

Resistance thermometer For sanitary applications Model TR22-A, sensor replaceable

WIKA data sheet TE 60.22



for further approvals
see page 13

Applications

- Sanitary applications
- Food and beverage industry
- Bio and pharmaceutical industry, production of active ingredients
- Paint finishing systems

Special features

- Simplified calibration through replaceable measuring inserts
- Materials and surface finish quality in accordance with the standards of hygienic designs
- Stainless steel connection head in optimised hygienic design
- Pt100, 4 ... 20 mA or HART® protocol, FOUNDATION™ fieldbus and PROFIBUS® PA output possible



**Resistance thermometer model TR22-A
VARIVENT® connection**
(Options: Sealing combination at neck tube, cable gland in hygienic design)

Description

The model TR22-A resistance thermometer is used for temperature measurement in sanitary applications. The process connections meet the stringent requirements, in terms of materials and design, of hygienic measuring points. For increased hygiene requirements in the ambient area of the measuring point, a stainless steel head is available in an optimised hygienic design. It enables easy cleaning of the measuring instrument, particularly for the splash zone in food production.

Due to the rotatable screw connection to the connection head, it is possible to loosen the connection head and to adjust it in the desired position. The connection head can be removed together with the measuring insert. This allows the resistance thermometer to be calibrated along with the whole

measuring chain, i.e. without disconnecting the electrical connections. In addition this avoids having to open the process, and thus the risk of contamination is minimised.

The spring-loaded measuring insert guarantees the contact between the sensor tip and the bottom of the thermowell and thus ensures a fast response time and high accuracy.

The welded junction between the thermowell and the flange makes the use of a sealing as additional material in those areas redundant which are in contact with the product.

Specifications

Output signal Pt100

Temperature range	Measuring range -50 ... +250 °C (-58 ... +482 °F)
Sensor	
<ul style="list-style-type: none"> ■ Measuring element (measuring current: 0.1 ... 1.0 mA) 	Pt100 DIN measuring resistor Face-sensitive Pt100 measuring resistor ¹⁾
<ul style="list-style-type: none"> ■ Connection method 	1 x 3-wire 1 x 4-wire 2 x 3-wire
Sensor tolerance value ²⁾ per IEC 60751	Class AA (1/3 DIN) Class A Class B
Response time (measurement in accordance with IEC 60751)	t ₅₀ < 4.7 s t ₉₀ < 12.15 s
Measuring insert diameter	3 mm

Output signal 4 ... 20 mA, HART® protocol, FOUNDATION™ fieldbus and PROFIBUS® PA

Transmitter (selectable versions)	model T19	model T24	model T32	model T53
Output				
<ul style="list-style-type: none"> ■ 4 ... 20 mA 	x	x	x	
<ul style="list-style-type: none"> ■ HART® protocol 			x	
<ul style="list-style-type: none"> ■ FOUNDATION™ Fieldbus and PROFIBUS® PA 				x
Connection method				
<ul style="list-style-type: none"> ■ 1 x 3-wire 	x	x	x	x
<ul style="list-style-type: none"> ■ 1 x 4-wire 			x	x
Measurement current	0.8 mA	0.5 mA	0.3 mA	0.2 mA
Temperature range	Measuring range -50 ... +250 °C (-58 ... +482 °F) ³⁾ , other measuring ranges are adjustable			
Response time (measurement in accordance with IEC 60751)	t ₅₀ < 4.7 s or t ₉₀ < 12.15 s + response time of the relevant transmitters (see data sheet of the relevant transmitter)			
Configuration	Basic configuration: Pt100, 3-wire, 0 ... 150 °C (+32 ... 302 °F) customer-specific configuration on request			

Thermowell model TW22

Process connections	<ul style="list-style-type: none"> ■ Tri-clamp and clamp per DIN 32676, ISO 2852 ■ VARIVENT® ■ BioControl® ■ Union nut DIN 11851 ■ Aseptic connections per DIN 11864 ■ Welding ball other process connections on request
Thermowell diameter	6 mm; optional: probe tip reduced to 4.5 mm (from U ₁ > 25 mm) 0.25 inch; optional: probe tip reduced to 0.2 inch (from U ₁ > 1 inch)
Materials (wetted)	Stainless steel 1.4435 (316L, UNS S31603)
Surface finish	Standard: R _a < 0.8 μm (R _a < 30 μin) Option: R _a < 0.4 μm (R _a < 15 μin) electropolished, further on request
Insertion length U ₁ ⁴⁾	Standard: 25, 50, 75, 100, 150, 200 mm or 1, 2, 3, 4, 6, 8 inch other insertion lengths are available as options
Neck tube diameter	up to DN 20: 9 mm (0,35 inch); except per DIN 11851, milk thread fitting: 12 mm from DN 25: 12 mm (0,5 inch)
Neck tube length M	85 mm (3,35 inch), others on request
Connection to the thermometer	M24 x 1.5

1) Face-sensitive measuring resistors, through their small design they serve to reduce the heat dissipation with short insertion lengths. Available for the temperature range -50 ... +150 °C (-58 ... +302 °F) in classes A and B.

For thermowell insertion lengths of less than 11 mm, face-sensitive measuring resistors are generally used.

2) For detailed specifications for Pt100 sensors, see Technical Information IN 00.17 at www.wika.com.

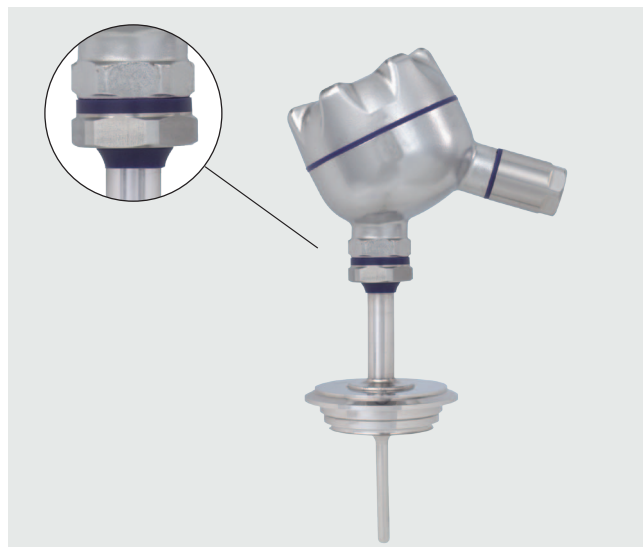
3) The temperature transmitter should therefore be protected from temperatures over 85 °C (185 °F)

4) For the TR22-A design without thermowell, the insertion length is defined by the dimension A(l₁) from the lower edge of the connection head to the tip of the measuring insert (see "Dimensions of the connection head in mm"). The thickness of bottom of the thermowell can be neglected for dimensioning. It is offset by the spring travel of the measuring insert.

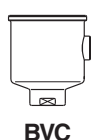
Options

The transition from the connection head to the thermowell is effected via an optional sealing combination (polyurethane) of flat gasket and wiper. This combination permanently prevents the penetration and depositing of humidity and impurities in this area (IP 68). Additionally, the sealing combination simplifies the cleaning process significantly.

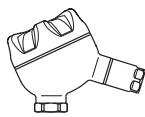
The design of the BVS head combined with the cable gland in hygienic design results in an easy to clean and hygienic measuring location, even in areas which are not in contact with the product.



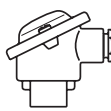
Connection head



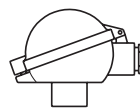
BVC



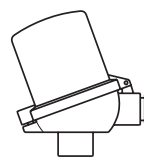
BVS



BS



**BSZ
BSZ-K**



**BSZ-H
BSZ-HK**



KPP

Model	Material	Cable entry	Ingress protection	Cap	Surface finish	Weight in kg
BVC	Stainless steel (1.4571)	M16 x 1.5 ¹⁾	IP 68	Flat screw cover	Metal blank	0.60
BVS	Stainless steel (1.4308)	M20 x 1.5 ¹⁾	IP 68	Screw cover, Hygienic Design	Precision casting, electropolished	0.50
BS	Aluminium	M20 x 1.5 ¹⁾	IP 65	Cap with 2 screws	Blue, lacquered ²⁾	0.14
BSZ	Aluminium	M20 x 1.5 ¹⁾	IP 65	Hinged cover with cylinder head screw	Blue, lacquered ²⁾	0.29
BSZ-K	PAV antistatic PA12	M20 x 1.5 ¹⁾	IP 65	Hinged cover with cylinder head screw	Black	0.30
BSZ-H	Aluminium	M20 x 1.5 ¹⁾	IP 65	Hinged cover with cylinder head screw	Blue, lacquered ²⁾	0.20
BSZ-HK	PAV antistatic PA12	M20 x 1.5 ¹⁾	IP 65	Hinged cover with cylinder head screw	Black	0.30
KPP	Polypropylene	M20 x 1.5	IP 65	Screw cover	White	0.16

1) Standard
2) RAL 5022

Connection head with digital indicator (option)

As an alternative to the standard connection head the thermometer can be fitted with an optional DIH10 digital indicator. The connection head used for this is similar to the model BSZ-H head. For operation, a 4 ... 20 mA transmitter is needed, which is mounted to the measuring insert. The indication range is configured identically to the measuring range of the transmitter.



Connection head with digital indicator, model DIH10

Transmitter (option)

Depending on the connection head used, a transmitter can be mounted within the thermometer.

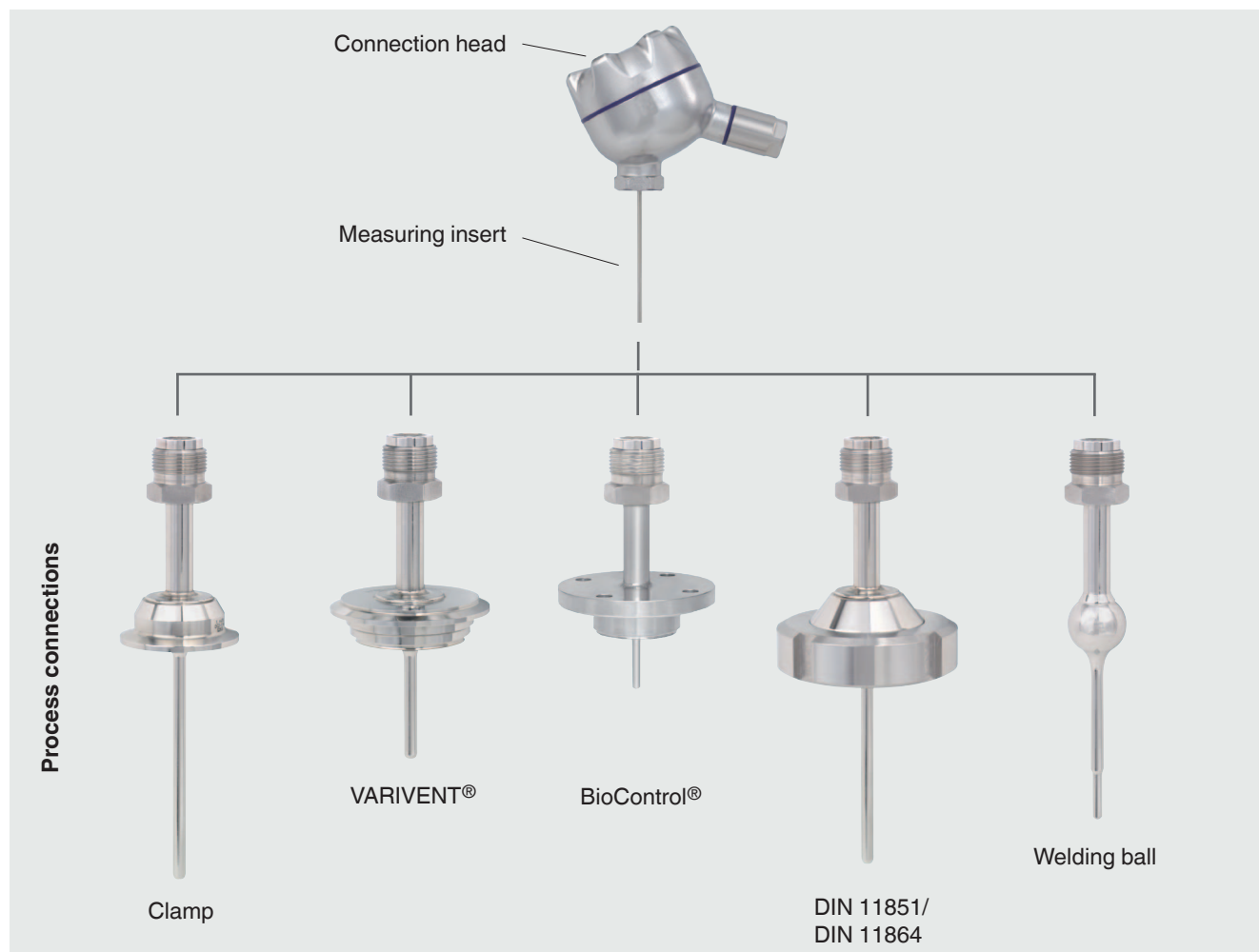
- Mounted instead of terminal block
- Mounted within the cap of the connection head
- Mounting not possible

Connection head	Transmitter model			
	T19	T24	T32	T53
BVC	○	○	○	○
BVS	○	○	○	○
BS	○	○	-	○
BSZ / BSZ-K	○	○	○	○
BSZ-H / BSZ-HK	●	●	●	●
KPP	○	○	○	○

Mounting of 2 transmitters on request.

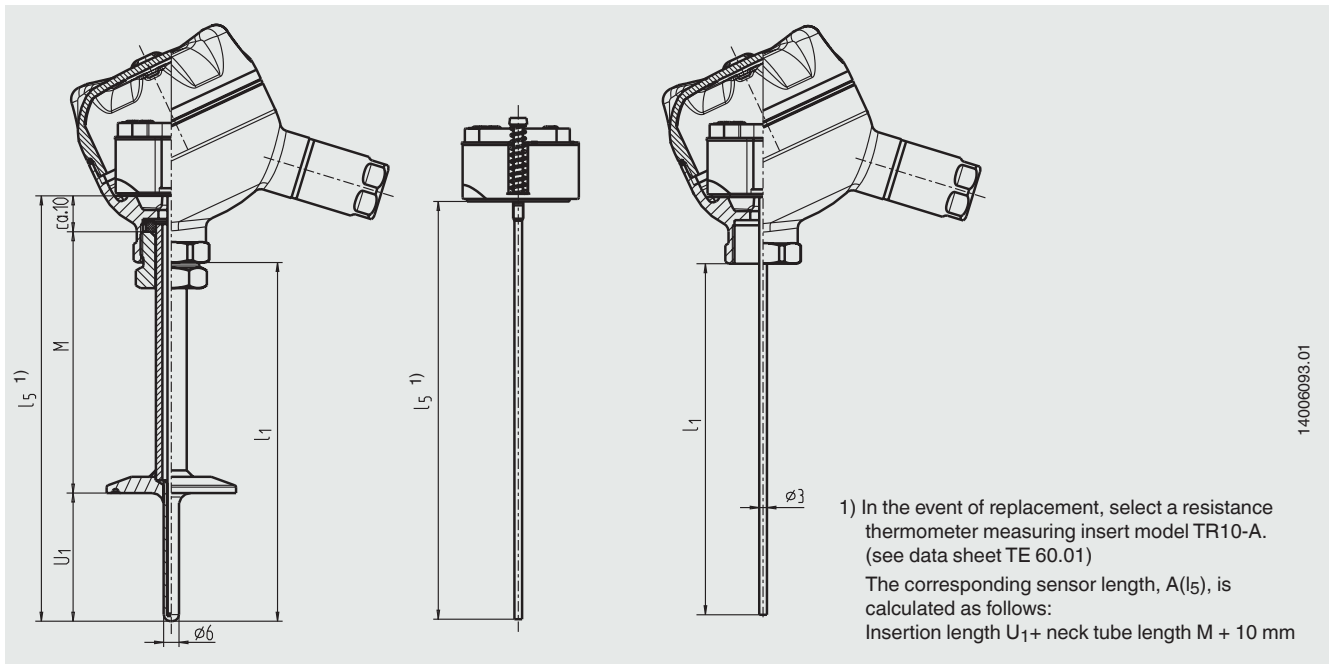
Model	Description	Explosion protection	Data sheet
T19	Analogue transmitter, configurable	Without	TE 19.03
T24	Analogue transmitter, PC configurable	Optional	TE 24.01
T32	Digital transmitter, HART® protocol	Optional	TE 32.04
T53	Digital transmitter FOUNDATION™ Fieldbus and PROFIBUS® PA	Standard	TE 53.01

Overview of the process connections, thermowell variants

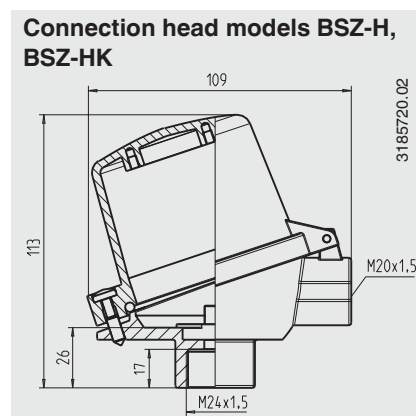
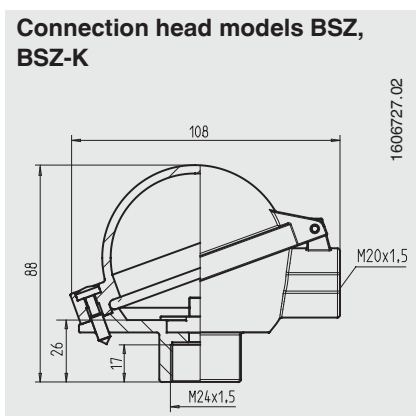
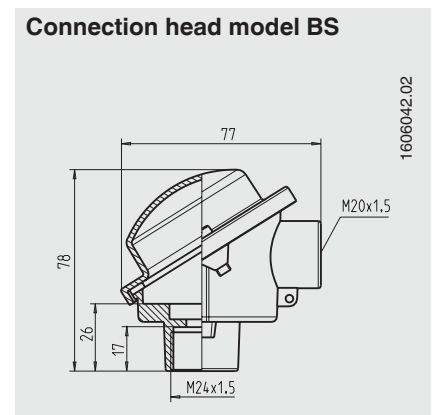
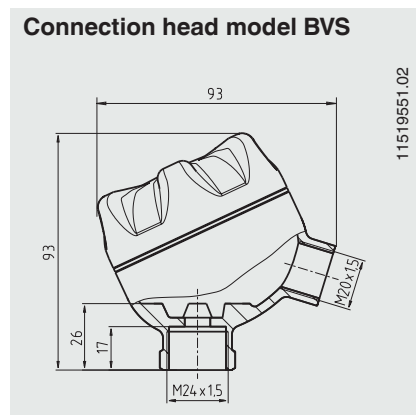
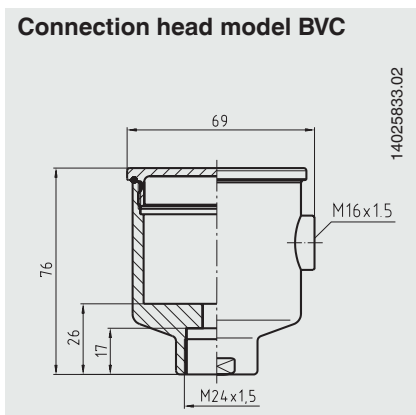


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 BioControl® is a registered trademark of the company NEUMO.

Dimensions in mm

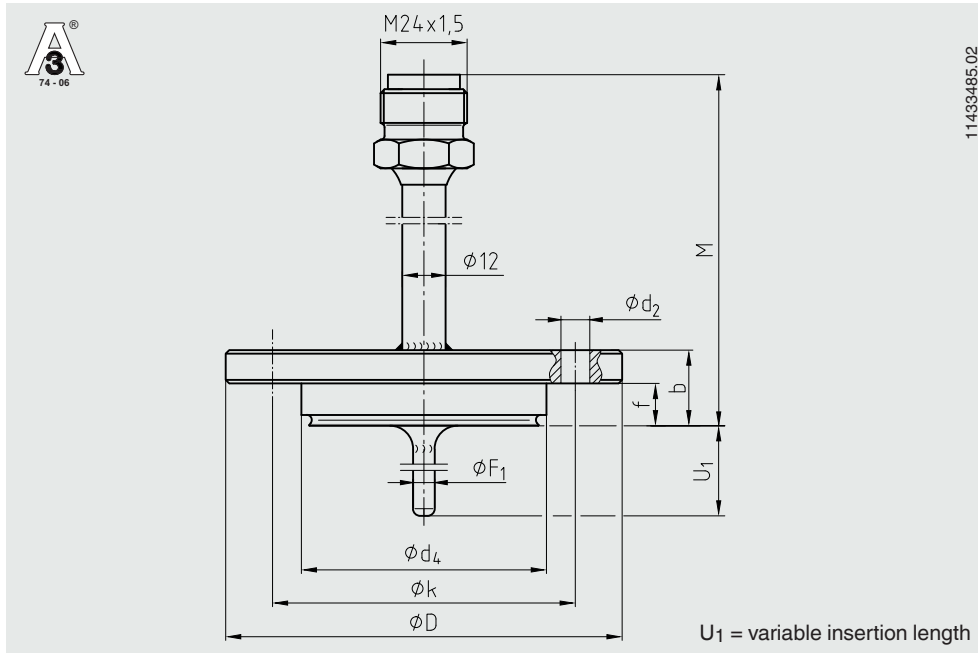


Dimensions of the connection heads in mm



Dimensions of the process connections in mm (model TW22 thermowells)

NEUMO BioControl® process connection

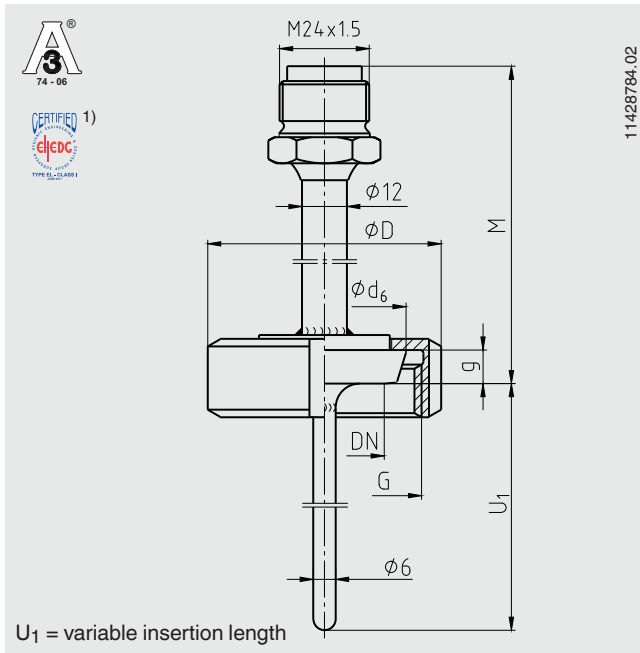


For mounting into a flow-through housing the insertion length U_1 and the thermowell diameter is adjusted. For the angular housing the insertion length is specified by the customer.

The housings are not part of the scope of delivery of the resistance thermometers and can be ordered as an separate position. For a detailed description of the BioControl® housings, see data sheet AC 09.14.

Case size	Nominal width of tube	PN in bar	Dimensions in mm							Weight in kg
			U_1	$\text{Ø } d_4$	$\text{Ø } D$	f	b	$\text{Ø } k$	$\text{Ø } d_2$	
Size 25	DN 8	16	5	30.5	64	11	20	50	4 x $\text{Ø } 7$	0.4
	DN 10	16	6	30.5	64	11	20	50	4 x $\text{Ø } 7$	0.4
	DN 15	16	9	30.5	64	11	20	50	4 x $\text{Ø } 7$	0.4
	DN 20	16	11	30.5	64	11	20	50	4 x $\text{Ø } 7$	0.4
Size 50	DN 25	16	15	50.0	90	17	27	70	4 x $\text{Ø } 9$	0.8
	DN 40	16	20	50.0	90	17	27	70	4 x $\text{Ø } 9$	0.8
	DN 50	16	25	50.0	90	17	27	70	4 x $\text{Ø } 9$	0.8
	DN 65	16	35	50.0	90	17	27	70	4 x $\text{Ø } 9$	0.8
	DN 80	16	45	50.0	90	17	27	70	4 x $\text{Ø } 9$	0.8
Size 65	DN 100	16	55	50.0	90	17	27	70	4 x $\text{Ø } 9$	0.8
	DN 40	16	20	68.0	120	17	27	95	4 x $\text{Ø } 11$	1.4
	DN 50	16	25	68.0	120	17	27	95	4 x $\text{Ø } 11$	1.4
	DN 65	16	35	68.0	120	17	27	95	4 x $\text{Ø } 11$	1.4
	DN 80	16	45	68.0	120	17	27	95	4 x $\text{Ø } 11$	1.4
	DN 100	16	55	68.0	120	17	27	95	4 x $\text{Ø } 11$	1.4

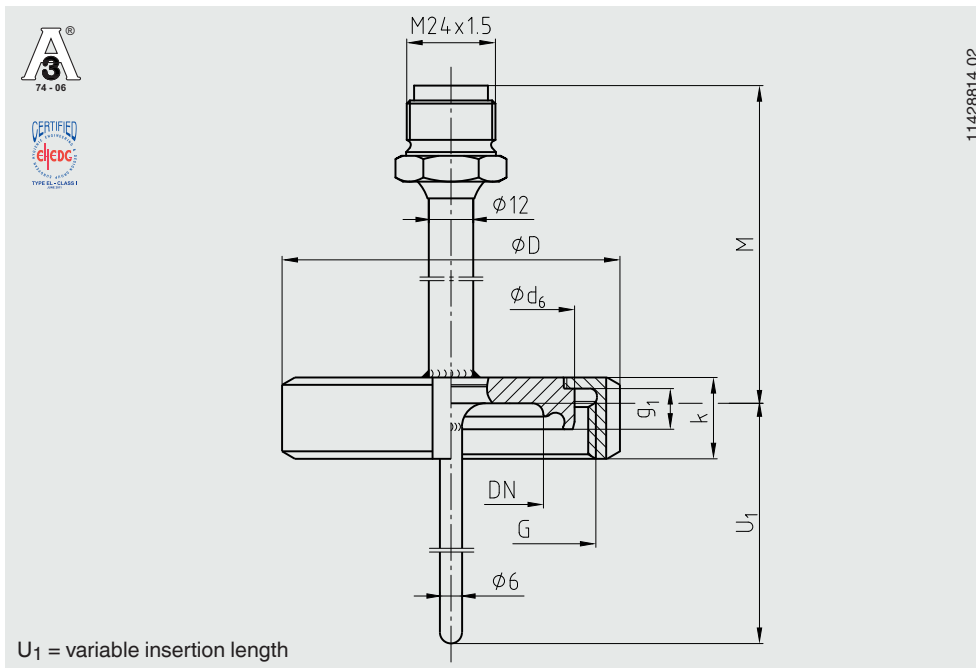
Union nut process connection DIN 11851 with conical coupling (milk thread fitting)



Nominal width in mm	PN in bar	Dimensions in mm			Weight in kg	
		Ø d ₆	G	Ø D	g	
DN 20	40	36.5	RD 44 x 1/6	54	8	0.40
DN 25	40	44.0	RD 52 x 1/6	63	10	0.50
DN 32	40	50.0	RD 58 x 1/6	70	10	0.60
DN 40	40	56.0	RD 65 x 1/6	78	10	0.80
DN 50	25	68.5	RD 78 x 1/6	92	11	0.90

- 1) In combination with
 - ASEPTO-STAR k-flex upgrade gaskets from Kieselmann GmbH, Germany or
 - SKS gasket set DIN 11851 EHEDG from Siersema Komponenten

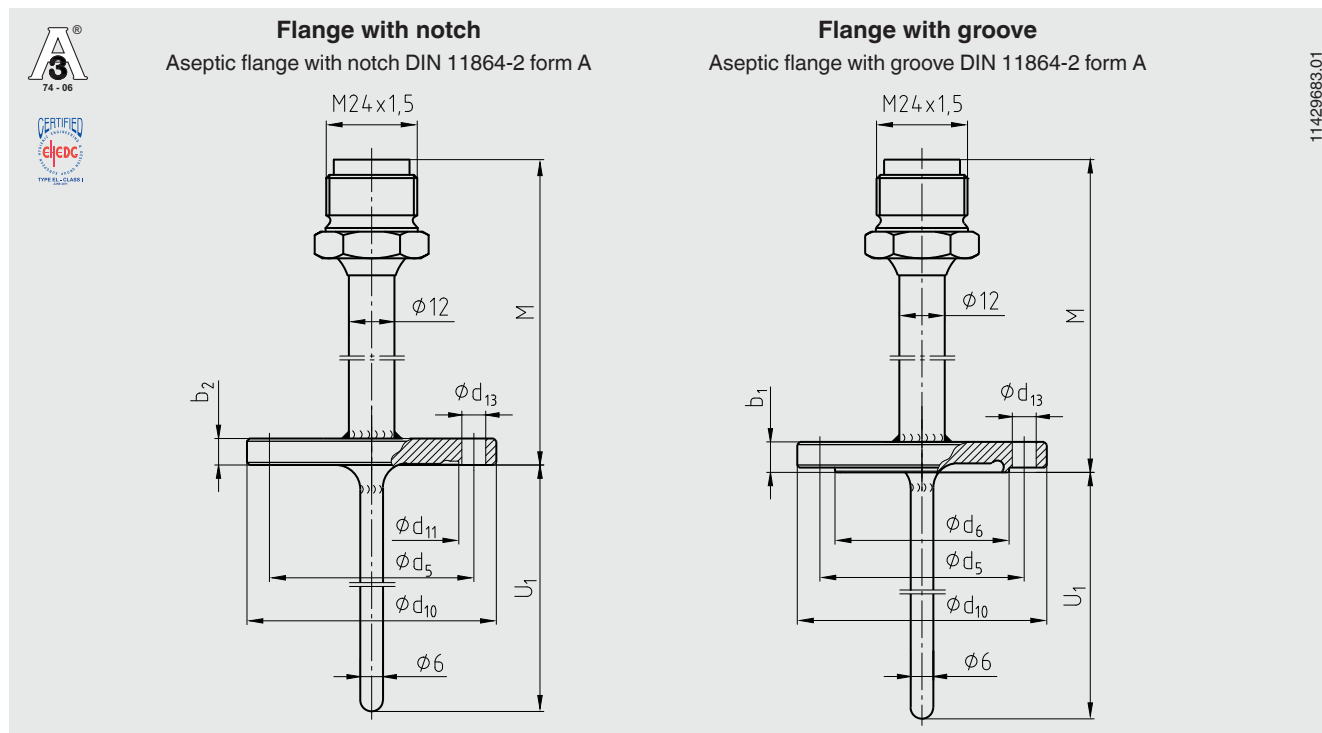
Process connection aseptic threaded pipe connection DIN 11864-1 with collar connecting sleeve form A, for pipes per DIN 11866 row A



Nominal width in mm	PN in bar	Dimensions in mm				g ₁	Aseptic O-ring	Weight in kg
		Ø D	Ø d ₆	G	k			
DN 10	40	38	21.9	RD 28 x 1/8	18	6	12 x 3.5	0.20
DN 15	40	44	27.9	RD 34 x 1/8	18	6	18 x 3.5	0.20
DN 20	40	54	35.9	RD 44 x 1/6	20	7	22 x 3.5	0.25
DN 25	40	63	42.9	RD 52 x 1/6	21	9	28 x 3.5	0.40
DN 32	40	70	48.9	RD 58 x 1/6	21	10	34 x 5	0.45
DN 40	40	78	54.9	RD 65 x 1/6	21	10	40 x 5	0.55
DN 50	25	92	66.9	RD 78 x 1/6	22	11	52 x 5	0.70

Connections for pipes per DIN11866 row B (ISO pipes) and row C (ASME pipes) are available on request.

Aseptic flansch process connection DIN 11864-2 form A for pipes per DIN 11866 row A

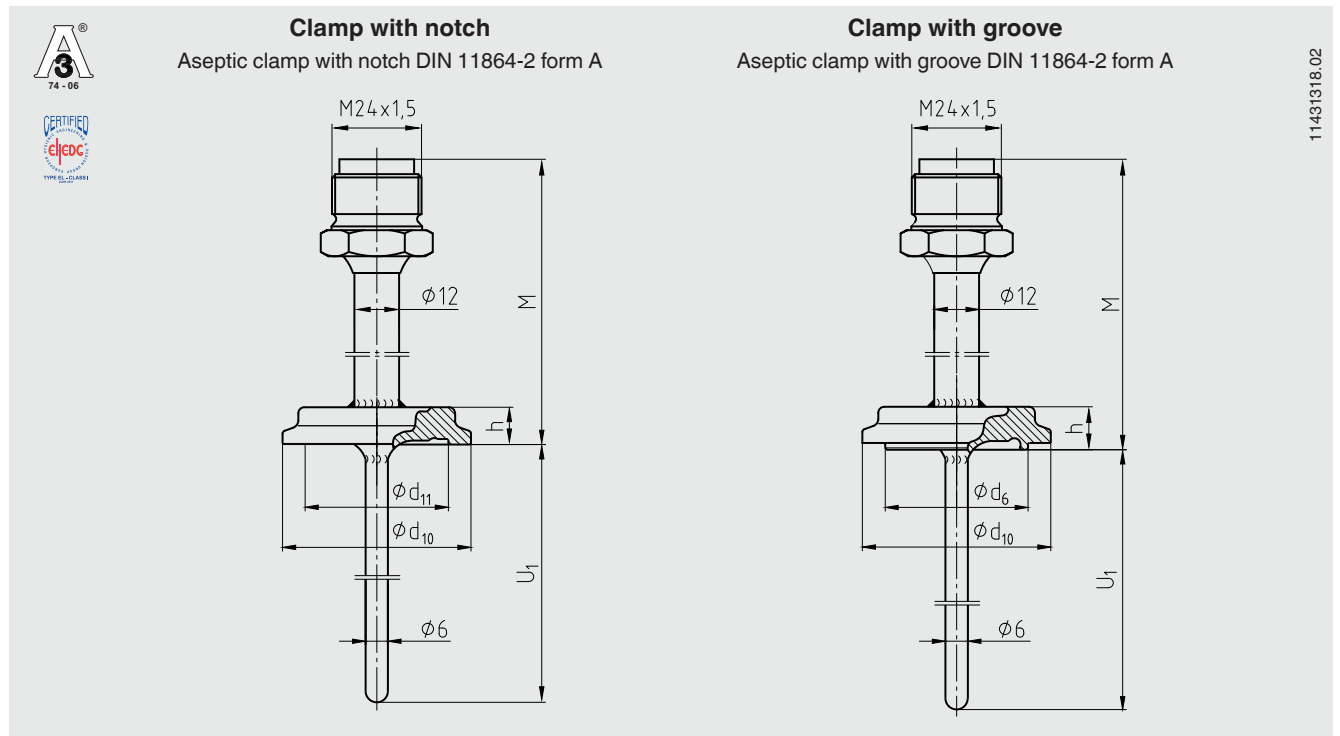


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Process connection	Nominal width in mm	PN in bar	Dimensions in mm							Aseptic O-ring	Weight in kg
			b ₁	b ₂	Ø d ₅	Ø d ₆	Ø d ₁₀	Ø d ₁₁	Ø d ₁₃		
Flange with notch	DN 10	25	-	10	37	-	54	22.4	4 x Ø 9	12 x 3.5	0.2
	DN 15	25	-	10	42	-	59	28.4	4 x Ø 9	18 x 3.5	0.25
	DN 20	25	-	10	47	-	64	32.4	4 x Ø 9	22 x 3.5	0.3
	DN 25	25	-	10	53	-	70	38.4	4 x Ø 9	28 x 3.5	0.4
	DN 32	25	-	10	59	-	76	47.7	4 x Ø 9	34 x 5	0.5
	DN 40	25	-	10	65	-	82	53.7	4 x Ø 9	40 x 5	0.6
	DN 50	16	-	10	77	-	94	65.7	4 x Ø 9	52 x 5	0.7
Flange with groove	DN 10	25	11.5	-	37	22.3	54	-	4 x Ø 9	12 x 3.5	0.25
	DN 15	25	11.5	-	42	28.3	59	-	4 x Ø 9	18 x 3.5	0.3
	DN 20	25	11.5	-	47	32.3	64	-	4 x Ø 9	22 x 3.5	0.3
	DN 25	25	11.5	-	53	38.3	70	-	4 x Ø 9	28 x 3.5	0.4
	DN 32	25	11.5	-	59	47.6	76	-	4 x Ø 9	34 x 5	0.45
	DN 40	25	11.5	-	65	56.6	82	-	4 x Ø 9	40 x 5	0.6
	DN 50	16	11.5	-	77	65.6	94	-	4 x Ø 9	52 x 5	0.7

Connections for pipes per DIN11866 row B (ISO pipes) and row C (ASME pipes) are available on request.

Process connection aseptic clamp connection DIN 11864-3 form A for pipes per DIN 11866 row A

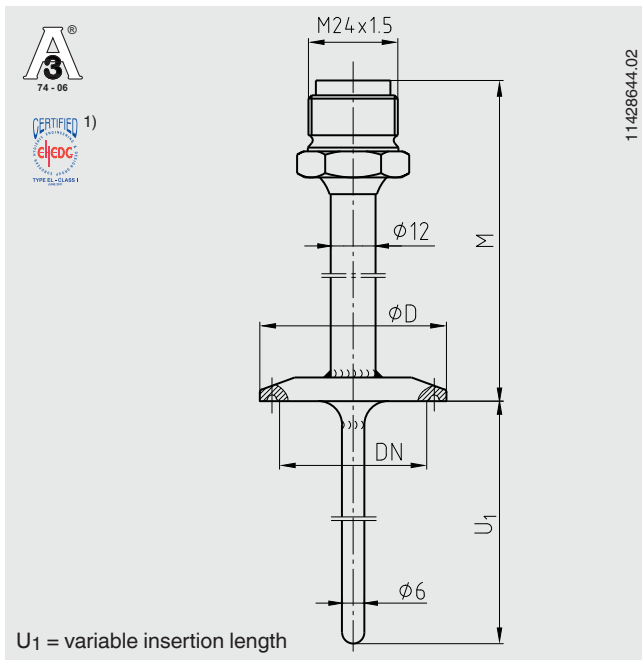


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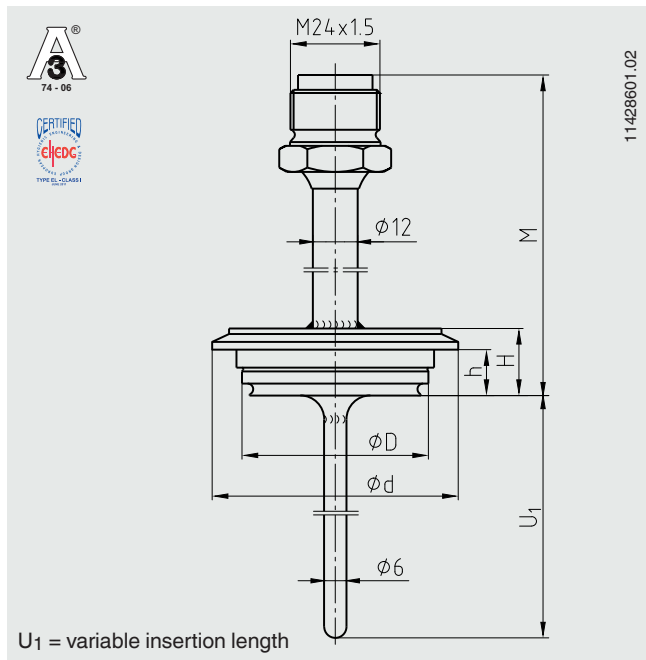
Process connection	Nominal width in mm	PN in bar	Dimensions in mm				Aseptic O-ring	Weight in kg
			Ø d ₆	Ø d ₁₀	Ø d ₁₁	h		
Clamp with notch	DN 10	40	-	34	22.4	10	12 x 3.5	0.2
	DN 15	40	-	34	28.4	10	18 x 3.5	0.2
	DN 20	40	-	50.5	32.4	10	22 x 3.5	0.3
	DN 25	40	-	50.5	38.4	10	28 x 3.5	0.3
	DN 32	40	-	50.5	47.7	10	34 x 5	0.3
	DN 40	40	-	64	53.7	10	40 x 5	0.4
	DN 50	25	-	77.5	65.7	10	52 x 5	0.5
Clamp with groove	DN 10	40	22.3	34	-	11.5	12 x 3.5	0.2
	DN 15	40	28.3	34	-	11.5	18 x 3.5	0.2
	DN 20	40	32.3	50.5	-	11.5	22 x 3.5	0.3
	DN 25	40	38.3	50.5	-	11.5	28 x 3.5	0.3
	DN 32	40	47.6	50.5	-	11.5	34 x 5	0.3
	DN 40	40	53.6	64	-	11.5	40 x 5	0.4
	DN 50	25	65.6	77.5	-	11.5	52 x 5	0.5

Connections for pipes per DIN11866 row B (ISO pipes) and row C (ASME pipes) are available on request.

Clamp process connection



VARIVENT® process connection



- 1) In combination with
 - Kalrez/Stainless steel gasket from Dupont de Nemours, Switzerland or
 - T-ring seals from Combifit International B. V., Netherlands

Dimensions for clamp process connection

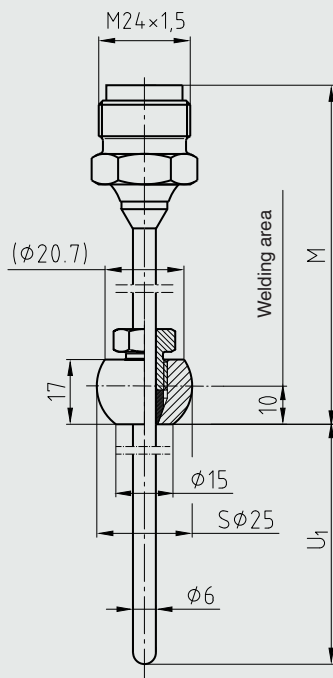
Process connection	Nominal width in mm	PN in bar	Dimensions in mm ϕD	Weight in kg
DIN 32676 for pipes to DIN 11866 row A	DN 10 ... 20	16	34.0	0.2
	DN 25 ... 40	16	50.5	0.3
	DN 50	16	64.0	0.4
DIN 32676 for pipes to DIN 11866 row B	13.5 ... 17.2	16	25.0	0.2
	21.3 ... 33.7	16	50.5	0.3
	42.4 ... 48.3	16	64.0	0.3
DIN 32676 for pipes to DIN 11866 row C	1/2" ... 3/4"	16	25.0	0.2
	1" ... 1 1/2"	16	50.5	0.3
	2"	16	64.0	0.4
Tri-clamp	1/2"	16	25.0	0.2
	3/4"	16	25.0	0.2
	1"	16	50.5	0.3
	1 1/2"	16	50.5	0.3
	2"	16	64.0	0.4
	2 1/2"	16	77.5	0.4
	3"	16	91.0	0.5
ISO 2852	DN 12 ... 21.3	16	34.0	0.2
	DN 25 ... 38	16	50.5	0.3
	DN 40 ... 51	16	64.0	0.4

Dimensions for VARIVENT® process connection

Process connection	Nominal width in mm	PN in bar	Dimensions in mm				Weight in kg
			ϕD	ϕd	H	h	
Form B	DN 10, DN 15	25	31	52.7	20	13.65	0.3
Form F	DN 25, DN 32	25	50	66.0	18	12.30	0.4
Form N	DN 40, DN 50	25	68	84.0	18	12.30	0.6

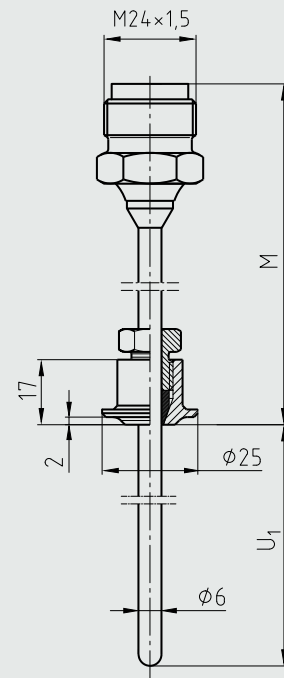
Compression fitting process connection

Ball-type compression fitting



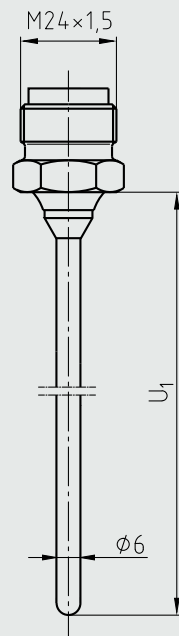
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Collar-type compression fitting



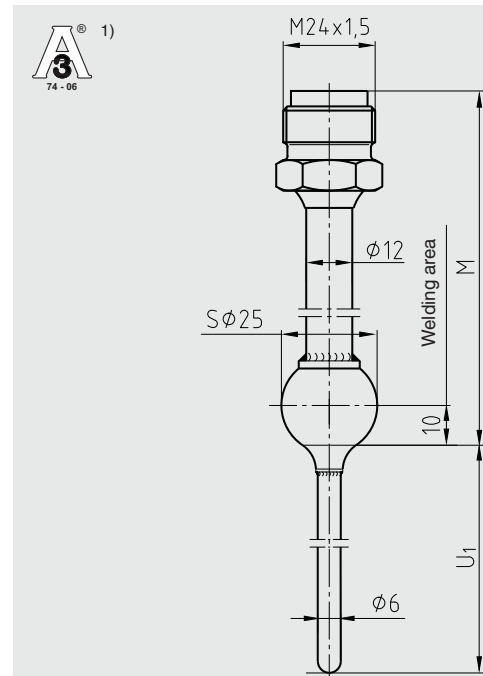
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Process connection, smooth, Ø 6 mm, basic shape of compression fitting



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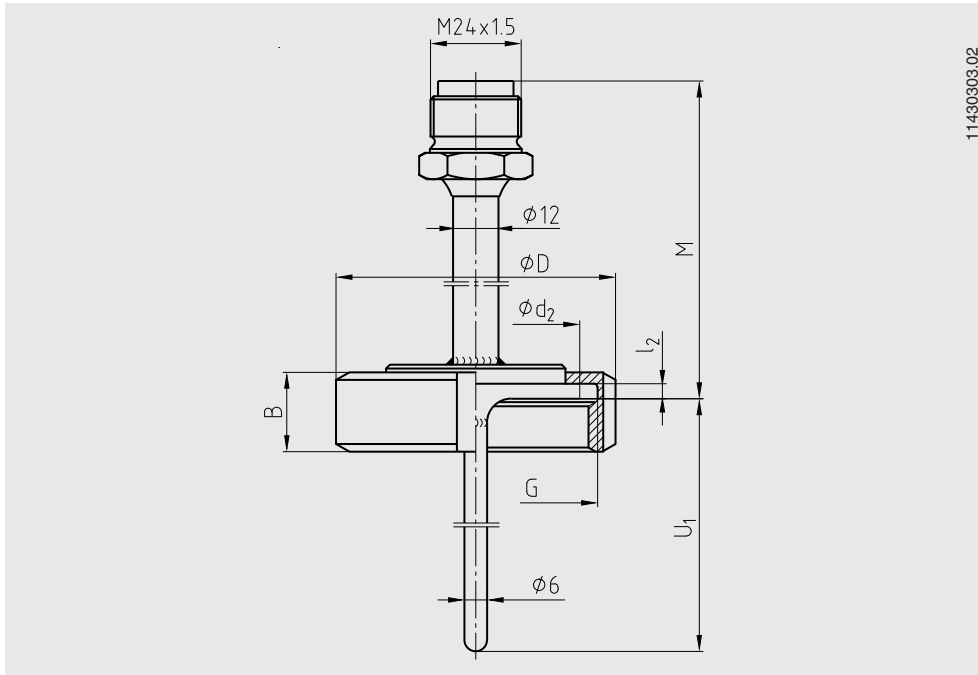
Process connection welding ball



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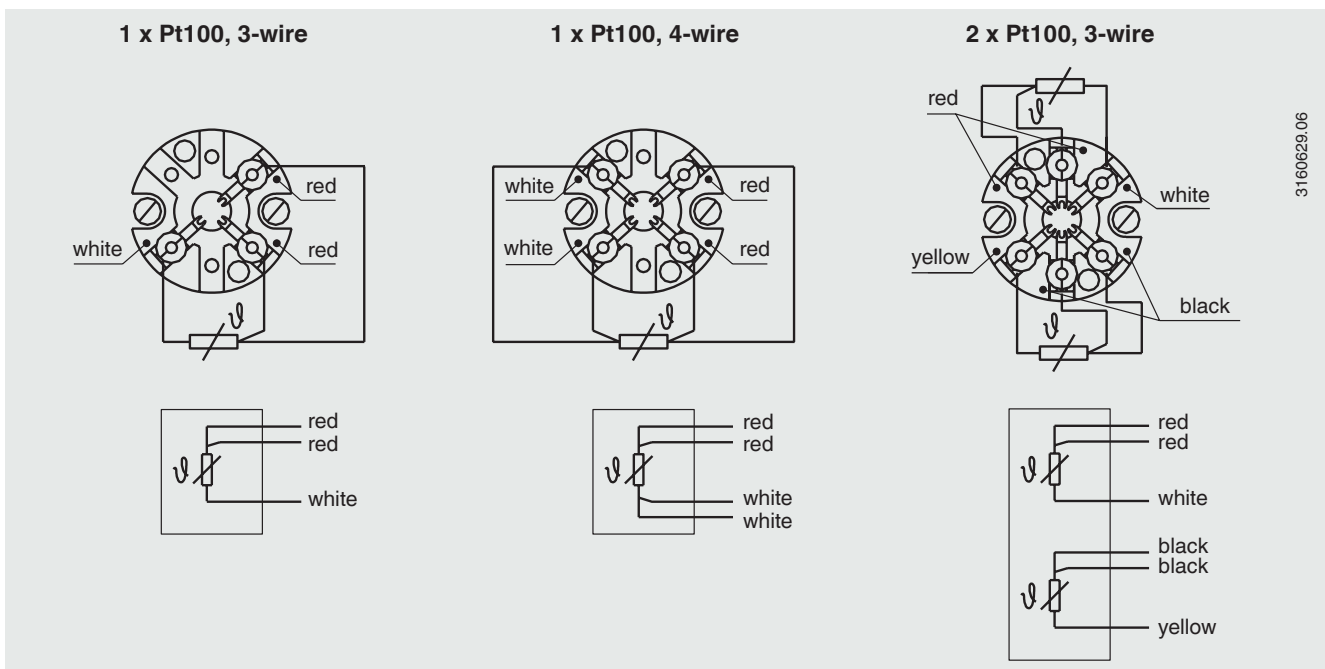
1) In order to meet the 3-A standards, the weld seam has to be carried out with a minimum radius of 3.2 mm on the product side. In doing so, one has to ensure that no weld seam defects such as recesses or cracks remain.

Process connection union nut SMS



Nominal width in inch	PN in bar	Dimensions in mm					Weight in kg
		ϕD	ϕd_2	B	l_2	G	
1"	40	51	35.5	25	3.5	RD 40 x 1/6	0.4
1½"	40	74	55	25	4	RD 60 x 1/6	0.8
2"	40	84	65	26	4	RD 70 x 1/6	1

Electrical connection



For the electrical connections of built-in temperature transmitters see the corresponding data sheets or operating instructions.

Explosion protection (option)

Resistance thermometers of the TR22-A series are available with a EC-type examination certificate for «intrinsically safe», Ex i, ignition protection.

These instruments comply with the requirements of 94/9/EC (ATEX) directive for gas and dust. Versions in accordance with NAMUR NE24 are also available.

The classification/suitability of the instrument (permissible power P_{max} as well as the permissible ambient temperature) for the respective category can be seen on the EC-type examination certificate and in the operating instructions.

Built-in transmitters have their own EC-type examination certificate. The permissible ambient temperature ranges of the built-in transmitters can be taken from the corresponding transmitter approval. The system operator is responsible for using suitable thermowells.

CE conformity

EMC directive ¹⁾

2004/108/EC, EN 61326 emission (group 1, class B) and interference immunity (industrial application)

ATEX directive (option)

94/9/EG, EN 60079-0, EN 60079-11

1) Only for built-in transmitter

Approvals (option)

- **IECEX**, international certification for the Ex area
- **GOST-R**, import certificate, ignition protection type „i“ - intrinsic safety, ignition protection type „iD“ - dust protection through intrinsic safety, Russia
- **GOST**, metrology/measurement technology, Russia
- **3-A**, food, USA
- **EHEDG**, food, Germany
- **KOSHA**, ignition protection type „i“ - intrinsic safety, ignition protection type „iD“ - dust protection through intrinsic safety, South Korea
- **NAMUR**

Certificates (Option)

- 2.2 test report
- 3.1 inspection certificate
- DKD/DAkkS calibration certificate
- Manufacturer's declaration regarding regulation 1935/2004 EC
- Hygienic design conformity

Process connection	3-A (74-06)	EHEDG
Clamp	yes	yes ²⁾
VARIVENT®	yes	yes
BioControl®	yes	no
DIN 11851	yes ¹⁾	yes ¹⁾
DIN 11864	yes	yes
Welding ball	yes	no
Compression fitting	no	no
SMS	no	no

1) In combination with
- ASEPTO-STAR k-flex upgrade gaskets from Kieselmann GmbH, Germany or
- SKS gasket set DIN 11851 EHEDG from Siersema Komponenten

2) In combination with
- Kalrez/Stainless steel gasket from Dupont de Nemours, Switzerland or
- T-ring seals from Combifit International B. V., Netherlands

Approvals and certificates, see website

Ordering information

Model / Explosion protection / Sensor / Accuracy class / Connection head / Cable gland / Transmitter / Thermowell / Process connection / Thermowell diameter / Wetted-parts materials / Insertion length U_1 / Neck tube length / Certificates / Optional further seal combinations

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