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GEA Tuchenhagen GmbH
Am Industriepark 2–10, 21514 Büchen, Germany
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</table>
GEA VARIVENT®
Hygienic special application valves

GEA VARIVENT®
Hygienic seat valves

GEA
Hygienic butterfly valves

GEA VARICOMP®
Hygienic expansion compensators

GEA VARINLINE®
Hygienic process connections

GEA VARITOP®
Hygienic tank safety systems
Hygienic Valve Technology

Efficiency delivering perfect results
Hygienic valves from GEA form the core component of matrix-piped process plants. Thanks to a pioneering valve concept that sets standards for its flexibility, as well as the latest control and automation functions, our valves offer manufacturers maximum product safety and process reliability.

All GEA hygienic valves are designed to be efficient and cost-effective for their particular applications, leading to sustainable operation and considerable savings potential.

GEA valve technology controls flow processes
Our hygienic valve technology ensures safe, efficient processes wherever sensitive liquid products are manufactured. In food production, the classic application areas range from milk processing (milk, yogurt, cheese ...) to liquid foods (sauces and pastes, instant products, baby food ...) and on to the brewing of beer and production of beverages. Further significant areas are biotechnology and pharmaceuticals, as well as care products and cleaning agents/detergents.

Regardless of the sector, the application or production specifications: Our hygienic valve technology is sure to meet the demands of our users.

Hygienic solutions for every task
Additional components in our portfolio are available to optimize the design of any process plant – from pigging systems for the recovery of valuable products, process connections, and expansion compensators for offsetting thermal stress, to tank safety systems for securing and cleaning tanks and containers.

Supported by our Research and Development Department we regularly launch new, technologically mature products on the markets. Our customers have high standards, which we continuously and systematically meet.
Special components, free of dead spaces, for your process

Every process operator who processes valuable or sensitive liquids benefits from our hygienic, 100 % drainable components for important special functions in the process. All components were developed on the basis of the groundbreaking and proven GEA VARIVENT® design and guarantee extraordinary reliability and functionality for trouble-free, efficient processes.

GEA VARINLINE® Process Connections

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 horizontal installation orientation – and thus permit instrumentation free of dead zones. VARINLINE® housings are 3A approved, according to the DGRL and are EHEDG-certified.
GEA VARICOMP® Expansion Compensators
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.

GEA 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.

GEA 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.
Technical Characteristics

Available nominal widths for valve series

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>DN</th>
<th>25</th>
<th>40</th>
<th>50</th>
<th>65</th>
<th>80</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>OD</td>
<td>1&quot;</td>
<td>1 ½&quot;</td>
<td>2&quot;</td>
<td>2 ½&quot;</td>
<td>3&quot;</td>
<td>4&quot;</td>
<td></td>
</tr>
</tbody>
</table>

Valve type

VARICOVER® product recovery system: • • • • • • • •

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

<table>
<thead>
<tr>
<th>Metric</th>
<th>Outside diameter according to DIN 11866, series A</th>
<th>OD IPS</th>
<th>Outside diameter based on ASME-BPE-a-2004, DIN 11866, series C</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>29.0 × 1.50</td>
<td>1&quot;</td>
<td>25.4 × 1.65</td>
</tr>
<tr>
<td>40</td>
<td>41.0 × 1.50</td>
<td>1 ½&quot;</td>
<td>38.1 × 1.65</td>
</tr>
<tr>
<td>50</td>
<td>53.0 × 1.50</td>
<td>2&quot;</td>
<td>50.8 × 1.65</td>
</tr>
<tr>
<td>65</td>
<td>70.0 × 2.00</td>
<td>2 ¾&quot;</td>
<td>63.5 × 1.65</td>
</tr>
<tr>
<td>80</td>
<td>85.0 × 2.00</td>
<td>3&quot;</td>
<td>76.2 × 1.65</td>
</tr>
<tr>
<td>100</td>
<td>104.0 × 2.00</td>
<td>4&quot;</td>
<td>101.6 × 2.11</td>
</tr>
</tbody>
</table>
Surfaces
The standard for surfaces in contact with the product depends on the particular nominal width standard:
• Metric, inch OD, ISO: $R_a \leq 0.8 \mu m$

Surfaces not in contact with the product (housing) are matt 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.

Seal materials
Seals in contact with the product are EPDM (standard), HNBR and FKM. 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.

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

**Ambient conditions**

**Ambient temperatures**

| VARICOVER® | 0 °C to 45 °C | 32 °F to 113 °F |

The components 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.

**Air supply**

The 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**

<table>
<thead>
<tr>
<th>Solid content</th>
<th>Quality class 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Particle size max.</td>
<td>5 μm</td>
</tr>
<tr>
<td>Particle density max.</td>
<td>5 mg/m³</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Water content</th>
<th>Quality class 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. dew point</td>
<td>3 °C</td>
</tr>
<tr>
<td>A correspondingly different dew point is required for applications at high altitude or with low ambient temperatures.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Oil content</th>
<th>Quality class 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max. 1 mg oil per 1 m³ air, preferably oil-free</td>
<td></td>
</tr>
</tbody>
</table>

**Feedback**

In the control top
See catalog GEA Valve Automation

Proximity switch holder (INA)
Proximity switches of size M12 × 1 can indicate the positions “open” and/or “closed”.

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 catalog GEA Valve Automation).

**Certificates**

Components for special process applications in the GEA Hygienic Valve Technology portfolio 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). Numerous components have been demonstrated to offer trouble-free and efficient cleaning ability not only in accordance with the above guidelines, but also in independent and standardized cleaning tests.

ATEX certificates and other additional certificates are available on request for many components in the GEA Hygienic Valve Technology portfolio.
Material properties

<table>
<thead>
<tr>
<th>Material number</th>
<th>Material number</th>
<th>Short name</th>
<th>Similar materials</th>
<th>PREN***</th>
<th>Cr (Chrome)</th>
<th>Ni (Nickel)</th>
<th>Mo (Molybdenum)</th>
<th>C max. (Carbon)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.4301*</td>
<td>X5CrNi18-10</td>
<td>AISI 304</td>
<td>BS 304S15</td>
<td>SS2332</td>
<td>18</td>
<td>17.5–19.5</td>
<td>8.0–10.5</td>
<td>–</td>
</tr>
<tr>
<td>1.4404**</td>
<td>X2 CrNiMo 17-12-2</td>
<td>AISI 316L</td>
<td>BS 316S11</td>
<td>SS2348</td>
<td>25</td>
<td>16.5–18.5</td>
<td>10.0–13.0</td>
<td>2.0–2.5</td>
</tr>
</tbody>
</table>

* 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) + 20 N

Seal material properties

<table>
<thead>
<tr>
<th>Seal material</th>
<th>EPDM</th>
<th>FKM</th>
<th>HNBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>General application temperature*</td>
<td>−40 to 135 °C</td>
<td>−10 to 200 °C</td>
<td>−25 to 140 °C</td>
</tr>
<tr>
<td></td>
<td>−40 to 275 °F</td>
<td>14 to 392 °F</td>
<td>13 to 284 °F</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medium</th>
<th>Concentration</th>
<th>At permitted operating temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkali</td>
<td>≤ 3 %</td>
<td>up to 80 °C</td>
</tr>
<tr>
<td></td>
<td>≤ 5 %</td>
<td>up to 40 °C</td>
</tr>
<tr>
<td></td>
<td>&gt; 5 %</td>
<td>up to 80 °C</td>
</tr>
<tr>
<td></td>
<td>≤ 5 %</td>
<td>up to 80 °C</td>
</tr>
<tr>
<td></td>
<td>&gt; 5 %</td>
<td>up to 100 °C</td>
</tr>
<tr>
<td>Inorganic acid**</td>
<td>≤ 3 %</td>
<td>up to 80 °C</td>
</tr>
<tr>
<td></td>
<td>≤ 5 %</td>
<td>up to 80 °C</td>
</tr>
<tr>
<td></td>
<td>&gt; 5 %</td>
<td>up to 100 °C</td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td>up to 80 °C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 100 °C</td>
</tr>
<tr>
<td>Steam</td>
<td></td>
<td>up to 135 °C</td>
</tr>
<tr>
<td></td>
<td></td>
<td>up to 150 °C</td>
</tr>
<tr>
<td>Hydrocarbons/fuels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Products containing grease</td>
<td>≤ 35 %</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt; 35 %</td>
<td></td>
</tr>
<tr>
<td>Oils</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other applications on request
* Depending on the installation situation
** Inorganic acids are, for example, hydrochloric acid, nitric acid, sulphuric acid

+ = Good resistance
○ = Reduced service life
− = Not resistant
## Selection Matrix

<table>
<thead>
<tr>
<th>Catalogs</th>
<th>Selections</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hygienic Valve Technology</strong></td>
<td>GEA VARIVENT* seat valves</td>
</tr>
<tr>
<td><strong>Hygienic Pump Technology</strong></td>
<td>GEA butterfly valves</td>
</tr>
<tr>
<td><strong>Aseptic Valve Technology</strong></td>
<td>GEA VARIVENT* special application valves</td>
</tr>
<tr>
<td><strong>Cleaning Technology</strong></td>
<td>GEA VARIVENT* valves for the U.S. dairy market</td>
</tr>
<tr>
<td><strong>GEA VARITOP</strong></td>
<td>GEA VARITOP* tank safety systems</td>
</tr>
<tr>
<td><em><em>GEA VARINLINE</em>/GEA VARICOMP</em>*</td>
<td>GEA VARINLINE*/GEA VARICOMP* process connections and expansion compensators</td>
</tr>
<tr>
<td><strong>GEA VARICOVER</strong></td>
<td>GEA VARICOVER* product recovery systems</td>
</tr>
<tr>
<td><strong>GEA Service</strong></td>
<td>GEA Service for hygienic valve technology</td>
</tr>
<tr>
<td><strong>GEA valve automation</strong></td>
<td>GEA valve automation control and feedback systems</td>
</tr>
</tbody>
</table>
Overview

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!

<table>
<thead>
<tr>
<th>Special features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design with no dead zones</td>
</tr>
<tr>
<td>CIP/SIP-able</td>
</tr>
<tr>
<td>Reduced product loss</td>
</tr>
<tr>
<td>Reduced cleaning media and water consumption</td>
</tr>
<tr>
<td>Reduced waste water load</td>
</tr>
<tr>
<td>Reduced production downtimes</td>
</tr>
<tr>
<td>Simple maintenance</td>
</tr>
</tbody>
</table>
Overview

**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 Tuchenhagen 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.

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.

**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 (101–01)
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.

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

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, CO₂ or N₂.
Overview

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

VARICOVER® Product Recovery System ATEX
Even in explosion endangered areas you are able to operate GEA Product Recovery Systems. Our pigging components can be used in ATEX-relevant areas in the following nominal sizes:
- DN 40; DN 50; DN 65
- OD 1½"; OD 2"; OD 2½"; OD 3"
- Authorized Ex zones inside of pipelines: 1; 2; 21; 22
- Authorized Ex zones outside of pipelines: 1; 2; 21; 22
- ATEX categories:
  - II 2G Ex h IIB T3...T6 Gb X
  - II 2D Ex h IIB T 135 °C Db X
- Suitable pig driving media:
  - Water
  - Nitrogen
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 Tuchenhagen 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 ± 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.

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.
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 cleaned during the pipe cleaning.

The pig catching pipe can be used with or without pig driving medium valves. 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 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.
**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 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 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**

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).
VARICOVER® Product Recovery Systems
VARIVENT® Type L
Piggable Double-seat Valve

**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 with low 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.

**Application ranges**
- Piggable valve blocks
- Piggable filling and emptying valves at product tanks

For more detailed information on the VARIVENT® valve type L, see the catalog GEA VARIVENT® Hygienic Seat Valves.
**VARICOVER® Pig Cleaning Station**

**Technical data of the standard version**

<table>
<thead>
<tr>
<th>Material in contact with the product</th>
<th>1.4404</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal material in contact with the product</td>
<td>EPDM (FDA)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 to 45 °C</td>
</tr>
<tr>
<td>Air supply pressure</td>
<td>4.8 bar (69.6 psi) to 8 bar (116 psi)</td>
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<tr>
<td>Max. product pressure</td>
<td>16 bar (232 psi)</td>
</tr>
<tr>
<td>Surface in contact with the product</td>
<td>Ra ≤ 0.8 µm</td>
</tr>
<tr>
<td>External housing surface</td>
<td>Matt blasted</td>
</tr>
<tr>
<td>Actuator type</td>
<td>Pneumatic actuator air/air</td>
</tr>
<tr>
<td>Actuator type of the pig retention cylinders</td>
<td>Pneumatic actuator air/spring</td>
</tr>
<tr>
<td>Connection fittings</td>
<td>Welding end</td>
</tr>
<tr>
<td>Identification</td>
<td>Adhesive ID tag</td>
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**Pipe Housing Dimensions**

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>Ø [mm]</th>
<th>Ødi [mm]</th>
<th>B [mm]</th>
<th>C [mm]</th>
<th>H1 [mm]</th>
<th>H2 [mm]</th>
<th>H3 [mm]</th>
<th>X1* [mm]</th>
<th>X2* [mm]</th>
<th>Weight [kg]</th>
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<tr>
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<td>647.0</td>
<td>156.0</td>
<td>558.0</td>
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</tr>
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<td>170.0</td>
<td>594.0</td>
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*Clearance

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**Connection fitting on port 1 / 7**
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<th>Position</th>
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<td>PIG/PCS</td>
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<tr>
<td></td>
<td>Pig cleaning station MST 3A</td>
</tr>
<tr>
<td>2</td>
<td>Design</td>
</tr>
<tr>
<td></td>
<td>G Pig cleaning station complete</td>
</tr>
<tr>
<td></td>
<td>A Only actuator of the pig cleaning station</td>
</tr>
<tr>
<td></td>
<td>M Only pig retention cylinder for the pig cleaning station</td>
</tr>
<tr>
<td>3</td>
<td>Nominal width</td>
</tr>
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<td></td>
<td>DN 25 OD 1&quot;</td>
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<td>DN 50 OD 2&quot;</td>
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<td>DN 80 OD 3&quot;</td>
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<td>DN 100 OD 4&quot;</td>
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<td>4</td>
<td>Seal material</td>
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<tr>
<td></td>
<td>2 FKM (FDA)</td>
</tr>
<tr>
<td></td>
<td>3 HNBR (FDA)</td>
</tr>
<tr>
<td>5</td>
<td>Surface quality</td>
</tr>
<tr>
<td></td>
<td>Inside Ra ≤ 0.8 µm, outside matt blasted</td>
</tr>
<tr>
<td></td>
<td>Inside Ra ≤ 0.8 µm, outside ground</td>
</tr>
<tr>
<td>6</td>
<td>Pig retention cylinder</td>
</tr>
<tr>
<td></td>
<td>0 Without pig retention cylinder</td>
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<tr>
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<td>7</td>
<td>Proximity switches at the pig actuator (for technical specifications, see catalog GEA Valve Automation)</td>
</tr>
<tr>
<td></td>
<td>0 Without proximity switches</td>
</tr>
<tr>
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<td>2 With proximity switches</td>
</tr>
<tr>
<td>8</td>
<td>Magnetic sensors at the pig station housing (for technical specifications, see catalog GEA Valve Automation)</td>
</tr>
<tr>
<td></td>
<td>0 Without magnetic sensors</td>
</tr>
<tr>
<td></td>
<td>2 With magnetic sensors</td>
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<tr>
<td>9</td>
<td>Connection fittings</td>
</tr>
<tr>
<td></td>
<td>Connection fitting on port 1 / 7</td>
</tr>
<tr>
<td></td>
<td>N Without connection fittings</td>
</tr>
<tr>
<td></td>
<td>TK VARIENT® flange connection complete, grooved flange on housing</td>
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<tr>
<td></td>
<td>J With connection fittings</td>
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<tr>
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<td></td>
<td>TF VARIENT® plain flange</td>
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<tr>
<td></td>
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<td>-</td>
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<td>/52</td>
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</table>

For order codes differing from the standard version, please refer to section 2.
VARICOVER®
Pig Cleaning Station ATEX

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 40 – DN 65 OD 1 ½” – OD 3” 16 bar (232 psi) |
| Surface in contact with the product | Ra ≤ 0.8 µm |
| External housing surface | Matt 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 | |

Pipe Housing Dimensions General

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>Ø [mm]</th>
<th>Ødi [mm]</th>
<th>B [mm]</th>
<th>C [mm]</th>
<th>H1 [mm]</th>
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<th>X2* [mm]</th>
<th>Weight [kg]</th>
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<tbody>
<tr>
<td>DN 40</td>
<td>41.0</td>
<td>1.50</td>
<td>38.00</td>
<td>339</td>
<td>90</td>
<td>353.0</td>
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<td>135.0</td>
<td>503.0</td>
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<tr>
<td>DN 50</td>
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<td>1.50</td>
<td>50.00</td>
<td>313</td>
<td>90</td>
<td>359.0</td>
<td>650.0</td>
<td>158.0</td>
<td>559.0</td>
<td>100</td>
</tr>
<tr>
<td>DN 65</td>
<td>70.0</td>
<td>2.00</td>
<td>66.00</td>
<td>323</td>
<td>90</td>
<td>367.0</td>
<td>692.0</td>
<td>170.0</td>
<td>597.0</td>
<td>100</td>
</tr>
<tr>
<td>OD 1 ½&quot;</td>
<td>38.1</td>
<td>1.65</td>
<td>34.80</td>
<td>337</td>
<td>90</td>
<td>351.5</td>
<td>510.0</td>
<td>125.5</td>
<td>501.5</td>
<td>100</td>
</tr>
<tr>
<td>OD 2&quot;</td>
<td>50.8</td>
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<tr>
<td>OD 2 ½&quot;</td>
<td>63.5</td>
<td>1.65</td>
<td>60.20</td>
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<tr>
<td>OD 3&quot;</td>
<td>76.2</td>
<td>1.65</td>
<td>72.90</td>
<td>326</td>
<td>125</td>
<td>374.0</td>
<td>721.0</td>
<td>192.0</td>
<td>634.0</td>
<td>100</td>
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</tbody>
</table>

* Clearance
<table>
<thead>
<tr>
<th>Position</th>
<th>Description of the order code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Pig cleaning station</td>
</tr>
<tr>
<td></td>
<td>PIG/PCS Pig cleaning station MST ATEX</td>
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<tr>
<td><strong>2</strong></td>
<td>Design</td>
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<tr>
<td></td>
<td>G Pig cleaning station complete</td>
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<tr>
<td></td>
<td>A Only actuator of the pig cleaning station</td>
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<tr>
<td></td>
<td>M Only pig retention cylinder for the pig cleaning station</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Nominal width</td>
</tr>
<tr>
<td></td>
<td>DN 40 OD 1 ½”</td>
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<td></td>
<td>DN 50 OD 2”</td>
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<tr>
<td></td>
<td>DN 65 OD 2 ½”</td>
</tr>
<tr>
<td></td>
<td>OD 3”</td>
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<td>Seal material</td>
</tr>
<tr>
<td></td>
<td>1 EPDM (FDA)</td>
</tr>
<tr>
<td></td>
<td>2 FKM (FDA)</td>
</tr>
<tr>
<td></td>
<td>3 HNBR (FDA)</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Surface quality</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td>3 Inside $R_s \leq 0.8 \mu m$, outside ground</td>
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<td><strong>6</strong></td>
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</tr>
<tr>
<td></td>
<td>0 Without pig retention cylinder</td>
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<td></td>
<td>2 With pig retention cylinder</td>
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<td>0 Without proximity switches</td>
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<tr>
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<td>2 With proximity switches</td>
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<td>22 Dust, zone 22</td>
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<td>Ex-zone pipework</td>
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<td>21 Dust, zone 21</td>
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<td>22 Dust, zone 22</td>
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<tr>
<td></td>
<td>N Without connection fittings</td>
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<tr>
<td></td>
<td>J With connection fittings</td>
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<tr>
<td></td>
<td>TK TK VARIVENT® flange connection complete, grooved flange on housing</td>
</tr>
<tr>
<td></td>
<td>TN TN VARIVENT® grooved flange complete, incl. O-ring and connecting parts</td>
</tr>
<tr>
<td></td>
<td>TF TF VARIVENT® plain flange</td>
</tr>
<tr>
<td></td>
<td>CO CO Clamp connection</td>
</tr>
<tr>
<td><strong>11</strong></td>
<td>Accessories</td>
</tr>
<tr>
<td></td>
<td>/52 Adhesive ID tag</td>
</tr>
<tr>
<td><strong>12-16</strong></td>
<td>Air connection/control and feedback system</td>
</tr>
<tr>
<td></td>
<td>000000M Metric for air hose Ø 8/4 mm</td>
</tr>
<tr>
<td></td>
<td>000000Z Inch for air hose Ø OD ¼” (6.35/4.35 mm)</td>
</tr>
<tr>
<td></td>
<td>XXXXXX Order code for different control and feedback systems see catalog GEA Valve Automation</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12 to 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>PIG/PCS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>/</td>
<td>/52</td>
<td>+</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For order codes differing from the standard version, please refer to section 2.
VARICOVER® Pig Catching Pipe/Pig Catching Station

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 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: Ra ≤ 0.8 µm
External housing surface: Matt blasted
Connection fittings: Welding end
Identification: Adhesive ID tag
Certificates: FDA

Pig catching pipe

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>Ø [mm]</th>
<th>Ødi [mm]</th>
<th>L [mm]</th>
<th>L1* [mm]</th>
<th>L2** [mm]</th>
<th>H [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 25</td>
<td>29.0</td>
<td>26.0</td>
<td>155</td>
<td>205</td>
<td>198</td>
<td>95</td>
</tr>
<tr>
<td>DN 40</td>
<td>41.0</td>
<td>38.0</td>
<td>176</td>
<td>226</td>
<td>219</td>
<td>101</td>
</tr>
<tr>
<td>DN 50</td>
<td>53.0</td>
<td>50.0</td>
<td>181</td>
<td>231</td>
<td>224</td>
<td>107</td>
</tr>
<tr>
<td>DN 65</td>
<td>70.0</td>
<td>66.0</td>
<td>206</td>
<td>256</td>
<td>262</td>
<td>115</td>
</tr>
<tr>
<td>DN 80</td>
<td>85.0</td>
<td>81.0</td>
<td>246</td>
<td>296</td>
<td>302</td>
<td>123</td>
</tr>
<tr>
<td>DN 100</td>
<td>104.0</td>
<td>100.0</td>
<td>271</td>
<td>321</td>
<td>327</td>
<td>132</td>
</tr>
<tr>
<td>OD 1&quot;</td>
<td>25.4</td>
<td>22.1</td>
<td>150</td>
<td>200</td>
<td>193</td>
<td>93</td>
</tr>
<tr>
<td>OD 1 ½&quot;</td>
<td>38.1</td>
<td>34.8</td>
<td>166</td>
<td>216</td>
<td>209</td>
<td>99</td>
</tr>
<tr>
<td>OD 2&quot;</td>
<td>50.8</td>
<td>47.5</td>
<td>176</td>
<td>226</td>
<td>219</td>
<td>105</td>
</tr>
<tr>
<td>OD 2 ½&quot;</td>
<td>63.5</td>
<td>60.2</td>
<td>196</td>
<td>246</td>
<td>252</td>
<td>112</td>
</tr>
<tr>
<td>OD 3&quot;</td>
<td>76.2</td>
<td>72.9</td>
<td>226</td>
<td>276</td>
<td>282</td>
<td>118</td>
</tr>
<tr>
<td>OD 4&quot;</td>
<td>101.6</td>
<td>97.38</td>
<td>261</td>
<td>311</td>
<td>317</td>
<td>131</td>
</tr>
</tbody>
</table>

* with VARIVENT® grooved flange  ** with clamp connection
### Pig catching station

<table>
<thead>
<tr>
<th>Position</th>
<th>Description of the order code</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>Pig catching pipe</td>
</tr>
<tr>
<td><strong>2</strong></td>
<td>Nominal width of the pigging line</td>
</tr>
<tr>
<td>DN 15</td>
<td>OD 1&quot;</td>
</tr>
<tr>
<td>DN 25</td>
<td>OD 1 ½&quot;</td>
</tr>
<tr>
<td>DN 50</td>
<td>OD 2&quot;</td>
</tr>
<tr>
<td>DN 65</td>
<td>OD 2 ½&quot;</td>
</tr>
<tr>
<td>DN 80</td>
<td>OD 3&quot;</td>
</tr>
<tr>
<td>DN 100</td>
<td>OD 4&quot;</td>
</tr>
<tr>
<td><strong>3</strong></td>
<td>Nominal width of the driving medium valves*</td>
</tr>
<tr>
<td>DN 15</td>
<td>Without driving medium valves</td>
</tr>
<tr>
<td>DN 25</td>
<td>OD 1&quot;</td>
</tr>
<tr>
<td>DN 40</td>
<td>OD 1 ½&quot;</td>
</tr>
<tr>
<td>DN 50</td>
<td>OD 2&quot;</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td>Magnetic sensors (for technical specifications, see catalog GEA Valve Automation)</td>
</tr>
<tr>
<td><strong>5</strong></td>
<td>Seal material</td>
</tr>
<tr>
<td><strong>6</strong></td>
<td>Surface quality</td>
</tr>
<tr>
<td><strong>7</strong></td>
<td>Connection fittings</td>
</tr>
<tr>
<td><strong>8</strong></td>
<td>Accessories</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Position</th>
<th>Code</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1</strong></td>
<td>PIG/PCP</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>/</td>
<td>/</td>
<td>/</td>
</tr>
</tbody>
</table>

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

*The order codes of the driving medium valves can be taken from the catalog GEA VARIVENT® Hygienic Seat Valves. Please indicate in your request that you need valves for product recovery systems.*
Pig Driving Medium Valves with VARINLINE® Housing

Connection fitting on port 1 / 2

Technical data of the standard version

| Material in contact with the product | 1.4404 |
| Seal material | 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 | Ra ≤ 0.8 µm |
| External housing surface | Matt blasted |
| Connection fittings | Welding end |
| Identification | Adhesive ID tag |

Certificates

VARINLINE® housings

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>Ø [mm]</th>
<th>Ødi [mm]</th>
<th>L [mm]</th>
<th>L1* [mm]</th>
<th>L2** [mm]</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 25</td>
<td>29.0 × 1.50</td>
<td>26.00</td>
<td>180</td>
<td>230</td>
<td>223</td>
</tr>
<tr>
<td>DN 40</td>
<td>41.0 × 1.50</td>
<td>38.00</td>
<td>180</td>
<td>230</td>
<td>223</td>
</tr>
<tr>
<td>DN 50</td>
<td>53.0 × 1.50</td>
<td>50.00</td>
<td>180</td>
<td>230</td>
<td>223</td>
</tr>
<tr>
<td>DN 65</td>
<td>70.0 × 2.00</td>
<td>66.00</td>
<td>250</td>
<td>300</td>
<td>306</td>
</tr>
<tr>
<td>DN 80</td>
<td>85.0 × 2.00</td>
<td>81.00</td>
<td>250</td>
<td>300</td>
<td>306</td>
</tr>
<tr>
<td>DN 100</td>
<td>104.0 × 2.00</td>
<td>100.00</td>
<td>250</td>
<td>300</td>
<td>306</td>
</tr>
<tr>
<td>OD 1&quot;</td>
<td>25.4 × 1.65</td>
<td>22.10</td>
<td>180</td>
<td>230</td>
<td>223</td>
</tr>
<tr>
<td>OD 1 ½&quot;</td>
<td>38.1 × 1.65</td>
<td>34.80</td>
<td>180</td>
<td>230</td>
<td>223</td>
</tr>
<tr>
<td>OD 2&quot;</td>
<td>50.8 × 1.65</td>
<td>47.50</td>
<td>180</td>
<td>230</td>
<td>223</td>
</tr>
<tr>
<td>OD 2 ½&quot;</td>
<td>63.5 × 1.65</td>
<td>60.20</td>
<td>250</td>
<td>300</td>
<td>306</td>
</tr>
<tr>
<td>OD 3&quot;</td>
<td>76.2 × 1.65</td>
<td>72.90</td>
<td>250</td>
<td>300</td>
<td>306</td>
</tr>
<tr>
<td>OD 4&quot;</td>
<td>101.6 × 2.11</td>
<td>97.38</td>
<td>250</td>
<td>300</td>
<td>306</td>
</tr>
</tbody>
</table>

* with VARIVENT® grooved flange  ** with clamp connection
Pig driving medium valves

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>Housing</th>
<th>Valve</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A [mm]</td>
<td>B [mm]</td>
<td>C [mm]</td>
</tr>
<tr>
<td>DN 15</td>
<td>47.0</td>
<td>40</td>
<td>65</td>
</tr>
<tr>
<td>DN 25</td>
<td>50.0</td>
<td>31</td>
<td>90</td>
</tr>
<tr>
<td>DN 40</td>
<td>62.0</td>
<td>39</td>
<td>90</td>
</tr>
<tr>
<td>DN 50</td>
<td>74.0</td>
<td>41</td>
<td>90</td>
</tr>
<tr>
<td>OD 1&quot;</td>
<td>46.0</td>
<td>29</td>
<td>90</td>
</tr>
<tr>
<td>OD 1 ½&quot;</td>
<td>59.0</td>
<td>39</td>
<td>90</td>
</tr>
<tr>
<td>OD 2&quot;</td>
<td>71.5</td>
<td>42</td>
<td>90</td>
</tr>
</tbody>
</table>

*Clearance

<table>
<thead>
<tr>
<th>Position</th>
<th>Description of the order code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pig catching pipe</td>
</tr>
<tr>
<td></td>
<td>PIG/T Inline housings</td>
</tr>
<tr>
<td>2</td>
<td>Nominal width</td>
</tr>
<tr>
<td></td>
<td>DN 25 OD 1&quot;</td>
</tr>
<tr>
<td></td>
<td>DN 40 OD 1 ½&quot;</td>
</tr>
<tr>
<td></td>
<td>DN 50 OD 2&quot;</td>
</tr>
<tr>
<td></td>
<td>DN 65 OD 2 ½&quot;</td>
</tr>
<tr>
<td></td>
<td>DN 80 OD 3&quot;</td>
</tr>
<tr>
<td></td>
<td>DN 100 OD 4&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Nominal width of the driving medium valves*</td>
</tr>
<tr>
<td></td>
<td>0 Without driving medium valves</td>
</tr>
<tr>
<td></td>
<td>DN 15</td>
</tr>
<tr>
<td></td>
<td>DN 25 OD 1&quot;</td>
</tr>
<tr>
<td></td>
<td>DN 40 OD 1 ½&quot;</td>
</tr>
<tr>
<td></td>
<td>DN 50 OD 2&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Seal material</td>
</tr>
<tr>
<td></td>
<td>1 EPDM (FDA)</td>
</tr>
<tr>
<td></td>
<td>2 FKM (FDA)</td>
</tr>
<tr>
<td></td>
<td>3 HNBR (FDA)</td>
</tr>
<tr>
<td>5</td>
<td>Surface quality</td>
</tr>
<tr>
<td></td>
<td>2 Inside Ra ≤ 0.8 μm, outside matt blasted</td>
</tr>
<tr>
<td></td>
<td>3 Inside Ra ≤ 0.8 μm, outside ground</td>
</tr>
<tr>
<td>6</td>
<td>Certificates</td>
</tr>
<tr>
<td></td>
<td>K Without</td>
</tr>
<tr>
<td></td>
<td>W Test report 2.2</td>
</tr>
<tr>
<td></td>
<td>Z Inspection certificate 3.1</td>
</tr>
<tr>
<td></td>
<td>A Inspection certificate 3.1 and 2.2</td>
</tr>
<tr>
<td>7</td>
<td>Connection fittings</td>
</tr>
<tr>
<td></td>
<td>N Without connection fittings</td>
</tr>
<tr>
<td></td>
<td>J With connection fittings</td>
</tr>
<tr>
<td></td>
<td>TK VARIVENT® flange connection complete, grooved flange on housing</td>
</tr>
<tr>
<td></td>
<td>TN VARIVENT® grooved flange complete, incl. O-ring and connecting parts</td>
</tr>
<tr>
<td></td>
<td>TF VARIVENT® plain flange</td>
</tr>
<tr>
<td></td>
<td>CO Clamp connection</td>
</tr>
<tr>
<td>8</td>
<td>Material in contact with the product</td>
</tr>
<tr>
<td></td>
<td>1.4404 1.4404 (AISI 316L)</td>
</tr>
</tbody>
</table>

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

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<tr>
<th>Position</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>PIG/T</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>/</td>
<td>1.4404</td>
</tr>
</tbody>
</table>

For order codes differing from the standard version, please refer to section 2.
VARICOVER®

Pig Stopper

Technical data of the standard version

<table>
<thead>
<tr>
<th>Material in contact with the product</th>
<th>1.4404</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seal material in contact with the product</td>
<td>EPDM (FDA)</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>0 to 45 °C</td>
</tr>
<tr>
<td>Air supply pressure</td>
<td>4.2 bar (61 psi) to 8 bar (116 psi)</td>
</tr>
</tbody>
</table>
| Max. product pressure | DN 25 – DN 65: 16 bar (232 psi)
| | OD 1" – OD 2 ½": 10 bar (145 psi)
| | DN 80 – DN 100: 10 bar (145 psi)
| | OD 3" – OD 4": 10 bar (145 psi) |
| Surface in contact with the product | Rₐ ≤ 0.8 µm |
| External housing surface | Ground |
| Actuator type | Pneumatic actuator air/spring |
| Connection fittings | VARIVENT® grooved flange (welding end) |
| Identification | Adhesive ID tag |

<table>
<thead>
<tr>
<th>\textbf{Pipe}</th>
<th>\textbf{Housing}</th>
<th>\textbf{Actuator}</th>
<th>\textbf{Dimension}</th>
<th>\textbf{General}</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal width</td>
<td>Ø [mm]</td>
<td>Ødi [mm]</td>
<td>B [mm]</td>
<td>L1 [mm]</td>
</tr>
<tr>
<td>DN 25</td>
<td>29.0 × 1.50</td>
<td>26.00</td>
<td>37.0</td>
<td>75</td>
</tr>
<tr>
<td>DN 40</td>
<td>41.0 × 1.50</td>
<td>38.00</td>
<td>41.0</td>
<td>75</td>
</tr>
<tr>
<td>DN 50</td>
<td>53.0 × 1.50</td>
<td>50.00</td>
<td>51.0</td>
<td>75</td>
</tr>
<tr>
<td>DN 65</td>
<td>70.0 × 2.00</td>
<td>66.00</td>
<td>58.0</td>
<td>75</td>
</tr>
<tr>
<td>DN 80</td>
<td>85.0 × 2.00</td>
<td>81.00</td>
<td>65.0</td>
<td>75</td>
</tr>
<tr>
<td>DN 100</td>
<td>104.0 × 2.00</td>
<td>100.00</td>
<td>79.5</td>
<td>75</td>
</tr>
<tr>
<td>OD 1&quot;</td>
<td>25.4 × 1.65</td>
<td>22.10</td>
<td>35.0</td>
<td>75</td>
</tr>
<tr>
<td>OD 1½&quot;</td>
<td>38.1 × 1.65</td>
<td>34.80</td>
<td>39.5</td>
<td>75</td>
</tr>
<tr>
<td>OD 2&quot;</td>
<td>50.8 × 1.65</td>
<td>47.50</td>
<td>49.5</td>
<td>75</td>
</tr>
<tr>
<td>OD 2½&quot;</td>
<td>63.5 × 1.65</td>
<td>60.20</td>
<td>55.0</td>
<td>75</td>
</tr>
<tr>
<td>OD 3&quot;</td>
<td>76.2 × 1.65</td>
<td>72.90</td>
<td>61.0</td>
<td>75</td>
</tr>
<tr>
<td>OD 4&quot;</td>
<td>101.6 × 2.11</td>
<td>97.38</td>
<td>78.0</td>
<td>75</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9 to 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>PIG/PS</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>/</td>
<td>/52</td>
<td>+</td>
</tr>
</tbody>
</table>

For order codes differing from the standard version, please refer to section 2.
VARICOVER® Pig Stopper ATEX

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 40 – DN 65 | 16 bar (232 psi) |
| OD 1 ½" – OD 2 ½" | 10 bar (145 psi) |
| OD 3" | |
| Surface in contact with the product | Rₐ ≤ 0.8 µm |
| External housing surface | Ground |
| Actuator type | Pneumatic actuator air/spring |
| Connection fittings | VARIVENT® grooved flange (welding end) |
| Identification | Adhesive ID tag |
| Certificates | |

### Nominal width

<table>
<thead>
<tr>
<th>Pipe Width</th>
<th>Ø [mm]</th>
<th>Ødi [mm]</th>
<th>B [mm]</th>
<th>L₁ [mm]</th>
<th>L₂ [mm]</th>
<th>D₁ [mm]</th>
<th>H [mm]</th>
<th>X* [mm]</th>
<th>Weight [kg]</th>
<th>Stroke [mm]</th>
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</thead>
<tbody>
<tr>
<td>DN 40</td>
<td>41.0 × 1.50</td>
<td>38.00</td>
<td>41.0</td>
<td>75</td>
<td>125</td>
<td>68</td>
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<td>364</td>
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<tr>
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<td>75</td>
<td>125</td>
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<td>377</td>
<td>407</td>
<td>11.0</td>
<td>59.0</td>
</tr>
<tr>
<td>DN 65</td>
<td>70.0 × 2.00</td>
<td>66.00</td>
<td>58.0</td>
<td>75</td>
<td>125</td>
<td>139</td>
<td>385</td>
<td>415</td>
<td>12.0</td>
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<tr>
<td>OD 1 ½&quot;</td>
<td>38.1 × 1.65</td>
<td>34.80</td>
<td>39.5</td>
<td>75</td>
<td>125</td>
<td>68</td>
<td>333</td>
<td>388</td>
<td>6.5</td>
<td>41.0</td>
</tr>
<tr>
<td>OD 2&quot;</td>
<td>50.8 × 1.65</td>
<td>47.50</td>
<td>49.5</td>
<td>75</td>
<td>125</td>
<td>139</td>
<td>376</td>
<td>406</td>
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<td>56.5</td>
</tr>
<tr>
<td>OD 2 ½&quot;</td>
<td>63.5 × 1.65</td>
<td>60.20</td>
<td>55.0</td>
<td>75</td>
<td>125</td>
<td>139</td>
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<tr>
<td>OD 3&quot;</td>
<td>76.2 × 1.65</td>
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<td>61.0</td>
<td>75</td>
<td>125</td>
<td>139</td>
<td>388</td>
<td>418</td>
<td>12.0</td>
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* Clearance
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<tr>
<th>Position</th>
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<tbody>
<tr>
<td>1</td>
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</tr>
<tr>
<td></td>
<td>PIG/PS Pig stopper ATEX</td>
</tr>
<tr>
<td>2</td>
<td>Nominal width</td>
</tr>
<tr>
<td></td>
<td>DN 40 OD 1 ¼&quot;</td>
</tr>
<tr>
<td></td>
<td>DN 50 OD 2&quot;</td>
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<tr>
<td></td>
<td>DN 65 OD 2 ½&quot;</td>
</tr>
<tr>
<td></td>
<td>OD 3&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Proximity switches at the actuator (for technical specifications, see catalog GEA Valve Automation)</td>
</tr>
<tr>
<td></td>
<td>0 Without proximity switches</td>
</tr>
<tr>
<td></td>
<td>2 With proximity switches</td>
</tr>
<tr>
<td>4</td>
<td>Design</td>
</tr>
<tr>
<td></td>
<td>S Pig stopper (complete)</td>
</tr>
<tr>
<td></td>
<td>A Actuator as spare part</td>
</tr>
<tr>
<td>5</td>
<td>Seal material</td>
</tr>
<tr>
<td></td>
<td>1 EPDM (FDA)</td>
</tr>
<tr>
<td></td>
<td>2 FKM (FDA)</td>
</tr>
<tr>
<td></td>
<td>3 HNBR (FDA)</td>
</tr>
<tr>
<td>6</td>
<td>Surface quality</td>
</tr>
<tr>
<td></td>
<td>3 Inside Ra ≤ 0.8 µm, outside ground</td>
</tr>
<tr>
<td>7</td>
<td>Ex-zone surrounding area</td>
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<tr>
<td></td>
<td>Ex-zone pipework</td>
</tr>
<tr>
<td></td>
<td>1 Gases, zone 1</td>
</tr>
<tr>
<td></td>
<td>2 Gases, zone 2</td>
</tr>
<tr>
<td></td>
<td>21 Dust, zone 21</td>
</tr>
<tr>
<td></td>
<td>22 Dust, zone 22</td>
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<td>8</td>
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<tr>
<td></td>
<td>Connection fitting on port 1 / 2</td>
</tr>
<tr>
<td></td>
<td>N Without connection fittings</td>
</tr>
<tr>
<td></td>
<td>J With connection fittings</td>
</tr>
<tr>
<td>9</td>
<td>Accessories</td>
</tr>
<tr>
<td></td>
<td>/52 Adhesive ID tag</td>
</tr>
<tr>
<td>10-15</td>
<td>Air connection/control and feedback system</td>
</tr>
<tr>
<td></td>
<td>00000M Metric for air hose Ø 6/4 mm</td>
</tr>
<tr>
<td></td>
<td>00000Z Inch for air hose Ø OD ¼&quot; (6.35/4.35 mm)</td>
</tr>
<tr>
<td></td>
<td>XXXXX Order code for different control and feedback systems see catalog GEA Valve Automation</td>
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The code is composed as following, depending on the chosen configuration:

<table>
<thead>
<tr>
<th>Position</th>
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<th>4</th>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10 to 15</th>
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</thead>
<tbody>
<tr>
<td>Code</td>
<td>PIG/PS</td>
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<td>-</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>/</td>
<td>/52</td>
<td>+</td>
</tr>
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</table>

For order codes differing from the standard version, please refer to section 2.
**VARICOVER® Pig T-Piece**

**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
    - 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
    - $R_a \leq 0.8 \mu m$
  - External housing surface
    - Matt based
  - Connection fittings
    - Welding end
  - Identification
    - Adhesive ID tag

---

### Pipe

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>Ø [mm]</th>
<th>Ødi [mm]</th>
<th>L [mm]</th>
<th>L1* [mm]</th>
<th>L2** [mm]</th>
<th>H [mm]</th>
<th>H1** [mm]</th>
<th>H2 [mm]</th>
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</thead>
<tbody>
<tr>
<td>DN 25</td>
<td>29.0 × 1.50</td>
<td>26.00</td>
<td>100</td>
<td>150</td>
<td>143</td>
<td>31.5</td>
<td>56.5</td>
<td>53.0</td>
</tr>
<tr>
<td>DN 40</td>
<td>41.0 × 1.50</td>
<td>38.00</td>
<td>120</td>
<td>170</td>
<td>163</td>
<td>39.5</td>
<td>64.5</td>
<td>61.0</td>
</tr>
<tr>
<td>DN 50</td>
<td>53.0 × 1.50</td>
<td>50.00</td>
<td>140</td>
<td>190</td>
<td>183</td>
<td>51.5</td>
<td>76.5</td>
<td>73.0</td>
</tr>
<tr>
<td>DN 65</td>
<td>70.0 × 2.00</td>
<td>66.00</td>
<td>160</td>
<td>210</td>
<td>216</td>
<td>61.5</td>
<td>86.5</td>
<td>89.5</td>
</tr>
<tr>
<td>DN 80</td>
<td>85.0 × 2.00</td>
<td>81.00</td>
<td>180</td>
<td>230</td>
<td>236</td>
<td>72.5</td>
<td>97.5</td>
<td>100.5</td>
</tr>
<tr>
<td>DN 100</td>
<td>104.0 × 2.00</td>
<td>100.00</td>
<td>200</td>
<td>250</td>
<td>256</td>
<td>89.0</td>
<td>114.0</td>
<td>117.0</td>
</tr>
<tr>
<td>OD 1”</td>
<td>25.4 × 1.65</td>
<td>22.10</td>
<td>100</td>
<td>150</td>
<td>143</td>
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</tr>
<tr>
<td>OD 1 ½”</td>
<td>38.1 × 1.65</td>
<td>34.80</td>
<td>120</td>
<td>170</td>
<td>163</td>
<td>41.1</td>
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</tr>
<tr>
<td>OD 2”</td>
<td>50.8 × 1.65</td>
<td>47.50</td>
<td>140</td>
<td>190</td>
<td>183</td>
<td>48.4</td>
<td>73.4</td>
<td>69.9</td>
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<tr>
<td>OD 2 ½”</td>
<td>63.5 × 1.65</td>
<td>60.20</td>
<td>160</td>
<td>210</td>
<td>216</td>
<td>58.8</td>
<td>83.8</td>
<td>86.8</td>
</tr>
<tr>
<td>OD 3”</td>
<td>76.2 × 1.65</td>
<td>72.90</td>
<td>180</td>
<td>230</td>
<td>236</td>
<td>64.1</td>
<td>89.1</td>
<td>92.1</td>
</tr>
<tr>
<td>OD 4”</td>
<td>101.6 × 2.11</td>
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<td>200</td>
<td>250</td>
<td>256</td>
<td>89.3</td>
<td>114.3</td>
<td>117.3</td>
</tr>
</tbody>
</table>

* with VARIVENT® grooved flange   ** with clamp connection
### Position Description of the order code

<table>
<thead>
<tr>
<th>Position</th>
<th>Description of the order code</th>
</tr>
</thead>
<tbody>
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<td>Pig T-piece</td>
</tr>
<tr>
<td></td>
<td>PIG/TEE Pig T-piece</td>
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<tr>
<td>2</td>
<td>Nominal width</td>
</tr>
<tr>
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<td>DN 25 OD 1&quot;</td>
</tr>
<tr>
<td></td>
<td>DN 40 OD 1 ½&quot;</td>
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<td></td>
<td>DN 50 OD 2&quot;</td>
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<td>DN 65 OD 2 ½&quot;</td>
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<td>DN 80 OD 3&quot;</td>
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<td>Seal material</td>
</tr>
<tr>
<td></td>
<td>1 EPDM (FDA)</td>
</tr>
<tr>
<td></td>
<td>2 FKM (FDA)</td>
</tr>
<tr>
<td></td>
<td>3 HNBR (FDA)</td>
</tr>
<tr>
<td>4</td>
<td>Surface quality</td>
</tr>
<tr>
<td></td>
<td>2 Inside $R_a \leq 0.8 \mu m$, outside matt blasted</td>
</tr>
<tr>
<td></td>
<td>3 Inside $R_a \leq 0.8 \mu m$, outside ground</td>
</tr>
<tr>
<td>5</td>
<td>Connection fittings</td>
</tr>
<tr>
<td></td>
<td>Connection fitting on port 1 / 2 / 7</td>
</tr>
<tr>
<td></td>
<td>N Without connection fittings</td>
</tr>
<tr>
<td></td>
<td>J With connection fittings</td>
</tr>
<tr>
<td></td>
<td>TK VARIVENT® flange connection complete, grooved flange on housing</td>
</tr>
<tr>
<td></td>
<td>TN VARIVENT® grooved flange complete, incl. O-ring and connecting parts</td>
</tr>
<tr>
<td></td>
<td>TF VARIVENT® plain flange</td>
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<td></td>
<td>CO Clamp connection</td>
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The code is composed as following, depending on the chosen configuration:

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<th>Position</th>
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<th>3</th>
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<tbody>
<tr>
<td>Code</td>
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<td>-</td>
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<td>/</td>
</tr>
</tbody>
</table>

For order codes differing from the standard version, please refer to section 2.
VARICOVER®
Pig Type PK

Technical data of the standard version

Pig material in contact with the product: VMQ, FKM

Ambient temperature: -5 to 130 °C

Certificates:

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>L1 [mm]</th>
<th>L2 [mm]</th>
<th>ØD [mm]</th>
<th>Material</th>
<th>Article number</th>
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<tbody>
<tr>
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<td>On request</td>
<td>On request</td>
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<tr>
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<td>80</td>
<td>42</td>
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<td>228-163.33</td>
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<td>228-163.36</td>
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<table>
<thead>
<tr>
<th>OD 1&quot;</th>
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<th>On request</th>
<th>On request</th>
<th>Material</th>
<th>Article number</th>
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<tbody>
<tr>
<td>OD 1 ½&quot;</td>
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<td>32</td>
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<td>VMQ</td>
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<td>OD 2&quot;</td>
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<td>&gt; 47.50</td>
<td>FKM</td>
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<tr>
<td>OD 2 ½&quot;</td>
<td>119</td>
<td>58</td>
<td>&gt; 60.20</td>
<td>VMQ</td>
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<tr>
<td>OD 3&quot;</td>
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<td>70</td>
<td>&gt; 72.90</td>
<td>FKM</td>
<td>228-263.18</td>
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<tr>
<td>OD 4&quot;</td>
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<td>83</td>
<td>&gt; 97.38</td>
<td>VMQ</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>OD 1½&quot;</th>
<th>On request</th>
<th>On request</th>
<th>On request</th>
<th>Material</th>
<th>Article number</th>
</tr>
</thead>
<tbody>
<tr>
<td>OD 1&quot;</td>
<td>67</td>
<td>32</td>
<td>&gt; 34.80</td>
<td>VMQ</td>
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<td>OD 2&quot;</td>
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<td>45</td>
<td>&gt; 47.50</td>
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<td>OD 2 ½&quot;</td>
<td>119</td>
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<td>OD 3&quot;</td>
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<td>FKM</td>
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</tr>
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<td>OD 4&quot;</td>
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<td>83</td>
<td>&gt; 97.38</td>
<td>VMQ</td>
<td>228-263.06</td>
</tr>
</tbody>
</table>

The diagram shows the dimensions of the pig with the specified values for L1, L2, and ØD.
**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.
VARICOVER® Product Recovery Systems
VARICOVER® DM/1
Automatic Product Recovery Systems

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 one 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.
VARICOVER® Product Recovery Systems
VARICOVER® SP1/SP2
Semi-automatic Product Recovery Systems

**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.
VARICOVER® Product Recovery Systems
VARICOVER® MP1/MP2
Manual Product Recovery Systems

**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 SP1/SP2**
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 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.

<table>
<thead>
<tr>
<th>Material</th>
<th>Article number</th>
</tr>
</thead>
<tbody>
<tr>
<td>FKM</td>
<td>228-000259</td>
</tr>
<tr>
<td>Silicone</td>
<td>228-000260</td>
</tr>
</tbody>
</table>

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).
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.

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>Article number</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 25</td>
<td>228-168.02</td>
</tr>
<tr>
<td>DN 40</td>
<td>228-168.04</td>
</tr>
<tr>
<td>DN 50</td>
<td>228-168.06</td>
</tr>
<tr>
<td>DN 65</td>
<td>228-168.08</td>
</tr>
<tr>
<td>DN 80</td>
<td>228-168.10</td>
</tr>
<tr>
<td>DN 100</td>
<td>228-168.12</td>
</tr>
<tr>
<td>OD 1&quot;</td>
<td>228-168.01</td>
</tr>
<tr>
<td>OD 1 ½&quot;</td>
<td>228-168.03</td>
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<td>228-168.09</td>
</tr>
<tr>
<td>OD 4&quot;</td>
<td>228-168.11</td>
</tr>
</tbody>
</table>
**VARICOVER® Product Recovery Systems**

**Questionnaire**

**VARICOVER®**

---

### Customer

<table>
<thead>
<tr>
<th>Company name / customer number</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Project</td>
<td></td>
</tr>
<tr>
<td>Contact</td>
<td></td>
</tr>
<tr>
<td>Phone</td>
<td></td>
</tr>
<tr>
<td>Email</td>
<td></td>
</tr>
</tbody>
</table>

---

### Basic data (these parameters refer to the pipeline)

<table>
<thead>
<tr>
<th>Prerequisites</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• The same pipe interior diameter across the entire pigging route.</td>
<td></td>
</tr>
<tr>
<td>• No sharp-edged and strongly sagging welds.</td>
<td></td>
</tr>
<tr>
<td>• No installations such as measuring mountings in the piggable area.</td>
<td></td>
</tr>
<tr>
<td>• Standard pipe bends with small middle radius can be used.</td>
<td></td>
</tr>
<tr>
<td>Recommendation: Minimize the number of pipe bends!</td>
<td></td>
</tr>
<tr>
<td>• Use pipe bends with low ovality.</td>
<td></td>
</tr>
<tr>
<td>Tolerance maximum ± 1.5 % referring to the outside diameter.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pipeline</th>
<th>□ Existing</th>
<th>□ Planned</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal width</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe diameter</td>
<td>Inside _______ mm</td>
<td>Outside _______ mm</td>
<td></td>
</tr>
<tr>
<td>Material</td>
<td>□ 1.4404</td>
<td>□ Others:</td>
<td></td>
</tr>
<tr>
<td>Seal material</td>
<td>□ EPDM</td>
<td>□ FKM</td>
<td>□ HNBR</td>
</tr>
<tr>
<td>Piggable pipe lengths</td>
<td>_______ m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height difference between launching and receiving stations</td>
<td>_______ m</td>
<td>□ Dropping</td>
<td>□ Rising</td>
</tr>
<tr>
<td>Outlets between launching and receiving stations</td>
<td>□ T-pieces</td>
<td>□ Quantity</td>
<td></td>
</tr>
</tbody>
</table>

---

### Products

<table>
<thead>
<tr>
<th>Designation</th>
<th>Viscosity mPas</th>
<th>Operating temperature °C</th>
<th>Operating pressure barg</th>
<th>Flow rate m³/h</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Properties product 1 | □ Foaming | □ Lubricating | □ Others: |  |
| Properties product 2 | □ Foaming | □ Lubricating | □ Others: |  |
| Properties product 3 | □ Foaming | □ Lubricating | □ Others: |  |

---

### Pig driving medium

| Compressed air (according to ISO 8573-1:2001) | Air pressure min. _______ bar₉ | Air pressure max. _______ bar₉ |  |
| Water | Pressure _______ bar₉ |  |  |
| Other | Pressure _______ bar₉ |  |  |

| □ Water can be used at the launching and air at the receiving station (preferred). |  |
| □ Water can be used at the launching and receiving stations. |  |
| □ Air can be used at the launching and water at the receiving station. |  |
| □ Air must be used at the launching and the receiving stations. |  |

---

*Note: Please send us viscosity charts, viscosity [mPas] depending on the shear rate [s⁻¹].*
Process

☐ Pipeline is cleaned after each product push-out.

☐ Pipeline must be emptied after each cleaning.

If so, ☐ the system is self draining. ☐ the pig must push out the water.

☐ The pipeline is sterilized with steam after cleaning. Temperature: °C

How often is the product pushed out? ☐ per day x ☐ per week x ☐ per month x

Cleaning

<table>
<thead>
<tr>
<th>Cleaning media</th>
<th>Concentration %</th>
<th>Temperature °C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Design

Explosion protected design ☐ No ☐ Yes

☐ With control top
☐ AS-interface-bus ☐ 24 V DC, 3-wire
☐ With solenoid valve ☐ Without solenoid valve
☐ Others:

☐ Without control top
☐ With holding plate “INA” for proximity switches
☐ With proximity switches ☐ Without 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.

Air supply pressure (according to ISO 8573-1:2001)

<table>
<thead>
<tr>
<th>Air pressure min.</th>
<th>Air pressure max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>bar</td>
<td>bar</td>
</tr>
</tbody>
</table>

Use of ball valves possible from a hygienic point of view? ☐ Yes ☐ No

3-A certified ☐ Yes ☐ No

Comments


2 OPTIONS

VARICOVER® Product Recovery Systems
# Available Options

<table>
<thead>
<tr>
<th>Page</th>
<th>Section</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>Surface Qualities</td>
</tr>
<tr>
<td>60</td>
<td>Inner and Outer Surface of the Housings</td>
</tr>
<tr>
<td>61</td>
<td>Connection Fittings</td>
</tr>
<tr>
<td>61</td>
<td>Overview</td>
</tr>
<tr>
<td>62</td>
<td>VARIVENT® Flange Connection</td>
</tr>
<tr>
<td>64</td>
<td>Clamp Connection (Tri-Clamp)</td>
</tr>
<tr>
<td>65</td>
<td>Additional Options</td>
</tr>
<tr>
<td>65</td>
<td>Test Report and Inspection Certificate</td>
</tr>
<tr>
<td>66</td>
<td>ID Plates, TAG Numbers</td>
</tr>
<tr>
<td>68</td>
<td>3-A Symbol</td>
</tr>
<tr>
<td>69</td>
<td>General</td>
</tr>
<tr>
<td>69</td>
<td>Lubricant</td>
</tr>
</tbody>
</table>
Options
Surface Qualities
Inner and Outer Surface of the Housings

Typical application and description
Deviating from the quality of the standard surface quality (** DN/OD corresponding to Rₐ ≤ 0.8 μm), different surface qualities are available up to a medium roughness for surfaces in contact with the product of Rₐ ≤ 0.4 μm. The outer surface of the housings is matt 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 Rₐ ≤ 0.8 μm 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 but also the corresponding surface quality 3.

Incorporation of the option in the order code and example

<table>
<thead>
<tr>
<th>Position</th>
<th>Description of the order code for options</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>Surface quality of the housing</td>
</tr>
<tr>
<td>2**</td>
<td>Inside Rₐ ≤ 0.8 μm, outside matt blasted</td>
</tr>
<tr>
<td>3</td>
<td>Inside Rₐ ≤ 0.8 μm, outside ground</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position</th>
<th>Code</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11 to 16</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PIG/PCS</td>
<td>G</td>
<td>DN</td>
<td>80</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>N /52</td>
<td>+</td>
</tr>
</tbody>
</table>

* According to valve type
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.

Connection fittings

<table>
<thead>
<tr>
<th>Connection fittings</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TK</td>
<td>VARIVENT® flange connection, groove flange on housing</td>
</tr>
<tr>
<td>TN</td>
<td>VARIVENT® groove flange incl. O-ring and connecting parts</td>
</tr>
<tr>
<td>TF</td>
<td>VARIVENT® flange</td>
</tr>
<tr>
<td>CO</td>
<td>Clamp connection/ TRI-Clamp, DIN 32676 (DN) / ISO 2852 (OD)</td>
</tr>
</tbody>
</table>

Incorporation of the option in the order code and example

<table>
<thead>
<tr>
<th>Position</th>
<th>Description of the order code for options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Connection fittings</td>
</tr>
<tr>
<td>J</td>
<td>Component with connection fittings (required connection fitting according to list above, please state separately)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11 to 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>PIG/PCS</td>
<td>G</td>
<td>DN</td>
<td>80</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>J</td>
<td>/52</td>
</tr>
</tbody>
</table>
Options
Connection Fittings
VARIVENT® Flange Connection

**Options**

**Connection Fittings**

**VARIVENT® Flange Connection**

---

**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.
Available nominal widths

| Metric DN | 25–100 |
| Inch OD | OD 1"–4" |

Technical data

| Material | 1.4404 |
| Surface in contact with the product | Ra ≤ 0.8 µm |
| Certificates | 3.1/AD2000W2 |
| Max. pressure | DN 25 – DN 65 OD 1"–OD 2 ¼" 16 bar |
| | DN 80 – DN 100 OD 3"–OD 4" 10 bar |
| Seal materials | EPDM (FDA), FKM (FDA), HNBR (FDA) |

<table>
<thead>
<tr>
<th>Nominal width</th>
<th>D1 [mm]</th>
<th>D2 [mm]</th>
<th>D3 [mm]</th>
<th>D4 [mm]</th>
<th>d [mm]</th>
<th>L [mm]</th>
<th>L1 [mm]</th>
<th>PS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DN 25</td>
<td>70</td>
<td>30.0</td>
<td>26.0</td>
<td>53</td>
<td>4 × Ø 9</td>
<td>50</td>
<td>25</td>
<td>25.0 × 5.0</td>
</tr>
<tr>
<td>DN 40</td>
<td>82</td>
<td>42.0</td>
<td>38.0</td>
<td>65</td>
<td>4 × Ø 9</td>
<td>50</td>
<td>25</td>
<td>36.0 × 5.0</td>
</tr>
<tr>
<td>DN 50</td>
<td>94</td>
<td>54.0</td>
<td>50.0</td>
<td>77</td>
<td>4 × Ø 9</td>
<td>50</td>
<td>25</td>
<td>47.0 × 5.0</td>
</tr>
<tr>
<td>DN 65</td>
<td>113</td>
<td>70.0</td>
<td>66.0</td>
<td>95</td>
<td>8 × Ø 9</td>
<td>50</td>
<td>25</td>
<td>62.0 × 5.0</td>
</tr>
<tr>
<td>DN 80</td>
<td>128</td>
<td>85.0</td>
<td>81.0</td>
<td>110</td>
<td>8 × Ø 9</td>
<td>50</td>
<td>25</td>
<td>75.0 × 5.0</td>
</tr>
<tr>
<td>DN 100</td>
<td>159</td>
<td>104.0</td>
<td>100.0</td>
<td>137</td>
<td>8 × Ø 11</td>
<td>50</td>
<td>25</td>
<td>95.0 × 5.0</td>
</tr>
<tr>
<td>OD 1&quot;</td>
<td>66</td>
<td>25.5</td>
<td>22.0</td>
<td>49</td>
<td>4 × Ø 9</td>
<td>50</td>
<td>25</td>
<td>25.0 × 5.0</td>
</tr>
<tr>
<td>OD 1 ¼&quot;</td>
<td>79</td>
<td>38.5</td>
<td>35.0</td>
<td>62</td>
<td>4 × Ø 9</td>
<td>50</td>
<td>25</td>
<td>36.0 × 5.0</td>
</tr>
<tr>
<td>OD 2&quot;</td>
<td>91</td>
<td>51.0</td>
<td>47.5</td>
<td>74</td>
<td>4 × Ø 9</td>
<td>50</td>
<td>25</td>
<td>47.0 × 5.0</td>
</tr>
<tr>
<td>OD 2 ½&quot;</td>
<td>106</td>
<td>63.5</td>
<td>60.0</td>
<td>88</td>
<td>8 × Ø 9</td>
<td>50</td>
<td>25</td>
<td>62.0 × 5.0</td>
</tr>
<tr>
<td>OD 3&quot;</td>
<td>119</td>
<td>76.5</td>
<td>73.0</td>
<td>101</td>
<td>8 × Ø 9</td>
<td>50</td>
<td>25</td>
<td>75.0 × 5.0</td>
</tr>
<tr>
<td>OD 4&quot;</td>
<td>156</td>
<td>102.0</td>
<td>97.5</td>
<td>134</td>
<td>8 × Ø 11</td>
<td>50</td>
<td>25</td>
<td>95.0 × 5.0</td>
</tr>
</tbody>
</table>

Incorporation of the option in the order code and example

**Position**

| Description of the order code for options |
| Connection fittings |
| Component with connection fittings (please state option TK, TN or TF separately with reference to the connection) |

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11 to 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>PIG/PCS</td>
<td>G</td>
<td>DN</td>
<td>80</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>-</td>
</tr>
</tbody>
</table>
Options
Connection Fittings
Clamp Connection (Tri-Clamp)

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.

Available nominal widths

<table>
<thead>
<tr>
<th>Metric</th>
<th>DN</th>
<th>25–100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inch OD</td>
<td>OD</td>
<td>1”–4”</td>
</tr>
</tbody>
</table>

Technical data

<table>
<thead>
<tr>
<th>Material</th>
<th>DN</th>
<th>1.4404 (AISI 316L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OD</td>
<td>AISI 316L</td>
</tr>
<tr>
<td>Standard</td>
<td>DN</td>
<td>DIN 32676</td>
</tr>
<tr>
<td></td>
<td>OD</td>
<td>DIN 32676*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Length 28.5 mm**</td>
</tr>
<tr>
<td>Inner diameter</td>
<td>DN</td>
<td>DIN 11866 row A</td>
</tr>
<tr>
<td></td>
<td>OD</td>
<td>DIN 11866 row C</td>
</tr>
<tr>
<td>Max. pressure</td>
<td>DN 25 – DN 40</td>
<td>25 bar</td>
</tr>
<tr>
<td></td>
<td>OD 1”–OD 2 ½”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DN 50 – DN 65</td>
<td>16 bar</td>
</tr>
<tr>
<td></td>
<td>OD 2”–OD 3”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DN 80 – DN 100</td>
<td>10 bar</td>
</tr>
<tr>
<td></td>
<td>OD 4”</td>
<td></td>
</tr>
<tr>
<td>Certificates</td>
<td>3.1</td>
<td></td>
</tr>
</tbody>
</table>

*similar to ASME BPE B  **OD 6” referred to DIN 32676

Incorporation of the option in the order code and example

<table>
<thead>
<tr>
<th>Position</th>
<th>Description of the order code for options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Component with connection fittings (required connection fitting, please state separately)</td>
</tr>
</tbody>
</table>

Code | PIG/PCS | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 to 16 |
-----|---------|---|---|---|---|---|---|---|---|---|----|---------|
| Code |         | G | - | DN | 80 | 1 | 2 | - | 2 | - | J | 52       |
| Code |         | - | 0 | 0 | 0 | 0 | 0 | M |   |   |   |         |
**Typical application and description**

Optionally, the housings and connection fittings can be supplied with a test report 2.2 and/or an inspection certificate 3.1 acc. to EN 10204.

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.

<table>
<thead>
<tr>
<th>Number</th>
<th>Type of test certificate</th>
<th>Content of the certificate</th>
<th>Confirmation of the certificate by</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2</td>
<td>Test report</td>
<td>Confirmation of compliance with the order, specifying results of a non-specific test</td>
<td>The manufacturer</td>
</tr>
<tr>
<td>3.1</td>
<td>Inspection certificate 3.1*</td>
<td>Confirmation of compliance with the order, specifying results of a specific test</td>
<td>The manufacturer's acceptance officer independent of the production department</td>
</tr>
</tbody>
</table>

* Inspection certificates 3.1 can be selected either for the housing or for product wetted parts, incl. connection fittings or ADW2 (please specify when ordering).

**Incorporation of the option in the order code and example**

**Accessories**

<table>
<thead>
<tr>
<th>Position</th>
<th>Description of the order code for options</th>
</tr>
</thead>
<tbody>
<tr>
<td>/41</td>
<td>Test report 2.2</td>
</tr>
<tr>
<td>/42</td>
<td>Inspection certificate 3.1 according to EN 10204</td>
</tr>
</tbody>
</table>
Options
Additional Options
ID Plates, TAG Numbers

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 component, 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.

Key data contained

<table>
<thead>
<tr>
<th>Key data contained</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve type</td>
<td></td>
</tr>
<tr>
<td>Serial number</td>
<td></td>
</tr>
<tr>
<td>Materials in contact with</td>
<td>Metallic material / seal material</td>
</tr>
<tr>
<td>the product</td>
<td></td>
</tr>
<tr>
<td>Air supply pressure</td>
<td>Min./Max. [bar/psi]</td>
</tr>
<tr>
<td>Product pressure</td>
<td>Housing 1/2/3 [bar/psi]</td>
</tr>
</tbody>
</table>
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.

Incorporation of the option in the order code and example

<table>
<thead>
<tr>
<th>Position</th>
<th>Description of the order code for options</th>
<th>Accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>/50</td>
<td>Engraved metal plate</td>
<td></td>
</tr>
<tr>
<td>/51</td>
<td>Metal plate (US version)</td>
<td></td>
</tr>
<tr>
<td>/52</td>
<td>Adhesive ID tag</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11 to 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>PIG/PCS</td>
<td>G</td>
<td>DN</td>
<td>80</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>N</td>
</tr>
</tbody>
</table>
Options
Additional Options
3-A Symbol

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. Compliance with these design specifications is examined by an independent expert and confirmed by issuing a certificate.

If the 3-A option is selected, compliance 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 $R_a \leq 0.8 \mu m$, outside matt”. Many customers in this market ask for the alternative surface quality “inside surface $R_a \leq 0.8 \mu m$, outside ground”. If this is required, it must be selected separately in the order code as a non-standard surface.

Incorporation of the option in the order code and example

<table>
<thead>
<tr>
<th>Position</th>
<th>Description of the order code for options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Accessories</strong></td>
<td><strong>/3A</strong> Adhesive ID tag, configuration of the valve according to 3-A standard</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Position</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11 to 16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
<td>PIG/PCS</td>
<td>-</td>
<td>G</td>
<td>-</td>
<td>OD 3”</td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>N/S</td>
</tr>
<tr>
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<td>/52/3A</td>
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<td>+</td>
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<td>M</td>
</tr>
<tr>
<td>Tool</td>
<td>Article number</td>
<td></td>
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<td></td>
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<td>----------------------</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rivolta F.L.G. MD-2 (1,000 g)</td>
<td>413-071</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Rivolta F.L.G. MD-2 (100 g)</td>
<td>413-136</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
GEA Valve Automation – Control and Feedback Systems

Valve automation for increased process reliability, efficiency and flexibility
GEA's valve technology sets the standards for reliable, safe and permanently efficient liquid processes. Leading-edge control and automation options enable operators to achieve optimum control and monitoring of the valve – thereby realizing state-of-the-art, highly flexible operating and automation concepts.

The key component is the latest generation of GEA control tops with reliable, ground-breaking control and feedback technology. Mechanical valve components and a control top specified for the particular application together to form a finely tuned valve unit capable of realizing advanced system concepts and enhancing process options.

The control top – integral part of the valve unit
The control top facilitates optimized production and cleaning processes with less expenditure on staff, energy and time. Valve functions can be automatically and continuously monitored, recorded, evaluated and if necessary, corrected. Detectable valve positions make a crucial contribution towards the achievement of optimum system operation. This ensures adherence to a smooth process flow, while also achieving the utmost in product safety.

Special priority is given to sustainability in intelligent valve control: Thanks to the selectable LEFF® function integrated in the T.VIS® A-15, up to 90 percent of cleaning agents can be saved by an optimized and PLC-independent pulsing of the valve discs during the cleaning process. The economical air guidance in the control top and the integrated solenoid valves with low power intake minimize energy consumption as well as the demand for compressed air and the number of hose connections.

In addition, the control top offers the best protection to components against adverse ambient conditions such as moisture, dust, liquids of any kind, vibrations and other mechanical impact.
Modern plant communication at the threshold to Industry 4.0
The control tops in the current GEA range can be configured for all common types of connection and control systems to make future-oriented, pioneering automation functions possible. For example, users can ensure early digital integration of their system control setup in Industry 4.0 environments by way of the modern IO-Link technology. Digital exchange of data enables central setting of component parameters and lossless information transfer.

Diagnostic data from the valve can be processed and displayed in central control unit of the plant. The options even extend to networking the system controller with the company’s ERP system for optimized resource utilization.

perfect symbiosis of mechanical and electronic engineering, largely with standardized components. Extensive tests and countless valve units installed around the world have continuously proved the reliability and cost-effectiveness for the user, always ensuring maximum safety of operation.

Easy start-up
Thanks to pre-configurable system parameters and a fully automatic SETUP, the installation for digital valve control is easy even also without extensive technical knowledge. Regional requirements, application-specific certificates (UL/CSA/PMO/ATEX) and other individual specifications can be provided as needed.

As a true pioneer with decades of experience in the development of valves and control tops for all processes, GEA offers the perfect symbiosis of mechanical and electronic engineering, largely with standardized components. Extensive tests and countless valve units installed around the world have continuously proved the reliability and cost-effectiveness for the user, always ensuring maximum safety of operation.

Recommended control and feedback systems for GEA VARICOVER® product recovery systems
The T.VIS® M-15 offers an attractively priced basic version of control and feedback technology for GEA VARICOVER® product recovery systems with optimum adaptation to process conditions. The T.VIS® M-15 is fitted with manually adjustable sensors and is available for all established types of communication such as 24VDC, As-i and DeviceNet.

The T.VIS® A-15 offers extended functional scope and greater ease of operation. Besides the established types of communication, this control top also features the groundbreaking IO-Link technology, which allows users to set the parameters for components centrally in the system via digital data exchange and transfer all process data loss-free. Thanks to a fully automatic setup, commissioning can be quickly and easily carried out by means of the push buttons fitted on the hood. Additional functions such as the selection of different tolerance bands, signal attenuation and the resource-saving LEFF® function round off the T.VIS® A-15.

Attention must be paid to regional requirements for use in explosive areas. The SES meets the requirements of the European ATEX Directive and can be used in Zones 1 and 20. The T.VIS® A-15 is certified in accordance with the Directive Class 1 / Div. 2 in compliance with the regulations in place for the North American market.
Proximity switches
External proximity switch M12 x 1 for position feedback at the actuator of the pig cleaning station and the pig stopper.

Technical data

<table>
<thead>
<tr>
<th>Nominal switching distance</th>
<th>10 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection class</td>
<td>IP68</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>1.4301 / LCP</td>
</tr>
<tr>
<td>Material</td>
<td>GD-Zn, chrome-plated</td>
</tr>
<tr>
<td>Permitted ambient temperature</td>
<td>−30 to +85 °C</td>
</tr>
<tr>
<td>Proximity switch M12×1</td>
<td>Article no.</td>
</tr>
<tr>
<td>3-wire PNP normally close</td>
<td>505-103</td>
</tr>
<tr>
<td>(plug connector 508-953)</td>
<td></td>
</tr>
</tbody>
</table>

Technical data

<table>
<thead>
<tr>
<th>Nominal switching distance</th>
<th>2 mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protection class</td>
<td>IP67</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>10 – 30 V DC</td>
</tr>
<tr>
<td>Material</td>
<td>Brass, chrome-plated / PA12</td>
</tr>
<tr>
<td>Permitted ambient temperature</td>
<td>−25 to +70 °C</td>
</tr>
<tr>
<td>Marking</td>
<td>EXP 2 G EEx ia IIC T6</td>
</tr>
<tr>
<td>Proximity switch M12 x 1</td>
<td>Article no.</td>
</tr>
<tr>
<td>for ATEX application</td>
<td></td>
</tr>
<tr>
<td>NAMUR (terminal chamber)</td>
<td>505-085</td>
</tr>
</tbody>
</table>
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.

Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal switching distance</td>
<td>90 mm</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>10 – 65 V DC</td>
</tr>
<tr>
<td>Material</td>
<td>GD-Zn, chrome-plated</td>
</tr>
<tr>
<td>Permitted ambient temperature</td>
<td>−25 to +70 °C</td>
</tr>
</tbody>
</table>

Magnetic sensor
M12 × 1 for pig recognition – normally open function

3-wire PNP normally close (terminal chamber) 505-081

Technical data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal switching distance</td>
<td>90 mm</td>
</tr>
<tr>
<td>Protection class</td>
<td>IP67</td>
</tr>
<tr>
<td>Operating voltage</td>
<td>8.2 VDC</td>
</tr>
<tr>
<td>Material</td>
<td>CuZn, chrome-plated / PA12-GF30</td>
</tr>
<tr>
<td>Permitted ambient temperature</td>
<td>−25 to +70 °C</td>
</tr>
</tbody>
</table>

Magnetic sensor
M12 × 1 for pig recognition – ATEX category II 2 G, Ex zone 1

NAMUR (plug connector 508-953) 505-078
Our service package for dependable valve technology

With a tailored service concept, you can extend the service life of your hygienic valve technology. Professional services and original spare parts from GEA help to ensure maximum system availability and security, smooth operation and precise process execution.

Our service specialists are here to help you in every phase of system utilization – from the initial process concept and throughout the entire performance period to advising on your best strategies for the future.

Beginning of life services
We draw on our decades of experience to support you in configuring your system and providing extensive employee training. Our consultations and training sessions take place in our Competence Centre in Büchen or, upon request, at your premises.

Lifetime services
We optimize your spare parts logistics by using our modular component system and our extensive service network. Preventive maintenance programmes based on comprehensive data, routine troubleshooting and efficient repair logistics keep downtimes to a minimum.

Extended life services
When upgrades are available to enhance your system, you benefit from our continuing advances in hygienic valve technology. We offer extensive advice and consultation.

Consulting and enhanced operations
Working in partnership with you, we support your enduring success and develop service strategies and Service Level Agreements for a profitable future operation.
## Description of Certificates

<table>
<thead>
<tr>
<th>3-A</th>
<th>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.</th>
</tr>
</thead>
<tbody>
<tr>
<td>24/7 PMO VALVE 2.0* NON-STOP PRODUCTION</td>
<td>24/7 PMO VALVE® is a registered trade mark of GEA Tuchenhagen 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.</td>
</tr>
<tr>
<td>AS-i</td>
<td>Actuator Sensor interface. BUS system for the lowest field level.</td>
</tr>
<tr>
<td>ATEX</td>
<td>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 2014/34/EU, for another, the ATEX workplace directive 1999/92/EC.</td>
</tr>
<tr>
<td>cCSAus</td>
<td>Test of a product by CSA according to applicable safety standards in Canada and the USA.</td>
</tr>
<tr>
<td>CE</td>
<td>Conformité Européenne. By affixing the CE mark, the manufacturer confirms that the product complies with the European directives 765/2008 applicable to the specific product.</td>
</tr>
<tr>
<td>CSA</td>
<td>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.</td>
</tr>
<tr>
<td>cULus</td>
<td>Test of a product by UL according to applicable safety standards in Canada and the USA.</td>
</tr>
<tr>
<td>DeviceNet</td>
<td>BUS system of the ODVA organization for complex communication on various field levels.</td>
</tr>
<tr>
<td>EG 1935/2004*</td>
<td>Materials in contact with the product used in valves from GEA Tuchenhagen 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.</td>
</tr>
<tr>
<td>EHEDG</td>
<td>European Hygienic Engineering &amp; 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.</td>
</tr>
<tr>
<td>FDA</td>
<td>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.</td>
</tr>
<tr>
<td>ODVA</td>
<td>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.</td>
</tr>
<tr>
<td>TÜV</td>
<td>Technischer Überwachungs-Verein. The German TÜV is a private company which carries out technical safety checks as prescribed in national legislation or regulations.</td>
</tr>
<tr>
<td>UL</td>
<td>Underwriters Laboratories. An organization founded in the USA for checking and certifying products and their safety.</td>
</tr>
</tbody>
</table>

* not possible for HNBR
Abbreviations and Terms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>°C</td>
<td>Degrees Celsius, unit of measurement for temperature</td>
</tr>
<tr>
<td>°F</td>
<td>Degrees Fahrenheit, unit of measurement for temperature</td>
</tr>
<tr>
<td>3-A</td>
<td>Standard of 3-A Sanitary Standards, Incorporated (3-A SSI)</td>
</tr>
<tr>
<td>3D</td>
<td>Three-dimensional</td>
</tr>
<tr>
<td>A</td>
<td>Ampere, unit of measurement of current intensity or Output, term used in automation</td>
</tr>
<tr>
<td>AC</td>
<td>Alternating Current</td>
</tr>
<tr>
<td>ADI free</td>
<td>All elastomer compounds are free of animal-derived ingredients</td>
</tr>
<tr>
<td>AISI</td>
<td>American Iron and Steel Institute, association of the American steel industry</td>
</tr>
<tr>
<td>ANSI</td>
<td>American National Standards Institute, American body for standardizing industrial processes</td>
</tr>
<tr>
<td>approx.</td>
<td>approximately</td>
</tr>
<tr>
<td>AS-i</td>
<td>Actuator Sensor interface, standard for fieldbus communication</td>
</tr>
<tr>
<td>ASME</td>
<td>American Society of Mechanical Engineers, professional association of mechanical engineers in the USA</td>
</tr>
<tr>
<td>ASME-BPE</td>
<td>Standard of the ASME’s – bioprocessing equipment association</td>
</tr>
<tr>
<td>ATEX</td>
<td>Atmosphères Explosibles, synonymous with the directives of the European Union for potentially explosive areas</td>
</tr>
<tr>
<td>bar</td>
<td>Unit of measurement for pressure. All pressure values [bar/psig] refer to positive pressure [bar/psi], unless specifically stated otherwise.</td>
</tr>
<tr>
<td>bar₉</td>
<td>Unit of measurement for pressure relative to atmospheric pressure</td>
</tr>
<tr>
<td>CAN</td>
<td>Controller Area Network; asynchronous serial bus system</td>
</tr>
<tr>
<td>CE</td>
<td>Conformité Européenne, administrative symbol for the free movement of industrial products</td>
</tr>
<tr>
<td>CIP</td>
<td>Cleaning In Place, designates a process for cleaning technical process systems.</td>
</tr>
<tr>
<td>CRN</td>
<td>The Canadian Registration Number is issued by a Canadian Jurisdiction and covers pressurized components. The authorization is needed to operate these components in Canada.</td>
</tr>
<tr>
<td>CSA</td>
<td>Canadian Standards Association, a non-governmental Canadian Standardization organization</td>
</tr>
<tr>
<td>dB</td>
<td>Decibel, one tenth of a bel, named after Alexander Graham Bell and used for identifying levels and dimensions</td>
</tr>
<tr>
<td>DC</td>
<td>Direct Current</td>
</tr>
<tr>
<td>DIN</td>
<td>Deutsches Institut für Normung e. V. Standardization organization in the Federal Republic of Germany, DIN = synonym for standards issued by the organization</td>
</tr>
<tr>
<td>DP</td>
<td>Dual Inline Package, design of a switch</td>
</tr>
<tr>
<td>DN</td>
<td>Diameter Nominal, DN nominal width</td>
</tr>
<tr>
<td>Device Net</td>
<td>Network system used in the automation industry to interconnect control devices for data exchange</td>
</tr>
<tr>
<td>E</td>
<td>Input, term used in automation</td>
</tr>
<tr>
<td>EAC</td>
<td>Certification of technical conformity from the customs union of Russia/Balarus/Kazakhstan</td>
</tr>
<tr>
<td>EG No. 1935/2004</td>
<td>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.</td>
</tr>
<tr>
<td>EHEDG</td>
<td>European Hygienic Engineering and Design Group. Consortium of equipment manufacturers, food industries, research institutes as well as public health authorities</td>
</tr>
<tr>
<td>EN</td>
<td>European standard, rules of the European Committee for Standardization</td>
</tr>
<tr>
<td>EPDM</td>
<td>Ethylene propylene diene rubber, acronym acc. to DIN/ISO 1629</td>
</tr>
<tr>
<td>Ex</td>
<td>Synonym for ATEX</td>
</tr>
<tr>
<td>FDA</td>
<td>Food and Drug Administration, official foodstuffs monitoring in the United States</td>
</tr>
<tr>
<td>FEM calculation</td>
<td>Finite Element Method; calculation process for simulating solids</td>
</tr>
<tr>
<td>FKM</td>
<td>Fluorinated rubber, acronym acc. to DIN/ISO 1629</td>
</tr>
<tr>
<td>H</td>
<td>Henry, unit of measurement for inductance</td>
</tr>
<tr>
<td>HNBR</td>
<td>Hydrated acrylonitrile butadiene rubber, acronym acc. to DIN / ISO 1629</td>
</tr>
<tr>
<td>Hz</td>
<td>Hertz, unit of frequency named after Heinrich Hertz</td>
</tr>
<tr>
<td>I</td>
<td>Formula symbol for electrical current</td>
</tr>
<tr>
<td>IEC</td>
<td>International Electrotechnical Commission, international standardization organization for electrical and electronic engineering</td>
</tr>
</tbody>
</table>
## Abbreviations and Terms

<table>
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<tr>
<th>Abbreviation</th>
<th>Explanation</th>
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</thead>
<tbody>
<tr>
<td>IP</td>
<td>Ingress Protection / International Protection, index of protection class acc. to IEC 60529</td>
</tr>
<tr>
<td>IPS</td>
<td>Iron Pipe Size, American pipe dimension</td>
</tr>
<tr>
<td>ISA</td>
<td>International Society of Automation, international US organization of the automation industry</td>
</tr>
<tr>
<td>ISO</td>
<td>International Organization for Standardization, international organization that produced international standards, ISO = synonym for standards from the organization</td>
</tr>
<tr>
<td>kg</td>
<td>Kilogram, unit of measurement for weight</td>
</tr>
<tr>
<td>Kv</td>
<td>The Kv value corresponds to the water flow rate through a valve (in m³/h) at a pressure differential of 0.98 bar and a water temperature of 5 °C to 30 °C.</td>
</tr>
<tr>
<td>Kvs</td>
<td>The Kvs value of a valve at nominal stroke (100 % opening) is designated the Kvs value</td>
</tr>
<tr>
<td>L</td>
<td>Conductive</td>
</tr>
<tr>
<td>LED</td>
<td>Light-Emitting Diode</td>
</tr>
<tr>
<td>LEFF®</td>
<td>Function of the T.VIS® valve informations system for cyclical pulsing during the lifting process; Low-Emission Flip Flop</td>
</tr>
<tr>
<td>mm</td>
<td>Millimeter, unit of measurement for length</td>
</tr>
<tr>
<td>M</td>
<td>Metric, system of units based on the meter or Mega, one million times a unit</td>
</tr>
<tr>
<td>m³/h</td>
<td>Cubic meters per hour, unit of measurement for volumetric flow</td>
</tr>
<tr>
<td>max.</td>
<td>Maximum</td>
</tr>
<tr>
<td>NAMUR</td>
<td>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</td>
</tr>
<tr>
<td>NC</td>
<td>Normally Closed; valve or solenoid valve control which is closed in idle status</td>
</tr>
<tr>
<td>NO</td>
<td>Normally Open; valve or solenoid valve control which is open in idle status</td>
</tr>
<tr>
<td>NOT-element</td>
<td>Logic element, NOT gate</td>
</tr>
<tr>
<td>NPN</td>
<td>Signal transmission against reference potential, current-consuming</td>
</tr>
<tr>
<td>NPT</td>
<td>National Pipe Thread, US thread standard for self-sealing pipe fittings</td>
</tr>
<tr>
<td>OD</td>
<td>Outside Diameter, pipe dimension</td>
</tr>
<tr>
<td>ODVA</td>
<td>Open DeviceNet Vendor Association, global association for network standards</td>
</tr>
<tr>
<td>PA 12/L</td>
<td>Polyamide</td>
</tr>
<tr>
<td>Pg</td>
<td>Armoured thread</td>
</tr>
<tr>
<td>PMO</td>
<td>Pasteurized Milk Ordinance</td>
</tr>
<tr>
<td>PN</td>
<td>Nominal pressure for pipeline systems according to EN 1333, rated pressure in bar at room temperature (20 °C)</td>
</tr>
<tr>
<td>PNP</td>
<td>Signal transmission against reference potential, current-supplying</td>
</tr>
<tr>
<td>PPO</td>
<td>Polyphenylene oxide, thermoplastic material</td>
</tr>
<tr>
<td>PS</td>
<td>Maximum permitted operating pressure at which the components can operate safely at maximum allowable temperature (TS)</td>
</tr>
<tr>
<td>psi</td>
<td>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/psi], unless specifically stated otherwise.</td>
</tr>
<tr>
<td>psiₐ</td>
<td>Unit of measurement for pressure relative to atmospheric pressure</td>
</tr>
<tr>
<td>PV</td>
<td>Solenoid valve</td>
</tr>
<tr>
<td>Rₐ in μm</td>
<td>Average roughness value, describes the roughness of a technical surface</td>
</tr>
<tr>
<td>RM</td>
<td>Feedback</td>
</tr>
<tr>
<td>International Protection-Code</td>
<td>Classifies and rates the degree of protection provided against intrusion dust, accidental contact, and water</td>
</tr>
<tr>
<td>IP67, IP66, IP69K</td>
<td></td>
</tr>
<tr>
<td>SES</td>
<td>GEA Tuchenhagen control head for Ex areas, control top system of GEA Tuchenhagen</td>
</tr>
<tr>
<td>SET-UP</td>
<td>Self-learning installation, the SET-UP procedure carries out all necessary settings for generating messages during commissioning and maintenance.</td>
</tr>
<tr>
<td>SIP</td>
<td>Sterilization in Place, refers to a process for cleaning technical process systems</td>
</tr>
<tr>
<td>SMS</td>
<td>Svensk Mjölk Standard, Scandinavian pipe dimension</td>
</tr>
<tr>
<td>SW</td>
<td>Indicates the size of a tool spanner, &quot;Schlüsselweite&quot;</td>
</tr>
</tbody>
</table>

**Abbreviation:**
- TA-Luft
- VDI 2440

**Explanation:**
- If a product is certified according to TA Luft it meets the requirements for proof of high grade performance according to TA Luft of $1.0 \times 10^{-4}$ mbar x l / (s x m) at service conditions under the VDI guideline 2440. The product will hence be tested for tightness.

**Brand name:**
- TEFASEP® gold

**Function:**
- Function of the T.VIS® valve informations system for cyclical pulsing during the lifting process; Low-Emission Flip Flop

**Standardization working association:**
- NAMUR

**Nominal pressure:**
- PN

**Unit of measurement:**
- psi

**Unit of measurement for pressure:**
- psiₐ

**Unit of measurement for pressure relative to atmospheric pressure:**
- PV

**Solenoid valve:**
- Rₐ

**Average roughness value:**
- Average roughness value, describes the roughness of a technical surface

**Feedback:**
- RM

**Classifies and rates the degree of protection provided against intrusion dust, accidental contact, and water:**
- International Protection-Code

**GEA Tuchenhagen control head for Ex areas, control top system of GEA Tuchenhagen:**
- SES

**Self-learning installation:**
- SET-UP

**Sterilization in Place:**
- SIP

**Svensk Mjölk Standard, Scandinavian pipe dimension:**
- SMS

**Indicates the size of a tool spanner:**
- SW
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<td>If a product is certified according to TA Luft it meets the requirements for proof of high grade performance according to TA Luft of $1.0 \times 10^{-4}$ mbar x l / (s x m) at service conditions under the VDI guideline 2440. The product will hence be tested for tightness.</td>
</tr>
<tr>
<td>VDI 2440</td>
<td></td>
</tr>
<tr>
<td>TEFASEP* gold</td>
<td>Brand name for GEA's proprietary valve seat seal (hard sealing)</td>
</tr>
<tr>
<td>T.VIS*</td>
<td>GEA Tuchenhagen valve information system, control top system from GEA Tuchenhagen</td>
</tr>
<tr>
<td>TS</td>
<td>Maximum permitted operating temperature</td>
</tr>
<tr>
<td>UL</td>
<td>Underwriters Laboratories, a certification organization established in the USA</td>
</tr>
<tr>
<td>USP Class VI</td>
<td>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.</td>
</tr>
<tr>
<td>UV</td>
<td>Ultraviolet, ultraviolet radiation is a wavelength of light</td>
</tr>
<tr>
<td>V</td>
<td>Volt, unit of measurement for voltage</td>
</tr>
<tr>
<td>VARICOMP*</td>
<td>Pipe expansion compensator from GEA Tuchenhagen</td>
</tr>
<tr>
<td>VMQ</td>
<td>High-polymer vinyl methyl polysiloxane, silicone rubber, MVQ = synonym</td>
</tr>
<tr>
<td>W</td>
<td>Watt, unit of measurement for power</td>
</tr>
<tr>
<td>Y</td>
<td>Control air connection for the working cylinder, designation from pneumatic systems</td>
</tr>
<tr>
<td>μ</td>
<td>Micro, one millionth of a unit</td>
</tr>
<tr>
<td>Ω</td>
<td>Ohm, the unit of electrical resistance named after Georg Simon Ohm</td>
</tr>
</tbody>
</table>
**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:**

<table>
<thead>
<tr>
<th>Format</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>drw</td>
<td>Native Pro/E</td>
</tr>
<tr>
<td>igs (2D)</td>
<td>IGS file</td>
</tr>
<tr>
<td>dxf</td>
<td>AutoCAD drawing exchange</td>
</tr>
<tr>
<td>pdf (2D)</td>
<td>Adobe Acrobat document</td>
</tr>
<tr>
<td>tif</td>
<td>TIFF (plot)</td>
</tr>
<tr>
<td>asm</td>
<td>Native Pro/E</td>
</tr>
<tr>
<td>igs (3D)</td>
<td>IGS file</td>
</tr>
<tr>
<td>pdf (3D)</td>
<td>Adobe Acrobat document</td>
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<tr>
<td>stp</td>
<td>STP file</td>
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<tr>
<td>bmp (3D)</td>
<td>Bitmap image</td>
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<td>jpg (3D)</td>
<td>JPEG image</td>
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<tr>
<td>tif (3D)</td>
<td>TIFF image</td>
</tr>
<tr>
<td>sat</td>
<td>Standard ACIS</td>
</tr>
</tbody>
</table>
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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.
VARICOVER® Pig Catching Pipe/Pig Catching Station
GEA VARICOVER® Hygienic Product Recovery Systems

VARICOVER® Pig Cleaning Station
GEA VARICOVER® Hygienic Product Recovery Systems

VARICOVER® Pig Stopper
GEA VARICOVER® Hygienic Product Recovery Systems

VARICOVER® Pig T-Piece
GEA VARICOVER® Hygienic Product Recovery Systems