

User Manual



Ion Battery Power Lithium Ion

12 V - 50 Ah | 12 V - 100 Ah | 12 V - 150 Ah | 24 V - 100 Ah

whisperpower.com

User Manual

Dear customer,

This manual contains all relevant information necessary to install, use and maintain the WhisperPower Ion Power Basic batteries, either 12 V - 50 Ah, 12 V - 100 Ah, 12 V - 150 Ah or 24 V - 100 Ah. Read this manual carefully before installing and using the product. In this manual, our Lithium batteries as described above, will be referred to as: Ion Power Basic.

This manual is meant for the installer and the user of the Li-Ion battery. Only qualified, certified personnel may install and perform maintenance on the Ion Power Basic.

Please consult the index at the start of this manual to read information relevant to you.

This is the original manual, keep it at a safe location!

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1. Introduction

1.1. Product description

Our Ion Power Basic batteries are Lithium Iron Phosphate re-chargeable batteries. Lithium Iron Phosphate (LiFePO4) technology is considered as the safest lithium technology available in the market.

Potential applications of this Ion Power Basic battery include: recreational vehicles, boats, recreational off-grid houses, industrial energy storage solutions.

1.2. Glossary of Terminology

CBS:	Cell Balancing System
Charge cycle:	A period of use from fully charged, to fully discharged, and fully recharged again
Endurance Life-cycle:	The products maximum lifespan, achieved by following the guidelines presented in this manual
LiFePO4:	Lithium Iron Phosphate
SoC:	State of Charge
CCCV:	Constant Current - Constant Voltage
DoD:	Depth of Discharge
C:	C-rate, capacity rating in Ah

2. Product specifications

2.1. Product features & benefits

- Replacement for lead acid batteries
- Traction battery behaviour
- Lithium Iron Phosphate (LiFePO₄): Safe lithium technology
- High performance, even under extreme conditions
- Integrated CBS (Cell Balancing System)
- Fast charging and discharging
- Very efficient, no charge factor (Peukert)
- Maintenance free
- Adaptive cell balancing
- Low self-discharge
- 6000 cycles at 50% DOD
- 2000 cycles at full DOD (80% discharge)
- BMS readout via bluetooth, app downloadable (only 100 & 150 Ah)

Optional

- Smart Battery Monitoring (WBM)
- DC Disconnect by Latch Relay (external discharge protection)
- Smart battery charging by Handy/ Supreme/ Supreme Pro chargers
- Smart battery charging by DC alternator with smart regulator (ACR)
- Solar charging by WP solar + smart MPP regulator

Deep cycle battery - No suitable to be used for engine starting (see Whisper Power AGM/Gel Range)

2.2. Bluetooth functionality

Our 12 V - 100 Ah and 12 V - 150 Ah Ion batteries are equipped with Bluetooth. By downloading the WhisperPower Ion Battery app from the Appstore and Google Play Store, you can easily connect your phone or tablet with the 12 V - 100 Ah and 12 V - 150 Ah battery.

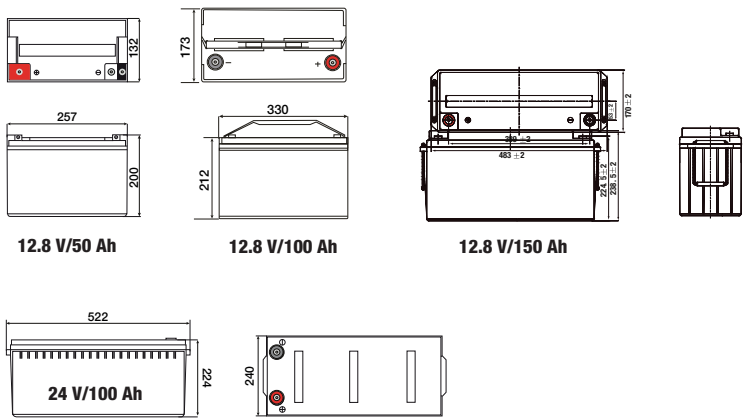
Our app shows the state of charge and main parameters of your battery for maximum control and monitoring.

2.3. General product specifications

	12 V - 50 Ah 640 Wh	12 V - 100 Ah 1280 Wh	12 V - 150 AH 1920 WH	24 V - 100 Ah 2560 Wh
Article Nr.	40291201	40291202	40291203	40291205
TECHNICAL SPECIFICATIONS				
Dimensions (LxWxH) mm	257 x 132 x 200	330 x 173 x 212	483 x 170 x 238	522 x 240 x 224
Weight	8.12 kg	12 kg	16.5 kg	29.6 kg
Terminal connection	M6	M8	M8	M8
Nominal voltage (V)	12.8 V	12.8 V	12.8 V	25.6 V
Charge cut off voltage	15.6 V	15.6 V	15.6 V	31.2 V
End charge voltage	14.6 VDC +- 0.2 V	14.6 VDC +- 0.2 V	14.6 VDC +- 0.2 V	29.2 VDC +- 0.2 V
Max charge current 1C	50 A	100 A	150 A	100 A
Max float charge current	25 A	50 A	75 A	50 A
Minimum discharge cutt off voltage	8 VDC	8 VDC	8 VDC	16 VDC
Nominal discharge cutt off voltage	10 VDC	10 VDC	10 VDC	20 VDC
Max. discharge current 1C	50 A	100 A	150 A	100 A
Pulsed discharge current (10 sec)	60 A	120 A	250 A	100 A
Usable battery capacity at 20°C	50 AH 640 Wh	100 AH 1280 Wh	150 AH 1920 Wh	100 AH 2560 Wh
Cycle Life @ 1c 100% DOD	>2000 cycles	>2000 cycles	>2000 cycles	>2000 cycles
Monthly Self Discharge	<3%	<3%	<2%	<3%
Temperature range (charging)	0°C to 45°C	0°C to 45°C	0°C to 45°C	0°C to 45°C
Temperature range (discharging)	-20°C to +60°C	-20°C to +60°C	-20°C to +60°C	-20°C to +60°C
Temperature range (storage)	-20°C to +60°C	-20°C to +60°C	-20°C to +60°C	-20°C to +60°C
Water dust resistance	IP56	IP56	IP56	IP56
Cell configuration	4S16P	4S32P	4S20P	8S32P
Cell data	26650	26650	32700	26650
Cell chemistry	LiFePo4, Lithium Iron Phosphate Battery, Cylindrical Cell			

2.3.1. Dimensions

Article Nr.	40291201	40291202	40291203	40291205
Height (H):	257 mm	330 mm	483 mm	522 mm
Width (W):	132 mm	173 mm	170 mm	240 mm
Depth (D):	200 mm	212 mm	238 mm	224 mm



2.4. Environmental conditions

Caution! Our Ion Power Basic batteries may only be used in conditions specified in this manual. Exposing the Ion Power Basic battery to conditions beyond the specified boundaries may lead to serious damage to the product and/or the user. Use the Ion Power Basic battery in a dry, clean, dust free, well ventilated space. Do not expose the Ion Power Basic battery to fire or water or solvents.

When the batteries are placed in an enclosed environment without air circulation, it is advised to provide 2 ventilation holes of 100 mm x 100 mm each, to prevent heat built-up.

Recommended charge temperature range	0°C to +45°C
Discharging operating temperature range	-20°C to +60°C
Short term (<1 month) storage temperature range	-20°C to +60°C
Recommended long term (>1 month) storage temperature range	23 ± 5°C
Relative humidity	10-90%

2.5. Product lay-out and connections



1. (-) Terminal to connect charger/consumer
2. (+) Terminal to connect charger/consumer

2.6. Protection modes

Discharge mode

When the Ion Power Basic battery voltage is below 10 V.

Deep discharge mode

When the Ion Power Basic voltage is below 6 V. The Ion Power Basic battery is not usable anymore, and cannot be repaired, only recycled. Make sure the batteries are not deeper discharged than 10 VDC.

3. Safety guidelines and measures

3.1. General

- Do not serial-connect the batteries, 12 Volt DC batteries can only be used in 12 V systems, 24 V are for 24 V systems only.
- Do not short-circuit Ion Power Basic battery.
- Treat the Ion Power Basic battery as described in this manual.
- Do not dismantle, crush, puncture, open or shred the Ion Power Basic battery.
- Do not expose Ion Power Basic battery to heat or fire. Avoid exposure to direct sunlight.
- Do not remove the Ion Power Basic battery from its original packaging until required for use.
- In the event of the Ion Power Basic battery leaking, do not allow the liquid to come in contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.

- Use battery charger devices that are capable to charge the Ion Power Basic battery.
- Observe the plus (+) and minus (–) marks on the Ion Power Basic battery and equipment and ensure correct use.
- Do not use any battery which is not designed for use with the Ion Power Basic battery.
- Do not mix batteries of different manufacture, capacity, size or type within a device.
- Keep the Ion Power Basic battery clean and dry.
- Secondary batteries need to be charged before use. Always use the correct charger and refer this manual for proper charging instructions.
- Do not leave the Ion Power Basic battery on continuous charge when not in use.
- After extended periods of storage, it may be necessary to charge and discharge the Ion Power Basic battery several times to obtain maximum performance.
- Retain the original product documentation for future reference.



Warning! Keep the battery away from water, dust and contamination.

Warning! Do not crush or puncture the battery.

Warning! Never touch the battery contacts or allow (conductive) objects to touch the contacts.

3.2. Disposal



Dispose of the Ion Power Basic battery in accordance with local, state and federal laws and regulations. Batteries may be returned to the manufacturer/WhisperPower.

Do not mix with other (industrial) waste.

4. Installation

4.1. General information



Warning! The 12 V Ion Power Basic battery is for 12 V use only. 24 VDC versions are meant to be used for 24 VDC systems. Never install multiple Ion Power batteries in series.



Warning! Never install or use a damaged Ion Power Basic battery.



Caution! Do not reverse connect the power cables (polarity)

When connecting several batteries in parallel, always use batteries of the same brand, type, age, capacity and state of charge.

4.2. Unpacking

Check the Ion Power Basic battery for damage after unpacking. If the Ion Power Basic battery is damaged, contact your reseller or Whisper Power. Do not install or use the Ion Power Basic battery if it is damaged!

4.3. Preparing the battery for use



Warning! Always remain within the limits indicated in chapter 2 during the use of the Ion Power Basic battery.



Caution! In case of an empty Ion Power Basic battery shutdown, charge immediately.

4.3.1. Location of the Ion Power Basic battery

Before it is used, the battery must be positioned in such a way that it will not move around in its compartment during use.

4.4. Connection cables (+ and -)

Use appropriate wire for the connection wires to ensure no overheating or unnecessary losses occur. Use appropriate fuses matching the wires and load.

4.5. Connecting a charger to the Ion Power Basic Battery



Warning! Ensure you have completed all the previous steps described in chapter 4 before connecting the battery to the charger.

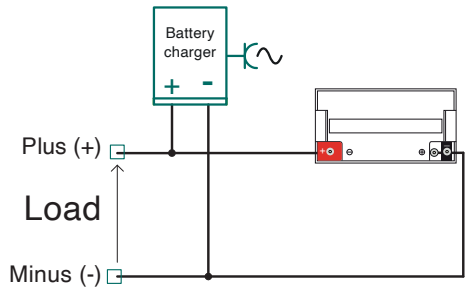


Figure 1. Connecting a charger to the battery

4.6. Connecting batteries in parallel to a charger device

The max. number of batteries in parallel is 8. To divide the current equally amongst batteries, use the schematic bellow:

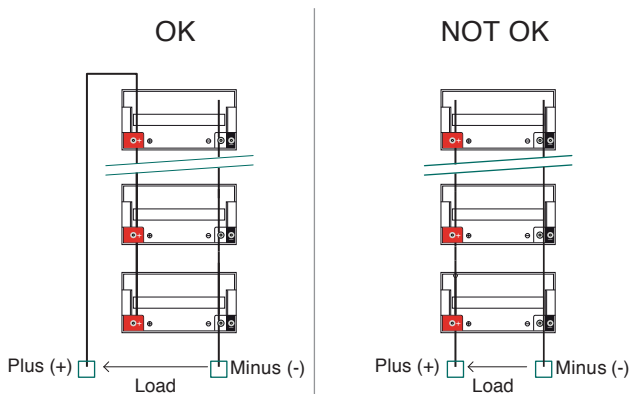


Figure 2. Connecting batteries in parallel

OK: Equally divided battery current. All batteries contribute equally to the current into the load.

NOT OK: Current not equally divided.

Batteries closest to load will have the highest contribution to the current into the load.

Whereas batteries further away from load will have lesser current contribution.

Wear and tear will be higher on the Ion Power Basic close to the load.

4.7. DC load connected - discharge protection

Our ION Power Basic batteries are as standard equipped with a DC switch-off device which is integrated inside the battery, which is activated at 80% discharge.

However, we recommend to install a bi-stable latch relay which should be installed between the battery and the entire DC load (or inverter) as an extra security. Ask your dealer or supplier for the right device.

4.8. Resetting after switch-off

Reset the battery after switch-off protection by disconnecting either the + or – connection cable from the battery.

Make sure the load on the battery is minimal when reconnecting the connection cable again.

4.9. Parallel battery use

- 12 V batteries can be paralleled up to 8 pcs
- 24 V batteries can be paralleled up to 8 pcs
- Series connection not allowed

4.10. BMS readout (12 V 100 & 150 Ah battery)

The main parameters (voltage, current and temperature) and the state of charge of each battery may be remotely accessed through bluetooth. On your remote device (mobile phone or tablet), download the WP-App from the App Store or Google Play. Open the App and connect to your battery under the bluetooth settings every time you are in close proximity to monitor the status.

5. Battery use

5.1. General information

 **Warning!** Follow the safety guidelines and measures of chapter 3.

5.2. Charging

 **Warning!** Never charge the Ion Power Basic battery with a charging current larger than 1C.

 **Warning!** Stop charging in case the Ion Power Basic battery switches into warning mode.

 **Caution!** Charge before use.

 **Caution!** Disconnect the charger from the Ion Power Basic battery if it is not used for a long time.

 **Caution!** To preserve the lifespan of the Ion Power Basic battery use a WhisperPower charger or a charger approved by WhisperPower.

1. Connect the charger to the battery as described in paragraph 4.5.
2. Charge the Ion Power Basic battery in case of an empty shutdown or if the state of charge drops below 20% to preserve the lifespan of the Ion Power Basic battery.

5.3. Charging rate

WhisperPower Lithium Iron Phosphate batteries can be charged in 1 hour. Displayed in Table are the charge times for the Ion Power Basic battery at different charge currents. Always use the indicated charge current and end of charge voltage during charging

Charging rate		
Parameter	Time	Charge current
Maximum	1 hour	1C
Endurance lifecycle	3 hours	C3

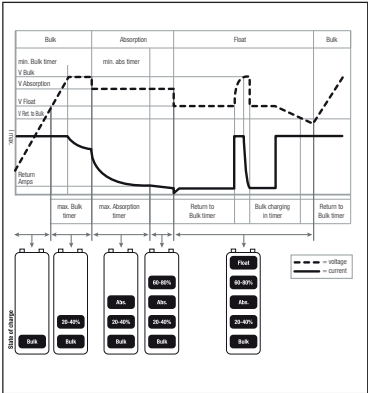
Table 1. Charging rates at different charge currents

5.3.1. Charging method

WhisperPower recommends using the following charging method.

A. Constant voltage, constant current, 14.6 V +/- 0.2 V for a 12 V battery, 29.2 V +/- 0.2 V for a 24 VDC battery. We recommend to use WhisperPower battery chargers with settings at “Lithium-mode” for the best result and most safe and reliable configuration.

B. Multiple or three-stage charging, see graphic at right, is allowed. WhisperPower can supply you with a battery charger with an optimized curve. We recommend to use WhisperPower chargers with settings at “Lithium-mode” for the best result and most safe and reliable configuration.



Bulk phase

In this phase the batteries are charged with a constant current up to the end of charge voltage (UBulk), If UBulk is reached the charger will automatically switch to absorption phase. The maximum charge current (Imax) for Whisper Power batteries is 1C, however for endurance cycle life Whisper Power suggests to limit the current to C2 (1C = nominal battery capacity, C2 = 1/2 of nominal capacity). On some chargers the maximum charger active time (t0) can be programmed. Whisper Power suggests setting t0 to: $t0 = 2 \cdot (BTcap / Chcur)$ Example: Battery capacity = 100Ah, Charger = 50A, Set t0 to a maximum of $2 \cdot (100/45) = 2$ hours.

Bulk Phase				
Parameter	Typical	Min	Max	Remark
Imax		-	-	1C
t0	Depends on the battery SoC	-	-	$2 \cdot (BTcap / Chcur)$

Table 2. Bulk Phase

Absorption phase

In this phase the charge voltage must be maintained at UAbsorption to fully charge the Ion Power Basic battery and set the SoC counter to 100%, see Table. This phase is finished when the SoC is indicating 100%.

Absorption Phase			
Parameter	Typical	Min	Max
UAbsorption	14,6/29,2 VDC	14,2/28,4 VDC	14,6/29,2 VDC
t1	20 minutes	10 minutes	1 hour

Table 3. Absorption Phase

Float phase

In this phase the charge voltage is set to UFloat.

Float Phase			
Parameter	Typical	Min	Max
UFloat	13,8/27,6 VDC	13,6/27,2 VDC	14/28 VDC

Table 4. Float Phase

Discharge Phase			
Parameter	Typical	Min	Max
UFloat	13.5/27 VDC	13.4/26,8 VDC	13.6/27,2 VDC

Table 5. Maintenance phase

5.3.2. Battery balancing

The CBS automatically balances the cells if necessary. Balancing can take place during charging and idle mode and will not have an effect on the functionality of the Ion Power Basic battery.

6. Inspection, cleaning and maintenance

6.1. General information



Warning! Never attempt to open or dismantle the Ion Power Basic battery! The inside of the Ion Power Basic battery does not contain serviceable parts.

1. Disconnect the Ion Power Basic battery from all loads and charging devices before performing cleaning and maintenance activities.
2. Place the enclosed protective caps over the terminals before cleaning and maintenance activities to avoid the risk of contacting the terminals.

6.2. Inspection

1. Inspect for loose and/or damaged wiring and contacts, cracks, deformations, leakage or damage of any other kind. If damage to the Ion Power Basic battery is found, it must be replaced by a professional. Do not attempt to charge or use a damaged Ion Power Basic battery. Do not touch the liquid from a ruptured battery.
2. Regularly check the Ion Power Basic battery's state of charge. Ion Power Basic battery will slowly self-discharge when not in use or whilst in storage.
3. Consider replacing the Ion Power Basic battery with a new one if you note either of the following conditions: The Ion Power Basic battery run time drops below 80% of the original run time. The Ion Power Basic battery charge time increases significantly.

6.3. Cleaning

If necessary, clean the Ion Power Basic battery with a soft, dry cloth. Never use liquids, solvents, or abrasives to clean the Ion Power Basic battery.

7. Storage

Follow the storage instructions in this manual to optimize the lifespan of the Ion Power Basic battery during storage. If these instructions are not followed and the Ion Power Basic battery has no charge remaining when it is checked, consider it to be damaged. Do not attempt to recharge or use it. Replace it with a new Li-ion battery.

See chapter 2.4 for storage temperature conditions.

The self-discharge of the Ion Power Basic battery is 1-2% per month.



Warning! Always set the Ion Power Basic battery in storage mode before storage.
Disconnected the battery after fully charged before storage.

8. Disposal and recycling

8.1. General information

Always discharge the battery Li-ion before disposal. Use electrical tape or other approved covering over the battery connection points to prevent short circuits.

Battery recycling is encouraged. Dispose of the battery in accordance with local, state and federal laws and regulations. Batteries may be returned to the manufacturer.

USA & Canada:

Lithium Iron Phosphate batteries are subject to disposal and recycling regulations that vary by country and region. Always check and follow your applicable regulations before disposing of any battery. Contact Rechargeable Battery Recycling Corporation (www.rbrc.org) for U.S.A. and Canada, or your local battery recycling organization.

EC

Waste must be disposed of in accordance with relevant EC Directives and national, regional and local environmental control regulations. For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used.

Other

Many countries prohibit the disposal of waste electronic equipment in standard waste receptacles.

9. Warranty and liability

9.1 Upon delivery, the customer is obliged to immediately verify whether the products have been damaged during transport. The customer must notify the dealer of such transport damage as soon as possible, in any event no later than within three (3) days of delivery, by means of an accurate, written statement, stating the damage and where possible a photograph. Failure to inspect the products and inform the dealer within the stated time or the use of the products at any time shall be conclusive evidence that Whisper Power has satisfactorily tendered delivery.

9.2 In the event that the customer demonstrates that any of the delivered products do not conform to the agreement, Whisper Power (at its option, upon having received those products returned by the customer) has the option to either repair or replace such products by new products, or to refund the invoice value, exclusive of any dispatch costs.

9.3 Whisper Power grants a five years limited warranty (PRO-RATA) for damages caused by manufacturing defects starting at the time of delivery. Damages caused by manufacturing defects do not include damage resulting from (a) general wear and tear, (b) short circuit, (c) overcharging, (d) deep discharging, (e) overheating of the products (f) installation of the product by persons unskilled to work with electro technical devices or components, (g) any other wrongful use contrary to the Whisper Power's user manual or the safety instruction, (h) any use contrary to the product specifications of that product; (i) any acts of force majeure.

9.4 Except as specified in the clause 9.3 Whisper Power makes no warranty, whether express or implied, including without limitation any implied warranty of merchantability and fitness for a particular purpose or any warranty arising from any course of dealing, course of performance or usage of trade and specifically disclaims any representation or warranty that the product will meet customer's requirements, perform any specific function or achieve a desired result other than expressly stated by Whisper Power in writing.

9.5 Any liability to the customer in any case ceases to apply in the event that the customer fails to notify Whisper Power of the existence of the defect within ten (10) days of having discovered the defect, in writing, in order to enable Whisper Power to investigate the damage.

9.6 Any liability of Whisper Power for damage suffered by the customer is in any case limited to the invoice amount of the relevant products, unless such damage has been caused by gross negligence or willful misconduct of Whisper Power.

Whisper Power can never be held liable for (a) damage caused by any of the circumstances mentioned in clause 9.3, leading to damage to the Whisper Power products or to any other device located near those products, or (b) consequential damage or (c) loss of profits or goodwill.

9.7 To the extent that a court determines that the limitation of liability as meant in clause 9.6 cannot be invoked against a particular claim for damages by the customer, Whisper Power's liability for loss of property, damage to property, and bodily injury (including death) caused by the application of those particular Whisper Power products shall in any event be limited to the amount actually paid out by Whisper Power's insurance company to Whisper Power in accordance with the insurance cover of that insurance policy for that particular type of damage. Whisper Power has taken out insurance against certain risks, as described in the respective insurance policies. These policies contain a usual limitation of insurance payment to be paid out to Whisper Power if, and to the extent that, the event is a covered event.



Enjoy Green Energy