

# Type: M1PRT & M1PRT-4W

## Phase Failure, Phase Sequence and Under Voltage plus Time Delay

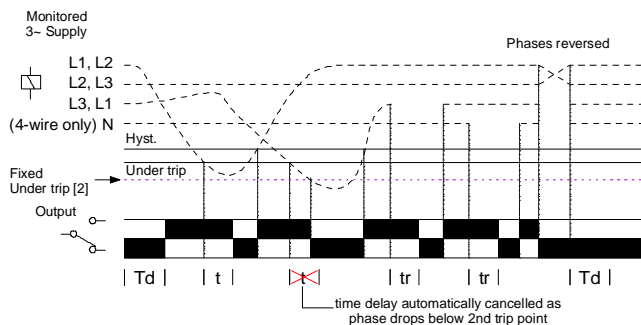
- ❑ 17.5mm DIN rail housing
- ❑ Monitors own supply and detects an Under voltage condition on one or more phases
- ❑ M1PRT measures phase to phase voltage and M1PRT-4W measures phase to neutral voltage
- ❑ Detects incorrect phase sequence, phase loss and neutral loss (4-wire only)
- ❑ Adjustment for under voltage trip level
- ❑ Adjustment for time delay (from an under voltage condition)
- ❑ 1 x SPDT relay output 8A
- ❑ Intelligent LED indication for supply and relay status

Dims:  
to DIN 43880  
W. 17.5mm



Terminal Protection to IP20

### • FUNCTION DIAGRAM



### • INSTALLATION AND SETTING



Installation work must be carried out by qualified personnel.

- BEFORE INSTALLATION, ISOLATE THE SUPPLY.
- Connect the unit as required. The diagram below shows a typical installation, whereby the supply to the load is being monitored by the relay. If a fault should occur, the contactor is de-energised removing the 3-phase supply to the load. The contactor only re-energises after the fault has cleared.

Applying power.

- Set the "trip level" and the "time delay" to minimum.
- Apply power and the green "supply on" and red "relay" LED's will illuminate, the relay will energise and contacts 15 and 18 will close. Refer to troubleshooting table if the unit fails to operate correctly.

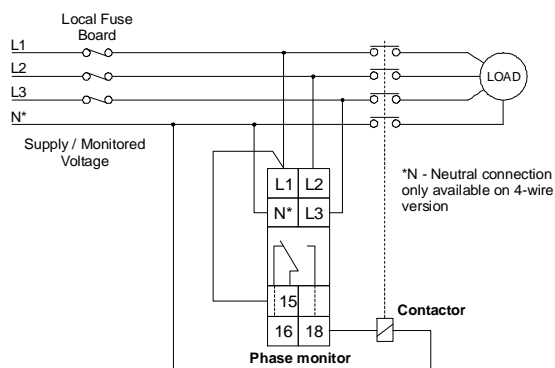
Setting the unit.

- Accurate setting can be achieved by adjusting the "trip level" until the unit trips (relay de-energises) then by decreasing the "trip level" setting until the relay re-energises. By close setting of the "trip level", the unit will also detect a phase loss even with a large percentage of re-generative voltage.
- In order to set the unit as previously described but without causing disruption to the equipment being controlled/monitored, set the "time delay" to maximum. It will now be possible to establish the trip point when the red "relay" LED starts to flash. Decrease the trip level setting to stop the LED flashing. (Note: If the time delay is allowed to expire, the output relay will de-energise)
- If large supply variations are anticipated, the "trip level" should be set further from the nominal voltage.
- Set the "time delay" as required. (Note that the delay is only effective should the supply drop below the set "trip level". However, if during an under voltage condition the supply drops below the 2<sup>nd</sup> under voltage trip level, any set time delay is automatically cancelled and the relay de-energises).

Troubleshooting. The table below shows the status of the unit during a fault condition.

Supply fault	Green LED	Red LED	Relay
Phase or Neutral (4-wire only) missing	Off	Off	De-energised
Phases reversed (no delay)	Flashing	Off	De-energised
Under Voltage condition (during timing)	On	Flashing	Energised for set delay (t)
Under Voltage condition (after timing)	On	Off	De-energised
Phase below 70% of Un (fixed under trip level [2])	On	Off	De-energised
Phase below 50% of Un	Off	Off	De-energised

### • CONNECTION DIAGRAM



### • TECHNICAL SPECIFICATION

Supply / monitoring voltage U\*:

M1PRT (L1, L2, L3)	M1PRT-4W (L1, L2, L3, N)
77 - 143V AC	44.5 - 82.5V AC
161 - 300V AC	93 - 173V AC
280 - 520V AC	161 - 300V AC

Frequency range:

48 - 63Hz

Isolation:

Over voltage cat. III

Rated impulse

withstand voltage:

4kV (1.2 / 50μs) IEC 60664

Power consumption: (max.)

L1: 20VA (3-wire), 13VA (4-wire)  
L2: 0.2VA (3-wire), 0.1VA (4-wire)  
L3: 20VA (3-wire), 0.1VA (4-wire)

\*Please state Supply / monitoring voltage when ordering

Trip levels:

Voltage range:

77 - 143V AC (3-wire)

161 - 300V AC (3-wire)

280 - 520V AC (3-wire)

44.5 - 82.5V AC (4-wire)

93 - 173V AC (4-wire)

161 - 300V AC (4-wire)

Under [2] fixed  $\pm 2\%$ :

77V

161V

280V

44.5V

93V

161V

Under (adjustable):

83 - 138V

173 - 288V

300 - 500V

48 - 79V

100 - 166V

173 - 288V

Repeat accuracy:

$\pm 0.5\%$  @ constant conditions

Hysteresis:

$\approx 2\%$  of trip level (factory set)

Response time:

$\approx 50$  ms

Time delay (t):

0.2 - 10 sec ( $\pm 5\%$ )

Note: actual delay (t) = adjustable delay + response time

Delay from

phase/neutral loss (tr):

$\approx 100$  ms (worst case =  $tr \times 2$ )

Power on delay (Td):

$\approx 1$  sec. (worst case =  $Td \times 2$ )

Ambient temp:

-20 to +60°C

Relative humidity:

$\approx 95\%$

Output (15, 16, 18):

SPDT relay

Output rating:

AC1 250V 8A (2000VA)  
AC15 250V 5A (no), 3A (nc)  
DC1 25V 8A (200W)

Electrical life:

$\geq 150,000$  ops at rated load

Dielectric voltage:

2kV AC (rms) IEC 60947-1

Rated impulse

withstand voltage:

4kV (1.2 / 50μs) IEC 60664

Housing:

Orange flame retardant UL94 VO

Weight:

$\approx 70$ g

Mounting option:

On to 35mm symmetric DIN rail to BS5584:1978 (EN50 002, DIN 46277-3) Or direct surface mounting via 2 x M3.5 or 4BA screws using the black clips provided on the rear of the unit.

Terminal conductor size:

$\leq 2 \times 2.5\text{mm}^2$  solid or stranded

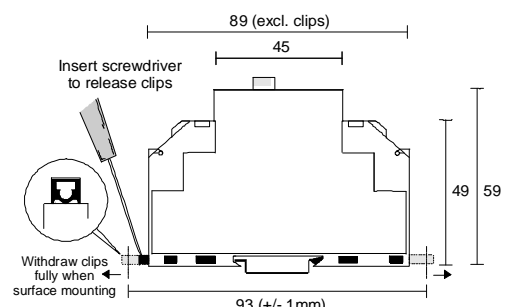
Approvals:

Conforms to IEC, CE and Compliant.

Options:

1. The unit is also available with a double-pole relay output. Refer to separate data sheet for M3prt/2 and M3prt/2-4w.
2. Higher voltage versions are also available (i.e. for 575, 600V supplies). Refer to separate data sheet M3prt (High voltage) and M3prt-4w (High voltage).

### • MOUNTING DETAILS



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M1PRT-3-A

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The information provided in this literature is believed to be accurate (subject to change without prior notice); however, use of such information shall be entirely at the user's own risk.