



VARINLINE® instrumentation free of dead pockets

The matrix piping found in process technology makes it difficult for the operator to directly view his product. The installation of VARINLINE® housings into the pipeline system permits integration of measurement and control instruments in the process system and thus, structuring the production process transparently.

Cleaning and sterilization capacities in the CIP/SIP procedures have the highest priority, as well as to ensure hygienic production in the brewery and beverage industries, dairy processing operations and the chemical, pharmaceuticals and cosmetic industries.

General benefits

No domes, no sumps

Gap-free sealing according to the VARIVENT® principle

Rapid, accurate instrument installation with clamp connection

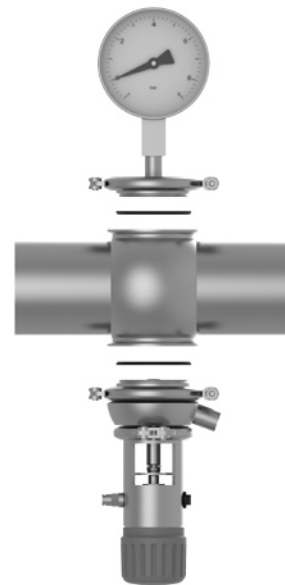
Connections for instrumentation independent of nominal widths and process variables

Detection of the respective measuring values directly in the product flow

Perfect flow properties and cleaning ability

Function of the VARINLINE® components

The adaptation of the meters in the VARINLINE® housings takes place via VARINLINE® process connections. Many manufacturers have assumed this established process connection type and offer meters for installation in VARINLINE® fittings as standard. This ensures hygienic and quick integration of different devices into the process system.



The process connections offer the option of holding up to two VARINLINE® components in one housing



Application examples

The VARINLINE® concept has proven its worth in hygienic processes. VARINLINE® housings permit installation of transmitters free of dead zones and thus, permit use of sensors in systems with high hygienic requirements.

The VARINLINE® system comprises of components for process monitoring, such as pressure, temperature and flow measurement.

Optimized process circuits reduce product loss, e.g. by measurement of the color, clouding or conductivity of the product to divert the ejections.

The GEA Tuchenhagen level probe is used as media recognition to protect the pumps or control filling of tanks.

Special features

Four different process connection sizes

Combination options of up to two devices in one VARINLINE® housing

Different adaptation options in tanks

VARINLINE® housing according to four different pipe standards

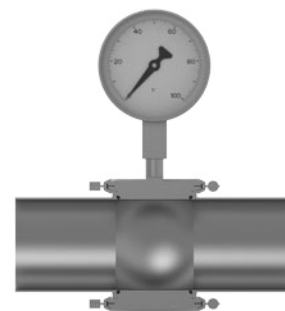
EHEDG certification of the housing

The GEA Breconcherry In-Line Sprayer type IS 25 can also be utilized in the respective process fittings for container and pipe cleaning.

For adapting measurement and control instruments in tanks, VARINLINE® housing connections and tank connection flanges for welding into wall, cone or dished bottoms are available.



Formation of a dome by conventional adaptation at the T-piece



Holder in the VARINLINE® housing free of dead zones

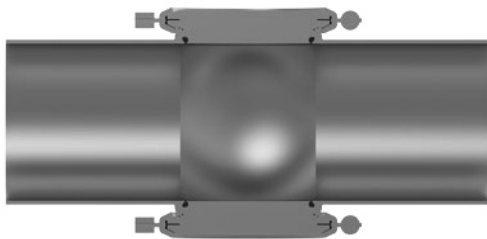


VARINLINE® housings

The VARINLINE® housing is the process connection that is the core element to the control and measurement technology. It is free of dead zones in pipeline systems.

Depending on the housing rated width and the installation depth of the instrumentation, up to two control or measuring instruments can be adapted into the double vertical port in-line housing. Only the nominal widths DN 10 and 15 as well as ISO 13.5 to 21.3 are an exception with only one process connection.

To meet the nominal width of the pipeline, housings with four different process connection sizes are available.



The pipe inside diameter corresponds to the inner height of the housing.

VARINLINE® housing connection flange type T and T-S

The housing connection flanges type T and T-S serve to adapt measurement and control instruments free of dead zones, e.g. for installation of VARINLINE® pressure gauges and sight glasses. This connection flange may be welded into the tank or vessel wall flush from the inside, in the cone or dished bottom.

The housing connection flange type T is designed for installation into vessels of a wall thickness up to 8 mm.

Due to its cylindrical shape, the housing connection flange of type T-S allows adjustment to the inclination or curve of the vessel bottom or vessel wall and is thus suitable for installation in tanks with smaller diameters (≤ 1.6 m).

For stress-free installation, a welding device is available (available for rent as well), which facilitates the reliable and simple installation. When welding in, the regulations of the weld must be complied with.



The conical inner contour permits a flat installation orientation



Cylindrical shape for adaptability to eccentric positions

Process connection sizes

The process connections are available in four sizes.

	Process connection			
	B	F	N	G
VARINLINE® housings	•	•	•	•
VARINLINE® housing connection flange type T	•	•	•	•
VARINLINE® housing connection flange type T-S			•	
VARINLINE® housing connection flange type U		•	•	•
VARINLINE® housing connection flange type U-S			•	
VARINLINE® tank connection flange type P		•	•	
VARINLINE® sight glass type TXIA		•	•	•
VARINLINE® pressure gauge type TPIA	•	•	•	
VARINLINE® thermometer type TTIA		•	•	
VARINLINE® sampling valve type TSVN*		•	•	
VARINLINE® sampling valve type TSVU*		•	•	
VARIVENT® double-seat sampling valve type T/09*			•	
GEA Tuchenhagen level probe type TNS		•	•	
GEA Breconcherry in-line sprayer type IS 25**			•	

* See section 4.2, sampling valves

** See catalog cleaning technology (GEA Breconcherry)

VARINLINE® housing connection flanges type U and U-S

The housing connection flange type U is used to adapt a measurement and control instrument free of dead zones, e.g. a VARINLINE® thermometer or a level probe. The flange may be welded into the tank or vessel wall front-flush, in the cone or dished bottom. The housing connection flanges type U and U-S are particularly suitable for installation of measuring technology at jacketed tanks due to their cylindrical form.

The housing connection flange type U-S is used for vertical holding of a measurement and control instrument free of dead zones. Its cylindrical shape allows the adjustment to the inclination of the cone or dished bottom and therefore allows for vertical installation of sight glasses and measuring instruments outside the vessel bottom.

For stress-free installation, the housing connections should be welded in with an inserted plug. Apart from this, the regulations of the weld must be complied with.



Conical inner contour permits flat installation orientations



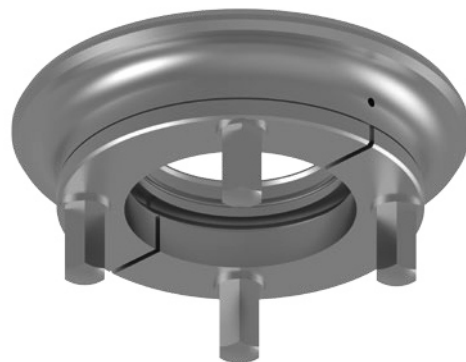
Cylindrical shape permits adjustment to the inner tank contours

VARINLINE® tank connection flange type P

The tank connection flange type P is used for front-flush installation with no dead zones of a measurement and control instrument. This flange type is suitable for installation into vessels of a wall thickness up to 20 mm.

The flange is equipped with pressure relief half-rings and a pressure relief bore for controlled discharge of the inner tank pressure for maintenance work.

For stress-free installation, a welding device is available (available for rent as well) which facilitates the reliable and simple installation. When welding in, the regulations of the weld must be complied with.

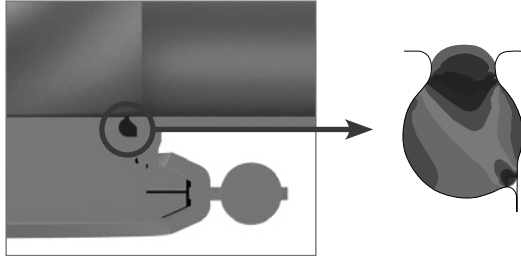


Possibility of pressure relief in the tank

Sealing according to the VARIVENT® principle

A defined seal deformation allows for more time to pass between required maintenance services, thereby allowing for continuous production and shorter downtimes.

The seal geometry was optimized by using FEM calculations.



Representation of the stress load on the housing O-ring

Seals

Long operating time

Vacuum-proof

Selection of FDA-compliant seal materials

- EPDM
- FKM
- HNBR
- FFKM
- PTFE

VARINLINE® pressure gauge

The Bourdon tube pressure gauge is equipped with a sealing diaphragm. A diaphragm provides separation from the measuring material and transmits the process pressure to the meter via a transmission medium. If pressure is applied from the measuring medium now, it is transmitted via the elastic diaphragm to the liquid and thus, to the meter.

The specifically constructed setup of this pressure gauge achieves a low temperature influence and permits use of the device for over- or under-pressure measurements.

According to the requirements of the FDA, the indicator is filled with certified glycerin (or insulation oil at equip with proximity switches) to permit dampening of the indicator under strong vibrations and to avoid formation of precipitation if the temperatures fluctuate strongly.

Thus, the pressure gauge is outstanding for use in the food industry. It is available for process connection sizes B, F and N. Depending on the installation position of the pressure gauge, different orientations are available for best reading of the display.



Pressure gauge with process connection B



Pressure gauge for vertical installation



VARINLINE® sight glass

The VARINLINE® sight glass can be inserted into the VARINLINE® housing or the housing connection flanges and serves visual product inspection. The glass closure of borosilicate glass can be used, depending on nominal width, for a pressure range of -1 bar to 25 bar; however, the pressure level of the installed fittings must be considered as well.

For good visual inspection even in cloudy media, an additional lighting facility is recommended. The LED lighting with 20 LEDs has either a 2 or 20 m connection cable. The 2W luminaire is operated via a button. An ATEX lighting without buttons can be delivered for use in potentially explosive atmospheres.



VARINLINE® sight glass
without illumination



VARINLINE® sight glass with
illumination



VARINLINE® sight glass with
ATEX illumination



VARINLINE® thermometer

The precision gas system thermometer has a sturdy design and is characterized by its optimal and completely welded installation into the VARINLINE® process connection. It ideally meets the high requirements to hygienic process technology.

According to the requirements of the FDA, the indicator is filled with certified glycerin (or insulation oil at equip with proximity switches) to permit dampening of the indicator under strong vibrations and to avoid formation of precipitation if the temperatures fluctuate strongly.

The VARINLINE® thermometer is ideal for use in the food industry. It is available for process connection sizes F and N. Depending on the installation position of the thermometer, different orientations are available for best reading of the display.



Thermometer with connection down



Thermometer with connection up

Pipe classes

Standard VARINLINE® housings are supplied with welding ends, although the housings can be delivered with various connection fittings as an option.

The dimensions of the welding ends comply with the following standards:

- **Metric:** Outside diameter according to DIN 11850, series II, DIN 11866, series A
- **Inch OD:** Outside diameter based on ASME-BPE-a-2004, DIN 11866, series C
- **Inch IPS:** Outside diameter according to IPS sched. 5
- **ISO:** Outside diameter according to DIN EN ISO 1127

Surfaces

The standard for surfaces in contact with the product depends on the particular nominal width standard:

- **Metric, inch OD, ISO:** $R_a \leq 0.8 \mu\text{m}$
- **Inch IPS:** $R_a \leq 1.2 \mu\text{m}$

Higher-quality surfaces are an available option.

Surfaces not in contact with the product (housing) are matte blasted as standard. Alternatively, a ground outer surface is available.

Materials

Components in contact with the product are produced from 1.4404/AISI 316 L, while those not in contact with the product use 1.4301/AISI 304. Alternatively (standard for nominal width standard ISO and DN 10/15), VARINLINE® housings and housing connection flanges are also available in 1.4435/AISI 316 L. Other materials, e.g. for use when handling corrosive fluids, are available on request.

For detailed information about the properties of the materials, refer to the **material properties** table.

Test report and inspection certificate

Optionally, the valve housings and product wetted parts can be supplied with a test report 2.2 or an inspection certificate 3.1 according to EN 10204.

If 3.1 inspection certificates are required, please notify us of this when you place the order.

Seal materials

Seals in contact with the product are made of EPDM (standard), HNBR, FKM, FFKM and PTFE. EPDM will be supplied if no seal material is specified in the orders.

The mixing constituents of our seal materials are contained in the FDA **White List** and are in accordance with **FOOD and DRUG** (FDA) guidelines 21 CFR Part 177.2600 or 21 CFR 177.1550: "Rubber articles intended for repeated use".

The resistance of the seal material depends on the type and temperature of the product being transported. The contact time with certain products can negatively affect the service life of seals.

For detailed information about the seal material properties, refer to the seal material properties table.

Operating pressure

VARINLINE® housings	
Nominal width	Nominal pressure
DN 10–65 OD 1"–2 ½" IPS 2" ISO 13.5–60.3	16 bar
DN 80–150 OD 3"–6" IPS 3"–6" ISO 76.1–114.3	10 bar

Optionally, VARINLINE® housings are available for use at higher options.

VARINLINE® housings	
Nominal width	Maximum permitted operating pressure
DN 25–100 OD 1"–3"	PS 20 bar


VARINLINE® housing connections

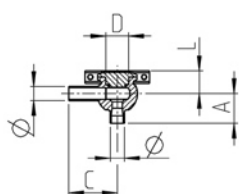
The VARINLINE® housing connections of types T and U as well as the VARINLINE® tank connection flange type P can be used for an operating pressure of 10 bar.



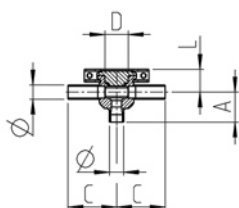
The in-line housing, usually with double vertical ports, permits hygienic holding of up to two in-line measurement and control instruments free of dead zones via process connections

Technical data of the standard version

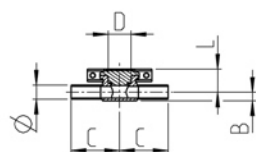
Material in contact with the product	DN 10–15, ISO	1.4435/AISI 316 L
	From DN 25, OD, IPS	1.4404/AISI 316 L
Seal material in contact with the product	EPDM, FKM, HNBR	
Product pressure	DN 10–65, OD 1"–2 ½", IPS 2", ISO 13.5–60.3	16 bar
	DN 80–150, OD 3"–6", IPS 3"–6", ISO 76.1–114.3	10 bar
Surface in contact with the product	DN, OD, ISO	Ra ≤ 0.8 µm
	IPS	Ra ≤ 1.2 µm
External housing surface	Matte blasted	
Connection fittings	Welding end	
Certificates		



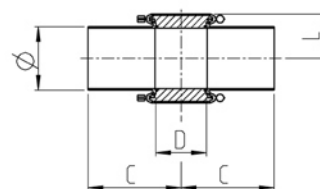
Housing design L



Housing design T



Housing design G



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Nominal width	Process connection	Housing design	Pipe	Dimension				
			Ø [mm]	A [mm]	B [mm]	C [mm]	D [mm]	L [mm]
DN 10	B	L, T, G	13.00 × 1.50	40	8.50	65.0	31	26.0
DN 15	B	L, T, G	19.00 × 1.50	40	11.50	65.0	31	29.0
DN 25	F	–	29.00 × 1.50	–	–	90.0	50	30.0
DN 40	N	–	41.00 × 1.50	–	–	90.0	68	36.0
DN 50	N	–	53.00 × 1.50	–	–	90.0	68	42.0
DN 65	N	–	70.00 × 2.00	–	–	125.0	68	50.0
DN 80	N	–	85.00 × 2.00	–	–	125.0	68	57.5
DN 100	N, G*	–	104.00 × 2.00	–	–	125.0	68*	67.0
DN 125	N, G*	–	129.00 × 2.00	–	–	125.0	68*	79.5
DN 150	N, G*	–	154.00 × 2.00	–	–	150.0	68*	92.0
OD 1"	F	–	25.40 × 1.60	–	–	90.0	50	28.0
OD 1 ½"	N	–	38.10 × 1.60	–	–	90.0	68	34.5
OD 2"	N	–	50.80 × 1.60	–	–	90.0	68	40.8
OD 2 ½"	N	–	63.50 × 1.60	–	–	125.0	68	47.0
OD 3"	N	–	76.20 × 1.60	–	–	125.0	68	53.5
OD 4"	N, G*	–	101.60 × 2.00	–	–	125.0	68*	65.8
OD 6"	N, G*	–	152.40 × 2.77	–	–	150.0	68*	92.0
IPS 2"	N	–	60.30 × 2.00	–	–	114.3	68	45.5
IPS 3"	N	–	88.90 × 2.30	–	–	152.4	68	59.5
IPS 4"	N, G*	–	114.30 × 2.30	–	–	152.4	68*	72.0
IPS 6"	N, G*	–	168.30 × 2.70	–	–	152.4	68*	98.0
ISO 13.5	B	L, T, G	13.50 × 1.60	40	8.35	65.0	31	25.5
ISO 17.2	B	L, T, G	17.20 × 1.60	40	11.50	65.0	31	27.5
ISO 21.3	B	L, T, G	21.30 × 1.60	40	13.50	65.0	31	29.5
ISO 33.7	F	–	33.70 × 2.00	–	–	114.3	50	32.0
ISO 42.4	N	–	42.40 × 2.00	–	–	114.3	68	36.3
ISO 48.3	N	–	48.30 × 2.00	–	–	114.3	68	39.3
ISO 60.3	N	–	60.30 × 2.00	–	–	114.3	68	45.5
ISO 76.1	N	–	76.10 × 2.00	–	–	152.4	68	53.5
ISO 88.9	N	–	88.90 × 2.30	–	–	152.4	68	59.5
ISO 114.3	N	–	114.30 × 2.30	–	–	152.4	68	72.0

* Process connection G only available with a sight glass. The dimension D is 123 mm.

Position	Description of the order code			
1	VARINLINE® system			
	T VARINLINE® housings			
2	Nominal width			
	DN 10			ISO 13.5
	DN 15			ISO 17.2
	DN 25	OD 1"		ISO 21.3
	DN 40	OD 1 ½"		ISO 33.7
	DN 50	OD 2"	IPS 2"	ISO 42.4
	DN 65	OD 2 ½"		ISO 48.3
	DN 80	OD 3"	IPS 3"	ISO 60.3
	DN 100	OD 4"	IPS 4"	ISO 76.1
	DN 125			ISO 88.9
DN 150	OD 6"	IPS 6"	ISO 114.3	
3	Housing design (only available for DN 10, DN 15, ISO 13.5, ISO 17.2 and ISO 21.3)			
	L			
	T			
	G			
4	Blanking plates			
	0	Without blanking plate		
	1	With one blanking plate 1.4404/316 L		
	2	With two blanking plates 1.4404/316 L		
	3	With one blanking plate 1.4435 cert. 3.1		
	4	With two blanking plates 1.4435 cert. 3.1		
5	Seal material			
	1	EPDM (FDA)		
	2	FKM (FDA)		
	3	HNBR (FDA)		
	4	FFKM (FDA)		
	5	PTFE (FDA)		
6	Surface quality of the housing			
	1	Inside Ra ≤ 1.2 µm, outside matte blasted (IPS)		
	2	Inside Ra ≤ 0.8 µm, outside matte blasted (DN, ISO, OD)		
7	Certificates			
	K	Without		
	A	Inspection certificate 3.1/AD2000W2 according to EN10204		
	M	EN 10204 test report 2.2 and inspection certificate 3.1		
	W	EN 10204 test report 2.2		
	Z	EN 10204 inspection certificate 3.1		
8	Language of the documentation			
	D	German		
	E	English		
9	Number of documentation			
	1	Single documentation		
	...	The number of documentations corresponds to their entered number		
10	Connection fittings			
	N	Welding end		
11	Material of the housing			
	1.4404	1.4404/AISI 316 L		
	1.4435*	1.4435/AISI 316 L		
12	Options			
	See section options			

* Standard material in the housings of the nominal width DN 10, DN 15 and ISO.
Optionally also available in the metric housings up to DN 125 and OD 4".

The code is composed as follows, depending on the chosen configuration:

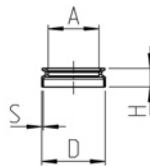
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Code	T									N		

For order codes differing from the standard version, please refer to section 7 (options).

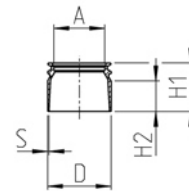


Housing connection flanges are used to connect measuring instruments without dead zones and are welded into the vessel wall or the vessel bottom. Type U-S is suitable for installation in the tank bottom, since it can be adjusted in inclination.

Technical data of the standard version		
Material in contact with the product	type U	1.4404/AISI 316 L
	type U-S	1.4435/AISI 316 L
Material blanking plate	1.4404/AISI 316 L	
	1.4435/AISI 316 L	
Seal material	EPDM, FKM, HNBR	
Operating temperature	135 °C, short-time 150 °C	
Product pressure	Process connection F	16 bar
	Process connection N	16 bar
	Process connection G	10 bar
Surface in contact with the product	Ra ≤ 0.8 µm	
Outside surface	Matte blasted	
Wall thickness t	2; 2.5; 3; 4 mm	



type U



type U-S

type U

Nominal width	Process connection	Dimension			
		A [mm]	D [mm]	H [mm]	S [mm]
DN 32/25	F	50	70	25	2
DN 50/40	N	68	85	25	2
DN 125/100	G	123	154	30	2

type U-S

Nominal width	Process connection	Dimension				
		A [mm]	D [mm]	H [mm]	H2* [mm]	S [mm]
DN 50/40	N	68	85	65	max. 40	2

* Possibility of the adjustment to the vessel

Position	Description of the order code
1	VARINLINE® system
	TU VARINLINE® housing connection flange type U
	TU-S VARINLINE® housing connection flange type U-S
2	Nominal width (process connection)
	32/25 F
	50/40 N
	100 G
3	Blanking plate
	0 Without blanking plate
	1 With blanking plate
4	Seal material
	1 EPDM (FDA)
	2 FKM (FDA)
	3 HNBR (FDA)
	4 FFKM (FDA)
	5 PTFE (FDA)
5	Welding instructions
	K Without
	D German
	E English
6	Welding device
	K Without
7	Certificates
	K Without
	A Inspection certificate 3.1/AD2000W2 according to EN10204
	M Inspection certificate 3.1 and test report 2.2 according to EN10204
	W Test report 2.2 according to EN10204
	Z Inspection certificate 3.1 according to EN10204
8	Material
	1.4404 (type U)
	1.4435 (type U-S)

The code is composed as follows, depending on the chosen configuration:

Position	1	2	3	4	5	6	7	8
Code						K		

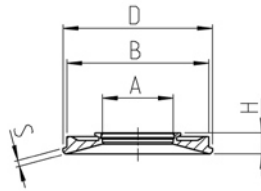
For order codes differing from the standard version, please refer to section 7 (options).



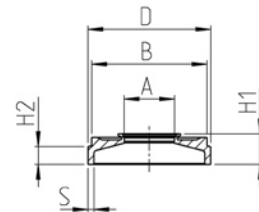
Housing connection flanges are used to connect measurement and control instruments front-flush and are welded into the vessel wall or the vessel bottom. Type T-S can be adjusted to the inclination or rounding of the vessel.

Technical data of the standard version		
Material in contact with the product	type T	1.4404/AISI 316 L or 1.4435/AISI 316 L*
	type T-S	1.4435/AISI 316 L
Material blanking plate	1.4404/AISI 316 L	
	1.4435/AISI 316 L	
Seal material	EPDM, FKM, HNBR	
Operating temperature	135 °C, short-time 150 °C	
Product pressure	10 bar	
Surface in contact with the product	$Ra \leq 0.8 \mu m$	
Outside surface	Matte blasted	

* Process connection N or G



Type T



Type T-S

Type T

Nominal width	Process connection	Dimension				
		A [mm]	B [mm]	D [mm]	H [mm]	S [mm]
DN 15	B	31	–	105	22.0	Max. 8
DN 32/25	F	50	135	145	24.0	Max. 8
DN 50/40	N	68	155	165	24.5	Max. 8
DN 125/100	G	123	215	225	27.5	Max. 8

Type T-S

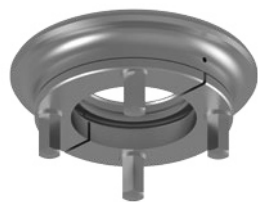
Nominal width	Process connection	Dimension					
		A [mm]	B [mm]	D [mm]	H1 [mm]	H2 [mm]	S [mm]
DN 50/40	N	68	155	165	41	25	max. 8

Position	Description of the order code
1	VARINLINE® system
	TT VARINLINE® housing connection flange type T
	TTS VARINLINE® housing connection flange type T-S
2	Nominal width (process connection)
	15 B
	32/25 F
	50/40 N
	100 G
3	Blanking plate
	0 Without blanking plate
	1 With blanking plate
4	Seal material
	1 EPDM (FDA)
	2 FKM (FDA)
	3 HNBR (FDA)
	4 FFKM (FDA)
	5 PTFE (FDA)
5	Welding instructions
	K Without
	D German
	E English
6	Welding device
	K Without
7	Certificates
	K Without
	A Inspection certificate 3.1/AD2000W2 according to EN10204
	M Inspection certificate 3.1 and test report 2.2 according to EN10204
	W Test report 2.2 according to EN10204
	Z Inspection certificate 3.1 according to EN10204
8	Material
	1.4404 (type T)
	1.4435 (type T-S)

The code is composed as follows, depending on the chosen configuration:

Position	1	2	3	4	5	6	7	8
Code						K		

For order codes differing from the standard version, please refer to section 7 (options).

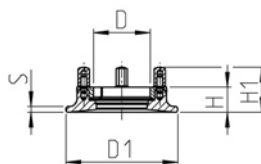


The tank connection flange is welded into vessels with a wall thickness up to 20 mm and takes a measurement or control instrument free of dead zones. Pressure relief half-rings can be used for controlled relief of the inner tank pressure.

Technical data of the standard version

Material in contact with the product	1.4435/AISI 316 L 1.4539*
Material blanking plate	1.4404/AISI 316 L 1.4435/AISI 316 L
Seal material	EPDM, FKM, HNBR
Operating temperature	135 °C, short-time 150 °C
Product pressure	10 bar
Surface in contact with the product	$Ra \leq 0.8 \mu m$
Outside surface	Matte blasted

* Only process connection N to 15 mm wall thickness



Nominal width	Process connection	Tank connection				
		D1 [mm]	D [mm]	H [mm]	H1 [mm]	S [mm]
DN 25-15	F	130	58	34	61	15
DN 50-5	N	150	76	34	61	5
DN 50-6	N	150	76	34	61	6
DN 50-8	N	150	76	34	61	8
DN 50-10	N	150	76	34	61	10
DN 50-12	N	150	76	34	61	12
DN 50-15	N	150	76	34	61	15
DN 50-20	N	150	76	39	66	20

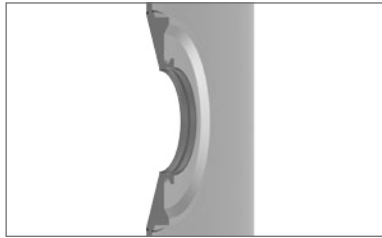
Position	Description of the order code
1	VARINLINE® system
	TP VARINLINE® tank connection flange type P
2	Nominal width (process connection)
	25 F
	50/40 N
3	Blanking plate
	0 Without blanking plate
	1 With blanking plate
4	Seal material
	1 EPDM (FDA)
	2 FKM (FDA)
	3 HNBR (FDA)
	4 FFKM (FDA)
	5 PTFE (FDA)
5	Welding instructions
	K Without
	D German
	E English
6	Welding device
	K Without
7	Certificates
	K Without
	A Inspection certificate 3.1/AD2000W2 according to EN10204
	M Inspection certificate 3.1 and test report 2.2 according to EN10204
	W Test report 2.2 according to EN10204
	Z Inspection certificate 3.1 according to EN10204
8	Material
	1.4435
	1.4539*

* Only process connection N to 15 mm wall thickness

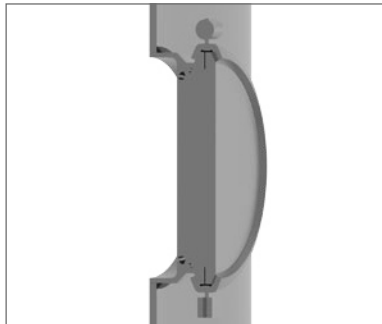
The code is composed as follows, depending on the chosen configuration:

Position	1	2	3	4	5	6	7	8
Code	TP		-			K		-

For order codes differing from the standard version, please refer to section 7 (options).



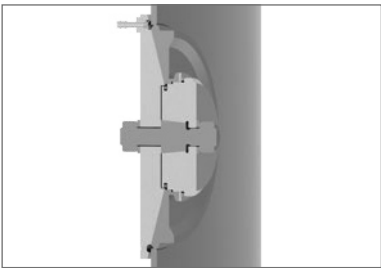
The VARINLINE® housing connection flanges and VARINLINE® tank connection flanges are welded into the vessel wall or the vessel bottom with a welding jig to protect against distortion. Since the different heat introduction when welding may cause deformation of the flanges and thereby leaks, the flange with the installed welding jig must be allowed to cool off to 30 °C. All conditions required for welding (such as insert gas, cooling, welding additive) can be taken from the respective welding instructions.



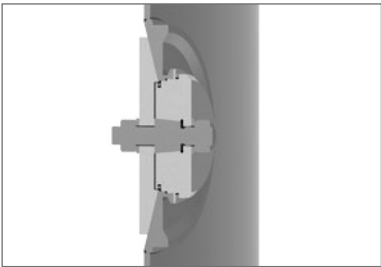
VARINLINE® housing connection U and U-S

Process connection	Lock (welding device)
F	221-144.01
N	221-144.02
N for type U-S	221-144.02
G	221-144.04
Required welding instructions 221RLI002533D	

The required welding jig corresponds to a plug with half-ring connections.



Outer weld with
insert gas connection inside

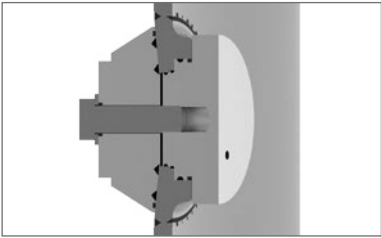


Inner weld

VARINLINE® housing connection T and T-S

Process connection	Lock (welding device)
B	–
F	229-104.01
N	229-104.07
N for type T-S	229-104.07
G	229-104.19
Required welding instructions 221RLI002244D	

The welding jig for stress-free installation is also available for rent.



VARINLINE® tank connection flange type P

Process connection	Lock (welding device)
F	229-103.48
N	229-103.45
Required welding instructions 222RLI005452D	

The welding jig for stress-free installation is also available for rent.



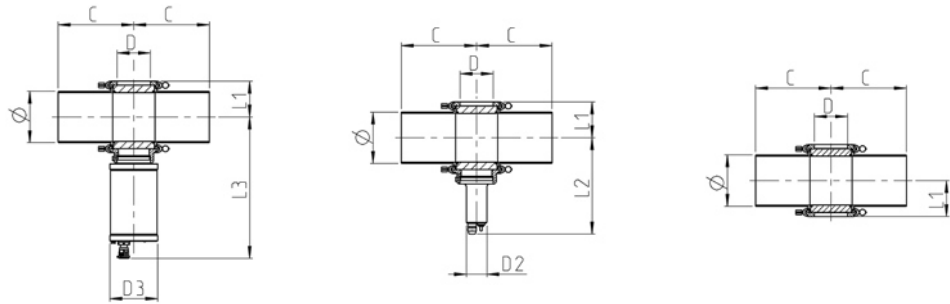
Sight glasses inserted into the VARINLINE® housings or into the housing connection flange are used for visual monitoring of the product. In case of optically dense products in pipelines, an illumination device is recommended to be used with the sight glass.

Technical data

Material in contact with the product	Borosilicate glass, thermally hardened	
Material not in contact with the product	1.4301/AISI 304	
Seal material in contact with the product	EPDM, FKM, HNBR	
Temperature resistance	-5 to 180 °C	
Shock-resistant	Up to Δt approximately 140° C	
Product pressure	25 bar (362.6 psi)	
Surface in contact with the product	DN, OD, ISO IPS	Ra ≤ 0.8 µm Ra ≤ 1.2 µm
External housing surface	Matte blasted	
Connection fittings	Welding end	

Technical data of the LED sight glass illumination

Connection voltage	24 V AC/DC	
Burning output nominal	2 W	
Luminaire	LED-use with 20 LEDs	
Protection class	IP65, ATEX variant IP67	
Installation space	Insertion flange for VARINLINE® process connection	
ATEX	Ex II 2 g + D Explosion groups IIC / IIIC Temperature class G / D - T6 / T80 °C Ignition protection type Ex d IIC Gb, Ex t IIIC Db IP67	



		Pipe	Housing	Sight glass		Illumination		Illumination ATEX	
Nominal width	Process connection	Ø [mm]	C [mm]	D [mm]	L1 [mm]	D2 [mm]	L2 [mm]	D3 [mm]	L3 [mm]
DN 25	F	29.0 × 1.5	90.0	38	30.00	34	130	77	203
DN 40	N	41.0 × 1.5	90.0	55	36.00	34	136	77	209
DN 50	N	53.0 × 1.5	90.0	55	42.00	34	142	77	215
DN 65	N	70.0 × 2.0	125.0	55	50.00	34	153	77	226
DN 80	N	85.0 × 2.0	125.0	55	57.50	34	160	77	233
DN 100	N	104.0 × 2.0	125.0	55	67.00	34	165	77	243
DN 125	N	129.0 × 2.0	125.0	55	79.50	34	180	77	255
DN 150	N	154.0 × 2.0	150.0	55	92.00	34	195	77	268
OD 1"	F	25.4 × 1.6	90.0	38	28.00	34	128	77	201
OD 1 ½"	N	38.1 × 1.6	90.0	55	34.50	34	135	77	207
OD 2"	N	50.8 × 1.6	90.0	55	40.75	34	141	77	214
OD 2 ½"	N	63.8 × 1.6	125.0	55	47.00	34	150	77	223
OD 3"	N	76.2 × 1.6	125.0	55	53.50	34	157	77	229
OD 4"	N	101.6 × 2.0	125.0	55	65.75	34	169	77	242
IPS 2"	N	60.3 × 2.0	114.3	55	45.50	34	146	77	218
IPS 3"	N	88.9 × 2.3	152.4	55	59.50	34	163	77	235
IPS 4"	N	114.3 × 2.3	152.4	55	72.00	34	175	77	248
IPS 6"	N	168.3 × 2.7	152.4	55	98.00	34	201	77	274
ISO 33.7	F	33.7 × 2.0	114.3	38	32.00	34	132	77	205
ISO 42.4	N	42.4 × 2.0	114.3	55	36.25	34	136	77	209
ISO 48.3	N	48.3 × 2.0	114.3	55	39.25	34	141	77	212
ISO 60.3	N	60.3 × 2.0	114.3	55	45.50	34	146	77	218
ISO 76.1	N	76.1 × 2.0	114.3	55	53.50	34	157	77	229
ISO 88.9	N	88.9 × 2.3	152.4	55	59.50	34	163	77	235
ISO 114.3	N	114.3 × 2.3	152.4	55	72.00	34	175	77	248

Position	Description of the order code			
1	VARINLINE® system			
	TXIA	VARINLINE® sight glass		
2	Process connection			
	F			
	N			
	G			
3	Installation in VARINLINE® component			
	–	Without VARINLINE® housing or flange		
	T	VARINLINE® housings		
	TT	VARINLINE® housing connection type T		
	TT-S	VARINLINE® housing connection type T-S		
	TU	VARINLINE® housing connection type U		
	TU-S	VARINLINE® housing connection type U-S		
4	Nominal width			
	DN 25	OD 1"		
	DN 40	OD 1 ½"		ISO 33.7
	DN 50	OD 2"	IPS 2"	ISO 42.4
	DN 65	OD 2 ½"		ISO 48.3
	DN 80	OD 3"	IPS 3"	ISO 60.3
	DN 100	OD 4"	IPS 4"	ISO 76.1
	DN 125			ISO 88.9
	DN 150		IPS 6"	ISO 114.3
5	Seal material			
	1	EPDM (FDA)		
	2	FKM (FDA)		
	3	HNBR (FDA)		
	4	FFKM (FDA)		
	5	PTFE (FDA)		
6	Surface quality of the housing			
	1	Inside Ra ≤ 1.2 µm, outside matte blasted (IPS)		
	2	Inside Ra ≤ 0.8 µm, outside matte blasted (DN, ISO, OD)		
7	Illumination			
	K	Without illumination		
	L	LED illumination, 24 V, 2 W, 2 m cable		
	M	LED illumination, 24 V, 2 W, 20 m cable		
	X	ATEX illumination LED, 24 V, 2 W		
8	Certificates			
	K	Without certificate		
	M	Test report and inspection certificate EN 10204 – 2.2 and 3.1		
	W	Test report EN 10204 – 2.2		
	Z	Inspection certificate EN 10204 – 3.1		
9	Language of the documentation			
	D	German		
	E	English		
10	Number of documentation			
	1	Single documentation		
	...	The number of documentations corresponds to their entered number		
11	Connection fittings			
	N	Welding end		
12	Options			
	See section options			

The code is composed as follows, depending on the chosen configuration:

Position	1	2	3	4	5	6	7	8	9	10	11	12
Code	TXIA		-								N	

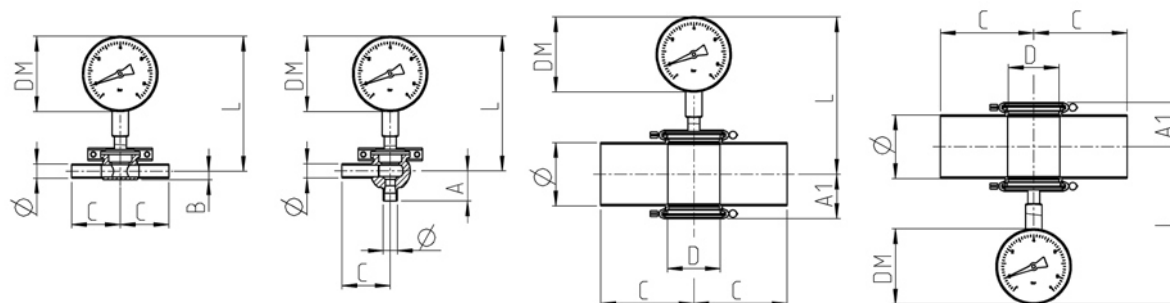
For order codes differing from the standard version, please refer to section 7 (options).



The Bourdon tube pressure gauge is equipped with a sealing diaphragm. A diaphragm separates it from the measured material and therefore is suitable for use in the food industry.

Technical data

Material in contact with the product	1.4404/AISI 316 L	
Material not in contact with the product	1.4301/AISI 304	
Diaphragm material	1.4435/AISI 316 L	
Seal material in contact with the product	EPDM, FKM, HNBR	
Damping liquid	Glycerin (FDA)	
Operating temperature	-20 to 100 °C	
Ambient temperature	-20 to 60 °C	
Measuring ranges	Min. -1 bar (-14.5 psi), max. 25 bar (362.6 psi) Pressure resistant up to 1.3 times the measured value	
Deviation at 20 °C	Max. ± 0.4%/10 K from the scale end value	
Surface in contact with the product	DN, OD, ISO	Ra ≤ 0.8 µm
	IPS	Ra ≤ 1.2 µm
External housing surface	Matte blasted	
Protection class	IP65	



Nominal width	Process connection	Pipe	Dimension					
		Ø [mm]	C [mm]	D [mm]	DM [mm]	L [mm]	A1 [mm]	A [mm]
DN 10	B	13.0 × 1.5	65.0	31	63	100.0	–	34.5
DN 15	B	19.0 × 1.5	65.0	31	63	103.0	–	40.5
DN 25	F	29.0 × 1.5	90.0	50	100	165.0	30.00	–
DN 40	N	41.0 × 1.5	90.0	68	100	171.0	36.00	–
DN 50	N	53.0 × 1.5	90.0	68	100	177.0	42.00	–
DN 65	N	70.0 × 2.0	125.0	68	100	185.0	50.00	–
DN 80	N	85.0 × 2.0	125.0	68	100	192.7	57.50	–
DN 100	N	104.0 × 2.0	125.0	68	100	202.0	67.00	–
DN 125	N	129.0 × 2.0	125.0	68	100	214.5	79.50	–
DN 150	N	154.0 × 2.0	150.0	68	100	227.0	92.00	–
OD 1"	F	25.4 × 1.6	90.0	50	100	163.0	28.00	–
OD 1 ½"	N	38.1 × 1.6	90.0	68	100	169.5	34.50	–
OD 2"	N	50.8 × 1.6	90.0	68	100	175.8	40.75	–
OD 2 ½"	N	63.8 × 1.6	125.0	68	100	182.0	47.00	–
OD 3"	N	76.2 × 1.6	125.0	68	100	188.5	53.5	–
OD 4"	N	101.6 × 2.0	125.0	68	100	200.8	65.75	–
IPS 2"	N	60.3 × 2.0	114.3	68	100	180.5	45.50	–
IPS 3"	N	88.9 × 2.3	152.4	68	100	194.5	59.50	–
IPS 4"	N	114.3 × 2.3	152.4	68	100	207.0	72.00	–
IPS 6"	N	168.3 × 2.7	152.4	68	100	233.0	98.00	–
ISO 17.2	B	17.2 × 1.6	65.0	31	63	102.0	–	40.0
ISO 21.3	B	21.3 × 1.6	65.0	31	63	107.0	–	40.0
ISO 33.7	F	33.7 × 2.0	114.3	50	100	167.0	32.00	–
ISO 42.4	N	42.4 × 2.0	114.3	68	100	171.3	36.25	–
ISO 48.3	N	48.3 × 2.0	114.3	68	100	174.3	39.25	–
ISO 60.3	N	60.3 × 2.0	114.3	68	100	180.5	45.50	–
ISO 76.1	N	76.1 × 2.0	152.4	68	100	188.5	53.50	–
ISO 88.9	N	88.9 × 2.3	152.4	68	100	194.5	59.50	–
ISO 114.3	N	114.3 × 2.3	152.4	68	100	207.0	72.00	–

Position	Description of the order code			
1	VARINLINE® system			
	TPIA	VARINLINE® pressure gauge		
2	Process connection			
	B			
	F			
	N			
3	Measuring range			
	I	-1 to 5 bar		
	K	-1 to 9 bar		
	D	0 to 4 bar		
	E	0 to 6 bar		
	F	0 to 10 bar		
	G	0 to 16 bar		
	L	0 to 25 bar*		
4	Nominal width (at delivery with VARINLINE® housing)			
	DN 10			
	DN 15			ISO 17.2
	DN 25	OD 1"		ISO 21.3
	DN 40	OD 1 ½"		ISO 33.7
	DN 50	OD 2"	IPS 2"	ISO 42.4
	DN 65	OD 2 ½"		ISO 48.3
	DN 80	OD 3"	IPS 3"	ISO 60.3
	DN 100	OD 4"	IPS 4"	ISO 76.1
	DN 125			ISO 88.9
	DN 150		IPS 6"	ISO 114.3
5	Connection direction			
	U	Down		
	H	Back		
	Z	Up		
6	Proximity switches			
	K	Without proximity switches		
	M	Magnetic spring contacts, 250 V AC/DC, 20 W, 1 A		
	I	Inductive limit switches, 250 V AC/DC, 20 W, 1 A (ATEX)		
7	Contact type – magnetic spring contacts			
	L	Type .01, one contact, normally open		
	H	Type .02, one contact, normally closed		
	Z	Type .12, two contacts, 1. Normally open contact, 2. Normally closed contact		
	M	Type .11, two contacts, both normally open		
	S	Type .22, two contacts, both normally closed		
8	Certificates			
	K	Without		
	W	EN 10204 test report 2.2		
	M	EN 10204 test report 2.2 and inspection certificate 3.1		
	Z	EN 10204 inspection certificate 3.1		
	E	Calibration certificate		
	B	Calibration certificate and EN 10204 test report 2.2		
9	Language of the documentation			
	D	German		
	E	English		
10	Number of documentation			
	1	Single documentation		
	...	The number of documentations corresponds to their entered number		
11	Options			
	See section options			

* Option PS 20 bar (/37) required

The code is composed as follows, depending on the chosen configuration:

Position	1	2	3	4	5	6	7	8	9	10	11
Code	TPIA		-		-						

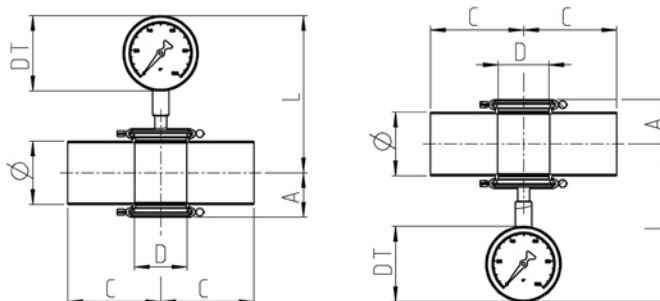
For order codes differing from the standard version, please refer to section 7 (options).



The robust gas system thermometer is characterized specifically by its optimal and complete welded installation in the VARINLINE® process connection and ideally meets the high requirements for hygienic processing technology.

Technical data

Material in contact with the product	1.4404/AISI 316 L	
Material not in contact with the product	1.4301/AISI 304	
Material Bourdon tube pressure gauge	1.4571/AISI 316 Ti	
Seal material in contact with the product	EPDM, FKM, HNBR	
Damping liquid	Glycerin (FDA)	
Ambient temperature	0 to 40 °C	
Measuring ranges	-30 to 160 °C	
Accuracy class	± 1 °C within the measuring range	
Surface in contact with the product	DN, OD, ISO	Ra ≤ 0.8 µm
	IPS	Ra ≤ 1.2 µm
External housing surface	Matte blasted	
Protection class	IP66	



		Pipe	Dimension				
Nominal width	Process connection	Ø [mm]	C [mm]	D [mm]	DT [mm]	L [mm]	A [mm]
DN 25	F	29.0 × 1.5	90.0	50	100	162.0	30.00
DN 40	N	41.0 × 1.5	90.0	68	100	168.0	36.00
DN 50	N	53.0 × 1.5	90.0	68	100	174.0	42.00
DN 65	N	70.0 × 2.0	125.0	68	100	182.0	50.00
DN 80	N	85.0 × 2.0	125.0	68	100	189.5	57.50
DN 100	N	104.0 × 2.0	125.0	68	100	199.0	67.00
DN 125	N	129.0 × 2.0	125.0	68	100	211.5	79.50
DN 150	N	154.0 × 2.0	150.0	68	100	224.0	92.00
OD 1"	F	25.4 × 1.6	90.0	50	100	160.0	28.00
OD 1 ½"	N	38.1 × 1.6	90.0	68	100	166.5	34.50
OD 2"	N	50.8 × 1.6	90.0	68	100	172.8	40.75
OD 2 ½"	N	63.8 × 1.6	125.0	68	100	179.0	47.00
OD 3"	N	76.2 × 1.6	125.0	68	100	185.5	53.50
OD 4"	N	101.6 × 2.0	125.0	68	100	197.8	65.75
IPS 2"	N	60.3 × 2.0	114.3	68	100	177.5	45.50
IPS 3"	N	88.9 × 2.3	152.4	68	100	191.5	59.50
IPS 4"	N	114.3 × 2.3	152.4	68	100	204.0	72.00
IPS 6"	N	168.3 × 2.7	152.4	68	100	130.0	98.00
ISO 33.7	F	33.7 × 2.0	114.3	50	100	164.0	32.00
ISO 42.4	N	42.4 × 2.0	114.3	68	100	168.3	36.25
ISO 48.3	N	48.3 × 2.0	114.3	68	100	171.3	39.25
ISO 60.3	N	60.3 × 2.0	114.3	68	100	177.3	45.50
ISO 76.1	N	76.1 × 2.0	152.4	68	100	185.5	53.50
ISO 88.9	N	88.9 × 2.3	152.4	68	100	191.5	59.50
ISO 114.3	N	114.3 × 2.3	152.4	68	100	204.0	72.00

Position	Description of the order code			
1	VARINLINE® system			
	TTIA	VARINLINE® thermometer		
2	Process connection			
	F			
	N			
3	Measuring range			
	D	–30 to 50 °C		
	U	0 to 120 °C		
	H	0 to 160 °C		
4	Nominal width (at delivery with VARINLINE® housing)			
	DN 25	OD 1"		
	DN 40	OD 1 ½"		ISO 33.7
	DN 50	OD 2"	IPS 2"	ISO 42.4
	DN 65	OD 2 ½"		ISO 48.3
	DN 80	OD 3"	IPS 3"	ISO 60.3
	DN 100	OD 4"	IPS 4"	ISO 76.1
	DN 125			ISO 88.9
	DN 150		IPS 6"	ISO 114.3
5	Connection direction			
	U	Down		
	H	Back		
	Z	Up		
6	Proximity switches			
	K	Without proximity switches		
	M	Magnetic spring contacts, 250 V AC/DC, 20 W, 1 A		
	I	Inductive limit switches, 250 V AC/DC, 20 W, 1 A (ATEX)		
7	Contact type – magnetic spring contacts			
	L	Type .01, one contact, normally open		
	H	Type .02, one contact, normally closed		
	Z	Type .12, two contacts, 1. Normally open contact, 2. Normally closed contact		
	M	Type .11, two contacts, both normally open		
	S	Type .22, two contacts, both normally closed		
8	Certificates			
	K	Without		
	W	EN 10204 test report 2.2		
	M	EN 10204 test report 2.2 and inspection certificate 3.1		
	Z	EN 10204 inspection certificate 3.1		
	E	Calibration certificate		
	B	Calibration certificate and EN 10204 test report 2.2		
9	Language of the documentation			
	D	German		
	E	English		
10	Number of documentation			
	1	Single documentation		
	...	The number of documentations corresponds to their entered number		
11	Options			
	See section options			

The code is composed as follows, depending on the chosen configuration:

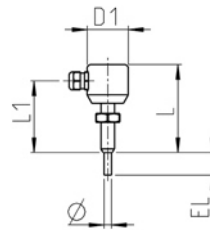
Position	1	2	3	4	5	6	7	8	9	10	11
Code	TTIA		-								

For order codes differing from the standard version, please refer to section 7 (options).



The level probe works conductively in connection with conventional evaluation electronics. The electrodes are mainly used in tanks for level control during vessel filling or emptying. The coated electrode rod (Ø 10 mm) can be shortened as required and also serves to collect media in pipelines, e.g. as pump protection.

Technical data	
Material in contact with the product	1.4404, PEEK
Material not in contact with the product	1.4301/AISI 304
Material electrode rod	ETFE coating
Seal material in contact with the product	EPDM, FKM, HNBR
Operating temperature	0 to 100 °C, short-time (30 min.) up to 140 °C
Ambient temperature	–10 to 60 °C
Product pressure	Max. 10 bar
Protection class	IP68

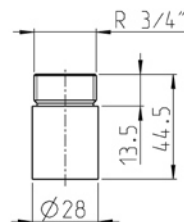


Length of the electrode EL [mm]	Dimension			
	Ø [mm]	L [mm]	L1 [mm]	D1 [mm]
30	10	110	80	55
150	10	110	80	55
500	10	110	80	55
1,000	10	110	80	55
1,800	10	110	80	55

Electrode holder N

To hold the level probe in vessels or tanks, the electrode holder N is available.

Technical data	
Material	1.4404/316 L
Certificate	Optional inspection certificate EN 10204 – 3.1



Position	Description of the order code
1	Type
	TNS Level probe
2	Process connection
	WA Without electrode holder
	ZA Electrode holder N
	NA VARINLINE® process connection size N with electrode holder N
3	Cable gland
	M M16×1.5
	U 4-pin M12/M16×1,5 plug
4	Level module
	0 Without
	1 With
5	Rod length in the product chamber
	30 30 mm
	31...149 31 bis 149 mm
	150 150 mm
	151...499 151 bis 499 mm
	500 500 mm
	501...999 501 bis 999 mm
	1000 1,000 mm
	1001...1799 1,001 bis 1,799 mm
	1800 1,800 mm
6	Certificates
	K Without
	W EN 10204 test report 2.2
	M EN 10204 test report 2.2 and inspection certificate 3.1
	Z EN 10204 inspection certificate 3.1
7	Accessories
	/52 Adhesive ID tag

The code is composed as follows, depending on the chosen configuration:

Position	1	2	3	4	5	6	7
Code	TNS	-			-		/52

For order codes differing from the standard version, please refer to section 7 (options).



VARINLINE® plugs

The VARINLINE® plugs are needed to close the VARINLINE® housings or housing connections when no measuring or control instrument is used. Clamping connections are available to attach the closures in the fittings.

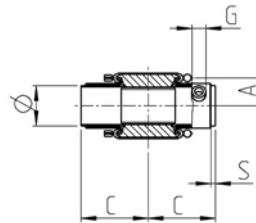


Process connection	Material		Dimension D [mm]	O-ring			Clamping connection complete
	1.4404	1.4435		Material			Article number
				EPDM	FKM	HNBR	
B	221-144.14	221-144.15	31	930-270	930-163	930-637	606-001
F	221-144.01	221-144.12	50	930-309	930-168	930-632	221-507.02
N	221-144.02	221-144.13	68	930-144	930-171	930-633	221-507.04
G	221-144.04	221-144.22	123	930-156	930-178	930-863	221-507.11



Jacketed VARINLINE® housings

For keeping chocolate or margarine fluid or for cooling ice cream, jacketed VARINLINE® housings are available. For heating or cooling products, a hot or cooling medium is passed through the housing jacket in the opposite flow direction.

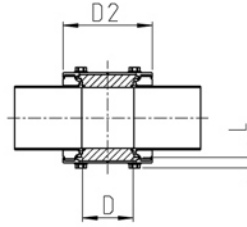


Nominal width	Process connection	Pipe	Dimension				G	Weight [kg]	Article number
		Ø [mm]	D [mm]	C [mm]	A [mm]	S [mm]			
DN 25	F	29 × 1.5	50	90	25.0	5	¼"	0.7	221-631.01
DN 40	N	41 × 1.5	68	90	31.0	5	¼"	1.1	221-631.02
DN 50	N	53 × 1.5	68	90	37.0	5	¼"	1.1	221-631.03
DN 80	N	85 × 2.0	68	125	55.5	5	½"	2.3	221-631.08
DN 100	G	104 × 2.0	123	125	65.0	5	½"	4.4	221-631.06
OD 1"	F	25.4 × 1.6	50	90	43.0	5	¼"	0.6	221-631.09
OD 1 ½"	N	38.1 × 1.6	68	90	29.5	5	¼"	0.9	221-631.10
OD 2"	N	50.8 × 1.6	68	90	36.0	5	¼"	1.1	221-631.11
OD 4"	G	101.6 × 2.0	123	125	64.0	5	½"	4.0	221-631.14



VARINLINE® pressure relief half rings

The VARINLINE® pressure relief half-rings are used for controlled channeling of the inner pipe pressure at maintenance or mounting work. The respective VARINLINE® process connection can also be used for taking up a measuring or control instrument*.



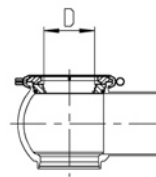
Process connection	Pipe	Dimension		Article number
	Ø [mm]	D [mm]	L [mm]	
F	102	50	14	222-156.02
N	120	68	14	222-156.01

* Not suitable for installation of a VARINLINE® sampling valve type TSVN or TSVU.



VARINLINE® adapters

The flexibility in the VARIVENT® system offers many advantages. Often, adjustments or modifications are required in existing valve systems of a process system. Use of a VARINLINE® adapter permits inserting a VARINLINE® process connection into a VARIVENT® housing, thereby integrating in-line control and measurement* free of dead zones in a valve housing.



Nominal width	Process connection	Dimension	O-ring			Seal disc INL	Locking ring INL	Clamping connection complete
		D [mm]	Material			Article number		
			EPDM	FKM	HNBR			
DN 65	N	68	930-150	930-176	930-634	222-108.03	222-108.01	221-507.09
DN 80	N	68	930-150	930-176	930-634	222-108.03	222-108.01	221-507.09
DN 100	N	68	930-156	930-178	930-863	222-108.04	222-108.02	221-507.11
DN 125	N	68	930-372	930-409	—	222-108.06	222-108.05	221-507.13
OD 2 ½"	N	68	930-150	930-176	930-634	222-108.03	222-108.01	221-507.09
OD 3"	N	68	930-150	930-176	930-634	222-108.03	222-108.01	221-507.09
OD 4"	N	68	930-156	930-178	930-863	222-108.04	222-108.02	221-507.11
IPS 3"	N	68	930-150	930-176	930-634	222-108.03	222-108.01	221-507.09
IPS 4"	N	68	930-156	930-178	930-863	222-108.04	222-108.02	221-507.11

* Not suitable for installation of a VARINLINE® sampling valve type TSVN or TSVU.