

EQSS Model6253 – OverWatch™ LGMG-E Series



**** Failure to follow this installation manual will void warranty ****



REV 1.3

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Model6253 OverWatch™ Installation Manual

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DOCUMENT ABSTRACT:

This Installation Manual details the manufacturer's installation instructions for installing the Model6253 OverWatch on a LGMG-E Series electric slab scissor lift.

PRODUCT NAME:

Model6253 OverWatch Operator Detection System

REFERENCE DOCUMENTS:

DO0001195 Model6253 OverWatch User Manual

CURRENT DOCUMENT REVISION:

1.3

REVISION INFORMATION:

- 1.0 Initial Document Creation for installation on a LGMG-E Series control box
- 1.1 Update of installation manual and instructions for plug and play installation
- 1.2 Inclusion of harness schematics and update of installation images for PCB's
- 1.3 Inclusion of sensor guard V2 and update of machine configuration instructions

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N23041

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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Preparation

Required Tools

The OverWatch has been designed to be fitted using basic workshop tools. Shown below is a list of tools required to complete the installation

Item	Tool / Description
1	Electric Drill
2	Centre punch
3	Hammer
4	Side Cutters
5	Drill 3.2mm
6	Drill 5.0mm
7	Step Drill (5 – 30mm)
8	Metric sockets or spanners
9	Needle nose pliers
10	Screw drivers

Installation Time

The suggested time required to install the OverWatch is as detailed below

Task	Estimated Time (Minutes)
Drilling of all mounting holes for the various components	10
Mechanical assembly	5
Electrical assembly	10
Post installation system tests	10
Total	35

Installation Instructions

Operator Sensor

Step	Description	Diagram
1.	Remove the Joystick controller from the metal housing.	
2.	Drill three 5.2mm holes into the metal housing in the position as shown in the image. These holes are required to mount the operator sensor bracket and the P-Clip which supports the operator sensor cable	

3.

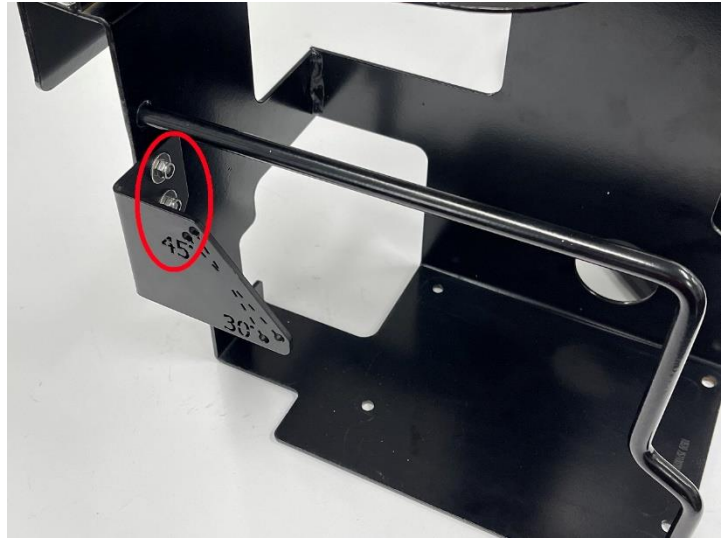
Mount the operator sensor bracket to the metal enclosure using the supplied nuts, bolts and washers.

Use the following hardware from the kit.

2 x M4 x 12mm bolts

2 x M4 Lock Nuts

4 x M4 Washers

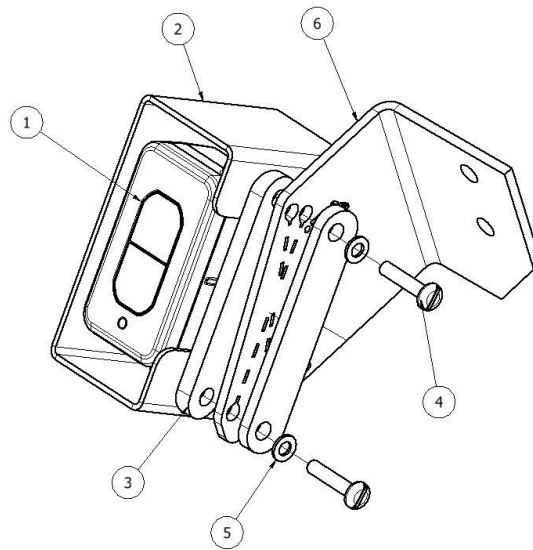


4.

Sensor Mounting Guard V1 (ME001794)

Mount the operator sensor in the **45-degree position** by using the positioning wedges, sensor guard, M4 washers, and bolts.

The orientation of the wedge blocks is critical for the correct positioning of the operator sensor, make sure that the sensor is angled, such that it is **twisted outwards** from the joystick controller.



PARTS LIST

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	AS001910	OverWatch Operator Sensor
2	1	ME001794	OverWatch Sensor Guard
3	2	ME001798	OverWatch Alignment Wedges
4	2	FA001422	M4 x 20mm Butt Screw
5	2	FA001235	M4 Plain Washer
6	1	ME001818	Operator Sensor Mounting Bracket

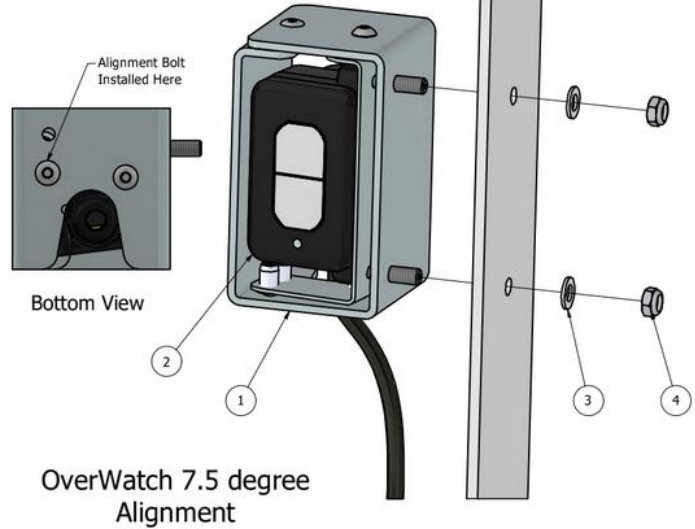
5.

Sensor Mounting Guard V2 (AS002326)

This guard (AS002326) supersedes the original V1 design. Attach the bracket in **45-degree** position using the M5 nuts and washers. Make sure that the sensor is on the 7.5-degree angle, such that it is twisted outwards from the joystick controller.

The 7.5-degree twist is achieved by rotating the sensor inside the assembly and using the bolt hole as show in the image.

PARTS LIST			
ITEM	QTY	STOCK NUMBER	DESCRIPTION
1	1	AS002326	Sensor Mounting Guard V2
2	1	AS001910	OverWatch Operator Sensor
3	2	FA001174	Washer, Plain, M5, 304 St. St.
4	2	FA001219	Nut, Hex, M5 x 0.8mm, Nylock

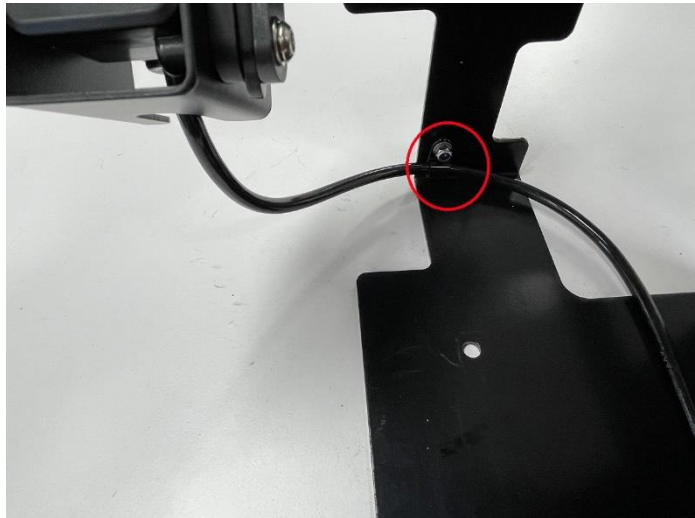


6.

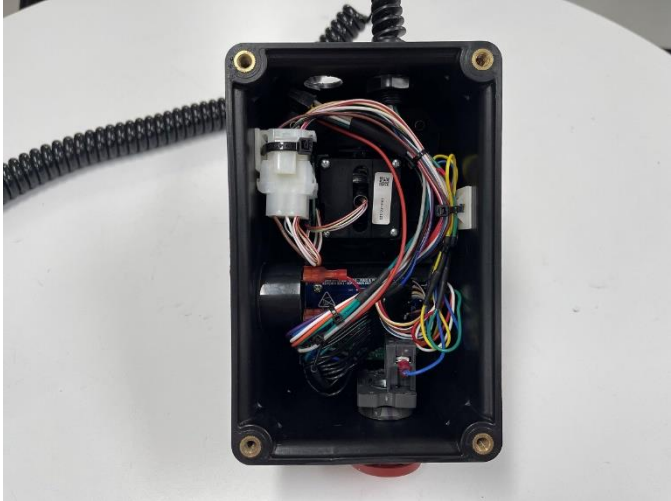

Route the operator sensor cable as shown in the image. Use a P-Clip to secure the cable to the metal enclosure.

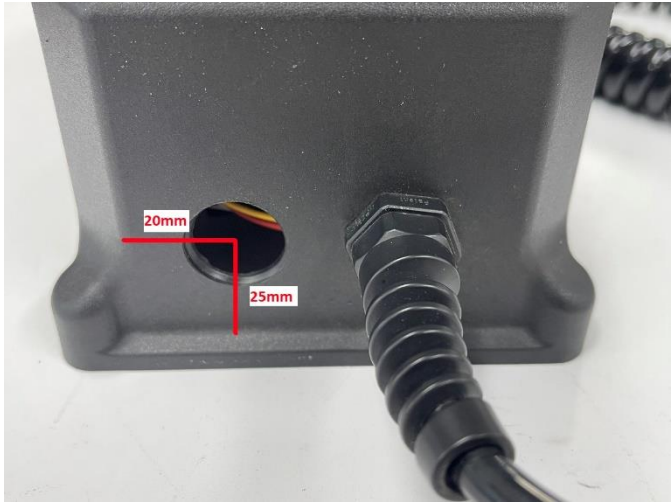
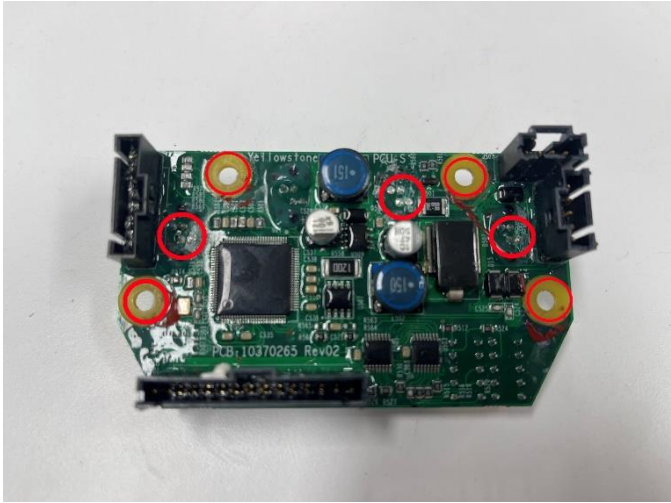
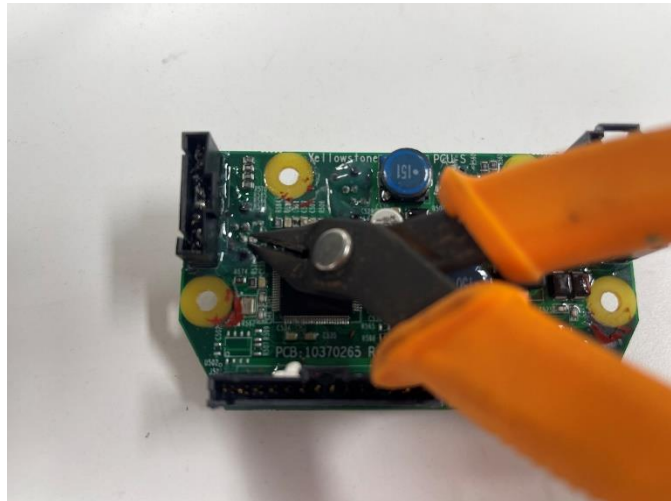
Use the following hardware from the kit.

- 1 x M4 x 12mm bolt
- 1 x M4 Lock Nuts
- 2 x M4 Washers

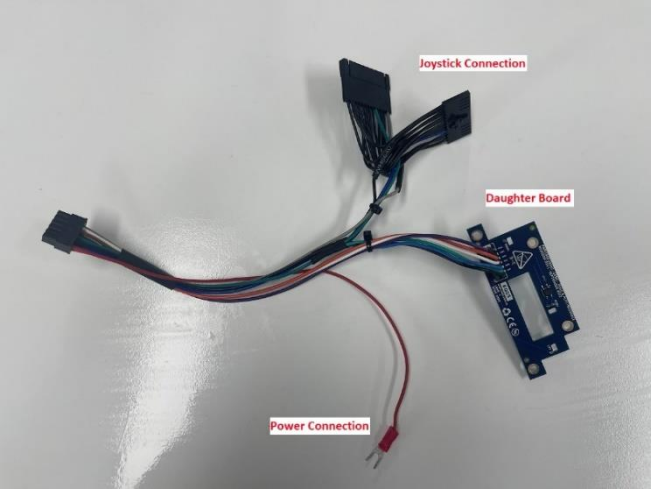
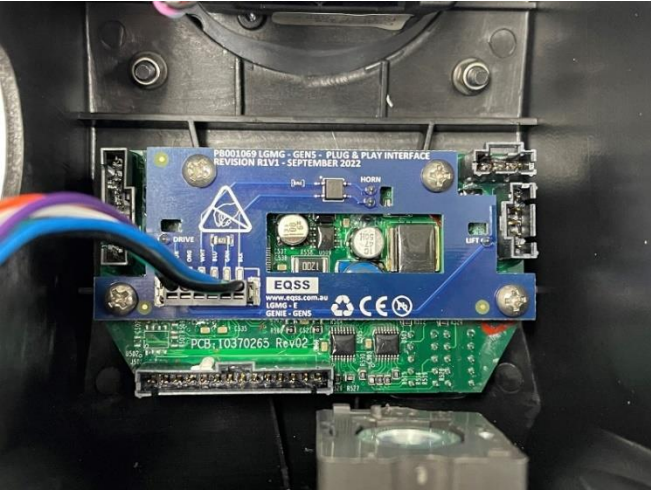
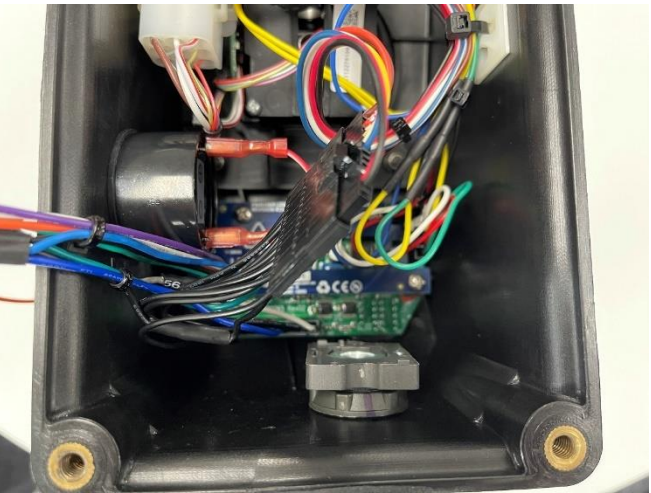


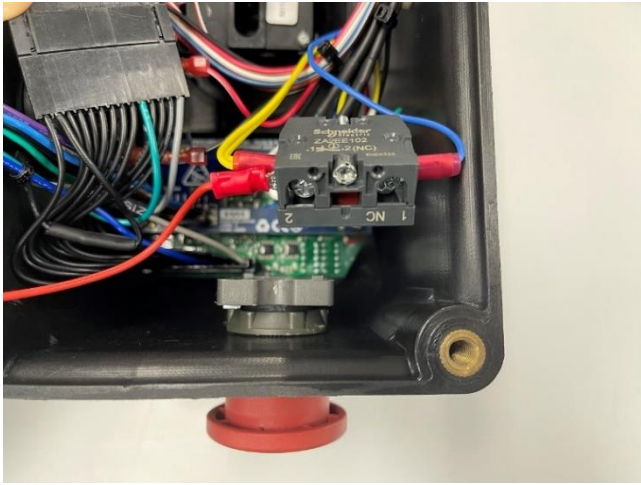


Control Module

Step	Description	Diagram
1.	Remove the bottom plastic cover from the Joystick to expose the inside wiring and electronics.	
2.	Remove the Buzzer, E-Stop, and the controller circuit board from the plastic enclosure.	

<p>3.</p>	<p>Drill a 20mm hole to run the operator sensor M20 Gland into the plastic joystick enclosure. The position of the hole is detailed as in the image. It is recommended to use a step drill for this hole, as it is running through plastic material.</p>	
<p>4.</p>	<p>Use a fine metal pick to clean the area shown in the red circles, on the adjacent image, to allow access to the pins. This process removes the conformal coating on the PCB and allows electrical access to the drive, elevate and horn connections on the circuit joystick board.</p>	
<p>5.</p>	<p>Use a fine pair of side cutters to trim down the signal pins. These connections must be trimmed to be as flat as possible so that the spring pin from the plug and play board can make suitable contact with the terminal</p>	

<p>6.</p>	<p>Trim down the Elevate signal pin. This pin is located as displayed in the image. Using a fine pair of side cutters make sure that the pin is trimmed flat.</p>	
<p>7.</p>	<p>Trim down the Drive signal pin. This pin is located as displayed in the adjacent image. Using a fine pair of side cutters make sure that the pin is trimmed flat.</p>	
<p>8.</p>	<p>Trim down the two Horn signal pins. These pins are located as displayed in the adjacent image. Using a fine pair of side cutters make sure that the pins are trimmed flat.</p>	

<p>9.</p>	<p>Wiring connections are made with the AS00221 harness.</p>	
<p>10.</p>	<p>Mount the Overwatch circuit board on top of joystick circuit board. Using the provided screws and spacers in the kit. Make sure that the board is sitting in the correct position and the spring pins are contacting the joystick circuit board signal pins. Use the cut-outs next to each spring pin to inspect that the contact is solid with the joystick board.</p>	
<p>11.</p>	<p>Install the Overwatch joystick connectors in between the joystick and the control box circuit board.</p> <p>Visually check that all pins from the original joystick connector have a corresponding cable on the Overwatch harness.</p> <p>Reconnect the other connectors, which were disconnected in step 1 to the control box circuit board.</p>	

<p>12.</p> <p>At the back of the Estop, install the OverWatch Red Power cable to terminal 2 of the E-Stop. Same terminal as where the yellow wires are connected.</p> <p><i>Note: this cable might need to be changed to terminal 1 if the Overwatch is powered with the E-stop pushed in.</i></p>		
<p>13.</p> <p>Mount the OverWatch ECU inside the joystick control box, the ECU is mounted to the bottom plastic using the adhesive Velcro tape.</p> <p>Run the operator sensor cable through the predrilled 20mm hole and secure the cable gland.</p> <p>Connect the 8-pin connector from the operator sensor and the 12-pin connector from the overwatch loom to the ECU.</p>		
<p>14.</p> <p>Re-assemble the joystick control box and mount to the metal shroud.</p> <p>Make sure the operator sensor cable runs clear to the joystick enclosure and tighten the M20 gland to seal the cable entry point.</p>		

Post Installation Configuration

Overview

After the system has been installed it must be configured with the parameters to suit the machine. Follow the instructions below to configure the OverWatch.

Minimum system requirements

Any smart phone, tablet or laptop that meets the following requirements:

- The device can connect to a Wi-Fi access point
- The device has an up to date web browser installed. Firefox, Chrome or Safari are recommended.

Wi-Fi Connection & Web Page Access

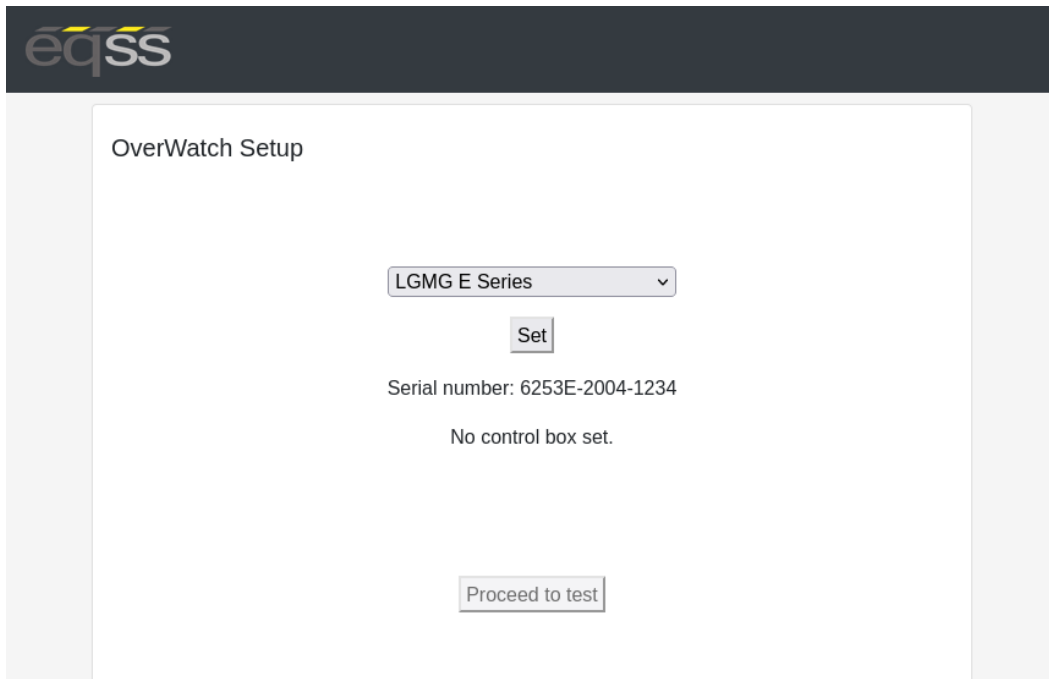
To enable the Wi-Fi connection on the OverWatch to complete the configuration follow the steps below.

1. Power down the platform control box with the ESTOP
2. Wait 5 seconds
3. Power up the platform control box with the ESTOP
4. While standing **in front of the operator sensor**, switch on the OverWatch
5. As the welcome chime starts to play, cover the sensor. The LED will flash white then black to acknowledge.
6. Remove your hand from the sensor. The LED will flash white then black to acknowledge.
7. After covering then uncovering the sensor this way 2 more times, "Wi-Fi On" will be announced
8. On your Wi-Fi enabled device (laptop, tablet, smartphone, etc), show the available wireless networks
9. Select the wireless network (starts with "overwatch") to connect to the OverWatch
10. When prompted, enter the **password 12345678**
11. Open your preferred web browser (Chrome, Firefox, Safari)
12. Enter the following into the address bar <http://192.168.4.1> to open the OverWatch main page

Machine Model Selection

Follow the instructions below to configure the OverWatch.

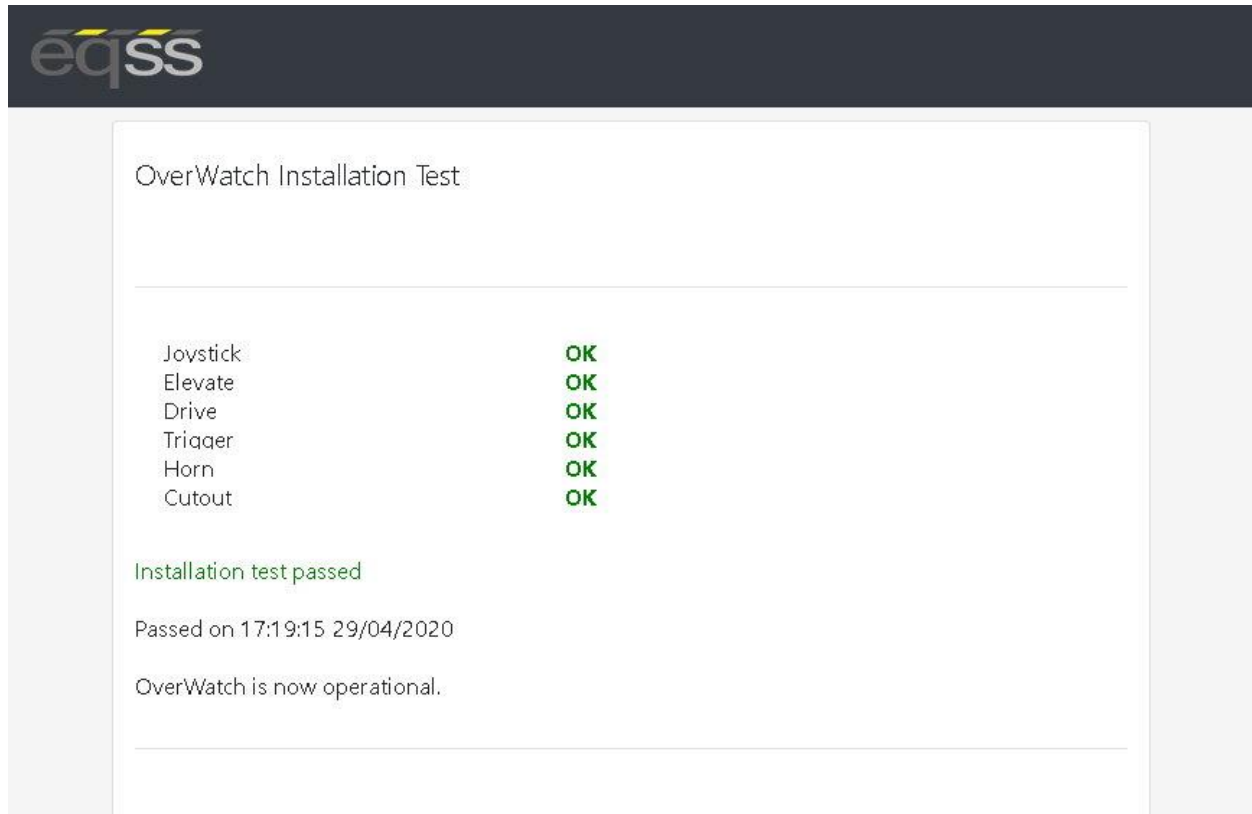
1. Select the Setup option
2. If there is a password field at the bottom of the page, follow the instructions in Change Model Configuration to obtain the password and enter the password field
3. Select the EWP Model from the drop-down list and click Set
4. Click on Proceed to test to begin the installation test



The screenshot shows the 'OverWatch Setup' web interface. At the top left is the 'eqss' logo. The main content area is titled 'OverWatch Setup'. In the center, there is a dropdown menu currently displaying 'LGMG E Series' with a downward arrow. Below the dropdown is a 'Set' button. Underneath the button, the text 'Serial number: 6253E-2004-1234' is displayed. Below the serial number, the text 'No control box set.' is shown. At the bottom of the form is a 'Proceed to test' button.

Installation Test

After the model configuration has been set or updated an Installation Test must be performed. This will ensure the installation has been correctly performed and the OverWatch is functioning correctly. Follow the instructions on the web page to complete the Installation Test.



The screenshot shows a web interface for the OverWatch Installation Test. At the top left is the eqss logo. The main heading is "OverWatch Installation Test". Below this is a table of test results:

Joystick	OK
Elevate	OK
Drive	OK
Tripper	OK
Horn	OK
Cutout	OK

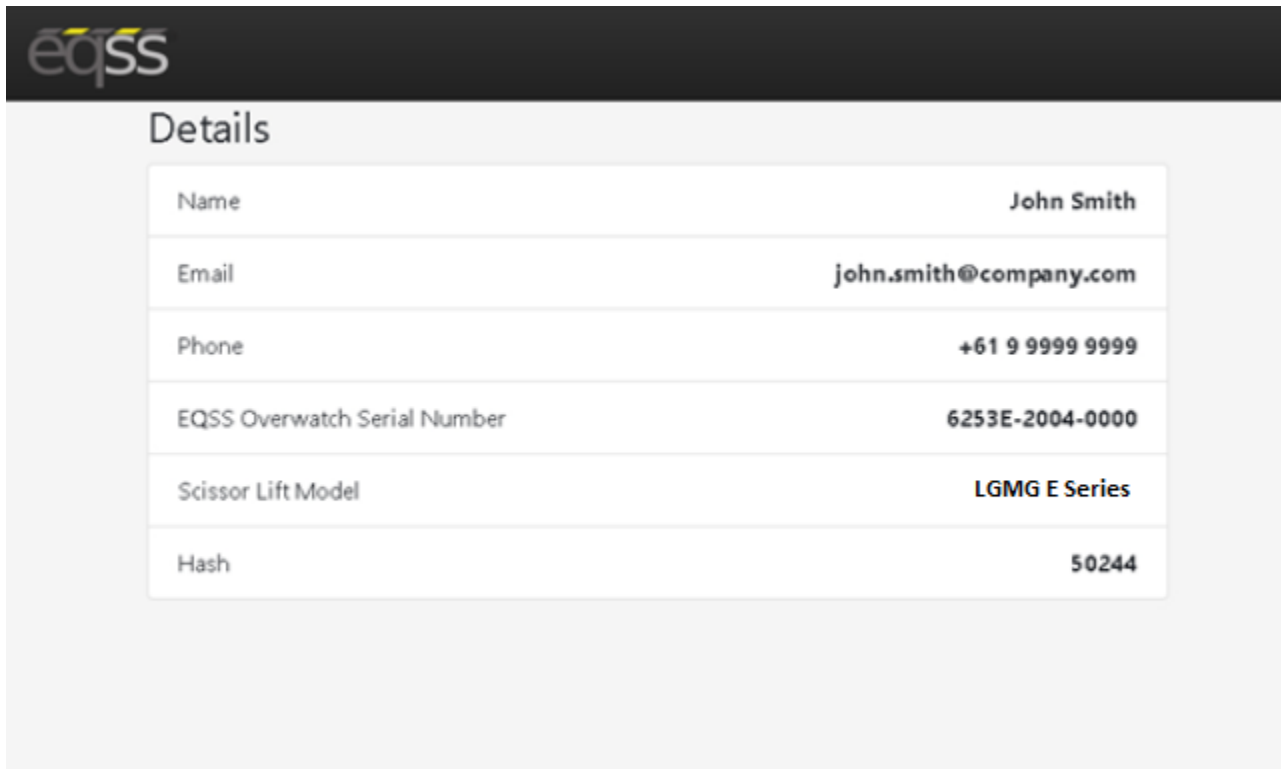
Below the table, the text "Installation test passed" is displayed in green. This is followed by "Passed on 17:19:15 29/04/2020" and "OverWatch is now operational." at the bottom of the test results section.

Change Model Configuration

To reconfigure the OverWatch for a different model requires an authorisation password. The authorisation password is generated from the EQSS website. The EQSS website requires a login username and password, contact EQSS for these details.

Follow the instructions below to obtain an authorisation password. It is important to note that each ECU has a unique serial number and a unique password.

1. Open your web and enter the following into the address bar <http://www.eqss.com.au/overwatch> to open the Login page
2. Enter your username and password
3. Enter the EUC serial number which is shown on the setup page or on the ECU serial number sticker, also enter the owner and model details of the EWP and then click Generate Hash
4. The generated Hash code or password can be used to change the model configuration.



The screenshot shows a web interface with the EQSS logo at the top left. Below the logo is the heading 'Details'. A table displays the following information:

Name	John Smith
Email	john.smith@company.com
Phone	+61 9 9999 9999
EQSS Overwatch Serial Number	6253E-2004-0000
Scissor Lift Model	LGMG E Series
Hash	50244

System Settings

Default Parameters

The OverWatch is configured with the following default parameters.

Setting Name	Description	Default
max_safe_velocity	This is the velocity threshold for the cutout in cm/s for drive mode.	105
max_safe_displacement	This is the maximum permitted distance in cm the operator may be away from the calibration position in drive mode.	60
max_safe_velocity_elevate	This is the velocity threshold for the cutout in cm/s for elevate mode.	95
max_safe_displacement_elevate	This is the maximum permitted distance in cm the operator may be away from the calibration position in elevate mode.	50
fwddispadj	The proportion of the calibration distance toward the sensor permitted to the operator.	0.7
fwdveloadj	The coefficient to apply to the maximum allowable velocity when the movement of the operator is toward the sensor.	1.0
zone_obstruction	If the lidar sensor reading is below this, the lidar is considered to be obstructed (with paint or thick coat of dust) and the system is cutout until the obstruction is cleared.	5
zone_minimum	The minimum calibration distance. If the operator is closer to the sensor than this "operator zone" will be announced.	17
zone_maximum	The maximum calibration distance. If the operator is further from the sensor than this "operator zone" will be announced.	120
adc_elevate_threshold	Threshold value for the elevate ADC input.	500
adc_drive_threshold	Threshold value for the drive ADC input.	500
adc_trigger_threshold	Threshold value for the trigger ADC input.	100
adc_joystick_fwd_threshold	Forward threshold value for the joystick ADC input.	1400
adc_joystick_bwd_threshold	Backward threshold value for the joystick ADC input.	1600
throttle_time	Period after the trigger is pressed (ms) during which initial velocity reading is computed.	500
driving_state_timeout	Mode selection switch timeout (ms)	7000

Polarity and Input Style

The table below describes each setting

Setting Name	Description	Default
joystick_drive_forward	Direction of joystick to move machine forward	forward
joystick_elevate_upward	Direction of joystick to move machine upwards	forward
elevate_polarity	Direction of signal logic	low
drive_polarity	Direction of signal logic	low
trigger_polarity	Direction of signal logic	low
joystick_polarity	Direction of signal logic	low
driving_state_input	Direct or timer based	direct

Harness Drawing AS002221

Rev.	Date	Author	Description
1.0	13/09/22	Andrew Donegan	Initial Design
1.1	20/09/2022	Andrew Donegan	Include all link wires on the 14 pin connectors

Bill of Materials			
Id	Description	Part Number	Quantity
1	Molex, Microfit-3.0, 12 Way, Female	CN001316	1
2	Molex, SL Plug, 14 Pos, 0701070013	CN001364	1
3	Molex, SL Receptacle, 14 Pos, 0650579414	CN001366	1
4	Micro-Fit 3.0 Female Terminals, 0430300001	CN001331	11
5	Molex, SL Male Pin, 0016020107	CN001365	14
6	Molex, SL Female Socket, 0016020086	CN001367	14
7	Lug Fork Terminal Crimp Connector, 4mm	CN001114	1
8	HCO047, 22AWG, Black	C8001087	1520 mm
9	HCO047, 22AWG, Blue	C8001088	310 mm
10	HCO047, 22AWG, Green	C8001091	360 mm
11	HCO047, 22AWG, Orange	C8001090	360 mm
12	HCO047, 22AWG, Yellow	C8001095	250 mm
13	HCO047, 22AWG, Violet	C8001098	250 mm
14	HCO047, 22AWG, White	C8001099	250 mm
15	HCO047, 22AWG, Red	C8001089	250 mm
16	HCO026, 24AWG, Pink	C8001116	160 mm

Final Assembly Photo: <https://drive.google.com/file/d/1WwKldm5TrnRchhoVap4dnt1-g4UD65/view>
Please Note: The Photo Shown Has The PCB Connected To The Loose Wires

From	To	Conductor	Color	Gauge	Notes
S1_GND1	C1_OW.2	W1.Black	Black	22 AWG	OW_GND
S1_GND1	LW1_GND	W3.Black	Black	22 AWG	PCB_GND
S1_GND1	S4_GND2	W2.Black	Black	22 AWG	GND_LINK
S2_DM_IN	C1_OW.3	W19.Green	Green	22 AWG	OW_DM_SS
S2_DM_IN	S4_GND2	W20.Green	Green	22 AWG	OW_DM_SS
S2_DM_IN	LW2_DM_IN	W21.Green	Green	22 AWG	CONN_DM_IN
S2_DM_IN	LW3_DM_OUT	W16.Blue	Blue	22 AWG	CONN_DM_OUT
S3_DM_OUT	C3_TF.5	W18.Black	Black	22 AWG	PCB_DM_OUT
S3_DM_OUT	LW3_DM_OUT	W17.Blue	Blue	22 AWG	CONN_DM_OUT
S4_GND2	C2_TM.13	W4.Black	Black	22 AWG	GND.M
S4_GND2	C3_TF.13	W5.Black	Black	22 AWG	GND.M
S4_GND2	S1_GND1	W2.Black	Black	22 AWG	GND_LINK
S5_JOY	C1_OW.12	W15.Gray	Gray	22 AWG	OW_JOY
S5_JOY	C2_TM.1	W14.Gray	Gray	22 AWG	OW_JOY
S5_JOY	C3_TF.1	W15.Gray	Gray	22 AWG	OW_JOY.F

From	To	Conductor	Color	Gauge	Notes
LW1_GND	S1_GND1	W3.Black	Black	22 AWG	PCB_GND
LW2_DM_IN	S2_DM_IN	W21.Green	Green	22 AWG	CONN_DM_IN
LW3_DM_OUT	S3_DM_OUT	W16.Blue	Blue	22 AWG	CONN_DM_OUT
LW4_HORN	C1_OW.5	W22.White	White	22 AWG	OW_HORN
LW5_ELE	C1_OW.9	W22.White	White	22 AWG	OW_ELE
LW6_DRY	C1_OW.10	W22.Orange	Orange	22 AWG	OW_ELE
LW6_DRY	W23.Violet	W23.Violet	Violet	22 AWG	OW_DRY

From	To	Conductor	Color	Gauge	Notes
ST1_PWR	C1_OW.1	W25.Red	Red	22 AWG	OW_PWR
ST1_PWR	W25.Red	W25.Red	Red	22 AWG	OW_PWR

From	To	Conductor	Color	Gauge	Notes
C2_TM.1	S5_JOY	W14.Gray	Gray	22 AWG	OW_JOY.F
C2_TM.2	C3_TF.2	W6.Black	Black	22 AWG	CONN_LINK.2
C2_TM.3	C3_TF.3	W7.Black	Black	22 AWG	CONN_LINK.3
C2_TM.4	C3_TF.4	W8.Black	Black	22 AWG	CONN_LINK.4
C2_TM.5	S2_DM_IN	W21.Green	Green	22 AWG	CONN_DM_IN
C2_TM.6	C3_TF.6	W9.Black	Black	22 AWG	CONN_LINK.6
C2_TM.7	W10.Black	W10.Black	Black	22 AWG	CONN_LINK.7
C2_TM.8	C3_TF.8	W11.Black	Black	22 AWG	CONN_LINK.8
C2_TM.9	C3_TF.9	W11.Black	Black	22 AWG	CONN_LINK.9
C2_TM.10	C3_TF.10	W12.Black	Black	22 AWG	CONN_LINK.10
C2_TM.11	C3_TF.11	W13.Black	Black	22 AWG	CONN_LINK.11
C2_TM.12	C3_TF.12	W12.Black	Black	22 AWG	CONN_LINK.12
C2_TM.13	S4_GND2	W4.Black	Black	22 AWG	GND.M
C2_TM.14	C3_TF.14	W28.Black	Black	22 AWG	CONN_LINK.14

From	To	Conductor	Color	Gauge	Notes
LW1_GND	S1_GND1	W3.Black	Black	22 AWG	PCB_GND
LW2_DM_IN	S2_DM_IN	W21.Green	Green	22 AWG	CONN_DM_IN
LW3_DM_OUT	S3_DM_OUT	W16.Blue	Blue	22 AWG	CONN_DM_OUT
LW4_HORN	C1_OW.5	W22.White	White	22 AWG	OW_HORN
LW5_ELE	C1_OW.9	W22.White	White	22 AWG	OW_ELE
LW6_DRY	C1_OW.10	W22.Orange	Orange	22 AWG	OW_DRY

From	To	Conductor	Color	Gauge	Notes
ST1_PWR	C1_OW.1	W25.Red	Red	22 AWG	OW_PWR
ST1_PWR	W25.Red	W25.Red	Red	22 AWG	OW_PWR

From	To	Conductor	Color	Gauge	Notes
C3_TF.1	S5_JOY	W15.Gray	Gray	22 AWG	OW_JOY.F
C3_TF.2	C2_TM.2	W6.Black	Black	22 AWG	CONN_LINK.2
C3_TF.3	C2_TM.3	W7.Black	Black	22 AWG	CONN_LINK.3
C3_TF.4	C2_TM.4	W8.Black	Black	22 AWG	CONN_LINK.4
C3_TF.5	S2_DM_OUT	W18.Blue	Blue	22 AWG	CONN_DM_OUT
C3_TF.6	C2_TM.6	W9.Black	Black	22 AWG	CONN_LINK.6
C3_TF.7	C2_TM.7	W10.Black	Black	22 AWG	CONN_LINK.7
C3_TF.8	C2_TM.8	W11.Black	Black	22 AWG	CONN_LINK.8
C3_TF.9	C2_TM.9	W11.Black	Black	22 AWG	CONN_LINK.9
C3_TF.10	C2_TM.10	W12.Black	Black	22 AWG	CONN_LINK.10
C3_TF.11	C2_TM.11	W13.Black	Black	22 AWG	CONN_LINK.11
C3_TF.12	C2_TM.12	W12.Black	Black	22 AWG	CONN_LINK.12
C3_TF.13	S4_GND2	W4.Black	Black	22 AWG	GND.F
C3_TF.14	C2_TM.14	W28.Black	Black	22 AWG	CONN_LINK.14

From	To	Conductor	Color	Gauge	Notes
LW1_GND	S1_GND1	W3.Black	Black	22 AWG	PCB_GND
LW2_DM_IN	S2_DM_IN	W21.Green	Green	22 AWG	CONN_DM_IN
LW3_DM_OUT	S3_DM_OUT	W16.Blue	Blue	22 AWG	CONN_DM_OUT
LW4_HORN	C1_OW.5	W22.White	White	22 AWG	OW_HORN
LW5_ELE	C1_OW.9	W22.White	White	22 AWG	OW_ELE
LW6_DRY	C1_OW.10	W22.Orange	Orange	22 AWG	OW_DRY

From	To	Conductor	Color	Gauge	Notes
ST1_PWR	C1_OW.1	W25.Red	Red	22 AWG	OW_PWR
ST1_PWR	W25.Red	W25.Red	Red	22 AWG	OW_PWR

Notes:

- Small Cable Tie Here
- Strip 5mm and Tin(Solder) All 6 Loose Wires
- Use Two Lengths of Pink 24 AWG Wire Here Do Not Splice. See Final Assembly Photo For Details
- Seal All Splice Joints Using Glue Heatshrink

Drawn By	Name	Date
A. Donegan	A. Donegan	20/09/22
Eng. Approved	K. Grogan	20/09/22
Mfg. Approved	A. Donegan	20/09/22
QA	K. Grogan	20/09/22

Part Number	Revision
AS002196	1.1

Description: Overwatch DeltaTech P500 Plug & Play Harness

Replacement Parts

Replacement parts for this OverWatch kit are available from EQSS, for all inquiries please email sales@eqss.com.au
Shown below are the part numbers for the major components included in this model specific kit.

Part Number	Description
AS002082	OverWatch - Complete kit for LGMG-E Series Control Box
AS001910	OverWatch - Operator Sensor with M20 gland
AS001916	OverWatch - Electronic Control Unit (ECU)
AS002221	OverWatch – LGMG-E Harness
AS002326	OverWatch - Sensor Guard V2
ME001818	OverWatch – L Bracket 30/45