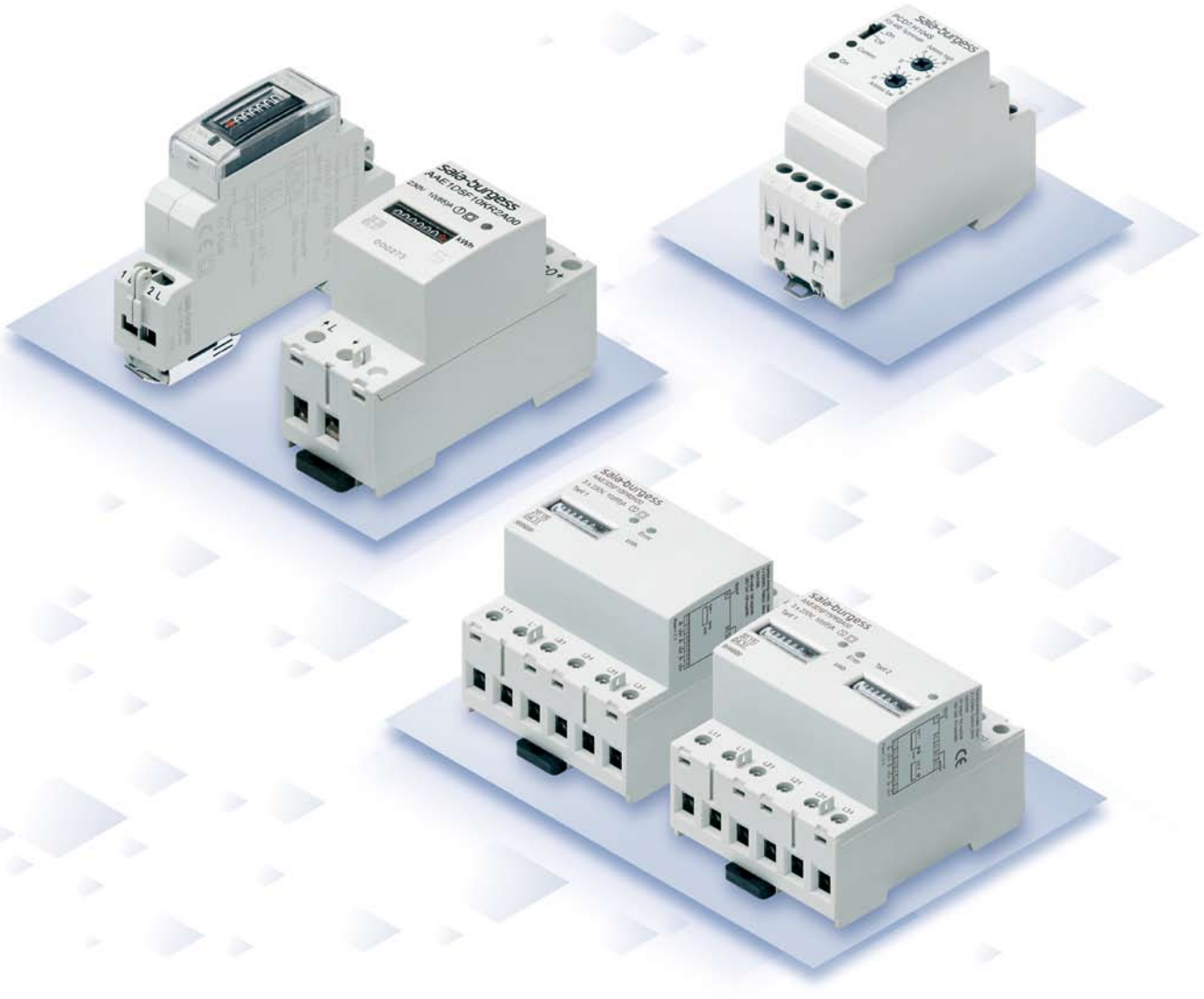
Energy meter counter



Types and functions

		Electronic single and three-phase energy meters							
		AAD1			AAE1		AAE3		PCD7
		AAD1 – 5 (20) A	AAD1 – 5 (32) A	AAD1 – 5 (32) A	AAE1 – 10 (65) A	AAE1 – 10 (65) A	AAE3 – 10 (65) A	AAE3 – 10 (65) A	PCD7.H104S
	1-phase alternating current	•	•	•	•	•			
	3-phase current, 1 tariff						•	•	
	3-phase current, 2 tariff						•	•	
Width	17.5 mm for DIN rail (1 TE)	•	•	•					
	35 mm for DIN rail (2 TE)				•	•			•
	70 mm for DIN rail (4 TE)						•	•	
Approvals	without	•							
	PTB approval		•		•		•		
	MID guideline			•		•		•	
Display	6-digit (99999.9 kWh)	•							
	7-digit (999999.9 kWh)		•	•	•	•	•	•	
Nominal/maximum current	I_N = 5 A, I_{max} = 20 A	•							
	I_N = 5 A, I_{max} = 32 A		•	•					
	I_N = 10 A, I_{max} = 65 A				•	•	•	•	
Voltage	230 V AC	•	•	•	•	•			•
	3 x 230/400 V AC						•	•	
S0 output	1000 Imp./kWh	•	•	•	•	•			
	100 Imp./kWh						•	•	
Interface	Saia® S-Bus								•
	Catalogue page	42	42	42	42	42	45	45	48

Energy meter
Note

Good to know

Whether it is in shopping centers, in housing estates or on camping sites and in marinas, increased power costs have resulted in the billing of power costs on the basis of consumption instead of as flat rates becoming ever more popular.

This is why we offer a series of small, low-cost energy meter. Apart from the built-in mechanical meter, they also have a counter impulse output for central power recording in a Saia®PCD and automatic further processing for individual billing on a PC.
The current consumption is also displayed via LED.

The energy meters are insensitive to shock, vibration and electromagnetic manipulation. This ensures that power costs are billed fairly at all times.

The Saia® S-Bus S0 module allows instead of parallel wiring of the individual counter impulse outputs, networking via the Saia®S-Bus. This means that installation costs can be significantly reduced for major projects, e.g. in building automation.

We distinguish between...

1-phase energy meter 20 A and 32 A
- AAD1 – 5 (20) A without approval
- AAD1 – 5 (32) A with PTB approval
- AAD1 – 5 (32) A as per MID

1-phase energy meter 65 A
- AAE1 – 10 (65) A with PTB approval
- AAE1 – 10 (65) A as per MID

Three-phase energy meter 65 A
- AAE3 – 10 (65) A with PTB approval
- AAE3 – 10 (65) A as per MID

MID (Measuring Instruments Directive)

The MID is a Directive published by the European Parliament in March 2004 which specifies basic and measuring instrument-specific requirements for certain groups of devices and assigns the responsibility for initial placing on the market of measuring instruments to the manufacturer. Only when these requirements are fulfilled, may measuring instruments under the MID be brought to market or used in the future. Saia-Burgess meets these requirements and offers the compliance valuation method in accordance with B + D module combination for 1-phase and three-phase energy meters.

The introduction of the European Measuring Instruments Directive (MID) replaces initial calibration at approved test centers with the manufacturer's declaration of compliance. The national regulations for the duration of validity of calibration then apply. Energy meters by Saia can be used to invoice energy costs.

PTB approval

Devices calibrated by a approved test center which were brought to market before 30 October 2006 require a respective national Approval.

PTB is Germany's National Metrology Institute, according to which the Saia-Burgess Controls AG's energy meter are licensed.

AAD1 5 (20)A / 5 (32)A AAE1 10 (65) A

1-phase energy meter, electronic

- 1-phase energy meter 230V AC, 50 Hz, 5 (20) A, 5 (32) A / 10 (65) A
- 6 or 7-digit, PTB or MID
- Accuracy class 1 as per IEC 62053-21, or B in accordance with IEC 50470-3
- S0 output
- Lead-sealable with cap as accessory

from left to right: AAD1, AAE1

		AAD1			AAE1	
Approvals	PTB approval		•		•	
	MID guideline			•		•
	without	•				
Nominal/maximum current	I_N = 5A, I_{max} = 20A	•				
	I_N = 5A, I_{max} = 32A		•	•		
	I_N = 10A, I_{max} = 65A				•	•
Starting current	20mA	•	•	•		
	40mA				•	•
Voltage	230V AC, 50Hz	•	•	•	•	•
	3 x 230/400V AC, 50Hz					
S0 output	1000 Imp./kWh	•	•	•	•	•
	100 Imp./kWh					
Electromechanical counter	6-digit	•				
	7-digit		•	•	•	•
Order no.		AAD1D5D10KR2A01	AAD1D5F10KR2A00	AAD1D5F10KR3A00	AAE1D5F10KR2A00	AAE1D5F10KR3A00

Applications

For precise power management and individual invoicing at jointly used facilities

- Precise and secure invoicing of power consumption on camping sites, in marinas, at exhibitions and on street markets
- Measurement of renewable power in the private area, e.g. photovoltaics
- Measurement of power consumption for advertising and lighting

Technical Data

Accuracy class	1 (1%) as per IEC 62053-21 or B in accordance with IEC 50470-3 (devices in accordance with MID)		
Nominal/maximum current	AAD1 - 20A	AAD1 - 32 A	AAE1 - 65 A
	I_N = 5A, I_{max} = 20A	I_N = 5A, I_{max} = 32A	I_N = 10A, I_{max} = 65A
Starting current	20 mA	20 mA	40 mA
Voltage	230 V AC, 50 Hz		
	Tolerance -20 %/+15 %		
Power consumption	Active 0.4 W		
Measurement	direct		
Counting range	0…99 999.9 kWh	0...999 999.9 kWh	0...999 999.9 kWh
Display	4 mm tall figures, decimal place red		
S0 output	Optocoupler max. 30 V/20 mA and 5 V min., impedance 100 Ω, impulse range 50 ms		
Impulse per kWh	1000 Imp./kWh		
Transmission distance	maximum 1000 m (with 30 V/20 mA)		
LED	Red, 2000 Imp./kWh	Red, 200 Imp./kWh	Red, 1000 Imp./kWh
Mounting	on DIN rail 35 mm		
Screwdrivers	Primary circuit: Pozidrive no. 1, Philips no. 1, slotted head no. 1 S0 output: Pozidrive no. 0, Philips no. 0, slotted head no. 1		
Primary circuit connections	max. 6 mm², M4	max. 6 mm², M4	max. 16 mm², M4
S0 impulse outputs	max. 2.5 mm², M3	max. 2.5 mm², M3	max. 2.5 mm², M3.5
Insulation characteristics	4 kV/50 Hz test in accordance with VDE 0435		
	6 kV 1.2/50 µs surge voltage in accordance with IEC 255-4		
	Equipment class II		
Ambient temperature	MID product: -10SDgr...+55SDgrC		
	PTB product and without license: -10SDgr...+45SDgrC		
EMC/resistance to interference	Surge voltage in accordance with IEC 61000-4-5 on primary circuit, 4 kV Surge voltage in accordance with IEC 61000-4-5 at S0 impulse outputs, 1 kV Burst voltage in accordance with IEC 61000-4-4, 4 kV ESD in accordance with IEC 61000-4-2, contact 8 kV, air 15 kV		

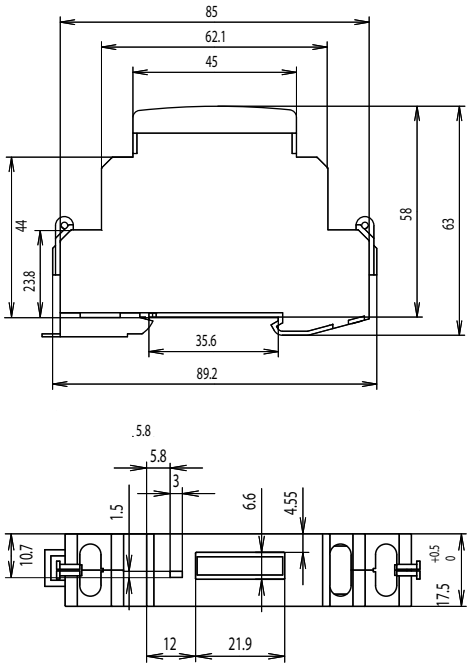
Accessories

		Order no.
Lead-sealing cap for AAD1 32 A	(2 units are recommended for contact protection)	4 104 7420 0
Lead-sealing cap for AAE1 65A	(2 units are recommended for contact protection)	4 104 7485 0

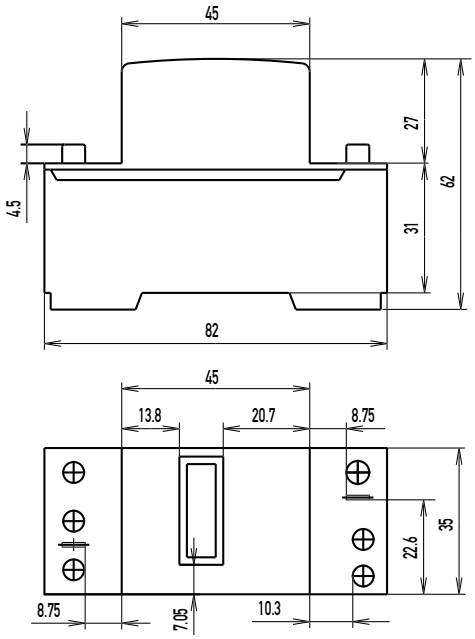
Dimension diagram

Structure

AAD



AAE



LED function

AAD

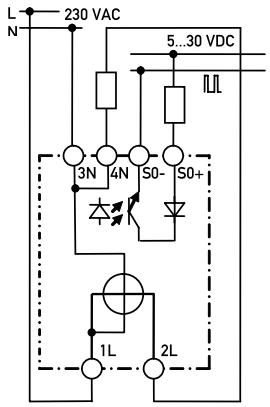
Normal operation	
Measured power	2000 pulses per kWh $P_{moment.}$ in kW 33,4 × imp./min.
Zero	No pulses
Low	Pulse pause 100 ms
High	Pulse length depending on consumption
Line inverted (Error)	
	cycle time: 600 / 600 ms

AAE

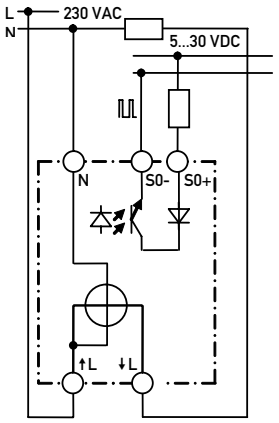
Normal operation	
Measured power	1000 pulses per kWh $P_{moment.}$ in kW 16,7 × imp./min.
Zero	No pulses
Low	Pulse pause 100 ms
High	Pulse length depending on consumption
Line inverted (Error)	
	cycle time: 600 / 600 ms

Connection diagram

AAD



AAE



AAE3 10 (65) A

Three-phase energy meter, electronic

- 3-phase energy meter 3 x 230/400V AC 50 Hz, 10 (65)A
- 7-digit display for 1 or 2 tariffs, lead-sealable with cap as accessory
- Accuracy class 1 as per IEC 62053-21 or B in accordance with IEC 50470-3, lead-sealable with cap as accessory
- S0 output

from left to right: AAE3 - 1 tariff, AAE3 - 2 tariffs

		AAE3			
Tariff	1 tariff	•	•		
	2 tariffs			•	•
Approvals	PTB approval	•		•	
	MID guideline		•		•
	without				
Nominal/maximum current	I_N = 5A, I_{max} = 20A				
	I_N = 5A, I_{max} = 32A				
	I_N = 10A, I_{max} = 65A	•	•	•	•
Starting current	20mA				
	40mA	•	•	•	•
Voltage	230V AC, 50Hz				
	3 x 230/400V AC, 50Hz	•	•	•	•
S0 output	1000 Imp./kWh				
	100 Imp./kWh	•	•	•	•
Order no.		AAE3D5F10PR2A00	AAE3D5F10PR3A00	AAE3D5F11PR2A00	AAE3D5F11PR3A00

Applications

For precise power management and individual invoicing at jointly used facilities, such as

- Shopping centers, airports, railway stations
- Shared offices, factories, shops, air-conditioned premises
- Holiday homes, houses, bungalows, hotels, hospitals and schools
- Measurement of power consumption for advertising and lighting

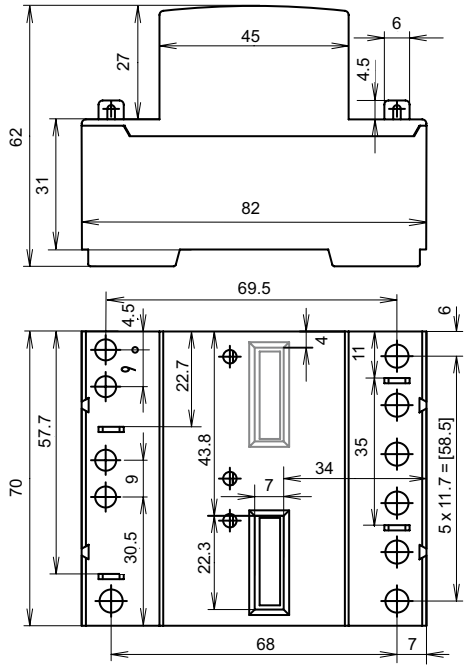
Technical Data

Accuracy class	1 (1%) as per IEC 62053-21 or B in accordance with IEC 50470-3 (devices in accordance with MID)
Nominal/maximum current	I_N = 10 A, I_{max} = 65 A
Starting current	40 mA
Operating voltage	3 x 230/400V AC, 50 Hz
	Tolerance -20%/+15%
Power consumption	Active 0.4 W per phase
Measurement	direct
Counting range	0…999 999.9 kWh
Display	4 mm tall figures, decimal place red
S0 output (interface)	Optocoupler max. 30 V/20 mA and 5 V min., impedance 100 Ω, impulse range 50 ms
Impulse per kWh	100 Imp./kWh.
Transmission distance	maximum 1000 m (with 30 V/20 mA)
LED	Red, 100 Imp/kWh.
Mounting	on DIN rail 35 mm
Screwdrivers	Primary circuit: Pozidrive no. 1, Philips no. 1, slotted head no. 1 S0 output: Pozidrive no. 0, Philips no. 0, slotted head no. 1
Primary circuit connections	max. 16 mm², M4, no. 1/2
S0 impulse outputs connections	max. 2.5 mm², M3.5, no. 1
Insulation characteristics	4 kV/50 Hz test in accordance with VDE 0435
	6kV 1.2/50 µs surge voltage as per IEC 255-4
	Equipment class II
Ambient temperature	MID product: -10SDgr...+55SDgrC
	PTB product and without license: -10SDgr...+45SDgrC
EMC/resistance to interference	Surge voltage in accordance with IEC 61000-4-5 on primary circuit, 4 kV Surge voltage in accordance with IEC 61000-4-5 at S0 impulse outputs, 1 kV Burst voltage in accordance with IEC 61000-4-4, 4 kV ESD in accordance with IEC 61000-4-2, contact 8 kV, air 15 kV

Accessories

		Order no.
Lead-sealing cap for AAE3 65 A	(4 units are recommended for contact protection)	4 104 7485 0

Dimension diagrams



LED function

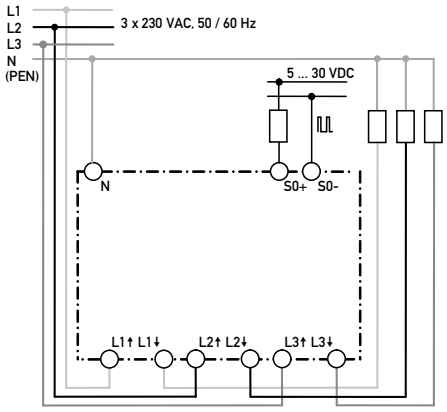
Normal operation	Measured power	100 imp. per kWh
	Zero	Puls pause =150 ms
	Low	$P_{momentarily}$ in kW
	High	= 1,7 × imp./min.

Error LED = Line errors (lines interchanged / not connected)

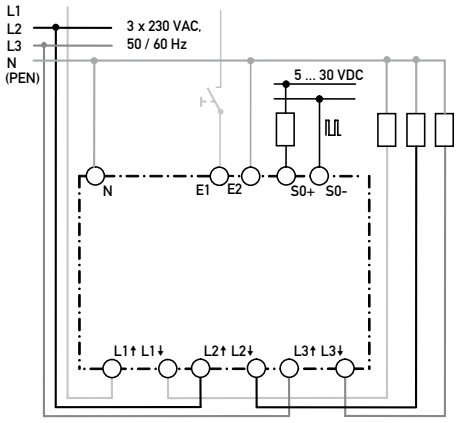
3 s 3 s 3 s	L1 interchanged, cycle time
3 s 3 s 3 s	L2 interchanged, cycle time
3 s 3 s 3 s	L2 interchanged, cycle time
3 s 3 s 3 s	L1 and L2 interchanged
3 s 3 s 3 s	L1 and L3 interchanged
3 s 3 s 3 s	L1, L2 and L3 interchanged

Timing diagram and connection diagram

1 tariff



2 tariffs



PCD7.H104S

Saia® S-Bus S0 module

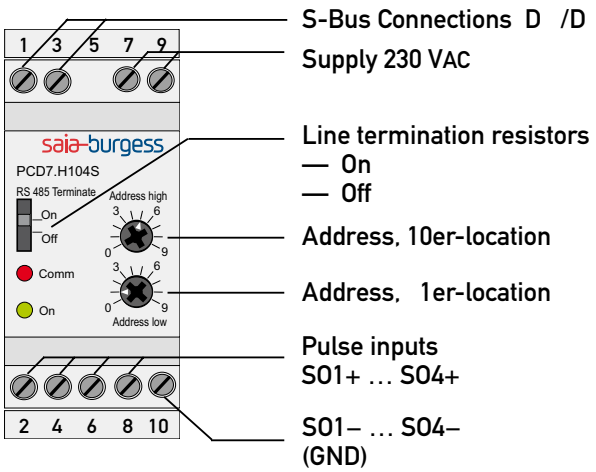
- Central counting, reading and invoicing with Saia® PCD/PCS
- Transmission of counting impulses via Saia® S-Bus
- Convenient programming/parameterization of energy meter networks with Saia® PG5 Fupla FBoxes
- 230 V AC

- Low installation costs by transmitting individual consumption details via Saia® S-Bus
- Up to 400 energy meters (4 per Saia® S-Bus S0 module)
- Up to 100 Saia® S-Bus S0 modules can be interconnected
- 4 S0 impulse outputs (S01…S04) per Saia® S-Bus S0 module
- LED signaling: green = operation display
  red = bus activity

Applications

- Individual consumption invoicing, e.g. in shared offices, in industry, etc.
- Knowledge of the need for power of the various consumers is important for power management in hotels, motels, homes, hospitals, etc.

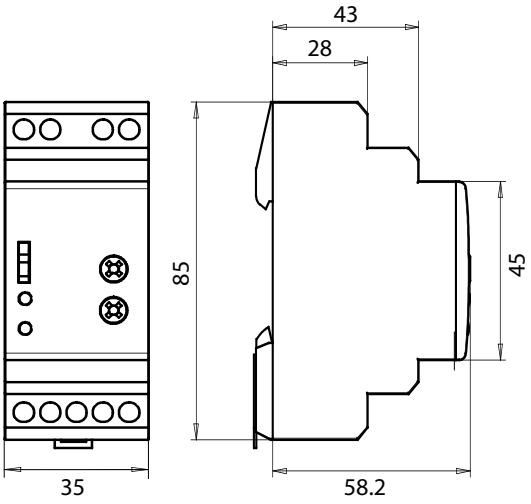
Settings



Technical Data

Bus system	Saia® S-Bus
Transmission rate	9600-19200-28800-33600-56600
Transmission mode	Data
Maximum bus length	1200m (without repeater)
Response time (until system response)	Write: 30ms Read: 10ms
Recovery time	30ms
Data transfer	Only "read/write" register instructions are recognized. Only one register can be read/written. The unit will not respond for unidentified queries. "Automatic transmission rate" is the default setting. The module has a voltage monitoring system. In the event of power failure the registers are saved in EEPROM (S0 number of registers, transmission rate, etc.)
Protection type	IP 40 (IP 20 connections)
Operating voltage	230V AC (-20/+15%)
Current consumption	< 12mA
Power consumption	< 3W
Transmission distance	maximum 1000m (with 30V/20mA)
LEDs	Operation display: green LED (on)
	Function display: red LED during bus activity
Mounting	on DIN rail 35mm (IEC 50 022), any position
Terminals	For Pozidrive, Philips or slotted-head screwdrivers no. 1 S0x, S-Bus, 230V AC - 0.5…2.5mm²
Ambient temperature	Temperature -20°C…+55°C
	Storage temperature -25°C…+70°C
EMC/resistance to interference	Surge voltage in accordance with IEC 61000-4-5 on primary circuit, 4kV
	Surge voltage in accordance with IEC 61000-4-5 at S0 inputs, 1kV
	Burst voltage in accordance with IEC 61000-4-4, primary circuit 4kV direct, S0 inputs 2kV capacitive, S-Bus connections 1kV capacitive
	ESD in accordance with IEC 61000-4-2, contact 8kV, air8kV
Insulation characteristics	4kV/50Hz test in accordance with VDE 0435
	6kV 1.2/50µs surge voltage in accordance with IEC 60947-1
	Equipment class II
S0 input	corresponds to S0 standard 62053-31
	counts the impulses as '0' if RL is < 800 Ω and al '1' if R is > 1 MΩ .
	Maximum voltage (GND-S0): 13 VDC
	Maximum power, (in the event of a short circuit): 6 mA
	Low impulse: min. 30 ms
	High impulse: min. 30 ms
	Maximum frequency: 17 Hz

Dimension diagrams



Connection diagram