

DPA01, PPA01



True RMS 3-Phase voltage monitoring relay



Benefits

- **Wide voltage range.** Working in systems from 208 to 690 V AC.
- **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.

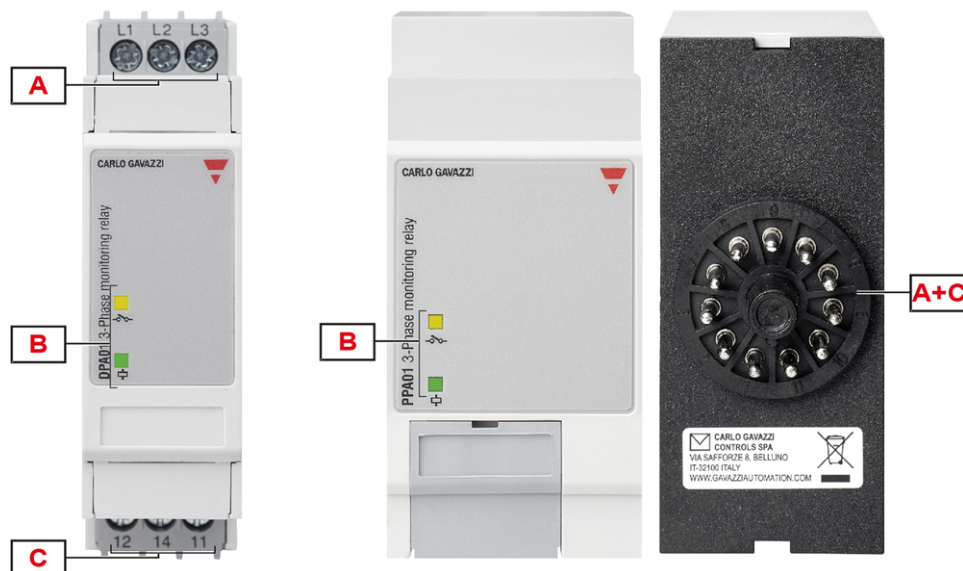
Applications

DPA01 and PPA01 offer solutions for a wide range of applications: lifts, escalators, HVAC, material handling, pumps, compressors and mobile machinery installations.

Main features

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

Structure

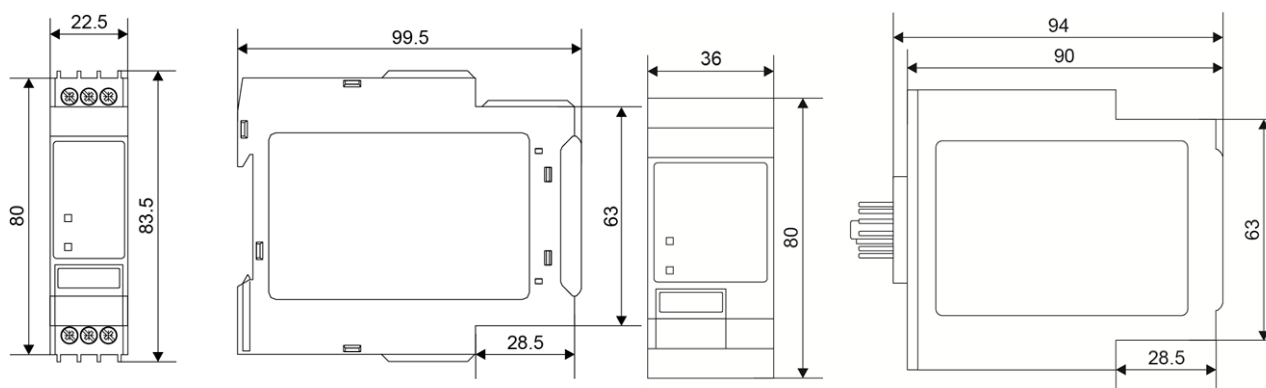


Element	Component	Function
A	Input terminals	Connection of the line voltages
B	Information LED	Yellow for relay output status Green for device ON
C	Output terminals	SPDT relay output (M44, M60, M69) DPDT relay output (M23, M48)

Features

General

Material	Polyamide (Nylon) or Phenylene ether + Polystyrene
Colour	RAL7035 (light grey)
Dimensions (W x H x D)	DPA01: 22.5mm x 80mm x 99.5mm PPA01: 36mm x 80mm x 94mm
Protection degree	IP20
Weight	Approx. 100 g
Terminals	Cable size from 0.05mm ² to 2.5mm ² (AWG30 to AWG13), stranded or solid
Tightening torque	Max. 0.5 Nm (4.425 lb.in)
Terminal type	Double cage screw terminals (DPA01), Undecal Plug-in terminals (PPA01)



Power supply

Power supply	Supplied by measured phases (L2, L3)	
Overvoltage category	III (IEC 60664)	
Voltage range	M23	208 to 240 V _{L-L} AC ±15%
	D.....M44	208 to 480 V _{L-L} AC ±15%
	P.....M44	208 to 415 V _{L-L} AC ±15%
	D.....M48	380 to 480 V _{L-L} AC ±15%
	P.....M48	380 to 415 V _{L-L} AC ±15%
	M60	380 to 600 V _{L-L} AC ±15%
	M69	600 to 690 V _{L-L} AC ±15%
Frequency range	50 to 60 Hz ±10% sinusoidal waveform	

Consumption	M23	< 6 VA
	M44	< 13 VA
	M48	< 10 VA
	M60, M69	< 15 VA

Environmental

Operating temperature	50 Hz: -20°C to 60°C (-4°F to 140°F)
	60 Hz: -20°C to 50°C (-4°F to 122°F)
Storage temperature	-30°C to 80°C (-22°F to 176°F)
Relative humidity	5-95% non condensing
Pollution degree	2
Operating max altitude	2000 m amsl (6560ft)
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

CE-marking			According to EN 60947-5-1. Complies to European LV directive 2014/35/EU and EMC directive 2014/30/EU: Immunity according to EN61000-6-2; Emissions according to EN61000-6-3
Approvals	DPA01DM23 DPA01DM48	 ,  , 	
	DPA01CM44 DPA01CM60	 ,  ,  , 	
	PPA01CM44	 ,  , 	
	DPA01CM69	 , 	

Inputs

Measured variables		Phase sequence Phase loss 3P: voltages V_{L12} , V_{L23} , V_{L31}
Nominal line range	M23	208 to 240 V AC $\pm 15\%$ (177 to 275 V AC)
	D.....M44	208 to 480 V AC $\pm 15\%$ (177 to 550 V AC)
	P.....M44	208 to 415 V AC $\pm 15\%$ (177 to 475 V AC)
	D.....M48	380 to 480 V AC $\pm 15\%$ (323 to 550 V AC)
	P.....M48	380 to 415 V AC $\pm 15\%$ (323 to 475 V AC)
	M60	380 to 600 V AC $\pm 15\%$ (323 to 690 V AC)
	M69	600 to 690 V AC $\pm 15\%$ (510 to 760 V AC)

Outputs

Number of outputs	xPA01C	1
	xPA01D	2
Type	xPA01C	SPDT electromechanical relay with change-over contacts
	xPA01D	DPDT electromechanical relay with change-over contacts
Logic		Output de-energised on alarm

Contact rating	xPA01C	AC1: 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
	xPA01D	AC1: 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	

Insulation

Terminals		Basic insulation
Inputs: L1, L2, L3 (DPA) / 5, 6, 7 (PPA) to Output: 11, 12, 14 (DPA) / 1, 3, 4 (PPA)	xPA01C	2.5 kVrms, 4 kV impulse 1.2/50 μs
Inputs: L1, L2, L3 (DPA) / 5, 6, 7 (PPA) to Output: 11, 12, 14, 21, 22, 24 (DPA) / 1, 3, 4, 8, 9, 10 (PPA)	xPA01D	

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	Voltage measurements L1-L2, L2-L3 and L3-L1
Alarm setpoint	One phase ≤ 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

Visual information

DPA01 and PPA01 feature 2 front LEDs which provide operation status information.

- Green LED is ON when the power supply is present.
- Yellow LED is ON when the output relay is energised.



Operating diagram

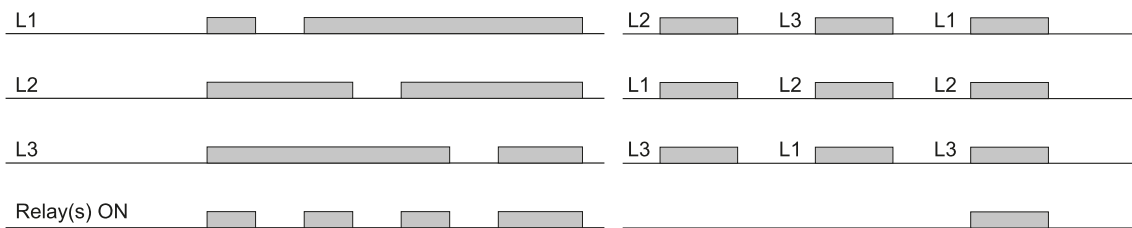


Fig. 1 Total phase loss, phase sequence

Connection diagrams

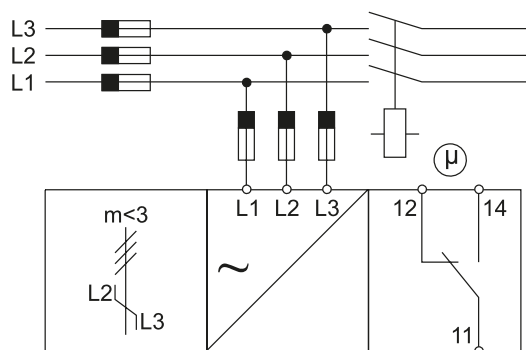


Fig. 2 DPA01C

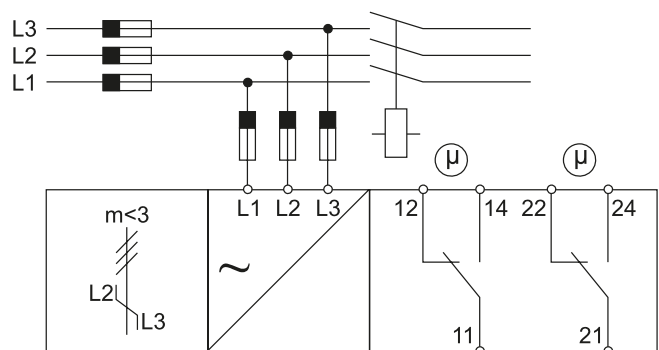


Fig. 3 DPA01D

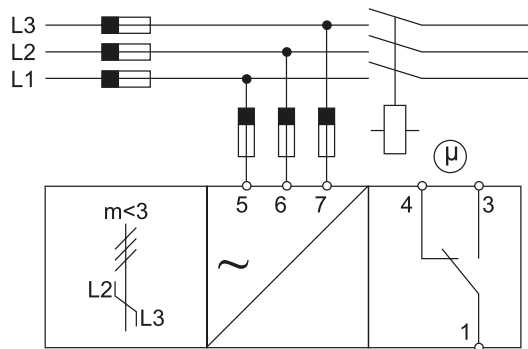


Fig. 4 PPA01C

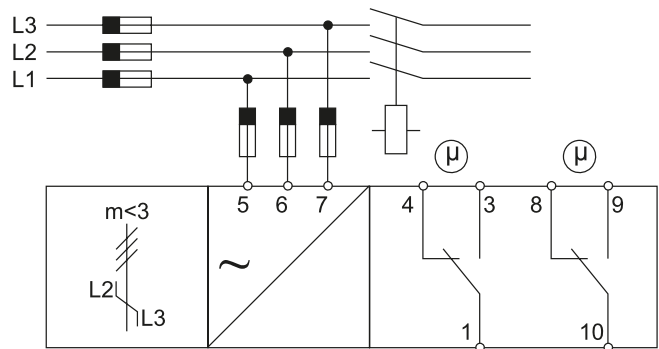


Fig. 5 PPA01D

References

Order code



Complete the code entering the corresponding option instead of

Code	Option	Description
<input type="checkbox"/>	D	DIN rail housing
	P	Plug-in housing
P	-	3-phase voltage
A	-	Single function
01	-	Item number
<input type="checkbox"/>	C	SPDT relay output
	D	DPDT relay output
<input type="checkbox"/>	M23	Power supply
	M44	
	M48	
	M60	
	M69	

Component name/part number	Mounting	Frequency	Power supply
DPA01DM23	DIN rail housing	50 - 60 Hz	208 to 240 V AC
PPA01DM23	Plug-in housing	50 - 60 Hz	208 to 240 V AC
DPA01CM44	DIN rail housing	50 - 60 Hz	208 to 480 V AC
PPA01CM44	Plug-in housing	50 - 60 Hz	208 to 415 V AC
DPA01DM48	DIN rail housing	50 - 60 Hz	380 to 480 V AC
PPA01DM48	Plug-in housing	50 - 60 Hz	380 to 415 V AC
DPA01CM60	DIN rail housing	50 - 60 Hz	380 to 600 V AC
DPA01CM69	DIN rail housing	50 - 60 Hz	600 to 690 V AC



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