the component information page. 

6.1.469 U1294-56

U1294-56

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1294-56

Error code:	**U1294-56**
ECU	Base ECU
Description :	CAN RC ERROR - Rolling counter for platform input signal1 message

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Component:	ECU
Vehicle reaction:	Recipient ignores received CAN message and transmits DM1 with SPN field = PGN of CAN message and FMI = 10 Recipient retains existing values. Recipient resets RC (rolling counter) to 0 Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1. Incorrect software or mis configured device 2. A poor connection or damaged terminal within the connector(s) 3. A damaged or broken wire within the wiring harness 4. Component is damaged
Service Action:	1. Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully. 2. Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Livelink Connector from Livelink ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms. Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section. 3. Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 4. Ensure all interconnects and device connectors are fully inserted. 5. Ensure all interconnects and device connectors have no water ingress issues. 6. Complete the full procedure for testing the CAN Network 257 the component information page.

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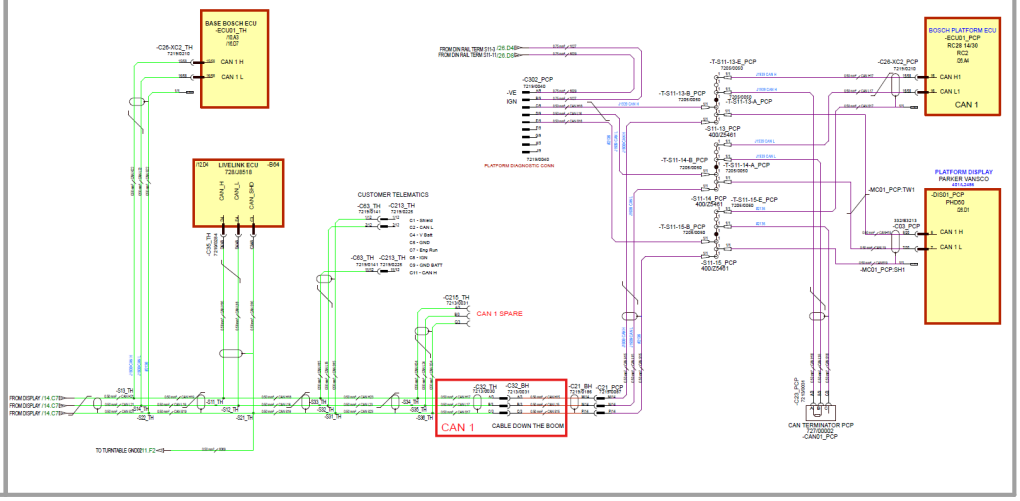

6.1.470 U1295-41

U1295-41

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1295-41

Error code:	U1295-41
ECU	Base ECU
Description:	CAN CHECK SUM ERROR
Component:	ECU
Vehicle reaction:	Recipient ignores received CAN message and transmits DM1 with SPN field = PGN of CAN message and FMI = 2 Recipient retains existing values. Recipient resets RC (rolling counter) to 0 Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1. Mismatch between transmitting and receiving message between ECU's
Service Action:	1. Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully.

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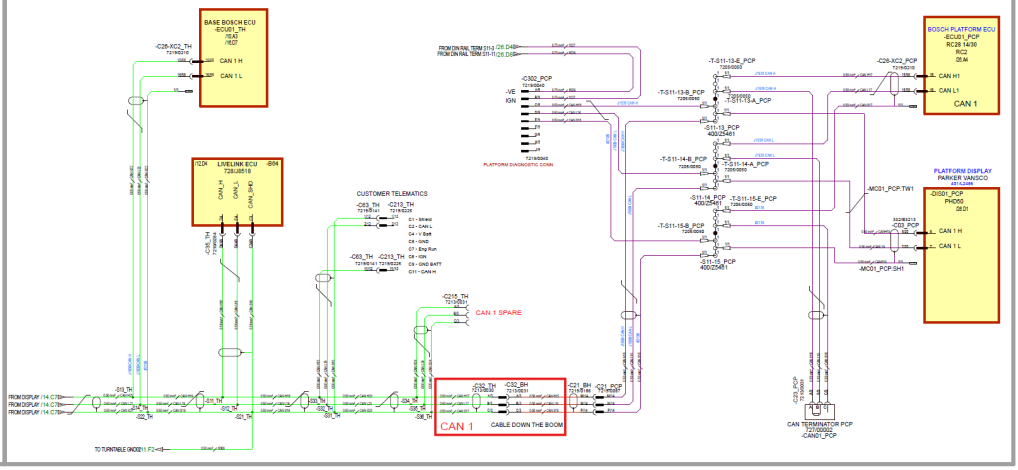
	2. Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Livelink Connector from Livelink ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms. Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section. 3. Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 4. Ensure all interconnects and device connectors are fully inserted. 5. Ensure all interconnects and device connectors have no water ingress issues. 6. Complete the full procedure for testing the CAN Network 257 the component information page. 

6.1.471 U1296-87

U1296-87

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1296-87

Error code:	U1296-87
ECU	Platform ECU

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Description:	CAN TIME OUT ERROR
Component:	ECU
Vehicle reaction:	Recipient transmits DM1 with SPN field = PGN of missing CAN message and FMI = 9 Recipient resets RC (rolling counter) to 0 Recipient disables all outputs Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1. Mismatched or un programmed VIN number in either Bosch ECU 2. Unterminated CAN network 3. Damaged CAN network 4. Poorly connected CAN network 5. Water Ingress
Service Action:	1. Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully. 2. Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Livelink Connector from Livelink ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms. Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section. 3. Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 4. Ensure all interconnects and device connectors are fully inserted. 5. Ensure all interconnects and device connectors have no water ingress issues. 6. Complete the full procedure for testing the CAN Network 257 the component information page.

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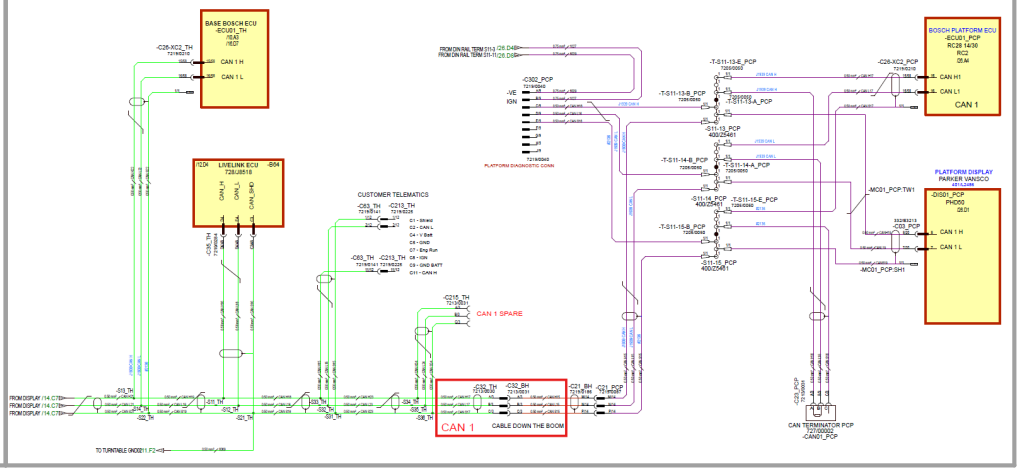

6.1.472 U1297-56

U1297-56

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1297-56

Error code:	U1297-56
ECU	Platform ECU
Description:	CAN RC ERROR
Component:	ECU
Vehicle reaction:	- Recipient ignores received CAN message and transmits DM1 with SPN field = PGN of CAN message and FMI = 10 - Recipient retains existing values. - Recipient resets RC (rolling counter) to 0 - Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1) Mismatched or un programmed VIN number in either Bosch ECU 2) Unterminated CAN network 3) Damaged CAN network 4) Poorly connected CAN network 5) Water Ingress
Service Action:	1) Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully.

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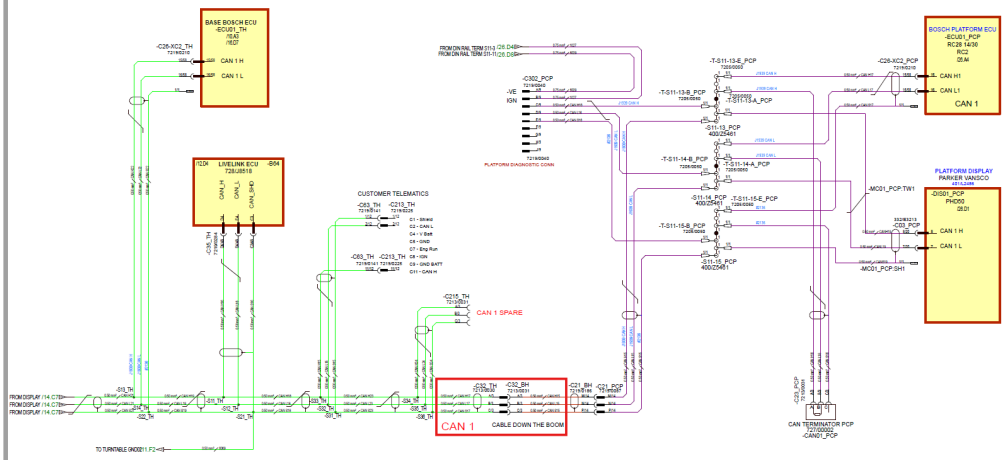
	2) Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Livelink Connector from Livelink ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms. Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section. 3) Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 4) Ensure all interconnects and device connectors are fully inserted. 5) Ensure all interconnects and device connectors have no water ingress issues. 6) Complete the full procedure for testing the CAN Network 257 the component information page. 

6.1.473 U1298-41

U1298-41

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1298-41

Error code:	**U1298-41**

ECU	Platform ECU
Description:	CAN CHECK SUM ERROR
Component:	ECU
Vehicle reaction:	Recipient ignores received CAN message and transmits DM1 with SPN field = PGN of CAN message and FMI = 2 Recipient retains existing values. Recipient resets RC (rolling counter) to 0 Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1. Mismatch between transmitting and receiving message between ECU's
Service Action:	1. Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully. 2. Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Livelink Connector from Livelink ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms. Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section. 3. Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 4. Ensure all interconnects and device connectors are fully inserted. 5. Ensure all interconnects and device connectors have no water ingress issues. 6. Complete the full procedure for testing the CAN Network 257 the component information page.

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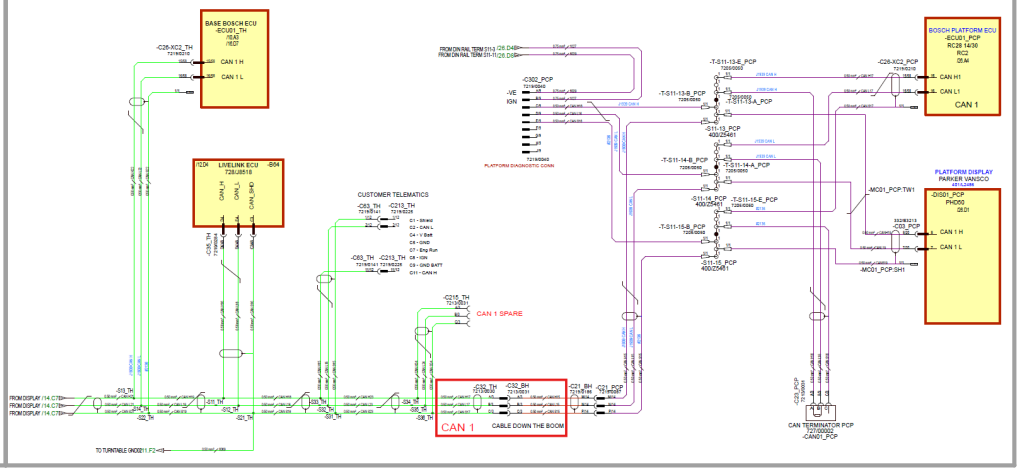

6.1.474 U1299-87

U1299-87

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1299-87

Error code:	U1299-87
ECU	BASE ECU
Description:	CAN PAIRING FAILED ERROR
Component:	BASE ECU
Vehicle reaction:	Recipient ignores received CAN message and transmits DM1 with SPN field = PGN of CAN message and FMI = 2 Recipient resets RC (rolling counter) to 0 Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1) Mismatched or un programmed VIN number in either Bosch ECU 2) Unterminated CAN network 3) Damaged CAN network 4) Poorly connected CAN network 5) Water Ingress

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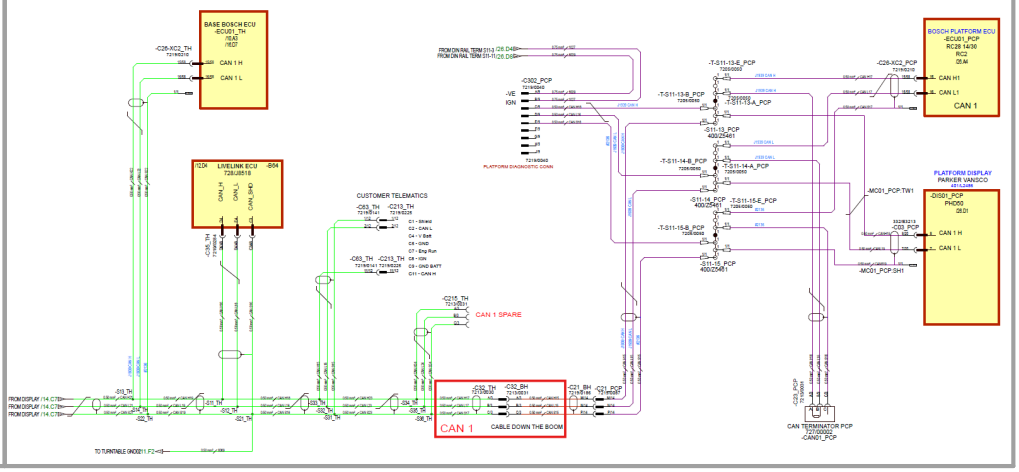
Service Action:	1. Check for any other faults codes that may cause an ECU to not turn on, eg startlock. If faults codes follow these fault codes first. If no other fault codes: 2. Check base and platform ECUs are available on the network, this can be done by scanning on the flash loader tool. Use vehicle setup tool. 3. Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully. 4. Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Livelink Connector from Livelink ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms. Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section. 5. Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 6. Ensure all interconnects and device connectors are fully inserted. 7. Ensure all interconnects and device connectors have no water ingress issues. 8. Complete the full procedure for testing the CAN Network 257 the component information page. 

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6.1.475 U1323-56

U1323-56

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1323-56

Error code:	U1323-56
ECU	Base ECU
Description:	CAN RC ERROR
Component:	ECU
Vehicle reaction:	Recipient ignores received CAN message and transmits DM1 with SPN field = PGN of CAN message and FMI = 10 Recipient retains existing values. Recipient resets RC (rolling counter) to 0 Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1. Mismatched or un programmed VIN number in either Bosch ECU 2. Unterminated CAN network 3. Damaged CAN network 4. Poorly connected CAN network 5. Water Ingress
Service Action:	1. Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully. 2. Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Livelink Connector from Livelink ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms. Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section.

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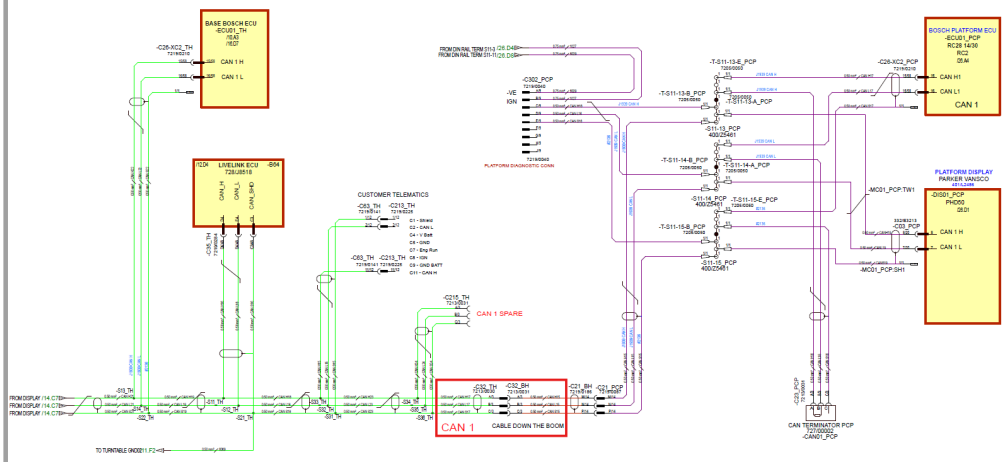
	3. Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 4. Ensure all interconnects and device connectors are fully inserted. 5. Ensure all interconnects and device connectors have no water ingress issues. 6. Complete the full procedure for testing the CAN Network 257 the component information page. 

6.1.476 U1324-56

U1324-56

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1324-56

Error code:	U1324-56
ECU	Base ECU
Description:	CAN RC ERROR
Component:	ECU
Vehicle reaction:	Recipient ignores received CAN message and transmits DM1 with SPN field = PGN of CAN message and FMI = 10 Recipient retains existing values. Recipient resets RC (rolling counter) to 0

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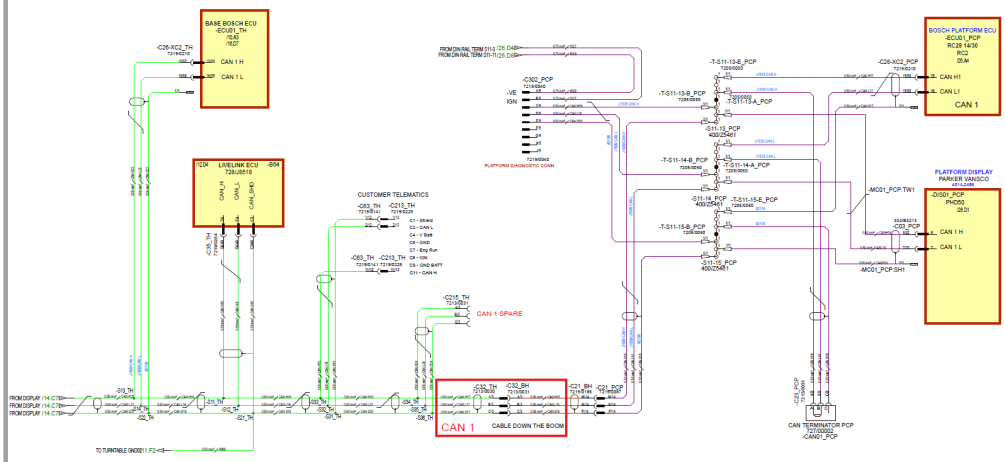
	Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1. Mismatched or un programmed VIN number in either Bosch ECU 2. Unterminated CAN network 3. Damaged CAN network 4. Poorly connected CAN network 5. Water Ingress
Service Action:	1. Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully. 2. Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Livelink Connector from Livelink ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms. Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section. 3. Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 4. Ensure all interconnects and device connectors are fully inserted. 5. Ensure all interconnects and device connectors have no water ingress issues. 6. Complete the full procedure for testing the CAN Network 257 the component information page. 

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6.1.477 U1325-56

U1325-56

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1325-56

Error code:	U1325-56
ECU	Base ECU
Description:	CAN RC ERROR
Component:	ECU
Vehicle reaction:	Recipient ignores received CAN message and transmits DM1 with SPN field = PGN of CAN message and FMI = 10 Recipient retains existing values. Recipient resets RC (rolling counter) to 0 Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1. Mismatched or un programmed VIN number in either Bosch ECU 2. Unterminated CAN network 3. Damaged CAN network 4. Poorly connected CAN network 5. Water Ingress
Service Action:	1. Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully. 2. Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Livelink Connector from Livelink ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms. Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high

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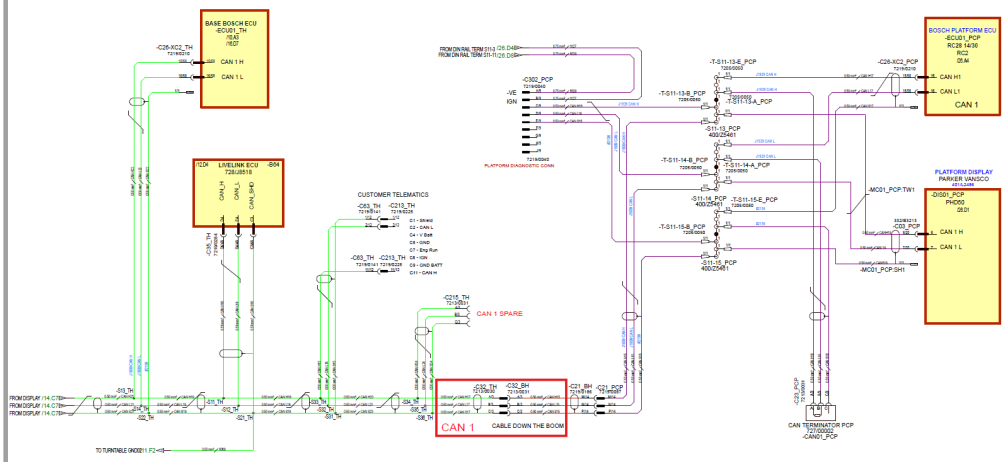
	reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section. 3. Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 4. Ensure all interconnects and device connectors are fully inserted. 5. Ensure all interconnects and device connectors have no water ingress issues. 6. Complete the full procedure for testing the CAN Network 257 the component information page. 

6.1.478 U1326-41

U1326-41

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1326-41

Error code:	U1326-41
ECU	Base ECU
Description:	CAN CHECK SUM ERROR
Component:	ECU
Vehicle reaction:	Recipient ignores received CAN message and transmits DM1 with SPN field = PGN of CAN message and FMI = 2

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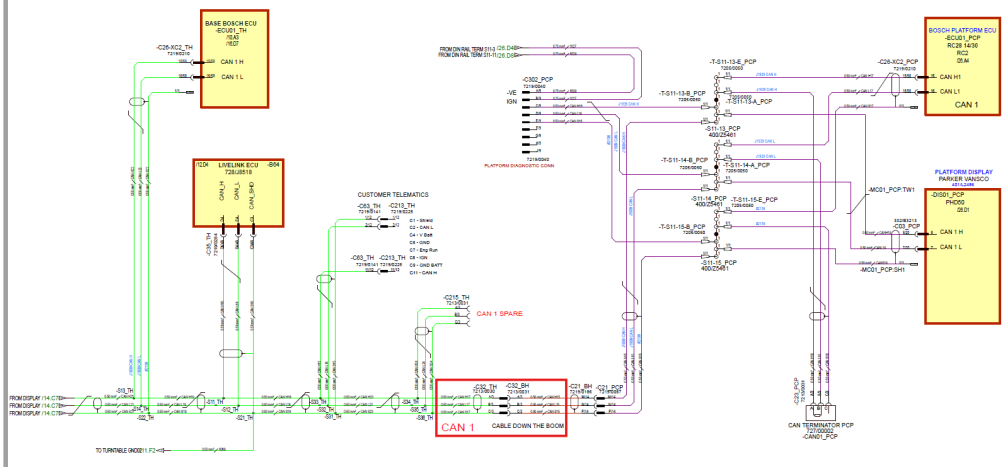
	Recipient retains existing values. Recipient resets RC (rolling counter) to 0 Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1. Mismatch between transmitting and receiving message between ECU's
Service Action:	1. Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully. 2. Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Livelink Connector from Livelink ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms. Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section. 3. Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 4. Ensure all interconnects and device connectors are fully inserted. 5. Ensure all interconnects and device connectors have no water ingress issues. 6.Complete the full procedure for testing the CAN Network 257 the component information page. 

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6.1.479 U1327-41

U1327-41

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1327-41

Error code:	U1327-41
ECU	Base ECU
Description:	CAN CHECK SUM ERROR
Component:	ECU
Vehicle reaction:	Recipient ignores received CAN message and transmits DM1 with SPN field = PGN of CAN message and FMI = 2 Recipient retains existing values. Recipient resets RC (rolling counter) to 0 Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1. Mismatch between transmitting and receiving message between ECU's
Service Action:	1. Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully. 2. Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Livelink Connector from Livelink ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms. Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section.

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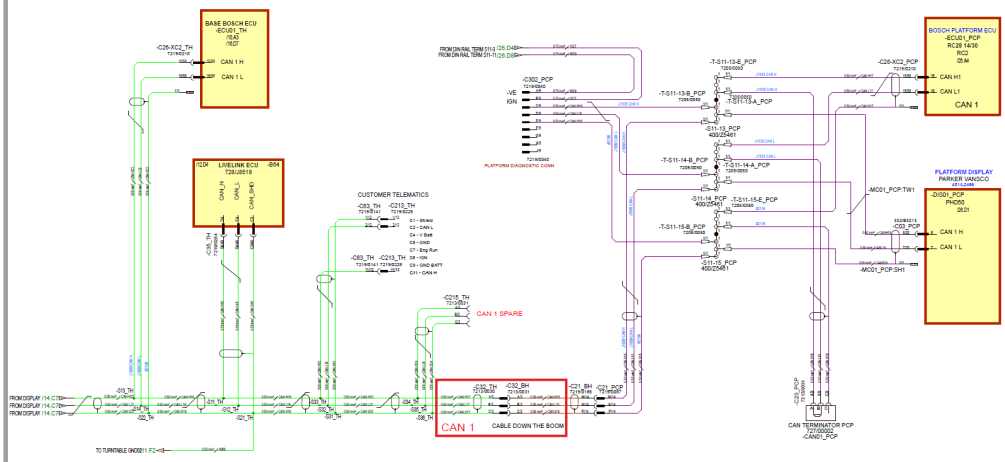
	3. Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 4. Ensure all interconnects and device connectors are fully inserted. 5. Ensure all interconnects and device connectors have no water ingress issues. 6. Complete the full procedure for testing the CAN Network 257 the component information page. 

6.1.480 U1328-41

U1328-41

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1328-41

Error code:	U1328-41
ECU	Base ECU
Description:	CAN CHECK SUM ERROR
Component:	ECU
Vehicle reaction:	Recipient ignores received CAN message and transmits DM1 with SPN field = PGN of CAN message and FMI = 2 Recipient retains existing values. Recipient resets RC (rolling counter) to 0

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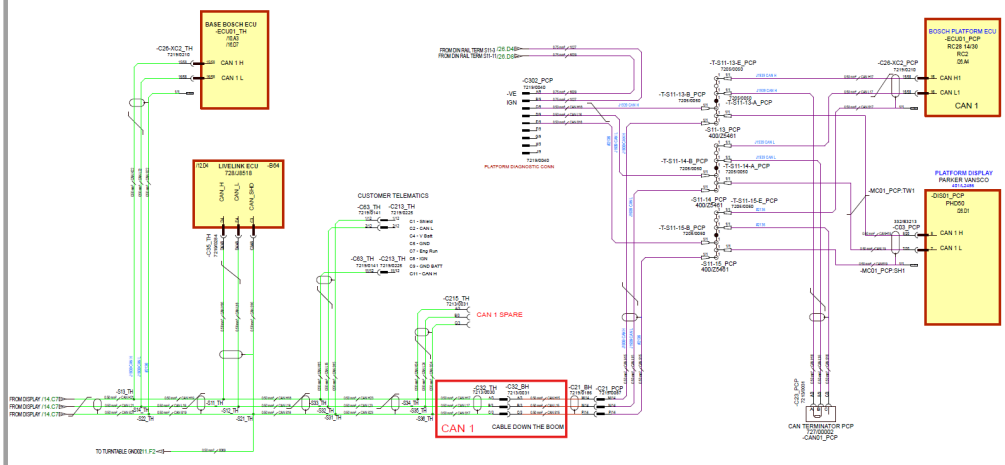
	Transmitter re-transmits CAN message requested by Recipient with RC set to 0.
Possible Cause:	1. Mismatch between transmitting and receiving message between ECU's
Service Action:	1. Connect to the machine via JCB Service Master and run the 'Vehicle Setup' tool. Ensure that the VIN number is displayed in Green and that the CAN Bus devices have paired successfully. 2. Check both can terminator resistors are placed correctly at either end of the CAN network (at base and platform control panels). Turn Ignition to OFF and remove Livelink Connector from Livelink ECU. Remove the CAN terminator at the base platform and then measure the resistance of CAN-L to CAN-H on the harness connector. This should measure 120 ohms. Measuring a value close to 0 ohms will indicate a short circuit on the CAN bus. To narrow down the fault location, replace the CAN terminator and then disconnect the CAN bus interconnect at -C32_TH / -C32_BH. Measure the resistance of the CAN bus on each connector, the one that reads low will be the section with the short circuit. If the original measurement was a high reading, then there is a break in the CAN bus wiring. Again, section up the CAN Bus network and complete continuity testing to isolate the faulty section. 3. Check the CAN bus wiring runs to check for damage to the harness, especially abrasions and pinching. Check there is no damage at any of the CAN device connectors (Interconnects and ECU's / Displays etc) 4. Ensure all interconnects and device connectors are fully inserted. 5. Ensure all interconnects and device connectors have no water ingress issues. 6. Complete the full procedure for testing the CAN Network 257 the component information page. 

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6.1.481 U1329-56

Error code:	U1329-56
ECU	Base ECU
Description:	CAN2 status message RC & Check sum error from RL
Component:	Drive Motor Motor Invertor
Vehicle reaction:	-Disables drive functionality - Go to "safe stop" (Refer SRD for more details)
Possible Cause:	1. Incorrect terminating resistors 2. Bad connections 3. wrong software
Service Action:	1. Check Speed Sensor 12 V supply and wire #4521. 2. Check Speed sensor signal and wire #4522 and 4523. 3. Check resistance value between CAN2 H & CAN2 L (Pin H & J) at Base Control Panel diagnostic Connector - Resistance value should read ~60ohms 4. If value doesn't read 60ohms separately check resistor 5. Check CAN2 Interconnection - -C88_CH & -C88_TH - Look for any wire/shield damage on CAN cab 6. Ensure all interconnects and device connectors are fully inserted. 7. Ensure all interconnects and device connectors have no water ingress issues. 8. Complete the full procedure for testing the CAN Network 257 the component information page.

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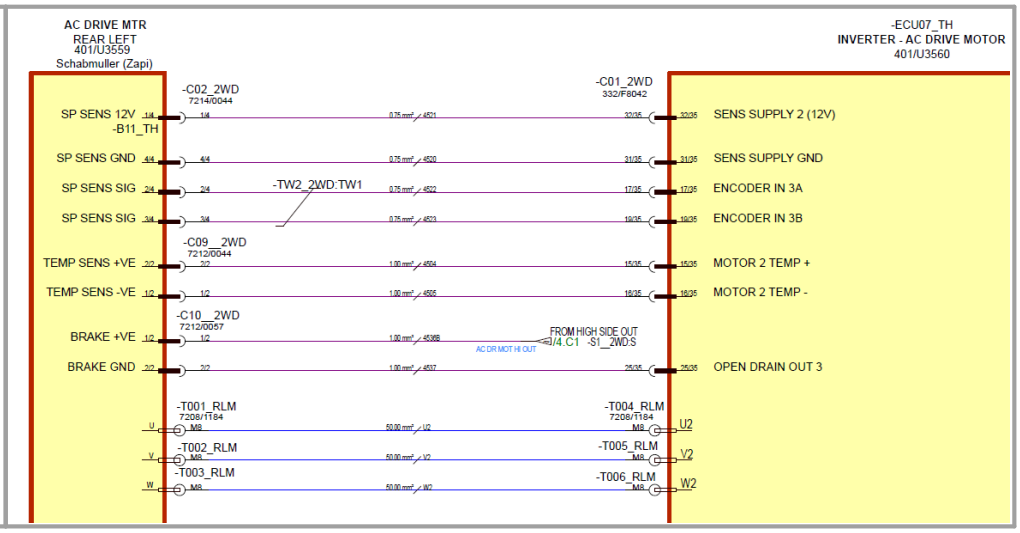

6.1.482 U1330-56

Error code:	U1330-56
ECU	Base ECU
Description:	CAN2 status message RC & Check sum error from RR
Component:	Drive Motor Motor Invertor
Vehicle reaction:	-Disables drive functionality - Go to "safe stop" (Refer SRD for more details)
Possible Cause:	1. Incorrect terminating resistors 2. Bad connections 3. wrong software
Service Action:	1. Check Speed Sensor 12 V supply and wire #4520B. 2. Check Speed sensor signal and wire #4526 and 4527. 3. Check resistance value between CAN2 H & CAN2 L (Pin H & J) at Base Control Panel diagnostic Connector - Resistance value should read ~60ohms 4. If value doesn't read 60ohms separately check resistor 5. Check CAN2 Interconnection - -C88_CH & -C88_TH - Look for any wire/shield damage on CAN cab 6. Ensure all interconnects and device connectors are fully inserted.

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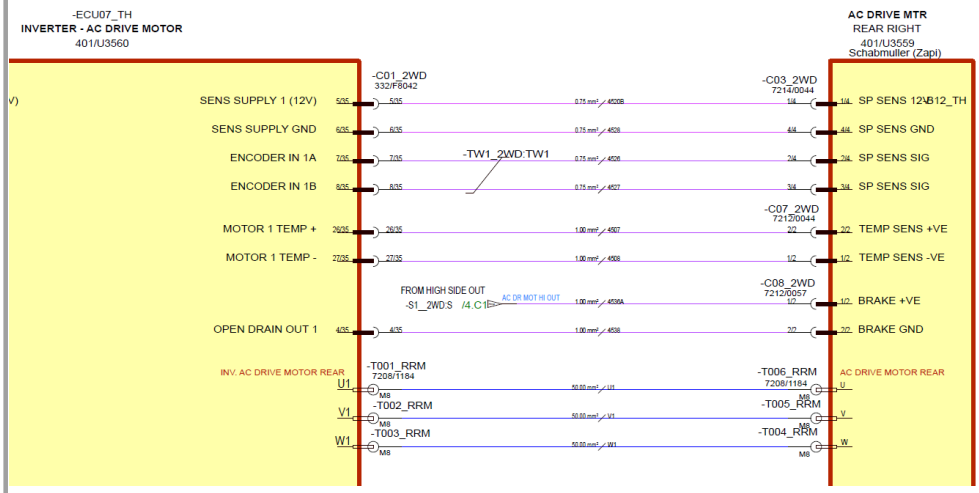
	7. Ensure all interconnects and device connectors have no water ingress issues. 8. Complete the full procedure for testing the CAN Network 257 the component information page. 

6.1.483 U1331-56

Error code:	U1331-56
ECU	Base ECU
Description:	CAN2 status message RC & Check sum error from FR
Component:	Drive Motor Motor Invertor
Vehicle reaction:	-Disables drive functionality - Go to "safe stop" (Refer SRD for more details)
Possible Cause:	1. Incorrect terminating resistors 2. Bad connections 3. wrong software
Service Action:	1. Check Speed Sensor 5 V supply and wire #4525. 2. Check Speed sensor signal and wire #4518 and 4519. 3. Check Voltage convertor I/P(12V), O/P(5V) and Ground connection

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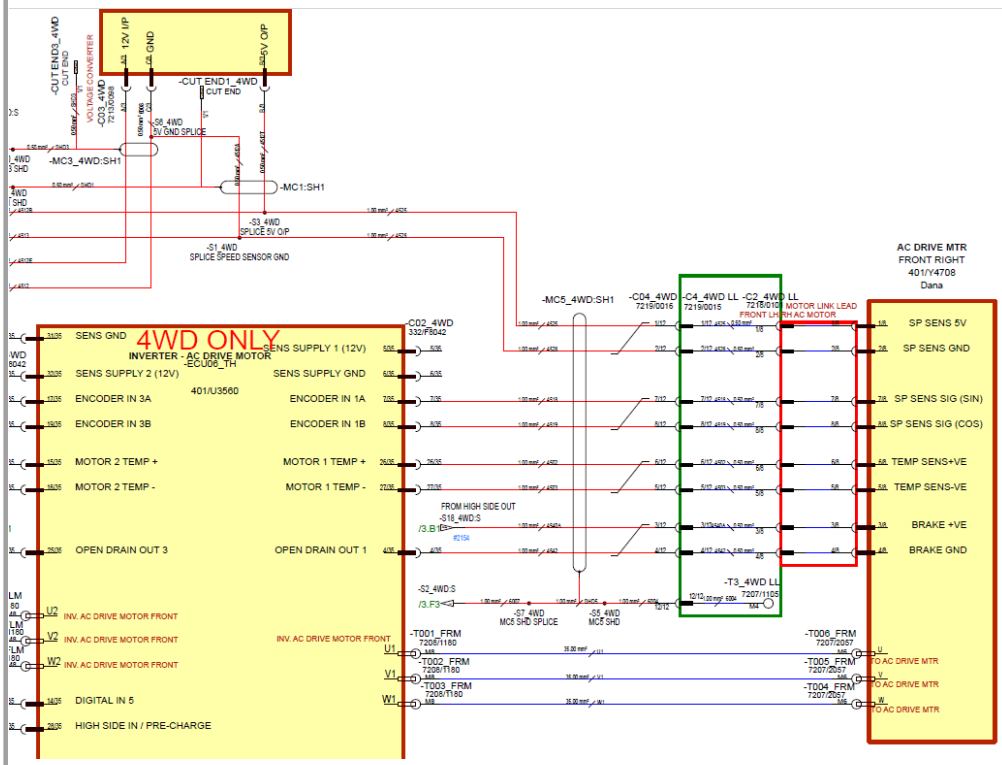
4. Check resistance value between CAN2 H & CAN2 L (Pin H & J) at Base Control Panel diagnostic Connector - Resistance value should read ~60ohms
5. If value doesn't read 60ohms separately check resistor
6. Check CAN2 Interconnection - -C88_CH & -C88_TH - Look for any wire/shield damage on CAN cab
7. Ensure all interconnects and device connectors are fully inserted.
8. Ensure all interconnects and device connectors have no water ingress issues.
9. Complete the full procedure for testing the CAN Network 257 the component information page.



6.1.484 U1332-56

Error code:	U1332-56
ECU	Base ECU
Description:	CAN2 status message RC & Check sum error from FL

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Component:	Drive Motor Motor Invertor.
Vehicle reaction:	-Disables drive functionality - Go to "safe stop" (Refer SRD for more details)
Possible Cause:	1. Incorrect terminating resistors 2. Bad connections 3. wrong software.
Service Action:	1. Check Speed Sensor 5 V supply and wire #4512B. 2. Check Speed sensor signal and wire #4514 and 4515. 3. Check Voltage convertor I/P(12V), O/P(5V) and Ground connection 4. Check resistance value between CAN2 H & CAN2 L (Pin H & J) at Base Control Panel diagnostic Connector - Resistance value should read ~60ohms 5. If value doesn't read 60ohms separately check resistor 6. Check CAN2 Interconnection - -C88_CH & -C88_TH - Look for any wire/shield damage on CAN cab 7. Ensure all interconnects and device connectors are fully inserted. 8. Ensure all interconnects and device connectors have no water ingress issues. 9. Complete the full procedure for testing the CAN Network 257 the component information page.

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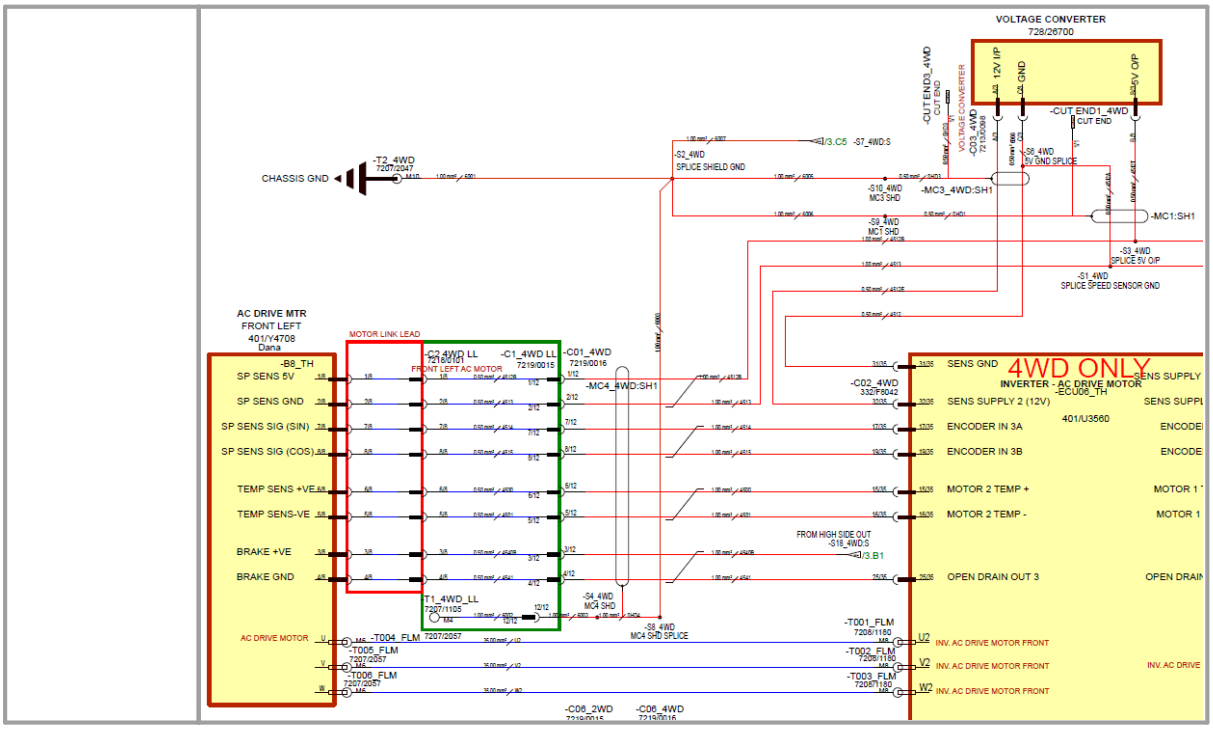

6.1.485 U1334-56

U1335-56

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1334-56

Error code:	U1335-56
ECU	Base ECU
Description:	CAN2 status message timeout from any of traction motor
Component:	ECU
Vehicle reaction:	Disables drive functionality - Disable all functions from Pump & traction. - Allow functions via aux from Base & platform
Possible Cause:	1. Mismatch between transmitting and receiving message between ECU's

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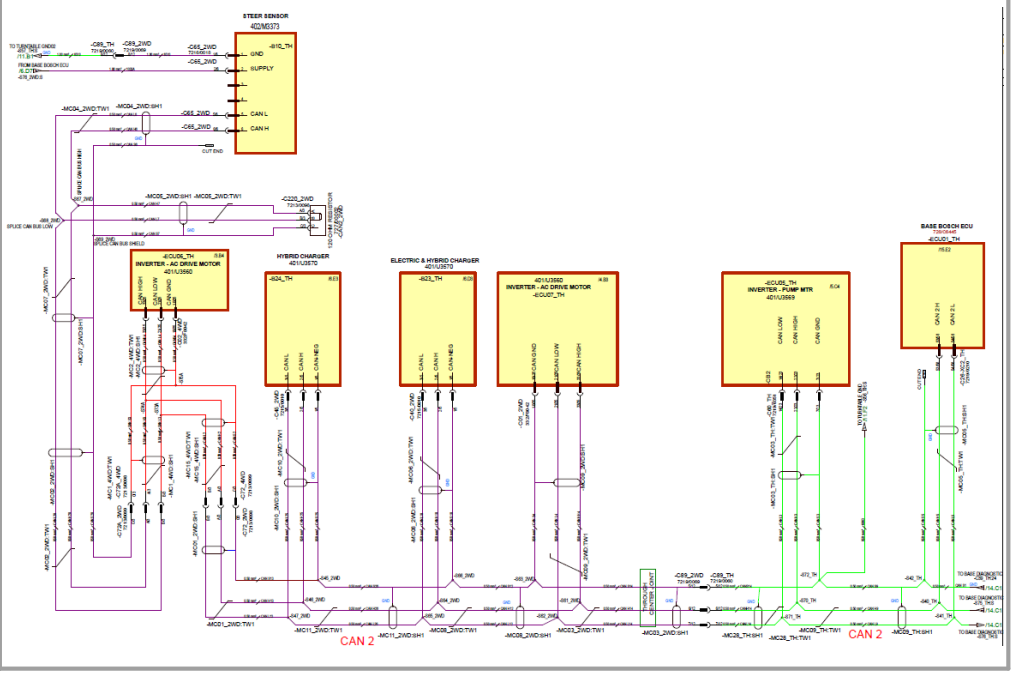
Service Action:	1. Check for CAN 2 terminating resistor values - One inside Turntable Control Panel (-C214_TCP), other at near to the Steer Sensor (-C220_CH). 2. Also check resistance value between CAN2 H & CAN2 L (Pin H & J) at Base Control Panel diagnostic Connector - Resistance value should read ~60ohms 3. If value doesn't read 60ohms separately check resistor 4. Check CAN2 Interconnection - -C88_CH & -C88_TH - Look for any wire/shield damage on CAN cable 5. Look for any pin back out at CAN 2 connectors 6. Look for 35 pin connector sitting properly at Inverter ends 7. Check all battery health Condition and 20amp fuse 8. Ensure all interconnects and device connectors are fully inserted. 9. Ensure all interconnects and device connectors have no water ingress issues. 10. Complete the full procedure for testing the CAN Network 257 the component information page. 

6.1.486 U1335-56

U1335-56

Machine Fault Codes 518 > DTC ERROR CODE 519 > U1335-56

Error code:	**U1335-56**

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ECU	Base ECU
Description:	CAN2 status message RC & Check sum error from Pump
Component:	ECU
Vehicle reaction:	Disables drive functionality - Disable all functions from Pump & traction. - Allow functions via aux from Base & platform
Possible Cause:	1. Mismatch between transmitting and receiving message between ECU's
Service Action:	1. Check for CAN 2 terminating resistor values - One inside Turntable Control Panel (-C214_TCP), other at near to the Steer Sensor (-C220_CH). 2. Also check resistance value between CAN2 H & CAN2 L (Pin H & J) at Base Control Panel diagnostic Connector - Resistance value should read ~60ohms 3. If value doesn't read 60ohms separately check resistor 4. Check CAN2 Interconnection - -C88_CH & -C88_TH - Look for any wire/shield damage on CAN cable 5. Look for any pin back out at CAN 2 connectors 6. Look for 35 pin connector sitting properly at Inverter ends 7. Check all battery health Condition and 20amp fuse 8. Ensure all interconnects and device connectors are fully inserted. 9. Ensure all interconnects and device connectors have no water ingress issues. 10.Complete the full procedure for testing the CAN Network 257 the component information page.

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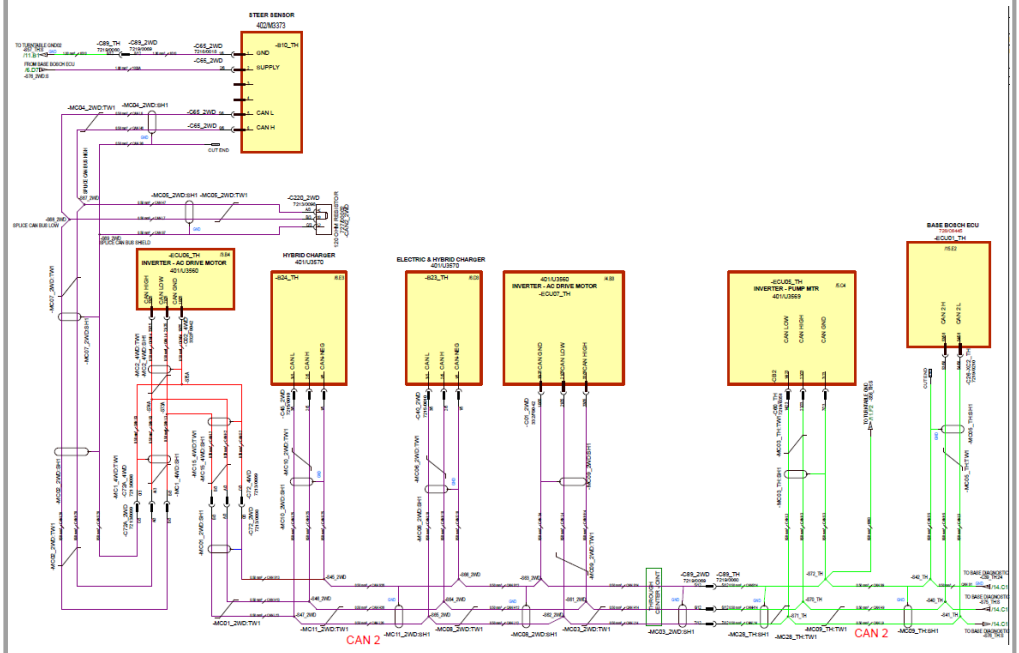

6.1.487 U1900-16

Error code:	U1900-16
ECU	Livelink ECU
Description:	LIVELINK - VEHICLE VOLTAGE BELOW NORMAL
Component:	Livelink
Vehicle reaction:	No instrument cluster notification or buzzer for this fault code.
Possible Cause:	This fault occurs when the Livelink ECU detects the machine battery voltage has dropped below 8V on a 12V Machine.
Service Action:	Important: Stop the engine and do not start the engine during the service procedures. 1. Check the power supply to the Livelink ECU on the connector. Pin 4 is battery positive and pin 5 is battery ground. If battery voltage is dropped below 8V on a 12V Machine then go to step 2 else step 3 2. Check the state of the machine battery and wiring, if Machine voltage is < 8 replace battery and check or else go to step 3

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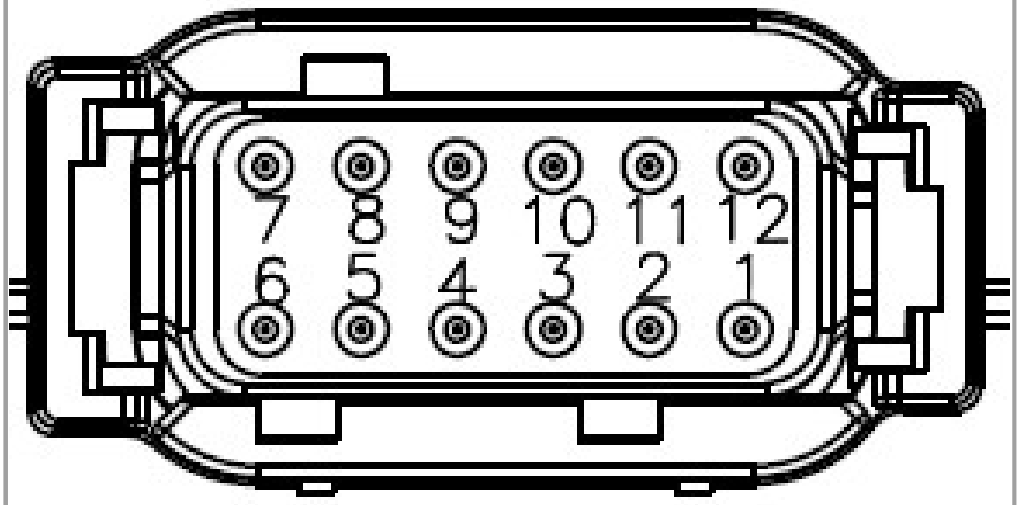
	3. If there is no problem found with the wiring, Livelink ECU may need to be replaced. Contact service center 

6.1.488 U1901-16

Error code:	**U1901-16**
ECU	Livelink ECU
Description:	LIVELINK - INTERNAL VOLTAGE BELOW NORMAL
Component:	Livelink
Vehicle reaction:	No instrument cluster notification or buzzer for this fault code.
Possible Cause:	The Livelink ECU has detected its internal voltage has dropped below 3V.
Service Action:	Important: Stop the engine and do not start the engine during the service procedures. 1. Check the power supply to the Livelink ECU on the connector. Pin 4 is battery positive and pin 5 is battery ground. If battery voltage is dropped below 8V on a 12V Machine then go to step 2 else step 3

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	2. Check the state of the machine battery and wiring, if Machine voltage is < 8 replace battery and check or else go to step 3 3. If there is no problem found with the wiring or Machine Battery Voltage, Livelink ECU may need to be replaced. Contact service center

6.1.489 U1904-85

Error code:	U1904-85
ECU	Livelink ECU
Description:	LIVELINK - ECU ABOVE TEMPERATURE THRESHOLD
Component:	Livelink
Vehicle reaction:	No instrument cluster notification or buzzer for this fault code.
Possible Cause:	The Livelink ECU internal temperature has been greater than 940C for more than two minutes.
Service Action:	Important: Stop the engine and do not start the engine during the service procedures. 1. Confirm if the Livelink ECU is still communicating with the web and/or connecting to ServiceMaster. 2. If the Livelink ECU has stopped reporting it may need to be replaced. Contact service center.

6.1.490 U1905-84

Error code:	U1905-84
ECU	Livelink ECU
Description:	LIVELINK - ECU BELOW TEMPERATURE THRESHOLD
Component:	Livelink

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Vehicle reaction:	No instrument cluster notification or buzzer for this fault code.
Possible Cause:	ECU Below Temperature Threshold. The Livelink ECU internal temperature has been greater than 94oC for more than two minutes.
Service Action:	1.Confirm if the Livelink ECU is still communicating with the web and/or connecting to ServiceMaster. 2.If the Livelink ECU has stopped reporting it may need to be replaced.

6.1.491 U1906-96

Error code:	**U1906-96**
ECU	Livelink ECU
Description:	LIVELINK - ACCELEROMETER INTERNAL FAILURE
Component:	Livelink
Vehicle reaction:	No instrument cluster notification or buzzer for this fault code.
Possible Cause:	The accelerometer in the Livelink ECU is no longer working as expected.
Service Action:	Important: Stop the engine and do not start the engine during the service procedures 1. The Livelink ECU may need to be replaced. Contact service center.

6.1.492 U1907-09

Error code:	**U1907-09**
ECU	Livelink ECU
Description:	LIVELINK - MODEM JAMMED
Component:	Livelink

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Vehicle reaction:	No instrument cluster notification or buzzer for this fault code.
Possible Cause:	The tracking unit has detected that an attempt has been made to prevent it connecting to the GPRS network by a jamming device.
Service Action:	Important: Stop the engine and do not start the engine during the service procedures. 1. Check surrounding for any Modem Device. This fault should clear once the jamming device is no longer present. Go to step 2 if issue is still present. 2. The Livelink ECU may need to be replaced. Contact service center.

6.1.493 U1908-09

Error code:	**U1908-09**
ECU	Livelink ECU
Description:	LIVELINK - GPS ANTENNA NOT OK
Component:	Livelink
Vehicle reaction:	No instrument cluster notification or buzzer for this fault code.
Possible Cause:	The Livelink ECU has detected that the GPS antenna is open circuit or short circuit.
Service Action:	Important: Stop the engine and do not start the engine during the service procedures. 1. Check if the Livelink ECU has obtained a GPS fix using the Livelink ECU diagnostics tool in ServiceMaster. Note: It may take up to 5 minutes for the Livelink ECU to obtain a GPS fix after start up. The unit's ability to achieve a GPS fix is environment dependent. Working indoors and around tall buildings will degrade GPS performance.

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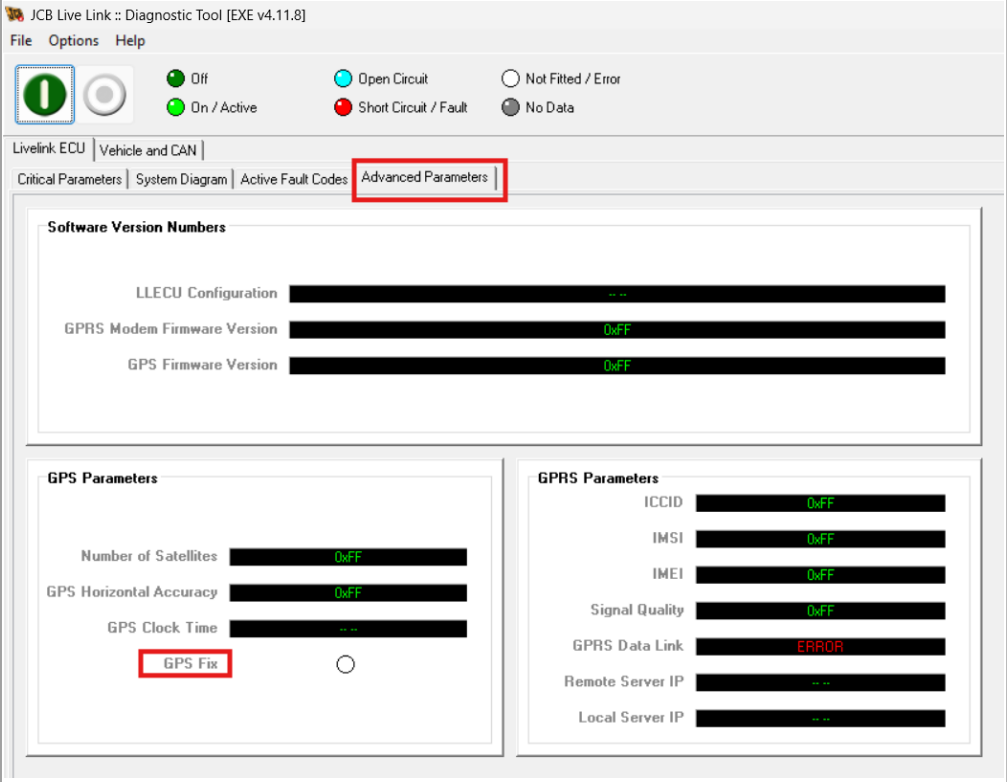

2. If the Livelink ECU has not had a fix or updated its location shown on the web for an
extended period of time then go to step 3.

3. The Livelink ECU may need to be replaced. Contact service center.

6.1.494 U1909-96

Error code:	U1909-96
ECU	Livelink ECU
Description:	LIVELINK - NO COMMS WITH GPS MODULE
Component:	Livelink
Vehicle reaction:	No instrument cluster notification or buzzer for this fault code.
Possible Cause:	The tracking unit cannot communicate with the GPS chip.

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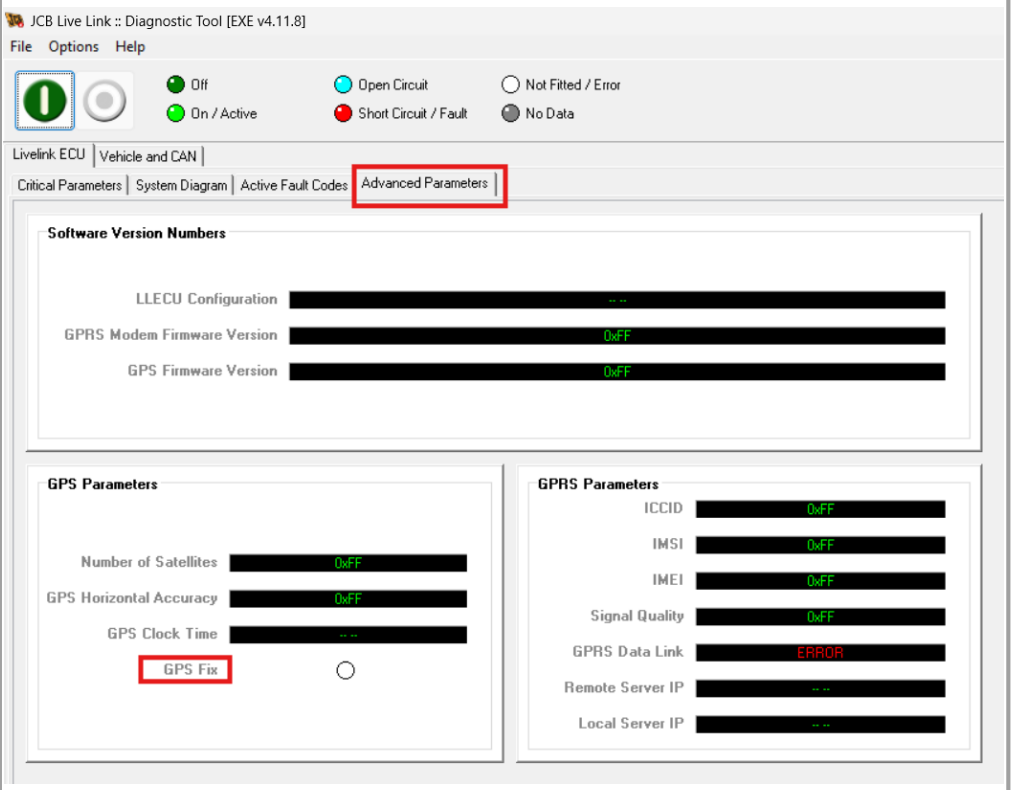
Service Action:	Important: Stop the engine and do not start the engine during the service procedures. 1. Check if the Livelink ECU has obtained a GPS fix using the Livelink ECU diagnostics tool in ServiceMaster. Note: It may take up to 5 minutes for the Livelink ECU to obtain a GPS fix after start up. The unit's ability to achieve a GPS fix is environment dependent. Working indoors and around tall buildings will degrade GPS performance.  2. If the Livelink ECU has not had a fix or updated its location shown on the web for an extended period of time then go to step 3. 3. The Livelink ECU may need to be replaced. Contact service center.

6.1.495 U190A-96

Error code:	**U190A-96**
ECU	Livelink ECU
Description:	SIM Card Failure

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Component:	Livelink
Vehicle reaction:	No instrument cluster notification or buzzer for this fault code.
Possible Cause:	The Livelink ECU has detected that the SIM card is not working as expected.
Service Action:	Important: Stop the engine and do not start the engine during the service procedures. 1. Check the last connection date/time for the machine on the web. If the unit has not made contact for an extended period of time then go to step 2. Note: The Livelink ECU uses GPRS to communicate with the web. If coverage in the area the machine is working in is poor or not available it will not be able to report in its events. It will store these events and report them once a network connection is restored. 2. The Livelink ECU may need to be replaced. Contact service center.

6.1.496 U190B-96

Error code:	**U190B-96**
ECU	Livelink ECU
Description:	LIVELINK - NO COMMS WITH GSM MODULE
Component:	Livelink
Vehicle reaction:	No instrument cluster notification or buzzer for this fault code.
Possible Cause:	The Livelink ECU cannot communicate with the modem so will not be able to report events to the web.
Service Action:	Important: Stop the engine and do not start the engine during the service procedures. 1. Check the network connection state using the LiveLink diagnostics tool. If the unit has not made contact for an extended period of time then go to step 2 Note: This fault will recover once the Livelink ECU can connect to a cell site.

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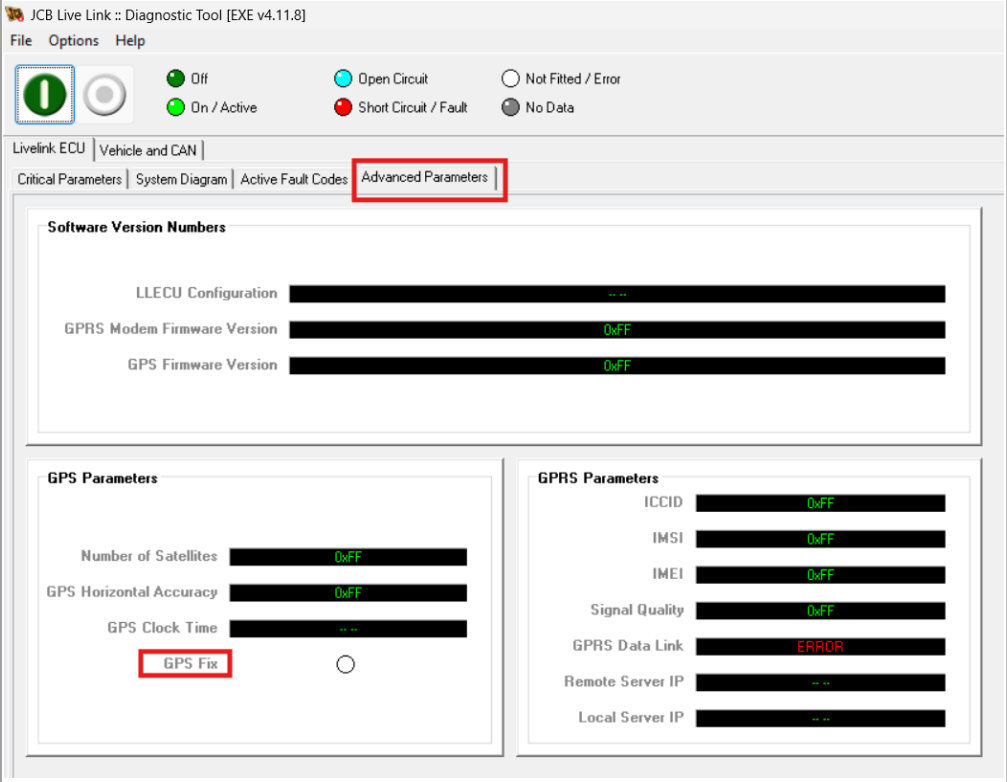

2. The Livelink ECU may need to be replaced. Contact service center.

6.1.497 U190C-96

Error code:	U190C-96
ECU	Livelink ECU
Description:	LIVELINK - GSM NETWORK REGISTRATION FAILED
Component:	Livelink
Vehicle reaction:	No instrument cluster notification or buzzer for this fault code.
Possible Cause:	The GPRS cell site/mast has refused the Livelink ECU's request to connect.
Service Action:	Important: Stop the engine and do not start the engine during the service procedures. 1. Check the network connection state using the LiveLink diagnostics tool. If the unit has

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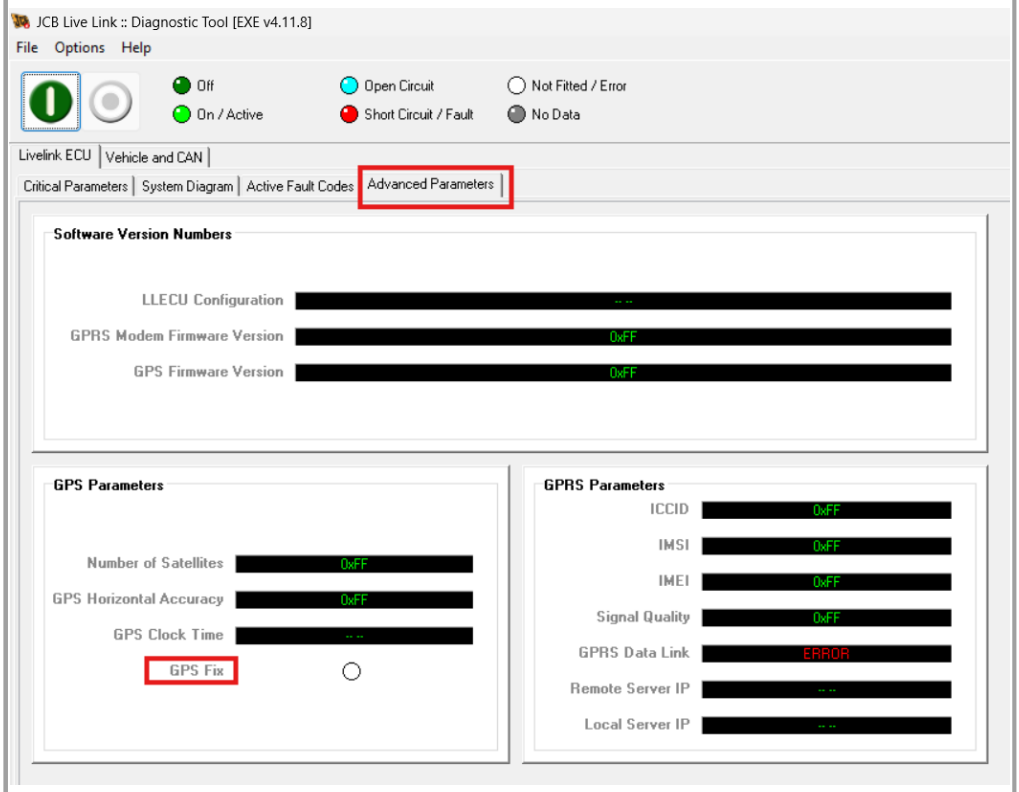
not made contact for an extended period of time then go to step 2.



2. The Livelink ECU may need to be replaced. Contact service center.

6.2 General Sensor Fault Table

General Sensor Fault Table

Machine Fault Codes 518 > General Sensor Fault Table

List of General sensor Fault Table 1089

Sr No.	Description
1	General Sensor Fault Table 1090

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6.2.1 General Sensor Fault Table (5)

General Sensor Fault Table

Machine Fault Codes 518 > General Sensor Fault Table 1089 > C116 -12_2_2_0_4_5

Step	Trouble	Action
1	Sensor supply voltage fault	Disconnect the sensor, check sensor voltage supply at the harness connector (see relevant sensor help file for pin numbers or refer to engine electrical schematic) If voltage supply is faulty, disconnect all other sensors in turn until the voltage supply returns. If sensor supply voltage is OK, proceed to Step 2
2	Sensor connection faulty	Check condition of sensor to harness connection, make sure the seals are in place. Check for signs of corrosion or contamination. Repair/replace as necessary. If no fault is found, proceed to Step 3.
3	Sensor failure	Check the sensor resistance (see relevant help file for values). If sensor is out of specification, replace. If no fault is found, proceed to Step 4
4	Wiring fault	Check the harness continuity, and machine and earth contacts. Repair/replace as necessary. If no fault is found, proceed to Step 5.

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5	ECU fault	Disconnect the harness from the ECU and inspect. Check seals are in place, check for signs of corrosion and pin damage. If harness is damaged repair/replace as necessary. If ECU pins are damaged, replace ECU and Reflash, see section on ECU flashing. If no fault is found, raise a Tech web Help desk Call.

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Live Link

7 Live Link

Live Link

List of Livelink 1094

Sr No.	Description
1	Introduction 1094
2	Setup Tool 1095
3	Diagnostic Tool 1098
4	General Information 1101
5	Getting Started with JCB Service Master 1102
6	Diagnostic Connector 1103
7	Service Master Driver Version 1107
8	Testing CAN Activity with Service Master 1109
9	Diagnostic Tool Help 1111
10	Using DLA 1113
11	Livelink4 Connector 1116

7.1 Introduction

Introduction

Live Link 1094 > Introduction

JCB LiveLink : Introduction

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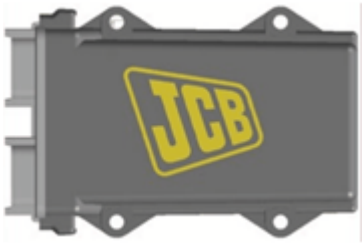
Overview :-

JCB LiveLink uses the latest global tracking system and satellite navigation technology. A transmitter is installed on the machine and sends data via satellite and cellular networks to a database that you can access through our secure website from anywhere in the world at anytime, day or night. The unit is hard wired into your machine's electrical equipment allowing critical machine performance data to be collected remotely.

LiveLink ECU :- The LiveLink ECU is the electronic control unit that processes the data from the machine and transmits this to the web server. The GPS and GSM Cellular antennae are internal to the unit.



Further Information :- Setup Tool

Diagnostic Tool General Information

Getting Started with JCB ServiceMaster

7.2 Setup Tool

Setup Tool

Live Link 1094 > Setup Tool

Live Link Set Up Tool

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JCB Livelink : Getting Started with JCB Service Master

Overview :-

The Setup Tool is used to configure the JCB LiveLink ECU.
A Vehicle Identification Number (17 Digit VIN) is the only parameter required for setup.

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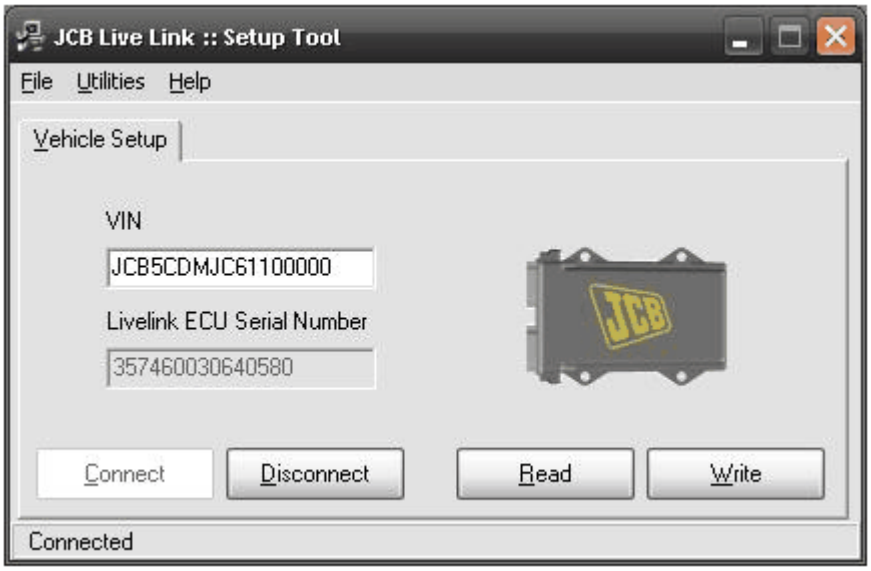
To use the Setup Tool :-

1. Connect a USB DLA between the computers USB port and the Diagnostic Socket.
2. Turn the vehicle Ignition On.
3. Run the Setup Tool program from ServiceMaster.
4. Click the Connect button at the bottom of the Setup Screen.
5. Connecting to Bus should be displayed in the lower left hand corner of the screen as the tool communicates with the ECU.
6. Once connected, the picture of the LiveLink ECU will have the 'LiveLink Disconnected' stamp removed and become clear.
7. If no communication occurs:
- Check you have clicked the Connect button.
- Check the Ignition has been turned On and there is not a vehicle power fault.
- Check if ECUs are functioning using the CanBus statistics page.
- Refer to the notes on using the DLA.
- Refer to testing CAN activity with ServiceMaster.
8. Click the 'Read' button, the VIN currently associated with the ECU is displayed.
9. Check this is correct for the vehicle that LiveLink is fitted to.
10. To enter a new VIN, type it in the VIN field and press the 'write' button. If the VIN is not correct a pop-up box will be displayed and writing it will not be permitted.
After 15s, the tool will automatically read back the new VIN and ECU Serial Number.
11. Contact the JCB LiveLink Team to pair the ECU serial number to the machine VIN for the customer tenancy.



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Further Information :-

Introduction

7.3 Diagnostic Tool

Live Link 1094 > Diagnostic Tool

JCB LiveLink : Diagnostic Tool

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Overview :-

The Diagnostic Tool is used to check operation of the JCB LiveLink ECU and also to diagnose problems if required.

There are 4 program menus in the Diagnostic Tool:

1. Critical Parameters.

2.System Diagram.

3.Active Fault Codes.

4.Advanced Parameters.

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To use the Diagnostic Tool :-

1.Connect a USB DLA between the computers USB port and the Diagnostic Socket.

2.Turn the vehicle Ignition On.

3.Run the Diagnostic Tool program from ServiceMaster.

4.Click the Green Start button at the top of the Diagnostic Screen (highlighted below).

5.Use the links across the top of the screen to view information menus. Select the required menu from the left hand column.

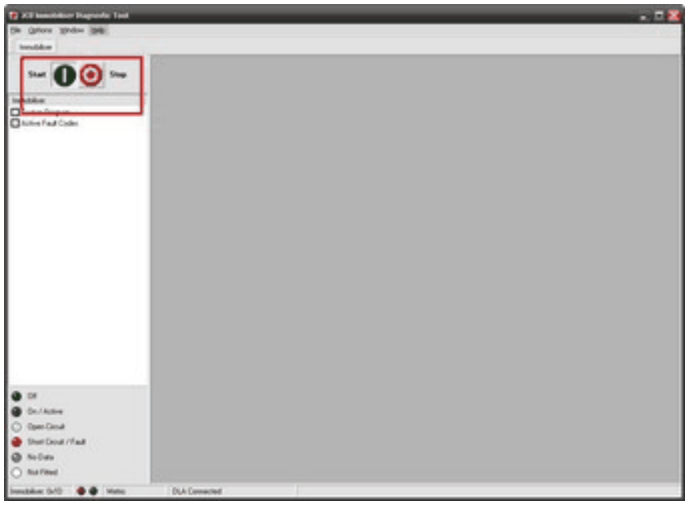
6.If no communication occurs:

-Check you have clicked the Green Start button.

-Check the Ignition is On and there is not a vehicle power fault.

-Check if ECUs are functioning using the CanBus statistics page.
-Refer to the notes on using the DLA.

Note:- Not all vehicles / service tools have the CanBus statistics page.



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Further Information :-

Introduction

Setup Tool

Diagnostic Tool Help

7.4 General Information

General Information

Live Link 1094 > General Information

JCB Livelink : General Information

1.1	Getting Started with JCB ServiceMaster
1.2	Diagnostic Connector
1.3	ServiceMaster Driver Versions
1.4	Testing CAN Activity with ServiceMaster
1.5	Diagnostic Tool Help
1.6	Using the DLA

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1.7	Understanding Digital Inputs in ServiceMaster

7.5 Getting Started with JCB ServiceMaster

Live Link > Getting Started with JCB ServiceMaster

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Overview :-

The ServiceMaster Tool allows communication between the service laptop and the vehicle.

A DLA connects the computer USB Port to the vehicle CanBus through the Diagnostic Connector.

The Vehicle ECUs control output signals according to a software decision based on sensor and switch inputs.

The states of ECU inputs, (switches and sensors) outputs (solenoids valves etc) and internal components are broadcast on the CanBus. These values can be monitored using the Diagnostic Tool.

If a switch is hardwired directly to a component (eg the horn), rather than being wired to an ECU, then there is no means of monitoring its state on the CanBus using the Diagnostic Tool.

Further Information :-

Testing CAN activity with ServiceMaster.

7.6 Diagnostic Connector

Live Link 1103 > Diagnostic Connector

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JCB Livelink : Diagnostic Connector

Overview :-

A Diagnostic connector allows communication between the vehicle CanBus systems through a DLA (Data Link Adapter) to the Service Laptop.

Note: For communication between a Service Laptop and the vehicle a DLA must be used and the Service Laptop correctly setup.

Refer to Getting started with JCB ServiceMaster for details.

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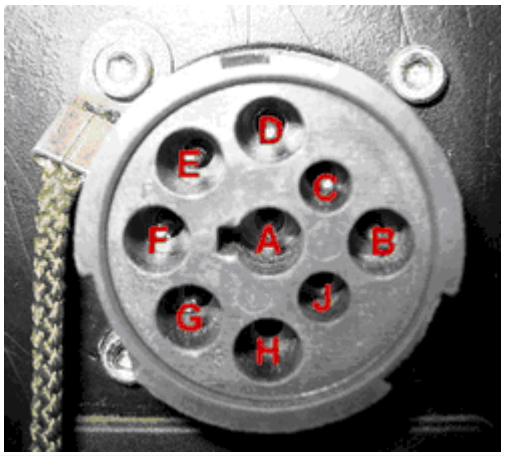
Pin Out :-

9 Pin Deutsch Connector:



Diagnostic Connector	
Diagnostic Connector Pin	**Function**
A	Earth
B	12 volt (Fuse FB-5)
C	CAN1 H
D	CAN1 L
E	CAN1 Screen
F	J1708 +
G	J1708 -
H	CAN2 H
J	CAN2 L

How to Test :-

Measure CAN1 resistance between pin C and D. A resistance of 60 ohms should be measured.

BEFORE testing the CanBus system with a multimeter, you must first disconnect the Service Laptop and DLA from the Diagnostic Socket and Switch the vehicle Ignition OFF.

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ECU messages will affect the multimeter and cause inaccurate readings.

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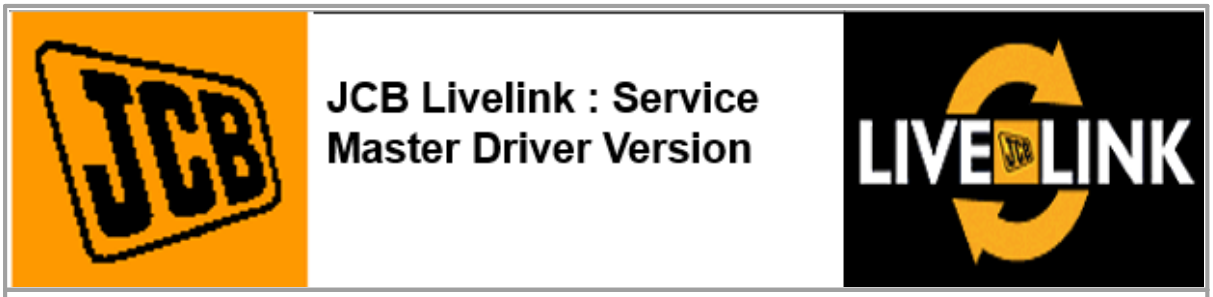
Further Information :-

Testing CAN activity with ServiceMaster.

7.7 Service Master Driver Version

Live Link 1094 > Service Master Driver Version



Overview :-

The Setup and LiveLink Diagnostic tools are intended for usage with the following driver versions.

-USB / RS232 Data Link Adapter Installation CD Version 1.5

-USB Data Link Adapter Firmware (App. Version) 2.02

If you are experiencing communication issues, check the driver versions on the computer which the DLA is connected to.

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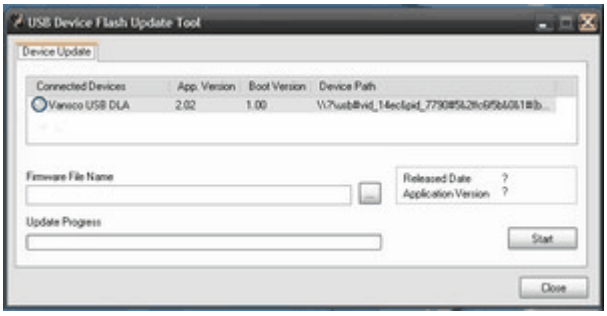
Checking DLA Firmware :-

The Data Link Adapter firmware versions can be found be opening the "Vansco USB DLA Software - USB Update Tool"

When the DLA is connected to the computer this tool will allow you to view which firmware versions are installed.



Further Information :-

Testing CAN activity with ServiceMaster.

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7.8 Testing CAN Activity with ServiceMaster

Testing CAN Activity with ServiceMaster

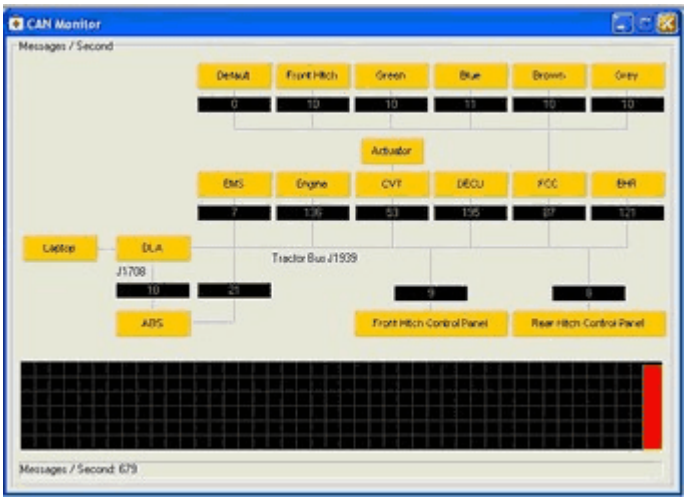
Live Link 10947 > Testing CAN Activity with ServiceMaster

JCB Livelink : Testing CAN Activity with Service Master

Overview :-

ECU activity using JCB ServiceMaster.

Monitor ECU CanBus activity using the JCB ServiceMaster Diagnostics CanBus Statistics screen.



With the ignition On there should never be an ECU message rate of 0.

If an ECU is not communicating, check the DLA J1939 or J1708 communication lights are on or flashing. If necessary, restart the service laptop.

The most likely cause of a lack of activity is an ECU supply fuse blown, or the engine is not running.

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Check the supply fuses.

Check the ECU supply and grounds are correct at the ECU connector.

If the message rate is still '0' perform the test outlined below.

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How to test :-

Measure CAN1 resistance between pin C and D of the Diagnostic Connector.

A resistance of 60 ohms should be measured.

BEFORE testing the CanBus system with a multimeter, you must first disconnect the Service Laptop and DLA from the Diagnostic Socket and Switch the vehicle Ignition OFF.

ECU messages will affect the multimeter and cause inaccurate readings.

If the system is correct, then the resistance between CAN H and CAN L at an ECU connector should be 60 ohms regardless if ECUs are connected or not.

If the resistance is not 60 ohms, likely causes are:

-The multimeter is affected by ECU messages because the vehicle Ignition On or the Service Laptop and DLA is connected.

-Terminating Resistor(s) not fitted correctly.

-CanBus wiring shorted to ground or a voltage.

-CanBus wires not connected properly to an ECU or wiring fault at an ECU connector.

7.9 Diagnostic Tool Help

Live Link 1094 > Diagnostic Tool Help

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JCB Livelink : Diagnostic Tool Help

Overview :-

If sensors and switches are wired to one of the vehicle ECUs then their values or states are generally sent over the CanBus.

The Diagnostic Tool monitors information available on the CanBus to display the value detected by the ECU. The DLA must be used, connecting to the CanBus through the vehicle Diagnostic Socket

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Understanding ECU Digital Inputs in ServiceMaster.

If a switch is hardwired directly to a component (eg the horn), rather than being wired to an ECU, then there is no means of monitoring it state on the CanBus using the Diagnostic Tool.

Manual Mode: ABS Modulators, Suspension Valves and Pilot Valve can be manually energized using the Diagnostic Tool.

The Diagnostic Tool can also be used to monitor activity of ECUs from their message rates.

If an ECU has a message rate of - then it is likely there is an ECU Power fault or a CanBus fault.

Note: With multiple Diagnostic Screens open, the computer can be reading so much vehicle information that the Diagnostic Tool response time is reduced.

Further Information :-

7.10 Using the DLA

Live Link 1093 > Using the DLA

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Overview :-

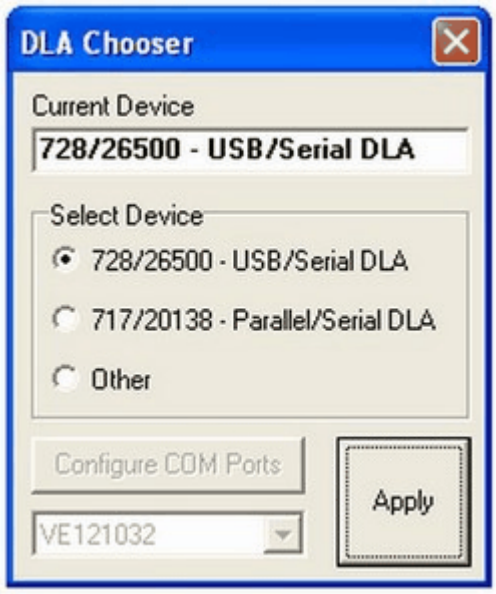
The DLA (Data link Adapter) allows CanBus communication between a service laptop and the vehicle ECUs through the Diagnostic Socket.

The DLA must be installed on the Laptop before it can be used.

Aftermarket installations of JCB LiveLink may only be used with a USB DLA, a parallel / serial DLA will not work.

Note: Some computers install the DLA on only one USB port.

In this case, if the DLA is connected to a different USB port then no communication can be made with the vehicle.



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Important Note :-

It is recommended that a USB DLA which connects to the computers USB port must be used rather than the traditional

Serial / Parallel port DLA. (part number 892/01174).

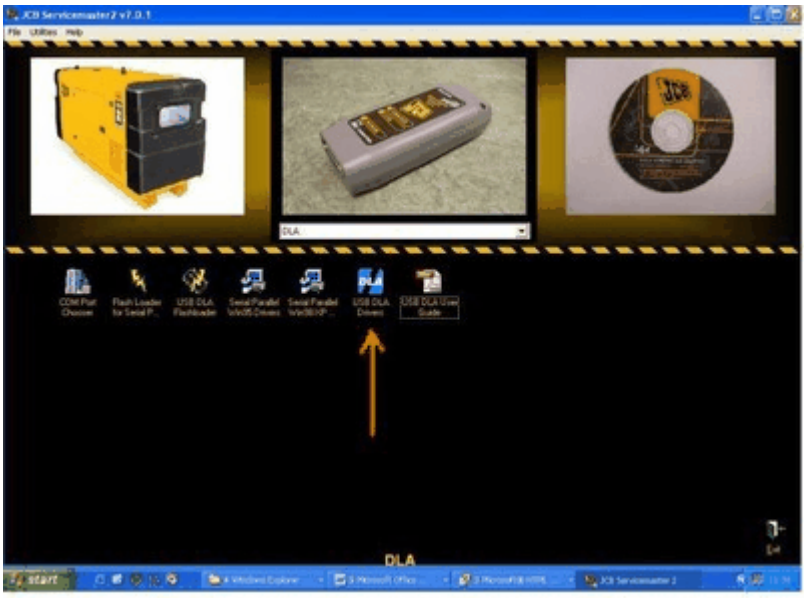
It may also be necessary to configure the Service Computer to be used with a USB DLA.

The DLA Chooser option (below) may be found by right clicking on the JCB ServiceMaster Start-up screen.

Installing DLA Drivers :-

Install the drivers using the DLA menu in JCB ServiceMaster (see below).

On some computers, the USB DLA is only assigned to certain USB ports. If it plugged in an incorrect port Windows shows a New Hardware pop-up message.



Further Information :-

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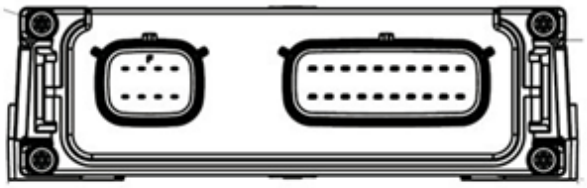
7.11 Livelink 4 Connector

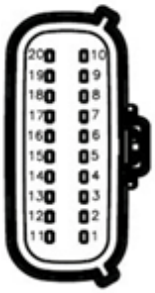
Livelink 4 Connector

Live Link 10947 > Livelink4Connector

LiveLink 4



20 - PIN connector



BATTERY (FUSE)	10	20	GROUND
IGNITION	9	19	GROUND
CONFIG I/P4	8	18	GROUND
CONFIG I/P3	7	17	GROUND
CONFIG I/P2	6	16	USB_ID
CONFIG I/P1	5	15	FREQUENCY I/P2
CAN-L1	4	14	FREQUENCY I/P1
CAN-H1	3	13	ANALOG I/P2
CAN-L2	2	12	ANALOG I/P1
CAN-H2	1	11	LOW SIDE O/P

8 - PIN connector

PIN NO	SIGNAL NAME	SIGNAL TYPE
1	USB POWER	USB POWER
2	USB DP	USB POSITIVE
3	USB DM	USB NEGATIVE
4	USB GND	USB GND
5	SPEAKER +	SPEAKER POSITIVE
6	SPEAKER –	SPEAKER NEGATIVE
7	MIC P	MIC POSITIVE
8	MIC N	MIC NEGATIVE

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Software Flashing

8 Software Flashing

This section is to describe the method for updating software on the machine.

Always ensure the platform and base ecu's are updated together to ensure the versions match.

The display software should always be aligned to the correct bosch ecu software, please check before updating any files on a machine

List of Software Flashing 1118

Sr No.	Description
1	Display Flashing 1119
2	Bosch ECU Flashing 1122
3	Inverter Flashing 1131

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8.1 Display Flashing

Display Flashing

Software Flashing 1118 > Display Flashing

Overview

The display can be flashed and updated through USB.

Please ensure the display software being flashed is at a suitable revision to match the Bosch software.

There will need an additional lead 721/G1618

To flash the display through USB

1.Connect the additional lead 721/G1618 to the connector to the 4 way connector on the rear of the display panel.

2.Save software file onto a memory stick (FAT32 formatted)

3.Insert USB into the USB connection on additional lead

4.View display screen - at this point the screen is touch screen.

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5.Use the yellow button first to remove any old parameters and software that is saved to the display

6.Select the software required to the flashed so it appears in the top file box (multiple software can be on the memory stick)

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7.Press the green download button to update new software

8.wait for the software to complete its update and then remove memory stick and the display will reset

9.The machine VIN number will need to be updated through service-master tool.

Note-

•Make Sure All Electrical harness connections completed as per SOP.

•Make sure all Electrical Interconnections are tight and are properly locked.

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•Visually inspect the High Voltage cables properly fitted & terminal tightened on device as specified torque.

•Check the Individual 6V battery & record the voltage.

•Make sure system voltage is more than 48V after all eight 6V batteries connections.

•Check continuity between the positive & negative busbar.

•There shall be no continuity.

•Check 12V battery, shall measure more than 12V.

•Check all grounds are paint free & terminal properly placed over it

•Make Ignition On & do the display software flashing for both Base & Platform display

8.2 Bosch ECU Flashing

Software Flashing 1118 > Bosch ECU Flashing

Flashing on the Base Bosch ECU's

Use the JCB Flashloader.

For information on the Flashloader tool, see JCB Servicemaster tools section

This instruction begins with the tool connected to the machine

Available ECU's on the machine

Available ECUs are displayed (Base ECU at boot and run mode shown).

While flashing the new ECU,

While flashing the Pre-programmed ECU,

The Flashloader tool relies on the source address (or hardware identity) to display ECUs as thumbnail images. An ECU not recognized by the Flashloader Tool is displayed as ? - Unknown.

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In this case take care to check the ECU source address before attempting to program it with new software.

Flashing the Base ECU Software

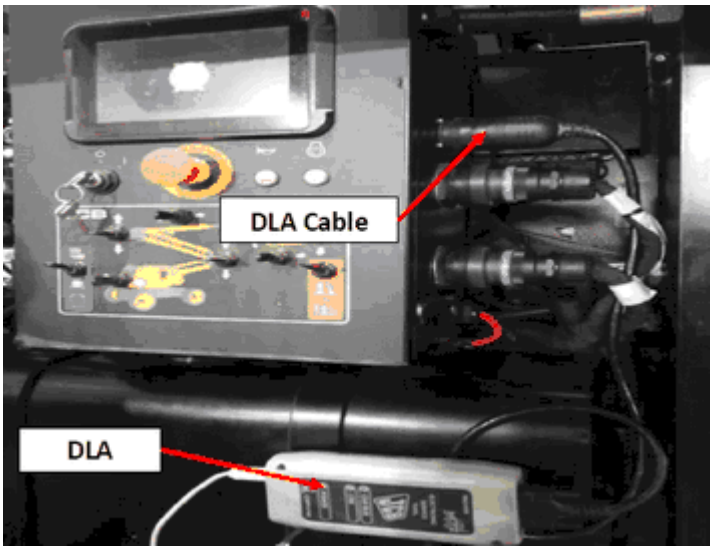
•Connect the Service Master using DLA-2 Connector (Ensure latest revision Service Master must be uploaded)

•Go on JCB Articulated Boom section

•Click on service master JCB Access Service master

•Click on JCB Access icon.

•Click on Access (Articulated Booms) icon.



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- Click on Flashloader icon. Wait until it shows connected.
- The system will ask. "DO YOU WANT TO RUN THIS FILE:- Run OR Cancel"
- Click on "RUN" button.

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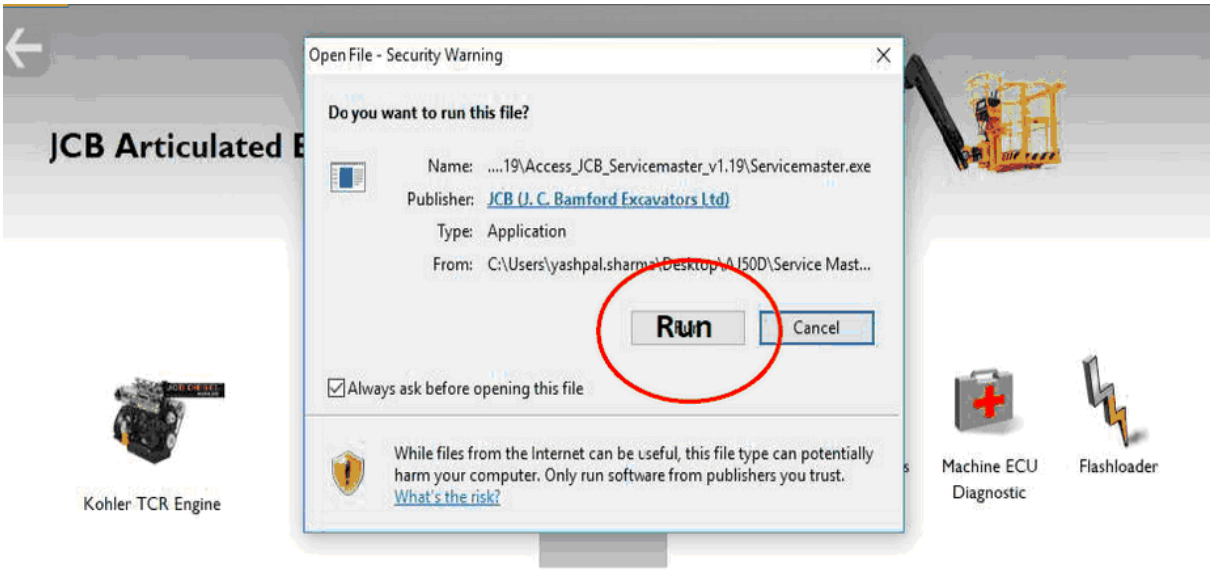

- Wait for 3 to 5 seconds & Click on TECU (boot mode) icon.
- After fulfilling all requirements wait for 3 to 5 seconds and than click on Start button.
- System connects with software, let this process happen until it is 100%.
- System erases the old program, wait for it to be 100%
- Select software from PC
- And, the system creates a new program, let this process happen until it is 100%.
- After select software from PC click start button & Flashing complete

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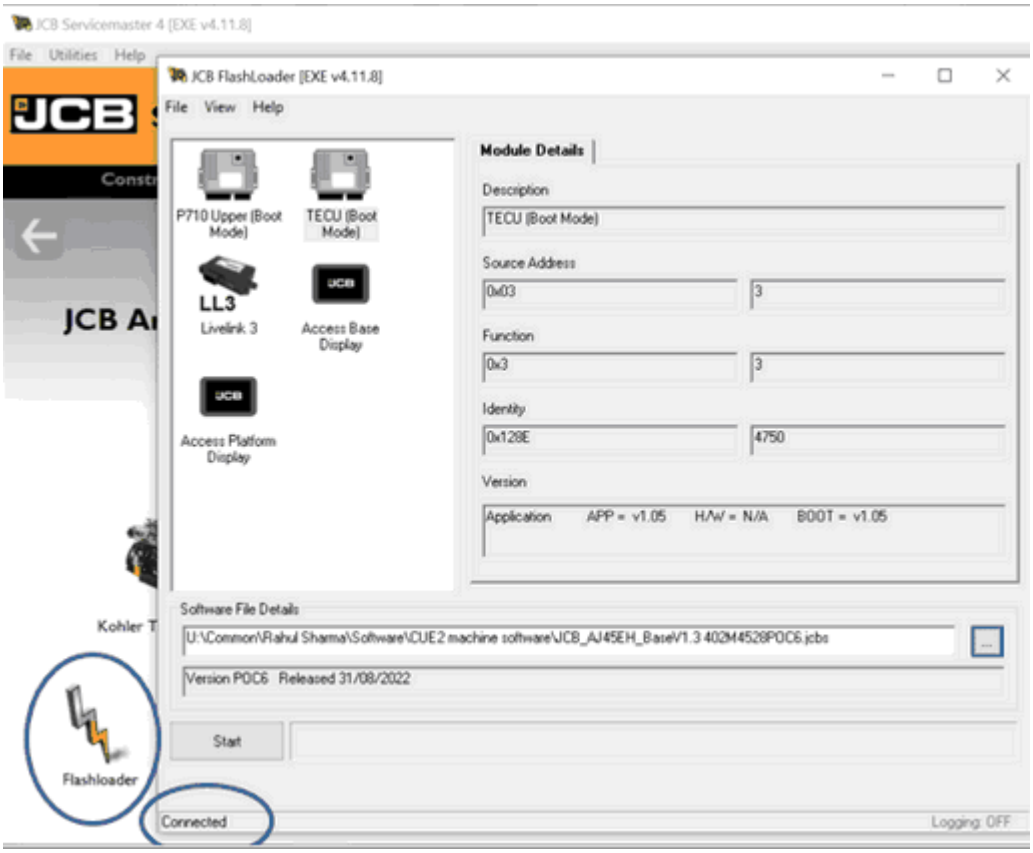

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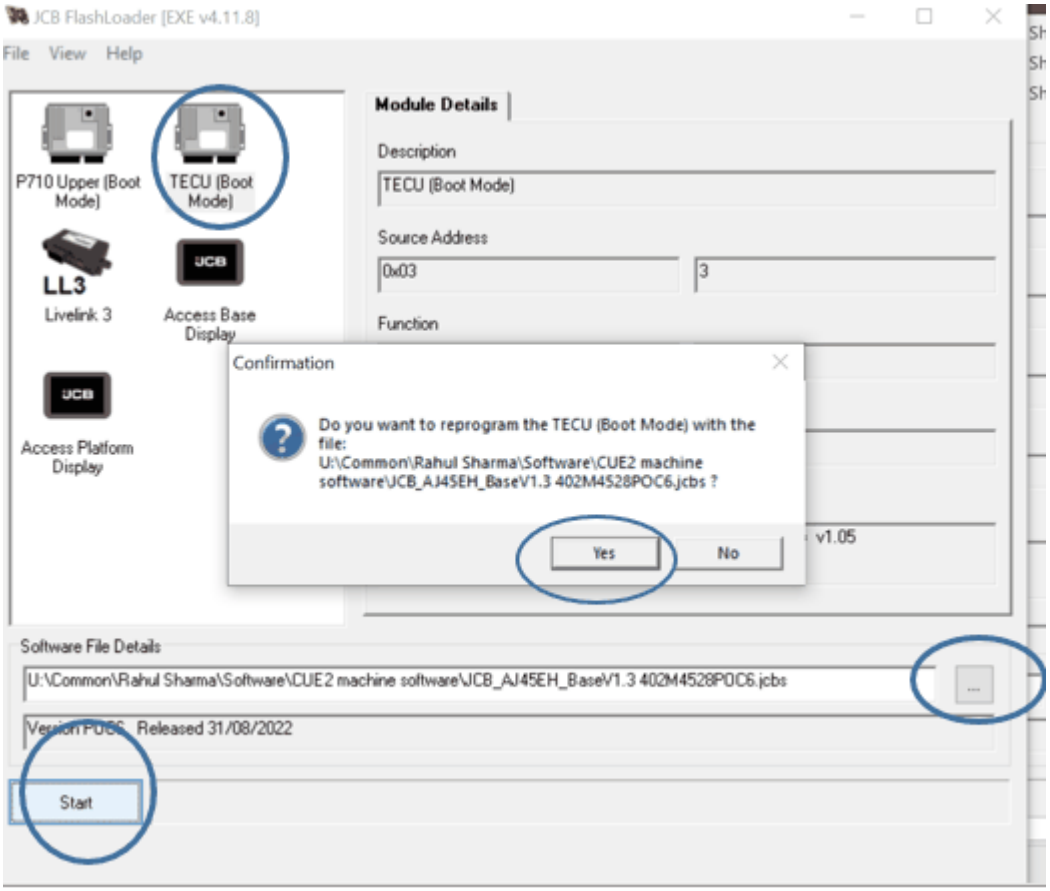

Flashing on the Platform Bosch ECU

•Click on P710 Upper (Boot Mode),

•Import the Platform ECU software file & click on Start.

•It will ask Do you want to reprogram, click Yes over it & wait until it says successfully flashed

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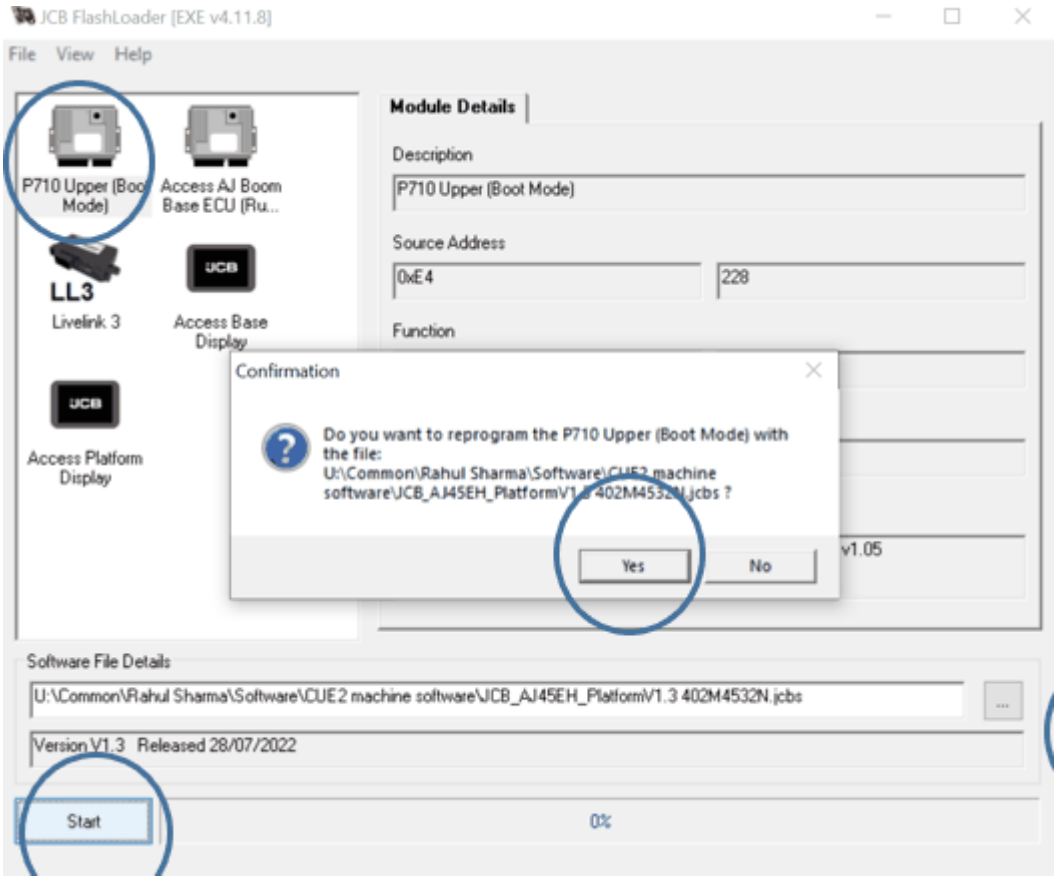
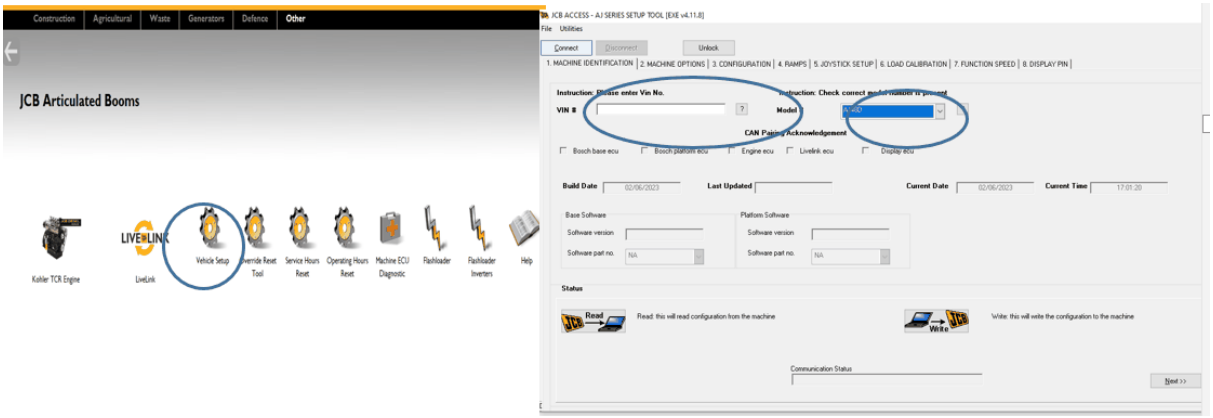


Once it flashed, will show as below, Flash programming has completed successfully.

Vehicle Set Up

•Click On to Vehicle set up & Write the VIN number

•Select the variant as A45EH or A45E



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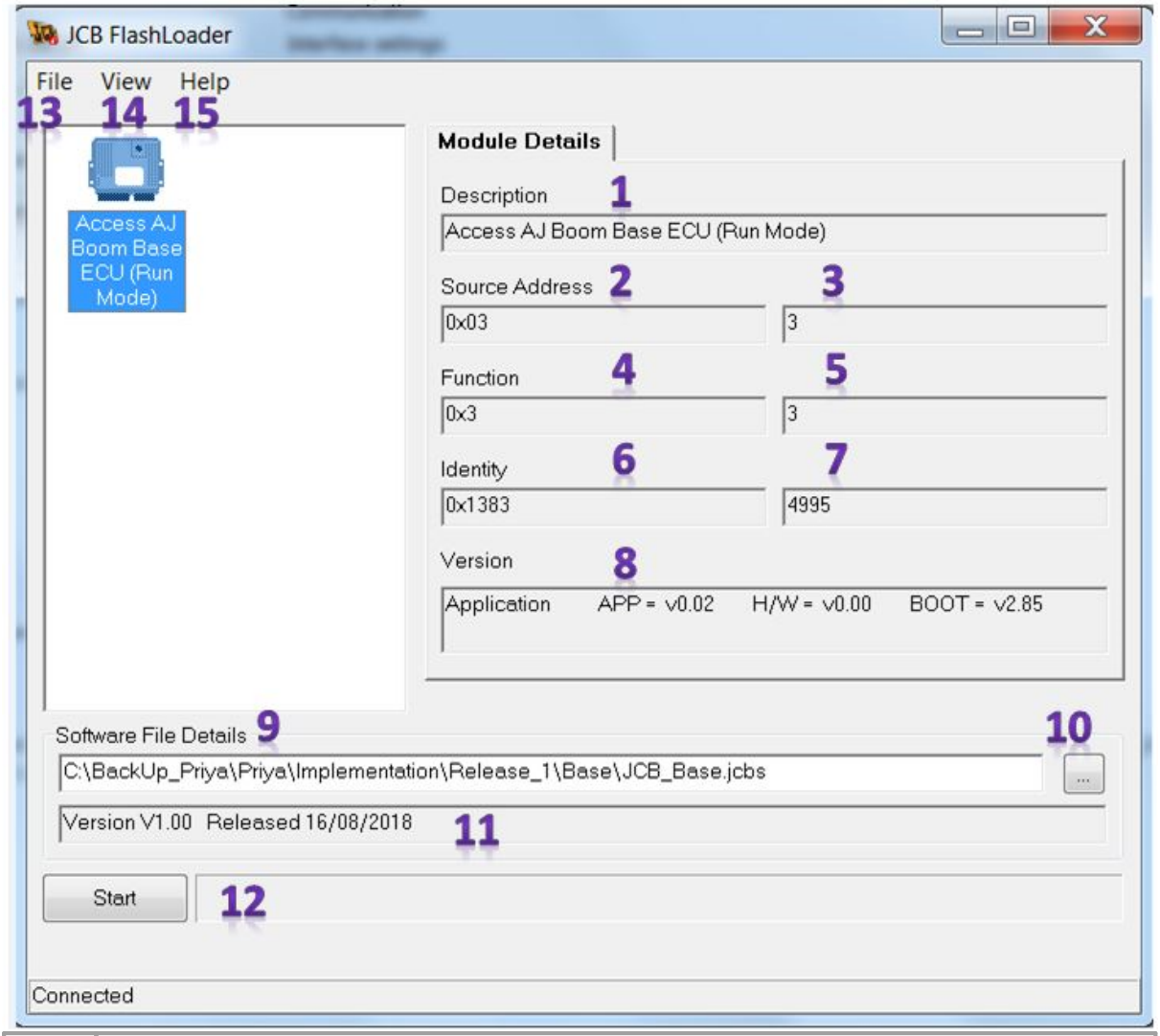
Flash Loader Tool bar

If you select one of ECU, the Flash loader gives the attribute values for specific selected ECU (after click on 'Flash Loader' tool in Service master)



1	Description of the selected ECU
2	The J1939 source address for the ECU in Hexadecimal
3	The J1939 source address for the ECU in Decimal
4	The function of the ECU in Hexadecimal
5	The function of the ECU in Decimal
6	The identity of the ECU in Hexadecimal
7	The identity of the ECU in Decimal

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8	The current version of software currently installed in the selected ECU.
9	The file location on the service laptop of the software that will be programmed if START is selected see note below
10	Click on (...) to open a window to chose a different file location of the software files on the service laptop
11	The version of software that will be programmed from the service laptop if START is selected
12	Click on this button to start programming the selected ECU with the listed software file
13	File change the language of the Flashloader wording from the Preferences option
14	View > Refresh to update the Flashloader display
15	Help > User Guide displays this guide. Help > About... displays the Flashloader Tool Version number.

Choosing the Required Software File

ECU Software files are stored within a Team center.

Both Turntable and platform software should be updated in pairs.

Reprogramming ECU Software - Progress Bar

Once the software is being loaded a progress bar is shown.

Some ECUs take several minutes to receive the software file.

If Reprogramming fails, check the correct file is selected. Switch the vehicle Ignition Off and On and re-attempt the process.

If necessary, restart the Service Laptop and close other windows.

If necessary, disconnect other ECUs on the CAN-Bus in case they are affecting the data transmission.

Reprogramming Complete

A message box indicates when the upload is complete. The file has been successfully received by the ECU.

Switch the Ignition Off and On.

It is not normally necessary to recalibrate sensors as this is not overwritten by these software files.

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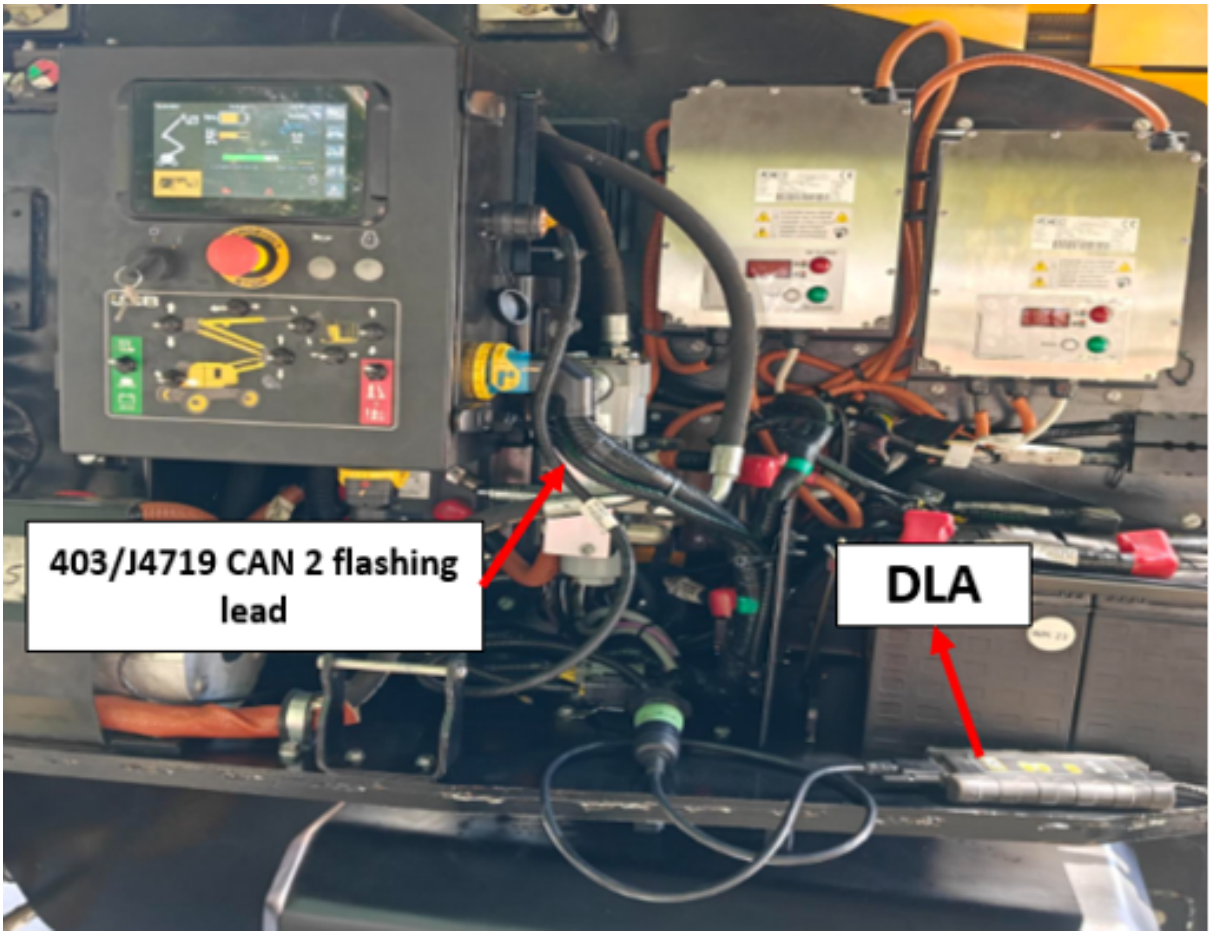
8.3 Invertor ECU Flashing

Invertor ECU Flashing

Software Flashing 1118 > Invertor ECU Flashing

Flashing on the ZAPI ECU s

Connect 403/J4719 CAN 2 flashing lead to Base Control through DLA cable & setup (tough book) to the machine



Go to Service Master

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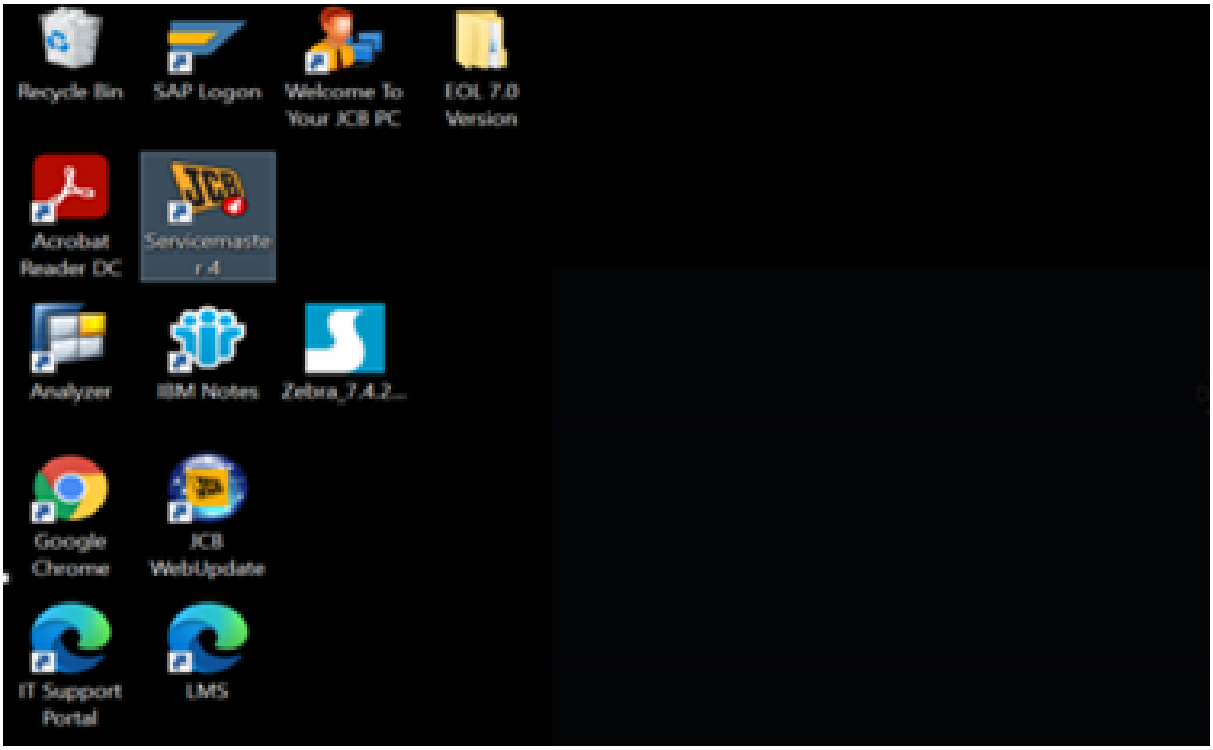
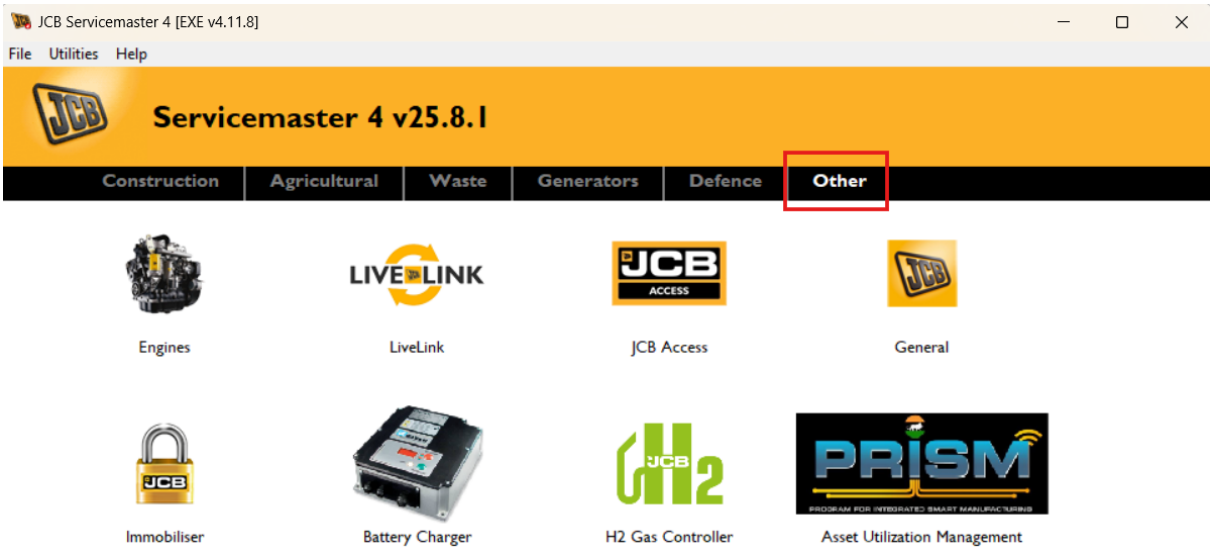


Click on others tab



Go to Access Icon

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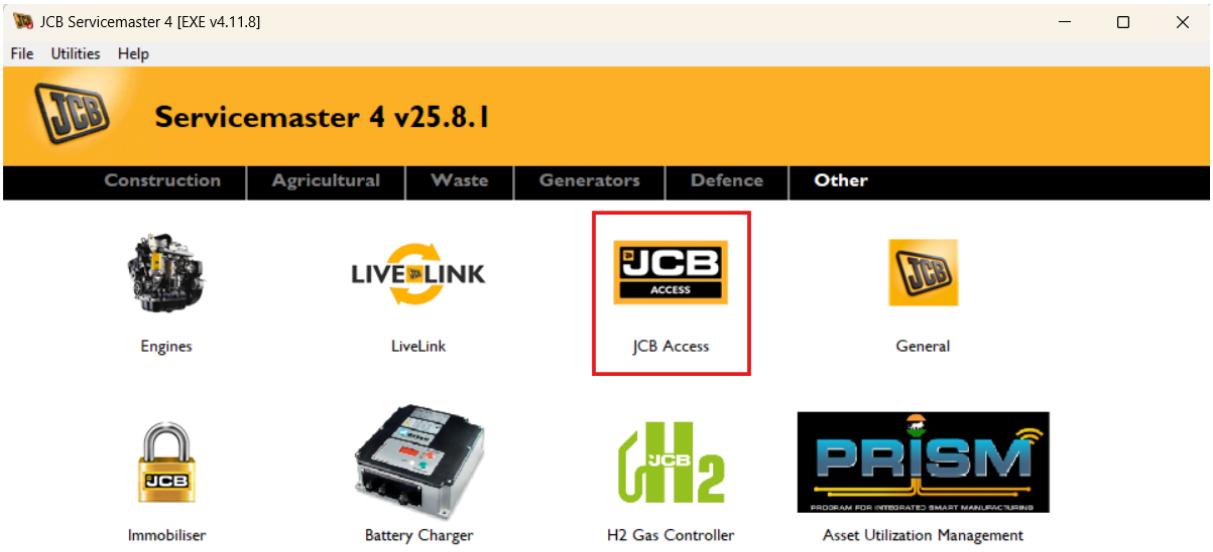

Click on Access(Articulated Booms) icon

Click on A45 Electric/Hybrid

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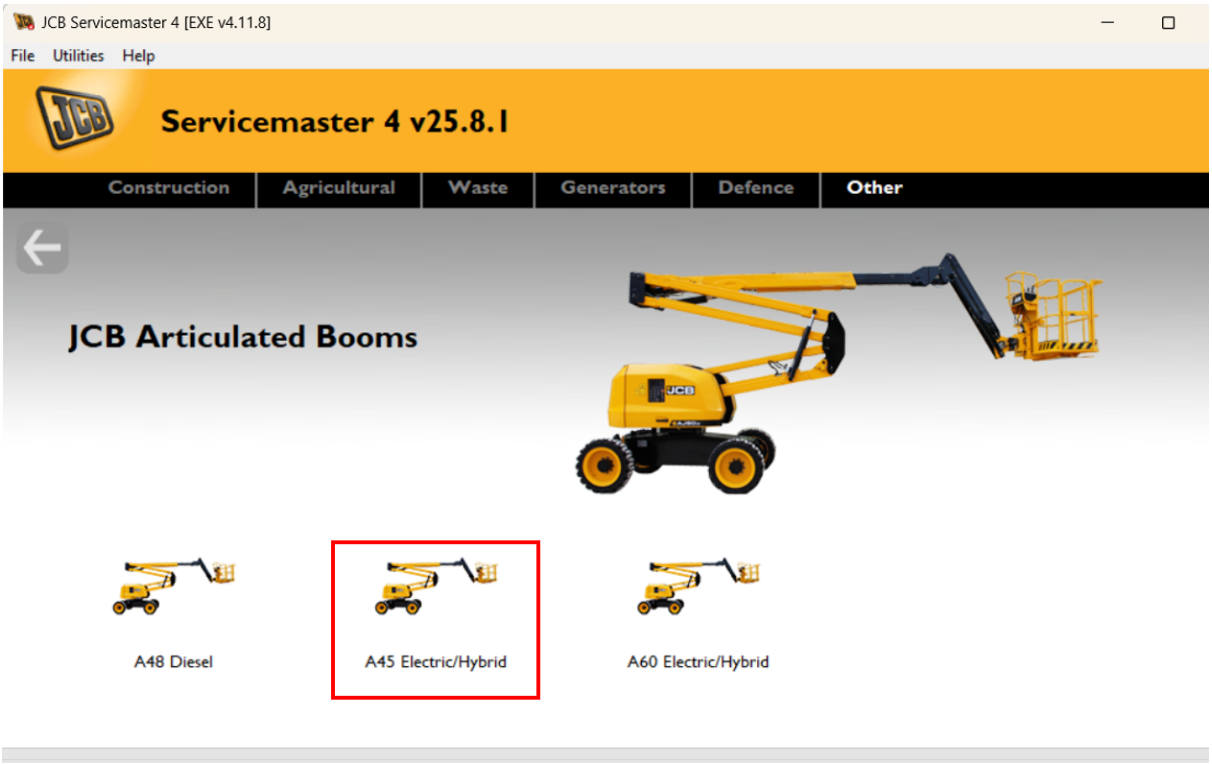
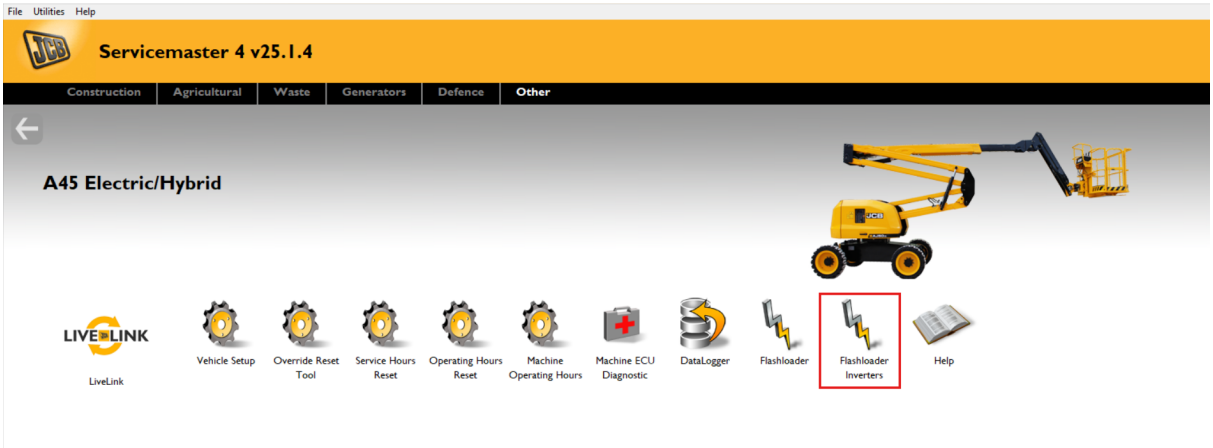


Click On Flashloader Inverters & wait until service master shows connected



Click On Access RR Traction & import the traction software file & start. Once it completes, it will show as successfully flashed. It is the same file to be flashed under Access RL traction, Access FR traction & Access FL traction

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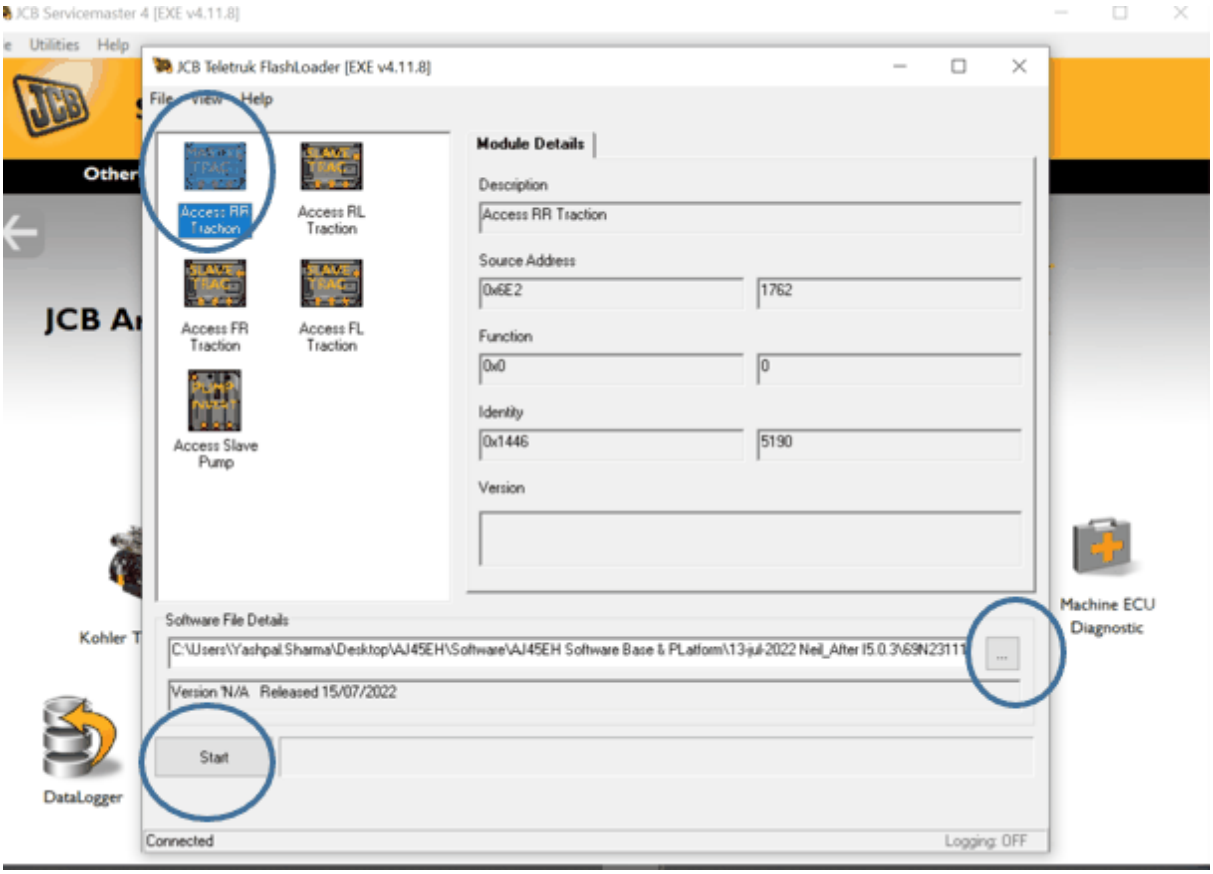

Once it is flashed, it will show as below. Flash programming has completed successfully Click OK then repeat the same for Access RL Traction, Access FR Traction & Access FL traction.

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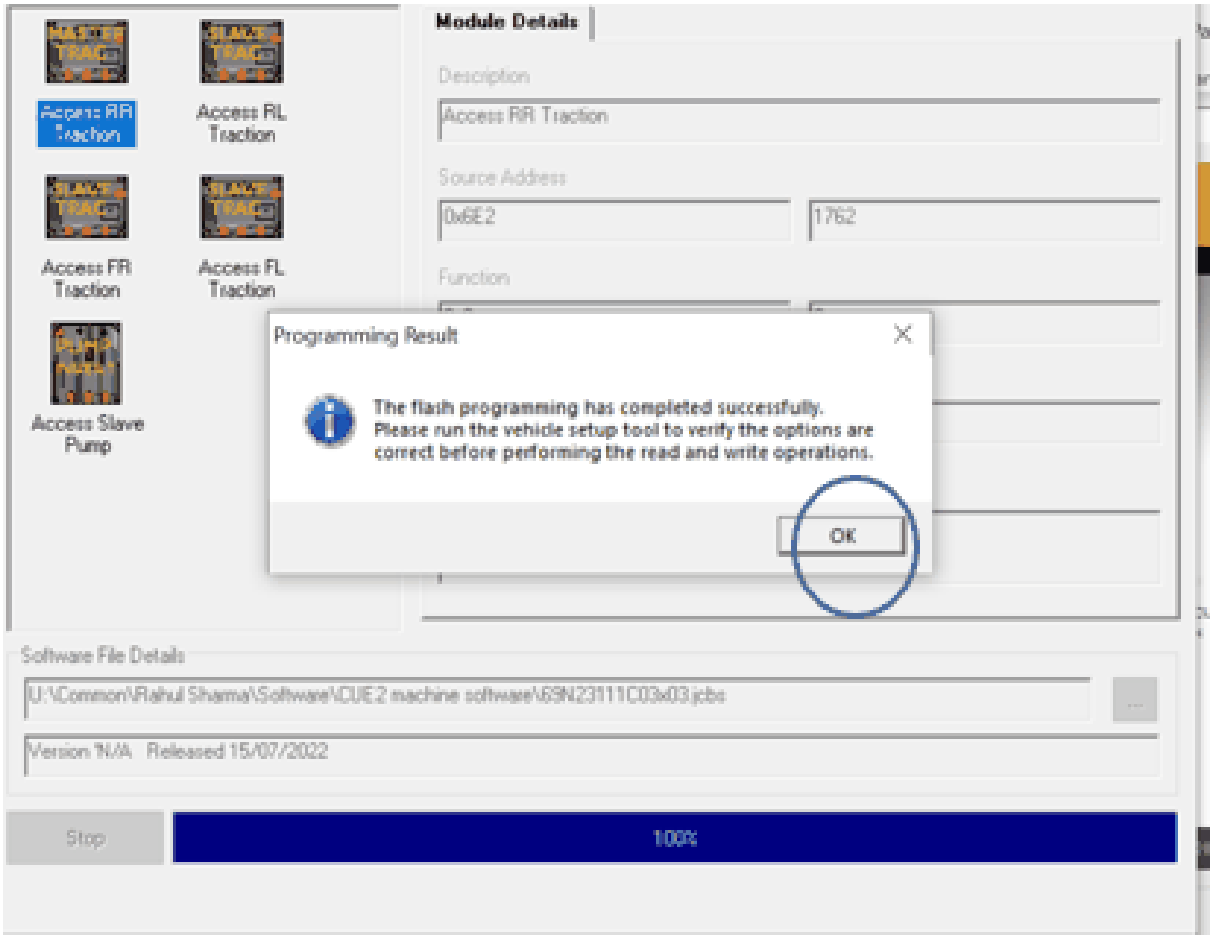

Follow the same process for Access RL Traction

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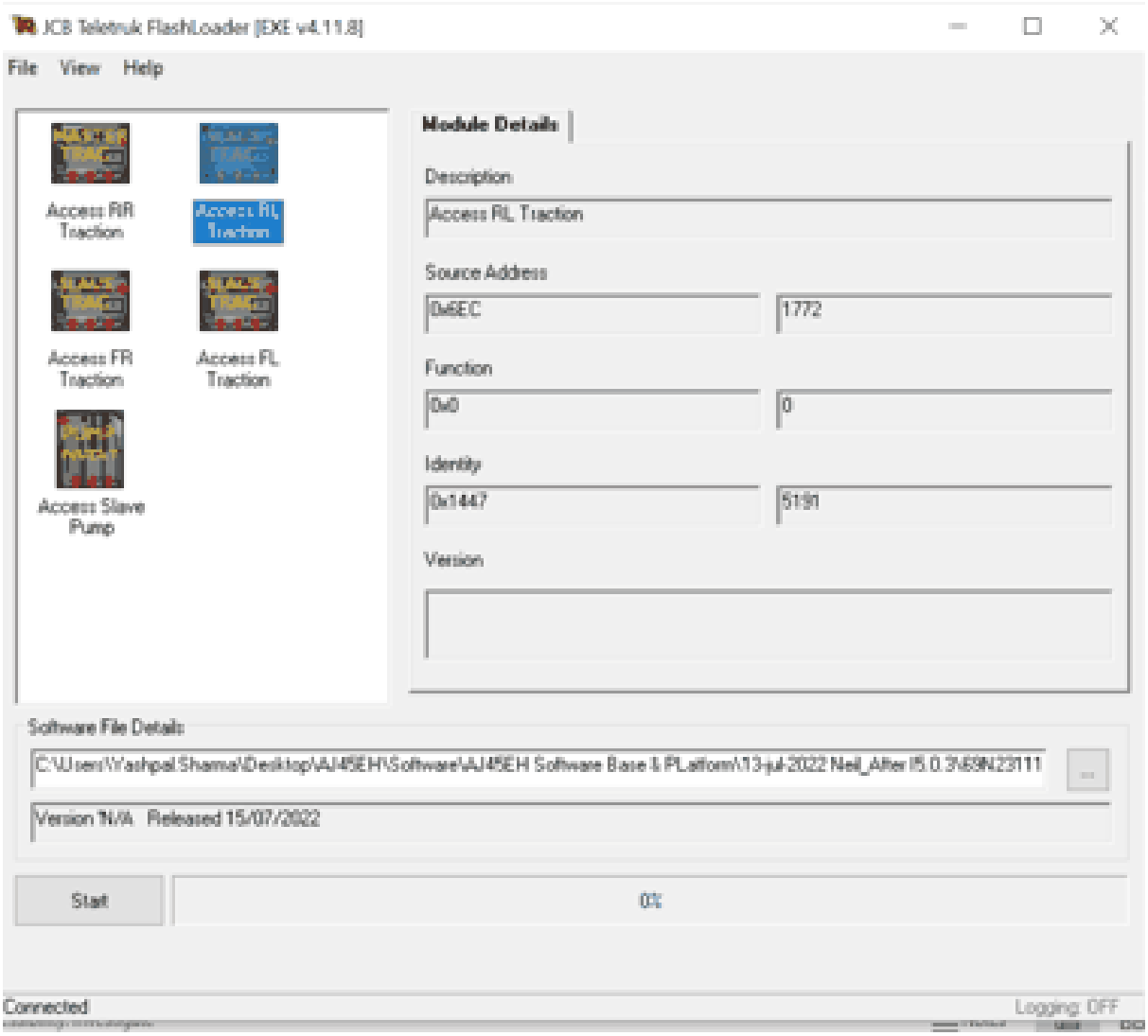

Follow the same process for Access FR Traction

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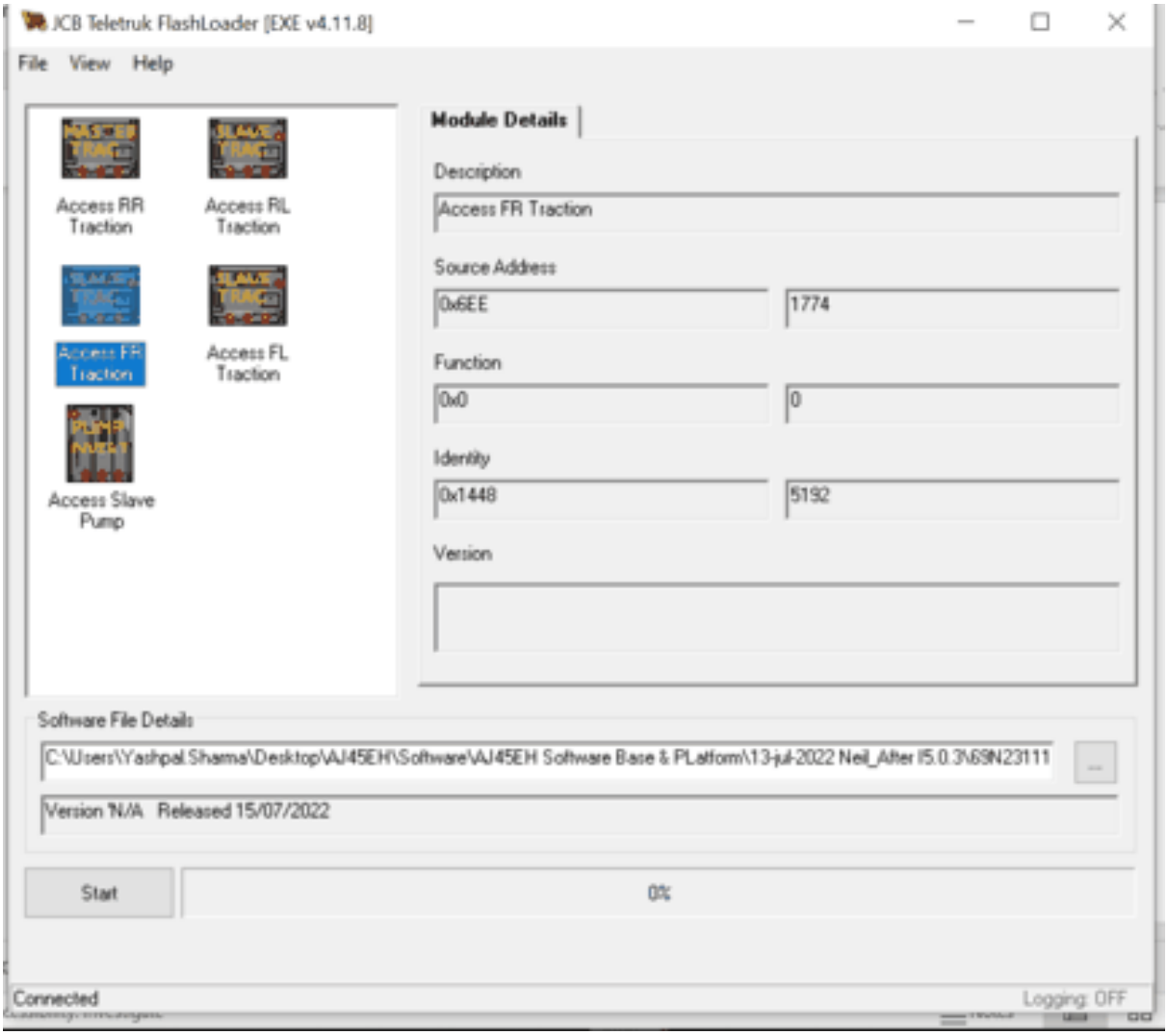

Follow the same process for Access FL Traction

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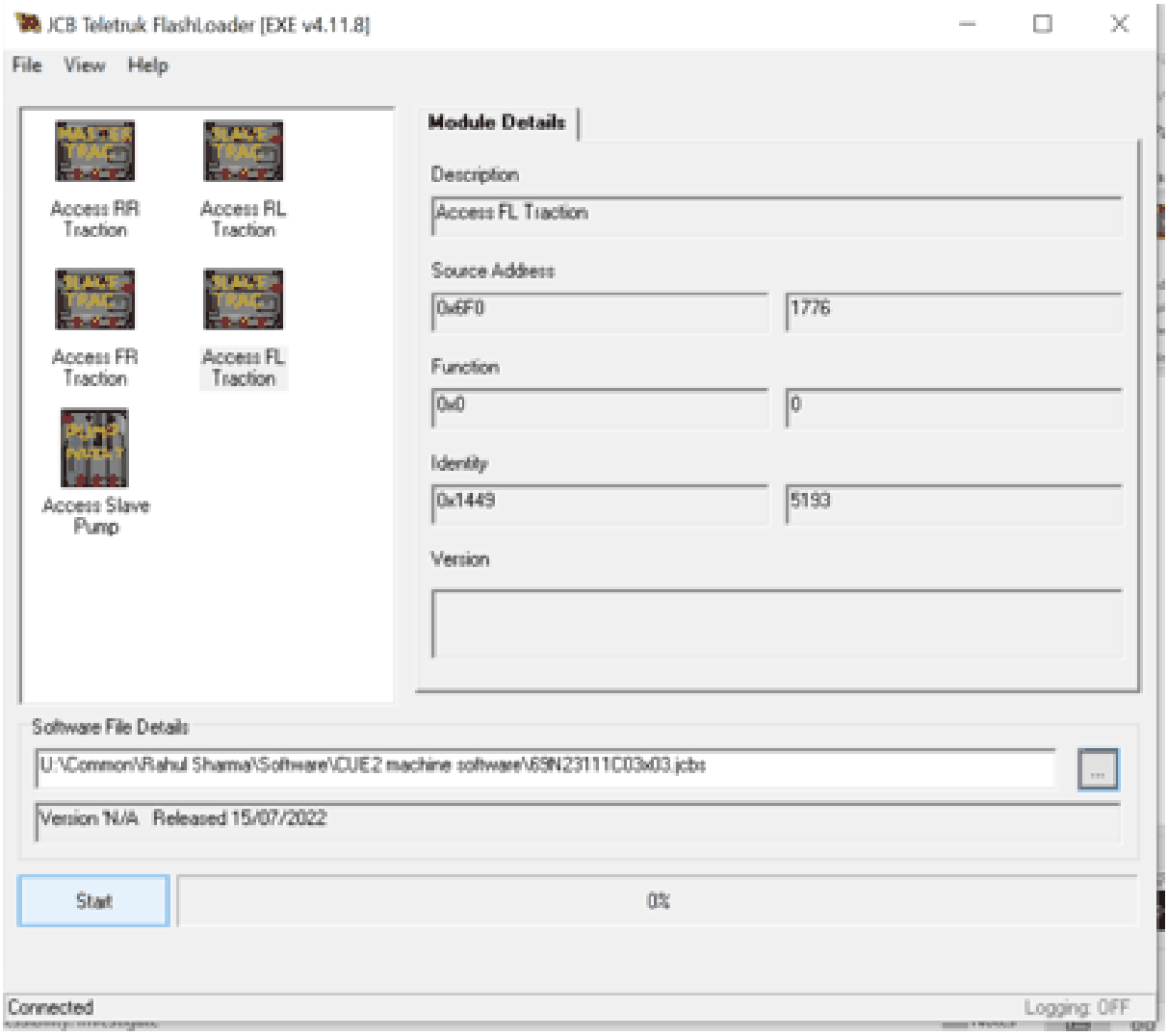

Click On Access Slave Pump & import the pump software file & start. Once it completes, it will show as successfully flashed.

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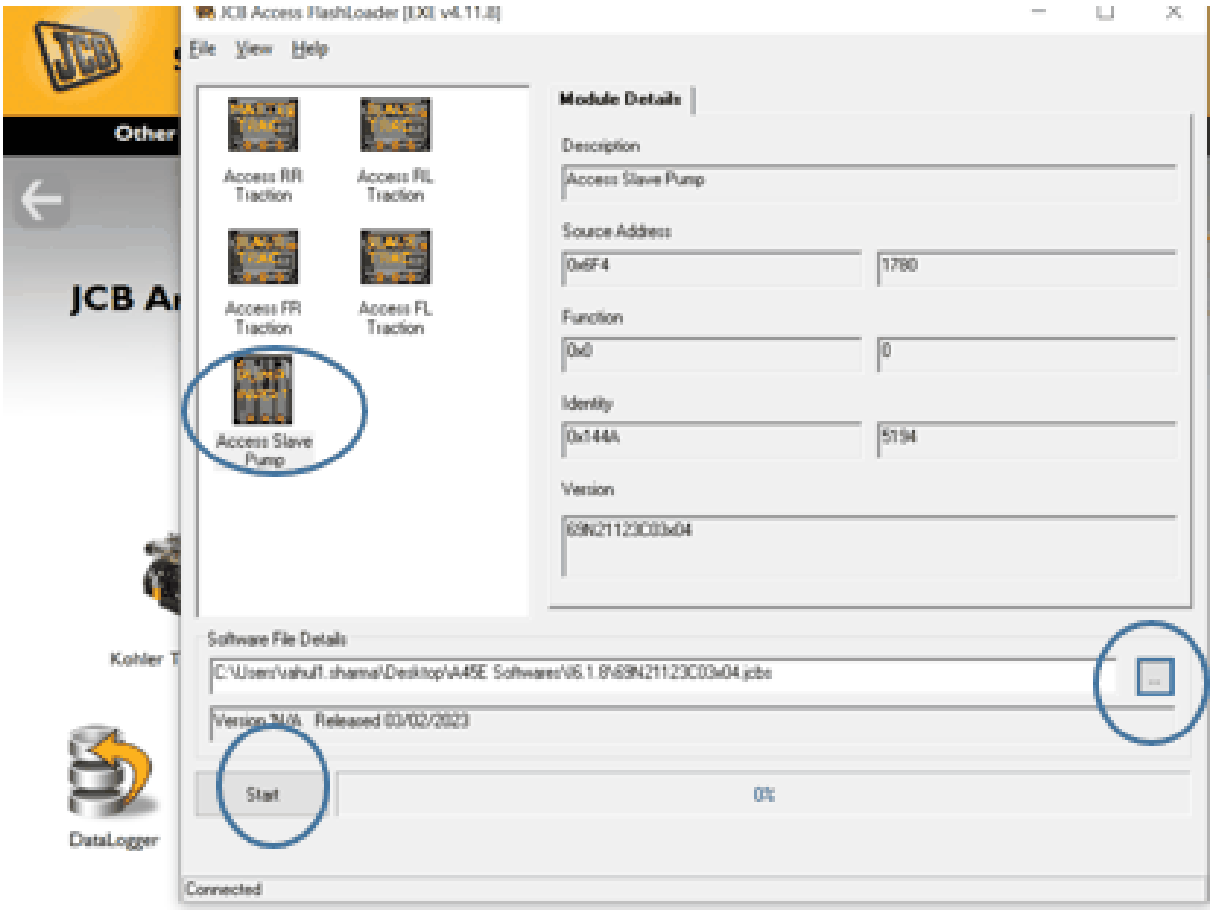
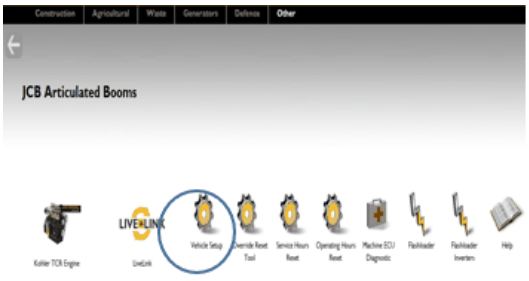
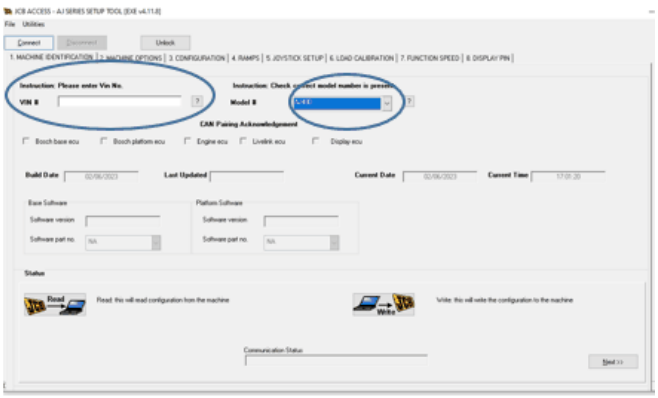


Once Inverter flashing completed. Again click On to Vehicle set up & Write the VIN number punched at Data plate fitted at Chassis & select the variant as A45EH or as per built ticket.





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Machine Setup & Calibration

9 Machine Setup & Calibration

List Of Machine Setup & Calibration 1142

Sr No.	Description
1	VIN Setup 1142
2	Load Cell Calibration From Service Master 1143
3	Steering Sensor Calibration 1144
4	Load Cell Calibration From Display 1145
5	Known Load Cell Calibration 1146

9.1 VIN Setup

Overview

The VIN number of the machine is required to be entered into the machine ECU's.

This number is a 17 Digit number that is on the side of the machine.

The ECU's will require this number so the correct software can be configured correctly to the machine.

The ECU's from base & platform will also use this number to pair, this will ensure they are both from the same machine.

The VIN may only be entered through the USE of service-master.

Entering the VIN Number

Open JCB Servicemaster,

Open applicable product group and open the vehicle setup tool

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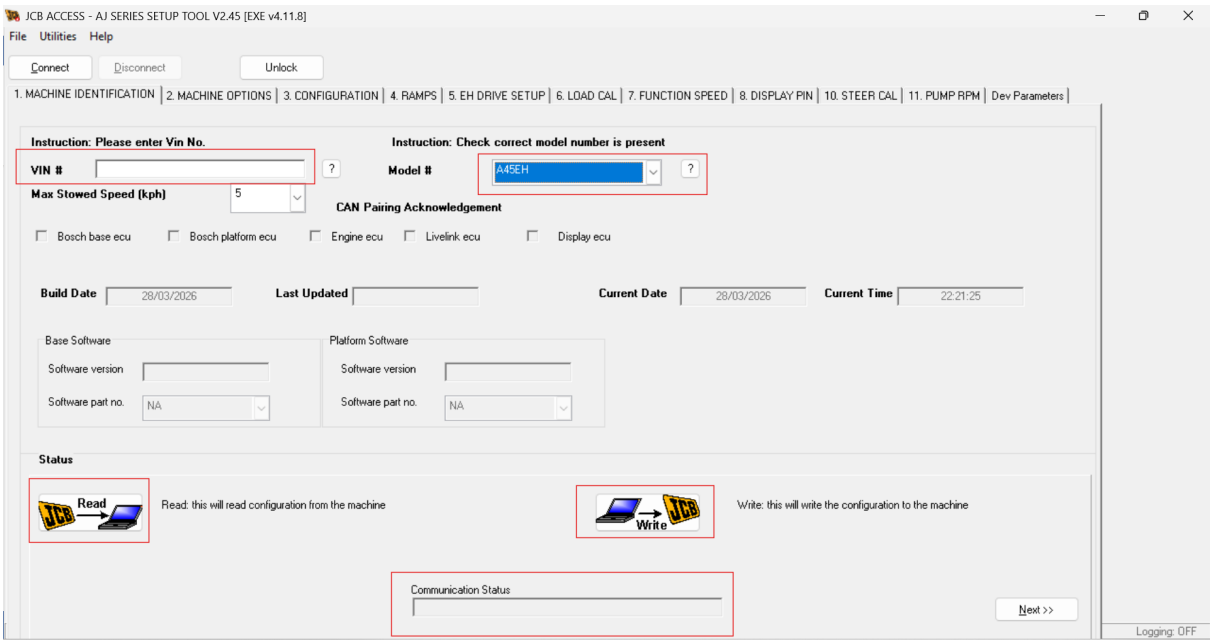
Enter the Vehicle VIN into the box and then press the write button.

Check the communication status and ensure the write process is complete before progressing or closing the tool.



9.2 Load Cell Calibration form Service Master

Go to Service-master, Vehicle setup tool
Connect to the machine and go to the load calibration tab

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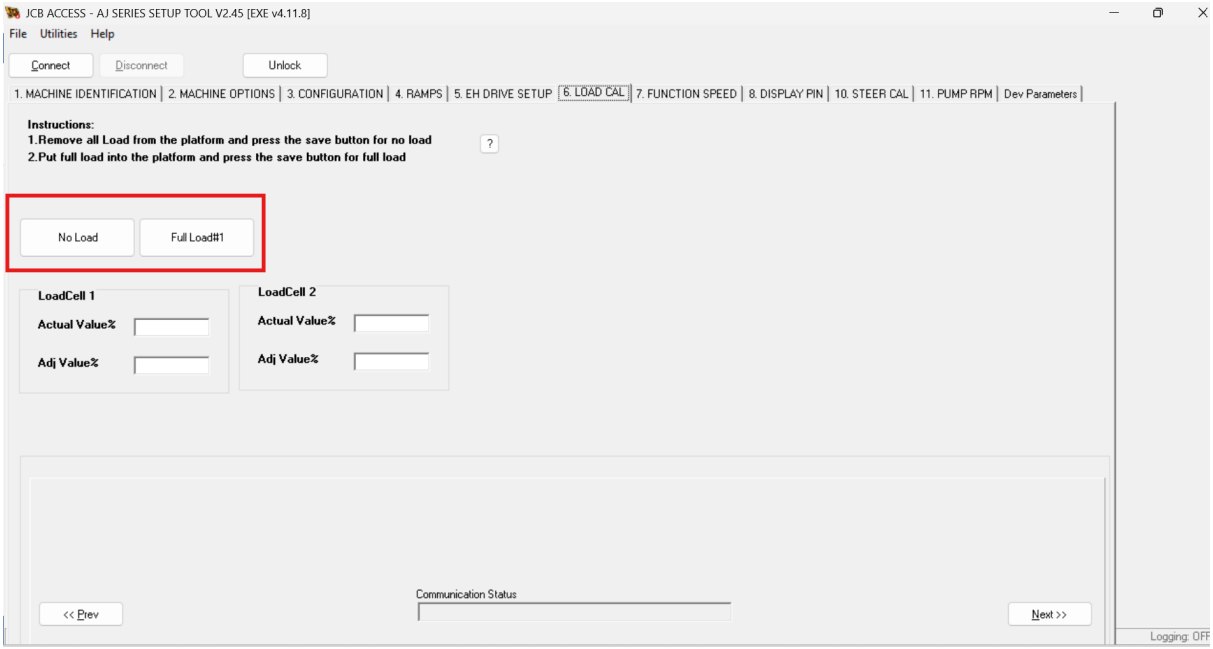

Ensure there is no weight in the platform and click the No load button, await for communication status to complete
Add 300Kg (660lbs) to the platform and click the Full load 1 button, await for communication status to complete

9.3 Steering Sensor Calibration

Steer Angle Calibration:

Step 1: Park the machine on firm, level ground. Make Sure machine all four wheels are in straight line.

Step 2: Connect the service master. Clicking on 'Servicemaster' tool, the below pop-up window will appear. Click on 'Other> JCB Access>JCB Articulated Boom>Vehicle setup

Step 3: Clicking on 'Vehicle Setup', the below pop-up window will appear. Click on 'MACHINE IDENTIFICATION' and enter VIN and Model number.

Step 4: Entering VIN and Model number. Steering calibration 'STEER CAL' pop-up window will appear.

Step 5: Clicking on 'STEER CAL', the below pop-up window will appear. Check the values shown, it shall be approx. 1800 and click on 'Write'.

Step 6: Clicking on 'Write' the steering angle sensor is calibrated.

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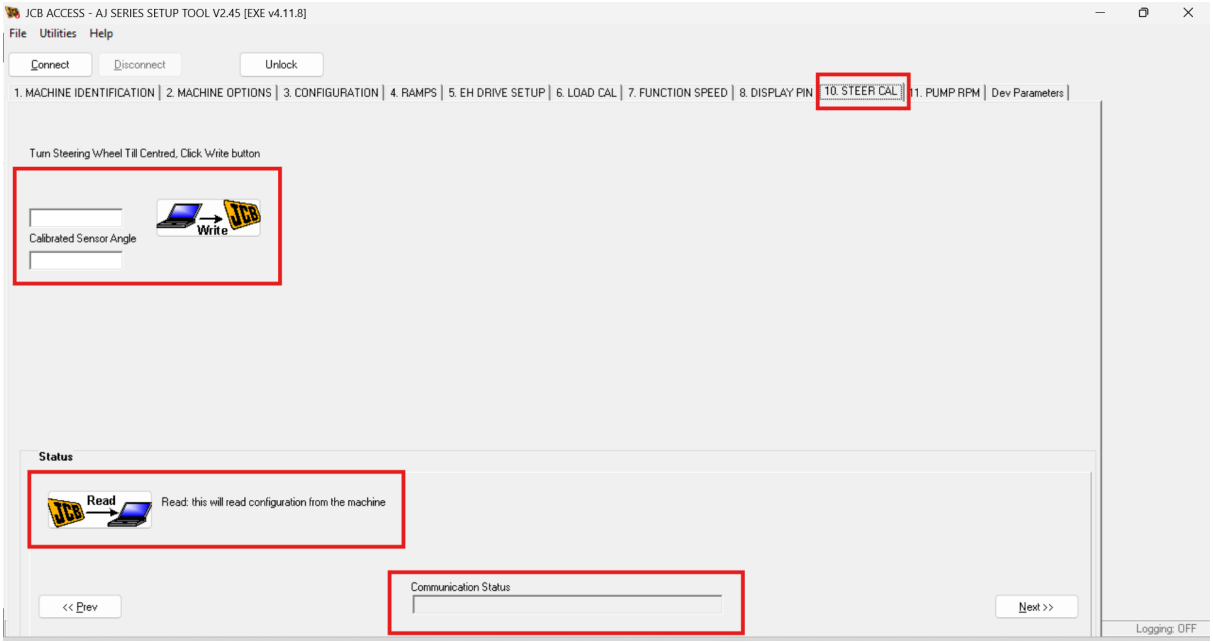

9.4 Load Cell Calibration from Display

Setting the Load Cell Calibration

1. On the machine home page , select Machine control Set up to open machine settings .

2. Select load cell calibration and use the tick to confirm

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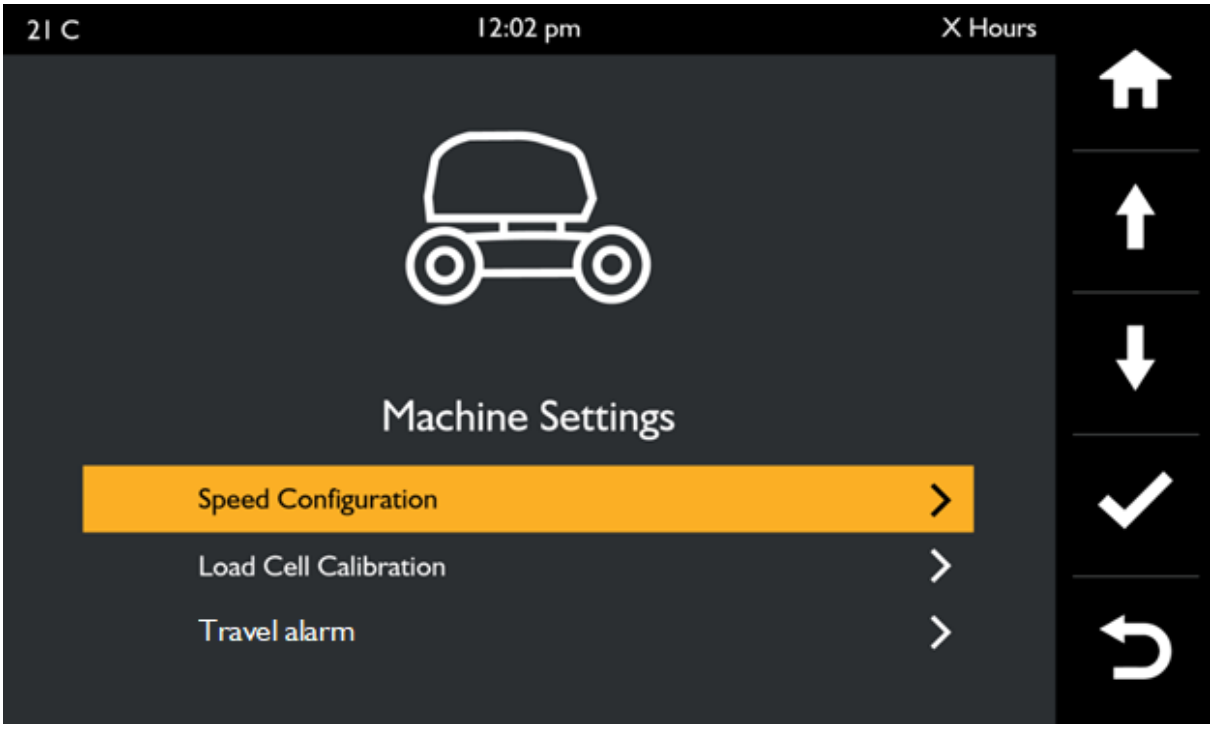


3. Use the arrow keys and select the 'NO load' or 'Rated load' depending on the calibration to be carried out.

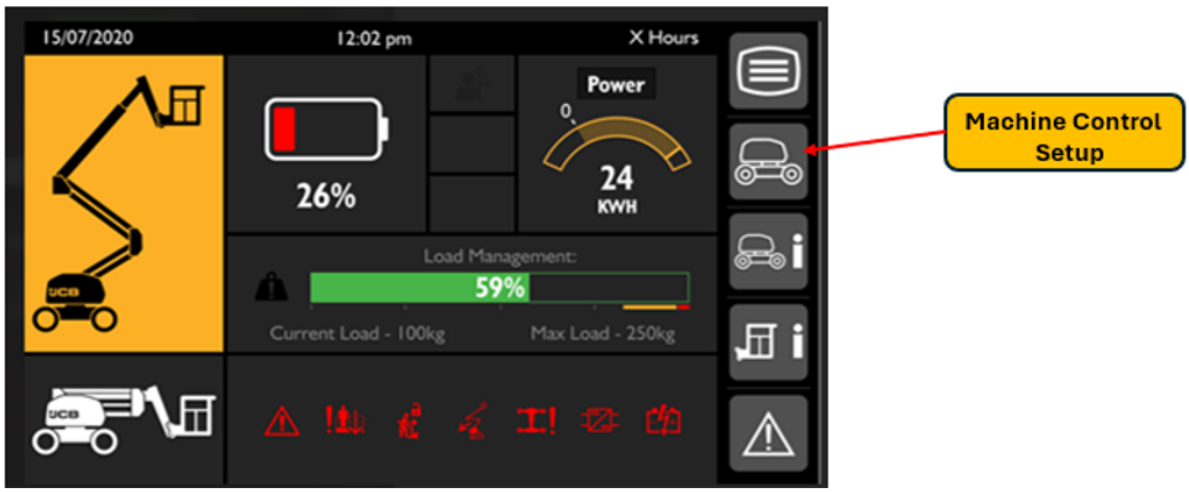
Ensure their is nothing in the platform when the 'NO load' is selected

Ensure 250Kg is in the platform to set the 'rated load'

4. When the machine has the correct loading, use the tick arrow to confirm setting.

9.5 Known Load Cell Calibration

1. On the machine home page , select Machine control Set up to open machine settings .



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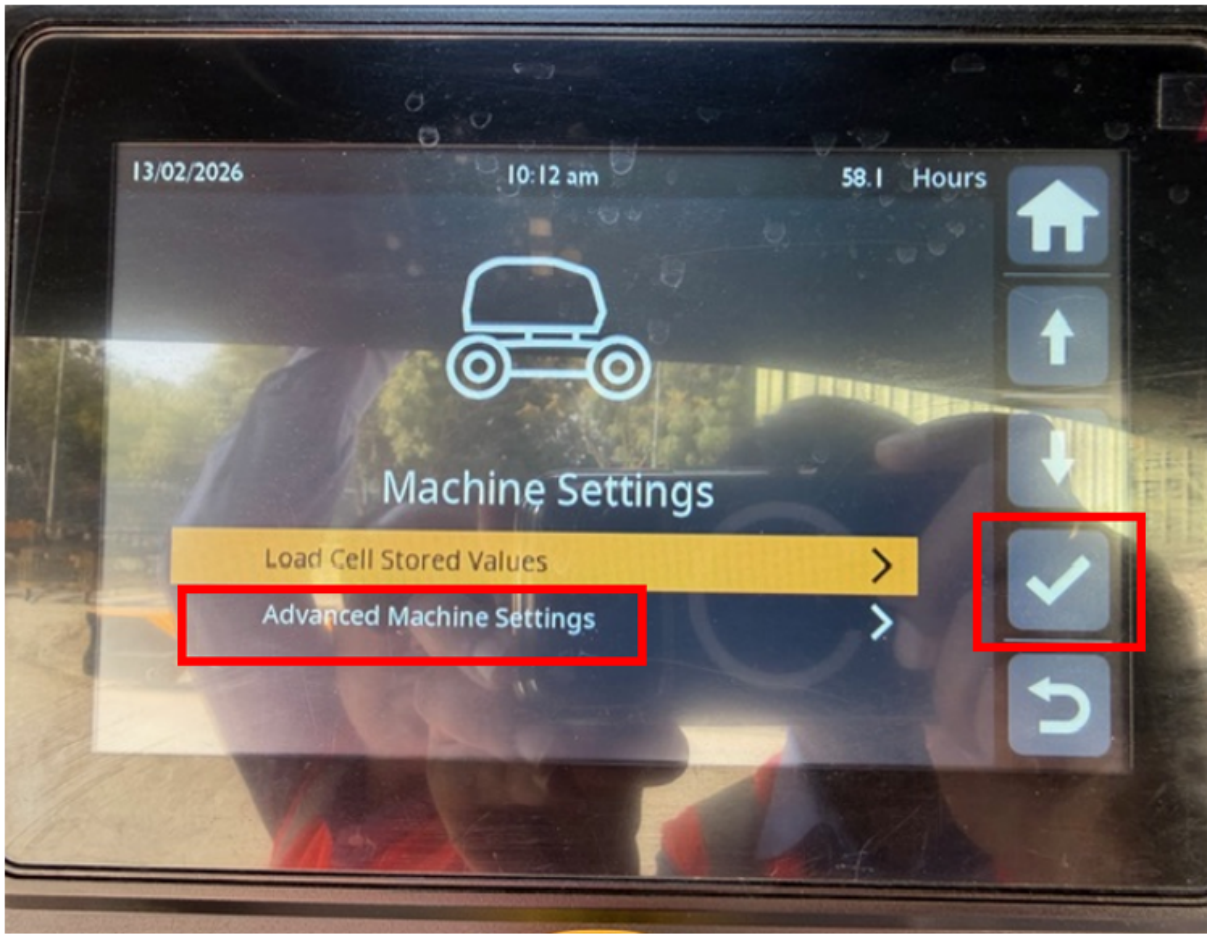
2. Use Up/ Down scroll icon to choose "Advance Machine Setting" in the menu , and click Ok Key .



B Home page icon

C Up scroll icon

D Down scroll icon

E Select icon

F Return icon

G Machine settings

3. Enter Password and click Ok Key.

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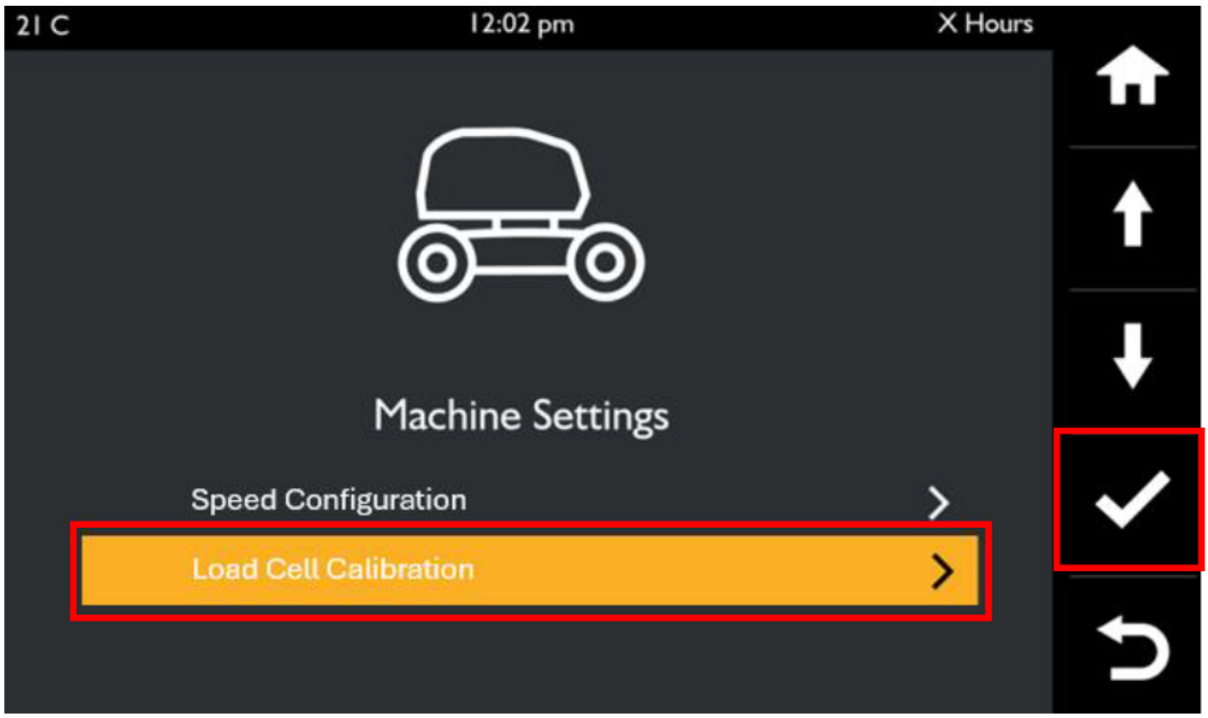
4. Select Load Cell calibration and click Ok Key.



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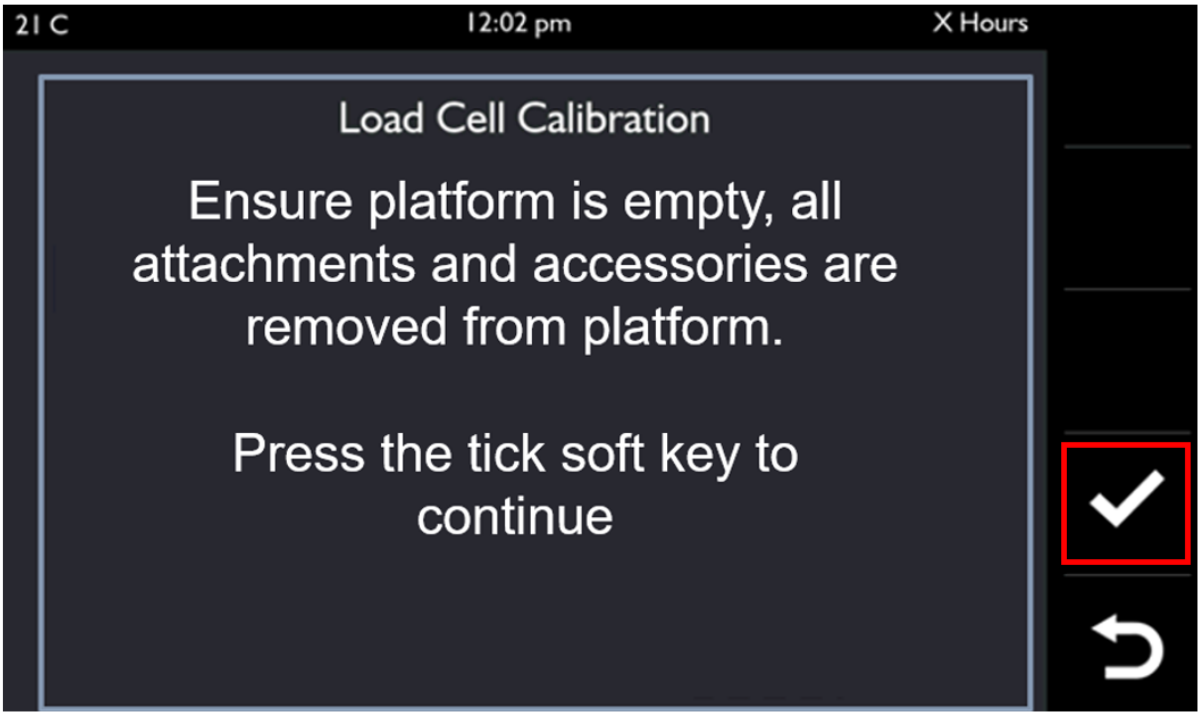
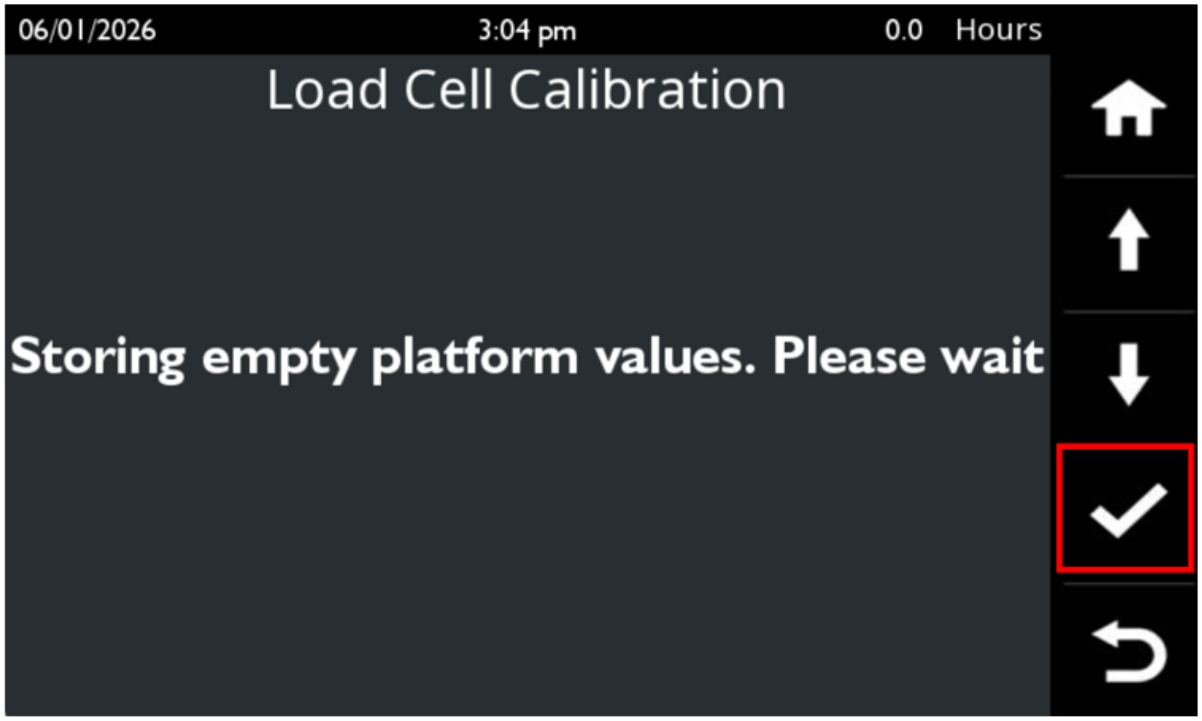
5. Load Cell Calibration requires the operator to ensure there is no weight in the basket, then proceed to next step by pressing OK. Refer below Pic.



6. After click on OK key, No Load Calibration Process will run.



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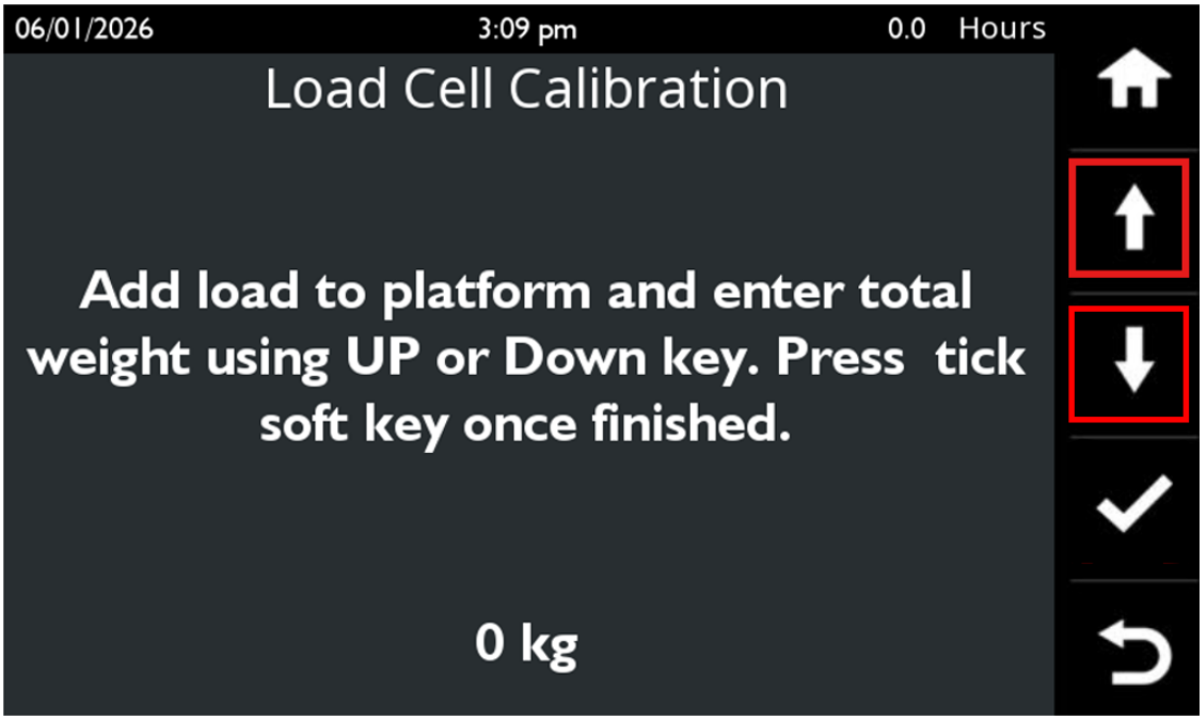
7. After No Load Calibration below screen for Load Calibration will appear, to put the load in basket 50 - 300 kg and click Up/Down Key



8. Enter the value of weight available in the platform for Load calibration and click Ok Key (Note - Enter the accurate weight for load calibration in the display)

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9. click Ok Key

10. After click on OK key, Load Calibration Process will run.

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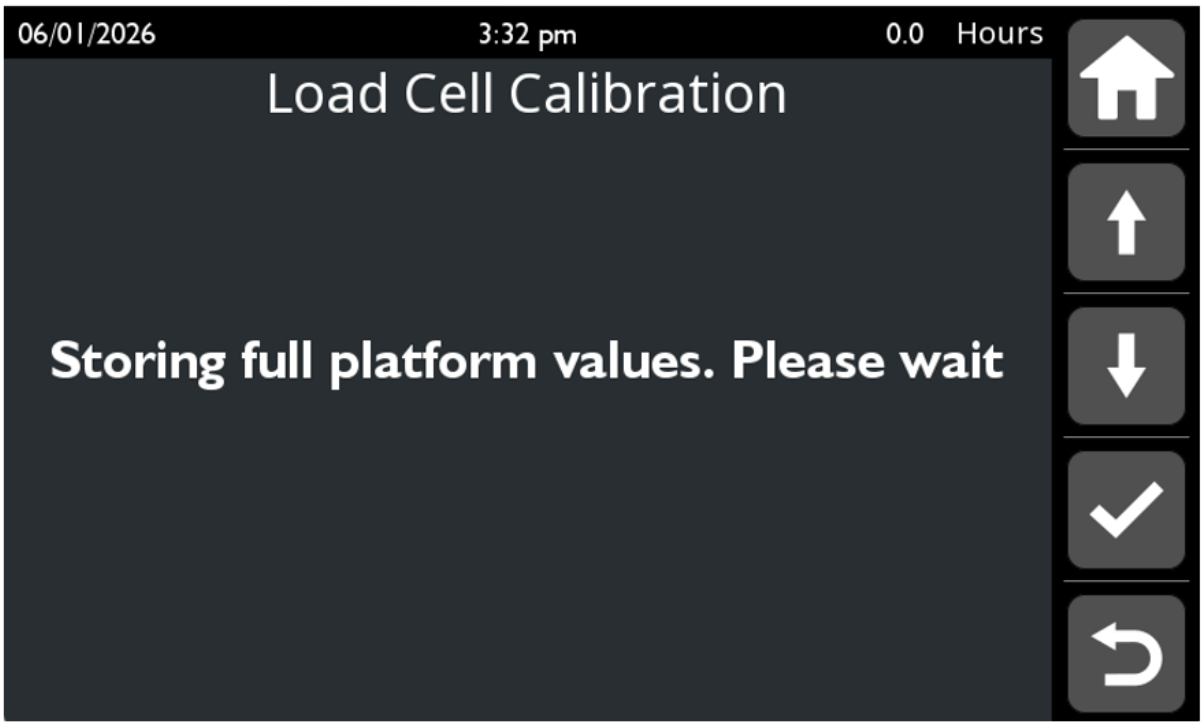

11. Once calibration steps are completed, Load calibration done Successfully massage will pop up on the Display.

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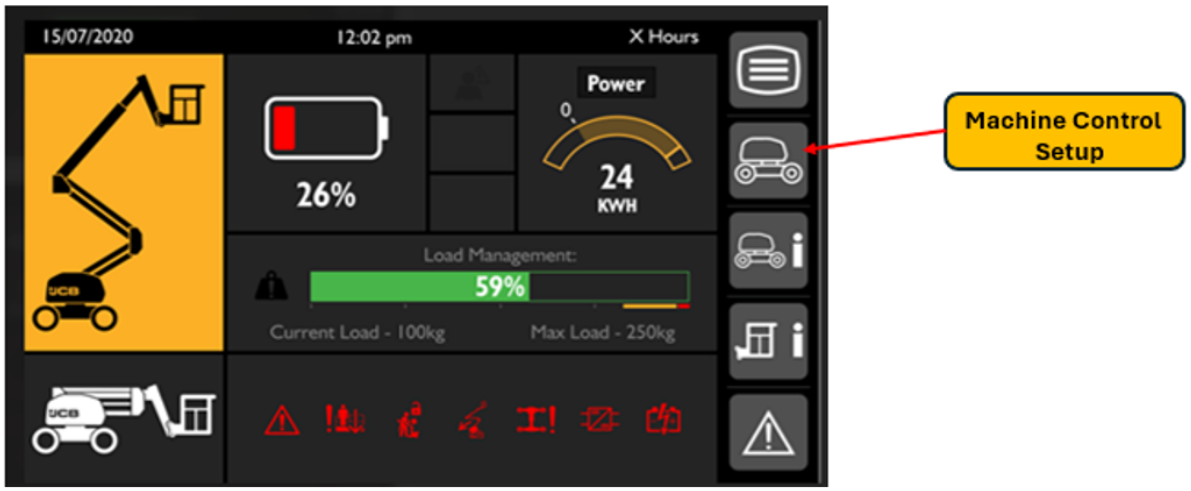
12. To check the calibration details, select Machine control Set up to open machine settings .



13. Select "Load Cell Stored Value" and Click on Ok Key.

14. After Clicking the Ok key, below screen will appear with Load calibration details.

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Service Master Tools Help

10 Service Master Tools Help

List of Service Master Tools Help 1156

Sr No.	Description
1	Install software - Service Master 1156
2	Using JCB Service Master 1158
3	Using DLA 1159
4	Diagnostic Tool 1164
5	Flashloader Tool 1165

10.1 Install Software - Service Master

Service Master Tools Help 1156 > Install Software - Service Master

General

The ServiceMaster Tools allows communication between the service laptop and the machine.

To use the 'ServiceMaster Tool', the operator must install the latest version software into service laptop.

Instructions for Install Software - ServiceMaster

Follow the below steps to install the software

Step 1: Visit the JCB Dealer Business Portal

Step 2: Enter your User and password details to login

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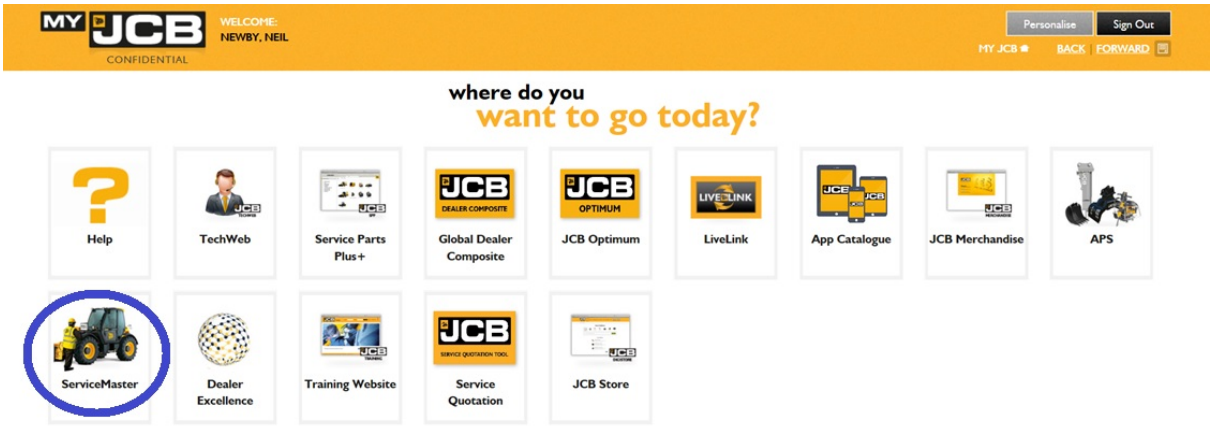
Step 3: Click on 'ServiceMaster' icon



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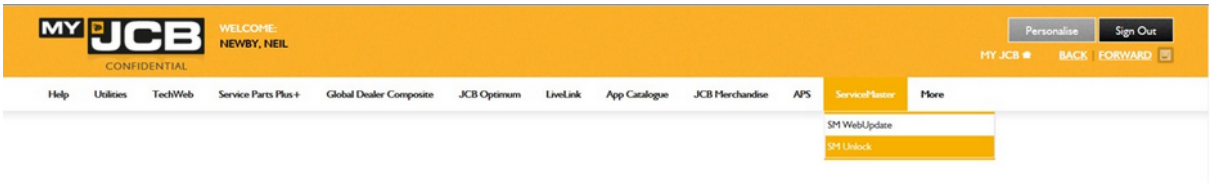
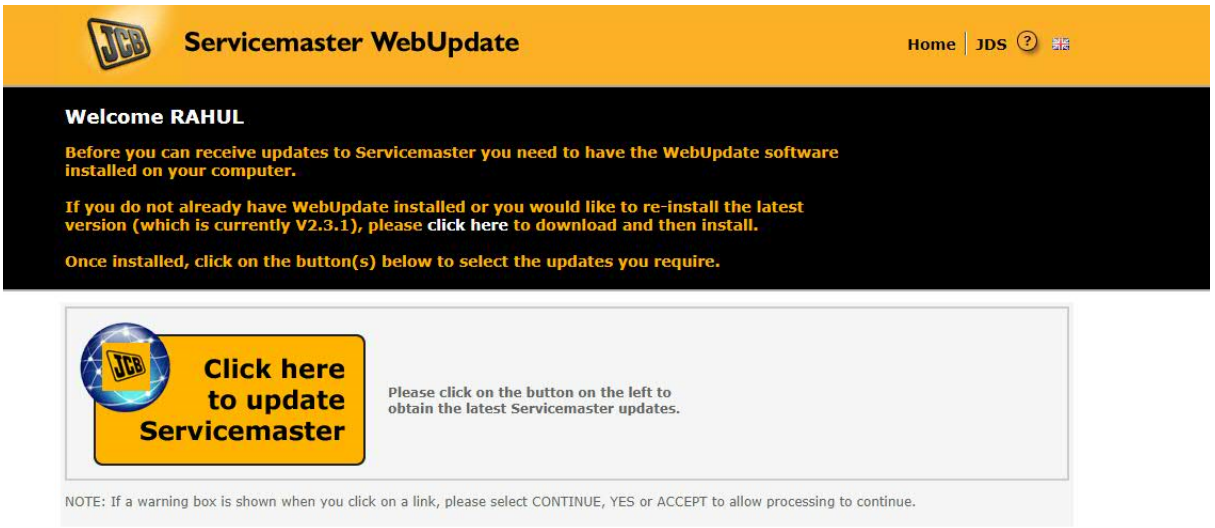
Step 4: Go to ServiceMaster tab --> SM Web Update



Step 5: Download or update the ServiceMaster tool software (check the text 'click here' to download)



10.2 Using JCB Service Master

Service Master Tools Help 1155 > Using JCB Service Master

Overview

•The ServiceMaster Tools allows communication between the service laptop and the machine.

•A Data Link Adapter (DLA)' connects the computer USB Port to the machine Can-Bus through the Diagnostic Connector.

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Fault Codes:

•Each ECU can generate a fault code if it detects the behaviour of an input or output is not as expected. Fault codes are transmitted by each ECU over the CanBus and stored on the DECU for future reference. View a complete list of error codes.

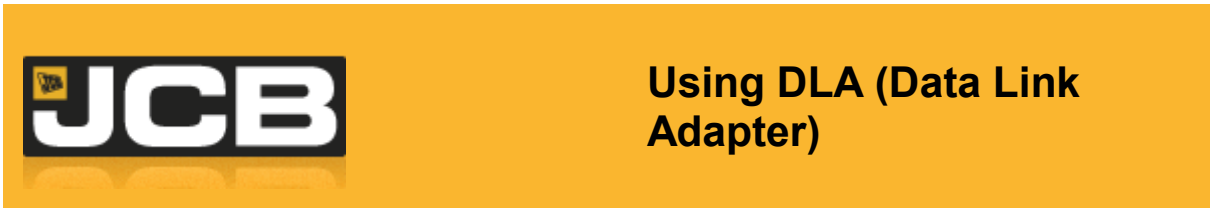
•The states of ECU inputs (switches and sensors) and outputs (solenoids, LED's etc) are broadcaster on the Can Bus. These values can be monitored using the Diagnostic Tool.

•If a switch is hardwired directly to a component (e.g. the horn), rather than being wired to an ECU, then there is no means of monitoring its state on the CanBus using the Diagnostic Tool.

•Information Pages detail many ECU inputs and outputs.

•The Flashloader Tool is used to program ECUs with new software, sending information to the ECU over the Can Bus.

10.3 Using DLA (Data Link Adapter)



Service Master Tools Help 1159 > Using DLA (Data Link Adapter)

Overview

The DLA (Data Link Adapter) allows Can-Bus communication between a service laptop and the Machine ECUs through the Diagnostic Socket.

The DLA must be installed on the Laptop before it can be used.

Note: Some computers install the DLA on only one USB port. In this case, if the DLA is connected to a different USB port then no communication can be made with the Machine.

Installation Procedure - DLA Drives

Follow the below steps to install the drives

Step 1: After ServiceMaster software install into the service laptop, Open 'ServiceMaster' tool link (shortcut should be available at desktop)

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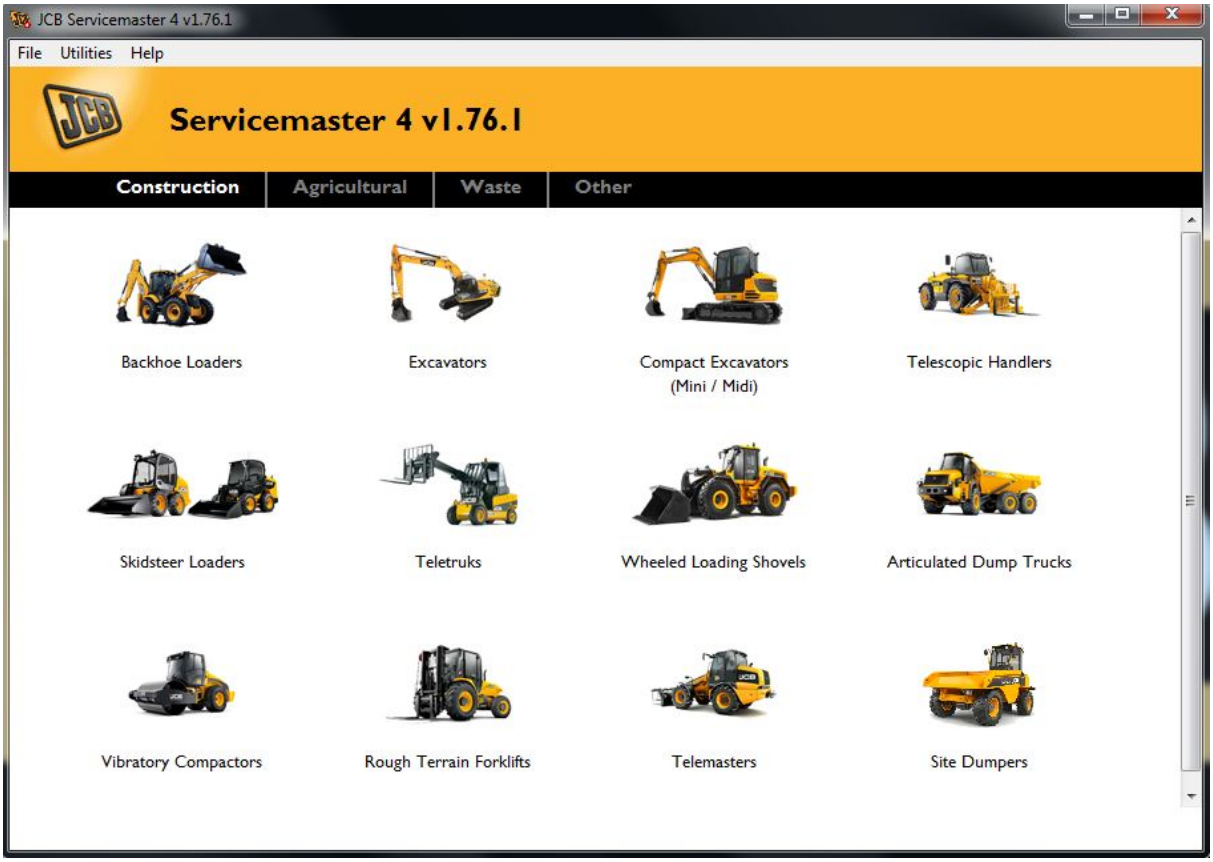

Step 2: Go to Other --> General

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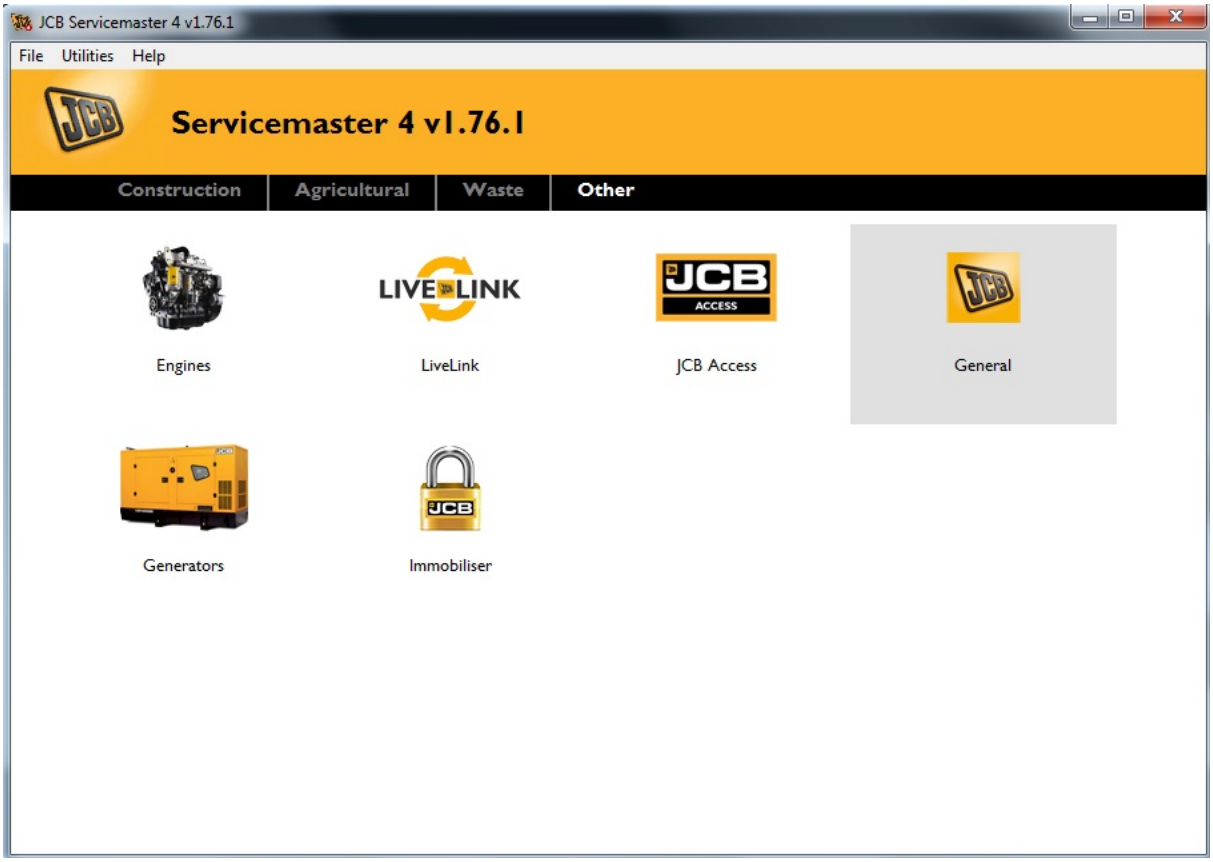

Step 3: Go to DLA

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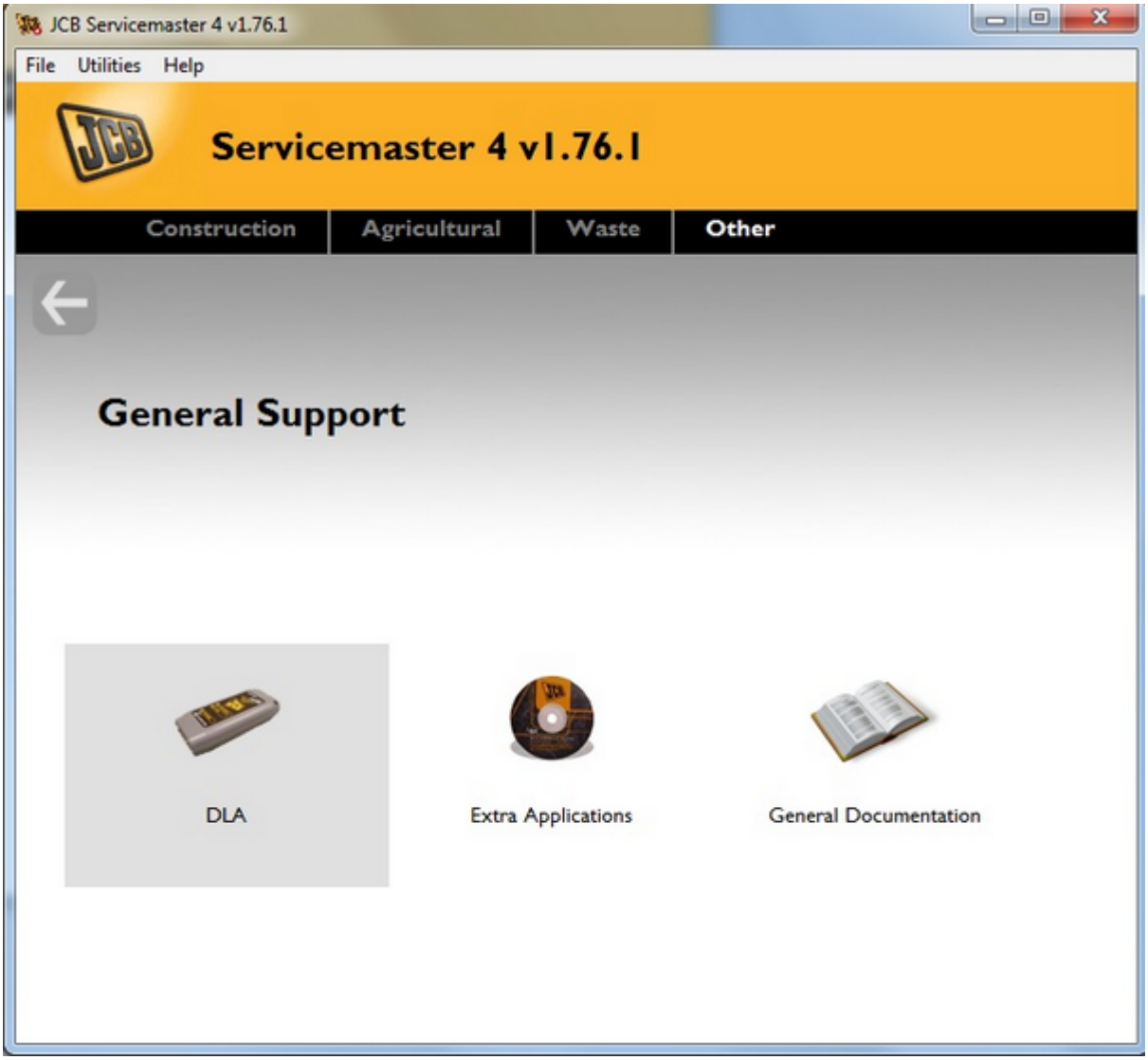

Step 4: Go to V1.7 USB DLA Win 7

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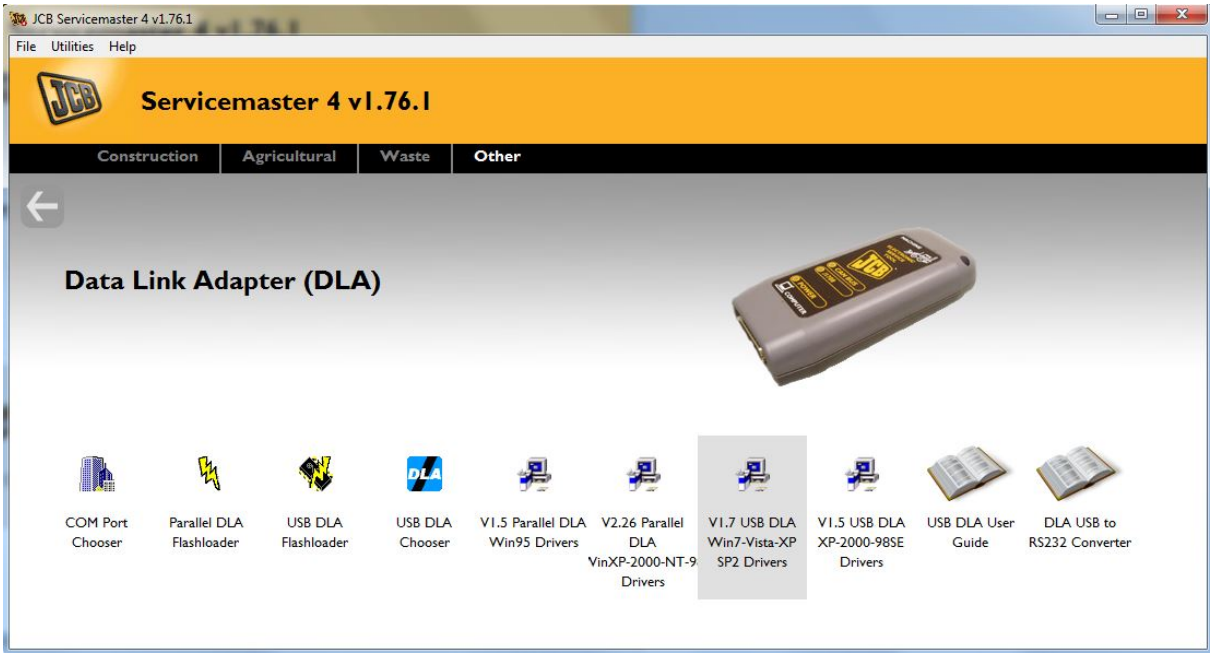
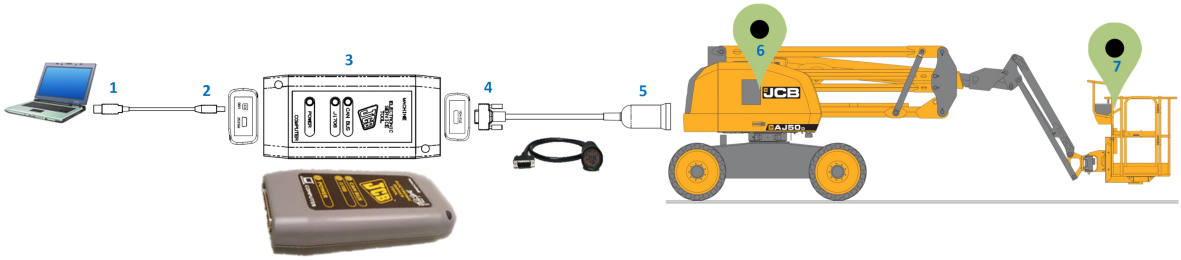


DLA Connections and Parts

Data Link Adapter should connect between service laptop and machine as shown below.



Parts	Description
1	To PC / Laptop USB
2	USB port at DLA
3	DLA
4	15 way D type connector at DLA
5	Deutsch 9 way 1939SE connector
6	Diagnostic connector location at Base control Panel
7	Diagnostic connector location at Platform control Panel

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Machine has Diagnostic connectors in two locations

1. Base control panel

2. Platform control panel

10.4 Diagnostic Tool

Service Master Tools Help 1156 > Diagnostic Tool

Overview

If sensors and switches are wired to one of the Machine ECUs then their values or states are generally sent over the CAN Bus.

The Diagnostic Tool monitors information available on the CAN Bus to display the value detected by the ECU. The DLA must be used, connecting to the CAN Bus through the Machine Diagnostic Sockets.

If a switch is hardwired directly to a component, rather than being wired to an ECU, then there is no means of monitoring its state on the CAN Bus using the Diagnostic Tool.

The Diagnostic Tool can also be used to monitor activity of ECUs from their message rates.

If an ECU has a message rate of - then it is likely there is an ECU Power fault or a CAN Bus fault.

Note: With multiple Diagnostic Screens open, the computer can be reading so much tractor information that the Diagnostic Tool response time is reduced.

To use the Diagnostic Tool

1.Connect a USB DLA between the computers USB port and the Machine Diagnostic connector

2.Switch the Machine Ignition On.

3.Run the AJ Series Diagnostic Tool program from ServiceMaster.

4.Click the Green Start button at the top of the Diagnostic Screen (highlighted below).

5.Use the links across the top of the screen to view information menus. Select the required menu from the left hand column.

6.If no communication occurs:

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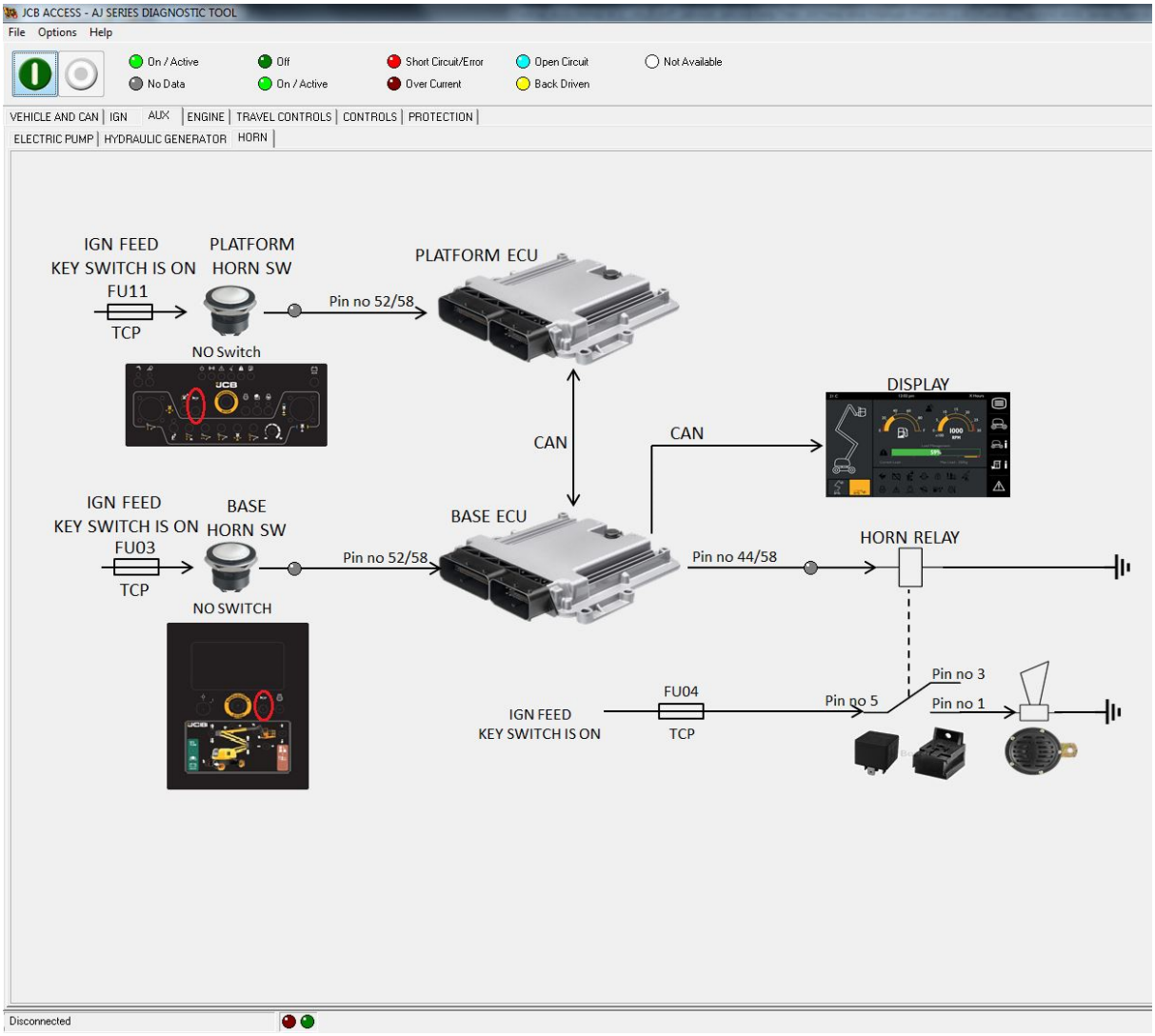
•Check you have clicked the Green Start button.

•Check the Ignition is On and there is not a Machine power fault.

•Check if ECUs are functioning using the Can bus statistic page.

Refer to the notes on using the DLA.



10.5 Flashloader Tool

Service Master Tools Help 1158 > Flashloader Tool

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Overview

The ServiceMaster Flashloader program is used to load software into the Electronic Control Units (ECUs) on JCB machines.

During the process, the Vehicle Ignition should remain On and the Laptop should not be disconnected or allowed to enter Standby. Close other programs running on the laptop.

This tool can not be used for flashing display ECU's.

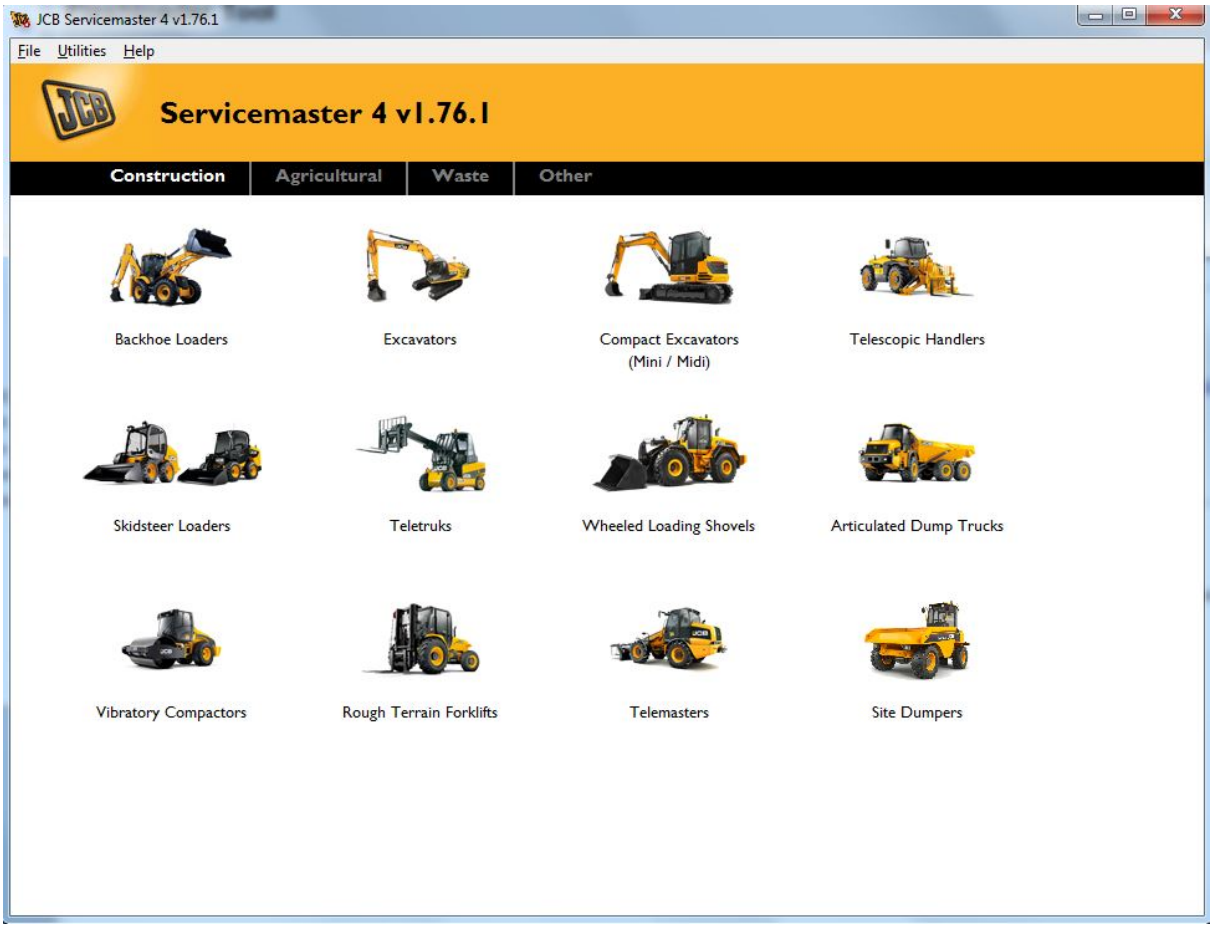
Flashloader

Check the service machine has installed the ServiceMaster software and DLA drives.

Connect the Data Link Adapter (DLA) USB port to service laptop and Data Link Adapter (DLA) diagnostic connector to machine (see DLA connections and parts)

Follow the below steps for Flash loader tool

Step 1: Open ServiceMaster --> Others



Step 2: Go to Others --> JCB Access

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Step 3: Go to Articulated boom

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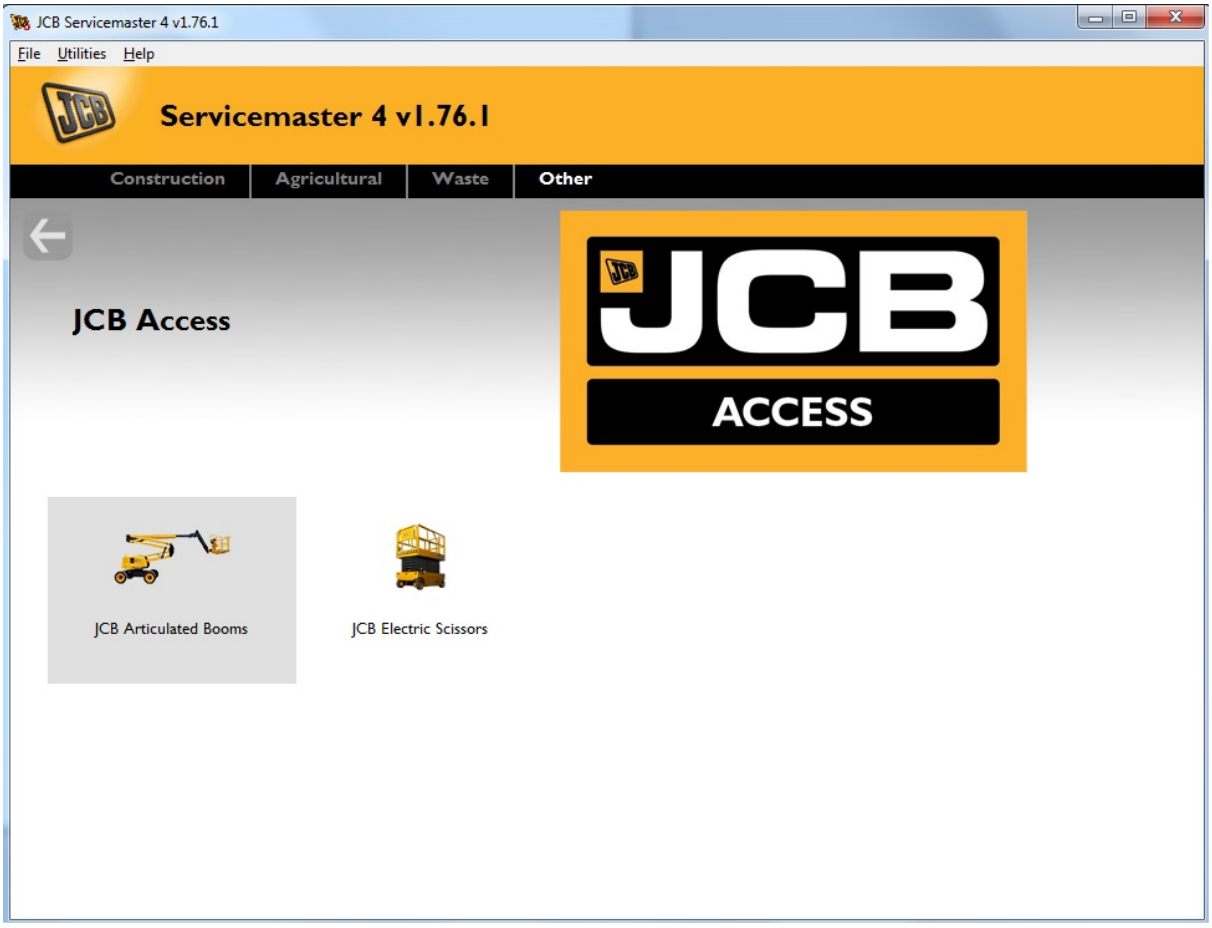

Step 4: Click on Flashloader icon (single click only)

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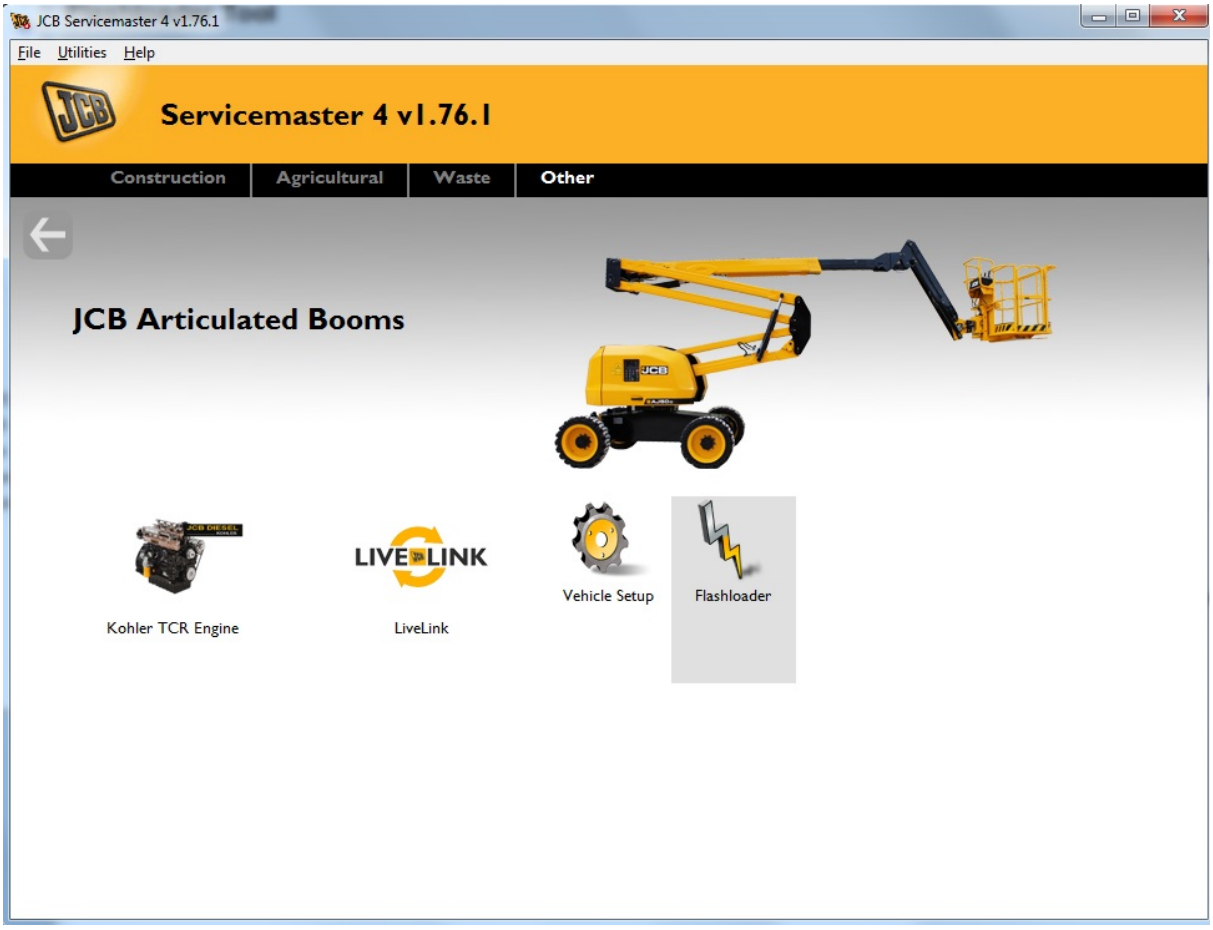

Flashing the ECU

Flashloader tool searches the ECU's connected in the machine

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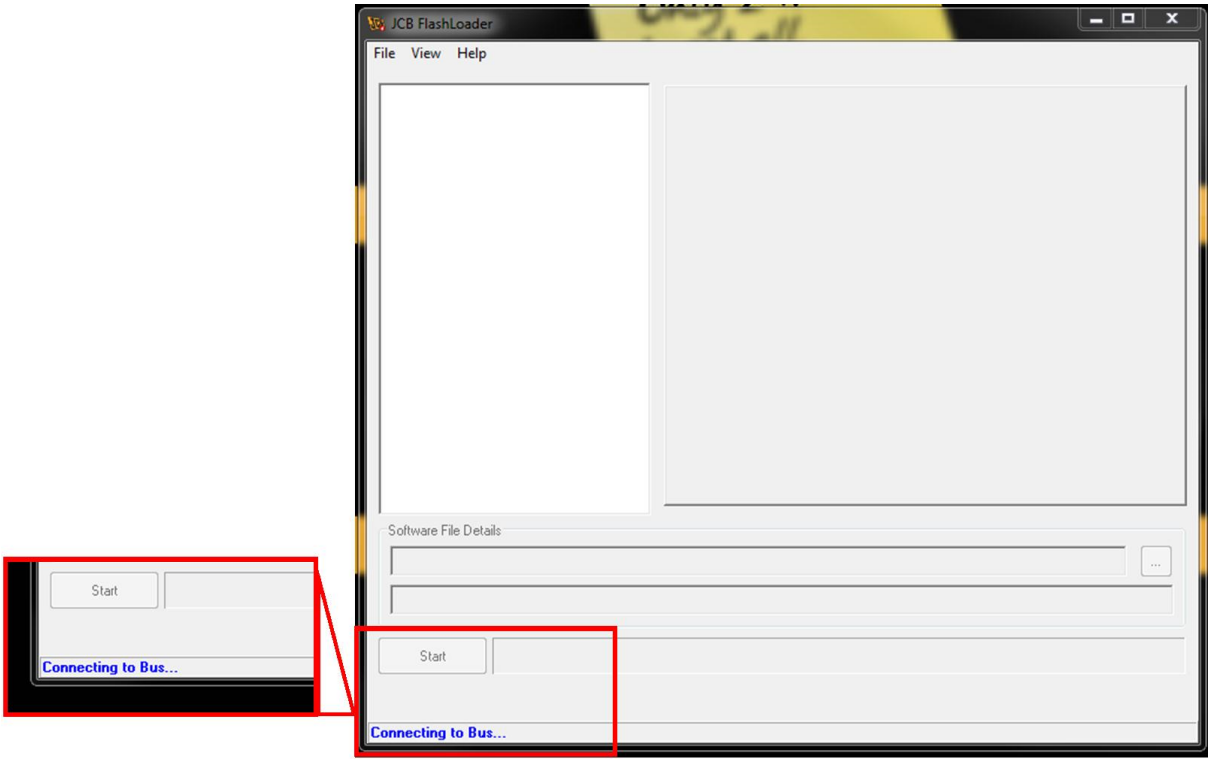

Communication Faults

Unable to connect to the DLA

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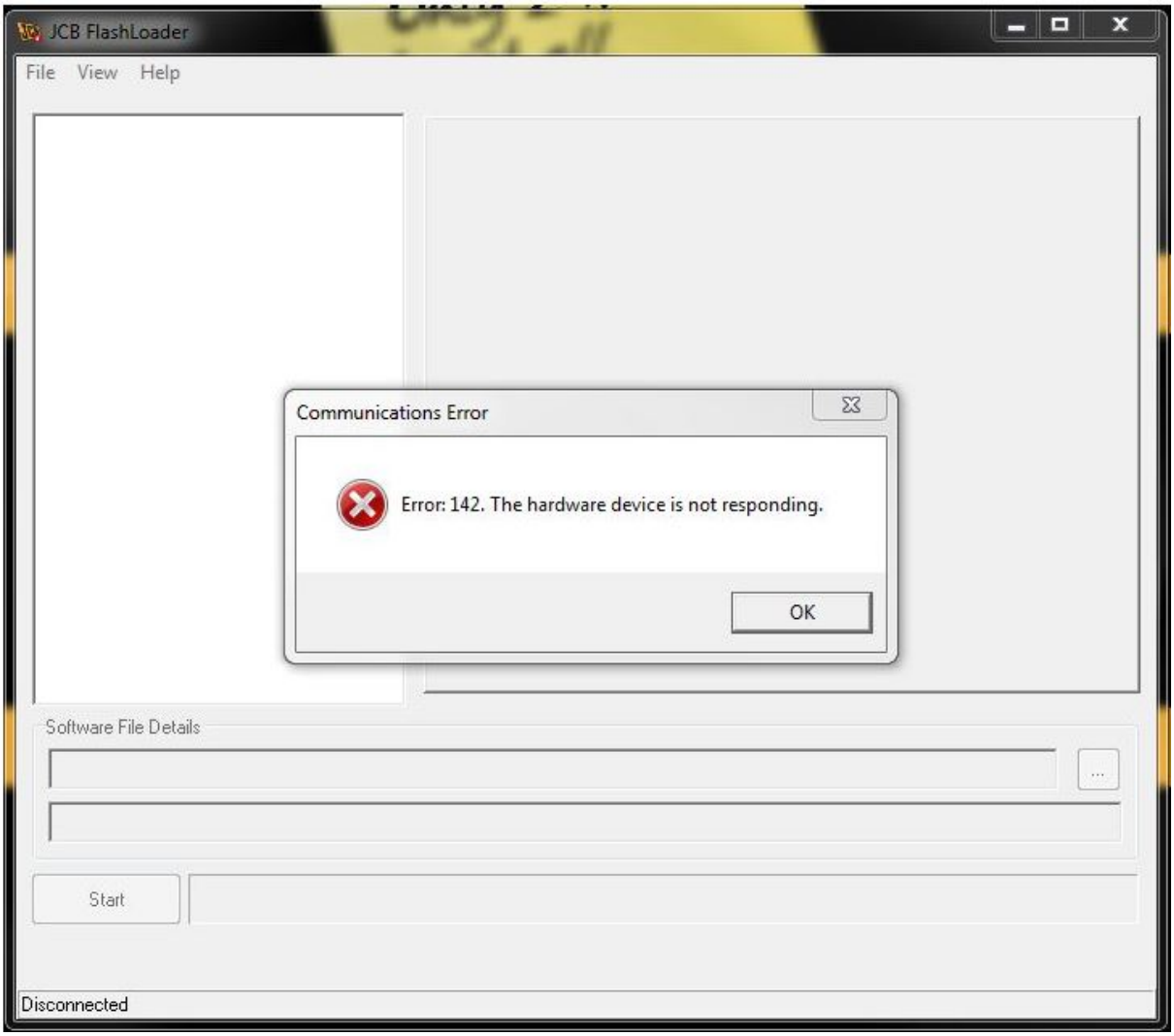

This screen is shown if:

- The Vehicle Ignition is not On
- The DLA is not connected to the laptop/machine
- The DLA is not configured for the USB port which it is plugged into
- The wrong type of DLA is configured Selecting the DLA
- The DLA does not show a red power light possibly due to a supply / earth fault with the Diagnostic Socket (fuse blown).

No modules found

- The machine is not fitted with any programmable ECUs
- There is a supply fault to the ECUs. fuse fault/ Primary fuse fault / wiring fault
- The Diagnostic socket is not connected to the CAN-Bus.
- There are no ECUs disconnected from the CAN-Bus.

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- There is a CAN-Bus fault Refer to 4000 Help Pages (CAN-Bus Tests)

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Supporting Document

11 Supporting Document

List of Supporting Document 1174

Number	Component
1	Generic CAN Troubleshooting 1174
2	Relay Testing 1175
3	Electrical Connection 1177
4	General Circuit Troubleshooting 1178

11.1 Generic CAN Troubleshooting

Supporting Document 1174 > Generic CAN Troubleshooting

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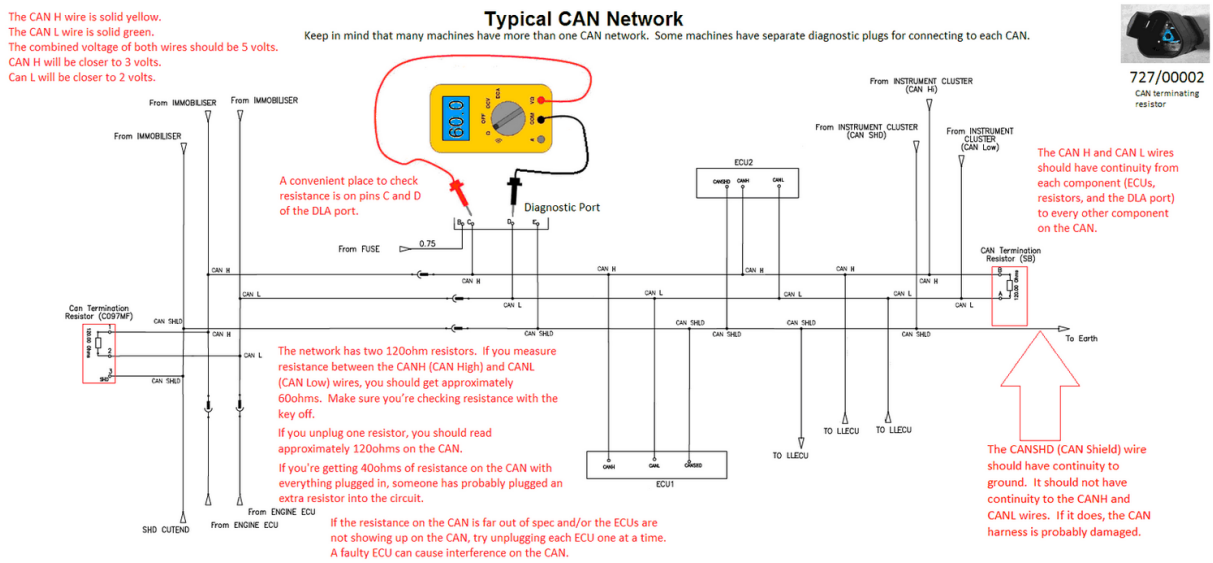

11.2 Relay Testing

Relay Testing

Supporting Document 1174 > Relay Testing

This is a basic guide on how to test relays.

PLEASE keep in mind that not every relay will operate like the example below. This example is just one type commonly used in JCB machines.

Always check the machine schematic to verify that you are testing the correct wires associated with the relay. Also, please be aware that the orientation of the pins may be different than the example shown.

Relay Operation

Relays control one electrical circuit by opening and closing contacts in another circuit. A relay uses an electromagnet to move a contact inside the relay. This contact sends voltage to a component (the contact can also complete a ground).

This is a typical relay when de-energized.

Voltage is waiting at the common feed but is not going through the relay because the contact is open.

Your voltage and ground should read like this:

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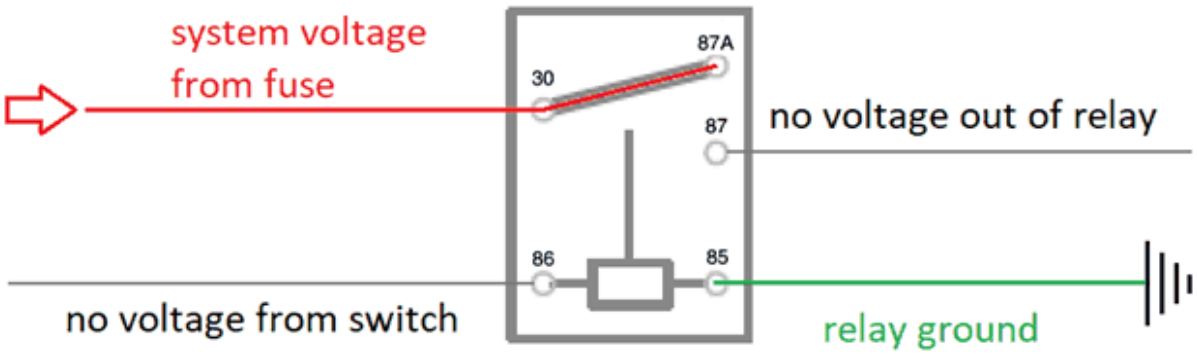
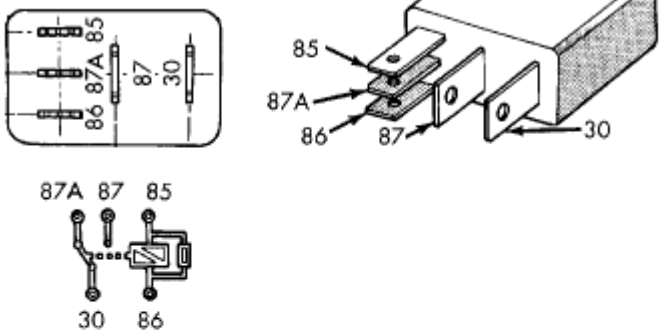


This is a typical relay when energized.

When system voltage (12v or 24v) is applied to the coil, the electromagnet energizes and pulls the contact from the open position to the closed position.

This allows the voltage from the common feed to go through the relay and power up whatever component the relay controls.

Relay terminal ID for the example above:



TERMINAL LEGEND	
NUMBER	**IDENTIFICATION**
30	COMMON FEED
85	COIL GROUND
86	COIL BATTERY
87	NORMALLY OPEN
87A	NORMALLY CLOSED

What youre looking for is battery voltage and ground at the appropriate pins. You should see a difference between an energized and de-energized relay.

Instead of blindly swapping relays as a test, use the electrical schematics to verify that youre on the correct relay. The schematics will provide wire numbers so you can accurately test for voltage and a ground with your multimeter.

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Commercial relay testers dont always work.

Other things to look for are:

Signs of moisture/ corrosion on relay and relay box

Correct voltage relay being used (12v relay vs. 24v relay)

Correct amperage relay being used (relay voltage and amp rating should be on the relay itself)

Make sure the relay has the correct number of pins for example: 4 pin relay vs 5 pin relay

11.3 Electrical Connection

Supporting Document 1174 > Electrical Connection

Integrity

The electronic control unit (ECU) and the devices connected to it are of rugged construction and inherently more reliable than the interconnecting wires and connectors.

Before testing or renewing electrical devices ensure that the relevant wires and connectors are fitted and functioning correctly. In many instances electrical faults are easily remedied by rectifying faulty wires, connectors or earth points. Before proceeding isolate the electrical system by disconnecting the battery. See the applicable machine documentation for the correct procedure.

1.Wiring Harness - Visually inspect the interconnecting wires and connectors for signs of damage. Check the following

a.Chaffed wires - Intermittent short circuits.

b.Cut wires - Open circuits. Possibly caused by wires becoming trapped in machine mechanical mechanisms.

c.Broken wires - Open circuits. Possibly caused by incorrect routing or tying of wires allowing insufficient length for machine movements.

d.Melted wires - Intermittent short circuits. Possibly caused by contact with turbocharger or exhaust systems.

2.Connectors - Visually inspect the applicable connectors. Check the following

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a.Coupling - Intermittent open circuits. Ensures that connectors are coupled correctly with the locking mechanisms properly latched.

b.Damage - Intermittent open or short circuits. Inspect the connectors for signs of physical damage such as broken housings or locking clips. Connectors can also melt if they come into contact with hot exhausts or turbochargers. Uncouple the connectors and inspect the pins for damage such as corroded, bent or broken pins. DO NOT TOUCH the connector pins on the engine electronic control unit (ECU). Broken connectors must be renewed.

c.Contamination - intermittent open or short circuits. Uncouple the connectors and inspect the inside for signs of contamination, typically with water, oil, Diesel Exhaust Fluid (DEF) or hydraulic fluid. If necessary clean the connector pins and receptacle using a cotton bud or similar. DO NOT TOUCH the connector pins on the engine electronic control unit (ECU). If water contamination is evident allow it to dry completely before coupling the connectors. Carefully inspect any sealing elements for signs of contamination or damage. Fluids can "creep," along wires so always check surrounding wires and connections for contamination if a instance of contamination is found.

3.Earth Points - locate the electrical earth points on the engine and machine. make sure that the wires terminals are correctly fitted. Make sure that the earth point is free from contamination and corrosion.

11.4 General Circuit Troubleshooting

Supporting Document 1174 > General Circuit Troubleshooting

Integrity

BEFORE testing or renewing electrical devices ensure that the relevant wires and connectors are fitted

and functioning correctly.

In many instances electrical faults are easily remedied by rectifying faulty wires, connectors or earth points.

Before proceeding isolate the electrical system by disconnecting the battery, or remove the battery isolator key. See the applicable

machine documentation for the correct procedure.

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1	**WIRING HARNESS** - Visually inspect the interconnecting wires and connectors for signs of damage. Check the following:
a	**Chaffed wires** intermittent short circuits.
b	**Cut wires** open circuits. Possibly caused by wires becoming trapped in machine mechanical mechanisms.
c	**Broken wires** open circuits. Possibly caused by incorrect routing or tying of wires allowing insufficient length for machine movements.
d	**Melted wires** intermittent short circuits. Possibly caused by contact with turbocharger or exhaust system.
2	**CONNECTORS -** Visually inspect the applicable connectors. Check the following:
a	**Coupling** - intermittent open circuits. Ensure that connectors are coupled correctly with the locking mechanisms properly latched.
b	**Damage** intermittent open or short circuits. Inspect the connectors for signs of physical damage such as broken housings or locking clips. Connectors can also melt if they come into contact with hot exhausts or turbochargers. Uncouple the connectors and inspect the pins for damage such as corroded, bent or broken pins. DO NOT TOUCH the connector pins on the engine electronic control unit (ECU). Broken connectors must be renewed.
c	**Contamination** intermittent open or short circuits. Uncouple the connectors and inspect the inside for signs of contamination, typically with water, oil or hydraulic fluid. If necessary clean the connector pins and receptacle using a cotton bud or similar. DO NOT TOUCH the connector pins on the engine electronic control unit (ECU). If water contamination is evident allow it to dry completely before coupling the connectors. Carefully inspect any sealing elements for signs of contamination or damage.
3	**Earth Points** Locate the electrical earth points on the engine and machine. Make sure that the wire terminals are correctly fitted. Make sure that the earth point is free from contamination and corrosion.
4	**Relays -** If a relay is an active part of a circuit check the following:

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a	**Welded Contacts -** Relay contacts can be "Welded" together so they are permanently closed. This can be caused by Overload, Inrush current larger than rating, Switching Frequency in excess of the permitted operating frequency and usage in a location subject to continuous vibration.

Use of Multimeter

In order to obtain the maximum benefit from the fault finding information contained in the Electrical Section, it is important that the technician fully understands the approach to fault finding and the use of the recommended test equipment, in this case a FLUKE 85 or AVO 2003 digital multimeter, or a moving pointer analogue multimeter. The approach is based on a fault finding check list. In tracing the fault from the symptoms displayed you will be directed to make measurements using a multimeter. These instructions are intended to cover the use of the recommended meters.

1. Make sure that the test leads are plugged into the correct sockets. The black test lead should be plugged into the black socket (sometimes, this socket is also marked by a-, or E or marked as COMMON or COM). The red test lead should be plugged into the red socket marked with +, V or ?

2. When you make a measurement, make sure that the test probes have a good clean contact with bare metal, free from grease, dirt, and corrosion as these can cause a false reading.

3. When you measure a voltage, make sure that the correct range is selected, that it is set to the selector value equal to or greater than that you are about to measure. e.g. If asked to measure 12 Volts, set the selector to the 12V range. If there is no 12V range, set the selector to the next range higher, 20V for instance. If the meter is set to a range that is too low, it may be damaged. e.g. setting to the 2V range to measure 12V.

Measuring DC Voltage

1. Select the correct range on the multimeter

On the digital multimeter, turn the switch to position B.

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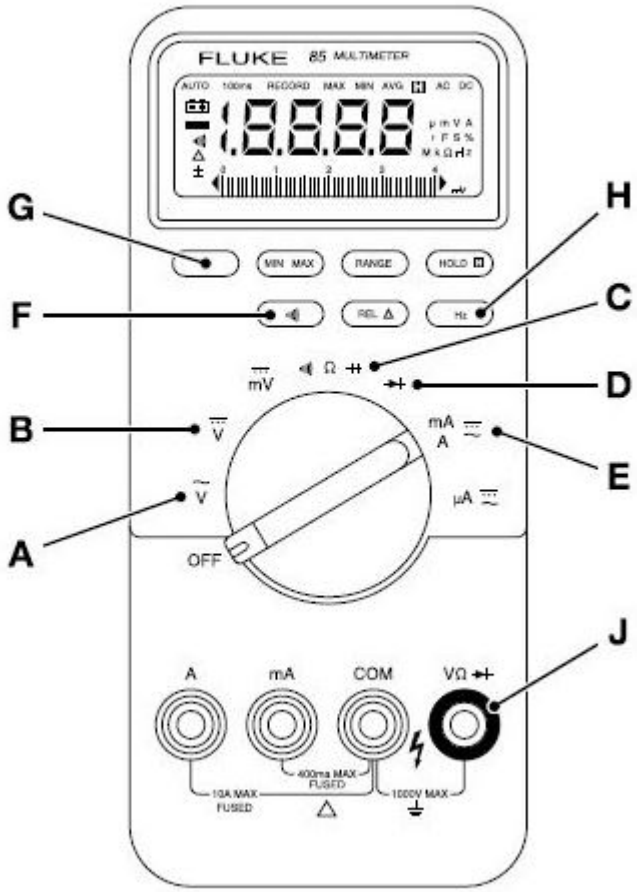
Figure 1. Fluke 85 Multimeter



Measuring Resistance

1. Make sure that there is no power to the part of the circuit you are about to measure.

2. Connect one probe at one end of the component or wire to be checked and the other probe at the other end. It does not matter which way round the two probes are placed.

3. Select the correct range on the multimeter.

3.1 on the digital multimeter. Turn the switch to position C and check that the W sign at the right hand side of the display window is on. If the F sign is on instead, press the blue button G to change the reading to ? . Touch the meter lead proves together and press the REL3 key on the meter to eliminate the lead resistance from the meter reading.

Measuring Continuity

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1. Make sure that there is no power to the part of the circuit you are checking for continuity.

2. Connect one probe to one end of the component or wire to be checked and the other prove to the other end. It does no matter which way round the two probes are placed.

3. Select the correct range on the multimeter.

3.1. On the digital multimeter, turn the switch to position C and check that the beeper symbol appears at the left hand side of the display window. If the F sign is on instead, press the button labeled F. If there is continuity in the circuit, the beeper will sound. If there is no continuity (open circuit), the beeper will not sound.

Testing a Diode

A diode wire is a diode with a male connector fitted on one end and a female connector fitted on the other end. The diode is sealed in the heatshrink sleeving. To test a Diode.

1. On the digital multimeter:

1.1. Turn the switch position to D.

1.2. Press the HOLD button and check that the H sign appears at the top right hand side of the display window.

1.3. Connect the black probe to the end of the diode with a band or to the male connector of the diode wire. Connect the red probe to the other end of the diode wire. If the beeper does not sound the diode or diode wire faulty.

1.4. Connect the red probe to the end of the diode marked with a band, or to the male connector of the diode wire, the black probe should be connected to the other end of the diode wire. If the beeper sound or the meter does not read O.L., the diode or diode wire is faulty.

1.5. Press the HOLD button and check that the H sign disappears from the right hand side of the display window.

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