

## VARIMETER

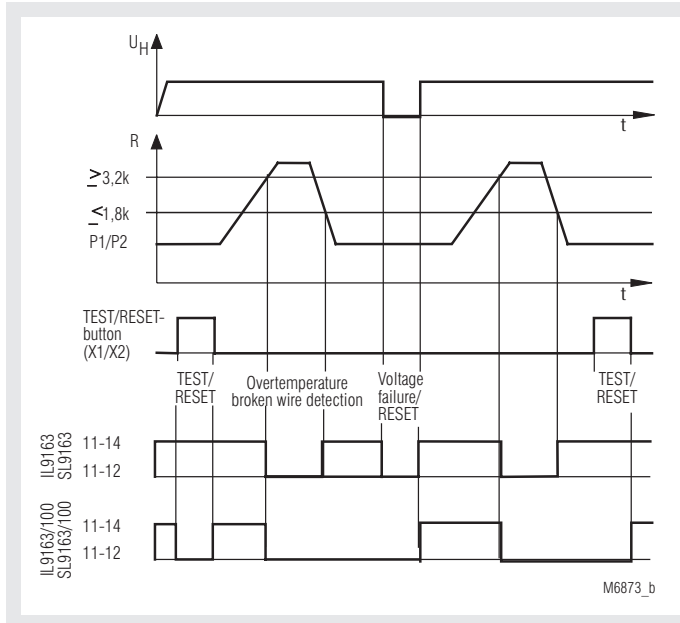
### Thermistor Motor Protection Relay

IL 9163, SL 9163



- According to IEC/EN 60 255-1
- Monitoring of:
  - overtemperature
  - broken wire detection in sensor circuit
- 1 input for 1 to 6 PTC-resistors
- With manual reset variant /100
- Optionally with button for reset and test function
- Remote reset on A1/A2 (NC contact) or X1/X2 (NO contact)
- Closed circuit operation
- LED indicator for
  - auxiliary supply
  - state of contact
- 2 changover contacts
- Devices available in 2 enclosure versions:
  - IL 9163: depth 58 mm, with terminals at the bottom for installation systems and industrial distribution systems according to DIN 43 880
  - SL 9163: depth 98 mm, with terminals at the top for cabinets with mounting plate and cable duct
- Width 35 mm

### Function Diagram



### Approvals and Markings



### Applications

To protect against thermal overload of motors caused by high switching frequency, heavy duty starting, phase failure on one phase, bad cooling, high ambient temperature.

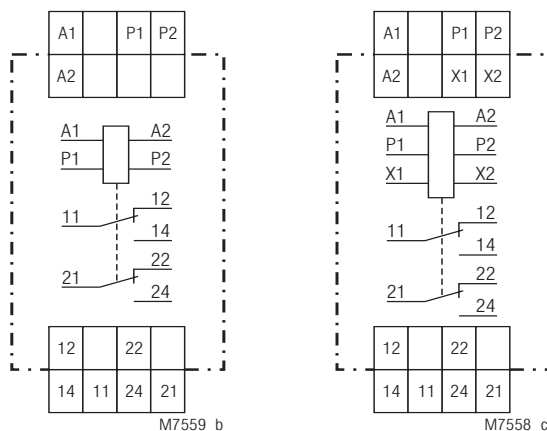
### Function

If one of the sensors in the Measuring Circuit reaches the response temperature (or broken wire is detected), the device indicates failure. This failure is stored in the device /100 even if the temperature goes back to normal. The unit can be resetted by pressing the Test/Reset button, by bridging X1/X2 for a short moment or by disconnecting the auxiliary supply for a short time.

#### Test/Reset button:

Besides the reset function this button provides in normal operation a test facility. The unit indicates fault as long as the button is activated.

### Circuit Diagram



IL 9163.12,  
SL 9163.12

IL 9163.12/100,  
SL 9163.12/100

### Indicators

- green LED: on, when auxiliary supply connected
- red LED: on, when overtemperature or broken wire is detected

### Notes

The unit with AC/DC 24 V has no galvanic separation between auxiliary supply (A1/A2) and measuring input (P1, P2), and therefore it should only be used for battery powered systems or with safety transformers according to IEC/EN 60 742.

Technical Data	
<b>Measuring Circuit</b>	
<b>Temperature sensors:</b>	PTC-Resistor according to DIN 44081/082
<b>No. of sensors:</b>	1 ... 6 in series
<b>Response value:</b>	3.2 ... 3.8 k $\Omega$
<b>Release value:</b>	1.5 ... 1.8 k $\Omega$
<b>Loading of measuring circuit:</b>	< 5 mW (at R = 1.5 k $\Omega$ )
<b>Broken wire detection:</b>	> 3.1 k $\Omega$
<b>Measuring voltage:</b>	$\leq$ 2 V (at R = 1.5 k $\Omega$ )
<b>Measuring current:</b>	$\leq$ 1 mA (at R = 1.5 k $\Omega$ )
<b>Voltage at broken wire:</b>	DC approx. 9 V
<b>Current when short circuit on input:</b>	DC approx. 1.1 mA

Auxiliary Circuit	
<b>Auxiliary voltage <math>U_H</math>:</b>	AC/DC 24 V AC 110, 230, 400 V    50 / 60 Hz
<b>Voltage range:</b>	AC 0.9 ... 1.1 $U_H$ DC 0.9 ... 1.25 $U_H$
at 10 % residual ripple:	
at 48 % residual ripple:	DC 0.9 ... 1.1 $U_H$
<b>Nominal consumption:</b>	AC: 1.5 VA DC: 0.85 W
<b>Nominal frequency:</b>	50 / 60 Hz
<b>Frequency range:</b>	45 ... 65 Hz
<b>Max. bridging time on failure of aux. supply:</b>	approx. 70 ms
<b>Operate delay:</b>	< 40 ms
<b>Release delay:</b>	< 100 ms
<b>Control input (X1/X2)</b>	
<b>Function:</b>	Remote reset with NO contact (voltage free)
<b>Remark:</b>	This input is not galvanic separated from measuring input P1/P2

Output	
<b>Contacts</b>	
IL/SL 9163.12:	2 changeover contacts
<b>Thermal current <math>I_{th}</math>:</b>	5 A
<b>Switching capacity to AC 15</b>	
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
<b>Electrical life</b>	IEC/EN 60 947-5-1
to AC 15 at 1 A, AC 230 V:	$\geq$ 5 x 10 <sup>5</sup> switching cycles
to AC 15 at 5 A, AC 230 V:	$\geq$ 1.5 x 10 <sup>5</sup> switching cycles
<b>Short-circuit strength max. fuse rating:</b>	4 AgL    IEC/EN 60 947-5-1
<b>Mechanical life:</b>	$\geq$ 1 x 10 <sup>8</sup> switching cycles

General Data	
<b>Operating mode:</b>	Continuous operation
<b>Temperature range:</b>	- 20 ... + 60°C
<b>Clearance and creepage distances</b>	
rated rated impulse voltage / pollution degree:	4 kV / 2    IEC 60 664-1
<b>EMC</b>	
Electrostatic discharge:	8 kV (air)    IEC/EN 61 000-4-2
HF irradiation:	10 V / m    IEC/EN 61 000-4-3
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
HF-wire guided:	10 V    IEC/EN 16 000-4-6
Interference suppressions:	Limit value class B    EN 55 011
<b>Degree of protection</b>	
Housing:	IP 40    IEC/EN 60 529
Terminals:	IP 20    IEC/EN 60 529

Technical Data	
<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 60 068-2-6
<b>Climate resistance:</b>	20 / 060 / 04    IEC/EN 60 068-1
<b>Terminal designation:</b>	EN 50 005
<b>Wire connection:</b>	2 x 2.5 mm <sup>2</sup> solid or 2 x 1.5 mm <sup>2</sup> stranded ferruled DIN 46 228-1/-2/-3/-4
<b>Wire fixing:</b>	Flat terminals with self-lifting clamping piece    IEC/EN 60 999-1
<b>Fixing torque:</b>	0.8 Nm
<b>Mounting:</b>	DIN rail    IEC/EN 60 715
<b>Weight</b>	
IL 9163:	150 g
SL 9163:	200 g

Dimensions	
<b>Width x height x depth</b>	
IL 9163:	35 x 90 x 58 mm
SL 9163:	35 x 90 x 98 mm

Standard Type	
IL 9163.12 AC 230 V 50 / 60 Hz	
Article number:	0049222
• Auxiliary voltage $U_H$ :	AC 230 V
• Automatic reset	
• Width:	35 mm
SL 9163.12 AC 230 V 50 / 60 Hz	
Article number:	0054752
• Auxiliary voltage $U_H$ :	AC 230 V
• Automatic reset	
• Width:	35 mm

Variant	
IL 9163.12/100:	2 changeover contacts with manual reset

