

DPA01, PPA01



True RMS 3-Phase voltage monitoring relay



Benefits

- **Wide voltage range.** Working in systems from 208 to 690 VAC.
- **"HVAC" variants comply with IEC 60335-2-40.** For use with A3 flammable refrigerants.
- **Output and status LED indication.** For quick troubleshooting.
- **Regenerated voltage detection.** To detect phase loss even while the motor is running.
- **Two mounting versions.** Available for DIN-rail (DPA01) and Plug-in (PPA01) mounting.

Description

DPA01 and PPA01 are 3-phase mains monitoring relays.

They operate on 3P systems, monitoring phase loss and phase sequence.

Power supply provided by the monitored mains.

Main features

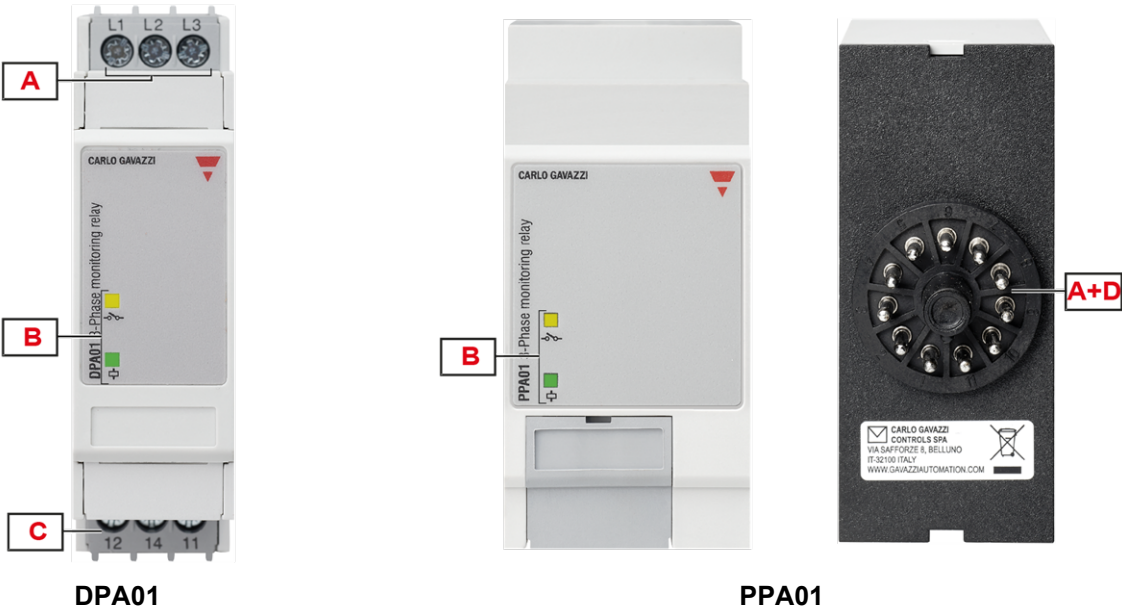
- Monitoring 3-phase mains with 3 wires (3P).
- Detection of the correct phase sequence and phase loss.
- Changeover relay output.



Order code

Mounting	Power supply	Component name/part number
DIN-rail	208 to 240 V AC	DPA01DM23
	208 to 480 V AC	DPA01CM44
		DPA01CM44HVAC
	380 to 480 V AC	DPA01DM48
	380 to 600 V AC	DPA01CM60
		DPA01CM60HVAC
	600 to 690 V AC	DPA01CM69
		DPA01CM69HVAC
Plug-in	208 to 240 V AC	PPA01DM23
	208 to 415 V AC	PPA01CM44
	380 to 415 V AC	PPA01DM48

Structure



Element	Component	Function
A	Input terminals	Connection of the line voltages
B	Information LEDs	Yellow for relay output status Green for device ON
C	Output terminals	SPDT relay output (DPA01C, PPA01C) DPDT relay output (DPA01D, PPA01D)

Features

Power supply

Power supply		Supplied by measured phases (L2, L3)
Overvoltage category		III (IEC 60664)
Voltage range	xPA01DM23	208 to 240 V _{L-L} AC ± 15% (177 to 276 V)
	DPA01CM44(HVAC)	208 to 480 V _{L-L} AC ± 15% (177 to 552 V)
	PPA01CM44	208 to 415 V _{L-L} AC ± 15% (177 to 477 V)
	DPA01DM48	380 to 480 V _{L-L} AC ± 15% (323 to 552 V)
	PPA01DM48	380 to 415 V _{L-L} AC ± 15% (323 to 477 V)
	DPA01CM60(HVAC)	380 to 600 V _{L-L} AC ± 15% (323 to 690 V)
	DPA01CM69(HVAC)	600 to 690 V _{L-L} AC ± 15% (510 to 793 V)
Frequency range		50 to 60 Hz ± 10% sinusoidal waveform
Consumption	xPA01DM23	< 6 VA
	xPA01CM44	< 13 VA
	xPA01DM48	< 10 VA
	DPA01CM60 DPA01CM69	< 15 VA

Inputs

Terminals		DPA01: L1, L2, L3 PPA01: 5, 6, 7
Measured variables		Phase sequence Phase loss 3P: voltages V _{L12} , V _{L23} , V _{L31}
Nominal line range	xPA01DM23	208 to 240 V AC ± 15% (177 to 276 V AC)
	DPA01CM44(HVAC)	208 to 480 V AC ± 15% (177 to 552 V AC)
	PPA01CM44	208 to 415 V AC ± 15% (177 to 477 V AC)
	DPA01DM48	380 to 480 V AC ± 15% (323 to 552 V AC)
	PPA01DM48	380 to 415 V AC ± 15% (323 to 477 V AC)
	DPA01CM60(HVAC)	380 to 600 V AC ± 15% (323 to 690 V AC)
	DPA01CM69(HVAC)	600 to 690 V AC ± 15% (510 to 793 V AC)

Outputs

Terminals	DPA01C DPA01D	11, 12, 14 11, 12, 14, 21, 22, 24
	PPA01C PPA01D	1, 3, 4 1, 3, 4, 8, 9, 10
Number of outputs	DPA01C, PPA01C	1
	DPA01D, PPA01D	2
Type	DPA01C, PPA01C	SPDT electromechanical relay with changeover contacts
	DPA01D, PPA01D	DPDT electromechanical relay with changeover contacts
Logic		Output de-energised on alarm
Contact rating	DPA01C PPA01C	I_{th} : 8 A @ 250 V AC DC12 : 5 A @ 24 V DC AC15 : 2.5 A @ 250 V AC DC13 : 2.5 A @ 24 V DC
	DPA01D PPA01D	I_{th} : 8 A @ 250 V AC AC15 : 3 A @ 250 V AC DC13 : 2 A @ 24 V DC
Electrical lifetime		≥50 x 10 ³ operations (at 8 A, 250 V, cos φ= 1)
Mechanical lifetime		>30 x 10 ⁶ operations
Assignment		Associated to all alarm types

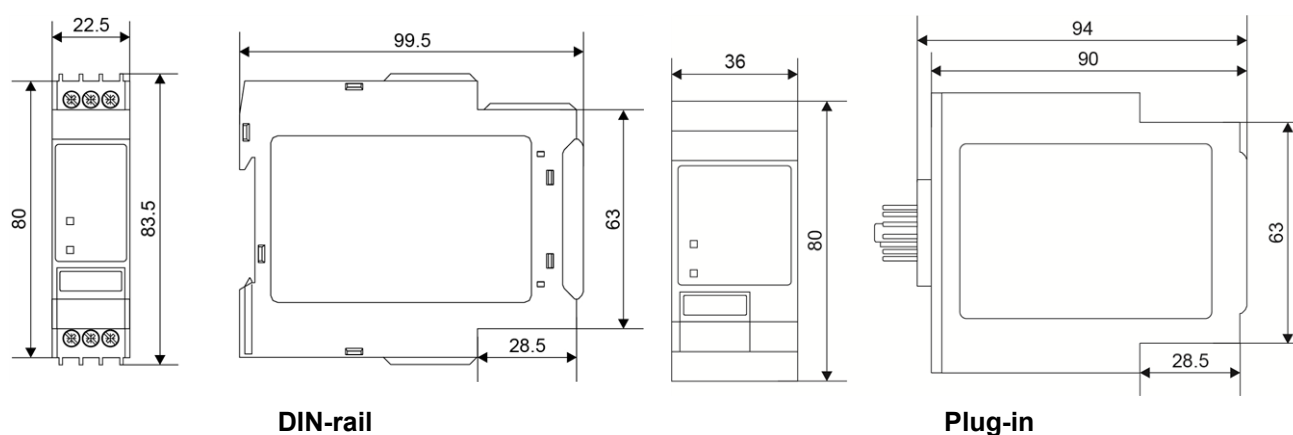
NOTE: models ending with "HVAC" are equipped with sealed relay tested in accordance with IEC 60335-2-40.

Insulation

Terminals	Basic insulation
Inputs to outputs	2.5 kVrms, 4 kV impulse 1.2/50 μs

General

Material	Polyamide (Nylon) (PA66/6) or Phenylene ether + Polystyrene (PPE-PS)
	Flammability rating: HB according to UL 94
Colour	RAL7035 (light grey)
Dimensions (W x H x D)	DPA01: 22.5 x 80 x 99.5 mm (0.89 x 3.15 x 3.92 in)
	PPA01: 36 x 80 x 94 mm (1.42 x 3.15 x 3.7 in)
Weight	Approx. 100 g (3.53 oz)
Terminals	Cable size from 0.05 to 2.5 mm ² (AWG30 to AWG13), stranded or solid
Tightening torque	Max. 0.5 Nm (4.425 lbin)
Terminal type	Double cage screw terminals (DPA01), Undecal Plug-in terminals (PPA01)



Environmental

Operating temperature	50 Hz: -20 to 60 °C (-4 to 140 °F)
	60 Hz: -20 to 50 °C (-4 to 122 °F)
Storage temperature	-30 to 80 °C (-22 to 176 °F)
Relative humidity	5 - 95% non condensing
Protection degree	IP20
Pollution degree	2
Operating max altitude	2000 m amsl (6560 ft)
Salinity	Non saline environment
UV resistance	No

Vibration/Shock resistance

Test condition	Test	Level
Tests with unpacked device	Vibration response (IEC60255-21-1)	Class 1
	Vibration endurance (IEC 60255-21-1)	Class 1
	Shock (IEC 60255-21-2)	Class 1
	Bump (IEC 60255-21-2)	Class 1
Tests with packed device	Vibration random (IEC60068-2-64)	Class 1
	Shock (IEC 60255-21-2)	Class 1
	Bump (IEC 60255-21-2)	Class 1

Class 1: monitoring devices for normal use in power plants, substations and industrial plants and for normal transportation conditions.

The packaging type is designed and implemented in such manner that the severity class parameters will not be exceeded during transportation.

Compatibility and conformity

Marking		
Directives		2014/35/EU (LVD - Low voltage) 2014/30/EU (EMC - Electromagnetic compatibility)
Standards		Insulation coordination: EN 60664-1 Immunity: EN61000-6-2 Emission: EN61000-6-3
Compliance	DPA01 HVAC	IEC 60335-2-40
Approvals	DPA01DM23 DPA01CM44 DPA01CM44HVAC DPA01DM48 DPA01CM60 DPA01CM60HVAC	   
	DPA01CM69 DPA01CM69HVAC	 
	PPA01CM44	  
	PPA01DM23 PPA01DM48	

Operating description

Device configuration

The relay operates when all the phases are present and the phase sequence is correct.

Alarms

- Phase loss and incorrect phase sequence cause immediate output relay de-energisation.

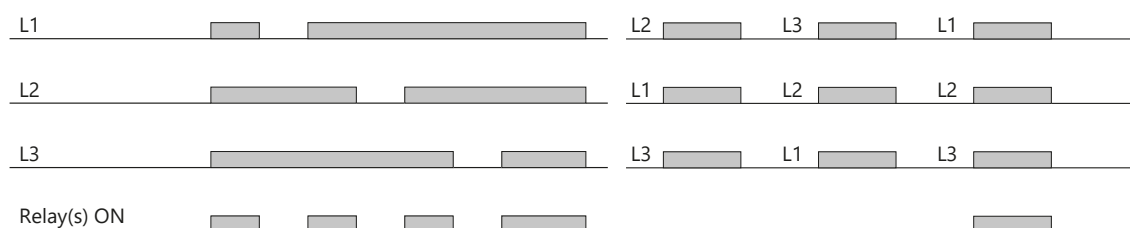
Phase loss alarm	
Input variables	L1-L2, L2-L3 and L3-L1
Alarm setpoint	One phase $\leq 85\%$ of the rated value (regenerated voltage detection)
Restore setpoint	All phases $> 85\%$ of the rated value + Hysteresis
Hysteresis	2% fixed
Delay ON	< 100 ms
Delay OFF	< 350 ms

Phase sequence alarm	
Input variables	Connection L1, L2, L3
Delay ON	< 100 ms
Delay OFF	< 350 ms

Information LEDs

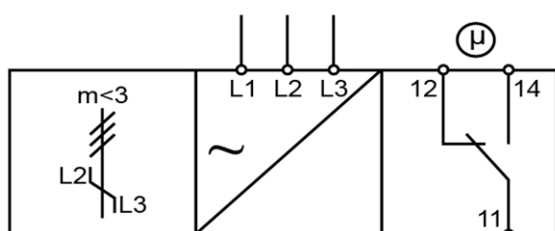
Colour	Status		Description
Green ($\bullet$)	Power supply	ON	Power supply ON
		OFF	Power supply OFF
Yellow ($\sim$)	Relay output	ON	Energised
		OFF	De-energised

Operating diagram

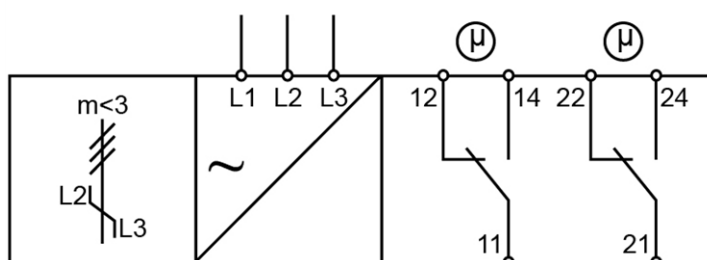


Total phase loss, phase sequence

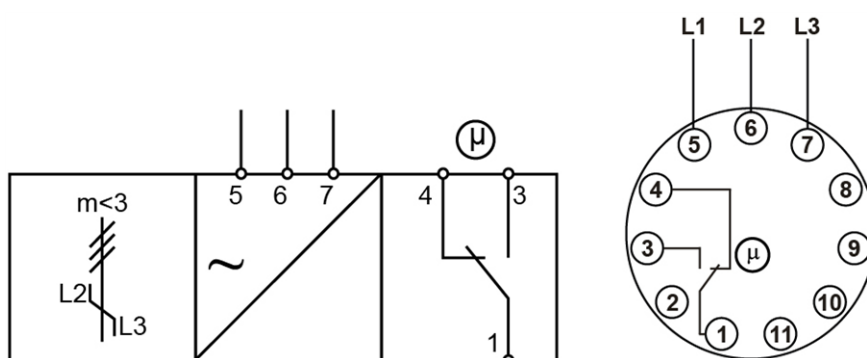
Connection diagrams



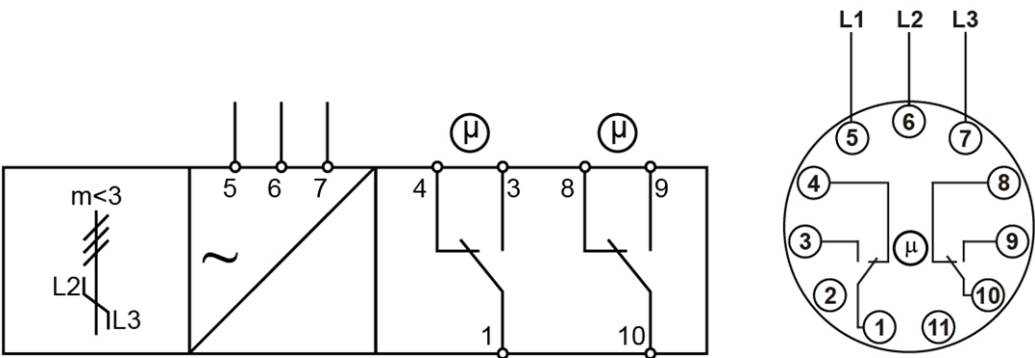
DPA01C



DPA01D



PPA01C



PPA01D

References

Further reading

Information	Where to find it	QR code
Installation manual	https://carlogavazzi-pss.com/manuals/DPA_PPA_IM_html	
PSS selection tool	https://carlogavazzi-pss.com/	



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