



# ENERGY METERS FOR DIRECT AND ALTERNATING CURRENT

TECHNICAL INFORMATION



EZG-S0



EZG-TCP



EZD-S0 1/5



EZD-S0 80



EZD-TCP 1/5



EZD-TCP 80



SINUS 5/1 S0 MID



SINUS 85 S0 MID

**Type:**

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**Energy meters for direct current**

0 - 1500 Volt, 0 - 10 A direct / via shunt resistor, S0 output	EZG-S0	Page 6
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**Energy meters for alternating current**

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## General description of energy meters

### Application

The Müller + Ziegler energy meters are meters for direct current (EZG) or alternating three-phase current (EZD). The energy meters can be operated either for direct measurement or in connection with shunt resistors (EZG - direct current) or current transformers (EZD - alternating three-phase current). They are used, depending on the model, in photovoltaic systems, battery systems, charging stations, DC machines or industrial plants, workshops, machines and offices.

### Special features

- S0 or Ethernet interface
- Analog output 20 mA in various types
- EZG types with wide-range power supply unit for auxiliary voltages from 21-265 VAC+DC
- EZD types can be operated without auxiliary voltage
- Adjustable ratio of shunt resistors and current transformers
- Direct connection possible
- Selectable value of pulses / kWh
- LEDs for function display
- Slim design with housing width 71 mm

### Technical data

General data		
Operation temperature	-15 °C to +20 °C to +30 °C to +55 °C	
Storage temperature	-25 °C to +85 °C	
Temperature influence	< 0,2 % at 10 K	
Ambient conditions	stationary application, indoor, rel. air humidity 5 .. 95%, no condensation, altitude up to 2000 m, water, rain, snow or hail excluded	
EMC	DIN EN 50470-1	
Electrical safety	DIN EN 61 010 part 1 housing insulated, protection class II, for rated voltages up to 1000V (phase to neutral), pollution degree 2, measuring category CAT III	
Fuse	The devices are equipped with short-circuit proofed transformers, an overcurrent protection device for the energy meter itself is not required.	
Test voltage EZG-S0	7,4 kV, 50 Hz input against auxiliary voltage and analog output and relay contact	
Test voltage EZG-TCP	7,4 kV, 50 Hz auxiliary voltage against input against Ethernet interface 4 kV, 50 Hz input against Ethernet interface	
Test voltage EZD-S0/-TCP	4 kV, 50 Hz input against analog output against pulse outputs against tariff control input	
IP code	DIN EN 60529, housing IP30, terminals IP20	
Installation	snap-on mounting on top hat rail 35 mm (DIN EN 60715) The equipment is suitable for tight on tight assembly, however with ambient temperatures of > 45 °C a distance apart of 10 mm is recommended. The assembly location should, if possible, free of vibration.	
Terminals	screw terminals max. 4 mm <sup>2</sup> , tightening torque 0,5 Nm	
Housing material	PPO / Polyamid PA, self extinguishing acc. to UL 94 V-0	
Weight	220 g	

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# Energy meter for direct current

for direct and indirect current measurement  
voltage ranges 0 - 1500 VDC

Type:  
**EZG-S0**



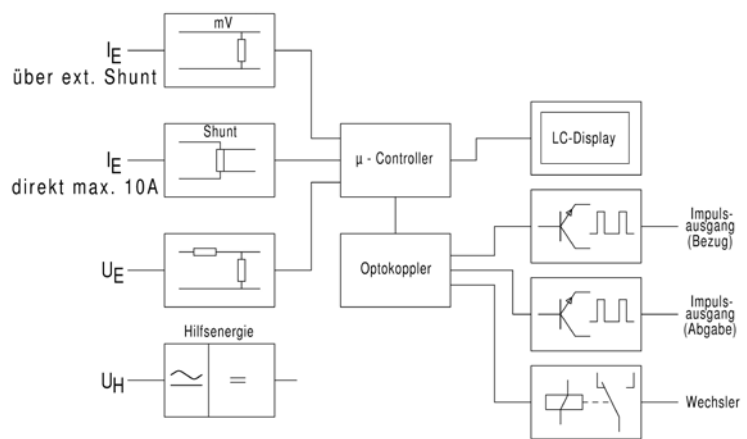
## Application

The electronic direct current meter EZG-S0 is used for measuring the active energy for import and export currents in direct current installations. It is applied in photovoltaic installations, battery systems, charging stations, direct current machines etc. Measurements can also be made in installations with pulsed direct current controls (PWM controls). The energy meter may directly measure up to 10 A DC or be connected to a shunt. The energy values are indicated in a display, stored and provided as pulses for further processing. Furthermore, the values for current, voltage and instantaneous active power can be displayed. A programmable relay contact may be used for monitoring the instantaneous active power, current or voltage.

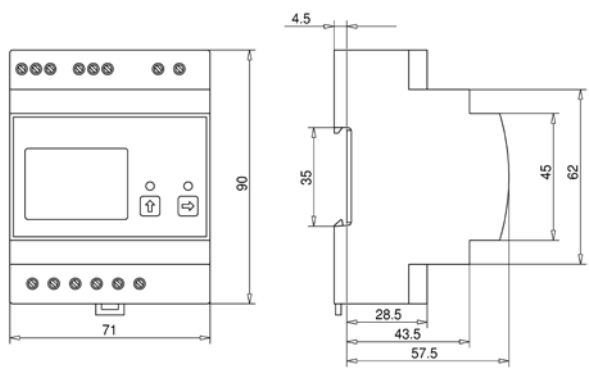


## Function

The parameters to be measured are supplied to an integrated module via an external or internal shunt as well as via a voltage divider. There, the instantaneous values of current and voltage are multiplied and converted into active power and active energy. A microcontroller accepts the assessments, the output of the pulses as well as the storage of the measured values. The results are displayed on LCD display. The pulse output of import and export active energy is realized via two open-collector transistor outputs. An auxiliary supply voltage is required. The meter readings are stored in case of power failure.



## Dimensions

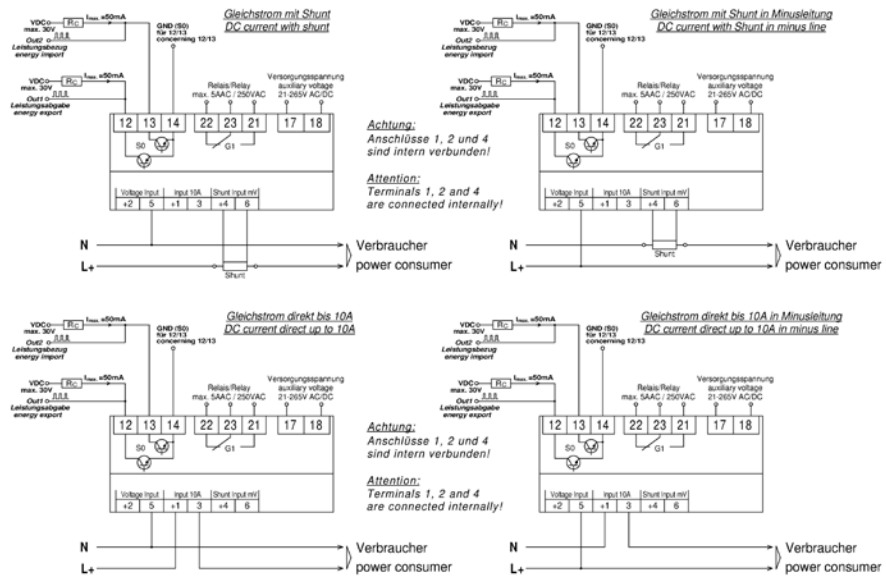


## Types and variants

EZG-S0



## Connection



## Technical data

<b>Input</b>	Accuracy	± 1% class B acc. DIN EN 50470-3
	Rated voltages	0-10 VDC, 0-25 VDC, 0-50 VDC, 0-100 VDC, 0-500 VDC, 0-1000 VDC 0-1500 VDC or by choice (please specify by ordering), $R_i \geq 2 \text{ M}\Omega$
	Rated current direct	direct measurement 0-10 A (voltage drop 60 mV)
	Rated current external	measuring via external shunt 1-20.000 A/ 60 mV, 100 mV or 150 mV, selectable via button on front panel
	Pulsed direct current (PWM)	20 Hz - 30 kHz
	Overload permanent	current and voltage 1,2-fold
<b>Indicators</b>	High surge load	voltage 2-fold 1 s, max. 2000 V, current 20-fold 0,5 s
	Display	LCD display active energy import 9 999 999,99 kWh/MWh (with return stop) active energy export 9 999 999,99 kWh/MWh (with return stop) ampere hours import 9 999 999,99 kWh (with return stop) ampere hours export 9 999 999,99 kWh (with return stop) instantaneous active power +9 999 999,99 kW with (-) in case of power, voltage, current
	Function indicators	LED for active energy (pulses/kWh equal to set pulses) LED for limit value G1 exceeded
	Update display	1 x per second
	Update registers	1 x per second
	<b>Pulse and relay outputs</b>	Pulse output
Number of pulses		1-80.000 pulses/kWh, selectable via button on front panel, max. value depends on set current and voltage range
Pulse length		adjustable from 10-120 ms
Accuracy		± 1% class B acc. DIN EN 50470-3
Standards		DIN EN 50470-1
Limit range		0-(±) 120% of full scale
Switching accuracy		± 1 % of full scale
Hysteresis		adjustable from 0-10 % of full scale
Min. current time circuit		< 200 ms for 10% limit value exceedance
Switching delay		adjustable from 0-99 s
Switching state		closed circuit or open circuit principle, min- or max-contact selectable
Relay contact		1 changeover contact, 10 mA-5 A, 5-250 VDC / VAC, 1250 W(VA)
Min. switching capacity	60 mW	
<b>Auxiliary voltage</b>	Standard	21-265 VAC+DC, 2 VA, (EMC DIN EN 61326 class A)

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## Energy meter for direct current

with HTTP, TCP/IP, Modbus-TCP protocol for indirect current measurement via shunt resistors  
voltage ranges 0 - 1500 VDC

Type:  
**EZG-TCP**



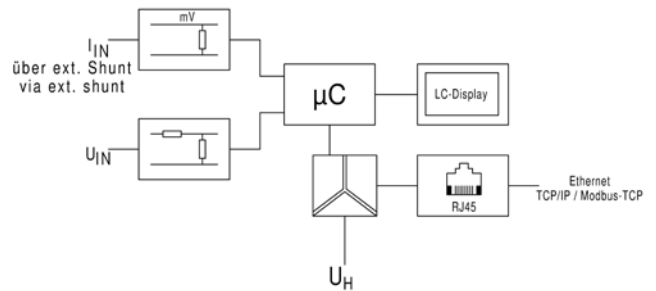
### Application

The electronic direct current meter EZG-TCP is used for measuring the active power for incoming and outgoing currents in direct current installations. It is applied in photovoltaic installations, battery systems, charging stations, direct current machines etc. Measurement can be made in installations with pulsed direct current controls (PWM controls). The energy meter is connected to a shunt. All measuring values for current, voltage and energy are indicated in a display. The energy values are stored and provided on an Ethernet interface for further processing.

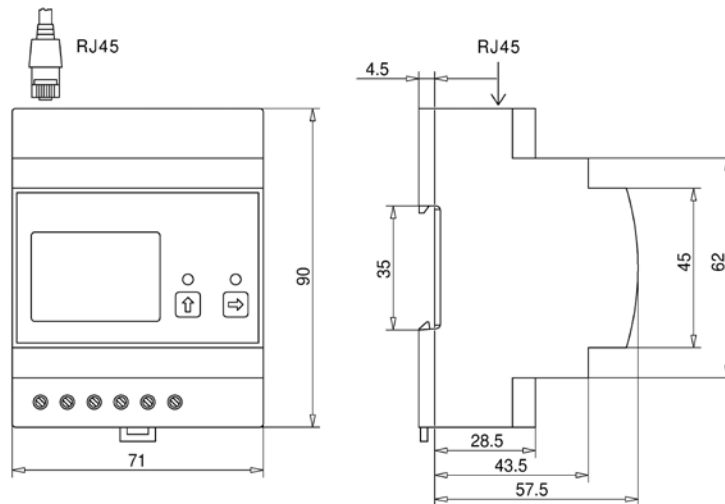


### Function

The parameters to be measured are supplied to an integrated module via an internal shunt as well as via a voltage divider. There, the instantaneous values of current and voltage are multiplied and converted into active power and active energy. A microcontroller accepts the assessments, the output of the pulses as well as the storage of the measured values. The results are displayed on LC display. An auxiliary supply voltage is required. The meter readings are stored in case of power failure.



### Dimensions



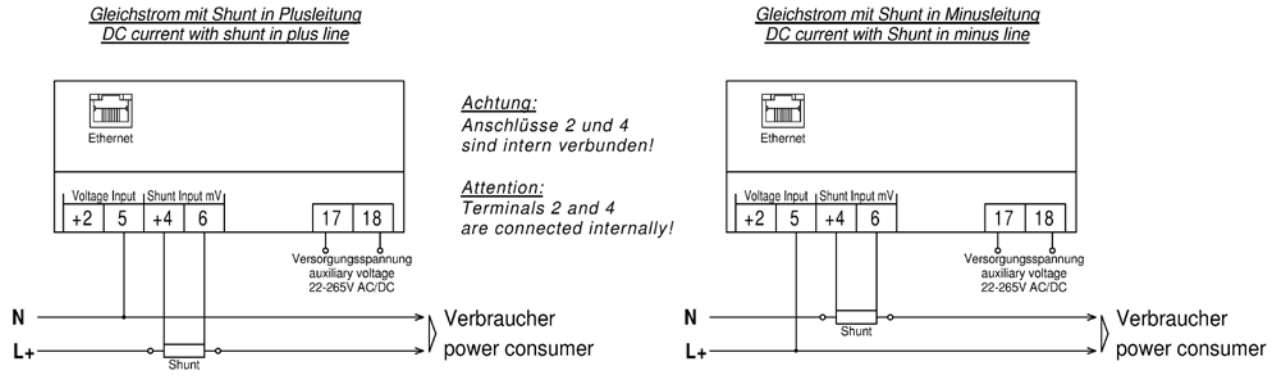
### Types and variants

EZG-TCP





## Connection



## Technical data

<b>Input</b>	Accuracy	± 1% class B acc. DIN EN 50470-3
	Rated voltages	0-10 VDC, 0-25 VDC, 0-50 VDC, 0-100 VDC, 0-500 VDC, 0-1000 VDC 0-1500 VDC or by choice (please specify by ordering), $R_i \geq 2 \text{ M}\Omega$
	Rated current external	measuring via external shunt 1-20.000 A/ 60 mV, 100 mV or 150 mV, selectable via button on front panel
	Pulsed direct current (PWM)	20 Hz - 30 kHz
	Overload permanent	current and voltage 1,2-fold
	High surge load	voltage 2-fold 1 s, max. 2000 V, current 20-fold 0,5 s
<b>Indicators</b>	Display	LCD display active energy import 9 999 999,99 kWh/MWh (with return stop) active energy export 9 999 999,99 kWh/MWh (with return stop) ampere hours import 9 999 999,99 kWh (with return stop) ampere hours export 9 999 999,99 kWh (with return stop) instantaneous active power +9 999 999,99 kW with (-) in case of power, voltage, current
	Function indicators	LED for active energy import and export (pulses/kWh depending on set shunt)
	Interface	10 Mbits/s Ethernet LAN interface
	Update display	1 x per second
	Update register	1 x per second
	<b>Auxiliary voltage</b>	Standard

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## Energy meter for alternating three-phase current

for current transformer connection secondary 1 / 5 A with S0 and analog output

Type:  
**EZD-S0 1/5**



### Application

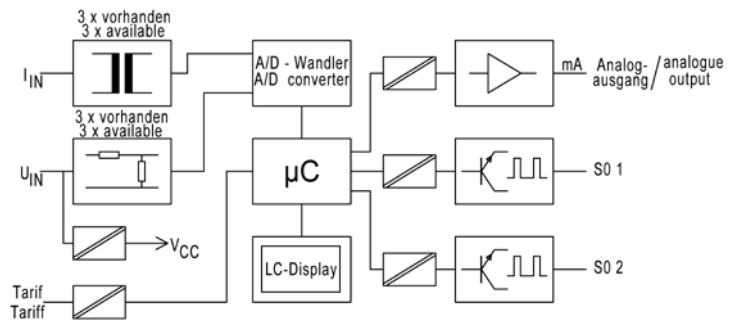
The electronic energy meter EZD-S0 is used to record the active and reactive energy during import and export in three-phase systems under any load. Their application covers for example industrial plants, workshops, machines and offices. The energy values are displayed, saved and made available as pulses for further processing. The current active or reactive power can be output via an analog output (20 mA). All values for current, voltage, frequency, power and energy can be read on an LCD display. The connection is made via current transformers with a nominal secondary current of 1 or 5 amps.



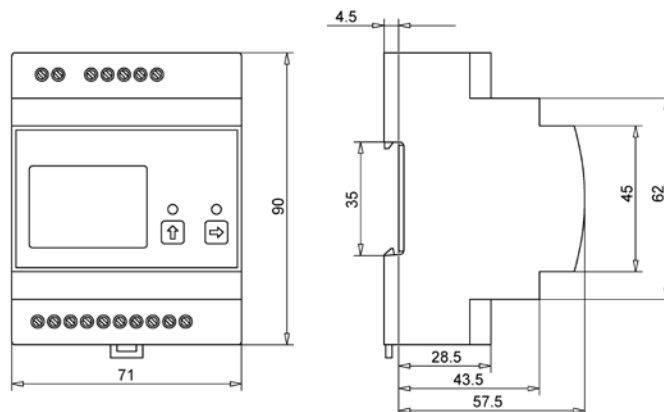
### Function

The values to be measured are transferred to an integrated module via external and internal current transformers and voltage dividers. The instantaneous values of current and voltage are recorded here. A microcontroller takes over the evaluation, the output of the impulses as well as the storage of the measured values. The values are shown on an LCD display.

The pulse output of active or reactive energy is realized via two open collector transistor outputs (S0 interfaces). An analog output of 20 mA represents the current active or reactive power. A separate auxiliary voltage is not required, it is obtained from the measuring voltage. The meter readings and programming are saved in case of a power failure.



### Dimensions

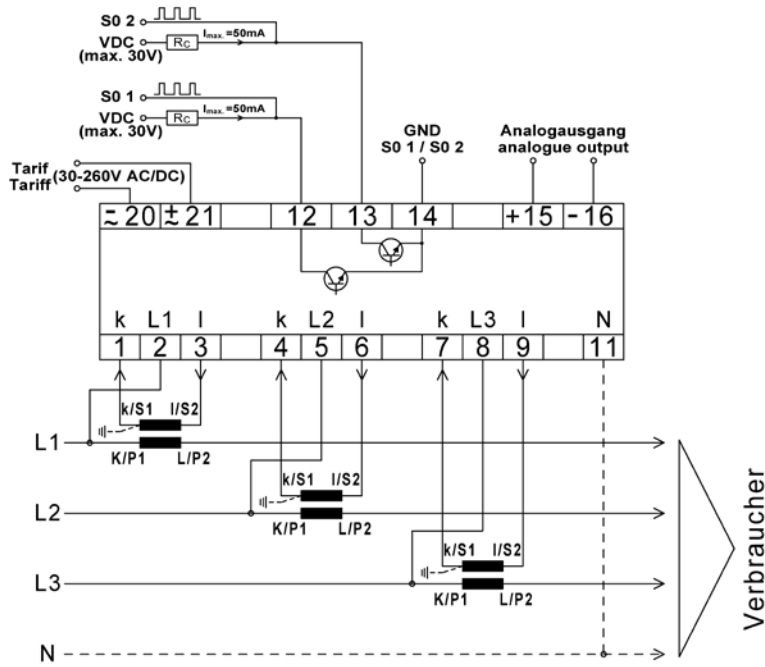


### Types and variants

EZD-S0 1/5



## Connection



## Technical data

<b>Input</b>	Mains connection	3-phase 4-wire power system, current transformer measurement bidirectional meter, 2-tariff measurement
	Rated voltage	50-300 V / 87-520 V and 3 x 87-520 V
	Current information acc. to meter print	$I_{min} - I_{ref} (I_{max}) A$
	Starting current $I_{st}$	0,002 A (symmetrical per phase)
	Minimum current $I_{min}$	0,01 A
	Transition current $I_{tr}$	0,05 A
	Reference current $I_{ref}$	1 / 5 A
	Limit current $I_{max}$	7 A
	Rated frequency	40-70 Hz
	Energy consumption	voltage circuit approx. 0,7 VA; current circuit approx. 0,1 VA
	Accuracy	active energy class B acc. DIN EN 50470-3 reactive energy class 2 acc. DIN EN 62053-23
	Backstop	yes
	<b>Indicators</b>	Display
Function indicators		LED for active energy import and export 10.000 pulses/kWh both LED light up at current $< I_{min}$
Reset		via buttons on front panel
<b>Pulse outputs (S0)</b>	Pulse output	npn-transistor, 24V DC (max. 30 V/50 mA), ON (activ) 10-27 mA OFF (inactiv) $< 1 mA$ , switching status open or closed selectable
	Number of pulses	selectable via button (number of pulses depend on the setting of current and voltage transformers)
	Pulse length	60 - 100 ms, selectable via button
	Accuracy	class B acc. DIN EN 50470-3
	Standards	DIN EN 62053-31
	<b>Tariff control input</b>	Tariff 1
Tariff 2		30 - 260V AC/DC, 0,4 VA
Separation		4 kV
<b>Analog output</b>	Rated value	0-20 mA or 4-20 mA, load 0-500 Ohm
	Accuracy	$\pm 0,5\%$ of full scale ( $\pm 1\%$ with spread $< 50\%$ )
	Setting time	$< 1 s$
	Spread	30 - 120% from power $U \times I \times \sqrt{3}$

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## Energy meter for alternating three-phase current

for direct connection up to 80 amps with S0 and analog output

Type:  
**EZD-S0 80**



### Application

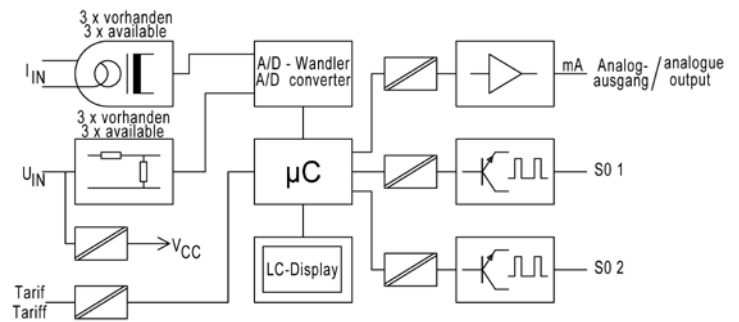
The electronic energy meter EZD-S0 is used to record the active and reactive energy during import and export in three-phase systems under any load. Their application covers for example industrial plants, workshops, machines and offices. The energy values are displayed, saved and made available as pulses for further processing. The current active or reactive power can be output via an analog output (20 mA). All values for current, voltage, frequency, power and energy can be read on an LCD display. The connection is made directly up to a maximum current of 80 amps.



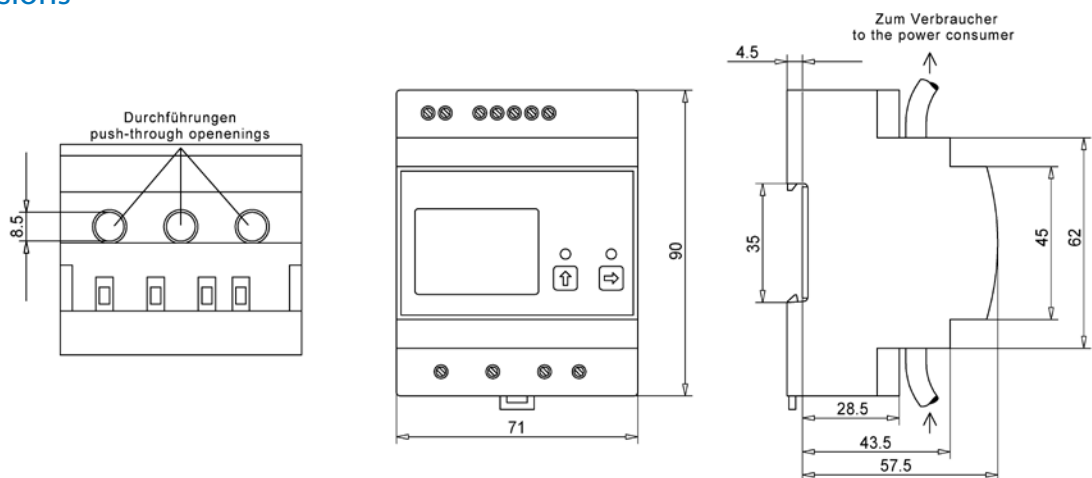
### Function

The values to be measured are transferred to an integrated module via internal current transformers and voltage dividers. The instantaneous values of current and voltage are recorded here. A microcontroller takes over the evaluation, the output of the impulses as well as the storage of the measured values. The values are shown on an LCD display.

The pulse output of active or reactive energy is realized via two open collector transistor outputs (S0 interfaces). An analog output of 20 mA represents the current active or reactive power. A separate auxiliary voltage is not required, it is obtained from the measuring voltage. The meter readings and programming are saved in case of a power failure.



### Dimensions

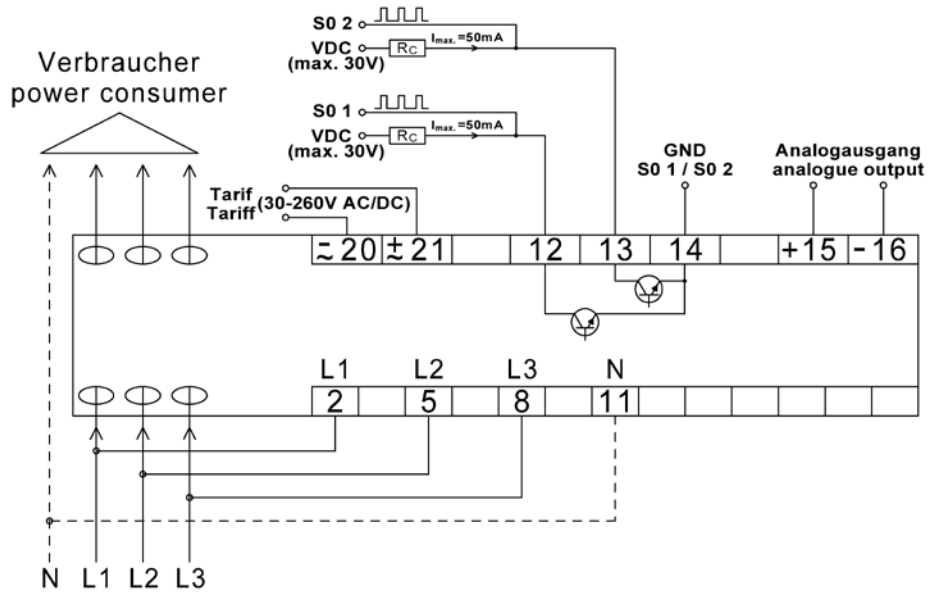


### Types and variants

EZD-S0 80



## Connection



## Technical data

<b>Input</b>	Mains connection	3-phase 4-wire power system, direct measurement bidirectional meter, 2-tariff measurement	
	Rated voltage	50-300 V / 87-520 V and 3 x 87-520 V	
	Current information acc. to meter print	$I_{min} - I_{ref} (I_{max})$ A	
	Starting current $I_{st}$	0,02 A (symmetrical per phase)	
	Minimum current $I_{min}$	0,2 A	
	Transition current $I_{tr}$	0,5 A	
	Reference current $I_{ref}$	5 A	
	Limit current $I_{max}$	80 A	
	Rated frequency	40-70 Hz	
	Energy consumption	voltage circuit approx. 0,7 VA; current circuit approx. 0,1 VA	
	Accuracy	active energy class B acc. DIN EN 50470-3 reactive energy class 2 acc. DIN EN 62053-23	
	Backstop	yes	
	<b>Indicators</b>	Display	LCD-display, update 2 times per second active energy in kWh or MWh with 7.2 digits reactive energy in kvarh or Mvarh with 5.2 digits
		Funktionsanzeigen	LED for active energy import and export 600 pulses/kWh both LED light up at current $< I_{min}$
Reset		via buttons on front panel	
<b>Pulse outputs (S0)</b>	Pulse output	npn-transistor, 24V DC (max. 30 V/50 mA), ON (activ) 10-27 mA OFF (inactiv) $< 1$ mA, switching status open or closed selectable	
	Number of pulses	selectable via button (number of pulses depend on the setting of voltage transformers)	
	Pulse length	60 - 100 ms, selectable via button	
	Accuracy	class B acc. DIN EN 50470-3	
	Standards	DIN EN 62053-31	
<b>Tariff control input</b>	Tariff 1	0 V or open	
	Tariff 2	30 - 260V AC/DC, 0,4 VA	
	Separation	4 kV	
<b>Analog output</b>	Rated value	0-20 mA or 4-20 mA, load 0-500 Ohm	
	Accuracy	$\pm 0,5\%$ of full scale ( $\pm 1\%$ with spread $< 50\%$ )	
	Setting time	$< 1$ s	
	Spread	30 - 120% from power $U \times I \times \sqrt{3}$	

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## Energy meter for alternating three-phase current

for current transformer connection secondary 1 / 5 A with Ethernet interface

Type:  
**EZD-TCP 1/5**



### Application

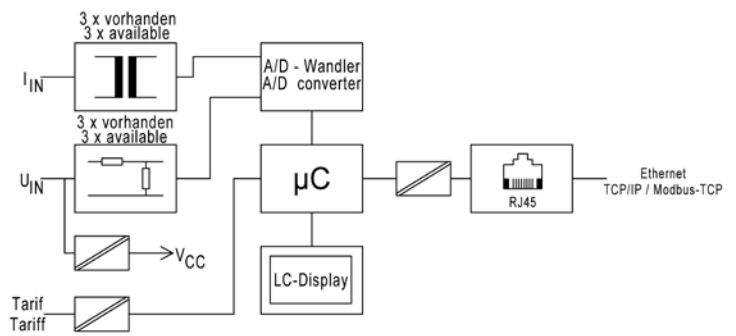
The electronic energy meter EZD-TCP is used to record the active and reactive energy during import and export in three-phase systems under any load. Their application covers for example industrial plants, workshops, machines and offices. The energy values are displayed, stored and provided on an Ethernet interface for further processing. All values for current, voltage, frequency, power and energy can be read on an LCD display. The connection is made via current transformers with a nominal secondary current of 1 or 5 amps.



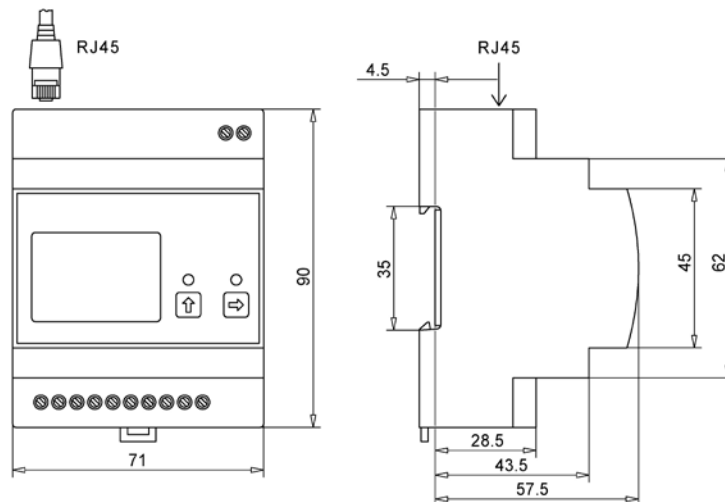
### Function

The values to be measured are transferred to an integrated module via external and internal current transformers and voltage dividers. The instantaneous values of current and voltage are recorded here. A microcontroller takes over the evaluation and the storage of the measured values. The values are shown on an LCD display.

A separate auxiliary voltage is not required, it is obtained from the measuring voltage. The meter readings and programming are saved in case of a power failure.



### Dimensions

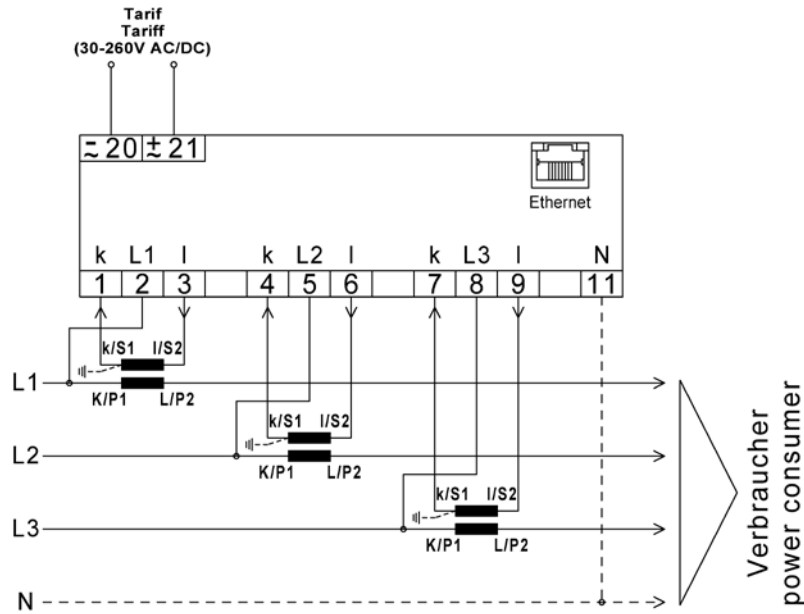


### Types and variants

EZD-TCP 1/5



## Connection



## Technical data

<b>Input</b>	Mains connection	3-phase 4-wire power system, current transformer measurement bidirectional meter, 2-tariff measurement	
	Rated voltage	50-300 V / 87-520 V and 3 x 87-520 V	
	Current information acc. to meter print	$I_{min} - I_{ref} (I_{max})$ A	
	Starting current $I_{st}$	0,002 A (symmetrical per phase)	
	Minimum current $I_{min}$	0,01 A	
	Transition current $I_{tr}$	0,05 A	
	Reference current $I_{ref}$	1 / 5 A	
	Limit current $I_{max}$	7 A	
	Rated frequency	40-70 Hz	
	Energy consumption	voltage circuit approx. 0,7 VA; current circuit approx. 0,1 VA	
	Accuracy	active energy class B acc. DIN EN 50470-3 reactive energy class 2 acc. DIN EN 62053-23	
	Backstop	yes	
	<b>Indicators</b>	Display	LCD-display, update 2 times per second active energy in kWh or MWh with 7.2 digits reactive energy in kvarh or Mvarh with 5.2 digits
		Function indicators	LED for active energy import and export 10.000 pulses/kWh both LED light up at current $< I_{min}$
Reset		via buttons on front panel	
<b>Interface</b>	Interface	10 Mbits/s Ethernet LAN-interface	
	Protocol	TCP/IP protocol MODBUS-TCP-protocol	
<b>Tariff control input</b>	Tariff 1	0 V or open	
	Tariff 2	30 - 260V AC/DC, 0,4 VA	
	Separation	4 kV	

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# Energy meter for alternating three-phase current

for direct connection up to 80 amps with Ethernet interface

Type:  
**EZD-TCP 80**



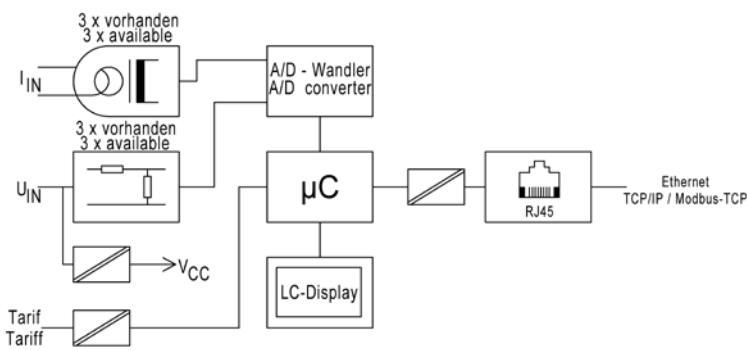
## Application

The electronic energy meter EZD-TCP is used to record the active and reactive energy during import and export in three-phase systems under any load. Their application covers for example industrial plants, workshops, machines and offices. The energy values are displayed, stored and provided on an Ethernet interface for further processing. All values for current, voltage, frequency, power and energy can be read on an LCD display. The connection is made directly up to a maximum current of 80 amps.

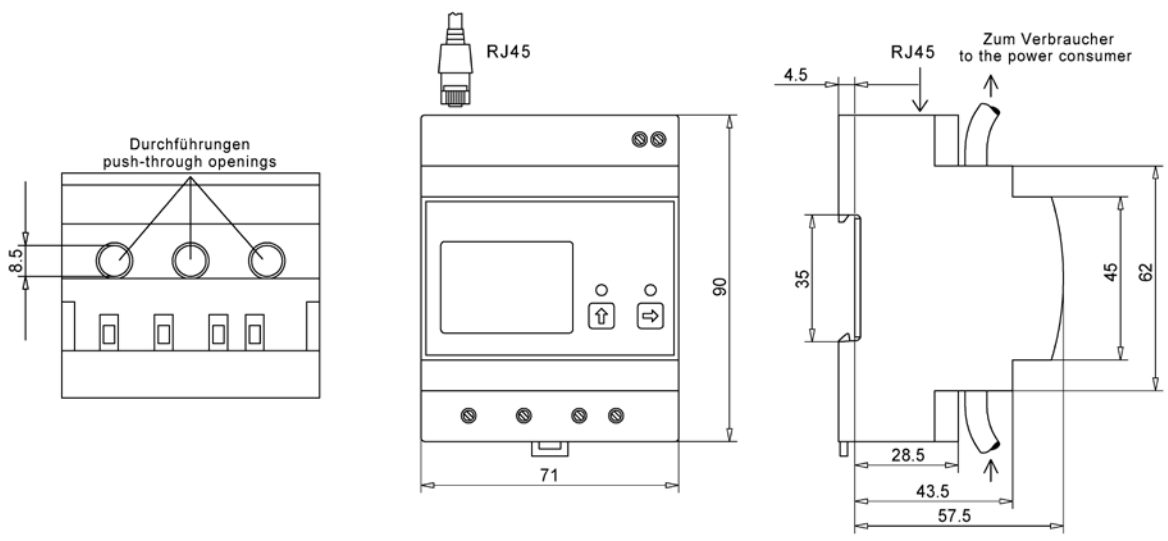


## Function

The values to be measured are transferred to an integrated module via internal current transformers and voltage dividers. The instantaneous values of current and voltage are recorded here. A microcontroller takes over the evaluation and the storage of the measured values. The values are shown on an LCD display. A separate auxiliary voltage is not required, it is obtained from the measuring voltage. The meter readings and programming are saved in case of a power failure.



## Dimensions



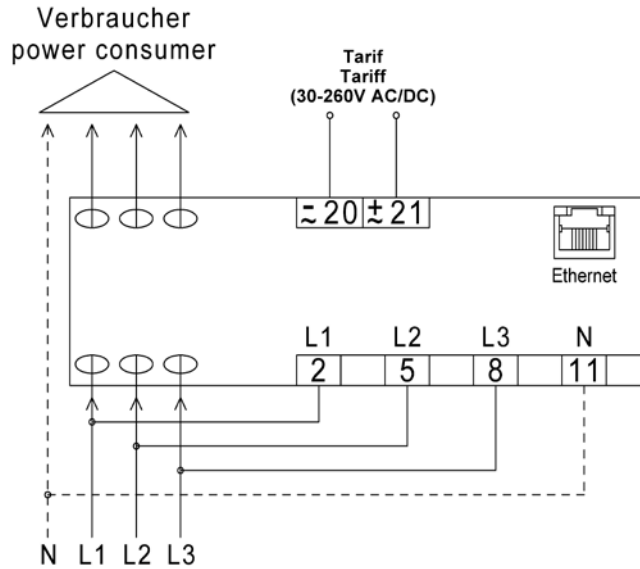
## Types and variants

**EZD-TCP 80**





## Connection



## Technical data

<b>Input</b>	Mains connection	3-phase 4-wire power system, direct measurement bidirectional meter, 2-tariff measurement	
	Rated voltage	50-300 V / 87-520 V and 3 x 87-520 V	
	Current information acc. to meter print	$I_{min} - I_{ref} (I_{max})$ A	
	Starting current $I_{st}$	0,02 A (symmetrical per phase)	
	Minimum current $I_{min}$	0,2 A	
	Transition current $I_{tr}$	0,5 A	
	Reference current $I_{ref}$	5 A	
	Limit current $I_{max}$	80 A	
	Rated frequency	40-70 Hz	
	Energy consumption	voltage circuit approx. 0,7 VA; current circuit approx. 0,1 VA	
	Accuracy	active energy class B acc. DIN EN 50470-3 reactive energy class 2 acc. DIN EN 62053-23	
	Backstop	yes	
	<b>Indicators</b>	Display	LCD-display, update 2 times per second active energy in kWh or MWh with 7.2 digits reactive energy in kvarh or Mvarh with 5.2 digits
		Function indicators	LED for active energy import and export 600 pulses/kWh both LED light up at current < $I_{min}$
Reset		via buttons on front panel	
<b>Interface</b>	Interface	10 Mbits/s Ethernet LAN-interface	
	Protocol	TCP/IP protocol MODBUS-TCP-protocol	
<b>Tariff control input</b>	Tariff 1	0 V or open	
	Tariff 2	30 - 260V AC/DC, 0,4 VA	
	Separation	4 kV	

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## General description of types SINUS 5//1 und SINUS 85

### Application

Energy meters of types SINUS 5//1 and SINUS 85 are three-phase four-wire alternating current meters for transformer and direct connection. They are used for measuring the electrical active and reactive energy in phases of any loads. It may be measured in installations with oscillation package controls (intermittent current consumption) as well as with distorted sine wave. The meters SINUS with MID conformity marking based on a type test are provided as offsetting measuring devices for the registration of electrical active energy. Their application covers industrial plants, workshops, machines, offices etc, and are designed for snap-on fastening on 35 mm top hat rails.

### Type and function

The meters SINUS 5//1 and SINUS 85 are fully electronic independently functioning alternating current electricity meters for fixed installation in three-phase four-wire power supply systems and are designed for measuring the electrical active and reactive energy and register them in up to two energy tariffs.

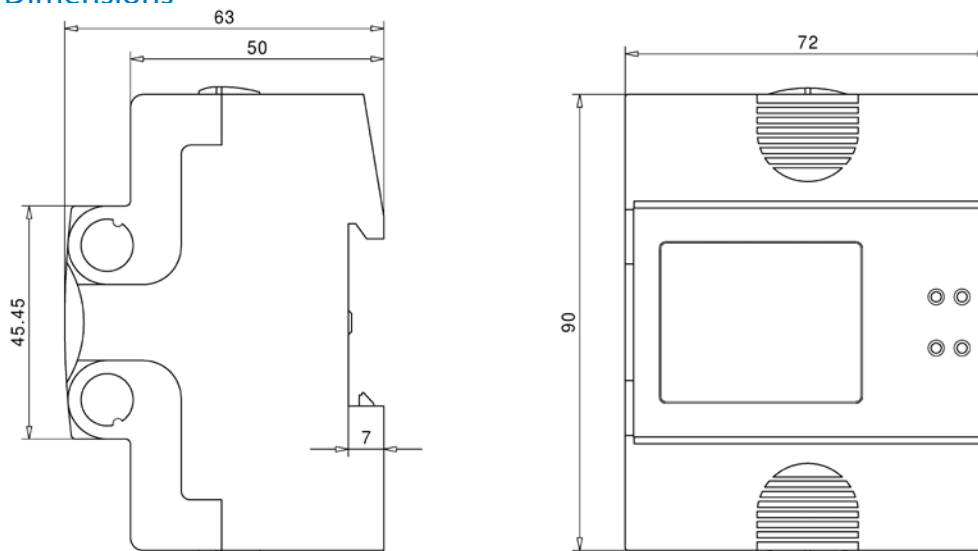
They are designed as indoor meters as housing type and as installation built-in type in 4 module widths and meant for snap-on fastening on top hat rails. One display, one tariff control input for tariff switchover and at least one pulsed output for the output of pulses proportional to the active energy are always available.

An additional auxiliary voltage for the meter is not necessary. The energy measured values are permanently stored in the meter in case of a power failure. Optionally, a second pulsed output for the output of pulses proportional to the reactive power or alternatively a M-Bus or Modbus communication interface for data transmission are available.

### Special features

- Digital three-phase energy counter 5//1 A or 85 A direct measurement
- 2 x 230 / 400 V
- Module widths 72 mm
- with MID certificate valid in the EU
- optionally available with integrated M-BUS or Modbus
- Accuracy class 1 (class B)
- LC display 8-digit (6+2 decimal places)
- Installation self test
- two tariff meter HT/NT with tariff switchover input
- with 2 N terminals (loop through of the neutral)
- with 2 S0 pulsed outputs for active and reactive energy
- with 2 LED's for active and reactive energy, permanently lit after power ON without load and flashing proportionally to the load
- the menu indicates: consumption, voltage (V), current (A), power output (W), apparent power (VA), reactive power (var)
- Factory-set S0 pulse number and pulse length (Option)

### Dimensions





## Energy meter for alternating three-phase current

for current transformer connection secondary 1/5 A

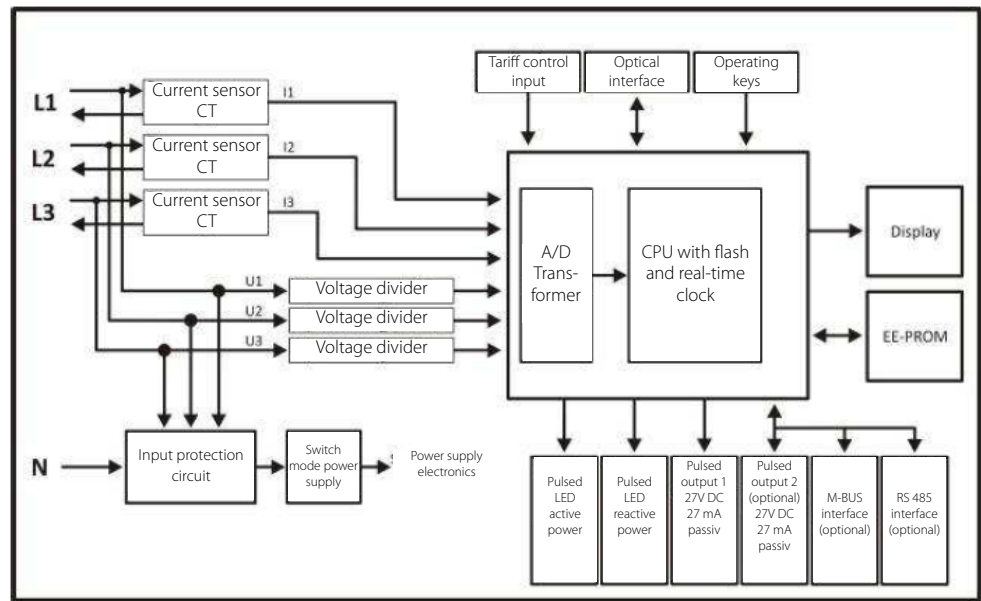
Type:

**SINUS 5//1 50 MID**  
**SINUS 5//1 M-BUS MID**  
**SINUS 5//1 Modbus MID**



### Function

The meter consists of a multi-part plastic housing. One part is manufactured from transparent plastic and covers the LC display (liquid crystal display) below and the name plate. For connecting the meter, terminal screws accessible from the outside are provided. The electronic function circuit of the meter is installed on printed circuit boards and is located inside the plastic housing. The current to be measured is internally adapted to the input conditions of the electronic sensors via a current transformer per current circuit (per phase). The voltage to be measured is internally adapted to the input conditions of the electronic sensors via a voltage divider per voltage circuit (per phase). The current and voltage signals are transmitted to the A/D converter process via filter circuits. The digitalized measuring values are further processed in a downstream processor. Following the processing, the registered energy quantities are indicated in the display. The software controls the processing in the meter. In this way, functions for meter start/stop, pulse output, display control, storage and backup of measured values, start-up and switch-off behavior and error monitoring are realized.

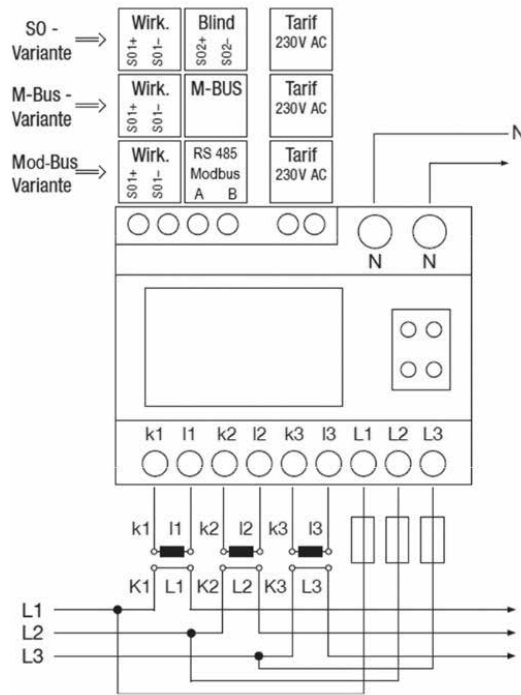


### Types and variants

SINUS 5//1 50 MID  
 SINUS 5//1 M-BUS MID  
 SINUS 5//1 Modbus MID



## Connection



## Technical data

Types	SINUS 5//1 S0 MID; M-BUS MID; Modbus MID
Reference voltage range	3 x 230/400 (1 ± 10%) V - see meter imprint
Reference frequency range	50 (1 ± 2%) Hz - see meter imprint
Current information	see meter imprint I <sub>min</sub> - I <sub>n</sub> (I <sub>max</sub> ) A
Meter imprint	I <sub>min</sub> - I <sub>ref</sub> (I <sub>max</sub> ) A
Inrush current I <sub>st</sub>	0,002 A (symmetrical per phase)
Minimum current I <sub>min</sub>	0,01 A - see meter imprint
Transfer current I <sub>tr</sub>	0,05 A
Rated current I <sub>ref</sub>	1 A oder 5 A - see meter imprint
Maximum current I <sub>max</sub>	6 A
Accuracy	class A (MPE = ± 3,5%) or class B (MPE = ± 2%)
Operation indicator/test output dev.	LED, red flashing, t <sub>min</sub> = 30 ms
Detection of standstill/reverse motion	LED, red permanent lit
Registration indication	LC-display (liquid crystal display)
Display capacity	5 digits kWh and 3 decimal places
Pulse constant optical	R <sub>L</sub> , standard 20.000 imp/kWh (0,05 Wh/imp) - see meter imprint
Pulse constant electrical	R <sub>A</sub> , standard 5.000 imp/kWh (0,2 Wh/imp) - see meter imprint
Pulse number/measuring time	min 2 pulses and 20 s integration time
Pulse output electric. passiv	potential free acc. to DIN EN 62053-31 class A and B
Pulse parameters electrical	U <sub>max</sub> = 30 V, I <sub>max</sub> = 30 mA, inverse-polarity protection
Pulse length (set)	t <sub>i max</sub> = 35 ms (adjustable)
Operating voltage range	180 V to 265 V, voltage single-phase or three-phase
Operating frequency range	40 Hz to 65 Hz
Energy consumption	voltage circuit approx. 0,6 VA, current circuit approx. 0,06 VA
Consideration of harmonic wave energy content	by measurement techniques up to approx. 4 kHz
Temperature range	-25 °C to +55 °C, indoor
Protection class	class II, protective insulation
Protection level	housing IP 51 with terminal cover installed
Fastening	snap on fastening on top hat rail 35 mm, DIN EN 60715
Electrical connection	screw terminal max 6 mm <sup>2</sup>
Weight	230 g

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## Energy meter for alternating three-phase current

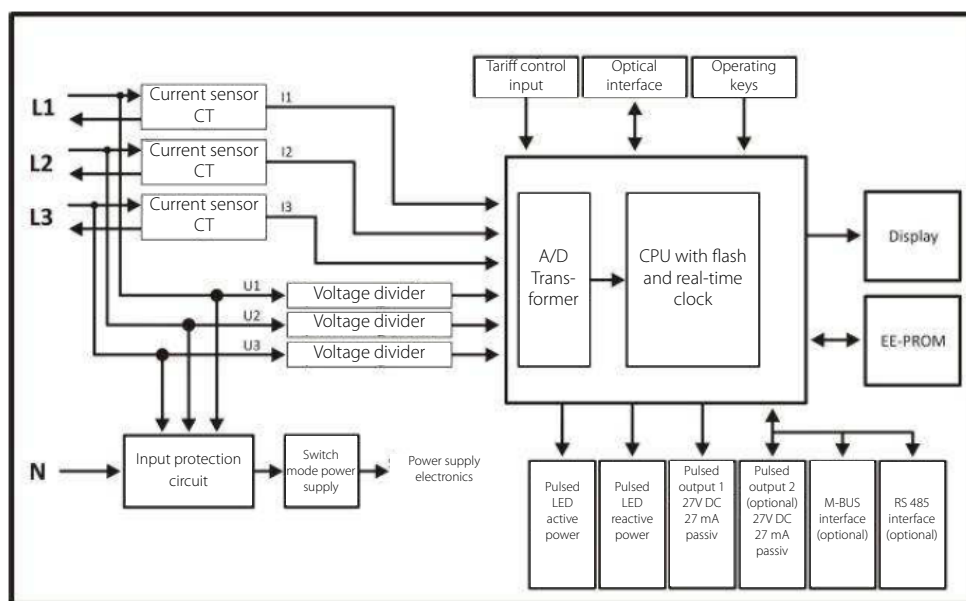
for direct connection up to 85 A

Type:  
**SINUS 85 50 MID**  
**SINUS 85 M-BUS MID**  
**SINUS 85 Modbus MID**



### Function

The meter consists of a multi-part plastic housing. One part is manufactured from transparent plastic and covers the LC display (liquid crystal display) below and the name plate. For connecting the meter, terminal screws accessible from the outside are provided. The electronic function circuit of the meter is installed on printed circuit boards and is located inside the plastic housing. The current to be measured is internally adapted to the input conditions of the electronic sensors via a current transformer per current circuit (per phase). The voltage to be measured is internally adapted to the input conditions of the electronic sensors via a voltage divider per voltage circuit (per phase). The current and voltage signals are transmitted to the A/D converter process via filter circuits. The digitalized measuring values are further processed in a downstream processor. Following the processing, the registered energy quantities are indicated in the display. The software controls the processing in the meter. In this way, functions for meter start/stop, pulse output, display control, storage and backup of measured values, start-up and switch-off behavior and error monitoring are realized.



### Types and variants

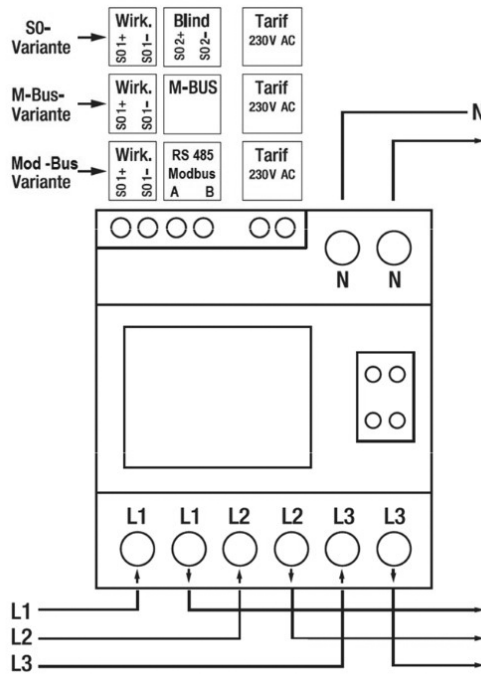
SINUS 85 50 MID

SINUS 85 M-BUS MID

SINUS 85 Modbus MID



## Connections



## Technical data

Types	SINUS 85 S0 MID; M-BUS MID; Modbus MID
Reference voltage range	3 x 230/400 (1 ± 10%) V - see meter imprint
Reference frequency range	50 (1 ± 2%) Hz - see meter imprint
Current information	see meter imprint I <sub>min</sub> - I <sub>n</sub> (I <sub>max</sub> ) A
Meter imprint	I <sub>min</sub> - I <sub>ref</sub> (I <sub>max</sub> ) A
Inrush current I <sub>st</sub>	0,002 A (symmetrical per phase)
Minimum current I <sub>min</sub>	0,25 A - see meter imprint
Transfer current I <sub>tr</sub>	0,5 A
Rated current I <sub>ref</sub>	5 A
Maximum current I <sub>max</sub>	85 A
Accuracy	class A (MPE = ± 3,5%) or class B (MPE = ± 2%)
Operation indicator/test output dev.	LED, red flashing, t <sub>min</sub> = 30 ms
Detection of standstill/reverse motion	LED, red permanent lit
Registration indication	LC-display (liquid crystal display)
Display capacity	5 digits kWh and 3 decimal places
Pulse constant optical	R <sub>L</sub> , standard 5.000 imp/kWh (0,2 Wh/imp) - see meter imprint
Pulse constant electrical	R <sub>A</sub> , standard 500 imp/kWh (2 Wh/imp) - see meter imprint
Pulse number/measuring time	min 2 pulses and 20 s integration time
Pulse output electric. passiv	potential free acc. to DIN EN 62053-31 class A and B
Pulse parameters electrical	U <sub>max</sub> = 30 V, I <sub>max</sub> = 30 mA, inverse-polarity protection
Pulse length (set)	t <sub>i max</sub> = 35 ms (adjustable)
Operating voltage range	180 V to 265 V, voltage single-phase or three-phase
Operating frequency range	40 Hz to 65 Hz
Energy consumption	voltage circuit approx. 0,6 VA, current circuit approx. 0,06 VA
Consideration of harmonic wave energy content	by measurement techniques up to approx. 4 kHz
Temperature range	-25 °C to +55 °C, indoor
Protection class	class II, protective insulation
Protection level	housing IP 51 with terminal cover installed
Fastening	snap on fastening on top hat rail 35 mm, DIN EN 60715
Electrical connection	screw terminal max 6 mm <sup>2</sup>
Weight	270 g

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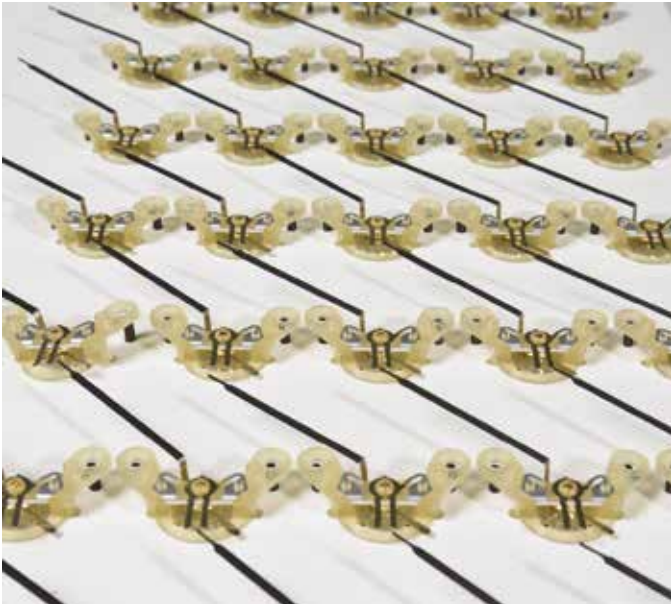
9 Shunts

10 Test apparatus

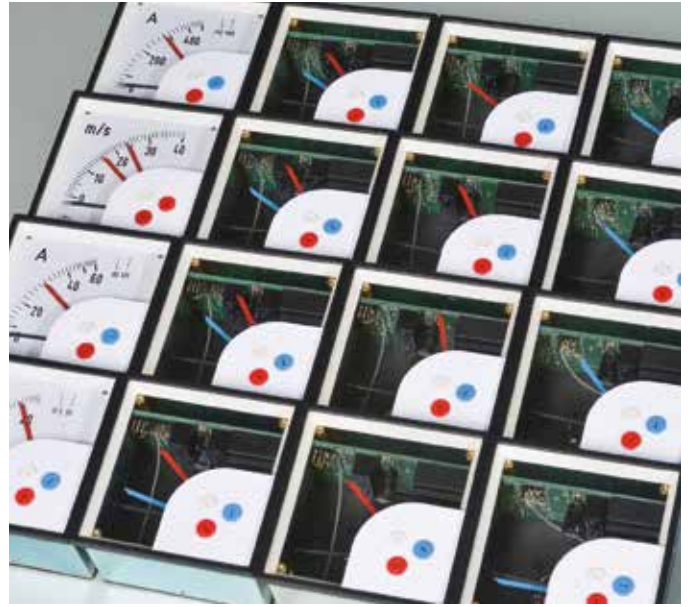




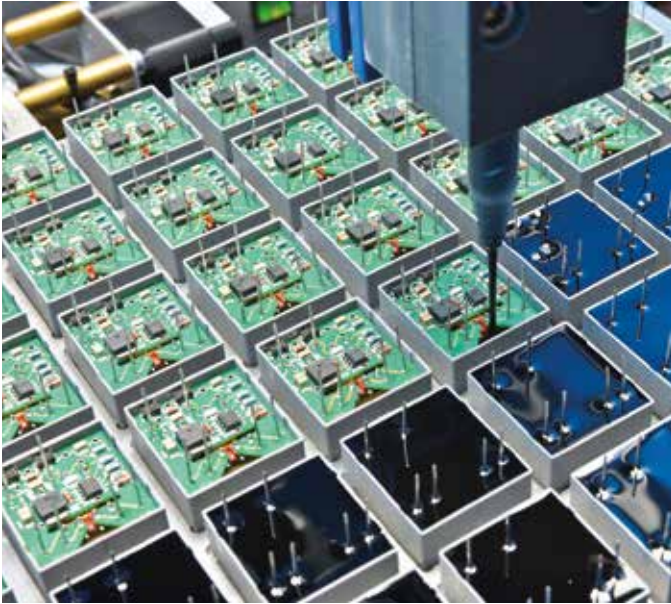
# Precision and service are the measure of all things



Measuring transducers



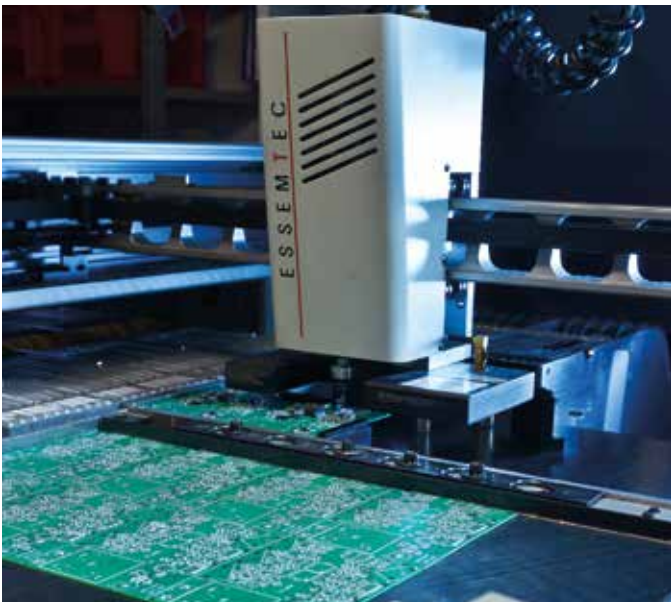
Mains and limit monitoring



Energy meters



Panel meters digital



Panel meters analog



Meas. instruments for top hat rail mounting



Universal measuring instruments



Current transformers



Shunts



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