

OPERATING INSTRUCTIONS

Original instructions



GEA Cleaning Technology

Direct Sprayer DS 25

GEA Tuchenhausen GmbH
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1 General

This chapter contains basic instructions for using the cleaner and explanations of illustration conventions. It also contains information about the design and structure.

The term cleaner in these Operating Instructions refers to GEA Cleaning Technology.

1.1 Information about the document

1.1.1 Purpose and structure of the document

The objective of these Operating Instructions is to provide information on how to operate the cleaner. To achieve this, it is divided into several chapters which are oriented on the various life phases of the valve. Compliance with the instructions will enhance the cleaner's longevity and reliability, and reduce the likelihood of harm to individuals or damage to property. The Operating Instructions also acts as the basis for creating operating instructions.

1.1.2 Design elements

In this document, the following design elements are used as orientation aids.

General orientation aids

- Figure numbers
- Table numbers
- Chapter numbers
- Page numbers
- Headers and footers
- References
- Lists

Lists

Bullet points are shown in lists and do not prescribe a specific sequence.

- Bullet point
- Bullet point
 - Sub-point
 - Sub-point
- Bullet point

Numbered lists

In a sequence of actions, the order of the action steps is specified by a numbered list. Partial results and the result of a sequence of actions are marked by arrows.

1. Action step one
2. Action step two
 - 2.1 First sub-step two
 - 2.2 Second sub-step two
 - Partial result
3. Action step three
 - Partial result
4. Action step four
 - ⇒ Outcome

INFO

Informational texts contain additional information about a description or action step.

1.1.3 Reading obligation and storage

Every person who works on or with the cleaner must have read these Operating Instructions. They must be available to these persons at all times.

1.2 Manufacturer address

GEA Tuchenhausen GmbH
Am Industriepark 2-10
Germany
21514 Büchen

1.3 Customer service

Phone: +49 4155 49-0
Fax: +49 4155 49-2035
flowcomponents@gea.com
www.gea.com

1.4 Declarations of conformity



EU Declaration of conformity within the meaning of the EC machine directive 2006/42/EC

Manufacturer: **GEA Tuchenhausen GmbH**
Am Industriepark 2-10
21514 Büchen, Germany

Hereby, we declare that the machine designated in the following

Designation: Direct Sprayer

Type: DS25

by virtue of its design and construction and in the versions placed on the market by us, complies with the essential health and safety requirements of the following directive:

Relevant EC directives: 2006/42/EC EC Machinery Directive

Applicable harmonized standards, in particular: EN ISO 12100: 2010

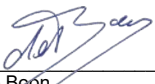
Remarks:

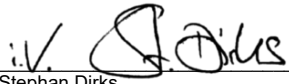
- In the event of a modification to the machine that was not agreed with us, this declaration loses its validity
- Furthermore, we declare that the specific technical documentation for this machine has been drawn up in accordance with Annex VII, Part A, and undertake to forward this documentation by means of data medium upon justified request by the national authorities

Person authorised for compilation and handover of technical documentation:

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Büchen, 27 November 2024


Sören de Boon
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Stephan Dirks
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998CER015731EN_1



UK- Declaration of Conformity by Supply of Machinery (Safety) Regulations 2008

Manufacturer: **GEA Tuchenhausen GmbH**
Am Industriepark 2-10
21514 Büchen, Germany

Hereby, we declare that the machine designated in the following

Designation: Direct Sprayer

Type: DS25

by virtue of its design and construction and in the versions placed on the market by us, complies with the essential health and safety requirements of the following directive:

Relevant UK legislation: Supply of Machinery (Safety) Regulations 2008

Applicable harmonized standards, in particular: EN ISO 12100: 2010 Safety of machinery - General principles for design - Risk assessment and risk reduction

Remarks:

- In the event of a modification to the machine that was not agreed with us, this declaration loses its validity
- Furthermore, we declare that the specific technical documentation for this machine has been drawn up in accordance with Annex VII, Part A, and undertake to forward this documentation by means of data medium upon justified request by the national authorities.

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2 Safety

This chapter describes the minimum requirements for the intended use of the cleaner. It forms the basis for safe operation of the cleaner.

2.1 Intended use

The Direct Sprayer is a cleaner designed for use in the pharmaceutical, chemical, cosmetics, dairy, and food industries.

It is used to clean tanks and agitators.

The use of the cleaner in combination with substances that pose a high health risk, such as hazardous viruses, bacteria, or toxic substances, is not intended.

Use in explosive areas is not permitted.

Proper use of the cleaner also includes compliance with these Operating Instructions.

INFO Start the cleaning process slowly and avoid pressure surges in the supply line. Only close the cleaner when no more cleaning fluid is being sprayed. During operation, the cleaning fluid flows in the closing direction of the valve plate. If a valve disk is closed, hydraulic pressure build-up may cause seal damage.

INFO The manufacturer will not accept any liability for damage resulting from any use of the cleaner which is not in accordance with its designated use. The risk is borne solely by the operating company.

2.1.1 Requirements for the operation

The prerequisite for the reliable and safe operation of the cleaner is proper transportation and storage as well as professional installation and assembly. Operating the unit within the limits of its designated use also involves adhering to the operating, maintenance and servicing instructions.

2.1.2 Pressure equipment directive

The cleaner is a piece of pressure equipment (without safety function) in the sense of the pressure equipment directive 2014/68/EU: Classified according to Annex II in category 1.

According to the scope of directive 2014/34/EC, article 1, paragraph 2, f), the exception of the directive applies, due to conformity with the Machinery Directive 2006/42/EC.

The nominal diameters smaller than DN 25 are subject to article 4, paragraph 3 of the Pressure Equipment Directive which specifies sound engineering practice.

Nominal diameters $\geq$ IPS 4"; DN 125 valid for the fluid group II.

In the event of any deviations, GEA Tuchenhausen GmbH will supply a special Declaration of Conformity.

2.1.3 Use in potentially explosive atmospheres (ATEX)

Use in explosive areas is not permitted.

2.1.4 Improper operating conditions

The operational reliability of the cleaner cannot be ensured under improper operating conditions. Therefore avoid improper operating conditions.

Operating the cleaner is not permitted if

- Persons or objects are in the danger zone.
- Safety devices are not working or were removed.
- Malfunctions have been detected on the cleaner.
- Damage or a leak has been detected on the cleaner.
- Maintenance intervals have been exceeded.

2.2 Modification

Subsequent changes to the cleaner are not permitted. Otherwise you will have to undergo a new conformity process in accordance with the EC Machinery Directive on your own.

In general, only original spare parts supplied by GEA Tuchenhausen GmbH should be installed. This ensures the reliable and economical operation of the cleaner.

2.3 Structure of warning notices

Warning notices warn of hazards that may exist when performing certain actions. In this document, the following warning notices are used. The extent of the hazards is categorized into risk levels and can be recognized by the corresponding signal words.

2.3.1 Preceding warning notices

Preceding warning notices are used when there is a hazard during a sequence of actions. Warning notices are colour-highlighted and supplemented by a pictogram in the event of possible personal injury.

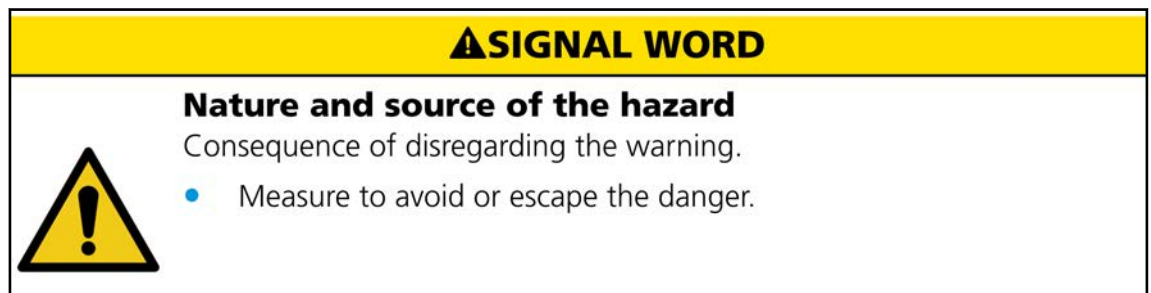


Figure 2-1 - Structure of a preceding warning notice

2.3.2 Integrated warning notices

Integrated warning notices are used when there is a hazard involved in a single action step.

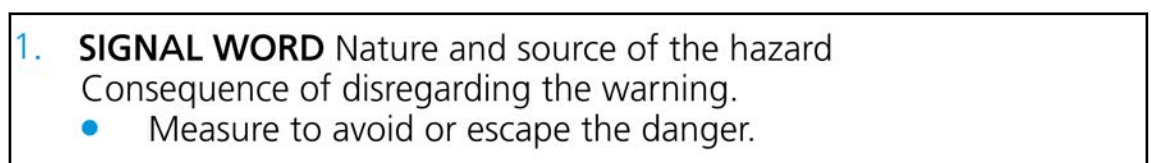


Figure 2-2 - Structure of an integrated warning notice

2.3.3 Signal words

ATTENTION

The signal word ATTENTION indicates a hazard that could result in property damage if not avoided.

CAUTION

The signal word CAUTION indicates a hazard with a low risk level which could result in light to medium injuries if not avoided.

WARNING

The signal word WARNING indicates a hazard with a medium risk level which could result in death or severe injury if not avoided.

DANGER

The signal word DANGER indicates a hazard with a high risk level which will result in death or serious injury if not avoided.

2.4 Personnel qualification

The following basic requirements must be fulfilled for all actions carried out on the cleaner.

- These Operating Instructions have been read and understood.
- Safety tasks in and around the cleaner are regulated and assigned.
 - Maintaining order
 - Compliance with safety requirements
 - Securing hazard zones

Additionally, the following groups of people must possess the personnel qualifications or skills listed below and be authorised by the operator to perform actions on the cleaner.

Operating staff

- Trained by the operating company, a qualified customer specialist or a GEA service expert

Customer specialist

- Technical training

Trained customer specialist

- Technical training in a specific field of expertise
- Training by GEA personnel or participation in training courses of the GEA Tuchen-
hagen

GEA service expert

- Personnel from GEA Tuchenhausen, see *1.3 Customer service* customer service

Where necessary, reference is made to the respective group of individuals in these Operating Instructions.

2.5 General safety instructions

The cleaner was built in accordance with the state of the art and recognised safety regulations at the time of its launch.

Nevertheless, the cleaner can pose dangers, especially if

- the cleaner is not used in accordance with its intended use,
- the cleaner is not used correctly,
- the cleaner is operated under impermissible operating conditions.

The safety measures stipulated by the operator and listed below must still be adhered to in order to ensure safety.

2.5.1 General hazard

Source	Consequences	Measures
Faulty cleaner	Injury and damage	Check that the cleaner is fully functional.
Non-compliance with these Operating Instructions	Injury and damage	Read and familiarise yourself with these Operating Instructions.
Operating materials	Injuries	• Wear personal protective equipment. • Avoid contact with operating materials.

Table 1: General hazard

2.5.2 Mechanical hazard

Source	Consequences	Measures
Moving or rotating components	• Being drawn in or caught • Entrapment • Crushing • Impact	• Remove jewellery. • Tie hair back or wear a hair net. • Wear tight-fitting clothing.
• Gravity • Falling objects	• Impact • Crushing	• Do not walk under suspended loads. • Eliminate the stumbling hazards.

2.5.3 Electrical hazard

Source	Consequences	Measures
Electromagnetic processes	Implications for electronic medical implants	People with medical implants must keep their distance.
Electrostatic processes	• Electric shock • Fire • Chemical reaction	• Avoid contact to components. • Check the voltage of components. • Wear personal protective gear. • Eliminate leaked flammable substances.

2.5.4 Thermal hazard

Source	Consequences	Measures
Objects or materials at high or low temperature	• Freezing • Burns • Scalding	• Wear personal protective gear. • Wait for adjustment to room temperature.

2.6 Personal protective equipment

To prevent possible personal injuries, the personal protection equipment must be worn.

In addition, GEA recommends keeping the requirements listed below.

- Locally applicable accident prevention regulations
- Instruction manual from the operator or employer

2.7 Safety devices

There is a lantern protector (45) on the Direct Sprayer DS 25. The lantern protector prevents reaching into the lantern. As soon as the cleaner is switched, it is possible to become jammed between the valve rod (7) and lantern (18).

If the lantern protector has been removed e.g. for cleaning, everyone within the danger zone must be made aware of this danger and access for third parties must be prevented.

2.8 Residual dangers

Despite all the measures taken, the following residual hazards can lead to personal injuries and property damage at any time.

- Improper use
- Material fatigue
- Failure of safety devices

Danger zones

Please observe the following notes:

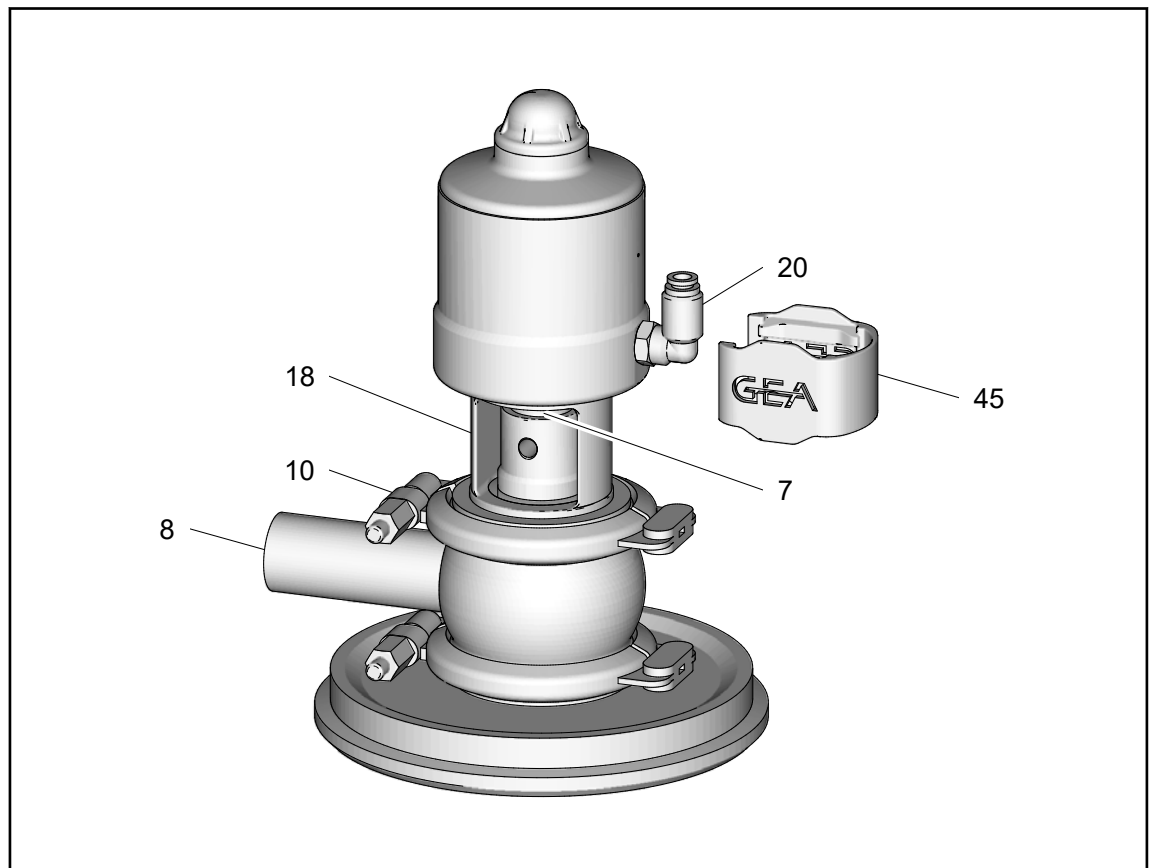


Figure 2-3 - Danger zones on the cleaner

Please observe the following notes:

- When the cleaner is opened, an effective cleaning jet is released from the nozzle (2). No persons should be in the direct or indirect range of the cleaning cone.
- If malfunctions occur, the cleaner must be decommissioned (disconnected from power and air supply) and secured against reuse.
- For all maintenance, servicing, and repair work, the cleaner must be de-energised and secured against unintentional restart.
- Only allow a qualified electrician to carry out any work on the electrical power supply.
- If work on live parts cannot be avoided, call in a second person, who can operate the main switch in case of an emergency.
- Never touch the pipes and the cleaner when these components are hot!
- Use the lantern protector (45) as soon as compressed air is connected, so that you can never reach between valve rod (7) and lantern (18). When moving the valve rod, there is a risk of crushing. See also chapter 3.1.7 *Protective devices*.
- Never reach into the housing (8).
- When loosening the clamping connection (10) of the non-actuated cleaner, there is a risk of impact as the spring energy is released suddenly.
- The housing sockets have very sharp edges. When transporting and installing the cleaner be sure to wear suitable protective gloves.
- Compressed air hoses may tear off at the connection (20). Refer to the chapter 5.4.2 *Establishing hose connections* for details.

Dangerous situations can be avoided by safety-conscious and proactive behaviour of the personnel and by wearing personal protective equipment.

Residual dangers on the cleaner and measures

Danger	Cause	Measure
Danger to life	Inadvertent switch-on of the cleaner	Effectively disconnect all components, effectively prevent switch-on.
	Electric power	Observe the following safety rules: 1. Isolate from the power supply. 2. Take appropriate measures to prevent switch on. 3. Test absence of voltage. 4. Earthing and short-circuiting. 5. Cover or safeguard any adjacent live parts.
Risk of injury	Danger presented by moving or sharp-edged parts	The operator must exercise caution and prudence. For all work: • Wear suitable work clothing. • Never operate the machine if the cover panels are not correctly fitted. • Never open the cover panels during the operation. • Never reach into openings. As a precautionary measure, wear personal protective equipment in the vicinity of the cleaner: • Protective gloves • Safety shoes
	Hazard due to escaping media at seals (33).	• Effectively disconnect all components. • Effectively prevent switching on. • Pipes must be depressurised.
Environmental damage	Operating materials with properties which are harmful to the environment	For all work: • Collect lubricants in suitable collecting vessels. • Dispose of lubricants in accordance with the pertinent regulations.

2.9 Safety signs

The safety symbols listed below are attached to the cleaner.

The position of the applicable safety symbols on the cleaner are shown in an overview, see 3.1.6 *Signs*.

Warning signs



Warning, risk of hand injuries

Hazard posed by mechanical components on the cleaner.

2.10 Emergency measures

In case of any emergencies on the cleaner, the operating regulations must be observed and the following actions implemented.

Fire

- Call local specialists
- If possible without danger to yourself, use extinguishing agents as outlined in the operating regulations
- Exit the hazard zone
- Warn individuals that are endangered

Injuries

- Administer first aid
- Call local emergency services

3 Description

This chapter contains instructions on how to install the cleaner and its functions.

3.1 Structure and function

3.1.1 Design

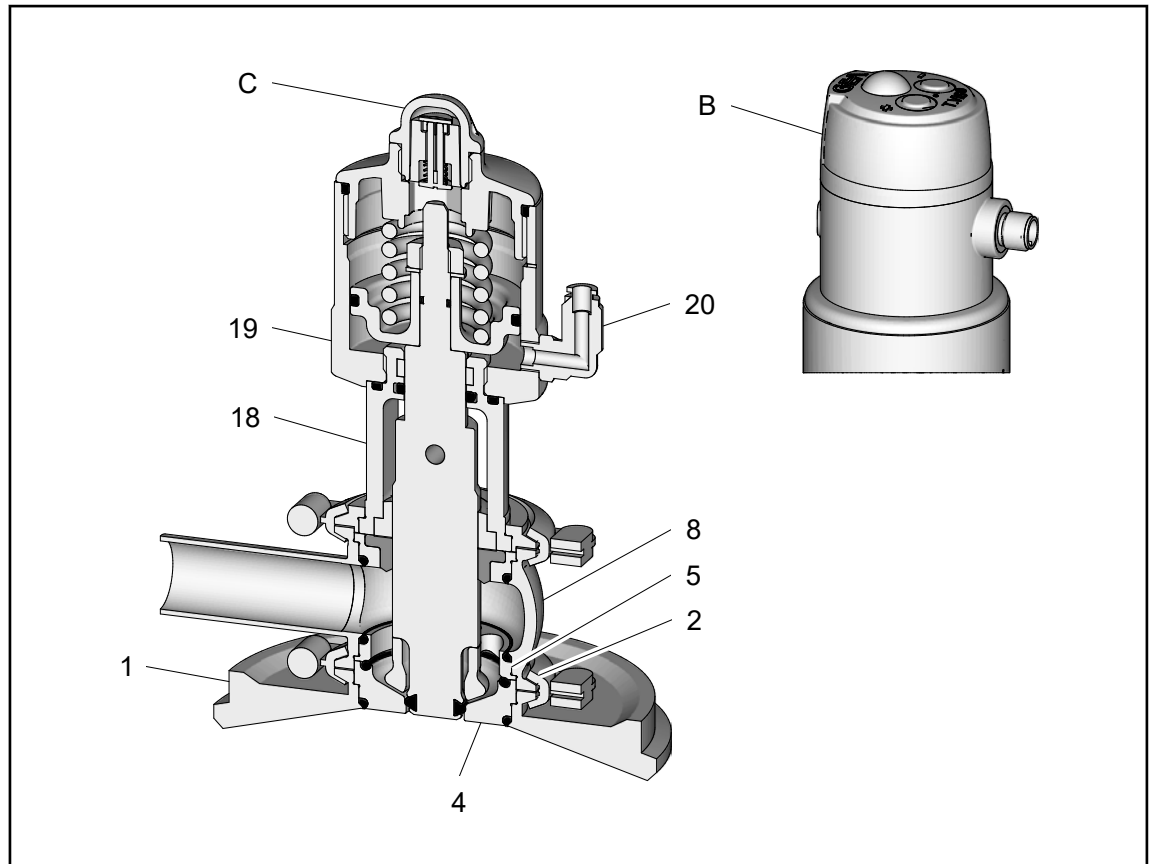


Figure 3-1 - Design of the cleaner

Position Description	Position Description
B - Control top	C - Mechanical control top
20 - Air connection	19 - Drive housing
18 - Lantern	2 - Hinged clamp
8 - Housing	5 - Flow insert
4 - Nozzle	1 - Tank connection

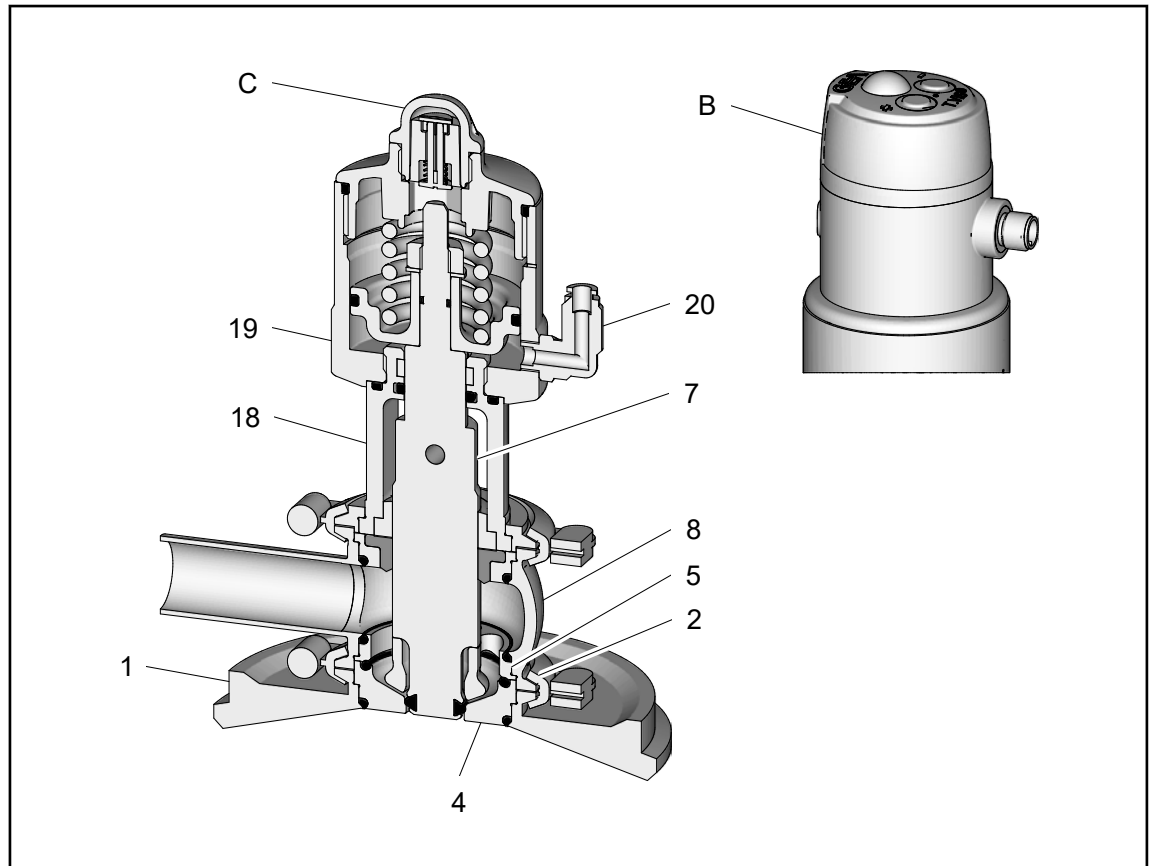
3.1.2 Functional description

The cleaner is always of the spring-to-close type (NC) when in the idle position.

When the cleaner is activated, the nozzle opens, and the cleaning fluid flows through the gap between the nozzle and the flow insert.

The cleaning jet converges after the nozzle and then fans out into a homogeneously distributed stream. The jet takes the shape of a full cone. The supply line for the cleaning fluid must be interrupted during production.

3.1.3 Media and parts that come into contact with the product



In the Direct Sprayer DS, a distinction is made between media-contacting and product-contacting components.

The product is located in the tank. The green-marked parts come into contact with the product: the tank connection (1), the nozzle (4), and the valve disk (7).

The CIP medium is the cleaning fluid. The cleaning fluid flows through the housing (8) with the valve plate (7), the nozzle insert (5), and the nozzle (4).

During cleaning inside the tank, the cleaning fluid also comes into contact with the tank flange (1).

The product-contacting components are therefore also in contact with the CIP medium.

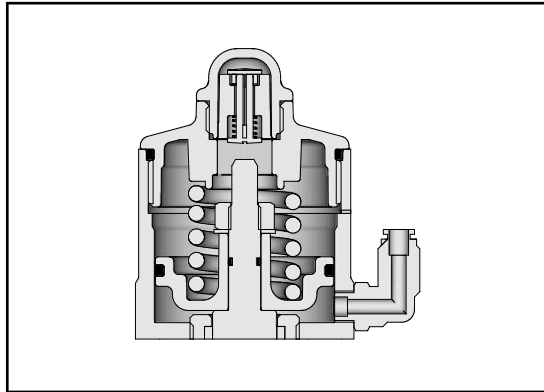
3.1.4 Mechanical position indicator

The mechanical position indicator provides a simple visual feedback of the cleaner's position, allowing the operator to manually check its status.

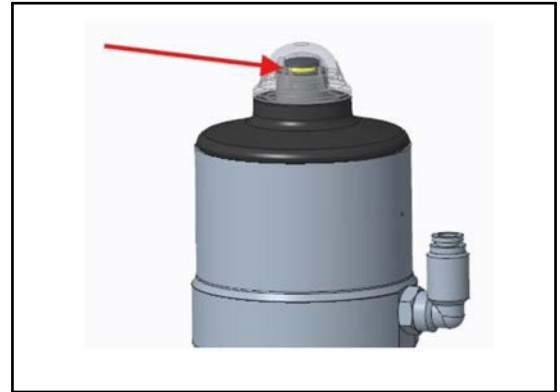
This is particularly useful when no automated feedback or control system is required above the actuator.

Identification feature with mechanical position indicator

Cleaner closed



Cleaner opened



The actuator is of the spring-to-close type (NC). The cleaner is closed in the idle position.

Identification:

- Black (no marking): cleaner is closed (in idle position)
- Yellow marking: cleaner is open (actuator is activated)

3.1.5 Control top T.VIS V-1

The control top T.VIS V.1 can be configured with or without a pilot valve.

3.1.5.1 Control top T.VIS V-1 with pilot valves

The T.VIS V-1 control top is a programmable control top with an integrated pilot valve that enables automatic control of the cleaner.

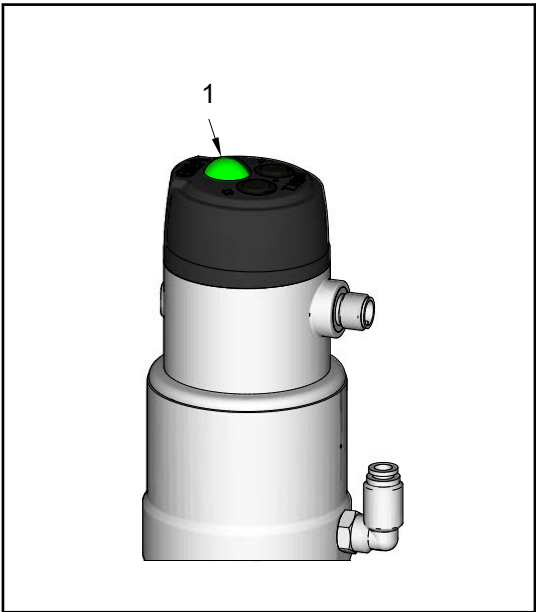
The control top provides both a position display via coloured LEDs and automated operation with control signals based on programming or external inputs.

3.1.5.2 Position Indicator T.VIS V-1 without pilot valves

The T.VIS V-1 control top without a pilot valve functions as a position indicator.

The T.VIS V-1 position indicator is also programmable and provides visual feedback on the cleaner's position using coloured LEDs to indicate its status. The pneumatic control is managed by an externally supplied solenoid valve, such as a solenoid valve manifold.

3.1.5.3 Identification with T.VIS control top



The actuator is of the spring-to-close type (NC). The cleaner is closed in the idle position.

Figure 3-2 - Permanent light (1) on the control top
T.VIS

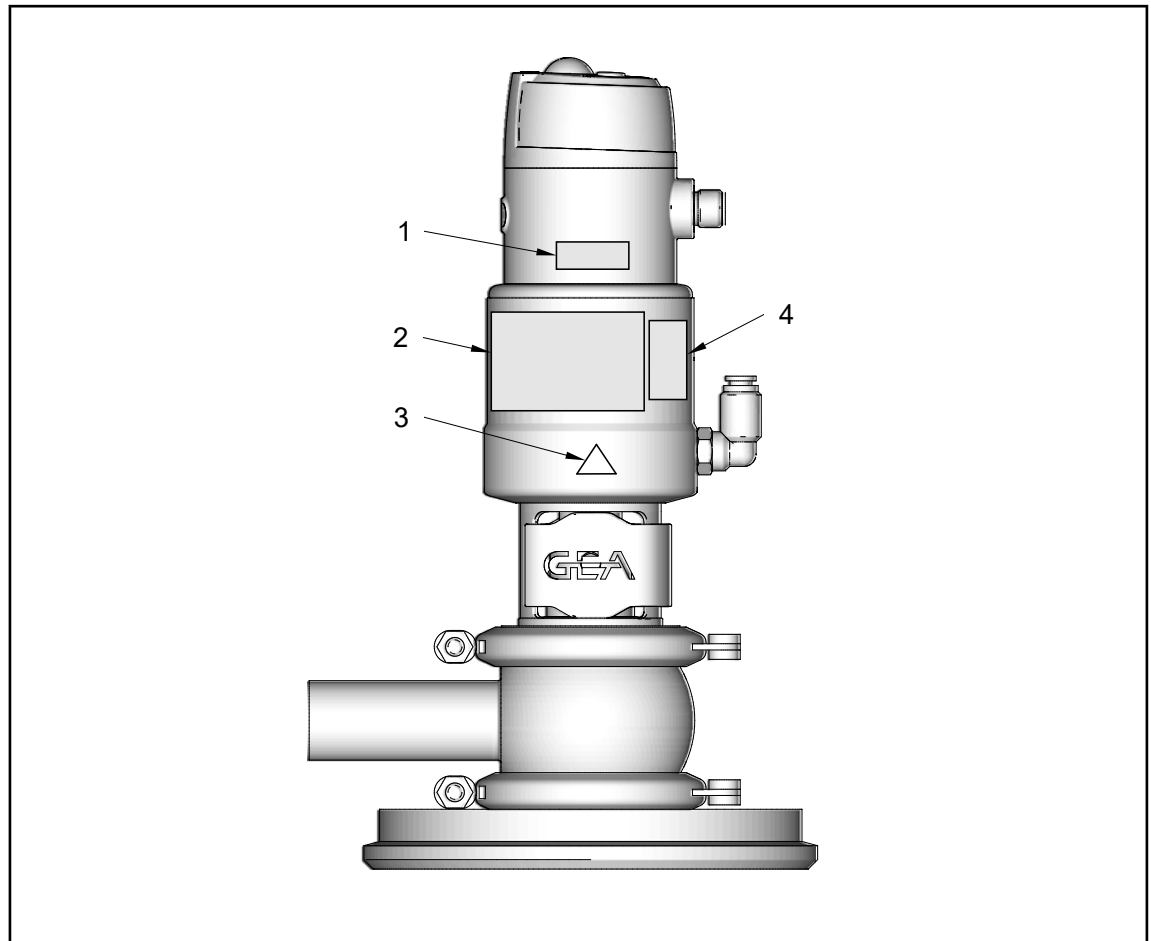
Condition of the cleaner	Display (1) on the control top
Cleaner closed	Steady green light
Cleaner opened	Flashing yellow
Cleaner opened	Steady yellow light
Cleaner closed	Flashing green
Programming mode active	Steady red light
Error/malfunction	flashing red (fast)
Cleaner reprogrammed	Flashing red Telegramm-like, e.g. flashing 3 times - pause - flashing 3 times - pause

3.1.6 Signs

Overview and layout

All safety symbols and other signs must meet the following criteria throughout the life cycle of the cleaner.

- Complete
- Attached as shown
- Clean and legible



No.	Signs
1	Type plate T.VIS; adhered to T.VIS
2	Type plate cleaner; adhered to actuator
3	Warning: crushing (refers to the lantern) adhered to actuator after lantern
4	Nameplate 3-A (for 3-A-compliant version)

The representation and meaning of the safety symbols used are listed in an overview corresponding to their category, see chapter 2.9 *Safety signs*

3.1.7 Protective devices

There is a lantern protector (45) on the Direct Sprayer DS 25. The lantern protector prevents reaching into the lantern. As soon as the cleaner is switched, it is possible to become jammed between the valve rod (7) and lantern (18).

If the lantern protector has been removed e.g. for cleaning, everyone within the danger zone must be made aware of this danger and access for third parties must be prevented.

3.2 Technical data

3.2.1 Type plate

The type plate clearly identifies the cleaner.

GEA		GEA Tuchenhausen GmbH Am Industriepark 2-10, 21514 Büchen, Germany		UK CA CE	
Type	DS25-H-1-OD1"-L-0-U-DN25-1-12-10-M-12-10-P/0/K/52				
	TV1P2BD/O/65		Serial	1682087-0010	
Mat.	(12) 1.4404/316L/EPDM		Direct Sprayer DS		
Air bar/psi min.	6.0/87	max	8.0/116	2025	
PS bar/psi	1 10.0/145	2	6.0/87	3	xxx/xxx

The type plate provides the following key data:

Characteristics of the cleaner

Characteristics	Values
Type	Configuration Direct Sprayer DS25 if appr. configuration of the control top T.VIS V-1
Serial	Serial number
Mat.	Material used for the parts in contact with product and media
Year of manufacture	e.g. 2025
Air bar/psi	Control air pressure: min. 6 bar/87 psi; max. 8 bar/116 psi
PS bar/psi	1: Cleaning pressure CIP max. 10 bar/145 psi 2: Tank pressure: max. 6 bar/87 psi

3.2.2 Technical data

The most important technical data of the cleaner can be found in the following tables:

Technical data: Cleaner

Designation	Description
Size	DN 25 1" OD
Media and parts that come into contact with the product: Tank connection (1), nozzle (4), valve disk(7), housing (8), flow insert (5), seal disk (9)	- Stainless steel 1.4404 / AISI 316L - Surface Ra 0,8 µm, optional Ra 0,4 µm electro-polished
Sealing material	- EPDM - FKM
Fitting position	Any position, if cleaner and pipe system can drain properly

Technical data: Ambient temperatures

Designation	Description
Direct Sprayer DS 25 with mechanical position indicator	0 ... 80°C (32 ... 176°F) < 0 °C: Use control air with low dew point. Protect parts of the cleaner against freezing.
Position indicator T.VIS V-1 without pilot valve	-20°C ... 70°C
Control top T.VIS V-1 with pilot valve	0°C ... 50°C
Product temperature and media temperature	0 ... 135 °C short-term 150°C, maximum for 30 minutes

Technical data: Compressed air supply, product pressure

Designation	Description
Air connection - metric	Material PE-LD Outside Ø 6 mm Inside Ø 4 mm
Air hose - inch	Material PA Outside Ø 6.35 mm Inside Ø 4.3 mm
Cleaning pressure CIP	2 bar (29 psi) up to 10 bar (145 psi) Standard
Tank pressure or product pressure	max. 6 bar (87 psi) The tank pressure must not exceed 2 bar while the cleaner is being opened and closed.
Vacuum-safe	0.1 bar (1.45 psi) cl.
Control air pressure	Actuator spring-to-close (NC): 6 bar (87 psi), maximum 8 bar (116 psi)

Designation	Description
Solid particle content	Quality class 6 Particle size max. 5 µm Particle density max. 5 mg/m ³
Water content	Quality class 4 Max. dew point +3 °C If the unit is used at higher altitudes or at low ambient temperatures, the dew point must be adapted accordingly.
Oil content	Quality class 3 preferably oil free maximum 1 mg oil to 1 m ³ air

INFO Compressed air support when using cleaners with NC actuator is not permitted.

Weighted cleaner insert*

Size	Feedback	Material Cover	Weight [kg]
Metric 25 and imperial 1" OD	Mechanical position indicator	Synthetic material	2.1
	Position indicator T.VIS V-1	Synthetic material	2.2
	Control top T.VIS V-1	Synthetic material	2.3
	Mechanical position indicator	1.4305	2.5
	Position indicator	1.4305	2.6
	Control top	1.4305	2.7

*Weights excluding housing, tank flange, nozzle, and flow insert

Weights for housing, nozzle, and flow insert

Feedback	Material Cover	Weight [kg]
Housing DN25*	1.4404 (316L)	0.37
Housing 1"OD*	1.4404 (316L)	0.35

Feedback	Material Cover	Weight [kg]
Nozzle	1.4404 (316L)	0.15
Nozzle insert	1.4404 (316L)	0.09
*Weights for housing with welded connection		

Weighted tank connections

Tank connection	Material	Weight [kg]
T	1.4404 (316L)	1.3
T-S	1.4404 (316L)	1.8
U	1.4404 (316L)	0.2

3.2.3 Resistance and permitted operating temperature of the sealing materials

The resistance and permitted operating temperature of the sealing materials depend on the type and temperature of the medium conveyed. The exposure time can adversely affect the service life of the seals.

The maximum operating temperature is defined by the sealing type and its mechanical load.

GEA Tuchenhausen recommends that user should carry out the resistance test himself in order to check the suitability of the selected elastomer for their application.

The resistance of sealing materials can only be determined by the user, as it depends on the operating conditions, such as the time the seals are in contact with the media, process temperature, flow rate, concentration of cleaning agents, and environmental conditions.

If necessary, GEA Tuchenhausen will provide support with further information for special applications if necessary.

Resistance information in the following table:

- + = good resistance
- o = reduced resistance
- – = no resistance

Seal resistance / permissible application temperature of the seal materials

Medium	Maximum operating temperatures	EPDM	FKM
Alkalis up to 3%	up to 80 °C (176°F)	+	o
Alkalis up to 5%	up to 40 °C (104°F)	+	o
Alkalis more than 5%	up to 80 °C (176°F)	+	–
Alkalis more than 5%		o	–

Medium	Maximum operating temperatures	EPDM	FKM
Inorganic acids up to 3%	up to 80 °C (176°F)	+	+
Inorganic acids up to 5%	up to 80 °C (176°F)	o	+
Inorganic acids up to 5%	up to 100 °C (212°F)	–	+
Water	up to 60 °C (140°F)	+	+
	up to 80 °C (176°F)	+	o
	up to 100 °C (176°F)	+	-
Steam	up to 135 °C (275°F)	+	o
Steam, approx. 30 min	up to 150 °C (302°F)	+	o
Fuels/hydrocarbons		-	+
Product with a fat content of max. 35%		+	+
Product with a fat content of more than 35%		-	+
Oils		-	+

Temperature resistance of the sealing materials

Sealing materials	General temperature resistance*
EPDM	-40 to +135 °C (-40 °F to 275 °F)
FKM	-10 to +200 °C (+14 °F to +392 °F)

* The general resistance of the material does not correspond to the maximum operating temperature.

3.2.4 Pipe ends - General table of measurements

INFO The cleaner is only available in sizes DN 25 and 1" OD.

Dimensions for tubes in DN

Metric DN	Outside diameter	Wall thickness	Inside diameter	Outside diameter acc. to DIN 11850
25	29	1.5	26	X

Table 2: Dimensions pipe DN

Dimensions for pipes in inch OD

Inch OD	Outside diameter	Wall thickness	Inside diameter	Outside diameter acc. to BS 4825
1"	25.4	1.65	22.1	X

Table 3: Dimensions pipe OD

3.2.5 Lubricants

Lubricant designation	Material no.
Rivolta F.L.G. MD-2 (1000 g)	413-071
Rivolta F.L.G. MD-2 (100 g)	413-136

Table 4: Lubricants

4 Storage and transport

This chapter contains information about transporting the cleaner. It also describes the minimum requirements for storage after delivery and for any necessary intermediate storage.

The target group of this chapter is all persons who carry out actions related to the transport or storage of the cleaner.

4.1 Scope of supply

On receipt of the cleaner check whether

- the details on the type plate correspond to the data in the order and delivery documents,
- the equipment is complete and all components are in good order.

Externally visible transport damage and / or missing packages must be indicated immediately on the freight note with the delivering forwarder. Written recourse must be taken immediately against the freight forwarder by the recipient and Tuchenhausen must be informed about the process.

Claims must be submitted within six days to the freight forwarder for transport damage that is not recognized immediately. The recipient will bear the cost of any damage claimed beyond this point.

4.2 Storage

The cleaner, cleaner inserts or spare parts should be stored in a dry place, free of vibration and dust, and protected from light. To avoid damage, leave the components in their original packaging if possible.

The storage temperature must be between -10 °C and +60 °C.

If, during transport or storage, the cleaner is going to be exposed to temperatures ≤ 0 °C, the valve block must be dried and suitable measures be taken to protect it from damage.

INFO We recommend storing at a temperature of ≥ 5 °C for a period of 24 hours prior to any handling (removal of the housing / activation of actuators with compressed air) so that any ice crystals formed by condensation water can melt.

4.3 Transport

For transport, the following principles apply:

- Observe the pictograms on the package.
- Handle cleaners with care to avoid damage caused by impact or careless loading and unloading. The outside synthetic materials are susceptible to breaking.
- Control tops must be protected from animal and vegetable fats.
- Only allow qualified staff to transport the cleaner.
- Movable parts must be properly secured.
- Only use approved, fully functional load lifting devices and lifting accessories which are suitable for the intended purpose. Observe the maximum load-bearing capacities.
- Secure the cleaner against slipping. Take the weight of the cleaner and the position of the point of gravity into account, see 3.2.2 *Technical data*.
- Under no circumstances should anyone stand under a suspended load.
- Take care when transporting the cleaner. Do not grip sensitive parts of the unit to lift or push the unit or to support yourself. Avoid jerky movements when putting down the unit.

5 Assembly and installation

This chapter contains information and instructions about the assembly and installation of the cleaner.

The target group of this chapter is all persons who carry out actions related to the cleaner.

5.1 Notes on installation

The cleaner can be installed in any position. When the cleaner is installed horizontally or from below (area U), it is self-draining through the downward-facing supply line. When the cleaner is installed from above (area T), the cleaning fluid drains automatically from the nozzle into the tank through the open nozzle.

Steps must be taken to ensure that the cleaner housing and the pipe system can drain properly.

If the cleaner is installed in a horizontal position, ensure that the vent hole (L) in the actuator is aligned horizontally to one side.

To avoid damage, ensure that the cleaner is installed in the piping system without stress and that no foreign objects (e.g. tools, screws, lubricants) remain in the system after installation.

The control top (B) must be positioned so that the air connections and silencer do not point upwards, to prevent water ingress.

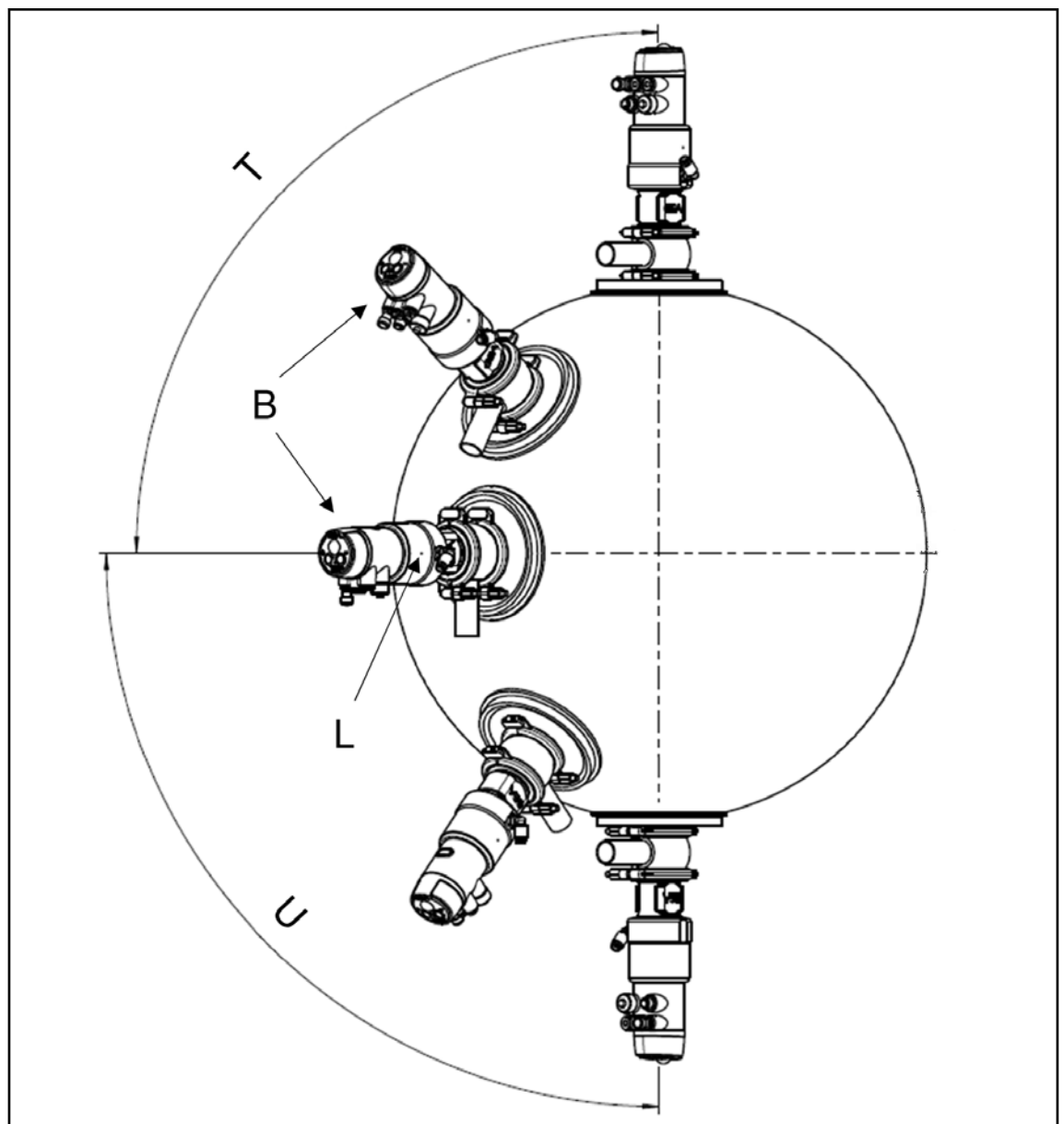


Figure 5-1 - Installation position of the cleaner

5.2 Control top

If different cleaners are operated via a control top, it must be ensured for each of the connected cleaners that the air supply does not fall below the required operating points.

5.3 Install the cleaner with detachable pipe connection elements

Prerequisites

- The pipe is drained, and cleaned or rinsed, if necessary.
- The pipe section for the cleaner to be mounted must be separated from the remaining pipe system.

1. Fit cleaners with detachable pipe connection elements – using suitable connection fittings – directly into the pipe system.

⇒ Cleaner is installed.

5.4 Checking the pneumatic connection

5.4.1 Air requirement

Nominal width of housing	Air requirement [dm ³ N]
DN 25	0.014
OD 1"	0.014

5.4.2 Establishing hose connections

INFO To ensure reliable operation, the compressed air hoses must be cut exactly at a right angle.

Tools

- Hose cutter

1. Shut off the compressed air supply.
2. Use the hose cutter to cut the pneumatic hoses at a right angle.
3. Install the air hose:
 - 3.1 When the control top T.VIS V-1 is used, connect the control top to the drive using a short air hose. To do this, insert the end of the air hose into the connector (20) of the drive and the other end into the Y-connector of the control top. Then insert the external air hose into the connector (P) of the control top.
 - 3.2 When using a mechanical position indicator or a T.VIS V-1 position indicator, insert the air connection directly into the connector (20) on the actuator housing.
4. Re-open the compressed air supply.

⇒ Hose connection has been established.

Hose connection diagram with T.VIS V-1 control top



Figure 5-2 - Hose Connection Diagram

Position	Designation
P	Air supply control top
Y	Control air connection for actuator
S	Exhaust air connection for silencer
20	Elbow screw-in plug connector

5.5 Electrical connection with T.VIS control top

⚠ DANGER

Live parts

Electrical shocks can cause serious personal injuries or death.

- Only allow properly qualified staff to work on the electrical equipment.
- Prior to establishing electrical connections, check the maximum permissible operating voltage.

⚠ DANGER

Explosive gases or dusts

An explosion can cause serious personal injuries or death.

- Observe the installation and operating regulations for use in potentially explosive areas!

Prerequisites

- Cleaner is installed

1. Connect the control top in accordance with the connection diagram and the instructions in the operating instructions for T.VIS V-1 control tops.

⇒ Control top is connected.

6 Commissioning

This chapter contains information for the initial and any subsequent commissioning of the cleaner. It also describes the necessary checks and tests.

The target group of this chapter is all persons who carry out actions related to the cleaner.

6.1 Preparing commissioning

For initial commissioning, the following principles apply:

- Take protective measures against dangerous contact voltages in accordance with pertinent regulations.
- The cleaner must be completely assembled and correctly adjusted. All screw connections must be securely tightened. All electrical cables must be installed correctly.
- Reliably secure machine parts which have already been connected against inadvertently being switched on.
- Relubricate all lubricating points.
- Make sure lubricants are used properly.
- After conversion of the cleaner, residual risks must be reassessed.

Notes on commissioning

Before starting commissioning observe the following:

- Make sure that there are no foreign materials in the system.
- Open and close the cleaner once by applying compressed air.
- Clean the pipe system prior to the first product run.
- During commissioning, regularly check all sealing points for leaks. Replace defective seals.

6.2 Restarting

The following principles apply for restarting:

- Only allow properly qualified staff to set the cleaner into operation.
- Make sure all connections are properly established.
- When the cleaner is switched on, the danger zones must be free.
- Remove any liquids that have escaped without leaving residues.

7 Operation and control

This chapter contains information on starting up and shutting down the cleaner.

The target group of this chapter is the operators of the cleaner.

7.1 Monitoring operation

Dangerous situations during operation can be avoided by safety-conscious and proactive behaviour of the personnel.

For operation, the following principles apply:

- Monitor the cleaner during the operation.
- Check all safety devices at regular intervals.
- All guards and hoods must be mounted as intended.
- The place of installation of the cleaner must be adequately ventilated at all times.
- Structural alterations of the cleaner are not permitted. Immediately report any changes on the cleaner to the person responsible.
- Always keep danger zones clear. Do not leave any objects in the danger zone. Only allow persons to enter the danger zone when the machine is de-energized.
- Regularly check that all emergency stop devices are working correctly.

7.2 Shutdown

The following principles apply for shutdown:

- Switch off the cleaner and secure against reactivation.
- In case of longer shut-downs, observe the storage conditions, see *4.2 Storage*.

8 Cleaning

This chapter contains information about cleaning the cleaner. It also contains information about cleaning intervals and the use of cleaning agents.

The target group of this chapter is all persons who carry out actions related to cleaning the cleaner.

8.1 General

All parts in contact with product must be cleaned at regular intervals. Always observe the safety data sheets issued by the cleaning agent manufacturers. Only use cleaning agents which do not cause damage to the seals and the inner parts of the cleaner. The housing is also rinsed out and cleaned during pipe cleaning.

With respect to the cleaning method and parameters like detergents, temperatures, times, and intervals, the component manufacturer can merely make recommendations but cannot provide any generally applicable details. Method and parameters should be determined and defined by the operator in accordance with the relevant process and product.

The cleaning effect must be checked regularly by the operating company!

8.1.1 Cleaning process examples

Typical cleaning parameters in dairy operations

Example of a two-phase cleaning process:

- Sodium hydroxide solution and sodium hydroxide based combination products in concentrations from 0.5% to 2.5% at 75 °C (167 °F) to 80 °C (176 °F)
- Phosphoric or nitric acid, and combination products based thereon in the concentrations of 0.3 % to 1.5% at approx. 65 °C (149 °F).

Example of a cleaning operation in one cleaning step:

- Formic acid and formic acid-based combination products at up to 85 °C (185 °F).

Typical cleaning parameters in breweries

Example of a two-phase cleaning process:

- Sodium hydroxide solution and sodium hydroxide based combination products in concentrations of 1% to 4% at about 85 °C (185 °F).
- Phosphoric or nitric acid, and combination products based thereon in the concentrations of 0.3 to 1.5% at 20 °C (68 °F).

8.1.2 Cleaning results

The cleaning result depends on the following factors:

- Temperature
- Time
- Mechanics
- Chemicals
- Degree of soiling

These factors can be combined in such a way as to make an optimal cleaning result probable.

8.2 Passivation

Before a system with long pipes and tanks is commissioned, it usually needs to be passivated.

Valve blocks are usually excepted from this.

Passivation is usually carried out with nitric acid (HNO_3) at about 80 °C (176 °F) in a concentration of 3 % and a contact time of 6 to 8 hours.

8.3 Sterilisation

The cleaner is suitable for SIP (Sterilisation in Place).

The permissible sterilisation media and temperatures for the various sealing materials are listed in the resistance table, see 3.2.3 *Resistance and permitted operating temperature of the sealing materials*. Other sterilisation media (e.g. H_2O_2) must be approved by the manufacturer.

9 Maintenance

This chapter contains information about cleaner maintenance, inspection and repairs.

The target group of this chapter is all persons who carry out actions related to the cleaner.

9.1 Carrying out inspections

Between the maintenance periods, the cleaner must be checked for leakage and proper function.

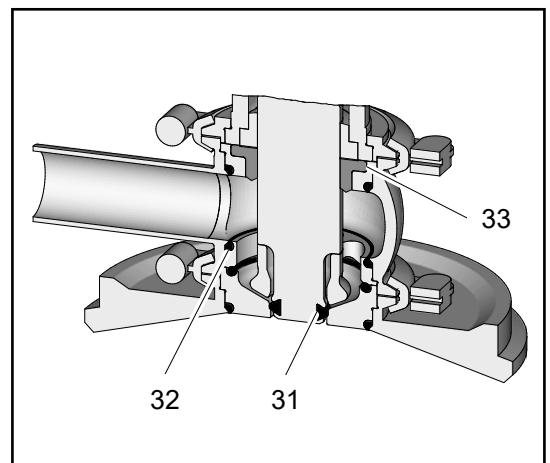
9.1.1 Seals that come into contact with the product and CIP

Prerequisites

- Access to seals that come into contact with the product and CIP

1. Regularly check the seals that come into contact with the product and CIP

- 1.1 Check the sealing ring (33) between upper housing and lantern.
 - 1.2 Check the V-ring (31) in the valve disks.
 - 1.3 Check the O-rings (32) on the nozzle, flow insert and seal disk.



⇒ The seals that come into contact with the product and CIP have been tested.

9.1.2 Checking the pneumatic connection

Prerequisites

- Access to the pneumatic connection

1. Check the operating pressure at the pressure reducing and filter station.
2. Regularly clean the air filter in the filter station.
3. Check that the air connections are tight.
4. Check the lines for kinks and leaks.
5. Check the solenoid valves for proper function.
 - When the control top is mounted, it must be actuated.

⇒ The pneumatic connection has been checked.

9.1.3 Checking the signs on the cleaner

Prerequisites

- The cleaner is accessible

1. Check the signs on the cleaner, see also 3.1.6 Signs.
2. If necessary, replace damaged or missing labels with new labels.

⇒ The signs on the cleaner have been checked.

9.2 Servicing intervals

To ensure the highest operational reliability, all wearing parts should be replaced at longer intervals.

The actual servicing intervals can only be determined by the operating company since they depend on the operating conditions, for instance:

- Daily period of use
- Switching frequency
- Type and temperature of the product
- Type and temperature of the cleaning solution
- Ambient conditions

Servicing intervals

Applications	Servicing Intervals (Guideline Values)
Media at temperatures of 60 °C to 130 °C (140 °F to 266 °F)	approx. every 3 months
Media at temperatures of < 60 °C (< 140 °F)	approx. every 12 months

9.3 List of tools

Tool	Intended Purpose	Material no.
V-ring insertion tool	Mount the V-rings	229-109.88
Open-end plug tool ECO_LAT_DN100 (For use with a torque wrench with a 15x19 holding fixture for insert tools.)	Disassembling and assembling the lantern	221-007481
Assembling device ECO-lantern	Disassembling and assembling the lantern	229-000071
Jaw wrench a/f 10x11	Remove clamp connection	408-033
Jaw wrench SW 13x17	Removing the switch bar / valve disk DN 25 Removing the elbow push-in fitting	408-036
Pick-Set	Removing the seals	221-007248
Hose cutter	Cutting the pneumatic hoses to size	407-065

Tool	Intended Purpose	Material no.
Torque wrench ¼" (2.5-25 Nm)	Fitting the clamp connection	408-424
Torque wrench size 2 (20-210 Nm)	Assembling the valve insert from individual parts	408-426
Socket for wrench ¼" long a/f 10	Fitting the clamp connection	408-477
Socket for wrench ¼" long a/f 16	Removing and installing the nut (pos. 23)	408-470
Hex key, a/f 12	Mounting the stainless steel cover without T.VIS	
Hex key, a/f 17	Mounting the plastic cover without T.VIS	
Hex key, a/f 17	Mounting the plastic cover with T.VIS	
Pin-type face spanner, pin dia. 4	Mounting the stainless steel with T.VIS	408-133
Mounting tool H_A/ hood	Mounting the mechanical position indicator	229-000045
Installation mandrel	Mount the O-ring (41)	221-200531

Table 5: List of tools

9.4 Prior to removal

Perform the following steps:

1. Drain all pipe system elements that lead to the cleaner and, if necessary, clean or rinse them.
 2. Disconnect the power supply.
- ⇒ Disassembly has been prepared.

9.5 Dismantling the cleaner

9.5.1 Disconnecting the cleaning insert from the housing

Tools

- Open end spanner, a/f 10/11

⚠ WARNING

Spring tension in the cleaner (NC)

Danger of injury when opening the clamp connections on the actuator or on the housing as the released spring pretension will suddenly lift the actuator.

- Therefore, release the spring tension before detaching the clamp connection by supplying the actuator with compressed air at max. 8 bar.

ATTENTION

Sensitive parts

Damage to the parts can result in a malfunction.

- Protect the parts against impact stress.

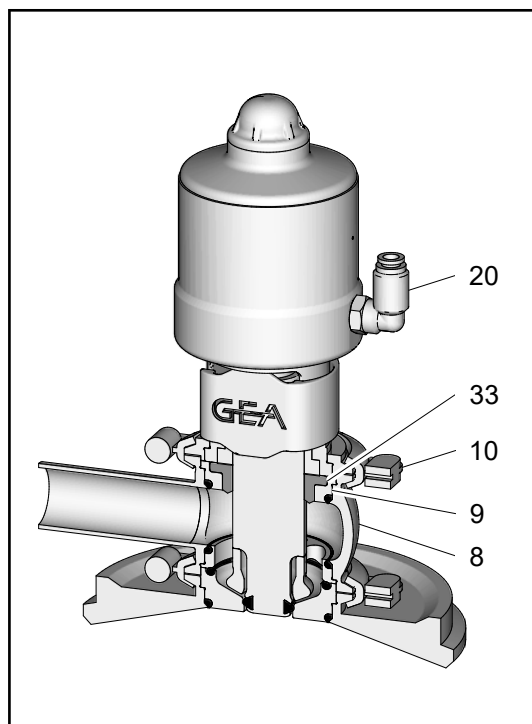
ATTENTION

For overhead installation

The cleaner insert may fall down after the clamp connection has been detached.

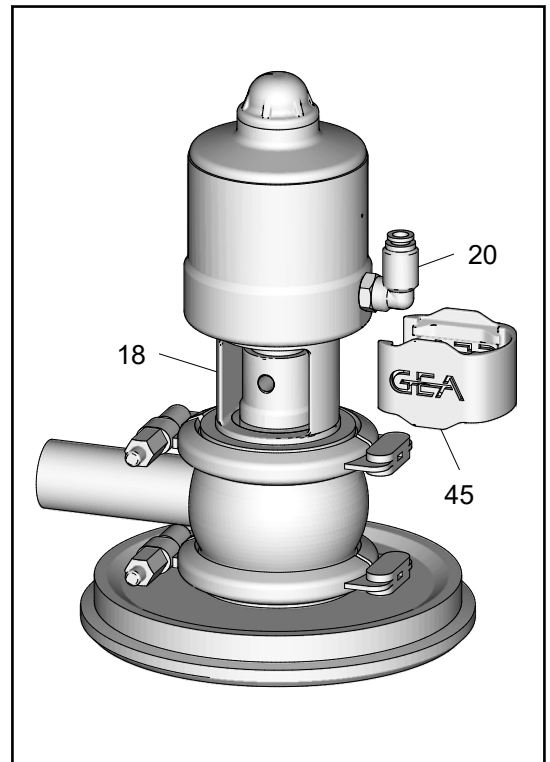
- Secure/hold the valve insert during disassembly.

1. Pressurize the actuator with compressed air, max. 8 bar (air connection 20).
→ The valve rod is raised.



2. Remove the clamp connection (10) between housing and lantern.
→ Secure/hold the cleaner insert during disassembly.

3. Vent the actuator by removing the compressed air.
→ The cleaner insert is pushed out of the housing.
4. Slowly pull the cleaner insert out of the housing.
→ Ensure that the sealing disc (9) with the seal ring (35) is also removed from the housing (8).
5. Remove the compressed air hose from the connector (20) of the drive. Then pull the lantern protector (45) off the lantern (18).



⇒ The cleaner insert is separated from the housing.

9.5.2 Removing the housing from the tank

Tools

- Open end spanner, a/f 10/11

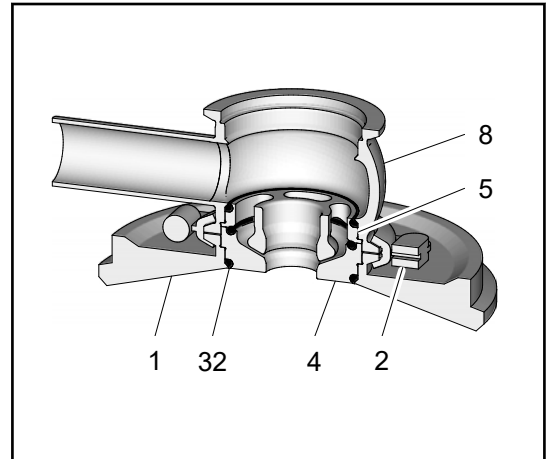
ATTENTION

For overhead installation

The nozzle and flow insert may fall down after the clamp connection has been detached.

- Secure/hold cleaner components during disassembly.

1. Loosen the clamp connection (2) between the housing (8) and tank flange (1).
- When assembling overhead, secure/hold the cleaner components during disassembly.



2. Remove the housing (8), nozzle insert (5), and nozzle (4).
 3. Remove the O-rings (32).
- ⇒ The cleaner is fully disassembled from the tank.

9.5.3 Removing the control top

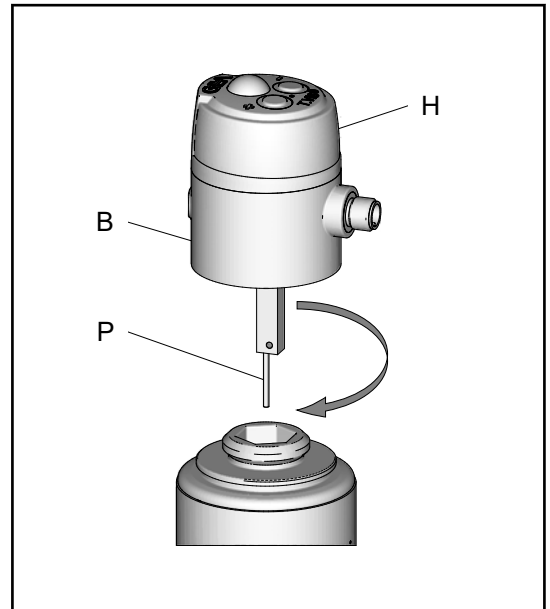
ATTENTION

The potentiometer spindle (P) is a sensitive component

Damage to potentiometer spindle (P)

- Handle potentiometer spindle (P) carefully

1. Remove electrical and pneumatic connections from the control top (B).
→ Do not remove the hood (H) of the control top (B).
2. Turn the control top (B) to the left (in the direction of the arrow) until the stop is reached.



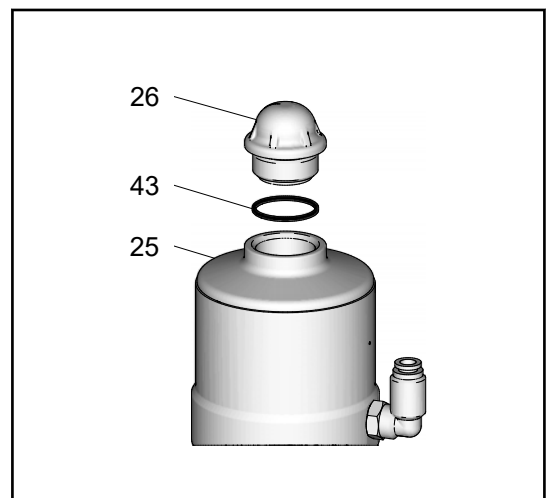
⇒ Control top T.VIS V-1 has been removed.

9.5.4 Disassembling the visual position indicator

Tools

- Mounting tool H_A/ hood

1. Unscrew position indicator (26) with mounting tool H_A/ hood.



2. Take the O-ring (43) out of the cover (25).

⇒ Visual position indicator is removed.

9.5.5 Disassembling the cleaner insert into individual parts

Tools

- Vice with protective jaws
- Jaw wrench SW 13
- Socket for wrench long SW 16
- Depending on the cover type, different tools are required:
- Inner hex SW 17 (cover without T.VIS - plastic)
- Inner hex SW 12 (cover without T.VIS - stainless steel)
- Inner hex SW 19 (cover with T.VIS - plastic)
- Face spanner with 4 mm pins (cover with T.VIS – stainless steel)

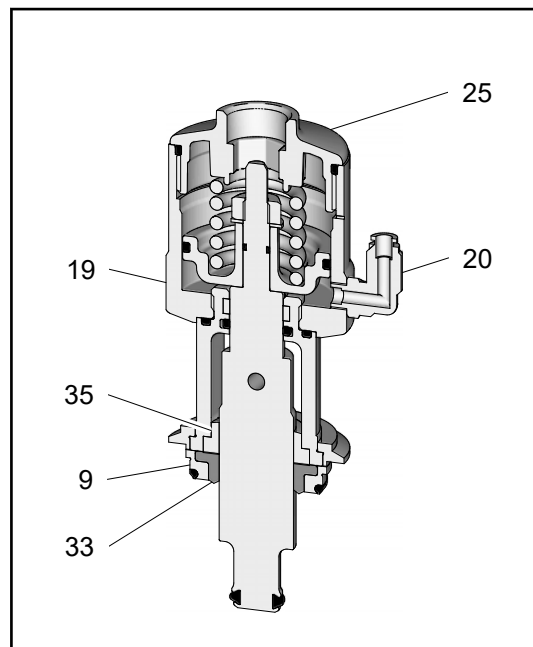
ATTENTION

Sensitive parts

Damage to the parts can result in a malfunction.

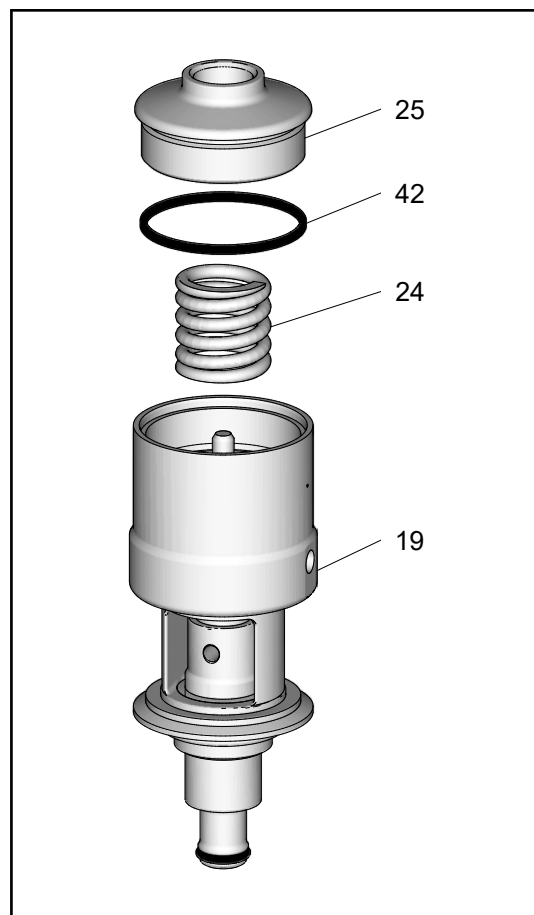
- Protect the parts against impact stress.

1. Remove the seal disk (9).
2. Remove the seal disk (9) together with the seal ring (33) and the bearing (35).
→ If this is difficult, the parts can also be removed after the valve disk (7) has been disassembled.
3. Unscrew elbow screw-in plug connector (20) with jaw wrench SW13.
4. Clamp the actuator housing (19) and the spanner flats in a vice with protective jaws.



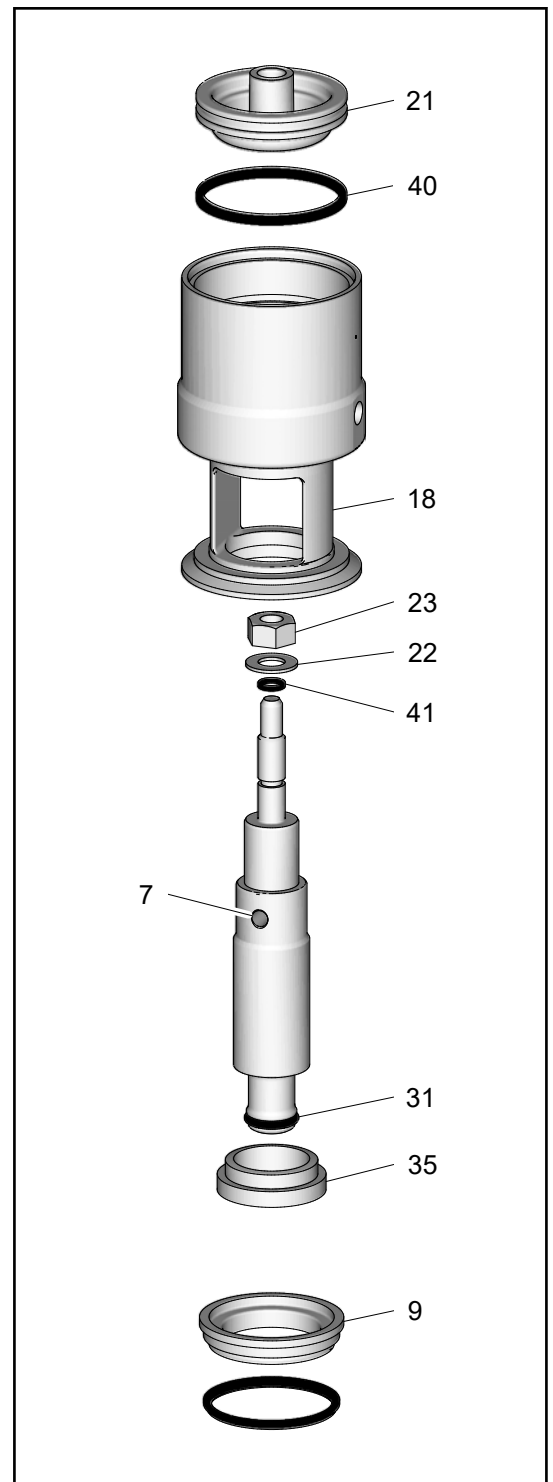
5. Unscrew cover (25) with a suitable tool. Depending on the configuration, a different tool is required (see tool list at the beginning of the chapter).

6. Take the O-ring (42) out of the housing (25).
7. Remove the compression spring (24).

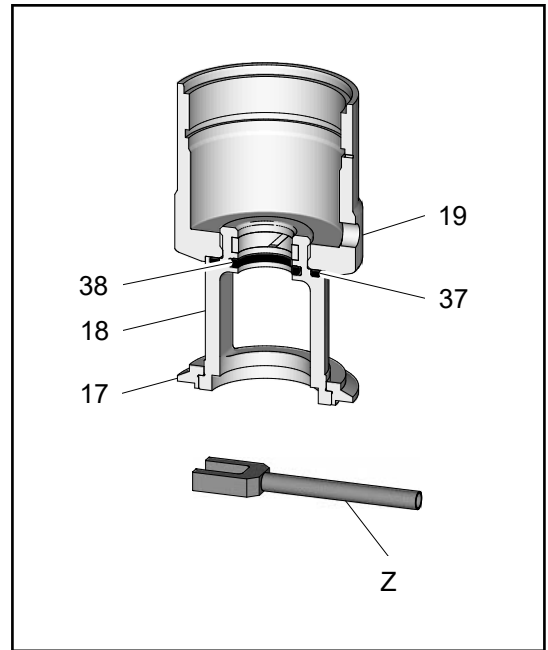


8. Remove the actuator housing (19) from the vice.

9. Affix the valve disk (7). To do this, insert a screwdriver or punch pin through the hole in the valve disk (7).
10. Loosen the hexagon nut (23) using a socket wrench SW 16 and slide the disc (22) off the valve disk (7).
11. Press out the valve rod (7) from the housing (8) and lantern (18).
12. Push the piston (21) with a screwdriver up and out of the lantern (18) and remove the O-ring (40).
13. Remove the bearing (35) from the valve disk (7).
14. Remove the O-ring (32) from the seal disk (9).
15. Remove the O-rings (41) from the valve disk (7).



16. Clamp the actuator housing (19) and the spanner flats in a vice with protective jaws.
17. Unscrew the lantern (18) of the mounting tool ECO lantern (Z) from the actuator housing (19).
18. Take the locking ring (17) from the lantern.
19. Remove O-ring (37) and Glyd ring (38).



⇒ The cleaner insert has been dismantled into its individual parts.

9.6 Assembling the Cleaner

INFO Follow the instructions for lubricating seals and threads **3.2.5 Lubricants**

9.6.1 Tightening torques

Tighten the following connections on the cleaner using the torque values specified in the table.

Tightening torques		[Nm]	[lbft]
Clamp connection	M6	9	6.6
Lantern	M34	60	44.2

9.6.2 Assembling the cleaner insert from individual components.

Tools

- Vice with protective jaws
- Jaw wrench SW 13
- Torque wrench 1/4" 2,5-25 Nm
- Socket for wrench 1/4" long a/f 10
- Depending on the cover type, different tools are required:
- Inner hex SW 17 (cover without T.VIS - plastic)
- Inner hex SW 12 (cover without T.VIS - stainless steel)
- Hex key SW 19 (cover with T.VIS – plastic)
- Face spanner with 4 mm pins (cover with T.VIS – stainless steel)
- Installation mandrel for O-ring (41)

⚠ CAUTION

Danger of injury due to sharp-edged parts

Danger of injury on parts with sharp edges during assembly.

- Do not put your hand into the housing.

ATTENTION

Sensitive parts

Damage to the parts can result in a malfunction.

- Protect the parts against impact stress.

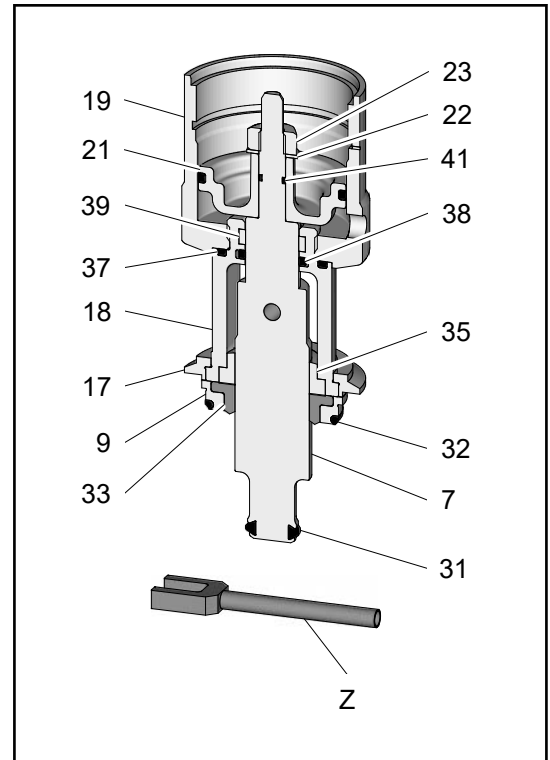
ATTENTION

Sensitive sealing surfaces in the actuator

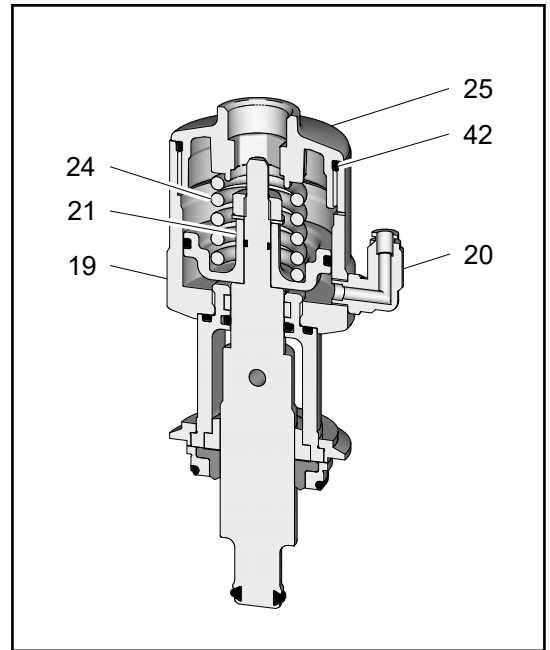
The sealing surfaces on the cylinder can become damaged.

- Take care no dirt enters the actuator.

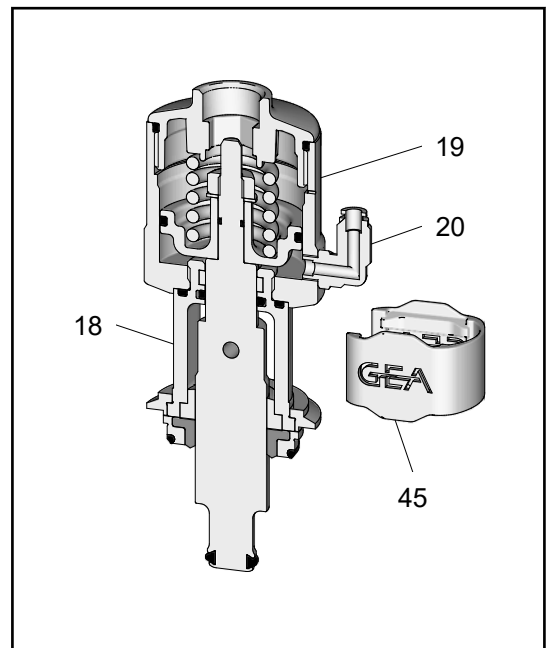
1. Mount the O-ring (37) and Glyd ring (38).
2. Place the locking ring (17) onto the lantern (18)
3. Clamp the actuator housing (19) and the spanner flats in a vice with protective jaws.
4. Screw the lantern (9) into the actuator housing (19) and tighten using the ECO-Lat (Z) open-end wrench insert or the ECO-lantern assembly fixture.
→ Observe torques, see 9.6.1 *Tightening torques*.
5. Push the seal disk (9) with the O-ring (32) and seal ring (33) onto the valve disk (7).
6. Press the bearing (35) into the lantern (18).
7. Retract the V-ring (31). For details, see 9.7.2.1 *Replacing the V-ring*.
8. Mount the O-ring (41) in the installation mandrel.
9. Press the valve disk (7) with the V-ring (31) and O-ring (41) through the lantern (18) into the actuator (19).
10. Remove the actuator housing (19) with the lantern (18) and valve plate (7) from the vice.
11. Press the piston (21) over the valve disk (7) into the actuator housing (19).
12. Affix the valve disk (7). To do this, insert a screwdriver or punch pin through the hole in the valve disk (7).
13. Place the disk (22) onto the valve disk (7) and tighten the hexagon nut (23) on the valve disk using a socket wrench.



14. Clamp the actuator housing (19) with its key surfaces into a vice with soft jaws and press the valve plate downward.
15. Grease both end faces of the compression spring (24) and place it on the piston (21).
16. Insert the O-ring (42) into the cover (25).
17. Screw the cover (25) on securely.
 - The tools that are required depends on the cover configuration. See tool list at the beginning of the chapter.



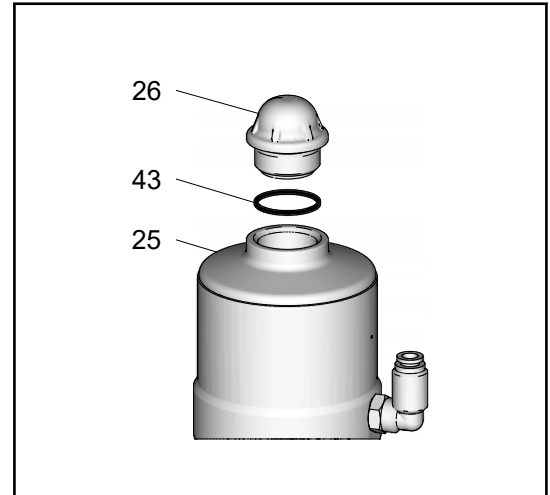
18. Tighten the elbow push-in fitting (20) on the actuator housing (19).
19. Clip the lantern protector (45) over the lantern (18).



⇒ The cleaner insert is assembled.

9.6.3 Mount the visual position indicator

1. Insert the O-ring (43) into the cover (25).
2. Screw on the position indicator (26).



⇒ Visual position indicator is mounted.

9.6.4 Mounting the control top

Tools

- Hex socket key

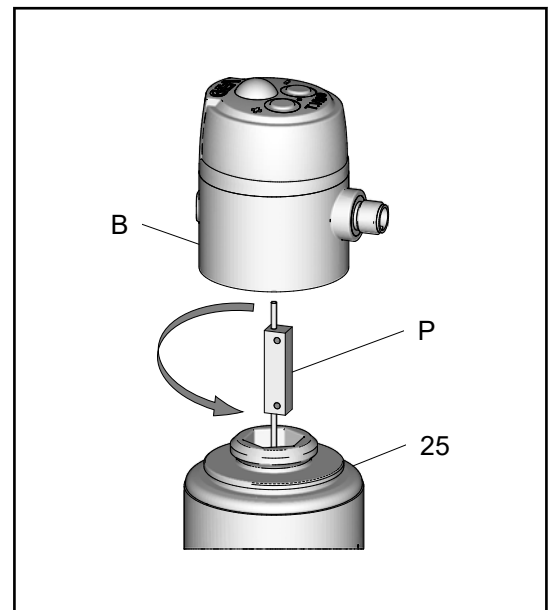
ATTENTION

The potentiometer spindle (P) is a sensitive component

Damage to the potentiometer spindle (P) can cause malfunctions.

- Handle potentiometer spindle (P) carefully

1. Carefully insert the potentiometer spindle (P) into the cover (25).
2. Screw the control top (B) onto the cover (25) to the right (in the direction of the arrow) until it reaches the stop, and hand-tighten (maximum torque 3 Nm).
3. Connect the electrical and pneumatic connections to the control top (B).
4. Align the connections by turning the control top (B) back slightly (locking mechanism).



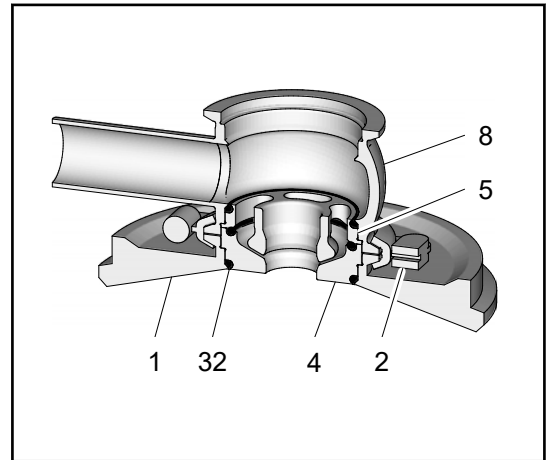
⇒ The T.VIS V-1 control top is mounted.

9.6.5 Mounting the housing on the tank

Tools

- Torque wrench $\frac{1}{4}$ " 2,5-25 Nm
- Socket for wrench $\frac{1}{4}$ " long a/f 10

1. Fit 3 O-rings (32) on the nozzle (4) and flow insert (5).
2. Insert flow insert into the housing (8).



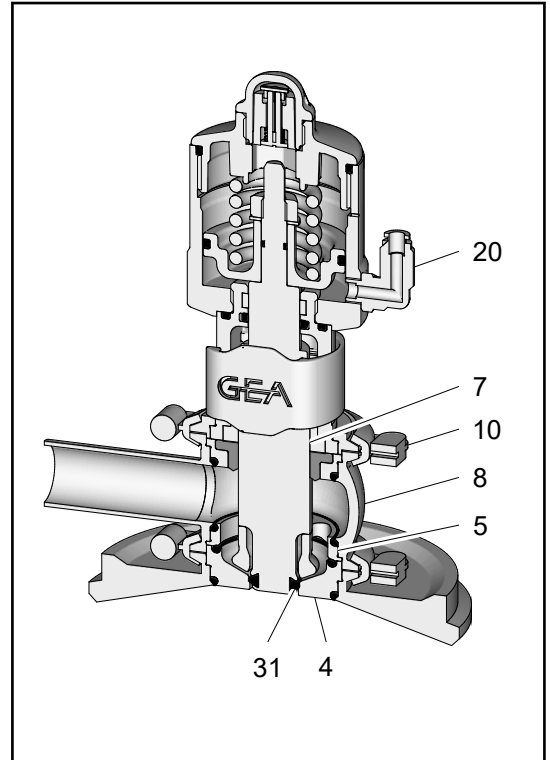
3. Insert nozzle (4) into the housing (8).
→ Ensure that the O-ring (32) is correctly positioned between the nozzle (4) and flow insert (5).
4. Insert all components into the tank connection.
5. Mount the clamp connection (2) between the housing (8) and tank flange (1).
Observe torques, see 9.6.1 *Tightening torques*.
→ When assembling overhead, secure/hold the cleaner components during installation.
6. Connect the flange of the housing (8) to the pipeline.
⇒ The housing is mounted on the tank.

9.6.6 Insert the cleaner insert into the housing

Tools

- Torque wrench $\frac{1}{4}$ " 2,5-25 Nm
- Socket for wrench $\frac{1}{4}$ " long a/f 10

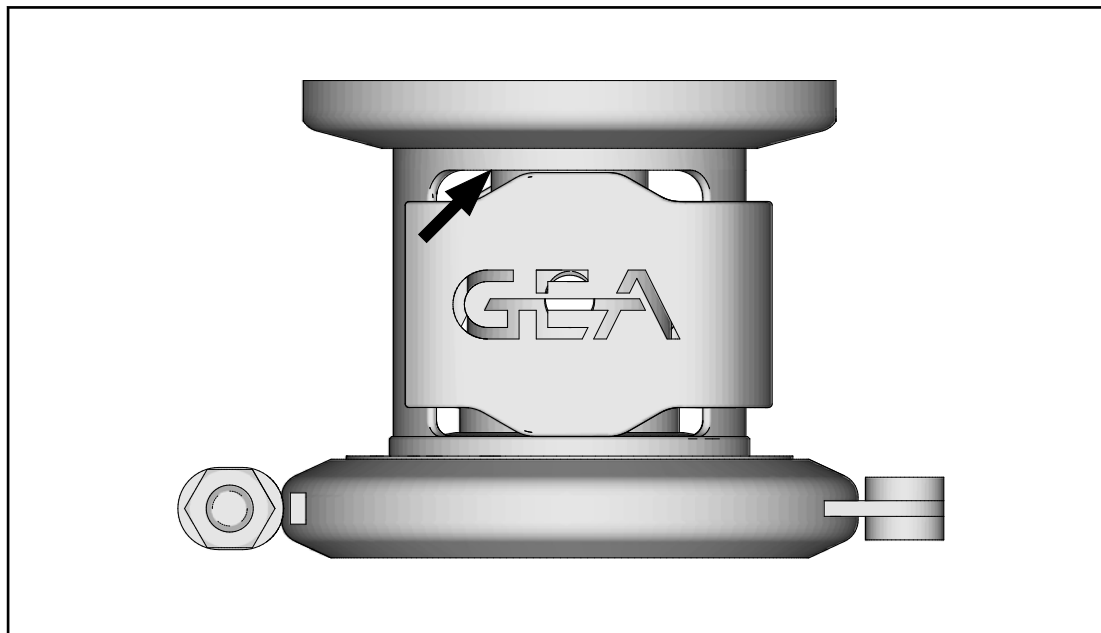
1. Pressurize the actuator with compressed air, max. 8 bar (air connection 20).
→ The valve rod is raised.
2. Insert the cleaner insert into the housing (8). Press to ensure that the V-ring (31) is properly seated in the nozzle insert (5).



3. Mount the clamp connection (10) between the housing and lantern.
→ Observe torques, see 9.6.1 *Tightening torques*.
4. Vent the actuator by removing the compressed air.
→ The valve disk (7) moves into the closed position in the seat inside the nozzle (4).
⇒ The cleaner insert is installed in the housing.

9.6.7 Check stroke

1. Apply compressed air to the cleaner.
2. Check if the cleaner fully opens.



- When actuated, there must be no gap between the valve rod and lantern.
- ⇒ The cleaner stroke has been checked.

9.7 Maintenance

9.7.1 Cleaner cleaned

Prerequisites

- The cleaner has been removed, see 9.5 *Dismantling the cleaner*.

ATTENTION

Malfunction of the cleaner due to damaged precision parts

The shaft of the valve stem (7), the inner surface of the nozzle (4) and nozzle insert (5), the O-ring grooves, and the V-ring groove are precision areas.

- Handle the cleaner with care!

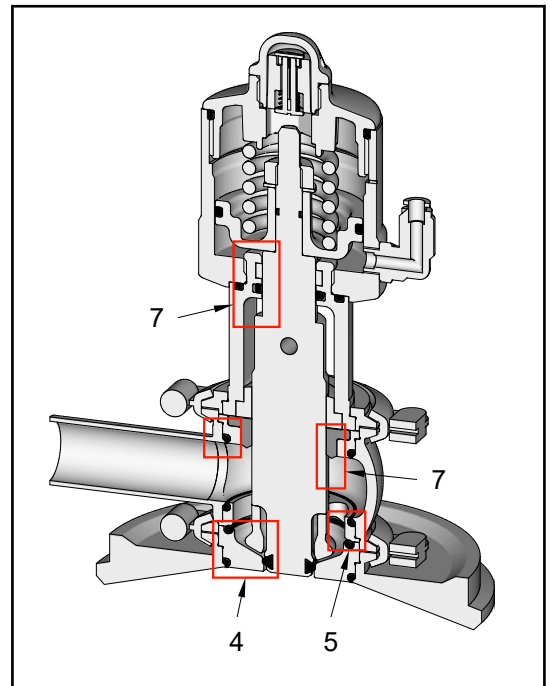
ATTENTION

Malfunction of the cleaner due to damaged parts as a result of incorrect cleaning agents!

Observe the safety information sheets issued by the detergent manufacturers!

- Only use cleaning agents that do not corrode or abrade stainless steel, PTFE and the sealing materials used.

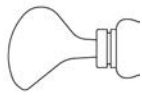
1. Carefully clean the individual parts.



⇒ Cleaner is cleaned.

9.7.2 Replacing seals

9.7.2.1 Replacing the V-ring



V-ring insertion tool

Prerequisites

- The cleaner has been removed, see 9.5 *Dismantling the cleaner*.
- Ensure that the V-ring groove is dry and clean.
- Insert V-Ring without grease. To facilitate fitting, use water with a drop of washing-up liquid to remove the surface tension. To ensure that no rust is transferred, the washing-up liquid solution must be mixed in a ceramic, plastic, or stainless steel container.

Tools

- V-ring insertion tool

⚠ CAUTION**Sharp-edged tool**

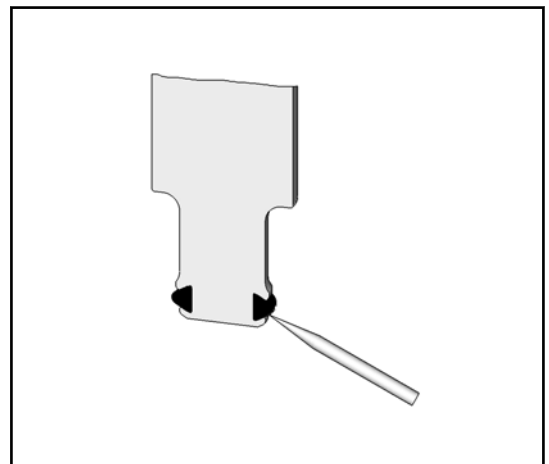
Risk of injury if the pickset tool slips when removing the V-ring.

- Clamp the valve rod with the vice mount into the vice.

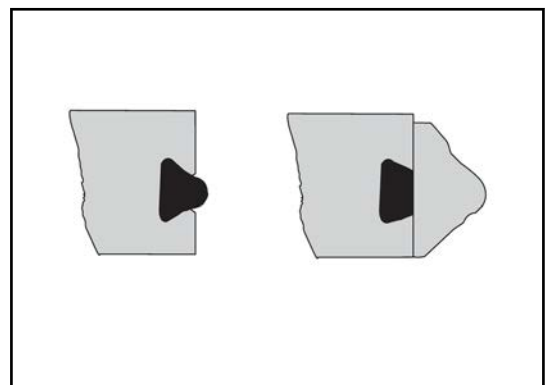
INFO Functional and running surfaces of the cleaner must not get damaged.

INFO Do not grease the V-ring.

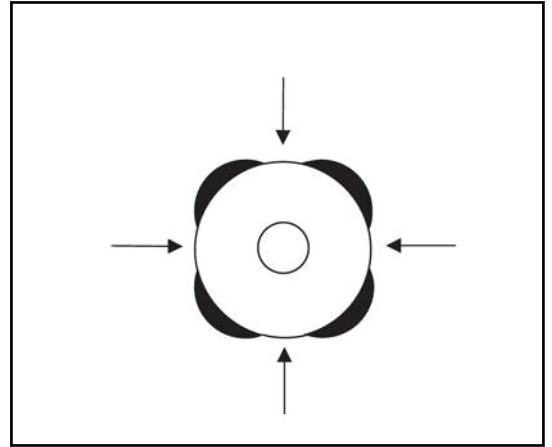
1. Put a tool from the pickset into the V-ring and take it out.



2. Check the V-ring groove: it must be clean and dry.
3. Put in the V-ring.



4. Use the insertion tool to press in the V-ring – press in evenly at several opposite points along the circumference.



5. Insert the V-ring evenly.

⇒ V-ring has been exchanged.

INFO Used seals must not be used again, since the proper function of the seal can then no longer be ensured.

9.7.2.2 Replacing more seals

Prerequisites

- The cleaner has been removed, see *9.5 Dismantling the cleaner*.

INFO Functional and running surfaces of the cleaner must not get damaged.

1. Replace all the other seals identified in the spare parts lists. See spare parts list *12.2 Spare parts lists*.

⇒ Seals have been replaced.

INFO Used seals must not be used again, since the proper function of the seal can then no longer be ensured.

9.7.3 Lubricating seals and threads

Prerequisites

- The cleaner has been removed, see 9.5 *Dismantling the cleaner*.

Tools

- Lubricants Rivolta F.L.G. MD-2 and PARALIQ GTE

ATTENTION

Damage to seals and threads

Stainless steel threads tend to seize and stick, and must be greased. Damage to seals and threads can result in malfunction.

- Ensure that an adequate film of lubricant is applied. No grease residues must be visible once the cleaner has been assembled completely.
- For product contact seals only use suitable greases and oils.
- Observe the safety data sheets issued by the lubricant manufacturer.

1. Apply a light film of lubricant to all threads.
2. Grease all seals – including the O-rings at the top and bottom of the actuator piston stem – very thinly.
→ Do not grease the V-ring.
3. Grease the inside of the seal ring (1) (contact surface).

⇒ Seals and threads have been lubricated.

INFO

GEA Tuchenhausen recommends Rivolta F.L.G. MD-2 und PARALIQ GTE 703. These lubricants are approved for foodstuff and are resistant to beer froth. They have the NSF-H1 (USDA H1) registration. They do not affect the taste or the consistency of the products and are compatible with the seals in contact with product. Rivolta F.L.G. MD-2 can be ordered from GEA Tuchenhausen. Using other types of grease can result in malfunctions or in premature seal failure. The warranty will also become null and void. A Manufacturer's Declaration for these products can be obtained from GEA Tuchenhausen if required. A thin film of grease is required on the seals to ensure the proper function of the fittings. It reduces friction and extends the service life of the seals. This is absolutely harmless from a health and hygienic point of view. Running dry must be avoided!

10 Malfunctions

This chapter contains information about how to handle cleaner malfunctions.

The target group of this chapter is all persons who carry out actions related to the cleaner.

INFO For any troubleshooting, refer to the relevant chapter *Safety* in this document.

Fault	Possible cause	Measure
Cleaner does not work	Fault in the controller	Check the system configuration
	No compressed air or compressed air too low	Check the compressed air supply Check air hoses for free passage and air tightness
	Fault in the electrical system	Check actuation / external controller and routing of electrical wires
	Faulty installation position of the cleaner housing	Install the cleaner housing aligned correctly upwards
Cleaner does not close	Dirt/foreign material between nozzle, flow insert and valve disk	Clean cleaner housing and seat
Cleaner closes too slowly	O-rings in the actuator and control top are dry (friction losses)	Grease O-rings
Leakage in the area of the cleaner housing	Housing O-rings defective	Dismantling the cleaner Replace the housing O-rings
Leakage on the valve shaft	Seal ring defective	Replace the seal ring
Flow rate is too high	Distance between the nozzle and flow insert is too high	Tighten the clamp connection correctly
Flow rate is too low	Foreign material between the nozzle and flow insert	Remove the nozzles and flow insert, and any foreign bodies
One-side spray pattern		

Table 6: Malfunctions

11 Decommissioning, dismantling and disposal

This chapter contains information about decommissioning the cleaner. It also describes the removal and disposal processes. The target group of this chapter is all persons who carry out actions related to the cleaner.

11.1 Decommissioning

The following principles apply for decommissioning:

- Switch off the compressed air.
- Switch off the component with the main switch.
- Padlock the main switch (if fitted) in the off position to prevent it from being switched back on. The key to the padlock must be deposited with the person responsible until the machine is restarted.
- For longer periods of standstill, observe the storage conditions, see 4.2 *Storage*.

11.2 Dismantling

Prerequisites

- Ensure that no active processes are running in the relevant area during dismantling.
1. Empty all pipe elements that lead to the cleaner.
 2. Shut off the control air supply.
 3. Disconnect the power supply.
 4. Take the cleaner out of the pipe section, with all housings and housing connections if possible.
→ Cleaner is removed.

11.3 Disposal

Dispose of the cleaner in an environmentally friendly manner. Observe the statutory waste disposal regulations applicable at the place of installation.

The cleaner is made of the following materials:

- Metals
- Synthetic materials
- Electronic parts
- Lubricants containing oil and grease

Separate the different materials and dispose of them correctly sorted. Also observe the instructions regarding disposal in the instruction manual for the individual components.

12 Replacement parts

This chapter contains information on ordering replacement parts for the cleaner and is aimed at all users of the cleaner.

12.1 Order information

Only original spare parts from GEA may be used. All spare parts are packed in GEA original packaging and marked accordingly.

The spare parts are not included in the scope of supply of the machine.

The specifications listed below must be cited on every spare part order.

- Machine type: see type plate
- Machine number: see type plate
- Order number: see spare parts list
- Name: see spare parts list

12.2 Spare parts lists

Spare parts list - cleaner Direct Sprayer

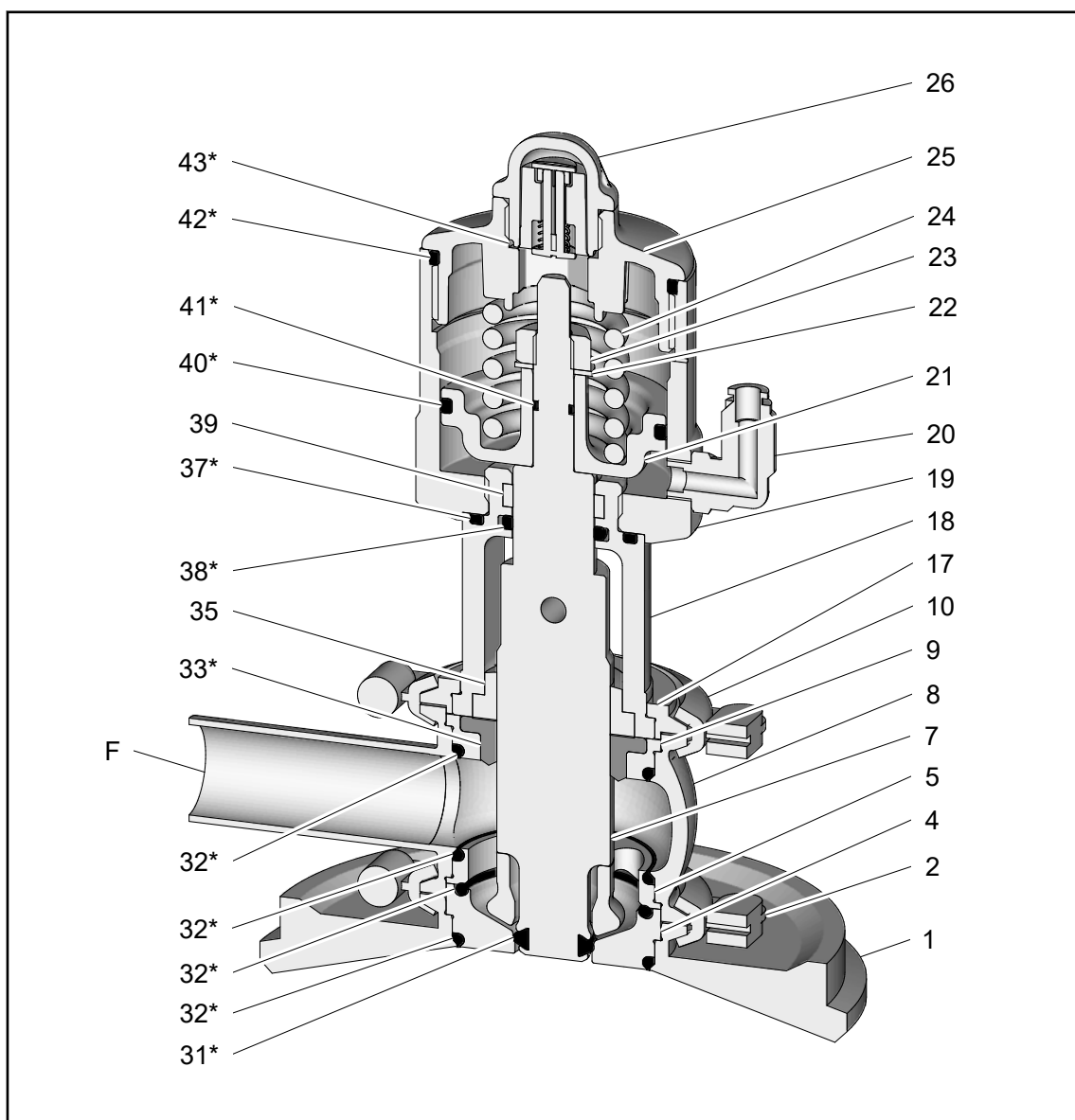


Figure 12-1 - Spare parts drawing - Direct Sprayer with mechanical position indicator

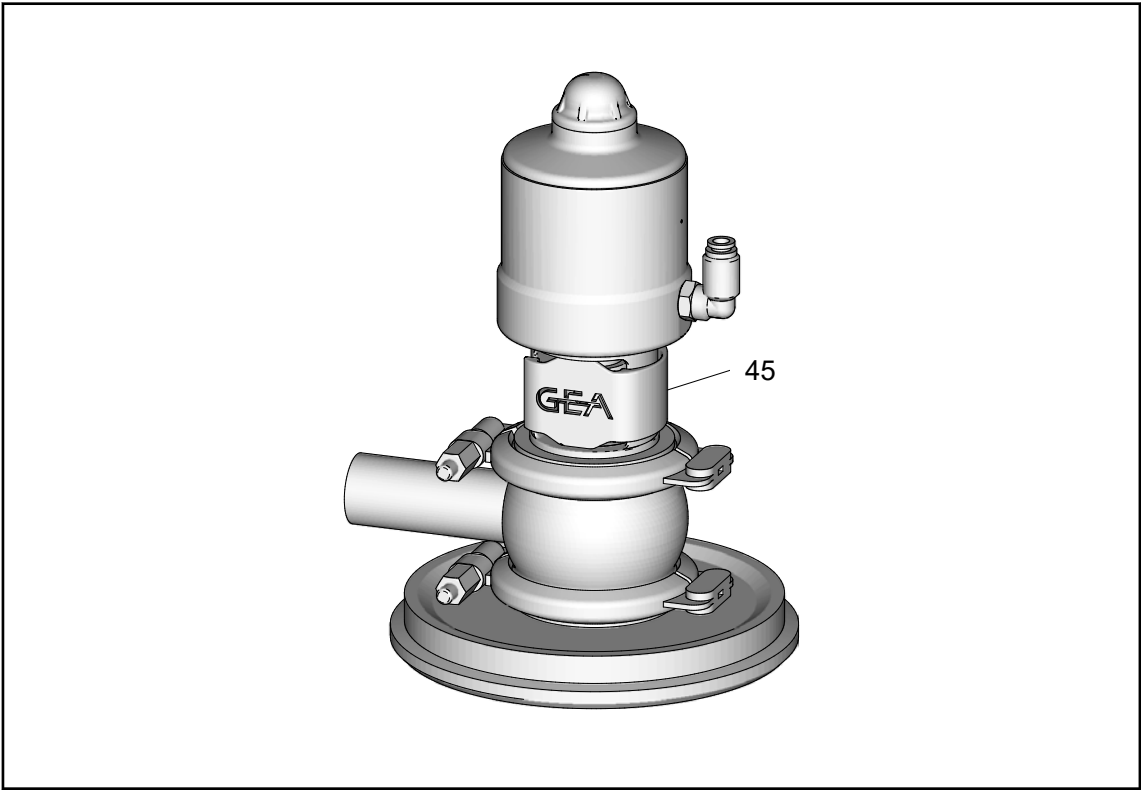


Figure 12-2 - Spare parts drawing - Direct Sprayer with lantern protector

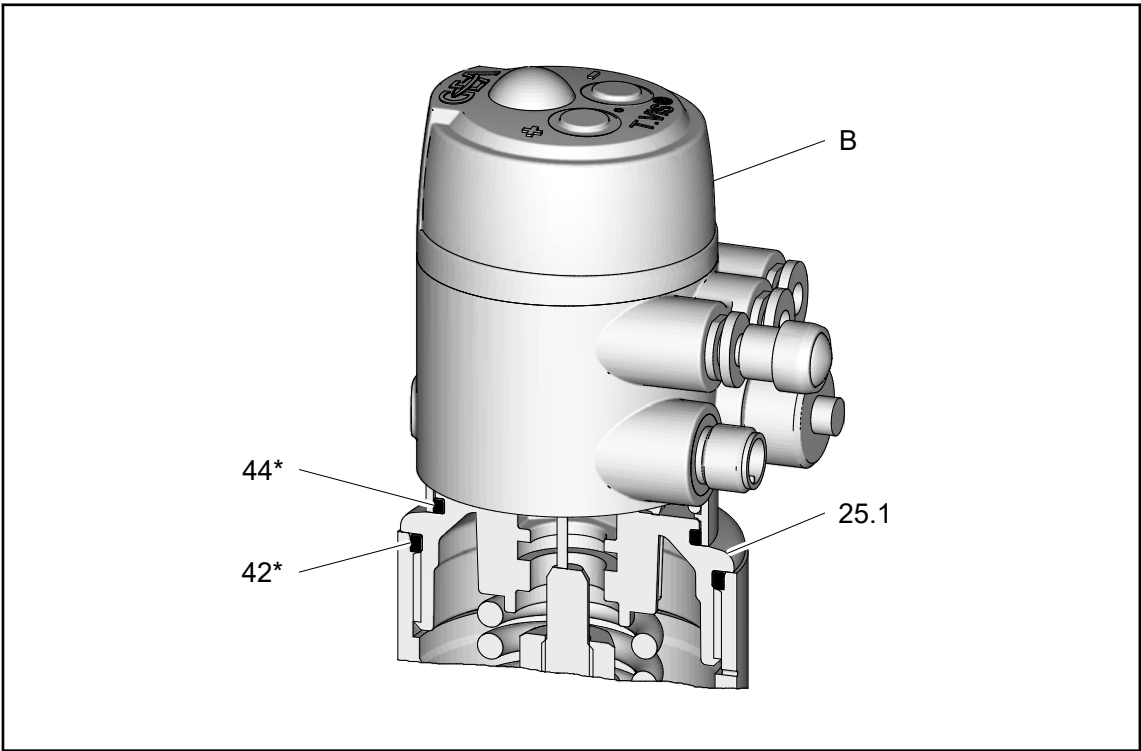


Figure 12-3 - Spare parts drawing - Direct Sprayer with control top T.VIS

Item no.	Designation	Material	Material number
1	Tank connection T	1.4404/316L	221-409.12
	Tank connection T-S	1.4404/316L	221-409.26

Item no.	Designation	Material	Material number
	Tank connection U	1.4404/316L	221-149.01
2	Hinged clamp	1.4404/316L	221-507.02
4	Nozzle	1.4404/316L	254-200011
5	Nozzle insert	1.4404/316L	254-200010
7	Valve rod DN 25	1.4404/316L	254-200009
	Valve rod 1" OD	1.4404/316L	254-200008
8	Housing V1 DN 25	1.4404/316L	221-101.19
	Housing V1 1" OD	1.4404/316L	221-101.27
	Housing V2 DN 25	1.4404/316L	221-102.41
	Housing V2 1" OD	1.4404/316L	221-102.52
9	Seal disk	1.4404/316L	221-141.18
10	Hinged clamp	1.4404/316L	221-507.02
17	Locking ring	1.4301	221-641.01
18	Lantern	1.4301	221-638.07
19	Cylinder	1.4301	254-000872
20	Screw-in plug connection G1/8-6		933-176
	Screw-in plug connection G1/8- 6.35		933-173
21	Piston		221-001089
22	Washer M10	A2	921-018
23	Nut M10	A2	910-026
24	Compression spring	1.4310	931-283
25	Cover	PPSGV40	221-000982
25.1	Cover T.VIS	PPSGV40	221-002304
26	Mechanical position indicator	PA (Polyamide)	221-001057
31*	V-ring	EPDM FKM	221-365.29 221-365.43
32*	O-ring housing	EPDM FKM	930-309 930-168
33*	Seal ring	EPDM FKM	924-085 924-083
35	Bearing	PTFE/carbon	935-088
	Bearing, 3A	PEEK	935-100

Item no.	Designation	Material	Material number
37*	O-ring	NBR	930-046
38*	Glyd ring	NBR	930-986
39	Guide ring	Turcite	935-018
40*	O-ring	NBR	930-065
41*	O-ring	NBR	930-931
42*	O-ring	NBR	930-073
43*	O-ring	HNBR	930-866
44*	O-ring	NBR	930-903
45	Lantern protector	PA12	254-200058
B	Control top		
F	Various housing connections can be configured.		
Positions marked with * are included in the seal set DS25.			

Spare parts list Parts Ra 0,4 E-polished

Item no.	Designation	Material	Material number
1	Tank connection T	1.4404/316L	221-409.33
	Tank connection T-S	1.4404/316L	221-409.34
	Tank connection U	1.4404/316L	221-149.39
4	Nozzle	1.4404/316L	254-200015
5	Nozzle insert	1.4404/316L	254-200016
7	Valve rod DN 25	1.4404/316L	254-200020
	Valve rod 1" OD	1.4404/316L	254-200019
9	Seal disk	1.4404/316L	221-141.53

Spare parts list special materials

Item no.	Designation	Material	Material number
1	Tank connection T	C22(2.4602)	221-409.36
	Tank connection T-S	C22(2.4602)	221-409.37
	Tank connection U	C22(2.4602)	221-149.35

Item no.	Designation	Material	Material number
4	Nozzle	C22(2.4602)	254-200017
7	Valve rod DN 25	C22(2.4602)	254-200022
	Valve rod 1" OD	C22(2.4602)	254-200021

Wear parts - Cleaner Direct Sprayer

Item no.	Designation	Material	Material number
All parts marked with *	Seal set DS25	EPDM	221-200218
		FKM	221-200219
2, 10	Hinged clamp	1.4404/316L	221-507.27
20	Elbow screw-in plug connection G1/8-6		933-475
	Elbow screw-in plug connection G1/8-6.35		933-979
22	Washer M10	A2	921-018
23	Hexagon nut M10	A2	910-026
35	Bearing	PTFE/carbon	935-088
	Bearing, 3A	PEEK	935-100

13 Annex

13.1 Dimension sheets

Dimension sheet - Cleaner Direct Sprayer

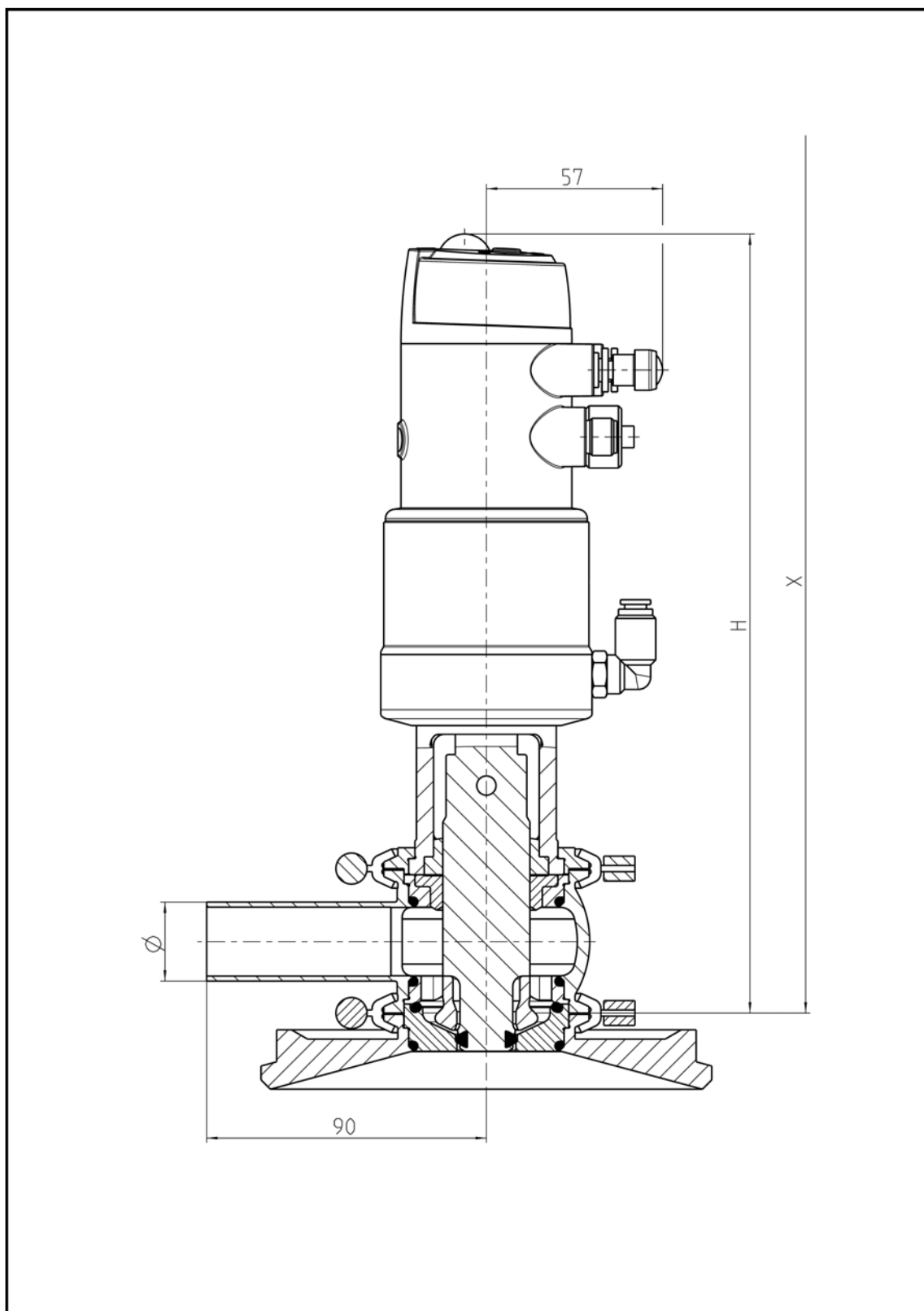


Figure 13-1 - Drawing with dimensions - Direct Sprayer with T.VIS V-1

Position Description	Position Description
H - Height	X - Space required for maintenance

Mechanical position indicator

Nominal width of housing	Ø [mm]	H [mm]	X [mm]
DN25	29	194	257
1"OD	25.4	190	249

Position indicator T.VIS V-1

Nominal width of housing	Ø [mm]	H [mm]	X [mm]
DN25	29	240	303
1"OD	25.4	236	295

Control top T.VIS V-1

Nominal width of housing	Ø [mm]	H [mm]	X [mm]
DN25	29	256	319
1"OD	25.4	252	311

Dimension sheet - VARIVENT®/VARINLINE® tank connection

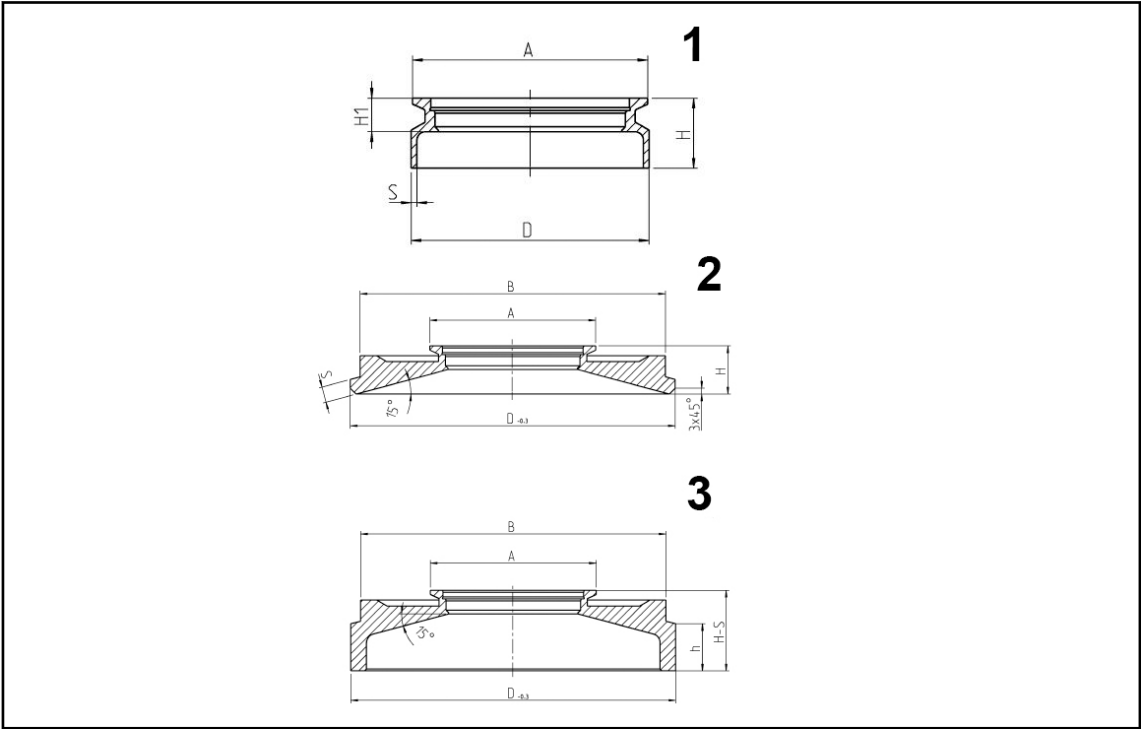


Figure 13-2 - Tank connections

Position Description		Position Description	
1	Tank connection U	2	Tank connection T
3	Tank connection T-S		

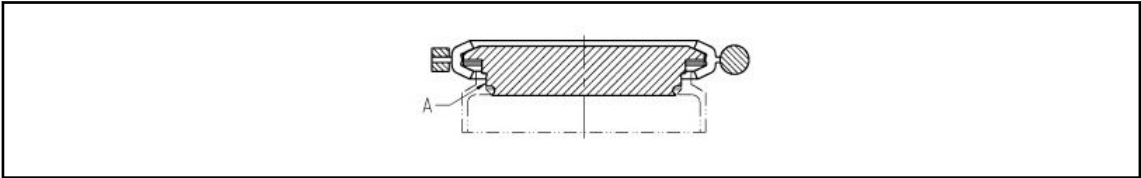


Figure 13-3 - Blanking plate for tank connection U

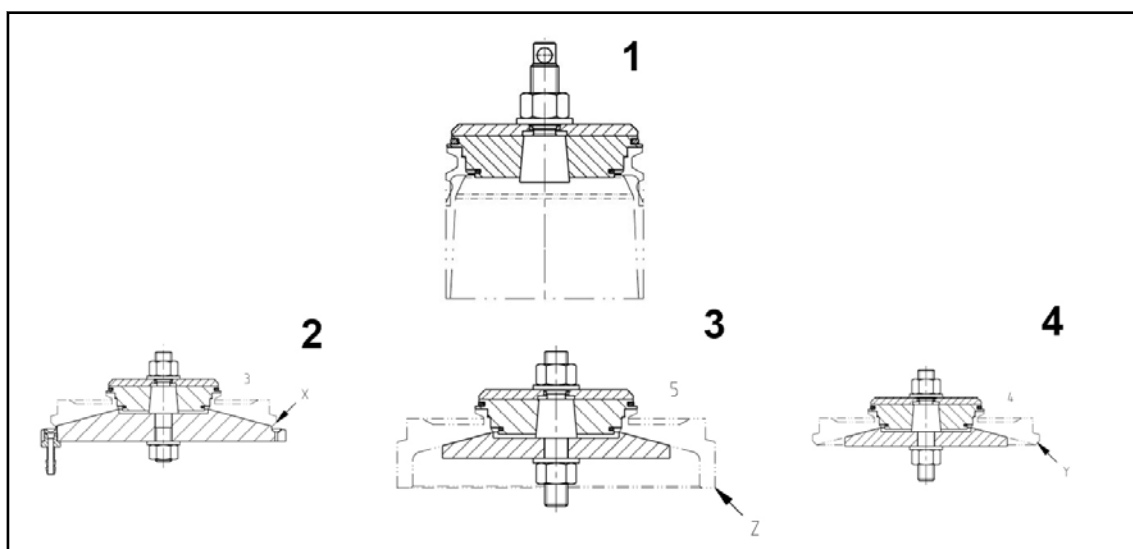


Figure 13-4 - Welding jig

Position	Description	Position	Description
1	Welding jig for tank connection U	2	Welding jig for tank connection T / X = 1st welding
3	Welding jig for tank connection T / Y = 2nd welding	4	Welding jig for tank connection T-S / Z = Welding

Tank connection - dimensions in [mm]

Tank connection	U	T	T-S
A	Ø 66	Ø 66	Ø 66
B	--	Ø 135	Ø 135
D	Ø 70	Ø 145	Ø 145
H	25	24	--
H1	12	--	--
H-S	65	--	41
S	2	max. 8	max. 8
h	--		25

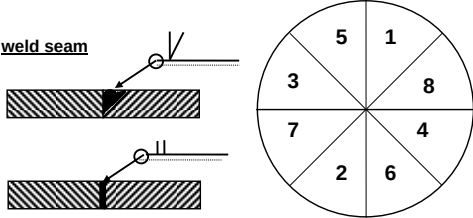
Required seal

Item	Material	Surface	Material no. DN 25 1"
A	1.4404/316L	Ra0.8	221-144.40

Required welding jig

Contract type	Tank connection	Material no. DN 25 1"
Purchase	U	229-104.91
	T	229-104.01
	T-S	229-104.29
Rent	U	229-104.97
	T	229-104.25
	T-S	229-104.80

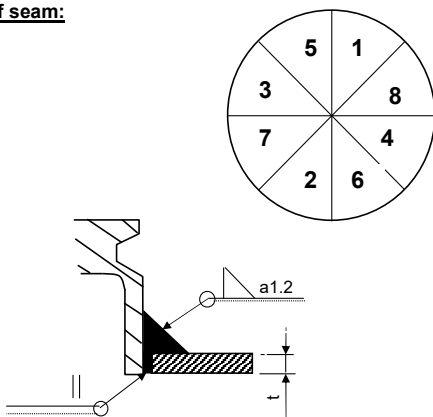
13.2 Welding instructions

Date: 2020-02-13 221RLI002244EN_9.DOC		Manufacturer's Welding Instructions (WPS) Housing Connection T DN 25; DN50/40; DN80/65; DN100 Housing Connection DN50 T-S				
Location: Büchen		Preparation: mechanical				
Welding process: 141 (TIG-Pulse)		Cleaning method: brushing or pickling				
Reference-No: WPSAnschiT1004		Specification of the parent metal: 1.4404; 1.4435; 316L				
Welder: Certified according to DIN EN 287-1; AD-2000 HP3						
Welding process: 141 DIN EN ISO 4063		Workpiece thickness (mm): t = 2mm to t = 8 mm				
Type of joint: see draft		Outside diameter (mm): 145; 165; 200; 225				
Preparation of joint: no gap between flange and base metal		Welding position: PA , PD (overhead)				
Location: Büchen		Preparation: mechanical				
Structure of the joint				Welding procedure		
Welding of the final run in 8 segments 				Pulsed arc welding to be applied only 1. Working diagonally when tacking, 8 times with filler 2. Welding may only be carried out using a welding fixture that needs to be connected to forming gas (see 221MBL007030G); when fitting the fixture, first position the segment clamping device from the outside and secure it. Then fit the relevant plate from the inside of the tank. After welding, quickly cool the weld seam with water. 3. Weld the root without filler if possible; top layers are welded with filler (number of top layers depending on material thickness) 4. Before welding the inside replace the plate of the fixture with a smaller plate. 5. Only remove / reclamp the fixture once the temperature of the component has fallen to < 30 °C.		
Weld layer	Process	Filler metal Ø [mm]	Current [A]	Voltage [V]	Kind of current/ Electrode polarity	Welding speed [cm/min]
Root	141	1,2; 1,6	50 - 60	10 -14	=/-	3 -7
First layer	141	1,2; 1,6	50 - 60	10 – 14	=/-	3 -7
2,3,4, etc. layers	141	1,2; 1,6	105 -125	10 – 14	=/-	3 -7
Filler metal: After consultation with the technical expert				Intermediate layer temperature: T<30°C		
Shielding gas: DIN EN ISO 14175 - I1				Flow rate [l/min]:		
Backing gas: DIN EN ISO 14175 - I1				Shielding gas: 13 - 15 Backing gas: 10 -20		
Manufacturer:				Confirmation of the correct work:		
Merhof / 2014-03-31.....						
Name, Date and Signature (Welding supervision)				Name, Date and Signature (Welder)		

GEA Mechanical Equipment
GEA Tuchenhausen GmbH

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sales.geatuchenhausen@gea.com, www.tuchenhausen.com

Date: 2019-12-15 221rli002533en_4.docx		Manufacturer's welding instruction Housing connection U 50/40; 80/65; 100; 125; 6"IPS				
Location: Büchen		Type of preparation: mechanical				
Manufacturer's welding method: 141 (TIG impulse)		Type of cleaning: degreasing				
Document no.:		Specifications for the base materials: 1.4404 ; 1.4435; 316L;				
Welder: tested according to ISO 9606-1						
Welding process: 141 DIN EN 24063		Workpiece thickness (mm): t = 2mm to t = 4mm				
Type of seam: Bevel seam, fillet weld		Outer diameter (mm): 70; 85; 114; 154; 184; 212				
Joint preparation: Gap between flange-tank max. 0.2mm		Welding position: PA (flat position) PD (overhead)				
Design of the connection				Welding sequence		
Welding of the layers in 8 segment steps <u>Types of seam:</u> 				<u>Only impulse welding may be used</u> 1. Always tacked opposite, 4 - 8 times with filler 2. Welding may only be carried out using a jig which is connected to forming gas (see 221MBL001334); during assembly of the jig insert the segment clamp from the outside and fix it in place. The max. tightening torque of the jig nut is 40Nm. After every welding job, cool the weld seam quickly with water. 3. Root without filler wherever possible, final runs are welded with filler (number of final runs depends on material thickness) 4. The jig may only be removed when the component temperature is < 30°C.		
Welding bead	Process	Filler material Ø [mm]	Amperage [A]	Voltage [V]	Type of current Polarity of electrode	Welding speed [mm/min]
Root	141	1	80 - 100	10 - 14	=/-	60 - 75
Final run	141	1.2; 1.6	80 - 100	10 - 14	=/-	40 - 60
Filler materials: in agreement with the expert				Temperature of intermediate run: T<30°C		
Inert gas: DIN EN ISO 14175 – I1				Flow rates [l/min]:		
Root protection / forming gas DIN EN ISO 14175 – I1				Inert gas: 10 - 15 Forming gas: 10 -20		
Manufacturer: Merhof, 2019-12-15 Name, date and signature (welding supervisor)				Confirmation of exact performance of work by the fabricator: Name, date and signature (welder)		

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14 List of abbreviations

Abbreviation	Explanation
BS	British Standard
bar	Unit of measurement of pressure [bar] All pressure data expressed in [bar/psi] is assumed to be gauge pressure [barg/psig] unless explicitly specified otherwise.
approx.	approximately
°C	Unit of measurement of temperature [degree Celsius]
CIP	Clean in Place
dm ³ n	Unit of measurement of volume [cubic decimetre] standard volume (standard litres)
DN	DIN nominal width
DIN	German standard issued by DIN (Deutsches Institut für Normung e.V., German Institute for Standardization)
EN	European Standard
EPDM	Material designation, Brief designation according to DIN/ISO 1629: Ethylene-propylene-diene- rubber
°F	Unit of measurement of temperature [degree Fahrenheit]
FKM	Material designation, short designation according to DIN/ISO 1629: Fluorine rubber
h	Unit of measurement of time [hour]
HNBR	Material specification short designation according to DIN/ISO 1629: Hydrated nitrile butadiene rubber
IP	Protection class
ISO	International Standard of the International Organization for Standardization
kg	Unit of measurement of weight [kilogram]
kN	Unit of measurement of force [kilonewton]
Kv value	Flow coefficient [m ³ /s] 1 KV = 0.86 x Cv
l	Unit of measurement of volume [litre]
max.	maximum
mm	Unit of measurement of length [millimetre]
µm	Unit of measurement of length [micrometre]
M	Metric

Abbreviation	Explanation
NC	Normally Closed; actuator is spring-to-close, cleaner is closed in idle position
Nm	Unit of measurement for the tightening torque [newton metre] 1 Nm = 0.737 lbft Pound-Force (lb) + Feet (ft)
PA	Polyamide
PPE	Polytetrafluoroethylene
psi	Anglo-American unit of measurement for pressure [pound-force per square inch] All pressure data expressed in [bar/psi] is assumed to be gauge pressure [barg/psig] unless explicitly specified otherwise.
PTFE	Polytetrafluoroethylene
SET-UP	Self-learning installation During commissioning and maintenance, the SET-UP procedure carries out all the necessary settings for the generation of messages.
AF	Indicates the size of spanners [width across flats]
T.VIS	Tuchenhagen valve information system
V AC	Volt alternating current
V DC	Volt direct current
W	Unit of measurement of power [Watt]
TIG	Welding method Tungsten inert gas welding
Inch	Unit of measurement of length in the Anglo-American language area
Inch OD	Tube measurement according to British Standard (BS), outside diameter
Inch IPS	American pipe measurement, iron pipe size

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