# Phase sequence relay BA 9041, AI 941 N varimeter

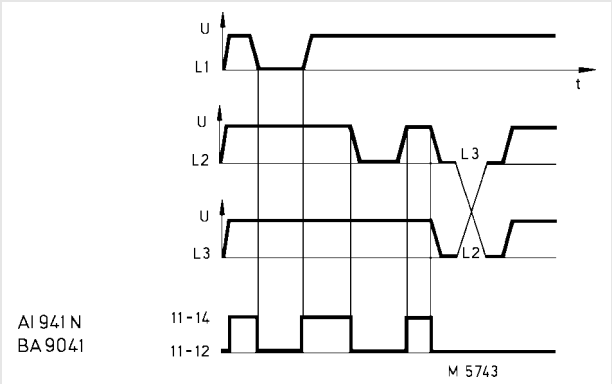
0225150


BA 9041

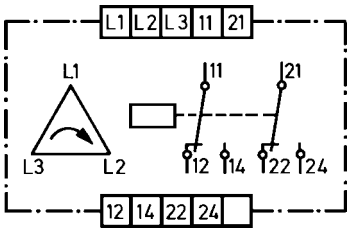

AI 941 N

- According to IEC 255, VDE 0435
- Detection of wrong phase sequence
- 1 or 2 changeover contacts
- Width 45 mm

## Function diagram




## Circuit diagram




BA 9041, AI 941 N.002

## Approvals and marking

GL* Deutschland CE * see variants

## Application

Monitoring three-phase mains for incorrect phase sequence

## Function

The phase sequence relays BA 9041 and AI 941N monitor the right order of the phases in a 3-phase system. When all 3 phases are connected to the device and the phase sequence is correct the output contacts are activated, 11-14 and 21-24 close and a green LED comes on.

When the voltage in one phase drops below 60 % of the nominal voltage the relay is deenergised. If a load feeds back a voltage that is higher then 60 % $U_N$ the fault is not detected. To avoid this problem an asymmetry relay BA 9040 should be used.

In systems with commutation peaks (thyristor controlled drives) the device can falsely detect a phase failure.

In this case it is helpful to know as much as possible about the actual conditions in the system.

## Variants

| | |
|---|---|
| AI 941 N. _ _ _ /03: | Nominal frequency 50 ... 60 Hz, phase failure cannot be detected with this unit |
| AI 941 N. _ _ _ /66: | with GL-approval |

## Technical data

### Input

| | |
|---|---|
| **Nominal voltage $U_N$:** | 3 AC 190, 230, 400, 415, 440, 500 V |
| **Voltage range:** | 0,8 ... 1,1 $U_N$ |
| **Nominal frequency of $U_N$:** | 50 Hz (60 Hz on request) |
| **Frequency range:** | ± 5 % |
| **Nominal consumption:** | < 3,5 VA |

### Output

| | | |
|---|---|---|
| **Contacts** | | |
| AI 941 N.001: | 1 changeover contact | |
| AI 941 N.002, BA 9041: | 2 changeover contacts | |
| **Operate-/release delay:** | < 100 / < 50 ms | |
| **Thermal current $I_{th}$:** | 5 A | |
| **Switching capacity** | | DIN VDE 0660 part 200 |
| to AC 11, AC 230 V: | 3 A | |
| to DC 11, DC 24 V: | 2 A | |
| **Electrical life** | | EN 60 947-5-1 |
| to AC 15 at 3 A, AC 230 V: | 2,5 x $10^5$ switching cycles | |
| **Short-circuit strength** | | |
| **max. fuse rating:** | 4 A gL | EN 60 947-5-1 |
| **Mechanical life:** | 50 x $10^6$ switching cycles | |

### General data

| | | |
|---|---|---|
| **Operating mode:** | Continuous operation | |
| **Temperature range:** | - 20 ... + 60°C | |
| **Clearance and creepage distances** | | |
| overvoltage category / contamination level: | 4 kV / 2 | DIN VDE 0110-1 (04.97) |
| **EMC** | | |
| Electrostatic discharge: | 8 kV (air) | EN 61 000-4-2 |
| HF irradiation: | 10 V/m | EN 61 000-4-3 |
| Fast transients: | 2 kV | EN 61 000-4-4 |
| Surge voltages: | 1 kV | EN 61 000-4-5 |
| Interference suppression: | Limit value class B | EN 55 011 |
| **Degree of protection:** | Housing: IP 40 | EN 60 529 |
| | Terminals: IP 20 | EN 60 529 |
| **Housing:** | Thermoplastic with V0 behaviour according to UL subject 94 | |
| **Vibration resistance:** | Amplitude 0,35 mm, frequency 10 ... 55 Hz, | EN 60 068-2-6 |
| **Climate resistance:** | 20 / 60 / 04 | EN 60 068-1 |
| **Terminal designation:** | EN 50 005 | |
| **Wire connection:** | 2 x 2,5 $mm^2$ solid or<br>2 x 1,5 $mm^2$ stranded wire with sleeve DIN 46 228-1/-2/-3/-4 | |
| **Wire fixing:** | Flat terminals with self-lifting clamping piece | EN 60 999 |
| **Screw mounting:** | | |
| AI 941 N: | 35 x 50 mm and 35 x 60 mm | |
| **Mounting:** | DIN rail | EN 50 022 |
| **Weight:** | | |
| BA 9041: | 310 g | |
| AI 941 N: | 300 g | |

## Ordering example

BA 9041 AC 400 V 50 Hz

- 50 Hz — Nominal frequency
- AC 400 V — Nominal voltage
- BA 9041 — Type

AI 941 N .002 /66 AC 400 V 50 Hz

- 50 Hz — Nominal frequency
- AC 400 V — Nominal voltage
- /66 — Variant
- .002 — Contacts
- AI 941 N — Type

## Dimensions

| Width x height x depth | |
|---|---|
| BA 9041: | 45 x 74 x 124 mm |
| AI 941 N: | 45 x 77 x 127 mm |