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GEA VARICOVER® HYGIENIC PRODUCT RECOVERY SYSTEMS

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for the U.S. dairy market

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 costeffective 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.

Hygienic Components – for Special Process Functions

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

Nominal width	DN	25	40	50	65	80	100
	OD	1"	1 ½"	2"	2 ½"	3"	4"
Valve type							
VARICOVER® product recovery system		•	•	•	•	•	•

Pipe classes

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

Metric		Inch	
DIN	Outside diameter according to DIN 11866, series A	OD IPS	Outside diameter based on ASME-BPE-a-2004, DIN 11866, series C
25	29.0 × 1.50	1"	25.4 × 1.65
40	41.0 × 1.50	1 ½"	38.1 × 1.65
50	53.0 × 1.50	2"	50.8 × 1.65
65	70.0 × 2.00	2 ½"	63.5 × 1.65
80	85.0 × 2.00	3"	76.2 × 1.65
100	104.0 × 2.00	4"	101.6 × 2.11

Surfaces
The standard for surfaces in contact with the product depends on the particular nominal width standard:
- Metric, inch OD, ISO: $R_a \leq 0.8$ µm

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.

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

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

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

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

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

						Main alloy elements in % by mass			
Material number	Short name			Similar materials	PREN***	Cr (Chrome)	Ni (Nickel)	Mo (Molybdenum)	C max. (Carbon)
1.4301*	X5CrNi18-10	AISI 304	BS 304S15	SS2332	18	17.5–19.5	8.0–10.5	–	0.07
1.4404**	X2 CrNiMo 17-12-2	AISI 316L	BS 316S11	SS2348	25	16.5–18.5	10.0–13.0	2.0–2.5	0.03

* 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

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

Other applications on request

* Depending on the installation situation

** Inorganic acids are, for example, hydrochloric acid, nitric acid, sulphuric acid

\+ = Good resistance

O = Reduced service life

– = Not resistant

Selection Matrix

Catalogs
Hygienic Valve Technology

Catalogs
Hygienic Pump Technology

Catalogs
Aseptic Valve Technology

Catalogs
Cleaning Technology

GEA VARIVENT®
seat valves

GEA butterfly valves

GEA VARIVENT®
special application valves

GEA VARIVENT®
valves for the U.S. dairy market

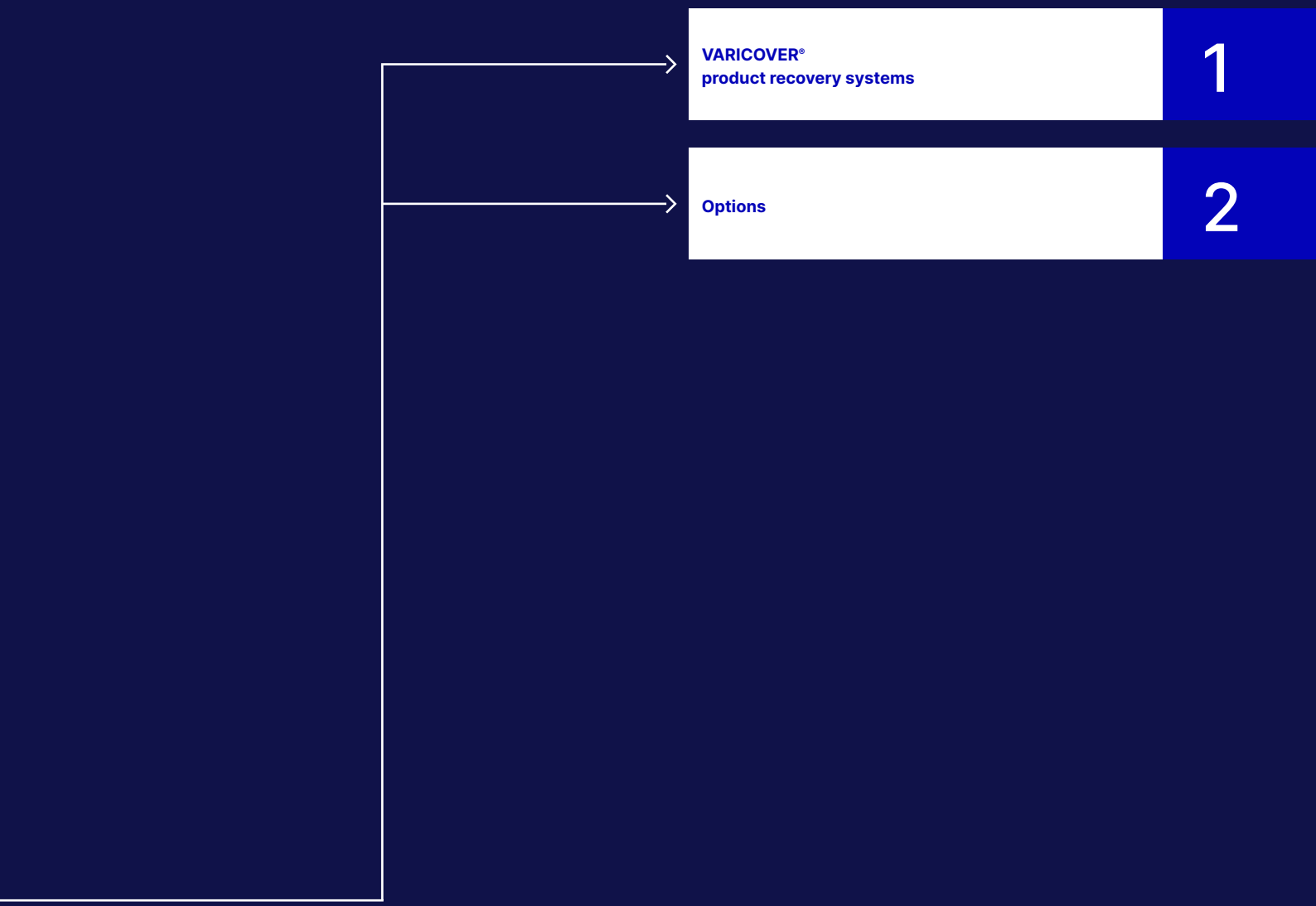
GEA VARITOP®
tank safety systems

GEA VARINLINE® / GEA VARICOMP®
process connections and
expansion compensators

GEA VARICOVER®
product recovery systems

GEA Service
for hygienic valve technology

GEA valve automation
control and feedback systems


VARICOVER®
product recovery systems
1
Options
2

1 VARICOVER® PRODUCT RECOVERY SYSTEMS

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!

Special features
Design with no dead zones
CIP/SIP-able
Reduced product loss
Reduced cleaning media and water consumption
Reduced waste water load
Reduced production downtimes
Simple maintenance

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.

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

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

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

The pig driving medium can be water, air, CO_2 or N_2.

Cross-section of the housing
of the pig cleaning station

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

Pig stopper with pig

Prerequisites for operating of product recovery systems

- Fluid products suitable for pumping
- Non-sedimenting products
- No installations protruding into the pipe in the section to be pigged, such as measuring mountings
- Only piggable valves matching the geometry of the GEA 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 pf 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

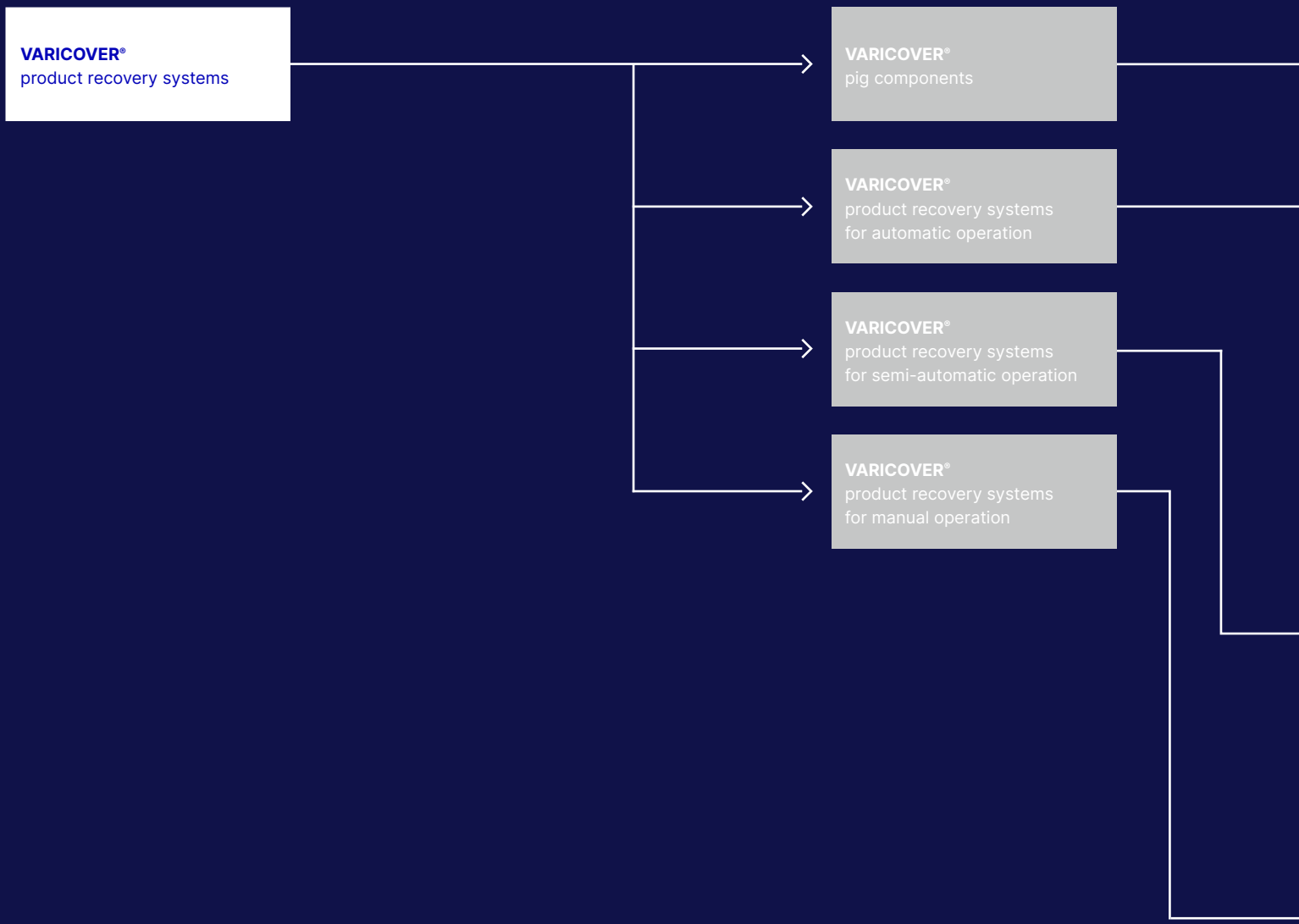
The pig speed control is important for the for successful operation of a product recovery system. It must not exceed 0.5 m/s when reaching the pig station. If the arrival speed is too high, there is the danger of damage to the pig.

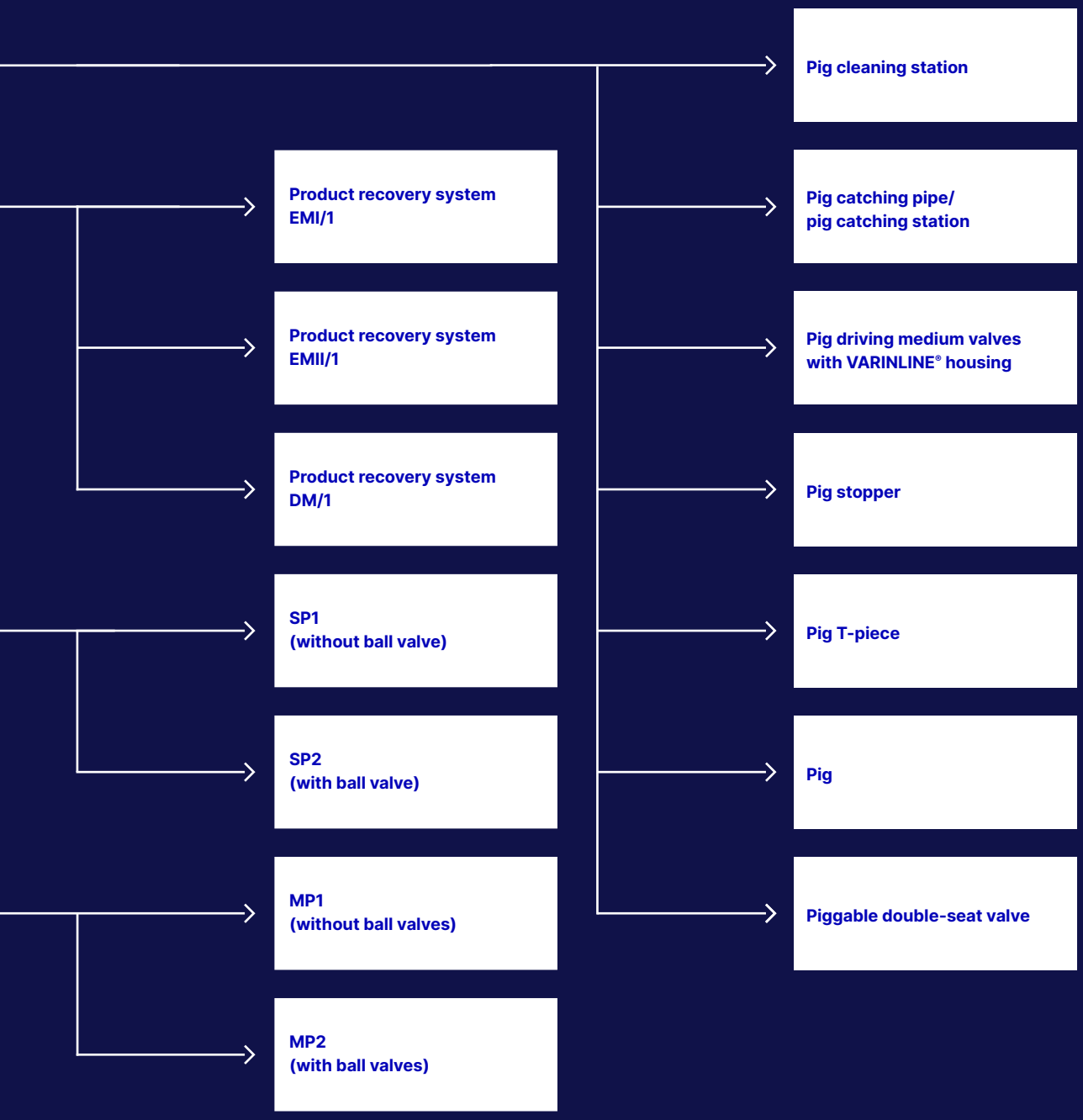
When using compressible media, such as air, before and behind the pig, the following applications must be avoided:

- 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.

Pig Selection Matrix




Product recovery system EMI/1
Product recovery system EMII/1
Product recovery system DM/1
SP1 (without ball valve)
SP2 (with ball valve)
MP1 (without ball valves)
MP2 (with ball valves)
Pig cleaning station
Pig catching pipe/ pig catching station
Pig driving medium valves with VARINLINE® housing
Pig stopper
Pig T-piece
Pig
Piggable double-seat valve

1

2

VARICOVER® Product Recovery Systems
Overview VARICOVER® Pig Components
Pig Cleaning Station

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.

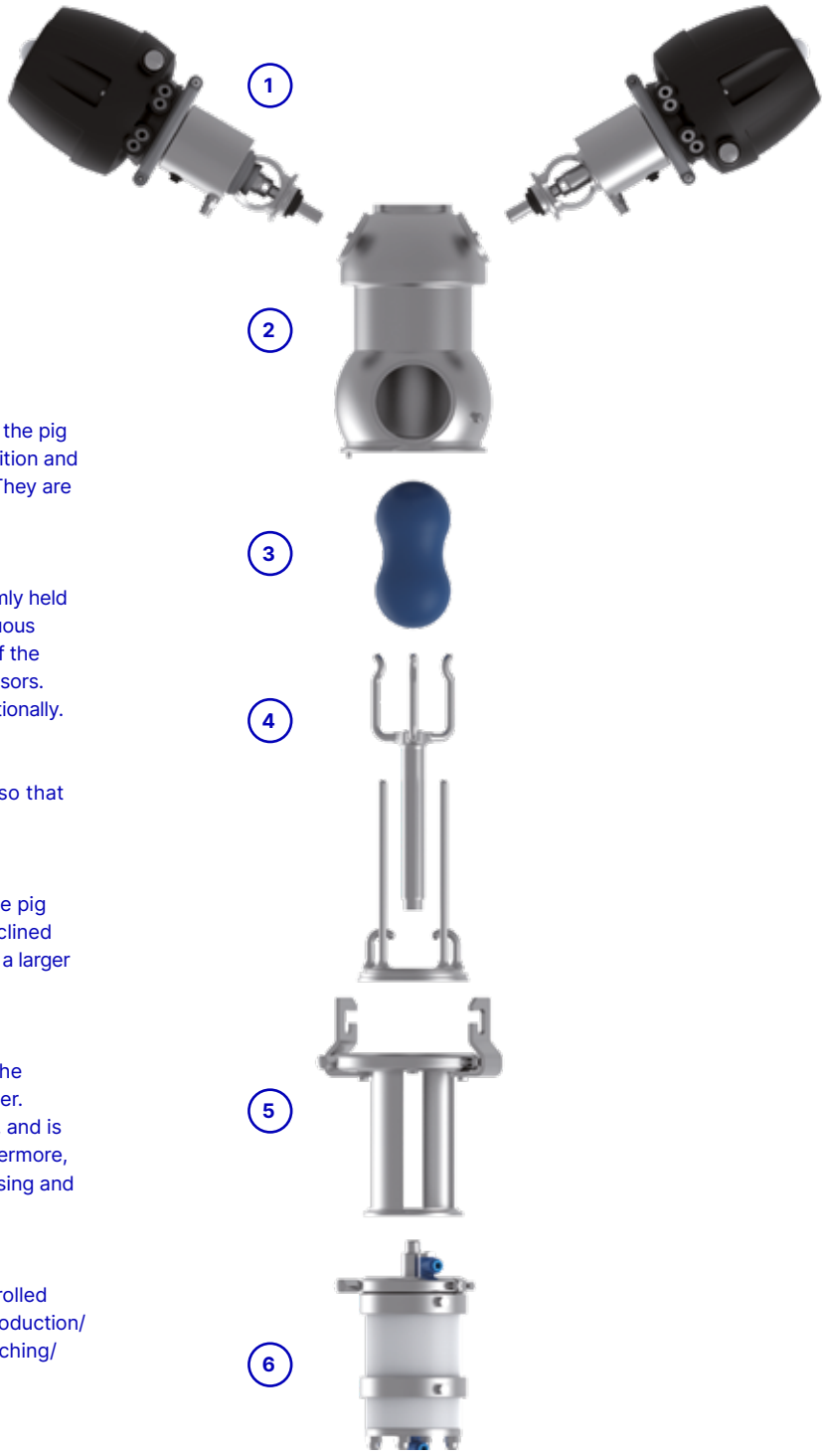
When receiving or launching the pig, the pig gripper is pushed forward. The pig is half gripped by the gripper rods, so that it securely reaches the retracted position for production or cleaning.

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.

Complete cleaning of the pig in the pig cleaning station



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.

VARICOVER® Product Recovery Systems
Overview VARICOVER® Pig Components
Pig Catching Pipe/Pig Catching Station

Pig catching pipe/pig catching station

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

Pig catching pipe
with pig driving medium valves

Cross section pig
catching station

VARICOVER® Product Recovery Systems
Overview VARICOVER® Pig Components
Pig Driving Medium Valves with VARINLINE® Housing

VARINLINE®
housings

VARINLINE®
housings
with pig driving
medium valves

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.

VARICOVER® Product Recovery Systems
Overview VARICOVER® Pig Components
Pig Stopper

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 stopper

Cross section pig stopper with opened stopper rod

Cross section pig stopper with closed stopper rod

Cross section pig stopper with pig

VARICOVER® Product Recovery Systems
Overview VARICOVER® Pig Components
Pig T-Piece

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

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

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

Pig in T-piece

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

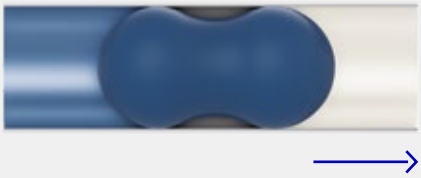
VARICOVER® Product Recovery Systems
Overview VARICOVER® Pig Components
Pig

Pig

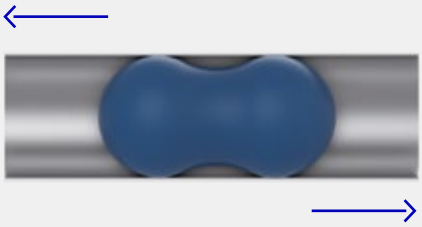
The pig is an inherently stable body made from wear- and temperature-resistant, product compatible material. Its contours allow reliable cleaning of the entire surface. The double ball shape of the pig ensures an optimal passage through small and large pipe bends as well as T-pieces with a reduced lateral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

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

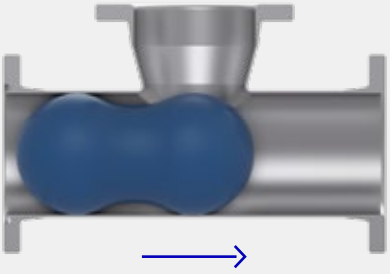
Available pig materials are Silicone and FKM (both FDA, 3A (18-03) and EU VO 1935/2004 compliant).



Separation of two different media



Both running directions possible



Separation of two different media

Pigging pipe bends

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.

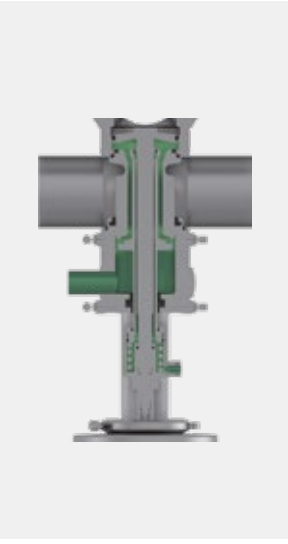
The double-seat valve type L can be installed in the standing or suspended position. When suspended, the valve opens with low switching leakage, while switching leakage occurs in the standing position. The switching leakage escapes from the additional emptying valve that is between the housings.

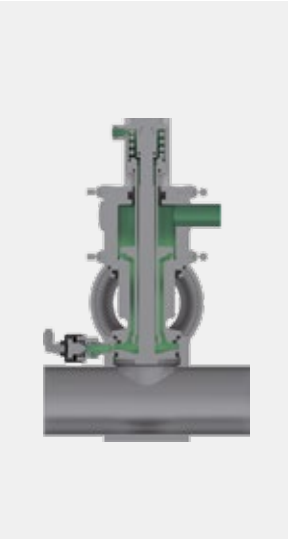
The emptying valve pneumatically connected to the actuator is opened while the valve is closed and closes when activating the actuator.

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.

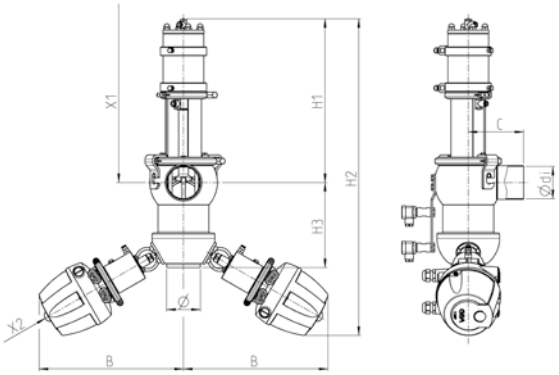
Application ranges
Piggable valve blocks
Piggable filling and emptying valves at product tanks

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

Material in contact with the product		1.4404
Seal material in contact with the product		EPDM (FDA)
Ambient temperature		0 to 45 °C
Air supply pressure		4.8 bar (69.6 psi) to 8 bar (116 psi)
Max. product pressure	DN 25 – DN 80 OD 1"–OD 3"	16 bar (232 psi)
	DN 100 OD 4"	10 bar (145 psi)
Surface in contact with the product		$R_a \leq 0.8$ 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		CE FDA

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

*Clearance

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

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

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

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

VARICOVER®
Pig Cleaning Station ATEX

Connection fitting
on port 1 / 7

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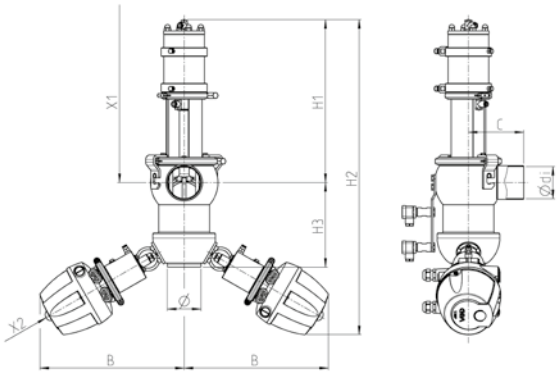


Technical data of the standard version

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		$R_a \leq 0.8$ 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		CE FDA

	Pipe		Housing		Dimensions					General
Nominal width	Ø [mm]	Ødi [mm]	B [mm]	C [mm]	H1 [mm]	H2 [mm]	H3 [mm]	X1* [mm]	X2* [mm]	Weight [kg]
DN 40	41.0 × 1.50	38.00	339	90	353.0	521.0	135.0	503.0	100	14.5
DN 50	53.0 × 1.50	50.00	313	90	359.0	650.0	158.0	559.0	100	16.0
DN 65	70.0 × 2.00	66.00	323	90	367.0	692.0	170.0	597.0	100	17.0
OD 1 ½"	38.1 × 1.65	34.80	337	90	351.5	510.0	125.5	501.5	100	15.5
OD 2"	50.8 × 1.65	47.50	313	90	358.0	647.0	156.0	558.0	100	16.0
OD 2 ½"	63.5 × 1.65	60.20	320	90	364.0	689.0	170.0	594.0	100	18.0
OD 3"	76.2 × 1.65	72.90	326	125	374.0	721.0	192.0	634.0	100	22.5

*Clearance

Position	Description of the order code			
1	**Pig cleaning station**			
	PIG/PCS	Pig cleaning station MST ATEX		
2	**Design**			
	G	Pig cleaning station complete		
	A	Only actuator of the pig cleaning station		
	M	Only pig retention cylinder for the pig cleaning station		
3	**Nominal width**			
	DN 40	OD 1 ½"		
	DN 50	OD 2"		
	DN 65	OD 2 ½"		
		OD 3"		
4	**Seal material**			
	1	EPDM (FDA)		
	2	FKM (FDA)		
	3	HNBR (FDA)		
5	**Surface quality**			
	2	Inside R_a ≤ 0.8 µm, outside matt blasted		
	3	Inside R_a ≤ 0.8 µm, outside ground		
6	**Pig retention cylinder**			
	0	Without pig retention cylinder		
	2	With pig retention cylinder		
7	**Proximity switches at the pig actuator (for technical specifications, see catalog GEA Valve Automation)**			
	0	Without proximity switches		
	2	With proximity switches		
8	**Magnetic sensors at the pig station housing (for technical specifications, see catalog GEA Valve Automation)**			
	0	Without magnetic sensors		
	2	With magnetic sensors		
9	**Ex-zone surrounding area**		**Ex-zone pipework**	
	1	Gases, zone 1	1	Gases, zone 1
	2	Gases, zone 2	2	Gases, zone 2
	21	Dust, zone 21	21	Dust, zone 21
	22	Dust, zone 22	22	Dust, zone 22
10	**Connection fittings**		**Connection fitting on port 1 / 7**	
	N	Without connection fittings	TK	VARIVENT® flange connection complete, grooved flange on housing
	J	With connection fittings	TN	VARIVENT® grooved flange complete, incl. O-ring and connecting parts
			TF	VARIVENT® plain flange
			CO	Clamp connection
11	**Accessories**			
	/52	Adhesive ID tag		
+				
12-16	**Air connection/control and feedback system**			
	00000M	Metric for air hose Ø 6/4 mm		
	00000Z	Inch for air hose Ø OD ¼" (6.35/4.35 mm)		
	XXXXX	Order code for different control and feedback systems see catalog GEA Valve Automation		

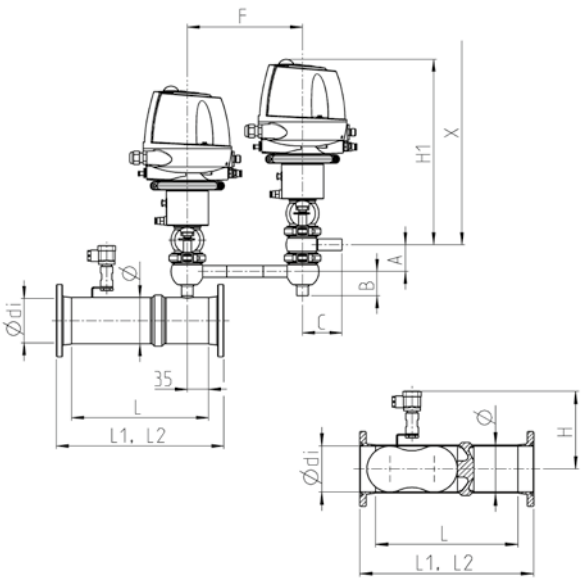
The code is composed as following, depending on the chosen configuration:

Position	1		2	3		4		5	6	7	8		9		10	11		12 to 16					
Code	PIG/PCS	-			-		-					-		-	/	/52	+						

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

VARICOVER®
Pig Catching Pipe/
Pig Catching Station

Connection fitting
on port 1 / 2



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		$R_a \leq 0.8$ µm
External housing surface		Matt blasted
Connection fittings		Welding end
Identification		Adhesive ID tag
Certificates		FDA

Pig catching pipe

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

* with VARIVENT® grooved flange ** with clamp connection

Pig catching station

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

*Clearance

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

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

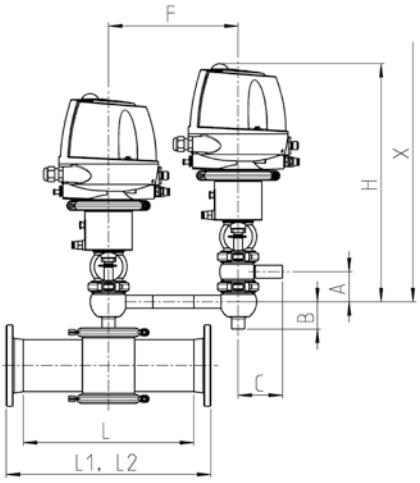
Position	1		2	3		4		5	6		7	8
Code	PIG/PCP	-			-		-			-	/	/52

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

* 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 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		$R_a \leq 0.8$ µm
External housing surface		Matt blasted
Connection fittings		Welding end
Identification		Adhesive ID tag
Certificates		FDA

VARINLINE® housings

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

* with VARIVENT® grooved flange ** with clamp connection

Pig driving medium valves

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

*Clearance

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

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

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

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

* 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.

VARICOVER®
Pig Stopper

Connection fitting
on port 1 / 2

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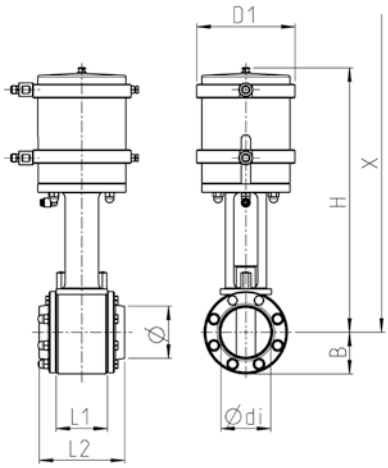


Technical data of the standard version

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		$R_a \leq 0.8$ µm
External housing surface		Ground
Actuator type		Pneumatic actuator air/spring
Connection fittings		VARIVENT® grooved flange (welding end)
Identification		Adhesive ID tag
Certificates		CE FDA

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

*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 ½"		
	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 R_a ≤ 0.8 µm, outside ground		
7	**Connection fittings**		**Connection fitting on port 1 / 2**	
	N	Without connection fittings	TN	VARIVENT® grooved flange complete, incl. O-ring and connecting parts
	J	With connection fittings		
8	**Accessories**			
	/52	Adhesive ID tag		
+				
9-14	**Air connection/control and feedback system**			
	00000M	Metric for air hose Ø 6/4 mm		
	00000Z	Inch for air hose Ø OD ¼" (6.35/4.35 mm)		
	XXXXX	Order code for different control and feedback systems see catalog GEA Valve Automation		

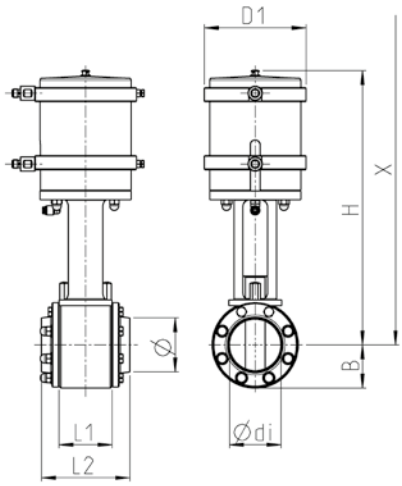
The code is composed as following, depending on the chosen configuration:

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

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

VARICOVER®
Pig Stopper ATEX

Connection fitting
on port 1 / 2



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 OD 1 ½" – OD 2 ½"	16 bar (232 psi)
	OD 3"	10 bar (145 psi)
Surface in contact with the product		$R_a \leq 0.8$ µm
External housing surface		Ground
Actuator type		Pneumatic actuator air/spring
Connection fittings		VARIVENT® grooved flange (welding end)
Identification		Adhesive ID tag
Certificates		CE FDA

	Pipe			Housing		Actuator	Dimension		General	
Nominal width	Ø [mm]	Ødi [mm]	B [mm]	L1 [mm]	L2 [mm]	D1 [mm]	H [mm]	X* [mm]	Weight [kg]	Stroke [mm]
DN 40	41.0 × 1.50	38.00	41.0	75	125	68	334	364	6.5	44.0
DN 50	53.0 × 1.50	50.00	51.0	75	125	139	377	407	11.0	59.0
DN 65	70.0 × 2.00	66.00	58.0	75	125	139	385	415	12.0	75.0
OD 1 ½"	38.1 × 1.65	34.80	39.5	75	125	68	333	368	6.5	41.0
OD 2"	50.8 × 1.65	47.50	49.5	75	125	139	376	406	11.0	56.5
OD 2 ½"	63.5 × 1.65	60.20	55.0	75	125	139	382	412	11.5	69.0
OD 3"	76.2 × 1.65	72.90	61.0	75	125	139	388	418	12.0	82.0

*Clearance

Position	Description of the order code			
1	**Pig stopper**			
	PIG/PS	Pig stopper ATEX		
2	**Nominal width**			
	DN 40	OD 1 ½"		
	DN 50	OD 2"		
	DN 65	OD 2 ½"		
		OD 3"		
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 $R_a \leq 0.8$ µm, outside ground		
7	**Ex-zone surrounding area**		**Ex-zone pipework**	
	1	Gases, zone 1	1	Gases, zone 1
	2	Gases, zone 2	2	Gases, zone 2
	21	Dust, zone 21	21	Dust, zone 21
	22	Dust, zone 22	22	Dust, zone 22
8	**Connection fittings**		**Connection fitting on port 1 / 2**	
	N	Without connection fittings	TN	VARIVENT® grooved flange complete, incl. O-ring and connecting parts
	J	With connection fittings		
9	**Accessories**			
	/52	Adhesive ID tag		
+				
10-15	**Air connection/control and feedback system**			
	00000M	Metric for air hose Ø 6/4 mm		
	00000Z	Inch for air hose Ø OD ¼" (6.35/4.35 mm)		
	XXXXX	Order code for different control and feedback systems see catalog GEA Valve Automation		

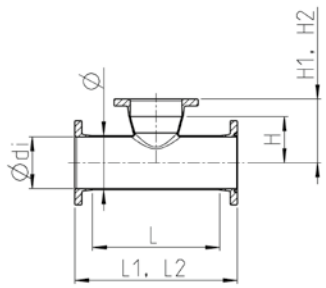
The code is composed as following, depending on the chosen configuration:

Position	1		2	3		4		5	6		7		8	9		10 to 15						
Code	PIG/PS	-			-		-		3	-		-	/	/52	+							

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

VARICOVER®
Pig T-Piece

Connection fitting
on port 1 / 2 / 7



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		$R_a \leq 0.8$ µm
External housing surface		Matt based
Connection fittings		welding end
Identification		Adhesive ID tag
Certificates		FDA

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

* with VARIVENT® grooved flange ** with clamp connection

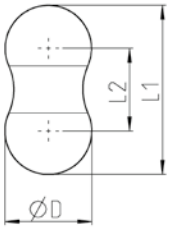
Position	Description of the order code			
1	**Pig T-piece**			
	PIG/TEE	Pig T-piece		
2	**Nominal width**			
	DN 25	OD 1"		
	DN 40	OD 1 ½"		
	DN 50	OD 2"		
	DN 65	OD 2 ½"		
	DN 80	OD 3"		
	DN 100	OD 4"		
3	**Seal material**			
	1	EPDM (FDA)		
	2	FKM (FDA)		
	3	HNBR (FDA)		
4	**Surface quality**			
	2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

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

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

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

VARICOVER®
Pig Type PK

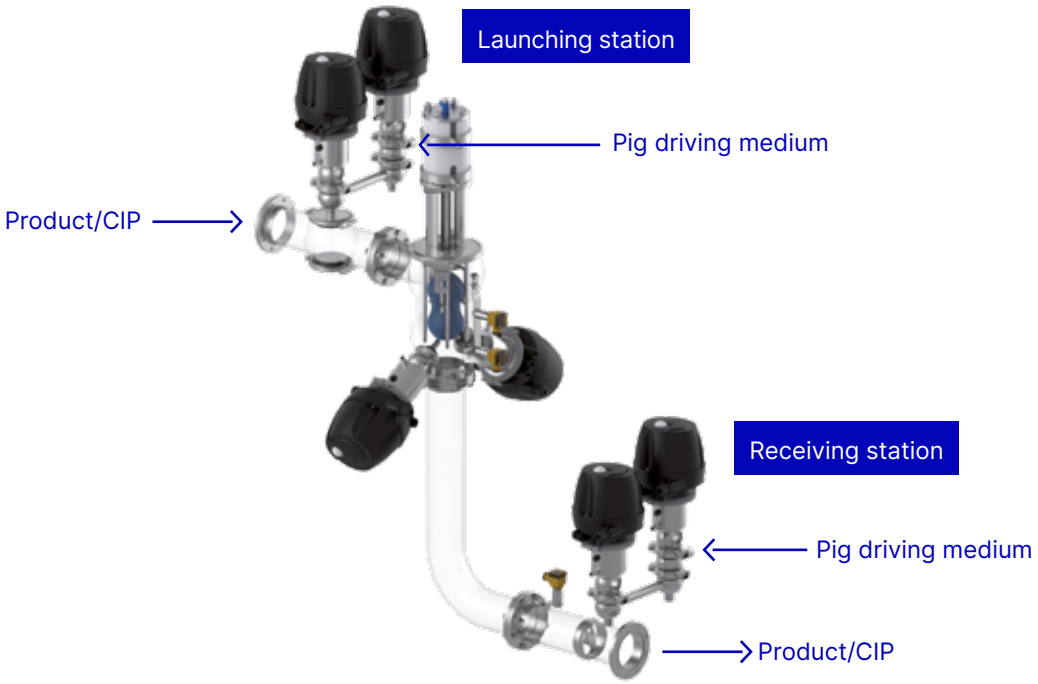


Technical data of the standard version

Pig material in contact with the product	VMQ , FKM
Ambient temperature	-5 to 130 °C
Certificates	FDA

	Dimensions			Article number	
Nominal width	L1 [mm]	L2 [mm]	ØD [mm]	Material VMQ	Material FKM
DN 25	On request	On request	On request	On request	On request
DN 40	80	42	> 38.00	228-163.24	228-163.23
DN 50	99	48	> 50.00	228-163.27	228-163.26
DN 65	127	60	> 66.00	228-163.30	228-163.29
DN 80	158	76	> 81.00	228-163.33	228-163.32
DN 100	192	91	> 100.00	228-163.36	228-163.35
OD 1"	On request	On request	On request	On request	On request
OD 1 ½"	67	32	> 34.80	228-263.12	228-263.11
OD 2"	93	45	> 47.50	228-263.03	228-263.02
OD 2 ½"	119	58	> 60.20	228-263.15	228-263.14
OD 3"	144	70	> 72.90	228-263.18	228-263.17
OD 4"	181	83	> 97.38	228-263.06	228-263.05

VARICOVER® Product Recovery Systems
VARICOVER® EMI/1
Automatic Product Recovery Systems



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

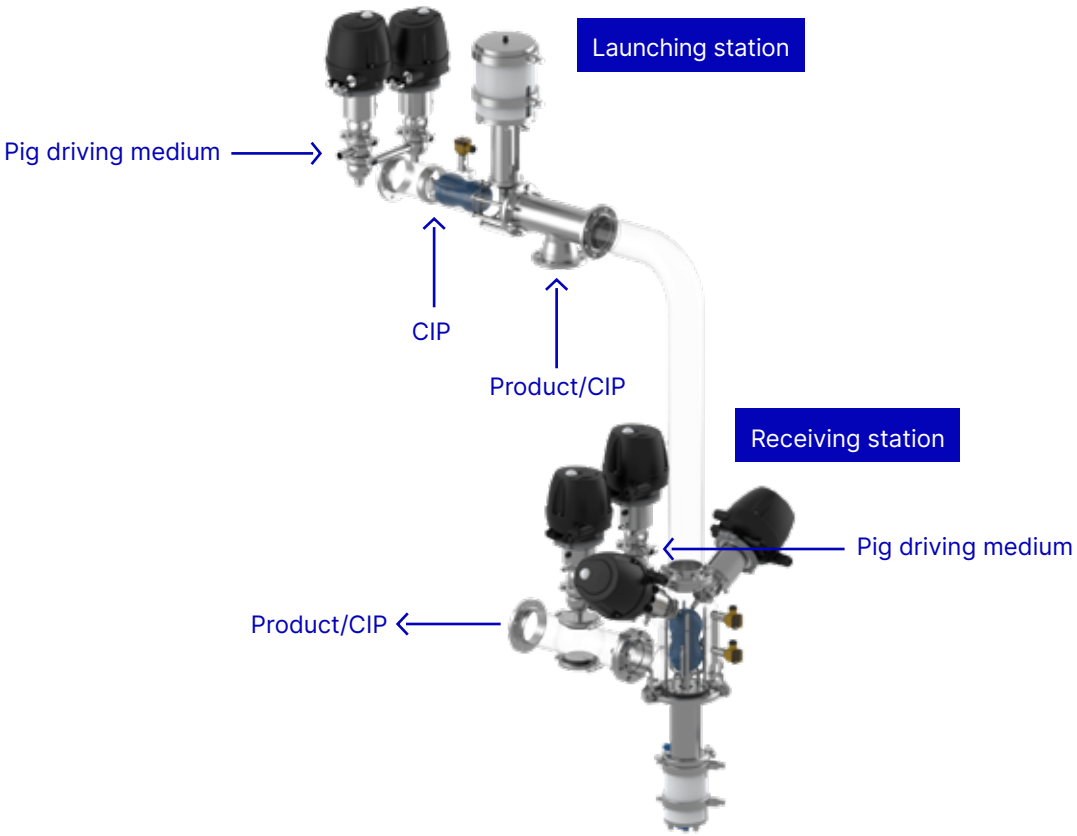
Launching station: Water
Receiving station: Air
At least one liquid medium is before or behind the pig in each pig run.

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.

VARICOVER® Product Recovery Systems
VARICOVER® EMII/1
Automatic Product Recovery Systems



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

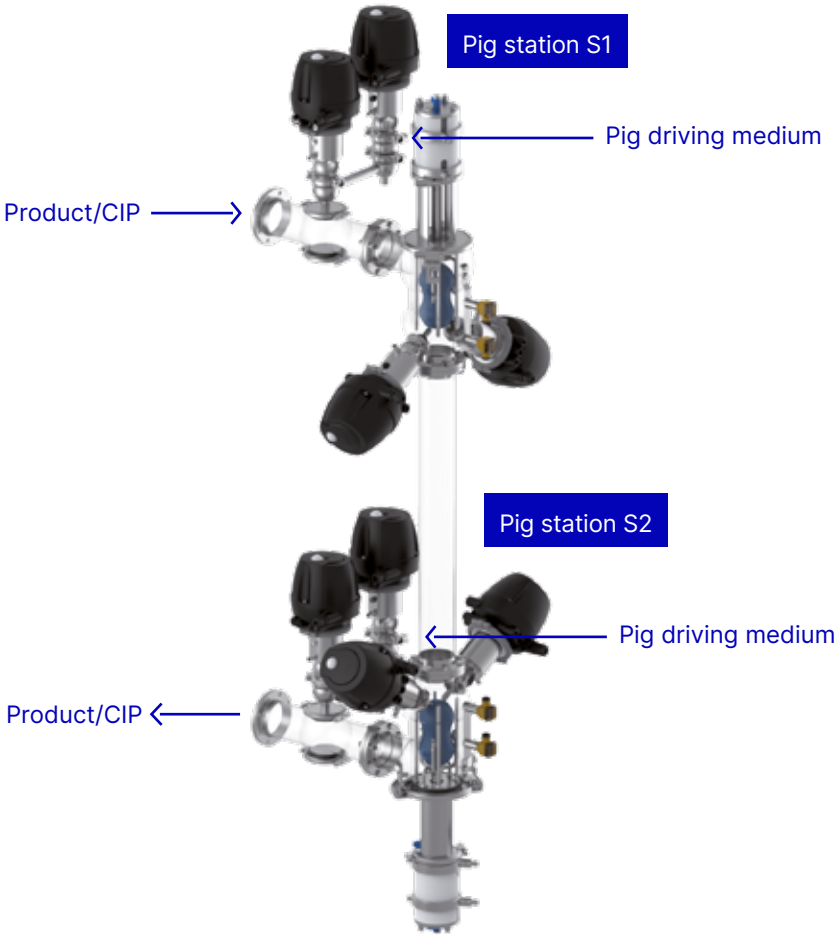
Launching station: Air
Receiving station: Air
One liquid medium is located before the pig in each pig run.

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

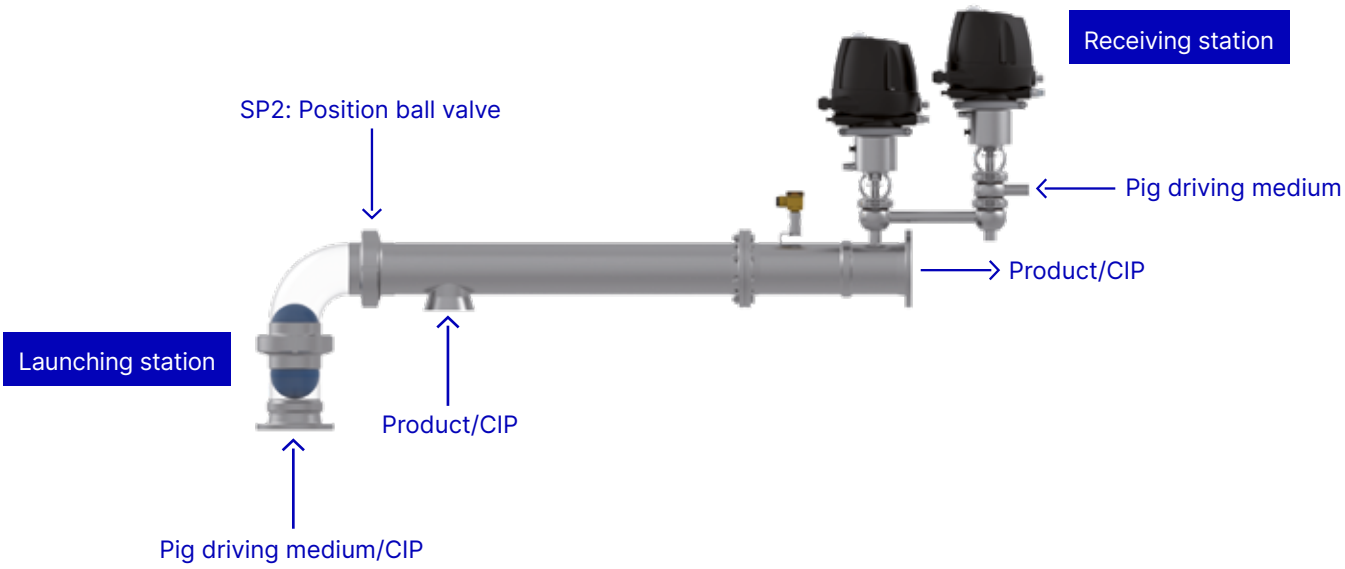
Only one pig is used in the system. The function method is the same as for the product recovery system EMII/1. In contrast to the EMII/1, no T-piece is used for product infeed. The product enters directly via the launching station and floods the pig firmly held in position.

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.

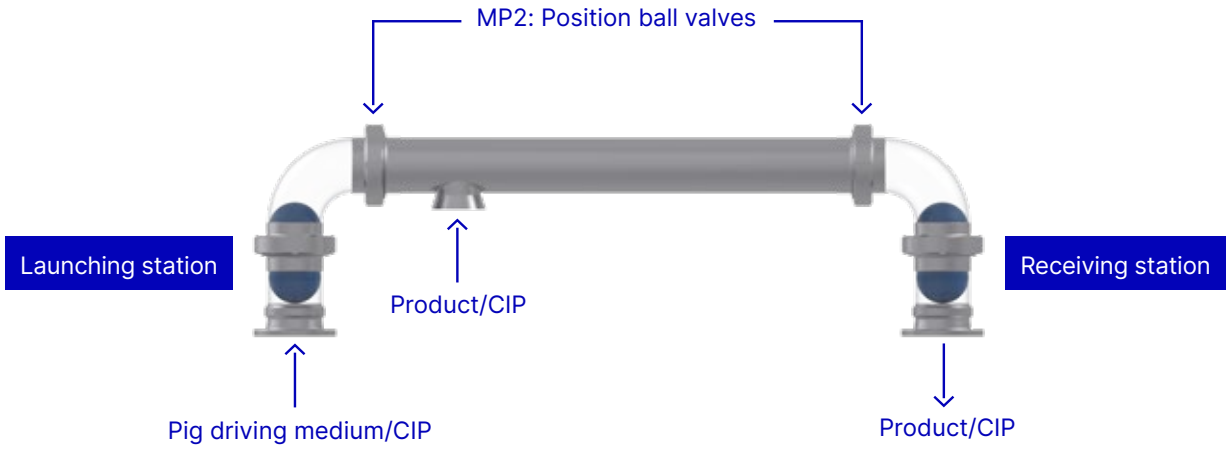
Preferred combination of the pig driving media

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.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.

VARICOVER® Product Recovery Systems Options

Pig detector

The pig detector serves to find an unmoving pig along the pipeline or in a pig station. For this, the detector is manually routed to the pipeline from the outside. Once it has entered the area of the pig's magnetic field, an indicator light comes on. The design of the pig detector is comparable to that of a pen. The detector is also approved for use in potentially explosive atmospheres (ATEX and FM)

Article number
228-000358

Pig test material

Using pig test materials helps to determine the chemical resistance of the pig material against products and/or cleaning media in the planning stages.

This procedure is particularly recommended when the resistance of the pig material is unknown. The test bodies have a diameter of approx. 40 mm and a thickness of approx. 4 mm. During resistance tests, deviations from the surface properties, dimensions and weights can be found. Available materials: Silicone and FKM.

Material	Article number
FKM	228-000259
Silicone	228-000260

Magnetic sensor with pipe bracket

Pigs are often detected along pipelines in the running state to initiate measures to reduce the pig speed. For this, magnetic sensors are attached to pipe brackets. They can be fitted anywhere at the pipeline.

Pipe bracket for magnetic sensors

Nominal width	Article number
DN 25	228-168.02
DN 40	228-168.04
DN 50	228-168.06
DN 65	228-168.08
DN 80	228-168.10
DN 100	228-168.12
OD 1"	228-168.01
OD 1 ½"	228-168.03
OD 2"	228-168.05
OD 2 ½"	228-168.07
OD 3"	228-168.09
OD 4"	228-168.11

VARICOVER® Product Recovery Systems Questionnaire **VARICOVER®**

Customer			
Company name / customer number			
Project			
Contact			
Phone			
Email			

Basic data (these parameters refer to the pipeline)			
Prerequisites	• The same pipe interior diameter across the entire pigging route. • No sharp-edged and strongly sagging welds. • No installations such as measuring mountings in the piggable area. • Standard pipe bends with small middle radius can be used. Recommendation: Minimize the number of pipe bends! • Use pipe bends with low ovality. Tolerance maximum ± 1.5 % referring to the outside diameter.		
Pipeline	☐ Existing	☐ Planned	
Nominal width			
Pipe diameter	Inside _____ mm	Outside _____ mm	
Material	☐ 1.4404	☐ Others:_____	
Seal material	☐ EPDM	☐ FKM	☐ HNBR
Piggable pipe lengths	_____m		
Height difference between launching and receiving stations	_____m	☐ Dropping	☐ Rising
Outlets between launching and receiving stations	☐ T-pieces	☐ Quantity	

Products

Designation	Viscosity mPas	Operating temperature °C	Operating pressure barg	Flow rate m³/h
1				
2				
3				

Properties product 1	☐ Foaming	☐ Lubricating	☐ Others:
Properties product 2	☐ Foaming	☐ Lubricating	☐ Others:
Properties product 3	☐ Foaming	☐ Lubricating	☐ Others:

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

Pig driving medium		
Compressed air (according to ISO 8573-1:2001)	Air pressure min. _____ bar_g	Air pressure max. _____ bar_g
Water	Pressure _____ bar_g	
Other	_____	Pressure _____ bar_g

☐ 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.

Process			
☐ Pipeline is cleaned after each product push-out.			
☐ Pipeline must be emptied after each cleaning.			
	If so, ☐ the system is self draining.	If so, ☐ the pig must push out the water.	
☐ The pipeline is sterilized with steam after cleaning. Temperature: °C			
How often is the product pushed out?	_____ x per day	_____ x per week	_____ x per month

Cleaning		
Cleaning media	Concentration %	Temperature °C
1.		
2.		
3.		

Design	
Explosion protected design	☐ No ☐ Yes
Control top	☐ 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)	Air pressure min. _____ bar_g	Air pressure max. _____ bar_g
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

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 R_a ≤ 0.8 µm), different surface qualities are available up to a medium roughness for surfaces in contact with the product of R_a ≤ 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 R_a ≤ 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

Position		Description of the order code for options
*		**Surface quality of the housing**
	2**	Inside R_a ≤0.8 µm, outside matt blasted
	3	Inside R_a ≤ 0.8 µm, outside ground

Position	1		2	3		4	5		6	7	8		9	10		11 to 16					
Code	PIG/PCS	-	G	DN 80	-	1	3	-	2	2	2	-	N	/52	+	0	0	0	0	0	M

* According to valve type

Options
Connection Fittings
Overview

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	
TK	VARIVENT® flange connection, groove flange on housing
TN	VARIVENT® groove flange incl. O-ring and connecting parts
TF	VARIVENT® flange
CO	Clamp connection / TRI-Clamp, DIN 32676 (DN) / ISO 2852 (OD)

Incorporation of the option in the order code and example

Position		**Description of the order code for options**
		Connection fittings
	J	Component with connection fittings (required connection fitting according to list above, please state separately)

Position	**1**		**2**		**3**		**4**	**5**		**6**	**7**	**8**		**9**	**10**		**11 to 16**					
Code	PIG/PCS	-	G	-	DN 80	-	1	2	-	2	2	2	-	J	/52	+	0	0	0	0	0	M

Options
Connection Fittings
VARIVENT® Flange Connection

Complete connection including bolts and nuts (TK)

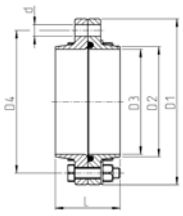
Groove flange (TN), including connecting elements and seal ring

Flange (TF)

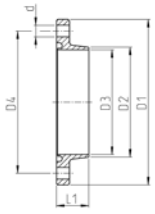
Typical application and description

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.

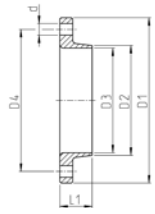
The VARIVENT® flange connection (TK) can be ordered either as a complete connection including bolts and nuts (TK) or a groove flange (TN)/flange (TF) as a connection fitting on a vertical port. If a complete connection is ordered as the connection fitting, the groove flange is welded onto the housing. The groove flange (TN) contains not only the O-ring but also the required connecting elements.



TK = VARIVENT® flange connection



TN = VARIVENT® groove flange



TF = VARIVENT® flange

Available nominal widths

Metric	DN	25–100
Inch OD	OD	1"–4"

Technical data

Material		1.4404
Surface in contact with the product		$R_a \leq 0.8$ µm
Certificates		3.1/AD2000W2
Max. pressure	DN 25 – DN 65 OD 1"–OD 2 ½"	16 bar
	DN 80 – DN 100 OD 3" – OD 4"	10 bar
Seal materials		EPDM (FDA), FKM (FDA), HNBR (FDA)

							Dimension	O-Ring	
Nominal width	D1 [mm]	D2 [mm]	D3 [mm]	D4 [mm]	d [mm]	L [mm]	L1 [mm]	[mm]	PS
DN 25	70	30.0	26.0	53	4 × Ø 9	50	25	25.0 × 5.0	16
DN 40	82	42.0	38.0	65	4 × Ø 9	50	25	36.0 × 5.0	16
DN 50	94	54.0	50.0	77	4 × Ø 9	50	25	47.0 × 5.0	16
DN 65	113	70.0	66.0	95	8 × Ø 9	50	25	62.0 × 5.0	16
DN 80	128	85.0	81.0	110	8 × Ø 9	50	25	75.0 × 5.0	10
DN 100	159	104.0	100.0	137	8 × Ø 11	50	25	95.0 × 5.0	10
OD 1"	66	25.5	22.0	49	4 × Ø 9	50	25	25 × 5.0	16
OD 1 ½"	79	38.5	35.0	62	4 × Ø 9	50	25	36 × 5.0	16
OD 2"	91	51.0	47.5	74	4 × Ø 9	50	25	47 × 5.0	16
OD 2 ½"	106	63.5	60.0	88	8 × Ø 9	50	25	62 × 5.0	16
OD 3"	119	76.5	73.0	101	8 × Ø 9	50	25	75 × 5.0	10
OD 4"	156	102.0	97.5	134	8 × Ø 11	50	25	95 × 5.0	10

Incorporation of the option in the order code and example

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

Position	1		2	3		4	5		6	7	8		9	10		11 to 16					
Code	PIG/PCS	-	G	DN 80	-	1	2	-	2	2	2	-	J	/52	+	0	0	0	0	0	M

Options
Connection Fittings
Clamp Connection (Tri-Clamp)

Clamp
connection (CO)

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

Metric	DN	25–100
Inch OD	OD	1"–4"

Technical data

Material	DN	1.4404 (AISI 316L)
	OD	AISI 316L
Standard	DN	DIN 32676
	OD	DIN 32676*; Length 28.5 mm**
Inner diameter	DN	DIN 11866 row A
	OD	DIN 11866 row C
Max. pressure	DN 25 – DN 40 OD 1"–OD 2 ½"	25 bar
	DN 50 – DN 65 OD 2"–OD 3"	16 bar
	DN 80 – DN 100 OD 4"	10 bar
Certificates	3.1	

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

Incorporation of the option in the order code and example

Position		Description of the order code for options
		Connection fittings
	J	Component with connection fittings (required connection fitting, please state separately)

Position	1		2		3		4	5		6	7	8		9	10		11 to 16					
Code	PIG/PCS	-	G	-	DN 80	-	1	2	-	2	2	2	-	J	/52	+	0	0	0	0	0	M

Options
Additional Options
Test Report and Inspection Certificate

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.

Number	Type of test certificate	Content of the certificate	Confirmation of the certificate by
2.2	Test report	Confirmation of compliance with the order, specifying results of a non-specific test	The manufacturer
3.1	Inspection certificate 3.1*	Confirmation of compliance with the order, specifying results of a specific test	The manufacturer's acceptance officer independent of the production department

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

Incorporation of the option in the order code and example

Position	Description of the order code for options	
	Accessories	
	/41	Test report 2.2
	/42	Inspection certificate 3.1 according to EN 10204

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	
Valve type	
Serial number	
Materials in contact with the product	Metallic material / seal material
Air supply pressure	Min./Max. [bar/psi]
Product pressure	Housing 1/2/3 [bar/psi]

Option /50 – engraved labeling plate cpl. for system identification number

In addition to the nameplate, the option /50 consists of an engraved labeling plate attached between the actuator and lantern using a key ring on the clamp connection.

Option /51 – metal labeling plate US version cpl.

The engraved labeling plate is attached between the actuator and lantern using a key ring on the clamp connection. Additional information can be recorded as well as the TAG number, customer designation and the valve type. In addition, the valve is identified with a nameplate.

Incorporation of the option in the order code and example

Position	Description of the order code for options	
	Accessories	
	/50	Engraved metal plate
	/51	Metal plate (US version)
	/52	Adhesive ID tag

Position	1		2		3		4	5		6	7	8		9	10		11 to 16					
Code	PIG/PCS	-	G	-	DN 80	-	1	2	-	2	2	2	-	N	/50	+	0	0	0	0	0	M

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 $R_a \leq 0.8$ µm, outside matt". Many customers in this market ask for the alternative surface quality "inside surface $R_a \leq 0.8$ µm, 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

Position		Description of the order code for options
		Accessories
	🔍	/3A Adhesive ID tag, configuration of the valve according to 3-A standard

Position	1		2		3		4	5		6	7	8		9	10		11 to 16					
Code	PIG/PCS	-	G	-	OD 3"	-	1	2	-	2	2	2	-	N/S 🔍	/52/3A 🔍	+	0	0	0	0	0	M

Options
General
Lubricant

Lubricant	
Tool	**Article number**
Rivolta F.L.G. MD-2 (1,000 g)	413-071
Rivolta F.L.G. MD-2 (100 g)	413-136

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.

GEA Valve Automation – Control and Feedback Systems Overview

Proximity switches

External proximity switch M12 × 1 for position feedback at the actuator of the pig cleaning station and the pig stopper.

Electrical connection by wiring in the terminal chamber

Technical data	
Nominal switching distance	10 mm
Protection class	IP68
Operating voltage	1.4301 / LCP
Material	GD-Zn, chrome-plated
Permitted ambient temperature	−30 to +85 °C

Proximity switch M12×1	Article no.
3-wire PNP normally close (plug connector 508-953)	505-103

Electrical connection by M12×1 connector

Technical data	
Nominal switching distance	2 mm
Protection class	IP67
Operating voltage	10 – 30 V DC
Material	Brass, chrome-plated / PA12
Permitted ambient temperature	−25 to +70 °C
Marking	EX II 2 G EEx ia IIC T6

Proximity switch M12 × 1 for ATEX application	Article no.
NAMUR (terminal chamber)	505-085

Magnetic sensors

Magnetic-inductive proximity sensors monitor the position of the permanent magnets in the pig from outside of the pig station housing or the pipeline.

Electrical connection by wiring in the terminal chamber

Technical data

Nominal switching distance	90 mm
Protection class	IP67
Operating voltage	10 – 65 V DC
Material	GD-Zn, chrome-plated
Permitted ambient temperature	−25 to +70 °C

Magnetic sensor M12 × 1 for pig recognition – normally open function	Article no.
3-wire PNP normally close (terminal chamber)	505-081

Electrical connection by M12×1 connector

Technical data

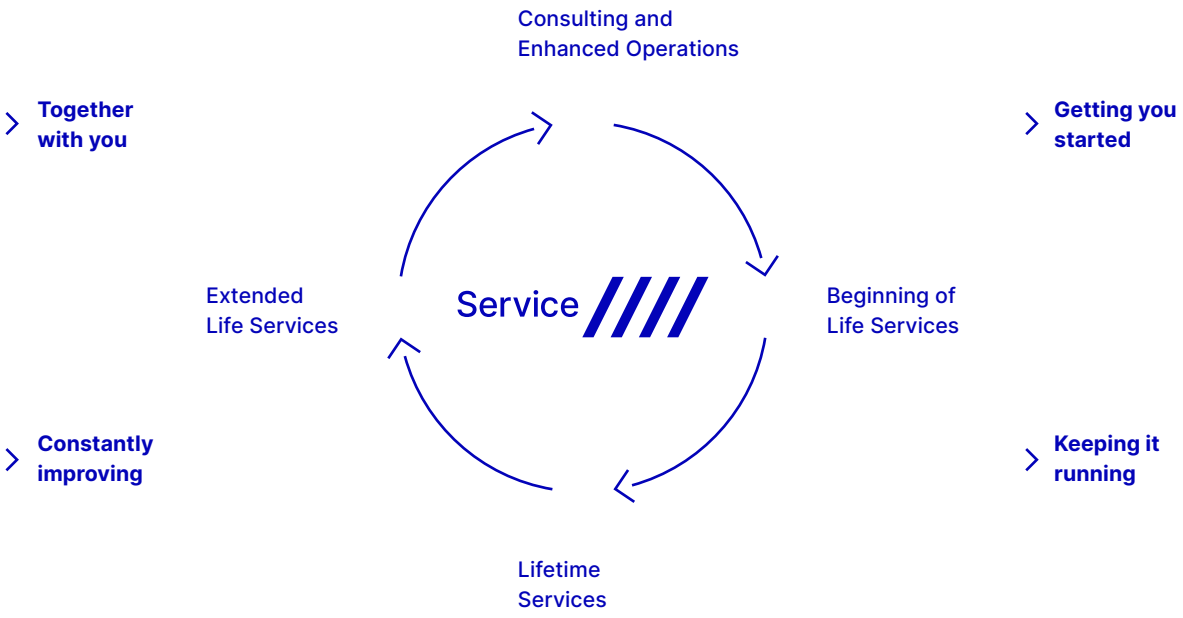
Nominal switching distance	90 mm
Protection class	IP67
Operating voltage	8.2 VDC
Material	CuZn, chrome-plated / PA12-GF30
Permitted ambient temperature	−25 to +70 °C

Magnetic sensor M12 × 1 for pig recognition – ATEX category II 2 G, Ex zone 1	Article no.
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

3-A		3-A Sanitary Standards, Inc. (3-A SSI) is an independent, non-profit corporation dedicated to advancing hygienic equipment design for the food, beverage, and pharmaceutical industries.
24/7 PMO VALVE 2.0® NON-STOP PRODUCTION		24/7 PMO VALVE® is a registered trade mark of GEA 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.
AS-i		Actuator Sensor interface. BUS system for the lowest field level.
ATEX		Atmosphères Explosibles. ATEX comprises the directives of the European Union in the area of explosion protection. For one thing, this is the ATEX equipment directive 2014/34/EU, for another, the ATEX workplace directive 1999/92/EC.
cCSAus		Test of a product by CSA according to applicable safety standards in Canada and the USA.
CE		Conformité Européenne. By affixing the CE mark, the manufacturer confirms that the product complies with the European directives 765/2008 applicable to the specific product.
CSA		Canadian Standards Association. A non-governmental Canadian organization which issues standards as well as checking and certifying the safety of products. It is now globally active.
cULus		Test of a product by UL according to applicable safety standards in Canada and the USA.
DeviceNet		BUS system of the ODVA organization for complex communication on various field levels.
EG 1935/2004*		Materials in contact with the product used in valves from GEA 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.
EHEDG		European Hygienic Engineering & Design Group. European supervisory authority for foodstuffs and pharmaceuticals. This authority issues approvals and certificates for products and materials that are used in the foodstuffs and pharmaceuticals industries.
FDA		Food and Drug Administration. US supervisory authority for foodstuffs and pharmaceuticals. This authority issues approvals and certificates for products and materials that are used in the foodstuffs and pharmaceuticals industries.
ODVA		ODVA is a worldwide association comprising leading automation companies. It develops network protocols and standards in the joint interests of its members, which are used for the international interoperability of production systems.
TÜV		Technischer Überwachungs-Verein. The German TÜV is a private company which carries out technical safety checks as prescribed in national legislation or regulations.
UL		Underwriters Laboratories. An organization founded in the USA for checking and certifying products and their safety.

* not possible for HNBR

Abbreviations and Terms

Abbreviation	Explanation
°C	Degrees Celsius, unit of measurement for temperature
°F	Degrees Fahrenheit, unit of measurement for temperature
3-A	Standard of 3-A Sanitary Standards, Incorporated (3-A SSI)
3D	Three-dimensional
A	Ampere, unit of measurement of current intensity or Output, term used in automation
AC	Alternating Current
ADI free	All elastomer compounds are free of animal-derived ingredients
AISI	American Iron and Steel Institute, association of the American steel industry
ANSI	American National Standards Institute, American body for standardizing industrial processes
approx.	approximately
AS-i	Actuator Sensor interface, standard for fieldbus communication
ASME	American Society of Mechanical Engineers, professional association of mechanical engineers in the USA
ASME-BPE	Standard of the ASME's – bioprocessing equipment association
ATEX	Atmosphères Explosibles, synonymous with the directives of the European Union for potentially explosive areas
bar	Unit of measurement for pressure. All pressure values [barg/psig] refer to positive pressure [bar_g/psi_g], unless specifically stated otherwise.
bar_g	Unit of measurement for pressure relative to atmospheric pressure
CAN	Controller Area Network; asynchronous serial bus system
CE	Conformité Européenne, administrative symbol for the free movement of industrial products
CIP	Cleaning In Place, designates a process for cleaning technical process systems.
CRN	The Canadian Registration Number is issued by a Canadian Jurisdiction and covers pressurized components. The authorization is needed to operate these components in Canada.
CSA	Canadian Standards Association, a non-governmental Canadian Standardization organization
dB	Decibel, one tenth of a bel, named after Alexander Graham Bell and used for identifying levels and dimensions
DC	Direct Current
DIN	Deutsches Institut für Normung e. V. Standardization organization in the Federal Republic of Germany, DIN = synonym for standards issued by the organization
DIP	Dual Inline Package, design of a switch
DN	Diameter Nominal, DIN nominal width
Device Net	Network system used in the automation industry to interconnect control devices for data exchange
E	Input, term used in automation
EAC	Certification of technical confirmity from the customs union of Russia/Balarus/Kazakhstan
Pressure Equipment Directive 2014/68/EU	Directive of the European Parliament and the Council Directive for layout and conformity evaluation for pressure equipment and assemblies with a maximim pressure (PS) of more than 0.5 bars.
EG No. 1935/2004	Regulation of the European Parliament which lays down common rules for materials which come, or may come, into contact with food, either directly or indirectly.
EHEDG	European Hygienic Engineering and Design Group. Consortium of equipment manufacturers, food industries, research institutes as well as public health authorities
EN	European standard, rules of the European Committee for Standardization
EPDM	Ethylene propylene diene rubber, acronym acc. to DIN/ISO 1629
Ex	Synonym for ATEX
FDA	Food and Drug Administration, official foodstuffs monitoring in the United States
FEM calculation	Finite Element Method; calculation process for simulating solids
FKM	Fluorinated rubber, acronym acc. to DIN/ISO 1629
H	Henry, unit of measurement for inductance
HNBR	Hydrated acrylonitrile butadiene rubber, acronym acc. to DIN / ISO 1629
Hz	Hertz, unit of frequency named after Heinrich Hertz
I	Formula symbol for electrical current
IEC	International Electrotechnical Commission, international standardization organization for electrical and electronic engineering

Abbreviations and Terms

Abbreviation	Explanation
IP	Ingress Protection / International Protection, index of protection class acc. to IEC 60529
IPS	Iron Pipe Size, American pipe dimension
ISA	International Society of Automation, international US organization of the automation industry
ISO	International Organization for Standardization, international organization that produced international standards, ISO = synonym for standards from the organization
kg	Kilogram, unit of measurement for weight
Kv	The Kv value corresponds to the water flow rate through a valve (in m^3/h) at a pressure differential of 0.98 bar and a water temperature of 5 °C to 30 °C.
Kvs	The Kv values of a valve at nominal stroke (100 % opening) is designated the Kvs value
L	Conductive
LED	Light-Emitting Diode
LEFF®	Function of the T.VIS® valve informations system for cyclical pulsing during the lifting process; Low-Emission Flip Flop
mm	Millimeter, unit of measurement for length
M	Metric, system of units based on the meter or Mega, one million times a unit
m^3/h	Cubic meters per hour, unit of measurement for volumetric flow
max.	Maximum
NAMUR	Standardization working association for measuring and control technology in the chemical industry, synonym for the interface type of the organization, especially for potentially explosive atmospheres
NC	Normally Closed; valve or solenoid valve control which is closed in idle status
NO	Normally Open; valve or solenoid valve control which is open in idle status
NOT-element	Logic element, NOT gate
NPN	Signal transmission against reference potential, current-consuming
NPT	National Pipe Thread, US thread standard for self-sealing pipe fittings
OD	Outside Diameter, pipe dimension
ODVA	Open DeviceNet Vendor Association, global association for network standards
PA 12/L	Polyamide
Pg	Armoured thread
PMO	Pasteurized Milk Ordinance
PN	Nominal pressure for pipeline systems according to EN 1333, rated pressure in bar at room temperature (20 °C)
PNP	Signal transmission against reference potential, current-supplying
PPO	Polyphenylene oxide, thermoplastic material
PS	Maximum permitted operating pressure at which the components can operate safely at maximum allowable temperature (TS)
psi	Unit of measurement for pressure, pound-force per square inch, 1 psi = 6894.75 Pa. All pressure values [bar/psi] refer to positive pressure [bar_g/psi_g], unless specifically stated otherwise.
psi_g	Unit of measurement for pressure relative to atmospheric pressure
PV	Solenoid valve
R_a in µm	Average roughness value, describes the roughness of a technical surface
RM	Feedback
International Protection-Code IP67, IP66, IP69K	Classifies and rates the degree of protection provided against intrusion dust, accidental contact, and water
SES	GEA Tuchenhagen control head for Ex areas, control top system of GEA Tuchenhagen
SET-UP	Self-learning installation, the SET-UP procedure carries out all necessary settings for generating messages during commissioning and maintenance.
SIP	Sterilization in Place, refers to a process for cleaning technical process systems
SMS	Svensk Mjölk Standard, Scandinavian pipe dimension
SW	Indicates the size of a tool spanner, “Schlüsselweite”

Abbreviation	Explanation
TA-Luft VDI 2440	If a product is certified according to TA Luft it meets the requirements for proof of high grade performance according to TA Luft of 1.0× 10-4 mbar x l / (s x m) at service conditions under the VDI guideline 2440. The product will hence be tested for tightness.
TEFASEP® gold	Brand name for GEA's proprietary valve seat seal (hard sealing)
T.VIS®	GEA Tuchenhagen valve information system, control top system from GEA Tuchenhagen
TS	Maximum permitted operating temperature
UL	Underwriters Laboratories, a certification organization established in the USA
USP Class VI	The United States Pharmacopeial Convention (USP) is a scientific nonprofit organization that sets standards to help protecting public health. Class VI administer tests and impacts of material and their substances on animal and human tissues.
UV	Ultraviolet, ultraviolet radiation is a wavelength of light
V	Volt, unit of measurement for voltage
VARICOMP®	Pipe expansion compensator from GEA Tuchenhagen
VMQ	High-polymer vinyl methyl polysiloxane, silicone rubber, MVQ = synonym
W	Watt, unit of measurement for power
Y	Control air connection for the working cylinder, designation from pneumatic systems
µ	Micro, one millionth of a unit
Ω	Ohm, the unit of electrical resistance named after Georg Simon Ohm

CAD Files

Typical application and description
You can receive two-dimensional and/or three-dimensional drawing files of our components for making your piping planning. For this purpose, please send us your specific request, stating the particular order code and the required drawing format. The required files will then be individually prepared for you.

Available drawing formats:

	Format	Name
2D formats	drw	Native Pro/E
	igs (2D)	IGS file
	dxf	AutoCAD drawing exchange
	pdf (2D)	Adobe Acrobat document
	tif	TIFF (plot)
3D formats	asm	Native Pro/E
	igs (3D)	IGS file
	pdf (3D)	Adobe Acrobat document
	stp	STP file
	bmp (3D)	Bitmap image
	jpg (3D)	JPEG image
	tif (3D)	TIFF image
	sat	Standard ACIS

General Sales Terms and Condition of Delivery

Please note
All our sales and/or services are exclusively subject to our valid terms and conditions of sale and/or service applicable in the respective country of business, which can be found on our internet platform: www.gea.com.

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

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