

DPB52CM44



True RMS 3-Phase voltage monitoring relay



Benefits

- **Wide voltages ranges.** Working in systems from 208 to 480 VAC.
- **Adjustable voltage levels and time delay.** To allow a correct response to real alarm conditions.
- **Output and status LED indication.** For quick troubleshooting.
- **Ultra-high harmonic immunity.** For very noisy environments.
- **High Compactness.** 17.5 mm DIN rail housing.

Description

DPB52 is a multifunction 3-phase mains monitoring relay.

It operates on 3P systems, monitoring phase loss and phase sequence, overvoltage and undervoltage.

Power supply provided by the monitored mains.

Delay on alarm, up to 30s, for over/under voltage alarms.

For mounting on DIN-rail.

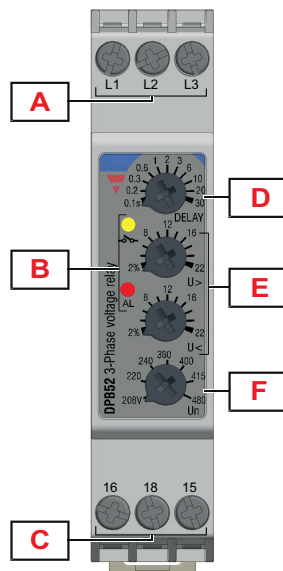
Applications

DPB52 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 overvoltage and undervoltage setpoints.
- Time delay.
- Changeover relay output.

Structure

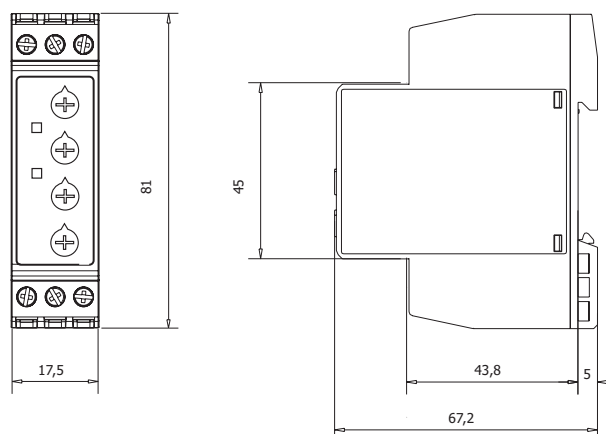


Element	Component	Function
A	Input terminals	Connection of the line voltages
B	Information LED	Yellow for relay output status Green / Red to signal alarm status
C	Output terminals	SPDT relay output
D	Delay time dial	Setting the alarm ON delay time
E	Voltage setpoints dials	Overvoltage and undervoltage setpoints adjustment
F	Mains nominal voltage dial	Mains nominal voltage adjustment

Features

General

Material	Polyamide (Nylon) or Phenylene ether + Polystyrene
Colour	RAL7035 (light grey)
Dimensions d x h x w	67.2mm x 81mm x 17.5mm
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. 0.5Nm (4.425lb.in)
Terminal type	Screw terminals



Power supply

Power supply	Supplied by measured phases (L2, L3)
Overvoltage category	III (IEC 60038)
Voltage range	208 V -40% to 480 V +30% (125 V to 624 V)
Frequency range	50Hz to 60Hz \pm 10% sinusoidal waveform
Consumption	< 2.5 VA

Environmental

Operating temperature	-20° C to 60° C (-4° F to 140° 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	 (UL508) (GB/T14048.5)

Inputs

Measuring ranges	
Measured variables	Phase sequence Phase loss Out of range Voltages V_{L12} , V_{L23} , V_{L31}
Nominal line range	208 V -35% to 480 V +25% (135 V to 600 V)
Nominal voltages	208V, 220V, 240V, 380V, 400V, 415V, 480V (delta voltage)

Outputs

Number of outputs	1
Type	SPDT electromechanical relay with change-over contacts
Logic	Output de-energized on alarm
Contact rating	AC1: 5 A @ 250 VAC AC15: 2.5 A @ 250 VAC DC12: 5 A @ 24 VDC DC13: 2.5 A @ 24 VDC
Electrical lifetime	$\geq 50 \times 10^3$ operations (at 8 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: 15, 16, 18	2.5kVrms, 4kV impulse 1.2/50µs (basic)

Operating description

► **Device configuration**

The relay is energized when all the phases are present, the phase sequence is correct and the phase-phase voltage levels are within set limits.

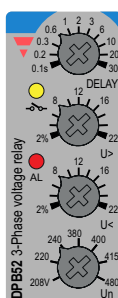
The relay is de-energized when one or more phase-phase voltages exceeds the upper set level or drops below the lower set level.

Undervoltage adjustment dial	
Typology	Linear selection from 2% to 22%
Resolution	2% setpoint increase per notch
Function	Relative undervoltage setpoint

Overvoltage adjustment dial	
Typology	Linear selection from 2% to 22%
Resolution	2% setpoint increase per notch
Function	Relative overvoltage setpoint

Delay setting dial	
Typology	Logarithmic adjustment from 0.1s to 30s
Resolution	From 100ms/notch at 0.1s to 10s/notch at 30s
Function	Alarm ON delay setting for undervoltage and overvoltage

Mains nominal voltage setting dial	
Function	Selection of mains nominal voltage value



► Alarms

DPB52 operates in 2 different modes depending upon the alarm type:

- Phase loss, incorrect phase sequence and out of range measurement cause immediate output relay de-energisation.
- Under or over voltage cause output relay de-energisation at the end of set delay.

Over / under voltage alarms	
Input variables	Voltages V_{L12} , V_{L23} , V_{L31}
Reaction time	≤ 200 ms
Undervoltage setting range	From -2% to -22%
Overvoltage setting range	From 2% to 22%
Repeatability	0.5% reading +1 V $\pm 0.2\%$
Hysteresis	2% fixed
Delay ON	Adjustable from 0.1s to 30s from 100ms/notch at 0.1s to 10s/notch at 30s
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 (regeneration voltage detection)
Restore setpoint	All phases $> 85\%$ of the rated value + Hysteresis
Reaction time	≤ 200 ms
Hysteresis	2% fixed
Delay ON	None
Delay OFF	None

Phase sequence alarm	
Input variables	Connection L1, L2, L3
Reaction time	≤ 200 ms
Hysteresis	None
Delay ON	None
Delay OFF	None

Measure out of range alarm	
Input variables	Voltages V_{L12} , V_{L23} , V_{L31}
Reaction time	≤ 200 ms
Hysteresis	2%
Delay ON	None
Delay OFF	None

► Visual information

DPB52 features 2 front LEDs which provide operation status information.

- Red/Green "AL" LED provides alarm status information:

AL LED	Status
Green ON fixed	OK
Green flashing (2 Hz)	Alarm triggered but configured delay is elapsing
1 red flash	Measure out of range alarm
2 red flashes	Phase sequence alarm
3 red flashes	Phase loss alarm
4 red flashes	Undervoltage alarm
5 red flashes	Overvoltage alarm

- Yellow LED is ON when the output relay is energised.



Operating diagrams

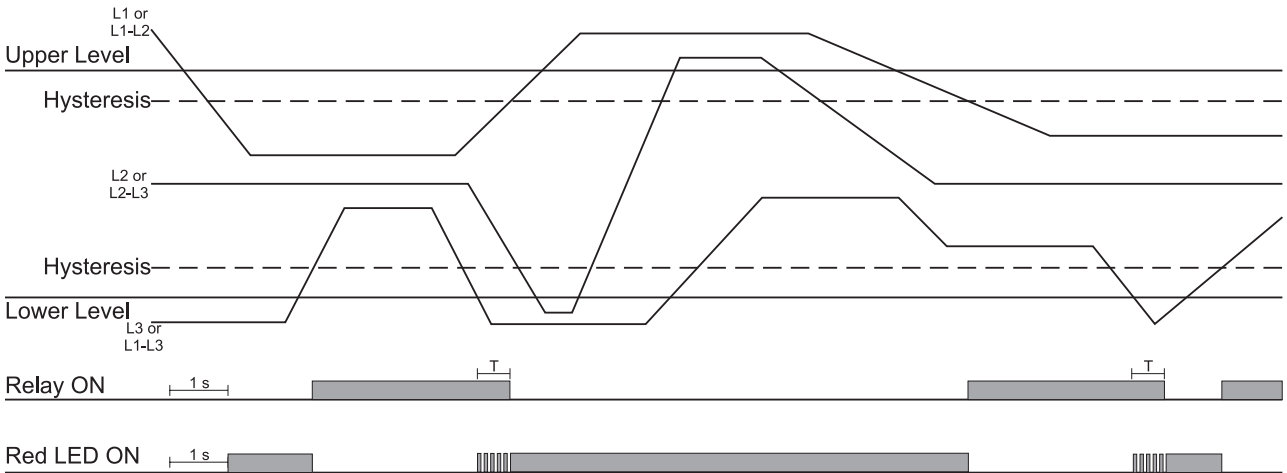


Fig. 1 Over and undervoltage monitoring (1 x SPDT relay)

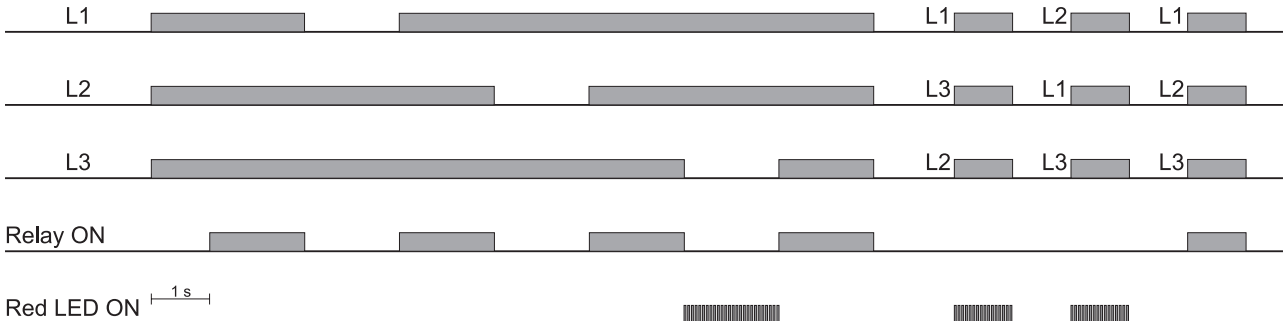
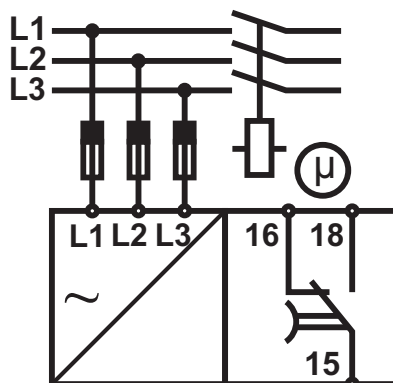


Fig. 2 Phase sequence, total phase loss

Connection Diagram

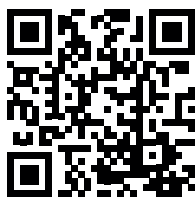


References

Order code



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