Features

Electronic voltage monitoring relays for single and three-phase applications

- Multifunctional types, providing the flexibility of monitoring Undervoltage, Overvoltage, Window Mode, Phase rotation, Phase loss, Asymmetry and Neutral loss
- Positive safety logic - Make output contact opens if the relay detects an error
- All functions and values can be easily adjusted by the selector and trimmer on front face
- "Blade + cross" – both flat blade and cross head screw drivers can be used to adjust the regulators and the function selector
- Colored LEDs for clear & immediate visual indication
- 1 CO relay output, 6 or 10 A
- Modular housing, 17.5 or 35 mm wide
- 35 mm rail (EN 60715) mount
- Cd-free contact material

Screw terminal

E

70.11

Single-phase (220...240 V) voltage monitoring:

- Undervoltage
- Overvoltage
- Window mode (overvoltage + undervoltage)
- Voltage fault memory selectable

70.31

Three-phase (380...415 V) voltage monitoring:

- Undervoltage
- Overvoltage
- Window mode (overvoltage + undervoltage)
- Voltage fault memory selectable
- Phase loss
- Phase rotation

70.41

Three-phase (380...415 V, with or without neutral) voltage monitoring:

- Window mode (overvoltage + undervoltage)
- Phase loss
- Phase rotation
- Asymmetry
- Neutral loss selectable

For outline drawing see page 8

Contact specification			
Contact configuration	1 CO (SPDT)	1 CO (SPDT)	1 CO (SPDT)
Rated current/Maximum peak current A	10 / 30	6 / 10	6 / 10
Rated voltage/Max. switching voltage V AC	250 / 400	250 / 400	250 / 400
Rated load AC1 VA	2,500	1,500	1,500
Rated load AC15 VA	750	500	500
Single phase motor rating (230 V AC) kW	0.5	0.185	0.185
Breaking capacity DC1: 30/110/220 V A	10 / 0.3 / 0.12	6 / 0.2 / 0.12	6 / 0.2 / 0.12
Minimum switching load mW (V/mA)	300 (5 / 5)	500 (12 / 10)	500 (12 / 10)
Standard contact material	AgNi	AgNi	AgNi
Supply specification			
Nominal system voltage (U_N) V AC (50/60 Hz)	220...240	380...415	380...415
Rated power VA (50 Hz) / W	2.6 / 0.8	11 / 0.9	11 / 0.9
Operating range V AC (50/60 Hz)	130...280	220...510	220...510
Technical data			
Electrical life at rated load AC1 cycles	$80 \cdot 10^3$	$60 \cdot 10^3$	$60 \cdot 10^3$
Voltage detection level range V	170...270	300...480	300...480
Asymmetry detection level range %	—	—	4...25
Switch-off delay time (T on function diagrams) s	0.5...60	0.5...60	0.5...60
Switch-on lock-out time s	0.5	1	1
Switch-on hysteresis (H on function diagrams) V	5 (L-N)	10 (L-L)	10 (L-L)
Power-on activation time s	≈ 1	≈ 1	≈ 1
Insulation between supply and contacts (1.2/50 μs) kV	4	4	4
Dielectric strength between open contacts V AC	1,000	1,000	1,000
Ambient temperature °C	–20...+60	–20...+60	–20...+60
Protection category	IP20	IP20	IP20
Approvals (according to type)			

CE PG EHI

Features

Electronic phase loss and rotation monitoring relays for three-phase applications

- Universal voltage monitoring (U_N from 208 V to 480 V, 50/60 Hz)
- Phase loss monitoring, even under phase regeneration
- Positive safety logic - Make contact opens if the relay detects an error
- 2 versions:
  1 CO relay output, 6 A (17.5 mm wide), and
  2 CO relay output, 8 A (22.5 mm wide)
- 35 mm rail (EN 60715) mount
- European patent pending for the innovative principle at the root of the 3 phase monitoring and error survey system (70.61)

Screw terminal

E

70.61

Three-phase (208...480 V) voltage monitoring:

- Phase loss
- Phase rotation

NEW **70.62**

Three-phase (208...480 V) voltage monitoring:

- Phase loss
- Phase rotation

For outline drawing see page 8

		70.61	70.62
Contact specification			
Contact configuration		1 CO (SPDT)	2 CO (DPDT)
Rated current/Maximum peak current	A	6 / 15	8 / 15
Rated voltage/Max. switching voltage	V AC	250 / 400	250 / 400
Rated load AC1	VA	1,500	2,000
Rated load AC15	VA	250	400
Single phase motor rating (230 V AC)	kW	0.185	0.3
Breaking capacity DC1: 30/110/220 V	A	3 / 0.35 / 0.2	8 / 0.3 / 0.12
Minimum switching load	mW (V/mA)	500 (10 / 5)	300 (5 / 5)
Standard contact material		AgCdO	AgNi
Supply specification			
Nominal system voltage (U_N)	V AC (50/60 Hz)	208...480	208...480
Rated power	VA (50 Hz) / W	8 / 1	11 / 0.8
Operating range	V AC (50/60 Hz)	170...500	170...520
Technical data			
Electrical life at rated load AC1	cycles	$100 \cdot 10^3$	$60 \cdot 10^3$
Switch-off delay time	s	0.5	0.5
Switch-on lock-out time	s	0.5	0.5
Power-on activation time	s	< 2	< 2
Insulation between supply and contacts (1.2/50 µs) kV		5	5
Dielectric strength between open contacts V AC		1,000	1,000
Ambient temperature	°C	–20...+60	–20...+60
Protection category		IP20	IP20
Approvals (according to type)		CE EAC PG- cⓊus	CE EAC

finder

70 Series - Line monitoring relay

Ordering information

Example: 70 series, three-phase voltage monitoring relay, 1 output, supply voltage 380…415 V AC.

```
          A  B  C  D
7 0 . 3 1 . 8 . 4 0 0 . 2 0 2 2
```
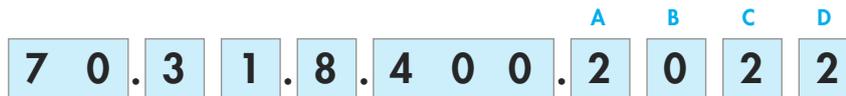
Series

Type
1 = 1 phase AC line monitoring
3 = 3 phase AC line monitoring
4 = 3 phase + neutral AC line monitoring
6 = 3 phase loss and rotation monitoring

No. of poles
1 = 1 pole
2 = 2 pole

Supply version
8 = AC (50/60 Hz)

Supply voltage
230 = 220…240 V (70.11)
400 = 380…415 V (70.31/41)
400 = 208…480 V (70.61/62)

D: Fault memory option
0 = No fault memory
2 = Fault memory function selectable

C: Time delay setting
0 = Fixed switch-off delay
2 = Adjustable switch-off delay
3 = Adjustable switch-off
    delay and asymmetry

B: Contact circuit
0 = CO

A: Detection values
0 = Non-adjustable detection values
2 = 2 adjustable detection values

Codes
70.11.8.230.2022   70.61.8.400.0000
70.31.8.400.2022   70.62.8.400.0000
70.41.8.400.2030

E

Monitoring and function overview

		70.11	70.31	70.41	70.61/62
Supply system type		Single phase system	3-phase systems	3-phase systems	3-phase systems
Nominal voltage 50/60 Hz	V	220…240	380…415	380…415	208…480
Undervoltage with/without memory (selectable)		•	•	—	—
Overvoltage with/without memory (selectable)		•	•	—	—
Window Mode with/without memory (selectable)		•	•	—	—
Window Mode without memory		—	—	•	—
Phase loss		—	•	•	•
Phase rotation		—	•	•	•
Phase asymmetry		—	—	•	—
Neutral loss (selectable)		—	—	•	—

Technical data

Insulation			70.11/31/41	70.61/62
Between supply and contacts	dielectric strength	V AC	2,500	3,000
	impulse (1.2/50 µs)	kV	4	5
Between open contacts	dielectric strength	V AC	1,000	1,000
	impulse (1.2/50 µs)	kV	1.5	1.5

EMC specifications				
Type of test			**Reference standard**	
Electrostatic discharge	contact discharge		EN 61000-4-2	4 kV
	air discharge		EN 61000-4-2	8 kV
Radiated electromagnetic field	80 … 1,000 MHz		EN 61000-4-3	10 V/m
	1 … 2.8 GHz		EN 61000-4-3	5 V/m
Fast transients (burst 5/50 ns, 5 and 100 kHz)	on supply terminals		EN 61000-4-4	4 kV
Voltage pulses on supply terminals (surge 1.2/50 µs)	common mode		EN 61000-4-5	4 kV
	differential mode		EN 61000-4-5	4 kV
Radiofrequency common mode voltage (0.15…230 MHz)	on supply terminals		EN 61000-4-6	10 V
Voltage dips	70 % U_N		EN 61000-4-11	25 cycles
Short interruptions			EN 61000-4-11	1 cycle
Radiofrequency conducted emissions	0.15…30 MHz		CISPR 11	class B
Radiated emissions	30…1,000 MHz		CISPR 11	class B

Terminals			solid cable	stranded cable
Max. wire size		mm²	1 x 6 / 2 x 4	1 x 4 / 2 x 2.5
		AWG	1 x 10 / 2 x 12	1 x 12 / 2 x 14
⊕ Screw torque		Nm	0.8	
Wire strip length		mm	9	

Other data			70.11	70.31/41	70.61/62
Power lost to the environment	without output current	W	0.8	0.9	1
	with rated output current	W	2	1.2	1.4

Functions

Output relay On (NO closed) when all OK: positive logic.

Type 70.11 70.31	**Overvoltage (OV and OVm functions)**
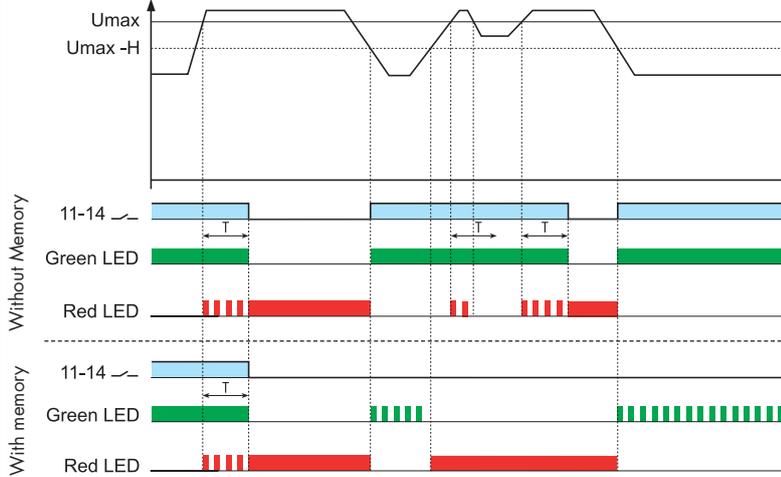
Functions

⌐	= Output contact (11-14)
OV	= Overvoltage
OVm	= Overvoltage with memory
UV	= Undervoltage
UVm	= Undervoltage with memory
W	= Window mode (OV + UV)
Wm	= Window mode (OV + UV) with memory
H	= Hysteresis

If the voltage moves out of limits, following delay **T** the output relay turns Off.

When the voltage is again within limits (± the Switch-on hysteresis **H**):
- if set in the "without memory" position, the output relay "recovers", i.e. it turns On (after the Switch-on lock-out time) without any memory of the previous event.
- if set in the "with memory" position (70.11 and 70.31 only), the output relay remains open. To reset, it is necessary to switch the supply Off and then On again, or to rotate the selector first to an adjacent position and then to the original position.

Type 70.11 70.31	**Undervoltage (UV and UVm functions)**
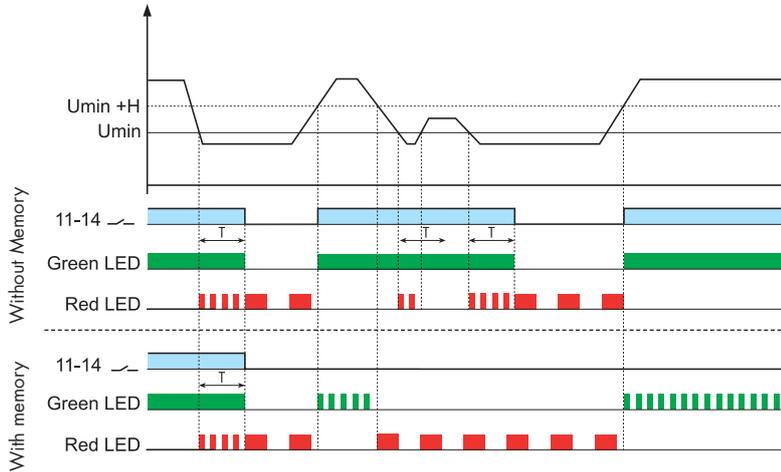
Type 70.11 70.31 70.41 (70.41 without memory)	**Window mode (overvoltage + undervoltage, W and Wm functions)**

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Functions

Output relay On (NO closed) when all OK: positive logic.

Type 70.31 70.41 70.61 70.62	**Phase loss and phase rotation**

L1

L2

L3

11-14
(for 70.62 only) 21-24

Green LED - 70.31, 70.41

Yellow LED - 70.31, 70.41

Red LED - 70.61

Red LED - 70.62

If the sequence (L1, L2, L3) is incorrect at power-on, the output relay will not turn-on.

If a phase is lost, the output relay turns off immediately.
When the phase is again active, the output relay turns on immediately.

For types 70.61 and 70.62:
Phase loss monitoring possible even under regeneration up to 80% of the average of the other 2 phases.

Type 70.41	**Neutral loss and asymmetry**

L1

Asymmetry

L2

L3

N

Neutral Loss

11-14

Green LED

Yellow LED

Red LED

T

If the neutral is lost (and the Neutral control function is set), the output relay turns off immediately.
When the neutral is again present, the output relay turns on immediately

If the asymmetry $(U_{max} - U_{min})/U_N$ is above the % set value, the output relay turns off after the set delay **T**.
When the asymmetry is again below the % set value (with a fixed hysteresis of approximately 2%), the output relay turns on after the Switch-on lock-out time.

E

Front view: function selector and regulators

70.11	70.31	70.41

70.11

Functions: OV, OVm, UV, UVm, W, Wm

$T_{off\ delay}$: (0.5...60) sec

U_{Max}: (220...270) V

U_{Min}: (170...230) V

70.31

Functions: OV, OVm, UV, UVm, W, Wm

U_{Max}: (380...480) V

U_{Min}: (300...400) V

$T_{off\ delay}$: (0.5...60) sec

70.41

N = With N-line monitoring
N̸ = Without N-line monitoring

U_{Max}: (380...480) V

(4...25) % U_N

U_{Min}: (300...400) V

$T_{off\ delay}$: (0.5...60) sec

E

LED indication

Monitoring relay Type	LED	Supply system normal	Supply system abnormal (Voltage out of limits, switch-off delay time T running)	Supply system abnormal (Reason for switch-off, RESET necessary when "with Memory"* is selected)	
		Contact 11 - 14 closed	Contact 11 - 14 closed	Contact 11-14 open	
70.11.8.230.2022	• •				Overvoltage OV and OVm
					Undervoltage UV and UVm
					With Memory, following a failure a manual "RESET" ** is necessary
70.31.8.400.2022	• • •				Overvoltage OV and OVm
					Undervoltage UV and UVm
					Phase loss
					Phase rotation
					With Memory, following a failure a manual "RESET" ** is necessary
70.41.8.400.2030	• • •				Overvoltage OV
					Undervoltage UV
					Asymmetry
					Phase loss
					Neutral loss
					Phase rotation
70.61.8.400.0000	•				Phase rotation or Phase loss
70.62.8.400.0000	•				Phase loss
					Phase rotation

*   The function "with Memory" is only available for type 70.11 and 70.31.

** It is necessary to switch the supply OFF and then On again (U off U on) or to rotate the function selector first to an adjacent position and then to the original position.

II-2014, www.findernet.com

Wiring diagrams

| Type 70.11 | Type 70.31 | Type 70.41 | Type 70.61 | Type 70.62 |

E
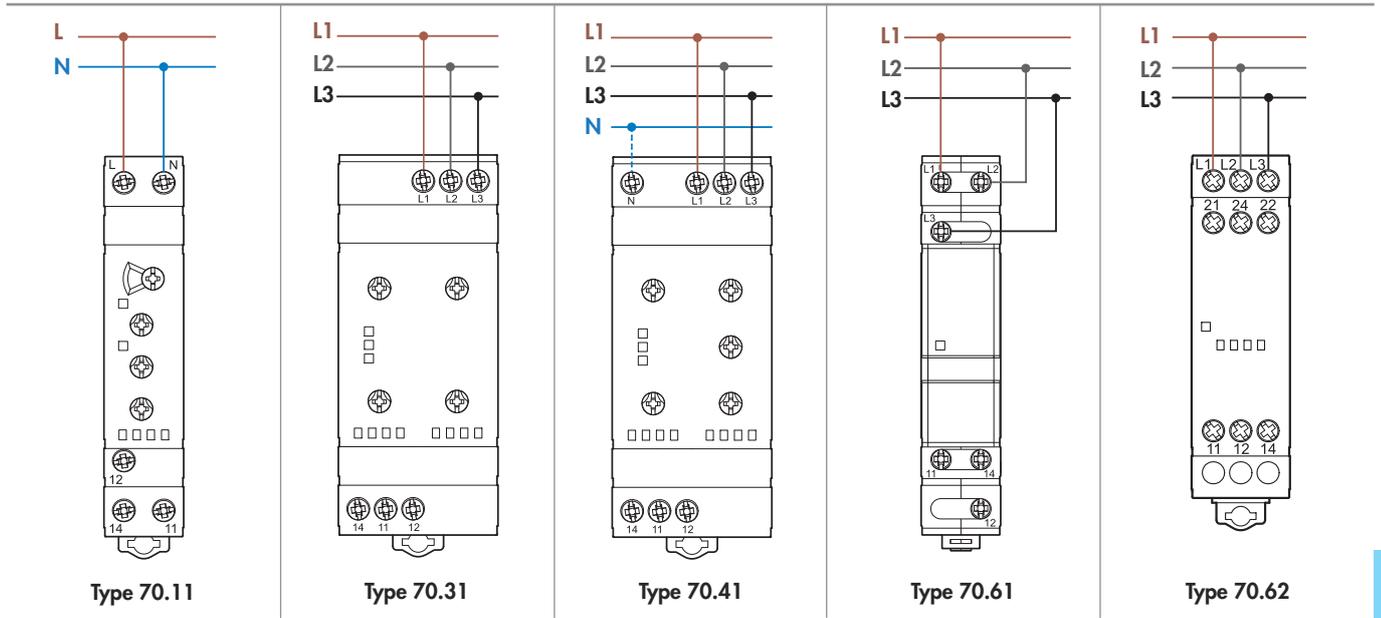
Application example

The output contact switches the coil of the line contactor.


LOAD
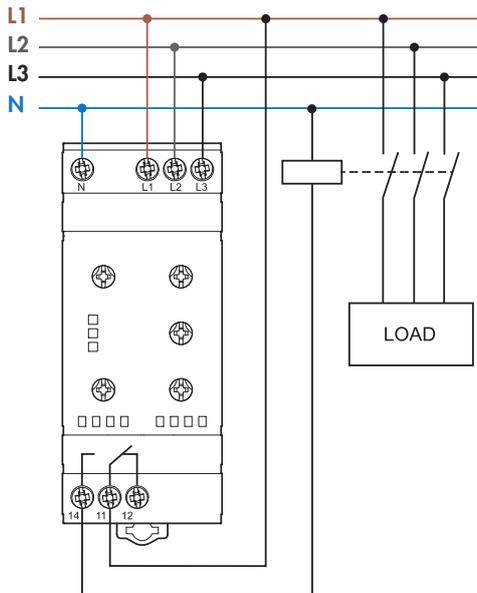
Outline drawings

70.11
Screw terminal
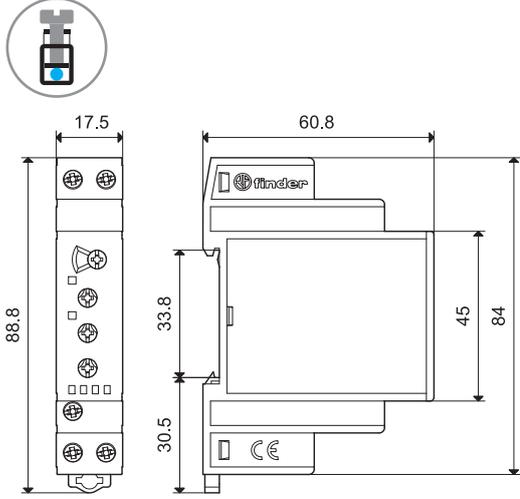
70.31
Screw terminal
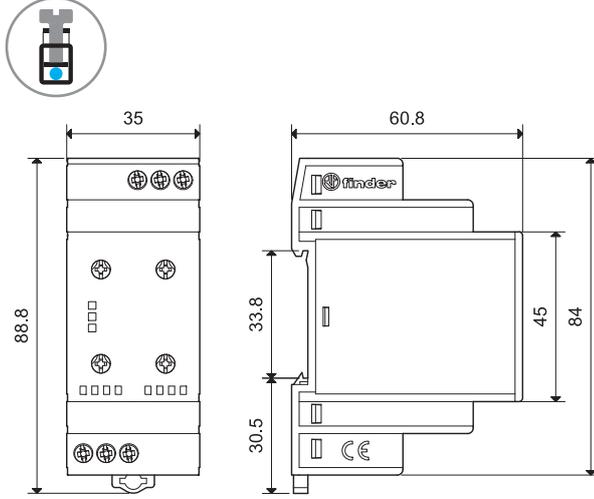
E

70.41
Screw terminal
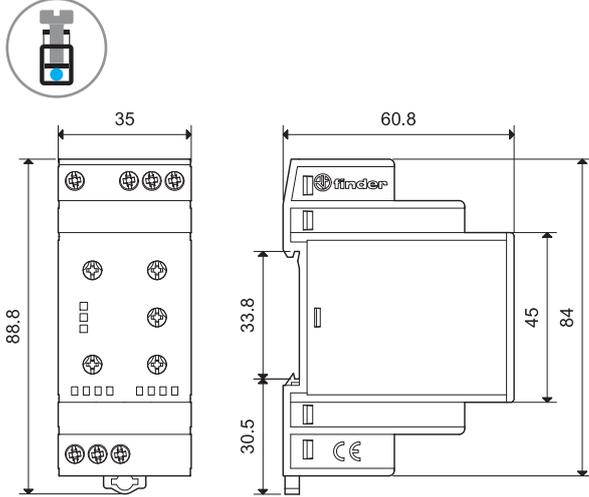
70.61
Screw terminal
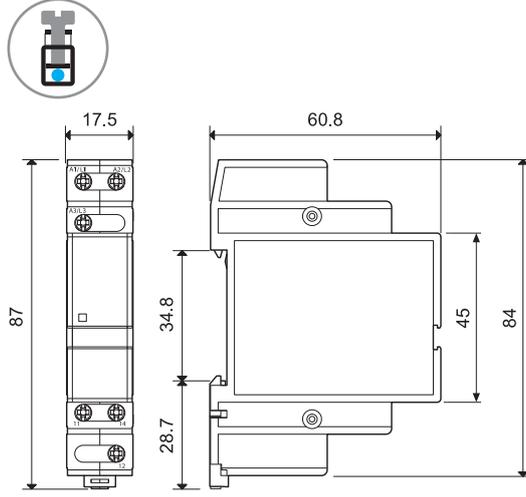
70.62
Screw terminal
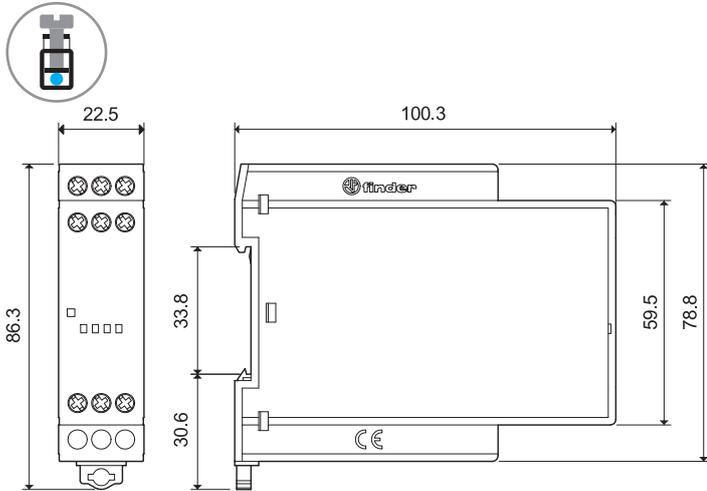
Accessories

020.01

| **Adaptor for panel mounting,** plastic, 17.5 mm wide for 70.11 and 70.61 | 020.01 |
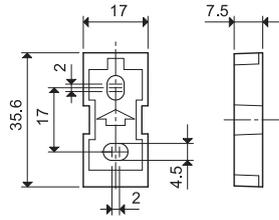
011.01

| **Adaptor for panel mounting**, plastic, 35 mm wide for 70.31 and 70.41 | 011.01 |

E
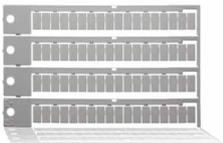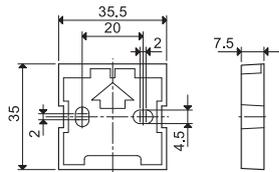
060.72

| **Sheet of marker tags,** plastic, 72 tags, 6x12 mm for 70.11, 70.31, 70.41 and 70.62 | 060.72 |
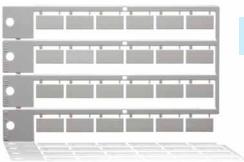
020.24

| **Sheet of marker tags,** plastic, 24 tags, 9x17 mm for 70.61 | 020.24 |

019.01

| **Identification tag,** plastic, 1 tag, 17x25.5 mm for 70.11, 70.31 and 70.41 | 019.01 |

020.03

| **Separator for rail mounting,** plastic, 3 mm wide | 020.03 |
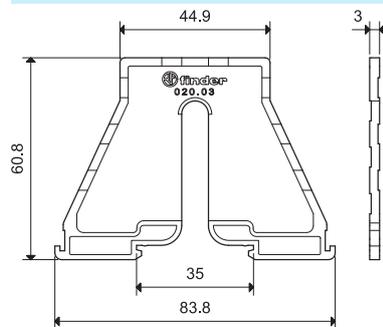
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22.64.0.230.4310 20.21.8.024.4000 20.22.8.024.4000 20.28.8.024.4000 22.22.8.024.4000 22.32.0.230.4440 26.06.8.024.0000
40.52.8.006.0000 44.52.9.060.0000 10.42.8.230.0000 11.42.8.230.0000 88.02.0.230.0002 96.04SMA 55.12.8.024.0000 55.33.8.230.0000
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12.11.8.230.1000 22.22.9.048.4000 22.64.0.230.4710 26.08.8.012.0000 20.21.8.012.4000 20.23.9.110.4000 20.26.8.230.4000
22.34.0.230.4340 22.34.0.230.4620 22.34.0.230.4720 22.44.0.230.4710 10.61.8.230.0000 55.14.9.012.0000 22.32.0.012.4420