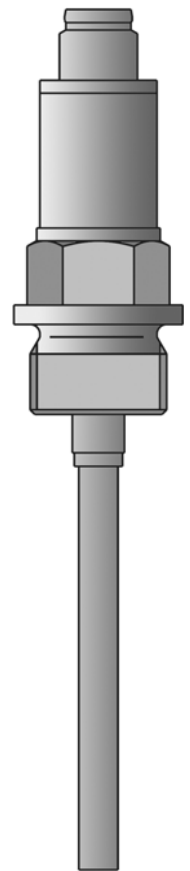


# **JUMO Dtrans T100**

## Screw-In RTD Temperature Probe with Transmitter



Operating manual



90281500T90Z001K000

V1.00/EN/00495568

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# 1 Introduction

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The screw-in RTD temperature probe in a compact design comprises a protection tube with integrated temperature sensor, a process connection, and an attached housing for the transmitter electronics. The integrated programmable two-wire transmitter converts the resistance value into a current signal.

The screw-in RTD temperature probe with programmable two-wire transmitter is used to measure temperatures from -50 to +150 °C (-58 to +302 °F), and up to 260 °C (500 °F) with an extension tube.

The measuring range, fine adjustment, or measuring circuit monitoring etc. can be configured with a setup program.

The output signal (4 to 20 mA or reversed, 20 to 4 mA), is available in a linearized manner (temperature-linear). The device is designed for industrial applications and complies with the European standards to guarantee electromagnetic compatibility (EMC).

**The transmitter must be protected from temperatures above 85 °C!**

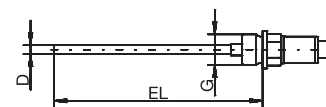
**Also available as an ATEX/IECEX RTD temperature probe upon request.**

## 2 Identifying the device version

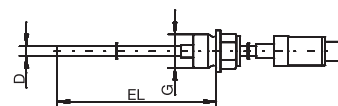
### 2.1 Order details

#### (1) Basic type

902815/20 Screw-in RTD temperature probe<sup>a</sup>  
with programmable transmitter,<sup>b</sup>  
connection M12 × 1 machine connector



902815/21 Screw-in RTD temperature probe<sup>a</sup>  
with programmable transmitter,<sup>b</sup>  
connection M12 × 1 machine connector,  
high-temperature version with extension  
tube



#### (2) Operating temperature in °C

X	370	-50 to +150 °C (max. transmitter temperature 85 °C)
X	386	-50 to +260 °C (max. transmitter temperature 85 °C)

#### (3) Measuring insert

X	X	1013	1 × Pt1000 in four-wire circuit
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#### (4) Tolerance class according to DIN EN 60751

X	X	2	Class A
---	---	---	---------

#### (5) Protection tube diameter D in mm

X	X	6	Ø 6 mm
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#### (6) Insertion length EL in mm (EL 50 to 500 mm)

X	X	50	50 mm
X	X	100	100 mm
X	X	150	150 mm
X	X	200	200 mm
X	X	...	Specification in plain text (50 mm increments)

<sup>a</sup> This JUMO product is licensed under American and Canadian patents. Purchasers of the JUMO product outside of the United States and Canada should inform JUMO of any planned sales of the products into the United States and Canada.

<sup>b</sup> Specify measuring range in plain text.



## 2 Identifying the device version

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### 2.2 Scope of delivery

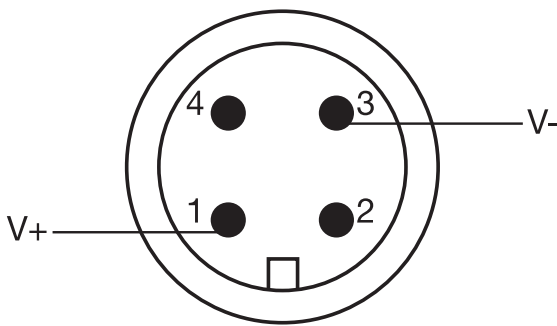
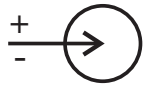

- 1 device in the ordered version
- 1 operating manual

### 2.3 Accessories for programmable transmitter

- Setup program on CD-ROM, multilingual, part no. 00485016
- Configuration cable, 4-pole, with connector and socket M12 × 1 and Western plug RJ-45, part no. 00484692
- PVC connecting cable, 4-pole with socket M12 × 1, length 2000 mm, part no. 00404585
- 5-pole cable socket M12 × 1, straight, without connecting cable for self-assembly, part no. 00419130
- 5-pole cable socket M12 × 1, angled, without connecting cable for self-assembly, part no. 00419133
- PC interface with USB/TTL converter and USB cable, part no. 00456352
- Power supply units for transmitter, single and 4-fold (data sheet 707500)
- Repeater power supply/input isolating amplifier for galvanic isolation of standard signals and voltage supply for two-wire transmitter (data sheet 707530)

## 3 Installation

### 3.1 Connection diagram

<b>Machine connector M12 × 1, 4-pole according to IEC 60947-5-2</b>	
	
<p><b>Warning:</b> Do not connect pin 2 and pin 4 to voltage!</p>	
Electrical connection	Terminal assignment
Voltage supply DC 8 to 35 V <div style="display: inline-block; vertical-align: middle; margin-left: 20px;">  </div>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">             1 ○   V+           </div> <div style="text-align: center;">             3 ○   V-           </div> </div>
Current output 4 to 20 mA <div style="display: inline-block; vertical-align: middle; margin-left: 20px;">  </div>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">             2 ○             </div> <div style="text-align: center;">             4 ○             </div> </div>
Setup communication via special configuration cable (only for configuration - continuous operation is not admissible)	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">             2 ○             </div> <div style="text-align: center;">             4 ○             </div> </div>



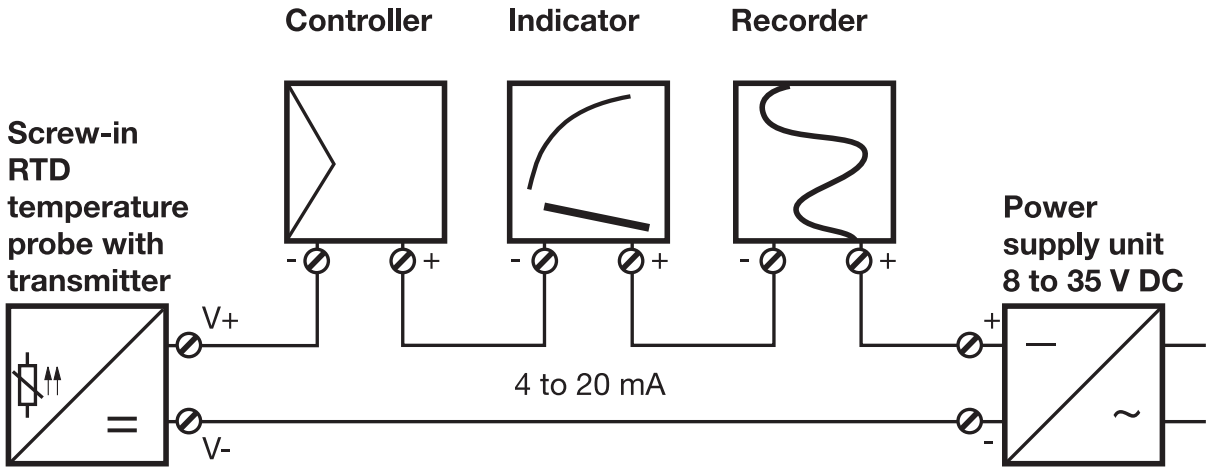
**Caution:**

Once the machine connector has been correctly inserted, take care to ensure the prescribed voltage supply and correct pin assignment during the connection process, otherwise the device will be destroyed.

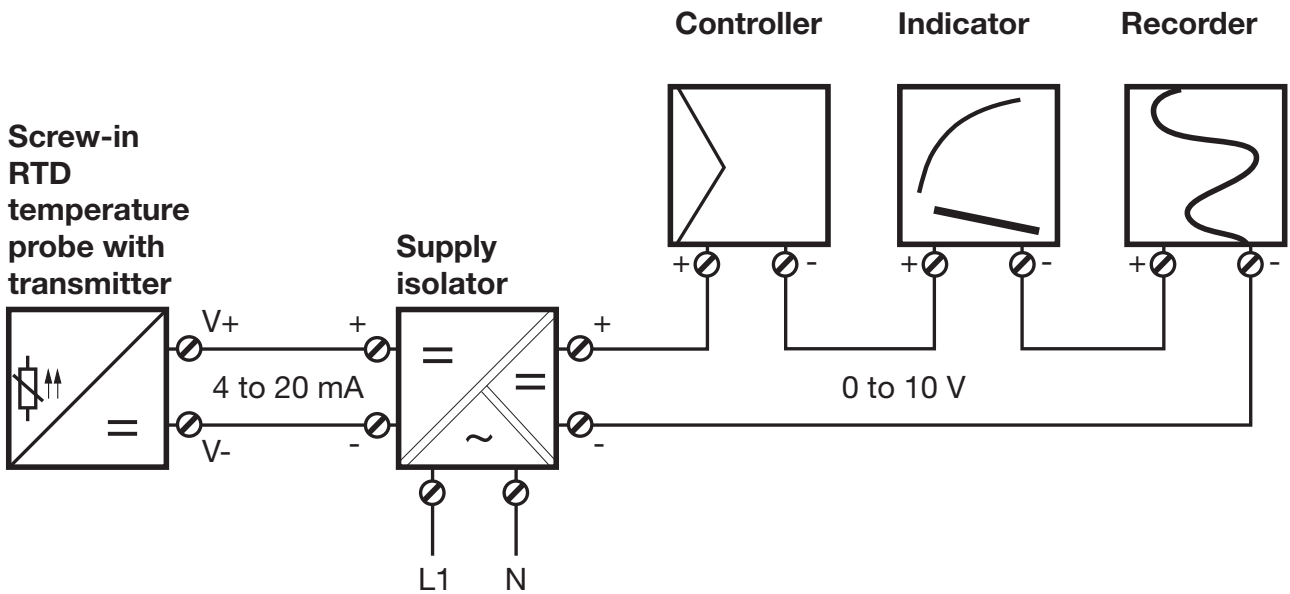


# 3 Installation

## 3.2 Connection example with power supply unit



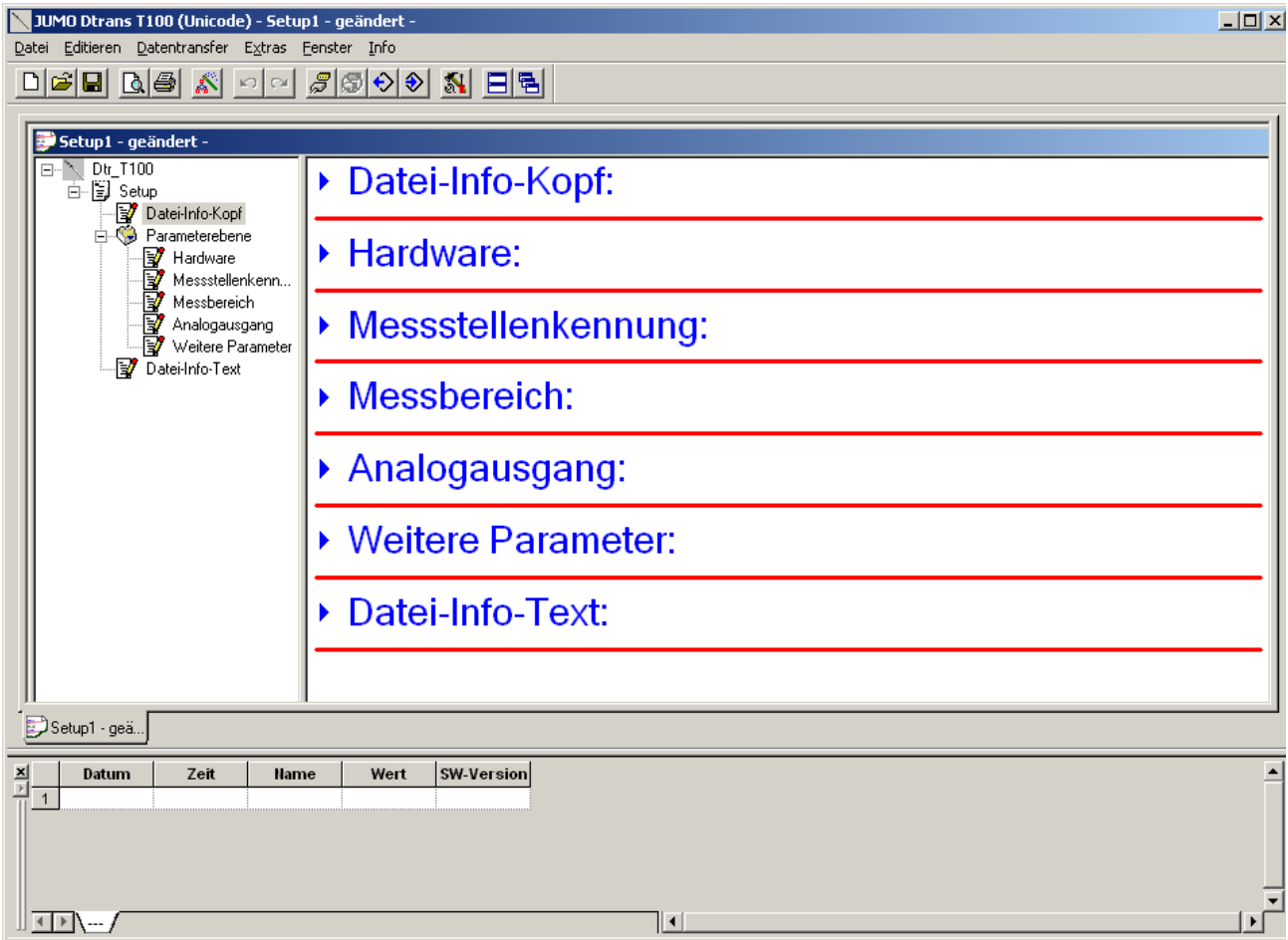
## 3.3 Connection example with supply isolator



## 4 Setup program

### Configuration via PC

The setup program is used to configure the programmable two-wire transmitter using a PC. The connection is made by means of a special configuration cable (4-pole with connector and socket M12 × 1 and a Western plug RJ-45 with the part no. 00484692). The 2000 mm long PVC connecting cable is also required. The PC interface with USB/TTL converter and USB cable is required in order to connect to the PC (see also the accessories for the programmable two-wire transmitter).



The two-wire transmitter must be connected to a voltage supply for configuration. If no power supply unit or supply isolator is available, it can also be supplied using a 9 V block battery.

## 4 Setup program

---

### 4.1 Configurable parameters

<b>Setup levels</b>	<b>Parameter</b>	<b>Value range</b>	<b>Default setting</b>
Hardware	Device type	-	-
Measuring point identification	TAG number	-	-
Measuring range configurable in °C or °F	Offset Measuring range start Measuring range end	-50 +150 or +260 °C with extension tube	0.0 °C 0.0 °C 100.0 °C
Analog output	Reversion of output Signal in case of probe break or short circuit	4 to 20 mA/ 20 to 4 mA < 3.8 mA/ > 21 mA	4 to 20 mA > 21 mA
Other parameters	Filter time constant Unit	0 s/ ... / ... 125 s °C/°F	0.1 s °C

## 4 Setup program

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### 4.2 Hardware and software requirements

- The hardware and software requirements can be obtained from the manufacturer's website.

### 4.3 Note on Windows® user management

If several users are managed on the PC, the user who intends to work with the program must be logged in during installation. The user must have administrator rights during installation. Failure to observe this information means that correct and complete installation cannot be guaranteed!

### 4.4 Fine adjustment

Fine adjustment means a correction of the output signal. Fine adjustment is carried out with the setup program. The 4 mA value (zero point) and the 20 mA value (end value) can be separately adjusted with the setup program.

## 4 Setup program

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### 4.5 Connection diagram

#### Usage

- The PC interface with USB/TTL converter is only designed for service use over a limited period, such as the transfer of setup data.
- It links JUMO devices to a PC through a galvanically isolated connection. The Western plug RJ-45 is intended specifically for JUMO devices and not for third-party equipment.



Do not mix up the socket RJ-45 with an ISDN or network connection.

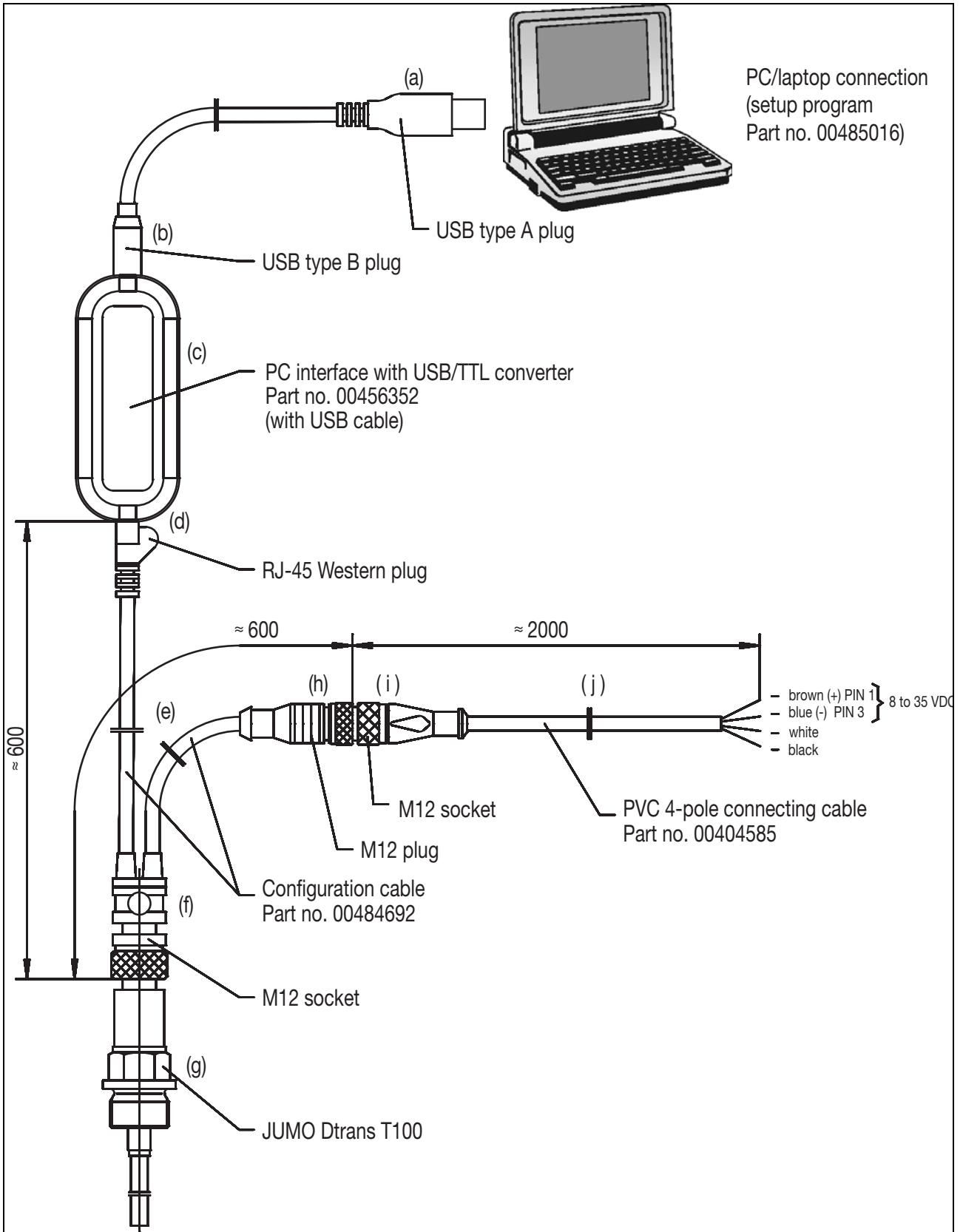
To perform the setup, establish the following connections:

1. Connect USB connector type A (a) to the PC/laptop. Then connect USB connector type B (b) to the PC interface with USB/TTL converter (c).  
This ensures safe grounding for the PC/laptop.
2. Connect the Western plug RJ-45 (d) of the configuration cable (e) to the PC interface with USB/TTL converter (c). Connect the socket M12 × 1 (f) to the JUMO Dtrans T100 (g).
3. Connect the socket M12 × 1 (i) of the PVC connecting cable (j) to the connector M12 × 1 (h) of the configuration cable (e).
4. Connect the DC 8 to 35 V voltage supply to the PVC connecting cable (j).



Remove the modular cable (not shown as it is not required for this setup) of the PC interface with USB/TTL converter including two adapters (socket and pins) (required for other devices).

# 4 Setup program

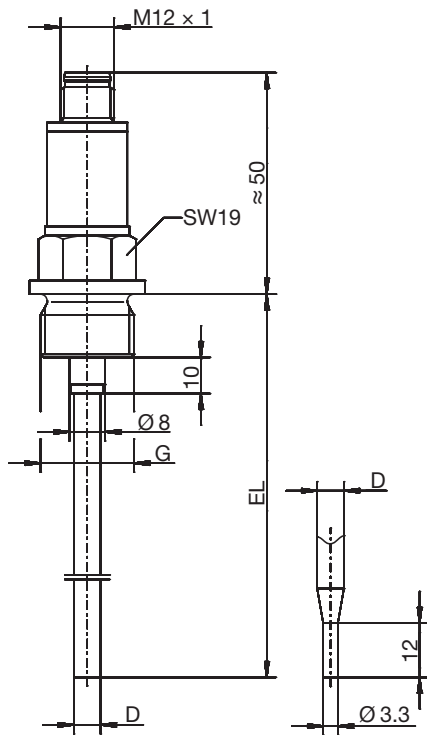


**Figure 1: Connection diagram for setup with JUMO Dtrans T100**

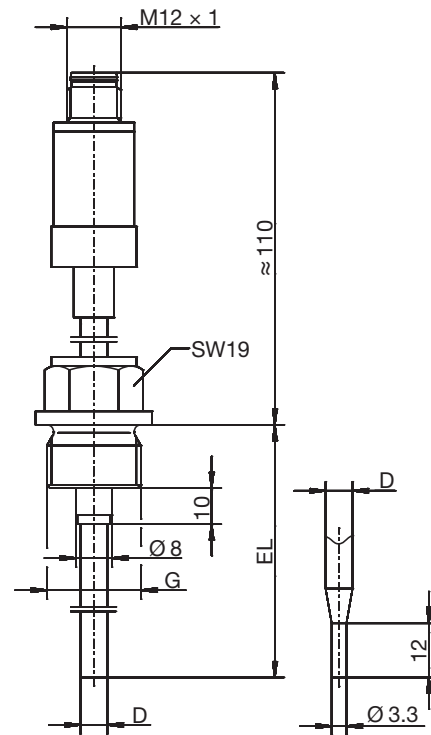
# 5 Dimensions

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## 5.1 Basic types



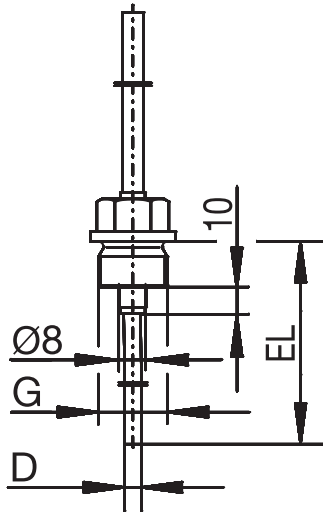
**Basic type 902815/20  
with process connection  
PA 104**



**Basic type 902815/21  
with process connection  
PA 104**

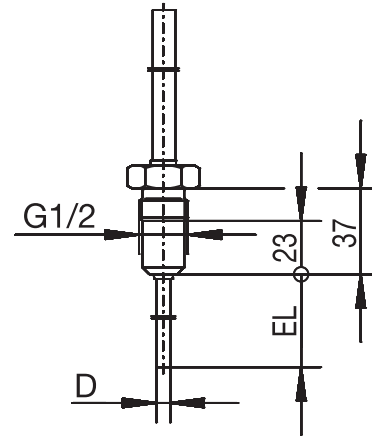
# 5 Dimensions

## 5.2 Process connections PA



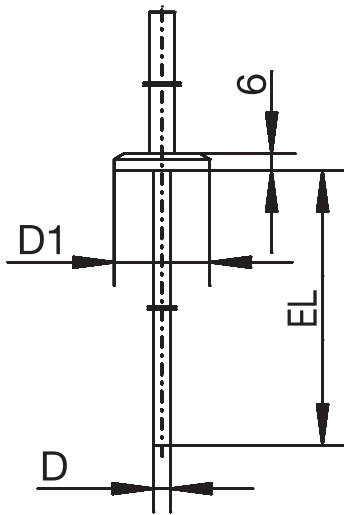
PA	G
103	3/8
104	1/2

**Screw connection**



PA	
380	

**Screw connection with CIP-compliant conical seal**

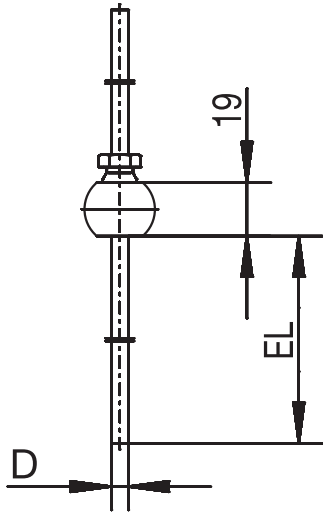


PA	DN	D1	PA	DN	D1
-	-	Ø 25	613	40/1.5"	Ø 50.5
611	10/20	Ø 34	616	50/2"	Ø 64
613	25/1"	Ø 50.5	617	2.5"	Ø 77.5

**Clamping socket according to DIN 32676 (clamp)**

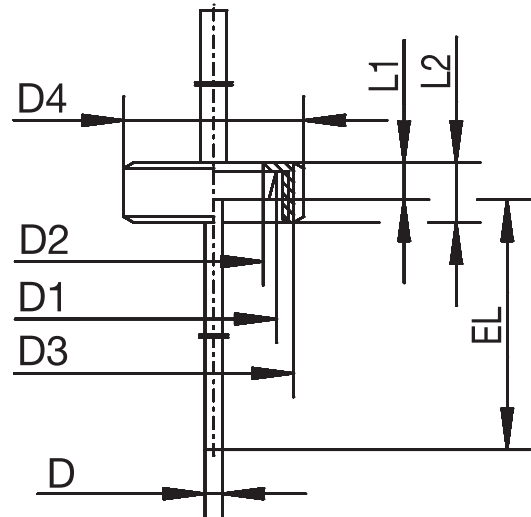


## 5 Dimensions



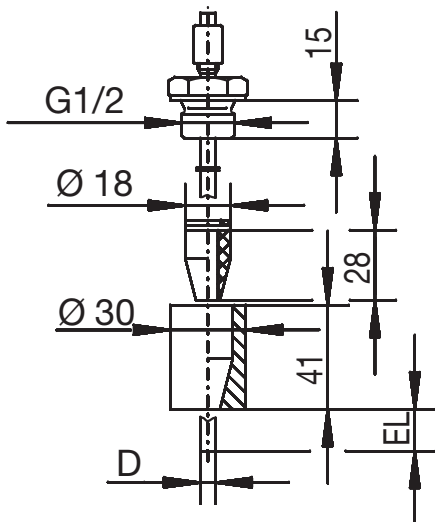
PA	
681	

**Ball welding socket  
with threaded fitting**



PA	DN	D1	D2	D3	D4	L1	L2
601	10	Ø 22	Ø 18	RD 28 × 1/8	Ø 38	9	18
604	25	Ø 44	Ø 35	RD 52 × 1/6	Ø 63	13	21
605	32	Ø 50	Ø 41	RD 58 × 1/6	Ø 70	13	21

**Taper socket  
with union nut  
according to DIN 11851  
(dairy pipe fitting)**

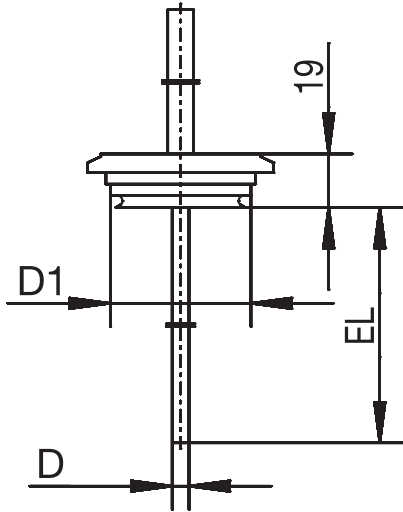


PA	
682	

**Welding socket  
with CIP-compliant conical seal**

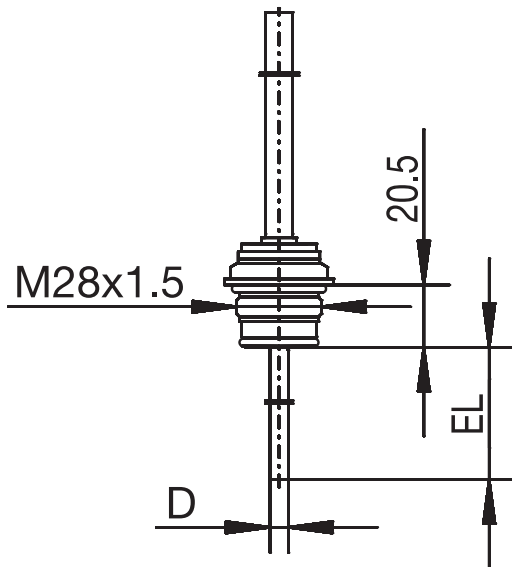
## 5 Dimensions

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PA	DN	D1
684	15/10	Ø 31
685	32/25	Ø 50
686	50/40	Ø 68

### VARIVENT® connection



VARIVENT®	Clamp	Aseptic	Welding socket
DN 25/32	DN 25/32/40	DN 40	Ø 55 mm
DN 40-125	DN 50	DN 50	-
-	-	NKS DN 40	-

**JUMO PEKA PA 997**  
**hygienic process connection,**  
**see data sheet 409711**

## 6 Technical data

Electrical connection	Machine connector M12 × 1, 4-pole according to IEC 60947-5-2
Process connections	Screw connection G 3/8 Screw connection G 1/2 Screw connection G 1/2 with CIP-compliant conical seal Taper socket with union nut (dairy pipe fitting) Clamping socket (clamp) DIN 32676 Ball welding socket with threaded fitting Welding socket with CIP-compliant conical seal VARIVENT® <sup>1</sup> connections Ball welding sleeve JUMO PEKA hygienic process connection
Protection tubes	Stainless steel 316L material-no. 1.4404/ 1.4435 Stainless steel 316Ti material-no. 1.4571 (upon request)
Protection type	IP67 according to DIN EN 60529 with inserted machine connector
Response times	Standard protection tube $t_{0.5} = 5 \text{ s}$ ; $t_{0.9} = 12 \text{ s}$ ; in water 0.4 m/s Stepped down protection tube $t_{0.5} = 2 \text{ s}$ ; $t_{0.9} = 5 \text{ s}$ ; in water 0.4 m/s Standard protection tube $t_{0.5} = 40 \text{ s}$ ; $t_{0.9} = 110 \text{ s}$ ; in air 3.0 m/s Stepped down protection tube $t_{0.5} = 21 \text{ s}$ ; $t_{0.9} = 70 \text{ s}$ ; in air 3.0 m/s

1.VARIVENT® is a registered trademark of GEA Tuchenhausen.

## 7 Technical data (general)

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### Input

Measurement input	Pt1000 temperature sensor, DIN EN 60751, class A, four-wire circuit
Measuring ranges	
Basic type 902815/20	-50 to +150 °C
Basic type 902815/21	-50 to +260 °C with extension tube
Limit deviations in °C	Class A: $\pm(0.15 + 0.002 \times  t )$ °C <sup>1</sup>

1. |t| = temperature in °C regardless of prefix sign.

### Environmental influences

Ambient temperature range of the head	-30 to +85 °C
Storage temperature range	-30 to +90 °C
Resistance to climatic conditions	According to IEC 60068-2-30 (relative humidity $\leq 95$ % with condensation)
Vibration resistance	According to IEC 60068-2-6 (according to GL characteristic line)

## 8 Technical data (transmitter)

### Input

Smallest measuring span	10 K
Sampling rate	1 measurement per second
Input filter	Digital filter 1st order, filter constant can be set from 0 to 125 s

### Measuring circuit monitoring

Measuring range underflow	Linear decrease to 3.8 mA (according to NAMUR recommendation 43)
Measuring range overflow	Linear increase to 20.5 mA (according to NAMUR recommendation 43)
Probe short circuit/ probe/cable break	$\leq 3.6$ mA or $\geq 21.0$ mA (configurable)
Current limiting in the event of probe short circuit or probe break	$\leq 25$ mA

### Output

Output signal	Load-independent direct current 4 to 20 mA, 20 to 4 mA
Transmission behavior	Temperature-linear
Maximum burden ( $R_B$ )	$R_B = (U_b - 8 \text{ V}) \div 23 \text{ mA}$ , max. 600 $\Omega$
Burden influence	$\leq \pm 0.02$ % per 100 $\Omega$ <sup>1</sup>
Setting time for temperature changes	$\leq 5$ s
Setting time after switch-on or reset	$\leq 5$ s
Electronic measuring accuracy	0.1 K or 0.08 % <sup>2,3</sup>

1. %-specifications refer to the measuring range end value of 20 mA.

## **8 Technical data (transmitter)**

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2. %-specifications refer to the set measuring span; the greater value is valid.
3. The deviation of the temperature sensor must be added to ensure the measuring accuracy of the transmitter.

## 8 Technical data (transmitter)

### Electrical data

Voltage supply ( $U_b$ )	DC 8 to 35 V (pin 1 = +, pin 3 = -), use only with SELV or PELV supply systems (according to DIN EN 61140)
Protection rating	III (according to DIN EN 61140)
Galvanic isolation	No galvanic isolation between sensor and output
Insulation resistance	> 100 M $\Omega$ at DC 100 V measured at room temperature between connection terminals and housing
Reverse voltage protection	Yes
Influence of the voltage supply	$\leq \pm 0.01$ % per V deviation from 24 V <sup>1</sup>

1. %-specifications refer to the measuring range end value of 20 mA.

### Environmental influences

Ambient temperature influence	$\leq \pm(15 \text{ ppm/K} \times (\text{measuring range end value} + 200) + 50 \text{ ppm/K} \times \text{set measuring range}) \times \Delta v$ $\Delta v$ = deviation of ambient temperature from reference temperature
Calibration/reference conditions	DC 24 V at 25 °C $\pm$ 5 °C (77 °F $\pm$ 9 °F)
Electromagnetic compatibility (EMC) Interference emission Interference immunity	DIN EN 61326 Class B Industrial requirements













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