

JUMO Wtrans probe
RTD temperature probe
with wireless transmission
of the measured values



B 90.2930.0
Operating Manual



This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada. Operation is subject to the following two conditions:

- this device may not cause harmful interference, and
- this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This Class A digital apparatus complies with Canadian ICES-003.

Changes or modifications made to this equipment not expressly approved by the manufacturer may void the FCC authorization to operate this equipment.

| | | |
|--------|--------|--------------------------------------|
| Canada | IC | 7472A-WTRANST01 7472A-WTRANST0102 |
| USA | FCC ID | VT4-WTRANST01 VT4-WTRANST01-02 |

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1.1 Safety information

General information

This manual contains information that must be observed in the interest of your own safety and to avoid damage to assets. This information is supported by symbols which are used in this manual as follows.

Please read this manual before commissioning the device. Keep the manual in a place accessible to all users at all times.

If difficulties occur during commissioning, please refrain from carrying out any manipulations that could jeopardize your warranty rights.

Warning signs



CAUTION!

This symbol in combination with the signal word indicates that **damage to assets or data loss** will occur if suitable precautions are not taken.

Note signs



TIP!

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



REFERENCE!

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

1 Introduction

1.2 Description

Wtrans probes are used in connection with corresponding Wtrans receivers for mobile or stationary temperature measurement within the application range of -30 to +260 °C or -200 to +600 °C. The ambient handle temperature must be between -30 to +85 °C (-25 to +125 °C). The measured temperature value is transmitted wireless to the receiver of the Wtrans system, displayed on the system and provided on the Wtrans receiver as a digital RS485 interface and analog outputs and/or relay outputs. The radio frequency within the ISM band (Industrial, Scientific and Medical Band) is 868 MHz or 915 MHz. These frequencies are almost insensitive to external interferences and allow transmission even in a rough industrial environment. When using the antenna wall holder with the 3 m long cable for the receiver, the open air range is 300 m.

The RTD temperature probe transmitter is fitted in the oil-resistant and acid-proof handle. The system is of a vibration proof design.

The protection type is IP67. The stainless steel sheath is available with flat, chisel or pointed insertion tip. The fitting length is between 50 to 1000 mm (10000 mm). The measuring insert is equipped with a Pt1000 temperature probe as per DIN EN 60751, class A in 3-wire circuit as a standard.

The 902930/50 and 902930/60 basic type is additionally equipped with a stainless steel neck pipe and an M 12 connector for the attachment of Pt1000 RTD temperature probes. Power Supply to the Wtrans temperature probe is provided by a 3.6 V lithium battery.

1.3 Block diagram

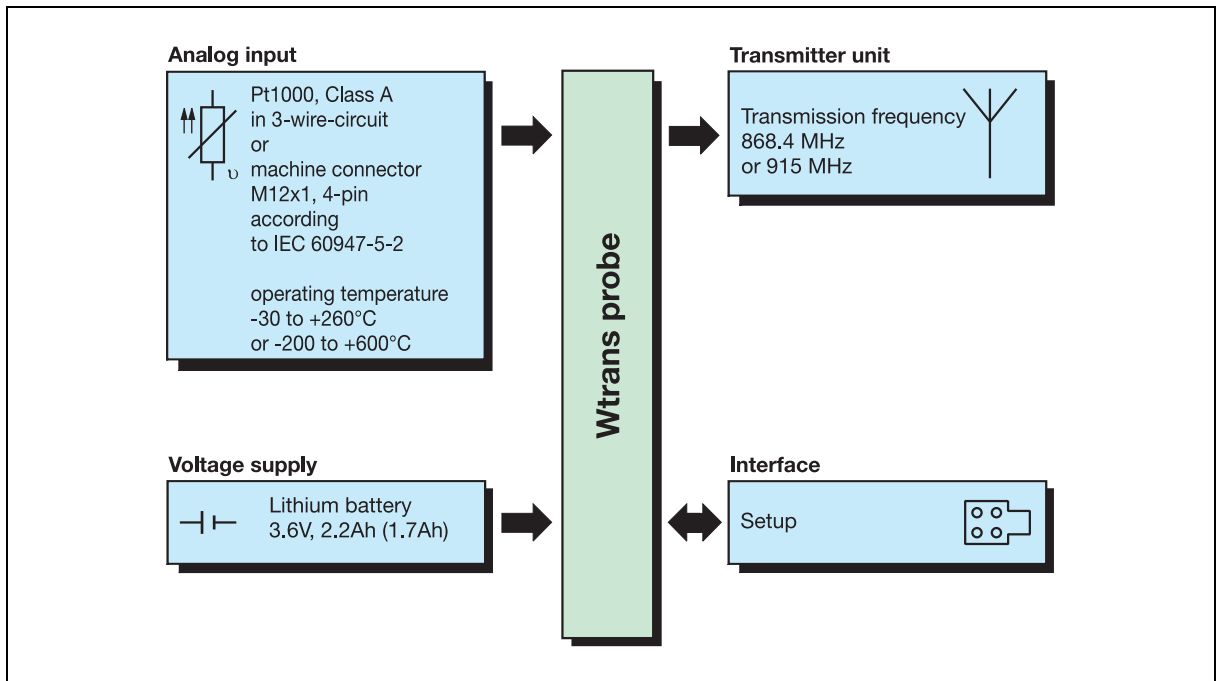


Figure 1: Block diagram of the probe

1 Introduction

1.4 Dimensions

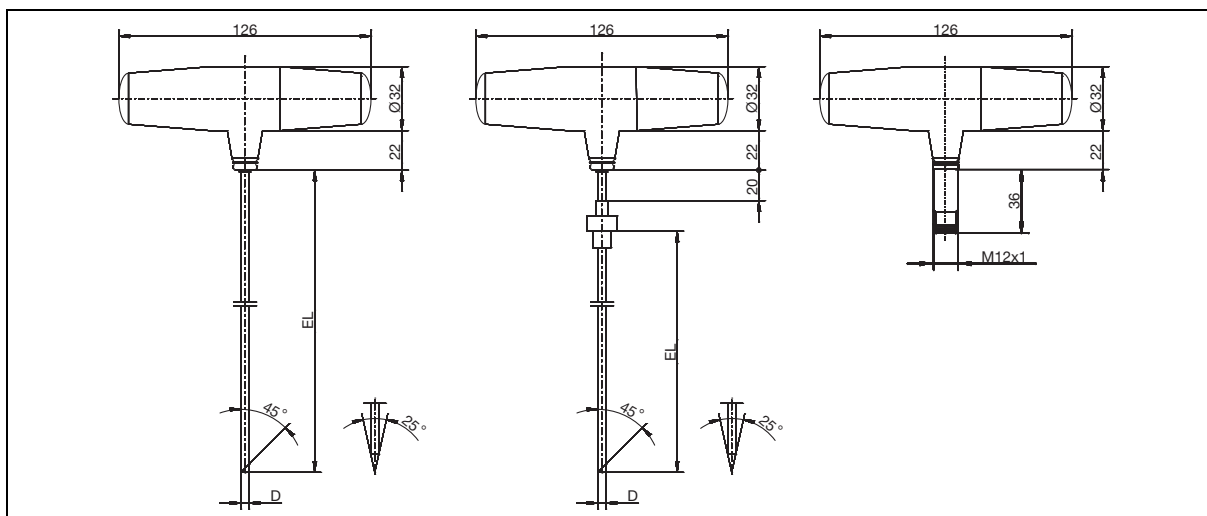


Figure 2: Basic type 902930/10, 902930/12, 902930/20 and 902930/22 (left)
Basic type 902930/10, 902930/12, 902930/20 and 902930/22
with process connection (center)
Basic type 902930/50 and 902930/60 with M 12 connector (right)

2 Identifying the device version

2.1 Type specifications

Position

A laser has been used to label the type specifications on the sheath.

Contents

The specifications contain important information. Amongst others:

| Description | Example |
|------------------------|---------------------|
| Serial No. (F-No.) | 0070033801207430006 |
| Probe ID | 12345 |
| Transmission frequency | 868.4 or 915 |

F-No

The serial number is used by the manufacturer to identify the device.

The serial number (F-No.) indicates the production date (year/week). The numbers 12, 13, 14, 15 indicates the date.

Example: F-No. = 0070033801**20743**0006.

The device has been produced in calendar week 43 in 2007.

Probe ID

The probe ID is factory set. It must be entered and activated on the receiver to establish communication between the probe and receiver. The probe ID can be changed to customer specific requirements using the setup program.

Transmission frequency

The transmission frequency identifies the frequency and frequency band used by the device for transmission. In the 868 MHz band, the transmission is carried out at 868.4 MHz. In the 915 MHz band, 10 frequencies can be configured.

2 Identifying the device version

2.2 Scope of delivery

Our scope of delivery includes:

- 1 device in the version ordered
- 1 preset lithium battery 3.6 V, 2.2 Ah
(ambient temperature, handle: -30 to +85 °C) or
- 1 preset lithium battery 3.6 V, 1.7 Ah
(ambient temperature, handle: -25 to +125 °C)
- 4 colour rings made of silicone (white, green, red, blue) for visual probe identification
- 1 operating instructions B 90.2930.0

In the event of questions, please contact your supplier.

2 Identifying the device version

2.3 Accessories

The following articles must be ordered separately and with costs:

| Article | Part No. |
|--|-------------|
| Setup program on CD-ROM, multilingual | 70/00488887 |
| preset lithium battery 3.6 V, 2.2 Ah (ambient temperature, handle: -30 to +85 °C) | 90/00525539 |
| preset lithium battery 3.6 V, 1.7 Ah (ambient temperature, handle: -25 to +125 °C) | 90/00534690 |
| Case sealing set with axial gaskets made of EPDM (ethylene propylene diene rubber) (content: 3 gaskets, white) and radial O-ring seals made of FPM (fluororubber) (content: 3 seals, black) | 90/00532794 |
| Color rings made of silicone (white, green, red, blue) for visual probe identification | 90/00489047 |
| Color cap set made of PEI (Polyetherimid) (content 10 caps, gray) for visual probe identification | 90/00525950 |
| Color cap set made of PEI (Polyetherimid) (content 10 caps, brown) for visual probe identification | 90/00525951 |
| Color cap set made of PEI (Polyetherimid) (content 10 caps, green) for visual probe identification | 90/00525952 |
| Color cap set made of PEI (Polyetherimid) (content 10 caps, blue) for visual probe identification | 90/00525953 |
| PC interface with USB/TTL converter, adapter (socket connector) and adapter (pins) | 70/00456352 |
| PC interface with TTL/RS232 converter and adapter (socket connector) | 70/00350260 |
| Wall holder for Wtrans probe with sheath diameter 4 mm | 90/00503317 |
| Wall holder for Wtrans probe with sheath diameter 4.5 mm | 90/00503326 |
| Wall holder for Wtrans probe with sheath diameter 6 mm | 90/00503328 |
| Wall holder for Wtrans probe with sheath diameter 12 mm | 90/00503329 |
| Machine connector M 12x1, 4-pin as per IEC 60 947-5-2 | 90/00506319 |
| Insertion RTD temperature probe with Pt1000 temperature probe and machine connector M 12x1, 4-pin as per IEC 60947-5-2 902150/30-386-1006-2-6-100-80-2500/315,317 Sheath diameter 6 mm, fitting length 100 mm, Connection cable length 2500 mm | 90/00514417 |
| Insertion RTD temperature probe with Pt1000 temperature probe and machine connector M 12x1, 4-pin as per IEC 60947-5-2 902150/30-386-1006-2-6-200-80-2500/315,317 Sheath diameter 6 mm, fitting length 200 mm, Connection cable length 2500 mm | 90/00514440 |

2 Identifying the device version

2.4 Type designation

| (1) Basic type | |
|-----------------------|--|
| 902930/10 | Wtrans probe T01.G1 Insertion RTD temperature probe Ambient temperature, handle: -30 to +85 °C |
| x | (2) Operating temperature in °C 596 -30 to +260 °C |
| x | (3) Measuring insert 1006 1x Pt1000 in 3-wire-circuit |
| x | (4) Tolerance class as per DIN EN 60751 2 Class A |
| x | (5) Sheath diameter D in mm 1.9 Ø 1.9 mm (particularly quick responding) stepped from Ø 4 mm to Ø 1.9 mm, available with flat probe tip only |
| x | 4 Ø 4 mm |
| x | 4.5 Ø 4.5 mm |
| x | 6 Ø 6 mm |
| x | (6) Fitting length EL in mm (EL 50 to 1000) 100 100 mm |
| x | 150 150 mm |
| x | 200 200 mm |
| x | ... Please specify in plain text (50 mm steps) |
| x | (7) Insertion tip 1 Flat |
| x | 2 Concentric, angled at 25° |
| x | 3 Oblique, angled at 45° |
| x | (8) Transmission frequency 10 ISM band 868.4 MHz (Europe) |
| x | 20 915 MHz (America, Australia, Canada and New Zealand) |
| x | (9) Process connection 000 None |
| x | 103 Screw connection G 3/8 |
| x | 104 Screw connection G 1/2 |
| x | 253 Pipe screw connection G 3/8 (for sheath diameter 6 mm only) |
| x | 254 Pipe screw connection G 1/2 (for sheath diameter 6 mm only) |
| x | 255 Pipe screw connection G 3/4 (for sheath diameter 6 mm only) |
| x | 263 Pipe screw connection M 10x1 (for sheath diameter 6 mm only) |
| x | 291 Pipe screw connection 1/2-14NPT (for sheath diameter 6 mm only) |
| x | 662 Sheet steel flange (for sheath diameter 6 mm only) |
| x | (10) Extra codes 000 None |
| x | 778 Customer-specific transmission interval, factory setting 10 s (for orders, specification in plain text between 1 to 3600 s) |

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|----------------------|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Order code | <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | / <input type="text"/> |
| Order example | 902930/10 | - 596 | - 1006 | - 2 | - 4 | - 100 | - 2 | - 10 | - 000 | / 000 |

2 Identifying the device version

(1) Basic type

| | | |
|---|-----------|--|
| | 902930/12 | Wtrans probe T01.G1 Mineral-insulated RTD temperature probe with flexible sheath Ambient temperature, handle: -30 to +85 °C |
| | | (2) Operating temperature in °C |
| x | 415 | -50 to +600 °C |
| | | (3) Measuring insert |
| x | 1006 | 1x Pt1000 in 3-wire-circuit |
| | | (4) Tolerance class as per DIN EN 60751 |
| x | 2 | Class A |
| | | (5) Sheath diameter D in mm |
| x | 1.9 | Ø 1.9 mm |
| x | 3 | Ø 3 mm |
| x | 6 | Ø 6 mm |
| | | (6) Fitting length EL in mm (EL 100 to 10000) |
| x | 100 | 100 mm |
| x | 150 | 150 mm |
| x | ... | Please specify in plain text (50 mm steps) |
| | | (7) Insertion tip |
| x | 1 | Flat |
| | | (8) Transmission frequency |
| x | 10 | ISM band 868.4 MHz (Europe) |
| x | 20 | 915 MHz (America, Australia, Canada and New Zealand) |
| | | (9) Process connection |
| x | 000 | None |
| x | 252 | Pipe screw connection G 1/4 (for sheath diameter 6 mm only) |
| x | 253 | Pipe screw connection G 3/8 (for sheath diameter 6 mm only) |
| x | 254 | Pipe screw connection G 1/2 (for sheath diameter 6 mm only) |
| x | 255 | Pipe screw connection G 3/4 (for sheath diameter 6 mm only) |
| x | 261 | Pipe screw connection M 8x1 (for sheath diameter 3 mm only) |
| x | 263 | Pipe screw connection M 10x1 (for sheath diameter 6 mm only) |
| x | 291 | Pipe screw connection 1/2-14NPT (for sheath diameter 6 mm only) |
| x | 662 | Sheet steel flange (for sheath diameter 6 mm only) |
| | | (10) Extra codes |
| x | 000 | None |
| x | 778 | Customer-specific transmission interval, factory setting 10 s (for orders, specification in plain text between 1 to 3600 s) |

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|----------------------|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Order code | <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | / <input type="text"/> |
| Order example | 902930/12 | - 415 | - 1006 | - 2 | - 3 | - 100 | - 1 | - 10 | - 000 | / 000 |

2 Identifying the device version

| (1) Basic type | |
|--|--|
| | 902930/20 Wtrans probe T02.G1 Insertion RTD temperature probe Ambient temperature, handle: -25 to +125 °C |
| (2) Operating temperature in °C | |
| x | 596 -30 to +260 °C |
| (3) Measuring insert | |
| x | 1006 1x Pt1000 in 3-wire-circuit |
| (4) Tolerance class as per DIN EN 60751 | |
| x | 2 Class A |
| (5) Sheath diameter D in mm | |
| x | 1.9 Ø 1.9 mm (particularly quick responding) stepped from Ø 4 mm to Ø 1.9 mm, available with flat probe tip only |
| x | 4 Ø 4 mm |
| x | 4.5 Ø 4.5 mm |
| x | 6 Ø 6 mm |
| (6) Fitting length EL in mm (EL 50 to 1000) | |
| x | 100 100 mm |
| x | 150 150 mm |
| x | 200 200 mm |
| x | ... Please specify in plain text (50 mm steps) |
| (7) Insertion tip | |
| x | 1 Flat |
| x | 2 Concentric, angled at 25° |
| x | 3 Oblique, angled at 45° |
| (8) Transmission frequency | |
| x | 10 ISM band 868.4 MHz (Europe) |
| x | 20 915 MHz (America, Australia, Canada and New Zealand) |
| (9) Process connection | |
| x | 000 None |
| x | 103 Screw connection G 3/8 |
| x | 104 Screw connection G 1/2 |
| x | 253 Pipe screw connection G 3/8 (for sheath diameter 6 mm only) |
| x | 254 Pipe screw connection G 1/2 (for sheath diameter 6 mm only) |
| x | 255 Pipe screw connection G 3/4 (for sheath diameter 6 mm only) |
| x | 263 Pipe screw connection M 10x1 (for sheath diameter 6 mm only) |
| x | 291 Pipe screw connection 1/2-14NPT (for sheath diameter 6 mm only) |
| x | 662 Sheet steel flange (for sheath diameter 6 mm only) |
| (10) Extra codes | |
| x | 000 None |
| x | 778 Customer-specific transmission interval, factory setting 15 s (for orders, specification in plain text between 1 to 3600 s) |

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|----------------------|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Order code | <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | / <input type="text"/> |
| Order example | 902930/20 | - 596 | - 1006 | - 2 | - 4 | - 100 | - 2 | - 10 | - 000 | / 000 |

2 Identifying the device version

(1) Basic type

| | | |
|---|-----------|---|
| | 902930/22 | Wtrans probe T02.G1 Mineral-insulated RTD temperature probe with flexible sheath Ambient temperature, handle: -25 to +125 °C |
| | | (2) Operating temperature in °C |
| x | 415 | -50 to +600 °C |
| | | (3) Measuring insert |
| x | 1006 | 1x Pt1000 in 3-wire-circuit |
| | | (4) Tolerance class as per DIN EN 60751 |
| x | 2 | Class A |
| | | (5) Sheath diameter D in mm |
| x | 1.9 | Ø 1.9 mm |
| x | 3 | Ø 3 mm |
| x | 6 | Ø 6 mm |
| | | (6) Fitting length EL in mm (EL 100 to 10000) |
| x | 100 | 100 mm |
| x | 150 | 150 mm |
| x | ... | Please specify in plain text (50 mm steps) |
| | | (7) Insertion tip |
| x | 1 | Flat |
| | | (8) Transmission frequency |
| x | 10 | ISM band 868.4 MHz (Europe) |
| x | 20 | 915 MHz (America, Australia, Canada and New Zealand) |
| | | (9) Process connection |
| x | 000 | None |
| x | 252 | Pipe screw connection G 1/4 (for sheath diameter 6 mm only) |
| x | 253 | Pipe screw connection G 3/8 (for sheath diameter 6 mm only) |
| x | 254 | Pipe screw connection G 1/2 (for sheath diameter 6 mm only) |
| x | 255 | Pipe screw connection G 3/4 (for sheath diameter 6 mm only) |
| x | 261 | Pipe screw connection M 8x1 (for sheath diameter 3 mm only) |
| x | 263 | Pipe screw connection M 10x1 (for sheath diameter 6 mm only) |
| x | 291 | Pipe screw connection 1/2-14NPT (for sheath diameter 6 mm only) |
| x | 662 | Sheet steel flange (for sheath diameter 6 mm only) |
| | | (10) Extra codes |
| x | 000 | None |
| x | 778 | Customer-specific transmission interval, factory setting 15 s (for orders, specification in plain text between 1 to 3600 s) |

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|----------------------|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Order code | <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | / <input type="text"/> |
| Order example | 902930/22 | - 415 | - 1006 | - 2 | - 3 | - 100 | - 1 | - 10 | - 000 | / 000 |

2 Identifying the device version

(1) Basic type

| | | |
|---|-----------|--|
| | 902930/50 | Wtrans probe T01.G2 with M 12 connector for RTD temperature probe Ambient temperature, handle: -30 to +85 °C |
| x | 150 | (2) Operating temperature in °C -200 to +600 °C |
| x | 1006 | (3) Measuring input 1x Pt1000 in 3-wire-circuit |
| x | 0 | (4) Tolerance class as per DIN EN 60751 none (not relevant) |
| x | 0 | (5) Sheath diameter D in mm none (not relevant) |
| x | 000 | (6) Fitting length EL in mm none (not relevant) |
| x | 0 | (7) Insertion tip none (not relevant) |
| x | 10 | (8) Transmission frequency ISM band 868.4 MHz (Europe) |
| x | 20 | 915 MHz (America, Australia, Canada and New Zealand) |
| x | 000 | (9) Process connection none (not relevant) |
| x | 000 | (10) Extra codes None |
| x | 778 | Customer-specific transmission interval, factory setting 10 s (for orders, specification in plain text between 1 to 3600 s) |

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|----------------------|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Order code | <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | / <input type="text"/> |
| Order example | 902930/50 | - 150 | - 1006 | - 0 | - 0 | - 000 | - 0 | - 10 | - 000 | / 000 |

2 Identifying the device version

(1) Basic type

| | | |
|---|-----------|--|
| | 902930/60 | Wtrans probe T02.G2 with M 12 connector for RTD temperature probe Ambient temperature, handle: -25 to +125 °C |
| x | 150 | (2) Operating temperature in °C -200 to +600 °C |
| x | 1006 | (3) Measuring input 1x Pt1000 in 3-wire-circuit |
| x | 0 | (4) Tolerance class as per DIN EN 60751 none (not relevant) |
| x | 0 | (5) Sheath diameter D in mm none (not relevant) |
| x | 000 | (6) Fitting length EL in mm none (not relevant) |
| x | 0 | (7) Insertion tip none (not relevant) |
| x | 10 | (8) Transmission frequency ISM band 868.4 MHz (Europe) |
| x | 20 | 915 MHz (America, Australia, Canada and New Zealand) |
| x | 000 | (9) Process connection none (not relevant) |
| x | 000 | (10) Extra codes None |
| x | 778 | Customer-specific transmission interval, factory setting 15 s (for orders, specification in plain text between 1 to 3600 s) |

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|----------------------|----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Order code | <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | - <input type="text"/> | / <input type="text"/> |
| Order example | 902930/60 | - 150 | - 1006 | - 0 | - 0 | - 000 | - 0 | - 10 | - 000 | / 000 |

2 Identifying the device version

3.1 Fitting/exchanging the battery

**CAUTION!**

Ensure that soiling, moisture and vapors cannot enter the device.
The device could be destroyed.

When inserting/changing the preset lithium battery, ensure that the device is not exposed to soiling, moisture and vapors.

**CAUTION!**

The probe does not function, if the poles are incorrectly connected.
The battery and the probe electronics could be damaged.

Ensure that the poles are correctly connected.

**CAUTION!**

Incorrect batteries put safety at risk.

The device could be destroyed when using incorrect batteries.

Only use the preset lithium battery available as accessories.

Do not solder in the lithium battery.

3 Probe preparation

As standard, power supply of the probe is provided by a lithium battery 3.6 V, 2.2 Ah (1.7 Ah) to be inserted prior to commissioning/start-up.

Battery service life depends on the set transmission interval and the ambient temperature and is approx. 1 year with the factory-set values and at room temperature.

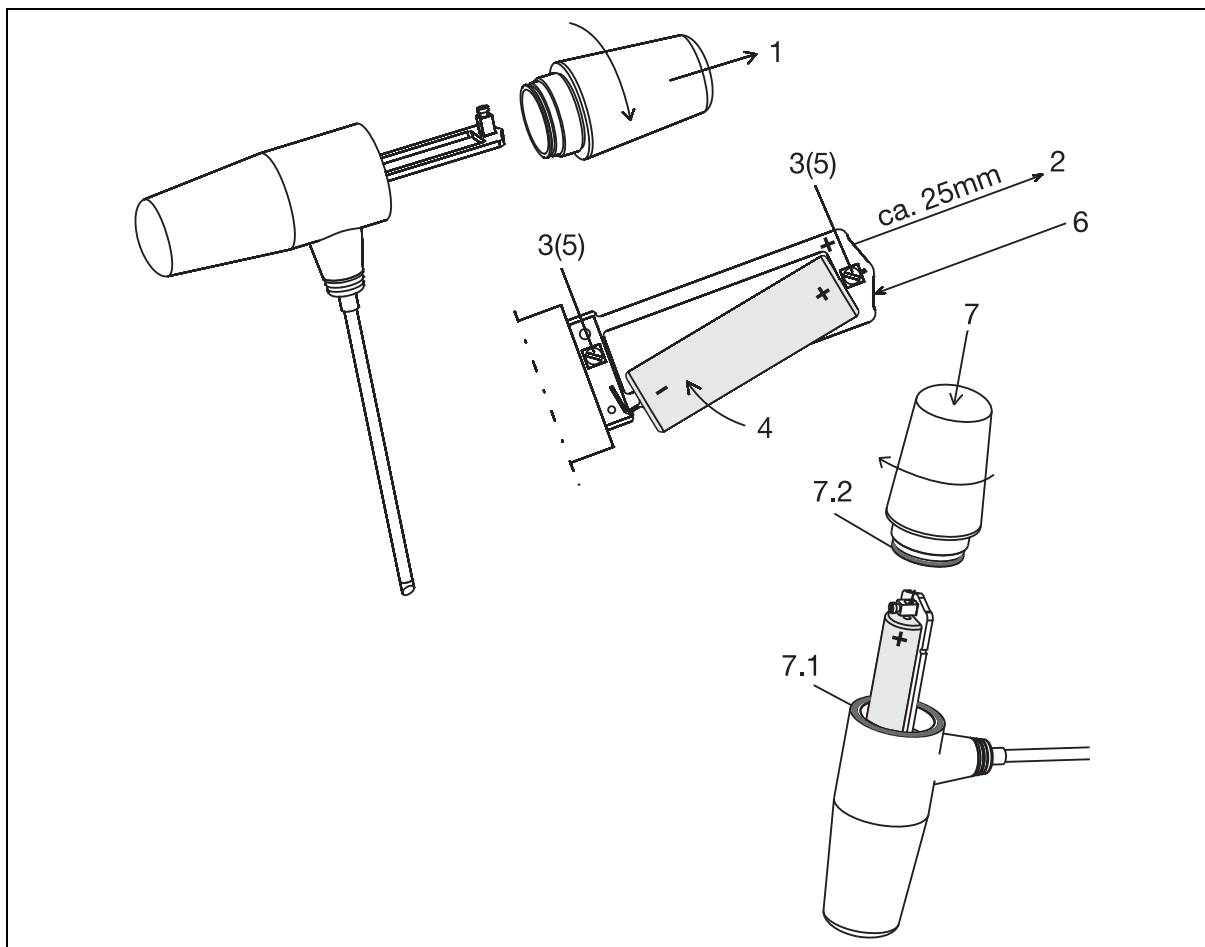


Figure 3: Fitting/exchanging the battery

| Step | Activity |
|------|---|
| 1 | Screw open the handle in the counter-clockwise direction and pull off one half of the handle. |
| 2 | Pull the PCB out of the handle by approx. 25 mm. <i>Never damage or remove the blue safety cable.</i> |
| 3 | Undo the screw terminals of the minus and plus pole using a screwdriver, remove the battery, if empty. |
| 4 | Insert the plus pole of the new battery into the (+) screw terminal. Swivel the battery and insert the minus pole into the (-) screw terminal. |
| 5 | Tighten the screw terminals of the minus and plus pole using a screwdriver. |
| 6 | Slide the PCB back into the handle up to the stop. |
| 7 | Hold the handle vertically (as shown in the figure) and turn the handle and the handle section clockwise to fasten tightly. <i>Ensure the correct seating of the two seals 7.1 and 7.2 on the handle sections.</i> |

3.2 Safety information concerning lithium batteries

⇒ <http://batterie.jumo.info>

3.3 Disposal of lithium batteries

Please dispose of all batteries according to the Life-Cycle Resource Management and Waste Act and the national regulations.

Insulate the contacts of lithium batteries not completely discharged. Disposal of batteries together with domestic waste is expressly prohibited. Batteries can be deposited at communal waste collection points or the local retailers.

3 Probe preparation

3.4 Battery service life

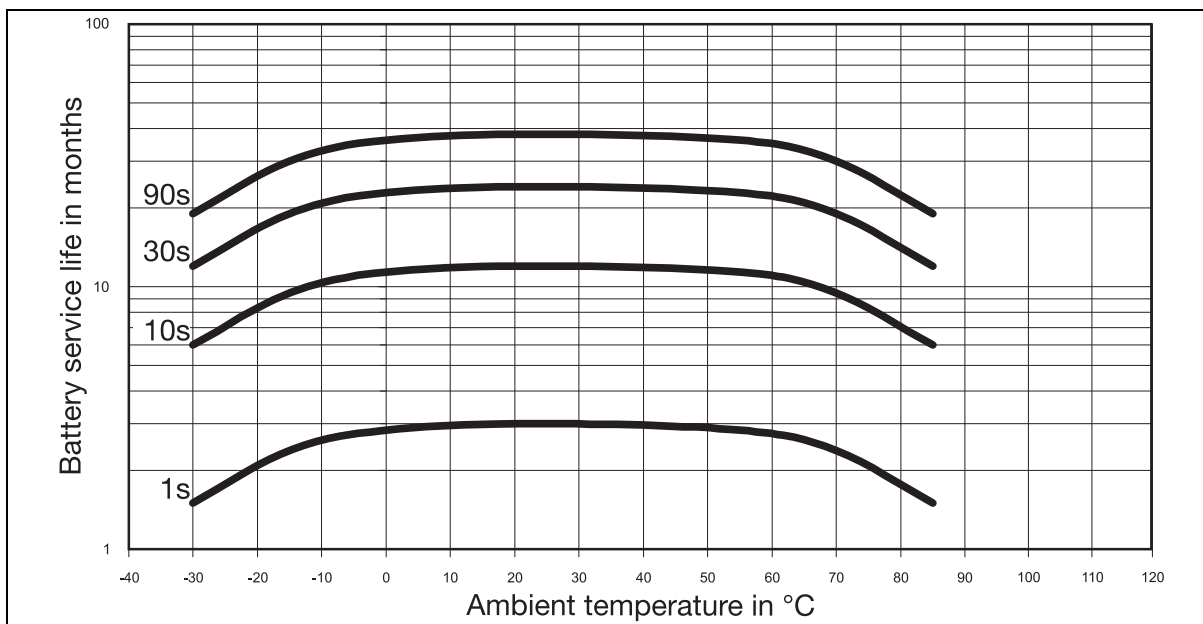


Figure 4: Battery service life depends on the transmission interval (1 s, 10 s, 30 s or 90 s) and the ambient temperature for Wtrans probe T01

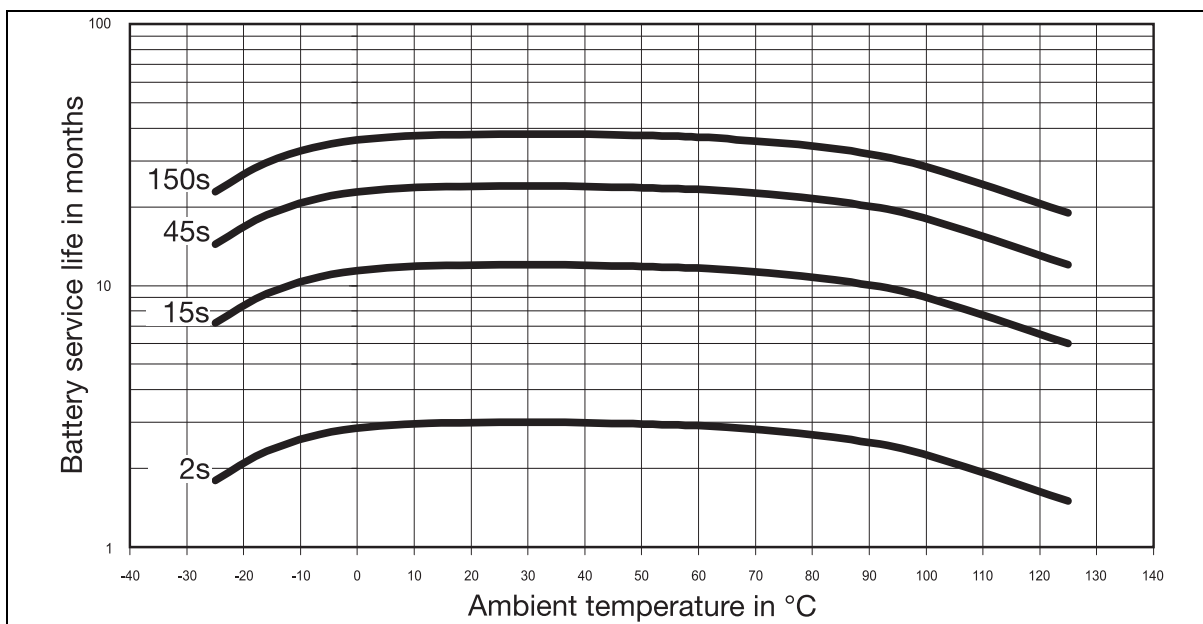


Figure 5: Battery service life depends on the transmission interval (2 s, 15 s, 45 s or 150 s) and the ambient temperature for Wtrans probe T02

The figures symbolize the dependence of the battery service life on the transmission interval and the average temporarily temperature load and are to be understood as a description.

The specifications concerning battery service life depend on the real application conditions and cannot be understood as guaranteed feature.

The service life can be reduced when the device is used at fast cyclical temperature changes or when permanently operated at the temperature limit values.

3.5 Fitting the color coding of a probe

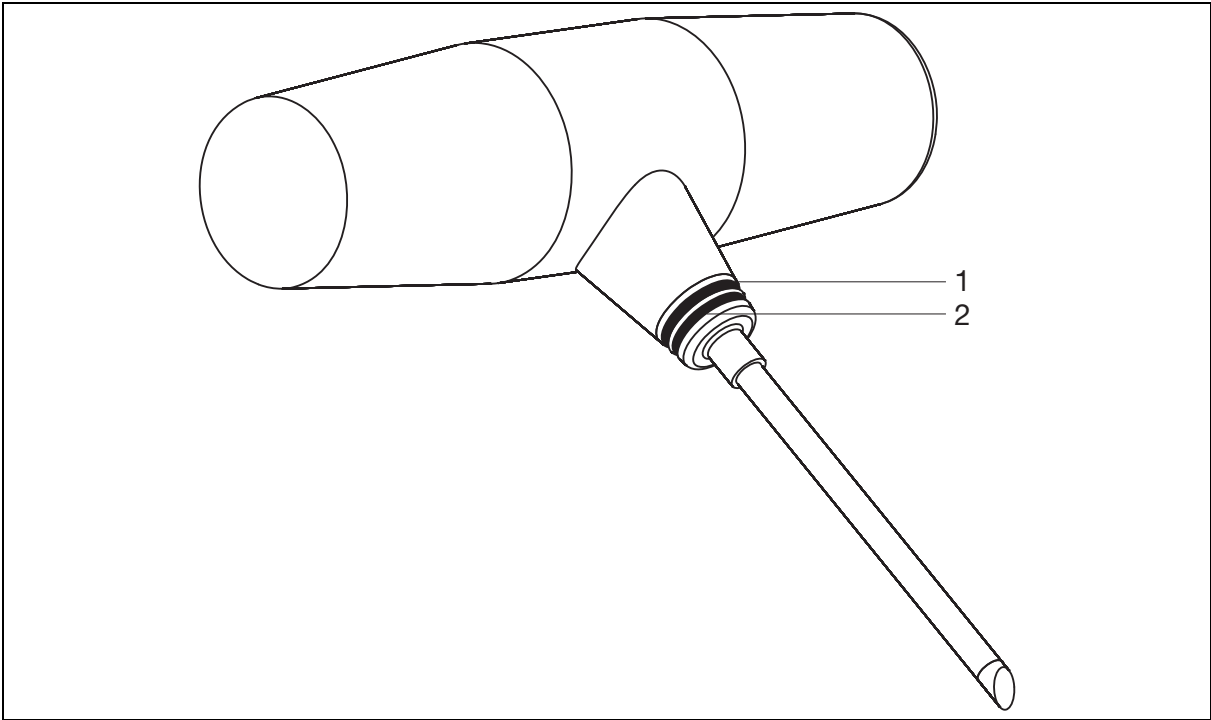


Figure 6: Fitting the color coding of a probe

- 1 Top color code
- 2 Bottom color code

The probe delivery scope includes four color rings made of silicon (white, green, red and blue) to be used to clearly identify the probes visually.

Proceed as follows to be able to identify the probes:

| Step | Activity |
|------|--|
| 1 | To fit a clear combination of silicon rings to the probe, push the rings onto the probe shank. |
| 2 | Note down the probe color combinations. |



TIP! Color caps (colored handle sections in gray, brown, green or blue) for the visual probe identification are available as accessories as an alternative to the color rings. The color caps can be replaced by screw-on handle sections.

3 Probe preparation

4.1 General information about radio transmission

Radio signals are electromagnetic waves the signal of which will become weaker on their path from the probe to the receiver (this is termed as path attenuation). The field strength reduces inversely proportional in relation to the square of the distance between the probe and receiver. In addition to this natural range restriction, a reduced range can also be the result of the following causes:

- Ferroconcrete walls, metallic objects and surfaces, heat insulation or windows with vapor deposited metal layer reflect and absorb electromagnetic waves and, for this reason, a deadspot is formed behind.
- Metal tubes, chains, etc. on the probe housing, for this reason, do not fasten any metallic objects on the probe housing.
- Insufficient spacing between several probes, for this reason, ensure a minimum spacing of 20 cm.
- The antenna is installed at an insufficient height; install as high as possible above the floor and ensure visual contact between the probe and receiver.

The following values are reference values concerning permeability of radio signals:

| Material | Permeability |
|-------------------------------|--------------|
| Wood, plaster, glass uncoated | 90 to 100 % |
| Brickwork, press boards | 65 to 95 % |
| Armored concrete | 10 to 90 % |
| Metal, aluminum lamination | 0 to 10 % |

The range between the probe and the receiver is 300 m in open air and when using the antenna wall holder for the receiver. The optimum reception can be achieved, if visual contact can be established between the probe and receiver.

If the receiver is installed into a switch cabinet, behind concrete walls or concrete ceilings, the antenna must always be installed with the wall holder and antenna cable for the receiver pointing in the direction of the probes.

4 Probe range

4.2 Possible impairment of radio transmission

Collisions when using an excessive number of probes

When using a large number of probes, do not select a transmission interval which is too low, otherwise the radio channel will be unnecessarily occupied. A too low transmission interval means a very high data volume on the selected frequency which can lead to collisions with other probes. Telegrams can be destroyed during radio transmission caused by collisions.

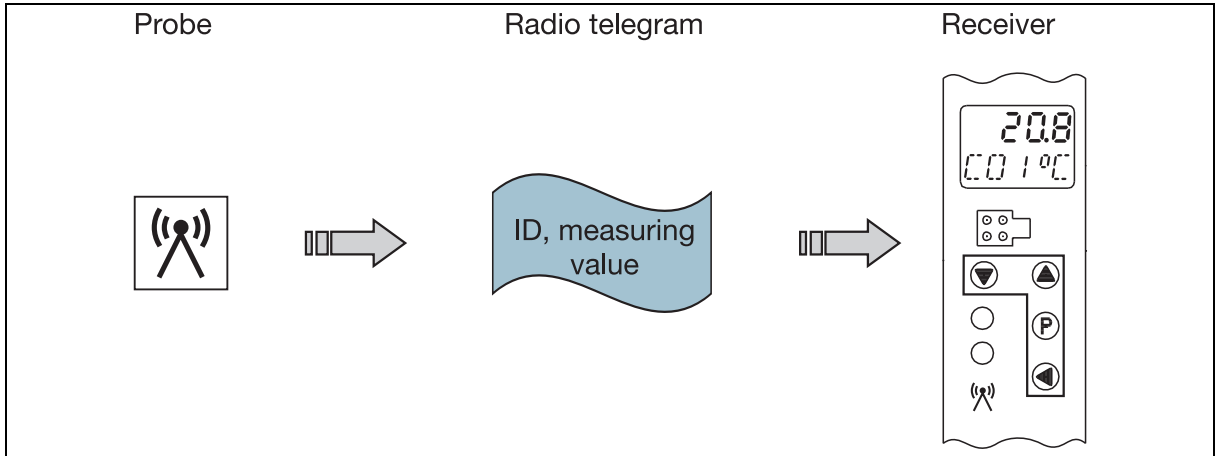


Figure 7: The telegrams of a probe reach the receiver without collisions.

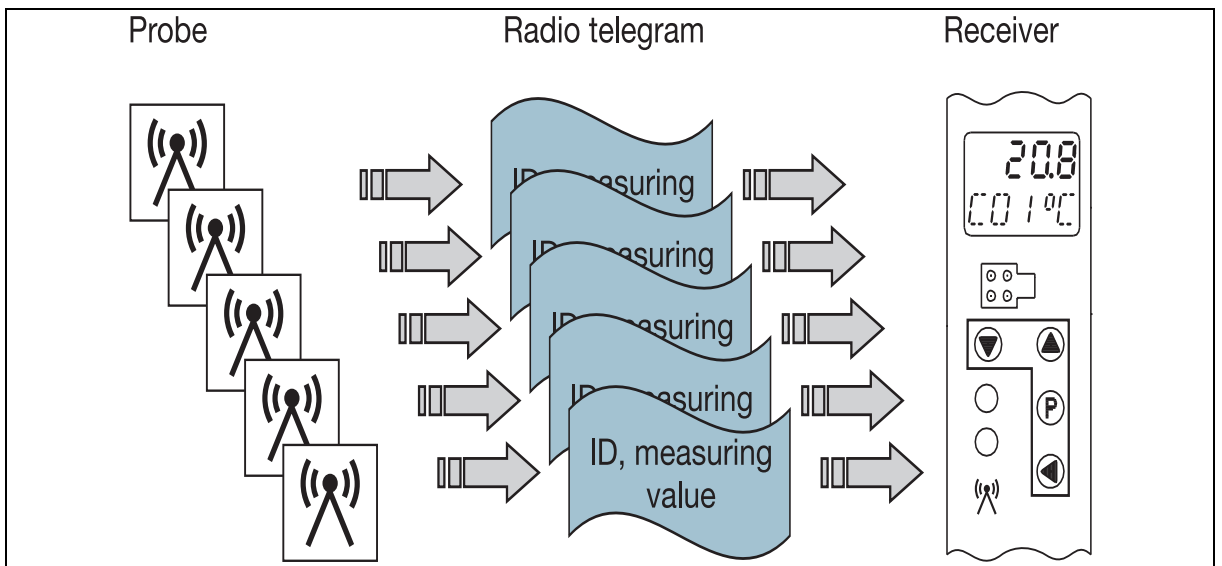


Figure 8: Telegrams of several probes can collide.

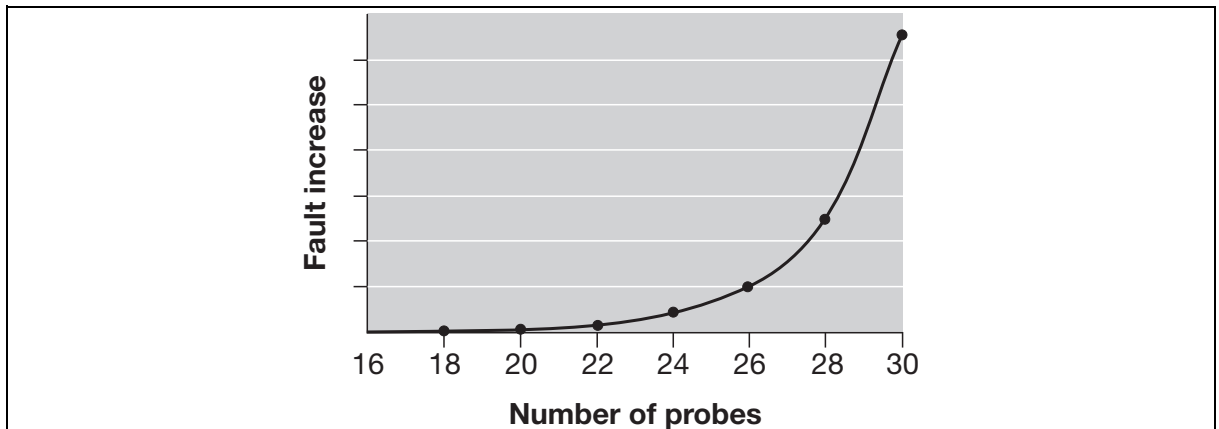


Figure 9: Collisions depending on the number of probes at a transmission interval of 1 s

As the figure shows 9, the error curve increases sharply once 24 probes are reached. For this reason, we recommend using a maximum of 16 probes for the smallest transmission interval of 1 s. For the factory setting of 10 s, a considerably larger number of probes is possible.

Estimation of the maximum number of probes

If more than the recommended 16 probes are to be used at a transmission interval of 1 s, select a higher transmission interval to prevent an increased error quota.

Example:

16 transmitters with a transmission interval of 1 s = 32 transmitters with a transmission interval of 2 s

When the number of probes is to be increased additionally, the following calculation results in the next example:

Example:

16 transmitters with a transmission interval of 1 s = 48 transmitters with a transmission interval of 3 s (in theory)

However, from a transmission interval of ≥ 3 s, the telegram is transmitted twice. For this reason, the number of probes to be used is cut in half.

16 transmitters with a transmission interval of 1 s = 24 transmitters with a transmission interval of 3 s (effective)

The identical behavior occurs from a transmission interval of ≥ 60 s. From this transmission interval, the telegram is transmitted three times.

External probes

The ISM band can also be used freely by other devices. External probes can transmit on the same frequency. If, for example, the probe and an external probe transmit their radio telegrams at the same time, the telegrams are destroyed. Due to the fact, that the probes are not able to check their own active transmission, no error is detected.

Electrical devices

In a rough industrial environment, radio telegrams can be destroyed, for example, by frequency converters, electrical welding equipment or poorly shielded PCs, audio/video devices, electronic transformers, electronic ballasts, etc.

4 Probe range

Error map-out

The radio transmission timeout parameter on the receiver can be used to map out lost telegrams (either by external influence or collisions caused by a large number of probes) and no error message appears. The value received last is retained over 2 to 10 transmission intervals and the alarm radio transmission timeout is only then activated (display "----").



TIP!

In the event of collisions caused by an excessive number of probes, observe and, if necessary, correct the factors "number of probes", "transmission intervals" and, on the receiver, "radio transmission timeout".

5.1 Information about fastening, securing and arrangement

**TIP!**

When fastening or securing a probe to prevent dropping, ensure that the plastic housing is not wrapped with metallic objects (e.g. chains or circlips). Non-observance will lead to impaired probe range.

**TIP!**

For optimum probe function ensure a minimum spacing of 200 mm between the probes.

**TIP!**

To prevent damage to the sheath, do not subject the probe to undue force when pushing into solid media.

5 Installation

5.2 Wall holder dimensions

Wall holder for sheath diameter 4 mm, 4.5 mm, 6 mm and 12 mm

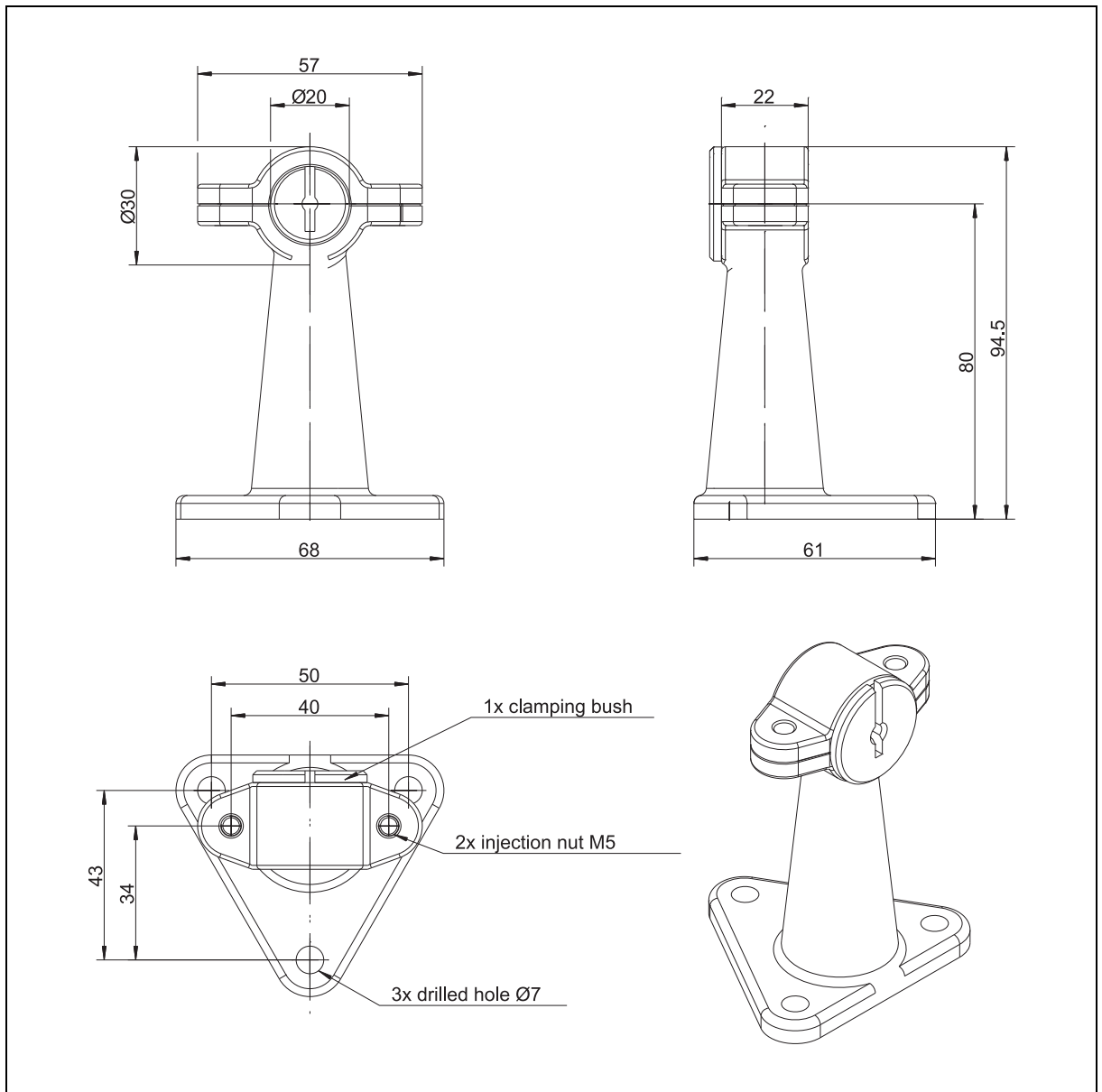


Figure 10: Wall holder dimensions

5.3 Fitting the wall holder and probe

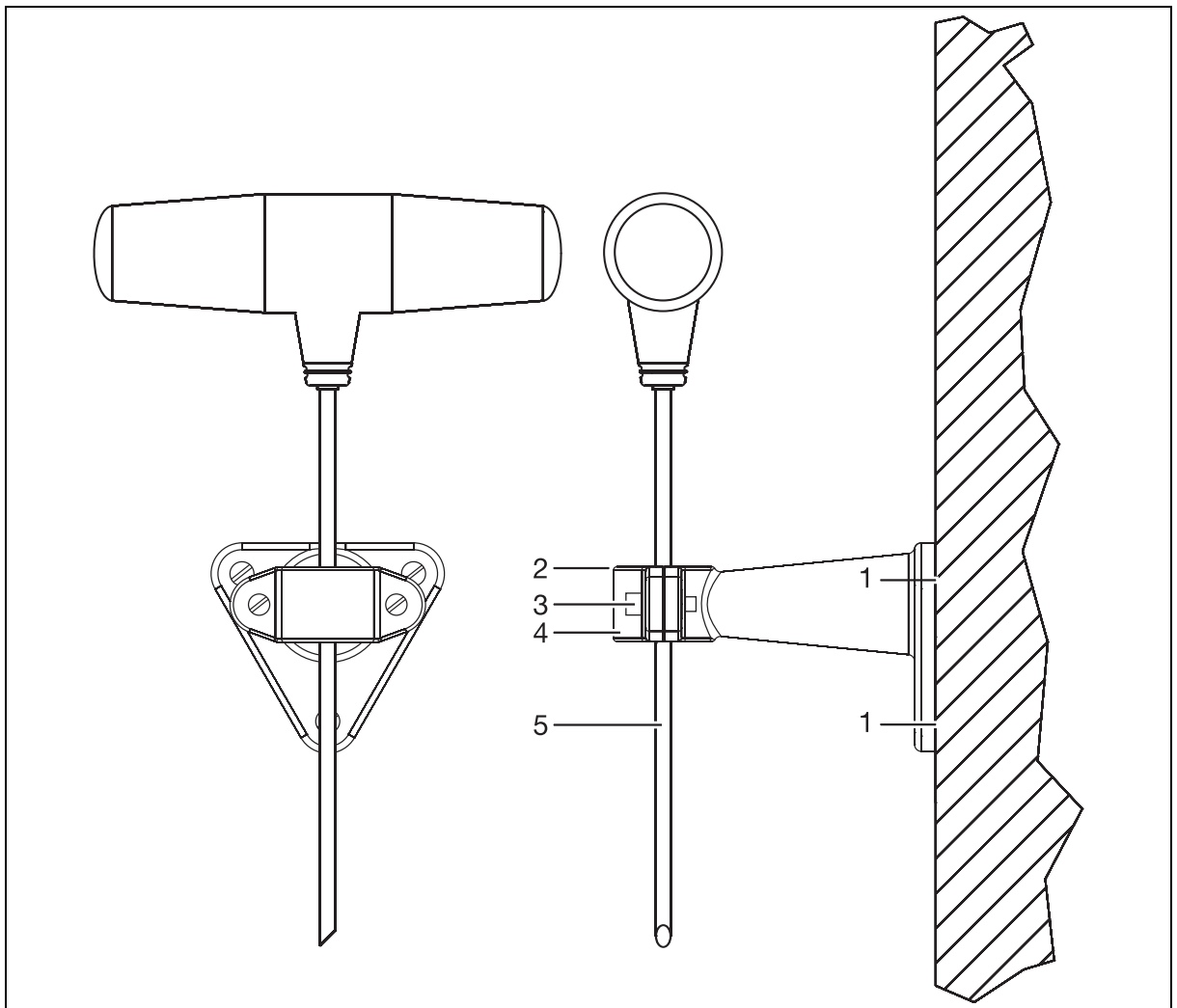


Figure 11: Fitting the wall holder and probe

- | | | | |
|---|--|---|-----------------|
| 1 | Holes for wall holder | 4 | Plastic circlip |
| 2 | Clamping bush (use for different sheath diameters) | 5 | Probe sheath |
| 3 | Cheese head screws M 5 | | |

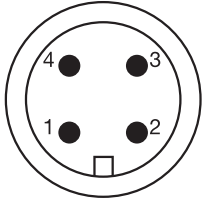
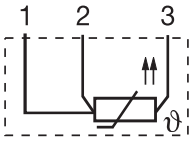
Proceed as follows to install the wall holder and the probe:

| Step | Activity |
|------|---|
| 1 | Fasten the wall holder to the wall using three suitable screws and dowels (not included in the delivery scope). |
| 2 | Insert the clamping bush into the wall holder from above. Align the guide open end in direction to the wall. Slightly tighten the two cheese head screws M 5 using the screwdriver. |
| 3 | Insert the sheath from above into the clamping bush and tighten with the two cheese head screws M 5. |

5 Installation

6 Connection diagram

6.1 Machine connector M 12x1, 4-pin as per IEC 60947-5-2

| | Electrical connection | Connection assignment |
|---|--|---|
|  | Basic type 902930/50 and 902930/60 | |
| | RTD temperature probe in 3-wire circuit (input) |  |



TIP!

For a safe, interference free device operation, only connect shielded measuring inserts with shielded cables and connected shielding on both sides (shielding connected to sheath and to machine connector M 12).

6 Connection diagram

7.1 General information about the setup program

The setup program serves to configure probes and receivers by means of a PC. The configuration data can be archived on data carriers and printed.

Configurable parameters are:

- Probe ID
- Transmission interval
- Transmission frequency (with 915 MHz only)

The factory settings are:

- Probe ID consecutively
- Transmission interval
- Transmission frequency 868.4 MHz (Europe) or 915.4 MHz (America, Australia, Canada, New Zealand); ten frequencies for transmitter and receiver can be set in the 915 MHz frequency band

The setup program can be used to overwrite changed parameters with the factory settings at any time.

The connection between probe and PC is established via a PC interface (USB/TTL or TTL/RS232 converter).

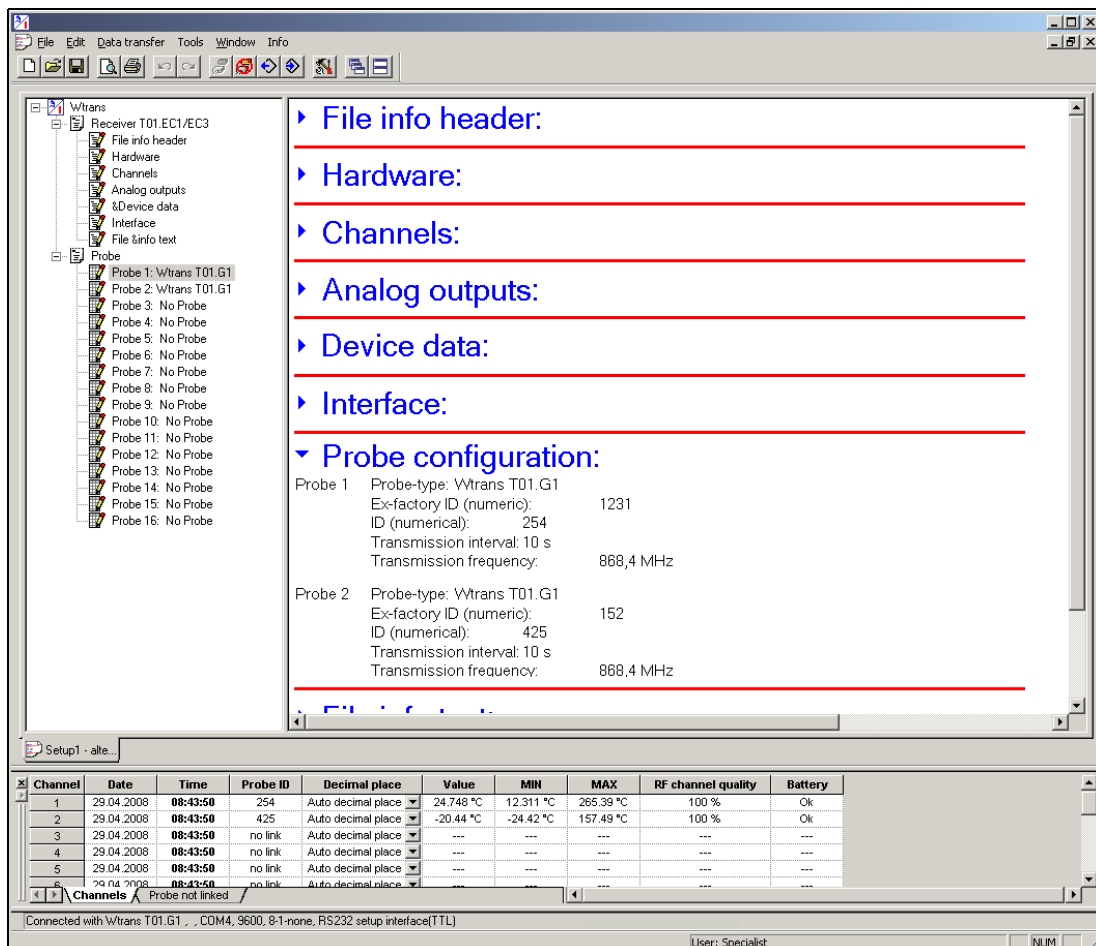


Figure 12: Setup program of the probe

7 Setup program

7.2 Required hardware and software

The following hardware and software prerequisites must be fulfilled for operation and software installation:

Minimum configuration

- Intel Pentium III¹ or higher
- Microsoft Windows 2000 or XP²
- 256 MB central memory
- CD drive
- Mouse
- one free USB port or
- one free serial interface (depending on the interface/port used)
- 120 MB free hard disk memory

Recommended configuration

- Intel Pentium 4¹
- Microsoft Windows XP²
- 512 MB central memory

Information about Windows 2000 or XP

If several users are managed on the computer, ensure that the user is logged in, who will work with the program later. Ensure that the user has administrator rights while installing the software. After installation, the rights can be restricted again.
In the event of non-observance of this information, correct and complete installation cannot be guaranteed!



TIP!

If no communication with the transmitter (probe) or the receiver is possible through the setup program, update the setup program.
The latest setup program is available as download on the manufacturer's internet page.

¹ Intel and Pentium are registered trademarks of Intel Corporation.

² Microsoft and Windows are registered trademarks of Microsoft Corporation.

7.3 Establishing the connection between PC and probe

The connection between probe and PC is established via a PC interface TTL/RS232 converter and adapter (socket) or USB/TTL converter and adapter (socket).



CAUTION!

Permanent interface operation!

The PC interface TTL/RS232 converter or USB/TTL converter is only designed for a time limited interface connection.

Please ensure that the interface connection is disconnected and the probe correctly closed once the setup data transfer is completed.



CAUTION!

Low battery!

A low battery can lead to interface problems and result in an incorrect configuration or data loss.

Please ensure that the battery used for the connection between PC and probe never reaches the "Low battery" status.

7 Setup program

TTL/RS232

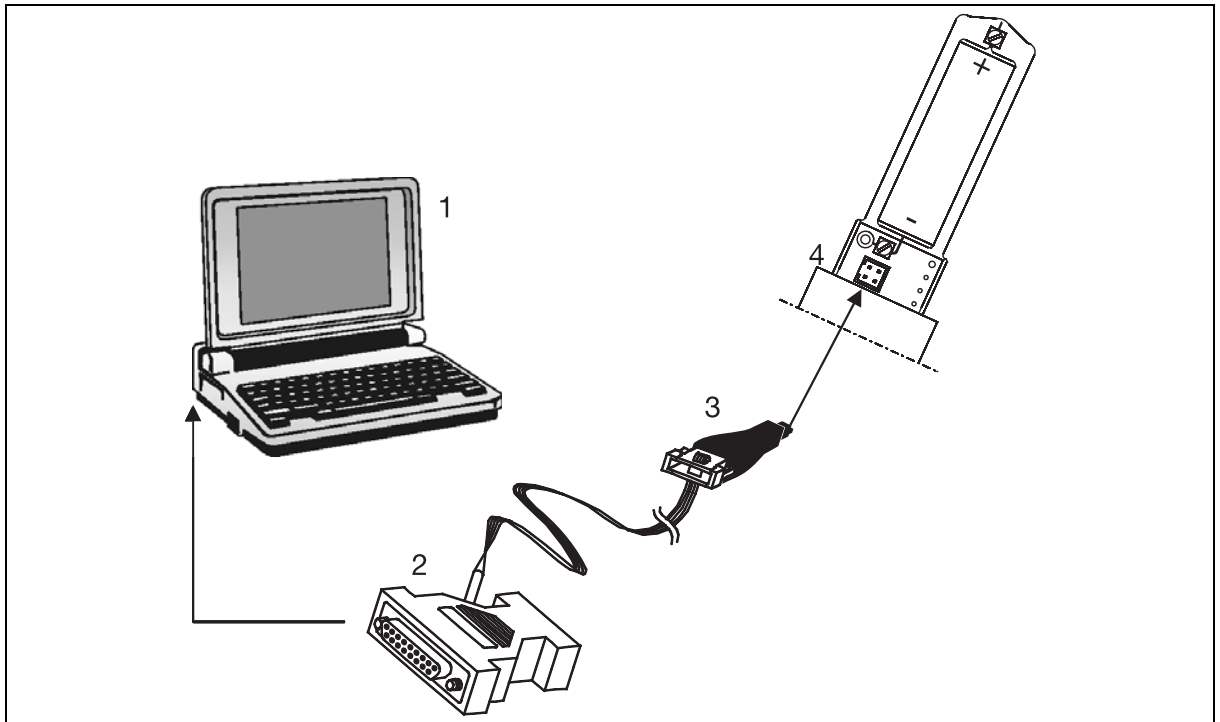


Figure 13: Establishing the connection between PC and probe via the TTL/RS232 converter and adapter socket

- | | | | |
|---|-----------------|---|-----------------------|
| 1 | Laptop/PC | 3 | Adapter socket, 4-pin |
| 2 | RS232 connector | 4 | Probe interface |

For the setup via the TTL/RS232 converter, establish the following connections:

How to proceed:

| Step | Activity |
|------|---|
| 1 | Insert the RS232 plug (2) into the laptop/PC (1). |
| 2 | Open probe. ⇒ Kapitel 3.1 "Fitting/exchanging the battery", Seite 19 |
| 3 | Connect the adapter socket, 4-pin, (3) to the probe interface (4). |

USB/TTL

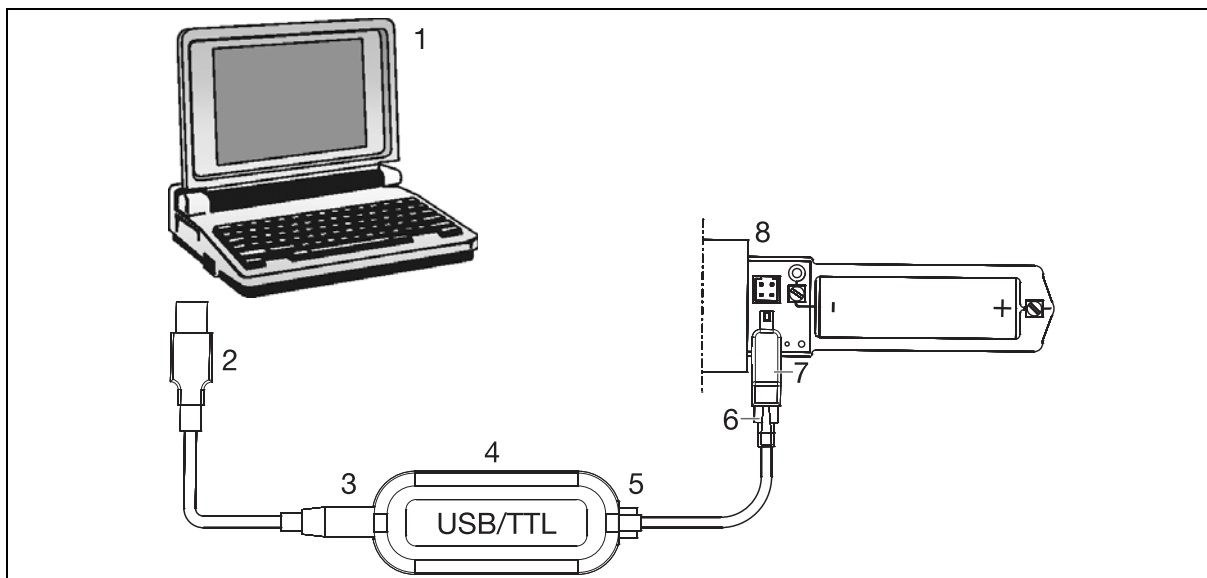


Figure 14: Establishing the connection between PC and probe via the USB/TTL converter and adapter socket

| | | | |
|---|-------------------|---|------------------------------|
| 1 | Laptop/PC | 5 | Modular jack RJ-45 |
| 2 | USB connector | 6 | Adapter of the modular cable |
| 3 | USB socket | 7 | Adapter socket, 4-pin |
| 4 | USB/TTL converter | 8 | Probe interface |

For the setup via the USB/TTL converter, establish the following connections:

How to proceed:

| Step | Activity |
|------|--|
| 1 | Insert the USB plug of the USB cable (2) into the laptop/PC (1). |
| 2 | Open probe. ⇒ Kapitel 3.1 "Fitting/exchanging the battery", Seite 19 |
| 3 | Insert the USB bush of the USB cable (3) into the plug of the USB/TTL converter (4). |
| 4 | Insert the modular jack RJ-45 (5) of the modular cable into the bush RJ-45 of the USB/TTL converter (4). |
| 5 | Connect the 4-pin adapter bush (7) to the adapter of the modular cable (6). |
| 6 | Connect the adapter socket, 4-pin, (7) to the probe interface (8). |

7 Setup program

7.4 Probe configuration

This chapter explains the configuration of a probe via the setup program. Prerequisite being that the probe and the PC are connected via an interface.

7.4.1 Establishing the communication

A differentiation is made between two different way of proceeding when establishing the communication between probe and setup program:

- Establish the communication with "Device settings assistant".
This is the case when the setup program is used for the first time (list of devices empty).
- Establish the communication without "Device settings assistant".
This is the case when the receiver/probe and setup program have already communicated (list of devices with entries).

Establishing the communication using the assistant

How to proceed:

| Step | Activity |
|------|---|
| 1 | Start the setup program. |
| 2 | Select the "Establish connection" function in the "Data transfer" menu. <i>The "Assistant for the device settings" appears.</i> |
| 3 | Select the probe under the "Device version" and confirm by pressing "Continue". |
| 4 | Confirm the PC communication interface "Serial interface" by pressing "Continue". |
| 5 | Select the serial interface (e.g. COM1) and confirm with "Continue". |
| 6 | Confirm the MU protocol (transmitter) by pressing "Continue". |
| 7 | Exit the assistant by pressing "Finish". <i>The device list with the selected probe appears.</i> |
| 8 | Click on the "Connect" button. <i>The device list is closed, the assistant terminated and the communication between probe and setup program established.</i> |

Establishing the communication without using the assistant

How to proceed:

| Step | Activity |
|------|---|
| 1 | Start the setup program. |
| 2 | Select the "Establish connection" function in the "Data transfer" menu. <i>The device list containing all devices entered is mapped in.</i> |
| 3 | Select the desired probe by clicking with the left mouse key. |
| 4 | Click on the "Connect" button. <i>The device list is closed, the assistant terminated and the communication between probe and setup program established.</i> |

7.4.2 Reading the current probe parameters

How to proceed:

| Step | Activity |
|------|---|
| 1 | In the "File" menu select the "New" function. <i>The "Device assistant" starts.</i> |
| 2 | Confirm the "User-defined setting" by pressing the "Continue" button. |
| 3 | Select the "Frequency band" and confirm with "Continue". |
| 4 | Select the receiver variant and confirm by pressing "Continue". |
| 5 | Exit the overview of the selected settings by pressing "Finish". <i>The current settings are displayed in the setup program.</i> |
| 6 | Select the desired probe from the navigation tree by clicking with the left mouse key. |
| 7 | In the "Data transfer" menu select the "Data transfer from device" function. |
| 8 | Exit the inquiry "Save file" by selecting "Skip". The current probe parameters are downloaded to the setup program. |

7.4.3 Editing probe parameters

How to proceed:

| Step | Activity |
|------|---|
| 1 | Select the probe to be edited from the navigation tree by double clicking with the left mouse key. <i>The "Probe configuration" is opened.</i> |
| 2 | Edit the desired parameters. |
| 3 | Confirm editing with "OK". |
| 4 | Save the parameters in the "File" menu with the "Save" function. |


7 Setup program

7.4.4 Transmitting new parameters to the probe

How to proceed:

| Step | Activity |
|------|---|
| 1 | In the "Data transfer" menu select the "Data transfer to device" function. <i>The current parameters are transmitted to the probe.</i> |
| 2 | Finish the communication between setup program and probe in the "Data transfer" menu using the "Disconnect connection" function. |

7.5 Parameters Overview

| Parameters | Factory setting | Value range/Selection |  |
|------------------------|------------------------|---|---|
| Probe ID | inactive | 1 to 99999 | |
| Transmission interval | 10 s (15 s) | 1 to 3600 s | |
| Transmission frequency | 868.4 MHz 915.4 MHz | 868.4 MHz with 868 MHz hardware | |
| | | 912.6 MHz with 915 MHz hardware 913.0 MHz 913.6 MHz 914.0 MHz 914.6 MHz 915.4 MHz 916.0 MHz 916.4 MHz 917.0 MHz 917.4 MHz | |



TIP!

At a transmission interval of > 15 s, the probe transmits a so-called Link telegram, i. e. the telegrams are transmitted at the factory-set intervals for a period of 30 minutes, afterwards at the set transmission interval.



TIP!

If the setup plug is connected, the probe automatically transmits telegrams with a transmission interval of 1 s to enable the receiver to detect changes. After the setup connector is removed, the telegrams are transmitted again at the set transmission interval.

Term definition

Probe ID

The probe ID is an unmistakable ID with max. 5 characters which is recognized by the receiver. The ID can be individually changed, for example, to achieve a better overview of a system. However, ensure that an ID is only assigned once within the reception range to avoid malfunctions.

Transmission interval

This parameter is used to define the time intervals used to transmit data to a receiver. The setting of the "Transmission interval" parameter affects the battery service life. For this reason, act with caution and do not only consider the transmission quality when selecting the interval.

Transmission frequency

The transmission frequency defines the frequency band used to transmit data to a receiver. The transmission frequency is determined to 868.4 MHz in Europe because special regulations are determined for the ISM band (Industrial-Scientific-Medical-Band) concerning transmission interval and transmission capacity.

In the 915 MHz frequency band, it is possible to select between frequencies.

7 Setup program

8.1 Technical data

Analog input

| | |
|-----------------------------------|---|
| Measuring input | Pt1000 as per DIN EN 60751 in 3-wire circuit |
| Operating temperature range | -30 to +260 °C for basic type 902930/10 and 902930/20 -50 to +600 °C for basic type 902930/12 and 902930/22 -200 to +600 °C for basic type 902930/50 and 902930/60 (refers to the sheath up to approx. 20 mm beneath the handle) |
| Accuracy of the temperature probe | Class A $\pm(0.15 \text{ K} + 0.002 \times \text{ItI})$ ItI = measured temperature in °C without prefix |
| Sensor lead resistance | $\leq 11 \text{ Ohm}$ per lead with 3-wire circuit |
| Probe current | $\leq 500 \mu\text{A}$ |
| Measuring circuit monitoring | Detection of probe break and short-circuit |

Output (radio transmission)

| | |
|---|--|
| Probe ID | max. 5-digit ID, factory setting, customer-specific configuration possible |
| Transmission interval | adjustable from 1 to 3600 s; factory setting for basic type 902930/10, 902930/12 and 902930/50 = 10 s factory setting for basic type 902930/20, 902930/22 and 902930/60 = 15 s |
| Transmission frequency | ISM band 868.4 MHz (Europe); 915 MHz (America, Australia, Canada and New Zealand); ten frequencies can be set in the 915 MHz band |
| Transmission capacity | < + 10 dBm |
| Open air range | 300 m for 868.4 MHz, 100 m for 915 MHz and when using the antenna wall holder for the receiver and the 3 m long antenna cable. When installing the antenna directly onto the receiver, a reduced range of approx. 40 % must be taken into account. |
| Output signal | 882.2 to 1977.1 Ohm = -30 to +260 °C 810.6 to 3137.1 Ohm = -50 to +600 °C 185.2 to 3137.1 Ohm = -200 to +600 °C |
| Response time of the complete probe | $t_{0,9} \leq 10 \text{ s}$ |
| Calibration accuracy of the electronic components | $\leq \pm 0.05 \% ^1$ |
| Configuration | with setup program |
| configurable parameters | Probe ID (max. 5-digit ID), transmission interval, transmission frequency (with 915 MHz only) |

¹ All accuracy specifications in % relating to the measuring range of 290 K or 800 K.

8 Supplement

Voltage supply

| | |
|-----------------|--|
| Lithium battery | Voltage: 3.6 V, Rated capacity: 2.2 Ah for basic type 902930/10, 902930/12 and 902930/50 Voltage: 3.6 V, Rated capacity: 1.7 Ah for basic type 902930/20, 902930/22 and 902930/60 |
| Operating life | approx. 1 year with the factory-set values and at room temperature (a fast transmission interval and a high or low ambient temperature reduce the lithium battery operating life) |
| Battery change | only use the preset lithium battery available as accessories |

Environmental influences

| | |
|--|---|
| Ambient temperature range, handle | -30 to +85 °C (handle including electronic components) for basic type 902930/10, 902930/12 and 902930/50 -25 to +125 °C (handle including electronic components) for basic type 902930/20, 902930/22 and 902930/60 |
| Storage temperature range | -40 to +85 °C (handle including electronic components) for basic type 902930/10, 902930/12 and 902930/50 -40 to +125 °C (handle including electronic components) for basic type 902930/20, 902930/22 and 902930/60 |
| Temperature coefficient | $\leq \pm 0.0025 \%^1/\text{K}$; per K deviation from the reference temperature 22 °C (± 3 K) (handle) |
| Environmental performance | rel. humidity ≤ 95 % without condensation as per IEC 68-2-30 |
| Vibration proof design | max. 2 g at 10 to 2000 Hz (relating to the handle including electronic components) as per IEC 60068-2-6 |
| Admissible mechanical shock resistance | 25 g/6 ms (relating to the handle including electronic components) DIN IEC 68-2.29 per 1000 cycles |
| EMC - emitted interference - interference resistance - radio frequency spectrum | DIN EN 61326-1 Class A - For industrial applications only - Industrial requirements ETSI EN 300 220-1 and ETSI EN 300 220-2 |

¹ All accuracy specifications in % relating to the measuring range of 290 K or 800 K.

Case

| | |
|-----------------------|--|
| Material | PEI (Polyetherimid) |
| Flammability class | UL 94 HB |
| Dimensions | Diameter approx. 32 mm, length approx. 126 mm for all basic types Fitting length of the sheath 50 to 1000 mm for basic type 902930/10, 902930/12, 902930/20 and 902930/22 Fitting length of the sheath 50 to 10000 mm for basic type 902930/12 and 902930/22 |
| Protection rating | IP67 as per DIN EN 60529 for basic type 902930/10, 902930/12, 902930/20 and 902930/22 For basic type 902930/50 and 902930/60 only with the machine connector M 12x1 connected |
| Installation position | any |
| Weight | approx. 120 g |

Approval/approval marks

| Approval marks | Inspection authority | Certificats/ Certification numbers | Inspection basics | valid for |
|----------------|-----------------------------------|--------------------------------------|---|-----------------------------------|
| c UL us | Underwriters Laboratories | E201387-A1-UL-1 | UL 61010-1 CAN/CSA-22.2 No. 61010-1 | 3.6 V, Basic type 902930/10 |
| IC | Industry Canada | 7472A-WTRANST01 7472A-WTRANST0102 | RSS210 Issue 7 RSS210 Issue 8 | 915 MHz |
| FCC | Federal Communications Commission | VT4-WTRANST01 VT4-WTRANST01-02 | FCC Rule Part 15C | 915 MHz |



JUMO GmbH & Co. KG

Street address:

Moritz-Juchheim-Straße 1
36039 Fulda, Germany

Delivery address:

Mackenrodtstraße 14
36039 Fulda, Germany

Postal address:

36035 Fulda, Germany

Phone: +49 661 6003-0

Fax: +49 661 6003-607

e-mail: mail@jumo.net

Internet: www.jumo.net

JUMO Instrument Co. Ltd.

JUMO House

Temple Bank, Riverway
Harlow, Essex CM20 2DY, UK

Phone: +44 1279 635533

Fax: +44 1279 635262

e-mail: sales@jumo.co.uk

Internet: www.jumo.co.uk

JUMO Process Control, Inc.

8 Technology Boulevard
Canastota, NY 13032, USA

Phone: 315-697-JUMO
1-800-554-JUMO

Fax: 315-697-5867

e-mail: info@jumo.us

Internet: www.jumo.us

