finder
RELAYING INNOVATION

Energy meters

7E
SERIES

- Panels for electrical distribution
- Control panels
- Electrical energy control
- Industrial robots
- Road / tunnel lighting
- Elevators and lifts

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kWh Energy meter 1-phase with electro-mechanical display and S0 pulse output

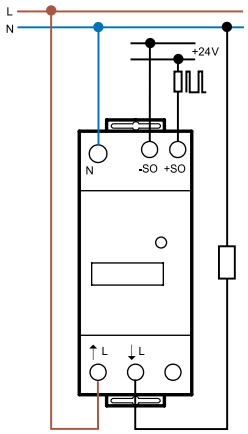
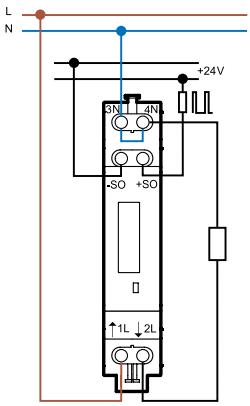
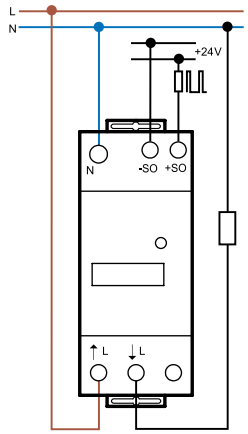
Type 7E.12.8.230.0002
10 (25) A , kWh, No MID, horizontal display

Type 7E.13.8.230.0010
5 (32) A , kWh, MID, 1 module wide

Type 7E.16.8.230.0010
10 (65) A, kWh, MID, horizontal display

- Complies with EN 62053-21 and EN 50470
- Accuracy class 1/B
- Protection class II
- S0 pulse output for remote energy monitoring according to EN 62053-31
- Tamper-proof cover with lead seal facility available as an accessory
- Space saving small size
- 35 mm rail (EN 60715) mount

7E.12/7E.13/7E.16
Box clamp

7E.12.8.230.0002	7E.13.8.230.0010	7E.16.8.230.0010
• Nominal current 10 A (25 A Maximum) • 1-phase 230 V AC • S0 pulse output • 35 mm wide	• Nominal current 5 A (32 A Maximum) • MID certified (50 Hz) • 1-phase 230 V AC • S0 pulse output • 17.5 mm wide	• Nominal current 10 A (65 A Maximum) • MID certified (50 Hz) • 1-phase 230 V AC • S0 pulse output • 35 mm wide
		

For outline drawing see page 10

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)	1950 (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		2000	2000	1000
Open collector- output specification (S0+/S0–)				
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		1000	1000	1000
Pulse length	ms	50	50	50
Internal series resistance	Ω	100	100	100
Maximum cable length @ 30 V/20 mA	m	1000	1000	1000
Technical data				
Accuracy class		1	B	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 UK CA	CE UK CA	

kWh Energy meter 3-phase
MID with electromechanical display and S0 pulse output

Type 7E.36.8.400.0010
10 (65) A, kWh, MID

Type 7E.36.8.400.0012
10 (65) A, kWh, dual tariff, MID

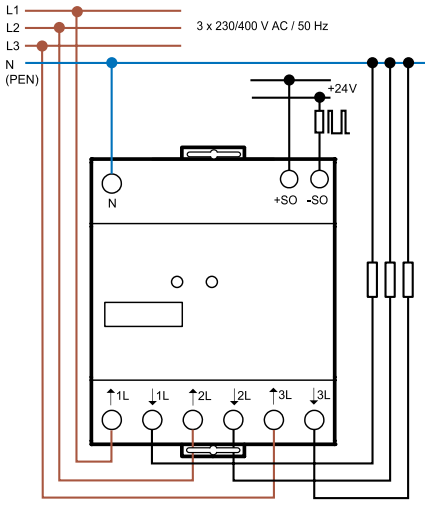
- Complies with EN 62053-21 and EN 50470
- Accuracy class B
- Protection class II
- S0 pulse output for remote energy monitoring according to EN 62053-31
- Tamper-proof cover with lead seal facility available as an accessory
- 35 mm rail (EN 60715) mount

7E.36.8.400.00xx
Box clamp

For outline drawing see page 10

7E.36.8.400.0010

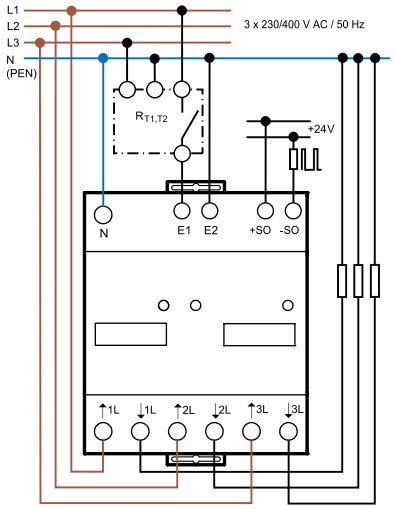
- Nominal current 10 A (65 A Maximum)
- MID certified (50 Hz)
- 3-phase
- S0 pulse output
- 70 mm wide



7E.36.8.400.0012

- Nominal current 10 A (65 A Maximum)
- MID certified (50 Hz)
- 3-phase
- S0 pulse output
- Dual tariff (Day and Night)
- 70 mm wide

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



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	1950 (10 ms)	1950 (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 (S0+/S0–)			
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	1000	1000
Technical data			
Accuracy class		B	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 UK CA	

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Three-phase multifunction single or dual tariff energy meters Bi-directional, Class C, MID certified 70°C with M-Bus and RS485 Modbus integrated interface, single S0 output and backlit LCD display for 3 or 4 wire systems

Type 7E.85.8.400.0210
6 A direct connection, up to 10 000 A using current transformer, dual tariff (7E.85-0212)

Type 7E.85.8.400.0310
6 A direct connection, up to 10 000 A using current transformer, dual tariff (7E.85-0312)

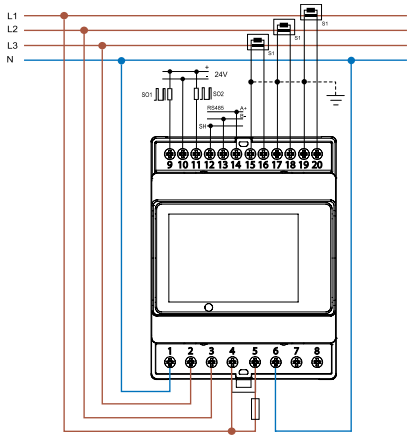
- Display of total or partial (resettable) energy consumption: kWh, kVAh or kvarh - for both T1 and T2 tariffs - for the total system or per phase
- Scroll to view the following instantaneous values: V, A, PF, kW, kVA, kvar, Hz and direction of power flow
- For networks: single phase two wires (1p2w), three phase three wires (3p3w) and three phase four wires (3p4w)
- 8 digit backlit LCD display
- RS485 Modbus integrated communications port - 7E.85-021x
- M-Bus integrated communications port - 7E.85-031x
- Programmable** S0 pulse output for remote energy monitoring according to EN 62053-31
- Active power accuracy Class C according to EN 50470-3
- Reactive power accuracy Class 2 according to EN 62053-23
- Protection category II
- Accessories: sealable tamperproof terminal cover
- 35 mm rail (EN 60715) mount

* Default transmission baud rate: 9600 bps - 7E.85-021x
Default transmission baud rate: 2400 bps - 7E85-031x
** S02 output can be associated with kWh or kvarh.

For outline drawing see page 10

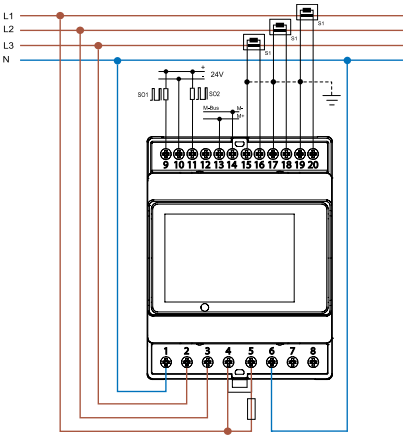
NEW **7E.85.8.400.021x**

- Reference current 1 A (6 A Maximum)
- RS485 Modbus integrated interface
- Three-phase systems - 4 wire
- Usable with current transformer
- Programmable CT secondary
- Dual tariff
- MID certified



NEW **7E.85.8.400.031x**

- Reference current 1 A (6 A Maximum)
- M-Bus integrated interface
- Three-phase systems programmable 3 or 4 wire
- Usable with current transformer
- Programmable CT secondary
- Dual tariff
- MID certified



Specification			
Reference/Maximum current I_n/I_{max}	A	1/6	1/6
Starting current I_{st}	A	0.005	0.005
Minimum measured current I_{min}	A	0.05	0.05
Current range (within accuracy class)	A	0.05…6	0.05…6
Maximum peak current	A	120 (500 ms)	120 (500 ms)
Supply (& monitored) nominal voltage U_N	V AC	3 x 230/400	3 x 230/400
Operating range L-N	V AC	100…277	100…277
Operating range L-L	V AC	100…480	100…480
Frequency	Hz	50/60	50/60
Power consumption per phase	W/VA	≤ 1/3.5	≤ 0.5/7.5
CT burden (per phase)	VA	0.04	0.04
Display		Eight digit counter - backlit LCD display	Eight digit counter - backlit LCD display
Max. totalising count/Min. increment	kWh	999 999.99/0.01	999 999.99/0.01
LED pulses per kWh		3200	3200
LED pulse length	ms	100	100
Aux Power input			
Operating range	V AC	100…480	100…480
	V DC	140…680	140…680
Power consumption	VA	< 10	< 10
Nominal current	A	0.01	0.01
Protocol technical information			
Bus system		RS485 Modbus	M-Bus
Max. bus length	m	1000	—
Max. Modbus energy meters connectable		32	—
Baud rate*	Baud	2400…38 400	300…9600
Output specification (S0+/S0–)			
Number/Type		2 opto-isolated output	2 opto-isolated output
Voltage range/Maximum current (conforming to EN 62053-31)	V DC/mA	3.3…27/1…27	3.3…27/1…27
Pulse for kWh S01/S02**	Imp/kWh**	3200/Configurable	3200/Configurable
Pulse length	ms	200/100 (default)/60	200/100 (default)/60
Technical data			
Accuracy class		C	C
Ambient temperature (Within accuracy class)	°C	–40…+70	–40…+70
Protective class		II	II
Protection category		IP 51 (Indoor)	IP 51 (Indoor)
Approvals (according to type)		CE UK CA	

Ordering information - Electromechanical meters

Example: Energy meter 32 A/230 V AC, with MID certification, Class B accuracy, for 35 mm rail (EN 60715) mounting.
Available with Tamper-proof lead sealed cover as accessory.

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

Series

Function
1 = 1-phase
3 = 3-phase

Current
2 = 25 A
3 = 32 A
6 = 65 A

Supply version
8 = AC 50 Hz

Option
0 = S0 +/- pulse output

Special version
0 = Standard
1 = MID compliant versions

Option
0 = Standard
2 = Standard (7E.12)
2 = Dual tariff (7E.36)

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.13.8.230.0010/17.5 mm
7E.16.8.230.0010/35 mm
7E.36.8.400.0010/70 mm
7E.36.8.400.0012/70 mm

E

Technical data

Insulation EN 62053-21			**7E.12, 7E.13, 7E.16**	**7E.36**
Insulation rated voltage		V	250	250
Overvoltage category			IV	IV
Insulation	between active parts and S0+/S0– terminals	kV (1.2/50 µs)	6	6
	between adjacent phases	kV (1.2/50 µs)	—	6
Insulation	between supply and S0+/S0–	V AC	4000	4000
	between adjacent phases	V AC	—	4000
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
Radio-Frequency Electromagnetic Field (80…1000)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 S0+/S0– 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 S0+/S0– 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	
Shock resistance		g/18 ms	30	
Shock resistance of the internal mechanical counter		g/18 ms	350	
Power lost to the environment			**7E.12, 7E.13**	**7E.16**	**7E.36**
	without current	W	0.4	0.4	1.5
	with maximum current	W	1	2	6

Supply terminals		**7E.12, 7E.13**		**7E.16, 7E.36**	
Max. wire size		solid cable	stranded cable	solid cable	stranded cable
	mm²	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		Pozidriv No.1, Flat No.1, 2			
S0+/S0– terminals					
Max. wire size		solid cable	stranded cable	solid cable	stranded cable
	mm²	2.5	1.5	2.5	1.5
	AWG	14	16	14	16
Screw torque for I_{max}	Nm	0.5		0.8	
Screw		Pozidriv No.0, Flat No.1		Pozidriv No.0, Flat No.2	

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Ordering information - Multifunction digital energy meters

Example: 3-phase energy meter for current transformer operation (6 A/400 V AC), with MID certification, Class C accuracy, for 35 mm rail (EN 60715) mounting. Supplied accessories: Tamper-proof lead sealed cover as accessory.

7	E	.	8	5	.	8	.	4	0	0	.	0	2	1	2

Series

Function
8 = 3-phase, backlit display, for current transformer operation

Current
5 = 6 A (up to 10 000 A, using 7E.85 and CT)

Supply version
8 = AC 50/60 Hz

Supply voltage
400 = 3 x 230/415 V AC 50/60 Hz

Special version
0 = Standard

Option
2 = RS485 Modbus integrated interface + 2 x S0 pulse output
3 = M-Bus integrated interface + 2 x S0 pulse output

Version
1 = Conforms to MID directive

Special version
0 = Single tariff
2 = Dual tariff

Table 1

S0 Pulse	
1000	1000 kWh/kVArh
100	100 kWh/kVArh
10	10 kWh/kVArh
1	1 kWh/kVArh
0.1	100 Wh/kVArh
0.01	10 Wh/kVArh

Available versions

Modbus	M-Bus
7E.85.8.400.0210	7E.85.8.400.0310
7E.85.8.400.0212	7E.85.8.400.0312

Technical data

Insulation			**7E.85.8.400.0xxx**	
Insulation rated voltage		V	250	
Insulation	between active parts and S0+/S0– terminals	kV (1.2/50 µs)	7.4	
	between supply and Modbus, M-Bus terminal	kV (1.2/50 µs)	7.4	
	between adjacent phases	kV (1.2/50 µs)	7.4	
Insulation	between active parts and S0+/S0– terminals	V AC	4000	
	between supply and Modbus, M-Bus terminal	V AC	4000	
	between adjacent phases	V AC	n/a	
Protection class			II	
EMC Specification according to 61000-4-(2/3/4)			**7E.85.8.400.0xxx**	
Electrostatic discharge	contact discharge		8 kV	
	air discharge		15 kV	
Radio frequency Electromagnetic field (80…2000)MHz			30 V/m	
Fast Transients (burst) (5-50 ns, 5 kHz)	on Supply terminals		4 kV	
	on S0+/S0– terminals		4 kV	
	Modbus, M-Bus terminal		4 kV	
Surge (1.2/50 µs)	on Supply terminals		4 kV	
	on S0+/S0– terminals		4 kV	
	Modbus, M-Bus terminal		4 kV	
Other data			**7E.85.8.400.0xxx**	
Pollution degree			2	
Vibration resistance			EN 60068-2-6	
Shock resistance			EN 60068-2-27	
Power lost to the environment	Max value per phase		1 W/7.5 VA	
	CT burden		0.04 VA/per phase	
Supply terminals			**7E.85.8.400.0xxx**	
Max. wire size			solid cable	stranded cable
(Terminals from 1 to 8)		mm^2	0.5…2.5	0.5…2.5
		AWG	22…12	22…12
Screw torque		Nm	0.4	0.4
S0+/S0–, TA terminals, RS485 Modbus, M-Bus			**7E.85.8.400.0xxx**	
Max. wire size			solid cable	stranded cable
(Terminals from 9 to 20)		mm^2	0.5…2.5	0.5…2.5
		AWG	30…14	30…14
Screw torque		Nm	0.4	0.4

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				2000	100 ms	kW = (number of pulse per Minute) / 33.3
7E.16				1000	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)

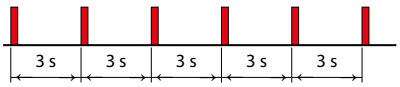
Status indicates errors of installation, as below

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

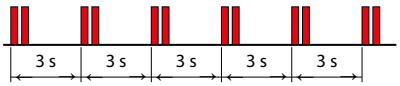
Device ON, incorrect connection (L-N inverted).
Mark = 600 ms, Space = 600 ms

Type 7E.36

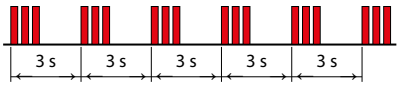
Mark = 100 ms,
Phase L1↑ L1↓ inverted or loss



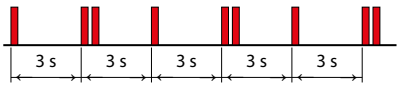
Phase L2↑ L2↓ inverted or loss



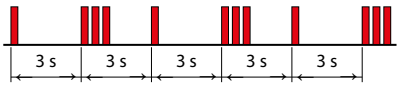
Phase L3↑ L3↓ inverted or loss



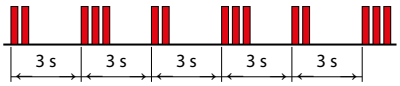
Phase L1↑ L1↓ and L2↑ L2↓ inverted or loss



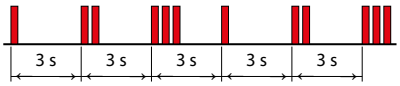
Phase L1↑ L1↓ and L3↑ L3↓ inverted or loss



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

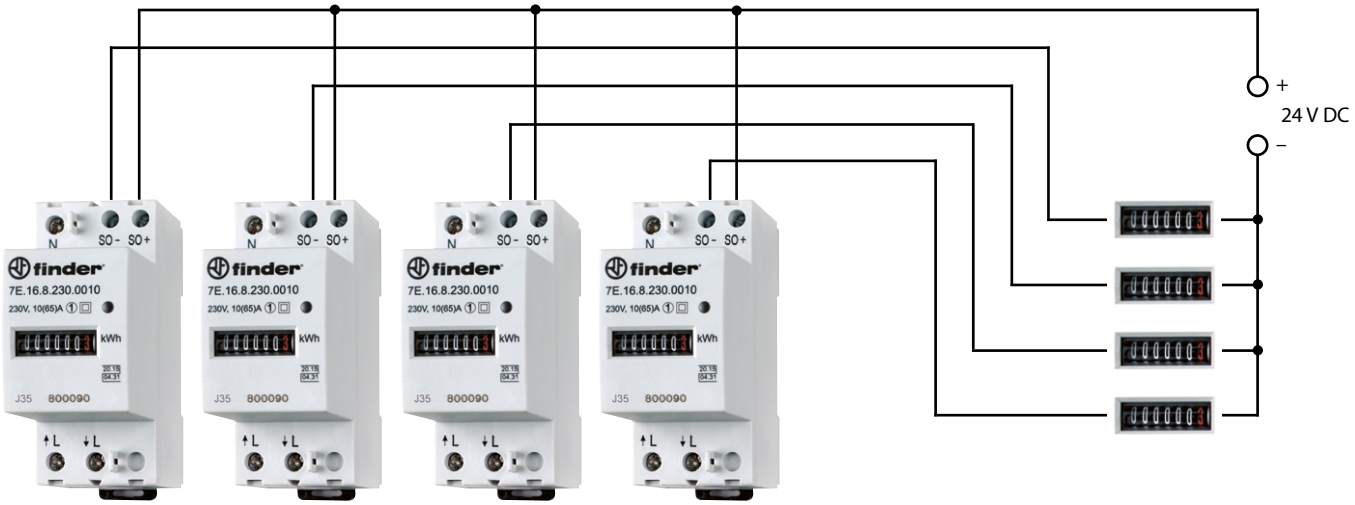


Phase L1↑L1↓ and L2↑L2↓ and L3↑L3↓ inverted or loss



S0+/S0– Open collector output wiring diagram Type 7E.12, 7E.13, 7E.16, 7E.36

The pulsating open collector output available at terminals S0+ and S0– can be interfaced with the input of a computer, plc or other energy management equipment to allow the remote monitoring of energy consumed.

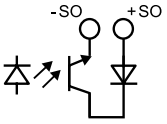


Energy meters – at difference locations (Note: Both Single and Dual tariff meters provide only a single pulsating output)

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

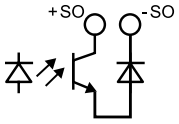
S0-Output Type 7E.12, 7E.13, 7E.16

S0+/S0– Open collector output



S0-Output Type 7E.36

S0+/S0– Open collector output



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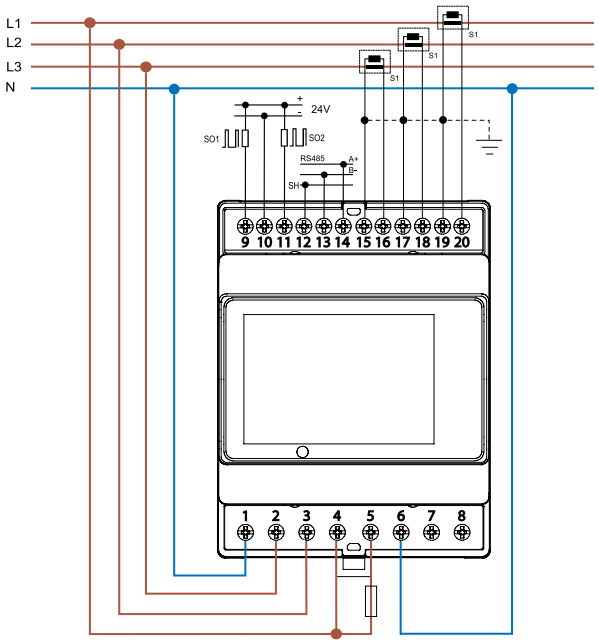
Wiring diagrams - 7E.85

Type 7E.85.8.400.0210



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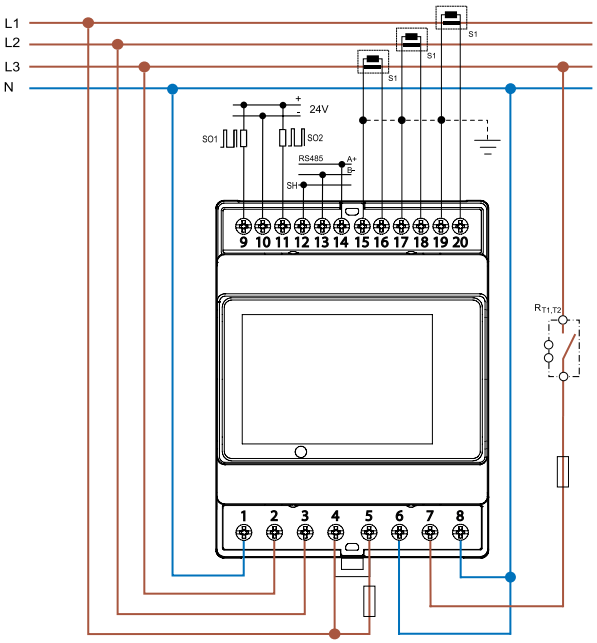

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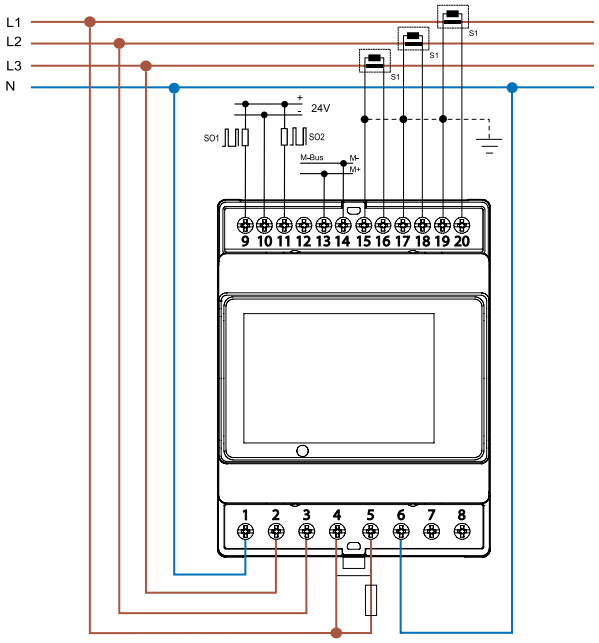

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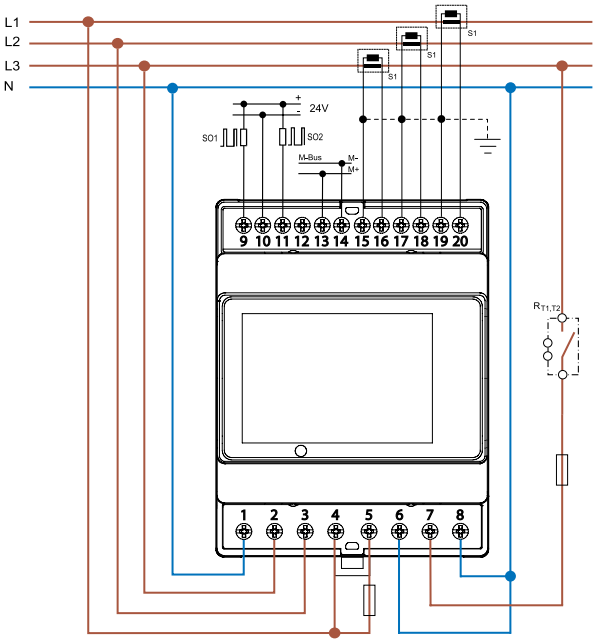
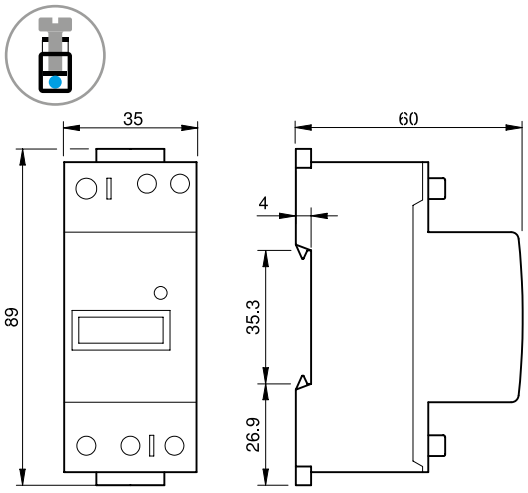


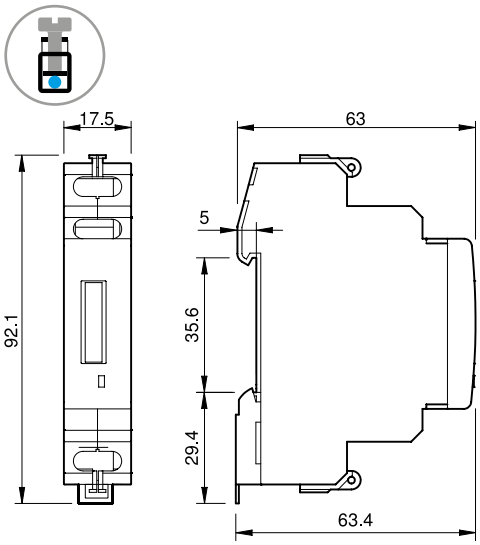
E

Outline drawings

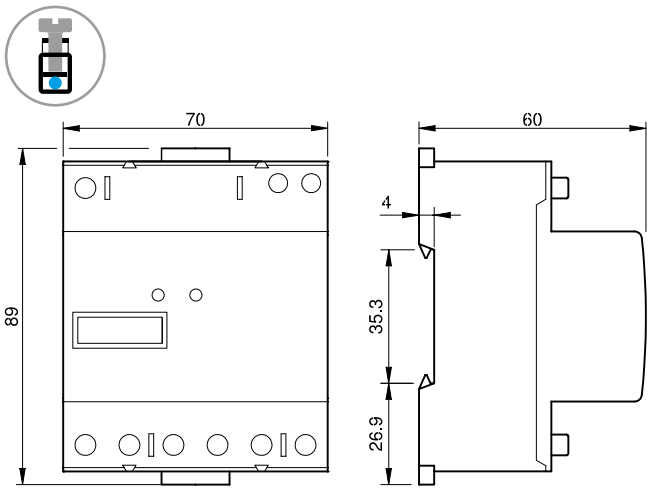
Type 7E.12.8.230.0002/7E.16.8.230.0010
Box clamp



Type 7E.13.8.230.0010
Box clamp



Type 7E.36.8.400.0010
Box clamp



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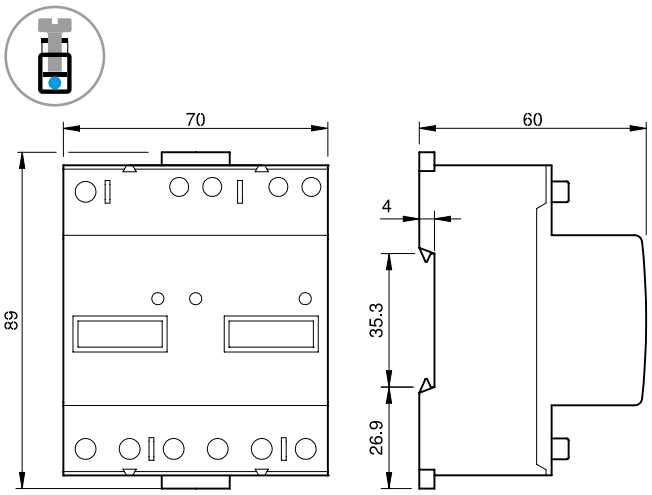

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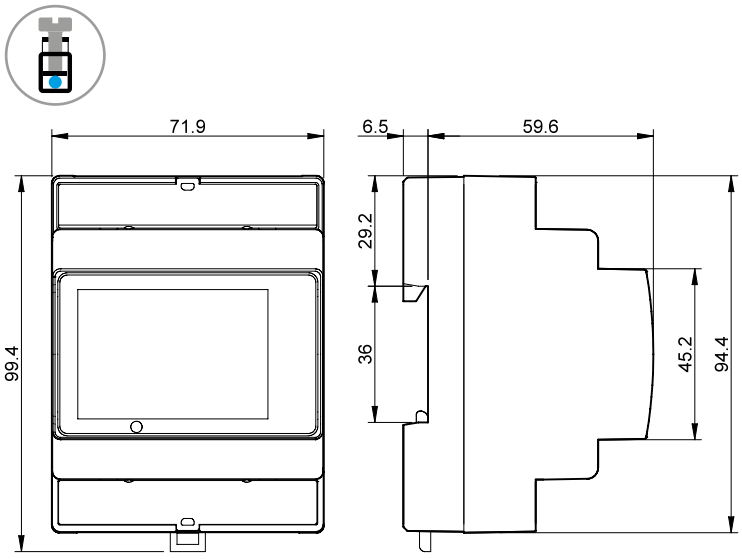
Box clamp



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Accessories

07E.13

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

For the tamper-proof lead seal use two terminal covers

07E.16

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

7E.12, 7E.16 - For the tamper-proof lead seal use two terminal covers
7E.36 - For the tamper-proof lead seal use four terminal covers

Terms and definitions

I	The electrical current flowing through the meter
I_n	The specified reference current for which the meter has been designed
I_{st}	The lowest declared value of "I" at which the meter registers active electrical energy at unity power factor (polyphase meters with balanced load)
I_{min}	The values of "I" above which the error lies within maximum permissible errors (MPEs) (polyphase meters with balanced load)
I_{tr}	The value of "I" above which the error lies within the smallest MPE corresponding to the class index of the meter
I_{max}	The maximum value of "I" for which the error lies within the MPEs

Detailed structure of the protocol is available on line