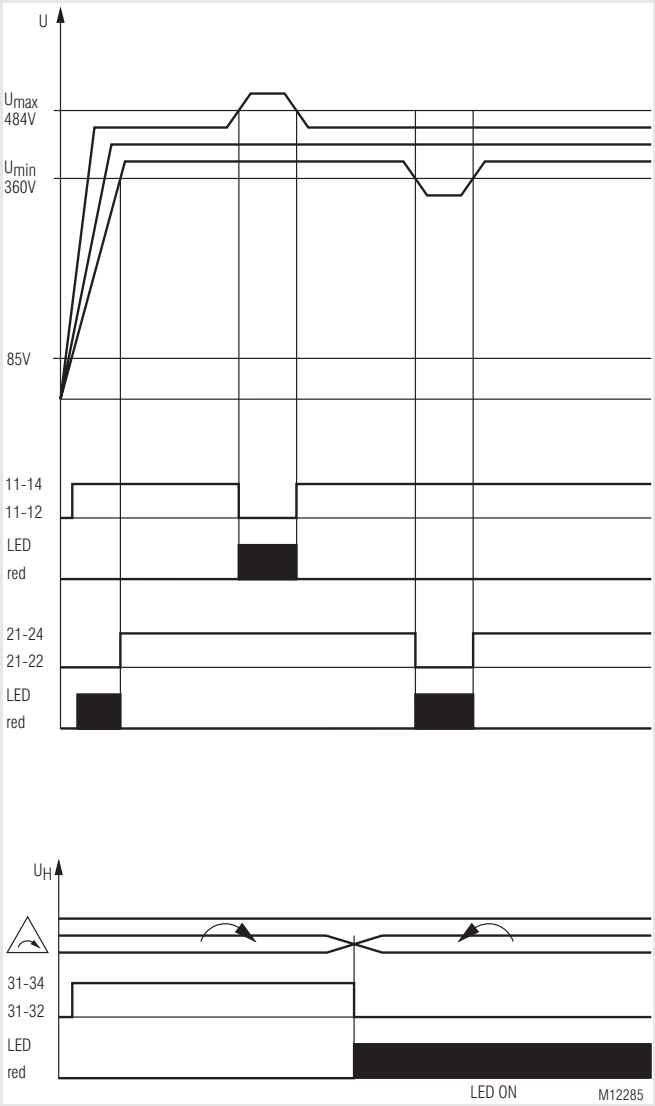
VARIMETER
Phase monitor
MH 9352/001

Translation of the original instructions

DOLD

0280449

Function Diagrams



Your Advantages

- Space and cost saving due to 3 devices in one housing
- Easy fault diagnostics by 3 separate DEL
  - Overvoltage
  - Undervoltage
  - Phase sequence and power failure
- Differentiated error transfer to PLC possible, e.g. for logging of error type and time
- Large measuring range 3 AC 85 ... 550 V by built-in power supply with wide voltage range

Features

- Acc. to IEC/EN 60255-1
- 3 phases mains monitoring on
  - Overvoltage
  - Undervoltage
  - Phase sequence and voltage failure
- 3 separate output relais with 1 changeover contact each
- Without N connection
- Closed circuit operation
- As option with different connection blocks
  - With fixed screw terminals
  - With plug-in screw terminals
  - With plug-in cage-clamp terminals
- Width: 45 mm

Approvals and Markings

CE

Application

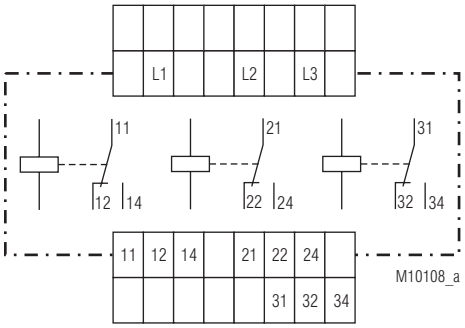
Monitoring of 3-phase networks for overvoltage, undervoltage and phase sequence.

- Crane applications with voltage supply via mains or mobile generator sets.

Function

The phase monitor monitors the 3 phases in a network for overvoltage, undervoltage, phase sequence and voltage failure. The setting values are fixed. The device works de-energized without auxiliary supply voltage. If an error is detected, the corresponding LED lights up. At voltages below AC 85 V at L2 and L3 the device is switched off.

Circuit Diagram



Connection Terminals

Terminal designation	Signal designation
L1, L2, L3	Connection phase voltage
11, 12, 14	Indicator relay for overvoltage
21, 22, 24	Indicator relay for undervoltage
31, 32, 34	Indicator relay for phase sequence

Indication

Green LED U_N: On, when operating voltage connected between L2 and L3 (U > AC85V)

Red LED U_{max}: On, at overvoltage

Red LED U_{min}: On, at undervoltage

Red LED Δ: On, at wrong phase sequence

Note

Because of the gold plated contacts the device can be used to switch small loads 1 mVA ... 7 VA, 1 mW ... 7 W in the range of 2 ... 60 V, 1 ... 300 mA. The gold plated contacts allow also to switch the maximum current but the gold plating will be burnt off. After that the contacts cannot be used any more to switch the small loads.

Technical Data

Input

Nominal voltage U_N 3 AC 400 V
Voltage range: 3 AC 85 ... 550 V
Nominal frequency: 50 / 60 Hz
Frequency range: 45 ... 400 Hz
Response values: Fixed
Relay 1: U ≥ 484 V AC Overvoltage
Relay 2: U ≤ 360 V AC Undervoltage
Relay 3: Phase sequence
Hysteresis: < 4%

Output

Contacts: 3 C/O contacts

For low loads with 3 µm gold contacts
Switching current: 1 ... 300 mA
Swithing voltage min. / max: AC/DC 2 V / AC/DC 60 V

At standard load:
Thermal current I_{th}: 3 x 4 A
Switching capacity
To AC 15
NO contact: 3 A / AC 230 V IEC/EN 60947-5-1
NC contact: 1 A / AC 230 V IEC/EN 60947-5-1
To DC 13 1 A / DC 24 V IEC/EN 60947-5-1
Electrical life
At 3 A, AC 230 V cos φ = 1: 2 x 10^5 switching cycles
Perm. operating frequency: 1800 / h
Short circuit strength
max. fuse rating: 4 A gG / gL IEC/EN 60947-5-1
Mechanical life: 30 x 10^6 switching cycles

General Data

Nominal operating mode: Continuous operation
Temperature range
Operation: - 25 ... + 60°C
Storage: - 25 ... + 60°C
Altitude: < 2000 m
Clearance and creepage distance
Rated impulse voltage / pollution degree
Inputs L1, L2, L3 to all others: 6 kV / 2 IEC/EN 60664-1
Contacts 11/12/14, 21/22/24, 31/32/34 to each other: 6 kV / 2 IEC/EN 60664-1
Overvoltage category: III
EMC
Electrostatic discharge (ESD): 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 voltage
Between
wires for power supply: 1 kV IEC/EN 61000-4-5
Between wire and ground: 2 kV IEC/EN 61000-4-5
HF-wire guided: 10 V IEC/EN 61000-4-6
Interference suppression: Limit class value A*)
*) The device is designed for the usage under industrial conditions (Class A, EN 55011). When connected to a low voltage public system (Class B, EN 55011) radio interference can be generated. To avoid this, appropriate measures have to be taken.
Degree of protection
Enclosure: IP 40 IEC/EN 60529
Terminals: IP 20 IEC/EN 60529
Housing: Thermoplastic with VO behaviour acc. to UL Subject 94
Vibration resistance: Amplitude 0.35 mm, frequency 10 ... 55 Hz
Climate resistance: 20 / 060 / 04 IEC/EN 60068-1

Technical Data

Terminal designation:	EN 50005
Wire connection	DIN 46228-1/-2/-3/-4
Screw terminal	
(fixed):	1 x 4 mm² solid or 1 x 2.5 mm² stranded ferruled (isolated) or 2 x 1.5 mm² stranded ferruled (isolated) or 2 x 2.5 mm² solid
Insulation of wires or sleeve length:	8 mm
Terminal block with screw terminals	
Max. cross section:	1 x 2.5 mm² solid or 1 x 2.5 mm² stranded ferruled (isolated)
Insulation of wires or sleeve length:	8 mm
Terminal block with cage clamp terminals	
Max. cross section:	1 x 4 mm² solid or 1 x 2.5 mm² stranded ferruled (isolated)
Min. cross section:	0.5 mm²
Insulation of wires or sleeve length:	12 mm
Wire fixing:	Plus-minus terminal screws M3,5 box terminals with wire protection or cage clamp terminals
Fixing torque:	0.8 Nm
Mounting:	DIN rail IEC/EN 60715
Weight:	Approx. 260 g

Dimensions

Width x height x depth	
MH 9352.13:	45 x 90 x 98 mm
MH 9352.13 PC:	45 x 111 x 98 mm
MH 9352.13 PS:	45 x 104 x 98 mm

Standard Type

MH 9352.13PC/001 3 AC 360 V / 3AC 484 V

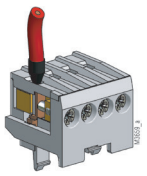
Article number:	0062548
• Nominal voltage:	3 AC 400 V
• Response value:	≤ 3 AC 360 V / ≥ 3 AC 484 V
• Phase sequence detection	
• Output:	3 changeover contacts
• Width:	45 mm

Ordering Example

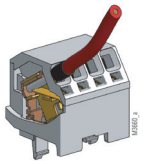
MH 9352 .13 _ _ 3 AC 360 V 3 AC 484 V

- Response value overvoltage
- Response value undervoltage
- Type of terminals
  - without indication: terminal blocks fixed with screw terminals
  - PC (plug in cage clamp): pluggable terminal blocks with cage clamp terminals
  - PS (plug in screw): pluggable terminal blocks with screw terminals
- Contacts
- Type

Options with Pluggable Terminal Blocks



Screw terminal (PS/plugin screw)



Cage clamp terminal (PC/plugin cage clamp)

Notes

Removing the terminal blocks with cage clamp terminals

1. The unit has to be disconnected.
2. Insert a screwdriver in the side recess of the front plate.
3. Turn the screwdriver to the right and left.
4. Please note that the terminal blocks have to be mounted on the belonging plug in terminations.