Open Energy For All

Technical Note

Export Management Guide of Hoymiles Microinverter System

Version: V1.4
Region: Americas
Release Date: 2024-11-20

CONTENTS

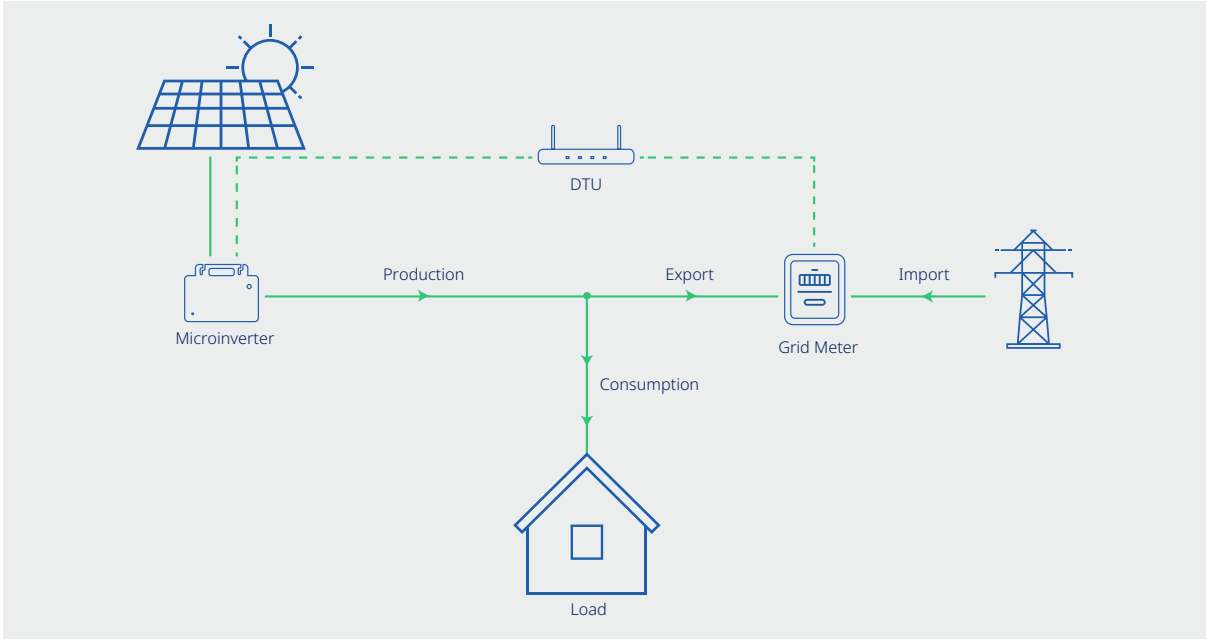
1 Introduction to Hoymiles Export Management

Local grid authorities in some countries limit the amount of power exported to the grid to prevent power surges, quality issues, or electricity instability. To address this requirement, Hoymiles has developed an Export Management Solution. It allows larger PV installations while ensuring compliance with the law.

Hoymiles export management works by using a smart meter and the Hoymiles gateway DTU-Pro, DTU-Pro-S, or DTU-Plus. The meter measures export when installed on the grid side, or consumption when installed on the load side. Based on the data, the DTU adjusts PV power generation to ensure that the exported power stays within a predetermined limit.

For accurate power generation measurement, you can install the meter on the solar side. However, if you do this, the solar meter and the DTU cannot perform the export management.

> **Note:**
> *The DTU-Pro is compatible with MI and HM series microinverters, the DTU-Pro-S is compatible with HMS and HMT series, and the DTU-Plus is only used and shipped with the Combiner Box. Select the appropriate DTU model based on your microinverter series for proper functionality.*



2 Terms and Definitions

- **Consumption**: Power consumed by local loads
- **Current Transformer (CT)**: A transformer fixed on a wire to detect the current flow
- **DTU**: Abbreviation for “Data Transfer Unit”. It receives data from the microinverter and the meter, then uploads them to Hoymiles monitoring platform S-Miles Cloud.
- **Export**: Power exportation from a PV system to the grid
- **Meter**: A device that measures the power flow
  - ▷ **Grid Meter**: A meter installed on the grid connection side that reads the power or energy exported to the grid
  - ▷ **Load Meter**: A meter installed on the load consumption side that reads the power or energy consumed by local loads
  - ▷ **Solar Meter**: A meter installed at the output of microinverters that reads the power or energy produced by the PV system
- **Production**: Power produced by the PV system

3 Setting up Hoymiles Export Management

3.1 Preparing for Installation

Before installation, ensure the following information and items at hand.

Information	Items
Grid type	Meter
Export management type	35 mm DIN rail
Load capacity	Shielded twisted pair RS485 cable

Table 1-Information and Items Prepared Before Installation

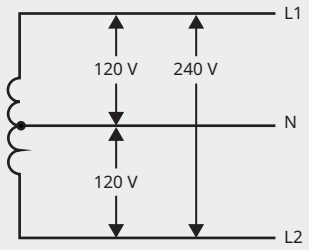
The details are as follows.

Step 1: Confirm the grid type.

Grid types vary in countries and regions. Confirm the grid type of the installation site.

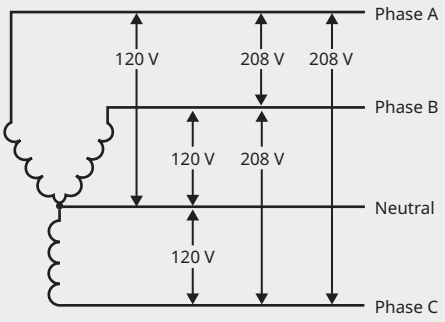
- **Split-phase 120 V/240 V**

This grid is mainly for residential systems in most regions in North America and Latin America. The phase voltage can vary from 211 V to 264 V. The outputs of microinverters are connected between the live wires (L1 and L2).

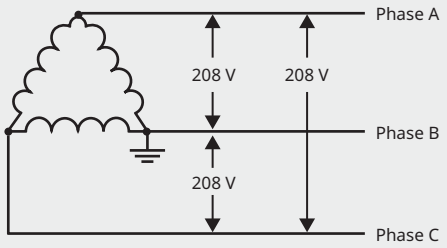


- **Three-phase 120 V/208 V**

This grid is mainly for commercial systems in most regions in North America and Latin America. The phase voltage can vary from 183 V to 228 V. For single-phase microinverters, the outputs are connected between the live wires (L1 and L2, L2 and L3, and L3 and L1); for three-phase microinverters, the outputs are connected among the three live wires and the neutral wire (L1, L2, L3, and N; the neutral wire is optional).



120 V/208 V Wye (Y)



208 V Delta (Δ)

Step 2: Choose an export management type.

- **Zero Export**

The exported power value is limited to zero. The meter can be installed on either the load side or the grid side.

- **Export Limit**

  The exported power value is limited within a certain range. The meter can be installed on either the load side or the grid side.

- **Production and Consumption Monitoring**

  An export limit is not needed. The meters should be installed on both the solar side for the production display and the load or the grid side for the consumption display.

Step 3: Verify the load capacity.

Step 4: Select meters.

You can choose from five models.

Model	Type	Applicable Grid	Serial Number	Description
DTSU666 (CT-2 × 100 A)	Split Phase, Single Channel	120 V/240 V	10C018XXXXXX, 4F07XXXXXX	With 100 A CT × 2
DTSU666 (CT-2 × 250 A)			10C019XXXXXX, 4F08XXXXXX	With 250 A CT × 2
DTSU666 (CT-4 × 250 A)	Split Phase, Dual Channel		4F09XXXXXX	With 250 A CT × 4 (two solid-core, two split-core)
DTSU666 (CT-3 × 100 A)	Three Phase	120 V/208 V Wye, 208 V Delta	10C016XXXXXX, 4F05XXXXXX	With 100 A CT x 3
DTSU666 (CT-3 × 250 A)			10C017XXXXXX, 4F06XXXXXX	With 250 A CT x 3

Table 2-Meter Specifications

Caution:

- *The maximum current of the PV system and of the load should be no higher than the rated current of the meter or the CTs, regardless of where the meter is installed.*
- *Single-phase and three-phase CTs cannot be used interchangeably. Single-phase CTs work only with single-phase meters.*

Note:

- *Hoymiles export management functions only with Chint meters purchased from Hoymiles.*
- *DTSU666 (CT-4 × 250 A) is only used and shipped with the Combiner Box and is pre-installed.*

Step 5: Prepare a 35 mm DIN rail and a shielded twisted pair RS485 cable with a proper length.

3.2 Installing the Meter

Note:

- *Before installing the meter, record the meter serial number (SN, shown in the circles below) for further use. Ensure that meter SNs in one PV system are not repeated.*
- *General installation steps are provided here. For installing split-phase meters, see "5.1 Split-phase Meter (Single Channel)" or "5.2 Split-phase Meter (Dual Channel)"; for installing three-phase meters, see "5.3 Three-phase Meter".*

Split-phase Meter

Three-phase Meter

Step 1: Mount the meter on the DIN rail.

Step 2: Wire the meter and the CTs according to export management needs.

Step 3: Connect the meter and the DTU using the RS485 cable.

Step 4: Connect the power cable to the DTU to energize the DTU.

3.3 Configuring Export Management

> **Note:**
>
> - *Screenshots provided in this guide are for reference only.*
> - *For details of Step 1 and Step 2, see the **quick installation guide or the user manual** of your microinverter model.*
> - *For examples of export management, see "**Appendix II**".*
> - *If you do not need to set an export limit, skip **Step 3 D)**.*

You can configure export management through two means.

S-Miles Cloud (Web)

For details, see *S-Miles Cloud (Web) User Manual*.

S-Miles Installer Application

Step 1: Establish an internet connection.

Step 2: Create a plant.

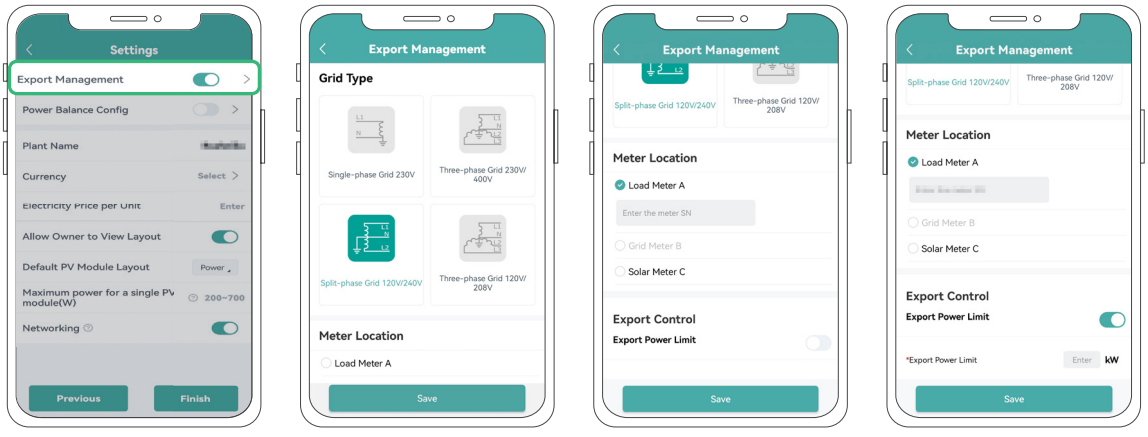
Step 3: Before finishing plant creation, configure export management.

A) On the Settings screen, enable **Export Management**.

B) On the Export Management screen, select the grid type.

C) Select the meter location and enter the meter SN.

D) Enable **Export Power Limit**, enter the limit value, and tap **Save**.



A) B) C) D)

4 Monitoring Export Management

4.1 Checking System Operation

You can access the system data through two means.

S-Miles Cloud (Web)

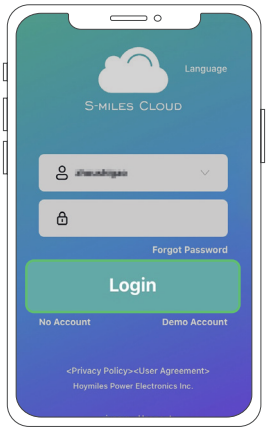
For details, see *S-Miles Cloud (Web) User Manual*.

S-Miles Installer Application

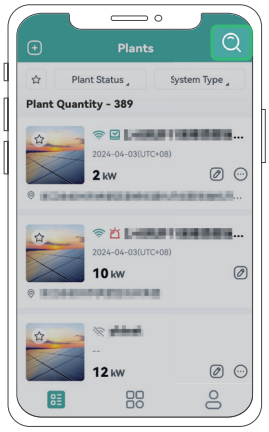
Step 1: Launch and log in to S-Miles Installer.

Step 2: Tap **Search** .

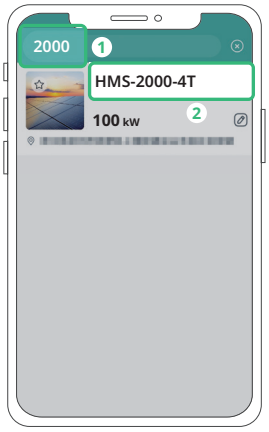
Step 3: Enter the plant name and tap it to move to the plant homepage.



1)

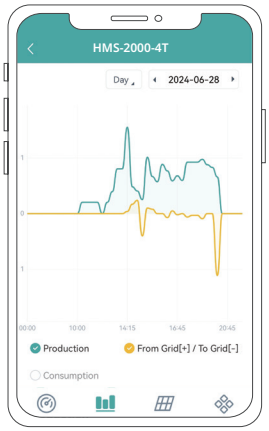


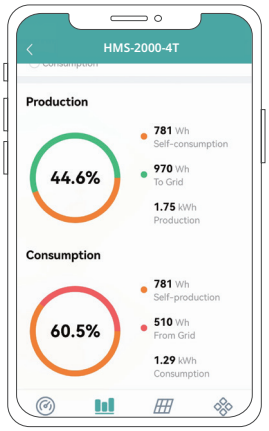
2)



3)

Step 4: On the plant homepage, view the system data.





Section Icon	Term	Description
	Today	Total energy generated this day
	This Month	Total energy generated this month
	Lifetime	Total energy generated to date
	From Grid	Energy imported from the grid
	To Grid	Energy exported to the grid
	Self-consumption	Consumption as a percentage of production
	Self-production	Production as a percentage of consumption

Table 3-Terms Used in Plant Homepage

Note:

- *The homepage screenshot is of a plant with a grid meter. For other meter types, the screen can appear differently.*
- *The production data can be higher than the consumption data because of the time lag between the meter and the DTU. This situation will not affect the export management.*

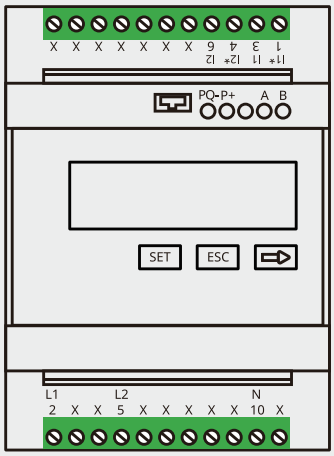
4.2 Generating Reports

You can generate a power report or an energy report of your PV system only on S-Miles Cloud website. For details, see ***S-Miles Cloud (Web) User Manual***.

5 Appendix I: Meter Installation Guide

5.1 Split-phase Meter (Single Channel)

5.1.1 Appearance

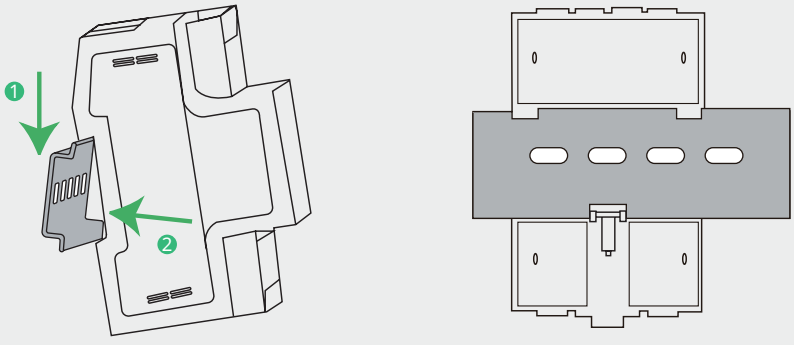


Terminal Number	Description
1	Connects to the CT I1* wire (white)
2	Connects to the L wire of Phase A
3	Connects to the CT I1 wire (blue)
4	Connects to the CT I2* wire (white)
5	Connects to the L wire of Phase B
6	Connects to the CT I2 wire (blue)
10	Connects to the N wire
A	Connects to DTU RS485A
B	Connects to DTU RS485B

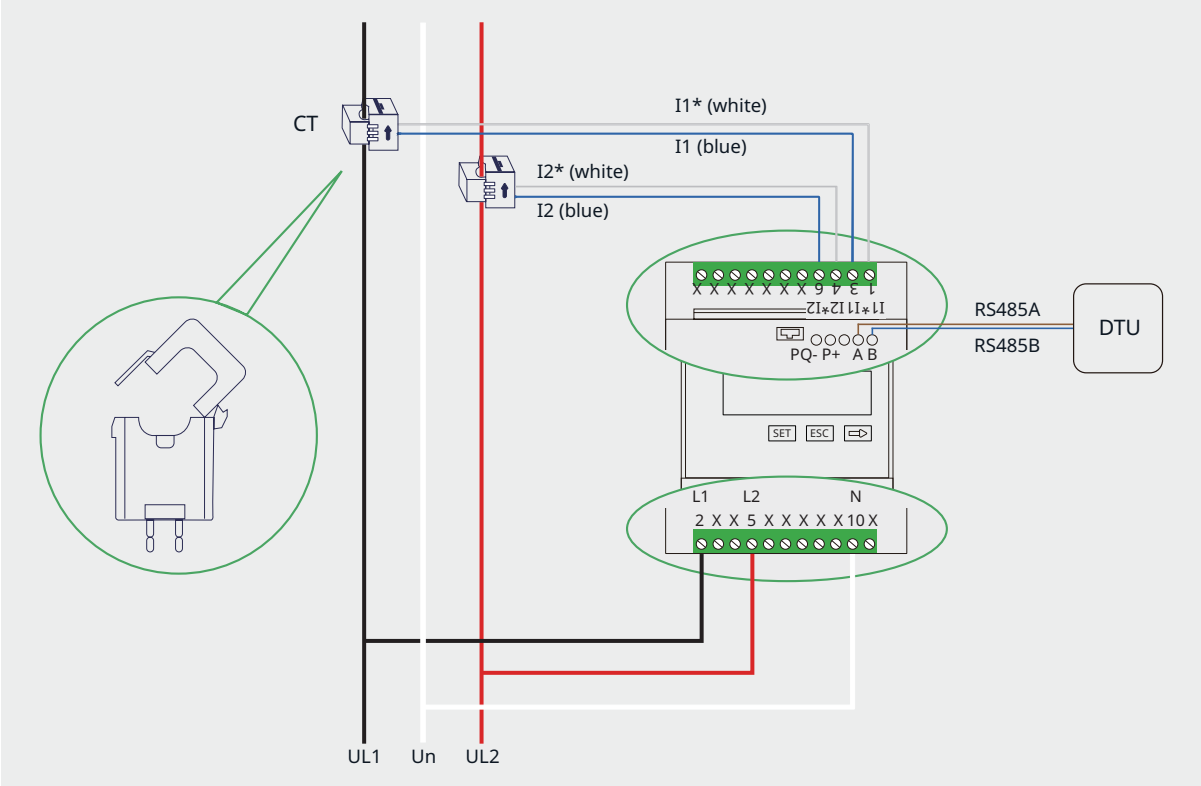
5.1.2 Mechanical Installation

Step 1: Press the meter downwards onto the 35 mm DIN rail.

Step 2: Push the meter in place to make it clip onto the rail.



5.1.3 Cable Connection



Step 1: Connect the UL1, UL2, and Un wires of a cable respectively to Terminal 2, 5, and 10.

Step 2: Connect the CT I1*, I1, I2*, and I2 wires respectively to Terminal 1, 3, 4, and 6.

> **Note:**
> - *The outer diameter of the selected cable should meet local standards.*
> - *Ensure that the I* and I wires are connected to the right terminals of the meter. If they are connected in the wrong order, the power measured will be negative.*

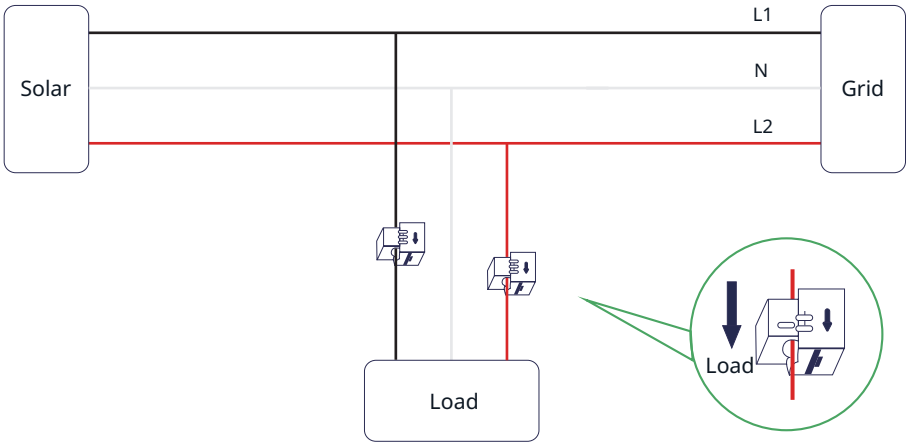
Step 3: Install the CTs in place.

The CTs can be installed in three positions based on the meter position.

- Position A (Load Meter Scenario):

Install the CTs on the load side and ensure that the arrows point to the load.

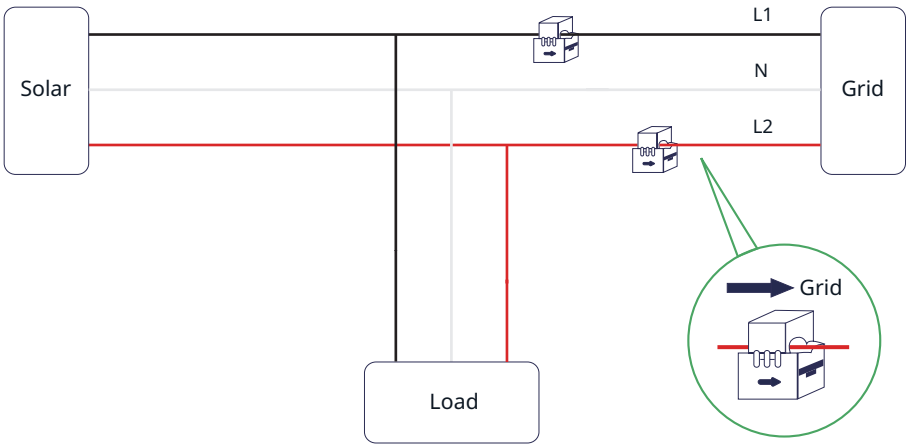
The CTs collect the consumption data, and the DTU adjusts the production accordingly for export management.



- Position B (Grid Meter Scenario):

Install the CTs on the grid side and ensure that the arrows point to the grid.

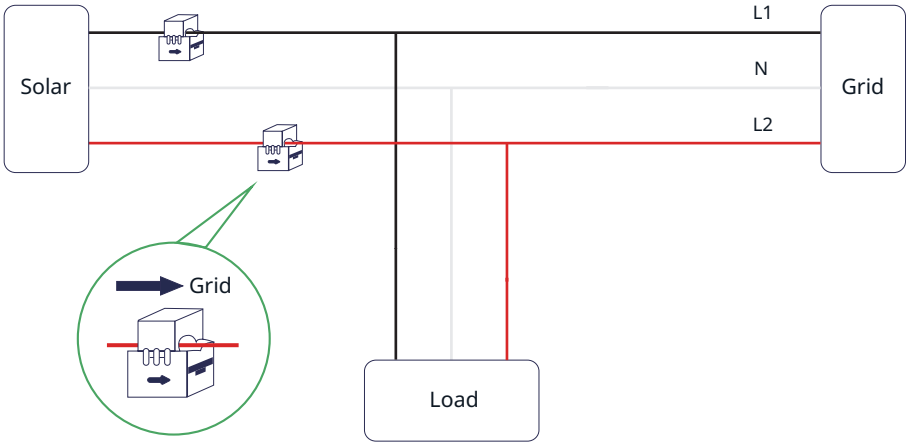
The CTs collect the grid-side data to check the export. If the exported power exceeds the limit, the DTU will limit the production.



- Position C (Solar Meter Scenario):

Install the CTs on the solar side and ensure that the arrows point to the grid.

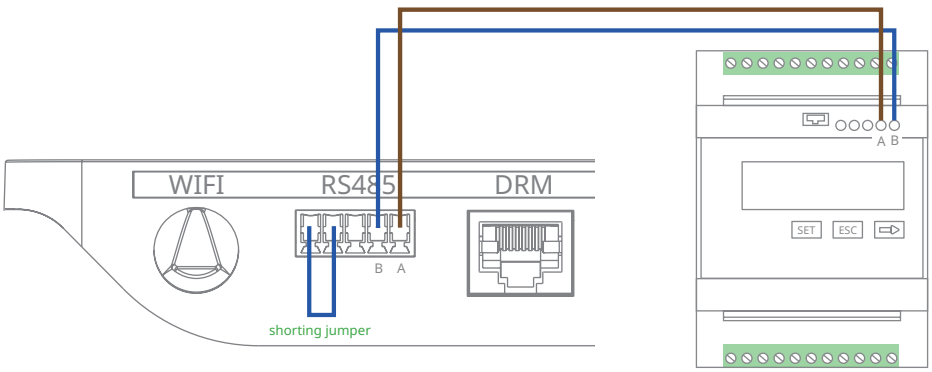
The CTs collect the production data, but note that they cannot perform export management.



Step 4: Connect Terminal A and B respectively to the RS485A and RS485B terminals of the DTU.

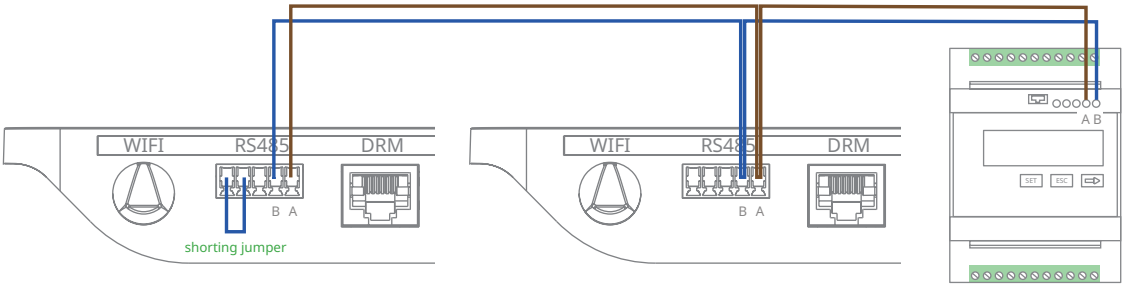
- For single-DTU PV system

If the RS485 cable length exceeds 200 meters, it is recommended to use shorting jumpers on the two left terminals of the RS485 interface.



- For multi-DTU PV system

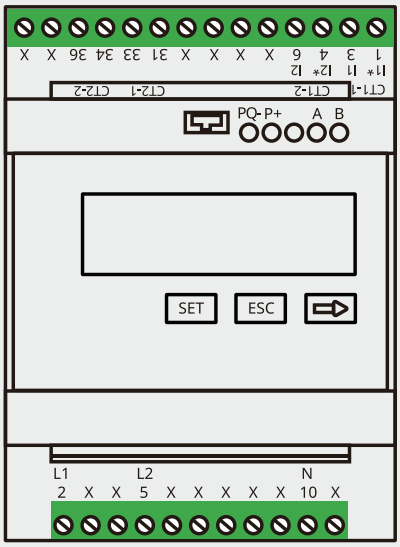
Connect the DTUs one by one. If the distance between the microinverters and the last DTU exceeds 200 meters, it is recommended to use shorting jumpers on the two left terminals of the RS485 interface on the last DTU.



Step 5: Connect the power cable to the DTU to energize the DTU.

5.2 Split-phase Meter (Dual Channel)

5.2.1 Appearance



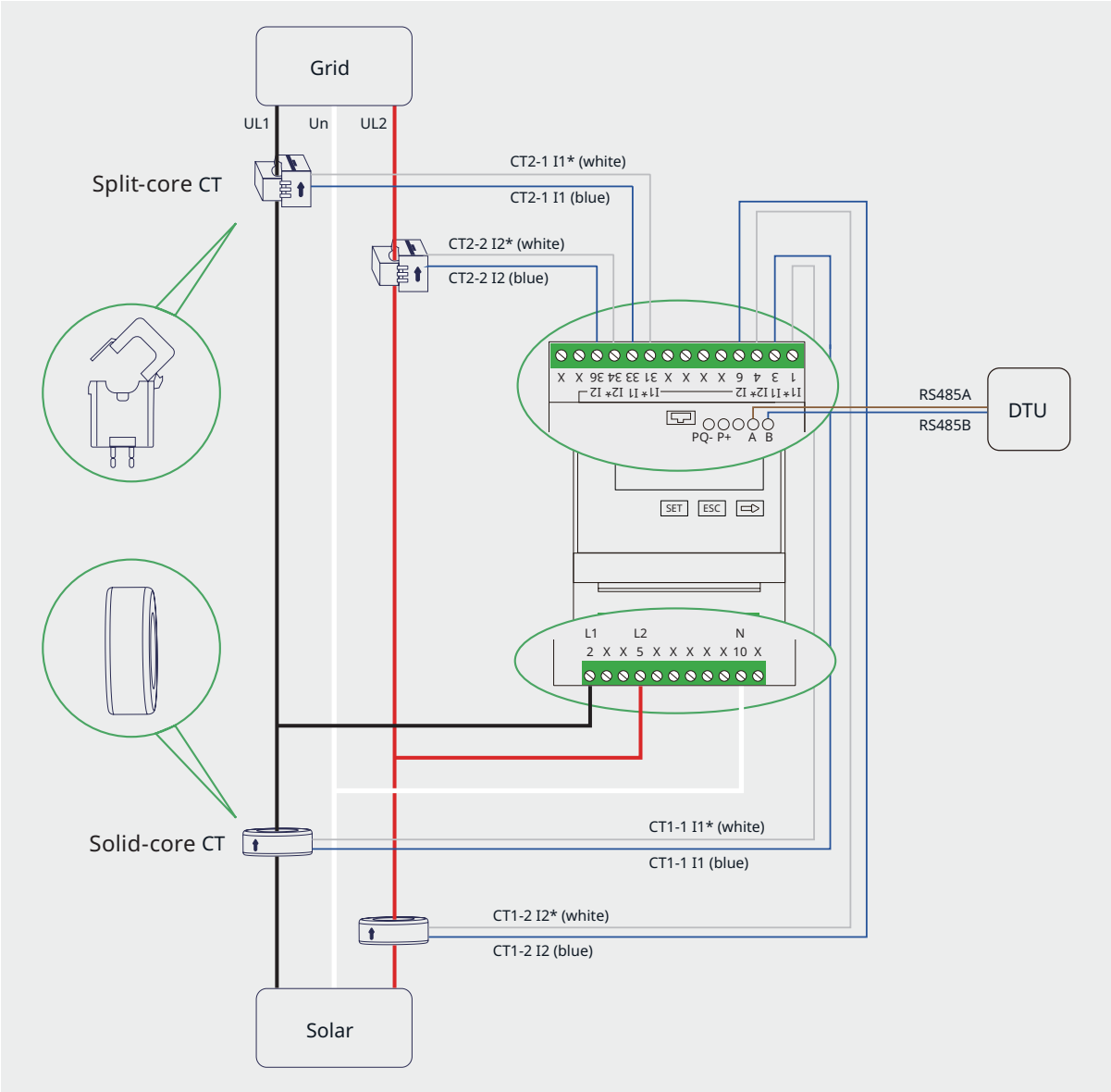
Terminal Number	Description
1	Connects to the CT1-1 I1* wire (white)
2	Connects to the L wire of Phase A
3	Connects to the CT1-1 I1 wire (blue)
4	Connects to the CT1-2 I2* wire (white)
5	Connects to the L wire of Phase B
6	Connects to the CT1-2 I2 wire (blue)
10	Connects to the N wire
31	Connects to the CT2-1 I1* wire (white)
33	Connects to the CT2-1 I1 wire (blue)
34	Connects to the CT2-2 I2* wire (white)
36	Connects to the CT2-2 I2 wire (blue)

A	Connects to DTU RS485A
B	Connects to DTU RS485B

5.2.2 Mechanical Installation

DTSU666 (CT-4 × 250 A) is pre-installed in the Combiner Box. No further mechanical installation is required.

5.2.3 Cable Connection



Step 1: Connect the UL1, UL2, and Un wires of a cable respectively to Terminal 2, 5, and 10.

Step 2: Connect the CT1-1 I1*, CT1-1 I1, CT1-2 I2*, and CT1-2 I2 wires respectively to Terminal 1, 3, 4, and 6.

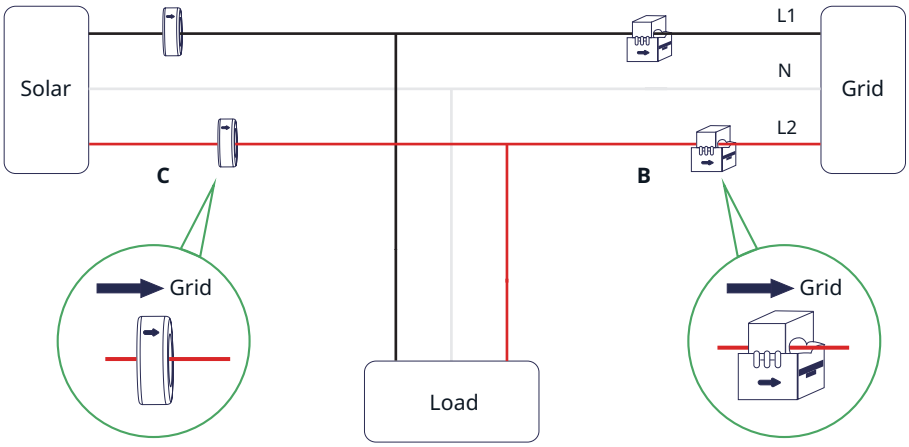
Step 3: Connect the CT2-1 I1*, CT2-1 I1, CT2-2 I2*, and CT2-2 I2 wires respectively to Terminal 31, 33, 34, and 36.

Note:

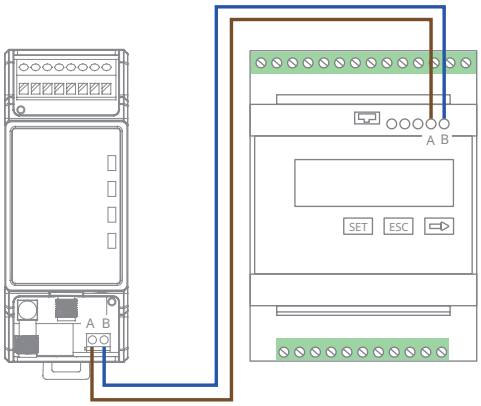
- *The outer diameter of the selected cable should meet local standards.*
- *Ensure that the I* and I wires are connected to the right terminals of the meter. If they are connected in the wrong order, the power measured will be negative.*

Step 4: Install the CTs in place.

Install the split-core CTs on the grid side (Position B) and the solid-core CTs on the solar side (Position C). Ensure that the arrows point to the grid.



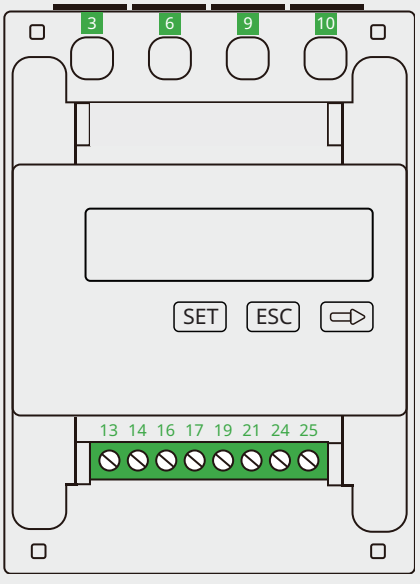
Step 5: Connect Terminal A and B respectively to the RS485A and RS485B terminals of the DTU.



Step 6: Connect the power cable to the DTU to energize the DTU.

5.3 Three-phase Meter

5.3.1 Appearance

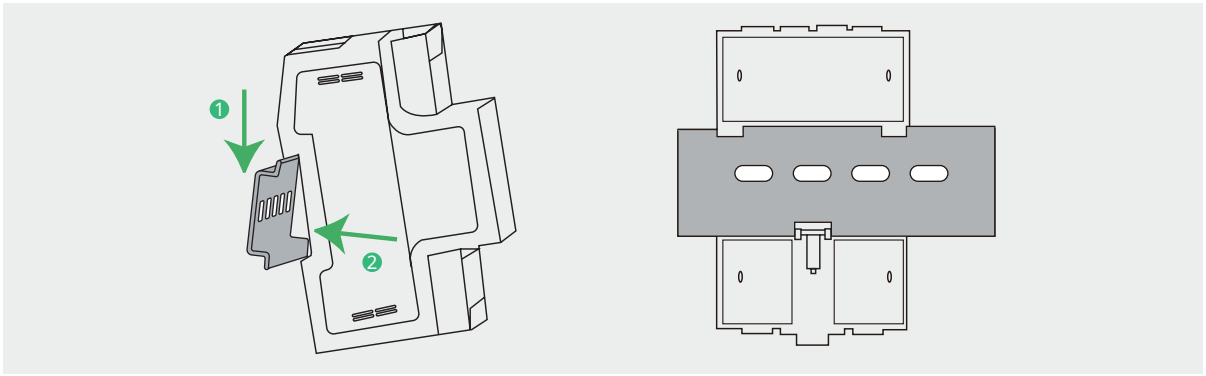


Terminal Number	Description
3	Connects to the L wire of Phase A
6	Connects to the L wire of Phase B
9	Connects to the L wire of Phase C
10	Connects to the N wire
13	Connects to the CT IA* wire (white)
14	Connects to the CT IA wire (blue)
16	Connects to the CT IB* wire (white)
17	Connects to the CT IB wire (blue)
19	Connects to the CT IC* wire (white)
21	Connects to the CT IC wire (blue)
24	Connects to DTU RS485A
25	Connects to DTU RS485B

5.3.2 Mechanical Installation

Step 1: Press the meter downwards onto the 35 mm DIN rail.

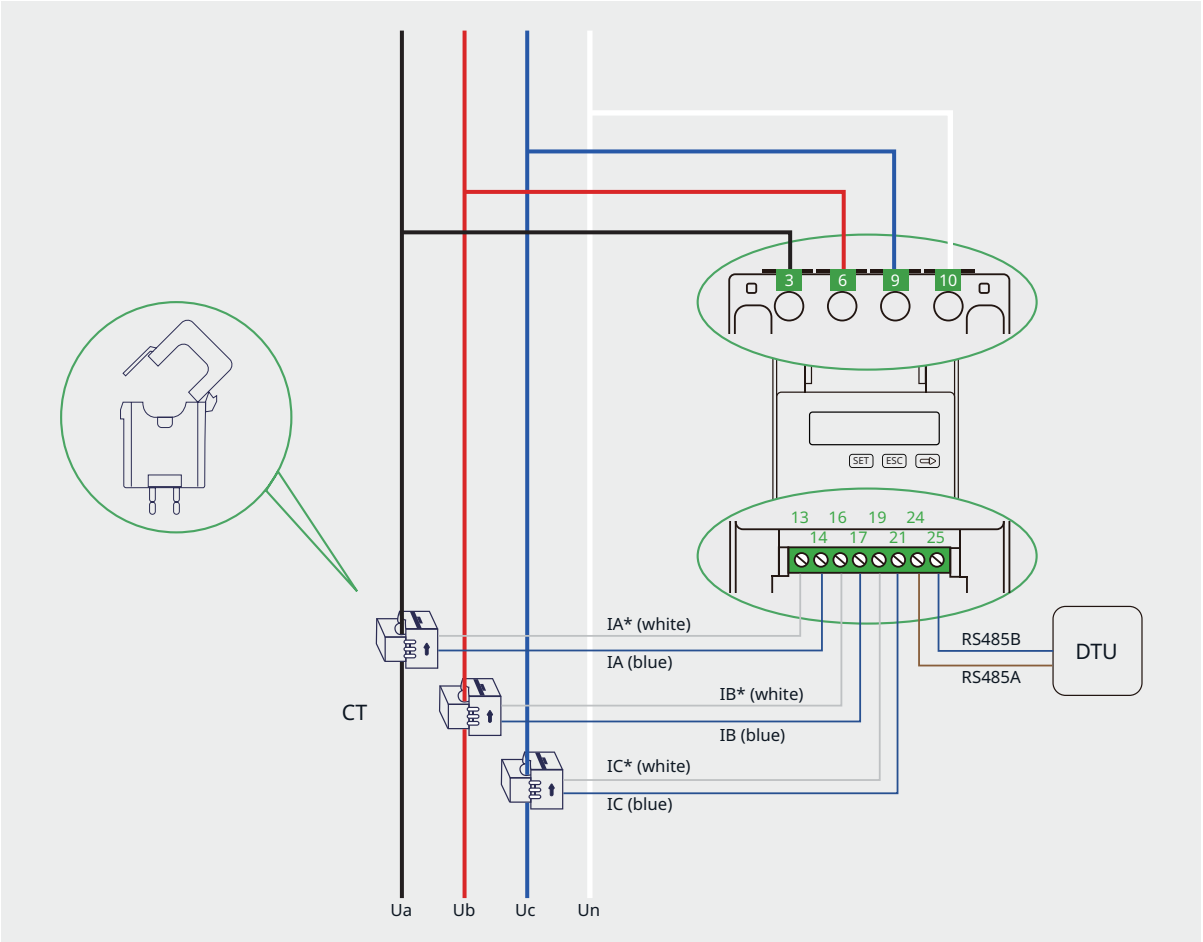
Step 2: Push the meter in place to make it clip onto the rail.



5.3.3 Cable Connection

DTSU666 (CT-3 × 100 A) and DTSU666 (CT-3 × 250 A) support three-phase 4-wire (3P4W) and three-phase 3-wire (3P3W), which are respectively used in 120 V/208 V Wye and 208 V Delta configurations. For 3P3W, the neutral wire is not connected.

The following illustrates the 3P4W wiring method.



Step 1: Connect the Ua, Ub, Uc, and Un cables respectively to Terminal 3, 6, 9, and 10.

Step 2: Connect the CT IA*, IA, IB*, IB, IC*, and IC wires respectively to Terminal 13, 14, 16, 17, 19, and 21.

> **Note:**
>
> - *The outer diameter of the selected cable should meet local standards.*
> - *Ensure that the I* and I wires are connected to the right terminals of the meter. If they are connected in the wrong order, the power measured will be negative.*

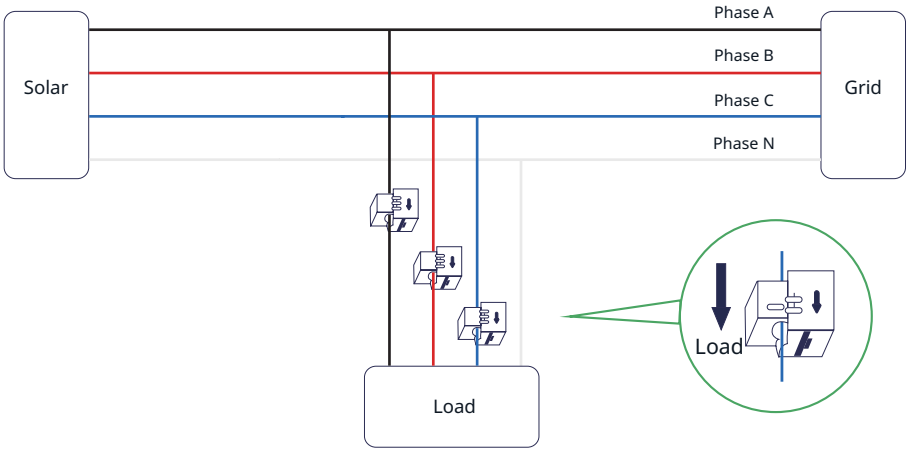
Step 3: Install the CTs in place.

The CTs can be installed in three positions based on the meter position.

- Position A (Load Meter Scenario):

Install the CTs on the load side and ensure that the arrows point to the load.

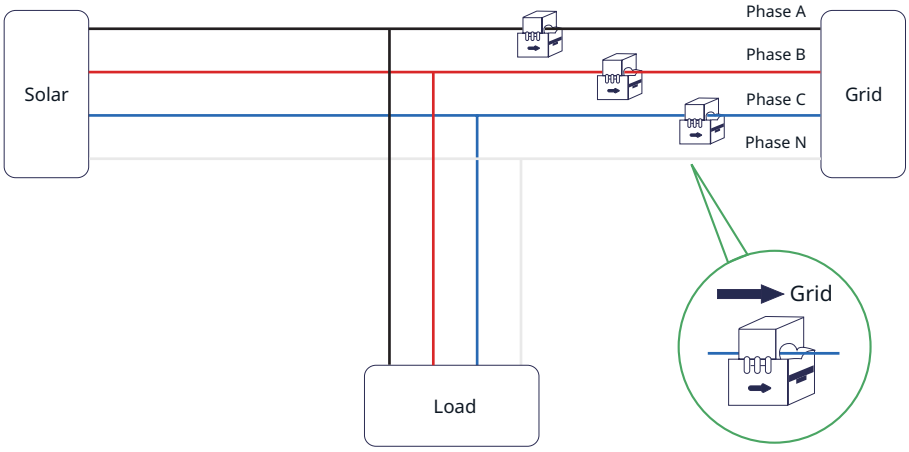
The CTs collect the consumption data, and the DTU adjusts the production accordingly for export management.



- Position B (Grid Meter Scenario):

Install the CTs on the grid side and ensure that the arrows point to the grid.

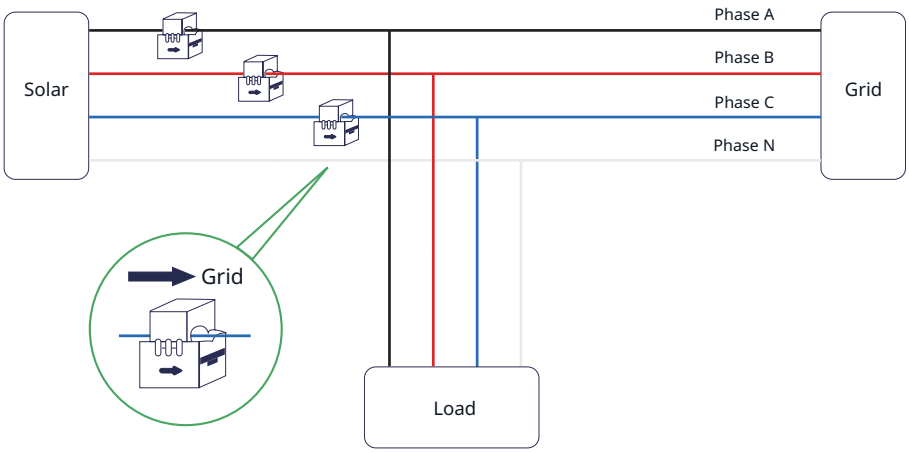
The CTs collect the grid-side data to check the export. If the exported power exceeds the limit, the DTU will limit the production.



- Position C (Solar Meter Scenario):

Install the CTs on the solar side and ensure that the arrows point to the grid.

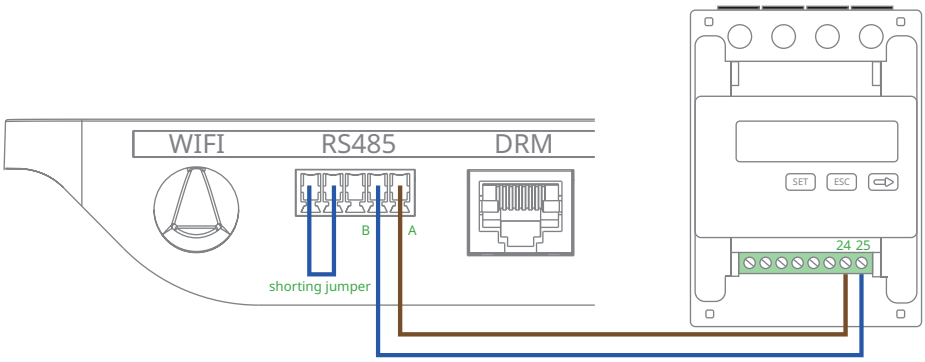
The CTs collect the production data, but note that they cannot perform export management.



Step 4: Connect Terminal 24 and 25 respectively to the RS485A and RS485B terminals of the DTU.

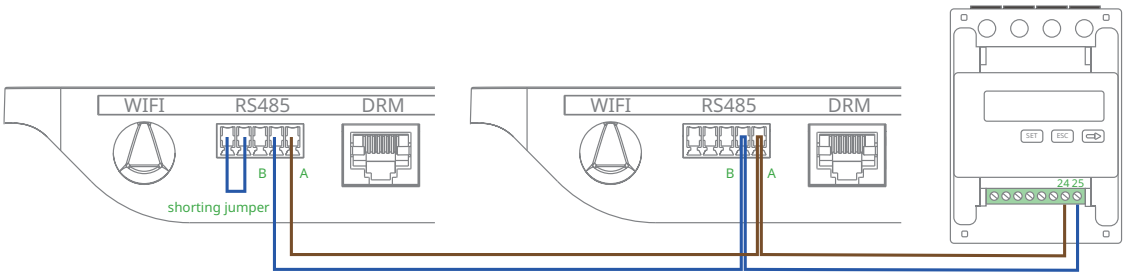
- For single-DTU PV system

If the RS485 cable length exceeds 200 meters, it is recommended to use shorting jumpers on the two left terminals of the RS485 interface.



- For multi-DTU PV system

Connect the DTUs one by one. If the distance between the microinverters and the last DTU exceeds 200 meters, it is recommended to use shorting jumpers on the two left terminals of the RS485 interface on the last DTU.



Step 5: Connect the power cable to the DTU to energize the DTU.

6 Appendix II: Examples of Export Management

A PV system of nine Hoymiles HMS-2000-4T microinverters is connected to split phase grid 120 V/240 V. The total output power of the microinverters and of PV modules are respectively 18 kW and 20 kW.

The following examples show how export and production are affected by different export limits.

> **Note:**
> *Minus signs in the tables below indicate that the power is imported from the grid.*

6.1 Example 1: Zero Export

In this case, power will not be exported to the grid.

Scenario 1

If the total ideal production is lower than the total consumption, all loads are powered by the PV system and the grid. In this case, no power is exported to the grid, thus the actual production will not be limited.

	Ideal Production	Consumption	Actual Production	Export
Total (kW)	4	7	4	-3

Scenario 2

If in one phase the ideal production exceeds the consumption, but the total ideal production does not exceed the total consumption, the actual production will not be limited.

	Ideal Production	Consumption	Actual Production	Export
Total (kW)	6	6	6	0

Scenario 3

If the total ideal production exceeds the total consumption, the actual production of both phases will be limited.

	Ideal Production	Consumption	Actual Production	Export
Total (kW)	8	6	6	0

6.2 Example 2: 70% Export Power Limit

If the local grid regulation provides that PV systems from 0.8 kW to 30 kW should feed a maximum of 70% of their installed power into the grid, you can set the export power limit accordingly.

For example, if the installed power of a PV system is 20 kW, the export power limit should be 20 kW × 70% = 14 kW.

Scenario 1

If the total ideal production is lower than the total consumption, all loads are powered by the PV system and the grid. In this case, no power is exported to the grid, thus the actual production will not be limited.

	Ideal Production	Consumption	Actual Production	Export
Total (kW)	4	7	4	-3

Scenario 2

If the total ideal production is higher than the total consumption, but the difference is no more than 70% of the installed power, the actual production will not be limited.

	Ideal Production	Consumption	Actual Production	Export
Total (kW)	9	7	9	2

Note:

2 kW is lower than 70% of 9 kW, which is 6.3 kW, thus the actual production is not limited.

Scenario 3

If the total ideal production is higher than the total consumption, and the difference exceeds 70% of the installed power, the actual production will be limited.

	Ideal Production	Consumption	Actual Production	Export
Total (kW)	10	2	9	7

Note:

8 kW exceeds 70% of 10 kW, which is 7 kW, thus the actual production is limited. Based on the export limit (7 kW) and the consumption (2 kW), the actual production is limited to 9 kW.

7 Appendix III: Meter Troubleshooting

Fault	Possible Cause	Solution
No display when powered on	• The wiring is incorrect. • The voltage supplied to the meter is abnormal.	• Rewire the meter based on the wiring diagram. (For details, see "*Appendix I*".) • Supply the meter with the specified voltage. • If the wiring and voltage are right, contact your distributor.
RS485 communication fault	The RS485 cable is open-circuited, short-circuited, or reversely connected.	Change a new RS485 cable.
	The meter's address, baud rate, data bit, and check bit are not the same as those of the DTU.	1. Set the the same address, baud rate, data bit, and check bit as those of the DTU. 2. Set the meter as "parameter setting" mode.
	• The communication distance between the meter and the DTU exceeds 100 meters and no termination resistors are installed at the ends of the RS485 cable. • The meter does not match the DTU's communication protocol.	• Install 120Ω termination resistors at both ends of the RS485 cable. • Lower the baud rate of the meter.
Inaccurate energy metering	The wiring is incorrect.	1. Check whether the phase sequence of voltage and current is correct. 2. If not, rewire the meter based on the wiring diagram. (For details, see "*Appendix I*".)
	The high and low ends of the CT inlet are reversely connected.	1. Observe the power of Phase A and B. If the values are negative, the wiring is incorrect. 2. Rewire the CT based on the wiring diagram. (For details, see "*Appendix I*".)
Abnormal electrical parameter (voltage, current, power, etc.) data	• The voltage and current ratios set on the meter are different from the CT ratio. • The data is secondary side data.	If you need to set the CT ratio, set the voltage and current ratios in "parameter setting" mode.
	The wiring is incorrect.	Connect the voltage and current of Phase A, B, and C to the meter terminals.
Abnormal electrical parameter (voltage, current, power, etc.) data read through RS485 communication	The data is secondary side data without a transformer ratio.	Multiply the data by the voltage and current ratios.
	The data frame analysis is wrong.	Analyze the data frame based on the communication protocol format. Pay attention to the endianness (big or small).

8 Appendix IV: Meter Technical Specifications

8.1 DTSU666 (CT-2 × 100 A)

Electrical Specifications	
Model	DTSU666New-Via-CT-2 × 100A
Reference Voltage	2 × 120/240 V
Operating Voltage Range	0.8 Un to 1.15 Un
Rated Current	100 A / 40 mA
Ambient Temperature Range	-25°C to +70°C
Type	CT Meter
Mechanical Data	
Dimensions (W × H × D)	72 mm × 98 mm × 65 mm
DIN Rail Size	35 mm

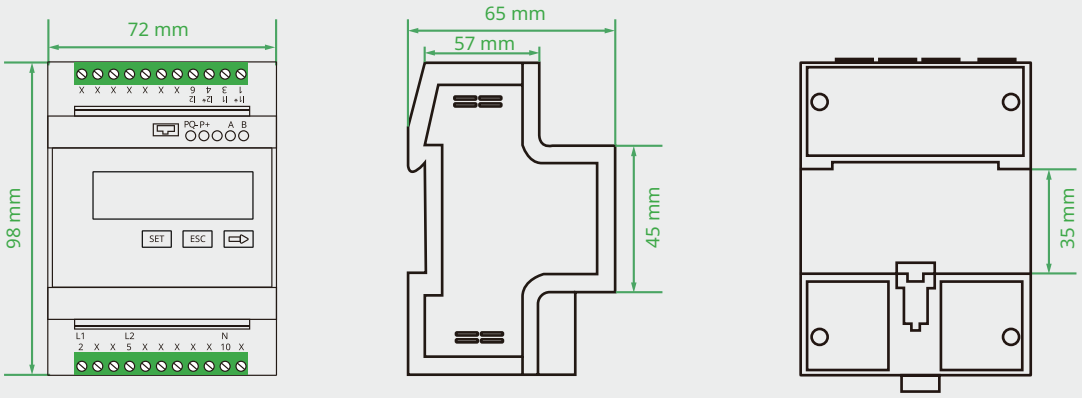
Power Factor	Current Value	Accuracy
1	0.01 In* ⩽ I < 0.05 In	±1.5
	0.05 In ⩽ I ⩽ Imax	±1.0
0.5L**	0.02 In ⩽ I < 0.1 In	±1.5
0.8C***	0.1 In ⩽ I ⩽ Imax	±1.0

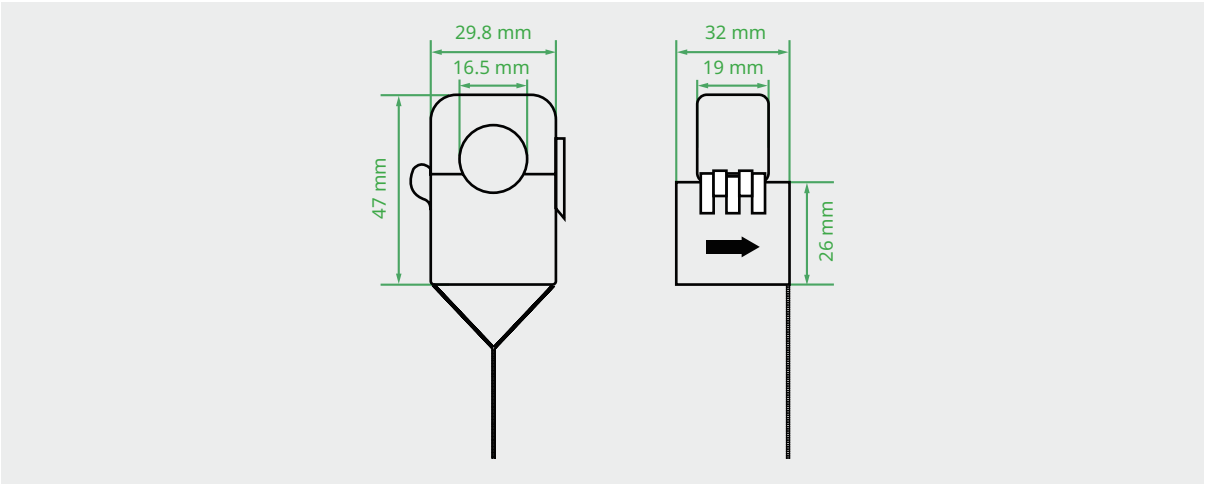
Note:

* : *"In" refers to the secondary current rating of the CT.*

** : *"L" refers to inductance.*

***: *"C" refers to capacitance.*





8.2 DTSU666 (CT-2 × 250 A)

Electrical Specifications	
Model	DTSU666New-Via-CT-2 × 250A
Reference Voltage	2 × 120/240 V
Operating Voltage Range	0.8 Un to 1.15 Un
Rated Current	250 A / 50 mA
Ambient Temperature Range	-25°C to +70°C
Type	CT Meter
Mechanical Data	
Dimensions (W × H × D)	72 mm × 98 mm × 65 mm
DIN Rail Size	35 mm

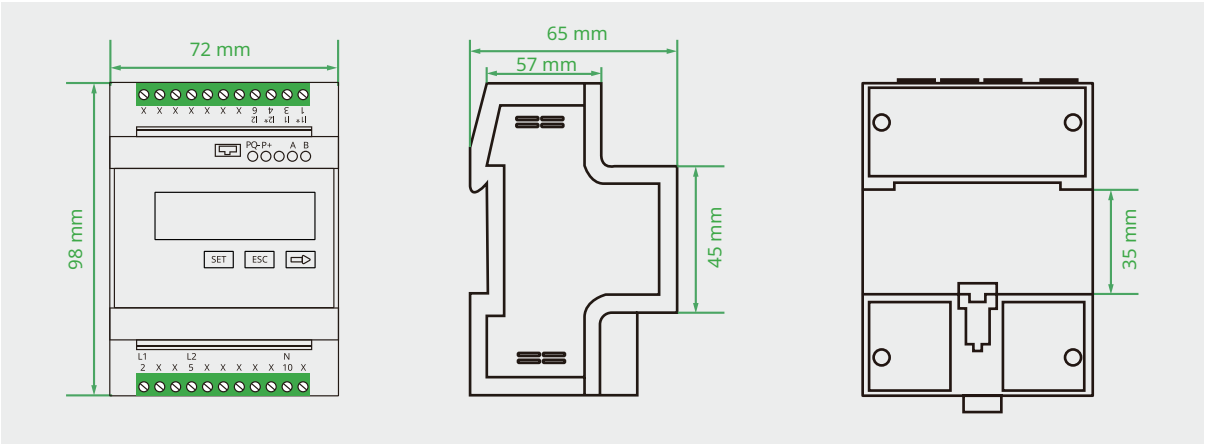
Power Factor	Current Value	Accuracy
1	0.01 In* ⩽ I < 0.05 In	±1.5
	0.05 In ⩽ I ⩽ Imax	±1.0
0.5L**	0.02 In ⩽ I < 0.1 In	±1.5
0.8C***	0.1 In ⩽ I ⩽ Imax	±1.0

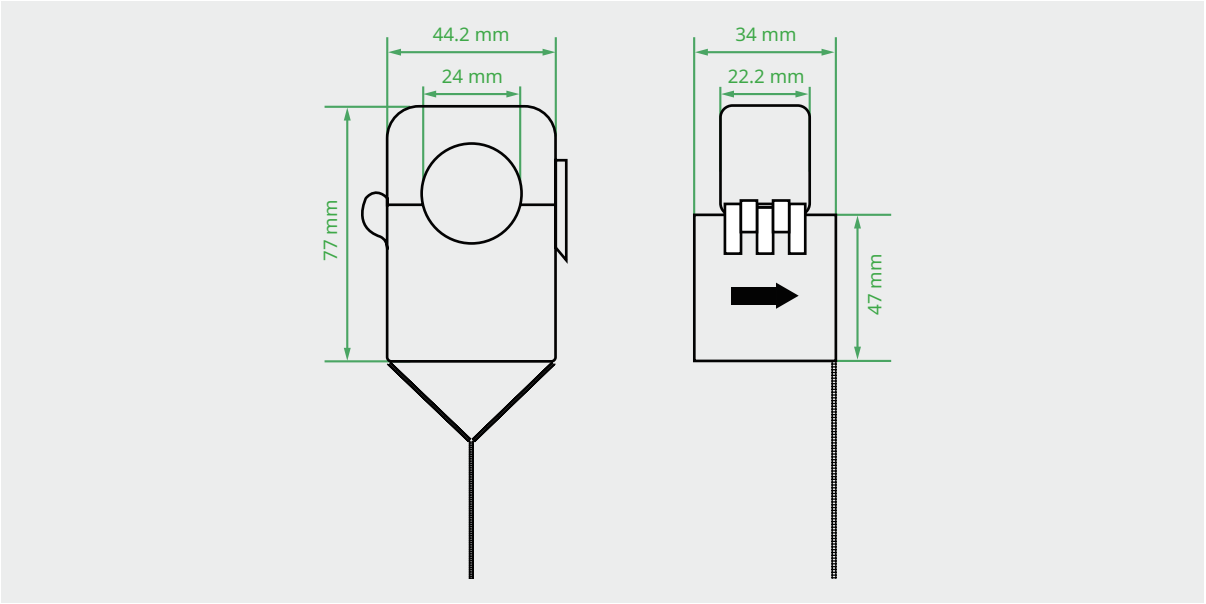
Note:

* : *"In" refers to the secondary current rating of the CT.*

** : *"L" refers to inductance.*

***: *"C" refers to capacitance.*





8.3 DTSU666 (CT-3 × 100 A)

Electrical Specifications	
Model	DTSU666New-Via-CT-3 × 100A
Reference Voltage	3 × 120 V/208 V or 3 × 208 V
Operating Voltage Range	0.7 Un to 1.15 Un
Rated Current	100 A / 40 mA
Ambient Temperature Range	-25°C to +70°C
Type	CT Meter
Mechanical Data	
Dimensions (W × H × D)	72 mm × 100 mm × 65.5 mm
DIN Rail Size	35 mm

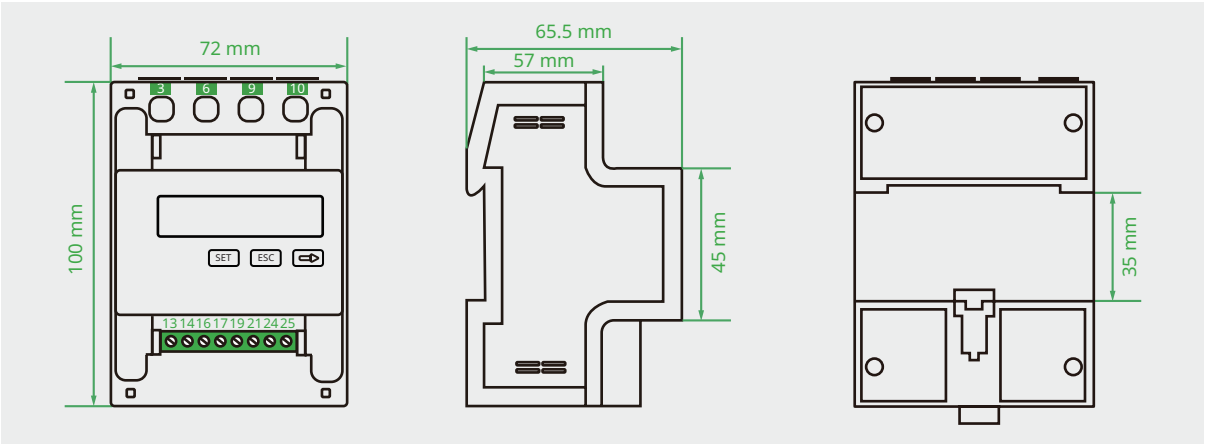
Power Factor	Current Value	Accuracy
1	0.01 In* ⩽ I < 0.05 In	±1.5
	0.05 In ⩽ I ⩽ Imax	±1.0
0.5L**	0.02 In ⩽ I < 0.1 In	±1.5
0.8C***	0.1 In ⩽ I ⩽ Imax	±1.0

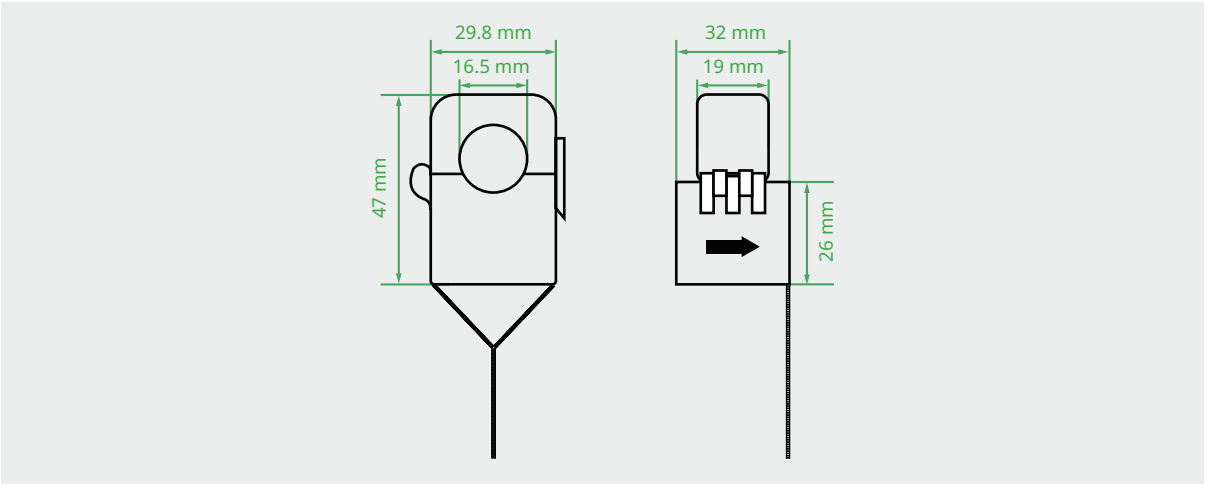
Note:

* : "In" refers to the secondary current rating of the CT.

** : "L" refers to inductance.

***: "C" refers to capacitance.





8.4 DTSU666 (CT-3 × 250 A)

Electrical Specifications	
Model	DTSU666New-Via-CT-3 × 250A
Reference Voltage	3 × 120 V/208 V or 3 × 208 V
Operating Voltage Range	0. 7Un to 1.15 Un
Rated Current	250 A / 50 mA
Ambient Temperature Range	-25°C to +70°C
Type	CT Meter
Mechanical Data	
Dimensions (W × H × D)	72 mm × 100 mm × 65.5 mm
DIN Rail Size	35 mm

Power Factor	Current Value	Accuracy
1	0.01 In* ⩽ I < 0.05 In	±1.5
	0.05 In ⩽ I ⩽ Imax	±1.0
0.5L**	0.02 In ⩽ I < 0.1 In	±1.5
0.8C***	0.1 In ⩽ I ⩽ Imax	±1.0

Note:

* : *"In" refers to the secondary current rating of the CT.*

** : *"L" refers to inductance.*

***: *"C" refers to capacitance.*