



eqssTM Gen-3 LMS Telehandler Load Management System

Installation Manual for JCB 541-70 CS



PLEASE NOTE:

*****Do Not Swap Components between Gen3-LMS kits*****
When installing multiple Gen3-LMS kits, make sure the serial number on the sticker matches the serial number on the machine.

*****Failure To Follow Installation Manual Will Void Warranty*****

Documentation Conventions

The list below highlights important documentation conventions.



Text presented in this manner is intended to provide the user with some general information. The user should ensure information presented in this manner is clearly understood.



Text presented in this manner provides the user with information to assist in completion of the current procedure being explained.



Text presented in this manner indicates that a failure to follow directions could result in damage to equipment, loss of information, bodily harm, or loss of life.

Important Information

Information contained in this publication regarding this device's applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that the application or our equipment meets with your specifications.

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Tools Required for Installation

The tools required to perform the installation of the TSS are listed below

- Pencil or Texta
- Drill
- Drill bits
 - 3.3 mm
 - 4.5 mm
 - 5 mm
 - 6.25 mm
 - 6.8 mm
 - 8.5 mm
- Centre punch
- Tap T-Handle
- Taps
 - M6
 - M7 x 0.75
 - M8
- Drill and tap oil
- Metric Allen keys
- Phillips Head screw driver
- Spanners and sockets
 - 7 mm
 - 10 mm
 - 13 mm
- Loctite thread locker
- Side cutters
- Stanley knife
- Crimpers
- Wire strippers

Covers

Remove the following covers before starting the installation

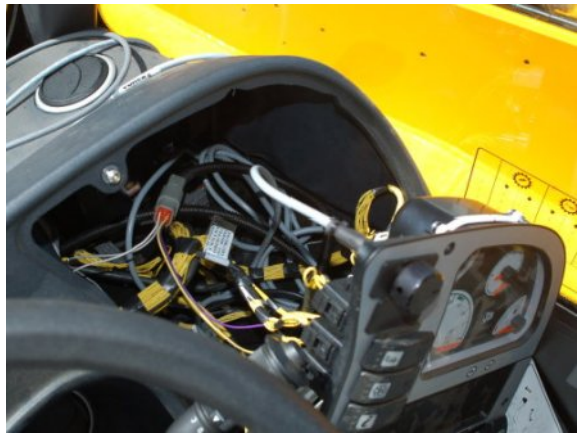


<i>Step</i>	<i>Description</i>	<i>Diagram</i>
1.	Release the dashboard display bolts	
2.	Remove the indicator display behind the steering wheel	
3.	Remove the cover for the hydraulics behind the cabin	




Table 1: Cover removal

Cable Reeler Installation

The cable reeler is used to measure the boom extension to determine the maximum lifting capacity.



A false N07 fault can occur if the boom jumps off the stow switch due to pressurising the hydraulic system and without operating the boom extension control. Ensure the stow switch arm is correctly adjusted to prevent this error.

Step	Description	Diagram
1.	<p>Drill and tap the holes for the cable reeler according to the mounting diagram on page 9.</p> <p>Mount using the supplied M6 x 12 mm bolts and washers.</p>	
2.	<p>Drill and tap an M8 hole for the cable anchor. Ensure the cable anchor is positioned so the cable runs in line with the boom.</p> <p>Mount the cable anchor and secure the cable to the anchor.</p>	
3.	<p>Drill and tap the M6 holes for the stow switch trigger. Ensure the stow switch is pressed when the boom is retracted.</p> <p>Mount the stow switch trigger using the supplied M6 x 30 mm bolts and 17 mm standoffs.</p>	



<i>Step</i>	<i>Description</i>	<i>Diagram</i>
4.	Connect the supplied M12 10 metre cable (CB001027) into the cable reeler connection.	
5.	<p>Run the cable along the hydraulic pipes running down the boom, secure using cable ties every 150 mm to 200 mm.</p> <p>Cable tie to the flexible hydraulic hoses down to the chassis. Make sure the cable isn't pinched or stretched when the boom is raised or lowered.</p> <p>Run the cable towards the cabin and cable tie with the other cables during External Cable Completion on page 21.</p>	

Table 2: Cable Reeler Installation

Cable Reeler Mounting Position

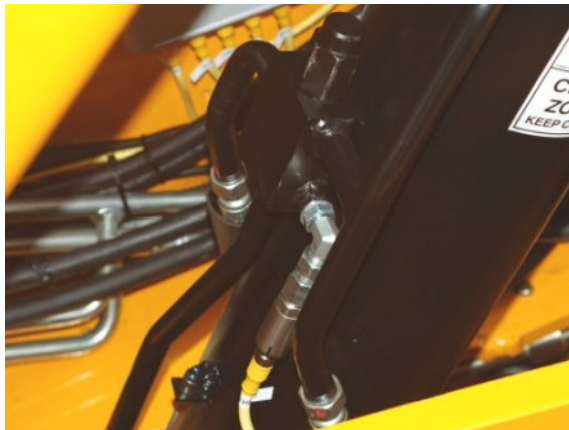
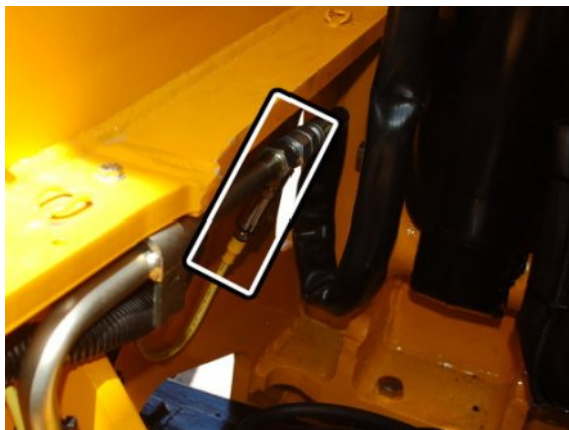


Illustration 1: Cable Reeler Mounting Position

Pressure Sensor Installation

The hydraulic pressure sensors are used to measure the lifting load of the telehandler.

Main Cylinder Pressure Sensors

Step	Description	Diagram
1.	<p>Raise the boom to approximately 40 degrees.</p> <p>Support and secure the boom using an A Frame or similar apparatus. It must support at least 2 tons.</p> <p>Apply the handbrake and insert chock under wheels.</p> <p>Release the blanking cap on the hydraulic tee.</p> <p>Removing the blanking cap will release the hydraulic pressure which may result in a spray of oil.</p> <p>Install the supplied pressure sensor and ensure it is tightly sealed.</p>	
2.	<p>Install the tee connector and pressure sensor into the rod of the main lift cylinder, where the flexible hose is connected to the solid hose on the chassis under the lift cylinder.</p> <p>Start the machine, pressurise the boom and check for leaks.</p>	 <p>View from under the main lift cylinder</p>

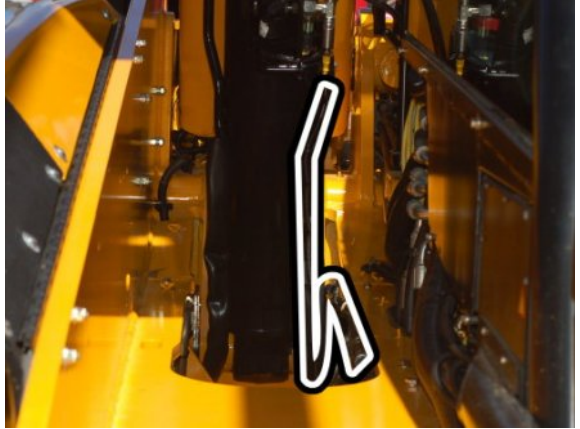
<i>Step</i>	<i>Description</i>	<i>Diagram</i>
3.	<p>Connect the supplied M12 4 metre cables (CB001026) into each of the pressure sensors.</p> <p>Cable tie the head pressure sensor cable to the flexible hydraulic hoses connected to the main lift cylinder. Make sure the cable isn't pinched or stretched when the boom is raised or lowered.</p> <p>Run the cables towards the cabin and cable tie with the other cables during External Cable Completion on page 21.</p>	

Table 3: Pressure Manifold Installation

Compensation Pressure Sensors

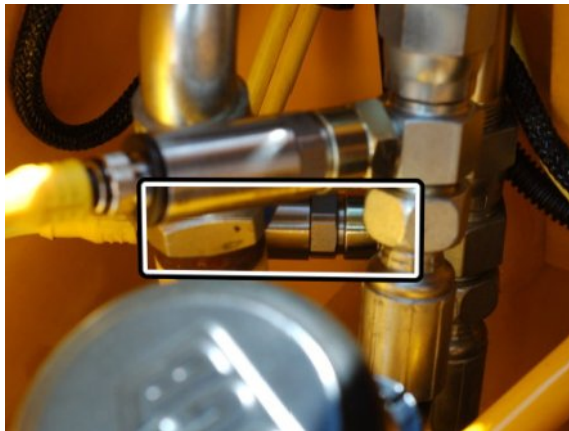


Step	Description	Diagram
1.	<p>Release the cover behind the machine.</p> <p>Undo the hydraulic connection for the head compensation into flexible hydraulic line at the rear of the machine.</p> <p>Install the supplied tee piece and pressure sensor in line with the hydraulic connection.</p>	
2.	<p>Undo the hydraulic connection for the rod compensation into flexible hydraulic line at the rear of the machine.</p> <p>Install the supplied tee piece and pressure sensor in line with the hydraulic connection</p> <p>Start the machine, pressurise the boom and check for leaks.</p>	
3.	<p>Connect the supplied M12 4 metre cables (CB001026) into each of the pressure sensors.</p> <p>Add both cables to 2 m of snake tube.</p> <p>Run the snake tube and cables towards the cabin and cable tie with the other cables during External Cable Completion on page 21.</p>	

Table 4: Compensation Pressure Sensor Installation



Angle the tee connections to ensure the hydraulic connections and pressure sensor do not hit the boom when the boom is lowered

Reverse Camera

The rear camera video is displayed on the screen when the machine is in reverse gear to allow the operator to see behind the telehandler while reversing.



Do not disconnect the camera power connection while the system is operating as this can damage the fuse.

Step	Description	Diagram
1.	<p>Drill a 31mm hole in the location shown. Making sure to leave enough room for a license plate</p> <p>Insert the camera through the hole and adjust the angle using the alignment washers.</p>	
2.	<p>Connect the camera power and signal connectors to the supplied 5m camera cable (CB001032).</p> <p>Note; The white connector is not used.</p> <p>Secure the camera cable to the license plate light cables</p> <p>Run the remainder of the cable towards the cabin and cable tie with the other cables during External Cable Completion on page 21.</p>	

Table 5: Reverse Camera Installation



The camera's viewing angle may need to be adjusted once the system is installed and the display is operational.

Forward Camera

The forward camera video is displayed on the screen when the machine is in forward gear to allow the operator to see past the boom to obstructions that would damage the right front tyre.



Do not disconnect the camera power connection while the system is operating as this can damage the fuse.



Step	Description	Diagram
1.	Mount the camera to the side mirror using the p-clips as shown. Secure using two M6 nuts.	
2.	Connect the camera power and signal connectors to the supplied 5m camera cable (CB001032). Note; The white connector is not used. Run the cable along the same path as the headlight cable, run it through the headlight post, then under the chassis to the side of the cabin. Cable tie during External Cable Completion on page 21.	

Table 6: Forward Camera Installation



The camera's viewing angle may need to be adjusted once the system is installed and the display is operational.

Signal Light Installation

The signal light warns other workers when the telehandler is lifting loads close to its maximum capacity.



Ensure the power supply voltage is greater than 13.5V otherwise the signal light may not illuminate correctly.

With Windshield Guard Bar






Step	Description	Diagram
1.	Mount the signal light to the top of the front windshield guard on the cabin.	
2.	Run the cable down the side of the windshield and cable tie to the windshield guard bar down towards the chassis.	

Table 7: Signal Light Installation With Windshield Guard Bar

Without Windshield Guard Bar

Step	Description	Diagram
1.	<p>Remove the magnet from the bottom of the signal light mounting bracket and flip the signal light mounting bracket so the mounting holes are on the bottom.</p> <p>Cut and remove 2.6 m of snake tube from the end of the cable starting at the signal light.</p> <p>Drill two M4 holes to mount the signal light bracket to the left headlight support bracket on the roof.</p> <p>Mount using the supplied M4 bolts and nuts.</p>	
2.	<p>Run the cable along the top of the roof to towards the right headlight support bracket.</p> <p>Drill a single M6 hole to mount a metal p-clip.</p> <p>Attach the cable to metal p-clip and secure using the supplied M6 bolt and nut.</p>	
3.	<p>Run the cable down between the edge of the windshield and cabin frame to the base of the windshield.</p> <p>Use a water proof adhesive to ensure the cable will remain within the gap between the edge of the windshield and cabin frame.</p>	


<i>Step</i>	<i>Description</i>	<i>Diagram</i>
4.	<p>Secure the cable to the chassis using a cable tie.</p> <p>Note: Make sure the cable is securely tensioned, so it doesn't move out of the groove between the edge of the windshield and cabin frame.</p>	

Table 8: Signal Light Installation Without Windshield Guard Bar

Can Pressure Input Module (CPIM)

The CPIM is responsible for processing the information sent from the pressure sensors.



Accidentally swapping the pressure sensor connections will not damage system and can be determined if the display is showing a negative load.



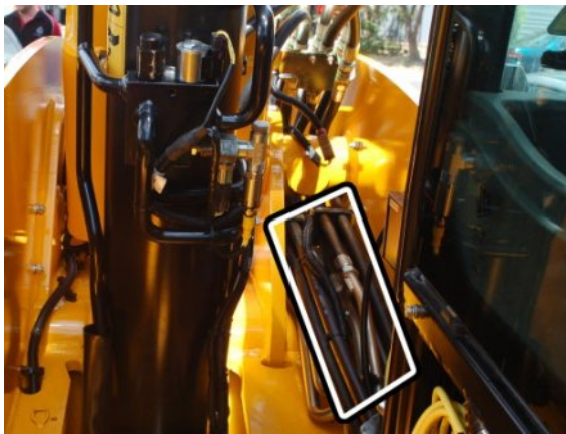

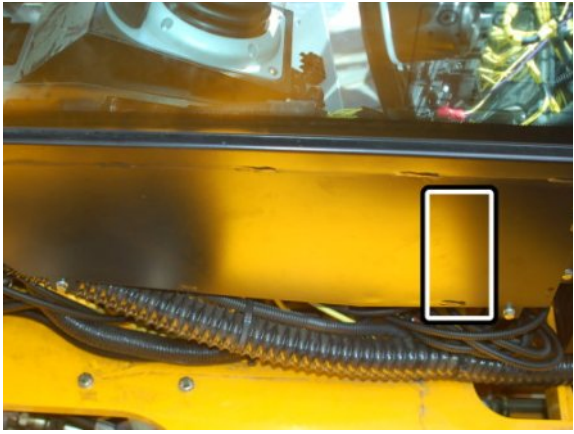
Do not plug the pressure sensor cable into the far right side boom cable. This will damage the system.

Step	Description	Diagram
1.	<p>Drill and tap two M8 holes for the CPIM bracket in the chassis behind the cabin.</p> <p>Mount using the supplied M8 x 12mm bolts and washers.</p>	
2.	<p>Connect the cables for the pressure sensors and boom cable to the CPIM according to the picture shown.</p> <p>Connect the supplied M12 4 metre cable (CB001026) into the connection out of the right side of the CPIM for the CCIM cable.</p> <p>Run the CCIM cable towards the cabin.</p>	

Table 9: Can Pressure Input Module (CPIM) Installation

External Cable Completion

All external cabling is completed in this step.

<i>Step</i>	<i>Description</i>	<i>Diagram</i>
1.	<p>Locate the reverse camera, boom and compensation pressure cables at the rear of the machine and cable tie to the existing snake tube and hydraulic lines running towards and underneath the cabin.</p> <p>Coil up any additional cable and store under the side panel beside the cabin.</p>	 <p>View from under the boom towards the rear of the machine</p>
2.	<p>At the front of the machine cable tie the front camera cable to the side of the cabin.</p> <p>Note: The old light tower is shown</p>	
3.	<p>Run the CCIM, signal light and camera cables through the hole into the cabin</p>	


<i>Step</i>	<i>Description</i>	<i>Diagram</i>
4.	<p>Secure all the cables from the CPIM and from out the holes into the cabin from the joystick and dashboard.</p> <p>Coil up any additional cable and store under the side panel beside the cabin.</p>	

Table 10: External Cable Completion

Can Cabin Interface Module (CCIM)

The CCIM connects the system into the machine electronics.




Step	Description	Diagram
1.	<p>Connect the CCIM and signal light cables to the M12 connectors on the CCIM.</p> <p>Note: It doesn't matter which of the M12 connectors the CCIM and signal light cables are plugged into.</p>	
2.	<p>Connect the Power/Camera and IO Harnesses to the bulkhead connectors on the CCIM.</p> <p>Position the CCIM underneath the dashboard using double sided velcro tape.</p> <p>Note: Make sure to leave enough room for the connectors and that the dashboard displays can be reinstalled.</p>	
3.	<p>Install the backup battery behind the indicator display using double sided velcro tape.</p>	

Table 11: CCIM Installation

Dashboard Switches

The user input control and override switch are installed in the dashboard.



Step	Description	Diagram
1.	Remove a blanking switch plate from the dashboard and install the override switch.	
2.	<p>Drill a 34 mm hole into the dashboard.</p> <p>Install the user input control dial in the dashboard, aligned so the Enter cap is facing up.</p>	

Table 12: Dashboard Switches Installation

Display Installation

The display shows the current safety status of the telehandler.


<i>Step</i>	<i>Description</i>	<i>Diagram</i>
1.	<p>Position the display bracket in the top right of the dashboard in the approximate location shown.</p> <p>Drill two 7 mm holes to attach the bracket to the dashboard.</p> <p>Secure the bracket to the dashboard using the supplied large washers and nuts</p> <p>Attach the display to the bracket and tighten the grub screw</p>	

Table 13: Display Installation



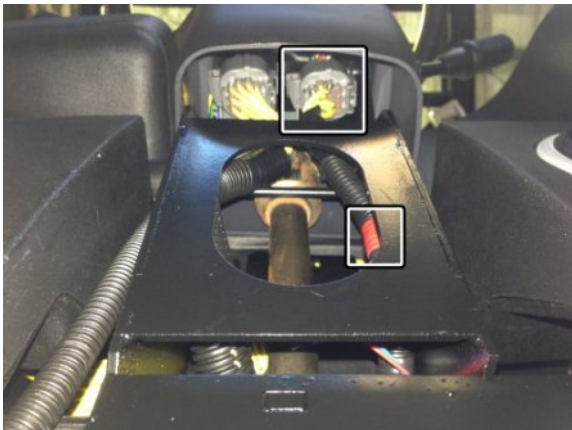

Adjust the display bracket for optimal viewing angle once the display is powered




Machine Connections

The following procedures connect the safety systems to the existing electronics in the machine.



Isolate the main battery before starting the machine connections

Step	Description	Diagram						
1.	<p>Splice the following wire colours from the machine input harness with the 4 pin connector into the connector for the left steering column switch (marked with red tape).</p> <p>Note: Remove the steering wheel height adjustment lever, to move the steering wheel higher, to get better access to the switch connector</p> <table><tr><td><u>Wire Colour</u></td><td><u>Wire Number</u></td></tr><tr><td>Orange</td><td>809</td></tr><tr><td>Red</td><td>808</td></tr></table>	<u>Wire Colour</u>	<u>Wire Number</u>	Orange	809	Red	808	
<u>Wire Colour</u>	<u>Wire Number</u>							
Orange	809							
Red	808							
2.	<p>Connect the spade terminals from the machine input harness to the override switch</p>							

Step	Description	Diagram										
3.	<p>Locate the hydraulic block behind the cabin.</p> <p>Run the machine cutout harness from underneath the dashboard down to the hydraulic block.</p>											
4.	<p>Attach the supplied 2 pin connectors to the machine cutout harness according to the table below.</p> <table><tr><th>Wire Colour</th><th>Pin Number</th></tr><tr><td>Black</td><td>Male - 1</td></tr><tr><td>Violet</td><td>Male - 2</td></tr><tr><td>Blue</td><td>Female - 1</td></tr><tr><td>Violet</td><td>Female - 2</td></tr></table>	Wire Colour	Pin Number	Black	Male - 1	Violet	Male - 2	Blue	Female - 1	Violet	Female - 2	
Wire Colour	Pin Number											
Black	Male - 1											
Violet	Male - 2											
Blue	Female - 1											
Violet	Female - 2											
5.	<p>Connect the tee connectors from the machine cutout harness into the bottom solenoid connector shown.</p> <p>Disconnect the tee connector from the solenoid, to allow for complete boom function until the installation is completed in the section Finalisation.</p>											



Step	Description	Diagram								
6.	<p>Attach the radio power harness to the radio connector.</p> <p>Note: If the radio connector is not installed in the machine. Cut off the tee connectors from the radio power harness and splice into the 4 pin radio power connector located under the dashboard according to the table below.</p> <table><tr><th>Wire Colour</th><th>Wire Number</th></tr><tr><td>Black</td><td>601AG</td></tr><tr><td>Violet</td><td>181</td></tr><tr><td>Yellow</td><td>301F</td></tr></table>	Wire Colour	Wire Number	Black	601AG	Violet	181	Yellow	301F	 
Wire Colour	Wire Number									
Black	601AG									
Violet	181									
Yellow	301F									

Table 14: Machine Connections


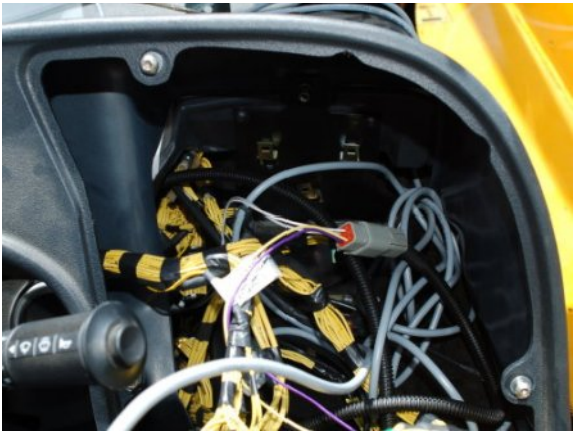


Finalisation

This section will complete the final power connections to power the system and finish any additional items.



Do not disconnect the camera power connection while the system is operating as this can damage the fuse.

Step	Description	Diagram
1.	Connect the 4, 6 and 12 pin connectors from the machine input and cutout harnesses into the I/O harness.	
2.	Connect the camera power and signal cables from the front and rear cameras to the power/camera harness connectors. Note: The white connector is not used.	
3.	Connect the 3 pin connector from the radio power harness into the power/camera harness.	

<i>Step</i>	<i>Description</i>	<i>Diagram</i>
4.	<p>Connect the spade lug on the black wire to the negative (black) battery terminal.</p> <p>Connect the spade lug on the blue wire to the positive (red) battery terminal.</p>	
5.	Coil up the extra cables and store underneath the dashboard cover.	
6.	Reconnect the tee connector back into the hydraulic block behind the cabin.	
7.	<p>Reconnect the main battery from the isolation switch.</p> <p>Turn the machine onto first stage /accessories and ensure the system is activated.</p>	


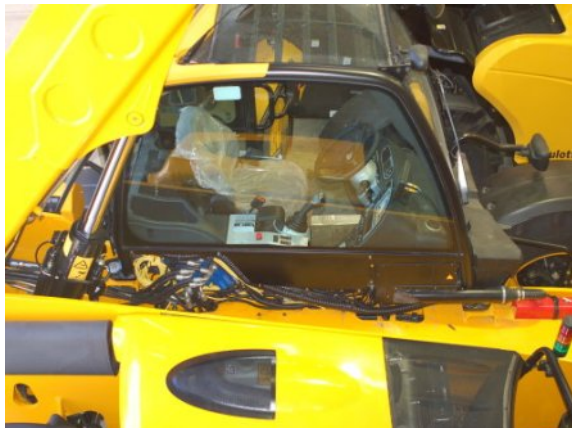
<i>Step</i>	<i>Description</i>	<i>Diagram</i>
8.	<p>Adjust the display bracket for optimal viewing</p> <p>Set the machine into forward gear to activate the forward camera. Adjust the forward camera so the front right wheel is visible.</p> <p>Set the machine into reverse gear to activate the reverse camera. Adjust the reverse camera so the video is level.</p>	
9.	<p>Perform a final check on all the cabling and sensors.</p> <p>Replace all the covers</p>	

Table 15: Finalisation



Complete the system checklist once installation has been completed.

Set Time & Sensor Calibration

Once the installation is complete, the time will need to be set and the sensors will require calibration.



A sensor calibration must be performed once the cable reeler and CPIM have been mounted. If the cable reeler or CPIM have been moved/repositioned a recalibration must be performed

<i>Step</i>	<i>Description</i>	<i>Diagram</i>
1.	<p>Press Enter on the user control dial to enter the menu system.</p> <p>Press the arrow buttons to select System Menu.</p> <p>Press Enter to select the menu.</p>	<div> <div>Main Menu</div> <div>Attachment Selection Menu</div> <div>System Menu</div> <div>Exit Menu</div> </div>
2.	Select Advanced Menu	<div> <div>System Menu</div> <div>Volume / Brightness</div> <div>Status Menu</div> <div>Diagnostics Menu</div> <div>System Tests</div> <div>Advanced Menu</div> <div>Return to Main Menu</div> </div>

Step	Description	Diagram												
3.	Enter the password (Default Password: 2-8-4)	<div>Enter Password</div> <table><tr><td>Number 1</td><td>2</td></tr><tr><td>Number 2</td><td>8</td></tr><tr><td>Number 3</td><td>4</td></tr><tr><td colspan="2">Submit Password</td></tr><tr><td colspan="2">Return to System Menu</td></tr></table>	Number 1	2	Number 2	8	Number 3	4	Submit Password		Return to System Menu			
Number 1	2													
Number 2	8													
Number 3	4													
Submit Password														
Return to System Menu														
4.	Select Set Time / Date	<div>Advanced Settings</div> <div>Set Time / Date</div> <div>Sensor Calibrations</div> <div>Change Language</div> <div>Change Password</div> <div>Return to System Menu</div>												
5.	Enter the correct time and date for your area. Press the arrow keys to select a time/date parameter Press Enter and the parameter will change to red, press the arrow keys to change the value and then press the Enter key to store the value. Note: The hour parameter is in 24 hour clock Repeat for the rest of the time values	<div>Set Time / Date</div> <table><tr><td>Hour</td><td>15</td></tr><tr><td>Minute</td><td>54</td></tr><tr><td>Day</td><td>10</td></tr><tr><td>Month</td><td>2</td></tr><tr><td>Year</td><td>2016</td></tr><tr><td>Region</td><td>Melbourne</td></tr></table> <div></div>	Hour	15	Minute	54	Day	10	Month	2	Year	2016	Region	Melbourne
Hour	15													
Minute	54													
Day	10													
Month	2													
Year	2016													
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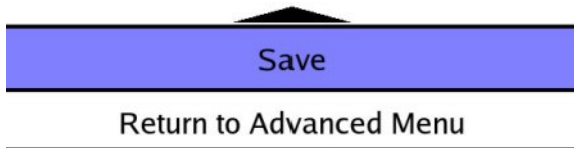
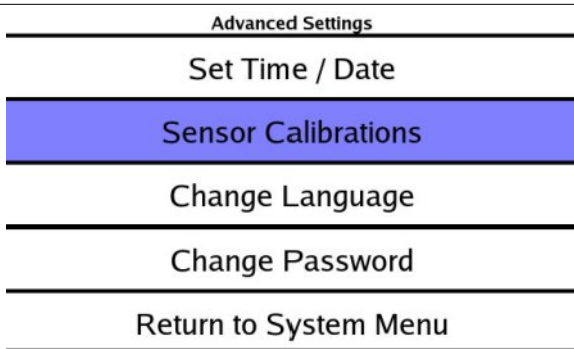
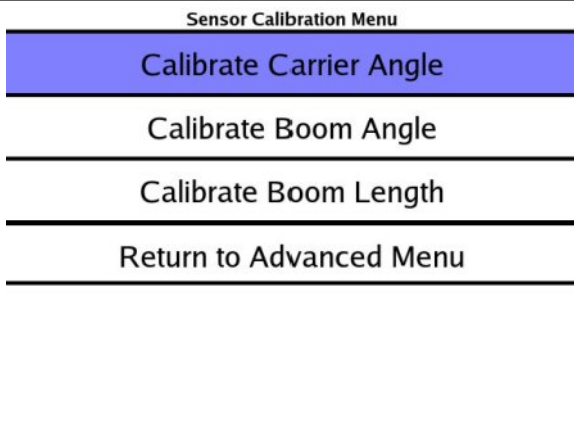
<i>Step</i>	<i>Description</i>	<i>Diagram</i>
6.	Scroll to the next page and select Save to store the new time/date and return to the Advanced Menu.	 <p>The diagram shows a menu interface. At the top, there is a blue button labeled 'Save'. Below it, the text 'Return to Advanced Menu' is displayed. The menu is enclosed in a rectangular frame with a thin border.</p>
7.	Select Sensor Calibrations	 <p>The diagram shows a menu titled 'Advanced Settings'. The menu items are: 'Set Time / Date', 'Sensor Calibrations' (highlighted in blue), 'Change Language', 'Change Password', and 'Return to System Menu'. The menu is enclosed in a rectangular frame with a thin border.</p>
8.	Select Calibrate Carrier Angle and then follow the instructions on the screen to complete the calibration. Repeat for Calibrate Boom Angle and Calibrate Boom Length.	 <p>The diagram shows a menu titled 'Sensor Calibration Menu'. The menu items are: 'Calibrate Carrier Angle' (highlighted in blue), 'Calibrate Boom Angle', 'Calibrate Boom Length', and 'Return to Advanced Menu'. The menu is enclosed in a rectangular frame with a thin border.</p>

Table 16: Sensor Calibration

Appendix A: Attaching Display Connectors

The procedure below describes the correct method of attaching the cables to the screw lock connectors on the display.



If the M12 screw lock connectors on the display are over tightened, it will twist the connector pins attaching the connector to the PCB.

Step	Description	Diagram
1.	<p>Connect the cable from the user control to the top 5 pin connector on the display.</p> <p>Connect the cable from the CCIM to the bottom 8 pin connector on the display.</p>	
2.	<p>Line up the alignment hole on the cable connector with the alignment notch on the display connector.</p>	




<i>Step</i>	<i>Description</i>	<i>Diagram</i>
3.	Push the female connector from the cable into the male connector on the display.	
4.	Rotate the nut on the female connector by hand in a clockwise direction, until the tension on the nut starts to increase.	
5.	Push the cable in again and repeat steps 3 and 4 until the connector is secure.	

Table 17: Install Display Connector Procedure



The method to correctly secure the cable is to push-twist-push-twist until the connector is fully inserted and secure. This will minimise the twisting force applied to the connector.

Below is a picture of a damaged connector on the PCB inside the display. This damaged occurred because the connector was over tightened.

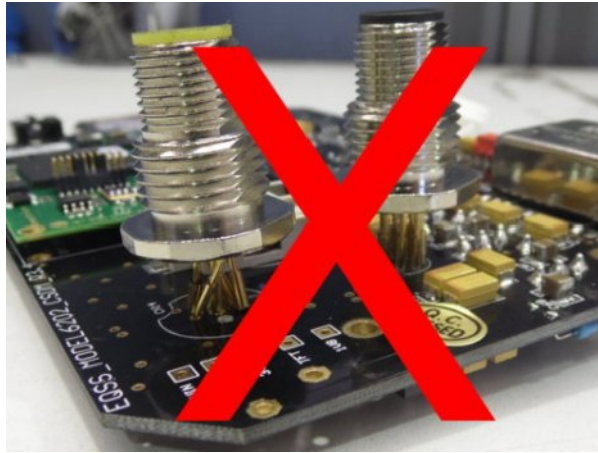


Illustration 2: Damaged Display Connector



Do not use any tools to tighten the connector.



Illustration 3: Do Not Use Tools To Tighten Connector



Do not over-tighten the nuts on the back of the display connectors. These nuts should only be hand tightened. If the nuts are overtightened it will damage the PCB inside the display.



Illustration 4: Do Not Over Tighten Nuts



Damage to the display connectors is not covered under warranty.

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