



OPERATING AND MAINTENANCE MANUAL

powerQuad Portable Battery Storage System
(With UPS Upgrade)
PQ-047 & PQ-075

Designed and Manufactured By

powerQuad© Ltd

BASE – Bordon Innovation Centre, 60 Barbados Road, Bordon, Hants, GU35 0FX, England

Telephone: +44 (0) 20 3290 3631

Email: hello@powerquad.co.uk

Web: www.powerQuad.co.uk

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1. General Safety

All safety warning and precautions should be reviewed to avoid injury to the user and damage to the product. To avoid potential hazards only use the product as specified.

ONLY SUITABLY QUAIFIED PERSONNEL SHOULD CARRY OUT MAINTENANCE TO THIS EQUIPMENT.

- Use the connection and charging leads as supplied.
- Ensure the charger connected earth is a protective earth. To avoid electric shock, it is essential that the mains supply earth is a local earth.
- Connect all applicable leads before turning the product on.
- INSPECT all leads prior to use DO NOT use if damaged.
- Connect applicable electrical items and equipment to the output before switching on.
- Each product is heavy, use a two-man lift.
- DO NOT Disconnect the connection cable with the output ON and equipment powered.
- DO NOT use the product if any damage is suspected. Refer the unit to suitably qualified personnel to be checked.
- DO NOT operate the product in wet/flooded conditions.
- DO NOT operate the product in an explosive atmosphere.
- DO NOT stand or stack other items on the product.
- DO NOT connect a load larger than the respective maximum loadin.

2. Safety Terms and Symbols



ELECTRIC SHOCK WARNING – Refer to user manual for guidance.



CORROSIVE CHEMICALS – Refer to user manual for guidance



CAUTION / WARNING – Refer to user manual for guidance



Safety earth to be connected to local earth.



Refer to user manual for guidance before proceeding.

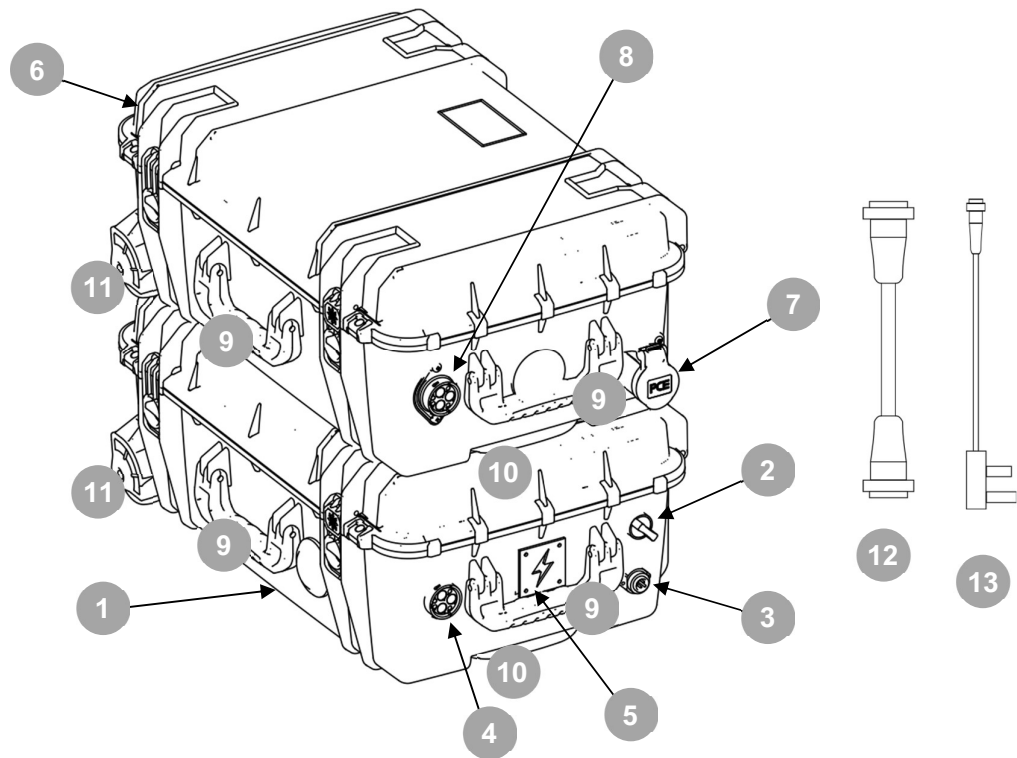
3. Description of Equipment

The powerQuad portable battery storage system is designed for providing portable electrical power up to a maximum of 16A, with a 230VAC +/- 10% industrial output.

The system is made up of one battery box (PQ-075) and one power conversion box (PQ-047), electrically connected through the supplied cable. The boxes are stacked on top of each other and connected to create the full system. Each box has its own carry handles and wheels for added portability. PQ-075 contains an upgrade which enables the system to be used as an 'online' UPS system. Please note in this mode the maximum allowable power to keep the battery system in continual health is 1000W.

The 5,000Wh lithium-ion battery can be charged separately from the power conversion box though its integrated charging system, when the supplied AC charger cable is connected to the charger input.

An LED indicator is provided to show the charge state of the battery when charging or discharging.



- | | |
|------------------------------------|-------------------------|
| 1. powerQuad 5 – 5kWh Battery Case | 8. DC Connector Input |
| 2. On/Off/Charge Switch | 9. Carry Handles |
| 3. Charger Input | 10. Extendable Handles |
| 4. DC Connector Output | 11. Wheels |
| 5. LED Indicator | 12. DC Connection Cable |
| 6. powerQuad Max – 4kW Output Case | 13. AC Charger Cable |
| 7. 16A CEE Output Socket | |

4. Technical Ratings

4.1. Mains Input Rating

Mains input supply ratings:

Mains Voltage:	230V +/- 10%
Frequency:	50Hz
Maximum Current:	5.5A

4.2. Mains Output Rating

Mains output supply ratings:

Mains Voltage:	230V +/- 10%
Frequency:	50Hz +/- 0.1%
Output Power:	<i>In Battery Mode</i> 4000W Continuous 8000W for 5 seconds <i>In UPS Mode</i> 1000W Continuous
Output Ripple:	<3%

4.3. Battery

Battery Capacity :	5000Wh
Idle Time:	>165h
Battery Chemistry:	LiFePO4

4.4. Other

Operating Temperature:	Discharging	-10°C – 55°C
	Charging	0°C – 55°C
IP Rating:	IP54	
Humidity	<95% RH Non condensing.	
Altitude:	<5000m	
Dimensions:	Per Case	260x610x410mm
Weight:	powerQuad 5	45kg
	powerQuad Max	16kg

5. Connections

5.1.powerQuad 5 – Battery Case

5.1.1. DC Connection Cable

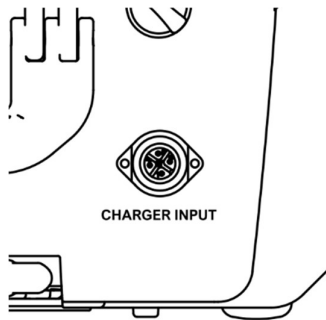
The complete battery storage system is made up by connecting the two cases together through the heavy-duty DC connection cable supplied. The cable connects at the DC Output and DC Input outlets.

To connect the cable, align the white lines on both parts of the connector facing directly upwards, push the connector in with one hand while using the other to twist the locking mechanism fully clockwise until it can go no further. To disconnect twist the locking mechanism anticlockwise and pull the connector out from the inlet. Connection and disconnect must ONLY be done with the battery unit switch in the OFF position.



WARNING: Make sure the connector is fully mated and the locking mechanism is fully tightened. Failure to do so may cause damage to the product.

5.1.2. AC Charger Cable

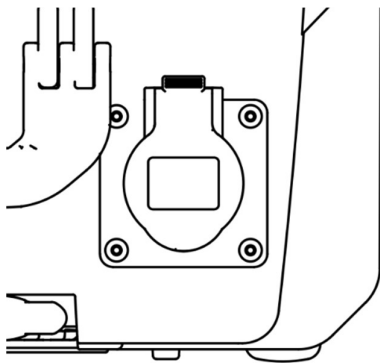


Before charging, the AC Charger cable needs to be connected. To connect the AC Charger Cable to the battery case, insert the supplied cable with 3 pin mains plug into the charger input. Align the notches, pushing in the connector. Twist the locking mechanism until fully rotated. Insert the 3 pin plug into a mains wall socket and switch on.

WARNING: Make sure the connector is fully mated and the locking mechanism is fully tightened. Failure to do so may cause damage to the product.

5.2. powerQuad Max – Output Case

5.2.1. AC Output Connector



The AC outlet socket provides a 230VAC power source up to 16A. To connect your compatible 'Industrial' 2P+E plug, lift the flap and insert the plug.

Available is an adaptor to convert this output to other socket types, such as UK 3 PIN. Contact powerQuad to find out about accessories available.

6. Operation

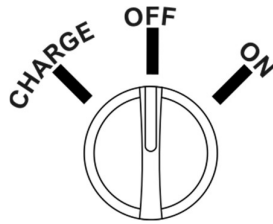
The system has three modes of operation, as a stand-alone portable battery system (Battery Mode), as an 'online' UPS (UPS Mode) or a Charge only mode. Take care to set the unit up in the correct mode for your operation.

6.1. On/ Battery Mode

1. The system is made up of one battery box (PQ-075) and one power conversion box (PQ-047).
2. The power conversion box and battery box can be stacked, when stacking make sure the boxes are stacked securely. Make sure there is adequate ventilation around the boxes, it is recommended 50cm from all sides.

WARNING: The boxes are heavy, it's recommended this operation is performed by two people.

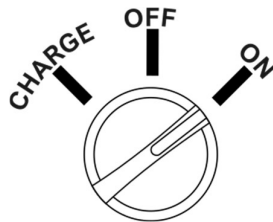
3. Ensure that the switch on the battery box is in the OFF position. Never connect or disconnect cables when the switch is in the ON or CHARGE position as you may cause damage to the equipment.



4. Connect the boxes together using the DC Connector Cable provided (See 5.1.1)

WARNING: Make sure connectors are fully pushed in and fully secure as you may damage the equipment.

5. Connect the output load via the output connector (See 5.2.1).
6. To turn on, rotate the switch on the battery box to the ON position. The LEDs will flash in a start up sequence going from Red to Green. They will all flash before showing the current battery charge level. You should hear a single audible beep or a 'clunk' from the power conversion box. Power is now available at the output.



7. Do not connect a load which is larger than the output indicated on the power conversion box. Continually overpowering the output power will damage the unit.
8. If the battery box falls below a minimum voltage the power conversion box will no longer provide power. You will hear an audible warning, it is recommended you turn off and disconnect the battery box as soon as possible to avoid damage to the system. Charge the battery box as described in 6.3 at your earliest convenience.

Note - In this mode the unit does not act as a UPS system.

6.2.On/ UPS Mode

In the 'online' UPS Mode the battery continuously powers the output and the on-board electronics keep the battery maintained and at a healthy state of charge when input power is present. If the input power is disconnected or lost the unit will continue to supply power to the output until the battery is depleted.

To use the system in the 'online' UPS mode:

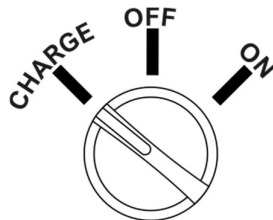
1. Ensure that the switch on the battery box is in the OFF position. Never connect or disconnect cables when the switch is in the ON or CHARGE position as you may cause damage to the equipment.

2. Connect the supplied AC Charger cable to the charger input on the battery box (See 5.1.2) and plug in the 3 Pin into a mains outlet, turn on the mains outlet.
3. Follow steps 4-8 in section 6.1.

Note - The connected load must be less than 1000W or the battery will fully discharge over time and will stop supplying output power even with the charger cable connected, and you may damage the equipment.

6.3. Charging Only

1. Ensure that the switch on the battery box is in the OFF position. Never connect or disconnect cables when the switch is in the ON or CHARGE position as you may cause damage to the equipment.
2. Connect the supplied AC Charger cable to the charger input on the battery box (See 5.1.2) and plug in the 3 Pin into a mains outlet, turn on the mains outlet.
3. Rotate the switch on the battery box to CHARGE. The upper most LED indicator will begin to flash and will gradually increase through the charge levels until it reaches 100%. At this point the LED will become solid to indicate charging has finished.

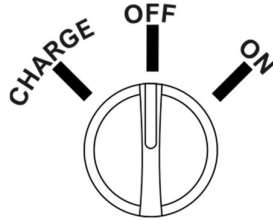


4. Once charging is finished it is recommended to switch the charger OFF at the mains outlet, and switch the battery box to OFF as soon as possible.
5. Charging can be re-initiated by switching to CHARGE. It is recommended to leave the battery for 1 hour after charging before another charging cycle is started.
6. Fully charging the battery from 0% should take around 5 hours.

Note – In this mode the output is disabled

6.4. Transport/Storage

During transport and storage ensure that the switch on the battery box is in the OFF position. This disconnects the battery from the output and internal electronics.

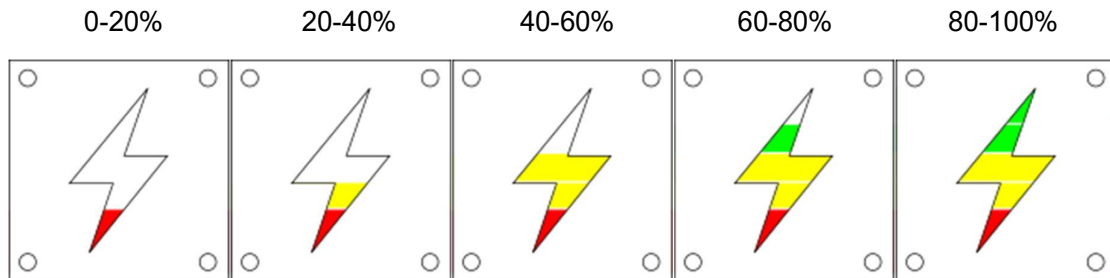


6.5. LED Indicator

The LED indicator located on the powerQuad 5 Battery box gives an indication of the battery state of charge. There are 5 levels each representing 20% charge. On start up the LED initialises and flashes the LEDs in sequence for approx. 5 seconds. During charging the uppermost LED indicator flashes. Once the battery is charged the indicator changes to solid. During discharging the LED indicator is solid.

The LED indicator shows battery charge level in both CHARGE and ON modes.

Charge Level:



6.6. Battery Care

Never allow the Battery to fully discharge. Even when no output is connected the Battery discharges slowly to power the onboard electronics when in the ON or CHARGE positions. The Battery can discharge at a rate of approximately 8% per 12 hour period, though the discharge rate may vary depending on environmental factors. Note - When in the CHARGE position after charging is complete the battery can discharge at a far lesser rate of 0.25% per 12 hour period.

Discharging the Battery to 0% may result in damage to components. To protect against a complete discharge, the unit enters a low-power consumption mode when the battery charge level drops to approximately 10%. In this mode, the Battery stops supporting the onboard electronics. Once this low-power consumption mode is active, immediately supply

the unit with mains electricity and switch to CHARGE to prevent a maintenance event or permanent battery damage.

7. Protection

The system has several protection devices:

The power conversion box has an internal 20A auto-reset MCB. If the MCB has activated the battery box will have the indicator LED lit but there will be no output from the power conversion box. To reset the MCB switch the battery box to OFF, wait 5 seconds and switch to ON. Remove all loads prior to resetting.

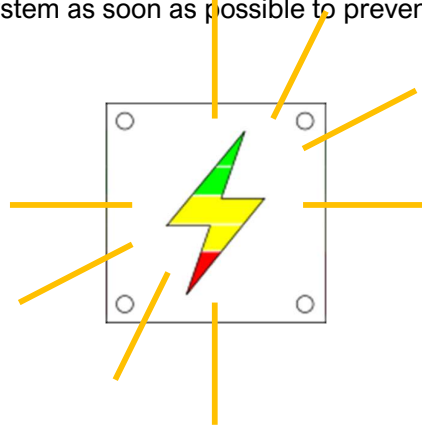
The AC Charger cable has 10A fuse in the plug. To replace the fuse turn OFF the system and disconnect all cables. The fuse is fitted under a flap on the underside of the plug.

Low voltage – If the battery gets too low the output will stop and an audible warning will be present. Turn the battery box OFF and charge as soon as possible.

7.1. Warnings

7.1.1. Low Voltage Warning

During ON mode if the battery voltage drops to a low voltage threshold the LED will begin to flash with all the LEDs lit. This indicates that the system will shortly stop providing power. To protect the system the output will stop first, if the battery voltage continues to drop the system will go into a special low power mode. If you see this warning you should disconnect the output and charge the system as soon as possible to prevent damage to batteries.



7.1.2. Audible Warnings

The system has an audible warning for:

Battery Low Voltage

Overload protection at:

1.2 x Rated Power for 1min

1.5 x Rated Power for 20s

1.7 x Rated Power for 5s

Inverter Fault

Over Temperature

8. Maintenance

8.1. Spare and Repair parts

For spare and replacement parts and maintenance please contact powerQuad.

9. Revision

Issue No	Date	Issued By	Approved By	Changes
2	17/08/2023	GS	PC	