# Grænse-relæer VEO

## Indholdsfortegnelse

# VEO

MONITORING RELAY / 1-PHASE CURRENT

## V2IM10AL10

Art.Nr.: 2100400

## V2IM10AL10P

Art.Nr.: 2100410

- AC/DC current monitoring
- Multifunction
- Supply voltage 24-240V DC or 110-240V AC
- 1 change-over contact
- Width 22,5 mm

**Control element**

- Tripping delay
- Maximum threshold
- Minimum threshold
- Function selector

**Status indication**

- LED U: Supply voltage
- LED Max: Overcurrent
- LED Min: Undercurrent
- LED R: Relay status


# TECHNICAL DATA

| SUPPLY CIRCUIT | | |
|---|---|---|
| Terminals | | Li-N |
| Supply voltage | AC | 110 ... 240 V |
| | DC | 24 ... 240 V |
| Supply voltage tolerance | AC | -15 / +15 % |
| | DC | -30 / +30 % |
| Rated frequency | | 16,6 ... 400 Hz or DC |
| Rated frequency tolerance | | 16,0 ... 420 Hz |
| Rated consumption | 230 V AC | 0,37 W / 1,3 VA |
| | 24 V DC | 0,25 W / 0,25 VA |
| Duty-cycle | | 100 % |
| Backup power time | | < 140 ms |
| Recovery time | | > 200 ms |
| Drop-out voltage | | ≥ 6 V |

| MEASURING CIRCUIT | | |
|---|---|---|
| Terminals | | Li-Lk |
| Measurand | | current 1-phase |
| Measuring method | | True RMS |
| Monitoring function | | underurrent (U), overcurrent (O), window (W) |
| Measuring range | | 10 A AC/DC |

# VEO

MONITORING RELAY / 1-PHASE CURRENT

## V2IM10AL10

Art.Nr.: 2100400

## V2IM10AL10P

Art.Nr.: 2100410

| MEASURING CIRCUIT | | |
|---|---|---|
| Frequency | | 16 ... 400 Hz or DC |
| Input resistance | | 2 mΩ |
| Overload capacity | permanent load | 15 A |
| | pulse load < 1 s | 50 A |
| | pulse load < 100 ms | 150 A |
| Thresholds | Max | 10 ... 100 % |
| | Min | 5 ... 95 % |
| Hysteresis | | 1 % |

| TIMING CIRCUIT | | |
|---|---|---|
| Start-up delay | fixed | approx. 300 ms |
| Tripping delay | adjustable | 0,1 ... 10 s |
| Start-up suppression | | - |

| RANGE OF FUNCTIONS | | |
|---|---|---|
| Functions | 6 | O, U, W, O+L, U+L, W+L |

| STATUS INDICATION | | |
|---|---|---|
| Supply voltage | LED U (green) on | supply voltage applied |
| Relay status | LED R (yellow) on | output relay energized |
| Current monitor | LED Max (red) on | indication of overcurrent |
| | LED Max (red) flashes | indication of tripping delay for overcurrent |
| | LED Min (red) on | indication of undercurrent |
| | LED Min (red) flashes | indication of tripping delay for undercurrent |

| OUTPUT CIRCUIT | | |
|---|---|---|
| Terminals | | 15-16-18 |
| Kind of output | | Relay |
| Number of contacts | change-over contact | 1 |
| Contact material | | AgNi |
| Rated voltage (IEC 60947-1) | | 250 V |
| Maximum switching voltage | | 400 V AC |
| Minimum switching voltage / switching current | | 12 V / 10 mA |

# VEO

MONITORING RELAY / 1-PHASE CURRENT

## V2IM10AL10

Art.Nr.: 2100400

## V2IM10AL10P

Art.Nr.: 2100410

### OUTPUT CIRCUIT

| | | |
|---|---|---|
| Rated current (IEC 60947-5-1) | AC-1 | 8 A / 250 V |
| | AC-15 | 1,5 A / 240 V (B300) |
| | DC-12 | 8 A / 24 V |
| | DC-13 | 0,1 A / 250 V |
| Endurance | mechanical | 30 x $10^6$ switching cycles |
| | electrical (AC-1) | 100 x $10^3$ switching cycles |
| Rated frequency of operation | with load | 6/min |
| | without load | 1200/min |
| Fuse rating | | 8 A fast acting |

### ACCURACY

| | | |
|---|---|---|
| Base accuracy | | < 2,5 % |
| Setting accuracy | | < 5 % (of full scale) |
| Repeat accuracy | | < 1 % |
| Temperature influence | | < 0,05 % / °C |
| Voltage influence | | - |
| Frequency influence | | - |

### ENVIRONMENTAL CONDITIONS

| | | |
|---|---|---|
| Ambient temperature | operation | -25 ... +60°C |
| | storage | -40 ... +70°C |
| Relative humidity | | 5 ... 95 % |
| Vibration | EN 60947-1 | 2 ... 13,2 Hz: 1 mm; 13,2 ... 100 Hz: 7 $m/s^2$ |
| Shock | EN 60947-1 | 150 $m/s^2$ 11 ms |

### GENERAL DATA

| | | |
|---|---|---|
| Dimensions | W × H × D | 22,5 x 67 x 76 mm |
| Mounting | | DIN rail (EN60715) |
| Mounting positions | | any |
| Housing material | | PA 66, self-extinguishing plastic, class V-0 |
| Degree of protection | housing | IP40 |
| | terminals | IP20 |
| Electrical connection | V2IM...10 | Screw terminal |
| Wire size | flexible with wire end ferrule | 0,5 ... 2,5 $mm^2$ (20 AWG ... 13 AWG) |
| | flexible without wire end ferrule | 0,5 ... 4 $mm^2$ (20 AWG ... 12 AWG) |
| | rigid | 0,5 ... 4 $mm^2$ (20 AWG ... 12 AWG) |
| Stripping length | | 8 mm |

# V2IM10AL10
Art.Nr.: 2100400

# V2IM10AL10P
Art.Nr.: 2100410

| GENERAL DATA | | |
|---|---|---|
| Tightening torque | | max. 1Nm |
| Electrical connection | V2IM...10P | Push-in terminal |
| Wire size | flexible with wire end ferrule | 0,25 ... 1,5 mm² (24 AWG ... 16 AWG) |
| | flexible with plastic ferrule | 0,25 ... 0,75 mm² (24 AWG ... 19 AWG) |
| | flexible without wire end ferrule | 0,2 ... 1,5 mm² (24 AWG ... 16 AWG) |
| | rigid | 0,2 ... 1,5 mm² (24 AWG ... 16 AWG) |
| Stripping length | | 8 mm |
| MTTF | | - |
| Weight | | 70 g |

| ISOLATION DATA | | |
|---|---|---|
| Pollution degree (IEC 60947-5-1) | | 2 |
| Overvoltage category (IEC 60947-5-1) | | III |
| Rated insulation voltage (IEC 60947-1) | supply circuit / output circuit | 300 V |
| | measuring circuit / output circuit | 300 V |
| Rated impulse withstanding voltage (IEC 60947-1) | supply circuit / output circuit | 6 kV |
| | measuring circuit / output circuit | 6 kV |
| Insulation test voltage (IEC 60947-1) | supply circuit / output circuit | 3780 V |
| | measuring circuit / output circuit | 3780 V |
| Degree of protection | supply circuit / output circuit | protective seperation |
| | measuring circuit / output circuit | protective seperation |

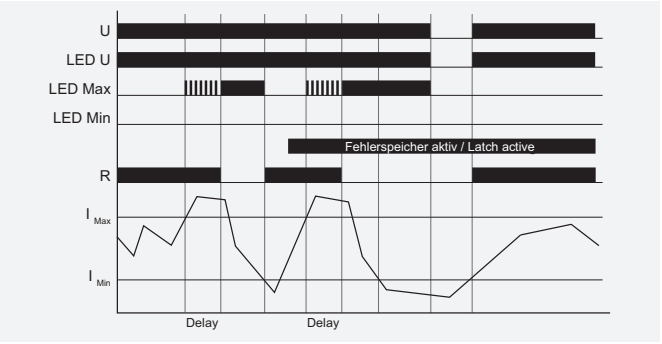
| STANDARDS | |
|---|---|
| Product standard | IEC 60947-5-1 |
| Interference immunity | IEC 61000-6-2 |
| Interference emmision | IEC 61000-6-4 |
| Approvals | |

**V2IM10AL10**
Art.Nr.: 2100400

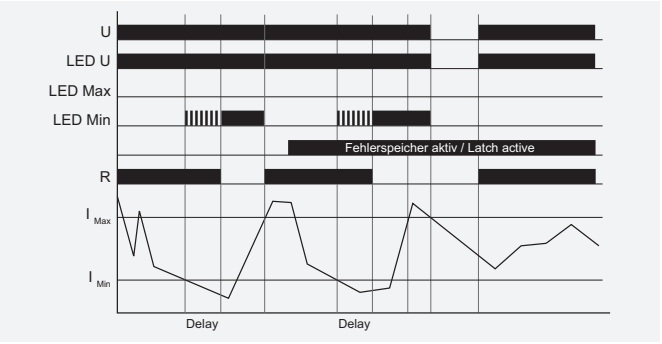
**V2IM10AL10P**
Art.Nr.: 2100410

# FUNCTIONS

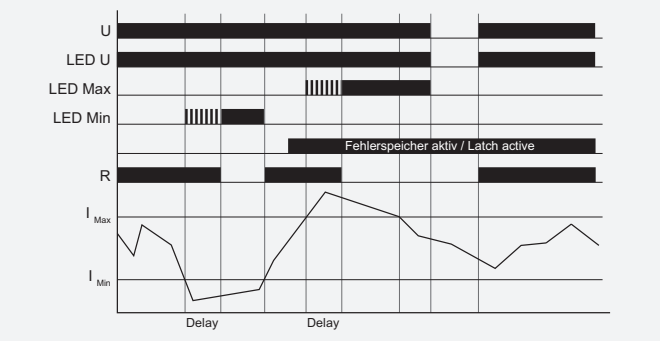
**Overcurrent monitoring (O)**
When the supply voltage U is applied, the output relay R switches into on-position if the measured current is below the adjusted threshold $I_{Max}$. When the measured current exceeds the adjusted threshold $I_{Max}$, the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relay R switches into off-position. The output relay R switches into on-position again, as soon as the measured current falls below the adjusted threshold $I_{Min}$.




**Undercurrent monitoring (U)**
When the supply voltage U is applied, the output relay R switches into on-position if the measured current is beyond the adjusted threshold $I_{Max}$. When the measured current falls below the adjusted threshold $I_{Min}$, the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relay R switches into off-position. The output relay R switches into on-position again, as soon as the measured current exceeds the adjusted threshold $I_{Max}$.




**Window function (W)**
When the supply voltage U is applied, the output relay R switches into on-position if the measured current is within the adjusted thresholds $I_{Min}$ and $I_{Max}$. When the measured current falls below the adjusted threshold $I_{Min}$, the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relay R switches into off-position. The output relay R switches into on-position again, as soon as the measured current exceeds the adjusted threshold $I_{Min}$. When the measured current exceeds the adjusted threshold $I_{Max}$, the set interval of the tripping delay (DELAY) begins again. After the interval has expired, the output relay R switches into off-position. The output relay R switches into on-position again, as soon as the measured current falls below the adjusted threshold $I_{Max}$.

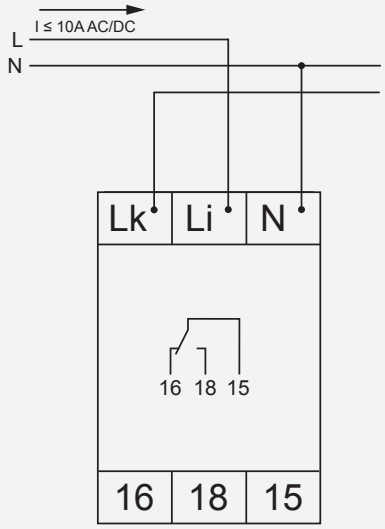



**Fault latch**
If the fault latch is activated and a failure has occurred, this failure is stored. The failure can only be reset by interrupting the supply voltage.

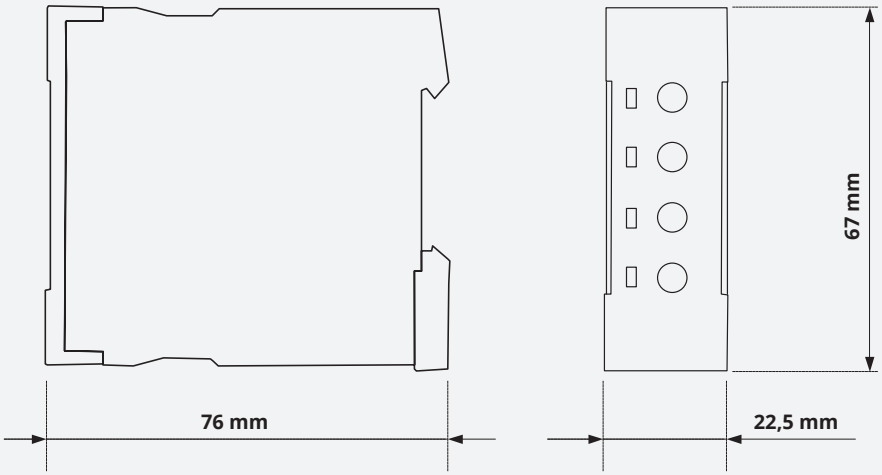
**V2IM10AL10**
Art.Nr.: 2100400

**V2IM10AL10P**
Art.Nr.: 2100410

## CONNECTIONS




## DIMENSIONS



# VEO

MONITORING RELAY / 1-PHASE CURRENT

## V4IM100AL20

Art.Nr.: 2104400

## V4IM100AL20P

Art.Nr.: 2104410

- AC/DC current monitoring
- Multifunction
- Supply voltage 24-240 V AC/DC
- Built-in current transformer
- 2 change-over contacts
- Width 45 mm

**Control elements**

- Start-up suppression
- Maximum threshold
- Minimum threshold
- Function selector
- Tripping delay

**Status indication**

- LED U/t: Supply voltage
- LED Max: Overcurrent
- LED Min: Undercurrent
- LED Rel1: Relay status Rel1
- LED Rel2: Relay status Rel2


# TECHNICAL DATA

| SUPPLY CIRCUIT | | |
|---|---|---|
| Terminals | | A1-A2 |
| Supply voltage | | 24 ... 240 V AC/DC |
| Supply voltage tolerance | AC | -15 / +10 % |
| | DC | -30 / +30 % |
| Rated frequency | | 16,6 ... 400 Hz or DC |
| Rated frequency tolerance | | 16,0 ... 420 Hz |
| Rated consumption | 230 V AC | typ. 0,5 W / 0,9 VA |
| | 24 V DC | typ. 0,4 W / 0,45 VA |
| Duty-cycle | | 100 % |
| Backup power time | | < 20 ms |
| Recovery time | | > 500 ms |
| Drop-out voltage | | ≥ 6 V |

| MEASURING CIRCUIT | | |
|---|---|---|
| Terminals | | Built-in current transformer |
| Measurand | | current 1-phase |
| Measuring method | | True RMS |
| Monitoring functions | | undercurrent (U), overcurrent (O), window (W), under- and over-current with seperate relay outputs (MM); fault latch selectable (+L) |
| Measuring range | | 100 A AC/DC |
| Frequency | sinus | 16,6 ... 400 Hz |
| | non-sinusoidal values | 50 / 60 Hz (arbitrary waveform) |

# V4IM100AL20
Art.Nr.: 2104400

# V4IM100AL20P
Art.Nr.: 2104410

| MEASURING CIRCUIT | | |
|---|---|---|
| Thresholds | Max | 10 ... 100 % |
| | Min | 5 ... 95 % |
| Hysteresis | | 1 % |

| TIMING CIRCUIT | | |
|---|---|---|
| Start-up delay | fixed | ca. 200 ms |
| Tripping delay | adjustable | 0,1 ... 10 s |
| Start-up suppression | adjustable | 0 ... 10 s |

| RANGE OF FUNCTIONS | | |
|---|---|---|
| Functions | 8 | O, U, W, MM, O+L, U+L, W+L, MM+L |

| STATUS INDICATION | | |
|---|---|---|
| Supply voltage | LED U/t (green) on | supply voltage applied |
| Relay status | LED Rel1 (yellow) on | output relay 1 energized |
| | LED Rel2 (yellow) on | output relay 2 energized |
| Current monitor | LED Max (red) on | indication of overcurrent |
| | LED Max (red) flashes | indication of tripping delay for overcurrent |
| | LED Min (red) on | indication of undercurrent |
| | LED Min (red) flashes | indication of tripping delay for undercurrent |

| OUTPUT CIRCUIT | | |
|---|---|---|
| Terminals | | 15-16-18; 25-26-28 |
| Kind of output | | Relay |
| Number of contacts | change-over contact | 2 |
| Kontakt material | | AgNi |
| Rated voltage (IEC 60947-1) | | 250 V |
| Maximum switching voltage | | 400 V AC |
| Minimum switching voltage / switching current | | 12 V / 10 mA |
| Rated current (IEC 60947-5-1) | AC-1 | 8 A / 250 V |
| | AC-15 | 1,5 A / 240 V (B300) |
| | DC-12 | 8 A / 24 V |

# V4IM100AL20
Art.Nr.: 2104400

# V4IM100AL20P
Art.Nr.: 2104410

| OUTPUT CIRCUIT | | |
|---|---|---|
| Endurance | mechanical | 30 x $10^6$ switching cycles |
| | electrical (AC-1) | 100 x $10^3$ switching cycles |
| Rated frequency of operation | with load | 6/min |
| | without load | 1200/min |
| Fuse rating | | 8 A fast acting |

| ACCURACY | | |
|---|---|---|
| Base accuracy | DC, AC Sinus 50/60 Hz | < 2 % |
| | AC Sinus 16,6 ... 400 Hz | < 2,5 % |
| | CF < 2,8 @ 50 Hz I peak max = 175A | < 5 % |
| Setting accuracy | | < 5 % (of full scale) |
| Repeat accuracy | | < 1 % |
| Temperature influence | | < 0,04 % / °C |
| Voltage influence | | - |
| Frequency influence | | - |
| Damp influence | > 85 % rel. humidity | +3 % of base accuracy |

| ENVIRONMENTAL CONDITIONS | | |
|---|---|---|
| Ambient temperature | operation | -25 ... +60°C |
| | storage | -40 ... +70°C |
| Relative humidity | | 5 ... 95 % |
| Vibration | EN 60947-1 | 2 ... 13,2 Hz: 1 mm; 13,2 ... 100 Hz: 7 $m/s^2$ |
| Shock | EN 60947-1 | 150 $m/s^2$ 11 ms |

| GENERAL DATA | | |
|---|---|---|
| Dimensions | W × H × D | 45 x 67 x 76 mm |
| | Ø Built-in current transformer | 14,5 mm |
| Mounting | | DIN rail (EN60715) |
| Mounting position | | any |
| Housing material | | PA 66, self-extinguishing plastic, class V-0 |
| Degree of protection | housing | IP40 |
| | terminals | IP20 |
| Electrical connection | V4IM...20 | Screw terminal |
| Wire size | flexible with wire end ferrule | 0,5 ... 2,5 $mm^2$ (20 AWG ... 13 AWG) |
| | flexible without wire end ferrule | 0,5 ... 4 $mm^2$ (20 AWG ... 12 AWG) |
| | rigid | 0,5 ... 4 $mm^2$ (20 AWG ... 12 AWG) |

# V4IM100AL20
Art.Nr.: 2104400

# V4IM100AL20P
Art.Nr.: 2104410

## GENERAL DATA

| | | |
|---|---|---|
| Stripping length | | 8 mm |
| Tightening torque | | max. 1Nm |
| Electrical connection | V4IM...20P | Push-in terminal |
| Wire size | flexible with wire end ferrule | 0,25 ... 1,5 mm² (24 AWG ... 16 AWG) |
| | flexible with plastic ferrule | 0,25 ... 0,75 mm² (24 AWG ... 19 AWG) |
| | flexible without wire end ferrule | 0,2 ... 1,5 mm² (24 AWG ... 16 AWG) |
| | rigid | 0,2 ... 1,5 mm² (24 AWG ... 16 AWG) |
| Stripping length | | 8 mm |
| MTTF | | - |
| Weight | | 160 g |

## ISOLATION DATA

| | | |
|---|---|---|
| Pollution degree (IEC 60947-5-1) | | 2 |
| Overvoltage category (IEC 60947-5-1) | | III |
| Rated insulation voltage (IEC 60947-1) | supply circuit / output circuit | 300 V |
| | measuring circuit / output circuit | 550 V |
| | supply circuit / measuring circuit | 550 V |
| Rated impulse withstanding voltage (IEC 60947-1) | supply circuit / output circuit | 6 kV |
| | measuring circuit / output circuit | 6 kV |
| | supply circuit / measuring circuit | 6 kV |
| Insulation test voltage (IEC 60947-1) | supply circuit / output circuit | 3780 V |
| | measuring circuit / output circuit | 3780 V |
| | supply circuit / measuring circuit | 3780 V |
| Degree of protection | supply circuit / output circuit | protective separation |
| | measuring circuit / output circuit | protective separation |
| | supply circuit / measuring circuit | protective separation |

## STANDARDS

| | |
|---|---|
| Product standard | IEC 60947-5-1 |
| Interference immunity | IEC 61000-6-2 |
| Interference emission | IEC 61000-6-4 |
| Approvals | |

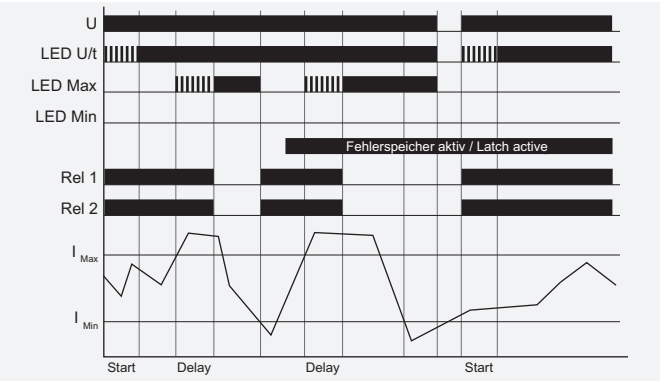
**V4IM100AL20**
Art.Nr.: 2104400

**V4IM100AL20P**
Art.Nr.: 2104410

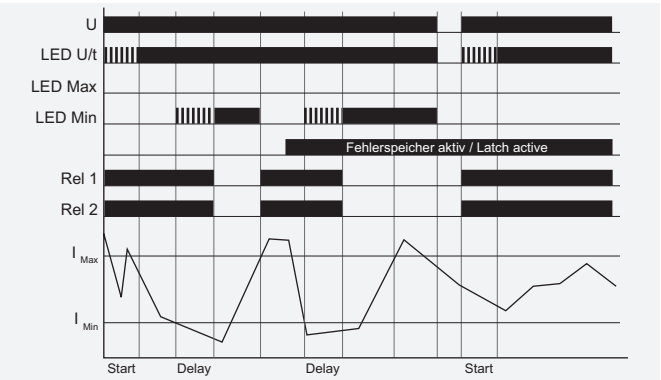
# FUNCTIONS

When the supply voltage U is applied, the output relays Rel1 and Rel2 switch into on-position and the set interval of the start-up suppression (START) begins. Changes of the measured current during this period do not affect the state of the output relays Rel1 and Rel2.

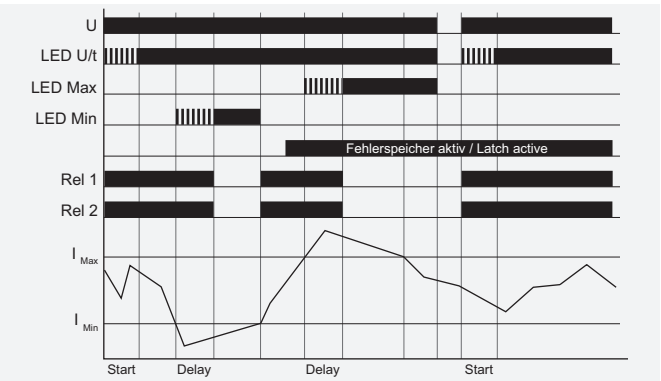
**Overcurrent monitoring (O)**
The adjusted maximum threshold $I_{Max}$ must be greater than the adjusted minimum threshold $I_{Min}$ . When the measured current exceeds the adjusted threshold $I_{Max}$ , the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relays Rel1 and Rel2 switch into off-position. The output relays Rel1 and Rel2 switch into on-position again, when the measured current falls below the adjusted threshold $I_{Min}$ .




**Undercurrent monitoring (U)**
The adjusted maximum threshold $I_{Max}$ must be greater than the adjusted minimum threshold $I_{Min}$ . When the measured current falls below the adjusted threshold $I_{Min}$ , the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relays Rel1 and Rel2 switch into off-position. The output relays Rel1 and Rel2 switch into on-position again after the measured current exceeds the adjusted threshold $I_{Max}$ .




**Windowfunktion (W)**
The adjusted maximum threshold $I_{Max}$ must be greater than the adjusted minimum threshold $I_{Min}$ . When the measured current falls below the adjusted threshold $I_{Min}$ , the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relays Rel1 and Rel2 switch into off-position. The output relays Rel1 and Rel2 switch into on-position again, as soon as the measured current exceeds the adjusted threshold $I_{Min}$ . When the measured current exceeds the adjusted threshold $I_{Max}$ , the set interval of the tripping delay (DELAY) begins again. After the interval has expired, the output relays Rel1 and Rel2 switch into off-position. The output relays Rel1 and Rel2 switch into on-position again, as soon as the measured current falls below the adjusted threshold $I_{Max}$ .

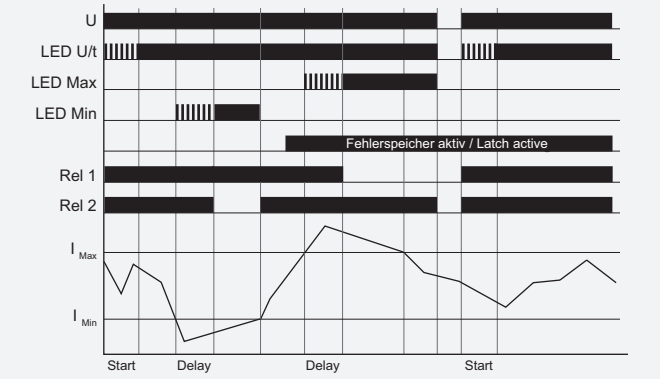


# V4IM100AL20
Art.Nr.: 2104400

# V4IM100AL20P
Art.Nr.: 2104410

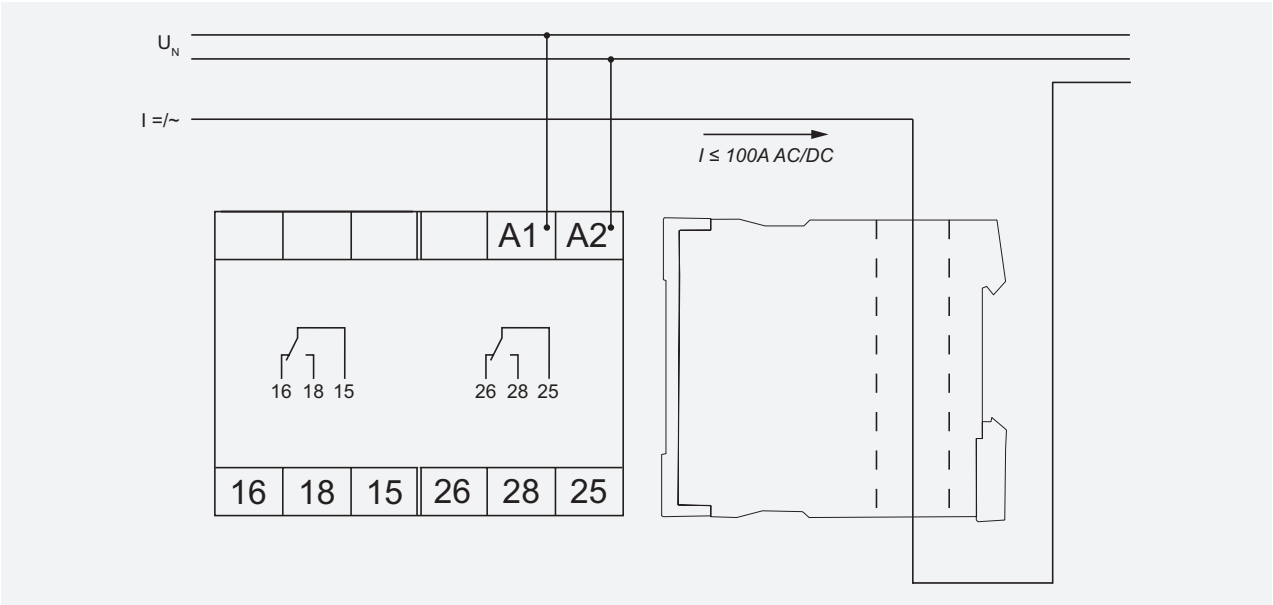
## FUNCTIONS

**Maximum and minimum monitoring (MM)**
The adjusted maximum threshold $I_{Max}$ must be greater than the adjusted minimum threshold $I_{Min}$ . When the measured current exceeds the adjusted threshold $I_{Max}$ , the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relay Rel1 switches into off-position. The output relay Rel1 switches into on-position again, as soon as the measured current falls below the adjusted threshold $I_{Max}$ . When the measured current falls below the adjusted threshold $I_{Min}$ , the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relay Rel2 switches into off-position. The output relay Rel2 switches into on-position again, as soon as the measured current exceeds the adjusted threshold $I_{Min}$ .




**Fault latch**
If the fault latch is activated and a failure has occurred, this failure is stored. The failure can only be reset by interrupting the supply voltage. After resetting the failure and re-applying the supply voltage, the output relays Rel1 and Rel2 switch into on-position and the measuring cycle begins with the set interval of the start-up suppression (START).

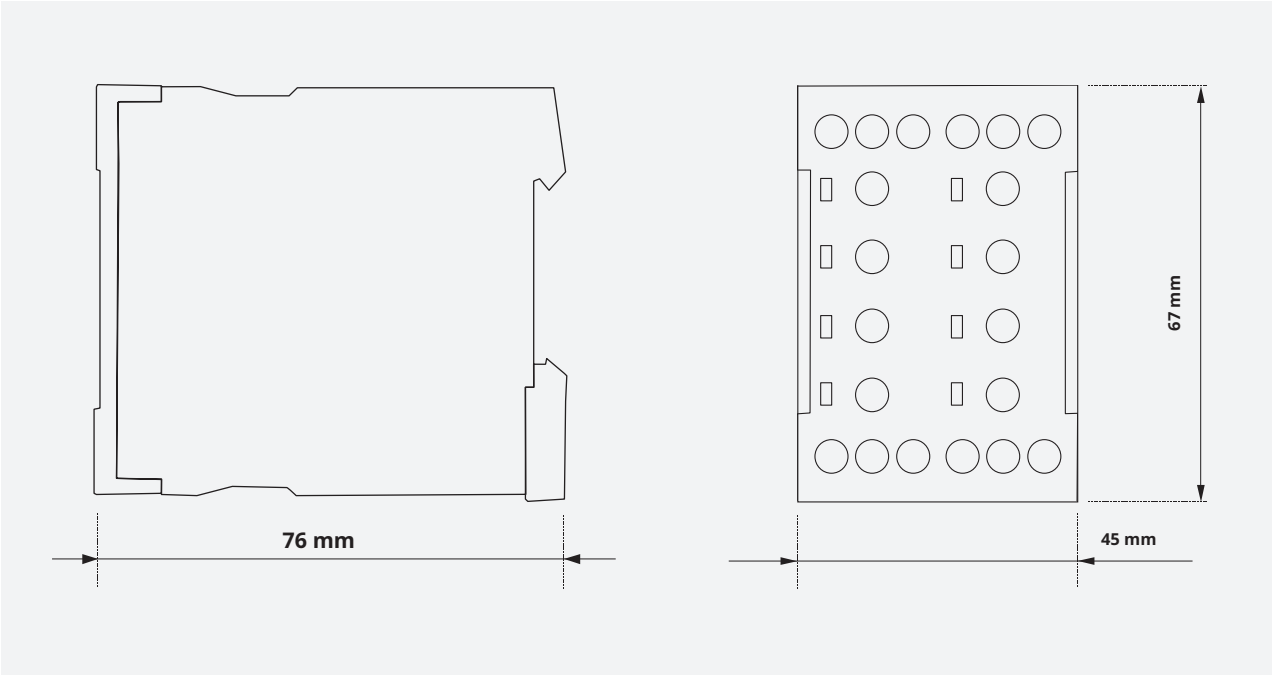
## CONNECTIONS



**V4IM100AL20**
Art.Nr.: 2104400

**V4IM100AL20P**
Art.Nr.: 2104410

## DIMENSIONS




## CONTACT

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VEO

ACTIVE CURRENT TRANSDUCER / 1-PHASE CURRENT

# V4IA100A 24-240V AC/DC

Art.Nr.: 2104420

- AC/DC active current measuring
- Multifunction transducer
- Measuring range 0 ... 100 A AC/DC
- Supply voltage: 24 ... 240 V DC
  48 ... 240 V AC
- Built-in current transformer (15 mm)
- Analog output
  (4-20 mA, 0-20 mA, 0-10 V)
- Ratiometric analog output selectable:
  (10 mA ±10 mA, 12 mA ±8 mA, 5 V ±5 V)
  Measuring range 0 ... 100 A DC
- Width 45 mm

**Control elements**

- Function selector
- Zero point
- Fine setting of zero point
- Span

**Status indication**

- LED U: Supply voltage
- LED Err: Output overdriving
- LED $C_{Out}$: Analog output
  4(0) - 20 mA active;
  10 mA ±10 mA; 12 mA ±8 mA active
- LED $V_{Out}$: Analog output
  0 - 10 V active;
  5 V ±5 V active

## TECHNICAL DATA

| SUPPLY CIRCUIT | | |
|---|---|---|
| Terminals | | A1-A2 |
| Supply voltage | AC | 48 ... 240 V |
| | DC | 24 ... 240 V |
| Supply voltage tolerance | AC | -10 / +10 % |
| | DC | -15 / +20 % |
| Rated frequency | | 16,6 ... 400 Hz or DC |
| Rated frequency including tolerance | | 16,0 ... 420 Hz |
| Rated consumption | 230 V AC @ 50 Hz | typ. 0,65 W / 1,2 VA |
| | 24 V DC | typ. 0,55 W |
| Duty-cycle | | 100 % |
| Backup power time | | < 6 ms |
| Recovery time | | ≥ 400 ms @ 24 V DC |

| MEASURING CIRCUIT | | |
|---|---|---|
| Terminals | | Built-in current transformer |
| Measurand | | current 1-phase |
| Measuring method | | True RMS |
| Measuring range | | 100 A AC/DC |
| Frequency | sinus | 16,6 ... 400 Hz |
| | non-sinusoidal signals | 50 / 60 Hz (arbitrary waveform) |

# V4IA100A 24-240V AC/DC

Art.Nr.: 2104420

## RANGE OF FUNCTIONS

| | | |
|---|---|---|
| Functions | Zero | Zero point adjustable<br>0 %, 25 %, 50 %, 75 % of nominal value |
| | Zero Fine | Fine setting of zero point<br>0 ... 25 % of nominal value |
| | Span | Measuring Span<br>25 %, 50 %, 75 %, 100 % of nominal value |
| | Analog output | 0 ... 20 mA, 4 ... 20 mA, 0 ... 10 V<br>10 mA ±10 mA*, 12 mA ±8 mA*, 5 V ±5 V* |

* Potentiometers „Zero“ and „Zero Fine“ have no function when ratiometric analog output is selected.
For ratiometric outputs, only the measured DC current is generated as an analog signal

## STATUS INDICATION

| | | |
|---|---|---|
| Supply voltage | LED U (green) on | supply voltage applied |
| Analog output | LED $C_{Out}$ (yellow) on | Analog output 4 (0) ... 20 mA, 10 mA ±10 mA, 12 mA ±8 mA active |
| | LED $V_{Out}$ (yellow) on | Analog output 0 ... 10 V, 5 V ±5 V active |
| Current monitor | LED Err (red) on | Error (output overdriving) |

## OUTPUT CIRCUIT CURRENT

| | | |
|---|---|---|
| Terminals | | CO+; CO- |
| Kind of output | Analog output | 4 ... 20 mA |
| | | 0 ... 20 mA |
| | | 10 mA ±10 mA |
| | | 12 mA ±8 mA |
| Step response 0 → 100A | 90% of final value | typ. 130 ms |
| Settling time | 99% of final value | < 200 ms |
| Load *1 | | 0 ... 300 Ω *2 |
| Galvanic isolation | | Between supply-, output- and measuring circuit |
| Output overridable | | typ. up to 20,4 mA |

## OUTPUT CIRCUIT VOLTAGE

| | | |
|---|---|---|
| Terminals | | VO+; VO- |
| Kind of output | Analog output | 0 ... 10 V |
| | | 5 V ±5 V |
| Step response 0 → 100A | 90% of final value | typ. 130 ms |
| Settling time | 99% of final value | < 200 ms |
| Load *1 | | min. 1,5 kΩ *2 |
| Galvanic isolation | | Between supply-, output- and measuring circuit |
| Output overridable | | typ. up to 10,5 V |

*1 Either the voltage or the current output may be used!
*2 Only resistive loads allowed

# V4IA100A 24-240V AC/DC

Art.Nr.: 2104420

## ACCURACY (@AMBIENT TEMPERATURE +25 °C, SPAN = 100 %

| | | |
|---|---|---|
| Base accuracy | DC, AC Sinus 50/60 Hz | < 2 % typ. 0,5 % |
| | AC Sinus 16,6 ... 400 Hz | < 2,5 % typ. 0,5 % |
| | CF < 2,8 @ 50 Hz I peak max = 160A | < 4 % |
| Setting accuracy | | < 5 % (of full scale of „Zero Fine“ potentiometer) |
| Repeat accuracy | | < 1 % typ. 0,1 % |
| Temperature influence | | < 0,05 % per °C |
| Damp influence | > 85 % rel. humidity | +3 % of base accuracy |

## ENVIRONMENTAL CONDITIONS

| | | |
|---|---|---|
| Ambient temperature | operation | -25 ... +60°C |
| | storage | -40 ... +70°C |
| Relative humidity | | 5 ... 95 % (non - condensing) |
| Vibration | GL VI-7-2 category C | 2 ... 13,2 Hz: 1 mm; 13,2 ... 100 Hz: 7 $m/s^2$ |
| Shock | IEC 60068-2-27 | 150 $m/s^2$ 11 ms |
| Installation altitude | | up to 2000 m above sea level |

## GENERAL DATA

| | | |
|---|---|---|
| Dimensions | W × H × D | 45 x 67 x 76 mm |
| | Ø Built-in current transformer | 15 mm |
| Mounting | | DIN rail (EN60715) |
| Mounting position | | any |
| Housing material | | PA 66, self-extinguishing plastic, class V-0 |
| Degree of protection | housing | IP40 |
| | terminals | IP20 |
| Electrical connection | | Screw terminal |
| Wire size | flexible with wire end ferrule | 0,5 ... 2,5 $mm^2$ (20 AWG ... 13 AWG) |
| | flexible without wire end ferrule | 0,5 ... 4 $mm^2$ (20 AWG ... 12 AWG) |
| | rigid | 0,5 ... 4 $mm^2$ (20 AWG ... 12 AWG) |
| Stripping length | | 8 mm |
| Tightening torque | | max. 1Nm |
| Weight | | 147 g |

# V4IA100A 24-240V AC/DC

Art.Nr.: 2104420

## ISOLATION DATA

| | | |
|---|---|---|
| Pollution degree (IEC 61010-1) | | 2 |
| Overvoltage category (IEC 61010-1) | | II (III for measuring circuit with phase-to-neutral voltages ≤ 300 $V_{eff}$) |
| Rated insulation voltage (IEC 61010-1) | supply circuit / output circuit | 300 V |
| | measuring circuit / output circuit | 550 V |
| | supply circuit / measuring circuit | 550 V |
| Rated impulse withstanding voltage (IEC 61010-1) | supply circuit / output circuit | 4 kV |
| | measuring circuit / output circuit | 6,4 kV |
| | supply circuit / measuring circuit | 6,4 kV |
| Degree of protection | supply circuit / output circuit | protective separation |
| | measuring circuit / output circuit | protective separation |
| | supply circuit / measuring circuit | protective separation |

## STANDARDS

| | |
|---|---|
| Product standard | IEC 61010-1 / IEC 61326-1 |
| Interference immunity | IEC 61000-6-2 |
| Interference emission | IEC 61000-6-4 |
| Approvals | CE |

## IMPORTANT NOTES

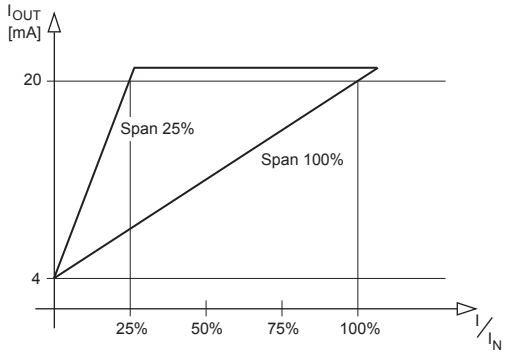
Unlabeled terminals may not be used!

# V4IA100A 24-240V AC/DC

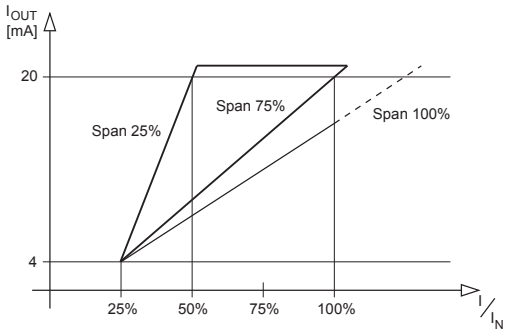
Art.Nr.: 2104420

## FUNCTIONS

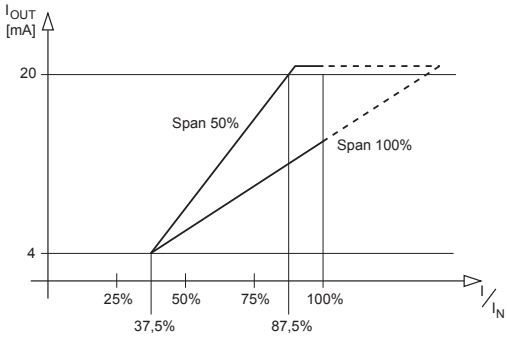
**Output: 4-20 mA**
**Zero = 0% / Span = 25% ; Zero = 0% / Span = 100%**



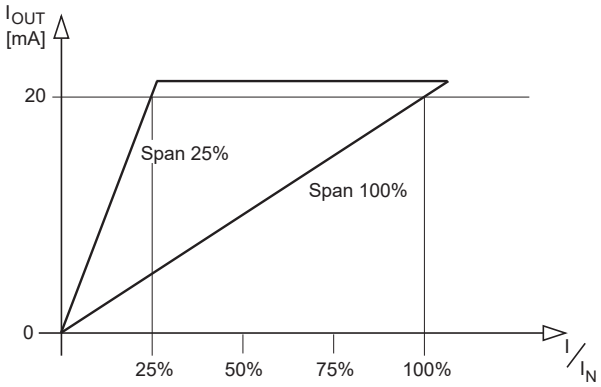

**Output: 4-20 mA**
**Zero = 25% / Span = 25% ; Zero = 25% / Span = 75%**



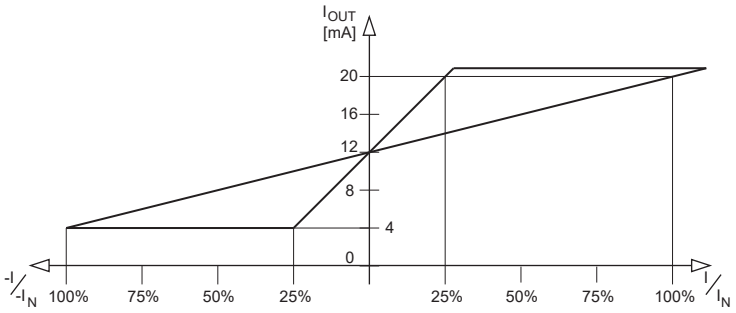

**Output: 4-20 mA**
**Zero = 37,5% / Span = 50% ; Zero = 37,5% / Span = 100%**



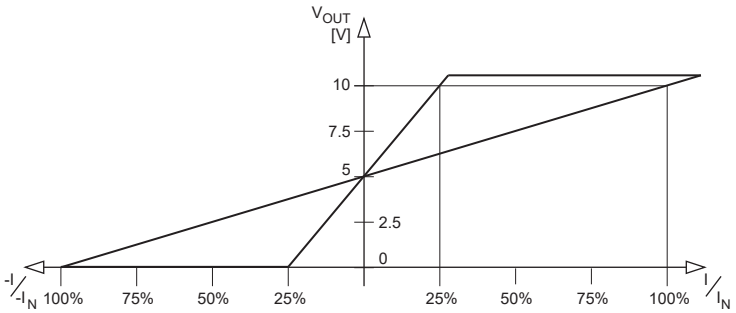

**Output: 0-20 mA**
**Zero = 0% / Span = 25% ; Zero = 0% / Span = 100%**




**Output: 12 mA ±8 mA**
**Zero = 0%* / Span = 25% ; Zero = 0%* / Span = 100%**
***Potentiometers „Zero“ and „Zero Fine“ have no function**




**Output: 5 V ±5 V**
**Zero = 0%* / Span = 25% ; Zero = 0%* / Span = 100%**
***Potentiometers „Zero“ and „Zero Fine“ have no function**

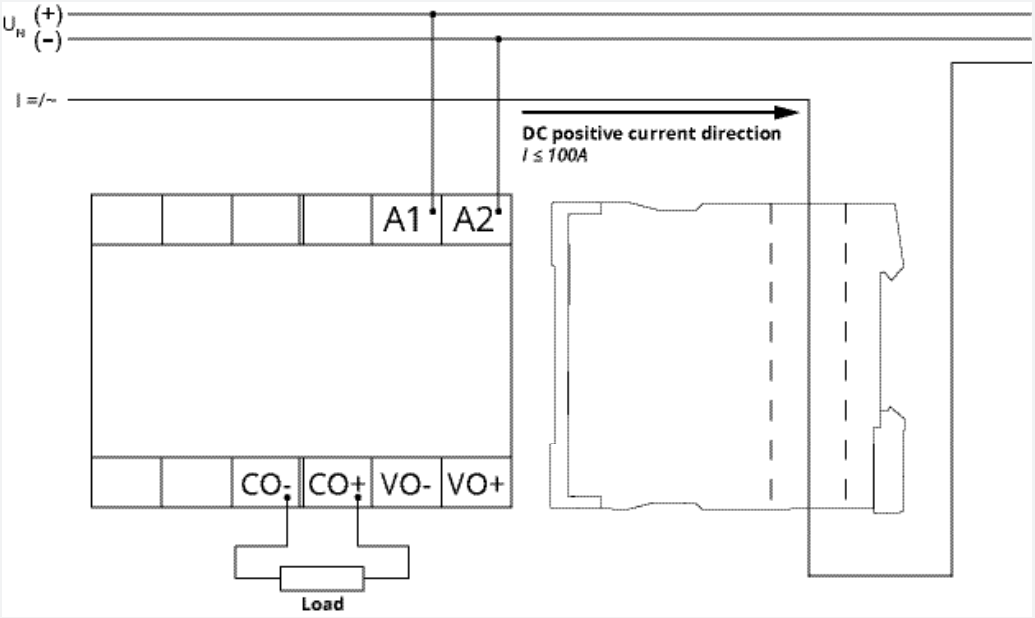


# V4IA100A 24-240V AC/DC

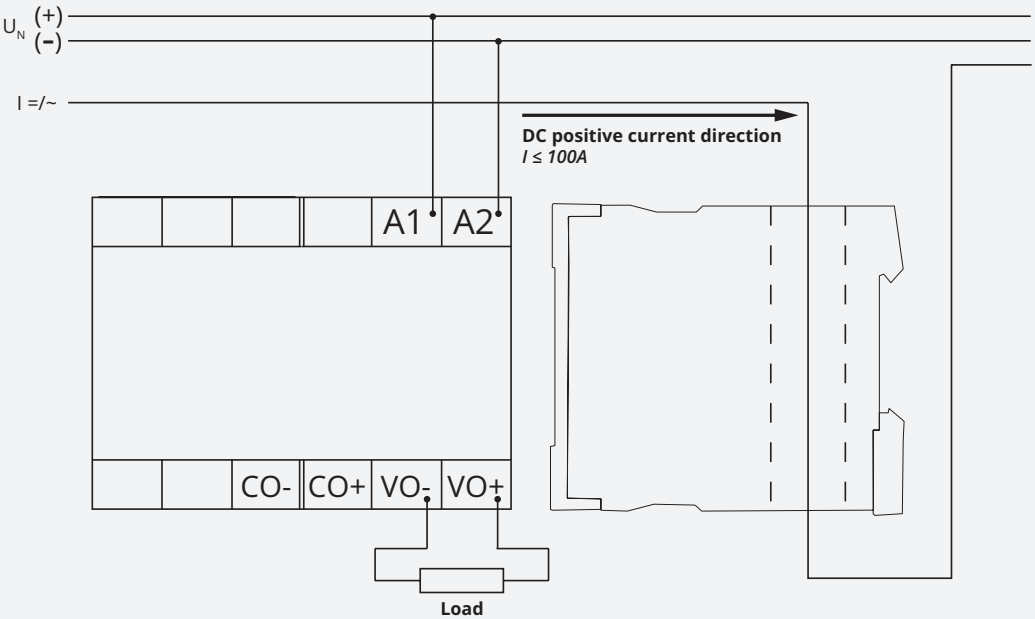
Art.Nr.: 2104420

## CONNECTIONS

**Output: 4-20 mA; 0-20 mA; 12 mA ±8 mA; 10 mA ±10 mA**



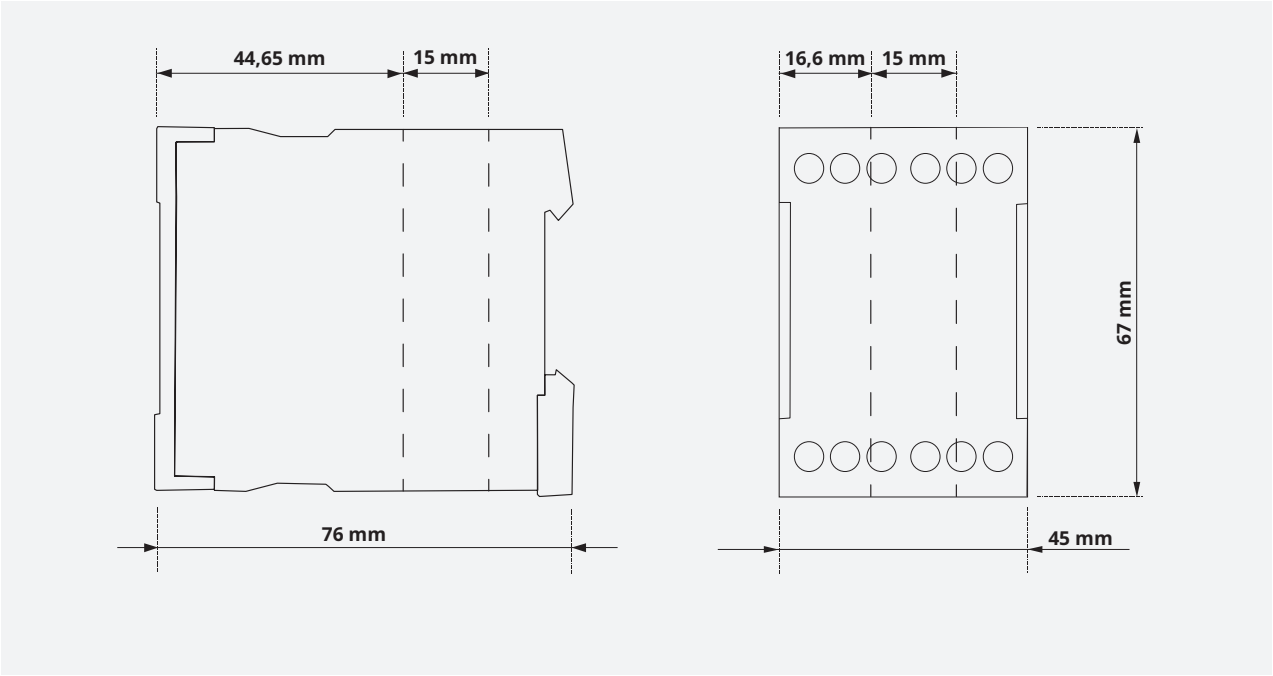

**Output: 0-10 V; 5 V ±5 V**



# V4IA100A 24-240V AC/DC

Art.Nr.: 2104420

## DIMENSIONS



# VEO

MONITORING RELAY / 1-PHASE VOLTAGE

## V2UM230V10

Art.Nr.: 2100300

## V2UM230V10P

Art.Nr.: 2100310

- AC/DC voltage monitoring
- Multifunction
- Supply voltage 24 V DC or 230V AC/DC
- Supply circuit = Measuring circuit
- 1 change-over contact
- Width 22,5 mm

**Control elements**

- Tripping delay
- Maximum threshold
- Minimum threshold
- Function selector

**Status indication**

- LED U: Supply voltage
- LED Max: Overvoltage
- LED Min: Undervoltage
- LED R: Relay status


# TECHNICAL DATA

| SUPPLY CIRCUIT (=MEASURING CIRCUIT) | | |
|---|---|---|
| Terminals | | E-F1-F2 |
| Supply voltage | F1-E | 24 V DC |
| | F2-E | 230 V AC/DC |
| Supply voltage tolerance | 24 V DC | -30 / +30% |
| | 230 V AC/DC | -30 / +20% |
| Rated frequency | | 16,6 ... 400 Hz or DC |
| Rated frequency tolerance | | 16,0 ... 420 Hz |
| Rated consumption | 24 V DC | typ. 0,4 W / 0,65 VA |
| | 230 V AC | typ. 0,3 W / 0,4 VA |
| Duty-cycle | | 100 % |
| Backup power time | 24 V DC | < 45 ms |
| | 230 V AC/DC | < 60 ms |
| Recovery time | | > 200 ms |
| Drop-out voltage | | ≥ 6 V |

| MEASURING CIRCUIT | | |
|---|---|---|
| Terminals | | E-F1-F2 |
| Measurand | | voltage 1-phase |
| Measuring method | | True RMS |
| Monitoring functions | | undervoltage (U), window (W) |
| Measuring range | | see supply voltage |
| Frequency | | see rated frequency |

# VEO

MONITORING RELAY / 1-PHASE VOLTAGE

## V2UM230V10

Art.Nr.: 2100300

## V2UM230V10P

Art.Nr.: 2100310

| MEASURING CIRCUIT | | |
|---|---|---|
| Overload capacity | | see supply voltage tolerance |
| Thresholds | Max | 80 ... 115 % |
| | Min | 75 ... 110 % |
| Hysteresis | | 1 % |

| TIMING CIRCUIT | | |
|---|---|---|
| Start-up delay | fixed | approx. 300 ms |
| Tripping delay | adjustable | 0,1 ... 10 s |

| RANGE OF FUNCTIONS | | |
|---|---|---|
| Functions | 2 | U, W |

| STATUS INDICATION | | |
|---|---|---|
| Supply voltage | LED U (green) on | supply voltage applied |
| Relay status | LED R (yellow) on | output relay energized |
| Voltage monitor | LED MAX (red) on | indication of overvoltage |
| | LED MAX (red) flashes | indication of tripping delay for overvoltage |
| | LED MIN (red) on | indication of undervoltage |
| | LED MIN (red) flashes | indication of tripping delay for undervoltage |

| OUTPUT CIRCUIT | | |
|---|---|---|
| Terminals | | 15-16-18 |
| Kind of output | | Relay |
| Number of contacts | change-over contact | 1 |
| Contact material | | AgNi |
| Rated voltage (IEC 60947-1) | | 250 V |
| Maximum switching voltage | | 400 V AC |
| Minimum switching voltage / switching current | | 12 V / 10 mA |
| Rated current (IEC 60947-5-1) | AC-1 | 8 A / 250 V |
| | AC-15 | 1,5 A / 240 V (B300) |
| | DC-12 | 8 A / 24 V |
| | DC-13 | 0,1 A / 250 V |
| Endurance | mechanical | 30 x $10^6$ switching cycles |
| | electrical (AC-1) | 100 x $10^3$ switching cycles |

# VEO

MONITORING RELAY / 1-PHASE VOLTAGE

## V2UM230V10

Art.Nr.: 2100300

## V2UM230V10P

Art.Nr.: 2100310

| OUTPUT CIRCUIT | | |
|---|---|---|
| Rated frequency of operation | with load | 6/min |
| | without load | 1200/min |
| Fuse rating | | 8 A fast acting |

| ACCURACY | | |
|---|---|---|
| Base accuracy | | < 2,5 % |
| Setting accuracy | | < 5 % (of full scale) |
| Repeat accuracy | | < 1% |
| Temperature influence | | < 0,01 % / °C |
| Voltage influence | | - |
| Frequency influence | | < 0,002 % / Hz |

| ENVIRONMENTAL CONDITIONS | | |
|---|---|---|
| Ambient temperature | operation | -25 ... +60°C |
| | storage | -40 ... +70°C |
| Relative humidity | | 5 ... 95 % |
| Vibration | EN 60947-1 | 2 ... 13,2 Hz: 1 mm; 13,2 ... 100 Hz: 7 $m/s^2$ |
| Shock | EN 60947-1 | 150 $m/s^2$ 11 ms |

| GENERAL DATA | | |
|---|---|---|
| Dimensions | W × H × D | 22,5 x 67 x 76 mm |
| Mounting | | DIN rail (EN60715) |
| Mounting position | | any |
| Housing material | | PA 66, self-extinguishing plastic, class V-0 |
| Degree of protection | housing | IP40 |
| | terminals | IP20 |
| Electrical connection | V2UM...10 | Screw terminal |
| Wire size | flexible with wire end ferrule | 0,5 ... 2,5 $mm^2$ (20 AWG ... 13 AWG) |
| | flexible without wire end ferrule | 0,5 ... 4 $mm^2$ (20 AWG ... 12 AWG) |
| | rigid | 0,5 ... 4 $mm^2$ (20 AWG ... 12 AWG) |
| Stripping length | | 8 mm |
| Tightening torque | | max. 1Nm |

# V2UM230V10
Art.Nr.: 2100300

# V2UM230V10P
Art.Nr.: 2100310

| GENERAL DATA | | |
|---|---|---|
| Electrical connection | V2UM...10P | Push-in terminal |
| Wire size | flexible with wire end ferrule | 0,25 ... 1,5 mm² (24 AWG ... 16 AWG) |
| | flexible with plastic ferrule | 0,25 ... 0,75 mm² (24 AWG ... 19 AWG) |
| | flexible without wire end ferrule | 0,2 ... 1,5 mm² (24 AWG ... 16 AWG) |
| | rigid | 0,2 ... 1,5 mm² (24 AWG ... 16 AWG) |
| Stripping length | | 8 mm |
| MTTF | | - |
| Weight | | 86 g |

| ISOLATION DATA | | |
|---|---|---|
| Pollution degree (IEC 60947-5-1) | | 2 |
| Overvoltage category (IEC 60947-5-1) | | III |
| Rated insulation voltage (IEC 60947-1) | supply circuit / output cicuit | 300 V |
| Rated impulse withstanding voltage (IEC 60947-1) | supply circuit / output cicuit | 6 kV |
| Insulation test voltage (IEC 60947-1) | supply circuit / output cicuit | 3780 V |
| Degree of protection | supply circuit / output cicuit | protective seperation |

| STANDARDS | |
|---|---|
| Product standard | IEC 60947-5-1 |
| Interference immunity | IEC 61000-6-2 |
| Interference emission | IEC 61000-6-4 |
| Approvals | |

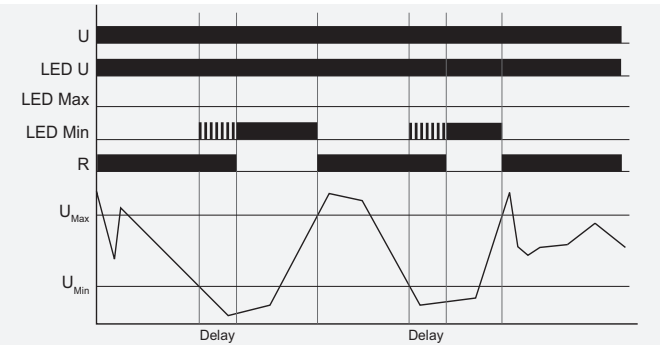
**V2UM230V10**
Art.Nr.: 2100300

**V2UM230V10P**
Art.Nr.: 2100310

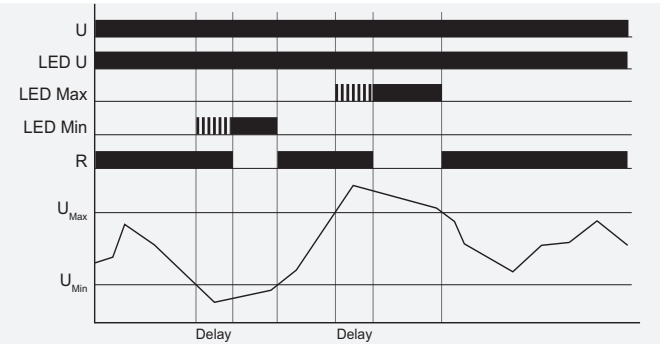
# FUNCTIONS

For all the functions the LEDs MIN and MAX are flashing alternating, when the minimum value for the measured voltage was chosen to be greater than the maximum value. If a failure already exists when the device is activated, the output relay R remains in off-position and the LED for the corresponding threshold is illuminated.

**Undervoltage monitoring (U)**
When the measured voltage falls below the adjusted threshold $U_{Min}$, the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relay R switches into off-position. The output relay R switches into on-position again after the measured voltage exceeds the adjusted threshold $U_{Max}$.




**Window function (W)**
When the measured voltage falls below the adjusted threshold $U_{Min}$, the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relay R switches into off-position. The output relay R switches into on-position again after the measured voltage exceeds the adjusted threshold $U_{Min}$. When the measured voltage exceeds the adjusted threshold $U_{Max}$, the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relay R switches into off-position. The output relay R switches into on-position again after the measured voltage falls below the adjusted threshold $U_{Max}$.

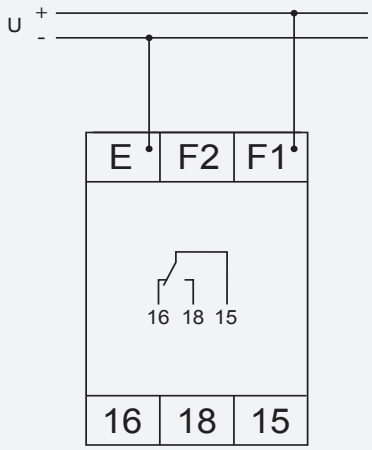


**V2UM230V10**
Art.Nr.: 2100300

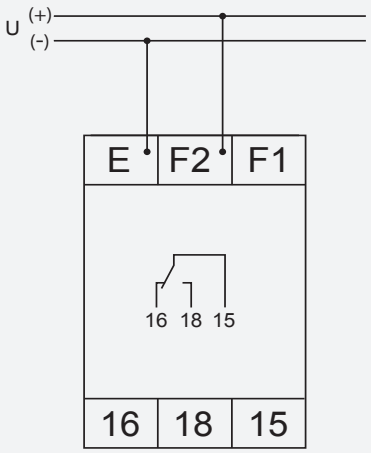
**V2UM230V10P**
Art.Nr.: 2100310

## CONNECTIONS

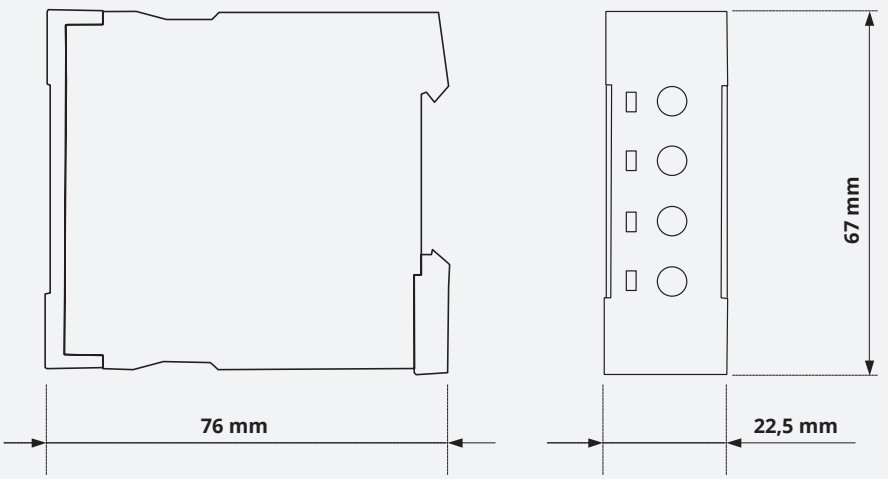
**24 V DC**




**230 V AC/DC**




## DIMENSIONS



# VEO

MONITORING RELAY / 3-PHASE VOLTAGE

## V2PM400Y/230VS10

Art.Nr.: 2100500

## V2PM400Y/230VS10P

Art.Nr.: 2100510

- Multifunction
- Monitoring of phase sequence and phase loss
- Supply voltage 400 V AC
- Supply circuit = measuring circuit
- 1 change-over contact
- Width 22,5 mm

**Control elements**

- Tripping delay
- Maximum threshold
- Minimum threshold
- Function selector

**Status indication**

- LED UFail.: Phase sequence failure or phase loss
- LED Max: Overvoltage
- LED Min: Undervoltage
- LED R: Relay status


# TECHNICAL DATA

| SUPPLY CIRCUIT (=MEASURING CIRCUIT) | | |
|---|---|---|
| Terminals | | L1-L2-L3 |
| Supply voltage | | 400/230 V AC |
| Supply voltage tolerance | | -35 / +35 % |
| Rated frequency | | 16,6 ... 400 Hz |
| Rated frequency tolerance | | 16,0 ... 420 Hz |
| Rated consumption | 3 x 400 V AC | typ. 0,45 W / 0,75 VA |
| Duty-cycle | | 100 % |
| Backup power time | | < 90 ms |
| Recovery time | | > 700 ms |
| Drop-out voltage | | ≥ 12 V |

| MEASURING CIRCUIT | | |
|---|---|---|
| Terminals | | L1-L2-L3 |
| Measurend | | voltage 3-phase |
| Measuring method | | True RMS |
| Monitoring functions | | undervoltage (U), window (W), phase sequence, phase loss |
| Measuring range | | see supply voltage |
| Frequency | | see rated frequency |
| Overload capacity | | see supply voltage tolerance |

# VEO

MONITORING RELAY / 3-PHASE VOLTAGE

## V2PM400Y/230VS10

Art.Nr.: 2100500

## V2PM400Y/230VS10P

Art.Nr.: 2100510

| MEASURING CIRCUIT | | |
|---|---|---|
| Thresholds | Max | 75 ... 130 % |
| | Min | 70 ... 125 % |
| | Asymmetry | - |
| Hysteresis | | 1 % |

| TIMING CIRCUIT | | |
|---|---|---|
| Start-up delay | fixed | approx. 200ms |
| Tripping delay | adjustable | 0,1 ... 10 s |
| | phase sequence | approx. 65 ms at 50 Hz |

| RANGE OF FUNCTIONS | | |
|---|---|---|
| Functions | 4 | U, W, U+S, W+S |

| STATUS INDICATION | | |
|---|---|---|
| Relay status | LED R (yellow) on | output relay energized |
| Voltage monitor | LED MAX (red) on | indication of overvoltage |
| | LED MAX (red) flashes | indication of tripping delay for overvoltage |
| | LED MIN (red) on | indication of undervoltage |
| | LED MIN (red) flashes | indication of tripping delay for undervoltage |
| | LED UFail. (red) on | indication of phase sequence failure or phase loss |
| | LED UFail. (red) flashes | indication of tripping delay for phase loss |

| OUTPUT CIRCUIT | | |
|---|---|---|
| Terminals | | 15-16-18 |
| Kind of output | | Relay |
| Number of contacts | change-over contact | 1 |
| Contact material | | AgNi |
| Rated voltage (IEC 60947-1) | | 250 V |
| Maximum switching voltage | | 400 V AC |
| Minimum switching voltage / switching current | | 12 V / 10 mA |
| Rated current (IEC 60947-5-1) | AC-1 | 8 A / 250 V |
| | AC-15 | 1,5 A / 240 V (B300) |
| | DC-12 | 8 A / 24 V |
| | DC-13 | 0,1 A / 250 V |

# VEO

MONITORING RELAY / 3-PHASE VOLTAGE

## V2PM400Y/230VS10

Art.Nr.: 2100500

## V2PM400Y/230VS10P

Art.Nr.: 2100510

| MEASURING CIRCUIT | | |
|---|---|---|
| Endurance | mechanical | 30 x $10^6$ switching cycles |
| | electrical (AC-1) | 100 x $10^3$ switching cycles |
| Rated frequency of operation | with load | 6/min |
| | without load | 1200/min |
| Fuse rating | | 8 A fast acting |

| ACCURACY | | |
|---|---|---|
| Base accuracy | | < 2,5 % |
| Setting accuracy | | < 5 % (of full scale) |
| Repeat accuracy | | < 1% |
| Temperature influence | | < 0,01 % / °C |
| Voltage influence | | - |
| Frequency influence | | < 0,003 % / Hz |

| ENVIRONMENTAL CONDITIONS | | |
|---|---|---|
| Ambient temperature | operation | -25 ... +60°C |
| | storage | -40 ... +70°C |
| Relative humidity | | 5 ... 95 % |
| Vibration | EN 60947-1 | 2 ... 13,2 Hz: 1 mm; 13,2 ... 100 Hz: 7 $m/s^2$ |
| Shock | EN 60947-1 | 150 $m/s^2$ 11 ms |

| GENERAL DATA | | |
|---|---|---|
| Dimensions | W × H × D | 22,5 x 67 x 76 mm |
| Mounting | | DIN rail (EN60715) |
| Mounting position | | any |
| Housing material | | PA 66, self-extinguishing plastic, class V-0 |
| Degree of protection | housing | IP40 |
| | terminals | IP20 |
| Electrical connection | V2PM...10 | screw terminal |
| Wire size | flexible with wire end ferrule | 0,5 ... 2,5 $mm^2$ (20 AWG ... 13 AWG) |
| | flexible without wire end ferrule | 0,5 ... 4 $mm^2$ (20 AWG ... 12 AWG) |
| | rigid | 0,5 ... 4 $mm^2$ (20 AWG ... 12 AWG) |
| Stripping length | | 8 mm |
| Tightening torque | | max. 1Nm |

# V2PM400Y/230VS10
Art.Nr.: 2100500

# V2PM400Y/230VS10P
Art.Nr.: 2100510

| GENERAL DATA | | |
|---|---|---|
| Electrical connection | V2PM...10P | Push-in terminal |
| Wire size | flexible with wire end ferrule | 0,25 ... 1,5 mm² (24 AWG ... 16 AWG) |
| | flexible with plastic ferrule | 0,25 ... 0,75 mm² (24 AWG ... 19 AWG) |
| | flexible without wire end ferrule | 0,2 ... 1,5 mm² (24 AWG ... 16 AWG) |
| | rigid | 0,2 ... 1,5 mm² (24 AWG ... 16 AWG) |
| Stripping length | | 8 mm |
| MTTF | | - |
| Weight | | 86 g |

| ISOLATION DATA | | |
|---|---|---|
| Pollution degree (IEC 60947-5-1) | | 2 |
| Overvoltage category (IEC 60947-5-1) | | III |
| Rated insulation voltage (IEC 60947-1) | supply circuit / output circuit | 300 V |
| Rated impulse withstanding voltage (IEC 60947-1) | supply circuit / output circuit | 6 kV |
| Insulation test voltage (IEC 60947-1) | supply circuit / output circuit | 3780 V |
| Degree of protection | supply circuit / output circuit | protective seperation |

| STANDARDS | |
|---|---|
| Product standard | IEC 60947-5-1 |
| Interference immunity | IEC 61000-6-2 |
| Interference emmision | IEC 61000-6-4 |
| Approvals | |

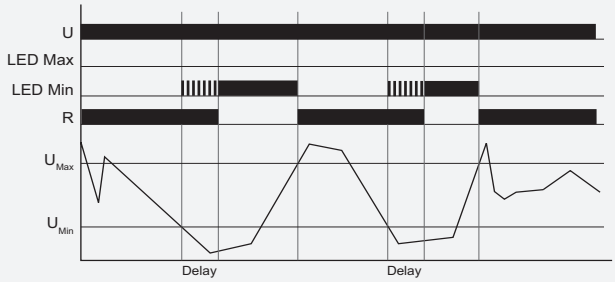
**V2PM400Y/230VS10**
Art.Nr.: 2100500

**V2PM400Y/230VS10P**
Art.Nr.: 2100510

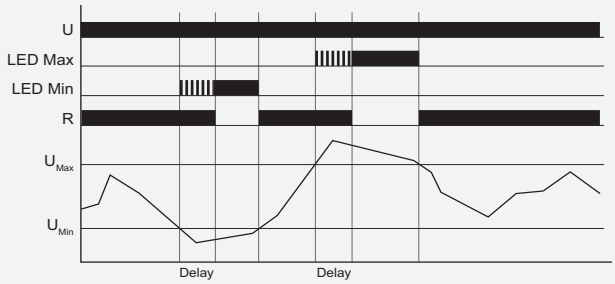
# FUNCTIONS

For all the functions the LEDs MIN and MAX are flashing alternating, when the minimum value for the measured voltage was chosen to be greater than the maximum value. If a failure already exists when the device is activated, the output relay R remains in off-position and the LED for the corresponding threshold is illuminated.

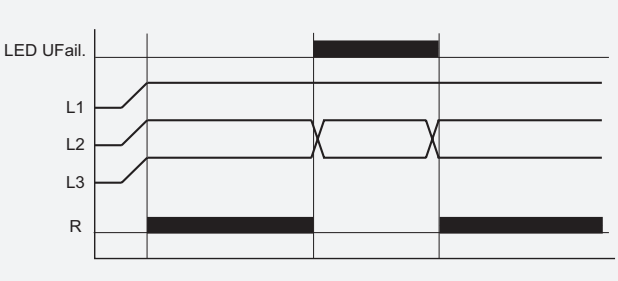
**Undervoltage monitoring (U)**
When one of the 3 measured voltages (phase-to-phase) falls below the adjusted threshold $U_{Min}$, the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relay R switches into off-position. The output relay R switches into on-position again after all of the 3 measured voltages exceed the adjusted threshold $U_{Max}$.



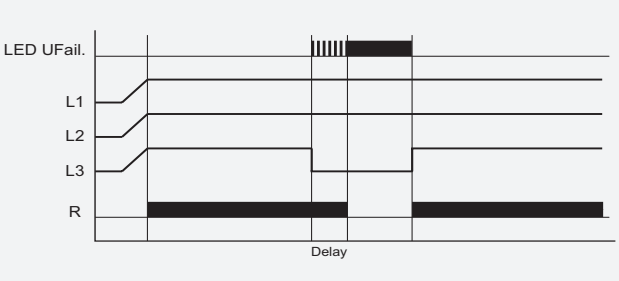

**Window function (W)**
When one of the 3 measured voltages (phase-to-phase) falls below the adjusted threshold $U_{Min}$, the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relay R switches into off-position. The output relay R switches into on-position again after all of the 3 measured voltages exceed the adjusted threshold $U_{Min}$. When one of the 3 measured voltages (phase-to-phase) exceeds the adjusted threshold $U_{Max}$, the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relay R switches into off-position. The output relay R switches into on-position again after all of the 3 measured voltages fall below the adjusted threshold $U_{Max}$.




**Phase sequence monitoring**
Phase sequence monitoring is selectable for all functions.
If a change in phase sequence is detected, the output relay R switches into off-position immediately.



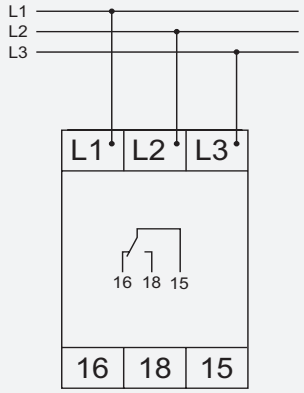

**Phase failure monitoring**
If one of the 3 phases fails, the set interval of the tripping delay (DELAY) begins. After the interval has expired, the output relay R switches into off-position.



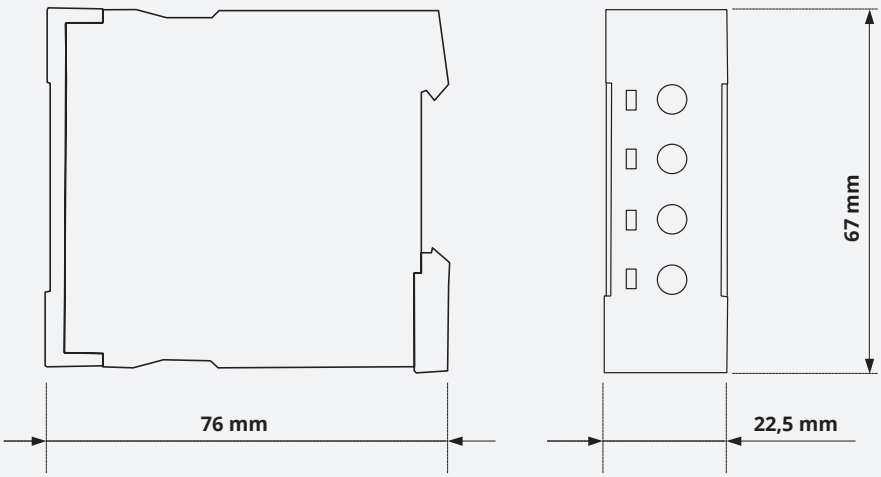
**V2PM400Y/230VS10**
Art.Nr.: 2100500

**V2PM400Y/230VS10P**
Art.Nr.: 2100510

## CONNECTIONS




## DIMENSIONS



VEO

MONITORING RELAY / LEVEL MONITORING

# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

- Level monitoring in conductive liquids
- 4 probe inputs for level monitoring
- Multifunction
- Adjustable sensor voltage
- Supply voltage 24-240V AC/DC
- Protective separation of measuring circuit
- 3 normally open contacts with common root
- Width 45 mm

**Control elements**

- Sensitivity
- Sensor voltage / Measuring range
- Function
- Delay / Operating mode

**Status indication**

- LED U/t: Supply voltage / time lapse
- LED R1: Relay status Rel1
- LED R2: Relay status Rel2
- LED R3: Relay status Rel3
- LED PP1: Pump performance 1
- LED PP2: Pump performance 2


## TECHNICAL DATA

| SUPPLY CIRCUIT | | |
|---|---|---|
| Terminals | | A1-A2 |
| Supply voltage | | 24 ... 240 V AC/DC |
| Supply voltage tolerance | AC | -10 / +10 % |
| | DC | -25 / +25 % |
| Rated frequency | | 16,6 ... 400 Hz or DC |
| Rated frequency tolerance | | 16,0 ... 420 Hz |
| Rated consumption | 230 V AC | typ. 0,75 W / 1,3 VA |
| | 24 V DC | typ. 0,65 W |
| Duty-cycle | | 100 % |
| Backup power time | | < 30 ms |
| Recovery time | | < 500 ms |
| Drop-out voltage | | ≥ 6 V |

| MEASURING CIRCUIT | |
|---|---|
| Terminals | E0-E0-E1-E2-E3-E4<br>(E0-E0 internal connected) |
| Measurand | Liquid level with conductive probes (type SK1, SK5) |
| Measuring method | Resistance measurement E1-E0, E2-E0, E3-E0, E4-E0 |
| Monitoring function | Level monitoring of conductive liquids with adjustable delay (measuring filter) |
| Measuring range | Low (L): 250Ω – 12.5kΩ<br>High (H): 10kΩ - 500kΩ |
| Sensor voltage $V_{SENS}$ | AC, 18.33Hz, 100% = 2.3Vrms open-circuit voltage |
| Sensor current @ $V_{SENS}$ = 100% | Range L: max. 1mA, Range H: max. 0.1mA |

# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

## MEASURING CIRCUIT

| | | |
|---|---|---|
| Wiring distance to level probes (capacity of cable 100nF/km) | @Vsens H = 100% Sensitivity ≤ 50% | 1000 m |
| | @Vsens L = 100% Sensitivity ≤ 100% | 1000 m |
| Measuring mode | | sequentially (delay = 1 ... 10 s) |
| | | simultaneously (concurrent sensing) |
| Hysteresis | | approx. 10% of adjusted sensitivity |

## RANGE OF FUNCTIONS

| | | |
|---|---|---|
| Functions | 10 | 2uA = Pump up; Min- / Max-Alarm (1 container, 4 probes) |
| | | 2dA = Pump down; Min- / Max-Alarm (1 container, 4 probes) |
| | | 3b- = Pump up and down; Min-Alarm (1 container, 3 (4) probes) |
| | | 3b+ = Pump up and down; Max-Alarm (1 container, 3 (4) probes) |
| | | 2u2 = Pump up (2 independent containers, 2 probes each) |
| | | 2d2 = Pump down (2 independent containers, 2 probes each) |
| | | 2uc = Pump up with pump change (1 container, 2 probes) |
| | | 2dc = Pump down with pump change (1 container, 2 probes) |
| | | 3w- = Well control; Min-Alarm (2 containers, 3 probes) |
| | | 4ce = Level code (up to 4 containers, 4 probes) |
| Potentiometers | | Sensitivity (threshold): Low = 0,25 ...12,5 kΩ; High = 10 ... 500 kΩ |
| | | Delay (measuring filter): 1 ... 10 s |
| Rotary switch | | Vsense[%] (20, 40, 60, 80, 100%) Sensitivity range Low / High |
| | | Function selector |

## TIMING CIRCUIT

| | | |
|---|---|---|
| Measuring filter | DELAY | 1 ... 10 s |

## STATUS INDICATION

| | | |
|---|---|---|
| Supply voltage | LED U/t (green) on | supply voltage applied |
| Measuring filter (Delay) | LED U/t (green) flashes | indication of time lapse for measuring filter |
| Relay status | Rel1 (yellow) on | output relay 1 energized |
| | Rel2 (yellow) on | output relay 2 energized |
| | Rel3 (yellow) on | output relay 3 energized |
| Pump performance | PP1 (yellow) on | Pump performance pump 1 |
| | PP2 (yellow) on | Pump performance pump 2 |

# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

## OUTPUT CIRCUIT

| | | |
|---|---|---|
| Terminals | Rel1 | 17-18 |
| | Rel2 | 17-28 |
| | Rel3 | 17-38 |
| Kind of output | | Relay (normally open contacts with common root) |
| Number of contacts | normally open contacts | 3 |
| Contact material | | AgNi / Au |
| Rated voltage (IEC 60947-1) | | 250 V |
| Maximum switching voltage | | 250 V AC |
| Minimum switching voltage / switching current | | 5 V DC / 10 mA |
| Rated current (IEC 60947-5-1) | AC-1 | 5 A / 250 V |
| | AC-15 | 1,5 A / 240 V (B300) |
| | DC-12 | 5 A / 24 V |
| Endurance | mechanical | 1 x $10^6$ switching cycles |
| | electrical (AC-1) | 1 x $10^5$ switching cycles |
| Rated frequency of operation | with load | 6/min |
| | without load | 1200/min |
| Fuse rating | | 5 A fast acting |

## ACCURACY

| | | |
|---|---|---|
| Base accuracy | | - |
| Setting accuracy | | - |
| Temperature influence | | - |
| Voltage influence | | - |

## ENVIRONMENTAL CONDITIONS

| | | |
|---|---|---|
| Ambient temperature | operation | -25 ... +60°C |
| | storage | -40 ... +70°C |
| Relative humidity | | 5 ... 95 % |
| Vibration | EN 60947-1 | 2 ... 13,2 Hz: 1 mm; 13,2 ... 100 Hz: 7 $m/s^2$ |
| Shock | EN 60947-1 | 150 $m/s^2$ 11 ms |

## GENERAL DATA

| | | |
|---|---|---|
| Dimensions | W × H × D | 45 x 67 x 76 mm |
| Mounting | | DIN rail (EN60715) |
| Mounting position | | any |
| Housing material | | PA 66, self-extinguishing plastic, class V-0 |

# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

| GENERAL DATA | | |
|---|---|---|
| Degree of protection | housing | IP40 |
| | terminals | IP20 |
| Electrical connection | | Screw terminal |
| Wire size | flexible with wire end ferrule | 0,5 ... 2,5 mm² (20 AWG ... 13 AWG) |
| | flexible without wire end ferrule | 0,5 ... 4 mm² (20 AWG ... 12 AWG) |
| | rigid | 0,5 ... 4 mm² (20 AWG ... 12 AWG) |
| Stripping length | | 8 mm |
| Tightening torque | | max. 1Nm |
| Rated conditional short circuit current | | 1000A |
| MTTF | | - |
| Weight | | - |

| ISOLATION DATA | | |
|---|---|---|
| Pollution degree (IEC 60947-5-1) | | 2 |
| Overvoltage category (IEC 60947-5-1) | | III |
| Rated insulation voltage (IEC 60947-1) | supply circuit / output cicuit | 300 V |
| | measuring circuit / output circuit | 300 V |
| | supply circuit / measuring circuit | 300 V |
| Rated impulse withstanding voltage (IEC 60947-1) | supply circuit / output cicuit | 6 kV |
| | measuring circuit / output circuit | 6 kV |
| | supply circuit / measuring circuit | 6 kV |
| Insulation test voltage (IEC 60947-1) | supply circuit / output cicuit | 3780 V |
| | measuring circuit / output circuit | 3780 V |
| | supply circuit / measuring circuit | 3780 V |
| Degree of protection | supply circuit / output cicuit | protective seperation |
| | measuring circuit / output circuit | protective seperation |
| | supply circuit / measuring circuit | protective seperation |

# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

| STANDARDS | |
|---|---|
| Product standard | IEC 60947-5-1 |
| Interference immunity | IEC 61000-6-2 |
| Interference emission | IEC 61000-6-4<br>Test conditions:<br>• $U_N$: 110 - 240V AC/DC ... powered from the main<br>• $U_N$: 24 - 110V DC ... powered by power supply<br>• $U_N$: 24 - 110V AC ... powered by transformer |
| Approvals | CE |

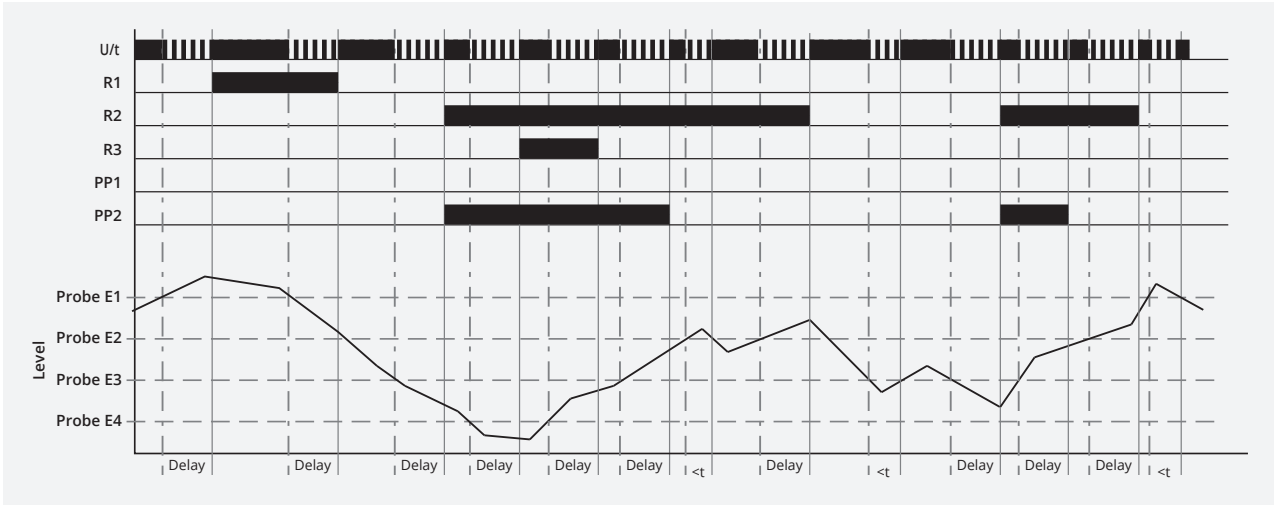
# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

## FUNCTIONS

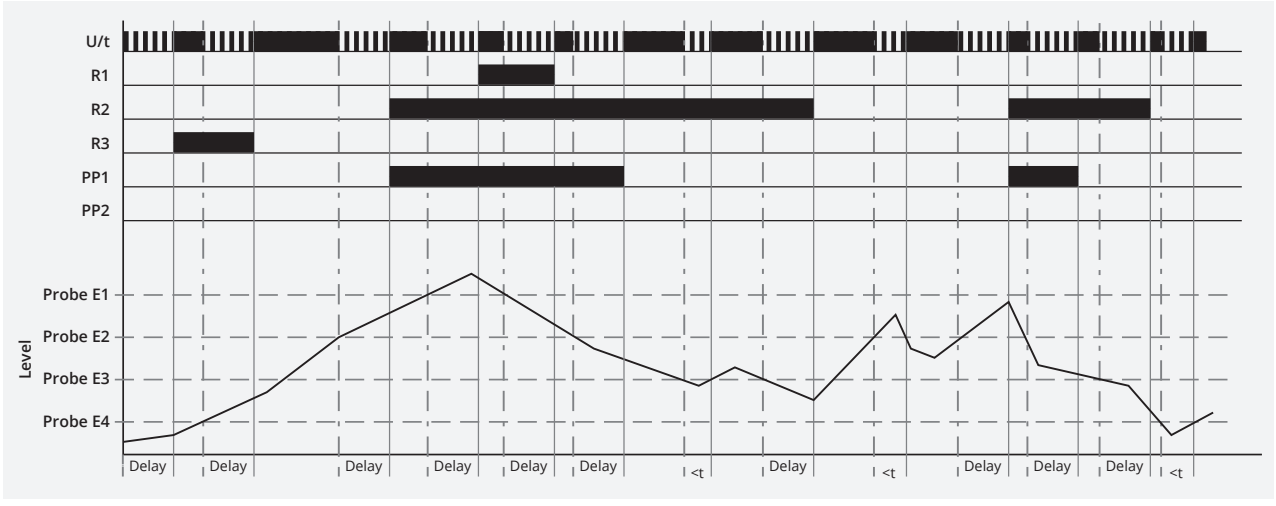
**Pump up with MIN and MAX alarm (2uA)**
**1 container, 4 probes**
Connection of the probes E0 - E4. Instead of the reference probe E0, the electroconductive container can be connected. When the liquid level drops below the probe E3 the set delay interval is triggered. After the delay time has elapsed the output relay R2 is energised. Simultaneously the yellow LED PP2 (pump performance) is switched on and stays on until the liquid reaches a stable level at probe E3 (delay time elapsed). As soon as probe level E2 is reached and the delay time has elapsed the output relay R2 is de-energised.

The minimum probe E4 and the maximum probe E1 are used for extreme value monitoring and are linked to the output relays R1 (maximum alarm probe E1) and R3 (minimum alarm probe E4) and can be used to control alarm lamps, additional pumps or inflow and discharge valves.




**Pump down with MIN and MAX alarm (2dA)**
**1 container, 4 probes**
Connection of the probes E0 - E4. Instead of the reference probe E0 the electroconductive container can be connected. When the liquid level rises above the probe E2 the set delay interval is triggered. After the delay time has elapsed the output relais R2 is energised. Simultaniously the yellow LED PP1 (pump performance) is switched on and stays on until the liquid level stablely drops below the probe level E2 (delay time elapsed). As soon as the level drops below probe level E3 and the delay time has elapsed the output relais R2 is de-energised.

The minimum probe E4 and the maximum probe E1 are used for extreme value monitoring and are linked to the output relays R1 (maximum alarm probe E1) and R3 (minimum alarm probe E4) and can be used to control alarm lamps, additional pumps or inflow and discharge valves.

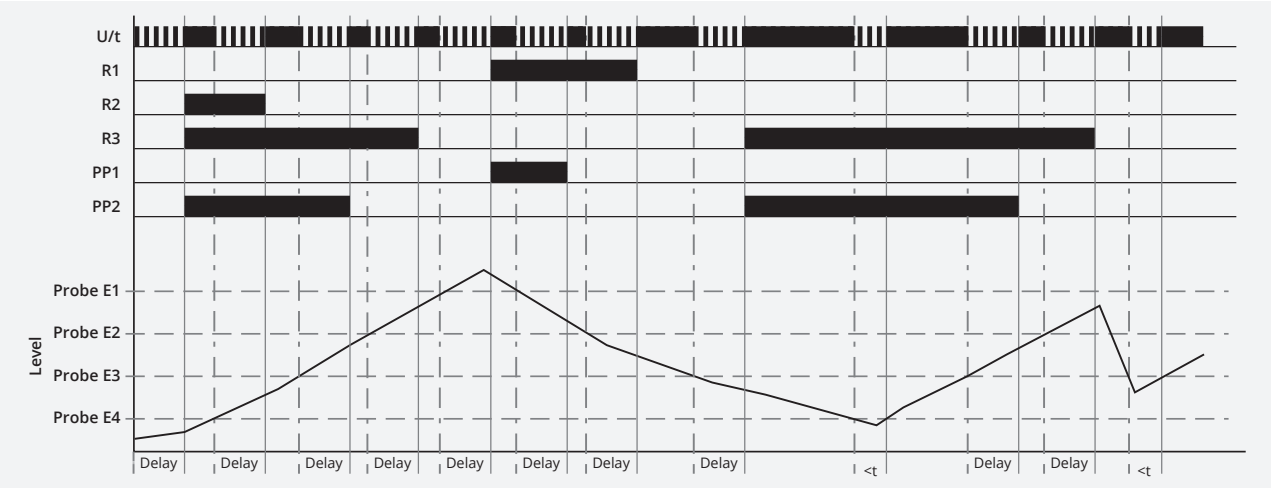


# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

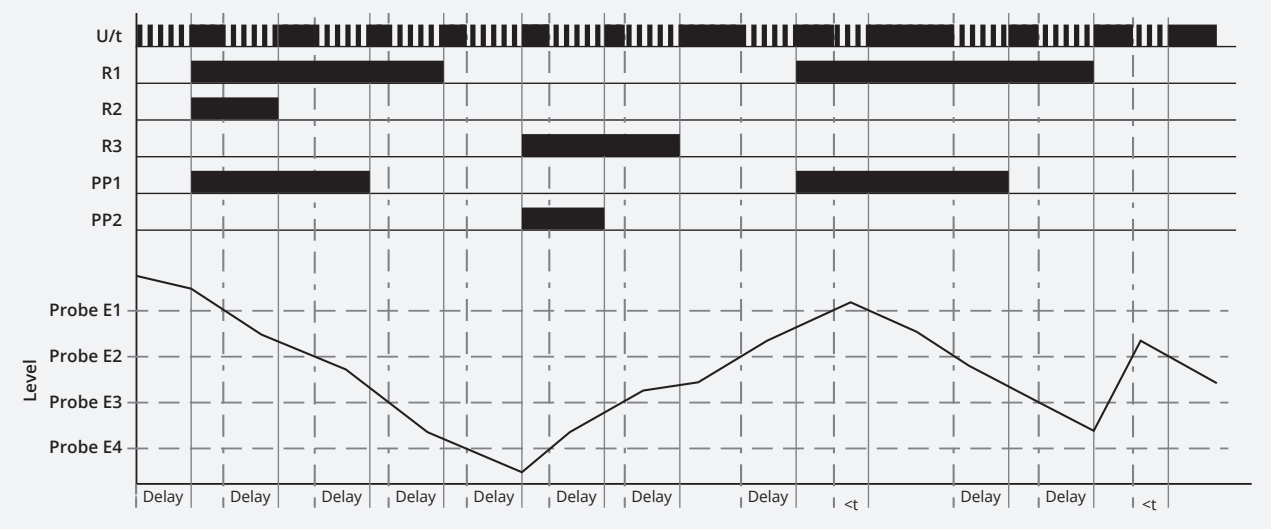
**Pump up and down with MIN alarm (3b-)**
**1 container, 3(4) probes**
Connection of the probes E0 - E4. Instead of the reference probe E0, the electroconductive container can be connected. This function controls the liquid level around probe E2. When the liquid level rises above the probe E1 the set delay interval is triggered. After the delay time has elapsed the output relay R1 (pump down) is energised. Simultaneously the yellow LED PP1 (pump performance) is switched on and stays on until the liquid reaches a stable level at probe E1 (delay time elapsed). As soon as the level drops below probe level E2 and the delay time has elapsed the output relay R1 is de-energised. When the liquid level drops below the probe E3 the set delay interval is triggered. After the delay time has elapsed the output relay R3 (pump up) is energised. Simultaniously the yellow LED PP2 (pump performance) is switched on and stays on until the liquid reaches a stable level at probe E3 (delay time elapsed). As soon as probe level E2 is reached and the delay time has elapsed the output relay R2 is de-energised.

The minimum probe E4 serves for dry running monitoring and is coupled to the output relay R2 and can be used to control alarm lamps, additional pumps or inflow valves.




**Pump up and down with MAX alarm (3b+)**
**1 container, 3(4) probes**
Connection of the probes E0 - E4. Instead of the reference probe E0 the electroconductive container can be connected. This function controls the liquid level around probe E3. When the liquid level rises above the probe E2 the set delay interval is triggered. After the delay time has elapsed the output relay R1 (pump down) is energised. Simultaneously the yellow LED PP1 (pump performance) is switched on and stays on until the liquid reaches a stable level at probe E2 (delay time elapsed). As soon as the level drops below probe level E3 and the delay time has elapsed the output relay R1 is de-energised. When the liquid level drops below the probe E4 the set delay interval is triggered. After the delay time has elapsed the output relay R3 (pump up) is energised. Simultaneously the yellow LED PP2 (pump performance) is switched on and stays on until the liquid level stablely reaches the probe level E4 (delay time elapsed). As soon as probe level E3 is reached and the delay time has elapsed the output relay R2 is de-energised.

The maximum probe E1 serves for overflow monitoring and is coupled to the output relay R2 and can be used to control alarm lamps, additional pumps or discharge valves.

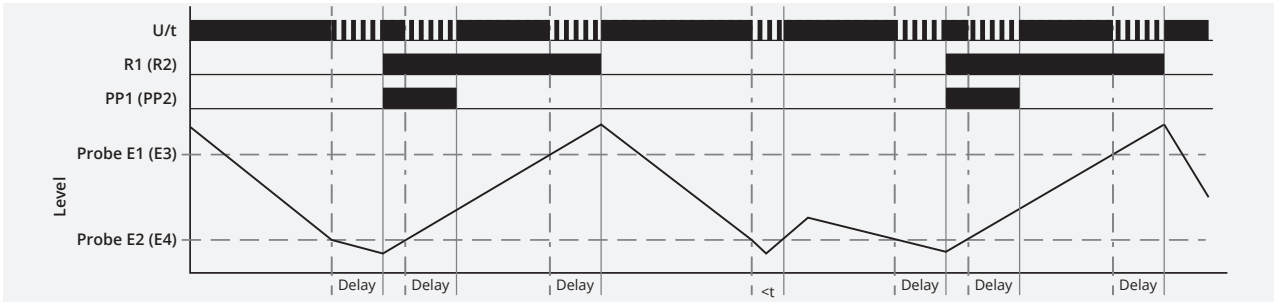


# V4LM4S30 24-240V AC/DC

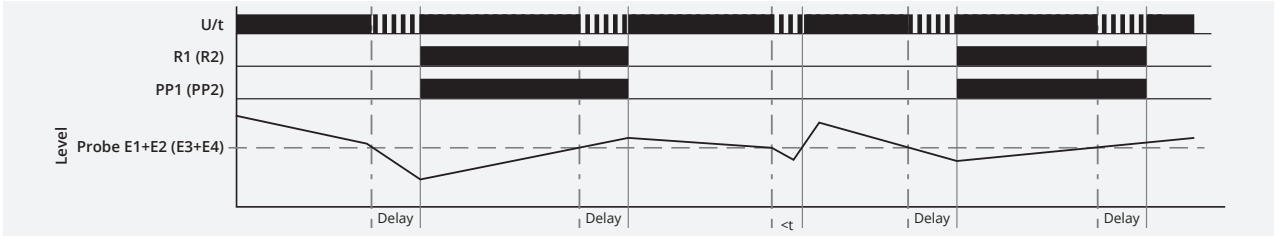
Art.Nr.: 2104500

**Pump up (2u2)**
**2 independent containers, 2 probes each**
This function serves the level control in two separate tanks. A pair of probes and an output relay are available for each of the tanks. Both level controls work independently. Connection of the probes E0, E1, E2 (second tank E0, E3, E4). Instead of the reference probe E0 the electroconductive containers can be connected. When the liquid level drops below the probe E2 (resp. E4) the set delay interval is triggered. After the delay time has elapsed the output relay R1 (resp. R2) is energised. Simultaneously the yellow LED PP1 (resp. PP2) (pump performance) is switched on and stays on until the liquid reaches a stable level at probe E2 (resp. E4) (delay time elapsed). As soon as probe level E1 (resp. E3) is reached and the delay time has elapsed the output relay R1 (resp. R2) is de-energised.

The use of this function is also possible with a single probe per container - in this case a single probe is connected to both inputs E1 and E2 (resp. E3 and E4). The „Concurrent Sensing" mode is deactivated in function 2u2 in order to avoid measuring inaccuracies.

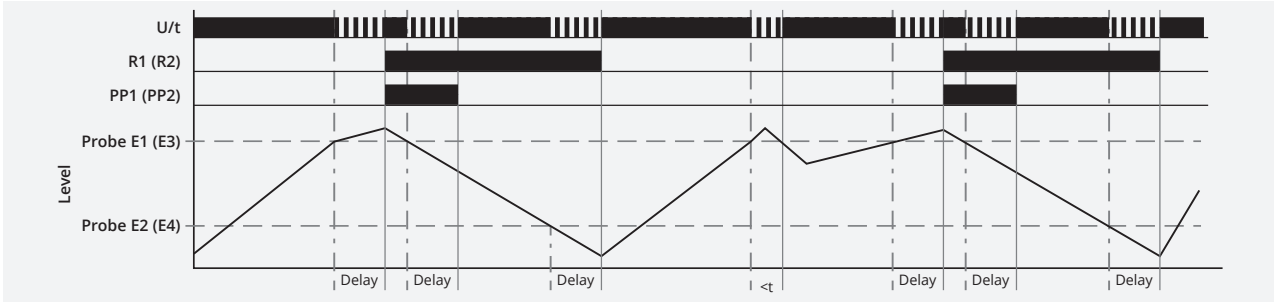



Single probe operation:

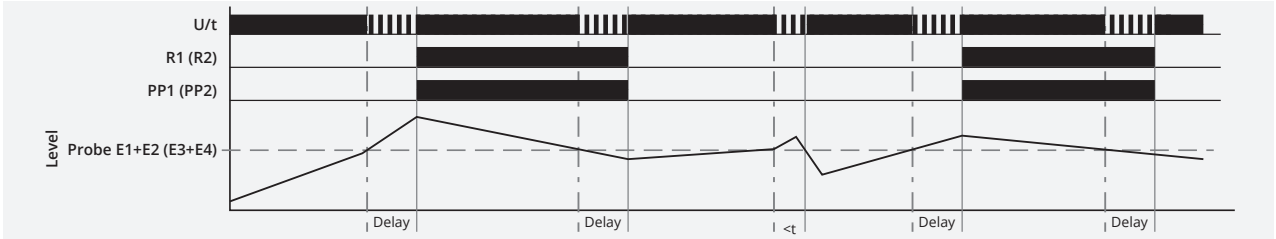



**Pump down (2d2)**
**2 independent containers, 2 probes each**
This function serves the level control in two separate tanks. A pair of probes and an output relay are available for each of the tanks. Both level controls work independently. Connection of the probes E0, E1, E2 (second tank E0, E3, E4). Instead of the reference probe E0 the electroconductive containers can be connected. When the liquid level rises above the probe E1 (resp. E3) the set delay interval is triggered. After the delay time has elapsed the output relay R1 (resp. R2) is energised. Simultaneously the yellow LED PP1 (resp. PP2) (pump performance) is switched on and stays on until the liquid reaches a stable level at probe E2 (resp. E4) (delay time elapsed). As soon as the level drops below probe level E2 (resp. E4) and the delay time has elapsed the output relay R1 (resp. R2) is de-energised.

The use of this function is also possible with a single probe per container - in this case a single probe is connected to both inputs E1 and E2 (resp. E3 and E4). The „Concurrent Sensing" mode is deactivated in function 2u2 in order to avoid measuring inaccuracies.



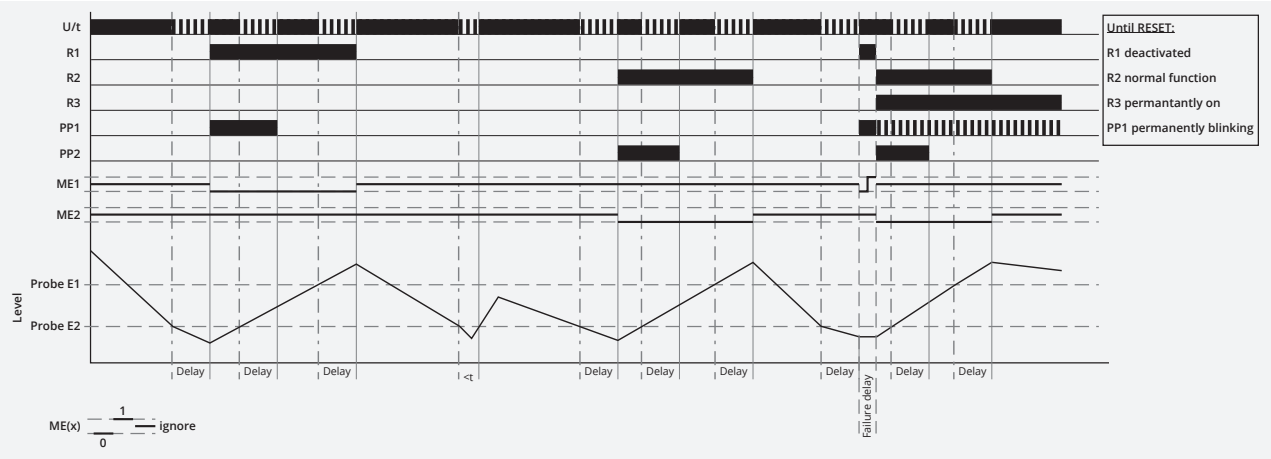

Single probe operation:



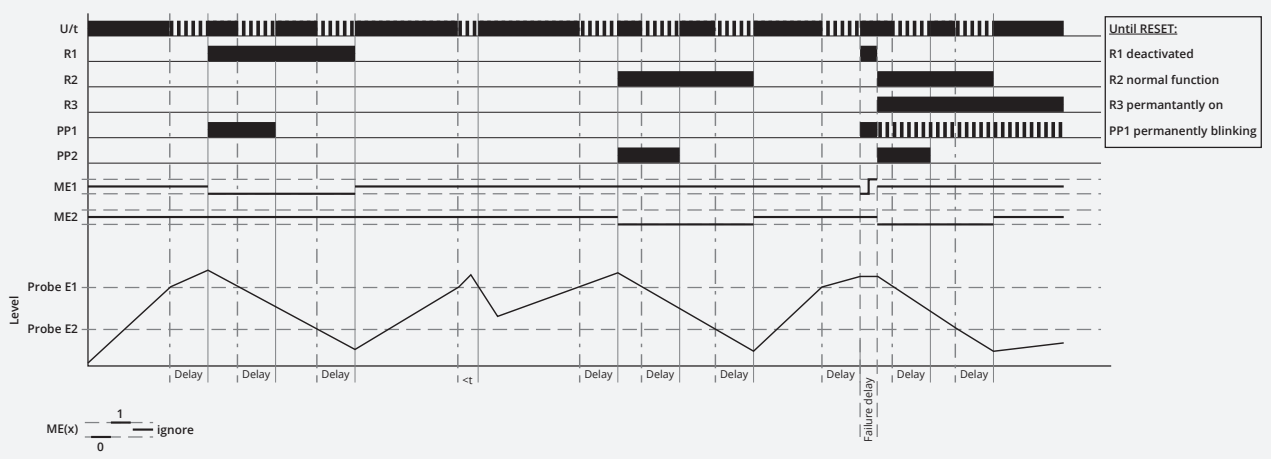
# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

**Pump up with pump change (2uc)**
**1 container, 2 probes, 2 pumps**
Connection of the probes E0 - E4. Instead of the reference probe E0 the electroconductive container can be connected. The probe inputs E3 and E4 are optionally available for pump monitoring (blockage or dry running monitoring e.g. V2IM10AL10 / V4IM100AL20, coupling to the monitoring inputs E3, E4 via the NC contacts of the monitoring relays). When the liquid level drops below the probe E2 the set delay interval is triggered. After the delay time has elapsed the output relay R1 (resp. R2) is energised. Simultaneously the yellow LED PP1 (resp. PP2) (pump performance) is switched on and stays on until the liquid reaches a stable level at probe E2 (delay time elapsed). As soon as probe level E1 is reached and the delay time has elapsed the output relay R1 (resp. R2) is de-energised. The two output relays R1 and R2 for pump controll are triggered alternately to ensure balanced utilization of the pumps. In the event of an error of the currently prioritized pump, the NC contact of the monitoring relay closes and the error signal is transfered to the respective monitoring input (E3 or E4). The faulty pump is deactivated and the alternative relay output gets energized. Simultaneously the relay output R3 (pump failure) gets permanently energized and the pump efficiency LED of the affected pump (PP1 or PP2) starts flashing. The fault-free pump remains permanently prioritized. The fault status is reset by temporarily switching to a different function or disconnecting the device from the mains.




**Pump down with pump change (2dc)**
**1 container, 2 probes, 2 pumps**
Connection of the probes E0 - E4. Instead of the reference probe E0 the electroconductive container can be connected. The probe inputs E3 and E4 are optionally available for pump monitoring (blockage or dry running monitoring e.g. V2IM10AL10 / V4IM100AL20, coupling to the monitoring inputs E3, E4 via the NC contacts of the monitoring relays). When the liquid level rises above the probe E1 the set delay interval is triggered. After the delay time has elapsed the output relay R1 (resp. R2) is energised. Simultaneously the yellow LED PP1 (resp. PP2) (pump performance) is switched on and stays on until the liquid reaches a stable level at probe E1 (delay time elapsed). As soon as the level drops below probe level E2 and the delay time has elapsed the output relay R1 (resp. R2) is de-energised. The two output relays R1 and R2 for pump controll are triggered alternately to ensure balanced utilization of the pumps. In the event of an error of the currently prioritized pump, the NC contact of the monitoring relay closes and the error signal is transfered to the respective monitoring input (E3 or E4). The faulty pump is deactivated and the alternative relay output gets energized. Simultaneously the relay output R3 (pump failure) gets permanently energized and the pump efficiency LED of the affected pump (PP1 or PP2) starts flashing. The fault-free pump remains permanently prioritized. The fault status is reset by temporarily switching to a different function or disconnecting the device from the mains.

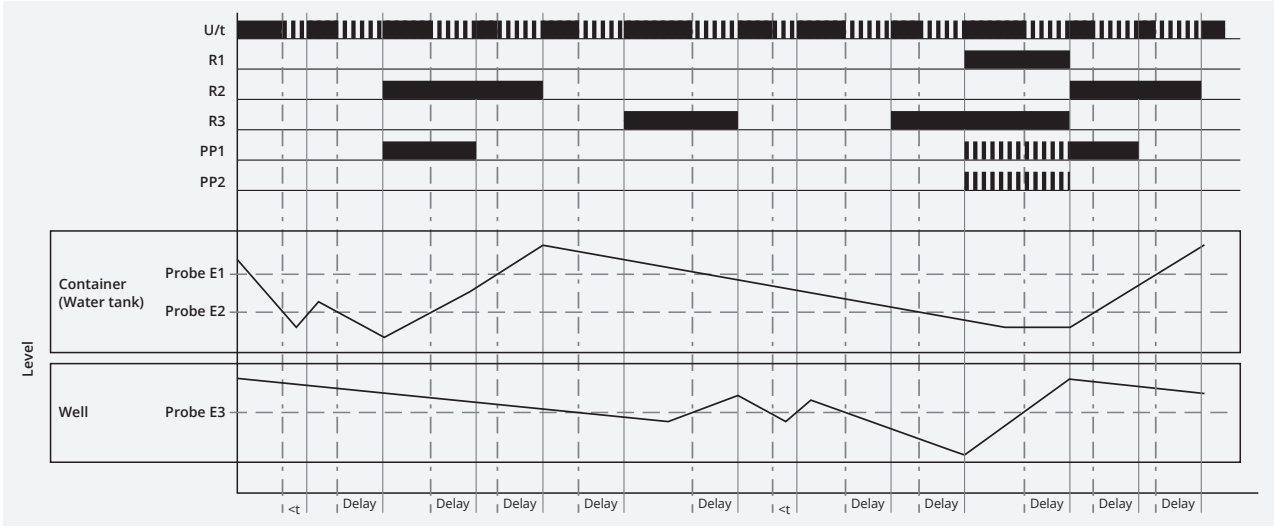


# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

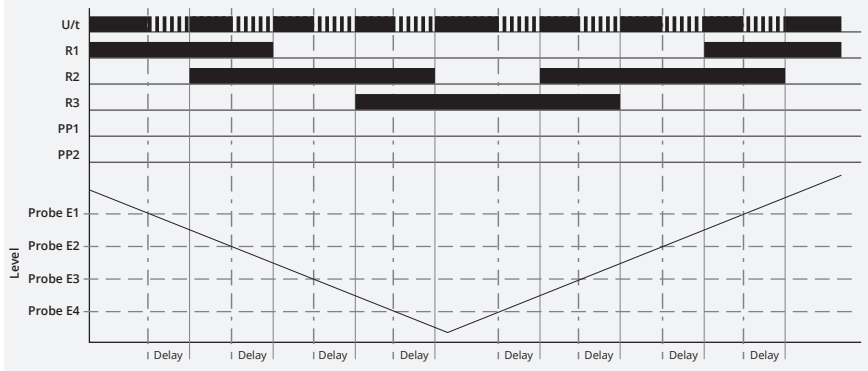
**Well control with MIN alarm (3w-)**
**2 containers, 3 probes**

The function is used to ensure the water supply by means of a water tower and a well. Connection of the probes E0 - E2 (water tower) and E0 and E3 (well). Instead of the reference probe E0 the electroconductive container can be connected. When the liquid level in the water tower drops below the probe E2 the set delay interval is triggered. After the delay time has elapsed the output relay R2 is energised and water from the well is pumped up. Simultaneously the yellow LED PP1 (pump performance) is switched on and stays on until the liquid reaches a stable level at probe E2 (delay time elapsed). As soon as probe level E1 is reached and the delay time has elapsed the output relay R2 is de-energised. When the liquid level in the well drops below the probe E3 the set delay interval is triggered. After the delay time has elapsed the output relay R3 (well alarm) is energised and remains in this state until the liquid level stablely reaches the probe E3 again (delay time elapsed). Only then pumping up into the water tower can be ensured again. If the liquid level in the well as well as the liquid level in the water tower fall below the respective minimum levels (E2 and E3 dry), the output relay R1 (dry alarm) is energized after the delay time has elapsed and the two LEDs PP1 and PP2 start to flash. This state remains until the probe E3 is once again stablely wetted (delay time elapsed) and thus pumping up into the water tower is again possible.



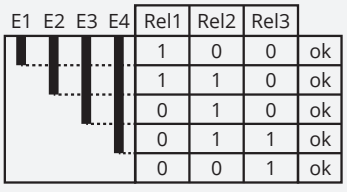

**Level code (4ce)**
**Up to 4 containers, 4 probes**

Connection of the probes E0 - E4. Instead of the reference probe E0 the electroconductive container can be connected. This function maps the probe states of the probes E1-E4 as a code to the relay outputs R1-R3. Each status change is subject to the set delay time. By using an external decision logic (e.g. PLC), reactions to the respective probe states may be programmed as desired. Undefined signal sequences provide the error code 1 - 0 - 1 to the output relay R1 - R3. Overflow or dry-running monitoring for 4 separate containers is possible by means of simple funktional wiring (see next page).




Probe signals

| E1 | E2 | E3 | E4 |
|---|---|---|---|
| 1 | 1 | 1 | 1 |
| 0 | 1 | 1 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 0 | 0 | 1 |
| 0 | 0 | 0 | 0 |




Level code

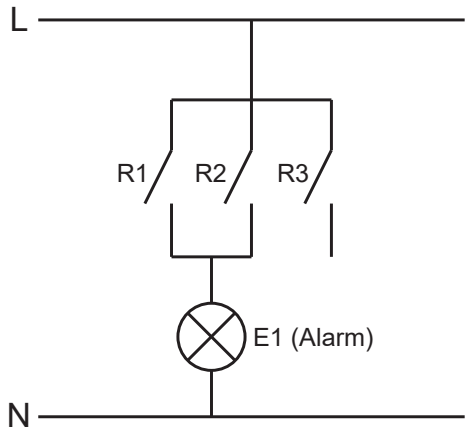
| E1 | E2 | E3 | E4 | Rel1 | Rel2 | Rel3 | |
|---|---|---|---|---|---|---|---|
| | | | | 1 | 0 | 0 | ok |
| | | | | 1 | 1 | 0 | ok |
| | | | | 0 | 1 | 0 | ok |
| | | | | 0 | 1 | 1 | ok |
| | | | | 0 | 0 | 1 | ok |

# V4LM4S30 24-240V AC/DC

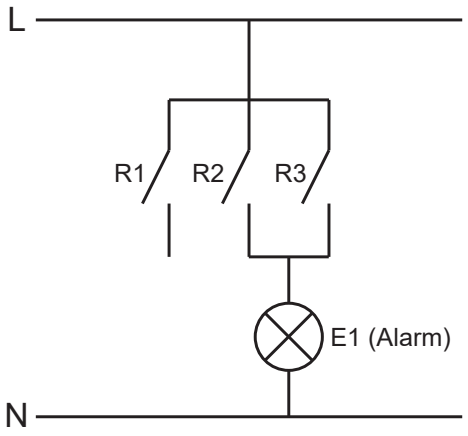
Art.Nr.: 2104500

**Level code functional wiring for overflow or dry-running monitoring of 4 separate containers**

**Overflow monitoring**
(Alarm if liquid level rises above one of the probes)




**Dry-running monitoring**
(Alarm if liquid level falls below one of the probes)




**Probe inconsistencies:**

All undefined binary states on E1-E4 indicate a probe failure (cable break / ground fault / short circuit).

Functions 5 & 6 do not detect a logical probe error since they are also suitable for use with only one probe per container.

Function 10 (level code) returns undefined binary states of the probes as 1-0-1 status at R1 to R3.

| | LED's PP1 & PP2 | Pumps |
|---|---|---|
| t probe inconsistency < delay time | Immediate error code<br>alternating blink | Pump status unchanged<br>Alarm contacts unchanged |
| Probe inconsistency ends within<br>t < delay time | Automatic return to normal operation | Pump status unchanged<br>Alarm contacts unchanged |
| t probe inconsistency > delay time | Error code LED (blinking) remains [1] | All pumps off<br>All Alarm contacts on |
| Probe inconsistency ends after<br>t > = delay time | Error code LED (blinking) remains [1] | Pump status is automatically reset<br>Pumps perform as in normal operation<br>Reset all alarm contacts |

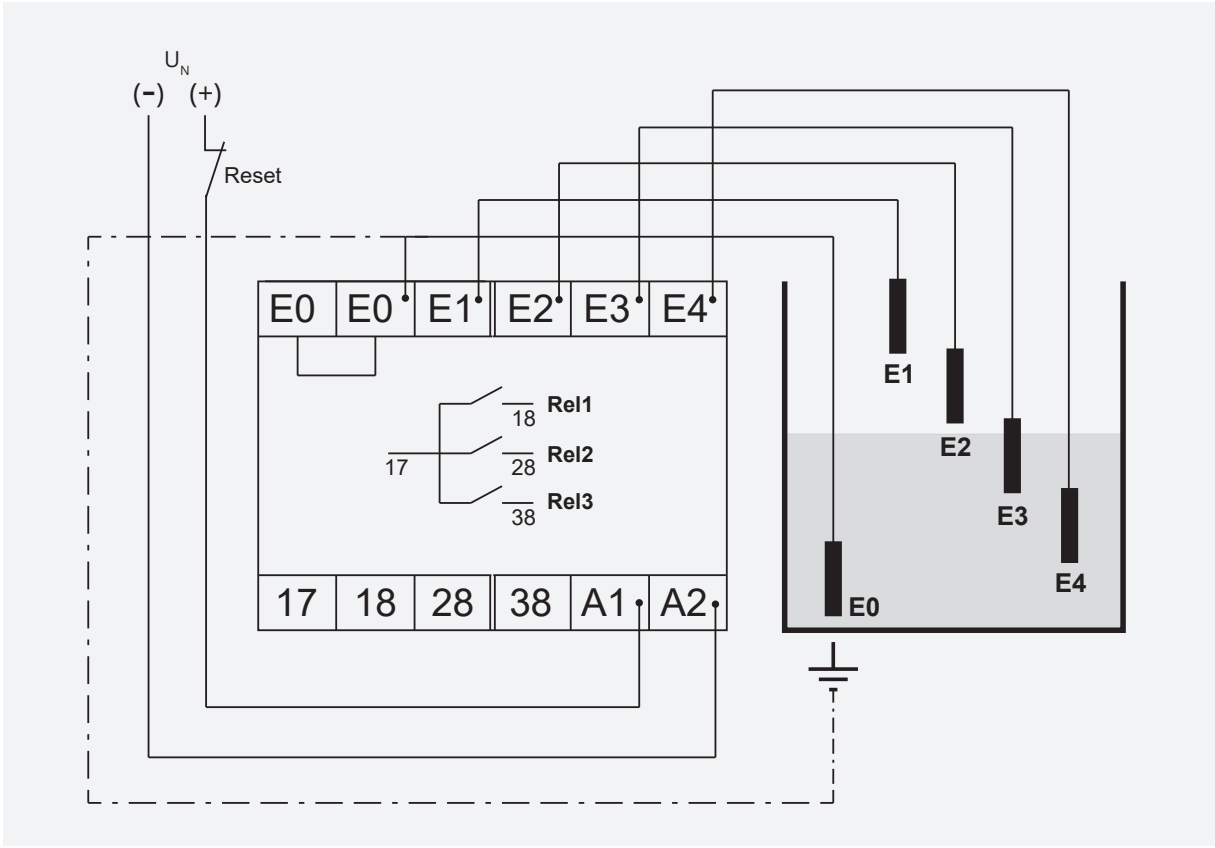
**[1] Stored errors can be reset by interrupting the supply voltage or a change of the function by turning the function selector. The change of function can result in uncontrolled states of the relay output!**

# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

## CONNECTIONS

**Functions: 2uA, 2dA, 3b-, 3b+, 4ce**
**1 container, 4 probes**

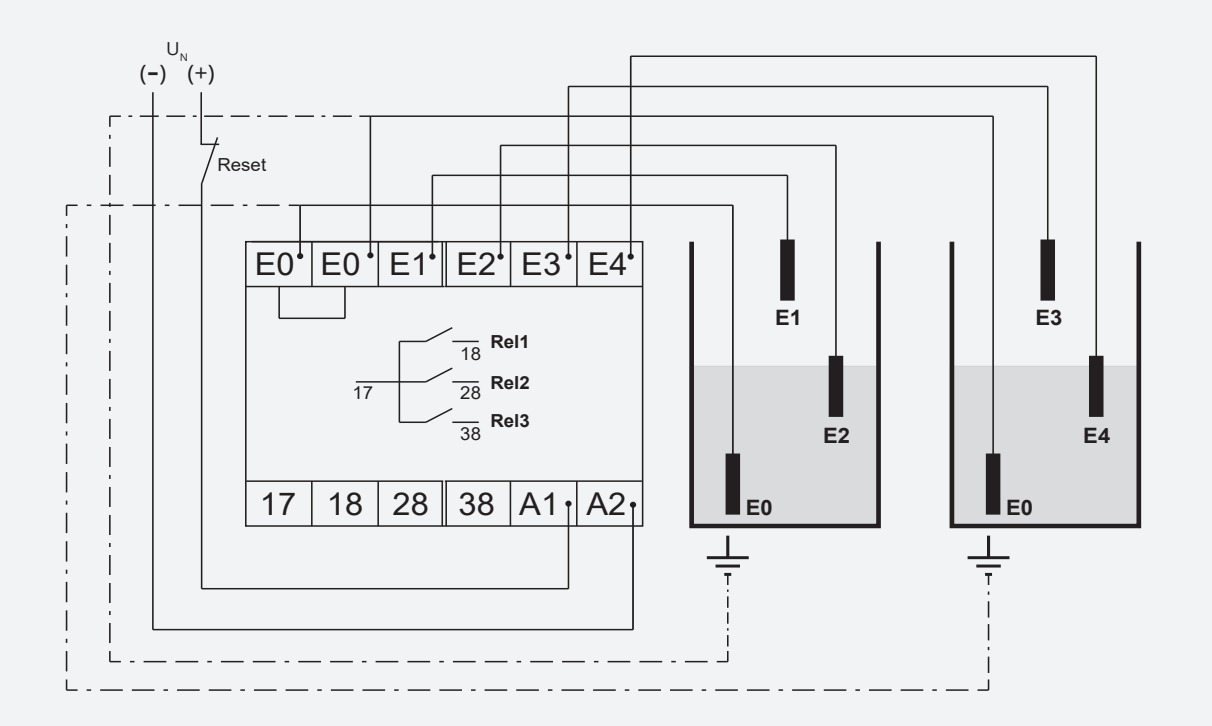


# V4LM4S30 24-240V AC/DC

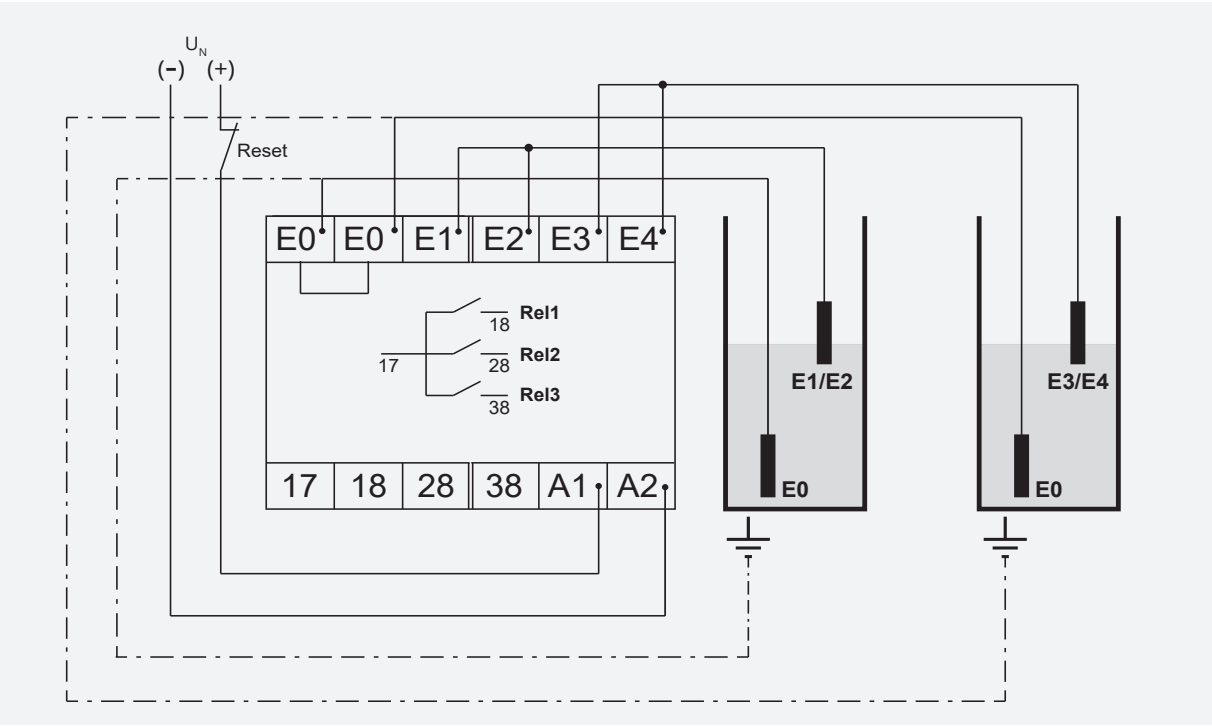
Art.Nr.: 2104500

## CONNECTIONS

**Functions: 2u2, 2d2**
**2 containers, 2 probes each**




**Functions: 2u2, 2d2**
**2 containers, 1 probe connected to E1 and E2, 1 probe connected to E3 and E4**

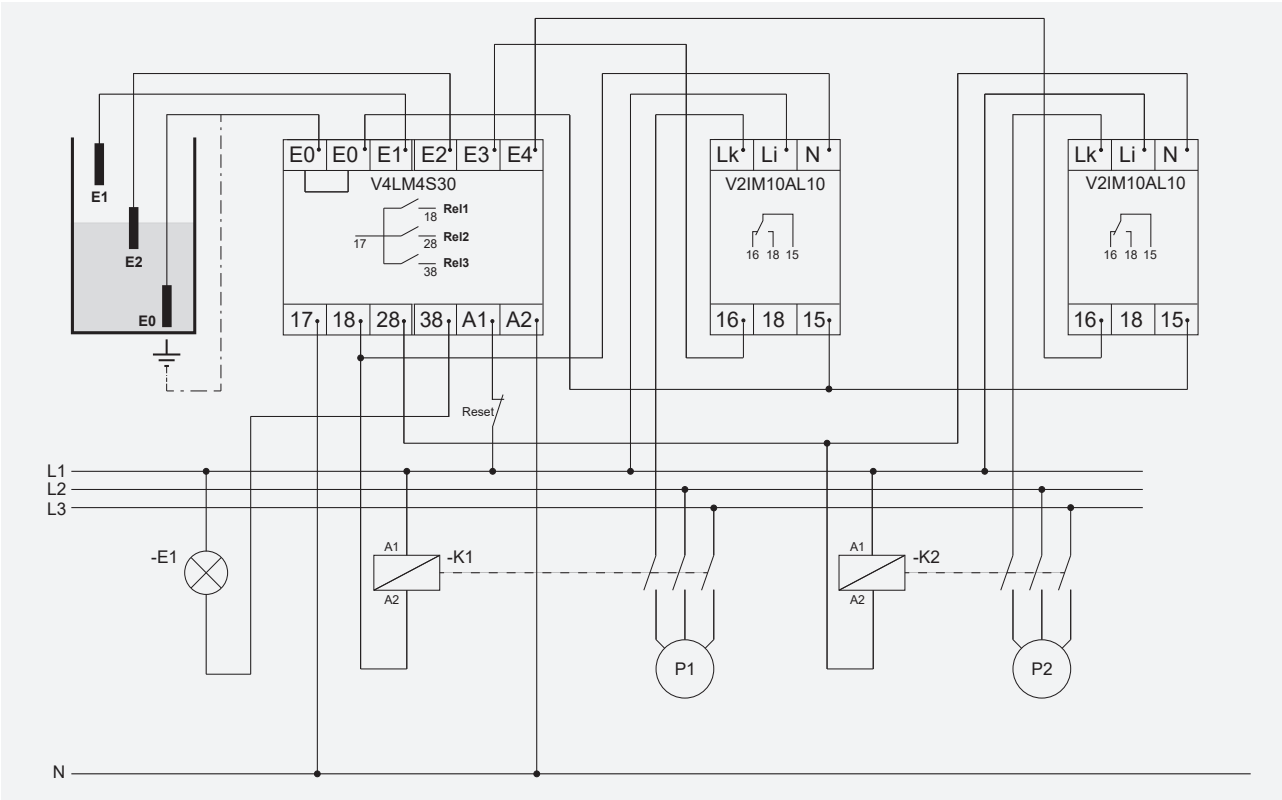


# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

## CONNECTIONS

**Functions: 2uc, 2dc**
**1 container, 2 probes**

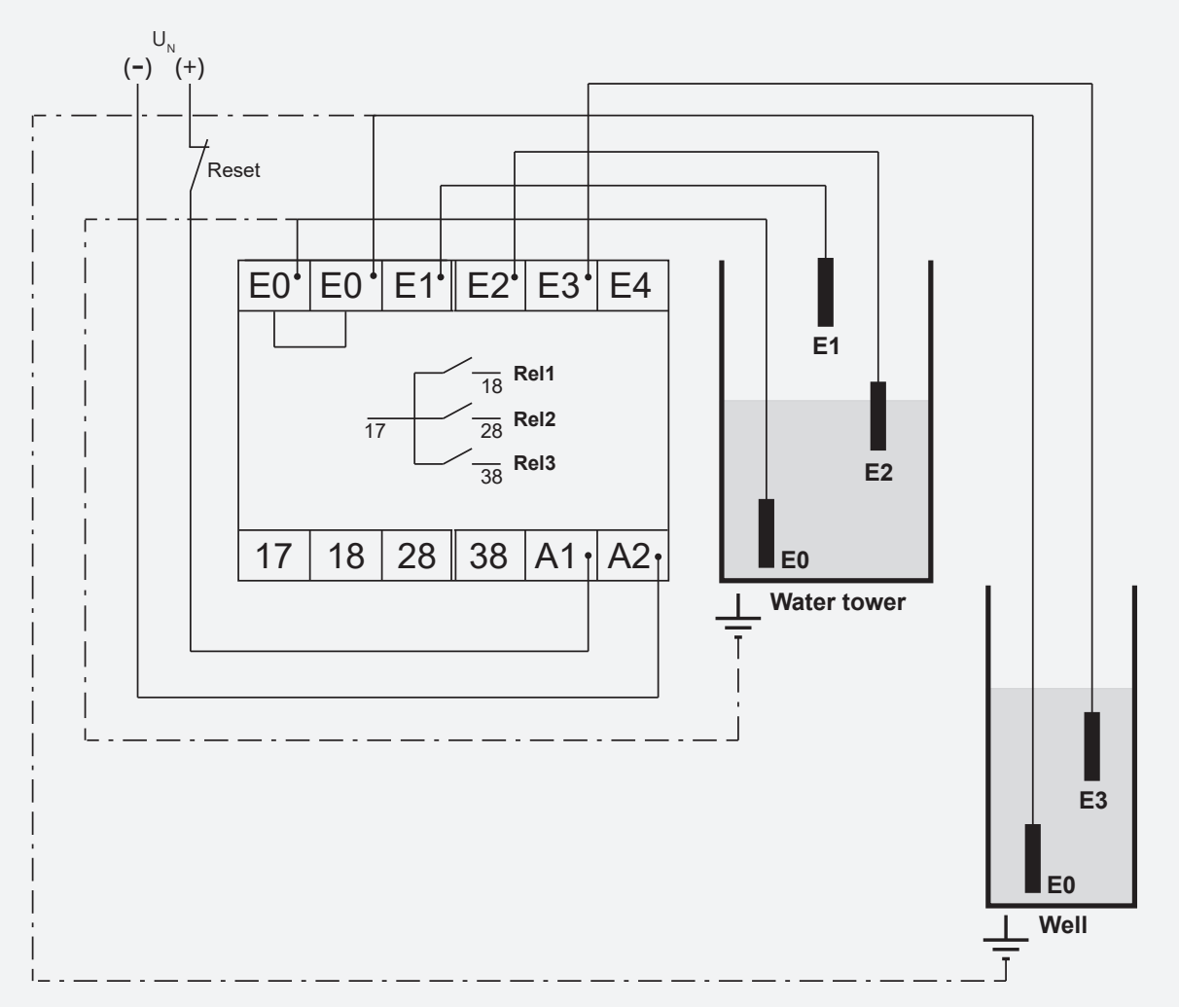


# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

## CONNECTIONS

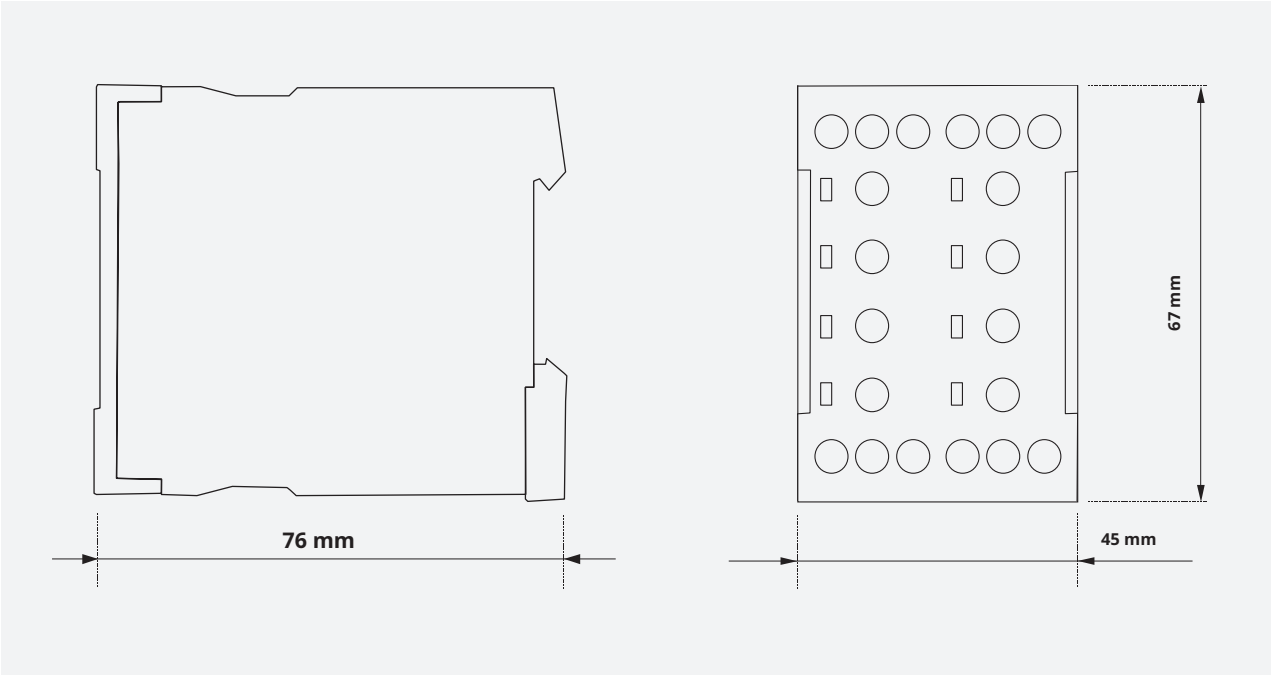
**Functions: 3w-**
**1 container (water tower) with 2 probes, 1 well with 1 probe**



# V4LM4S30 24-240V AC/DC

Art.Nr.: 2104500

## DIMENSIONS



# VEO

MONITORING RELAY / TEMPERATURE

**V2TF01**
Art.Nr.: 2100100

**V2TF01P**
Art.Nr.: 2100110

- Temperature monitoring (PTC)
- Short-circuit monitoring
- Supply voltage 24-240 V AC/DC
- 1 normally open contact
- Width 22,5 mm

**Status indication**

- LED U: Supply voltage
- LED TFailure: Temperature failure


## TECHNICAL DATA

| SUPPLY CIRCUIT (=MEASURING CIRCUIT) | | |
|---|---|---|
| Terminals | | A1-A2 |
| Supply voltage | | 24 ... 240 V AC/DC |
| Supply voltage tolerance | | -15 / +10 % |
| Rated frequency | | 16,6 ... 400 Hz or DC |
| Rated frequency tolerance | | 16,0 ... 420 Hz |
| Rated consumption | 24 V DC | typ. 0,45 W / 0,55 VA |
| | 230 V AC | typ. 0,5 W / 0,85 VA |
| Duty-cycle | | 100 % |
| Backup power time | | < 60 ms |
| Recovery time | | > 100 ms |
| Drop-out voltage | | ≥ 5 V |

| MEASURING CIRCUIT | | |
|---|---|---|
| Terminals | | T1-T2 |
| Measurand | | temperature (PTC) |
| Monitoring functions | | overtemperature |
| Measuring range | | - |
| Switch-off resistance | | ≥ 3,6 kΩ |
| Switch-on resistance | | ≤ 1,6 kΩ |
| Summing initial resistance | | ≤ 1,5 kΩ |
| Short-circuit monitoring | | yes |
| | switch-on re-sistance | ≤ 20 Ω |

# VEO

MONITORING RELAY / TEMPERATURE

## V2TF01

Art.Nr.: 2100100

## V2TF01P

Art.Nr.: 2100110

| | | |
|---|---|---|
| **MEASURAND** | | |
| Reset | | autoreset |
| No-load voltage | max. | 4 V |
| Sensor current | max. | 0,5 mA |
| **TIMING CIRCUIT** | | |
| Start-up delay | fixed | approx. 50 ms |
| **STATUS INDICATION** | | |
| Supply voltage | LED U (green) on | supply voltage applied |
| Temperature monitor | LED TFailure (red) on | indication of overtemperature |
| **OUTPUT** | | |
| Terminals | | 13-14 |
| Kind of output | | Relay |
| Number of contacts | normally open contact | 1 |
| Contact material | | AgNi |
| Rated voltage (IEC 60947-1) | | 250V |
| Maximum switching voltage | | 400V AC |
| Minimum switching voltage / switching current | | 12 V / 10 mA |
| Rated current (IEC 60947-5-1) | AC-1 | 8 A / 250 V |
| | AC-15 | 1,5 A / 240 V (B300) |
| | DC-12 | 8 A / 24 V |
| | DC-13 | 0,1 A / 250 V |
| Endurance | mechanical | 30 x $10^6$ switching cycles |
| | electrical (AC-1) | 100 x $10^3$ switching cycles |
| Rated frequency of operation | with load | 6/min |
| | without load | 1200/min |
| Fuse rating | | 8 A fast acting |
| **ACCURACY** | | |
| Base accuracy | | ± 10 % |
| Temperature influence | | < 0,05 % / °C |
| **ENVIRONMENTAL CONDITIONS** | | |
| Ambient temperature | operation | -25 ... +60°C |
| | storage | -40 ... +70°C |

# V2TF01
Art.Nr.: 2100100

# V2TF01P
Art.Nr.: 2100110

| ENVIRONMENTAL CONDITIONS | | |
|---|---|---|
| Relative humidity | | 5 ... 95 % |
| Vibration | EN 60947-1 | 2 ... 13,2 Hz: 1 mm; 13,2 ... 100 Hz: 7 m/s² |
| Shock | EN 60947-1 | 150 m/s² 11 ms |

| GENERAL DATA | | |
|---|---|---|
| Dimensions | W × H × D | 22,5 x 67 x 76 mm |
| Mounting | | DIN rail (EN60715) |
| Mounting position | | any |
| Housing material | | PA 66, self-extinguishing plastic, class V-0 |
| Degree of protection | housing | IP40 |
| | terminals | IP20 |
| Electrical connection | V2TF01 | Screw terminal |
| Wire size | flexible with wire end ferrule | 0,5 ... 2,5 mm² (20 AWG ... 13 AWG) |
| | flexible without wire end ferrule | 0,5 ... 4 mm² (20 AWG ... 12 AWG) |
| | rigid | 0,5 ... 4 mm² (20 AWG ... 12 AWG) |
| Stripping length | | 8 mm |
| Tightening torque | | max. 1Nm |
| Electrical connection | V2TF01P | Push-in terminal |
| Wire size | flexible with wire end ferrule | 0,25 ... 1,5 mm² (24 AWG ... 16 AWG) |
| | flexible with plastic ferrule | 0,25 ... 0,75 mm² (24 AWG ... 19 AWG) |
| | flexible without wire end ferrule | 0,2 ... 1,5 mm² (24 AWG ... 16 AWG) |
| | rigid | 0,2 ... 1,5 mm² (24 AWG ... 16 AWG) |
| Stripping length | | 8 mm |
| MTTF | | - |
| Weight | | 70 g |

| ISOLATION DATA | | |
|---|---|---|
| Pollution degree (IEC 60947-5-1) | | 2 |
| Overvoltage category (IEC 60947-5-1) | | III |
| Rated insulation voltage (IEC 60947-1) | supply circuit / output circuit | 300 V |
| | supply circuit / thermistor circuit | 300 V |
| | thermistor circuit / output circuit | 300 V |

# V2TF01
Art.Nr.: 2100100

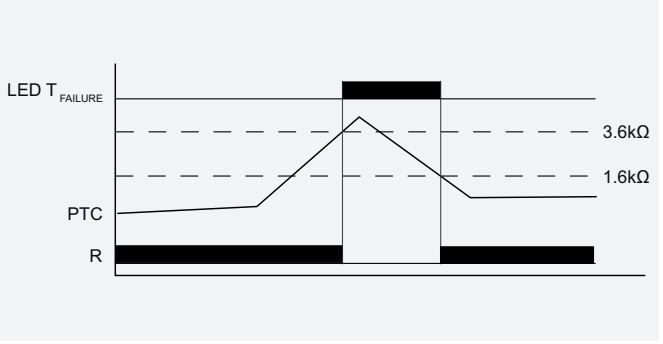
# V2TF01P
Art.Nr.: 2100110

| ISOLATION DATA | | |
|---|---|---|
| Rated impulse withstanding voltage (IEC 60947-1) | supply circuit / output circuit | 4 kV |
| | supply circuit / thermistor circuit | 4 kV |
| | thermistor circuit / output circuit | 6 kV |
| Insulation test voltage (IEC 60947-1) | supply circuit / output circuit | 1500 V |
| | supply circuit / thermistor circuit | 1500 V |
| | thermistor circuit / output circuit | 3000 V |
| Degree of protection | supply circuit / output circuit | basic insulation |
| | supply circuit / thermistor circuit | basic insulation |
| | thermistor circuit / output circuit | protective seperation |

| STANDARDS | |
|---|---|
| Product standard | IEC 60947-5-1 |
| Interference immunity | IEC 61000-6-2 |
| Interference emission | IEC 61000-6-4 |
| Approvals | |

# FUNCTIONS

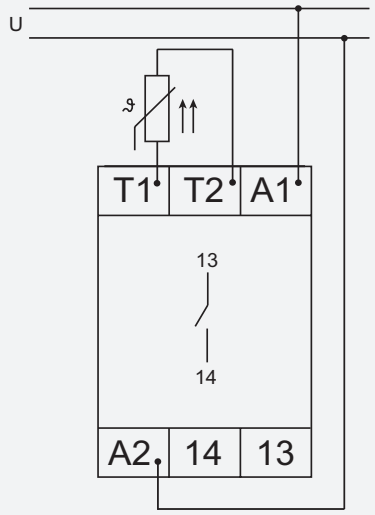
**Temperature monitoring**
If the supply voltage U is applied and the cumulative resistance of the PTC-circuit is less than 3.6kΩ (standard temperature of the motor), the output relay R switches into on-position. When the cumulative resistance of the PTC-circuit exceeds 3.6kΩ, the output relay R switches into off-position. The output relay R switches into on-position again after the cumulative resistance falls below 1.6kΩ.



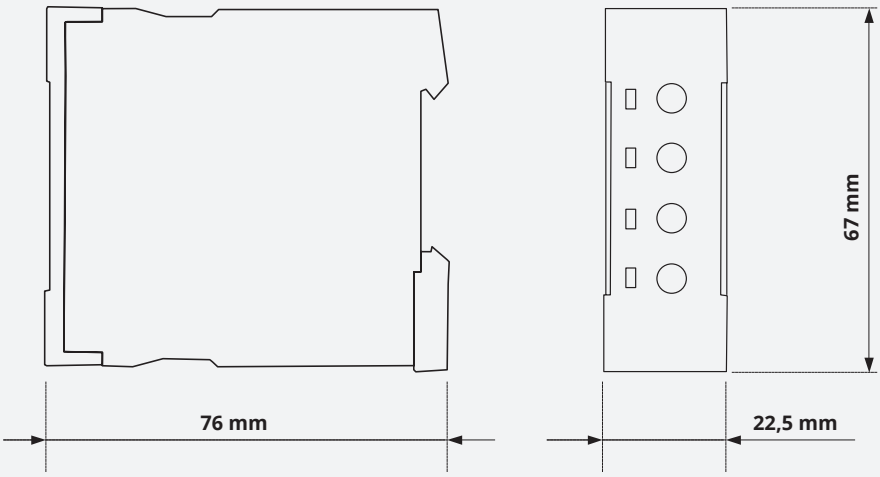
**V2TF01**
Art.Nr.: 2100100

**V2TF01P**
Art.Nr.: 2100110

## CONNECTIONS




## DIMENSIONS



# VEO

MONITORING RELAY / 3-PHASE VOLTAGE

## V4PF480Y/277VSYTK02

Art.Nr.: 2104200

## V4PF480Y/277VSYTK02P

Art.Nr.: 2104210

- Monitoring of phase sequence and phase loss
- Monitoring of asymmetry
- Temperature monitoring (PTC)
- Supply voltage 208-480 V AC
- Supply circuit = measuring circuit
- 2 change-over contacts
- Width 45 mm

**Control elements**

- Asymmetry

**Status indication**

- LED U: Supply voltage
- LED UFailure: Mains faults
- LED TFailure: Temperature failure


# TECHNICAL DATA

| SUPPLY CIRCUIT (=MEASURING CIRCUIT ) | | |
|---|---|---|
| Terminals | | L1-L2-L3 |
| Supply voltage | | 208 / 120 ... 480 / 277 V AC |
| Supply voltage tolerance | | -10 / +10 % |
| Rated frequency | | 50 / 60 Hz |
| Rated frequency tolerance | | 48 ... 63 Hz |
| Rated consumption | 3 x 480 V AC | typ. 0,6 W / 1 VA |
| | 3 x 208 V AC | typ. 0,35 W / 0,55 VA |
| Duty-cycle | | 100 % |
| Backup power time | | < 10 ms |
| Recovery time | | > 500 ms |
| Drop-out voltage | | ≥ 121/70 V AC |

| MEASURING CIRCUIT | |
|---|---|
| Terminals | L1-L2-L3 |
| Measurand | voltage 3-phase |
| Measuring method | rectified value |
| Monitoring functions | phase sequence, phase loss, asymmetry |
| Measuring range | see supply voltage |
| Frequency | see rated frequency |
| Input resistance | 3 MOhm |
| Overload capacity | see supply voltage tolerance |

# VEO

MONITORING RELAY / 3-PHASE VOLTAGE

## V4PF480Y/277VSYTK02

Art.Nr.: 2104200

## V4PF480Y/277VSYTK02P

Art.Nr.: 2104210

| MEASURING CIRCUIT | | |
|---|---|---|
| Thresholds | Max | - |
| | Min | - |
| | Asymmetry | 5 ... 25 %, OFF |
| Hysteresis | | - |
| | | |
| Terminals | | T1-T2-T3 |
| Measurand | | temperature (PTC) |
| Monitoring functions | | overtemperature |
| Switch-off resistance | | ≥ 3,6 kΩ |
| Switch-on resistance | | ≤ 1,8 kΩ |
| Short-circuit monitoring | | terminals T1-T2 |
| | switch-on resistance | ≤ 20 Ω |
| No-load voltage | max. | 5 V DC |
| Reset | | autoreset |

| TIMING CIRCUIT | | |
|---|---|---|
| Start-up delay | fixed | approx. 500ms |
| Tripping delay | mains faults | approx. 200 ms |
| | temperature failure | approx. 250 ms |

| STATUS INDICATION | | |
|---|---|---|
| Supply voltage | LED U (green) on | supply voltage applied |
| Voltage monitor | LED UFailure (red) on | indication of mains fault |
| Temperature monitor | LED TFailure (red) on | indication of overtemperature |

| OUTPUT CIRCUIT | | |
|---|---|---|
| Terminals | overtemperature | 11-12-14 |
| | mains fault | 21-22-24 |
| Kind of output | | Relay |
| Number of contacts | change-over contact | 2 |
| Contact material | | AgNi |
| Rated voltage (IEC 60947-1) | | 250 V |
| Maximum switching voltage | | 400 V AC |
| Minimum switching voltage / switching current | | 12 V / 10 mA |

# V4PF480Y/277VSYTK02
Art.Nr.: 2104200

# V4PF480Y/277VSYTK02P
Art.Nr.: 2104210

## OUTPUT CIRCUIT

| | | |
|---|---|---|
| Rated current (IEC 60947-5-1) | AC-1 | 8 A / 250 V |
| | AC-15 | 1,5 A / 240 V (B300) |
| | DC-12 | 8 A / 24 V |
| | DC-13 | 0,1 A / 250 V |
| Endurance | mechanical | 30 x $10^6$ switching cycles |
| | electrical (AC-1) | 100 x $10^3$ switching cycles |
| Rated frequency of operation | with load | 6/min |
| | without load | 1200/min |
| Fuse rating | | 8 A fast acting |

## ACCURACY

| | | |
|---|---|---|
| Base accuracy | | < 5 % (of full scale) |
| Setting accuracy | | < 5 % (of full scale) |
| Repeat accuracy | | < 1 % |
| Temperature influence | | < 0,05 % / °C |
| Voltage influence | | - |
| Frequency influence | | - |

## ENVIRONMENTAL CONDITIONS

| | | |
|---|---|---|
| Ambient temperature | operation | -25 ... +60°C |
| | storage | -40 ... +70°C |
| Relative humidity | | 5 ... 95 % |
| Vibration | EN 60947-1 | 2 ... 13,2 Hz: 1 mm; 13,2 ... 100 Hz: 7 $m/s^2$ |
| Shock | EN 60947-1 | 150 $m/s^2$ 11 ms |

## GENERAL DATA

| | | |
|---|---|---|
| Dimensions | W × H × D | 45 x 67 x 76 mm |
| Mounting | | DIN rail (EN60715) |
| Mounting position | | any |
| Housing material | | PA 66, self-extinguishing plastic, class V-0 |
| Degree of protection | housing | IP40 |
| | terminals | IP20 |
| Electrical connection | V4PF...TK02 | Screw terminal |
| Wire size | flexible with wire end ferrule | 0,5 ... 2,5 $mm^2$ (20 AWG ... 13 AWG) |
| | flexible without wire end ferrule | 0,5 ... 4 $mm^2$ (20 AWG ... 12 AWG) |
| | rigid | 0,5 ... 4 $mm^2$ (20 AWG ... 12 AWG) |
| Stripping length | | 8 mm |

# V4PF480Y/277VSYTK02
Art.Nr.: 2104200

# V4PF480Y/277VSYTK02P
Art.Nr.: 2104210

## GENERAL DATA

| | | |
|---|---|---|
| Tightening torque | | max. 1Nm |
| Electrical connection | V4PF...TK02P | Push-in terminal |
| Wire size | flexible with wire end ferrule | 0,25 ... 1,5 mm² (24 AWG ... 16 AWG) |
| | flexible with plastic ferrule | 0,25 ... 0,75 mm² (24 AWG ... 19 AWG) |
| | flexible without wire end ferrule | 0,2 ... 1,5 mm² (24 AWG ... 16 AWG) |
| | rigid | 0,2 ... 1,5 mm² (24 AWG ... 16 AWG) |
| Stripping length | | 8 mm |
| MTTF | | - |
| Weight | | 135 g |

## ISOLATION DATA

| | | |
|---|---|---|
| Pollution degree (IEC 60947-5-1) | | 2 |
| Overvoltage category (IEC 60947-5-1) | | III |
| Rated insulation voltage (IEC 60947-1) | supply circuit / output cicuit | 550 V |
| | supply circuit / thermistor circuit | 550 V |
| | thermistor circuit / output circuit | 550 V |
| Rated impulse withstanding voltage (IEC 60947-1) | supply circuit / output cicuit | 6 kV |
| | supply circuit / thermistor circuit | 4 kV |
| | thermistor circuit / output circuit | 6 kV |
| Insulation test voltage (IEC 60947-1) | supply circuit / output cicuit | 3780 V |
| | supply circuit / thermistor circuit | 1890 V |
| | thermistor circuit / output circuit | 3780 V |
| Degree of protection | supply circuit / output cicuit | protective seperation |
| | supply circuit / thermistor circuit | basic insulation |
| | thermistor circuit / output circuit | protective seperation |

## STANDARDS

| | |
|---|---|
| Product standard | IEC 60947-5-1 |
| Interference immunity | IEC 61000-6-2 |
| Interference emission | IEC 61000-6-4 |
| Approvals | |

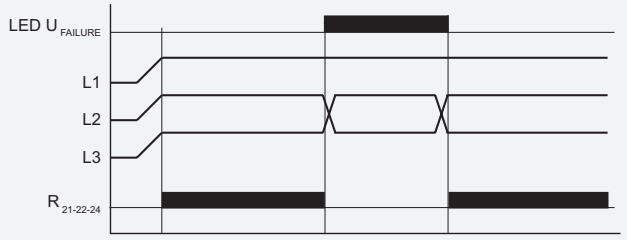
**V4PF480Y/277VSYTK02**
Art.Nr.: 2104200

**V4PF480Y/277VSYTK02P**
Art.Nr.: 2104210

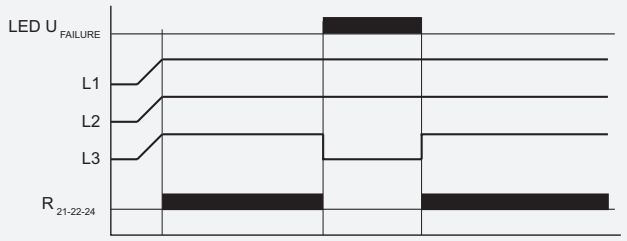
# FUNCTIONS

When all the phases are connected in the correct sequence and the measured asymmetry is less than the set value, the output relay $R_{21\text{-}22\text{-}24}$ switches into on-position.

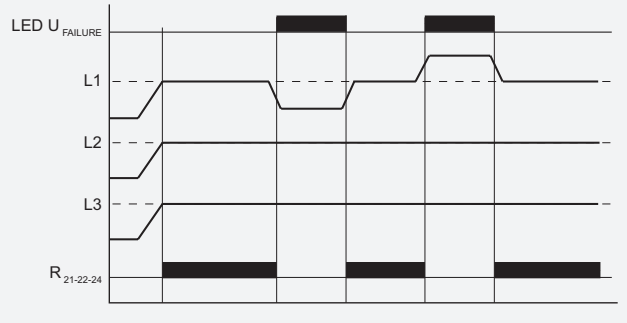
**Phase sequence monitoring**
When the phase sequence changes, the output relay $R_{21\text{-}22\text{-}24}$ switches into off-position.



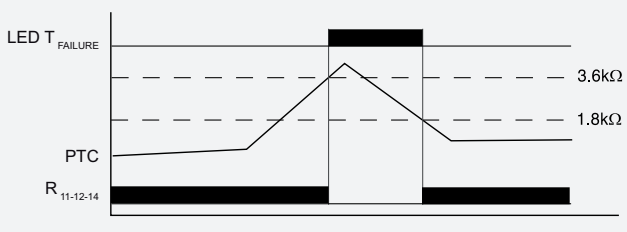

**Phase failure monitoring**
When one of the three phases fails, the output relay $R_{21\text{-}22\text{-}24}$ switches into off-position.




**Asymmetry monitoring**
When the asymmetry exceeds the value at the ASYM-regulator, the output relay $R_{21\text{-}22\text{-}24}$ switches into off-position. Reverse voltages of a consumer (e.g. a motor which continues to run on two phases only) do not effect the disconnection.




**Temperature monitoring**
If the supply voltage U is applied and the cumulative resistance of the PTC-circuit is less than 3.6kΩ (standard temperature of the motor), the output relay $R_{11\text{-}12\text{-}14}$ switches into on-position. When the cumulative resistance of the PTC-circuit exceeds 3.6kΩ, the output relay $R_{11\text{-}12\text{-}14}$ switches into off-position. The output relay $R_{11\text{-}12\text{-}14}$ switches into on-position again after the cumulative resistance falls below 1.8kΩ.

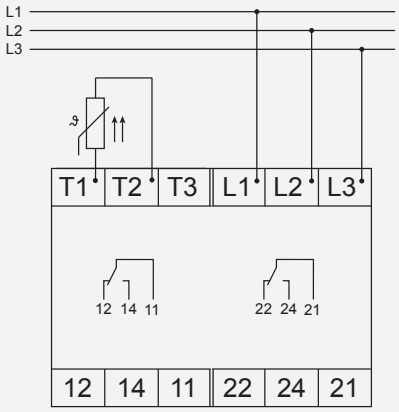


**V4PF480Y/277VSYTK02**
Art.Nr.: 2104200

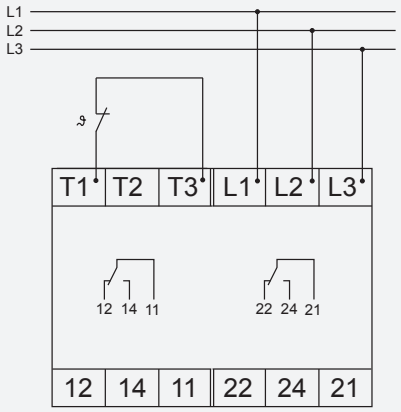
**V4PF480Y/277VSYTK02P**
Art.Nr.: 2104210

## CONNECTIONS

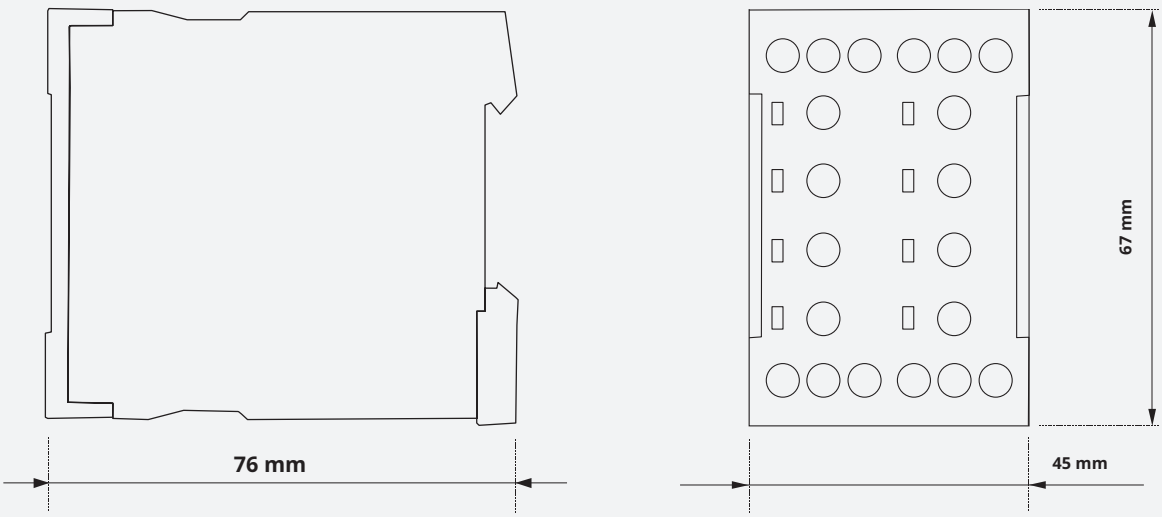
**Voltage monitoring with PTC**

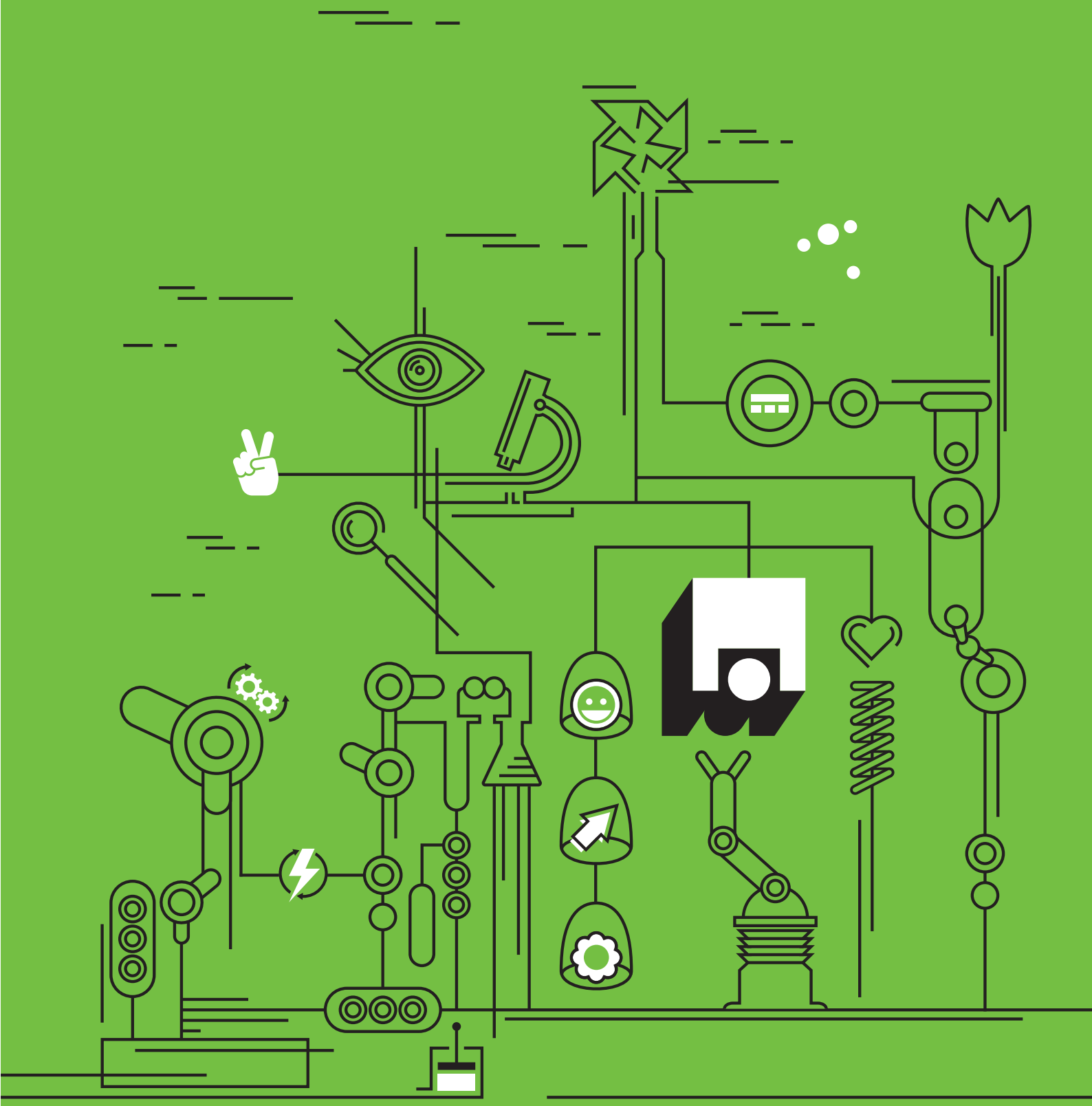



**Voltage monitoring with thermal contact**




## DIMENSIONS





**For contact data of your local distributor please visit**
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Art.nr.: 091113/V3


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