Smart Meter
DDSU666-CT / DTSU666-CT
User Manual

STATEMENT

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About This Manual

Scope of Validity

This manual introduces the installation, electric connection, parameter setting and troubleshooting of Smart Meter (hereinafter referred to as "the meter" or "the device"). Please read it carefully before operating.

Meter model:

- Single phase: DDSU666-CT
- Three phase: DTSU666-CT

Target Group

The installation, cable connection and parameter setting can only be performed by qualified personnel who

- Are licensed and/or satisfy state and local jurisdiction regulations.
- Have good knowledge of this manual and other related documents.

Conventions

The symbols that may be found in this manual are defined as follows.

Symbol	Description
⚠ DANGER	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION!	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
NOTICE!	Provides tips for the optimal operation of the product.

Change History

Version 00 (Jan. 15, 2024)

Initial release

Table of Contents

1 Safety

The Meter is well designed and tested to meet applicable state and international safety standards. As an electrical and electronic equipment, safety precautions must be observed and followed during the installation and electric connection to reduce the risk of personal injury and device damage.

Before installing the device, carefully read, fully understand and strictly follow the detailed instruction of the *User Manual* and other related regulations. The safety instructions in this document are only supplements to local laws and regulations.

SolaX shall not be liable for any consequences caused by the violation of the installation, and operation regulations specified in this document, including, but not limited to:

- Device damage due to force majeure, such as earthquake, flooding, thunderstorm, lighting, fire hazard, volcanic eruption and overvoltage

- Device damage due to human causes

- Failure to follow the operation instructions and safety precautions on the product and in this document

- Installation and use under improper environment or electrical condition

- Unauthorized modifications to the product or software

- Use of incompatible inverters or devices

2 Product Overview

2.1 Introduction

Smart Meter is suitable for use in electric power systems such as distributed PV systems, energy storage stations and more. It can be connected to electric power devices to monitor the power and meter the energy, allowing you to grasp the power status and regulate the power flow of the system at all times.

2.2 Highlights

- Easy installation and parameter setting

    Features a small size and convenient DIN rail mounting that occupies little space, and supports setting parameters simply through the buttons.

- Accurate measurement and clear display

    Measures voltage, current, positive and negative power, and other parameters with precision, and displays the data on the wide LCD in real time.

- High security and compatibility

    CE, RCM and CPA certified, and is compatible with multiple electric devices that cover a wide range of application scenarios.

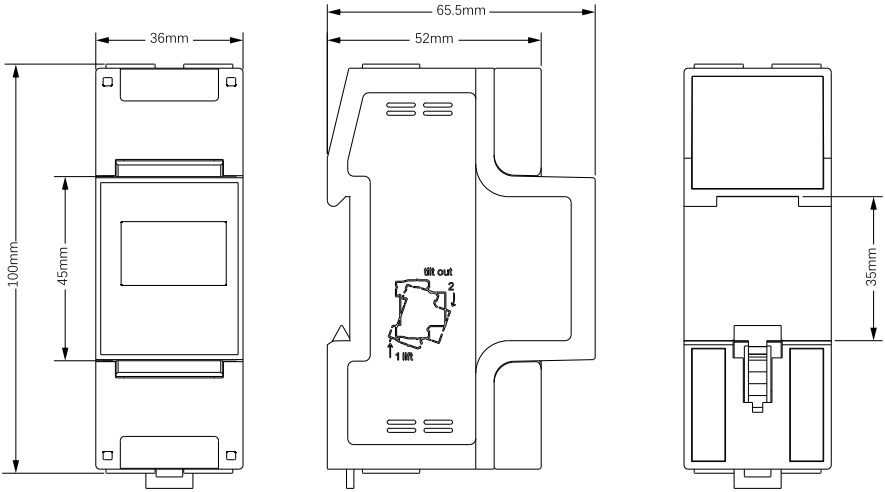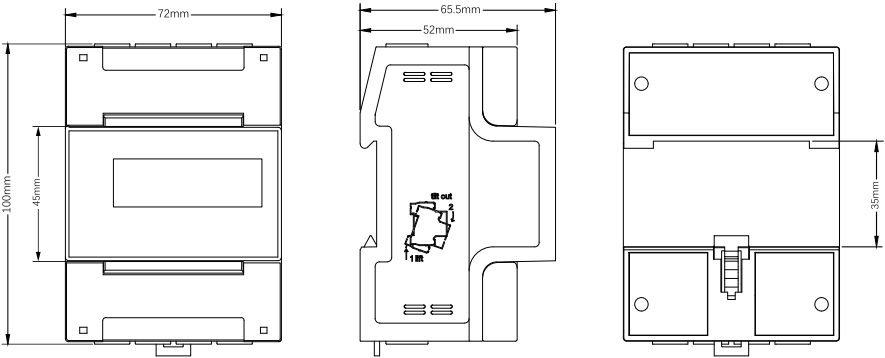## 2.3   Dimensions

Figure 2-1 DDSU666-CT

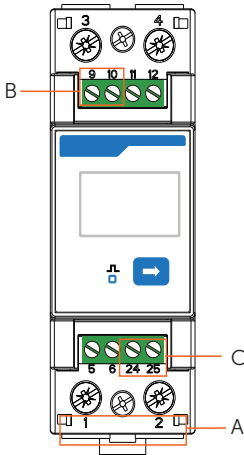Figure 2-2 DTSU666-CT

3   Cable Connection

3.1   Terminals

Figure 3-1 DDSU666-CT
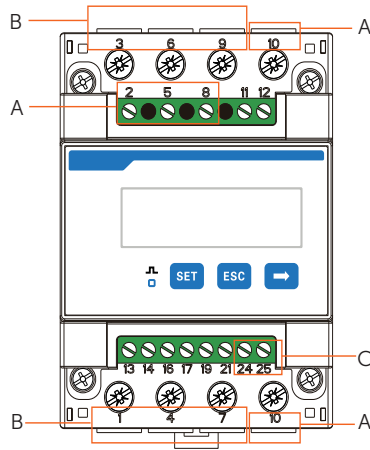
Figure 3-2 DTSU666-CT

Table 3-1 DDSU666-CT terminal definition

No.	Terminal No.	Terminal Definition	Description
A	1	UL	Voltage input terminal, connected to the L wire
	2	UN	Phase N voltage input terminal, connected to the N wire
B	9	I*	Current input terminal, connected to S1 wire of CT
	10	I	Current output terminal, connected to S2 wire of CT
C	24	RS485A	RS485 terminal A
	25	RS485B	RS485 terminal B

Table 3-2 DTSU666-CT terminal definition

No.	Terminal No.	Terminal Definition	Description
A	2, 5, 8	UA, UB, UC	Voltage input terminal of phase A, B and C, respectively connected to L1, L2 and L3 wire
	10	UN	Phase N voltage input terminal, connected to the N wire
B	1, 4, 7	IA*, IB*, IC*	Current input terminal of phase A, B and C, connected to S1 wire of CT
	3, 6, 9	IA, IB, IC	Current output terminal of phase A, B and C, connected to S2 wire of CT
C	24	RS485A	RS485 terminal A
	25	RS485B	RS485 terminal B

Note: The terminals in the same box are a pair.

3.2   Cable Requirements

Table 3-3 Cables for DDSU666-CT

Usage	Terminal No.	Cable type (Recommended)	Sectional area (mm^2)	Outer diameter (mm)	Torque (N·m)
Voltage cable	1 — 2	Multi-core outdoor copper wire	4~25	5~10	Max.: 1.7 Rec.:0.9~1.1
CT cable	9 — 10	Multi-core outdoor copper wire	1.5~2.5	3~5	Max.: 0.4 Rec.:0.15~0.25
COM cable	24 — 25	Two-core outdoor shielded twisted pair cable	0.25~1.5	4~11	

Table 3-4 Cables for DTSU666-CT

Usage	Terminal No.	Cable type (Recommended)	Sectional area (mm^2)	Outer diameter (mm)	Torque (N·m)
Voltage cable	2, 5, 8	Multi-core outdoor copper wire	1.5~2.5	3~5	Max.: 0.4 Rec.:0.15~0.25
	10				Max.: 1.7 Rec.:0.9~1.1
CT cable	1, 4, 7	Multi-core outdoor copper wire	4~25	5~10	Max.: 1.7 Rec.:0.9~1.1
	3, 6, 9				
COM cable	24	Two-core outdoor shielded twisted pair cable	0.25~1.5	4~11	Max.: 0.4 Rec.:0.15~0.25
	25				

3.3   System Wiring

The following diagrams take the meter used in the PV system for example. For each meter model, two communication methods are available. You can either connect the meter to the inverter through communication cables, or through DataHub for centralized control.

The type and pin definition of inverter terminals for connecting meter and CT vary depending on the inverter models. For specific pin information of the inverter, see the user manual of the inverter and "Appendix".

⚠️ WARNING!

- Only the qualified personnel can perform the cable connection following local standards and requirements.
- Before wiring, make sure you have cut off the power supply for the entire system.

NOTICE!

- DO NOT place the CT on the N wire.
- The CT must point away from the grid to the inverter or load.
- To prevent the CT from falling off, it is recommended to wrap the CT clip in circles with insulating tape.
- When the system is powered on, ensure that the RS485 cables are kept separate from the power cables to protect the inverter from potential damages.
- The wiring diagrams are for reference only. Actual wiring details depend on the on-site conditions.

DDSU666-CT

L wire ——— S1 wire ——— RS485A wire ——— PE wire
N wire ——— S2 wire ——— RS485B wire

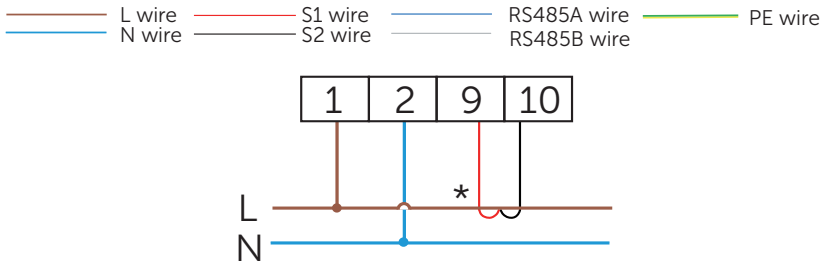
Figure 3-3 Terminal wiring

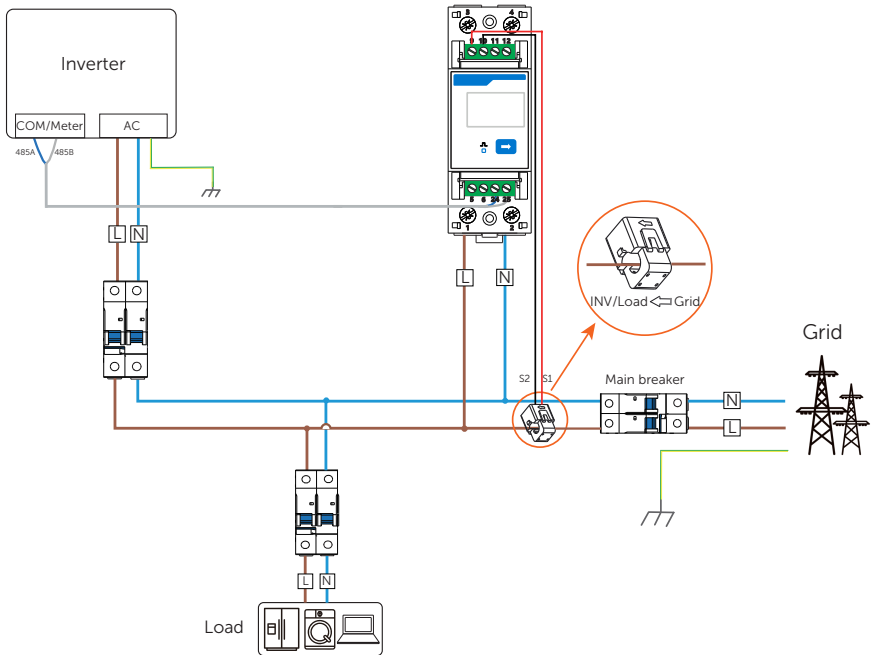Note: * represents the incoming side of current.

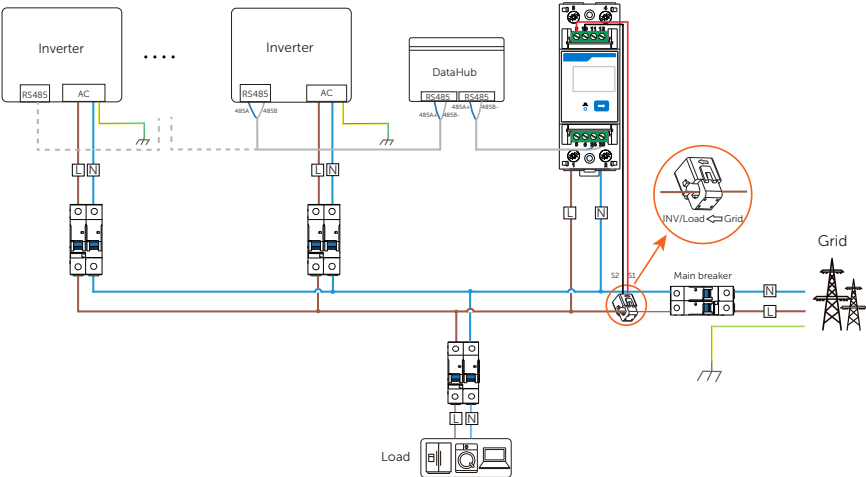Figure 3-4 Networking through RS485 cable

Figure 3-5 Networking through DataHub

Note: The diagram of networking through DataHub uses the cascading of gird-connected inverters for example, and the RS485 terminal of the master inverter for connecting slave inverters and DataHub might vary depending on the inverter models. For wiring details, see the user manual of the specific inverter and DataHub.

DTSU666-CT

DTSU666-CT supports 3-phase 4-wire (3P4W) and 3-phase 3-wire (3P3W). For 3P3W, N wire does not need to be connected, and CT is not required for phase B. The overall system wiring diagrams use 3P4W wiring method for example.
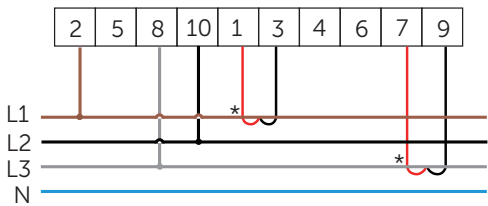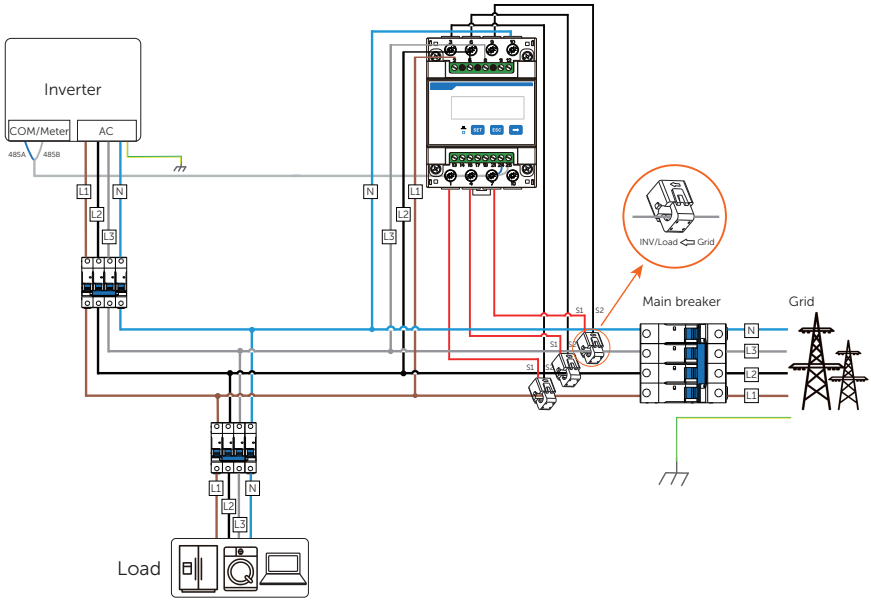

Figure 3-6 3P4W wiring mode

Figure 3-7 3P3W wiring mode

Note: * represents the incoming side of current.
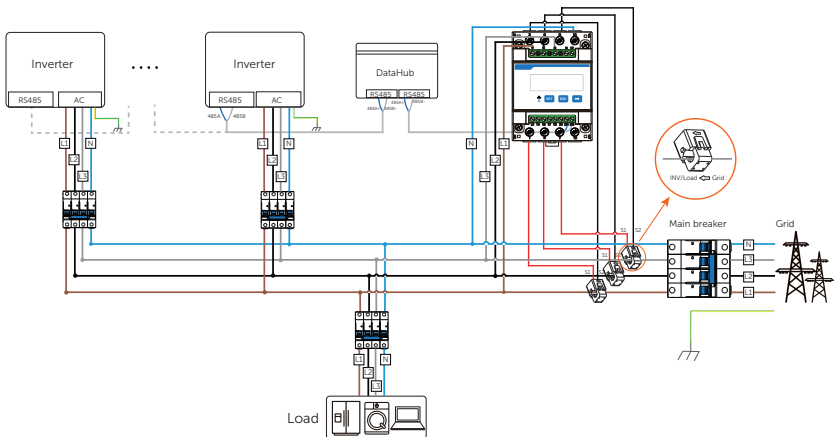
Figure 3-8 Networking through RS485 cable

Figure 3-9 Networking through DataHub

Note: The diagram of networking through DataHub uses the cascading of gird-connected inverters for example, and the RS485 terminal of the master inverter for connecting slave inverters and DataHub might vary depending on the inverter models. For wiring details, see the user manual of the specific inverter and DataHub.

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4   Mechanical Installation

The meter is designed to be installed on the 35 mm DIN rail inside the power distribution box.

> ⚠ **WARNING!**
>
> - Only the qualified personnel can perform the mechanical installation following local standards and requirements.
> - Before installation, make sure you have cut off the power supply for the system.

> **NOTICE!**
>
> - Keep the installation site dry, clean, and easy for ventilation and heat dissipation.

Procedure

After connecting the cables based on the wiring diagrams, mount the meter onto the 35mm DIN rail, and then clip it to the rail with strength.
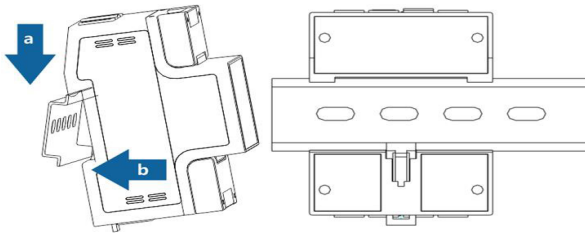

Figure 4-1 Mounting the meter

5   LCD Display

The meter LCD can display multiple items, such as positive active energy, reverse active energy, current, power, and more. The default display item is positive active energy.

You can press the → button on the front panel to switch among the display items, and set the **disp** parameter to enable the loop display function.

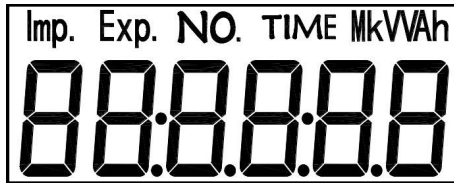| NOTICE! |
| --- |
| • The following display item images are for reference, and might differ from the screen of the actual product. |

DDSU666-CT

Figure 5-1 LCD display items

Table 5-1 Display item description

No.	Item	Description	No.	Item	Description
1	Imp. kW h 000 1.20	Positive active energy=1.20 kWh	2	Exp. kW h 000 1.00	Reverse active energy=1.00 kWh
3	kW h 000 2.20	Total active energy=2.20 kWh	4	V U 220.0	Voltage=220.0 V
5	A I 5.000	Current=5.000 A	6	kW P 1.100	Active power=1.100 kW
7	FE 1.000	Power factor PFt=1.000	8	F 50.00	Frequency=50.00 Hz

9	NO. modbuS	Communication protocol: Modbus	10	NO. ii- 8n1	8 data bit, none parity, and 1 stop bit
11	NO. ii- 001	Communication address: 001	12	NO. bAUd-3	Communication baud rate: 9600

DTSU666-CT
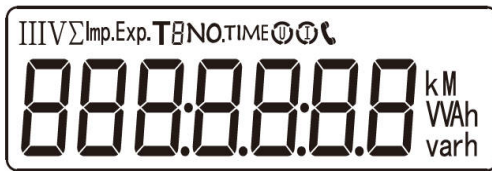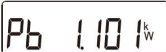
Figure 5-2 LCD display items

Table 5-2 Display item description

No.	Item	Description	No.	Item	Description
1	Imp 1000000 kWh	Positive active energy= 1000.00 kWh	2	Exp. 234567 kWh	Reverse active energy= 2345.67 kWh
3	NO. n1-9.600	n1: None parity, and 1 stop bit Communication baud rate: 9600.	4	NO. ----001	Communication address: 001
5	UA 220.0 v	Phase A voltage=220.0 V	6	Ub 220.1 v	Phase B voltage=220.0 V
7	UC 220.2 v	Phase C voltage=220.2 V	8	I A 5.000 A	Phase A current=5.000 A
9	I b 5.001 A	Phase B current=5.001 A	10	I C 5.002 A	Phase C current=5.002 A

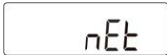| 11	`Pt 3.291 kW`	Combined phase active power=3.291 kW	12	`PA 1.090 kW`	Phase A active power=1.090 kW
13	`Pb 1.101 kW`	Phase B active power=1.101 kW	14	`PC 1.100 kW`	Phase C active power=1.100 kW
15	`Ft 0.500`	Combined phase power factor PFt=0.500	16	`FA 1.000`	Phase A power factor PFa=1.000
17	`Fb 0.500`	Phase B power factor PFb=0.500	18	`FC -0.500`	Phase C power factor PFc=0.500

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6 Parameter Setting

Both meter models support parameter setting. For DDSU666-CT, only communication protocol can be set. For DTSU666-CT, multiple parameters can be set.

6.1 Parameter Description

NOTICE!
• This section only applies to DTSU666-CT. DDSU666-CT directly enters the communication protocol interface after you long press the → button.

Table 6-1 Parameter description of DTSU666-CT

No.	Parameter	Value range	Description
1	**Ct**	1~9999	Current ratio, used for setting the input loop current ratio.
2	**Pt**	0.1~999.9	Voltage ratio, used for setting the input loop voltage ratio.
3	**Prot**	1: 645; 2: n.2; 3: n.1; 4: E.1; 5: o.1;	Communication protocol, stop bit and parity bit: • 1: DL/T 645; • 2: None parity, 2 stop bits, n.2; • 3: None parity, 1 stop bit, n.1; • 4: Even parity, 1 stop bit, E.1; • 5: Odd parity, 1 stop bit, O.1;
4	**Addr**	1~247	Communication address
5	**bAud**	0: 1.200; 1: 2.400; 2: 4.800; 3: 9.600;	Communication baud rate: 0: 1200 bps; 1: 2400 bps; 2: 4800 bps; 3: 9600 bps;
6	**nEt**	0: n.34; 1: n.33;	Wiring mode: • 0: n.34 represents 3 phase 4 wire • 1: n.33 represents 3 phase 3 wire

7	$\boxed{\text{CL r.E}}$	0: no; 1: E;	Clear the history data: • 0: Do not clear the data. It is enabled by default. • 1: Clear the history data
8	$\boxed{\text{di SP}}$	0~30	Display interval (second): • 0: Constant display of positive active energy • 1~30: Each item will be displayed for the specified seconds in a loop.
9	$\boxed{\text{b.LCd}}$	0~30	Backlight on duration (minute): • 0: Solid on • 1~30: The backlight will be on for the specified minutes without operation on it.
10	$\boxed{\text{ESEt}}$	0: Phase metering; 1: Sum metering;	Metering method: • The power of each phase is counted separately into feed-in energy or consumed energy. • 1: The total feed-in power is counted into feed-in energy or consumed energy.

6.2 Setting Parameters

For ease of use, certain parameters, such as communication protocol, address and current ratio, are preset in accordance with the requirements for operation with the inverters upon delivery. You can also modify the configurations through the function buttons as needed.

Table 6-2 Button description

| Model	Button	Description
DDSU666-CT	→	Long press to go to the communication protocol interface, and short press to select the stop bit and parity bit combination.
DDSU666-CT	SET	• Enter the parameter setting interface • Confirm the selection • Shift the cursor (when inputting digits)
	ESC	Exit from the current interface
	→	• Go to the next item • Increase the value

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DDSU666-CT

You can set the communication protocol of the meter to Modbus or 645 protocol. For Modbus protocol, multiple stop bit and parity bit combinations are available, and you can press ➞ to switch among them.

NOTICE!
• Meter screenshots used in this section are for reference only, and may differ from the actual item display sequence of the meter.

Procedure

Step 1: Long press the ➞ button to enter the communication protocol interface, and then short press to select the protocol, and stop bit and parity bit combination.
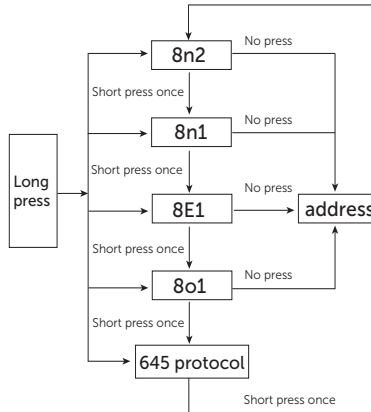
Step 2: (Optional) For Modbus protocol, after the screen displays the desirable stop bit and parity bit combination, wait for 4 seconds for the meter to enter the address setting interface, and then continue to set the address through the ➞ button.

DTSU666-CT

All parameters mentioned in "Parameter Description" can be set. The setting procedures are similar, and this section only introduces the setting steps of commonly used functions.

| NOTICE! |
| --- |
| • Password verification is required for parameter setting. The default password is 701. |

Setting the transformer current and voltage ratio

The current ratio of the included CT model is 40, and it is preconfigured upon delivery. If there is any inconsistency, or if you have changed the CT model, follow the steps to set the current and voltage ratio.
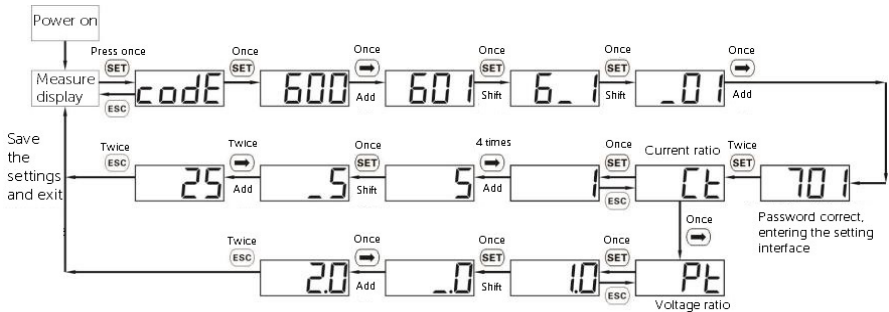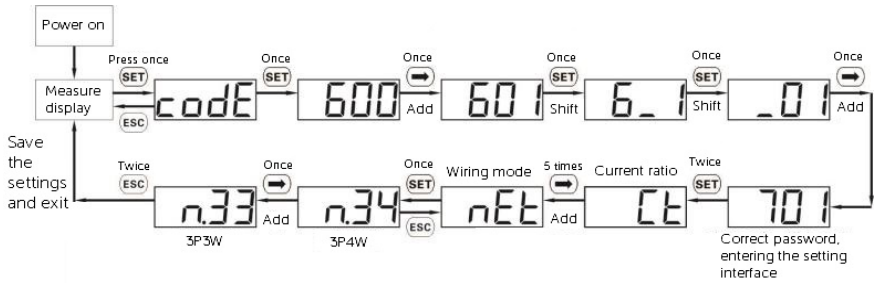

Setting the communication address and baud rate

Generally, the communication address and baud rate of the meter for communicating with the inverters are 001 and 9600 respectively.


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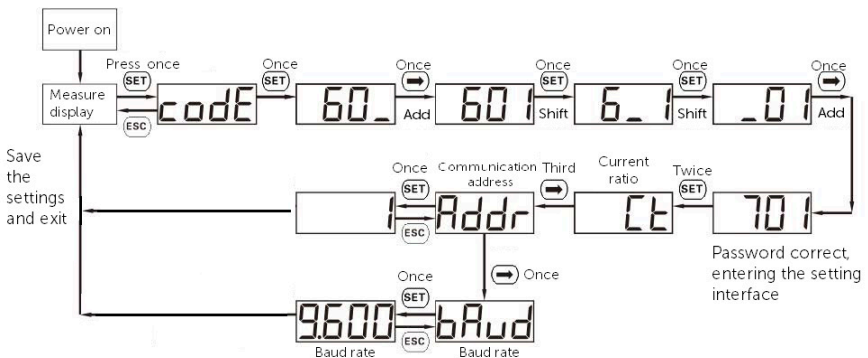
Setting the wiring mode

Setting the wiring mode to 3-phase 4-wire (3P4W) or 3-phase 3-wire (3P3W).

Setting the metering mode

Set the metering mode to phase metering or net metering. For net metering, the screen will display an **1** on the Imp/Exp status bar.

Metering mode	Screen display	Description
Phase metering		The power of each phase is counted separately into feed-in energy or consumed energy. For example, in an hour, if phase A and B respectively deliver 1 kW energy to the grid, and phase C receives 1 kW from the grid, the displayed export energy will be 2 kWh, and the import energy be 1 kWh.
Sum metering		The total feed-in power is counted into feed-in energy or consumed energy. For example, in an hour, if phase A and B respectively deliver 1 kW energy to the grid, and phase C receives 1 kW from the grid, the displayed export energy will be 1 kWh, and the import energy be 0 kWh.
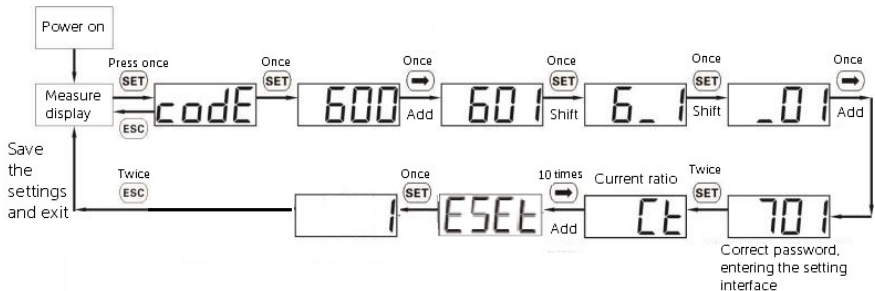
7 Technical Data

Table 7-1 Specification

	DDSU666-CT	DTSU666-CT
Power grid type	1P2W	3P4W/3P3W
Rated voltage	220 V/230 V	3 × 230 V/400 V
Input voltage (phase voltage)	176 Vac ~ 264 Vac	161 Vac ~ 276 Vac
Current	0.05—1.5 (6) A	
Power Consumption	≤1 W	≤1.5 W
Measurement accuracy class	Class B	
Frequency	50 Hz/60 Hz	
Baud rate	9600 bps (Default)	
Communication terminal	1 × RS485	
Communication protocol	Modbus-RTU	
Operating temperature	-40°C to +70°C	
Operating humidity	≤75% (Non-condensing)	
Accessories	RS485 cable (10 m), RJ45 connector	
	1 × CT 200 A/5 A	3 × CT 200A/5A (Optional)

8   Troubleshooting

Following are common problems with the meter when used with inverters. When a problem occurs, check the questions below for possible reasons and solutions. For further assistance, contact SolaX after-sales Service.

01 What if the inverter LCD or SolaXCloud reports a **MeterFault** alarm when the meter is connected to and enabled on the inverter?

The inverter reports a **MeterFault** alarm when it fails to communicate with the meter. Please follow the steps to troubleshoot:

Step 1:   Check the wiring of the meter and inverter based on the wiring diagrams. Make sure terminal 24 and 25 of the meter are respectively connected to RS485 terminal A and B of the inverter. For pin definition of different inverter models, see "Compatible Inverters and Pin Definition" and the user manual of the inverter.

Step 2:   Check whether the meter settings meet the requirements of the inverter. Generally, for communication with SolaX inverters, the meter address should be set to 001, with a baud rate of 9600, none parity and 1 stop bit. These settings are default to the meter. If the current meter settings are not correct, see "Setting the communication address and baud rate" to modify them.

Step 3:   Contact the distributor or SolaX technical support.

02 What if the meter readings, such as power, do not match the actual situation?

Abnormal meter reading might result from incorrect wiring, improper CT connection, inconsistent parameter settings and more of the meter.

Following are common problems with abnormal meter readings and methods to fix them. For other situations, contact the distributor or SolaX after-sales service.

- **The power reading of a phase is opposite to the actual power flow. For example, the actual power flow is importing 2 kWh, but the reading is exporting 2 kWh.**

  In this case, check whether the CT direction and wiring of S1 and S2 are correct. The CT must point away from the grid to the inverter or load. S1 and S2 wire of the CT must be connected to the input and output terminal of the meter respectively.

- **The reading is proportionally larger or smaller than the actual value. For example, the actual export power is 2 kWh, but the reading is 1 kWh.**

  In this case, check whether the current ratio set on the meter corresponds to the CT specification. If not, see "Setting the transformer current and voltage ratio" to reset it.
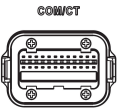
9 Appendix

9.1 Compatible Inverters and Pin Definition

DDSU666-CT

DDSU666-CT can only be connected to single-phase inverters. It is compatible with the following single-phase inverters. While connecting the cables, pay special attention to the connector type and the pin number of the inverter.

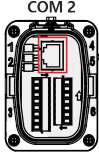Table 9-1 Compatible Inverters and pin definition

Inverter series	Terminal type	Connector type	Pin No.	Pin definition	Remarks
X1-HYB LV	COM	RJ45	4	485A	Select either COM1, COM2 or COM3
			5	485B	
X1-AC	Meter	RJ45	7	485A	—
			8	485B	
• X1-HYB G4 • X1-FIT G4 • X1-IES	Meter/CT	RJ45	4	485A	—
			5	485B	
• X1-MINI G4 • X1-BOOST G4	COM/CT	RJ45	4	485A	—
			5	485B	

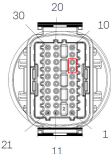|					
X1-SMART G2		Quick-connect terminal	4 / 11	485A	—
			5 / 12	485B	

*Note: Two terminals of different types are available for meter on X1-Smart G2, and the pins in the same box are a pair.

DTSU666-CT

DTSU666-CT can be connected to both single-phase and three-phase inverters. Therefore, besides the above the single-phase inverters, it is also compatible with the following three-phase inverters.

Inverter series	Terminal Type	Connector type	Pin No.	Pin definition
• X3-HYB G4 • X3-FIT G4 • X3-IES	Meter/CT	RJ45	4	485A
			5	485B
X3-ULTRA	COM 2	RJ45	4	485A
			5	485B
X3-MIC G2		RJ45	4	485A
			5	485B

X3-PRO G2	RS 485	O/I terminal	5	485A
			6	485B
• X3-MEGA G2 • X3-FORTH		Quick-connect terminal	7	485A
			8	485B

9.2 Optional CT Models

The included CT model for both DDSU666-CT and DTSU666-CT is NCTK24 200A/5A. DDSU666-CT does not support other CT models. DTSU666-CT supports the following CT models.

Configuration	CT Model	Specification	Current Ratio
Included	NCTK24 200A/5A	200A/5A	40
Optional	SCT-36 Split Core 400/5	400A/5A	80
	SCT-36 Split Core 600/5	600A/5A	120
	ESCT-B812 1500A/5A	1500A/5A	300
	CTSB0512 2000A/5A	2000A/5A	400

If you need to purchase any of the optional CT models for your meter, contact the distributor for detailed information.

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