JUMO diraTRON DR100

Universal controller for mounting on DIN rail 35 mm

Operating Manual

70206100T90Z001K000

V1.00/EN/30050974/2025-06-16

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1.1 General information

Preventing personal injury and material damage

This document contains all the information required to ensure the product is used safely and as intended.

The user should

- Ensure they have read and fully understood the document as well as the safety information and warnings
- Store the document in its entirety in an easily accessible location, and so that it can be read in full at all times
- Contact the manufacturer if they have any questions about the product or document

Target group

This description is exclusively directed at trained personnel qualified in control and automation technology who are familiar with the applicable national and international standards and rules.

The following notes and explanations must strictly be observed when installing and starting up the components. The qualified personnel must ensure that the application or use of the described products meets all safety requirements, including all applicable laws, regulations, conditions and standards.

1.2 Warranty conditions

Warranty and liability claims shall be voided if

- the product has not been used as intended,
- the damage is a result of not observing the operating instructions,
- the operator personnel is not sufficiently qualified
- or independent changes which are not described in this manual or which are even forbidden have been made.

1.3 Current document issue

The manufacturer reserves the right to update specific information in this document without notice. The version and the date of issue will be revised each time the document is updated.

This is the **English translation of the original German manual**.

1. Identify the version (1) and date of issue (2) on the title page of the document.

2. Scan the adjacent QR code or follow the hyperlink to download the latest document issue and further information about the product.

jmo.to-702061-de

1 About this documentation

1.4 Applicable documentation

This document is supplemented by the documents listed below:

Document	Product group
JUMO diraTRON DR100 data sheet	702061
JUMO diraTRON DR100 short operating manual	
JUMO diraTRON DR100 interface description	

These documents can be downloaded free of charge from the JUMO website under **Services > Download center**.

Enter the number of the product group or the title of the document in the search field.

1.5 Abbreviations

ADC	Analog-to-digital converter (A/D converter)
AWG	American Wire Gauge
CPU	Central processing unit
CRC	Cyclic redundancy check
EMC	Electromagnetic compatibility
PELV	Protective extra low voltage
RTU	Remote terminal unit (Modbus protocol)
SELV	Safety extra low voltage
USB	Universal serial bus (data transmission system)
RT	Resistance transmitter

1.6 Symbols and signal words

1.6.1 Warning symbols

DANGER!

The signal word "DANGER" indicates an imminent threat of danger.

Non-observance results in death or serious injuries.

▶ Strictly observe and comply with the instructions in the warning notice!

WARNING!

The signal word "WARNING" indicates an imminent threat of danger.

Non-observance may result in death or serious injuries.

▶ Strictly observe and comply with the instructions in the warning notice!

CAUTION!

The signal word "CAUTION" indicates an imminent threat of danger.

Non-observance may result in minor or moderate injuries.

▶ Strictly observe and comply with the instructions in the warning notice!

NOTICE!

The signal word "NOTICE" indicates possible material damage

Non-observance may result in damage to devices, plants, or the environment.

▶ Observe the instructions in the note to prevent damage!

1.6.2 Note symbols

NOTE!

This symbol refers to **important information** about the product, its handling, or additional benefits.

NOTE!

This symbol is used in tables and indicates that further information is provided after the table.

REFERENCE!

This symbol refers to **further information** in other sections, chapters, or other manuals.

FURTHER INFORMATION AND DOWNLOADS

This document uses QR codes and hyperlinks to provide further information, downloads, and contact options via the Internet.

DISPOSAL!

At the end of its service life, this device and any batteries present do not belong in the trash! Please ensure that they are **disposed of** properly and in an **environmentally friendly** manner.

NOTE!

This product is built based on state-of-the-art technology and is safe to use. It has been tested and was shipped from the factory in safety-instrumented, perfect working order.

A safe working and operating environment protects the user from death or serious injury, and protects the product and plant against damage.

As a result, it is essential to observe and take on board the following safety information!

2.1 Intended use

The JUMO diraTRON DR 100 controller is a device for controlling temperature, pressure, and other process variables. The measurement input is user configurable and can be used for various sensors or signals.

The user is responsible for compliance with the technical data and the specifications indicated in the data sheet (e.g. operating and ambient temperature).

The device may only be operated in a technically perfect condition, in accordance with its intended use, in a safety-conscious and hazard-conscious manner, and in compliance with the operating manual.

The following in particular are considered to be improper

- any structural, technical, or electrical modifications to the product,
- use of the product outside the areas described in this operating manual,
- use of the product deviating from the technical data.

2.2 Qualification of personnel

The personnel deployed must meet the following requirements in all phases of the product lifecycle:

- Trained and sufficiently qualified electrical, mechanical, and plant engineering personnel.
- Members of personnel are familiar with this documentation and the safety information and warnings it contains.
- The personnel are regularly instructed in all applicable issues of occupational safety and environmental protection.

The operator must ensure that:

- only sufficiently qualified and authorized personnel operate the JUMO products
- the personnel are regularly instructed in all applicable issues of occupational safety and environmental protection

2.3 Safety measures

Incorrect installation or incorrectly set values on the controller may impair proper functioning of the device. The following measures enable safe operation:

Ensure that additional safety equipment independent from the device is present, such as

- Overpressure valves
- Temperature limiters
- Temperature monitors

Only allow settings to be made by qualified personnel.

Observe the corresponding safety regulations.

Check the actual temperature value for stability, as not all conceivable control processes can be controlled with autotuning.

3 Device Description

3.1 Brief description

The diraTRON DR 100 controller is a universally applicable DIN rail controller for controlling temperature, pressure, and other process variables. The device can be used as a two-state/three-step controller, and can also be used as a continuous controller with the analog output option.

The measurement input is user configurable and can be used for

- RTD temperature probes,
- single and double thermocouples,
- resistance transmitters,
- resistance potentiometers
- and current or voltage signals.

The device is characterized by simple, clearly structured operation that is supported with texts. The device is optionally available with an RS485 interface, an additional digital input, and an analog output. The basic type includes autotuning, a ramp function, manual mode, limit value monitoring function, and digital control signals. Measured values are visualized on a dot-matrix LCD display with white backlight. The operating status is indicated by a two-color LED. In the event of a fault, the LED lights up red and if there is no fault, it lights up green.

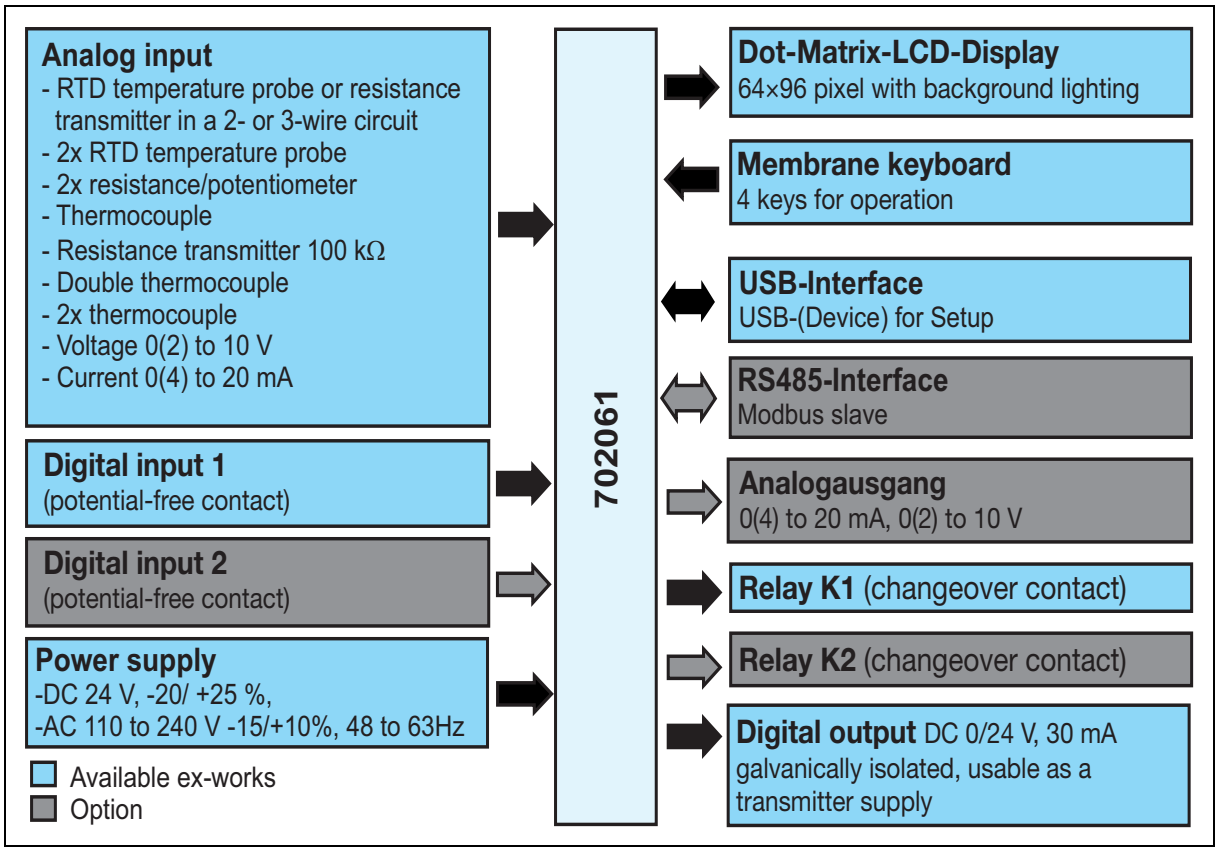
The device can be configured via a setup program or via the four keys on the device.

3.2 Basic and additional equipment

The following table provides an overview of all elements of the device. What belongs to the standard version and what is optional is also marked.

Switching group	**Standard**	**Option**
Analog output		x
Analog input	x	
Digital output	x	
Digital input 1	x	
Digital input 2		x
Display	x	
Power supply unit	x	
Relay K1	x	
Relay K2		x
RS485 interface		x
Keypad	x	
Status LED	x	
USB interface	x	

3.3 Modules



3.3.1 Analog output

The analog output is optionally present. The analog output can be configured, inverted, scaled, and simulated. Furthermore, it can be used as a constant voltage source or constant current source.

The fault signal of the output can be configured.

- Low signal (-0.2 V/1.7 V/-0.4 mA/3.4 mA)
- High signal (10.6 V/10.6 V/21.2 mA/21.2 mA)
- Any value: -0.40(3.40)..4.00..21.20 mA or -0.20(1.70)...10.60 V

The smallest signal is output during the initialization phase.

When the device software is started, the following values are output, depending on the configuration:

- 0 V to 10 V: ≤ -1.34 V
- 2 V to 10 V: ≤ -1.34 V
- 0 mA to 20 mA: ≤ -2.7 mA
- 4 mA to 20 mA: ≤ -2.7 mA

An analog output fault can be reset via the "Reset fault at analog output" parameter, see chapter "Configuration ", Page 75. If the fault persists, the plant switches off again after five seconds.

3.3.2 Analog input

The analog input is a universal input. It is available as standard. A four-pole connection is available to load the measurands. Various temperature sensors can be connected there or the current or voltage standard signals can be loaded. Sensor signals with special characteristic line properties can also be used through customer-specific linearization and changing resistors and potentiometers (which, for example, measure the level, see list in chapter "Brief description ", Page 12).

3.3.3 Digital output

The digital output is available as standard and designed as galvanically isolated.

The digital output can fulfil one of the three functions:

- The digital output is configured as voltage supply for transmitters and always outputs 24 V.
- The digital output outputs a user configurable signal, see chapter "Digital selector ", Page 78.
- The digital output is simulated, see chapter "Simulation ", Page 17.

The digital output outputs 0 V during the initialization phase.

3.3.4 Digital input 1

The digital input 1 is available as standard and designed as galvanically isolated. The contact is designed for connecting a potential-free contact.

The function of the digital input is defined via the digital selector, see chapter "Digital selector ", Page 78.

3.3.5 Digital input 2

The digital input 2 is optionally available and designed as galvanically isolated. The contact is designed for connecting a potential-free contact.

The function of the digital input is defined via the digital selector, see chapter "Digital selector ", Page 78.

3.3.6 Dot-matrix LCD display

The device is equipped with a dot-matrix LCD display. The resolution is 64 px × 96 px. The display has a white backlight.

3.3.7 Membrane keyboard

The device has a membrane keyboard with four keys that can be used to operate and configure the device.

3.3.8 Power supply unit

The power supply unit covers the following voltage ranges:

- AC: 110 V to 240 V; -15 % / +10 %; 48 Hz to 63 Hz
- DC: 24 V, -20 /+25 %

3.3.9 Relay K1

Relay K1 is part of the standard equipment and is actuated galvanically isolated.
An inactive (de-energized) relay corresponds to logic level 0.

In the initialization phase, the relay is always inactive (de-energized).

The relay output can be simulated, see chapter "Simulation ", Page 17.

3.3.10 Relay K2

Relay K2 is optionally available and is actuated galvanically isolated.

A de-energized relay corresponds to logic level 0.

In the initialization phase, the relay is always inactive (de-energized).

The relay output can be simulated, see chapter "Simulation ", Page 17.

3.3.11 RS485 interface

The RS485 interface is optionally available. There is galvanic isolation to the entire device.

The interface is suitable for unlimited continuous operation in a hard-wired plant. It is intended for communicating with a Modbus master. The Modbus RTU protocol is used for communication. The RS485 can only be used as a Modbus slave.

An external operating unit can be connected via the RS485 interface.

See interface description 70206100T92Z000K000.

3.3.12 Status LED

The device has a two-color status LED. It signals the status of the device using the colors green and red.

The LED signals the following states:

Status	LED	Indicator in display
Initialization	Red and green	Logo, device name, hourglass
Setup active	Red and green	"Setup active" message
Simulation[a] active	Red and green	"Simulation active" message alternately with normal display.
Fault	Red	• Value flashes, arrows, dashes, or stars may be displayed. • Fault in the fault display.
Normal operation	Green	Normal display or menus

[a] Simulation of relay K1 or relay K2, digital output or analog output

3.3.13 USB interface

The device is equipped with a USB device interface that is provided for the connection to a PC as standard. The interface is only intended for using the setup program, which can be used to configure the device.

The USB interface is only designed for service use over a limited period. The RS485 interface is suitable for unlimited operation of the interface in a hard-wire plant.

The USB connection is located on the front. It is a micro USB type B. The device cannot be supplied with power via the USB interface. External power supply is always required.

3.4 Functions

3.4.1 Limit value monitoring

The limit value monitoring function can be used to monitor any input signal with different functions.

All analog selector signals are available as an input signal "Actual value input (x)", see chapter "Analog selector ", Page 79. If a relative limit value "Setpoint value input (w)" is monitored, a signal of the analog selector can also be selected.

Eight limit value monitoring functions are available, see chapter "Switching functions ", Page 72. The functions AF1 and AF2 monitor whether the actual value is in a range around a relative limit value. Functions AF3 to AF6 monitor a relative limit value. The functions AF7 and AF8 monitor a fixed limit value.

The result of the limit value monitoring function is TRUE (logic level 1) or FALSE (logic level 0). Which value is to be output in the event of a fault can be set.

The limit value monitoring function can be output via the

- digital output
- and/or relay output K1 or K2.

In the initialization phase, FALSE (logic level 0) is output.

3.4.2 Difference monitoring

The "Difference monitoring" function is only possible with the following configurations:

- 2 × RTD temperature probe in two-wire circuit
- 2 × resistance potentiometer in two-wire circuit
- 2 × thermocouple

The prerequisite for the function is that the configuration "Difference monitoring function" = "Difference" is made, see chapter "Difference monitoring ", Page 61.

The difference is calculated as follows:

Difference = absolute value (measured value 1 - measured value 2)

The difference can be processed by the

- analog output
- or controller function.

If the difference exceeds the user configurable limit value "Difference limit value", an alarm signal is generated. The alarm signal can be output to

- relay output K1 or K2
- or digital output.

3.4.3 Simulation

Using a simulation of the following output signals, the plant can be checked.

- Relay output K1
- Relay output K2
- Digital output
- Analog output

The LED lights up red and green during the simulation. Except with the simulation of relay output K1, the "Simulation active" message is shown in the display alternately with the normal display.

Relay output K1

The relay output K1 can be simulated. In this process, the de-energized relay can be simulated (inactive state) or the energized relay (active state). The simulation has priority over faults. The relay can therefore be switched despite a fault.

The output value of the simulation can be configured via the digital selector.

Relay output K2

The relay output K2 can be simulated. In this process, the de-energized relay can be simulated (inactive state) or the energized relay (active state). The simulation has priority over faults. The relay can therefore be switched despite a fault.

The output value of the simulation can be configured via the digital selector.

Digital output

The digital output can be simulated. The Low signal or the High signal can be simulated here. The simulation has priority over faults. The digital output can therefore be switched despite faults.

The output value of the simulation can be configured via the digital selector.

Analog output

The analog output can be operated in simulation mode. The simulation value is user configurable. The simulation has priority over faults. The output can therefore be simulated at the input despite the missing sensor.

3.4.4 Service

Min. and max. values for drag indicator

The min. and max. values of the two measured values 1, 2 are saved and can be reset.

Limit values for relay switching cycles

Current switching cycles can be displayed here and limit values defined for how often a relay has been switched on.

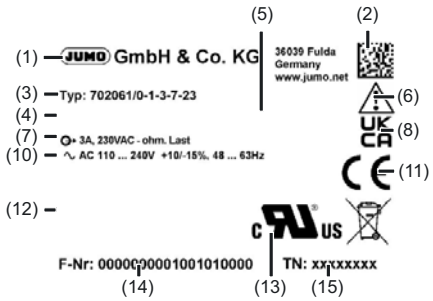
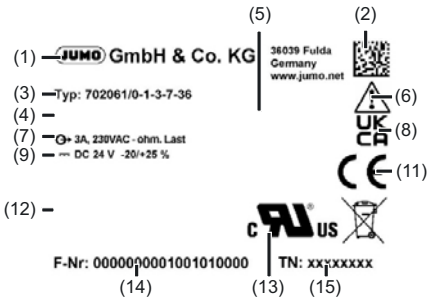
Operation times of the device

The total operation time and the operation time after the last configuration can be viewed here.

3 Device Description

3.5 Nameplate

For device product identification, the nameplate is affixed to the side of the device.

Voltage supply: AC 110 to 240 V	Voltage supply: DC 24 V
	

(1) Information on the manufacturer

(2) QR code of the fabrication number

(3) Type designation, see chapter "Type designation ", Page 19

(4)

(5) Software version number

(6) "Read the operating manual" note

(7) Output signal

(8) UKCA identification marking for England, Wales, Scotland

(9) Voltage supply when configuring direct current

(10) Voltage supply when configuring alternating current

(11) CE marking

(12) "Recognized Component" approval mark for Canada and USA

(13) Fabrication number

(14) Part no.

Date of manufacture

You can find out the date of manufacture from the 19-digit fabrication number (14). Digits 12 to 15 denote the year of manufacture and the calendar week.

A product with the fabrication number 0123456701**2315**0001 was therefore produced in the 15th calendar week of 2023.

Device software versions

This operating manual is a translation of the original German manual. It is valid for the following versions:

Hardware version(s)	Software version(s)	Device display
	Measuring channel version 478.01.01	
	Operation version 478.01.01	

3.6 Type designation

	(1)	**Basic type**
702061		JUMO diraTRON DR100 with 1 analog input, digital input 1, digital output, K1 relay (changeover contact)
	(2)	**Version**
0		Standard with default settings
1		Customer-specifically modified hardware
2		Customer-specifically modified software
3		Customer-specifically modified hardware and software
	(3)	**Option 1**
0		None
1		K2 relay (changeover contact) and digital input 2 (galvanically isolated)
	(4)	**Option 2**
0		None
3		Analog output
4		RS485 interface[a]
	(5)	**Option 3**
0		None
7		RS485 interface[b]
	(6)	**Voltage supply**
23		AC 110 to 240 V, -15/+10 %, 48 to 63 Hz
36		DC 24 V, -20 /+25 %

[a] Connection of RS485 via connection terminals 11 and 12 or via rear wall terminals (mounting rail rear wall terminals or PUSH IN connection terminals).

[b] If option 2 = 0 or = 3 has been selected, connection of RS485 is only possible via rear wall terminals (mounting rail rear wall terminals or PUSH IN connection terminals).

Explanation on (2) version	
0	Standard with default settings means: everything that can be ordered in the order code shown
1	Customer-specifically modified hardware means: everything that **cannot** be ordered in the order code shown, e.g. customer-specific front film
2	Customer-specifically modified software means: device differs from the standard JUMO configuration (highlighted **bold** in the BTA). if the customer wants to have another measurement input configured, for example
3	Combination of 1 and 2

	(1)		**(2)**		**(3)**		**(4)**		**(5)**		**(6)**	
Type designation		/		-		-		-		-		,
Example	702061	/	0	-	1	-	3	-	7		23	

4 Technical data

4.1 Electrical data

Voltage supply Galvanically isolated	AC 110 V to 240 V, -15 % / +10 %, 48 Hz to 63 Hz	DC 24 V, -20 % / +25 % The device may only be connected to SELV electrical circuits
Power consumption	3.8 W	3.0 W
Electrical safety	According to DIN EN 60730-2-9:2021; Overvoltage category III, Rated surge voltage 4000 V Pollution degree 2	
Protection rating	I with internal isolation from SELV	
Electrical connection	Spring-cage terminals (PUSH IN technology) Type of mounting type Y	
Conductor cross section Wire or stranded wire (without ferrule) Stranded wire with ferrule	 Min. 0.2 mm^2, max. 1.5 mm^2 Without plastic collar: min. 0.2 mm^2, max. 1.5 mm^2 With plastic collar: min. 0.2 mm^2, max. 0.75 mm^2	
Stripping length	8 mm	

4.2 Inputs

4.2.1 Analog input

RTD temperature probe

Designation	Standard	ITS	Connection type	Measuring range	Accuracy[a]	Tc
Pt100 Pt500 Pt1000	IEC 60751:2008 DIN EN 60751:2009	ITS-90	Two/three-wire	-200 to +850 °C	± 0.1 %	3.85 × 10^{-3} 1/K
Pt100	GOST 6651-2009 A.2			-200 to +850 °C	± 0.1 %	3.917 × 10^{-3} 1/K
Pt50				-200 to +850 °C	± 0.1 %	3.91 × 10^{-3} 1/K
Ni100 Ni500 Ni1000	DIN 43760:1987-09			-60 to +250 °C	± 0.1 %	6.18 × 10^{-3} 1/K
Ni100	GOST 6651-2009 A.5			-60 to +180 °C	± 0.1 %	6.17 × 10^{-3} 1/K
Cu50	GOST 6651-2009 A.3			-180 to +200 °C	± 0.1 %	4.28 × 10^{-3} 1/K
Cu100	GOST 6651-2009 A.3			-180 to +200 °C	± 0.1 %	4.28 × 10^{-3} 1/K

[a] Accuracy refers to the measuring range.

General specifications	
Connection type	Two-wire circuit Three-wire circuit Two RTD temperature probes in two-wire circuit
Ambient temperature influence	≤ 100 ppm/K referring to 22 °C
Sensor line resistance	Maximum 50 Ω per line
Sensor current	< 1 mA
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100 s
Sampling rate	210 ms

Thermocouples

Designation	Type	Standard	ITS	Measuring range	Accuracy[a]
Fe-CuNi	L	DIN 43710:1985-12	IPTS-68	-200 to +900 °C	± 0.4 %
Fe-CuNi	J	IEC 60584-1:2013 DIN EN 60584-1:2014	ITS-90	-210 to +1200 °C	± 0.4 % from -100 °C
Cu-CuNi	U	DIN 43710:1985-12	IPTS-68	-200 to +600 °C	± 0.4 % from -100 °C
Cu-CuNi	T	IEC 60584-1:2013 DIN EN 60584-1:2014	ITS-90	-200 to +400 °C	± 0.4 % from -150 °C
NiCr-Ni	K			-200 to +1300 °C	± 0.4 % from -50 °C
NiCr-CuNi	E			-200 to +1000 °C	± 0.4 % from -80 °C
NiCrSi-NiSi	N			-200 to +1300 °C	± 0.4 % from -80 °C
Pt10Rh-Pt	S			-50 to +1768 °C	± 0.4 % from +20 °C
Pt13Rh-Pt	R			-50 to +1768 °C	± 0.4 % from +50 °C
Pt30Rh-Pt6Rh	B			-50 to +1820 °C	± 0.4 % from +400 °C
W5Re-W26Re	C			0 to 2315 °C	± 0.4 %
W5Re-W20Re	A			0 to 2500 °C	± 0.4 %
W3Re-W25Re	D	ASTM E1751M-20		0 to 2315 °C	± 0.4 %
Chromel®-COPEL®	L	GOST R 8.585-2001		-200 to +800 °C	± 0.4 % from -80 °C
Chromel®-Alumel®	K			-270 to +1372 °C	± 0.4 % from -80 °C
Platinel II		ASTM E1751M-20		0 to 1395 °C	± 0.4 %

[a] Accuracy refers to the maximum measuring range.

General specifications	
Connection type	Thermocouple Double thermocouple 2 × thermocouple
Ambient temperature influence	≤ 100 ppm/K referring to 22 °C, plus accuracy of the cold junction
Cold junction	Internal (Pt1000) or external (fixed value)
Cold junction accuracy	± 1 K
Cold junction temperature (external)	-20 to +80 °C (adjustable)
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100 s
Sampling rate	Thermocouple: 210 ms

4 Technical data

Voltage, current (standard signals)

Designation	Measuring range	Accuracy[a]	Input resistance
Voltage	0 V to 10 V	≤ 0.1 %	> 500 kΩ
	2 V to 10 V	≤ 0.1 %	> 500 kΩ

[a] Accuracy refers to the maximum measuring range.

Designation	Measuring range	Accuracy[a]	Compliance voltage
Current	4 mA to 20 mA	≤ 0.2 %	≤ 3 V
	0 mA to 20 mA	≤ 0.2 %	≤ 3 V

[a] Accuracy refers to the maximum measuring range.

General specifications	
Ambient temperature influence	≤ 150 ppm/K referring to 22 °C
Measuring range limits	According to NAMUR recommendation NE 43 (only current input 4 to 20 mA)
Input filter	Digital filter, 2nd order; filter constant can be set from 0 to 100 s
Sampling rate	210 ms

Measuring circuit monitoring

The device behavior in the event of a fault is configurable.

Measuring probe	Measuring range undershoot	Measuring range exceedance	Break of probe or line	Short-circuit of probe
RTD temperature probe	Is detected	Is detected	Is detected	Is detected
Thermocouple and 2 × thermocouple	Is detected	Is detected	Is detected	Is not detected
Double thermocouple	Is detected	Is detected	Is detected	Is detected [a]
Resistance transmitter	Is not detected	Is not detected	Is not detected	Is not detected
Resistance potentiometer	Is not detected	Is detected	Is detected	Is not detected
Current 0 mA to 20 mA	Is detected	Is detected	Is not detected	Is not detected
Current 4 mA to 20 mA	Is detected	Is detected	Is detected	Is detected
Voltage 0 V to 10 V	Is detected	Is detected	Is not detected	Is not detected
Voltage 2 V to 10 V	Is detected	Is detected	Is detected	Is detected

[a] Probe short circuit can only be detected with a double thermocouple (via double thermocouple fault limit)

4.2.2 Digital inputs

Digital input 1

Operating mode	Potential-free contact
Switching voltage, current	internal voltage source DC 3.3 V, 1 mA
Function	Contact closed: input is active (R_{ON} < 1 kΩ)
	Contact open: input is inactive (R_{OFF} > 100 kΩ)
Galvanic isolation	No
Standard or option	Standard

Digital input 2

Operating mode	Potential-free contact
Switching voltage, current	internal voltage source DC 24 V, 5 mA
Function	Contact closed: input is active (R_{ON} < 1 kΩ)
	Contact open: input is inactive (R_{OFF} > 100 kΩ)
Galvanic isolation	Yes
Standard or option	Option

4.3 Outputs

4.3.1 Analog output

Voltage	
Output signal	DC 0 V to 10 V or 2 V to 10 V
Load resistance	≥ 500 Ω
Load influence	±15 mV/100 Ω
Current	
Output signal	DC 0 mA to 20 mA or 4 mA to 20 mA
Burden	≤ 500 Ω
Burden influence	±0.05 mA/100 Ω
Accuracy[a]	±0.5 %
Ambient temperature influence	≤ 150 ppm/K
Standard or option	Option

[a] Accuracy refers to the maximum output signal range.

4.3.2 Digital outputs

Relay K1 (changeover contact)

Switching capacity	Installed slow-blow microfuse 3.15 A with AC 250 V, resistive load
Contact life	100000 switching cycles at 3 A 250000 switching cycles at 1 A
Contact capability	AC 230 V or 24 V; 3 A at cos φ = 1; (0.5 A at cosφ ≥ 0.6); 50 Hz DC 24 V; 3 A; (0.5 A at τ =7 ms) UL 60730 AC 230 V; 3 A D300; 30 k AC/DC 24 V; 3 A
Minimum current	DC 24 V, 50 mA
Standard or option	Standard

Relay K2 (changeover contact)

Switching capacity	Installed slow-blow microfuse 3.15 A with AC 250 V, resistive load
Contact life	100000 switching cycles at 3 A 250000 switching cycles at 1 A
Contact capability	AC 230 V or 24 V; 3 A at cos φ = 1; (0.5 A at cosφ ≥ 0.6); 50 Hz DC 24 V; 3 A; (0.5 A at τ =7 ms) UL 60730 AC 230 V; 3 A D300; 30 k AC/DC 24 V; 3 A
Minimum current	DC 24 V, 50 mA
Standard or option	Option

Digital output

Output signal	DC 0 V or 24 V
Current	Max. 30 mA
Transmitter feed	The digital output can be configured to be permanently switched to DC 24 V and supply the transmitter.
Standard or option	Standard

4.4 Interface

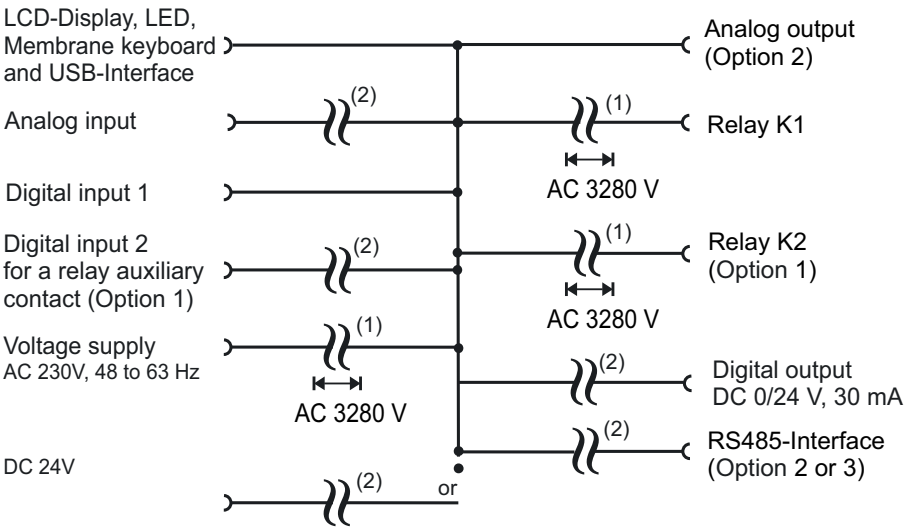
USB interface

Connector type	Micro-B (socket)
Standard	Low-Speed, Full-Speed
Max. cable length	5 m
Standard or option	Standard

RS485 interface

Baud rate	9600 baud 19200 baud 38400 baud 57600 baud 115200 baud
Data format (Data bit / parity / stop bit)	8 / no / 1 (8N1) 8 / odd / 1 (8O1) 8 / even / 1 (8E1) 8 / no / 2 (8N2)
Protocol	Modbus RTU, as slave
Standard or option	Option

4.5 Electrical isolation



(1) The voltage specifications correspond to the test voltages (alternating voltage, rms values) according to DIN EN 60730-1 (VDE 0631-1):2021-06 EN 60730-1:2016 + A1:2019 for type testing.

(2) Functional galvanic isolation for connecting SELV or PELV electrical circuits.

4.6 Display

Type	Dot-matrix LCD
Resolution	64 px × 96 px
Brightness setting	Contrast can be adjusted on device. Backlight can be switched off manually or via timeout.
Decimal places	0, 1, 2 (user configurable)

4 Technical data

4.7 Environmental influences

Ambient temperature range	
Storage	-30 °C to +70 °C
Operation	-10 °C to +55 °C
Site altitude	Max. 2000 m above sea level
Climatic environmental influences	According to DIN EN 60721-3 with extended temperature range
Resistance to climatic conditions	≤ 95 % rel. humidity without condensation
Storage	According to class 1K2
Operation	According to class 3K3
Mechanical environmental influences	According to DIN EN 60721-3
Storage	According to class 1M2
Transportation	According to class 2M2
Operation	According to class 3M3
Electromagnetic compatibility (EMC)	According to DIN EN 0730-1:2021 and DIN EN 61326-1:2022
Interference emission	Class B[a]
Interference immunity	Industrial requirement

[a] Explanation of class A and class B.

4.8 Mechanical features

Housing type	Plastic housing for DIN rail (indoor use only)
Housing front	Housing: cobalt blue RAL 5013 Membrane keyboard – silver gray RAL 7001
Housing mounting	On DIN rail according to DIN EN 60715 with the dimensions 35 mm × 7.5 mm
Operating position	Vertical
Protection type	According to DIN EN 60529 at the rear IP20, at the front IP65
Flammability class	V-1 according to UL94
Weight	Maximum 200 g

4.9 Approval marks and certificates

Approval mark	Test facility	Certificates/certification numbers	Inspection basis	Valid for
UL requested	Underwriters Laboratories	File no.: E325456	UL/CSA 60730-1 UL/CSA 60730-2-9	for all versions

4.10 Test voltages

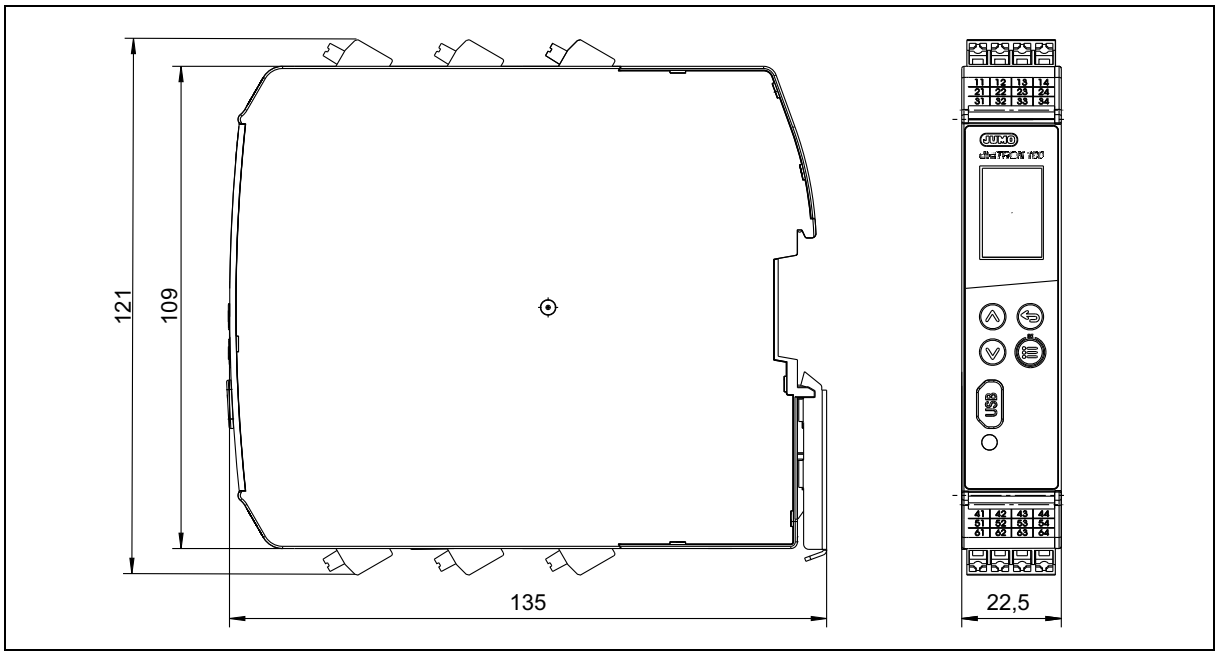
Input or output to voltage supply, see chapter "Electrical isolation ", Page 25	3.28 kV/50 Hz

4.11 Air gaps and creepage distances

According to DIN EN IEC 60730-2-9:2021-01, chapter 20	Air gap	Creepage distances
Mains voltage to electronic components and probes	≥ 6 mm	≥ 5 mm
Mains voltage to relays	≥ 6 mm	≥ 5 mm
Relays to relays	≥ 6 mm	≥ 5 mm
Relays to electronic components and probes	≥ 6 mm	≥ 5 mm

4 Technical data

4.12 Dimensions



5.1 Storage

Improper storage may result in damage to the device.

- Store the device in a dry and dust-free environment.
- Observe the storage temperature range for the device, see chapter "Environmental influences ", Page 26.

5.2 Packaging and transport

If the device is not protected properly against external influences, it may become damaged during transport.

- Transport the device in an impact-proof packaging solution that protects it against moisture and dirt.
- Also comply with the admissible storage temperatures while the device is being transported.
- Protect all electrical and mechanical connections from damage.

6 Installation

6.1 Installation instructions

DANGER!

The voltage supply and load circuits of relay outputs may result in a dangerous electric voltage (e.g. 230 V) on the device.

There is a risk of electric shock.

▶ Before mounting or dismounting, disconnect the load circuits from the voltage supply. This work must only be performed by qualified personnel.

6.2 Mounting site and environmental conditions

Mounting site

The device has protection type IP20 and is only intended for use in fireproof control cabinets or switch boxes. The mounting site must be virtually vibration-free. Electromagnetic fields caused by equipment such as motors or transformers should be avoided.

WARNING!

The device must never be installed in potentially-explosive areas.

Explosion hazard.

▶ The device must only be used outside of potentially explosive areas.

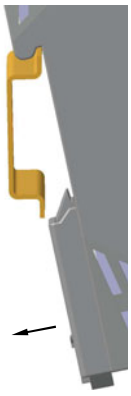
Climatic conditions

The ambient temperature and the relative humidity at the mounting site must correspond to the technical data. Aggressive gases, acids, and steams have a negative effect on the operating life of the modules. The mounting site must be free from dust, powder, and other suspended matter so that the ventilation slots do not become blocked.

6.3 Mounting on DIN rail

DIN-rail mounting

For mounting on a DIN rail according to DIN EN 60715 (35 mm × 7,5 mm), the device requires a minimum spacing of 20 mm upward and downward for hooking in and out.
The spacing of the fastening screws for the DIN rail must not exceed 200 mm for reasons of stability.



Installation position

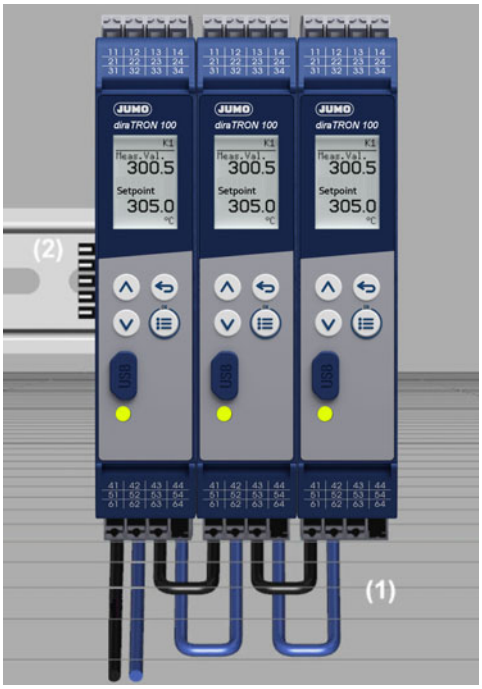
The DIN rail must be mounted horizontally so that all modules are arranged vertically. Otherwise the admissible ambient temperature range will be restricted.

Close mounting

Up to 10 devices without minimum spacings can be positioned lined up directly next to one another.

The voltage supply can be looped through from device to device with lines (1).
If the device interfaces are also due to be connected, a mounting rail rear wall terminal is also available as an accessory (2).

See chapter "Accessories ", Page 85.



7 Electrical connection

7.1 Installation notes

WARNING!

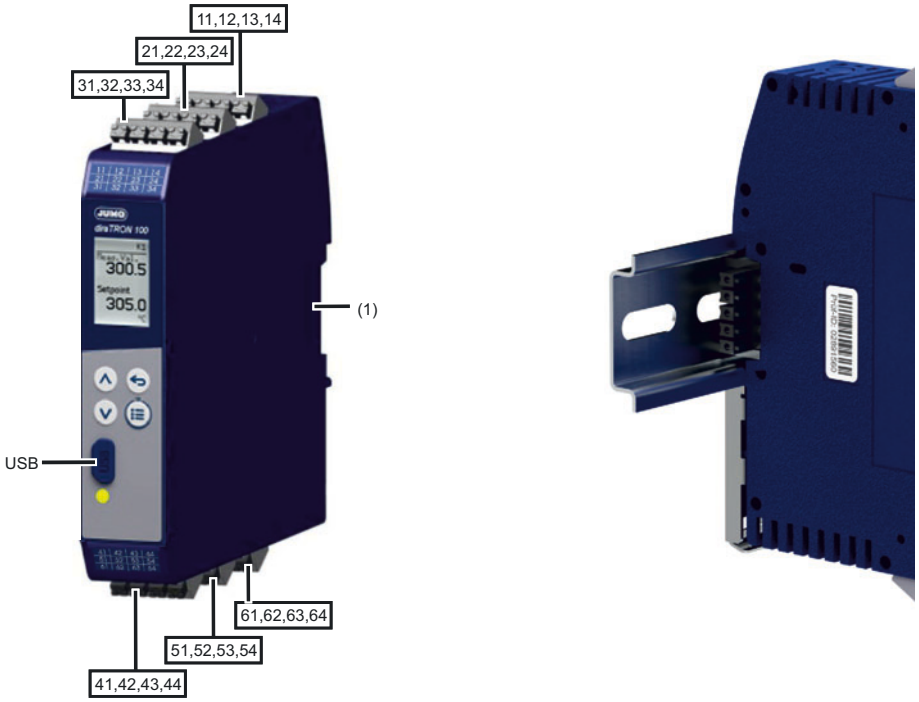
Risk of explosion!

The controller is not suitable for installation in potentially explosive areas.

▶ Only install and deploy the device outside of potentially explosive areas.

- Both the choice of line material for the installation as well as the electrical connection of the device must conform to the requirements of VDE 0100 "Regulations on the Installation of Power Circuits with Nominal Voltages below 1000 V" or the appropriate regulations for the respective country.
- Check to see if the device is installed in a manner appropriate to the application (temperature measurement) and that it is operated within the admissible plant parameters.
- Disconnect all of the device's poles from the mains voltage for service or repair work.
- Disconnect both of the device's poles from the mains voltage if live parts could be touched when working.
- Route the input, output, and supply lines separately and not parallel to one another.
- Route all input and output lines without a connection to the voltage supply grid with shielded and stranded lines and not close to components or lines through which current is flowing. Also do not route the lines close to current-carrying components or cables. The shielding must be connected to ground potential on the device side.
- The relay circuit should be protected by suitable measures so that the installed 3.15 A slow-blow microfuse is not destroyed.
- In the case of devices with an AC 230 V or DC 24 V voltage supply that is supplied via terminals 61 to 64, the on-site 4 A slow-blow fuse protection must not be exceeded.
- In the case of devices with a DC 24 V voltage supply which is supplied via a mounting rail rear wall terminal, the on-site 2 A slow-blow fuse protection must not be exceeded.
- Suppress inductive loads near the device, such as contactors or solenoid valves with RC combinations.
- The electromagnetic compatibility (EMC) corresponds to the standards and regulations listed in the technical data, see chapter "Environmental influences ", Page 26.

7.2 Connection elements and connectors



(1)	Mounting rail rear wall terminal	33, 34	Digital input 1
11, 12	Option: Analog output or RS485 interface	41, 42, 43, 44	K1 relay
13, 14	Option: Digital input 2 (galvanically isolated)	51, 52, 53, 54	Option: K2 relay
21, 22, 23, 24	Analog input	61, 62, 63, 64	Voltage supply
31, 32	Digital output (galvanically isolated)	USB	USB connection

Conductor cross sections and ferrules

Connection is established via fixed PUSH IN connection terminals.

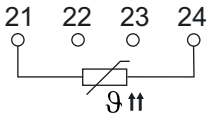
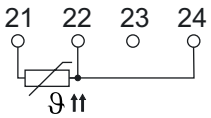
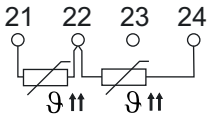
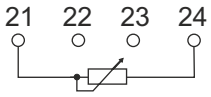
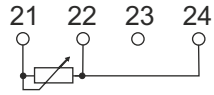
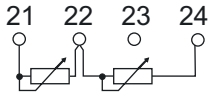
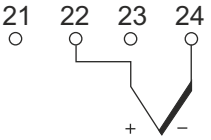
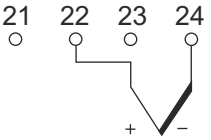
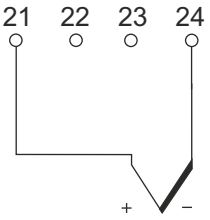
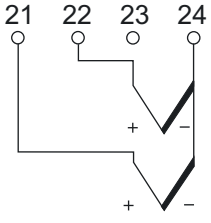
Conductor cross section	
Wire or stranded wire (without ferrule)	Min. 0.2 mm^2, max. 2.5 mm^2, AWG 24 to 14
Stranded wire with ferrule (for flexible line)	Without plastic collar: min. 0.25 mm^2, max. 2.5 mm^2 With plastic collar: min. 0.25 mm^2, max. 2.5 mm^2
Stripping length	10 mm

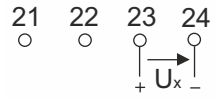
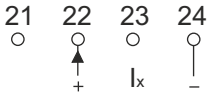
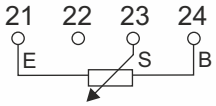
7.3 Connection diagram

When connecting the device to an external PELV electrical circuit, the existing internal SELV electrical circuit becomes a PELV electrical circuit. In this case, protection against electric shock is provided via double or reinforced insulation and voltage limitation. A connection to the protective ground is not required.

7 Electrical connection

Analog input

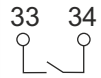
Connection	Terminals	Symbol and terminal designation	
RTD temperature probe in two-wire circuit	(21,24)		
RTD temperature probe in three-wire circuit	(21, 22, 24)		
2 × RTD temperature probe in two-wire circuit	(21, 22, 24) Input 1: 21, 22 Input 2: 22, 24		For example for differential measurement
Resistance potentiometer in two-wire circuit	(21,24)		
Resistance potentiometer in three-wire circuit	(21, 22, 24)		
2 × resistance potentiometer in two-wire circuit	(21, 22, 24) Input 1: 21, 22 Input 2: 22, 24		For example for differential measurement
Thermocouple	(22, 24)		
2 × Thermocouple	(22, 24) Input 1: 22, 24		For example for differential measurement
	(21, 24) Input 2: 21, 24		
Double thermocouple not galvanically isolated	(22, 24) Input 1: 22, 24 (21, 24) Input 2: 21, 24		

Connection	Terminals	Symbol and terminal designation	
Voltage DC 0 V to 10 V DC 2 V to 10 V	(23, 24)		
Current DC 0 mA to 20 mA DC 4 mA to 20 mA	(22, 24)		
Resistance transmitter E = End S = Sliding contact B = Beginning	(21, 23, 24)		

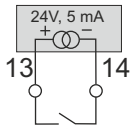
Analog output (option)

Connection	Terminals	Symbol and terminal designation	
Current DC 0 mA to 20 mA DC 4 mA to 20 mA (user configurable)	(11, 12)		
Spannung DC 0 V bis 10 V DC 2 V bis 10 V (user configurable)	(11, 12)		

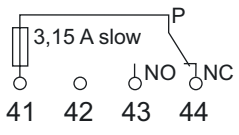
Digital input 1

Connection	Terminals	Symbol and terminal designation	
Potential-free contact Switching current 1 mA	(33, 34)		

Digital input 2 (option)

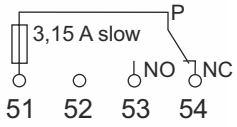
Connection	Terminals	Symbol and terminal designation	
DC 24 V, 5 mA Galvanically isolated	(13, 14)		

Relay K1

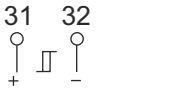
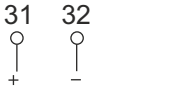
Connection	Terminals	Symbol and terminal designation	
(safe operating state according to quiescent current principle)			
Changeover contact with installed 3.15 A slow-blow microfuse in pole arm P: Pole NO: normally open NC: normally closed	(41, 43, 44)		

7 Electrical connection

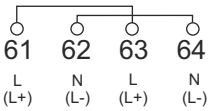
Relay K2 (option)

Connection	Terminals	Symbol and terminal designation	
Changeover contact with installed 3.15 A slow-blow microfuse in pole arm P: Pole NO: normally open NC: normally closed	(51, 53, 54)		

Digital output

Connection	Terminals	Symbol and terminal designation	
DC 0 V / 24 V, 30 mA Galvanically isolated	(31, 32)		
DC 24 V, 30 mA Transmitter feed; Galvanically isolated	(31, 32)		

Voltage supply

Connection	Terminals	Symbol and terminal designation	
AC 110 V bis 240 V, -15 % / +10 %, 48 Hz to 63 Hz (Galvanically isolated)	(61, 62)		
DC 24 V, -20 % / +25 % (Galvanically isolated)			The device may only be connected to SELV electrical circuits.
Terminals 63 and 64 are intended for looping through a maximum of 10 adjacent devices.	(63, 64)		

RS485 interface

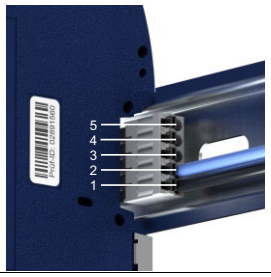
Connection	Terminals	Symbol and terminal designation	
RS485-interface - as option 2	11 12 or via mounting rail rear wall terminal	TxD+/RxD+ (11) TxD-/RxD- (12)	Transmission/received data + Transmission/received data -
RS485-interface - as option 3	via mounting rail rear wall terminal	TxD+/RxD+ TxD-/RxD-	Transmission/received data + Transmission/received data -

USB interface

Connection	Terminals	Symbol and terminal designation
USB-interface (Device)	(USB-Socket)	Micro-B-connector, standard (5-pole), front side

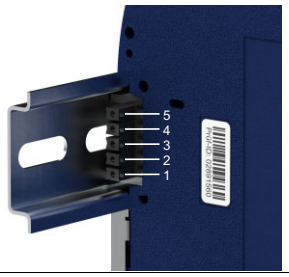
Rear wall contacts: PUSH IN connection terminal

It enables the DC 24 V voltage supply and RS485 interface to be connected in conjunction with the mounting rail rear wall terminal.
Note: It is not suitable for connecting AC 230 V.

Connection	Terminals	Symbol and terminal designation	
Voltage supply	1 2 3	(L+) (L-) not used	
RS485-interface - as option 3	4 5	TxD-/RxD - TxD+/RxD +	

Rear wall contacts: Mounting rail rear wall terminal

Other devices can therefore be connected via the back cover connection.
A maximum of 10 devices can be supplied.

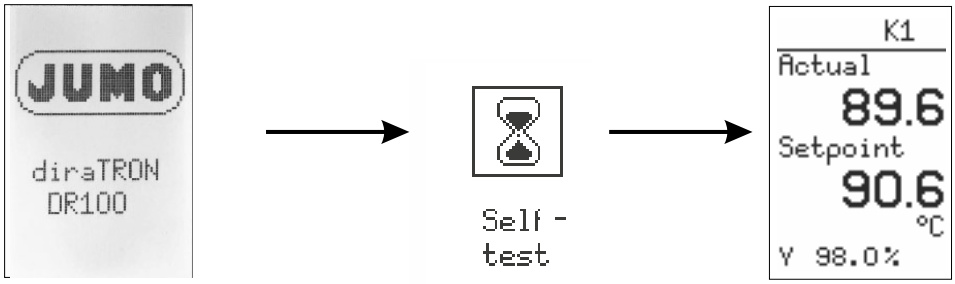
Connection	Terminals	Symbol and terminal designation	
Voltage supply	1 2 3	(L+) (L-) not used	
RS485-interface - as option 3	4 5	TxD-/RxD - TxD+/RxD +	

8 Device response when switching on

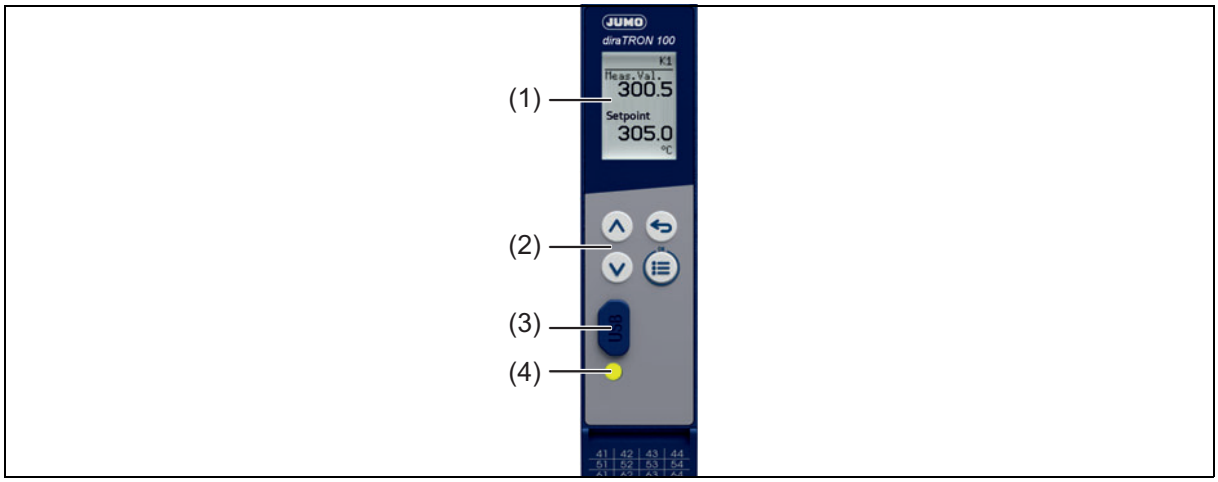
8.1 Device response when switching on

When the voltage supply is applied, the device switches on automatically. A self-test then starts immediately. The backlit display shows white pixels for two seconds and black pixels for two seconds. The device name is then shown. During this time, the LED lights up red and green simultaneously.

When first starting the device, a query concerning the operator's preferred device language appears. The query is in English. If the language selection is confirmed with the OK key, the query is no longer shown during the next switch-on.



9.1 Display and control elements



1 Black/white dot-matrix LCD display with backlight
2 Keys for operating the device
3 Micro USB connection cover
4 Two-colored status LED

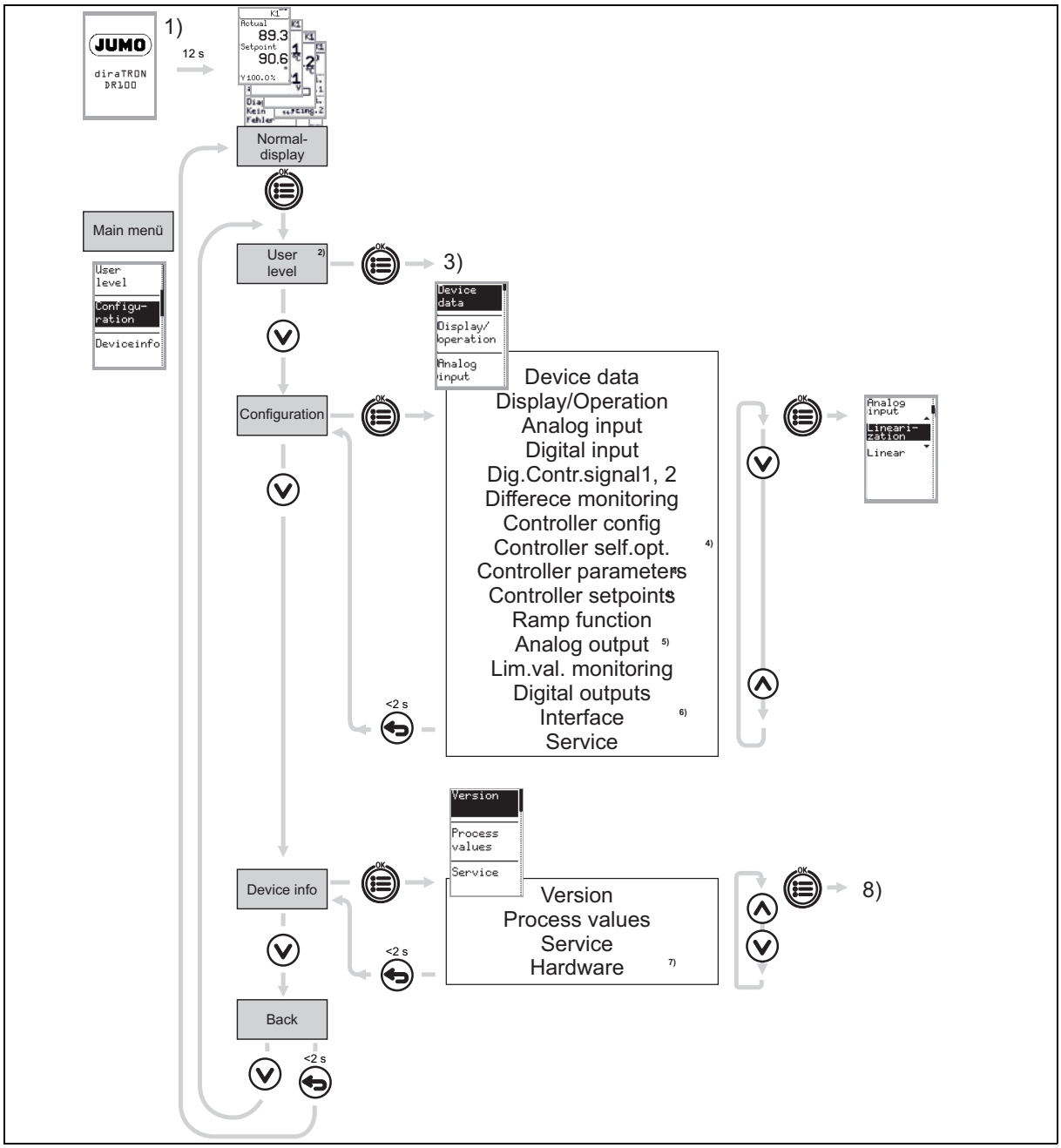
	Up key
	Down key
	Back key
	Menu/OK key

9 Operation

9.2 Key function

Key (duration)	Function		
	In basic status	**When navigating**	**Comment**
	Automatic mode	Edit the setpoint value	Only in the controller screen
	Manual mode	Edit the output level For modulating controller: start up and shut down	Only in the controller screen
		Switch to the main menu	
Short press (< 2 s) 	Function key 1	Configurable Default: next basic screen	
Long press (> 2 s) 	Function key 2	Configurable Default: switch between automatic and manual mode	Only in the controller screen
Long press Up + down (> 2 s)  and 	Start/stop autotuning		Only in the controller screen

9.3 Operating overview



1	Start screen; switches to the normal display 12 seconds after switch-on	2	User level is shown once parameters have been stored in the setup program
3	Parameters saved in the user level	4	Optional, if controller type ≠ OFF
5	Only with "Analog output" option	6	Only with "RS485 interface" option
7	Optionally available equipment features	8	Device information display

NOTE!

If no inputs are made, the display jumps back to the normal display after the configured timeout.

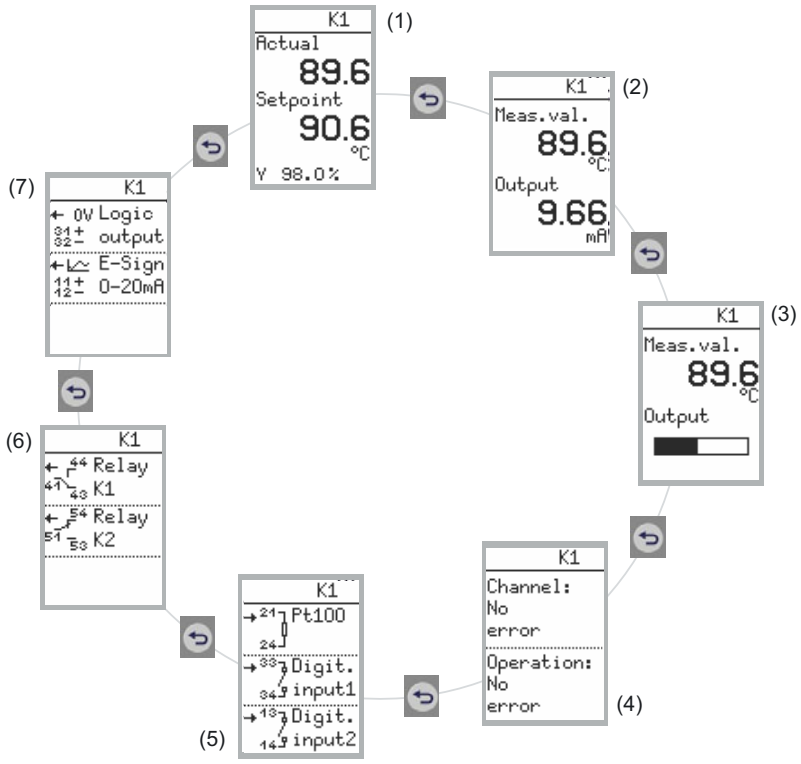
9 Operation

9.3.1 Start screen

After starting the device, the start screen with JUMO logo and device name appears. A customer-specific start screen can be configured. To do so, the screen and text have to be configured in the setup program, see chapter "Display/operation ", Page 50.

9.3.2 Normal display

There are various normal displays, which are switched in a ring. The display content can be switched by pressing function key 1.



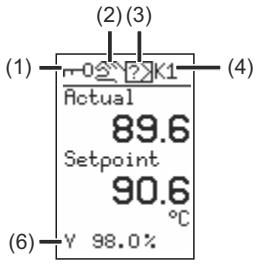
	Normal display	Displayed content	Comment
(1)	**Controller**	Actual value, current setpoint value, output level, controller switching output	
(2)	**Analog output**	Analog output measured value	Only if optional analog output is present
(3)	**Bar graph**	Measured value, bar graph of the analog output	Only if optional analog output is present
(4)	**I/O information 1**	Symbols and terminal designation: Analog input [21, 22, 23, 24] Digital input 1 [33, 34] Digital input 2 [13, 14]	Digital input 2 optional
(5)	**I/O information 2**	Symbols and terminal designation: Relay K1 [41, 43, 44] Relay K2 [51, 53, 54]	Relay K2 optional
(6)	**I/O information 3**	Symbols and terminal designation: Logic/digital output [31, 32] RS485/analog output [11, 12]	RS485 interface and analog output optional

	Normal display	Displayed content	Comment
(7)	**Fault**	Measuring channel/operating fault	Only if there is a fault. See also chapter 12.1 "Measured value errors", Page 80

The "normal display" configuration defines which normal display is to be displayed when restarting the device and returning, see chapter "Display/operation ", Page 50.

9.3.3 Status bar

The status bar is always shown above the normal display.



Status bar	Meaning
(1)	Indicates that the configuration is protected by an access code.
(2)	Indicates that the controller is in "manual mode".
(3)	Indicates that the controller is in "autotuning" mode.
(4)	Indicates that the relay K1 is switched. CAUTION fuse installed!
	Indicates that the relay K2 is switched. CAUTION fuse installed!
(6)	Display of the output level in %

9.3.4 Fault status display

The fault display can be called up in the normal display control ring. Current faults are displayed there, divided by fault location "Measuring channel" and "Operation".

All potential faults can be found in chapter "Troubleshooting ", Page 80.

9.3.5 Messages

The device outputs various messages which each consist of an icon and a maximum of three lines of text.

The following messages indicate required steps or actions that must be performed.

Message	Meaning
Code incorrect	The incorrect access code has been input.
Code input disabled	Code input is temporarily disabled due to an incorrect access code.
No access to channel	When initializing or reading the channel, a fault occurred.
Setup fault! Restart!	A fault occurred when communicating with the setup program. The device must be restarted.
Keypad locked	Keyboard lock is active and a key is pressed.
Level inhibited	Level inhibit is active and the configuration level is to be switched to.
Drag indicator reset	Drag indicator was reset.
Editing blocked	An internal fault occurred when editing.

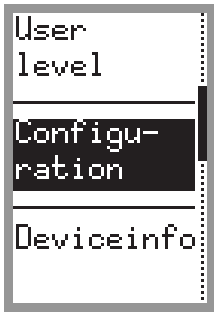
Message	Meaning
Communication cancellation Editing	Communication interrupted when editing.
Simulation active *(is shown cyclically)*	Simulation is active K2 = relay K2, DO = digital output or AO = analog output
Check dependent parameters	If the sensor type has been changed, please check linearization, scaling (input), and limit values. If the linearization has been changed, please check scaling (input) and limit values. If the scaling (input) has been changed, please check limit values. If the signal type analog output has been changed, please check scaling (output), replacement value, and simulation value.
Check resistors	Please check resistors R_x, R_0, and R_L.

The following messages only show one status.

Message	Meaning
Setup active	Setup transmission is active.
Writing, RS485 active	Writing via RS485 interface is active.
Data reconciliation	After setup transmission or RS485 writing, the data is reconciled/synchronized internally.

9.4 Main menu

The main menu is opened by pressing the menu/OK key from the normal display. The selected submenus open by pressing the menu/OK key again.



Normal display > Main menu >	
User level	Contains configuration parameters which have been specially selected using the setup program, see chapter "Display/operation ", Page 50.
Configuration	Contains all configuration parameters, see chapter "Configuration ", Page 49.
Device info	Contains general information that cannot be edited, see chapter "Device information ", Page 46.

9.5 User level

The user level is not used in the new device. The user can store up to eight configuration parameters which can be accessed directly on the device here. These parameters are selected via the setup program

The user level can be locked using a four-digit access code.

The user level is only displayed on the device if parameters have been configured in the setup program.

9.6 Controller operation

Controller parameters can be individually configured, see chapter "Parameter ", Page 63.

The following elements are shown in the menu:

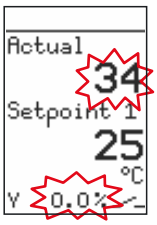
Parameter	Value range	Default setting	Description
Setpoint value 1	Setpoint value min. to Setpoint value max.	0 400	The unit of the setpoint values is set in the device data, chapter "Device data ", Page 50.
Setpoint value 2			
Autotuning	Off On	Off	Only if "Autotuning inhibit" = "Enabled" and "Manual mode" = "Off".
Manual mode	Off On	Off	Only if "Manual mode inhibit"= "Enabled" and "Autotuning" = "Off".
Manual output level	0 % to 100 %	0	Only if "Manual mode" = "On".

Control function

The controller is active once a controller type is configured for it (it is therefore no longer in "OFF").
In this example, the measured value is used as an actual value for the controller. A controller output must be set, which can be used to realize a two-state controller via relay K2, for example.

The controller now regulates to the set setpoint value 1.

Setpoint changeover, see chapter 11.8 "Controller", Page 61.



9 Operation

9.7 Device information

Normal display > Main menu > Device info	
Version	
	Software version of measuring channel
	Software version of operation
	Fabrication number
	Inspection ID
	Information text
	Tag no.
Process values	
	Measured value 1
	Measured value 2
	Difference
	Analog output
Service	
	Drag indicator 1 and 2 (min., max. measured value)
	Relay switching cycles, relay K1 and relay K2
	Operation time, operation time since last reconfiguration
	Number of reconfigurations of measuring channel
	Number of reconfigurations of operation
Hardware	
	Analog output option
	Relay K2 option
	Digital input 2 option
	RS485 interface option
	Hardware identification
	Hardware version
	Hardware compatibility index
	Microcontroller

9.8 Access code

In order to prevent unauthorized operation, access codes for the following areas can be set in the configuration.

- User level (code user lev.): Blocks access to the user level insofar as parameters have been saved there by the user via the setup program.
- Code for configuration (code configur.): Configuration menu, configuration in the setup program, and RS485 interface.

The codes protect the area from being accessed and against unwanted or unauthorized changes.
The configuration menu only opens if the code is entered correctly.

The access code is set per default to 0 (= inactive). This means that the device switches directly to the menu when pressing the menu/OK key without prompting. If an access code has been assigned, the operator is requested to enter this when entering the menu.
The access code is set via the arrow keys and confirmed with the menu/OK key.

If the access code is entered incorrectly, a message is output and the menu cannot be entered. A temporary block of five seconds on entry of the code is activated. The block is extended by five more seconds with each incorrect attempt.

When accessing the setup program or the RS485 interface, the access code is also requested. It also protects the company's expertise, as it is also required when reading via the RS485 interface and the setup program. Without an access code, the configuration cannot be viewed nor read into another device. When expertise protection is activated, the device cannot be cloned.

If the access code is forgotten, the device must be sent to JUMO, see chapter "Sending back the device ", Page 82.

9.9 Digital control functions

Various device functions can be controlled using digital signals.

For example, for automated setpoint changeover digital signals can be

- linked with AND/OR/XOR function,
- inverted and delayed.

The behavior of the output signal is configurable (pulse).

2 digital functions with the following functions are available for this:

- Pulse with switch-on and switch-off time
- Delay
- Pulse function
- Evaluation of the rising edge
- Evaluation of the falling edge
- AND/OR/XOR function of up to 3 signals

2 control signals can be programmed. Any digital signal can serve as input (see digital selector).

This can be output modified as follows:

- Inverted
- As a pulse (switch-on time, switch-off time)
- As delayed switch-on or switch-off operation (delay time = switch-on time, switch-off time)
- As a pulse signal (pulse time = switch-on time)
- As AND/OR/XOR function with up to 3 digital signals

Furthermore, it is possible to determine the rising or falling edge of the input signal. For a sampling rate, the output is then set in each case.

10 Setup program

The diraTRON DR100 setup program is a multilingual Windows^{TM}-based PC program. It is intended for conveniently configuring the devices. The setup program can be used to create the configuration data of the devices, save them in a file, and transfer them to the device. It is also possible to extract the configuration data of the devices. The data is transferred serially via the USB interface. The data can be printed out for plant documentation.

In online mode, the setup program shows the current process values and supports diagnosis and the status display. For production plants, it provides an interface for accessing the device. The production plant is able to perform hardware tests and adjust the device via this OLE interface. Furthermore, the production plant can write production data, software versions and configuration values via this interface.

10.1 Data transmission

The LED lights up red and green (yellow) during data transmission.

10.2 Configuration

The device can optionally be configured on the device itself or with the setup program and the USB interface. Several parameters can only be set via the setup program; others only via the device.

The configuration is described in chapter "Configuration ", Page 49.

10.3 Measured value recording

It can be used for startup and is only available in the setup program.

10.4 Connection diagram

The connection diagram of the connected device for the current hardware configuration is displayed in the setup program and can be printed out.

This chapter describes the configuration based on the menu items and parameters of the device. The description always also applies to configuration with the setup program, which is why the designation in the setup program may differ slightly.

NOTE!

Functions and parameters which are only present in the device or setup program are marked accordingly.

NOTE!

Some parameters are hidden by activating SIL operation or configuring to temperature limiter (TB).

11.1 General information on configuration

11.1.1 Types of configuration

The device can optionally be configured via the device itself, via the setup program, or – to a limited extent – via the RS485 interface. Several parameters can only be set via the setup program or only via the device.

Operation

During setup transmission or a RS485 write process, operation of the device is disabled. A relevant message appears in the display. Key presses are ignored.

Setup program

The setup program can only start transmission if the device is in the normal display, i.e. the device is not operated and write access via the RS485 interface is not active. Otherwise, establishing a connection is disabled.

RS485 interface

The RS485 interface is configured as a Modbus slave. The Modbus master can only start a RS485 write process if the device is in the normal display, i.e. the device is not operated and setup transmission is not active. Otherwise, establishing a connection is disabled.

11.1.2 Checking the configuration

The parameter inputs via the keypad or interface are immediately checked for plausibility. Invalid values are not accepted. The configuration data of the setup program is checked for the correct value range by the setup program itself.

11.1.3 Configuration via the RS485 interface

The standard protocol Modbus RTU is implemented to extract process and configuration data. The RS485 interface can only be used as a Modbus slave. Read or write access via the RS485 interface is only possible if the device is not operated and setup transmission is not active.

To input or change parameters, the following requirements must be met:

- If an access code has been assigned, it must be entered correctly.
- The "Parameter write enable" value must be configured as "Yes", see chapter "RS485 interface ", Page 74.

If the requirements are met, the parameters can be written.

11 Configuration

11.2 Device data

Parameter	Text display	Value	Default setting	Description
Device language	Language	German English French Spanish	German	Sets the language used in the display
Language query after power ON	Language query aft. power ON	Off On	On	• **On**: Language is queried the next time the device is switched on (query in English). • **Off**: Language is not queried the next time the device is switched on. Value is set automatically if the language has been selected.
Unit Measured value	Unit	°C °F Text	°C	• °C is used internally. • "Text" is user configurable. • No conversion of the unit if "Text" is selected. • Unit is hidden with the "Linearization" = "Linear" or = "Customer-specific" configuration; text is then always used.
Unit text	-	*Max. nine characters*		Can only be set in the setup program.

11.3 Display/operation

Parameter	Text display	Value	Default setting	Description
Normal display	Normal display	Controller Analog output Bar graph I/O information 1 I/O information 2 I/O information 3	Controller	• Sets the normal display when restarting and returning. • **Analog output**: Only if optional analog output is present. • **Bar graph**: Only if optional analog output is present.
Decimal place	Decimal point	XXXX. (None) XXX.X (one) XX.XX (two)	XXXX.	• Applies to measured values and associated parameters. • Several parameters have a specified number of decimal places.
Contrast	Contrast	0 to 10	5	
Back-light	Light	Off On During operation	On	
Timeout, back-light	Timeout, light	0 to 100 s	30	Only if "Backlight" = "During operation".

Parameter	Text display	Value	Default setting	Description
Timeout, operation	Time-out, oper.	10 to 100 s	30	• The device switches back to the parameter selection when editing, or otherwise to the normal display. • Relevant for simulation of relay K1.
Code for user level	Code, user level	0 to 9999	0	• 0: No access code • Only if parameters are present in the user level.
Code for configuration, setup, and RS485[a]	Code, config.	0 to 9999	0	0: No access code
Keypad lock via digital signal	Keypad lock	Digital selector See chapter "Digital selector ", Page 78	No selection	• Digital signal 0: Keypad not locked. • Digital signal 1: Keypad locked.
Level lock via digital signal		Digital selector See chapter "Digital selector ", Page 78	No selection	• Digital signal 0: Configuration not locked. • Digital signal 1: Configuration locked.
User level parameters 8 parameters	_	*Various parameters*	No selection	• Can only be set in the setup program. • The parameters can be selected from a selector that contains all parameters which can be configured on the device.
Show customer-specific start picture	Customer-spec. start picture	Inactive Active	Inactive	
Customer-specific start picture 26 x 64 pixels black/white bitmap	Customer-specific start picture		*Black pixels*	• Can only be set in the setup program. • Only if "Customer-specific start picture" = "Active".
Customer-specific start text	Customer-specific start text	19 ASCII characters + termination "----------"		• Can only be set in the setup program. • Only if "Show customer-specific start picture" = "Active".
Function key 1	Short back key <2 s	No selection Manual mode Self-optimization next basic status previous basic status	next basic status	Function of the back key with a short key press (<2 s)

Parameter	Text display	Value	Default setting	Description
Function key 2	Long back key >2 s	No selection Manual mode Self-optimization next basic status previous basic status	Manual mode	Function of the back key with a long key press (>2 s)

[a] In order to prevent unauthorized operation, an access code can be set, which is used to protect the device. The configuration menu only opens if the code is entered correctly. The access code is also requested in the setup program and when accessing via the RS485 interface.

11.4 Analog input

NOTE!

During reconfiguration of the sensor type and linearization, check the following parameters (incl. fine adjustment) and, if necessary, reset the drag indicators (min./max. measured value 1, 2), see chapter "Configuration ", Page 75.

Parameter	Text display	Value	Default setting	Description
Sensor type	Sensor type	RTD temperature probe 2-w RTD temperature probe 3-w 2 × RTD temperature probe 2-w Resistance/potentiometer 2-w Resistance/potentiometer 3-w 2 × resistance/ potentiometer 2-w RT 100 kOhm Thermocouple Double thermocouple 2 × thermocouple 4 to 20 mA 0 to 20 mA 0 to 10 V 2 to 10 V	RTD temperature probe 3-w	

Parameter	Text display	Value	Default setting	Description
Linearization	Linearization	Linear		Default setting for resistance transmitters, resistance potentiometers, and the voltage and current standard signals.
		Pt100 Pt500 Pt1000 Pt100 GOST Pt50 GOST Ni100 Ni500 Ni1000 Ni100 GOST Cu50 GOST Cu100 GOST	Pt100	Only for RTD temperature probes.
Linearization	Linearization	Pt13Rh-Pt type R Pt10Rh-Pt type S Pt30Rh-Pt6Rh type B Fe-CuNi type J Cu-CuNi type T NiCr-CuNi type E NiCr-Ni type K NiCrSI-NiSi type N Fe-CuNi type L Cu-CuNi type U Chromel®-COPEL® Chromel®-Alumel® W5Re-W20Re type A1 W5Re-W26Re type C W3Re-W25Re type D Platinel® type PL II	R	Only for thermocouple, double thermocouple, and 2 × thermocouple.
		Customer-specific		• For all sensors. • Can only be set in the setup program. • See chapter "Customer-specific linearization ", Page 58.
Temperature compensation	Temp. compensation	Internal Fixed value	Internal	• Only with thermocouple, 2 × thermocouple. • Only if "Linearization" does not equal "Linear".

Parameter	Text display	Value	Default setting	Description
Temperature compensation fixed value	Tc Fixed value	-20.00 to +80.00 °C -4.00 to +176.00 °F	0.00 (°C) 32.00 (°F)	• Only with thermocouple and 2 × thermocouple. • Absolute temperature • Only if "Linearization" does not equal "Linear" and "Temperature compensation" = "Fixed value".
Resistance measuring range	Resist. meas. range	400 Ω 4000 Ω	400	• Only for resistance potentiometer and RTD temperature probe. • Only if "Linearization" = "Linear" or "Customer-specific".
Start resistance RT	Start resistance RT	0.0 to 100000.0 Ω	0.0	• Only for resistance transmitter. • $R_a + R_s + R_e \leq 100000.0\ \Omega$
Loop resistance RT	Loop resistance RT	0.0 to 100000.0 Ω	50000.0	• Only for resistance transmitter. • $R_a + R_s + R_e \leq 100000.0\ \Omega$
Final resistance RT	Final resistance RT	0.0 to 100000.0 Ω	0.0	• Only for resistance transmitter. • $R_a + R_s + R_e \leq 100000.0\ \Omega$
Line resistance R_L	Line resistance	0.0 to 100.0 Ω	0.0	• Only with two-wire circuit of RTD temperature probe and of resistance potentiometer • With resistance potentiometer: $R_0 + R_x + R_L \leq$ "resistance measuring range"
Resistance R_x	Resistance Rx	0.0 Ω to max. measuring range	400.0	• Only with resistance potentiometer: $R_0 + R_x \leq$ "resistance measuring range" • With two-wire circuit: $R_0 + R_x + R_L \leq$ "resistance measuring range"
Resistance R_0	Resistance R0	0.0 Ω up to max. measuring range	0.0	• Only with resistance potentiometer: $R_0 + R_x \leq$ "resistance measuring range" • With two-wire circuit: $R_0 + R_x + R_L \leq$ "resistance measuring range"
Scale start Input 1	Scale Start	-5000 to +50000	0	• Only if "Linearization" = "Linear". • "Scale start" < "Scale end"
Scale end Input 1	Scale End	-5000 to +50000	100	• Only if "Linearization" = "Linear" • "Scale start" < "Scale end"
Measured value offset	Measured value offset	-5000 to +50000 °C -9000 to +90000 °F	0 (°C) 0 (°F)	• Relative temperature • Measured value is moved by the correction value (= measured value offset)

Parameter	Text display	Value	Default setting	Description
Filter time constant	Filter time constant	0.0 to 100.0 s	0.6	• To change the digital input filter. • **0.0:** Filter off
Line resistance R_L Input 2	Line resistance 2	0.0 Ω to 100.0 Ω	0.0	• Only with two-wire circuit of two RTD temperature probes and two resistance potentiometers • With resistance potentiometer: $R_0 + R_x + R_L \leq$ "resistance measuring range"
Resistance R_x Input 2	Resistance Rx 2	0.0 Ω up to max. measuring range	400.0	• Only with two-wire circuit of two resistance potentiometers • $R_0 + R_x + R_L \leq$ "resistance measuring range"
Resistance R_0 Input 2	Resistance R0 2	0.0 Ω up to max. measuring range	0.0	• Only with two-wire circuit of two resistance potentiometers • $R_0 + R_x + R_L \leq$ "resistance measuring range"
Scale start Input 2	Scale Start 2	-5000 to +50000	0	• Only with two RTD temperature probes, two resistance potentiometers and two thermocouples. • Only if "Linearization" = "Linear" • "Scale start" < "Scale end"
Scale end Input 2	Scale Start 2	-5000 to +50000	100	• Only with two RTD temperature probes, two resistance potentiometers and two thermocouples • Only if "Linearization" = "Linear" • "Scale start" < "Scale end"
Measured value offset Input 2	Measured value offset 2	-5000 to +50000 °C -9000 to +90000 °F	0 (°C) 0 (°F)	• Only with two RTD temperature probes, two resistance potentiometers and two thermocouples • Relative temperature
Fine adjustment, actual start value	Fine adjust., actual start	-5000 to +50000 °C -8968 to +90032 °F	0 (°C) 32 (°F)	• Absolute temperature • Measured value at the bottom measuring point • See chapter "Fine adjustment ", Page 59
Fine adjustment, actual end value	Fine adjust., actual end value	-5000 to +50000 °C -8968 to +90032 °F	0 (°C) 32 (°F)	• Absolute temperature • Measured value at the top measuring point • See chapter "Fine adjustment ", Page 59

Parameter	Text display	Value	Default setting	Description
Fine adjustment, target start value	Fine adjust., target start	-5000 to +50000 °C -8968 to +90032 °F	0 (°C) 32 (°F)	• Absolute temperature • Reference value at the bottom measuring point • See chapter "Fine adjustment ", Page 59
Fine adjustment, target end value	Fine adjust., target end value	-5000 to +50000 °C -8968 to +90032 °F	0 (°C) 32 (°F)	• Absolute temperature • Reference at the top measuring point • See chapter "Fine adjustment ", Page 59
Fine adjustment 2, actual start value	Fine adjust.2, actual start	-5000 to +50000 °C -8968 to +90032 °F	0 (°C) 32 (°F)	• Only with two RTD temperature probes, two resistance potentiometers and two thermocouples • Absolute temperature • See chapter "Fine adjustment ", Page 59
Fine adjustment 2, actual end value	Fine adjust.2, actual end value	-5000 to +50000 °C -8968 to +90032 °F	0 (°C) 32 (°F)	• Only with two RTD temperature probes, two resistance potentiometers and two thermocouples • Absolute temperature • See chapter "Fine adjustment ", Page 59
Fine adjustment 2, target start value	Fine adjust.2, target start	-5000 to +50000 °C -8968 to +90032 °F	0 (°C) 32 (°F)	• Only with two RTD temperature probes, two resistance potentiometers and two thermocouples • Absolute temperature • See chapter "Fine adjustment ", Page 59
Fine adjustment 2, target end value	Fine adjust.2, target end value	-5000 to +50000 °C -8968 to +90032 °F	0 (°C) 32 (°F)	• Only with two RTD temperature probes, two resistance potentiometers and two thermocouples • Absolute temperature • See chapter "Fine adjustment ", Page 59.
Filter time constant input 2	Filter time constant 2	0.0 to 100.0 s	0.6	• Only with two RTD temperature probes, two resistance potentiometers and two thermocouples • 0.0: Filter off

Parameter	Text display	Value	Default setting	Description
MR start Customer-specific	--	-9999 to +99999	0	• Only visible in the setup program • Can be set with customer-specific linearization via the customer-specific linearization table • Shows the start value of the Y axis of the linearization table
MR end Customer-specific	--	-9999 to +99999	0	• Only visible in the setup program • Enter range for formula • Shows the end value of the Y axis of the linearization table

Customer-specific linearization

With customer-specific linearization, the user can create an individual linearization characteristic line for the analog input. Two processes are available for this: formula or table.

The customer-specific linearization can only be configured in the setup program.
For this purpose "Linearization" = "Customer-specific" must be selected.

Parameter	Value	Default setting	Description
Customer linearization	Formula Table	Table	-
Linearization start	*Depending on the linearization*	-	Start value of the Y axis (linearized value)
Linearization end	*Depending on the linearization*	-	End value of the Y axis (linearized value)
Correction value 1	-99999 to +99999	0	Only if "Linearization" = "Customer-specific" and sensor type = "Thermocouple"
Correction value 2	-99999 to +99999	0	Only if "Linearization" = "Customer-specific" and sensor type = "Thermocouple"
Coefficient A (exponent 0)	-99999 to +99999	0	Only if "Customer linearization" = "Formula".
Coefficient B (exponent 1)	-99999 to +99999	1	• Only if "Customer linearization" = "Formula". • Coefficient before x
Coefficient C (exponent 2)	-99999 to +99999	0	• Only if "Customer linearization" = "Formula". • Coefficient before x^2
Coefficient D (exponent 3)	-99999 to +99999	0	• Only if "Customer linearization" = "Formula". • Coefficient before x^3
Coefficient E (exponent 4)	-99999 to +99999	0	• Only if "Customer linearization" = "Formula". • Coefficient before x^4
Number of value pairs	0 to 40	0	Only if "Customer linearization" = "Table".
X-values	-99999 to +99999	0	• Only if "Customer linearization" = "Table". • Unlinearized measured value
Y-values	-99999 to +99999	0	• Only if "Customer linearization" = "Table". • Linearized measured value

Formula

The linearization is specified by a formula with five coefficients (4th order polynomial).

Polynomial: $\mathbf{Y = E \cdot X^4 + D \cdot X^3 + C \cdot X^2 + B \cdot X + A}$

(X - unlinearized measured value; Y - linearized measured value)

Table

The linearization is specified by inputting up to forty grid points as XY value pairs. The value Y always represents a linearized value, for example the temperature in °C. The value X depends on the input signal.

- RTD temperature probe: X stands for the physically measured value (resistance in Ω).
- Thermocouple: X stands for the physically measured value (voltage in mV).
- Voltage/current signal: X stands for the physically measured value (voltage in V, current in mA).
- Resistance potentiometer/resistance transmitter: X stands for the physically measured value (resistance in Ω).

A polynomial can be calculated from the input value pairs which describes the course of the linearization characteristic line. The two types of linearization – table and formula – then match.

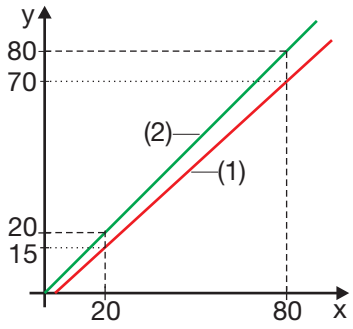
Fine adjustment

You can use this function to correct the measured values of the analog input. In contrast to measured value offsetting, which is used to specify a constant correction value for the entire characteristic line, fine adjustment can also be used to change the gradient of the characteristic line.

For example, the temperature in measured in a furnace. The measured value displayed by the device deviates from the actual temperature as a result of the sensor temperature drifting. At the bottom measuring point (= start value) and at the top measuring point (= end value), the deviation is by a different amount, meaning that correction by means of measuring value offsetting is not suitable. The actual temperature (reference value) is determined using a reference measuring device.

- Actual start value: 15 °C (measured value)
- Target start value 20 °C (reference value)
- Actual end value: 70 °C (measured value)
- Target end value 80 °C (reference value)

If these values are entered in the configuration, fine adjustment takes place. The following diagram shows how the characteristic line from this example changes due to the measured value offset (x = reference value; y = display value).



(1) Characteristic line before fine adjustment (2) Characteristic line after fine adjustment

In order to undo the fine adjustment, the following settings have to be made:

- "Fine adjustment actual start value" = "Fine adjustment target start value"
- "Fine adjustment actual end value" = "Fine adjustment target end value"

11.5 Digital inputs

The device is equipped with 2 digital inputs if the device is configured accordingly.

Digital input 1	Digital input 2
Available as standard	Optionally available
No galvanic isolation	Galvanic isolation
Potential-free contact	For connecting to an external potential-free contact
Switching current approx. 1 mA	DC 24 V/5 mA

Parameter	Text display	Value	Default setting	Description
Inversion Digital input 1	Inversion 1	No Yes	No	
Inversion Digital input 2	Inversion 2	No Yes	No	Only with digital input 2 option

11.6 Digital control signals

With the two digital control signals 1 and 2, function blocks are available that can be used to modify the application.

Any binary signal can serve as input (digital selector).

The device can output this as follows:

- Inverted
- As a pulse (switch-on time, switch-off time)
- As a delayed switch-on or switch-off operation; (delay time = switch-on time, switch-off time)
- As a pulse signal (pulse time = switch-on time)
- As AND/OR/XOR function with up to three binary signals (e.g. to show a message text linked to an event).

Furthermore, it is possible to determine the rising or falling edge of the input signal. For a sampling rate, the output is then set in each case.

The two digital control signals 1 and 2 can also be used to actuate a relay or trigger a function such as setpoint changeover.

NOTE!

The digital control signals are independent of a probe break/short circuit.

The control signals are inactive after power ON (during the initialization phase).

11.7 Difference monitoring

Parameter	Text display	Value	Default setting	Description
Difference monitoring function	Difference function	Off Difference	Off	See chapter "Difference monitoring ", Page 16.
Limit value, difference	Limit value, difference	0 to 50000 °C 0 to 90000 °F	10 (°C) 18 (°F)	• Only if "Difference monitoring function" = "Difference". • Relative temperature
Switching differential difference	Switching dif. difference	0 to 50000 °C 0 to 90000 °F	1 (°C) 1.8 (°F)	• Hysteresis • Only if "Difference monitoring function" = "Difference". • Relative temperature

11.8 Controller

Parameter	Text display	Value	Default setting	Description
Controller type	Controller type	Off Two-state controller Continuous controller Three-state controller Modulating controller	Two-state controller	• **Off**: All following parameters in this table are hidden. The controller is inactive and does not actuate any outputs. • **Two-state controller**: Controller with one switching output. • **Continuous controller**: Controller with one continuous output (analog output). • **Three-state controller**: Controller with two switching outputs (e.g. for heating/cooling). A combination of one continuous (e.g. for heating) and one switching output (e.g. for cooling) is possible. • **Modulating controller**: Controller with two switching outputs (for motor actuator).
Control direction	Control direction	Direct Inverse	Inverse	• **Direct**: Controller output level is positive if the actual value is greater than the setpoint value. • **Inverse**: Controller output level is positive if the actual value is lower than the setpoint value.
Actual value input	Actual value input	*Various values*, see chapter "Analog selector ", Page 79	Measured value	

Parameter	Text display	Value	Default setting	Description
Setpoint value input	Setpoint value input	*Various values*, see chapter "Analog selector ", Page 79	Current setpoint value	
Output level feedback	Output level feedb.	*Various values*, see chapter "Analog selector ", Page 79	No selection	Only with "Modulating controller".
Manual mode inhibit	Man. mode inhib.	Enabled Disabled	Enabled	• **Enabled**: Toggling into manual mode is possible (by pressing a key or digital signal). • **Disabled**: Toggling into manual mode is disabled.
Output level is adopted when activating manual mode	Y in manual mode	Y manual mode Current value	Current value	• **Y manual mode**: Corresponds to "Manual output level". • **Current value**: Current output level before activation.
Manual output level	Y manual mode	-100 % to +100 %	0	• Only if "Output level is adopted when activating manual mode" = "Y manual mode". • Manual specification of the controller output level.
Output level is adopted when activating manual mode due to fault	Y with fault	Y replacement value Current value	Y replacement value	• **Y replacement value**: Corresponds to "Replacement value". • **Current value**: Current output level before the fault occurs.
Replacement value	Y replacement value	-100 % to +100 %	0	Only if "Output level is adopted when activating manual mode due to fault" = "Y replacement value".
Manual mode inhibit via digital signal	Man.mode inhib. signal	*Various digital signals,* see chapter "Digital selector ", Page 78	No selection	
Toggling of manual mode, automatic mode via digital signal	Manual/auto toggl.sig.	*Various digital signals,* see chapter "Digital selector ", Page 78	No selection	.
Setpoint changeover via digital signal	Setpoint changeover	*Various digital signals,* see chapter "Digital selector ", Page 78	No selection	
Additional functions: 1st - 4th expansion	-	0	0	Can only be set via the setup program.

11.8.1 Autotuning

The menu is only available if "Controller type" does not equal "Off".

Parameter	Text display	Value	Default setting	Description
Autotuning method	Autotuning method	Step response Oscillation	Oscillation	• **Oscillation**: Output level is alternately set to 100 % and 0 %. • **Step response**: A step of the specified step size takes place starting from the standby output.
Autotuning inhibit	Autotun. inhib.	Enabled Disabled	Enabled	• **Enabled**: Autotuning is enabled. • **Disabled**: Autotuning is disabled.
Adoption of the cycle time	Adoption Cy	No Yes	Yes	• Adoption of the "Cycle time (C_y)" after autotuning is complete. • **No**: The determined value will not be applied. • **Yes**: The determined value will be applied.
1st output type 2nd output type	Output type 1 Output type 2	Automatic Switched Continuous Logic	Automatic	• Type of controller output; the cycle time is calculated depending on the type of controller output. • Output type 2 with three-state controller and modulating controller
Standby output	Standby output	-100 to 100 %	0	• Only with "Autotuning method" = "Step response". • Initial output level when starting autotuning.
Step size	Step size	10 to 100 %	30	Only with "Autotuning method" = "Step response".
Autotuning inhibit via digital signal	Autotun.inhib. sign.	No selection Digital selector	No selection	see "Digital selector ", Page 78
Start/stop autotuning via digital signal	Start/stop autotuning	No selection Digital selector	No selection	see "Digital selector ", Page 78

11.8.2 Parameter

The menu is only available if "Controller type" does not equal "Off".

Parameter	Text display	Value	Default setting	Description
Controller structure 1 Controller structure 2[a]	Controller structure 1 Controller structure 2	P I PD PI PID	PID	Transmission behavior of the controller output.

Parameter	Text display	Value	Default setting	Description
Proportional band 1 Proportional band 2[a]	Prop. band 1 Prop. band 2	0.0 to 9999.0	0.0	• Size of the proportional band. • **0**: Controller structure is out of action (behavior as with limit value monitoring function). • With a continuous controller, X_p has to be > 0. • Unit same as value of analog selector "Actual value input", see chapter "Controller ", Page 61.
Derivative time 1 Derivative time 2[a]	Derivative time 1 Derivative time 2	0.0 to 9999.0 s	80.0	Impacts the differential component of the controller output signal.
Reset time 1 Reset time 2[a]	Reset time 1 Reset time 2	0.0 to 9999.0 s	350.0	Impacts the integral component of the controller output signal.
Cycle time 1 Cycle time 2[a]	Cycle time 1 Cycle time 2	0.0 to 9999.0 s	20.0	When using a switching output, the cycle time should be chosen so that the energy supply to the process is almost continuous, and the switching elements are not overloaded.
Contact spacing[b]	Contact spacing	0.0 to 999.0	0.0	
Switching differential 1 Switching differential 2[b]	Switching differential 1 Switching differential 2	0.0 to 999.0	1.0	Unit same as value of analog selector "Actual value input", see chapter "Controller ", Page 61.
Actuator time	Actuator time	5 to 3000	60	Only with modulating controller
Working point	Working point	-100 to 100 %	100 %	
Maximum output level limit	Max. output level	0 to 100 %	100	"Min. output level limit" ≤ "Max. output level limit"
Minimum output level limit	Min. output level	-100 to 100 %	100 %	"Min. output level limit" ≤ "Max. output level limit"
Minimum relay switch-on time 1 Minimum relay switch-on time 2[b]	Min. relay on 1 Min. relay on 2	0.0 to 9999.0 s	0.0	Limitation of the switching frequency in the case of switching outputs (digital outputs).

[a] Only with three-state controller

[b] Only with three-state controller or modulating controller

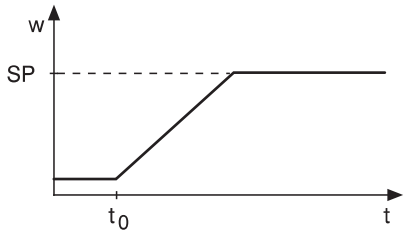
11.8.3 Setpoint values

The menu is only available if "Controller type" does not equal "Off".

Parameter	Text display	Value	Default setting	Description
Minimum value setpoint limitation	Min. setpoint value	-5000 to +50000 °C -8968 to +90032 °F	0 (°C) 32 (°F)	• Unit same analog selector "Actual value input", see "Controller ", Page 61. • "Minimum value setpoint limitation" ≤ "Maximum value setpoint limitation"
Maximum value setpoint limitation	Max. setpoint value	-5000 to +50000 °C -8962 to +90032 °F	400 (°C) 752 (°F)	• Unit same analog selector "Actual value input", see "Controller ", Page 61. • "Minimum value setpoint limitation" ≤ "Maximum value setpoint limitation"
Setpoint value 1	Setpoint value 1	0.0 Setpoint limitation	0.0	• Unit same as analog selector For "Actual value input", see "Controller ", Page 61.
Setpoint value 2	Setpoint value 2	0.0 Setpoint limitation	0.0	• Unit same as analog selector For "Actual value input", see "Controller ", Page 61.

11.9 Ramp function

The ramp function is used for a constant change of setpoint value w, starting from the current ramp value (= current actual value at time t_0 of the setpoint value change) up to the ramp end value SP (default setpoint value).



A tolerance band can be set around the setpoint value curve to monitor the actual value. If the actual value leaves the tolerance band, the tolerance band signal is activated and the ramp stopped.

NOTE!

The ramp function is not active in manual mode. After switching from manual mode to automatic mode, the actual value is applied as the current ramp value (ramp starts).

Parameter	Selection/text/value	Description
Function	**Off**	Ramp function is not active.
	Per minute	Ramp function is active. Unit of ramp slope: Kelvin per minute
	Per hour	Kelvin per hour
	Per day	Kelvin per day
Pos. gradient	**0** to 999	Value for positive ramp slope
Neg. gradient	**0** to 999	Value for negative ramp slope

Parameter	Selection/text/value	Description
Tolerance band	**0** to 9999	Amount of admissible upward and downward deviation of the actual value (standard tolerance band around setpoint value)
Stop signal	Digital selector **No selection**	Signal (high active) for stopping the ramp (setpoint value remains constant at the current value)
Off signal	Digital selector **No selection**	Signal (high active) for switching off the ramp function (setpoint value immediately assumes the specified end value)
Restart signal	Digital selector **No selection**	Signal (high-active) for aborting and restarting the ramp (with actual value as setpoint value)
Ramp actual value	Analog selector	Default: Measured value 1
Additional functions (setup only)	4 expansions	Reserved functions for service purposes. Only activate when instructed to do so by service personnel! Click checkbox to activate the function.

Response in case of a fault

In the event of a fault (above or below the measuring range, probe/line breaks or probe/line short circuits), the ramp function is interrupted. Once the fault is over, the current actual value is applied as the current ramp value.

Behavior after power ON

After power ON, the current actual value is applied as the current ramp value (ramp starts).

11.10 Analog output

The analog output is optionally present. If activated, the following output signals are possible:

- Current signals 4 to 20 mA and 0 to 20 mA
- Voltage signals 0 to 10 V and 2 to 10 V

The analog output can be operated in simulation mode. The simulation value is user configurable. The simulation has priority over faults. The output can therefore be simulated at the input despite the missing sensor.

Parameter	Text display	Value	Default setting	Comment
Signal type	Signal type	0 to 10 V 2 to 10 V 0 to 20 mA 4 to 20 mA	4 to 20 mA	
Source Analog signal	Source	Measured value For analog selector, see "Analog selector ", Page 79	Measured value	• Analog signal that is output at the output.
Scale start, output	Scale, start	-5000 to +50000 °C (-8969 to 90032 °F)	0 °C (32 °F)	• Unit and temperature conversion same as value of analog selector "Source" • 2 decimal places are generated automatically
Scale end, output	Scale end	-5000 to +50000 °C (-8969 to 90032 °F)	100 °C (212 °F)	• Unit and temperature conversion same as value of analog selector "Source" • 2 decimal places are generated automatically
Fault signal	Fault signal	Low -0.2 V/1.7 V/ 0.4 mA/3.4 mA High 10.6 V/10.6 V/ 21.2 mA/21.2 mA Replacement value	Low	The voltage/current value is in the order of the signal type.
Replacement value	Replacement value	-0.2 (1.7) to +10.60 V -0.40 (3.40) to +21.20 mA	4.00 mA	• Replacement value for the output signal in the event of a fault. • Only if "Fault signal" = "Replacement value". • See chapter "Fault ", Page 68.
Faults	Faults	Source fault Source or sensor All faults	All faults	• **Source or sensor**: Fault of source or fault of sensor (e.g. probe break). • See chapter "Fault ", Page 68. • **Fault of source**: Delete fault in source, sensor, TB/TW

Parameter	Text display	Value	Default setting	Comment
Simulation Output	Simulation Output	off on	On	
Simulation value	Simulation value	-0.20 V to +10.60 V 1.70 V to 10.60 V -0.40 mA to +21.20 mA 3.40 mA to 21.20 mA	4 mA	

Scaling

An input signal range is assigned to the physical output signal range by scaling. If, for example, a temperature that ranges from 150 °C to 500 °C (= input signal range) is output via the analog output with signal type 0 mA to 20 mA (= output signal range), the "Output scale start" must be set to 150 (corresponds to 0 mA) and the "Output scale end" to 500 (corresponds to 20 mA).

The default setting corresponds to an input signal range of 0 to 100 (e.g. output level of 0 % to 100 % in the event of a controller output).

Fault

The user can configure which faults the output signal responds to ("Analog output faults"):

- Fault with the signal to be output.
- Fault with the signal to be output or sensor fault.
- All faults, including internal diagnosis faults.

The signal to be output in the event of a fault can be configured.

Signal type	Low	High	Replacement value	
			Value range	Default setting
0 – 10 V	-0.2 V	10.6 V	-0.20 V to +10.60 V	0.00 V
2 – 10 V	1.7 V	10.6 V	1.70 V to 10.60 V	2.00 V
0 – 20 mA	-0.4 mA	21.2 mA	-0.40 mA to +21.20 mA	0.00 mA
4 – 20 mA	3.4 mA	21.1 mA	3.40 mA to 21.20 mA	4.00 mA

11.11 Limit value monitoring

Parameter	Text display	Value	Default setting	Comment
Function	Function (AF)	No function AF1 AF2 AF3 AF4 AF5 AF6 AF7 AF8	No function	• Switching behavior • AF1: Limit value above and below setpoint value • AF2: As for AF1, output signal inverted • AF3: Limit value below setpoint value • AF4: As for AF3, output signal inverted • AF5: Limit value above setpoint value • AF6: As for AF5, output signal inverted • AF7: Fixed limit value (independent of the setpoint value) • AF8: As for AF7, output signal inverted
Actual value input	Actual value input (AF)	*Various values*, see chapter "Analog selector ", Page 79	No selection	Actual value to be monitored.
Setpoint value input	Setpoint value input (AF)	*Various values*, see chapter "Analog selector ", Page 79	No selection	• Only for "Function" = "AF1" to "AF6". • Signal that is to be used as a setpoint value or reference signal.
Limit value	Limit value (AF)	-5000 to +50000	0	• For AF1 to AF6: Admissible deviation of the actual value from the setpoint value. • For AF7 and AF8: Fixed switching point. • Unit same as "Actual value input".
Limit value behavior	Limit value behavior (AF)	Symmetrical Unsymmetrical	Symmetrical	• Only for "Function" = "AF1" or "AF2". • **Symmetrical**: Both switching points have the same distance to the setpoint value ("Limit value"). • **Unsymmetrical**: Both switching points have different distances to the setpoint value ("Limit value" and "Limit value 2").

Parameter	Text display	Value	Default setting	Comment
Limit value 2	Limit value 2 (AF)	-5000 to +50000	0	• Only for "Function" = "AF1" or "AF2" and "Limit value behavior" = "Unsymmetrical". • Unit same as "Actual value input".
Switching differential	Switching differential (AF)	-5000 to +50000	0	• Distance between switch-on and switch-off threshold. • Unit same as "Actual value input".
Switching behavior	Switching behavior (AF)	Symmetrical Left Right	Symmetrical	• Definition as to which side the set value for the switching differential is. • **Symmetrical**: Switching differential is symmetrical around the limit value. • **Left**: Switching differential is below the limit value (switching point "On" is at the limit value). • **Right**: Switching differential is above the limit value (switching point "Off" is at the limit value).
Startup alarm suppression	Startup al. suppression (AF)	Off On	Off	• **Off**: Alarm function is always active; a limit value exceedance is transmitted to the output signal immediately, even after switch-off or when parameters are changed. • **On**: Output signal is only active when the valid range has been reached for the first time; if, for example, the setpoint value input has changed or the device is switched on, the limit value exceedance is not transmitted to the output signal.
Switch-on delay	Switch-on delay (AF)	0 s to 9999 s	0	• **0**: Function switched off • Limit value exceedance is only transmitted to the output once the switch-on delay has elapsed. • If the actual value returns to the valid range during this period, the time count starts from the beginning again at the next event.

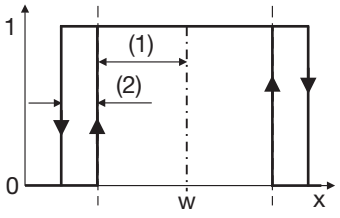
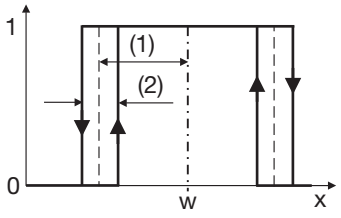
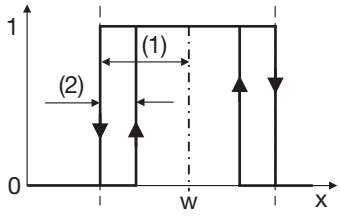
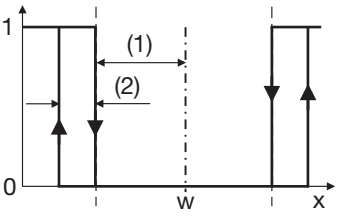
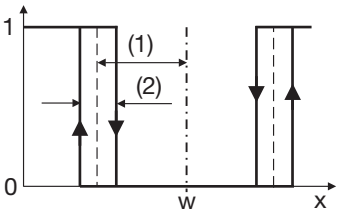
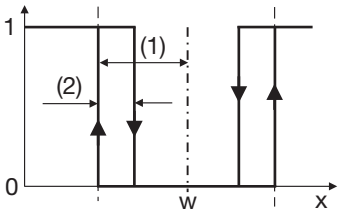
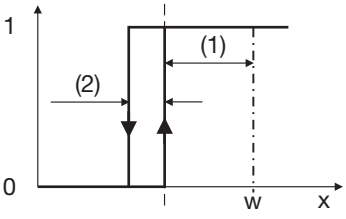
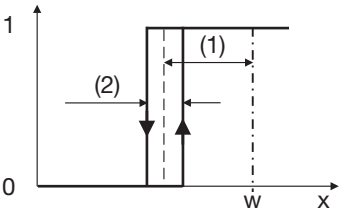
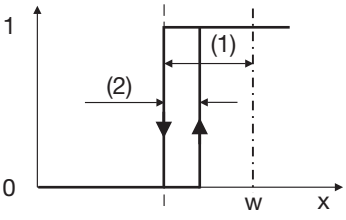
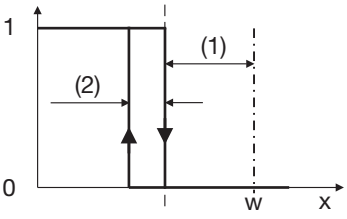
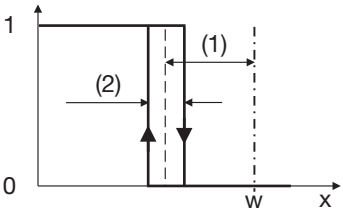
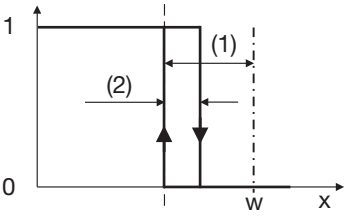
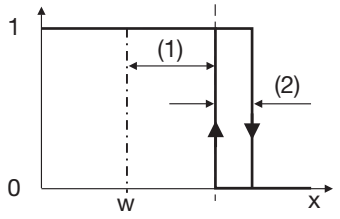
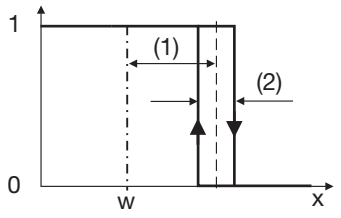
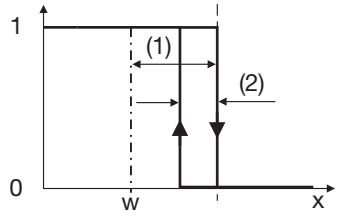
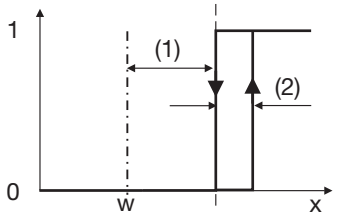
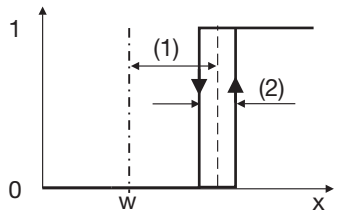
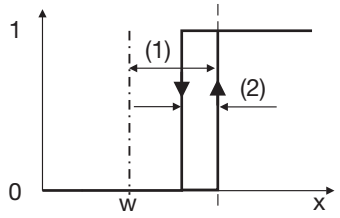
Parameter	Text display	Value	Default setting	Comment
Switch-off delay	Switch-off delay (AF)	0 s to 9999 s	0	Analog switch-on delay
Pulse time	Pulse time (AF)	0 s to 9999 s	0	• **0**: Function switched off • Output signal is automatically reset after this time if the limit value is breached, even if the alarm condition is still present. • Pulse function has priority over switch-off delay.
Response in the event of a fault	Response in event of fault (AF)	Off On	Off	• State of the output in the event of a fault; fault means fault values with the actual value or setpoint value input. • **Off**: Low signal (= 0) in the event of a fault (output signal inactive) • **On**: High signal (= 1) in the event of a fault (output signal active)
Faults	Faults AF	Source fault Source or sensor Source, sensor All faults	Source fault	• Source stands for "Actual value input" and, in the case of "Function" = "AF1" to "AF6" also for "Setpoint value input". • **Source or sensor**: Fault of source or sensor measured value (e.g. probe break). • **Source, sensor**: Fault of source or measured value has triggered. • **Source fault**: Delete fault in source, sensor
Lock	Lock (AF)	Off On Always acknowledgeable	Off	• **Off**: Output signal remains unchanged. • **On**: Output signal can only be acknowledged if the breach of the limit value is no longer present. • **Can always be acknowledged**: Output signal can always be acknowledged.
Acknowledgement signal	Acknow. signal (AF)	*Various digital signals,* see chapter "Digital selector ", Page 78	No selection	• Only if "Lock" does not equal "Off". • Signal for acknowledging the lock.

11.11.1 Switching functions

In this section, the switching functions AF1 to AF8 and the "Switching behavior" (left, symmetrical, right) are shown.

Monitoring of a relative limit value – related to the setpoint value

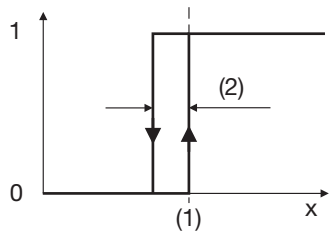
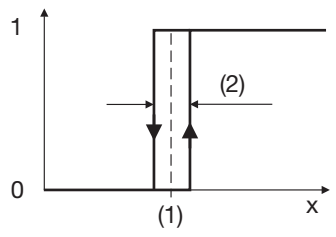
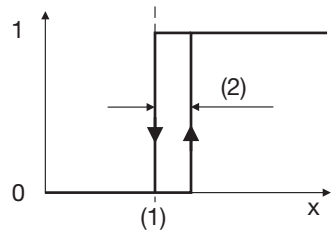
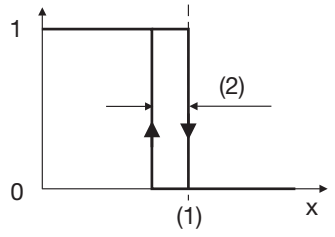
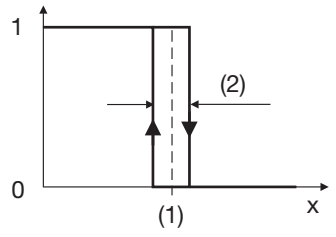
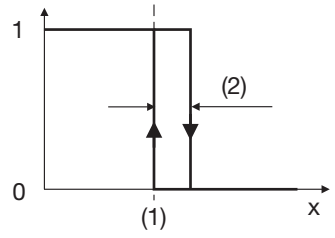
The AF1 and AF6 functions monitor whether the actual value x is in a symmetrical band around the relative setpoint value with the "Limit value behavior" = "Symmetrical" configuration.

	Left	Symmetrical	Right
AF1			
AF2			
AF3			
AF4			
AF5			
AF6			

	Left	Symmetrical	Right
0 = output signal not active		x = actual value	(1) Limit value
1 = output signal active		w = setpoint value	(2) Switching differential

Fixed limit value

The switching functions AF7 and AF8 monitor a fixed limit value.

	Left	Symmetrical	Right
AF7			
AF8			
0 = output signal not active		x = actual value	(1) Limit value (AL)
1 = output signal active			(2) Switching differential

11.12 Digital outputs

Parameter	Text display	Value	Default setting	Comment
Relay output K1	Source Relay 1	Digital selector Controller output 1	Controller output 1	
Simulation Relay output K1	Simulation Relay 1	Off Relay inactive Relay active	Off	
Relay output K2	Source Relay 2	No selection Digital selector	None Selection	Only if second relay option is available
Simulation Relay output K2	Simulation Relay 2	Off Relay inactive Relay active	Off	Only if second relay option is available
Logic output as voltage supply for transmitters	Logic as volt.supp.	No Yes	No	
Logic output	Source Logic out.	No selection Digital selector	No selection	Only if logic output not as voltage supply
Simulation Logic output	Simulation Logic out.	Off Low simulation High simulation		Only if logic output not as voltage supply

11.13 RS485 interface

The menu is only available if the optional RS485 interface is present.

Parameter	Text display	Value	Default setting	Description
Baud rate	Baud rate	9600 19200 38400 57600 115200	9600	"Baud" unit
Data format	Data format	8/1/no parity 8/1/odd parity 8/1/even parity 8/2/no parity	8/1/ no parity	• 8/1/no parity: 8 data bits, 1 stop bit, no parity • 8/1/odd parity: 8 data bits, 1 stop bit, odd parity • 8/1/even parity: 8 data bits, 1 stop bit, even parity • 8/2/no parity: 8 data bits, 2 stop bits, no parity
Device address	Device address	1 to 254	1	Modbus device address
Parameter write enable	Write enable	No Yes	No	Parameters can only be written via the RS485 interface if "Yes".
Write timeout time	Timeout write	1 to 9999 s	5	-

11.14 Service

11.14.1 Configuration

Parameter	Value	Default setting	Description
Limit for switching cycles, relay K1	0 to 999999	0	**0**: No monitoring of the switching cycles; a pending fault is reset due to the limit being exceeded.
Limit for switching cycles, relay K2	0 to 999999	0	• **0**: No monitoring of the switching cycles; a pending fault is reset due to the limit being exceeded. • Only if optional relay K2 is present.
RST fault, analog output	No Yes	No	• **Yes**: The analog output fault is reset and the value is set back to "No". • Can only be edited on the device. • Only if optional analog output is present.
Current switching cycles, relay K1	0 to 4,294,967,295	0	Display and editing on the device up to 999,999
Current switching cycles, relay K2			Display and editing on the device up to 999,999 (Only if optional relay is present)
Reset minimum measured value 1	No Yes	No	Resets the value to 0
Reset maximum measured value 1	No Yes	No	
Reset minimum measured value 2	No Yes	No	
Reset maximum measured value 2	No Yes	No	

11.14.2 Process values

The service process values can be viewed in the submenu Device info -> Service or in the setup program in the online data window.

Parameter	Text display	Value	Default setting	Description
Drag indicator				
Minimum Measured value 1	Minimum measured value	-5000 °C to +50000 °C -8968 °F to +90032 °F	50000 (°C) 90032 (°F)	
Maximum Measured value 1	Maximum measured value	-5000 °C to +50000 °C -8968 °F to +90032 °F	-5000 (°C) -8968 (°F)	
Time since minimum measured value 1	--	0 s to 4294967295 s	0	• Only extract via setup program. • Is automatically also reset when resetting "Minimum measured value".
Time since maximum measured value 1	--	0 to 4294967295 s	0	• Only extract via setup program. • Is automatically also reset when resetting "Maximum measured value".
Minimum Measured value 1 Reset (min. drag indicator)	Reset min. meas. value	No Yes	No	• With "Yes" and menu/OK key, the "Minimum measured value" is reset; the value then jumps automatically to "No". • "Time since minimum measured value" is also reset.
Maximum measured value 1 Reset (max. drag indicator)	Reset max. meas. value		No	• With "Yes" and menu/OK key, the "Maximum measured value" is reset; the value then jumps automatically to "No". • "Time since maximum measured value" is also reset.
Minimum measured value 2	Minimum measured value 2	-5000 °C to +50000 °C -8968 °F to +90032 °F	50000 (°C) 90032 (°F)	
Maximum measured value 2	Maximum measured value 2	-5000 °C to +50000 °C -8968 °F to +90032 °F	-5000 (°C) -8968 (°F)	
Time since minimum measured value 2	--	0 to 4294967295 s	0	• Only extract via setup program. • Is automatically also reset when resetting "Minimum measured value 2".

Parameter	Text display	Value	Default setting	Description
Time since maximum measured value 2	--	0 to 4294967295 s	0	• Only extract via setup program. • Is automatically also reset when resetting "Maximum measured value 2".
Reset minimum measured value 2 (min. drag indicator)	Reset min meas. value 2	No Yes	No	• With "Yes" and menu/OK key, the "Minimum measured value 2" is reset; the value then jumps automatically to "No". • "Time since minimum measured value 2" is also reset.
Reset maximum measured value 2 (max. drag indicator)	Reset max meas. value 2	No Yes	No	• With "Yes" and menu/OK key, the "Maximum measured value 2" is reset; the value then jumps automatically to "No". • "Time since maximum measured value 2" is also reset.
Switching cycles				
Current switching cycles, relay 1	Current switching cycles	0 to 4294967295	0	• can be set on the device • display and editing on the device up to 999999
Service, switching cycles, relay 1	Service, switching cycles			can only be viewed in setup calibration mode
Current switching cycles, relay 2	Current switching cycles			• only with relay 2 option • display and editing up to 999999
Service, switching cycles, relay 2	Service, switching cycles			• only with relay 2 option • can only be viewed in setup calibration mode
Miscellaneous				
Operation time	Operation t. total	0 to 4294967295 s	0	Only extraction
Operation time since last reconfiguration	Operation t. since conf.	0 to 4294967295 s	0	Only extraction
Number of reconfigurations Channel	Num.config. Channel	0 to 4294967295 s	0	Only extraction
Number of reconfigurations Diagnosis	Num.config. Diagnosis	0 to 4294967295 s	0	Only extraction

11 Configuration

11.15 Detailed information

"Detailed information" can only be set in the setup program.

Parameter	Value	Default setting	Description
TAG number	*Maximum* 19 characters	-	Is shown in the "TAG no. & information text" normal display.
Information text	*Maximum* 27 characters	-	

11.16 Selectors

Selectors are intended to connect output variables of a device function with input variables of another device function. A distinction is made between digital and analog selectors.

Process values present in the device are found in the selectors. Process values which are not present in the present device configuration, for example due to a missing option, are hidden.

11.16.1 Digital selector

The device only shows the digital selectors that are possible depending on the current device configuration or selected option.

Function	Comment
No selection	
Digital input 1	-
Digital input 2	Only if optional digital input 2 is present.
Difference alarm	
Limit value monitoring function	
Digital control signal 1	
Digital control signal 2	
Controller output 1	
Controller output 2	
Autotuning status	
Manual mode status	
Ramp end signal	
Tolerance band signal	
Short back key (<2 s)	
Long back key (>2 s)	
Alarm, switching cycles, relay 1	
Alarm, switching cycles, relay 2	Only if optional relay 2 available.

11.16.2 Analog selector

Several of the following analog selectors may not be available depending on the selected options.

Function	Comment
No selection	-
Measured value, input 1	-
Measured value, input 2	-
Difference	Result/output of the difference calculation
Current setpoint value	
Setpoint value 1	
Setpoint value 2	
Controller actual value	
Controller setpoint value	
Controller, output value display	
Control difference	
Controller, output 1 (analog)	
Controller, output 2 (analog)	
Ramp setpoint value	
Ramp end value	
Drag indicator min. measured value, input 1	Drag indicator, largest measured value
Drag indicator max. measured value, input 1	Drag indicator, smallest measured value
Drag indicator min. measured value, input 2	Drag indicator, largest measured value
Drag indicator max. measured value, input 2	Drag indicator, smallest measured value

12 Troubleshooting

12.1 Measured value errors

The following faults may be displayed on the device if there is a problem with a measured value. If this fault is pending, flashing arrows, stars, or dashes are shown in all displays instead of the measured value. The bar graph flashes.

Type of fault	View	Fault text in the fault display	Measure
Measuring range underrange (Underrange)	<<<<<	Measuring range underrange	• Check sensor configuration. • Check measuring chain.
Measuring range overrange (Overrange)	>>>>>	Measuring range overrange	• Check sensor configuration. • Check measuring chain.
Value invalid	-----	Value invalid	• Restart the device. • Send in device.
Division by zero	--4--	Division by zero	• Restart the device. • Send in device.
Fault in mathematics module			
Fault with terminal temperature or compensation signal	+++++	Terminal temperature	• Restart the device. • Send in device.
Probe short circuit	<-<-<	Probe short circuit	• Check sensor configuration. • Check sensor for short circuit.
Break of probe	>->->	Probe break	• Check sensor configuration. • Check sensor for break.
Timeout when determining values	--9--	Timeout	• Restart the device. • Send in device.
No data received from measuring channel	-1-0-	No meas. val. from channel	• Restart the device. • Send in device.
Value cannot be displayed	*****	-	• Check configuration. • Restart the device. • Send in device.

13.1 Cleaning

Care of the front panel

The front panel can be wiped with a damp cloth soaked with commercially available washing agents, detergents, and cleaning agents such as screen cleaners.

13.2 Maintenance

The device is maintenance-free.

13.3 Spare parts

No spare parts can be purchased for the device. A defective device must be sent back to the manufacturer or disposed of in an environmentally friendly manner.

14 Shutdown

14.1 Dismounting the device

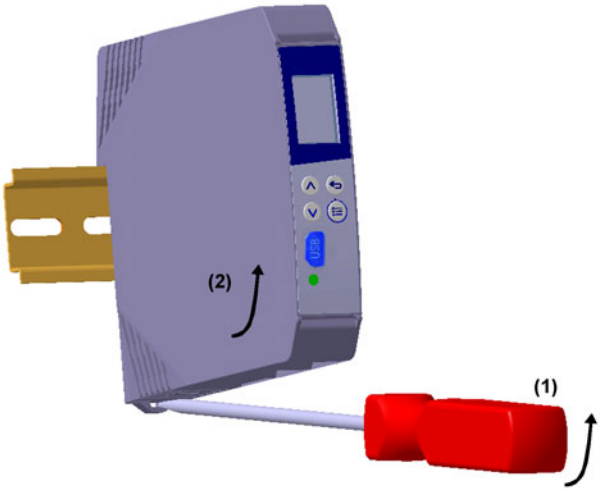
DANGER!

The voltage supply and load circuits of relay outputs may result in a dangerous electric voltage (e.g. 230 V) on the device.

There is a risk of electric shock.

▶ Before mounting or dismounting, disconnect the load circuits from the voltage supply. This work must only be performed by qualified personnel.

- Place screwdriver in release catch at bottom and press upward (1).
- Remove housing upward (2).



14.2 Sending back the device

Observe the following information to send back a device to us:

- Use the original packaging or a suitable and safe transport container.
- Fill out, sign and enclose the "Supplementary sheet for product returns" with the device.

Hazardous materials

Specifications regarding protection against contamination must always be made. If the device was in contact with hazardous substances, you must specify this here. The device must be free of any hazardous substances.

Forms

All forms required to send back the device are available on the JUMO website under:

Services -> Repair services -> Product returns.

You can also find a contact person's contact details there if you have questions about the return.

You can find the return address on the "Supplementary sheet for product returns".

14.3 Disposing of the device

Disposing of the packaging material

The entire packaging material (cardboard packaging, inserts, plastic film, and plastic bags) is fully recyclable.

The country-specific laws and regulations for waste treatment and disposal must be observed.

15 Scope of delivery

15.1 Scope of delivery

- 1 device in the ordered version
- 1 quick start guide

15.2 Checking the delivery

- Ensure that the packaging and its contents are undamaged.
- Check the delivery for completeness against the packing slip and order details.
- Inform the supplier immediately if there is any damage.
- Store damaged parts until clarification is received from the supplier.

16.1 Accessories

Designation	Material number
Setup program (JUMO)	30071435
USB cable, A connector on Micro-B connector, 3 m	00616250
Mounting rail rear wall terminal (device)	00763134
PUSH IN connection terminal	00764414

You can find further information on our website:

http://www.jumo.de

16.2 Software

A Windows®-based setup program is available to configure the device. You can download the software on the JUMO website and test it free of charge for 30 days. Once these 30 days have elapsed, only limited use of the setup program is possible. To use the full functional range, you need to request a license key, which is subject to a charge.

System requirement

The setup program only works on the following Windows® operating systems:

- Windows® 8, 32-bit or 64-bit version
- Windows® 8.1, 32-bit or 64-bit version
- Windows® 10, 32-bit or 64-bit version
- Windows® 11, 32-bit or 64-bit version

Languages

The following languages can be selected for the setup program:

- German
- English
- French
- Spanish

Download

Navigate to the relevant product on the JUMO website to download the software and request the license key. You can find all information about the setup program there.

17 Certificates

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