

DPA52



3-Phase Sequence and Phase Loss monitoring relay



Benefits

- **Measuring Voltage Range.** Very wide input voltage range: from 125 to 624V (208V – 40% to 480 + 30%).
- **Bicolor Alarm LED indication.** A green/red LED provides visual indication of the alarms status by means of colours of blinks.
- **Outputs LED indication.** A yellow LED provides visual indication of the output status.
- **Relay contact output.** A relay contact provides electrical (remote) indication of the alarms/output status.
- **High Compactness.** The DPA52 is a 3-Phase monitoring relay with 17,5mm width.

Description

DPA52 is a monitoring relay suitable 3-phase without neutral mains. It protects loads from wrong phase sequence and phase loss. It detects phase loss also with regenerated voltage presence. DPA52 doesn't require any setting nor adjustment, as soon as wired it is ready for operation. Power supply is provided by the measured mains, and it is switch mode, making it wide range and immune to mains disturbances, transients and harmonics problems. Additional protection, against dust and humidity, is provided by the PCB conformal coating. The output signal is a 5A changeover electromechanical relay.

2 front LEDs provide visual indication of output state and alarm discrimination. Alarm LED is bi-colour, colour and flashes indicate the operation status.

Thanks to the low profile DIN construction it is possible to install it either in industrial cabinets as well as NORM distribution panels.

Applications

DPA52 is suitable for all applications where it is necessary to monitor phase presence and correct phase sequence of three-phase load mains: lifts, escalators, HVAC, material handling, conveyors, pumps and compressors.

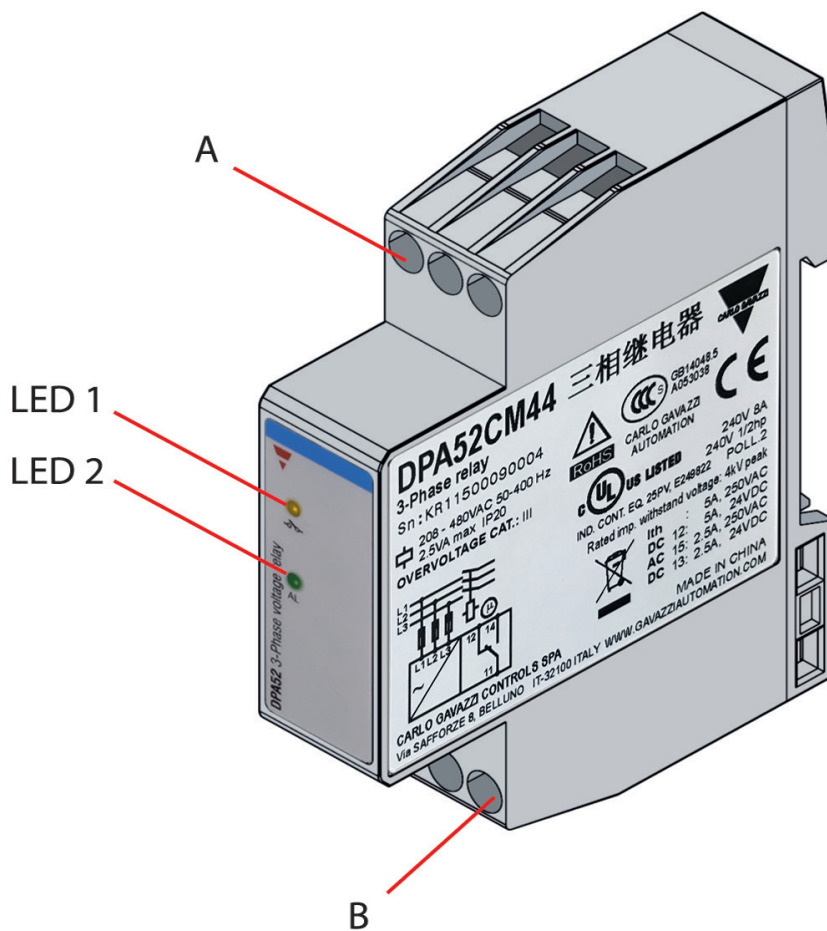
DPA52



Main function

- 3Ph monitoring
- From 208V to 480V rated input
- Phase sequence and Phase loss Alarm
- 5A SPDT relay output
- MiniDIN 17.5 Enclosure

Structure

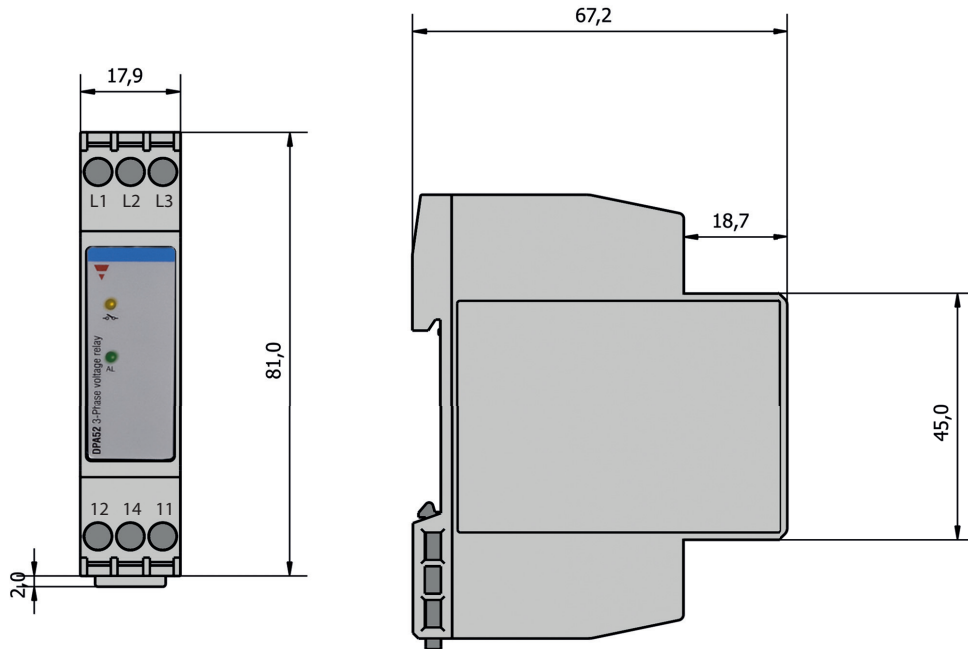


Element	Component	Function
A	Power supply terminals	L1, L2 and L3 supply and measuring terminals
B	Output terminals	Output Relay contacts terminals: COM, NO and NC
LED 1	Output Led	ON when relay is Energised
LED 2	Alarm LED	This LED is bicolour green/red, and can be blinking or fixed: Green steady ON: OK (all alarms OFF, no pending alarms) 1 red flash: Parameters " Out of range " alarm 2 red flashes: Phase sequence alarm 3 red flashes: Phase loss alarm

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Features



General data

Material	Nylon
Protection grade	IP20
Housing colour	RAL7035
Weight	approx. 75g (2.65oz)
Dimensions	81H x 67.2D x 17.5W
Terminals wire size	AWG30 to AWG13, stranded or solid
Terminals tightening torque	max. 0.5Nm

Power supply

Power supply	Voltage range: 208V -40% to 480V +30% (125V to 624V) Supplied from L2, L3 measured phases Frequency range: 45Hz to 65Hz sinusoidal waveform
Consumption	< 2 VA

Environmental

Working 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%
Pollution degree	2
Operating max altitude	2000m a.m.s.l. (6562ft)
Salinity	No saline environment
UV resistance	None
Other	Possible UV exposure if installed in an outdoor electric panel with transparent door




Vibration/Shock resistance	
Tests with the device outside the box:	
Vibration response (IEC60255-21-1)	Class1
Vibration endurance (IEC 60255-21-1)	Class1
Shock (IEC 60255-21-2)	Class1
Bump (IEC 60255-21-2)	Class1
Tests with the device inside the box:	
Vibration, random (IEC60068-2-64)	Class1
Shock (IEC 60255-21-2)	Class1
Bump (IEC 60255-21-2)	Class1

Note:

Class 1: Monitoring devices for normal use in power plants, substations and industrial plants and for normal transportation conditions(*)

(*) Packaging type is designed and implemented in such manner that the severity class parameters will not be exceeded during transportation.

Compatibility and conformity

Approvals	  
CE Marking	LV directive, EMC directive EN 60947-5-1
cULus Marking	UL 508, CSA 22.2

Inputs

Measuring ranges	
Variable measuring	Voltage PH-PH measurement on L1, L2 and L3 lines: Phase sequence Phase loss Out of range measurement

Voltage measurement	
Typology	PH-PH voltage measurement on L1, L2 and L3 lines
Nominal Line Range	208Vac -35% to 480Vac +25% (135Vac to 600Vac)
Overload range	125V to 624V (208Vac -40% to 480Vac +30%)

Phase Loss alarm	
Input variables	L1-L2, L2-L3 and L3-L1 Voltage measurements
Alarm Threshold	$\leq 85\%$ of $(1 - (L1,2,3 \text{ Max} - L1,2,3\text{Min}) / L1,2,3\text{Avg})$
Restore threshold	$> 85\%$ of $(1 - (L1,2,3 \text{ Max} - L1,2,3\text{Min}) / L1,2,3\text{Avg}) + \text{Hysteresis}$
Adjustable range	Fixed
Reaction time	$\leq 200\text{ms}$
Resolution	1V
Accuracy	1% reading +1V
Repeatability	0.5% reading +1V
Hysteresis	2% fixed
Delay ON	None
Delay OFF	None

Phase Sequence alarm	
Input variables	Connections L1, L2, L3
Restore threshold	≤ 200ms
Adjustable range	Not applicable, always active.
Delay ON	None
Delay OFF	None

Out of range alarm	
Input variables	L1-L2, L2-L3 and L3-L1 Voltage measurements
Reaction time	≤ 200ms
Resolution	1V
Accuracy	1% reading +1V
Repeatability	0.5% reading +1V
Hysteresis	2%
Delay ON	None
Delay OFF	None

▶ Output

Number of outputs	1
Type	SPDT electromechanical relay with change-over contacts
Logic	Output De-Energized on Alarm
Contact rating	AC1: 5A @ 250Vac AC15: 2.5A @ 250Vac DC12: 5A @ 24Vdc DC13: 2.5A @ 24Vdc
Assignment	Associated to all alarm types

▶ Insulation

Output 1	
Terminals	Basic Insulation
Inputs: L1,L2,L3 to Output: 11,12,14	2.5KVrms, 4KV impulse 1.2/50us (basic)

Operating description

- **Suitability**

DPA52 can be used for power supply and mains quality monitoring of all types of threephase loads with rated supply voltage from 208VAC to 480VAC. Monitoring function is performed between Line to Line.

- **Device configuration**

DPA52 does not require any setting or configuration. It automatically adapts to the grid to which is connected.

- **Alarm**

The relay operates when all the phases are present and the phase sequence is correct. Alarm goes off when one phase-phase voltage drops below 85% of the other phase-phase voltages, the phase sequence is wrong or the mains voltage is out of range. The alarm state de-energises the output relay.

As soon as the alarm cause is no longer present the normal operation is automatically restored.

- **Visual information**

The DPA52 is equipped with 2 LEDs which provide the status information

LED1 (Output Led) is lit when the output is energized

LED2 (Alarm Led) is bicolour green/red and can be blinking or steady ON:

Green steady ON: OK (all alarms off, no pending)

1 red flash: Alarm Out of range parameters

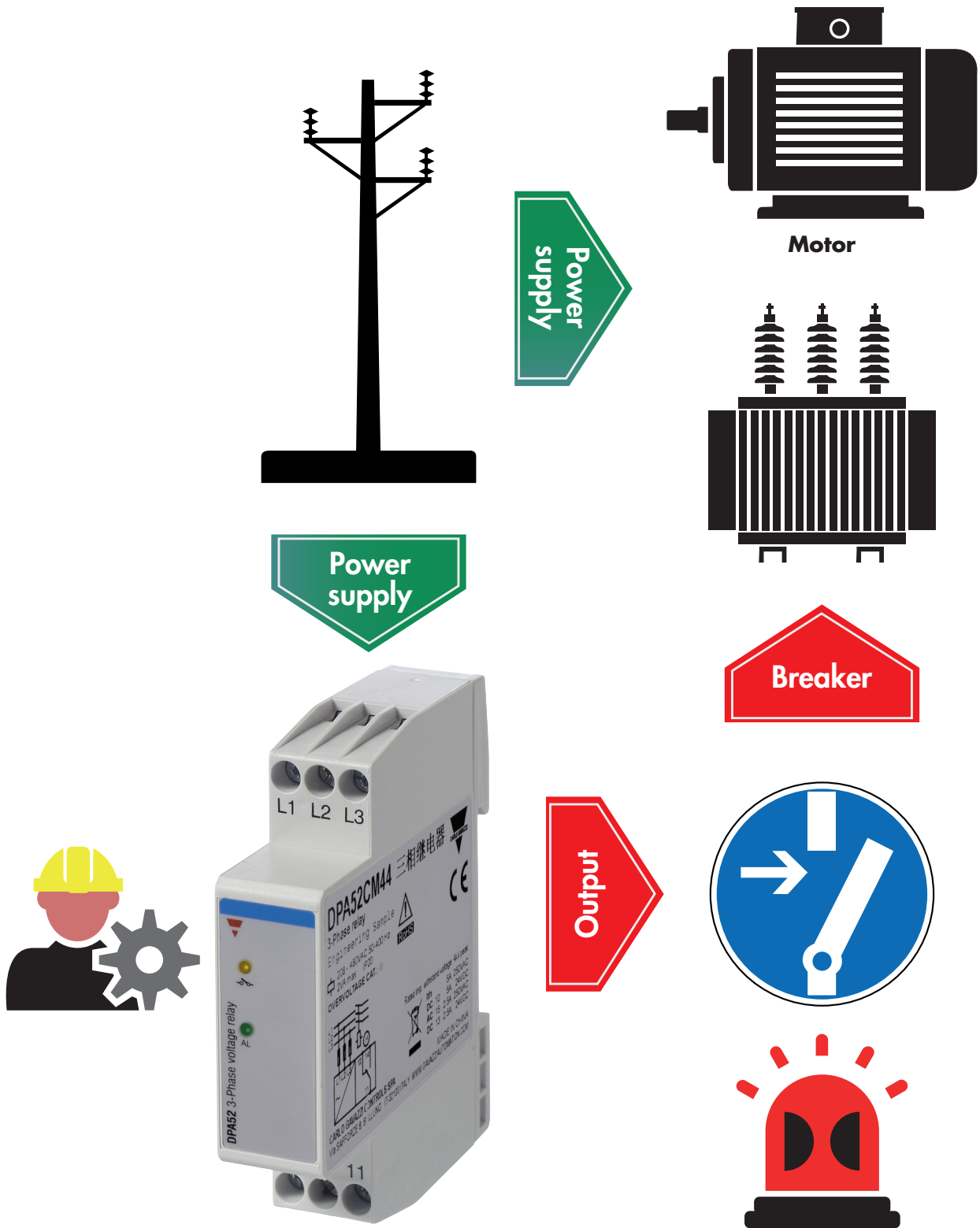
2 red flashes: Alarm Phase sequence

3 red flashes: Alarm Phase loss

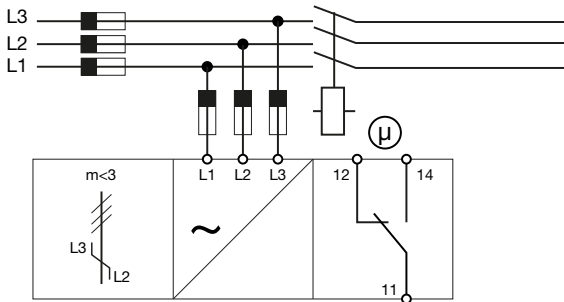
- **Phase loss**

Phase loss measurement is performed by comparing the 3 phases voltage values. If the voltage of one phase falls below the threshold (85%), compared to the other 2 phases, the alarm goes off. The detection occurs also in case of regenerated voltage presence: eg. with motor or transformer load.

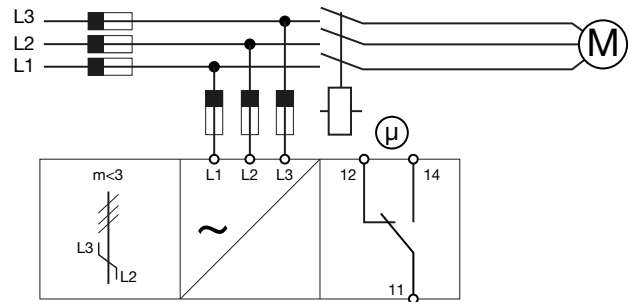
General operation block diagram



Connection Diagrams



Example 1



Example 2

Example 1

The relay monitors that the power supply has the correct phase sequence and that all phases are present.

Example 2

The relay releases in case of interruption of one or more phases, provided that the regenerated voltage does not exceed 85% of the phase-phase voltage.

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References

Further reading

Information	Where to find it	QR
Instructions Manual	http://www.productselection.net/MANUALS/UK/DPA52_IM.pdf	
Monitoring relays Brochure	http://www.productselection.net/MANUALS/UK/BRO_Monitoring_2017.pdf	

CARLO GAVAZZI compatible components

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Order code



DPA52CM44

