

# Monitoring Relays True RMS 3-Phase, Phase Sequence/Loss - Asymmetry Types DPB02, PPB02

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DPB02



PPB02

- TRMS 3-phase phase sequence, phase loss and asymmetry monitoring relays
- Detect when all 3 phases are present and have the correct sequence
- Detect if asymmetry level is below the set value
- Measure their own power supply
- Selection of measuring range by DIP-switches
- Adjustable asymmetry on relative scale
- Adjustable delay function (0.1 to 30 s)
- Output: 8 A relay SPDT N.E.
- For mounting on DIN-rail in accordance with DIN/EN 50 022 (DPB02) or plug-in module (PPB02)
- 22.5 mm Euronorm housing (DPB02) or 36 mm plug-in module (PPB02)
- 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 and asymmetry with built-in time delay function.

Supply ranges from 208 to 480 VAC covered by two multi voltage relays.

## Ordering Key

**DPB 02 C M23**

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

## Type Selection

Mounting	Output	Supply: 208 to 240 VAC	Supply: 380 to 415 VAC	Supply: 380 to 480 VAC
DIN-rail	SPDT	<b>DPB 02 C M23</b>		
Plug-in	SPDT	<b>PPB 02 C M23</b>	<b>PPB 02 C M48</b>	<b>DPB 02 C M48</b>

## Input Specifications

<b>Input</b> L1, L2, L3, N	DPB02: Terminals L1, L2, L3, N PPB02: Terminals 5, 6, 7, 11 Measure their own supply
Note: Connect the neutral only if it is intrinsically at the star centre	
<b>Measuring ranges</b> 208 to 240 VAC 380 to 480 VAC (DPB02CM48) 380 to 415 VAC (PPB02CM48)	177 to 275 ΔVAC 323 to 550 ΔVAC 323 to 475 ΔVAC
<b>Ranges</b> Asymmetry	2 to 22% of the nominal voltage
<b>Note:</b> The input voltage must not exceed the maximum rated voltage or drop below the minimum rated voltage reported above.	

## Output Specifications

<b>Output</b> Rated insulation voltage	SPDT relay 250 VAC
<b>Contact ratings</b> (AgSnO <sub>2</sub> ) Resistive loads AC 1 DC 12 Small inductive loads AC 15 DC 13	μ 8 A @ 250 VAC 5 A @ 24 VDC 2.5 A @ 250 VAC 2.5 A @ 24 VDC
<b>Mechanical life</b>	≥ 30 x 10 <sup>6</sup> operations
<b>Electrical life</b>	≥ 10 <sup>5</sup> operations (at 8 A, 250 V, cos φ = 1)
<b>Operating frequency</b>	≤ 7200 operations/h
<b>Dielectric strength</b> Dielectric voltage Rated impulse withstand volt.	2 kVAC (rms) 4 kV (1.2/50 μs)

## Supply Specifications

<b>Power supply</b>	Overvoltage cat. III (IEC 60664, IEC 60038)
Rated operational voltage through terminals: L1, L2, L3, N (DPB02) 5, 6, 7, 11 (PPB02) M23 - Delta Voltage:	208 to 240 VAC ± 15% 45 to 65 Hz
M48 (DIN-rail) - Delta Voltage:	380 to 480 VAC ± 15% 45 to 65 Hz
M48 (DIN-rail) - Star Voltage:	220 to 277 VAC ± 15% 45 to 65 Hz
M48 (Plug-in) - Delta Voltage:	380 to 415 VAC ± 15% 45 to 65 Hz
M48 (Plug-in) - Star Voltage:	220 to 240 VAC ± 15% 45 to 65 Hz

<b>Rated operational power</b> DPB02CM23, PPB02CM23 DPB02CM48, PPB02CM48	13 VA @ Δ230 VAC, 50 Hz 13 VA @ Δ400 VAC, 50 Hz Supplied by L1 and L2
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## General Specifications

<b>Power ON delay</b>	1 s ± 0.5 s or 6 s ± 0.5 s
<b>Reaction time</b> Incorrect phase sequence or total phase loss Asymmetry Alarm ON delay Alarm OFF delay	< 200 ms < 200 ms (delay < 0.1 s) < 200 ms (delay < 0.1 s)
<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  Output relay ON	LED, green LED, red (flashing 2 Hz during delay time) LED, yellow
<b>Environment</b> Degree of protection Pollution degree Operating temperature @ Max. voltage, 50 Hz @ Max. voltage, 60 Hz Storage temperature	IP 20 3 (DPB02), 2 (PPB02) -20 to 60°C, R.H. < 95% -20 to 50°C, R.H. < 95% -30 to 80°C, R.H. < 95%
<b>Housing</b> Dimensions Material	DPB02 PPB02 22.5 x 80 x 99.5 mm 36 x 80 x 94 mm PA66 or Noryl
<b>Weight</b>	Approx. 120 g
<b>Screw terminals</b> Tightening torque	Max. 0.5 Nm acc. to IEC 60947
<b>Product standard</b>	EN 60947-5-1
<b>Approvals</b>	UL, CSA CCC (GB14048.5) only DPB
<b>CE Marking</b>  EMC Immunity Emissions	L.V. Directive 2006/95/EC EMC Directive 2004/108/EC  According to EN 61000-6-2 According to EN 61000-6-3

## Mode of Operation

Connected with the 3 phases (and neutral) DPB02 and PPB02 operate when all 3 phases are present at the same time, the phase sequence is correct and the asymmetry is under the set level. Asymmetry is defined as follows:

$$\frac{\max\{|\Delta V_{ph-ph}|\}}{\text{nom. voltage}}$$

when measuring phase-phase voltages and also as follows:

$$\frac{\max\{|\Delta V_{ph-n}|\}}{\text{nom. voltage}}$$

when measuring phase-neutral voltages.

If the asymmetry exceeds the set level the red LED starts flashing 2 Hz and the output relay releases after the set time period. If the phase sequence is incorrect 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 after the alarm condition occurs.

### Example 1 (mains network monitoring)

The relay monitors asymmetry, phase loss and correct phase sequence.

### Example 2 (load monitoring)

The relay releases in case of interruption of one or more phases or when the asymmetry exceeds the set level.

## Function/Range/Level and Time Delay Setting

Adjust the input range setting the DIP switches 3 and 4 as shown below.

Select the desired function setting the DIP switches 1 and 2 as shown below.

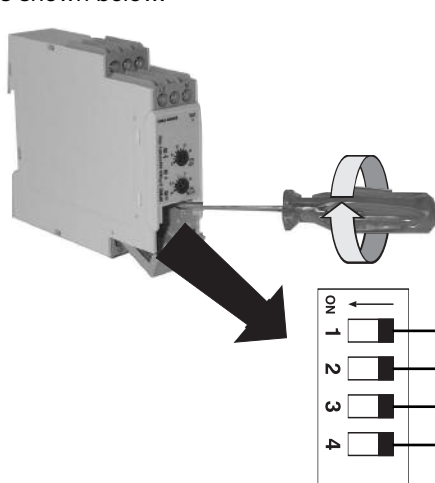
To access the DIP switches open the grey plastic cover as shown below

**Selection of asymmetry and time delay:**

**Centre knob:**  
Setting of asymmetry on relative scale.

**Lower knob:**

Setting of delay on alarm time on absolute scale (0.1 to 30 s).



### Power ON delay

ON: 6 s ± 0.5 s  
OFF: 1 s ± 0.5 s

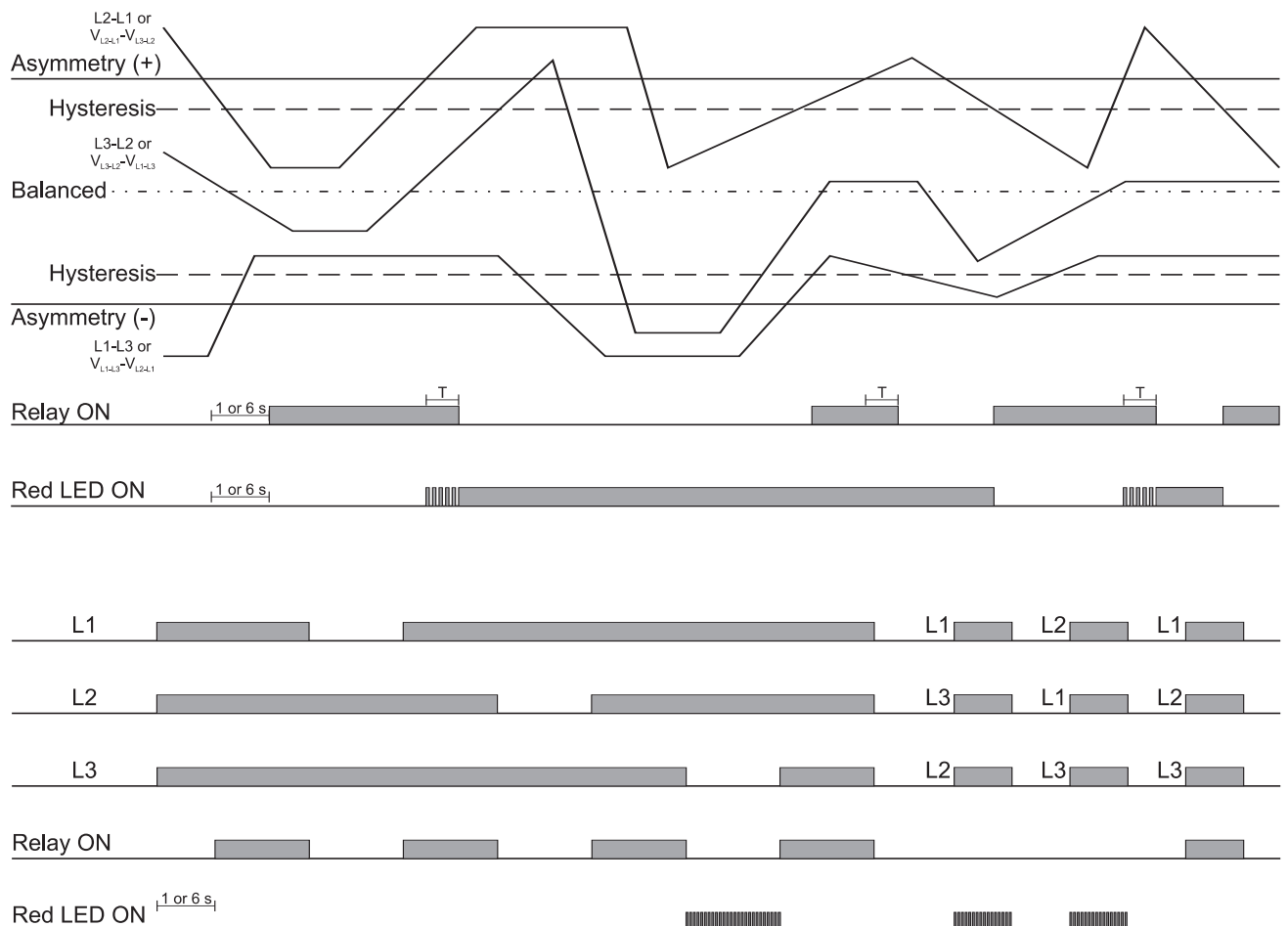
### Monitored voltage

ON: Phase-Neutral  
OFF: Phase-Phase

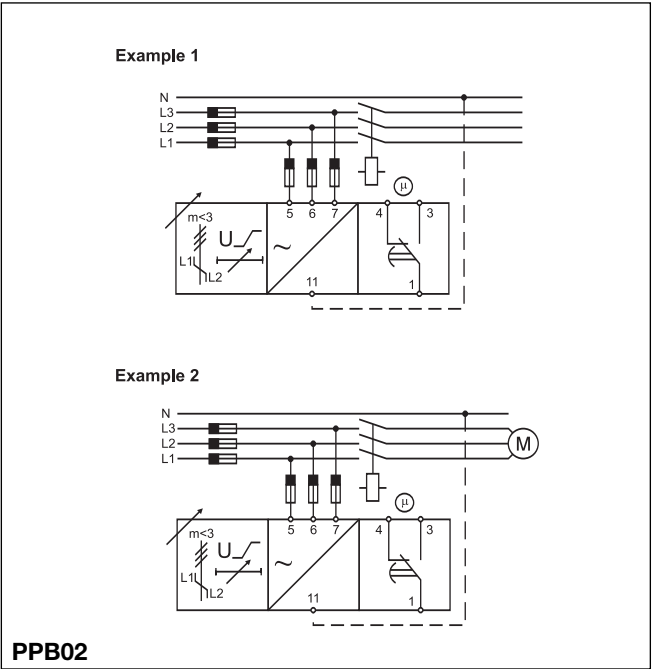
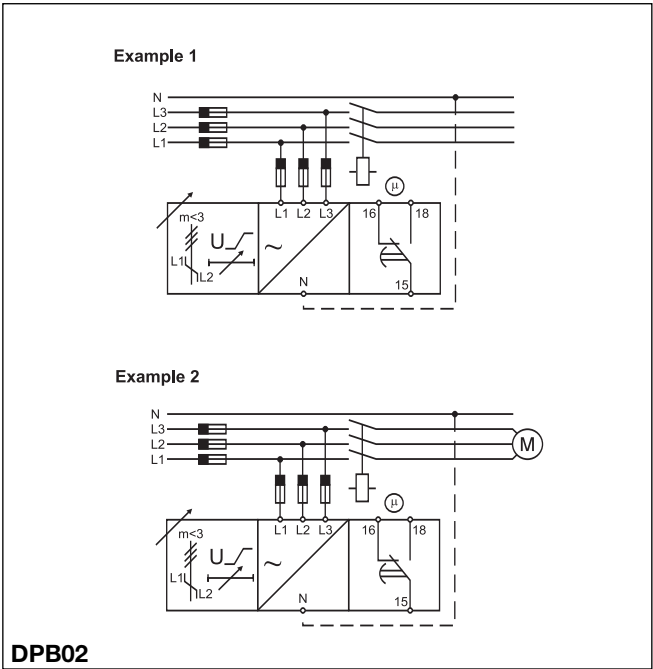
### Measuring range

SW3	ON	ON	OFF	OFF
SW4	ON	OFF	ON	OFF
M23 Ph-Ph Voltage	208 VAC	220 VAC	230 VAC	240 VAC
M48 Ph-Ph Voltage	380 VAC	400 VAC	415 VAC	480 VAC DPB02 only
M48 Ph-N Voltage	220 VAC	230 VAC	240 VAC	277 VAC DPB02 only

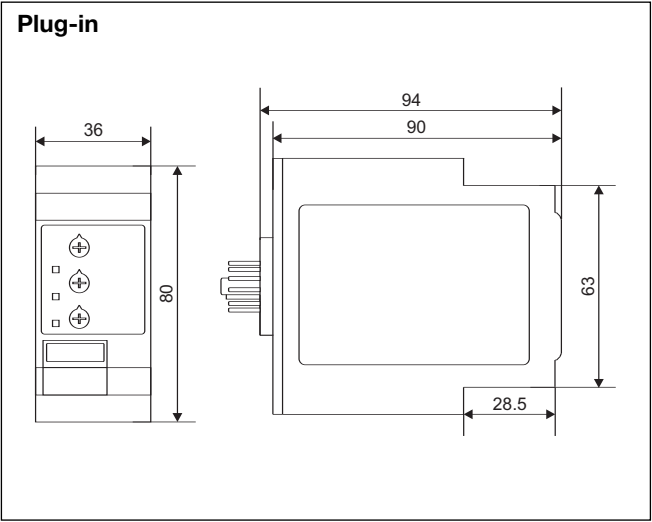
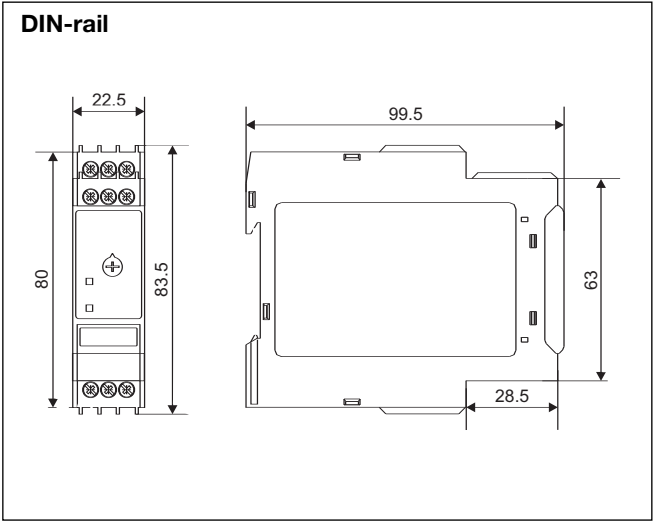
## Operation Diagrams



Wiring Diagrams



Dimensions



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