Growatt Energy Management Solutions

GROWATT

01

System Solutions

Solution for Single Inverters

![GROWATT]

-X series Inverter   Smart Meter   Monitoring   USB-WiFi

All Growatt X series inverters support export limitation function with Growatt Smart Meter

Use USB-WiFi to do the local configuration, if you use WiFi-X for monitoring, you can use

WiFi-X for configuration before configurate for online monitoring.

System Diagram

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Solar panel

MIN 5000TL-XE

Single Phase Meter

Grid

Single Phase

Load

Three Phase

PV Array

MOD 3~15KTL3-X

Load

Smart meter

CT 1

CT 2

CT 3

Grid
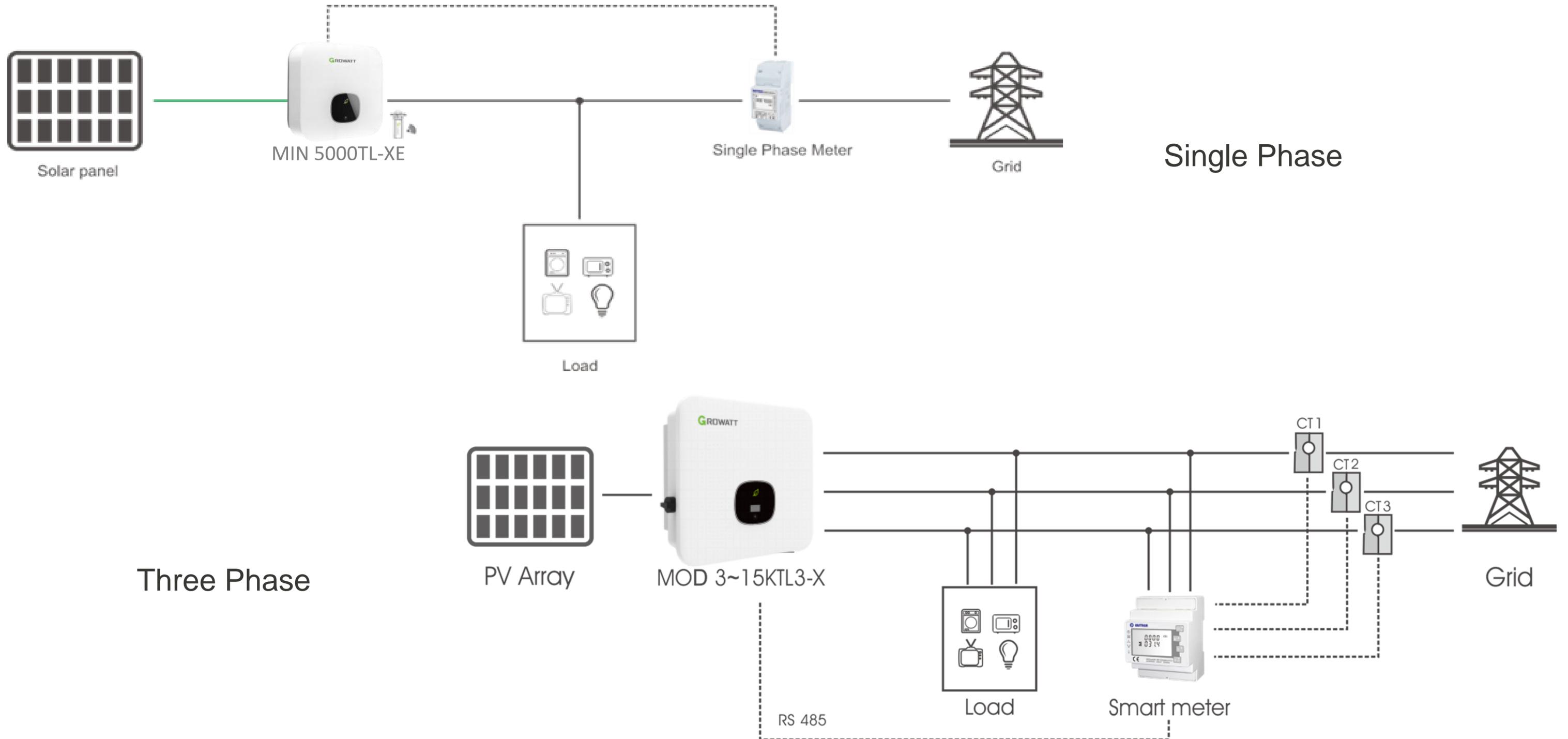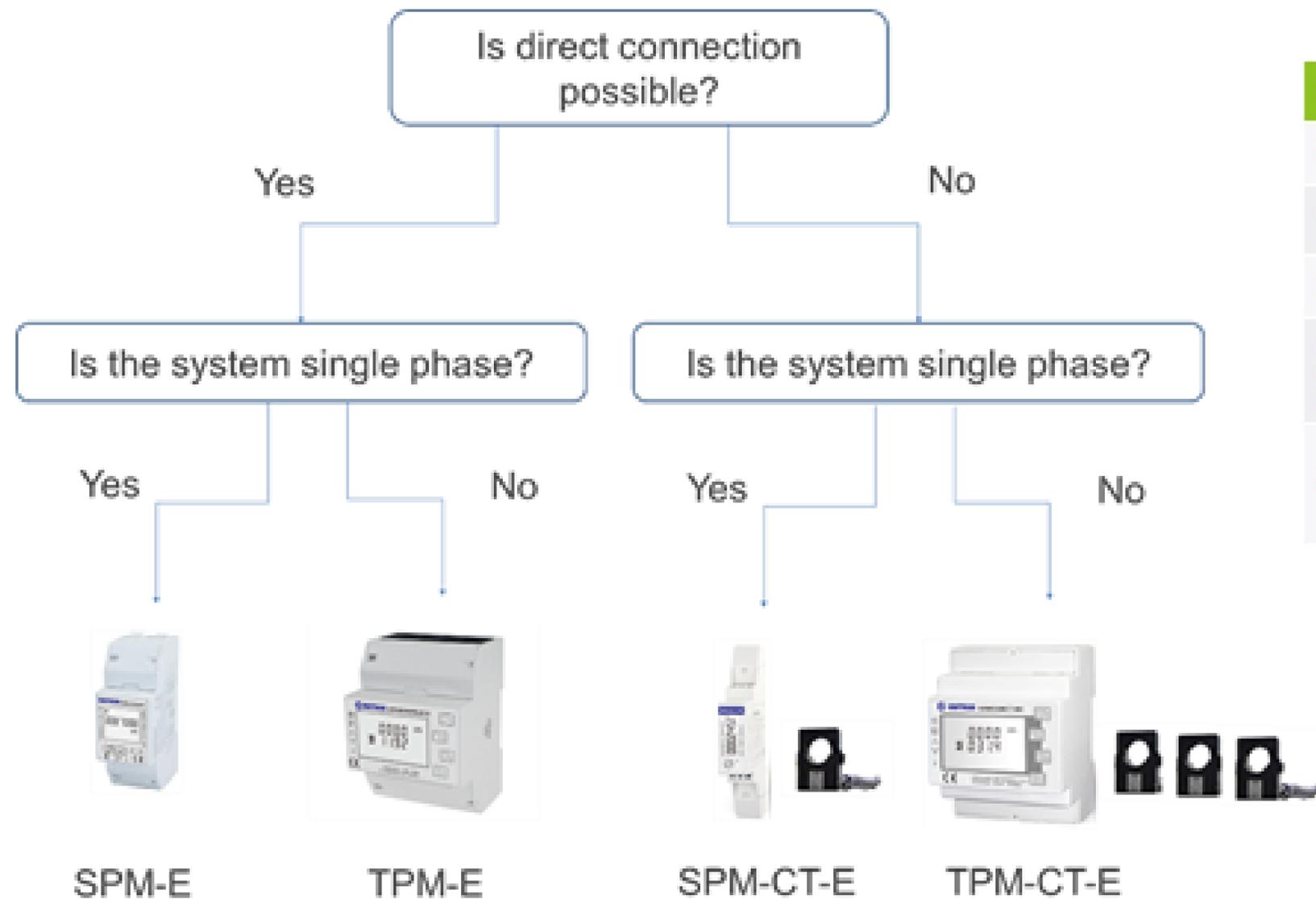
RS 485

Model	SPM-E	TPM-E	SPM-CT-E	TPM-CT-E
Connection	1P2W	3P4W	1P2W	3P4W
Voltage range (L-N)	176~276V	100~289V	176~284V	100-289V
Current	10A (max.100A)	10A（max.100A)	40mA	40mA
Max. RS485 communication range	100m	100m	100m	100m
CT	/		1CT 100A 250A CT is optional	3CTs 100A

Decision flow:
- Is direct connection possible?
  - Yes → Is the system single phase?
    - Yes → SPM-E
    - No → TPM-E
  - No → Is the system single phase?
    - Yes → SPM-CT-E
    - No → TPM-CT-E

Note: Make sure the system current are not over the 80% of max. allowed current.

Monitoring Solution

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ShineLAN-X

ShineWiFi-X

ShineLink-X

- Storage data max 30 days
- Plug & Play
- Up to 100m

- Storage data max 30 days
- Up to 50m
- Support remote service

- Monitoring up to 8 inverters
- Storage data max 30 days
- Up to 120m
- Automatically acquire IP
  Support remote service
- RF communication

Solution for Multiple Inverters

Growatt Inverters

Smart Energy Manager (SEM)

SEM is the solution to do 24h self-consumption and system export limitation.

Max. control inverter number is 32.

System Diagram

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Solar panel

MAX 50-80KTL3 LV

RS485

Consumption

Smart Energy Manager

Solar panel

MAX 50-80KTL3 LV

CT

CT

CT

Grid
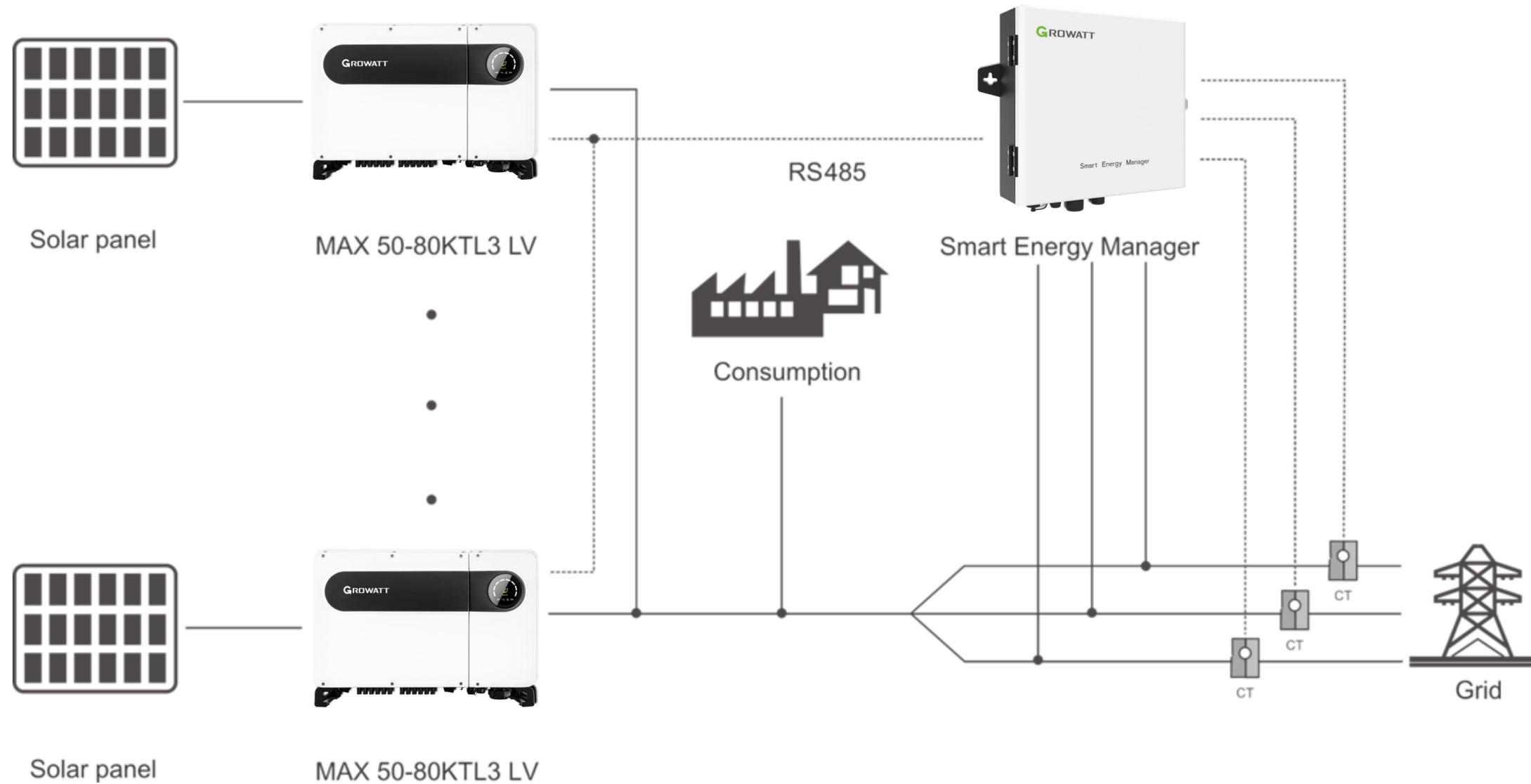
How to Select SEM Model

![Growatt logo]

1. What's the size of the solar plant and the system consumption

2. What's the max. current of the Main Switch

3. Choose according the max. current

4. Make sure the CT aperture is suitable to connect to the main Line.

40mA CT   5A CT

SEM Model	SEM-E 50kW	SEM-E/SEM 100kW	SEM 300kW	SEM 600kW	SEM 1MW	SEM 2MW
Voltage	230/400Vac (100-264Vac)					
CT data	150A/40mA	250A/40mA 250A/5A	600A/5A	1200A/5A	2000A/5A	4000A/5A
	Ø24mm	Ø24mm 22/23mm	42/46mm	82/122mm	82/162mm	82/162mm

24H Self-consumption Monitoring*

Growatt Smart Meter and monitoring device are required for single inverter system, SEM is for multiple inverters solution.
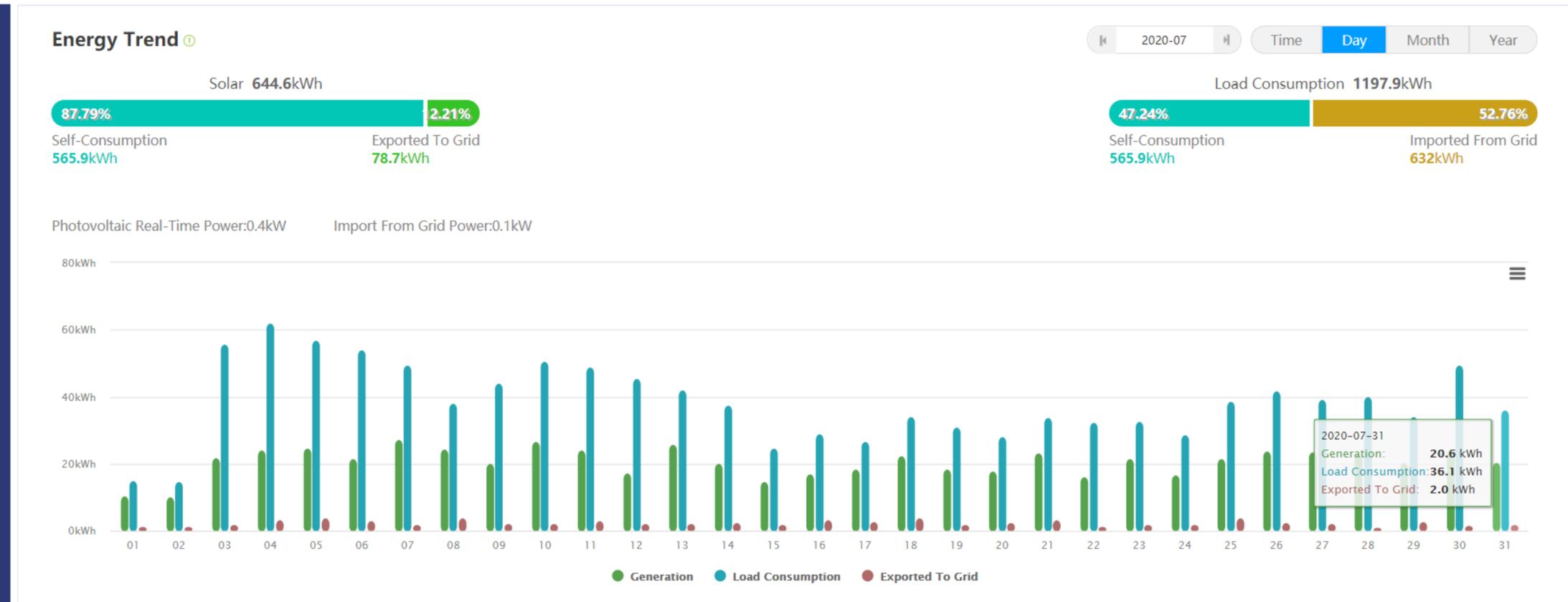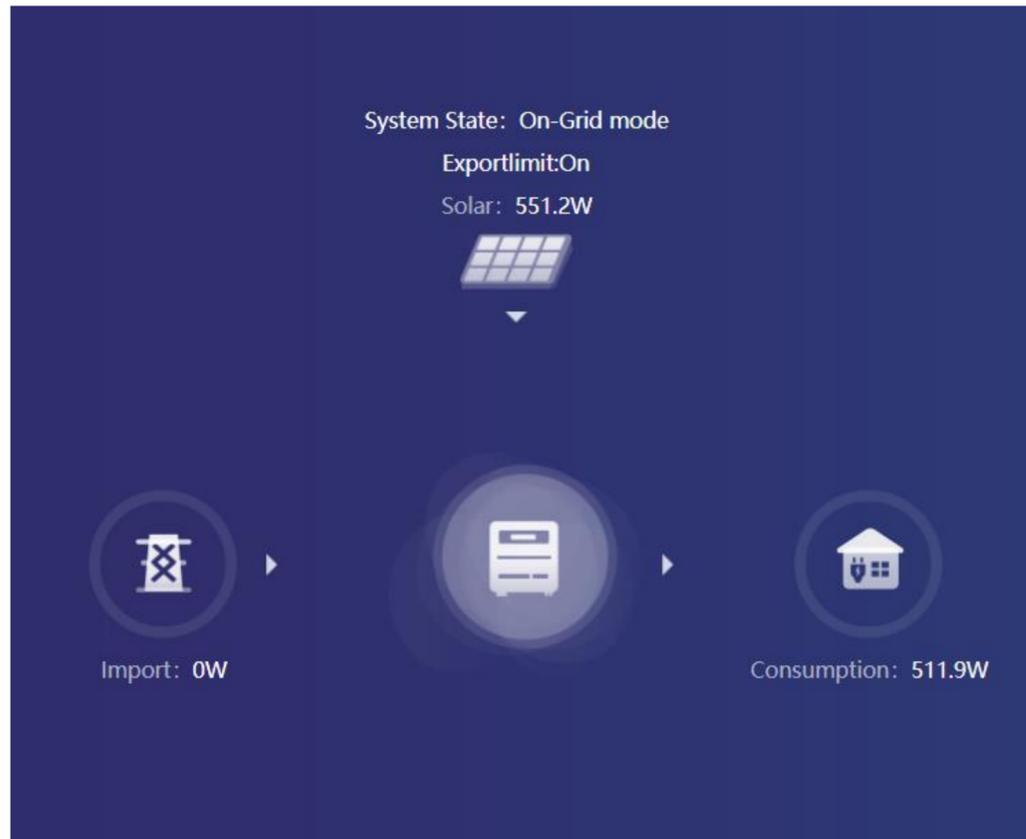
System Overview

Self-consumption Data

- Check with Growatt engineer for details, MIC, MIN, MOD with special version for this function
- SEM can do self-consumption for all X models.

02

System Connection and Configuration

System Connection (MIN 2500-6000TL-XE/XH)

Solar panel

MIN 5000TL-XE/XH

Single Phase Meter

Grid

Load

Grid side L

Load side L

RS485A

RS485B

Grid side N

Load side N

MIN 2500-6000TL-XE

SPM-E

5 6 7 8 9 10

A B GND ⎍1+ COM ⎍2+

3 4
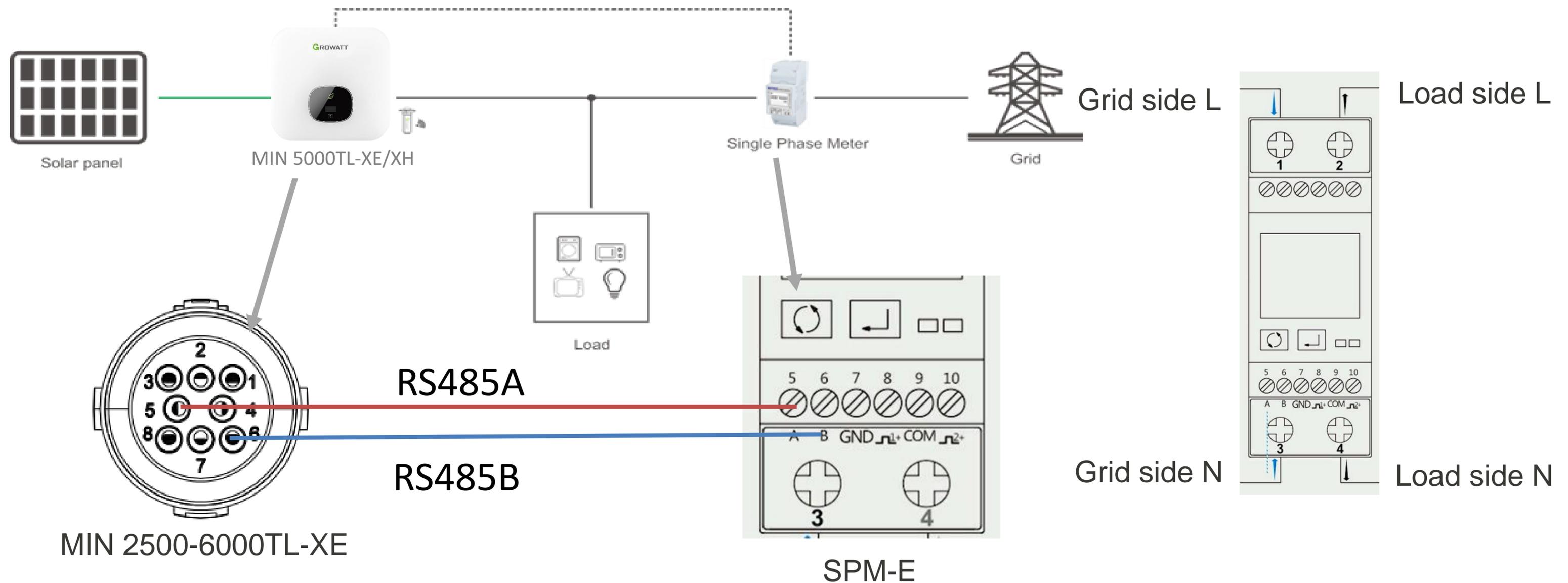
Note:
1. The direct connection meter need install at the grid connection point, after the main switch
2. RS485 connection between inverter and meter must be correct

Single Phase Inverter + Meter (CT) MIN XE/XH
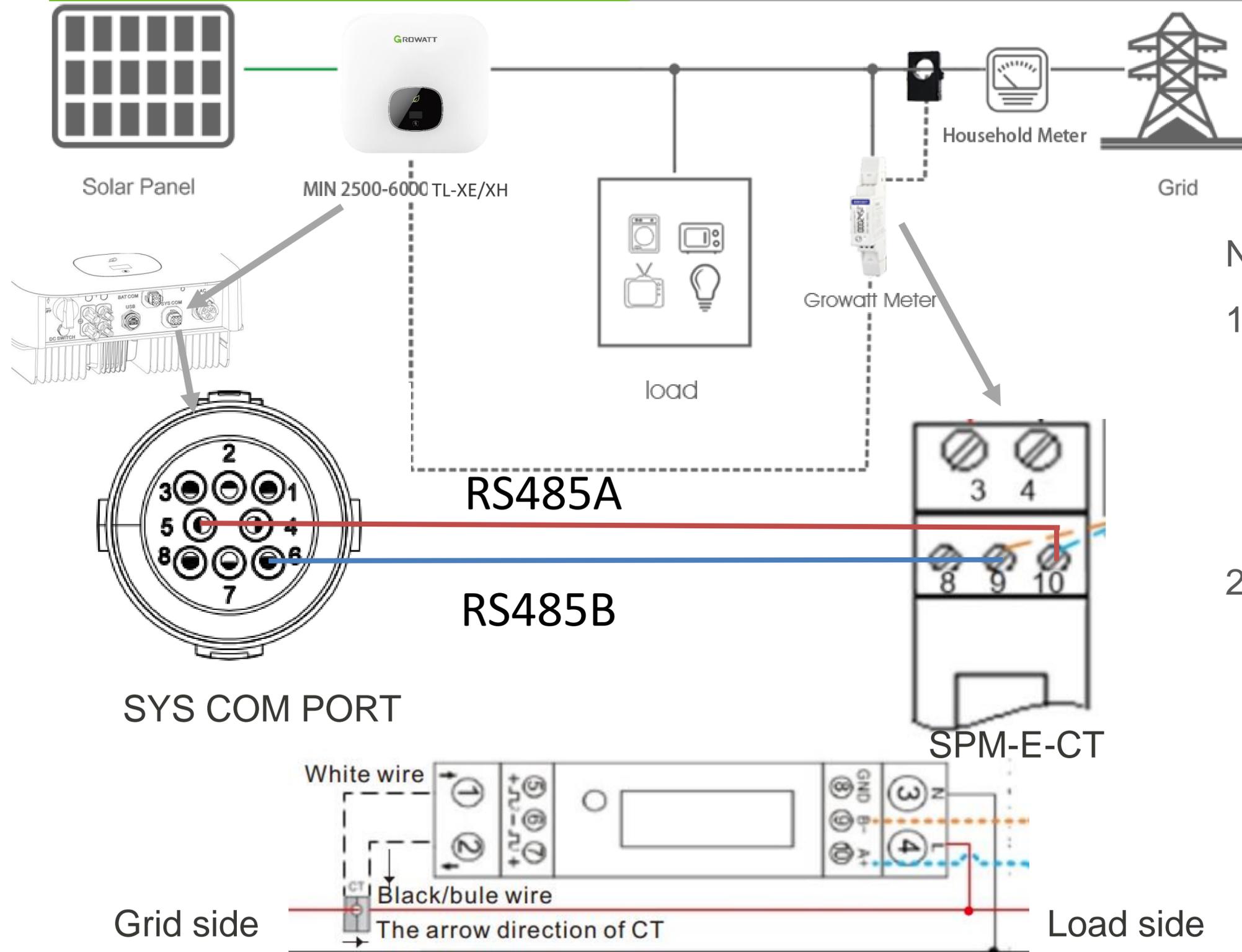
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Solar Panel

MIN 2500-6000 TL-XE/XH

Household Meter

Grid

load

Growatt Meter

RS485A

RS485B

SYS COM PORT

SPM-E-CT

White wire

Black/bule wire

The arrow direction of CT

Grid side

Load side

Note:

1. The CT need install at the grid connection point, after the main switch, and the arrow point from grid to load side

2. RS485 connection between inverter and meter must be correct

Single Phase Inverter + Meter (CT) MIN/MIC TL-X
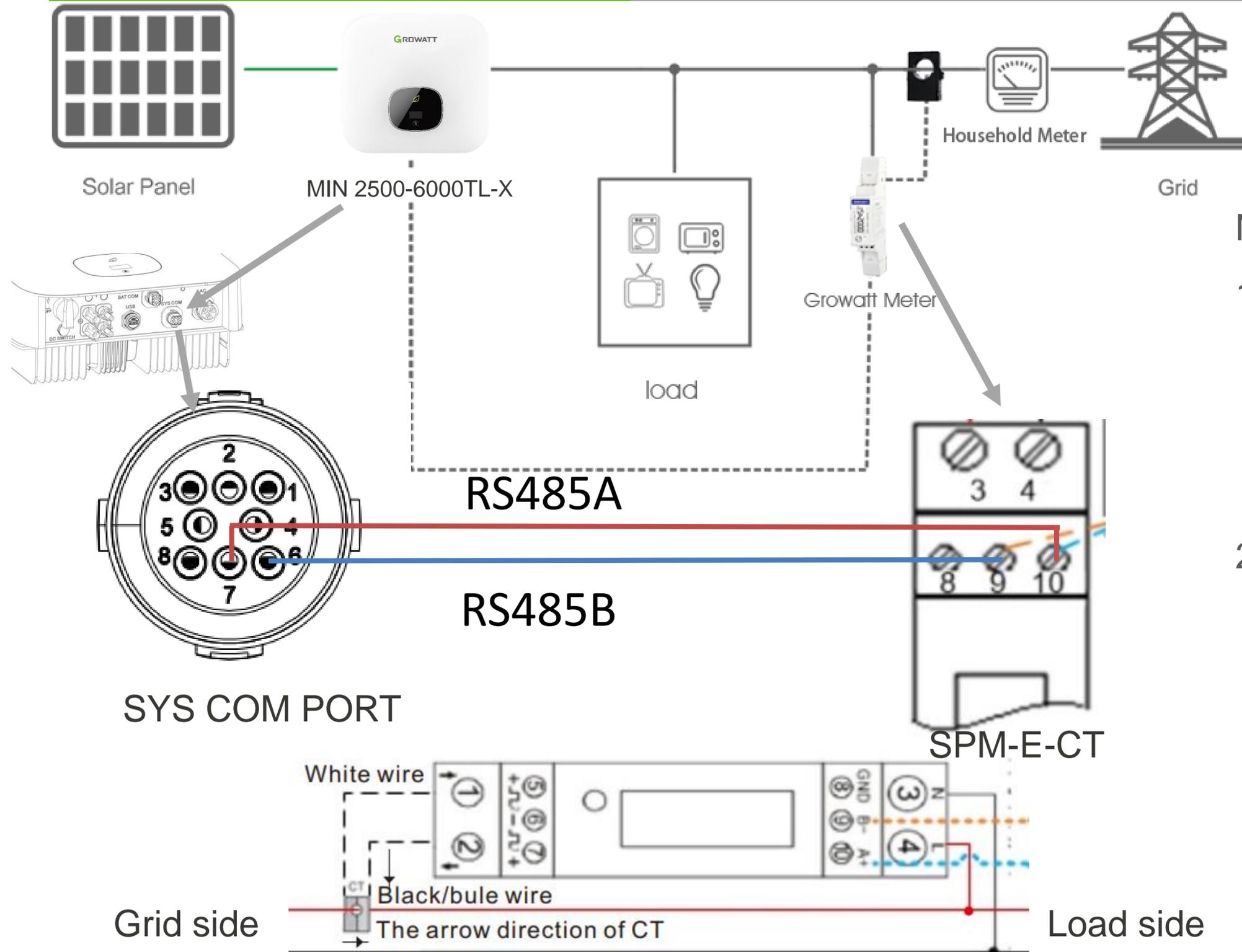
Solar Panel

MIN 2500-6000TL-X

Household Meter

Grid

load

Growatt Meter

RS485A

RS485B

SYS COM PORT

SPM-E-CT

White wire

Black/bule wire

The arrow direction of CT

Grid side

Load side

Note:

1. The CT need install at the grid connection point, after the main switch, and the arrow point from grid to load side

2. RS485 connection between inverter and meter must be correct

System Connection (MOD 3-15K/MID 25-40KTL3-X)
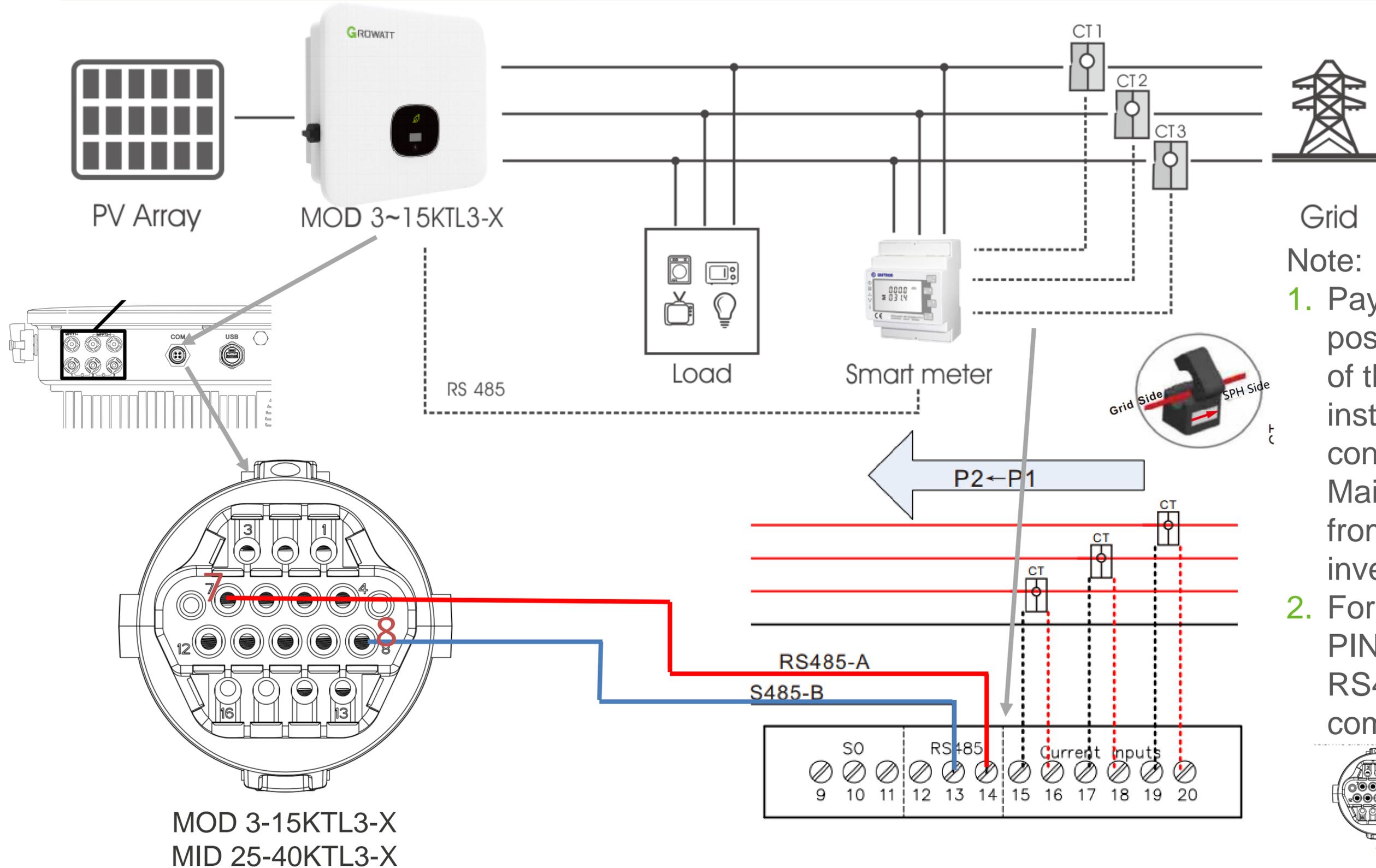
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PV Array

MOD 3~15KTL3-X

CT 1

CT2

CT3

Grid

Load

Smart meter

RS 485

Grid Side   SPH Side

P2←P1

MOD 3-15KTL3-X
MID 25-40KTL3-X

RS485-A

S485-B

7

8

SO   RS485   Current Inputs
9 10 11 | 12 13 14 | 15 16 17 18 19 20

CT   CT   CT

Note:

1. Pay attention of CT position and the direction of the arrow, CTs should install at the grid connection point, after the Main Switch, and the arrow from grid side to the inverter side

2. For Vietnam model, PIN 3, PIN 4 are RS485A and RS485 B for meter communication
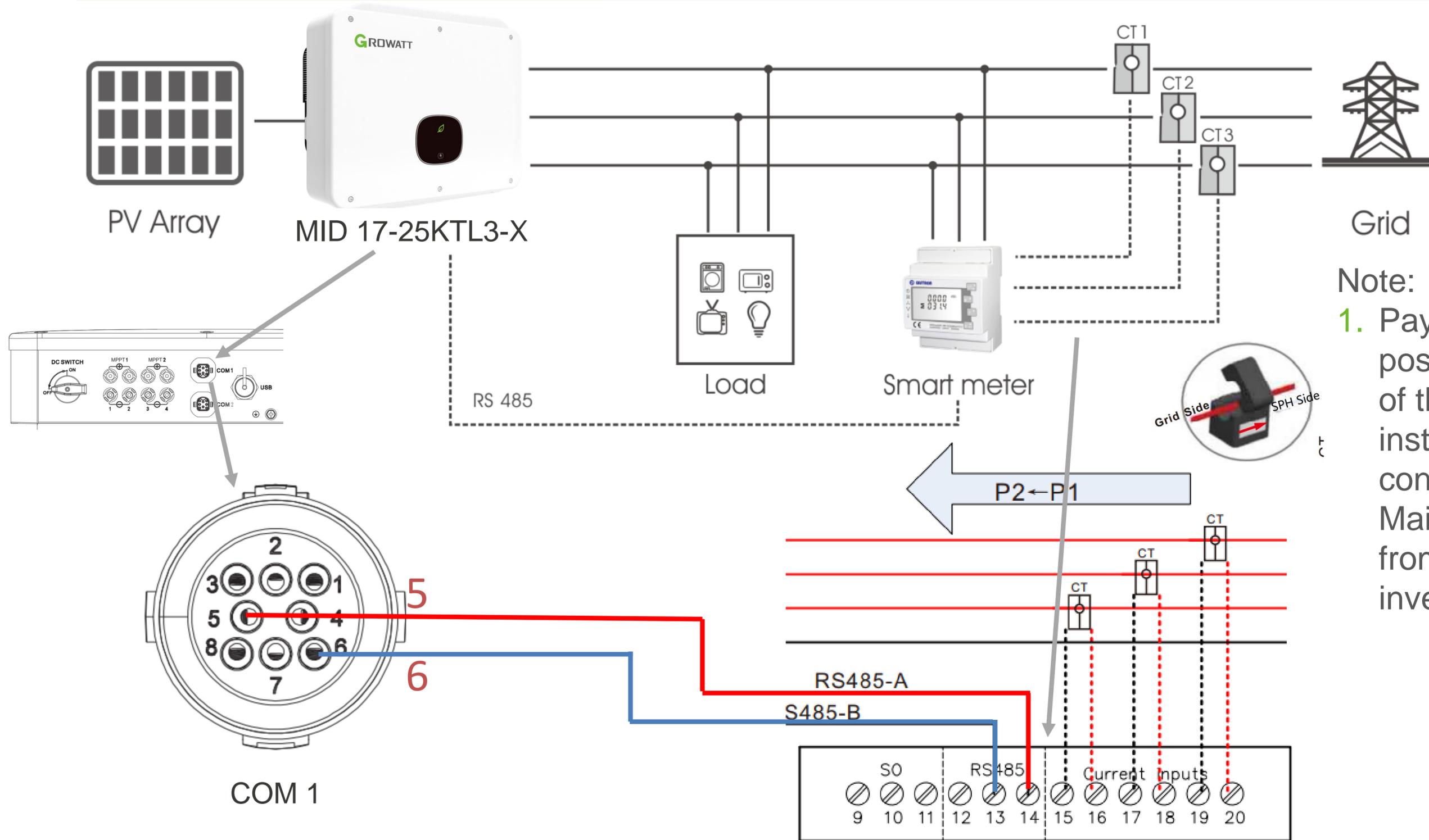
A   B   C just for Vietnam models

System Connection for Three Phase Inverter

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PV Array

MID 17-25KTL3-X

DC SWITCH
MPPT1 MPPT2
ON
OFF
COM1
USB
1 2 3 4
COM2

CT 1

CT 2

CT 3

Grid

Load

Smart meter

RS 485

Grid Side   SPH Side

Note:

1. Pay attention of CT position and the direction of the arrow, CTs should install at the grid connection point, after the Main Switch, and the arrow from grid side to the inverter side

P2←P1

CT

CT

CT

COM 1

2
3   1
5   4
8   6
7

5

6

RS485-A

S485-B

SO   RS485   Current Inputs

9 10 11 12 13 14 15 16 17 18 19 20

System Connection for Three Phase Inverter

Note:
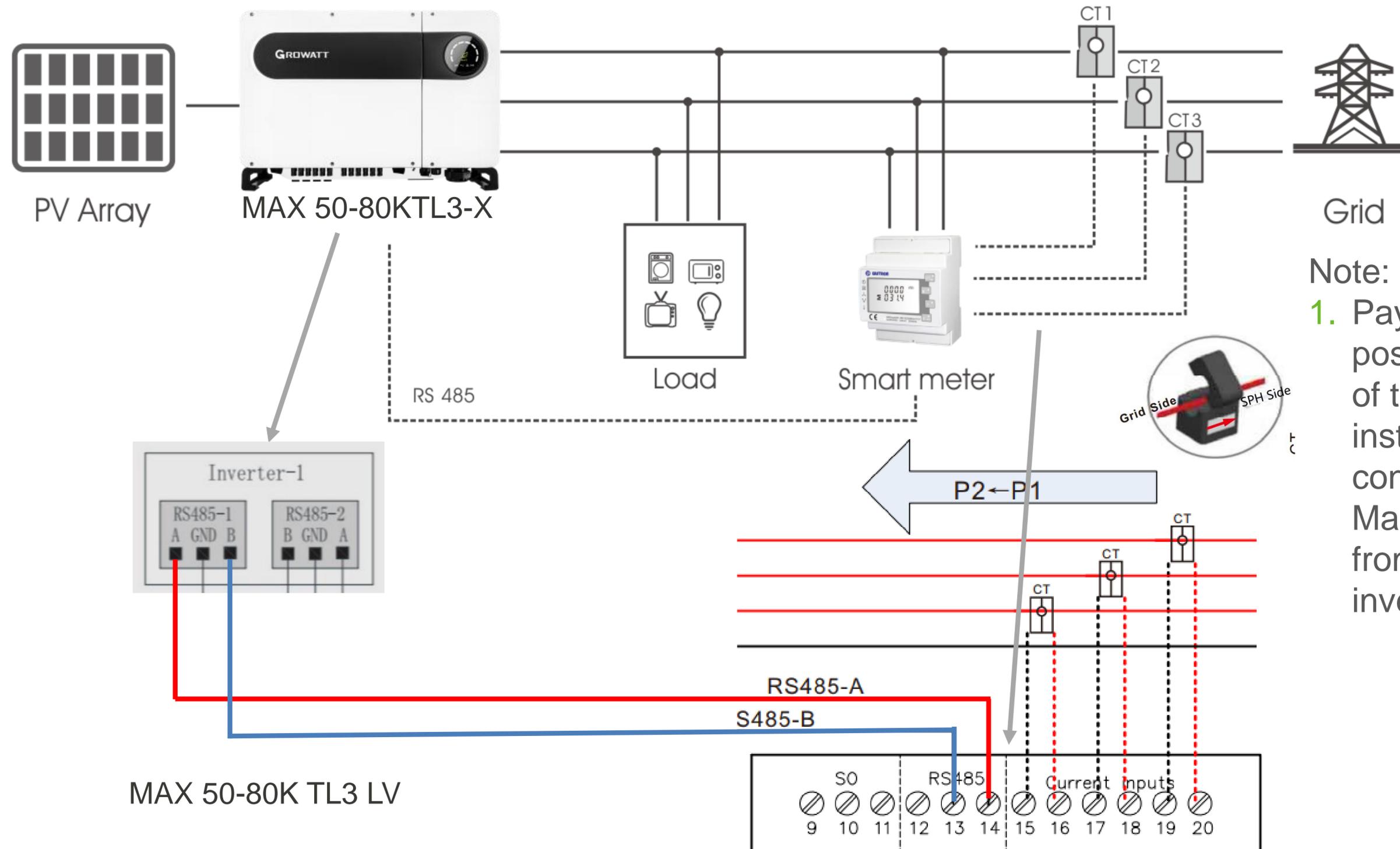
1. Pay attention of CT position and the direction of the arrow, CTs should install at the grid connection point, after the Main Switch, and the arrow from grid side to the inverter side

How to configuration-Via LCD

```
┌─────────────────┐              ┌─────────────────┐
│                 │              │                 │
│  Set parameter  │─────────────▶│     Meter       │
│                 │              │                 │
└────────┬────────┘              └────────┬────────┘
         │                                │
         ▼                                ▼
┌─────────────────┐              ┌─────────────────┐
│    General      │              │ ExportLimit Rate│
│    Advanced     │              │    XXX.X%        │
└────────┬────────┘              └────────┬────────┘
         │                                │
         ▼                                ▼
┌─────────────────┐              ┌─────────────────┐
│   Password      │              │                 │
│     123         │              │    Set OK       │
└────────┬────────┘              └─────────────────┘
         │                                ▲
         ▼                                │
┌─────────────────┐                       │
│   Exporlimit    │                       │
│  OFF      ON    │───────────────────────┘
└─────────────────┘
```
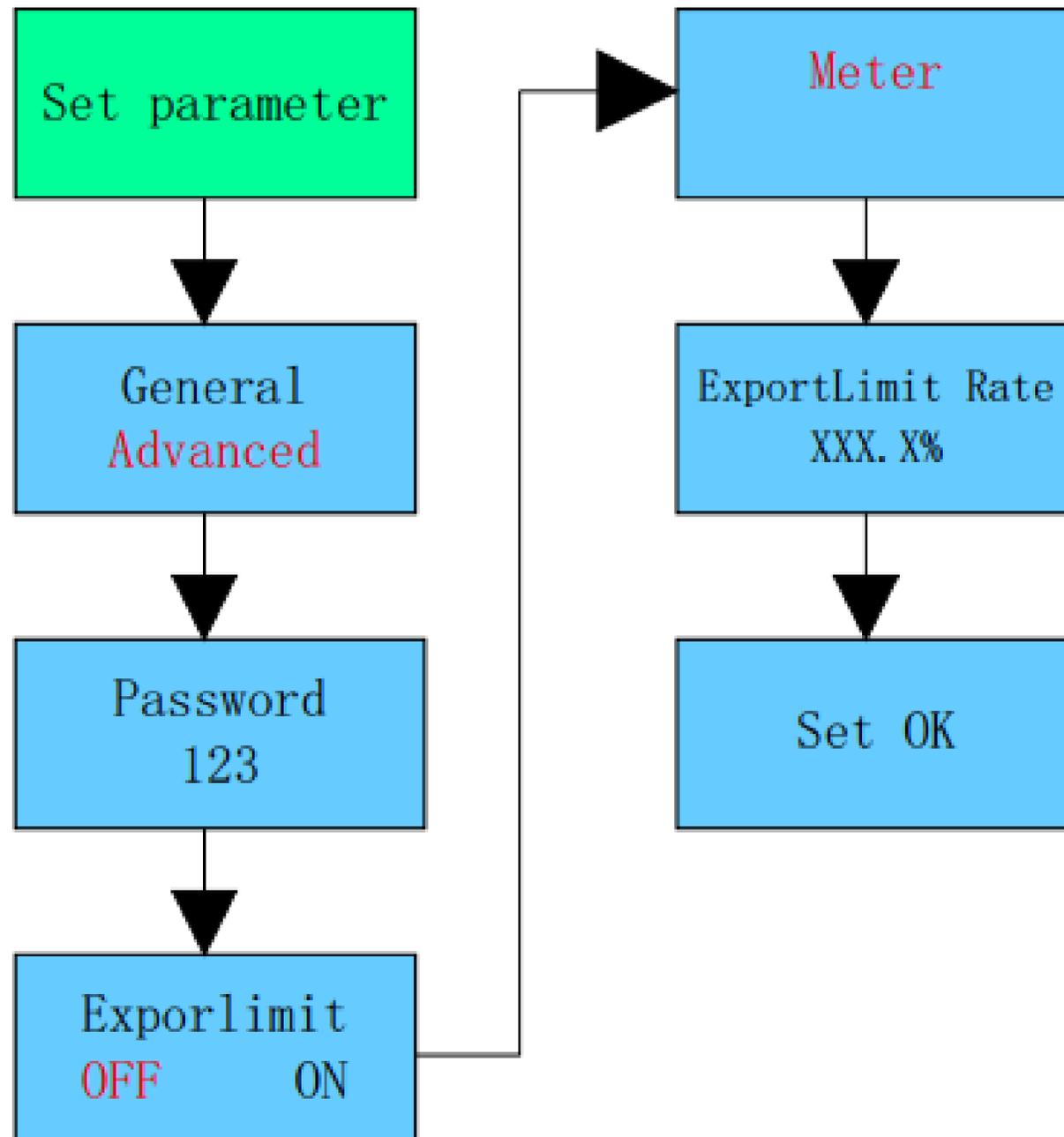
Note:

1. The Advanced setting password for MIN and MIC are 123, for MOD, MID are 111

2. Turn on and select meter, and set the export limit rate, if you set 70.0%, means allowed export to grid 70%Pn.

3. Note: MAX and MID，MOD suggest to use USB-WiFi to do the setting.

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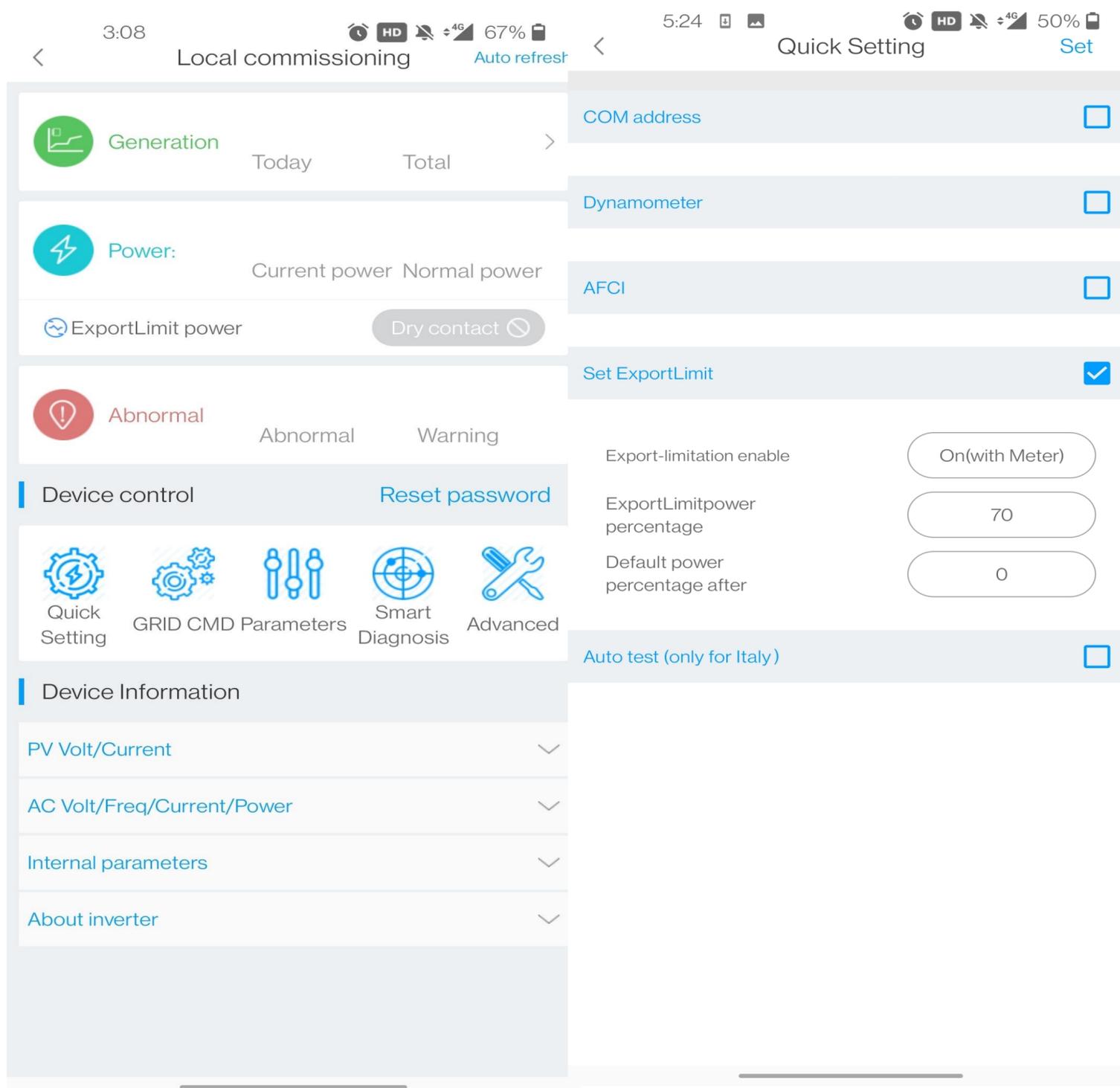
1. Login OSS account and go to local commissioning page
2. Click Quick Setting, and set Export limitation
3. Failsafe setting is a protection when communication between meter lost, the inverter run at the default setting to not over the limitation value.

Note: If you use ShineWiFi-X for monitoring, you can use ShineWiFi-X to configurate the inverter before configure for monitoring.

How to configuration-Via OSS

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Go to the Device list page, and click setting button, and fill in the setting value, then click Yes to save the settings.

Cable Connection- RS485
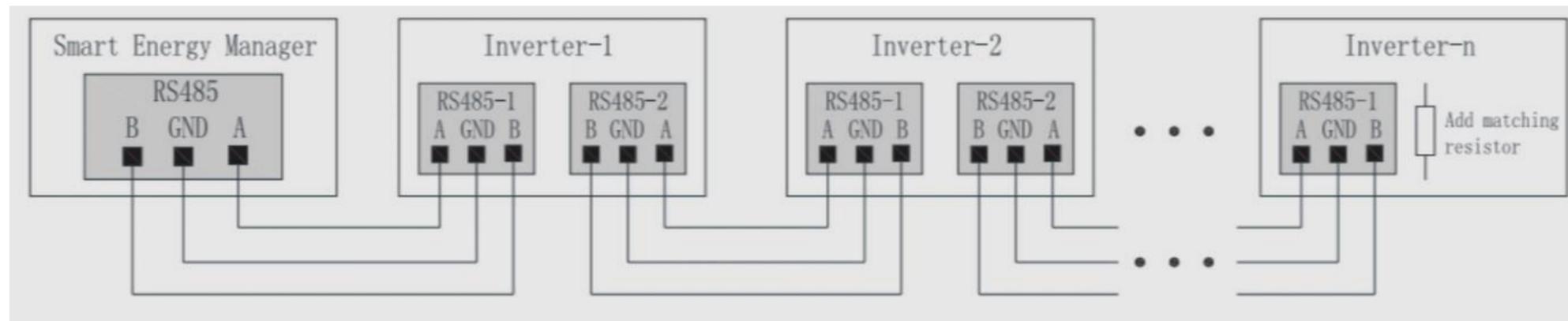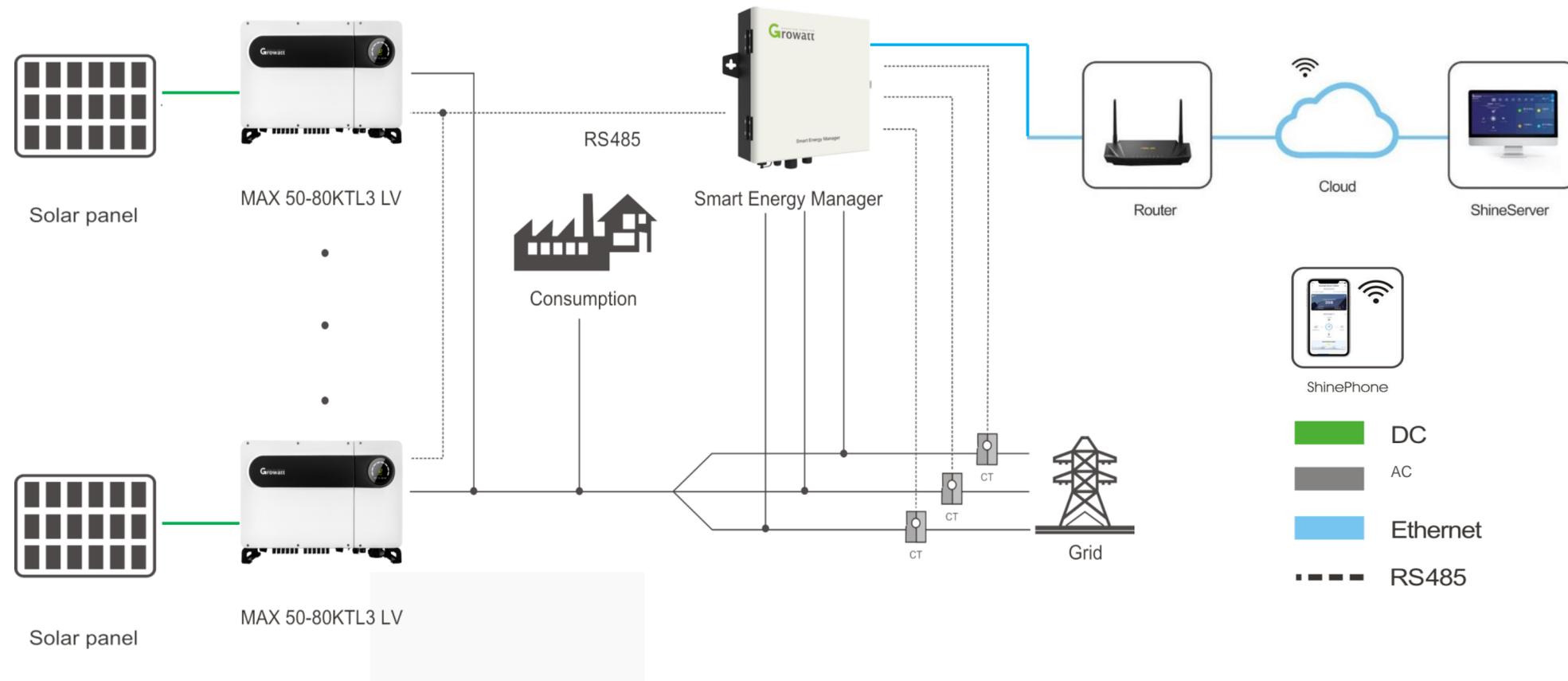
1. Inverter RS485 connection in parallel as above to SEM
2. Refer to inverter manual for RS485 PIN details
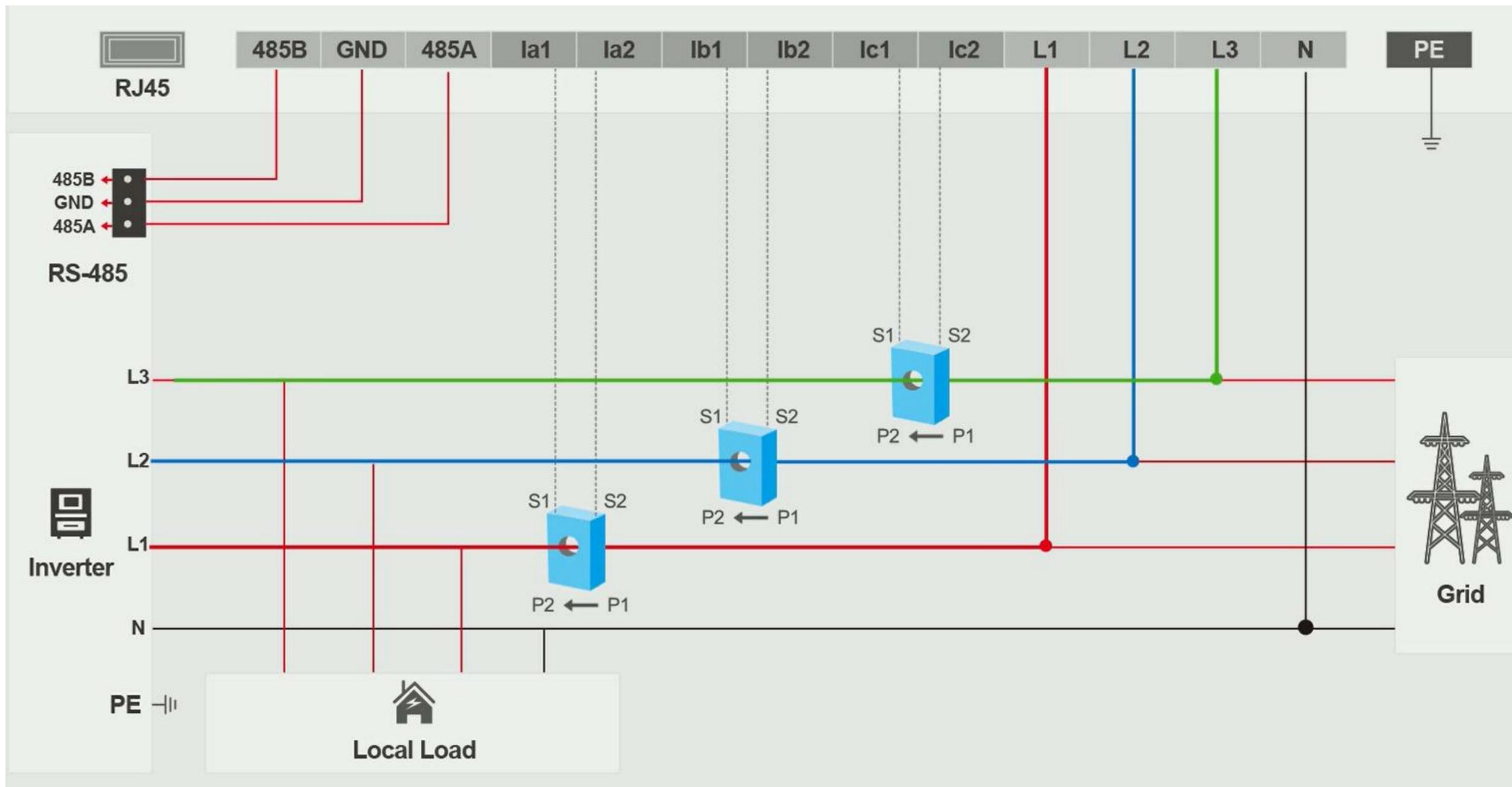
1. Voltage sampling must be on same phase of the current sensor
2. The current points from P1 to P2, P1 is grid side, P2 is load side

Export limitation Settings

ShineMaster Setting Center

简体中

Export limit & Datalogger setting	
Meter channel	RS485_2 ▼
Meter address	1
Export limit function	⦿ On ◯ Off ☐
Export limit power (kW)	100 (XX:Export, -XX:Import)
Fallback activated	⦿ On ◯ Off
Active power	20 % (0 ~ 100)%
Fallback activates after	120 s (120 ~ 5000) seconds
Reactive power regulation	◯ On ⦿ Off
Usage Scenario	◯ NO_1 ◯ NO_2
Add or delete devices	NULL ▼ NULL ▼ ◯ Add ◯ Del
Update firmware	◯ Yes ⦿ No
Reboot	◯ Yes ⦿ No
	Save Cancel

1. Turn on Export limit function
2. Set limit power value, here means allowed export 100kW to grid.
3. Fallback function: when communication problem happened, the inverter work as this default setting.

03

Q&A
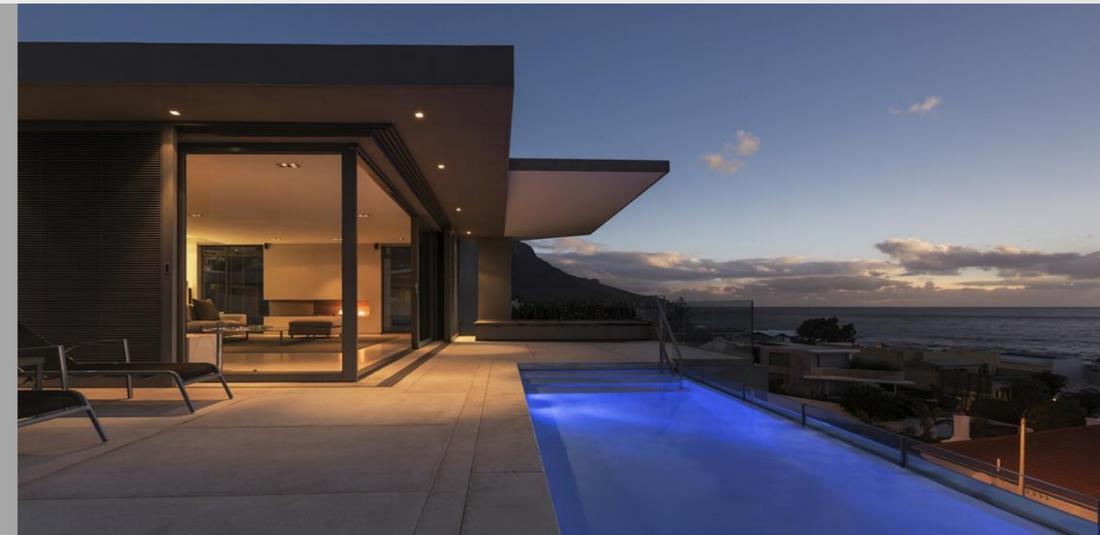
Single Inverter Solution Q&A

Q1, The export limitation function is not working.

Check if the export limitation is turned on, and the limit power rate, if it's correct.
Check meter's cable connection, CT's arrow direction and connection.

Q2, Self-consumption data is not update on ShineServer/ShinePhone
Make sure Meter communication is connect good.
Make sure you have turned on the export limitation function, if problem still there, set register 553 to 1 , otherwise, check with Growatt service engineer.

Q3, I can't see 24h self-consumption on monitoring
Make sure your inverters are X generation, and the version with AC power supply.
Now only some EU model with AC power supply as standard.

Q1, The export limitation function is not working.

Check ShineMaster interal websit setting, if everything is correct.
Check the RS485, CTs, voltage sampling cable connection, if everything is correct.
Make sure not turn on the export limitation on inverter, only do the settings on ShineMaster inside SEM.

Q2, Self-consumption data is not update on ShineServer/ShinePhone

Check if meter connect ok to SEM.
Check the internet setting of ShineMaster, not block port 5027.

THANKS

Growatt New Energy