

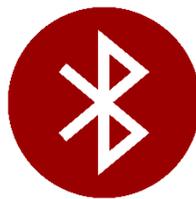
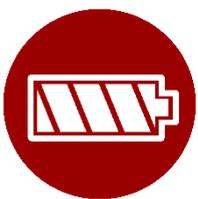
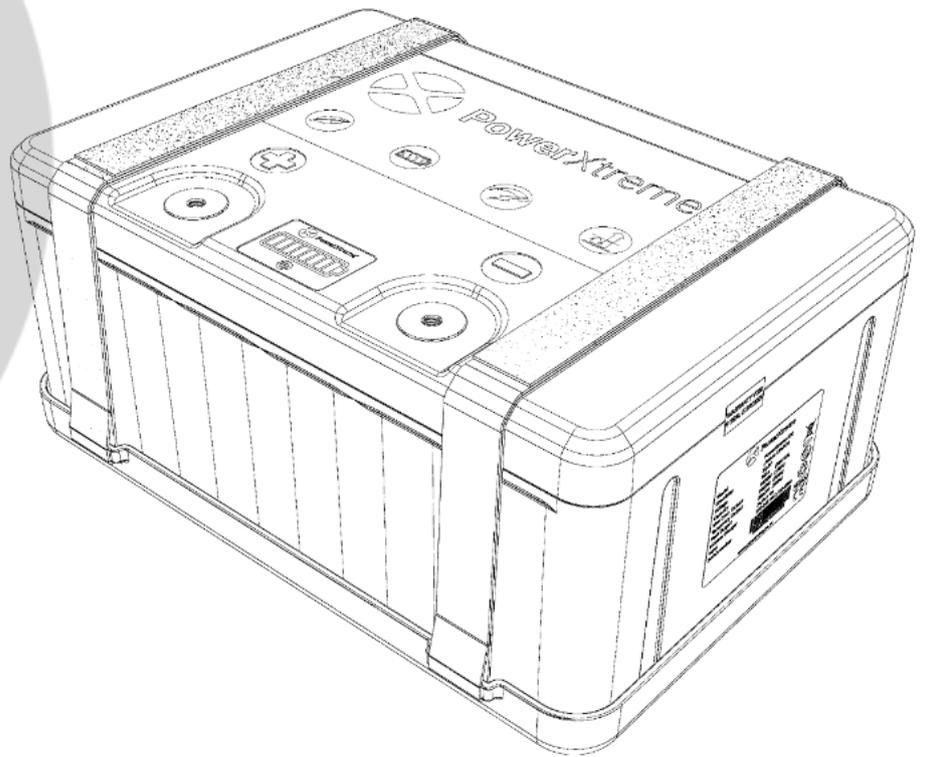


PowerXtreme

Proud experts in LiFePO4 batteries!

User manual

PowerXtreme X20 & X30 LiFePO4 Battery



English
Rev04



EmergoPlus BV
Informaticastraat 20
NL-4538 BT Terneuzen



www.emergoplus.com
info@emergoplus.com



PowerXtreme

Dear customer,

Congratulations on the purchase of this high quality PowerXtreme battery from EmergoPlus!

This product has been developed using the most modern technologies and quality systems. We assure you that we make every effort to ensure trouble-free operation so that you are happy with your purchase. Our ultimate goal is a satisfied customer. If you have any questions, please contact one of our dealers or our service department.

We hope you enjoy your PowerXtreme battery!

Warm regards,

EmergoPlus BV

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1. Product description

The PowerXtreme X20/X30 is a Lithium-iron phosphate (LiFePO₄) battery. This is the safest of the most important lithium-ion battery types. Besides safety, the LiFePO₄ technology is characterized by:

- Minimal weight
- Small dimensions
- Low internal resistance
- High efficiency
- Excellent cycle performance
- Large permitted temperature range
- Almost constant Voltage throughout the entire discharge cycle
- Full capacity is usable

It is possible to use 100% of the capacity before the battery is empty and switches itself off. On the PowerXtreme X20 this is 20Ah and on the PowerXtreme X30 is this 30Ah. This is in contrast to lead-acid batteries where usually 50 - 60% of the capacity can be used before the battery needs to be recharged.

Which makes the X20/X30 battery the right choice for a wide range of applications. Another big advantage compared to lead-acid batteries is that the LiFePO₄ battery does not need to be fully charged. A lead-acid battery will fail due to sulphating if it is not fully charged for a longer period of time.

The PowerXtreme X20/X30 battery consists of 4 cells connected in series with a nominal voltage of 3.2V which together form 12.8V.

Essential part of the LiFePO₄ battery is its Battery Management System (BMS). The BMS monitors the cells that make up the battery for the following risks

- Too deep discharge – If the cells get under a certain voltage, the BMS will stop the discharging. You have to recharge the battery as soon as possible.
- Overvoltage - If the cell voltage exceeds 3.65V during charging, the BMS will stop the higher voltage. The BMS stops the charging process before the cell voltage becomes too high.
- Too high temperature - The BMS will turn off the battery if the system temperature becomes too high.
- Too low temperature - The BMS prevents the battery from being charged at temperatures below -10°C.
- Short circuit - The BMS switches the battery off if the terminals are shorted.
- Our batteries have a cell balancing function built into the BMS. Because the cells are never 100% identical, this system ensures that the cells remain balanced and that no major differences in cell voltages can arise due to the discharge and charging.

The PowerXtreme X20 & X30 are equipped with a smart BMS with Bluetooth technology. After installing the PowerXtreme app on your smartphone, you can read the state of charge, the status, the voltage, the number of cycles, the temperature and the condition of your battery. It is also possible to turn your battery on and off via this app.

2. Safety instructions

2.1 Safety instructions statement

The safety instructions help you to avoid hazards when performing actions.
The safety instructions are divided into the following categories:



WARNING!

Means that the act in question is dangerous and should be prepared before proceeding.



CAREFUL!

Means that the operation can cause damage.



PAY ATTENTION!

Means advice for instruction to the user.

2.2 Safety instructions

- Carefully read this manual before using the battery pack.
 - Only technically qualified personnel may carry out work on the battery.
 - The electrolyte is highly corrosive. Under normal circumstances, contact with the electrolyte is not possible. In case of damage to the battery, avoid direct contact with the electrolyte or powder. If you have come into contact with the electrolyte, rinse it immediately with plenty of water. After this, consult a doctor.
 - Use cables of the correct cross-section and keep the cable connections as short as possible. Use reliable cable clamps and tighten the bolts firmly.
 - Never short-circuit the + and - poles. The internal BMS is protected against short circuits, but to prevent dangerous sparks this is strongly discouraged.
 - Never connect the battery pack in series or in parallel with any other type of battery pack.
 - Do not use the battery as a starter battery.
 - Do not open the battery pack. The guarantee is void if the battery is opened.
 - Do not place the battery pack in a high temperature environment or in direct sunlight or near a heat source >45°C.
 - Never install the battery in rain or damp conditions with RV>80%.
 - Avoid damage to the battery and/or charger housing.
 - Do not store the battery in discharged condition (< 11.5V) for a longer period of time.
 - **Don't forget to disconnect the battery terminals or turn off the ground switch when you don't use the battery for a longer period of time. You can also turn you battery off via the app on your smartphone.**
- Never charge the battery pack at temperatures below 0 °C.
Always use the supplied charger. This charger is suitable for LiFePO4 cell chemistry with the corresponding charging voltage.

- Never use a damaged battery pack.
- Make sure that the battery and charger are never covered with clothing or other materials! This can lead to overheating!

**CAREFUL!**

Using a charger that is not suitable for LiFePO₄ chemicals can damage the battery because it is not properly charged.

2.3 Transport Alert

- The Li-ion battery must be transported in its original packaging.
- The X20/X30 batteries have been tested according to the UN handbook for tests and criteria, part III, paragraph 38.3 (ST/SG/AC.10/11/Rev.5). During transport, the battery falls under category UN3480 class 9, packing group II and must be transported in accordance with these regulations. This means that the battery must be packed in accordance with the packaging instruction P903 for transport over land or sea (ADR, RID & IMDG) and in the case of air transport (IATA) in accordance with the packaging instruction P965. The original packaging complies with these instructions.
- Make sure that the battery is properly secured during transport. The battery can become a projectile if a vehicle is involved in an accident.

3. Description and Operation

3.1 LiFePO₄ battery for caravan mover

The battery has more than enough capacity to carry out 2 normal displacement operations of a caravan. With heavy use (35 A continuous) you can use the mover for up to 60 (X20) or 75 (X30) minutes. With extreme use (100 A) you can use the mover for approx. 18 (X20) or 24 (X30) minutes. After each operation, it is recommended that you charge the battery for another operation.

The battery is suitable for briefly (approx. 10 sec) delivering very high currents to overcome a threshold or other obstacle. If you try to do this for a longer period of time, the battery will switch off automatically and you should wait until the battery resets itself.

If the battery is switched off due to a short-circuit, the cause of this short-circuit must be eliminated. After that, by connecting the charger to the grid, the battery will reactivate.

3.2 Led indicator

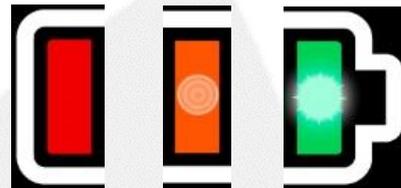
Your PowerXtreme battery is equipped with a smart LED indicator to read the remaining battery-capacity. The display shows whether the battery is being charged, the available capacity and it also shows if it is connected via the PowerXtreme app (see paragraph 3.5).

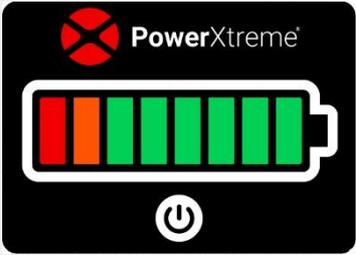
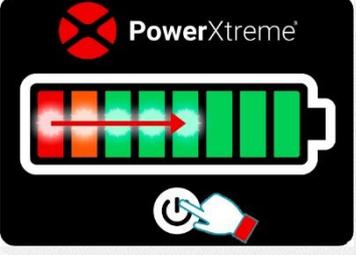
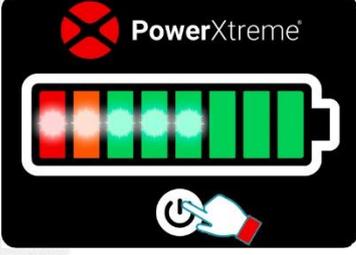
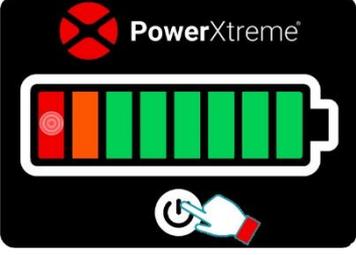
The LED indicator is located on the top of the battery, between the battery poles. You can operate it with the power button.

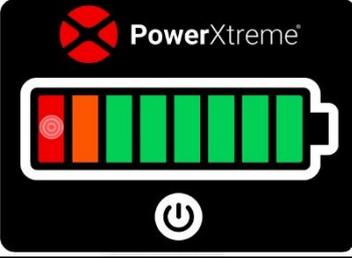
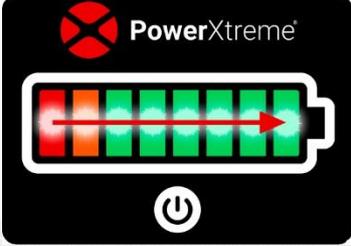
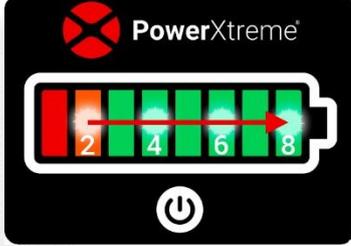
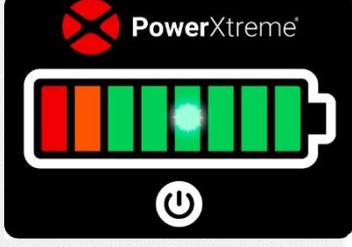
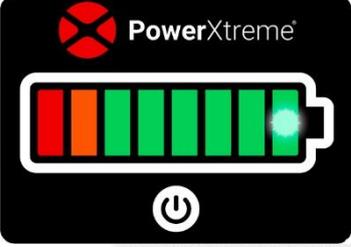
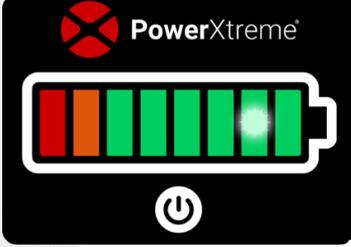


Legend lights Led indicator

Off Blink On



Battery is not connected with 230V grid powercord		
	Battery is not connected with app	Battery is connected with app
If the battery is not connected with 230V powercord, NO LEDs will light up.		
Checking the capacity of your battery		
	After pressing, the LEDs will increase to the remaining level, this will remain lit for +/- 20 seconds.	After pressing, the number of lit LEDs (+/- 5 sec.) indicate the level.
Battery capacity lower than 5%		
	After pressing the red LED flashes	

Battery is connected by 230V grid power cord		
	Battery is <u>not connected</u> with with app	Battery is <u>connected</u> with app
If the red LED flashes, the battery is charged less than 5%		
While charging	 <p>All LEDs will run up once, then (follow arrow)</p>	 <p>Even LEDs run up once, then (follow arrow)</p>
	 <p>Level is indicated by one lit LED (+/- sec.) This process continues to repeat until the battery is fully charged.</p>	
Battery is fully charged	 <p>The last LED lights up.</p>	 <p>or</p> <p>The second last LED lights up (*this situation indicates balancing status.)</p>

3.3 Charging

After using the battery must be recharged. During charging: by means of illuminated LEDs the indicator shows the indication of the charging status and the charging process. (see paragraph 3.2).

For example: If the capacity of a X20 still remains 40% (the capacity is still 40% of 20Ah = 8 Ah), 12 Ah will be able to charge. The charging time is then about $12\text{Ah} / 4\text{A}$ (charging current) = 3 hours + ca. 1 hour for the last part of the charging process.

We advise not to keep the charger connected to 230V for a long time (> 1 month) It is also not recommended to charge the battery at temperatures below 0 ° C

The battery can also be charged by solar panels if they are connected to a charger that is suitable for charging LiFePO4 batteries. We have the XS20s MPPT Solar charger in our program. Because of the MPPT technique this charger gets the maximum efficiency from your Solar panels.

You can also charge the battery while driving. For charging the battery while driving, you need to use a PowerXCharger XC3. (see paragraph 3.4)



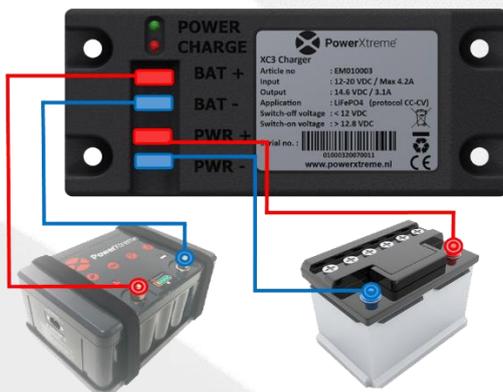
WARNING!

Stop the charging process if the battery becomes too hot during charging (> 45°C – 50 °C).

3.4 PowerXCharger XC3 (OPTIONAL)

To charge the battery while driving, the PowerXCharger XC3 is available as an option. This converts boosts the charging voltage of the car alternator into the right charging voltage for the PowerXtreme battery. Due to the limited charging current, there is no need to install thick wiring. The XC3 also acts as a battery guard. If the terminal voltage of the starter battery is too low, the XC3 switches the battery off so that the starter battery does not discharge further.

Charging will resume as soon as the battery voltage is sufficiently high (for example, after starting the engine)



Some caravans already have a charging system on board. In most cases our PowerXtreme batteries can be connected without any problems. Contact your dealer or our service-department for more information.

3.5 PowerXtreme App

Via the Apple store (suitable for iPhone 4S with IOS 6 or higher) or the Google Play store (suitable for Android 4.3 or higher) you can download the PowerXtreme App and use it to read the status and health of your battery.

Below, you see the QR-codes for a quick search from our app in your App or in the Play Store:

Play Store (Android)



App Store (IOS)

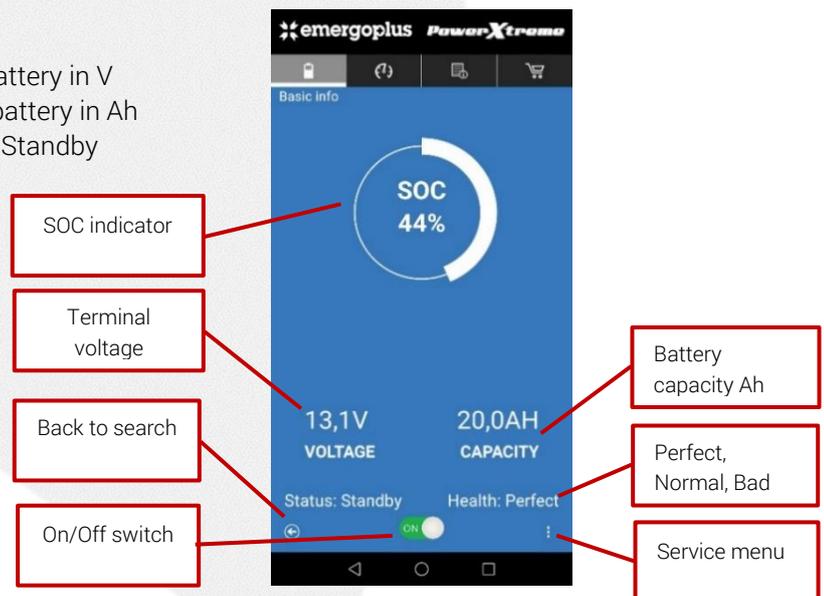


To connect your mobile phone with the PowerXtreme app, you must turn on Bluetooth and also turn on location services. Opening the APP a dialog box appears where you can see all Bluetooth devices within the range (< 5.0 metres). You can recognise your battery by the serial number that starts with EM..... Select your battery, connect via Bluetooth and you will see all the information about the battery.

The following data is displayed in the APP:

Tab Basic Info:

- State of Charge: SOC State of charge in %
- Voltage: Terminal voltage of the battery in V
- Capacity: Capacity/Content of the battery in Ah
- Status: Charging - Discharging – Standby
- Health: Health condition
- On/ Off: On/ Off switch



SOC means "State of Charge" or the state of charge of the battery. The voltage and capacity of the battery are listed below.

"STATUS" shows whether the battery is charging or discharging or whether the battery is in standby mode.

Health shows the condition of the battery. The three dots at the bottom right will open a menu intended for service purposes.

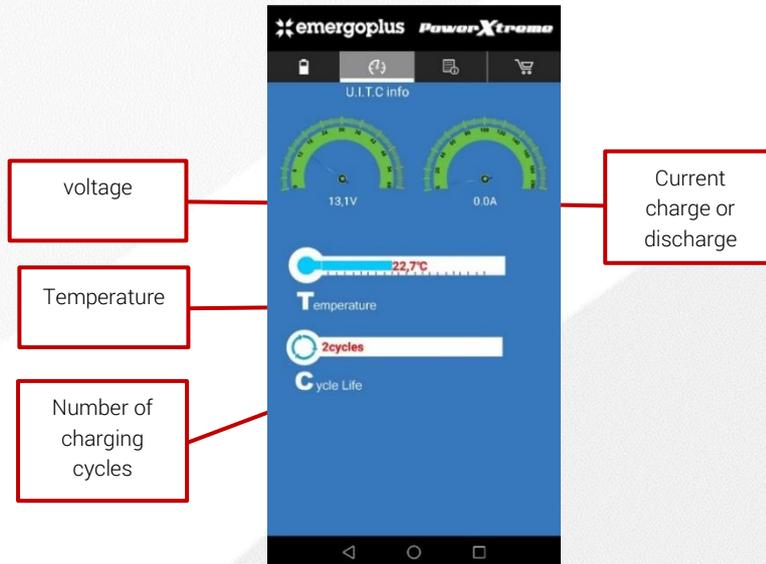


PAY ATTENTION!

It is possible that the app displays a value that is too low for the SOC (charge status) when the battery has not been used for a longer period of time. Once you have charged the battery, the SOC display will be correct again.

Tab U.I.T.C tab:

- Voltage meter Terminal voltage of the battery in V
- Current meter Present current consumption in A
- Temperature Temperature of the battery cells
- Cycle life: Number of charge/discharge cycles



The UITC info shows 2 "meters", on the left the battery voltage and on the right the current. This can be the charging current or the current drawn from the battery. If the battery is connected to a charger but at the same time power is requested by users, the resulting current is displayed.

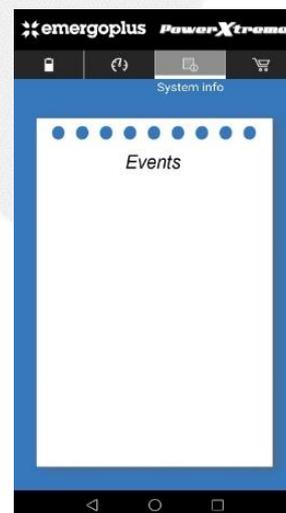
Temperature of the cell pack. If the temperature is too low or too high, a safety device is activated.

Cycle Life shows how often the battery has been discharged and recharged. 4 x 25% discharging and charging also counts as 1 cycle.

System Info tab:

System info contains messages about events that occurred during the charging or discharge process. This refers to the following events:

- Short circuit
- Lift up short circuit
- High temperature at charging
- High temperature at discharge
- Low temperature at charging
- Low temperature at discharge
- Overcurrent when charging
- Too much current when discharged
- High Voltage
- Low Voltage
- Temperature/Voltage/Current back to normal
- Display remaining charge time



The Buy Info tab:

Provide the contact details of EmergoPlus.

3.6 Storage

If you want to store the battery for a longer period of time, disconnect the battery terminals. This will prevent the battery from being discharged by slumber leaking consumption.

The battery has a very low self-discharge, it is possible to put the battery in a storage for a period up to six months without any problems. (Pay attention, you have to store the battery fully charged). We recommend to charge the battery every 6 months.

Keep in mind, if you drive the caravan with help of the mover in the garage, the battery (depending on the manoeuvring time and the load) is a bit discharged. This can affect the bridging period without charging.

3.7 Installation

The box contains:

- Battery
- Battery terminals + and – with 2 mounting bolts
- Mounting plate with Velcro and 4 self-tapping screws
- 4 self-tapping screws
- Warranty & instruction card
- Grid Charging cord 230V AC



Figure 1. Package contents X20 & X30

Important before installing the battery:

- After unpacking, check all parts for possible damage.
- Fully charge the battery before first use.



WARNING!

Never use the LiFePO4 battery in locations with gas or dust explosion hazards or potentially flammable products.

- Install the battery pack using the supplied mounting plate and Velcro fastener at the location of your choice in the caravan.
- Make sure there is at least 10 cm clearance around the battery. Do not install the LiFePO4 battery in an unventilated area, there is a risk of overheating!



Figure 2. Difference diameter of + and – pole



PAY ATTENTION!

The supplied battery poles have different diameters. The thinnest pole is to connect the negative pole, the thickest pole is to connect the positive pole

- Switch off all loads and charging equipment before you start connecting.
- Use proper cabling of sufficient cross-section and correctly dimensioned terminals and battery terminals. Tighten all connections securely. Recommended tightening torque for M6 is 10 - 14 Nm. Do not use too great tightening torque, as this can lead to damage to the LiFePO4 battery.
- If you use screws to connect consumers instead of the supplied battery terminals, make sure that you don't turn these screws more than 10mm into the battery terminal connection.


CAREFUL!

If bolts which are too long are used, the connections will not get tight! This leads to large contact resistances and can cause the battery or equipment to overheat or switch off.

- Connect the negative pole of the battery to the negative connection of the caravan mover unit.
- Connect the positive terminal of the battery to the positive terminal of the caravan mover unit.
- Use cables as prescribed in your caravan mover manual. It is recommended to use a minimum of 16 mm². Use one red wire for the + and one black or blue wire for the -.


CAREFUL!

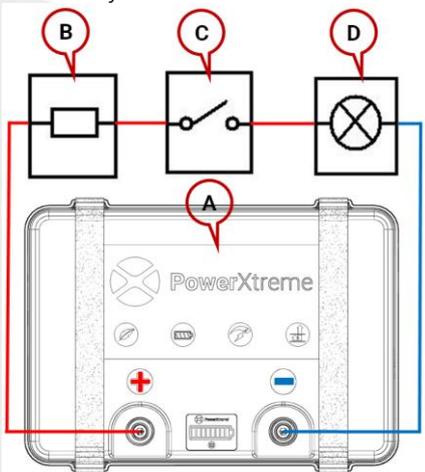
Observe the polarity of the battery and avoid short circuits! Equipment whose polarity is incorrectly connected can be irreparably damaged.

- Never connect the battery in parallel to any other type of battery, including the wiring from the car.
- Do not work on the LiFePO₄ battery or the installation when it is still live. Only make changes to your electrical installation carried out by qualified electricians.


PAY ATTENTION!

Install a fuse and a main switch to the power circuit according to local regulations. Place the fuse as close as possible to the + pole of the battery.

- After first use test all the connections for (over) heating. Repair or replace connections that have become too hot.
- Check the wiring and connections at least once a year. Immediately rectify defects such as loose connections and burnt/melted cables.

System overview:


A = PowerXtreme X20/X30

B = Fuse

C = Main switch

D = Load


WARNING!

Never connect the battery in parallel to another battery, including the wiring from the car.

Figure 3. Wiring diagram

An X20 can be connected in parallel with another X20 battery.

4 Decommissioning



Electric appliances should not be disposed of with normal household waste. According to the European Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), these devices must be collected separately in order to recycle them in an environmentally friendly manner. For this you can contact your municipality or local supplier.



5 Technical specifications

5.1 Indication battery



Indication battery capacity +
LED indication charging



Charging cord
connection

+ pole

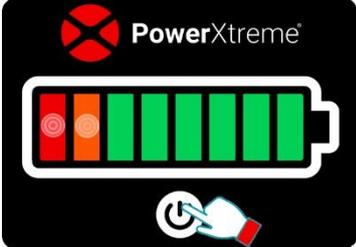
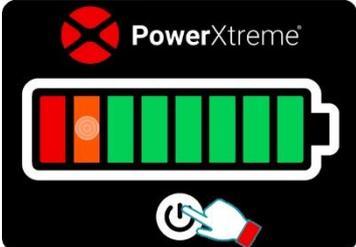
- pole

5.2 Battery

Model	 X20	 X30	unit
Cell Chemistry	LiFePO4		
Cell Technology	Prismatic		
Voltage	12		V
Nominal Voltage	12,8		V
Capacity	20	30	Ah
Max. continuous current	100	150	A
Momentary current (30 Sec)	150	210	A
Peak current	200	300	A
Max. charging current	40	60	A
Max. charging voltage	14,6		V
Max. discharge voltage	9		V
Operating temperature	-20 to 60		°C
Charge temperature	0 to 45		°C
Storage temperature	-10 to 45		°C
Weight	3,8	5	kg
Poles	2 x M6 threaded hole + poles		
Communication	Bluetooth indication with App + indication on battery		
Lifespan (80% DOD)	>2000 cycles		
IP-class	IP 62		
Cell balancing	Yes		
Dimensions	255 x 177 x 115		mm
Safety features	Over current, Under- and Over voltage, Short circuit, Temperature		
Internal charger			
Input Voltage	100 – 240		Vac
Input Frequency	50 – 60		Hz
Output Voltage	14,6		Vdc
Charge Current	4		A
Charging Characteristic	CC - CV		

6 Failures and repairs

6.1 Fault finding chart

Problem	Cause	Solution
Battery capacity drops away, but voltage >12V.	SOC decreases faster than is actually the case. (Probably after long storage time)	Fully charge the battery. SOC is then again accurate.
No voltage at poles.	Short circuit or overload.	Disconnect the battery terminals. Let the charger charge for a while. Reconnect the battery terminals.
Charger connected with 230V power cord, Red and Orange LED flashing 	Charger defect	Contact your dealer
No voltage on poles, Orange LED flashing 	Battery is switched off in the app	Turn on the battery with the PowerXtreme app or consult Service on our website www.powerxtreme.nl

For an extensive fault flowchart see: www.powerxtreme.nl/service

7 Warranty conditions

EmergoPlus guarantees that the PowerXtreme X20/X30 battery is designed in accordance with the legally applicable standards and regulations. During production and prior to delivery, all PowerXtreme X20/X30 batteries were extensively tested and checked. If you do not act in accordance with the instructions and the regulations of this manual, damage may occur and/or the unit will not comply with our specifications. This could imply that the warranty becomes void.

The warranty period is 2 years. If you register your battery with us on time (via website www.emergoplus.com) we extend the warranty period to 5 years.

Warranty period

EmergoPlus B.V. guarantees within the warranty period of 5 years (*after registration) that the product is free from defects in materials and production under normal use, if installation and maintenance instructions have been followed and at normal storage (by storage is meant the condition in which the product is not used for which it is intended) The warranty period starts at the date of purchase in the store. This warranty is not transferable for resale.

Exclusions

This warranty does not cover: a) wear, corrosion, discoloration and aging due to normal use and storage; b) damage as a result of incorrect and/or improper maintenance; c) damage caused to the product by external causes such as fire, water, vapor, liquid, ice, misapplication, falling, neglect, misuse (including use contrary to the instruction given by EmergoPlus BV) or abuse.

Invocation of the Guarantee

If you wish to make a claim under this warranty, you have to notify the point of sale where you have purchased the product of the defect within a reasonable period of time after the defect is discovered, but in any case before the end of the warranty period. You can also contact the head office of EmergoPlus BV. When invoking the warranty, the product (or the defect part) must be accompanied by the warranty certificate and the original purchase invoice.

8 Liability

EmergoPlus is not liable for:

- Damage resulting from the use of the PowerXtreme X20/X30;
- Possible errors in the supplied manual and their consequences;
- Use that is incompatible with the purpose of the product.
- Information in this document is subject to change without notice. EmergoPlus BV is not liable for any technical errors or omissions in this document. The purchased product may differ from the product described in this manual.

The liability of EmergoPlus BV is limited to the costs of reparation and/or replacement of the product under warranty. With a replacement of the product, the warranty date starts with the purchase of the original product and EmergoPlus BV is not liable for loss of profit, consequential damage, indirect damage or other special forms of damage. In any case, this warranty does not affect your statutory rights as a consumer and is only valid and legally enforceable in the country where the product was purchased.

9 EG Declaration of Conformity

EG DECLARATION OF CONFORMITY OF ELECTRICAL EQUIPMENT

Declaration according to Directive 2014/35 / EC, as amended

This language version of the statement is checked by the manufacturer (original statement).

We:

Name : EmergoPlus BV
Address : Informaticastraat 20, 4538 BT Terneuzen
Country : The Netherlands

declare for the product described below:

Generic name : LiFePO4 battery
Trade name : PowerXtreme X20/X30
Model : X20/X30
Function : 12V Battery for power supply in caravans and other applications.

that all relevant provisions of the Machinery Directive are met;

that the product also complies with the provisions of the following European directives:

2014-35/EU DIRECTIVE 2014/35 / EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonization of the laws of the Member States concerning the making available on the market of electrical equipment for use within specified voltage limits.

2014/30/EU DIRECTIVE 2014/30 / EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonization of the laws of the Member States concerning electromagnetic compatibility.

2011/65/EU DIRECTIVE 2011/65 / EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

And the following harmonized standards:

EN 61000-6-1:2007 Electromagnetic compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial and light-industrial environments

EN 61000-6-2:2005 Electromagnetic Compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments

EN 61000-6-3:2007+A1:2011 Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standards for residential, commercial and light-industrial environments

EN 61000-3-2:2014 Electromagnetic compatibility (EMC) - Part 3-2: Limit values - Limit values for harmonic currents emissions (input current of the devices ≤ 16 A per phase)

EN 61000-3-3:2013 Electromagnetic compatibility (EMC) - Part 3-3: Limits for voltage fluctuations, voltage fluctuations and flicker in public low-voltage networks for equipment with an input current ≤ 16 A per phase and without conditional connection

EN60950-1:2005+A1:2009+A2:2013 Information technology equipment - Safety - Part 1: General requirements

and which the following natural or legal person established in the Community is authorized to compile the technical file:

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Done at Terneuzen 01-09-2020



Dick van Wijck
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