

JUMO Dtrans T100

Screw-In RTD Temperature probe
with Transmitter



Operating Manual



90281500T90Z001K000

V2.00/EN/00495568/2022-08-17

1	Introduction	4
2	Identifying the device version	5
2.1	Order details	5
2.2	Accessories	8
3	Connection diagram	9
3.1	Connection examples	9
4	Setup program	10
4.1	Configurable parameters	11
4.2	Hardware and software requirements	11
4.3	Note on Windows user management	11
4.4	Fine adjustment	11
4.5	Connection diagram	12
5	Dimensions	14
5.1	Basic types	14
5.2	Process connections	15
6	Technical data	18
6.1	General Information	18
6.1.1	Input	18
6.1.2	Environmental influences	19
6.2	Transmitter	19
6.2.1	Input	19
6.2.2	Measuring circuit monitoring	19
6.2.3	Output	19
6.2.4	Electrical data	20
6.2.5	Environmental influences	20
6.3	Approvals and approval marks	20

1 Introduction

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 set-up program.


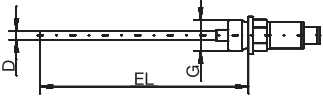
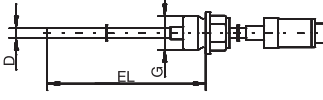
The output signal (4 to 20 mA or reversed, 20 to 4 mA), is available in a linearized manner (temperature-linear). The device is designed for industrial applications and complies with the European standards to guarantee electromagnetic compatibility (EMC).

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		
	902815/10	Screw-in RTD temperature probe without transmitter, connection M12 × 1 machine connector			
	902815/20	Screw-in RTD temperature probe ^a with programmable transmitter ^b , connection M12 × 1 machine connector			
	902815/21	Screw-in RTD temperature probe ^a mit programmierbarem Messumformer ^b , 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	380	-50 to +200 °C			
	386	-50 to +260 °C (max. transmitter temperature 85 °C)	x		
		(3) Measuring insert			
x	1003	1× Pt100 in two-wire circuit			
x	1005	1× Pt1000 in two-wire circuit			
x	1011	1× Pt100 in four-wire circuit			
x	1013	1× Pt1000 in four-wire circuit	x	x	
x	2003	2× Pt100 in two-wire circuit			
x	2005	2× Pt1000 in two-wire circuit			
		(4) Tolerance class according to DIN EN 60751			
x	1	Class B			
x	2	Class A	x	x	
x	3	Class AA			
		(5) Protection tube diameter D in mm			
x	0	Without protection tube (only with process connection 388)	x	x	
x	6	Ø 6 mm	x	x	
		(6) Insertion length EL in mm (EL 50 to 500 mm)			
x	0	0 mm (only with process connection 388)	x	x	
x	50	50 mm	x	x	
x	100	100 mm	x	x	
x	150	150 mm	x	x	
x	200	200 mm	x	x	
x	...	Specification in plain text (50 mm increments)	x	x	
		(7) Process connection PA			
x	000	Without (for basic type 902815/20 max. transmitter temperature 85 °C)	x	x	
x	103	Screw connection G 3/8"	x	x	
x	104	Screw connection G 1/2"	x	x	
x	380	Screw connection G 1/2" with CIP-compliant conical seal	x	x	
x	387	Screw connection G 1/2" with PEEK sealing	x	x	
x	388	Screw connection G 1/2" with PEEK sealing front-flush	x	x	
x	601	Taper socket with union nut DN 10 DIN 11851 (dairy pipe fitting)	x	x	

2 Identifying the device version

x	x	x	604	Taper socket with union nut DN 25 DIN 11851 (dairy pipe fitting)
x	x	x	605	Taper socket with union nut DN 32 DIN 11851 (dairy pipe fitting)
x	x	x	611	Clamping socket (clamp) DN 10/20 DIN 32676
x	x	x	613	Clamping socket (clamp) DN 25/40 (1"/1.5") DIN 32676
x	x	x	616	Clamping socket (clamp) DN 50 (2") DIN 32676
x	x	x	617	Clamping socket (clamp) 2.5" similar to DIN 32676
x	x	x	681	Ball welding socket with threaded fitting
x	x	x	682	Welding socket with CIP-compliant conical seal
x	x	x	684	VARIVENT® connection DN 15/10
x	x	x	685	VARIVENT® connection DN 32/25
x	x	x	686	VARIVENT® connection DN 50/40
x	x	x	997	JUMO PEKA hygienic process connection
(8) Protection tube material				
x	x	x	24	Stainless steel 316 L (material-no. 1.4404/1.4435)
x	x	x	26	Stainless steel 316Ti (material-no. 1.4571) (upon request)
(9) Extra codes				
x	x	x	000	None
	x	x	100	Customer-specific configuration (specifications in plain text)
x	x	x	310	Protection tube stepped down from Ø 6 mm to Ø 3.5 mm
x	x	x	452	Wetted, electrolytically polished parts, surface roughness Ra ≤ 0.8 mm (without thread and welding seams)
x			658	SIL and PL-compliant in conjunction with safety temperature limiter and safety temperature monitor 70115X
x			659	SIL and PL-compliant in conjunction with temperature transmitter dTRANS T06 SIL according to data sheet 707071
x			665	SIL and PL-compliant in conjunction with DIN rail temperature transmitter dTRANS T07 SIL according to data sheet 707083
x	x	x	810	Welding socket (only for process connection 380)

^a This JUMO product is licensed under United States and Canadian patents. Purchasers of the JUMO product outside of the United States and Canada should advise JUMO of any planned sales of the product in the United States and Canada.

^b Specify measuring range in plain text.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)						
Order code	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	-	<input type="text"/>	/	<input type="text"/>	, ... ^a	
Order example	902815/20	-	370	-	1013	-	1	-	6	-	100	-	104	-	24 / 000

^a State extra codes one after another, separated by commas.

2 Identifying the device version

(1) Basic type

	902815/40	Screw-in RTD temperature probe without transmitter, connection M12 × 1 machine connector and adaptation system for thermowell 902812/10 (please select associated thermowells in data sheet 902812)	
	902815/41	Screw-in RTD temperature probe ^a with programmable transmitter ^b , connection M12 × 1 machine connector and adaptation system for thermowell 902812/10 (please select associated thermowells in data sheet 902812)	
		(2) Operating temperature in °C	
x	380	-50 to +200 °C	
	x	386	-50 to +260 °C (max. transmitter temperature 85 °C)
		(3) Measuring insert	
x	1003	1× Pt100 in two-wire circuit	
x	1005	1× Pt1000 in two-wire circuit	
x	1011	1× Pt100 in four-wire circuit	
x	x	1013	1× Pt1000 in four-wire circuit
x	2003	2× Pt100 in two-wire circuit	
x	2005	2× Pt1000 in two-wire circuit	
		(4) Tolerance class according to DIN EN 60751	
x	1	Class B	
x	x	2	Class A
x	3	Class AA	
		(5) Protection tube diameter D in mm	
x	x	3	Ø 3 mm
		(6) Insertion length EL in mm	
x	x	50	50 mm
x	x	100	100 mm
x	x	150	150 mm
		(7) Process connection PA	
x	x	120	Screw connection M14 × 1 for adapting hygienic thermowells
		(8) Protection tube material	
x	x	20	Stainless steel
		(9) Extra codes	
x	x	000	None
	x	100	Customer-specific configuration (specifications in plain text)
x		658	SIL and PL-compliant in conjunction with safety temperature limiter and safety temperature monitor 70115X
x		659	SIL and PL-compliant in conjunction with temperature transmitter dTRANS T06 SIL according to data sheet 707071
x		665	SIL and PL-compliant in conjunction with DIN rail temperature transmitter dTRANS T07 SIL according to data sheet 707083

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2 Identifying the device version

^b Specify measuring range in plain text.

Order code (1) (2) (3) (4) (5) (6) (7) (8) (9)
 Order example 902815/40 - 380 - 1003 - 1 - 3 - 50 - 120 - 20 / 000, ...^a

^a State extra codes one after another, separated by commas.

2.2 Accessories

for programmable 2-wire transmitter

Designation	Part no.
Setup program on CD-ROM, multilingual	00485016
Configuration cable, 4-pole with connector and socket M12 × 1, and Western plug RJ-45	00484692
PVC connecting cable, 4-pole with socket M12 × 1, length 2,000 mm	00404585
5-pole cable socket M12 × 1, straight, without connecting cable to be patched by the customer	00419130
5-pole cable socket M12 × 1, angled, without connecting cable to be patched by the customer	00419133
PC interface with USB/TTL converter and USB cable	00456352
Power supply units for transmitter, single and 4-fold (data sheet 707500)	-
Isolation amplifier and supply isolator for the galvanic isolation of standard signals and voltage supply for the two-wire transmitter (data sheet 707530)	-

for process connection 997

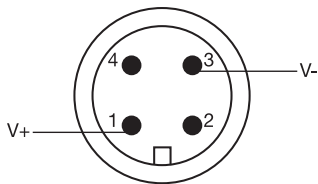
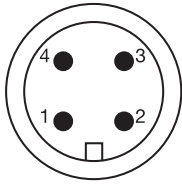
Designation	Part no.
T piece with PEKA connection DN100	00643582
T-piece with PEKA connection DN80	00643581
T-piece with PEKA connection DN65	00643580
T-piece with PEKA connection DN50	00643579
T-piece with PEKA connection DN40	00643576
T-piece with PEKA connection DN32	00643574
T-piece with PEKA connection DN25	00643555

for process connection 387/388 (EL < DN)

Designation	Part no.
T-piece with screw connection G 1/2" DN100	00772334
T-piece with screw connection G 1/2" DN80	00772333
T-piece with screw connection G 1/2" DN65	00772332
T-piece with screw connection G 1/2" DN50	00772331
T-piece with screw connection G 1/2" DN40	00772330
T-piece with screw connection G 1/2" DN32	00772321
T-piece with screw connection G 1/2" DN25	00772316

3 Connection diagram

Machine connector M12 × 1, 4-pole, according to IEC 60947-5-2



Warning:
Do not connect pin 2 and pin 4 to voltage!

Electrical connection		Terminal assignment
Basic type 902815/10 and 902815/40 without transmitter		
Screw-in RTD temperature probe in two-wire circuit		
Screw-in RTD temperature probe in four-wire circuit		
Basic type 902815/20, 902815/21, and 902815/41 with programmable transmitter		
Voltage supply DC 8 to 35 V		
Current output 4 to 20 mA		
Setup communication via special configuration cable (only for configuration - continuous operation is not admissible)		

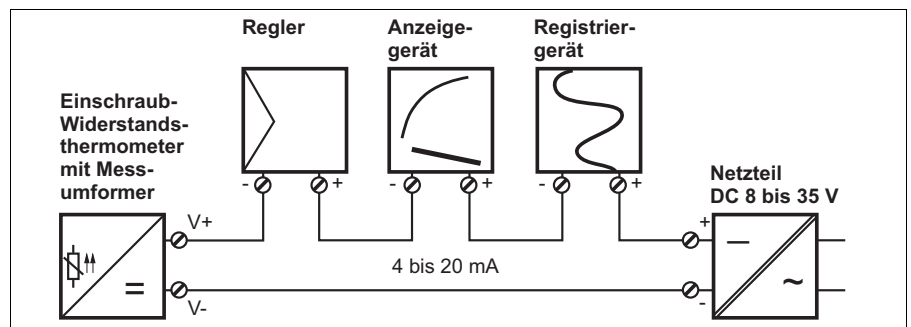


CAUTION!

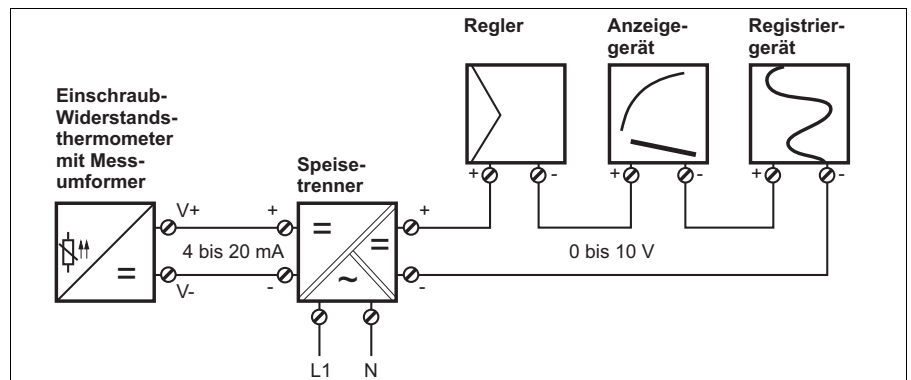
Once the machine connector has been correctly inserted, take care to ensure the prescribed voltage supply and correct pin assignment during the connection process, otherwise the device will be destroyed.

3.1 Connection examples

Connection example with power supply unit



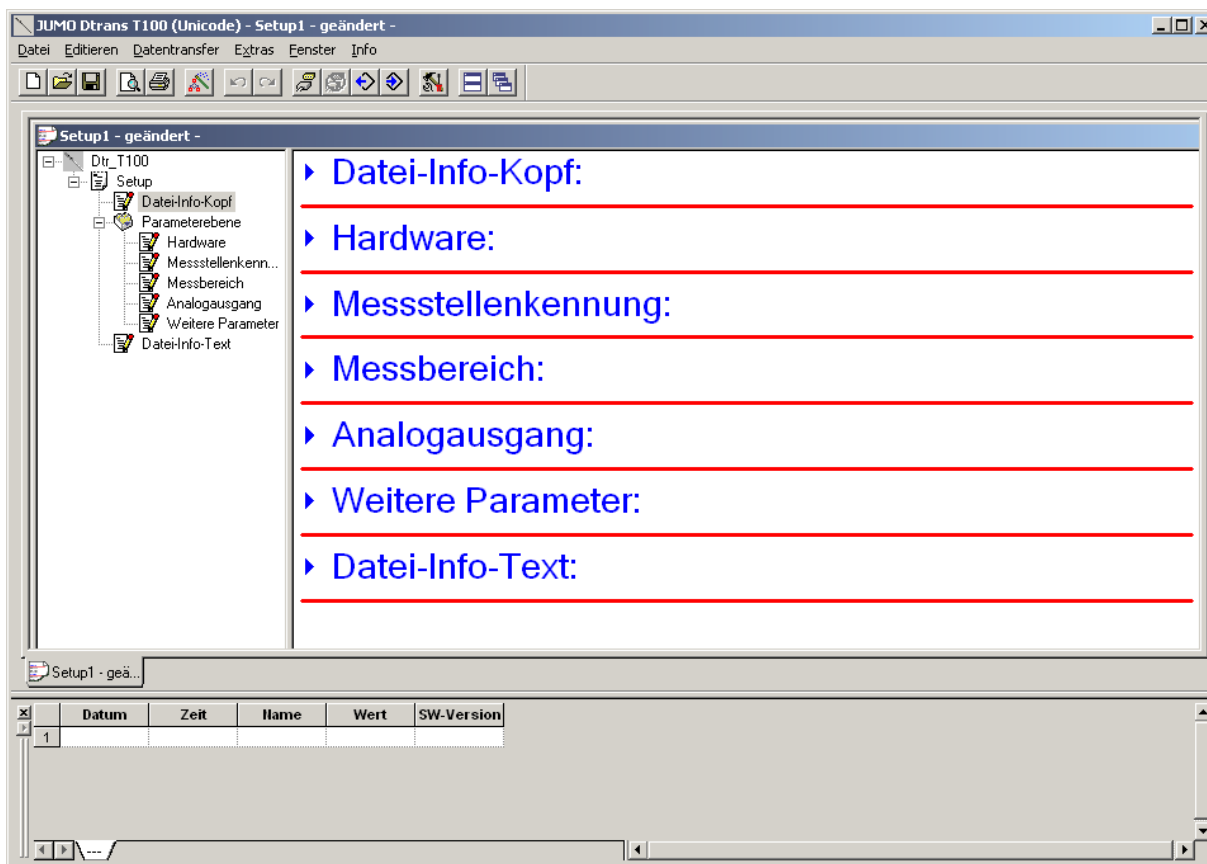
Connecting example with supply isolator



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).



NOTE!

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.

4.1 Configurable parameters

Setup levels	Parameter	Wertebereich	werkseitig
Hardware	Gerätetyp	-	-
Messstellenkennung	TAG-Nummer	-	-
Messbereich in °C oder °F konfigurierbar	Offset		0,0 °C
	Messbereichsanfang	-50	0,0 °C
	Messbereichsende	+150 oder +260 °C mit Halsrohr	100,0 °C
Analogausgang	Reversion des Ausganges	4 bis 20 mA oder 20 bis 4 mA	4 bis 20 mA
	Signal bei Fühlerbruch oder -kurzschluss	< 3,8 mA oder > 21 mA	> 21 mA
weitere Parameter	Filterzeitkonstante	0 s/ bis / bis 125 s	0,1 s
	Einheit	°C oder °F	°C

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

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.



CAUTION!

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 a safe grounding on the PC/laptop side.
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 transmitter (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).



NOTE!

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

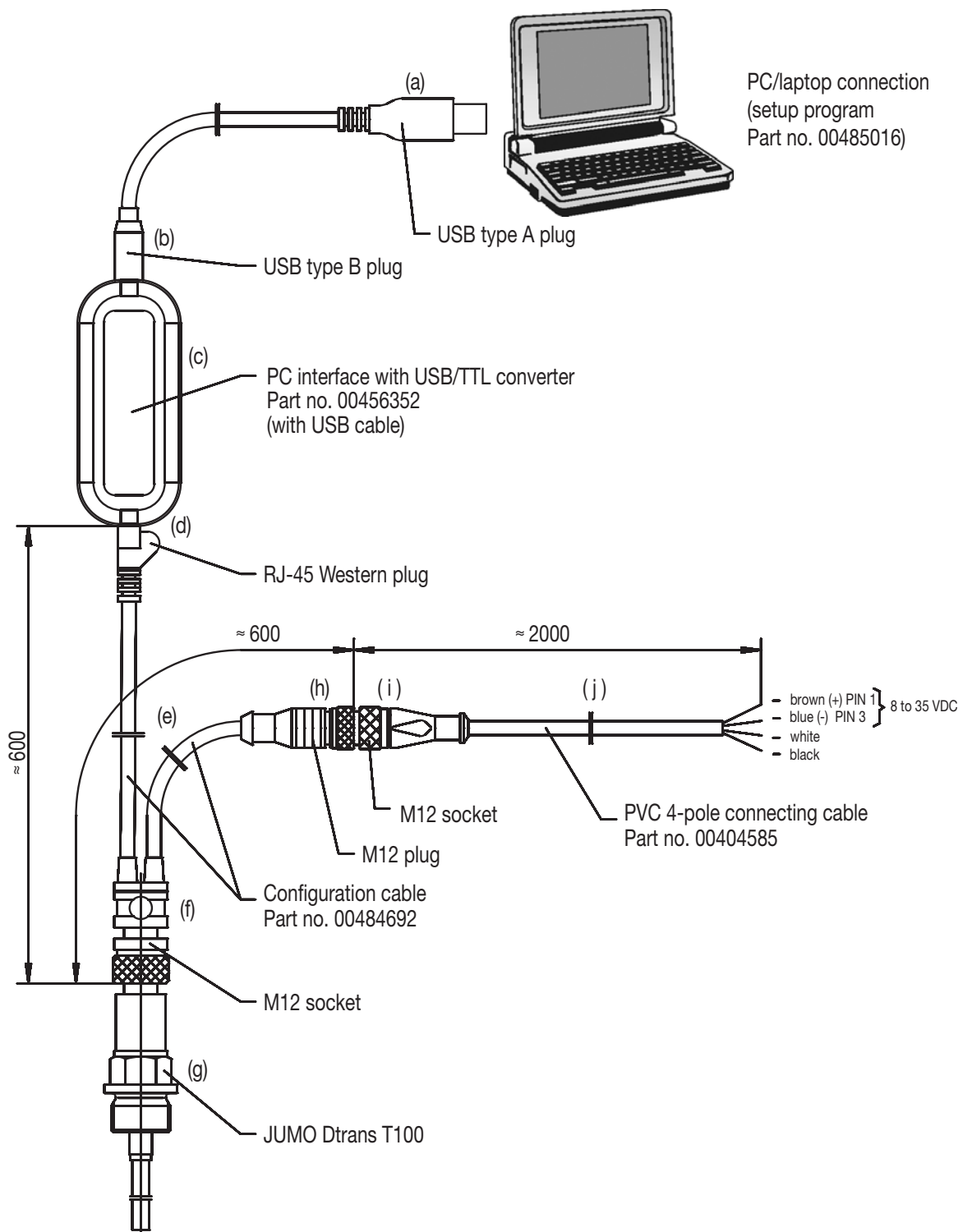
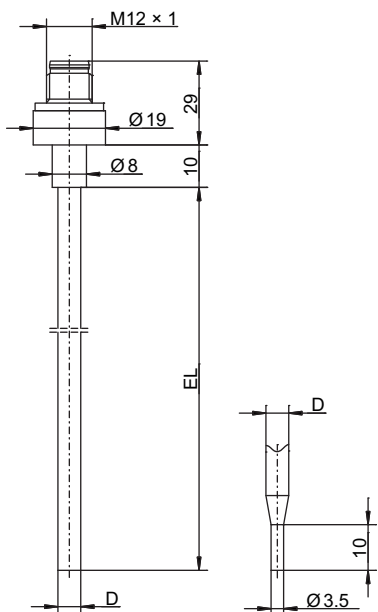


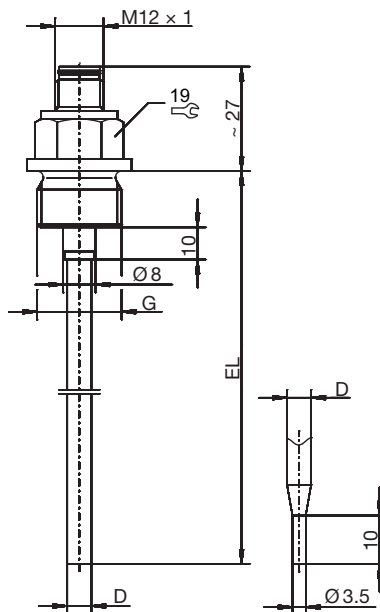
Fig. 4-1 Connection diagram for setup with JUMO Dtrans T100

5 Dimensions

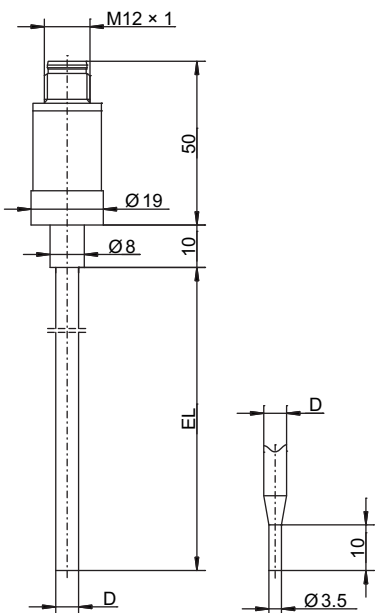
5.1 Basic types



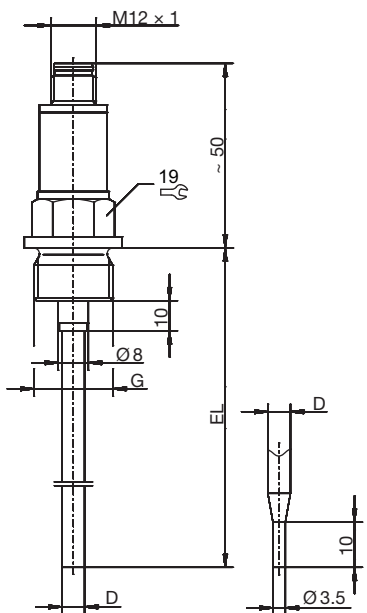
Basic type 902815/10
with process connection PA 000



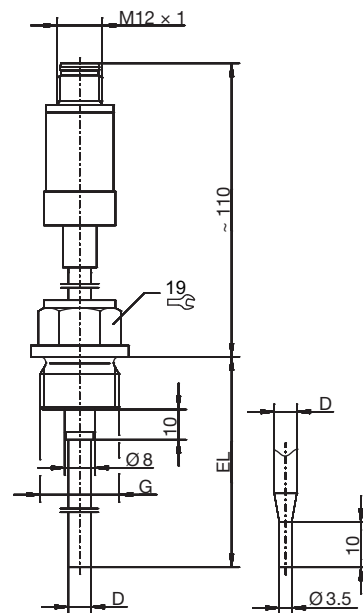
Basic type 902815/10
with process connection PA 104



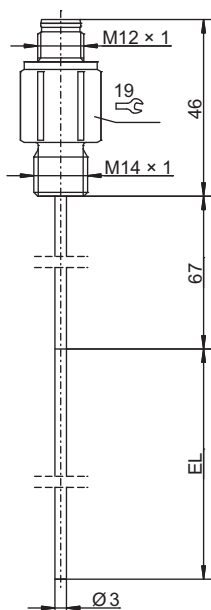
Basic type 902815/20
with process connection PA 000



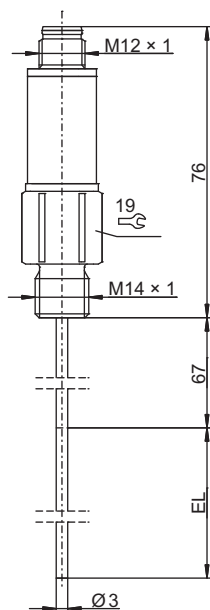
Basic type 902815/20
with process connection PA 104



Basic type 902815/21
with process connection PA 104

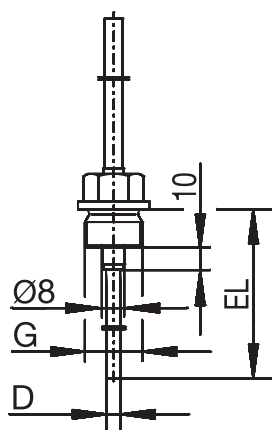


Basic type 902815/40
with process connection PA 120



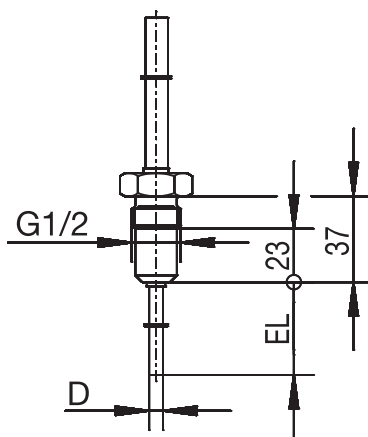
Basic type 902815/41
with process connection PA 120

5.2 Process connections



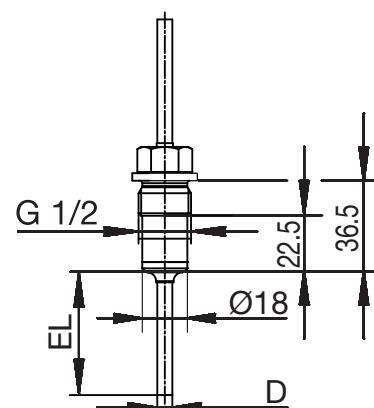
PA	G
103	3/8"
104	1/2"

Screw connection



PA	G
380	1/2"

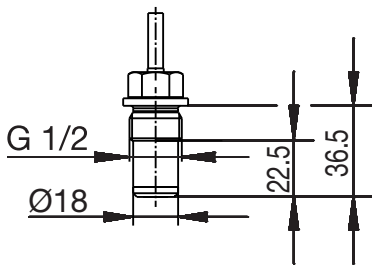
**Screw connection
with CIP-compliant conical seal**



PA	G
387	1/2"

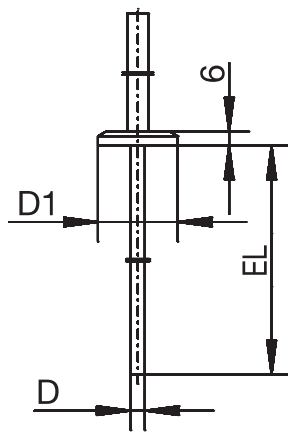
**Screw connection
with PEEK sealing**

5 Dimensions



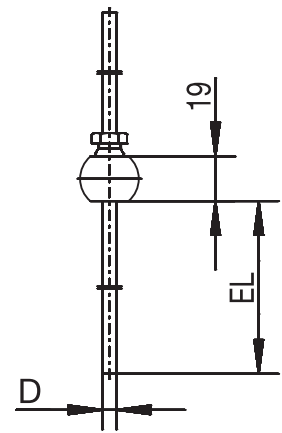
PA	G
388	1/2"

Screw connection with PEEK sealing front-flush



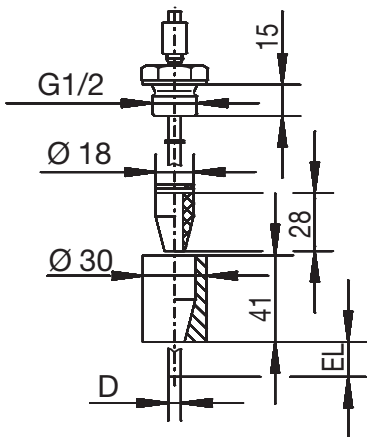
PA	DN	D1
-	-	Ø 25
611	10/20	Ø 34
613	25/1"	Ø 50,5
613	40/1,5"	Ø 50,5
616	50/2"	Ø 64
617	2,5"	Ø 77,5

Clamping socket according to DIN 32676 (clamp)



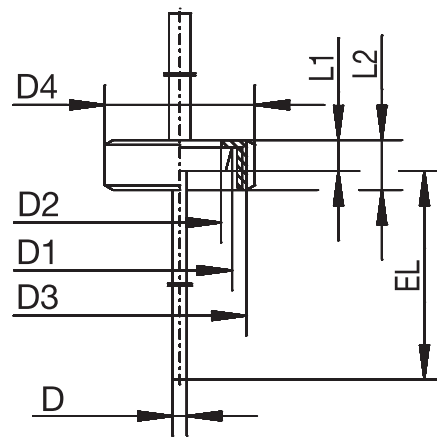
PA	
681	

Ball welding socket with threaded fitting



PA	
682	

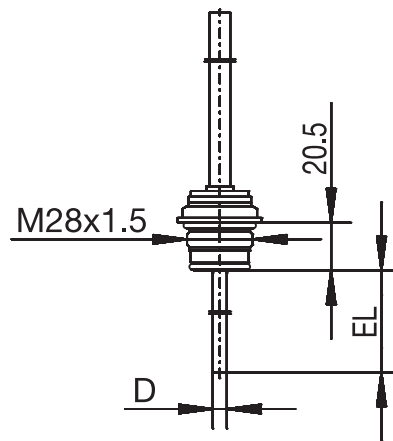
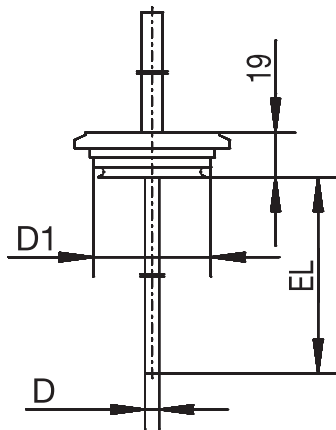
Welding socket with CIP-compliant conical seal



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)

5 Dimensions



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

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	-

VARIVENT® connection

**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 Screw connection G 1/2" with CIP-compliant conical seal PEEK 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® ^a connections Ball welding sleeve JUMO PEKA hygienic process connection
Protection tubes	Stainless steel 316 L, material-no. 1.4404/1.4435 Stainless steel 316 Ti, material-no. 1.4571 (upon request)
Protection type	IP67 according to DIN EN 60529 with inserted machine connector
Response times	Standard protection tube $t_{0,5} = 5$ s; $t_{0,9} = 12$ s; in water 0.4 m/s Stepped down protection tube $t_{0,5} = 2$ s; $t_{0,9} = 5$ s; in water 0.4 m/s Standard protection tube $t_{0,5} = 40$ s; $t_{0,9} = 110$ s; in air 3.0 m/s Stepped down protection tube $t_{0,5} = 21$ s; $t_{0,9} = 70$ s; in air 3.0 m/s Front-flushed sensor PA 388 $t_{0,5} = 140$ s; $t_{0,9} = 380$ s; in air 3.0 m/s Front-flushed sensor PA 388 $t_{0,5} = 0.7$ s; $t_{0,9} = 6$ s; in water 0.4 m/s

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

6.1 General Information

6.1.1 Input

Measurement input	
Without transmitter	Pt100 or Pt1000 temperature sensor, DIN EN 60751, class A, B, and/or AA, two or four-wire circuit
With programmable transmitter	Pt1000 temperature sensor, DIN EN 60751, class A, four-wire circuit
Measuring ranges	
Basic type 902815/10, and 902815/41	-50 to +200 °C
Basic type 902815/20	-50 to +150 °C
Basic type 902815/20, and 902815/41	-50 to +260 °C with extension tube
Limit deviations in °C	Class A (standard): $\pm(0.15 + 0.002 \times t)$ °C ^a Class AA: $\pm(0.10 + 0.0017 \times t)$ °C ^a Class B: $\pm(0.30 + 0.005 \times t)$ °C ^a

^a |t| = temperature in °C regardless of prefix sign

6.1.2 Environmental influences

Ambient temperature range of the head	
Basic type 902815/10, and 902815/41	-30 to +90 °C
Basic type 902815/20, 902815/21, and 902815/41	-30 to +85 °C
Storage temperature range	-30 to +90 °C
Resistance to climatic conditions	According to IEC 60068-2-30 (relative humidity ≤ 95 % with condensation)
Vibration resistance	According to IEC 60068-2-6 (according to GL characteristic line)

6.2 Transmitter

6.2.1 Input

Smallest measuring span	10 K
Sampling rate	1 measurement per second
Input filter	Digital filter 2nd order Filter constant can be set from 0 to 125 s

6.2.2 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 and cable break	≤ 3.6 mA or ≥ 21.0 mA (configurable)
Current limiting in the event of a probe short circuit or probe break	≤ 25 mA

6.2.3 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 Ω
Burden influence	≤ ±0.02 % per 100 Ω ^a
Setting time for temperature changes	≤ 5 s
Setting time after switch-on or reset	≤ 5 s
Electronic measuring accuracy	0.1 K or 0.08 % ^{b, c}

^a The %-specifications refer to the measuring range end value of 20 mA.

^b The %-specifications refer to the set measuring span; the greater value is valid.

^c The deviation of the temperature sensor must be added to ensure the measuring accuracy of the transmitter.

6 Technical data

6.2.4 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 Ω 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 ^a



^a The %-specifications refer to the measuring range end value of 20 mA.

6.2.5 Environmental influences

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

^a The product is suitable for industrial use as well as for households and small businesses.

6.3 Approvals and approval marks

	Testing agency Certificate no. Inspection basis Valid for	- - - Extra code 658 in conjunction with safety temperature limiter and safety temperature monitor 70115X, Extra code 659 in conjunction with temperature transmitter dTRANS T06 SIL according to data sheet 707071, Extra code 665 in conjunction with DIN rail temperature transmitter dTRANS T07 SIL according to data sheet 707083, Basic type 902815/10, and 902815/40 in conjunction with declaration of manufacturer
	Testing agency Certificate no. Inspection basis Valid for	- - - Extra code 658 in conjunction with safety temperature limiter and safety temperature monitor 70115X, Extra code 659 in conjunction with temperature transmitter dTRANS T06 SIL according to data sheet 707071, Extra code 665 in conjunction with DIN rail temperature transmitter dTRANS T07 SIL according to data sheet 707083, Basic type 902815/10, and 902815/40 in conjunction with declaration of manufacturer



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