RPN-1VFR-A400

RPN-2VFR-A400

NEW

- **Multifunctions monitoring relays**
  **(AC voltage monitoring in 3-phase network - 3(N)~ 400/230 V)**
- Monitoring of phase failure, asymmetry, phase sequence
- Histeresis mode • Tripping delay
- Cadmium - free contacts 1 CO and 2 CO • AC input voltages
- Cover - modular, width 17,5 mm
- Direct mounting on 35 mm rail mount acc. to EN 60715
- Compliance with standard EN 50178
- Recognitions, certifications, directives: RoHS, CE UK CA

## Output circuit - contact data

| | | | |
|---|---|---|---|
| Number and type of contacts | | 1 CO | 2 CO |
| Contact material | | $AgSnO_2$ | |
| Max. switching voltage | | 300 V AC | |
| Rated load | AC1 | 12 A / 250 V AC | 6 A / 250 V AC |
| | DC1 | 12 A / 24 V DC | 6 A / 24 V DC |
| | DC1 | 0,3 A / 250 V DC | 0,1 A / 250 V DC |
| Rated current | | 12 A / 250 V AC | 6 A / 250 V AC |
| Max. breaking capacity | AC1 | 3 000 VA | 1 500 VA |
| Min. breaking capacity | | 1 W 10 mA | |
| Contact resistance | | ≤ 100 mΩ | |
| Max. operating frequency | | | |
| • at rated load | AC1 | 600 cycles/hour | |

## Input circuit

| | | |
|---|---|---|
| Supply voltage | AC | = monitoring voltage |
| Rated voltage | 50/60 Hz AC | 3(N)~ 400/230 V terminals (N)-L1-L2-L3 |
| Must release voltage | | AC: ≥ 0,2 $U_n$ |
| Operating range of supply voltage | | when supplied from at least two phases: 0,7...1,15 $U_n$<br>when supplied from single phase: 0,85...1,15 $U_n$ |
| Rated power consumption | | 1,2 W |
| Range of supply frequency | AC | 48...63 Hz |
| **Measuring circuit** ❶ | | |
| • measured value | | electrical voltage, RMS value, 50 Hz<br>3(N)~, sinus, 48...63 Hz |
| • measuring inputs | | = supply voltage AC: 3(N)~ 400/230 V |
| • measuring terminals | | (N)-L1-L2-L3 |
| • measuring range | | 0,7...1,15 $U_n$ |
| • overload capacity | | ≥ 1,2 $U_n$ |
| • hysteresis H | | 5 V |
| • switching thresholds for single phase | | ERROR: ≤ 175 V AC<br>OK: > 175 V AC<br>OK (when returning after an error): ≥ 180 V AC |
| • switching thresholds for asymmetry | | smooth adjustment:<br>ERROR: > 5...80 V AC<br>OK: ≤ 5...80 V AC<br>OK (when returning after an error): ≤ 0...75 V AC |
| • switching thresholds for phase sequence | | OK: correct sequence of phase connection to the terminals<br>ERROR: phase connection to terminals other than OK status |

## Insulation according to EN 60664-1

| | | |
|---|---|---|
| Insulation rated voltage | | 400 V AC |
| Rated surge voltage | | 4 000 V 1,2 / 50 µs |
| Overvoltage category | | III |
| Insulation pollution degree | | 2 |
| Flammability class | | V-0 for modular cover, UL 94 |
| Dielectric strength | | |
| • input - output | | 4 000 V AC type of insulation: basic |
| • contact clearance | | 1 000 V AC type of clearance: micro-disconnection |

❶ The measuring circuit is not galvanically insulated from the relay supply circuit.

04.12.2025





**Export Sales Department** phone +48 68 47 90 832, 951 • e-mail: export@relpol.com.pl

## General data

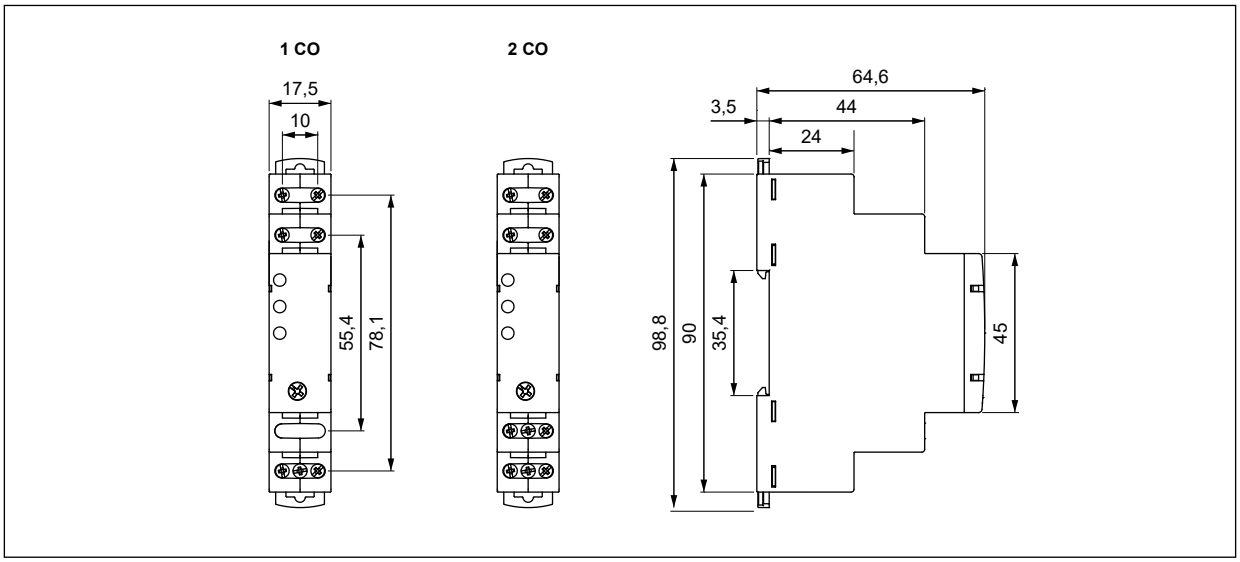
| | | | |
|---|---|---|---|
| Electrical life | • resistive AC1 | > 0,5 x $10^5$ | 12 A, 6 A, 250 V AC |
| Mechanical life (cycles) | | > 3 x $10^7$ | |
| Dimensions (L x W x H) | | 90 ❷ x 17,5 x 64,6 mm | |
| Weight | | contact 1 CO: 72 g | contacts 2 CO: 75 g |
| Ambient temperature (non-condensation and/or icing) | • storage<br>• operating | -40...+70 °C<br>-20...+60 °C | |
| Cover protection category | | IP 20 | EN 60529 |
| Relative humidity | | up to 85% | |
| Shock resistance | | 15 g | |
| Vibration resistance | | 0,35 mm DA | 10...55 Hz |

## Meassuring circuit data ❶

| | |
|---|---|
| Functions | LOST D - phase failure monitoring<br>ASYM D - asymmetry monitoring<br>SEQ D - phase sequence monitoring<br>histeresis mode |
| Ranges of asymmetry | smooth adjustment: OFF - permanent switching off;<br>5...80 V AC |
| Tripping delay | fixed value: 4 s |
| Base accuracy | voltage measurement: ± 5% ❸ |
| Accuracy of asymmetry settings | threshold limits: ± 10% ❹ |
| Recovery time | 200 ms |
| LED indicator ❺ | two-colour LEDs (green/red) LOST+ASYM, SEQ:<br>indication of supply voltage U, error, tripping delay<br>yellow LED R - output relay status |

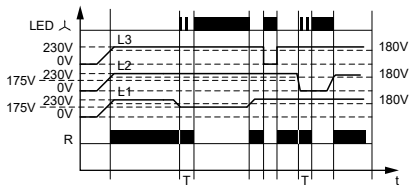
❶ The measuring circuit is not galvanically insulated from the relay supply circuit. ❷ Length with 35 mm rail catches: 98,8 mm. ❸ From a measured value in the range of 100...230 V. ❹ Calculated from the final range values, for the setting direction from minimum to maximum. ❺ LED indication - see "Additional functions", page 3.

## Dimensions



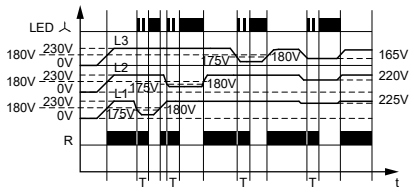
## Functions

**LOST D** - Phase failure monitoring (with delayed disconnection of contact R).




If the voltage at all phases will exceed 175 V and no error condition occurred earlier, then the operational relay R is switched on. If voltage at one of the three phases, L1, L2, L3 falls to a value of 175 V, then after applying a delay time 4 s, the R contact is switched off. The operational relay R will be switched back on when the voltage value at the given phase rises to 180 V. A rapid phase loss is treated as a phase sequence error and no delay is then applied.

**ASYM D** - Asymmetry monitoring (with delayed disconnection of contact R).




The operational relay R switches to the off position when the asymmetry exceeds the setpoint value (diagram: switching threshold of asymmetry error 60 V). The asymmetry caused by the return voltage of the receiver (e.g. a motor that still operates in only two phases) does not disconnect.

**SEQ D** - Phase sequence monitoring (without delay for disconnection of contact R).

If all the phases are connected to the terminals in the correct sequence (L1->L1, L2->L2, L3->L3) or in a consecutive sequence, then the operational relay R switches on. When the phase sequence changes, the operational relay R is immediately switched off.

Allowed connections combinations phases with terminal:

| Terminal | Phase |
|---|---|
| L1 -> | L1 |
| L2 -> | L2 |
| L3 -> | L3 |
| L1 -> | L2 |
| L2 -> | L3 |
| L3 -> | L1 |
| L1 -> | L3 |
| L2 -> | L1 |
| L3 -> | L2 |

L1: misalignment phase 0°
L2: misalignment phase 2π/3=120°
L3: misalignment phase 4π/3=240°

**L1**, **L2**, **L3** - phase supply voltages; **R** - output state of the relay;
**T** - delay time; t - time axis

## Additional functions

**LEDs**: two-colour (green/red) LOST+ASYM, SEQ - are lit permanently or flashes at 500 ms period where it is lit for 50% of the time, and off for 50% of the time. Yellow R is lit permanently.

**Adjustment of the set values**: the value of range of asymmetry is read in the course of the relay's operation. The set value may be modified at any moment.

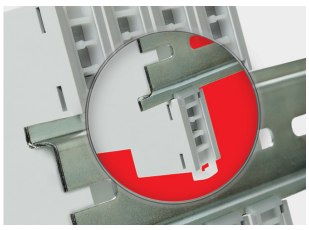
**Supply**: the relay may be supplied with AC voltage 48...63 Hz of 161...264,5 V.

| LED indication | LOST+ASYM | SEQ | R |
|---|---|---|---|
| green lights up all the time | power supply and asymmetry are correct | correct phase sequence | – |
| red lights up all the time | ERROR power supply or asymmetry | ERROR phase sequence | – |
| red flashes | ERROR power supply or asymmetry ❻ | – | – |
| yellow does not light up | – | – | contact R disconnected |
| yellow lights up all the time | – | – | contact R connected |

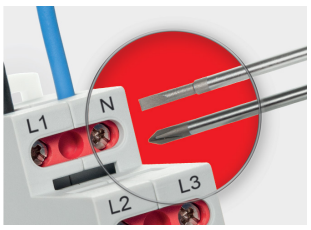
❻ Measurement of the tripping delay time (disconnection of contact R) after has occurred a phase failure or asymmetry error.

## Mounting

Relays **RPN-.VFR-A400** are designed for direct mounting on 35 mm rail mount acc. to EN 60715. Operational position - any. **Connections:** max. cross section of the cables: 1 x 2,5 mm² (1 x 14 AWG), stripping length: 6,5 mm, max. tightening moment for the terminal: 0,5 Nm.

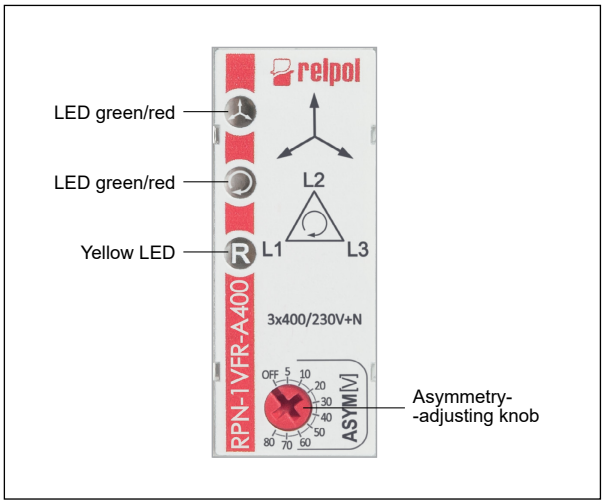


**Two catches**: easy mounting on 35 mm rail, firm hold (top and bottom).

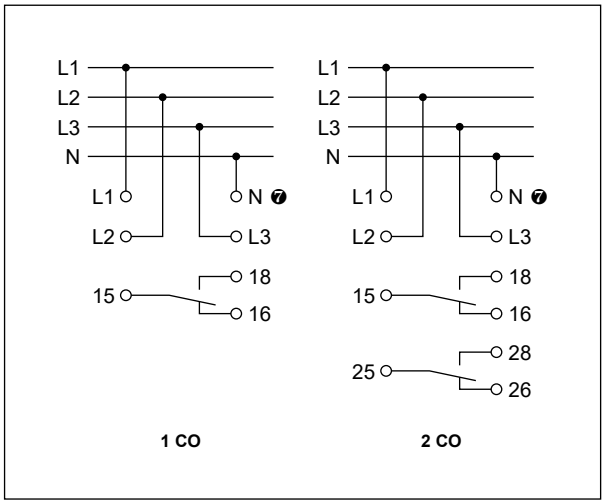



**Mounting wires in clamps**: universal screw (cross-recessed or slotted head).

## Front panel description




## Connection diagrams




❼ Requires terminal (N) connection to the neutral wire.

## Ordering codes

| Type | Number and type of contacts | Functions performed | Rated input voltage |
|---|---|---|---|
| RPN | – | VFR | – A400 |

**Number and type of contacts**

**1** - 1 CO
**2** - 2 CO

**Functions performed**

**VFR** - relay performing functions LOST D, ASYM D, SEQ D

**Rated input voltage**

**A400** - 3(N)~ 400/230 V AC 50/60 Hz

Examples of ordering codes:

**RPN-1VFR-A400** monitoring relay **RPN-1VFR-A400**, multifunction (relay perform 3 functions), cover - modular, width 17,5 mm, one changeover contact, contact material $AgSnO_2$, rated input voltage = monitoring 3(N)~ 400/230 V AC 50/60 Hz

**RPN-2VFR-A400** monitoring relay **RPN-2VFR-A400**, multifunction (relay perform 3 functions), cover - modular, width 17,5 mm, two changeover contacts, contact material $AgSnO_2$, rated input voltage = monitoring 3(N)~ 400/230 V AC 50/60 Hz

**PRECAUTIONS:**
**1.** Ensure that the parameters of the product described in its specification provide a safety margin for the appropriate operation of the device or system and never use the product in circumstances which exceed the parameters of the product. **2.** Never touch any live parts of the device. **3.** Ensure that the product has been connected correctly. An incorrect connection may cause malfunction, excessive heating or risk of fire. **4.** In case of any risk of any serious material loss or death or injuries of humans or animals, the devices or systems shall be designed so to equip them with double safety system to guarantee their reliable operation.