ZIEHL industrie – elektronik GmbH + Co KG
Daimlerstr.13, 74523 Schwäbisch Hall, Germany
+ 49 791 504-0, info@ziehl.de, www.ziehl.de

Operating Manual MU1000K

updated: 2023-03-14 / dr
from Firmware: 0-04

For more information and help about this product please scan the QR-Code or choose the following link: MU1000K

Operating manual, Quick guide, Datasheet, Connection diagram, CAD Data
Firmwareupdates, FAQ, Videos about installation and settings, Certificates

- Universal-Measuring-Transducer

Table of contents

1 General Notes

Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, commissioning and disposal / recycling are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.

Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

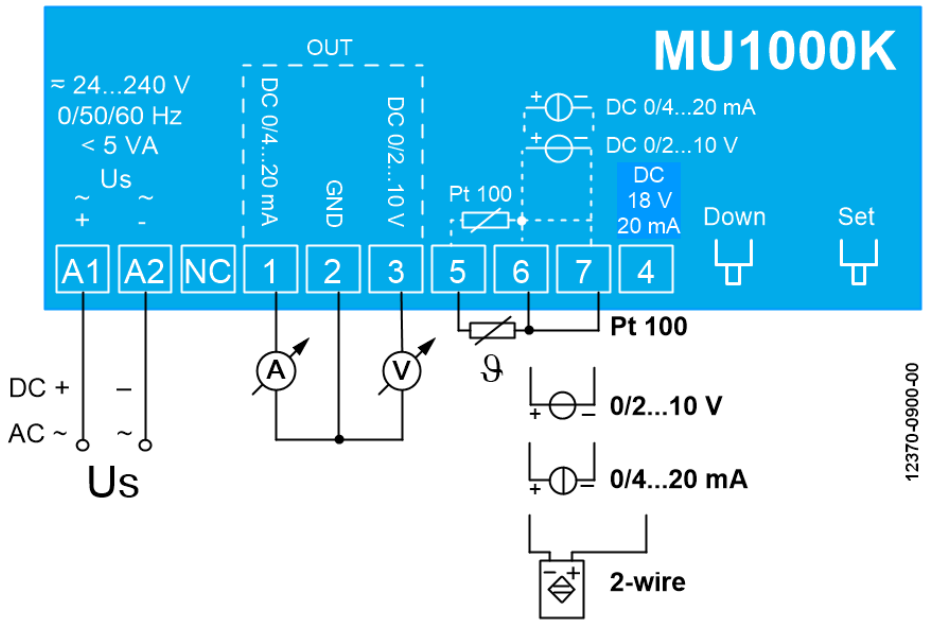
2 Application and short description

Universal-measuring-transducers MU1000K can measure signals Pt100 (RTD) and DC current (0/4-20 mA) and voltage (DC 0/2-10 V). Several measuring-ranges are pre-programmed. More can be easily scaled. Temperatures at sensors Pt 100 can be evaluated from -200 °C to + 800 °. The output-signals 0/2-10 V and 0/4-20 mA are potentially separated from inputs and supply voltage. With its universal power-supply AC/DC 24-240 V the measuring transducer can be connected to all common supply-voltages.

3 Overview of functions

- Current input 0-20mA, scalable
- Voltage input 0-10V, scalable
- Input Pt 100, 3-wire, -200…+800 °C, scalable
- Output signal 0-20mA and 0-10V or 4-20mA and 2-10V
- Rated Supply Voltage AC/DC 24-240V
- Insulation between inputs, outputs and supply voltage
- Standard ranges adjustable, universally scalable input ranges

4 Connecting diagram



For Pt100 2-wire connection: Bridge from terminal 6-7.

5 Important Information

DANGER!
Hazardous voltage!
Will cause death or serious injury. Turn off and lock out all power supplying this device before working on this device.

To use the equipment flawless and safe, transport and store properly, install and start professionally and operate as directed.
Only let persons work with the equipment who are familiar with installation, start and use and who have appropriate qualification corresponding to their function. They must observe the contents of the instructions manual, the information which are written on the equipment and the relevant security instructions for the setting up and the use of electrical units.
The equipment is built according to DIN VDE/EN/IEC and checked and leave the plant according to security in perfect condition. If, in any case the information in the instructions manual is not sufficient, please contact our company or the responsible representative.
In order to maintain this status, you must observe the safety regulations entitled “caution” in this operating manual. Failures to follow the safety regulations can result in death, personal injury or property damage to the device itself and to other devices and facilities.
To maintain this condition, you must observe the safety instructions in this instruction manual titled “Important Information”. Failure to follow the safety instructions may result in death, personal injury, or property damage to the equipment itself and other equipment and facilities.
Instead of the industrial norms and regulations written in this instruction manual valid for Europe, you must observe out of their geographical scope the valid and relevant regulations of the corresponding country.

6 Installation

The unit can be installed as follows:

- Installation in switchgear cabinet on 35 mm mounting rail according to EN 60715 for protection against fire, external environmental conditions and mechanical effects.
- With screws M4 for installation on walls or panel. (additional latch is not included in delivery)
- Connection according to connection plan or type plate.

Failure to comply with the information in this instruction manual will not guarantee the function of the device.

Attention!
A circuit-breaker or switch must be situated within easy reach of the unit and fused. Installation excess current protection should be ≤ 10 A.

Attention! Universal power supply
The device has a universal power supply, that is suitable for DC- and AC-voltages. Before connecting the device to supply-voltage make sure that the connected voltage corresponds with the voltage on the lateral type on the device

Attention!
Observe the maximum temperature permissible when installing in switching cabinet. Make sure sufficient space to other equipment or heat sources. If the cooling becomes more difficult e.g. through close proximity of apparatus with elevated surface temperature or hindrance of the cooling air, the tolerable environmental temperature is diminishing.

7 Commissioning

7.1 Overview of commissioning

The MU1000K can be commissioned to predefined standard ranges or scaled to an arbitrary range.
There are two different ways to do the settings:

Point 6.2 – 6.4: MU1000K setting a predefined range
Point 6.5 – 6.7: MU1000K scaling an arbitrary range

7.2 Overview of the predefined standard ranges

Following standard ranges can be set without adjustment to the unit:

Input (U / I)	
Zero point	Full scale
0 V -	10 V
2 V -	10 V
0 mA -	20 mA
4 mA -	20 mA

Input (Pt 100)	
Zero point	Full scale
-200 °C -	
-50 °C -	
0 °C -	
100 °C -	
200 °C -	
	0 °C
	50 °C
	100 °C
	150 °C
	200 °C
	250 °C
	300 °C
	400 °C
	500 °C

Output	
Zero point	Full scale
0 V -	10 V
2 V -	10 V
0 mA -	20 mA
4 mA -	20 mA

7.3 Setting a predefined range

Power off the device

Press Button **[Set]** and keep pressed

Power on the device, and keep pressed the button [Set]

⇒ After 5s flashes the green LED, release button [Set]

⇒ Parameterization „input type“ >> LED Power flashes 1x

Select with button [Set] the input type (displayed by LEDs Pt100 / U / I)

Press button [Down]

⇒ Parameterization „input zero point“ >> LED Power flashes 2x

- Select with button [Set] the zero point of the input

Number of flashes	LED Pt100	LED U	LED I
1 x	- 200 °C	0 V	0 mA
2 x	- 50 °C	2 V	4 mA
3 x	0 °C		
4 x	100 °C		
5 x	200 °C		

Press button [Down]

⇒ Parameterization „input full scale“ (only for Pt100 input) >> LED Power flashes 3x

- Select with button [Set] the full scale of the input

Number of flashes	LED Pt100	Number of flashes	LED Pt100
1 x	0 °C	5 x	200 °C
2 x	50 °C	6 x	250 °C
3 x	100 °C	7 x	300 °C
4 x	150 °C	8 x	400 °C
		9 x	500 °C

Press button [Down]

⇒ Parameterization „output“ >> LED Power flashes 4x

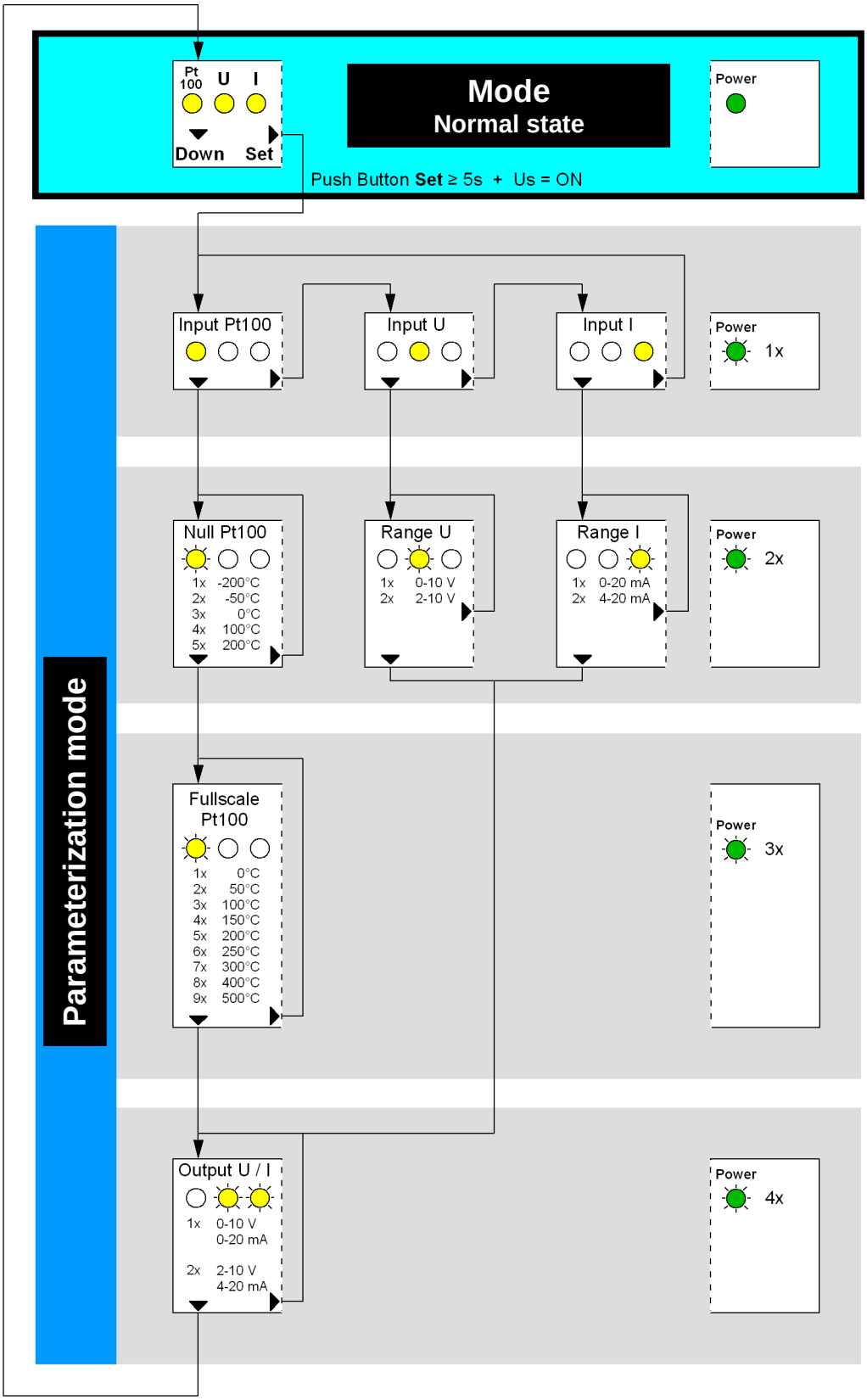
- Select with button [Set] the output range

Number of flashes	LED U / I
1 x	0 - 10V / 0 - 20mA
2 x	2 - 10V / 4 - 20mA

Press button [Down]

⇒ End of parameterization, Power LED lights permanently

7.4 Diagram for setting a predefined range



7.5 Query firmware version on the device

Query only possible from version 0-04:

- Keep the [Set] Button pressed (≥ 5s)

⇒ The LEDs indicate the firmware version by flashing rapidly (binary coded: LED 300V = Bit0 … LED ON = Bit3)

7.6 Overview of scaling an arbitrary range

Other ranges may be set by scaling of the input signal:

Input (U / I / Pt 100)	
Zero point	Full scale
0-10 V	0-10 V
0-20 mA	0-20 mA
-200 - 800 °C	-200 - 800 °C

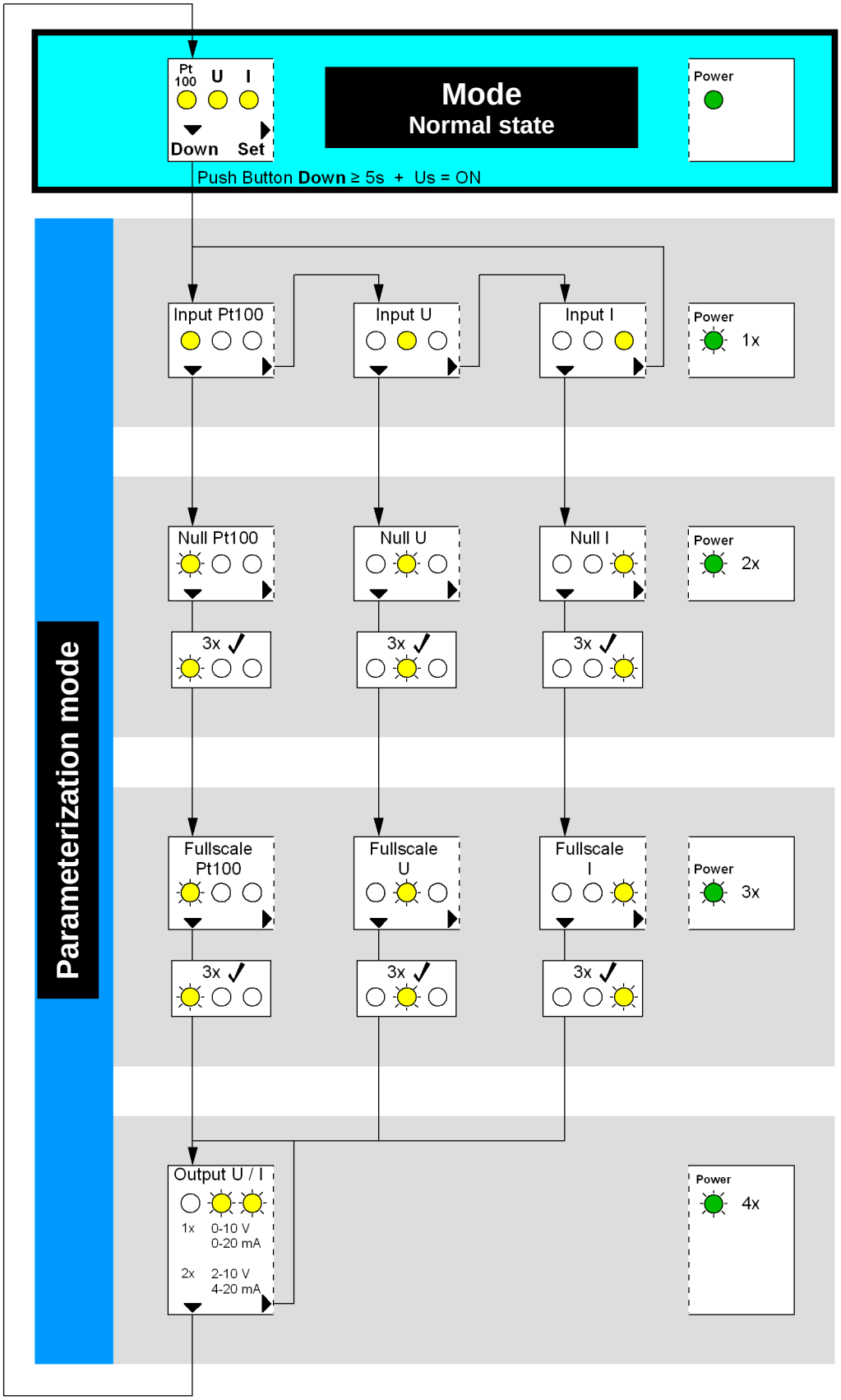
Output	
Zero point	Full scale
0 V -	10 V
2 V -	10 V
0 mA -	20 mA
4 mA -	20 mA

7.7 Scaling of range

Parameterization:

Power off the device		
Press Button **[Down]** and keep pressed		
Power on the device, and keep pressed the button [Down]		
⇒ After 5s flashes the green LED, release button [Down]		
⇒ Parameterization „input type“ >> LED Power flashes 1x		
Select with button [Set] the input type (displayed by LEDs Pt100 / U / I)		
Press button [Down]		
⇒ Parameterization „input zero point“ >> LED Power flashes 2x		
⇒ Connect a signal at the input corresponding to the zero point		
Press button [Down] (store of value, green LED flashes 3 times quickly)		
⇒ Parameterization „input full scale“ >> LED Power flashes 3x		
⇒ Connect a signal at the input corresponding to the full scale		
Press button [Down] (store of value, green LED flashes 3 times quickly)		
⇒ Parameterization „output“ >> LED Power flashes 4x		
• Select with button [Set] the output range	Number of flashes	LED U / I
	1 x	0 - 10V / 0 - 20mA
	2 x	2 - 10V / 4 - 20mA
Press button [Down]		
⇒ End of parameterization, Power LED lights permanently		

7.8 Diagram for scaling of range



Signal input = Zero point

Signal input = Full scale

7.9 Factory setting

Default settings:
Input: Pt100, 0 – 200°C
Output: 0 – 10V, 0 – 20mA

8 Error search

Wrong output signal (current/voltage) OUT (terminal 1 – 2 – 3)	
Cause	The device is not configured correctly
Remedy	Check commissioning

For selected output range 4-20 mA (2-10V) the current is < 3,8 mA (the voltage is <1,9V)	
Cause	Sensor short-circuit or sensor interruption
Remedy	Check sensor/wire at terminal 5-6-7

9 Technical data

Rated supply voltage Us	DC/AC 24 – 240 V 0/50/60 Hz		
Tolerance	DC 20.4 - 297 V	AC 20 - 264 V	
Power consumption	< 3 W	< 5 VA	

Inputs	Input-resistance	Maximus Input signal	Error of full scale
Voltage input	12 kΩ	DC 27 V	0,1 %
Current input	18 Ω	DC 100 mA	0,5 %
Resolution	14 Bit		

	Measuring range	Max. Resistance of sensor + wire
Pt100 sensor input	-200 °C ... 800 °C	500 Ω

Tolerance	±0,5 % of measured value ±0,5 K
Resolution	0,1 °C
Sensor current	≤0,6 mA
Temperature factor	<0,04 °C / K

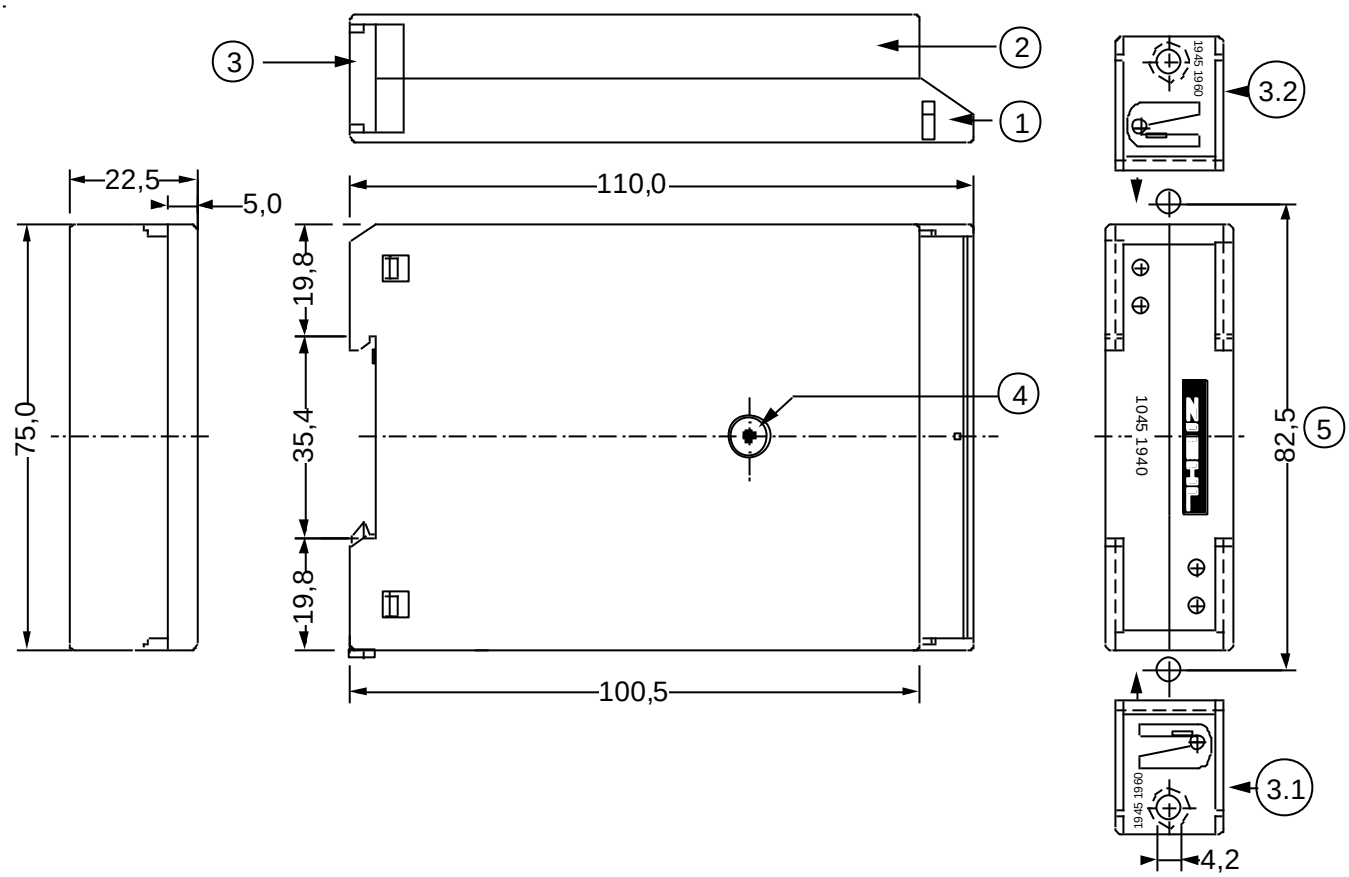
Outputs	2 outputs with common ground
Voltage output	DC 0/2 – 10 V
Tolerance	0,3 % of full scale (from 0,1 V)
Temperature factor	< 0,01 % / K
Resolution	11,6 Bit < 3,1 mV
Load	≥ 1 k Ω
Current output	DC 0/4 – 20 mA
Tolerance	0,3 % of full scale (from 0,1 mA)
Temperature factor	< 0,015 % / K
Resolution	11,6 Bit < 6,1 µA
Load	≤ 500 Ω
Error from Load	(250 Ω – resistance) / 250 Ω * 0,3 % of final value

Response-time T09	
Pt100 sensor input	< 350ms
Voltage / current input	< 20ms
Galvanic insulation	**Us – input - output**
Test voltage	Us – output DC 3540V Us – input DC 3540V Input – output DC 3540V
Test conditions	**EN 61010-1**
Rated impulse voltage	4000 V
Overvoltage category	III
Pollution degree	2
Rated insulation voltage Ui	300 V
On-period	100 %
EMC-tests	
Emission	EN 61326-1; CISPR 11 class B
Immunity	EN 61326-1 industrial environment
Electrical fast transient (Burst)	EN 61000-4-4 ±4,5 kV Pulse 5/50 ns, f = 5 kHz, t = 15 ms, T = 300 ms
Surge immunity test	IEC 61000-4-5 ±2 kV
Installation conditions	
Permissible ambient temperature	-20 °C ... +65 °C
Permissible storage temperature	-20 °C …+70 °C
Permissible wiring temperature	-5 °C …+70 °C
Climatic conditions	5 … 85% rel. humidity, no condition
Installation height	< 2000 m over N.N.
Vibration resistance EN 60068-2-6	2…25 Hz ±1,6 mm 25 ... 150 Hz 5 g
Auxiliary supply 18V 20mA	
Supply-voltage for external measuring transducer	DC 15 – 20V / 25mA
Housing	**Type K**
Dimension (H x W x D)	75 x 22,5 x 115 mm
Width	1 TE
Line connection solid wire	1 x 0,5 mm^2 – 2,5 mm^2 / AWG 22 - 14
Standard wire with insulated ferrules	1 x 0,14 mm^2 – 1,5 mm^2 / AWG 28 - 16
Torque	0,5 Nm
Protection class housing / terminals	IP40 / IP 20
Mounting	Snap mounting on 35 mm standard rail EN60715 or M4 screws (additional bar not included)
Mounting position	beliebig
Weight	app. 100 g

Subject to technical changes

10 Housing Type K

Dimensions in mm



1 lower part
2 upper part
3 bar
4 screw
5 holes for screw-mount

11 Disposal

Disposal should be carried out properly and in an environmentally friendly manner in accordance with legal provisions.
ZIEHL is registered with the EAR Foundation under WEEE no.: DE 49 698 543.