



eqss™ Gen-3 LMS Telehandler Load Management System

User Manual



Equipment Safety Systems P/L only provide programming for the vehicle/tool combination when provided with the manufacturers Rating Charts. Use outside the operational envelope of the suite of tools is outside the protection of the system.

It is the responsibility of the operator to select the correct attachment for use by the safety system. Selection of an incorrect attachment negates the protection of the system as does the use of a tool not engineered by Equipment Safety Systems P/L for use on the vehicle. This inappropriate use could result in damage to the vehicle, the tool, the operator, or personnel outside the vehicle.

Please refer to the vehicle's Operators Manual for the safe operation of the vehicle, the attachment and removal of tools, plus the operational parameters of the combination of vehicle and tools.

*****This Manual Must Remain With The Machine At All Times*****

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in this publication regarding this device's applications and the like is provided only for your convenience and may be superseded by updates.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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This is a class A product certified to AS/NZS CISPR 22:2006. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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Important Safety Information

- **Only Jump Start Machine using a Floating Battery** – Connect a floating battery of the same type and voltage to the machine by following the instructions in the machine operator manual. If the machine operator manual does not specify using a floating battery or for any other jump starting methods, see below.
- **Disconnect Gen3-LMS before Jump Start Machine** – Before jump starting the machine ensure the 26 and 34 pin black bulkhead mount connections are removed from the CCIM, installed under the covers inside the cabin. Otherwise the sensitive electronics in the Gen3-LMS system may be damaged from the power surge, negating the protection of the system.



Illustration 1: CCIM Bulkhead Connectors Removed

System Startup & Shutdown

Startup

The Gen-3 safety system is activated when the ignition is set to accessories or first stage. The company logo is briefly displayed before loading the main screen.



Illustration 2: Startup Screen



After power has been applied there will be a delay of about 5 seconds before the company logo is displayed. This is to allow the power to stabilise before activating the display.

Shutdown

After the ignition is turned off the Gen-3 safety system remains active for an additional 2-5 seconds while saving information to disk. During this time the shutdown logo is displayed.



Illustration 3: Shutdown Screen

Pre Operation Checks

Run through the tests below before operating the machine.



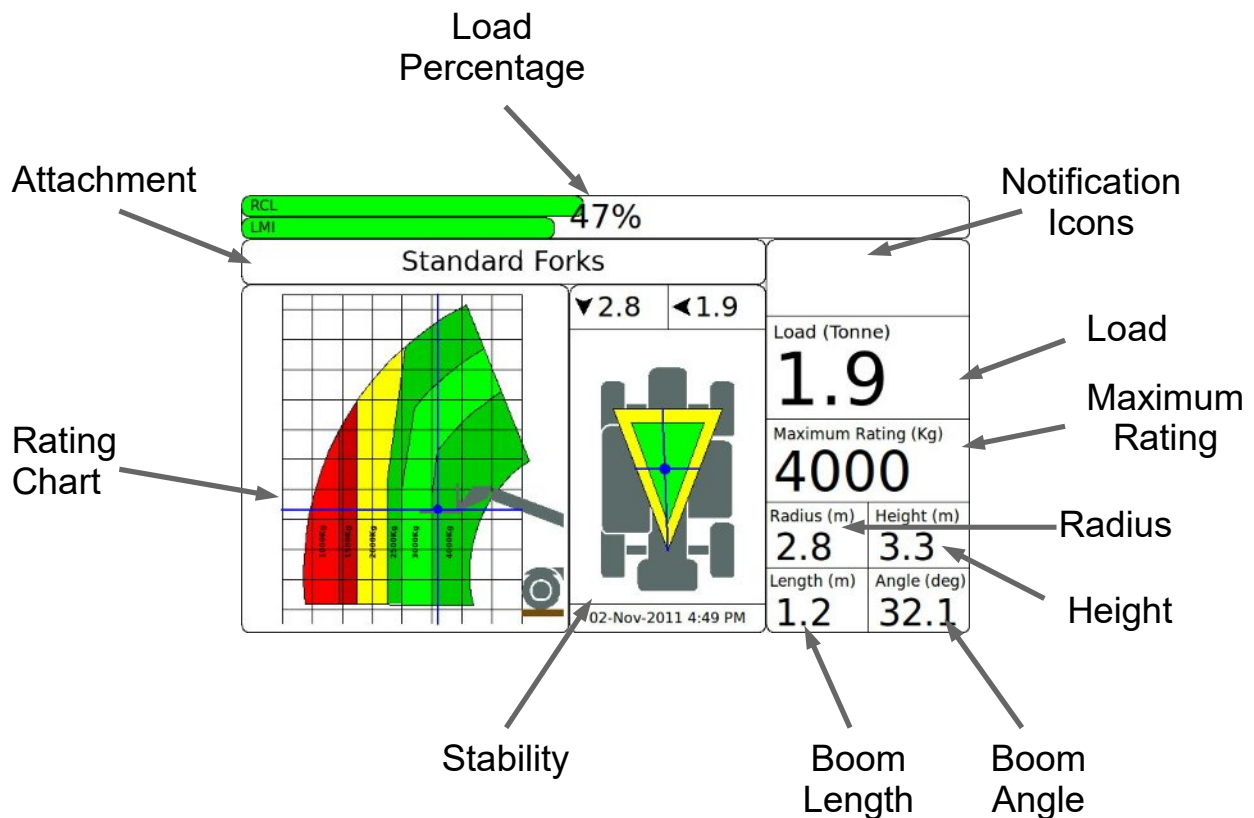
These tests must be performed in addition to the pre operation checks listed in the machine operator manual

<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 up or down buttons on the user control dial to select System Menu.</p> <p>Press Enter on the user control dial to enter the menu.</p>	<p>Main Menu</p> <hr/> <p>Attachment Selection Menu</p> <hr/> <p>System Menu</p> <hr/> <p>Exit Menu</p> <hr/>
2.	Select System Tests	<p>System Menu</p> <hr/> <p>Volume / Brightness</p> <hr/> <p>Status Menu</p> <hr/> <p>Diagnostics Menu</p> <hr/> <p>System Tests</p> <hr/> <p>Advanced Menu</p> <hr/> <p>Return to Main Menu</p> <hr/>

<i>Step</i>	<i>Description</i>	<i>Diagram</i>
3.	<p>Select Test Primary Cutout.</p> <p>The background colour will change to red when selected.</p> <p>Attempt to move the boom to ensure the machine's hydraulic cutout is engaged.</p> <p>Press Enter on the user control dial to disable the cutout and return the system to normal operation.</p>	<p>The diagram shows a vertical list of menu items under the heading 'System Tests'. The items are: 'Test Primary Cutout' (highlighted in red), 'Test Secondary Cutout', 'Test Boom Raise Cutout', 'Test Boom Extend Cutout', 'Test Light Tower', and 'Return to System Menu'. Each item is separated by a horizontal line.</p>

Table 1: System Tests

Screen Layout



Load Percentage – Shows the percentage of maximum load for the Rated Capacity Limiter (RCL) and Load Moment Indicator (LMI). If the LMI has not been fitted there will only be one percentage bar for the RCL. The load percentage number displays the maximum of the two bars. The bars are colour coded depending on their load percentage, with green between 0% - 79%, yellow between 80% - 99% and red 100%+.

Attachment – This displays the description of the currently selected attachment. To change the attachment see Attachment Menu.

Rating Chart – This shows the rating chart for the currently selected attachment and the stabiliser configuration. For more details regarding the rating chart features see Rating Chart.

Stability – The stability window shows the current stability status of the telehandler. For more details on the stability window see Stability.

Notification Icons – This area displays the important notification icons. For more details on the types of icons displayed see Status Icons.

Load – This displays the currently lifted load in tonnes and has a 100 Kg resolution

Maximum Rating – This displays the maximum rating in kilograms from the rating chart for the current boom position



As an added safety feature the Gen-3 safety system will automatically derate the maximum rating further than is specified on the rating chart when the attachment load center is within the negative working radius region (when the load is above the front wheels and the cabin). This should have a minimal impact on the performance of the machine since the load center rarely passes within the negative working radius region during lifting operations.

Radius – This displays the current radius of the attachment in metres measured from the attachment load centre to the front of the tyre

Height – This displays the current height of the attachment from the ground to the bottom of the attachment



The height measurement is taken from the ground to the bottom of the attachment. It is not the total height of the telehandler and should not be used as a maximum height limit. If a suspended load is attached it does not measure the height of the load from the ground.

Boom Length – This displays the current length or extension of the boom in metres

Boom Angle – This displays the current boom angle in degrees

User Control

The operator will be required to select different configuration options for the safety system, such as changing the attachment selection. This is accomplished by the user control switch.



Illustration 4: User Control Dial



Illustration 5: User Control Dial



Illustration 6: User Control Dial



Illustration 7: User Control Dial

Note: Please note the location of the user control dial may differ.



The user control may be mounted in a different location on other dashboards

The user control switch has 3 functions: increment up, increment down and select.

Increment Up – Pressing either the Up or Right buttons performs a increment up action which may depending on the current screen scroll up the user menu or zoom into the rating chart

Increment Down – Pressing either the Down or Left buttons performs a increment down which may either scroll down the user menu or zoom out of the rating chart

Select – Press the Enter button to perform a select which is used to either select a menu option or to enter the menu system. Press the Enter button when a camera is active to disable the camera and switch back to the rating chart view.



When any of the user control actions are performed the display will emit a short notification sound.

Attachment Menu – Manual Selection

The attachment selection menu is accessible by pressing the user control dial to enter the Menu System, then select Attachment Selection Menu. This will display a list of the currently calibrated attachments for this telehandler.

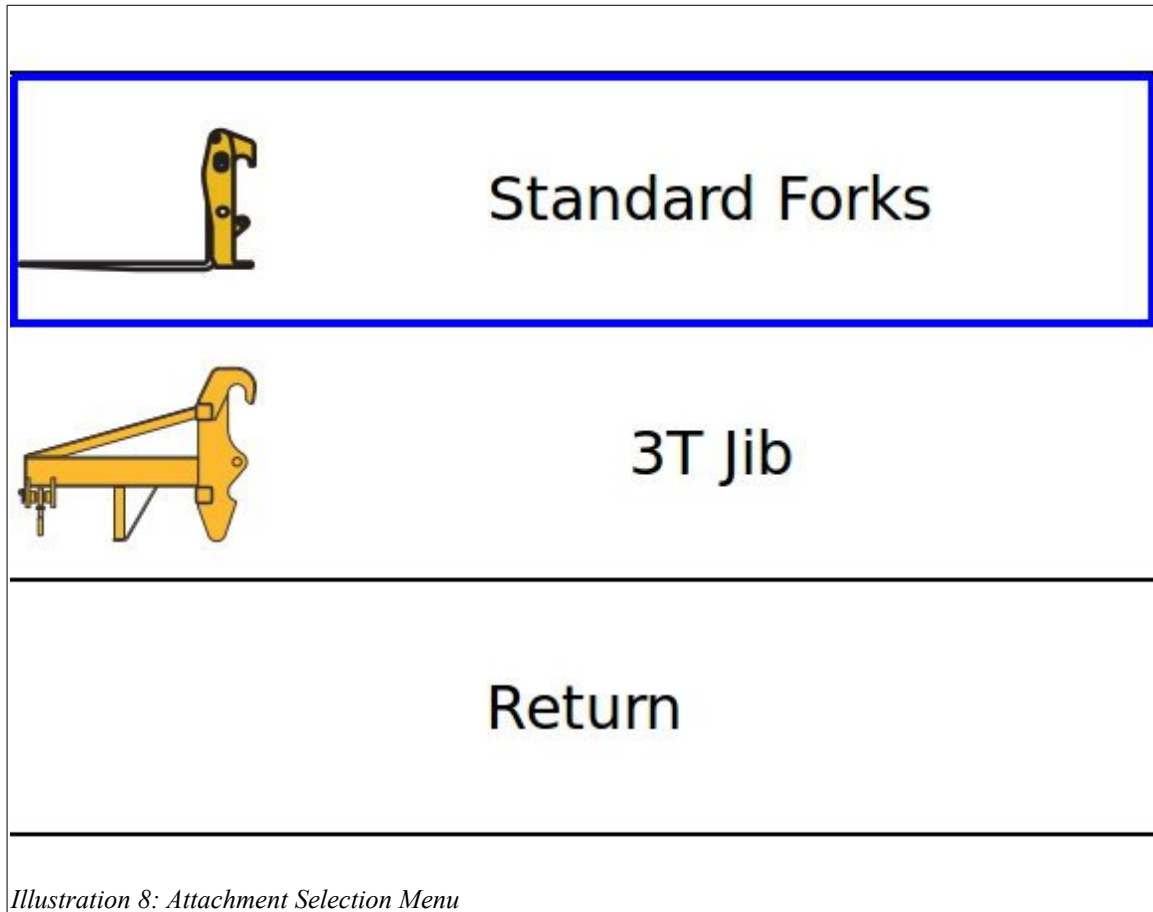


Illustration 8: Attachment Selection Menu

Each attachment listed includes both a picture of the attachment for ease of identification and a description which will be shown on the attachment window on the main screen if selected.

To select a new attachment scroll through the menu until the desired attachment is highlighted and press the user control. This will exit to the main screen and load the configuration for the new attachment.

If there are more attachments that can be displayed on a single screen then arrows are displayed at the top or bottom to indicate there are more attachments on other pages.



The operator can only select from attachments that have been enabled, if the attachment is not enabled it will not be shown in the menu.

Attachment Menu – Automatic Recognition

When the Gen-3 system is configured for automatic tool selection, the system will read the identification tag on the attachment and automatically change the system to the matching attachment.

If the attachment has multiple configurations (eg multiple knuckle positions) the attachment selection menu will be shown to select the correct configuration. To change the selected configuration, access the attachment selection menu.



If the current attachment has multiple configurations the attachment selection menu will be shown to select the configuration when the system starts.

If the machine has multiple attachments without identification tags, the attachment selection menu will be shown if an attachment can't be identified.

When using automatic tool selection the attachment window may show the following messages

- No Attachment – There is currently no attachment on the telehandler or the system can't find the identification tag.
- Attachment Not Calibrated – The Gen-3 system has recognised an attachment but the system has not yet been calibrated for the attachment.
- Unknown Attachment – The Gen-3 system has read an identification tag that is not in the system.

When any of the above messages are shown, no visual rating chart is shown on the screen and the system is de-rated to 80% of the standard fork rating charts.

Using Specific Attachments

Below is some information to be aware of when using specific types of attachments with the Gen-3 system.

Long Reach Attachments

When using attachments that have a long reach such as a long boom or fly jib/winch, the attachment can only be used in a horizontal position. Since there are no sensors on the tilt head, the Gen-3 assumes the attachment is horizontal. If the attachment is tilted the load reading will become more inaccurate as the attachment is tilted towards vertical.

Make sure to always lift the load from the ground by raising the boom rather than tilting the attachment head. Tilting the attachment head can cause pressure spikes in the hydraulic system, affecting the pressure sensors which the Gen-3 uses to measure the load, resulting in an inaccurate load reading while the head is being tilted. The load rating on most long reach attachments is far less than the capacity of the machine, which means that if a load is lifted which exceeds the load rating the attachment will break or be damaged before the rear wheels lift off the ground.



When using long reach attachments always use in the horizontal position. Always lift the load by raising the boom and not tilting the attachment head. Failure to do so will result in inaccurate load readings, which may damage the attachment causing injury.

Man Platforms

All compliant man platforms must be operated from the platform. Most machines require the stabilisers to be lowered before being able to operate the boom from the man platform. In these circumstances, when the platform attachment is selected from the Gen-3 menu, the rating chart window displays a message to the operator instead of the rating chart while the stabilisers are raised. The message informs the operator that the man platform can not be used until the stabilisers are lowered.

Winches

The rating chart shows the maximum load rating for the boom location with the winch hook block fully retracted. Most rating charts decrease the rating as the boom is raised higher. The load rating will remain the same even if the hook block is lowered into a higher load capacity band, since the boom is still at the same height.

Buckets

When using earth moving buckets, most machines are allowed to temporarily exceed

the capacity rating and lift the rear wheels off the ground such as when breaking through the heap, as long as the boom is fully retracted.

When the boom is extended less than 1 metre and is at an angle of less than 10 degrees the Gen-3 cutout is disabled. Within this region the load capacity is unlimited allowing full operation of the bucket.

Rating Chart

The rating chart window displays the current rating chart for the selected attachment and the stabiliser configuration.

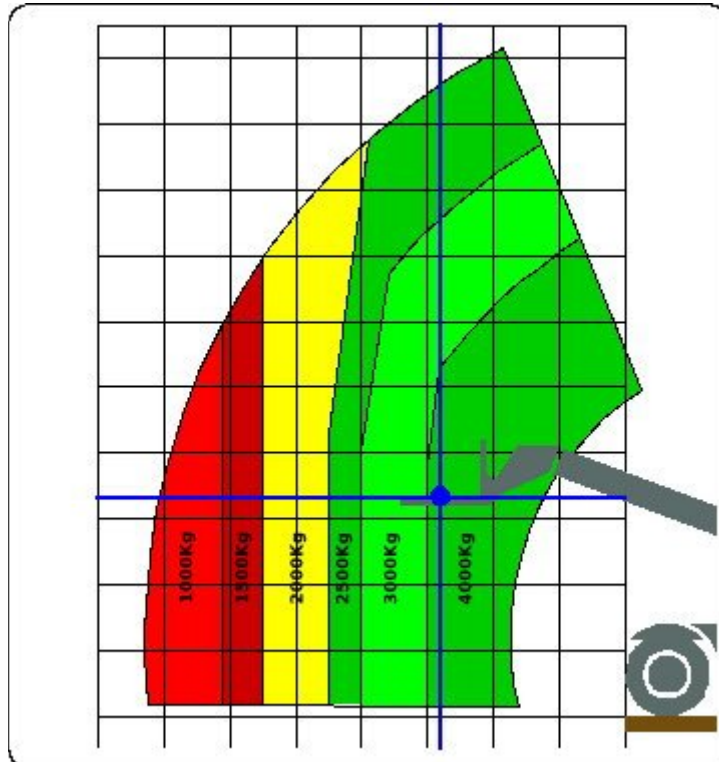


Illustration 9: Rating Chart

The load segments on the rating chart are colour coded to match the current load. If the segment is green and the boom was moved inside the segment the rated capacity percentage would be between 0% - 79%. If the segment is yellow the capacity would be between 80% - 99% in that region and if red the capacity would be 100%+ in that region. This allows the operator to lift the load and determine the boom range before the lift is performed.

The rating chart also has an image of the telehandler showing the current boom location within the chart. The telehandler image also changes the attachment to match the currently selected attachment. When both stabilisers are lowered the telehandler image is updated with a stabiliser shown in front of the tyre.

The current position within the chart is shown via crosshairs. With the chart grid in 1 metre increments the operator can determine the distance the load can be moved.

For more detail the operator can zoom into the chart via the user control. This will zoom into the current load centre location in the chart, as the boom approaches the edge of the chart the window will slide along to keep the load centre in view.

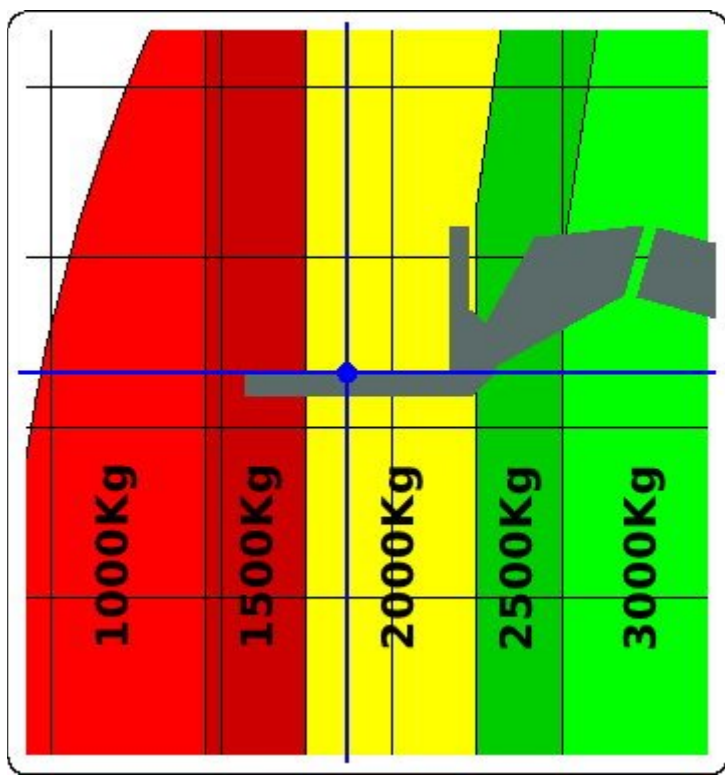
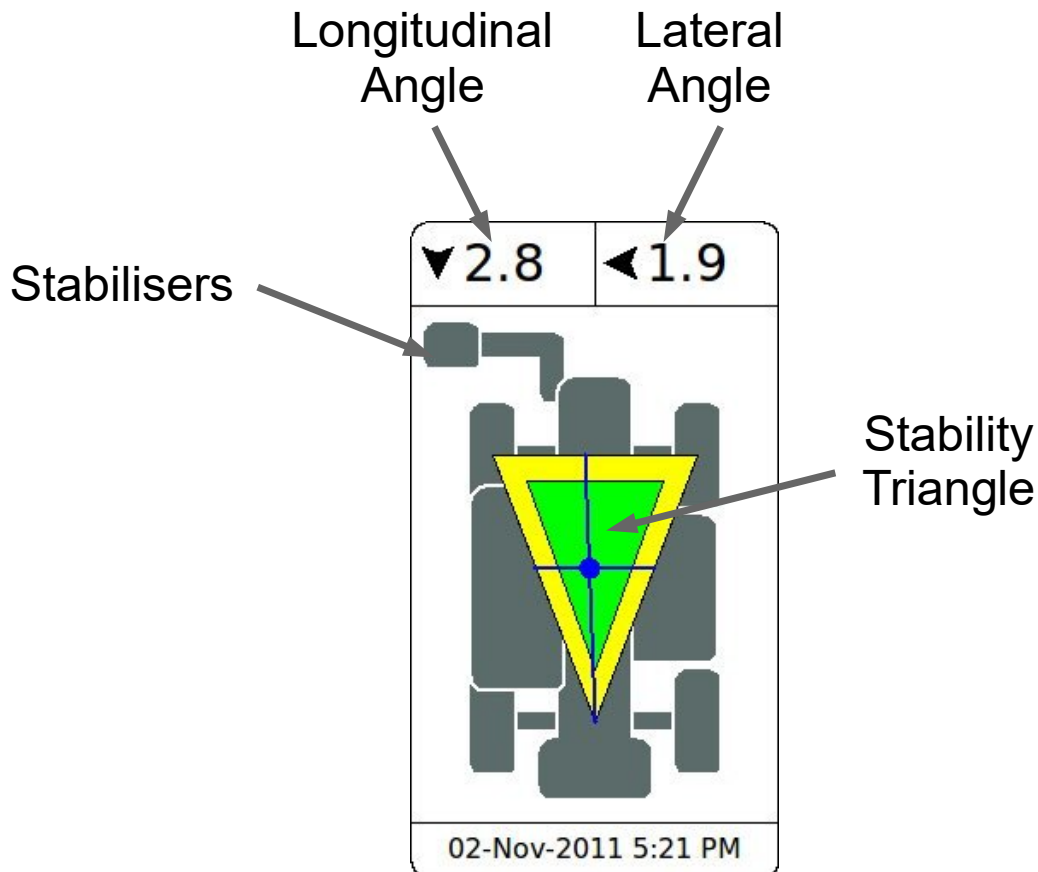


Illustration 10: Rating Chart

Stability

The stability window displays the current stability status of the telehandler.



Longitudinal Angle – The longitudinal angle shows the current longitudinal angle of the carrier. The arrow indicates the direction of the angle with a down arrow indicating a backward tilt (eg travelling up a hill) and a up arrow indicating a forward tilt (eg, travelling down a hill). The angle is in 0.1 degree increments unless the angle is greater 10 degrees then it is displayed in 1 degree increments.

Lateral Angle – The lateral angle shows the current lateral angle of the carrier. The arrow indicates the direction of the angle with a left arrow indicating a left side tilt and a right arrow indicating a right side tilt. The angle is in 0.1 degree increments unless the angle is greater than 10 degrees then it is displayed in 1 degree increments.

Stabilisers – The stability window shows an overhead view of a telehandler. When a stabiliser is raised/lowered the telehandler image is updated to show the new stabiliser status. The image above shows the left stabiliser down.

Stability Triangle – The stability triangle shows the current centre of mass of the telehandler taking into account the lifted load and the carrier angle. The centre of mass location is indicated by the crosshair. The centre of mass is overlay over a triangle, which is drawn between the front tyres and the centre of the rear axle. If the centre of mass moves outside of the triangle there is a danger of tipping over the telehandler. When both stabilisers are lowered the stability triangle is redrawn between the stabilisers and rear axle.

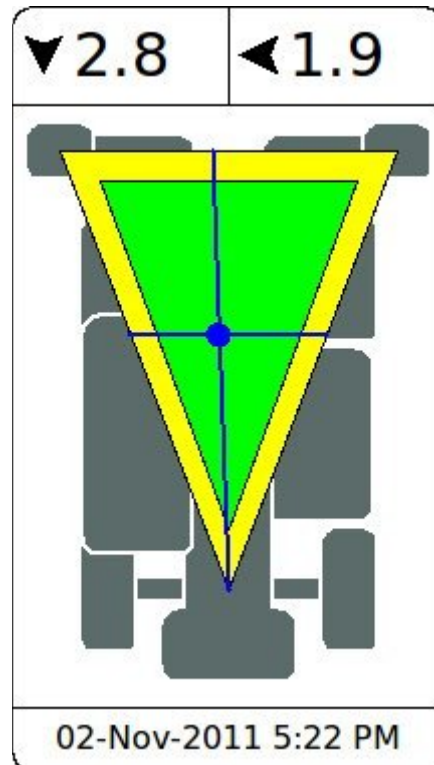


Illustration 11: Full Stability Triangle



Moving outside the stability triangle will only alarm but will not produce a cutout. It is up to the operator to determine the required corrective action.


Cameras

The Gen-3 safety system has the ability to connect up to 3 cameras to improve the operators' range of vision.

RCL

LMI

47%



Load (Tonne)	
1.9	
Maximum Rating (Kg)	
4000	
Radius (m)	Height (m)
2.8	3.3
Length (m)	Angle (deg)
1.2	32.1

Illustration 12: Main Screen - Camera View

Forward camera – The forward or side wheel camera, is displayed when the telehandler is in forward gear. It is positioned to show the view of the front right wheel, which is usually obstructed from the view of the operator by the boom while performing a pick-and-carry lift. This allows the operator to see obstructions that will hit the front right tyre while driving.

Reverse camera – This is displayed when the telehandler is in reverse gear. The camera shows obstructions that are behind the telehandler, that the telehandler might hit when reversing.

Remote camera – This is activated by a switch in the dashboard. The remote camera is a wireless camera that can be placed in a location to help the operator complete the lift. It can be mounted on the dogman's helmet to allow the operator to see from the dogman's perspective, or it can be mounted on the attachment to allow the operator to perform fine manoeuvres at long extensions where it is difficult to see the attachment.



If applicable the forward and reverse cameras may operate via a switch in the dashboard instead of when the machine is in gear.



If a cutout or alarm occurs or if the boom has been moved a significant distance the camera will switch off to allow the operator to see the stability and rating chart windows.

Height Limiter

The Gen-3 safety system has the ability to limit the maximum height of the boom, to ensure the machine operates below a pre defined height limit threshold. This is useful when the machine is operating under power lines or inside a tunnel.

When the Gen-3 calculates the boom has reached the height limit threshold it will produce a hydraulic cutout preventing the boom raise and boom extend functions of the telehandler.

When the height limit is engaged, the height limit icon will be shown in the notification area, see Status Icons on page 27 for more information.



*Illustration
13: Height
Limit Icon*



Some machines can not support hydraulic cutouts of individual boom functions such as the raise and extend functions used in the height limiter. Before enabling the height limiter, ensure the boom raise and extend cutouts operate from the System Test Menu



The height limit will only calculate the height of the boom and can not calculate the height of the attachment or the load.



The calculated height will vary from the actual height depending on how the boom pivot is mounted to the boom. The height limit threshold will need to be adjusted accordingly.

Height Limiter on Sloping Terrain

The height limiter will adjust based on the slope of the terrain and will take the angle of the carrier into account when performing the height limit calculation.

The height limiter will assume that the height ceiling will adjust to match the slope of the terrain, so the height limit is always the same distance from the ground. See the example image below showing two power poles on a slope.

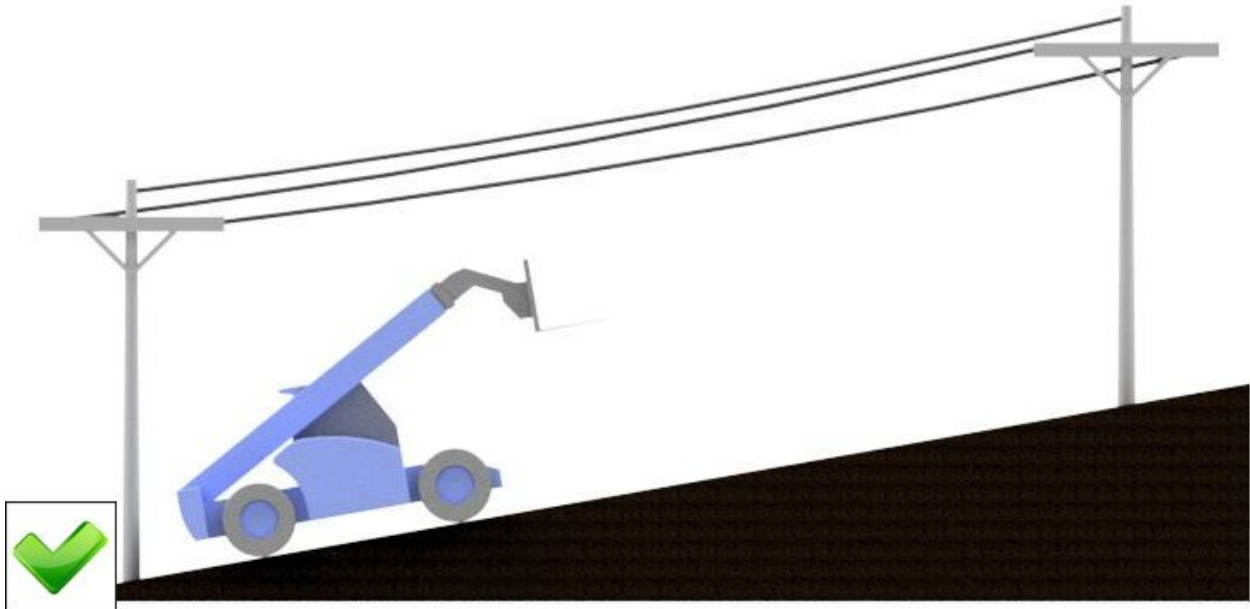


Illustration 14: Height Limit matching the Slope of the Ground

However there may be some cases where uneven terrain such as small hills or bumps may cause the height ceiling to not always be the same distance from the ground. Under these circumstances the height limit threshold will need to be lowered to take the uneven terrain into account. See the example image below showing two power poles between a small hill.

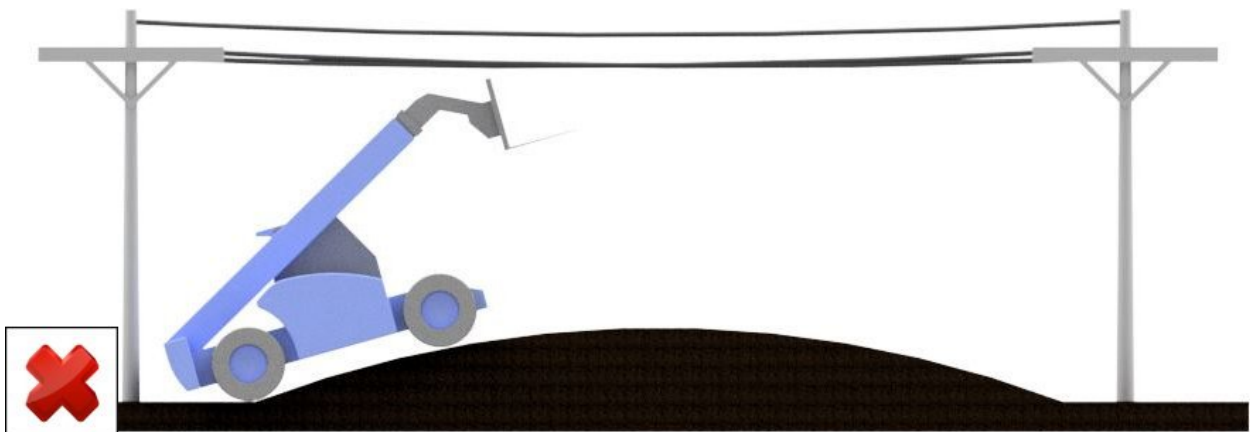


Illustration 15: Height Limit varies due to Uneven Terrain

Status Icons

The top right of the main window below the capacity bar holds the location of the status icons. Below is a description of each status icon.










<i>Symbol</i>	<i>Description</i>
	Cutout RCL – The hydraulic cutout has been engaged due to the load been beyond the rating chart capacity
	Cutout LMI – The hydraulic cutout has been engaged to prevent the telehandler tipping forward
	Dynamic Stability Triangle (DST) Warning – The centre of mass is approaching the edge of the stability triangle. No cutout has been engaged.
	Cutout Override – The hydraulic cutout has been overridden and the boom has full movement restored. The number on the icon indicates the amount of time remaining before the cutout is re-engaged.
	System Fault – An error has occurred with the system. Use the menu system to determine the fault. See Fault Codes on page 32.
	Man Platform Mode – The system is in observer mode and will not produce a cutout, to allow for operation from the man platform. The system will still display the load reading for an operator in the cabin and for the light tower.
	Height Limit Exceeded – The height limit has been exceeded and the hydraulic cutouts for the boom raise and extend functions have been engaged.

Table 2: Status Icons

 The icon status can only display 3 icons. If more than 3 icons are enabled the 3 most important icons are shown, such as override or cutout.

 The system will not engage the cutout if the boom extension is less than 1 metre or the boom angle is less than 10 degrees as per the Australian Standards

Cutout Override

The Gen-3 safety system will engage the hydraulic cutout if the telehandler is beyond its recommended capacity. The operator is allowed to temporarily override this cutout to allow the boom to be moved back into a safe working region.



Illustration 16: Emergency Override Switch



Illustration 17: Emergency Override Switch



Illustration 18: Emergency Override Switch



The emergency override may be mounted in a different location on other dashboards

In order to engage the hydraulic override the operator must turn the key/switch and hold. This will display the override icon on the screen. The number in the icon is amount of time remaining in seconds until the cutout is re-engaged. Once the number drops to 0 the operator will need to release the key and then turn and hold again for additional override time.



The default override time is 15 seconds. It can be increased to a maximum of 60 seconds via the configuration.

Menu System

The menu system allows for configuring the Gen-3 system.

To enter the menu system press the user control dial. This will display the main menu.

To navigate through the menu options press the arrow buttons on the user control dial. The currently selected option will be highlighted. To select the highlighted option press the Enter button on the user control dial.

To change a menu value item (eg change the volume). Highlight the item to be modified and press Enter on the user control dial. The item background will change to the edit colour. Press the arrow buttons to change the item value. Press the Enter button again to save the new value.

Main Menu

The main menu contains the following

<i>Item</i>	<i>Description</i>
Attachment Selection Menu	Lists the attachments that can be selected for the telehandler. Note: May not be shown if using automatic tool recognition See Attachment Menu on page 15.
System Faults	Describes the current system errors. Note: Only shown if there are errors See Fault Codes on page 32.
System Menu	Contains the system configuration options See System Menu below.

Table 3: Main Menu

System Menu

The system menu contains the following

<i>Item</i>	<i>Description</i>
Volume / Brightness	Allows the operator to change the sound volume and display brightness.
Status Menu	Displays the configuration settings for the Gen-3 system on this telehandler.
Diagnostics Menu	Displays information from the Gen-3 sensors and switches from the machine electronics
System Tests	Forces the Gen-3 system to generate outputs to test the system cut-outs and light tower are functioning correctly
Advanced Menu	Allows for adjusting the date and time. This menu is password protected.

Table 4: System Menu



If operating the machine in a very dark environment adjust the display brightness to the minimum level.

Fault Codes

When a system fault has occurred the fault icon will be showing in the status icon area. To identify the fault, enter the Menu System then select System Faults. This will display a list of the current system fault codes, select a fault code for more information.

The table below describes the fault codes and actions required to fix the fault.



The information in the table below is also displayed on the system fault information screen on the display for the selected fault code.

<i>Code</i>	<i>Description</i>	<i>Action</i>
N01	CCIM Off-line There is a communication error between the display module and the CCIM module.	Ensure the bottom 8 pin circular connector from the display is fastened and secured to the cable connector. Inspect the cable for possible damage. Replace the CCIM or display module.
N02	CPIM Off-line There is a communication error between the CCIM module and CPIM module.	Ensure the cable with the 4 pin circular connectors from the CCIM to the CPIM is fastened and secured on both ends of the cable. Inspect the cable for possible damage. Replace the CPIM module.
N03	CALM Off-line There is a communication error between the CPIM module and the CALM (Cable Reeler).	Ensure the cable running along the boom with the 4 pin circular connectors from the CPIM to the CALM (Cable Reeler) is fastened and secured on both ends of the cable. Inspect the cable for possible damage. Replace the CALM (Cable Reeler).
N04	CARM Off-line There is a communication error between the CALM (Cable Reeler) and CARM (ID Reader) module. Note: Automatic Tool Recognition Only.	Inspect the CARM module in the cable tray of the cable reeler for any damaged wires. Replace the CARM module.

<i>Code</i>	<i>Description</i>	<i>Action</i>
N05	CAN One Wire The CAN bus system is operating on only one wire.	Inspect the CAN cables running between the display, CCIM, CPIM, CALM and CARM modules for possible damage. Ensure the cable connectors are all fastened and secure.
N06	CAN No End Termination There is a communication error between the display module and the CCIM module.	Ensure the bottom 8 pin circular connector from the display is fastened and secured to the cable connector. Inspect the cable for possible damage. Replace the CCIM or display module.
N07	CALM Cable Break Detected The cable on the cable reeler measuring the boom extension has been broken or may not be extending or retracting.	Inspect the cable wire from the cable reeler for damage. Ensure the cable is extending and retracting from the cable reeler. Replace the cable wire.
N08	CALM Stow Switch Mechanical Fault The stow switch on the cable reeler may be damaged or may not be triggering.	Retract the boom and ensure the stow switch is triggered when the boom is fully retracted. Extend the boom and ensure the stow switch is released. Inspect the stow switch for damage. Replace the stow switch.
N09	CALM Stow Switch Electrical Fault The stow switch on the cable reeler may be damaged.	Inspect the stow switch trigger arm for damage. Replace the stow switch.
N10	CALM Angle Fault One of the angle sensors inside the cable reeler have produced a fault.	Contact your local EQSS representative to repair or replace the cable reeler.
N11	CALM Length Fault There is a variance in the boom length reading between the two length sensors or one of the length sensors is damaged inside the cable reeler.	Inspect the cable reeler to ensure the cable wire is extending/retracting and the stow switch is triggered when fully retracted. Fully retract the boom, then fully extend the boom and check if the error continues to occur. If the error continues to occur contact your local EQSS representative to repair or replace the cable reeler
N12	Boom Raise Relay Fault The boom raise cutout relay in the CPIM has failed to energise.	Contact your local EQSS representative to repair or replace the CPIM.

<i>Code</i>	<i>Description</i>	<i>Action</i>
N13	Boom Extend Relay Fault The boom extend cutout relay in the CPIM has failed to energise.	Contact your local EQSS representative to repair or replace the CPIM
N14	Main Head Pressure Fault The main head pressure sensor output is out of the defined range.	Inspect the cable running between the main head pressure sensor and CPIM for damage. Ensure the 4 pin connectors are fastened and secured on both ends of the cable. Replace the main head pressure sensor.
N15	Main Rod Pressure Fault The main rod pressure sensor output is out of the defined range.	Inspect the cable running between the main rod pressure sensor and CPIM for damage. Ensure the 4 pin connectors are fastened and secured on both ends of the cable. Replace the main rod pressure sensor.
N16	Compensation Head Pressure Fault The compensation head pressure sensor output is out of the defined range.	Inspect the cable running between the compensation head pressure sensor and CPIM for damage. Ensure the 4 pin connectors are fastened and secured on both ends of the cable. Replace the compensation head pressure sensor.
N17	Compensation Rod Pressure Fault The compensation rod pressure sensor output is out of the defined range.	Inspect the cable running between the compensation rod pressure sensor and CPIM for damage. Ensure the 4 pin connectors are fastened and secured on both ends of the cable. Replace the compensation rod pressure sensor.
N18	Carrier Angle Sensor Fault The carrier angle sensor inside the CPIM has produced a fault.	Contact your local EQSS representative to repair or replace the CPIM.
N19	Primary Cutout Relay Fault One of the primary cutout relays in the CCIM has failed to energise.	Contact your local EQSS representative to repair or replace the CCIM.
N20	Secondary Cutout Relay Fault The secondary cutout relay in the CCIM has failed to energise.	Contact your local EQSS representative to repair or replace the CCIM.
N21	Override Relay Fault The override relay in the CCIM has failed to energise.	Contact your local EQSS representative to repair or replace the CCIM.
N22	Auxiliary Relay Fault The auxiliary relay in the CCIM has failed to energise.	Contact your local EQSS representative to repair or replace the CCIM.

<i>Code</i>	<i>Description</i>	<i>Action</i>
N23	Corrupt Firmware One or more sensor modules contain corrupted firmware.	Contact your local EQSS representative to load new firmware.
N24	Auxiliary Pressure Fault The auxiliary pressure sensor output is out of the defined range.	Inspect the cable running between the auxiliary pressure sensor and CCIM for damage. Ensure the 4 pin connectors are fastened and secured on both ends of the cable. Replace the auxiliary pressure sensor.
T01	Boom Angle Out of Range The boom angle has exceeded the defined range.	Raise/lower the boom and ensure the angle is changing. If the angle is changing recalibrate the boom angle. If the angle does not change replace the cable reeler.
T02	Boom Length Out of Range The boom length has exceeded the defined range.	Inspect the cable reeler to ensure the cable wire is extending/retracting and the stow switch is triggered when fully retracted. Extend/retract the boom and ensure the length is changing. If the length is changing recalibrate the boom length. If the length does not change replace the cable reeler.
T03	Lateral Angle Out of Range The lateral angle has exceeded the defined range.	Tilt the carrier left/right and ensure the lateral angle is changing. If the lateral angle is changing recalibrate the carrier angle. If the angle does not change replace the CPIM.
T04	Longitudinal Angle Out of Range The longitudinal angle has exceeded the defined range.	Tilt the carrier forward/back and ensure the longitudinal angle is changing. If the longitudinal angle is changing recalibrate the carrier angle. If the angle does not change replace the CPIM.
T05	SD Card Read Only The SD Card in the display is read only.	Ensure the lock tab on the side of the SD Card is pushed up into the unlock position. Contact your local EQSS representative to replace the SD card or repair the SD card holder.
T06	Verification Failure There was an inconsistency in the calculations performed by the two processors	Contact your local EQSS representative to reload the calculation software.

<i>Code</i>	<i>Description</i>	<i>Action</i>
T07	Corrupt Load Calibration Data Error The load calibration data for this attachment has been corrupted	Contact your local EQSS representative to reinstall the load calibration data files.
T08	Corrupt Rating Chart The rating chart files for this attachment have been corrupted	Contact your local EQSS representative to reinstall the rating chart files.
T09	Missing Rating Chart One of the rating charts for the attachment could not be located on the disk.	Contact your local EQSS representative to reinstall the rating chart files.
T10	Configuration Variable Error One or more configuration files on the SD card are invalid or corrupted.	Contact your local EQSS representative to reinstall the configuration files.
T11	Height Limit Error The boom height has increased beyond the height limit.	Inspect the connections responsible for generating the cutout for damage or misconfiguration.
T12	Radius Limit Error The boom radius has increased beyond the radius limit.	Inspect the connections responsible for generating the cutout for damage or misconfiguration.
T13	Cutout Error The boom has increased beyond the rating chart limit for the current load.	Inspect the connections responsible for generating the cutout for damage or misconfiguration.
T14	Forward and Reverse Detected Both the forward and reverse signals are being detected	Inspect the connections responsible for detecting the forward and reverse gear switch.
T15	Maximum Retraction Speed Exceeded The boom has retracted faster the design specifications. This could indicate a cable break on the cable reeler.	Inspect the cable wire from the cable reeler for damage. Ensure the cable is extending and retracting from the cable reeler. Replace the cable wire.

Table 5: System Fault Codes

Maintenance

The components of the Gen-3 safety system require periodic checks and maintenance to be performed to ensure it remains in working order. If any of the maintenance instructions below are unclear or for further information please contact an eqss™ representative.

Cable Reeler Lubrication

The cable reeler consists of a multi core cable wrapped around a drum. As the boom extends the cable unwinds from the drum, when the boom retracts the cable winds back onto the drum.

A cable guide prevents overlying of the cable ensuring the cable retracts uniformly onto the drum. Due to friction between the lays of wire and the layer guide the cable may sag or catch during retraction, therefore regular lubrication of the cable is required.

A regular inspection of the cable must be performed to ensure proper lubrication. The inspection interval will be dependant on the operating environment.

To lubricate the cable, fully extend the boom. While retracting the boom spray a lubricant (RP7, WD40 or equivalent) onto the cable, until the boom is fully retracted.

The cable must be lubricated at all times while the machine is in operation.

System Calibration

As the Gen-3 is a safety device it's load calibration must be tested every 12 months or when ever changes have occurred to the hydraulic systems.

The Gen-3 uses boom length and angle transducers plus pressure sensors installed into the main lifting cylinder and converts the information to a load reading. The variables in the system can change after a period of time due to a number of different factors, this may result in a higher or lower load reading. e.g. If the counter balance valves have been adjusted or sections of the hydraulic system have been replaced, incorrect load readings can occur. A recalibration will readjust the load reading for any minor changes in the systems.

With each attachment, lift a known weight to ensure the load reading is within ± 100 Kg of the actual weight. If outside this region, a recalibration must be performed.

If recalibration is required contact an eqss™ representative to arrange a time to perform the recalibration.



The load calibration must be tested every 12 months. An incorrect load reading may allow loads to be lifted which could damage the telehandler or cause injury.

Troubleshooting

Problem The boom won't move and the cutout icon is showing on the display

Solution You are trying to lift a load which is greater than the maximum capacity specified by the manufacturer rating charts for that attachment.
To move the boom turn the override key switch to the left and hold. This will temporarily shut off the safety system limiting capabilities to allow you to move the boom.



Illustration 19: Emergency Override Switch




Illustration 20: Emergency Override Switch



Illustration 21: Emergency Override Switch

Problem Boom still won't move even while holding the override switch and the override icon is showing 00

Solution The emergency override function is enabled for 60 seconds or less after the key switch has initially been activated. Once this time expires the safety system resumes it's normal limiting operations. To engage the cut-out, release the switch, turn and hold again.

Problem	Engine won't start
Solution	The eqss™ Gen-3 safety system will never prevent the machine from starting. If the engine doesn't start contact your local Haulotte representative for troubleshooting support.
Problem	The system alarms when trying to push the boom beyond its maximum angle
Solution	<p>This is a safety feature built into the system to discourage the operator from over pressurising the main lifting cylinder. If this occurs engage the override and lower the boom slightly to release the pressure and the system will disengage the cutout and alarms.</p> <p>If operating the man platform use the emergency boom controls on the platform to lower the boom and release the pressure.</p>
	
	<i>Illustration 22: Man Platform Emergency Boom Controls</i>
Problem	The load reading is too high or too low when lifting a load with a known weight
Solution	The safety system may require recalibration. See System Calibration on page 37 of the maintenance section.
Problem	The cable on the cable reeler is “sagging” when the boom is retracted
Solution	The cable reeler may require lubrication. See Cable Reeler Lubrication on page 37 of the maintenance section.
Problem	An icon with “LMS Fault” is shown on the display
Solution	This indicates a system fault has occurred. See Fault Codes on page 32.

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