

Monitoring Relays True RMS 3-Phase, 3-Phase+N, Multifunction Type DPC02

CARLO GAVAZZI



- TRMS 3-phase over and under voltage, over and under frequency, phase sequence and phase loss monitoring relay
- Detect when all 3 phases are present and have the correct sequence
- Detect if all the 3-phase-phase or phase-neutral voltages are within the set limits
- Detect if the system frequency is between the set limits
- Separately adjustable setpoints
- Separately adjustable delay functions (0.1 to 30 s)
- Output: 2 x 8 A relay SPDT
- For mounting on DIN-rail in accordance with DIN/EN 50 022
- 45 mm Euronorm housing
- LED indication for relays, alarm and power supply ON

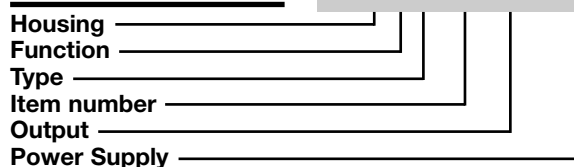
Product Description

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

Supply ranges from 208 to 690 VAC covered by four multivoltage relays. The main application is for generator sets.

Ordering key

DPC 02 D M48



Type Selection

Mounting	Output	Supply: 208 to 240 VAC	Supply: 380 to 415 VAC	Supply: 440 to 480 VAC	Supply: 600 to 690 VAC
DIN-rail	2 x SPDT	DPC 02 D M23	DPC 02 D M48	DPC 02 D M49	DPC 02 D M69

Input Specifications

Input L1, L2, L3, N	DPC02:	Terminals L1, L2, L3, N Measures its own supply	Ranges Upper voltage level	+2 to +22% of the nominal voltage
Note: Connect the neutral only if it is intrinsically at the star centre			Lower voltage level	-22 to -2% of the nominal voltage
			Frequency window	10 to 110% of the selected range
Measuring ranges (voltage)			Hysteresis (frequency)	
M23		177 to 275 ΔVAC	2 Hz range	~ 0.05 Hz
M48		323 to 475 ΔVAC	15 Hz range	~ 0.25 Hz
M49		374 to 552 ΔVAC		
M69		510 to 793 ΔVAC		
Measuring ranges (frequency)	Upper level	Lower level		
Selectable by DIP-switches				
2 Hz range				
	50 Hz	+0.2 to +2.2 Hz		
	60 Hz	50.2 to 52.2 Hz		
		60.2 to 62.2 Hz		
15 Hz range		+1.5 to +16.5 Hz		
	50 Hz	51.5 to 66.5 Hz		
	60 Hz	61.5 to 76.5 Hz		
		-2.2 to -0.2 Hz		
		47.8 to 49.8 Hz		
		57.8 to 59.8 Hz		
		-16.5 to -1.5 Hz		
		33.5 to 48.5 Hz		
		43.5 to 58.5 Hz		

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

Output Specifications

Output Rated insulation voltage	2 x SPDT relays N.E. 250 VAC
Contact ratings (AgSnO ₂)	μ
Resistive loads AC 1	8 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 ⁶ operations
Electrical life	≥ 10 ⁵ operations (at 8 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

Power supply	Overvoltage cat. III
Rated operational voltage through terminals:	(IEC 60664, IEC 60038)
	L1, L2, L3, N
M23 - Delta Voltage:	208 to 240 VAC ± 15%
	45 to 65 Hz
M48 - Delta Voltage:	380 to 415 VAC ± 15%
	45 to 65 Hz
M48 - Star Voltage:	220 to 240 VAC ± 15%
	45 to 65 Hz
M49 - Delta Voltage:	440 to 480 VAC ± 15%
	45 to 65 Hz
M49 - Star Voltage	254 to 277 VAC ± 15%
	45 to 65 Hz
M69 - Delta Voltage:	600 to 690 VAC ± 15%
	45 to 65 Hz
M69 - Star Voltage:	347 to 400 VAC ± 15%
	45 to 65 Hz
Rated operational power	8 VA, 50/60 Hz Supplied by L2 and L3

General Specifications

Power ON delay	1 s ± 0.5 s
Accuracy	(15 min warm-up time)
Temperature drift	± 1000 ppm/°C
Delay ON alarm	± 10% on set value ± 50 ms
Repeatability	± 0.5% on full-scale
Reaction time	
Incorrect phase sequence or total phase loss	< 200 ms
Voltage level	(input signal variation from -20% to +20% or from +20% to -20% of set value)
Frequency level	
Alarm ON delay:	< 200 ms (delay < 0.1 s)
Alarm OFF delay:	< 200 ms (delay < 0.1 s)
Indication for	
Power supply ON	LED, green
Alarm ON	LED, red (flashing 2 Hz during delay time)
Output relays ON	2 x LED, yellow
Environment	(EN 60529)
Degree of protection	IP 20
Pollution degree	3
Operating temperature	
8A output	-20 to +50°C, R.H. < 95%
5A output	-20 to +60°C, R.H. < 95%
Storage temperature	-30 to 80°C, R.H. < 95%
Housing	
Dimensions	45 x 80 x 99.5 mm
Material	PA66 or Noryl
Weight	Approx. 220 g
Screw terminals	
Tightening torque	Max. 0.5 Nm acc. to IEC 60947
Product standard	EN 60255-6
Approvals	UL, CSA
CE Marking	L.V. Directive 2006/95/EC EMC Directive 2004/108/EC
EMC	
Immunity	According to EN 60255-26 According to EN 61000-6-2
Emissions	According to EN 60255-26 According to EN 61000-6-3

Mode of Operation

Connected to the 3 phases (and neutral) DPC02 operates when all 3 phases are present at the same time and the phase sequence is correct.

Voltage and frequency level monitoring:

if one or more phase-phase or phase-neutral voltage exceed the upper set level or drop below the lower set level, the red LED starts flashing 2 Hz and the respective output relay

releases after the set time period. If the mains frequency gets out of the symmetrical window across the nominal frequency the red LED starts flashing 2 Hz and the respective output relay releases after the set time period.

Example 1

(Generator monitoring - 2xSPDT relays - phase-phase voltage)
The relay monitors phase loss and correct phase sequence, over and under voltage and the frequency of the system. A voltage failure is detected through relay 1 and a frequency failure is detected through relay 2.

Example 2

(Mains monitoring - DPDT relay)
DPC02 monitors phase loss and correct phase sequence, over and under voltage and the frequency. Every failure is detected through relays 1 and 2 at the same time to allow independent operations.

Function/Range/Level/Time Setting

Adjust the input range setting the DIP-switches 3 and 4. Select the desired function setting the DIP-switches 5 and 6 as shown on the left. To access the DIP-switches open the plastic cover using a screwdriver as shown below.

Lower knobs:
Setting of delay on alarm time on absolute scale: 0.1 to 30 s.



Upper left knob:
Setting of upper voltage level on relative scale.
Centre left knob:
Setting of lower voltage level on relative scale.
Centre right knob:
Setting of frequency window width on relative scale.



Output
ON: 2 x SPDT relays
OFF: 1 x DPDT relay

Monitoring
ON: Phase-Neutral voltages
OFF: Phase-Phase voltages

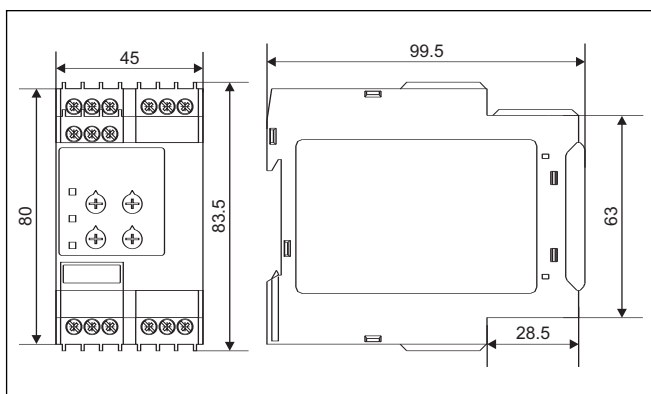
Measuring range

	ON	ON	OFF	OFF
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	415VAC	415VAC
M48 Ph-N Voltage	220 VAC	230 VAC	240 VAC	240 VAC
M49 Ph-Ph Voltage	440 VAC	440 VAC	480 VAC	480 VAC
M49 Ph-N Voltage	254 VAC	254 VAC	277 VAC	277 VAC
M69 Ph-Ph Voltage	600 VAC	600 VAC	690 VAC	690 VAC
M69 Ph-N Voltage	347 VAC	347 VAC	400 VAC	400 VAC

System frequency
ON: 60 Hz
OFF: 50 Hz

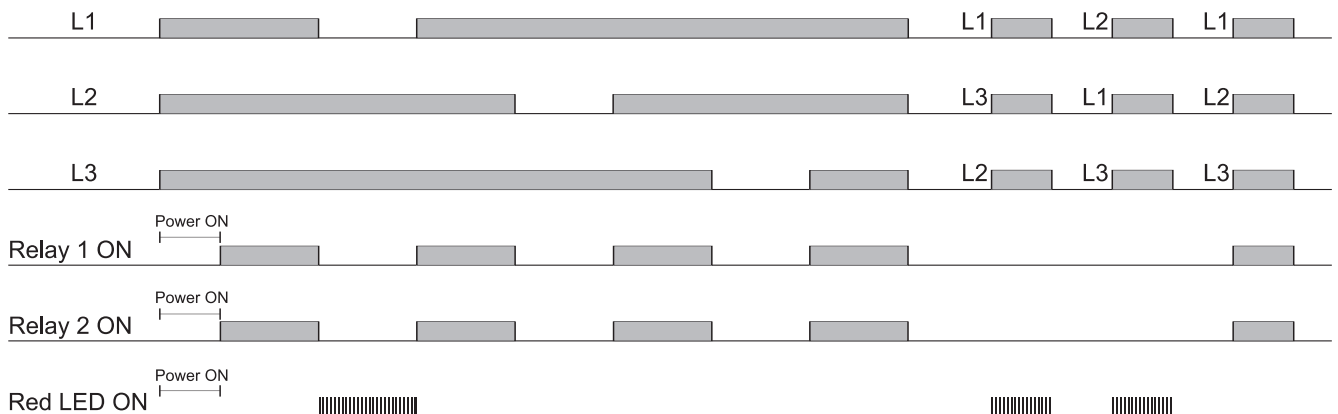
Frequency setpoint range
ON: 2 Hz
OFF: 15 Hz

Dimensions

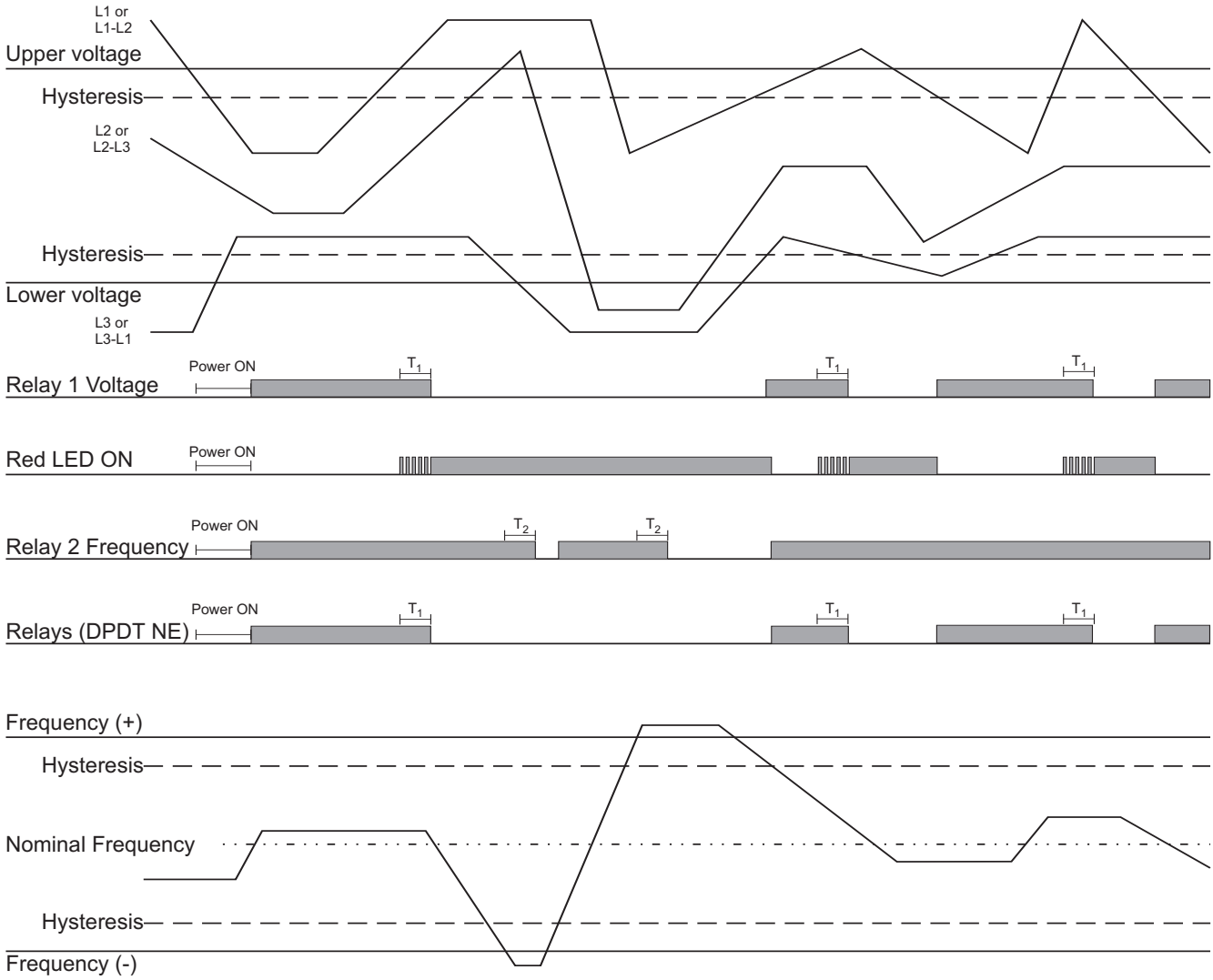


Operation Diagrams

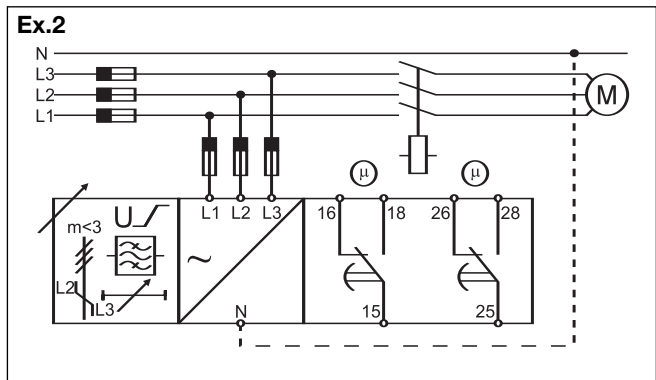
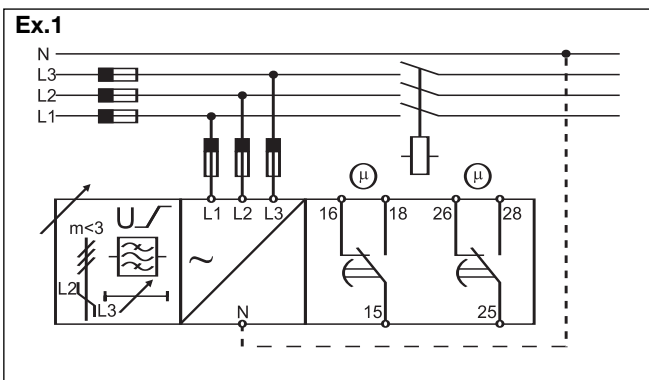
Phase sequence, total phase loss



Operation Diagrams (cont.)



Wiring Diagrams



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