Solar-Log™

EN Meter Connection Manual V.4.2.3

Solar-Log™

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1 External Power Meter

1.1 Recording Energy Flows with External Power Meters

External power meters can be connected to every Solar-Log™ model via the S0 input and/or the RS-485 bus.
Solar-Log™ devices have a varying number of SO inputs:

S0 inputs

Solar-Log™	Number of S0 inputs
Solar-Log 300, 1200, 1900 and 2000	2 x S0-In and 1 x S0-Out
Solar-Log$^{1000, 500}$	1 x S0-In/Out
Solar-Log^{200}	1 x S0-In
Solar-Log 250	1 x S0-In

Note

The Solar-Log™ requires a S0 pulse duration of 30-40 ms. That is why we recommend using SDS tested meters that we offer.
We cannot guarantee the functionality of other products.
In addition, the maximum length between the power meters and Solar-Log™ should not exceed 10 m.

Note

Consumption meters can be assigned to plant groups.
It is only possible to assign a meter after a rule with the calculation of self-consumption has been activated in the power management configuration Configuration | Feed-in Management.

Note

With the Solar-Log™, the electricity fed into the power grid from a PV plant can be limited.
The actual reduction of output can be set as a fixed rate (kW or %) or dynamic with the local consumption of the generated electricity factored into the actual reduction rate.
Recording the current consumption plays a key role when the local consumption is taken into account for the reduction.
A consumption meter has to be installed to achieve an accuracy of +/- 2%.
It is not generally possible to achieve this accuracy with just a bidirectional meter at the grid connection point. The feed-in limits may be exceeded and there could be irregularities due to different measuring, reading and control intervals. That is why we strongly discourage such installation and the use of S0 meters.

Note

The Solar-Log™ offers the option of a “Fixed Regulation of X% with the Calculation of Self-Consumption.”
A general requirement for the fixed regulation of X% is that the inverters used allow the Solar-Log™ to limit the output.
There is a major difference between Solar-Log™ compatible inverters when it comes to power reductions.
Some inverters cannot be limited to 0 watts or 0% of the generator output; they produce a certain amount of residual power even when the output is set to zero. This needs to considered when designing plants with 0% output reduction. For example, the base load always needs to be greater than the residual power output.
There is also a distinct difference between the reaction times of various inverters. The reaction time also depends on the number of devices installed. It is not recommended to use S0 meters for 0% reductions.

► For these reasons, Solare Datensysteme GmbH cannot guarantee an absolute 0% feed-in reduction.

► It is always necessary to consult the grid operator about the reduction.

External power meters/accumulating meters

With multiple phase meters, a basic distinction is made between phase-exact and accumulating meters.

Accumulating meters provide the total values from all three phases. The meter calculates the total output (to and from the grid) of the individual phases and provides this total as a single value.

In the example:
Phase 1 supplies 3 kW via an inverter (single phase).
Phase 2 refers to 2 kW (energy)
Phase 3 refers to 1 kW (energy)
With an accumulating meter, this results in a total of 0 kW.

An example of an accumulating meter is the Janitza UMG 104 or the Solar-Log™ Pro380 Mod.

2 Solar-Log™ Meter Operating Modes

2.1 Explanation of the Solar-Log™ Meter Operating Modes

There are various setting options when configuring meters in Solar-Log™. These are in particular:

- Battery meter (bi-directional meter):
  - Records the battery charges and discharges.
- Deactivated: The recording of consumption has been or is deactivated.
- Meter for the entire plant: The entire production from all of the inverters.
- Sub-consumer: Meter to record the individual consumption from appliances that was already recorded with a consumption meter.
- Utility Meter (U+I) (only Solar-Log 2000): Meter for control and reduction functions - including current measurements if necessary with current transformers.
- Utility Meter (U) (only Solar-Log 2000): Meter for control and reduction functions - only voltage measurements.
- Utility Meter (U+I) + Consumption Meter (bi-directional) (only Solar-Log 2000):
  Meters that are used as Utility Meters (U+I) can also be used as consumption meters (bi-directional) in this mode.
- Consumption meter: Meter that only records the consumption.
- Consumption meter (Bi-directional meter): Meter that records consumption and production collectively - the actual consumption is determined by monitoring the inverters.
- Generator: The meter values are considered inverter values.

Note

See attachment beginning on page 43 for further examples of meter circuitry in connection with yield and consumption logging.

3 General Information on Wiring

3.1 Wiring for S0 meter

The SO connection for external power meters is connected to a 6-pin S0A-In/Out connection (S0-IN A and S0-OUT) or to a 4-pin S0-IN B as follows:

SO meters in general	
S0 Solar-Log™	Power meter
PIN	Assignment
1	S0+
2	S0-
3	
4	

Place a cable bridge between pin 3 and 4 on the Solar-Log™.

3.2 Wiring for RS485 meter

The meter's RS485 output can be connected to any RS485 interface (A, B and C) on the Solar-Log™.

Overview

- 2-pin wiring
- The communication address has to be assigned.

Installation steps

- Switch off the meter and Solar-Log™.
- Connect the meter to the Solar-Log™.

3.3 Wiring meters to record self-consumption

There are two options to record self-consumption via the Solar-Log™:

- Measuring just the consumption.
- Measuring with bi-directional measurements (two-way measurements) at the grid connection point behind the utility company meter.

Fundamentally, a separate meter needs to be installed to record energy consumption.
The meters used by utility companies generally cannot be used to send data to the Solar-Log™.

3.3.1 Meter connection options to record the total consumption via an RS485/S0 interface.

This meter has to measure the total consumption of the house.
The meters installed by grid operators, or two-way meters, cannot be used to implement this function.

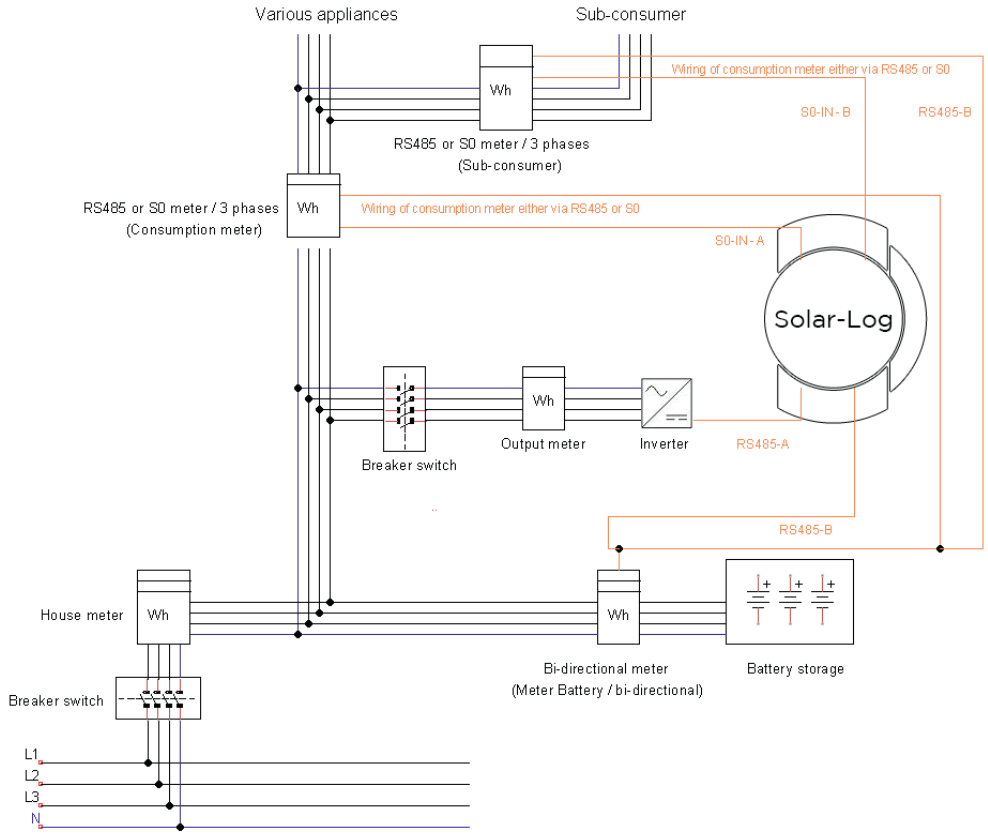

Fig.: Wiring diagram to record self-consumption. (optional with battery storage)

3.3.2 Meter connection options for bi-directional recording of the total consumption via only an RS485 interface.

Feed-in and consumption can be logged by means of a bi-directional meter as long as no limitation is set for power generation (including self-consumption). The Solar-Log™ thereby calculates the total consumption in connection with the yield values.

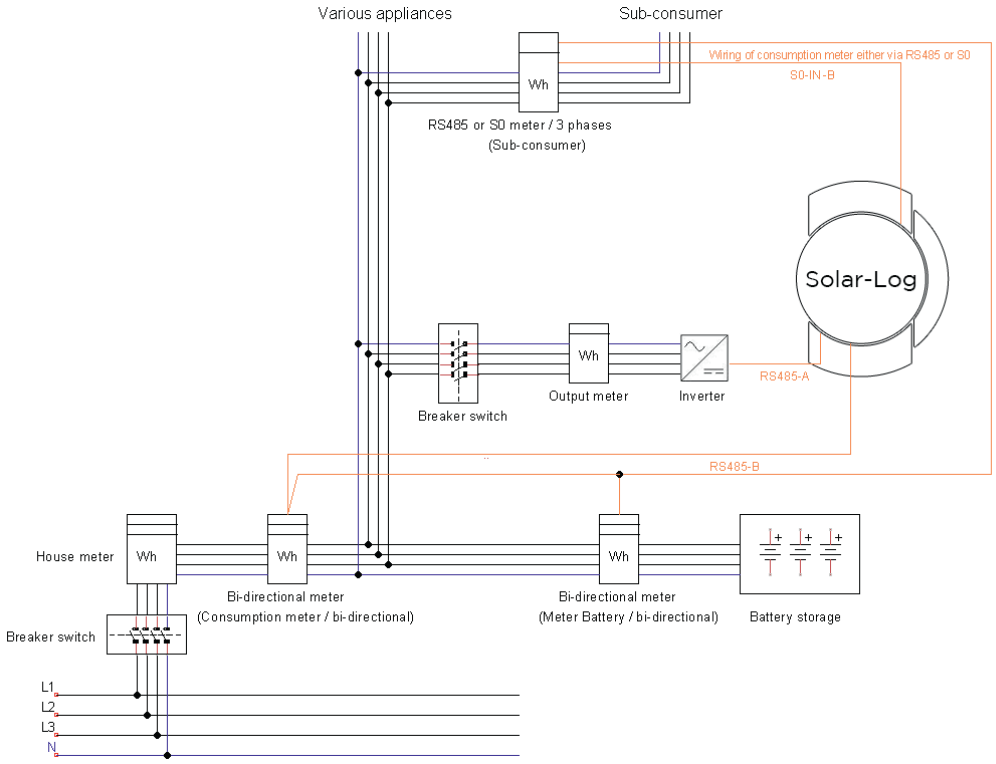

Fig.: Wiring diagram for recording self-consumption – bi-directional meter. (optional with battery storage)

Important information on possible options when using meters for recording consumption:

- Bi-directional meters (only via RS485) in the operating mode „Consumption meter (bi-directional):“ It is only possible to have one meter per Solar-Log™ device. Additional meters are only possible as „sub-consumption meters.“
- Uni-directional meters (RS485 or S0) in the operating mode „Consumption meter:“
  It is possible to have several meters connected to a single Solar-Log™ device as consumption meters – the consumption value is totaled together. Additional meters are also possible in the „Consumption meter“ operating mode.
- Meters in the „Consumption meter“ operating mode are used to display the consumption values from individual appliances. These consumption values have already been recorded in the total consumption values by the uni- and bi-directional meters.

Note

With the Solar-Log™, the electricity fed into the power grid from a PV plant can be limited.
The actual reduction of output can be set as a fixed rate (kW or %) or dynamic with the local consumption of the generated electricity factored into the actual reduction rate.
Recording the current consumption plays a key role when the local consumption is taken into account for the reduction.
A consumption meter has to be installed to achieve an accuracy of +/- 2%.
It is not generally possible to achieve this accuracy with just a bidirectional meter at the grid connection point. The feed-in limits may be exceeded and there could be irregularities due to different measuring, reading and control intervals. That is why we strongly discourage such installation and the use of S0 meters.

Note

The Solar-Log™ offers the option of a „Fixed Regulation of X% with the Calculation of Self-Consumption."
A general requirement for the fixed regulation of X% is that the inverters used allow the Solar-Log™ to limit the output.
There is a major difference between Solar-Log™ compatible inverters when it comes to power reductions.
Some inverters cannot be limited to 0 watts or 0% of the generator output; they produce a certain amount of residual power even when the output is set to zero. This needs to considered when designing plants with 0% output reduction. For example, the base load always needs to be greater than the residual power output.
There is also a distinct difference between the reaction times of various inverters. The reaction time also depends on the number of devices installed. It is not recommended to use S0 meters for 0% reductions.

- ► For these reasons, Solare Datensysteme GmbH cannot guarantee an absolute 0% feed-in reduction.

- ► It is always necessary to consult the grid operator about the reduction.

4 Solar-Log™ PRO

4.1 Solar-Log™ PRO1 Mod (single phase)

Selections available under „Solar-Log/Pro/RS485“

Overview

- The communication address has to be assigned.
- 2-pin wiring.
- Installation steps:
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Note

The communication address is set to 1 by default, but can be adjusted if several meters are connected to one RS485 bus.
Maximum of 32 meters per RS485 bus.

Connect the meter to the Solar-Log™

The wiring is done using a

- self-made cable connection with a terminal block connector.

4.1.1 Connection diagram

According to circuit type 1000 (DIN 43856)

L-IN Terminal 1	Supply line input phase „L1“
L-OUT Terminal 3	Supply line output phase „L1“
Terminal 4 „N“	Neutral conductor connection „N“
Terminal 6 „N“	Neutral conductor connection „N“
Terminal 20, 21	S_0 pulse output
Terminal 23,24	ModBus connection terminal 23 -> A, 24 -> B

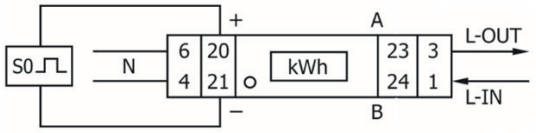

Fig.: Pin assignment

Technical data

Nominal voltage	230 V AC
Current	0,25 - 5(45) A
Frequency	50 Hz
Measurement	Active- and Reactiveenergy in forward and reverse direction
Accuracy class	B
Power consumption	≤ 10VA/Phase - ≤ 2W/Phase
Width	1 TE (17.5 mm)
Pulse Output LED	10,000 Imp/kWh
S_0–pulse output:	2,000 Imp/kWh, RA = 0,5 Wh/Imp
Pulse length	≤ 5 625 W -> 32 ms > 5625 W -> 11,2 ms
Temperature range	-25°C to +55°C
Max. rel. humidity	75% average, 95% short term
Registered harmonics:	0.05 – 0.25 kHz
LED blinking red	consumption >4W, pulsrate= consumption
Display	4 + 2 Digits (9,999.11 kWh)
Max diameter	Mainclamps: max. 8 mm^2 Additional clamps:: max. 2,5 mm^2

Connection diagram for different operating modes

The meter connections are labeled IN (bottom) and OUT (top)

Solar-Log™ PRO1 Mod (RS485 or S0) connection assignments

► As consumption or sub-consumer meter	Connection to the grid (IN) – connection for appliances (OUT)
► As generator / production meter	Connection for the production (IN) – connection to the grid (OUT)

Solar-Log™ PRO1 Mod connection assignments (only RS485)

► As a battery meter (bi-directional)	Connection to the production/grid (IN) – connection to the battery (OUT)

Cable connection via RS485:

Solar-Log™ terminal strip connector	Solar-Log 50	Solar-Log™ PRO1 Mod
Terminal		PIN
► 1	1 or 5	23 (A)
► 4	4 or 6	24 (B)

Note

If the meter is the last device on the bus, it has to be terminated at connection block 23 and 24 with a resistor (120 ohm / 0.25W).

Note

The Inepro PRO1 Mod cannot be connected to the inverters with a single bus.
For this reason, use one RS485 connection for the inverters and one RS485 connection for the Solar-Log™ PRO1 Mod.

► A combination with an M&T Sensor on the same bus is possible.

Possible meter operating modes for the Solar-Log™ PRO1 Mod via RS485:

- Battery meter (bi-directional)
- Sub-consumer
- Consumption meter
- Generator

Cable connection via S0 (in):

Solar-Log™ S_0 terminal block	Solar-Log™ PRO1-Mod
Pin assignment	Pin assignment
1 - S0+	20 - S0+
2 - S0-	21 - S0-
3	
4	

Place a cable bridge between pin 3 and 4 on the Solar-Log™.

Possible meter operating modes for the Solar-Log™ PRO1 Mod via SO connection:

- Total plant meter
- Sub-consumption meter
- Consumption meter
- Generator

Meter's impulse factor:
1000 p / kWh

Note the SO pulse length for the Solar-Log™ PRO1-Mod.

The following values for the SO pulse length are known:

► ≤ 5625W = pulse length 32ms

► > 5625W = pulse length 11,2ms

The Solar-Log™ can process a SO pulse with at least a length of 30 ms. This means a maximum pulse length of 5625W can be defined for the S0 output of the Solar-Log™ PRO1 Mod.

4.2 Solar-Log™ PRO380 Mod

Selections available under Solar-Log Pro

Overview

- The communication address has to be assigned.
- 2-pin wiring
- Installation steps
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Note

The communication address is set to 1 by default, but can be adjusted if several meters are connected to one RS485 bus. Maximum of 32 meters per RS485 bus

Connect the meter to the Solar-Log™.

The wiring is done using a

- self-made cable connection with a terminal block connector.

4.2.1 Connection diagram

according to circuit type 1000 (DIN 43856)

Input "L1, L2, L3"	Supply line input phase "L1, L2, L3"
Output "L1, L2, L3"	Supply line output phase "L1, L2, L3"
Terminal "N"	Neutral conductor connection "N"
Terminal 18, 19	S_0 pulse output "consumption" (terminal 18 = "+")
Terminal 20, 21	S_0 pulse output "supply" (terminal 20 = "+")
Terminal 22, 23	ModBus connection terminal 22 -> A, 23 -> B
Terminal 24, 25	External tariff switching (230V AC)
	The SO signal for the supply is not used when a meter is connected to the Solar-Log™.

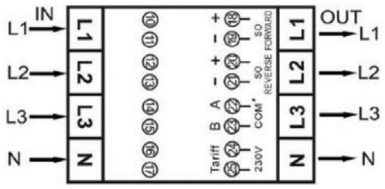

Fig.: Pin assignment

Technical data

Nominal voltage	230 / 400 V AC
Current	0.25 - 5(100) A
Frequency	50 Hz
Measurement	Active and reactive energy in reference and delivery direction
Accuracy class	B
Power consumption	< 10 VA - < 2 W
Start-up current	20 mA
Width	4 TE (70 mm)
Pulse Output LED	10,000 Imp/kWh, 30 ms
S_0–pulse output:	1,000 Imp/kWh, 30 ms
Temperature range	-40°C to +70°C
Max. rel. humidity	75 % average, 95 % short term
Registered harmonics:	0.05 – 0.25 kHz
LED blinking red	consumption >4W, pulsrate= consumption
Display	6 + 2 Digits (999999,11 kWh)
Max diameter	Mainclamps: Flexible cable up to max. 25 mm² Rigid cable up to max. 35 mm² Additional clamps:: max. 2.5 mm²
Baud rate ModBus	9,600 baud

Connection diagram for different operating modes

The meter connections are labeled IN (bottom) and OUT (top).

Solar-Log™ Pro380 Mod (RS485 or S0) connection assignments

► As consumption or sub-consumer meter	Connection to the grid (IN) – connection for appliances (OUT)
► As inverter / production meter	Connection for the production (IN) – connection to the grid (OUT)

Solar-Log™ Pro380 Mod connection assignments (only RS485)

► As a consumption meter (bi-directional)	Connection for grid (OUT) – connection to the house/plant (IN) (installation position according to the arrow system)
► As battery meter (bi-directional):	Connection to the production/grid (IN) – connection to the battery (OUT)

Cable connection via RS485:

Solar-Log™ terminal strip connector	Solar-Log 50	Solar-Log™ PRO380 Mod
Terminal		PIN
► 1	1 or 5	► 22 (A)
► 4	4 or 6	► 23 (B)

Note
If the meter is the last device on the bus, it has to be terminated at connection block 22 and 23 with a resistor (120 ohm / 0.25W).

Note

The Solar-Log™ PRO380 Mod cannot be connected to the inverters with a single bus.
For this reason, use one RS485 connection for the inverters and one RS485 connection for the Solar-Log™ PRO380 Mod.

► a combination with an M&T Sensor on the same bus is possible.

Possible meter operating modes for the Solar-Log™ PRO380 Mod via RS485:

- Battery meter (bi-directional)
- Total plant meter
- Sub-consumer
- Consumption meter
- Consumption meter (bi-directional)
- Generator

Cable connection via S0 (consumption):

Solar-Log™ S_0 terminal block	Solar-Log™ PRO380 Mod
Pin assignment	Pin assignment
1 - S0+	18 - S0+
2 - S0-	19 - S0-
3	
4	

Place a cable bridge between pin 3 and 4 on the Solar-Log™.

Possible meter operating modes for the Solar-Log™ PRO380 Mod via SO connection (consumption):

- Total plant meter
- Sub-consumer
- Consumption meter
- Generator

Impulse factor of the meter:
1000 p / kWh

4.2 Solar-Log™ PRO380-CT

Selections available under Solar-Log Pro

Important!

The converter ratio can only be set once with this transformer-connected meter.

► It is essential to clarify which converter ratio is to be set for the meter before the initial installation.

When the meter is connected to power, the display alternates between „Set CT“ and „CT5 0005.“. If one of the arrow keys is pressed, the first number from the left blinks. Using the arrow keys, define the secondary power between /1A and /5A and confirm the selection by pressing both of the arrow keys at the same time for 3 seconds. After that, define the primary power by selecting the 4 numbers from left to right with the arrow keys. The primary power can be freely set between 0005 and 9995. The first three digits can be between 0 and 9 and the last digit between 0 and 5. Confirm every number by pressing both arrow keys for 3 seconds.
The converter ratio has now been set and cannot be modified.

Overview

- The communication address has to be assigned.
- 2-pin wiring.
- Installation steps
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Note

The communication address is set to 1 by default, but can be adjusted if several meters are connected to one RS485 bus.
Maximum of 32 meters per RS485 bus.
The Solar-Log™ Pro380 CT and Solar-Log™ Pro380 Mod are compatible in the bus.

Connect the meter to the Solar-Log™.

The wiring is done using a

- self-made cable connection with a terminal block connector.

4.2.1 Connection diagram

according to circuit type 1000 (DIN 43856)	
CT 1 (in) terminal k (s1) / (out) terminal l (s2)	10 Volts Phase 1 (10/11 internally bridged)
CT 2 (in) terminal k (s1) / (out) terminal l (s2)	12 Volts Phase 2 (12/13 internally bridged)
CT 3 (in) terminal k (s1) / (out) terminal l (s2)	14 volts phase 3 (14/15 internally bridged)
Terminal "N"	Neutral conductor connection "N"
Terminal 18, 19	S_0 pulse output "consumption" (terminal 18 = "+")
Terminal 20, 21	S_0 pulse output "supply" (terminal 20 = "+")
Terminal 22, 23	ModBus connection terminal 22 -> A, 23 -> B
Terminal 24, 25	External tariff switching (230V AC)
	The SO signal for the supply is not used when a meter is connected to the Solar-Log™.

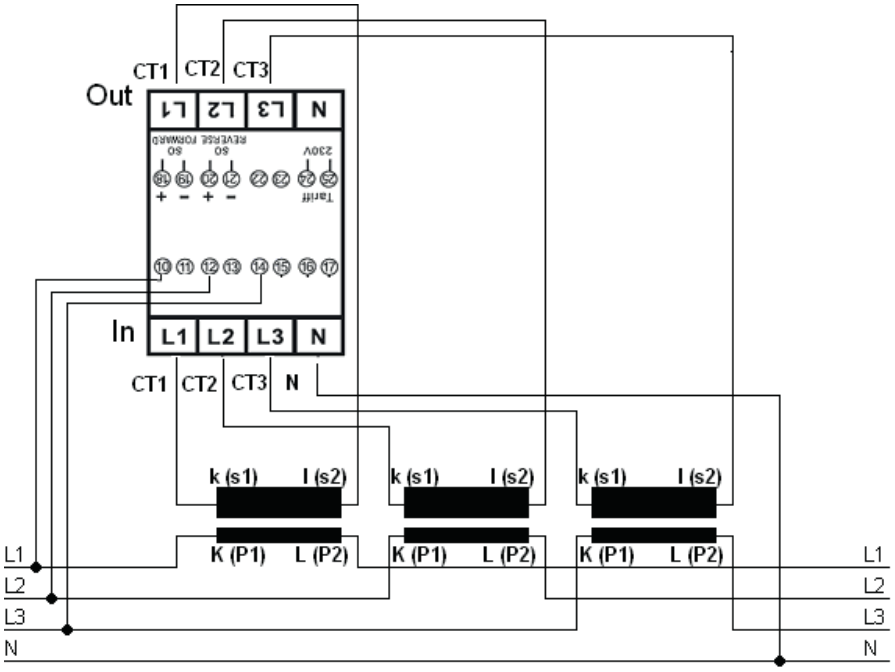

Fig.: Pin assignment

Note

We recommend using a fuse to safeguard the connection lines for the voltage measurement in accordance with the local laws and regulations and with appropriate isolating switches and overload protection devices.

Technical Data

Nominal voltage	230 / 400 V AC	
Current	0.015 - 1.5 (6) A	
Frequency	50 Hz	
Measured value	Active and reactive energy in reference and delivery direction	
Accuracy class	B	
Self-consumption	< 10 VA - < 2 W	
Start-up current	3 mA	
Width	4 TE (70 mm)	
Pulse output LED	10,000 Imp/kWh, 2.5 ms	
S_0 Pulse output	10,000 Imp/kWh, 30 ms	
Operating temperature	-25°C to +70°C	
Max. relative humidity:	75 % on average, temporary 95 %	
Registered harmonic	0.05 – 0.25 kHz	
LED	blinking red: Supply > 4 W, pulse rate = consumption	
Display	5 + 3 Digits (99999,111 kWh)	
Maximum cable cross-section	Main terminal blocks: Additional terminals:	max. 10 mm^2 max. 2.5 mm^2
Baud rate ModBus	9,600 baud	

Connection diagram for different operating modes

The pin assignments refer to the figure on page 17

Solar-Log™ Pro380 CT (RS485 or S0) connection assignments

► As consumption or sub-consumer meter	Access to the grid on converter K(P1) - outgoing line to appliance on converter L(P2)
► As generator / meter for the entire plant	Access to production on converter K(P1) - outgoing line to the grid on converter L(P2)

Solar-Log™ Pro380 CT connection assignments (only RS485)

► As a consumption meter (bi-directional)	Access to the grid on converter L(P2) - outgoing line to house/plant on converter K(P1) (installation position according to the arrow system) --- (Starting with firmware version 3.4.2, the metering direction (report) for consumption meters in bi-direction mode can be set in the Solar-Log™.)
► As a battery meter (bi-directional)	Access to production/grid on converter K(P1) - outgoing line to the battery on converter L(P2)

Cable connection via RS485:

Solar-Log™ terminal strip connector	Solar-Log 50	Solar-Log™ PRO380-CT (COM)
Terminal		PIN
► 1	1 or 5	22 (A)
► 4	4 or 6	23 (B)

Note

If the meter is the last device on the bus, it has to be terminated at connection block 22 and 23 with a resistor (120 ohm / 0.25W).

Note

The Solar-Log™ PRO380 CT cannot be connected to the inverters with a single bus.
For this reason, use one RS485 connection for the inverters and one RS485 connection for the Solar-Log™ PRO380 CT.

► A combination with a M&T sensor, as well as with the Solar-Log™ PRO380 Mod, in the same bus is possible.

Possible meter operating modes for the Solar-Log™ PRO380 CT via RS485:

- Battery meter (bi-directional)
- Total plant meter
- Sub-consumer
- Consumption meter
- Consumption meter (bi-directional)
- Generator

Cable connection via S0 (consumption):

Solar-Log™ S_0 terminal block	Solar-Log™ PRO380-CT
Pin assignment	Pin assignment
1 - S0+	18 - S0+
2 - S0-	19 - S0-
3	
4	

Place a cable bridge between pin 3 and 4 on the Solar-Log™.

Possible meter operating modes for the Solar-Log™ PRO380 CT via SO connection (consumption):

- Total plant meter
- Sub-consumer
- Consumption meter
- Generator

Meter‘s impulse factor:
10000 p / kWh

5 Inepro

5.1 Inepro 75D

Selections available under Inepro / DMM

Overview

- The communication address cannot be freely assigned.
- 2-pin wiring
- Installation steps
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Connect the meter to the Solar-Log™.

The wiring is done using a

- self-made cable connection with a terminal block connector.

Cable connection via RS485:

Solar-Log™ RS485 terminal block	Solar-Log 50	Inepro 75D
Pin assignment		Pin assignment
1	1 or 5	8 - RS485A
4	4 or 6	7 - RS485B

Possible meter operating modes for the Inepro 75D meter via RS485:

- Meter for the entire plant
- Sub-consumption meter
- Consumption meter
- Inverter mode

Cable connection via S0:

Solar-Log™ S_0 terminal block	Inepro 75D
Pin assignment	Pin assignment
1 - S0+	6 - S0+
2 - S0-	5 - S0-
3	
4	

Place a cable bridge between pin 3 and 4 on the Solar-Log™.

Possible meter operating modes for the Inepro 75D meter via S0:

- Total plant meter
- Sub-consumer
- Consumption meter
- Generator

Note

The Inepro 75D cannot be used on the same bus input with RS422 connected inverters.

Note

The Inepro 75D meters are automatically assigned the mod bus address 234 by Solar-Log™ during the detection process.
This address is therefore not allowed to be used for other devices.
After the configuration, the display on the Inepro meter alternates between the meter status and the address display (ID=EA). This can be used to check if Solar-Log™ has correctly detected the meter.

All RS485 meters have to be terminated with a 120Ω resistor between the two pins used.

5.2 Inepro 1250D

Selections available under Inepro / DMM

Overview

- The communication address cannot be freely assigned.
- 2-pin wiring
- Installation steps
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Connect the meter to the Solar-Log™.

The wiring is done using a

- self-made cable connection with a terminal block connector.

Cable connection via RS485:

Solar-Log™ RS485 terminal block	Solar-Log 50	Inepro 1250D
Pin assignment		Pin assignment
1	1 or 5	11 - RS485A
4	4 or 6	10 - RS485B

Possible meter operating modes for the Inepro meter 1250D via RS485:

- Total plant meter
- Sub-consumer
- Consumption meter
- Generator

Cable connection via S0:

Solar-Log™ S_0 terminal block	Inepro 1250D
Pin assignment	Pin assignment
1 - S0+	9 - S0+
2 - S0-	8 - S0-
3	
4	

Place a cable bridge between pin 3 and 4 on the Solar-Log™.

Possible meter operating modes for the Inepro 1250D meter via S0:

- Total plant meter
- Sub-consumer
- Consumption meter
- Generator

5.2.1 Connection diagram for different operating modes

Solar-Log™ Inepro 1250D (RS485 or S0) connection assignments	
► As consumption or sub-consumer meter	Connection to the grid (IN) – connection for appliances (OUT)
► As inverter / production meter	Connection for the production (IN) – connection to the grid (OUT)

Note

The Inepro 1250D cannot be used on the same bus input with RS422 connected inverters.

Note

All three phases have to be connected for the Solar-Log™ to accurately detect the meter.

If an Inepro 1250D is used, the PRG button on the meter must be pressed and held down during entire detection process.

If it is not possible to hold down the PRG button during the whole process, we recommend provisionally connecting the meter to the Solar-Log™ with a short cable after the installation in order to be able to press and hold down
the PRG button during entire detection process.

In a second detection attempt with the inverter, the meter is then detected by the Solar-Log™ even if the PRG button is not pressed.

The detection of an Inepro 1250D in an existing installation can take up to 15 minutes. After the detection, a restructuring of the data takes places which can take up to 45 minutes depending on the amount of data on the devices.

Note

The Inepro 1250D meters are automatically assigned the mod bus address 234 by Solar-Log™ during the detection process.
This address is therefore not allowed to be used for other devices.
After the configuration, the display on the Inepro meter alternates between the meter status and the address display (ID=EA). This can be used to check if Solar-Log™ has correctly detected the meter.

► All RS485 meters have to be terminated with a 120Ω resistor between the two pins used.

6 Iskra

6.1 Iskra WS0021

Overview

- 2-pin wiring
- Installation steps
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Connect the meter to the Solar-Log™.

The wiring is done using a

- self-made cable connection with a terminal block connector.

Cable connection via S0:

Solar-Log™ S_0 terminal block	Iskra WS0021
Pin assignment	Pin assignment
1 - S0+	9 - S0-
2 - S0-	8 - S0+
3	
4	

Place a cable bridge between pin 3 and 4 on the Solar-Log™.

Possible meter operating modes for the Iskra WS0021 meter via S0:

- Meter for the entire plant
- Sub-consumption meter
- Consumption meter
- Generator

6.2 Iskra WS0031

Overview

- 2-pin wiring
- Installation steps
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Connect the meter to the Solar-Log™.

The wiring is done using a

- self-made cable connection with a terminal block connector.

Cable connection via S0:

Solar-Log™ S_0 terminal block	Iskra WS0031
Pin assignment	Pin assignment
1 - S0+	S0+
2 - S0-	S0-
3	
4	

Place a cable bridge between pin 3 and 4 on the Solar-Log™.

Possible meter operating modes for the Iskra WS0031 meter via S0:

- Meter for the entire plant
- Sub-consumption meter
- Consumption meter
- Generator

6.3 Iskra WS1102

Selections available under Device Class: Meter
Manufacturer: Iskra

Overview

- 2-pin wiring
- Installation steps
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Connect the meter to the Solar-Log™.

The wiring is done using a

- self-made cable connection with a terminal block connector.

Cable connection via RS485:

Solar-Log™ RS485 terminal block	Solar-Log 50	Iskra WS1102
Pin assignment		Pin assignment
1 - Data+	1 or 5	A+ (23)
4 - Data-	4 or 6	B- (24)

Possible meter operating modes for the Iskra WS1102 meter via RS485:

- Meter for the entire plant
- Sub-consumption meter
- Consumption meter
- Generator

Note

If the meter is the last device on the bus, it has to be terminated at connection block A (23) and B (24) with a resistor (120 ohm).

Note

A maximum of 32 devices can be connected per bus.

7 Janitza UMG 104 / UMG 604 / UMG 604 PRO (Utility Meter)

7.1 Janitza UMG 104 / UMG 604 / UMG 604-PRO

The Solar-Log™ Utility Meter is a universal metering device. It can be integrated in both low- and medium-voltage networks (via a transformer) and is needed for various functions:

- controlling voltage-dependent reactive power via the Q(U) function
- controlling reactive power at the feeding point
- recording the measurement data needed for the response signals sent to the grid operator

Only voltage measurements are required for voltage-dependent reactive power reduction Q(U). However, we still recommend using both current and voltage measurements to be able to check that the reduction function is operating properly. Current and voltage measurements are needed for the other functions.
Utility Meter supply voltage:

- 95-240Vac, 45-65Hz or 135-340Vdc

The Utility Meter's measuring inputs have the following limits:

- Voltage line conductor AC (without a voltage transformer): 10...300 V AC
- Voltage phase AC (without a voltage transformer): 17...520 V AC
- Current (without a current transformer) 0.005, 7.5 A
- Frequency of the fundamental component: 45 ..65 Hz

The limit may not be exceeded. For this reason, a measuring transformer needs to be installed for most applications.
We recommend the following transformer ratio:

- Voltage: Secondary 100V
  e.g. at 20kV grid converter 20000:100V
- Current: Secondary 5A
  e.g. 100:5A

Note

The Utility Meter that we use is produced by the company Janitza.
Refer to the Janitza UMG 104 / UMG 604 / UMG 604-PRO manual for further technical details.
We cannot guarantee the functionality of other Janitza devices.
► The operating modes Utility Meter (U / U+I) is only possible with the Solar-Log 1000 and 2000.

Note

The Utility Meter cannot be connected to the inverters with a single bus.
For this reason, use one RS485 connection for the inverters and one RS485 connection for the Utility Meter.

Connecting the Utility Meter to the power grid

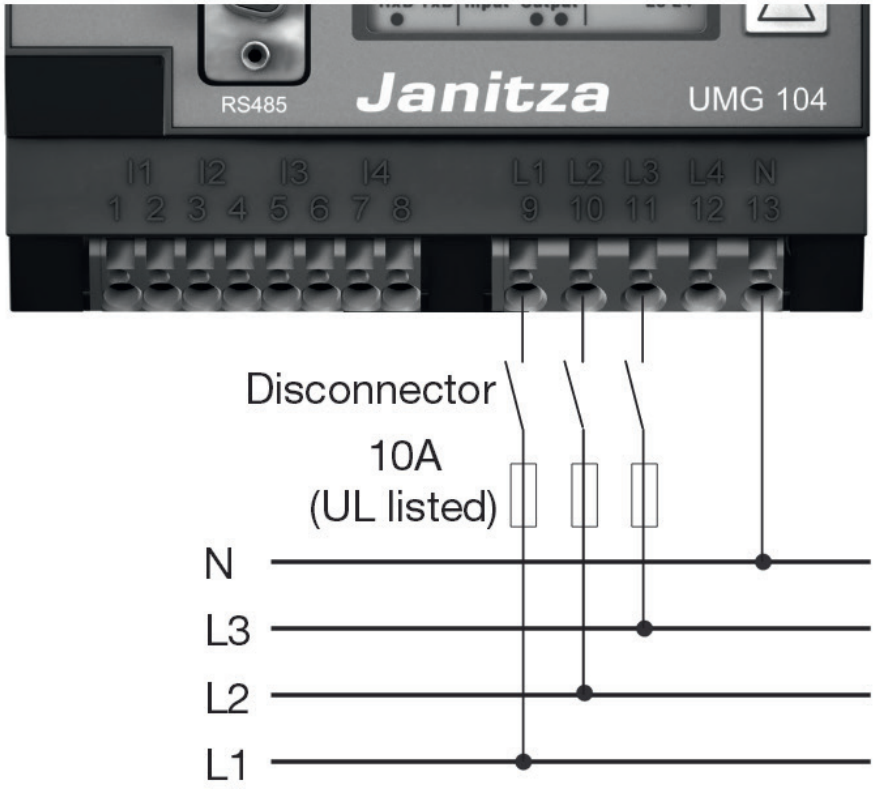

Fig.: Example - UMG 104 Utility Meter connection diagram for voltage measurements in low-voltage power grids

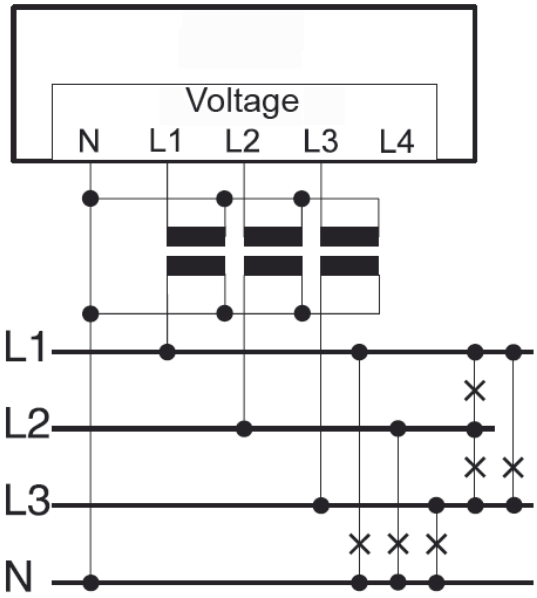

Fig.: Utility Meter connection diagram for voltage measurements with current transformers (medium voltage)

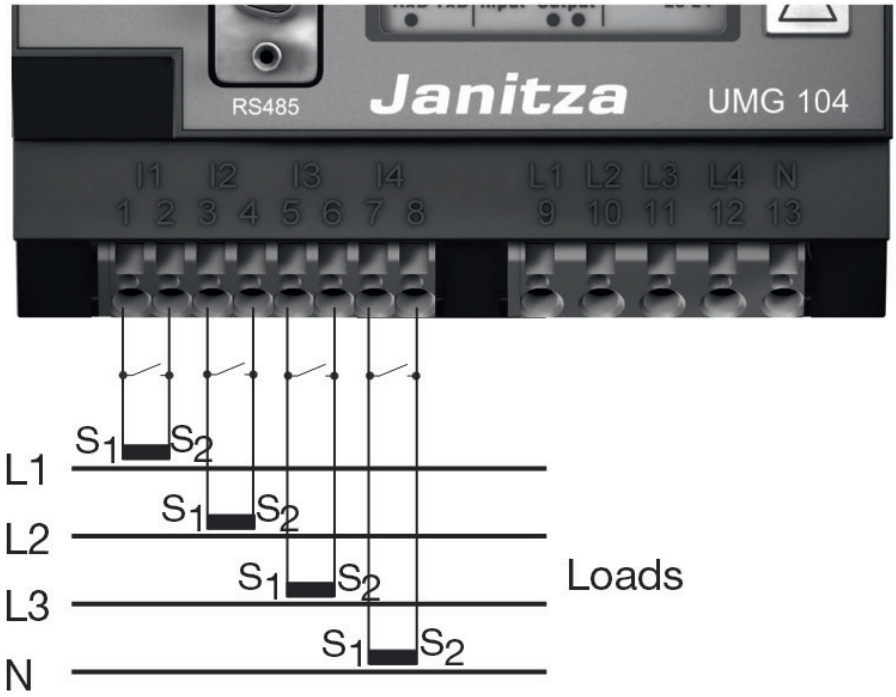

Fig.: Example - UMG 104 Utility Meter connection diagram for current measurements with current transformers

Procedure

- Enter the supply voltage into the Utility Meter

Note
We recommend using a fuse to safeguard the connection lines for the supply voltage. Please follow the instructions in the Janitza UMG 104 / UMG 604 / UMG 604-PRO manual.

Note
Supply voltages that do not correspond to the specifications on the rating plate can cause malfunctions and damage the device.

Caution
The inputs for the supply voltage are dangerous to touch.

Note

The measurement voltage must in effect be at least 10V or an exact measurement is not possible.

Cable connection via RS485:

1. Connect the wires as shown in the following diagram:

Solar-Log™ terminal strip connector	Solar-Log 50	Utility meter terminal strip
Terminal		PIN
► 1	1 or 5	22
► 4	4 or 6	23

2. Insert the terminal block connector into the Solar-Log™ RS485 socket.

- The RS485 bus must be terminated.
  Install a 120 Ohm, 0.25 W resistor between pin 22 and 23 of the Utility Meter to terminate.
- Configuring the Utility Meter from the display
  Setting MODBUS Address (PRG 200 = 1)
  Setting Baud rate RS485 (PRG 202 = 2)
  Setting Mode (PRG 203 = 0)
  Setting Current converter primary (PRG 000)
  Setting Current converter secondary (PRG 001)
  Setting Voltage converter primary (PRG 002)
  Setting Voltage converter secondary (PRG 003)
  Refer to the accompanying manual of the device for the UMG 104 / UMG 604 / UMG 604-PRO configuration procedure.

Note
The parameter settings need to be adjusted before device detection.
If the parameters differ, the Utility Meter will not be detected by the Solar-Log™.

- Perform an inverter detection
  See the installation manual, Chapter "Performing inverter detections."
- Configure the Utility-Meter under Configuration | Devices | Configuration, select the corresponding Operating mode and click on Save.

Check

- Does the Utility Meter display a positive value for inverters feeding power, the current output (kW)?
  If this is not the case, the current measurements are incorrectly connected.
  If necessary, switch the polarity of measuring inputs.

Note
When replacing the polarity, the cable must not be energized, since the converter can be destroyed otherwise.

Possible meter operating modes for the Janitza UMG 104 / UMG 604 / UMG 604-PRO via RS485:

- Battery (Bi-directional meter)
- Meter for the entire plant
- Sub-consumer
- Utility Meter (U)
- Utility Meter (U+I)
- Utility Meter (U+I) + Consumption Meter (bi-directional)
- Consumption meter
- Battery (Bi-directional meter)
- Generator

Connection assignments / installation position of the Janitza UMG 104 / UMG 604 / UMG 604-PRO (Utility Meter) in connection with the Solar-Log™

Note
Check the installation position of the current transformers for the different operating modes of the Janitza UMG 104 / UMG 604 / UMG 604-PRO.

Note
Check that the phase assignment of the voltage measurements for the current measurements is correct.

The following output values are recorded in the various operating modes when the installation position is correct.

Operating mode	Output value
► As a Utility Meter (U+I)	with positive output value (kW) for feed-in
► As total plant meter	with positive output value (kW) for feed-in
► As an inverter	with positive output value (kW) for feed-in
► As a consumption or sub-consumer meter:	with positive output value (kW) for consumption
► As a consumption meter (bi-directional)	When the production is greater than the consumption, positive output values (kW) (installation position according to the arrow system)
► As a battery meter (bi-directional)	► When the battery storage is being charged, positive output values (kW). ► When the battery storage is being discharged, negative output values (kW).

7.2 Janitza UMG 604 / UMG 604-PRO via Ethernet

Termination	Addressing	Interface
No	Yes	LAN

Overview

- Integrated interface
- Connect using network cable (patch cable) and Ethernet router or switch
- A static IP address must be assigned
- Installation steps
  - Switch off the Janitza device and the Solar-Log™
  - Connect the Janitza device to the Solar-Log™

Connect Janitza to the Solar-Log™

The wiring is done using a

- network cable (patch cable/crossover cable) and the
- Ethernet router or switch.

Assign the IP address for detection and communication:

IP addresses assignment according to manufacturer's instructions. Both devices need to be in the same subnet mask.

Detection via the Solar-Log™ WEB Interface

- For detection on the Solar-Log™ , select the device class under the menu Configuration | Device | Definition | Interface with the plus symbol and then select Janitza as the manufacturer. Confirm your selection with OK.
- Save your selections and then start the Device Detection under Configuration | Device | Detection.

Detection from the Solar-Log 1200

- When using the Solar-Log 1200, the detection can also be started from the display. Select the settings Start ► Initial Configuration ► Page 2 „Device“ ► Add and select the manufacturer Janitza from there. Save and start the Device Detection.

Note

The meter operating modes via Ethernet are identical to those of the RS485 version.

8 Larsen & Toubro

8.1 Larsen & Toubro (WDM313CDNC)

Selections available under L&T

Overview

- The communication address has to be assigned.
- 2-pin wiring.
- Installation steps
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Connect the meter to the Solar-Log™.

The wiring is done using a

- self-made cable connection with a terminal block connector.

Cable connection via RS485:

Solar-Log™ RS485 terminal block	Solar-Log 50	L&T WDM313CDNC
Pin assignment		Pin assignment
1	1 or 5	9 D+
4	4 or 6	10 D-

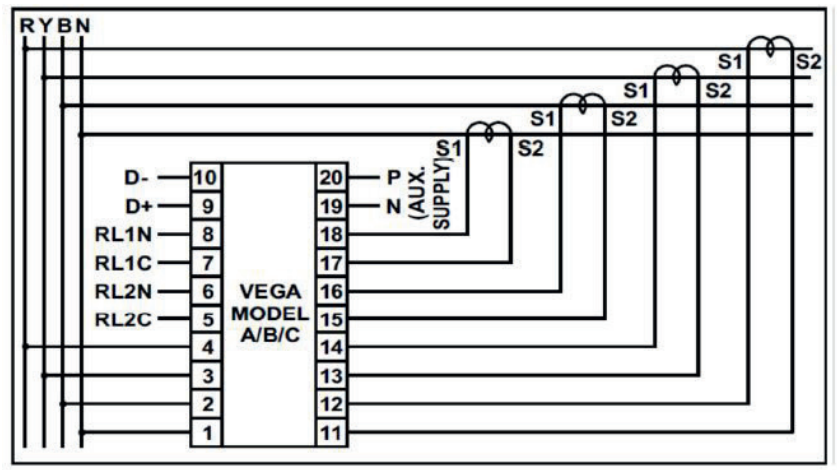

Fig.: Pin assignment

Note

The following parameters need to be checked before the device detection to ensure that the meter is detected.
Assign the communication address (start with 1).
Baud rate: 9600 bps
Data bits: 8
Stop bits: 1
Parity: even

► The settings are adjusted via the device's display. (Please refer to the notes and instructions in the manufacture's manual for instructions.)

Possible meter operating modes for the L&T WDM313CDNC via RS485:

- Battery (Bi-directional meter)
- Meter for the entire plant
- Sub-consumer
- Utility Meter (U)
- Utility Meter (U+I)
- Utility Meter (U+I) + Consumption Meter (bi-directional)
- Consumption meter
- Battery (Bi-directional meter)
- Generator

Note

The meter cannot be connected to the inverters with a single bus.
For this reason, use one RS485 connection for the inverters and one RS485 connection for the meter.

Note

A maximum of 32 devices can be connected per bus.

Note:

Please refer to manufacturer's manual for information on the installation, wiring and configuration of the device.

9 Mikro PowerMeter

9.1 Mikro PowerMeter DPM680

Auswählbar unter „Mikro:DPM680“

Overview

- The communication address has to be assigned.
- 3-pin wiring.
- Installation steps
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Connect the meter to the Solar-Log™.

The wiring is done using a

- self-made cable connection with a terminal block connector.

Cable connection via RS485:

Solar-Log™ RS485 terminal block	Solar-Log 50	Mikro PowerMeter DPM680
Pin assignment		Pin assignment
► 1	1 or 5	► +
► 3	3	► GND
► 4	4 or 6	► -

Note

The default RS485 communication parameters for the meter are:
Baud: 38400
Data bits: 8
Parity: None
Stop bits: 1

The Solar-Log™ can only communicate with the meter when it has these settings. It is important to check the settings before performing the device detection.

► Assign the communication address (according to the manufacturer‘s manual).

► The settings are adjusted via the device‘s display. (Please refer to the notes and instructions in the manufacture‘s manual for instructions.)

Possible meter operating modes for the Mikro PowerMeter DPM680 via RS485:

- Battery (Bi-directional meter)
- Meter for the entire plant
- Sub-consumer
- Utility Meter (U)
- Utility Meter (U+I)
- Utility Meter (U+I) + Consumption Meter (bi-directional)
- Consumption meter
- Battery (Bi-directional meter)
- Generator

Note

A maximum of 32 devices can be connected per bus.

Note

Please refer to manufacturer's manual for information on the installation, wiring and configuration of the device.

10 Schneider Electric

10.1 Schneider EM6400NG (3-phase)

Selections available under „Schneider Electric/EM6400NG“.

Overview

- The communication address has to be assigned.
- 2-pin wiring.
- Installation steps:
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Connect the meter to the Solar-Log™

The wiring is done using a

- self-made cable connection with a terminal block connector.

Cable connection via RS485:

Solar-Log™ RS485 terminal block	Solar-Log 50	Schneider EM4600NG
Pin assignment		Pin assignment
► 1	1 or 5	► 7 (D1 +)
► 4	4 or 6	► 14 (D0 -)

Termination: 120-ohm resistor at connection pin 7 and 14 on the meter

Note

The following parameters need to be checked before the device detection to ensure that the meter is detected.
Baud rate: 19200 bps
Data bits: 8
Stop bits: 1
Parity: even

► The settings are adjusted via the device's display. (Please refer to the notes and instructions in the meter's manual for instructions.)

Possible meter operating modes for the Schneider EM6400S via RS485:

- Battery meter (Bi-directional)
- Total plant meter
- Sub-consumer
- Consumption meter
- Consumption meter (bi-directional)
- Generator

Note

The meter cannot be connected to the inverters with a single bus.
For this reason, use one RS485 connection for the inverters and one RS485 connection for the meter.

Note

Different model series from the same manufacturer cannot be used with the same bus.

Note

A maximum of 32 devices can be connected per bus.
The maximum cable length is 900 meters.

Note

Follow the instructions in the manufacturer's manual for installation, wiring and configuration of the device.

10.2 Schneider EM6400S (3-phase)

Selections available under Schneider Electric

Overview

- Communication address must be allocated.
- 2-pin wiring
- Installation steps
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Connect the meter to the Solar-Log™.

The wiring is done using a

- self-made cable connection with a terminal block connector.

Cable connection via RS485:

Solar-Log™ RS485 terminal block	Solar-Log 50	Schneider EM4600S
Pin assignment		Pin assignment
1	1 or 5	7 (D1)
4	4 or 6	14 (D0)

Termination: 120-ohm resistor at connection pin 7 and 14 on the meter

Note

The following parameters need to be checked before the device detection to ensure that the meter is detected.
Baud rate: 9600 bps
Data bits: 8
Stop bits: 1
Parity: even

► The settings are adjusted via the device's display. (Please refer to the notes and instructions in the meter's manual for instructions.)

Possible meter operating modes for the Schneider EM6400S via RS485:

- Battery (Bi-directional meter)
- Meter for the entire plant
- Sub-consumer
- Consumption meter
- Battery (Bi-directional meter)
- Generator

Note

The meter cannot be connected to the inverters with a single bus.
For this reason, use one RS485 connection for the inverters and one RS485 connection for the meter.

Note

A maximum of 32 devices can be connected per bus.

Note:

Please refer to manufacturer's manual for information on the installation, wiring and configuration of the device.

11 Secure Meters

11.1 Secure Meters (3-phasig)

Selections available under „Secure“.

Supported Series/Models:

- Series Elite 440:
- Models:
  - 445, 446, 447

Overview

- The communication address has to be assigned.
- 2-pin wiring.
- Installation steps:
  - Switch off the meter and the Solar-Log™.
  - Connect the meter to the Solar-Log™.

Connect the meter to the Solar-Log™

The wiring is done using a

- self-made cable connection with a terminal block connector.

Cable connection via RS485:

Solar-Log™ RS485 terminal block	Solar-Log 50	Secure Meters (RS485)
Pin assignment		Pin assignment
► 1 +	1 or 5	► +
► 4 -	4 or 6	► -

Note

The following parameters need to be checked before the device detection to ensure that the meter is detected:
Baud rate: 9600 bps
Data bits: 8
Stop bits: 1
Parity: Non

► The settings are adjusted via the device‘s display. (Please refer to the notes and instructions in the meter‘s manual for instructions.)

Possible meter operating modes for the Secure Meters:

- Battery meter (Bi-directional)
- Total plant meter
- Sub-consumer
- Consumption meter
- Consumption meter (bi-directional)
- Generator

Note!

Follow the instructions in the manufacturer's manual for installation, wiring and configuration of the device.

12 Attachment Wiring diagrams

12.1 Sample plans for recording production and consumption

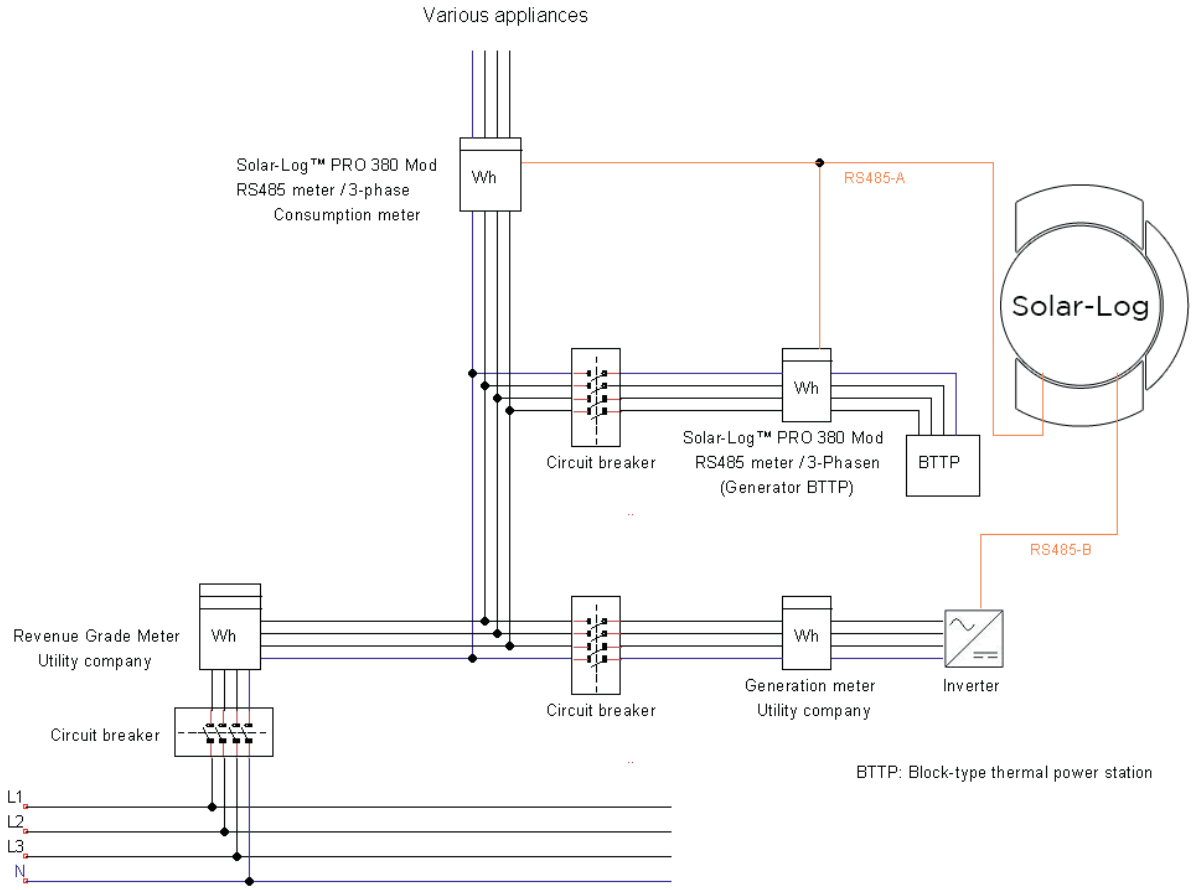

Fig.: Direct consumption measurement with PV and BHKW

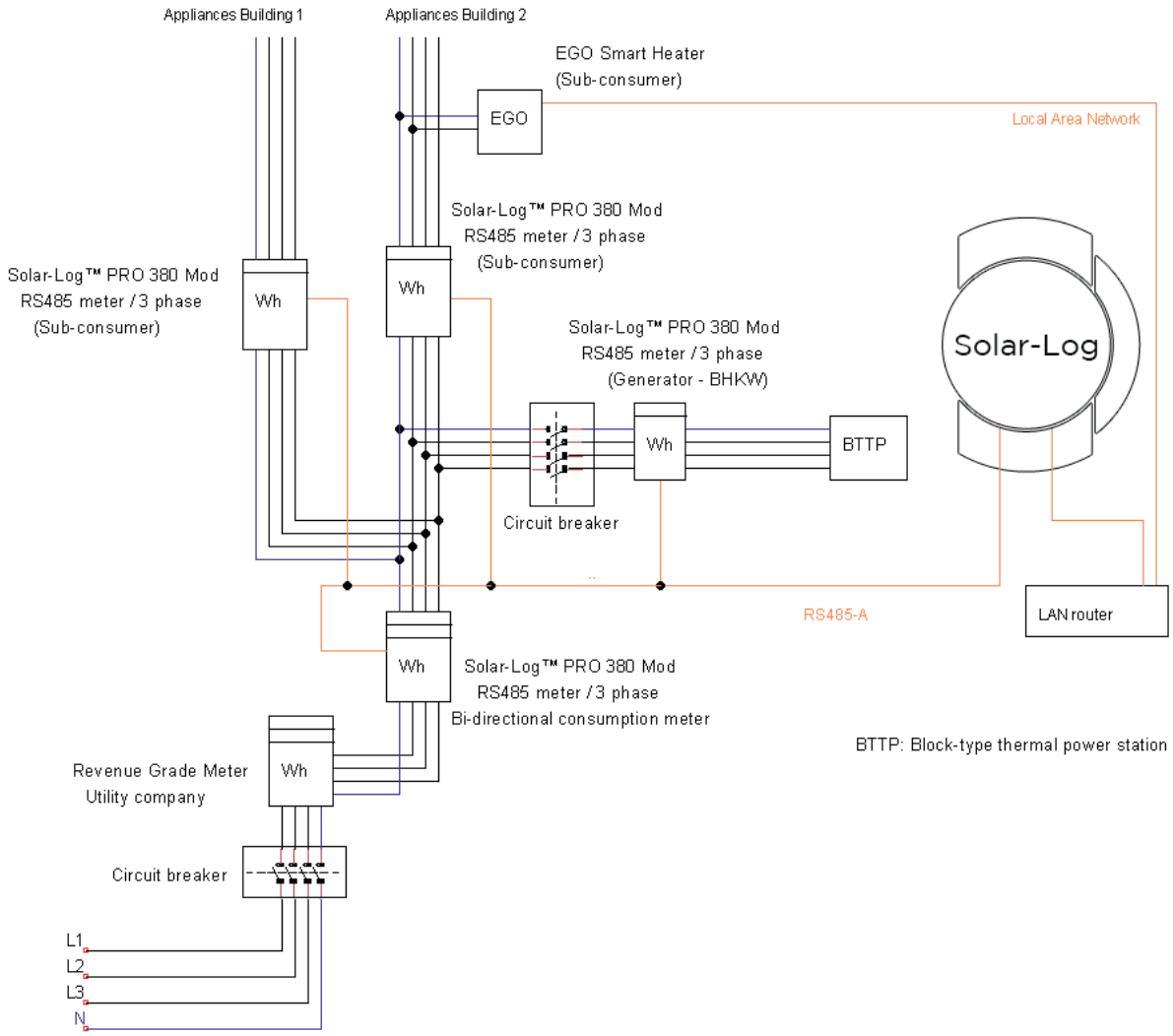

Fig.: Consumption meter bi-directional with BHKW and various sub-consumers.

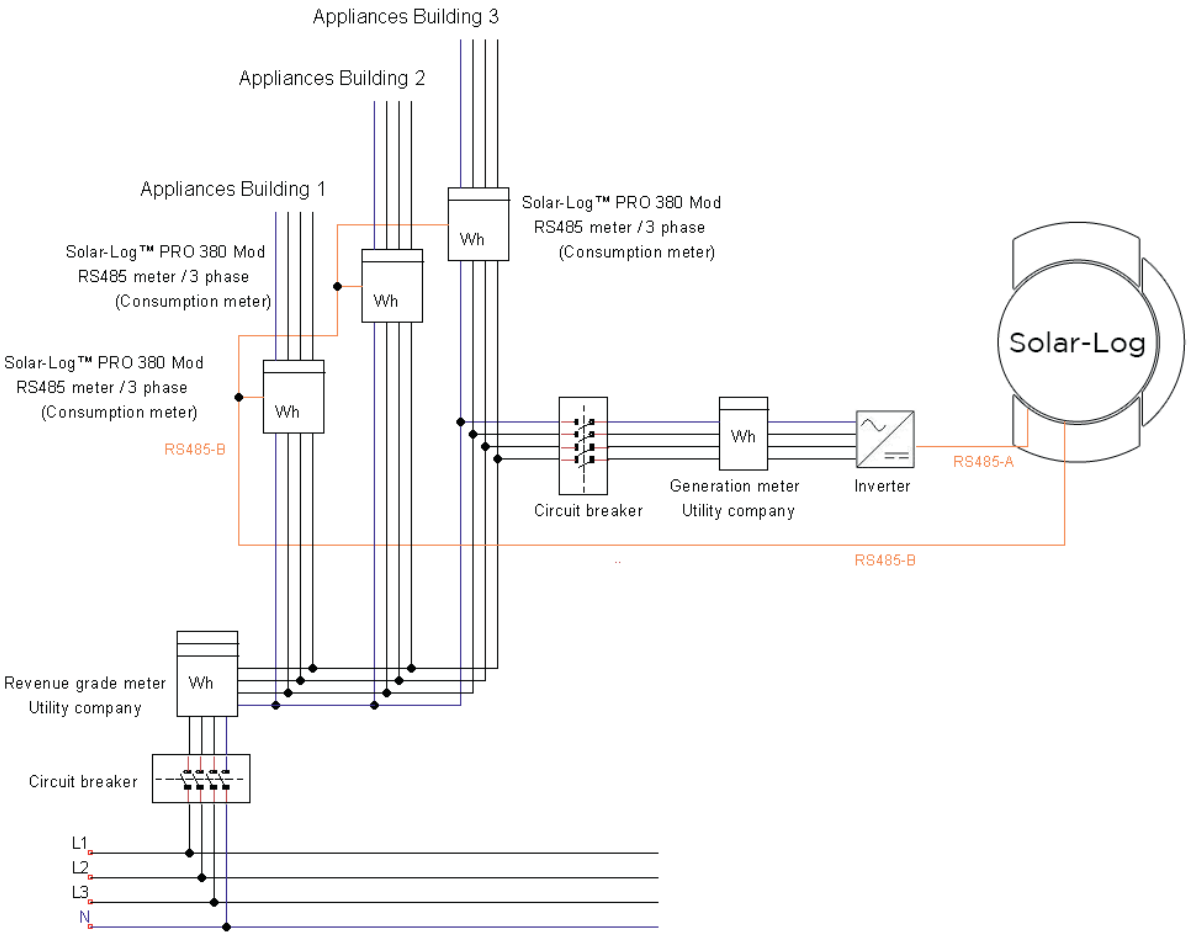

Fig.: Direct consumption measurement with several meters

Notice in circuit diagram:

When using multiple meters in “Consumption meter” operating mode, the values are added up by the Solar-Log™.

Note

If there are any open questions regarding your planning, please feel free to contact our technical support.

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