

# Monitoring Relays True RMS 3-Phase, 3-Phase+N, Multi-function Type DPB51

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- TRMS 3-phase over and under voltage, phase sequence and phase loss monitoring relay
- Detects when all 3 phases are present and have the correct phase sequence
- Detects if all the 3-phase-phase or phase-neutral voltages are within the set limits
- Upper and lower limits separately adjustable
- Measures on own power supply
- Adjustable voltage on relative scale
- Adjustable delay function (0.1 to 30 s)
- Output: 5 A SPDT relay N.E.
- For mounting on DIN-rail in accordance with DIN/EN 50 022
- 17.5 mm DIN-rail housing
- LED indication for relay, alarm and power supply ON

## Product Description

3-phase or 3-phase+neutral line voltage monitoring relay for phase sequence, phase loss, over and under voltage (separately adjustable set points) with built-in time delay function.

Supply ranges from 208 to 480 VAC covered by one multivoltage relay. 17.5 mm wide housing suitable both for back and front panel mounting.

## Ordering Key

**DPB 51 C M44**

Housing \_\_\_\_\_  
 Function \_\_\_\_\_  
 Type \_\_\_\_\_  
 Item number \_\_\_\_\_  
 Output \_\_\_\_\_  
 Power supply \_\_\_\_\_

## Type Selection

### Mounting

DIN-rail

### Output

SPDT

### Supply: 208 to 480 VAC

DPB 51 C M44

## Input Specifications

### Input

L1, L2, L3, N

Terminals L1, L2, L3, N  
 Measure on own supply

Note: Connect the neutral only if it is intrinsically at the star centre

### Measuring ranges

208 to 480 Δ VAC

177 to 550 Δ VAC

### Ranges

Upper level

+2 to +22%  
 of the nominal voltage

Lower level

-22 to -2%  
 of the nominal voltage

**Note:** The input voltage must not exceed the maximum rated voltage or drop below the minimum rated voltage reported above.

### Hysteresis

Set points from 2 to 4%

1%

Set points from 4 to 22%

2%

## Output Specifications

### Output

Rated insulation voltage

SPDT relay  
 250 VAC

### Contact ratings (AgSnO<sub>2</sub>)

Resistive loads AC 1

μ  
 5 A @ 250 VAC

DC 12

5 A @ 24 VDC

Small inductive loads AC 15

2.5 A @ 250 VAC

DC 13

2.5 A @ 24 VDC

### Mechanical life

≥ 30 x 10<sup>6</sup> operations

### Electrical life

≥ 10<sup>5</sup> operations  
 (at 5 A, 250 V, cos φ = 1)

### Operating frequency

≤ 7200 operations/h

### Dielectric strength

Dielectric voltage

2 kVAC (rms)

Rated impulse withstand volt.

4 kV (1.2/50 μs)



## Supply Specifications

<b>Power supply</b> Rated operational voltage through terminals: Delta Voltage: Star Voltage:	Overvoltage cat. III (IEC 60664, IEC 60038) L1, L2, L3, N 208 to 480 VAC ± 15% 45 to 65 Hz 120 to 277 VAC ± 15% 45 to 65 Hz
<b>Rated operational power</b>	13 VA @ 400 ΔVAC, 50 Hz Supplied by L1 and L2

## General Specifications

<b>Power ON delay</b>	1 s ± 0.5 s
<b>Reaction time</b> Incorrect phase sequence or total phase loss	< 200 ms (input signal variation from -20% to +20% or from +20% to -20% of set value)
Alarm ON delay	< 200 ms (delay < 0.1 s)
Alarm OFF delay	< 200 ms (delay < 0.1 s)

## General Specifications (cont.)

<b>Accuracy</b> Temperature drift Delay ON alarm Repeatability	(15 min warm-up time) ± 1000 ppm/°C ± 10% on set value ± 50 ms ± 0.5% on full-scale
<b>Indication for</b> Power supply ON Alarm ON	LED, green LED, red (flashing 2 Hz during delay time)
Output relay ON	LED, yellow
<b>Environment</b> Degree of protection Pollution degree Operating temperature Storage temperature	IP 20 3 -20 to 60°C, R.H. < 95% -30 to 80°C, R.H. < 95%
<b>Housing</b> Dimensions	17.5 x 90 x 67.2 mm
<b>Weight</b>	Approx. 100 g
<b>Screw terminals</b> Tightening torque L1, L2, L3, N 15, 16, 18, Z1, Z2	Min. 0.5 Nm, Max. 1.1 Nm Min. 0.4 Nm, Max. 0.8 Nm
<b>Approvals</b>	UL
<b>CE Marking</b>	Yes
<b>EMC</b> Immunity Emissions	Electromagnetic Compatibility According to EN 61000-6-2 According to EN 61000-6-3

## Mode of Operation

Connected to the 3 phases (and neutral) DPB51 operates when all 3 phases are present at the same time, the phase sequence is correct and the phase-phase (or phase-neutral) voltage levels are within set limits.

If one or more phase-phase or phase-neutral voltages exceeds the upper set level or drops below the lower set level, the red LED starts flashing 2 Hz and the output relay releases after the set time period. If the phase sequence is wrong or one phase is lost, the output relay releases immediately.

Only 200 ms delay occurs. The failure is indicated by the red LED flashing 5 Hz during the alarm condition.

**Example 1**  
(mains network monitoring)  
The relay monitors over and under voltage, phase loss and correct phase sequence.

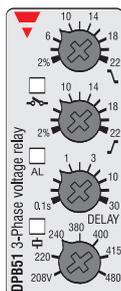
**Example 2**  
(load monitoring)  
The relay releases in case of interruption of one or more phases, when one or more voltages drop below the lower set level or exceed the upper set level.

## Function/Range/Level and Time Delay Setting

**Selection of monitored voltage:**  
Connecting the terminals Z1 and Z2:  
No connection: phase-phase.  
Connected: phase-neutral.

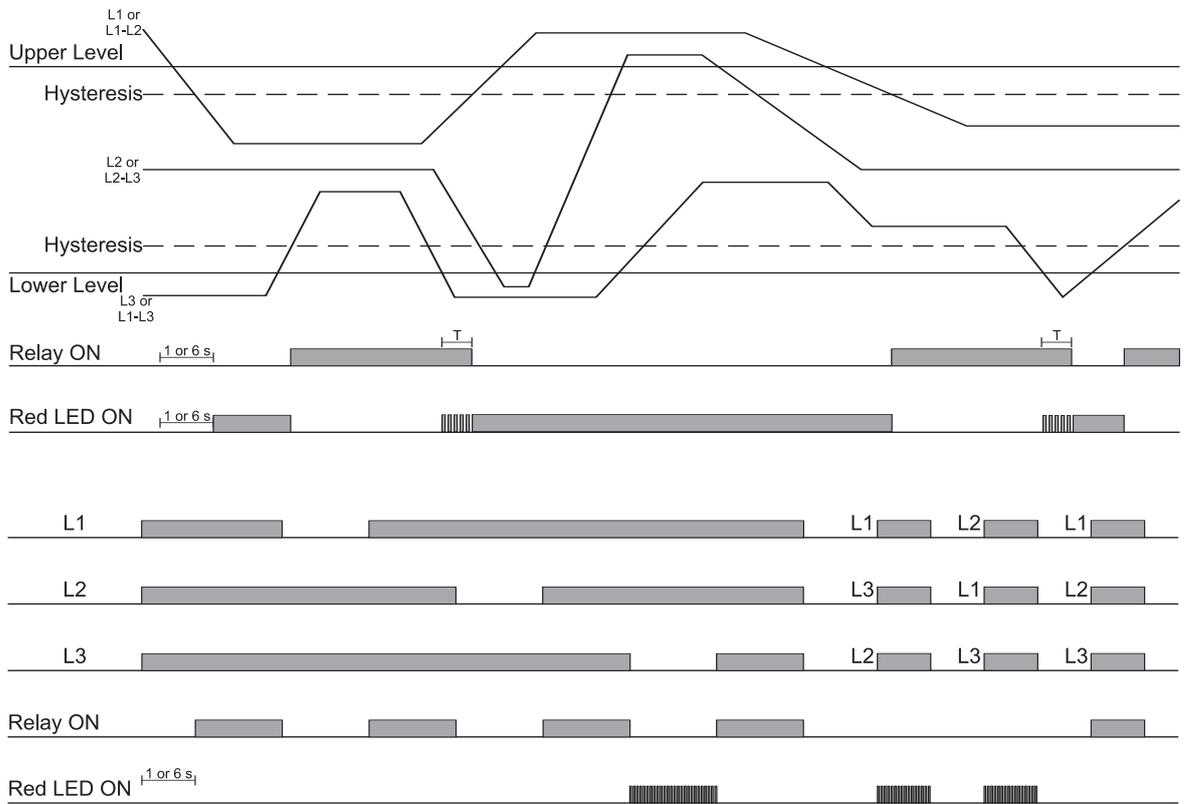
**Selection of range, level and time delay:**  
Upper knob ( ^ ):  
Setting of lower level on relative scale.  
Centre top knob ( / ):  
Setting of upper level on relative scale.

Centre bottom knob (DELAY):  
Setting of delay on alarm time on absolute scale (0.1 to 30 s).  
Lower knob (see on the right):  
Setting of nominal delta voltage.

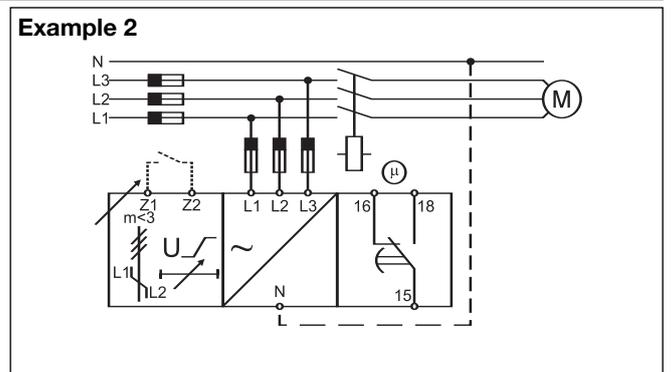
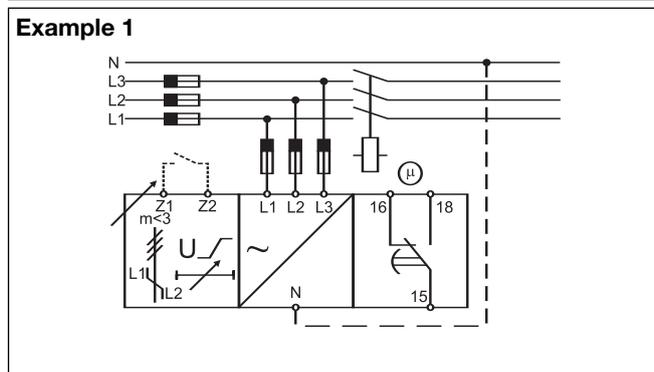


Nominal Ph-Ph voltage (delta connections)	Nominal Ph-N voltage (star connections)
480 VAC	277 VAC
415 VAC	240 VAC
400 VAC	230 VAC
380 VAC	220 VAC
240 VAC	139 VAC
220 VAC	127 VAC
208 VAC	120 VAC

## Operation Diagrams



## Wiring Diagram



## Dimensions

