

DPA53



True RMS 3-Phase voltage monitoring relay



Benefits

- **Wide voltage range.** Working in systems from 208 to 480 V AC.
- **Adjustable undervoltage level.** To allow a correct response to real alarm conditions.
- **Output and status LED indication.** For quick troubleshooting.
- **Regenerated voltage detection.** To detect phase loss even while the motor is running.
- **High Compactness.** 17.5 mm DIN rail housing.

Description

DPA53 is a 3-phase mains monitoring relay. It operates on 3P systems, monitoring phase loss, phase sequence and undervoltage. Power supply provided by the monitored mains. For mounting on DIN-rail.

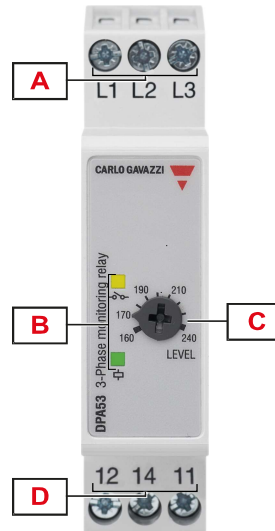
Applications

DPA53 offers 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.
- Front dial adjustable undervoltage setpoints.
- Change-over relay output.

Structure

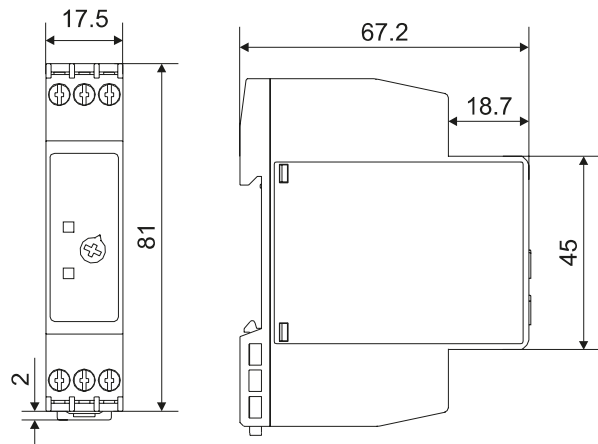


Element	Component	Function
A	Input terminals	Connection of the line voltages
B	Information LED	Yellow for relay output status Green for device ON
C	Voltage setpoint dial	Undervoltage setpoint adjustment
D	Output terminals	SPDT relay output

Features

General

Material	Polyamide (Nylon) or Phenylene ether + Polystyrene
Colour	RAL7035 (light grey)
Dimensions (W x H x D)	17.5mm x 81mm x 67.2 mm
Protection degree	IP20
Weight	75 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	Screw terminals



Power supply

Power supply	Supplied by measured phases (L1, L3)	
Overvoltage category	III (IEC 60664)	
Voltage range	M23	208 to 240 V _{L-L} AC ±15%
	M48	380 to 480 V _{L-L} AC ±15%
Frequency range	50 to 60 Hz ±10% sinusoidal waveform	
Consumption	M23	< 7 VA
	M48	< 13 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


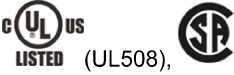

Vibration/Shock resistance

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	 

Inputs

Measured variables	Phase sequence Phase loss 3P: voltages V_{L12} , V_{L23} , V_{L31}
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Outputs

Number of outputs	1
Type	SPDT electromechanical relay with change-over contacts
Logic	Output de-energised on alarm
Contact rating	AC1: 5 A @ 250 V AC AC15: 2.5 A @ 250 V AC DC12: 5 A @ 24 V DC DC13: 2.5 A @ 24 V DC
Electrical lifetime	$\geq 50 \times 10^3$ operations (at 5 A, 250 V, $\cos \varphi = 1$)
Mechanical lifetime	$> 30 \times 10^6$ operations
Assignment	Associated to all alarm types

Insulation

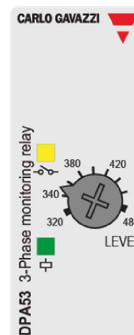
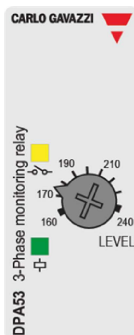
Terminals	Basic insulation
Inputs: L1, L2, L3 to Output: 12, 14, 11	2.5 kVrms, 4 kV impulse 1.2/50 μ s

Operating description

Device configuration

The relay operates when all the phases are present, the phase sequence is correct and the phase-phase voltage levels are above the adjusted setpoint.

Undervoltage adjustment dial		
Typology	M23	Linear selection from 160 to 240 V
	M48	Linear selection from 320 to 480 V
Resolution	M23	10 V increase per notch
	M48	20 V increase per notch
Function		Undervoltage setpoint



Alarms

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

Undervoltage alarm		
Input variables		3P: voltages V_{L12} , V_{L23} , V_{L31}
Reaction time		Alarm ON : < 100 ms Alarm OFF : < 300 ms
Undervoltage setting range	M23	From 160 to 240 V AC
	M48	From 320 to 480 V AC
Repeatability		0.5% on full scale
Hysteresis	M23	3% on full scale
	M48	4% on full scale
Delay ON		None
Delay OFF		None

Phase loss alarm		
Input variables	Voltage measurements 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	
Reaction time	Alarm ON : $<$ 100 ms Alarm OFF : $<$ 300 ms	
Hysteresis	M23	3% on full scale
	M48	4% on full scale
Delay ON	None	
Delay OFF	None	

Phase sequence alarm		
Input variables	Connection L1, L2, L3	
Reaction time	Alarm ON : $<$ 100 ms Alarm OFF : $<$ 300 ms	
Delay ON	None	
Delay OFF	None	

Visual information

DPA53 features 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

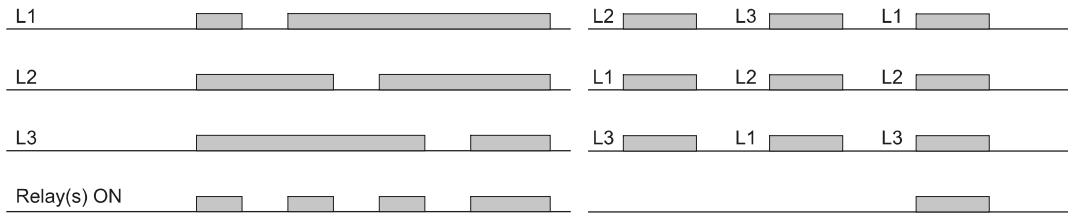


Fig. 1 Total phase loss, phase sequence

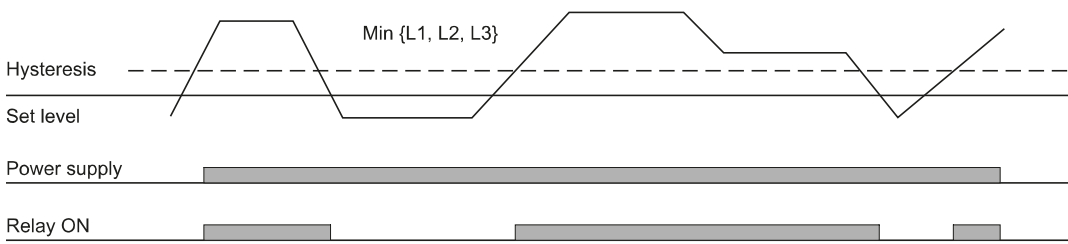
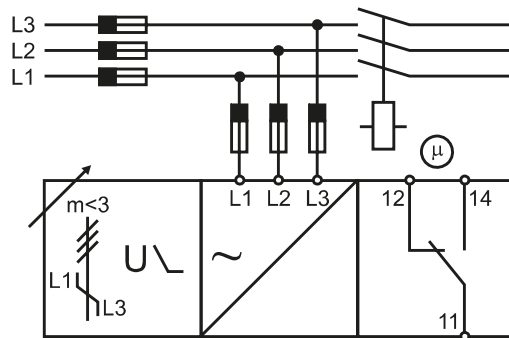


Fig. 2 Undervoltage monitoring

Connection diagrams



References

Order code



DPA53C



Complete the code entering the corresponding option instead of

Code	Option	Description
D	-	DIN rail housing
P	-	3-phase voltage
A	-	Single function
53	-	Item number
C	-	SPDT relay output
	M23	Power supply
	M48	

Component name/part number	Mounting	Frequency	Power supply
DPA53CM23	DIN rail housing	50 - 60 Hz	208 to 240 V AC
DPA53CM48	DIN rail housing	50 - 60 Hz	380 to 480 V AC



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