



# KS 10-I Mini-indicator



- High-precision universal input
- Two freely configurable alarm outputs for suppression, latch, and timer function
- One signaller output
- Precise, galvanically isolated measurement value output
- RS 485 interface with Modbus RTU protocol
- Front panel protection IP 65

economy line

## PROFILE

With their compact dimensions, these mini-indicator can be mounted even in the smallest machines. They have one signaller output and two alarm outputs.

## SAFE OPERATION

Operation is done by means of 3 front-panel keys in the Operating, Parameter and Configuration Levels. Easily remembered mnemonics are displayed for every adjusted parameter, thus simplifying the unit's configuration. Alarm and control parameters can be selected for adjustment in the Operating Level. Two DIP switches enable the adjustment of set-point and parameters to be disabled.

## UNIVERSAL INPUT INP1

The measurement input is configurable for all conventional applications. With thermocouple and Pt 100 input, resolution is 0,1°C. Optionally, the display can be in °F or in a linear engineering unit of your choice. Measurement value correction is fitted as standard. Current/voltage input signals are scalable in the range of -19999...+45536. Set-point limits are adjustable within the measurement range. In case of sensor break, the output goes to a pre-defined state.

## ADDITIONAL DISPLAY MODE

Apart from the standard display of set-point and process value, it is possible to select a display mode for previous min/max process values together with their gradients. Heating current and output value can also be displayed in this way.

## TWO UNIVERSAL, CONFIGURABLE ALARM OUTPUTS

Both alarm outputs operate on the working current principle; when triggered by an alarm, the relays are energized, and the front-panel LED lights. The switching difference is individually adjustable. Configurable alarm modes are: Absolute or relative measurement value alarm, min/max alarm, tolerance band alarm, or control loop monitoring. The absolute alarm is selectable

for INP1 or INP2. Furthermore, alarm behaviour is configurable: Alarm suppression after power-up, alarm „latch“ or alarm „on/off“ in case of a fault, e.g. sensor break. Latched alarms can be reset via an external contact.

## SIGNALLER OUTPUT (OUT1)

In addition to the alarm outputs a signaller output operating on the quiescent current principle for the monitoring of INP1 is implemented. The relay attracts in case of alarm and the depending red LED is lighted. The switching difference can be adjusted separately.

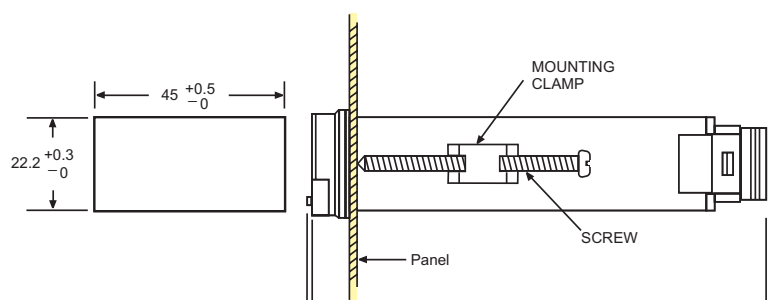
## OPTION: INTERFACE OR MEASUREMENT VALUE OUTPUT

The RS 485 interface with Modbus RTU protocol can be used for remote access to all the parameters. The high-precision 0/4.. 20 mA measurement value output is galvanically isolated and configurable to represent the process value, the control deviation, or the controller output.

## DELIVERY STATUS

- OUT1: MAX-monitoring of INP1  
Relay 2A / 230VAC
- ALM1: MAX-monitoring of INP1  
Logic 5V / 100mA
- ALM2: MAX-monitoring of INP1  
Relay 2A / 230VAC

## DIMENSIONS



## VERSIONS

9407 - 403 - x 0 x 0 1 - 001

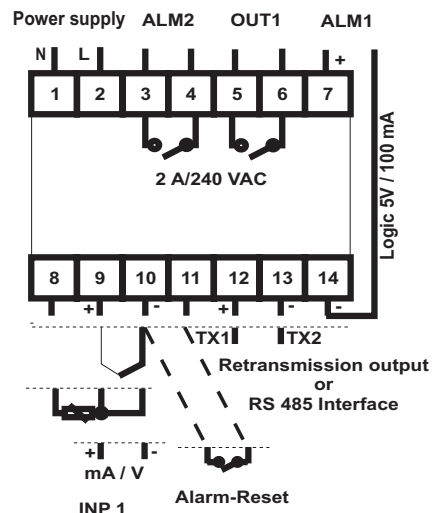
### Power supply

90-264 VAC	0
11-26 VUC	1

### Options

No option	0
RS 485 interface	1
Retransmission output 0/4-20 mA	2

## CONNECTION DIAGRAMM



## TECHNICAL DATA

### POWER SUPPLY

#### AC supply

90...264 VAC, 50/60 Hz

#### Universal supply

11-26 VUC

#### Power consumption

Max15VA /7 W

### UNIVERSAL INPUT INP1

#### Scanning cycle

100 ms

#### Input filter

Time constant adjustable: max. 60 s

#### Display

°C, °F or engineering unit selectable

#### Sensor break monitoring

Response time: approx. 1 s

Thermocouple and Pt 100 break protection

#### Lead break monitoring:

current <1 mA for 4...20 mA input;

voltage <0,025 V for 1...5 V input

Output response: adjustable 0...100.0 %

Alarm output action: adjustable On / Off

#### Sensor and signal types

Sensor/signal	Type	Measuring range		Error*
Fe-CuNi	J	-120...1000 °C	-184...1832 °F	2 K
Fe-CuNi	L	-200...900 °C	-328...1625 °F	2 K
NiCr-Ni	K	-200...1370 °C	-328...2498 °F	2 K
PtRh-Pt 10%	S	0...1820 °C	32...3214 °F	2 K
PtRh-Pt 13%	R	0...1767 °C	32...3214 °F	2 K
PtRh-Pt 6%	B	0...1820 °C	32...3308 °F	2 K**
Cu-CuNi	T	-250...400 °C	-418...752 °F	2 K
Nicrosil/Nisil	N	-250...1300 °C	-418...2372 °F	2 K
NiCr-CuNi	E	-100...900 °C	-148...1652 °F	2 K
Pt 100		-210...700 °C	-346...1292 °F	0,1 K
Linear		4-20 mA	-19999...45536	0,05 %
Linear		0-20 mA	-19999...45536	0,05 %
Linear		0-1 V	-19999...45536	0,05 %
Linear		0-5 V	-19999...45536	0,05 %
Linear		1-5 V	-19999...45536	0,05 %
Linear		0-10 V	-19999...45536	0,05 %

\* Error includes linearity, temperature compensation, lead resistance, and offset drift

\*\* For range 200...1820 °C

#### Current 0/4...20 mA

Input resistance: 70,5 Ω

#### Voltage

Input resistance: 302 kΩ

#### Lead resistance

Max. 100 Ω

#### Temperature compensation

Additional error: typically 0,1 K /10 K

#### Effect of compensating lead

Additional error: 0,1 μV / Ω

#### Resistance thermometer connection

2 or 3-wire connection

#### Measurement value correction

-200,0...200,0 °C

#### Decimal point adjustment

0 or 1 for thermocouple, Pt 100 ranges

0, 1, 2 or 3 for mA, V ranges

#### Interference suppression

Series mode rejection: 40 dB

Common mode rejection: 120 dB

### DIGITAL INPUT

Configurable action:

Display	Description
NONE	No function
RS.A1	Reset alarm 1 output
RS.A2	Reset alarm 2 output
RA1.2	Reset Alarm 1&2
LOCK	All parameters disabled

### OUTPUTS

#### Relay contacts

Rating: 240 VAC, 2 A, resistive load

#### Logic output

Rating: >4V with  $R_L > 400\Omega$

max. 30 mA with  $R_L < 400\Omega$

### CONTROL BEHAVIOUR

Absolute alarm: within measuring range

Switching difference (hysteresis):

0,1...55,6 °C

### ALARM OUTPUTS 1 AND 2

Alarm 1: Logic output 5 V /100mA

Alarm 2: Relay output

#### Configurable alarm action

Alarm suppression on power up

Alarm latch

Alarm On / Off for sensor break

#### Adjustment of alarm trigger points

Absolute alarm: within measuring range

Switching difference (hysteresis):

0,1...55,6 °C

### COMMUNICATION

#### RS 485 interface

Data protocol: Modbus RTU

Interface address: 1...247

Transmission speed: max. 38.400 bits/s

#### Measurement value output

0/4...20 mA, load max 250 Ω

Galvanically isolated, scalable

Resolution: 0,025 %

Accuracy: ± 0,05 %

Configurable, scalable for

representation of: Process value x

### ENVIRONMENTAL CONDITIONS

#### Operating temperature

-10...+50 °C

#### Storage temperature

-40...+60 °C

#### Relative humidity

0...90 %, no condensation

#### Shock and vibration

Shock test: 20 g

Vibration test: 10...55 Hz, 1 mm

### CONFORMITY TESTS

#### CE marking

The unit meets the relevant

European Standards

#### Electrical safety

According to DIN EN 61 010-1

Over-voltage category II

Contamination degree 1

Working voltage range 300 V

Protection class II

UL approval (in preparation)

CSA approval (in preparation)

#### Electromagnetic compatibility

Meets EN 50 081-1, EN 50 082-2

and EN 61326

### GENERAL

#### Housing

Front dimensions: 48 x 24 mm

Depth behind panel: 99 mm

Panel cut-out: 45+0,5 x 22,2+0,3

#### Electrical connection

Screw terminals for max. 2,5 mm<sup>2</sup>

#### Weight

Approx. 0,11 kg

#### Protection mode

Front: IP 65 (NEMA 4X)

#### Accessories

operating instructions (D, GB, F)



#### PMA

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