



**PYLON**TECH

# **Lithium-Ion Phosphate Battery Force-L1 Product Manual**

Information Version: 2.2

This manual introduces Force-L1 from Pylontech. Force-L1 is a 48Vdc Lithium-Ion Phosphate Battery storage system. Please read this manual before you install the battery and follow the instruction carefully during the installation process. Any confusion, please contact Pylontech immediately for advice and clarification.

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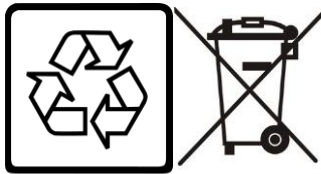
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## 1. Safety Precautions



### Reminding

- 1) It is very important and necessary to read the user manual carefully (in the accessories) before installing or using battery. Failure to do so or to follow any of the instructions or warnings in this document can result in electrical shock, serious injury, or death, or can damage battery, potentially rendering it inoperable.
- 2) If the battery is stored for long time, it is required to charge them every six months, and the SOC should be no less than 90%;
- 3) Battery needs to be recharged within 12 hours, after fully discharged;
- 4) Do not expose cable outside;
- 5) All the battery terminals must be disconnected for maintenance;
- 6) Please contact the supplier within 24 hours if there is something abnormal.
- 7) Do not use cleaning solvents to clean battery;
- 8) Do not expose battery to flammable or harsh chemicals or vapors;
- 9) Do not paint any part of battery, include any internal or external components;
- 10) Do not connect battery with PV solar wiring directly;
- 11) The warranty claims are excluded for direct or indirect damage due to items above.
- 12) Any foreign object is prohibited to insert into any part of battery.



**Li-ion** 



### Warning

#### 1.1 Before Connecting

- 1) After unpacking, please check product and packing list first, if product is damaged or lack of parts, please contact with the local retailer;
- 2) Before installation, be sure to cut off the grid power and make sure the battery is in the turned-off mode;
- 3) Wiring must be correct, do not mistake the positive and negative cables, and ensure no short circuit with the external device;
- 4) It is prohibited to connect the battery and AC power directly;
- 5) The embedded BMS in the battery is designed for 48VDC, please DO NOT connect battery in series;
- 6) Battery system must be well ground and the resistance must be less than 1Ω;
- 7) Please ensured the electrical parameters of battery system are compatible to related equipment;

8) Keep the battery away from water and fire.

## **1.2 In Using**

- 1) If the battery system needs to be moved or repaired, the power must be cut off and the battery is completely shut down;
- 2) It is prohibited to connect the battery with different type of battery.
- 3) It is prohibited to put the batteries working with faulty or incompatible inverter;
- 4) It is prohibited to disassemble the battery (QC tab removed or damaged);
- 5) In case of fire, only dry powder fire extinguisher can be used, liquid fire extinguishers are prohibited;

Please do not open, repair or disassemble the battery except staffs from Pylontech or authorized by Pylontech. We do not undertake any consequences or related responsibility which because of violation of safety operation or violating of design, production and equipment safety standards.

## 2. Introduction

Force-L1 lithium iron phosphate battery is one of new energy storage products developed and produced by Pylontech, it can be used to support reliable power for various types of equipment and systems. Force-L1 is especially suitable for application scene of high power, limited installation space, restricted load-bearing and long cycle life.

Force-L1 has built-in BMS battery management system, which can manage and monitor cells information including voltage, current and temperature. What's more, BMS can balance cells charging and discharging to extend cycle life.

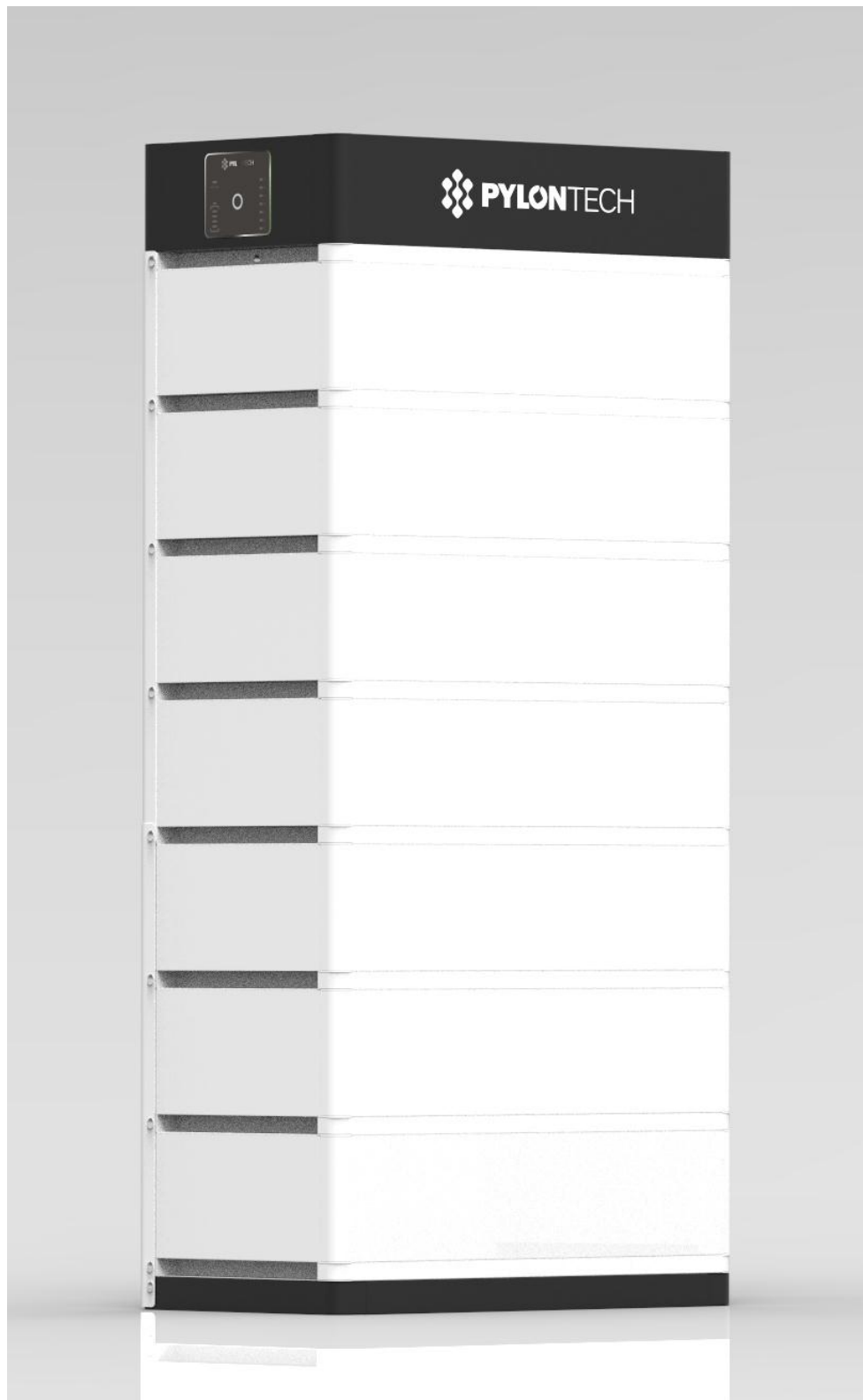
Multiple batteries can connect in parallel to expand capacity and power in parallel for larger capacity and longer power supporting duration requirements.

### 2.1 features:

- The whole module is non-toxic, non-polluting and environmentally friendly;
- Cathode material is made from LiFePO<sub>4</sub> with safety performance and long cycle life;
- Battery management system (BMS) has protection functions including over-discharge, over-charge, over-current and high/low temperature;
- The system can automatically manage charge and discharge state and balance current and voltage of each cell;
- Flexible configuration, multiple battery modules can be in parallel for expanding capacity and power
- Adopted self-cooling mode rapidly reduced system entire noise;  
The module has less self-discharge, up to 6 months without charging it on shelf, no memory effect, excellent performance of shallow charge and discharge;
- Working temperature range is from -10°C to 50°C, (Charging 0~50°C; discharging -10~50°C) with excellent discharge performance and cycle life;
- Small size and light weight, stackable connection comfortable for installation and maintenance;

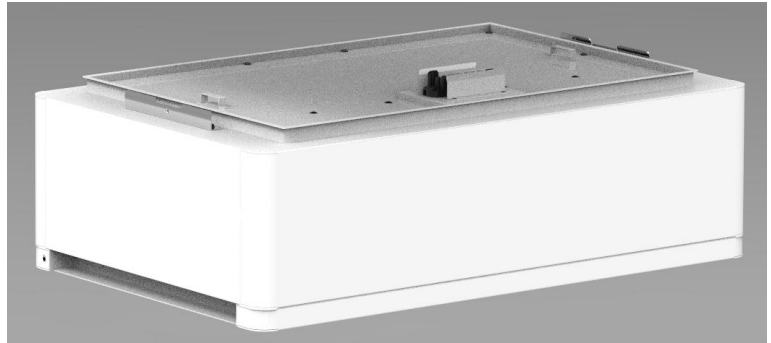
## 2.2 Specifications

### 2.2.1 The parameter of system



Product Type	FORCE-L1 (48V518AH)
Cell Technology	Li-ion(LFP)
Battery System Capacity(kWh)	24.86
Battery System Voltage(Vdc)	48
Battery System Capacity(AH)	518
Battery Controller Name	FC0048-100
Battery Module Name	FL48074
Battery Module Quantity(pcs)	7
Battery Module Capacity(kWh)	3.55
Battery Module Voltage(Vdc)	48
Battery Module Capacity(AH)	74
Battery Module Cell Series Quantity(pcs)	15
Battery System Charge Upper-Voltage(Vdc)	53.5
Battery System Charge Current(Standard)	100
Battery System Charge Current(Normal)	100
Battery System Charge Current(Max.@15S)	110
Battery System Discharge lower-Voltage(Vdc)	44.5
Battery System Discharge Current(Standard)	100
Battery System Discharge Current(Normal)	100
Battery System Discharge Current(Max.)	110
Efficiency	96%
Depth of Discharge	90%
Dimension(W*D*H,mm)	600*380*1380
Communication	RS485\CAN
Protection Class	IP55
Weight (kg)	265
Operation Life(Years)	15+
Operation Temperature(°C)	0~50°C
Storage Temperature(°C)	-20~60°C
Product Certificate	VDE2510-50, IEC62619 CE
Transfer Certificate	UN38.3
Other: 1) Battery Controller Dimensions(W*D*H) 2) Battery Module Dimensions (W*D*H) 3) Battery bottom base Dimensions(W*D*H)	600×380×150mm 600×380×170mm 600×380×40mm

### 2.2.2 Battery Module (FL48074)



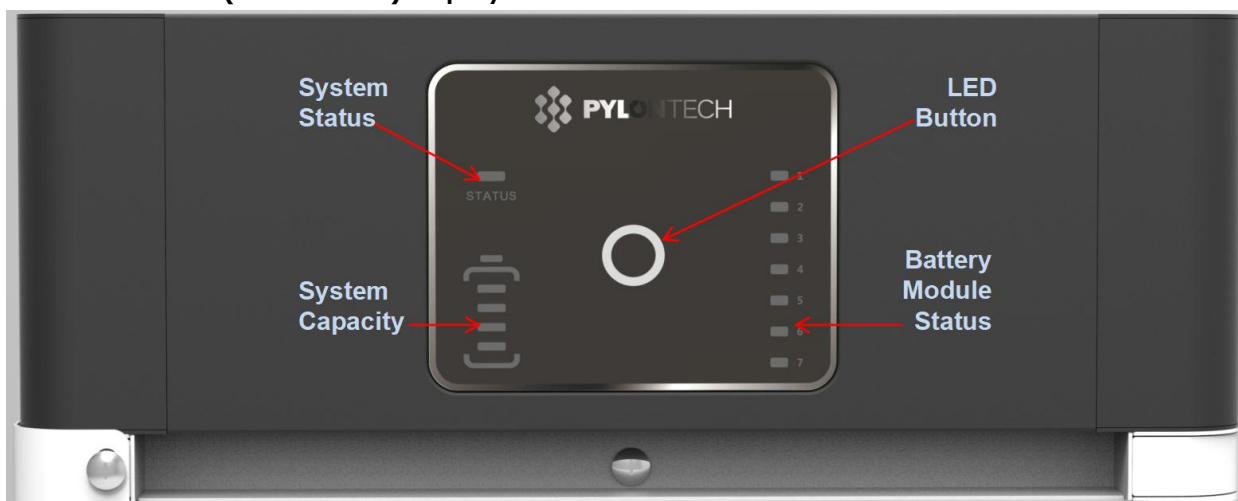
Product Type	FL48074
Cell Technology	Li-ion (LFP)
Battery Module Capacity (kWh)	3.55
Battery Module Voltage (Vdc)	48
Battery Module Capacity (Ah)	74
Battery Module Serial Cell Quantity (pcs)	15
Battery Cell Voltage (Vdc)	3.2
Battery Cell Capacity (AH)	37
Dimension (W*D*H, mm)	600*380*170
Weight (kg)	35
Operation Life	15+Years
Operation Cycle Life	5,000
Operation Temperature	0~50°C
Storage Temperature	-20~60°C
Transportation Certificate	UN38.3




### 2.2.3 Control Module FC0048-100 (internal power supply)



#### Control Module (FC0048-100) Display Panel

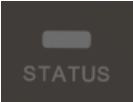


#### LED Button

	Short Press	Display the LED panel for 20sec.
	Long Press (more than 5sec)	<p>When status LED fast flash blue ●, loss the button, then it is chosen 115200 baud rate of RS485.</p> <p>When status LED fast flash orange ●, loss the button, then it is chosen 9600 baud rate of RS485.</p>


## Status

System Status: blue means working normally; Orange means protection or failure.

	Blue, slow flashing.	Power Relay CLOSE. Alarm exist but can work continue.
	Blue, lighting.	Power Relay CLOSE. Normal.
	Orange, slow flashing.	Power Relay OPEN. Normal protection, can recover on its own (Over Voltage, Under Voltage, etc.).
	Orange, lighting.	Power Relay OPEN. Important protection, failure, lost efficacy etc. Or failed to assign address.


## Battery Module Status

Battery Module Status: blue means working normally; Orange means protection or failure

	Blue, slow flashing.	Alarm exist but can work continue.
	Blue, lighting.	Normal.
	Blue, light once.	1~n LED lights on one by one, for address distribution.
	Orange, slow flashing.	Module offline.
	Orange, lighting.	Module protection, failure, etc.

## System Capacity

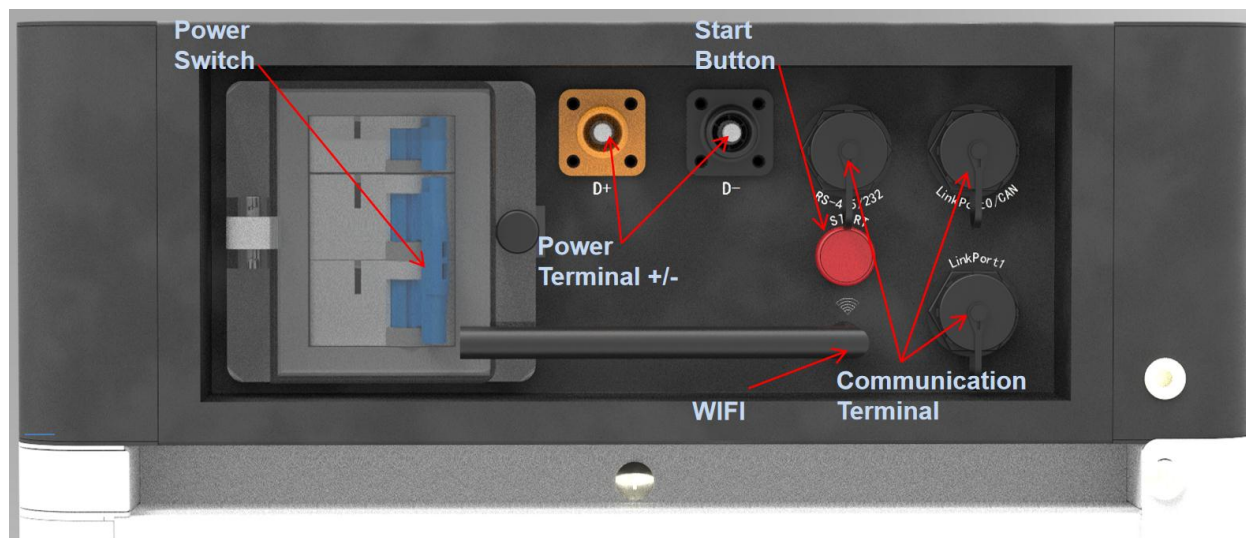
Indicate the system SOC.

	Blue, slow flashing.	Each LED indicate 25%SOC. <b>Idle</b>
	Blue, flashing.	Each LED indicate 25%SOC. <b>Discharge</b>
	Blue, lighting.	Each LED indicate 25%SOC. <b>Charge</b>

**Remark:** Slow flashing: 1.5s ON/0.5s OFF. Flashing 0.5s ON/0.5s OFF.

Fast flashing: 0.1s ON/0.1s OFF.

## Control Module (FC0048-100) Cable Panel



### Power Switch

Switch A (1P). ON: the battery system's controller able to turn on. OFF: whole system turns OFF.

Switch B (2P). Main breaker.



**Caution:** When the breaker is tripped off because of over current or short circuit, must wait more than 30min then can turn on it again, otherwise may cause the breaker damage.

### Start

Start function: press more than 5sec until the buzzer rings, to turn on controller.



开机：长按至蜂鸣器响

**Power on:** Press and hold  $\geq 5\text{sec}$  till the buzzer rings

Black start function: when system turn on, and

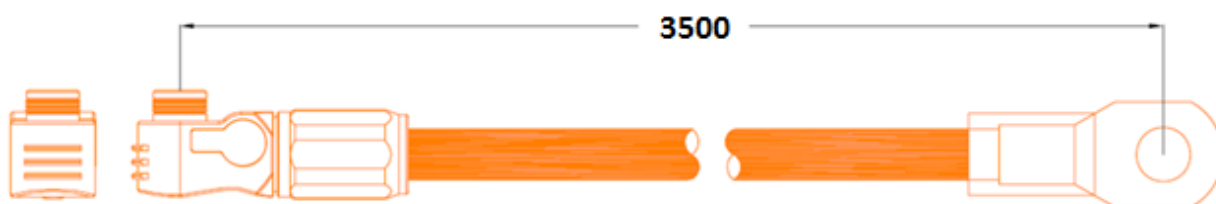
relay is OFF, press more than 5sec, and relay will turn on for 3 min (depends on conditions).

### Wi-Fi

Currently not available. Function reserved.

### Power Terminal (+/-)

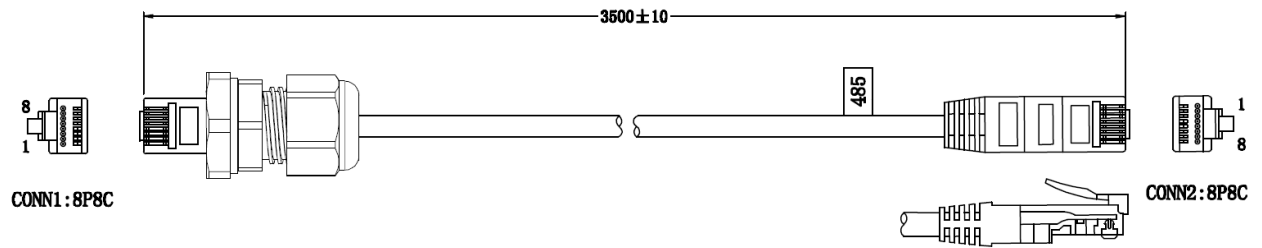
Connect power cables of battery system with Inverter.



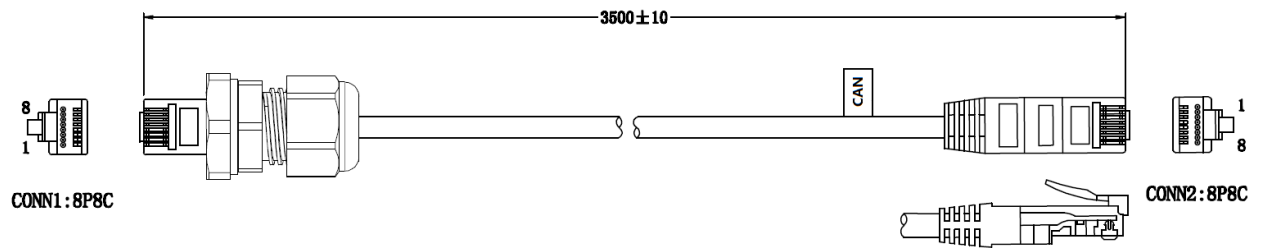


**Communication Terminal (RS485 / CAN / RS232 / Link Port 0 / Link Port 1)**

**RS485** Communication Terminal: (RJ45 port) follow RS485 protocol, for communication between battery system and inverter.



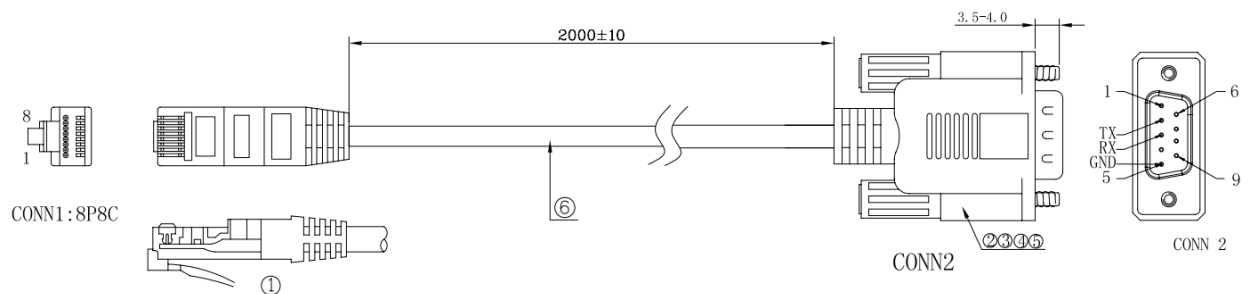
**CAN** Communication Terminal: (RJ45 port) follow CAN protocol, for communication between battery system and inverter.



**CAN** Communication Terminal: (RJ45 port) follow CAN protocol,

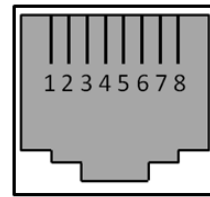
**Link port0/1** for communication between battery piles.

**RS232** Communication Terminal: (RJ45 port) follow RS232 protocol, for manufacturer or professional engineer to debug or service.



### Definition of RJ45 Port Pin

CAN	RS485	RS232
---	---	---
---	---	---
---	---	TX
CANH	---	---
CANL	---	---
GND		RX
---	RS485A	---
---	RS485B	---



**RJ45 Port**



**RJ45 Plug**

Note: Other Pin must be NULL, if not may influence the communication of system.

### **3. Emergency Situations**

#### **1) Leaking Batteries**

If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If one is exposed to the leaked substance, immediately perform the actions described below.

Inhalation: Evacuate the contaminated area, and seek medical attention.

Contact with eyes: Rinse eyes with flowing water for 15 minutes, and seek medical attention.

Contact with skin: Wash the affected area thoroughly with soap and water, and seek medical attention.

Ingestion: Induce vomiting, and seek medical attention.

#### **2) Fire**

NO WATER! Only dry powder fire extinguisher can be used; if possible, move the battery pack to a safe area before it catches fire.

#### **3) Wet Batteries**

If the battery pack is wet or submerged in water, do not let people access it, and then contact Pylontech or an authorized dealer for technical support.

#### **4) Damaged Batteries**

Damaged batteries are dangerous and must be handled with the utmost care. They are not fit for use and may pose a danger to people or property. If the battery pack seems to be damaged, pack it in its original container, and then return it to Pylontech or an authorized dealer.

#### **NOTE**

Damaged batteries may leak electrolyte or produce flammable gas. If such damage occurs, please contact Pylontech: [service@pylontech.com.cn](mailto:service@pylontech.com.cn)



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