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JUMO dTRANS T1000

Temperature sensor with IO-Link

Application

- Process automation
- Machines for the food and beverage industry
- General mechanical and apparatus engineering

Brief description

The temperature sensor is used for temperature measurement and monitoring. The effect of the temperature on a resistance RTD temperature probe generates a signal, which is amplified, digitalized and processed.

The temperature sensor is equipped with an IO-Link interface as per specification 1.1. IO-Link supports bidirectional communication and is used to exchange the process data, parameters, diagnostic information and status messages. The two green LEDs are permanently lit as soon as power is supplied to the device. Once an IO-Link connection is established, the LEDs flash.

The switching behavior and the switching thresholds of the switching outputs (max. 2 pcs.; p or n switching) can be individually configured, as can many other parameters. Any IO-Link master can be used for the configuration.

The temperature sensor is thus suitable for use in plant and mechanical engineering in connections to automation systems. Many process connections are available to the user.



Type 902915

Customer benefits

- IO-Link
  - Multi-vendor point-to-point connection
  - Open standard with maximum transparency to the field level (IEC 61131-9)
  - Inexpensive, pre-fabricated connecting cable (no wiring errors)
  - Simple and uniform wiring and startup thanks to standardized interface
- Industry 4.0: pervasive communication from the control to the sensors
  - Retrieval of process data and diagnostic information
  - Dynamic parameter changes
- More safety during sensor replacement
  - Automatic parameterization possible
  - Replacement with sensors of same type, but with different properties, can be detected
- Optimization of the production process through communication down to the lowest field level
- Reduction of mounting and startup times
- Reduction of maintenance and service costs with simultaneous increase in plant availability

Special features

- Small, compact, robust
- Stainless steel, fully welded
- Various process connections
- Hygienic connections
- Simple startup
- Easy sensor replacement
- Proven accuracy
- Connection via IO-Link master
- LED status display
- Also available as a pressure sensor with IO-Link; see data sheet 402058

Approvals

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Approvals

c UL us	Designation	UL
	Testing agency	-
	Certificate no.	2022-07-27-E201387
	Inspection basis	UL 61010-1, 3 Ed. Mai 2012 revised 19. Juli 2019 und CAN/CSA-C22.2 No. 61010-1 (2012-05). 3. Ed. with revision through 2018-11
	Valid for	Type 902915

Technical data

Input

Sensor element	RTD temperature probe Pt1000
Standard	DIN EN 60751
Measuring range	902915/10: -50 to +150 °C 902915/30: -50 to +260 °C
Sensor accuracy	Class A, ±(0.15 + 0.002 × ItI) °C[a] Class AA, ±(0.10 + 0.0017 × ItI) °C[a]
Connection type	Resistance measurement 4-wire
Calibration accuracy of the electronic components	≤ ±(0.08 %)[b]
Ambient temperature influence	≤ 0.0025 %/K[b, c]
Measuring current	≤ 500 µA
Sampling rate	160 ms
Input filter	Digital filter, 2nd order; filter constant can be set
Galvanic isolation	to the protection tube; no galvanic isolation between sensor and output

[a] ItI = temperature value in °C regardless of the prefix sign.

[b] All accuracy specifications in % relative to the respective measuring range

[c] Relative to the temperature deviation at the calibration point (25 °C ±5 K)

Measuring circuit monitoring

Process data invalid	IO-Link event configurable; appears in the process value as an error value
Measuring range overflow	
Measuring range underflow	
Device hardware fault	

Output

Number	1 output in IO-Link operation (output signal according to IO-Link communication standard version 1.1; see section"Interface ", Page 3) 2 outputs for switch operation (SIO mode; SIO = standard IO)
Switching functions configurable	Hysteresis function or window function N/C or N/O contact Output p switching (PNP) or n switching (NPN) Switch-on/switch-off delay
Switching current	≤100 mA per output
Voltage drop at switching transistor	≤2 V
Short-circuit proof	Yes (clocked)
Reverse polarity protected	Yes
Current limiting	Yes

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Hysteresis	
For hysteresis function	Configurable
For window function	Fixed setting (symmetrical; ±0.25 % of the measuring range)
Switch-on, switch-off delay	0 to 100 s

Response time	In water 0.4 m/s	In air 3.0 m/s
Protection tube Ø 6 mm (standard)	$t_{0.5}$ = 5 s; $t_{0.9}$ = 12 s	$t_{0.5}$ = 40 s; $t_{0.9}$ = 110 s
Protection tube Ø 6 mm (offset by Ø 3.5 mm)	$t_{0.5}$ = 2 s; $t_{0.9}$ = 5 s	$t_{0.5}$ = 25 s; $t_{0.9}$ = 85 s
Protection tube Ø 3 mm (PA 379)	$t_{0.5}$ = 1.5 s; $t_{0.9}$ = 4 s	$t_{0.5}$ = 15 s; $t_{0.9}$ = 50 s

Interface

Communication interface	IO-Link device V 1.1, downward compatible to V 1.0
Data transfer rate (baud rate)	COM 3 (230.4 kBaud)
Max. cable length	20 m, unshielded
Min. cycle time	2 ms
IO Device Description (IODD)	Depending on the ordered input range; available on the manufacturer's website www.jumo.de or at http://ioddfinder.io-link.com

Electrical data

Voltage supply	
In IO-Link operation	DC 18 to 32 V
In switch operation	DC 9.6 to 32 V
Nominal voltage	DC 24 V
Current consumption	
In idle mode	≤16 mA
In IO-Link operation	≤20 mA
In switch operation	≤200 mA (with 2 switching outputs)
Electrical safety	Protection rating III according to DIN EN 61140
Intended use	Temperature measurement in industrial plants

The auxiliary energy of the temperature sensor must meet SELV requirements. Furthermore, the device must be equipped with an electrical circuit that meets the requirements of EN 61010-1 with regard to "Limited-energy circuits".

Mechanical features

Materials	
Protection tube	Stainless steel 1.4404 (1.4435 for clamp acc. to DIN 32676)
Process connection	Stainless steel 1.4404 (1.4435 for clamp acc. to DIN 32676)
Housing	Stainless steel
Installation position	Any
Weight[a]	902915/10 with PA 104 and EL = 100 mm: approx. 80 g 902915/30 with PA 104 and EL = 100 mm: approx. 120 g

[a] The weight of the temperature sensor depends on the process connection (PA) and the insertion length (EL).

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Environmental influences

Admissible temperatures	
Medium	902915/10: -50 to +150 °C
	902915/30: -50 to +260 °C
Ambient temperature[a]	-40 to +85 °C (ambient temperature range of the head)
Storage	-40 to +85 °C
Resistance to climatic conditions	
During operation	≤100 % humidity without condensation on the outer skin of the device
During storage	≤90 % relative humidity without condensation
Climate class	3K7 acc. to DIN EN 60721-3-3
Admissible mechanical load	
Vibration resistance	10 g, at 10 to 500 Hz acc. to DIN EN 60068-2-6
Shock resistance	20 g for 11 ms according to DIN EN 60068-2-27
	50 g for 1 ms according to DIN EN 60068-2-27
Process media	Liquid and gaseous media
Protection type	According to DIN EN 60529
With mating connector	IP66/IP67/IP69
Electromagnetic compatibility	According to EN 61326-2-3
Interference emission	Class B[b]
Interference immunity	Industrial requirement

[a] Basic type 902915/10: At process temperatures above 120 °C, the maximum admissible ambient temperature is 60 °C (stated at nominal voltage DC 24 V).
Basic type 902915/30: No restrictions (stated at nominal voltage DC 24 V).

[b] The product is suitable for industrial use as well as for households and small businesses.

Process connections

Process connection (PC)	000	103 to 104	379	380	550 to 554	601 to 605
Protection fitting material	1.4404					
Operating temperature in °C[a]	-50 to +260	-50 to +260	-50 to +150	-50 to +260	-50 to +260	-50 to +260
Admissible pressure in bar	-	40	16	16	According to DIN 11864[b]	According to DIN 11851[b]

Process connection (PC)	611 to 617	681 to 682	684 to 686	755 to 758	997	
Protection fitting material	1.4435[c]	1.4404				
Operating temperature in °C[a]	-50 to +260	-50 to +150	-50 to +260	-10 to +200	-50 to +150	
Admissible pressure in bar	According to DIN 32676[b]	10	10	16	10	

[a] depending on the seal used

[b] The approval pressures are designed for an operating temperature range of -10 to +140 °C given use of suitable clamps and sealing materials.

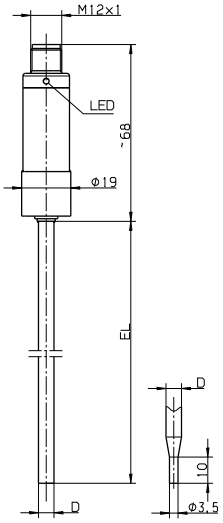
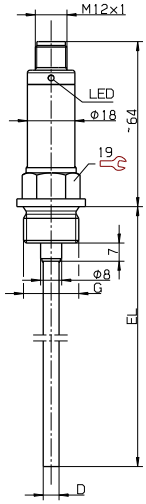
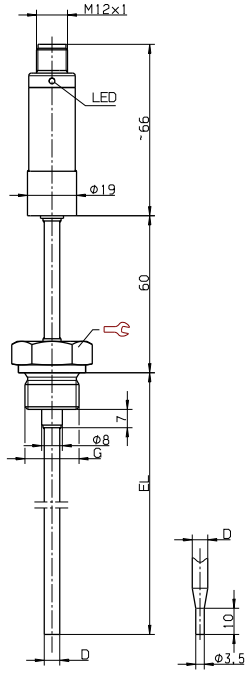
[c] According to Basler Norm II

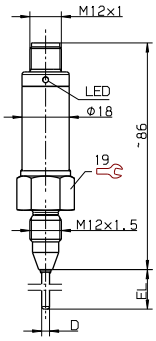
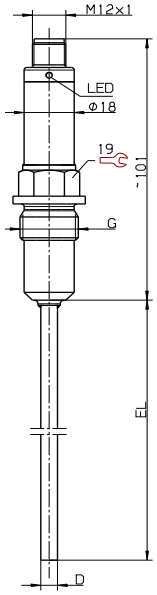
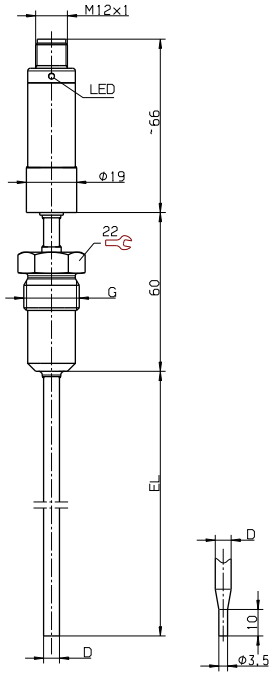
The maximum possible process pressure depends on different influences, e.g. design type, process connection, and process temperature.

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Dimensions

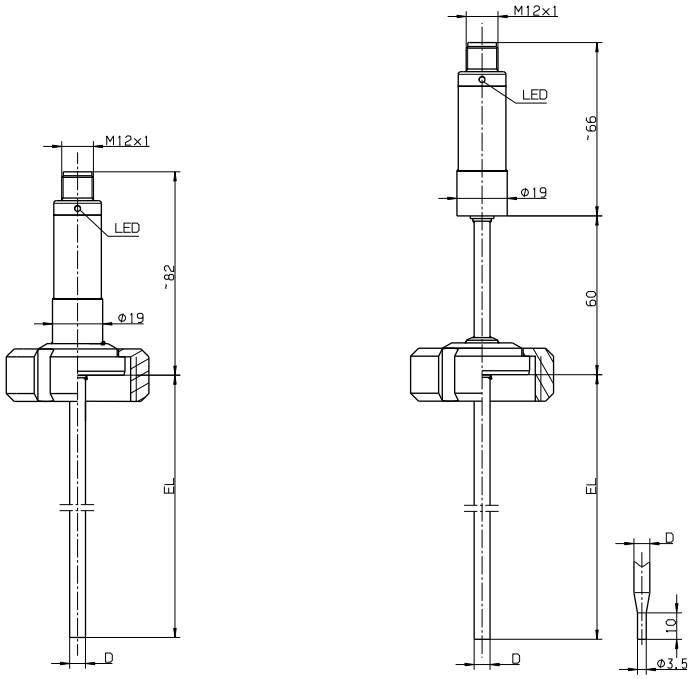
Type 902915/10 and type 902915/30 Without process connection (PA) 000	Type 902915/10 with PA 103-104 (left) Type 902915/30 with PA 103-104 (right)
	 

Type 902915/10 with PA 379	Type 902915/10 with PA 380 (left) Type 902915/30 with PA 380 (right)
	 

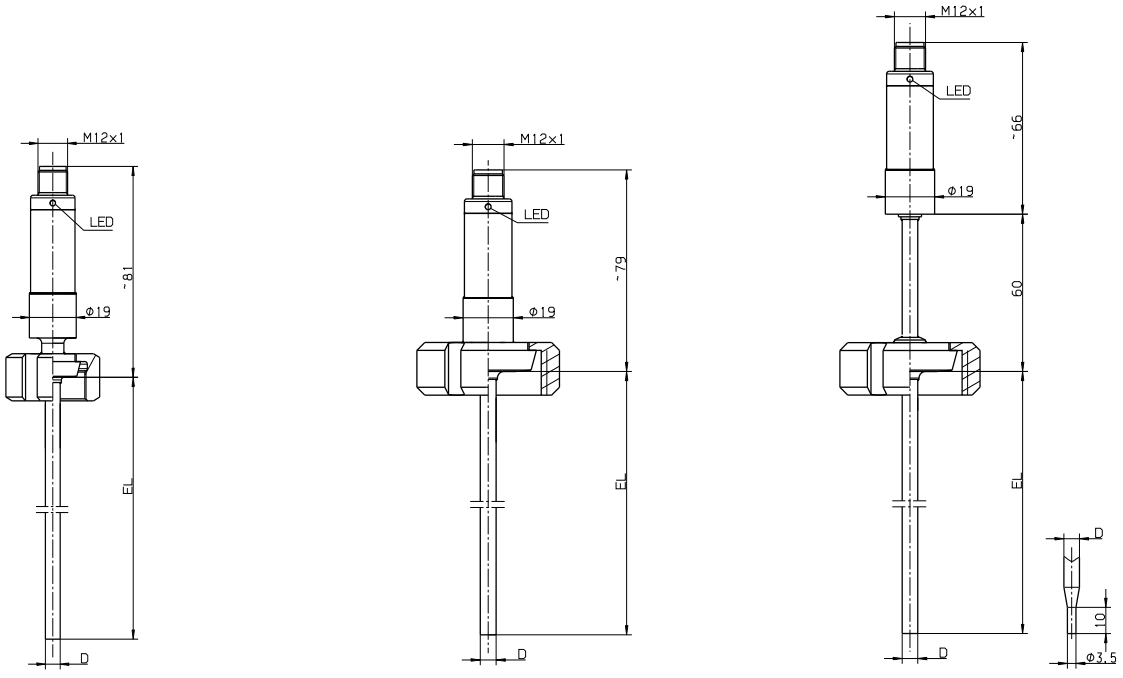
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Type 902915/10 with PA 550-554 (left)
Type 902915/30 with PA 550-554 (right)



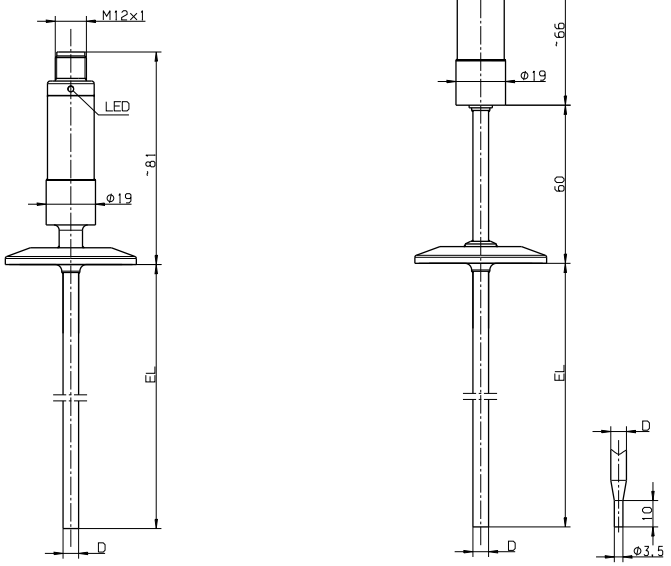
Type 902915/10 with PA 601 (left)
Type 902915/10 with PA 604-605 (center)
Type 902915/30 with PA 601-605 (right)



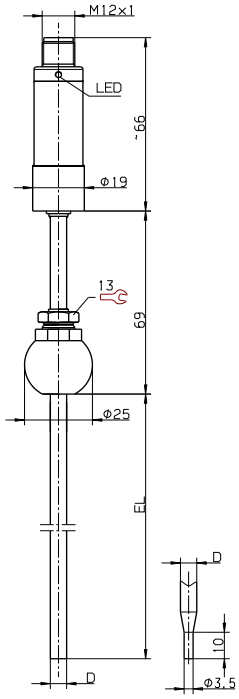
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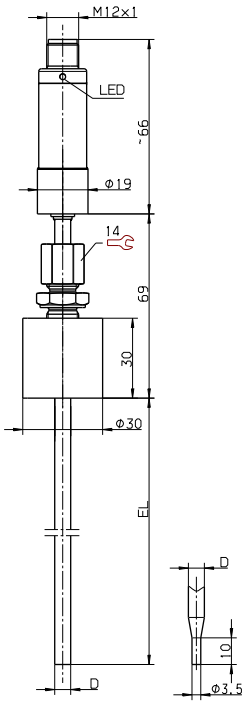
Type 902915/10 with PA 611-617 (left)
Type 902915/30 with PA 611-617 (right)



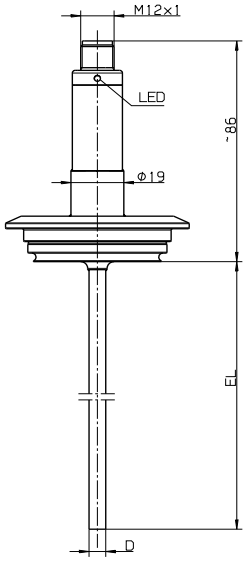
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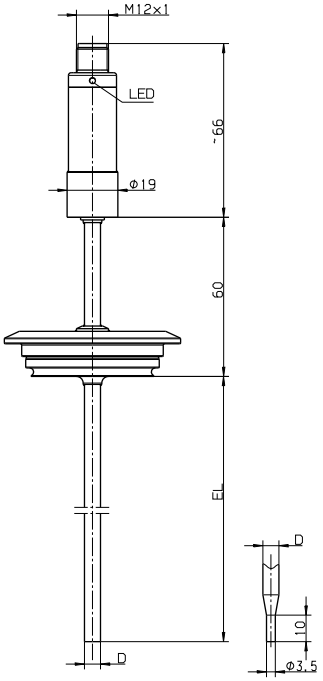


Type 902915/10 with PA 682



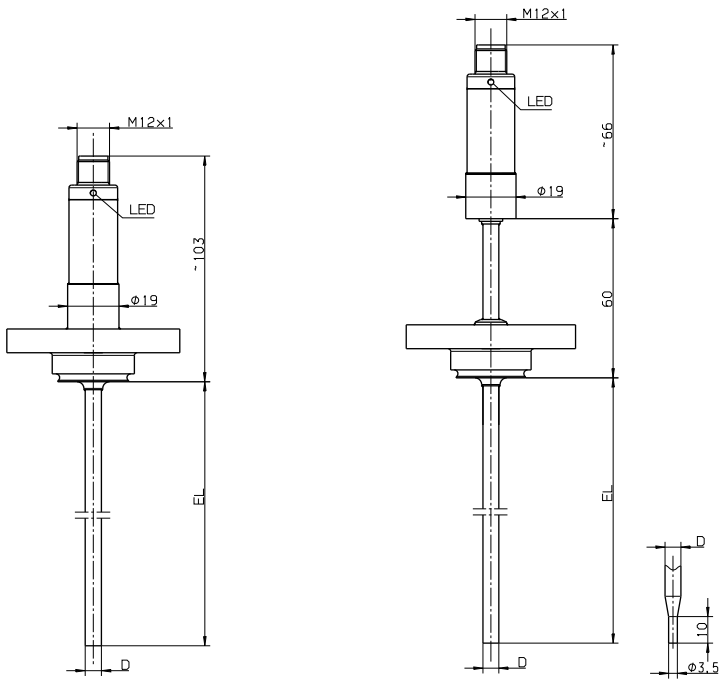
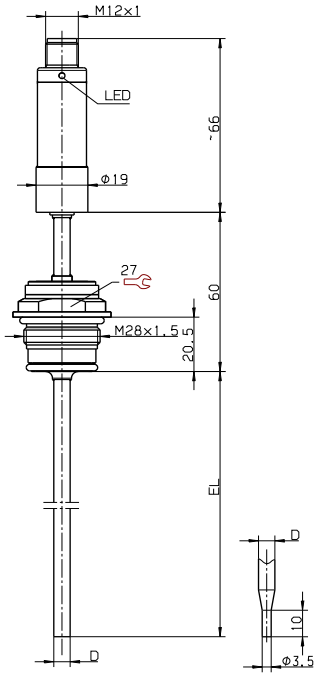
Type 902915/10 with PA 684-686 (left)
Type 902915/30 with PA 684-686 (right)





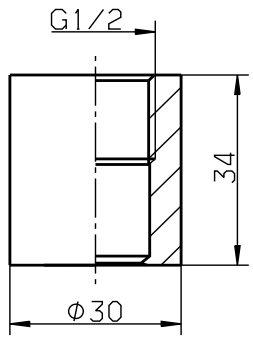
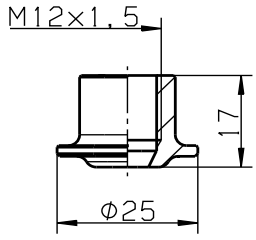
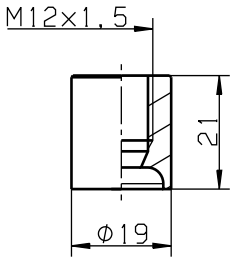
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Type 902915/10 with PA 755-758 (left) Type 902915/30 with PA 755-758 (right)	Type 902915/30 with PA 997
	

Welding sockets

The following welding sockets are available as accessories:

Welding socket G 1/2 Suitable forPA 380	Welding socket with collar M12 × 1.5 Suitable forPA 379	Welding socket M12 × 1.5 Suitable forPA 379
		

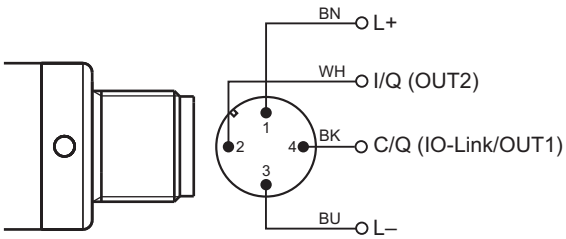
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Connection diagram

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

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

Connection	Terminal assignment	
		
	Round plug M12 × 1 (A-coded, non-rotating)	
Switch operation		
Voltage supply[a] DC 9.6 to 32 V	1 BN (brown)[b] 3 BU (blue)	L+ L-
Switching output 1	4 BK (black)	C/Q = OUT1
Switching output 2	2 WH (white)	I/Q = OUT2
IO-Link operation		
Voltage supply[a] DC 18 to 32 V	1 BN (brown) 3 BU (blue)	L+ L-
IO-Link	4 BK (black)	C/Q = IO-Link
Switching output 2	2 WH (white)	I/Q = OUT2
Potential equalization		
Functional bonding conductor FB[c]		

[a] The auxiliary energy of the temperature sensor must meet SELV requirements. Furthermore, the device must be equipped with an electrical circuit that meets the requirements of EN 61010-1 with regard to "Limited-energy circuits".

[b] The colour coding is only valid for A-coded standard cables!

[c] The temperature sensor must be connected to the potential equalization system of the plant via the process connection.

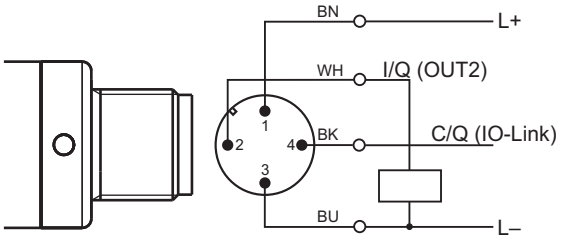
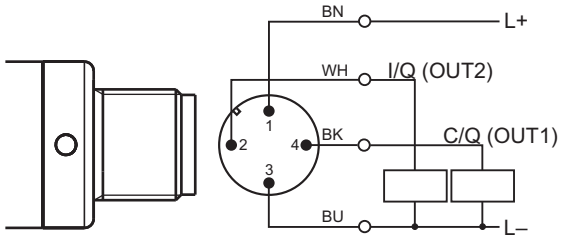
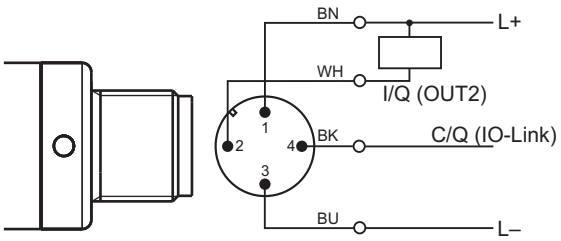
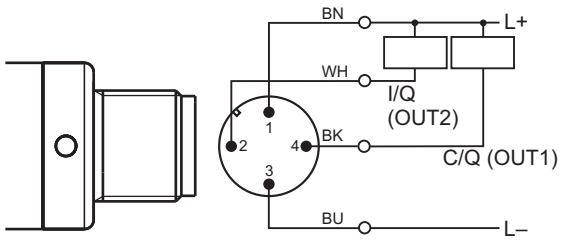
NOTE!

When using the device with UL approval, the user must make sure that the accessory he uses is also approved for a UL application (e. g. cable with UL approval AVLV2/8 and/or cable with UL approval
CYJV/7 or CYJV/8 or PVVA/7 or PVVA2/8, in each case approved for ambient temperatures > 90 °C).

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Connection examples

IO-Link operation with 1 switching output	Switch operation with 2 switching outputs
p switching (PNP)	p switching (PNP)
	
n switching (NPN)	n switching (NPN)
	

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Order details

	(1)	**Basic type**
902915		JUMO dTRANS T1000 – Temperature sensor with IO-Link
	(2)	**Basic type extension**
10		IO-Link interface, M12 × 1 connector
30		IO-Link interface, M12 × 1 connector, high-temperature
	(3)	**Operating temperature in °C**
370		-50 to +150 °C
386		-50 to +260 °C
	(4)	**Measuring insert**
1013		1 × Pt1000 in 4-wire circuit
	(5)	**Tolerance class of RTD temperature probe according to DIN EN 60751**
2		Class A
3		Class AA
	(6)	**Protection tube diameter D in mm**
3		3 mm[a]
6		6 mm
	(7)	**Insertion length**
15		15 mm[a]
20		20 mm[a]
25		25 mm[a]
50		50 mm
100		100 mm
150		150 mm
	(8)	**Process connection (PC)**
000		None
103		Screw connection G 3/8
104		Screw connection G 1/2
379		Screw connection M12 x 1.5 with CIP-compliant conical seal
380		Screw connection G 1/2 with CIP-compliant conical seal
550		Aseptic screw connection DN 20 DIN 11864-1 Form A
551		Aseptic screw connection DN 25 DIN 11864-1 Form A
552		Aseptic screw connection DN 32 DIN 11864-1 Form A
553		Aseptic screw connection DN 40 DIN 11864-1 Form A
554		Aseptic screw connection DN 50 DIN 11864-1 Form A
601		Taper socket with union nut DN 10 DIN 11851 (dairy pipe fitting)
604		Taper socket with union nut DN 25 DIN 11851 (dairy pipe fitting)
605		Taper socket with union nut DN 32 DIN 11851 (dairy pipe fitting)
611		Clamping socket (clamp) DN 10/20 DIN 32676
613		Clamping socket (clamp) DN 25/40 DIN 32676
616		Clamping socket (clamp) DN 50 DIN 32676 (2" ISO 2852)
617		Clamping socket (clamp) 2 1/2" similar to DIN 32676
681		Ball welding socket with threaded fitting
682		Welding socket with CIP-compliant conical seal
684		VARIVENT® connection DN 15/10
685		VARIVENT® connection DN 32/25
686		VARIVENT® connection DN 50/40
755		BioControl® D25
756		BioControl® D50
757		BioControl® D65

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758		BioControl® D80
997		JUMO PEKA hygienic process connection
	(9)	**Protection tube material**
24		Stainless steel 316L (material no. 1.4404/1.4435)
	(10)	**Extra code**
061		With UL approval
100		Customer-specific configuration (specifications in plain text)
310		Protection tube offset[b]
374		Inspection certificate 3.1 DIN EN 10204 (material)
452		Wetted, electrolytically polished parts, surface roughness Ra ≤ 0.8 mm
458		Surface roughness R_a ≤ 0.4 µm for clamping socket (clamp) (area touching medium)
774		DAkkS(DKD) calibration (standard, test points 0, 100 and 200 °C)
775		DAkkS(DKD) calibration (service, please state desired test points in plain text)
974		DAkkS(DKD) adjustment with calibration report (standard, test points 0, 100 and 200 °C)
975		DAkkS(DKD) adjustment with calibration report (service, please state desired test points in plain text)

[a] Only with screw connection M12 x 1.5 with CIP-compliant conical seal (process connection 379)

[b] Not for screw connection M12 x 1.5 with CIP-compliant conical seal (process connection 379)

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)
Order code		/		-		-		-		-		-		-		-		/	
Order example	902915	/	10	-	370	-	1013	-	2	-	3	-	15	-	379	-	24	/	452

Scope of delivery

Designation
1 temperature sensor in the ordered version
1 installation instructions

Stock versions

Order code	Part no.
902915/10-370-1013-2-6-50-104-24/000	00661665
902915/10-370-1013-2-6-100-104-24/000	00676722

Accessories

Designation	Part no.
IO-Link master upon request.	
Device data (IODD) at www.jumo.de or at http://ioddfinder.io-link.com	
Welding socket[a] G 1/2 for process connection 380	00378264
Welding socket with collar[a] M12 × 1.5 for process connection 379	00614228
Welding socket[a] M12 × 1.5 for process connection 379	00655051

[a] Welding sockets made of material 1.4404, parts touching the media electrolytically polished, surface roughness Ra ≤ 0.4 µm