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7E Series - Energy meter

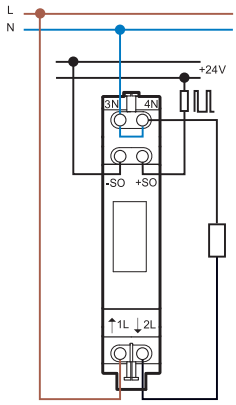
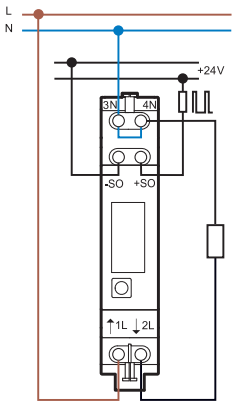
Features

kWh Energy meter
1-phase with multi-functional LC-Display

Type 7E.23 5(32)A - 1 module wide

- Complies with EN 62053-21 and EN 50470
- Display indicates total consumption, partial consumption (this value is resettable), instantaneous: power, voltage and current
- Seven digit counter, LCD with backlight
- Accuracy class: 1/B
- Easy to operate by one control key
- Protection class II
- Pulse output for remote energy management; SO interface (open collector) according DIN 43864 to link the energy meter to a centrally located monitoring/management system
- Tamper-proof cover with lead seal facility available as an accessory
- Space saving small size
- 35 mm rail (EN 60715) mount
- MID compliant version (50 Hz only) available

* 0.01 kWh for readings ≤ 99,999.99 kWh and 0.1 kWh for readings ≥ 100,000.0 kWh
** LED indicator for consumption

	7E.23.8.230.0001	7E.23.8.230.00x0
		
	• Nominal current 5 A (32 A Maximum) • 1-phase 230 V AC • kWh only • 17.5 mm wide	• Nominal current 5 A (32 A Maximum) • 1-phase 230 V AC • 17.5 mm wide
		

For outline drawing see page 8

Specification			
Nominal/Maximum current	A	5/32	5/32
Minimum measured current	A	0.02	0.02
Current range (within accuracy class)	A	0.25...32	0.25...32
Maximum peak current	A	960 (10 ms)	960 (10 ms)
Supply (& monitored) voltage (U_N)	V AC	230	230
Operating range		$(0.8...1.15)U_N$	$(0.8...1.15)U_N$
Frequency	Hz	50	50
Power consumption	W	< 0.4	< 0.4
Display (digit height 5 mm)		Seven digit counter, LCD without backlight	Seven digit counter, LCD with backlight
Max. totalising count/Min. increment	kWh	999,999.9/0.01 *	999,999.9/0.01 *
LCD-segment pulses per kWh		2,000 **	2,000
Open collector- output specification (SO+/SO–)			
Voltage (external supply)	V DC	5...30	5...30
Maximum current	mA	20	20
Maximum leakage current @30 V/25 °C	µA	10	10
Pulses per kWh		1,000	1,000
Pulse length	ms	30	30
Internal series resistance	Ω	100	100
Maximum Cable length @30 V/20 mA	m	1,000	1,000
Technical data			
Accuracy class		1 / B	1 / B
Ambient temperature (Within accuracy class)	°C	–10...+55	–25...+55
Protective class		II	II
Protection category: Housing/terminals		IP 50/IP 20	IP 50/IP 20
Approvals (according to type)		CE	

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7E Series - Energy meter

Features

kWh Energy meter
3-phase with multi-functional LC-Display

Type 7E.46-0002 10(65)A - Single and Dual tariff
Type 7E.56-0000 5 (6)A - for current transformer up to 1,500 A

- Complies with EN 62053-21 and EN 50470
- Display indicates total consumption, partial consumption (this value is resettable), instantaneous power per phase or all phases, voltage per phase, current per phase
- ERROR-Display, in case of missing phase or wrong current direction
- Seven digit counter, LCD with backlight
- Accuracy class: 1/B
- Easy to operate by two control keys
- LC-Display can be read twice within a period of 10 days following the loss of supply voltage
- Protection class II
- Pulse output for remote energy management; SO interface (open collector) according DIN 43864 to link the energy meter to a centrally located monitoring/management system
- Tamper-proof cover with lead seal facility available as an accessory
- 35 mm rail (EN 60715) mount
- MID compliant version (50 Hz only) available

* Current transformer ratios: 5:5, 50:5, 100:5, 150:5, 200:5, 250:5, 300:5, 400:5, 500:5, 600:5, 750:5, 1,000:5, 1,250:5, 1,500:5.

** 0.01 kWh for readings ≤ 99,999.99 kWh and 0.1 kWh for readings ≥ 100,000.0 kWh

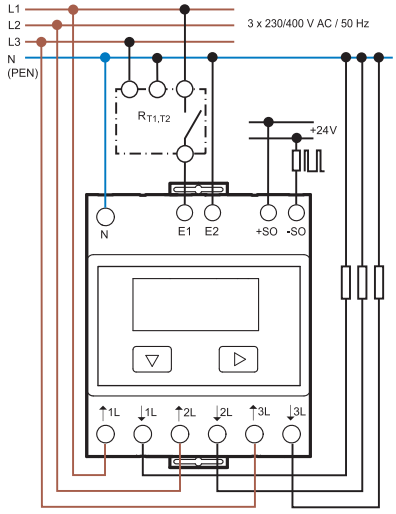
*** 0.1 kWh for readings ≤ 999,999.9 kWh and 1 kWh for readings ≥ 1,000,000 kWh

For outline drawing see page 8

7E.46.8.400.00x2



- Nominal current 10 A (65 A Maximum)
- 3-phase
- Single and Dual tariff (Day and Night)
- 70 mm wide

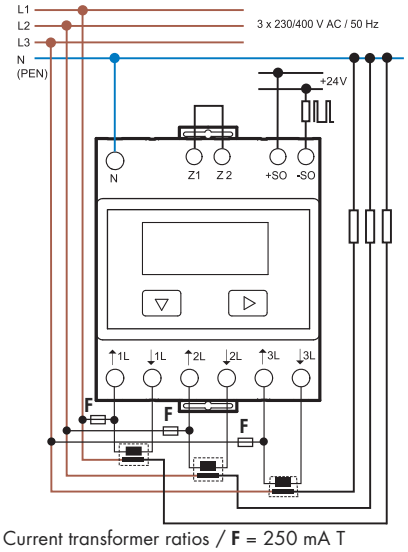


$R_{T1,T2}$ = Tariff switching equipment

7E.56.8.400.00x0



- Nominal current 5 A (6 A Maximum)
- 3-phase
- Usable with current transformer up to 1,500 A
- 14 selectable Current Transformer ratios*
- 70 mm wide



* Current transformer ratios / **F** = 250 mA T

Specification			
Nominal/Maximum current	A	10/65	5/6
Minimum measured current	A	0.04	0.01
Current range (within accuracy class)	A	0.5...65	0.05...6
Maximum peak current	A	1,950 (10 ms)	180 (10 ms)
Supply (& monitored) voltage (U_N)	V AC	3 x 230	3 x 230
Operating range		$(0.8...1.15)U_N$	$(0.8...1.15)U_N$
Frequency	Hz	50	50
Power consumption per phase	W	< 1.5	< 1.5
Display (digit height 6 mm)		Seven digit counter, LCD with backlight	
Max. totalising count/Min. increment	kWh	999,999.9/0.01 **	9,999,999/0.1 ***
LCD-segment pulses per kWh		100	10
Open collector- output specification (SO+/SO–)			
Voltage (external supply)	V DC	5...30	5...30
Maximum current	mA	20	20
Maximum leakage current @30 V/25 °C	µA	10	10
Pulses per kWh		1,000	10
Pulse length	ms	30	30
Internal series resistance	Ω	100	100
Maximum Cable length @30 V/20 mA	m	1,000	1,000
Technical data			
Accuracy class		1 / B	1 / B
Ambient temperature	°C	–25...+55 °C	–25...+55 °C
Protective class		II	II
Protection category: Housing/terminals		IP 50/IP 20	IP 50/IP 20
Approvals (according to type)		CE	

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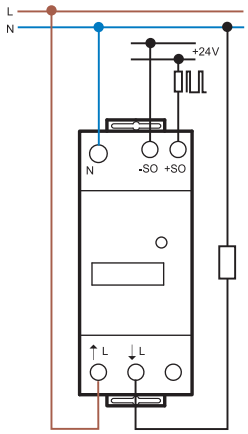
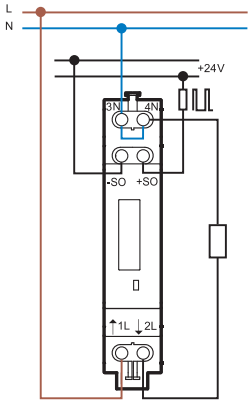
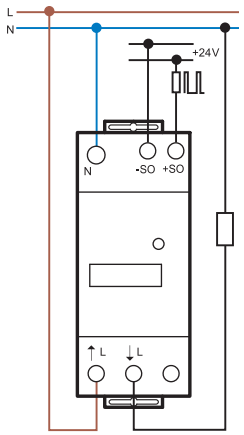
7E Series - Energy meter

Features

kWh Energy meter
1-phase with mechanical display

Type 7E.12 10(25)A - 2 module wide
Type 7E.13 5(32)A - 1 module wide
Type 7E.16 10(65)A - 2 module wide

- Complies with EN 62053-21 and prEN 50470
- Certified by PTB (Physikalisch - Technischen Bundesanstalt)
- Accuracy class 1 / B
- Protection class II
- Pulse output for remote energy management; SO interface (open collector) according DIN 43864 to link the energy meter to a centrally located monitoring/management system
- Tamper-proof cover with lead seal facility available as an accessory
- Space saving small size
- 35 mm rail (EN 60715) mount
- MID compliant version (50 Hz only) available

	7E.12.8.230.0002	7E.13.8.230.00x0	7E.16.8.230.00x0
			
	• Nominal current 10 A (25 A Maximum) • 1-phase 230 V AC • 35 mm wide	• Nominal current 5 A (32 A Maximum) • 1-phase 230 V AC • 17.5 mm wide	• Nominal current 10 A (65 A Maximum) • 1-phase 230 V AC • 35 mm wide
			

For outline drawing see page 8

Specification				
Nominal/Maximum current	A	10/25	5/32	10/65
Minimum measured current	A	0.04	0.02	0.04
Current range (within accuracy class)	A	0.5...25	0.25...32	0.5...65
Maximum peak current	A	750 (10 ms)	960 (10 ms)	1,950 (10 ms)
Supply (& monitored) voltage (U_N)	V AC	230	230	230
Operating range		$(0.8...1.15)U_N$	$(0.8...1.15)U_N$	$(0.8...1.15)U_N$
Frequency	Hz	50	50	50
Power consumption	W	< 0.5	< 0.4	< 0.5
Display (digit height 4 mm)		Six digit counter, red decimal digit	Seven digit counter, red decimal digit	
Max. totalising count/Min. increment	kWh	99,999.9/0.1	999,999.9/0.1	999,999.9/0.1
LED- Pulses per kWh		2,000	2,000	1,000
Open collector- output specification (SO+/SO–)				
Voltage (external supply)	V DC	5...30	5...30	5...30
Maximum current	mA	20	20	20
Maximum leakage current @30 V/25 °C	µA	10	10	10
Pulses per kWh		1,000	1,000	1,000
Pulse length	ms	50	50	50
Internal series resistance	Ω	100	100	100
Maximum Cable length @30 V/20 mA	m	1,000	1,000	1,000
Technical data				
Accuracy class		1 / B	1 / B	1 / B
Ambient temperature (Within accuracy class)	°C	–10...+55	–10...+55	–10...+55
Protective class		II	II	II
Protection category: Housing/terminals		IP 50/IP 20	IP 50/IP 20	IP 50/IP 20
Approvals (according to type)		CE	CE PTB	

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7E Series - Energy meter

Features

kWh Energy meter
3-phase with mechanical display

Type 7E.36-0000 10(65)A - Single tariff
Type 7E.36-0002 10(65)A - Dual tariff

- Complies with EN 62053-21 and prEN 50470
- Certified by PTB (Physikalisch - Technischen Bundesanstalt)
- Accuracy class 1 / B
- Protection class II
- Pulse output for remote energy management; SO interface (open collector) according DIN 43864 to link the energy meter to a centrally located monitoring/management system
- Tamper-proof cover with lead seal facility available as an accessory
- 35 mm rail (EN 60715) mount
- MID compliant version (50 Hz only) available

7E.36.8.400.00x0

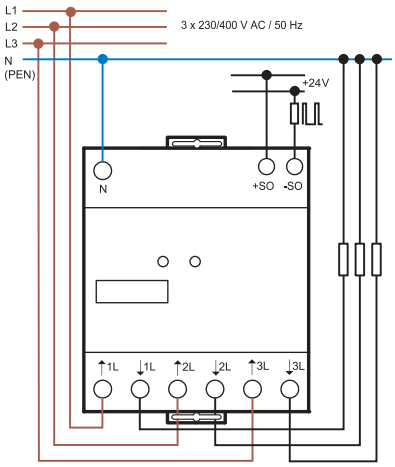


- Nominal current 10 A (65 A Maximum)
- 3-phase
- 70 mm wide

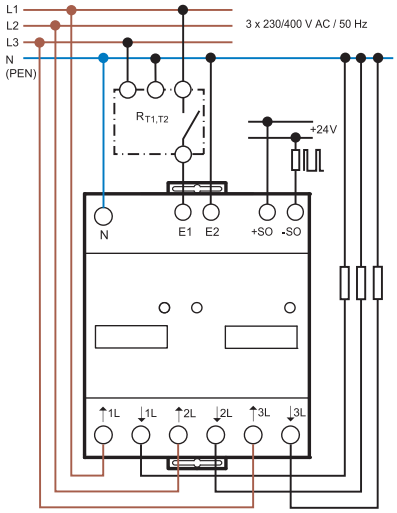
7E.36.8.400.00x2



- Nominal current 10 A (65 A Maximum)
- 3-phase
- Dual tariff (Day and Night)
- 70 mm wide



$R_{T1,T2}$ = Tariff switching equipment



For outline drawing see page 8

Specification			
Nominal/Maximum current	A	10/65	10/65
Minimum measured current	A	0.04	0.04
Current range (within accuracy class)	A	0.5...65	0.5...65
Maximum peak current	A	1,950 (10 ms)	1,950 (10 ms)
Supply (& monitored) voltage (U_N)	V AC	3 x 230	3 x 230
Operating range		$(0.8...1.15)U_N$	$(0.8...1.15)U_N$
Frequency	Hz	50	50
Power consumption per phase	W	< 1.5	< 1.5
Display (digit height 4 mm)		Seven digit counter, red decimal digit	
Max. totalising count/Min. increment	kWh	999,999.9/0.1	999,999.9/0.1
LED- Pulses per kWh		100	100
Open collector- output specification (SO+/SO–)			
Voltage (external supply)	V DC	5...30	5...30
Maximum current	mA	20	20
Maximum leakage current @30 V/25 °C	µA	10	10
Pulses per kWh		100	100
Pulse length	ms	50	50
Internal series resistance	Ω	100	100
Maximum Cable length @30 V/20 mA	m	1,000	1,000
Technical data			
Accuracy class		1 / B	1 / B
Ambient temperature	°C	–10...+55	–10...+55
Protective class		II	II
Protection category: Housing/terminals		IP 50/IP 20	IP 50/IP 20
Approvals (according to type)		CE PTB	

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7E Series - Energy meter

Ordering information

Example: Energy meter 32 A/230 V AC, with PTB certified, accuracy class 1, available with Tamper-proof lead sealed cover as accessory, for 35 mm rail (EN 60715) mounting.

7	E	.	1	3	.	8	.	2	3	0	.	0	0	0	0

Series

Function
1 = 1-phase
2 = 1-phase with LC-Display
3 = 3-phase
4 = 3-phase with LC-Display
5 = 3-phase with LC-Display for current transformer operation

Current
2 = 25 A
3 = 32 A
6 = 65 A (up to 1,500 A, type 7E.56)

Supply version
8 = AC 50 Hz

Special version
0 = Standard
1 = MID compliant versions

Option
0 = Standard
1 = Only kWh (7E.23)
2 = Standard (7E.12 only)
2 = Dual tariff (7E.36, 7E.46)

Supply voltage
230 = 230 V AC 50 Hz
400 = 3 x 230/400 V AC 50 Hz

All versions/width

7E.12.8.230.0002/35 mm	7E.36.8.400.0000/70 mm
7E.13.8.230.0000/17.5 mm	7E.36.8.400.0010/70 mm
7E.13.8.230.0010/17.5 mm	7E.36.8.400.0002/70 mm
7E.16.8.230.0000/35 mm	7E.36.8.400.0012/70 mm
7E.16.8.230.0010/35 mm	7E.46.8.400.0002/70 mm
7E.23.8.230.0000/17.5 mm	7E.46.8.400.0012/70 mm
7E.23.8.230.0001/17.5 mm	7E.56.8.400.0000/70 mm
7E.23.8.230.0010/17.5 mm	7E.56.8.400.0010/70 mm

Technical data

Insulation EN 62053-21			**7E.12, 7E.13, 7E.16, 7E.23**	**7E.36, 7E.46, 7E.56**
Insulation rated voltage		V	250	250
Overvoltage category			IV	IV
Isolation	between active part SO+/SO– terminals	kV (1.2/50 µs)	6	6
	adjacent phases	kV (1.2/50 µs)	—	6
Insulation	between supply and SO+/SO–	V AC	4,000	4,000
	between adjacent phases	V AC	—	4,000
Protection class			II	II

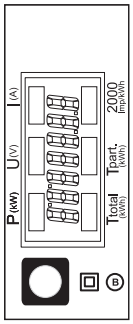
EMC Specification		**Reference standard**	
Electrostatic discharge	contact discharge	EN 61000-4-2	8 kV
	air discharge	EN 61000-4-2	15 kV (13 kV type 7E.23)
Radio-Frequency Electromagnetic Field (80...1,000)MHz		EN 61000-4-3	10 V/m
Fast Transients (Burst) (5-50 ns, 5 kHz)	on Supply Terminals	EN 61000-4-4	Class 4 (4 kV)
	on SO+/SO– Terminals	EN 61000-4-4	Class 4 (2 kV)
Surge (1.2/50 µs)	on Supply Terminals	EN 61000-4-5	Class 4 (4 kV)
	on SO+/SO– Terminals	EN 61000-4-5	Class 3 (1 kV)
Radio-Frequency Common Mode (0.15...80)MHz on Supply terminals		EN 61000-4-6	10 V
Radiated and Conducted Emission		EN 55022	Class B

Other data					
Pollution degree			2		
Vibration resistance	(10...60)Hz	mm	0.075		
	(60...150)Hz	g	1		
Vibration resistance of the internal mechanical counter (10...500)Hz		g	2		
Schock resistance		g/18 ms	30		
Schock resistance of the internal mechanical counter		g/18 ms	350		
Power lost to the environment			**7E.12, 7E.13, 7E.23**	**7E.16**	**7E.36, 7E.46, 7E.56**
	without current	W	0.4	0.4	1.5
	with maximum current	W	1	2	6

Supply terminals			**7E.12, 7E.13, 7E.23**		**7E.16, 7E.36, 7E.46, 7E.56**	
	Max. wire size		solid cable	stranded cable	solid cable	stranded cable
		mm^2	1...6	0.75...4	1.5...16	1.5...16
		AWG	18...10	18...12	16...6	16...6
	Screw torque for I_{max}	Nm	0.8...1.2		1.5...2	
	Screw		M4 Pozidrive No.1, Phillips No.1, Flat No.1			
SO+/SO– terminals	Max. wire size		solid cable	stranded cable	solid cable	stranded cable
		mm^2	2.5	1.5	2.5	1.5
		AWG	14	16	14	16
	Screw torque for I_{max}	Nm	0.5		0.8	
	Screw		M3 Pozidrive No.1, Phillips No.1, Flat No.1		M4 Pozidrive No.1, Phillips No.1, Flat No.1	

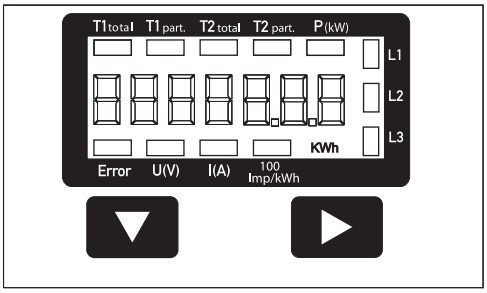
LC-Display Type 7E.23, 7E.46, 7E.56

Indication elements

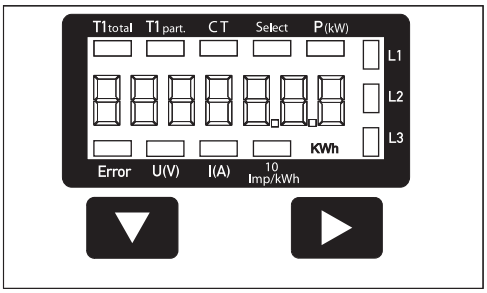


Type 7E.23		
Ttotal	kWh	Indicates total consumption
Tpart.	kWh	Indicates partial consumption, this value is resettable
P	kW	Indicates the instantaneous power
U	V	Indicates the voltage
I	A	Indicates the current
2,000 Imp/kWh		Pulsed according to drawn power Error indication (line 1L/2L inverted) with pulsating 600/600 ms

For 7E.23.8.230.0001 only with total consumption.



Type 7E.46		
T1 total	kWh	Indicates total consumption Tariff 1
T1 part.	kWh	Indicates partial consumption for Tariff 1, this value is resettable
T2 total	kWh	Indicates total consumption Tariff 2
T2 part.	kWh	Indicates partial consumption for Tariff 2, this value is resettable
P	kW	Indicates the instantaneous power per phase or all phases
U	V	Indicates the voltage per phase
I	A	Indicates the current per phase
100 Imp/kWh		Pulsed according to drawn power
kWh		Indicates the unit kWh when the consumption is displayed
L1/L2/L3		For P-, U-, I- or Error display, the corresponding phase is displayed
Error		Indicates a missing phase or incorrect current direction - the appropriate phase is also displayed



Type 7E.56		
T1 total	kWh	Indicates total consumption
T1 part.	kWh	Indicates partial consumption, this value is resettable
CT		Indicates the set current transformer ratio, factory setting is 5:5
Select		The transformer ratio can be selected in the menu item Select *
P	kW	Indicates the instantaneous power per phase or all phases
U	V	Indicates the voltage per phase
I	A	Indicates the current per phase
10 Imp/kWh		Pulsed according to drawn power
kWh		Indicates the unit kWh when the consumption is displayed
L1/L2/L3		For P-, U-, I- or Error display, the corresponding phase is displayed
Error		Indicates a missing phase or incorrect current direction - the appropriate phase is also displayed

* To adjust the current transformer ratio remove the bridge Z1 - Z2 and reset the energy meter according to the operation instructions. Then lock it again with the bridge. For a tamper proof lead seal use 4 terminal covers (07E.16).

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7E Series - Energy meter

Mechanical Display Type 7E.12, 7E.13, 7E.16, 7E.36

LED indication (Normal operation)

Type	Energy consumption			Pulses per kWh	Pulse space	The LED Pulse rate represents the instantaneous power being consumed, according to the following
	None	Low	High			
7E.12 7E.13				2,000	100 ms	kW = (number of pulse per Minute) / 33.3
7E.16				1,000	100 ms	kW = (number of pulse per Minute) / 16.7
7E.36				100	150 ms	kW = (number of pulse per Minute) / 1.7

LED indication (Abnormal operation)

Status indicates errors of installation, as below

Type 7E.12, 7E.13, 7E.16

Device ON, incorrect connection (L-N inverted).
Mark = 600 ms, Space = 600 ms

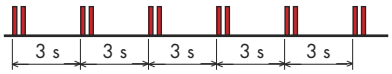


Type 7E.36

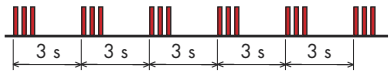
Mark = 100 ms,
Phase L1↑ L1↓ inverted or loss



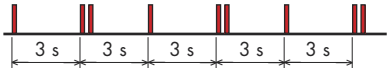
Phase L2↑ L2↓ inverted or loss



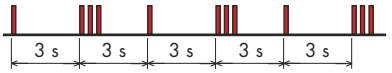
Phase L3↑ L3↓ inverted or loss



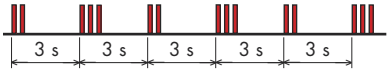
Phase L1↑ L1↓ and L2↑ L2↓ inverted or loss



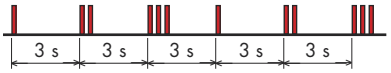
Phase L1↑ L1↓ and L3↑ L3↓ inverted or loss



Phase L2↑L2↓ and L3↑L3↓ inverted or loss

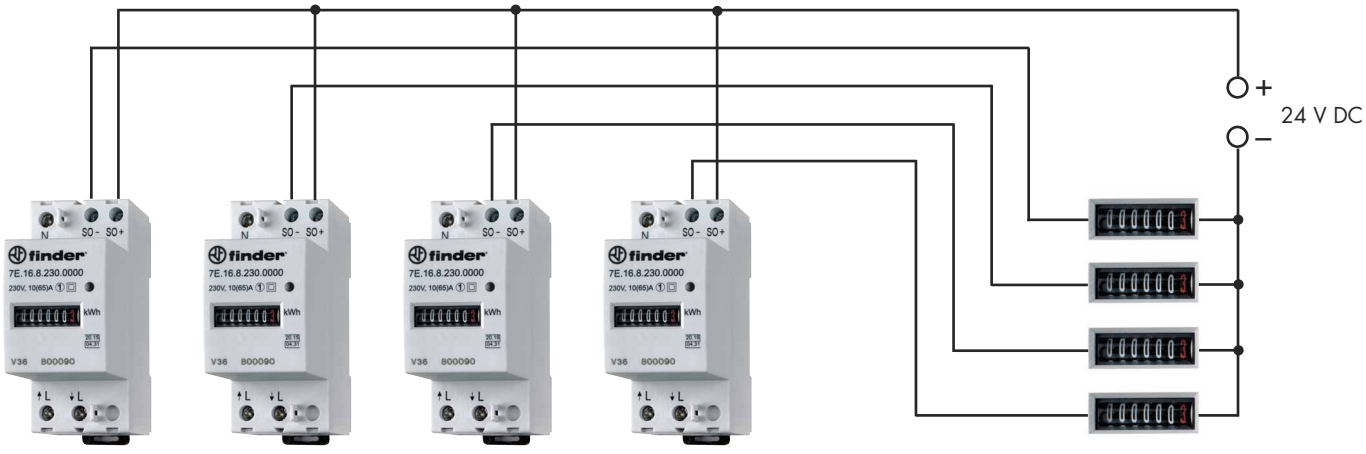


Phase L1↑ L1↓ and L2↑L2↓ and L3↑L3↓ inverted or loss



SO+/SO– Open collector output wiring diagram Type 7E.12, 7E.13, 7E.23, 7E.16, 7E.36, 7E.46, 7E.56

The pulsating open collector output available at terminals SO+ and SO– can be interfaced with the input of a computer, plc or other energy management equipment to allow the remote monitoring of energy consumed.

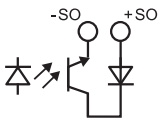


Energy meters – at difference locations
(Note: Both Single and Dual tariff meters provide only a single pulsating output)

Central monitoring/management system
(max. 20 mA for each input)

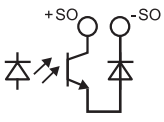
SO-Output Type 7E.12, 7E.13, 7E.16, 7E.23

SO+/SO– Open collector output



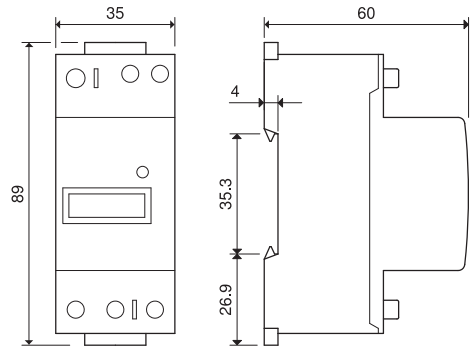
SO-Output Type 7E.36, 7E.46, 7E.56

SO+/SO– Open collector output

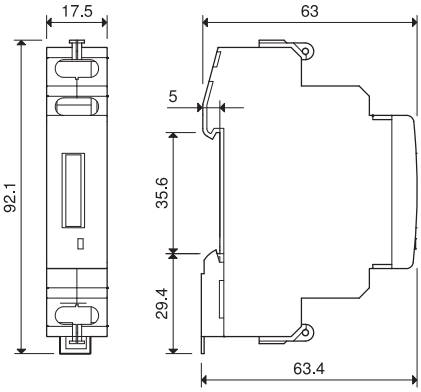


Outline drawing

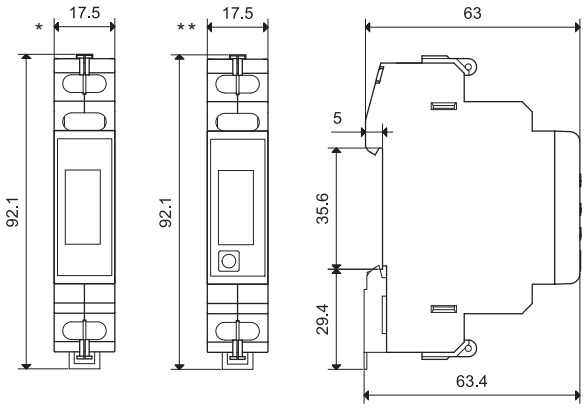
Type 7E.12.8.230.0002 / 7E.16.8.230.0000/10



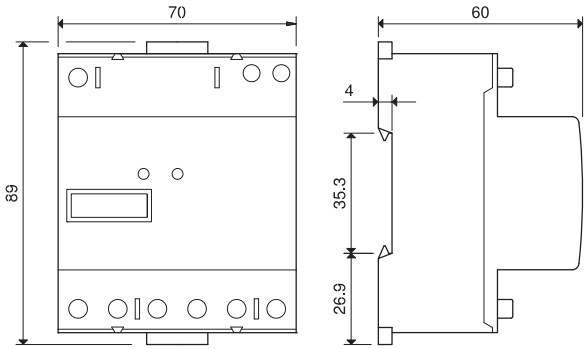
Type 7E.13.8.230.0000/10



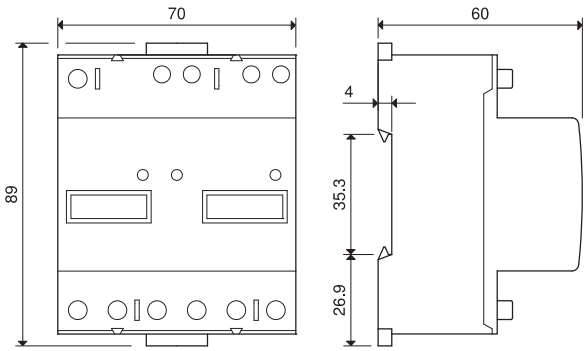
Type 7E.23.8.230.0001* / 7E.23.8.230.0000/10**



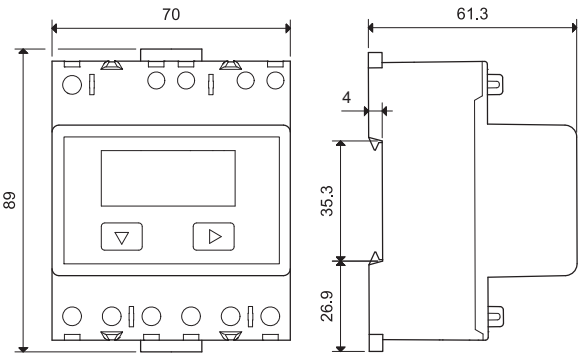
Type 7E.36.8.400.0000/10



Type 7E.36.8.400.0002/12



Type 7E.46.8.400.0002/12 - 7E.56.8.400.0000/10



Accessories



07E.13

Terminal cover for type 7E.13, 7E.23	07E.13

For the tamper-proof lead seal use 2 terminal covers



07E.16

Terminal cover for type 7E.12, 7E.16, 7E.36, 7E.46 and 7E.56	07E.16

7E.12, 7E.16 - For the tamper-proof lead seal use 2 terminal covers

7E.36, 7E.46, 7E.56 - For the tamper-proof lead seal use 4 terminal covers

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