



# Hygienic Valves and Components

Business Line Hygienic Valve Technology  
Catalog 2018



[gea.com](http://gea.com)

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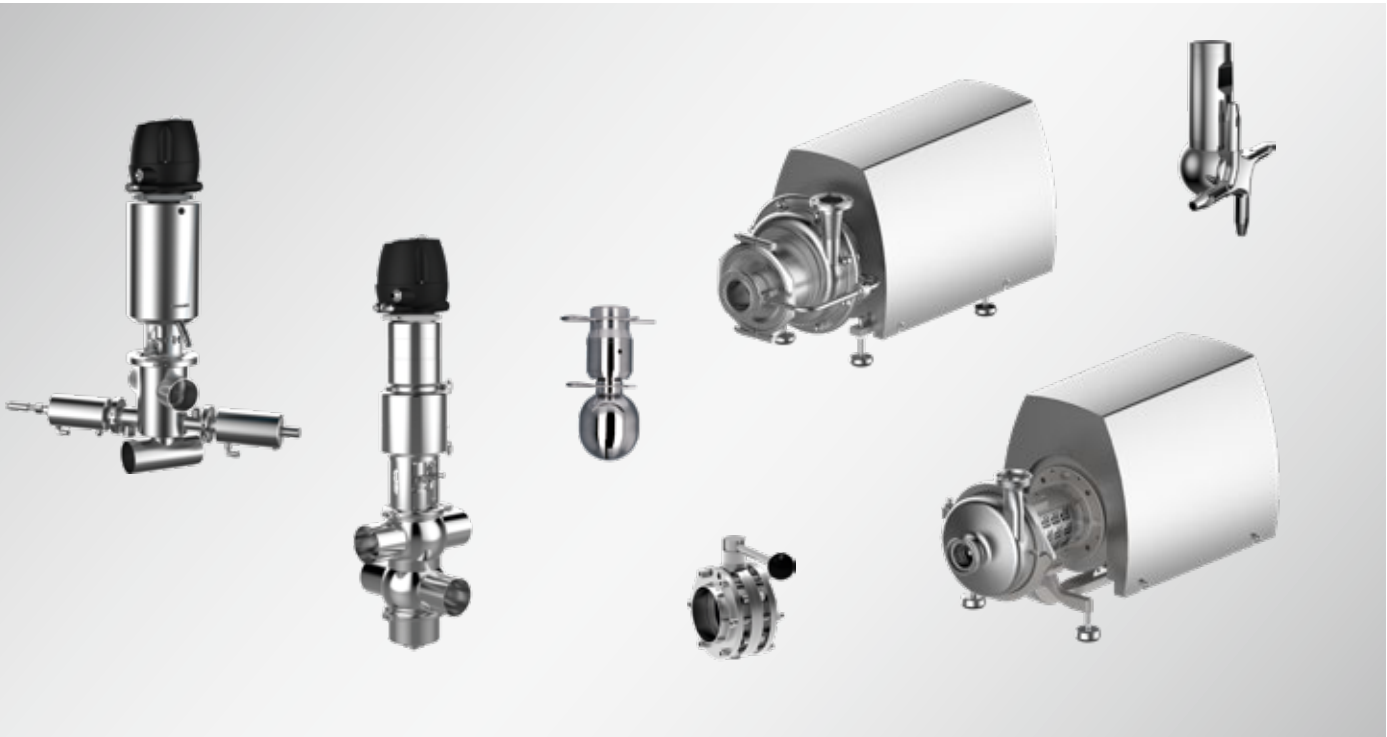
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Regardless of the application – for our customers product quality and profitability are what matters. This is what GEA Flow Components is known for. Our engineers are specialists in everything that flows.

### GEA Group Aktiengesellschaft

GEA is one of the largest suppliers of process technology for the food industry and for a wide range of other industries. As an international technology group, the company focuses on world-leading process solutions and components for sophisticated production processes.

### GEA Flow Components

GEA offers well-engineered process components and services to ensure smooth production processes in the treatment of liquid products. We develop and produce a comprehensive product range that includes valve technology for all hygienic classes (Hygienic, UltraClean, Aseptic), hygienic pumps and cleaning technology.

GEA Flow Components products and services are available around the world through the international GEA network.



Around one quarter of the milk processed is handled by GEA equipment



Roughly every second liter of beer is brewed using GEA equipment and solutions



Approx. one in three instant coffee lines has been built by GEA

## State-of-the-art hygienic design

GEA Flow Components meet the highest hygienic standards where required, such as EHEDG and 3-A standards.

Hygienic valves and components from GEA form the core component of matrix-piped process plants.

When it comes to sterile applications, GEA offers both UltraClean and Aseptic valves and systems. The hermetic sealing of the product area provides a maximum level of process line isolation and thus contributes to process and product safety.

The hygienic pump range from GEA includes centrifugal pumps (single-stage, multi-stage and self-priming), as well as rotary lobe pumps.

GEA cleaning devices – whether index, orbital, rotary or static – achieve optimum cleaning results in multiple industries. GEA product recovery systems help to recover valuable products and reduce both waste disposal costs as well as water and detergent consumption.

## Applications

- Beverage
  - Beer, juice, smoothie products ...
- Dairy
  - Milk, yoghurt, cheese ...
- Food
  - Sauces & cremes, ketchup, mayonnaise ...
- Pharma/Biotech
  - Pharmaceuticals, biotechnology products, cosmetics & health care ...
- Chemicals
  - Fine chemicals, bulk chemicals, cleaning chemicals ...
- Dairy farming
  - Raw milk processing ...



### Hygienic Valve Technology

A complete range of economically designed Hygienic valves for complex tasks as well as basic functions, helping producers to achieve high product quality and efficiency.



### Aseptic Valve Technology

UltraClean and Aseptic valves are suitable for production processes which require a higher safety protection against contamination from the environment and thus warrant microbial stability of the product over the whole process.



### Hygienic Pump Technology

A great variety of Hygienic pumps with sensibly rated high efficiency motors and carefully designed flow paths, driving economic efficiency and sustainable operation.



### Cleaning Technology

Index, orbital, rotating and static cleaners in a complete range, developed with special emphasis on saving valuable resources in the cleaning process.



The components of GEA Tuchenhausen are based on future-oriented company and product concept principles that include an obligation to economic viability, sustainability and service.

**Your investment pays off**

GEA Tuchenhausen hygienic valves and components help you to achieve considerable cost savings. The valve concepts with a variable structure and the efficient control technology provide both low purchase costs and low energy consumption.

The design of the valves and individual components without dead space satisfies the most exacting hygienic requirements and prevents unnecessary product losses. Thanks to the metallic stops, the seals used are characterized by a very long service life. This significantly cuts operating costs.

The GEA Tuchenhausen design concept reduces consumption of valuable energy and helps you to cut your water consumption, as well as the use of chemicals.

The ingenious maintenance concept additionally ensures that the personnel and time required for necessary maintenance work can be reduced to a minimum.

Thus, your investment in innovative process technology from GEA Tuchenhausen will quickly repay itself.

**Economical**

Higher product quality

Reduced consumption of energy, water and cleaning media

Reduced time and personnel costs for maintenance and cleaning





**You score points with environmental protection**

Lower consumption of energy, water and chemicals means less pollution for the environment. GEA Tuchenhausen meets these requirements by complying with binding international standards.

As a user of GEA Tuchenhausen products, you benefit from proven environmentally-friendly production processes, as well as the high standards for hygienic processing and care of your products. This makes a significant contribution to protecting the global environment and climate.

With our products, you show how important sustainable operating methods are to you and that you take responsibility for future generations!

**Our support is your gain**

In addition to our product range, you can also make use of the individualized engineering support from GEA Tuchenhausen. Even before you have started using our products, this support provides you with extensive digital tools – from technical drawings to 3-D models.

The individualized service concepts from GEA Tuchenhausen ensure that maintenance work is conducted with the lowest amount of production downtime possible.

We look forward to creating and customizing a maintenance plan for you.

Sustainable
Lower climate and environmental impact
Sustainable, environmentally friendly production processes
High standards for hygienic processing and care of products

Service-oriented
Individual engineering support
Shortest possible interruptions of production
Individual service concept

### Hygienic valves and components

Hygienic valves and components are suitable for CIP/SIP, easy to maintain, offer reliable function and represent a significant factor in consistent product quality. Low costs with operation, maintenance and service ensure economical system productivity.

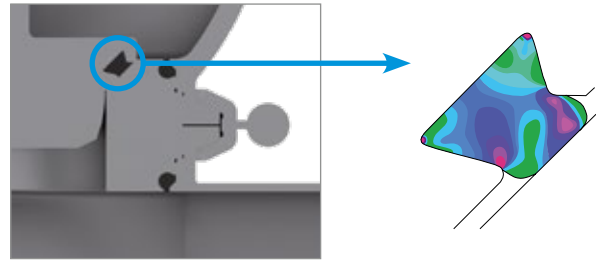
The highly flexible VARIVENT® modular system is the basis for the hygienic valves and components of GEA Tuchenhausen. The result is economic efficiency for the system operator, optimized stock keeping and low-cost spare parts production due to the reduced diversity of parts.

Modular system
Greater flexibility because of the ability to adapt rapidly to process changes
High economic efficiency
Low spare part stocks

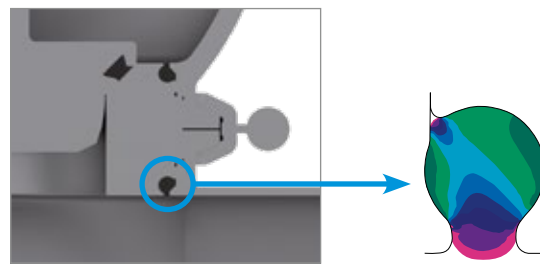
Hygienic design
Lower risk of contaminating the end product
Maximum efficiency in cleaning
Lower CIP costs

### Sealing according to the VARIVENT® principle

The hygienic valves and components offered by GEA Tuchenhausen are characterized by special seal technology. A metallic stop results in defined seal deformation, ensuring long seal life. This allows for more time to pass between required maintenance services, thereby allowing for continuous production and shorter downtimes. The special grooved shape in the valve disc ensures the seal has a secure hold at all times up to a pressure differential of 10 bar during switching. The seal geometry was optimized by using FEM calculations.



Representation of the stress load on the V-ring



Representation of the stress load on the housing O-ring

Seals
Long operating time
Vacuum-proof
Selection of FDA-compliant seal materials
<ul style="list-style-type: none"> <li>• EPDM</li> <li>• FKM</li> <li>• HNBR</li> <li>• PTFE</li> </ul>



## Hygienic valves and components

### VARINLINE® instrumentation free of dead pockets

The trademark VARINLINE® includes control and measuring instruments that meet the requirement of being CIP/SIP-able, thus enabling cleaning and sterilization without the need for dismantling. The instruments can be cleaned and sterilized without any residue in automatic cleaning and sterilizing process cycles. The core piece of the in-line control and measurement technology is the process connection fitting, the VARINLINE® housing. It is mainly an in-line housing with double vertical ports with two process connections.



The process connections in the VARINLINE® housing allow up to two control / measuring instruments, e.g. a sight glass with opposite illumination unit or different measuring mountings. They are available for all pipe sizes, with the VARIVENT® process connection designed for the nominal width of the respective components to be installed. VARINLINE® housings are self draining – also in the vertical installation orientation – and thus permit instrumentation free of dead zones. VARINLINE® housings are 3A approved, according to the DGRL and are EHEDG-certified.



### VARICOMP® expansion compensator

VARICOMP® expansion compensators compensate for expansions and tensions in pipeline systems that result from temperature differences. Due to the dead-zone free design, they are able to be used in hygienic and aseptic processes.



### VARIVENT® valves with special function

The high flexibility in the VARIVENT® system offers many advantages. With the ability to combine all basic elements with one another, the system offers a broad range of possible applications. Existing valve systems in process installations can be modified or enhanced without changing the current system concept.

Housings and other components from the VARIVENT® modular kit are used e.g. in control valves, overflow valves and vacuum valves.



### VARITOP® tank safety systems

The VARITOP® tank safety system consists of a modular system and thereby forms a functional unit designed individually according to the customer's requests.

The diverse applications of the VARITOP® system range from tank cleaning to protecting tanks against high and low pressures to gassing and degassing of tanks.

## VARICOVER® product recovery systems

VARICOVER® product recovery systems are designed for use in fully automatic operations with maximum cleaning demands. They are used to recover valuable products from pipelines – an important consideration to optimize the economic efficiency of a process system. Pigging pushes the product from the pipes and returns it to the production cycle.

A VARICOVER® product recovery system usually comprises of a pig cleaning station, a pig catching station with propellant medium valves and a pig.



Available nominal widths for valve series

Valve type	Nominal width																
	DN	10	15	25	40	50	65	80	100	125	150	162					
	OD			1"	1 ½"	2"	2 ½"	3"	4"		6"						
IPS													2"	3"	4"	6"	
VARIVENT® pipe connections				•	•	•	•	•	•	•	•	•		•	•	•	•
VARICOMP® expansion compensator							•	•	•	•					•	•	•
VARIVENT® control valve type S				•	•	•	•	•	•	•	•			•	•	•	•
VARIVENT® control valve type P				•	•	•	•	•	•	•	•			•	•	•	•
VARIVENT® sampling valve type I		•	•	•	•	•	•	•	•	•	•			•	•	•	•
VARIVENT® sampling valve type TSVN and TSVU					•												
VARIVENT® double-seat sampling valve type T/09					•												
VARIVENT® overflow valve type Q				•	•	•	•	•	•					•	•	•	
VARIVENT® constant pressure valve type DHV				•	•	•	•										
VARIVENT® safety relief valve type 488				•	•	•	•	•	•								
VARIVENT® safety relief valve type 483				•	•												
Spring-loaded safety relief valve type HyCom				•	•	•	•	•									
VARIVENT® vacuum valve type V							•	•	•		•						•
VARITOP® tank safety system									•	•		•					
VARICOVER® product recovery system				•	•	•	•	•	•								

Pipe classes

Standard VARIVENT® valve housings and VARINLINE® housings are supplied with welding ends, although the components can be delivered with various connection fittings as an option (see section 7).

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

Metric		Inch			ISO	
DN	Outside diameter according to DIN 11866, series A	OD IPS	Outside diameter based on ASME-BPE-a-2004, DIN 11866, series C	Outside diameter according to IPS schedule 5	ISO	Outside diameter according to DIN 11866, series B
10	13.0 × 1.50				13.5	13.5 × 1.6
15	19.0 × 1.50				17.2	17.2 × 1.6
25	29.0 × 1.50	1"	25.4 × 1.65		21.3	21.3 × 1.6
40	41.0 × 1.50	1 ½"	38.1 × 1.65		33.7	33.7 × 2.0
50	53.0 × 1.50	2"	50.8 × 1.65	60.3 × 2.00	42.4	42.4 × 2.0
65	70.0 × 2.00	2 ½"	63.5 × 1.65		48.3	48.3 × 2.0
80	85.0 × 2.00	3"	76.2 × 1.65	88.9 × 2.30	60.3	60.3 × 2.0
100	104.0 × 2.00	4"	101.6 × 2.11	114.3 × 2.30	76.1	76.1 × 2.0
125	129.0 × 2.00				88.9	88.9 × 2.3
150	154.0 × 2.00	6"	152.4 × 2.77	168.2 × 2.77	114.3	114.3 × 2.3

## 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 (see section 7).

Surfaces not in contact with the product (housing) are matte blasted or metal ground as standard. Detailed information on surface designs can be taken from the respective sections.

## Materials

Components in contact with the product are produced from 1.4404 (AISI 316L), while those not in contact with the product use 1.4301 (AISI 304). Other materials, e.g. for use when handling aggressive 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 EPDM (standard), HNBR, FKM and FFKM (on request; not available for all components). NBR material is used for seals not in contact with the product.

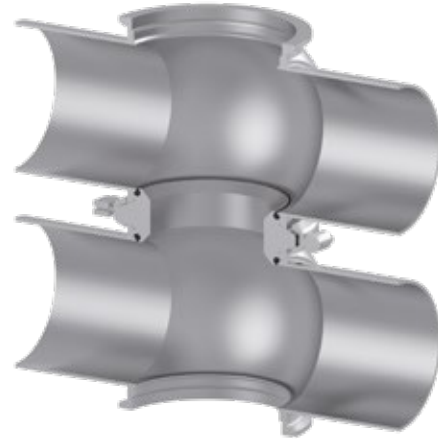
The mixing constituents of our seal materials conform to the USP class VI and are contained in the FDA White List. In this the sealings fulfill FOOD and DRUG (FDA) guidelines 21 CFR Part 177.2600 or 21 CFR 177.1550: "Rubber articles intended for repeated use".

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. The seal material PTFE is available for individual valve types and components as well.

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

## Housing connections

For valves with the option of combining housings, such as overflow and control valves, the clamped housing connection forms a flexible selection of the port orientation.



Clamped housing connection:  
Seat ring clamped by clamping connection

Ambient conditions

Ambient temperatures	
Hygienic valves and components (with connection 0)	0 °C to 45 °C
	32 °F to 113 °F
Proximity switches	-20 °C to 80 °C
	-4 °F to 176 °F

The valves can also be used outdoors. However, in these application areas they must be protected against icing, or else de-iced before switching or lifting. In addition, the particular requirements on the control and feedback system must be taken into account in this case.

The product or operating temperature depends on the seal material and can be seen in the **seal material properties** table.

Installation

Hygienic valves and components must be installed without stresses. Lateral forces such as expansion of the pipelines due to heat cannot be compensated in the valve, as a result valve damages are possible. In such cases, we recommend taking measures to compensate for the expansion, such as by using the VARICOMP® expansion compensator.

The required clearance for installing and removing a component is specified in the particular technical data and dimensional sheet.

Air supply

The valve actuators are configured for operation with min. 4 bar and max. 8 bar air pressure. The standard actuator sizes are configured for an air supply pressure of min. 6 bar (with a product pressure of 5 bar). The quality of the air supply must meet the requirements of ISO 8573-1:2010.

ISO 8573-1:2010	
Solid content	<b>Quality class 6</b>
	Particle size max. 5 µm
	Particle density max. 5 mg/m³
Water content	<b>Quality class 4</b>
	Max. dew point 3 °C
	A correspondingly different dew point is required for applications at high altitude or with low ambient temperatures.
Oil content	<b>Quality class 3</b>
	Max. 1 mg oil per 1 m³ air, preferably oil-free

Feedback

In the control top

See section 9: Control and feedback systems

In the lantern (LAT)

Proximity switches of size M12×1 can indicate the positions “open” and/or “closed”. In double-seat valves with lifting actuator, it is also possible to detect the upper valve disc stroke in the lantern by means of a proximity switch (see section 9: Control and feedback systems).

For detecting the end positions by proximity switches in these valves, it is recommended to use the proximity switch holder (INA) on the actuator (see section 9: Control and feedback systems).

Recommended flow direction

If possible, the valves should close against the flow direction so to avoid water hammer. Exception: Constant pressure valve type DHV, sampling valve type I and vacuum valve type V.

## Material properties

Material number	Short name	Similar materials			PREN***	Main alloy elements in % by mass			
						Cr (Chrome)	Ni (Nickel)	Mo (Molybdenum)	C max. (Carbon)
<b>1.4301*</b>	<b>X5CrNi18-10</b>	<b>AISI 304</b>	<b>BS 304S15</b>	<b>SS2332</b>	<b>18</b>	<b>17.5–19.5</b>	<b>8.0–10.5</b>	<b>–</b>	<b>0.07</b>
<b>1.4404**</b>	<b>X2 CrNiMo 17-12-2</b>	<b>AISI 316L</b>	<b>BS 316S11</b>	<b>SS2348</b>	<b>25</b>	<b>16.5–18.5</b>	<b>10.0–13.0</b>	<b>2.0–2.5</b>	<b>0.03</b>
1.4435	X2 CrNiMo 18-14-3	AISI 316L	BS 316S11	SS2353	27	17.0–19.0	12.5–15.0	2.5–3.0	0.03
1.4462	X2 CrNiMoN 22-5-3	2205	BS 318S13	SS2377	37	21.0–23.0	4.5–6.5	2.5–3.5	0.03
1.4410	X2 CrNiMoN 25-7-4	SAF 2507®	–	SS2328	39	24.0–26.0	6.0–8.0	3.0–4.5	0.03
1.4529	X1 NiCrMoCuN 25-20-7	AISI 926	–	–	42	19.0–21.0	24.0–26.0	6.0–7.0	0.02
AL-6XN®	–	–	–	–	43	20.0–22.0	23.5–25.5	6.0–7.0	0.03
1.4539	X1 NiCrMoCu 25-20-5	AISI 904L	BS 904S13	SS2562	35	19.0–21.0	24.0–26.0	4.0–5.0	0.02
2.4602	NiCr21Mo14W HASTELLOY C-22	–	–	–	69	20.0–22.5	Rest	12.5–14.5	0.01
2.4819	NiMo16Cr15W HASTELLOY C-276	N 10276	–	–	75	14.5–16.5	Rest	15.0–17.0	0.01

\* Standard material for components not in contact with the product

\*\* Standard material for components in contact with the product (other materials available on request)

\*\*\* Pitting Resistance Equivalent Number = % Cr + 3.3 × (% Mo + 0.5 W) + 20N

## Seal material properties

Seal material			EPDM	FKM	HNBR	FFKM	PTFE	VMQ (pig)
General application temperature*			–40 to 135 °C –40 to 275 °F	–10 to 200 °C 14 to 392 °F	–25 to 140 °C –13 to 284 °F	–10 to 230 °C 14 to 446 °F	–200 to 260 °C	–50 to 200 °C
Medium	Concentration	At permitted operating temperature						
Alkali	≤ 3 %	up to 80 °C	+	○	+	+	+	○
	≤ 5 %	up to 40 °C	+	○	○	+	+	○
	≤ 5 %	up to 80 °C	+	–	–	+	+	○
	> 5 %		○	–	–	+	+	○
Inorganic acid**	≤ 3 %	up to 80 °C	+	+	+	+	+	○
	≤ 5 %	up to 80 °C	○	+	○	+	+	○
	> 5 %	up to 100 °C	–	+	–	+	+	○
Water		up to 80 °C	+	+	+	+	+	+
		up to 100 °C	+	+	+	+	+	○
Steam		up to 135 °C	+	○	○	+	+	○
Steam, approx. 30 min		up to 150 °C	+	○	–	+	+	○
Hydrocarbons/fuels			–	+	○	+	+	–
Products containing grease	≤ 35 %		+	+	+	+	+	○
	> 35 %		–	+	+	+	+	○
Oils			–	+	+	+	+	○

+ = Good resistance

○ = Reduced service life

– = Not resistant





Other applications on request

\* Depending on the installation situation

\*\* Inorganic acids include hydrochloric acid, nitric acid, sulphuric acid

The certificates in this list are valid for the corresponding hygienic valves and components in the GEA portfolio. Valves that meet the requirements of the European Hygienic Engineering and Design Group (EHEDG) as well as those of 3-A Sanitary Standards, Inc. (3-A SSI) are available for many



fields of application. Additionally, numerous valves have been demonstrated to offer trouble-free and efficient cleaning ability in independent, standardized cleaning tests – for optimum safety and high savings potentials.

	Index		Standard certificates			3A	ASME UV
			CE	EHEDG	FDA		
							
VARINLINE®	1	Housings		•	•		
	1	Housing connection flange type U, U-S			•		
	1	Housing connection flange type T, T-S			•		
	1	Tank connection flange, type P			•		
	1	Sight glass type TXI			•		
	1	Pressure gauge type TPIA			•		
	1	Thermometer type TTIA			•		
	1	Level probe, type TNS			•		
	2	Flange and flange connection	•		•		
	3	VARICOMP® Expansion compensator		•	•		
VARIVENT®	4	Control valve type S	•	•	•	53-06	
	4	Control valve type P			•	53-06	
	4	Sampling valve type I			•	53-06	
	4	Sampling valve type TSVN			•	53-06	
	4	Sampling valve type TSVU			•	53-06	
	4	Mixproof sampling valve type T/09			•		
	4	Overflow valve type Q	•		•	53-06	
	4	Constant pressure valve type DHV			•	53-06	
	4	Safety relief valve type 488	•		•		•
	4	Safety relief valve type 483	•		•		•
4	Safety relief valve type HyCom			•			
4	Vacuum valve type V			•			
VARICOVER®	6	Pig cleaning station	•		•	101-00	
	6	Pig catching pipe/pig catching station			•	101-00	
	6	VARINLINE® housing for pig driving medium valves			•	101-00	
	6	Pig stopper	•		•	101-00	
	6	Pig t-piece			•	101-00	
	6	Pig type PK			•	18-03	
	7	VARITOP® Tank Safety Systems			•		


\* not for HNBR

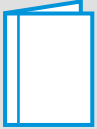
\*\* TA Luft not applicable in combination with bellows





Optional certificates									
ATEX	CRN	EAC	EG No. 1935/2004*	EG-Druck-geräterichtlinie 97/23/EG	GOST	TA-Luft VDI 2440	TÜV Cert	TS	USP Class VI
									
		•	•	•	•				•
		•			•				•
		•			•				•
		•			•				•
•		•	•		•				•
		•			•				•
•	OB9686.5CL		•			•			•
									•
	OC9687.5CL		•			•			•
	OC9687.5CL		•		•	•			•
			•		•	•			•
			•			•**			•
			•			•**			•
			•		•	•			•
•	OC9687.5CL		•		•	•			•
			•		•	•			•
•	•	•	•		•		•	•	•
•	•	•	•		•		•	•	•
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	OC9687.5CL		•		•	•			•
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		•	•		•				•

Catalogs  
Hygienic Valve Technology

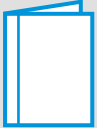
 Hygienic valves  
VARIVENT® and ECOVENT®

 Butterfly valves T-smart

 Seat valves T-smart

 Hygienic valves and  
components


Catalogs  
Hygienic Pump Technology

 Hygienic centrifugal pumps

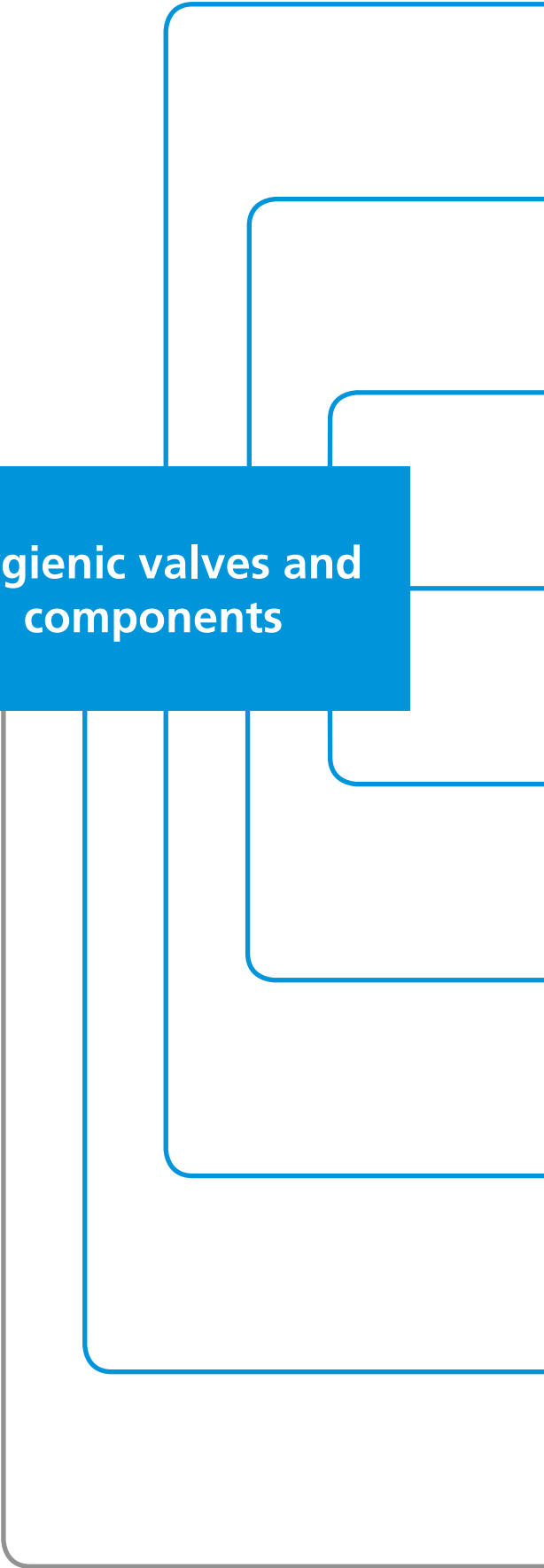
Catalogs  
Aseptic Valve Technology

 Aseptic Valve Technology

Catalogs  
Cleaning Technology

 Cleaning technology

**Hygienic valves and  
components**



	VARINLINE® housings and connection flanges	1
	VARIVENT® pipe connections	2
	VARICOMP® expansion compensators	3
	VARIVENT® valves with special function	4
	VARITOP® tank safety systems	5
	VARICOVER® product recovery systems	6
	Options	7
	Spare parts	8
	Control and feedback systems	9



**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 Tuchenhausen 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

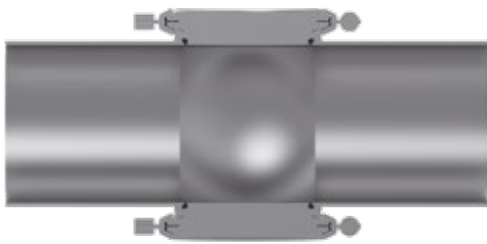


**VARINLINE® housings**

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 ( $\leq 1.6$  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 Tuchenhausen level probe type TNS		•	•	
GEA Breconcherry in-line sprayer type IS 25**			•	
VESTA® sampling valve type H_A/1 2/2 way seat valve***		•	•	
Aseptomag® sampling valve type PV***			•	

\* See section 4.2, sampling valves  
 \*\* See catalog cleaning technology  
 \*\*\* See catalog aseptic valve technology

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.

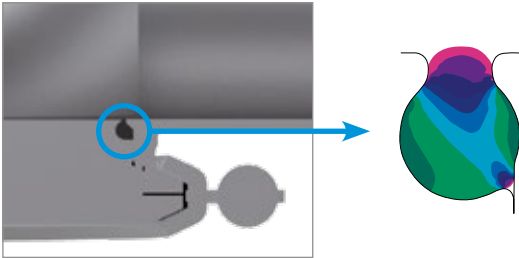


Possibility of pressure relief in the tank

### 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
<ul style="list-style-type: none"> <li>• EPDM</li> <li>• FKM</li> <li>• HNBR</li> <li>• FFKM</li> <li>• PTFE</li> </ul>

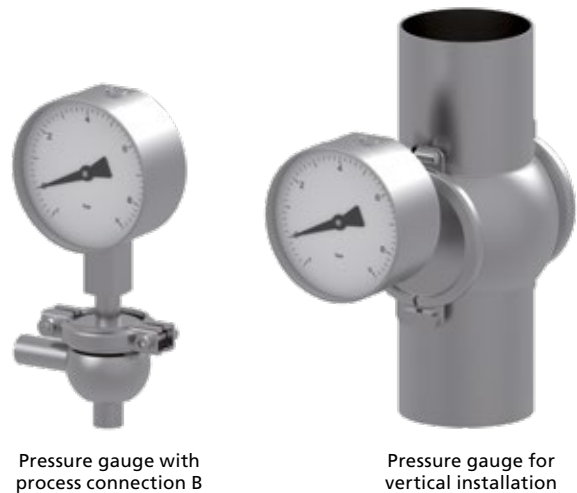
### VARINLINE® pressure gauge

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.







### 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 illumination is recommended. The durable LED illumination with 20 LED's and a 3-pole M8 connector optional disposes of a three-core connection cable with a length of 2 or 25 m. The 2W illumination can either be operated manually via an integrated tactile switch or automatically via the SPS. An ATEX lighting without a tactile switch 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 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 11866, series B

### 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 316L). 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 conform to the USP class VI and are contained in the FDA White List. In this the sealings fulfill 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	Maximum permitted operating 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 OD 1"	PS 25 bar
DN 40–100 OD 1 ½"–4"	PS 20 bar

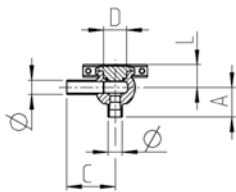
VARINLINE® housing connections and tank connections flanges				
Nominal width	VARINLINE® process connection	Maximum permitted operating pressure		
		Type U	Type T	Type P
DN 25	F	PS 16 bar	PS 10 bar	PS 20 bar
DN 50/40	N	PS 16 bar	PS 10 bar	PS 20 bar
DN 100	G	PS 10 bar	PS 10 bar	–



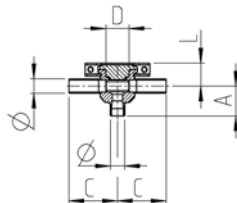


The in-line housing, usually with double vertical ports, permits hygienic holding of up to two in-line measurement and control instruments free of dead zones via process connections

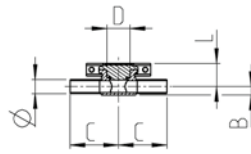
Technical data of the standard version		
Material in contact with the product	DN 10–15, ISO	1.4435 (AISI 316L)
	From DN 25, OD, IPS	1.4404 (AISI 316 L)
Seal material in contact with the product	EPDM, FKM, HNBR	
Product pressure	DN 10–65, OD 1"–2 ½", IPS 2", ISO 13.5–60.3	16 bar
	DN 80–150, OD 3"–6", IPS 3"–6", ISO 76.1–114.3	10 bar
Surface in contact with the product	DN, OD, ISO	$R_a \leq 0.8 \mu\text{m}$
	IPS	$R_a \leq 1.2 \mu\text{m}$
External housing surface	Matte blasted	
Connection fittings	Welding end	
Certificates	 	



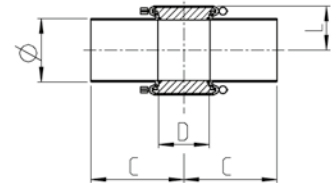
Housing design L



Housing design T



Housing design G



-

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 × 1.65	-	-	90.0	50	28.0	
OD 1 ½"	N	-	38.10 × 1.65	-	-	90.0	68	34.5	
OD 2"	N	-	50.80 × 1.65	-	-	90.0	68	40.8	
OD 2 ½"	N	-	63.50 × 1.65	-	-	125.0	68	47.0	
OD 3"	N	-	76.20 × 1.65	-	-	125.0	68	53.5	
OD 4"	N, G*	-	101.60 × 2.11	-	-	125.0	68*	65.8	
OD 6"	N, G*	-	152.40 × 2.77	-	-	150.0	68*	90.5	
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 × 2.77	-	-	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	<b>VARINLINE® system</b> T VARINLINE® housings																																								
2	<b>Nominal width</b> <table border="1"> <tr><td>DN 10</td><td></td><td></td><td>ISO 13.5</td></tr> <tr><td>DN 15</td><td></td><td></td><td>ISO 17.2</td></tr> <tr><td>DN 25</td><td>OD 1"</td><td></td><td>ISO 21.3</td></tr> <tr><td>DN 40</td><td>OD 1 ½"</td><td></td><td>ISO 33.7</td></tr> <tr><td>DN 50</td><td>OD 2"</td><td>IPS 2"</td><td>ISO 42.4</td></tr> <tr><td>DN 65</td><td>OD 2 ½"</td><td></td><td>ISO 48.3</td></tr> <tr><td>DN 80</td><td>OD 3"</td><td>IPS 3"</td><td>ISO 60.3</td></tr> <tr><td>DN 100</td><td>OD 4"</td><td>IPS 4"</td><td>ISO 76.1</td></tr> <tr><td>DN 125</td><td></td><td></td><td>ISO 88.9</td></tr> <tr><td>DN 150</td><td>OD 6"</td><td>IPS 6"</td><td>ISO 114.3</td></tr> </table>	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
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	<b>Housing design (only available for DN 10, DN 15, ISO 13.5, ISO 17.2 and ISO 21.3)</b> L T G																																								
4	<b>Blanking plates</b> 0 Without blanking plate 1 With one blanking plate 1.4404 (AISI 316L) 2 With two blanking plates 1.4404 (AISI 316L) 3 With one blanking plate 1.4435 cert. 3.1 4 With two blanking plates 1.4435 cert. 3.1																																								
5	<b>Seal material</b> 1 EPDM (FDA) 2 FKM (FDA) 3 HNBR (FDA) 4 FFKM (FDA) 5 PTFE (FDA)																																								
6	<b>Surface quality of the housing</b> 1 Inside $R_a \leq 1.2 \mu\text{m}$ , outside matte blasted (IPS) 2 Inside $R_a \leq 0.8 \mu\text{m}$ , outside matte blasted (DN, ISO, OD)																																								
7	<b>Certificates</b> 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	<b>Language of the documentation</b> D German E English																																								
9	<b>Number of documentation</b> 1 Single documentation ... The number of documentations corresponds to their entered number																																								
10	<b>Connection fittings</b> N Welding end																																								
11	<b>Material of the housing</b> 1.4404 1.4404 (AISI 316 L) 1.4435* 1.4435 (AISI 316L)																																								
12	<b>Options</b> 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:

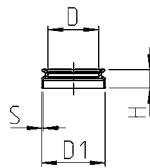
<b>Position</b>	1	2	3	4	5	6	7	8	9	10	11	12
<b>Code</b>	T									N		

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

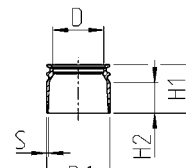


Housing connection flanges are used to connect measuring instruments without dead zones and are welded into the vessel wall or the vessel bottom. Type U-S is suitable for installation in the tank bottom, since it can be adjusted in inclination.

Technical data of the standard version		
Material in contact with the product	type U	1.4404 (AISI 316L) or 1.4435 (AISI 316L)
	type U-S	1.4435 (AISI 316L)
Material blanking plate	1.4404 (AISI 316 L)	
	1.4435 (AISI 316L)	
Seal material	EPDM, FKM, HNBR	
Operating temperature	-10 °C up to 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	$R_a \leq 0.8 \mu\text{m}$	
Outside surface	Matte blasted	
Wall thickness t	2; 2.5; 3; 4 mm	
Certificates		



type U



type U-S

Type U

Nominal width	Process connection	Dimension			
		D [mm]	D1 [mm]	H [mm]	S [mm]
DN 25	F	50	70	25	2
DN 50/40	N	68	85	25	2
DN 100	G	123	154	30	2

Type U-S

Nominal width	Process connection	Dimension				
		D [mm]	D1 [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	<b>VARINLINE® system</b>
	TU VARINLINE® housing connection flange type U
	TU-S VARINLINE® housing connection flange type U-S
2	<b>Nominal width (process connection)</b>
	25 F
	50/40 N
	100 G
3	<b>Blanking plate</b>
	0 Without blanking plate
	1 With blanking plate
4	<b>Seal material</b>
	1 EPDM (FDA)
	2 FKM (FDA)
	3 HNBR (FDA)
	4 FFKM (FDA)
	5 PTFE (FDA)
5	<b>Welding instructions</b>
	K Without
	D German
	E English
6	<b>Welding device</b>
	K Without
7	<b>Certificates</b>
	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	<b>Material</b>
	1.4404 (type U)
	1.4435 (type U and U-S)


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

<b>Position</b>	1	2	3	4	5	6	7	8
<b>Code</b>						K		

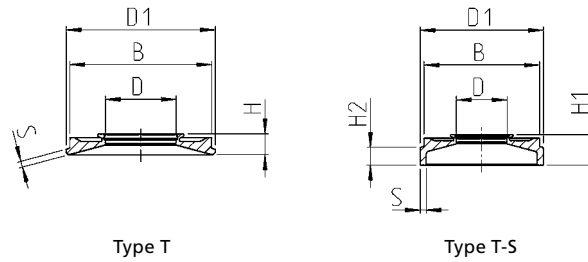
For order codes differing from the standard version, please refer to section 7 (options).



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 316L)*
	type T-S	1.4404 (AISI 316L)
Material blanking plate	1.4404 (AISI 316 L) 1.4435 (AISI 316L)	
Seal material	EPDM, FKM, HNBR	
Operating temperature	-10 °C up to 150 °C	
Product pressure	10 bar	
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$	
Outside surface	Matte blasted	
Certificates		

\* Process connection N or G



Type T

Nominal width	Process connection	Dimension				
		D [mm]	B [mm]	D1 [mm]	H [mm]	S [mm]
DN 15	B	31	-	105	22.0	Max. 8
DN 25	F	50	135	145	24.0	Max. 8
DN 50/40	N	68	155	165	24.5	Max. 8
DN 100	G	123	215	225	27.5	Max. 8

Type T-S

Nominal width	Process connection	Dimension					
		D [mm]	B [mm]	D1 [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	<b>VARINLINE® system</b>
	TT VARINLINE® housing connection flange type T
	TTS VARINLINE® housing connection flange type T-S
2	<b>Nominal width (process connection)</b>
	15 B
	25 F
	50/40 N
	100 G
3	<b>Blanking plate</b>
	0 Without blanking plate
	1 With blanking plate
4	<b>Seal material</b>
	1 EPDM (FDA)
	2 FKM (FDA)
	3 HNBR (FDA)
	4 FFKM (FDA)
	5 PTFE (FDA)
5	<b>Welding instructions</b>
	K Without
	D German
	E English
6	<b>Welding device</b>
	K Without
7	<b>Certificates</b>
	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	<b>Material</b>
	1.4404 (type T and T-S)
	1.4435 (type T)


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

<b>Position</b>	1	2	3	4	5	6	7	8
<b>Code</b>						K		

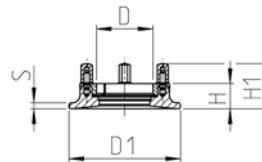
For order codes differing from the standard version, please refer to section 7 (options).



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 316L) 1.4539*
Material blanking plate	1.4404 (AISI 316 L) 1.4435 (AISI 316L)
Seal material	EPDM, FKM, HNBR
Operating temperature	-10 °C up to 150 °C
Product pressure	20 bar
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
Outside surface	Matte blasted
Certificates	

\* 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	<b>VARINLINE® system</b>
	TP VARINLINE® tank connection flange type P
2	<b>Nominal width (process connection)</b>
	25 F
	50/40 N
3	<b>Blanking plate</b>
	0 Without blanking plate
	1 With blanking plate
4	<b>Seal material</b>
	1 EPDM (FDA)
	2 FKM (FDA)
	3 HNBR (FDA)
	4 FFKM (FDA)
	5 PTFE (FDA)
5	<b>Welding instructions</b>
	K Without
	D German
	E English
6	<b>Welding device</b>
	K Without
7	<b>Certificates</b>
	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	<b>Material</b>
	1.4435
	1.4539*

\* Only process connection N to 15 mm wall thickness

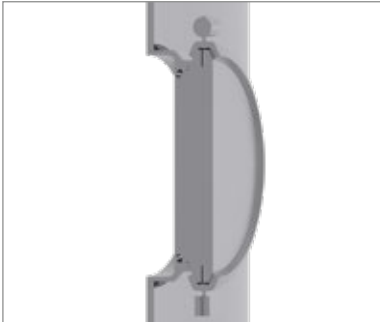
The code is composed as follows, depending on the chosen configuration:

<b>Position</b>	1	2		3	4	5	6	7		8
<b>Code</b>	TP		-				K		-	

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



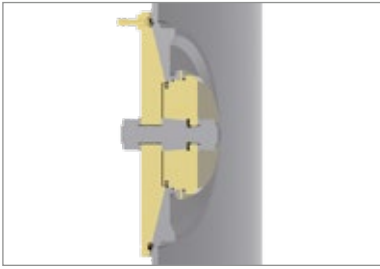
The VARINLINE® housing connection flanges and VARINLINE® tank connection flanges are welded into the vessel wall or the vessel bottom with a welding jig to protect against distortion. Since the different heat introduction when welding may cause deformation of the flanges and thereby leaks, the flange 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.



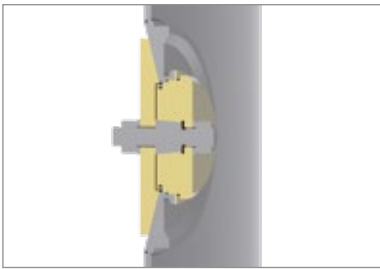
VARINLINE® housing connection U and U-S

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 221RLI002534EN	

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



Outer weld with insert gas connection inside

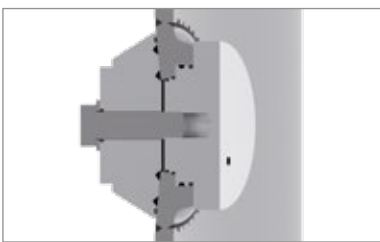


Inner weld

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 221RLI003025EN	

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




VARINLINE® tank connection flange type P

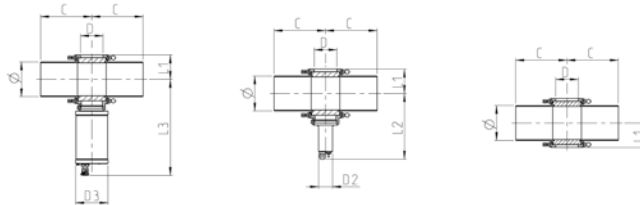
Process connection	Lock (welding device)
F	229-103.48
N	229-103.45
Required welding instructions 222RLI005453E	

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	10 bar (145 psi)	
Surface in contact with the product	DN, OD, ISO	R <sub>a</sub> ≤ 0.8 μm
	IPS	R <sub>a</sub> ≤ 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 variant	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	
Certificates		



		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	29.00 × 1.50	90.0	38	30	34	134	77	207
DN 40	N	41.00 × 1.50	90.0	55	36	34	136	77	209
DN 50	N	53.00 × 1.50	90.0	55	42	34	142	77	215
DN 65	N	70.00 × 2.00	125.0	55	50	34	150	77	223
DN 80	N	85.00 × 2.00	125.0	55	58	34	157	77	230
DN 100	N/G	104.00 × 2.00	125.0	55/100	67	34	167/173	77	240/246
DN 125	N/G	129.00 × 2.00	125.0	55/100	80	34	179/186	77	252/259
DN 150	N/G	154.00 × 2.00	150.0	55/100	92	34	192/198	77	265/271
OD 1"	F	25.40 × 1.65	90.0	38	28	34	132	77	205
OD 1 ½"	N	38.10 × 1.65	90.0	55	35	34	134	77	207
OD 2"	N	50.80 × 1.65	90.0	55	41	34	141	77	214
OD 2 ½"	N	63.50 × 1.65	125.0	55	47	34	150	77	223
OD 3"	N	76.20 × 1.65	125.0	55	54	34	156	77	229
OD 4"	N/G	101.60 × 2.11	125.0	55/100	66/70	34	166/172	77	239/245
IPS 2"	N	60.30 × 2.00	114.3	55	46	34	145	77	218
IPS 3"	N	88.90 × 2.30	152.4	55	60	34	159	77	232
IPS 4"	N/G	114.30 × 2.30	152.4	55/100	72	34	172/178	77	245/251
IPS 6"	N/G	168.30 × 2.77	152.4	55/100	98	34	198/204	77	271/277
ISO 33.7	F	33.70 × 2.00	114.3	38	32	34	136	77	209
ISO 42.4	N	42.40 × 2.00	114.3	55	37	34	136	77	209
ISO 48.3	N	48.30 × 2.00	114.3	55	40	34	139	77	212
ISO 60.3	N	60.30 × 2.00	114.3	55	46	34	145	77	218
ISO 76.1	N	76.10 × 2.00	114.3	55	54	34	153	77	229
ISO 88.9	N	88.90 × 2.30	152.4	55	60	34	159	77	232
ISO 114.3	N	114.30 × 2.30	152.4	55	72	34	172	77	245

## VARINLINE® Sight Glass, Type TXIA

Position	Description of the order code																																
1	<b>VARINLINE® system</b> TXIA VARINLINE® sight glass																																
2	<b>Process connection</b> F N G																																
3	<b>Installation in VARINLINE® component</b> – Without VARINLINE® housing or flange T VARINLINE® housings TT VARINLINE® housing connection type T TT-5 VARINLINE® housing connection type T-5 TU VARINLINE® housing connection type U TU-5 VARINLINE® housing connection type U-5																																
4	<b>Nominal width</b> <table border="1"> <tr> <td>DN 25</td> <td>OD 1"</td> <td></td> <td></td> </tr> <tr> <td>DN 40</td> <td>OD 1 ½"</td> <td></td> <td>ISO 33.7</td> </tr> <tr> <td>DN 50</td> <td>OD 2"</td> <td>IPS 2"</td> <td>ISO 42.4</td> </tr> <tr> <td>DN 65</td> <td>OD 2 ½"</td> <td></td> <td>ISO 48.3</td> </tr> <tr> <td>DN 80</td> <td>OD 3"</td> <td>IPS 3"</td> <td>ISO 60.3</td> </tr> <tr> <td>DN 100</td> <td>OD 4"</td> <td>IPS 4"</td> <td>ISO 76.1</td> </tr> <tr> <td>DN 125</td> <td></td> <td></td> <td>ISO 88.9</td> </tr> <tr> <td>DN 150</td> <td></td> <td>IPS 6"</td> <td>ISO 114.3</td> </tr> </table>	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
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	<b>Seal material</b> 1 EPDM (FDA) 2 FKM (FDA) 3 HNBR (FDA) 4 FFKM (FDA) 5 PTFE (FDA)																																
6	<b>Surface quality of the housing</b> 1 Inside $R_a \leq 1.2 \mu\text{m}$ , outside matte blasted (IPS) 2 Inside $R_a \leq 0.8 \mu\text{m}$ , outside matte blasted (DN, ISO, OD)																																
7	<b>Illumination</b> K Without illumination W LED illumination, 24 V, 2 W, without cable, with connector M8 L LED illumination, 24 V, 2 W, with 2 m cable, incl. connector M8 T LED illumination, 24 V, 2 W, with 25 m cable, incl. connector M8 X ATEX LED illumination, 24 V, 2 W																																
8	<b>Certificates</b> 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	<b>Language of the documentation</b> D German E English																																
10	<b>Number of documentation</b> 1 Single documentation ... The number of documentations corresponds to their entered number																																
11	<b>Connection fittings</b> N Welding end																																
12	<b>Options</b> 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	

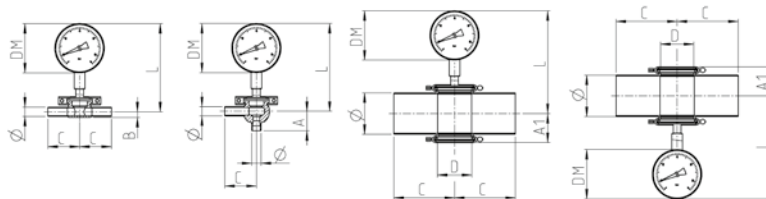
For order codes differing from the standard version, please refer to section 7 (options).



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 316L)
Window	Laminated safety glass (Polycarbonate)
Seal material in contact with the product	EPDM, FKM, HNBR
Damping liquid	Neobee® M-20 (FDA)
Liquid of the pressure gauge housing	Glycerin (FDA)
Process temperature	Max. 80 °C, during sterilisation (SIP) max. 130 °C
Ambient temperature	10 to 40 °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 $R_s \leq 0.8 \mu\text{m}$ IPS $R_s \leq 1.2 \mu\text{m}$
External housing surface	Matte blasted
Protection class	IP65
Certificates	



Nominal width	Process connection	Pipe		Dimension				
		Ø [mm]	C [mm]	D [mm]	DM [mm]	L [mm]	A1 [mm]	A [mm]
DN 10	B	13.00 × 1.50	65.0	31	63	100.0	-	34.5
DN 15	B	19.00 × 1.50	65.0	31	63	103.0	-	40.5
DN 25	F	29.00 × 1.50	90.0	50	100	165.0	30.00	-
DN 40	N	41.00 × 1.50	90.0	68	100	171.0	36.00	-
DN 50	N	53.00 × 1.50	90.0	68	100	177.0	42.00	-
DN 65	N	70.00 × 2.00	125.0	68	100	185.0	50.00	-
DN 80	N	85.00 × 2.00	125.0	68	100	192.7	57.50	-
DN 100	N	104.00 × 2.00	125.0	68	100	202.0	67.00	-
DN 125	N	129.00 × 2.00	125.0	68	100	214.5	79.50	-
DN 150	N	154.00 × 2.00	150.0	68	100	227.0	92.00	-
OD 1"	F	25.40 × 1.65	90.0	50	100	163.0	28.00	-
OD 1 ½"	N	38.10 × 1.65	90.0	68	100	169.5	34.50	-
OD 2"	N	50.80 × 1.65	90.0	68	100	175.8	40.75	-
OD 2 ½"	N	63.50 × 1.65	125.0	68	100	182.0	47.00	-
OD 3"	N	76.20 × 1.65	125.0	68	100	188.5	53.5	-
OD 4"	N	101.60 × 2.11	125.0	68	100	200.8	65.75	-
IPS 2"	N	60.30 × 2.00	114.3	68	100	180.5	45.50	-
IPS 3"	N	88.90 × 2.30	152.4	68	100	194.5	59.50	-
IPS 4"	N	114.30 × 2.30	152.4	68	100	207.0	72.00	-
IPS 6"	N	168.30 × 2.77	152.4	68	100	233.0	98.00	-
ISO 17.2	B	17.20 × 1.60	65.0	31	63	102.0	-	40.0
ISO 21.3	B	21.30 × 1.60	65.0	31	63	107.0	-	40.0
ISO 33.7	F	33.70 × 2.00	114.3	50	100	167.0	32.00	-
ISO 42.4	N	42.40 × 2.00	114.3	68	100	171.3	36.25	-
ISO 48.3	N	48.30 × 2.00	114.3	68	100	174.3	39.25	-
ISO 60.3	N	60.30 × 2.00	114.3	68	100	180.5	45.50	-
ISO 76.1	N	76.10 × 2.00	152.4	68	100	188.5	53.50	-
ISO 88.9	N	88.90 × 2.30	152.4	68	100	194.5	59.50	-
ISO 114.3	N	114.30 × 2.30	152.4	68	100	207.0	72.00	-





Position	Description of the order code
1	<b>VARINLINE® system</b> TPIA VARINLINE® pressure gauge
2	<b>Process connection</b> B F N
3	<b>Measuring range</b> 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	<b>Nominal width (at delivery with VARINLINE® housing)</b> 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	<b>Connection direction</b> U Down H Back Z Up
6	<b>Proximity switches</b> 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	<b>Contact type – magnetic spring contacts</b> 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	<b>Certificates</b> 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	<b>Language of the documentation</b> D German E English
10	<b>Number of documentation</b> 1 Single documentation ... The number of documentations corresponds to their entered number
11	<b>Options</b> See section options

\* Option PS 20 bar (/37) required


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

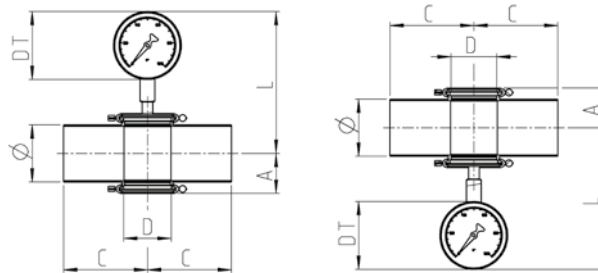
<b>Position</b>	1	2	3	4	5	6	7	8	9	10	11
<b>Code</b>	TPIA		-								

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)
Window	Laminated safety glass (Polycarbonate)
Seal material in contact with the product	EPDM, FKM, HNBR
Damping liquid	Neobee® M-20 (FDA)
Liquid of the pressure gauge housing	Glycerin (FDA)
Ambient temperature	10 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 $R_a \leq 0.8 \mu\text{m}$ IPS $R_a \leq 1.2 \mu\text{m}$
External housing surface	Matte blasted
Protection class	IP66
Certificates	



Nominal width	Process connection	Pipe		Dimension			
		Ø [mm]	C [mm]	D [mm]	DT [mm]	L [mm]	A [mm]
DN 25	F	29.00 × 1.50	90.0	50	100	162.0	30.00
DN 40	N	41.00 × 1.50	90.0	68	100	168.0	36.00
DN 50	N	53.00 × 1.50	90.0	68	100	174.0	42.00
DN 65	N	70.00 × 2.00	125.0	68	100	182.0	50.00
DN 80	N	85.00 × 2.00	125.0	68	100	189.5	57.50
DN 100	N	104.00 × 2.00	125.0	68	100	199.0	67.00
DN 125	N	129.00 × 2.00	125.0	68	100	211.5	79.50
DN 150	N	154.00 × 2.00	150.0	68	100	224.0	92.00
OD 1"	F	25.40 × 1.65	90.0	50	100	160.0	28.00
OD 1 1/2"	N	38.10 × 1.65	90.0	68	100	166.5	34.50
OD 2"	N	50.80 × 1.65	90.0	68	100	172.8	40.75
OD 2 1/2"	N	63.50 × 1.65	125.0	68	100	179.0	47.00
OD 3"	N	76.20 × 1.65	125.0	68	100	185.5	53.50
OD 4"	N	101.60 × 2.11	125.0	68	100	197.8	65.75
IPS 2"	N	60.30 × 2.00	114.3	68	100	177.5	45.50
IPS 3"	N	88.90 × 2.30	152.4	68	100	191.5	59.50
IPS 4"	N	114.30 × 2.30	152.4	68	100	204.0	72.00
IPS 6"	N	168.30 × 2.77	152.4	68	100	130.0	98.00
ISO 33.7	F	33.70 × 2.00	114.3	50	100	164.0	32.00
ISO 42.4	N	42.40 × 2.00	114.3	68	100	168.3	36.25
ISO 48.3	N	48.30 × 2.00	114.3	68	100	171.3	39.25
ISO 60.3	N	60.30 × 2.00	114.3	68	100	177.3	45.50
ISO 76.1	N	76.10 × 2.00	152.4	68	100	185.5	53.50
ISO 88.9	N	88.90 × 2.30	152.4	68	100	191.5	59.50
ISO 114.3	N	114.30 × 2.30	152.4	68	100	204.0	72.00



Position	Description of the order code
1	<b>VARINLINE® system</b>
	TTIA VARINLINE® thermometer
2	<b>Process connection</b>
	F N
3	<b>Measuring range</b>
	D -30 to 50 °C
	U 0 to 120 °C
	H 0 to 160 °C
4	<b>Nominal width (at delivery with VARINLINE® housing)</b>
	DN 25 OD 1"
	DN 40 OD 1 ½"
	DN 50 OD 2" IPS 2"
	DN 65 OD 2 ½"
	DN 80 OD 3" IPS 3"
	DN 100 OD 4" IPS 4"
	DN 125 ISO 88.9
	DN 150 ISO 114.3
	IPS 6"
5	<b>Connection direction</b>
	U Down
	H Back
	Z Up
6	<b>Proximity switches</b>
	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	<b>Contact type – magnetic spring contacts</b>
	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	<b>Certificates</b>
	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	<b>Language of the documentation</b>
	D German
	E English
10	<b>Number of documentation</b>
	1 Single documentation
	... The number of documentations corresponds to their entered number
11	<b>Options</b> See section options


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

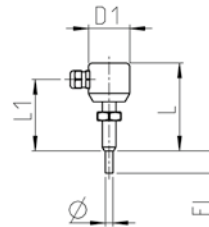
<b>Position</b>	1	2	3	4	5	6	7	8	9	10	11
<b>Code</b>	TTIA		-								

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
Certificates	

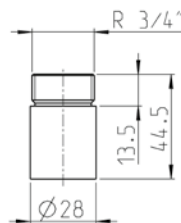


Length of the electrode EL [mm]	Dimension			
	Ø [mm]	L [mm]	L1 [mm]	D1 [mm]
30	10	110	80	55
150	10	110	80	55
500	10	110	80	55
1,000	10	110	80	55
1,800	10	110	80	55

### 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	<b>Type</b>
	TNS Level probe
2	<b>Process connection</b>
	WA Without electrode holder
	ZA Electrode holder N
	NA VARINLINE® process connection size N with electrode holder N
3	<b>Cable gland</b>
	M M16×1.5
	U 4-pin M12/M16×1.5 plug
4	<b>Level module</b>
	0 Without
	1 With
5	<b>Rod length in the product chamber</b>
	30 30 mm
	31...149 31 up to 149 mm
	150 150 mm
	151...499 151 up to 499 mm
	500 500 mm
	501...999 501 up to 999 mm
	1000 1,000 mm
	1001...1799 1,001 up to 1,799 mm
1800 1,800 mm	
6	<b>Certificates</b>
	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	<b>Accessories</b>
	/52 Adhesive ID tag

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

<b>Position</b>	1	2	3	4	5	6	7
<b>Code</b>	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.

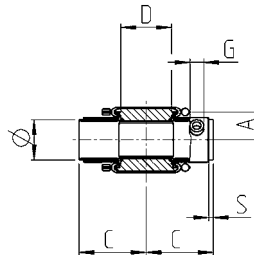


Process connection	Material		Dimension D [mm]	O-ring			Clamping connection complete  Article number
	1.4404	1.4435		Material			
				EPDM	FKM	HNBR	
B	221-144.14	221-144.15	31	930-270	930-163	930-637	606-001
F	221-144.01	221-144.12	50	930-309	930-168	930-632	221-507.02
N	221-144.02	221-144.13	68	930-144	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.

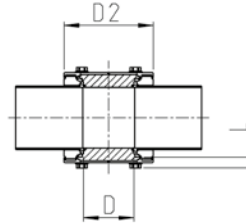


Nominal width	Process connection	Pipe Ø [mm]	Dimension				G	Weight [kg]	Article number
			D [mm]	C [mm]	A [mm]	S [mm]			
DN 25	F	29 × 1.50	50	90	25.0	5	¼"	0.7	221-631.01
DN 40	N	41 × 1.50	68	90	31.0	5	¼"	1.1	221-631.02
DN 50	N	53 × 1.50	68	90	37.0	5	¼"	1.1	221-631.03
DN 80	N	85 × 2.00	68	125	55.5	5	½"	2.3	221-631.08
DN 100	G	104 × 2.00	123	125	65.0	5	½"	4.4	221-631.06
OD 1"	F	25.4 × 1.65	50	90	43.0	5	¼"	0.6	221-631.09
OD 1 ½"	N	38.1 × 1.65	68	90	29.5	5	¼"	0.9	221-631.10
OD 2"	N	50.8 × 1.65	68	90	36.0	5	¼"	1.1	221-631.11
OD 4"	G	101.6 × 2.11	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\*.



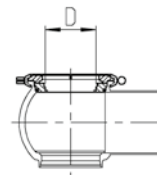
Process connection	Pipe	Dimension		Article number
	Ø [mm]	D [mm]	L [mm]	
F	102	50	14	222-156.02
N	120	68	14	222-156.01

\* 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					
			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 1/2"	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.



### Use and function

An O-ring is used for sealing the VARIVENT® flange connection, and is given a defined range of compression by a metal stop. The O-ring is also protected by the special geometry of the recess from being pulled out at high flow rates.

The VARIVENT® flange connection is available as a complete connection including O-rings, screws and nuts, as well as in components (grooved and plain flanges).

The range also contains VARIVENT® blind flanges that are also available as grooved and plain flanges. They are used for shutting off pipelines, e.g. when expansion of the system is only planned for a later time.



Complete connection including bolts and nuts




Grooved flange including connecting elements and O-ring

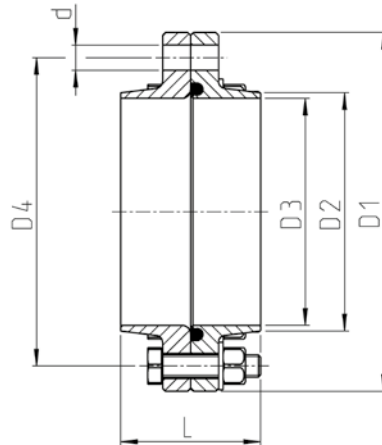


Plain Flange





Technical data	
Material	1.4404
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
Inspection	3.1/AD2000W2
Seal materials	EPDM (FDA), FKM (FDA), HNBR (FDA)
Certificates	

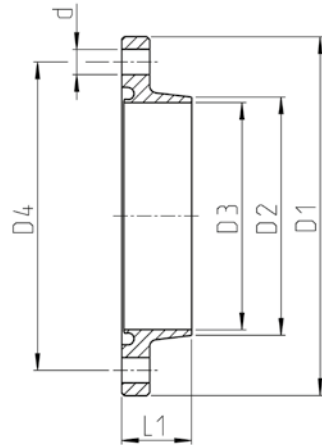


Nominal width	Dimension						O-ring	PS	Weight [kg]	Article number		
	D1 [mm]	D2 [mm]	D3 [mm]	D4 [mm]	d [mm]	L [mm]				Material		
							[mm]			EPDM	FKM	HNBR
DN 25	70	30.0	26.0	53	4 × Ø 9	50	25.0 × 5.0	16	0.6	752-828	752-838	752-848
DN 40	82	42.0	38.0	65	4 × Ø 9	50	36.0 × 5.0	16	0.7	752-830	752-840	752-849
DN 50	94	54.0	50.0	77	4 × Ø 9	50	47.0 × 5.0	16	0.9	752-831	752-841	752-850
DN 65	113	70.0	66.0	95	8 × Ø 9	50	62.0 × 5.0	16	1.2	752-832	752-842	752-851
DN 80	128	85.0	81.0	110	8 × Ø 9	50	75.0 × 5.0	10	1.5	752-833	752-843	752-852
DN 100	159	104.0	100.0	137	8 × Ø 11	50	95.0 × 5.0	10	2.3	752-834	752-844	752-853
DN 125	183	129.0	125.0	161	8 × Ø 11	50	115.0 × 5.0	10	2.7	752-835	752-845	752-854
DN 150	213	154.0	150.0	188	8 × Ø 14	60	134.2 × 5.7	10	4.8	752-836	752-846	752-878
OD 1"	66	25.5	22.0	49	4 × Ø 9	50	25 × 5.0	16	0.6	752-858	752-864	752-872
OD 1 ½"	79	38.5	35.0	62	4 × Ø 9	50	36 × 5.0	16	0.7	752-859	752-865	752-873
OD 2"	91	51.0	47.5	74	4 × Ø 9	50	47 × 5.0	16	0.9	752-860	752-866	752-874
OD 2 ½"	106	63.5	60.0	88	8 × Ø 9	50	62 × 5.0	16	1.0	752-861	752-867	752-875
OD 3"	119	76.5	73.0	101	8 × Ø 9	50	75 × 5.0	10	1.3	752-862	752-868	752-876
OD 4"	156	102.0	97.5	134	8 × Ø 11	50	95 × 5.0	10	2.3	752-863	752-869	752-877
OD 6"	211	152.4	146.5	186	8 × Ø 14	50	115 × 5.0	10	5.2	752-691	752-692	752-693
IPS 2"	101	60.5	57.0	84	8 × Ø 9	50	25 × 5.0	16	1.0	752-855	-	-
IPS 3"	132	89.0	85.0	114	8 × Ø 9	50	36 × 5.0	10	1.5	752-856	-	-
IPS 4"	169	114.0	110.0	147	8 × Ø 9	50	47 × 5.0	10	2.5	752-857	-	-
IPS 6"	227	168.0	162.0	202	8 × Ø 14	60	62 × 5.0	10	5.4	752-837	752-847	-





Technical data	
Material	1.4404
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
Inspection	3.1/AD2000W2
Seal materials	EPDM (FDA), FKM (FDA), HNBR (FDA)
Certificates	




Grooved flange

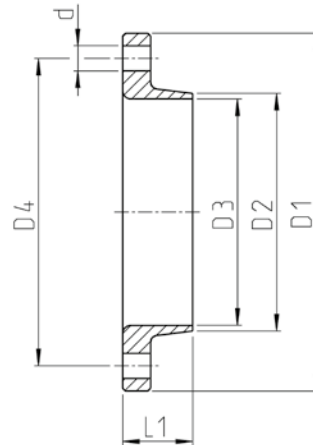


O-Ring

Grooved flange										O-ring			
Nominal width	Dimensions						PS	Weight [kg]	Article number	Dimensions	Article number		
	D1 [mm]	D2 [mm]	D3 [mm]	D4 [mm]	d [mm]	L1 [mm]					Material		
										EPDM	FKM	HNBR	
DN 25	70	30.0	26.0	53	4 × Ø 9	25	16	0.3	752-703	25.0 × 5.0	930-393	930-564	930-551
DN 40	82	42.0	38.0	65	4 × Ø 9	25	16	0.3	752-705	36.0 × 5.0	930-545	930-566	930-552
DN 50	94	54.0	50.0	77	4 × Ø 9	25	16	0.4	752-706	47.0 × 5.0	930-546	930-567	930-553
DN 65	113	70.0	66.0	95	8 × Ø 9	25	16	0.5	752-707	62.0 × 5.0	930-547	930-526	930-554
DN 80	128	85.0	81.0	110	8 × Ø 9	25	10	0.6	752-708	75.0 × 5.0	930-450	930-527	930-555
DN 100	159	104.0	100.0	137	8 × Ø 11	25	10	1.0	752-709	92.0 × 5.0	930-549	930-568	930-556
DN 125	183	129.0	125.0	161	8 × Ø 11	25	10	1.2	752-710	115.0 × 5.0	930-550	930-569	930-557
DN 150	213	154.0	150.0	188	8 × Ø 14	30	10	2.0	752-711	134.2 × 5.7	930-574	930-575	930-872
OD 1"	66	25.5	22.0	49	4 × Ø 9	25	16	0.3	752-718	22.0 × 5.0	930-376	930-593	930-851
OD 1 ½"	79	38.5	35.0	62	4 × Ø 9	25	16	0.3	752-719	33.5 × 5.0	930-497	930-570	930-852
OD 2"	91	51.0	47.5	74	4 × Ø 9	25	16	0.4	752-720	45.0 × 5.0	930-559	930-571	930-853
OD 2 ½"	106	63.5	60.0	88	8 × Ø 9	25	16	0.5	752-721	56.0 × 5.0	930-560	930-572	930-854
OD 3"	119	76.5	73.0	101	8 × Ø 9	25	10	0.6	752-722	68.0 × 5.0	930-319	930-666	930-652
OD 4"	156	102.0	97.5	134	8 × Ø 11	25	10	1.0	752-723	90.0 × 5.0	930-561	930-573	930-855
OD 6"	211	152.4	146.5	186	8 × Ø 14	30	10	2.0	752-694	134.2 × 5.7	930-574	930-575	930-872
IPS 2"	101	60.5	57.0	84	8 × Ø 9	25	16	0.4	752-715	53.0 × 5.0	930-562	-	-
IPS 3"	132	89.0	85.0	114	8 × Ø 9	25	10	0.6	752-716	78.0 × 5.0	930-563	-	-
IPS 4"	169	114.0	110.0	147	8 × Ø 9	25	10	1.0	752-717	102.0 × 5.0	930-154	930-667	930-654
IPS 6"	227	168.0	162.0	202	8 × Ø 14	30	10	2.3	752-712	149.0 × 5.7	930-403	930-404	-



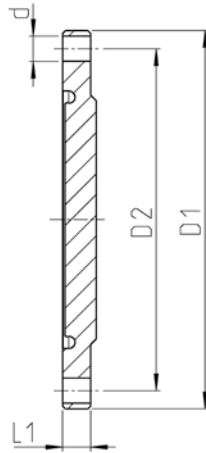
Technical data	
Material	1.4404
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
Inspection	3.1/AD2000W2
Certificates	



Flange									
Nominal width	Dimensions						PS	Weight [kg]	Article number
	D1 [mm]	D2 [mm]	D3 [mm]	D4 [mm]	d [mm]	L1 [mm]			
DN 25	70	30.0	26.0	53	4 × Ø 9	25	16	0.3	752-724
DN 40	82	42.0	38.0	65	4 × Ø 9	25	16	0.3	752-726
DN 50	94	54.0	50.0	77	4 × Ø 9	25	16	0.4	752-727
DN 65	113	70.0	66.0	95	8 × Ø 9	25	16	0.6	752-728
DN 80	128	85.0	81.0	110	8 × Ø 9	25	10	0.7	752-729
DN 100	159	104.0	100.0	137	8 × Ø 11	25	10	1.1	752-730
DN 125	183	129.0	125.0	161	8 × Ø 11	25	10	1.2	752-731
DN 150	213	154.0	150.0	188	8 × Ø 14	30	10	2.1	752-733
OD 1"	66	25.5	22.0	49	4 × Ø 9	25	16	0.2	752-739
OD 1 ½"	79	38.5	35.0	62	4 × Ø 9	25	16	0.3	752-740
OD 2"	91	51.0	47.5	74	4 × Ø 9	25	16	0.4	752-741
OD 2 ½"	106	63.5	60.0	88	8 × Ø 9	25	16	0.5	752-742
OD 3"	119	76.5	73.0	101	8 × Ø 9	25	10	0.6	752-743
OD 4"	156	102.0	97.5	134	8 × Ø 11	25	10	1.0	752-744
OD 6"	211	152.4	146.5	186	8 × Ø 14	30	10	2.4	752-695
IPS 2"	101	60.5	57.0	84	8 × Ø 9	25	16	0.4	752-736
IPS 3"	132	89.0	85.0	114	8 × Ø 9	25	10	0.7	752-737
IPS 4"	169	114.0	110.0	147	8 × Ø 9	25	10	1.1	752-738
IPS 6"	227	168.0	162.0	202	8 × Ø 14	30	10	2.4	752-734



Technical data	
Material	1.4404
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
Inspection	3.1/AD2000W2
Seal materials	EPDM (FDA), FKM (FDA), HNBR (FDA)
Certificates	




Blind grooved flange

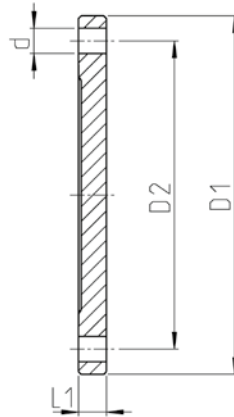


O-Ring

Blind grooved flange								O-ring				
Nominal width	Dimensions				PS	Weight [kg]	Article number	Dimensions	Article number			
	D1 [mm]	D2 [mm]	d [mm]	L1 [mm]					D1 [mm]	Material		
								EPDM	FKM	HNBR		
DN 25	70	53	4 × Ø 9	10	16	0.3	752-763	25.0 × 5.0	930-393	930-564	930-551	
DN 40	82	65	4 × Ø 9	10	16	0.4	752-766	36.0 × 5.0	930-545	930-566	930-552	
DN 50	94	77	4 × Ø 9	10	16	0.5	752-792	47.0 × 5.0	930-546	930-567	930-553	
DN 65	113	95	8 × Ø 9	10	16	0.7	752-790	62.0 × 5.0	930-547	930-526	930-554	
DN 80	128	110	8 × Ø 9	10	10	0.9	752-770	75.0 × 5.0	930-450	930-527	930-555	
DN 100	159	137	8 × Ø 11	10	10	1.4	752-772	92.0 × 5.0	930-549	930-568	930-556	
DN 125	183	161	8 × Ø 11	10	10	2.0	752-773	115.0 × 5.0	930-550	930-569	930-557	
DN 150	213	188	8 × Ø 14	15	10	4.1	752-638	134.2 × 5.7	930-574	930-575	930-872	
OD 1"	66	49	4 × Ø 9	25	16	0.2	752-762	22.0 × 5.0	930-376	930-593	930-851	
OD 1 ½"	79	62	4 × Ø 9	25	16	0.4	752-765	33.5 × 5.0	930-497	930-570	930-852	
OD 2"	91	74	4 × Ø 9	25	16	0.5	752-767	45.0 × 5.0	930-559	930-571	930-853	
OD 2 ½"	106	88	8 × Ø 9	25	16	0.6	752-768	56.0 × 5.0	930-560	930-572	930-854	
OD 3"	119	101	8 × Ø 9	25	10	0.8	752-769	68.0 × 5.0	930-319	930-666	930-652	
OD 4"	156	134	8 × Ø 11	25	10	1.5	752-771	90.0 × 5.0	930-561	930-573	930-855	
OD 6"	211	186	8 × Ø 14	30	10	4.2	752-070	134.2 × 5.7	930-574	930-575	930-872	
IPS 6"	227	202	8 × Ø 14	30	10	4.9	752-004	149.0 × 5.7	930-403	930-404	–	



Technical data	
Material	1.4404
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
Inspection	3.1/AD2000W2
Certificates	



Blind flange							
Nominal width	Dimensions				PS	Weight [kg]	Article number
	D1 [mm]	D2 [mm]	d [mm]	L1 [mm]			
DN 25	70	53	4 × Ø 9	10	16	0.3	752-774
DN 40	82	65	4 × Ø 9	10	16	0.4	752-777
DN 50	94	77	4 × Ø 9	10	16	0.5	752-779
DN 65	113	95	8 × Ø 9	10	16	0.7	752-782
DN 80	128	110	8 × Ø 9	10	10	0.9	752-784
DN 100	159	137	8 × Ø 11	10	10	1.4	752-787
DN 125	183	161	8 × Ø 11	10	10	2.0	752-788
DN 150	213	188	8 × Ø 14	15	10	4.1	752-791
OD 1"	66	49	4 × Ø 9	10	16	0.2	752-825
OD 1 ½"	79	62	4 × Ø 9	10	16	0.4	752-776
OD 2"	91	74	4 × Ø 9	10	16	0.5	752-778
OD 2 ½"	106	88	8 × Ø 9	10	16	0.6	752-781
OD 3"	119	101	8 × Ø 9	10	10	0.8	752-783
OD 4"	156	134	8 × Ø 11	10	10	1.5	752-786
OD 6"	211	186	8 × Ø 14	15	10	4.2	752-071
IPS 2"	101	84	8 × Ø 9	10	16	0.6	752-780
IPS 3"	132	114	8 × Ø 9	10	10	1.0	752-785
IPS 4"	169	147	8 × Ø 9	10	10	1.6	752-789
IPS 6"	227	202	8 × Ø 14	15	10	4.4	752-212



### Function method of the expansion compensator

The innovative VARICOMP® expansion compensator compensates for expansions and tensions that result from temperature differences in the pipeline system. Its special design principles allow for use in aseptic processes as well.

A decisive benefit of the VARICOMP® expansion compensator is its dead-zone free design with drain characteristics. This design meets the prerequisites for best cleaning in CIP/SIP-processes.



### Special features

Suitable for hygienic and aseptic applications

EHEDG-certified

Design with no dead zones

CIP/SIP-able

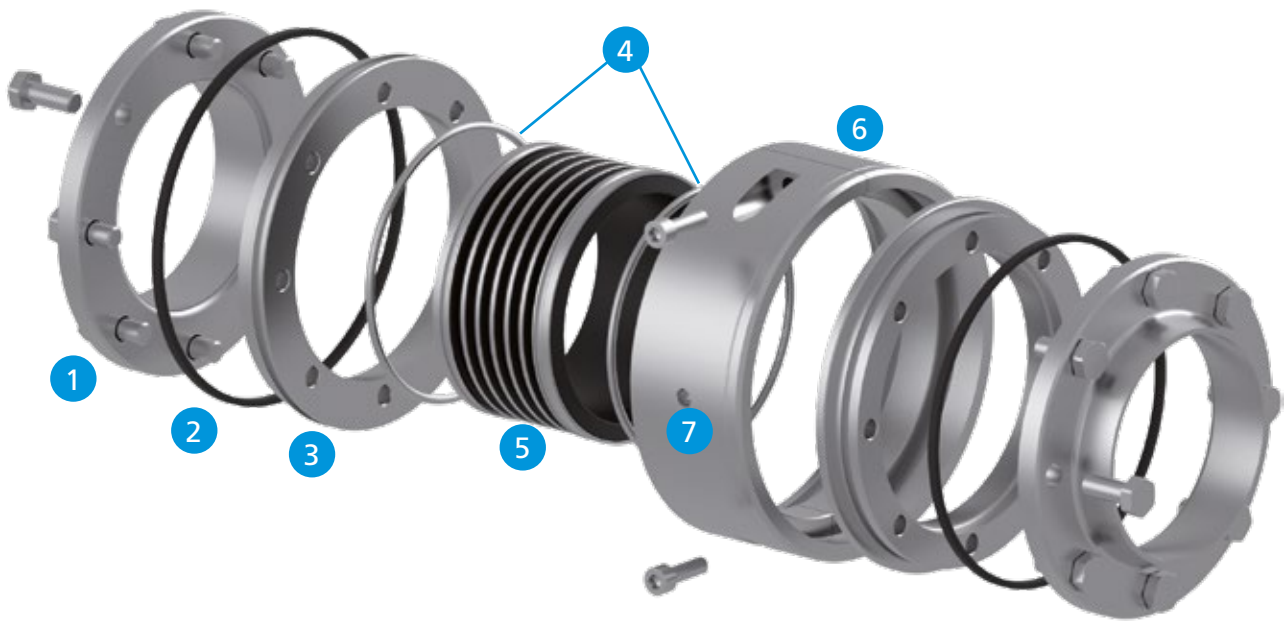
Short, compact design

Compensation element available in EPDM and FKM

Compensation distances (tension/compression) limited by metallic stop

Maximum compensation distance 8 mm

Compensation element with integral vulcanized support rings for high pressure loads



1 VARIVENT® flange

2 O-Ring

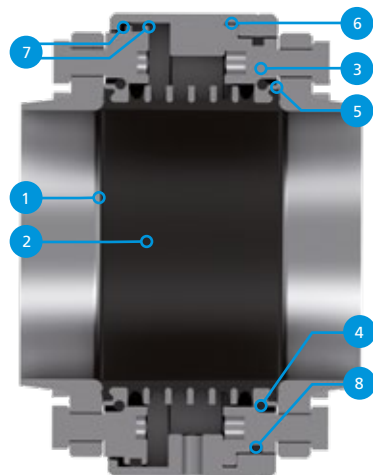
3 Internal flange

4 Snap ring

5 Compensation element

6 Half ring

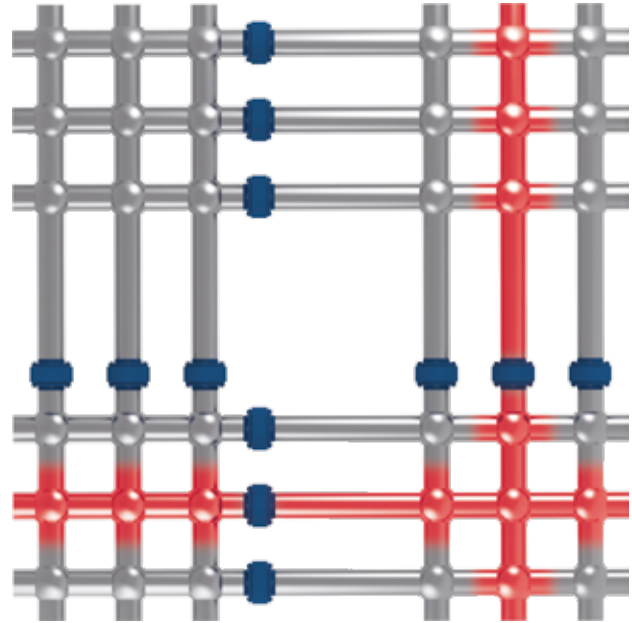
7 Leakage display



Technical features	
1	Gap-free sealing
2	Pipe-flush, even passage
3	Flange used to fix the compensation element
4	Snap ring for the transmission of force (sealing)
5	Metallic stop (defined sealing pressure, no excessive strain on the compensation element)
6	Fixing of the compensation element at the external ring
7	Defined compensation distance due to metallic stop (tensile/compressive stress) at the external ring, no excessive strain on the compensation element
8	Additional sealing to the outside provided by O-rings

### Application ranges

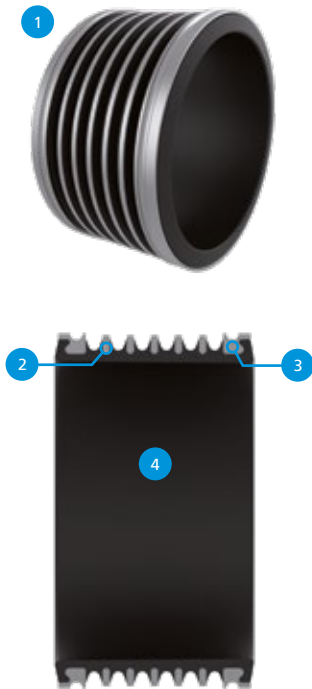
VARICOMP® expansion compensators are used especially in valve blocks and matrix piped systems to compensate for thermal stress in pipeline systems resulting from thermal expansion. They are designed for hygienic and aseptic applications in the dairy, beverage and food industries, as well as in the pharmaceutical, fine chemical, biotechnological and cosmetic industries. The expansion compensators can be used as an alternative for  $\Omega$ -bends.



Valve block with VARICOMP® compensators

### The compensation element

The elastomer compensation element takes up tensions as the core piece of the compensator and compensates for them.



Technical features	
1	Sprayed compensation element of elastomer (EPDM and FKM available)
2	Vulcanized-in support rings of stainless steel for support at pressure load (excess pressure and negative pressure)
3	Vulcanized-in carrying rings for fastening the compensation element
4	Smooth inner faces

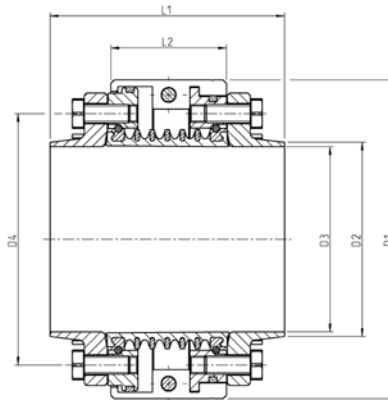




Technical data of the standard version

Material in contact with the product	1.4404
Material not in contact with the product	1.4301
Seal material in contact with the product	EPDM (FDA), FKM (FDA)
Max. product pressure	16 bar (232 psi) from DN 80/OD 3" 10 bar (145 psi)
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
Connection fittings	VARIVENT® flange

Certificates



Nominal width	Dimension						Article number	
	L1 [mm]	L2 [mm]	D1 [mm]	D4 [mm]	D3 [mm]	D2 [mm]	Material	
							EPDM	FKM
DN 50	102.6	50.6	109.5	77.0	50.0	54.0	228-000126	228-000127
DN 65	102.6	50.6	124.5	95.0	66.0	70.0	228-000091	228-000136
DN 80	102.6	50.6	139.5	110.0	81.0	85.0	228-000132	228-000133
DN 100	102.6	52.6	171.3	137.0	100.0	105.0	228-000092	228-000137
DN 125	102.6	52.6	203.3	161.0	125.0	129.0	228-000115	228-000143
OD 2"	102.6	50.6	109.5	77.0	47.5	51.0	228-000128	228-000129
OD 2 1/2"	102.6	50.6	124.5	88.0	60.0	63.5	228-000134	228-000135
OD 3"	102.6	50.6	124.5	101.0	73.0	76.5	228-000130	228-000131
OD 4"	102.6	50.6	171.3	137.0	97.5	102.0	228-000138	228-000139
IPS 3"	102.6	50.6	147.5	114.0	84.7	88.9	228-000140	-
IPS 4"	102.6	50.6	186.3	147.0	110.1	114.3	228-000141	-
IPS 6"	112.6	50.6	246.3	202.0	162.7	168.3	228-000142	-

### VARIVENT® control valves

VARIVENT® control valves are used for control of applications where constant parameters are required. With gases, vapors or liquids, the valve series is characterized by reliable control of the process.

With many configuration options available, these control valves offer the best economical solutions for individual process requirements. Based on the proven VARIVENT® sealing and housing technology, maximum hygiene is ensured.



### VARIVENT® sampling valves

VARIVENT® sampling valves are designed for many different tasks. Both manual sampling of very small amounts and the incorporation into fully automatic, mix-proof sampling and dosage systems are possible. Thanks to the VARIVENT® modular principle, the sampling valves can be easily integrated into process lines and vessels, while fully complying with hygiene requirements.



### VARIVENT® overflow valves

Critical pressures in pipeline system can be secured cost-effectively by overflow valves. They are mostly applied in combination with displacement pumps.



### VARIVENT® constant pressure valves

A compact design and high function characterize the VARIVENT® constant pressure valve. It is designed for compensating for process-related pressure fluctuations and to keep production-relevant pressures at a constant level at all times.



### VARIVENT® vacuum valves

VARIVENT® vacuum valves offer reliable protection from negative pressures. Small differential pressures and a fail-safe construction mark this valve series. The upside down design of the valve disc prevents sucking in of dirt particles into the vessel and thus into the product.



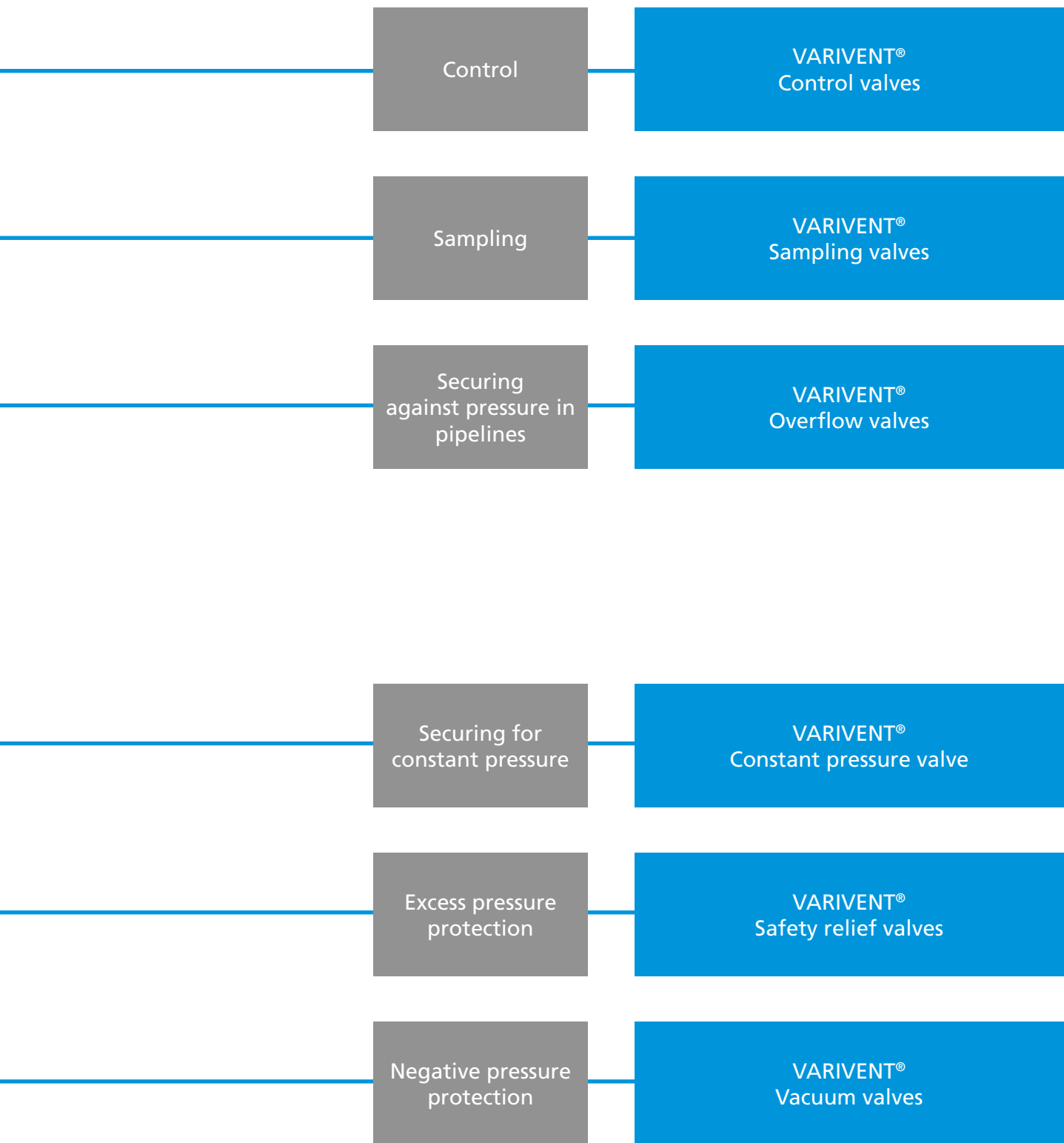
### VARIVENT® safety relief valves

VARIVENT® safety relief valves work purely mechanically and offer reliable protection against critical process pressures. The often proven valve contributes to protection from pressure-bearing vessels in various applications. The hygienic design ensures full cleaning capability.





**VARIVENT® valves  
with special function**





## VARIVENT® control valves

To ensure an economical system productivity, it is necessary to keep the operation, maintenance and servicing costs at a minimum. At the same time, increasing cost pressure leads to higher expectations toward technology, quality and service and more comprehensive and stringent statutory provisions.

The VARIVENT® system's modular design makes it possible to individually adjust control valves to specific process requirements. This results in economic efficiency for the system operator, optimized stock keeping, and cost-effective spare parts production due to the low diversity of parts.

The integration of the control valves into the process control technology has a decisive impact on the quality of the control and the product. Preventive maintenance of the control valves ensures the system's high availability.

### General benefits

Proven sealing geometry
Dead zone-free VARIVENT® housing
Maximum cleaning efficiency
Low spare part stocks
Positioner for a large variety of requirements

## Valve function

Control valves serve as actuators in control loops. In this process, the particular control valve works as a throttle device that sets the desired flow rate by changing the pressure loss in a pipeline.

## Technical design

The linear or equal percentage control cone and the corresponding valve seat are located in the completely cleanable, dead zone-free VARIVENT® housing. The exchangeable seat ring with an associated control cone allows the selection of several Kvs values per nominal width; subsequent adjustments to changes in the operating conditions are possible at any time. All control cones are available in either a soft- or a metallic-sealing version.

The open lantern allows easy detection of potential leakages due to a defective stem seal.

Detachable clamp connections between the individual modules enable the control valve's quick assembly and maintenance. The valves are available in both effective directions, spring-to-close (NC) and spring-to-open (NO).

Positioners determine the valve's stroke with a high level of accuracy; a variety of designs allows for ideal integration into the process control.



Application examples

The need for strict adherence to standards in food production requires that control valves be designed to comply with the food and beverage industry's maximum hygiene demands.

In the manufacture of drugs by the pharmaceutical industry and in chemical process systems or in the technical use of enzymes, cells and microorganisms, any contamination would endanger the process results as well. Therefore, the application of dead zone-free control valves is required, which can be cleaned efficiently and without leaving residue.

VARIVENT® valves enable germ-free processes. The control valves meet high hygiene requirements and allow the cleaning of pipes according to the efficient CIP or SIP procedure.

Control valves are used for pressure regulation, flow control, or for the mixing of liquids. Typical applications include: Temperature control in heat exchangers, tank pressure control, wort aeration, or the dosing of a variety of different media. A number of different control valves is available that are adjusted to various control tasks.

Special features
Modular design for flexible adaptation to application conditions
Linear and equal percentage control cones
Soft- or metallic-sealing valve discs
Low maintenance and assembly due to detachable clamp connections
Positioner for a large variety of requirements

4.1



Control valve with a soft-sealing valve disc



VARIVENT® control valves

The VARIVENT® system's modular design offers numerous optional implementations for the valve's optimal adaptation to the process. The portfolio comprises two different valve types. Type S has a diaphragm actuator and a positioner, whereas the type P control valve is equipped with a VARIVENT® air/spring actuator and a T.VIS® P-15 positioner.



VARIVENT® control valve type S



VARIVENT® control valve type P

Housing combinations

VARIVENT® control valves are available with different housing combinations.

Valve seat version

The use of clamped housing connections during the valve's installation achieves a high degree of flexibility. The valve seat is installed between the housings by means of a clamp connection. This makes it possible to adjust the valve's port orientation to the particular orientation of the pipeline system.



Housing combination with two housings



Housing combination with one housing and housing connection

The interchangeability of the seat ring and the associated valve disc enables the subsequent adjustment of the required Kvs value.

The following table shows an overview of all available Kvs values per nominal width:

Nominal width	Kvs values																						
	0.1*	0.16*	0.25*	0.4*	0.63*	1*	1.6	2.5	4	6.3	10	16	25	35	40	60	80	100	160	200	260	360	
DN 25	•	•	•	•	•	•	•	•	•	•	•	•	•										
DN 40										•	•	•	•										
DN 50											•	•	•	•	•								
DN 65												•	•	•	•	•							
DN 80													•	•	•	•	•						
DN 100														•	•	•	•	•	•				
DN 125																•	•	•	•	•	•	•	
DN 150																			•	•	•	•	•
OD 1"	•	•	•	•	•	•	•	•	•	•	•	•	•										
OD 1 1/2"										•	•	•	•										
OD 2"											•	•	•	•	•								
OD 2 1/2"												•	•	•	•	•							
OD 3"													•	•	•	•	•						
OD 4"														•	•	•	•	•	•				
OD 6"																				•	•	•	•
IPS 2"												•	•	•	•	•							
IPS 3"													•	•	•	•	•						
IPS 4"															•	•	•	•					
IPS 6"																				•	•	•	•

\* For gas applications



## Control characteristic

The characteristic of a control valve denotes the Kv value's dependence on the stroke, as specified by the control cone's shape. Here, linear or equal percentage control cones are available.

In a valve with a linear characteristic, the Kv value changes in a linear fashion in relation to the stroke, while the equal percentage characteristic leads to a percentage change of the free flow area identical to the change in stroke.

A control valve with a linear characteristic is used for controls in which the valve causes more than 30 % of the overall pressure loss in the line system, e.g., in a level control. For all other applications the use of an equal percentage control cone is recommended. This is the case for approx. 90 % of all applications.

A Kvs value is the flow in m<sup>3</sup>/h of water at a temperature of 5–30°C that flows through the fully opened valve at a pressure loss of 1 bar.

It is customary to select a Kvs value for the valve that is approx. 30 % higher than the maximum Kv value calculated for the particular operating conditions. Thus, a reserve is generated that offsets fluctuations or changes of the design data to a certain extent.

The control valves with a 3-stage seat have a linear control characteristic. The metallic-sealing valves are used to control large pressure differentials in order to counter-act cavitation.

The three-way control valves can be provided as flow mixers or flow dividers. They are only available with linear control cones in the metallic-sealing design.



Control valve with linear control cone



Control valve with equal-percentage control cone

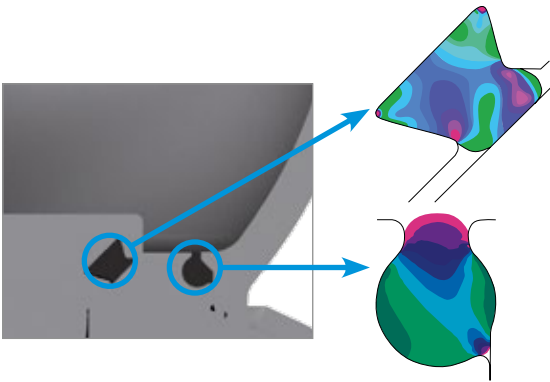
## Recommended flow direction

In order to fulfill a reliable modulating function, and to prevent water hammers when closing the valve during the product flow, it is recommended to direct the flow through VARIVENT® control valves counter to the control cone's fail-safe position.

Sealing acc. to the VARIVENT® principle

The hygienic control valves are characterized by a special seal technology. A metallic stop causes a defined seal deformation. This achieves a longer service life in the process system - which means shorter downtimes and a continuous production.

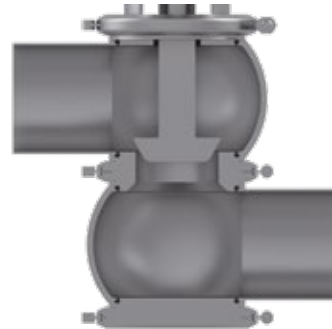
The special groove form in the valve disc ensures a secure hold of the seal at all times up to a pressure differential of 10 bar during the switching. In order to minimize the danger of cavitation, the pressure loss between the upper and the lower housing should be kept as low as possible. The sealing geometry was optimized by means of FEM calculations.



Representation of the stress load of the housing O-ring and the V-ring

Seals	
High operating time	
Vacuum-proof	
Selection of FDA-compliant sealing materials	
• EPDM	
• FKM	
• HNBR	
• FFKM	

If the applied control valves do not need to assume an additional shut-off function, or if a higher leakage rate of the seat seal is tolerable, it is also possible to use control valves with a metallic seat design. These valves offer the advantage of even lower maintenance requirements.

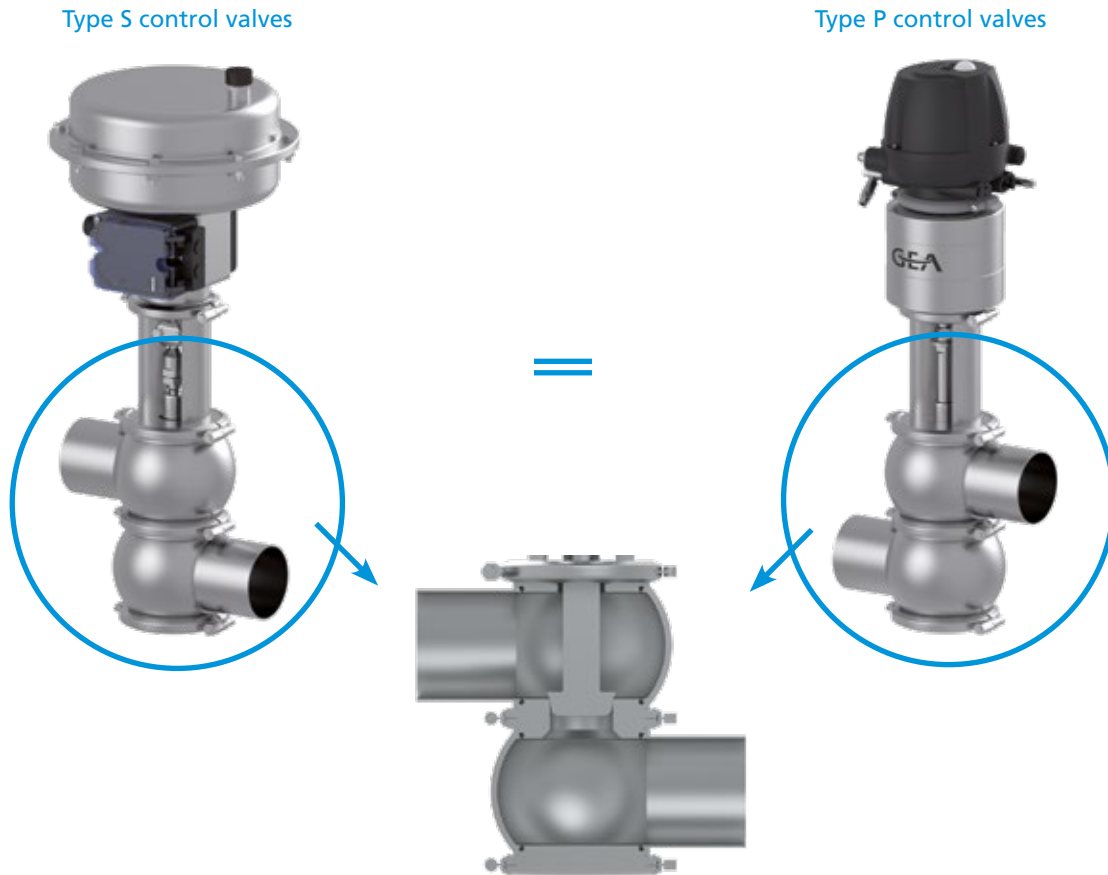


Metal seat design

Distinguishing features of VARIVENT® control valves

VARIVENT® control valves are available in two designs. While type S uses a diaphragm actuator in combination with a positioner, type P is equipped with a VARIVENT® air/spring actuator and the TVIS® P-15 positioner. Both variants differ exclusively in the actuator's design.

All components are based on the VARIVENT® modular system principle. This provides the option to convert either the type S or the type P control valve to the particular other valve type at a later time.

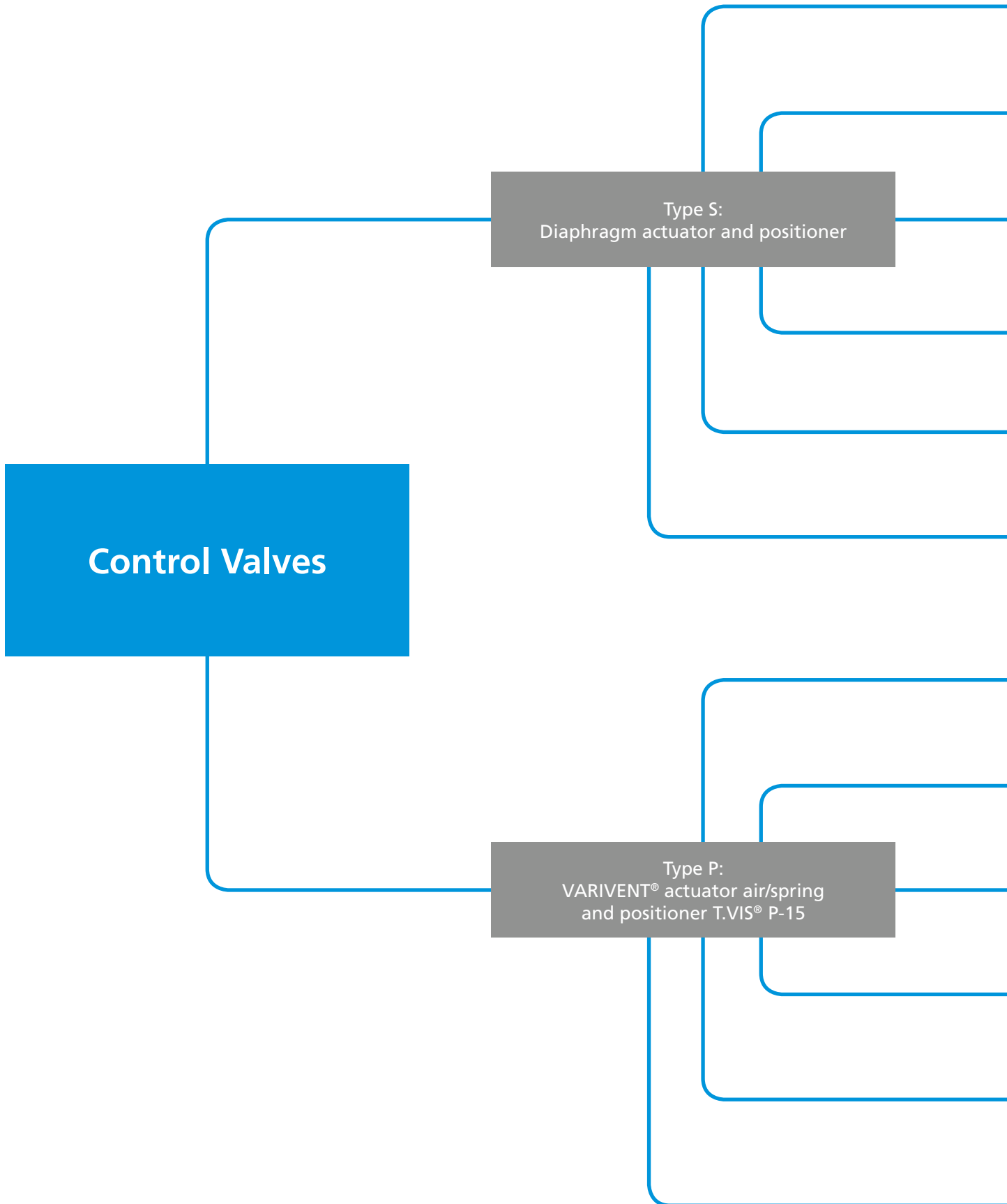


Both the components in contact with the product as well as the strokes are identical in type S and type P control valves

The type S control valve was designed for fast, high-precision process controls. Due to a different operating principle, the type P control valve works at a slightly slower speed. It is not possible to offer a delimitation according to simple or difficult control tasks or applications, since the control quality must always be considered individually in connection with the superordinate process control.

However, both series can be differentiated based on their options. Process-related requirements toward the valve can have a decisive effect on the selection.




	Type S	Type P
Actuator type	Diaphragm actuator	VARIVENT® air/spring actuator
Positioner	Samson positioner	T.VIS® P-15
Manometer for air pressure	✓	-
Emergency handwheel	✓	-
Protection class	IP 66 NEMA 4X	IP 66 / IP 67 / IP 69K
ATEX approvals	✓	-
Pneumatic command variable	✓	-
BUS / HART communication	✓	-
Position transmitter 4... 20 mA	Optional	Standard
Troubleshooting functions	✓	-
Split range	✓	-



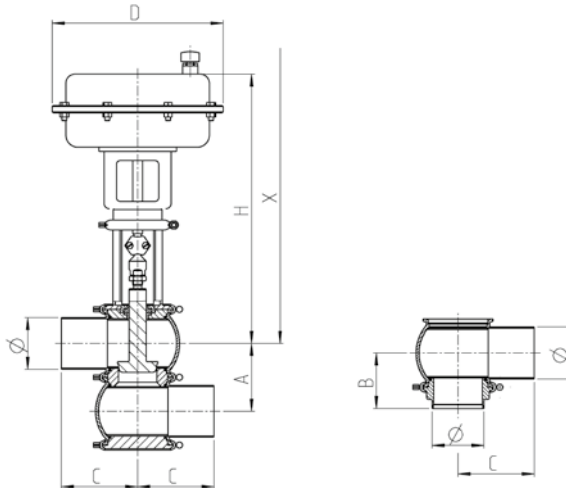
Equal-percentage characteristic curve	VARIVENT® control valve type S_F
Linear characteristic curve	VARIVENT® control valve type S_J
3-stage seat, reduction of high differential pressures	VARIVENT® control valve type S_K
Divert valve, product-merging	VARIVENT® control valve type S_W
Divert valve, product distribution	VARIVENT® Control valve type S_X
Analog or digital SAMSON positioner	
Equal-percentage characteristic curve	VARIVENT® Control valve type P_F
Linear characteristic curve	VARIVENT® Control valve type P_J
3-stage seat, reduction of high differential pressures	VARIVENT® Control valve type P_K
Divert valve, product-merging	VARIVENT® Control valve type P_W
Divert valve, product distribution	VARIVENT® Control valve type P_X
Positioner T.VIS® P-15	

4.1



Technical data of the standard version	
Control characteristics	Equal-percentage
Recommended flow direction	Against closing direction
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Ambient temperature	0 to 45 °C
Air supply pressure	4–7 bar (58–101.5 PSI)
Product pressure	DN 25–65, OD 1"–2 ½", IPS 2" 0–16 bar* (0–232 psi)
	DN 80–150, OD 3"–6", IPS 3"–6" 0–10 bar (0–145 psi)
Surface in contact with the product	DN, OD $R_a \leq 0.8 \mu\text{m}$ IPS $R_a \leq 1.2 \mu\text{m}$
External housing surface	Matte blasted
Positioner	I/P positioner; type 3725
Actuator type	Diaphragm actuator air/spring
Connection fittings	Welding end
Identification	Adhesive ID tag
Valve seat version	Clamped seat ring
Certificates	  

\* We recommend the metallic seat design at a differential pressure of more than 10 bar.



	Pipe		Housing			Diaphragm surface 175 cm <sup>2</sup>		Diaphragm surface 350 cm <sup>2</sup>		Diaphragm surface 750 cm <sup>2</sup>		Valve X [mm]
	Nominal width	Ø [mm]	A [mm]	B [mm]	C [mm]	D [mm]	H [mm]	D [mm]	H [mm]	D [mm]	H [mm]	
DN 25	29.0 × 1.50	50.0	58.0	90.0	215	370	–	–	–	–	393	
DN 40	41.0 × 1.50	62.0	64.0	90.0	215	376	280	380	–	–	415	
DN 50	53.0 × 1.50	74.0	70.0	90.0	215	382	280	386	–	–	433	
DN 65	70.0 × 2.00	96.0	83.0	125.0	215	393	280	397	–	–	466	
DN 80	85.0 × 2.00	111.0	90.5	125.0	215	401	280	405	–	–	489	
DN 100	104.0 × 2.00	130.0	100.0	125.0	–	–	280	414	390	471	574	
DN 125	129.0 × 2.00	155.0	112.5	150.0	–	–	–	–	390	484	612	
DN 150	154.0 × 2.00	180.0	125.0	150.0	–	–	–	–	390	496	718	
OD 1"	25.4 × 1.65	46.0	56.0	90.0	215	368	–	–	–	–	391	
OD 1 ½"	38.1 × 1.65	59.0	62.5	90.0	215	375	280	379	–	–	414	
OD 2"	50.8 × 1.65	71.5	69.0	90.0	215	381	280	385	–	–	432	
OD 2 ½"	63.5 × 1.65	90.0	80.0	125.0	215	390	280	394	–	–	464	
OD 3"	76.2 × 1.65	103.0	86.5	125.0	–	397	280	401	–	–	541	
OD 4"	101.6 × 2.11	127.5	99.0	125.0	–	–	280	413	390	469	573	
OD 6"	152.4 × 2.77	177.0	123.0	150.0	–	–	–	–	390	495	714	
IPS 2"*	60.3 × 2.00	81.0	73.5	114.3	215	386	280	390	–	–	437	
IPS 3"*	88.9 × 2.30	115.0	92.5	152.5	215	403	280	407	–	–	491	
IPS 4"*	114.3 × 2.30	140.0	105.0	152.5	–	–	280	419	390	476	579	
IPS 6"*	168.2 × 2.77	192.0	131.0	152.5	–	–	–	–	390	502	724	

Position	Description of the order code					
1	<b>Valve type</b>					
	S VARIVENT® control valve					
2	<b>Housing combinations</b>					
3	<b>Supplement to the valve type</b>					
	F Equal-percentage characteristic curve					
4/5	<b>Nominal width (upper housing/lower housing)</b>					
	DN 25	OD 1"				
	DN 40	OD 1 ½"				
	DN 50	OD 2"			IPS 2"	
	DN 65	OD 2 ½"				
	DN 80	OD 3"			IPS 3"	
	DN 100	OD 4"			IPS 4"	
	DN 125					
	DN 150	OD 6"			IPS 6"	
6	<b>Non-actuated position</b>					
	Z Spring-to-close (NC)					
	A Spring-to-open (NO)					
7	<b>Control cone seal</b>					
	M Metallic, no V-ring					
	W Soft-sealing, with V-ring					
8	<b>Kvs value</b>					
	0.1	DN 25, OD 1"	4	DN 25, OD 1"	80	DN 80–100, OD 3"–4", IPS 3"–4"
	0.16	DN 25, OD 1"	6.3	DN 25–40, OD 1"–1 ½"	100	DN 100–125, OD 4", IPS 4"
	0.25	DN 25, OD 1"	10	DN 25–50, OD 1"–2", IPS 2"	160	DN 100–125, OD 4", IPS 4"
	0.4	DN 25, OD 1"	16	DN 40–50, OD 1 ½"–2", IPS 2"	200	DN 125–150, OD 6", IPS 6"
	0.63	DN 25, OD 1"	25	DN 40–65, OD 1 ½"–2 ½", IPS 2"	260	DN 125–150, OD 6", IPS 6"
	1	DN 25, OD 1"	35	DN 50–80, OD 2"–3", IPS 2"–3"	360*	DN 150, OD 6", IPS 6"
	1.6	DN 25, OD 1"	40	DN 50–80, OD 2"–3", IPS 2"–3"		
	2.5	DN 25, OD 1"	60	DN 65–100, OD 2 ½"–4", IPS 2"–4"		
9	<b>Actuator</b>					
	175 Diaphragm surface 175 cm²					
	350 Diaphragm surface 350 cm²					
	750 Diaphragm surface 750 cm²					
10	<b>Actuation pressure</b>					
	1	0.4–2.0 bar	4	1.65–2.65 bar	7	2.3–4.2 bar
	2	0.8–2.4 bar	5	2.1–3.3 bar		
	3	1.0–3.0 bar	6	2.2–3.4 bar		
11	<b>Actuator material</b>					
	S Stainless Steel		P Steel sheet, powder-coated			
12	<b>Seal material in contact with the product</b>					
	1	EPDM (FDA)	2	FKM (FDA)	3	HNBR (FDA; to DN 100, OD 4")
13	<b>Surface quality of the housing</b>					
	1 Inside R <sub>a</sub> ≤ 1.2 µm, outside matte blasted (IPS)					
	2 Inside R <sub>a</sub> ≤ 0.8 µm, outside matte blasted (DN, OD)					
14	<b>Connection fittings</b>					
	N Welding end					
15	<b>Options (See acc. to valve types)</b>					
	+					
16	<b>Positioner</b>					
	0----- Order code for positioners, see at the end of the Section Control Valves index					

\* Maximum product pressure is 7.5 bar.




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

<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16
<b>Code</b>	S		F	/									N		0-----

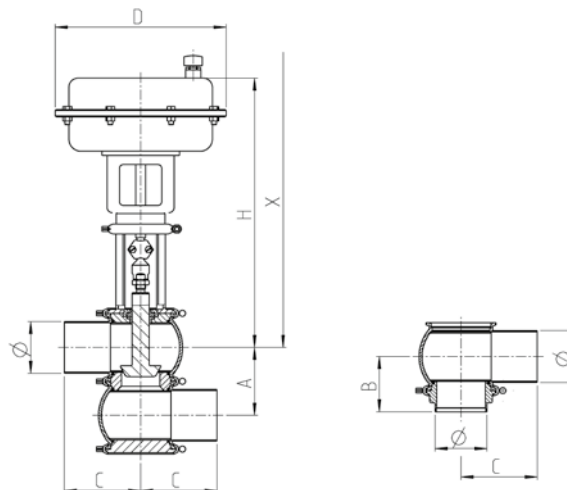
For order codes differing from the standard version, please refer to section 7 (options).





Technical data of the standard version	
Control characteristics	Linear
Recommended flow direction	Against closing direction
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Ambient temperature	0 to 45 °C
Air supply pressure	4–7 bar (58–101.5 PSI)
Product pressure	DN 25–65, OD 1"–2 ½", IPS 2" 0–16 bar* (0–232 psi)
	DN 80–150, OD 3"–6", IPS 3"–6" 0–10 bar (0–145 psi)
Surface in contact with the product	DN, OD $R_a \leq 0.8 \mu\text{m}$ IPS $R_a \leq 1.2 \mu\text{m}$
External housing surface	Matte blasted
Positioner	I/P positioner; type 3725
Actuator type	Diaphragm actuator air/spring
Connection fittings	Welding end
Identification	Adhesive ID tag
Valve seat version	Clamped seat ring
Certificates	  

\* We recommend the metallic seat design at a differential pressure of more than 10 bar.



	Pipe		Housing			Diaphragm surface 175 cm <sup>2</sup>		Diaphragm surface 350 cm <sup>2</sup>		Diaphragm surface 750 cm <sup>2</sup>		Valve X [mm]
	Nominal width	Ø [mm]	A [mm]	B [mm]	C [mm]	D [mm]	H [mm]	D [mm]	H [mm]	D [mm]	H [mm]	
DN 25	29.0 × 1.50	50.0	58.0	90.0	215	370	–	–	–	–	393	
DN 40	41.0 × 1.50	62.0	64.0	90.0	215	376	280	380	–	–	415	
DN 50	53.0 × 1.50	74.0	70.0	90.0	215	382	280	386	–	–	433	
DN 65	70.0 × 2.00	96.0	83.0	125.0	215	393	280	397	–	–	466	
DN 80	85.0 × 2.00	111.0	90.5	125.0	215	401	280	405	–	–	489	
DN 100	104.0 × 2.00	130.0	100.0	125.0	–	–	280	414	390	471	574	
DN 125	129.0 × 2.00	155.0	112.5	150.0	–	–	–	–	390	479	612	
DN 150	154.0 × 2.00	180.0	125.0	150.0	–	–	–	–	390	560	718	
OD 1"	25.4 × 1.65	46.0	56.0	90.0	215	368	–	–	–	–	391	
OD 1 ½"	38.1 × 1.65	59.0	62.5	90.0	215	378	280	382	–	–	414	
OD 2"	50.8 × 1.65	71.5	69.0	90.0	215	381	280	385	–	–	432	
OD 2 ½"	63.5 × 1.65	90.0	80.0	125.0	215	397	280	401	–	–	464	
OD 3"	76.2 × 1.65	103.0	86.5	125.0	–	–	280	408	–	–	541	
OD 4"	101.6 × 2.11	127.5	99.0	125.0	–	–	280	416	390	537	573	
OD 6"	152.4 × 2.77	177.0	123.0	150.0	–	–	–	–	390	559	714	
IPS 2"*	60.3 × 2.00	81.0	73.5	114.3	215	379	280	383	–	–	437	
IPS 3"*	88.9 × 2.30	115.0	92.5	152.5	215	399	280	403	–	–	491	
IPS 4"*	114.3 × 2.30	140.0	105.0	152.5	–	–	280	409	390	439	579	
IPS 6"*	168.2 × 2.77	192.0	131.0	152.5	–	–	–	–	390	555	724	



Position	Description of the order code					
1	<b>Valve type</b>					
	S VARIVENT® control valve					
2	<b>Housing combinations</b>					
3	<b>Supplement to the valve type</b>					
	J Linear characteristic curve					
4/5	<b>Nominal width (upper housing/lower housing)</b>					
	DN 25	OD 1"				
	DN 40	OD 1 ½"				
	DN 50	OD 2"			IPS 2"	
	DN 65	OD 2 ½"				
	DN 80	OD 3"			IPS 3"	
	DN 100	OD 4"			IPS 4"	
	DN 125					
	DN 150	OD 6"			IPS 6"	
6	<b>Non-actuated position</b>					
	Z Spring-to-close (NC)					
	A Spring-to-open (NO)					
7	<b>Control cone seal</b>					
	M Metallic, no V-ring					
	W Soft-sealing, with V-ring					
8	<b>Kvs value</b>					
	0.1	DN 25, OD 1"	4	DN 25, OD 1"	80	DN 80–100, OD 3"–4", IPS 3"–4"
	0.16	DN 25, OD 1"	6.3	DN 25–40, OD 1"–1 ½"	100	DN 100–125, OD 4", IPS 4"
	0.25	DN 25, OD 1"	10	DN 25–50, OD 1"–2", IPS 2"	160	DN 100–125, OD 4", IPS 4"
	0.4	DN 25, OD 1"	16	DN 40–50, OD 1 ½"–2", IPS 2"	200	DN 125–150, OD 6", IPS 6"
	0.63	DN 25, OD 1"	25	DN 40–65, OD 1 ½"–2 ½", IPS 2"	260	DN 125–150, OD 6", IPS 6"
	1	DN 25, OD 1"	35	DN 50–80, OD 2"–3", IPS 2"–3"	360*	DN 150, OD 6", IPS 6"
	1.6	DN 25, OD 1"	40	DN 50–80, OD 2"–3", IPS 2"–3"		
	2.5	DN 25, OD 1"	60	DN 65–100, OD 2 ½"–4", IPS 2"–4"		
9	<b>Actuator</b>					
	175 Diaphragm surface 175 cm²					
	350 Diaphragm surface 350 cm²					
	750 Diaphragm surface 750 cm²					
10	<b>Actuation pressure</b>					
	1	0.4–2.0 bar	4	1.65–2.65 bar	7	2.3–4.2 bar
	2	0.8–2.4 bar	5	2.1–3.3 bar		
	3	1.0–3.0 bar	6	2.2–3.4 bar		
11	<b>Actuator material</b>					
	S Stainless Steel		P Steel sheet, powder-coated			
12	<b>Seal material in contact with the product</b>					
	1	EPDM (FDA)	2	FKM (FDA)	3	HNBR (FDA; to DN 100, OD 4")
13	<b>Surface quality of the housing</b>					
	1 Inside R <sub>a</sub> ≤ 1.2 µm, outside matte blasted (IPS)					
	2 Inside R <sub>a</sub> ≤ 0.8 µm, outside matte blasted (DN, OD)					
14	<b>Connection fittings</b>					
	N Welding end					
15	<b>Options (See acc. to valve types)</b>					
+						
16	<b>Positioner</b>					
	0----- Order code for positioners, see at the end of the Section Control Valves index					

\* Maximum product pressure is 7.5 bar.




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

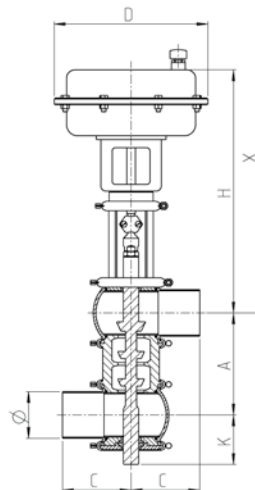
<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16
<b>Code</b>	S		J	/									N		0-----

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

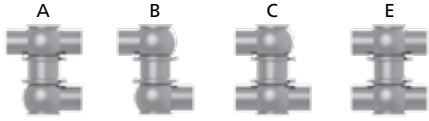




Technical data of the standard version		
Control characteristics	Linear	
Recommended flow direction	Against closing direction	
Material in contact with the product	1.4404 (AISI 316L)	
Material not in contact with the product	1.4301 (AISI 304)	
Seal material in contact with the product	EPDM, FKM, HNBR	
Ambient temperature	0 to 45 °C	
Air supply pressure	4–7 bar (58–101.5 PSI)	
Product pressure	DN 25–65, OD 1"–2 ½"	0–16 bar (0–232 psi)
	DN 80–100, OD 3"–4"	0–10 bar (0–145 psi)
Surface in contact with the product	DN, OD	R <sub>a</sub> ≤ 0.8 µm
External housing surface	Matte blasted	
Positioner	I/P positioner; type 3725	
Actuator type	Diaphragm actuator air/spring	
Connection fittings	Welding end	
Identification	Adhesive ID tag	
Valve seat version	Clamped seat ring	
Certificates	  	



Nominal width	Pipe	Housing			Diaphragm surface 350 cm <sup>2</sup>		Diaphragm surface 750 cm <sup>2</sup>		Valve
	Ø [mm]	A [mm]	C [mm]	K [mm]	D [mm]	H [mm]	D [mm]	H [mm]	X [mm]
DN 25	29.0 × 1.50	77.5	90.0	75.0	280	370	–	–	393
DN 40	41.0 × 1.50	112.5	90.0	81.0	280	380	–	–	415
DN 50	53.0 × 1.50	124.5	90.0	87.0	280	386	–	–	433
DN 65	70.0 × 2.00	170.5	125.0	105.0	–	–	390	454	466
DN 80	85.0 × 2.00	185.5	125.0	114.0	–	–	390	462	489
DN 100	104.0 × 2.00	214.5	125.0	120.0	–	–	390	471	574
OD 1"	25.4 × 1.65	73.5	90.0	75.0	280	372	–	–	391
OD 1 ½"	38.1 × 1.65	109.5	90.0	81.0	280	382	–	–	414
OD 2"	50.8 × 1.65	122.0	90.0	87.0	280	388	–	–	432
OD 2 ½"	63.5 × 1.65	164.5	125.0	105.0	280	401	390	451	464
OD 3"	76.2 × 1.65	177.5	125.0	114.0	–	–	390	465	541
OD 4"	101.6 × 2.11	212.0	125.0	120.0	–	–	390	473	573

Position	Description of the order code												
1	<b>Valve type</b> S VARIVENT® control valve												
2	<b>Housing combinations</b> 												
3	<b>Supplement to the valve type</b> K 3-stage seat, linear characteristic curve												
4/5	<b>Nominal width (upper housing/lower housing)</b> <table border="1"> <tr><td>DN 25</td><td>OD 1"</td></tr> <tr><td>DN 40</td><td>OD 1 ½"</td></tr> <tr><td>DN 50</td><td>OD 2"</td></tr> <tr><td>DN 65</td><td>OD 2 ½"</td></tr> <tr><td>DN 80</td><td>OD 3"</td></tr> <tr><td>DN 100</td><td>OD 4"</td></tr> </table>	DN 25	OD 1"	DN 40	OD 1 ½"	DN 50	OD 2"	DN 65	OD 2 ½"	DN 80	OD 3"	DN 100	OD 4"
DN 25	OD 1"												
DN 40	OD 1 ½"												
DN 50	OD 2"												
DN 65	OD 2 ½"												
DN 80	OD 3"												
DN 100	OD 4"												
6	<b>Non-actuated position</b> Z Spring-to-close (NC) A Spring-to-open (NO)												
7	<b>Control cone seal</b> M Metallic, no V-ring												
8	<b>Kvs value</b> 2.3 DN 25, OD 1" 5.8 DN 40, OD 1 ½" 9.2 DN 50, OD 2" 14.4 DN 65, OD 2 ½" 23.1 DN 80, OD 3" 34.6 DN 100, OD 4"												
9	<b>Actuator</b> 175 Diaphragm surface 175 cm² 350 Diaphragm surface 350 cm² 750 Diaphragm surface 750 cm²												
10	<b>Actuation pressure</b> 1 0.4–2.0 bar 2 0.6–1.8 bar 3 0.8–2.4 bar 4 2.4–3.6 bar												
11	<b>Actuator material</b> S Stainless Steel P Steel sheet, powder-coated												
12	<b>Seal material in contact with the product</b> 1 EPDM (FDA) 2 FKM (FDA) 3 HNBR (FDA)												
13	<b>Surface quality of the housing</b> 2 Inside R <sub>a</sub> ≤ 0.8 µm, outside matte blasted (DN, OD)												
14	<b>Connection fittings</b> N Welding end												
15	<b>Options (See acc. to valve types)</b> /2F Double stem guidance												
+													
16	<b>Positioner</b> 0----- Order code for positioners, see at the end of the Section Control Valves index												






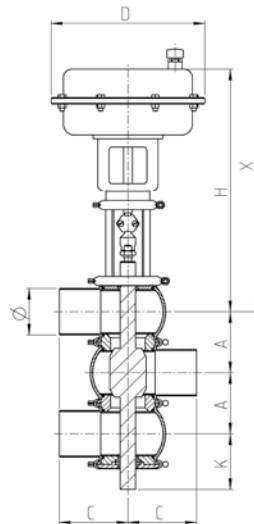
The code is composed as follows, depending on the chosen configuration:

<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16
<b>Code</b>	S		K	/		M						2	N	/2F	0-----

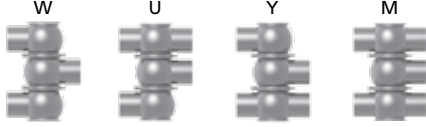
For order codes differing from the standard version, please refer to section 7 (options).



Technical data of the standard version		
Control characteristics	Linear	
Recommended flow direction	Product merging	
Material in contact with the product	1.4404 (AISI 316L)	
Material not in contact with the product	1.4301 (AISI 304)	
Seal material in contact with the product	EPDM, FKM, HNBR	
Ambient temperature	0 to 45 °C	
Air supply pressure	4–7 bar (58–101.5 PSI)	
Product pressure	DN 25–65, OD 1"–2 ½"	0–16 bar (0–232 psi)
	DN 80–100, OD 3"–4"	0–10 bar (0–145 psi)
Surface in contact with the product	DN, OD $R_a \leq 0.8 \mu\text{m}$	
External housing surface	Matte blasted	
Positioner	I/P positioner; type 3725	
Actuator type	Diaphragm actuator air/spring	
Connection fittings	Welding end	
Identification	Adhesive ID tag	
Valve seat version	Clamped seat ring	
Certificates	  	



Nominal width	Pipe		Housing			Diaphragm surface 175 cm <sup>2</sup>		Diaphragm surface 350 cm <sup>2</sup>		Diaphragm surface 750 cm <sup>2</sup>		Valve X [mm]
	Ø [mm]		A [mm]	C [mm]	K [mm]	D [mm]	H [mm]	D [mm]	H [mm]	D [mm]	H [mm]	
DN 25	29.0 × 1.50		50.0	90.0	73.5	215	370	280	347	–	–	393
DN 40	41.0 × 1.50		62.0	90.0	80.0	215	376	280	380	–	–	415
DN 50	53.0 × 1.50		74.0	90.0	85.5	–	–	280	386	–	–	433
DN 65	70.0 × 2.00		96.0	125.0	101.5	–	–	280	397	–	–	466
DN 80	85.0 × 2.00		111.0	125.0	110.0	–	–	280	405	–	–	489
DN 100	104.0 × 2.00		130.0	125.0	133.5	–	–	280	414	390	471	574
OD 1"	25.4 × 1.65		46.0	90.0	71.5	215	368	–	–	–	–	391
OD 1 ½"	38.1 × 1.65		59.0	90.0	78.5	215	378	280	382	–	–	414
OD 2"	50.8 × 1.65		71.5	90.0	84.5	–	–	280	385	–	–	432
OD 2 ½"	63.5 × 1.65		90.0	125.0	98.5	–	–	280	401	–	–	464
OD 3"	76.2 × 1.65		103.0	125.0	105.0	–	–	280	408	–	–	541
OD 4"	101.6 × 2.11		127.5	125.0	132.5	–	–	280	416	390	473	573

Position	Description of the order code												
1	<b>Valve type</b> S VARIVENT® control valve												
2	<b>Housing combinations</b> 												
3	<b>Supplement to the valve type</b> W Divert valve, product-merging, linear characteristic curve												
4/5	<b>Nominal width (upper housing/lower housing)</b> <table border="1"> <tr> <td>DN 25</td> <td>OD 1"</td> </tr> <tr> <td>DN 40</td> <td>OD 1 ½"</td> </tr> <tr> <td>DN 50</td> <td>OD 2"</td> </tr> <tr> <td>DN 65</td> <td>OD 2 ½"</td> </tr> <tr> <td>DN 80</td> <td>OD 3"</td> </tr> <tr> <td>DN 100</td> <td>OD 4"</td> </tr> </table>	DN 25	OD 1"	DN 40	OD 1 ½"	DN 50	OD 2"	DN 65	OD 2 ½"	DN 80	OD 3"	DN 100	OD 4"
DN 25	OD 1"												
DN 40	OD 1 ½"												
DN 50	OD 2"												
DN 65	OD 2 ½"												
DN 80	OD 3"												
DN 100	OD 4"												
6	<b>Non-actuated position</b> Z Spring-to-close (NC) A Spring-to-open (NO)												
7	<b>Control cone seal</b> M Metallic, no V-ring												
8	<b>Kvs value</b> 6.3 DN 25, OD 1" 16 DN 40, OD 1 ½" 25 DN 50, OD 2" 35 DN 65, OD 2 ½" 60 DN 80, OD 3" 100 DN 100, OD 4"												
9	<b>Actuator</b> 175 Diaphragm surface 175 cm² 350 Diaphragm surface 350 cm² 750 Diaphragm surface 750 cm²												
10	<b>Actuation pressure</b> 1 0.4–2.0 bar 2 1.4–2.3 bar 3 1.4–2.4 bar												
11	<b>Actuator material</b> S Stainless Steel P Steel sheet, powder-coated												
12	<b>Seal material in contact with the product</b> 1 EPDM (FDA) 2 FKM (FDA) 3 HNBR (FDA)												
13	<b>Surface quality of the housing</b> 2 Inside R <sub>a</sub> ≤ 0.8 µm, outside matte blasted (DN, OD)												
14	<b>Connection fittings</b> N Welding end												
15	<b>Options (See acc. to valve types)</b> /2F Double stem guidance												
+													
16	<b>Positioner</b> 0----- Order code for positioners, see at the end of the Section Control Valves index												






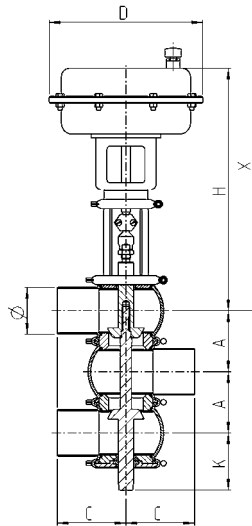
The code is composed as follows, depending on the chosen configuration:

Position	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16
Code	S		W	/		M						2	N	/2F	0-----

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

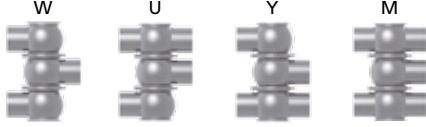


Technical data of the standard version		
Control characteristics	Linear	
Recommended flow direction	Product distribution	
Material in contact with the product	1.4404 (AISI 316L)	
Material not in contact with the product	1.4301 (AISI 304)	
Seal material in contact with the product	EPDM, FKM, HNBR	
Ambient temperature	0 to 45 °C	
Air supply pressure	4–7 bar (58–101.5 PSI)	
Product pressure	DN 25–65, OD 1"–2 ½"	0–16 bar (0–232 psi)
	DN 80–100, OD 3"–4"	0–10 bar (0–145 psi)
Surface in contact with the product	DN, OD $R_a \leq 0.8 \mu\text{m}$	
External housing surface	Matte blasted	
Positioner	I/P positioner; type 3725	
Actuator type	Diaphragm actuator air/spring	
Connection fittings	Welding end	
Identification	Adhesive ID tag	
Valve seat version	Clamped seat ring	
Certificates	  	



Nominal width	Pipe		Housing			Diaphragm surface 175 cm <sup>2</sup>		Diaphragm surface 350 cm <sup>2</sup>		Diaphragm surface 750 cm <sup>2</sup>		Valve X [mm]
	Ø [mm]		A [mm]	C [mm]	K [mm]	D [mm]	H [mm]	D [mm]	H [mm]	D [mm]	H [mm]	
DN 25	29.0 × 1.50		50.0	90.0	73.5	215	370	280	347	–	–	393
DN 40	41.0 × 1.50		62.0	90.0	80.0	215	376	280	380	–	–	415
DN 50	53.0 × 1.50		74.0	90.0	85.5	–	–	280	386	–	–	433
DN 65	70.0 × 2.00		96.0	125.0	101.5	–	–	280	397	–	–	466
DN 80	85.0 × 2.00		111.0	125.0	110.0	–	–	280	405	–	–	489
DN 100	104.0 × 2.00		130.0	125.0	133.5	–	–	280	414	390	471	574

OD 1"	25.4 × 1.65		46.0	90.0	71.5	215	368	–	–	–	–	391
OD 1 ½"	38.1 × 1.65		59.0	90.0	78.5	215	378	280	382	–	–	414
OD 2"	50.8 × 1.65		71.5	90.0	84.5	–	–	280	385	–	–	432
OD 2 ½"	63.5 × 1.65		90.0	125.0	98.5	–	–	280	401	–	–	464
OD 3"	76.2 × 1.65		103.0	125.0	105.0	–	–	280	408	–	–	541
OD 4"	101.6 × 2.11		127.5	125.0	132.5	–	–	280	416	390	473	573

Position	Description of the order code												
1	<b>Valve type</b> S VARIVENT® control valve												
2	<b>Housing combinations</b> 												
3	<b>Supplement to the valve type</b> X Divert valve, product distribution, linear characteristic curve												
4/5	<b>Nominal width (upper housing/lower housing)</b> <table border="1"> <tr> <td>DN 25</td> <td>OD 1"</td> </tr> <tr> <td>DN 40</td> <td>OD 1 ½"</td> </tr> <tr> <td>DN 50</td> <td>OD 2"</td> </tr> <tr> <td>DN 65</td> <td>OD 2 ½"</td> </tr> <tr> <td>DN 80</td> <td>OD 3"</td> </tr> <tr> <td>DN 100</td> <td>OD 4"</td> </tr> </table>	DN 25	OD 1"	DN 40	OD 1 ½"	DN 50	OD 2"	DN 65	OD 2 ½"	DN 80	OD 3"	DN 100	OD 4"
DN 25	OD 1"												
DN 40	OD 1 ½"												
DN 50	OD 2"												
DN 65	OD 2 ½"												
DN 80	OD 3"												
DN 100	OD 4"												
6	<b>Non-actuated position</b> Z Spring-to-close (NC) A Spring-to-open (NO)												
7	<b>Control cone seal</b> M Metallic, no V-ring												
8	<b>Kvs value</b> 6.3 DN 25, OD 1" 16 DN 40, OD 1 ½" 25 DN 50, OD 2" 35 DN 65, OD 2 ½" 60 DN 80, OD 3" 100 DN 100, OD 4"												
9	<b>Actuator</b> 175 Diaphragm surface 175 cm² 350 Diaphragm surface 350 cm² 750 Diaphragm surface 750 cm²												
10	<b>Actuation pressure</b> 1 0.4–2.0 bar 2 1.4–2.3 bar 3 1.4–2.4 bar												
11	<b>Actuator material</b> S Stainless Steel P Steel sheet, powder-coated												
12	<b>Seal material in contact with the product</b> 1 EPDM (FDA) 2 FKM (FDA) 3 HNBR (FDA)												
13	<b>Surface quality of the housing</b> 2 Inside R <sub>a</sub> ≤ 0.8 µm, outside matte blasted (DN, OD)												
14	<b>Connection fittings</b> N Welding end												
15	<b>Options (See acc. to valve types)</b> /2F Double stem guidance												
+													
16	<b>Positioner</b> 0----- Order code for positioners, see at the end of the Section Control Valves index												



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

<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16
<b>Code</b>	S		X	/		M						2	N	/2F	0-----

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



### Description

Positioners compare the set value from a superordinate controller (PLC) to the stroke of the control valve and convert it into a pneumatic actuator pressure that is sent to the diaphragm actuator. A mechanical return of the current position of the actuator stroke can balance out changes regarding operating pressure and actuation energy automatically. This improves the accuracy and reduces the actuation time. Interferences such as friction or flow influences are balanced out by the positioner itself. The positioners can be used in the normal and split range operation.

The positioners are directly assembled to the diaphragm actuator of the control valve, which means the pneumatic connections are realized without additional tubes or hoses.

### Function of the positioner

Positioners convert an electrical or pneumatic input signal into a corresponding output signal (set position).



Differentiation acc. to type of signal

**Pneumatic/electro-pneumatic positioner**

A difference is made acc. to the input signal between pneumatic (p/p) and electro-pneumatic (i/p) positioners.

**Pneumatic (p/p) positioners**

For pneumatic devices, the input value is a mechanical signal with a pressure of 0.2 to 1 bar (3 to 15 psi) and the output value is an actuator pressure up to 6 bar (90 psi) at most.



Type 3766

**Electro-pneumatic (i/p) positioners**

For the electro-pneumatic positioners, the input is an analog direct current signal of 4 to 20 mA or a digital signal (PROFIBUS®, FOUNDATION™ Fieldbus). The input signal is converted into the corresponding required pressure with an integrated circuit. The output signal is an actuation pressure with up to 6 bar (90 psi).



Type 3725



Type 3730



Type 3767

**Special features of digital positioners**

Simple operation
Display with switchable reading direction
Automatical setup of the neutral point and the range during the initialization process (except type 3730-0)
Independent recognition of errors in the actuator
Movement direction independent of the installation orientation
Continuous monitoring of the zero point
Minimized air consumption
Fail-safe storage of all parameters

The respective positioners can be equipped with further accessories. The positioners of type 3730-3 additionally permit HART®-communication between field and process

control level. The positioners type 3730-4 and type 3730-5 integrate control valves into fieldbus systems via PROFIBUS® PA or FOUNDATION™ fieldbus.

Type	3725	3730-0	3730-1
Input/output signal	i/p	i/p	i/p
Communication			
Diagnosis			
Guide size	4 to 20 mA	4 to 20 mA	4 to 20 mA
Split range	•	•	•
Supply air pressure	4 to 6 bar	4 to 6 bar	4 to 6 bar
<b>Options</b>			
Position indicator, 4–20 mA			
With 3/2 directional solenoid valve			
Pressure gage component	•	•	•
AS-Interface module type 6150	•	•	•
<b>Open/close position feedback</b>			
2 proximity switches (software)			•
1 inductive+ 1 software proximity switch			
2 proximity switches			
<b>Approval acc. to ATEX</b>			
II 2G Ex ia IIC T4	•		
EEx ia		•	•
II 2G Ex ia IIC T6 / II 2D Ex tb IIIC T80 °C			
II 2G Ex ia IIC T6			
IECEX			•
<b>Operating elements</b>			
Display	•		•
Volume throttle	•	•	•
Buttons	3		
Dial switch/push button			•
Slider			
Potentiometer		•	
DIP switch		•	
Setting screws			
Ambient temperature	–20 to 80 °C	–20 to 80 °C	–20 to 80 °C
Index of protection class	IP66	IP66	IP66
Option in the order code	1	2	3

The optionally available 3/2 way solenoid valve for the positioner type 3720-2, 3720-3, 3730-4 and 3767 converts binary control signals into pneumatic control signals, which opens or closes the associated diaphragm actuator.

3730-2	3730-3	3730-4	3730-5	3766	3767
i/p	i/p	i/p	i/p	p/p can be converted to i/p	i/p can be converted to p/p
	HART	PROFIBUS®	FOUNDATION™		
EXPERTplus	EXPERTplus	EXPERTplus	EXPERTplus		
4 to 20 mA	4 to 20 mA	–	–	0.2 to 1 bar (4 to 20 mA)	0 to 20 mA (0.2 to 1 bar)
•	•	•	•	•	•
4 to 6 bar	4 to 6 bar	4 to 6 bar	4 to 6 bar	4 to 6 bar	4 to 6 bar
<b>Options</b>					
•					
•					•
•	•	•	•	•	•
•					•
<b>Open/close position feedback</b>					
•	•				
•	•	•			
				•	•
<b>Approval acc. to ATEX</b>					
•	•	•			
					•
•	•	•		•	•
<b>Operating elements</b>					
•	•	•	•		
•	•	•	•	•	•
1	1	1	1		
•	•	•	•		
•	•	•	•		
				•	•
–20 to 80 °C	–20 to 80 °C	–45 to 80 °C	–45 to 80 °C	–20 to 80 °C	–20 to 80 °C
IP66	IP66	IP66	IP66	IP54	IP54
4	5	6	7	8	9



Position	Description of the order code
1	<b>Positioner type</b>
	0 Without positioner
	1 Type 3725 i/p
	2 Type 3730-1 i/p
	3 Type 3730-0 i/p
	4 Type 3730-2 i/p
	5 Type 3730-3 i/p HART
	6 Type 3730-5 i/p (FOUNDATION™ fieldbus)
	7 Type 3730-4 i/p PROFIBUS®
	8 Type 3766 p/p
9 Type 3767 i/p	
2	<b>Solenoid valve</b>
	– Without 1 With 3/2 directional solenoid valve 24 V DC
3	<b>Open/close position feedback</b>
	– Without information
	S 2 proximity switches (software)
	I 1 proximity switch F 2 proximity switches
4	<b>Position feedback</b>
	– Without position feedback 2 With position feedback 4–20 mA
5	<b>Ex-design</b>
	– Without Ex-protection certificate E With Ex-protection certificate*
6	<b>Pressure gage component</b>
	– Without pressure gage assembly 1 With pressure gage assembly
7	<b>Air connection</b>
	M Metric for air hose Ø 6/4 mm Z Inch for air hose Ø OD ¼" (6.35/4.35 mm)
8	<b>ASI module</b>
	– Without ASI module A With ASI module

\* For the available ATEX approvals please see table "further options".


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

<b>Position</b>		1	2	3	4	5	6	7	8
<b>Code</b>	+								

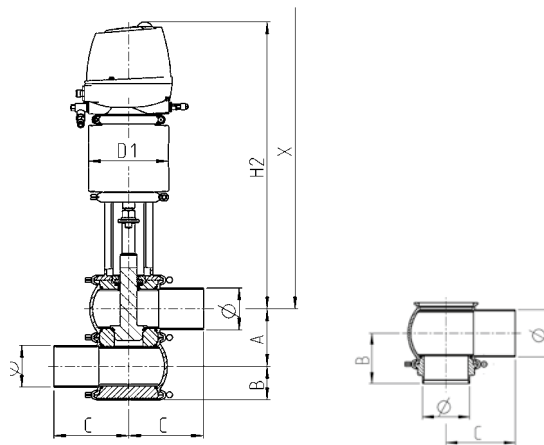
The code to describe the positioner is attached to the order code of the control valve.






Technical data of the standard version	
Recommended flow direction	Against closing direction
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Ambient temperature	0 to 45 °C
Air supply pressure	5–8 bar (73–116 psi)
Product pressure	DN 25–65, OD 1"–2 ½", IPS 2" 0–16 bar* (0–232 psi)
	DN 80–150, OD 3"–6", IPS 3"–6" 0–10 bar (0–145 psi)
Surface in contact with the product	DN, OD $R_a \leq 0.8 \mu\text{m}$
	IPS $R_a \leq 1.2 \mu\text{m}$
External housing surface	Matte blasted
Control and feedback system	Positioner T.VIS® P-15
Actuator type	Air/spring
Connection fittings	Welding end
Identification	Adhesive ID tag
Valve seat version	Clamped seat ring
Certificates	

\* We recommend the metallic seat design at a differential pressure of more than 10 bar.



Nominal width	Pipe	Housing			Actuator	Dimension		Valve	
	Ø [mm]	A [mm]	B [mm]	C [mm]	D1 [mm]	H [mm]	X [mm]	Hub S [mm]	Weight [kg]
DN 25	29.0 × 1.50	50.0	58	90.0	99	423.0	508	15	6
DN 40	41.0 × 1.50	62.0	64	90.0	110	464.0	514	15	7
DN 50	53.0 × 1.50	74.0	70	90.0	110	470.0	520	15	7
DN 65	70.0 × 2.00	96.0	83	125.0	135	481.0	626	15	11
DN 80	85.0 × 2.00	111.0	90	125.0	170	519.0	634	15	11
DN 100	104.0 × 2.00	130.0	100	125.0	210	714.0	643	15	16
DN 125	129.0 × 2.00	155.0	112	150.0	260	784.0	884	30	39
DN 150	154.0 × 2.00	180.0	125	150.0	260	708.0	908	30	50
OD 1"	25.4 × 1.65	46.0	56	90.0	99	421.0	506	15	6
OD 1 ½"	38.1 × 1.65	59.0	62	90.0	110	466.0	516	15	7
OD 2"	50.8 × 1.65	71.5	69	90.0	110	472.0	522	15	7
OD 2 ½"	63.5 × 1.65	90.0	80	125.0	135	485.0	630	15	11
OD 3"	76.2 × 1.65	103.0	86	125.0	170	522.0	637	15	11
OD 4"	101.6 × 2.11	127.5	99	125.0	210	616.0	645	15	17
OD 6"	152.4 × 2.77	177.0	123	150.0	260	706.5	907	30	50
IPS 2"	60.3 × 2.00	81.0	73	114.3	110	467.0	517	15	7
IPS 3"	88.9 × 2.30	115.0	92	152.5	135	487.0	632	15	11
IPS 4"	114.3 × 2.30	140.0	105	152.5	135	493.0	638	15	17
IPS 6"	168.2 × 2.77	192.0	131	152.5	260	702.0	902	30	50

Position	Description of the order code																																																																																																																																																																																																																																																																																																										
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	<4	6.3	10	16	25	35	40	60	80	100	160	200	260	360	<4	6.3	10	16	25	35	40	60	80	100	160	200	260	360																																																																																																																																																																																																																																																																															
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DN 50, OD 2", IPS 2"	AA				BB				CD				AA				BA																																																																																																																																																																																																																																																																																										
DN 65, OD 2 1/2"					BB				CD								BA																																																																																																																																																																																																																																																																																										
DN 80, OD 3", IPS 3"					BB				CD				DF				BA				CA																																																																																																																																																																																																																																																																																						
DN 100, OD 4", IPS 4"									CD				DF				E6				BA				CA				DB																																																																																																																																																																																																																																																																														
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DN 150, OD 6", IPS 6"																	SH6Z												EF6A																																																																																																																																																																																																																																																																														
11	<b>Valve seat version</b> L0 Clamped seat ring/clamp connection																																																																																																																																																																																																																																																																																																										
12	<b>Seal material in contact with the product</b> 1 EPDM (FDA) 2 FKM (FDA) 3 HNBR (FDA; to DN 100, OD 4")																																																																																																																																																																																																																																																																																																										
13	<b>Surface quality of the housing</b> 1 Inside R <sub>a</sub> ≤ 1.2 µm, outside matte blasted (IPS) 2 Inside R <sub>a</sub> ≤ 0.8 µm, outside matte blasted (DN, OD)																																																																																																																																																																																																																																																																																																										
14	<b>Connection fittings</b> N Welding end																																																																																																																																																																																																																																																																																																										
15	<b>Options</b> /52 Adhesive ID tag																																																																																																																																																																																																																																																																																																										
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16–21	<b>Control and feedback system</b> TP15XXX Order code for positioner T.VIS® P-15 see register 9																																																																																																																																																																																																																																																																																																										

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

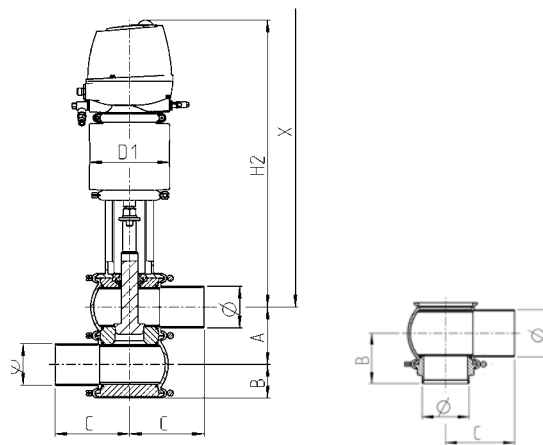
Position	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16 to 21				
Code	P		F	/	S				L0				N	/52	TP15	I		P	A






Technical data of the standard version	
Recommended flow direction	Against closing direction
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Ambient temperature	0 to 45 °C
Air supply pressure	5–8 bar (73–116 psi)
Product pressure	DN 25–65, OD 1"–2 ½", IPS 2" 0–16 bar* (0–232 psi)
	DN 80–150, OD 3"–6", IPS 3"–6" 0–10 bar (0–145 psi)
Surface in contact with the product	DN, OD $R_a \leq 0.8 \mu\text{m}$ IPS $R_a \leq 1.2 \mu\text{m}$
External housing surface	Matte blasted
Control and feedback system	Positioner T.VIS® P-15
Actuator type	Air/spring
Connection fittings	Welding end
Identification	Adhesive ID tag
Valve seat version	Clamped seat ring
Certificates	

\* We recommend the metallic seat design at a differential pressure of more than 10 bar.



Nominal width	Pipe	Housing			Actuator	Dimension		Valve	
	Ø [mm]	A [mm]	B [mm]	C [mm]	D1 [mm]	H [mm]	X [mm]	Hub S [mm]	Weight [kg]
DN 25	29.0 × 1.50	50.0	58	90.0	99	423.0	508	15	6
DN 40	41.0 × 1.50	62.0	64	90.0	110	464.0	514	15	7
DN 50	53.0 × 1.50	74.0	70	90.0	110	470.0	520	15	7
DN 65	70.0 × 2.00	96.0	83	125.0	135	481.0	626	15	11
DN 80	85.0 × 2.00	111.0	90	125.0	170	519.0	634	15	11
DN 100	104.0 × 2.00	130.0	100	125.0	210	714.0	643	15	16
DN 125	129.0 × 2.00	155.0	112	150.0	260	784.0	884	30	39
DN 150	154.0 × 2.00	180.0	125	150.0	260	708.0	908	30	50
OD 1"	25.4 × 1.65	46.0	56	90.0	99	421.0	506	15	6
OD 1 ½"	38.1 × 1.65	59.0	62	90.0	110	466.0	516	15	7
OD 2"	50.8 × 1.65	71.5	69	90.0	110	472.0	522	15	7
OD 2 ½"	63.5 × 1.65	90.0	80	125.0	135	485.0	630	15	11
OD 3"	76.2 × 1.65	103.0	86	125.0	170	522.0	637	15	11
OD 4"	101.6 × 2.11	127.5	99	125.0	210	616.0	645	15	17
OD 6"	152.4 × 2.77	177.0	123	150.0	260	706.5	907	30	50
IPS 2"	60.3 × 2.00	81.0	73	114.3	110	467.0	517	15	7
IPS 3"	88.9 × 2.30	115.0	92	152.5	135	487.0	632	15	11
IPS 4"	114.3 × 2.30	140.0	105	152.5	135	493.0	638	15	17
IPS 6"	168.2 × 2.77	192.0	131	152.5	260	702.0	902	30	50




Position	Description of the order code		
1	<b>Valve type</b> P VARIVENT® control valve		
2	<b>Housing combinations</b> 		
3	<b>Supplement to the valve type</b> J Linear characteristic curve		
4/5	<b>Nominal width (upper housing/lower housing)</b>		
	DN 25	OD 1"	
	DN 40	OD 1 1/2"	
	DN 50	OD 2"	IPS 2"
	DN 65	OD 2 1/2"	
	DN 80	OD 3"	IPS 3"
	DN 100	OD 4"	IPS 4"
	DN 125		
	DN 150	OD 6"	IPS 6"
6	<b>Actuator type</b> S Air/spring		
7	<b>Non-actuated position</b> Z Spring-to-close (NC)    A Spring-to-open (NO)		
8	<b>Control cone seal</b> M Metallic, no V-ring    W Soft-sealing, with V-ring		
9	<b>Kvs value</b>		
	0.1    DN 25, OD 1"	4.0    DN 25, OD 1"	80    DN 80–100, OD 3"–4", IPS 3"–4"
	0.16    DN 25, OD 1"	6.3    DN 25–40, OD 1"–1 1/2"	100    DN 100–125, OD 4", IPS 4"
	0.25    DN 25, OD 1"	10    DN 25–50, OD 1"–2", IPS 2"	160    DN 100–125, OD 4", IPS 4"
	0.4    DN 25, OD 1"	16    DN 40–50, OD 1 1/2"–2", IPS 2"	200    DN 125–150, OD 6", IPS 6"
	0.63    DN 25, OD 1"	25    DN 40–65, OD 1 1/2"–2 1/2", IPS 2"	260    DN 125–150, OD 6", IPS 6"
	1.0    DN 25, OD 1"	35    DN 50–80, OD 2"–3", IPS 2"–3"	360    DN 150, OD 6", IPS 6"
	1.6    DN 25, OD 1"	40    DN 50–80, OD 2"–3", IPS 2"–3"	
	2.5    DN 25, OD 1"	60    DN 65–100, OD 2 1/2"–4", IPS 2"–4"	
10	<b>Standard configuration with 5 bar air supply pressure for 5 bar product pressure (higher pressures on request)</b>		
	<b>Nominal width</b>	<b>Actuator (Spring-to-close)</b>	<b>Actuator (Spring-to-open)</b>
	<b>Kvs value</b>	<4 6.3 10 16 25 35 40 60 80 100 160 200 260 360	<4 6.3 10 16 25 35 40 60 80 100 160 200 260 360
	DN 25, OD 1"	AA	AA
	DN 40, OD 1 1/2"	AA BB	AA BA
	DN 50, OD 2", IPS 2"	AA BB	AA BA
	DN 65, OD 2 1/2"	BB CD	BA
	DN 80, OD 3", IPS 3"	BB CD DF	BA CA
	DN 100, OD 4", IPS 4"	CD DF E6	BA CA DB
	DN 125	DF EG6 SH6Z	CA DB EF6A
	DN 150, OD 6", IPS 6"	SH6Z	EF6A
11	<b>Valve seat version</b> L0 Clamped seat ring/clamp connection		
12	<b>Seal material in contact with the product</b> 1 EPDM (FDA)    2 FKM (FDA)    3 HNBR (FDA; to DN 100, OD 4")		
13	<b>Surface quality of the housing</b> 1 Inside R <sub>a</sub> ≤ 1.2 µm, outside matte blasted (IPS)    2 Inside R <sub>a</sub> ≤ 0.8 µm, outside matte blasted (DN, OD)		
14	<b>Connection fittings</b> N Welding end		
15	<b>Options</b> /52 Adhesive ID tag		
+			
16–21	<b>Control and feedback system</b> TP15XXX Order code for positioner T.VIS® P-15 see register 9		

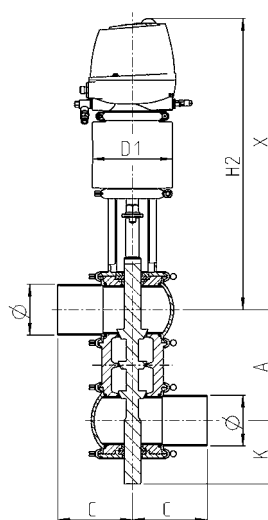


The code is composed as follows, depending on the chosen configuration:

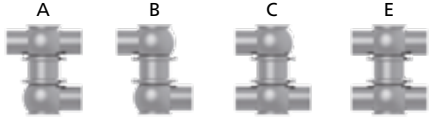
Position	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16 to 21				
Code	P		J	/	S				L0				N	/52	+	TP15	I	P	A



Technical data of the standard version		
Recommended flow direction	Against closing direction	
Material in contact with the product	1.4404 (AISI 316L)	
Material not in contact with the product	1.4301 (AISI 304)	
Seal material in contact with the product	EPDM, FKM, HNBR	
Ambient temperature	0 to 45 °C	
Air supply pressure	5–8 bar (73–116 psi)	
Product pressure	DN 25–65, OD 1"–2 ½"	0–16 bar (0–232 psi)
	DN 80–100, OD 3"–4"	0–10 bar (0–145 psi)
Surface in contact with the product	DN, OD	R <sub>a</sub> ≤ 0.8 µm
External housing surface	Matte blasted	
Control and feedback system	Positioner T.VIS® P-15	
Actuator type	Air/spring	
Connection fittings	Welding end	
Identification	Adhesive ID tag	
Valve seat version	Clamped seat ring	
Certificates		



Nominal width	Pipe	Housing			Actuator	Dimension		Valve	
	Ø [mm]	A [mm]	C [mm]	K [mm]	D1 [mm]	H2 [mm]	X [mm]	Hub S [mm]	Weight [kg]
DN 25	29.0 × 1.50	77.5	90	75	99	423	611	15	6
DN 40	41.0 × 1.50	112.5	90	81	99	429	646	15	9
DN 50	53.0 × 1.50	124.5	90	87	110	470	693	15	9
DN 65	70.0 × 2.00	170.5	125	105	110	481	806	15	15
DN 80	85.0 × 2.00	185.5	125	114	135	489	823	15	17
DN 100	104.0 × 2.00	214.5	125	120	170	528	878	15	24
OD 1"	25.4 × 1.65	73.5	90	75	99	421	609	15	6
OD 1 ½"	38.1 × 1.65	109.5	90	81	99	431	648	15	9
OD 2"	50.8 × 1.65	122	90	87	110	472	695	15	9
OD 2 ½"	63.5 × 1.65	164.5	125	105	110	485	810	15	15
OD 3"	76.2 × 1.65	177.5	125	114	135	492	826	15	17
OD 4"	101.6 × 2.11	212	125	120	170	530	880	15	25


Position	Description of the order code																																																																																																																				
1	<b>Valve type</b> P VARIVENT® control valve																																																																																																																				
2	<b>Housing combinations</b> 																																																																																																																				
3	<b>Supplement to the valve type</b> K 3-stage seat, reduction of high differential pressures, linear characteristic curve																																																																																																																				
4/5	<b>Nominal width (upper housing/lower housing)</b> <table border="1"> <tr><td>DN 25</td><td>OD 1"</td></tr> <tr><td>DN 40</td><td>OD 1 ½"</td></tr> <tr><td>DN 50</td><td>OD 2"</td></tr> <tr><td>DN 65</td><td>OD 2 ½"</td></tr> <tr><td>DN 80</td><td>OD 3"</td></tr> <tr><td>DN 100</td><td>OD 4"</td></tr> </table>	DN 25	OD 1"	DN 40	OD 1 ½"	DN 50	OD 2"	DN 65	OD 2 ½"	DN 80	OD 3"	DN 100	OD 4"																																																																																																								
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6	<b>Actuator type</b> S Air/spring																																																																																																																				
7	<b>Non-actuated position</b> Z Spring-to-close (NC) A Spring-to-open (NO)																																																																																																																				
8	<b>Control cone seal</b> M Metallic, no V-ring																																																																																																																				
9	<b>Kvs value</b> 2.3 DN 25, OD 1" 5.8 DN 40, OD 1 ½" 9.2 DN 50, OD 2" 14.4 DN 65, OD 2 ½" 23.1 DN 80, OD 3" 34.6 DN 100, OD 4"																																																																																																																				
10	<b>Standard configuration with 5 bar air supply pressure for 5 bar product pressure (higher pressures on request)</b> <table border="1"> <thead> <tr> <th rowspan="2">Nominal width</th> <th rowspan="2">Kvs value</th> <th colspan="6">Actuator (Spring-to-close)</th> <th colspan="6">Actuator (Spring-to-open)</th> </tr> <tr> <th>2.3</th> <th>5.8</th> <th>9.2</th> <th>14.4</th> <th>23.1</th> <th>34.6</th> <th>2.3</th> <th>5.8</th> <th>9.2</th> <th>14.4</th> <th>23.1</th> <th>34.6</th> </tr> </thead> <tbody> <tr> <td>DN 25, OD 1"</td> <td></td> <td>AA</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>AA</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DN 40, OD 1 ½"</td> <td></td> <td></td> <td>AA</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>AA</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DN 50, OD 2"</td> <td></td> <td></td> <td></td> <td>BB</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>BA</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DN 65, OD 2 ½"</td> <td></td> <td></td> <td></td> <td></td> <td>BB</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>BA</td> <td></td> <td></td> <td></td> </tr> <tr> <td>DN 80, OD 3"</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>CD</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>BA</td> <td></td> <td></td> </tr> <tr> <td>DN 100, OD 4"</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>DF</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>CA</td> </tr> </tbody> </table>	Nominal width	Kvs value	Actuator (Spring-to-close)						Actuator (Spring-to-open)						2.3	5.8	9.2	14.4	23.1	34.6	2.3	5.8	9.2	14.4	23.1	34.6	DN 25, OD 1"		AA						AA							DN 40, OD 1 ½"			AA						AA						DN 50, OD 2"				BB						BA					DN 65, OD 2 ½"					BB						BA				DN 80, OD 3"						CD						BA			DN 100, OD 4"							DF							CA
Nominal width	Kvs value			Actuator (Spring-to-close)						Actuator (Spring-to-open)																																																																																																											
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12	<b>Seal material in contact with the product</b> 1 EPDM (FDA) 2 FKM (FDA) 3 HNBR (FDA)																																																																																																																				
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16–21	<b>Control and feedback system</b> TP15XXX Order code for positioner T.VIS® P-15 see register 9																																																																																																																				

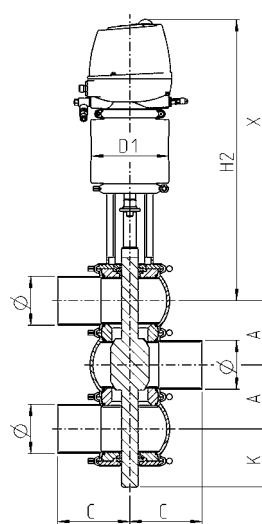


The code is composed as follows, depending on the chosen configuration:

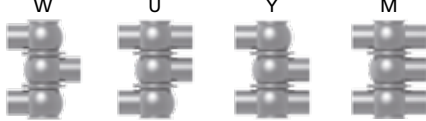
<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16 to 21				
<b>Code</b>	P		K	/	S		M		L0		2	N	/52	+	TP15	I		P	A



Technical data of the standard version		
Recommended flow direction	Product merging	
Material in contact with the product	1.4404 (AISI 316L)	
Material not in contact with the product	1.4301 (AISI 304)	
Seal material in contact with the product	EPDM, FKM, HNBR	
Ambient temperature	0 to 45 °C	
Air supply pressure	5–8 bar (73–116 psi)	
Product pressure	DN 25–65, OD 1"–2 ½"	0–16 bar (0–232 psi)
	DN 80–100, OD 3"–4"	0–10 bar (0–145 psi)
Surface in contact with the product	DN, OD	R <sub>a</sub> ≤ 0.8 µm
External housing surface	Matte blasted	
Control and feedback system	Positioner T.VIS® P-15	
Actuator type	Air/spring	
Connection fittings	Welding end	
Identification	Adhesive ID tag	
Valve seat version	Clamped seat ring	
Certificates		



Nominal width	Pipe	Housing			Actuator	Dimension		Valve	
	Ø [mm]	A [mm]	C [mm]	K [mm]	D1 [mm]	H2 [mm]	X [mm]	Hub S [mm]	Weight [kg]
DN 25	29.0 × 1.50	50.0	90	73.5	110	458	692	15	9
DN 40	41.0 × 1.50	62.0	90	80.0	110	464	704	15	10
DN 50	53.0 × 1.50	74.0	90	85.5	110	470	716	15	11
DN 65	70.0 × 2.00	96.0	125	101.5	135	481	868	15	23
DN 80	85.0 × 2.00	111.0	125	110.0	170	519	914	15	22
DN 100	104.0 × 2.00	130.0	125	133.5	170	538	957	15	33
OD 1"	25.4 × 1.65	46.0	90	71.5	110	456	688	15	9
OD 1 ½"	38.1 × 1.65	59.0	90	78.5	110	466	705	15	10
OD 2"	50.8 × 1.65	71.5	90	84.5	110	472	717	15	11
OD 2 ½"	63.5 × 1.65	90.0	125	98.5	135	485	869	15	23
OD 3"	76.2 × 1.65	103.0	125	105.0	170	522	912	15	21
OD 4"	101.6 × 2.11	127.5	125	132.5	170	540	958	15	32


Position	Description of the order code																																																														
1	<b>Valve type</b> P VARIVENT® Control valve																																																														
2	<b>Housing combinations</b> 																																																														
3	<b>Supplement to the valve type</b> W Divert valve, product-merging, linear characteristic curve																																																														
4/5	<b>Nominal width (upper housing/lower housing)</b> <table border="1"> <tr><td>DN 25</td><td>OD 1"</td></tr> <tr><td>DN 40</td><td>OD 1 ½"</td></tr> <tr><td>DN 50</td><td>OD 2"</td></tr> <tr><td>DN 65</td><td>OD 2 ½"</td></tr> <tr><td>DN 80</td><td>OD 3"</td></tr> <tr><td>DN 100</td><td>OD 4"</td></tr> </table>	DN 25	OD 1"	DN 40	OD 1 ½"	DN 50	OD 2"	DN 65	OD 2 ½"	DN 80	OD 3"	DN 100	OD 4"																																																		
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6	<b>Actuator type</b> S Air/spring																																																														
7	<b>Non-actuated position</b> Z Spring-to-close (NC) A Spring-to-open (NO)																																																														
8	<b>Control cone seal</b> M Metallic, no V-ring																																																														
9	<b>Kvs value</b> 6.3 DN 25, OD 1" 16 DN 40, OD 1 ½" 25 DN 50, OD 2" 35 DN 65, OD 2 ½" 60 DN 80, OD 3" 100 DN 100, OD 4"																																																														
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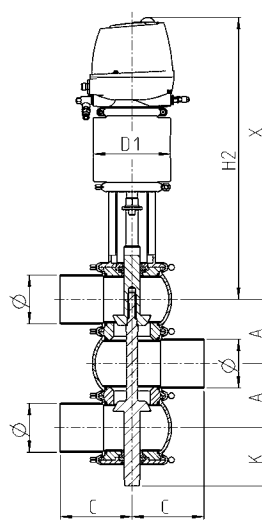


The code is composed as follows, depending on the chosen configuration:

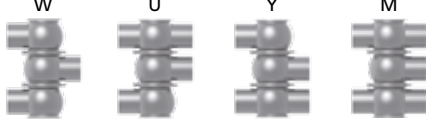
Position	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16 to 21					
Code	P		W	/	S		M		L0			2	N	/52	+	TP15	I		P	A



Technical data of the standard version		
Recommended flow direction	Product distribution	
Material in contact with the product	1.4404 (AISI 316L)	
Material not in contact with the product	1.4301 (AISI 304)	
Seal material in contact with the product	EPDM, FKM, HNBR	
Ambient temperature	0 to 45 °C	
Air supply pressure	5–8 bar (73–116 psi)	
Product pressure	DN 25–65, OD 1"–2 ½"	0–16 bar (0–232 psi)
	DN 80–100, OD 3"–4"	0–10 bar (0–145 psi)
Surface in contact with the product	DN, OD	R <sub>a</sub> ≤ 0.8 µm
External housing surface	Matte blasted	
Control and feedback system	Positioner T.VIS® P-15	
Actuator type	Air/spring	
Connection fittings	Welding end	
Identification	Adhesive ID tag	
Valve seat version	Clamped seat ring	
Certificates		



Nominal width	Pipe	Housing			Actuator	Dimension		Valve	
	Ø [mm]	A [mm]	C [mm]	K [mm]	D1 [mm]	H2 [mm]	X [mm]	Hub S [mm]	Weight [kg]
DN 25	29.0 × 1.50	50.0	90	73.5	110	458	692	15	9
DN 40	41.0 × 1.50	62.0	90	80.0	110	464	704	15	10
DN 50	53.0 × 1.50	74.0	90	85.5	110	470	716	15	11
DN 65	70.0 × 2.00	96.0	125	101.5	135	481	868	15	23
DN 80	85.0 × 2.00	111.0	125	110.0	170	519	914	15	22
DN 100	104.0 × 2.00	130.0	125	133.5	170	538	957	15	33
OD 1"	25.4 × 1.65	46.0	90	71.5	110	456	688	15	9
OD 1 ½"	38.1 × 1.65	59.0	90	78.5	110	466	705	15	10
OD 2"	50.8 × 1.65	71.5	90	84.5	110	472	717	15	11
OD 2 ½"	63.5 × 1.65	90.0	125	98.5	135	485	869	15	23
OD 3"	76.2 × 1.65	103.0	125	105.0	170	522	912	15	21
OD 4"	101.6 × 2.11	127.5	125	132.5	170	540	958	15	32

Position	Description of the order code																																																														
1	<b>Valve type</b> P VARIVENT® control valve																																																														
2	<b>Housing combinations</b> 																																																														
3	<b>Supplement to the valve type</b> X Divert valve, product distribution, linear characteristic curve																																																														
4/5	<b>Nominal width (upper housing/lower housing)</b> <table border="1"> <tr><td>DN 25</td><td>OD 1"</td></tr> <tr><td>DN 40</td><td>OD 1 ½"</td></tr> <tr><td>DN 50</td><td>OD 2"</td></tr> <tr><td>DN 65</td><td>OD 2 ½"</td></tr> <tr><td>DN 80</td><td>OD 3"</td></tr> <tr><td>DN 100</td><td>OD 4"</td></tr> <tr><td>DN 125</td><td></td></tr> <tr><td>DN 150</td><td>OD 6"</td></tr> </table>	DN 25	OD 1"	DN 40	OD 1 ½"	DN 50	OD 2"	DN 65	OD 2 ½"	DN 80	OD 3"	DN 100	OD 4"	DN 125		DN 150	OD 6"																																														
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6	<b>Actuator type</b> S Air/spring																																																														
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The code is composed as follows, depending on the chosen configuration:

Position	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16 to 21					
Code	P		X	/	S		M		L0			2	N	/52	+	TP15	I		P	A

## Concept

The positioner T.VIS® P-15 represents a low-cost alternative to proven positioners. The controller is equipped with a highly precise path measuring system and can move to any valve position between the taught open/close positions in combination with an air-spring actuator.

The T.VIS® P-15 is characterized not only by its performance but also by its ease of operation and outstanding price/performance ratio.

## Standard variant



- 1 Pneumatic block
- 2 Control unit
- 3 Path measuring system
- 4 Solenoid valves
- 5 LED lighting
- 6 2 push buttons
- 7 Exchangeable filter
- 8 M12 plug connection
- 9 Supply air throttle
- 10 Exhaust air throttle

## Features

Automatic initialization
Simple and safe operation
Manual operation of the process valve
Valve status display by LED
Open/close position feedback (optional)
Selectable dead band (control hysteresis)
High-quality pneumatic fittings
High potential for cost reduction
Standard protection class IP66

## Structure

The T.VIS® P-15 is equipped with a precise path measuring system for detecting its position.

The necessary wiring for control and feedback is configured using M12 plug connections that can be accessed externally.

The control top can be opened for this.

Operation and configuration of the T.VIS® P-15 takes place either by the two push buttons mounted on the cap or, with the cap removed, via the buttons below. The push buttons are secured electronically against inadvertent or incorrect operation, while in operating mode.

The T.VIS® P-15 is equipped with adjustable supply and exhaust air throttles as standard, through which the control quality can be adjusted individually.



## Position control

The T.VIS® P-15 position controller works with an integrated microprocessor which contains the software for operation, visualization as well as intelligent position detection and evaluation. When a nominal value is specified (4–20 mA), e.g. by the PLC, the process valve can be set to any required position. The push buttons on the cap also make it possible to specify a nominal value manually, in order to set the process valve to the required position. The position is detected using a position transducer and is automatically controlled using two integrated solenoid valves. The position of the cone can also be permanently evaluated using the analog actual value output, as well as, three binary outputs in the PLC.

## Setting

**Automatic** – following unlocking, simply pressing the two buttons on the cap of the T.VIS® P-15 starts the initialization process which runs fully automatically. There is no need to open the position controller for this purpose, resulting in particularly quick, easy and safe commissioning of the position controller (on average < 1 minute).

Immediately after the setup, end position tolerances, control hysteresis and control settings can be set.



## Visualization

### LED display:

- Green
- Yellow
- Red
- Blue
- Blue flashing

### Feedback

- Standard: valve position 0–100 %, opening amount (4–20 mA)
- Option: additionally 24 V DC feedback signals for open/close position and error output

## Service mode

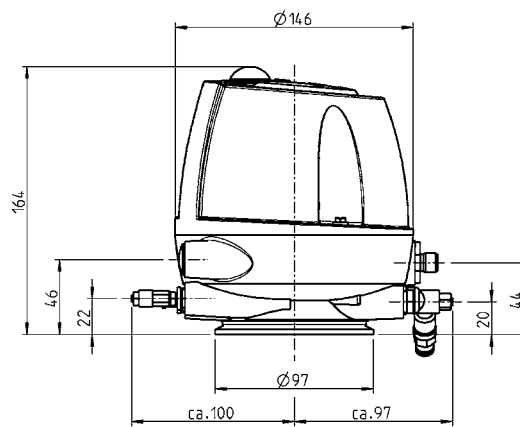
Activation of the main stroke, which may be required in VARIVENT® Control Valves Type P with closed (non-actuated) position for valve maintenance, is performed using the service mode that can be activated by the buttons. At the same time, all feedbacks are stopped (warning to the system control). Furthermore, input signals from the control room are not implemented by the T.VIS®, in order to protect the employee.

## Field of application

In addition to use on VARIVENT® control valves of type P, the T.VIS® P-15 can also be used on VARIVENT® and ECOVENT® seat valves and T-smart disc valves to control the valve disc position. Opening the valves to specific intermediate positions makes it possible to influence the hydraulic characteristics of the system.



Technical data of the standard version		
Position detection	Path measuring system	
Housing material	PA 12/L	
Ambient temperature	-20 to +55 °C	
Air supply	Pressure range	2 to 8 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (1/4")	
Protection class	IP66 (powerful water jet)	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	LED (green, yellow, red, blue)	



Type of interface	24 V DC programmable
<b>Supply</b>	
Supply voltage $U_V$	24 V DC (+20 %, -12.5 %)
No-load current	$\leq 20$ mA
Maximum current consumption	$\sum I = (I_{T,VIS} + I_{PV} + I_{RM}) = 260$ mA $\pm 10$ %
Maximum residual ripple	5 %
<b>Inputs</b>	
Control voltage max. 28.8 V DC	High = $\geq 13$ V DC Low = $\leq 6$ V DC
Pilot current	$\leq 10$ mA
<b>Outputs</b>	
Output voltage	High = $U_V - \leq 5$ % Low = $\leq 5$ V
Max. current	$(\sum I_{RM})$ 200 mA short circuit-proof
Switching frequency	(ohmic + inductive loads $\leq 25$ mH) 2 Hz
Operating current	Internal solenoid valve ( $I_{PV}$ ) 35 ... 45 mA
Analog input	Setpoint 4–20 mA/0–100 % stroke
Analog output	Actual value 4–20 mA/0–100 % stroke
Load	Max. 600 $\Omega$

Position	Description of the order code	
14	<b>Feedback location</b>	
	TP15 Control top T.VIS® P-15	
15	<b>Control top type</b>	
	I 2 solenoid valves	
16	<b>Feedback</b>	
	4 T.VIS® P-15 (with analog module)	
	5 T.VIS® P-15 (with analog module + 2 feedbacks/error output)	
17	<b>Type of interface</b>	
	P 24 V DC programmable	
18	<b>Solenoid valve</b>	
	A 24 V DC, 0.85 W	
19	<b>Screw connection (with analog module)</b>	
	J Metric air connection, 5-pin M12 plug, A-coded With feedback code 5: additional M12 plug B-coded inclusive	
	P Inch air connection, 5-pin M12 plug, A-coded With feedback code 5: additional M12 plug B-coded inclusive	
	IMPORTANT: Please also order the appropriate connection sockets as well.	
	<b>Options (multiple selection possible)</b>	
/22	5-pin connection socket for screw connection A-coded (article no. 508-963) 5-pin connection socket for screw connection B-coded (article no. 508-964)	
/67	Protection class IP67 (temporary immersion)	
/69k	Protection class IP69k (high pressure spray down)	
/UC	Certification UL/CSA	



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

<b>Position</b>	14	15	16	17	18	19	<b>Options</b>						
<b>Code</b>	TP15	I		P	A								



Typical application and description

Horizontal tank valves or horizontally installed valves are configured so the connection piping can be completely drained.

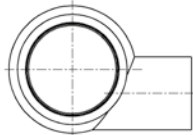
Tangential valve housings are provided with eccentrically welded-on vertical ports, as a result, no fluid remains in the housing sphere of the horizontal installation.

Various nominal widths are available. If required, please contact GEA Tuchenhausen to ask about the dimensions and feasibility.

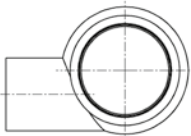
Available nominal widths
On request

Available valve types	
VARIVENT® control valve	P

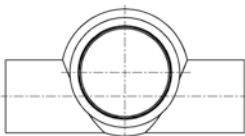
Technical data	
Material	1.4404 (AISI 316L)
Product pressure	10 bar
Valve seat version	Clamped or welded housing connection



Tangential right  
(view from the direction of the actuator)



Tangential left  
(view from the direction of the actuator)



Tangential straight  
(view from the direction of the actuator)

Incorporation of the option in the order code and example

Position	Description of the order code for options
15	<b>Accessories</b>
	/TR Tangential right
	/TL Tangential left
	<b>/TT</b> Tangential straight

<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21				
<b>Code</b>	P		J	- DN 80/DN 80 -	S	Z	-	M	60	-	CD	L0	1	2	N	/52	<b>/TT</b>	+	TP15	I		P	A	



Typical application and description

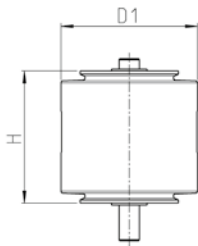
As one of the basic elements of the VARIVENT® modular system, the actuator air/spring is used for performing the valve movement in all VARIVENT® valves.

The air supply is connected to the particular control and feedback system and led via the internal air channel under the piston surface of the actuator. Simply by reversing the actuator, it is possible to convert the fail-safe position of the valve (in single-seat valves) from spring-to-close (NC) to spring-to-open (NO). In these cases, or if the product or air supply pressure differs from the standard, check the definition of the actuator size based on the selection sheets from page 178 onwards.

Available nominal widths		
Metric	DN	25 – 150
Inch OD	OD	1" – 6"
Inch IPS	IPS	2" – 6"

Available valve types	
VARIVENT® control valve	P

Technical data	
Material	1.4301
Outside surface	Turned, R <sub>a</sub> ≤ 1.6 µm



Type	Dimensions			Type	Dimensions		
No. 8 in the order code	D1 [mm]	H [mm]	Weight [kg]	No. 8 in the order code	D1 [mm]	H [mm]	Weight [kg]
AA	99	95	3.2	BD5	140	140	5.1
BA	110	130	4.3	DD5	160	160	9.0
BB	110	130	4.5	DF5	170	170	10.4
BD	110	130	5.1	DG5	170	170	11.1
CA	135	130	5.7	ED5	160	160	12.3
CB	135	130	5.8	EF5	170	170	12.9
CD	135	130	6.2	EG5	170	170	13.5
CF	135	130	7.0	EH5	170	170	14.1
DB	170	160	8.0	DF6	170	199	13.5
DD	170	160	8.7	EF6	210	246	20.5
DF	170	160	9.6	EG6	210	246	21.7
DG	170	160	10.8	EH6	210	246	24.2
DH	170	160	11.4	EK6	210	246	25.5
ED	210	160	11.2	SG6	260	246	26.0
EF	210	160	12.1	SH6	260	246	28.4
EG	210	160	13.2	SK6	260	246	29.8
EH	210	160	13.8	SM6	260	246	33.4
				SN6	260	246	35.8

Incorporation of the option in the order code and example

Position	Description of the order code for options	
6	<b>Actuator type</b>	
	S	Air/Spring
10	<b>Actuator</b>	
...	...	Acc. to actuator selection scheme (e.g. EF)

Position	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21			
Code	P		J	- DN 80/DN 80 -	S	Z	-	M	60	-	CD	L0	1	2	N	/52	+	TP15	I		P	A	





Typical application and description

For manual operation of VARIVENT® valves.

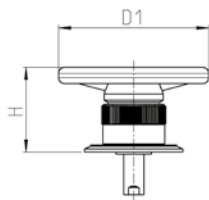
The manual actuator is designed as a handwheel up to the nominal width DN 100 or 4". With larger nominal widths, the manual actuator is designed as a crank. The manual actuator can be locked in any position using a lock nut.

One full turn of the manual actuator results in a valve stroke of 11 mm, irrespective of the nominal width.

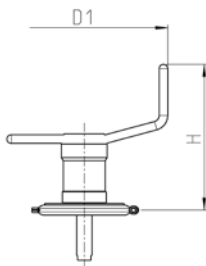
Available nominal widths		
Metric	DN	25 – 100
Inch OD	OD	1" – 6"
Inch IPS	IPS	2" – 6"

Available valve types	
VARIVENT® control valve	P

Technical data	
Material	1.4301
Outside surface	Turned, R <sub>a</sub> ≤ 1.6 µm



G1 and G2



G6

Nominal width	Type	Dimensions			
		No. 10 in order code	D1 [mm]	H [mm]	Weight [kg]
DN 25 – DN 50 1" – 2"	G1		148	107	2.7
DN 65 – DN 100 2 ½" – 4"	G2		198	113	3.1
DN 125 – DN 150 6"	G6		532	239	5.8

Incorporation of the option in the order code and example

Position	Description of the order code for options
6	<b>Actuator type</b>
	G Manual actuator
10	<b>Actuator</b>
...	Acc. to size (e.g. G2)

Position	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
Code	P		J	- DN 80/DN 80	G	Z	- M	60	G2	L0	1	2	N	/52	+	0	0	0	0	0	0

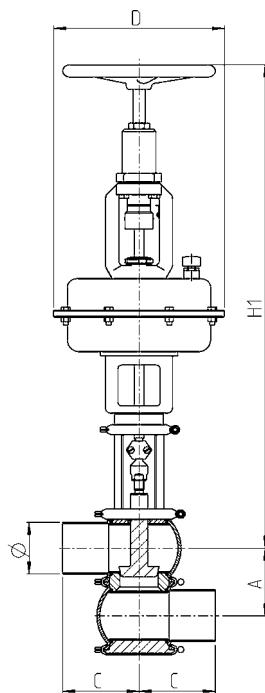


Typical application and description

Optionally, the diaphragm actuators can be equipped with an additional manual adjustment. This is attached on the upper actuator lid. The handwheel can be used to manually adjust the stroke of the valve disc against the spring force of the actuator.

Available valve types	
VARIVENT® control valve	S

Diaphragm surface [cm²]	D [mm]	H1 [mm]	H2 [mm]	Weight [kg]
175	180	234	279	4
350	250	237	282	5
750	315	355	403	5



Incorporation of the option in the order code and example

Position	Description of the order code for options
15	<b>Accessories</b>
	/5 Additional handwheel

<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16				
<b>Code</b>	S	B	F	- DN80/DN80 -	Z	M	80	-	350	8	-	S	-	1	2	N	/5	+	0-----



Typical application and description

Mechanically adjustable limit on the stroke.

The maximum stroke can be reduced by using a mechanically adjustable limit stop. The limit stop limits either the opening or the closing stroke of the valve. The minimum stroke is 5 mm.

It is not possible to install a proximity switch as a feedback function in the lantern!

NOTE: The limit stop can not be used simultaneously with a sterile lock.

Available nominal widths		
Metric	DN	25–150
Inch OD	OD	1"–6"
Inch IPS	IPS	2"–6"

Available valve types	
VARIVENT® control valve	P

Technical data	
Material	1.4301
Setting possibility	Limitation of the stroke in closing or opening direction

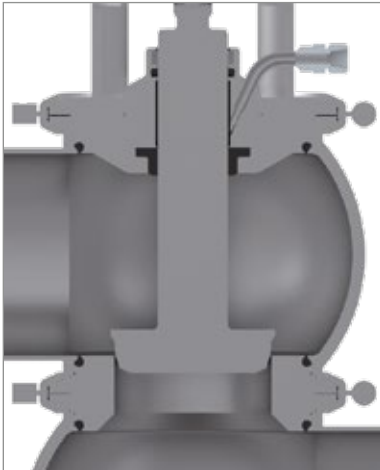
			Type	Dimensions
Valve type			P	
Nominal width				Weight [kg]
DN 25	OD 1"		N 25–50	0.4
DN 40	OD 1 ½"		N 25–50	0.4
DN 50	OD 2"	IPS 2"	N 25–50	0.4
DN 65	OD 2 ½"		N 65–100	0.7
DN 80	OD 3"	IPS 3"	N 65–100	0.7
DN 100	OD 4"	IPS 4"	N 65–100	0.7
DN 125			N 125–6"IPS	1.1
DN 150	OD 6"	IPS 6"	N 125–6"IPS	1.1

Incorporation of the option in the order code and example

Position	Description of the order code for options
15	<b>Accessories</b>
	/20 Limit stop, opening
	/21 Limit stop, closing

<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
<b>Code</b>	P		J	- DN 80/DN 80 -	S	Z	- M	60 -	CD	L0	1	2	N	/20 /52 +	TP15	I		P	A	





Typical application and description

The sterile lock is used for reliable separation between the surface of the valve disc in contact with the product and the atmosphere.

Applying sterilizing media to the sterile lock prevents contamination of the product from atmosphere due to the switching movement of the valve stem ("elevator effect").

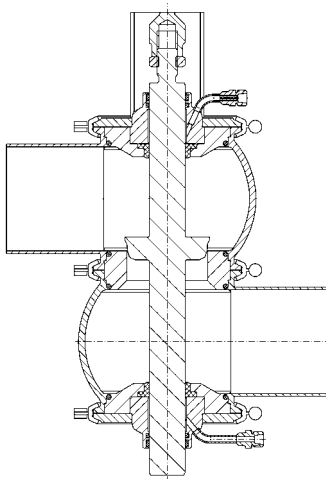
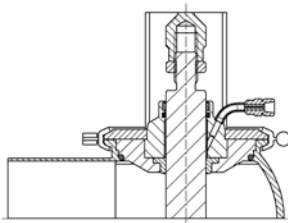
If the media has a tendency towards crystallization, this effect can be avoided by pressurizing the sterile lock with a liquid and securing the shaft seal against damage.

If this option is selected with valves with double stem guide, both the upper and the lower stem feedthrough will be equipped with a sterile lock.

Available nominal widths		
Metric	DN	25–150
Inch OD	OD	1"–6"

Available valve types	
VARIVENT® control valve	S

Technical data	
Material	1.4301
Barrier fluid	e.g. sterile water, condensate, steam
<b>IMPORTANT: The sterile lock is not suitable for permanent vapor application. Brief actuation is recommended after or before the switching procedure.</b>	



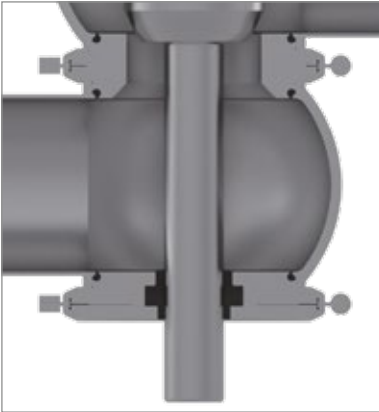
Nominal width		Dimensions	
		Connection [mm]	Weight [kg]
DN 25	OD 1"	6/4	0.4
DN 40	OD 1 ½"	6/4	0.8
DN 50	OD 2"	6/4	0.8
DN 65	OD 2 ½"	6/4	1.5
DN 80	OD 3"	6/4	1.5
DN 100	OD 4"	6/4	2.6
DN 125		6/4	5.9
DN 150	OD 6"	6/4	7.2

Incorporation of the option in the order code and example

Position	Description of the order code for options														
15	<b>Accessories</b>														
	/24 Sterile lock complete														

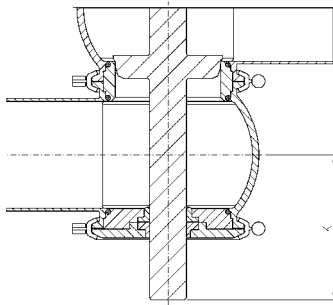
Position	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16				
Code	S	B	F	- DN80/DN80 -	Z	M	80	-	350	8	-	S	-	1	2	N	/24	+	0-----





Typical application and description

The double guidance of the valve stem is recommended to avoid vibrations that may result from the flow dynamics within the valve body. The additional bearing of the stem in the lower housing is available from a nominal width of DN 80, OD 3", IPS 3" onwards. Modulating control valves with 3-stage seat\* and divert valves\* are equipped as standard with double stem guide.



Available valve types	
VARIVENT® control valve	S

VARIVENT® control valve type S and P with equal percentage and linear characteristic		
Nominal width	Kvs	K [mm]
DN 80	35-80	109.5
DN 100	60-80	119.0
DN 100	100-160	134.0
DN 125	100-260	147.5
DN 150	200-360	166.0
OD 3"	35-80	109.5
OD 4"	60-80	119.0
OD 4"	100-160	134.0
OD 6"	200-360	166.0
IPS 3"	35-80	109.5
IPS 4"	60-80	119.0
IPS 4"	100-160	134.0
IPS 6"	200-360	166.0

\* Dimensions for 3-stage Seat Control Valves or Divert valves can be found on the particular valve pages.

Incorporation of the option in the order code and example

Position	Description of the order code for options
15	Accessories
	<b>/2F</b> Double stem guidance

Position	1	2	3	4/5	6	7	8	9	10	11	12	13	14	15	16				
Code	S	B	F	- DN80/DN80 -	Z	M	80	-	350	8	-	S	-	1	2	N	<b>/2F</b>	+	0-----



Typical application and description

For transporting VARIVENT® and ECOVENT® valves with pneumatic actuator for assembly and maintenance purposes.

The transport device is screwed into the piston stem of the actuator after removal of the control and feedback system and thus permits secure transport with available lifting equipment. The transport device must be removed before commissioning.

Available nominal widths		
Metric	DN	25 – 150
Inch OD	OD	1" – 6"
Inch IPS	IPS	2" – 6"

Available valve types	
VARIVENT® control valve	P

Technical data	
Material	1.4301
Connection size	M14
Article number	221-104.98





Typical application and description

For manual actuation of pneumatic VARIVENT® valves if there is a power failure as well as for actuation during maintenance and assembly work.

The emergency manual actuator attachment NOH is used for manual activation of all pneumatically operated VARIVENT® valves as well as for maintenance and assembly work on all valve types. Radial sealing valves with lifting actuator represent an exception to this. The manual emergency actuator cannot be used in these valves.

Available nominal widths		
Metric	DN	25 – 150
Inch OD	OD	1" – 6"
Inch IPS	IPS	2" – 6"

Available valve types	
VARIVENT® control valve	P

Technical data	
Material	1.4301
Article number	221-310.74

Control Valve Design

Formula symbols used:

Q	= Flow rate (liquid)	[m <sup>3</sup> /h]
Q <sub>N</sub>	= Flow rate (gas) at the standard condition	[m <sup>3</sup> /h]
p <sub>1</sub>	= Pressure upstream of the valve	[bar abs.]
p <sub>2</sub>	= Pressure downstream of the valve	[bar abs.]
Δp	= Differential pressure	[bar]
ρ	= Density (liquid)	[kg/m <sup>3</sup> ]
ρ <sub>N</sub>	= Density (gas) at the standard condition	[kg/m <sup>3</sup> ]
η	= Dynamic viscosity	[mPas]
T <sub>1</sub>	= 273+t <sub>1</sub> = Operating temperature	[Kelvin]
	= Operating temperature	[°C]

1. Kv value calculation:

Kv- value = Valve-stroke-dependent flow volume Q in m<sup>3</sup>/h referring to water at t = 5 to 30 at a differential pressure of Δp = p<sub>1</sub> - p<sub>2</sub> = 1 bar in the control valve.

For low-viscous liquids:

$$Kv = \frac{Q}{31.6} \sqrt{\frac{\rho}{\Delta p}} \left[ \frac{m^3}{h} \right]$$

For gases:

- Subcritical pressure reduction at Δp < 0.5 p<sub>1</sub> or p<sub>2</sub> > 0.5 p<sub>1</sub>

$$Kv = \frac{Q_N}{514} \sqrt{\frac{\rho_N \times T_1}{\Delta p \times p_2}} \left[ \frac{m^3}{h} \right]$$

- Over-critical pressure reduction at Δp < 0.5 p<sub>1</sub> or p<sub>2</sub> < 0.5 p<sub>1</sub>

$$Kv = \frac{Q_N}{257 \times p_1} \sqrt{\rho_N \times T_1} \left[ \frac{m^3}{h} \right]$$

Over-critical pressure reduction = strong noise development

Example 1: low-viscous liquid

Q = 30 m<sup>3</sup>/h, = 1000 kg/m<sup>3</sup>, Δp = 0.5 bar, p<sub>1</sub> = 7 bar

$$Kv = \frac{30}{31.6} \sqrt{\frac{1000}{0.5}} \approx 42.46 \left[ \frac{m^3}{h} \right]$$

At different operating conditions:  
Highest throughput and lowest differential pressure.

For high-viscous liquids:

$$Kv_T = \frac{Q}{31.6} \sqrt{\frac{\rho}{\Delta p}} \left[ \frac{m^3}{h} \right]$$

$$Kv_L = \frac{1}{1.05} \left( \frac{Q \times \eta}{216 \times \Delta p} \right)^{\frac{2}{3}} \left[ \frac{m^3}{h} \right]$$

$$\frac{Kv_T}{Kv_L} < 0.46 \Rightarrow Kv_L = Kv \quad \frac{Kv_T}{Kv_L} > 20 \Rightarrow Kv_T = Kv$$

$$0.46 < \frac{Kv_T}{Kv_L} < 20 \Rightarrow \text{Calculation as below}$$

$\frac{Kv_T}{Kv_L}$	0.46	0.52	0.59	0.68	0.8	1.00	1.35	1.9	3.0	4.9	9.5	20
F <sub>R</sub>	0.46	0.50	0.54	0.58	0.62	0.68	0.74	0.80	0.86	0.90	0.94	0.98

$$Kv = \frac{Q}{F_R \times 31.6} \sqrt{\frac{\rho}{\Delta p}}$$



## 2. Determination of the Kvs value and the valve size

The chosen Kvs value must be above the calculated Kv value. This ensures that the control valve works even at deviating operating data (Reserve).

There are two cases for this:

### Linear control cone

$$Kv_{req.} = \frac{Kv \text{ value calculated}}{\approx 0.7}$$

### Equal-percentage control cones

$$Kv_{req.} = \frac{Kv \text{ value calculated}}{\approx 0.6}$$

## 3. Determination of the control cone

The characteristic curve of the control valve is defined as the dependence of the Kv value from the stroke. Control valves are performed either with an equal-percentage or a linear characteristic curve. The equal-percentage characteristic curve is characterized by stroke changes leading to same percentage changes of the particular Kv value. For a linear characteristic curve, same stroke changes cause changes to the Kv value.

The selection of the control cone depends on the ratio of the pressure reduction  $\Delta p = p_1 - p_2$  in the control valve at maximum flow to the pressure reduction  $\Delta p_{ges}$  in the entire system.

- Linear control cones are used if more than 30% of the total pressure drop is caused in the line system of the control valve. Level control is a typical example for this.
- Equal-percentage control cones are used if less than 30% of the total pressure drop is caused in the line system of the control valve; these are approx. 90 % of the applications of the control valves.

### Example:

$Kv = 42.5 \text{ m}^3/\text{h}$ , equal-percentage control characteristics

$$Kv_{req.} = \frac{42.5}{0.6} = 70.8$$

According to the data sheet, a Kvs value of  $80 \text{ m}^3/\text{h}$  must be chosen, i.e. management of the control task set requires a valve of DN 80.

## 4. Determination of the nominal width and actuator size of the valve

Calculation of the actuator forces is the basis for the actuator selection scheme. The diaphragm actuator to be chosen acc. to the required closing force is determined depending on the selected Kvs value of the valve and the maximum product pressure. This information must be specified in the order.

Example:

Chosen Kvs = 80,  $p_1 = 7 \text{ bar}$ , ( $Q = 30 \text{ m}^3/\text{h}$ )

A valve nominal width of DN 80 is chosen from the data sheet. An actuator of size 350 results. Based on the flow volume, a flow speed of  $1.6 \text{ m/s}$  through the valve results.

## Actuator selection for VARIVENT® Control Valve, Type S spring to close

Nominal width	Kvs	Seat bore Ø [mm]	Maximum product pressure [bar]	Diaphragm surface of the actuator [cm <sup>2</sup> ]	Actuation pressure [bar]	Stroke [mm]		
DN 25, OD 1"	0.1	3	20	175	1.00-3.00			
	0.16	3						
	0.25	3						
	0.63	6						
	1	6						
	1.6	12						
	2.5	12						
	4	12						
DN 40, OD 1 ½"	6.3	24	20	175	1.00-3.00	15		
	10	24	20	175	1.00-3.00			
	16	31	15.5	175	1.00-3.00			
			20	350	0.80-2.40			
	25	38	10	175	1.00-3.00			
			18.5	350	0.80-2.40			
			20	350	2.10-3.30			
	DN 50, OD 2", IPS 2"	10	24	20	175		1.00-3.00	15
16		31	15.5	175	1.00-3.00			
			20	350	0.80-2.40			
25		38	10	175	1.00-3.00			
			18.5	350	0.80-2.40			
			20	350	2.10-3.00			
35 and 40		48	6	175	1.00-3.00			
			11	350	0.80-2.40			
			20	350	2.10-3.30			
			10	175	1.00-3.00			
DN 65, OD 2 ½"	25	38	18.5	350	0.80-2.40	15		
			20	350	2.10-3.30			
			6	175	1.00-3.00			
	35 and 40	48	11	350	0.80-2.40			
			20	350	2.10-3.30			
			6	350	0.80-2.40			
	60	63	19.3	350	2.10-3.30			
DN 80, OD 3", IPS 3"	35 and 40	48	6	175	1.00-3.00	15		
			11	350	0.80-2.40			
			20	350	2.10-3.30			
	60	63	6	350	0.80-2.40			
			19.3	350	2.10-3.30			
	80	80	11.7	350	2.10-3.30			
			20	750	2.40-3.60			
6			350	0.80-2.40				
DN 100, OD 4", IPS 4"	60	63	19.3	350	2.10-3.30	15		
			11.7	350	2.10-3.30			
			20	750	2.40-3.60			
	80	80	20	750	1.65-2.65			
			160	100	13.1		750	1.65-2.65
			18	750	2.20-3.40			
DN 125	100	80	10	750	1.65-2.65	30		
	160	100	10	750	1.65-2.65			
	200	110	10	750	1.65-2.65			
	260	130	7.6	750	1.65-2.65			
			10	750	2.20-3.40			
DN 150, OD 6", IPS 6"	200	110	10	750	1.65-2.65	30		
	260	130	7.6	750	1.65-2.65			
			10	750	2.20-3.40			
	360	150	5.6	750	1.65-2.65			
			7.8	750	2.20-3.40			

\* The data apply at flow against the fail-safe position of the cone. The maximum permitted product pressures must not be exceeded. The minimum required air supply pressure is 4 bar.

Customer			
Company/Customer Number	_____		
Project	_____		
Contact	_____		
Phone	_____		
E-Mail	_____		
Product			
	Case I (e.g. product at full load)	Case II (e.g. product at partial load)	Case III (e.g. CIP)
Type of medium	<input type="checkbox"/> Liquid <input type="checkbox"/> Gas / gaseous <input type="checkbox"/> Saturated steam	<input type="checkbox"/> Liquid <input type="checkbox"/> Gas / gaseous <input type="checkbox"/> Saturated steam	<input type="checkbox"/> Liquid <input type="checkbox"/> Gas / gaseous <input type="checkbox"/> Saturated steam
Name of medium	_____	_____	_____
Density $\rho$	_____ <input type="checkbox"/> kg/m <sup>3</sup> <input type="checkbox"/> lb/gal [US] <input type="checkbox"/> lb/gal [UK]	_____ <input type="checkbox"/> kg/m <sup>3</sup> <input type="checkbox"/> lb/gal [US] <input type="checkbox"/> lb/gal [UK]	_____ <input type="checkbox"/> kg/m <sup>3</sup> <input type="checkbox"/> lb/gal [US] <input type="checkbox"/> lb/gal [UK]
Viscosity $\eta$ (for liquids only)	_____ mPas/cP	_____ mPas/cP	_____ mPas/cP
Compressibility factor Z (for gas)	_____	_____	_____
Isentropic exponent $\gamma$ (gases and steams)	_____	_____	_____
Process			
Unit for pressure	<input type="checkbox"/> bar-g <input type="checkbox"/> lb/ft <sup>2</sup> -g <input type="checkbox"/> mbar-g <input type="checkbox"/> psi-g <input type="checkbox"/> MPa-g	<input type="checkbox"/> bar-g <input type="checkbox"/> lb/ft <sup>2</sup> -g <input type="checkbox"/> mbar-g <input type="checkbox"/> psi-g <input type="checkbox"/> MPa-g	<input type="checkbox"/> bar-g <input type="checkbox"/> lb/ft <sup>2</sup> -g <input type="checkbox"/> mbar-g <input type="checkbox"/> psi-g <input type="checkbox"/> MPa-g
Input pressure $p_1$	_____	_____	_____
Output pressure $p_2$	_____	_____	_____
Differential pressure (optional)	_____	_____	_____
Application temperature	_____ <input type="checkbox"/> K <input type="checkbox"/> °F <input type="checkbox"/> °C	_____ <input type="checkbox"/> K <input type="checkbox"/> °F <input type="checkbox"/> °C	_____ <input type="checkbox"/> K <input type="checkbox"/> °F <input type="checkbox"/> °C
Flow	_____ <input type="checkbox"/> l/h <input type="checkbox"/> m <sup>3</sup> /h <input type="checkbox"/> mn <sup>3</sup> /h <input type="checkbox"/> gpm <input type="checkbox"/> kg/h <input type="checkbox"/> lb/h <input type="checkbox"/> scfm	_____ <input type="checkbox"/> l/h <input type="checkbox"/> m <sup>3</sup> /h <input type="checkbox"/> mn <sup>3</sup> /h <input type="checkbox"/> gpm <input type="checkbox"/> kg/h <input type="checkbox"/> lb/h <input type="checkbox"/> scfm	_____ <input type="checkbox"/> l/h <input type="checkbox"/> m <sup>3</sup> /h <input type="checkbox"/> mn <sup>3</sup> /h <input type="checkbox"/> gpm <input type="checkbox"/> kg/h <input type="checkbox"/> lb/h <input type="checkbox"/> scfm



Basic data	
Valve type	<input type="checkbox"/> Typ S <input type="checkbox"/> Typ P
Housing combination	<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> E <input type="checkbox"/> L <input type="checkbox"/> T <input type="checkbox"/> W <input type="checkbox"/> U <input type="checkbox"/> Y <input type="checkbox"/> M
Nominal size standard	<input type="checkbox"/> DN <input type="checkbox"/> OD <input type="checkbox"/> IPS
Control characteristics	<input type="checkbox"/> Equal-percentage <input type="checkbox"/> Linear
Options for the control valve	<input type="checkbox"/> 3-stage seat <input type="checkbox"/> Divert valve type W <input type="checkbox"/> Divert valve type X
Seat seal	<input type="checkbox"/> Metallic <input type="checkbox"/> Soft-sealing
Seal material	<input type="checkbox"/> EPDM <input type="checkbox"/> FKM <input type="checkbox"/> HNBR <input type="checkbox"/> FFKM (on request)
Positioner basic type S	<input type="checkbox"/> 3730-0 <input type="checkbox"/> 3730-1 <input type="checkbox"/> 3730-2 <input type="checkbox"/> 3730-3 HART <input type="checkbox"/> 3730-4 PROFIBUS® <input type="checkbox"/> 3730-5 FOUNDATION™ Fieldbus <input type="checkbox"/> 3767 i/p <input type="checkbox"/> 3766 p/p <input type="checkbox"/> 3725
Options for the positioner	<input type="checkbox"/> Inductive threshold contact <input type="checkbox"/> Analogue position indicator (4...20 mA) <input type="checkbox"/> Pressure gage component
Options for the control valve	<input type="checkbox"/> Double stem guide <input type="checkbox"/> Sterile lock <input type="checkbox"/> Additional manual adjustment
Certificates	<input type="checkbox"/> 3A <input type="checkbox"/> ATEX <input type="checkbox"/> FDA
Certificates	<input type="checkbox"/> 3.1 Certificate
Comments /Miscellaneous	<hr/> <hr/> <hr/> <hr/>



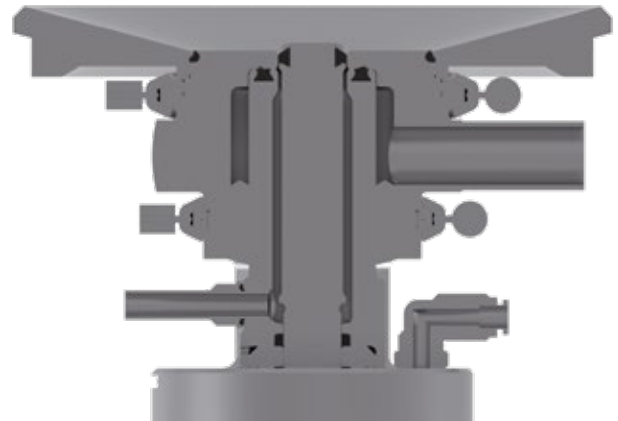


### VARIVENT®/VARINLINE®

VARIVENT®/VARINLINE® valves are characterized by their ease of operation and flexibility. The modular design of the VARIVENT® modular system offers the user a wide range of options. The variable system of VARIVENT®/VARINLINE® products permits adjustable use of the valves.

### Function of the valve

The sampling valves can be installed either by the process connection options of the VARINLINE® housing or through direct connection in the process. The valve is manually or pneumatically opened for sampling. The valve position can be reported to the PLC via proximity switches. An integrated metallic stop in the actuator prevents excess pressure on the seals.





### Application examples

Sampling valves can be employed in a variety of situations. In practice, these valves are often integrated into the processes of the dairy, brewing or beverage industries. An example of a typical application is in the fermentation tanks of breweries.

#### Special features

Certified hygienic design

Flexibility because of the modular principle

Simple connection options

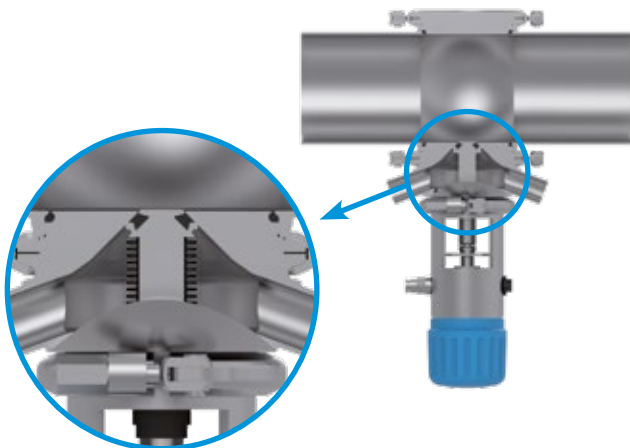
### Sampling valve VARIVENT® type I

The sampling valve VARIVENT® type I is installed into the process system upright. The actuator is dually configured so that the valve can be actuated pneumatically or manually. Due to the conical contour of the valve disc, smaller sample volumes can be tapped as well. The VARIVENT® type I valve can be expanded with various individual components. Using up to two proximity switches permits detection of the closed and/or open valve positions.



### Sampling valve VARINLINE® type TSVN and TSVU

The sampling valve VARINLINE® type TSV in the versions N and U can be installed into the process system vertically or horizontally. The VARIVENT® modular system makes the valve compatible with the VARINLINE® product family. The connection sockets of the sampling housing permit integration of the valve into a sampling system or alternatively connecting the second port to the CIP supply. The illustrated model shows version N. In version U, the valve disc closes for the product side and therefore additionally protects against product loss in water hammers. The valve type TSV is also available as an aseptic sampling valve with stainless steel bellows.



### Sampling valve VARIVENT® type T/09

The mixproof sampling valve type T/09 of series VARIVENT® is used as a fully automatic sampling and dosing valve. The sampling line can be cleaned or sterilized immediately after sampling via connected CIP-/SIP-loop. The design as a mixproof double-seat valve ensures that the process can be executed safely in the connected tank during cleaning or sterilization.



### Fully automated sampling

The double-seat valve can be fitted on the tank simply with the connection through a tank flange. The VARIVENT® interface permits installation of all common TVIS® control tops so that the valve can be used for fully automated sampling. The mixproof design as double-seat valve offers the option of cleaning and sterilizing the sampling line independently of the tank.

### Simple dosage

The compact double-seat valve is very suitable for the dosage of smaller liquid volumes into larger process lines. The inline connection provided as standard permits easy insertion of the valve into the common VARINLINE® housings (process connection N) and seals flush with the pipe – free of dead zones.

Sampling

The sampling valve is available with single or double horizontal ports in the sampling line. The sampling line is always size DN 15. The process connection N as standard connects the valve directly to the tank via tank flanges.



For tank or pipe cleaning, the valve disc is lifted and the cleaning media flow into the leakage chamber. This cleans the seal of the valve disc and discharges the cleaning media through the periphery. The V-ring of the double disc seals off the cleaning medium against percolation into the sampling chamber.



Cleaning the leakage chamber

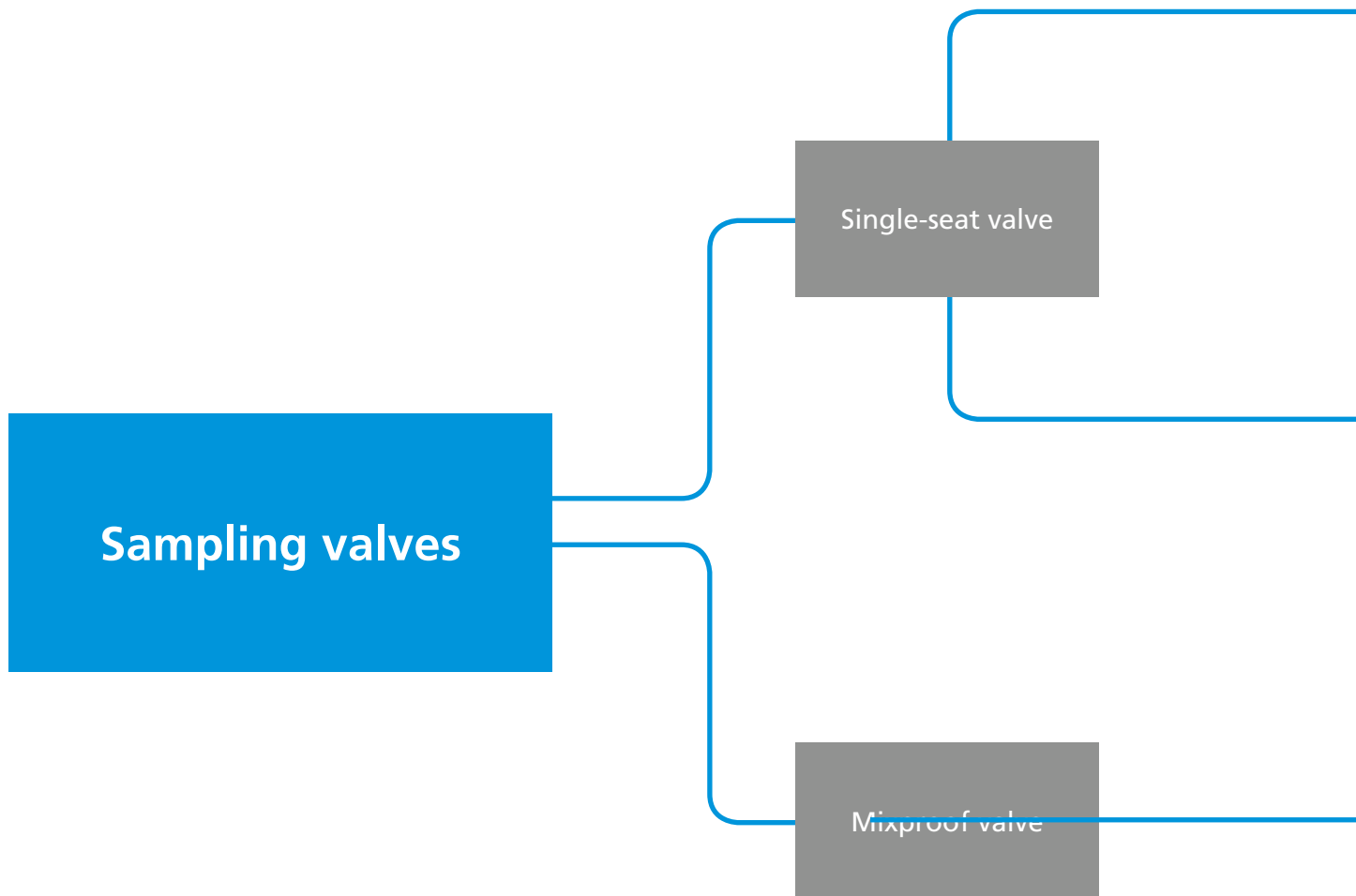
Cleaning the leakage chamber takes place via the lift functions of the two valve discs during the pipeline or tank cleaning phases. This function ensures an individual lifting of the individual valve discs independently of each other.

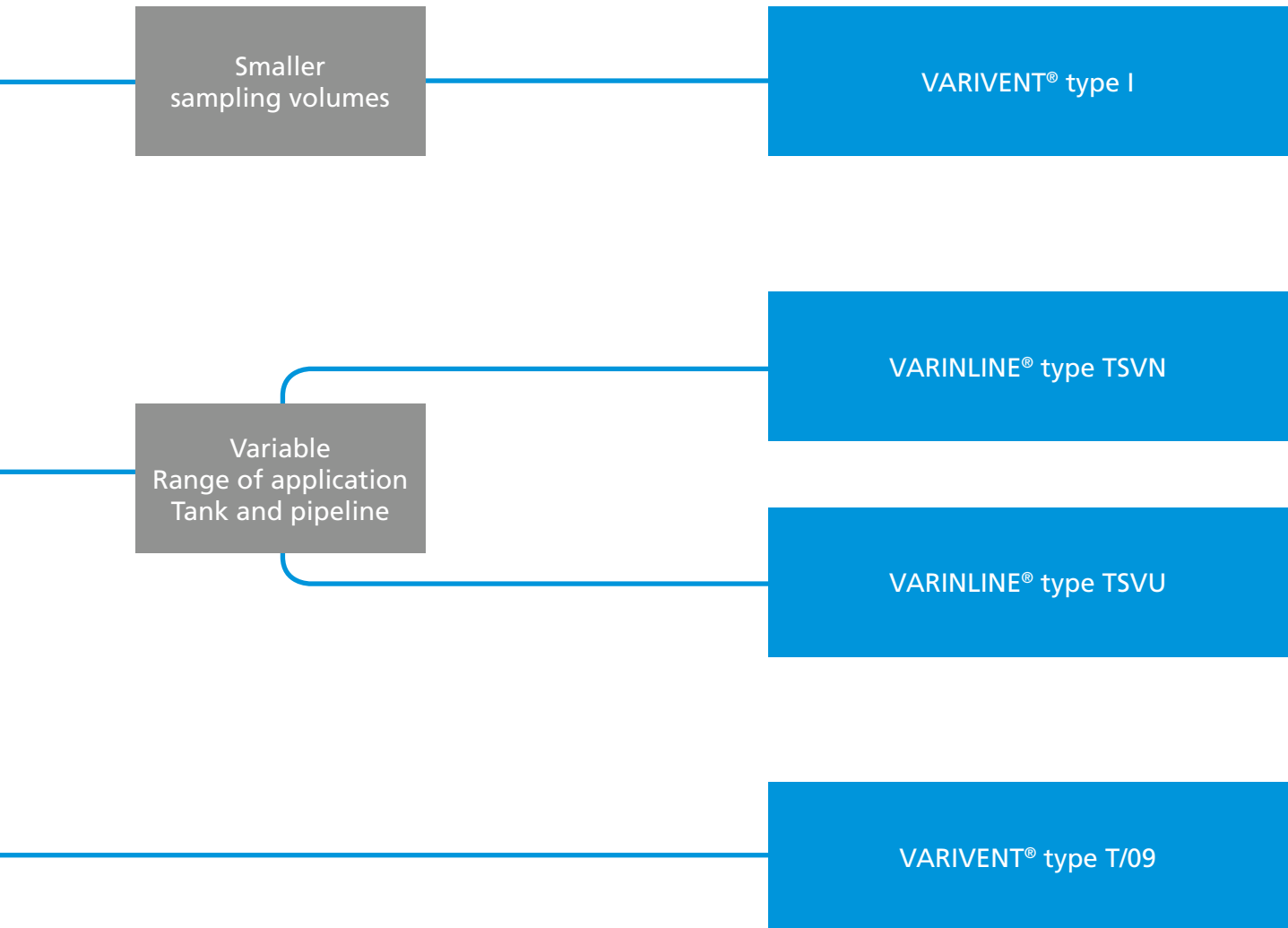


The advantages
Permits fully automated sampling
Completely drainable even in the horizontal installation
Small, compact and light-weight
Level shut-off free of dead zones


Special features
Mixproof
VARIVENT® sealing principle
Both valve discs can be cleaned via lifting function
VARINLINE® connection flange
Equipment with common feedback systems possible

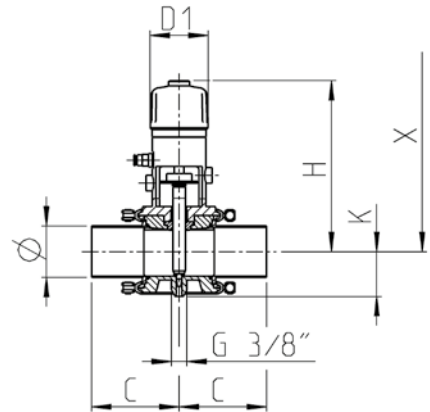
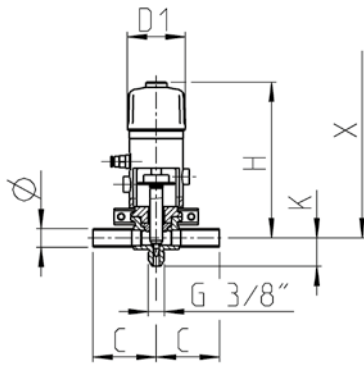
4.2








Technical data of the standard version		
Material in contact with the product	1.4404 (AISI 316L), 1.4460	
Material not in contact with the product	1.4301 (AISI 304)	
Seal material in contact with the product	EPDM, FKM, HNBR	
Ambient temperature	0 to 60 °C	
Air supply pressure	Min. 4 bar (87 psi)	
Product pressure	Max. 10 bar (145 psi)	
Surface in contact with the product	DN, OD	$R_a \leq 0.8 \mu\text{m}$
	IPS	$R_a \leq 1.2 \mu\text{m}$
External housing surface	Matte blasted	
Control and feedback system	Connection 0 (without control top)	
Actuator type	Pneumatic actuator air/spring	
Connection fittings	Welding end with additional connection fittings	
Identification	Adhesive ID tag	
Certificates		



Nominal width	Pipe	Housing		Dimension		Actuator	Valve	
	Ø [mm]	C [mm]	K [mm]	H [mm]	X [mm]	D1 [mm]	Stroke [mm]	Weight [kg]
DN 10	13.0 × 1.50	65.0	26.0	156.0	193	60	5.5	1.5
DN 15	19.0 × 1.50	65.0	29.0	159.0	202	60	8.0	1.6
DN 25	29.0 × 1.50	90.0	34.0	162.0	210	60	8.0	2.2
DN 40	41.0 × 1.50	90.0	40.0	168.0	222	60	8.0	3.0
DN 50	53.0 × 1.50	90.0	46.0	174.0	234	60	8.0	3.2
DN 65	70.0 × 2.00	125.0	54.0	182.0	250	60	8.0	3.8
DN 80	85.0 × 2.00	125.0	61.5	189.5	265	60	8.0	4.0
DN 100	104.0 × 2.00	125.0	71.0	199.0	284	60	8.0	4.4
DN 125	129.0 × 2.00	125.0	83.5	211.5	310	60	8.0	4.7
DN 150	159.0 × 2.00	150.0	96.0	224.0	323	60	8.0	9.1
OD 1"	25.4 × 1.65	90.0	32.0	160.0	206	60	8.0	2.1
OD 1 1/2"	38.1 × 1.65	90.0	38.5	166.5	219	60	8.0	3.0
OD 2"	50.8 × 1.65	90.0	44.7	173.0	232	60	8.0	3.1
OD 2 1/2"	63.5 × 1.65	125.0	51.0	179.0	244	60	8.0	3.6
OD 3"	76.2 × 1.65	125.0	57.5	185.5	257	60	8.0	3.8
OD 4"	101.6 × 2.11	125.0	69.7	198.0	282	60	8.0	4.3
OD 6"	152.4 × 2.77	150.0	92.7	221.0	346	60	8.0	9.5
IPS 2"	60.3 × 2.00	114.3	49.5	177.5	241	60	8.0	3.6
IPS 3"	88.9 × 2.30	152.5	63.4	191.5	269	60	8.0	4.2
IPS 4"	114.3 × 2.30	152.5	76.0	204.0	294	60	8.0	5.2
IPS 6"	168.2 × 2.77	152.5	102.0	230.0	346	60	8.0	10.3



Position	Description of the order code																														
1	<b>Valve type</b> I VARIVENT® sampling valve																														
2	<b>Gehäusekombinationen</b> 																														
3	<b>Nominal width (housing)</b> <table border="1"> <tr><td>DN 10</td><td></td><td></td></tr> <tr><td>DN 15</td><td></td><td></td></tr> <tr><td>DN 25</td><td>OD 1"</td><td></td></tr> <tr><td>DN 40</td><td>OD 1 ½"</td><td></td></tr> <tr><td>DN 50</td><td>OD 2"</td><td>IPS 2"</td></tr> <tr><td>DN 65</td><td>OD 2 ½"</td><td></td></tr> <tr><td>DN 80</td><td>OD 3"</td><td>IPS 3"</td></tr> <tr><td>DN 100</td><td>OD 4"</td><td>IPS 4"</td></tr> <tr><td>DN 125</td><td></td><td></td></tr> <tr><td>DN 150</td><td>OD 6"</td><td>IPS 6"</td></tr> </table>	DN 10			DN 15			DN 25	OD 1"		DN 40	OD 1 ½"		DN 50	OD 2"	IPS 2"	DN 65	OD 2 ½"		DN 80	OD 3"	IPS 3"	DN 100	OD 4"	IPS 4"	DN 125			DN 150	OD 6"	IPS 6"
DN 10																															
DN 15																															
DN 25	OD 1"																														
DN 40	OD 1 ½"																														
DN 50	OD 2"	IPS 2"																													
DN 65	OD 2 ½"																														
DN 80	OD 3"	IPS 3"																													
DN 100	OD 4"	IPS 4"																													
DN 125																															
DN 150	OD 6"	IPS 6"																													
4	<b>Seal material in contact with the product</b> <table border="1"> <tr><td>1</td><td>EPDM (FDA)</td></tr> <tr><td>2</td><td>FKM (FDA)</td></tr> <tr><td>3</td><td>HNBR (FDA)</td></tr> </table>	1	EPDM (FDA)	2	FKM (FDA)	3	HNBR (FDA)																								
1	EPDM (FDA)																														
2	FKM (FDA)																														
3	HNBR (FDA)																														
5	<b>Surface quality of the housing</b> <table border="1"> <tr><td>1</td><td>Inside <math>R_a \leq 1.2 \mu\text{m}</math>, outside matte (standard with IPS)</td></tr> <tr><td>2</td><td>Inside <math>R_a \leq 0.8 \mu\text{m}</math>, outside matte (standard with DN and OD)</td></tr> </table>	1	Inside $R_a \leq 1.2 \mu\text{m}$ , outside matte (standard with IPS)	2	Inside $R_a \leq 0.8 \mu\text{m}$ , outside matte (standard with DN and OD)																										
1	Inside $R_a \leq 1.2 \mu\text{m}$ , outside matte (standard with IPS)																														
2	Inside $R_a \leq 0.8 \mu\text{m}$ , outside matte (standard with DN and OD)																														
6	<b>Connection fittings</b> N Welding end																														
7	<table border="1"> <thead> <tr> <th>Type of outlet</th> <th>Connection sleeve (optionally for outlet type threaded connection)</th> </tr> </thead> <tbody> <tr> <td>/O Threaded connection (standard)</td> <td>- Without connection sleeve</td> </tr> <tr> <td>/S Schütt connection</td> <td>/A Hose nozzle</td> </tr> <tr> <td>/L LUER connection</td> <td>/B Flammable nozzle straight</td> </tr> <tr> <td>/M LUER connection 90°</td> <td>/C Flammable nozzles 90°</td> </tr> <tr> <td></td> <td>/D Spiral-type flammable nozzle</td> </tr> </tbody> </table>	Type of outlet	Connection sleeve (optionally for outlet type threaded connection)	/O Threaded connection (standard)	- Without connection sleeve	/S Schütt connection	/A Hose nozzle	/L LUER connection	/B Flammable nozzle straight	/M LUER connection 90°	/C Flammable nozzles 90°		/D Spiral-type flammable nozzle																		
Type of outlet	Connection sleeve (optionally for outlet type threaded connection)																														
/O Threaded connection (standard)	- Without connection sleeve																														
/S Schütt connection	/A Hose nozzle																														
/L LUER connection	/B Flammable nozzle straight																														
/M LUER connection 90°	/C Flammable nozzles 90°																														
	/D Spiral-type flammable nozzle																														
8	<b>Accessories</b> /52 Adhesive ID tag																														
+																															
9-14	<b>Air connection/control and feedback system</b> LAT.0000M Metric for air hose $\varnothing$ 6/4 mm LAT.0000Z Inch for air hose $\varnothing$ OD ¼" (6.35/4.35 mm) XXXXX Order code for different control and feedback systems see section 9																														



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

<b>Position</b>	1	2	3	4	5	6	7	8	9 to 14						
<b>Code</b>	I		-			N		/52	+						

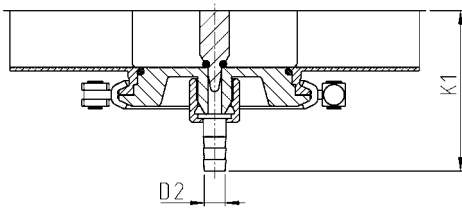
For order codes differing from the standard version, please refer to section 7 (options).

Typical application and description

Various types of connection flanges are available for a reliable and no-loss discharge of the sample volume. The threaded connection as a basis permits easy installation of the connection sleeves. The following sleeves are present for the sampling valve type I.

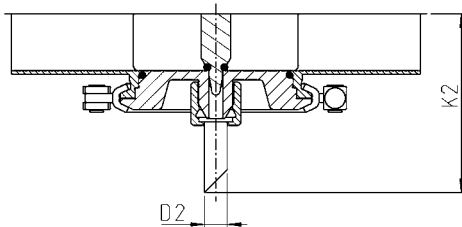
Hose nozzle

The connection type “Hose sleeve” offers the option of targeted discharge of the sample through a hose.



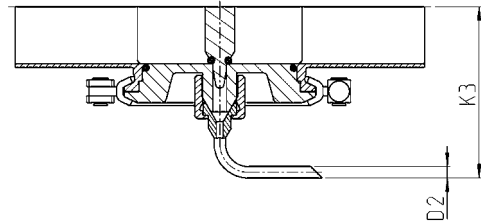
Flammable nozzle straight

The connection type “Flammable nozzle straight” has been constructed for the vertical installation orientation. The burner can be used to sterilize the flammable nozzle.



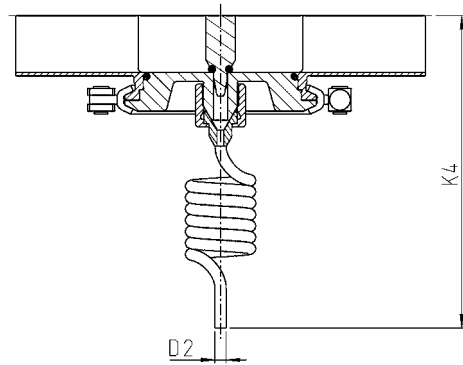
Flammable nozzles 90°

The connection type “Flammable nozzle 90°” has been constructed for horizontal sampling or installation orientation. A burner is recommended to sterilize the nozzle.



Spiral-type flammable nozzle

The connection type “Spiral-type flammable nozzle” is used in CO<sub>2</sub>-containing and foaming liquids. The flammable nozzle can be sterilized with a burner.



		Dimension					
Nominal width		K1 [mm]	K2 [mm]	K3 [mm]	K4 [mm]	D [mm]	D2 [mm]
DN 10		48	61	51	115	10	5
DN 15		51	64	54	118	10	5
DN 25		56	69	59	123	10	5
DN 40		62	75	65	129	10	5
DN 50		68	81	71	135	10	5
DN 65		76	89	79	143	10	5
DN 80		83	97	87	150	10	5
DN 100		93	106	96	160	10	5
DN 125		106	119	109	172	10	5
DN 150		117	132	122	185	10	5
OD 1"		54	67	57	121	10	5
OD 1 1/2"		60	74	64	127	10	5
OD 2"		66	80	70	134	10	5
OD 2 1/2"		73	86	77	140	10	5
OD 3"		79	93	83	146	10	5
OD 4"		92	105	95	159	10	5
OD 6"		115	130	120	183	10	5
IPS 2"		71	85	75	138	10	5
IPS 3"		85	99	89	152	10	5
IPS 4"		98	111	101	165	10	5
IPS 6"		123	138	128	191	10	5

### Outlets deviating from the standard

The threaded connection in G3/8" presents the standard connection of the outlets. Deviating from the standard connection, alternative outlets are available for the flammable nozzle.



### Outlet KEOFITT

The outlet KEOFITT is used for aseptic sampling systems with quick couplings.



### Outlet SCHÜTT

The outlet SCHÜTT can be connected with a clamping connection to a sampling vessel.



### Outlet AL clip-on

This outlet is connected to a corresponding sampling valve. It additionally can be used to connect pipes or a sealing cap.



### Outlet LUER

The LUER outlet connection is designed for cannulas or hoses with an inner diameter of 4 mm. It is sealed via the conical design of the outlet, the LUER cone.




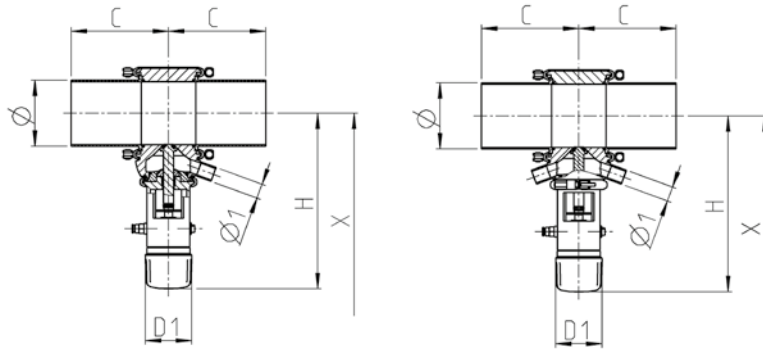
### Outlet LUER 90°

In the LUER 90° connection, the sampling process takes place in accordance with the outlet type of LUER. The outlet LUER 90° is used for vertical pipeline routing. The sampling valve is installed horizontally.






Technical data of the standard version	
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Ambient temperature	0 to 60 °C
Air supply pressure	Min. 6 bar (87 psi)
Product pressure	Max. 10 bar (145 psi) With stainless steel bellows max. 5 bar (73 psi)
Surface in contact with the product	R <sub>a</sub> ≤ 0.8 µm
External housing surface	Matte blasted
Actuator type	Pneumatic actuator air/spring
Connection fittings	Welding end
Certificates	



Nominal width	Process connection	Pipe	Housing		Dimension		Actuator	Valve	
		Ø [mm]	Ø1 [mm]	C [mm]	H [mm]	X [mm]	D1 [mm]	Stroke [mm]	Weight [kg]
DN 25	F	29.0 × 1.50	10	90.0	193.0	205.0	60	8	3.0
DN 40	N	41.0 × 1.50	16	90.0	199.0	212.0	60	8	3.9
DN 50	N	53.0 × 1.50	16	90.0	205.0	218.0	60	8	4.0
DN 65	N	70.0 × 2.00	16	125.0	213.0	226.0	60	8	4.6
DN 80	N	85.0 × 2.00	16	125.0	220.5	233.5	60	8	4.8
DN 100	N	104.0 × 2.00	16	125.0	230.0	243.0	60	8	5.2
DN 125	N	129.0 × 2.00	16	125.0	242.5	255.5	60	8	5.5
DN 150	N	154.0 × 2.00	16	150.0	255.0	268.0	60	8	9.9
OD 1"	F	25.4 × 1.65	10	90.0	191.0	204.0	60	8	2.9
OD 1 ½"	N	38.1 × 1.65	16	90.0	197.5	210.5	60	8	3.8
OD 2"	N	50.8 × 1.65	16	90.0	203.8	216.8	60	8	4.0
OD 2 ½"	N	63.5 × 1.65	16	125.0	210.0	223.0	60	8	4.4
OD 3"	N	76.2 × 1.65	16	125.0	216.5	229.5	60	8	4.6
OD 4"	N	101.6 × 2.11	16	125.0	228.8	241.8	60	8	5.1
OD 6"	N	152.4 × 2.77	16	150.0	258.0	272.0	60	8	10.5
IPS 2"	N	60.3 × 2.00	16	114.3	208.5	221.5	60	8	4.4
IPS 3"	N	88.9 × 2.30	16	152.4	222.5	235.5	60	8	5.0
IPS 4"	N	114.3 × 2.30	16	152.4	235.0	248.0	60	8	6.0
IPS 6"	N	168.3 × 2.77	16	152.4	261.0	274.0	60	8	11.0
ISO 33.7	F	33.7 × 2.00	10	114.3	194.9	207.9	60	8	3.1
ISO 42.4	N	42.4 × 2.00	16	114.3	199.2	212.2	60	8	4.0
ISO 48.3	N	48.3 × 2.00	16	114.3	202.2	215.2	60	8	4.1
ISO 60.3	N	60.3 × 2.00	16	114.3	208.1	221.1	60	8	4.5
ISO 76.1	N	76.1 × 2.00	16	152.4	216.5	229.5	60	8	4.8
ISO 88.9	N	88.9 × 2.30	16	152.4	222.5	235.5	60	8	5.3
ISO 114.3	N	114.3 × 2.30	16	152.4	235.0	248.0	60	8	6.1

Position	Description of the order code	
1	<b>Valve type</b>	
	TSV	VARINLINE® sampling valve
2	<b>Type</b>	
	N	Fail-safe position against the flow direction
3	<b>Process connection</b>	
	N	Housing DN 40–125, OD 1 ½"–6", IPS 2"–6", ISO 42.4–114.3
	F	Housing DN 25, OD 1", ISO 33.7
4	<b>Sampling housing</b>	
		
5	<b>Aseptic</b>	
	K	Without metal bellows
6	<b>Feedback</b>	
	0	Without feedback*
	1	1 feedback
	2	2 feedbacks
7	<b>Magnetic-inductive proximity sensors M12x1</b>	
	0	Without
	B	24 V DC, 3-wire, PNP, terminal chamber
	F	25 V DC, 2-wire, PNP, terminal chamber
8	<b>Seal material in contact with the product</b>	
	1	EPDM (FDA)
	2	FKM (FDA)
9	<b>Language operating instruction</b>	
	D	German
10	<b>Number of pieces of documentation</b>	
	1	4
	2	5
	3	6
11	<b>Installation type VARINLINE® fitting*</b>	
	–	Without
	T**	VARINLINE® housing (Process connection N)
	TU	VARINLINE® housing connection flange, type U (Process connection N)
	TT	VARINLINE® housing connection flange, type T (Process connection N)
	TU-S	VARINLINE® housing connection flange, type U-S (Process connection N)
	TT-S	VARINLINE® housing connection flange, type T-S (Process connection N)
12**	<b>Nominal width VARINLINE® housing</b>	
	DN 25	OD 1"
	DN 40	OD 1 ½"
	DN 50	OD 2"
	DN 65	OD 2 ½"
	DN 80	OD 3"
	DN 100	OD 4"
	DN 125	
	DN 150	OD 6"
	13**	<b>Blanking plates</b>
0		Without blanking plate
14**	<b>Surface quality of the VARINLINE® housing</b>	
	2	Inside R <sub>a</sub> ≤ 0,8 µm, outside matte blasted
15	<b>Accessories</b>	
	–	Without
	/52	Adhesive ID tag

\* In that case, position 7 must be without proximity sensors  
 \*\* Positions 12, 13, 14 apply only for installation type T, VARINLINE®-housing


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

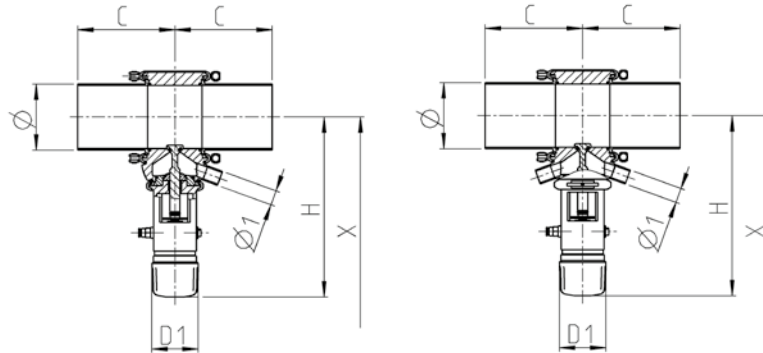
<b>Position</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Code</b>	TSV	N												2	

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






Technical data of the standard version	
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Ambient temperature	0 to 60 °C
Air supply pressure	Min. 6 bar (87 psi)
Product pressure	Max. 10 bar (145 psi) With stainless steel bellows max. 5 bar (73 psi)
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
External housing surface	Matte blasted
Actuator type	Pneumatic actuator air/spring
Connection fittings	Welding end
Certificates	



Nominal width	Process connection	Pipe	Housing		Dimension		Actuator	Valve	
		Ø [mm]	Ø1 [mm]	C [mm]	H [mm]	X [mm]	D1 [mm]	Stroke [mm]	Weight [kg]
DN 25	F	29.0 × 1.50	10	90.0	193.0	209.0	60	8	3.0
DN 40	N	41.0 × 1.50	16	90.0	199.0	216.0	60	8	3.9
DN 50	N	53.0 × 1.50	16	90.0	205.0	222.0	60	8	4.0
DN 65	N	70.0 × 2.00	16	125.0	213.0	230.0	60	8	4.6
DN 80	N	85.0 × 2.00	16	125.0	220.5	237.5	60	8	4.8
DN 100	N	104.0 × 2.00	16	125.0	230.0	247.0	60	8	5.2
DN 125	N	129.0 × 2.00	16	125.0	242.5	259.5	60	8	5.5
DN 150	N	154.0 × 2.00	16	150.0	255.0	272.0	60	8	9.9
OD 1"	F	25.40 × 1.65	10	90.0	191.0	208.0	60	8	2.9
OD 1 ½"	N	38.10 × 1.65	16	90.0	197.5	214.5	60	8	3.8
OD 2"	N	50.80 × 1.65	16	90.0	203.8	220.8	60	8	4.0
OD 2 ½"	N	63.50 × 1.65	16	125.0	210.0	227.0	60	8	4.4
OD 3"	N	76.20 × 1.65	16	125.0	216.5	223.5	60	8	4.6
OD 4"	N	101.60 × 2.11	16	125.0	228.8	245.8	60	8	5.1
OD 6"	N	152.40 × 2.77	16	150.0	258.0	272.0	60	8	10.5
IPS 2"	N	60.3 × 2.00	16	114.3	208.5	225.5	60	8	4.4
IPS 3"	N	88.9 × 2.30	16	152.4	222.5	239.5	60	8	5.0
IPS 4"	N	114.3 × 2.30	16	152.4	235.0	252.0	60	8	6.0
IPS 6"	N	168.3 × 2.77	16	152.4	261.0	279.0	60	8	11.0
ISO 33.7	F	33.7 × 2.00	10	114.3	194.9	211.9	60	8	3.1
ISO 42.4	N	42.4 × 2.00	16	114.3	199.2	216.2	60	8	4.0
ISO 48.3	N	48.3 × 2.00	16	114.3	202.2	219.2	60	8	4.1
ISO 60.3	N	60.3 × 2.00	16	114.3	208.1	225.1	60	8	4.5
ISO 76.1	N	76.1 × 2.00	16	152.4	216.5	233.5	60	8	4.8
ISO 88.9	N	88.9 × 2.30	16	152.4	222.5	239.5	60	8	5.3
ISO 114.3	N	114.3 × 2.30	16	152.4	235.0	252.0	60	8	6.1

Position	Description of the order code	
1	<b>Valve type</b>	
	TSV	VARINLINE® sampling valve
2	<b>Type</b>	
	U	Fail-safe position with the flow direction
3	<b>Process connection</b>	
	N	Housing DN 40–125, OD 1 ½"–6", IPS 2"–6", ISO 42.4–114.3
	F	Housing DN 25, OD 1", ISO 33.7
4	<b>Sampling housing</b>	
		
5	<b>Aseptic</b>	
	K	Without metal bellows
6	<b>Feedback</b>	
	0	Without feedback*
	1	1 feedback
	2	2 feedbacks
7	<b>Magnetic-inductive proximity sensors M12x1</b>	
	0	Without
	B	24 V DC, 3-wire, PNP, terminal chamber
	F	25 V DC, 2-wire, PNP, terminal chamber
8	<b>Seal material in contact with the product</b>	
	1	EPDM (FDA)
	2	FKM (FDA)
	3	HNBR (FDA)
9	<b>Language operating instruction</b>	
	D	German
10	<b>Number of pieces of documentation</b>	
	1	4
	2	5
	3	6
11	<b>Installation type VARINLINE® fitting</b>	
	–	Without
	T**	VARINLINE® housing (Process connection N)
	TU	VARINLINE® housing connection flange, type U (Process connection N)
	TT	VARINLINE® housing connection flange, type T (Process connection N)
	TU-S	VARINLINE® housing connection flange, type U-S (Process connection N)
	TT-S	VARINLINE® housing connection flange, type T-S (Process connection N)
12**	<b>Nominal width VARINLINE® housing</b>	
	DN 25	OD 1"
	DN 40	OD 1 ½"
	DN 50	OD 2"
	DN 65	OD 2 ½"
	DN 80	OD 3"
	DN 100	OD 4"
	DN 125	
	DN 150	OD 6"
13**	<b>Blanking plates</b>	
	0	Without blanking plate
14**	<b>Surface quality of the VARINLINE® housing</b>	
	2	Inside R <sub>a</sub> ≤ 0,8 µm, outside matte blasted
15	<b>Accessories</b>	
	–	Without
	/52	Adhesive ID tag

\* In that case, position 7 must be without proximity sensors  
 \*\* Positions 12, 13, 14 apply only for installation type T, VARINLINE®-housing


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

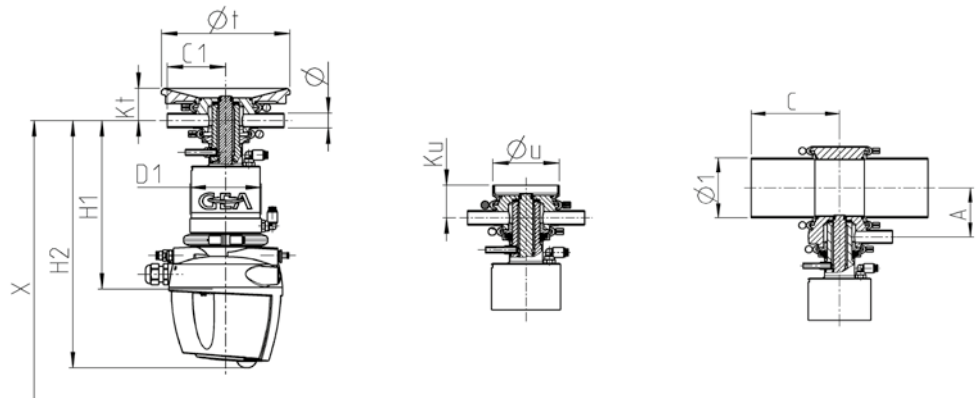
<b>Position</b>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
<b>Code</b>	TSV	U												2	

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





Technical data of the standard version	
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM
Ambient temperature	0 to 45 °C
Air supply pressure	6 to 8 bar (87 to 116 psi)
Product pressure	Max. 8 bar (116 psi)
Surface in contact with the product	R <sub>a</sub> ≤ 0.8 μm
External housing surface	Matte blasted
Control and feedback system	Connection 0 (without control top)
Actuator type	Pneumatic actuator air/spring
Connection fittings	Welding end
Certificates	




With housing connection

		Pipe			Dimension				Actuator	Valve
Nominal width	Ø [mm]	Øt [mm]	Øu [mm]	C1 [mm]	H2 [mm]	Kt [mm]	Ku [mm]	D1 [mm]	Stroke [mm]	
DN 15	19.0 × 1.5	165	85 × 2	75	317.5	41	41.5	93	15	

With in-line housing

		Pipe		Dimension					Actuator	Valve	
Nominal width	Process connection	Ø [mm]	Ø1 [mm]	A [mm]	C [mm]	H1 [mm]	H2 [mm]	X [mm]	D1 [mm]	Stroke [mm]	Weight [kg]
DN 15/DN 40	N	19 × 1.5	41.0 × 1.50	47.5	90.0	204	317.5	368	93	15	7.9
DN 15/DN 50	N	19 × 1.5	53.0 × 1.50	53.5	90.0	204	317.5	368	93	15	8.1
DN 15/DN 65	N	19 × 1.5	70.0 × 2.00	61.5	125.0	204	317.5	368	93	15	8.7
DN 15/DN 80	N	19 × 1.5	85.0 × 2.00	69.0	125.0	204	317.5	368	93	15	8.9
DN 15/DN 100	N	19 × 1.5	104.0 × 2.00	78.5	125.0	204	317.5	368	93	15	9.2
DN 15/DN 125	N	19 × 1.5	129.0 × 2.00	91.0	125.0	204	317.5	368	93	15	9.6
DN 15/DN 150	N	19 × 1.5	154.0 × 2.00	103.5	150.0	204	317.5	368	93	15	14.0
DN 15/OD 1 ½"	N	19 × 1.5	38.1 × 1.65	46.0	90.0	204	317.5	368	93	15	7.9
DN 15/OD 2"	N	19 × 1.5	50.8 × 1.65	52.0	90.0	204	317.5	368	93	15	8.0
DN 15/OD 2 ½"	N	19 × 1.5	63.5 × 1.65	58.5	125.0	204	317.5	368	93	15	8.5
DN 15/OD 3"	N	19 × 1.5	76.2 × 1.65	65.0	125.0	204	317.5	368	93	15	8.6
DN 15/OD 4"	N	19 × 1.5	101.6 × 2.11	77.0	125.0	204	317.5	368	93	15	9.2
DN 15/OD 6"	N	19 × 1.5	152.4 × 2.77	92.7	150.0	204	317.5	368	93	15	9.2
DN 15/IPS 2"	N	19 × 1.5	60.3 × 2.00	57.0	114.3	204	317.5	368	93	15	8.5
DN 15/IPS 3"	N	19 × 1.5	88.9 × 2.30	71.0	152.4	204	317.5	368	93	15	9.1
DN 15/IPS 4"	N	19 × 1.5	114.3 × 2.30	83.0	152.4	204	317.5	368	93	15	10.0
DN 15/IPS 6"	N	19 × 1.5	168.3 × 2.77	110.0	152.4	204	317.5	368	93	15	15.1



Position	Description of the order code																					
1	<b>Valve type</b> T Mixproof sampling valve																					
2	<b>Housing combinations</b> L T F D C (VARINLINE®) E (VARINLINE®) 																					
3	<b>Supplement to the valve type</b> RC Lifting actuator without spray cleaning																					
4	<b>Nominal width top</b> DN 15																					
5	<b>Nominal width bottom (optional for the VARINLINE® housing combination)</b> <table border="1"> <tr> <td>DN 40</td> <td>OD 1 ½"</td> <td></td> </tr> <tr> <td>DN 50</td> <td>OD 2"</td> <td>IPS 2"</td> </tr> <tr> <td>DN 65</td> <td>OD 2 ½"</td> <td></td> </tr> <tr> <td>DN 80</td> <td>OD 3"</td> <td>IPS 3"</td> </tr> <tr> <td>DN 100</td> <td>OD 4"</td> <td>IPS 4"</td> </tr> <tr> <td>DN 125</td> <td></td> <td></td> </tr> <tr> <td>DN 150</td> <td>OD 6"</td> <td>IPS 6"</td> </tr> </table>	DN 40	OD 1 ½"		DN 50	OD 2"	IPS 2"	DN 65	OD 2 ½"		DN 80	OD 3"	IPS 3"	DN 100	OD 4"	IPS 4"	DN 125			DN 150	OD 6"	IPS 6"
DN 40	OD 1 ½"																					
DN 50	OD 2"	IPS 2"																				
DN 65	OD 2 ½"																					
DN 80	OD 3"	IPS 3"																				
DN 100	OD 4"	IPS 4"																				
DN 125																						
DN 150	OD 6"	IPS 6"																				
6	<b>Actuator type</b> S Air/spring																					
7	<b>Non-actuated position</b> Z Spring-to-close (NC)																					
8	<b>Actuator</b> T/09																					
9	<b>Valve seat version</b> L0 Clamped seat ring/clamp connection																					
10	<b>Seal material in contact with the product</b> 1 EPDM (FDA) 2 FKM (FDA)																					
11/12	<b>Surface quality of the sampling housing</b> / <b>Surface quality of the VARINLINE® housing</b> <table border="1"> <tr> <td>3 Inside <math>R_a \leq 0.8 \mu\text{m}</math>, outside ground</td> <td>2 Inside <math>R_a \leq 0.8 \mu\text{m}</math>, outside matte</td> </tr> <tr> <td></td> <td>3 Inside <math>R_a \leq 0.8 \mu\text{m}</math>, outside ground</td> </tr> </table>	3 Inside $R_a \leq 0.8 \mu\text{m}$ , outside ground	2 Inside $R_a \leq 0.8 \mu\text{m}$ , outside matte		3 Inside $R_a \leq 0.8 \mu\text{m}$ , outside ground																	
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	3 Inside $R_a \leq 0.8 \mu\text{m}$ , outside ground																					
13	<b>Connection fittings</b> N Welding end																					
14	<b>Accessories</b> /52 Adhesive ID tag																					
+																						
15–20	<b>Air connection/control and feedback system</b> 00000M Metric for air hose $\varnothing$ 6/4 mm 00000Z Inch for air hose $\varnothing$ OD ¼" (6.35/4.35 mm) XXXXX Order code for different control and feedback systems see section 9																					



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

<b>Position</b>	1	2	3	4	5	6	7	8	9	10	11/12	13	14	15 to 20							
<b>Code</b>	T		RC	- DN 15 /		- S	Z	- T/09	- L0	-	3/	N	/52	+							

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



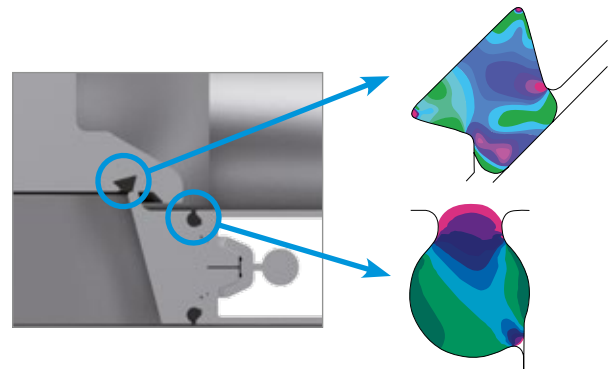
### VARIVENT® overflow valves

VARIVENT® overflow valves are used to reduce excess pressure or pressure spikes and are used to protect the pipeline system and the components installed in it.

### Application examples

VARIVENT® overflow valves are mainly used for overpressure protection downstream of displacement pumps. The valves are installed so that the respective pump will convey the medium in a circle and the pressure cannot increase further.

Sizes		
Type F	Type M	Type F-CJ
Opening pressure adjustable via a spring	Opening pressure adjustable via a spring and with pneumatic lifting	Opening pressure adjustable via a spring with pneumatic actuator (D-Force)
DN 25 – DN 100		
OD 1" – OD 4"		
IPS 2" – IPS 4"		



Representation of the stress load of the housing O-ring and the V-ring

### Function of the valve

The VARIVENT® overflow valve regulates the respective opening pressure of the valve with a manually adjustable actuator. When the set pressure is exceeded, the valve will open. The special contour of the valve disc and the seat ring effect a controlled diversion of the product flow so that the valve continues to remain open in spite of the pressure relief starting. This way, flutter of the valve is avoided.

The overflow valves can be equipped additionally with up to two proximity switches in the lantern. This permits feedback of the valve disc position.

#### Special features

- Hygienic design
- Metallic stop
- Flexibility because of the VARIVENT® modular principle
- Proven VARIVENT® seal geometry
- Availability of the three different actuator types
- Low investment and maintenance costs
- Mismatched housing combinations available

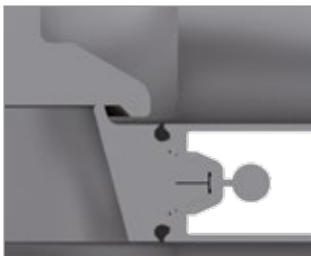


### Sealing according to the VARIVENT® principle

The VARIVENT® overflow valves are characterized by special seal technology. A metallic stop results in defined seal deformation, ensuring long seal life. This allows for more time to pass between required maintenance services, thereby allowing for continuous production and shorter downtimes.

The special, grooved shape in the valve disc ensures the seal has a secure hold at all times, up to a pressure differential of 10 bar during switching. The seal geometry has been optimized by using FEM calculations.

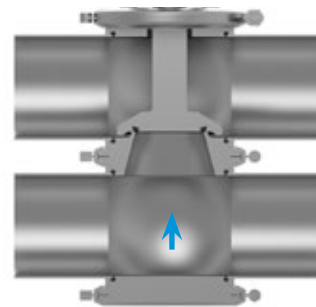
Overflow valves with metallic seat design can be used to secure a pressure difference above 10 bar. When selecting the valve, the permitted maximum pressures of the housings and the possible setting pressures of the actuators must be considered. These valves offer the benefit of lower maintenance requirements.



Metallic seat design

### Recommended flow direction

In order to ensure the desired safety function of the valve during product flow, the VARIVENT® overflow valves must have a flow contrary to the fail-safe position of the valve disc. An upright installation orientation of the valve is recommended.



### Actuator types of the overflow valves

The spring-to-close actuators available for the overflow valve (F) are to be set to the desired set pressure with a setting screw. Different spring packages are available to permit different pressure ranges. Take them from the table **Adjustable set pressures**.

The overflow valves are optionally available with an additionally integrated pneumatic actuator (M). This permits individual lifting of the valve disc during pipe cleaning.

The cleaning media flows past the seal of the lifted valve disc, cleans the seal surfaces and the seat area and then drains through the upper housing. This ensures hygienic cleaning of all areas in contact with the product.

The D-Force actuator permits holding shut of the valve against a higher pressure during specific production steps. This is a combination of two actuators: the overflow valve actuator with set screw (F) and an air/air actuator (CJ).

The D-Force actuator combination by air pressure allows deliberate keeping shut of the valve against higher pressures than the mechanically set pressure. This properly is required specifically for the production of carbonated beverages, since a pressure increase may result in nearly any process step here. There will be gasification of the product and foam formation in the pipeline. This actuator also permits lifting of the valve disc during cleaning.

Adjustable set pressures [bar]								
Nominal width			Actuator type					
			F11 M11	F21 M21	F1 M1	F2 M2	F3 M3	F4 M4
DN 25	OD 1"		1.5–4.5	4.6–9.0	9.1–16.0	–	–	–
DN 40	OD 1 ½"		–	1.5–2.0	2.1–5.0	5.1–15.0	15.1–20.0	–
DN 50	OD 2"	IPS 2"	–	–	1.5–4.0	4.1–11.0	11.1–20.0	–
DN 65	OD 2 ½"		–	–	–	1.0–4.0	4.1–10.0	10.1–15.0
DN 80	OD 3"	IPS 3"	–	–	–	1.0–4.0	4.1–10.0	10.1–15.0
DN 100	OD 4"	IPS 4"	–	–	–	1.0–1.5	1.6–4.0	4.1–7.0
Required air supply pressure for lifting [type M]			3	3	3	4	3	5
Nominal width			Actuator type					
					D-Force F1-CJ	D-Force F2-CJ	D-Force F3-CJ	D-Force F4-CJ
DN 25	OD 1"		–	–	1.0–20.0	–	–	–
DN 40	OD 1 ½"		–	–	1.5–5.0	5.1–15.0	15.1–20.0	–
DN 50	OD 2"	IPS 2"	–	–	1.5–4.0	4.1–11.0	11.1–20.0	–
DN 65	OD 2 ½"		–	–	–	1.0–4.0	4.1–10.0	10.1–15.0
DN 80	OD 3"	IPS 3"	–	–	–	1.0–4.0	4.1–10.0	10.1–15.0
DN 100	OD 4"	IPS 4"	–	–	–	1.0–1.5	1.6–4.0	4.1–7.0
Required air supply pressure [type F-CJ]			–	–	3	3	4	6.5

Higher pressures on request.



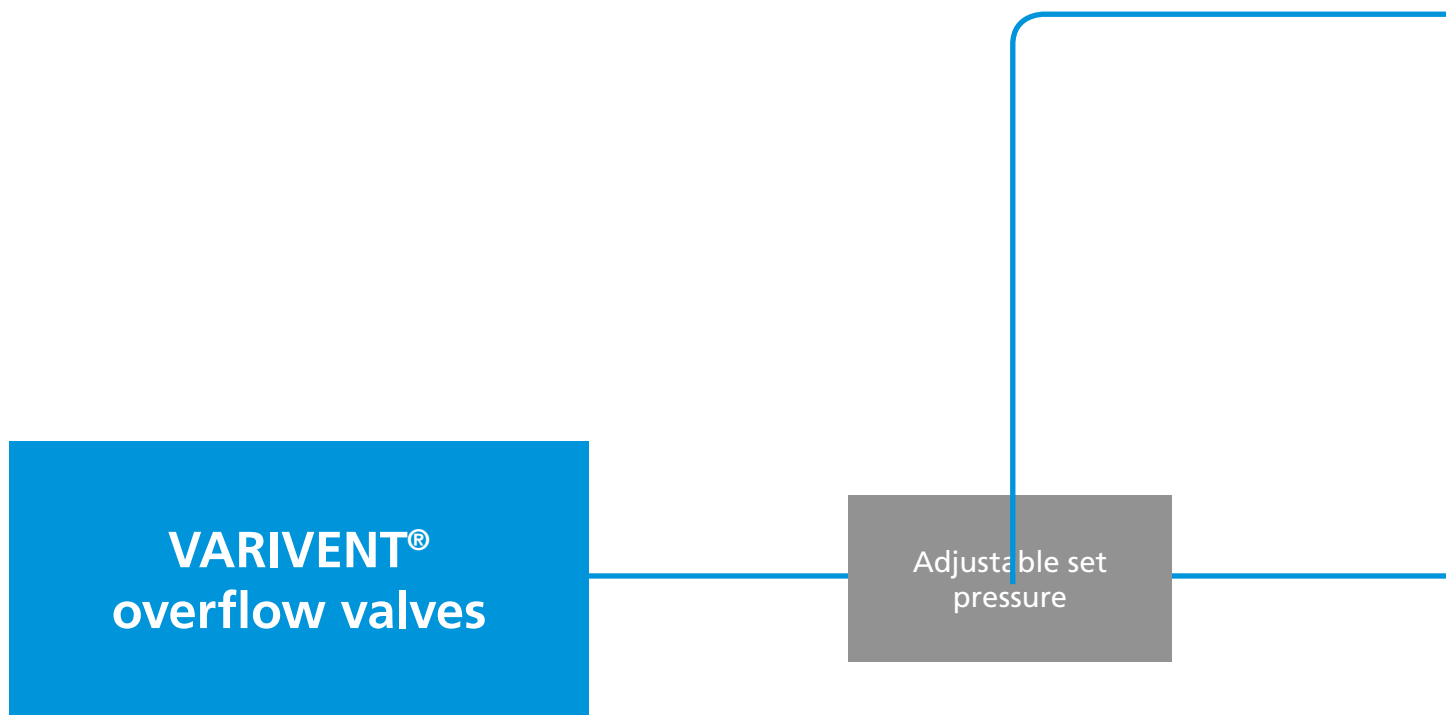
Actuator type F  
with set screw for the set  
pressure

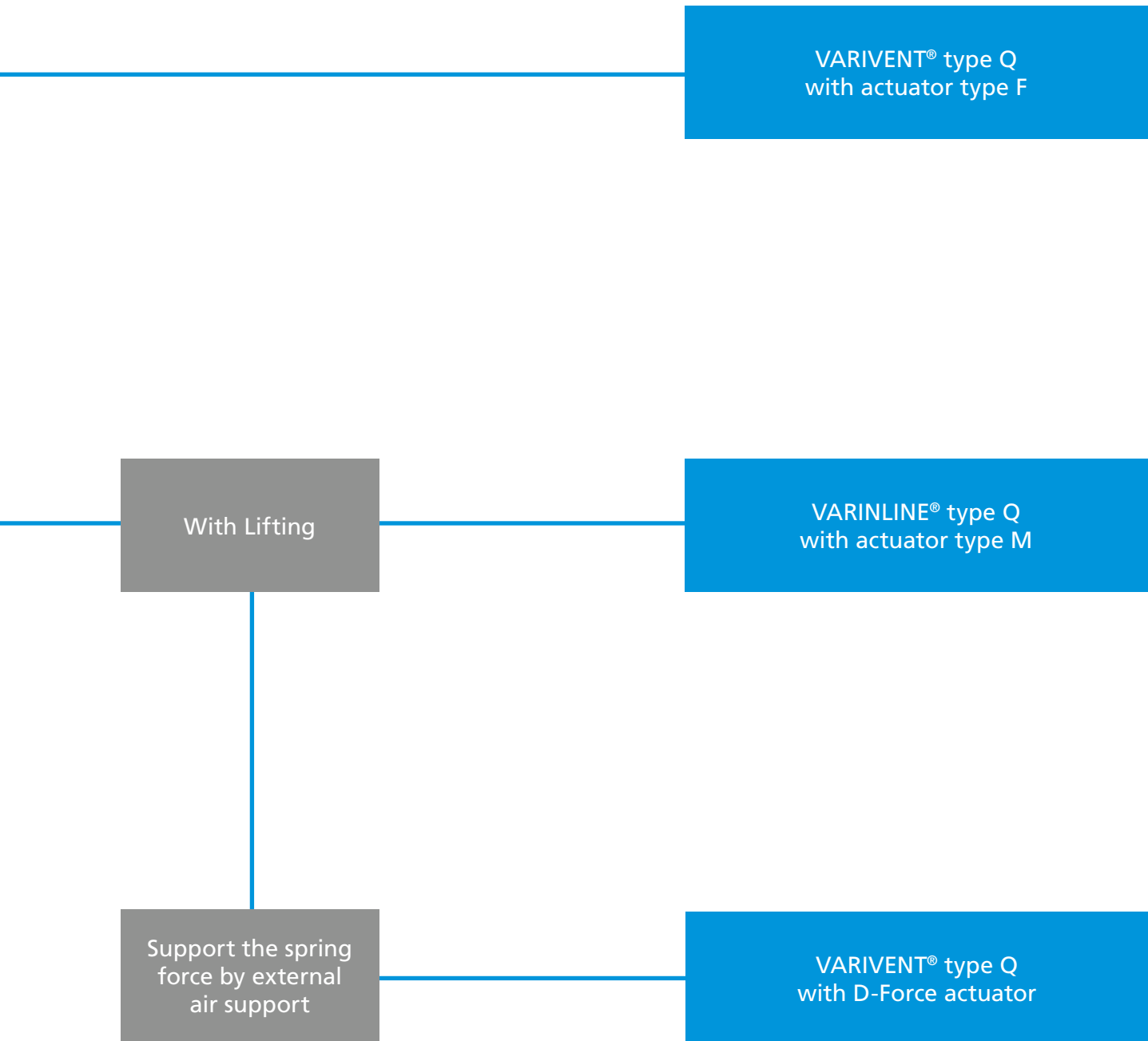


Actuator type M  
with set screw and  
pneumatic lifting




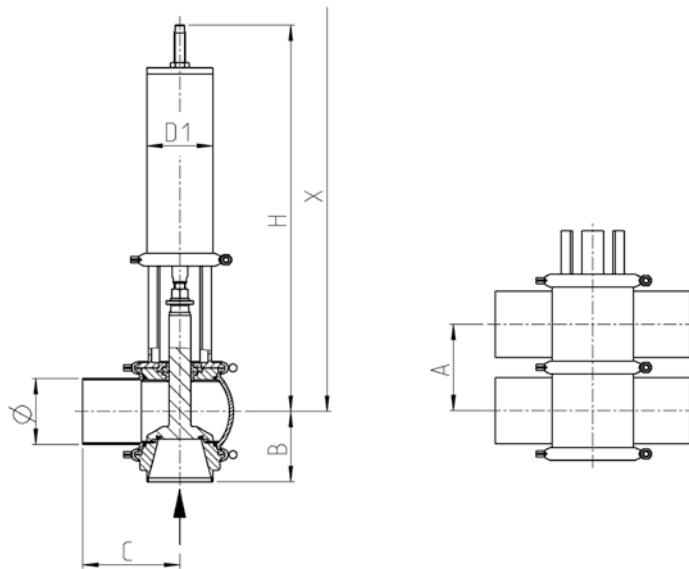
D-Force actuator  
with set screw and air/air  
actuator








Technical data of the standard version	
Recommended flow direction	Against closing direction
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Valve disc sealing	Soft-sealing with V-ring
Ambient temperature	0 to 45 °C
Product pressure	See separate table set pressures
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
External housing surface	Matte blasted
Actuator type	Adjustable spring
Connection fittings	Welding end
Identification	Adhesive ID tag
Valve seat version	Clamped seat ring
Certificates	



	Pipe	Housing			Actuator	Dimension		Valve	
Nominal width	Ø [mm]	A [mm]	B [mm]	C [mm]	D1 [mm]	H [mm]	X [mm]	Stroke [mm]	Weight [kg]
DN 25	29.0 × 1.50	50.0	58.0	90.0	85	394.0	644.0	10.0	4.6
DN 40	41.0 × 1.50	62.0	64.0	90.0	85	490.0	740.0	15.0	6.6
DN 50	53.0 × 1.50	74.0	70.0	90.0	85	496.0	746.0	27.0	6.8
DN 65	70.0 × 2.00	96.0	83.0	125.0	85	517.0	767.0	30.0	10.8
DN 80	85.0 × 2.00	111.0	90.5	125.0	85	524.5	774.5	30.0	11.0
DN 100	104.0 × 2.00	130.0	100.0	125.0	85	534.0	784.0	30.0	13.9
OD 1"	25.4 × 1.65	46.0	56.0	90.0	85	392.0	642.0	6.0	4.5
OD 1 ½"	38.1 × 1.65	59.0	62.5	90.0	85	491.5	741.5	15.0	6.5
OD 2"	50.8 × 1.65	71.5	69.0	90.0	85	498.0	748.0	27.5	6.7
OD 2 ½"	63.5 × 1.65	90.0	80.0	125.0	85	521.0	771.0	31.0	10.7
OD 3"	76.2 × 1.65	103.0	86.5	125.0	85	527.5	777.5	29.0	10.9
OD 4"	101.6 × 2.11	127.5	99.0	125.0	85	536.0	786.0	30.5	13.6
IPS 2"	60.3 × 2.00	81.0	73.5	114.3	85	492.5	742.5	27.0	7.0
IPS 3"	88.9 × 2.30	115.0	92.5	152.4	85	522.5	772.5	30.0	11.1
IPS 4"	114.3 × 2.30	140.0	105.0	152.4	85	529.0	779.0	30.0	14.1



Position	Description of the order code																		
1	<b>Valve type</b> Q Overflow valve																		
2	<b>Housing combinations</b> 																		
3	<b>Valve disc sealing</b> W Soft-sealing (with V-ring) M Metallic (no V-ring)																		
4/5	<b>Nominal width (upper housing/lower housing)</b> <table border="1"> <tr> <td>DN 25</td> <td>OD 1"</td> <td></td> </tr> <tr> <td>DN 40</td> <td>OD 1 ½"</td> <td></td> </tr> <tr> <td>DN 50</td> <td>OD 2"</td> <td>IPS 2"</td> </tr> <tr> <td>DN 65</td> <td>OD 2 ½"</td> <td></td> </tr> <tr> <td>DN 80</td> <td>OD 3"</td> <td>IPS 3"</td> </tr> <tr> <td>DN 100</td> <td>OD 4"</td> <td>IPS 4"</td> </tr> </table>	DN 25	OD 1"		DN 40	OD 1 ½"		DN 50	OD 2"	IPS 2"	DN 65	OD 2 ½"		DN 80	OD 3"	IPS 3"	DN 100	OD 4"	IPS 4"
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DN 65	OD 2 ½"																		
DN 80	OD 3"	IPS 3"																	
DN 100	OD 4"	IPS 4"																	
6	<b>Actuator type</b> F F-actuator without lifting																		
7	<b>Actuator type</b> F11 F21 F1 F2 F3 F4																		
8	<b>Valve seat version</b> L0 Clamped seat ring/clamp connection																		
9	<b>Seal material in contact with the product</b> 1 EPDM (FDA) 2 FKM (FDA) 3 HNBR (FDA)																		
10	<b>Surface quality of the housing</b> 2 Inside R <sub>a</sub> ≤ 0.8 μm, outside matte blasted																		
11	<b>Connection fittings</b> N Welding end																		
12	<b>Accessories</b> /52 Adhesive ID tag																		
+																			
13-18	<b>Air connection/control and feedback system</b> 00000M Metric for air hose Ø 6/4 mm 00000Z Inch for air hose Ø OD ¼" (6.35/4.35 mm) XXXXX Order code for different control and feedback systems see section 9																		



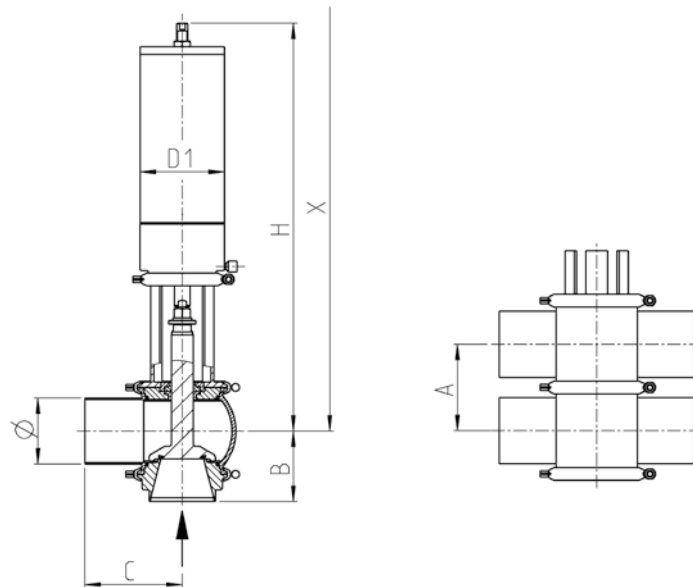
The code is composed as follows, depending on the chosen configuration:

<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13 to 18
<b>Code</b>	Q			/	F		L0		2	N	/52	+ [ ] [ ] [ ] [ ] [ ] [ ]


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



Technical data of the standard version	
Recommended flow direction	Against closing direction
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Valve disc sealing	Soft-sealing with V-ring
Ambient temperature	0 to 45 °C
Air supply pressure	Max. 8 bar (116 psi)
Product pressure	See separate table set pressures
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
External housing surface	Matte blasted
Actuator type	Adjustable spring with pneumatic lifting
Connection fittings	Welding end
Identification	Adhesive ID tag
Valve seat version	Clamped seat ring
Certificates	



Nominal width	Pipe	Housing			Actuator	Dimension		Valve	
	Ø [mm]	A [mm]	B [mm]	C [mm]	D1 [mm]	H [mm]	X [mm]	Stroke [mm]	Weight [kg]
DN 25	29.0 × 1.50	50.0	58.0	90.0	108	439.0	689.0	10.0	9.5
DN 40	41.0 × 1.50	62.0	64.0	90.0	108	545.0	795.0	15.0	10.3
DN 50	53.0 × 1.50	74.0	70.0	90.0	108	551.0	801.0	27.0	10.5
DN 65	70.0 × 2.00	96.0	83.0	125.0	168	562.0	812.0	30.0	16.8
DN 80	85.0 × 2.00	111.0	90.5	125.0	168	569.5	819.5	30.0	17.0
DN 100	104.0 × 2.00	130.0	100.0	125.0	168	579.0	829.0	30.0	19.9
OD 1"	25.4 × 1.65	46.0	56.0	90.0	108	437.0	687.0	6.0	9.5
OD 1 ½"	38.1 × 1.65	59.0	62.5	90.0	108	546.5	796.5	15.0	10.2
OD 2"	50.8 × 1.65	71.5	69.0	90.0	108	553.0	803.0	27.5	10.5
OD 2 ½"	63.5 × 1.65	90.0	80.0	125.0	168	566.0	816.0	31.0	16.7
OD 3"	76.2 × 1.65	103.0	86.5	125.0	168	572.5	822.5	29.0	16.9
OD 4"	101.6 × 2.11	127.5	99.0	125.0	168	581.0	831.0	30.5	19.6
IPS 2"	60.3 × 2.00	81.0	73.5	114.3	108	547.5	797.5	27.0	10.8
IPS 3"	88.9 × 2.30	115.0	92.5	152.4	168	567.5	817.5	30.0	17.2
IPS 4"	114.3 × 2.30	140.0	105.0	152.4	168	574.0	824.0	30.0	20.1

Position	Description of the order code																		
1	<b>Valve type</b> Q Overflow valve																		
2	<b>Housing combinations</b> 																		
3	<b>Valve disc sealing</b> W Soft-sealing (with V-ring) M Metallic (no V-ring)																		
4/5	<b>Nominal width (upper housing/lower housing)</b> <table border="1"> <tr> <td>DN 25</td> <td>OD 1"</td> <td></td> </tr> <tr> <td>DN 40</td> <td>OD 1 ½"</td> <td></td> </tr> <tr> <td>DN 50</td> <td>OD 2"</td> <td>IPS 2"</td> </tr> <tr> <td>DN 65</td> <td>OD 2 ½"</td> <td></td> </tr> <tr> <td>DN 80</td> <td>OD 3"</td> <td>IPS 3"</td> </tr> <tr> <td>DN 100</td> <td>OD 4"</td> <td>IPS 4"</td> </tr> </table>	DN 25	OD 1"		DN 40	OD 1 ½"		DN 50	OD 2"	IPS 2"	DN 65	OD 2 ½"		DN 80	OD 3"	IPS 3"	DN 100	OD 4"	IPS 4"
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DN 50	OD 2"	IPS 2"																	
DN 65	OD 2 ½"																		
DN 80	OD 3"	IPS 3"																	
DN 100	OD 4"	IPS 4"																	
6	<b>Actuator type</b> M M-actuator with lifting																		
7	<b>Actuator type</b> M11 M21 M1 M2 M3 M4																		
8	<b>Valve seat version</b> L0 Clamped seat ring/clamp connection																		
9	<b>Seal material in contact with the product</b> 1 EPDM (FDA) 2 FKM (FDA) 3 HNBR (FDA)																		
10	<b>Surface quality of the housing</b> 2 Inside R <sub>a</sub> ≤ 0.8 μm, outside matte blasted																		
11	<b>Connection fittings</b> N Welding end																		
12	<b>Accessories</b> /52 Adhesive ID tag																		
+																			
13-18	<b>Air connection/control and feedback system</b> 00000M Metric for air hose Ø 6/4 mm 00000Z Inch for air hose Ø OD ¼" (6.35/4.35 mm) XXXXX Order code for different control and feedback systems see section 9																		




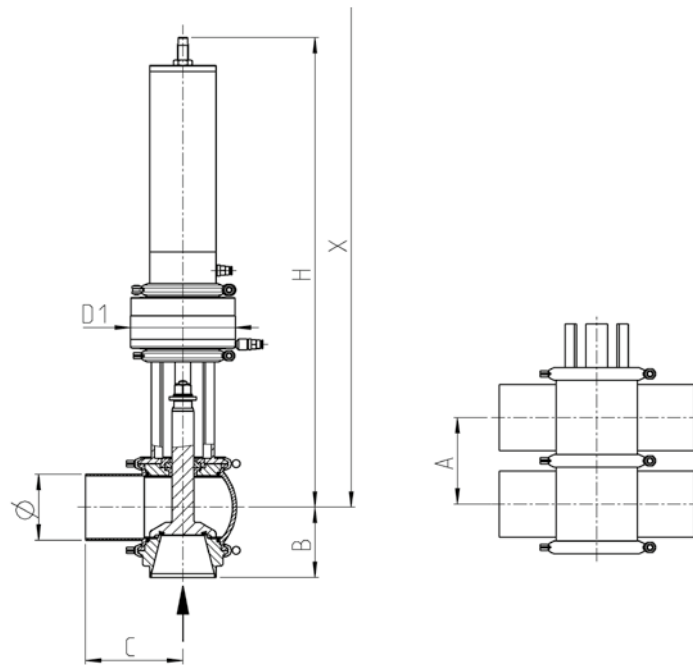
The code is composed as follows, depending on the chosen configuration:

<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13 to 18
<b>Code</b>	Q			/	M		L0		2	N	/52	+ [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]


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



Technical data of the standard version	
Recommended flow direction	Against closing direction
Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4301 (AISI 304)
Seal material in contact with the product	EPDM, FKM, HNBR
Valve disc sealing	Soft-sealing with V-ring
Ambient temperature	0 to 45 °C
Air supply pressure	Max. 8 bar (116 psi)
Product pressure	See separate table set pressures
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
External housing surface	Matte blasted
Actuator type	Adjustable spring with pneumatic guard against higher pressures and lifting
Connection fittings	Welding end
Identification	Adhesive ID tag
Valve seat version	Clamped seat ring
Certificates	



Nominal width	Pipe	Housing			Actuator	Dimension		Valve	
	Ø [mm]	A [mm]	B [mm]	C [mm]	D1 [mm]	H1 [mm]	X [mm]	Stroke [mm]	Weight [kg]
DN 25	29.0 × 1.50	50.0	58.0	90.0	135	524.0	774.0	10.0	12.6
DN 40	41.0 × 1.50	62.0	64.0	90.0	135	630.0	880.0	15.0	13.6
DN 50	53.0 × 1.50	74.0	70.0	90.0	135	636.0	886.0	27.0	13.8
DN 65	70.0 × 2.00	96.0	83.0	125.0	135	647.0	897.0	30.0	17.5
DN 80	85.0 × 2.00	111.0	90.5	125.0	135	654.5	904.5	30.0	17.7
DN 100	104.0 × 2.00	130.0	100.0	125.0	135	664.0	914.0	30.0	20.9
OD 1"	25.4 × 1.65	46.0	56.0	90.0	135	522.0	772.0	6.0	12.6
OD 1 1/2"	38.1 × 1.65	59.0	62.5	90.0	135	631.5	881.5	15.0	13.5
OD 2"	50.8 × 1.65	71.5	69.0	90.0	135	638.0	888.0	27.5	13.7
OD 2 1/2"	63.5 × 1.65	90.0	80.0	125.0	135	651.0	901.0	31.0	17.4
OD 3"	76.2 × 1.65	103.0	86.5	125.0	135	657.5	907.5	29.0	17.6
OD 4"	101.6 × 2.11	127.5	99.0	125.0	135	666.0	916.0	30.5	20.7
IPS 2"	60.3 × 2.00	81.0	73.5	114.3	135	632.5	882.5	27.0	14.0
IPS 3"	88.9 × 2.30	115.0	92.5	152.4	135	652.5	902.5	30.0	17.8
IPS 4"	114.3 × 2.30	140.0	105.0	152.4	135	659.0	909.0	30.0	21.1

Position	Description of the order code																		
1	<b>Valve type</b> Q Overflow valve																		
2	<b>Housing combinations</b> 																		
3	<b>Valve disc sealing</b> W Soft-sealing (with V-ring) M Metallic (no V-ring)																		
4/5	<b>Nominal width (upper housing/lower housing)</b> <table border="1"> <tr> <td>DN 25</td> <td>OD 1"</td> <td></td> </tr> <tr> <td>DN 40</td> <td>OD 1 ½"</td> <td></td> </tr> <tr> <td>DN 50</td> <td>OD 2"</td> <td>IPS 2"</td> </tr> <tr> <td>DN 65</td> <td>OD 2 ½"</td> <td></td> </tr> <tr> <td>DN 80</td> <td>OD 3"</td> <td>IPS 3"</td> </tr> <tr> <td>DN 100</td> <td>OD 4"</td> <td>IPS 4"</td> </tr> </table>	DN 25	OD 1"		DN 40	OD 1 ½"		DN 50	OD 2"	IPS 2"	DN 65	OD 2 ½"		DN 80	OD 3"	IPS 3"	DN 100	OD 4"	IPS 4"
DN 25	OD 1"																		
DN 40	OD 1 ½"																		
DN 50	OD 2"	IPS 2"																	
DN 65	OD 2 ½"																		
DN 80	OD 3"	IPS 3"																	
DN 100	OD 4"	IPS 4"																	
6	<b>Actuator type</b> D D-Force																		
7	<b>Actuator type</b> F1-CJ F2-CJ F3-CJ F4-CJ																		
8	<b>Valve seat version</b> L0 Clamped seat ring/clamp connection																		
9	<b>Seal material in contact with the product</b> 1 EPDM (FDA) 2 FKM (FDA) 3 HNBR (FDA)																		
10	<b>Surface quality of the housing</b> 2 Inside R <sub>a</sub> ≤ 0.8 μm, outside matte blasted																		
11	<b>Connection fittings</b> N Welding end																		
12	<b>Accessories</b> /52 Adhesive ID tag																		
+																			
13-18	<b>Air connection/control and feedback system</b> 00000M Metric for air hose Ø 6/4 mm 00000Z Inch for air hose Ø OD ¼" (6.35/4.35 mm) XXXXX Order code for different control and feedback systems see section 9																		



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

<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13 to 18
<b>Code</b>	Q			/	D		L0		2	N	/52	+

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



### VARIVENT® constant pressure valve

The VARIVENT® constant pressure valve is used to set a constant pressure at the input side of the valve. When process-related pressure fluctuations occur, the piston will open or close automatically so to compensate for them. The product pressure to be maintained in the housing is set by the air supply pressure in the actuator. Due to this, a constant air supply pressure is required.

#### Special features

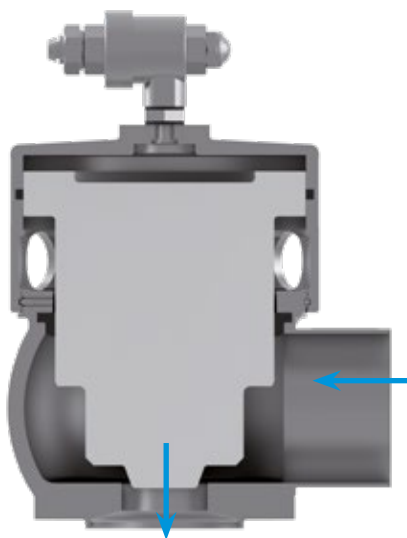
Mechanically limited open/close position of the valve disc
PTFE-valve disc with low friction
Simple maintenance, only two seals
Good control properties
Kvs values depending on requested flow
Hygienic design
Approval according to 3-A

### Function of the valve

In the VARIVENT® constant pressure valve, the exit opening opens when the pressure acting on the ring face of the valve disc is larger than the holding force of the piston set via the air pressure. If the product pressure drops, the valve will close automatically in order to maintain a constant pressure in the inlet socket.

Additionally, the lower part of the valve disc is equipped with a control cone to optimize the function method of the valve.

The valve disc of the constant pressure valve is made of PTFE with very good resilience against corrosive fluids and only low friction during the lifting movement.



The PTFE valve disc is lifted by the product flow

### Recommended flow direction

In order to ensure the desired safety function of the valve during product flow, the flow needs to be directed laterally against the valve disc of the VARIVENT® constant pressure valve. An upright installation orientation of the valve is recommended.

### Application examples

VARIVENT® constant pressure valves are used to keep the pressure constant at the output of a separator. The self-adjusting VARIVENT® constant pressure valve offers a cost-efficient alternative to a control valve. No additional pressure transmitter is required since the valve will work independently after setting the product pressure.

Furthermore, the VARIVENT® constant pressure valve is used to maintain the required pressure at heat exchangers.

Nominal width			Kvs
DN 40/25	OD 1½"/1"		4
DN 40/40	OD 1½"/1½"		4
DN 40/40	OD 1½"/1½"		10
DN 65/50	OD 2½"/2"		16
DN 65/65	OD 2½"/2½"		25
DN 65/65	OD 2½"/2½"		35
DN 65/65	OD 2½"/2½"		60


### Additional equipment

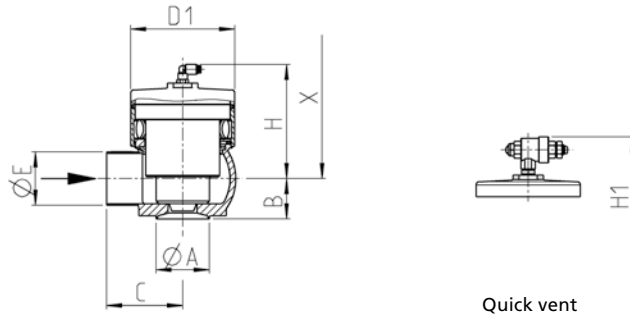
Optionally, the valve can be equipped with a quick vent or a fine pressure controller. The supply and exhaust quantity permits precise setting of the air supply pressure above the piston surface so that the desired content product pressure can be regulated on the input side of the valve.



Quick venting valve with muffler



Technical data of the standard version	
Recommended flow direction	See arrow in the drawing
Material housing	1.4404 (AISI 316L)
Material valve disc	PTFE (FDA)
Seal material in contact with the product	EPDM, FKM, HNBR
Ambient temperature	0 to 45 °C
Air supply pressure	Max. 8 bar (116 psi)
Product pressure	Max. 10 bar (145 psi)
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
External housing surface	Matte blasted
Connection fittings	Welding end
Identification	Adhesive ID tag
Certificates	



Nominal width (inlet/outlet)	Housing				Actuator	Dimension			Valve		
	ØE [mm]	ØA [mm]	B [mm]	C [mm]	D1 [mm]	H [mm]	H1 [mm]	X [mm]	Stroke [mm]	Kvs [m³/h]	Weight [kg]
DN 40/25	41.0	29.0	39	70	76.5	141	161	169	15	4	2.0
DN 40/40	41.0	41.0	39	70	76.5	141	161	169	15	4	2.0
DN 40/40	41.0	41.0	39	70	76.5	141	161	169	15	10	2.0
DN 65/50	70.0	53.0	53	100	137.0	155	175	203	15	16	7.0
DN 65/65	70.0	70.0	53	100	137.0	155	175	200	15	25	6.9
DN 65/65	70.0	70.0	53	100	137.0	155	175	200	15	35	6.9
DN 65/65	70.0	70.0	53	100	137.0	155	175	203	15	60	6.7
OD 1 ½"/1"	38.1	25.4	39	70	76.5	141	161	169	15	4	2.0
OD 1 ½"/1 ½"	38.1	38.1	39	70	76.5	141	161	169	15	4	2.0
OD 1 ½"/1 ½"	38.1	38.1	39	70	137.0	141	161	169	15	10	2.0
OD 2 ½"/2"	63.5	50.8	53	100	137.0	155	175	203	15	16	7.0
OD 2 ½"/2 ½"	63.5	63.5	53	100	137.0	155	175	200	15	25	6.9
OD 2 ½"/2 ½"	63.5	63.5	53	100	137.0	155	175	200	15	35	6.9
OD 2 ½"/2 ½"	63.5	63.5	53	100	137.0	155	175	203	15	60	6.7



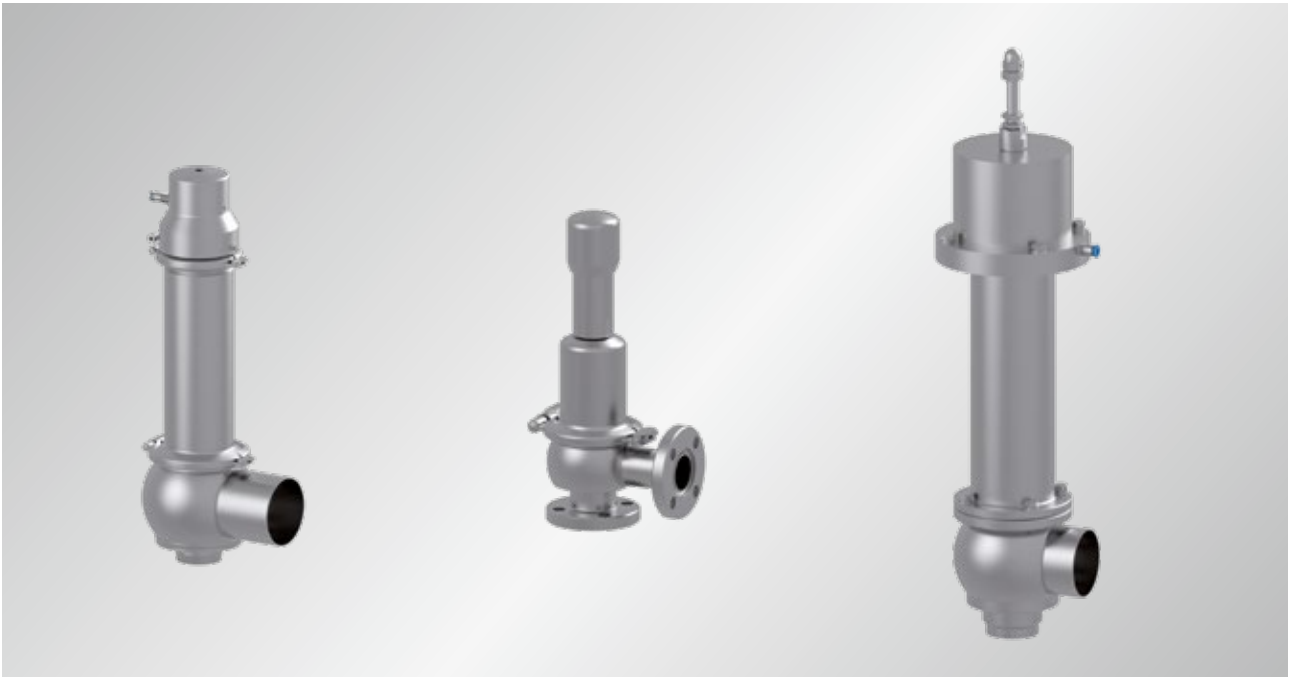
Position	Description of the order code
1	<b>Valve type</b>
	DHV VARIVENT® constant pressure valve
2	<b>Nominal width inlet</b>
	40 DN 40 1.5 OD 1 ½"
	65 DN 65 2.5 OD 2 ½"
3	<b>Connection fitting inlet</b>
	00 Welding end
4	<b>Nominal width outlet</b>
	25 DN 25 1 OD 1"
	40 DN 40 1.5 OD 1 ½"
	50 DN 50 2 OD 2"
	65 DN 65 2.5 OD 2 ½"
5	<b>Connection fitting outlet</b>
	00 Welding end
6	<b>Kvs value</b>
	4
	10
	16
	25
	35
7	<b>Air connection</b>
	0 Without
	M Metric Ø 6/4 mm
	Z Ø G ½"/Ø OD ¼" (standard-US)
	U Metric/inch Ø 8/6 (Ø 5/16")
8	<b>Pressure control</b>
	0 Without
	1 With quick vent
2 With pressure control valve, G ½"*	
9	<b>Seal material in contact with the product</b>
	1 EPDM (FDA)
	2 FKM (FDA)
	3 HNBR (FDA)

\* Only available with air connection Z.



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

Position	1	2	3	4	5	6	7	8	9								
Code	DHV	-		-	00	/		-	00	-		-		-		-	



## Safety relief valves

VARIVENT® safety relief valves have been specifically developed for the requirements of the food, beverage and pharmaceuticals industries and meet the requirements of the relevant rules, such as DIN 11866 or ASME BPE. Due to the inlet area free from dead zones, the unique elastomer bellows and the optional pneumatic lifting, the valves are characterized by very good cleaning ability (CIP/SIP). Many connections permit best adjustment of the valves to different tasks.

## Function of the valve

Full stroke safety relief valves are used in areas where surge flows or very fast pressure increases occur, due to their quick opening response. The main application is in pressure relief of steams and gases. Since the full stroke safety relief valve performs a full stroke after opening – no matter the pending flow rate – the full flow rate can be discharged even at a slight pressure increase.

Normal safety relief valves are ideal pressure relief valves. Their large proportional range leads to a continuous operating method and relief of pressure spikes specifically in liquids. The valves have a full stroke charge after an expanded proportional phase and thus reach a higher flow rate. They are also used as overflow valves and are used when the smallest design of the full stroke safety relief valve is too large already.

To ensure hygienic cleaning (CIP) or sterilization (SIP) of all surfaces in the system, the safety relief valves are available with a pneumatic lifting mechanism.

### Special features

High-quality materials and surface finish
Manual or pneumatic lifting
Insensitive to temperature
Welded housing in CIP-able design
Self-draining housing shape free of dead zones ensures free drain

## Application examples

Safety relief valves protect from excess pressure, e.g. for vessels within a sterilization process or during filling. They secure fermentation tanks in case of unexpected faults.

Safety relief valves are also used for inner pressure relief of vessels and other process equipment for curing media such as chocolate.

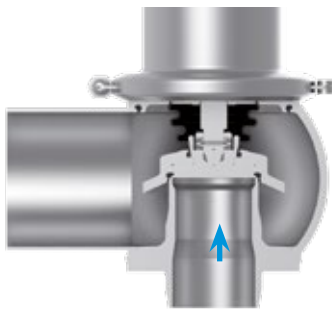
### HyTight Assembly

Ease of cleaning – this is a requirement for the design of the VARIVENT® safety relief valves type 488. They are equipped with HyTight Assembly and therefore offer the best cleaning opportunities.

HyTight means Hygienic and Tight.

Advantages of the elastomer bellow
Increased tightness by O-ring seal
Elastomer bellows to protect difficult-to-clean components in the guide and spring cap
Fixing elements are placed within the bellows
Gap-free installation parts, exposed, flooded O-rings

Difficult-to-clean components are protected from contact with the product by use of an elastomer bellows. Please observe that an elastomer bellows is not counterpressure-compensating like a stainless steel bellows.



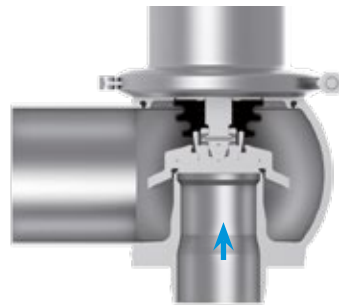
### Recommended flow direction

In order to ensure the desired safety function of the valve during product flow, the VARIVENT® safety relief valves must have a flow contrary to the fail-safe position of the valve disc. The installation orientation of the valve, upright or horizontal, is essential for the operating pressure.

### Full stroke safety relief valve type 488

The safety relief valves in the series 488 has been developed in close cooperation with system operators and manufacturers. They reliably protect process systems from excess pressure without putting hygienic requirements at risk. The whole series has been configured and officially approved according to international standards (DGR 97/23/CG, ASME, GOST et al.). A version for steam, gases and liquids of each valve has been type-tested by TÜV in accordance with German regulations. They comply with the EU directive for pressure equipment and bear the CE symbol.

The VARIVENT® safety relief valve type 488 more than meets the special hygienic and performance requirements of the food, brewery and beverage industries. The valves have been developed for a great performance range and are mostly used in large plants, breweries and the beverage industry.

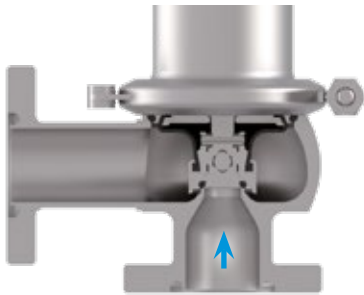


Safety relief valve type 488

Special features
Low contamination by bacteria and other contaminations
Minimized dead space in the inlet and flush installation possibility
Gap-free design of the internal assembly
Medium-contacting surface requirements according to DIN 11866 and ASME BPE
Use of FDA compliant elastomers
One-part spindle for higher setting accuracy and less friction
Valve stem and guide protected by EPDM bellows
Approvals worldwide

### Normal safety relief valve type 483

The safety relief valves of series 483 have been developed for small to medium outputs. This type meets the properties of VARIVENT® safety relief valves type 488 and can be used in all areas of the food and beverage industries. The valves are used in applications such as bottling systems.



### Normal safety relief valve type HyCom

HyCom normal safety relief valves have proven to be a cost-effective option for the VARIVENT® safety relief valves series 488. The HyCom series meets the requirements according to European PED 97/23/EC and AD2000 regulations. The valves are type-test approved by TÜV for non-toxic gases, steams and non-sticky liquids (fluid group 2). The HyCom safety relief valve is available with nominal widths DN 25 to DN 80.

#### Special features

Standardized design

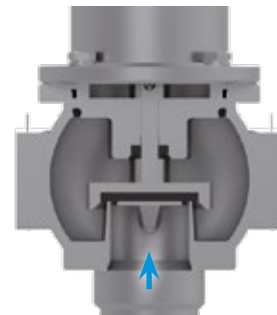
Manual and pneumatic lifting actuators available

CIP/SIP-able

Design with no dead zones

Seat heating (option)

Set pressure 0.5 to 10 bar



Liftings

The safety relief valves of the series VARIVENT® are equipped with a gas-tight lifting of the valve disc. This design characteristic permits cleaning media (steam or cleaning liquid) to flow through the valve during the cleaning process.

Manual lifting H4

The manual lifting H4 is a unique construction that clearly differs from the conventional lifting. The valves of nominal width DN 25 are equipped with a rotating lifting mechanism in which the safety relief valve opens when the cap turns. The valve remains opened until it is closed again by another turn of the cap. In larger valves, the valve disc can be lifted with a lever lift.



Turning lifting



Lever lifting

Pneumatic lifting H8

The pneumatic lifting H8 permits cleaning (CIP) or sterilizing (SIP) in the system. By pressurization of the lifting with air, the valve disc in the spindle is lifted from its seat and the flushing medium (steam or cleaning media) flows through the safety relief valve.

Depending on the setting and lifting pressure (compressed air supply), a double piston version (in exceptions also a triple piston lifting mechanism) can be required instead of the single piston design.



Single piston lifting in the VARIVENT® safety valve types 488 and 483

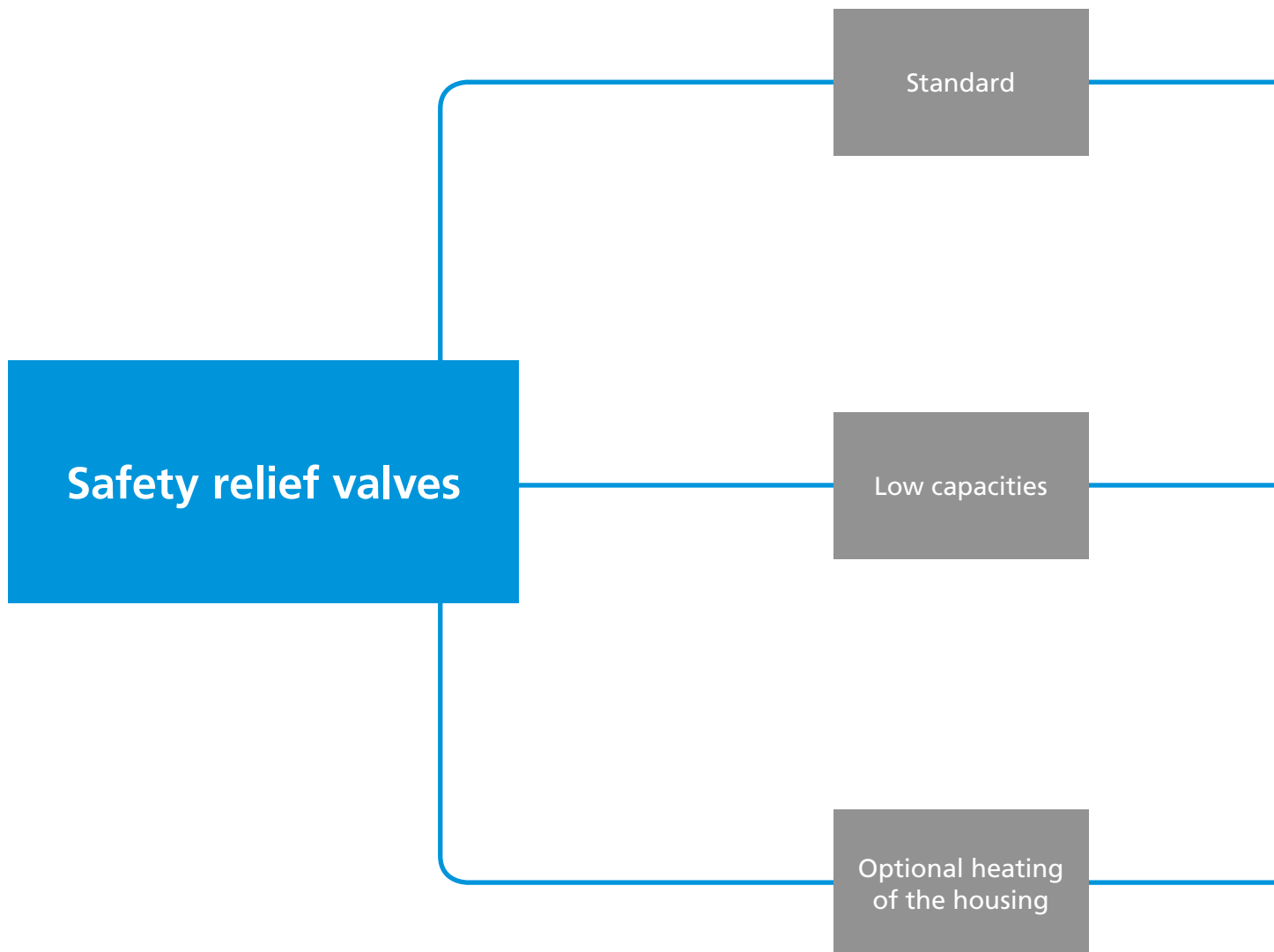


Double piston lifting in the VARIVENT® safety valve types 488 and 483



Pneumatic lifting at the spring-loaded safety relief valve type HyCom

4.5



VARIVENT®  
spring safety relief valve  
type 488

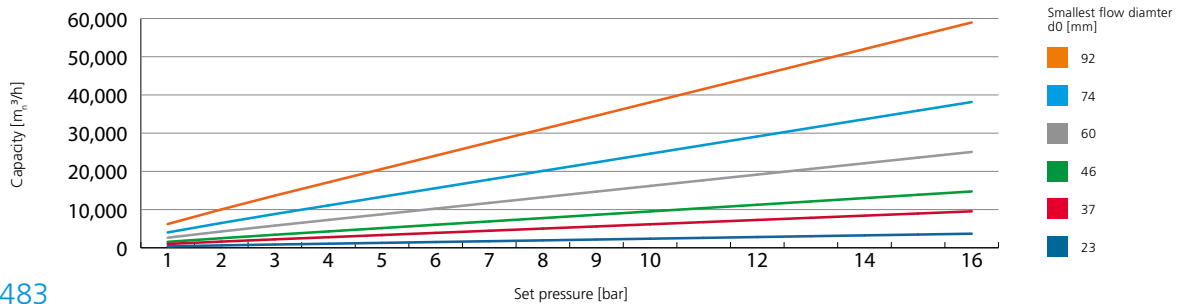
VARIVENT®  
spring safety relief valve  
type 483

Spring-loaded safety relief valve  
type HyCom

4.5

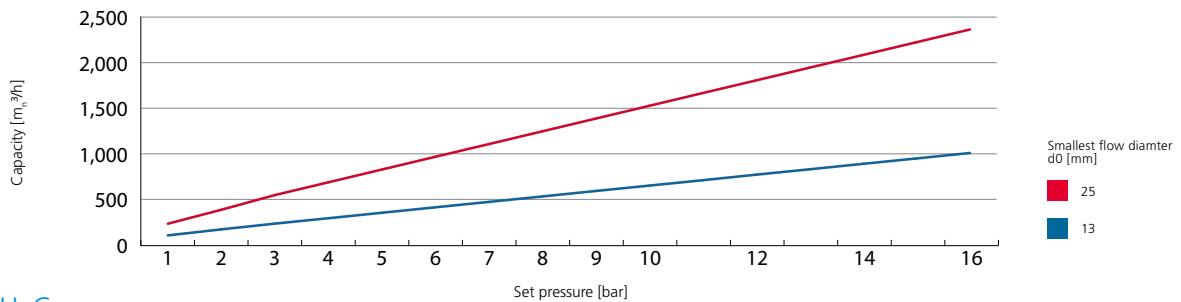
Type 488

Nominal width		Discharge Capacity [mn <sup>3</sup> /h]														
DN	OD	Flow diameter d <sub>0</sub> [mm]	Set pressure													
			1	2	3	4	5	6	7	8	9	10	12	14	16	
			[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]
			14.5 [psi]	29.0 [psi]	43.5 [psi]	58.0 [psi]	72.5 [psi]	87.0 [psi]	101.5 [psi]	116.0 [psi]	130.5 [psi]	145.0 [psi]	174.0 [psi]	203.0 [psi]	232.0 [psi]	
25	1"	23	388	627	854	1,071	1,289	1,507	1,725	1,943	2,161	2,379	2,814	3,250	3,686	
40	1 1/2"	37	1,004	1,622	2,209	2,773	3,337	3,900	4,464	5,028	5,592	6,155	7,283	8,411	9,538	
50	2"	46	1,552	2,507	3,414	4,286	5,157	6,029	6,900	7,771	8,643	9,514	11,257	13,000	14,743	
65	2 1/2"	60	2,641	4,265	5,809	7,291	8,774	10,257	11,739	13,222	14,704	16,187	19,152	22,117	25,082	
80	3"	74	4,017	6,487	8,836	11,091	13,346	15,601	17,857	20,112	22,367	24,622	29,132	33,642	38,153	
100	4"	92	6,209	10,026	13,657	17,143	20,629	24,114	27,600	31,086	34,571	38,057	45,028	52,000	58,971	



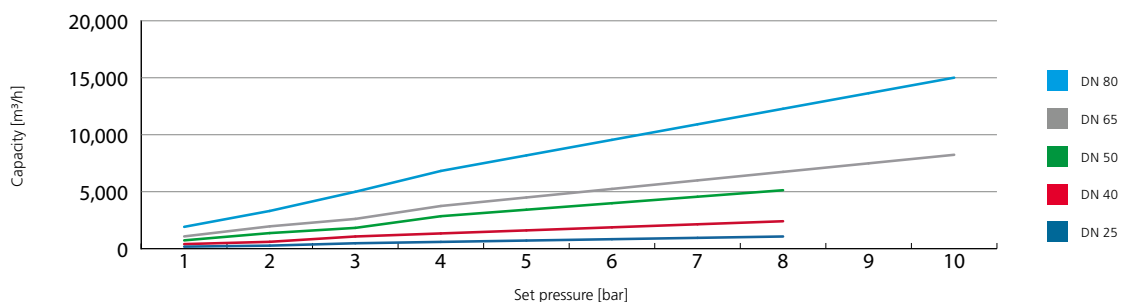
Type 483

Nominal width		Discharge Capacity [mn <sup>3</sup> /h]														
DN	OD	Flow diameter d <sub>0</sub> [mm]	Set pressure													
			1	2	3	4	5	6	7	8	9	10	12	14	16	
			[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]
			14.5 [psi]	29.0 [psi]	43.5 [psi]	58.0 [psi]	72.5 [psi]	87.0 [psi]	101.5 [psi]	116.0 [psi]	130.5 [psi]	145.0 [psi]	174.0 [psi]	203.0 [psi]	232.0 [psi]	
25	1"	13	105	171	234	293	353	413	472	532	592	651	771	890	1,009	
40	1 1/2"	25	233	386	547	687	827	967	1,106	1,246	1,386	1,526	1,805	2,084	2,364	



Type HyCom

Nominal width		Discharge Capacity [mn <sup>3</sup> /h]									
DN	Set pressure	Set pressure									
		1	2	3	4	5	6	7	8	9	10
		[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]	[bar]
25		178	267	475	594	713	832	950	1,069	-	-
40		401	602	1,070	1,338	1,605	1,873	2,141	2,408	-	-
50		730	1,368	1,824	2,850	3,420	3,990	4,560	5,130	-	-
65		1,076	1,959	2,612	3,746	4,495	5,244	5,993	6,742	7,491	8,240
80		1,916	3,310	4,993	6,822	8,187	9,551	10,916	12,280	13,645	15,009

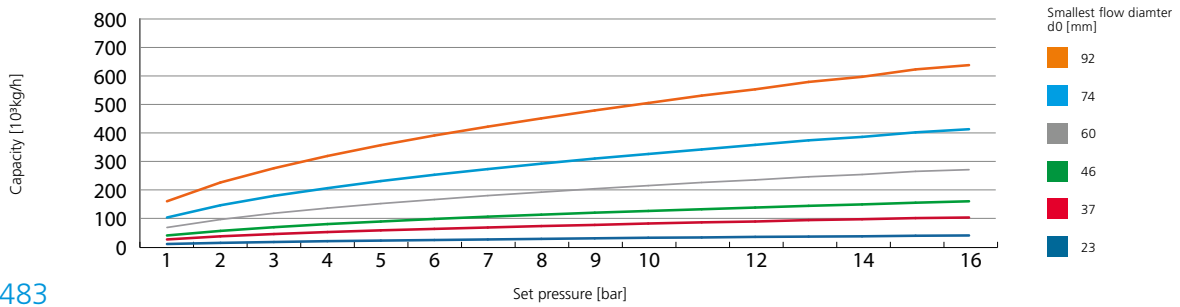


\* AD 2000-data sheet A2



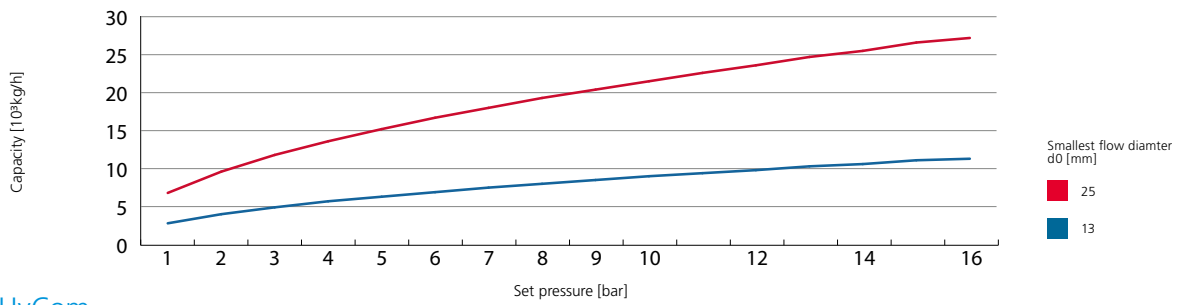
Type 488

Nominal width		Flow diameter d <sub>0</sub> [mm]	Set pressure													
DN	OD		1 [bar]	2 [bar]	3 [bar]	4 [bar]	5 [bar]	6 [bar]	7 [bar]	8 [bar]	9 [bar]	10 [bar]	12 [bar]	14 [bar]	16 [bar]	
			14.5 [psi]	29.0 [psi]	43.5 [psi]	58.0 [psi]	72.5 [psi]	87.0 [psi]	101.5 [psi]	116.0 [psi]	130.5 [psi]	145.0 [psi]	174.0 [psi]	203.0 [psi]	232.0 [psi]	
25	1"	23	10	14	17	20	22	24	26	28	30	32	35	37	40	
40	1 1/2"	37	26	37	45	52	58	63	68	73	77	82	89	97	103	
50	2"	46	40	56	69	80	89	98	106	113	120	126	138	149	160	
65	2 1/2"	60	68	96	118	136	152	166	180	192	204	215	235	254	271	
80	3"	74	103	146	179	206	231	253	273	292	310	326	358	386	413	
100	4"	92	160	226	276	319	357	391	422	451	479	505	553	597	638	



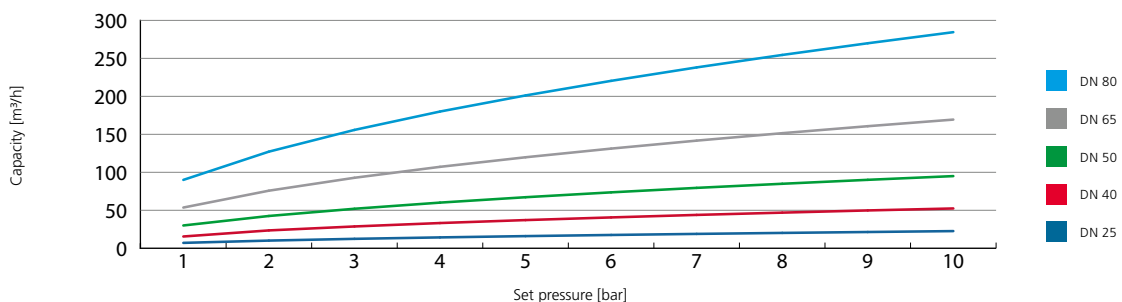
Type 483

Nominal width		Flow diameter d <sub>0</sub> [mm]	Set pressure													
DN	OD		1 [bar]	2 [bar]	3 [bar]	4 [bar]	5 [bar]	6 [bar]	7 [bar]	8 [bar]	9 [bar]	10 [bar]	12 [bar]	14 [bar]	16 [bar]	
			14.5 [psi]	29.0 [psi]	43.5 [psi]	58.0 [psi]	72.5 [psi]	87.0 [psi]	101.5 [psi]	116.0 [psi]	130.5 [psi]	145.0 [psi]	174.0 [psi]	203.0 [psi]	232.0 [psi]	
25	1"	13	2.8	4.0	4.9	5.7	6.3	6.9	7.5	8.0	8.5	9.0	9.8	10.6	11.3	
40	1 1/2"	25	6.8	9.6	11.8	13.6	15.2	16.7	18.0	19.3	20.4	21.5	23.6	25.5	27.2	



Type HyCom

Nominal width		Set pressure									
DN		1 [bar]	2 [bar]	3 [bar]	4 [bar]	5 [bar]	6 [bar]	7 [bar]	8 [bar]	9 [bar]	10 [bar]
25		7.1	10.1	12.4	14.3	16.0	17.5	18.9	20.2	21.4	22.6
40		15.5	23.5	28.7	33.2	37.1	40.6	43.9	46.9	49.8	52.4
50		30.0	42.5	52.0	60.1	67.2	73.6	79.5	84.9	90.1	95.0
65		53.6	75.8	92.8	107.2	119.8	131.2	141.7	151.5	160.7	169.4
80		90.0	127.2	155.8	180.0	201.2	220.4	238.1	254.5	269.9	284.5



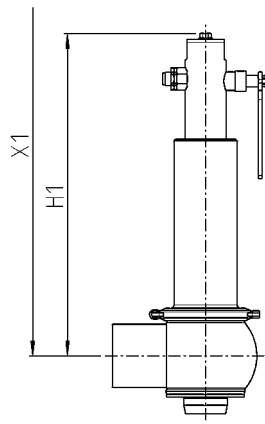
\* AD 2000-data sheet A2



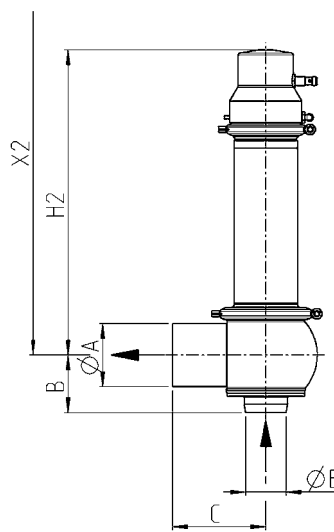


Technical data of the standard version

Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4310, 1.4401
Seal material in contact with the product	EPDM
Ambient temperature	2 to 60 °C
Air supply pressure	3.5 to 10 bar
Set pressure	0.2 to 16 bar
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
External housing surface	Matte blasted
Connection fittings	VARINLINE® grooved flange
Lifting	Manual lifting
Certificates	



Lifting H4



Lifting H8\*\*\*

		Pipe		Housing				Lifting				Valve		
ØE	Ø [mm]	ØA	Flow diameter $d_0$ [mm]	Flow cross section $A_0$ [mm <sup>2</sup> ]	B [mm]	C [mm]	H1 (with lifting H4) [mm]	X1 [mm]	H2 (with lifting H8***) [mm]	X2 [mm]	Actuation pressure min. [bar]	Actuation pressure max. [bar]	Weight* [kg]	
DN 25	29.0 × 1.50	DN 40	23	416	53.0	90.0	257	342	217	338	0.20	16.00	8	
DN 40	41.0 × 1.50	DN 65	37	1,075	70.0	125.0	426	521	395	536	0.20	16.00	14	
DN 50	53.0 × 1.50	DN 80	46	1,662	77.5	125.0	434	529	401	543	0.25	15.00	16	
DN 65	70.0 × 2.00	DN 100	60	2,827	87.0	125.0	444	579	412	593	0.23	10.34	24	
DN 80	85.0 × 2.00	DN 125	74	4,301	102.5	150.0	516	669	517	722	0.26	10.34	39	
DN 100	104.0 × 2.00	DN 150	92	6,648	121.0	152.5	534	719	535	771	0.20	8.20	39	
OD 1"***	29.0 × 1.50	OD 2"	23	416	53.0	90.0	257	342	217	338	0.20	16.00	8	
OD 1 ½"***	41.0 × 1.50	OD 3"	37	1,075	70.0	125.0	426	521	395	536	0.20	16.00	14	
OD 2"***	53.0 × 1.50	OD 3 ½"	46	1,662	77.5	125.0	434	529	401	543	0.25	15.00	16	
OD 2 ½"***	70.0 × 2.00	OD 4"	60	2,827	87.0	125.0	444	579	412	593	0.23	10.34	24	
OD 3"***	85.0 × 2.00	OD 5"	74	4,301	102.5	150.0	516	669	517	722	0.26	10.34	39	
OD 4"***	104.0 × 2.00	OD 6"	92	6,648	121.0	152.5	534	719	535	771	0.20	8.20	39	

\* Weights refer to the valve without connection fitting

\*\* The nominal widths in inch are only available with the connection type clamping flange ISO 2852 (CO).

\*\*\* Illustration and dimensions show valves with double piston design.

Position	Description of the order code	
1	<b>Valve type</b>	
	488 VARIVENT® full stroke safety relief valve	
2	<b>Nominal width inlet</b>	
	DN 25	OD 1 ½"
	DN 40	OD 2"
	DN 50	OD 2 ½"
	DN 65	OD 3"
	DN 80	OD 3 ½"
	DN 100	OD 4"
3	<b>Connection type inlet</b>	
	00 Welding end	VE VARIVENT® process connection G (DN 25–100)
	TN VARIVENT® grooved flange incl. O-ring and connecting parts	FD Flange PN16EN1092-1/11/B1
	CO Clamp connection/TRI-clamp*	FA Flange ASME B16.5 CL150RF
	SO Clamp connection DIN 32676	BS Aseptic liner with nut DIN11864-1
	GO Male end SC, DIN 11851, incl. seal ring G	BF Aseptic plain flange DIN11864-2
	KO Liner SD, DIN 11851, incl. grooved nut	NF Aseptic grooved flange DIN11864-2
	VG VARIVENT® process connection F (DN 25)	GS Aseptic union male DIN11864-1
	VH VARIVENT® process connection N (DN 25–40)	
	4	<b>Connection type outlet</b>
00 Welding end		FD Flange PN16EN1092-1/11/B1
TN VARIVENT® grooved flange incl. O-ring and connecting parts		FA Flange ASME B16.5 CL150RF
CO Clamp connection/TRI-clamp*		BS Aseptic liner with nut DIN11864-1
SO Clamp connection DIN 32676		BF Aseptic plain flange DIN11864-2
GO Male end SC, DIN 11851, incl. seal ring G		NF Aseptic grooved flange DIN11864-2
KO Liner SD, DIN 11851, incl. grooved nut		GS Aseptic union male DIN11864-1
5	<b>Lifting</b>	
	H4 Manual lifting	
	H8 Pneumatic lifting	
6	<b>Certificates</b>	
	- No approvals	
	TÜV TÜV	
	A ASME VII – US	
	AA ASME VIII AD2000 – US	
	R EAC (TR) – Russia	
	C AQSIQ – China	
K CRN – Canada		
7	<b>Accessories</b>	
	/52 Adhesive ID tag	
	/J 41 Double piston lifting	
8	<b>Type of switch</b>	
	- Without switch	
	B NI 24 V DC 3-wire PNP M12x1	
	F NI 24 V DC 2-wire M12x1	
	E NI 8.2 V DC NAMUR, ATEX M12x1	
	X NI 24 V DC 3-wire NPN M12x1, opener	
9	<b>Proximity switch holder</b>	
	I (J38) with proximity switch holder M12x1 (for DN 25, lifting H4+H8)	
	J (J39) with proximity switch holder M12x1 (for DN 40–100, lifting H4)	
K (J40) with proximity switch holder M12x1 (for DN 40–100, lifting H8)		
10	<b>Documentation</b>	
	- Without	L30 Material certificate. 3.1. spring cover
	H03 LESER CGA 3.1	L23 Material certificate. 3.1. disc
	H01 Material certificate. 3.1. body	N04 Surface measure certificate

\* Connections in OD-nominal widths

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

Position	1	2	3	4	5	6	7	8	9	10
Code	488	-		/		-		-		+

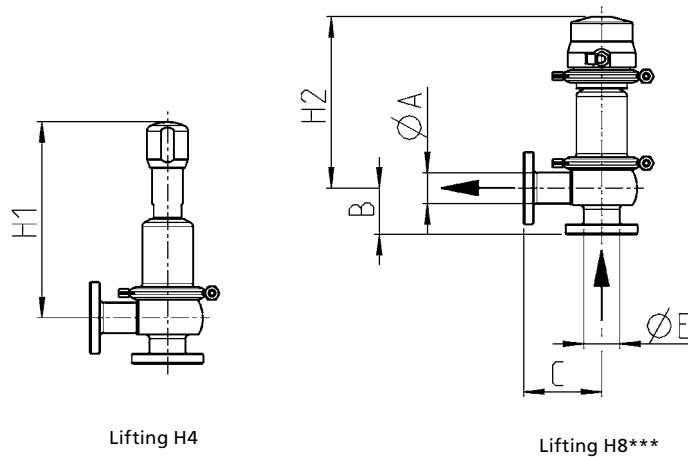




**Technical data of the standard version**

Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4310, 1.4401
Seal material in contact with the product	EPDM
Ambient temperature	2 to 60 °C
Air supply pressure	3.5 to 10 bar
Set pressure	0.2 to 16 bar
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
External housing surface	Matte blasted
Connection fittings	VARINLINE® grooved flange
Lifting	Manual lifting

Certificates



Lifting H4

Lifting H8\*\*\*

Pipe		Housing					Lifting		Valve		Weight* [kg]
ØE	Ø [mm]	ØA	Flow diameter d <sub>0</sub> [mm]	Flow diameter d <sub>0</sub> [mm]	B [mm]	C [mm]	H1 (with lifting H4) [mm]	H2 (with lifting H8***) [mm]	Actuation pressure min. [bar]	Actuation pressure max. [bar]	
DN 25	29.0 × 1.50	DN 40	13	133	20	51	177	159	0.3	16	1.6
DN 40	41.0 × 1.50	DN 65	25	491	26	57	258	222	0.1	16	3.7
OD 1"***	29.0 × 1.50	OD 1 ½"***	13	133	20	51	177	159	0.3	16	1.6
OD 1 ½"***	41.0 × 1.50	OD 2"	25	491	26	57	258	222	0.1	16	3.7

\* Weights refer to the valve without connection fitting

\*\* The nominal widths in inch are only available with the connection type clamping flange ISO 2852 (CO).

\*\*\* Illustration and dimensions show valves with double piston design.

Position	Description of the order code	
1	<b>Valve type</b>	
	483 VARIVENT® normal safety relief valve	
2	<b>Nominal width inlet</b>	
	DN 25	OD 1"
	DN 40	OD 1 ½"
3	<b>Connection type inlet</b>	
	00 Welding end	VG VARIVENT® process connection F (DN 15)
	TN VARIVENT® grooved flange incl. O-ring and connecting parts	VH VARIVENT® process connection N (DN 25–40)
	CO Clamp connection/TRI-clamp*	BS Aseptic liner with nut DIN11864-1
	SO Clamp connection DIN 32676	BF Aseptic plain flange DIN11864-2
	GO Male end SC, DIN 11851, incl. seal ring G	NF Aseptik-Nutflansch DIN11864-2
	KO Liner SD, DIN 11851, incl. grooved nut	GS Aseptik-Gewindestutzen DIN11864-1
	<b>Connection type outlet</b>	
00 Welding end	KO Liner SD, DIN 11851, incl. grooved nut	
TN VARIVENT® grooved flange incl. O-ring and connecting parts	BS Aseptic liner with nut DIN11864-1	
CO Clamp connection/TRI-clamp*	BF Aseptic plain flange DIN11864-2	
SO Clamp connection DIN 32676	NF Aseptic grooved flange DIN11864-2	
GO Male end SC, DIN 11851, incl. seal ring G	GS Aseptic union male DIN11864-1	
5	<b>Lifting</b>	
	H4 Manual lifting	
	H8 Pneumatic lifting	
6	<b>Certificates</b>	
	-	Certificates
	TÜV	TÜV
	A	ASME VII – US
	AA	ASME VIII AD2000 – US
	R	EAC (TR) – Russia
	C	AQSIQ – China
K	CRN – Canada	
7	<b>Accessories</b>	
	/52 Adhesive ID tag	
	/J 41 Double piston lifting	
8	<b>Type of switch</b>	
	-	Without switch
	B	NI 24 V DC 3-wire PNP M12×1
	F	NI 24 V DC 2-wire M12×1
	E	NI 8.2 V DC NAMUR, ATEX M12×1
	X	NI 24 V DC 3-wire NPN M12×1, opener
9	<b>Proximity switch holder</b>	
	I	(J38) with proximity switch holder M12×1 (for DN 25, lifting H4+H8)
	J	(J39) with proximity switch holder M12×1 (for DN 40–100, lifting H4)
K	(J40) with proximity switch holder M12×1 (for DN 40–100, lifting H8)	
10	<b>Documentation</b>	
	-	Without
	H03	LESER CGA 3.1
	H01	Material certificate. 3.1. body
	L30	Material certificate. 3.1. spring cover
	L23	Material certificate. 3.1. disc
	N04	Surface measure certificate

\* Connections in OD-nominal widths

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

<b>Position</b>	1	2	3	4	5	6	7	8	9	10
<b>Code</b>	483	-	-	/	-	-	-	+		

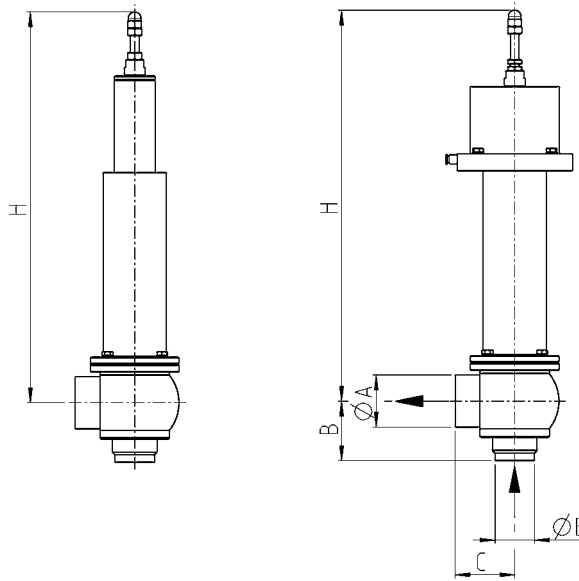




Technical data of the standard version

Material in contact with the product	1.4404 (AISI 316L)
Material not in contact with the product	1.4310 (AISI 304)
Seal material in contact with the product	EPDM
Ambient temperature	-10 to 130 °C
Air supply pressure	6 bar
Set pressure	0.5 to 10 bar
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
External housing surface	Electro-polished
Connection fittings	VARINLINE® grooved flange

Certificates



DN	Pipe		Housing				Lifting		Valve			
	ØE	Ø [mm]	ØA	Flow diameter $d_o$ [mm]	Flow diameter $d_o$ [mm]	B [mm]	C [mm]	H [mm] without lifting H	H [mm] with pneumatic lifting P	Actuation pressure min. [bar]	Actuation pressure max. [bar]	Weight without lifting [kg]
DN 25	29.0 × 1.50	DN 40	24	452	43.5	59.5	365	365	0.5	10	4.4	9.9
DN 40	41.0 × 1.50	DN 50	36	1,018	48.5	59.5	480	480	0.5	10	7.2	12.7
DN 50	53.0 × 1.50	DN 65	47	1,735	58.5	79.5	525	525	0.6	10	9.1	16.5
DN 65	70.0 × 2.00	DN 80	61	2,922	59.5	89.5	635	635	0.5	10	12.1	20.6
DN 80	85.0 × 2.00	DN 100	75	4,418	72.5	104.5	698	698	0.5	10	20.8	31.3

Position	Description of the order code
1	<b>Valve type</b> FHCSV02 Spring-loaded safety relief valve
2	<b>Nominal width inlet</b> 25 DN 25 40 DN 40 50 DN 50 65 DN 65 80 DN 80
3	<b>Connection type inlet</b> TN VARIVENT® grooved flange incl. O-ring and connecting parts KO Liner SD, DIN 11851, incl. grooved nut
4	<b>Connection type outlet</b> TN VARIVENT® grooved flange incl. O-ring and connecting parts GO Male end SC, DIN 11851, incl. seal ring G
5	<b>Lifting</b> H Manual lifting P Pneumatic lifting
6	<b>Options</b> See following pages
+	
7	<b>Feedback</b> 0 Without feedback 1 One feedback
8	<b>Type of switch</b> - Without switch B NI 24 V DC 3-wire PNP M12x1 F NI 24 V DC 2-wire M12x1 E NI 8.2 V DC NAMUR, ATEX M12x1



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

<b>Position</b>	1	2	3	4	5	6	7	8	
<b>Code</b>	FHCSV02	-		/		-		+	

### Surface quality

Deviating from the quality of the standard surface quality ( $R_a \leq 0.8 \mu\text{m}$ ) a surface quality is available up to a medium roughness for surfaces in contact with the product of  $R_a \leq 0.4 \mu\text{m}$ . The outer surface of the housings is matte blasted as standard.

One process for improving the surface quality is electrochemical polishing, in which peaks on the surfaces of material are abraded by a galvanic process, resulting in an evened-out elevation profile.

This surface treatment makes it much less likely for contaminating substances and micro-organisms to stick to the surface. In addition, the smooth surface improves corrosion resistance by formation of an inert oxide layer.

Available valve types
Type 488
Type 483

Surface quality of the housing inlet in contact with the product	
$R_a \leq 0.8 \mu\text{m}$	Electro-polished
$R_a \leq 0.4 \mu\text{m}$	Electro-polished

### Limit stop

The limit stop permits adjustment of the safety relief valve to the required outlet mass flow to avoid an unstable function behavior of the safety relief valve. This additional equipment limits the stroke of the valve and is therefore suitable for best adjustment of the respective valve size to the required capacity to be discharged.

Available valve types
Type 488



### Heating facility

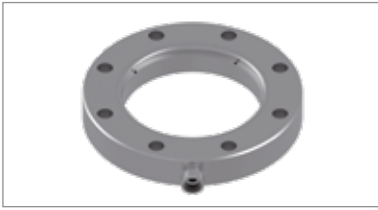
The heating facility is used as a freeze protection of the valve seat so that the safety function of the valve is still ensured even at temperatures below 0 °C. The valve housing is equipped with up to two heating rods. Compensation for a temperature differences of up to 30 °C is possible. Overheating of the valve seat must be avoided!

Available valve types
Type HyCom

Technical data	
Voltage	24 V
Power	30 W per heating rod

Nominal width	Number of heating rods
DN 25	1
DN 40	2
DN 50	2
DN 65	2
DN 80	2



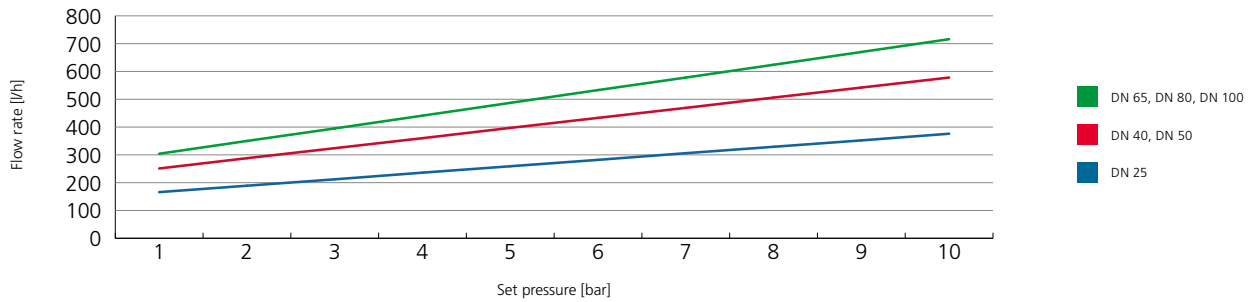


### Cleaning module

The cleaning module serves the hygienic cleaning of the entrance side of an upright safety relief valve. A cleaning connection module is used to spray cleaning media into the seat area of the valve. To use the cleaning module, the safety relief valve must be equipped with the connection fitting VARIVENT® grooved flange.

Available valve types
Type 488
Type 483
Type HyCom

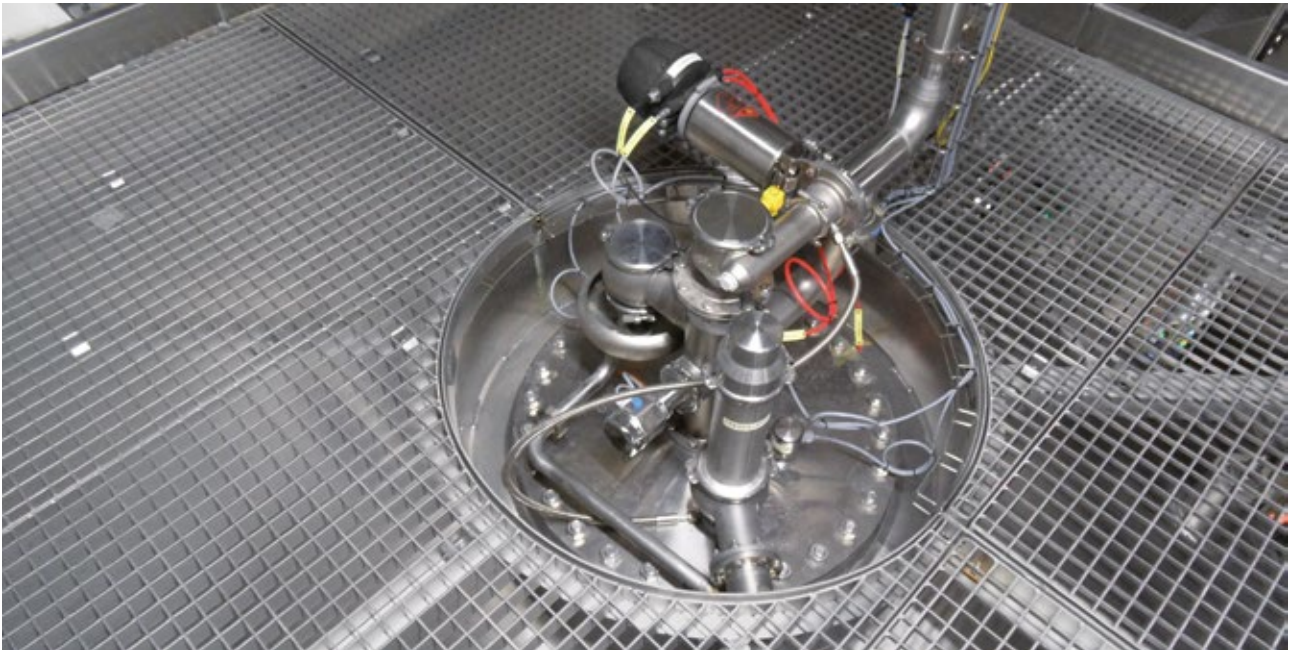
Technical data	
Material in contact with the product	1.4404 (AISI 316L)
Connection CIP hose	6/8 mm
Cleaning nozzles	2-4



Nominal width	Number of nozzles	For mounting on flange		For mounting on tank cover	
		Material		Material	
		EPDM	FKM	EPDM	FKM
DN 25	2	223-159.13	223-159.19	223-159.01	223-159.07
DN 40	3	223-159.14	223-159.20	223-159.02	223-159.08
DN 50	3	223-159.15	223-159.21	223-159.03	223-159.09
DN 65	4	223-159.16	223-159.22	223-159.04	223-159.10
DN 80	4	223-159.17	223-159.23	223-159.05	223-159.11
DN 100	4	223-159.18	223-159.24	223-159.06	223-159.12

Customer	
Company name/customer number	_____
Project	_____
Contact	_____
Phone	_____
Email	_____
Product	
Type of medium	<input type="checkbox"/> Liquid <input type="checkbox"/> Gas / gaseous <input type="checkbox"/> Saturated steam
Name of medium	_____
Density $\rho$	_____ <input type="checkbox"/> kg/m <sup>3</sup> <input type="checkbox"/> lb/gal [US] <input type="checkbox"/> lb/gal [UK]
Viscosity $\eta$ (for liquids only)	_____ mPas/cP
Compressibility factor Z (for gas)	_____
Isentropic exponent $\gamma$ (gases and steams)	_____
Process	
Set pressure $p_1$	_____ <input type="checkbox"/> bar-g <input type="checkbox"/> mbar-g <input type="checkbox"/> psi-g
Back-pressure $p_2$	_____ <input type="checkbox"/> lb/ft <sup>2</sup> -g <input type="checkbox"/> MPa-g
Application temperature	_____ <input type="checkbox"/> K <input type="checkbox"/> °F <input type="checkbox"/> °C
Dischargeable flow	_____ <input type="checkbox"/> l/h <input type="checkbox"/> m <sup>3</sup> /h <input type="checkbox"/> mn <sup>3</sup> /h <input type="checkbox"/> gpm _____ <input type="checkbox"/> kg/h <input type="checkbox"/> lb/h <input type="checkbox"/> scfm
Basic data	
Valve type	<input type="checkbox"/> Type 488 <input type="checkbox"/> Type 483 <input type="checkbox"/> Type HyCom
Nominal width standard	<input type="checkbox"/> DN <input type="checkbox"/> OD
Accessories	<input type="checkbox"/> INI holder <input type="checkbox"/> Manual lifting <input type="checkbox"/> Heating <input type="checkbox"/> Pneumatic lifting <input type="checkbox"/> Limit stop
Certificates	<input type="checkbox"/> 3.1 Certificate for the housing material <input type="checkbox"/> 3.2 Certificate for the setting pressure <input type="checkbox"/> ASME certificate (Canada) <input type="checkbox"/> ASME certificate (USA)
Surface quality	<input type="checkbox"/> > 0.8 $\mu$ m <input type="checkbox"/> > 0.4 $\mu$ m <input type="checkbox"/> Inlet electro-polished
Connection flanges	<input type="checkbox"/> TN – VARIVENT® grooved flange <input type="checkbox"/> GO – male end SC, DIN 11851 <input type="checkbox"/> CO – clamp connection <input type="checkbox"/> 00 – welding end
Comments / Miscellaneous	_____ _____ _____ _____





### VARIVENT® vacuum valves

VARIVENT® vacuum valves are used for hygienic protection of tanks against negative pressure. Protection takes place from  $-2.5 \text{ mbar}_g$ . To minimize cleaning and for protection from sticking of the valve disc, the seat ring of the valves has an anti-adhesive coating. The elastomer seals used are FDA-compliant.

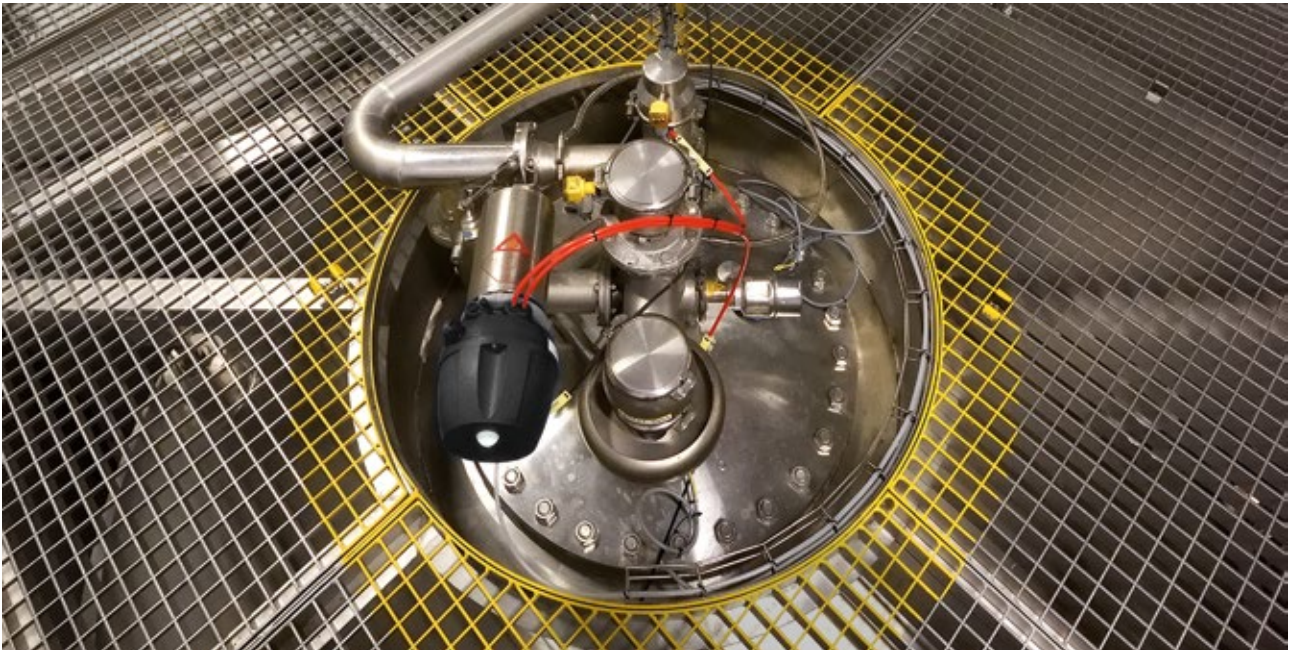
VARIVENT® vacuum valves have quick reaction times when vacuum occurs, as well as safe closing functions at excess pressure.

### Function of the valve

Hydraulic configuration of GEA Tuchenhausen vacuum valves is always based on prevention of vacuum caused by free emptying of a tank. Prevention of vacuum caused by hot/cold cleaning is not taken into consideration.

If a vacuum occurs in the tank system, the valve disc is lifted by the negative pressure. The inflowing air flows up through the valve from below. This arrangement offers best protection against the percolation of dirt particles into the tank and thus into the product. The valve runs empty.

The functions of the VARIVENT® vacuum valve can be optionally expanded with a proximity switch feedback, a pneumatic lifting mechanism and a heating element.



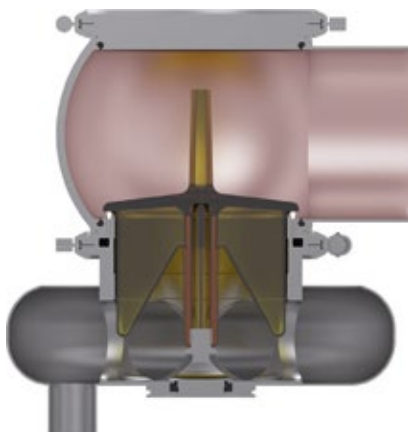
### Application examples

The VARIVENT® vacuum valves are mostly used in combination with the VARITOP® tank safety system. Accordingly, the main application is the beer brewing industry.

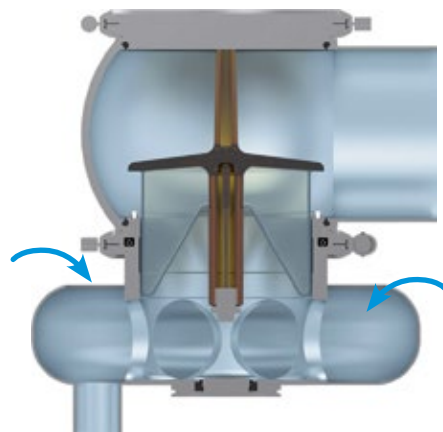
The optional installation of a heating element ensures full function even at temperatures below freezing. VARIVENT® vacuum valves therefore can also be operated outdoors. Only protection from weather must be provided.

Special features
Best protection from dirt particles being sucked in
Ideal combination with the VARITOP® tank safety system
Quick reaction times
Additional equipment

4.6



The valve is connected to the housing at the tank system. The valve disc is closed. The coloration in the housing represents the vacuum.

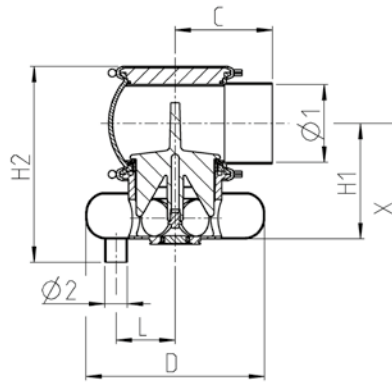


The valve disc is opened by the vacuum; air flows into the system without dirt particles being pulled along.



**Technical data of the standard version**

Material in contact with the product	1.4404 (AISI 316L)	
Material not in contact with the product	1.4301 (AISI 304)	
Seal material in contact with the product	EPDM, FKM, HNBR	
Ambient temperature	0 to 45 °C	
Air supply pressure	Min. 4 bar (58 psi)	
	Max. 8 bar (116 psi)	
Product pressure	Max. 6 bar (87 psi)	
Surface in contact with the product	DN, OD	$R_a \leq 0.8 \mu\text{m}$
	IPS	$R_a \leq 1.2 \mu\text{m}$
External housing surface	Matte blasted	
Actuator type	Pneumatic actuator air/spring	
Connection fittings	Welding end	
Identification	Adhesive ID tag	



Nominal width	Pipe		Housing			Dimension			Valve
	Ø1 [mm]	Ø2 [mm]	C [mm]	L [mm]	D [mm]	H1 [mm]	H2 [mm]	X [mm]	Weight [kg]
DN 65	70.0 × 2.00	29	125.0	68	230	126	210	260	6
DN 80	85.0 × 2.00	29	125.0	68	230	133	225	268	6
DN 100	104.0 × 2.00	29	125.0	76	230	152	252	295	8
OD 2 ½"	63.5 × 1.65	29	125.0	68	230	123	204	260	6
OD 3"	76.2 × 1.65	29	125.0	68	230	129	217	268	6
OD 4"	101.6 × 2.11	29	125.0	76	230	150	249	295	8
IPS 6"	168.2 × 2.77	29	152.5	102	285	231	364	417	21

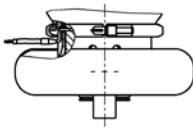


Position	Description of the order code
1	<b>Valve type</b> V VARIVENT® vacuum valve
2	<b>Housing combinations</b> L
3	<b>Supplement to the valve type (further information can be found under options on the reserve)</b> - Without A With lifting E With feedback R With lifting and feedback
4	<b>Nominal width</b> DN 65 OD 2 ½" DN 80 OD 3" DN 100 OD 4" IPS 6"
5	<b>Valve seat version</b> L0 Clamped seat ring/clamp connection
6	<b>Seal material in contact with the product</b> 1 EPDM (FDA) 2 FKM (FDA) 3 HNBR (FDA)
7	<b>Surface quality of the housing</b> 1 Inside $R_a \leq 1.2 \mu\text{m}$ , outside matte blasted (IPS) 2 Inside $R_a \leq 0.8 \mu\text{m}$ , outside matte blasted (DN, OD)
8	<b>Connection fittings</b> N Welding end
9	<b>Options</b> /52 Adhesive ID tag
+	
10	<b>Type of the switch (further information can be found under options on the reverse)</b> 0 Without feedback B NI 24 V DC 3-wire M18x1 F NI 24 V DC 2-wire M18x1
11	<b>Air connection (further information can be found under options on the reverse)</b> 0 Without M Metric for air hose $\varnothing 6/4 \text{ mm}$ Z Inch for air hose $\varnothing \text{OD } 1/4" (6.35/4.35 \text{ mm})$

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

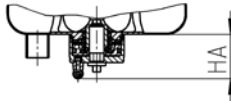
<b>Position</b>	1	2	3	4	5	6	7	8	9	10	11
<b>Code</b>	V	L			L0			N	/52		

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



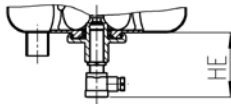
### Heating

Heating of the vacuum valve is recommended when ambient temperatures could fall below the freezing point. This ensures that the valve disc does not freeze to the seat. Voltage: 24 V AC, power: 20 W



### Pneumatic lifting type A

The pneumatic lifting serves control of the valve disc for valve seat cleaning during tank cleaning. This way, the seat and seal surfaces are cleaned in addition to the valve housing. The lifting mechanism can be retrofitted.

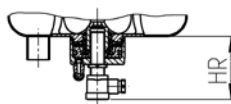


### Feedback type E

The proximity switch detects the closed valve position. As soon as the valve disc leaves the non-actuated position the switching contact is interrupted.

Two types of proximity switches are available:

Proximity switch 24 V DC M18x1 for type E	Article number
2-wire (terminal chamber)	505-036
3-wire (terminal chamber)	505-083



### Pneumatic lifting actuator and feedback type R

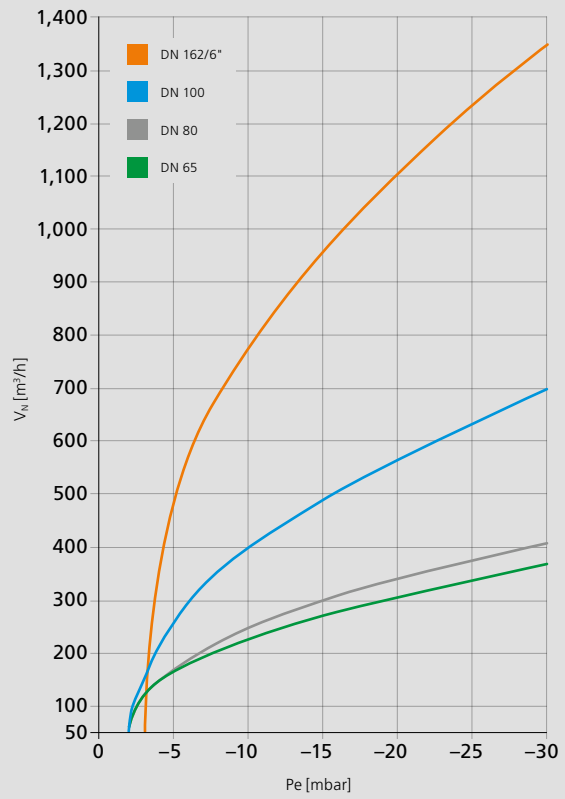
Type R is a combination of the pneumatic lifting actuator type A and the proximity switch type E. The function method is comparable to type A and E.

Nominal width	Dimension		
	HA [mm]	HE [mm]	HR [mm]
DN 65	45	77	77
DN 80	45	77	77
DN 100	45	77	77
OD 2 1/2"	45	77	77
OD 3"	45	77	77
OD 4"	45	77	77
IPS 6"	42	71	73



Customer	
Company name/ customer number	_____
Project	_____
Contact	_____
Phone	_____
Email	_____

Process	
Max. fill level of the tank	_____ m
Max. emptying volume flow	_____ m <sup>3</sup> /h
Max. diameter of the outlet opening	_____ mm
Vacuum-proofness of the tank	_____ mbar-a
Nominal width standard	<input type="checkbox"/> DN <input type="checkbox"/> OD <input type="checkbox"/> IPS
Accessories	
	<input type="checkbox"/> INI-holder <input type="checkbox"/> Pneumatic lifting <input type="checkbox"/> Heating
Surface quality	
	<input type="checkbox"/> > 0.8 µm <input type="checkbox"/> > 0.4 µm
Seal material	
	<input type="checkbox"/> EPDM <input type="checkbox"/> FKM <input type="checkbox"/> HNBR



Comments / Miscellaneous	
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## VARITOP®

The tank safety system VARITOP® is a modular system on the basis of standardized basic components. VARITOP® is used for tank cleaning, to secure against inadmissible excessive and negative pressure and for gassing and degassing of tanks. Each customer may select the respective desired function units. Apart from this, the setup can be structured individually. The result is a functional unit adapted to customer desires.

## Filling and emptying



## Function of the system

The tank is secured against excess pressure with spring-loaded safety relief valves. VARIVENT® vacuum valves secure against negative pressure. For more detailed information about and the configuration of these valves please see section 4.

A central connection is used to switch gas and CIP paths. The CIP/gas management takes place either via an automatic switch-over module (no power supply required) or via a butterfly valve combination. The cleaning media enters the tank through the CIP line in the module. If no cleaning process takes place, gassing and degassing is ensured by a gas bypass at the cross piece and via the switch-over module.

The tank safety system VARITOP® can be placed on a central connection or a tank dome cover. The interface is always the proven VARIVENT® flange connection on the cross piece.

Application example

In practice, VARITOP® tank safety systems are often used in the brewery industry. A typical application is in the securing of tanks in the fermentation and storage cellar areas. During fermentation and storage, VARITOP® can be used to adjust the pressure in the head space of the tank. At the same time, the VARITOP® system protects the tanks from over- or under-pressure when filling or emptying.

The option of heating the vacuum valve and the safety relief valve permits using the VARITOP® tank safety system outdoors. However, there is the prerequisite that protective measures must be taken, e.g. for adequate protection from weather influences (enclosure).

Special features
Flexibility because of modular principle
Reliability in fully automated processes
Reproducible cleaning result
Securing against excess pressure
Securing against negative pressure

Tank dome cover connection



Central connection



Advantages of the tank dome cover
More compact design
Additionally expansible
Sight glass with and without illumination
GEA Tuchenhagen level-probe type TNS
VARIVENT® flange connection

Advantages of the central connection
Reduced to one connection to the tank
Identical function ensured
More cost-effective version
VARIVENT® flange connection



## Design of the central connection

**1** Cross piece

The cross piece is the central connection point of the containers. All essential components are installed at the cross piece. The special construction ensures complete cleaning of all connected components.

**2** Cleaning lance or rotating jet cleaner

The cleaning lance or the rotating jet cleaner is connected to the CIP/gas management and leads to the tank through the cross piece. Special nozzles additionally clean the cross piece from the inside and the connected components.

**3** Safety relief valve

The safety relief valve of type 488 or HyCom secures the tanks reliably against excess pressures. For more detailed information and notes on design, see section 4.5.

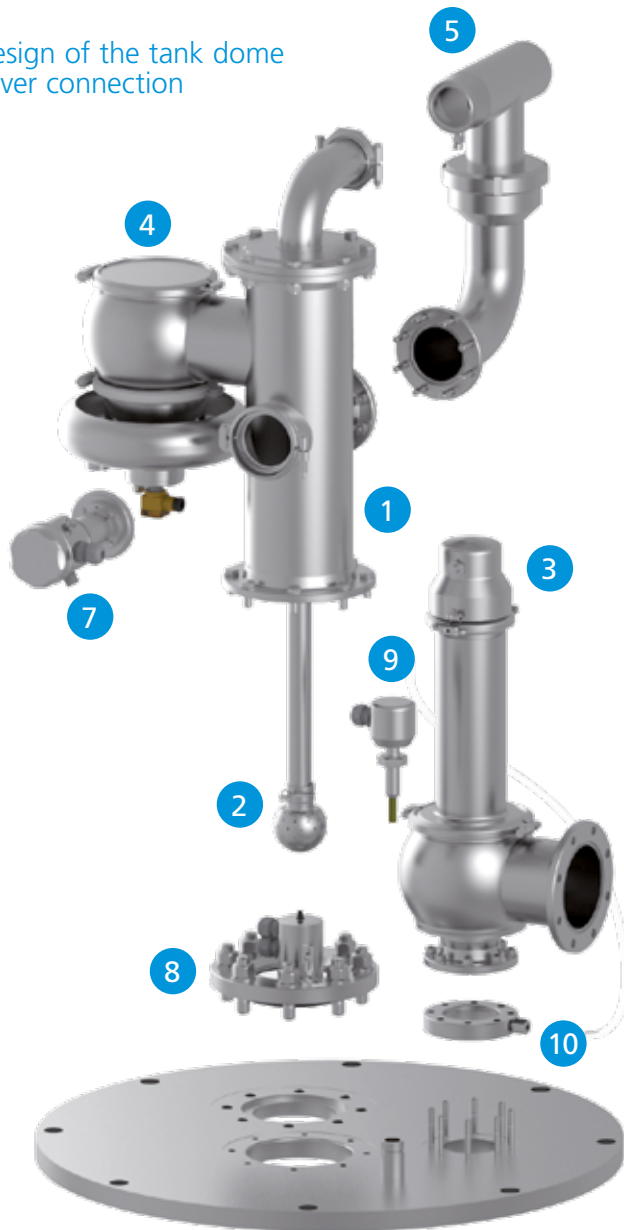
**4** Vacuum valve

VARIVENT® vacuum valves secure the tank against a minimum negative pressure of  $-2.5 \text{ mbar}_g$ . The construction of the valve ensures fast reaction times when a vacuum occurs. For more detailed information and notes on design, see section 4.6.

**5** Switch-over module of the CIP/Gas management

For more detailed information, see the next pages.

Design of the tank dome cover connection



10 Cleaning module

The cleaning module serves the hygienic cleaning of the entrance side of an upright safety relief valve. A cleaning connection at the switch-over module is used to spray cleaning media into the seat area of the valve.

9 GEA Tuchenhausen level probe type TNS

The GEA Tuchenhausen level probe is used as overfill protection at vessel filling. It is fitted right on the tank dome cover.

8 Sight glass valve (with illumination)

The sight glass is available as a selection option for the tank dome cover. Additionally, the sight glass can be equipped with illumination. This is attached on the sight glass.

6 Central connection

For the central connection, the connection to the container takes place via the tried and tested VARIVENT® flange connection. The grooved flange is always provided for at the cross piece.

7 Pressure transmitter

The optional pressure transmitter records the pressure in the head space of the tank above the product. The process connection type VARINLINE® N 50/40 is always present even if no pressure transmitter is provided.



## Automatic switch-over module

Way I: Open

Way II: Open

In the idle position, the switch-over module keeps the path for gassing and degassing of the tank open (path II). The path to the cleaning device is always opened (path I).

During the supply of cleaning media to the cleaning lance, the switch-over module automatically switches at a flow rate of 10 m<sup>3</sup>/h um and closes path II. The exception is with the use of a rotating jet cleaner where the switch-over module closes at 8 m<sup>3</sup>/h. The path to gassing and degassing is closed after switching.

Please note the following with the design of the VARITOP®! The gas capacity is pressure dependent and the maximum is 92 m<sup>3</sup>/h CO<sub>2</sub> at an operating pressure of 2 bar<sub>g</sub>. This can also be converted to other process parameters.

The switch-over module is self-cleaning.

The maximum gas flow into the tank is 145 m<sup>3</sup>/h at a maximum pressure drop of 0.01 bar.

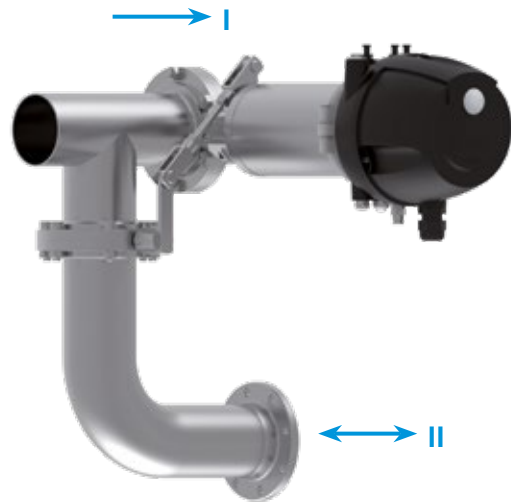


### Butterfly valve (with power supply)

Way I: Closed

Way II: Open

In the idle position the switch-over module keeps the path for gassing and degassing open. The path to the cleaning device is closed. Pneumatic path switching is provided. After activation the path to the cleaning device is then opened and the gassing and degassing path closed. The switch-over module is designed for higher gas rates.

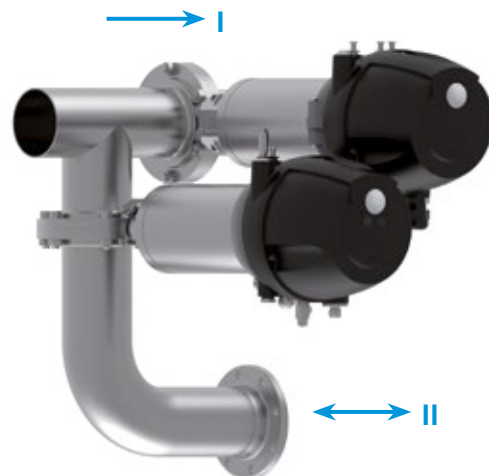


### Butterfly valve with T.VIS® P-15 (with power supply)

Way I: Closed

Way II: Open

The diversion valve controls the gassing and degassing or the container inner pressure depending on the process parameters. Thus, the pressure can be compactly and reliably controlled e.g. during fermentation. The control valve, designed as a butterfly valve T-smart 7 in combination with a T.VIS® P-15, is provided in path II. Path I is locked with a butterfly valve T-smart 7 in combination with a T.VIS® M-15.

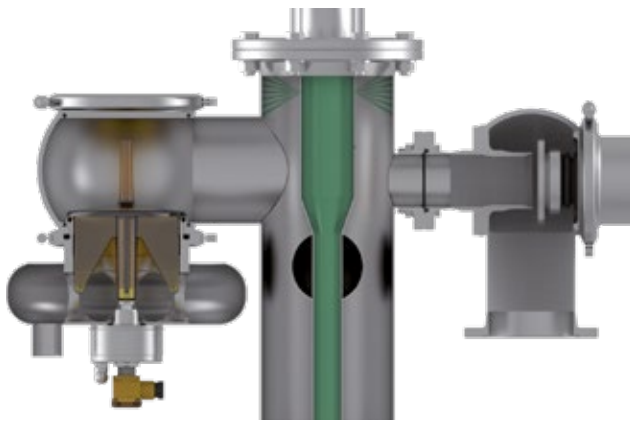
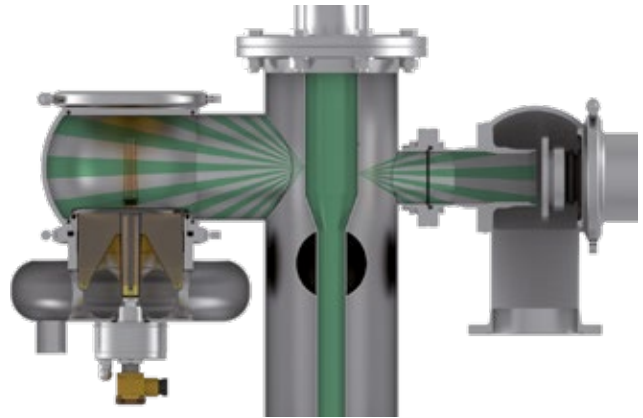




## Cleaning of the valves

For the central connection, the safety relief valve and the vacuum valve are cleaned by the cleaning lance or the rotating jet cleaner. The cleaning media is sprayed onto the valve seats through the bores in the lance pipe. To ensure that the valve seats as well as the housings are cleaned, the valve discs can be lifted (optional).

The tank dome cover version has the safety relief valve fitted vertically on the tank dome cover. The valve can be cleaned via a separate cleaning module that is fitted between the tank dome cover and the safety relief valve. For further information refer to the section 4.5.



## Internal cleaning

The tank can be cleaned with a cleaning lance or a rotating jet cleaner. For the cleaning lance, spray balls, orbital cleaners and rotating cleaners are available cleaning devices.

The cleaning lance or the rotating jet cleaner is fitted on the top of the cross piece and protrudes into the tank through the cross piece. Nozzles in the lance pipe ensure cleaning of the cross piece during tank cleaning.

The automatic switch-over module closes only starting at a corresponding flow rate (see following pages). This volume flow must be reached or exceeded and may be higher than the necessary flow rate for tank cleaning. The divert valve has cleaning openings that ensure cleaning of the connection pipeline to the cross piece when closed.



### Cleaning lance and accessories

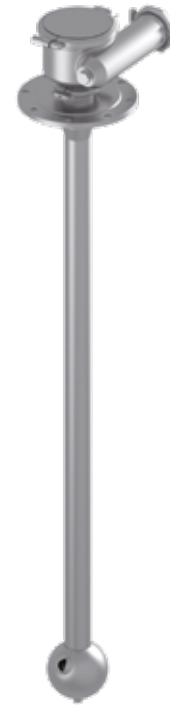
Many cleaners from the GEA Breconcherry cleaning technology range can be used with the tank safety system VARITOP®. Technical differences from single use can result. Be aware that the maximum permitted working pressure for all installed cleaners is 10 bar<sub>g</sub>.

The cleaning lance is used to adapt the cleaners in the VARITOP®.



### Rotating jet cleaner

The rotating jet cleaner has a proven cleaning concept of slow rotation, combined with powerful and targeted blasting to achieve the best cleaning result.



The following cleaners can be used:

Rotating cleaners	Orbital cleaners	Static cleaners
Clipdisc	Tempest	Spray ball
Sanitor	Tornado	Recommended operating pressure is between 1.0 and 2.5 bar <sub>g</sub>
Torus	Tornado 4	
Turbo SSB	Typhoon	
Turbodisc	Torrent	

The following nozzle arrangements are available.

Nozzle placement		
A	C4	E1
B	D1	F2
B1	D2	F3
C1	D3	F5
C2	E	

For more information on the individual cleaners, see the cleaning technology catalog.

When using the rotating jet cleaner, we recommend a CIP/Gas management in the form of a butterfly valve combination.



### Determination of the cleaning volume flow for the overall system

The required flow rate of cleaning media is composed of three different parts. First, the flow rate for the cleaner is determined. Second, the flow rate for the internal cleaning of the systems is determined. If required, a share from using the automatic switch-over module is added. To give an illustrative example, we will present the calculation based on a spray ball type A2 and a cross piece DN 162.

#### 1. Cleaner

Read the flow rate for the cleaner at the desired working pressure; see catalog Cleaning Technology.

Example: Spray ball A2 (1 bar<sub>g</sub>):  $\dot{V}_{\text{cleaner}} : 21.9 \text{ m}^3/\text{h}$

Important: If the spray balls are used at a higher pressure than 1 bar<sub>g</sub>, the flow rate changes (see catalog Cleaning Technology)

#### 2. Determination of the flow rate for the internal cleaning in the VARITOP®

Example: Cross piece DN162

$$\dot{V}_{\text{cleaning lance}} = K_{vs \text{ -value}} \cdot \sqrt{\frac{P}{1} \frac{\text{bar}_g}{\text{bar}_g}}$$

$$\dot{V}_{\text{cleaning lance}} = 2.3 \cdot \sqrt{\frac{1.0}{1} \frac{\text{bar}_g}{\text{bar}_g}} = 2.3 \frac{\text{m}^3}{\text{h}}$$

Cleaning flow rate of the internal cleaning			
Nominal width of the cross piece	DN 100	DN 125	DN 162
Kvs values [m <sup>3</sup> /h]	0.93	1.88	2.30

### 3. Determination of the overall volume flow

#### a) For the disc switchover:

For all cleaners:

$$\dot{V}_{total} = \dot{V}_{cleaner} + \dot{V}_{cleaning\ lance}$$

Example: For the spray ball A2 at 1.0 bar<sub>g</sub> in a cross piece DN 162 with disc valve switchover:

$$\dot{V}_{total} = 21.9 \frac{m^3}{h} + 2.3 \frac{m^3}{h} = 24.2 \frac{m^3}{h}$$

#### b) Exception for automatic switch-over module

The automatic switch-over module consumes the flow rate for self-cleaning:  $\dot{V}_{Auto. Switch-over\ module}$

This is determined based on the following chart and results from the pressure at the cleaner.

Thus, the overall volume flow is composed as follows:

$$\dot{V}_{total} = \dot{V}_{cleaner} + \dot{V}_{cleaning\ lance} + \dot{V}_{switch\ module}$$

Additionally, the automatic switch-over module requires a **minimum volume flow of 10 m<sup>3</sup>/h** for the divert function independently of the cleaner.

Exception: Rotating jet cleaners always close at 8 m<sup>3</sup>/h.

#### Case 1:

- ≤ 8 m<sup>3</sup>/h for rotating jet cleaners
- ≤ 10 m<sup>3</sup>/h for all other cleaners

The calculated flow rate is not enough to close the automatic switch-over module.

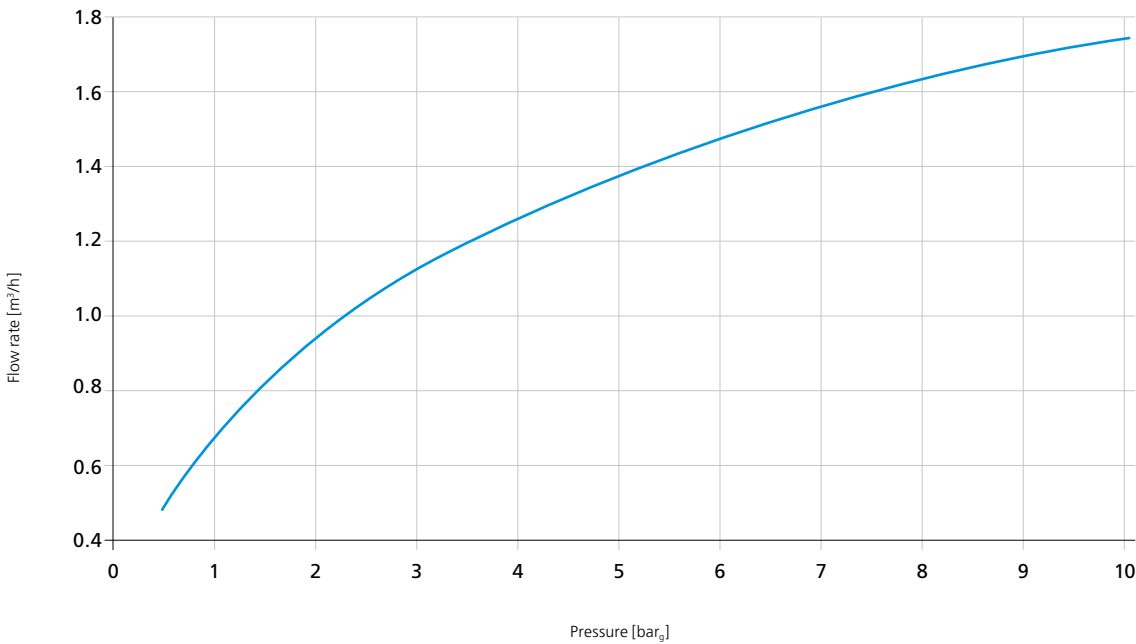
#### Case 2:

- > 8 m<sup>3</sup>/h for rotating jet cleaners
- > 10 m<sup>3</sup>/h for all other cleaners

The calculated flow rate is enough to close the switch-over module.

Example: For the spray ball A2 at 1.0 bar<sub>g</sub> in a cross piece DN 162 with automatic switch-over module:

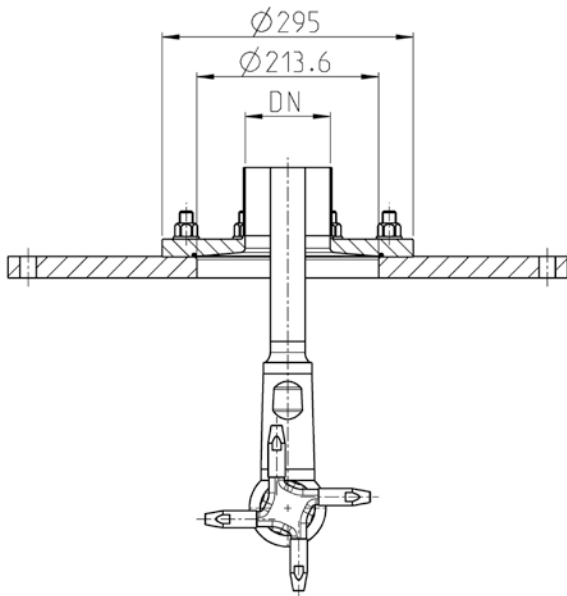
$$\dot{V}_{total} = 21.9 \frac{m^3}{h} + 2.3 \frac{m^3}{h} + 0.65 \frac{m^3}{h} = 24.85 \frac{m^3}{h}$$



Special flange for cleaners with larger installation opening

The special flange is used for cleaners that require an access opening larger than the nominal width of the cross piece. To permit installation of such cleaners from the outside, an enlarged flange is attached to the cross piece. The cleaner is first fitted to the cross piece and then installed at the tank as one unit. For overproportional cleaners, the special flange is selected automatically.

This version is only possible in combination with the tank dome cover (D).



The special flange is fitted on the tank dome cover. The mounting opening and the outer diameter of the special flange always have the same sizes, as you can see from the dimensional drawing on the left. The connection diameter to the cross piece varies according to the cross piece nominal width.

Nominal width	Diameter of the installation opening
DN 100	213.6 mm
DN 125	213.6 mm
DN 162/IPS 6"	213.6 mm

### Pressure transmitter

The pressure transmitter is installed at the cross piece. Gas pressures of 0–4 bar<sub>g</sub> or 0–10 bar<sub>g</sub> can be measured in the head space of the tank. The process connection type is VARINLINE® N 50/40.



### GEA Tuchenhagen level probe type TNS

Evaluation of the GEA Tuchenhagen level probe takes place conductively and can be used for different media. It can be chosen optionally and is fitted into a weld-in adapter on the tank dome cover. For further information refer to the section 1.



### Sight glass

The sight glass is available as a selection option for the tank dome cover. Additionally, the sight glass can be equipped with illumination.

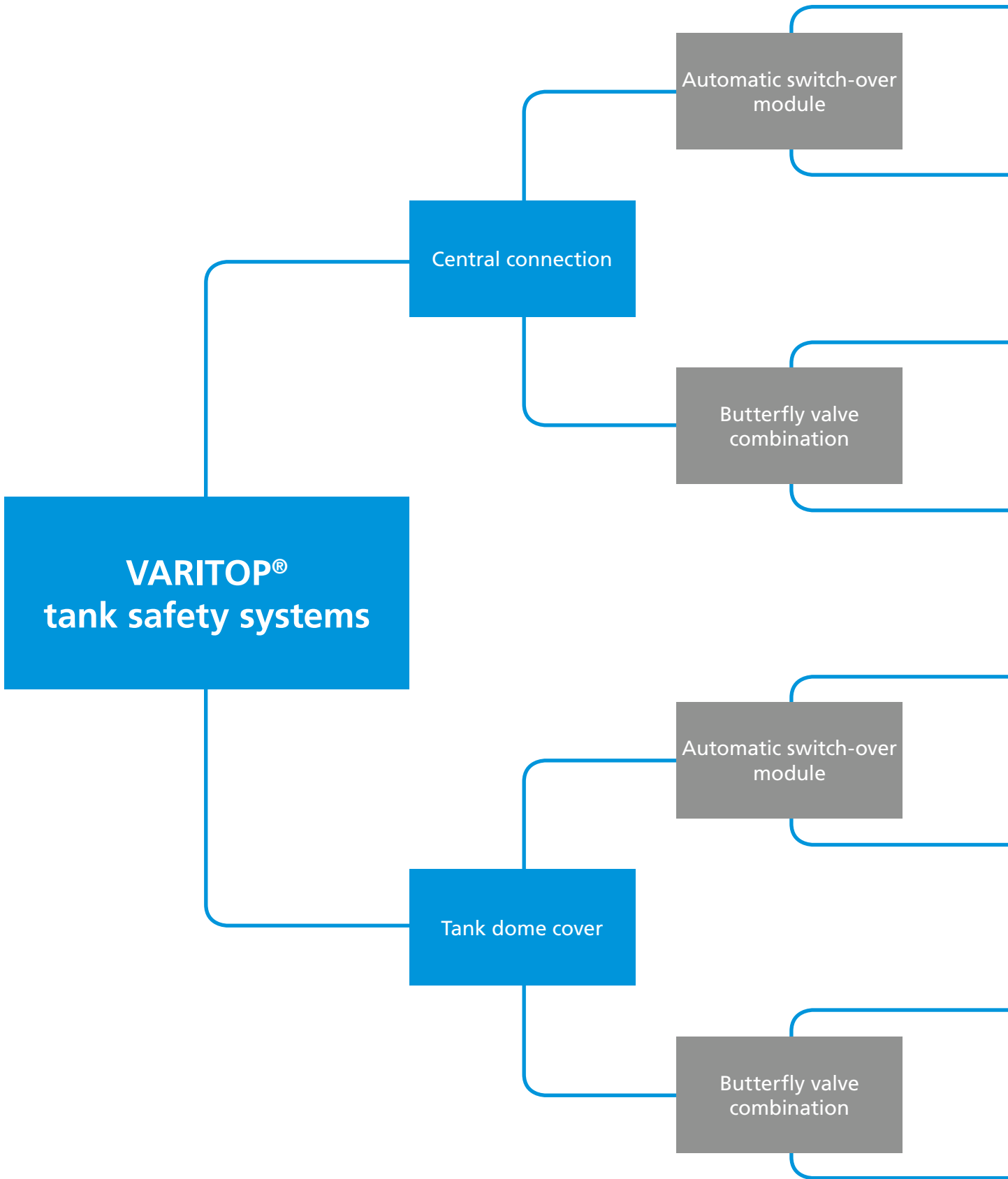


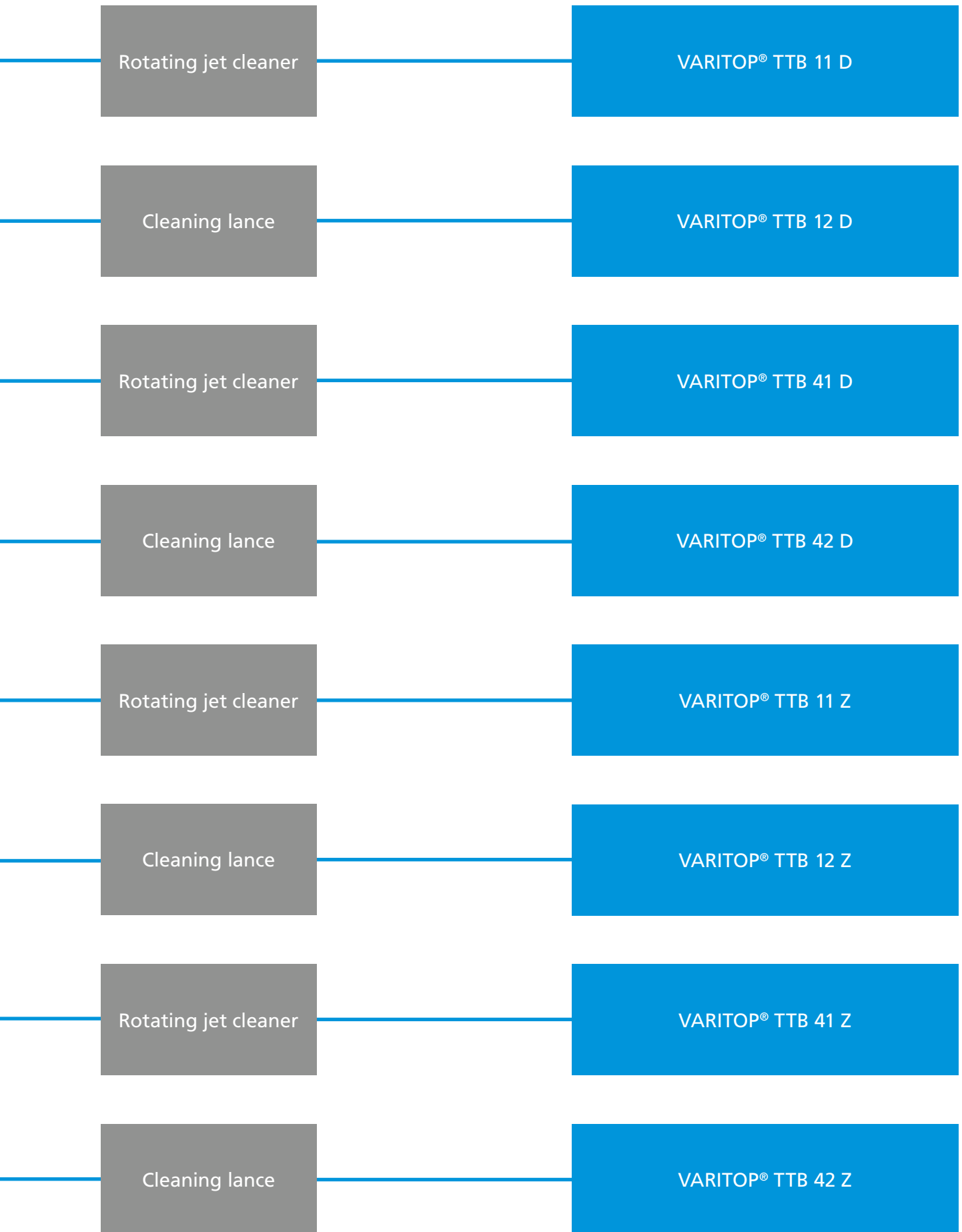
### Cleaning module

The cleaning module performs the hygienic cleaning of the entrance side of an upright safety relief valve. It is installed between the tank dome cover and the safety relief valve. A cleaning connection at the switch-over module is used to spray cleaning media into the seat area of the valve.

For further information refer to the section 4.5.

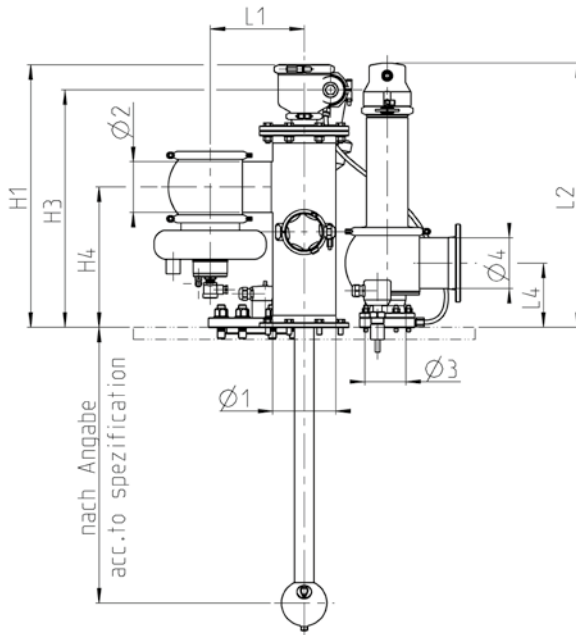




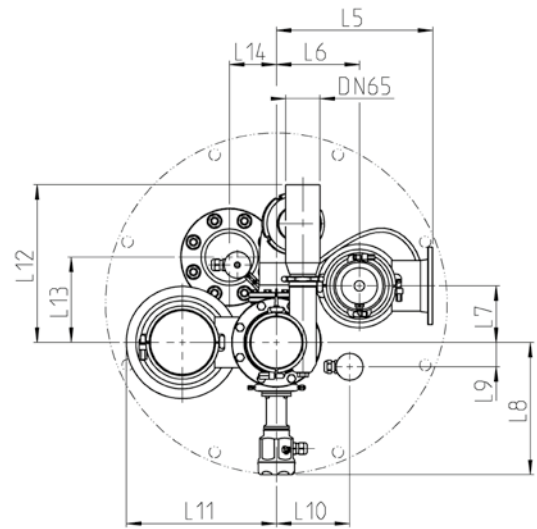




Technical data of the standard version	
Material in contact with the product	1.4404
Seal material	EPDM
Ambient temperature	0 to 45 °C
Operating temperature	< 60 °C
Air supply pressure	6 bar (87 psi), max. 8 bar (116 psi)
Product pressure	10 bar (145 psi)
Surface in contact with the product	$R_a \leq 1.6 \mu m$
CIP/GAS management	Automatic switch-over module
Cleaner	Rotating jet cleaner
Connection fittings	VARIVENT® flange on the tank side, CIP/ GAS connection of the welding end
Identification	Adhesive ID tag



Front view



Top view

		Dimension													
Nominal width Ø1	Ø2 [mm]	H1 [mm]	H3 [mm]	H4 [mm]	L1 [mm]	L6 [mm]	L7 [mm]	L8 [mm]	L9 [mm]	L10 [mm]	L11 [mm]	L12 [mm]	L13 [mm]	L14 [mm]	
DN 100	80	514	457	271	180	170	116	288	50	150	295	324	160	96	
DN 125	100	545	488	288	193	170	116	301	50	150	308	324	175	96	
DN 162	162	649	592	361	243	170	116	323	50	180	386	324	200	96	

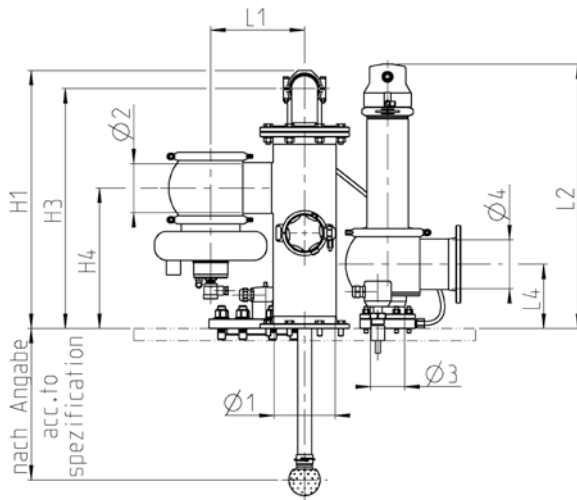
Maximum values for safety relief valve								
		Safety relief valve type 488			Safety relief valve type HyCom			
Ø3 [mm]	Ø4 [mm]	L2 [mm]	L4 [mm]	L5 [mm]	L2 [mm]	L4 [mm]	L5 [mm]	
25	40	363	98	260	454	89	255	
40	65	559	115	295	574	94	255	
50	80	574	123	295	629	104	275	
65	100	593	132	295	740	105	285	
80	125	732	148	320	816	118	300	

The description of the options – as well as the configuration of the system designation – can be found at the end of this section.

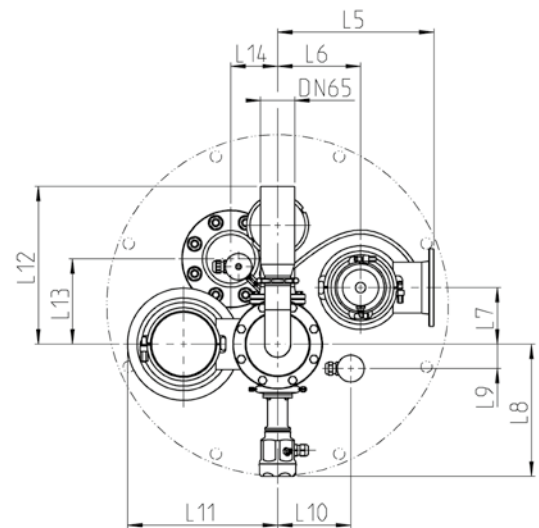




Technical data of the standard version	
Material in contact with the product	1.4404
Seal material	EPDM
Ambient temperature	0 to 45 °C
Operating temperature	< 60 °C
Air supply pressure	6 bar (87 psi), max. 8 bar (116 psi)
Product pressure	10 bar (145 psi)
Surface in contact with the product	$R_a \leq 1.6 \mu m$
CIP/GAS management	Automatic switch-over module
Cleaner	Cleaning lance
Connection fittings	VARIVENT® flange on the tank side, CIP/ GAS connection of the welding end
Identification	Adhesive ID tag



Front view



Top view

		Dimension												
Nominal width Ø1	Ø2 [mm]	H1 [mm]	H3 [mm]	H4 [mm]	L1 [mm]	L6 [mm]	L7 [mm]	L8 [mm]	L9 [mm]	L10 [mm]	L11 [mm]	L12 [mm]	L13 [mm]	L14 [mm]
DN 100	80	502	465	271	180	170	116	288	50	150	295	324	160	96
DN 125	100	529	492	288	193	170	116	301	50	150	308	324	175	96
DN 162	162	637	600	361	243	170	116	323	50	180	386	317	200	96

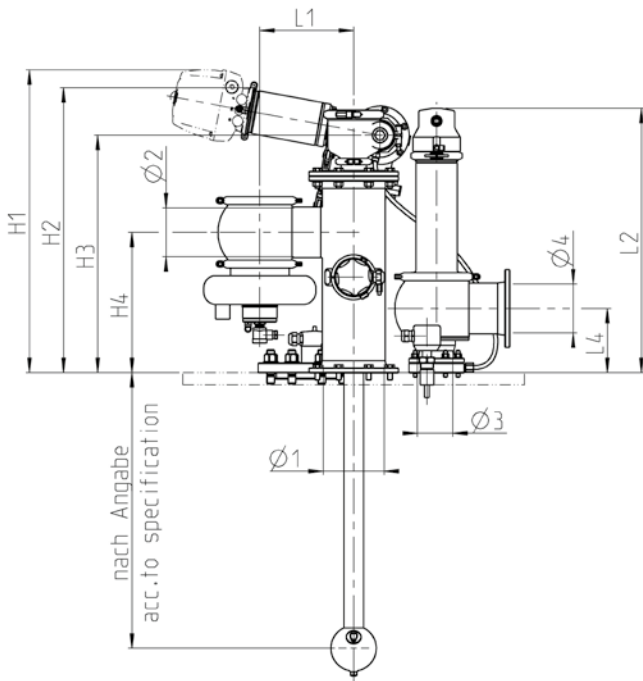
Maximum values for safety relief valve								
		Safety relief valve type 488			Safety relief valve type HyCom			
Ø3 [mm]	Ø4 [mm]	L2 [mm]	L4 [mm]	L5 [mm]	L2 [mm]	L4 [mm]	L5 [mm]	
25	40	363	98	260	454	89	255	
40	65	559	115	295	574	94	255	
50	80	574	123	295	629	104	275	
65	100	593	132	295	740	105	285	
80	125	732	148	320	816	118	300	

The description of the options – as well as the configuration of the system designation – can be found at the end of this section.

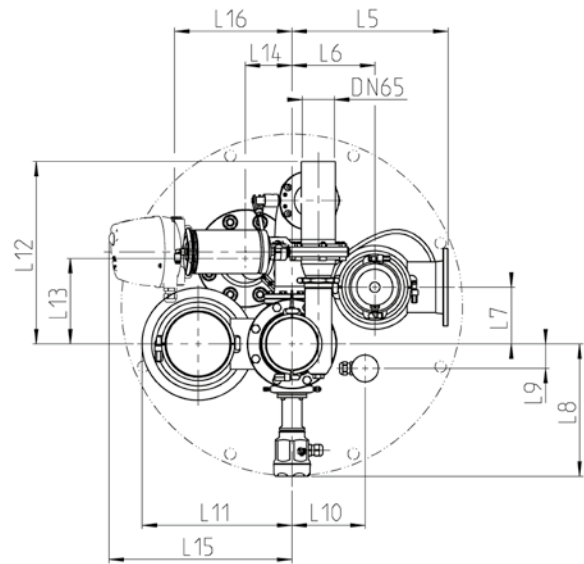




Technical data of the standard version	
Material in contact with the product	1.4404
Seal material	EPDM
Ambient temperature	0 to 45 °C
Operating temperature	< 80 °C
Air supply pressure	6 bar (87 psi), max. 8 bar (116 psi)
Product pressure	10 bar (145 psi)
Surface in contact with the product	R <sub>a</sub> ≤ 1.6 μm
CIP/GAS management	Butterfly valve combination
Cleaner	Rotating jet cleaner
Connection fittings	VARIVENT® flange on the tank side, CIP/ GAS connection of the welding end
Identification	Adhesive ID tag



Front view



Top view

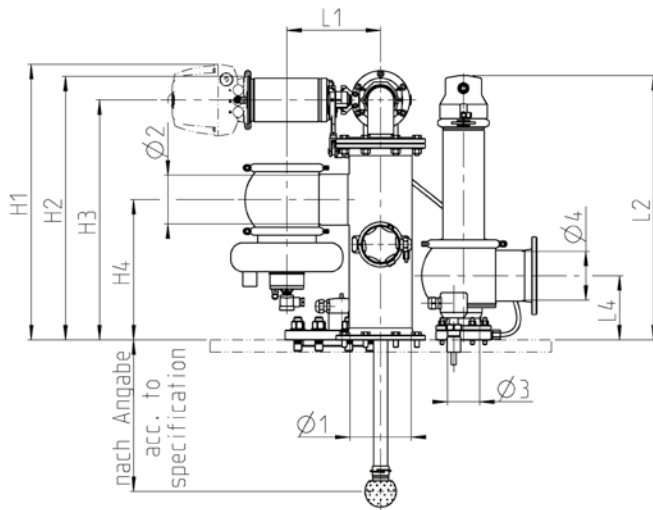
		Dimension																
Nominal width	Ø1	Ø2	H1	H2	H3	H4	L1	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
DN 100	80	640	575	457	271	180	170	116	288	50	150	295	374	160	96	428	319	
DN 125	100	671	606	488	288	193	170	116	301	50	150	308	374	175	96	428	319	
DN 162	162	775	710	592	361	243	170	116	323	50	180	386	375	200	96	428	319	

Maximum values for safety relief valve								
		Safety relief valve type 488			Safety relief valve type HyCom			
Ø3	Ø4	L2	L4	L5	L2	L4	L5	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
25	40	363	98	260	454	89	255	
40	65	559	115	295	574	94	255	
50	80	574	123	295	629	104	275	
65	100	593	132	295	740	105	285	
80	125	732	148	320	816	118	300	

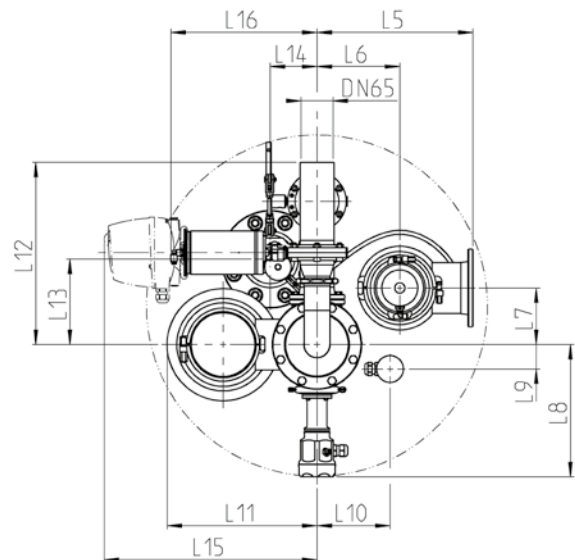
The description of the options – as well as the configuration of the system designation – can be found at the end of this section.



Technical data of the standard version	
Material in contact with the product	1.4404
Seal material	EPDM
Ambient temperature	0 to 45 °C
Operating temperature	< 80 °C
Air supply pressure	6 bar (87 psi), max. 8 bar (116 psi)
Product pressure	10 bar (145 psi)
Surface in contact with the product	R <sub>a</sub> ≤ 1.6 µm
CIP/GAS management	Butterfly valve combination
Cleaner	Cleaning lance
Connection fittings	VARIVENT® flange on the tank side, CIP/ GAS connection of the welding end
Identification	Adhesive ID tag



Front view



Top view

		Dimension																
Nominal width	Ø1	Ø2	H1	H2	H3	H4	L1	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
DN 100	80	568	526	465	271	180	170	116	288	50	150	295	374	160	96	435	326	
DN 125	100	595	553	492	288	193	170	116	301	50	150	308	374	175	96	435	326	
DN 162	162	700	658	597	361	243	170	116	323	50	180	386	375	200	96	435	326	

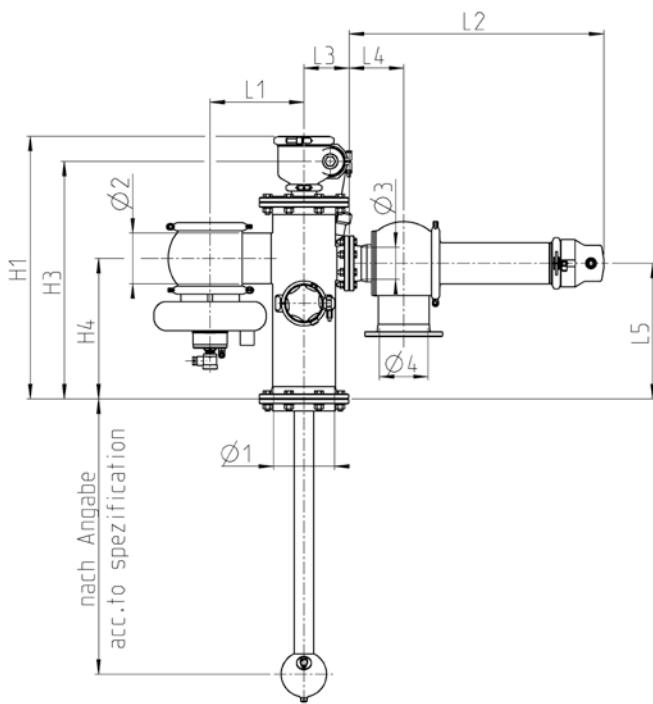
Maximum values for safety relief valve								
		Safety relief valve type 488			Safety relief valve type HyCom			
Ø3	Ø4	L2	L4	L5	L2	L4	L5	
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
25	40	363	98	260	454	89	255	
40	65	559	115	295	574	94	255	
50	80	574	123	295	629	104	275	
65	100	593	132	295	740	105	285	
80	125	732	148	320	816	118	300	

The description of the options – as well as the configuration of the system designation – can be found at the end of this section.

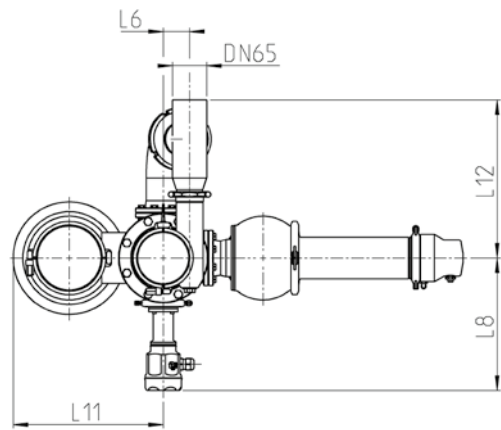




Technical data of the standard version	
Material in contact with the product	1.4404
Seal material	EPDM
Ambient temperature	0 to 45 °C
Operating temperature	< 60 °C
Air supply pressure	6 bar (87 psi), max. 8 bar (116 psi)
Product pressure	10 bar (145 psi)
Surface in contact with the product	$R_a \leq 1.6 \mu\text{m}$
CIP/GAS management	Automatic switch-over module
Cleaner	Rotating jet cleaner
Connection fittings	VARIVENT® flange on the tank side, CIP/ GAS connection of the welding end
Identification	Adhesive ID tag



Front view



Top view

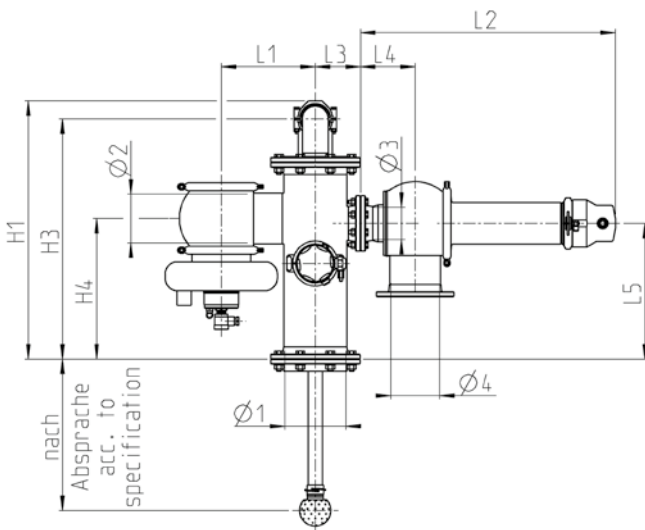
		Dimension									
Nominal width	Ø1	Ø2 [mm]	H1 [mm]	H3 [mm]	H4 [mm]	L1 [mm]	L5 [mm]	L6 [mm]	L8 [mm]	L11 [mm]	L12 [mm]
DN 100	80	80	514	457	271	180	276	54	288	295	324
DN 125	100	100	545	488	288	193	283	54	301	308	324
DN 162	162	162	649	592	361	243	376	54	323	386	324

Maximum values for safety relief valve							
		Safety relief valve type 488		Safety relief valve type HyCom			
Ø3 [mm]	Ø4 [mm]	L2 [mm]	L4 [mm]	L2 [mm]	L4 [mm]		
25	40	343	78	434	69		
40	65	539	95	554	74		
50	80	554	103	609	84		
65	100	573	112	720	85		
80	125	712	128	796	98		

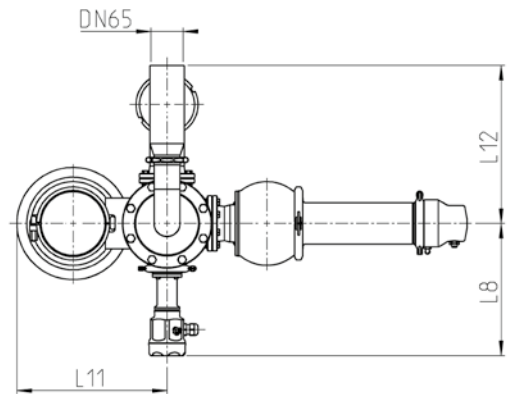
The description of the options – as well as the configuration of the system designation – can be found at the end of this section.



Technical data of the standard version	
Material in contact with the product	1.4404
Seal material	EPDM
Ambient temperature	0 to 45 °C
Operating temperature	< 60 °C
Air supply pressure	6 bar (87 psi), max. 8 bar (116 psi)
Product pressure	10 bar (145 psi)
Surface in contact with the product	$R_a \leq 1.6 \mu m$
CIP/GAS management	Automatic switch-over module
Cleaner	Cleaning lance
Connection fittings	VARIVENT® flange on the tank side, CIP/ GAS connection of the welding end
Identification	Adhesive ID tag



Front view



Top view

Dimension									
Nominal width Ø1	Ø2 [mm]	H1 [mm]	H3 [mm]	H4 [mm]	L1 [mm]	L5 [mm]	L8 [mm]	L11 [mm]	L12 [mm]
DN 100	80	502	465	271	180	276	288	301	323
DN 125	100	529	492	288	193	283	295	308	386
DN 162	162	637	600	361	243	376	324	324	317

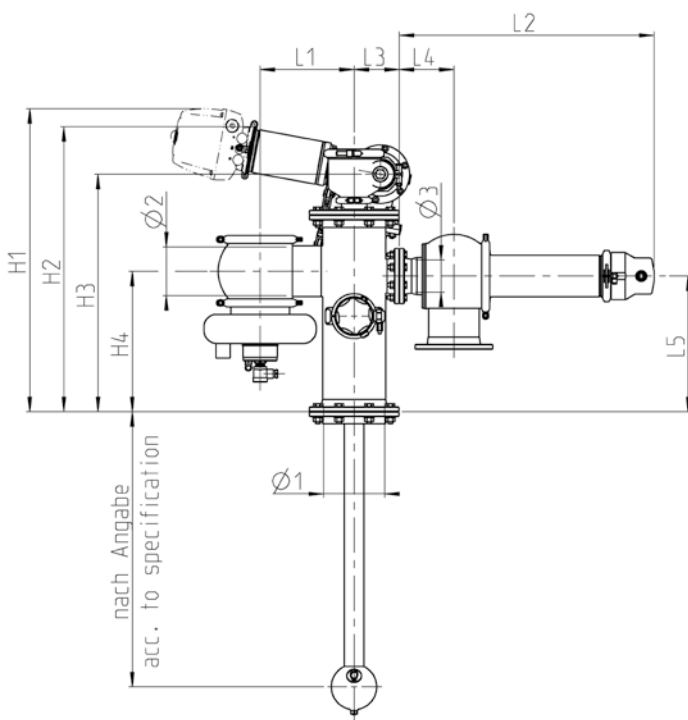
Maximum values for safety relief valve					
		Safety relief valve type 488		Safety relief valve type HyCom	
Ø3 [mm]	Ø4 [mm]	L2 [mm]	L4 [mm]	L2 [mm]	L4 [mm]
25	40	343	78	434	69
40	65	539	95	554	74
50	80	554	103	609	84
65	100	573	112	720	85
80	125	712	128	796	98

The description of the options – as well as the configuration of the system designation – can be found at the end of this section.

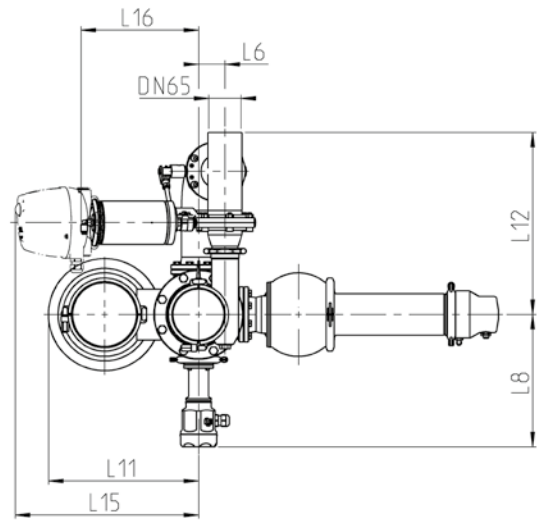




Technical data of the standard version	
Material in contact with the product	1.4404
Seal material	EPDM
Ambient temperature	0 to 45 °C
Operating temperature	< 80 °C
Air supply pressure	6 bar (87 psi), max. 8 bar (116 psi)
Product pressure	10 bar (145 psi)
Surface in contact with the product	$R_a \leq 1.6 \mu\text{m}$
CIP/GAS management	Butterfly valve combination
Cleaner	Rotating jet cleaner
Connection fittings	VARIVENT® flange on the tank side, CIP/ GAS connection of the welding end
Identification	Adhesive ID tag



Front view



Top view

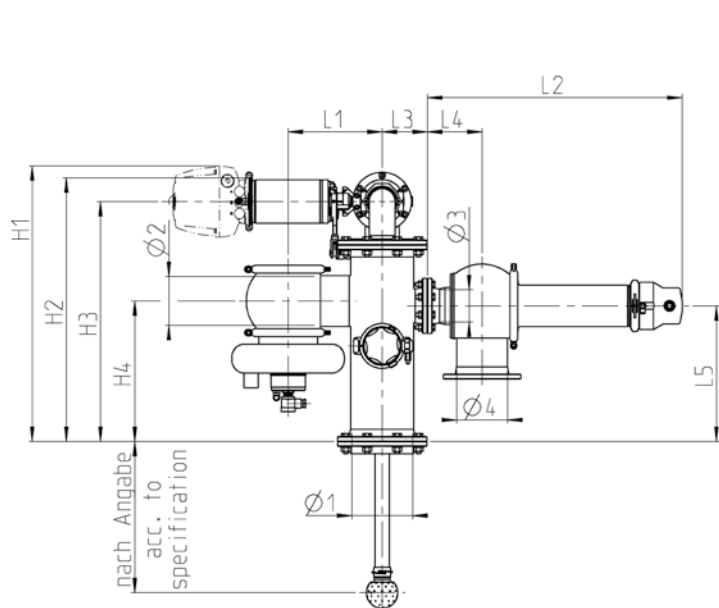
Dimension												
Nominal width Ø1	Ø2 [mm]	H1 [mm]	H2 [mm]	H3 [mm]	H4 [mm]	L1 [mm]	L5 [mm]	L6 [mm]	L8 [mm]	L12 [mm]	L15 [mm]	L16 [mm]
DN 100	80	640	575	457	271	180	276	54	288	374	428	326
DN 125	100	671	606	488	288	193	283	54	301	374	428	326
DN 162	162	775	710	592	361	243	376	54	323	375	428	326

Maximum values for safety relief valve					
		Safety relief valve type 488		Safety relief valve type HyCom	
Ø3 [mm]	Ø4 [mm]	L2 [mm]	L4 [mm]	L2 [mm]	L4 [mm]
25	40	343	78	434	69
40	65	539	95	554	74
50	80	554	103	609	84
65	100	573	112	720	85
80	125	712	128	796	98

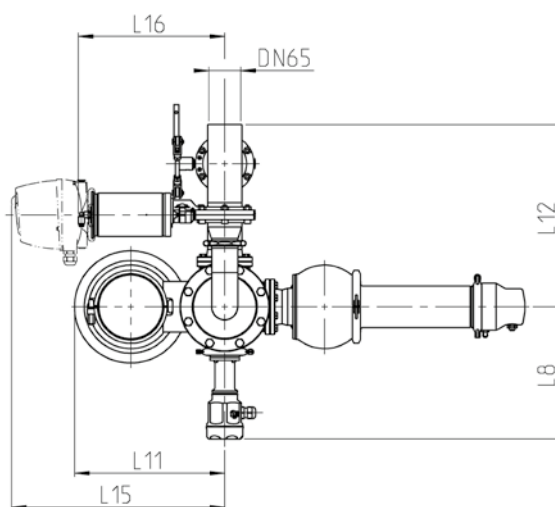
The description of the options – as well as the configuration of the system designation – can be found at the end of this section.



Technical data of the standard version	
Material in contact with the product	1.4404
Seal material	EPDM
Ambient temperature	0 to 45 °C
Operating temperature	< 80 °C
Air supply pressure	6 bar (87 psi), max. 8 bar (116 psi)
Product pressure	10 bar (145 psi)
Surface in contact with the product	R <sub>a</sub> ≤ 1.6 µm
CIP/GAS management	Butterfly valve combination
Cleaner	Cleaning lance
Connection fittings	VARIVENT® flange on the tank side, CIP/ GAS connection of the welding end
Identification	Adhesive ID tag



Front view




Top view

		Dimension									
Nominal width Ø1	Ø2 [mm]	H1 [mm]	H2 [mm]	H3 [mm]	H4 [mm]	L1 [mm]	L5 [mm]	L8 [mm]	L12 [mm]	L15 [mm]	L16 [mm]
DN 100	80	568	526	465	271	180	276	288	374	435	326
DN 125	100	595	553	492	288	193	283	301	374	435	326
DN 162	162	700	658	597	361	243	376	323	375	435	326

Maximum values for safety relief valve					
		Safety relief valve type 488		Safety relief valve type HyCom	
Ø3 [mm]	Ø4 [mm]	L2 [mm]	L4 [mm]	L2 [mm]	L4 [mm]
25	40	343	78	434	69
40	65	539	95	554	74
50	80	554	103	609	84
65	100	573	112	720	85
80	125	712	128	796	98

The description of the options – as well as the configuration of the system designation – can be found at the end of this section.

Position	Description of the selection scheme
1	<b>CIP/GAS management</b>
	1 Automatic switch-over module
	4 Butterfly valve combination
	Selection actuator type butterfly valve combination Pneumatic (standard)      Pneumatic with control top      Regular combination 
2	<b>Cleaning device</b>
	1 Rotating jet cleaner 2 Cleaning lance
3	<b>Tank connection</b>
	D Tank dome cover Z Central connection DZ Tank dome cover
	<b>Installation orientation safety relief valve</b>
4	L Horizontal S Upright
	<b>Safety relief valve type</b>
5	L Safety relief valve type 488 M Safety relief valve type HyCom
	<b>Connection type cross piece</b>
6	TN VARIVENT® grooved flange X Special connection tank side (for cleaner > Ø 162 mm)
	<b>CIP/GAS connection</b>
7	N Welding end DN 65 GK Pipe fitting S complete DN 65 DIN 11851 TK VARIVENT® flange connection DN 65
	<b>Pressure measurement</b>
	- Without; housing connection N + blanking plate VP D1 Pressure transmitter 0–4 bar D2 Pressure transmitter 0–10 bar
9	<b>Level indicator (optional for tank connection D and DZ)</b>
	- Without N GEA Tuchenhagen level probe, type TNS
10	<b>Sight glass (optional for tank connection D and DZ)</b>
	- Without G Sight glass GB Sight glass illuminated 50 W 24 V
	<b>Counter flange cross piece (optional for tank connection Z)</b>
11	- Without TF VARIVENT® plain flange

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

<b>Position</b>		1	2	3	4	5	6	7	8	9	10	11
<b>Code</b>	TTB			-		-		-		-		-

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

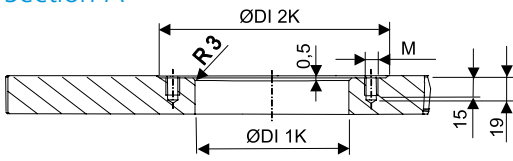


Customer	
Company name/ customer number	_____
Project	_____
Contact	_____
Phone	_____
Email	_____
Basic data	
Installation of the VARITOP®	<input type="checkbox"/> Central connection <input type="checkbox"/> Tank dome cover
Switch-over module	<input type="checkbox"/> Automatic switch-over module (11/12) <input type="checkbox"/> Butterfly valve combination (41/42)
Selection actuator type butterfly valve combination (41/42)	<input type="checkbox"/> Pneumatically – 1 actuator with switching combination (standard) <input type="checkbox"/> Pneumatically with control top T.VIS® M-15 – 1 actuator with switching combination <input type="checkbox"/> Control combination with 2 butterfly valves – one T.VIS® M-15 and T.VIS® P-15 each
Safety relief valve	<input type="checkbox"/> Pneumatic lifting <input type="checkbox"/> Monitoring <input type="checkbox"/> Heating
Vacuum valve	<input type="checkbox"/> Pneumatic lifting <input type="checkbox"/> Monitoring <input type="checkbox"/> Heating
Option	<input type="checkbox"/> <b>Level probe</b> <input type="checkbox"/> 30 mm <input type="checkbox"/> 150 mm <input type="checkbox"/> 500 mm <input type="checkbox"/> 1,000 mm <input type="checkbox"/> 1,800 mm <input type="checkbox"/> Required length between 30 and 1.800 mm: _____
	<input type="checkbox"/> <b>Sight glass</b> <input type="checkbox"/> Illuminated
	<input type="checkbox"/> <b>Pressure transmitter</b> <input type="checkbox"/> 0–4 bar <sub>g</sub> <input type="checkbox"/> 0–10 bar <sub>g</sub>
Process	
Ø of the tank	_____ m
Tank height	_____ m
Outlet diameter	DN _____
Set pressure safety relief valve	_____ bar <sub>g</sub>
Tank vacuum safety	_____ mbar <sub>g</sub>
Max. fill flow rate	_____ m <sup>3</sup> /h
Emptying output	_____ m <sup>3</sup> /h

Product				
Medium*	_____		<input type="checkbox"/> Configuration for water	
Viscosity*	_____			
Density*	_____			
Min. temperature*	_____			
Cleaner				
Type of contamination	<input type="checkbox"/> Water-soluble		<input type="checkbox"/> Solvent-soluble	<input type="checkbox"/> Crusted
Rotating cleaners	Orbital cleaners	Rotating jet cleaner with nozzle placement		Static cleaners
<input type="checkbox"/> Clipdisc <input type="checkbox"/> Sanitor <input type="checkbox"/> Torus <input type="checkbox"/> Turbo SSB <input type="checkbox"/> Turbodisc	<input type="checkbox"/> Tempest <input type="checkbox"/> Tornado <input type="checkbox"/> Tornado 4 <input type="checkbox"/> Typhoon <input type="checkbox"/> Torrent <input type="checkbox"/> Twister	<input type="checkbox"/> A <input type="checkbox"/> C4 <input type="checkbox"/> E1 <input type="checkbox"/> B <input type="checkbox"/> D1 <input type="checkbox"/> F2 <input type="checkbox"/> B1 <input type="checkbox"/> D2 <input type="checkbox"/> F3 <input type="checkbox"/> C1 <input type="checkbox"/> D3 <input type="checkbox"/> F5 <input type="checkbox"/> C2 <input type="checkbox"/> E <input type="checkbox"/> F6		<input type="checkbox"/> Spray ball
		<input type="checkbox"/> With monitoring		
Comments				

\* If any information is missing, the safety relief valve is designed for water.

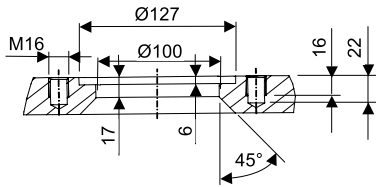
Section A



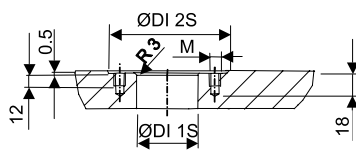
Surface finish of the sealing surfaces  $R_a \leq 1.6 \mu\text{m}$   
Tolerances according to ISO 2768-mk

**⚠** No screws must be on the marked diameter  $\text{ØK}$  for tank lid attachment, since the proximity switch of the vacuum valve otherwise cannot be removed.

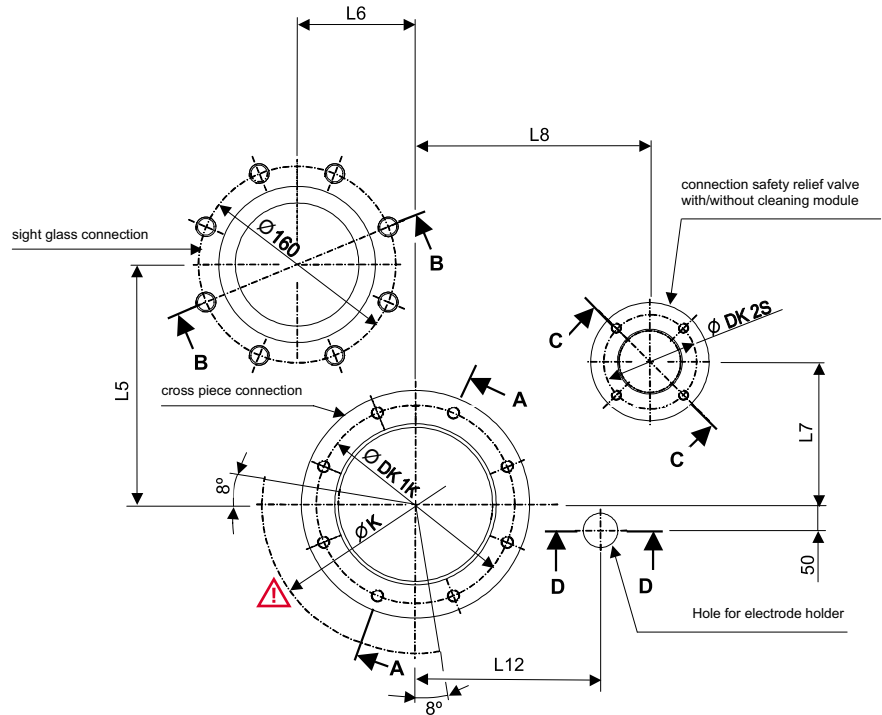
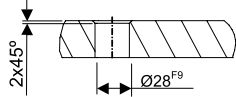
Section B



Section C



Section D



**Note:** The following dimensions are minimum distances. The sight glass and electrode holder are available as options for the respective design.

	Coordinates		
	L5 [mm]	L6 [mm]	L12 [mm]
	for sight glass		for electrode holder
<b>VARITOP® TTB DN 100</b> with vacuum valve DN 80	160	96	150
<b>VARITOP® TTB DN 125</b> with vacuum valve DN 100	175	96	150
<b>VARITOP® TTB DN 162</b> with vacuum valve DN 162	200	96	150

Dimensions for cross piece connection (see section A)					
Nominal width	Number of threaded bores × M [mm]	ØDK 1K [mm]	ØDI 1K [mm]	ØDI 2K [mm]	ØK [mm]
DN 100	8 × M10	137	100	161	360
DN 125	8 × M10	161	125	185	384
DN 162	8 × M12	202	162	230	485

Dimensions for safety valve connection (see section C)						
Nominal width	Number of threaded bores × M [mm]	ØDK 2S [mm]	ØDI 1S [mm]	ØDI 2S [mm]	L7 [mm]	L8 [mm]
DN 25	4 × M8	53	26	72	116	170
DN 40	4 × M8	65	38	84	116	170
DN 50	4 × M8	77	50	96	116	170
DN 65	8 × M8	95	66	115	116	170
DN 80	8 × M8	110	81	130	116	170
DN 100	8 × M10	137	100	161	130	220





### VARICOVER® product recovery systems

Product recovery systems optimize the economic efficiency of a process system by recovering the valuable products from pipelines.

Pigging pushes the remaining product from the pipe and returns it to the production cycle. The thin product film is easy to remove by subsequent cleaning, so that the pre-flushing time can be reduced.

**Recover the value, reduce the waste!**



#### Special features

Design with no dead zones

CIP/SIP-able

Reduced product loss

Reduced cleaning media and water consumption

Reduced waste water load

Reduced production downtimes

Simple maintenance

## Application ranges

### Product push-out

Product recovery systems are used for the ejection of viscous / flowing products from pipelines without mixing with any other media. This is especially required for high quality products in the food and beverages industries, as well as, pharmaceutical and personal and health care industries.

### Product control

In addition to pushing out of products from the pipelines, product recovery systems are also used for gentle filling of pipelines with sensitive and foaming products. Even vertical pipelines can be easily filled by letting the product push the pig downwards in the pipe.



## Applications

### Personal and health care industry

- body care
- shampoo, lotion, cream
- toothpaste
- cleaning media, washing agents, softeners

### Food industry

- yogurt, quark, cheese
- fruit juice
- dough, vegetable oil
- sauce, ice cream

### Beverage industry

- concentrate
- syrup

## Types of product recovery systems

The pigging process can be implemented with different degrees of automation. That is why the portfolio of GEA Tuchenhausen offers three different product recovery systems:

### 1. Automatic product recovery systems

Due to the complete automation of the process, the pig can push out and be cleaned without manual action. The entire process takes place solely in the pipeline.

#### Special features

Safe operation by closed pipe systems

No pig removal required in operation

Automatic function mode and thus fully verifiable processes

Components certified to 3A (101-00)

### 2. Semi-automatic product recovery systems

In contrast to the automatic product recovery systems, with the semi-automatic product recovery systems the pig is inserted and removed manually. Pushing out of product and returning of the pig then takes place automatically.

### 3. Manual product recovery systems

In the manual product recovery system, the pig is manually inserted into the pipeline and at the end removed manually. The pig runs in only one direction.

## Design of a product recovery system

A VARICOVER® product recovery system usually comprises of a pig cleaning station, a pig catching station with propellant medium valves, and a pig. The pig is placed in the pig cleaning station during production and cleaning. In the pig catching station, the pig is stopped mechanically after successful product push-out and the propellant medium valves are used for propellant medium supply (air/water).

The pig components can be installed either in new systems or integrated into already present process systems.



Arrangement of the components in the product recovery system EMI/1

## Features of VARICOVER® product recovery systems

VARICOVER® product recovery systems are characterized by use in fully automatic operations at maximum cleaning demands. Safe operation is secured by a firmly installed and closed pipe system so that no dismantling of the pig cleaning station is required for operation and cleaning. That is why the automatic function mode corresponds to a process that can be validated.

Detection of the pig position via magnetically inductive proximity switch – from the outside of the pipeline – permits automatic control and cleaning (CIP) of the product recovery system.

The pig driving medium can be water, air, CO<sub>2</sub> or N<sub>2</sub>.



Cross-section of the housing of the pig cleaning station

## Applications in process systems

Product recovery systems are used in different applications to meet the various requirements in numerous industries and processes:

- From product acceptance to pre-phase tanks
- From pre-phase tanks to mixers/process tanks
- From mixers/process tanks to storage tanks
- From storage tanks to filling machines



Pig stopper with pig

## Prerequisites for operating of product recovery systems

- Fluid products suitable for pumping
- Non-sedimenting products
- No installations protruding into the pipe in the section to be pigged, such as measuring mountings
- Only piggable valves matching the geometry of the GEA Tuchenhausen double ball pig can be used
- Same interior diameter throughout the pipe system
- No sharp-edged and strongly sagging welds
- Connection fittings with transfers rounded on the inside can be used
- No seals protruding into the pipe permitted
- Standard pipe bends with small middle radius can be used – minimize number of pipe bends
- Use pipe bends with low ovality – Tolerances up to  $\pm 1.5\%$  referring to the outside diameter across the entire bend length



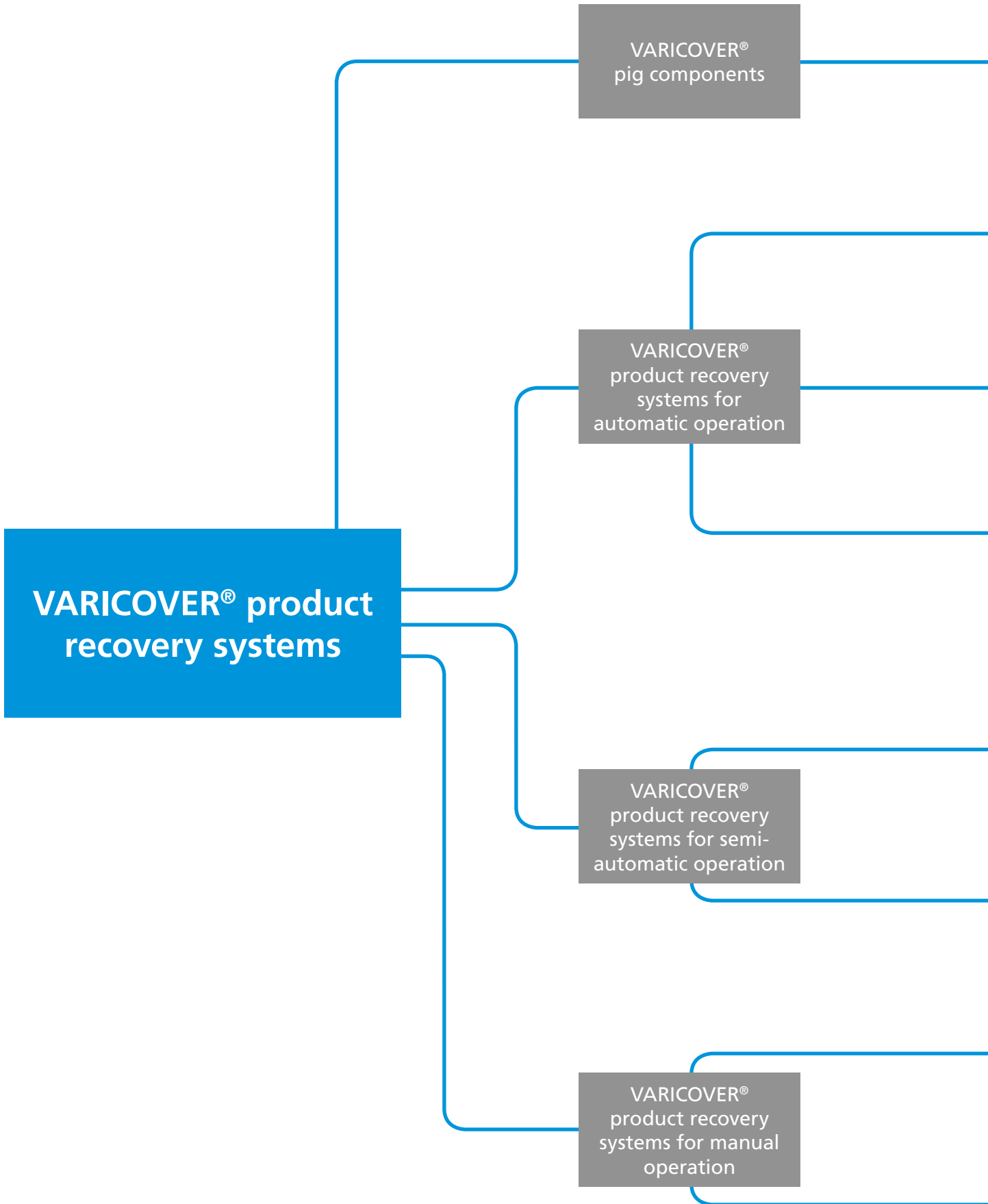
## Process system recommendations

The pig speed control is important for the successful operation of a product recovery system. It must not exceed 0.5 m/s when reaching the pig station. If the arrival speed is too high, there is the danger of damage to the pig.

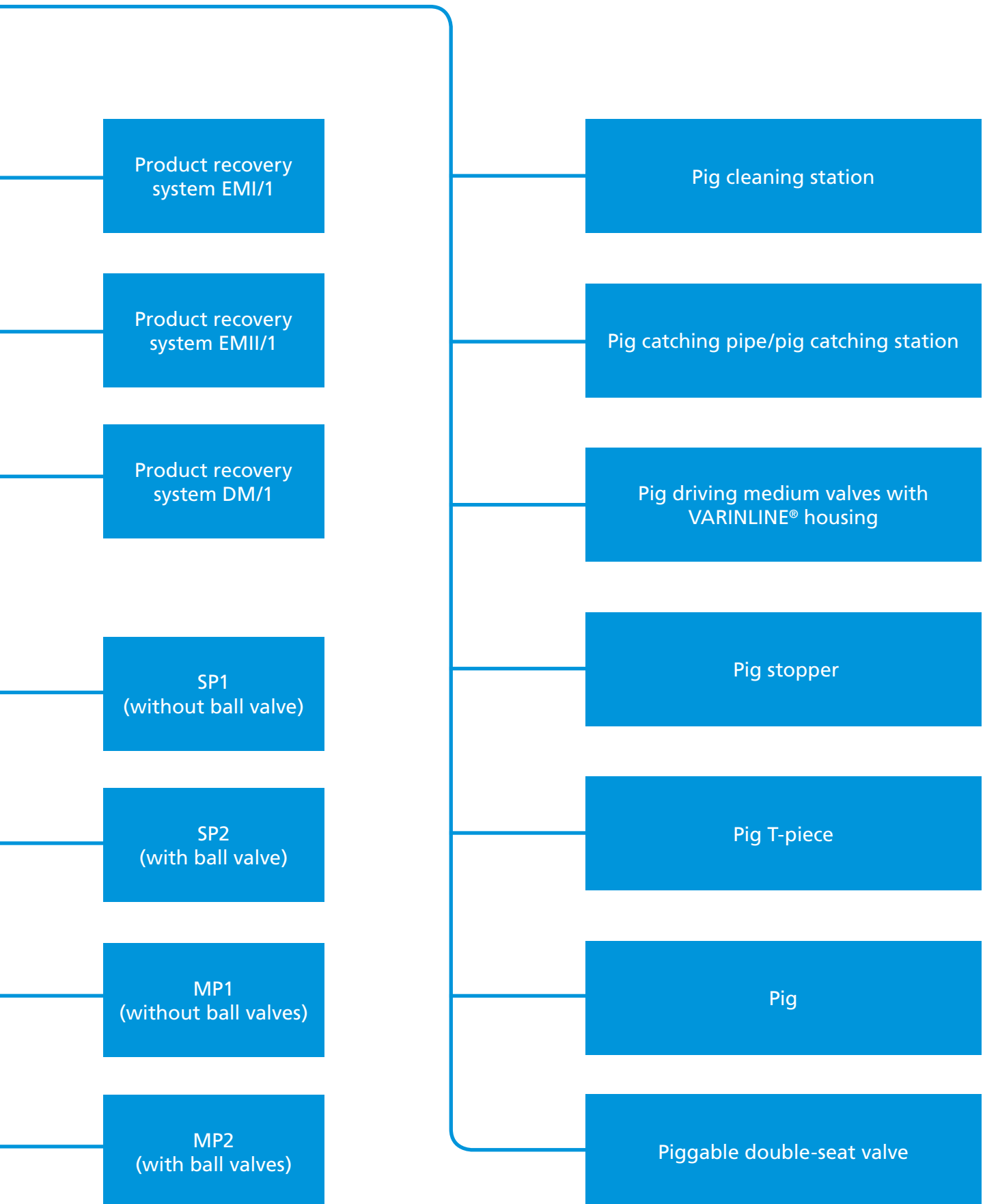
When using compressible media, such as air, before and behind the pig, the following applications must be avoided:

- running the pig in a dry pipeline
- returning the pig after pushing out water

If these applications are not observed, there is the danger of a “stick-slip effect”. Here, the pig moves jerkily through the pipeline and may reach too high of speeds. An exception of this effect are with very slippery products such as shampoo and vegetable oils that form a sufficient lubricating film between the pig and the pipe wall.







### Function method of the pig cleaning station

The pig cleaning station, free of dead zones and completely CIP-/SIP-able, is integrated into the product path and is flexible for use as the launching or receiving station. The pig retention cylinders and guidance keeps the pig firmly in position in the station during flooding with product or cleaning media. The flow direction through the station is irrelevant.

When receiving or launching the pig, the pig gripper is pushed forward. The pig is half gripped by the gripper rods, so that it securely reaches the retracted position for production or cleaning.

When the pig is flooded with product, there is a continuous product exchange in the pig station housing. The product is gently transported through the housing. This is possible since the flow area around the pig corresponds to that of the pipeline. Since the housing is free of dead zones without domes and sumps, this ensures the best cleaning with complete residual emptying.



### Cleaning the pig in the pig cleaning station

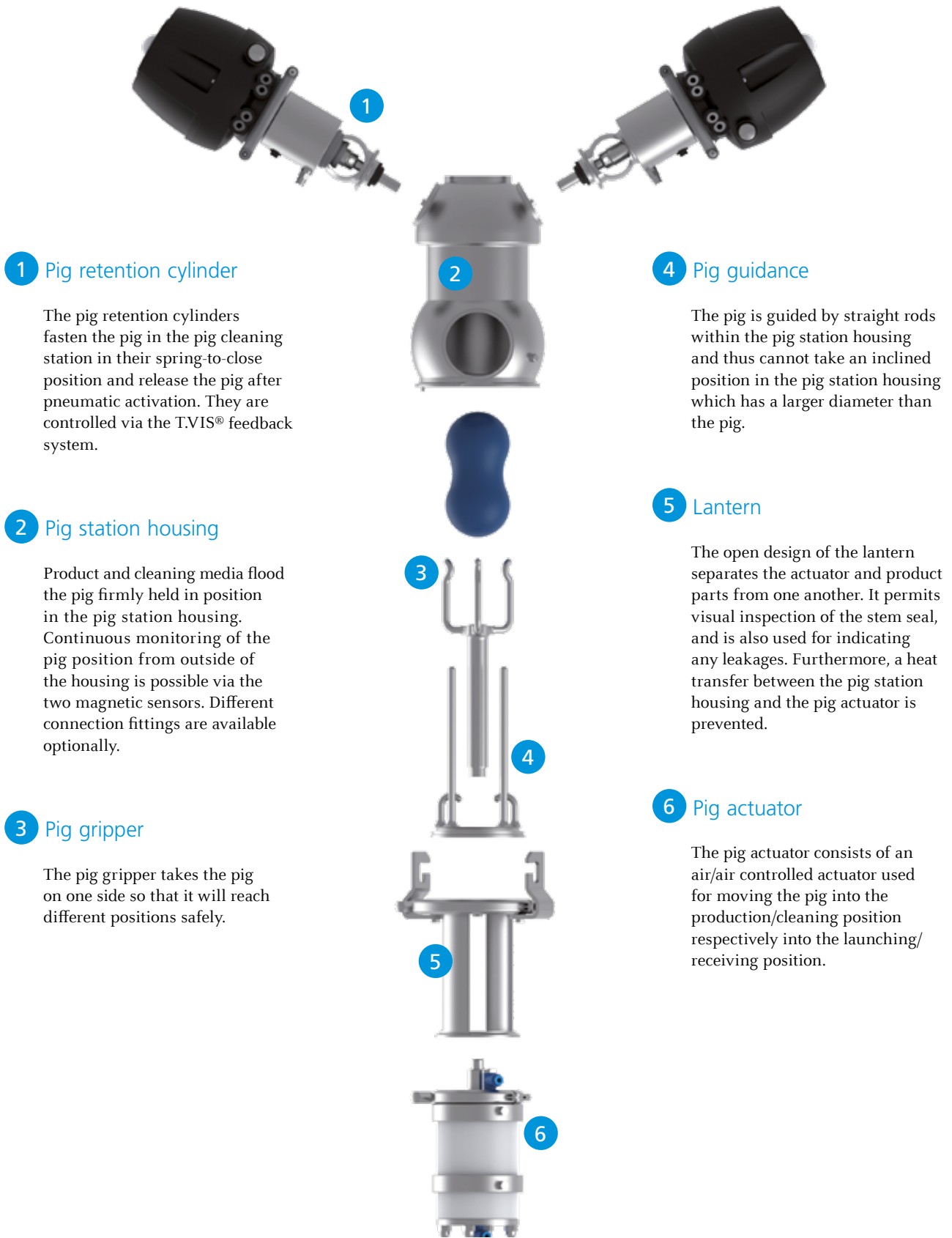
During cleaning, the pig remains in the pig cleaning station. Only there can it be flooded completely. This is possible because the pig gripper moves forward and backward several times by the control of the actuator so that a gap results between the pig front and the metallic stop.



Complete cleaning of the pig in the pig cleaning station

Furthermore, the pig can move between the gripper and the guidance rods, so that the pig contract points to the rods are completely cleaned.

Design of the pig cleaning station



**1 Pig retention cylinder**  
 The pig retention cylinders fasten the pig in the pig cleaning station in their spring-to-close position and release the pig after pneumatic activation. They are controlled via the T.VIS® feedback system.

**2 Pig station housing**  
 Product and cleaning media flood the pig firmly held in position in the pig station housing. Continuous monitoring of the pig position from outside of the housing is possible via the two magnetic sensors. Different connection fittings are available optionally.

**3 Pig gripper**  
 The pig gripper takes the pig on one side so that it will reach different positions safely.

**4 Pig guidance**  
 The pig is guided by straight rods within the pig station housing and thus cannot take an inclined position in the pig station housing which has a larger diameter than the pig.

**5 Lantern**  
 The open design of the lantern separates the actuator and product parts from one another. It permits visual inspection of the stem seal, and is also used for indicating any leakages. Furthermore, a heat transfer between the pig station housing and the pig actuator is prevented.

**6 Pig actuator**  
 The pig actuator consists of an air/air controlled actuator used for moving the pig into the production/cleaning position respectively into the launching/receiving position.



Pig catching pipe/pig catching station

In the catching pipe, the pig is stopped mechanically. It cannot be flooded with cleaning media there and leaves the station right after arriving in most applications. The mechanical pig stop which is integrated in the catching pipe is thoroughly cleaned during the pipe cleaning.

The catching pipe is used with and without the welded-on pig driving medium valve. The standard valve unit consists of two combined ECOVENT® valves of types NL and WK. The NL valve is used for shut-off from the product pipe and the WK valve serves as a divert valve between the inlet of the pig driving medium at the upper housing and the connection to the vent at the lower housing.

This arrangement ensures a complete cleaning of the NL shut-off valve. Furthermore, mixing between the product and the pig driving medium – in case of possible leaks – is prevented by the open venting socket at the WK divert valve.

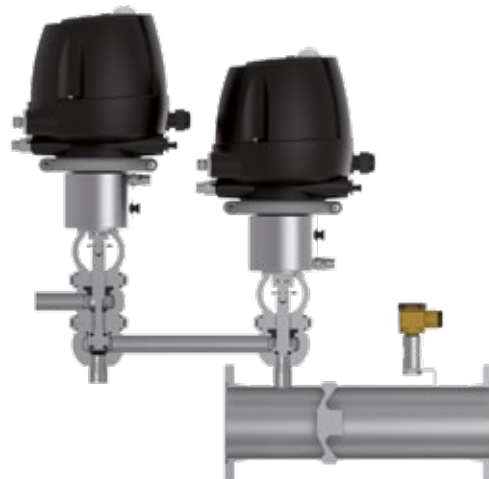
When air is used as the pig driving medium, an air throttle valve is always installed at the inlet socket of the WK divert valve. It sets the average pig speed by a hand-actuated adjustment of the flow area.



Pig catching pipe



Pig catching station



Cross section pig catching station

### Pig driving medium valves with VARINLINE® housing

The VARINLINE® housing permits, aside from the connection of the pig driving medium valves, the adaptation of a pressure gauge, or a pressure transmitter, to record the driving medium pressure during commissioning.

The standard valve unit also consists of two combined ECOVENT® valves of types NL and WK. The NL valve is used for shut-off from the product pipe and the WK valve serves as a divert valve between the inlet of the pig driving medium at the upper housing and the connection to the vent at the lower housing. This arrangement ensures a complete cleaning of the NL shut-off valve. Furthermore, mixing between the product

and the pig driving medium – in case of possible leaks – is prevented by the open venting socket at the WK divert valve.

When air is used as the pig driving medium, an air throttle valve is always installed at the inlet socket of the WK divert valve. It sets the average pig speed by a hand-actuated adjustment of the flow area.



VARINLINE® housings



VARINLINE® housings with pig driving medium valves

Design pig stopper

In the spring-to-close position of the pig stopper, a rod travels over the entire pipe cross section. In it, the pig is stopped mechanically. Product or cleaning media can flow through the free cross-section around the rod.

In contrast to the closed position, the stopper rod is retracted in the air-to-open condition, so that the pig can pass the stopper.

The housing of the pig stopper is screwed to a VARIVENT® grooved flange on both sides and the complete pig stopper is welded into the pipeline.

Both the closed and the opened positions are monitored by proximity switches.

Function method pig stopper

The pig stopper is automatically operated and mostly used for two applications.

Filling and emptying of tanks is often performed by tee-outlets into pipelines. Pig stoppers can be placed before or behind tee-outlets and serve as precise positioning of the pigs. When a pig reaches a stopper rod, it works as a shut-off element and prevents further filling of the line.

In the product recovery system EMII/1, the product is supplied through the lateral socket of the T-piece and the pig stopper prevents the pig from leaving the launching station if any vacuum occurs.



Pig stopper



Cross section pig stopper with pig



Cross section pig stopper with opened stopper rod



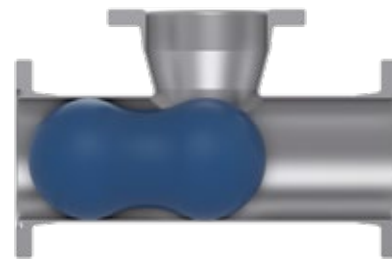
Cross section pig stopper with closed stopper rod

## Pig T-piece

Special T-pieces in pigging lines are used as product inlet and outlet.

For the pig to be guided well in the T-piece, the pull out of the lateral socket is one nominal width smaller than the main line. This prevents canting of the pig.

The pig T-piece is used to feed product and cleaning media into the product recovery system EMII/1.



Pig in T-piece



Arrangement of the components in the product recovery system EMII/1

Pig

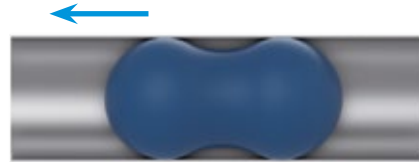
The pig is an inherently stable body made from wear- and temperature-resistant, product compatible material. Its contours allow reliable cleaning of the entire surface. The double ball shape of the pig ensures an optimal passage through small and large pipe bends as well as T-pieces with a reduced lateral pull out. Either running direction is possible.

Inside the pig, there are two stainless steel-encapsulated permanent magnets that permit detection of the pig with a magnetic sensor.

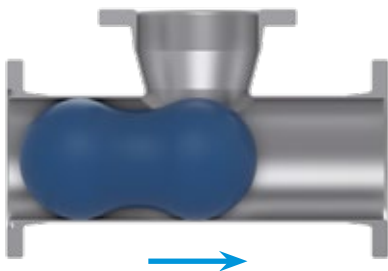
Available pig materials are Silicone and FKM (both FDA, 3A (18-03) and EU VO 1935/2004 compliant).



Separation of two different media



Both running directions possible



Passage of piggable T-pieces



Pigging pipe bends



### VARIVENT® double-seat valve type L

The piggable double-seat valve type L is used when different products must be separate from each other and fully mixproof at pipeline junctions and the valve should at the same time be piggable.

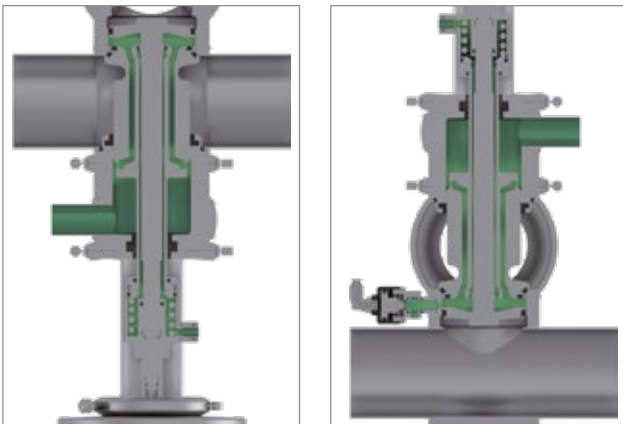
Only the lower valve housing with double horizontal ports is piggable, while the upper housing can have one or two horizontal ports. The upper and lower housings are always welded to each other.

Similar to the double-seat valve type R, type L also has the upper valve disc with an axial and the lower one with a radial seal. The double-seat valve type L cannot be equipped with a balancer in the lower housing to protect against pressure hammers.

The double-seat valve type L can be installed in the standing or suspended position. When suspended, the valve opens nearly without any switching leakage, while switching leakage occurs in the standing position. The switching leakage escapes from the additional emptying valve that is between the housings.

The emptying valve pneumatically connected to the actuator is opened while the valve is closed and closes when activating the actuator.

In the standing installation orientation of the valve type L, the cleaning media drains from two ports at the same time – through the port above the housings and through the emptying valve.



For more detailed information on the VARIVENT® valve type L, see the catalog Hygienic Valves VARIVENT® and ECOVENT®.

#### Application ranges

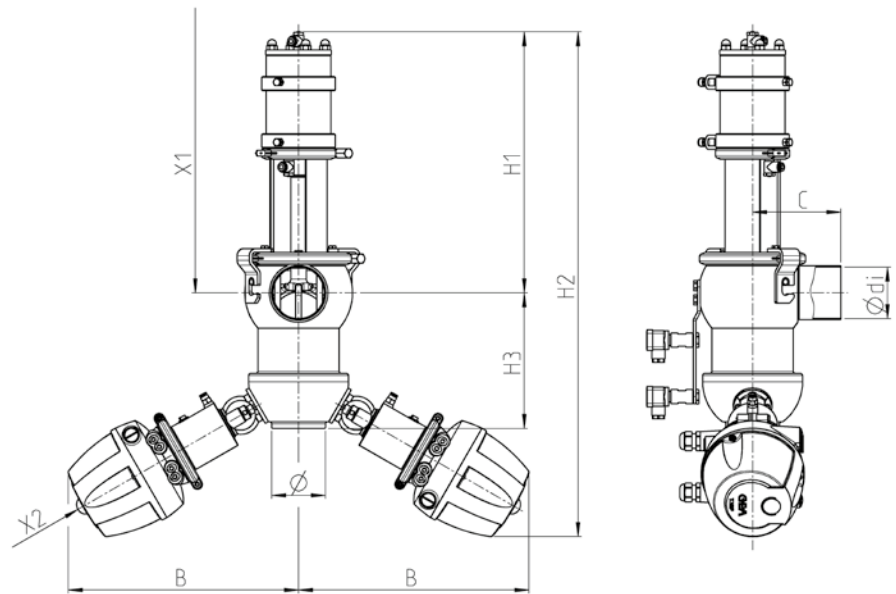
Piggable valve blocks

Piggable filling and emptying valves at product tanks






Technical data of the standard version		
Material in contact with the product	1.4404	
Seal material in contact with the product	EPDM (FDA)	
Ambient temperature	0 to 45 °C	
Air supply pressure	4.8 bar (69.6 psi) to 8 bar (116 psi)	
Max. product pressure	DN 25 – DN 80 OD 1" – OD 3"	16 bar (232 psi)
	DN 100 OD 4"	10 bar (145 psi)
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$	
External housing surface	Matte blasted	
Actuator type	Pneumatic actuator air/air	
Actuator type of the pig retention cylinders	Pneumatic actuator air/spring	
Connection fittings	Welding end	
Identification	Adhesive ID tag	
Certificates	<b>CE FDA</b>	



Nominal width	Pipe		Housing		Dimension					General
	Ø [mm]	Ødi [mm]	B [mm]	C [mm]	H1 [mm]	H2 [mm]	H3 [mm]	X1 [mm]	X2 [mm]	Weight [kg]
DN 25	29.0 × 1.50	26.00	329	60	300.0	482.0	118.0	450.0	100	8.5
DN 40	41.0 × 1.50	38.00	339	90	353.0	521.0	135.0	503.0	100	14.5
DN 50	53.0 × 1.50	50.00	313	90	359.0	650.0	158.0	559.0	100	16.0
DN 65	70.0 × 2.00	66.00	323	90	367.0	692.0	170.0	597.0	100	17.0
DN 80	85.0 × 2.00	81.00	331	125	378.0	730.5	194.5	648.0	100	24.0
DN 100	104.0 × 2.00	100.00	340	125	462.0	829.0	215.0	762.0	100	37.0
OD 1"	25.4 × 1.65	22.10	329	60	298.0	477.0	115.0	448.0	100	8.5
OD 1 ½"	38.1 × 1.65	34.80	337	90	351.5	510.0	125.5	501.5	100	15.5
OD 2"	50.8 × 1.65	47.50	313	90	358.0	647.0	156.0	558.0	100	16.0
OD 2 ½"	63.5 × 1.65	60.20	320	90	364.0	689.0	170.0	594.0	100	18.0
OD 3"	76.2 × 1.65	72.90	326	125	374.0	721.0	192.0	634.0	100	22.5
OD 4"	101.6 × 2.11	97.38	340	125	461.0	829.0	216.0	761.0	100	36.0

Position	Description of the order code	
1	<b>Pig cleaning station</b>	
	PIG/PCS	Pig cleaning station MST 3A
2	<b>Design</b>	
	G	Pig cleaning station complete
	A	Only actuator of the pig cleaning station
	M	Only pig retention cylinder for the pig cleaning station
3	<b>Nominal width</b>	
	DN 25	OD 1"
	DN 40	OD 1 ½"
	DN 50	OD 2"
	DN 65	OD 2 ½"
	DN 80	OD 3"
	DN 100	OD 4"
4	<b>Seal material</b>	
	1	EPDM (FDA)
	2	FKM (FDA)
	3	HNBR (FDA)
5	<b>Surface quality</b>	
	2	Inside R <sub>a</sub> ≤ 0.8 µm, outside matte blasted
	3	Inside R <sub>a</sub> ≤ 0.8 µm, outside ground
6	<b>Pig retention cylinder</b>	
	0	Without pig retention cylinder
	2	With pig retention cylinder
7	<b>Proximity switches at the pig actuator (for technical specifications, see section control and feedback systems)</b>	
	0	Without proximity switches
	2	With proximity switches
8	<b>Magnetic sensors at the pig station housing (for technical specifications, see section control and feedback systems)</b>	
	0	Without magnetic sensors
	2	With magnetic sensors
9	<b>Connection fittings</b>	<b>Connection fitting on port 1 / connection fitting on port 7</b> 
	N Without connection fittings	TK VARIVENT® flange connection complete, grooved flange on housing
	J With connection fittings	TN VARIVENT® grooved flange complete, incl. O-ring and connecting parts
		TF VARIVENT® plain flange
		CO Clamp connection
10	<b>Accessories</b>	
	/52	Adhesive ID tag
+		
11–16	<b>Air connection/control and feedback system</b>	
	00000M	Metric for air hose Ø 6/4 mm
	00000Z	Inch for air hose Ø OD ¼" (6.35/4.35 mm)
	XXXXX	Order code for different control and feedback systems see section 9.


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

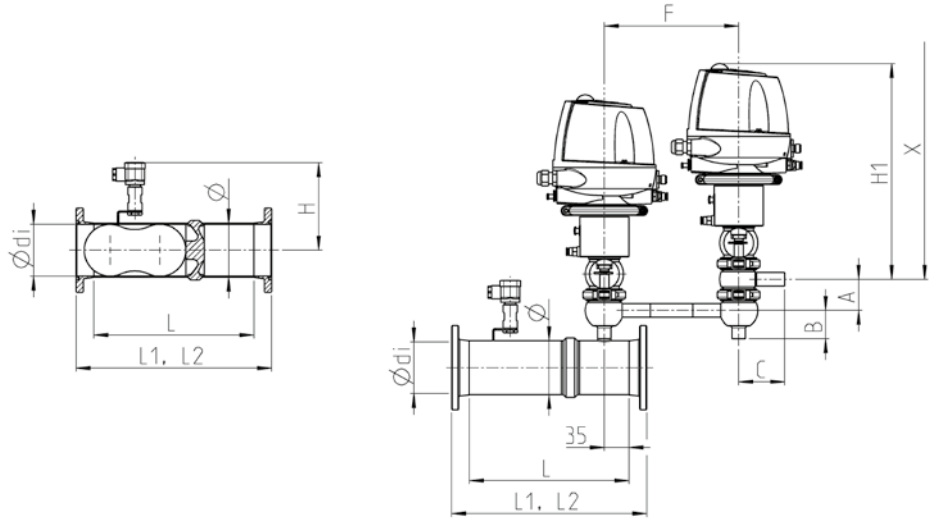
<b>Position</b>	1	2	3	4	5	6	7	8	9	10	11 to 16							
<b>Code</b>	PIG/PCS	-		-					/	/	/52	+						

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





Technical data of the standard version		
Material in contact with the product	1.4404	
Seal material in contact with the product	EPDM (FDA)	
Ambient temperature	0 to 45 °C	
Max. product pressure	DN 25 – DN 65	16 bar (232 psi)
	OD 1" – OD 2 ½"	
	DN 80 – DN 100	10 bar (145 psi)
Max. product pressure	OD 3" – OD 4"	
	Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
External housing surface	Matte blasted	
Connection fittings	Welding end	
Identification	Adhesive ID tag	
Certificates		




Pig catching pipe

Nominal width	Pipe					Dimension	
	Ø [mm]	Ødi [mm]	L [mm]	L1 with VARIVENT® grooved flange [mm]	L2 with clamp connection [mm]	H [mm]	
DN 25	29.0 × 1.50	26.00	155	205	198	95	
DN 40	41.0 × 1.50	38.00	176	226	219	101	
DN 50	53.0 × 1.50	50.00	181	231	224	107	
DN 65	70.0 × 2.00	66.00	206	256	262	115	
DN 80	85.0 × 2.00	81.00	246	296	302	123	
DN 100	104.0 × 2.00	100.00	271	321	327	132	
OD 1"	25.4 × 1.65	22.10	150	200	193	93	
OD 1 ½"	38.1 × 1.65	34.80	166	216	209	99	
OD 2"	50.8 × 1.65	47.50	176	226	219	105	
OD 2 ½"	63.5 × 1.65	60.20	196	246	252	112	
OD 3"	76.2 × 1.65	72.90	226	276	282	118	
OD 4"	101.6 × 2.11	97.38	261	311	317	131	

Pig catching station

Nominal width	Housing		Valve		Dimension	
	A [mm]	B [mm]	C [mm]	F [mm]	H1 [mm]	X [mm]
DN 15	47.0	40	65	180	298	348
DN 25	50.0	31	90	230	338	498
DN 40	62.0	39	90	230	372	532
DN 50	74.0	41	90	230	378	538
OD 1"	46.0	29	90	230	336	496
OD 1 ½"	59.0	39	90	230	370	530
OD 2"	71.5	42	90	230	377	537

Position	Description of the order code	
1	<b>Pig catching pipe</b> PIG/PCP Pig catching pipe	
2	<b>Nominal width of the pigging line</b> DN 25 OD 1" DN 40 OD 1 ½" DN 50 OD 2" DN 65 OD 2 ½" DN 80 OD 3" DN 100 OD 4"	
3	<b>Nominal width of the driving medium valves*</b> 0 Without driving medium valves DN 15 DN 25 OD 1" DN 40 OD 1 ½" DN 50 OD 2"	
4	<b>Magnetic sensors (for technical specifications, see section control and feedback systems)</b> 0 Without magnetic sensor 1 With magnetic sensor	
5	<b>Seal material</b> 1 EPDM (FDA) 2 FKM (FDA) 3 HNBR (FDA)	
6	<b>Surface quality</b> 2 Inside R <sub>a</sub> ≤ 0.8 μm, outside matte blasted 3 Inside R <sub>a</sub> ≤ 0.8 μm, outside ground	
7	<b>Connection fittings</b> N Without connection fittings J With connection fittings	<b>Connection fitting on port 1 / connection fitting on port 2</b> TK VARIVENT® flange connection complete, grooved flange on housing TN VARIVENT® grooved flange complete, incl. O-ring and connecting parts TF VARIVENT® plain flange CO Clamp connection 
8	<b>Accessories</b> /52 Adhesive ID tag	

\* The order codes of the driving medium valves can be taken from the catalog Hygienic Valves VARIVENT® and ECOVENT®, section shut-off valves and divert valves. Please indicate in your request that you need valves for product recovery systems.


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

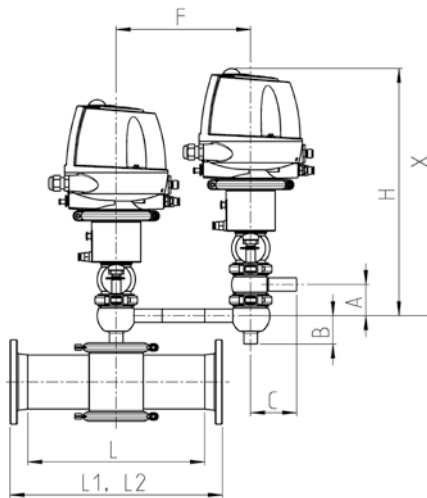
<b>Position</b>	1	2	3	4	5	6	7	8
<b>Code</b>	PIG/PCP	-		-		-	/ /	/52

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





Technical data of the standard version		
Material in contact with the product	1.4404	
Seal material	EPDM (FDA)	
Ambient temperature	0 to 45 °C	
Product pressure	DN 25 – DN 65 OD 1" – OD 2 ½"	16 bar (232 psi)
	DN 80 – DN 100 OD 3" – OD 4"	10 bar (145 psi)
Surface in contact with the product	R <sub>a</sub> ≤ 0.8 µm	
External housing surface	Matte blasted	
Connection fittings	Welding end	
Identification	Adhesive ID tag	
Certificates		




VARINLINE® housings

Nominal width	Pipe				
	Ø [mm]	Ødi [mm]	L [mm]	L1 with VARIVENT® grooved flange [mm]	L2 with clamp connection [mm]
DN 25	29.0 × 1.50	26.00	180	230	223
DN 40	41.0 × 1.50	38.00	180	230	223
DN 50	53.0 × 1.50	50.00	180	230	223
DN 65	70.0 × 2.00	66.00	250	300	306
DN 80	85.0 × 2.00	81.00	250	300	306
DN 100	104.0 × 2.00	100.00	250	300	306
OD 1"	25.4 × 1.65	22.10	180	230	223
OD 1 ½"	38.1 × 1.65	34.80	180	230	223
OD 2"	50.8 × 1.65	47.50	180	230	223
OD 2 ½"	63.5 × 1.65	60.20	250	300	306
OD 3"	76.2 × 1.65	72.90	250	300	306
OD 4"	101.6 × 2.11	97.38	250	300	306

Pig driving medium valves

Nominal width	Housing		Valve		Dimension	
	A [mm]	B [mm]	C [mm]	F [mm]	H [mm]	X [mm]
DN 15	47.0	40	65	180	298	348
DN 25	50.0	31	90	230	338	498
DN 40	62.0	39	90	230	372	532
DN 50	74.0	41	90	230	378	538
OD 1"	46.0	29	90	230	336	496
OD 1 ½"	59.0	39	90	230	370	530
OD 2"	71.5	42	90	230	377	537

Position	Description of the order code	
1	<b>Inline housings</b>	
	PIG/T	Inline housings
2	<b>Nominal width</b>	
	DN 25	OD 1"
	DN 40	OD 1 ½"
	DN 50	OD 2"
	DN 65	OD 2 ½"
	DN 80	OD 3"
	DN 100	OD 4"
3	<b>Nominal width of the driving medium valves*</b>	
	0	Without driving medium valves
	DN 15	
	DN 25	OD 1"
	DN 40	OD 1 ½"
	DN 50	OD 2"
4	<b>Seal material</b>	
	1	EPDM (FDA)
	2	FKM (FDA)
	3	HNBR (FDA)
5	<b>Surface quality</b>	
	3	Inside $R_a \leq 0.8 \mu\text{m}$ , outside ground
6	<b>Certificates</b>	
	K	Without
	W	Test report 2.2
	Z	Inspection certificate 3.1
	A	Inspection certificate 3.1 and 2.2
7	<b>Connection fittings</b>	<b>Connection fitting on port 1 / connection fitting on port 2</b> 
	N Without connection fittings	TK VARIVENT® flange connection complete, grooved flange on housing
	J With connection fittings	TN VARIVENT® grooved flange complete, incl. O-ring and connecting parts
		TF VARIVENT® plain flange
		CO Clamp connection
8	<b>Material in contact with the product</b>	
	1.4404	1.4404 (AISI 316L)


\* The order codes of the driving medium valves can be taken from the catalog Hygienic valves VARIVENT® and ECOVENT®, section shut-off valves and divert valves. Please indicate in your request that you need valves for product recovery systems.

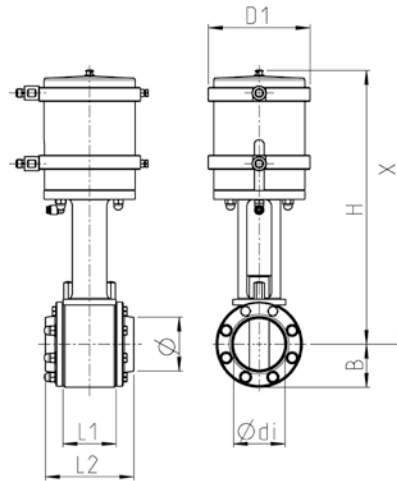
The code is composed as follows, depending on the chosen configuration:

<b>Position</b>	1	2	3	4	5	6	7	8
<b>Code</b>	PIG/T	-		-		-	/ /	1.4404

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




Technical data of the standard version		
Material in contact with the product	1.4404	
Seal material in contact with the product	EPDM (FDA)	
Ambient temperature	0 to 45 °C	
Air supply pressure	4.2 bar (61 psi) to 8 bar (116 psi)	
Max. product pressure	DN 25 – DN 65	16 bar (232 psi)
	OD 1" – OD 2 ½"	
	DN 80 – DN 100	10 bar (145 psi)
OD 3" – OD 4"		
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$	
External housing surface	Outside ground	
Actuator type	Pneumatic actuator air/spring	
Connection fittings	Welding end	
Identification	Adhesive ID tag	
Certificates		



Nominal width	Pipe		Housing			Actuator	Dimension		General	
	Ø [mm]	Ødi [mm]	B [mm]	L1 [mm]	L2 [mm]	D1 [mm]	H [mm]	X [mm]	Weight [kg]	Stroke [mm]
DN 25	29.0 × 1.50	26.00	37.0	75	125	68	328	358	6.0	32.0
DN 40	41.0 × 1.50	38.00	41.0	75	125	68	334	364	6.5	44.0
DN 50	53.0 × 1.50	50.00	51.0	75	125	139	377	407	11.0	59.0
DN 65	70.0 × 2.00	66.00	58.0	75	125	139	385	415	12.0	75.0
DN 80	85.0 × 2.00	81.00	65.0	75	125	139	392	422	12.5	90.0
DN 100	104.0 × 2.00	100.00	79.5	75	125	139	402	432	14.5	109.0
OD 1"	25.4 × 1.65	22.10	35.0	75	125	68	326	356	6.0	28.0
OD 1 ½"	38.1 × 1.65	34.80	39.5	75	125	68	333	368	6.5	41.0
OD 2"	50.8 × 1.65	47.50	49.5	75	125	139	376	406	11.0	56.5
OD 2 ½"	63.5 × 1.65	60.20	55.0	75	125	139	382	412	11.5	69.0
OD 3"	76.2 × 1.65	72.90	61.0	75	125	139	388	418	12.0	82.0
OD 4"	101.6 × 2.11	97.38	78.0	75	125	139	401	431	14.0	106.5



Position	Description of the order code	
1	<b>Pig stopper</b>	
	PIG/PS	Pig stopper
2	<b>Nominal width</b>	
	DN 25	OD 1"
	DN 40	OD 1 ½"
	DN 50	OD 2"
	DN 65	OD 2 ½"
	DN 80	OD 3"
	DN 100	OD 4"
3	<b>Proximity switches at the actuator (for technical specifications, see section control and feedback systems)</b>	
	0	Without proximity switches
	2	With proximity switches
4	<b>Design</b>	
	S	Pig stopper (complete)
	A	Actuator as spare part
5	<b>Seal material</b>	
	1	EPDM (FDA)
	2	FKM (FDA)
	3	HNBR (FDA)
6	<b>Surface quality</b>	
	3	Inside $R_a \leq 0.8 \mu\text{m}$ , outside ground
7	<b>Connection fittings</b>	<b>Connection fitting on port 1 / connection fitting on port 2</b> 
	N Without connection fittings	TN VARIVENT® grooved flange complete, incl. O-ring and connecting parts
	J With connection fittings	
8	<b>Accessories</b>	
	/52	Adhesive ID tag
+		
9-14	<b>Air connection/control and feedback system</b>	
	00000M	Metric for air hose $\varnothing 6/4$ mm
	00000Z	Inch for air hose $\varnothing$ OD ¼" (6.35/4.35 mm)
	XXXXX	Order code for different control and feedback systems see section 9.




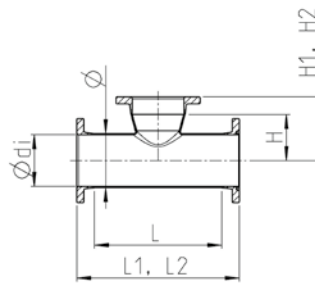
The code is composed as follows, depending on the chosen configuration:

<b>Position</b>	1	2	3	4	5	6	7	8	9 to 14									
<b>Code</b>	PIG/PS	-		-		-	3	-	/	/	/52	+						


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



Technical data of the standard version		
Material in contact with the product	1.4404	
Seal material in contact with the product	EPDM (FDA)	
Ambient temperature	0 to 45 °C	
Max. product pressure	DN 25 – DN 65	16 bar (232 psi)
	OD 1" – OD 2 ½"	
	DN 80 – DN 100	10 bar (145 psi)
OD 3" – OD 4"		
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$	
External housing surface	Matte blasted	
Connection fittings	Welding end	
Identification	Adhesive ID tag	
Certificates		



Nominal width	Pipe					Dimension		
	Ø [mm]	Ødi [mm]	L [mm]	L1 with VARIVENT® grooved flange [mm]	L2 with clamp connection [mm]	H [mm]	H1 with VARIVENT® grooved flange [mm]	H2 with clamp connection [mm]
DN 25	29.0 × 1.50	26.00	100	150	143	31.5	56.5	53.0
DN 40	41.0 × 1.50	38.00	120	170	163	39.5	64.5	61.0
DN 50	53.0 × 1.50	50.00	140	190	183	51.5	76.5	73.0
DN 65	70.0 × 2.00	66.00	160	210	216	61.5	86.5	89.5
DN 80	85.0 × 2.00	81.00	180	230	236	72.5	97.5	100.5
DN 100	104.0 × 2.00	100.00	200	250	256	89.0	114.0	117.0
OD 1"	25.4 × 1.65	22.10	100	150	143	29.7	54.7	51.2
OD 1 ½"	38.1 × 1.65	34.80	120	170	163	41.1	66.1	62.6
OD 2"	50.8 × 1.65	47.50	140	190	183	48.4	73.4	69.9
OD 2 ½"	63.5 × 1.65	60.20	160	210	216	58.8	83.8	86.8
OD 3"	76.2 × 1.65	72.90	180	230	236	64.1	89.1	92.1
OD 4"	101.6 × 2.11	97.38	200	250	256	89.3	114.3	117.3

Position	Description of the order code	
1	<b>Pig T-piece</b>	
	PIG/TEE	Pig T-piece
2	<b>Nominal width</b>	
	DN 25	OD 1"
	DN 40	OD 1 ½"
	DN 50	OD 2"
	DN 65	OD 2 ½"
	DN 80	OD 3"
	DN 100	OD 4"
3	<b>Seal material</b>	
	1	EPDM (FDA)
	2	FKM (FDA)
	3	HNBR (FDA)
4	<b>Surface quality</b>	
	2	Inside $R_a \leq 0.8 \mu\text{m}$ , outside matte blasted
	3	Inside $R_a \leq 0.8 \mu\text{m}$ , outside ground
5	<b>Connection fittings</b>	<b>Connection fitting on port 1 /                      Connection fitting on port 2 /                      connection fitting on port 7</b> 
	N Without connection fittings	TK VARIVENT® flange connection complete, grooved flange on housing
	J With connection fittings	TN VARIVENT® grooved flange complete, incl. O-ring and connecting parts
		TF VARIVENT® plain flange
		CO Clamp connection
6	<b>Accessories</b>	
	/52	Adhesive ID tag



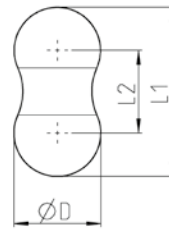
The code is composed as follows, depending on the chosen configuration:

<b>Position</b>	1	2	3	4	5	6
<b>Code</b>	PIG/TEE	-	-	-	/ /	/52

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



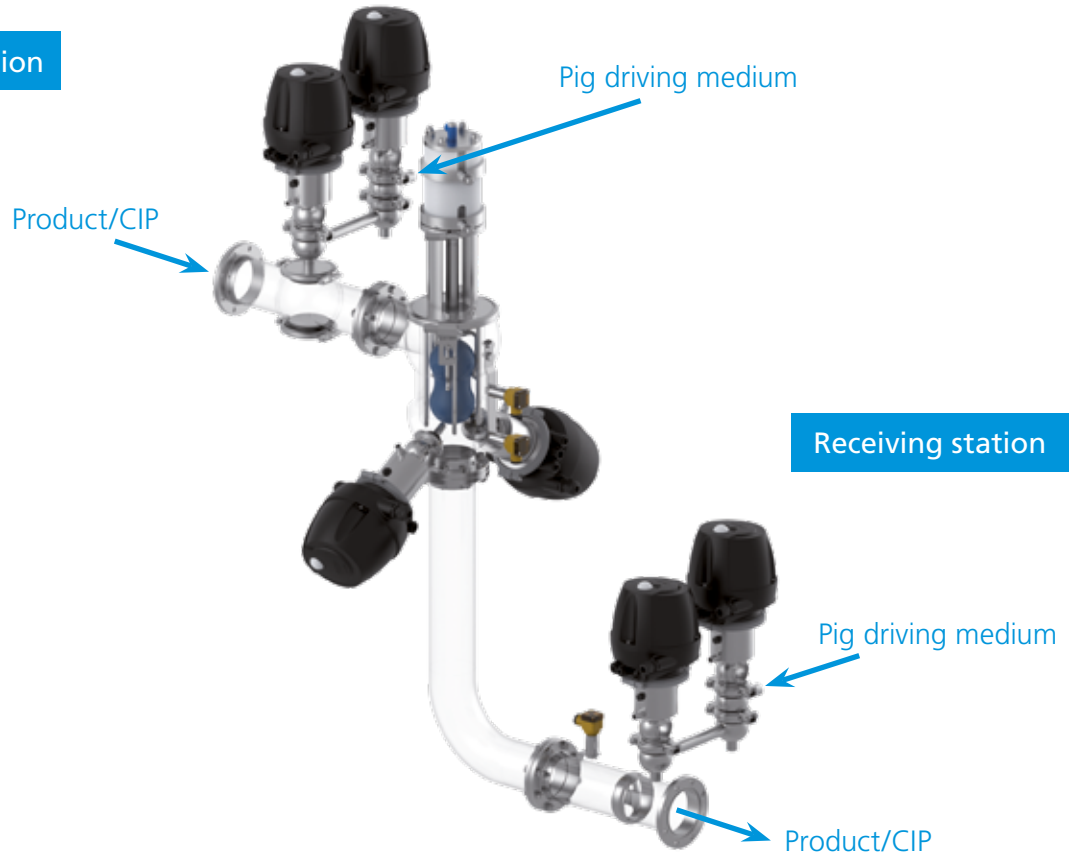
Technical data of the standard version	
Material in contact with the product	VMQ (Silicone), FKM
Ambient temperature	-5 to 130 °C
Certificates	



Nominal width	Dimensions			Article number	
	L1 [mm]	L2 [mm]	ØD [mm]	Material	
				VMQ	FKM
DN 25	On request	On request	On request	On request	On request
DN 40	80	42	> 38.00	228-163.24	228-163.23
DN 50	99	48	> 50.00	228-163.27	228-163.26
DN 65	127	60	> 66.00	228-163.30	228-163.29
DN 80	158	76	> 81.00	228-163.33	228-163.32
DN 100	192	91	> 100.00	228-163.36	228-163.35
OD 1"	On request	On request	On request	On request	On request
OD 1 ½"	67	32	> 34.80	On request	On request
OD 2"	93	45	> 47.50	228-263.03	228-263.02
OD 2 ½"	119	58	> 60.20	228-263.15	228-263.14
OD 3"	144	70	> 72.90	228-263.18	228-263.17
OD 4"	181	83	> 97.38	228-263.06	228-263.05



**Launching station**



**Functional description**

**Production**

The pig is firmly held in position in the launching station and flooded with product.

**Product push-out**

The pig is pushed through the pipeline by means of the driving medium and pushes the residual product towards the receiving station.

**Pig return**

When reaching the receiving station, the pig is immediately returned to the launching station.

**Cleaning**

The pig stations are cleaned during the pipe cleaning. The pig is fully flooded in the launching station and cleaned.

**Selection criteria for the product recovery system EMI/1**

The product recovery system is automatically operated and the pig is cleaned in the launching station. The pig is removed from the pipeline for inspection.

**Preferred combination of the pig driving media**

Launching station: Water

Receiving station: Air

At least one liquid medium is before or behind the pig in each pig run.

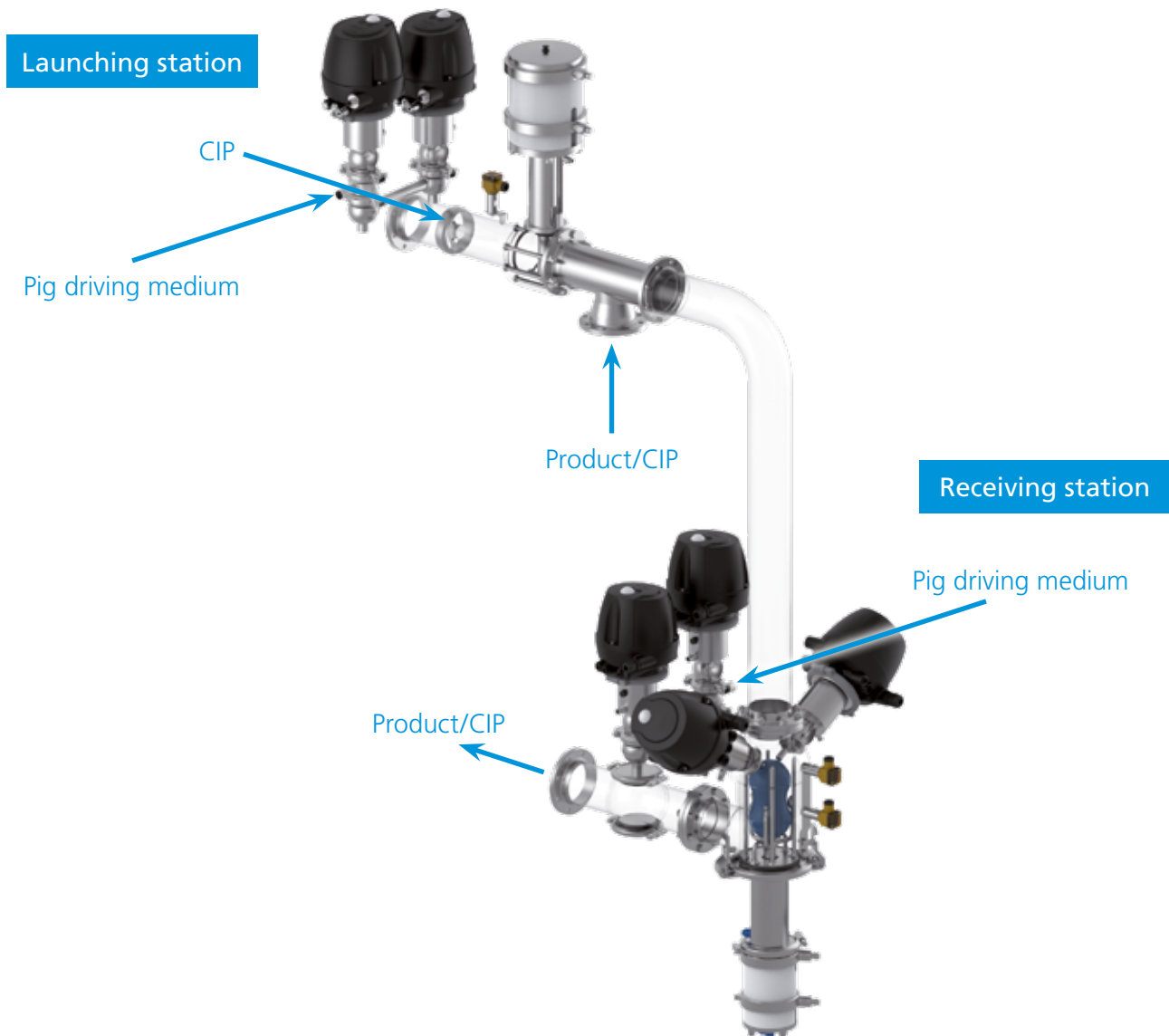
**Combination of the pig driving media**

Launching station: Air

Receiving station: Air

This is only possible with very slippery products such as shampoo and vegetable oils that form a sufficient lubricating film between the pig and the pipe wall. Not applicable for products that do not lubricate, so to avoid the "Stick-slip effect".

The pipeline can be fully self-drained after cleaning.



## Functional description

### Production

The pig is firmly held in position in the pig catching pipe of the launching station and the product enters the system via the lateral socket of the special T-piece. The pig stopper prevents the pig from exiting the system if a vacuum occurs.

### Product push-out

The pig is pushed through the pipeline by means of the driving medium and pushes the residual product towards the receiving station. For subsequent cleaning, the pig remains in the receiving station.

### Cleaning

The pig stations are cleaned during the pipe cleaning. The pig is fully flooded in the receiving station and cleaned. The system must not be sterilized with steam, because the pig cannot be driven back along a dry line.

### Pig return

At the end of the cleaning, the pig is driven back to the launching station by a gaseous driving medium. On its way back, the pig is pushing out the final rinsing water from the pipeline.

## Selection criteria for the product recovery system EMII/1

The product recovery system is automatically operated and the pig is cleaned in its specific receiving station. The pig is removed from the pipeline for inspection.

### Preferred combination of the pig driving media

Launching station: Air

Receiving station: Air

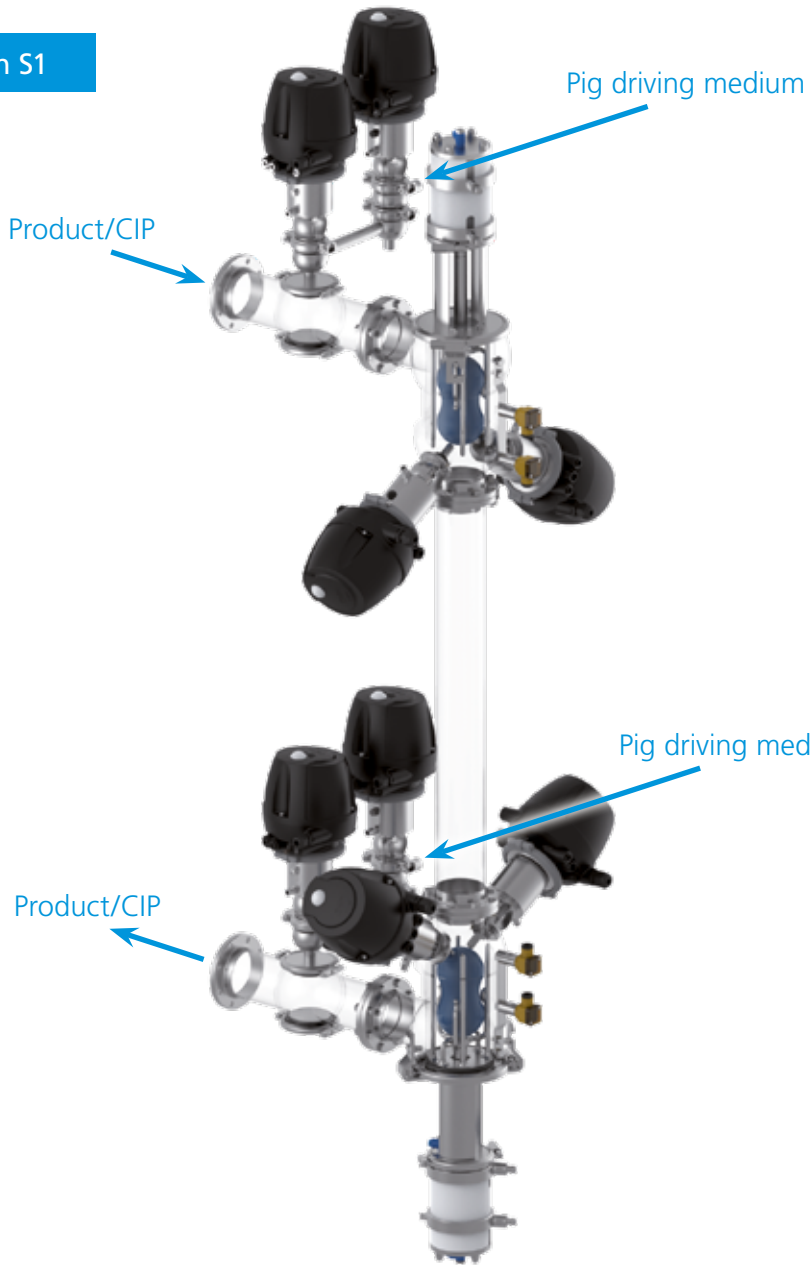
One liquid medium is located before the pig in each pig run.

Applicable for products with low lubrication properties

Applicable for pipelines that do not self-drain. The pig pushes the water from the last cleaning step out towards the launching station.

The pipeline is not sterilized with steam.

Pig station S1



Pig station S2



## Functional description

### 1. Product push-out optionally in two directions

#### Production

The pig stations have one pig firmly held in position each. Both are flooded with product in their stations.

#### Product push-out

After the production end, the residual product may be pushed out in the desired direction using the driving medium. The pig moves to the opposite pig of the receiving station for this.

#### Pig return

When reaching the receiving station, the pig is immediately returned to the launching station.

#### Cleaning

The pig stations are cleaned during the pipe cleaning. The pigs are fully flooded in their specific stations and cleaned.

### 2. Product filling with slope

If the product is filled into empty and descending pipelines, product and air may mix and produce foam.

This incident can be avoided using the product recovery system DM/1. For this purpose, pig S2 is driven against pig S1 prior to production start. Afterwards pig S2 is pushed back with product into its station and serves as a separator between product and air. All further process steps are the same as described before under section 1.

### 3. Operation with the pig

Only one pig is used in the system. The function method is the same as for the product recovery system EMII/1. In contrast to the EMII/1, no T-piece is used for product infeed. The product enters directly via the launching station and floods the pig firmly held in position.

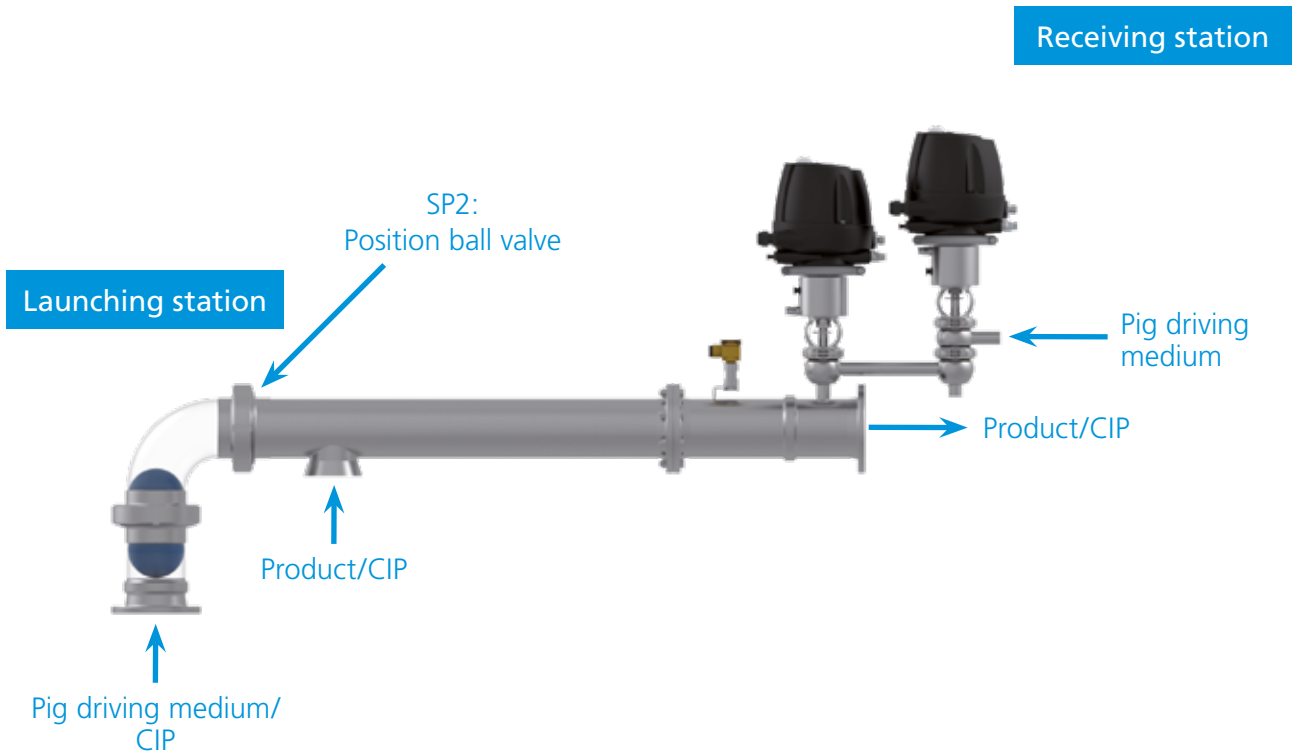
## Selection criteria for the product recovery system DM/1

The product recovery system is automatically operated and the pigs are cleaned in the pig station. The pigs are removed from the pipeline for inspection.

Three possible applications:

- Product push-out optionally in two directions
- Product filling with slope
  - particularly when having foaming products
- Operation with one pig
  - benefit as compared to EMII/1: Product infeed without T-piece

All combinations of driving media can be used if at least one liquid medium is located before or behind the pig in each pig run.



Functional description

**Production**

Before starting production, the pig is manually inserted in the launching station. The pipe bend is removed for this and then installed again. Product infeed takes place via the lateral socket of the T-piece.

**Product push-out**

The pig is pushed through the pipeline by means of the driving medium and pushes the residual product towards the receiving station.

**Pig return**

When reaching the receiving station, the pig is immediately returned to the launching station.

**Cleaning**

The pig is removed manually before the start of cleaning at the launching station and manually cleaned outside of the system.

Selection criteria for the product recovery system SP1/SP2

The product recovery system is semi-automatically operated, since the pig runs automatically and cleaning of the pig takes place manually.

SP1: without ball valve

SP2: with ball valve

The ball valve increases operational safety when inserting and removing the pig.

**Preferred combination of the pig driving media**

Launching station: Water

Receiving station: Air

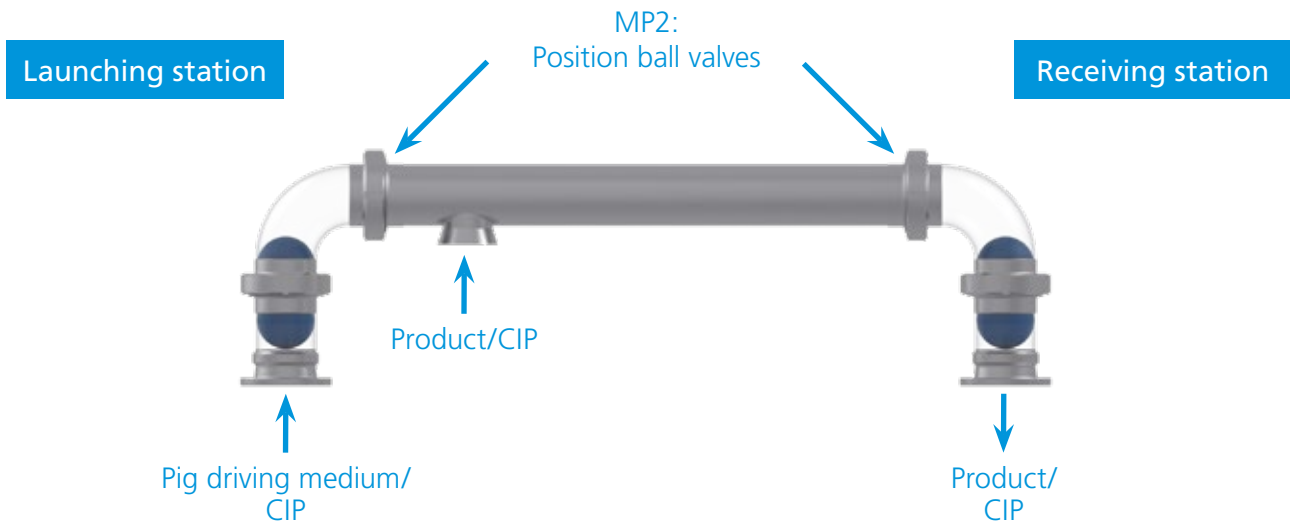
At least one liquid medium is located before or behind the pig in each pig run.

**Combination of the pig driving media**

Launching station: Air

Receiving station: Air

This is only possible with very slippery products such as shampoo and vegetable oils that form a sufficient lubricating film between the pig and the pipe wall.



## Functional description

### Production

Before starting production, the pig is manually inserted in the launching station. The pipe bend is removed for this and then installed again. Product infeed takes place via the lateral socket of the T-piece.

### Product push-out

The pig is pushed through the pipeline by means of the driving medium and pushes the residual product towards the receiving station. It is removed for subsequent cleaning there and not pushed back to the launching station.

### Cleaning

The pig is manually cleaned outside of the system.

## Selection criteria for the product recovery system MP1/MP2

The product recovery system is manually operated, since both the pig runs and the cleaning of the pig take place manually.

MP1: without ball valves

MP2: with ball valves

The ball valves increase operational safety when inserting and removing the pig.

### Preferred pig driving medium at system MP1

Launching station: Air

When using water, there is the danger of water escaping when opening the pipe bend at the receiving station.

### Preferred pig driving medium at system MP2

Launching station: Water

Using water permits better adjustment of the pig speed than with the compressible medium of air. There is no risk of water escaping since the ball valve before the receiving station is closed when opening the pipe bend.

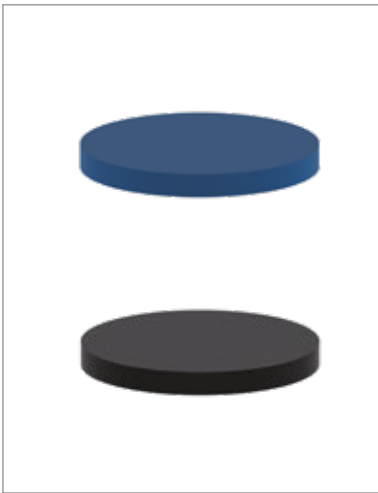
Alternatively, the MP1 and MP2 systems can also be operated semi-automatically. For this, the valves are equipped with pneumatic actuators. The pig run takes place automatically and the pig is cleaned manually. As for the manual application, the pig is taken out at the receiving station.



### Pig detector

The pig detector serves to find an unmoving pig along the pipeline or in a pig station. For this, the detector is manually routed to the pipeline from the outside. Once it has entered the area of the pig's magnetic field, an indicator light comes on. The design of the pig detector is comparable to that of a pen. The detector is also approved for use in potentially explosive atmospheres (ATEX and FM).

Article number
228-000358

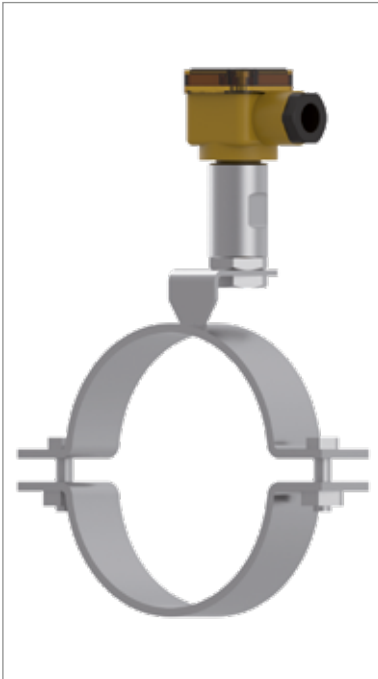


### Pig test material

Using pig test materials helps to determine the chemical resistance of the pig material against products and/or cleaning media in the planning stages.

This procedure is particularly recommended when the resistance of the pig material is unknown. The test bodies have a diameter of approx. 40 mm and a thickness of approx. 4 mm. During resistance tests, deviations from the surface properties, dimensions and weights can be found. Available materials: Silicone and FKM.

Material	Article number
FKM	228-000259
Silicone	228-000260



### Magnetic sensor with pipe bracket

Pigs are often detected along pipelines in the running state to initiate measures to reduce the pig speed. For this, magnetic sensors are attached to pipe brackets. They can be fitted anywhere at the pipeline.

Pipe bracket for magnetic sensors*	
Nominal width	Article number
DN 25	228-168.02
DN 40	228-168.04
DN 50	228-168.06
DN 65	228-168.08
DN 80	228-168.10
DN 100	228-168.12
OD 1"	228-168.01
OD 1 ½"	228-168.03
OD 2"	228-168.05
OD 2 ½"	228-168.07
OD 3"	228-168.09
OD 4"	228-168.11

\* The magnetic sensors can be taken from the section control and feedback systems.

Customer				
Company name/ customer number	_____			
Project	_____			
Contact	_____			
Phone	_____			
Email	_____			
Basic data (these parameters refer to the pipeline)				
Prerequisites	The same pipe interior diameter across the entire pigging route. • No sharp-edged and strongly sagging welds. • No installations such as measuring mountings in the piggable area. • Standard pipe bends with small middle radius can be used. Recommendation: Minimize the number of pipe bends! • Use pipe bends with low ovality. Tolerance maximum $\pm 1.5\%$ referring to the outside diameter.			
Pipeline	<input type="checkbox"/> Existing <input type="checkbox"/> Planned			
Nominal width	_____			
Pipe diameter	Inside _____ mm      Outside _____ mm			
Material	<input type="checkbox"/> 1.4404 <input type="checkbox"/> Others: _____			
Seal material	<input type="checkbox"/> EPDM <input type="checkbox"/> FKM <input type="checkbox"/> HNBR			
Piggable pipe lengths	_____ m			
Height difference between launching and receiving stations	_____ m <input type="checkbox"/> Dropping <input type="checkbox"/> Rising			
Outlets between launching and receiving stations	<input type="checkbox"/> T-pieces <input type="checkbox"/> Quantity _____			
Products				
Designation	Viscosity mPas	Operating temperature °C	Operating pressure bar <sub>g</sub>	Flow rate m <sup>3</sup> /h
1 _____	_____	_____	_____	_____
2 _____	_____	_____	_____	_____
3 _____	_____	_____	_____	_____
Properties product 1	<input type="checkbox"/> Foaming	<input type="checkbox"/> Lubricating	<input type="checkbox"/> Others: _____	
Properties product 2	<input type="checkbox"/> Foaming	<input type="checkbox"/> Lubricating	<input type="checkbox"/> Others: _____	
Properties product 3	<input type="checkbox"/> Foaming	<input type="checkbox"/> Lubricating	<input type="checkbox"/> Others: _____	
Note: Please send us viscosity charts, viscosity [mPas] depending on the shear rate [s <sup>-1</sup> ].				
Pig driving medium				
Compressed air (according to ISO 8573-1:2001)	Air pressure min. _____ bar <sub>g</sub> Air pressure max. _____ bar <sub>g</sub>			
Water	Pressure _____ bar <sub>g</sub>			
Other	_____ Pressure _____ bar <sub>g</sub>			
<input type="checkbox"/> Water can be used at the launching and air at the receiving station (preferred). <input type="checkbox"/> Water can be used at the launching and receiving stations. <input type="checkbox"/> Air can be used at the launching and water at the receiving station. <input type="checkbox"/> Air must be used at the launching and the receiving stations.				

Process		
<input type="checkbox"/> Pipeline is cleaned after each product push-out. <input type="checkbox"/> Pipeline must be emptied after each cleaning. If so, <input type="checkbox"/> the system is self draining.      If so, <input type="checkbox"/> the pig must push out the water. <input type="checkbox"/> The pipeline is sterilized with steam after cleaning. Temperature: _____ °C		
<b>How often is the product pushed out?</b>	_____ x per day	_____ x per week      _____ x per month
Cleaning		
Cleaning media	Concentration %	Temperature °C
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
Design		
<b>Explosion protected design</b>	<input type="checkbox"/> No <input type="checkbox"/> Yes	
<b>Control top</b>	<input type="checkbox"/> <b>With control top</b> <input type="checkbox"/> AS-interface-bus <input type="checkbox"/> 24 V DC, 3-wire <input type="checkbox"/> With solenoid valve <input type="checkbox"/> Without solenoid valve <input type="checkbox"/> Others: _____	
	<input type="checkbox"/> <b>Without control top</b> <input type="checkbox"/> With holding plate "INA" for proximity switches <input type="checkbox"/> With proximity switches <input type="checkbox"/> Without proximity switches <input type="checkbox"/> Without holding plate "INA" for proximity switches	
<input type="checkbox"/> <b>With control top</b> <input type="checkbox"/> With solenoid valve <input type="checkbox"/> Without solenoid valve		
<input type="checkbox"/> <b>Without control top</b> <input type="checkbox"/> With holding plate "INA" for proximity switches <input type="checkbox"/> With proximity switches <input type="checkbox"/> Without proximity switches <input type="checkbox"/> Without holding plate "INA" for proximity switches		
Note: Please send us a sketch of the planned installation position or a flow chart of the plant section into which the VARICOVER® product recovery system is to be integrated.		
<b>Air supply pressure (according to ISO 8573-1:2001)</b>	Air pressure min. _____ bar <sub>g</sub> Air pressure max. _____ bar <sub>g</sub>	
<b>Use of ball valves possible from a hygienic point of view?</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<b>3-A certified</b>	<input type="checkbox"/> Yes <input type="checkbox"/> No	
Comments		
_____ _____ _____ _____ _____ _____ _____		







## Housing and Nominal Widths

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Typical application and description

For keeping chocolate or margarine fluid and for cooling ice cream.

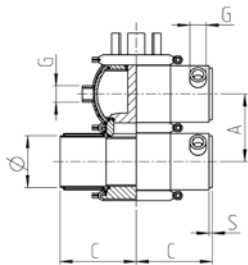
For heating or cooling products, a hot or cold medium is passed through the housing jacket in the opposite flow direction.

The product range includes jacketed valve housings with both one and two vertical ports. However, the housings cannot be supplied for valves with mix-matched nominal widths or a welded seat ring.

Available nominal widths		
Metric	DN	25–100
Inch OD	OD	1"–4"

Available valve types	
VARIVENT® control valve	S, P
VARIVENT® overflow valve	Q
VARINLINE® housings*	

\* Only available for nominal widths DN 25 to DN 50 as well as DN 80 and OD 1" to OD 2"



Technical data	
Material	1.4404 (AISI 316L)
Max. product pressure	10 bar DN 25–50, OD 1"–2" 6 bar DN 65–100, OD 2 ½"–4"
Jacket pressure resistance	3.5 bar
Surface in contact with the product	R <sub>a</sub> ≤ 0.8 µm
Outside surface	Matte blasted
Valve seat version	Clamped connection

Nominal width	Dimensions						Weight [kg] single vertical ports	Weight [kg] double vertical ports
	Ø [mm]	C [mm]	A [mm]	S [mm]	G [mm]			
DN 25	29 × 1.5	90	50	5	1/4"	0.5	0.7	
DN 40	41 × 1.5	90	62	5	1/4"	0.8	1.1	
DN 50	53 × 1.5	90	74	5	1/4"	1.0	1.1	
DN 65	70 × 2.0	125	96	5	1/2"	2.5	2.7	
DN 80	85 × 2.0	125	111	5	1/2"	3.0	3.2	
DN 100	104 × 2.0	125	130	5	1/2"	4.1	4.4	
OD 1"	25.4 × 1.65	90	46.0	5	1/4"	0.5	0.6	
OD 1 ½"	38.1 × 1.65	90	59.0	5	1/4"	0.8	0.9	
OD 2"	50.8 × 1.65	90	71.5	5	1/4"	1.0	1.1	
OD 2 ½"	63.5 × 1.65	125	90.0	5	1/2"	2.3	2.5	
OD 3"	76.2 × 1.65	125	103.0	5	1/2"	2.7	2.8	
OD 4"	101.6 × 2.11	125	127.5	5	1/2"	4.1	4.0	

Incorporation of the option in the order code and example

Position	Description of the order code for options
*	Accessories
/25	Jacketed valve housings

Position	1	2	3	4/5	6	7	8	9	10	11	12	13	14 to 19	
Code	D	E		- DN 80/DN 80 -	S	Z	- CD -	LO	-	1	2	N	/25 /52	+ 0 0 0 0 0 M

\* According to valve type

Typical application and description

For static use of valves with increased product pressure. For increasing the strength, the half rings on the valve housings are made of cast material and the housings with nominal widths DN 100/OD 4" are made of a higher-quality material.

**IMPORTANT:** The differential pressure between the product chambers on both sides of the valve disc is not allowed to exceed 10 bar during switching of the valve. The actuator size of the valve must be selected based on the product data.

Available nominal widths		
Metric	DN	25–100
Inch OD	OD	1"–4"

Available valve types	
VARIVENT® control valve	S, P
VARIVENT® overflow valve	Q

Technical data		
Material	1.4404 (AISI 316L) 1.4462	DN 25–80, OD 1"–3" DN 100, OD 4"
Pressure level	PS 20 bar	
Pressure level jacketed housing	PS 16 bar	DN 25–80, OD 1"–3"

Nominal width	Dimensions		
	Ø [mm]	C [mm]	A [mm]
DN 25	29 × 1.5	90	50
DN 40	41 × 1.5	90	62
DN 50	53 × 1.5	90	74
DN 65	70 × 2.0	125	96
DN 80	85 × 2.0	125	111
DN 100	104 × 2.0	125	130
OD 1"	25.4 × 1.65	90	46.0
OD 1 ½"	38.1 × 1.65	90	59.0
OD 2"	50.8 × 1.65	90	71.5
OD 2 ½"	63.5 × 1.65	125	90.0
OD 3"	76.2 × 1.65	125	103.0
OD 4"	101.6 × 2.11	125	127.5

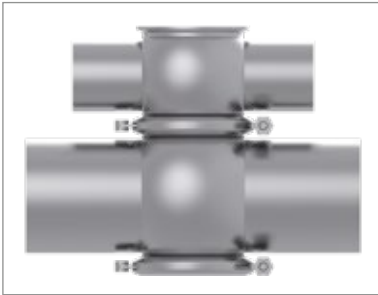
Incorporation of the option in the order code and example

Position	Description of the order code for options
*	<b>Accessories</b>
	/37 PS 20 bar
	/38 PS 16 bar (jacketed valve housing)

<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13	14 to 19	
<b>Code</b>	N	E		- DN 80/DN 80 -	S	Z	- CD -	LO	-	1	2	N	/37 /52 +	0 0 0 0 0 M

\* According to valve type





Typical application and description

Many mix-matched housings are already available.

For technical reasons, however, a mix-matched combination is not possible for all valve types! If required, please contact GEA Tuchenhausen to ask about the feasibility.

The first mentioned nominal width indicates the upper valve housing, the second one is the nominal width of the lower valve housing. In divert valves, both upper housings are configured with the same nominal width. The larger housing in the mix-matched combination must always be configured as a housing with two vertical ports.

Available nominal widths		
Metric	DN	25–150
Inch OD	OD	1"–6"
Inch IPS	IPS	2"–6"

Available valve types	
VARIVENT® control valve	S, P
VARIVENT® overflow valve	Q

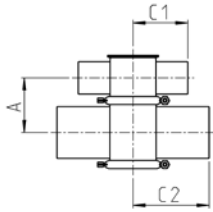
lower housing \ upper housing	DN 25			DN 40			DN 50			DN 65		
	A	C1	C2	A	C1	C2	A	C1	C2	A	C1	C2
DN 25	50	90	90	–	–	–	–	–	–	–	–	–
DN 40	56	90	90	62	90	90	68	90	90	–	–	–
DN 50	62	90	90	68	90	90	74	90	90	–	–	–
DN 65	70	90	125	76	90	125	82	90	125	96	125	125
DN 80	77.5	90	125	83.5	90	125	89.5	90	125	103.5	125	125
DN 100	87	90	125	93	90	125	99	90	125	113	125	125
DN 125	–	–	–	105.5	90	125	111.5	90	125	125.5	125	125
DN 150	–	–	–	118	90	150	124	90	150	138	125	150

lower housing \ upper housing	OD 1"			OD 1 ½"			OD 2"			OD 2 ½"		
	A	C1	C2	A	C1	C2	A	C1	C2	A	C1	C2
OD 1"	46	90	90	–	–	–	–	–	–	–	–	–
OD 1 ½"	52.5	90	90	59	90	90	65.25	90	90	–	–	–
OD 2"	58.75	90	90	65.25	90	90	71.5	90	90	77.75	125	90
OD 2 ½"	65	90	125	71.5	90	125	77.75	90	125	90	125	125
OD 3"	71.5	90	125	78	90	125	84.25	90	125	96.5	125	125
OD 4"	83.75	90	125	90.25	90	125	96.5	90	125	108.75	125	125
OD 6"	–	–	–	116.5	90	150	122.75	90	150	133.5	125	150

lower housing \ upper housing	IPS 2"		
	A	C1	C2
IPS 2"	58.75	90	90
IPS 3"	65.25	90	90
IPS 4"	71.5	90	90
IPS 6"	77.75	90	125



Technical data	
Material	1.4404 (AISI 316L)
Product pressure	10 bar
Valve seat version	Clamped

DN 80			DN 100			DN 125			upper housing / lower housing	
A	C1	C2	A	C1	C2	A	C1	C2		
-	-	-	-	-	-	-	-	-		DN 25
-	-	-	-	-	-	-	-	-		DN 40
-	-	-	-	-	-	-	-	-		DN 50
103.5	125	125	-	-	-	-	-	-		DN 65
111	125	125	-	-	-	-	-	-		DN 80
120.5	125	125	130	125	125	-	-	-		DN 100
133	125	125	142.5	125	125	155	125	125		DN 125
145.5	125	150	155	125	150	167.5	125	150		DN 150

OD 3"			OD 4"			upper housing / lower housing	
A	C1	C2	A	C1	C2		
-	-	-	-	-	-		OD 1"
-	-	-	-	-	-		OD 1 ½"
-	-	-	-	-	-		OD 2"
96.5	125	125	-	-	-		OD 2 ½"
103	125	125	-	-	-		OD 3"
115.25	125	125	127.5	125	125		OD 4"
140	125	150	152.25	125	150		OD 6"

IPS 3"			IPS 4"			upper housing / lower housing	
A	C1	C2	A	C1	C2		
-	-	-	-	-	-		IPS 2"
115	152.5	152.5	-	-	-		IPS 3"
127.5	152.5	152.5	140	152.5	152.5		IPS 4"
153.5	152.5	152.5	166	152.5	152.5		IPS 6"

Incorporation of the option in the order code and example

Position	Description of the order code for options
4/5	Nominal width (upper housing/lower housing)

Position	1	2	3	4/5	6	7	8	9	10	11	12	13 to 18					
Code	Q	E	W	DN 40/DN 50	M	M3	L0	1	2	N	/52	0	0	0	0	0	M



Typical application and description

Perfluorinated rubber (FFKM) is an elastomer that is used in areas where particularly high thermal and/or chemical resistance properties are required.

FFKM seal material combines the chemical properties of PTFE and the mechanical properties of Viton, and is characterized by a wide range of application temperatures, very good resistance to fluids, low-pressure deformation and minimum swelling.

Available nominal widths		
Metric	DN	10–100
Inch OD	OD	1"–4"
Inch IPS	IPS	2"–4"

Available valve types	
VARIVENT® control valve	S, P
VARIVENT® overflow valve	Q
VARIVENT® sampling valve	I, N, U
VARINLINE® components	

Technical data	
Operating temperature	–10 °C to 230 °C (14 °F to 446 °F)
Properties	See table of seal material properties

Incorporation of the option in the order code and example

Position	Description of the order code for options
*	Seal material in contact with the product
4	FFKM (FDA)

Position	1	2	3	4/5		6	7	8	9	10	11	12	13 to 18						
Code	Q	E	W	DN 80/DN 80		M	M3	L0	4	2	N	/52	+	0	0	0	0	0	M

\* According to valve type



Typical application and description

Deviating from the quality of the standard surface quality (\*\* DN/OD corresponding to  $R_a \leq 0.8 \mu\text{m}$ ; \*\*\* IPS corresponding to  $R_a \leq 1.2 \mu\text{m}$ ), different surface qualities are available up to a medium roughness for surfaces in contact with the product of  $R_a \leq 0.4 \mu\text{m}$ . The outer surface of the housings is matte blasted as standard. Optionally, it can also be supplied ground.

Housings that should comply with the 3-A standard are produced as standard with an inner surface of  $R_a \leq 0.8 \mu\text{m}$  with ground welds and a blasted outer surface. If a configuration with a ground outer surface is required, it is necessary to select not only option /3-A (position 13) but also the corresponding surface quality 3 (position 11).



Incorporation of the option in the order code and example

Position	Description of the order code for options
*	<b>Surface quality of the housing</b>
	1*** Inside $R_a \leq 1.2 \mu\text{m}$ , outside matte blasted
	2** Inside $R_a \leq 0.8 \mu\text{m}$ , outside matte blasted
	3 Inside $R_a \leq 0.8 \mu\text{m}$ , outside ground
	4 Inside $R_a \leq 0.4 \mu\text{m}$ , outside matte blasted
	6 Inside $R_a \leq 0.5 \mu\text{m}$ , outside matte blasted
	7 Inside $R_a \leq 0.5 \mu\text{m}$ , outside ground
	8 Inside $R_a \leq 0.4 \mu\text{m}$ , outside ground

<b>Position</b>	1	2	3	4/5	6	7	8	9	10	11	12	13 to 18											
<b>Code</b>	Q	E	W	-	DN 80/DN 80	-	M	M3	-	L0	-	1	-	2	N	/52	+	0	0	0	0	0	M

\* According to valve type



### Typical application and description

One process for improving the surface quality is electrochemical polishing, in which peaks on the surfaces of material are abraded by a galvanic process, resulting in an evened-out elevation profile.

This surface treatment makes it much less likely for contaminating substances and micro-organisms to stick to the surface. In addition, the smooth surface improves corrosion resistance by formation of an inert oxide layer.

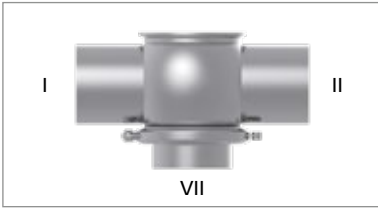
### Incorporation of the option in the order code and example

Position	Description of the order code for options
*	<b>Accessories</b>
/E	Surface finish electrolytically polished

Position	1	2	3	4/5	6	7	8	9	10	11	12	13 to 18
Code	Q	E	W	DN 80/DN 80	M	M3	L0	1	2	N	/E /52	0 0 0 0 0 M

\* According to valve type





Valves with one housing and vertical port

Typical application and description

The valve housings can be specified with a welded-on connection fitting. To find which connection fittings are available, please refer to the list on the following pages.

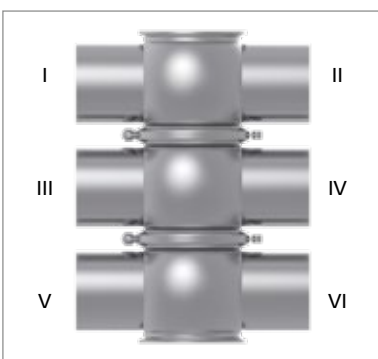
If the vertical ports within a valve do have different configurations, please inform us of the designation for the particular housing port including the required connection fitting (as in the example below). The seal which may be included corresponds to the sealing material of the valve.



Valves with two housings

Connection fittings	
TK	VARIVENT® flange connection, groove flange on housing
TN	VARIVENT® groove flange incl. O-ring and connecting parts
TF	VARIVENT® flange
GK	Pipe fitting, DIN 11851, male end on housing
GO	Male end SC, DIN 11851, incl. seal ring G
KO	Liner SD, DIN 11851, incl. groove nut
ASK	Hygienic flange connection, DIN 11853-2
NFK	Hygienic groove flange, DIN 11853-2
BFK	Hygienic flange, DIN 11853-2
CO	Clamp connection/TRI-Clamp, DIN 32676 (DN)/ISO 2852 (OD)

Example



Valves with three housings

Housing port	Connection fitting
I	TN
II	TF
III	TK
IV	
V	
VI	
VII	

Incorporation of the option in the order code and example

Position	Description of the order code for options
*	<b>Connection fittings</b>
J	Valve with connection fittings (required connection fitting according to list above, please state <b>separately</b> )

Position	1	2	3	4/5	6	7	8	9	10	11	12	13 to 18							
Code	Q	E	W	- DN 80/DN 80 -	M	M3	- L0 -	1	-	2	J	/52	+	0	0	0	0	0	M

\* According to valve type



Typical application and description

An O-ring is used for sealing the VARIVENT® flange connection, and is given a defined compression by a metal stop. The O-ring is also protected by the special geometry of the recess from being pulled out at high flow rates.

The VARIVENT® flange connection (TK) can be ordered either as a complete connection including bolts and nuts (TK) or a groove flange (TN)/flange (TF) as a connection fitting on a vertical port. If a complete connection is ordered as the connection fitting, the groove flange is welded onto the housing. The groove flange (TN) contains not only the O-ring but also the required connecting elements.



Complete connection including bolts and nuts (TK)



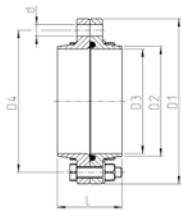
Groove flange (TN), including connecting elements and seal ring



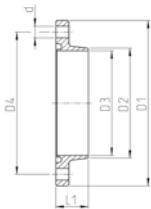
Flange (TF)

Available nominal widths		
Metric	DN	25 – 150
Inch OD	OD	1" – 6"
Inch IPS	IPS	2" – 6"

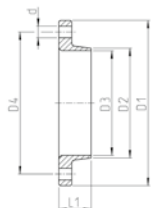
Technical data	
Material	1.4404
Surface in contact with the product	$R_a \leq 0.8 \mu\text{m}$
Certificates	3.1/AD2000W2
Seal materials	EPDM (FDA), FKM (FDA), HNBR (FDA)



TK = VARIVENT® flange connection



TN = VARIVENT® groove flange



TF = VARIVENT® flange

Nominal width	Dimensions							O-ring	
	D1 [mm]	D2 [mm]	D3 [mm]	D4 [mm]	d [mm]	L [mm]	L1 [mm]	[mm]	PS
DN 25	70	30.0	26.0	53	4 × Ø 9	50	25	25.0 × 5.0	16
DN 40	82	42.0	38.0	65	4 × Ø 9	50	25	36.0 × 5.0	16
DN 50	94	54.0	50.0	77	4 × Ø 9	50	25	47.0 × 5.0	16
DN 65	113	70.0	66.0	95	8 × Ø 9	50	25	62.0 × 5.0	16
DN 80	128	85.0	81.0	110	8 × Ø 9	50	25	75.0 × 5.0	10
DN 100	159	104.0	100.0	137	8 × Ø 11	50	25	95.0 × 5.0	10
DN 125	183	129.0	125.0	161	8 × Ø 11	50	25	115.0 × 5.0	10
DN 150	213	154.0	150.0	188	8 × Ø 14	60	30	134.2 × 5.7	10
OD 1"	66	25.5	22.0	49	4 × Ø 9	50	25	25 × 5.0	16
OD 1 ½"	79	38.5	35.0	62	4 × Ø 9	50	25	36 × 5.0	16
OD 2"	91	51.0	47.5	74	4 × Ø 9	50	25	47 × 5.0	16
OD 2 ½"	106	63.5	60.0	88	8 × Ø 9	50	25	62 × 5.0	16
OD 3"	119	76.5	73.0	101	8 × Ø 9	50	25	75 × 5.0	10
OD 4"	156	102.0	97.5	134	8 × Ø 11	50	25	95 × 5.0	10
OD 6"	211	152.4	146.5	186	8 × Ø 11	50	25	115 × 5.0	10
IPS 2"	101	60.5	57.0	84	4 × Ø 9	50	25	25 × 5.0	16
IPS 3"	132	89.0	85.0	114	4 × Ø 9	50	25	36 × 5.0	10
IPS 4"	169	114.0	110.0	147	4 × Ø 9	50	25	47 × 5.0	10
IPS 6"	227	168.0	162.0	202	8 × Ø 9	50	25	62 × 5.0	10

Incorporation of the option in the order code and example

Position	Description of the order code for options
*	Connection fittings
J	Valve with connection fittings (please state option TK, TN or TF separately with reference to the connection)

Position	1	2	3	4/5	6	7	8	9	10	11	12	13 to 18	
Code	Q	E	W	- DN 80/DN 80 -	M	M3	- L0 -	1	-	2	J	/52	+ 0 0 0 0 0 M

\* According to valve type

Typical application and description

A seal ring G is used for sealing the pipe fitting acc. to DIN 11851. The pipe fitting acc. to DIN 11851 can be ordered either as a complete connection (GK) or male end SC (GO)/liner SD (KO) as a connection fitting on a vertical port. If a complete

connection is ordered on a housing port, the male end is welded onto the housing. The groove flange contains the seal ring G. The liner (KO) contains the groove nut.



Complete connection (GK)



Male end SC (GO), including seal ring G



Liner SD (KO), including groove nut

GK – Complete connection, male end on housing

Available nominal widths		
Metric	DN	10–150
Inch OD	OD	1"–4"

Technical data	
Material	1.4404 (AISI 316L)
Standard	DIN 11851

GO – Male end SC, including seal ring G

Available nominal widths		
Metric	DN	10–150
Inch OD	OD	1"–4"

Technical data	
Material	1.4404 (AISI 316L)
Standard	DIN 11851

KO – Liner SD, including groove nut

Available nominal widths		
Metric	DN	10–150
Inch OD	OD	1"–4"

Technical data	
Material	1.4404 (AISI 316L)
Standard	DIN 11851

Incorporation of the option in the order code and example

Position	Description of the order code for options
*	<b>Connection fittings</b>
J	Valve with connection fittings (required connection fitting, please state <b>separately</b> )

Position	1	2	3	4/5		6	7	8	9	10	11	12	13 to 18						
Code	Q	E	W	DN 80/DN 80		M	M3	L0	1	2	J	/52	+	0	0	0	0	0	M

\* According to valve type



Typical application and description

An O-ring is used for sealing the hygienic flange connection acc. to DIN 11853-2, and is given a defined compression by a metal stop. The O-ring is also protected by the special geometry of the recess from being pulled out at high flow rates. Furthermore, the flange connection is centered by the design shape. The sealing geometry of the hygienic flange connection corresponds to the aseptic flange connection acc. to DIN 11864-2.

The hygienic flange connection (ASK) can be ordered either as a complete connection including bolts and nuts (ASK) or a hygienic groove flange (NFK)/hygienic flange (BFK) as a connection fitting on a vertical port. If a complete connection is ordered on a housing port, the groove flange is welded onto the housing. The groove flange (NFK) contains not only the O-Ring but also the required connecting elements.



Complete hygienic flange connection (ASK)



Hygienic-groove flange (NFK), including connecting elements and seal ring



Hygienic flange (BFK)

ASK – Complete hygienic flange connection

Available nominal widths		
Metric	DN	10–150
Inch OD	OD	1"–4"

Technical data	
Material	1.4404 (AISI 316L)
Seal material	EPDM (FDA), FKM (FDA), HNBR (FDA)
Standard	DIN 11853-2

NFK – Hygienic groove flange, including connecting elements and seal

Available nominal widths		
Metric	DN	10–150
Inch OD	OD	1"–4"

Technical data	
Material	1.4404 (AISI 316L)
Seal material	EPDM (FDA), FKM (FDA), HNBR (FDA)
Standard	DIN 11853-2

BFK – Hygienic flange

Available nominal widths		
Metric	DN	10–150
Inch OD	OD	1"–4"

Technical data	
Material	1.4404 (AISI 316L)
Standard	DIN 11853-2

Incorporation of the option in the order code and example

Position	Description of the order code for options
*	<b>Connection fittings</b>
J	Valve with connection fittings (required connection fitting, please state separately)

Position	1	2	3	4/5	6	7	8	9	10	11	12	13 to 18							
Code	Q	E	W	- DN 80/DN 80 -	M	M3	- L0 -	1	-	2	J	/52	+	0	0	0	0	0	M

\* According to valve type

Typical application and description

The clamp connection acc. to DIN 32676 is a widely used connection fitting, especially in North America. The connection uses a symmetrically structured clamp connection with a seal located in between it, and is secured by a clamp. The second clamp connection, the seal and the clamp are not supplied.



Clamp connection (CO)

CO – Clamp connection

Available nominal widths		
Metric	DN	25–150
Inch OD	OD	1"–4"

Technical data	
Material	DN 1.4404 (AISI 316L)
	OD AISI 316L
Standard seal outline	DN DIN 32676
	OD DIN 32676 / ISO 2852
Standard inside diameter	DN DIN 11866, series A
	OD DIN 11866, series C
Certificates	3.1

Incorporation of the option in the order code and example

Position	Description of the order code for options
*	<b>Connection fittings</b>
J	Valve with connection fittings (required connection fitting, please state <b>separately</b> )

Position	1	2	3	4/5	6	7	8	9	10	11	12	13 to 18							
Code	Q	E	W	- DN 80/DN 80 -	M	M3	- L0 -	1	-	2	J	/52	+	0	0	0	0	0	M

\* According to valve type





### Typical application and description

Optionally, the housings or all parts in contact with the product can be supplied with a test report 2.2 and/or an inspection certificate 3.1 acc. to EN 10204.

**IMPORTANT:** An inspection certificate for all components in contact with the product can only be produced if notification of this requirement is provided with the order. The inspection certificate 3.1 acc. to EN 10204 can only be issued subsequently for the housings. Unless special requirements are stated, the order code referred to below only covers issuing the inspection certificate 3.1 acc. to EN 10204 for the housings.

European standard EN 10204 in its 2004 edition defines the various types of test certificate that can be issued to the ordering party in accordance with the agreements in the order for delivery of metallic products.

Number	Type of test certificate	Content of the certificate	Confirmation of the certificate by
2.2	Test report	Confirmation of compliance with the order, specifying results of a non-specific test	The manufacturer
3.1	Inspection certificate 3.1*	Confirmation of compliance with the order, specifying results of a specific test	The manufacturer's acceptance officer independent of the production department

\* Inspection certificates 3.1 can be selected either for the housing or for product wetted parts connection fittings, incl. connection fittings or ADW2 (please specify when ordering).

### Incorporation of the option in the order code and example

Position	Description of the order code for options
*	<b>Accessories</b>
	/41 Test report 2.2
	/42 Inspection certificate 3.1 according to EN 10204

Position	1	2	3	4/5	6	7	8	9	10	11	12	13 to 18
Code	Q	E	W	- DN 80/DN 80 -	M	M3	- L0 -	1	-	2	N /41 /52	+ 0 0 0 0 0 M

\* According to valve type



Typical application and description

If no alternative identification option is selected, the valves are always provided with a nameplate for clear identification (option /52). All key information required for clear allocation of the valve, as well as technical data, is specified on the nameplate. The plate is glued onto the actuator. If the required identification number is specified, this is allocated to the valve by means of a separate sticker on the actuator or control and feedback system.

Key data contained	
Valve type	
Serial number	
Materials in contact with the product	Metallic material / seal material
Air supply pressure	Min./Max. [bar/psi]
Product pressure	Housing 1/2/3 [bar/psi]



Option /50 – engraved labeling plate cpl. for system identification number

In addition to the nameplate, the option /50 consists of an engraved labeling plate attached between the actuator and lantern using a key ring on the clamp connection.



Option /51 – metal labeling plate US version cpl.

The engraved labeling plate is attached between the actuator and lantern using a key ring on the clamp connection. Additional information can be recorded as well as the TAG number, customer designation and the valve type. In addition, the valve is identified with a nameplate.



Option /55 – valve identification with TAG number (yellow)

Option /55 consists of a carrier for up to 10 characters made of plastic which is attached to the actuator with cable carriers. For clear identification, the valve is additionally provided with a nameplate.



Option /56 – valve identification with TAG number (yellow)

Option /56 consists of two carriers for up to 10 characters each made of plastic which are attached to the actuator with cable carriers. For clear identification, the valve is additionally provided with a nameplate.

Incorporation of the option in the order code and example

Position	Description of the order code for options	
*	<b>Accessories</b>	
	/50	Engraved metal plate
	/51	Metal plate (US version)
	/52	Adhesive ID tag
	/55	Valve identification 10 numbers on carrier
	/56	Valve identification 20 numbers on carrier

Position	1	2	3	4/5		6	7	8	9	10	11	12	13 to 18						
Code	Q	E	W	DN 80/DN 80		M	M3	L0	1	2	N	/50	+	0	0	0	0	0	M

\* According to valve type





Typical application and description

3-A Sanitary Standards, Inc. is an independent, non-profit corporation dedicated to advancing hygienic equipment design for the food, beverage, and pharmaceutical industries. In particular, it represents the interests of three stakeholder groups in the US dairy industry with a common commitment to promoting food safety and the public health – regulatory sanitarians, equipment fabricators and processors. To achieve this purpose, it has produced guidelines which define various design requirements on components. In the area of seat valves, it is above all the standards 53-06 (compression type valves) and 85-02 (double-seat mixproof valves) that are relevant. Compliance with these design specifications is examined by an independent expert and confirmed by issuing a certificate. Almost the entire VARIVENT® and ECOVENT® valve series complies with these design specification in the standard design acc. to section 1.

If the 3-A option is selected, compliance of the valve with the requirements of the standard is confirmed by means of a sticker on the component. Consequently, if this option is selected, it is necessary to comply with the standard in terms of identification as well.

Furthermore, when this option is selected, the welds of the port connections are ground smooth. The standard does not specify that this is mandatory, but it is in line with customers’ preferences in this market.

**IMPORTANT:** The standard surface when this option is selected is “inside surface  $R_a \leq 0.8 \mu\text{m}$ , outside matte”. Many customers in this market ask for the alternative surface quality “inside surface  $R_a \leq 0.8 \mu\text{m}$ , outside ground”. If this is required, it must be selected separately at position 11 in the order code as a non-standard surface.



Incorporation of the option in the order code and example

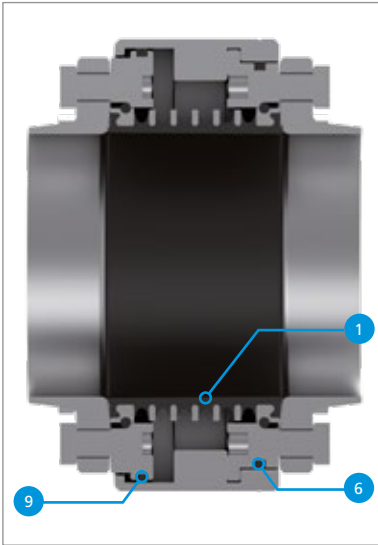
Position	Description of the order code for options
*	<b>Accessories</b>
	/3A Adhesive ID tag, configuration of the valve according to 3-A standard

Position	1	2	3	4/5	6	7	8	9	10	11	12	13 to 18							
Code	Q	E	W	- DN 80/DN 80 -	M	M3	- L0 -	1	-	2	N	/3A /52	+	0	0	0	0	0	M

\* According to valve type



	Lubricant	Article number
	Rivolta F.L.G. MD-2 (1,000 g)	413-071
	Rivolta F.L.G. MD-2 (100 g)	413-136



The illustration of a VARICOMP® expansion compensator VC/8 shown here represents the wearing parts comprising the compensator (1) and the O-rings (6), (9).

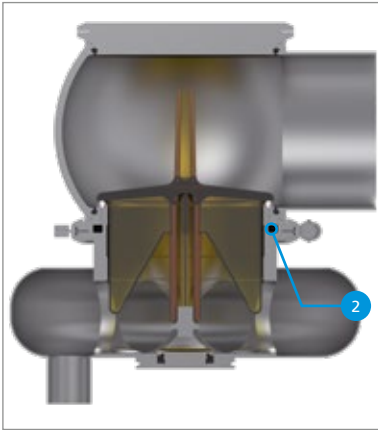
Information about maintenance can be found in the associated operating instructions.

Wearing parts of an expansion compensator VC/8		
Position	Quantity	Designation
1	1	Expansion compensator VC/8
6	1	O-ring
9	1	O-ring

VARICOMP® expansion compensator VC/8					
Nominal width			1.4301/EPDM	1.4301/FKM	
DN	OD	IPS	Article number	Article number	
50	2"	-	228-000124	228-000125	
-	2 ½"	-	228-000005	228-000010	
65	-	-	228-000006	228-000011	
-	3"	-	228-000007	228-000012	
80	-	-	228-000008	228-000013	
-	-	3"	228-000047	-	
100	4"	-	228-000009	228-000014	
-	-	4"	228-000048	-	
125	-	-	228-000053	228-000055	
-	-	6"	228-000049	-	

O-ring (position 6)			
Nominal width			NBR
DN	OD	IPS	Article number
50	2"	-	930-107
65	2 ½"	-	930-115
80	3"	-	930-120
-	-	3"	930-238
100	4"	-	930-124
-	-	4"	930-125
125	-	-	930-626
-	-	6"	930-643

O-ring (position 9)			
Nominal width			NBR
DN	OD	IPS	Article number
50	2"	-	930-111
65	2 ½"	-	930-119
80	3"	3"	930-238
100	4"	4"	930-125
125	-	-	930-963
-	-	6"	930-717

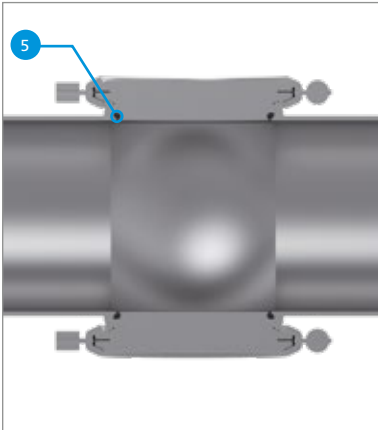


The illustration of a VARIVENT® vacuum valve type V shown here represents the wearing parts comprising the seat ring including compressed O-ring.

Information about maintenance can be found in the associated operating instructions.

Wearing parts of the VARIVENT® vacuum valve type V		
Position	Quantity	Designation
2	1	Seat ring including O-ring

VARIVENT® vacuum valve type V				
Nominal width			1.4301/VMQ	
DN	OD	IPS	Article number	
65/80	2 ½"/3"	3"	221-468.04	
100	4"	4"	221-468.05	
150	–	6"	221-468.06	



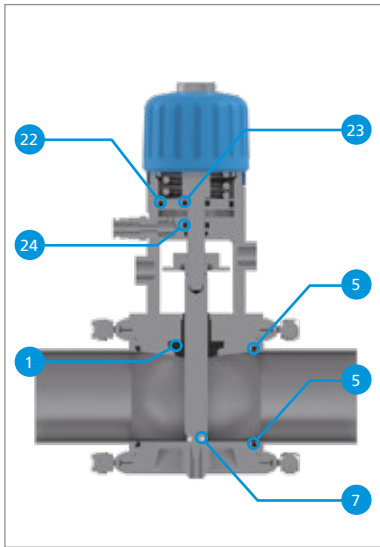
The adjacent figure of a VARINLINE® housing shows examples for the wear parts comprising an O-ring.

Information about maintenance can be found in the associated operating instructions.

Components of a seal set at the example of the VARINLINE® housing	
Position	Designation
5	O-ring

O-ring for VARINLINE® housing*							
Nominal width			Process connection	EPDM	FKM	HNBR	PTFE
DN	OD	ISO		Article number	Article number	Article number	Article number
10/15	–	13.5–21.3	B	930-270	930-163	930-637	930-181
25	1"	33.7	F	930-309	930-168	930-632	930-188
40–150	1 ½"–6"	42.4–114.3	N	930-144	930-171	930-633	930-190
100–150	4"–6"	–	G	930-156	930-178	930-863	–

\* O-ring for FFKM seal material on request

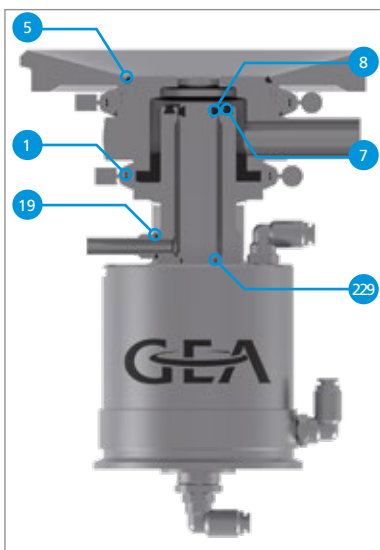


The illustration of a VARIVENT® sampling valve type I shown here represents an example of the configuration of a seal set for sampling valves.

Chiefly, a seal set consists of all seals of the valve in question that come in contact with the product. The precise components of all seal sets and information about maintenance can be found in the associated operating instructions.

Components of a seal set at the example of the VARIVENT® type I		
Position	Quantity	Designation
1	1	Seal ring
5	2	O-ring
7	1	O-ring
22	1	O-ring
23	1	O-ring
24	1	Quad ring

VARIVENT® sampling valve type I			EPDM	FKM	HNBR
Nominal width			Article number	Article number	Article number
DN	OD	IPS			
10/15	–	–	221-004744	221-004745	221-004746
25	1"	–	221-004747	221-004748	221-004749
40–150	1 ½"–6"	2"–6"	221-004750	221-004751	221-004752



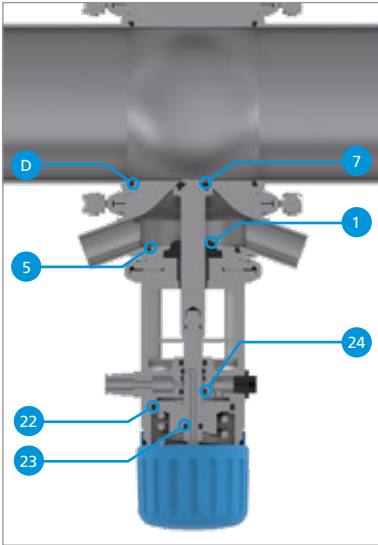
The illustration of a mixproof sampling valve VARIVENT® type T/09 shown here represents an example of the configuration of a seal set for sampling valves.

Chiefly, a seal set consists of all seals of the valve in question that come in contact with the product. The precise components of all seal sets and information about maintenance can be found in the associated operating instructions.

Components of a seal set at the example of the VARIVENT® type T/09		
Position	Quantity	Designation
1	1	Seal ring
5	1	O-ring
7	2	V-ring
8	1	V-ring
19	1	O-ring
229	1	O-ring

VARIVENT® mixproof sampling valve type T/09		
Nominal width	EPDM	FKM
DN	Article number	Article number
15	221-004411	221-004413





The illustration of a VARINLINE® sampling valve type TSVN shown here represents an example of the configuration of a seal set for sampling valves. The content can differ slightly between the individual valve types.

Chiefly, a seal set consists of all seals of the valve in question that come in contact with the product. The precise components of all seal sets and information about maintenance can be found in the associated operating instructions.

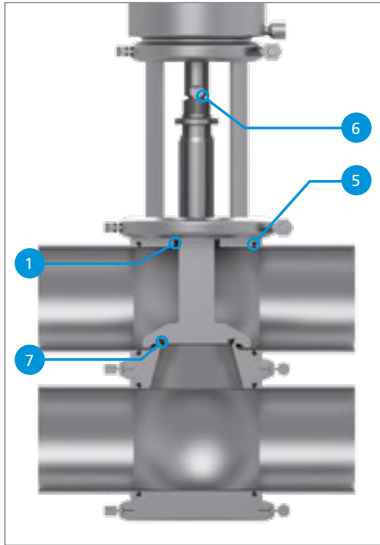
Components of a seal set at the example of the VARINLINE® type TSVN		
Position	Quantity	Designation
1	1	Seal ring
5	1	O-ring
7	1	V-ring
22	1	O-ring
23	1	O-ring
24	2	Quad ring
D	1	O-ring

VARINLINE® sampling valves type TSVN					
Nominal width			EPDM	FKM	
DN	OD	IPS	Article number	Article number	
25	1"	–	221-004411	221-004413	
40-150	1 ½"-6"	2"-6"	221-004412	221-004414	

VARIVENT® sampling valve type TSVN with metal bellows					
Nominal width			EPDM	FKM	
DN	OD	IPS	Article number	Article number	
25	1"	–	221-004415	221-004417	
40-150	1 ½"-6"	2"-6"	221-004416	221-004418	

VARINLINE® sampling valve type TSVU					
Nominal width			EPDM	FKM	
DN	OD	IPS	Article number	Article number	
25	1"	–	221-004419	221-004421	
40/150	1 ½"-6"	2"-6"	221-004420	221-004422	

VARIVENT® sampling valve type TSVU with metal bellows					
Nominal width			EPDM	FKM	
DN	OD	IPS	Article number	Article number	
25	1"	–	221-004423	221-004424	
40/150	1 ½"-6"	2"-6"	221-004425	221-004426	

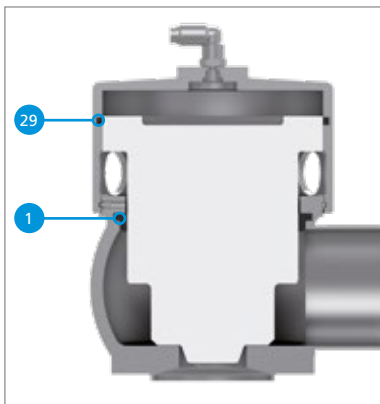


The illustration of a VARIVENT® overflow valve type Q shown here represents an example of the configuration of a seal set for overflow valves.

Chiefly, a seal set consists of all seals of the valve in question that come in contact with the product. The precise components of all seal sets and information about maintenance can be found in the associated operating instructions.

Components of a seal set at the example of the VARIVENT® type Q		
Position	Quantity	Designation
1	1	Seal ring
5	1	O-ring
6	4	O-ring
7	1	V-ring

VARIVENT® overflow valve type Q				
Nominal width		EPDM	FKM	HNBR
DN	OD	Article number	Article number	Article number
25	1"	221-304.39	221-519.49	221-519.62
40/50	1 ½"/2"	221-304.40	221-519.50	221-519.63
65/80	2 ½"/3"	221-304.41	221-519.51	221-519.64
100	4"	221-304.42	221-519.52	221-001019



The illustration of a VARIVENT® constant pressure valve type DHV shown here represents an example of the configuration of a seal set for constant pressure valves.

Chiefly, a seal set consists of all seals of the valve in question that come in contact with the product. The precise components of all seal sets and information about maintenance can be found in the associated operating instructions.

Components of a seal set at the example of the VARIVENT® type DHV		
Position	Quantity	Designation
1	1	Seal ring
29	1	O-ring

VARIVENT® constant pressure valve type DHV		
Nominal width	NBR/EPDM	NBR/FKM
DN	Article number	Article number
40	221-004447	221-004446
65	221-004156	221-004157

**T.VIS® control top**

The T.VIS® control top is an optimal system for controlling and monitoring GEA Tuchenhagen valves.

This is available in several variants depending on the valve type, tasks and user convenience.

**Common features of all T.VIS® variants are:**

- Flexible modular system for optimum variant configuration for the particular task (e.g. type of interface module, number of solenoid valves, etc.)
- Internal air supply for high security against failure of the main valve functions because no external air hose is required
- Characteristic design
- High Protection class (min. IP66, optional IP67 or IP69k)
- Ease of cleaning without dead zones, whatever the installation orientation
- Clear visualization of the valve status via a light dome visible 360°, which is illuminated by colored LEDs
- Low energy consumption
- Ease of handling
- Maintenance-free electronic modules
- Many special options, e.g.:
  - Air throttles
  - Cable connections, etc.

For maintenance work on the valve, the control tops can be removed from the valve actuator by loosening two bolts on the clamp, without electrical or pneumatic connections having to be disconnected.

**T.VIS® concept – for valves with pneumatic actuator**



**T.VIS® M-15 – control top with manual sensor setting**

- For open/close position feedback and actuator control
- Proven sensor technology
- Modules and solenoid valves can be retrofitted



**T.VIS® A-15 – control top with automatic set-up**

- For open/close position feedback and actuator control
- Automatic set-up
- Semi-automatic setup



**SES – control top for potentially explosive areas**

- For open/close position feedback and actuator control
- Intrinsically safe sensors and solenoid valves



**INA – proximity switch holder on the actuator**

- For 2 proximity switches M12x1



**LAT – proximity switch holder in the lantern**



- For 2 proximity switches M12x1



The certificates listed here are valid for corresponding GEA control and feedback systems. Components conforming to the requirements of the European Hygienic Engineering and Design Group (EHEDG) as well as 3-A Sanitary Standards, Inc. (3-A SSI) are available for numerous fields of applications.

Moreover, independent, standardized tests have confirmed the efficient, problem-free cleanability of numerous components – for optimum safety and economic gain.

EHEDG certificates apply only to the specific control head type as listed. However, they can be transferred to other types, owing to identical design characteristics.

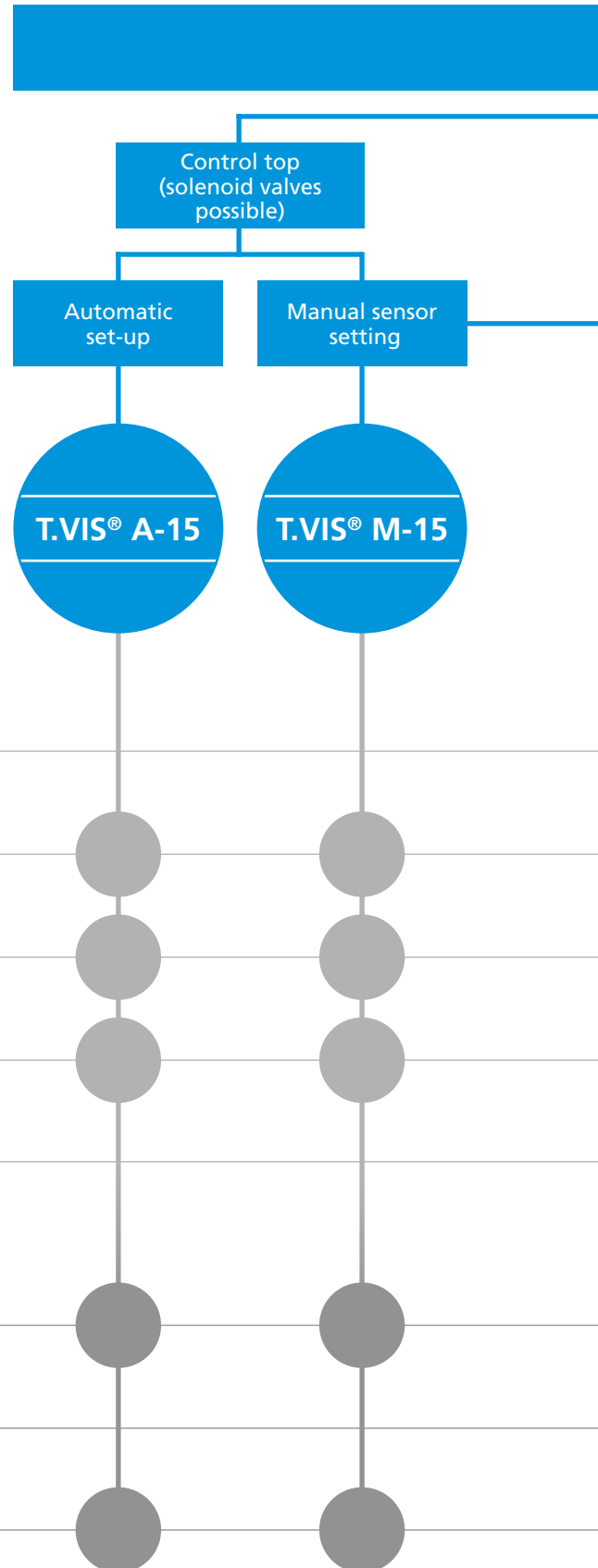
		Optional Certificates			
	Index	ATEX	GOST	International Protection-Code IP67, IP66, IP69k	UL/CSA
					
Control and Feedback Systems	9	T.VIS® M-15		•	•
	9	T.VIS® A-15		•	•
	9	T.VIS® P-15		•	•
	9	SES	•	•	•
	9	INA	•		
	9	LAT	•		
	9	Connection 0			

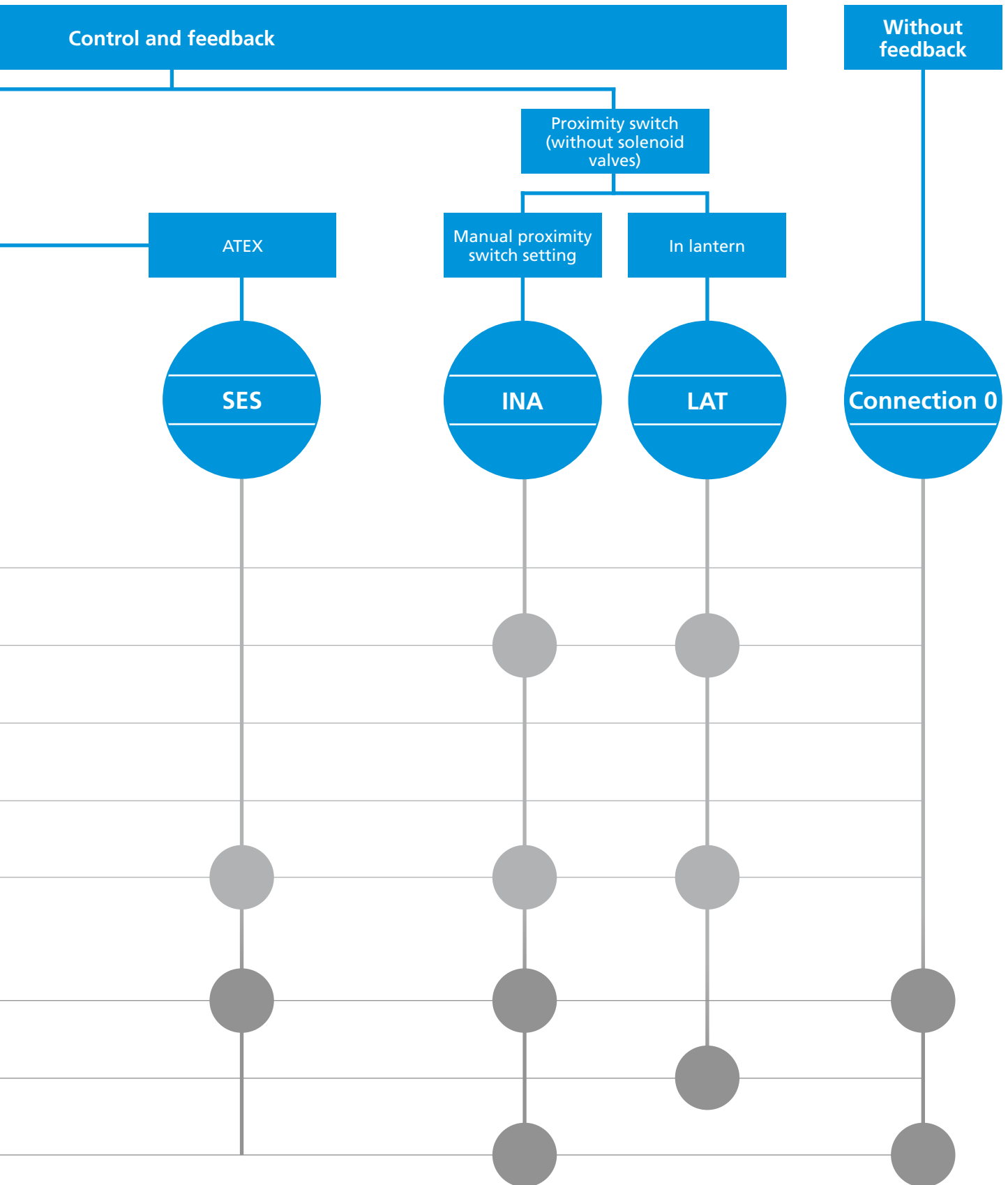
Function

Product

Available interface

Available for





## Concept

The T.VIS® M-15 is equipped with manually adjustable sensors and a modular system of options, all of which form the basics of the T.VIS® feedback technology. This means it is optimally adapted to the basic requirements of the process system.

With proven sensor technology, it offers the advantages of the modern T.VIS® series in an inexpensive manner.

## Standard variant



- 1 Pneumatic block
- 2 24 V DC interface module
- 3 Sensors
- 4 Solenoid valves
- 5 LED lighting
- 6 Central compressed air connection with replaceable filter
- 7 Cable gland

## Features

Flexible modular system
Use of proven sensor technology
Quick and easy adjustment of the sensors
Valve status indication by LED
Various communication standards available
Components can be upgraded/converted subsequently
Filter protects solenoid valves
High-quality pneumatic fittings
Exchangeable compressed air connection
Supply and exhaust air throttles can be fitted
Standard protection class IP66

## Structure

The T.VIS® M-15 is characterized by proven sensor technology. The basic equipment of the control top comprises of the 24 V DC interface module with two sensors for feedback of the valve position and three solenoid valves which can be installed subsequently, if necessary.

In the interface types with DeviceNet and AS-Interface an adapter module is connected ahead of the standard interface module, and can also be retrofitted or converted.

A replaceable filter in the supply air connection protects the solenoid valves.

### Position detection

**Inductive sensor system** – The valve positions are detected using two manually adjustable sensors.

### Setting

**Mechanical** – the sensors are calibrated mechanically using the positioning spindles, which are subsequently secured to prevent self-adjustment.

### Visualization

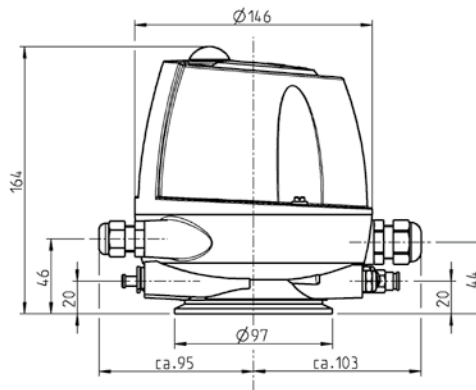
**LED display:**

- green
- yellow





Technical data of the standard version		
Position detection	Sensors	
Housing material	PA 12/L	
Ambient temperature	-20 to 55 °C	
Air supply	Pressure range	2 to 8 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (1/4")	
Protection class	IP66 (powerful water jet)	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	LED (green, yellow)	



Type of interface	24 V DC, 3-wire, PNP 24 V DC, 3-wire, NPN
Supply	
Operating voltage	24 V DC (+20 %, -12.5 %)
No-load current	≤ 40 mA
Maximum current consumption	255 mA
Polarity reversal protection	Yes
Inputs	
Activation voltage	21–28.8 V = high; < 16 V = low
Current consumption per input	≤ 35 mA
Activation "PV Y1"	Direct PV activation
Activation "PV Y2"	Direct PV activation
Activation "PV Y3"	Direct PV activation
Outputs	
Connection type	24 V DC (PNP/NPN with changeover function)
Maximum current carrying capacity per feedback output	50 mA
Voltage drop on the outputs	≤ 3 V
Feedback "start position"	Electronic outputs
Feedback "end position"	Electronic outputs
Feedback "seat lift position"	Electronic outputs

Position	Description of the order code
*	<b>Feedback location</b>
	TM15 Control top T.VIS® M-15
	<b>Control top type</b>
	N Without solenoid valve
	P 1 solenoid valve Y1
	R 1 solenoid valve Y1 (retrofittable: Y2, Y3)
	I 2 solenoid valves Y1, Y2 (retrofittable: Y3)
	J 2 solenoid valves Y1, Y3 (retrofittable: Y2)
L 3 solenoid valves Y1, Y2, Y3	
	<b>Feedback</b>
	2 2 feedbacks 3 2 feedbacks with external proximity switch
	<b>Type of interface</b>
	B 24 V DC, 3-wire, PNP N 24 V DC, 3-wire, NPN
	<b>Solenoid valve</b>
	A 24 V DC, 0.85 W 0 Without
	<b>Screw connection</b>
	M Metric air connection, M20x1.5 cable gland
	Z Inch air connection, 0.5" NPT cable gland
	J Metric air connection, 5-pin M12 plug (1 solenoid valve, 2 feedbacks)
	P Inch air connection, 5-pin M12 plug (1 solenoid valve, 2 feedbacks)
	H Metric air connection, 8-pin M12 plug (> 1 solenoid valve, > 2 feedbacks)
	I Inch air connection, 8-pin M12 plug (> 1 solenoid valve, > 2 feedbacks)
B Inch air connection, Brad Harrison 0.5" NPT 5-pin plug (US)	
	<b>Options (multiple selection possible)</b>
	/18 Supply air throttle: regulates the opening speed of the valve
	/19 Exhaust air throttle: regulates the closing speed of the valve
	/22 5-pin M12 connection socket for screw fitting J, P (article no. 508-963) 8-pin M12 connection socket for screw fitting H, I (article no. 508-061)
	/67 Protection class IP67 (temporary immersion)
	/69k Protection class IP69k (high-pressure spray down)
/UC Certification UL/CSA	

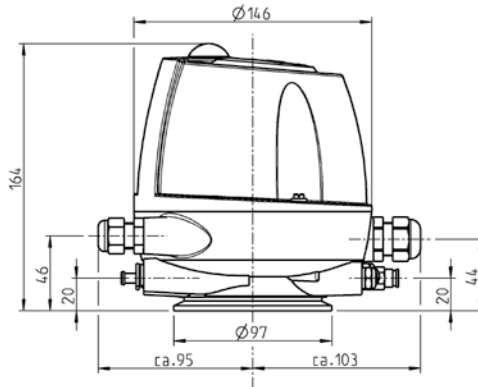
\* The positions for the indication of the order code correspond to the consecutive numbering of the components for which the control and feedback systems can be selected (see selection matrix at the beginning of this section).

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

<b>Position</b>							<b>Options</b>								
<b>Code</b>	TM15														



Technical data of the standard version		
Position detection	Sensors	
Housing material	PA 12/L	
Ambient temperature	-20 to +55 °C	
Air supply	Pressure range	2 to 8 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (1/4")	
Protection class	IP66 (powerful water jet)	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	LED (green, yellow)	



Type of interface	AS-Interface bus	DeviceNet
Supply		
Operating voltage	25.0–31.6 V DC	21.5–26.0 V DC
No-load current	≤ 62 mA	≤ 58 mA (at 24 V DC)
Maximum current consumption	140 mA	140 mA
Polarity reversal protection	Yes	Yes
Specification	AS-i V3.0 (max. 62 slaves with master V3.0)	
Additional information	IO.ID.ID2-code: 7.A.E	EDS file: F1022_R4.eds
Conformity	AS-i Association	ODVA
Inputs		
Feedback "start position"	Data bit DI 0	Data bit I-0
Feedback "end position"	Data bit DI 1	Data bit I-1
Feedback "seat lift position" (ext. NI)	Data bit DI 2	Data bit I-2
Collective fault		Data bit I-7
Outputs		
Activation "PV Y1"	Data bit DO 0	Data bit O-0
Activation "PV Y2"	Data bit DO 1	Data bit O-1
Activation "PV Y3"	Data bit DO 2	Data bit O-2



Position	Description of the order code
*	<b>Feedback location</b>
	TM15 Control top T.VIS® M-15
	<b>Control top type</b>
	N Without solenoid valve
	P 1 solenoid valve Y1
	R 1 solenoid valve Y1 (retrofittable: Y2, Y3)
	I 2 solenoid valves Y1, Y2 (retrofittable: Y3)
	J 2 solenoid valves Y1, Y3 (retrofittable: Y2)
	L 3 solenoid valves Y1, Y2, Y3
	<b>Feedback</b>
	2 2 feedbacks
	3 2 feedbacks with external proximity switch
	<b>Type of interface</b>
	A AS-Interface bus
	D DeviceNet
	<b>Solenoid valve</b>
	A 24 V DC, 0.85 W
	0 Without
	<b>Screw connection</b>
	A Metric air connection M20x1.5 cable gland with connection box on cable 1 m (AS-i)
	S Inch air connection M20x1.5 cable gland with connection box on cable 1 m (AS-i)
	L Metric air connection, 2-pin M12 plug (AS-i)
	U Inch air connection, 2-pin M12 plug (AS-i)
	D Metric air connection, 5-pin M12 plug (DeviceNet)
	K Inch air connection, 5-pin M12 plug (DeviceNet)
	<b>Options (multiple selection possible)</b>
	/18 Supply air throttle: regulates the opening speed of the valve
	/19 Exhaust air throttle: regulates the closing speed of the valve
	/22 5-pin M12 connection socket for screw fitting L, U, D, K (A-coded, article no. 508-963)
	/67 Protection class IP67 (temporary immersion)
	/69k Protection class IP69k (high-pressure spray down)
	/81 AS-i connection box on cable 1 m with M12 connection socket (article no. 508-027) for screw fitting L, U
	/82 AS-i connection box on cable 2 m with M12 connection socket (article no. 508-028) for screw fitting L, U
	/UC Certification UL/CSA

\* The positions for the indication of the order code correspond to the consecutive numbering of the components for which the control and feedback systems can be selected (see selection matrix at the beginning of this section).

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

<b>Position</b>							<b>Options</b>				
<b>Code</b>	TM15										

## Concept

The T.VIS® A-15 is equipped with a high-precision path measuring system. This automatic open/close position recognition is available on any valve from GEA Tuchenhagen, along with a T.VIS® feedback system.

Development has focussed on the requirements and necessities of our customers from the fluid-processing industry. In addition to safe control and monitoring of all functions of the process valves in breweries, dairies, plants for manufacturing fruit juices as well as pharmaceuticals, the T.VIS® A-15 offers significant advantages that are directly reflected in lower total cost of ownership.

## Standard variant



- 1 Pneumatic block
- 2 Control unit
- 3 Path measuring system
- 4 Solenoid valves
- 5 LED lighting
- 6 2 push buttons
- 7 Central compressed air connection with replaceable filter
- 8 M12 plug connection

## Features

Quick, automatic initialization
Tamper-proof setting of tolerances
Reduced energy consumption
Reduction in operating costs
Valve status display by LED
Basic LED colors can be selected specifically for the customer
Filter protects solenoid valves
High-quality pneumatic fittings
Exchangeable compressed air connection
Supply and exhaust air throttles can be fitted
Semi-automatic setup
Standard protection class IP66

## Structure

The T.VIS® A-15 is equipped with a precise path measuring system for detecting its position.

The necessary wiring for control and feedback is performed, depending on the requirements, via the M12 plug connections accessible from the outside or through direct wiring and cable glands.

The control top can be opened for this.

Operation and configuration of the T.VIS® A-15 takes place either by the two push buttons on the cap or, with the cap removed, via the buttons below. The push buttons are secured electronically against inadvertent or incorrect operation, while in operating mode.

A replaceable filter, in the supply air connection, protects the solenoid valves.

## Position detection

**Path measuring system** – the valve position is registered by means of a highly modern path measuring system.

## Setting

**Automatic** – following unlocking, simply pressing the two buttons on the cap of the T.VIS® A-15 starts the initialization process which runs fully automatically. There is no need to open the control top for this purpose, resulting in particularly quick, easy and safe commissioning of the control top (on average < 1 minute).

Immediately following the set-up, it is possible to set the open/close position tolerances and signal attenuation in the parameter menu.

## Semi-automatic setup

As a new feature, our control top T.VIS® A-15 has the option of semi-automatic setup that permits uncomplicated exchange in the current process.

For more information about the semi-automatic setup, refer to the end of this section.

## Visualization

### LED display:

- Green
- Yellow
- Red



Protection class IP66

The programmable color change allows the display of colors yellow and green to be swapped over.

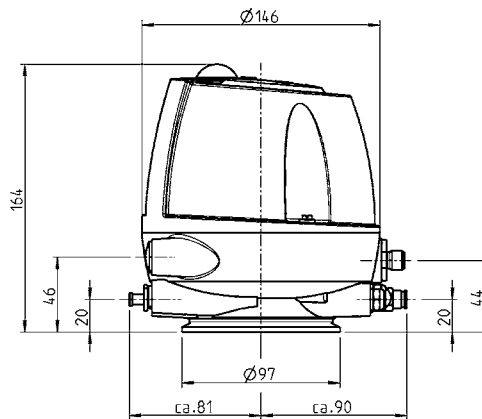
## Service mode

Activation of the main stroke which may be required in VARIVENT® and ECOVENT® valves with open non-actuated position for valve maintenance is performed using the service mode which can be activated by the buttons. At the same time, all feedbacks are stopped (warning to the system control). Furthermore, input signals from the control room are not implemented by the T.VIS®, in order to protect the employee.

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Technical data of the standard version		
Position detection	Path measuring system	
Housing material	PA 12/L	
Ambient temperature	-20 to 55 °C	
Air supply	Pressure range	2 to 8 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (1/4")	
Protection class	IP66 (powerful water jet)	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	LED (green, yellow, red)	



Type of interface	24 V DC, 3-wire, PNP	AS-Interface bus	DeviceNet
Supply			
Operating voltage	24 V DC (+20 %, -12.5 %)	26.5–31.0 V DC	21.5–26.0 V DC
No-load current	≤ 25 mA	≤ 25 mA	≤ 35 mA
Maximum current consumption	205 mA	105 mA	90 mA
Polarity reversal protection	Yes	Yes	Yes
Specification		AS-i V3.0 (max. 62 slaves)	
Additional information		IO.ID.ID2-code: 7.A.E.	221-002917DNET-TVIS_R1.eds
Conformity		AS-i association	ODVA

Inputs			
Connection type	24 V DC (PNP)		
Short circuit-proof	Yes		
Overload-proof	Yes		
Maximum current carrying capacity per feedback output	100 mA		
Voltage drop on the outputs	≤ 1 V		
Feedback "start position"	Electronic output	Data bit DI 0	Data bit I-0
Feedback "end position"	Electronic output	Data bit DI 1	Data bit I-1
Feedback "seat lift position"	Electronic output	Data bit DI 2	Data bit I-2

Outputs			
Activation voltage	> 13 V = high; < 6 V = low		
Current consumption per input	< 10 mA		
Activation "PV Y1"	Electronic input	Data bit DO 0	Data bit O-0
Activation "PV Y2"	Electronic input	Data bit DO 1	Data bit O-1
Activation "PV Y3"	Electronic input	Data bit DO 2	Data bit O-2

Position	Description of the order code
*	<b>Feedback location</b>
	TA15 Control top T.VIS® A-15
	<b>Control top type</b>
	N Without solenoid valve
	P 1 solenoid valve Y1
	I 2 solenoid valves Y1, Y2 (Y2 for lower seat lift)
	J 2 solenoid valves Y1, Y3 (Y3 for upper seat lift, air/air actuator or external process valve)
L 3 solenoid valves Y1, Y2, Y3	
	<b>Feedback</b>
	8 2 digital feedbacks
	9 2 digital feedbacks with external proximity switch
	<b>Type of interface</b>
	A AS-Interface BUS
	B 24 V DC PNP
	D DeviceNet
	<b>Solenoid valve</b>
	A 24 V DC, 0.85 W
	0 Without
	<b>Screw connection</b>
	J Metric air connection, 5-pin M12 plug for 24 V DC (1 PV, 2 feedbacks), AS-i
	P Inch air connection, 5-pin M12 plug for 24 V DC (1 PV, 2 feedbacks), AS-i
	H Metric air connection, 8-pin M12 plug for 24 V DC (> 1 solenoid valve, > 2 feedbacks)
	I Inch air connection, 8-pin M12 plug for 24 V DC (> 1 solenoid valve, > 2 feedbacks)
	M Metric air connection, M20x1.5 cable gland with integrated terminal strip for 24 V DC
	Z Inch air connection, 0.5" NPT cable gland with integrated terminal strip for 24 V DC
	<b>Options (multiple selection possible)</b>
	/18 Supply air throttle: regulates the opening speed of the valve
	/19 Exhaust air throttle: regulates the closing speed of the valve
	/22 24 V DC/AS-i/DeviceNet: 5-pin connection socket for screw connection J, P (article no. 508-963) 24 V DC: 8-pin connection socket for screw fitting H, I (article no. 508-061)
	/67 Protection class IP67 (temporary immersion)
	/69k Protection class IP69k (high-pressure spray down)
	/81 AS-i connection box on cable 1 m with 5-pin M12 connection socket (article no. 508-027)
	/82 AS-i connection box on cable 2 m with 5-pin M12 connection socket (article no. 508-028)
	/UC Certification UL/CSA

\* The positions for the indication of the order code correspond to the consecutive numbering of the components for which the control and feedback systems can be selected (see selection matrix at the beginning of this section).

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

<b>Position</b>							<b>Options</b>				
<b>Code</b>	TA15										

Concept

The SES is characterized by proven sensor technology. The control top consists of an interface module, up to 2 sensors for valve position feedback and up to 3 solenoid valves which can also be installed subsequently.

The SES is only available in PA 12/L material, because conductivity of the material is required for use in ATEX/Ex areas.

Features
Proven NAMUR sensors
Simple and quick adjustment of sensors
Flexible modular system
Selection of various solenoid valves
Retro-fittable



- 2 Interface module
- 3 Proximity switches
- 4 Solenoid valves
- 8 Cable gland

## Position detection

**Proximity switches** – the valve positions are recorded using two manually adjustable proximity switches for the non-actuated and actuated position.

## Setting

**Mechanical** – the sensors are calibrated mechanically using the positioning spindles, which are subsequently secured to prevent adjustment.

## Field of application

Use in potentially explosive atmospheres is permitted:\*

- **With proximity switch\*\* up to zone 1 and 20**
  - For connection to approved intrinsically safe equipment
  - ATEX identification:
    - II 2G Ex ia IIC T6...T1 Gb
    - II 1D Ex ia IIIC T135°C Da
- **With solenoid valve up to zone 0 and 20**
  - For connection to approved intrinsically safe equipment
  - ATEX identification:
    - II 1 GD
    - Ex ia IIC T4, T5 or T6 Ga
    - Ex ia IIIC T85°C, T100°C or T135°C Da
- **With interface module**
  - Not subject to Ex approval because it is a purely passive component

## Please note

- \*) There is no ATEX certification for the complete control top. Certifications can only be issued for the individual components of the control top. Please note that the permitted Ex-zone/ATEX category of the complete control top depends on the approval of the component with the lowest protection level. The entire control top with all components is optionally certified according to:
- CSA C22.2
  - ANSI/ISA 82.02.01-1999
  - UL 1203, 4th Ed.
  - UL 429, 6th Ed.
  - ISA/ANSI 12.12.01-2011
- \*\*) The intrinsically safe components are only allowed to be individually connected to an approved safety barrier. This arrangement permits use in a risk area.

## Visualization

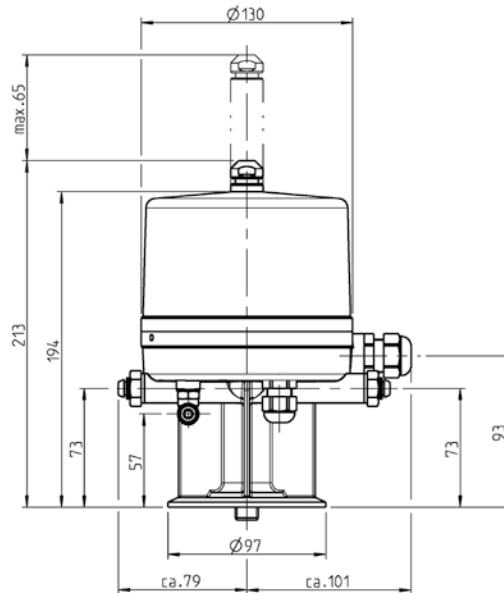
The position of the switch bar projecting from the control top makes it possible to detect what the position of the valve is.





Technical data of the standard version		
Position detection	Inductive proximity switches	
Housing material	PA 12/L	
Ambient temperature	0 to 45 °C	
Air supply	Pressure range	1.5 to 7 bar
	Standard	acc. to ISO 8573-1:2010
	Solid content	Quality class 6
	Water content	Quality class 4
	Oil content	Quality class 3
Dimensions of air connections	Metric 6/4 mm, inch 6.35/4.31 mm (¼")	
Protection class	IP65*	
Sound pressure level via exhaust air throttle	Max. 72 dB	
Visualization	Position of switch rod	

\* Not for overhead installation



Type of interface	EEx / ATEX (12 V DC)	EEx / ATEX (24 V DC)
Sensor		
Communication	NAMUR 8.2 VDC (operating voltage 6–30 V DC)	NAMUR 8.2 VDC (operating voltage 6–30 V DC)
Equipment category	II 2 G Ex ia IIC T6...T1 Gb II 1 D Ex ia IIIC T135°C Da	II 2 G Ex ia IIC T6...T1 Gb II 1 D Ex ia IIIC T135°C Da
Article no.	505-093	505-093
Solenoid valve		
Rated voltage	12 V DC –10 % / +25 %	24 V DC –10 % / +15 %
Rated power	0.5 W	0.5 W
Equipment category	II 1 GD Ex ia IIC T4, T5 or T6 Ga Ex ia IIIC T85°C, T100°C or T135°C Da	II 1 GD Ex ia IIC T4, T5 or T6 Ga Ex ia IIIC T85°C, T100°C or T135°C Da
Article no.	512-124	512-155



Position	Description of the order code
*	<b>Feedback location</b>
	SES. Control top sensor technology
	<b>Control top type</b>
	N Without solenoid valve
	P 1 solenoid valve Y1
	I 2 solenoid valves Y1, Y2
	L 3 solenoid valves Y1, Y2, Y3
	<b>Feedback</b>
	0 Without
	1 1 feedback
	2 2 feedbacks
	3 2 feedbacks with external proximity switch
	<b>Type of interface</b>
	E EEx/ATEX
	<b>Solenoid valve</b>
	0 Without
	E 12 V DC, ATEX
	X 24 V DC, ATEX
	<b>Screw connection</b>
	E Metric air connection, Pg 13.5 cable gland
	N Inch air connection, Pg 13.5 cable gland
	<b>Options (multiple selection possible)</b>
	/UC Certification UL/CSA

\* The positions for the indication of the order code correspond to the consecutive numbering of the components for which the control and feedback systems can be selected (see selection matrix at the beginning of this section).

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

<b>Position</b>							<b>Options</b>
<b>Code</b>	SES.			E			/UC



### Connection 0

Connection 0 can be used as an alternative to feedback systems if no feedback sensors are wanted above the actuator. Connection 0 is available in a metric and inch variant.

#### Technical data

Material	1.4301 (AISI 304)
Surface	Metal blank



### INA – proximity switch holder on the actuator

The proximity switch holder M12×1 (INA) makes it possible to use feedback sensors above the actuator. The proximity switch holder has prepared M12×1 holes which allow the sensors to be set optimally. A direct connection to the controller provides the feedback on the valve position.

#### Technical data

Material	1.4301 (AISI 304)
Surface	Metal blank



### LAT – lantern for 2 proximity switches M12×1

Feedback in the lantern is preferably used wherever control and feedback systems cannot be employed (e.g. in valves with manual actuator or two-position-stop cylinder).

Position	Description of the order code
*	<b>Feedback location</b>
	000 Connection 0 (without feedback)
	INA. Proximity switch holder for connection 0 for max. 2 proximity switches M12x1
	LAT. Lantern for max. 2 proximity switches M12x1
	<b>Control top type</b>
	0 Connection 0
	<b>Feedback</b>
	0 Without (INA, 000)
	1 1 feedback (INA, LAT)
	2 2 feedbacks (INA, LAT)
	3 3 feedbacks in the lantern (LAT)
	7 Without, prepared for 2 feedbacks in the lantern (LAT)
	<b>Type of switch</b>
	0 Without (INA, LAT, 000)
	B NI 24 V DC 3-wire PNP M12x1 with terminal chamber (INA, LAT)
	F NI 24 V DC 2-wire M12x1 with terminal chamber (INA, LAT)
	E NI NAMUR M12x1 with terminal chamber (INA, LAT)
	X NI 24 V DC 3-wire NPN M12x1 with terminal chamber (INA, LAT)
	S NI 24 V DC 3-wire PNP M12x1 with plug connector (INA, LAT)
	<b>Cable connection</b>
	0 Without
	<b>Air connection</b>
	0 Without
	M Metric (article no. 221-140.02)
	Z Inch (article no. 2214-140.04)
	<b>Options (multiple selection possible)</b>
	/43 Material PA 12/L: UV, oil and grease resistant (standard in control top SES)
	/UC Certification UL/CSA

\* The positions for the indication of the order code correspond to the consecutive numbering of the components for which the control and feedback systems can be selected (see selection matrix at the beginning of this section).

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

<b>Position</b>							<b>Options</b>								
<b>Code</b>		0			0										

External proximity switches M12×1 for installation on the actuator or in the lantern.



Electrical connection by M12×1 connector



Electrical connection by wiring in the terminal chamber

Technical data	
Protection class	IP67
Operating voltage	10–30 V DC
Material	PA 12/VA
Permitted ambient temperature	–25 to +85 °C

Proximity switch M12×1 for INA, LAT	Nominal switching distance	Article no.
2-wire (terminal chamber)	2 mm	505-104
3-wire PNP (terminal chamber)	3 mm	505-088
3-wire PNP (Connector, M12×1)	4 mm	505-096
4-wire NPN/changeover contact (terminal chamber)	3 mm	505-105

Technical data	
Protection class	IP67
Operating voltage	7.5–30 V DC
Material	316L/PEEK
Permitted ambient temperature	–20 to +55 °C

Proximity switch M12×1 for T.VIS®	Nominal switching distance	Article no.
NAMUR (Connector M12×1)	4 mm	505-098

Technical data	
Protection class	IP67
Operating voltage	8.2 V DC nom.
Material	Brass, chrome-plated / PA12
Permitted ambient temperature	–25 to +70 °C
Marking	II 2 G EEx ia IIC T6

Proximity switch M12×1 for SES	Nominal switching distance	Article no.
NAMUR (terminal chamber)	2 mm	505-085

Technical data	
Protection class	IP68
Operating voltage	10–30 V DC
Material	1.4301/LCP
Permitted ambient temperature	–30 to +85 °C

Proximity switch M12×1 for pig cleaning station	Nominal switching distance	Article no.
3-wire PNP, shutter (Connector M12×1)	10 mm	505-103

Magnetic Sensors

Magnetic-inductive proximity sensors monitor the position of the permanent magnets in the pig from outside of the pig station housing or the pipeline.



Electrical connection by M12x1 connector



Electrical connection by wiring in the terminal chamber

Technical data	
Nominal switching distance	90 mm
Protection class	IP67
Operating voltage	10–65 V DC
Material	GD-Zn, chrome-plated
Permitted ambient temperature	–25 to 70 °C

Magnetic sensor M12x1 for pig recognition – normally open function	Article number
3-wire PNP (terminal chamber)	505-081

Technical data	
Nominal switching distance	90 mm
Protection class	IP67
Operating voltage	8.2 VDC
Material	CuZn, chrome-plated / PA12-GF30
Permitted ambient temperature	–25 to 70 °C

Magnetic sensor M12x1 for pig recognition – ATEX category II 2 G, Ex zone 1	Article number
NAMUR (plug connector 514-161)	505-078

Switch bars and adapters

The following components are required for subsequent installation of a control and feedback system on a VARIVENT® valve or VARICOVER® pig retention cylinder.

If a complete control and feedback system is ordered, switch bar 221-589.80, 221-589.75 or 221-405.03 is already included. If an alternative switch bar is required, please state the corresponding article number or the component provided.

Valve type	Control top			
	T.VIS® M-15	T.VIS® A-15	T.VIS® P-15	SES
VARIVENT®	Switch bar			
Control valve type P			221-589.75	
Mixproof sampling valve type T/09	221-589.80	221-589.75		221-405.03

VARICOVER®	Switch bar/add-on parts			
Pig retention cylinder	Switch bar	221-589.80	221-589.75	-
	Adapter	221-624.03	221-624.03	-
	Mounting socket	221-589.32	221-589.32	-



Switch bar 221-589.80 for T.VIS® M-15



Switch bar 221-589.75 for T.VIS® A-15

The IP protection classes inform about the scope at which the housing of an electrical device is protected against percolation of foreign bodies (first number) and moisture (second number).

The protected systems are assigned IP-codes. The index figures represent common error options against which the system is protected. The code starts with the letters IP for "International Protection".

### Meaning of the index numbers

1. Index*	Protection from foreign bodies
6	Dust-tight
2. Index*	Protection from moisture
6	Protection from powerful water jet
7	Protection from temporary immersion
9k	Protection from water at high-pressure spray down/ high pressure steam jet cleaning

\* Further indices and more precise explanations can be found in the corresponding standard.

If an index number is not stated, it is replaced by the letter x (e.g. IPx6)

For the 2nd index figure (protection from moisture), the following applies:

- The protection class IPx6 includes all indices of protection class below.
- **This does not apply to the higher protection class IPx7.** If this protection class is to include a lower protection class, this is indicated by a combination of index figures (e.g. IP67/69k).

The T.VIS® control top designs of the M-15, A-15 and P-15 comply with the requirements of protection class IP66 (DIN EN 60529) as standard. Designs in the stronger protection classes IP67 or IP69k (both DIN EN 60529) are also available.











By means of the semi-automatic setup, a control top can be replaced without interrupting the current process.

For this, an employee only needs to perform the simple configuration once on site: in the version in protection class IP66 with two push buttons on the T.VIS® cap, and for the optional protection classes IP67 and IP69k with the cap removed right with the two buttons below.

For the semi-automatic set-up, the control top initially only learns the position of the valve disc on the non-actuated position and then remains until the valve is actuated in the scope of a running process. Only then will the end position of the valve be stored. The process thus does not need to be stopped!

The semi-automatic set-up is integrated into the T.VIS® A-15 as standard and does not require any additional hardware.



	Order code for air connection		In conjunction with screw fitting or plug	Use	Matching connection socket		
	Metric	Inch			Option	Item no.	Designation
	M		M20x1,5 cable gland	T.VIS® M-15 T.VIS® A-15	-	-	-
	E		Pg 13.5 cable gland	SES	-	-	-
		Z	0.5" NPT cable gland	T.VIS® M-15 T.VIS® A-15	-	-	-
		N	Pg 13.5 cable gland	SES	-	-	-
	A	S	M20x1.5 cable gland with connection box on cable 1 m	T.VIS® M-15 (AS-i)	-	-	-
	L	U	2-pin M12 plug (A-coded)	T.VIS® M-15 (AS-i)	/22	508-963	5-pin M12-connection socket (A-coded)
					/81	508-027	AS-i connection box on cable 1 m with 5-pin M12 connection socket (A-coded)
					/82	508-028	AS-i connection box on cable 2 m with 5-pin M12 connection socket (A-coded)
	D	K	5-pin M12 plug (A-coded)	T.VIS® M-15 (DeviceNet)	/22	508-963	5-pin M12-connection socket (A-coded)
	J	P	5-pin M12 plug (A-coded)	T.VIS® M-15 (24 V DC)	/22	508-963	5-pin M12-connection socket (A-coded)
				T.VIS® A-15 (24 V DC) T.VIS® A-15 (AS-i)			
				T.VIS® P-15			
			5-pin M12 plug (B-coded)	T.VIS® P-15		508-964	5-pin M12-connection socket (B-coded)
	H	I	8-pin M12 plug (A-coded)	T.VIS® M-15 (24 V DC)	/22	508-061	8-pin M12-connection socket (A-coded)
				T.VIS® A-15 (24 V DC)			
		B	Brad Harrison 0.5" NPT 5-pin plug	T.VIS® M-15 (24 V DC)	-	-	-

### 24 V (PNP/NPN)

In 24 V parallel wiring digital signals are exchanged between a terminal unit and generally the corresponding input and output modules of a PLC. In this case, it is necessary to have a separate wire for each signal, usually in the form of a multi-core cable.

PNP (current-supplying) indicates signal transfer against reference potential L<sub>-</sub>.

NPN (current-drawing) indicates signal transfer against reference potential L<sub>+</sub>.

### BUS AS-Interface



AS-Interface (Actuator-Sensor Interface) is a standard in fieldbus communication that was developed for connecting actuators and sensors. This is to replace parallel wiring used in the past. The AS-Interface has been an international standard acc. to EN 50295 and IEC 62026-2 since 1999. AS-i products are certified by the AS International Association, thereby, ensuring that equipment from different manufacturers will work together in the same system. The transmission medium is an unshielded, two-core yellow cable which also carries the electrical power supply (24–30 V direct current voltage) for the communication electronics and the slaves. A maximum of 62 slaves can be used per AS-i master. The slaves are addressed manually using a manual addressing unit or automatically by the master. The maximum length of the AS-i cable is 100 m, although by using repeaters it is possible to extend the entire length up to 400 m.

### DeviceNet bus

DeviceNet is a CAN-based fieldbus that is chiefly used in automation engineering. DeviceNet was developed by Allen-Bradley (part of Rockwell Automation) and later transferred to the ODVA (Open DeviceNet Vendor Association) as an open standard. DeviceNet is chiefly used in the USA and, to a certain extent, Asia. A maximum of 64 network nodes can be used per fieldbus segment. The nodes address is set either using dial or DIP switches on the device, or can be configured using the bus on the basis of software. The maximum length of the DeviceNet cable depends on the selected cable type and baud rate, although it cannot exceed 500 m.

### NAMUR













The 2-wire NAMUR sensors and solenoid valves used here can be operated in the Ex area because of their “intrinsically safe” ignition protection type. Using external isolating switching amplifiers, it is possible to operate control tops with this communication technology up to zone 1 or 21.

### 4–20 mA (3-wire)

In industrial automation engineering, the 4–20 mA current signal is the one most frequently used for analog measured value transmission. The enormously widespread use of this type of signal is explained by its ease of handling and, above all, its resistance to interference.

Using 4 mA as the initial value instead of 0 mA makes it very easy to detect and evaluate a wire break. As a rule, 4–20 mA corresponds to 0–100 % of the physical measuring range of an analog sensor or the working range of an actuator set in the parameters; the nominal value is supplied or the actual value is returned via an interface of this kind.



3-A		3-A Sanitary Standards, Inc. (3-A SSI) is an independent, non-profit corporation dedicated to advancing hygienic equipment design for the food, beverage, and pharmaceutical industries.
24/7 PMO VALVE 2.0® NON-STOP PRODUCTION		24/7 PMO VALVE® is a registered trade mark of GEA Tuchenhausen GmbH. It describes double-seat valves that have been authorized for use in PMO-regulated systems for carrying out the seat lift in order to clean the leakage chamber while the other pipeline is carrying product. This grants system operators the possibility of cleaning all valve components in contact with the product in parallel with the production process. In this way, the valves permit uninterrupted production on a 24/7 basis.
AS-i		Actuator Sensor interface. BUS system for the lowest field level.
ATEX		Atmosphères Explosibles. ATEX comprises the directives of the European Union in the area of explosion protection. For one thing, this is the ATEX equipment directive 94/9/EC, for another, the ATEX workplace directive 1999/92/EC.
cCSAus		Test of a product by CSA according to applicable safety standards in Canada and the USA.
CE		Conformité Européenne. By affixing the CE mark, the manufacturer confirms that the product complies with the European directives applicable to the specific product.
CSA		Canadian Standards Association. A non-governmental Canadian organization which issues standards as well as checking and certifying the safety of products. It is now globally active.
cULus		Test of a product by UL according to applicable safety standards in Canada and the USA.
DeviceNet		BUS system of the ODVA organization for complex communication on various field levels.
EG 1935/2004		Materials in contact with the product used in valves from GEA Tuchenhausen GmbH are in accordance with EC regulation 1935/2004. This defines a general framework for materials and objects intended to come into contact with foodstuffs.
EHEDG		European Hygienic Engineering & Design Group. European supervisory authority for foodstuffs and pharmaceuticals. This authority issues approvals and certificates for products and materials that are used in the foodstuffs and pharmaceuticals industries.
FDA		Food and Drug Administration. US supervisory authority for foodstuffs and pharmaceuticals. This authority issues approvals and certificates for products and materials that are used in the foodstuffs and pharmaceuticals industries.
ODVA		ODVA is a worldwide association comprising leading automation companies. It develops network protocols and standards in the joint interests of its members, which are used for the international interoperability of production systems.
TÜV		Technischer Überwachungs-Verein. The German TÜV is a private company which carries out technical safety checks as prescribed in national legislation or regulations.
UL		Underwriters Laboratories. An organization founded in the USA for checking and certifying products and their safety.

Abbreviation	Explanation
°C	Degrees Celsius, unit of measurement for temperature
°F	Degrees Fahrenheit, unit of measurement for temperature
3-A	Standard of 3-A Sanitary Standards, Incorporated
3D	Three-dimensional
A	Ampere, unit of measurement of current intensity or Output, term used in automation
AC	Alternating Current
ADI free	All elastomer compounds are free of animal-derived ingredients
AISI	American Iron and Steel Institute, association of the American steel industry
ANSI	American National Standards Institute, American body for standardizing industrial processes
approx.	approximately
AS-i	Actuator Sensor interface, standard for fieldbus communication
ASME	American Society of Mechanical Engineers, professional association of mechanical engineers in the USA
ASME-BPE	Standard of the ASME's – bioprocessing equipment association
ATEX	Atmosphères Explosibles, synonymous with the directives of the European Union for potentially explosive areas
bar	Unit of measurement for pressure. All pressure values [bar/psi] refer to positive pressure [bar <sub>g</sub> /psi <sub>g</sub> ], unless specifically stated otherwise.
bar <sub>g</sub>	Unit of measurement for pressure relative to atmospheric pressure
CAN	Controller Area Network; asynchronous serial bus system
CE	Conformité Européenne, administrative symbol for the free movement of industrial products
CIP	Cleaning In Place, designates a process for cleaning technical process systems.
CRN	Canadian Registration Number, is issued by a Canadian Jurisdiction and covers pressure vessels, fittings, or pressure piping. It is a necessary authorization allowing these components to be in operation in Canada.
CSA	Canadian Standards Association, a non-governmental Canadian Standardization organization
Cv	The Cv value corresponds to the water flow rate through a valve (in US gal / min) at a pressure differential of 1 PSI and a water temperature of 5 °C to 30 °C. kv = 14,28 Cv (USA).
Cvs	The Cv values of a valve at nominal stroke (100 % opening) is designated the Cvs value.
dB	Decibel, one tenth of a bel, named after Alexander Graham Bell and used for identifying levels and dimensions
DC	Direct Current
DIN	Deutsches Institut für Normung e. V. Standardization organization in the Federal Republic of Germany, DIN = synonym for standards issued by the organization

Abbreviation	Explanation
DIP	Dual Inline Package, design of a switch
DN	Diameter Nominal, DIN nominal width
Device Net	Network system used in the automation industry to interconnect control devices for data exchange
E	Input, term used in automation
EAC	Certification of technical conformity from the customs union of Russia/Balarus/Kazakhstan
Pressure Equipment Directive 97/23/EC	Directive of the European Parliament and the Council Directive for layout and conformity evaluation for pressure equipment and assemblies with a maximum pressure (PS) of more than 0.5 bars.
EG No. 1935/2004	Regulation of the European Parliament which lays down common rules for materials which come, or may come, into contact with food, either directly or indirectly.
EHEDG	European Hygienic Engineering and Design Group. Consortium of equipment manufacturers, food industries, research institutes as well as public health authorities
EN	European standard, rules of the European Committee for Standardization
EPDM	Ethylene propylene diene rubber, acronym acc. to DIN/ISO 1629
Ex	Synonym for ATEX
FDA	Food and Drug Administration, official foodstuffs monitoring in the United States
FEM calculation	Finite Element Method; calculation process for simulating solids
FKM	Fluorinated rubber, acronym acc. to DIN/ISO 1629
GOST	Gosudarstvennyy Standart, Certification of conformity for components according to standards and regulations of the Russian Federation
H	Henry, unit of measurement for inductance
HNBR	Hydrated acrylonitrile butadiene rubber, acronym acc. to DIN/ISO 1629
Hz	Hertz, unit of frequency named after Heinrich Hertz
I	Formula symbol for electrical current
IEC	International Electrotechnical Commission, international standardization organization for electrical and electronic engineering
IP	Ingress Protection/International Protection, index of protection class acc. to IEC 60529
IPS	Iron Pipe Size, American pipe dimension
ISA	International Society of Automation, international US organization of the automation industry
ISO	International Organization for Standardization, international organization that produced international standards, ISO = synonym for standards from the organization
kg	Kilogram, unit of measurement for weight
Kv	The Kv value corresponds to the water flow rate through a valve (in m <sup>3</sup> /h) at a pressure differential of 0.98 bar and a water temperature of 5 °C to 30 °C.

Abbreviation	Explanation
Kvs	The Kv values of a valve at nominal stroke (100 % opening) is designated the Kvs value
L	Conductive
LED	Light-Emitting Diode
LEFF®	Function of the T.VIS® valve informations system for cyclical pulsing during the lifting process; Low-Emission Flip Flop
mm	Millimeter, unit of measurement for length
M	Metric, system of units based on the meter or Mega, one million times a unit
m³/h	Cubic meters per hour, unit of measurement for volumetric flow
max.	Maximum
NAMUR	Standardization working association for measuring and control technology in the chemical industry, synonym for the interface type of the organization, especially for potentially explosive atmospheres
NC	Normally Closed; valve or solenoid valve control which is closed in idle status
NO	Normally Open; valve or solenoid valve control which is open in idle status
NOT-element	Logic element, NOT gate
NPN	Signal transmission against reference potential, current-consuming
NPT	National Pipe Thread, US thread standard for self-sealing pipe fittings
OD	Outside Diameter, pipe dimension
ODVA	Open DeviceNet Vendor Association, global association for network standards
PA 12/L	Polyamide
Pg	Armoured thread
PLC	Programmable Logic Controller, device for controlling a machine or system on a digital basis
PMO	Pasteurized Milk Ordinance
PN	Nominal pressure for pipeline systems according to EN 1333, rated pressure in bar at room temperature (20 °C)
PNP	Signal transmission against reference potential, current-supplying
PPO	Polyphenylene oxide, thermoplastic material
PS	Maximum permitted operating pressure at which the components can operate safely at maximum allowable temperature (TS)
psi	Unit of measurement for pressure, pound-force per square inch, 1 psi = 6894.75 Pa. All pressure values [bar/psi] refer to positive pressure [bar <sub>g</sub> /psi <sub>g</sub> ], unless specifically stated otherwise.
psi <sub>g</sub>	Unit of measurement for pressure relative to atmospheric pressure

Abbreviation	Explanation
PV	Solenoid valve
R <sub>a</sub> in μm	Average roughness value, describes the roughness of a technical surface
RM	Feedback
International Protection-Code IP67, IP66, IP69K	Classifies and rates the degree of protection provided against intrusion dust, accidental contact, and water
SES	GEA Tuchenhagen control head for Ex areas, control top system of GEA Tuchenhagen
SET-UP	Self-learning installation, the SET-UP procedure carries out all necessary settings for generating messages during commissioning and maintenance.
SIP	Sterilization in Place, refers to a process for cleaning technical process systems
SMS	Svensk Mjök Standard, Scandinavian pipe dimension
SW	Indicates the size of a tool spanner, "Schlüsselweite"
TA-Luft VDI 2440	If a product is certified according to TA Luft it meets the requirements for proof of high grade performance according to TA Luft of 1.0x 10 <sup>-4</sup> mbar x l / (s x m) at service conditions under the VDI guideline 2440. The product will hence be tested for tightness.
T.VIS®	GEA Tuchenhagen valve information system, control top system from GEA Tuchenhagen
TS	Maximum permitted operating temperature
T-smart	Valve series from GEA Tuchenhagen
UL	Underwriters Laboratories, a certification organization established in the USA
USP Class VI	The United States Pharmacopeial Convention (USP) is a scientific nonprofit organization that sets standards to help protecting public health. Class VI administer tests and impacts of material and their substances on animal and human tissues.
UV	Ultraviolet, ultraviolet radiation is a wavelength of light
V	Volt, unit of measurement for voltage
VARICOMP®	Pipe expansion compensator from GEA Tuchenhagen
VMQ	High-polymer vinyl methyl polysiloxane, silicone rubber, MVQ = synonym
W	Watt, unit of measurement for power
Y	Control air connection for the working cylinder, designation from pneumatic systems
μ	Micro, one millionth of a unit
Ω	Ohm, the unit of electrical resistance named after Georg Simon Ohm



### Typical application and description

You can receive two-dimensional and/or three-dimensional drawing files of our components for making your piping planning. For this purpose, please send us your specific request, stating the particular order code and the required drawing format. The required files will then be individually prepared for you.

### Available drawing formats:

	Format	Name
2D formats	drw	Native Pro/E
	igs (2D)	IGS file
	dxg	AutoCAD drawing exchange
	pdf (2D)	Adobe Acrobat document
	tif	TIFF (plot)
3D formats	asm	Native Pro/E
	igs (3D)	IGS file
	pdf (3D)	Adobe Acrobat document
	stp	STP file
	bmp (3D)	Bitmap image
	jpg (3D)	JPEG image
	tif (3D)	TIFF image
	sat	Standard ACIS



#### Please note

All our sales and/or services are exclusively subject to our valid terms and conditions of sale and/or service applicable in the respective country of business, which can be found on our internet platform: [www.gea.com](http://www.gea.com).

If not available or if you otherwise wish to receive such terms and conditions directly from us, please contact us and we of course will send you the applicable version of our terms and conditions for the envisaged business.





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GEA is a global technology company with multi-billion euro sales operations in more than 50 countries. Founded in 1881 the company is one of the largest providers of innovative equipment and process technology. GEA is listed in the STOXX® Europe 600 Index. In addition, the company is included in selected MSCI Global Sustainability Indexes.

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