VARIMETER
Temperature Monitoring Relay
IK 9094, IL 9094, SK 9094, SL 9094

0233819


IK 9094


IL 9094


SK 9094

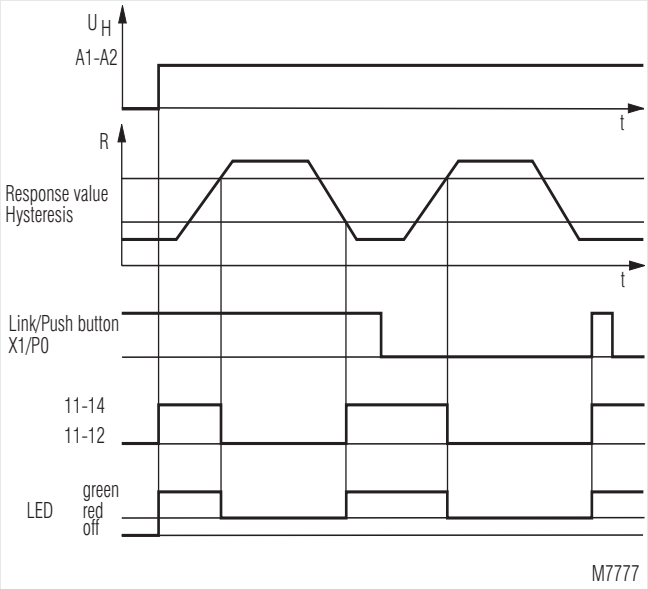

SL 9094

- 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

CE

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

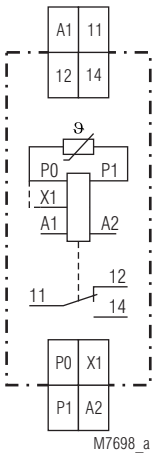
Function

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

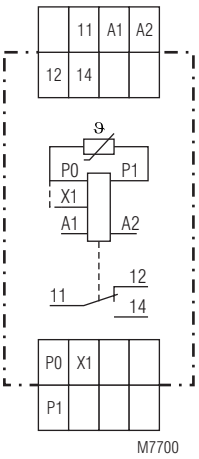
Indicators

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 description
A1, A2	Auxiliary voltage
P0, P1	Connection for resistance thermometer PT100
X1, P0	Control input (manual reset / hysteresis function) X1/P0 not bridged: manual reset X1/P0 bridget: 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 postion 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 mm² 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:
- with bridge X1-P0: hysteresis function
- without bridge X1-P0: latching function (Fault signal remains stored when temperature goes over set point)

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,
IL/SL 9094.11/010: 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_H
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_N
at DC: 0.9 ... 1.25 U_N
Nominal consumption
IK/SK 9094.11
at AC: approx. 1 VA
at DC: approx. 0.6 W
IK/SK 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_{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
to DC 13 at 0.1 Hz: 1 A / DC 24 V IEC/EN 60 947-5-1
Electrical life IEC/EN 60 947-5-1
to AC 15 at 1 A, AC 230 V: ≥ 3 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

Technical Data

General Data

Operating mode:	Continuous operation	
Temperature range		
Operation:	- 20 ... + 60 °C	
Storage:	- 25 ... + 60 °C	
Relative air humidity:	max. 95 %	
Altitude:	< 2,000 m	
Clearance and creepage distances		
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	
EMC		
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
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
Climate resistance:	20 / 060 / 04 IEC/EN 60 068-1	
Terminal designation:	EN 50 005	
Wire connection:		
Cross section:	2 x 2.5 mm² solid 2 x 1.5 mm² stranded wire with sleeve DIN 46 228-1/-2/-3/-4	
Stripping length:	10 mm	
Wire connection:	Flat terminals with self-lifting clamping pieceIEC/EN 60 999-1	
Fixing torque:	0.8 Nm	
Mounting:	DIN rail mounting (IEC/EN 60715) or screw mounting M4, 90 mm hole pattern, with additional clip available as accessory	

Weight

IK 9094:	65 g
SK 9094:	83 g
IL 9094:	137 g
SL 9094:	164 g

Dimensions

Width x heigth 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 shock resistance:	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_H: AC/DC 24 V
- Response value: 0 ... 150°C
- Width: 17.5 mm

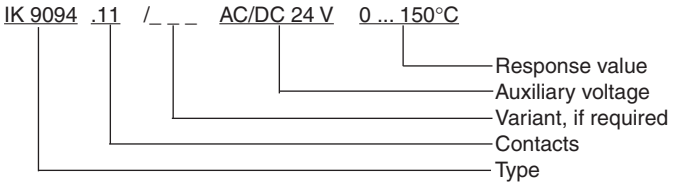
IL 9094.11 AC 230 V 0 ... 150°C
Article number: 0056024
SL 9094.11 AC 230 V 0 ... 150°C
Article number: 0056100

- Output: 1 changeover contact
- Auxiliary voltage U_H: 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

Application Examples