

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
- 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



For outline drawing see page 10

Contact specification

| | | | |
|--|-----------|-------------|-------------|
| Contact configuration | | 1 CO (SPDT) | 1 CO (SPDT) |
| Rated current/Maximum peak current | A | 10/30 | 6/10 |
| Rated voltage/ Max. switching voltage | V AC | 250/400 | 250/400 |
| Rated load AC1 | VA | 2500 | 1500 |
| Rated load AC15 | VA | 750 | 500 |
| Single phase motor rating (230 V AC) | kW | 0.5 | 0.185 |
| Breaking capacity DC1: 30/110/220 V | A | 10/0.3/0.12 | 6/0.2/0.12 |
| Minimum switching load | mW (V/mA) | 300 (5/5) | 500 (12/10) |
| Standard contact material | | AgNi | AgNi |

Supply specification

| | | | |
|--|-----------------|-----------|-----------|
| Nominal system voltage (U _N) | V AC (50/60 Hz) | 220...240 | 380...415 |
| Rated power | VA (50 Hz)/W | 2.6/0.8 | 11/0.9 |
| Operating range | V AC (50/60 Hz) | 130...280 | 220...510 |

Technical data

| | | | |
|--|--------|----------------------|----------------------|
| Electrical life at rated load AC1 | cycles | 80 · 10 ³ | 60 · 10 ³ |
| Voltage detection level range | V | 170...270 | 300...480 |
| Asymmetry detection level range | % | — | — |
| Switch-off delay time (T on function diagrams) | s | 0.5...60 | 0.5...60 |
| Switch-on lock-out time | s | 0.5 | 1 |
| Switch-on hysteresis (H on function diagrams) | V | 5 (L-N) | 10 (L-L) |
| Power-on activation time | s | ≈ 1 | ≈ 1 |
| Insulation between supply and contacts (1.2/50 μs) | kV | 4 | 4 |
| Dielectric strength between open contacts | V AC | 1000 | 1000 |
| Ambient temperature | °C | -20...+60 | -20...+60 |
| Protection category | | IP 20 | IP 20 |

Approvals (according to type)



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, even under phase regeneration
- Phase rotation

Electronic voltage monitoring relays for three-phase applications

- Multifunctional types, providing the flexibility of monitoring Undervoltage, Overvoltage, Window Mode, Phase rotation, Phase loss, Asymmetry and Neutral loss
- Phase loss monitoring, even under phase regeneration
- 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 or 2 CO relay output, 6 or 8 A
- Modular housing, 35 mm wide
- 35 mm rail (EN 60715) mount
- Cd-free contact material

Screw terminal



For outline drawing see page 10

Contact specification

| | | 70.41 | 70.42 |
|--|-----------|-------------|-------------|
| Contact configuration | | 1 CO (SPDT) | 2 CO (DPDT) |
| Rated current/Maximum peak current | A | 6/10 | 8/15 |
| Rated voltage/ Max. switching voltage | V AC | 250/400 | 250/400 |
| Rated load AC1 | VA | 1500 | 2000 |
| Rated load AC15 | VA | 500 | 400 |
| Single phase motor rating (230 V AC) | kW | 0.185 | 0.3 |
| Breaking capacity DC1: 30/110/220 V | A | 6/0.2/0.12 | 8/0.3/0.12 |
| Minimum switching load | mW (V/mA) | 500 (12/10) | 300 (5/5) |
| Standard contact material | | AgNi | AgNi |

Supply specification

| | | 70.41 | 70.42 |
|----------------------------------|-----------------|-----------|-----------|
| Nominal system voltage (U_N) | V AC (50/60 Hz) | 380...415 | 380...415 |
| Rated power | VA (50 Hz)/W | 11/0.9 | 12.5/1 |
| Operating range | V AC (50/60 Hz) | 220...510 | 220...510 |

Technical data

| | | 70.41 | 70.42 |
|---|--------------|-----------------|-----------------|
| Electrical life at rated load AC1 | cycles | $60 \cdot 10^3$ | $60 \cdot 10^3$ |
| Voltage detection level range | V | 300...480 | 300...480 |
| Asymmetry detection level range | % | 4...25 | 5...25 |
| Switch-off delay time (T on function diagrams) | s | 0.5...60 | 0.5...60 |
| Switch-on lock-out time | s | 1 | 1 |
| Switch-on hysteresis (H on function diagrams) | V | 10 (L-L) | 10 (L-L) |
| Power-on activation time | s | ≈ 1 | ≈ 1 |
| Insulation between supply and contacts (1.2/50 μ s) | kV | 4 | 4 |
| Dielectric strength between open contacts | V AC | 1000 | 1000 |
| Ambient temperature | $^{\circ}$ C | -20...+60 | -20...+60 |
| Protection category | | IP 20 | IP 20 |

Approvals (according to type)

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

70.42


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

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

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



For outline drawing see page 10

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 | 1500 | 2000 |
| 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 | | AgSnO ₂ | 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 · 10 ³ | 60 · 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 | 1000 | 1000 |
| Ambient temperature | °C | -20...+60 | -20...+60 |
| Protection category | | IP 20 | IP 20 |

Approvals (according to type)



70.61

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

- Phase loss
- Phase rotation



70.62

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

- Phase loss
- Phase rotation



Ordering information

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

70.31.8400.20.22

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 (70.31/41/42)
 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 70.42.8.400.2032
 70.31.8.400.2022 70.61.8.400.0000
 70.41.8.400.2030 70.62.8.400.0000

Monitoring and function overview

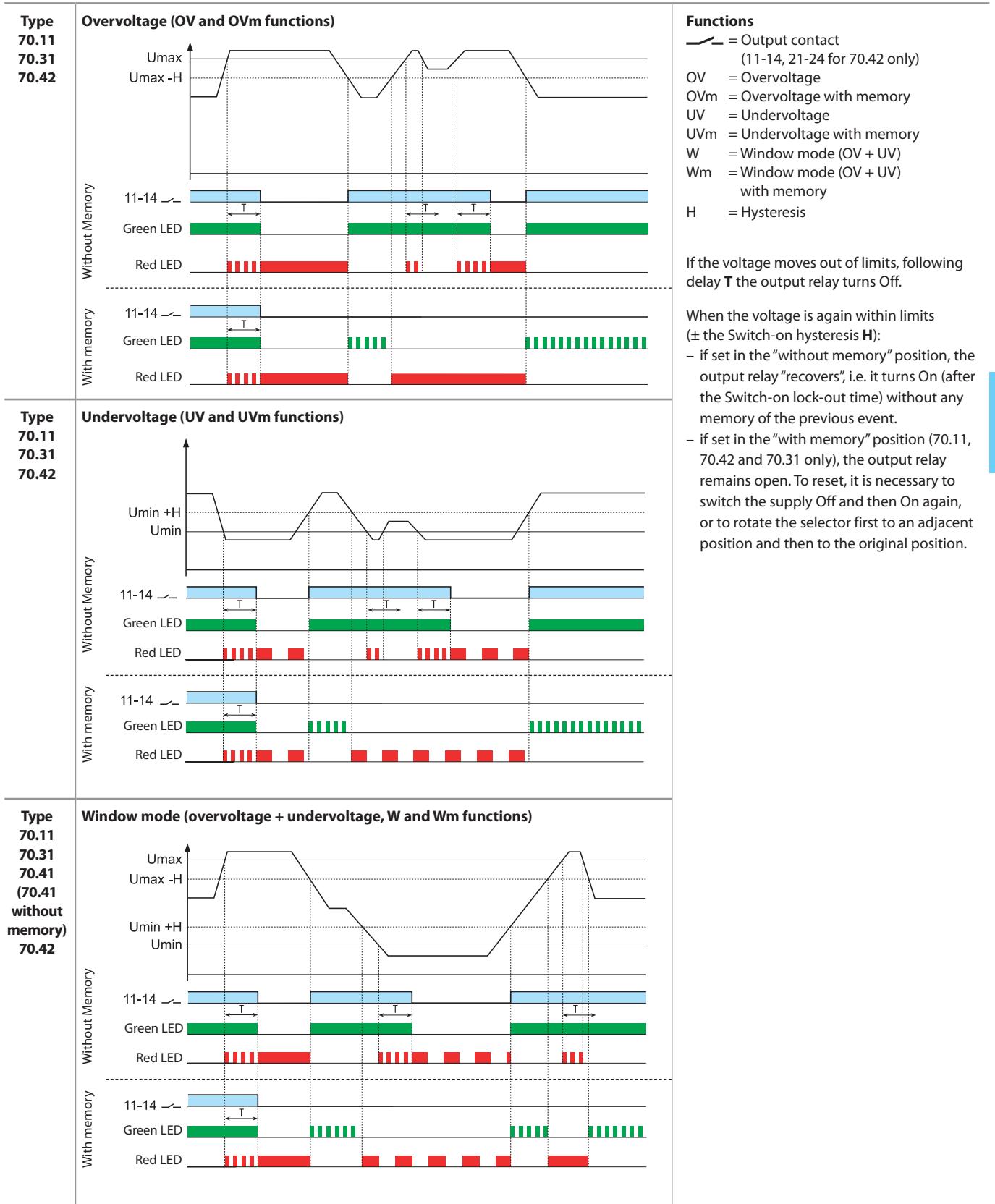
| | 70.11 | 70.31 | 70.41 | 70.42 | 70.61/62 |
|---|---------------------|-----------------|-----------------|-----------------|-----------------|
| Supply system type | Single phase system | 3-phase systems | 3-phase systems | 3-phase systems | 3-phase systems |
| Nominal voltage 50/60 Hz | V 220...240 | 380...415 | 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) | — | — | • | • (fixed) | — |

Technical data

| Insulation | | 70.11/31/41/42 | | 70.61/62 | |
|---|---------------------------|--------------------|----------|-----------------|-----|
| Between supply and contacts | dielectric strength | V AC | 2500 | 3000 | |
| | impulse (1.2/50 µs) | kV | 4 | 5 | |
| Between open contacts | dielectric strength | V AC | 1000 | 1000 | |
| | 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...1000 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...1000 MHz | CISPR 11 | | class B | |
| Terminals | | solid cable | | stranded cable | |
| Max. wire size | mm ² | 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 | 70.42/61/62 | |
| 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

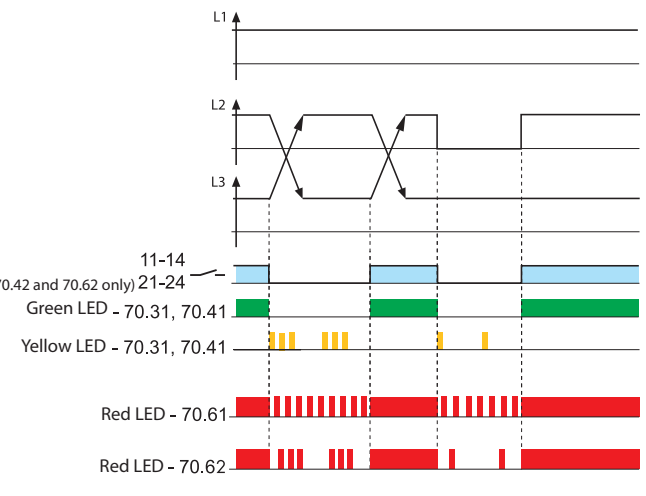
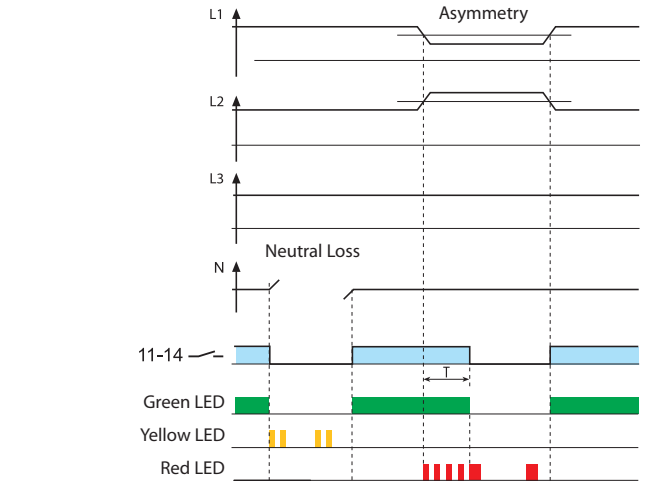
Output relay On (NO closed) when all OK: positive logic.



E

Functions

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

| | | |
|---|--|--|
| Type 70.31 70.41 70.42 70.61 70.62 | Phase loss and phase rotation  | <p>If the sequence (L1, L2, L3) is incorrect at power-on, the output relay will not turn-on.</p> <p>If a phase is lost, the output relay turns off immediately. When the phase is again active, the output relay turns on immediately.</p> <p>Phase loss monitoring possible even under regeneration up to 80% of the average of the other 2 phases.</p> |
| E Type 70.41 70.42 | Neutral loss and asymmetry  | <p>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.</p> <p>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.</p> |

Front view: function selector and regulators

| | | |
|--|--|--|
| <p>70.11</p> <p>Functions: OV, OVm, UV, UVm, W, Wm</p> <p>T_{off} delay: (0.5...60)sec</p> <p>U_{Max}: (220...270)V</p> <p>U_{Min}: (170...230)V</p> | <p>70.31</p> <p>Functions: OV, OVm, UV, UVm, W, Wm</p> <p>U_{Max}: (380...480)V</p> <p>U_{Min}: (300...400)V</p> <p>T_{off} delay: (0.5...60) sec</p> | <p>70.41</p> <p>N= With N-line monitoring N≠ Without N-line monitoring</p> <p>U_{Max}: (380...480)V</p> <p>(4...25)% U_N</p> <p>U_{Min}: (300...400)V</p> <p>T_{off} delay: (0.5...60)sec</p> |
| <p>70.42</p> <p>Functions: OV, OVm, UV, UVm, W, Wm</p> <p>U_{Max}: (380...480)V</p> <p>(5...25)% U_N</p> <p>U_{Min}: (300...400)V</p> <p>T_{off} delay: (0.5...60)sec</p> | | |

E

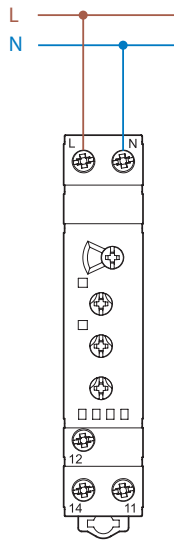
LED indication

| 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 |
| 70.42.8.400.2032 | • • • | | | Overvoltage OV and OVm Undervoltage UV and UVm Asymmetry Phase loss Neutral loss Phase rotation With Memory, following a failure a manual "RESET" ** is necessary |
| 70.61.8.400.0000 | • | | | Phase rotation or Phase loss |
| 70.62.8.400.0000 | • | | | Phase loss Phase rotation |

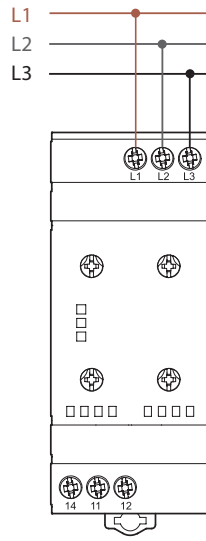
* The function "with Memory" is only available for type 70.11, 70.42 and 70.31.

** 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.

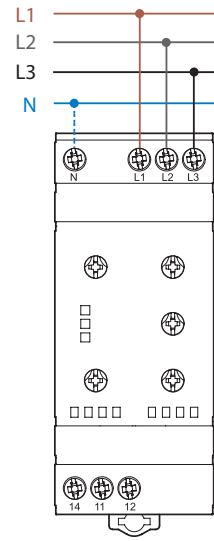
Wiring diagrams



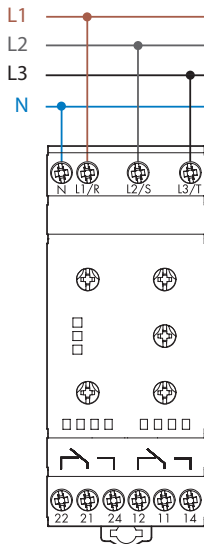
Type 70.11



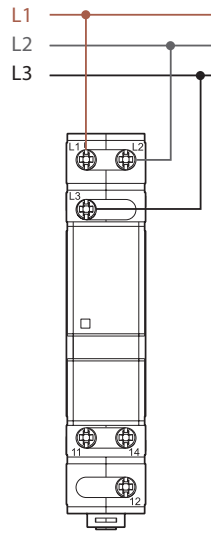
Type 70.31



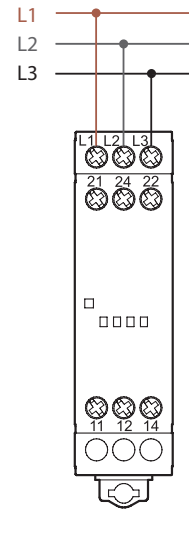
Type 70.41



Type 70.42



Type 70.61

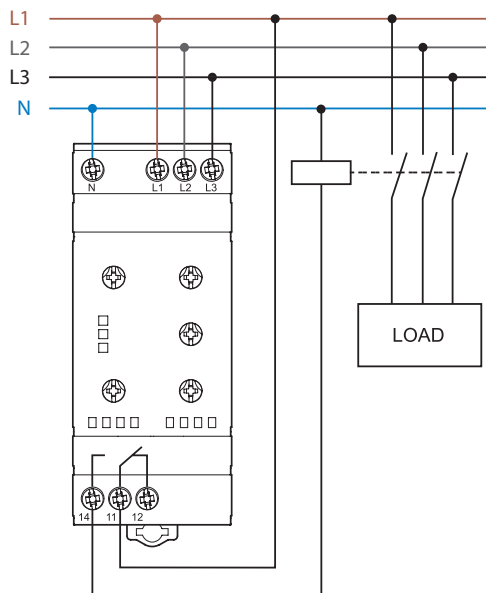


Type 70.62

E

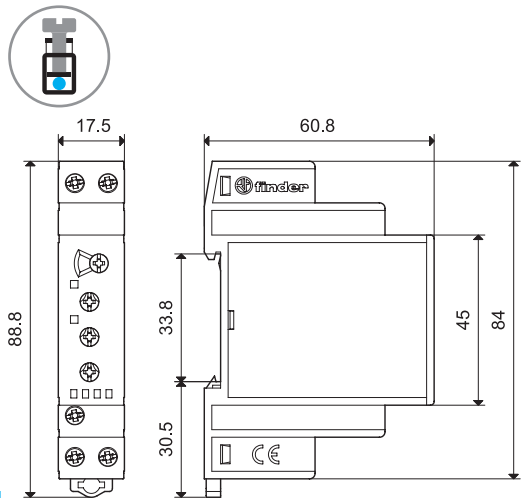
Application example

The output contact switches the coil of the line contactor.

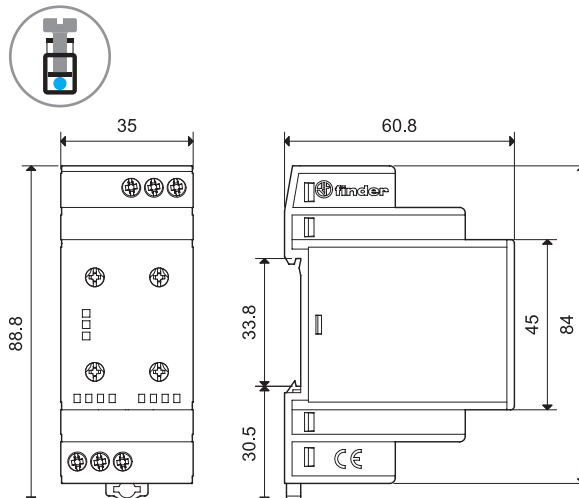


Outline drawings

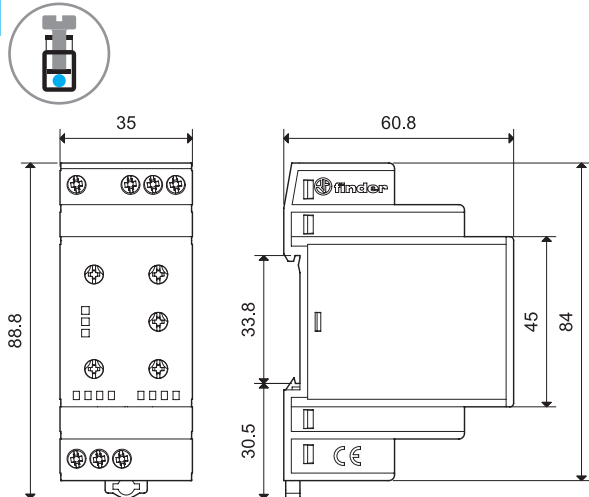
70.11
Screw terminal



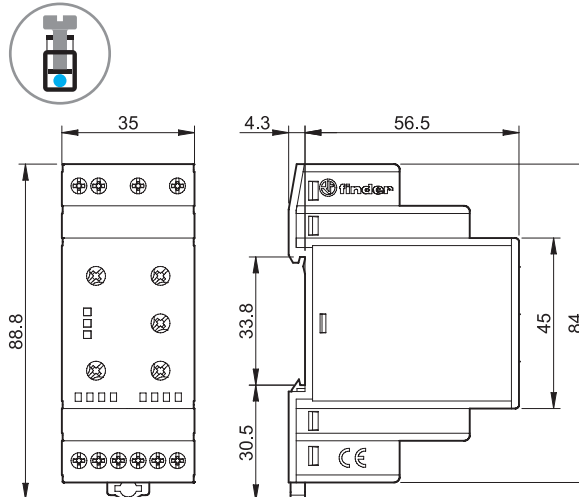
70.31
Screw terminal



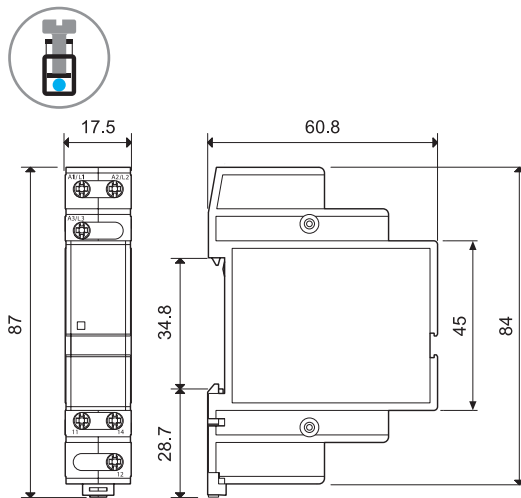
E 70.41
Screw terminal



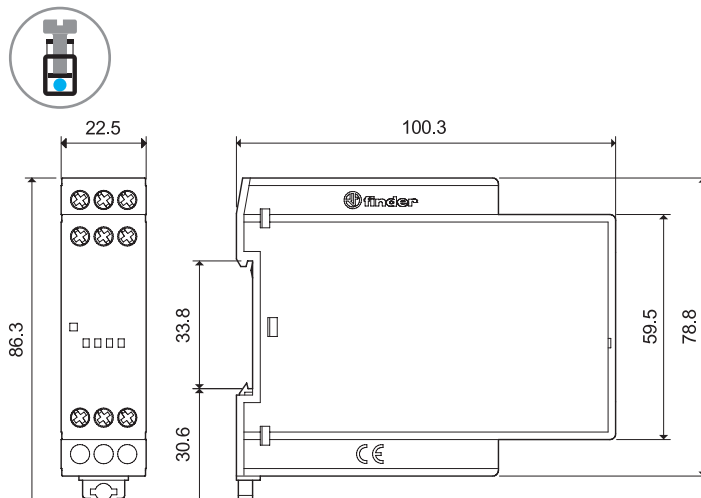
70.42
Screw terminal



70.61
Screw terminal



70.62
Screw terminal



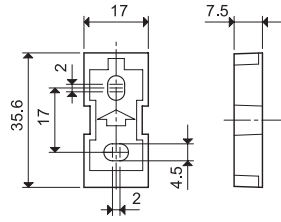
Accessories



020.01

Adaptor for panel mounting, plastic, 17.5 mm wide for 70.11 and 70.61

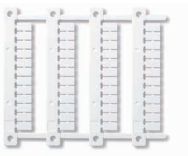
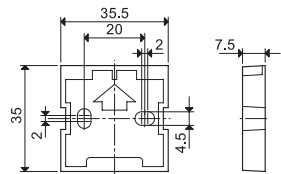
020.01



011.01

Adaptor for panel mounting, plastic, 35 mm wide for 70.31, 70.42 and 70.41

011.01



060.48

Sheet of marker tags (CEMBRE Thermal transfer printers) for relays types 70.11, 70.31, 70.41, 70.42 and 70.62 (48 tags), 6 x 12 mm

060.48



020.24

Sheet of marker tags, plastic, 24 tags, 9 x 17 mm for 70.61

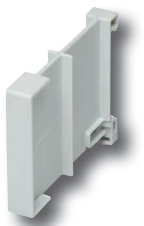
020.24



019.01

Identification tag, plastic, 1 tag, 17 x 25.5 mm for 70.11, 70.31, 70.42 and 70.41

019.01



022.09

Separator for rail mounting, plastic, 9 mm wide

022.09

