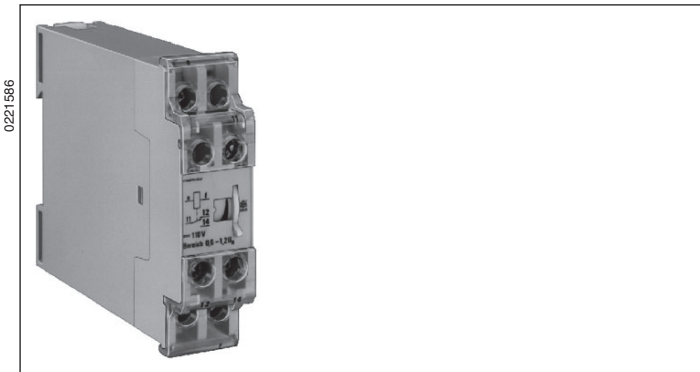


## VARIMETER Current Relay ML 9701

Translation  
of the original instructions



### Your Advantages

- Purely electromechanical design
- High insensitivity to interference in the radio frequency range and high voltage peaks
- Easy device adjustment
- Can be used for under- or overcurrent detection

### Features

- According IEC/EN 60255-1
- Single-phase
- Measuring ranges from 0,5 to 12 A
- Settable response value (Measuring value)
- Without auxiliary voltage
- Width 22.5 mm

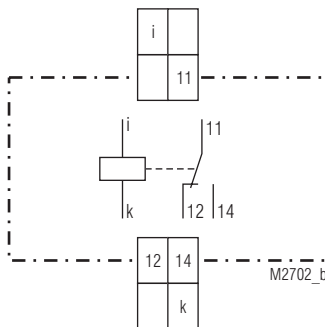
### Product Description

Because of the electromechanical construction the current relay ML 9701 is insensitive to high voltage peaks with high energy and radio frequency disturbance. Special interference suppression is not necessary. The current range can be adjusted via a stepless adjustment lever. The current relay can be used for under- or overcurrent detection and is applied to monitor current in heatings, field current and motorprotection.

### Approvals and Markings



### Circuit Diagram



### Applications

- For monitor current in heatings, field current and motorprotection.

### Function

The setting ratio is 1 : 2.

- Please note when mounting the units without distance to each other:
1. If the relays are connected to DC current please connect all the units with the same polarity
  2. If the relays are connected to AC current please connect on all units terminal f to neutral
  3. If the relays are connected to a 3-phase system it is possible that the relays influence each other by magnetic fields, so that the response value is increased by approx. 25 %

If the units are mounted with a distance of > 22 mm, the a.m. behaviour does not occur.

### Connection Terminals

Terminal designation	Signal description
i, k	Current measuring input
11, 12, 14	Changeover contact

### Technical Data

#### Input

<b>Measuring range:</b>	0,5 ... 1    0,8 ... 1,6    1,5 ... 3    2,5 ... 5 4 ... 8    6 ... 12 A
<b>Setting:</b>	AC 50 / 60 Hz, DC 0 ... 48 % RW Infinite variable
<b>Setting accuracy:</b>	± 5 %
<b>Hysteresis:</b>	AC approx. 0,85 / DC    approx. 0,5
<b>Nominal consumption:</b>	7 VA / 1,4 W
<b>Nominal frequency:</b>	50 / 60 Hz
<b>Frequency range:</b>	± 5 %

#### Output

##### Contacts

ML 9701.11:	1 changeover contact
<b>Thermal current <math>I_{th}</math>:</b>	4 A
<b>Switching capacity</b>	
NO contact:	2 A / AC 230 V    IEC/EN 60947-5-1
NC contact:	1 A / AC 230 V    IEC/EN 60947-5-1

## Technical Data

<b>Electrical life:</b>	1,2 x 10 <sup>6</sup> switching cycles 1 500 switching cycles / h at 30 % of the switching capacity 0,8 x 10 <sup>6</sup> switching cycles 1 000 switching cycles / h at 50 % of the switching capacity 0,3 x 10 <sup>6</sup> switching cycles 500 switching cycles / h at 100 % of the switching capacity
<b>Permissible switching:</b>	1 000 switching cycles / h
<b>Short-circuit strength</b>	
<b>Max. fuse rating:</b>	2 A gG / gL IEC/EN 60947-5-1
<b>Mechanical life:</b>	1,5 x 10 <sup>6</sup> switching cycles

## General Data

<b>Operating mode:</b>	Continuous operation	
<b>Temperature range:</b>	See nomograph of overload and temperature range	
<b>Clearance and creepage distances</b>		
Rated impulse voltage / pollution degree:	4 kV / 3	IEC 60664-1
<b>EMC</b>		
Electrostatic discharge:	8 kV (air)	IEC/EN 61000-4-2
HF irradiation:	10 V/m	IEC/EN 61000-4-3
Fast transients:	2 kV	IEC/EN 61000-4-4
Surge voltages		
Between		
wires for power supply:	1 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
<b>Degree of protection</b>		
Housing:	IP 40	IEC/EN 60529
Terminals:	IP 20	IEC/EN 60529
<b>Housing:</b>	Thermoplastic with V0 behaviour according to UL subject 94	
<b>Vibration resistance:</b>	Amplitude 0,35 mm frequency 10 ... 55 Hz IEC/EN 60068-2-5	
<b>Climate resistance:</b>	Humid heat IEC/EN 60068-2-30	
<b>Terminal designation:</b>	EN 50005	
<b>Wire connection:</b>	2 x 2,5 mm <sup>2</sup> solid or 2 x 1,5 mm <sup>2</sup> stranded wire with sleeve DIN 46228-1/-2/-3/-4	
<b>Wire fixing:</b>	Flat terminals with self-lifting clamping piece IEC/EN 60999-1	
<b>Fixing torque:</b>	0,8 Nm	
<b>Mounting:</b>	DIN rail IEC/EN 60715	
<b>Weight:</b>	250 g	

## Dimensions

**Width x height x depth:** 22,5 x 80 x 102 mm

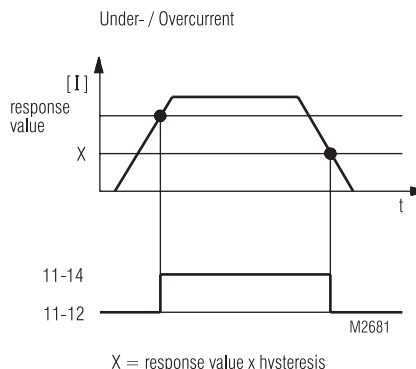
## Standard Type

ML 9701.11	0,8 ... 1,6 A
Article number:	0029209
• Output:	1 changeover contact
• Measuring range:	0,8 ... 1,6 A
• Width:	22,5 mm

## Ordering Example

ML 9701	.11	4 ... 8 A	
			Measuring range
			Contact
			Type

## Characteristics



### Undercurrent detection (closed circuit operation)

Example:  
Required response value: ≤ AC 3 A

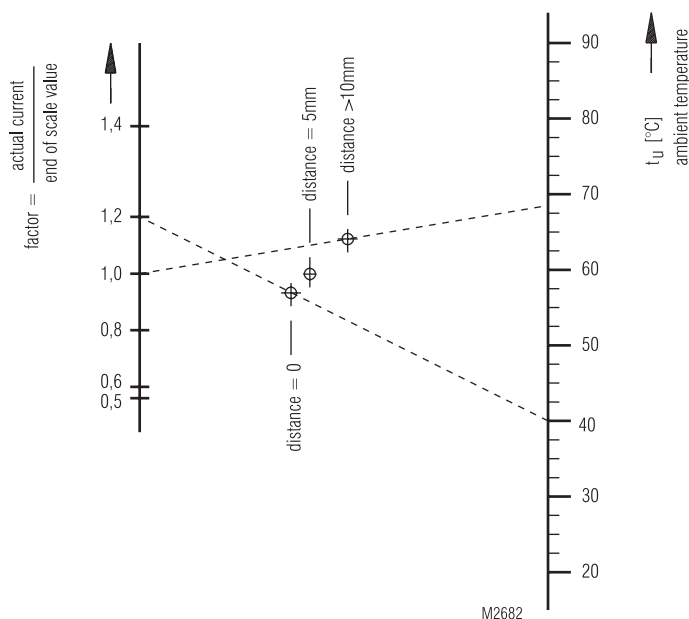
$$\text{Setting value} = \frac{\text{required response value}}{\text{Hysteresis}} = \frac{3 \text{ A}}{0,85} = 3,5 \text{ A}$$

If the current exceeds 3,5 A the contact 11-14 closes. If the current drops under 3 A the output contact switches back to 11-12.

### Overcurrent detection (open circuit operation)

Example:  
Required response value: ≥ AC 4 A  
= Setting value on ML 9701

If the current exceeds 4 A the contact 11-14 closes. If the current drops under 3,4 A (hysteresis 0,85) the output contact switches back to 11-12.



### Overload and ambient temperature:

Nomograph to evaluate the max. continuous overload depending on mounting distance and ambient temperature:

1. Select ambient temperature e.g. 40 °C

2. Select mounting distance e.g. 0 mm

Draw a line through the 2 points and extend it to the left scale.

Factor 1,2 means, that the relay can be used with 1,2 times overvoltage having an ambient temperature of 40 degrees and the relay is mounted without distance.