Connection of energy meters

The StecaGrid coolcept / coolcept flex / coolcept³ / coolcept³ fleX inverters communicate with selected energy meters via a Modbus RTU interface. The scope of functionality described here is available for the following types:

Manufacturer	Type	Phases	Inverter FW from HMI App		[1]	[2]
			coolcept coolcept³	coolcept fleX coolcept³ fleX		
ABB	ABB B23	3	2.26.0	3.4.0	x	x
B+G E-Tech GmbH	SDM120-Modbus	1	2.19.0	3.4.0	x	-
	SDM220-Modbus	1	2.10.0	3.4.0	x	-
	SDM230-Modbus	1	2.19.0	3.4.0	x	-
	SDM630-Modbus	3	2.7.0	3.4.0	x	-
Carlo Gavazzi	EM24-DIN.AV9.3.X.IS.X	3	2.7.0	3.4.0	x	-
	EM330/340-Modbus	3	-	3.5.0	x	-
	ET330/340-Modbus	3	-	3.5.0	x	-
Herholdt	ECS1-63 CP Modbus	1	2.10.0	3.4.0	x	-
	ECS3-80 B Modbus	3	2.7.0	3.4.0	x	-
	ECS3-63 CP Modbus	3	2.7.0	3.4.0	x	-
Janitza	B21 312-10J Modbus	1	-	3.5.0	x	x
	B23 312-10J Modbus	3	-	3.5.0	x	x
	ECS1-63 CP Modbus	1	2.10.0	3.4.0	x	-
	ECS3-5 Basic MID Modbus	3	2.7.0	3.4.0	x	-
	ECS3-63 CP Modbus	3	2.7.0	3.4.0	x	-
KDK-Dornscheidt	KDK Pro380-Mod	3	2.26.0	3.4.0	x	-
KOSTAL Solar Electric GmbH	KOSTAL Smart Energy Meter (KSEM)	3	-	3.9.0	x	x
Schneider Electric	IEM3155	3	2.10.0	3.4.0	x	-
TQ Systems GmbH	B-Control EM300LR	3	2.19.0	3.4.0	x	x

[1] For Building consumption

[2] For dynamic active power control. The energy meter can be used instead of a ripple control receiver for dynamic active power control.

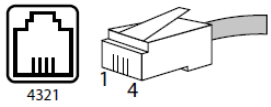
The following applies:

- Only the energy meters that are pre-programmed into the StecaGrid inverters can be used. These combinations have been tested and correct functionality is ensured when the inverter and energy meter are correctly installed and configured.
- It is possible that other models not listed here but from the same manufacturer may also seem to operate with the same settings. However, full and correct functionality cannot be guaranteed for these.
- The energy meter must measure consumption from the grid in a positive direction. Please observe the respective manufacturer's installation and operating manual for this.

Please note: **The technical information in this document does not replace the comprehensive installation and operating manuals for the StecaGrid coolcept / coolcept flex / coolcept³ / coolcept³ fleX inverters and for the various energy meters!**

Data link cable StecaGrid coolcept / coolcept³

A 4-core telephone cable with a 4P4C plug (commonly known as an RJ10 plug) can be used at the inverter side. The individual strands of the cable are connected to screw connections at the various energy meters.

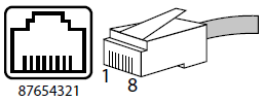
Device connection	coolcept / coolcept³ connection RJ10	Bus signal	
Contact / Pin	1	Data A	
	2	Data B	
	3	Ground	
	4	---	

IMPORTANT INFORMATION

- Material damage caused by electrical voltage! The data connection cable may only be manufactured by a technical specialist.
- Danger of destroying the Modbus RTU input of the inverter! Contact 4 of the RJ10 socket on the inverter carries voltage <20V. Do not use this contact.

Data link cable StecaGrid coolcept fleX / coolcept³ fleX

Use a RJ45 standard cable or a CAT5 patch cable as data connecting cable. The individual strands of the cable are connected to screw connections at the various energy meters.

Device connection	coolcept fleX coolcept³ fleX connection RJ45 (COM2)	Bus signal	
Contact / Pin	1	-	
	2	-	
	3	-	
	4	-	
	5	-	
	6	Data A	
	7	Data B	
	8	Ground	

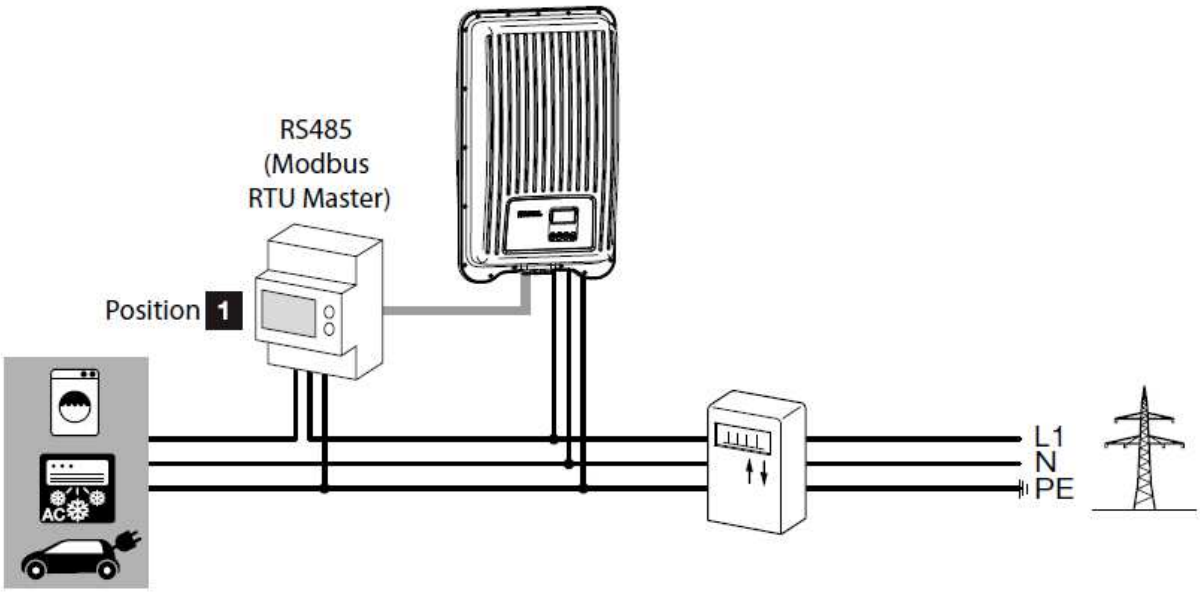
IMPORTANT INFORMATION

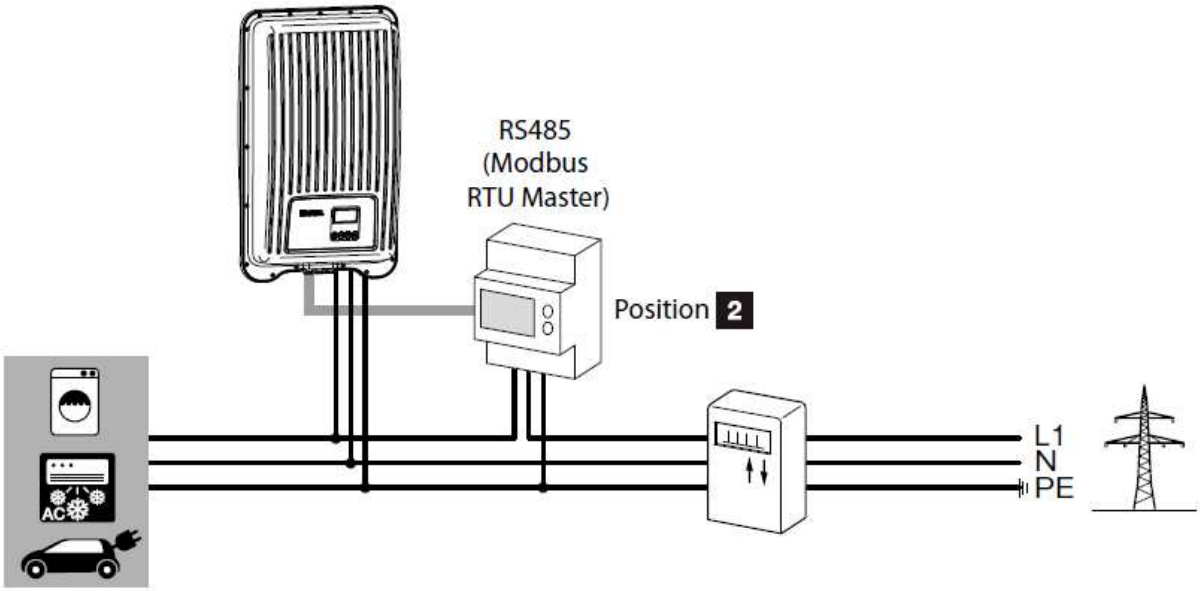
- Voltage may cause property damage. Only have specialists manufacture the alternative data connecting cable.
- Danger of destroying the Modbus RTU input of the inverter!

Installation position energy meter

The energy meter can be installed at two positions in the house network, whereby the position house connection is to be preferred. The installation position is selected via the inverter menu (Settings > Energy management > Configuration > Meter position).

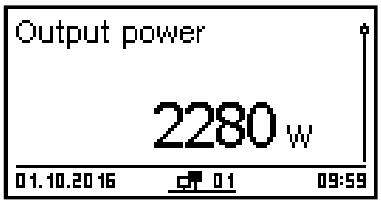
1 House connection (consumption)
2 Grid connections (feed in)



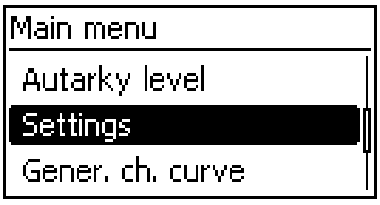


Configuration

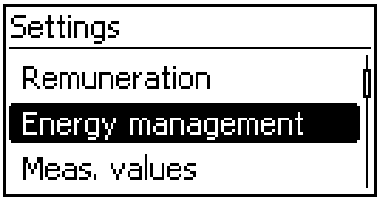
After connecting the StecaGrid coolcept / coolcept flex / coolcept³ / coolcept³ flex inverter to an energy meter via the data connection cable you must then make the following energy management settings in the inverter menu.



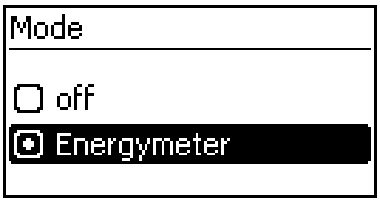
Pressing the "**SET**" button brings you to the "Main menu"



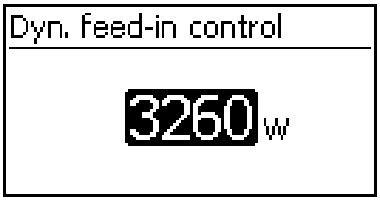
Select the "**Settings**" item in the main menu



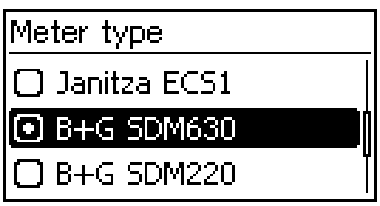
Select the "**Energy management**" item in the "Settings" menu



Select "**Energy meter**" in the "Mode" screen



In the "**Dyn. feed in control**" screen, set the maximum power that may be fed into the public mains grid
(This can be e.g. 70% of the max. PV generator power)



Select the "**Meter type**" item in the "Configuration" menu

Energy meter configuration

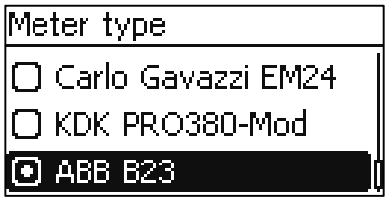
If the energy meters listed below are used with their respective factory settings then **no** settings need to be made in the energy meter configuration menu. If the factory settings are changed then the following settings must be adjusted at the energy meter.

Menu item	Example settings
Address (Slave-ID)	see energy meter
Baud rate	see energy meter
Parity	see energy meter
Stop bits (quantity)	see energy meter

Please note: **Information on operating the respective energy meter is provided in the latest version of the manufacturer's installation and operating manual!**

ABB B23

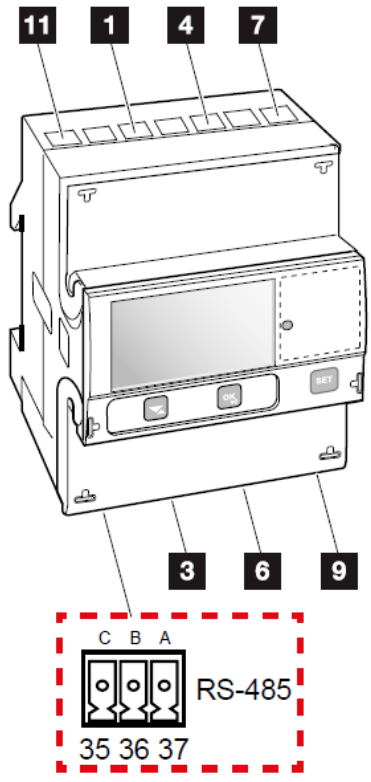
This three-phase energy meter is designated as "**ABB B23**" in the "Meter type" field in the energy management settings of the inverter.

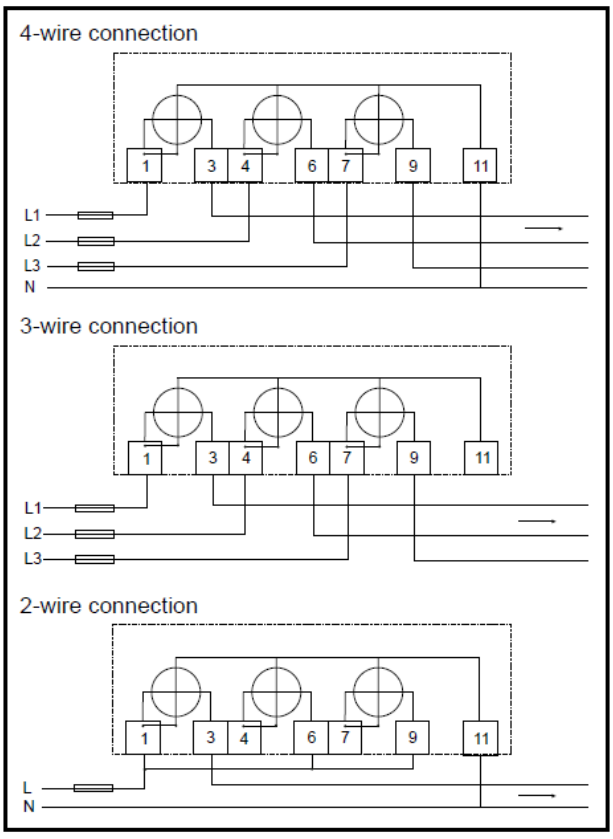


RS485 interface settings at the energy meter:

Menu item	Settings
Address (Slave-ID)	1
Baud rate	19200 Baud
Parity	Even
Stop bits (quantity)	1

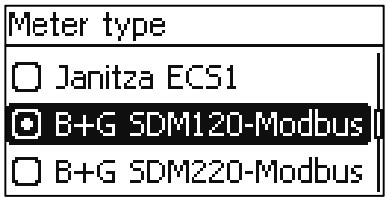
Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter ABB B23
Contact / Pin	1	6	Data A	36
	2	7	Data B	37
	3	8	Ground	35





B+G SDM120 Modbus

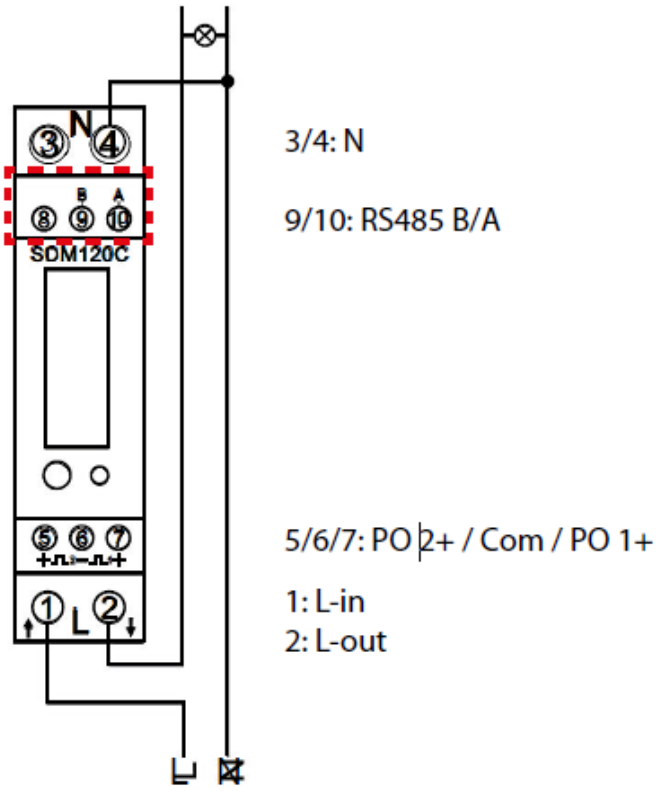
This single-phase energy meter is designated as "**B+G SDM120-Modbus**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

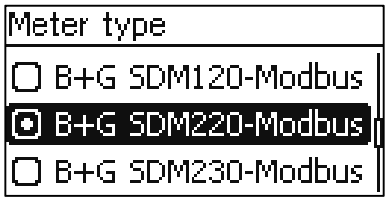
Menu item	Settings
Address (Slave-ID)	1
Baud rate	2400 Baud
Parity	None
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter B+G SDM120
Contact / Pin	1	6	Data A ≙ A	10
	2	7	Data B ≙ B	9
	3	8	Ground ≙ GND	8



B+G SDM220 Modbus

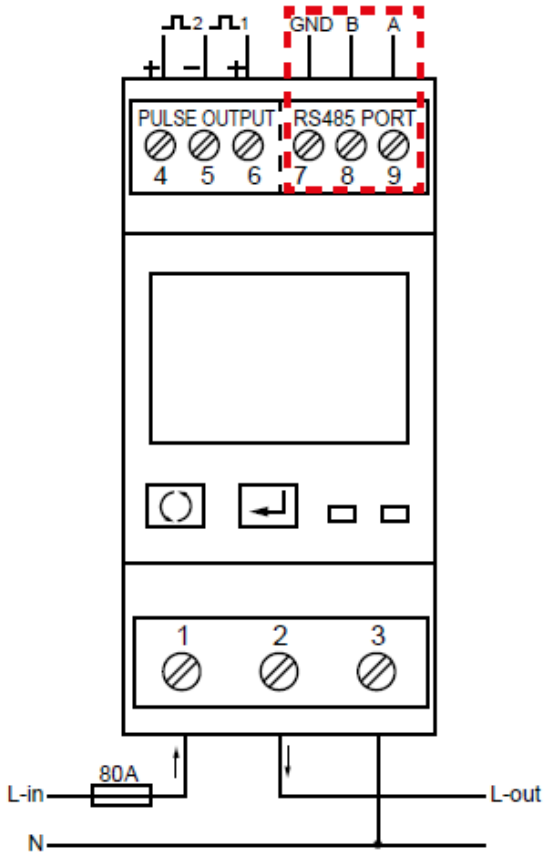
This single-phase energy meter is designated as "**B+G SDM220-Modbus**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

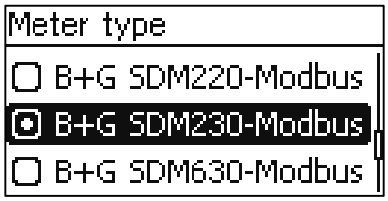
Menu item	Settings
Address (Slave-ID)	1
Baud rate	9600 Baud
Parity	None
Stop bits (quantity)	2

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter B+G SDM220
Contact / Pin	1	6	Data A ≙ A	9
	2	7	Data B ≙ B	8
	3	8	Ground ≙ GND	7



B+G SDM230 Modbus

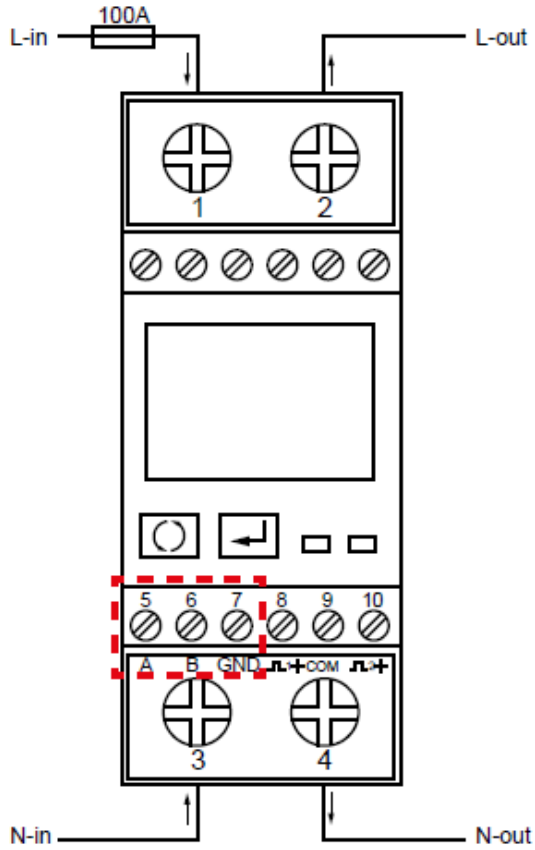
This single-phase energy meter is designated as "**B+G SDM230-Modbus**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

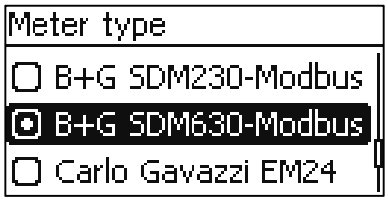
Menu item	Settings
Address (Slave-ID)	1
Baud rate	2400 Baud
Parity	None
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter B+G SDM230
Contact / Pin	1	6	Data A ≙ A	5
	2	7	Data B ≙ B	6
	3	8	Ground ≙ GND	7



B+G SDM630 Modbus

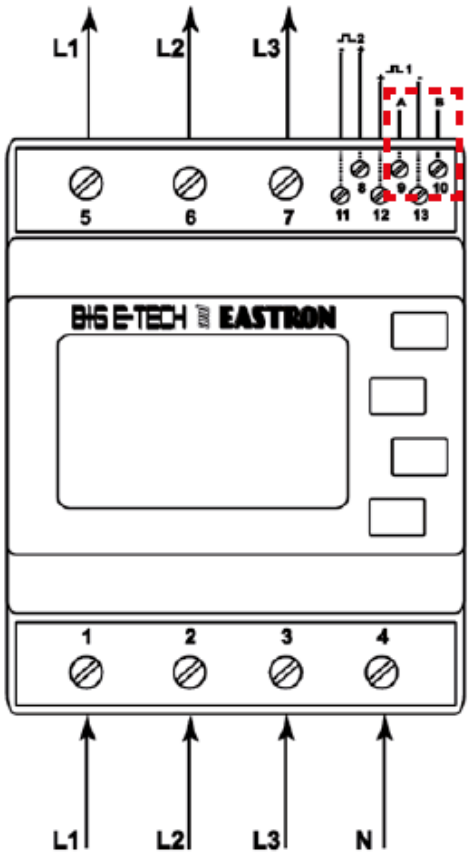
This three-phase energy meter is designated as "**B+G SDM630-Modbus**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

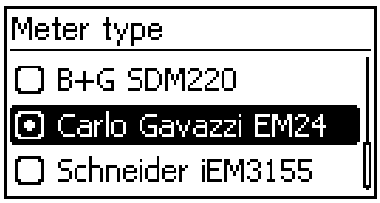
Menu item	Settings
Address (Slave-ID)	1
Baud rate	9600 Baud
Parity	None
Stop bits (quantity)	2

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter B+G SDM630
Contact / Pin	1	6	Data A ≙ A	9
	2	7	Data B ≙ B	10
	3	8	Ground ≙ GND	---



Carlo Gavazzi EM24-DIN.AV9.3.X.IS.X

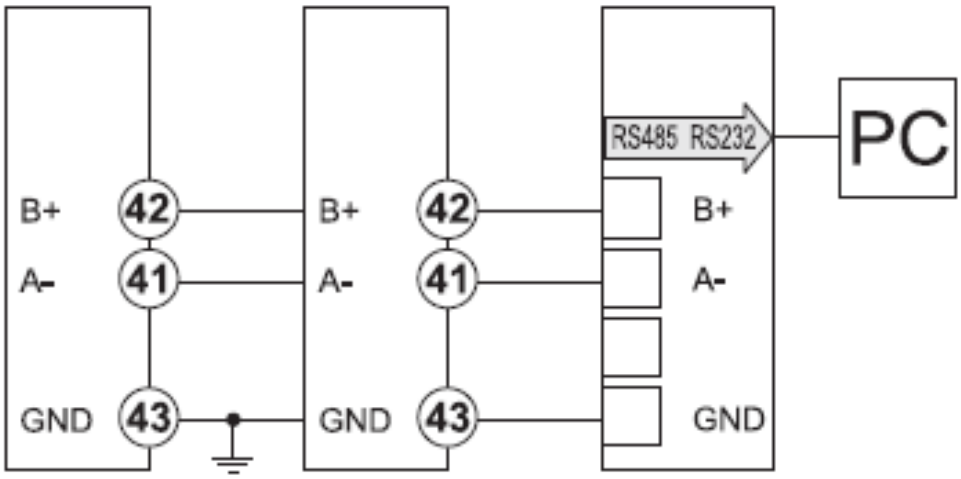
This three-phase energy meter is designated as "**Carlo Gavazzi EM24**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

Menu item	Settings
Address (Slave-ID)	1
Baud rate	9600 Baud
Parity	None
Stop bits (quantity)	1

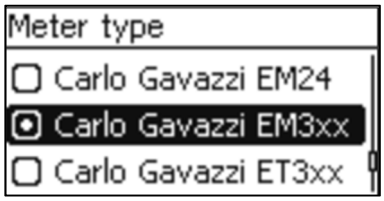
Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter Carlo Gavazzi EM24
Contact / Pin	1	6	Data A ≙ B+	42
	2	7	Data B ≙ A-	41
	3	8	Ground ≙ GND	43



Please note: **The energy meter is supplied configured with default Baud rate of 9600 Baud. Up to firmware version HMI APP 2.9.0, a different default Baud rate was stored in the inverter. You must change the Baud rate of the energy meter to 4800 Baud when using this firmware.**

Carlo Gavazzi EM330/340-Modbus

This three-phase energy meter is designated as "**Carlo Gavazzi EM3xx**" in the "Meter type" field in the energy management settings of the inverter. Please note that only the devices EM330/340 are supported.

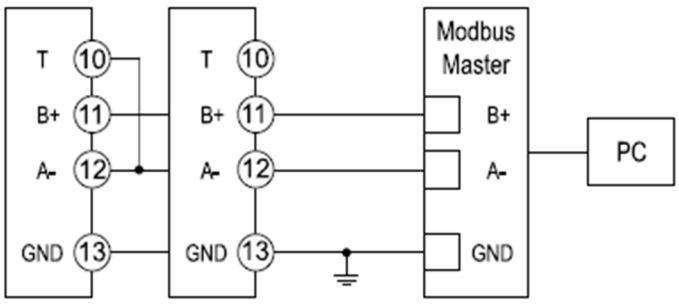


RS485 interface settings at the energy meter:

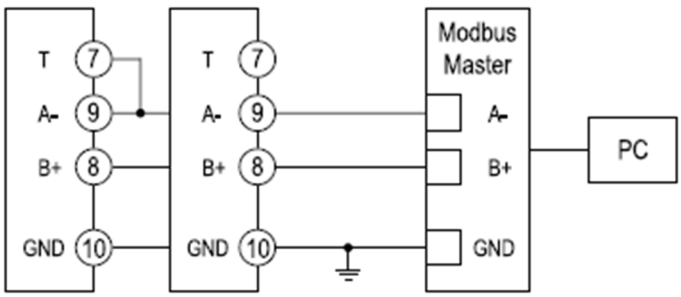
Menu item	Settings
Address (Slave-ID)	1
Baud rate	9600 Baud
Parity	None
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter Carlo Gavazzi	
				EM330	EM340
Contact / Pin	1	6	Data A ≙ B+	11	8
	2	7	Data B ≙ A-	12	9
	3	8	Ground ≙ GND	13	10

Modbus-Connections EM330

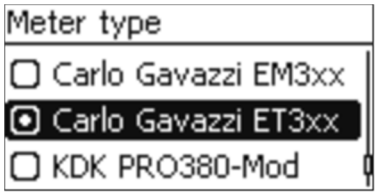


Modbus-Connections EM340



Carlo Gavazzi ET330/340-Modbus

This three-phase energy meter is designated as "**Carlo Gavazzi ET3xx**" in the "Meter type" field in the energy management settings of the inverter. Please note that only the devices ET330/340 are supported.

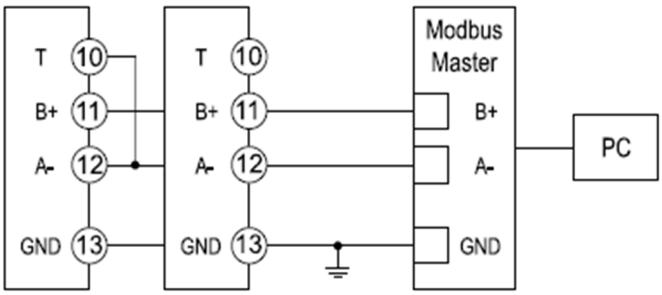


RS485 interface settings at the energy meter:

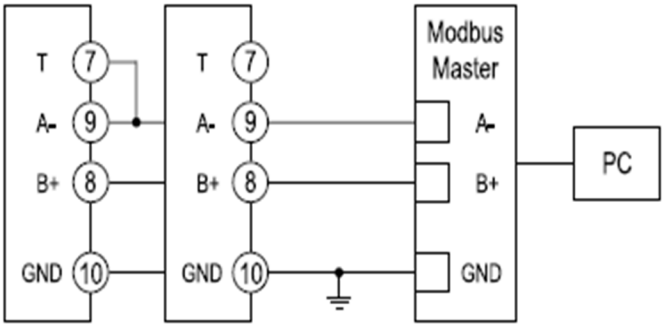
Menu item	Settings
Address (Slave-ID)	1
Baud rate	9600 Baud
Parity	None
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter Carlo Gavazzi	
				ET330	ET340
Contact / Pin	1	6	Data A ≙ B+	11	8
	2	7	Data B ≙ A-	12	9
	3	8	Ground ≙ GND	13	10

Modbus-Connections ET330

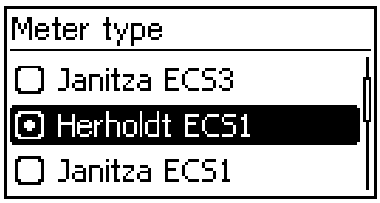


Modbus-Connections ET340



Herholdt ECS1-63 CP Modbus (ECSEM213 / ECSEM214MID)

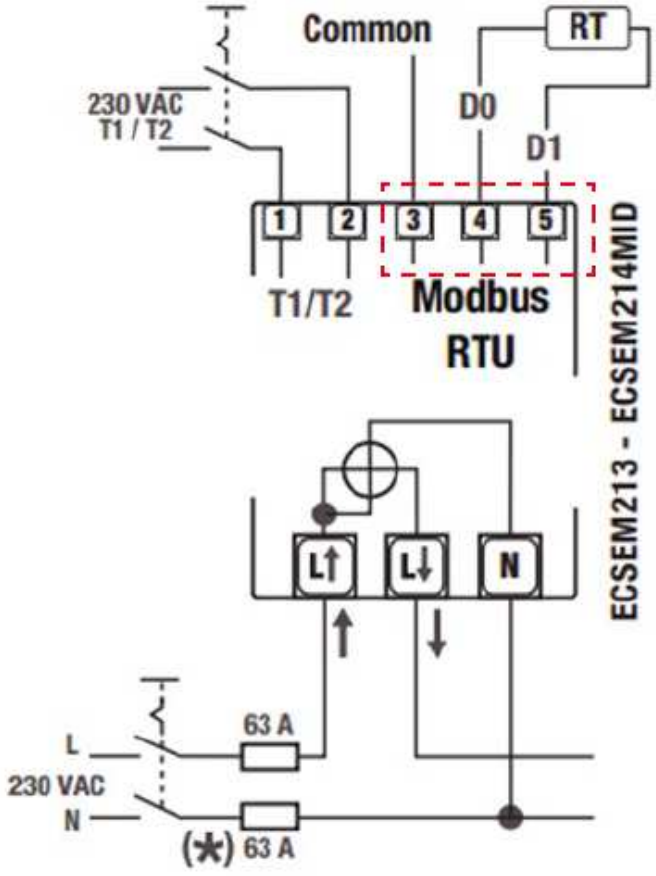
This single-phase energy meter is designated as "**Herholdt ECS1**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

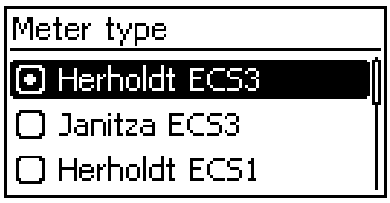
Menu item	Settings
Address (Slave-ID)	1
Baud rate	19200 Baud
Parity	None
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter Herholdt ECS1
Contact / Pin	1	6	Data A ≙ D1	5
	2	7	Data B ≙ D0	4
	3	8	Ground ≙ Common	3



Herholdt ECS3-80 B Modbus (ECSEM 72)

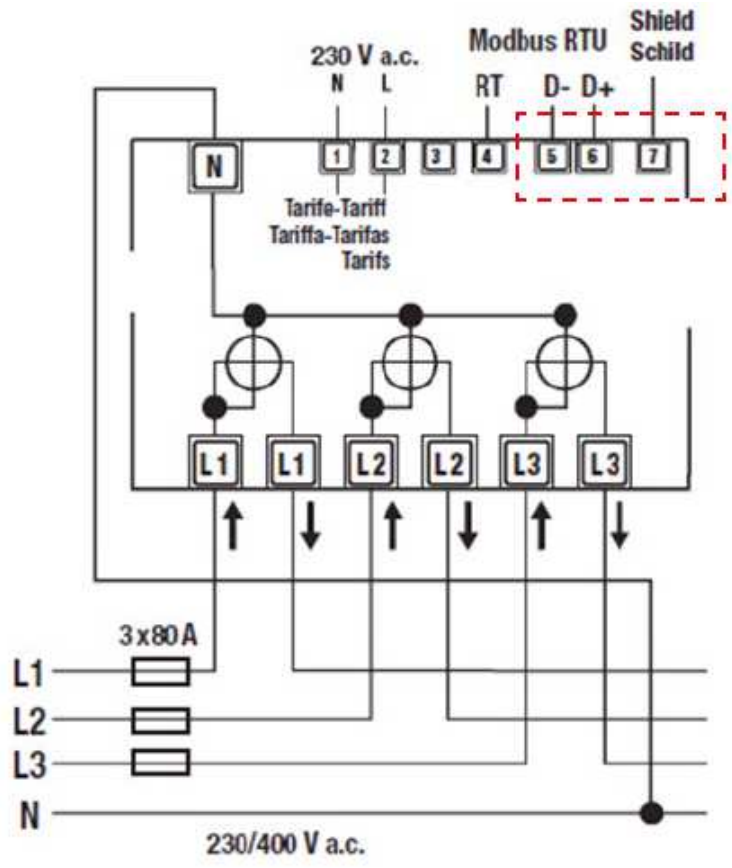
This three-phase energy meter is designated as "**Herholdt ECS3**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

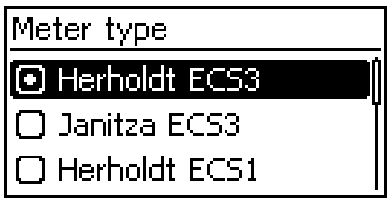
Menu item	Settings
Address (Slave-ID)	1
Baud rate	19200 Baud
Parity	None
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter Herholdt ECS3
Contact / Pin	1	6	Data A ≙ D+	6
	2	7	Data B ≙ D-	5
	3	8	Ground ≙ Shield	7



Herholdt ECS3-63 CP Modbus (ECSEM113 / ECSEM114MID)

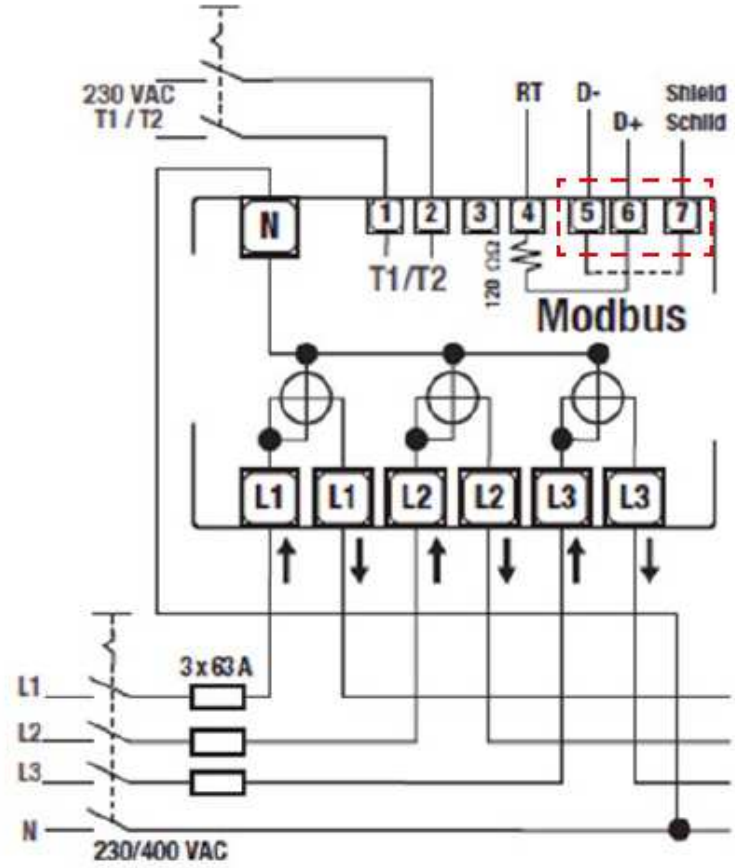
This three-phase energy meter is designated as "**Herholdt ECS3**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

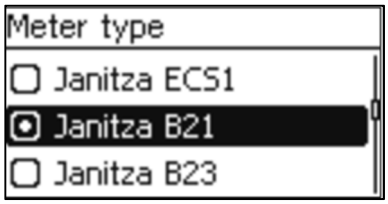
Menu item	Settings
Address (Slave-ID)	1
Baud rate	19200 Baud
Parity	None
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter Herholdt ECS3
Contact / Pin	1	6	Data A ≙ D+	6
	2	7	Data B ≙ D-	5
	3	8	Ground ≙ Shield	7



Janitza B21 312-10J Modbus

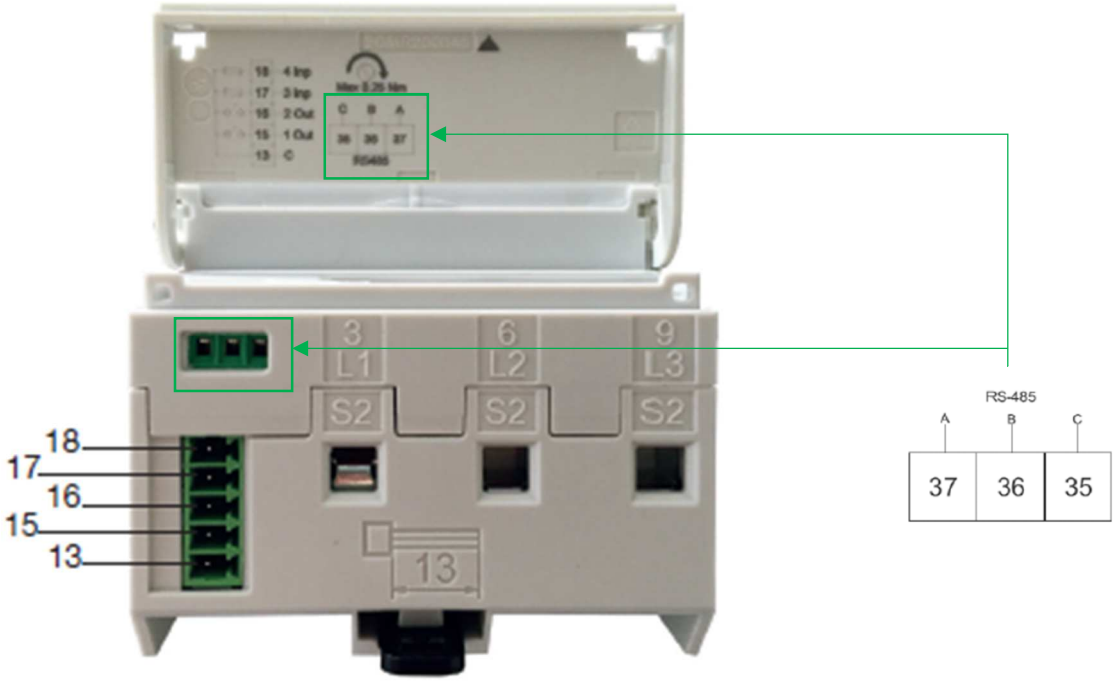
This single-phase energy meter is designated as "**Janitza B21**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

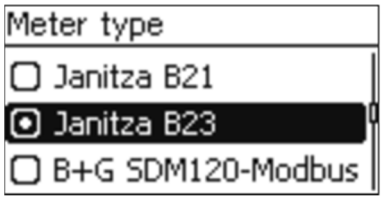
Menu item	Settings
Address (Slave-ID)	1
Baud rate	19200 Baud
Parity	None
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter Janitza B21 312-10J
Contact / Pin	1	6	Data A ≙ A	37
	2	7	Data B ≙ B	36
	3	8	Ground ≙ C	35



Janitza B23 312-10J Modbus

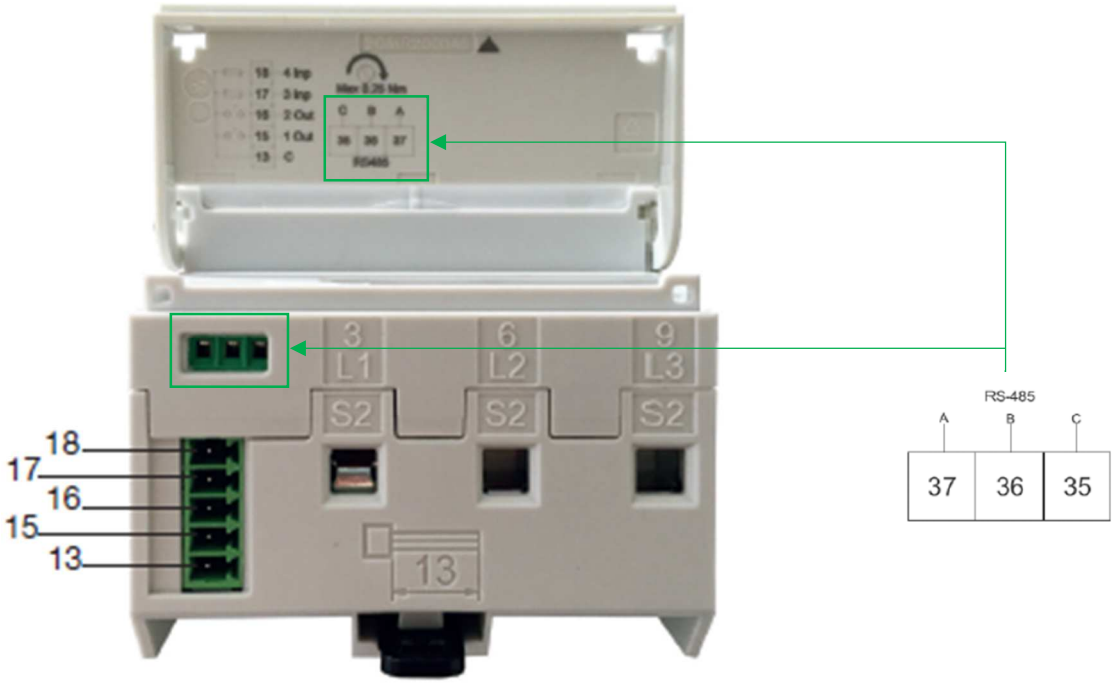
This single-phase energy meter is designated as "**Janitza B23**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

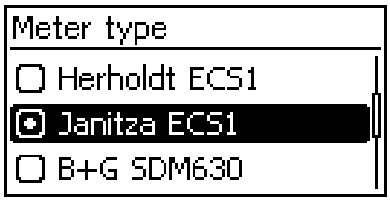
Menu item	Settings
Address (Slave-ID)	1
Baud rate	19200 Baud
Parity	None
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter Janitza B23 312-10J
Contact / Pin	1	6	Data A ≙ A	37
	2	7	Data B ≙ B	36
	3	8	Ground ≙ C	35



Janitza ECS1-63 CP Modbus (ECSEM213 / ECSEM214MID)

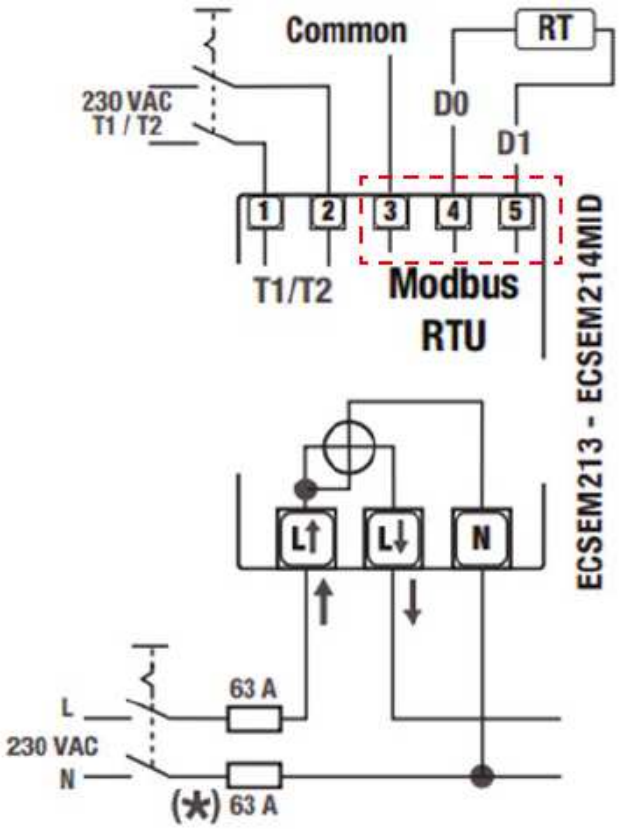
This single-phase energy meter is designated as "**Janitza ECS1**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

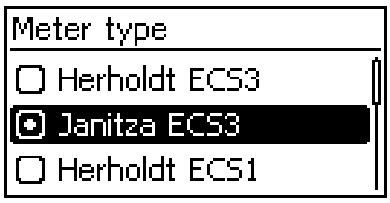
Menu item	Settings
Address (Slave-ID)	1
Baud rate	19200 Baud
Parity	None
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter Janitza ECS1
Contact / Pin	1	6	Data A ≙ D1	5
	2	7	Data B ≙ D0	4
	3	8	Ground ≙ Common	3



Janitza ECS3-5 Basic MID Modbus (ECSEM68MID)

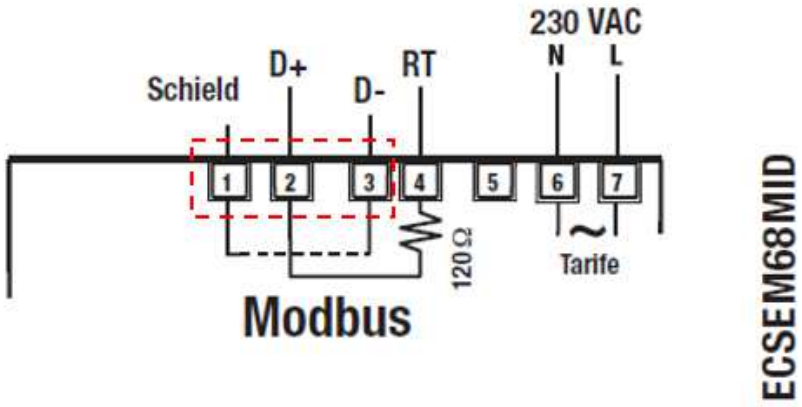
This three-phase energy meter is designated as "**Janitza ECS3**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

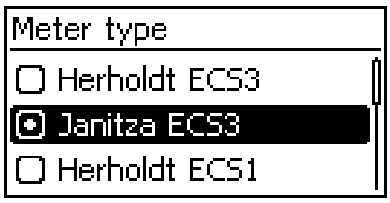
Menu item	Settings
Address (Slave-ID)	1
Baud rate	19200 Baud
Parity	None
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter Janitza ECS3
Contact / Pin	1	6	Data A ≙ D+	2
	2	7	Data B ≙ D-	3
	3	8	Ground ≙ Shield	1



Janitza ECS3-63 CP Modbus (ECSEM113 / ECSEM114MID)

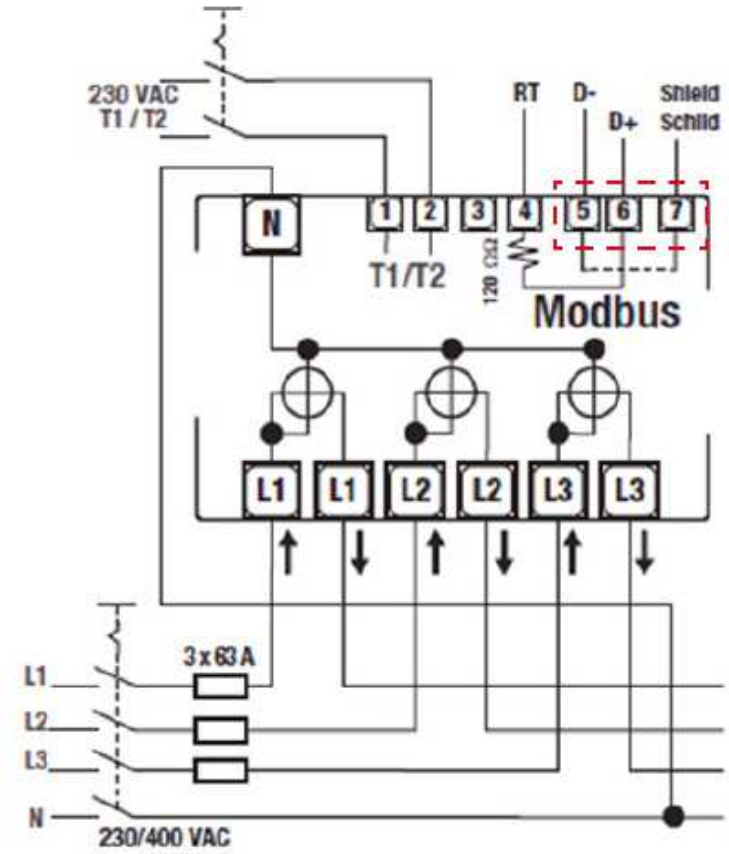
This three-phase energy meter is designated as "**Janitza ECS3**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

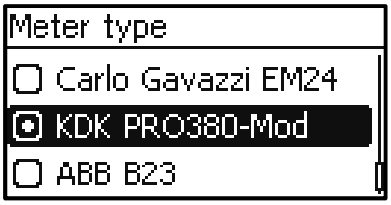
Menu item	Settings
Address (Slave-ID)	1
Baud rate	19200 Baud
Parity	None
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter Janitza ECS3
Contact / Pin	1	6	Data A ≙ D+	6
	2	7	Data B ≙ D-	5
	3	8	Ground ≙ Shield	7



KDK-Dornscheidt KDK PRO380-Mod

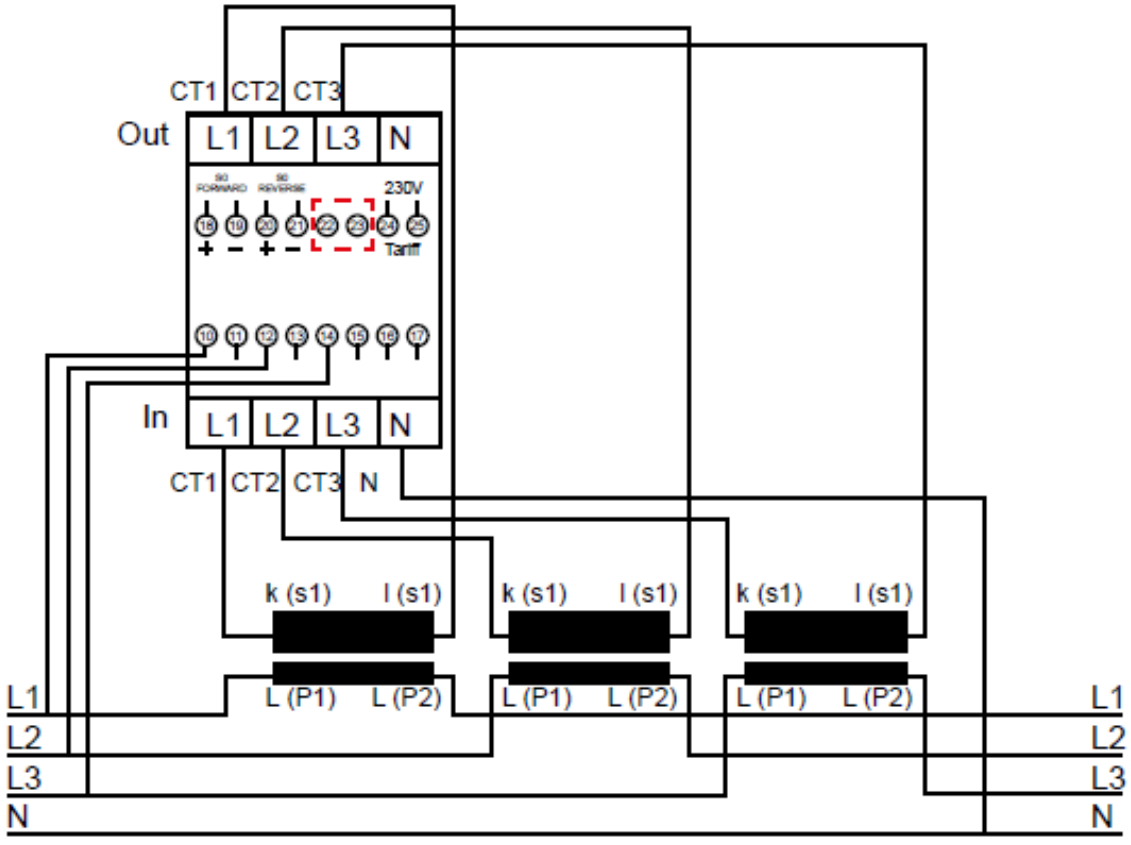
This three-phase energy meter is designated as "KDK PRO380-Mod" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

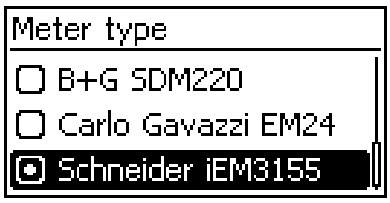
Menu item	Settings
Address (Slave-ID)	1
Baud rate	9600 Baud
Parity	Even
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter KDK PRO380-Mod
Contact / Pin	1	6	Data A	22
	2	7	Data B	23
	3	8	Masse	--



Schneider Electric IEM3155 (A9MEM3155)

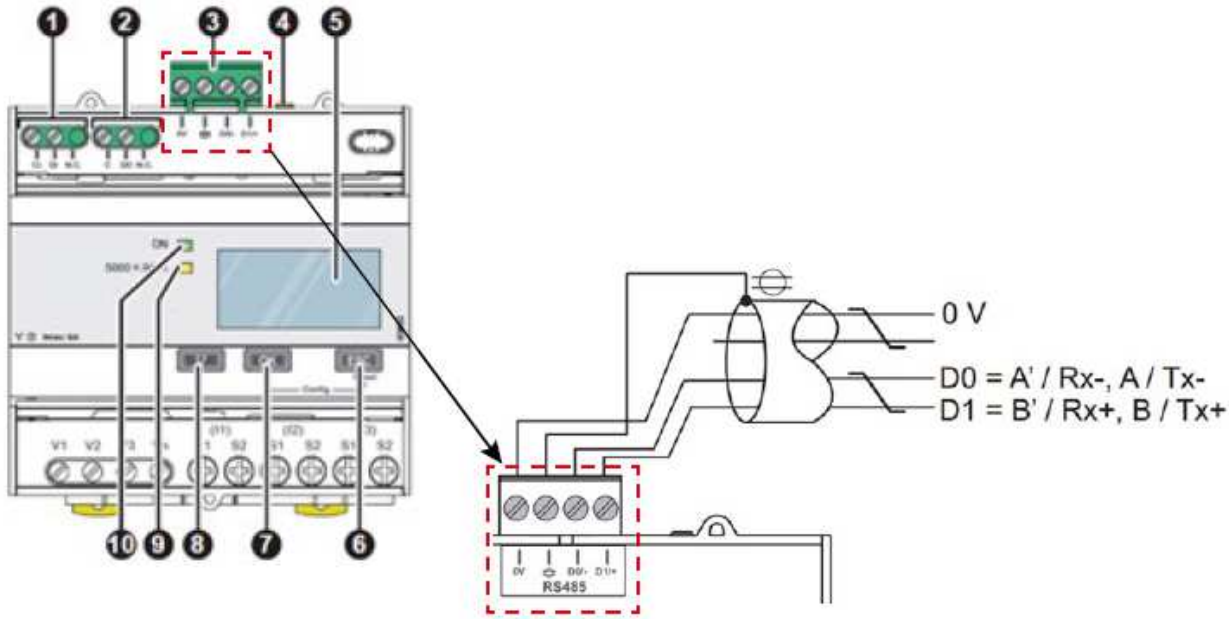
This three-phase energy meter is designated as "**Schneider iEM3155**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

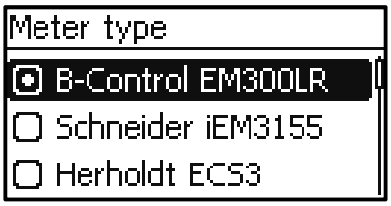
Menu item	Settings
Address (Slave-ID)	1
Baud rate	19200 Baud
Parity	Even
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter Schneider IEM3155
Contact / Pin	1	6	Data A ≙ D1	D1/+
	2	7	Data B ≙ D0	D0/-
	3	8	Ground ≙ 0V	0V



B- Control EM300LR

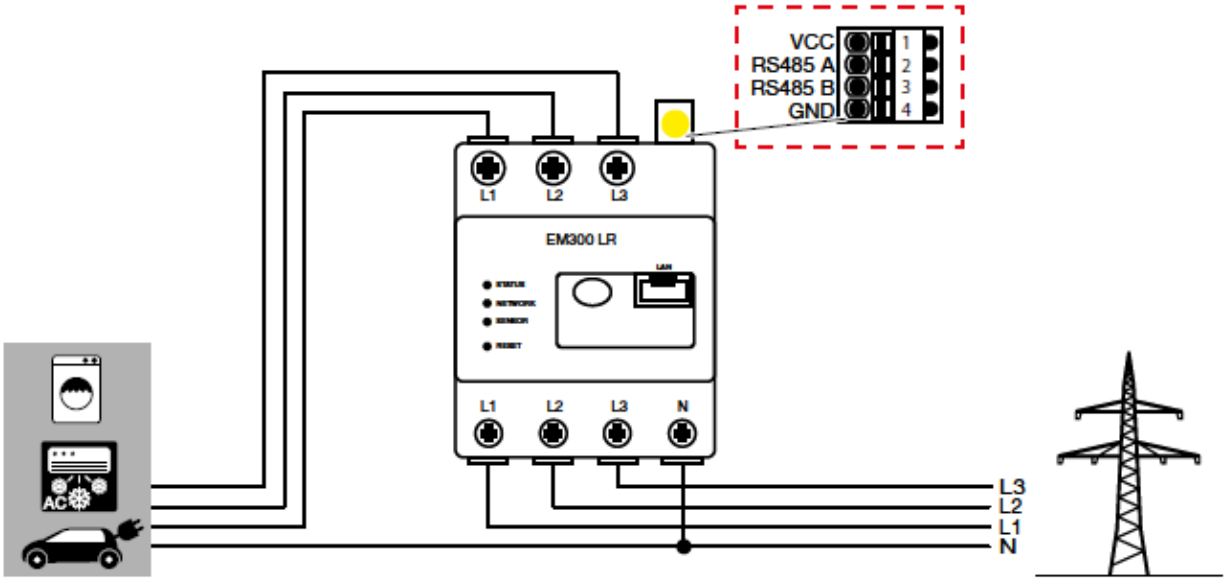
This three-phase energy meter is designated as "**B-Control EM300LR**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

Menu item	Settings
Address (Slave-ID)	247
Baud rate	19200 Baud
Parity	Even
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter B-Control EM300LR
Contact / Pin	1	6	Data A ≙ A	2
	2	7	Data B ≙ B	3
	3	8	Masse ≙ GND	4



Konfiguration B-Control EM300LR

INFO

A detailed description can be found in the operating instructions manual of the manufacturer.

After connecting the energy meter for the first time, a standard RS485 scan is performed which can not be interrupted. The scan lasts about 5 minutes and is indicated by a flashing green sensor LED on the device. Only then can the configuration of the energy meter be started.

1. Connect PC with energy meter via LAN cable
2. Open a web browser and enter the address: http://b-control-em
   If the energy counter is not found, use the „B-control Finder" tool from the manufacturer's home page at https://www.tq-automation.com/Service-Support/Downloads/Downloads-Energiemanagement > Tools. With the tool it is possible to find and call up the correct IP address of the energy meter.

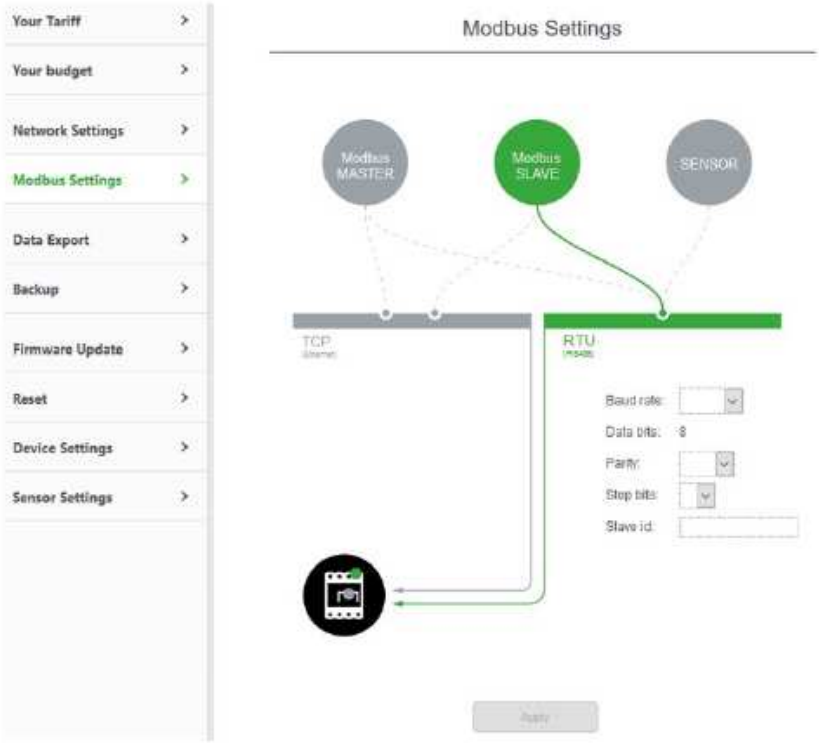
3. Press „Next". The configuration can be done without a password.

4. Press „Apply“ and take the time.

5. „Your Tariff“ and „Your budget“ does not require any settings. Press button „Save setting“. The installation is complete.

6. Continue with „extented settings“.

7. Make settings for the Modbus. To do this, follow these steps:
   - Disable SENSOR (by clicking on the circle)
   - Activate Modbus slave (click twice to get into the Modbus configuration) Einstellungen für den



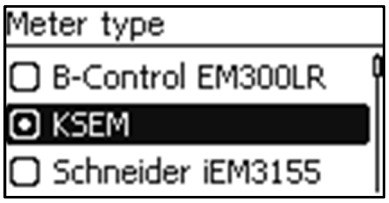
Menu item	Settings
Addresse (Slave ID)	247
Baud rate	19200 Baud
Parity	Even
Stop bits (quantity)	1

8. Save settings.

✓ Configuration completed

KOSTAL Smart Energy Meter – KSEM

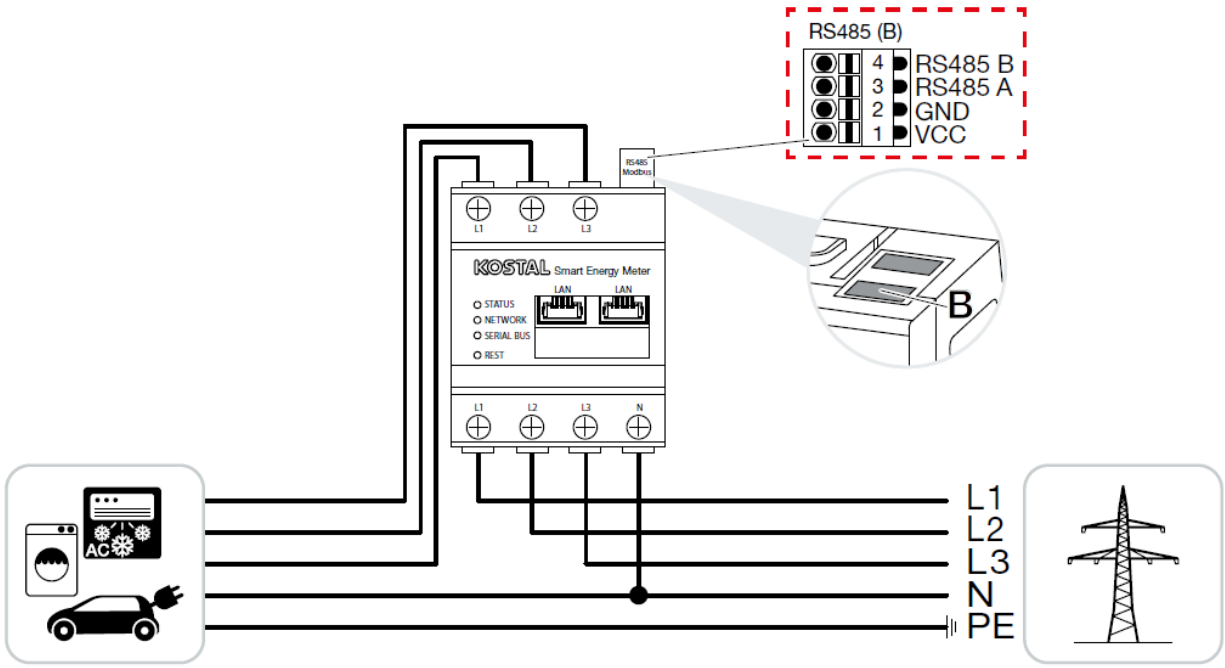
This three-phase energy meter is designated as "**KSEM**" in the "Meter type" field in the energy management settings of the inverter.



RS485 interface settings at the energy meter:

Menu item	Settings
Address (Slave-ID)	247
Baud rate	19200 Baud
Parity	Even
Stop bits (quantity)	1

Device connection	coolcept / coolcept³ (RJ10)	coolcept fleX / coolcept³ fleX (RJ45) COM2	Bus signal	Energy meter B-Control EM300LR
Contact / Pin	–	6	Data A ≙ A	3
	–	7	Data B ≙ B	4
	–	8	Masse ≙ GND	2



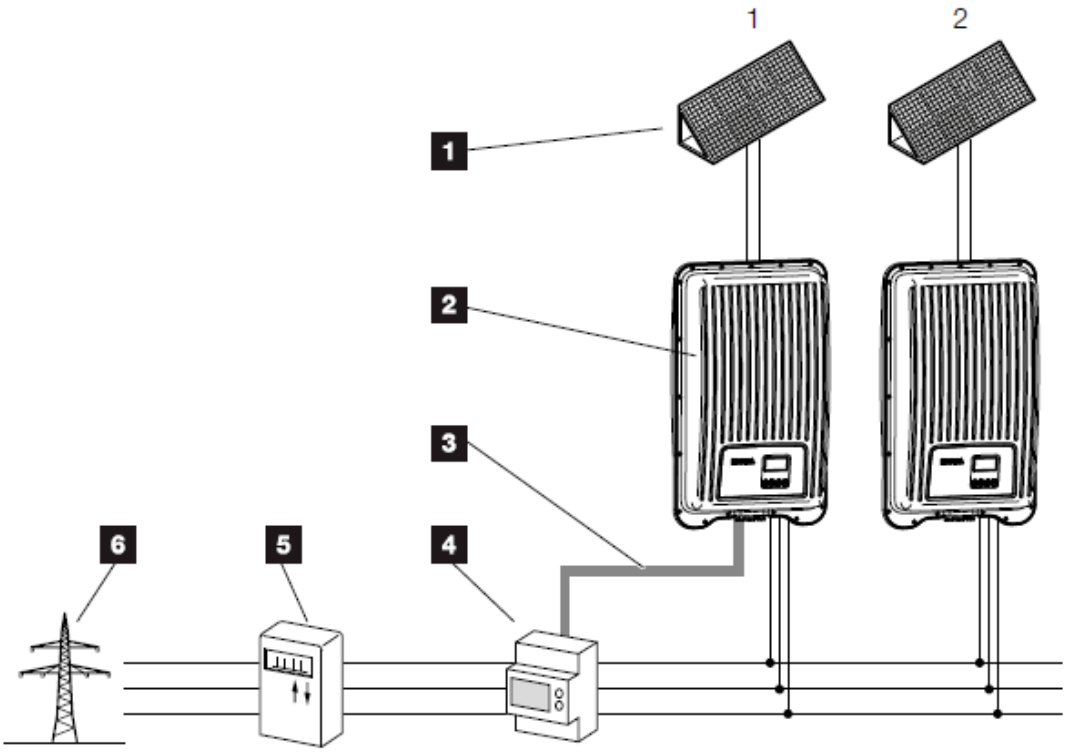
Settings in the KOSTAL Smart Energy Meter are not necessary as this is preconfigured on the RS485 B interface for the coolcept fleX /coolcept³ fleX.

PV systems with one energy meter and two inverters

The general recommendation is to connect the energy meter to the inverter having the greatest AC output power. This is the easiest way of reducing the feed in power to the specified value. If this is not possible due to the technical prerequisites of the system then the following formula must be used to determine whether or not a sufficient reduction can be achieved.

The ratio of the PV power of PV generator 2 (PV2) to the total PV generator power (PV1 + PV2) yields the minimum possible power limit for the total PV generator power. This results in the following formula for calculating the minimum possible power limit.

Minimum possible power limiting = PV2 : (PV1 + PV2)



1. PV-Generator
2. Inverter coolcept fleX or coolcept³ fleX
3. Modbus RTU interface
4. Energy meter with Modbus RTU (position grid connections (feed in))
5. Consumption and feed-in meter
6. Public grid

Example:
PV1 = 6000Wp / WR1 = StecaGrid 5503 / PV2 = 3400Wp / WR2 = StecaGrid 3203

Specification:
This should be variably reduced to 70% of the maximum PV generator power.

Calculation of the minimum possible power limit:
PV2 : (PV1 + PV2) = 3400Wp : (6000Wp + 3400Wp) = 0.36
Minimum possible possible power limit= 36% of the max. PV generator power of 9400W (DC)

Result:
The energy meter is connected to inverter 1 (StecaGrid 5503). Under the "Dyn. feed in control" menu item in the inverter, a value of 6580W (= PV1 + PV2 * 0.7) is set.

If necessary, inverter 1 can reduce its output power to ensure that the maximum permissible value of 6580W at the grid transfer point is not exceeded. The specified power limiting to 70% of the maximum PV generator power is thus adhered to.