# 1 General information

The StecaGrid coolcept / coolcept³ / coolcept 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 Firmware coolcept/coolcept³ | Inverter Firmware coolcept fleX |
|---|---|---|---|---|
| ABB | ABB B23 | 3-phase | HMI APP 2.26.0 or later | HMI APP 3.4.0 or later |
| B+G E-Tech GmbH | SDM120-Modbus | 1-phase | HMI APP 2.19.0 or later | |
| | SDM220-Modbus | 1-phase | HMI APP 2.10.0 or later | |
| | SDM230-Modbus | 1-phase | HMI APP 2.19.0 or later | |
| | SDM630-Modbus | 3-phase | HMI APP 2.7.0 or later | |
| Carlo Gavazzi | EM24-DIN.AV9.3.X.IS.X | 3-phase | HMI APP 2.7.0 or later | |
| Herholdt | ECS1-63 CP Modbus | 1-phase | HMI APP 2.10.0 or later | |
| | ECS3-80 B Modbus | 3-phase | HMI APP 2.7.0 or later | |
| | ECS3-63 CP Modbus | 3-phase | HMI APP 2.7.0 or later | |
| Janitza | ECS1-63 CP Modbus | 1-phase | HMI APP 2.10.0 or later | |
| | ECS3-5 Basic MID Modbus | 3-phase | HMI APP 2.7.0 or later | |
| | ECS3-63 CP Modbus | 3-phase | HMI APP 2.7.0 or later | |
| KDK-Dornscheidt | KDK Pro380-Mod | 3-phase | HMI APP 2.26.0 or later | |
| Schneider Electric | IEM3155 | 3-phase | HMI APP 2.10.0 or later | |
| TQ Systems GmbH | B-Control EM300LR | 3-phase | HMI APP 2.19.0 or later | |

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 / coolcept³ / coolcept fleX inverters and for the various energy meters!**

# 2 Configuration

## 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 | Inverter RJ10 | Bus signal |
|---|---|---|
| Contact / Pin | 1 | Data A |
| | 2 | Data B |
| | 3 | Ground |
| | 4 | --- |


*Fig.1 Contact/pin assignments of RJ10 plug*

Notes on the electrical connection of StecaGrid inverters to selected energy meters:

- 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.

## StecaGrid coolcept 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 | Inverter COM2 RJ45 | Bus signal |
|---|---|---|
| Contact / Pin | 1 | - |
| | 2 | - |
| | 3 | - |
| | 4 | - |
| | 5 | - |
| | 6 | Data A |
| | 7 | Data B |
| | 8 | Ground |


*Abb.2 Contact/pin assignments of RJ45 plug*

Notes on the electrical connection of StecaGrid inverters to selected energy meters:

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

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

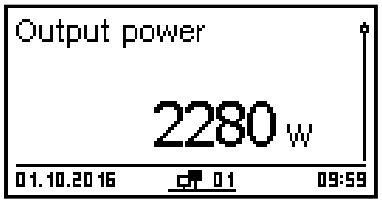



*Fig. 3 Status display*

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

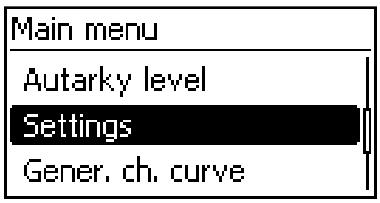



*Fig. 4 Main menu*

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

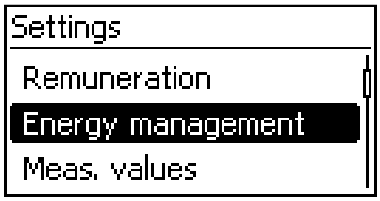



*Fig. 5 Settings*

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

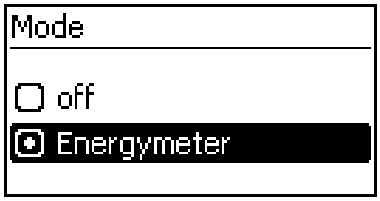



*Fig. 6 Mode*

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

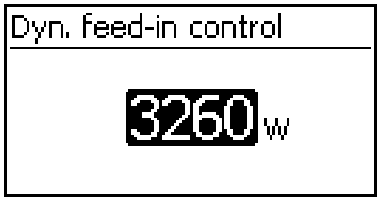



*Fig. 7 Dynamic feed limitation*

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)

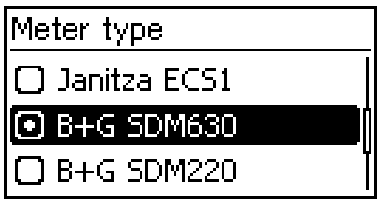



*Fig. 8 Meter type*

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

# 3 Energy meter configuration

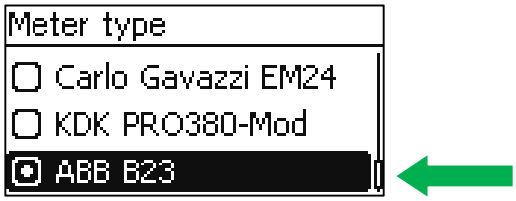
If the energy meters listed below are used with their respective factory settings then **no** settings need to be made in the energy meter configuration menu. If the factory settings are changed then the following settings must be adjusted at the energy meter.

| Menu item | Settings |
|---|---|
| Address | 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!**

# 4 ABB B23

This three-phase energy meter is designated as "**ABB B23**" in the "Meter type" field in the energy management settings of the StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the ABB B23 energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 19200 Baud |
| Parity | Even |
| Stop bits | 1 |

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

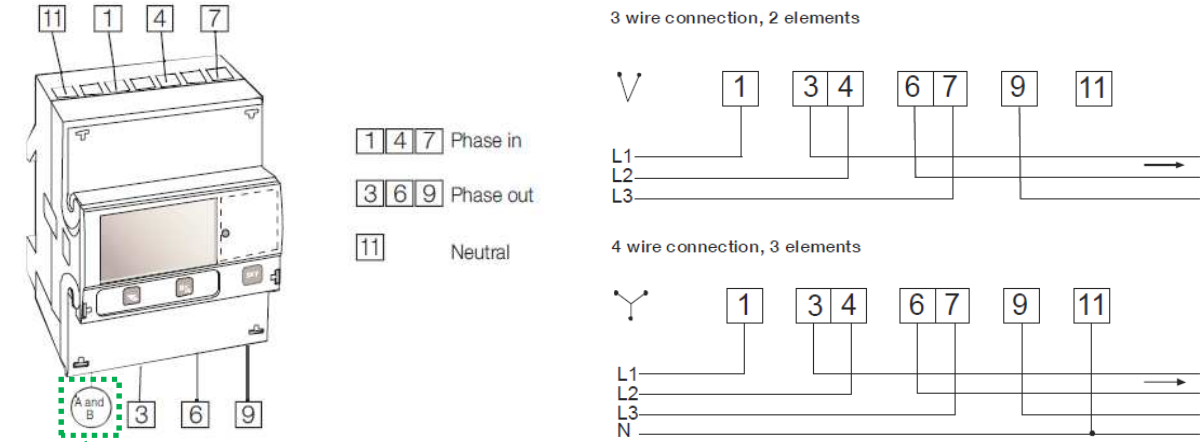



*Fig. 9 Wiring diagram energy meter B23*

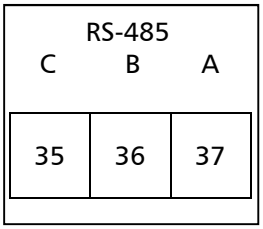
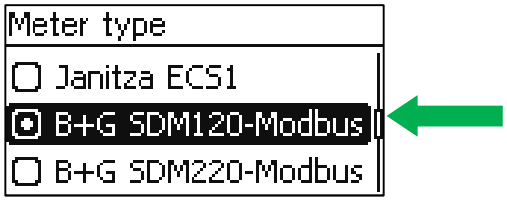



*Fig. 10 Communication RS-485 (Modbus) see pos. B Fig. 9*

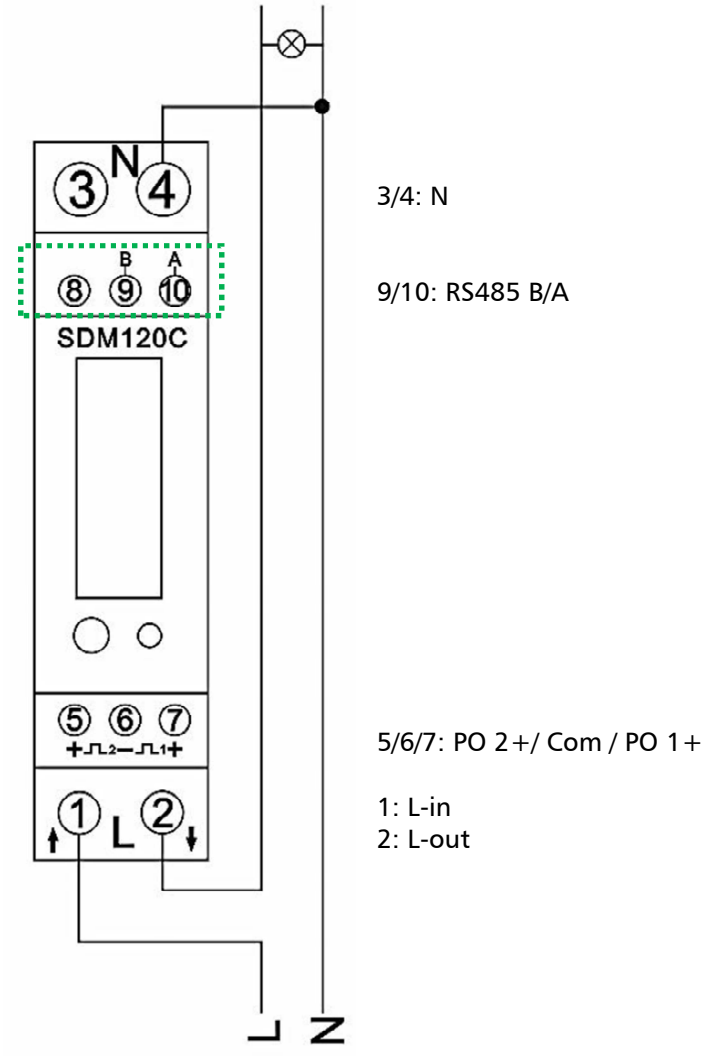
# 5 B+G SDM120 Modbus

This single-phase energy meter is designated as "**B+G SDM120-Modbus**" in the "Meter type" field in the energy management settings of the StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the B+G SDM120 Modbus energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 2400 Baud |
| Parity | None |
| Stop bits | 1 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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** |




3/4: N

9/10: RS485 B/A

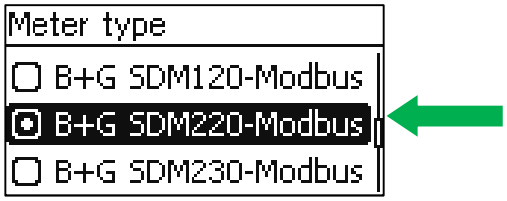
5/6/7: PO 2+/ Com / PO 1+

1: L-in
2: L-out

*Fig. 11 Wiring diagram for B+G SDM120 Modbus*

# 6 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 StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the B+G SDM220 Modbus energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 9600 Baud |
| Parity | None |
| Stop bits | 2 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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** |

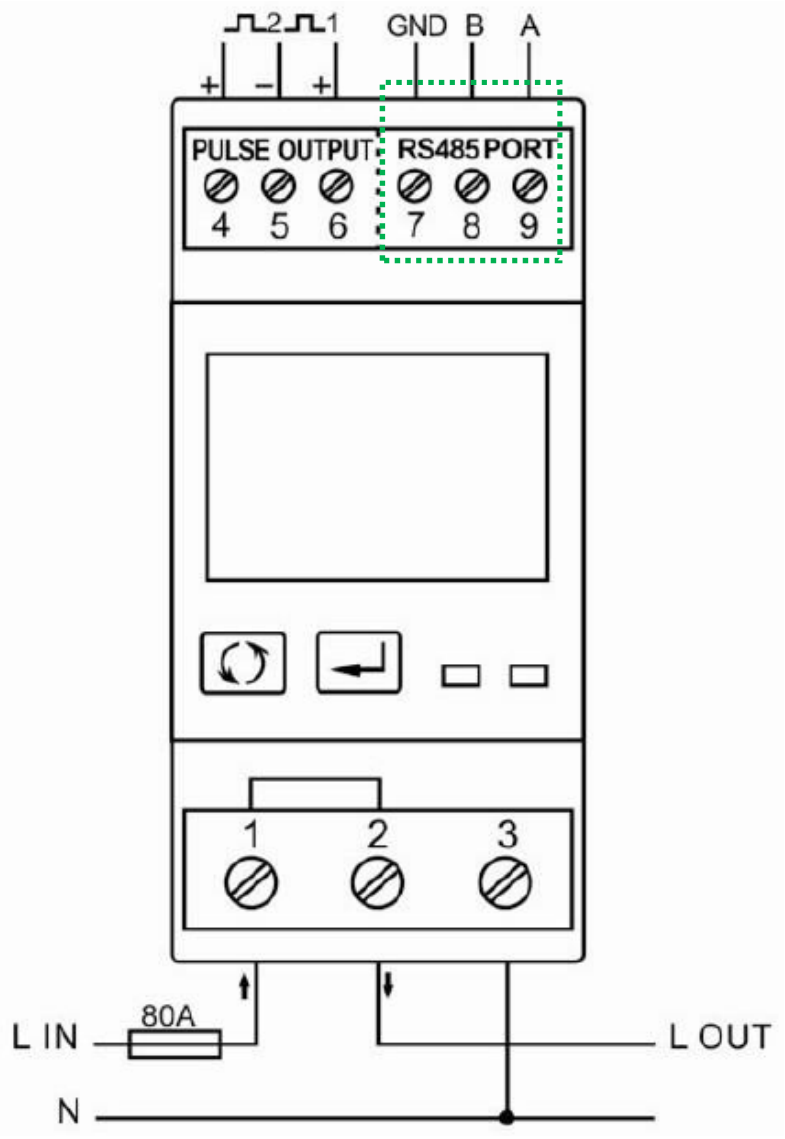
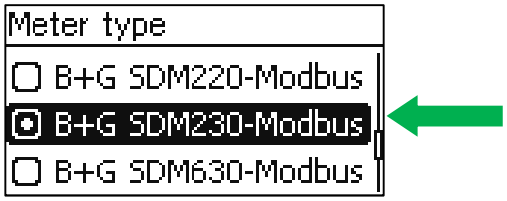



*Fig. 12 Wiring diagram for B+G SDM220 Modbus*

# 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 StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the B+G SDM230 Modbus energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 2400 Baud |
| Parity | None |
| Stop bits | 1 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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** |

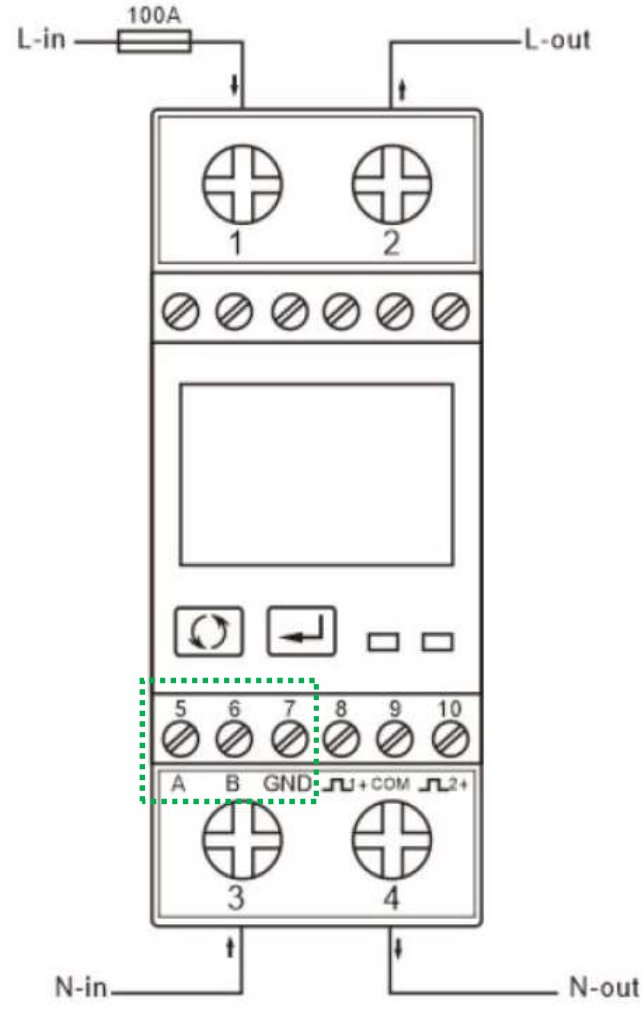
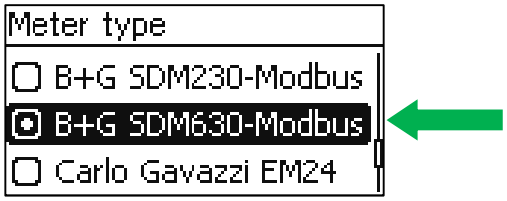



*Fig. 13 Wiring diagram for B+G SDM230 Modbus*

# 8 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 StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the B+G SDM630 Modbus energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 9600 Baud |
| Parity | None |
| Stop bits | 2 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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 | --- |

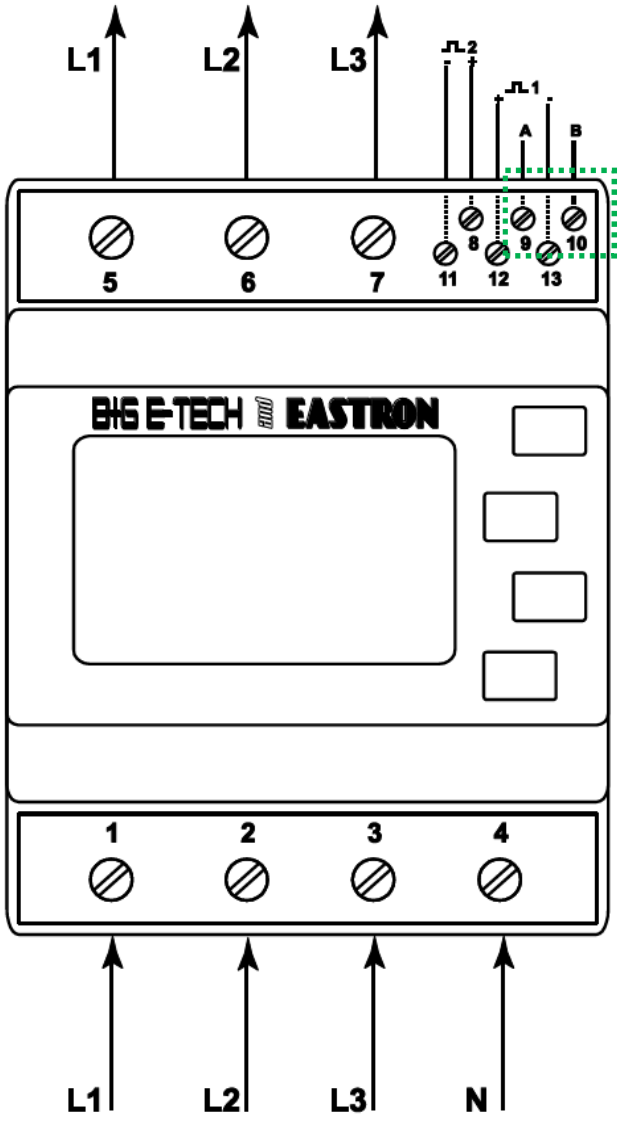
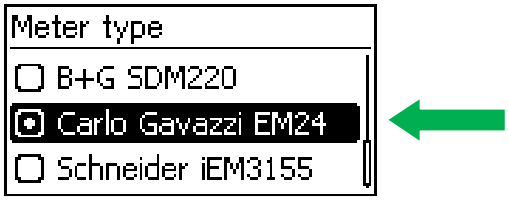



*Fig. 14 Wiring diagram for B+G SDM630 Modbus*

# 9 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 StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the Carlo Gavazzi EM24 energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 9600 Baud |
| Parity | None |
| Stop bits | 1 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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** |

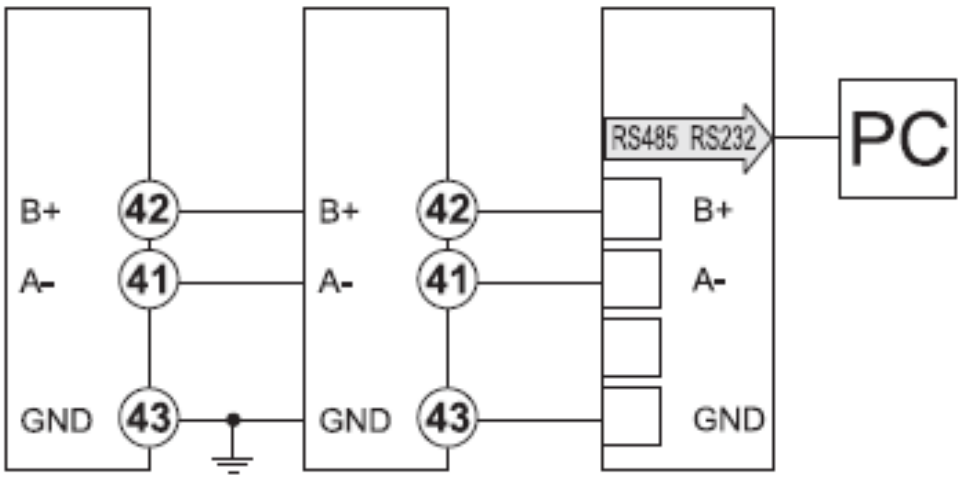
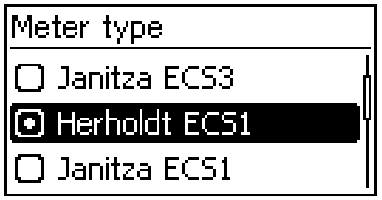



*Fig. 15 Wiring diagram for Carlo Gavazzi EM24-DIN.AV9.3.X.IS.X*

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.**

# 10 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 StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the Herholdt ECS1 energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 19200 Baud |
| Parity | None |
| Stop bits | 1 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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** |

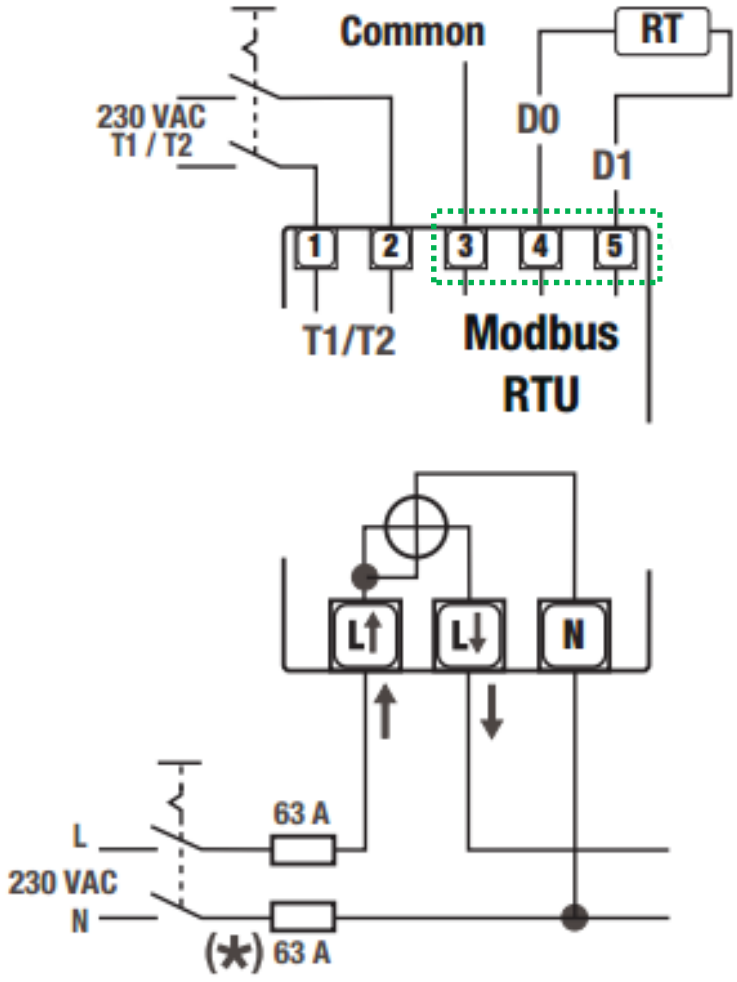
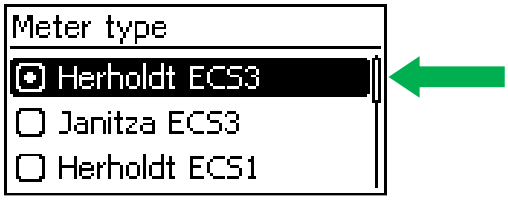



*Fig. 16 Wiring diagram for Herholdt ECS1-63 CP Modbus*

# 11 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 StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the Herholdt ECS3 energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 19200 Baud |
| Parity | None |
| Stop bits | 1 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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** |

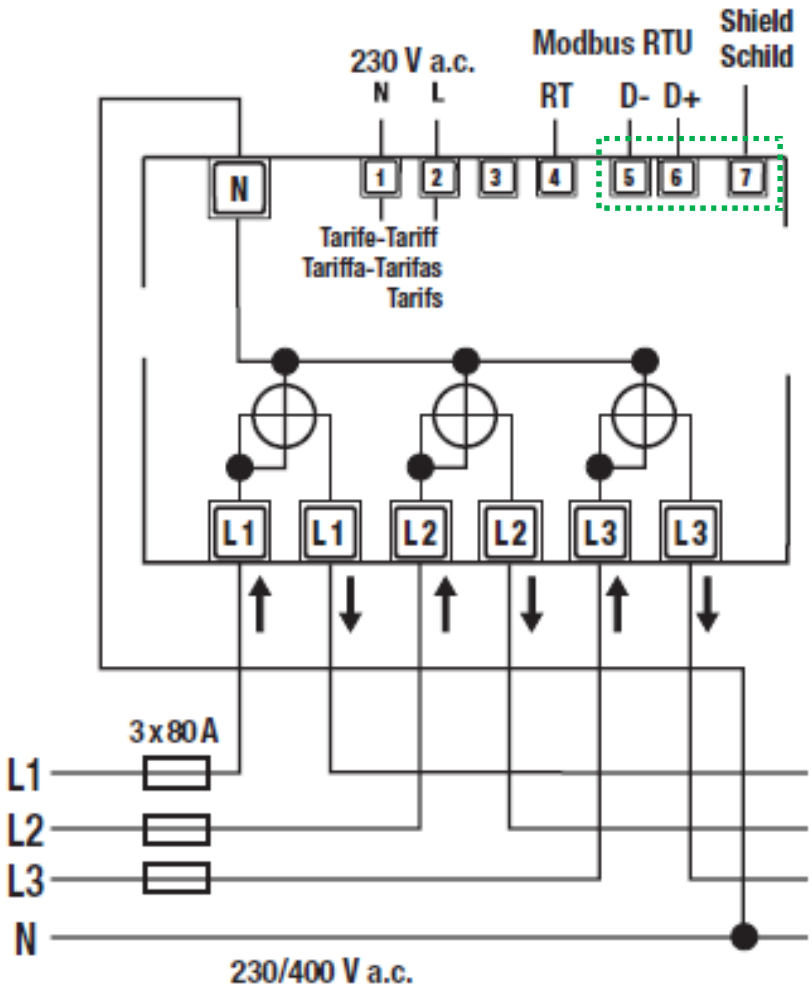
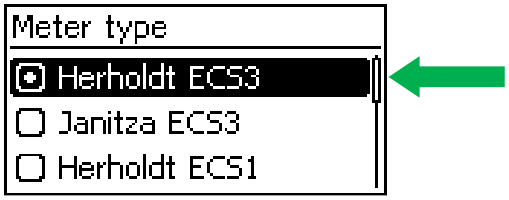



*Fig. 17 Wiring diagram for Herholdt ECS3-80 B Modbus*

# 12 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 StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the Herholdt ECS3 energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 19200 Baud |
| Parity | None |
| Stop bits | 1 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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** |

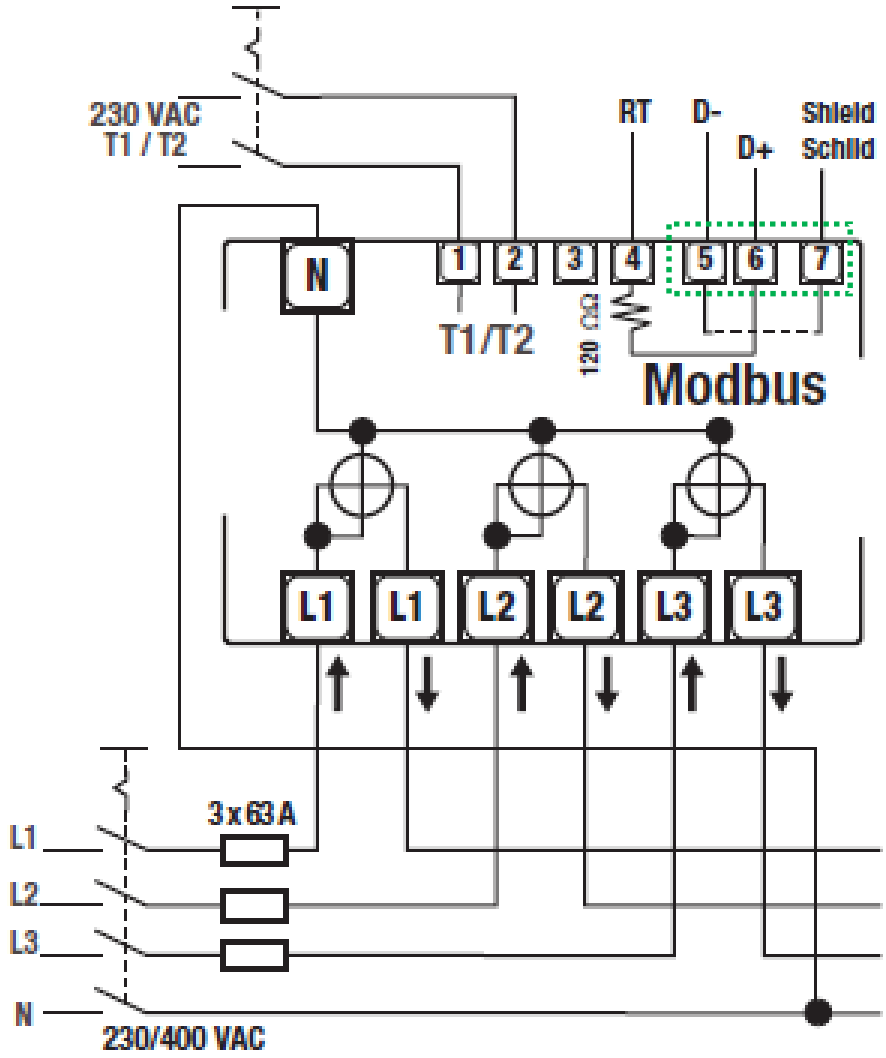
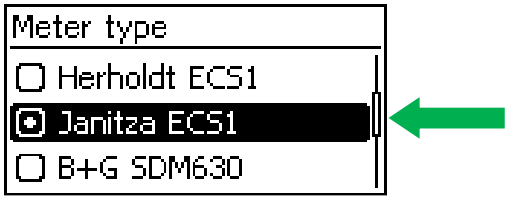



*Fig. 18 Wiring diagram for Herholdt ECS3-63 CP Modbus*

# 13 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 StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the Janitza ECS1 energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 19200 Baud |
| Parity | None |
| Stop bits | 1 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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** |

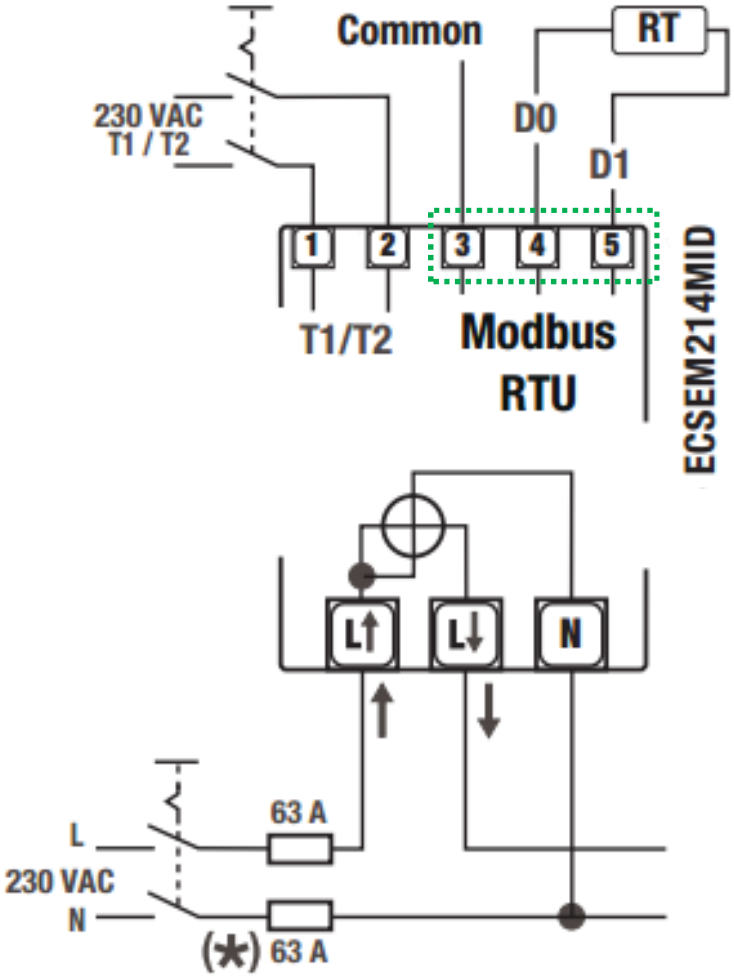
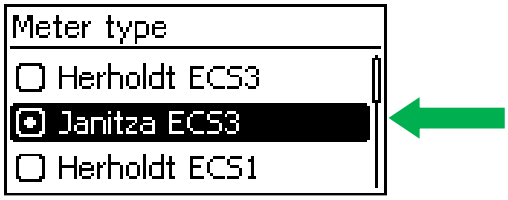



*Fig. 19 Wiring diagram for Janitza ECS1-63 CP Modbus*

# 14 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 StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the Janitza ECS3 energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 19200 Baud |
| Parity | None |
| Stop bits | 1 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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** |

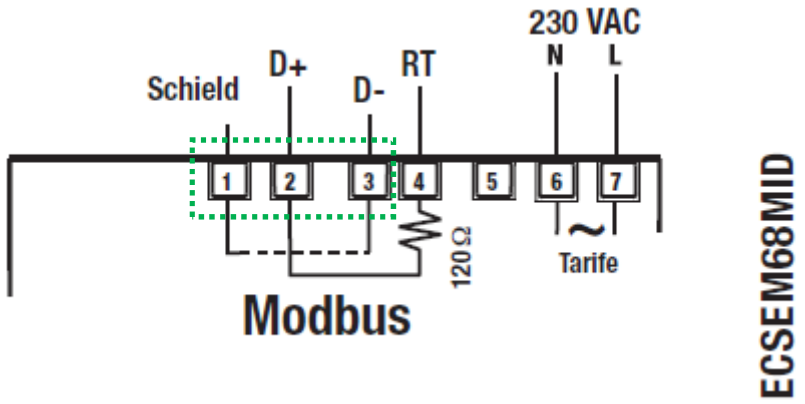
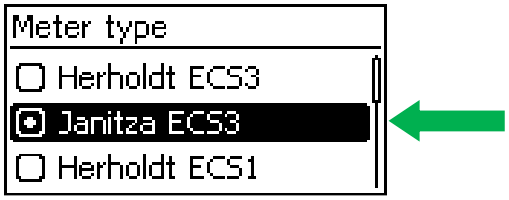



*Fig. 20 Wiring diagram for Janitza ECS3-5 Basic MID Modbus*

# 15 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 StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the Janitza ECS3 energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 19200 Baud |
| Parity | None |
| Stop bits | 1 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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** |

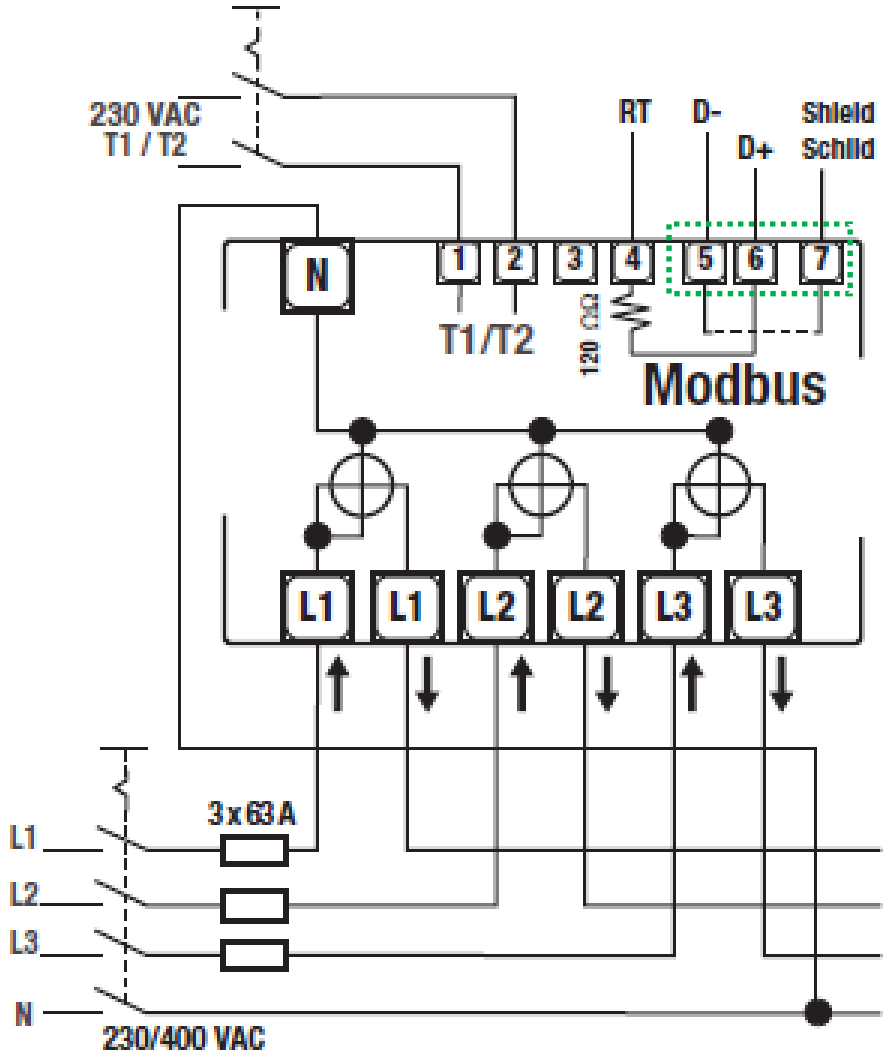



*Fig. 21 Wiring diagram for Janitza ECS3-63 CP Modbus*

# 16 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 StecaGrid coolcept / coolcept³ / coolcept fleX.


| RS485 interface settings at the KDK PRO380-Mod energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 9600 Baud |
| Parity | Even |
| Stop bits | 1 |

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

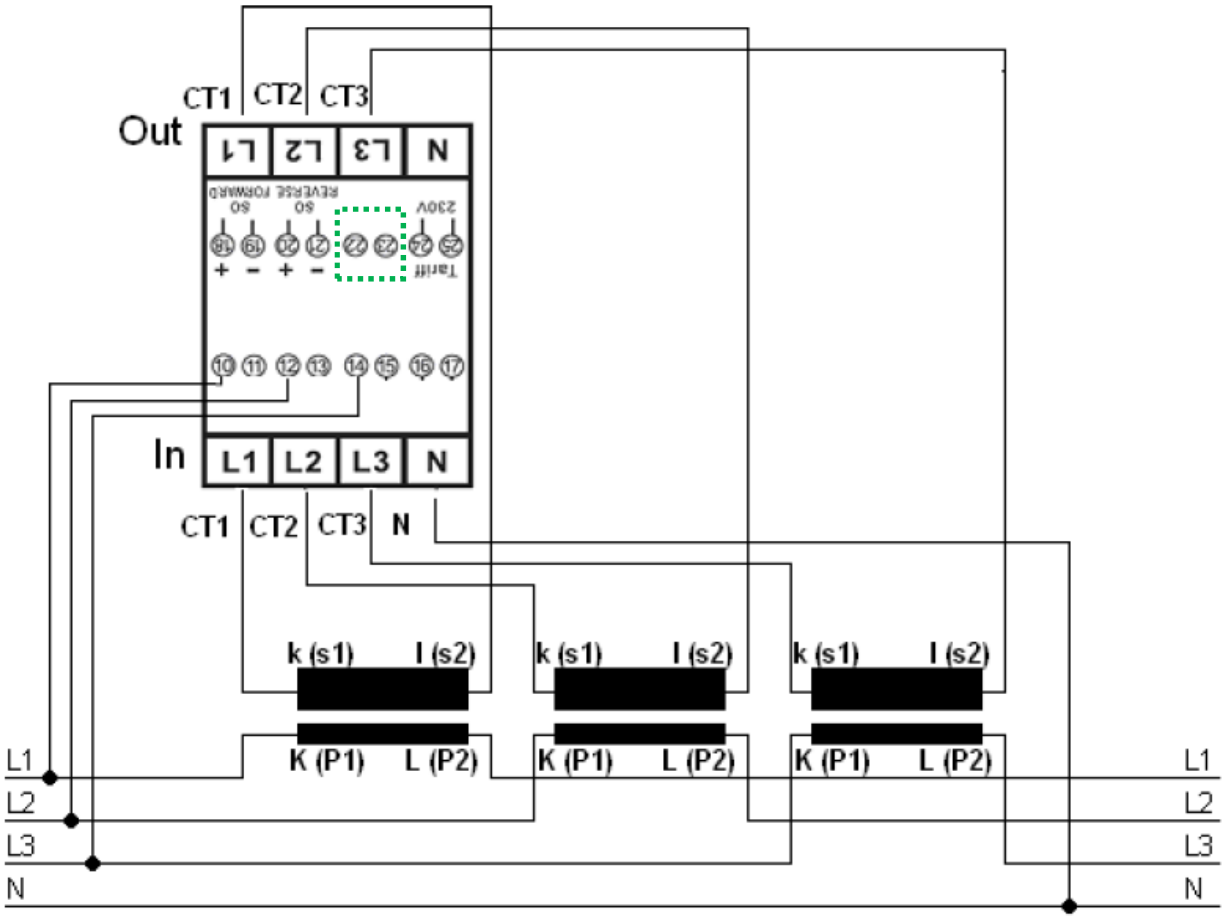
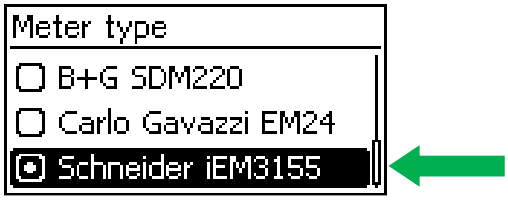



*Fig. 22 Wiring diagram for KDK-Dornscheidt KDK PRO380-Mod*

# 17 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 StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the Schneider iEM3155 energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 1 |
| Baud rate | 19200 Baud |
| Parity | Even |
| Stop bits | 1 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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** |

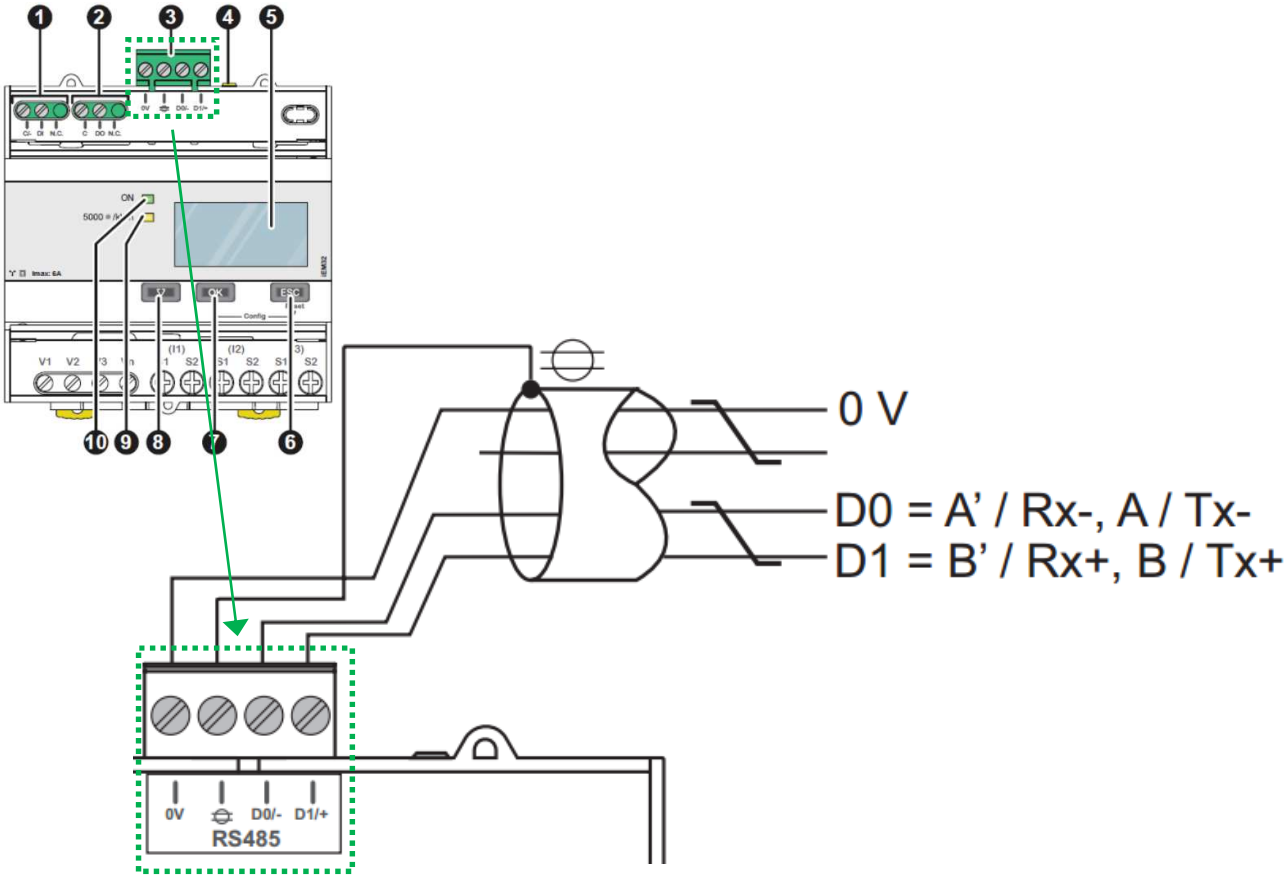
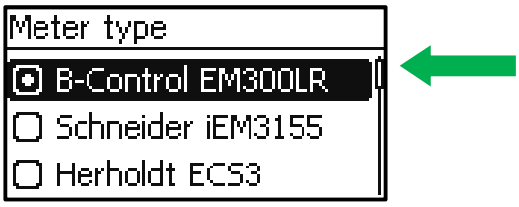



*Fig. 23 Wiring diagram for Schneider Electric IEM3155*

# 18 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 StecaGrid coolcept / coolcept³ / coolcept fleX.




| RS485 interface settings at the B-Control EM300LR energy meter | |
|---|---|
| **Menu item** | **Settings** |
| Address | 247 |
| Baud rate | 19200 Baud |
| Parity | Even |
| Stop bits | 1 |

| Device connection | Inverter coolcept / coolcept³ RJ10 | Inverter coolcept fleX RJ45 | 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** |

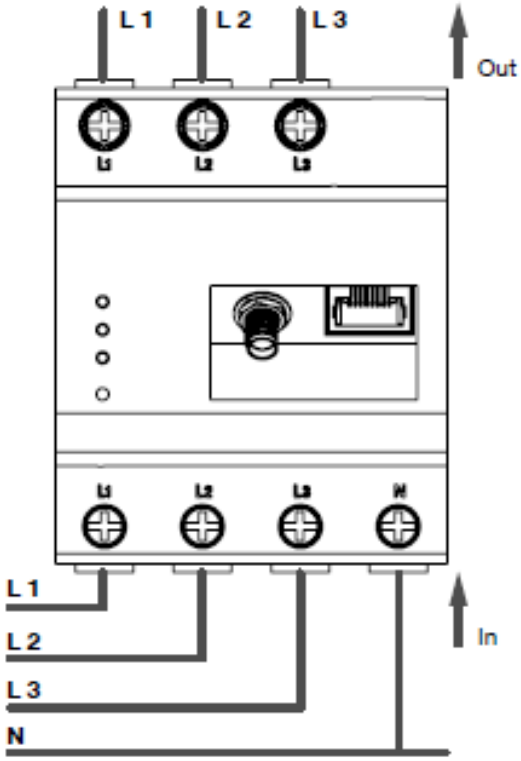



*Fig. 24 Wiring diagram B-Control EM300LR*

| in | Identification | Description |
|---|---|---|
| 1 | VCC | Power supply for supplying external devices 9 V ± 10 % max. 280 mA |
| 2 | A | RS485 A |
| 3 | B | RS485 B |
| 4 | GND | Ground |

*Fig. 25 Connecting diagram RS485 plug on the B-Control EM300LR*

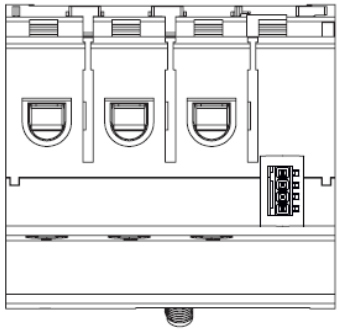


*Fig. 26 Energy meter from above without plug*

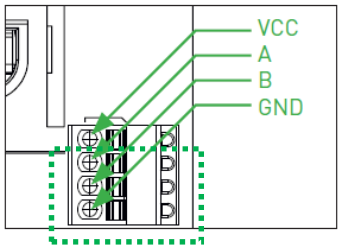



*Fig. 27 Enlarged section of the plug*

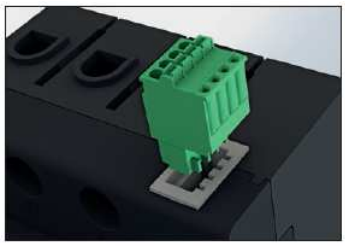
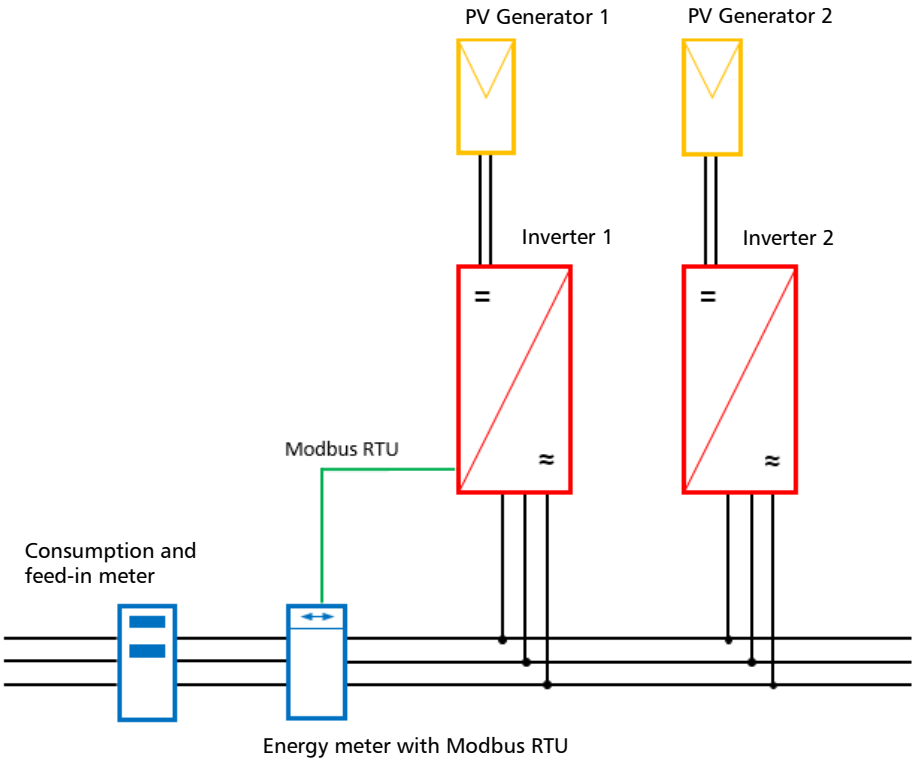


*Fig. 28 Energy meter with plug to RS485 interface*

# 19 PV systems with one energy meter and two StecaGrid coolcept / coolcept³ 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)**




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.**