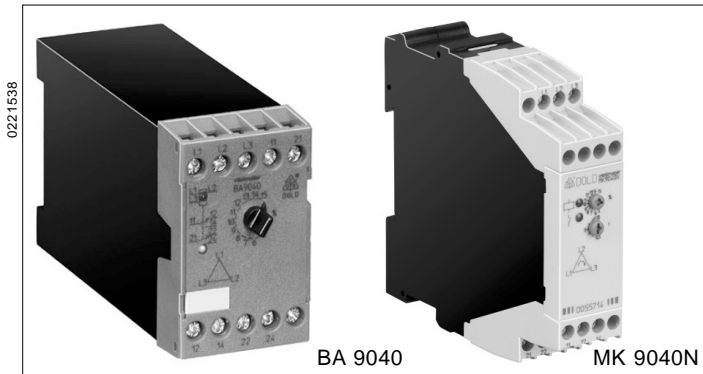


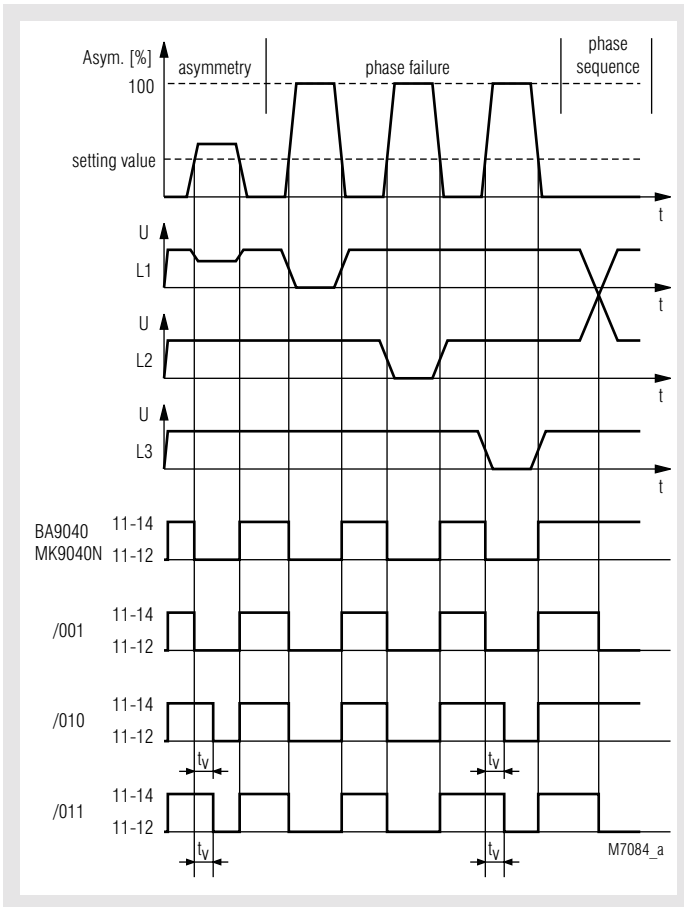
# Monitoring technique

## Asymmetry relay BA 9040, MK 9040N varimeter

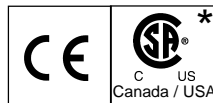


- According to IEC 255, EN 60 255, VDE 0435 part 303
- Recognition of
  - voltage asymmetry
  - phase failure
  - voltage feedback
  - optionally with phase sequence recognition
- Optionally with adjustable response delay
- Insensitive against
  - symmetric harmonics up to K-factor K 20 %
- 2 LED displays for power supply and state of contact
- BA 9040: width 45 mm
- MK 9040N: width 22,5 mm

### Function diagram



### Approvals and marking



\* only for BA 9040 (see variants)

### Applications

Monitoring three-phase mains for voltage asymmetry, phase failure or incorrect phase sequence, e.g. in elevators, escalators, crane systems etc.

### Indications

upper LED: on when supply voltage connected  
lower LED: on when output relay energized

### Technical data

#### Input

**Nominal voltage  $U_N$ :** 3 AC 400 V  
**Voltage range:** 0,8 ... 1,1  $U_N$   
**Nominal consumption:**  
 BA 9040: approx. 4,8 VA  
 MK 9040N: 7 VA  
**Nominal frequency:** 50 / 60 Hz  
**Frequency range:** 45 ... 65 Hz  
**Temperature influence:** < 0,05 % / K  
**Frequency influence:** < 0,02 % / Hz  
**Resistance of harmonics symmetric:** K-factor K 20 %

#### Setting ranges

**Setting range:** 5 ... 15 % voltage asymmetry  
**Repeat accuracy:** ≤ 0,5 %  
**Release ratio:** < 4 %  $U_N$   
**Voltage feedback recognition:** up to 100 % - setting value, e.g. when setting value = 5 % asymmetry, 100 % - 5 % = 95 %  
 Recognition of voltage feedback up to 95 %

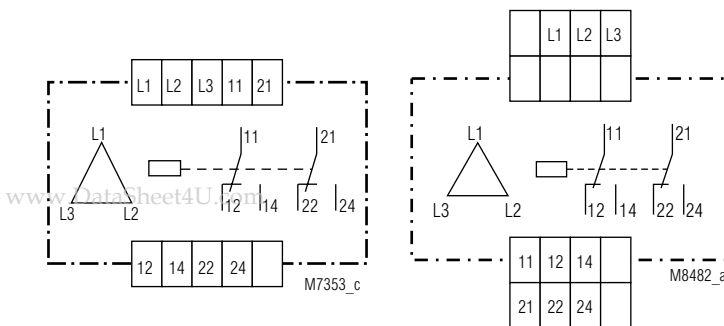
#### Time delay $t_v$

BA 9040: 0,5 ... 5 s  
 MK 9040N: 0,5 ... 10 s

#### Output

**Contacts:** 2 changeover contacts  
**Response/release time:**  
 BA 9040: ≤ 1 s / ≤ 250 ms  
 MK 9040N: ≤ 1,5 s / ≤ 250 ms  
**Thermal current  $I_{th}$ :** 6 A (see continuous current limit curve)

### Circuit diagram



BA 9040.12

MK 9040N.12

## Technical data

### Switching capacity

to AC 15

NO contact: 3 A / AC 230 V IEC/EN 60 947-5-1  
 NC contact: 1 A / AC 230 V IEC/EN 60 947-5-1

### Electrical life:

to AC 15 at 3 A, AC 230 V: 10<sup>5</sup> switching cycles IEC/EN 60 947-5-1

### Permissible switching frequency:

6 000 switching cycles / h

### Short circuit strength

max. fuse rating: 4 A gL IEC/EN 60 947-5-1

### General data

**Operating mode:** Continuous operation

**Temperature range:** - 20 ... + 60 °C

### Clearance and creepage distances

overvoltage category /  
 contamination level: 4 kV / 2 IEC 60 664-1

### EMC

Electrostatic discharge: 8 kV (air) IEC/EN 61 000-4-2

HF irradiation: 10 V/m IEC/EN 61 000-4-3

Fast transients: 2 kV IEC/EN 61 000-4-4

Surge voltages  
 between

wires for power supply: 2 kV IEC/EN 61 000-4-5

between wire and ground: 4 kV IEC/EN 61 000-4-5

Interference suppression: Limit value class B EN 55 011

Housing: IP 40 IEC/EN 60 529

Terminals: IP 20 IEC/EN 60 529

**Degree of protection:** Thermoplast with V0 behaviour  
 according to UL subject 94

**Housing:** Frequency 10 ... 55 Hz,  
 Amplitude 0,35 mm IEC/EN 60 068-2-6  
 20 / 060 / 04 IEC/EN 60 068-1

**Vibration resistance:** 2 x 2,5 mm<sup>2</sup> solid or  
 2 x 1,5 mm<sup>2</sup> stranded wire with sleeve  
 DIN 46 228-1/-2/-3/-4

### Climate resistance:

**Wire connection:** Flat terminals with self-lifting  
 clamping piece IEC/EN 60 999-1

Box terminal with wire protection

**Mounting:** DIN rail IEC/EN 60 715

**Weight:** 325 g

### Dimensions

#### Width x height x depth:

BA 9040: 45 x 74 x 133 mm

MK 9040N: 22,5 x 90 x 100 mm

## Standard type

BA 9040.12/001 3 AC 400 V 50/60 Hz

Article number: 0043764 stock item

- With phase sequence detection
- Without operate delay
- Output: 2 changeover contacts
- Nominal voltage U<sub>N</sub>: 3 AC 400 V
- Width: 45 mm

MK 9040N.12/001 3AC 400 V 50/60 Hz

Article number: 0055712 stock item

- With phase sequence detection
- Without operate delay
- Output: 2 changeover contacts
- Nominal voltage U<sub>N</sub>: 3 AC 400 V
- Width: 22,5 mm

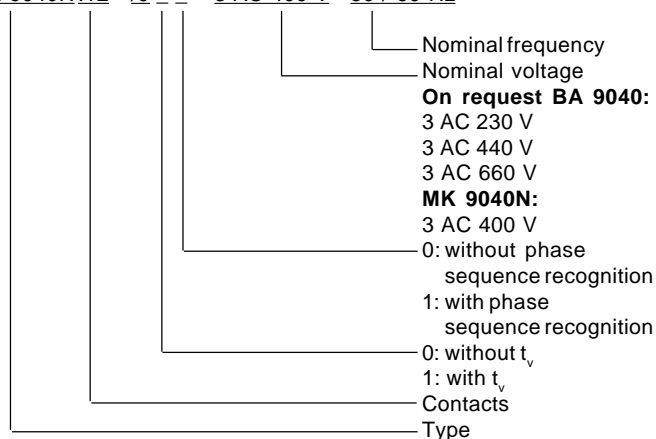
## Variants

BA 9040.12/60: CSA/UL approval  
 BA 9040.12/0\_0: without phase sequence detection  
 BA 9040.12/0\_1: with phase sequence detection  
 BA 9040.12/00\_ : without time delay  
 BA 9040.12/01\_ : with adjustable time delay  
 t<sub>v</sub>: 0 ... 5 s

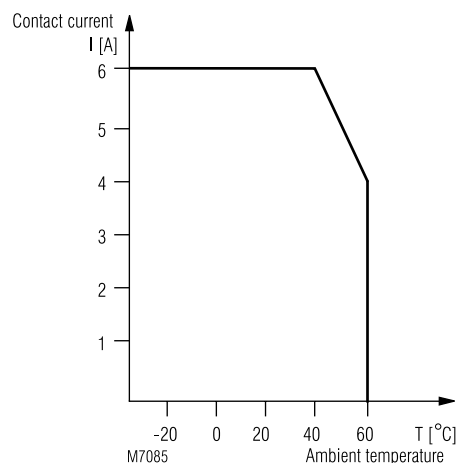
MK 9040N.12/0\_0: without phase sequence detection  
 MK 9040N.12/0\_1: with phase sequence detection  
 MK 9040N.12/00\_ : without time delay  
 MK 9040N.12/01\_ : with adjustable time delay  
 t<sub>v</sub>: 0 ... 10 s

## Ordering example for variants

MK 9040N.12 /0 \_ \_ 3 AC 400 V 50 / 60 Hz



## Characteristics



Continuous current limit curve