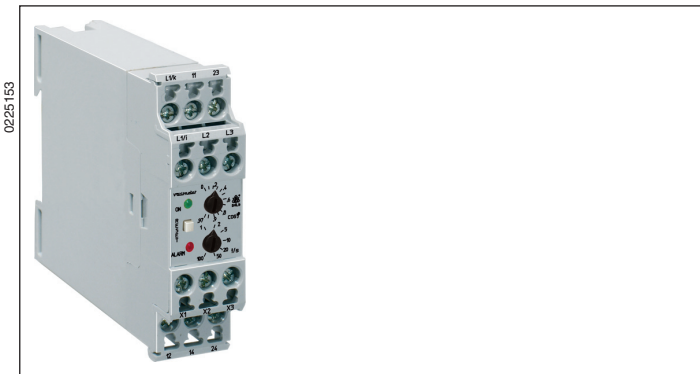
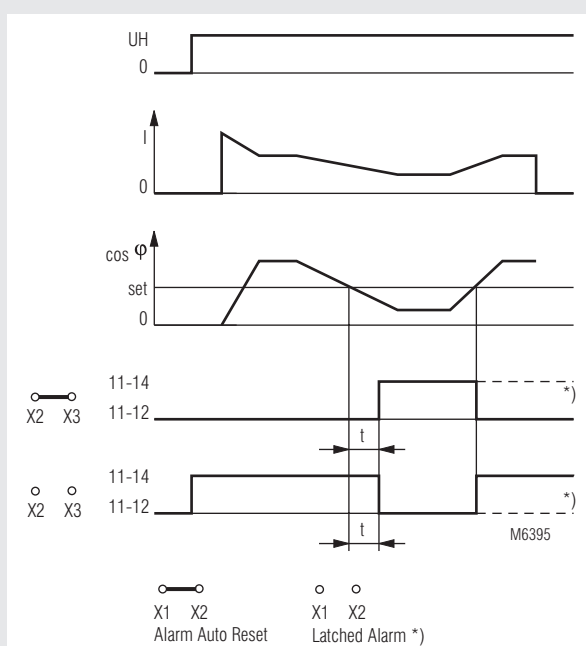


VARIMETER Underload Monitor MK 9065



- According to IEC/EN 60 255, DIN VDE 0435-303
- Detection of underload ($\cos \varphi$)
- Current ranges up to 10 A
- Adjustable response value
- Programmable functions:
 - automatic or manual reset
 - closed or open circuit operation
- Manual remote reset
- Adjustable operate delay up to 100 s
- For single and 3-phase AC-systems without neutral
- Independent of phase sequence
- Also for 400 Hz systems
- MK 9065.11 can be used for motors with frequency converters (2 ... 200 Hz)
- Optionally with sealable cover
- Green indicator LED for operational mode
- Red indicator LED for underload monitoring
- Width 22.5 mm

Function Diagram



Approvals and Marking



Applications

- Monitors underload and no load on squirrel cage motors e.g.
- fan monitoring (broken belt)
 - filter monitoring (blocked filter)
 - pump monitoring (blocked valve, dry running)

Indicators

- | | |
|------------|-----------------------------|
| green LED: | on, when supply connected |
| red LED: | on, when underload detected |

Function

The underload monitor MK 9065 measures the phase shift between voltage and current. The phase angle changes with changing load. This measuring method is suitable to monitor asynchronous motors on underload and no load independent of motor size. In some cases the $\cos \varphi$ does not change much with load change on the motor, e.g.:

- small load change on oversized motor
- single phase chaded-pole and collector motors

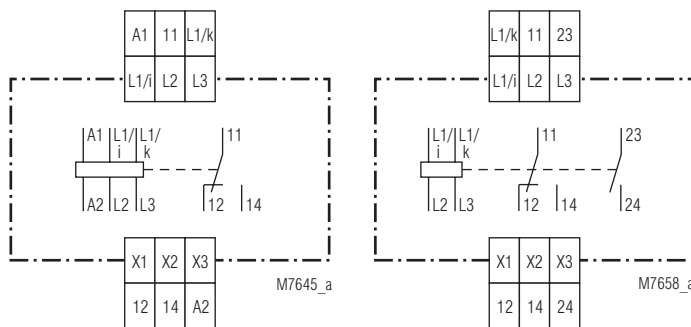
In these cases we recommend the use of motor load monitor BA 9067.

Programmable by bridging terminals:

- X1 - X2 bridged: alarm not stored (auto reset)
- X1 - X2 open: stored alarm:
 - reset by external or internal reset button
- X2 - X3 bridged: open circuit operation (relay energized on underload)
- X2 - X3 open: closed circuit operation (relay de-energized on underload)

When setting the MK 9065 in a system with frequency converters please note that the $\cos \varphi$ varies with the frequency.

Circuit Diagrams



MK 9065.11

MK 9065.20

Technical Data

Input (L1-L2-L3)

Nominal voltage U_N:	(= Motor voltage)
MK 9065.11:	AC or 3 AC 15 ... 690 V
MK 9065.20:	AC or 3 AC 110 ... 127 V, 220 ... 240 V, 380 ... 415 V
Voltage range:	0.8 ... 1.1 U_N
Nominal frequency of U_N:	
MK 9065.11:	2 ... 200 Hz
MK 9065.20:	45 ... 400 Hz
Nominal consumption:	2 VA
Current range (L1/i-L1/k):	0.1 ... 2 A 0.5 ... 10 A*
Internal resistance (L1/i-L1/k):	approx. 30 m Ω approx. 10 m Ω
Consumption (L1/i-L1/k):	max. 0.12 VA max. 1.1 VA
Short time overload:	see diagram (for 2 A range reduced) * for higher currents use external current transformer (see connection diagram) Suitable current transformers: 1 A or 5 A types, class 3, with necessary load capacity

Setting Ranges

Setting range $\cos \varphi$:	0 ... 0.97 infinite variable
Operate delay t_v:	approx. 1 ... 100 s infinite variable

Auxiliary circuit

Auxiliary voltage U_H (A1 - A2)

MK 9065.11:	AC 110 ... 127 V, 220 ... 240 V, 380 ... 415 V
MK 9065.20:	$U_H = U_N$
Voltage range:	0.8 ... 1.1 U_H
Frequency range:	45 ... 400 Hz

Output

Contacts

MK 9065.11:	1 changeover contact
MK 9065.20:	1 changeover contact, 1 NO contact
Thermal current I_{th}:	4 A
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:	5 x 10 ⁵ switching cycles
Short-circuit strength max. fuse rating:	4 A gL IEC/EN 60 947-5-1
Mechanical life:	30 x 10 ⁶ switching cycles

General Data

Operating mode:	Continuous operation
Temperature range:	- 20 ... + 50°C with a distance of ≥ 10 mm to the next units a max. ambient temperature of 60°C is possible
Clearance and creepage distances	
rated impuls voltage / pollution degree:	4 kV / 2 IEC 60 664-1
EMC	
Electrostatic discharge:	4 kV (air) IEC/EN 61 000-4-2
Fast transients:	4 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
Degree of protection	
Housing:	IP 40 IEC/EN 60 529
Terminals:	IP 20 IEC/EN 60 529
Housing:	Thermoplastic with V0 behaviour according to UL subject 94
Vibration resistance:	Amplitude 0.35 mm frequency 10 ... 55 Hz IEC/EN 60 068-2-6

Technical Data

Climate resistance:	20 / 050 / 04	IEC/EN 60 068-1
Terminal designation:	EN 50 005	
Wire connection:	2 x 1.5 mm ² solid or 2 x 1.0 mm ² stranded wire with sleeve DIN 46 228-1/-2/-3/-4	
Wire fixing:	Flat terminals with self-lifting clamping piece	IEC/EN 60 999-1
Mounting:	DIN rail	IEC/EN 60 715
Weight:	155 g	

Dimensions

Width x height x depth:	22.5 x 82 x 99 mm
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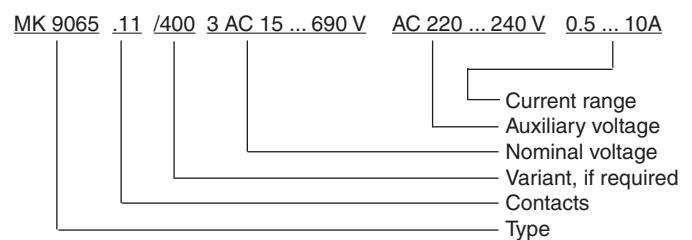
Standard Type

MK 9065.20	3 AC 380 ... 415 V	0.5 ... 10 A	1 ... 100 s
Article number:	0045108		
• Output:	1 changeover contact, 1 NO contact		
• Nominal voltage U_N :	3 AC 380 ... 415 V		
• Current range:	0.5 ... 10 A		
• Width:	22.5 mm		

Variants

MK 9065.11:	Output 1 changeover contact, auxiliary supply separated from measuring input, standard unit can be used also with frequency converters
MK 9065.20:	Model with 1 changeover contact and 1 separate NO contact, auxiliary supply is taken from measuring input, cannot be used with frequency converters
MK 9065. __ /400:	with transparent sealable cover

Ordering example for variants



Characteristics

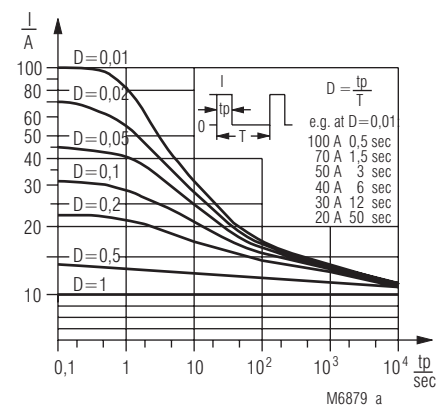
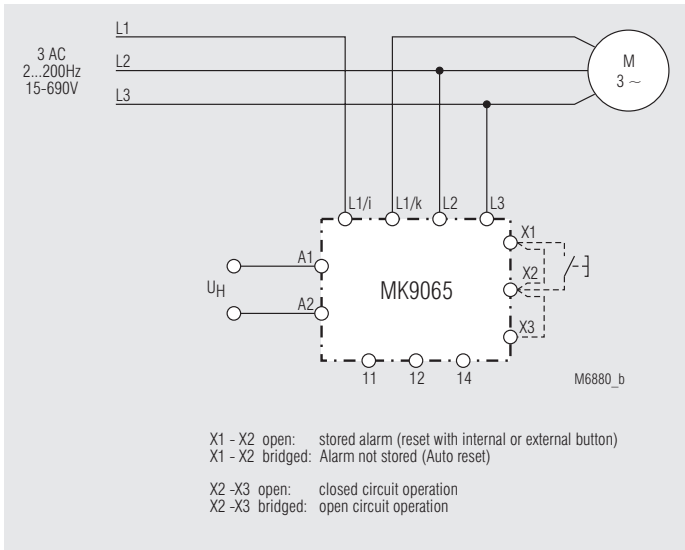


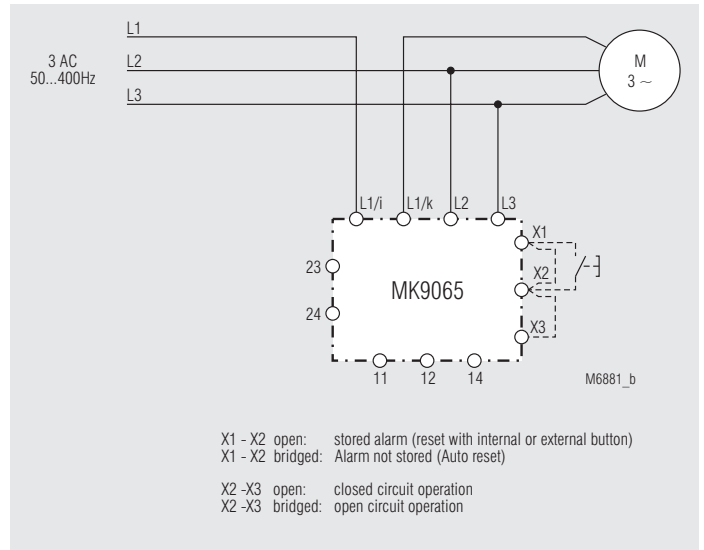
diagram for short-time overload of the current input L1/i-L1/k (0.5 ... 10 A)

Connection Examples

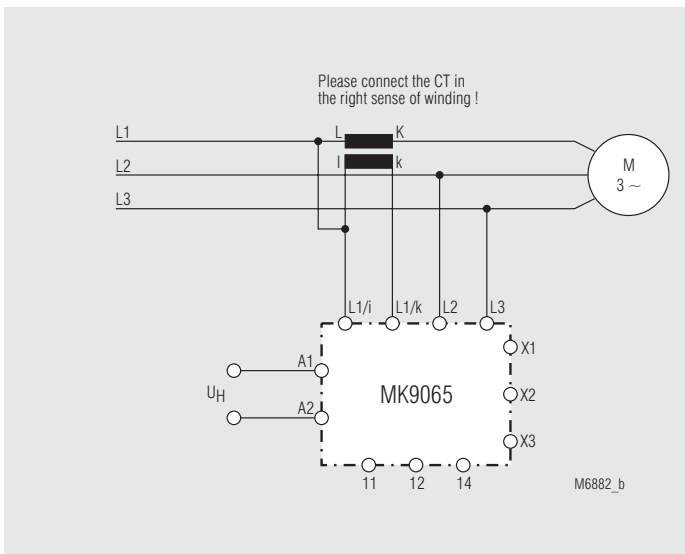


Standard circuit with MK 9065.11

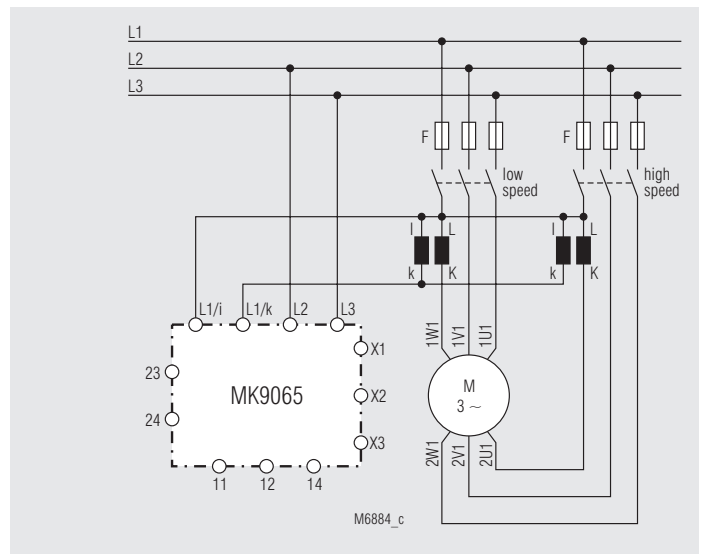
Connection Examples



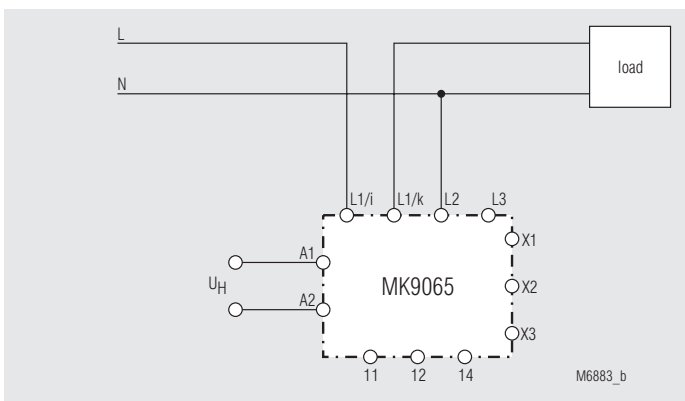
Standard circuit with MK 9065.20



Connection Example for MK 9065.11 with current transformer



Connection Example for MK 9065.20 for motors with separate windings



Connection Example for MK 9065.11 with single phase connection

