

# DPA52



## True RMS 3-Phase voltage monitoring relay



### Benefits

- **Wide voltage range.** Working in systems from 208 to 480 VAC.
- **Output and status LED indication.** For quick troubleshooting.
- **Regenerated voltage detection.** To detect phase loss even while the motor is running.
- **Ultra-high harmonic immunity.** For very noisy environments.
- **High Compactness.** 17.5 mm DIN-rail housing.

### Description

DPA52 is a 3-phase mains monitoring relay. It operates on 3P systems, monitoring phase loss and phase sequence. Power supply provided by the monitored mains. For mounting on DIN-rail.

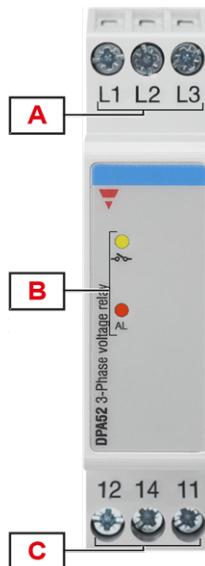
### Main features

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

### Order code

Mounting	Frequency	Power supply	Component name/part number
DIN-rail	50 - 60 Hz	208 to 480 VAC	DPA52CM44

## ► Structure



Element	Component	Function
A	Input terminals	Connection of the line voltages
B	Information LEDs	Yellow for relay output status Green for power ON / Red for signal alarm status
C	Output terminals	SPDT relay output

## Features

### ► Power supply

<b>Power supply</b>	Supplied by measured phases (L2, L3)
<b>Overvoltage category</b>	III (IEC 60664)
<b>Voltage range</b>	208 -40% to 480 V <sub>L-L</sub> AC +30% (125 to 624 V)
<b>Frequency range</b>	50 to 60 Hz $\pm$ 10% sinusoidal waveform
<b>Consumption</b>	< 2.5 VA

 **Inputs**

<b>Terminals</b>	L1, L2, L3
<b>Measured variables</b>	Phase sequence Phase loss Out of range 3P: voltages $V_{L12}$ , $V_{L23}$ , $V_{L31}$
<b>Nominal line range</b>	208 -35% to 480 VAC +25% (135 to 600 VAC)

 **Outputs**

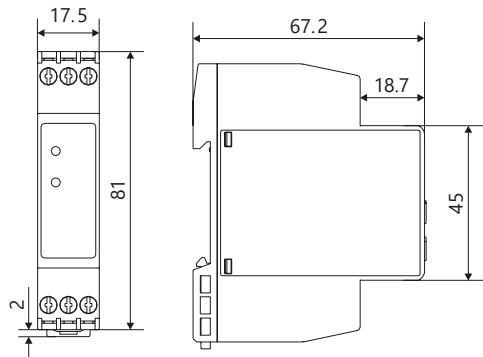
<b>Terminals</b>	11, 12, 14
<b>Number of outputs</b>	1
<b>Type</b>	SPDT electromechanical relay with changeover contacts
<b>Logic</b>	Output de-energised on alarm
<b>Contact rating</b>	<b>Ith:</b> 5 A @ 250 VAC <b>AC15:</b> 2.5 A @ 250 VAC <b>DC12:</b> 5 A @ 24 VDC <b>DC13:</b> 2.5 A @ 24 VDC
<b>Electrical lifetime</b>	$\geq 50 \times 10^3$ operations (at 5 A, 250 V, $\cos \varphi = 1$ )
<b>Mechanical lifetime</b>	$> 30 \times 10^6$ operations
<b>Assignment</b>	Associated to all alarm types

 **Insulation**

<b>Terminals</b>	<b>Basic insulation</b>
<b>Inputs: L1, L2, L3</b> <b>to</b> <b>output: 11, 12, 14</b>	2.5 kVrms, 4 kV impulse 1.2/50 $\mu$ s

 **General**

<b>Material</b>	Polyamide (Nylon) (PA66/6) or Phenylene ether + Polystyrene (PPE-PS)
	Flammability rating: HB according to UL 94
<b>Colour</b>	RAL7035 (light grey)
<b>Dimensions (W x H x D)</b>	17.5 x 81 x 67.2 mm (0.68 x 3.19 x 2.65 in)
<b>Weight</b>	75 g (2.65 oz)
<b>Terminals</b>	Cable size from 0.05 to 2.5 mm <sup>2</sup> (AWG30 to AWG13), stranded or solid
<b>Tightening torque</b>	0.4 to 0.8 Nm (3.54 to 7.08 lbin)
<b>Terminal type</b>	Screw terminals



## ► Environmental

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

## Vibration/Shock resistance

Test condition	Test	Level
<b>Tests with unpacked device</b>	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
<b>Tests with packed device</b>	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

<b>Marking</b>	
<b>Directives</b>	2014/35/EU (LVD - Low voltage) 2014/30/EU (EMC - Electromagnetic compatibility)
<b>Standards</b>	Insulation coordination: EN 60664-1 Immunity: EN61000-6-2 Emission: EN61000-6-3
<b>Approvals</b>	  

## ► 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	
<b>Input variables</b>	L1-L2, L2-L3 and L3-L1
<b>Alarm setpoint</b>	One phase $\leq$ 85% of the rated value (regenerated voltage detection)
<b>Restore setpoint</b>	All phases $>$ 85% of the rated value + Hysteresis
<b>Reaction time</b>	$\leq$ 200 ms
<b>Repeatability</b>	0.5% reading +1 V
<b>Accuracy</b>	1% reading + 1 V
<b>Hysteresis</b>	2% fixed
<b>Delay ON</b>	None
<b>Delay OFF</b>	None

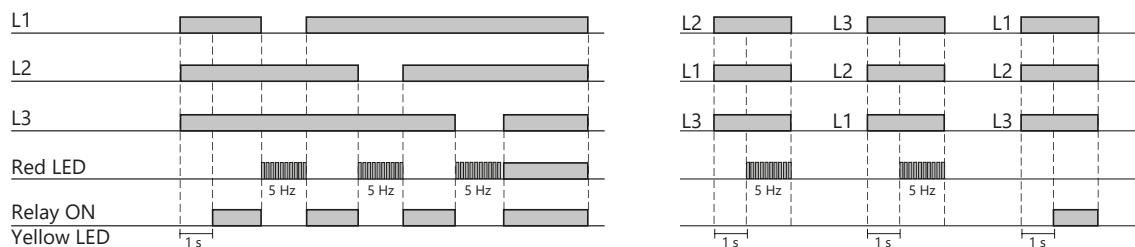
Phase sequence alarm	
<b>Input variables</b>	Connection L1, L2, L3
<b>Reaction time</b>	$\leq$ 200 ms
<b>Hysteresis</b>	None
<b>Delay ON</b>	None
<b>Delay OFF</b>	None

Measure out of range alarm	
<b>Input variables</b>	$V_{L12}, V_{L23}, V_{L31}$
<b>Reaction time</b>	$\leq 200$ ms
<b>Repeatability</b>	0.5% reading +1 V
<b>Accuracy</b>	1% reading + 1 V
<b>Hysteresis</b>	2%
<b>Delay ON</b>	None
<b>Delay OFF</b>	None

### Information LEDs

Colour		Status	Description
<b>Green / Red (AL)</b>	Alarm	Green ON (steady)	Power ON and no alarm active
		1 red flash	Measure out of range alarm
		2 red flashes	Phase sequence alarm
		3 red flashes	Phase loss alarm
<b>Yellow ( -○- )</b>	Relay output	ON	Energised
		OFF	De-energised

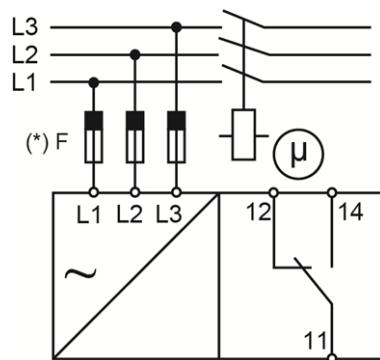
### Operating diagram



**Fig. 1 Total phase loss, phase sequence**

## Connection diagram

(\*) NOTE: fuses F of 315 mA delayed, if required by local law.



## References

### ▶ Further reading

Information	Where to find it	QR code
<b>Installation manual</b>	<a href="https://carlogavazzi-pss.com/manuals/DPA_PPA_IM_html">https://carlogavazzi-pss.com/manuals/DPA_PPA_IM_html</a>	
<b>PSS selection tool</b>	<a href="https://carlogavazzi-pss.com/">https://carlogavazzi-pss.com/</a>	



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