VARIMETER
Asymmetry Relay
BA 9040, MK 9040N

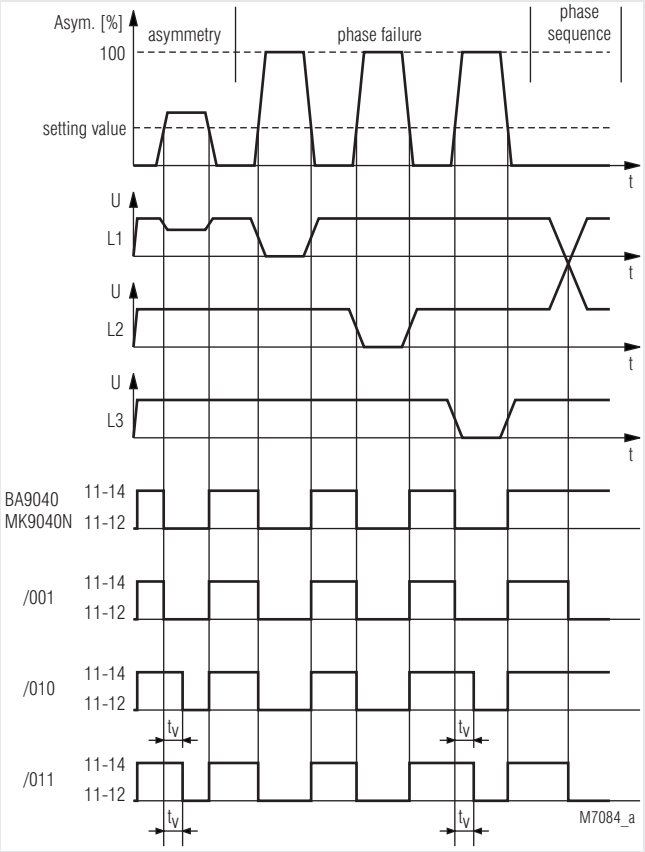
DOLD

0221538


BA 9040
MK 9040N

- According to IEC/EN 60255-1
- Recognition of
  - Voltage asymmetry
  - Phase failure
  - Voltage feedback
  - Optionally with phase sequence recognition
- Optionally with adjustable response delay
- 2 LED displays for power supply and state of contact
- Wire connection: also 2 x 1.5 mm² stranded ferruled, or 2 x 2.5 mm² solid DIN 46 228-1/-2/-3/-4
- As option with pluggable terminal blocks for easy exchange of devices
  - With screw terminals
  - Or with cage clamp terminals
- BA 9040: width 45 mm
  MK 9040N: width 22.5 mm

Function Diagram



Approvals and Markings

CE | C US Canada / USA * | A025518 *

* see variants

Applications

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

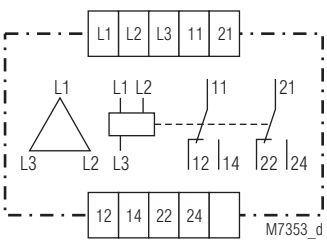
Indicators

Upper LED:	On, when supply voltage connected
Lower LED:	On, when output relay energized

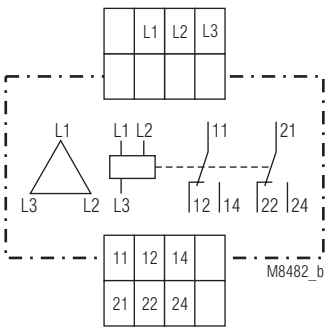
Connection Terminals

Terminal designation	Signal description
L1, L2, L3	Connection of the monitoring 3-phase system
11, 12, 14	1. changeover contact
21, 22, 24	2. changeover contact

Circuit Diagrams



BA 9040.12



MK 9040N.12

All technical data in this list relate to the state at the moment of edition. We reserve the right for technical improvements and changes at any time.

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

Setting Ranges

Setting range:	5 ... 15 % voltage asymmetry
Repeat accuracy (constant parameters):	≤ 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)	
Switching capacity		
to AC 15		
NO contact:	2 A / AC 230 V	IEC/EN 60 947-5-1
NC contact:	1 A / AC 230 V	IEC/EN 60 947-5-1
to DC 13		
NO contact:	1 A / DC 24 V	IEC/EN 60 947-5-1
NC contact:	1 A / DC 24 V	IEC/EN 60 947-5-1
MK:		
to AC 15		
NO contact:	1,5 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:		
at 3 A, AC 230 V cos φ = 1:	10^5 switching cycles	IEC/EN 60 947-5-1
Permissible switching frequency:	6 000 switching cycles / h	
Short circuit strength max. fuse rating:	4 A gG / gL	IEC/EN 60 947-5-1
Mechanical life:	10 x 10^6 switching cycles	

General Data

Operating mode:	Continuous operation	
Temperature range		
Operation:	- 20 ... + 60 °C	
Storage:	- 20 ... + 60 C	
Altitude:	< 2,000 m	
Clearance and creepage distances		
rated impulse voltage / pollution degree:	4 kV / 2	IEC 60 664-1
Overvoltage category:	III *)	
	*) up to 3 AC 480 V	
EMC		
Electrostatic discharge:	8 kV (air)	IEC/EN 61 000-4-2
HF irradiation 80 MHz ... 2.7 GHz:	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
HF wire guided:	10 V	IEC/EN 61 000-4-6
Interference suppression:	Limit value class B	EN 55 011
Degree of protection		
Housing:	IP 40	IEC/EN 60 529
Terminals:	IP 20	IEC/EN 60 529
Housing:	Thermoplast with V0 behaviour according to UL subject 94	

Technical Data

Vibration resistance:	Frequency 10 ... 55 Hz, Amplitude 0.35 mm	IEC/EN 60 068-2-6
Climate resistance:	20 / 060 / 04	IEC/EN 60 068-1
Wire connection:	2 x 2.5 mm² solid or 2 x 1.5 mm² stranded wire with sleeve DIN 46 228-1/-2/-3/-4	
Stripping length:	10 mm	
Wire fixing:		
BA 9040:	Flat terminals with self-lifting clamping piece	IEC/EN 60 999-1
MK 9040N:	Box terminal with wire protection	
Fixing torque:	0.8 Nm	
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

CSA-Data

Switching capacity:	3A 230Vac
Wire connection:	60°C / 75°C copper conductors only AWG 20 - 14 Sol Torque 0.8 Nm AWG 20 - 16 Str Torque 0.8 Nm

Technical data that is not stated in the CSA-Data, can be found in the technical data section.

CCC-Data

Thermal current I_{th}:	5 A	
Switching capacity		
to AC 15:	2 A / AC 230 V	IEC/EN 60 947-5-1
to DC 13:	1 A / DC 24 V	IEC/EN 60 947-5-1

Technical data that is not stated in the CCC-Data, can be found in the technical data section.

Standard Types

BA 9040.12/001 3 AC 400 V 50/60 Hz
Article number: 0043764
- With phase sequence detection
- Without operate delay
- Output: 2 changeover contacts
- Nominal voltage U_N: 3 AC 400 V
- Width: 45 mm

MK 9040N.12/001 3AC 400 V 50/60 Hz
Article number: 0055712
- With phase sequence detection
- Without operate delay
- Output: 2 changeover contacts
- Nominal voltage U_N: 3 AC 400 V
- Width: 22.5 mm

Variants

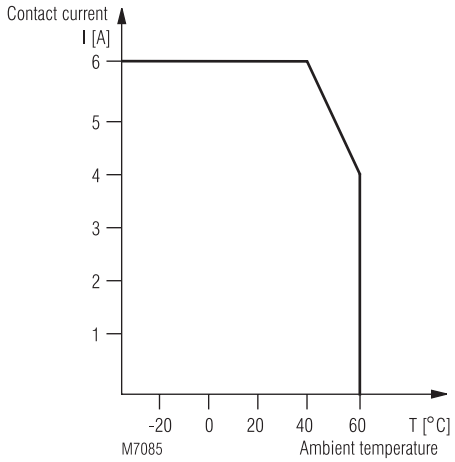
BA 9040.12/60:	With CSA approval on request
BA 9040:	With CCC approval on request
BA 9040.12/0 _ 0:	Without phase sequence detection
BA 9040.12/0 _ 1:	With phase sequence detection
BA 9040.12/00 _ :	Without time delay
BA 9040.12/01 _ :	With adjustable time delay t_v: 0 ... 5 s
MK 9040N.12/0 _ 0:	Without 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_v: 0 ... 10 s

Ordering example for variants

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

- Nominal frequency
- Nominal voltage
  - **On request BA 9040:**
  - 3 AC 230 V
  - 3 AC 440 V
  - 3 AC 660 V
  - **MK 9040N:**
  - 3 AC 400 V
- 0: Without phase sequence recognition
- 1: With phase sequence recognition
- 0: Without t_v
- 1: With t_v
- Contacts
- Type

Characteristic



Continuous current limit curve

Options with Pluggable Terminal Blocks



Screw terminal
(PS/plugin screw)



Cage clamp
(PC/plugin cage clamp)