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JUMO Wtrans E01

Measuring probe for humidity, temperature, and CO_2 with wireless data transmission

- Humidity from 0 to 100 % RH (incl. -40 to +80 °C) or
  CO_2 from 0 to 2000/5000/10000 ppm or
  Temperature from -200 to +600 °C using RTD temperature probe Pt1000
- Two inputs for measured value recording
- Wall-mounted housing with backlit LCD display
- Open air range 300 m
- Wiring expenses are eliminated with modern wireless technology



Basic type 902928
with optional sensors

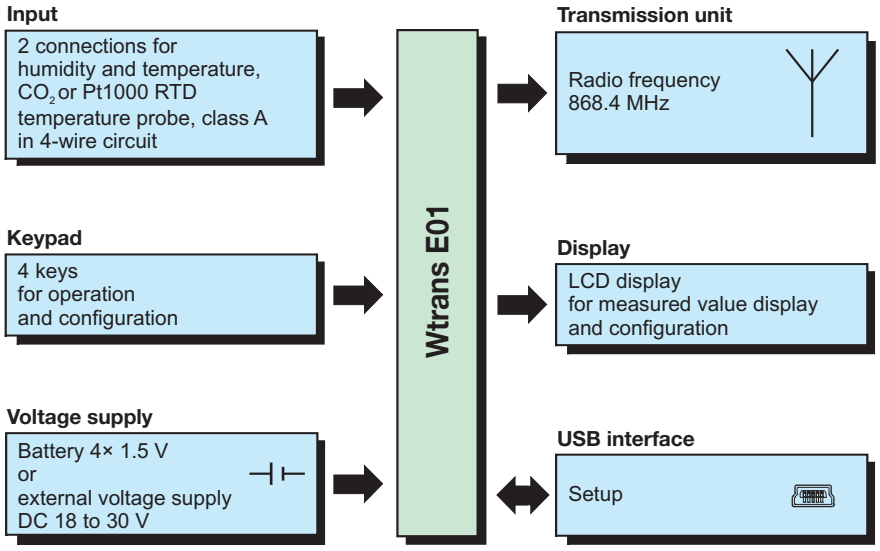
Brief description

The Wtrans E01 measuring probe is used in combination with a Wtrans receiver for recording measured values using digital sensors for humidity, temperature, and CO_2. The measuring probe has two inputs with plug connectors M12 × 1 to which the sensors can be connected and where the sensors are detected in any combination (plug and play).

Other measurands can be derived from the measured values determined. Up to four measured values are recorded. They are transmitted to the receiver of the Wtrans measuring system at a radio frequency of 868.4 MHz and displayed there. They are available as digital or analog output variables. The voltage is supplied externally (DC 18 to 30 V) or internally by means of four lithium batteries (size AA). The battery operating life with the recommended type of battery is one year (with default settings and one sensor).

The electronics of the measuring probe with backlit LCD display and operating keys are encased in a wall-mounted case (protection type IP65). The ambient temperature range of the measuring probe is -30 to +80 °C, but the differing ambient temperatures of the sensors and lithium batteries must also be considered. The measuring probe can be configured using the USB interface or the operating keys.

Block diagram



Universal Wtrans receiver

- Max. 16 receiver channels per receiver
- Little wiring work required
  due to modern wireless technology
- Radio frequency 868.4 MHz
- RS 485 interface with Modbus protocol
- 4 analog outputs
  0(4) to 20 mA or 0 to 10 V
  or
  2 analog outputs
  0(4) to 20 mA or 0 to 10 V
  and 2 relay outputs AC 230 V
- For mounting on a 35 × 7.5 mm
  DIN rail acc. to DIN EN 60715

For further information refer to data sheet 902931

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Technical data – JUMO Wtrans E01

Sensor inputs 1 and 2

Measurand/Description	Measuring range	Measuring accuracy
Humidity and temperature	see Technical data – Sensors	No impact on sensor accuracy
CO_2	see Technical data – Sensors	No impact on sensor accuracy
RTD temperature probe Pt1000 in four-wire circuit (IEC 60751)	-200 to +600 °C	≤ ±0.2 K
Sensor current	≤ 500 µA	
Lead wire resistance	Maximum 11 ohm per wire	
Measuring interval		
Sensor for humidity and temperature	5 to 3600 s (per default 90 s)	
Sensor for CO_2	30 to 3600 s (per default 1200 s)	
RTD temperature probe Pt1000	1 to 3600 s (per default 15 s)	

Measuring circuit monitoring

Behavior upon probe break or short circuit	
Sensor for humidity and temperature	Is recognized as an error and indicated with an error message (Err) on the LCD display
Sensor for CO_2	Is recognized as an error and indicated with an error message (Err) on the LCD display
RTD temperature probe Pt1000	Is recognized as an error and indicated with an error message (Err) on the LCD display (if plug and play is deactivated, over or under range is indicated)

Output (wireless transmission)

Transmitter detection (transmitter ID)	Five-digit ID, factory set, four digits can be configured according to customer specifications
Transmission interval	1 to 3600 s All measured values are always transmitted together with a default transmission interval of 15 s.
Radio frequency	868.4 MHz (Europe)
Transmission power	< +10 dBm
Open air range	300 m
Output signal	All measured values can be selected. Other measurands can be derived from the values measured. They must be activated on the device (extra code/accessories). Up to four measured values can be displayed and sent to the receiver.
Configuration	Via operating keys or USB interface in combination with the setup program available as an accessory
Configurable parameters	Transmitter detection (max. 4-digit ID), transmission interval, measurands, offset, measuring interval, and LCD display

Display

Technology	Positive, transflective LCD display
Size (W × H)	52 × 30 mm
LCD display	Can be switched on and off
Backlight	Can be switched on and off

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Electrical data

Voltage supply

Lithium battery	4× 1.5 V (size AA)
	⎓
Operating life	One year with the default settings and one sensor connected (an additional sensor, fast measuring and transmission interval, or high or low ambient temperatures reduce the batteries' operating life).
Recommended lithium batteries	Energizer Ultimate Lithium AA-L91-FR6-1.5 V This battery is part of the initial Wtrans E01 equipment and is available as an accessory.
Recommended alkaline batteries	Duracell Ultra Power Alkaline AA-MX1500-LR6-1.5 V, not available as an accessory.
	The information about the operating life of the lithium batteries applies only to the batteries recommended by JUMO.
External voltage supply	DC 18 to 30 V, SELV voltage
	⎓
Power consumption	2.4 W
Peak current	250 mA
Requirement	The device must be equipped with an electrical circuit that meets the requirements of EN 61010-1 with regard to "Limited-energy circuits".
Reverse voltage protection	Yes

Environmental influences

Ambient temperature range	With external voltage supply: -30 to +80 °C With batteries: Energizer Ultimate Lithium -20 to +60 °C Duracell Ultra Power Alkaline 0 to 50 °C
Storage temperature range	With external voltage supply: -40 to +85 °C With batteries: Energizer Ultimate Lithium -40 to +60 °C Duracell Ultra Power Alkaline -20 to +35 °C
Temperature influence for RTD temperature probe Pt1000	≤ ±0.005 % per K deviation from the reference temperature of 22 °C (% of the measuring span of -200 to +600 °C)
Site altitude	Max. 2000 m above sea level
Resistance to climatic conditions	DIN EN 60721-3-3 Standard climate 3K8H (-30 to +70 °C, 100 % RH) Dripping water 3Z7
Vibration resistance	DIN EN 60068-2-6 Table C.2 (general industrial use) Frequency range: 10 to 55 Hz Amplitude: 0.15 mm Cycles per axis: 10
Electromagnetic compatibility (EMC)	DIN EN 61326-1
Interference emission	Class B – household and small businesses –
Interference immunity	Industrial requirements
Radio frequency spectrum	ETSI EN 300 220-1 and ETSI EN 300 220-2

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Case

Material	PC-ABS (polycarbonate acrylonitrile butadiene styrene), RAL 9003 signal white
Flammability class	UL94 V-0
Dimensions with lambda/4 antenna, connection for sensor and RTD temperature probe Pt1000 (W × H × D)	133.6 × 210.0 × 60.5 mm
Mounting	Wall mounting using DIN rail piece (can be used inside and outside of buildings)
Connections for sensors and RTD temperature probe Pt1000	2× plug connector M12 × 1 with internal thread and union nut
Protection type	IP65
Cleaning	The device can be cleaned with conventional washing, rinsing, and cleaning agents
Installation position	Vertical ⊥
Weight	Approx. 550 g (incl. 4 batteries)

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Technical data – Sensors

Sensors

These sensors are available as accessories. They can be connected directly to the measuring probe. Antenna and extension cables enable indirect mounting.

Sensor for humidity and temperature

Measurand	Measuring range	Measuring accuracy
Relative humidity	0 to 100 % RH (RH = relative humidity)	±2 % RH (0 to 90 % RH) ±3 % RH (90 to 100 % RH)
Temperature	-40 to +80 °C	±0.2 K at 20 °C

More technical data for the sensor for humidity and temperature can be downloaded from the Internet.

Sensor for CO_2

Measurand	Measuring range	Measuring accuracy
CO_2 concentration	0 to 2000 ppm	≤ ±(50 ppm + 2 % of the measuring range)
CO_2 concentration	0 to 5000 ppm	≤ ±(50 ppm + 3 % of the measuring range)
CO_2 concentration	0 to 10000 ppm	≤ ±(100 ppm + 5 % of the measuring range)

More technical data for the sensor for CO_2 can be downloaded from the Internet.

RTD temperature probe Pt1000

Description	Measuring range	Measuring accuracy
RTD temperature probe Pt1000, class A acc. to DIN EN 60751	-50 to +150 °C	±(0.15 K + 0.002 × ItI) ItI = measured temperature in °C without prefix
Connection type	Four-wire circuit	
Response times	Water 0.4 m/s, air 3.0 m/s	
Protection tube diameter 4.0 mm	Water $t_{0.5}$ approx. 3 s, $t_{0.9}$ approx. 7 s, air $t_{0.5}$ approx. 25 s, $t_{0.9}$ approx. 80 s	
Ambient temperature range	-50 to +150 °C	
Storage temperature range	-50 to +150 °C	
Case material	Stainless steel	
Connection	Plug connector M12 × 1 with external thread	
Protection type	IP65 with connected mating connector	
Installation position	Any	
Weight	Approx. 10 g	

Other connectable RTD temperature probes Pt1000 can be found in the Accessories section and the data sheets 902150 and 902815.

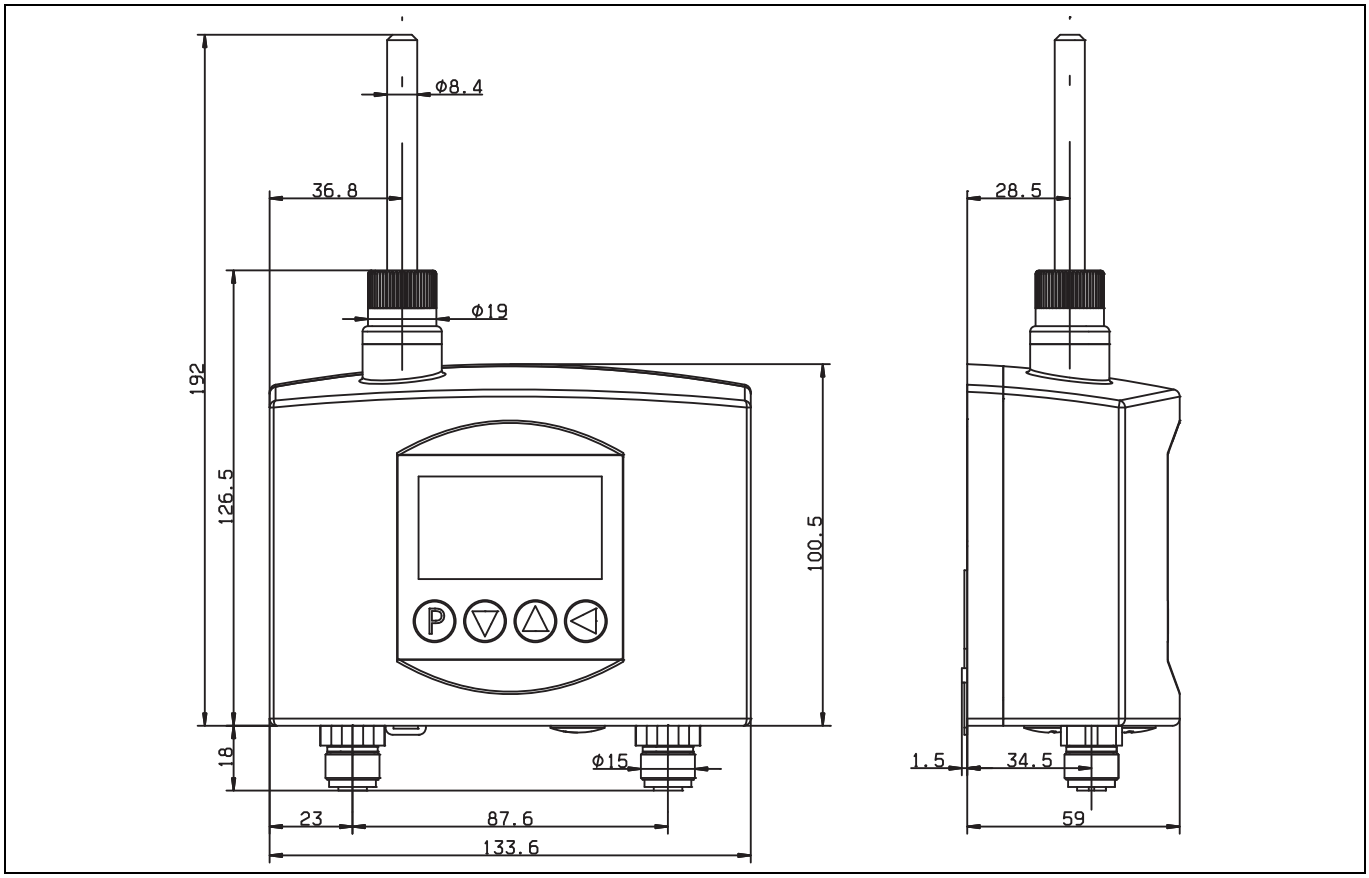
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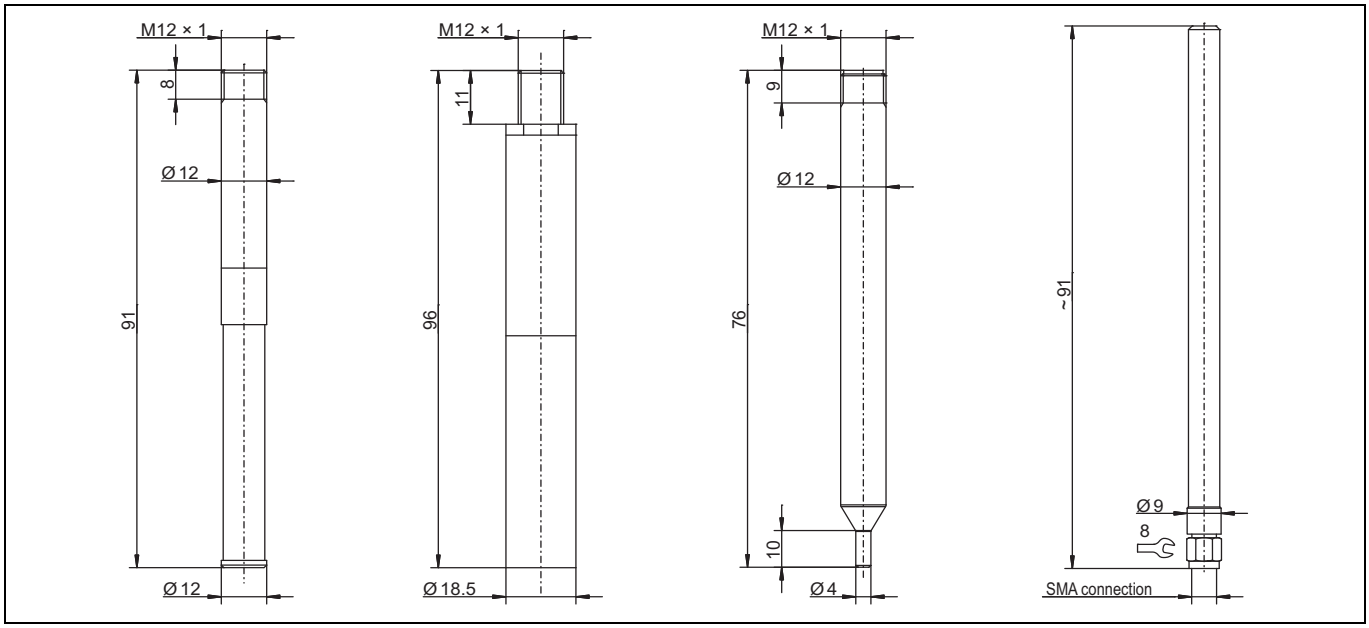
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Dimensions

Measuring probe



Sensors and lambda/4 antenna



Sensor for humidity and temperature, and CO_2, RTD temperature probe Pt1000, and lambda/4 antenna (from left to right)

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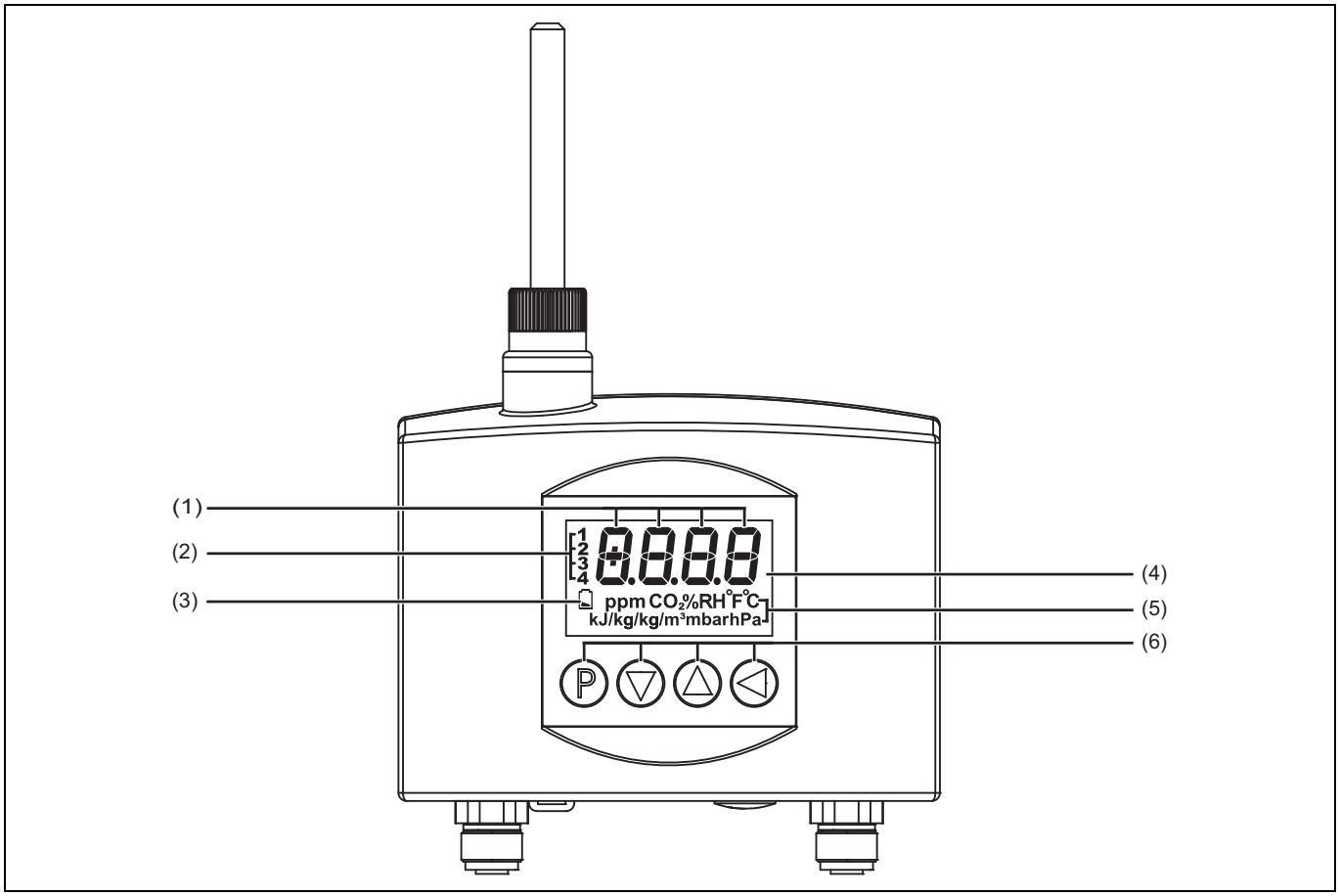
Display and control elements

Operation and configuration of the measuring probe require four operating keys located at the front. These have various functions depending on the menu. The dialog is supported by an LCD display. The operation and configuration of the parameters are organized into three different levels:

- Normal display (display of measured value, measured value no., and measurand)
- Parameter level (editing of configuration parameters)
- Startup level (display of measured value, measured value no., and measurand)

The startup level differs from the normal display in that it uses a temporary fast measuring and transmission interval.

A code can be used to protect the parameter level from unauthorized access.



(1) Measured value

(2) Measured value no. (1, 2, 3, and 4)

(3) Battery symbol (battery low/battery empty)

(4) LCD display,
15 mm-high 4-digit segment display and 4 mm-high symbols for measurands with white backlight

(5) Measurands (ppm CO_2, %RH, °F, °C, kJ/kg, g/kg, g/m^3, mbar, and hPa)

(6) Operating keys (P key, down key, up key, and left key)

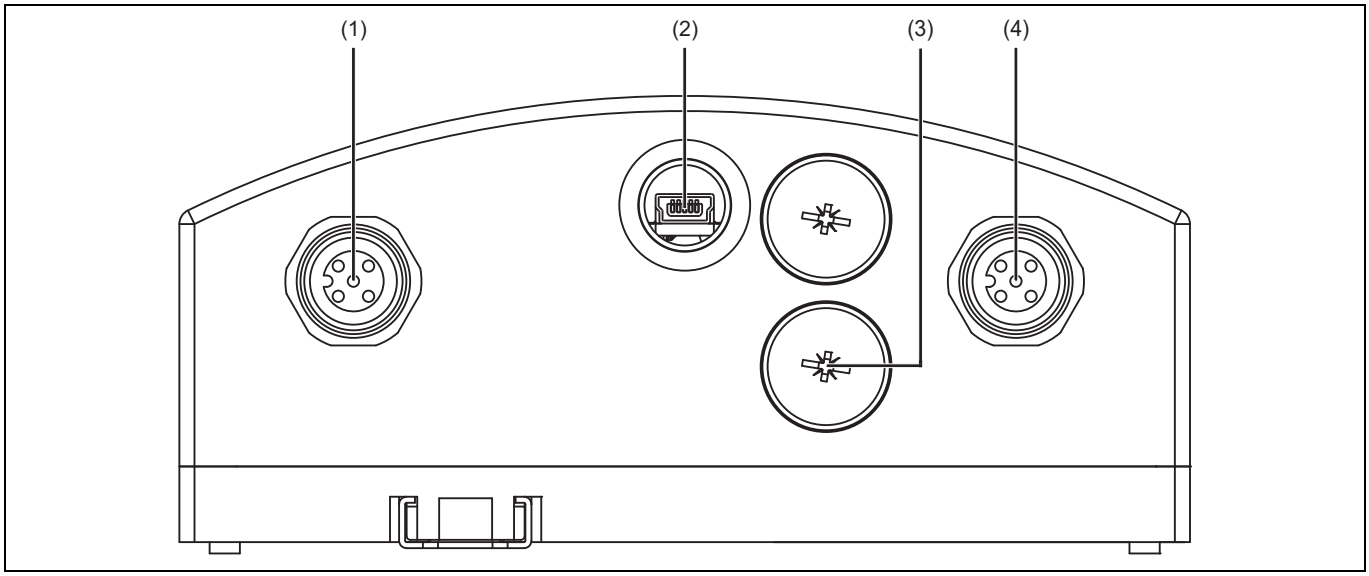
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Connection elements

View from below



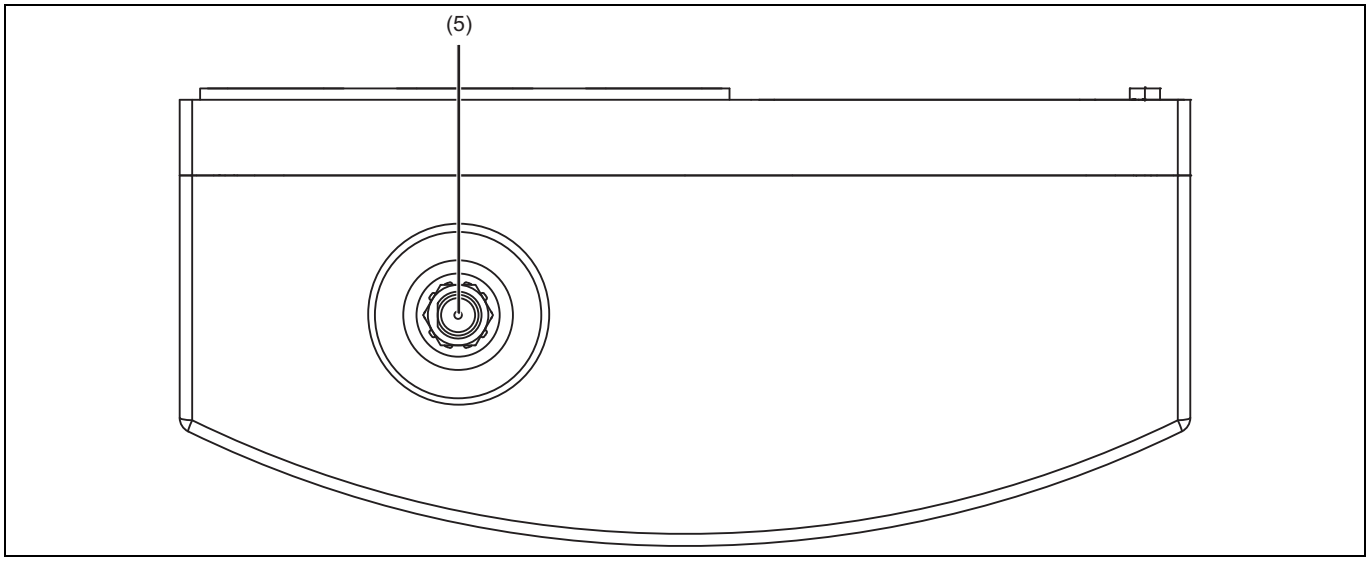
(1) Connection for sensor 1: sensor for humidity and temperature, sensor for CO_2, or RTD temperature probe Pt1000

(2) Connection for USB connector (Mini-B): if the interface is not needed or after a configuration, the opening on the device must be sealed using the sealing screw M12 × 1.5 supplied (accessories set) with the help of the mounting key (accessories set).

(3) Connection for external voltage supply: if the voltage is supplied externally, the cable fitting supplied (accessories set) must be used instead of the M12 × 1.5 sealing screw. Install the cable fitting instead of the sealing screw labeled with (3).

(4) Connection for sensor 2: sensor for humidity and temperature, sensor for CO_2, or RTD temperature probe Pt1000

View from above



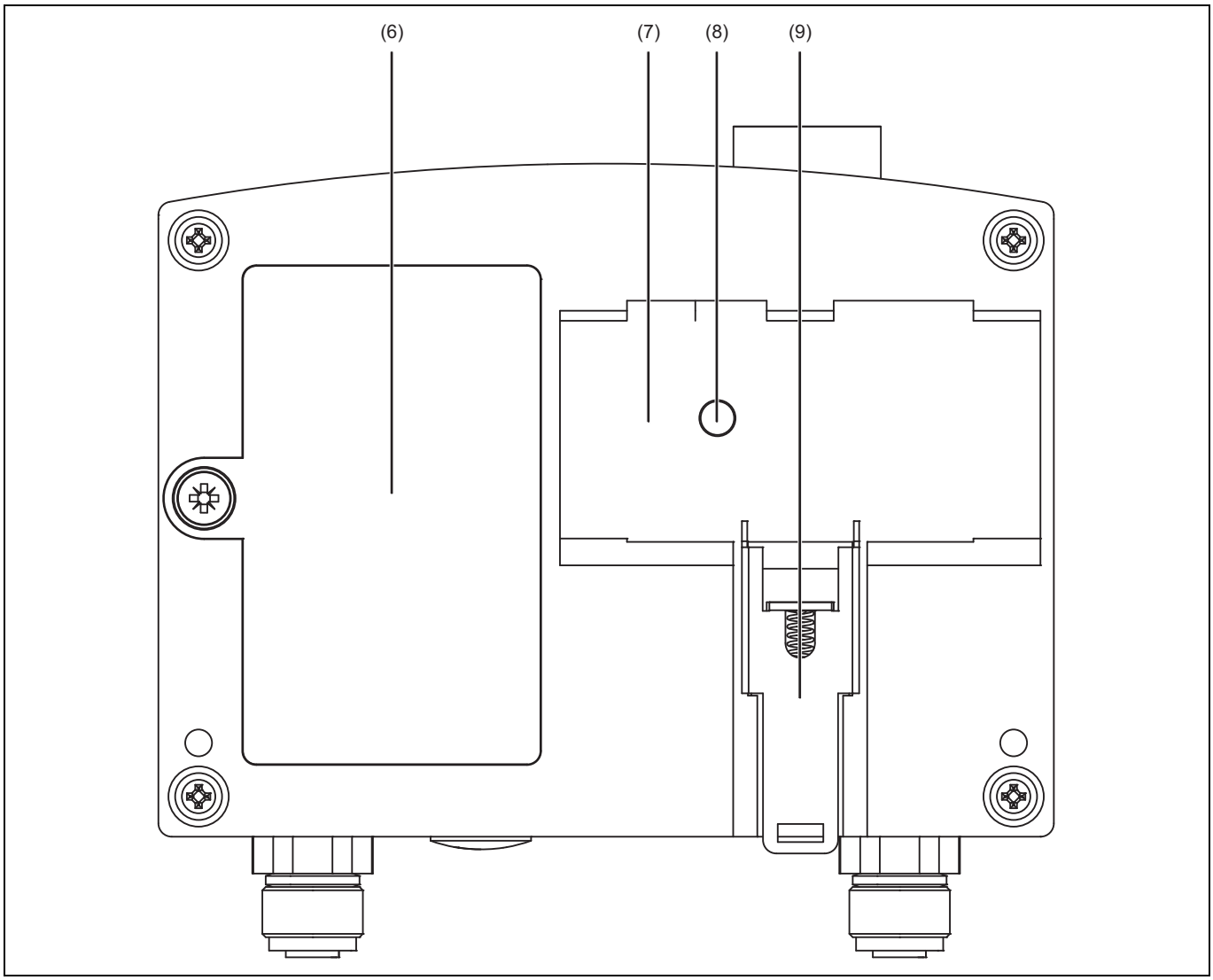
(5) Connection for lambda/4 antenna, or optionally lambda/4 antenna with antenna cable and antenna holder for wall mounting

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Rear view



(6) Battery compartment for inserting batteries and connecting to external voltage supply

(7) Recess for DIN rail for mounting the case

(8) Pressure compensation element (do not tape)

(9) Unlocking to release the device from the DIN rail

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Connection diagram

The connection diagram in the data sheet provides information on product selection.

For the electrical connection, only use the installation instructions or the operating manual.

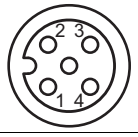
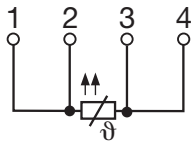
Voltage supply

Connection	Connection element	Comment
4× 1.5 V lithium or alkaline batteries (size AA)	6	Connection in the battery compartment by inserting batteries ⎓

or

Connection	Connection element	Comment
DC 18 to 30 V, SELV voltage	3 and 6	Connection in the battery compartment using spring-cage terminal (Drawing out of the connecting cable via the cable fitting on the underside of the case) ⎓

Input

Connection	Connection element	Symbol
Sensor for humidity and temperature	1 or 4	
Sensor for CO_2	1 or 4	
RTD temperature probe Pt1000 in four-wire circuit	1 or 4	 

Output

Connection	Connection element	Symbol
Lambda/4 antenna	5	

Interface

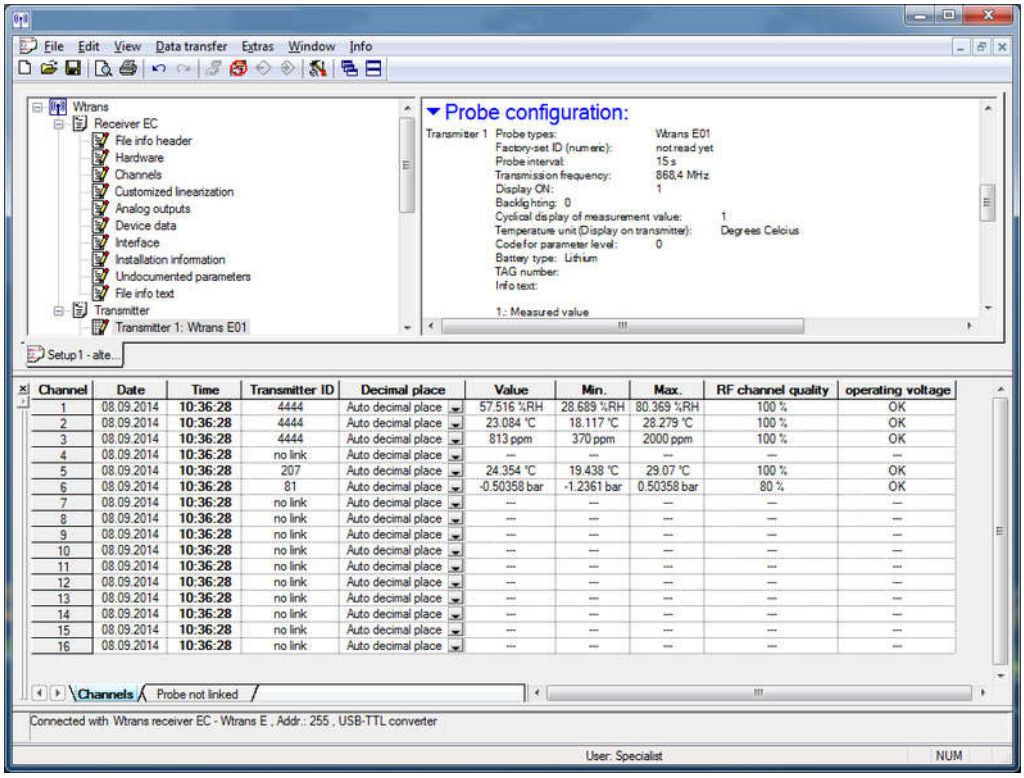
Connection	Connection element	Symbol
USB interface (Mini-B)	2	

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Setup program



Channel	Date	Time	Transmitter ID	Decimal place	Value	Min.	Max.	RF channel quality	operating voltage
1	08.09.2014	10:36:28	4444	Auto decimal place	57.516 %RH	28.689 %RH	80.369 %RH	100 %	OK
2	08.09.2014	10:36:28	4444	Auto decimal place	23.084 °C	18.117 °C	28.279 °C	100 %	OK
3	08.09.2014	10:36:28	4444	Auto decimal place	813 ppm	370 ppm	2000 ppm	100 %	OK
4	08.09.2014	10:36:28	no link	Auto decimal place	---	---	---	---	---
5	08.09.2014	10:36:28	207	Auto decimal place	24.354 °C	19.438 °C	29.07 °C	100 %	OK
6	08.09.2014	10:36:28	81	Auto decimal place	-0.50358 bar	-1.2361 bar	0.50358 bar	80 %	OK
7	08.09.2014	10:36:28	no link	Auto decimal place	---	---	---	---	---
8	08.09.2014	10:36:28	no link	Auto decimal place	---	---	---	---	---
9	08.09.2014	10:36:28	no link	Auto decimal place	---	---	---	---	---
10	08.09.2014	10:36:28	no link	Auto decimal place	---	---	---	---	---
11	08.09.2014	10:36:28	no link	Auto decimal place	---	---	---	---	---
12	08.09.2014	10:36:28	no link	Auto decimal place	---	---	---	---	---
13	08.09.2014	10:36:28	no link	Auto decimal place	---	---	---	---	---
14	08.09.2014	10:36:28	no link	Auto decimal place	---	---	---	---	---
15	08.09.2014	10:36:28	no link	Auto decimal place	---	---	---	---	---
16	08.09.2014	10:36:28	no link	Auto decimal place	---	---	---	---	---

The setup program enables the measuring probe to be configured using a laptop/PC. The configuration data can be archived and printed.

Configurable parameters	Default settings
Transmitter detection (transmitter ID)	Transmitter detection (transmitter ID), consecutive
Transmission interval	All measured values are always transmitted together with a default transmission interval of 15 s. Each sensor type has its own measuring interval. • Sensor for humidity and temperature: 5 to 3600 s (per default 90 s) • Sensor for CO_2: 30 to 3600 s (per default 1200 s) • RTD temperature probe Pt1000: 1 to 3600 s (per default 15 s)
1st and 2nd measured value	Automatic sensor detection
3rd and 4th measured value	Without measured value

The setup program can be used to overwrite changed parameters with the default settings at any time. The connection between measuring probe and laptop/PC is established via a USB interface (Mini-B).

The setup program also enables other parameters to be configured, such as LCD display (switch-off, automatic measured value forwarding, back-light permanently on). Each of the four measured values can be configured (sensor selection, measurand selection, offset, measuring interval, measured value permanently on, etc.)

Interface

Connection for	Type	Terminal assignment	
USB connection to laptop/PC	USB interface (Mini-B)	Standard (5-pin)	

The USB interface is designed only to configure the measuring probe. Continuous operation is not admissible.

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Order details

	(1)	**Basic type**
902928/10		Wtrans E01 Measuring probe for humidity, temperature, and CO_2 with wireless data transmission
	(2)	**Version**
8		Standard with default settings
9		Customer-specific configuration (specification in plain text)[a]
	(3)	**Parameters**
10		Humidity, temperature, and CO_2 (standard)
20		Activation of other parameters (absolute humidity (a), enthalphy (h), wet-bulb temperature (Tw), mixing ratio (x), dew point temperature (Td), and steam pressure (pw))
	(4)	**Extra code**
000		Without

[a] The customer-specific configuration only applies to the transmission interval (depends on the sensor connected and RTD temperature probe Pt1000) and offset. Sensor for humidity and temperature (5 to 3600 s, per default 90 s), sensor for CO_2 (30 to 3600 s, per default 1200 s), RTD temperature probe Pt1000 (1 to 3600 s, per default 15 s), offset (-99.9 to +99.9, per default 0). Transmission interval and offset can also be set using the setup program (see accessories).

	(1)		**(2)**		**(3)**		**(4)**
Order code		-		-		/	
Order example	902928/10	-	8	-	10	/	000

Scope of delivery

1 device in the ordered version (sensors for humidity, temperature and CO_2 must be ordered separately, see accessories)
1 lambda/4 antenna, impedance 50 ohm, 868.4 MHz, $T_{max.}$ 125 °C
4× 1.5 V lithium batteries (size AA) in blister packaging
1 battery case for 4× 1.5 V batteries (size AA)
1 spring-cage terminal for DC 18 to 30 V external voltage supply, SELV voltage
2 accessories sets
1 operating manual

Accessories

Description	**Part no.**
Setup program on CD-ROM, multilingual[a]	00488887
Setup program incl. OnlineChart on CD-ROM, multilingual[a]	00549067
OnlineChart activation	00549188
USB cable, type A USB connector on Mini-B USB connector, length 3 m[a]	00506252
Lambda/4 antenna, impedance 50 ohm, 868.4 MHz, $T_{max.}$ 125 °C	00503151
Antenna holder for wall mounting with antipole for lambda/4 antenna	00482648
Antenna cable with preconfigured screw-type connection, length 3 m, $T_{max.}$ 85 °C	00601189
Antenna cable with preconfigured screw-type connection, length 5 m, $T_{max.}$ 85 °C	00601190
Antenna cable with preconfigured screw-type connection, length 10 m, $T_{max.}$ 125 °C	00669026
4× 1.5 V lithium batteries (size AA) in blister packaging	00617446
1 battery case for 4× 1.5 V batteries (battery size AA)	00606043
Spring-cage terminal for DC 18 to 30 V external voltage supply, SELV voltage	00598340
Plug-in power supply unit Voltage supply: AC 100 to 240 V, 50 to 60 Hz Output: DC 24 V, 0.5 A Ambient temperature range: 0 to 40 °C	00619184

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Description	Part no.
Sensor for humidity and temperature, measuring range 0 to 100 % RH and -40 to +80 °C For connecting directly Protection tube diameter 12 mm, length 91 mm	00614528
Sensor for CO_2, measuring range 0 to 2000 ppm For connecting directly Protection tube diameter 18.5 mm, length 96 mm	00614530
Sensor for CO_2, measuring range 0 to 5000 ppm For connecting directly Protection tube diameter 18.5 mm, length 96 mm	00614531
Sensor for CO_2, measuring range 0 to 10,000 ppm For connecting directly Protection tube diameter 18.5 mm, length 96 mm	00614532
RTD temperature probe with Pt1000 temperature sensor and machine connector M12 × 1 For connecting directly Protection tube diameter 12 mm, reduced to 4 mm, length 76 mm	00606033
Push-in RTD temperature probe with Pt1000 temperature sensor and machine connector M12 × 1 902150/99-386-1013-2-6-100-56-2500/315 Protection tube diameter 6 mm, insertion length 100 mm, connecting cable length 2500 mm	00551310
Push-in RTD temperature probe with Pt1000 temperature sensor and machine connector M12 × 1 902150/99-386-1013-2-6-200-56-2500/315 Protection tube diameter 6 mm, insertion length 200 mm, connecting cable length 2500 mm	00551311
Screw-in RTD temperature probe without transmitter with Pt1000 temperature sensor and machine connector M12 × 1 902815/10-380-1013-2-6-100-000-24/000 Protection tube diameter 6 mm, insertion length 100 mm	00511233
Compression fitting G 1/2 (stainless steel) for protection tube diameter 6 mm	00305445
Compression fitting G 1/2 (stainless steel) for protection tube diameter 12 mm	00312448
Compression fitting M20 × 1.5 (stainless steel) for protection tube diameter 12 mm	00558447
Cable fitting M20 × 1.5 (nickel-plated brass)	00575665
Holder for wall mounting for RTD temperature probe Pt1000 with plug connection M12 × 1	00503329
Holder for wall mounting for RTD temperature probe Pt1000 with protection tube diameter 6 mm	00503328
PUR[b] extension cable (shielded) with machine connector M12 × 1, length 2000 mm	00503577
PUR[b] extension cable (shielded) with M12 × 1 machine connector, length 5000 mm	00503578
PUR[b] extension cable (shielded) with M12 × 1 machine connector, length 10,000 mm	00503579
Note: for compression fittings and flanges refer to data sheet 909750	

[a] Configuration using a laptop/PC is only possible with the USB cable and one of the two setup programs.

[b] Polyurethane

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JUMO Wtrans series

Type	Description	Data sheet
JUMO Wtrans receiver	Universal receiver for JUMO wireless measuring probes (Voltage supply AC 110 to 240 V or AC/DC 20 to 30 V)	902931
JUMO Wtrans T	Transmitter RTD temperature probe with wireless data transmission (for universal receivers as of software version 01.01) • as insertion or mineral-insulated RTD temperature probe • for various ambient and operating temperatures • with fixed and flexible protection tubes • with plug connector M12 × 1 for RTD temperature probes • with plug connector M12 × 1 for RTD temperature probes with connecting cable • with ATEX approval	902930
JUMO Wtrans E01	Transmitter Measuring probe for humidity, temperature, and CO_2 with wireless data transmission (for universal receivers as of software version 05.01)	902928
JUMO Wtrans B	Transmitter Programmable head transmitter with wireless data transmission (for universal receivers as of software version 03.01)	707060
JUMO Wtrans p	Transmitter Pressure transmitter with wireless data transmission (for universal receivers as of software version 04.01)	402060

Stock versions

Order code	Part no.
902928/10-8-10/000	00618852