

## VARIMETER

### Temperature Monitoring Relay

IK 9094, IL 9094, SK 9094, SL 9094

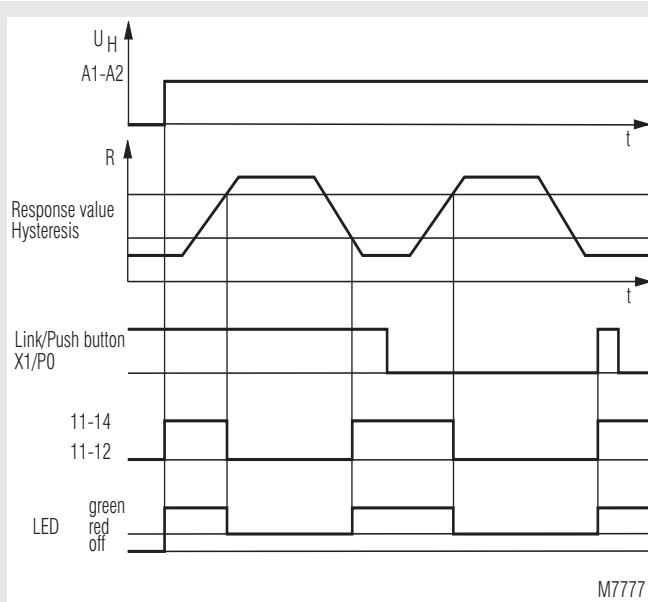


- According to IEC/EN 60 255-1
- 1 PT100 input, 2-wire connection
- 3 temperature ranges
- Adjustable response value
- Adjustable Hysteresis with wide range 3 ... 30 °C or 1 ... 15°C
- Broken wire detection in sensor circuit
- Programmable hysteresis or latching function via terminal X1
- IK 9094 no galvanic separation between measuring and Auxiliary Circuit
- Closed circuit operation
- LED indicator for operation and state of output relay
- 1 changeover contact
- As option with response value up to - 50°C, e.g. for refrigeration plants
- As option with galvanic separation between measuring and Auxiliary Circuit
- Devices available in 2 enclosure versions:
  - I-model: depth 59 mm, with terminals at the bottom for installation systems and industrial distribution systems according to DIN 43 880
  - S-model: depth 98 mm, with terminals at the top for cabinets with mounting plate and cable duct
- DIN rail or screw mounting
- IK 9094, SK 9094: 17.5 mm width
- IL 9094, SL 9094: 35 mm width

#### Approvals and Markings



#### Function Diagram



#### Applications

- Monitoring of temperature e.g. Motors, ball bearings, rooms, refrigeration plants, etc.
- Temperature control
- Monitoring of humidity, see relay workshop no. 19
- For industrial and railway applications

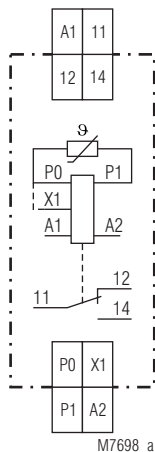
#### Function

On terminals P0 - P1 the resistance of the PT 100 is measured. On overtemperature and broken wire the output relay deenergises

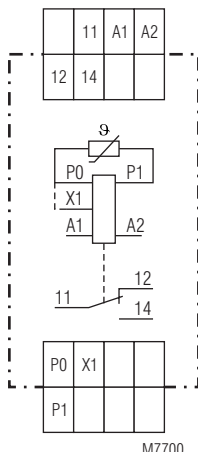
#### Indicators

LED: green, when auxiliary supply connected  
LED: red, when overtemperature

## Circuit Diagrams



IK 9094.11, SK 9094.11



IL 9094.11, SL 9094.11

## Connection Terminal

Terminal designation	Signal designation
A1, A2	Auxiliary voltage
P0, P1	Connection for resistance thermometer PT100
X1, P0	Control input (manual reset / hysteresis function) X1/P0 nicht gebrückt: manual reset X1/P0 gebrückt: Hysteresis function
11, 12, 14	Changeover contact

## Notes

Setting  
Easy to set the temperature in °C:  
Response value: Upper switch sets range (3 positions)  
+ Middle potentiometer sets response value in °C

Release value: Lower potentiometer sets Hysteresis in °C

To operate the unit as temperature controller it has to be set to hysteresis function and to a small hysteresis (e.g. 3 °C).

With link X1-P0: Hysteresis function  
Without link X1-P0: Latching function (the relay stays in off position even if the temperature is correct again.

The latching can be reset by bridging X1-P0 for a short time (Push button) or by disconnecting the auxiliary supply.

The IK/SK 9094 is designed to operate 2 wire PT 100 sensors. Therefore the setting must be corrected when using longer wires with about 2.6 °C per Ω of the connection wires (e.g. 2 pole cable 2 x 1.5 mm<sup>2</sup> of 40 m length has about 1Ω).

A temperature sensor with insulation must be used (AC 300 V).

## Technical Data

### Input

**Inputs :** P0 and P1 for PT100 sensors according to DIN 43 760 / DIN IEC 751  
X1 to set hysteresis or latching function:  
hysteresis function  
latching function (Fault signal remains stored when temperature goes over set point)

- with bridge X1-P0:  
- without bridge X1-P0:

**Setting range of response value:** 0 ... 150°C in 3 ranges  
( 0 ... 50°C, 50 ... 100°C, 100 ... 150°C)  
(on request 100 ... 250°C in 3 ranges of 50°C)

IL/SL 9094.11/010: - 50 ... +25°C in 3 ranges  
(- 50 ... -25°C, -25 ... 0°C, 0 ... +25°C)

**Release value:** Adjustable hysteresis on absolute scale 3 ... 30°C,  
Hysteresis 1 ... 15°C adjustable  
(Release value = response value minus hysteresis)

**Voltage and temperature influence:**

< 1 % of setting value

**Measuring current:**

approx. 2.5 mA

**Dissipation of PT 100:**

approx 0.6 mW

**Voltage on open terminals**

**P0-P1:**

approx. 6 V

**Broken wire detection:**

A broken wire in the PT 100 sensor wires is detected as fault (over-temperatur)

### Auxiliary Circuit (A1-A2)

**Auxiliary voltage U<sub>H</sub>**

IK/SK 9094:

AC/DC 24 V

IL/SL 9094:

AC 230 V ( galvanic separation to measuring circuit)

**Voltage range**

at AC:

0.8 ... 1.1 U<sub>N</sub>

at DC:

0.9 ... 1.25 U<sub>N</sub>

**Nominal consumption**

IK/SK 9094.11

at AC:

approx. 1 VA

at DC:

approx. 0.6 W

IL/SL 9094.11/001

at AC:

approx. 1.2 VA

at DC:

approx. 0.7 W

IL/SL 9094.11:

approx. 2 VA

**Nominal frequency (AC):**

50/60 Hz

**Galvanic isolation between measuring and auxiliary inputs**

IK/SK 9094.11/001

DC 1000 V

IL/SL 9094.11:

4 kV / 2

### Output

**Contacts**

IK/SK 9094.11, IL/SL 9094.11: 1 changeover contact

**Thermal current I<sub>th</sub> :**

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

to DC 13 at 0.1 Hz:

1 A / DC 24 V

IEC/EN 60 947-5-1

**Electrical life**

to AC 15 at 1 A, AC 230 V:

≥ 3 x 10<sup>5</sup> Switching cycles

**Short circuit strength**

**max. fuse rating:**

4 A gL

IEC/EN 60 947-5-1

**Mechanical life:**

≥ 30 x 10<sup>6</sup> Switching cycles

**Technical Data****General Data**

<b>Operating mode:</b>	Continuous operation	
<b>Temperature range</b>		
Operation:	- 20 ... + 60 °C	
Storage:	- 25 ... + 60 °C	
<b>Relative air humidity:</b>	max. 95 %	
<b>Altitude:</b>	< 2,000 m	
<b>Clearance and creepage distances</b>		
rated impulse voltage / pollution degree		
IK/SK 9094.11:		
Between A1-A2 auxiliary supply:	0.5 kV / 2	IEC 60 664-1
IK/SK 9094.11/001:		
Between measuring input P0-P1 (-X1) and auxiliary supply:	1 kV / 2	IEC 60 664-1
IL/SL 9094.11:	4 kV / 2	IEC 60 664-1
Between input and output contacts:	4 kV / 2 (basis insulation)	IEC 60 664-1
Airgap:	≥ 3 mm	
Creepage distance on PCB:	≥ 3 mm,	
Inside enclosure:	≥ 5.5 mm	
Outside enclosure:	≥ 5.5 mm	
Overvoltage category:	III	
<b>EMC</b>		
Electrostatic discharge:	8 kV (air)	IEC/EN 61 000-4-2
HF-irradiation		
80 MHz ... 1 GHz:	10 V / m	IEC/EN 61 000-4-3
1 GHz ... 2 GHz:	10 V / m	IEC/EN 61 000-4-3
2 GHz ... 2.7 GHz:	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		
IK/SK 9094:	0.5 kV	IEC/EN 61 000-4-5
IL/SL 9094:	2 kV	IEC/EN 61 000-4-5
HF wire guided:	10 V	IEC/EN 61 000-4-6
Interference suppression:	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
<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>		
Cross section:	2 x 2.5 mm <sup>2</sup> solid 2 x 1.5 mm <sup>2</sup> stranded wire with sleeve DIN 46 228-1/-2/-3/-4	
Stripping length:	10 mm	
<b>Wire connection:</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 mounting (IEC/EN 60715) or screw mounting M4, 90 mm hole pattern, with additional clip available as accessory	
<b>Weight</b>		
IK 9094:	65 g	
SK 9094:	83 g	
IL 9094:	137 g	
SL 9094:	164 g	

**Dimensions****Width x height x depth**

IK 9094:	17.5 x 90 x 59 mm
SK 9094:	17.5 x 90 x 98 mm
IL 9094:	35 x 90 x 59 mm
SL 9094:	35 x 90 x 98 mm

**Classification to DIN EN 50155 for IK 9094****Vibration and**

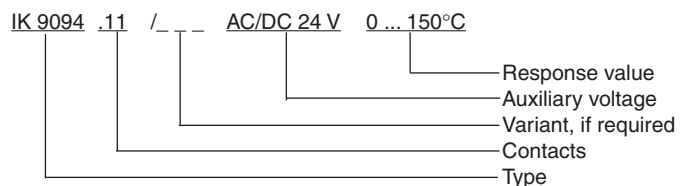
<b>shock resistance:</b>	Category 1, Class B	IEC/EN 61 373
Ambient temperature:	T1 compliant	
	T2, T3 and TX with operational limitations	

**Protective coating of the PCB:** No**Standard Types**

IK 9094.11 AC/DC 24 V 0 ... 150°C	
Article number:	0051642
SK 9094.11 AC/DC 24 V 0 ... 150°C	
Article number:	0054753
• Output:	1 changeover contact
• Auxiliary voltage U <sub>H</sub> :	AC/DC 24 V
• Response value:	0 ... 150°C
• Width:	17.5 mm
IL 9094.11 AC 230 V 0 ... 150°C	
Article number:	0056024
SL 9094.11 AC 230 V 0 ... 150°C	
Article number:	0056100
• Output:	1 changeover contact
• Auxiliary voltage U <sub>H</sub> :	AC 230 V
• Response value:	0 ... 150°C
• Width:	35 mm

**Variants**

IK 9094.11 /001:	with galvanic isolation between measuring and Auxiliary Circuit
IL 9094.11/010:	for refrigeration plants Art.-no.: 0056080

**Ordering example for variants****Accessories**

ET 4086-0-2:	Additional clip for screw mounting Article number: 0046578
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## Application Examples

