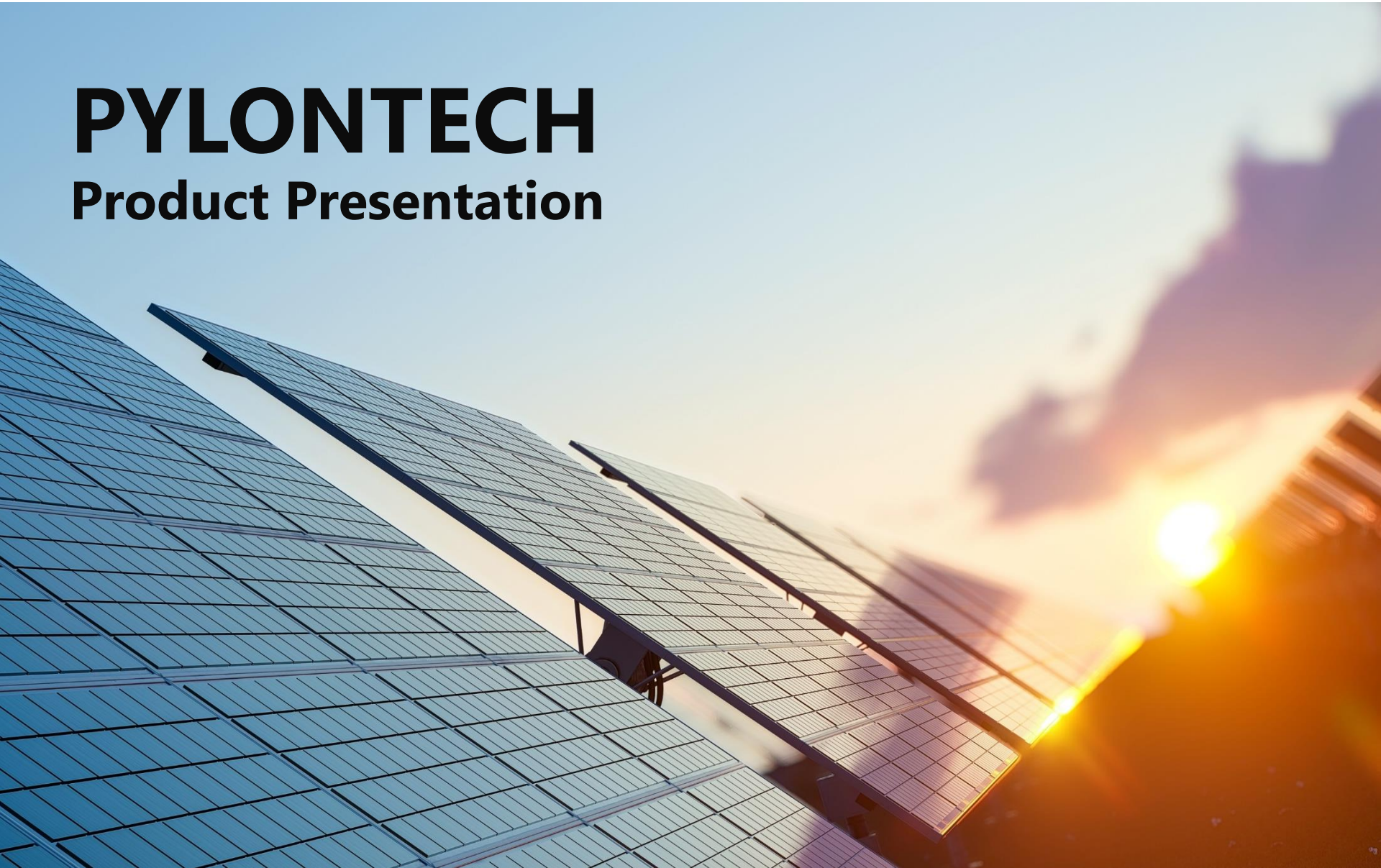
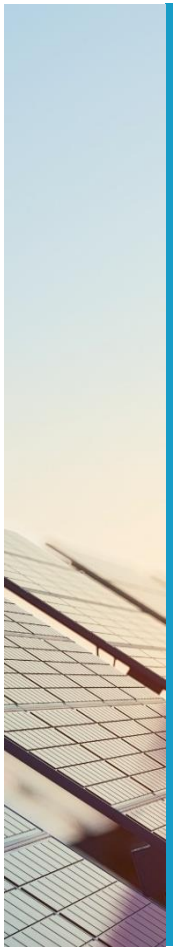
PYLONTECH

Segen Solar (Pty) Ltd

PYLONTECH

Product Presentation





01
PRODUCT OVERVIEW

Product parameter feature

Basic Parameters	US2000C
Nominal Voltage（V）	48
Nominal Capacity (Wh)	2400
Usable Capacity (Wh)	2280
Dimension（mm）	442*410*89
Weight（Kg）	24
Discharge Voltage（V）	44.5 ~ 53.5
Charge Voltage（V）	52.5 ~ 53.5
Charge / Discharge Current（A）	25(Recommend)
	50 (Max)@60s
	90 (Peak@15s)
Communication Port	RS485，CAN
Single string quantity(pcs)	16
Working Temperature/℃	0~50
Shelf Temperature/℃	-20~60
Humidity	5%~95%
Altitude (m)	<4000
Design life	15+ Years（25℃/77℉）
Cycle Life	>6000, 25℃
Authentication Level	IEC62619/CE /UN38.3
Feature	Pre-Charge Dual-active protection Flexible current steps Dry contact wake up

*Double single string module quantity
*95% DoD
*Double installation altitude
*Pre-charge: smooth inrush current
*Dual-active protection: enhanced safety
*Flexible current steps: enable 50% more power during critical temperature condition.
*Dry contact wake up: available for dry contact wake up.

Figure 1 US2000C product parameters[1]

Performance

A. C-rate:

The C-rate is a measure of the rate at which a battery is being charged or discharged. It is defined as the current through the battery divided by the theoretical current draw under which the battery would deliver its nominal rated capacity in one hour.
Normally Pylontech LV batteries(US2000C, US3000C, UP5000) are working at 0.5C. For example, the capacity of US2000C is 50 Ah, so the max. constant charge/discharge current is 50 Ah x 0.5 C = 25A.

B. DoD(Depth of Discharge)：

DoD means the real capacity you used in one cycle.
Example: The capacity of US2000C is 2.4 kWh, if you set DoD at 90%, the capacity you applied in one cycle is 2.4 kWh x 90% = 2.16 kWh.

C. The tolerance voltage rise on the Pylontech batteries:

If battery is full and discharging, then the load suddenly drops, the power is pushed back to the battery, the max. tolerance voltage is 60V. If the load without a power source, the voltage will come back to 53.2V.

Ascendancy

Lithium-ion Battery Testing Report from ITP renewable Australia shows the estimated state of health (SOH) against cycles completed for each Phase 2 battery pack still cycling. SOH is estimated by dividing the energy delivered at each capacity test by the energy delivered in the first capacity test.

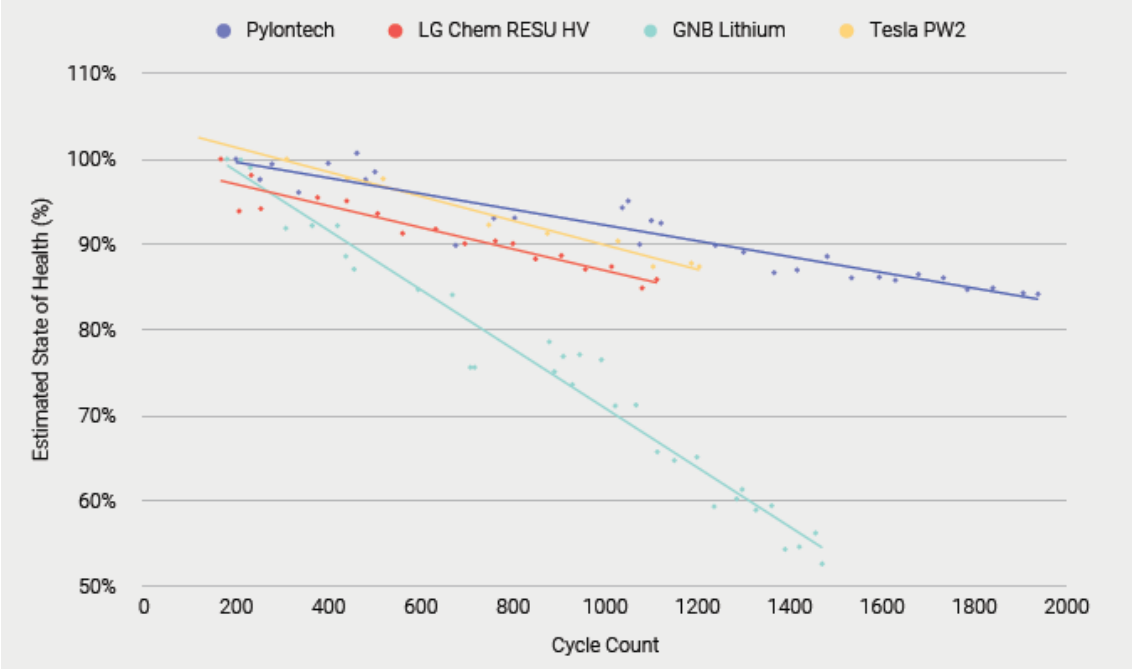


Figure 2: Capacity fade of Phase 2 battery packs based on monthly capacity tests[3]

Ascendancy

Compared with most types of LV batteries in the market,
Pylon batteries posses:

A. DoD – 95%
B. Weight – 24kG for a 2.4kWh module
C. Power strength – Available for max. 1C rate operation, Peak up to 200 Amps @15 sec per single module
D. Safety – IEC/CE/UL/UN38.3 proved
E. Expansion - Max. 38.4kWh per single string, expandable to 192 kWh per system
F. Life span – more than 6000 cycles
G. Operation environment – 4000m altitude, 0 – 50 ℃

02

APPLICATION & CONFIGURATION

Application

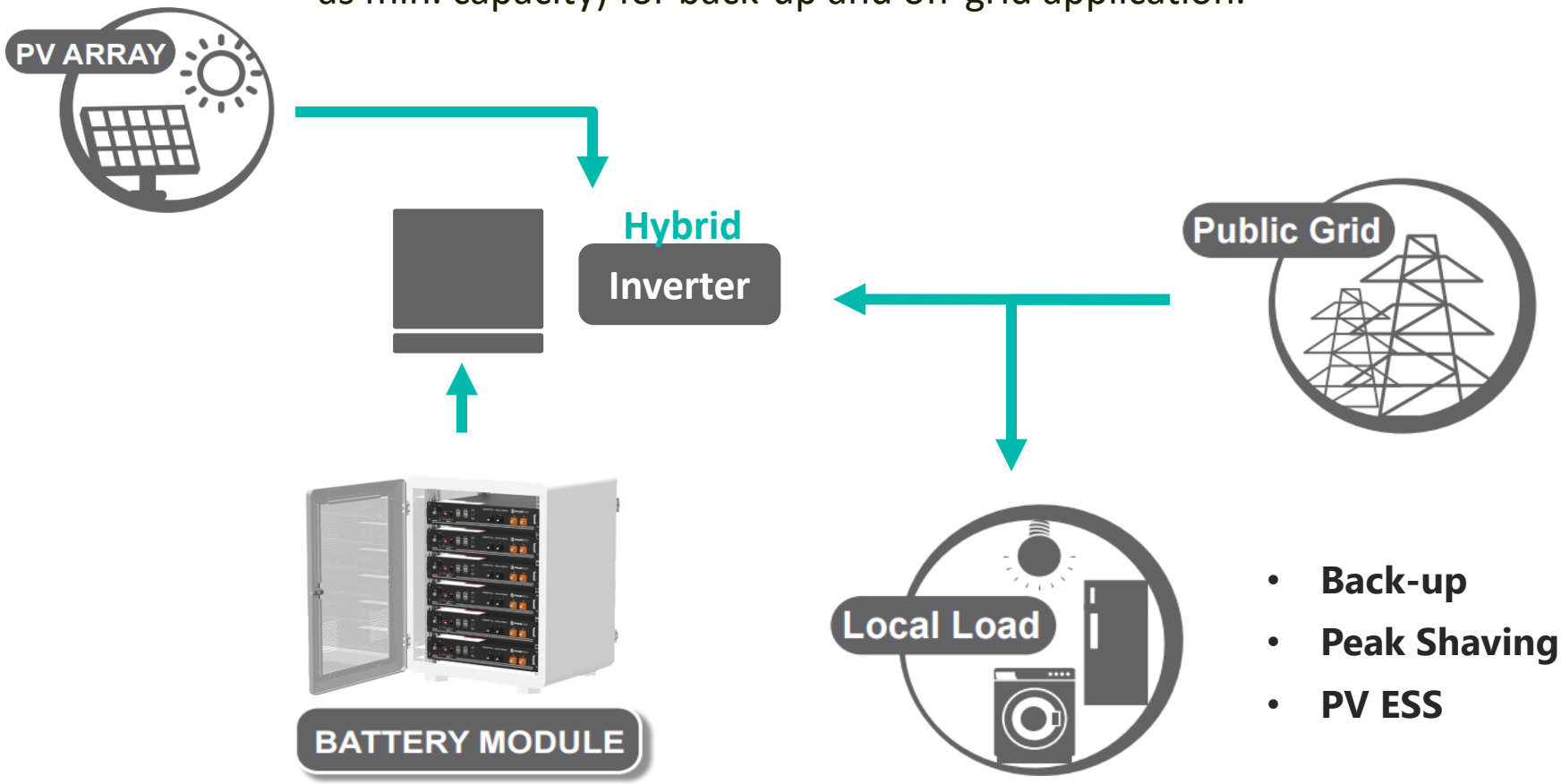
Back Up

Residential

Commercial

Residential

Note: For the PV/battery sizing ratio, there is no strict rules but guidance at 1:2 as min. (e.g. 1kW PV shall sizing 2kWh battery system as min. capacity) for back-up and off-grid application.



- **Back-up**
- **Peak Shaving**
- **PV ESS**

Residential Configuration

Item	Amount	Rated Power(kW)(1)	Max Power(kW, 60S)	Peak Power(kW, 15S)	Nominal Capacity(kWh)	Usable Capacity(kWh)	Min. Back-up time(2)
US2000C	1	1.2	2.4	4.3	2.4	2.28	1.9hrs
	2	2.4	4.8	8.6	4.8	4.56	
	3	3.6	7.2	13.0	7.2	6.84	
	4	4.8	9.6	17.3	9.6	9.12	
	5	6.0	12.0	21.6	12.0	11.40	
	6	7.2	14.4	25.9	14.4	13.68	
	7	8.4	16.8	30.2	16.8	15.96	
	8	9.6	19.2	34.6	19.2	18.24	
	9	10.8	21.6	38.9	21.6	20.52	
	10	12.0	24.0	43.2	24.0	22.80	
	11	13.2	26.4	47.5	26.4	25.08	
	12	14.4	28.8	51.8	28.8	27.36	
	13	15.6	31.2	56.2	31.2	29.64	
	14	16.8	33.6	60.5	33.6	31.92	
	15	18.0	36.0	64.8	36.0	34.20	
	16	19.2	38.4	69.1	38.4	36.48	

(1) Rated Power is based on ideal operation temperature(10 - 45℃), during charging the power will leveling decrease when reaching full capacity.
(2) Min. Back-up time is based on rated power and related condition during beginning of life, in real application please consider the load.

Quotation Item:

1.Battery Module – varying amount depends on application.
2.External Cable kits–1 kit per 5kW installation.
3.Brackets/Cabinets –if necessary.

03
INSTALLATION

CHECKING LIST

For battery module package:

1 pair of 18cm power cables

1 PC 1 m grounding cable

1 PC user manual and warranty card

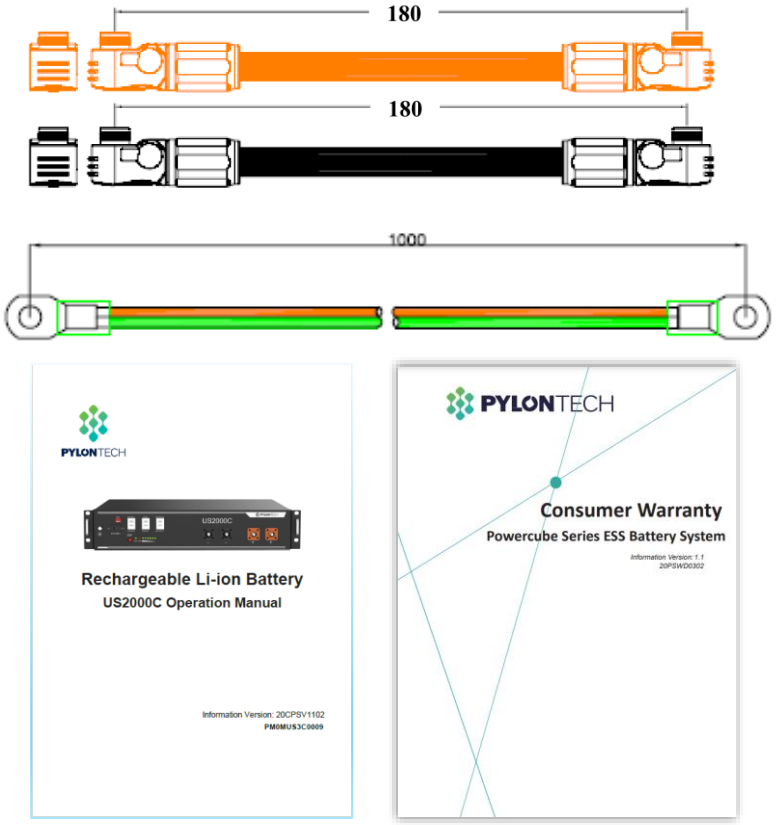


Figure 3: US2000C battery module package

CHECKING LIST

External cable kits

1 Pair of 2 m power cables

(NB: Please apply an advised communication cable with corresponding pin definitions of two terminals)

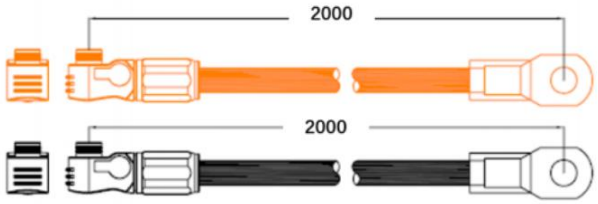


Figure 4: Battery external cable kits

Before You Start

- Installation Manual
- Location & Environment
- Tools & Accessories
- Compatible Inverter

Installation

1)Battery Module Front Interface: US2000C

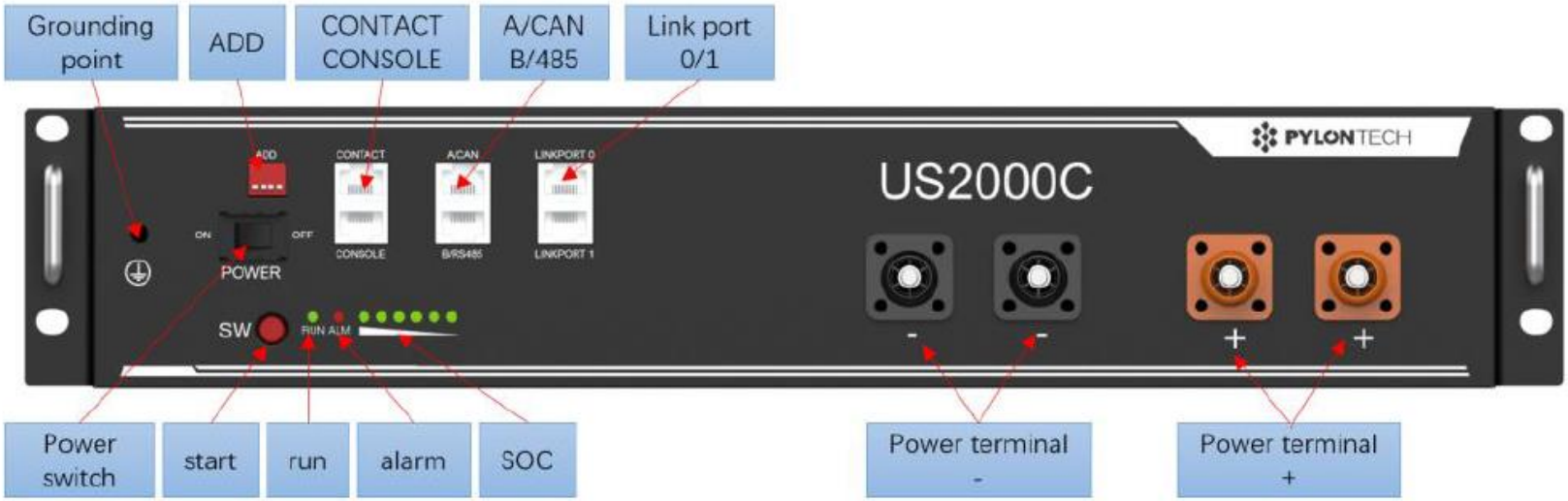


Figure 5: US2000C battery module front interface

Installation

2) Cable connection

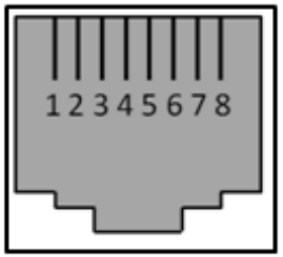
Figure 6: US2000C battery cable connection diagram

Installation

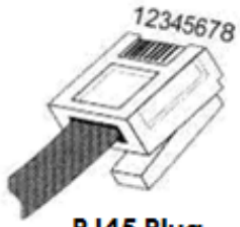
2) Cable connection

Definition of RJ45 Port Pin

	A/CAN	B/RS485
Pin1	**These pins shall be NULL.**	
Pin2	**If not, may influence communication**	
Pin3	**between BMS and inverter.**	
Pin4	CAN-H	CAN-H (single group)
Pin5	CAH-L	CAN-L (single group)
Pin6	CAN-GND	CAN-GND (single group)
Pin7	485A	485A
Pin8	485B	485B



RJ45 Port

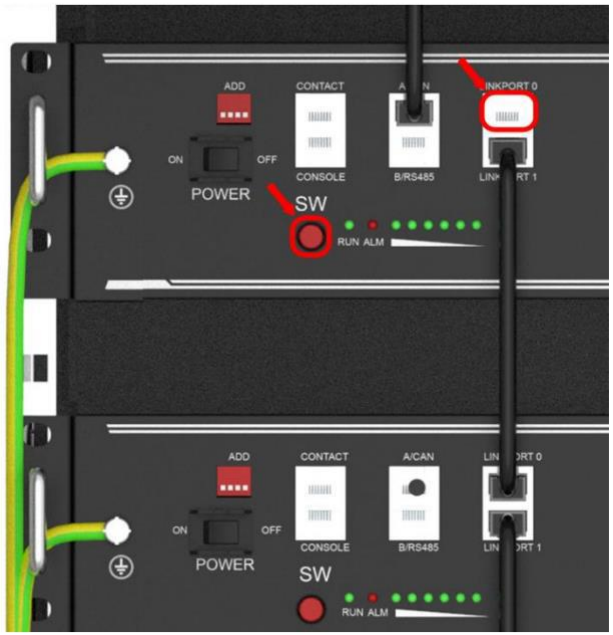


RJ45 Plug

Figure 7: Battery communication port pin definitions

Installation

2) Cable connection: Communication cable connection:



The one with **empty Link Port 0** is the Master Battery Module, Which is **connected to the Inverter,** other batteries are slave batteries.

1 Master Battery configure with maximum 15 Slave Batteries in one string.

Figure 8: Battery communication cable connection diagram

Installation

2) Cable connection: Ground cable connection:

Figure 9: Battery rack

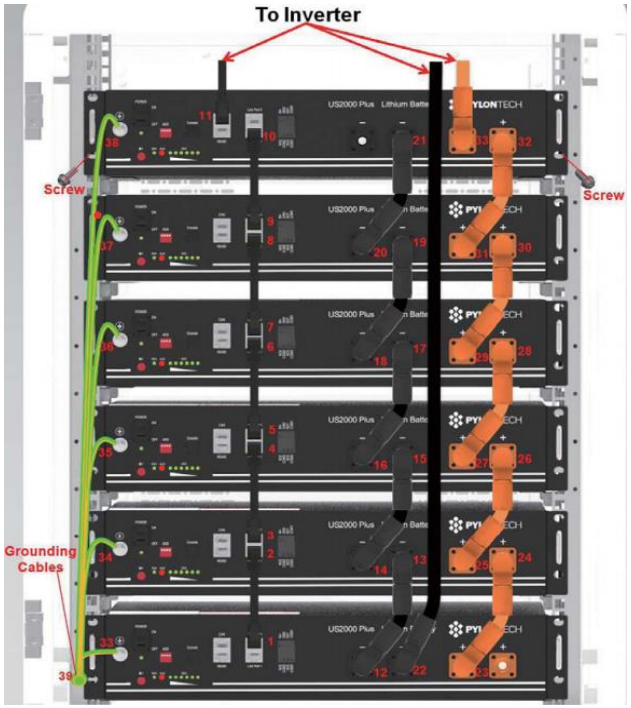
1) Based on metal directly touch between the module's surface and rack's surface. If using painted rack, the corresponding place shall remove the painting.

Figure 10: Battery grounding point

2) Install a grounding cable to the grounding point of the modules.

Installation

Power ≤ 5kW



5kW < Power < 10kW

Figure 11: Battery power cable connection diagram

Power On/Off

1) Power on:

Figure 12: Battery power switch

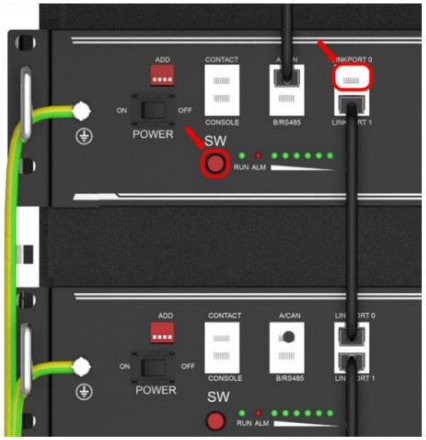


Figure 13: Battery soft switch button

Double check all the power cable and communication cable.

1.Switch ON all the battery modules by hard switch.

2.Press the Red SW button of master battery(≥ 0.5 sec).

Power On/Off

1) Power on:

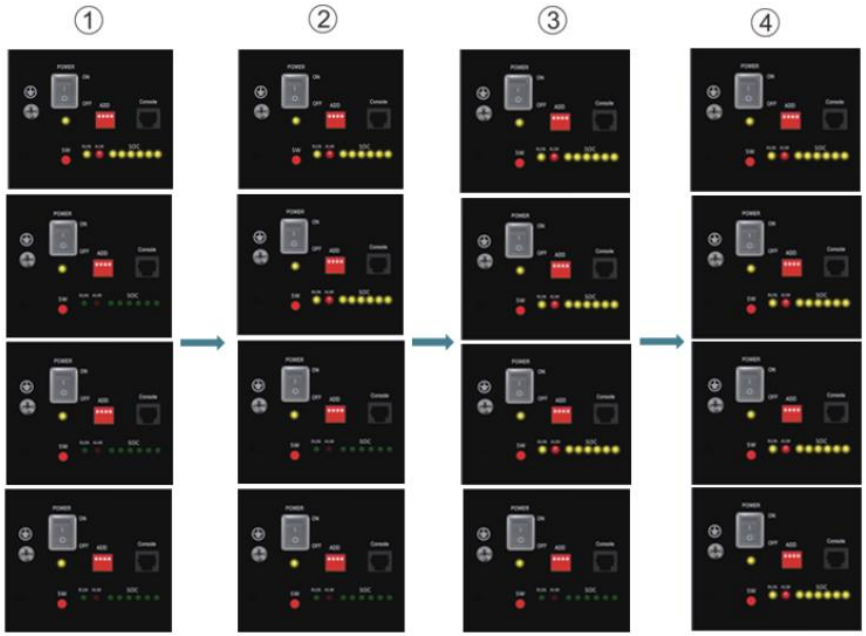


Figure 14: Group batteries power on process

Note:

1) After the battery module is powered on, the soft-start function takes **3 sec** to activate. Battery is ready to have a high-power output after soft-start operation is finished.

2) During capacity expansion or replacement, when paralleling different SOC/voltage of modules together, please maintain the system in idle for ≥15mins or till the SOC LEDs becomes similar(≤1dot difference) before normal operation.

Power On/Off

2) Power OFF:

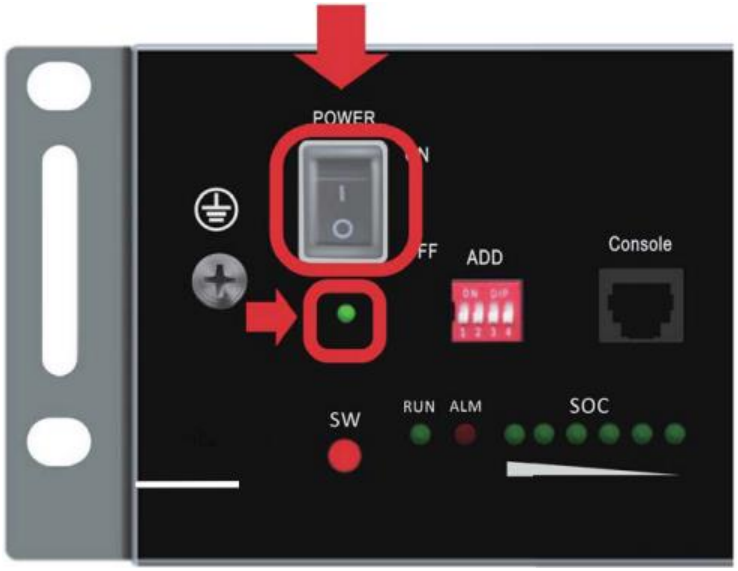


Figure 15: Battery power off process

Double check all the power wires and communication cables.

1.Press the Red SW button of the master battery.(0.5 sec)

2.Switch OFF the battery modules.

Inverter brand	Suitable battery type	Communication	Application	Key features		Installation
				Activation	Force charge	
Kodak	US2000/US3000, US2000C/US3000C, UP2500,UP5000	RS485	Off-grid	Yes	Yes	Wall mounting
Victron		CAN	On/Off-grid	Yes	Yes	Wall mounting
Sunsynk		CAN	On/Off-grid	Yes	Yes	Wall mounting

Connection Diagram

* ADD Switch -Kodak

Based on design of BMS, the dip switch is deployed physically reversely.
For instance:

Dip1	Dip2	Dip3	Dip4	The corresponding position of switch	Status
0	0	0	0		RS485:115200 CAN terminal resistance: connected
1	0	0	0		RS485:9600 CAN terminal resistance: connected
0	1	0	0		RS485: 115200 CAN terminal resistance: NONE

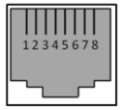
*** Suitable Breaker

1) The rated voltage shall ≥60V DC. Do **NOT** use AC breaker.
2) The type of breaker shall be type C (recommended) or type D.
3) The rated current shall match with system design:
   shall consider the DC current on inverter side.
   the number of power cable: for instance, if only one pair of 4awg cable, the rated current of breaker shall be 125A or smaller.
4) The Icu required:
   the short circuit current for calculation of each module is 2500A. for instance:

	Icu of breaker
1~4 modules	Must ≥10kA
5~8 modules	Must ≥20kA

** Comm. Cable PINOUT

RS485	BAT	inverter
Pin1	First 3 pins must be NULL	
Pin2		
Pin3		485B
Pin4		
Pin5		485A
Pin6		
Pin7	485A	
Pin8	485B	



RJ45 Port

RJ45 Plug

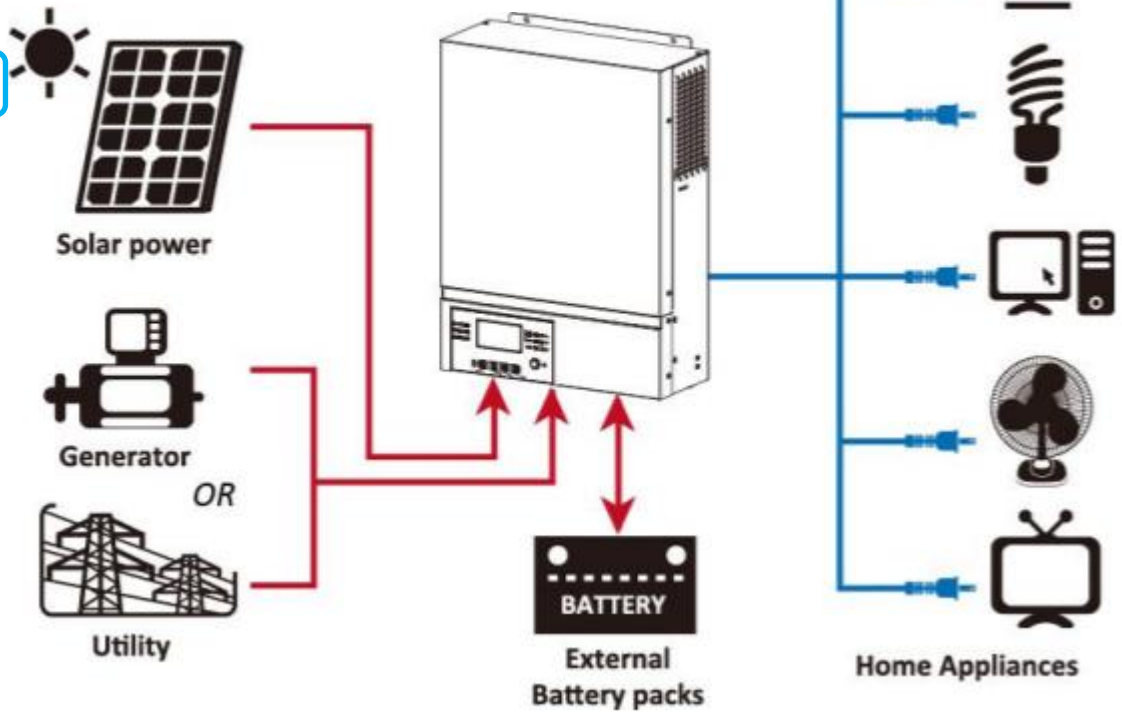


Figure 16: Pylontech batteries with Kodak inverter connection diagram

Configuration-Kodak

1. Long press Enter to Menu, choose the suitable working mode.
If you apply "USB" or "SOL" setting

2. Choose PYLON in the 5th setting

3. Select suitable frequency in the 9th setting

4. If you apply "SBU" mode, except for the first 3 steps, the 11th setting, the maximum charge current from grid should be set according to battery numbers.

5. The 12th setting, discharge voltage limit could be set at 46V.

6. The 13th setting, charge voltage limit could be set at 53V.

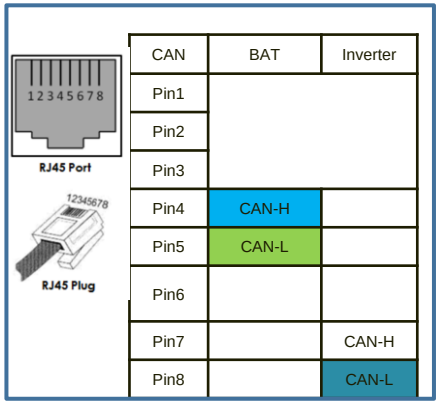
Connection Diagram -Victron

* ADD Switch

Based on design of BMS, the dip switch is deployed physically reversely. For instance:

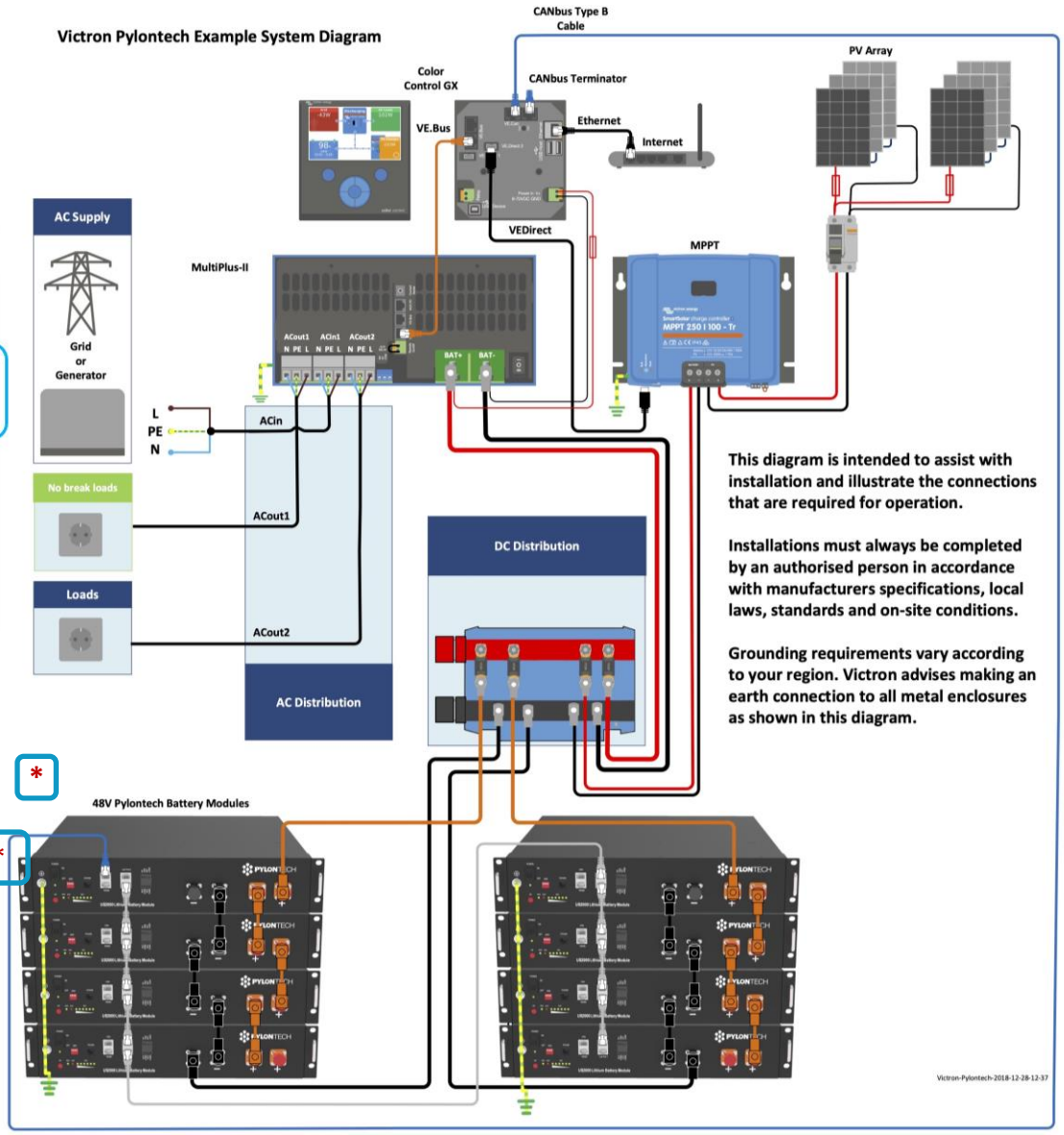
Dip1	Dip2	Dip3	Dip4	The corresponding position of switch	Status
0	0	0	0		RS485:115200 CAN terminal resistance: connected
1	0	0	0		RS485:9600 CAN terminal resistance: connected
0	1	0	0		RS485: 115200 CAN terminal resistance: NONE

** Comm. Cable PINOUT

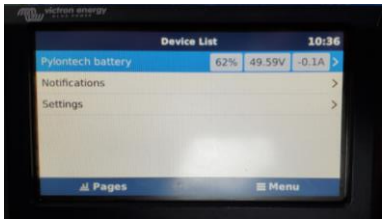


CAN	BAT	Inverter
Pin1		
Pin2		
Pin3		
Pin4	CAN-H	
Pin5	CAN-L	
Pin6		
Pin7		CAN-H
Pin8		CAN-L

You must use the VE.Can to CAN-bus BMS type B Cable, part number ASS030720018 for connection with US2000/US3000/UP2500; and VE.Can to CAN-bus BMS type A Cable, part number ASS030710018 for connection with US2000C/US3000C/UP5000/ Force-L, you cannot use the cable supplied by Pylontech.



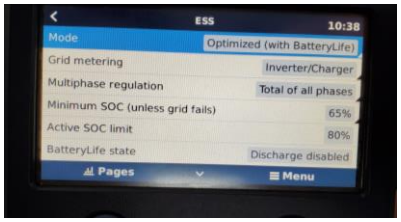
Configuration-Victron



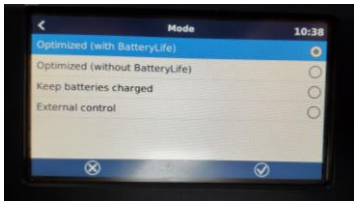
1. When connected to the battery, the color control can automatically identify "Pylontech"

2. Go to settings, open "DVCC"

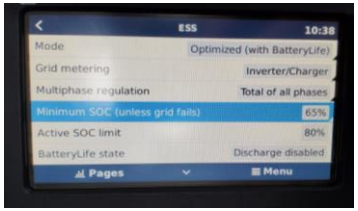
3. Switch on "DVCC"



4. Go to settings, open "ESS"



5. Choose suitable operation "mode"



6. If you choose "Optimized", please set minimum SOC at 10% or 5%.

7. Connect inverter to host computer

8. The host computer (VE configure) settings can be referred at Victron website: https://www.victronenergy.com/live/battery_compatibility:pylontech_phantom

Connection Diagram-Sunsynk

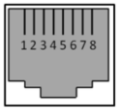
* ADD Switch

Based on design of BMS, the dip switch is deployed physically reversely. For instance:

Dip1	Dip2	Dip3	Dip4	The corresponding position of switch	Status
0	0	0	0		RS485:115200 CAN terminal resistance: connected
1	0	0	0		RS485:9600 CAN terminal resistance: connected
0	1	0	0		RS485: 115200 CAN terminal resistance: NONE

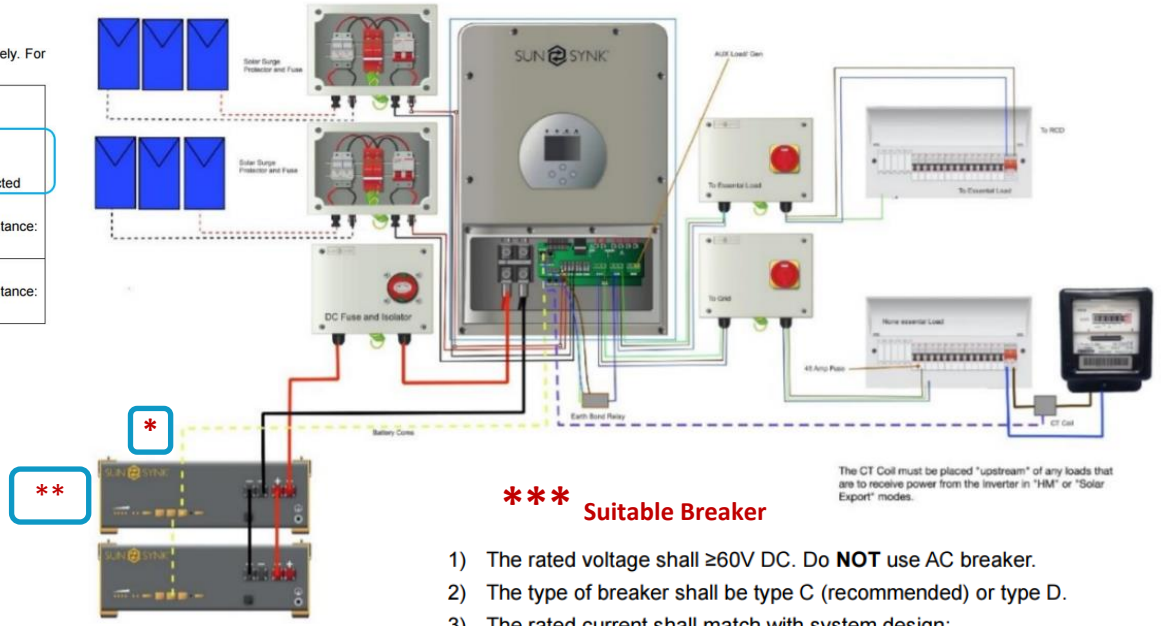
** Comm. Cable PINOUT

CAN	BAT	inverter
Pin1	The 3 pins must be NULL	
Pin2		
Pin3		
Pin4	CAN-H	CAN-H
Pin5	CAN-L	CAN-L
Pin6		
Pin7		
Pin8		



RJ45 Port

RJ45 Plug



*** Suitable Breaker

1) The rated voltage shall ≥60V DC. Do **NOT** use AC breaker.
2) The type of breaker shall be type C (recommended) or type D.
3) The rated current shall match with system design:
   shall consider the DC current on inverter side.
   the number of power cable: for instance, if only one pair of 4awg cable, the rated current of breaker shall be 125A or smaller.
4) The Icu required:
   the short circuit current for calculation of each module is 2500A. for instance:

	Icu of breaker
1~4 modules	Must ≥10kA
5~8 modules	Must ≥20kA

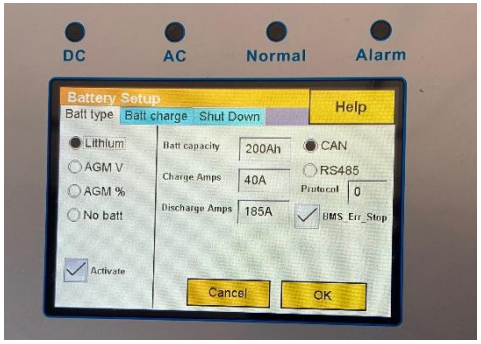
Figure 18: Pylontech batteries with Sunsynk inverter connection diagram

Configuration-Sunsynk

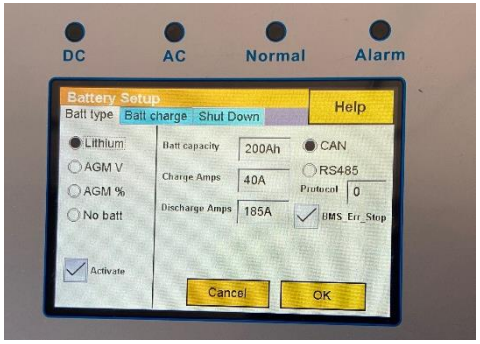
1. Press Enter/Gear icon to go to setup menu.

2. Press “Battery”.

3. Press “Shut Down” and Set “Shut down” at 5%, “Low Batt” at 8%.



4. Press “Batt type”. Choose battery mode “Lithium”, input capacity, charge/discharge current according to battery number



5. Tick “BMS_Err_Stop”.

04

MULTIPLE STRINGS

1) Cable connection for RS485:

Multiple Battery Groups RS485 Communication Cable Connection

Max 6 groups
1) The A/CAN of 1st group/master battery connects to inverter or EMS(pin: 7A, 8B, DO NOT connect other pins)
2) The B connect to A of next group; the B/RS485 of last group master battery is empty.

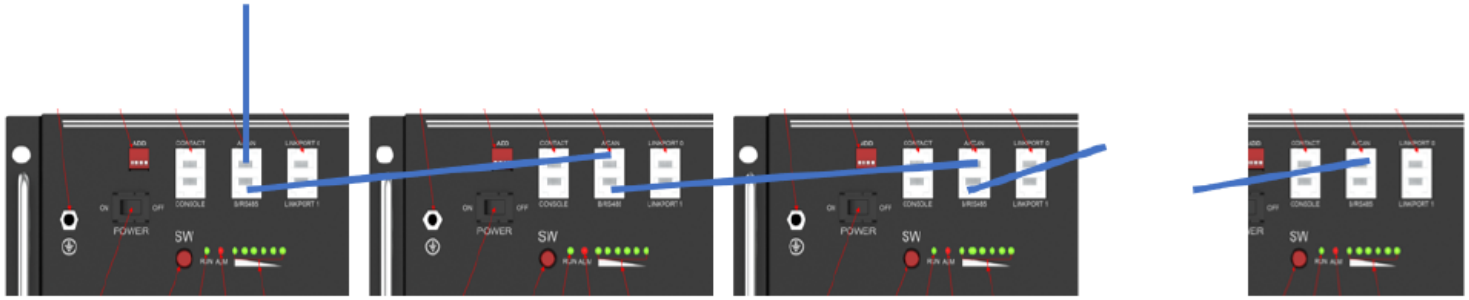


Figure 19: RS485 bus communication cable connection diagram for Pylontech batteries

- Make sure all dip switches of master batteries are R0XX, then turn ON batteries. R: is the baud rate of RS485 needed, all master batteries shall be the same.
- After all batteries are in running mode, the buzzer of master battery in group1 will ring 3 times. This means that all groups are online.
- The interruption of each RS485 command shall ≥ 1s.

2) Cables Connection for CAN:

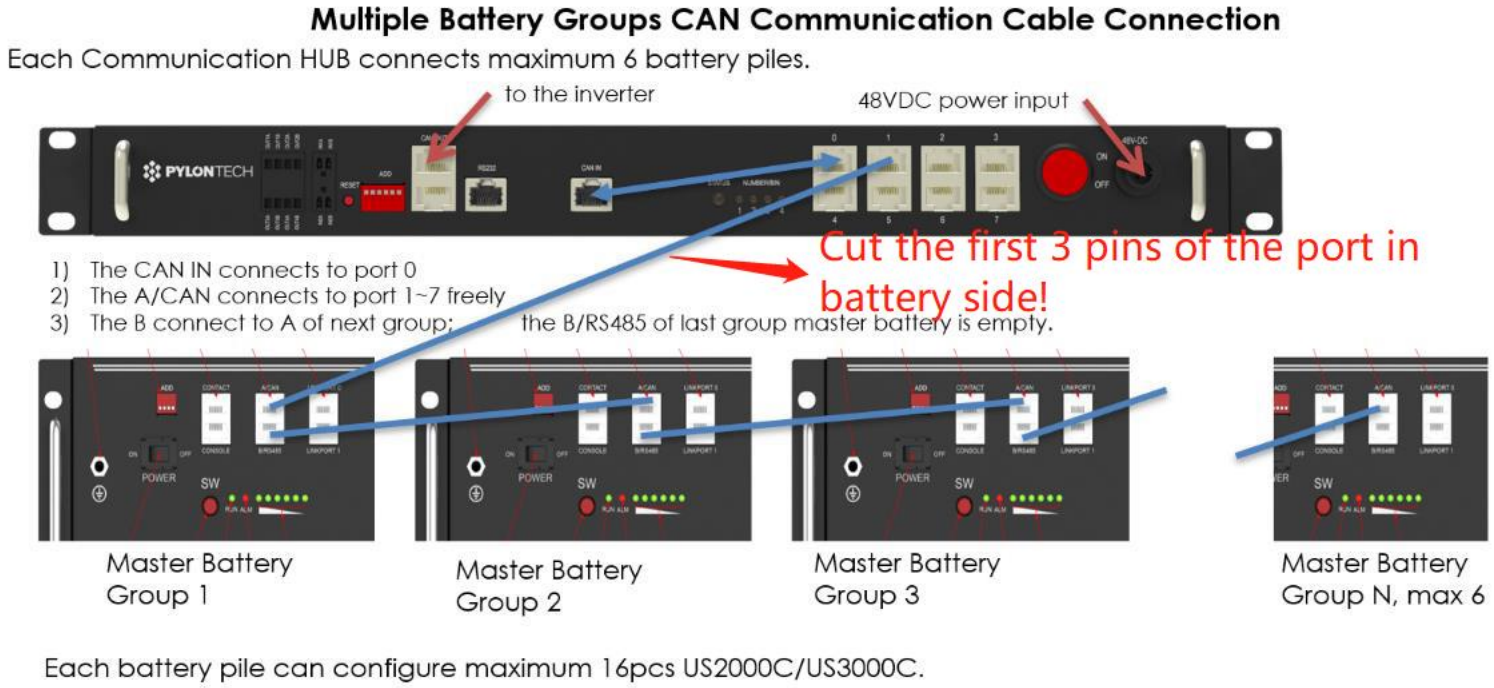


Figure 20: CAN bus communication cable connection diagram for Pylontech batteries

1) Set all dip switches at 0000 first, turn on the batteries.
2) After all batteries are in running mode, the buzzer of master battery in group1 will ring 3 times. This means that all groups are online.
3) Change the dip switch of master battery in group1 to 0100. Then connect communication cable between LV-HUB and master battery in group 1.
4) Then turn ON LV-HUB.

Mixture application

A new battery module can be added onto an existing system at any time. Please make sure that the new battery is acting as the master. The new module, due to a higher SOH may have a difference on SOC with the existing system, but it will not affect the parallel connection system performance.

*Mixing using master battery priority:

US3000C > US2000C > US3000 >US2000

*For same type of module always use the latest product unit as master

*Mixture using battery deployment option:

Master battery (1st)	US3000C > US2000C
Slave 2nd ~ 8th	US3000C/US2000C/US3000/US2000
Slave 9th ~ 16th	US3000C/US2000C

05

TROUBLE SHOOTING

Trouble shooting

Communication related problems:

1）Baud rate selection
Solution: Check the dip switch 1 on the battery. If the baud rate of the communication is 9600, the dip switch 1 should be 1,If the baud rate is 115200, the dip switch 1 should be 0.

2） Cable connections
Solution: Check the cable connections, including communication methods, link ports.

3） Pin definitions of communication cables
Solution: Please refer to pin definition diagrams.

Functional related problems:

1） Battery over discharged
Solution: Please use a DC charger to charge the battery.

2) Cell voltages imbalance
Solution: Please use a DC charger (around 1 – 2 Amps) to balance the battery cell voltages.

3） BMS error
Solution: Please swap the BMS or use BatteryView to clear the BMS error.

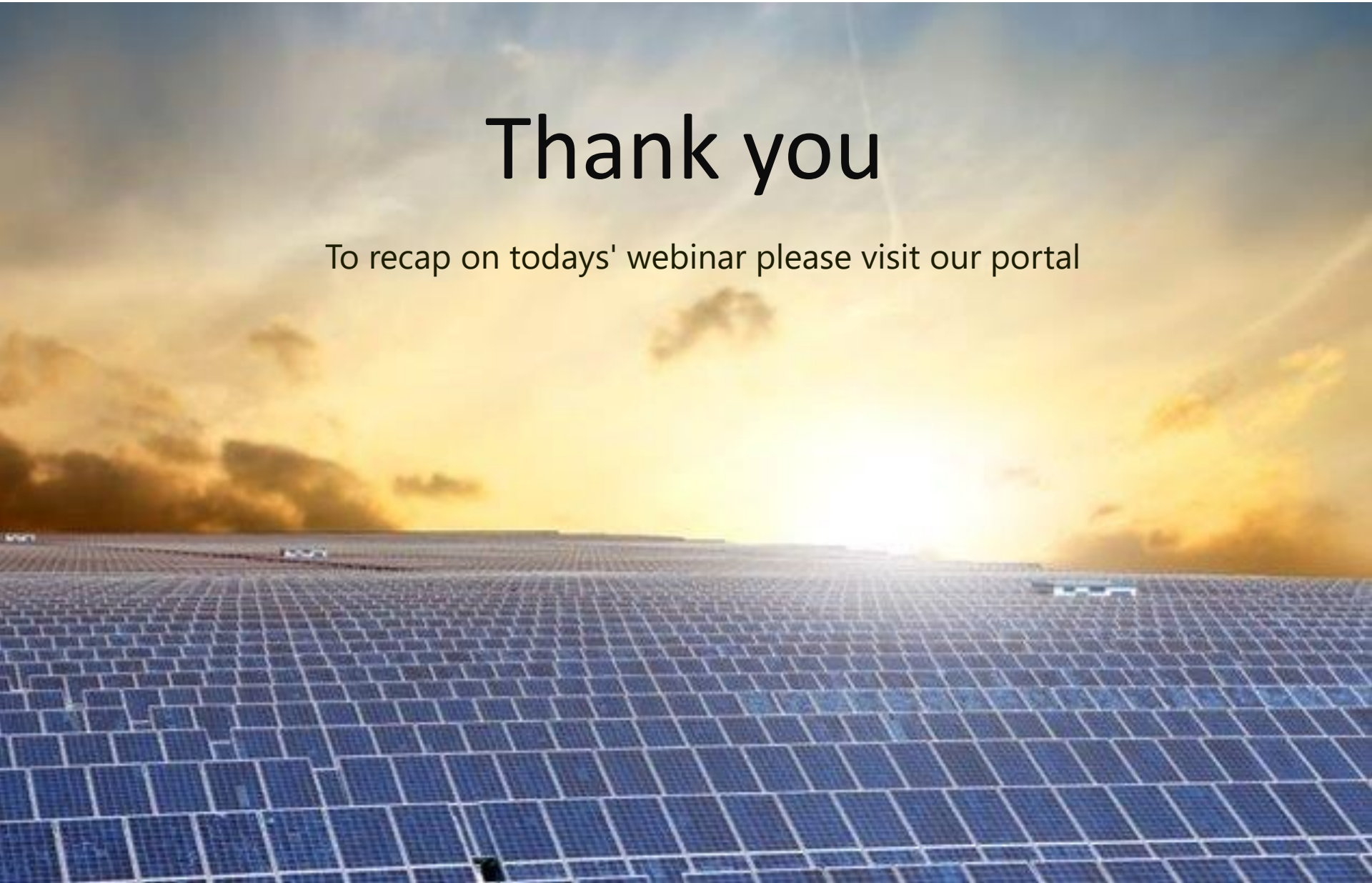
At present, the complex technical training is only open to SegenSolar SA. Should you experience any technical issues, please contact Segensolar for assistance. Pylontech share the most advanced product knowledge with them.

Reference list

[1] Pylon Technologies Co., Ltd. *Rechargeable Li-ion Battery US3000C Operation Manual*. Version: 20CQSV1103.

[2] Pylon Technologies Co., Ltd. *Rechargeable Li-ion Battery UP5000 Operation Manual*. Version:SD20UP501001.

[3] ITP Renewables Australia. *Lithium-ion Battery Testing Report*.


Thank you
To recap on todays' webinar please visit our portal