

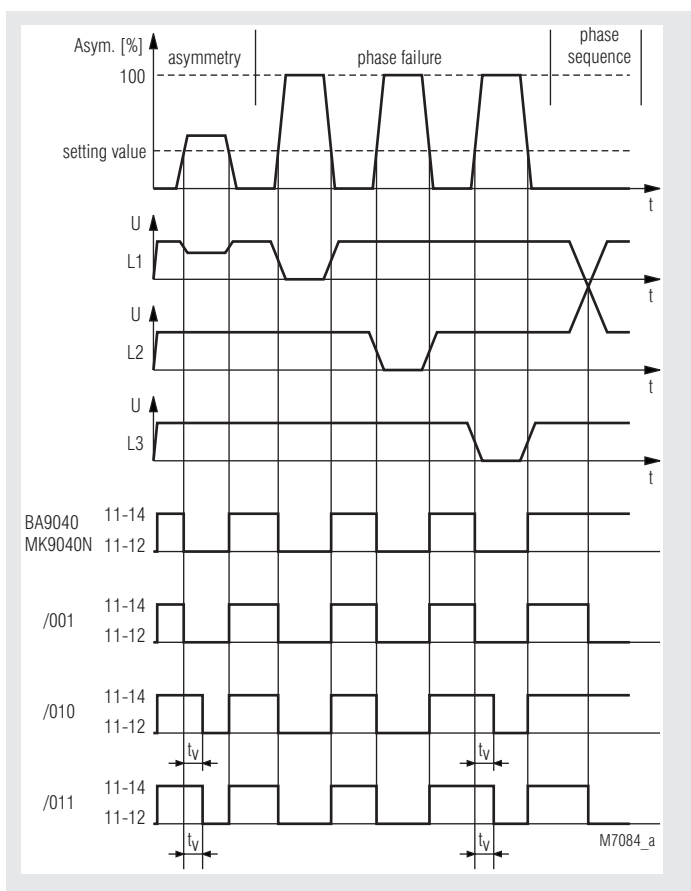
VARIMETER Asymmetry Relay BA 9040, MK 9040N

Translation
of the original instructions



- 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 46228-1/-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



* see variants

Applications

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

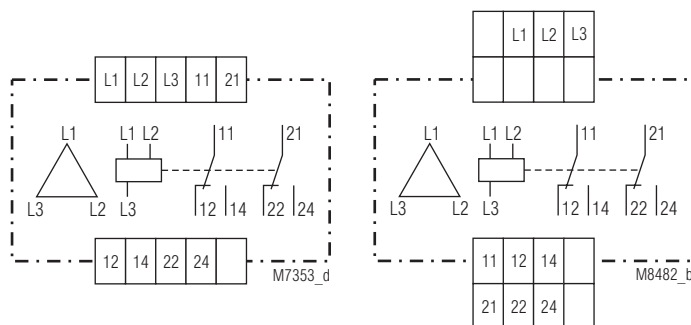
Indicators

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

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_d

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 60947-5-1
NC contact:	1 A / AC 230 V	IEC/EN 60947-5-1
To DC 13		
NO contact:	1 A / DC 24 V	IEC/EN 60947-5-1
NC contact:	1 A / DC 24 V	IEC/EN 60947-5-1
MK:		
To AC 15		
NO contact:	1,5 A / AC 230 V	IEC/EN 60947-5-1
NC contact:	1 A / AC 230 V	IEC/EN 60947-5-1
Electrical life:		
At 3 A, AC 230 V $\cos \varphi = 1$:	10 ⁵ switching cycles	IEC/EN 60947-5-1
Permissible switching frequency:	6 000 switching cycles / h	
Short circuit strength		
Max. fuse rating:	4 A gG / gL	IEC/EN 60947-5-1
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:	< 2000 m	
Clearance and creepage distances		
Rated impulse voltage / pollution degree:	4 kV / 2	IEC 60664-1
Overvoltage category:	III *)	
	*) up to 3 AC 480 V	
EMC		
Electrostatic discharge:	8 kV (air)	IEC/EN 61000-4-2
HF irradiation		
80 MHz ... 2.7 GHz:	10 V / m	IEC/EN 61000-4-3
Fast transients:	2 kV	IEC/EN 61000-4-4
Surge voltages		
Between		
wires for power supply:	2 kV	IEC/EN 61000-4-5
Between wire and ground:	4 kV	IEC/EN 61000-4-5
HF wire guided:	10 V	IEC/EN 61000-4-6
Interference suppression:	Limit value class B	EN 55011
Degree of protection		
Housing:	IP 40	IEC/EN 60529
Terminals:	IP 20	IEC/EN 60529
Housing:	Thermoplast with V0 behaviour according to UL subject 94	

Technical Data

Vibration resistance:	Frequency 10 ... 55 Hz, Amplitude 0.35 mm IEC/EN 60068-2-6
Climate resistance:	20 / 060 / 04 IEC/EN 60068-1
Wire connection:	2 x 2.5 mm ² solid or 2 x 1.5 mm ² stranded wire with sleeve DIN 46228-1/-2/-3/-4
Stripping length:	10 mm
Wire fixing:	
BA 9040:	Flat terminals with self-lifting clamping piece IEC/EN 60999-1
MK 9040N:	Box terminal with wire protection
Fixing torque:	0.8 Nm
Mounting:	DIN rail IEC/EN 60715
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 60947-5-1
To DC 13:	1 A / DC 24 V IEC/EN 60947-5-1



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

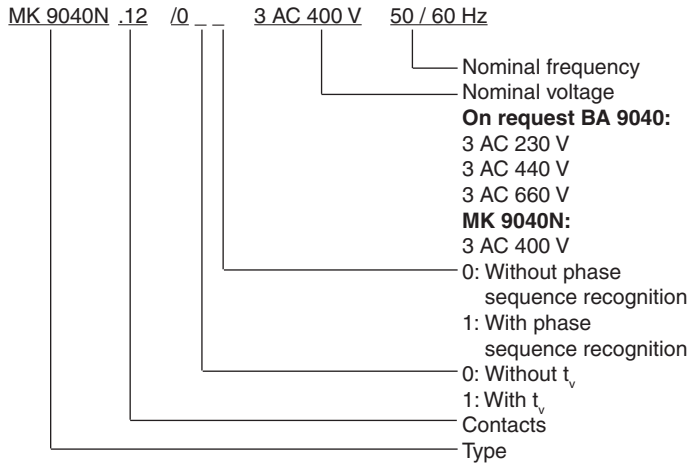
Standard Types

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	

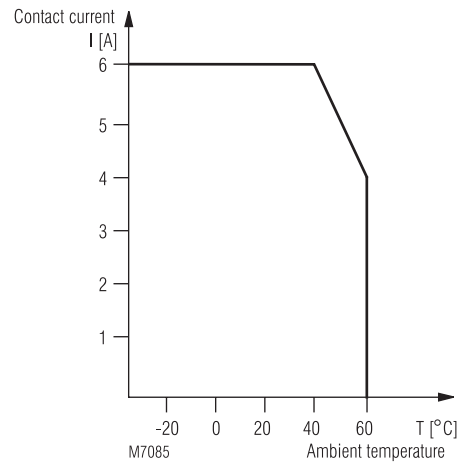
Variants

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

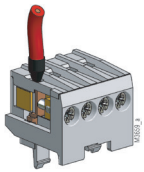
Ordering example for variants



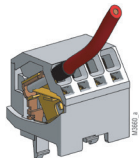
Characteristic



Options with Pluggable Terminal Blocks



Screw terminal
(PS/plugin screw)



Cage clamp
(PC/plugin cage clamp)

