RPN-1VFT-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 • Timing adjustment of tripping delay
- Cadmium - free contacts 1 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,

Output circuit - contact data

Number and type of contacts		1 CO
Contact material		$AgSnO_2$
Max. switching voltage	AC	300 V
Rated load	AC1	12 A / 250 V AC
	DC1	12 A / 24 V DC
	DC1	0,3 A / 250 V DC
Rated current		12 A / 250 V AC
Max. breaking capacity	AC1	4 000 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 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 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 OK: > 175 V AC OK (when returning after an error): ≥ 180 V AC
• switching thresholds for asymmetry		smooth adjustment: ERROR: > 5...80 V AC OK: ≤ 5...80 V AC OK (when returning after an error): ≤ 0...75 V AC
• switching thresholds for phase sequence		OK: correct sequence of phase connection to the terminals 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 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.

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General data

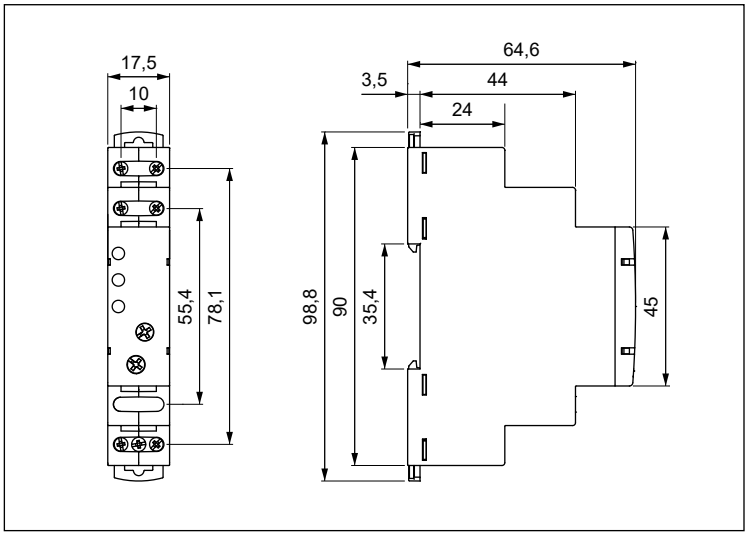
Electrical life • resistive AC1	> 0,5 x 10^5	12 A, 250 V AC
Mechanical life (cycles)	> 3 x 10^7	
Dimensions (L x W x H)	90 ❷ x 17,5 x 64,6 mm	
Weight	72 g	
Ambient temperature • storage	-40...+70 °C	
(non-condensation and/or icing) • operating	-20...+60 °C	
Cover protection category	IP 20	EN 60529
Relative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

Meassuring circuit data ❶

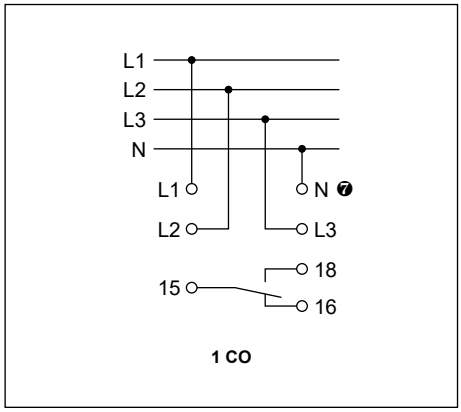
Functions	LOST D - phase failure monitoring ASYM D - asymmetry monitoring SEQ D - phase sequence monitoring histeresis mode
Ranges of asymmetry	smooth adjustment: OFF - permanent switching off; 5...80 V AC
Time ranges of tripping delay	step adjustment: OFF - permanent switching off; (1 s; 2 s ❸); 3 s; 4 s; 5 s; 6 s; 7 s; 8 s; 9 s
Base accuracy	voltage measurement: ± 5% ❹
Accuracy of asymmetry settings	threshold limits: ± 10% ❺
Accuracy of delay time settings	threshold limits: ± 5% ❺ ❸
Values affecting the timing adjustment • temperature • supply voltage	 ± 0,05% / °C ± 0,01% / V
Recovery time	200 ms
LED indicator ❻	two-colour LEDs (green/red) LOST+ASYM, SEQ: indication of supply voltage U, error, tripping delay 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 For initial ranges (1 s; 2 s) setting accuracy is smaller than the given ones in technical parameters (significant influence of the operational relay operating time, processor start-time, and the moment of supply switching as referred to the AC supply course). ❹ From a measured value in the range of 100...230 V. ❺ Calculated from the final range values, for the setting direction from minimum to maximum. ❻ LED indication - see "Additional functions", page 3.

Dimensions



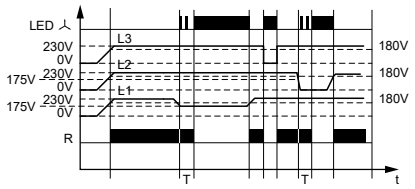
Connection diagram



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

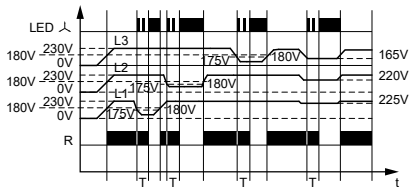
Functions

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 setpoint delay time, 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.

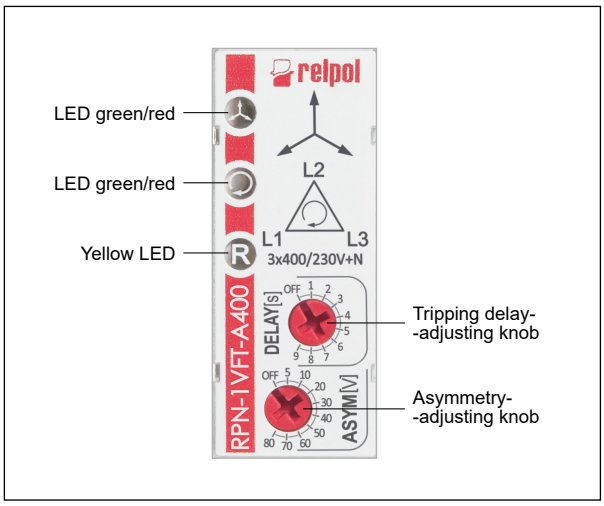
Adjustment of the set values: the values of range of asymmetry and tripping delay are read in the course of the relay's operation. The set values may be modified at any moment.

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 ❽	–	–
yellow does not light up	–	–	contact R disconnected
yellow lights up all the time	–	–	contact R connected

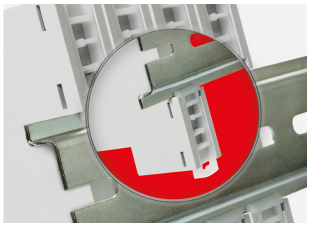
❽ Measurement of the tripping delay time (disconnection of contact R) after has occurred a phase failure or asymmetry error.

Front panel description

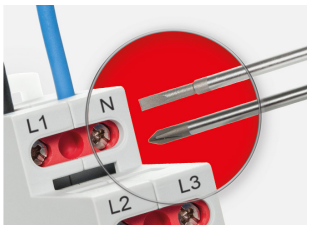


Mounting

Relays **RPN-1VFT-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.

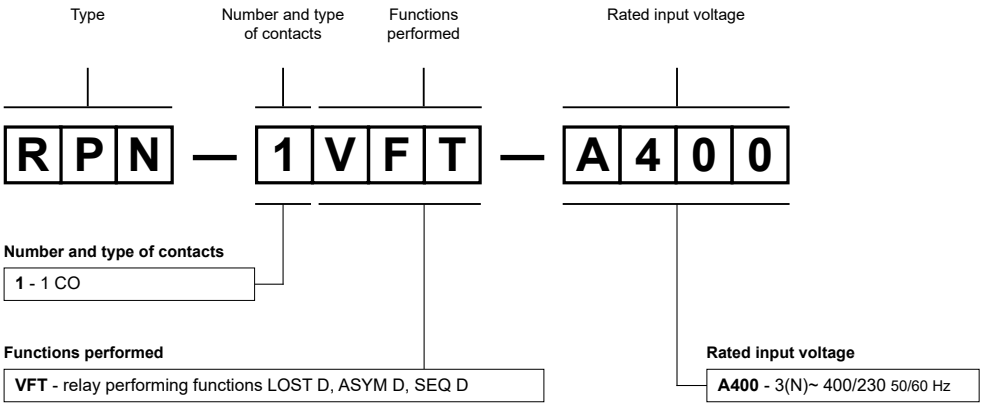


Two catches: easy mounting on 35 mm rail, firm hold (top and bottom).



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

Ordering codes



Example of ordering codes:

RPN-1VFT-A400 monitoring relay **RPN-1VFT-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

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.

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