PROTECTIVE
ENGINEERED SAFETY

Protective Shield

For Select Genie Smart Link® Scissor Lifts

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About this Document

Document Information

Document Type	Installation Manual
Document Abstract	Listing of all the step-by-step instructions for the Genie Smart Link (or compatible) devices.
Document Status	In Circulation
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Document Revision History

Sr. #	Version	Date	Comments
1.	0.1	Jan 01, 2024	Initial Draft
2.	0.2	Apr 22, 2024	Protective Standard Template incorporated.
3.	0.3	Apr 28, 2024	Initial feedback provided and incorporated.
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5.	0.5	Apr 30, 2024	Final draft circulated for review
6.	1.0	Apr 30, 2024	First Release Version
7.	1.1	May 11, 2024	Genie feedback incorporated

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1 Disclaimer

⚠	Please read the disclaimer carefully and understand the risks before operating.
☛	This document does not replace and is not intended to replace any local, state, provincial, including without limitation applicable in the jurisdiction of installation. Protective Pty Ltd. assumes no responsibility for the compliance or non-compliance with such laws or codes in connection with the installation of the product.

Crushing incidents may result in injury or death. Use of multiple systems reduces risk of incident and Protective Shield should be used as an operator aid and backup system only. It is not a substitute for suitable experience, training, safe work practices and procedures or due care.

The information contained on this document is of a general nature only. It should not be relied upon to assess risk. Users and operators of the machinery to which the Protective Shield is fitted, must separately assess, and verify risks before use. Product capability and operation is dependent on correct system selection, setup and installation, and maintenance by appropriately qualified and authorized personnel. Regular inspections of the Protective Shield components and validation of system performance, forms a part of the required maintenance of the system.

Because of the nature of the sensors used in this system, it is essential that they are cleaned before use as part of the system's pre-start check procedure. If the sensors are unable to transmit the ultrasonic pulses due to physical obstruction of the sensor's faces (either intentional or accidental) the sensor will be unable to detect obstacles in its field of view.

For further information on whether the system is right for you please contact our sales staff. For details on the product capabilities see the relevant Product Manual.

Technical Support

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2 About this Installation Manual

☞	This manual is for qualified technicians only. The tasks described in this manual may only be performed by qualified technicians.

2.1 Symbols Used

The following types of safety instructions and general information appear in this document described as below:

Symbol	Type of Hazard	Description
⚠	DANGER	Indicates a hazardous situation that needs immediate attention. If not avoided, serious injury or even death may occur.
⚠	WARNING	Indicates a hazardous situation that needs immediate attention. If not avoided, serious injury or even death may occur.
⚠	CAUTION	Indicates a hazardous situation that needs immediate attention. If not avoided, serious injury or even death may occur.
☞	NOTE	Provides you tips that are valuable for the optimal operation of your product.

2.2 Abbreviations and Acronyms

Abbreviation	Description
BLE	Bluetooth Low Energy
LED	Light Emitting Diode
LIN	Local Interconnect Network
MCU	Shield Master Control Unit
(M)EWP	(Mobile) Elevated Work Platform
OP	Operator Panel Component
PI	Protective Innovations
PCON	Genie Smart Link Platform Controls
SHIELD	The Protective Shield system, including all provided components, wiring and hardware.

2.3 Scope of Validity

This installation manual is applicable to Genie GS-1330m, GS-1432m, GS-1932m, GS-1532, GS-1932, GS-2032, GS-2632, GS-2046, GS-2646, GS-3246, GS-4046, GS-4047 and GS-4655 scissor lifts with Smart Link platform controls. It describes the assembly, installation, commissioning and maintenance of the Protective Shield secondary guarding system for Genie® Smart Link lifts or compatible devices. Please read it carefully before operating.

3 Before Using the Product

☞	Carefully read all the safety instructions. Otherwise, there exists a risk of an accident or a fatal injury.

3.1 Important safety instructions

3.1.1 Risk of fire

⚠ 🔥 *This is an electrical product and is susceptible to fires.*

- Do not store or place any flammable substances near the product circuitry.
- Keep cigarettes and other open flames away from the product. There is a danger of a fire hazard.
- Do not expose the product to temperatures in excess of 70°C.
- Reverse polarity will cause irreversible damage to the circuitry.
- Do not store or operate in a location where it may be at risk of getting in contact with chemicals

3.1.2 Electrostatic Discharge

⚠ 

- PCB Components are susceptible to Electrostatic Discharge (ESD).
- Observe ESD precautions when handling ESD sensitive components. Refer to Genie specific procedures if applicable.

3.2 Installation Pre-requisites

Before installation, carefully verify the below-mentioned prerequisites.

1. There is no excessive humidity in the installation area.
2. There are no flammables or explosives stored nearby.
3. There is no excessive dust and dirt in the installation area.
4. All federal, state and local site safety requirements are in place

3.2.1 Safety Gear

Installation and maintenance personnel must operate according to applicable federal, state, and local regulations. Non-compliance with these standards is a punishable offense.

3.2.2 Tools & Consumables

Following tools/Consumables are needed for installation.

3.2.2.1 Tools

The following tools and equipment are required to install the MEWP Shield System components:

Electric drill & Drill Bit Kit	PH2 Phillips head screwdriver	M4 & M5 Nut Drivers
Hole Punch – 25mm	Digital Multimeter	Hand Tap – M12 x 1.5

3.2.2.2 Consumables

The following consumable items provided in the Genie install kit are used to install the MEWP Shield System components:

- 4x M4x12 screws and nyloc nuts for mounting the sensor. (sensor packaging.)
- 4x M5x16 screws and nyloc nuts for mounting the MCU.
- 4x M4x16 screws and nyloc nuts for mounting the Operator Panel.
- 1x M12 gland for water proofing the cable exit from the Genie platform control box for the 5 core power cable to the MCU.
- 1x 6Gx30 self tapping screw and 1pcs of15mm spacer to mount adaptor board.
- 2x of 100 mm cable ties to secure the MCU power cable in the Genie platform control box.

4 About the Product

4.1 About Protective Shield

PROTECTIVE SHIELD is the innovative Mobile Elevated Work Platform (MEWP), secondary guarding safety device that engages its worker protection function BEFORE an incident occurs. The purpose of the PROTECTIVE SHIELD system is to reduce the risk of crush incidents whenever the EWP machine itself or the platform is moved.

Using ultrasonic sensor technology for proximity detection and control, the PROTECTIVE SHIELD system engages the worker protection function to identify potential hazards before an elevated work platform (EWP) incident occurs. Protective Shield provides excellent secondary guarding protection in industrial proximity control by seamlessly interfacing to the exiting EWP controls via logical dry-contact connections into the machine's existing dead-man / lockout signals for control override.

The system functions by utilizing one or more ultrasonic sensors to detect the presence of objects within a predetermined threshold distance. When an object is detected within the threshold or 'Alarm' zone of a sensor, the system stops the machine and alerts the operator of the obstacle via the LED indicators and siren. The system will also warn the operator when an object is being approached before the alarm distance has been reached (Warning Zone).

The 'Override' button on the system's operator panel will allow machine movement when engaged for a predetermined amount of time while the sensor is obstructed. The Override button is an acknowledgement from the operator that an object is within the alarm zone of the machine.

The sensors have a nominal 4.5m detection range following a prescribed beam pattern. In practice, detection distances are set for EWP use at working height. To best utilize the sensor, it should be angled in the direction of the platform motion that is most likely to cause injury to the persons in the vehicle. Multiple sensors can be utilized to achieve the desired coverage depending on intended use.

This document provides installation instructions for Protective's Protective Shield Secondary Guarding system.

4.2 Product Overview

The Protective Shield System is designed to provide an early detection of crush hazards when operating from the platform controls. The system uses ultrasonic sensing mounted to the control box to detect potential hazards.

The system is comprised of multiple components, which communicate along a common LIN-BUS. A maximum of 8 sensor modules can be connected to the MCU.

A standard Protective Shield System comprises of:

- 1 x Master Control Unit
- 1 x Operator Panel
- 1 x Sensor Module
- 1x Shield Genie Gen 6 Adapter Board
- 1x Link Cable - Operator Panel to Sensor
- 1x Shield Genie Installation Kit

☞	• The level of protection provided by the system depends on the installation arrangement of sensors. It is important to understand the limitations of the system. • The Genie Shield system incorporates a single sensor mounted forward of the operator to detect overhead hazards. • If you are unsure about whether the current system provides adequate protection for your needs, please contact support.
☞	• The OEM 'personality' profile of the MEWP should be considered when setting the detection stop distance (see Protective Shield Application Manual). • In some cases, gradual stops can be configured as per OEM instructions on MEWPs to lessen the impact of sudden stops. If an MEWP is using a gradual stop personality profile, consider increasing the detection stop distance via the Protective Shield mobile phone application.

4.2.1 Master Control Unit

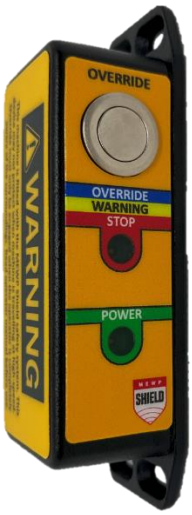
The Master Control Unit houses all the main control electronics and provides configuration access over BLE. The Master Control Unit has the following features:

- BLE for Bluetooth Connection
- LIN-BUS for Communications
- Polycarbonate Enclosure
- IP-65 Rating – Dust Tight and Water Resistant to jets of water / rain
- Operating range of -30 to +85 °C

☞	• The Master Control Unit has built in diagnostics that continuously monitor the LIN-BUS for missing devices caused by module failure, damaged cabling or mis-connection. The system will enter Alarm mode in the event of any failure

4.2.2 Operator Panel

The Operator Panel is the main interface between the machine operator and the system. The Operator Panel connects to the Master Control Unit over the LIN-BUS to provide visual indication of the system status and houses an override button, which allows machine movement in the event of an alarm / error situation.



4.2.3 Sensor Modules

The sensor module is used to detect the presence of objects within 4,500mm of the top of the sensor. The 'Alarm' zone is the distance an object is detected triggering the alarm status of the sensor and system. The 'Warning' zone is 1.5x the distance of the Alarm zone.

4.3 Technical Data

Sensor Specification	
Specification	**Value**
Supply Voltage	3.3V
Average Current Draw	65mA (@3.3V) *(Note 1)*
Communications	LIN-BUS
Max. Nodes per Bus	8
Sensing Range	280mm Min. 4500mm Max.
Size	77L x 55W x 32H (L, R, D-Models), 77L x 67W x 32H (B-Model) *(Note 2)*
Net Weight	160 grams
Mounting	• Four mounting points • M3.5 Screws or M4 Bolts • Brackets provided or supplied by customer *(Note 3)*
Operating Temperature	-30 to +85 °C
Storage Temperature	-40 to +70 °C
Ingress	IP67 in accordance with ISO16750 Section 5.4.3
Enclosure	Diecast aluminum alloy, black powder coated

Operator Panel	
Specification	**Value**
Supply Voltage	12-24V
Average Current Draw	11mA (@12V), 6mA (@24V)
Communications	LIN-BUS
Max. Nodes per Bus	1
Size	121L x 54W x 33H
Net Weight	160 grams
Mounting	• Four mounting points, M3.5 Screws or M4 Bolts • Brackets provided or supplied by customer *(Note 3)*
Operating Temperature	-30 to +85 °C
Storage Temperature	-40 to +70 °C
Ingress	IP67 in accordance with ISO16750 Section 5.4.3
Enclosure	Diecast aluminum alloy, black powder coated
Master Control Unit	
Specification	**Value**
Power	12- or 24-volt automotive (4.8 – 40 VDC) Max 100mA
Internal Power Hold-up	5 seconds for orderly user alert and shutdown *(Note 4)*
Operator Interface	GUI via Bluetooth® to Android® or iOS® device
Communications	LIN-BUS, CAN-BUS (Not currently Used)
LIN-BUS Limitations	Max 8 Nodes, Max 40m length *(Note 5)*
Internal Lockout Contact	240VAC / 220VDC contact Rating, 3A contact current Max.
Size	122L x 83W x 40H not including space for cable exits
Net Weight	300 grams
Mounting	Four mounting points, M5 hard-mounted
Operating Temperature	-30 to +85 °C
Storage Temperature	-40 to +70 °C
Ingress	IP65 in accordance with ISO16750 Section 5.4.3
Enclosure	Polycarbonate with clear lid
Electrical Susceptibility	Meets ISO7637 parts 1&2

☞	• *Note 1:* Actual battery draw is far less when considering power conversion. ~4mA @12V • *Note 2:* Sensor model selection depends on individual use cases. • *Note 3:* Sensor and User panel mounting brackets can be supplied depending on the machine model / use case. For custom brackets, a mounting template can be provided. • *Note 4:* Brownout detected at 11 volts and if the supply voltage is lower than 8 volts for more than 0.5 seconds, an orderly shutdown is initiated. • *Note 5:* LIN-BUS limitations in accordance to ISO17897

5 Device Assembly & Installation

☞	The device must be installed by a qualified technician only. Improper installation may lead to issues resulting in damage to individuals or device.

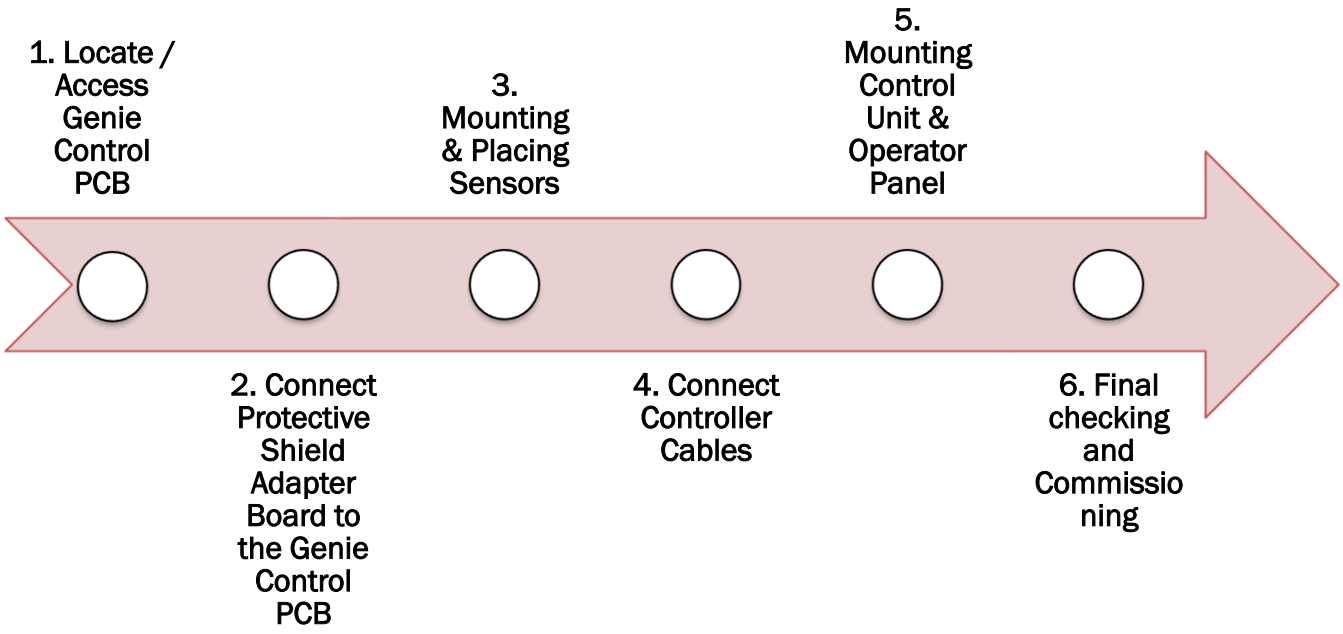
5.1 Assembly Prerequisites

Please make sure that the following pre-requisites are met before installation.

1. Adequate power wiring is in place (12v-24v DC)
2. A functional Genie PCON Unit is available.
3. Protective Shield complete system is available.
4. There are no flammables or explosives stored nearby.
5. There is no excessive dust and dirt in the installation area.

5.2 Typical Assembly Workflow

All Protective Shield assembly for Genie Smart Link devices, follow the below core steps / stages.



Core steps in a typical Protective Shield Assembly for Genie Smart Link

5.3 Step by Step Assembly & Installation

Follow these steps to accurately assemble and install Protective Shield in the existing Genie PCON

Step 1. Before proceeding with the following steps, the technician needs to

a. Push in the red Emergency Stop button to the off position at both the ground and platform controls.
b. Disconnect the PCON from the control cable at the platform.

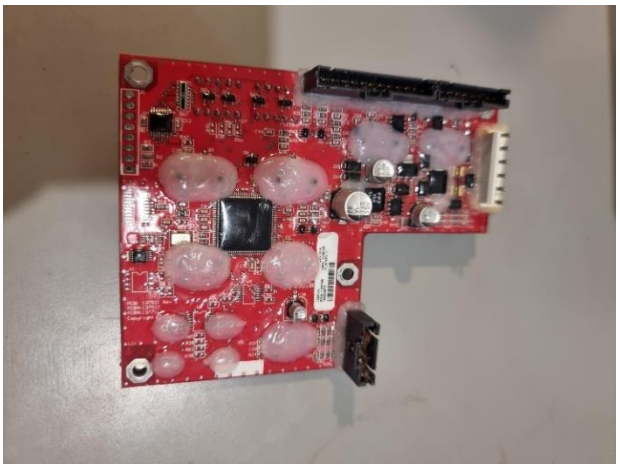
Step 2. Access the Genie Control PCB.

a. Remove the fasteners securing the platform control box to the platform control bracket.
b. Remove the fasteners securing the bottom cover to the platform control box. Open the control box.
c. Now carefully remove the 3 connectors leading to the curly cable, Joystick and Buzzer/E-Stop. For reference see the figure below.

Genie PCON PCB inside housing

Step 3. Remove the Genie Control PCB from the housing.

a. Remove the 4 screws holding the PCB.
b. Carefully remove the PCB from the controller housing. For reference see the figure below.

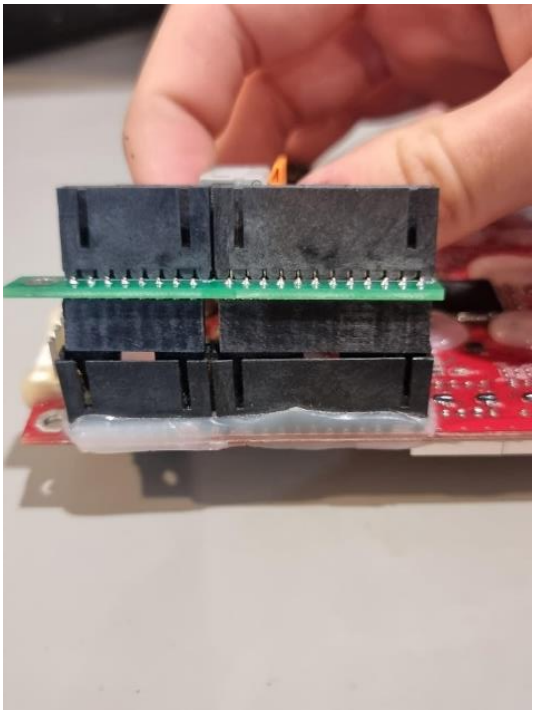


Separated Genie PCB

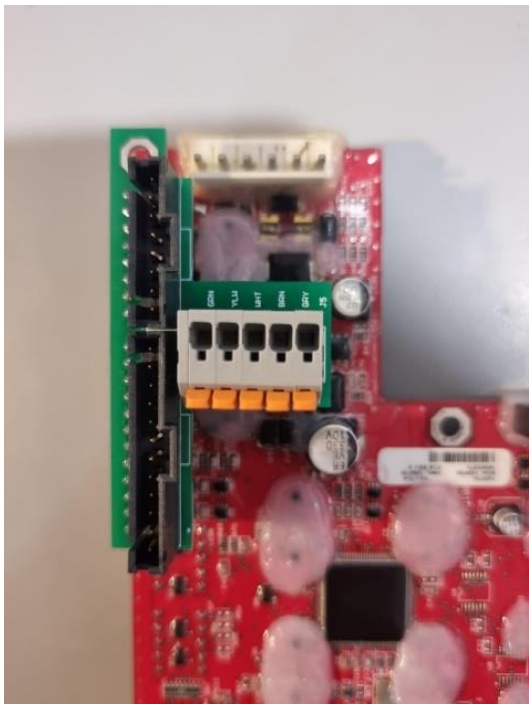
Step 4. Connect the Adapter Board to the Genie PCB.

a. Align headers on the Adapter board with the Joystick and Buzzer/E-Stop connectors.
b. Securely push-fit the Adapter board into the Genie PCB.

☞	• Connectors may have a very tight fit. This is because of the mating tolerance of the housings. • Carefully insert the housing and avoid any excessive pressure to the PCB or to the connector housing, which may result in bending / breakage of the connectors.



Push Fitting the Adapter Board

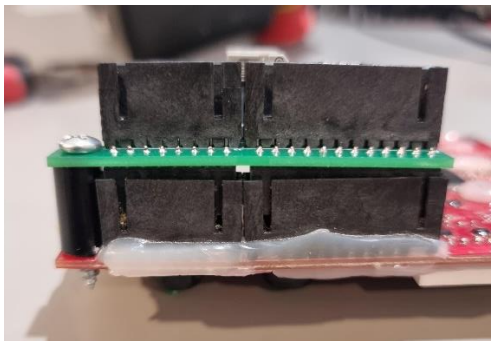


A Fitted Adapter on Genie PCB

Step 5. Insert the 15mm Standoff.

a. Insert the 15mm Standoff into the space between the Adapter board and the controller.
b. Now securely screw the (longer) 6Gx30mm screw all the way through the standoff.

☞	• The silicone rubber next to the Buzzer/E-Stop connector may need to be cut away in order to align the standoff correctly.



Adapter Board with Genie PCB – Completed Setup

Step 6. Mounting Operator Panel

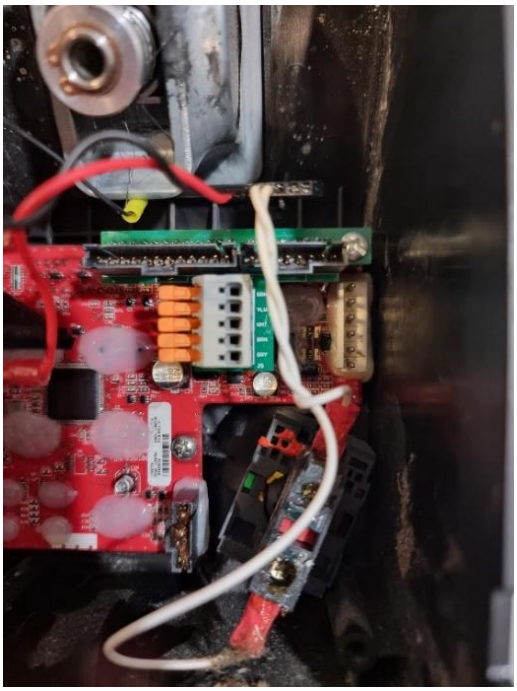
a. With the control box removed from the Genie platform control bracket, use the holes in the OP unit to mark out mounting hole locations in the position shown in the pics below.
b. Drill four 5.5mm mounting holes in the side of the platform control box.
c. Carefully align and mount the Operator Panel at its place.
d. Mount the Operator Panel by securing all the Four (4) 5.5mm nuts and screws.

Pictures depict the Operator Panel fully installed

☞	• Limit the torque on the mounting screws to avoid damage to the mounting flanges.
☞	• The mounting surface must be flat to prevent damage from undue ending or twisting.
☞	• The connectors on the OP are interchangeable.

Step 7. Place the Genie PCB back into the housing

a. Place the board back into the controller housing making sure all button caps are correctly in place.
b. Ensure that the button caps are aligned while placing the board in the housing.
c. Securely fix the board in place with the provided screw and standoff.



Genie PCB with Adapter placed into the housing

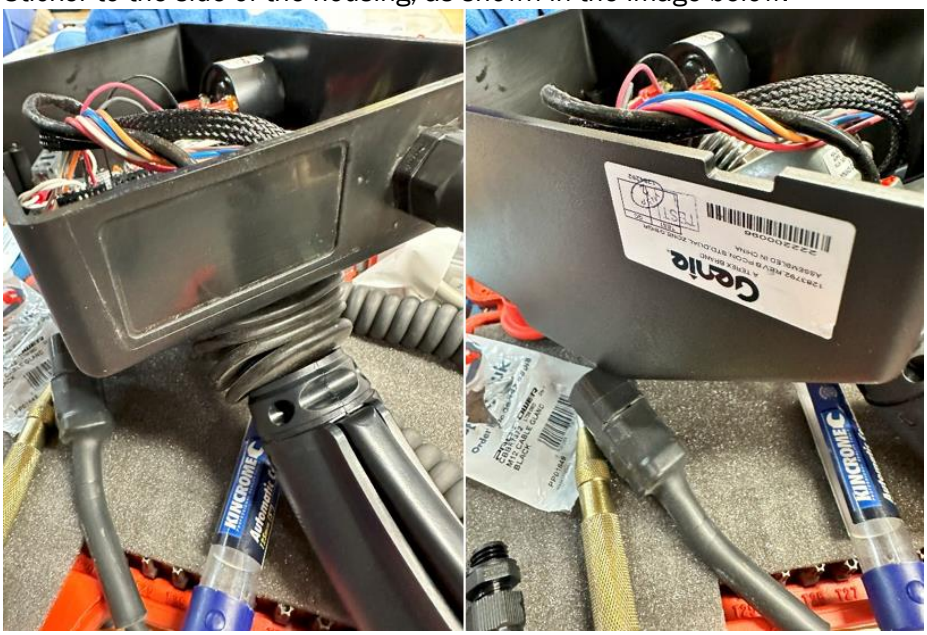
Step 8. Fitting Cable gland

a. Locate the center of the front panel of the platform control box and using a step drill, drill a 10.5-11mm hole for the cable gland. Use M12x1.5 tap to thread hole. and then screw in the gland. Remove nut from gland leaving sela in place. Screw in gland until seal contacts face of enclosure. Tighten 1/3 – 1/2 turn.

12mm drill hole position

b. It is recommended to fix the cable gland at the lowest possible position. Doing this ensures that only a small amount of scalloping is required from the plastic inner base.

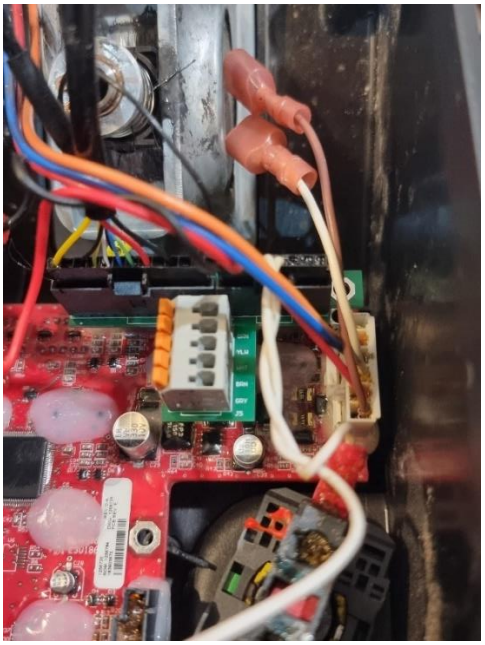
c. To keep the owner's information intact, it is recommended to shift the Genie Info Sticker to the side of the housing, as shown in the image below.



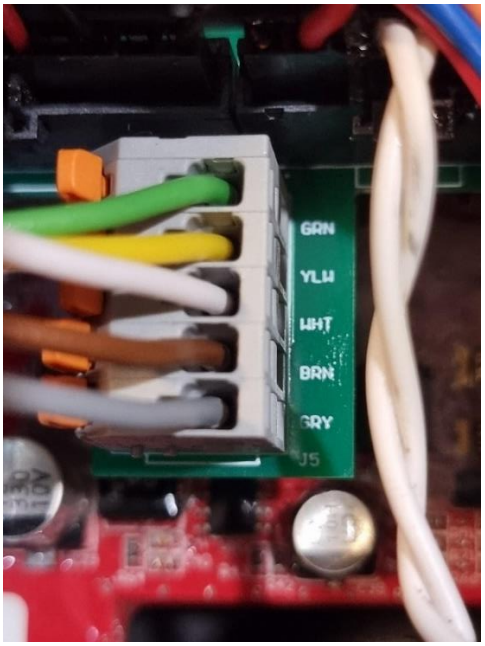
Shifting the Genie's Information Sticker to the Side

Step 9. Reconnect Cables

a. Reconnect the new Joystick and Buzzer/E-Stop connectors on the Adapter board.
b. Reconnect the Relay/Power cable to the adapter board. This step should occur only after the gland has been mounted and the power cable from the MCU threaded through. Once reconnected, tighten the gland compression nut.



Connecting Joystick, Buzzer/E-Stop Cables



Connecting the Relay/Power Cable

☛	• Please note the color sequence of the Relay/Power cables. It is mandatory to connect cables in the correct sequence.
⚠	• Failure to comply with the color-coded Relay/Power cables, may result in permanent damage to the controller board or Adapter Board or both.

Step 10. Reinstall bottom cover on the platform control box.

Step 11. Mounting, Placing and Securing Sensors

a. Use the 25mm hole punch at the top-center of the frame as shown.

25mm Drill hole position

Sensor fitted properly at its place

b. On front of PCON bracket, align sensor to the center of the 25mm hole in the center of the frame. Mark top holes 18mm down from top of housing (see pic bottom left).
c. Using the sensor flange as a guide, precisely mark and drill four 4.5mm holes
d. Mount the sensor by securing the four (4) M4 nuts and screws as shown below.
e. It is recommended not to tighten the sensor module fully yet. This leaves some adjustment room for any final adjustments (if needed).
f. Once in position, tighten all screws.

4.5mm holes for sensor mounting/fixing

Completed sensor setup

Step 12. Mounting the Control Module and Completing Installation

a. Locate, mark, and drill the four 5.5mm holes in front of the platform control bracket for the Control Module mounting
b. Now securely mount the control module by securing the 4 M5 nuts and screws.
c. Refer to the image below for details.
d. Tidy cabling using cable-ties provided.

Mounted Protective Shield Control Module

Protective Shield – Completed Setup

Step 13. Reinstall platform control box onto the platform control bracket.

Step 14. Connect PCON to control platform

6 System Operation

☞	• This section explains the normal operation of the Protective Shield System. For correct functioning the Protective Shield system must be installed and configured correctly. The positioning and configuration of the sensor is a key-element in the correct functioning of the system.

6.1 Pre-start System Checks

☞	• Before operating any machinery with the Protective Shield System installed, a pre-start check is mandatory to ensure that all system components are functioning correctly and to ensure no damage has occurred to the system during transit / storage.
⚠	• Never skip the Pre-start checks. Failure to do so may result in serious injury or death.

A simplified pre-start checklist should be implemented according to your company guidelines and should preferably be a part of the machine's pre-start check. Protective has existing Quick Access & Prestart Guides available on request.

6.1.1 Checks to Perform Before Power On

Sr. #	Check	Steps / Details
1.	Check Master Control Unit	• Ensure all cabling leading into the controller is connected. • No wiring shows signs of strain / stress. • Inspect MCU front panel and enclosure for any physical damage (cracks, dents, etc.). • MCU is mounted securely
2.	Check the Sensor(s)	• Check sensor alignment (bent brackets, loose mounting, etc.). • Make sure that the sensor face is clean (free from any dirt or foreign materials). • Inspect sensor face for any damage (chips, dents, etc.). • Ensure sensor connector is secure and undamaged. • Inspect sensor cabling for any damage (cuts, signs of stress, kinks, etc.).

6.1.2 Checks to Perform on System Power-up

Sr. #	Check	Steps / Details
1.	Check Sensor Functioning	• Ensure all LEDs on Master Control Unit illuminate in sequence to indicate correct startup functionality. • Check that no errors occur on startup (Indicated by blinking RED indicator and beeping horn / buzzer). • Check that all connected sensors have an illuminated LED indicator to show that power is provided. • Block each sensor one-by-one to check that they are communicating with the base correctly, and that the base lockout features are behaving as expected.

		• Block sensor with hand (intentionally invoke RED indicator), check that the Override button on the Operator Panel is functioning correctly by pressing it and observing that the BLUE indicator becomes visible AND that the siren output stops sounding. • With the sensor blocked and the override active (BLUE indicator), ensure that the machine can be moved after activating the dead-man switch.

6.2 System Startup

- If the Master Control Unit is wired correctly to the 12-24V supply power, the MCU and connected components should all power up with the machine.
- On successful startup, the operator panel LEDs should all light up sequentially. Afterwards, the Green LED will stay ON, indicating power is OK.

☞	• If GREEN LED is OFF, it indicates that the supply voltage is not present. Check the power source and retry.
⚠	• If GREEN LED is blinking, it indicates a low supply voltage. Please disconnect and check the power source.

6.3 Normal Operation

The following information represents normal operations and expectations of the Protective Shield system.

Sr. #	Event / State	Details / Description
1.	Power up	• Sequence for the OP LED is WHITE-RED–GREEN–BLUE-WHITE–GREEN, with Power LED solid GREEN after the sequence
2.	No Objects / Obstacle Detected	• The GREEN LED stays ON indicating normal operation or “All Clear” status.
3.	Warning State *(Near Obstacle Status)*	• When the operator begins to approach an object, the system will enter a ‘Warning’ state. • In this state, the machine is still able to move, and the Amber LED and the horn output will pulse at a rate of 2.5Hz, alerting the operator of an approaching object. • The Warning zone of a sensor is 1.5x the Alarm zone. ○ A sensor with a 1-meter alarm threshold will have a warning threshold of 1.5 meters. • The system will warn when at least 1 sensor is in Warning zone, and no sensors are reporting a higher alert level (Alarm, Error).
4.	Alarm State *(Obstacle Detected)*	• When the sensor detects an obstacle within its Alarm threshold, the system will enable the machine lockout and the operator panel will display a solid Red LED. • The machine will not move any further in this state and the Red LED will remain active until the hazard is cleared. • The operator can re-enable the machine movements by either clearing the obstruction from the sensor

		area or by pressing the manual override button on the operator panel.
5.	Override state (*Operator control functions and machine movement will be enabled when Override is active)*	<u>Alarm State</u> • If the system is in the Alarm state, pressing the override button will disable the safety relay. The operator control will be enabled. • In this state, the Blue Override indication LED will turn ON and will Blink Red/Blue alternatively. <u>Warning State</u> • The override will remain active even in the Warning state. • As the machine is moving away from the obstacle, the warning siren output will not re-engage. • This allows the operators to enable the override from alarm, move away from the obstacle and continue to work in the warning zone without the siren constantly activating. <u>Error State</u> • If the system is in the Error state, the override will clear the buzzer, and will also clear the LED state. The override will also enable the machine movements. <u>Override Auto clear Function</u> • When the affected sensor's Alarm zone is clear (i.e., the obstacle is clear), the Override will automatically clear. It takes the system only ONE second to detect the status and clear the Override state. • As the system clears the Override state, the machine can be re-locked if another obstacle is detected in the Alarm zone. • In case of a System Error, the Override state will clear after 10 seconds. This enables the operator to move the machine to a safe area and fix the malfunction. This prevents the need for a constant override if a system component is removed / damaged.
6.	Error State *(System Error)*	• The system will enter the Error state when a device is missing from the LIN-BUS, or any LIN-BUS device reports an error. • In the Error state the Red LED will blink continuously and the siren will also activate. • In the error state, the machine will Lockout.

6.4 State Outputs

6.4.1 Base Unit

STATE	OUT-1	Aux. Relay	Buzzer Out	Machine Enable
Clear	OFF	OFF	OFF	ENABLE
Clear + Override	OFF	OFF	OFF	ENABLE
Warn	OFF	OFF	BEEP	ENABLE
Warn + Override	OFF	OFF	OFF	ENABLE
Alarm	BLINK	ON	ON	LOCKOUT
Alarm + Override	OFF	OFF	OFF	ENABLE
Error	BLINK	ON	BEEP	LOCKOUT
Error + Override	OFF	OFF	OFF	ENABLE
Low Voltage	OFF	OFF	OFF	LOCKOUT

6.4.2 Operator Panel

STATE	POWER LED	STATUS LED	LED BLINK STATUS
Clear	ON	GREEN	STABLE
Clear + Override	ON	GREEN/BLUE	STABLE
Warn	ON	AMBER BLINK	STABLE
Warn + Override	ON	AMBER/BLUE	STABLE
Alarm	ON	RED	STABLE
Alarm + Override	ON	RED/BLUE	STABLE
Error	ON	RED	BLINK
Error + Override	ON	RED/BLUE	STABLE
Low Voltage	BLINK	OFF	STABLE
No LIN Master	BLINK	WHITE	BLINK

6.4.3 Sensor Modules

STATE	STATUS LED	LED BLINK STATUS
Clear	GREEN	STABLE
Clear + Override	GREEN	STABLE
Warn	AMBER BLINK	BLINK
Warn + Override	AMBER BLINK	BLINK
Alarm	RED	STABLE
Alarm + Override	BLUE	STABLE
Error	RED BLINK	BLINK
Error + Override	BLUE	STABLE

7 Troubleshooting

☞	• This quick reference troubleshooting guide is not a repair or maintenance guide. Efforts to alter product parameters may result in permanent damage to the product.
⚠	• The components of the Shield system are not user serviceable. Do not attempt to repair or modify any part of the system as damage may occur that would render the system inoperable, the consequence of which may result in serious injury or death
☞	• Please contact our support team for recommendations, suggestions and troubleshooting.

Sr. #	Situation	Possible Cause	Solution(s)
1.	Green indicator blinking on startup and no system functionality	Insufficient Voltage	i. Check Master Control Unit's wiring. Ensure that all the wiring into the Master Control Unit is correct and that a constant 12-24V DC source is being applied from the machines control power. ii. Make sure that the power coming into the system is NOT a 12-24V data signal of any kind. iii. Check the bus voltage with the device disconnected (Cinch connector removed from base unit) to see if the bus normally has the correct voltage. iv. If not, the supply line may be incorrect or could be shorted / current limited by another device. v. If the supply voltage is correct, the supply line might not have the power capabilities to run the device OR there could be an issue with one of the devices itself. vi. Disconnect all LIN devices from the bus and supply power to the base. vii. Reconnect devices one-by-one until a power failure is detected to isolate a potentially faulty system module. viii. If the issue persists after replacing the module, check the current limit of the connected power supply line. If the current limit is correct and still the device does not function, please connect our support.
2.	Blinking RED indicator and horn / buzzer on startup	Equipment damage or missing	i. One or more configured system modules are not detected by the base OR a module is reporting an internal error. ii. Check each system module (sensors, etc.) for blinking RED indicators. If a sensor has a blinking RED indicator, the physical sensor part of the module is damaged, and the unit must be replaced. iii. No blinking RED indicators means a LIN device is missing. Inspect all LIN-BUS devices have an active indicator light to show power is supplied. Check that all LIN-BUS connections are secure. iv. Inspect cabling for any damage (cuts, signs of stress, pinched cables, etc.)

			v.	If available, check the debug log of the base to see which devices aren't communicating before contacting support.
3.	No input from override button	Controller issue	i. ii. iii. iv. v. vi.	Restart the controller by removing power until the blinking GREEN indicator turns off. Connect to the base unit in the Protective Shield App. With the App open and connected, press the button on the physical Operator Panel and check to see if the App Button changes too. If not, replace the Operator Panel. If the button does change, block / remove a Shield Sensor to trigger alarm mode. If pressing the button does not enable Override, contact support.
4.	System constantly alarming / intermittentl y alarming with no objects in range	Sensor Malfunction	i. ii. iii. iv. v. vi.	Observe sensor indicator lights to determine which sensors are causing the false triggers. Make sure that all sensor faces are free from dirt and foreign material that may causing false triggers. Ensure that the sensors are correctly mounted and there are no parts of the machine frame within view of the sensor. Check all wiring connections leading to the sensors are secure. If false triggers persist, replace the faulty sensor module.
5.	Operator Panel displays Green / White blinking lights on startup	Connection Issues	i. ii. iii. iv. v.	This implies that the Operator Panel is powered, but cannot see the Base Unit on the LIN-BUS Ensure all connectors are fully done up and secure. Power off all system components and make sure everything powers on at the same time. Make sure the Base Unit is running by checking for a BLE connection in the App. If the problem persists, contact support.

Our Technical Support

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