



User Manual

Product:

PORTABOOM®
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PB4000 and PB4000L

Document:

User Manual

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Product Owner:

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1. Document overview

1.1. Overview

This user manual has been developed to provide users with the required information to safely assemble, utilise, maintain and care for the product. The product refers to PORTABOOM® PB4000 and PB4000L.

The document includes the following information:

- Introduction of the product.
- Information on the product, components and safety recommendations.
- Instruction on the product assembly, operation and warning information.
- Accessories.
- Repair and maintenance processes.
- Technical specifications.

1.2. Document Control

Version	Date	Author	Details
1	12/08/2024	Traffic & Access Solutions	User manual developed for PB4000 and P43000L.

2. Introduction

2.1. Product overview

PORTABOOM® (the product) is a ground-breaking traffic management system that has set a new standard in traffic management. The product itself is a portable boom gate that can be easily moved and operated by specially trained operators to provide the safest work environment currently available.

The product is a multifunctional device:

- Traffic control device – PORTABOOM is nationally approved to control traffic in lieu of traffic controlled when the stop sign is attached. This removes traffic controllers from 'live lanes' and into 'safe zones'.
- Access control – PORTABOOM is the most compact portable boom gate and barrier device. Fitted with wheels and an independent battery source provides the product with unmatched mobility and operability.

Designed for applications such as:

- Temporary traffic control.
- Work site gate access.
- Event management.
- Temporary car park access.
- School zone pedestrian access.

Product benefits include:

- It is easily moved and operated.
- Operators are less likely to be abused (physically or verbally) because of their separation from the tower at which drivers may become aggressive.
- Operators are positioned outside the path of vehicles, heavy vehicles and plant, significantly improving safety.
- The product is assembled on-site without the need for any tools.
- The boom arm may be quickly and safely released or attached, facilitating ease of transport.
- The one button remote control has billions of combinations to make tampering unlikely.
- Longevity of operation with 7552 up/down movements from a fully charged battery (13.2V).
- Ability to connect an auxiliary battery into the 12V electrical connector to extend operations.
- Drivers are prevented from disobeying traffic controllers or running red lights in view of the physical barrier.
- The battery enables operation at places without power with the ability to use solar power.
- The stabilisers provide stability in all weather conditions and on uneven ground.

2.1.1 PB4000 Innovations

The PB4000 represents the next step in the evolution of the PORTABOOM series, incorporating significant enhancements in control panel design, battery systems, and RF communication technology, aimed at improving accessibility, durability, and operational efficiency.

2.1.2 Control Panel Design and Housing Transformation



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Elimination of Traditional Components

- **Change Summary:** The PB4000 model phases out the conventional Top Box, integrating electrical and control components directly into the new control panel. This modification addresses feedback for better accessibility, reduced maintenance efforts, and increased system durability.

Improved Control Panel with Integrated Features

- **Design Highlights:** A redesigned control panel incorporates charging and accessory connections within a compact, specialised enclosure. This enclosure, separate from the main unit, is engineered for enhanced accessibility and durability, making the system less prone to damage and unauthorised tampering.

Benefits of the New Design

- **Accessibility and Serviceability:** Relocating components to a more accessible area facilitates easier operation and maintenance. The modular nature of the control panel housing allows for swift, tool-free access, drastically reducing service times and potential system downtime.

2.1.3 Enhanced Dual Battery System

Introduction of a Flexible Battery Configuration

- **System Enhancement:** Transitioning from a single, high-capacity battery setup, the PB4000 is now equipped to support a primary 140Ah battery and an optional 40Ah secondary battery. This change offers extended power availability and adaptability to varying operational demands.

Operational and Service Advantages

- **Extended Runtime and Reliability:** The dual battery capability ensures longer operation periods and reduces the likelihood of power outages. The easy swap mechanism for batteries enhances the system's service efficiency, significantly minimising downtime.

2.1.4 Advanced RF Communication Technology

RF System Overhaul

- **Technology Update:** Moving from a 433MHz to a 915MHz frequency band, the PB4000 incorporates an internal antenna and offers optional external antennas for extended range and improved signal penetration, addressing previous model limitations.

Tailored Antenna Solutions

- **Operational Flexibility:** The PB4000 comes with a built-in antenna suitable for most conditions, with the option to upgrade to longer antennas for enhanced range. These upgrades are designed to be retrofit-compatible with PB3000 models, extending their utility and performance.

Enhanced System Stability

- **Improved Performance:** Upgraded frequency modulation and signal processing techniques significantly reduce interference, ensuring more reliable and stable communication over extended distances and in challenging environments.

2.1.5 Improved LED Boom Light

Enhanced Visibility and Durability

- **Design Highlights:** The LED boom light on the PB4000 offers enhanced visibility, crucial for precision work in low-light conditions. The new design ensures better durability and longer life span.



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3000 Series Compatibility

- **Retrofit Option:** The LED light enhancements can be retrofitted to PB2000 and PB3000 models with upgrade kits.

2.1.6 Redesigned Base Section

Enhanced Stability and Maneuverability

- **Design Highlights:** The base section of the PB4000 has been redesigned with an X Type outrigger configuration to provide extensive improvement in stability and ease of movement. This includes the addition of the footstep to facilitate tilting and maneuvering the unit.

Material Improvements

- **Stainless Steel Components:** The use of stainless steel for leveling feet and plunge pins significantly reduces rust and maintenance issues, ensuring the unit remains stable and functional over a longer period.

3000 Series Compatibility

- **Modification Kits:** These improvements in materials can be applied to PB3000 models through retrofit kits.

2.1.7 Comparison Between PB3000 and PB4000

Changes from PB3000 to PB4000

1. Removal of the Top Box

- * Simplifies the design, reducing weight and bulk, making it more compact and easier to handle.
- * Equipment previously housed in the top box is now integrated into the main barrier unit, enhancing maneuverability.

2 Integrated Control and Electrical Panels

- * Combines control and electrical panels into a single unit.
- * Facilitates true plug-and-play functionality, streamlining the setup process and enhancing user experience.
- * Supports quick installation and removal for easy maintenance and fast swaps of the control panel housing.

Improvements in PB4000

1. LED Boom Light

- * Enhanced visibility, crucial for precision work in low-light conditions.
- * **3000 Series Compatibility:** Retrofit to PB2000 and PB3000 models with upgrades.

2. Battery System and Housing

- * Supports a second 40Ah battery, sharing the load equally and allowing true plug-and-play functionality.
- * Enhanced housing ensures secure placement and protection from elements.
- * **3000 Series Compatibility:** Retrofit to PB3000 models with upgrades.

3. Additional Battery and Charging Options

- * Secondary battery for long-term use.
- * Improved charger and wiring design for enhanced safety and efficiency.
- * **3000 Series Compatibility:** Retrofit to PB3000 models with upgrades.

4. Upgraded RF Technology

- * Enhanced RF technology with 915MHz frequency band and frequency hopping for improved communication stability and range.



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* Internal and optional external antennas for diverse environmental conditions.

* **3000 Series Compatibility:** Retrofit to PB3000 models with upgrades.

5. Flexible Control Panel Options

* One-button, two-button, and four-button remotes for versatile control.

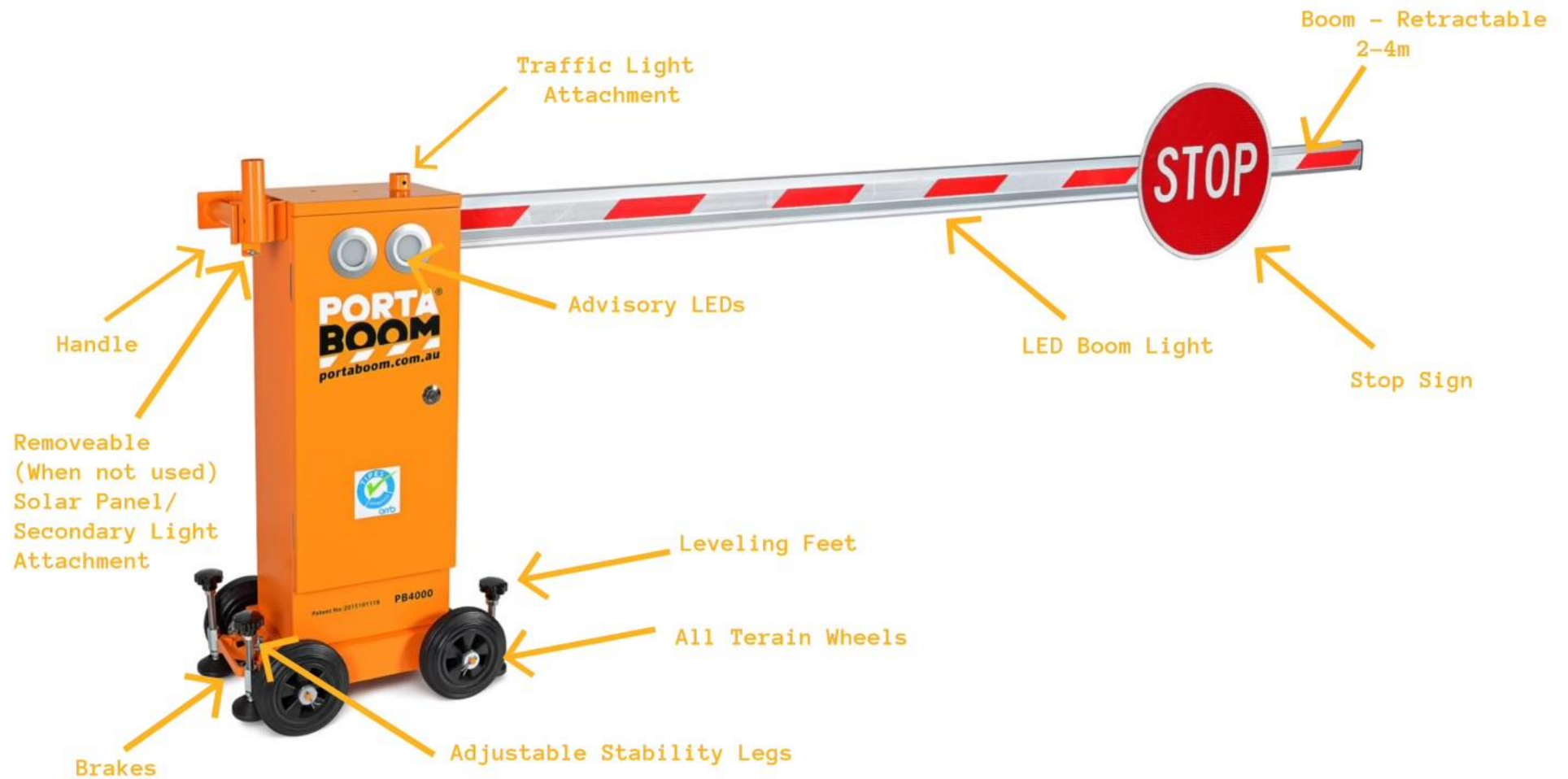
* **3000 Series Compatibility:** Retrofit to PB3000 models with upgrades.

Summary Table of Compatibility

Feature	PB3000	PB4000	PB3000 Compatibility
LED Boom Light	Yes	Improved	Yes
Battery System	Single Battery	Dual Battery	Yes – With Upgrade
RF Technology	433MHz	915MHz	Yes – With Upgrade
Control Panel	Yes	Improved	NA
Base Section	Yes	Improved	Yes

2.1.7 Comparison Between PB3000 and PB4000

2.2. Product illustration



3. Standard assembly

3.1. Product components

The product is supplied with key componentry including circuit board, internal cabling, motor, battery, 12v & 240v Internal Battery Charger, lifting lug and boom holder connection pre-installed.

Additional standalone components are supplied as part of the standard issue. Please check the package to ensure the following are available:

- 1 x PORTABOOM PB4000 or PB4000L Model



- 1 x Boom Arm – Extendable from 2.2m to 4m

- 1 x Stop sign (applicable to relevant country, state or region)



- 2 x keys for both the access & control panel

- 1 x 1 Button Remote (Different to Previous PORTABOOM Models)



- 1x charging lead



\If any of the supporting components are missing, please contact the distributor or us directly.

***IMPORTANT NOTE: Ensure battery is fully charged prior to use (this is particularly important for the effective operation of solar accessories.**

3.2. Assembly guide

It is important to note that specific hand tools or tightening devices are not required for standard assembly of components. To avoid damage, apply a general hand tightening force to secure components





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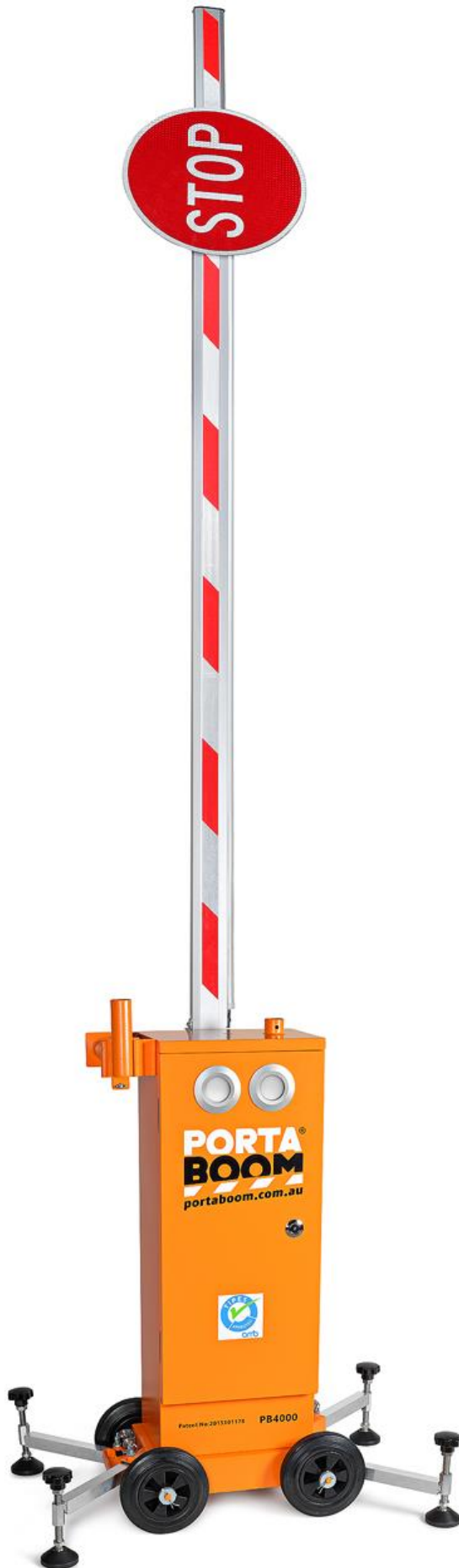








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STEP 1 – Unpack product and check components:

- Unpack in a safe location, complete a risk assessment of the work area as required.
- Check the package to ensure all components have been supplied.
- Ensure product is vertical and on a level and stable surface prior to fitting components.

STEP 2 – Move product into position and secure:

- Ensure wheels are unlocked, use handle and foothold to tilt product back.
- Move into designated position ensuring personal and public safety at all times.
- Secure wheels using locking mechanism.
- **Ensure product is switched off prior to fitting any components.**

STEP 3 – Attach boom arm to product:

- Check for overhead and surrounding obstructions prior to fitting the boom arm.
- **Position the boom vertical and place into the boom arm holder**
- Connect the latch on the boom arm holder to the clip on the boom (Do not use force)

STEP 4 – Extending the boom arm:

- Ensure the Boom Arm is the horizontal position and **NOT in the live lane**
- Lift and hold plunge pin and extend the boom arm to the desired length.
- Let go off plunge pin to secure the extension position.

STEP 5 – Attach stop sign to boom arm:

- While the Boom Arm is still in the horizontal position:
- Position the stop sign at the end of the fixed boom arm.
- If using the LED boom light, ensure the stop sign doesn't obstruct the LED
- If the arm is being extended, ensure the straps are fitted to the fixed and extension arm.
- Ensure straps are secure and the stop sign is displaying correctly.

STEP 6 – Stabilise the product and secure:

- Ensure the product is positioned on a level and stable surface.
- Lift plunge pin and fully slide out each of the stabilising leg into position then release pin to secure
- Once secure wind down each levelling foot until it is firmly on the ground. Do not lift rear wheels off ground

STEP 7 – Use of sandbags:

- If additional stability is required, insert sandbags of each of the stability

WARNING

- Never use excessive force or tools to fit and extend boom and installing the stability legs & levelling feet .
- Ensure product is switched off prior to fitting any component or making adjustments.
- Ensure control panels are locked and keys removed to prevent tampering or theft.
- Ensure boom is locked into place prior to use, if the product is going to in position for long term periods, period checks should be conducted.
- Product is wind rated, ensure sandbags are used to provide additional stability.
- Product is 75kg and is considered to be a crush hazard, ensure use on level surface.
- It is recommended that manual aid be used if lifting the product.
- Keep fingers clear of any moving parts and wear gloves when assembling.

4. Operation

4.1. Control panel and switch modes

The control panel contains the primary switches that control the product and accessories.

NEW INTEGRATED CONTROL UNIT, CHARGING & CONNECTION PORTS:



The switches identify the different modes of operation available to the product.



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The switch modes are captured in the below table:

Switch	Term	Details
AC	Auto Close	Automatic cycle starts with boom down.
AO	Auto Open	Automatic cycle starts with boom up.
SS	Safety Sensor	Sensor prevents boom from coming down if broken.
DL	Disable LEDs	Disables the LED warning lights on the front panel.
DB	Disable Boom	Disables the boom arm.

To turn ON a mode, switch upwards. To turn OFF a mode, switch downwards. Multiple modes may be activated simultaneously when using accessories, ensure they are switched on.

STEP 1 – Accessing the control panel.

- Unlock the control panel using the key provided.

STEP 2 – Select the mode.

- Standard manual boom operation is enabled when all mode switches are off (down).
- Ensure the product is turned off prior to selecting the relevant mode(s).
- Identify the mode(s) relevant to the operation and press the switch up to turn on.
- Ensure the relevant accessories are plugged in and connected.
- If multiple modes are going to be in operation, ensure they are all switched on.

STEP 3 – Securing the control panel.

- Once the mode(s) have been selected switch the unit ON and lock the control panel and remove the key.

4.2. Connection sockets

The product has two connection sockets, one for charging and the other for the solar panel accessory. These sockets connect to the battery fitted internally.

STEP 1 – Connecting charging devices.

- Ensure the product is turned off prior to connecting a charging device.
- Slide the relevant socket cover open and connect the cable and plug.
- A blue light will illuminate on the control panel indicating that the battery is charging.

4.3. Connection ports

The product has five connection ports which have been designed to fit multiple accessories. These ports are wired to the respective switches.



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The port functions are captured in the table below ('L' SERIES ONLY):

Port	Term	Details
SS	Safety Sensor	Sensor prevents boom from coming down if broken.
AS	Activation Sensor	Sensor activates boom (raises) if broken.
L2	Secondary Operation	Secondary accessory operation.
L1	Primary Operation	Primary accessory operation.
BL	Boom Light	Boom Arm LED Strip Light – CAN BE USED ON PB3000

STEP 1 – Connecting to the port.

- Ensure the product is turned off prior to connecting to a port.
- Remove the port cover, align the connection pins and connect to the socket.
- Ensure plug is pushed in and fully connected (do not force plugs).
- Fit dust caps when port is not in use.

4.4. Testing prior to operation

The product will run a self-testing cycle each time it is turned on. The self-test will run diagnostics for the software, lights, ports and additional sensors. This process will also recognise any attachments connected to the product.

STEP 1 – Turn on the product.

- Turn product on and press the manual UP/DOWN button (can press remote if already paired) - wait for the self-testing cycle to complete which includes the boom lowering to 60 degrees then raising back to the open position
- Once complete, the 2 x round LED lights will illuminate green indicating the product is ready.
- This will also indicate that any connected accessories have been recognised.
- If charging the product, a blue light will illuminate.

STEP 2 – Testing the product.

- Test the product operation and relevant accessories in manual mode and with remotes.
- Test the product operation and relevant accessories in automatic mode.

If the light does not turn green, an issue has been identified. Refer to the trouble shooting section of this manual or contact your distributor.

4.5. Manual operation, pairing and using remote controls

The product can be operated manually from the control panel and by using the remote controls. It is recommended that a manual test be conducted on a daily basis, prior to commissioning the product in the field.



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STEP 1 – Manual operation.

- Push the UP/DOWN button located in the middle of the control panel.
- Push the button to run through each respective operation (up/down).

STEP 2 – Remote pairing instructions.

=Dipswitch Matching (Least Secure)

Pairing Procedure:

For 1-Button Remote:

- **Set Dipswitches:**
 - Set the 12-way dipswitches on both the transmitter and receiver to the exact same configuration (e.g., 0011 0011 0011).
- **Power On:**
 - Ensure both the receiver and transmitter are powered on.
- **Test the Connection:**
 - Press Button 1 to verify it controls the corresponding relay on the receiver.

For 2-Button Remote:

- **Step 1:** Set the dipswitches to match for both the transmitter and receiver.
- **Step 2:** Power on the devices.
- **Step 3:** Press Button 1 and Button 2 to verify that each button controls its corresponding relay.

For 4-Button Remote:

- **Step 1:** Set the dipswitches to match for both the transmitter and receiver.
- **Step 2:** Power on the devices.
- **Step 3:** Press Button 1, 2, 3, and 4 to verify that each button controls its corresponding relay.

Unpairing Procedure:

- **Change Dipswitch Configuration:**

Change the dipswitch configuration on either the transmitter or receiver so they no longer match. This will unpair the remote from the receiver.

- Remote controls provided with the product will be paired with the product.
 - Ensure only experienced fleet technicians utilise this function
 - Ensure that pairing is not conducted in the vicinity of any other operating PORTABOOM® as it may pair to those other units

STEP 3 – Remote operation.

- Push the button on the remote controller to operate the boom arm.
- Push the button each time to activate each respective operation (up/down).
- Ensure both remotes are tested on a daily basis.

4.6. Automatic operation

The product can be operated using an automatic cycle which is pre-programmed, this is generally used as the default for field operations.

Warning: Care required here and seek advice from Distributor/Manufacturer if required

STEP 1 – Automatic operation.

- Ensure the product is turned off prior to selecting the relevant mode(s).
- Switch AO (auto open) to commence the automatic operation with the boom up/open.
- Switch AC (auto close) to commence the automatic operation with the boom down/closed.
- For simultaneous operations, ensure the relevant switches are pushed up.

4.7. Activating switch functions and accessories

In order for any of switch functions and subsequent attachments to work, the product must be turned off, the relevant switch activated and the product turned on. The self-testing cycle will register the switch and connected accessory during this process.

4.8. Overriding cycles

Cycles can be overridden using the manual switch or remote. Press the UP/DOWN button on the control panel or the button on the remote control to override the current cycle.

4.9. Product security

To ensure that the product is not tampered with while in operation, ensure:

- All access panels are secured/locked and keys removed.
- Keep keys and remote controls on your person.
- Regularly monitor the product, check for tampering and report any damage.

WARNING

- Check for overhead hazards and ensure the area under the boom is clear prior to testing.
- Ensure the product is turn off prior to engaging different modes and switches.
- If any of the checks or cycles fail, do not use the product.
- Refer to the trouble shooting section, if that fails contact your distributor for assistance.
- It is recommended that safety sensors are used for all automatic boom operations.

5. Charging

The product is supplied with a build in rechargeable sealed gel battery and connection socket for charging. It is recommended that the battery is charged on a regular basis to ensure optimal performance.



STEP 1 – Connecting to the charging socket.

- Ensure the product is turned off prior to connecting a charging device.
- Slide the socket cover open and connect the cable and plug.
- Ensure plug is pushed in and fully connected.
- Plug into power source and turn on, a full charge will take approximately (8-12 hours).
- A blue LED light will illuminate indicating the product is fully charged.
- A red LED light will come on when the battery requires charging.
- A red LED light will commence flashing prior to the product to shutting down.

WARNING

- It is recommended that the battery is fully charged prior to use.
- Ensure charging area is away from flammable hazards or other sources of ignition.
- Ensure external electrical cables are regularly inspected for damage.
- Ensure power is off prior to connecting any charging devices.
- Primary charging is via 240V with Solar Charging as secondary

6. Accessories

6.1. Traffic light

The traffic light accessory provides an additional visual feature to enhance safety by providing further advanced warning for a motorist to prepare to stop.



STEP 1 – Unpack the accessory and check components:

- Check the condition of the accessory to ensure all components have been supplied.
- Position the accessory in close proximity to the product.

STEP 2 – Attach accessory to product:

- Use the fitted handles to lift the accessory.
- Insert accessory into adapter located on top of the PORTABOOM unit, position light to face the direction of traffic.
- Align connection points and secure with pin

STEP 3 – Connect accessory cable to port:

- Ensure the product is turned off prior to connecting cable.
- Line up pins and connect cable plug to the L1 port (primary).
- The L2 port is secondary and operated opposite to the boom function.
- Ensure plug is pushed in and fully connected.

STEP 4 – Test operational sequence:

- Access the control panel using the key and turn the product on.
- The product will run a self-test, once complete the 2 x Round LED lights will illuminate solid green.
- Test attachment in manual mode by pressing the UP/DOWN button and using the remote control.
- Ensure the product is turned off prior to changing the mode.

STEP 5 – Operating the traffic light:

- Ensure the product is turned off prior to switching between modes.
- Refer to section 4.1 for information on the modes and select.
- If the boom is not required, switch deactivate boom (DB) 'ON' and detach it from the product.
- If intending to use the automatic cycle, switch auto open (AO) on.
- If other accessories are being used simultaneously, connect them and switch on.
- Turn the product on, self-testing will identify modes and attachments.
- A flashing amber light will activate on the back of the traffic light when the light is red.
- Automatic cycles can be overridden by the manual button or remote controls.

6.2. Pedestrian light

The pedestrian light accessory improves the instruction given to pedestrians, this may include around construction sites. Both the traffic and pedestrian light may be used together or independently.



STEP 1 – Unpack the accessory and check components:

- Check the condition of the accessory to ensure all components have been supplied.
- Position the accessory in close proximity to the product.

STEP 2 – Attach accessory to product:

- Insert accessory into adapter located on handle or on top of unit if utilised solely, position light to face the direction of pedestrians.
- Align connection points and secure with pin

STEP 3 – Connect accessory cable to port:

- Ensure the product is turned off prior to connecting cable.
- If using this as the primary accessory, line up pins and connect cable plug to the L1 port.
- If using this as a secondary accessory, connect cable and plug to the L2 port.
- Ensure plug is pushed in and fully connected.

STEP 4 – Test operational sequence:

- Access the control panel using the key and turn the product on.
- The product will run a self-test, once complete the 2 x Round LED lights will illuminate solid green.
- Test attachment in manual mode by pressing the UP/DOWN button and using the remote control.
- Ensure the product is turned off prior to changing the mode.

STEP 5 – Operating the pedestrian light:

- Ensure the product is turned off prior to switching between modes.
- Refer to section 4.1 for information on the modes and select.
- If the boom is not required, switch deactivate boom (DB) 'ON' and detach it from the product.
- If intending to use the automatic cycle, switch auto open (AO) on.
- If other accessories are being used simultaneously, connect them and switch on.
- Turn the product on, self-testing will identify modes and attachments.
- Automatic cycles can be overridden by the manual button or remote controls.

6.3. Solar panel

The 120W solar panel provides power to the product and eliminates the need for interval recharging of the product (depending on sun exposure). It is recommended for optimal performance that primary charging from 240v source is applied weekly. The panel may be fitted to the product or the traffic light accessory.



STEP 1 – Unpack the accessory and check components:

- Check the condition of the accessory to ensure all components have been supplied.
- Position the accessory in close proximity to the product.

STEP 2 – Attach accessory to product:

- Insert accessory into adapter, position panel to face the direction of the sun.
- Align connection points and secure with pin
- Apply the same process if fitting to the traffic light accessory.

STEP 3 – Connect accessory cable to port:

- Ensure the product is turned off prior to connecting a charging device.
- Slide the socket cover open and connect the cable and plug.
- Ensure plug is pushed in and fully connected.
- A blue LED light will illuminate indicating the product is fully charged.
- A red LED light will come on when the battery requires charging.
- A red LED light will commence flashing prior to the product shutting down.

STEP 4 – Test operation:

- Access the control panel using the key and turn the product on.
- The product will run a self-test, once complete the 2 x Round LED lights will illuminate solid green.

6.4. LED boom light

The LED boom lights provide enhanced visibility of the product and boom arm to attract motorists attention, this is appropriate in both day and night settings.



\

\STEP 1 – Unpack the accessory and check components:

- Check the condition of the accessory to ensure all components have been supplied.

STEP 2 – Attach accessory to boom:

- Slide LED Strip Light into the channel at the base of the boom, push all the way along.

STEP 3 – Connect accessory cable to connection socket:

- Ensure the product is turned off prior to connecting cable.
- The connection socket is positioned on the face of the product next to the advisory lights.
- Connect cable and plug into the connection socket.

- Ensure plug is pushed in and fully connected.

STEP 4 – Test operational sequence:

- Access the control panel using the key and turn the product on.
- The product will run a self-test, once complete the 2 x Round LED lights will illuminate solid green.
- The accessory will illuminate red if the boom is down and green if the boom is up.

6.5. Pedestrian button

The pedestrian button is a compatible, wireless pedestrian push button that can operate multiple product units (and light accessories).

**STEP 1 – Unpack the accessory and check components:**

- Check the condition of the accessory to ensure all components have been supplied.

STEP 2 – Pairing instructions.

- Pedestrian button accessories provided will not be paired with the product (unless requested).
- Pairing is required prior to operation, the same process applies as per the remote controls.

STEP 3 – Positioning the accessory:

- Position the accessory in close proximity to the product (radius no greater than 4m).
- Ensure the accessory is on a flat surface and secured to the ground to prevent it from falling.
- Ensure the accessory is visible and accessible to pedestrians.

STEP 4 – Test and operate accessory:

- Once paired, the pedestrian button will work with the pedestrian lights.
- Test the pedestrian light as a part of the operational testing sequence.
- Press the button and wait for the pedestrian light to go green.

STEP 5 – Changing the battery:

- It is recommended that batteries are replaced every 3-6 months (depending on use).
- Detach casing by removing the screw at the base of the casing.
- Replace the battery with 9V batteries.
- Place casing over the product and secure using the screw.

6.6. Key pad access controller

The key pad is a suitable solution for longer term access control points at locations such as worksites. Vehicles approaching the access control point enter a pin number that raises the boom.



STEP 1 – Unpack the accessory and check components:

- Check the condition of the accessory to ensure all components have been supplied.

STEP 2 – Positioning the accessory:

- Position the accessory in close proximity to the product.
- Ensure the accessory is on a flat surface and secured to the ground to prevent it from falling.
- Ensure the accessory is visible and accessible.

STEP 3 – Test and operate the accessory:

- The key pad is pre-programmed to work with the boom
- The factory code is a 4 digit code which will be supplied with the accessory.
- Test the key pad as a part of the operational testing sequence.
- Enter the 4 digit code and wait for the boom to open.

STEP 4 – Programming instructions.

- Enter programming mode (one beep, green light flashes once, red light “On” to confirm you are in programming mode):
 - * → Master code → #
 - After 1min with no button pressed keypad will exit programming mode
- Add a user in programming mode:
 - 1 → user ID number → # → PIN → #
 - ID number can be between 1- 2000. The PIN is any 4 -8 digits with the exception of 1234 which is reserved.
 - Users can be added continuously without existing from programming mode as follows:
 - 1 → User ID No → # → PIN → # → User ID No 2
 - → # → PIN → # Press # * to Exit.
- Delete a user (orange light confirms you are in adding mode. Green light flash indicates a user has been added):
 - 2 → User ID number → #
 - Users can be deleted continuously without existing programming mode.
 - Press # * to Exit.

6.7. GSM mobile phone access control

The GSM mobile phone access control is another suitable solution for longer term access control points at locations such as worksites. Vehicles call or text the number that raises the boom.



It is recommended that the GSM controller be installed by an approved service technician, contact your distributor or us directly.

STEP 1 – Install access control program:

- A USB stick will be provided with the software.
- Install the software onto a computer and follow the instructions.

STEP 2 – Install sim card.

- Ensure the product is turned off prior to installing the sim card.
- Open the main compartment on the product.
- Disconnect both terminal blocks from the GSM Mobile Phone Access Controller.
- Detach the GSM Controller by removing the two cable ties.
- Open the back of the controller, insert the pre-paid 3G SIM card and turn the switch to ON.
- Secure back of the unit, refit GSM controller with cable ties and connect terminals blocks.
- Turn the product on – Power “ON” LED will illuminate and the 3G LED will also illuminate.
- Close the main compartment on the product.

STEP 3 – Establishing a connection using the software:

- Refer to the GSM mobile phone access controller guide for programming and operation instructions.
- <https://www.elsema.com/wp-content/uploads/2019/05/g-2000.pdf>

STEP 4 – Establishing a connection using a text message:

- The accessory factory settings password is 1234.
- Establish a connection to the sim card via test message.
- Message 1234TEL and the sim card number followed by # (e.g. 1234TEL0406000000#).
- Ensure uppercase is used and press send.

STEP 5 – Setup authorised mobile numbers using a text message:

- To add an authorised number, a sequential text message must be sent for each number.
- This will require the addition of an A and 001 to the message in step 4.
- Message 1234TELA001# and the sim card number followed by #.
- For example, 1234TELA001#0406000000#.



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- Repeat this process for additional numbers ensuring a sequential numbering sequence is adopted e.g. A002, A003, A004. Ensure uppercase is used and press send.

Note: It is recommended that you document the date, serial number, name and mobile number of the person you are given access to

STEP 6 – Operating the GSM mobile phone access controller:

- Phone or txt SIM card mobile number to “OPEN” Boom gate
- Once the vehicle has proceeded past the PORTABOOM, stop.
- Phone or txt SIM card mobile number to “CLOSE” Boom gate.

Note: The GSM Mobile Phone Access Controller comes with a USB that allows you to control your device when plugged into a computer.

6.8. Safety sensor

The safety sensor is required when using product accessories such as the key pad, GSM phone access or activation sensor ensuring the boom does not lower when the beam is broken. The safety sensor is mounted to the product with the reflector mounted to a bollard which will be placed opposite the sensor.



STEP 1 – Unpack the accessory and check components:

- Check the condition of the accessory to ensure all components have been supplied.

STEP 2 – Attach accessory to the product:

- Attach the safety sensor to the side of the unit as indicated in the picture.
- The sensor is attached using a double sided adhesive tape.
- Ensure that the sensor is level with the reflector bollard.

STEP 3 – Connect accessory cable to connection port:

- Ensure the product is turned off prior to connecting cable.
- Connect cable and plug into the safety sensor (SS) connection socket.
- Ensure plug is pushed in and fully connected.

STEP 4 – Positioning the accessory:

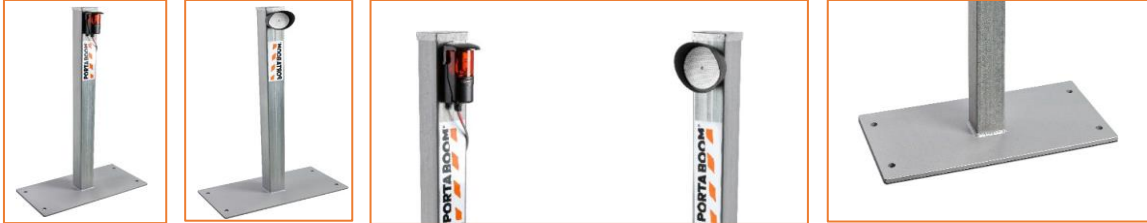
- Position the reflector bollard in close proximity to the product (radius no greater than 4m).
- Ensure the reflector bollard is aligned opposite the sensor fitted to the product.
- Ensure the safety sensor light turns green, if it turns red, realignment is required.
- Ensure the bollard is on a flat surface and secured to the ground to prevent it from falling.

STEP 5 – Test and operate accessory:

- Access the control panel using the key.
- Turn the safety sensor (SS) switch on by pressing the switch up.
- Activate the product on by switching the power button on.
- The product will run a self-test, once complete the 2 x Round LED lights will illuminate solid green.
- Test attachment in manual mode by pressing the UP/DOWN button and using the remote control.
- Obstruct/break the beam as the boom is lowering to test the safety bounce-back feature.

6.9. Activation sensor

The activation sensor is an alternative to the GSM phone and key pad entry systems. It may be applied at sites where authorisation at the access point is not required or controlled.



STEP 1 – Unpack the accessory and check components:

- Check the condition of the accessory to ensure all components have been supplied.

STEP 2 – Connect accessory cable to connection port:

- Ensure the product is turned off prior to connecting cable.
- Connect cable and plug into the activation sensor (AS) connection socket.
- Ensure plug is pushed in and fully connected.

STEP 3 – Positioning the accessory:

- Position the both bollards in close proximity to the product (radius no greater than 4m).
- Ensure the reflector bollard is aligned opposite the sensor fitted to the product.
- Ensure the activation sensor light turns green, if it turns red, realignment is required.
- Ensure the bollard is on a flat surface and secured to the ground to prevent it from falling.
- Position cable so that it cannot be damaged or create a tripping hazard.

STEP 4 – Test and operate accessory:

- Access the control panel using the key.
- Turn the safety sensor (SS) switch on by pressing the switch up.
- Activate the product on by switching the power button on.
- The product will run a self-test, once complete the 2 x Round LED lights will illuminate solid green.
- Test attachment in manual mode by pressing the UP/DOWN button and using the remote control.
- Obstruct/break the beam to activate the boom.

6.10. Accessories warning

WARNING

- Ensure product is turned off prior to fitting or adjusting any accessories.
- If using mobile phone for access, ensure road laws and site rules are complied with.
- Some of the accessories are considered heavy or awkward, it is recommended that manual aid or a two person lift be adopted.
- Wear gloves when handling and fitting any of the accessories.
- Ensure accessories are appropriately secured to prevent them from falling.
- If any of the accessories are not working or damaged, do not use them, refer to the trouble shooting section or contact your distributor.

7. Repair and maintenance

Regular maintenance of the product is strongly recommended to ensure that it remains in an optimal state and that maintenance or repair issues are addressed.

Always ensure that the product is turned off and charging cables unplugged prior to completing any inspection or maintenance activities.

7.1. Daily inspection

Step 1 – Product condition:

- Check the external casing, lifting lug, panels, and locks for damage.
- Check battery is secure – must always be tight to ensure no movement
- Check that stabilising legs are free from damage and working.
- Ensure all locking pins, nuts and securing devices are in place and working.

Step 2 – Wheels and stopping mechanism:

- Check the wheel condition and tread for wear and tear and damage.
- Ensure stopping pins / mechanisms are free from damage and working.

Step 3 – Boom Holder:

- Ensure latch is in good condition and can secure the boom arm

Step 4 – Control switches and connection ports:

- Check the control panel for damage.
- Check port sockets for damage.
- Ensure controls and ports have functional covers and are labelled.

Step 5 – Attachments:

- Check the condition of attachments for damage.
- Check any cabling or connections for damage.
- Ensure all locking pins, nuts and securing devices are in place and working.

Step 6 – Periodic checks when in operation:

- Periodically check that the product and accessories are working.
- This should be conducted at regular intervals throughout the day.

If the product or accessories are damaged, identified as unsafe or not working, it is recommended that you do not use the product, refer to the trouble shooting section and or contact your distributor or Traffic & Access Solutions directly.

Please be aware that tampering with any internal componentry including circuits, cables, boards or use of the product contrary to the recommendations and training resources provided in this user manual may void any existing warranty and increase the risk of harm or property damage.

7.2. Servicing

Servicing should only be carried out by an approved service technician, directly by the distributor or factory. It is recommended that servicing be arranged on an annual basis. Annual servicing will include:

- Comprehensive product check including seals and internal structure;
- System diagnostic and cabling; and
- General parts replacement and internal clean.

7.3. Records

A standard inspection checklist has been developed as a guide to assist you with your daily inspection process. It is recommended that you review the inspection checklist and tailor this appropriately whilst not impeding on warranty conditions.

WARNING

- Ensure product is off and charging cable disconnected prior to inspection/maintenance.
- Keep fingers clear of any moving parts and when conducting repairs and maintenance.
- Avoid using water or other liquids to clean the product externally.
- Do not use water or liquids to clean the product internally, this will cause damage.
- Warning - DO NOT tamper with any of the circuitry both internally or externally or any of the mechanical components, this may void the warranty and may increase risk of harm.
- Boom shaft and billet is hydraulic and considered a crush and entanglement zone, keep clear of moving parts and ensure hands, loose items of clothing, jewellery and hair is clear when in operation.

8. Technical specifications

Component	Details
Product dimensions	Height 1153mm, width 415mm, Depth 598mm.
Colour	Standard orange.
Material	Sheet metal 1.5mm thickness, anti-corrosion, anti-rust, UV exposure.
Water proofing	Tower has water proofing to protect internal electrical components.
Motor	DC, 7.5 AMP maximum, power supply 12V-90W maximum.
Weight	75kg.
Boom arm length	2.2m long.
Boom arm extension	Additional 1.8m, totaling 4m.
Speed	4.5 seconds (up/down).
Safety kick back	Boom arm will kick back (raise) if it contacts an object when coming down.
Battery	12V 40AH rechargeable gel battery, 8-10hours charging time.
Battery charging	240V internal charging unit, audible and visual low battery capacity alert (40% and less than 10%), 8-10hours charging time.
Up/down cycles	Up to 4000 up and down movements with on a fully charged battery without accessories. Note: TAS recommends upgrading to a 90Ah battery when intending to operate the PORTABOOM Unit with accessories (Traffic Lights and/or Pedestrian Lights, Safety & Activation Sensors).
Wheel type	Solid
Lifting lug	0.75T.
Remote	The remote is waterproof and has a range is 100m (max) with clear line of site.
Traffic light	Supplied in line with AS4191:2015.
Accessory radius from product	Position accessories no greater than 4m away from the product.



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Appendix A – Example inspection checklist

MODEL No: _____ UNIT No: _____ DATE INSPECTED: _____

Checklist Items	(Y/N)
Check that the chassis is free from damage.	
Check battery secure – Battery terminal facing back panel	
Check brakes are in good working order and free of sand and dust that may impact functionality.	
Check all wheels in in good working order and free of sand and dust that may impact functionality.	
Check control unit access panels are free of damage and locks securely.	
Check boom arm and extension including pins	
Check Boom Arm LED Strip Light is free of damage	
Check and ensure all ports and connectors are secure and free from damage.	
Check and ensure antenna free from damage.	
Check and ensure lifting lug (eye bolt) and swivel is secure and free from damage.	
Check all external fittings, nuts and bolts are secure and free from damage.	
Check the on/off switch for operation ensuring green LED is illuminated when the product is turned on.	
Check the manual push button operation up/down/stop.	
Check remotes operation up/down/stop ensuring green and red LEDs illuminate as required.	
Check that the blue LED illuminates when charging using the 240V connection.	
Check bounce back operation ensuring the boom arm returns to OPEN position when striking an object.	
Ensure remotes are working and free from damage.	
Check that remotes are clearly labelled with unit number.	
Comments:	



Appendix B – Detailed Technical Information

PORTABOOM PB4000 Portable Barrier Gate System

1. PB4000 System

1.1 Overview

The PB4000 Barrier Gate System, as detailed in the "PB4000" manual, is a specialized system designed for efficient and reliable operation in various environments. This system is particularly suitable for applications requiring off-grid or backup power solutions, using a 12V battery as its primary power source.

1.2 System Components and Specifications

1.2.1 Comprehensive Specifications

Attribute	Details
Motor Type	DC motor, optimized for 12V operation
Drive Mechanism	Robust, designed for frequent operations
Control Board	Manages motor, sensors, and external communications
Power Input	12V DC
Battery Type	Sealed Lead Acid (SLA) or Lithium (LiFePO4)
Battery Capacity	40Ah (standard), with higher capacity options
Charging Efficiency	>96% (MPPT Charger)
System Voltage	12V
Max Charging Current	15A (via solar MPPT Charger)
Max Voltage on Battery Terminal	25V
Operating Temperature Range	-10°C to 50°C (charging), -20°C to 50°C (storage)
Discharge Rate	24A for 1 hour, 13A for 3 hours, 9.2A for 5 hours
Solar Panel Capacity	100W, with Voc 21.60V and Isc 5.89A
Solar Panel Dimensions	1010mm x 510mm x 30mm
Solar Panel Weight	6.2kg ± 0.3kg
System Protection Rating	IP55 (system), IP67 (solar panel junction box)
Relay Outputs	Configurable for external device control

1.2.2 Motor and Drive Mechanism Specifications

Specification	Details
Motor Voltage	12V DC
Motor Power	Optimized for smooth barrier operation
Drive Type	Gear-driven, low-maintenance design
Boom Arm Length	Up to 6 meters
Operation Speed	Adjustable via control board
Motor Duty Cycle	Continuous, designed for high-frequency use



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1.2.3 Control Unit Specifications

Specification	Details
Input Voltage	12V DC
Output Voltage	12V DC
Communication Interface	Wired and wireless (RF) connections available
Safety Sensors	Supports infrared and mechanical sensors
Relay Output	Programmable, can control traffic lights or alarms
Control Logic	Microcontroller-based, with configurable settings

1.3 Power Supply and Management

1.3.1 Battery Specifications

Attribute	Details
Battery Type	Sealed Lead Acid (SLA) or Lithium (LiFePO4)
Voltage	12V
Capacity	40Ah (standard), with options for higher capacities
Terminal Type	F3 (Faston Tab 250)
Dimensions	197mm x 165mm x 170mm
Weight	Approx. 12.5kg
Self-Discharge Rate	<3% per month at 25°C
Operating Temperature	-15°C to 50°C (discharge), -10°C to 50°C (charge)
Storage Temperature	-20°C to 50°C
Charging Characteristics	Cycle Use: 14.4-15.0V, Standby Use: 13.5-13.8V
Discharge Performance	24A (1hr), 13A (3hr), 9.2A (5hr), 5.3A (10hr), 2.8A (20hr)

1.3.2 Charging System

- **Primary Charging Method (AC):** The PB4000 system primarily uses the **Victron Smart Charger** for charging via 240V AC input. The integrated control panel of the PB4000 allows for straightforward charging through this method, ensuring efficient and reliable charging when connected to a standard AC power source.
- **Secondary Charging Method (DC Solar):** The system is also equipped to handle solar charging through an **MPPT (Maximum Power Point Tracking) Charger**. This charger is specifically optimized for solar input, making the PB4000 system suitable for off-grid or renewable energy-powered operations. The MPPT charger efficiently converts solar energy to charge the 12V battery, with a charging efficiency greater than 96%.

Charger Type	Details
Victron Smart Charger	For 240V AC charging. Integrated with PB4000 control panel for easy use.
MPPT Solar Charger	Optimized for 18-25V input from solar panels. Efficiency >96%.
Max Charging Current (Solar)	15A



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Input Voltage (from Solar Panel)	18-25V
Protection Rating	IP67 (solar charger)

1.4 Functional Tables and Parameter Settings

1.4.1 Control Functions

Function	Description	Parameter Settings
Open/Close Control	Manages the motorized opening and closing of the barrier arm.	Timing and speed adjustments can be set based on site requirements.
Obstacle Detection	Sensors detect obstacles during operation, preventing damage or injury.	Sensitivity levels can be configured to stop and reverse the arm when obstacles are detected.
Battery Monitoring	Monitors battery voltage and charge level, ensuring reliable operation.	Low voltage thresholds can trigger automatic shutdown or alerts.
Solar Integration	Supports solar power to reduce grid dependency and enable off-grid operation.	Solar charging parameters can be adjusted for optimal power management based on solar panel specifications.
Relay Outputs	Controls external devices such as traffic lights or alarms.	Programmable for custom operations, based on site-specific requirements.

1.4.2 Parameter Settings for System Configuration

ID	Name	Description	Notes
MS_AC	Auto Close	Enables automatic closing of the boom after a vehicle passes through.	Typically used in automated traffic control scenarios.
MS_AO	Auto Open	Enables automatic opening of the boom when a vehicle approaches.	Useful for high-traffic areas where manual operation is impractical.
MS_SS	Safety Sensor	Activates the safety sensor system, which stops the boom if an obstacle is detected.	Critical for ensuring safety in environments where pedestrians or objects might cross the gate.
MS_NB	No Boom	Configures the system to operate without a physical boom arm.	This mode is used when the barrier is intended to control only lights or alarms.
SW_DL	Disable Lights	Disconnects the inbuilt LED lights,	Particularly beneficial in low-visibility



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		useful for minimizing power consumption.	conditions where external lights are used instead.
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2. Barrier Function 4000 Control, Operational Options, and Traffic Light Systems

2.1 Overview

The PB4000 Barrier Gate System is a robust and versatile solution for controlling vehicular and pedestrian traffic in various environments, such as industrial sites, parking facilities, and restricted access areas. This system is designed for both manual and automated operations, providing flexible control through various configurations, including safety and remote operation features.

2.2 Mechanical Specifications

- **Model:** PB 4000
- **Power Supply:** 12V DC
- **Max Boom Length:** 6 meters
- **Operation Temperature:** -20°C to 75°C
- **Protection Level:** IP55 (Dust and water-resistant)
- **Structure:** The barrier gate is constructed with a durable steel frame and a boom arm, designed to withstand harsh weather conditions and frequent use.

2.3 Control Board Functions

The PB4000 control board is the central component managing all operational aspects of the barrier gate, including power distribution, motor control, safety mechanisms, and communication interfaces.

2.3.1 Boom Arm Control

- **Open/Close Control:** The control board manages the motorized opening and closing of the boom arm. The timing

for these actions can be adjusted based on the specific operational needs, such as the speed at which the gate should open or close.

- **Obstacle Detection:** The control board is equipped with sensors to detect obstacles in the path of the boom arm. If an obstacle is detected during the closing operation, the system will automatically stop and reverse the boom arm to prevent damage or injury.

2.3.2 Power Management

- **Battery Monitoring:** The control board continuously monitors the voltage and charge level of the connected 12V battery. This ensures that the system operates reliably, with automatic shutdown or alerts if the battery level falls below critical thresholds.
- **Solar Integration:** The control board supports integration with solar power systems, allowing the PB4000 to be powered by renewable energy, reducing dependence on grid power and extending operational capability in remote locations.

2.3.3 Input/Output Interfaces

- **Signal Inputs:** The system can receive inputs from various sources, including remote controls, manual push buttons, and automated sensors. These inputs trigger the opening or closing of the boom arm or other system actions, such as activating external lights.
- **Relay Outputs:** The control board includes relay outputs that can be used to control external devices such as traffic lights, alarms, or additional security systems. These relays are



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programmable, allowing for customized operations depending on the site's requirements.

2.4 Configuration Options

The PB4000 system offers several configuration options, which can be adjusted using the configuration switches on the control board. These switches allow users to tailor the system's behaviour to specific operational needs.

ID	Name	Description	Notes
MS_AC	Auto Close	Enables automatic closing of the boom after a vehicle passes through.	Typically used in automated traffic control scenarios.
MS_AO	Auto Open	Enables automatic opening of the boom when a vehicle approaches.	Useful for high-traffic areas where manual operation is impractical.
MS_SS	Safety Sensor	Activates the safety sensor system, which stops the boom if an obstacle is detected.	Critical for ensuring safety in environments where pedestrians or objects might cross the gate.
MS_NB	No Boom	Configures the system to operate without a physical boom arm.	This mode is used when the barrier is intended to control only lights or alarms.
SW_DL	Disable Lights	Disconnects the inbuilt LED lights, useful for minimizing power consumption.	Particularly beneficial in low-visibility conditions where external lights are used instead.

2.5 Operational Phases

The PB4000 barrier gate operates through a sequence of phases to manage traffic flow effectively. These phases are controlled by the control board and can be customized to suit different traffic scenarios.

Phase	Description	Typical Duration
ClsRdy	The system is ready with the boom in the closed position, awaiting a trigger signal (manual or automatic) to open.	Variable (manual)
Warn 2	A warning is issued to side traffic, typically through yellow or flashing lights, indicating that the gate will open or close soon.	2-3 seconds
PreOpn	All traffic is stopped, with red lights active, as the system prepares to open the gate.	3-5 seconds
RunOpn	The boom arm begins to lift, allowing vehicles to pass.	Depends on arm length
Green1	The gate remains open for a minimum duration, ensuring that vehicles have adequate time to pass.	7-10 seconds
OpnRdy	The gate is fully open, ready to receive another trigger to close (in automatic mode) or remain open until manually closed.	Variable (manual)
Warn 1	A warning is issued to gate traffic that the gate will soon close, using yellow or flashing lights to	2-3 seconds



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	signal the impending action.	
PreCls	All traffic is stopped as the gate prepares to close, with red lights active for both gate and side traffic.	3-5 seconds
RunCls	The boom arm begins to lower, signalling the end of the allowed passage.	Depends on arm length
Green2	Once the gate is closed, the lights signal side traffic to proceed, ensuring a smooth transition between traffic flows.	7-10 seconds

2.6 Boom Gate States

The PB4000 system provides real-time status indicators that describe the current state of the boom gate. These states help operators understand the current position and action of the boom arm, allowing for effective monitoring and troubleshooting.

State	Description	Indicator
TOP	The boom is at the top, fully open and allowing traffic to pass.	Vertical position (~90 degrees)
!up	The boom stopped while lifting, possibly due to an obstacle or manual override.	Requires manual or automatic intervention.
Rev	The system is waiting to reverse the boom arm after an opening command.	Typically follows an obstacle detection.
Hit	An impact was detected during lowering, causing the boom to reverse.	Safety mechanism to prevent damage.
!dn	The boom stopped while lowering, awaiting the next command.	Requires manual or automatic intervention.
BOT	The boom is at the bottom, fully closed, blocking traffic.	Horizontal position (~0 degrees)
>UP	The boom is currently lifting.	Motor engaged, raising the arm.
>DN	The boom is currently lowering.	Motor engaged, lowering the arm.

2.7 Quick Start Guide

The PB4000 can be configured for various common applications using the quick start guide. This guide provides easy-to-follow steps to set up the system for different scenarios.

2.7.1 Common Configurations

#	Configuration Name	AC	AO	SS	DB	Description	Typical Use Case
1	Classic	0	0	0	0	Uses internal LEDs to mimic rail crossing signals.	Small sites with simple traffic control needs.
2	VEH lights	0	0	0	0	Integrates vehicle traffic lights (Red/Yellow/Green).	Parking lots, toll booths.
3	PED lights	0	0	0	0	Integrates pedestrian lights (Red/Green).	School zones, pedestrian



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							crossings.
4	PED+VEH	1	0	0	0	Auto-close boom after pedestrians cross.	High-traffic pedestrian areas.
5	VEH+PED	0	1	0	0	Auto-open boom for vehicles, stopping pedestrians.	Mixed-use areas with vehicles and pedestrians.

2.7.2 Installation Procedure

- **Turn Power OFF and Open Panel:**
 - Ensure the system is powered down before making any configurations to avoid electrical hazards.
- **Configure Traffic Signals:**
 - Connect the required external lights into the TL1 & TL2 connectors on the control board.
 - Align and secure the traffic lights to face the appropriate traffic flow (vehicles or pedestrians).
- **Configure Optional Safety Sensor:**
 - If using a safety sensor, plug it into the SS connector and set the SS switch accordingly.
 - Test the sensor by placing an obstacle in the path of the boom and ensuring it stops or reverses as expected.
- **Configure Activation Sensor:**
 - Plug in the activation sensor into the AS connector if automatic operation is desired.
 - Adjust the AC and AO switches to match the desired automatic behaviours.
- **Configure Other Options:**
 - Set the DB switch if the system will operate without a boom (e.g., controlling lights only).
 - Set the DL switch if internal lights should be disabled.
- **Close Panel and Turn Power ON:**
 - After completing the configurations, close the control panel securely and restore power to the system.
- **Test Boom Gate Operation:**
 - Perform a full cycle test of the boom gate to ensure all configurations are working correctly. Adjust as necessary.

2.8 Safety Precautions and Best Practices

- **Training:** Ensure all operators are trained in the use and maintenance of the PB4000 system, including emergency procedures.
- **Inspection:** Regularly inspect the barrier gate for wear and tear, particularly the boom arm, motor, and control board connections.
- **Operational Checks:** Perform routine operational checks to ensure the safety sensors and obstacle detection systems are functioning correctly.
- **Secure Components:** Keep all panels securely closed and locked when not in use to prevent unauthorized access or tampering.
- **Environment Considerations:** Install the PB4000 in environments that are within the specified



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temperature and humidity ranges to avoid malfunction.

3. RF Technology Systems

3.1 Overview

The PB4000 Barrier Gate System incorporates advanced RF (Radio Frequency) technology to facilitate wireless control and communication. This RF system is crucial for enabling remote operation of the gate, ensuring secure and reliable performance even in challenging environments.

3.2 RF Receiver Specifications

Attribute	Details
Model	ELSEMA 1-Channel, 915MHz Receiver (MCR91501R)
Frequency Range	915 to 928 MHz (Australia), 915 to 927 MHz (New Zealand)
Frequency Hopping	Operates between 915 to 928 MHz to prevent interference and jamming.
Digital Coding	Utilizes 12-way dipswitch or encrypted coding for enhanced security.
Supply Voltage	12 – 24 Volts AC or DC
Current Consumption	30 mA standby at 12VDC, 50mA with 1 relay on
Operating Range	Up to 400 meters
Operating Temperature	-5 to 50°C
Decoding System	12-way code switch (4096 codes), encrypted coding (16 million codes)
Outputs	One change-over relay output, rated at 8 Amps 240VAC
Relay Contacts	Common (C), Normally Closed (NC), Normally Open (NO)
Dimensions	95 x 70 x 30 mm

3.3 Antenna Specifications

Attribute	Details
Connector	50 ohms SMA connector

3.4 Output Modes

The MCR91501R RF receiver supports multiple output modes, which can be selected based on the operational requirements:

- **Momentary Mode:** The output remains active only while the transmitter button is pressed. This is ideal for temporary or controlled access scenarios where the gate should close automatically after a vehicle has passed.
- **Latching Mode:** The output remains active until the transmitter button is pressed again. This mode is suitable for applications where the gate needs to remain open or closed for extended periods without continuous operator intervention.



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3.5 Advanced RF Features

The PB4000's RF system incorporates several advanced features designed to enhance security and reliability:

- **Frequency Hopping Spread Spectrum (FHSS):** This technology reduces the risk of signal interference and jamming by rapidly switching frequencies within the specified range. This ensures a more stable and secure communication link between the transmitter and receiver.
- **Encrypted Coding:** The system supports encrypted coding with up to 16 million possible codes, providing a high level of security against unauthorized access or signal duplication.
- **Signal Reception Indicator:** An on-board red LED on the receiver indicates successful reception of a signal, allowing for quick diagnostics and confirmation of operation.

3.6 Programming and Setup

3.6.1 Basic Programming:

1. **Match Dipswitches:** Set the dipswitches on the transmitter to match the receiver's dipswitch settings.
2. **Avoid Interference:** Ensure that the first 8 dipswitches are different to avoid interference from other units.
3. **Power On:** Ensure both the transmitter and receiver are powered on.
4. **Test Signal:** Press the transmitter button to test the signal reception on the receiver. The LED should light up to confirm the reception.

3.6.2 Advanced Programming Features:

1. **Encrypted Coding Setup:**
 1. Set all dipswitches to the off position on both the transmitter and receiver.
 2. Short the Add/Delete pin on the receiver to generate a random encrypted code.
 3. Broadcast the code by holding button 1 on the transmitter, flicking dipswitch 12 on and off, and then releasing button 1.
 4. To program additional units, press button 1 on another transmitter or receiver for 1 second and then release.
 5. The orange LED will flash twice to confirm successful programming.
1. **Multiple Transmitters to One Receiver:**
 1. Set all transmitters to the same dipswitch settings as the receiver.
 2. Test each transmitter to ensure they all control the receiver as expected.

3.7 Antenna Options and Placement

The PB4000's RF system includes a standard internal antenna, suitable for most installations. However, for sites requiring extended range or enhanced signal penetration, external antennas can be added:

- **Standard Antenna (ANT915S):** Suitable for most installations, providing a good balance of range and signal strength.
- **Extended Range Antenna:** For installations where the receiver must be located at a significant distance from the transmitter or where signal interference is a concern, an extended range antenna can be added. This antenna should be installed in a location with minimal obstructions to maximize signal reception.

3.8 Troubleshooting RF Issues

If the RF system is not functioning as expected, consider the following troubleshooting steps:

- **Check Dipswitch Settings:** Ensure that the dipswitch settings on the transmitter and receiver match.
- **Verify Power Supply:** Confirm that both the transmitter and receiver are receiving the correct voltage.
- **Signal Interference:** Check for sources of interference, such as other RF devices operating on the same frequency.
- **Antenna Placement:** Ensure that the antenna is properly connected and positioned for optimal signal reception.
- **Test Signal:** Use the signal reception indicator (LED) on the receiver to confirm that the signal is being received correctly.

4. The PB4000 12V System

4.1 Overview

The 12V system is the heart of the PB4000 Barrier Gate System, providing the necessary power to operate the motor, control board, and associated components. This system is designed to be both reliable and efficient, with options for battery backup and solar power integration to ensure continuous operation even in remote or off-grid locations.

4.2 12V Battery Specifications

Attribute	Details
Type	Sealed Lead Acid Battery
Voltage	12V
Capacity	40Ah
Terminal	F3 (Faston Tab 250)
Dimensions	197mm x 165mm x 170mm
Weight	Approx. 12.5kg

4.2.1 Battery Life and Performance

The 12V 40Ah Sealed Lead Acid (SLA) battery used in the PB4000 system is engineered for long life and consistent performance. The battery is maintenance-free, meaning it does not require regular topping up of electrolyte levels, and it is designed to operate effectively in a wide range of temperatures.

- **Self-Discharge Rate:** The battery has a low self-discharge rate of less than 3% per month at 25°C, which ensures that it retains charge well during periods of inactivity.
- **Storage Duration:** It can be stored for more than 6 months without a significant drop in charge, but it is recommended to recharge the battery before use if it has been stored for a prolonged period.



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4.3 Battery Charging Characteristics

Usage	Initial Charging Current	Voltage (at 25°C)
Cycle Use	Less than 12A	14.4-15.0V
Standby Use	-	13.5-13.8V

- **Cycle Use:** This mode is used when the battery is regularly charged and discharged, such as during daily operation of the barrier gate.
- **Standby Use:** This mode is for applications where the battery is kept fully charged and only occasionally used, such as in backup power scenarios.

4.4 Temperature Ranges

Condition	Temperature Range
Discharge	-15°C to 50°C
Charge	-10°C to 50°C
Storage	-20°C to 50°C

- **Operating in Extreme Temperatures:** The battery is designed to function effectively in a wide range of temperatures, but performance may degrade in extreme conditions. For instance, charging efficiency decreases at low temperatures, and the battery should not be charged if the temperature is below -10°C.

4.5 Discharge Performance

The discharge performance of the battery is critical for understanding how long the PB4000 can operate under different loads. Below are the discharge rates for the battery:

Discharge Time	Current (Amperes)
1 hour	24A
3 hours	13A
5 hours	9.2A
10 hours	5.3A
20 hours	2.8A

- **High Discharge Rates:** At high discharge rates (e.g., 24A over 1 hour), the battery will deplete quickly, which is important to consider for applications requiring high power over short periods.
- **Longer Discharge Durations:** For extended operations, the discharge rate is much lower, allowing for several hours of continuous operation.

4.6 Solar Panel Specifications

Attribute	Details
Maximum Power (Pmax)	100W
Open Circuit Voltage (Voc)	21.60V
Short Circuit Current (Isc)	5.89A
Voltage at Pmax (Vmp)	18.00V
Current at Pmax (Imp)	5.56A
Dimensions	1010mm x 510mm x 30mm
Weight	6.2kg ± 0.3kg
Operating Temperature	-40°C to +85°C

Junction Box	IP67
Connector	MC4 Compatible
Front Glass	3.2mm tempered glass
Frame	Aluminium (Silver Frame)

4.6.1 Solar Panel Integration

The 100W solar panel is designed to be integrated with the PB4000's 12V system, providing a renewable energy source to maintain battery charge and extend operational time, particularly in remote or off-grid locations.

- **Durability:** The panel is built with a robust aluminium frame and tempered glass, ensuring it can withstand harsh environmental conditions.
- **Efficiency:** With a high efficiency rating, the panel can produce enough power to keep the system running under typical daylight conditions.

4.7 MPPT Charger Specifications

The Maximum Power Point Tracking (MPPT) charger is a key component in the PB4000's power management system, ensuring that the solar panel operates at its maximum efficiency.

Attribute	Details
System Voltage	12V
Max Charging Current	15A
Max Voltage on Battery Terminal	25V
Battery Type	Lithium (LiFePO4), AGM/GEL
Charging Voltage Target	14.4V
Charging Voltage Recovery	13.5V
Max Input Power	200W
Max Tracking Efficiency	>99.9%
Max Charge Conversion	96.50%
Ambient Temperature	-35°C to +60°C
Ambient Humidity	0~100%RH
Protection Degree	IP67

4.7.1 Key Features

- **High Efficiency:** The MPPT charger ensures that the solar panel operates at its maximum efficiency by continuously adjusting the load to match the panel's maximum power point.
- **Temperature Compensation:** The charger automatically adjusts the charging parameters based on the ambient temperature, protecting the battery from overcharging or undercharging in extreme conditions.
- **Durable Design:** With an IP67 rating, the charger is protected against dust and water ingress, making it suitable for outdoor installations.

4.8 System Setup and Monitoring

The 12V system is designed for easy setup and monitoring, with several tools and features to assist in installation and ongoing operation.



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4.8.1 Installation Steps:

- **Battery Connection:** Connect the red (positive) and black (negative) cables from the control board to the corresponding terminals on the battery.
- **Solar Panel Connection:** Use the MC4-compatible connectors to attach the solar panel to the MPPT charger. Ensure that the polarity is correct to prevent damage.
- **Charger Connection:** Connect the MPPT charger to the battery, observing the correct polarity and ensuring a secure connection to avoid voltage drops.

4.8.2 Monitoring with VictronConnect:

The VictronConnect app provides a user-friendly interface for monitoring and configuring the 12V system.

- **Bluetooth Setup:** Enable Bluetooth on your device and connect to the MPPT charger using the default PIN code 000000.
- **Real-time Monitoring:** The app provides real-time data on voltage, current, and charge stage, allowing you to monitor the system's performance and make adjustments as needed.
- **Historical Data:** The app also stores historical data, enabling you to review the system's performance over time and identify any issues that may have occurred.

4.8.3 LED Indicators:

The MPPT charger includes LED indicators that provide a quick visual status of the system.

LED State	Status
Green LED On	Ready/Battery Full
Green LED Fast Flash	Charging to CVT
Green LED Flash	Boost Charging
Green LED Slow Flash	Charging final stage
Yellow LED Off	Over voltage protection
Yellow LED On	Battery is normal
Yellow LED Slow Flash	Battery voltage is low
Yellow LED Fast Flash	Low voltage protection
Red LED Off	Normal operation
Red LED Flash	Over temperature

4.9 Calculations for Continuous Operation

To maintain continuous operation of the PB4000, particularly in off-grid or solar-powered scenarios, it's important to understand the power requirements and system capabilities.

4.9.1 Power Consumption:

- **PB 4000 Daily Consumption:** Assuming a continuous draw of 5A, the system will consume 120Ah over a 24-hour period.

4.9.2 Solar Power Generation:

- **Solar Panel Output:** A 100W solar panel produces approximately 5.56A at peak performance.
- **Daily Charge Time:** With an estimated 5 hours of optimal sunlight per day, the panel can generate 27.8Ah daily.

4.9.3 Charging Efficiency:

- **MPPT Efficiency:** The MPPT charger's efficiency is approximately 97.5%, resulting in an effective daily charge of 27.1Ah.



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Parameter	Value
PB 4000 Daily Consumption (5A x 24h)	120Ah
Solar Panel Daily Output (5.56A x 5h)	27.8Ah
MPPT Efficiency	97.5%
Effective Solar Charge (27.8Ah x 97.5%)	27.1Ah

Conclusion: To ensure continuous operation of the PB4000, multiple 100W solar panels or additional battery storage will be necessary to cover the total daily consumption of 120Ah.

4.10 Maintenance and Troubleshooting

Regular maintenance of the 12V system ensures its longevity and reliable performance.

- **Battery Maintenance:** Although the battery is maintenance-free, it should be periodically checked for any signs of wear or damage. Ensure the connections are secure and free from corrosion.
- **Solar Panel Cleaning:** Keep the solar panel clean from dust, dirt, and debris to maximize its efficiency. Clean with a soft cloth and mild detergent as needed.
- **Charger Inspection:** Check the MPPT charger for any signs of damage or overheating. Ensure that the ventilation around the charger is adequate to prevent overheating.

4.10.1 Troubleshooting Tips:

- **Battery Not Charging:** Check the connections between the solar panel, MPPT charger, and battery. Ensure the polarity is correct and that the solar panel is receiving sufficient sunlight.
- **System Overheating:** Ensure that the charger and battery are installed in a well-ventilated area. Overheating can lead to reduced efficiency and potential system shutdown.
- **Low Power Output:** Verify the solar panel's orientation and angle to ensure it is receiving maximum sunlight. Check for any shading or obstructions.