

3-phase bidirectional energy meter with transformer connection and serial S-Bus interface

Bidirectional energy meters with an integrated serial S-Bus interface make it possible to read out all relevant data such as energy, current and voltage per phase, active and idle power per phase or as total output.

Specifications:

- ▶ 3-phase energy meter, 3 × 230 / 400 VAC 50 Hz
- ▶ Converter metering to 1500 A in both directions of current
- ▶ Display of the active power, voltage and current per phase
- ▶ Display of the total active power
- ▶ S-Bus interface used to query data
- ▶ Idle power per phase or total available via the interface
- ▶ Up to 254 energy meters can be connected to a single S-Bus interface
- ▶ 7-digit LCD display for energy supply and feeding back
- ▶ Can be sealed and is provided with a sealing cap as an accessory
- ▶ Accuracy class B in accordance with EN50470-3, Accuracy class 1 in accordance with IEC62053-21



Order number

Standard version: AWD3B5WS00C2A00
 MID version: AWD3B5WS00C3A00
 Sealing cap: 4 104 7485 0

Assembly

| | |
|--|--|
| Assembly | On 35 mm top-hat rail in accordance with EN60715TH35 |
| Connections Main current circuit | Conductor cross section 1.5 – 16 mm ² , Pozidrive screwdriver size 1, flat-head screwdriver size 2, torque 1.5 – 2 Nm |
| Connections Control current circuit | Conductor cross section 2.5 mm ² , Pozidrive screwdriver size 0 or flat-head screwdriver size 2, torque 0.8 Nm |
| Insulating properties | – 4 kV / 50 Hz test in accordance with VDE0435 for energy meters – 6 kV 1.2 / 50 μs overvoltage in accordance with IEC255-4 – 2 kV / 50 Hz test in accordance with VDE0435 for energy meters – Device protection class II |
| Ambient temperature | –25 °...+55 °C |
| Storage temperature | –30 °...+85 °C |
| Environment | Mechanical M2 Electromagnetic E2 |
| Relative humidity | 75 % without condensation |
| EMC/resistance | – Surge voltage in accordance with IEC61000-4-5 at the main current circuit 4 kV at the S-Bus interface 1 kV – Burst voltage in accordance with IEC61000-4-4, at the main current circuit 4 kV, at the S-Bus interface 1 kV – ESD in accordance with IEC61000-4-2, contact 8 kV, air 15 kV |

Technical data

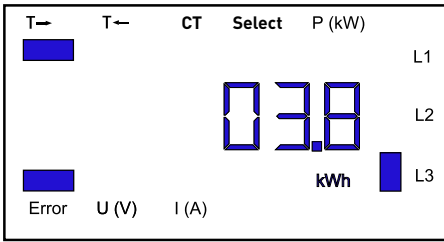
| | |
|--|--|
| Accuracy class | B in accordance with EN50470-3, 1 in accordance with IEC62053-21 |
| Operating voltage | 3 × 230 / 400 VAC, 50 Hz Tolerance -20% / +15% |
| Power consumption | Active 0.4 W per phase |
| Meter range | 00000.00... 99999.99 100000.0 ...999999.9 |
| Display | Backlight LCD, numbers 6 mm high |
| Display without mains electricity | Condenser protected LCD maximum 2 times in 10 days |

Converter measurement

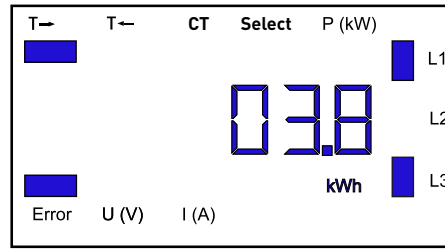
| | | 5...1500 A | | | |
|--|-----------------|--|-------|--------|--|
| Reference current / maximum current | | $I_{ref} = 5 \text{ A}, I_{max} = 6 \text{ A}$ | | | |
| Start current / minimum current | | $I_{st} = 10 \text{ mA}, I_{min} = 0.05 \text{ A}$ | | | |
| Conversion factor | 5:5 | 50:5 | 100:5 | 150:5 | |
| | 200:5 | 250:5 | 300:5 | 400:5 | |
| | 500:5 | 600:5 | 750:5 | 1000:5 | |
| | 1250:5 | 1500:5 | | | |
| Pulses per kWh | 10 pulses / kWh | | | | |

Error display

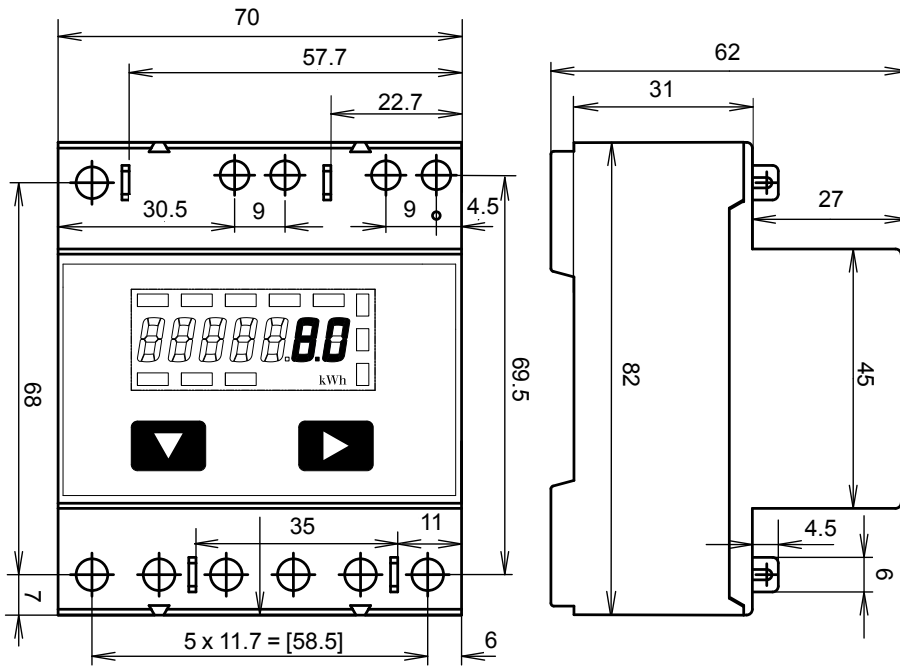
Example: Connection error at L3



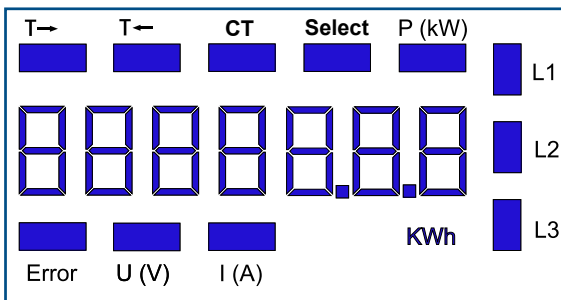
Example: Connection error at L1 and L3



Dimension drawings

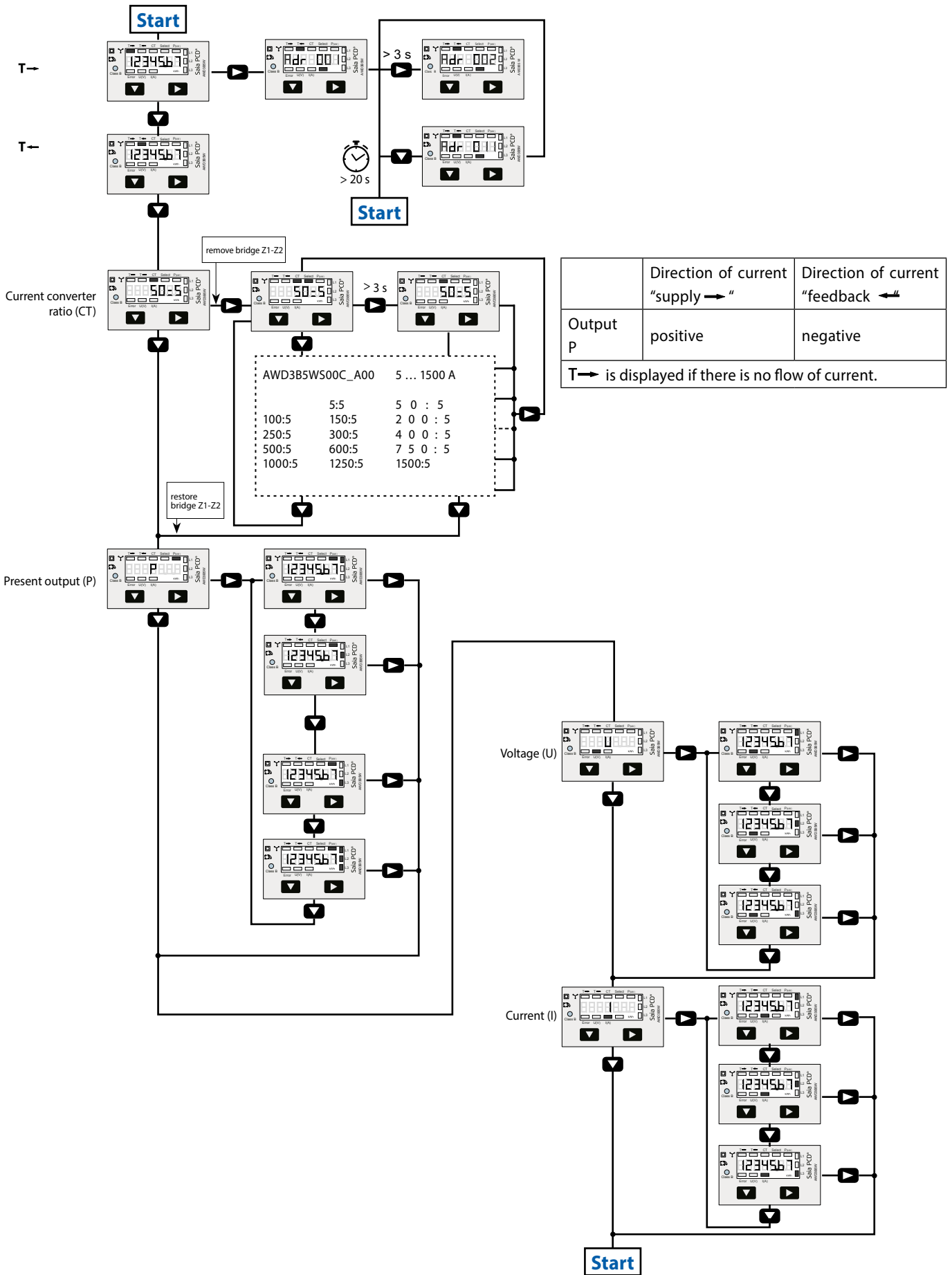


Display components

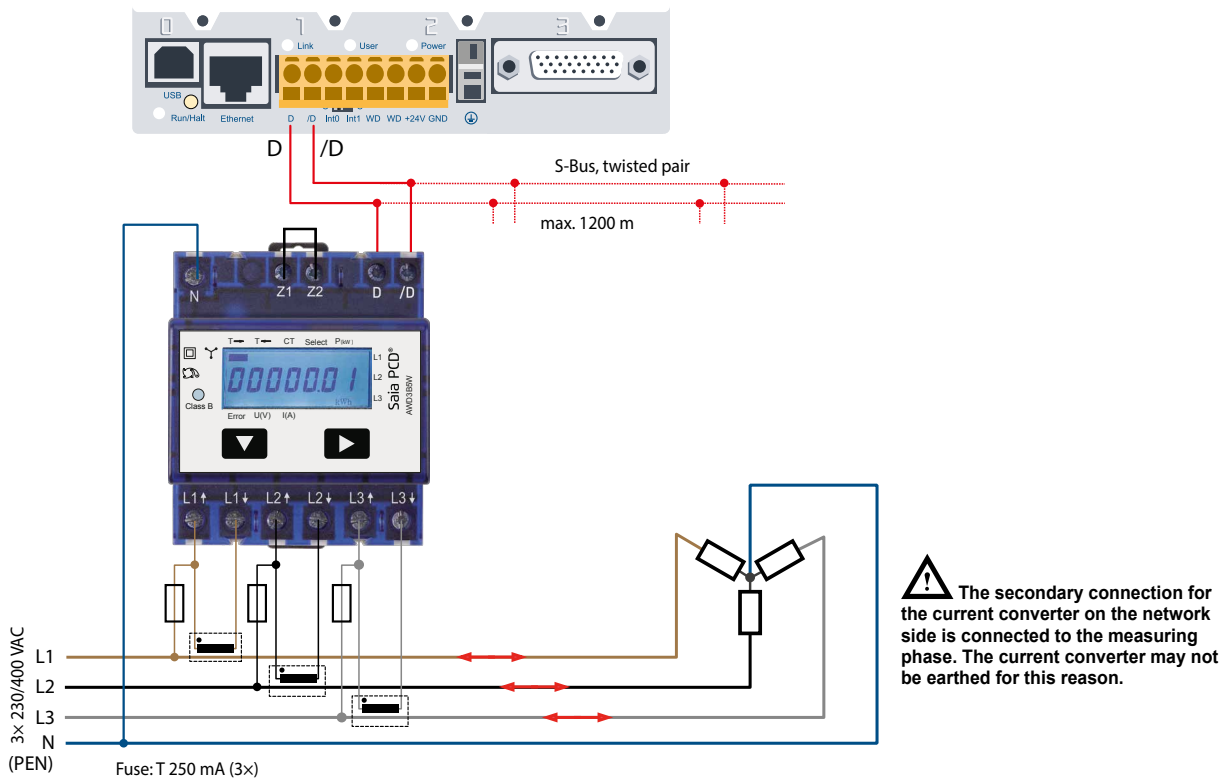


- ▶ T→ Shows the total consumption →
- ▶ T← Shows the total consumption ←
- ▶ CT Shows the set current converter ratio
- ▶ Select When the Z1-Z2 bridge is open, the converter ratio can be set under the menu item: Select
- ▶ P (kW) Shows the present output per phase or for all phases
Current «→» = supply (P positive)
Current «←» = feedback (P negative)
- ▶ U (V) Shows the voltage per phase
- ▶ I (A) Shows the current per phase
- ▶ kWh Shows the unit kWh in the consumption display (only for standard version)
- ▶ L1/L2/L3 Displays the corresponding phase for the P, U, I or error display
- ▶ Error In the absence of a phase. The corresponding phase is also displayed.

Menu used to display the values on the LCD display



Connection diagram



Technical data S-Bus

| | |
|--------------------|--|
| Bus system | S-Bus |
| Transmission rates | 2400-4800-9600-19200-38400-57600-115200. The transmission rates are detected automatically. |
| Transmission mode | Data |
| Bus length (max.) | 1200 m (without repeater) |
| Reactions time | Writing: Up to 60 ms Reading: Up to 60 ms |

- ▶ The interface only functions if phase 1 is connected
- ▶ Communication is ready 30 s after activation
- ▶ Energy meters in a bus system with high data volume can result in performance losses in the bus
- ▶ Data are updated every 10 s. For this reason, an energy meter's query interval should not be shorter than 10 sec
- ▶ 254 devices can be connected to the S-Bus. With more than 128 devices, a repeater should be used
- ▶ The interface has no terminating resistance; this should be provided externally
- ▶ The registers being used are explained in the register list

Data transmission

- ▶ Only «read/write» register commands are recognised
- ▶ Only one register can be written at a time
- ▶ The device returns a «NAK» if more than one register is written at the same time
- ▶ Up to 10 registers can be read at the same time
- ▶ The device returns a «NAK» if more than 10 registers are read at the same time
- ▶ The device will not respond to unknown queries
- ▶ The device has a voltage monitor. The registers are saved in the EEPROM (transmission rate, etc.) in the event of a drop in voltage

Changing the device's S-Bus address

- ▶ To change the S-Bus address, hold ▶ pressed for 3 sec
- ▶ In the menu, ▼ increases the address by 10, ▶ increases the address by 1
- ▶ Once the desired address has been reached, wait until the main display reappears

Register

The following registers are available. The registers 4, 10, 13 and 18 are not used, and a 0 is always issued.

| R | Read | Write | Description | Values |
|----|------|-------|--------------------------------------|--|
| 0 | X | | Firmware version | Ex: «11» = FW 1.1 |
| 1 | X | | Number of supported register | Will give «41» |
| 2 | X | | Number of supported flags | Will give «0» |
| 3 | X | | Baud rate | BPS |
| 4 | | | Not used | Will give «0» |
| 5 | X | | Type/ASN function | Will give «AWD3» |
| 6 | X | | Type/ASN function | Will give «B5WS» |
| 7 | X | | Type/ASN function | Will give «00Cx» x : 2 = Non MID x : 3 = MID |
| 8 | X | | Type/ASN function | Will give «A00» |
| 9 | X | | HW version modif | Ex: «11» = FW 1.1 |
| 10 | | | Not used | Will give «0» |
| 11 | X | | Serial number | Serial number high |
| 12 | X | | serial number | Serial number low |
| 13 | | | Not used | Will give «0» |
| 14 | X | | Status | «0» = no problem «1» = problems with the last communication query |
| 15 | X | | S-Bus timeout | ms |
| 16 | X | X | S-Bus address | |
| 17 | X | | Flags error | 0: No errors 1: Error, phase 1 2: Error, phase 2 3: Error, phase 1 and 2 4: Error, phase 3 5: Error, phase 1 and 3 6: Error, phase 2 and 3 7: Error, phase 1, 2 and 3 |
| 18 | X | | Converter ratio | Example: Converter 100/5 Will give 20 |
| 19 | X | | Energy direction register | 0 = energy direction «consumption» 4 = energy direction «feedback» |
| 20 | X | | Counter total «energy → consumption» | 10 ⁻¹ kWh (multiplier 0.1) Example: 00912351= 0091235.1 kWh |
| 21 | X | | Counter total «energy ← feedback» | 10 ⁻¹ kWh (multiplier 0.1) Example: 00912351= 0091235.1 kWh |
| 22 | | | Not used | |
| 23 | | | Not used | |
| 24 | X | | URMS, phase 1 Voltage, phase 1 | V Example: 230 = 230 V |
| 25 | X | | IRMS, phase 1 Current, phase 1 | A / Except. 5/5=10 ⁻¹ A Example: 145 = 145 A |
| 26 | X | | PRMS, phase 1 Output, phase 1 | positive: Energy "→" negative: Energy "←" 10 ⁻¹ kW (multiplier 0.1) Example: 1545 = 154.5 kW |
| 27 | X | | QRMS, phase 1 Idle power, phase 1 | 10 ⁻¹ kvar (multiplier 0.1) Example: 1545 = 154.5 kvar |
| 28 | X | | Cos phi, phase 1 | 10 ⁻² (multiplier 0.01) Example: 67 = 0.67 |
| 29 | X | | URMS, phase 2 Voltage, phase 2 | V Example: 230 = 230 V |
| 30 | X | | IRMS, phase 2 Current, phase 2 | A / Except. 5/5=10 ⁻¹ A Example: 145 = 145 A |
| 31 | X | | PRMS, phase 2 Output, phase 2 | positive: Energy "→" negative: Energy "←" 10 ⁻² kW (multiplier 0.1) Example: 1545 = 154.5 kW |
| 32 | X | | QRMS, phase 2 Idle power, phase 2 | 10 ⁻¹ kvar (multiplier 0.1) Example: 1545 = 154.5 kvar |
| 33 | X | | Cos phi, phase 2 | 10 ⁻² (multiplier 0.01) Example: 67 = 0.67 |
| 34 | X | | URMS, phase 3 Voltage, phase 3 | V Example: 230 = 230 V |
| 35 | X | | IRMS, phase 3 Current, phase 3 | A / Except. 5/5=10 ⁻¹ A Example: 145 = 145 A |
| 36 | X | | PRMS, phase 3 Output, phase 3 | positive: Energy "→" negative: Energy "←" 10 ⁻¹ kW (multiplier 0.1) Example: 1545 = 154.5 kW |
| 37 | X | | QRMS, phase 2 Idle power, phase 3 | 10 ⁻¹ kvar (multiplier 0.1) Example: 1545 = 154.5 kvar |
| 38 | X | | Cos phi, phase 3 | 10 ⁻² (multiplier 0.01) Example: 67 = 0.67 |
| 39 | X | | PRMS, total Output, total | positive: Energy "→" negative: Energy "←" 10 ⁻¹ kW (multiplier 0.1) Example: 1545 = 154.5 kW |
| 40 | X | | QRMS, total Idle power, total: | 10 ⁻¹ kvar (multiplier 0.1) Example: 1545 = 154.5 kvar |

Connection diagram / Method of operation

Energy is added as indicated by the arithmetic operator. Positive output in the meter indicates that energy is being supplied, while negative output indicates that energy is being delivered. The energy measurement is carried out in accordance with mode 2, is balanced.

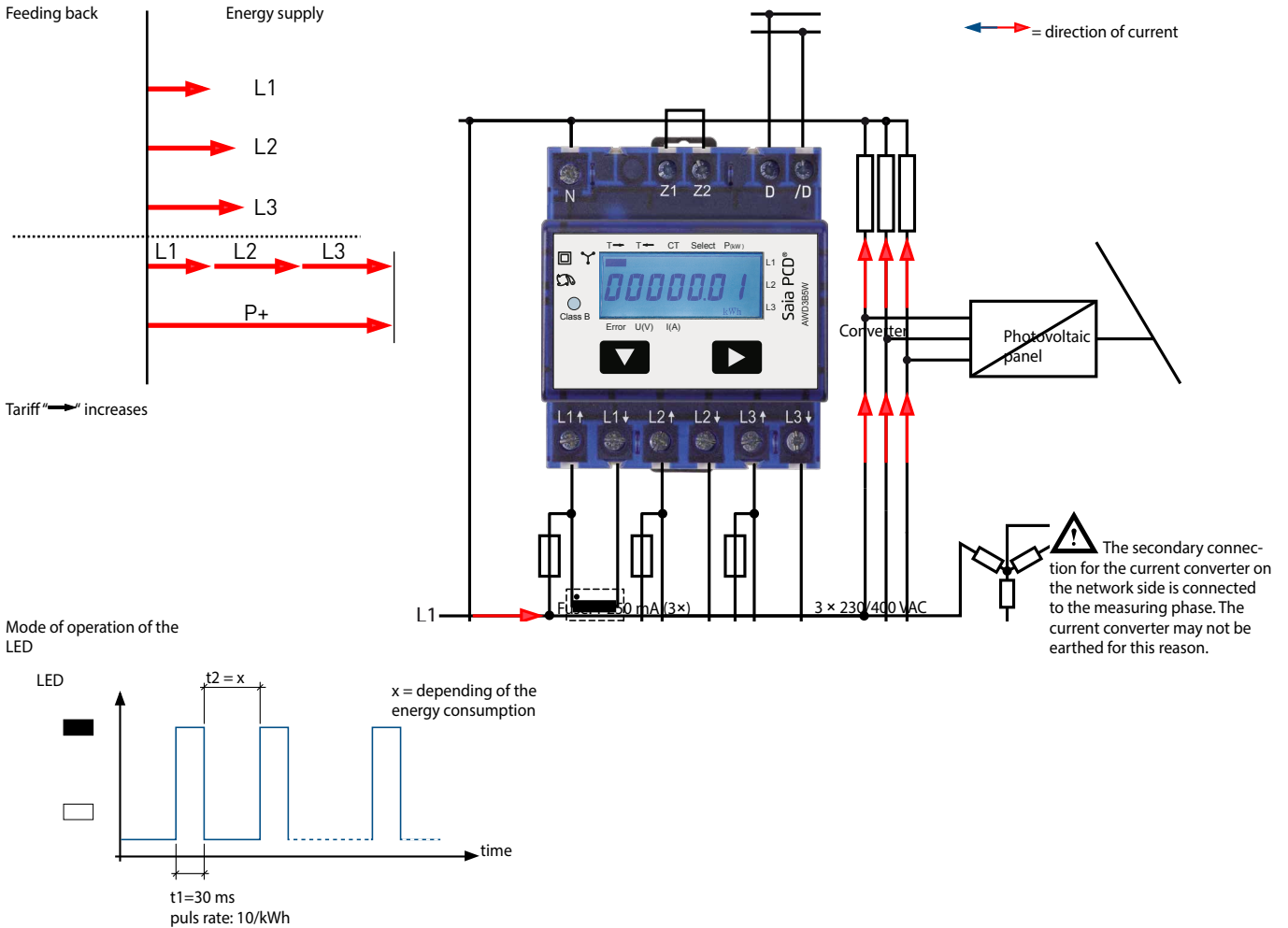
If the supply of energy (P positive) is greater than the delivery of energy (P negative), the counter $T \rightarrow$ increases.

The LED is OFF and only switches on if there is a pulse.

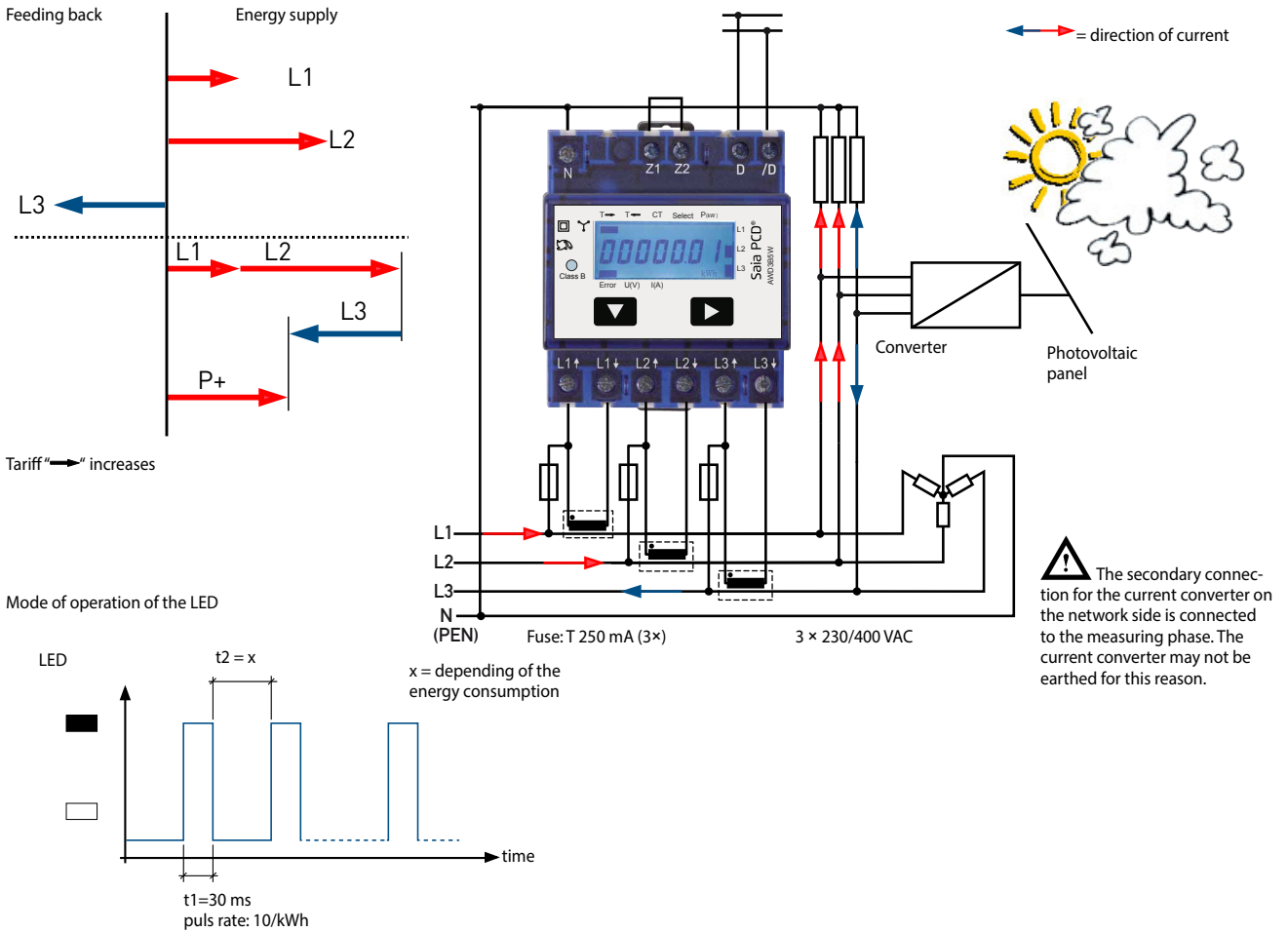
If the delivery of energy is greater than the supply of energy, the counter $T \leftarrow$ increases.

The LED in this case is ON and only switches off if there is a pulse.

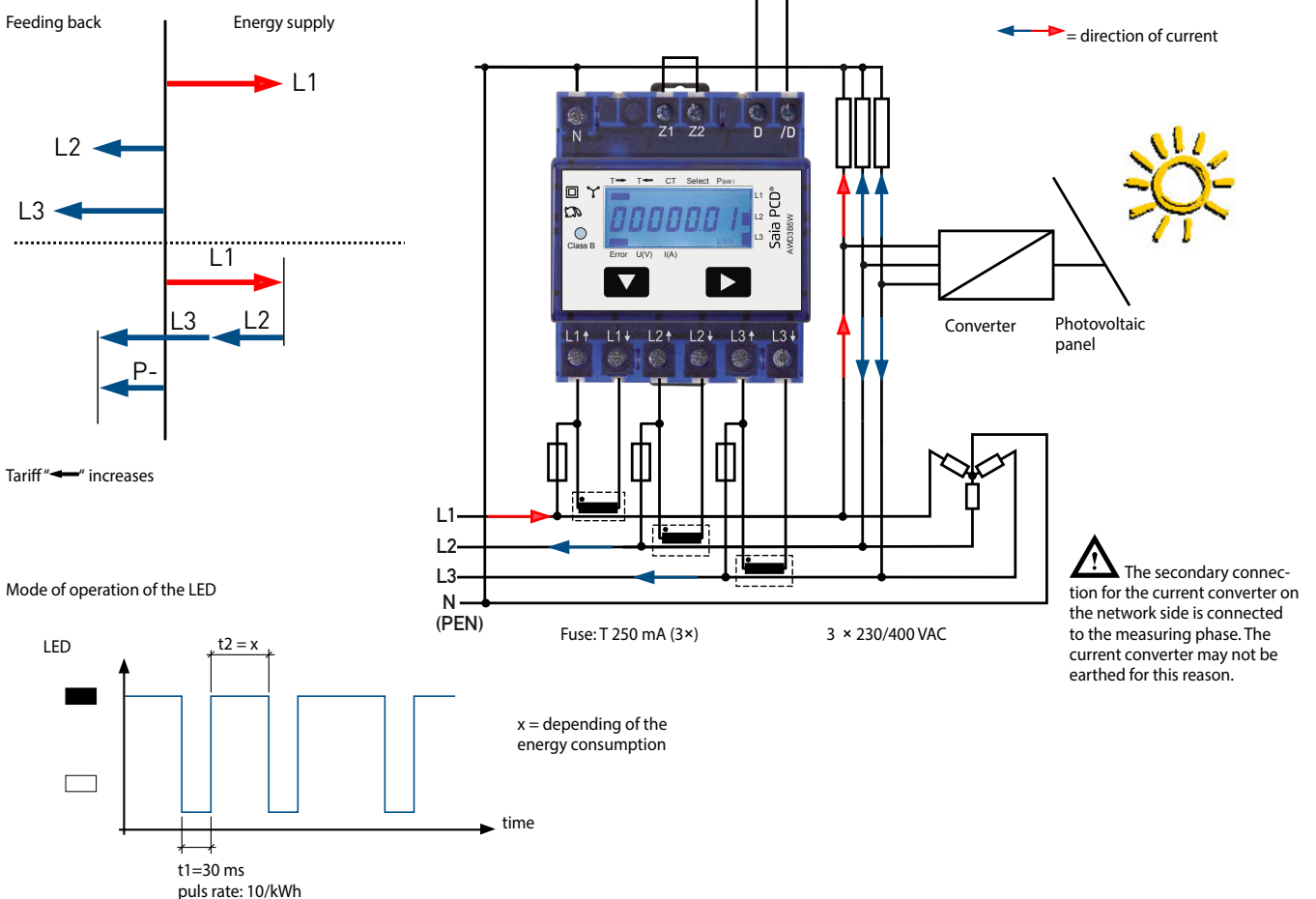
Method of operation with direction of current «supply \rightarrow »



Method of operation with direction of current «supply →» and «feeding back ←»



Method of operation with direction of current «feeding back ←»



Accessories

Sealing cover for:

- Single-phase Saia PCD® energy meter AAE1
- 3-phase Saia PCD® energy meter ALE3, AWC3 and AWD3

2 units are recommended for contact protection on AAE1.

4 units are recommended for contact protection on ALE3, AWC3 and AWD3.

Order no.

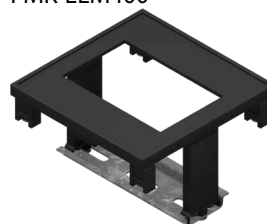
4 104 7485 0



ALE3, AWC3 or AWD3
with sealing cover

Mounting frame for 3-ph energy meters
of the families ALE3/AWC3/AWD3

PMK-EEM400



ALE3, AWC3 or AWD3
mounted in panel kit

Order details

| Type | Short description | Description | Weight |
|-----------------|---|--|--------|
| AWD3B5WS00C3A00 | Three-phase energy meters with integral serial S-Bus interface for current transformer (CT) measurement, 3x 230/400 VAC - 50 Hz | Three-phase two-way energy meter with LCD display S-Bus interface, 5...1'500 A display of active power, voltage and current according to MID directive | 230 g |
| AWD3B5WS00C2A00 | Three-phase energy meters with integral serial S-Bus interface for current transformer (CT) measurement, 3x 230/400 VAC - 50 Hz | Three-phase two-way energy meter with LCD display S-Bus interface, 5...1'500 A display of active power, voltage and current | 230 g |
| 4 104 7485 0 | Accessories for energy meters | Lead sealing cap for energy meters AAE1, AAE3, ALE3 and AWD3 | 4 g |
| PMK-EEM400 | Accessories for energy meters | Kit for mounting ALE3/AWD3 energy meters on door cabinet | |
| PCD7.T161 | Termination box | Termination box for RS-485 line, with galvanic isolation, 230 VAC | 80 g |
| PCD7.T162 | Termination box | Termination box for RS-485 line, with galvanic isolation, 24 VDC | 80 g |

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