Installation training MOD XH(BP), APX, SYN, MID XH

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Training content

- **Basic technical parameters of MOD XH(BP) and APX battery**
  - Battery-ready inverter MOD XH(BP)
  - Technical parameters of MOD XH(BP) and APX battery
  - Connection and operation options
  - Recommended **installation** procedure **MOD XH(BP)**
    - Inverter outputs and inputs
  - Recommended **APX installation** procedure
    - Battery outputs and inputs
  - Recommended **SYN installation** procedure
    - Technical parameters
    - Outputs and inputs of the back-up box
  - Starting the MOD XH(BP) inverter with APX battery and SYN back-up box
- **Basic technical parameters MID XH**
  - Technical parameters
  - Inputs and outputs of the inverter
  - Wiring and commissioning - options
- **Installation videos on YouTube**

Battery-ready inverter MOD XH(BP)

Hybrid inverter MOD XH(BP)

- **100% three-phase asymmetry when connected with battery**
- **10 years warranty**
- **EPS function -** switching within 0.5s when connected with **SYN 50-XH-30**
- Dynamic export limit function
- 2.0 DC/AC ratio - 200% power utilization
- Available in power variants 5, 8, **10 kW** - other power variants available on request
- Weight **14 kg**
- Compatible batteries - **Growatt APX only**
- **The inverter is symmetrical when connected without battery**
- **AFCI -** active protection against DC arc burning

APX batteries

- **5 - 30 kWh** scalable range
- **-10°C - 50°C** operating temperature range
- **5 kWh** capacity of one battery module
- Optimisation at the level of individual battery modules
- Used for MOD XH(BP) and MID XH inverters (2 battery inputs - up **to 60 kWh**)

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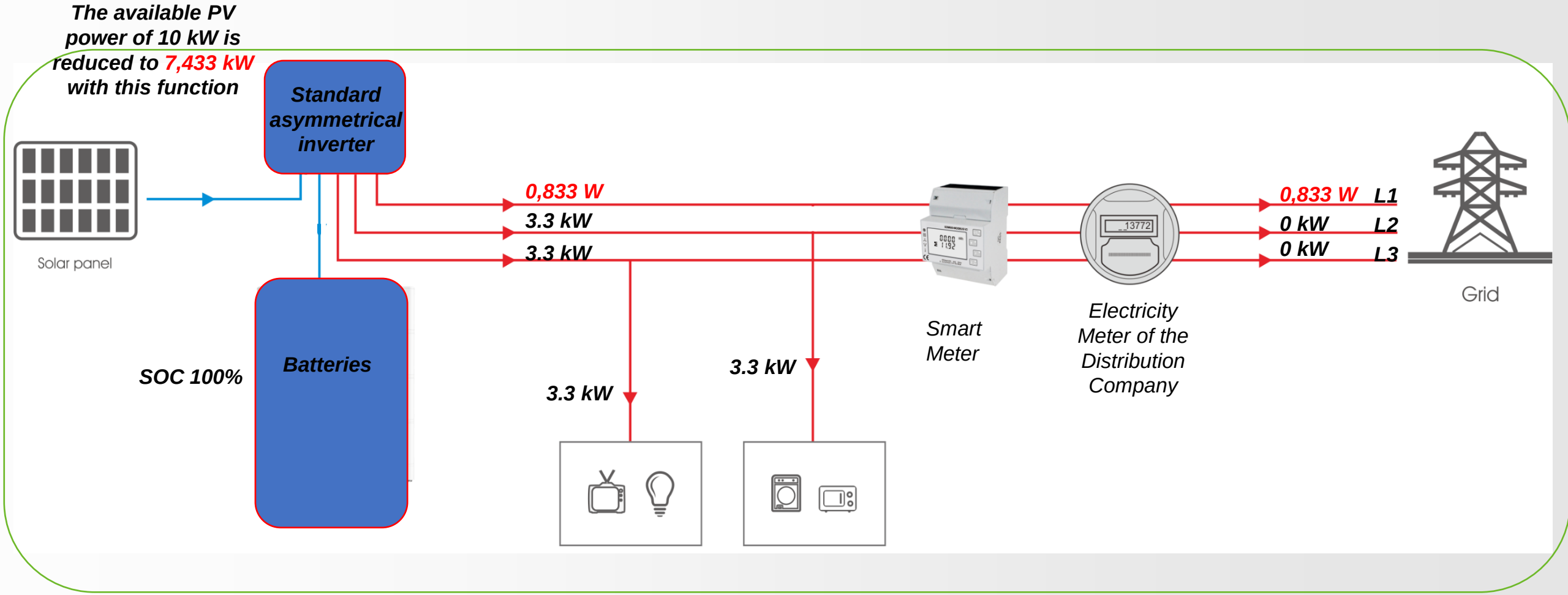
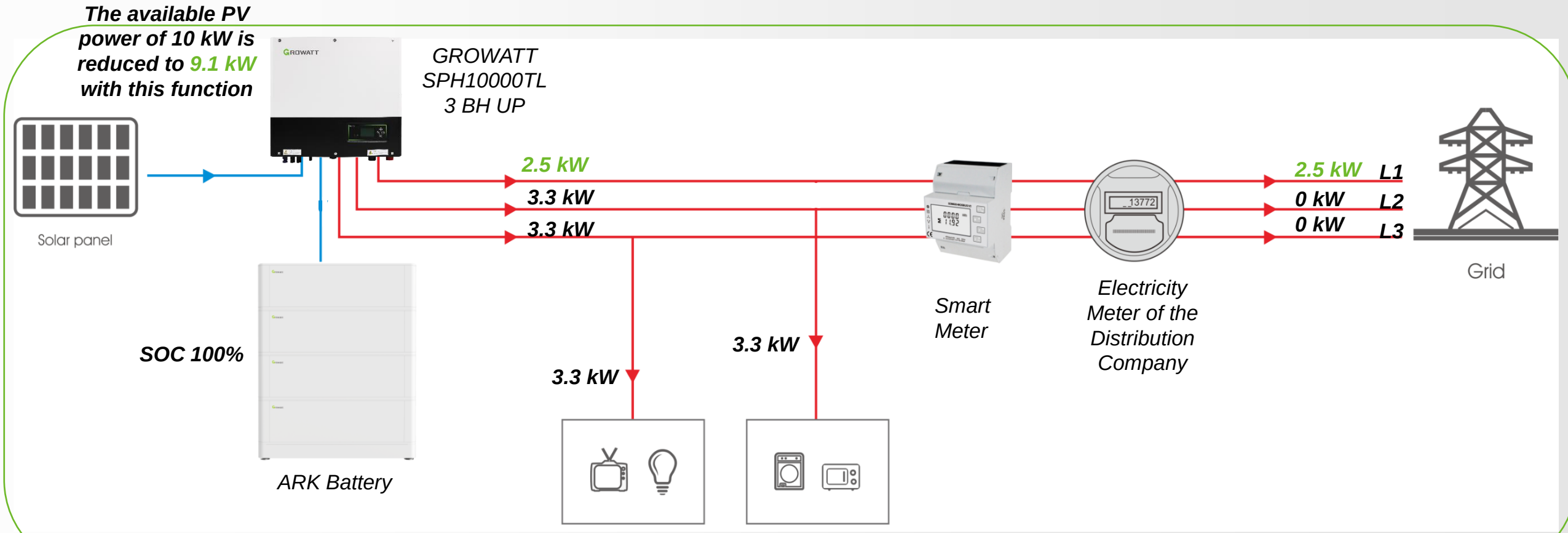
Standard export limit



*Set value **25%** (2 500 W)

***Standard export mode limits the value at the level of individual stages (total export limit / 3) - this unnecessarily reduces the exported** power*

Dynamic Export Limit - SPH



*Set Exportlimit **On, 25%** Power Rate Limit (%)

functional only for FW versions **YBAA61xxxx, YBAA050510

***Maximum power per phase 3.3 kW

Important technical parameters MOD XH(BP) :

2 MPPT, each with one PV input

Input MPP current 16 A

Max short circuit current 20 A

Datasheet	MOD 3000TL3-XH	MOD 4000TL3-XH	MOD 5000TL3-XH	MOD 6000TL3-XH	MOD 7000TL3-XH	MOD 8000TL3-XH	MOD 9000TL3-XH	MOD 10KTL3-XH
Input data (DC)								
Max. recommended PV power (for module STC)	6000W	8000W	10000W	12000W	14000W	16000W	18000W	20000W
Max. DC voltage	1100V							
Start voltage	160V							
Nominal voltage	600V							
MPPT voltage range	140V-1000V							
No. of MPP trackers/strings per MPP tracker	2/1							
Max. input current per MPP tracker	16A							
Max. short-circuit current per MPP tracker	20A							
Input data (DC battery)								
Compatible battery	APX HV Battery System (5kWh-30kWh)							
Operating voltage range	600 V-950 V							
Max.operating current	11A				18.5A			
Max.charge power	6000W				10000W			
Max.discharge power	3300W	4400W	5500W	6600W	7700W	8800W	9900W	11000W
Output data (AC)								
AC nominal power	3000W	4000W	5000W	6000W	7000W	8000W	9000W	10000W
Max. AC apparent power	3300VA	4400VA	5500VA	6600VA	7700VA	8800VA	9900VA	11000VA
Nominal AC voltage (range*[1])	220V/380V, 230V/400V (340-440V)							
AC grid frequency (range*[1])	50/60 Hz (45-55Hz/55-65 Hz)							
Max. output current	5.0A	6.7A	8.3A	10.0A	11.7A	13.3A	15.0A	16.7A
Adjustable power factor	0.8leading...0.8lagging							
THDi	<3%							
AC grid connection type	3W+N+PE							
Output data (Backup*[2])								
Max. apparent power	3000VA	4000VA	5000VA	6000VA	7000VA	8000VA	9000VA	10000VA
Nominal AC voltage	230V/400V							
AC grid frequency	50/60Hz							
Efficiency								
MAX. efficiency	98.3%	98.3%	98.3%	98.3%	98.6%	98.6%	98.6%	98.6%
European efficiency	97.5%	97.5%	97.5%	97.5%	98.1%	98.1%	98.1%	98.1%
MPPT efficiency	99.9%							

Max ½ power per MPPT e.g. **10 kWp** for MOD 10KTL3-XH(BP)

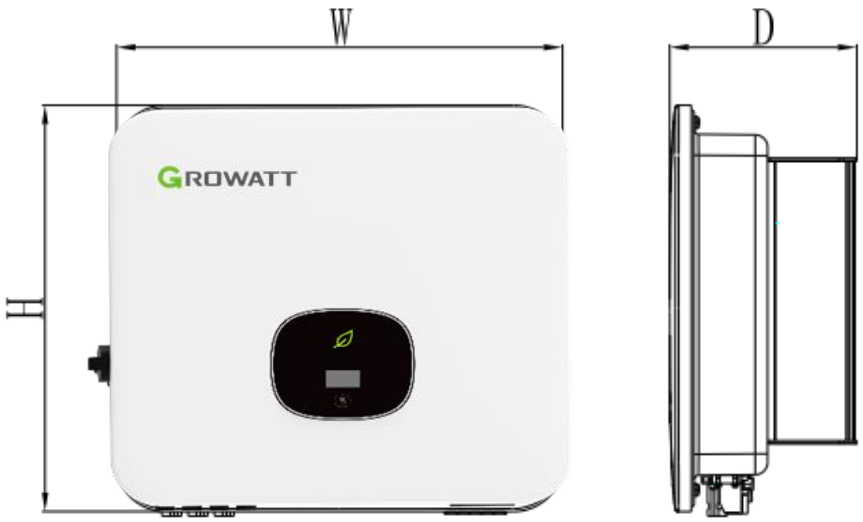
Maximum system voltage 1100 V! (consider the lowest possible temperatures!)
MPPT up to 1000 V!

Differential max charging/discharging power*

*Overall system performance depends on the connected APX battery capacity

Important technical parameters MOD XH(BP) :

Protection devices								
DC reverse polarity protection	Yes							
DC Switch	Yes							
AC/DC surge protection	Type II / Type II							
Insulation resistance monitoring	Yes							
AC short-circuit protection	Yes							
Ground fault monitoring	Yes							
Grid monitoring	Yes							
Anti-islanding protection	Yes							
Residual-current monitoring unit	Yes							
String fault monitoring	Yes							
AFCI protection	Optional							
General data								
Dimensions (W / H / D)	425/387/147mm	425/387/147mm	425/387/147mm	425/387/147mm	425/387/178mm	425/387/178mm	425/387/178mm	425/387/178mm
Weight	12.5kg	12.5kg	12.5kg	12.5kg	14kg	14kg	14kg	14kg
Operating temperature range	- 25℃ ... +60℃							
Nighttime power consumption	< 5.5W							
Topology	Transformerless							
Cooling	Natural convection							
Protection degree	IP66							
Relative humidity	0~100%							
Altitude	4000m							
DC connection	H4/MC4(Optional)							
AC connection	Connector							
Display	OLED+LED/WIFI+APP							
Interfaces: USB/RS485/WiFi /GPRS/LAN/RF	Yes/Yes/Optional/Optional/Optional/Optional							
Warranty: 5 years /10 years	Yes/Optional							
CE, VDE0126, Greece, EN50549, C10/C11, VFR 2019, IEC62116, IEC61727, IEC 60068, IEC 61683, CEI0-21, N4105, TOR Erzeuger G98/G99, G100, AS4777, UNE217001, UNE206007, PO12.2								



*1 The AC voltage range and frequency range may vary depending on specific country grid standard. All specifications are subject to change without notice.
*2 The backup function is ready for the BP version with Backup lable by using the SYN 50-XH-30 device.

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Important technical parameters APX battery

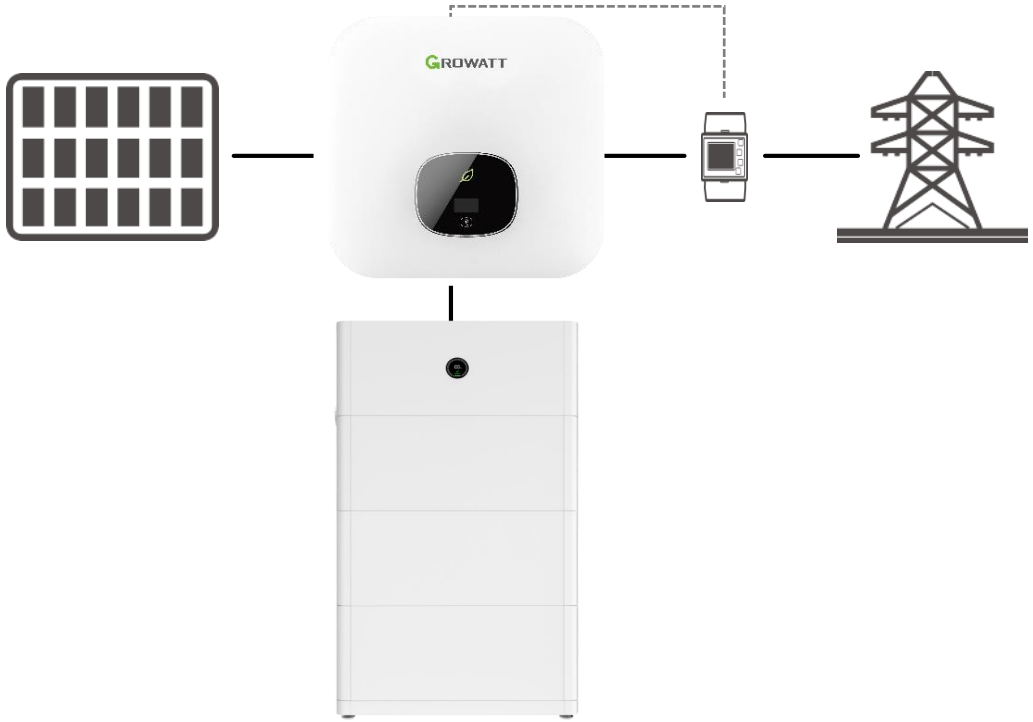
System Model	APX 5.0P	APX 10.0P	APX 15.0P	APX 20.0P	APX 25.0P	APX 30.0P
System demo						
Power module	APX 98020-P1/APX 98034-P2					
Number of power modules	1					
Battery Module	APX 5.0P-B1					
Battery module energy	5kWh					
Number of battery modules	1	2	3	4	5	6
Energy capacity	5kWh	10kWh	15kWh	20kWh	25kWh	30kWh
Nominal power*1	2.5kW	5kW	7.5kW	7.5kW	7.5kW	7.5kW
Peak output power*1	4kW,60s	8kW,60s	10kW,60s	10kW,60s	10kW,60s	10kW,60s
Nominal power*2	2.5kW	5kW	7.5kW	10kW	12.5kW	15kW
Peak output power*2	4kW,60s	8kW,60s	12kW,60s	16kW,60s	20kW,60s	20kW,60s
Dimension (W/D/H)*3	690/185/660mm	690/185/955mm	690/185/1250mm	690/185/1545mm	690*2/185/1250mm	690*2/185/1250mm
Weight	68kg	118kg	168kg	218kg	271kg	321kg
Nominal voltage (three phase system)	650V					
Operating voltage range (three phase system)	600V~980V					
Battery type	Cobalt Free Lithium Iron Phosphate (LFP)					
Ingress protection	IP66					
Installation	Wall-mounted or Floor installation*4					
Operating ambient temperature	-10°C~50°C					
Relative humidity	5%~95%					
Cooling	Natural					
Altitude	≤4000m					
DOD	90%					
Warranty	10 years					

- Growatt APX 5.0P-B1 battery
  - Nominal capacity **5 kWh, 100 Ah**
  - Usable 4.5 kWh
  - Nominal voltage **385 V** (working range 330-450 V)
  - LFP
  - Weight of one module **50 kg**
  - 690 mm x 185 mm x 295 mm
  - The nominal module power is **2.5 kW per module**, i.e. a 10 kWh battery can be charged and discharged at a maximum of 5 kW.
- Growatt APX 5.0P BMS (98034-P2)*
  - Weight 16 kg
  - 690 mm x 185 mm x 295 mm
  - The wiring for connection to the inverter is also included.
- Growatt APX 5.0P Battery Base
  - Base for stationary installation
- Growatt APX 5.0P Parallel cable
  - Cabling for connecting modules to two towers for 25 kWh and 30 kWh battery systems.

MOD XH(BP) connection and operation options

PV system

Hybrid system



Important operating characteristics:

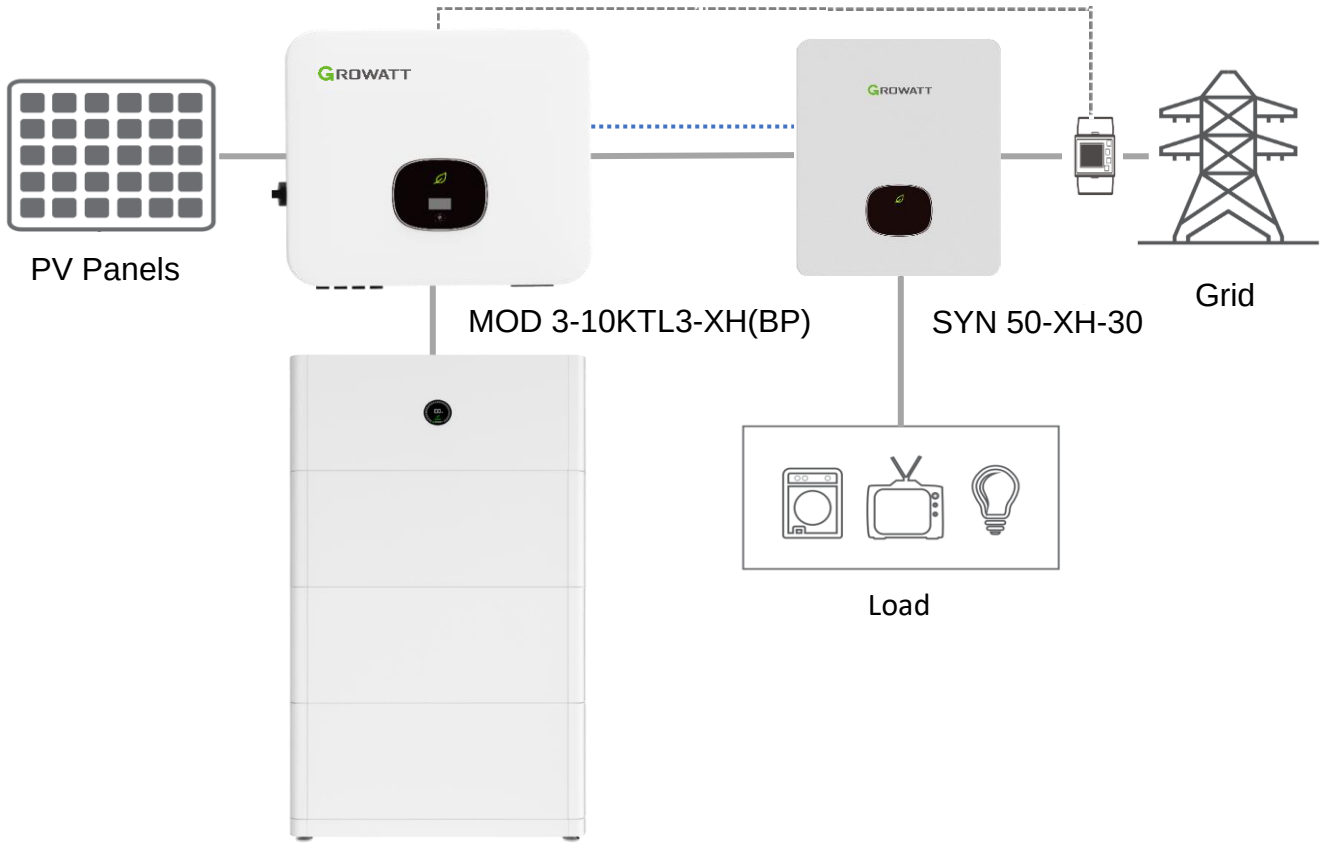
- Symmetrical inverter operation
- Together with the Smart Meter, the total consumption of the building is measured 24 h
- Without EPS

Important operating characteristics:

- 100% asymmetric operation
- Together with the Smart Meter, the total consumption of the building is measured 24 h
- Without EPS

Note: MID XH inverters can be operated in the same way

MOD XH(BP) connection and operation options



Important operating characteristics:

- **100% asymmetric operation**
- **Together with the electricity meter, the total consumption of the building is measured 24 h**
- **With EPS - switching within 0.5 s**

Note: MID XH inverters can be operated in the same way

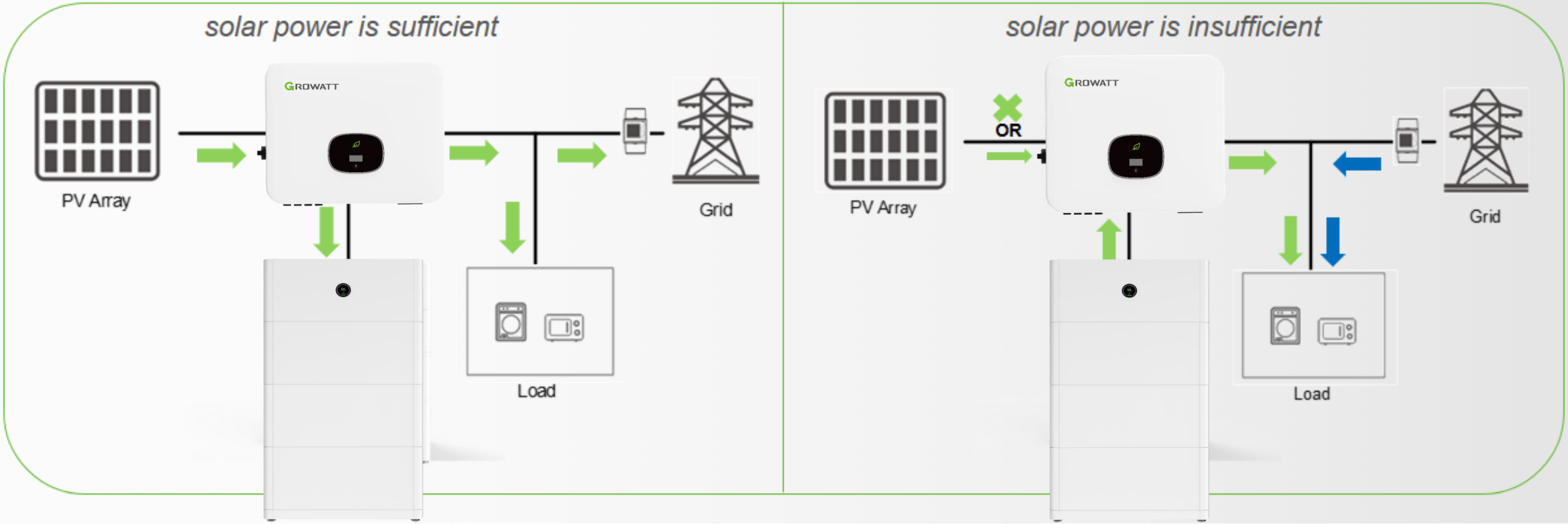
Work Modes – Load First to maximize the solar self-consumption

Load First Mode

Default mode to maximize the solar energy, reduce the power imported from grid

Priority: Load > Battery > Grid

How it works?



Note: This mode is set after the initial power-up of the inverter (default mode)

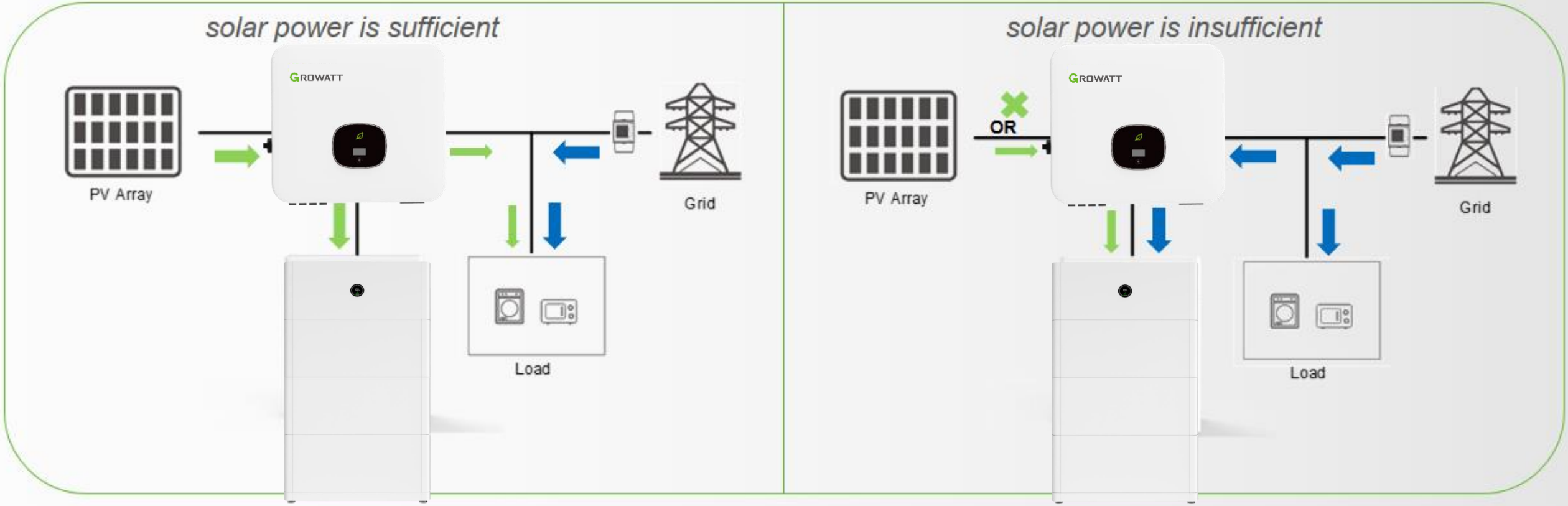
Work Modes – Battery First for peak shaving

Battery First Mode

High priority to charge the battery for peak shaving or guarantee enough energy in case blackout happens.

Priority: Battery > Load > Grid

How it works?



Note: When Battery First Mode runs out, the inverter switches to Load First Mode

Work Modes – Grid First for grid scheduling

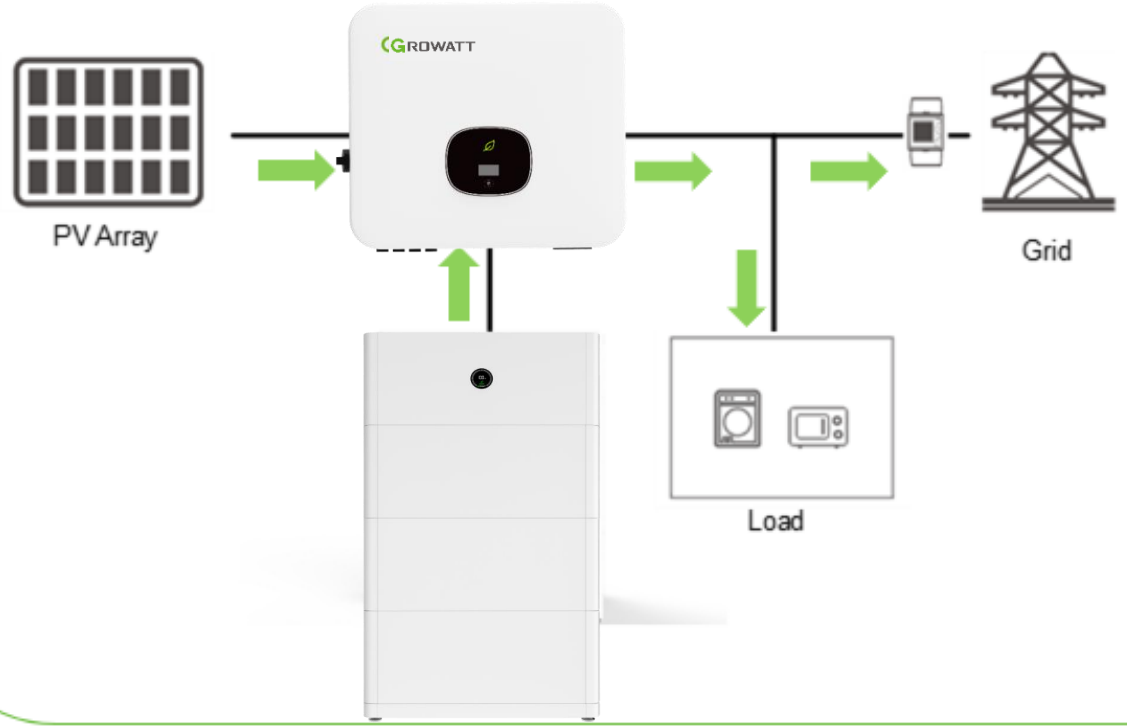
Grid First Mode

Export the energy into grid in response to the grid scheduling

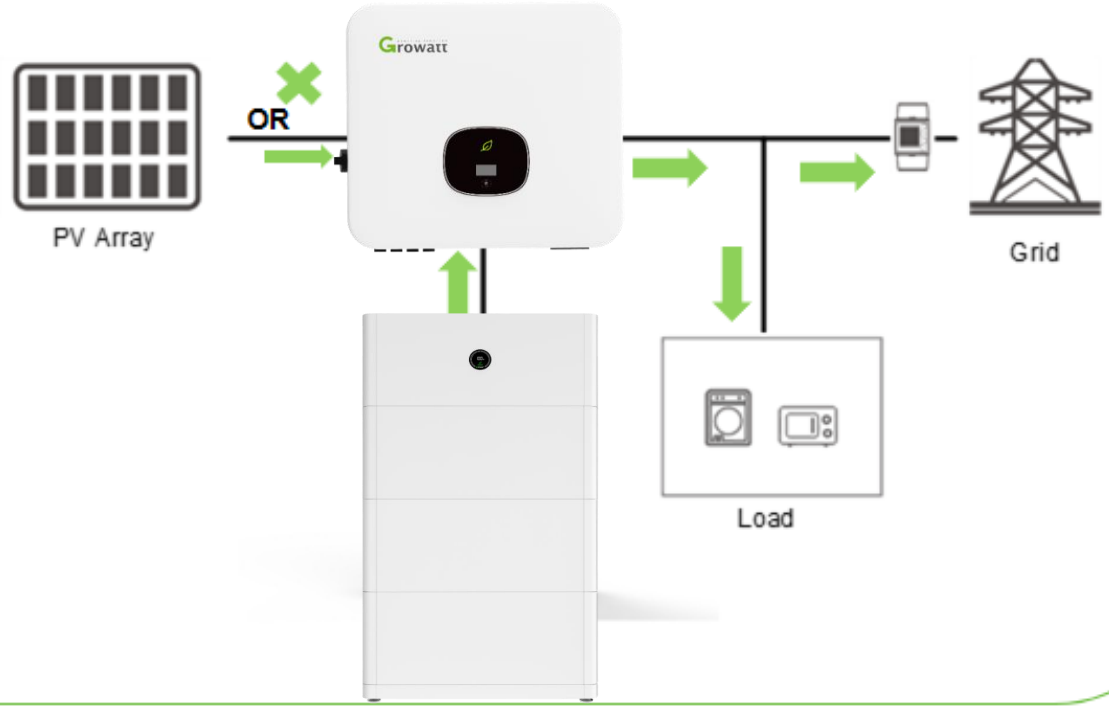
Priority: Load > Grid > Battery

How it works?

solar power is sufficient



solar power is insufficient



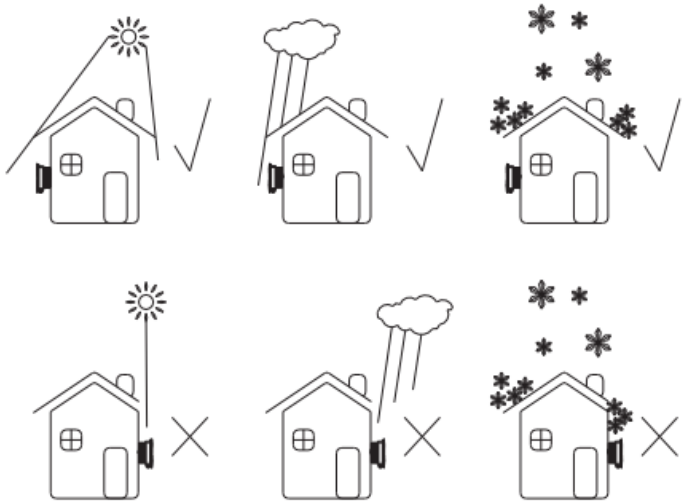
Recommended installation procedure for MOD XH (BP)

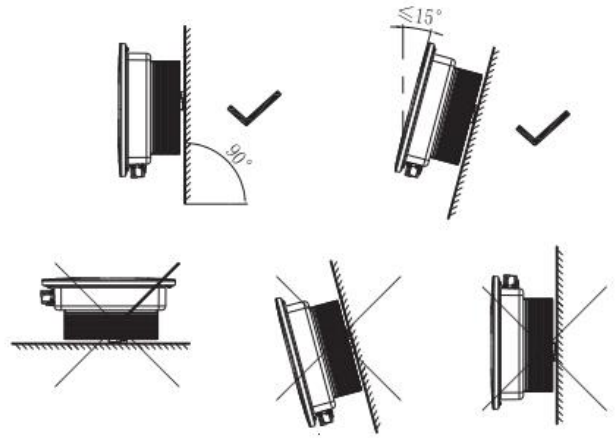
Installation instructions are included in the package
Electronic manuals are available for download at www.ginverter.com

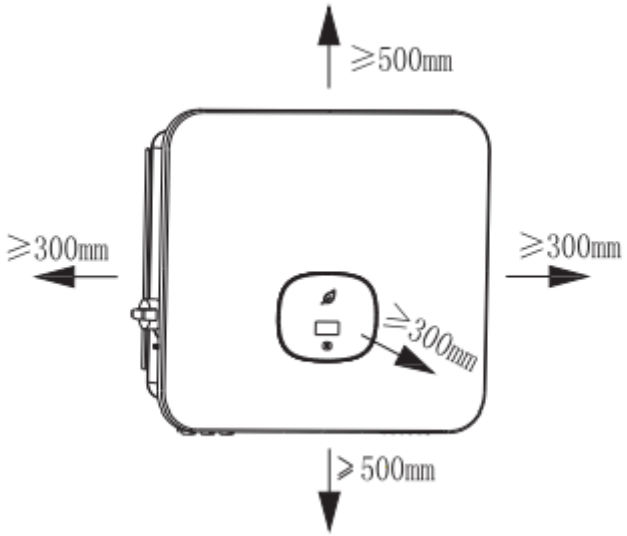
1.Packing inspection

Note: Compared to SPH, ENERGY METER is NOT included, must be purchased separately together with Wifi-X (LAN-X etc.)

2. Suitable inverter location







- Make sure that the inverter is installed in a suitable location, i.e. not in a closed box, out of reach of children and in a sheltered and **protected place against direct exposure to snow, rain and sunlight**.
- Make sure that the wall is strong enough to **support the weight of the inverter**, up to 14 kg**, in the long term.**
- Make sure that there is enough space for the inverter at the installation site, as well as clearance above and below (**50 cm in both directions**) and to the left and right (30 cm in both directions).

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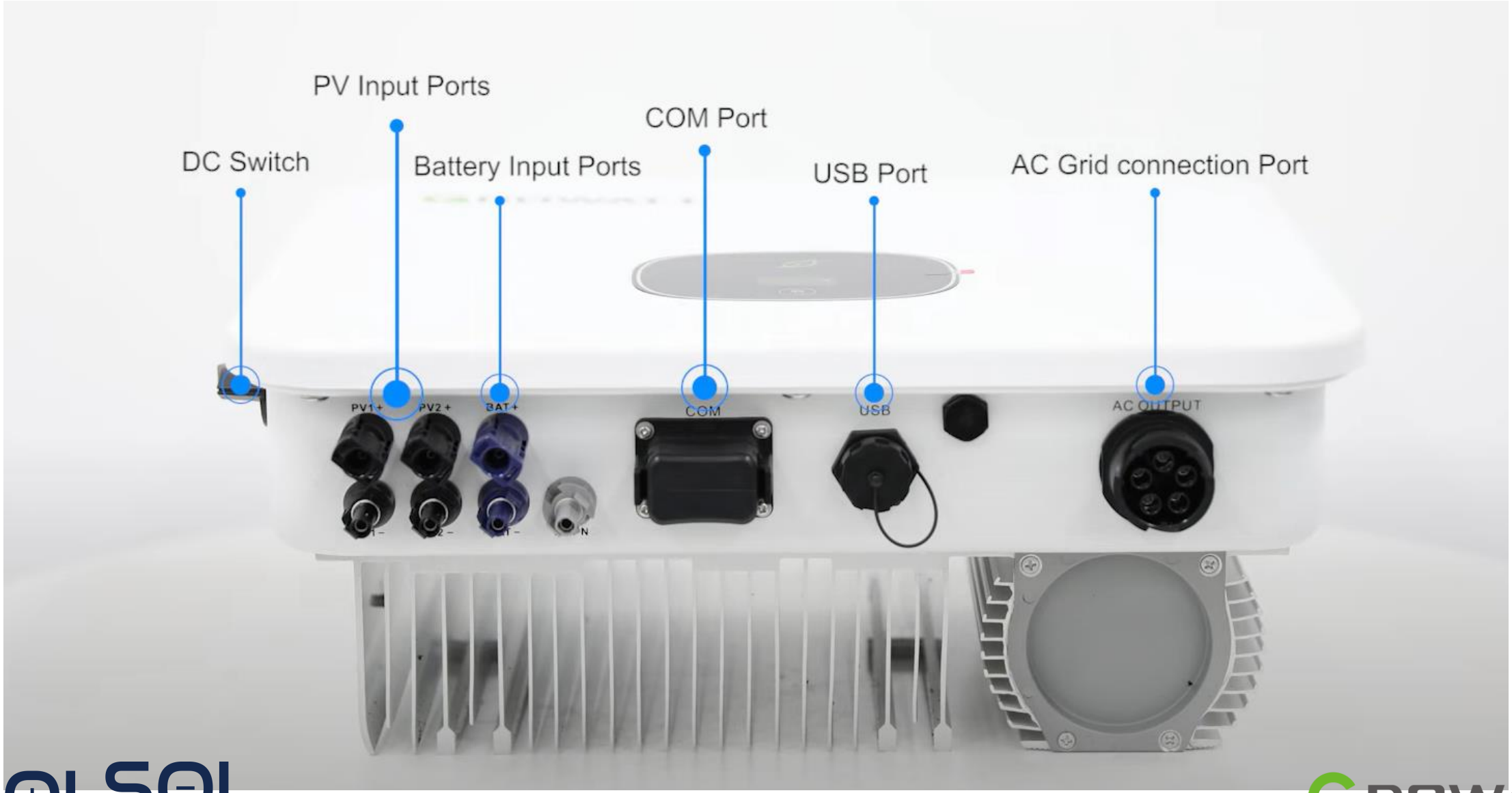
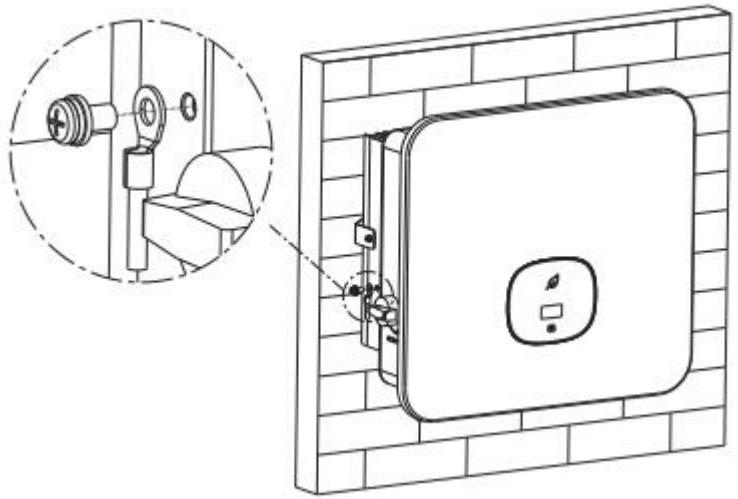
3. Inverter wiring - inputs



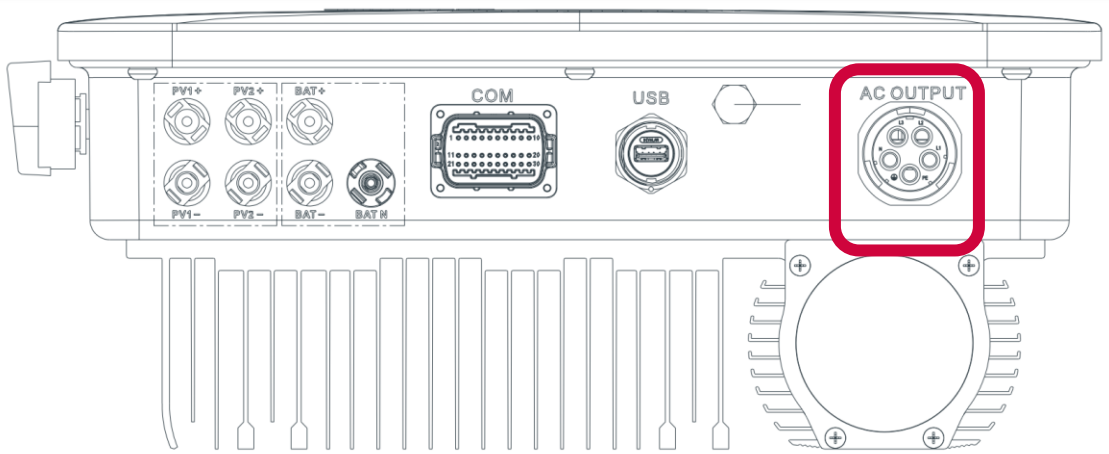
3. Inverter wiring
a) Inverter grounding



Recommended minimum cross-section of the grounding cable 6 mm2*

*Final cross-section and type of cabling is determined by the responsible designer according to local conditions of the implementation

3. Inverter wiring
b) AC output



Model	Wire cross-sectional area	Maximum wire length
		MOD TL3-XH series
MOD 3-6KTL3-XH	6-8mm²	6mm² : MAX40m 8mm² : MAX60m
MOD 7-10KTL3-XH	6-10mm²	6mm² : MAX40m 10mm² : MAX80m

Recommended inverter AC protection

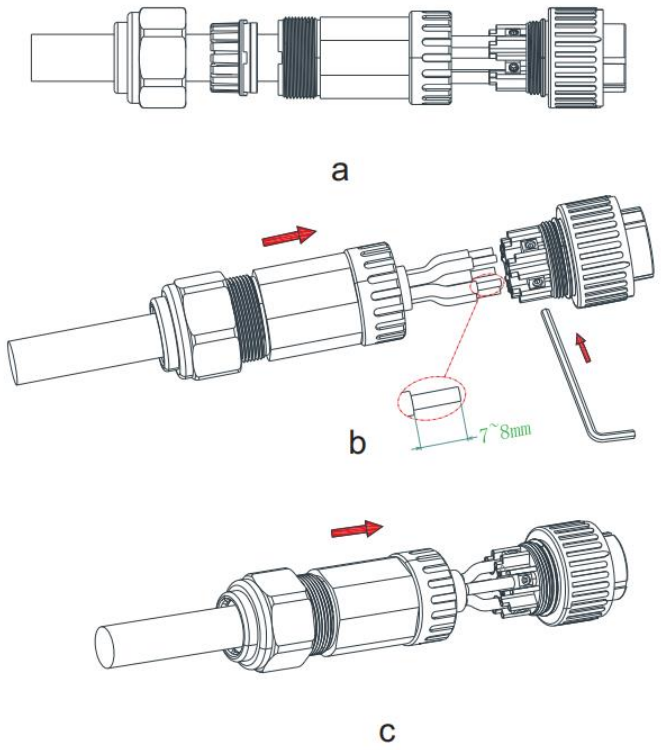
Inverter model	Switch specification
MOD 3000TL3-XH	10A/230V
MOD 4000TL3-XH	10A/230V
MOD 5000TL3-XH	15A/230V
MOD 6000TL3-XH	15A/230V
MOD 7000TL3-XH	15A/230V
MOD 8000TL3-X	20A/230V
MOD 9000TL3-XH	20A/230V
MOD 10KTL3-XH	25A/230V

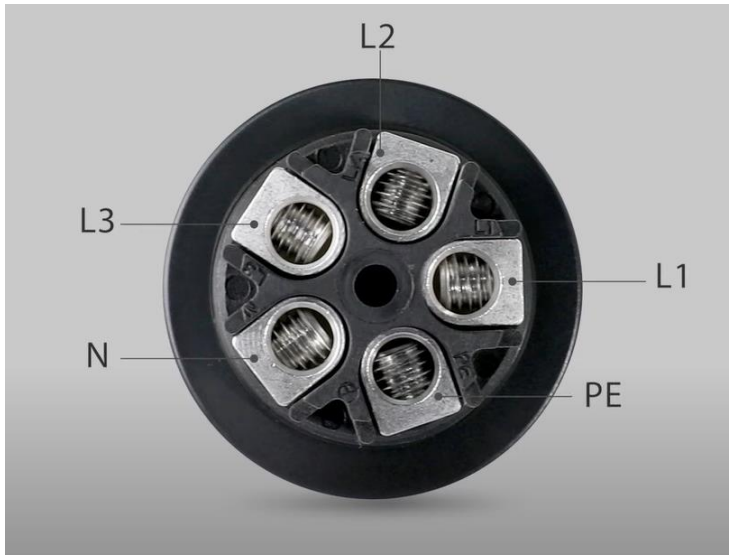
- Recommended wire cross-section: 6 - 10 mm2 , maximum spacing see table above*

  CGSG 5Gx6 mm²

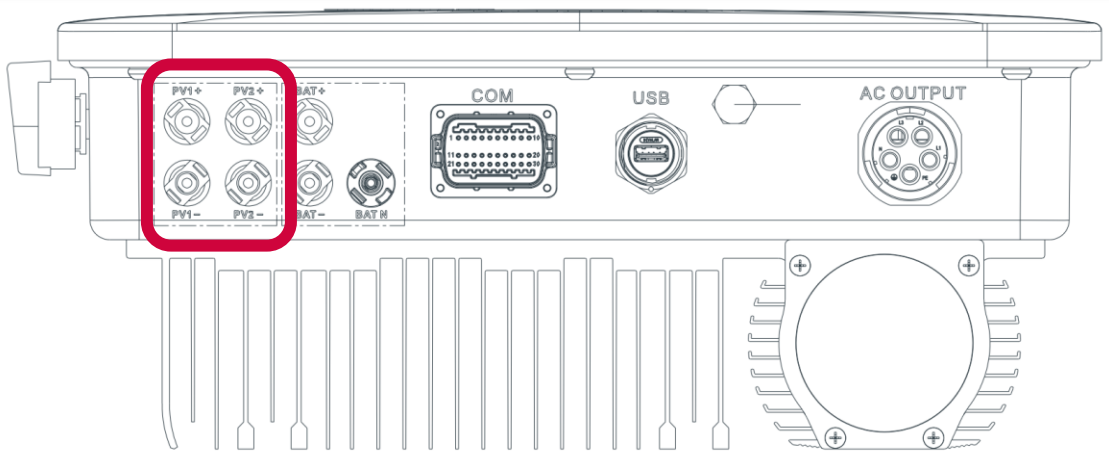
*Final cross-section and type of cabling is determined by the responsible designer according to local conditions of the implementation

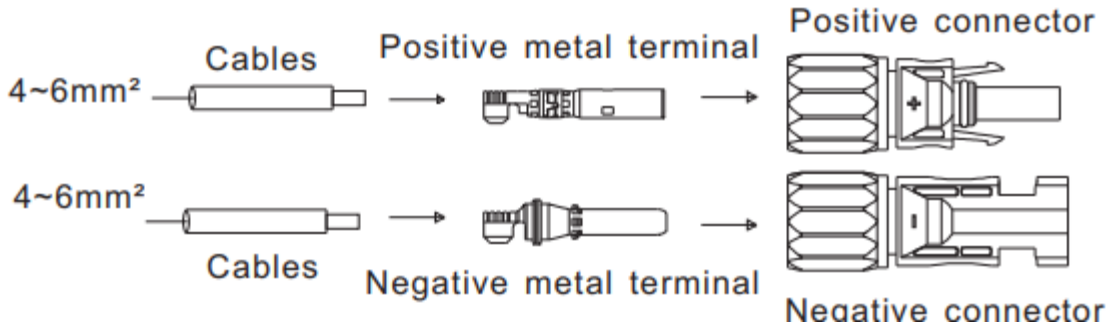
3. Inverter wiring
b) AC output





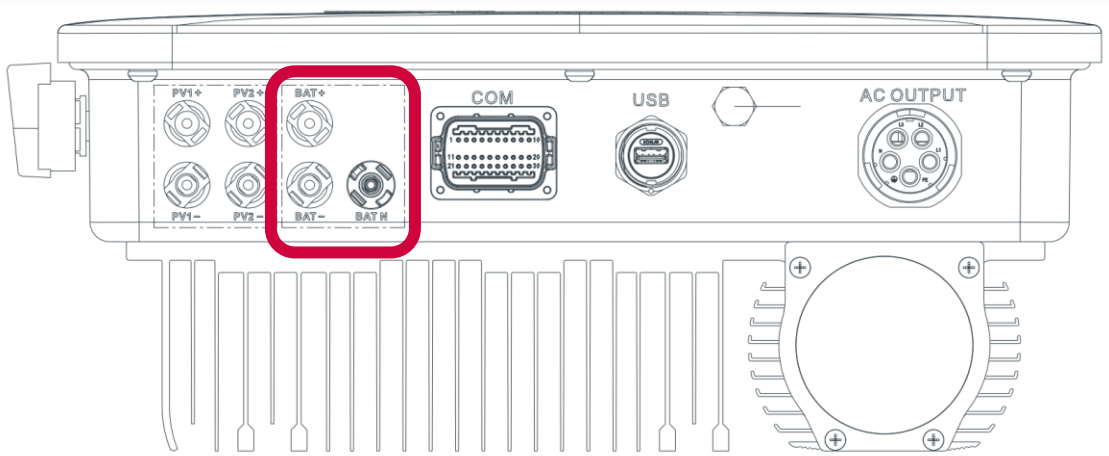
3. Inverter wiring
c) PV inputs

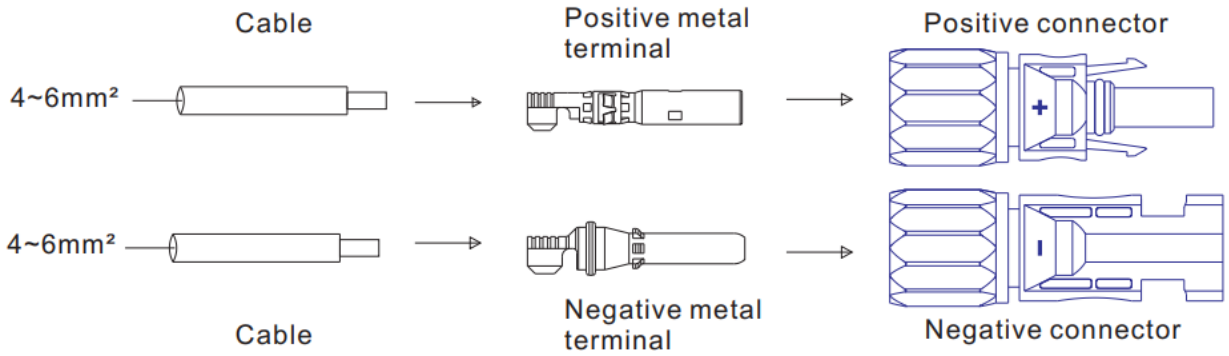


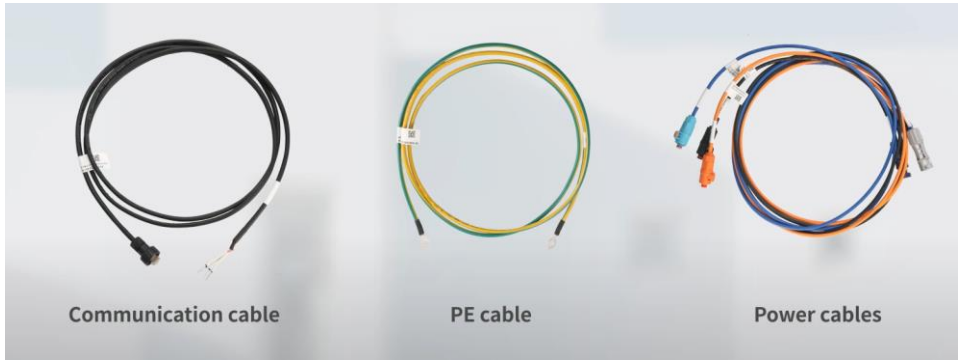


- Max DC power per 1 MPPT = ½ PV power (for STC panel power)
  E.g. MOD10KTL3-XH(BP) - max. **10 kWp per 1 MPPT**
- PV inputs to be connected with the **DC switch OFF**
- Before connecting DC inputs check polarity + -
- Maximum voltage must not exceed **1100 V DC**
- Maximum DC input current must not exceed 16 A for MPPT, 20 A for Isc.
- We recommend using the MC4 connectors included in the inverter package.

3. Wiring inputs of the inverter
d) Battery input



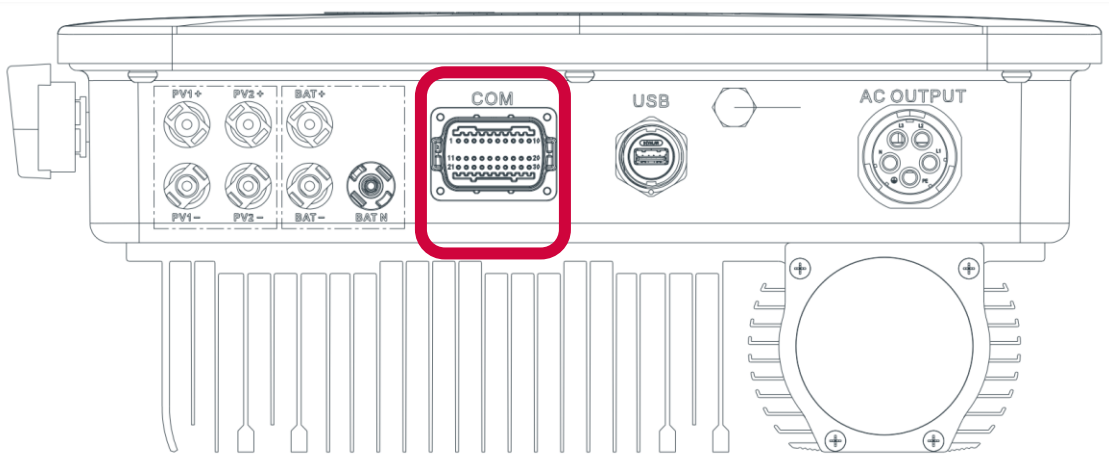


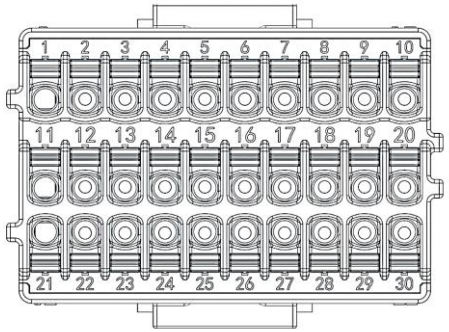


- Maximum voltage **950 V**, Maximum power **10 kW***
- Wiring harness included **Growatt APX 5.0P BMS (98034-P2)**
- Never disconnect or connect battery inputs under load
- **We recommend using original Growatt connectors and cables**

*Resulting performance depends on the connected APX battery capacity

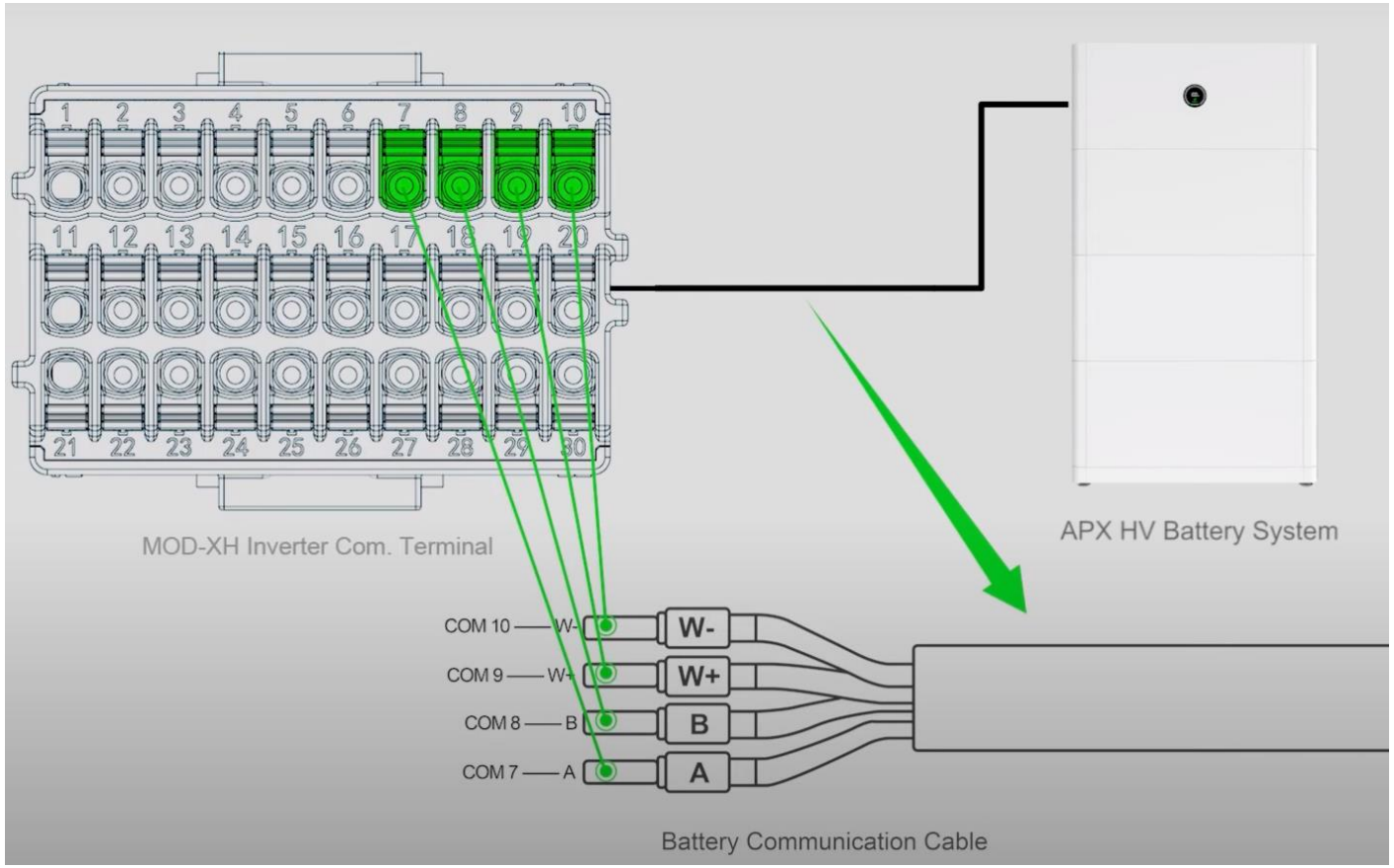
3. Inverter wiring
(e) COM port





No.	Description	Remarks
1	+12V	Dry junction : external relay coil interface, power is not more than 2W
2	COM	
3	RS485A1	RS485 communication port
4	RS485B1	
5	RS485A3	Meter communication port
6	RS485B3	
7	RS485A2	Battery communication port
8	RS485B2	
9	BAT.EN+	Battery wake-up signal
10	BAT.EN-	
11	DRM1/5	Relay contact 1 input
12	DRM2/6	Relay contact 2 input
13	DRM3/7	Relay contact 3 input
14	DRM4/8	Relay contact 4 input
15	REF/GEN	GND
16	DRM0/COM	/
17	RS485A4	Backup box communication
18	RS485B4	
21	BOX.EN+	Backup box identification signal
22	BOX.EN-	

3. Inverter wiring
e) COM port - connection of APX communication



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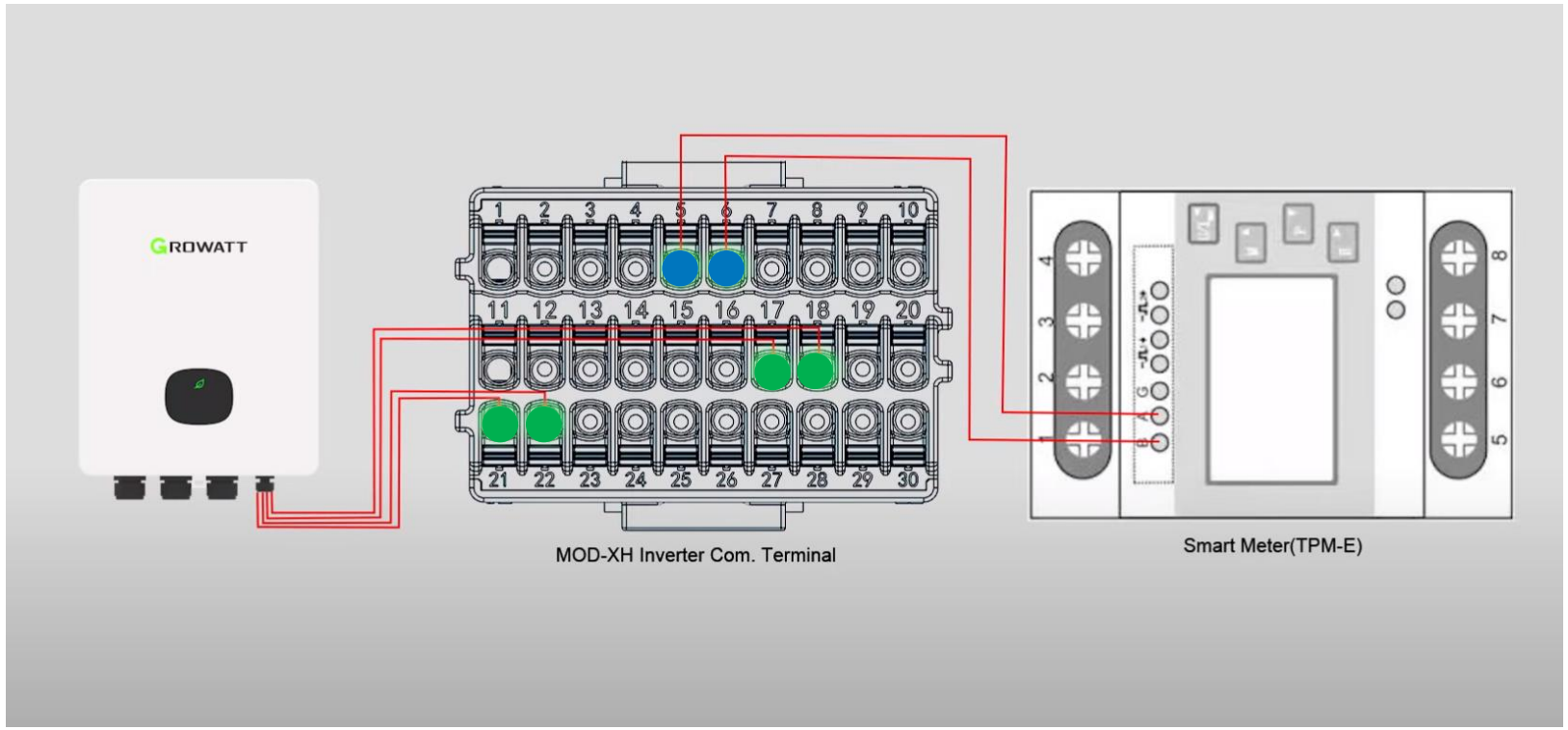
8	RS485B2	
9	BAT.EN+	Battery wake-up signal
10	BAT.EN-	
11	DRM1/5	Relay contact 1 input
12	DRM2/6	Relay contact 2 input
13	DRM3/7	Relay contact 3 input
14	DRM4/8	Relay contact 4 input
15	REF/GEN	GND
16	DRM0/COM	/
17	RS485A4	Backup box communication
18	RS485B4	
21	BOX.EN+	Backup box identification signal
22	BOX.EN-	

3. Inverter wiring
e) COM port - connection of SYN 50-XH-30 and Smart Meter



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6	RS485B3	
7	RS485A2	Battery communication port
8	RS485B2	
9	BAT.EN+	Battery wake-up signal
10	BAT.EN-	
11	DRM1/5	Relay contact 1 input
12	DRM2/6	Relay contact 2 input
13	DRM3/7	Relay contact 3 input
14	DRM4/8	Relay contact 4 input
15	REF/GEN	GND
16	DRM0/COM	/
17	RS485A4	Backup box communication
18	RS485B4	
21	BOX.EN+	Backup box identification signal
22	BOX.EN-	

*Standard length of the included Smart Meter communication cable is **15 m**, can be extended up to **100 m**

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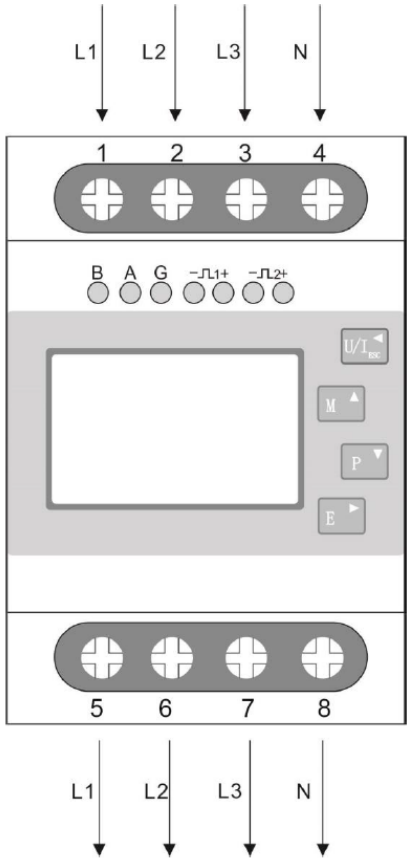
3. Inverter wiring
e) COM port - SmartMeter Eastron connection

Distribution network

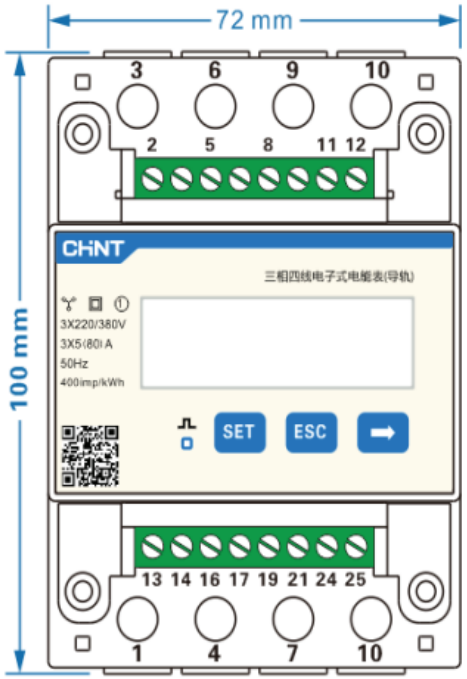


Load
(consumption of the object)

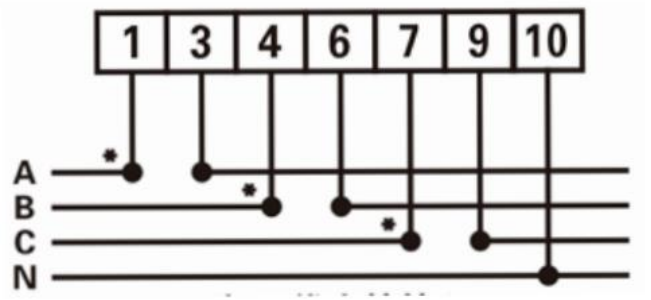
- ENERGY METER
  - EASTRON SDM630 with Growatt firmware
  - Can not be used other than from Growatt!!
- Settings (factory default)
  - Password - default: 1000
  - Addr 002
  - Baud Rate 9.6 k
- Technical parameters
  - Accuracy class 1
  - Nominal/Maximum current 10 - 100 A
  - Self-contained demand below 2 W
  - Dimensions 72 x 94.5 x 65 mm

4. Inverter wiring
e) COM port - SmartMeter CHINT connection

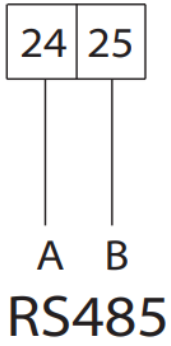
Load
(consumption of the
obiect)



Distribution network



Direct connect



RS485

Technical parameters

- Accuracy class 0.5
- Nominal/Maximum current 6-80 A
- Dimensions 72 x 100 x 65.5 mm
- Factory default Address 004
- Code to settings: 701

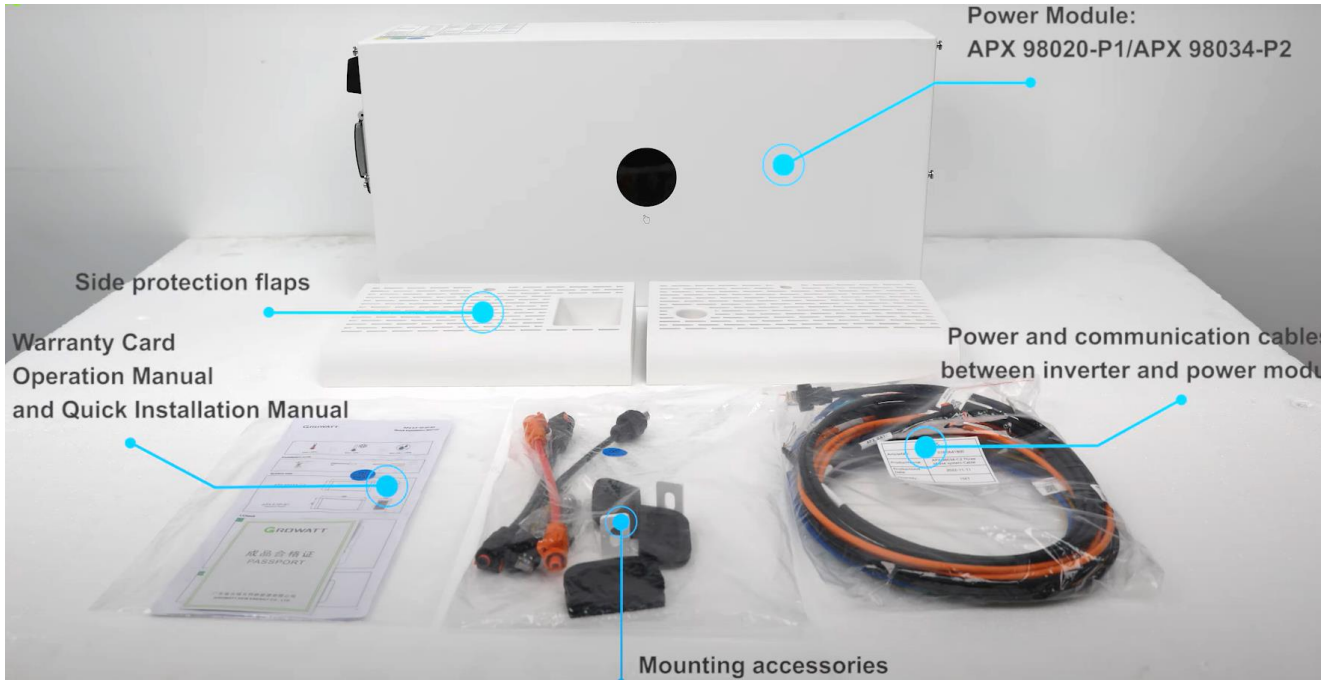
4. Inverter wiring
f) USB port - connection of Wifi-X, LAN-X, RF-Stick monitoring

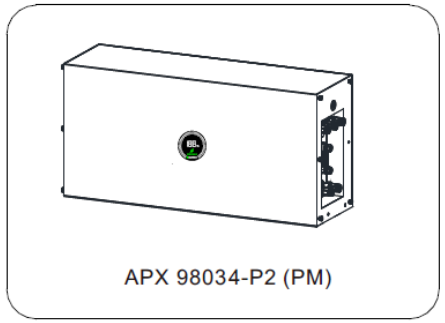
Note: if the battery is not monitored via the Growatt monitoring system, the warranty is reduced to 3 years

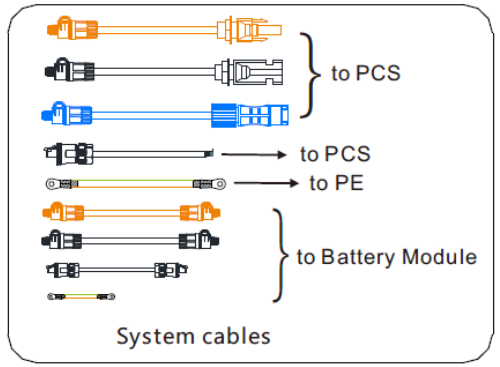
Recommended installation procedure for Growatt APX

Installation instructions are included in the package
Electronic manuals are available for download at www.ginverter.com

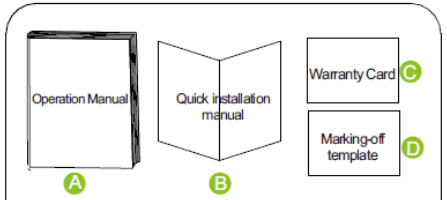
1.Package inspection - Growatt APX 5.0P BMS (98034-P2)



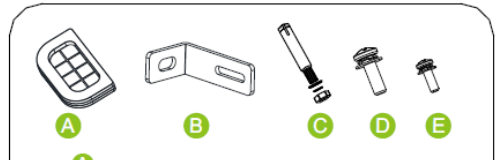

APX 98034-P2 (PM)



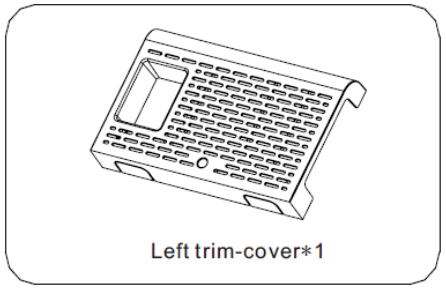
System cables

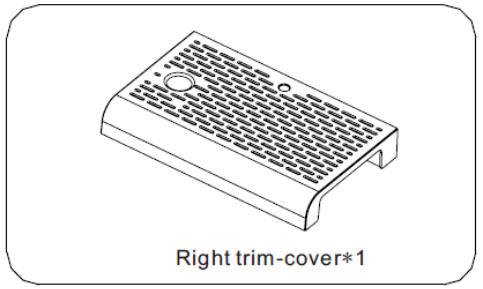


A Operation Manual *1
B Quick installation manual *1
C Warranty Card *1
D Marking-off template *1

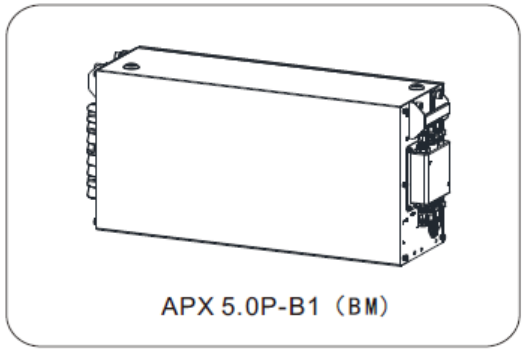


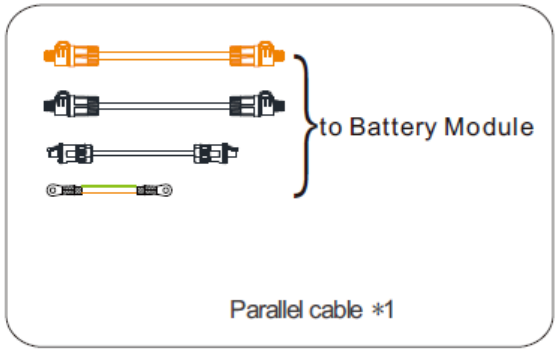
A Protective rubber ring *4
B Anti-tipping plate *2
C M6 expansion bolt *2
D M6x12 stainless steel screw *1
E M4x9 stainless steel screw *3


Left trim-cover*1

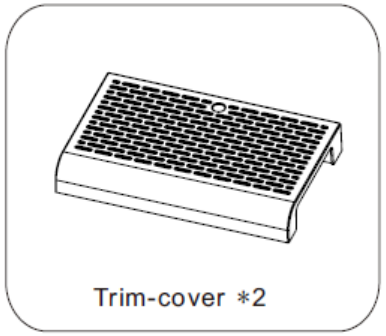

Right trim-cover*1

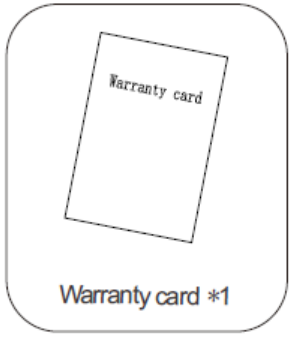
1.Package inspection - Growatt APX 5.0P-B1 Battery


APX 5.0P-B1（BM）

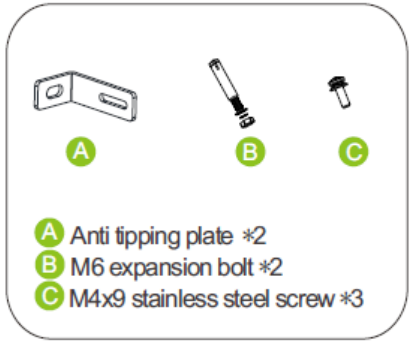


Parallel cable *1


Trim-cover *2

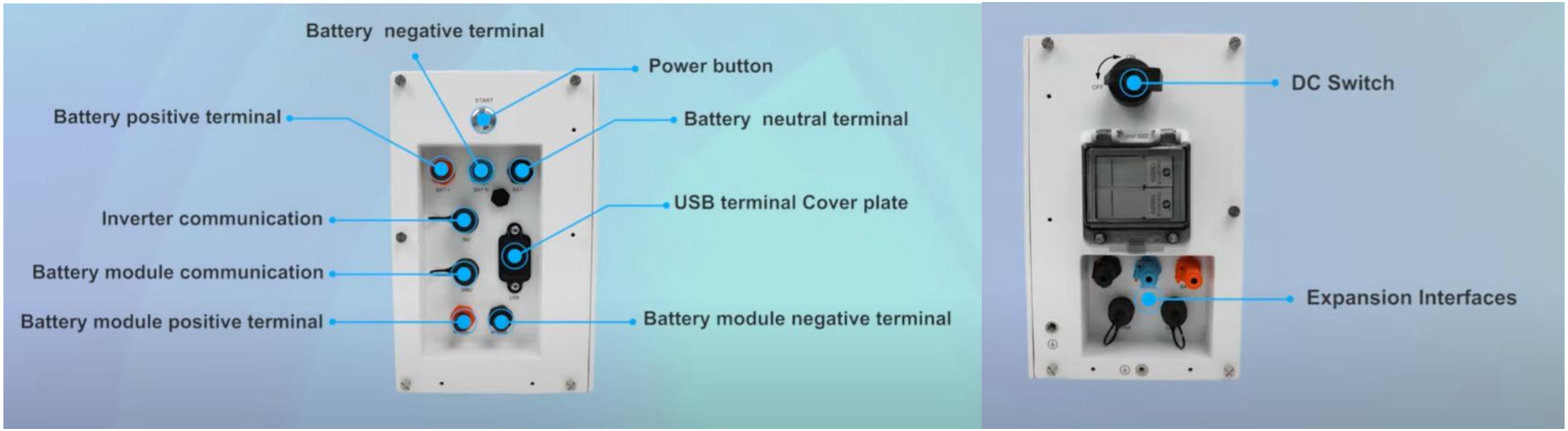


Warranty card *1

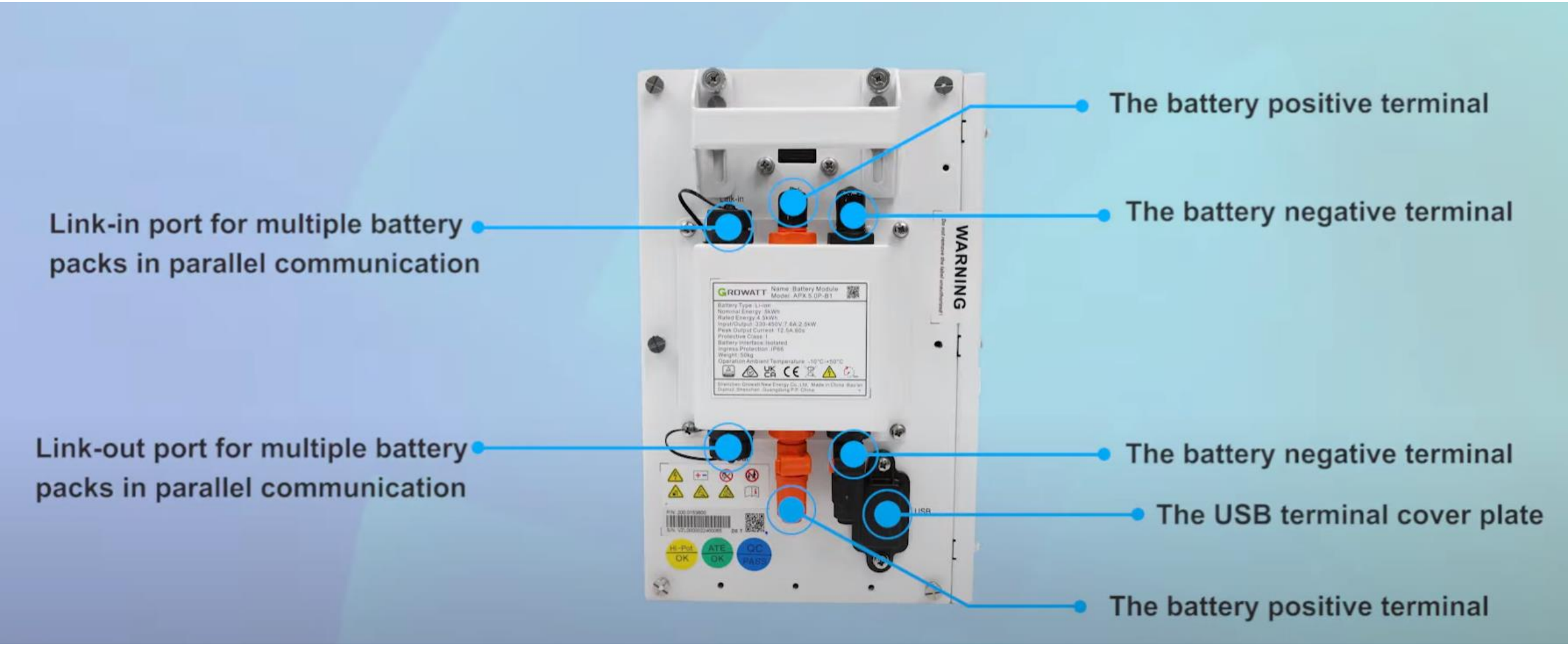


A Anti tipping plate *2
B M6 expansion bolt *2
C M4x9 stainless steel screw *3

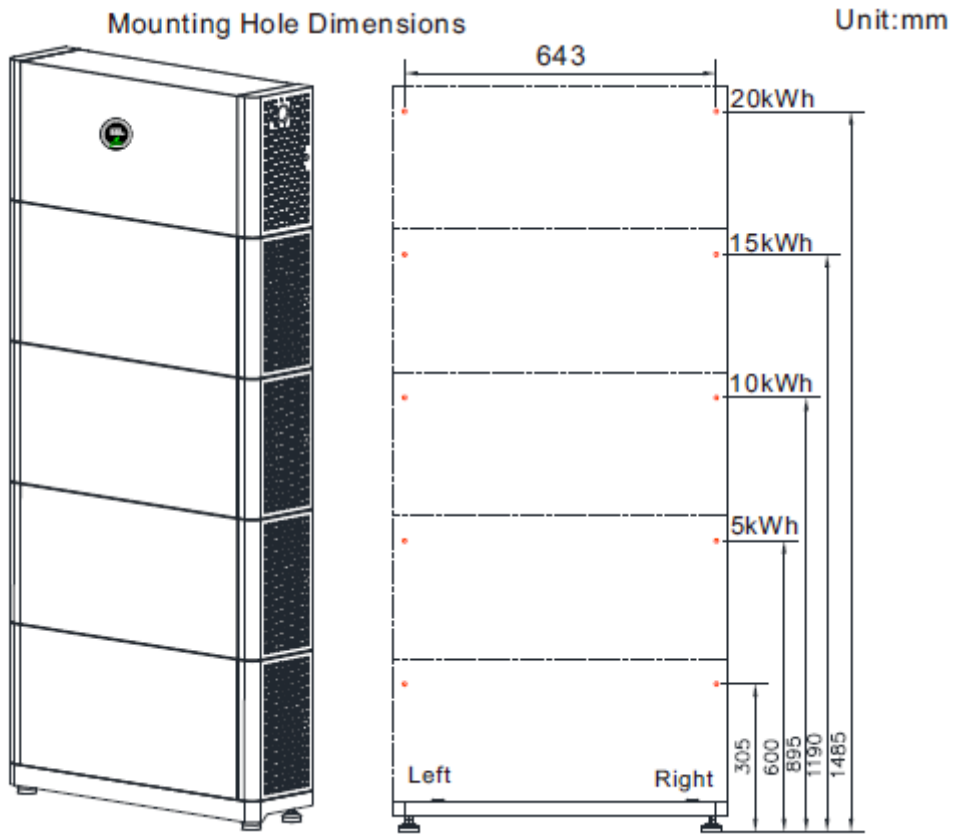
2. Inputs and outputs - Growatt APX 5.0P BMS (98034-P2)

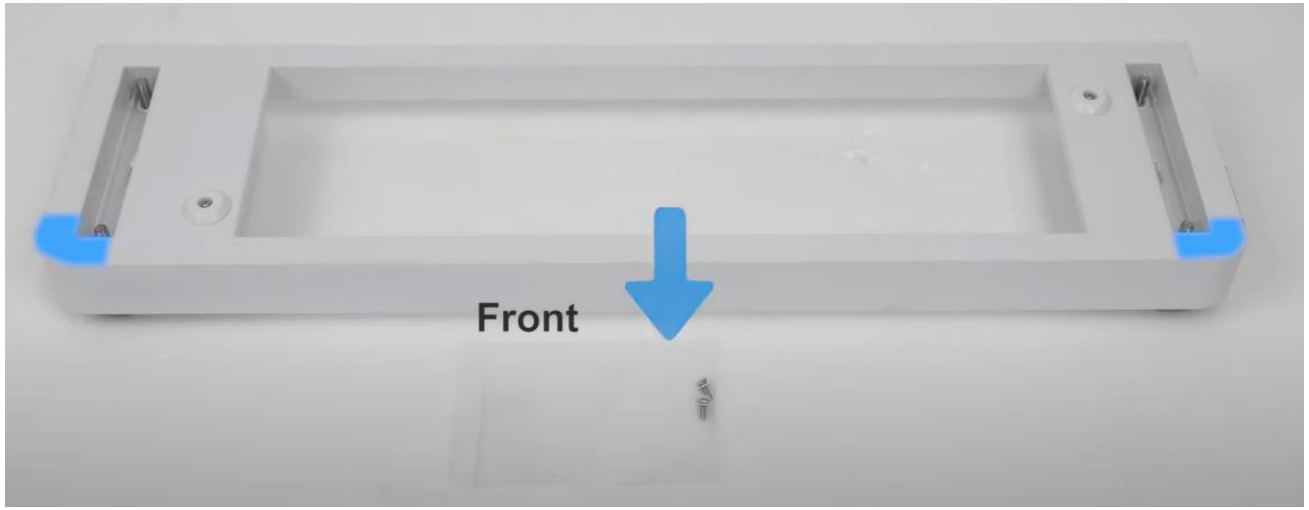


2. Inputs and outputs - Growatt APX 5.0P-B1 Battery



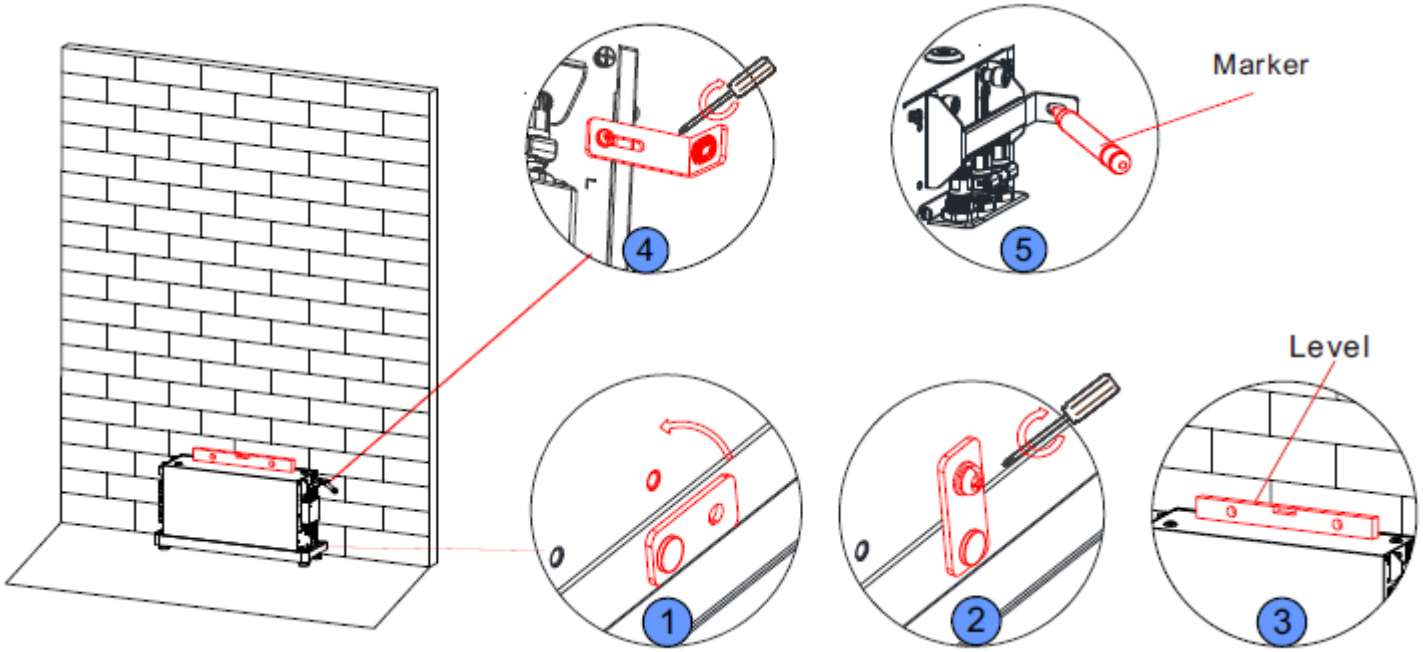
3. Installation - on the floor*



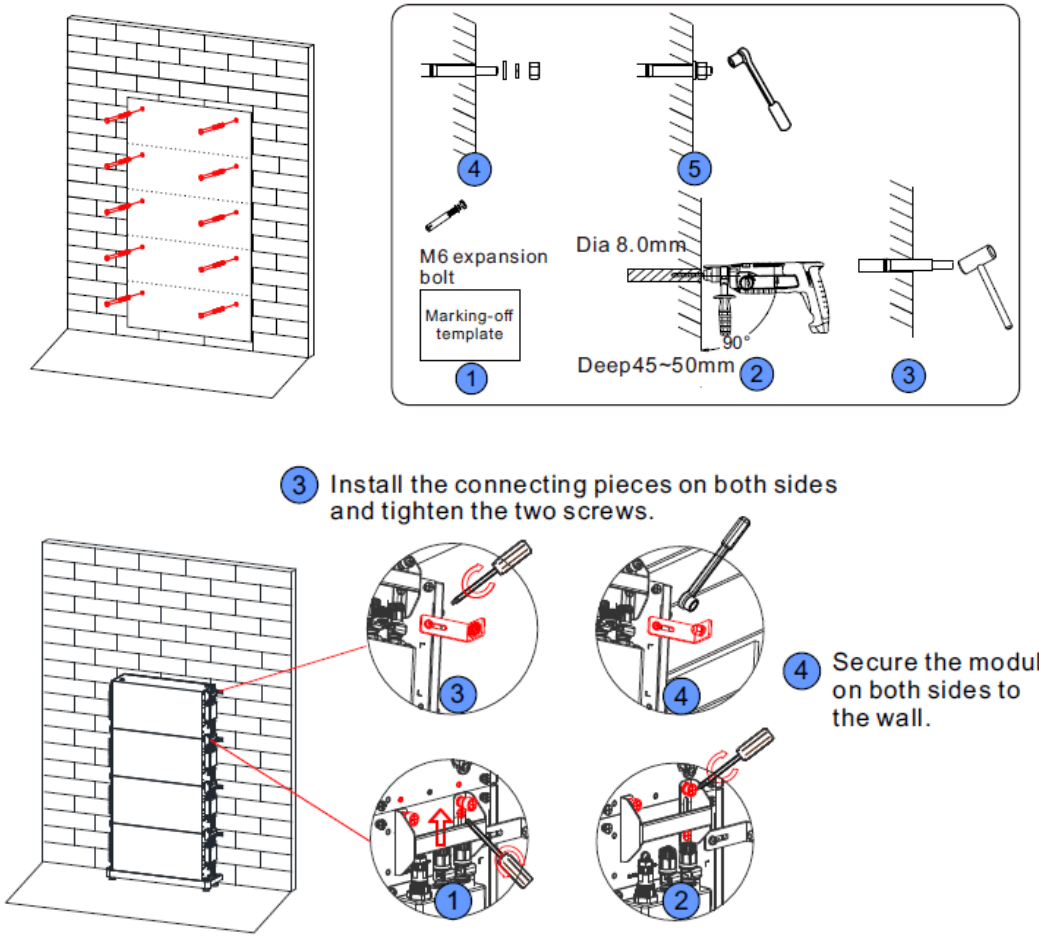


* can also be installed on the wall, see APX user manual for details (max. 4 battery modules per wall 20 kWh, if more modules are needed, they must be divided). Need to buy a **mounting bracket** for each battery module.

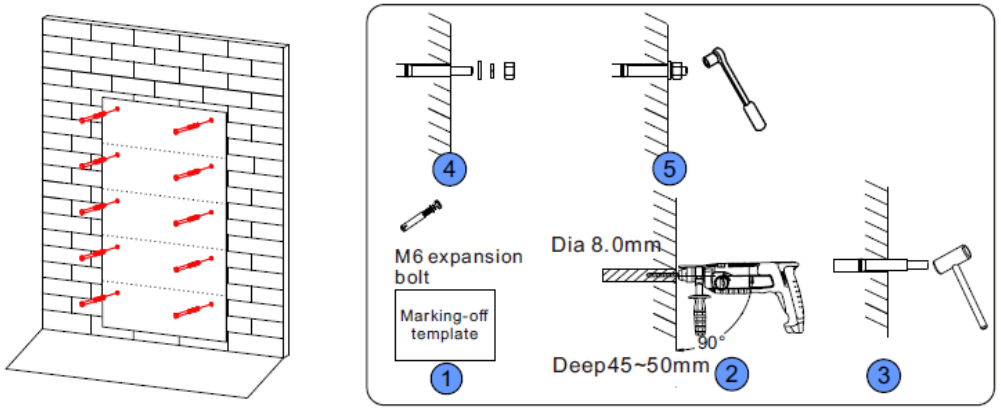
3. Installation - on the floor



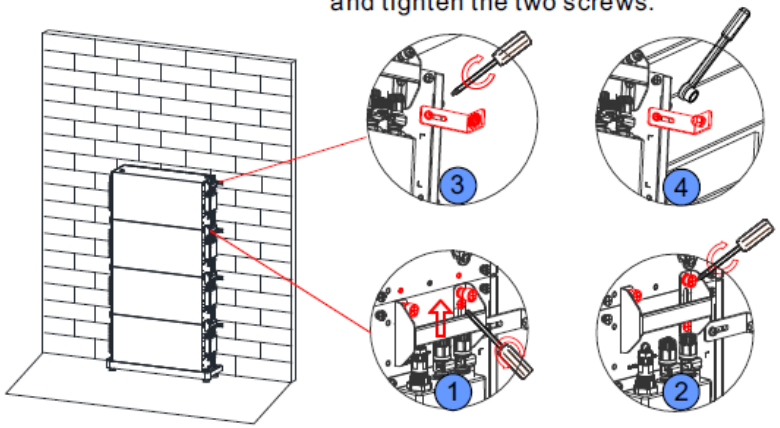
3. Installation - on the floor



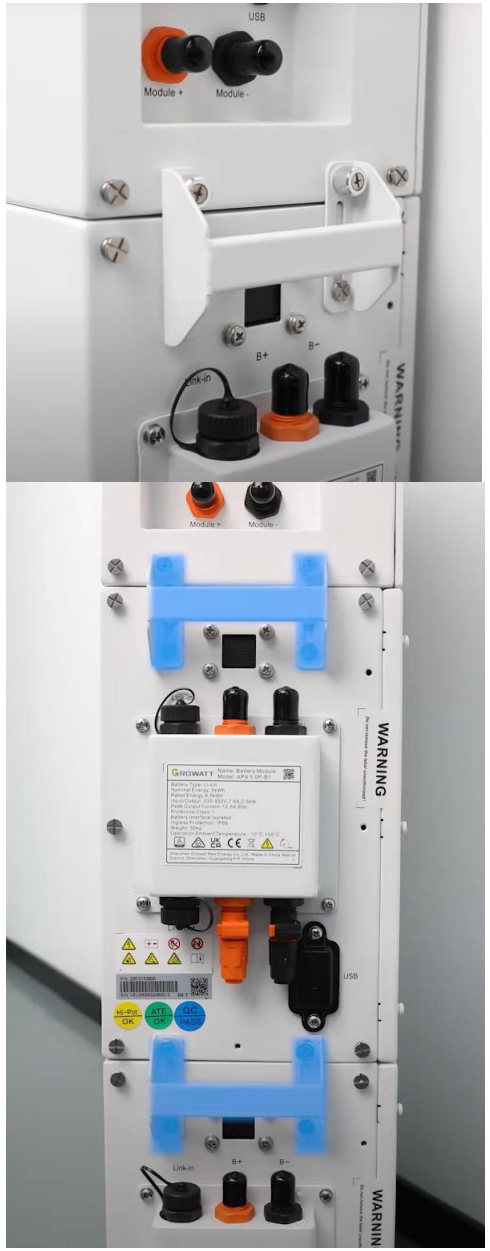
3. Installation - on the floor



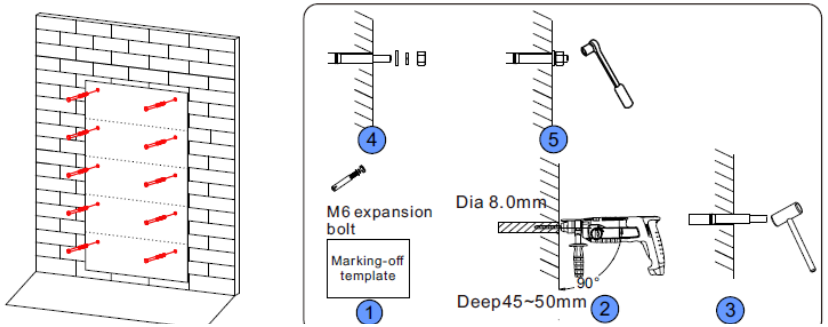
3 Install the connecting pieces on both sides and tighten the two screws.

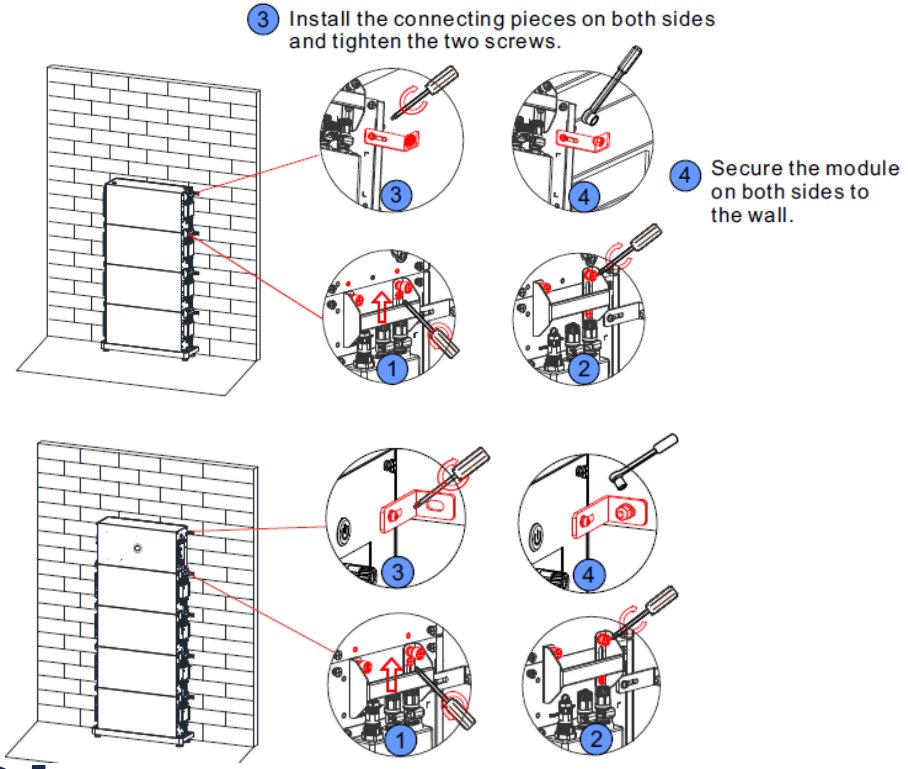


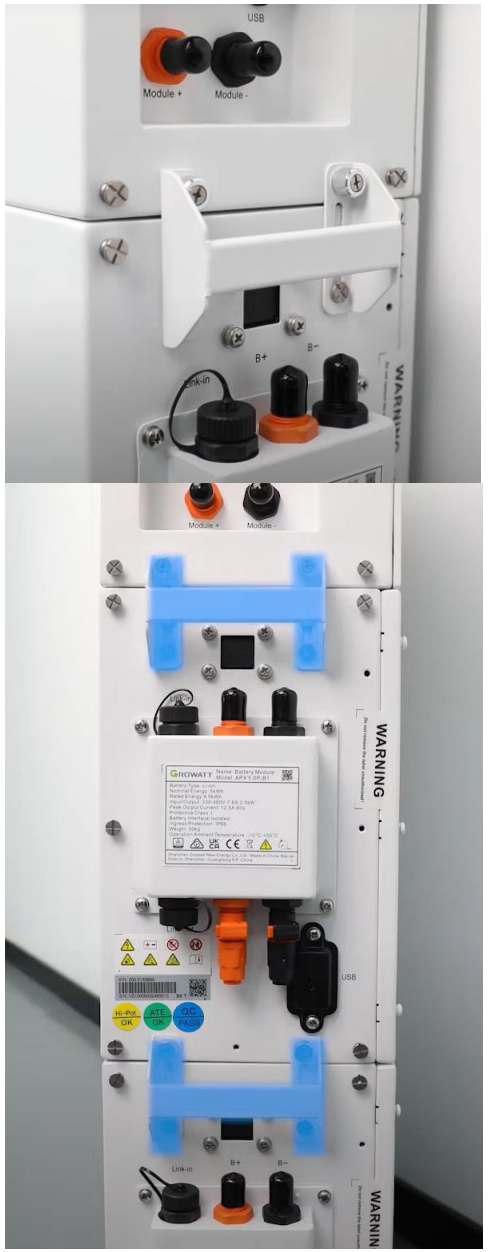
4 Secure the module on both sides to the wall.



3. Installation - on the floor







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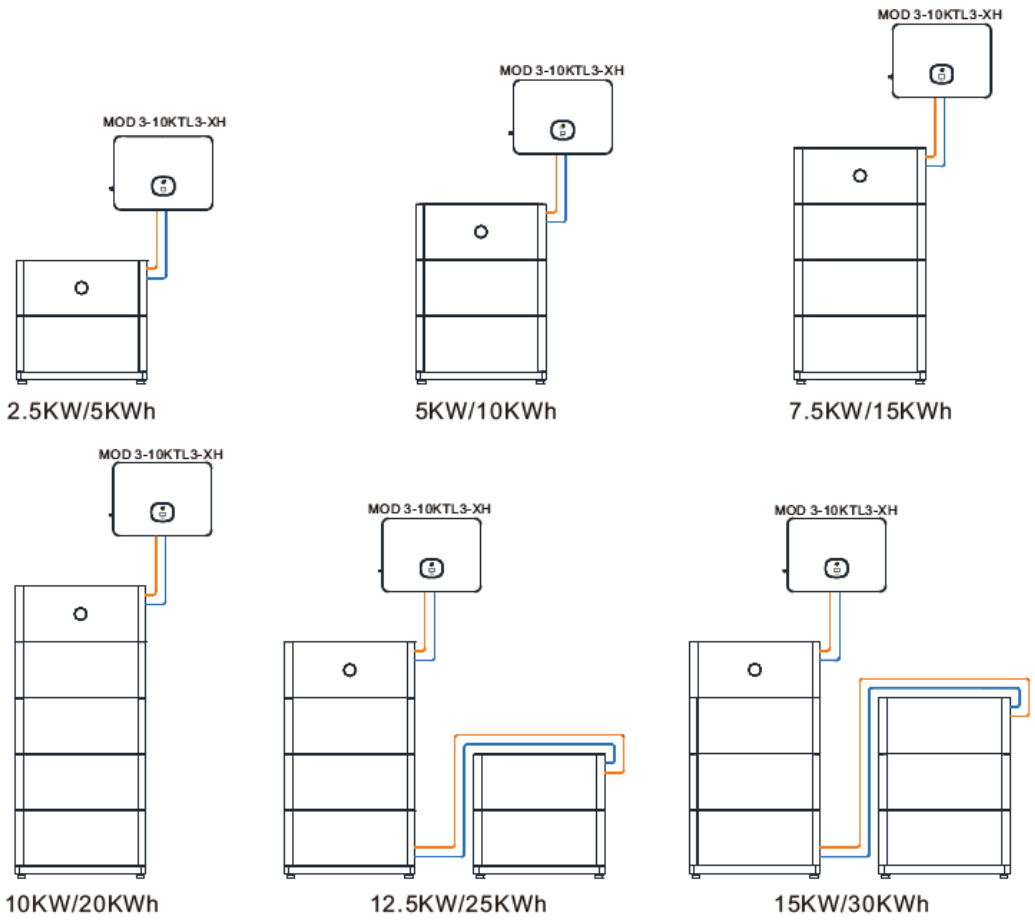
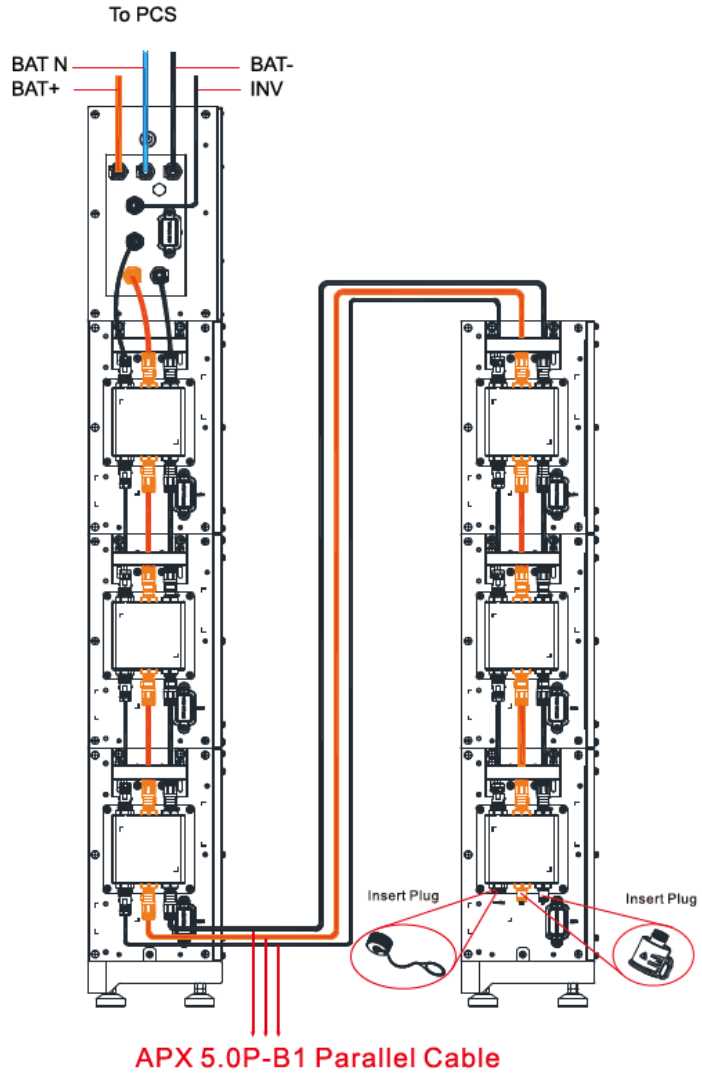
4. Installation - electrical connection with MOD XH (BP) inverter

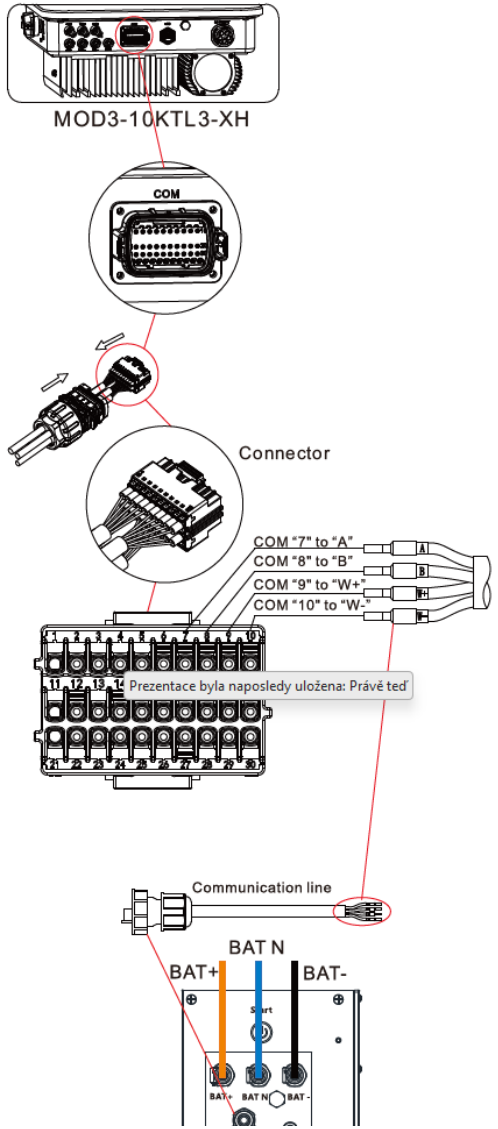




For capacities of 25kWh and above, purchase **APX 5.0P-B1 Parallel Cable** and **APX 5.0P Battery Base**

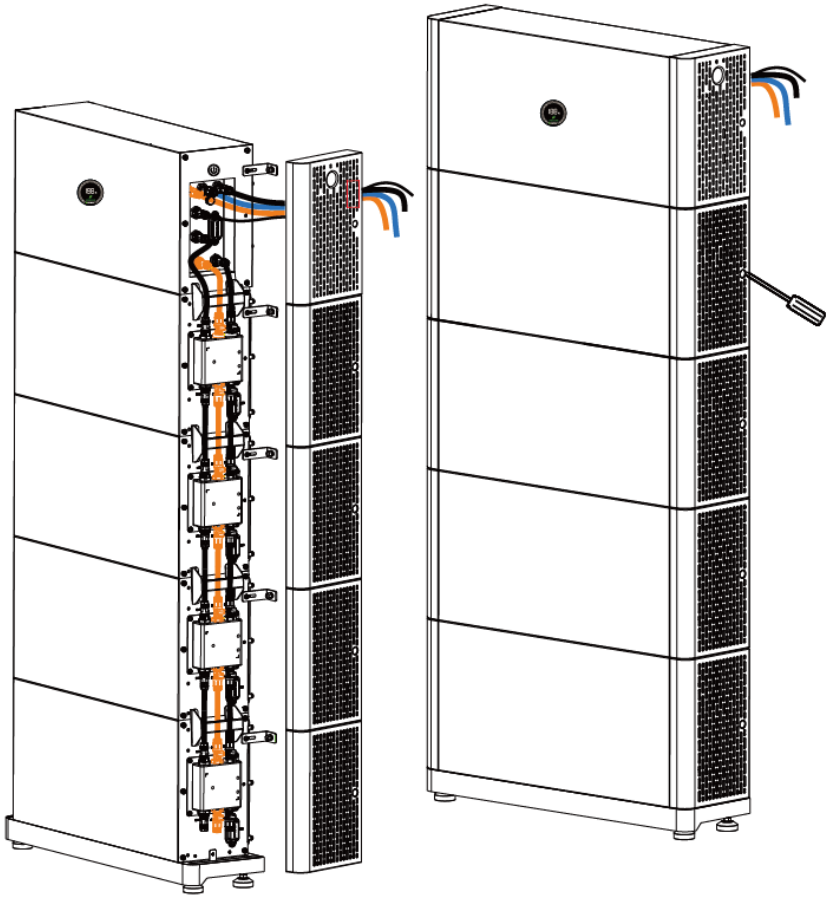
CORRECT ORDER OF CABLE CONNECTION: 1.ground wiring 2. communication line 3. power cabling

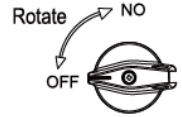
4. Installation - electrical connection with MOD XH (BP) inverter



APX 5.0-30.0P-S2			MOD 3-10KTL3-XH		
Silk screen	Terminal serial number	Definition	Silk screen	Terminal serial number	Definition
INV	1	WAKE-(W-)	COM	10	BAT.EN-
	2	WAKE+(W+)		9	BAT.EN+
	7	RS485_B(B)		8	RS485B2
	8	RS485_A(A)		7	RS485A2

4. Installation - Covering and proper battery start-up and shutdown



Power on	1.Turn on DC Switch 2.Press the start key more than 5S	
System off	Turn off DC Switch (waiting more than 90S)	

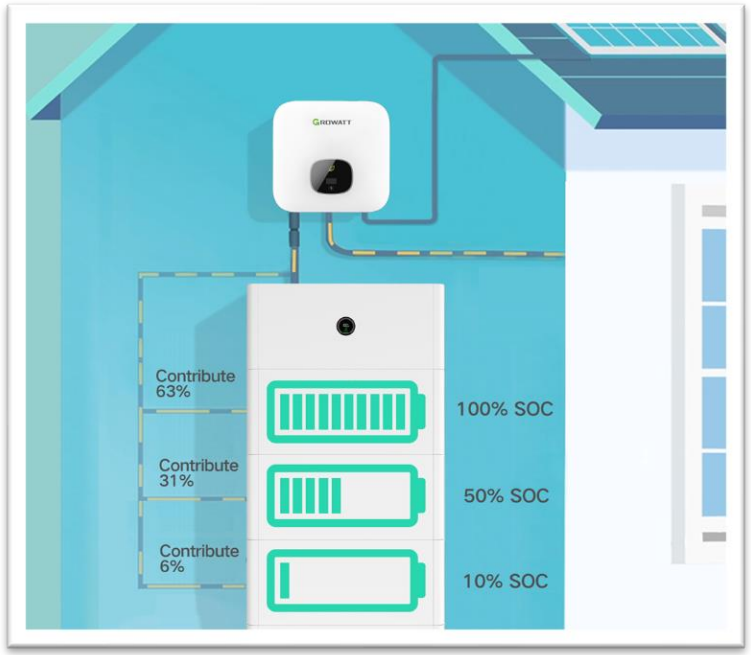
SWITCHING ON THE APX BATTERY

1. Turn the switch to the ON position
2. Hold the Power button for more than 5 seconds

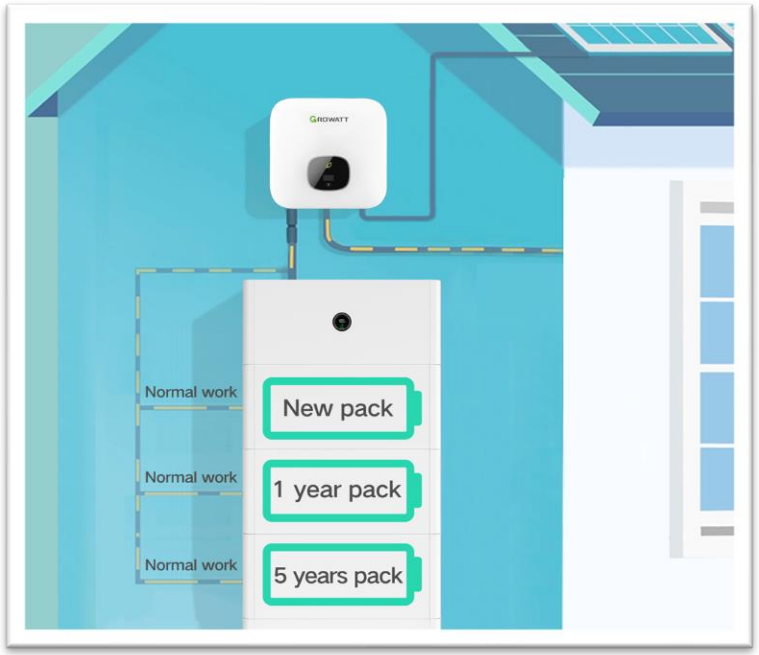
APX BATTERY SHUTDOWN

1. Turn the switch to OFF
2. Wait at least 90 seconds before shutting down the entire system

Optimisation at APX battery module level



✓ Mixing of differently charged modules



✓ Mixing new and old modules

Battery system with unique parallel wiring with Soft-Switching function

Built-in power "optimizer" at the battery module level, which allows the use of:

- With different capacities (SOC 0 - 100%) of the battery modules connected together
- For different shipments of goods, different production batches

This brings new possibilities for future expansion, bringing greater flexibility. It facilitates logistics, storage, installation and service.

4. Installation - Basic APX operating states and their signalling

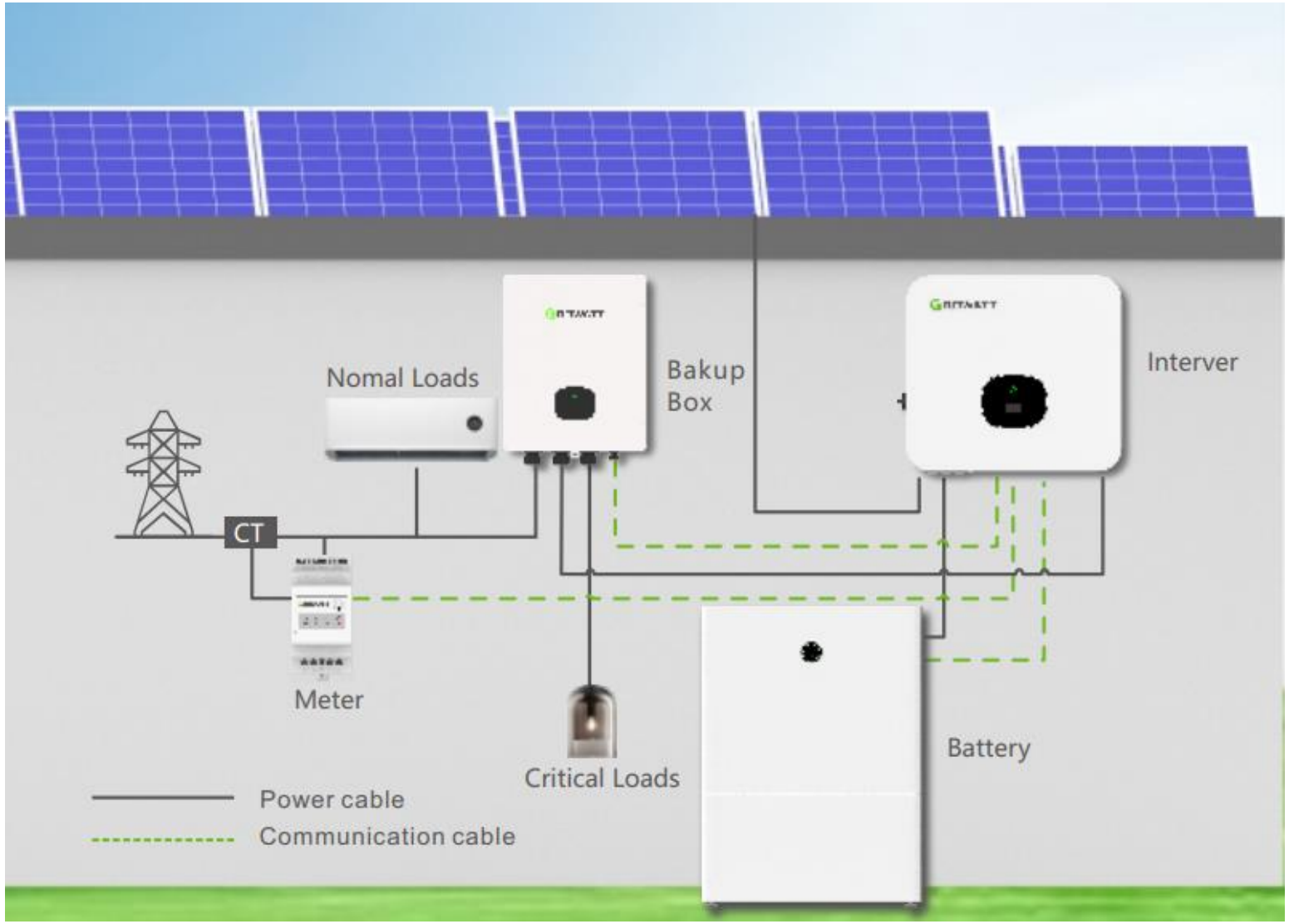
			Meaning 指示含义
Steady white 白灯常亮	Blinking green at long intervals 绿灯慢闪	Steady green 绿灯常亮	Standby mode 待机模式
Blink in a clockwise direction 顺时针转	Steady green 绿灯常亮	N/A	Charging mode 充电模式
Blink in an anti-clockwise direction 逆时针转	Steady green 绿灯常亮	N/A	Discharge mode 放电模式
N/A	Blinking green at short intervals 绿灯快闪	N/A	Alarm 告警
N/A	Steady red 红灯常亮	N/A	System failure 系统故障
N/A	Blinking red at long intervals 红灯慢闪	Steady red 红灯常亮	Battery module failure 电池模块故障
8 LED indicators blink clockwise and "UP" is displayed 8个LED顺时针转和数显显示UP	N/A	N/A	Upgrade 升级
Off	Off	Off	Hibernation mode休眠模式
Blinking green at short intervals (on for 0.5s and then off for 0.5s,on for 0.5s and then off for 2s) 绿灯快闪(亮0.5s,灭0.5s/亮0.5s,灭2s)			
Blinking green at long intervals (on for 0.5s and then off for 2s) 绿灯慢闪(亮0.5s,灭2s)			
Blinking red at long intervals (on for 1s and then off for 1s) 红灯慢闪(亮1s,灭1s)			

1. Standby mode
2. Charging mode - charging the battery
3. Discharge mode - discharging the battery
4. Alarm
5. System failure - system error
6. Battery module failure - battery module error
7. Upgrade
8. Hibernation mode

Recommended installation procedure for SYN back-up box with MOD XH (BP)/MID XH inverter

Installation instructions are included in the package
Electronic manuals are available for download at www.ginverter.com

1. Overview of the SYN system with MOD XH(BP)/MID XH inverters



2.Important technical parameters of the SYN 50-XH-30 back-up box

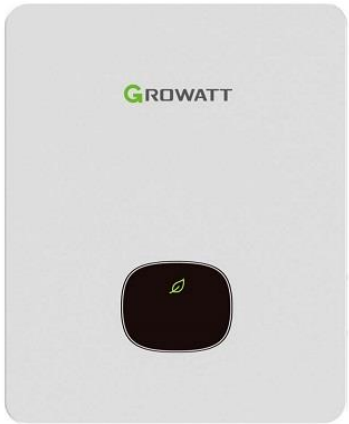
Datasheet	SYN 50-XH-30
Input from grid	
Max. AC input overcurrent protection	63A
Max. continuous input current	50A
AC output voltage(nominal)	230V/400V
AC output voltage range	180-280V (L-N)
AC frequency(nominal)	50Hz/60Hz
AC frequency range	45-65Hz
Grid disconnection switchover time	<500ms
Input from inverter	
Rated AC power	18kW
Max. continuous input current@230v	26.1A
Rated AC power in continuous backup operation	18kW
Max. continuous input current in backup operation	26.1A
Peak AC power(<10s) in backup operation	19.8kW
Peak AC current(<10s) in backup operation	28.7A

NETWORK INPUT

- Compatible with **MOD XH(BP)** inverter
- Maximum continuous input current **50 A**
- Switching time up to **0.5 s**

INPUT FROM THE INVERTER

- **Pn 18 kW**
- Maximum input current **26.1 A** current in backup operation
- Maximum peak current **28.7 A** (within 10 s)



DIMENSIONS (WxDxH)
365/450/123 mm

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2.Important technical parameters of the SYN 100-XH-30 back-up box

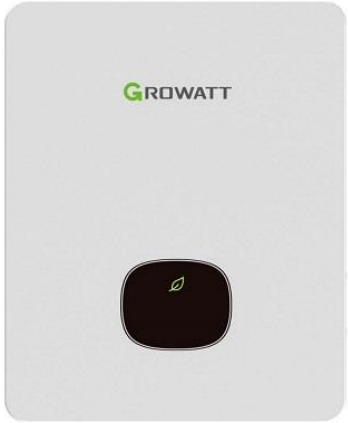
Datasheet	SYN 100-XH-30
Input from grid	
Max. AC input overcurrent protection	125A
Max. continuous input current	90A
AC output voltage(nominal)	230V/400V (340-440V)
AC frequency(nominal)	50Hz/60Hz
AC frequency range	45-65Hz
Grid disconnection switchover time	<500ms
Input from inverter	
Rated AC power	40kW
Max. continuous input current@230v	58A
Rated AC power in continuous backup operation	40kW
Max. continuous input current in backup operation	58A
Peak AC power(<10s) in backup operation	44kW
Peak AC current(<10s) in backup operation	63A

NETWORK INPUT

- Compatible with **MID XH** inverter
- Maximum continuous input current **90 A**
- Switching time up to **0.5 s**

INPUT FROM THE INVERTER

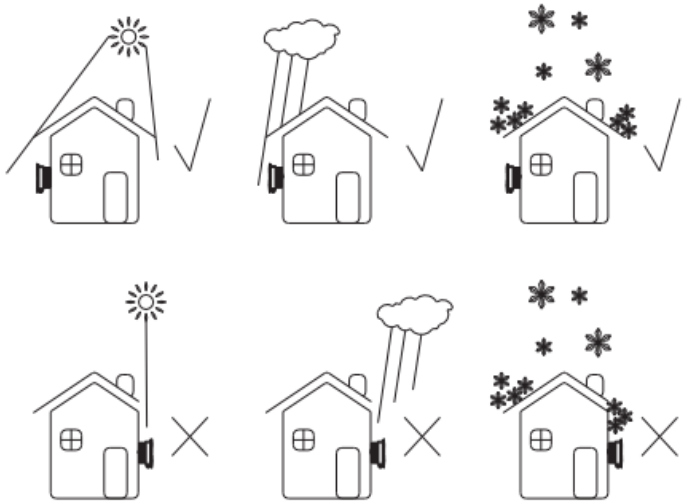
- **Pn 40 kW**
- Maximum input current **58 A** current in backup operation
- Maximum peak current **63 A** (within 10 s)

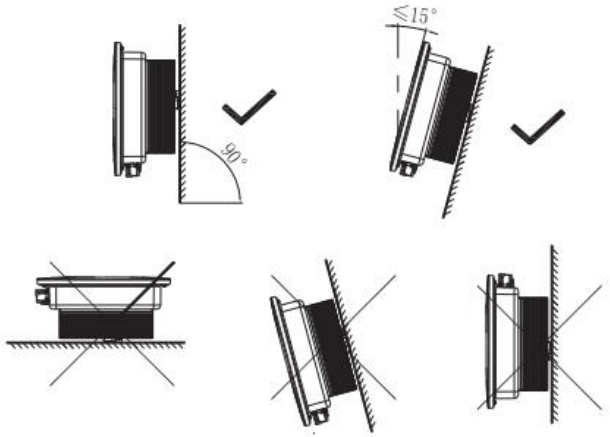


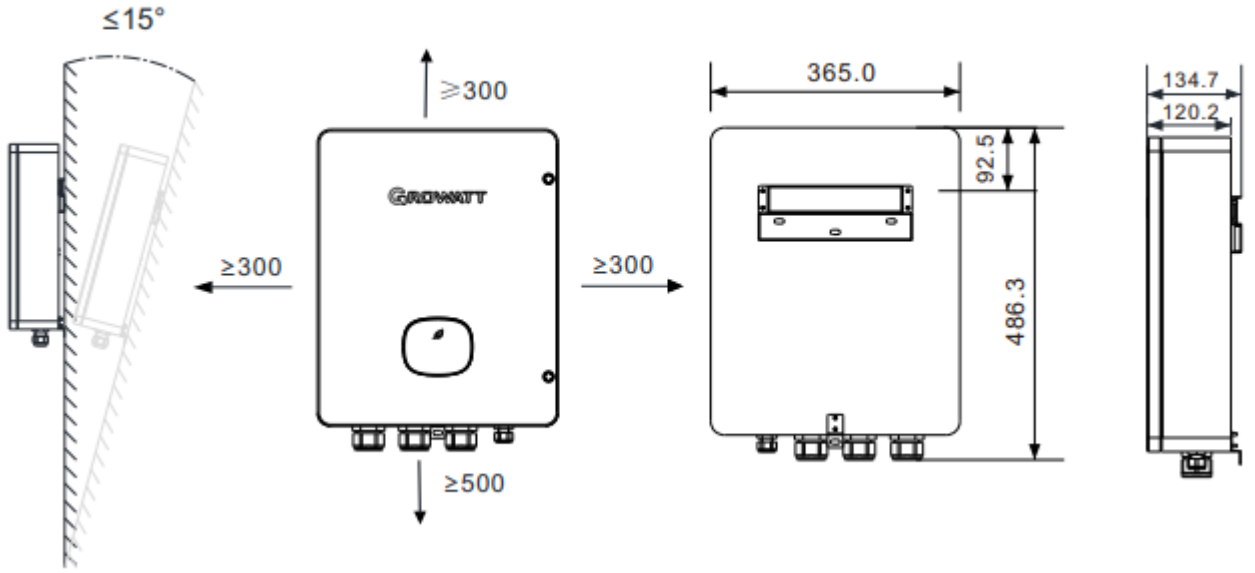
DIMENSIONS (WxHxD)

365/450/123 mm

2. Suitable SYN location

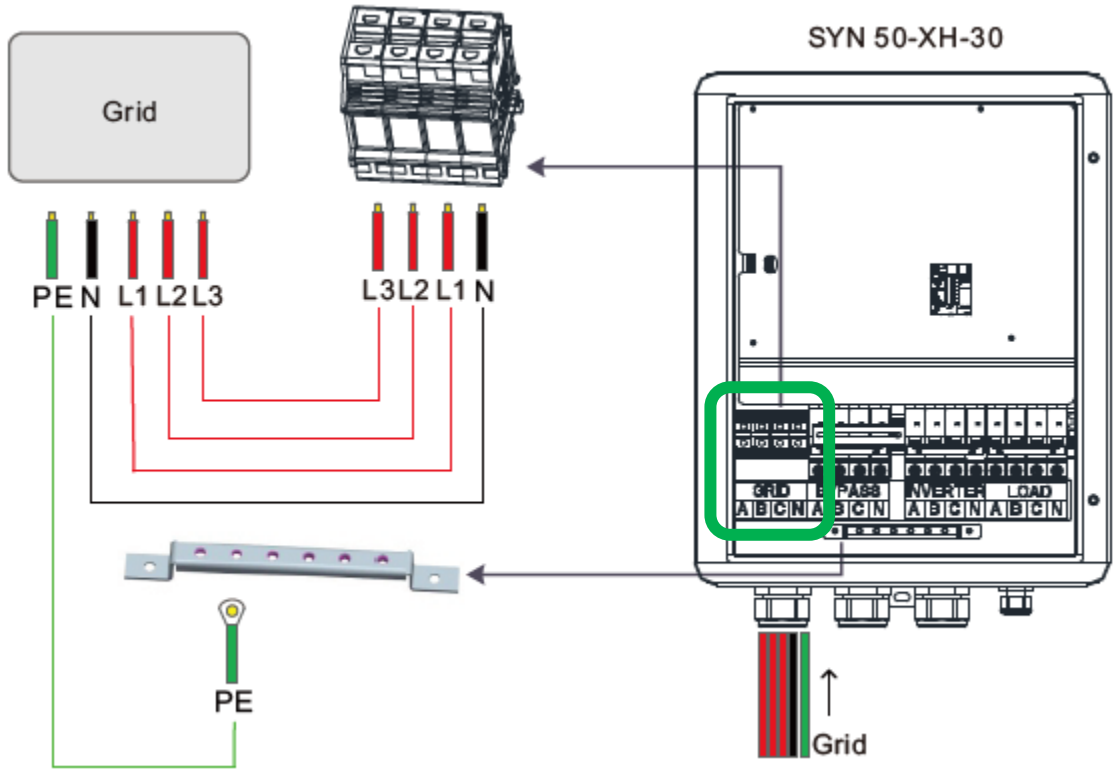






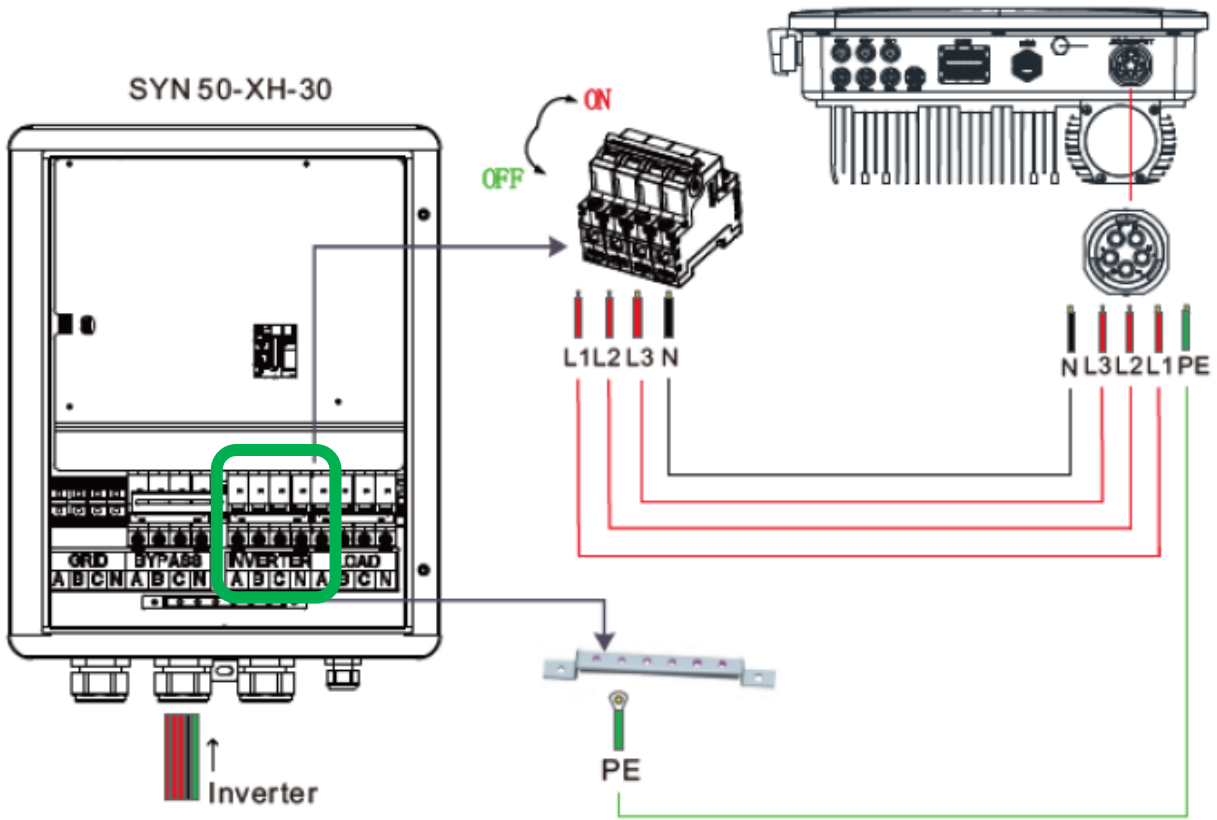
- Make sure that the SYN is installed in a suitable location, i.e. not in a closed box, out of reach of children and in a sheltered and **protected place against direct exposure to snow, rain and sunlight**.
- Check that the wall is strong enough to **support the weight of the SYN**, up to 12 kg**, in the long term.**
- Check that there is sufficient space for the SYN in the installation area and also free space above and below

3. Connection SYN 50-XH-30/SYN 100-XH-30
a) GRID (Distribution Network)



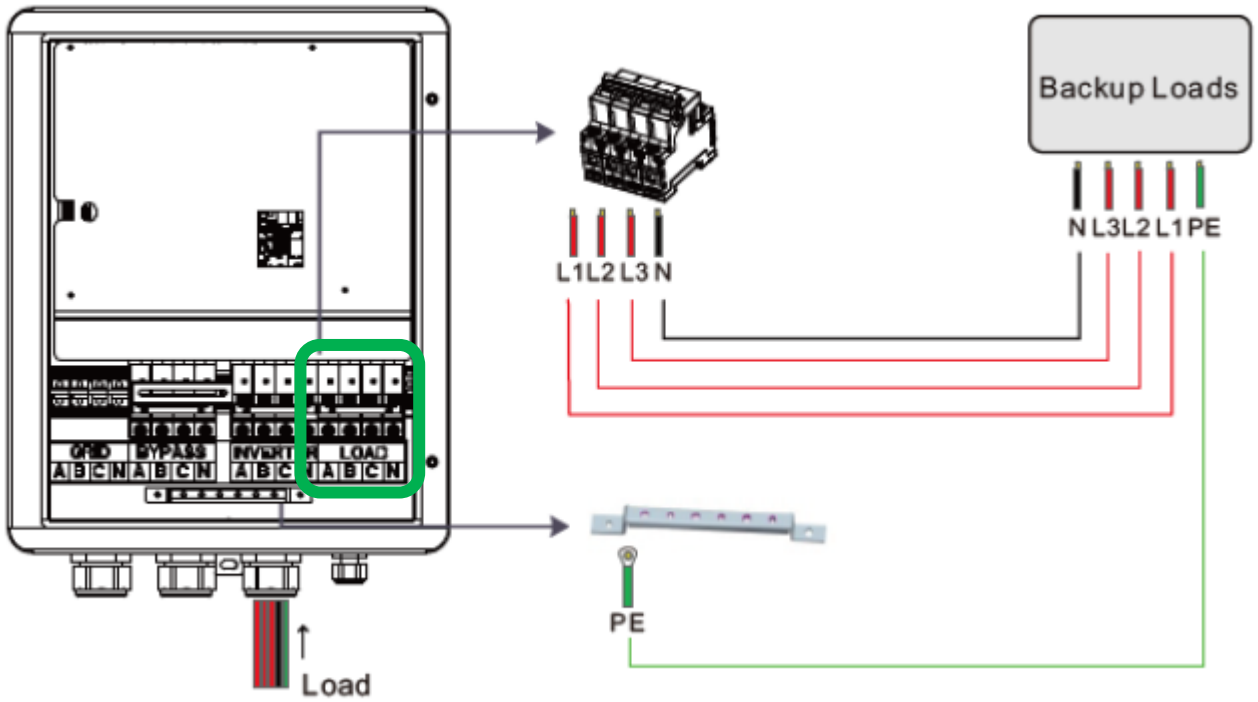
- Wires L1, L2, L3, N, PE from the mains, are pulled through the left cable gland.
- The wires L1, L2, L3, N are connected to the terminals on the left side of the SYN device. A cable lug should be pressed to the PE wire and connected as shown on the figure.

3. Connection SYN 50-XH-30/SYN 100-XH-30
a) INVERTER



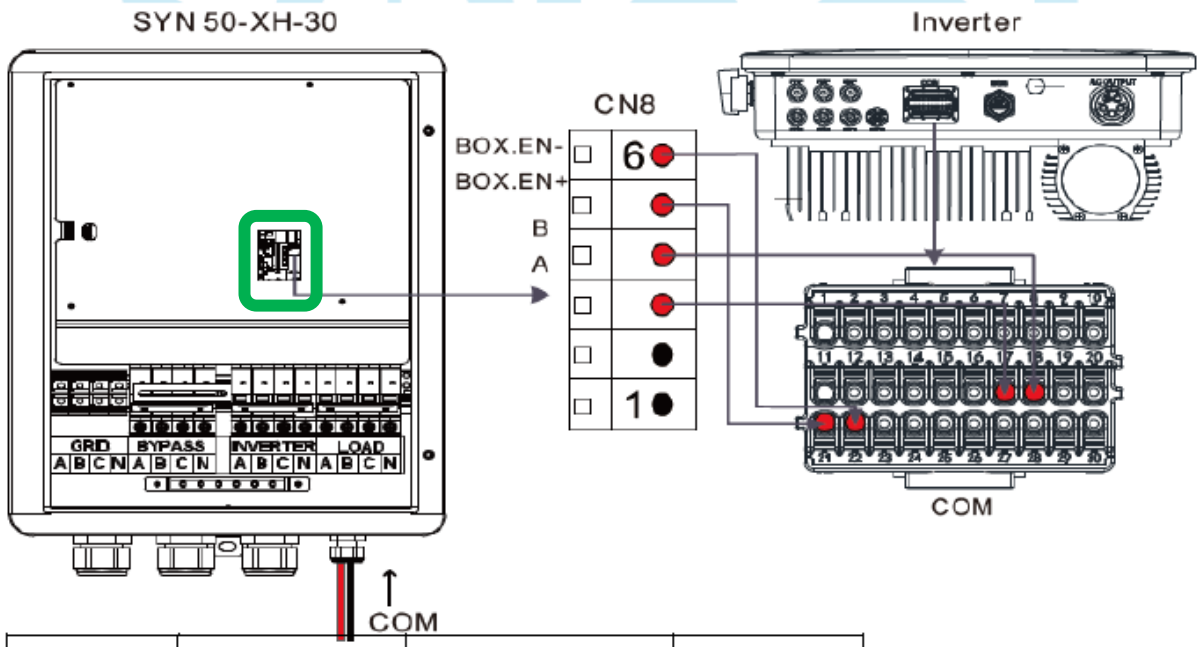
- For cable connection of the inverter and the SYN device a second cable gland is used, see figure, and connect the wires L1, L2, L3, N to the circuit breaker called INVERTER. A cable lug should be pressed to the PE wire and connected as shown on the figure.

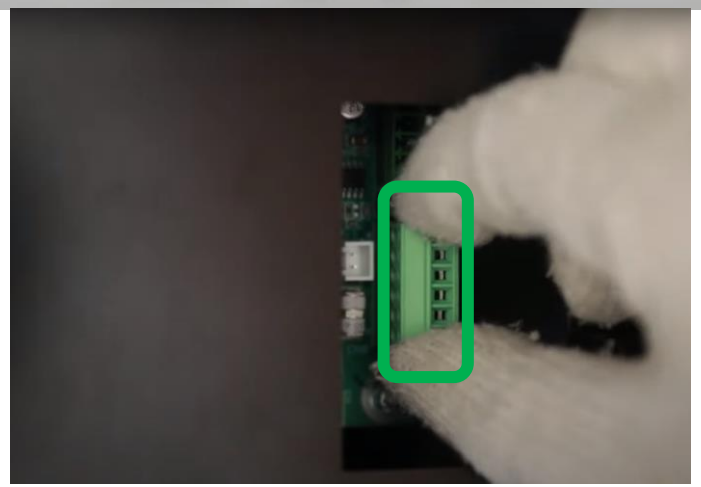
3. Connection SYN 50-XH-30/SYN 100-XH-30
b) Back-up Loads (back-up appliances)



- The third cable grommet is used for the backup circuit, see figure. The wires L1, L2, L3, N are connected to the circuit breaker called LOAD. A cable lug is to be pressed to the PE wire and connected as shown on the figure.

3. Wiring SYN 50-XH-30
c) COM (communication with MOD XH (BP) inverter)

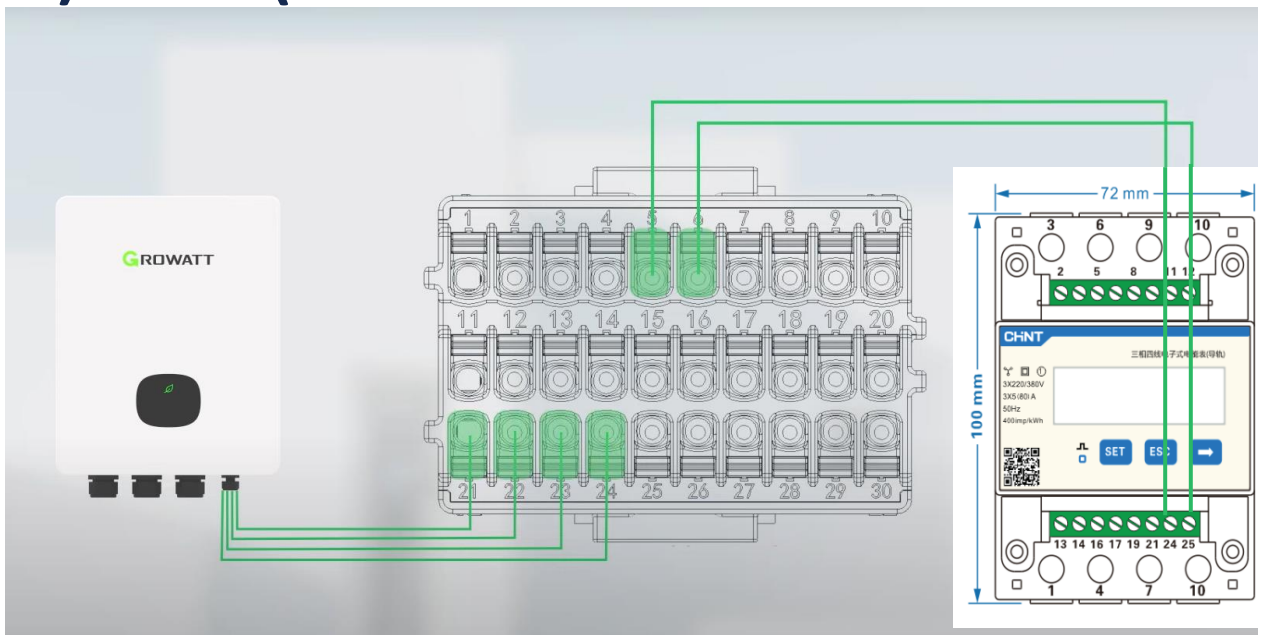


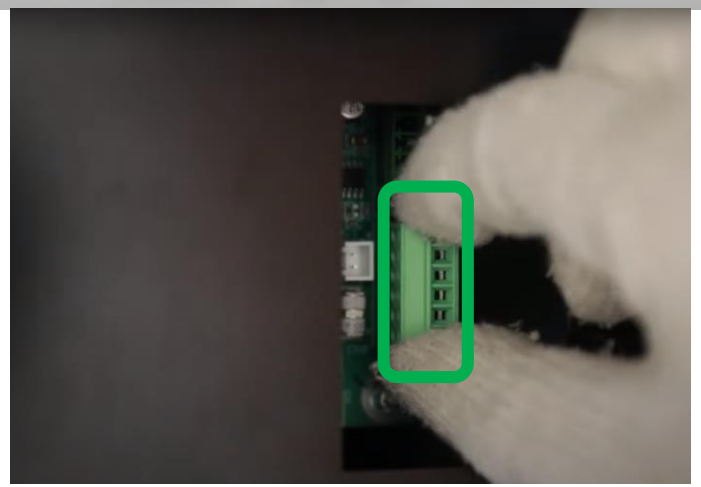


COM Port	XH Inverter COM	SYN 50-XH-30 COM	Control Board
RS485 A	PIN 17	PIN 3	CN8
RS485 B	PIN 18	PIN 4	
BOX.EN+	PIN 21	PIN 5	
BOX.EN-	PIN 22	PIN 6	

- The third cable grommet is used for the backup circuit, see figure. The wires L1, L2, L3, N are connected to the circuit breaker called LOAD. A cable lug is to be pressed to the PE wire and connected as shown on the figure.
- Recommended cabling - Twisted-pair (e.g. FTP Cat.5e)

4. Wiring SYN 100-XH-30
c) COM (communication with MID XH inverter)

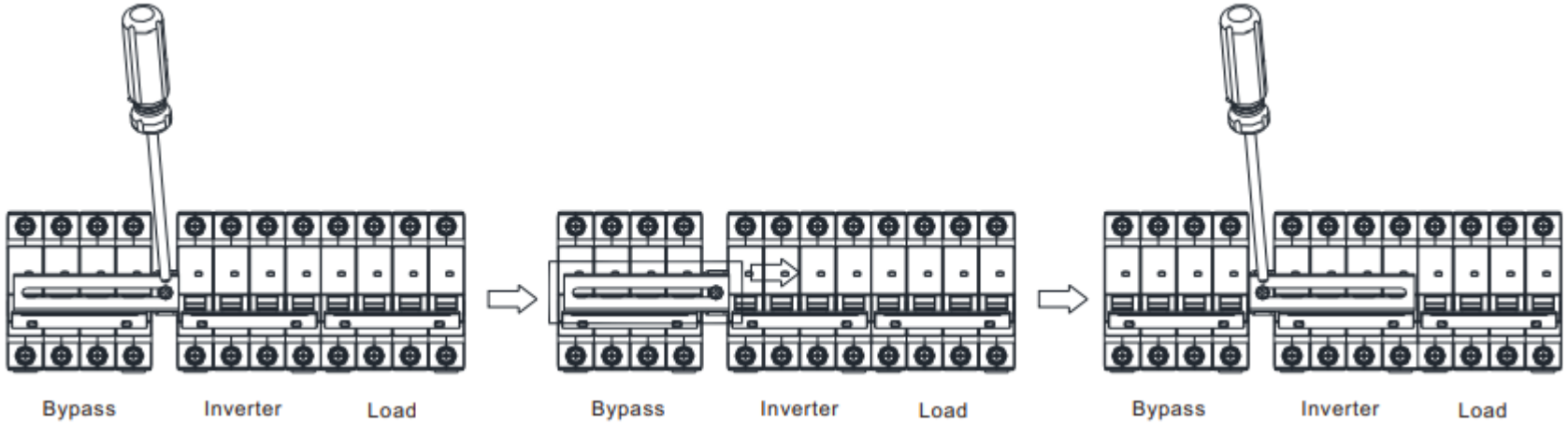




COM Port	XH Inverter COM	SYN 100-XH-30 COM (Control Board CN8)
RS 485 A	PIN23	PIN3
RS 485 B	PIN24	PIN4
BOX.EN+	PIN21	PIN5
BOX.EN-	PIN22	PIN6

- The third cable grommet is used for the backup circuit, see figure. The wires L1, L2, L3, N are connected to the circuit breaker called LOAD. A cable lug is to be pressed to the PE wire and connected as shown on the figure.
- Recommended cabling - Twisted-pair (e.g. FTP Cat.5e)

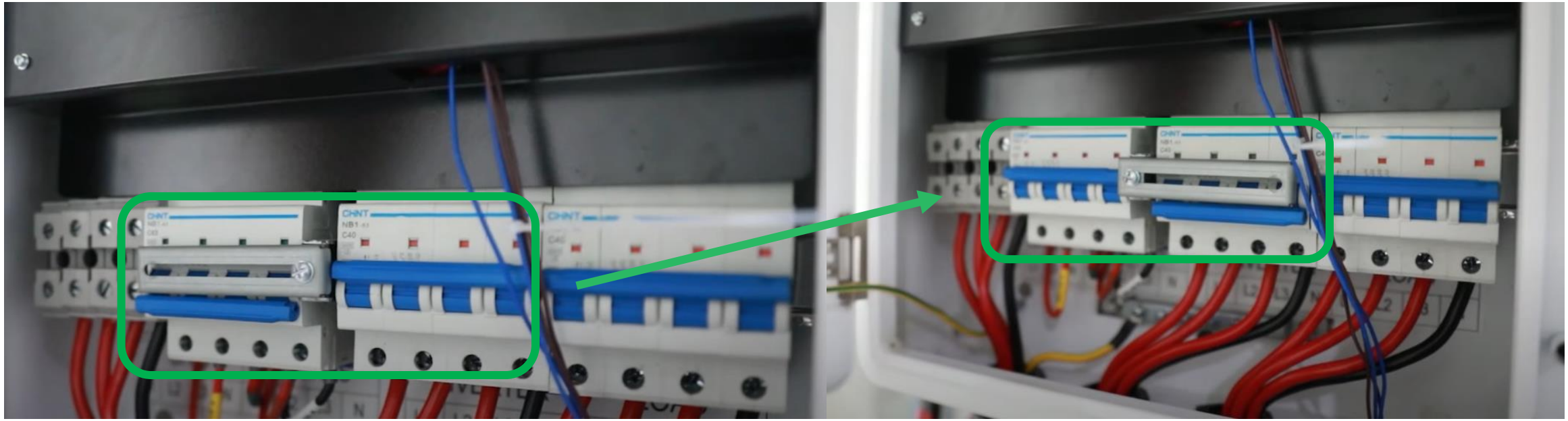
5. Manual switch to Bypass



In case of SYN device failure, **manual switching to BYPASS** is required

1. Shut down the entire system (OFF the AC breakers INVERTER, LOAD and the AC breaker that supplies power from the distribution network
2. Turn off the DC switch on the inverter and the APX battery
3. Wait for the inverter, battery and SYN display to switch off
4. Loosen the screw on the BYPASS switch
5. Turn on the BYPASS switch and secure the INVERTER switch against turning on

5. Manual switch to Bypass



In case of SYN device failure, **manual switching to BYPASS** is required

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Starting the MOD XH(BP) inverter with APX battery and SYN back-up box

Starting the MOD XH(BP) inverter with APX battery and SYN back-up box

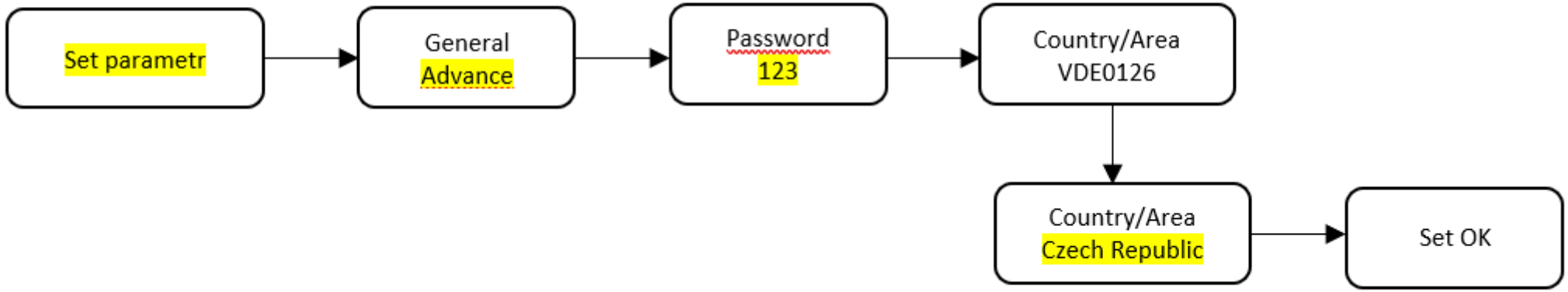
Brand	Description	Explanation	
	Touch marking	A simple click	Switch interfaces by one step
		Double click	Entry or confirmation of the current offer
		Triple click	Return to the previous interface view
		Long press 5 s	The current data will return to the default value

Important settings

1. Country code
2. Export limit
3. Backup Box and Backup setting

Starting the MOD XH(BP) inverter with APX battery and SYN back-up box

Country code

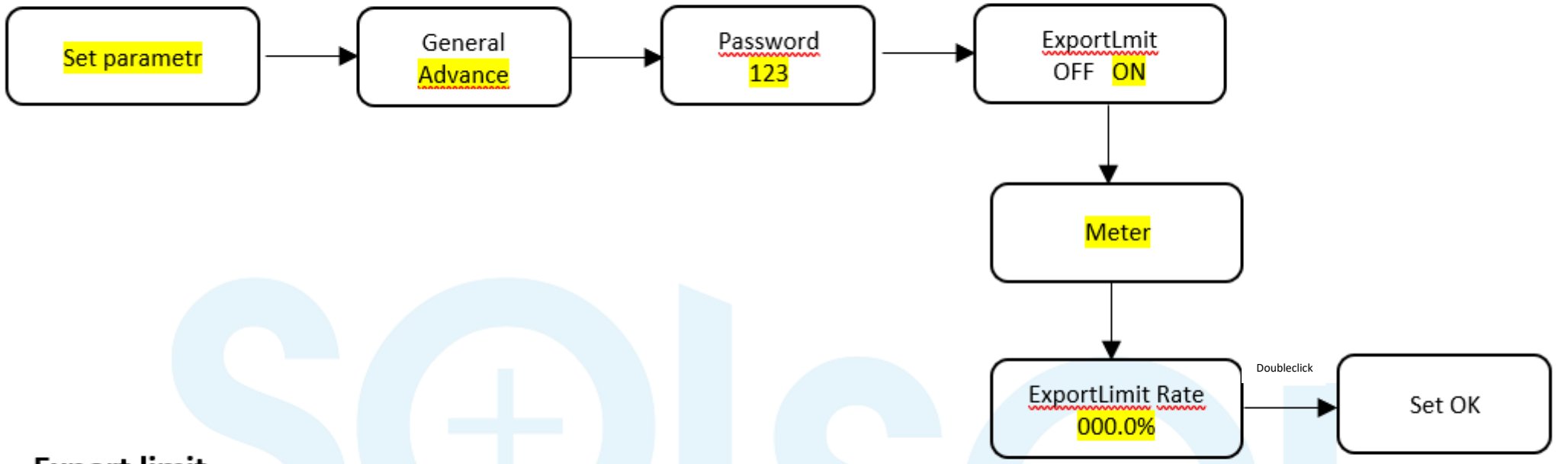


https://youtu.be/nO3IsLf9Z58

Starting the MOD XH(BP) inverter with APX battery and SYN back-up box

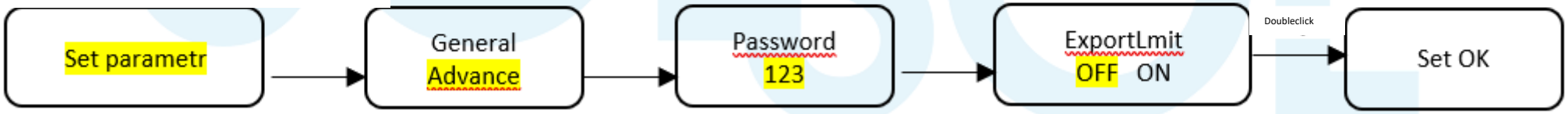
Export limit

Enabling Export limit



Export limit

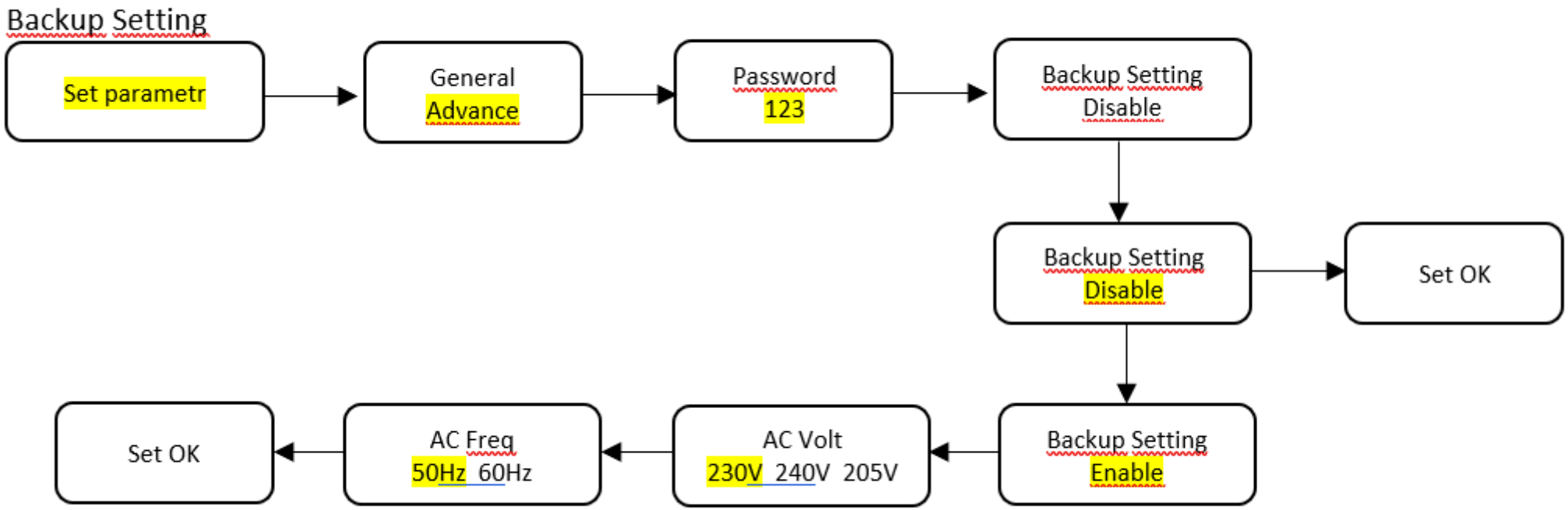
Disabling Export limit



https://youtu.be/gSOZc-LCCRI

Starting the MOD XH(BP) inverter with APX battery and SYN back-up box

Backup Box a Backup setting



https://youtu.be/g2rGm0-rlGo

Starting the MOD XH(BP) inverter with APX battery and SYN back-up box

Starting the system

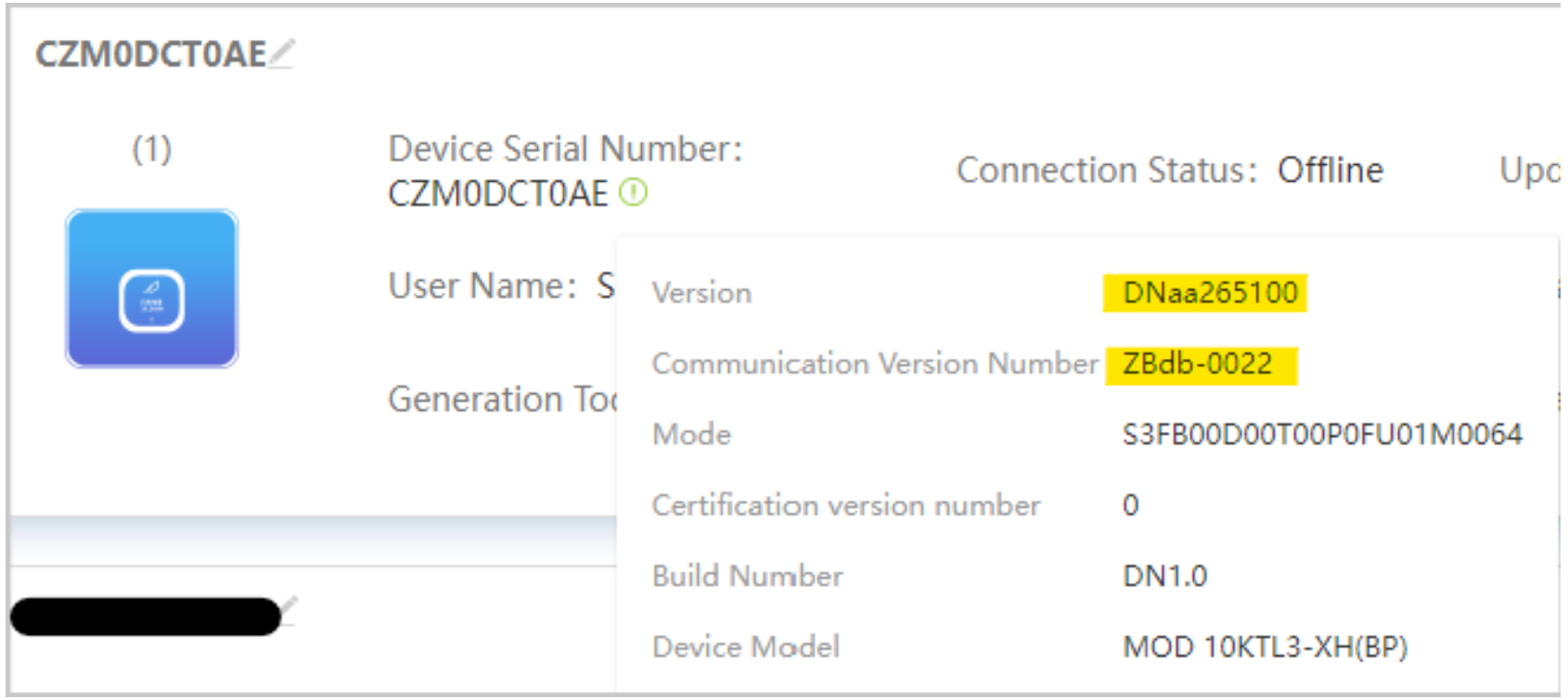
To start the system correctly, please follow the following procedure

1. Apply voltage to the SYN device and check that the voltage is at the terminals.
2. Turn on the **APX battery** switch and press the start button momentarily. This will bring DC voltage to the inverter
3. Check the **PV connectors for** proper connection **and then turn on the DC power switch**.
4. Enable the Backup Box setting on the inverter, see. instructions above.
5. Enable Backup Setting on the inverter, see. Instructions above.
6. Check the voltage at the INVERTER breaker in the SYN device. If there is voltage, the **circuit breaker can be switched on**.
7. You can now turn on the LOAD circuit breaker.
8. If the settings are correct, the SYN device LED indicator will be green.
9. If the LED indicator is red, repeat the system start-up.

Shutting down the system

1. Switch off the INVERTER circuit breaker and then the LOAD circuit breaker
2. Turn off the battery switch
3. Turn off the DC switch
4. Wait until all LED indicators are off

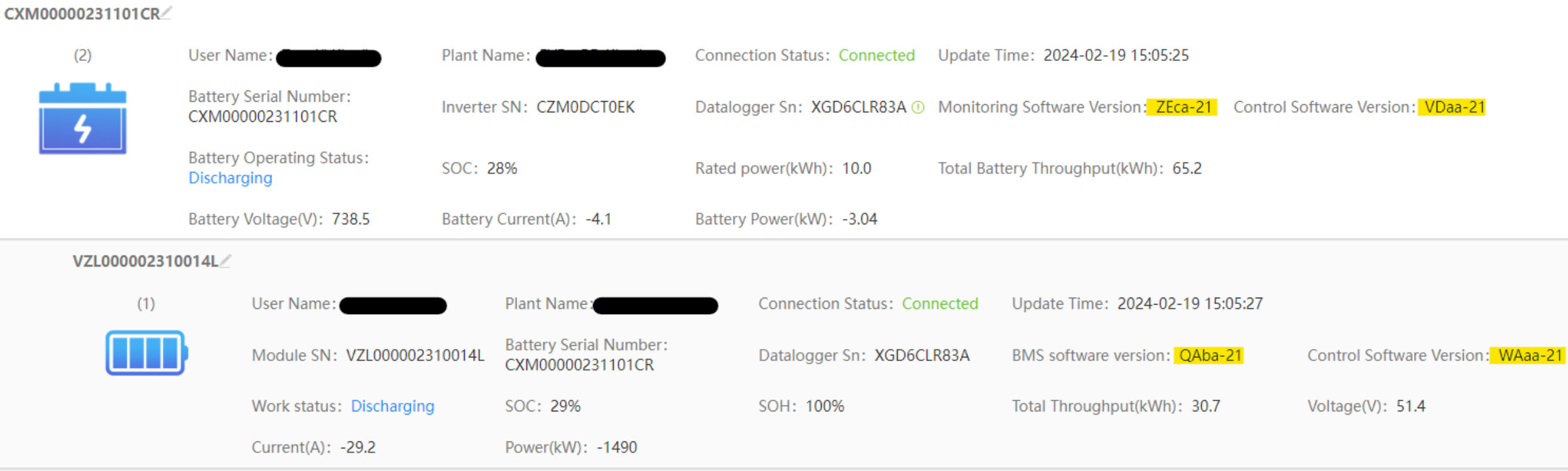
MOD-XH(BP) inverter FW check



Current FW for MOD 10KTL3-XH(BP) is **DNaa 265100 and ZBdb-0022**

For exact firmware version, please contact Solsol

APX and BMS APX battery FW check



Current FW for BMS is **VDaa-21, ZEca-21** and Battery **QAba-21, WAaa-21**

For exact firmware version, please contact Solsol

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Battery-ready inverter MID XH

Hybrid inverter MID XH

- **100% three-phase asymmetry when connected with battery**
- **10 years warranty**
- **EPS function -** switching within 0.5 s when connected with **SYN 100-XH-30**
- 2.0 DC/AC ratio (note, full utilization for certain power outputs)
- Available in power variants 11,12,13,**15**,17,**20,25,30kW**
- Weight **29,5 kg, 31 kg (25, 30 kW)**
- Compatible batteries - **Growatt APX only**
- **The inverter is symmetrical when connected without battery**
- **AFCI -** active protection against DC arc burning
- **2 battery inputs - up to 60 kWh** with APX battery

APX batteries

- **5 - 30 kWh** scalable range
- **-10°C - 50°C** operating temperature range
- **5 kWh** - capacity of one battery module
- Optimisation at the level of individual battery modules
- Used for MOD XH(BP) and MID XH inverters (2 battery inputs - up **to 60 kWh**)

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Important technical parameters MID XH 11-30 kW:

2 MPPT, each with 2 PV inputs (25&30 kW: 3 MPPT, 2 inputs each)

Input MPP current 32 A per MPPT (16 A per input)

Max short circuit current 40 A (20 A per input)

Datasheet	MID 11KTL3-XH	MID 12KTL3-XH	MID 13KTL3-XH	MID 15KTL3-XH	MID 17KTL3-XH	MID 20KTL3-XH	MID 25KTL3-XH	MID 30KTL3-XH
Input data (DC)								
Max. recommended PV power (for module STC)	22000W	24000W	26000W	30000W	34000W	40000W	50000W	60000W
Max. DC voltage	1100V							
Start voltage	200V							
Nominal voltage	600V							
MPPT voltage range	160V-1000V							
No. of MPP trackers	2	2	2	2	2	2	3	3
No. of PV strings per MPP tracker	2							
Max. input current per MPP tracker	32A							
Max. short-circuit current per MPP tracker	40A							
Input data (DC battery)								
Compatible battery	APX HV Battery System (5kWh~60kWh)							
Operating voltage range	600 V-980 V							
Max.operating current	25A/25A*[1]							
Max.charge power	15000W or 30000W*[2]							
Max.discharge power	11000W	12000W	13000W	15000W	17000W	20000W	25000W	30000W
Output data (AC)								
AC nominal power	11000W	12000W	13000W	15000W	17000W	20000W	25000W	30000W
Max. AC apparent power	12100VA	13200VA	14300VA	16500VA	18700VA	22000VA	27500VA	30000VA
Nominal AC voltage (range*)	220V/380V, 230V/400V (340-440V)							
AC grid frequency (range*)	50/60 Hz (45-55Hz/55-65 Hz)							
Max. output current	18.3A	20A	21.7A	25A	28.3A	33.3A	41.6A	45.5A
Adjustable power factor	0.8leading...0.8lagging							
THDi	<3%							
AC grid connection type	3W+N+PE							
Efficiency								
MAX. efficiency	98.75%						98.80%	
European efficiency	98.5%							

Max **10 kWp** per PV input.
Max **20 kWp** per MPPT

Maximum system voltage 1100 V! (consider the lowest possible temperatures!)
MPPT up to 1000 V!

Different ma. charging/discharging power*

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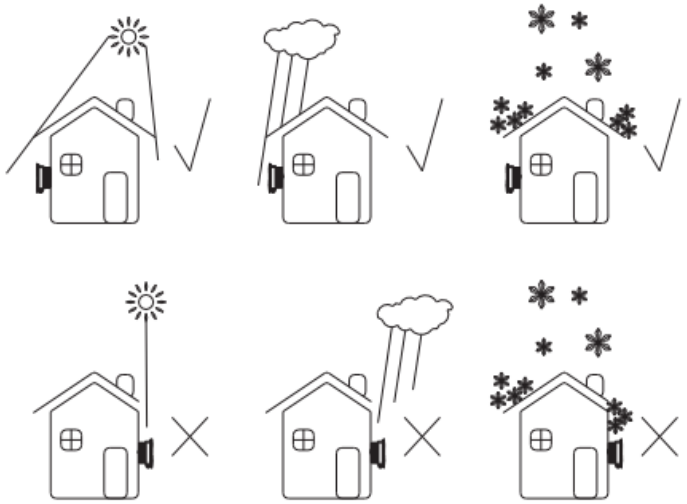
*Overall system performance depends on the connected APX battery capacity

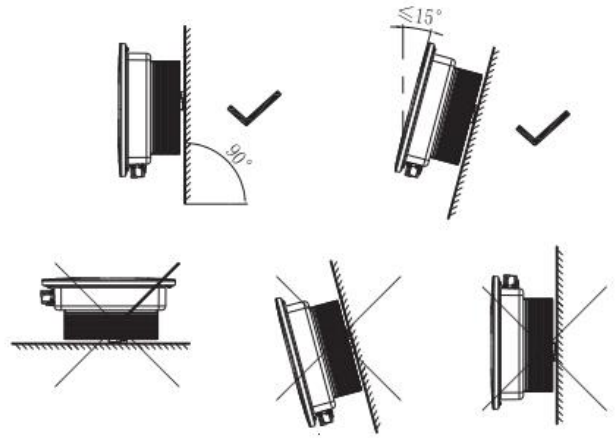
GROWATT

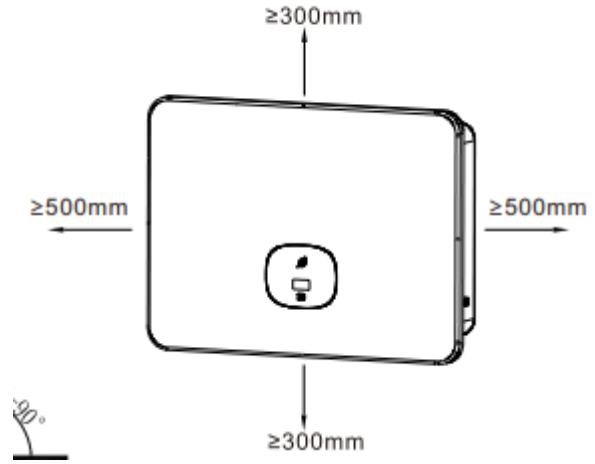
1.Packing inspection

Note: Compared to SPH, ENERGY METER is NOT included, must be purchased separately together with Wifi-X (LAN-X etc.)

2. Suitable inverter location

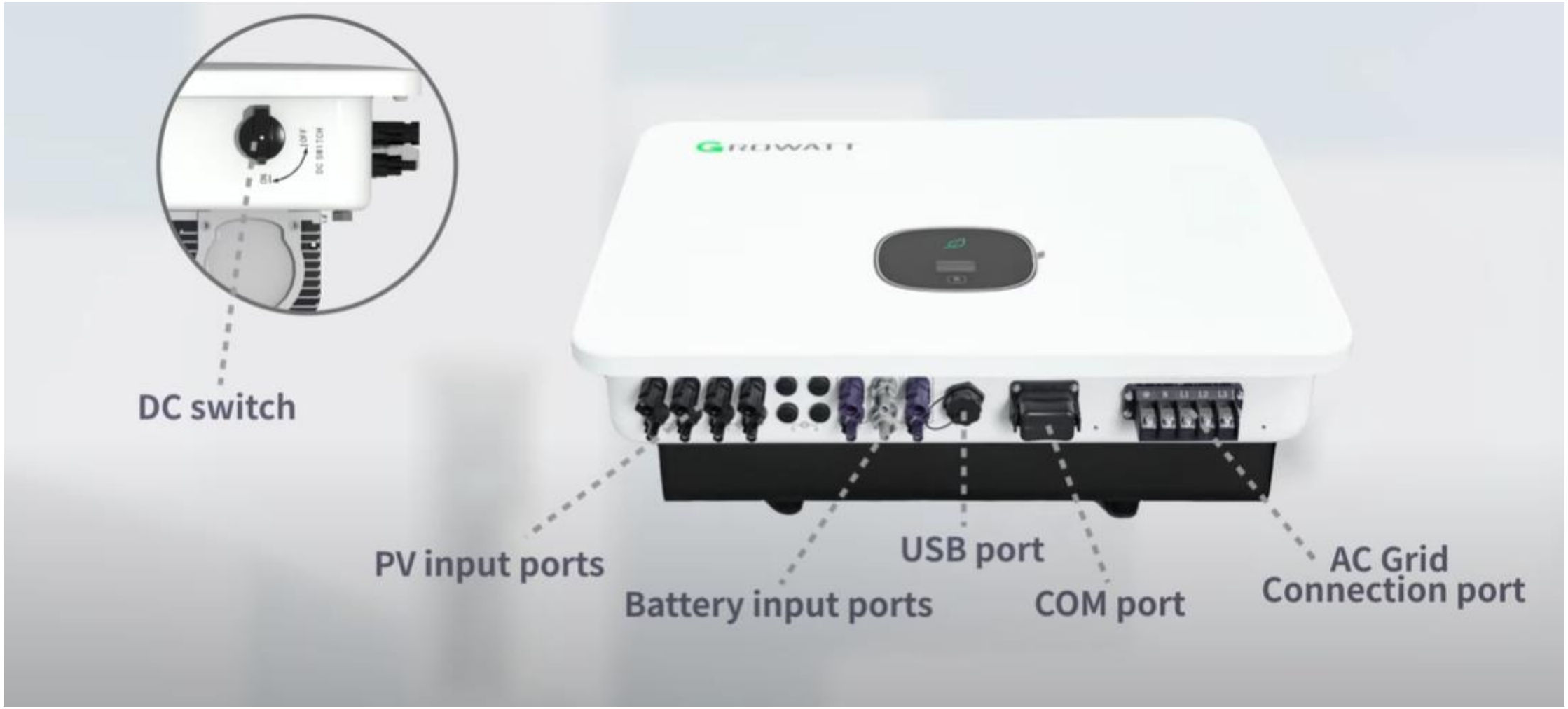




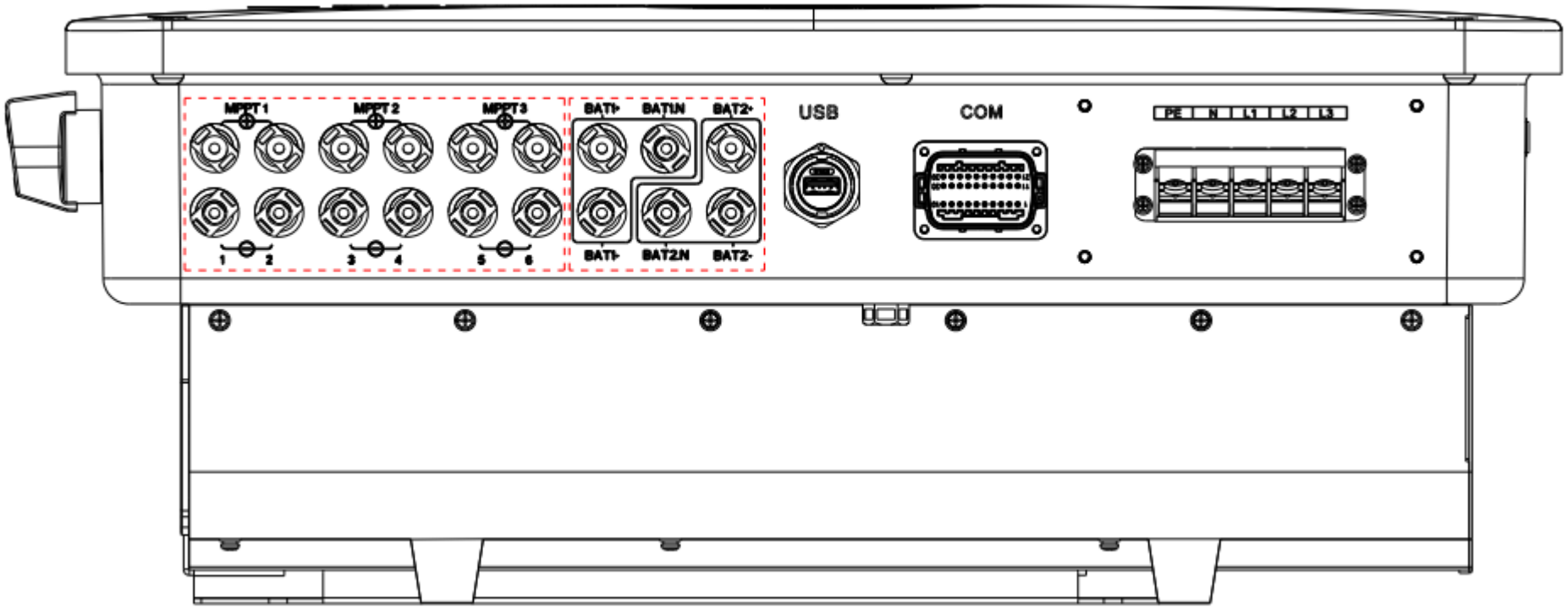


- Make sure that the inverter is installed in a suitable location, i.e. not in a closed box, out of reach of children and in a sheltered and **protected place against direct exposure to snow, rain and sunlight**.
- Check that the wall is strong enough to **support the weight of the inverter**, up to 31 kg**, in the long term.**
- Make sure that there is enough space for the inverter at the installation site, as well as clearance above and below (**30 cm in both directions**) and to the left and right (**50 cm** in both directions).

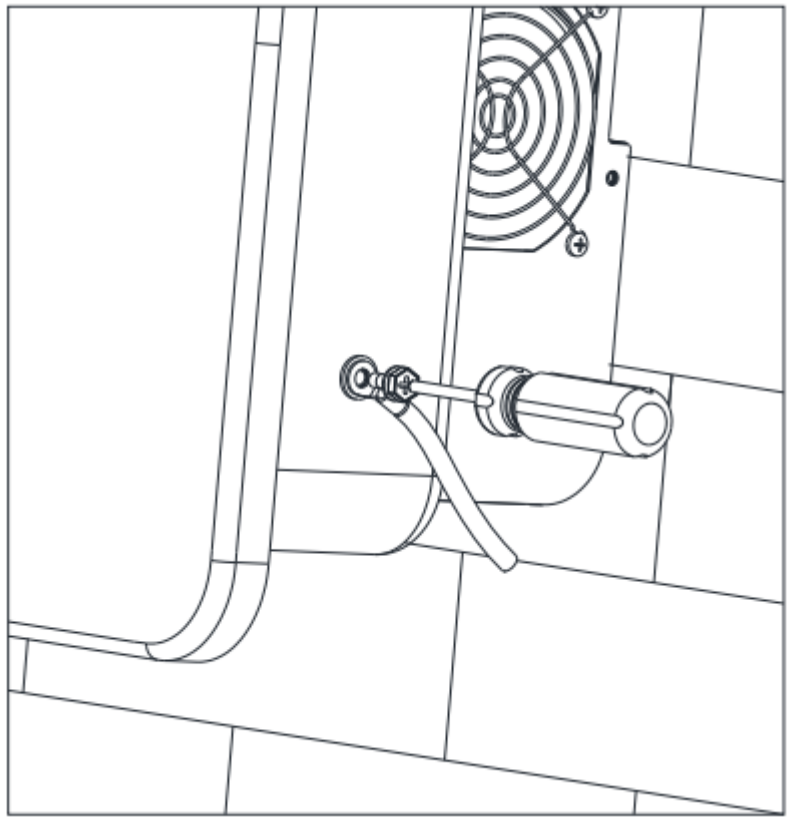
3. Inverter wiring - inputs



3. Inverter wiring - inputs



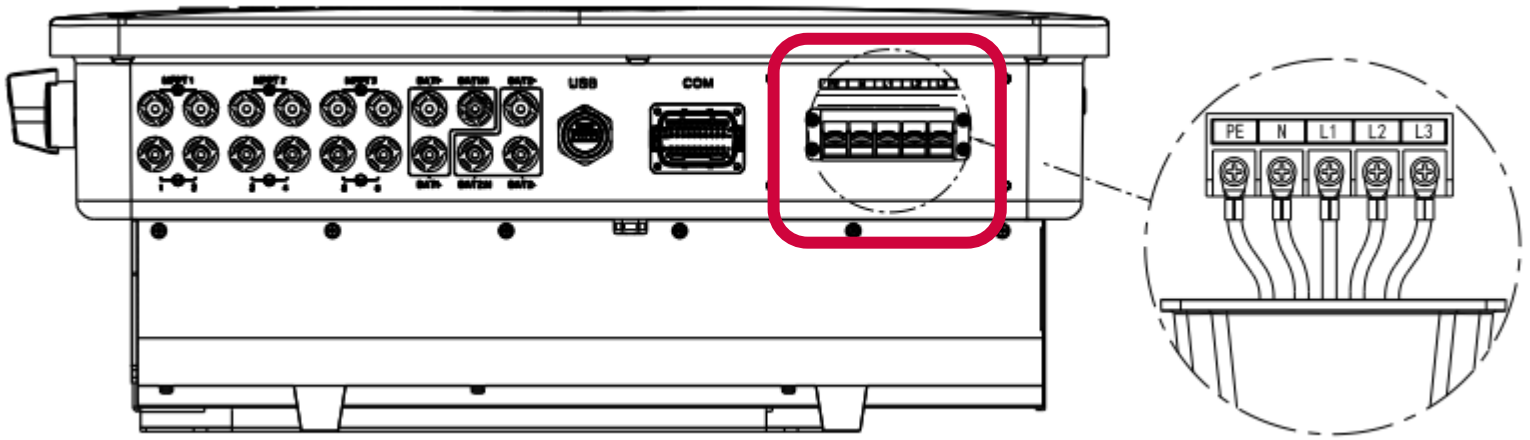
3. Inverter wiring
a) Inverter grounding

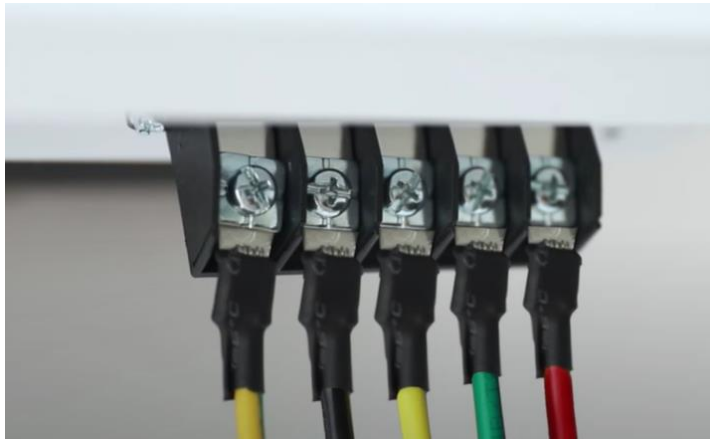


Recommended minimum cross-section of the grounding wire 6 mm2*

*Final cross-section and type of cabling is determined by the responsible designer according to local conditions of the implementation

3. Inverter wiring
b) AC output





Model	Cross-section area (Cu)	Maximum cable length
MID 11-20KTL3-XH	10-12mm^2	40m
MID 25-30KTL3-XH	14-16mm^2	40m

- Recommended wire cross section: 10-16 mm2 , maximum spacing see table above*

  E.g. KV H07RN-F 5Gx16 mm2

Recommended inverter AC protection

Inverter model	Switch specification
MID 11KTL3-XH	25A(230/400V)
MID 12KTL3-XH	25A(230/400V)
MID 13KTL3-XH	30A(230/400V)
MID 15KTL3-XH	30A(230/400V)
MID 17KTL3-XH	35A(230/400V)
MID 20KTL3-XH	40A(230/400V)
MID 25KTL3-XH	40A(230/400V)
MID 30KTL3-XH	50A(230/400V)

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*Final cross-section and type of cabling is determined by the responsible designer according to local conditions of the implementation

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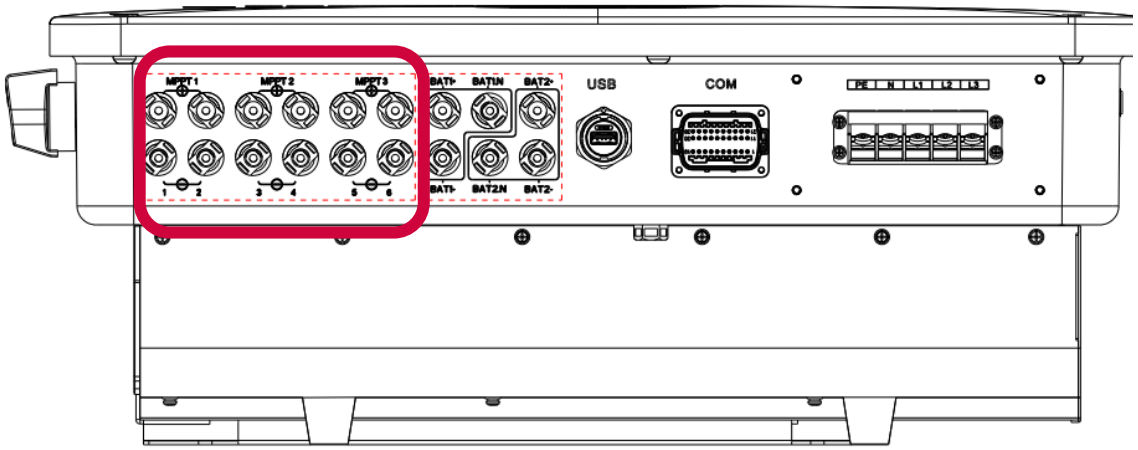
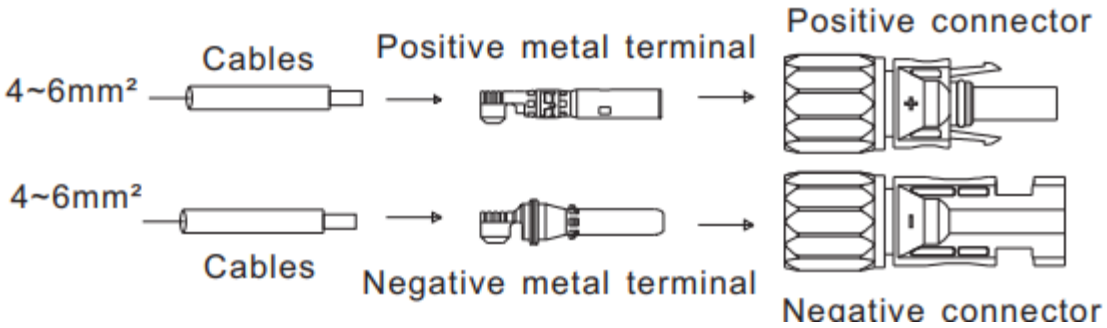
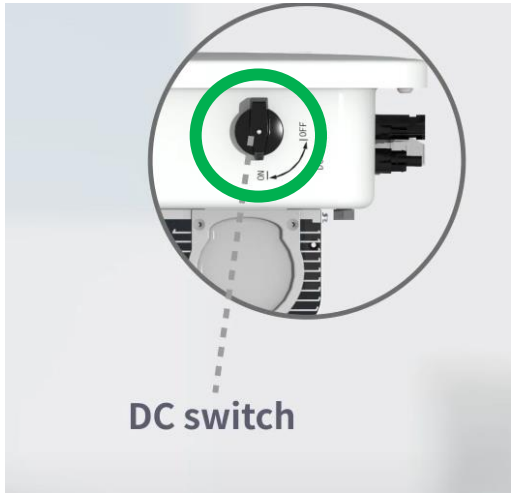
3. Inverter wiring
c) PV inputs

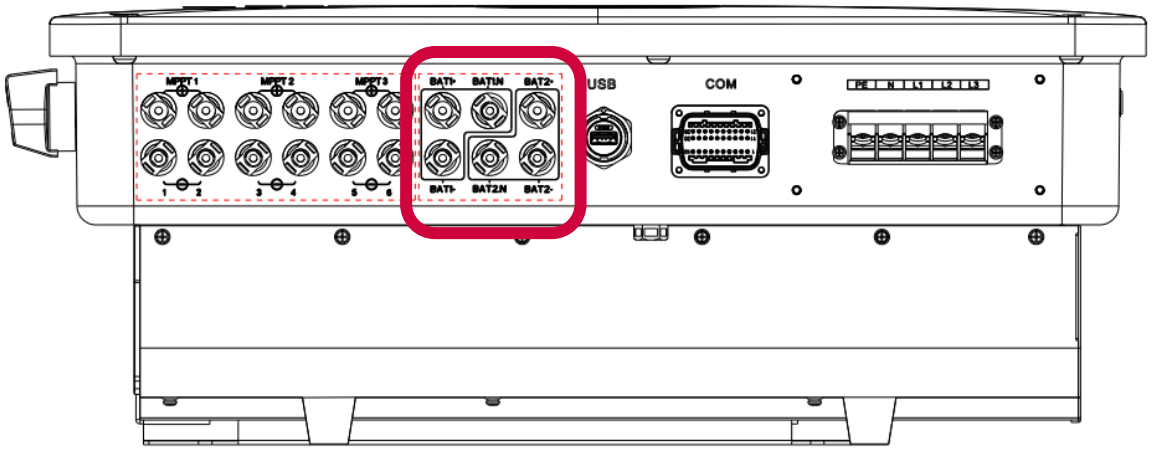


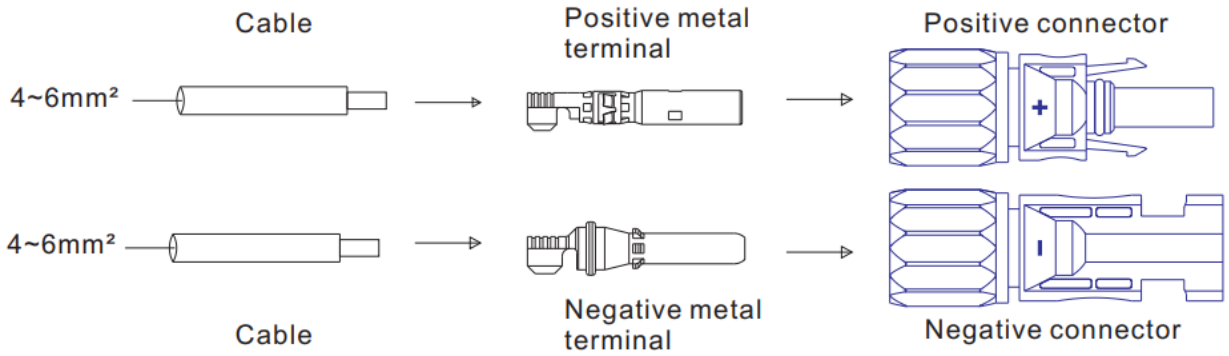


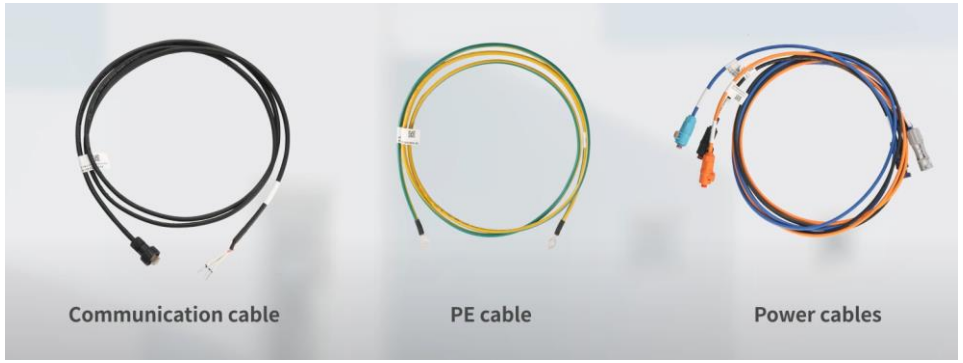


- Max DC power per 1 PV input max **10 kWp per 1 MPPT 20 kWp**
- PV inputs to be connected with the **DC switch OFF**
- Before connecting DC inputs check polarity + -
- Maximum voltage must not exceed **1100 V DC (all conditions)**
- Maximum DC input current must not exceed **16 A for PV input**, 20 A for Isc.
- We recommend using the MC4 connectors included in the inverter package.

3. Wiring inputs of the inverter
d) Battery input



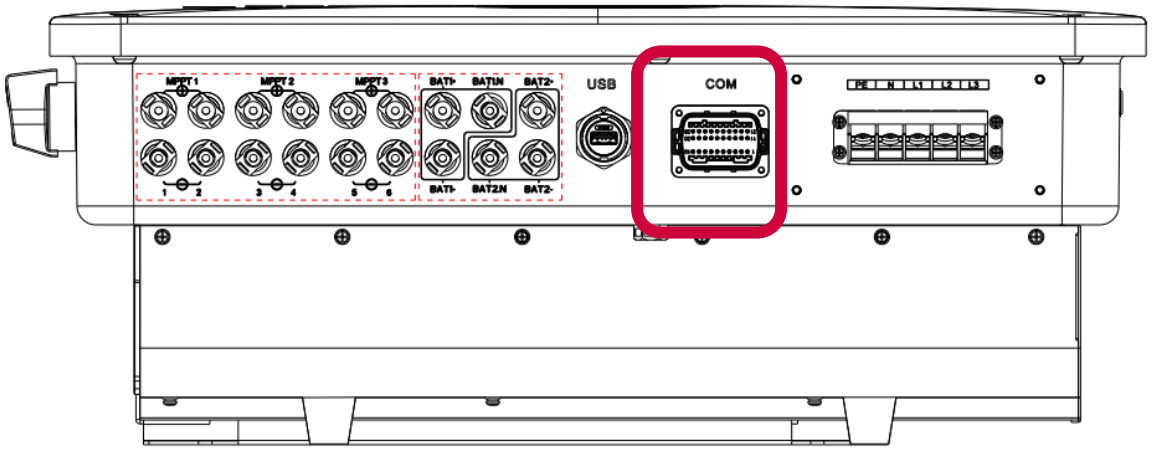


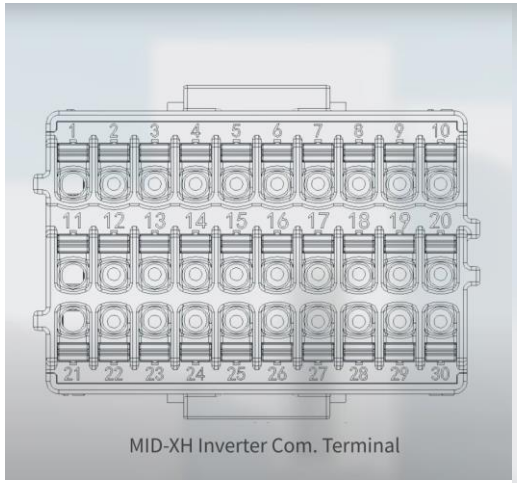


- Maximum voltage **950 V**, Maximum power **30 kW (15 kW per BAT input)***
- Wiring harness included **Growatt APX 5.0P BMS (98034-P2)**
- Never disconnect or connect battery inputs under load
- **We recommend using original Growatt connectors and wires**

*Overall performance depends on the connected APX battery capacity

3. Inverter wiring
(e) COM port



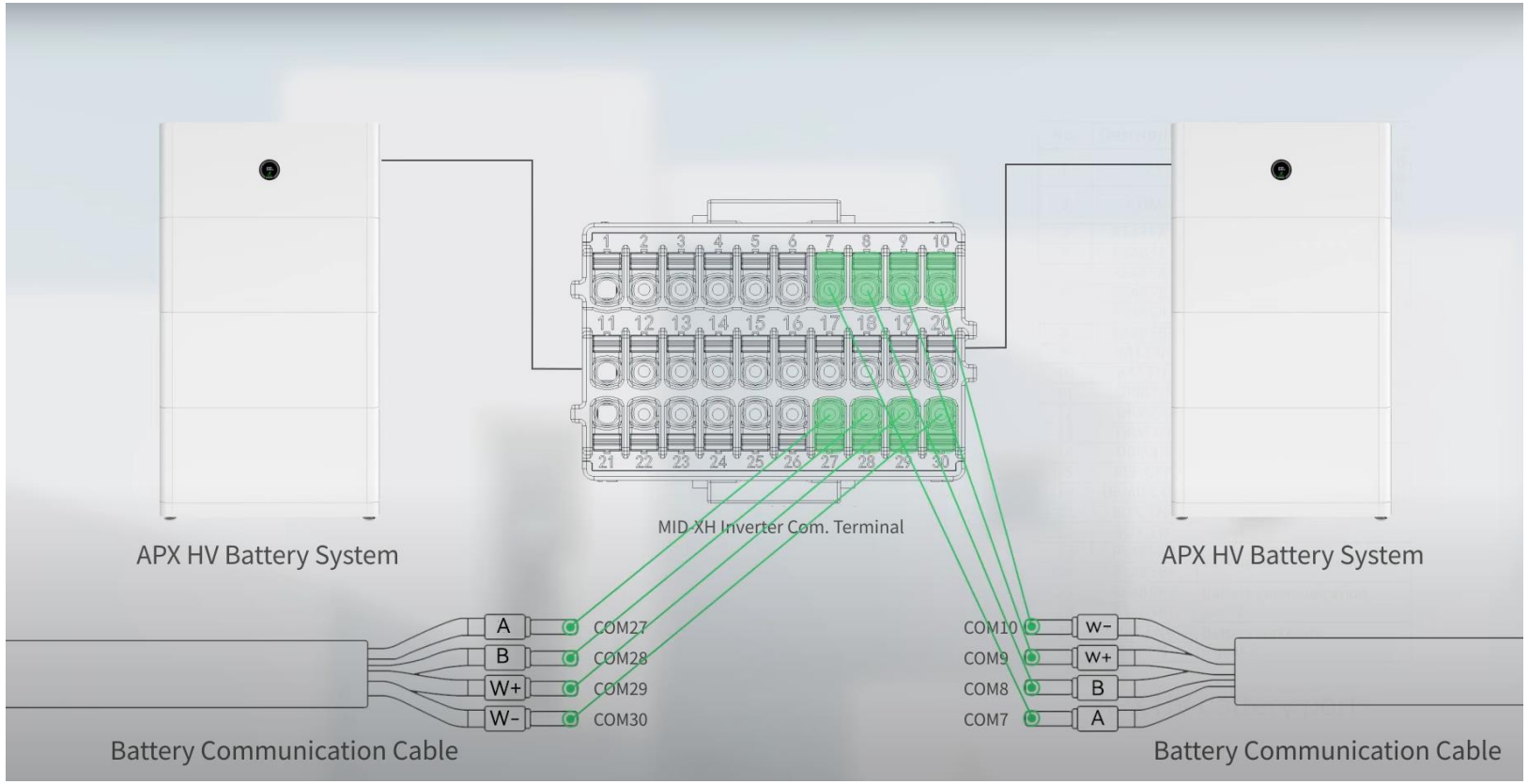


MID-XH Inverter Com. Terminal

No.	Description	Function
1	+12V	Dry contact:the power of any external wiring connected to it should not be greater than 2W
2	COM	
3	RS485A1	RS485 communication port
4	RS485B1	
5	RS485A3	Meter communication port
6	RS485B3	
7	RS485A2	Battery communication port
8	RS485B2	
9	BAT.EN+	Battery wake-up signal
10	BAT.EN-	
11	DRM1/5	Relay contact 1 input
12	DRM2/5	Relay contact 2input
13	DRM3/7	Relay contact 3 input
14	DRM4/8	Relay contact 4 input
15	REF/GEN	GND
16	DRM0/COM	/
21	BOX.EN+	Backup box identification signal
22	BOX.EN-	
23	RS485A4	Backup box communication
24	RS485B4	
27	RS485A2	Battery communication port 2
28	RS485B2	
29	BAT.EN+	Battery wake-up signal 2
30	BAT.EN-	

APX HV battery port

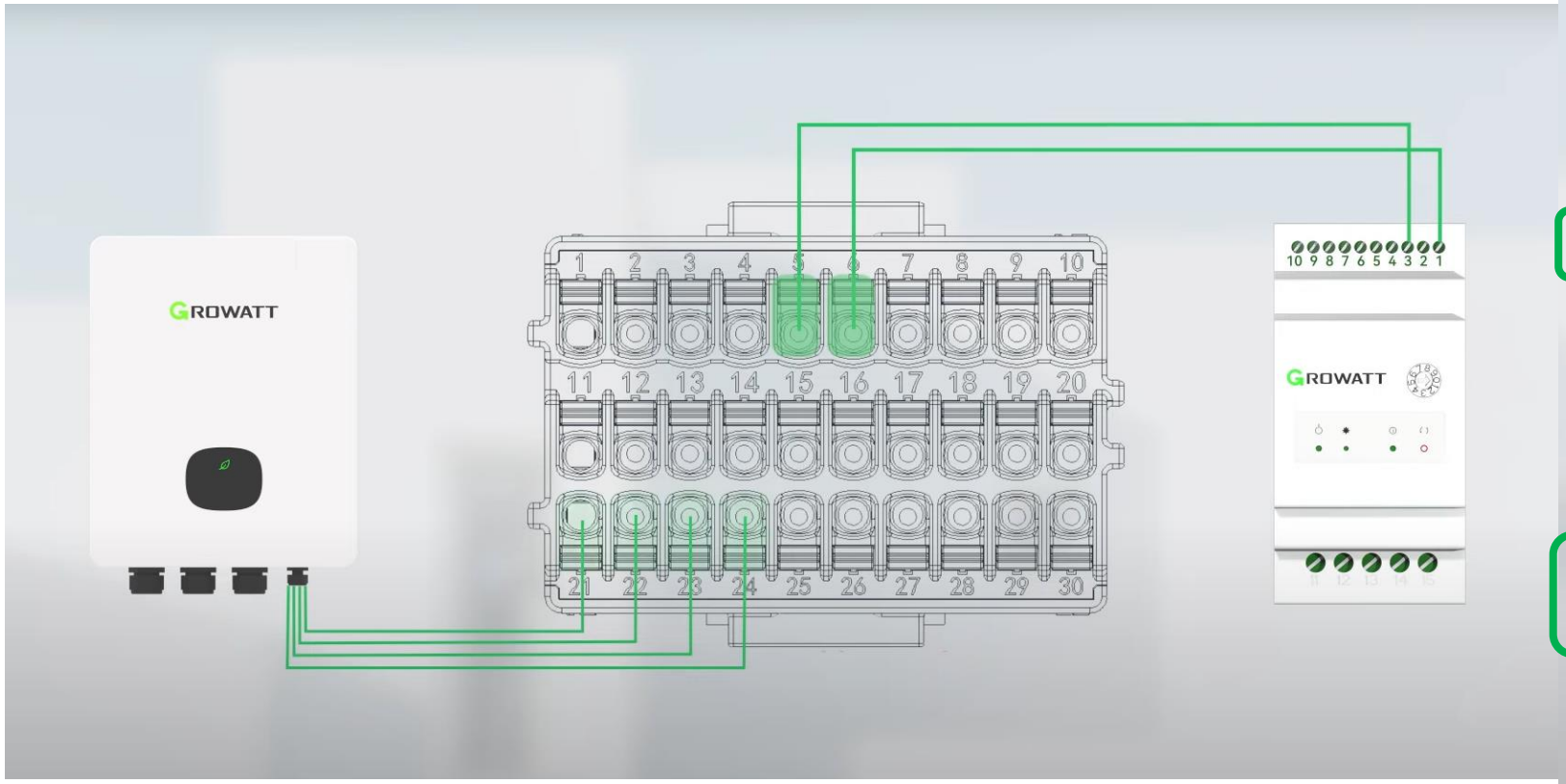
3. Inverter wiring
e) COM port for 2 APX batteries



No.	Description	Function
1	+12V	Dry contact:the power of any external wiring connected to it should not be greater than 2W
2	COM	
3	RS485A1	RS485 communication port
4	RS485B1	
5	RS485A3	Meter communication port
6	RS485B3	
7	RS485A2	Battery communication port
8	RS485B2	
9	BAT.EN+	Battery wake-up signal
10	BAT.EN-	
11	DRM1/5	Relay contact 1 input
12	DRM2/5	Relay contact 2input
13	DRM3/7	Relay contact 3 input
14	DRM4/8	Relay contact 4 input
15	REF/GEN	GND
16	DRM0/COM	/
21	BOX.EN+	Backup box identification signal
22	BOX.EN-	
23	RS485A4	Backup box communication
24	RS485B4	
27	RS485A2	Battery communication port 2
28	RS485B2	
29	BAT.EN+	Battery wake-up signal 2
30	BAT.EN-	

APX HV battery port

3. Inverter wiring
e) COM port SYN and ENERGY METER



No.	Description	Function
1	+12V	Dry contact:the power of any external wiring connected to it should not be greater than 2W
2	COM	
3	RS485A1	RS485 communication port
4	RS485B1	
5	RS485A3	Meter communication port
6	RS485B3	
7	RS485A2	Battery communication port
8	RS485B2	
9	BAT.EN+	Battery wake-up signal
10	BAT.EN-	
11	DRM1/5	Relay contact 1 input
12	DRM2/5	Relay contact 2input
13	DRM3/7	Relay contact 3 input
14	DRM4/8	Relay contact 4 input
15	REF/GEN	GND
16	DRM0/COM	/
21	BOX.EN+	Backup box identification signal
22	BOX.EN-	
23	RS485A4	Backup box communication
24	RS485B4	
27	RS485A2	Battery communication port 2
28	RS485B2	
29	BAT.EN+	Battery wake-up signal 2
30	BAT.EN-	

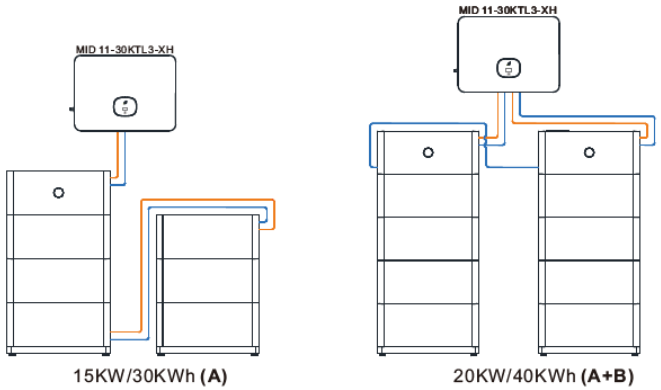
APX HV battery port

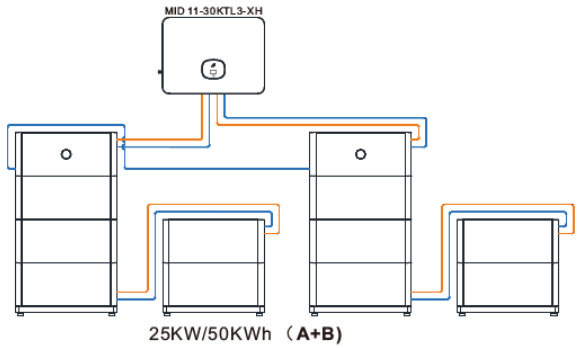
Standard length of the included Smart Meter communication cable is **15 m**, can be extended up to **100 m**

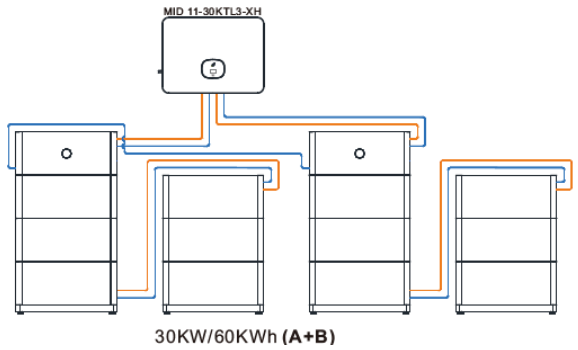
Compatible energy meters EASTRON and CHINT

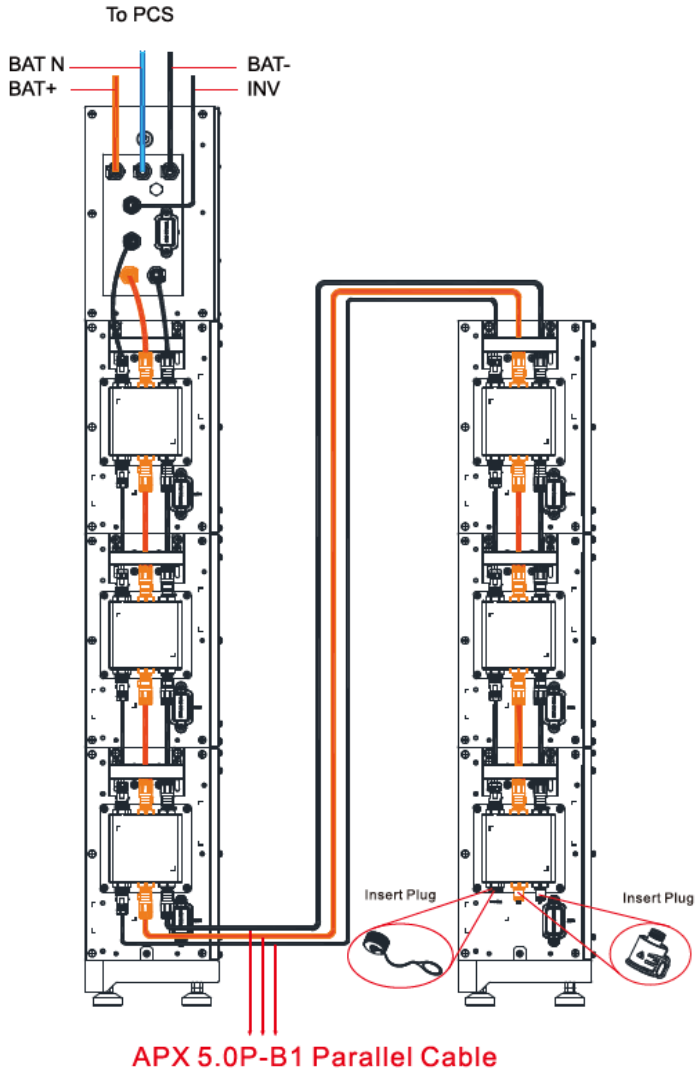
Smart meter models		
No.	Meter Brand	Meter Pin No.
1	Chint	24,RS485A/25,RS485B
2	Eastron	A,RS485A/B,RS485B
3	Growatt	A,RS485A/B,RS485B

4. Installation - electrical connection with MID XH inverter





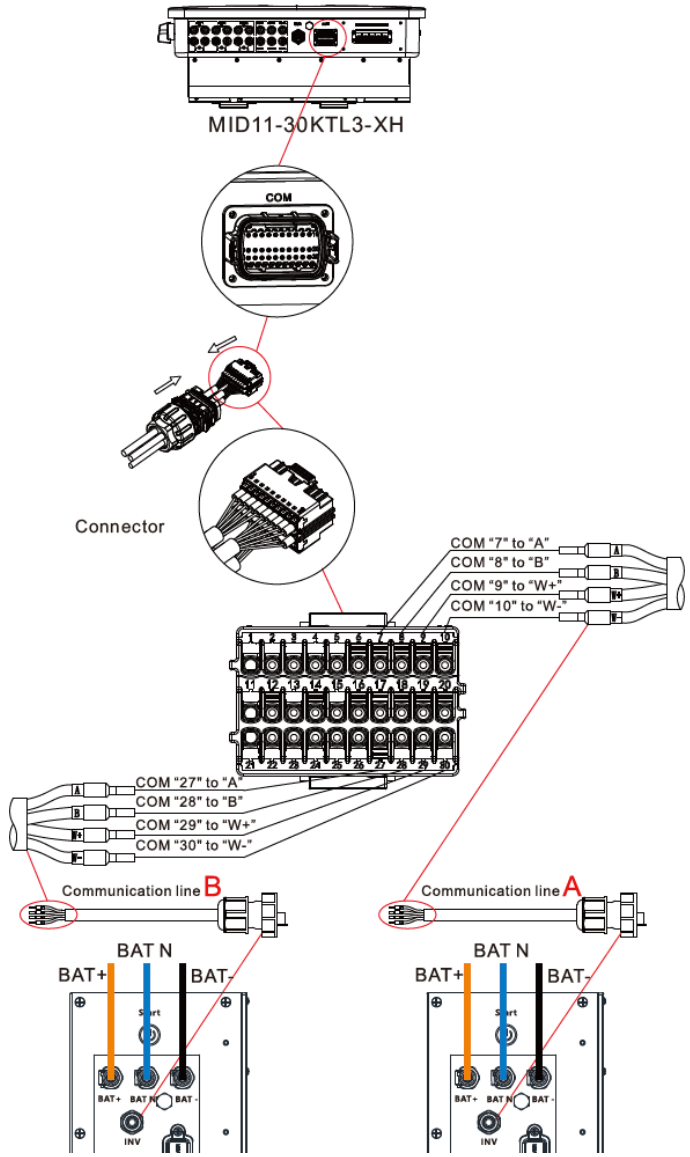




For capacities of 2 5kWh and above, purchase **APX 5.0P-B1 Parallel Cable** and **APX 5.0P Battery Base**

CORRECT CONNECTION ORDER: 1. ground wiring 2. communication line 3. power wiring

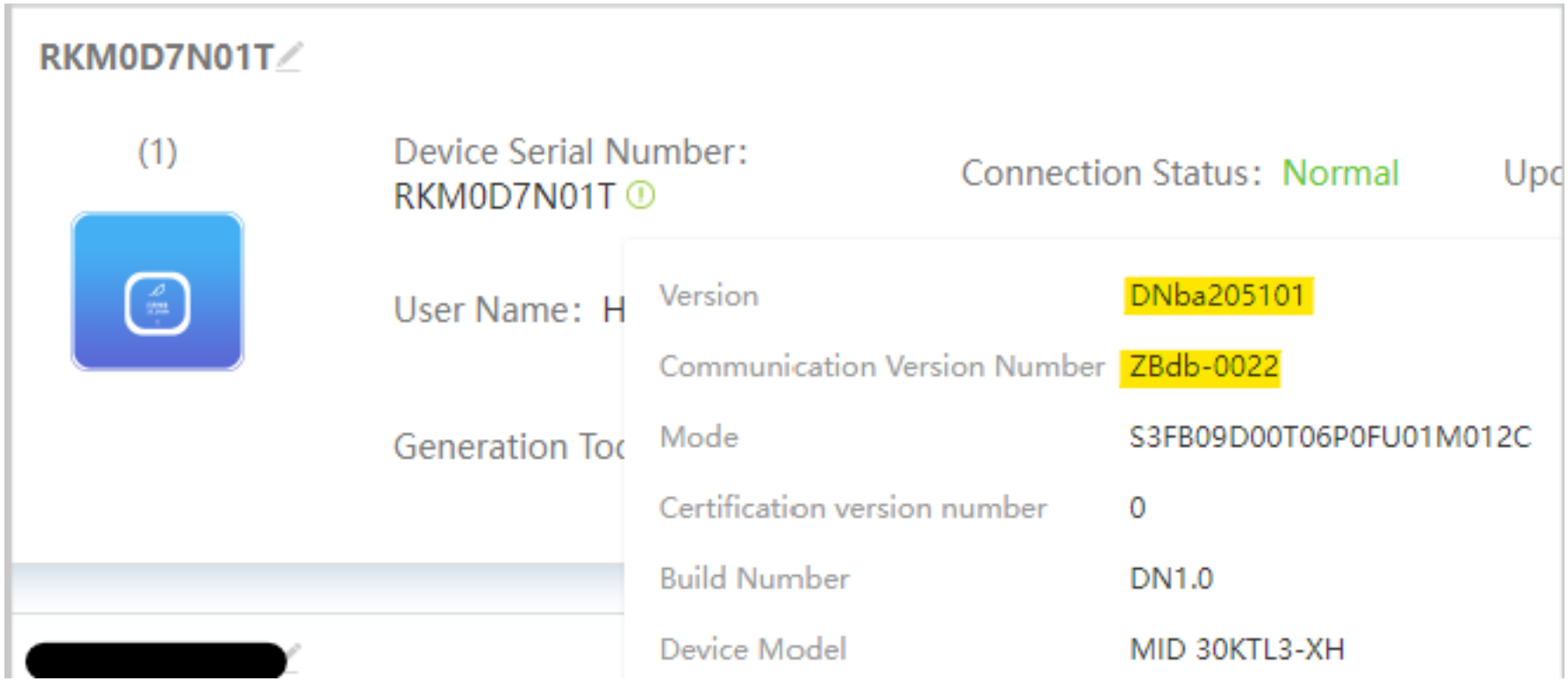
4. Installation - electrical connection with MID XH inverter



APX 5.0-30.0P-S2			MID 11-30KTL3-XH			
Silk screen	Terminal serial number	Definition	Silk screen	Terminal serial number		Definition
				A	B	
INV	1	WAKE-(W-)	COM	10	30	BAT.EN-
	2	WAKE+(W+)		9	29	BAT.EN+
	7	RS485_B(B)		8	28	RS485B2
	8	RS485_A(A)		7	27	RS485A2

Start-up and control of the MID XH inverter is identical to the MOD XH

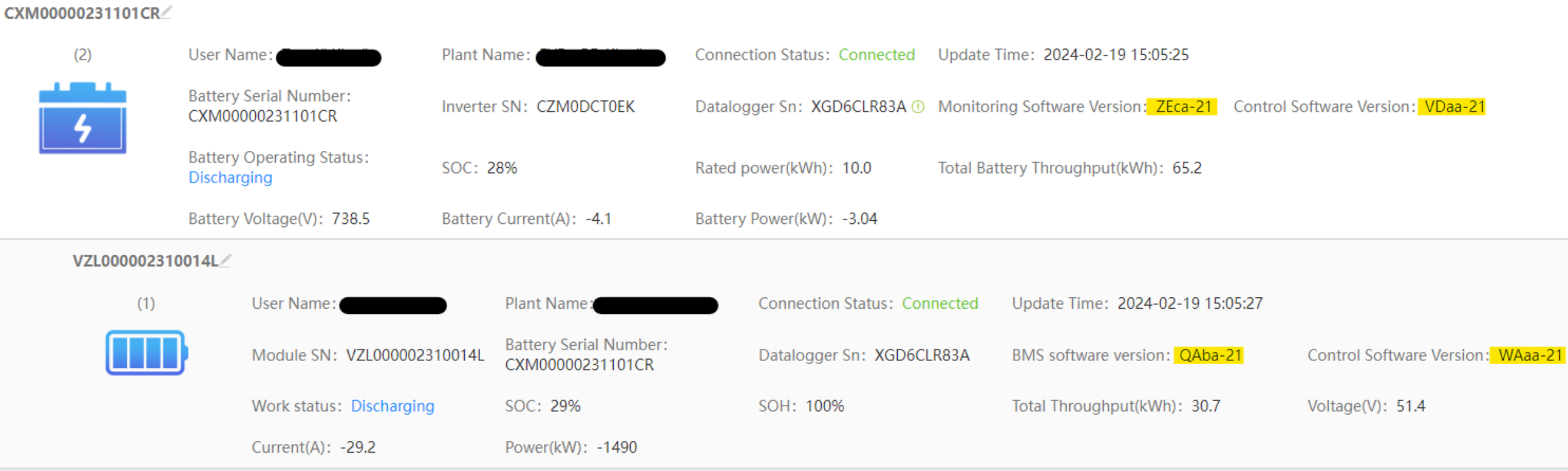
MID-XH inverter FW check



Current FW for MID XH inverter is **DNba205101 and ZBdb-0022**

For exact firmware version, please contact Solsol

APX and BMS APX battery FW check (identical to MOD XH)

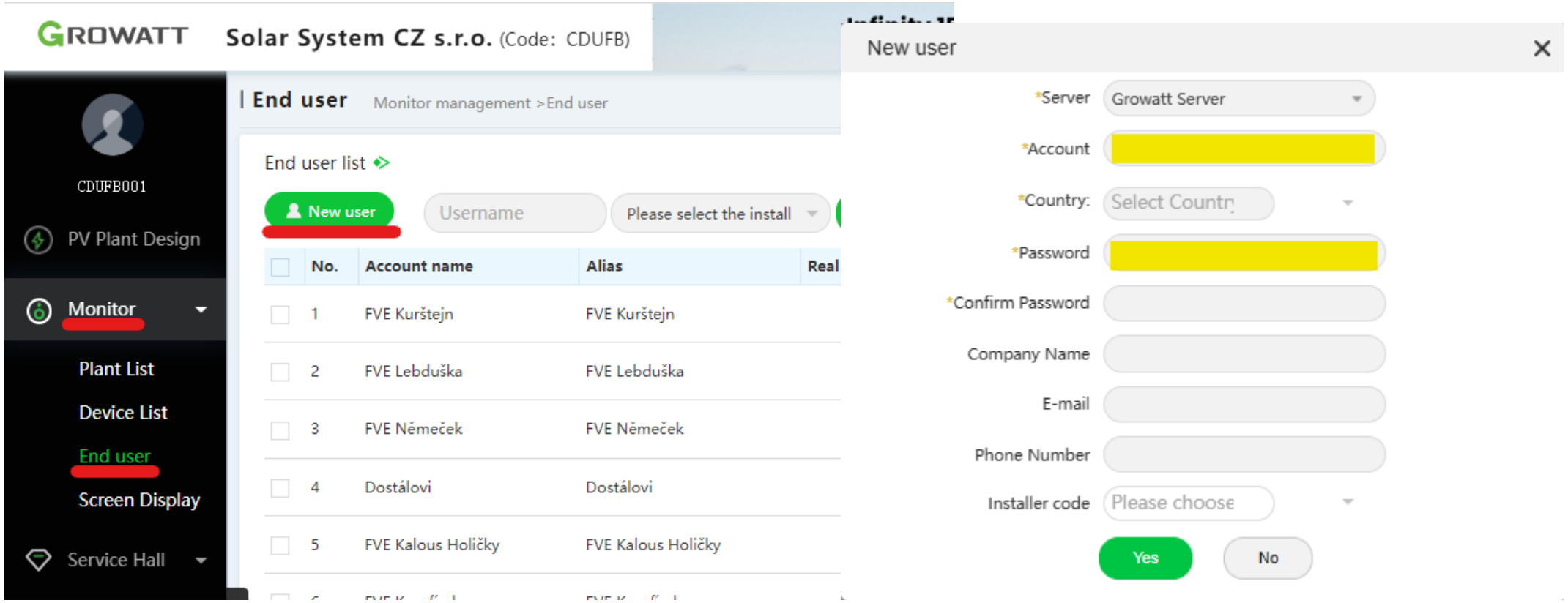


Current FW for BMS is **VDaa-21 , ZEca-21** and Battery **QAba-21, WAaa-21**

For exact firmware version, please contact Solsol

End user creation in OSS

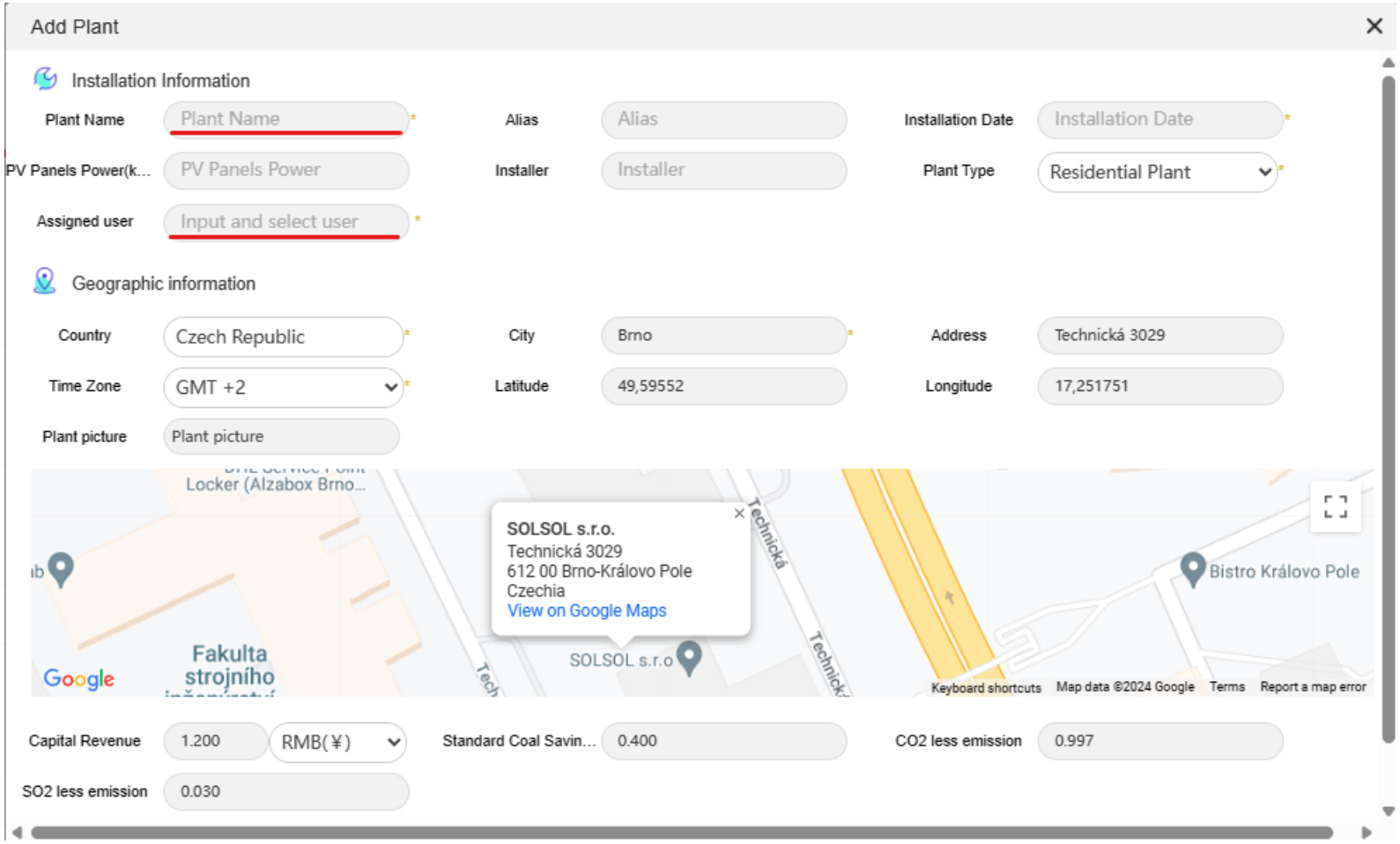
Monitor > End user > New user



End User – an account for end users if you want to grant them a full access. This account is also suitable for installation technicians during plant installation

End user creation in OSS

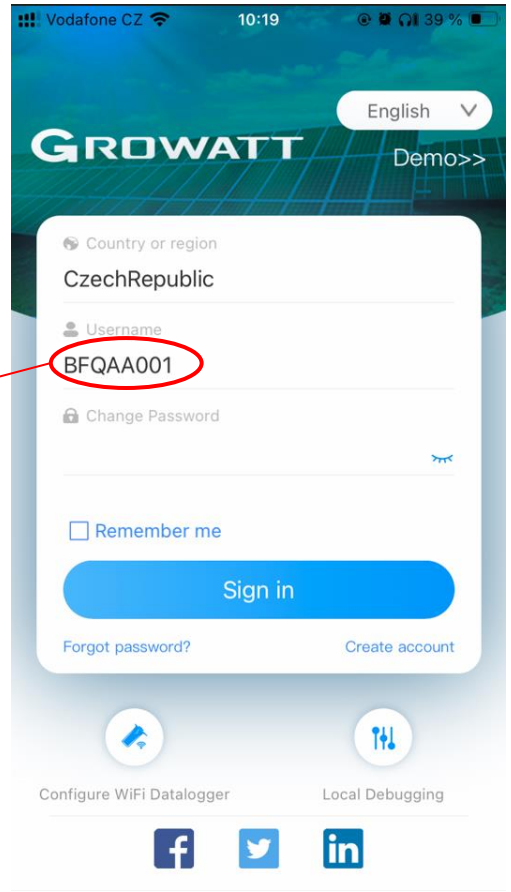
Monitor > Plant list > Add Plant

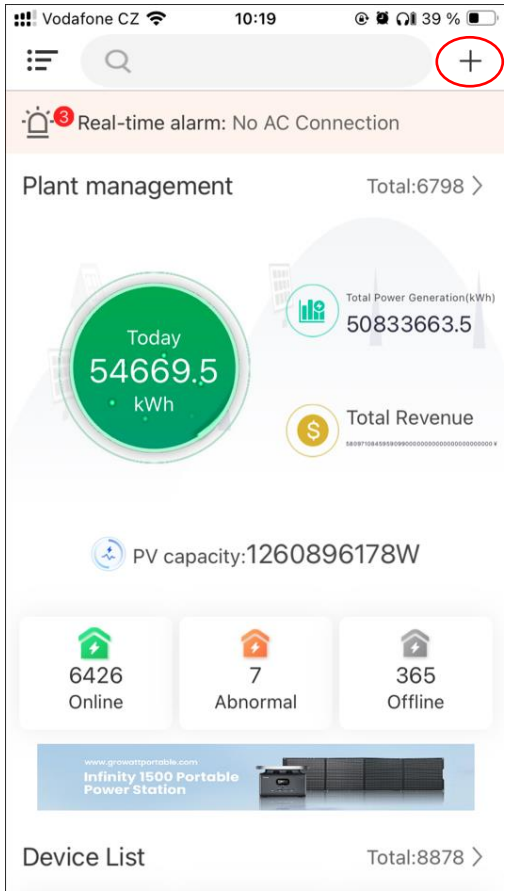


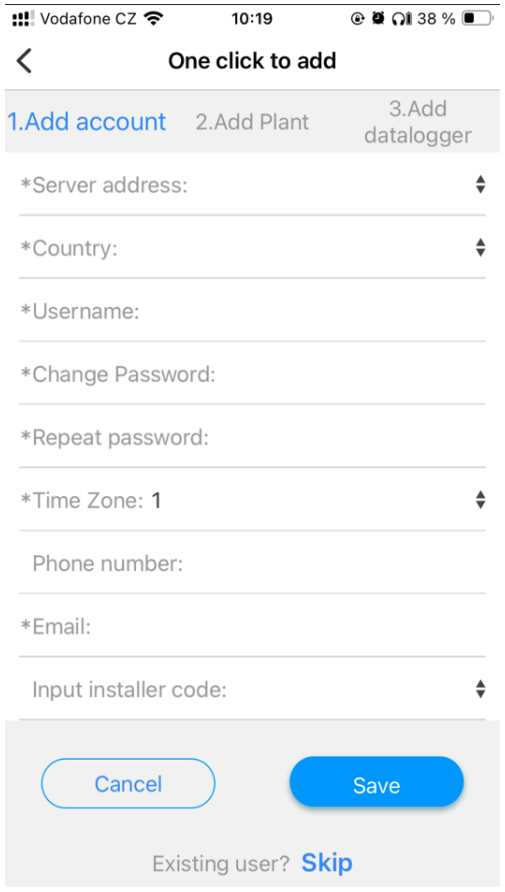
End user creation in ShinePhone

Monitor > End user > New user

- Specify your Installer code
- Installer code is created by Solsol for your based on request from Account representative

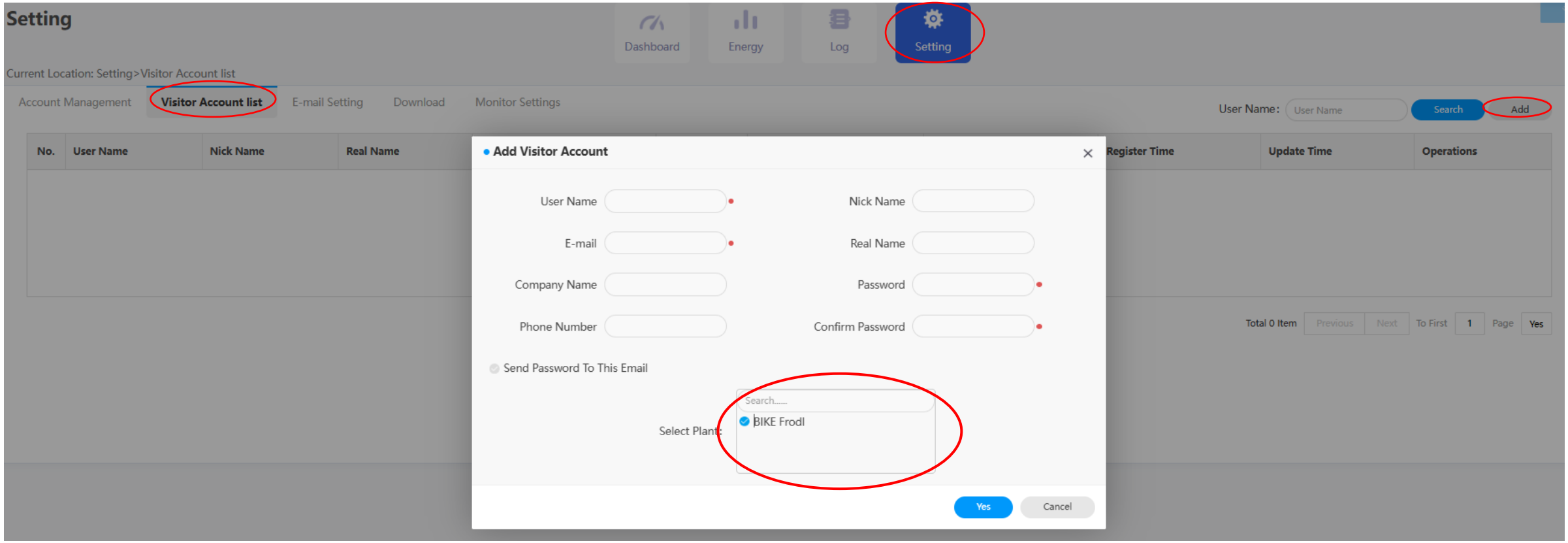






Browse account creation

Server.growatt.com > Setting > Visitor Account list



Browse account – an account for end users if you want want to enable them only read access

YouTube videos to help you minimize installation time

YouTube videos Growatt / Solsol

Installation Guide: Growatt's MOD 3-10KTL3-XH(BP) - YouTube

SYN 50-XH-30 Installation: SYN 50-XH-30 Installation - YouTube

Installation Tutorial: APX HV Battery System: Installation Tutorial: APX HV Battery System - YouTube

Check after unpacking: check after unpacking - YouTube

Preparing the space for placement: preparing the space for placement - YouTube

Inverter wiring diagram: inverter wiring diagram - YouTube

Inverter Wiring - Ports: Inverter Wiring - Ports - YouTube

Inverter Wiring - AC Connector: inverter wiring - AC Connector - YouTube

Inverter wiring - PV Connectors: inverter wiring - PV Connectors - YouTube

Inverter Wiring - Battery Connectors: inverter wiring - Battery Connectors - YouTube

Inverter wiring - COM Port: Inverter Wiring - COM Port - YouTube

We will be happy to answer your questions

SOLSOL

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