

# Protection tube For sanitary applications Model TW22

WIKA data sheet TW 95.22



## Applications

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

## Special features

- Materials and surface finish quality in accordance with the standards of hygienic design
- Fully welded
- Can be combined with models TR21-A and TR22-A electrical resistance thermometers, measuring insert exchangeable
- Can be combined with mechanical thermometers, resistance thermometers and DiwiTherm®



Fig. left: Welding ball process connection  
Fig. right: VARINLINE® process connection

## Description

The model TW22 protection tube is used to adapt thermometers and measuring inserts to the process and protects the sensor against harsh process conditions. The protection tube is mounted to a weld-in nozzle equipped with a respective hygienic connection and is built in pipelines and tanks.

Due to the rotatable threaded connection, the connection head or display can be loosened and adjusted to the desired position.

With a combination of a model TR21-A or TR22-A resistance thermometer, the connection head is removable along with the measuring insert. This enables the thermometer to be calibrated along with the complete 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.

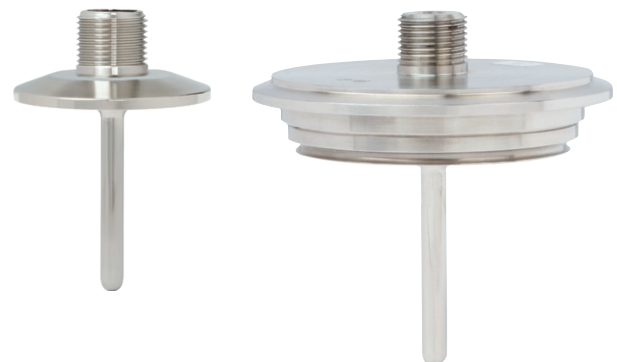


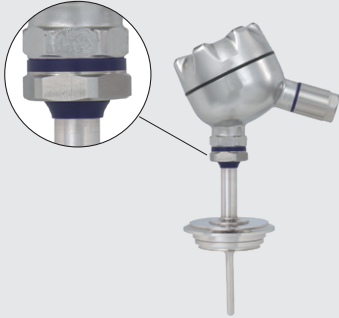
Fig. left: Clamp process connection with G  $\frac{3}{8}$ "  
Fig. right: VARINLINE® process connection with G  $\frac{3}{8}$ "

# Specifications

Basic information	
<b>Protection tube form</b>	<ul style="list-style-type: none"> <li>■ Straight</li> <li>■ With tapered tip</li> </ul>
<b>Version with tapered tip</b>	<ul style="list-style-type: none"> <li>■ Optimised response time</li> <li>■ Through the mass reduction at the sensor tip, the heat transfer to the sensor element is considerably improved</li> <li>■ Recommended for media with poor heat transfer, especially gases</li> <li>■ Observe minimum insertion length!</li> </ul>
<b>Material (wetted)</b>	Stainless steel 1.4435 (316L, UNS S31603)

Neck tube					
<b>Neck tube length M</b>	85 mm [3.35 in] Further neck tube lengths on request				
<b>Neck tube diameter</b>					
Models TR21-A or TR22-A	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">To DN 20</td> <td>9 mm [0.35 in] per DIN 11851, milk thread fitting: 12 mm [0.5 in]</td> </tr> <tr> <td>From DN 25</td> <td>12 mm [0.5 in]</td> </tr> </table>	To DN 20	9 mm [0.35 in] per DIN 11851, milk thread fitting: 12 mm [0.5 in]	From DN 25	12 mm [0.5 in]
To DN 20	9 mm [0.35 in] per DIN 11851, milk thread fitting: 12 mm [0.5 in]				
From DN 25	12 mm [0.5 in]				
Models TG54, 55, 73 or TR75 (DiwiTherm®)	Same diameter as the protection tube diameter				

Process connection	
<b>Type of process connection</b>	<ul style="list-style-type: none"> <li>■ Clamp</li> <li>■ VARINLINE®</li> <li>■ NEUMO BioControl®</li> <li>■ Union nut DIN 11851</li> <li>■ Aseptic threaded pipe connection DIN 11864-1</li> <li>■ Aseptic flange DIN 11864-2</li> <li>■ Aseptic clamp connection DIN 11864-3</li> <li>■ Union nut SMS</li> <li>■ Process connection, straight</li> <li>■ Welding ball</li> <li>■ Ball-type compression fitting</li> <li>■ Collar-type compression fitting</li> <li>■ Ingold connection</li> </ul>
<b>Connection to thermometer</b>	
In combination with model TR21-A	G 3/8" fixed
In combination with model TR22-A	<ul style="list-style-type: none"> <li>■ M24 x 1.5 pressure screw (rotatable)</li> <li>■ 1/2 NPT, fixed</li> </ul>
In combination with models TG54 or 55	<ul style="list-style-type: none"> <li>■ M24 x 1.5 pressure screw (rotatable)</li> <li>■ G 1/2 female <sup>1)</sup></li> <li>■ 1/2 NPT female <sup>1)</sup></li> </ul>
In combination with models 73 (design 3 / union nut) or TR75 (DiwiTherm®)	M24 x 1.5 pressure screw (rotatable)

Process connection		
<b>Protection tube diameter</b>		
Models TR21-A or TR22-A	<ul style="list-style-type: none"> <li>■ Ø 6 mm [0.24 in] for Ø 3 mm [0.12 in] probes</li> <li>■ Ø 6 mm [0.24 in] tapered to Ø 4.5 mm [0.18 in] for Ø 3 mm [0.12 in] probes (fast response)</li> <li>■ Ø 4.5 mm [0.18 in] for Ø 3 mm [0.12 in] probes (fast response, only insertion length <math>U_1 \leq 25</math> mm [0.98 in])</li> </ul>	
Models TG54, 55, 73 or TR75 (DiwiTherm®)	<ul style="list-style-type: none"> <li>■ Ø 8 x 0.9 mm [0.31 x 0.04 in] for Ø 6 mm [0.24 in] probes</li> <li>■ Ø 12 x 1.5 mm [0.47 x 0.06 in] for Ø 8 mm [0.31 in] probes</li> </ul>	
<b>Insertion length <math>U_1</math></b>	<ul style="list-style-type: none"> <li>■ 25 mm [1 in]</li> <li>■ 50 mm [2 in]</li> <li>■ 75 mm [3 in]</li> <li>■ 100 mm [4 in]</li> <li>■ 150 mm [6 in]</li> <li>■ 200 mm [8 in]</li> <li>■ To customer specification up to 400 mm [16 in]</li> </ul>	
BioControl® flow-through housing	see table on page 12	
Calculating the insertion length of the thermometer	Models TG54, 55 and 73	Design 2 $L_1 = U_1 (TW22) + M - 25$ mm [0.98 in]
		Design 3 $L_1 = U_1 (TW22) + M - 5$ mm [0.20 in]
	Model TR75	$A(I_1)$ or $A(U_2) = U_1 (TW22) + M (TW22) - 15$ mm [0.59 in]
	Model TR21-A	$L_1 = U_1^{2)} + M^{3)}$
	TR22-A	Sensor length $I_5 = U_1^{2)} + M^{4)} + 10$ mm [0.39 in]
<b>Surface roughness of wetted parts</b>	<ul style="list-style-type: none"> <li>■ <math>R_a &lt; 0.76</math> µm (SF3 per ASME BPE)</li> <li>■ <math>R_a &lt; 0.38</math> µm (SF4 per ASME BPE)</li> <li>■ <math>R_a &lt; 0.38</math> µm electropolished (SF4 per ASME BPE)</li> </ul>	
<b>Sealing combination (option)</b>	<p>Transition from the connection head to the protection tube is effected via an optional sealing combination (polyurethane) of flat gasket and wiper</p> <ul style="list-style-type: none"> <li>■ Permanently prevents the penetration and depositing of humidity and impurities in this area (IP68)</li> <li>■ Simplifies cleaning considerably (in combination with the patented BVS head and the hygienic cable gland, an easy to clean and hygienic measuring location results, even in areas which are not in contact with the product)</li> </ul>	
		

1) Only for design S (fixed), design 2 (rotatable threaded connection), design 4 (compression fitting) or design 5 (union nut and loose threaded connection)

2) Face-sensitive measuring resistors, through their small design they serve to reduce the heat dissipation with short insertion lengths. Available for the temperature range up to 150 °C [302 °F].

For protection tube insertion lengths of less than 50 mm [2 in], face-sensitive measuring resistors are recommended.

For protection tube insertion lengths of less than 11 mm [0.43 in], face-sensitive measuring resistors are generally used.

3) Neck tube length M see data sheet TE 60.26 (TR21-A)

4) Neck tube length M see data sheet TW 95.22 (TR22-A)

VARINLINE® is a registered trademark of the company GEA Tuchenhausen (former designation: VARIVENT®).

BioControl® is a registered trademark of the company NEUMO.

→ For dimensions, see dimension tables from page 7

Legend:

M Neck tube length

$U_1$  Insertion length protection tube




$L_1$  Insertion length mechanical thermometers

$A(I_1)$  /  $A(U_2)$  Insertion length DiwiTherm®

$L_1$  Insertion length TR21-A

$I_5$  Insertion length TR22-A

## Approvals

Logo	Description	Region
	<b>EAC</b> Pressure equipment directive	Eurasian Economic Community
	<b>3-A</b> <sup>1)</sup> Sanitary Standard	USA
	<b>EHEDG</b> <sup>1)</sup> Hygienic Equipment Design	European Union

1) Confirmation of 3-A or EHEDG conformity only valid with separately selectable 2.2 test report

## Certificates (option)

Certificates		
<b>Certificates</b>	<ul style="list-style-type: none"> <li>■ 2.2 test report</li> <li>■ 3.1 inspection certificate</li> <li>■ Manufacturer's declaration regarding regulation (EC) 1935/2004</li> <li>■ Certificate of the surface roughness of wetted parts</li> </ul>	
<b>Hygienic certificates</b>	3-A approval	EHEDG approval
Clamp	Yes	Yes
VARINLINE®	Yes	Yes
BioControl®	Yes	No
DIN 11851	Yes <sup>1)</sup>	Yes <sup>1)</sup>
DIN 11864-1	Yes	Yes
DIN 11864-2	Yes	Yes
DIN 11864-3	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 Service (S.K.S.) B.V., Netherlands

2) In combination with  
 T-ring seals from Combifit International B. V., Netherlands

→ For approvals and certificates, see website

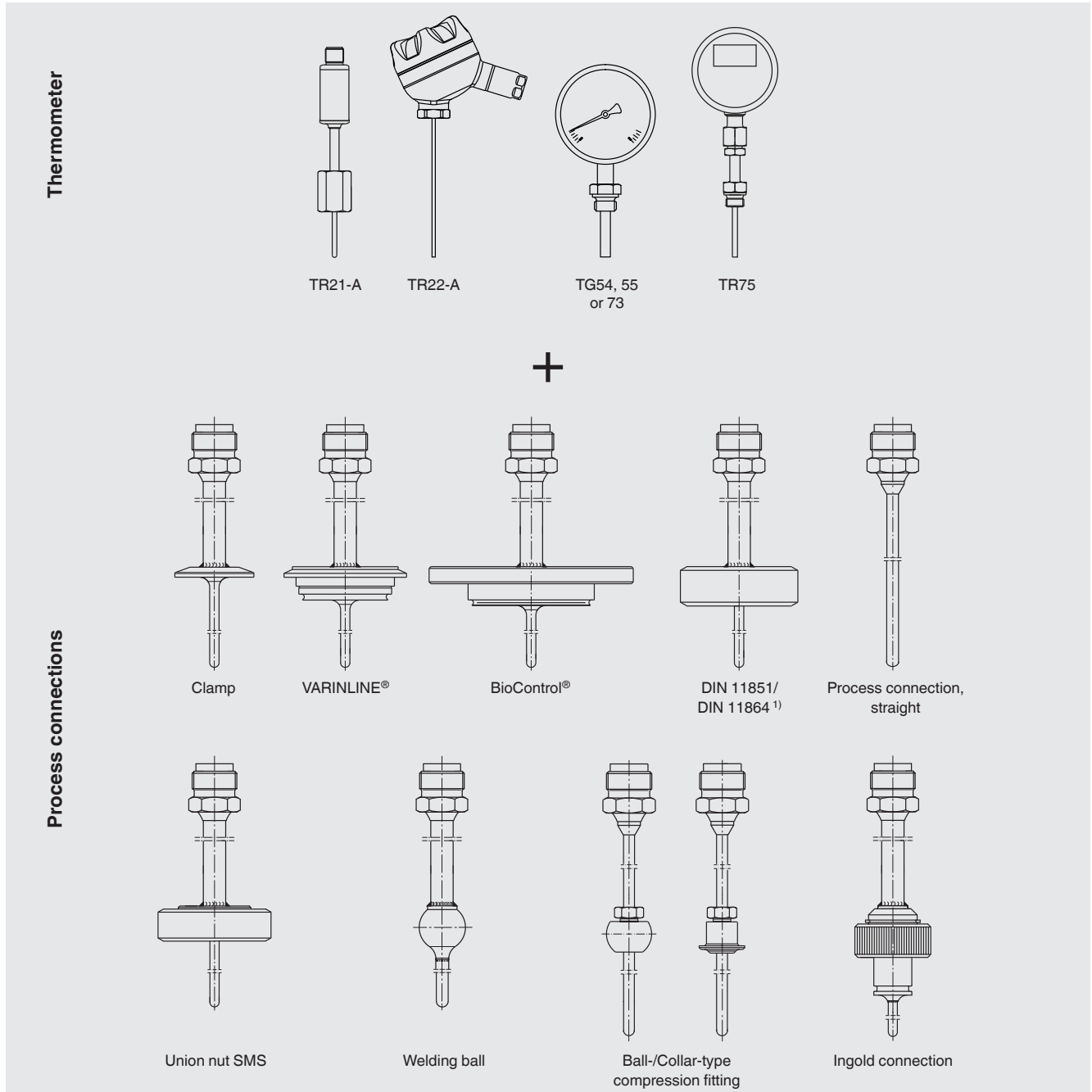
## Patents, property rights

Case with easily cleanable twist crown, integrated into the case cap (GM 000984349)

## Combination possibilities

- Resistance thermometers models TR21-A or TR22-A
- Mechanical thermometers models TG54, 55 or 73
- DiwiTherm® model TR75

### Combination examples

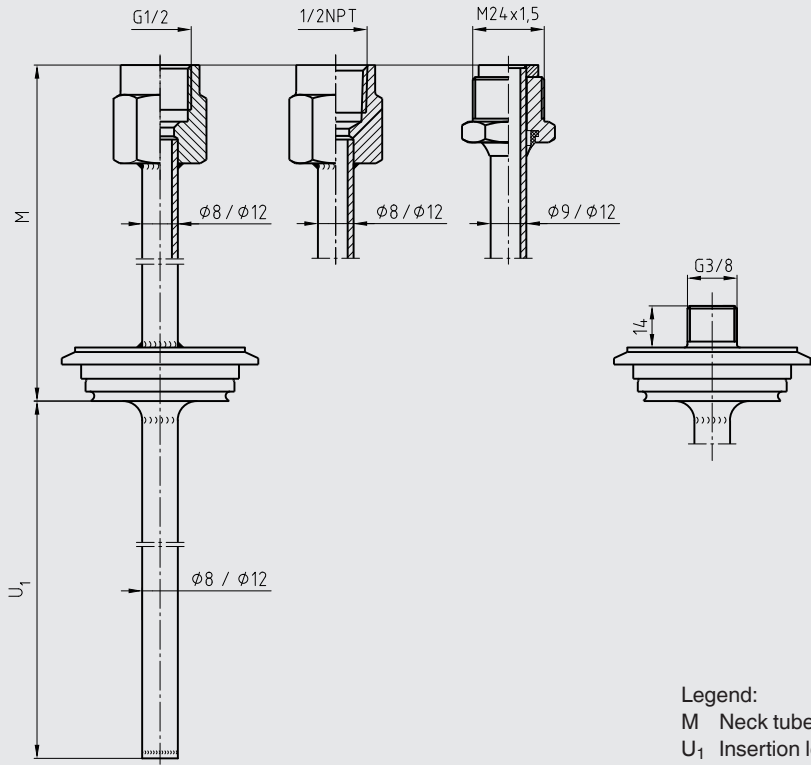


1) Process connections per DIN 11864-2 and DIN 11864-3, see "Dimensions of the process connections in mm"

VARINLINE® is a registered trademark of the company GEA Tuchenhagen (former designation: VARIVENT®).  
 BioControl® is a registered trademark of the company NEUMO.

# General protection tube design

For mechanical thermometers models TG54, 55 and 73

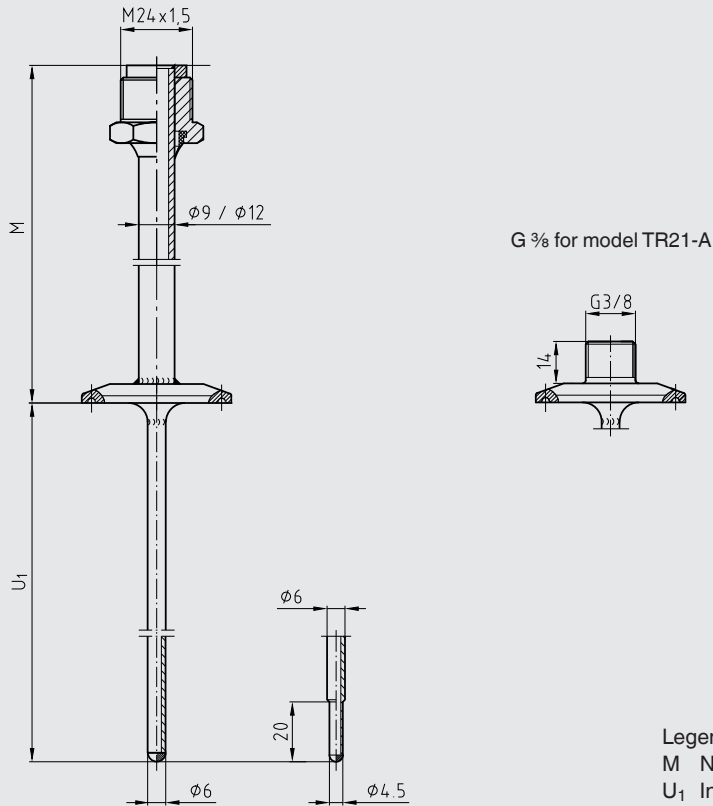


11440538.02

Legend:  
M Neck tube length  
U<sub>1</sub> Insertion length

For resistance thermometers models TR21-A and TR22-A

M24 x 1.5 for model TR22-A

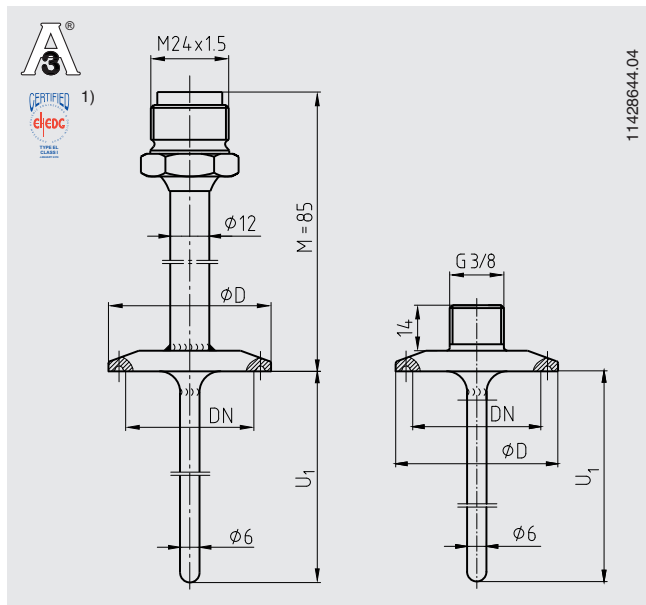


11440546.02

Legend:  
M Neck tube length  
U<sub>1</sub> Insertion length

# Dimensions of the process connections in mm

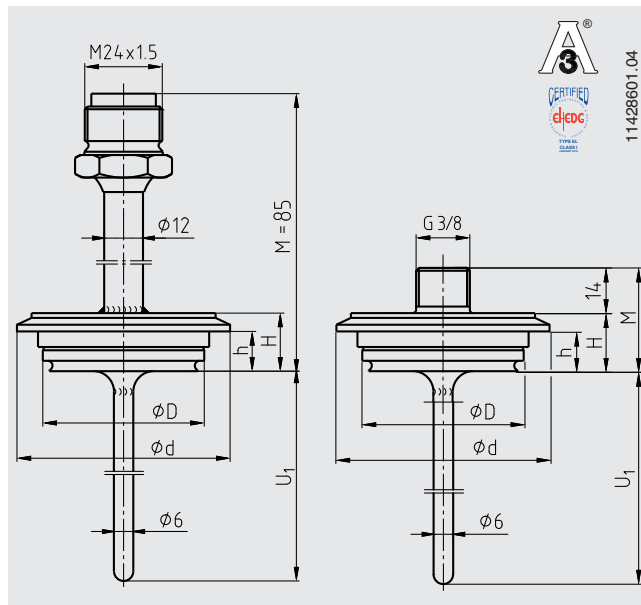
## Clamp process connection



$U_1$  = variable insertion length

1) In combination with T-ring seals from Combifit International B. V., Netherlands

## VARINLINE® process connection



$U_1$  = variable insertion length

## Dimensions for clamp process connection

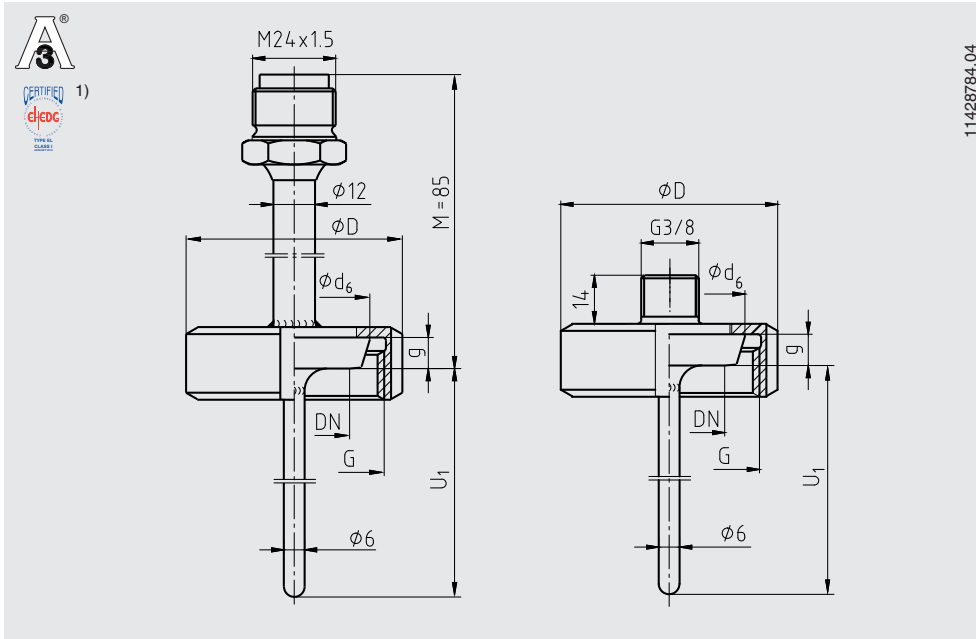
Process connection	Nominal width in mm/inch	PN in bar	Dimensions in mm		Weight in kg
			$\phi D$	$\phi d$	
DIN 32676 for pipes per DIN 11866 row A <sup>2)</sup>	DN 10 ... 20	25	34.0		0.2
	DN 25 ... 40	25	50.5		0.3
	DN 50	16	64.0		0.4
DIN 32676 for pipes per DIN 11866 row B	13.5 ... 17.2	25	25.0		0.2
	21.3 ... 33.7	25	50.5		0.3
	42.4 ... 48.3	16	64.0		0.3
DIN 32676 for pipes per DIN 11866 row C	1/2" ... 3/4"	25	25.0		0.2
	1" ... 1 1/2"	25	50.5		0.3
	2"	16	64.0		0.4
Tri-Clamp	1/2" ... 3/4"	13.8	25.0		0.2
	1" ... 1 1/2"	13.8	50.5		0.3
	2"	13.8	64.0		0.4
	2 1/2"	13.8	77.5		0.4
	3"	13.8	91.0		0.5
	4"	13.8	119.0		0.5

2) Process connection identical in construction to ISO 2852

## Dimensions for VARIVENT® process connection

Process connection	Nominal width in mm	PN in bar	Dimensions in mm				Weight in kg
			$\phi D$	$\phi d$	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

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



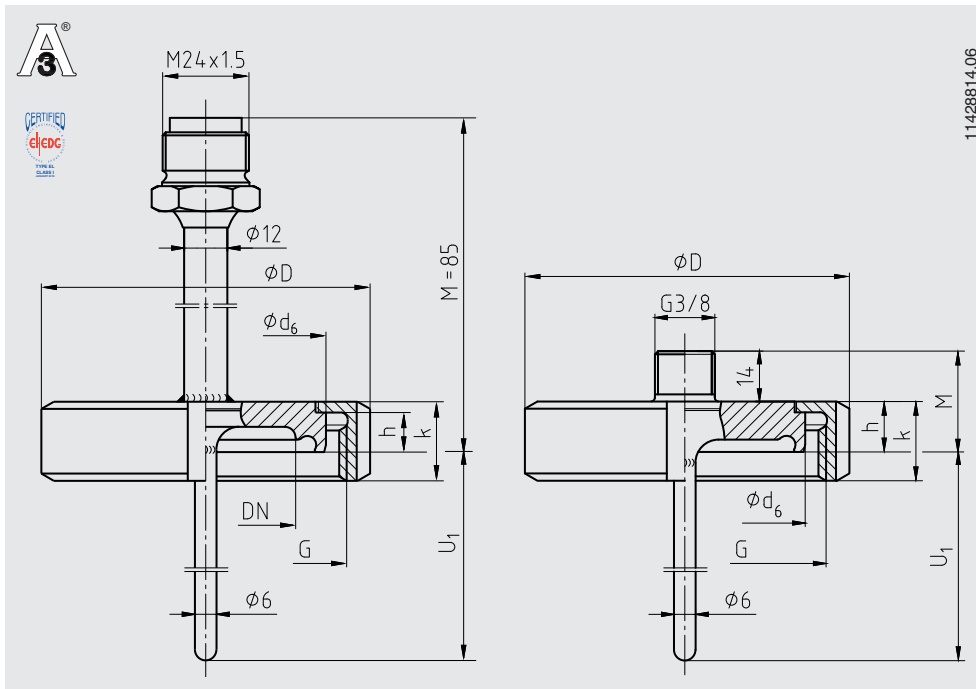
Nominal width in mm	PN in bar	Dimensions in mm				Weight in kg
		$\phi d_6$	G	$\phi D$	g	
DN 20	40	36.5	RD 44 x 1/6	54	8	0.40
DN 25	40	44.0	RD 52 x 1/6	63	10	0.50
DN 32	40	50.0	RD 58 x 1/6	70	10	0.60
DN 40	40	56.0	RD 65 x 1/6	78	10	0.80
DN 50	25	68.5	RD 78 x 1/6	92	11	0.90

$U_1$  = variable insertion length

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



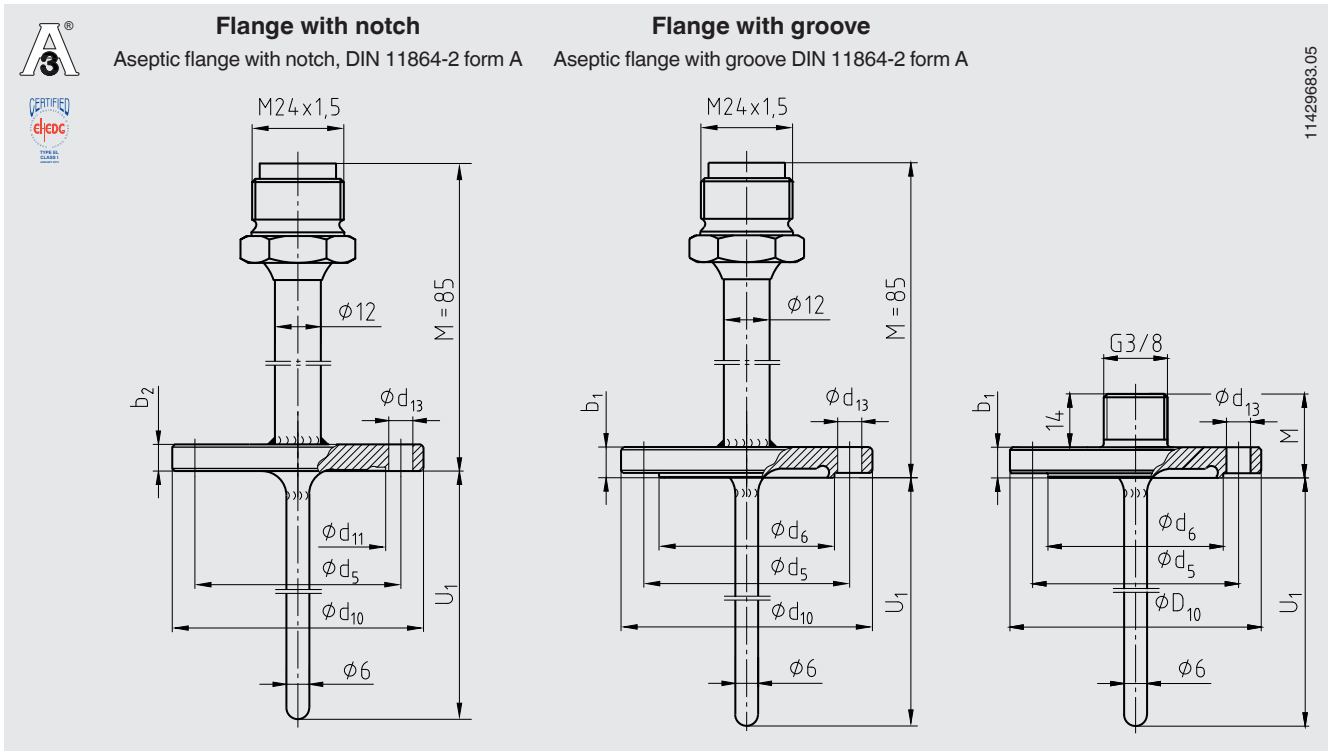
**Aseptic threaded pipe process connection, DIN 11864-1 with liner form A, for pipes in accordance with DIN 11866 row A, B and C**



U<sub>1</sub> = variable insertion length

Nominal width of pipe DN / OD	Nominal pressure in bar PN	Outer diameter of pipe	Pipe schedule s	Inner diameter of pipe	Process connection				Aseptic O-ring	Weight in kg
					Ø D	G	h	k		
<b>DIN 11866 row A or metric</b>										
10	40	13	1.5	10	38	RD 28 x 1/8	9	18	12 x 3.5	0.2
15	40	19	1.5	16	44	RD 34 x 1/8	9	18	18 x 3.5	0.2
20	40	23	1.5	20	54	RD 44 x 1/6	10	20	22 x 3.5	0.25
25	40	29	1.5	26	63	RD 52 x 1/6	12	21	28 x 3.5	0.4
32	40	35	1.5	32	70	RD 58 x 1/6	13	21	34 x 5	0.45
40	40	41	1.5	38	78	RD 65 x 1/6	13	21	40 x 5	0.55
50	25	53	1.5	50	92	RD 78 x 1/6	14	22	52 x 5	0.7
<b>DIN 11866 row B or ISO</b>										
8 (13.5)	40	13.5	1.6	10.3	38	RD 28 x 1/8	9	18	12 x 3.5	0.2
10 (17.2)	40	17.2	1.6	14	44	RD 34 x 1/8	9	18	16 x 3.5	0.2
15 (21.3)	40	21.3	1.6	18.1	54	RD 44 x 1/6	10	20	20 x 3.5	0.3
20 (26.9)	40	26.9	1.6	23.7	63	RD 52 x 1/6	12	21	26 x 3.5	0.4
25 (33.7)	40	33.7	2	29.7	70	RD 58 x 1/6	13	21	32 x 5	0.5
32 (42.4)	25	42.4	2	38.4	78	RD 65 x 1/6	13	21	40.5 x 5	0.6
40 (48.3)	25	48.3	2	44.3	92	RD 78 x 1/6	14	22	46.6 x 5	0.7
<b>DIN 11866 row C or ASME BPE</b>										
1/2"	40	12.7	1.65	9.4	38	RD 28 x 1/8	9	18	12 x 3.5	0.2
3/4"	40	19.05	1.65	15.75	44	RD 34 x 1/8	9	18	18 x 3.5	0.2
1"	40	25.4	1.65	22.1	63	RD 52 x 1/6	12	21	24 x 3.5	0.4
1 1/2"	40	38.1	1.65	34.8	78	RD 65 x 1/6	13	21	37 x 5	0.6
2"	25	50.8	1.65	47.5	92	RD 78 x 1/6	14	22	50 x 5	0.7

**Aseptic flange process connection DIN 11864-2, form A for pipes in accordance with DIN 11866 row A**

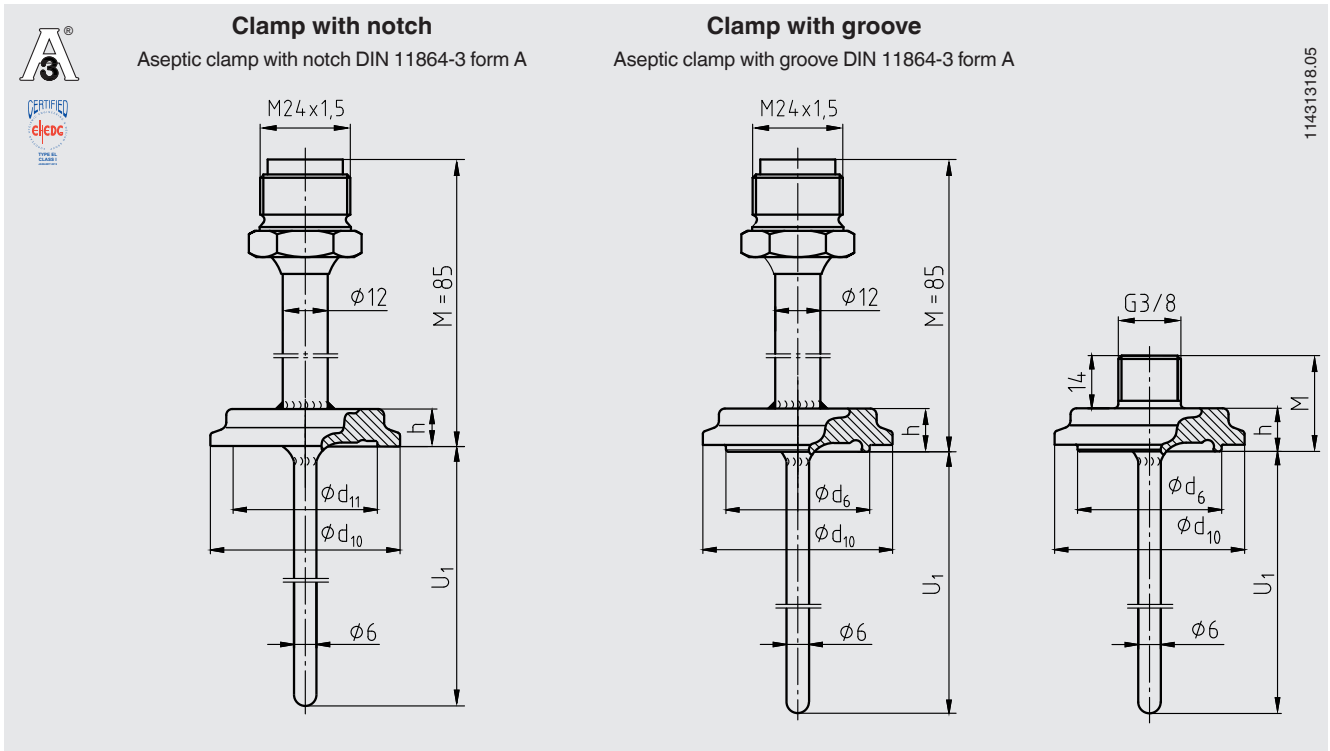


11429683.05

Process connection	Nominal width in mm	PN in bar	Dimensions in mm								Aseptic O-ring	Weight in kg
			b <sub>1</sub>	b <sub>2</sub>	Ø d <sub>5</sub>	Ø d <sub>6</sub>	Ø d <sub>10</sub>	Ø d <sub>11</sub>	Ø d <sub>13</sub>			
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 in accordance with DIN 11866 row B (ISO pipes) and row C (ASME pipes) available on request.

**Aseptic clamp process connection, DIN 11864-3, form A for pipes in accordance with DIN 11866 row A**

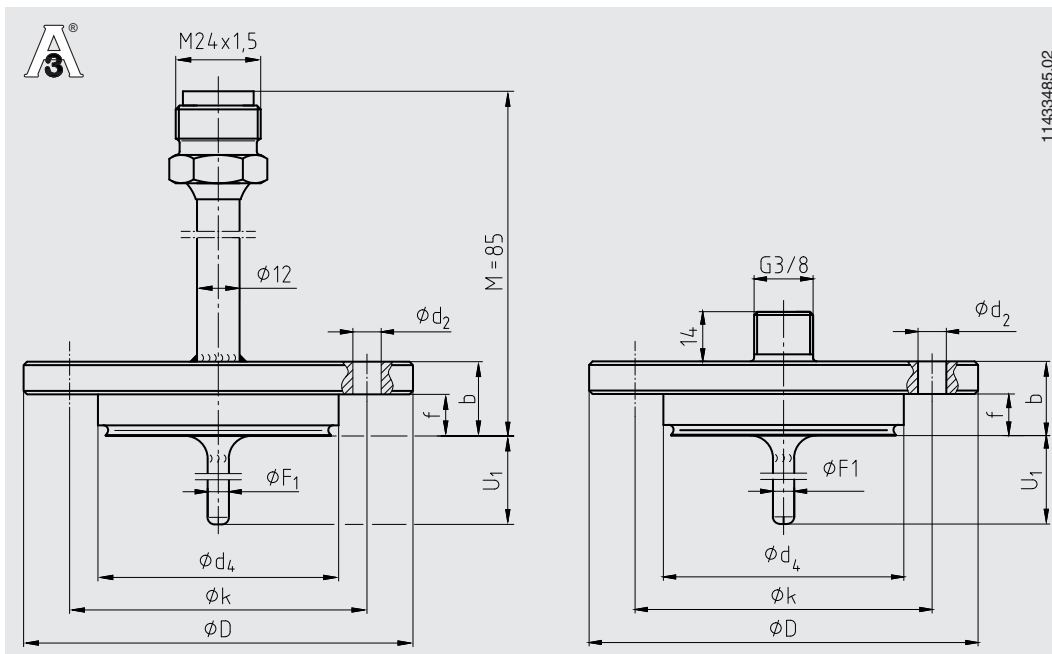


11431318.05

Process connection	Nominal width in mm	PN in bar	Dimensions in mm				Aseptic O-ring	Weight in kg
			$\phi d_6$	$\phi d_{10}$	$\phi d_{11}$	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 in accordance with DIN 11866 row B (ISO pipes) and row C (ASME pipes) available on request.

NEUMO BioControl® process connection



U<sub>1</sub> = variable insertion length

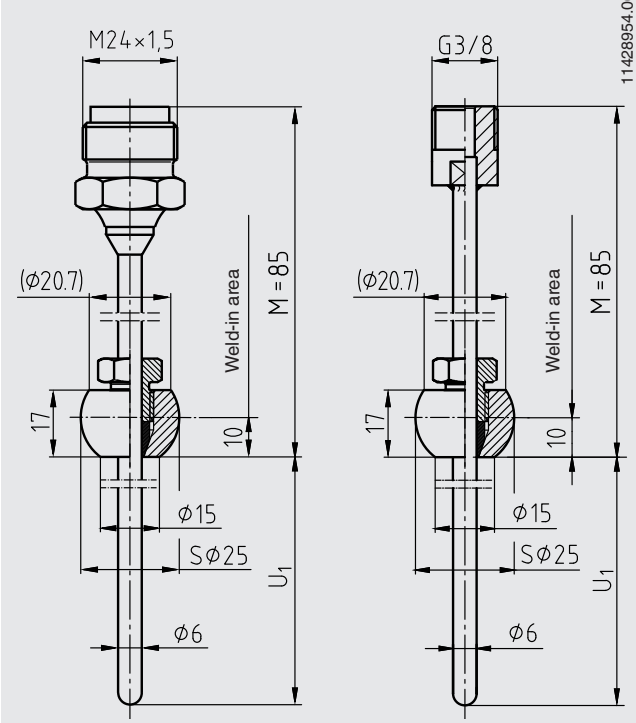
For fitting into a flow-through housing, the insertion length U<sub>1</sub> and the protection tube diameter must be matched. For angular housings, the insertion length U<sub>1</sub> must be specified by the customer.

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

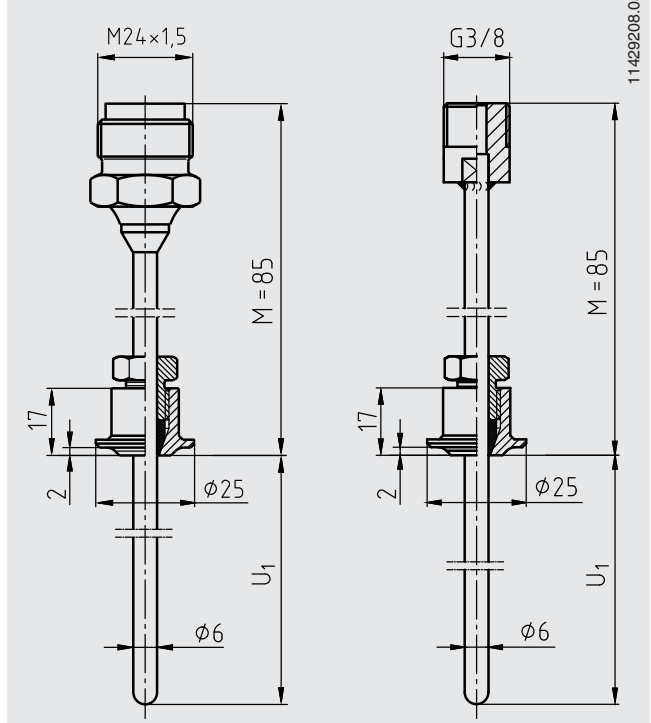
Case size	Nominal width of pipe	PN in bar	Dimensions in mm							Weight in kg
			U <sub>1</sub>	Ø d <sub>4</sub>	Ø D	f	b	Ø k	Ø d <sub>2</sub>	
Size 25	DN 8	16	5	30.5	64	11	20	50	4 x Ø 7	0.4
	DN 10	16	6	30.5	64	11	20	50	4 x Ø 7	0.4
	DN 15	16	9	30.5	64	11	20	50	4 x Ø 7	0.4
	DN 20	16	11	30.5	64	11	20	50	4 x Ø 7	0.4
Size 50	DN 25	16	15	50.0	90	17	27	70	4 x Ø 9	0.8
	DN 40	16	20	50.0	90	17	27	70	4 x Ø 9	0.8
	DN 50	16	25	50.0	90	17	27	70	4 x Ø 9	0.8
	DN 65	16	35	50.0	90	17	27	70	4 x Ø 9	0.8
	DN 80	16	45	50.0	90	17	27	70	4 x Ø 9	0.8
	DN 100	16	55	50.0	90	17	27	70	4 x Ø 9	0.8
Size 65	DN 40	16	20	68.0	120	17	27	95	4 x Ø 11	1.4
	DN 50	16	25	68.0	120	17	27	95	4 x Ø 11	1.4
	DN 65	16	35	68.0	120	17	27	95	4 x Ø 11	1.4
	DN 80	16	45	68.0	120	17	27	95	4 x Ø 11	1.4
	DN 100	16	55	68.0	120	17	27	95	4 x Ø 11	1.4

## Compression fitting process connection

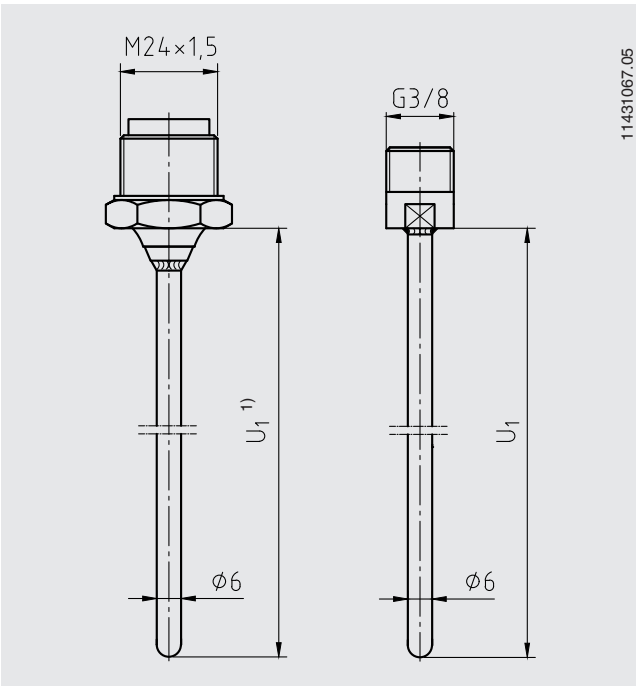
### Ball-type compression fitting



### Collar-type compression fitting

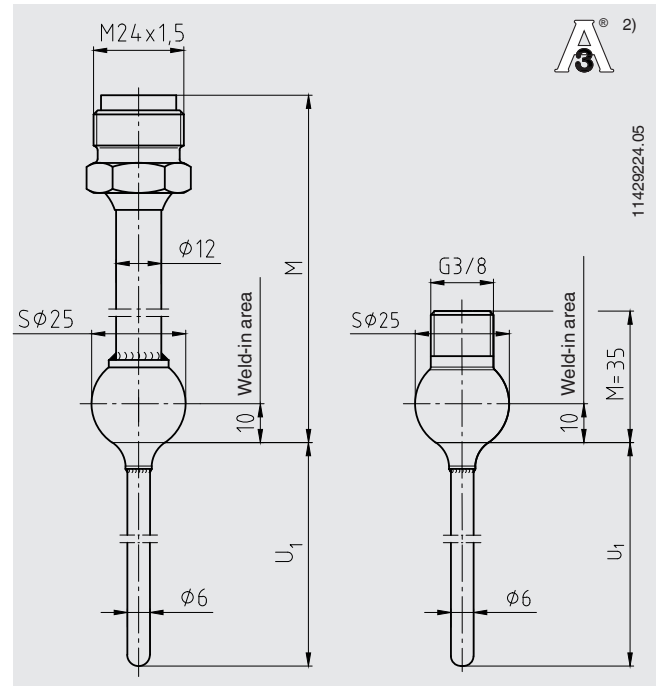


### Process connection, straight, $\phi 6$ mm, basic shape for compression fitting



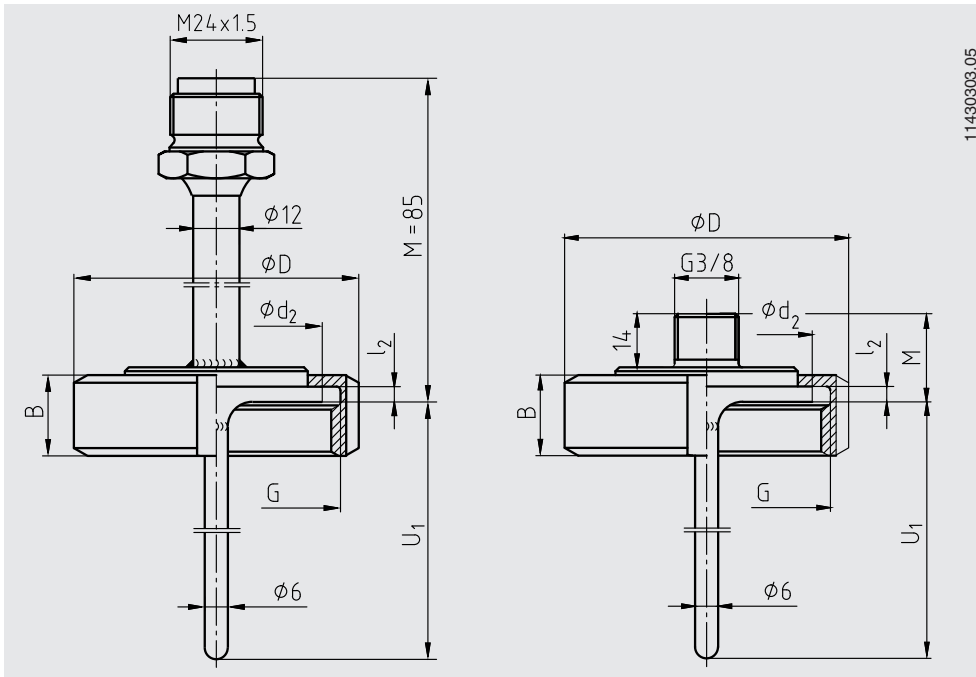
1) When using the optional wiper, the available insertion length is reduced by 12 mm.

### Welding ball process connection



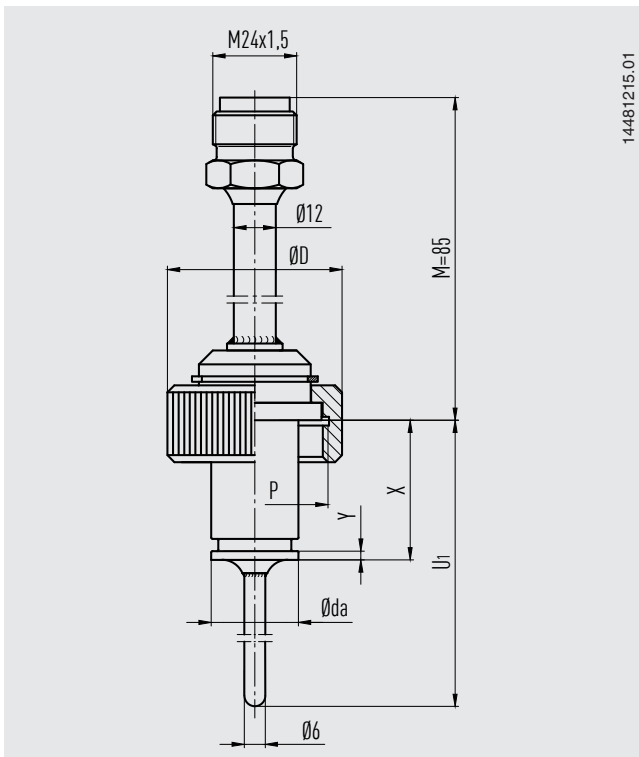
2) In order to meet the 3-A standard, the weld seam must be finished with a minimum radius of 3.2 mm on the product side. In this way, no weld defects, such as recesses or gaps, remain.

### Union nut process connection SMS



Nominal width in inch	PN in bar	Dimensions in mm					Weight in kg
		Ø D	Ø d <sub>2</sub>	B	l <sub>2</sub>	G	
1"	40	51	35.5	25	3.5	RD 40 x 1/6	0.4
1½"	40	74	55.0	25	4.0	RD 60 x 1/6	0.8
2"	40	84	65.0	26	4.0	RD 70 x 1/6	1.0

### Process connection, Ingold connection



**Ordering information**

Model / Type of process connection / Nominal width / Protection tube material / Surface roughness of the wetted parts /  
Connection to thermometer (N) / Insertion length  $U_1$  / Protection tube diameter / Neck tube length M / Neck tube diameter /  
Assembly with resistance thermometer / Thermometer / Certificates / Options

© 03/2009 WIKA Alexander Wiegand SE & Co. KG, all rights reserved.  
The specifications given in this document represent the state of engineering at the time of publishing.  
We reserve the right to make modifications to the specifications and materials.



**WIKA Alexander Wiegand SE & Co. KG**  
Alexander-Wiegand-Straße 30  
63911 Klingenberg/Germany  
Tel. +49 9372 132-0  
Fax +49 9372 132-406  
info@wika.de  
www.wika.de