

Liquids to Value





Operating Instructions

T-smart Butterfly Valve, Series 8000

Made by GEA Tuchenhagen

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Product Butterfly Valve, Series 8000

Document Operating Instructions

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Notes for the Reader

The present Operating Instructions is part of the user information for the valve. The Operating Instructions contain all the information you need to transport, install, commission, operate and carry out maintenance for the valve.

Binding Character of These Operating Instructions

These Operating Instructions contains the manufacturer's instructions on what they should do for the owner of the valve and for all persons who work on or use the valve.

Carefully read these Operating Instructions before starting any work on or using the valve. Your personal safety and the safety of the valve can only be ensured if you act as described in the Operating Instructions.

Store the Operating Instructions in such a way that it is accessible to the owner and the operating staff during the entire life cycle of the valve. When the location is changed or the valve is sold make sure you also provide the Operating Instructions.

Notes on the Illustrations

The illustrations in these Operating Instructions show the valve in a simplified form. The actual design of the valve can differ from the illustration. For detailed views and dimensions of the valve please refer to the design documents.



Symbols and Highlighting

In this Operating Instructions, important information is highlighted by symbols or special formatting. The following examples illustrate the most important types of highlighting.

DANGER

Warning: Fatal injuries.

Failure to observe the warning can cause serious damage to health, or even death.

→ The arrow identifies a precautionary measure you have to take to avoid the hazard.



ξχ EXPLOSION HAZARD

Warning: Explosions.

Failure to observe the warning may result in a severe explosion.

→ The arrow identifies a precautionary measure you have to take to avoid the hazard.



WARNING

Warning: Serious Injuries.

Failure to observe the warning note can result in serious damage to health.

→ The arrow identifies a precautionary measure you have to take to avoid the hazard.



CAUTION

Warning: Injuries.

Failure to observe the warning note can result in minor or moderate damage to health.

→ The arrow identifies a precautionary measure you have to take to avoid the hazard.

NOTE

Warning: Damage to property.

Non-observance of the warning note can cause serious damage to the valve or the vicinity of the valve.

→ The arrow identifies a precautionary measure you have to take to avoid the hazard.

Carry out the following steps: = Start of instructions for a task.

- First step in a sequence of operations.
- Second step in a sequence of operations.
- Result of the previous operation.
- ✓ The operation is complete, the goal has been achieved.

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Further useful information.

Abbreviations and Terms

Abbreviation	Explanation
BS	British Standard
bar	Unit of measurement of pressure [bar]
approx.	approximately
°C	Unit of measurement of temperature [degree Celsius]
dm ³ _n	Unit of measurement of volume [cubic decimetre] Volume (litre) at standard temperature and pressure
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 Short designation according to DIN/ISO 1629: Ethylene Propylene Diene Rubber
GEA	GEA AG group of companies GEA stands for Global Engineering Alliance
FKM	Material designation, short designation according to DIN/ISO 1629: Fluorine rubber
h	Unit of measurement of time [hour]
HNBR	Material designation Short designation according to DIN/ISO 1629: Hydrogenated Acrylonitrile Butadiene Rubber
IP	Protection class
ISO	International standard issued by the International Organization for Standardization
kg	Unit of measurement of weight [kilogram]
kN	Unit of measurement of force [kilonewton]
L	Unit of measurement of volume [litre]
max.	maximum
mm	Unit of measurement of length [millimetre]
μm	Unit of measurement of length [micrometre]
М	metric
Nm	Unit of measurement of work [newton metre] UNIT OF TORQUE 1 Nm = 0.737 lbft Pound-Force (lb) + Feet (ft)



Abbreviation	Explanation
PA	Polyamide
PE-LD	Low-density polyethylene
SET-UP	Self-learning installation During commissioning and maintenance, the SET-UP procedure carries out all the necessary settings for the generation of messages.
a/f	Indicates the size of spanners width across flats
T.VIS	Tuchenhagen Ventil 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 OD	Pipe dimension acc. to British standard (BS), Outside Diameter
Inch IPS	US pipe dimension Iron Pipe Size

Safety

Safety Note

The valve is operationally reliable. It was built according to state-of-the art standards.

Nevertheless, the valve can pose dangers, especially if

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

Operator's Duties

In your capacity as operator of the facility you bear a particular responsibility for the proper and safe handling of the valve in your facility. Only use the valve when it is in perfect condition to prevent danger to persons and property.

These Operating Instructions contains the information you and your staff need for the safe and reliable operation during the entire service life of the valve. Be sure to read these Operating Instructions carefully and ensure that the measures described here are observed.



The operator's duty of care includes planning the necessary safety measures and monitoring that these measures are observed. The following principles apply:

- Only allow qualified staff to work on the valve.
- The operator must authorize the staff to carry out the relevant tasks.
- Working areas and the entire environment of the valve must be neat and clean.
- The staff must wear suitable work clothing and personal protective equipment. As the operator of the facility make sure that work clothing and personal protective equipment are used.
- Instruct the staff with regard to any properties of the product which might pose a health risk and the preventative measures to be taken.
- Have a qualified first-aider on call during the operation, which can initiate the necessary first-aid measures in case of an emergency.
- Clearly define processes, lines of authority and responsibilities associated with the valve. Everybody must know what to do in case of an emergency. Instruct the staff in this respect at regular intervals.
- The signs relating to the valve must always be complete and legible. Check, clean and replace the signs as necessary at regular intervals.

TIP

Carry out regular checks. This way you can ensure that these measures are actually observed.

Qualification of Staff

This section contains information about the qualifications that staff working on the valve must have.

Operating and maintenance staff must

- have the necessary qualification to carry out their tasks,
- be instructed with regard to possible dangers,
- know and observe the safety instructions given in the documentation.

Only allow qualified electricians to carry out work on the electrical equipment or have a qualified electrician supervise the work.

Only allow specially trained staff to carry out any work on explosion-protected equipment. When working on explosion-protected equipment observe the standards DIN EN 60079-14 for gases and DIN EN 50281-1-2 for dusts.

The following minimum qualifications are required:

- Vocational training as a specialist who can work on the valve independently.
- Sufficient instruction to work on the valve under the supervision and direction of a qualified specialist.

Each member of staff must meet the following requirements to be allowed to work on the valve:

- Personal qualification for the relevant task.
- Sufficient professional qualification for the relevant task.
- Instructed with regard to the function of the valve.
- Instructed with regard to the operating sequences of the valve.
- Familiar with the safety devices and their function.
- Familiar with this Operating Instructions, especially with the safety instructions and the information which is relevant for the task on hand.
- Familiar with the basic regulations with regard to occupational health and safety and accident prevention.

For work to be carried out on the valve the following user groups are distinguished:

User groups

Oser groups	
Staff	Qualifications
Operating staff	Adequate instruction and sound knowledge in the following areas: • Function of the valve • Valve operating sequences • What to do in case of an emergency • Lines of authority and responsibilities with respect to the task.
Maintenance staff	Adequate instruction as well as sound knowledge of the design and function of the valve. Sound knowledge in the following areas: Mechanical equipment Electrical equipment Pneumatic system Authorization with regard to safety engineering standards to carry out the following tasks: Setting devices into operation Earthing of devices Marking of devices The relevant certificate of qualification must be submitted before work can be carried out on ATEX certified machines.

Supplementary Regulations

In addition to the instructions in this documentation the following also has to be observed:

- pertinent accident prevention regulations,
- generally accepted safety rules,
- national regulations applicable in the country of use,
- work and safety instructions applicable in the facility,
- installation and operating regulations for use in potentially explosive areas.



Instructions for the Safe Operation

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

General Principles:

To ensure the safe operation of the valve the following principles apply:

- The Operating Instructions must be kept ready to hand at the valve's place of use. It must be complete and in clearly legible form.
- Only use the valve for its intended use.
- The valve must be functional and in good working order. Check the condition of the valve before starting work and at regular intervals.
- Wear tight-fitting work clothing for all work on the valve.
- Ensure that nobody can get hurt on the parts of the valve.
- Immediately report any faults or noticeable changes on the valve to the person responsible.
- Observe the accident prevention regulations and all local regulations.

Installation

For installation, the following principles apply:

- Only properly qualified staff is allowed to install, assemble and set the valve into operation.
- Ensure that adequate working and traffic areas are available at the place of installation.
- Observe the maximum load-bearing capacity of the installation surface.
- Observe the transport instructions and markings on the part(s) to be transported.
- Remove any nails protruding from transport crates immediately after opening the crate.
- Under no circumstances should anyone stand under a suspended load.
- During assembly, the valve safety devices might not be working effectively.
- Reliably secure machine parts which have already been connected against inadvertently being switched on.

Commissioning/Setup Mode

For commissioning, the following principles apply:

- Take protective measures against dangerous contact voltages in accordance with pertinent regulations.
- The valve 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 valve, residual risks must be reassessed.

Setting into Operation

For setting into operation, the following principles apply:

- Only allow properly qualified staff to set the valve into operation.
- Establish all connections correctly.
- The safety devices for the valve must be complete, fully functional and in perfect condition. Check the function before starting any work.
- When the valve is switched on, the danger zones must be free.
- Remove any liquids that have escaped without leaving residues.

Operation

For operation, the following principles apply.

- Monitor the valve during the operation.
- Safety devices must not be changed, removed or taken out of service. Check all safety devices at regular intervals.
- All guards and hoods must be fitted as intended.
- The place of installation of the valve must be adequately ventilated at all times.
- Structural alterations of the valve are not permitted. Immediately report any changes on the valve 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.



Shutting down

For shutting down, the following principles apply:

- Switch off the compressed air.
- Switch off the valve via 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 Storage (Page 21).

Maintenance and Repair

Before starting and maintenance and repair work on the electrical devices of the valve, carry out the following steps in accordance with the "5 safety rules":

- Isolate from the power supply
- Take appropriate measures to prevent switch on
- Test absence of voltage
- · Earthing and short-circuiting
- · Cover or safeguard any adjacent live parts.

For maintenance and repair, the following principles apply:

- Observe the intervals specified in the maintenance schedule.
- Only allow qualified staff to carry out maintenance or repair work on the valve.
- Before starting any maintenance or repair work, the valve must be switched off and secured against being switched back on. Work may only be started once any residual energy has been discharged.
- Block access for unauthorized persons. Put up notice signs which draw attention to the maintenance or repair work going on.
- Do not climb on the valve. Use suitable access aids and working platforms.
- Wear suitable protective clothing.
- Only use suitable and undamaged tools to carry out maintenance work.
- When replacing parts only use approved, fully functional load lifting devices and lifting accessories which are suitable for the intended purpose.
- Before setting the valve back into operation refit all safety devices as originally provided in the factory. Then check that all safety devices are working correctly.
- Make sure lubricants are used properly.
- Check pipes are firmly secured, also check for leaks and damage.
- · Check that all emergency stop devices are working correctly.

Disassembly

For disassembly, the following principles apply:

- Only allow qualified staff to disassemble the valve.
- Before starting disassembly, the valve must be switched off and secured against being switched back on. Work may only be started once any residual energy has been discharged.
- Disconnect all power and utility lines.
- Markings, e.g. on lines, must not be removed.
- Do not climb on the valve. Use suitable access aids and working platforms.
- Mark the lines (if unmarked) prior to disassembly to ensure they are not confused when re-assembling.
- Protect open line ends with blind plugs against ingress of dirt.
- Pack sensitive parts separately.
- For longer periods of standstill, observe the storage conditions, see "Storage" (Page 21).

Environmental Protection

Harm to the environment can be avoided by safety-conscious and proactive behaviour of the staff.

For environmental protection the following principles apply:

- Substances harmful to the environment must not be discharged into the ground or the sewage system.
- Always observe the pertinent regulations relating to waste avoidance, disposal and utilization.
- Substances harmful to the environment must be collected and stored in suitable containers. Clearly mark the containers.
- Dispose of lubricants as hazardous waste.

Electrical Equipment

For all work on electrical equipment, the following principles apply:

- Access to electrical equipment should only be allowed to qualified electricians. Always keep unattended switch cabinets locked.
- Modifications of the control system can affect the safe and reliable operation. Modifications are only permitted after the express permission of the manufacturer.
- After completion of all work, check that the protective devices are fully functional.



Signage

Dangerous points on the valve are indicated by warning signs, prohibition signs and mandatory signs.

The signs and notes on the valve must always be legible. Any illegible signs must be replaced immediately.

Signs on the valve

Sign	Meaning
	General hazard warning
	Warning Crushing
⟨£x⟩	Explosive atmosphere hazard warning

Residual Risk

Hazard Areas



Please observe the following notes:

- In the event of malfunctions, shut down the valve (disconnect from the power and air supply) and secure it against being used.
- When the valve is switching, never reach into pipe Y or into bracket X (on pneumatic actuators). Fingers can be crushed or cut off.
- Before starting any service, maintenance or repair work, disconnect the valve from the power supply and secure it against inadvertently being switched back on again.
- Only allow a qualified electrician to carry out any work on the electrical power supply.
- Check the electrical equipment of the valve at regular intervals. Immediately remedy loose connections and molten cables.
- If work on live parts cannot be avoided, call in a second person, who can operate the main switch in case of an emergency.

Residual Dangers

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

Residual dangers on the valve and measures

Danger	Cause	Measure
Danger to life	Inadvertent switch-on of the valve	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.
	Spring tension in the actuator	Danger to life caused by compression spring in the actuator. Do not open the actuator but return it to GEA Tuchenhagen for proper disposal.
Danger 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 each into openings. As a precautionary measure, wear personal protective equipment in the vicinity of the valve: Protective gloves Safety shoes
Environmental damage	Operating materials with properties which are harmful to the environment	For all work: Collect lubricants in suitable containers. Dispose of lubricants in accordance with the pertinent regulations.



Declaration of Incorporation

in accordance with the EC Machinery Directive 2006/42/EC

We herewith declare that this consignment contains the subsequently identified - but incomplete - machine and that putting into service is not permitted until is has been established that the machinery into which this machine is to be incorporated is in conformity with the provisions of the EC Machinery Directive.

We declare that the incomplete machine identified here complies with the "Essential Health and Safety Requirements" defined in Annex I, section 1 and section 2.1. The technical documentation is compiled in accordance with Annex VII, part 3. In response to a reasoned request the relevant information will be transmitted to the appropriate national authorities.

This declaration will become invalid if any alterations are made to the machine which have not been agreed with us.

Designation of the machine: Butterfly Valve, Series 8000

Machine type: T-smart

Relevant EC directives: 2006/42/EG

Applicable harmonized standards: DIN EN ISO 12100, parts 1 + 2

Büchen, 2012-01-04

Franz Bürmann i.V. Peter Fahrenbach

Managing Director Head of Development and Design

Transport and Storage

Scope of Supply

On receipt of the valve 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.

Transport

For transport, the following principles apply:

- Only use suitable lifting gear and slings for transporting the package units/valves.
- Observe the pictograms on the package and on the valve.
- Handle valves with care to avoid damaged caused by impact or careless onloading and unloading. The outside synthetic materials are susceptible to breaking.
- The control modules must be protected from animal and vegetable fats.
- Only allow qualified staff to transport the valve.
- 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 valve against slipping. Take the weight of the valve into account and the position of the point of gravity.
- Under no circumstances should anyone stand under a suspended load.
- Take care when transporting the valve. Do not grip sensitive parts of the valve to lift or push the valve or support yourself. Avoid putting the valve down with a jerk.



Storage

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

TIP

We recommend that the valve should be stored at a temperature of \geq 5 °C for a period of 24 hours prior to any handling (disassembling the housings / activation of actuators) so that any ice crystals formed by condensation water can melt.

Intended Purpose

Designated Use

The butterfly valve is used for opening and shutting off pipe sections fully or in part. Using the valve for any other purpose is considered contrary to its designated use.

TIP

The manufacturer will not accept any liability for damage resulting from such use of the valve. The risk of such misuse lies entirely with the operator of the facility.

Requirements for the Operation

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

Flow Velocity

If the flow rates are too low, solids that may be present can deposit at specific points.

If the butterfly valve is closed quickly, the resulting interruption in the flow will cause a vacuum pressure at the disk and in the butterfly valve seal area. From flow rates ≥ 3.5 m/s, the valve may only be closed at a considerably reduced speed.

Pressure Equipment Directive

The butterfly valves are pressure equipment (without safety function) in the sense of the pressure equipment directive: Directive 97/23/EC. They are classified according to Annex II, article 3, section 3. In the event of any deviations, GEA Tuchenhagen GmbH will supply a special Declaration of Conformity.



ATEX Directive

If the butterfly valves are used in areas with a potentially explosive atmosphere, you must absolutely comply with directive 94/9/EC with respect to all ignition hazards. The supplementary "EX" operating manual for the T-smart butterfly valves must be observed.

For details regarding the marking of valves for potentially explosive areas refer to the additional "Ex" operating manual for the T-smart butterfly valves.

Improper Operating Conditions

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

Operating the valves is not permitted if

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

Conversion Work

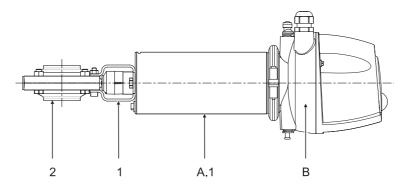
You should never make any technical modifications to the valve. Otherwise you will have to undergo a new conformity process in accordance with the EC Machinery Directive on your own.

In general, only original spare parts supplied by GEA Tuchenhagen GmbH should be fitted. This ensures the reliable and economical operation of the valve.

Design and Function

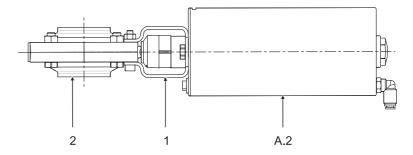
Design

Pneumatic actuator with control module



No.	Designation
A.1	Pneumatic actuator
В	T.VIS control module
1	Mounting bracket
2	Valve disk assembly

Pneumatic actuator without control module



No.	Designation
A.2	Pneumatic actuator
1	Mounting bracket
2	Valve disk assembly
Optional	Electrical feedback (proximity switch in the mounting bracket)



Intermediate flange design – VV (8880/8881)

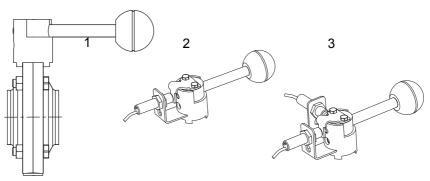


Butterfly valve design for matrix-piped systems.

Manual actuator type H

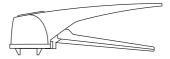
The manual actuator is available in various designs.

Standard manual actuator design



No.	Designation
1	Standard
2	Electrical feedback – one signal (optional)
3	Electrical feedback - two signals (optional)

Actuator with scissors handle



The actuator with scissors handle can position the valve disk at specific positions on the circumference (12x15°).

Adjustable manual actuator



The lever of the adjustable manual actuator is used to infinitely adjust the valve disk in a range between 0° and 90°.

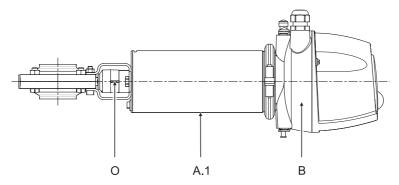
Functional Description

Pneumatic actuator

The compressed air which enters above the piston causes a downwards movement of the piston and the disk of the butterfly valve opens or closes, depending on the definition of the non-actuated position. When the air supply is shut off, the valve closes automatically as a result of the spring force.

The stroke of the piston is converted into a rotary movement of the shaft. The travel of the piston is limited, so that the shaft performs a 90° rotation per stroke. This rotation exactly corresponds to the rotational angle required to open or close the disk of the butterfly valve.

Actuator A.1

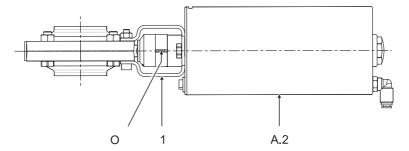


The position of the disk is detected and indicated by the control module (B).

The visual position indication (O) can be recognized by the red marking on the coupling.



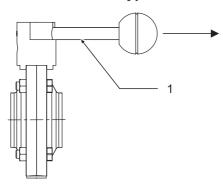
Actuator A.2



Feedback of switching states can be provided by proximity switches in the mounting bracket. The non-actuated position can be signalled by proximity switches fitted to the mounting bracket.

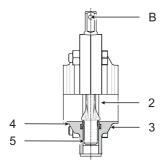
The visual position indication (O) can be recognized by the red marking on the coupling.

Manual actuator type H



To open or close the valve, unlock the hand lever (1) by gently pulling it out of the locking device and turn it through 90°. When the lever is released, it locks into place in the holes provided. The valve limit positions can be detected by proximity switches.

Valve disk assembly without actuator



The valve disk (2) is held between two flanges screwed together (3, 4) and is supported by a separate bearing (5).

The position of the disk in the pipe and hence the degree the flow path in the pipe is opened is controlled by the actuator. When the blade of the disk is parallel to the centre axis of the pipe, the butterfly valve is completely open and allows maximum flow. In the closed position, the blade of the disk shuts off the flow of the butterfly valve.

TIP

The hole (B) in the square and the marking on the bottom shaft indicate the position of the valve disk.



Installation and Commissioning

Notes on Installation

The butterfly valve can be installed in any position. However, care must be taken to ensure that the butterfly valve housing and the pipe system can drain properly.

To prevent damage, make sure that

- the butterfly valve is installed in the pipe system free of tension and
- no foreign materials (e.g. tools, bolts, lubricants) are left in the system.

Valve with Welding Ends

This section describes the welding procedure for the butterfly valve.

NOTE

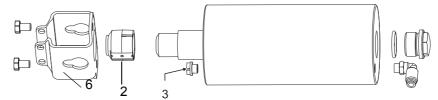
Damage caused by welding

The butterfly valve can be damaged by distortion due to welding and when the position of the grooves is altered.

- Only weld the butterfly valve in assembled condition without gasket and disk.
- → To ensure that a proper weld is formed when the valve is welded into the pipe, make sure that the root side of the weld is protected against oxidation by forming gas.

Carry out the following steps:

- 1. Remove the actuator.
- 2. Cut the pipe open at the point of installation.
- Weld the housing in position in the pipe, ensuring that the connection is free of stress and distortion. Use the TIG welding with pulse method.
- 4. Remove the welding beads.
- 5. Fit the switching ring (2).



6. Fit the mounting bracket (6).

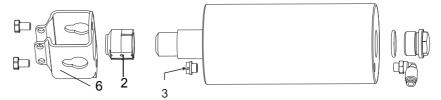
- 7. Fit the plug (3) into the cylinder bottom.
- → Do not hit or press the plug.



Valve with Screw Connection

Carry out the following steps:

- 1. Remove the actuator.
- 2. Screw the body parts together with the gasket and the disk inserted.
- **3.** Open the point of installation with connection fittings.
- **4.** Mount the butterfly valve to the the fitting welded to the pipe.
- **5.** Fit the switching ring (2).



- 6. Fit the mounting bracket (6).
- **7.** Fit the plug (3) into the cylinder bottom.
- → Do not hit or press the plug.



TIP

Fit exhaust air/supply air flow control devices for all compressed-air operated design variants. This way you prevent pipe hammers.

Pneumatic Connections

Air requirement

The air requirement for the switching operations depends on the actuator type.



Actuator type	Actuator diameter (mm)	Air requirement (dm ³ _n /stroke) dm ³ _n at 1.01325 bar at 0°C as per DIN 1343
BFV 125	89	0.325
BFV 150	114.3	0.53

Establishing the hose connection

To ensure reliable operation, the compressed air hoses must be cut exactly square.

Tools required:

A hose cutter.

Carry out the following steps:

- 1. Shut off the compressed air supply.
- 2. Use the hose cutter to cut the pneumatic hoses square.

Actuator with T.VIS control module

Carry out the following steps:

- 1. Push the air hose into the air connector on the control module.
- 2. Re-open the compressed air supply.

Actuator without control module

Carry out the following steps:

- 1. Remove the plug from the cylinder.
- 2. Screw in the air connector size G 1/8".
- 3. Push the air hose into the air connector.
- 4. Re-open the compressed air supply.

Electrical Connections

For T.VIS control module

DANGER

Live parts

Electrical shock can result in serious personal injury or death.

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

EXPLOSION HAZARD

Explosive gases or dusts

An explosion can result in serious personal injury or death.

- → Observe the installation and operating regulations for use in potentially explosive areas.
- → Connect in accordance with the connection diagram and the instructions in the relevant operating manual for the control modules type T.VIS M-1, T.VIS A-7, A-8 or T.VIS P20.

Adjusting the proximity switch – actuator without T.VIS

DANGER

Live parts

Electrical shock can result in serious personal injury or death.

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

⟨£x⟩ EXPLOSION HAZARD

Explosive gases or dusts

An explosion can result in serious personal injury or death.

→ Observe the installation and operating regulations for use in potentially explosive areas.

Carry out the following steps:

- 1. Slacken the cap nuts on the proximity switch.
- 2. Hold the proximity switch and turn the cap nuts until a switching gap of max. 4 mm to the associated contact element is achieved.
- Tighten the cap nuts.



Commissioning

Before starting commissioning observe the following:

- Make sure that there are no foreign materials in the system.
- Actuate the valve 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.

Malfunctions

In the event of malfunctions immediately deactivate the butterfly valve and secure it against inadvertent reactivation. Malfunctions may only be remedied by qualified staff, who must observe the safety instructions.,

Malfunction	Cause	Remedy
Actuator does not work	Air hoses clogged or leaking	Clean or replace the air hoses
	Control air pressure too low	Increase the control air pressure
	Solenoid valve defective	Replace the solenoid valve
	Valve disk is blocked	Clear the blockage
No feedback signal	Proximity switch incor- rectly adjusted	Adjust the proximity switch
	Proximity switch not connected correctly	Check and correct the wiring
	Proximity switch defective	Replace the proximity switch
Leakage at flanges	Valve seal defective	Replace the valve seal



Maintenance

Inspections

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

Pneumatic Connections

Carry out the following steps:

- 1. Check the operating pressure at the pressure reducing and filter station.
- **2.** Clean the air filter at regular intervals.
- 3. Check that the air hoses sit firmly in the air connections.
- Check the lines for kinks and leaks.
- ✓ Done.

Electrical Connections

Carry out the following steps:

- Check that the cap nut on the cable gland is tight.
- 2. Only for T.VIS control module: Check the cable connections on the adapter and interface module (see operating manual for control module types T.VIS M-1, T.VIS A-7, A-8 or T.VIS P-20.)
- Done.

Maintenance Intervals

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

The actual maintenance intervals can only be determined by the user 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.

Maintenance intervals

Applications	Maintenance intervals (guideline values)
Media at temperatures of 60 °C to 130 °C	approx. every 3 months
Media at temperatures of < 60 °C	approx. every 12 months

Removing the Valve

Requirement

Make sure that during maintenance and repair work no process is in operation in the area concerned.

Carry out the following steps:

- 1. Drain all pipe system elements that lead to the butterfly valve and, if necessary, clean or rinse them.
- 2. Shut off the control air supply.
- 3. Disconnect the power supply.
- **4.** Detach the pipe connection of the butterfly valve.

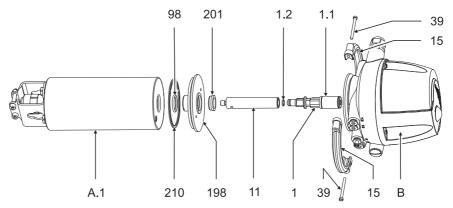




Disassembly

This section describes disassembly of various components.

Removing the Control Module, Types T.VIS M-1 and A-7



Requirement

The pneumatic and electrical connections on the plant side can remain on the control module.

NOTE

The permanent magnet on the switch bar is fragile.

Damage to the permanent magnet.

→ Protect the permanent magnet against impact stress.

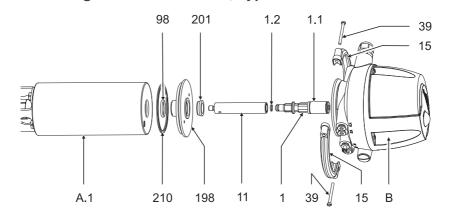
Carry out the following steps:

- Undo the screws (39).
- 2. Remove the clamps (15).
- **3.** Withdraw the control module (B) via the switch bar (11) from the actuator (A.1).
- 4. Unscrew both switch bars (1, 11).
- **5.** Hold the actuator (A.1) using a belt wrench and use a face spanner to unscrew the mounting base (198) from the actuator (A.1).
- **6.** Take off the O-ring (1.2) from the switch bar (1).
- 7. Take off the O-rings (210, 98) from the closure.
- 8. Remove the bearing (201) from the mounting base (198).



TIP

Assemble the valve in reverse order. Refer to the operating manual for T.VIS M-1, T.VIS A-7.



Requirement

 The pneumatic and electrical connections on the plant side can remain on the control module.

NOTE

The permanent magnet on the switch bar is fragile.

Damage to the permanent magnet.

→ Protect the permanent magnet against impact stress.

NOTE

The sensor is a sensitive component.

Damage of the sensor and failure of the valve.

→ Always handle the sensor with care!

Carry out the following steps:

- 1. Undo the screws (39).
- 2. Remove the clamps (15).
- Withdraw the control module (B) via the switch bar (1) from the actuator (A1).
- 4. Unscrew switch bar (1) together with switch bar (11).
- **5.** Hold the actuator using a belt wrench and use a face spanner to unscrew the mounting base (198) from the actuator (A.1).
- **6.** Take off the O-rings (210, 98).
- 7. Remove the bearing (201) from the mounting base (198).

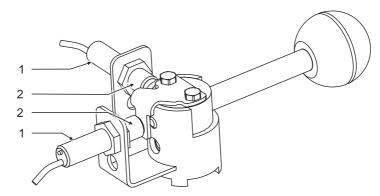


TIP

Assemble in reverse order (refer to the operating manual for T.VIS P-20).



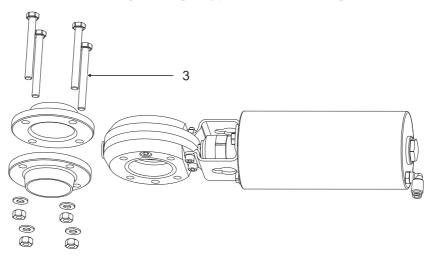
Removing the Proximity Switch – Actuator Without T.VIS



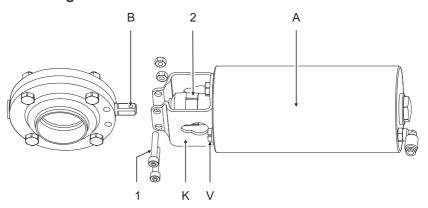
Carry out the following steps:

- 1. Unscrew the hex. nuts (2) on the proximity switches (1).
- 2. Remove the proximity switches (1).
- ✓ Done.

Intermediate Flange Design Type VV – Removing the Valve



- 1. Undo the screw connections (3).
- **2.** Remove the valve from the pipe.
- ✓ Done.



Carry out the following steps:

- 1. Undo the screw connections (1).
- **2.** Lift off the actuator (A).

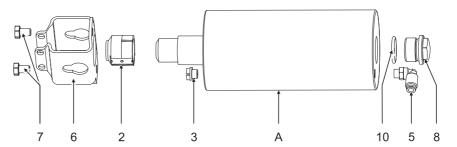


TIP

The red red position indication marker (2) is aligned with the hole (B) in the valve disk so that indicates the position of the disk in the valve.



Dismantling the Actuator Parts



Requirement

 Only actuator sizes DN 25 to DN 125 and 1" OD to 4" OD must be detached from the mounting bracket.

NOTE

Actuators size DN 150 can be damaged.

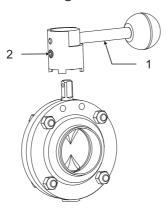
Damage to the actuator will result in a malfunction.

- → Do not undo the connection between the actuator and the mounting bracket.
- Spring-closing actuators must not be converted to spring-opening actuators.

- 1. Remove the hex screws (7).
- 2. Take off the holder (6).
- **3.** Take off the position indicator (2).
- 4. Unscrew the vent screw (3).
- 5. Hold the actuator (A) with a belt wrench and unscrew the plug screw (8).
- 6. Remove the O-ring (10).
- 7. Unscrew the elbow screw-in plug connection (5).



Removing the Manual Actuator Type H

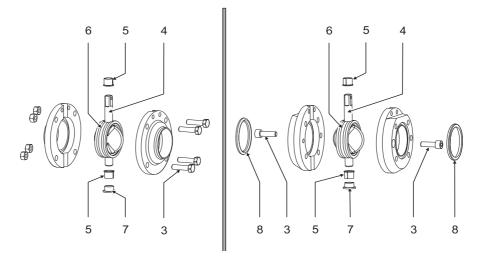


- 1. Use an a/f 4 hex socket screwdriver to unscrew the locking screw until it is flush with the bushing.
- 2. Take off the hand lever (1).
- ✓ Done.



Removing the Valve Disk Gasket

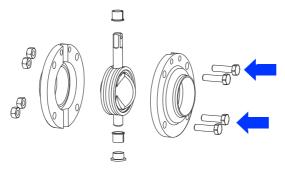
The steps to be performed to remove the valve disk gasket are the same for both valve types.



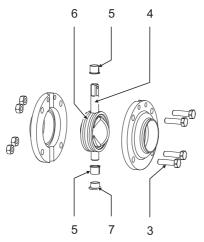
Removing the flanges

Carry out the following steps:

1. Undo the screw connections (3).



- 2. Pull the butterfly valve flanges apart.
- **3.** Remove the plug (7).



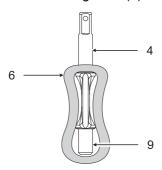
→ The plug protects the bushes against soiling.

Done.

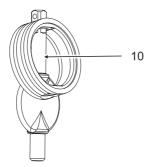
Removing the gasket

Carry out the following steps:

- 1. Pull off the bushes (5).
- 2. Turn the gasket (6) until it is positioned at a 90° angle to the disk (4).



- 3. Pull the gasket over the free end (9) of the disk.
- 4. Unclamp the disk.
- **5.** Pull the gasket over the long end of the shaft (10).



6. Remove the O-ring (8).

Done.

✓ This completes removal of the valve disk gasket.



Maintenance

Cleaning the Butterfly Valve

NOTE

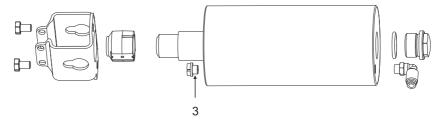
Damage to the valve

Damage to the valve can result in a malfunction.

- Observe the safety information sheets issued by the detergent manufacturers!
- → Only use detergents which are non-abrasive and not aggressive towards stainless steel.

Carry out the following steps:

- 1. Carefully clean the individual parts.
- 2. Check that air can exit freely from the vent screw (3).





Lubricating Seals and Threads

CAUTION

Damage to seals and threads

Damage to seals and threads can result in a malfunction.

- → Ensure that an adequate film of lubricant is applied.
- → For product contact seals only use suitable greases and oils.
- → Observe the safety information sheets issued by the lubricant manufacturer!

- Apply a light film of lubricant to all threads.
- 2. Apply a light film of lubricant to all seals.

3. Apply a light film of lubricant to the shaft ends.

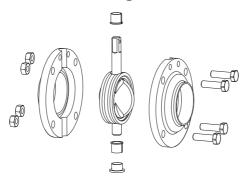
✓ Done.

TIP

GEA Tuchenhagen recommends Rivolta F.L.G. MD-2 and PARALIQ GTE 703. These lubricants are approved for foodstuff and are resistant to bear froth. They have the NSF-H1 (USDA H1) registration. PARALIQ GTE 703 can be ordered from GEA Tuchenhagen under part no. 413-064, Rivolta F.L.G. MD-2 can be ordered under part no. 413-071.

Assembling the Valve Disk

Overview Drawing



General Notes

Observe the following points when assembling:

- Before the valve disk is inserted between the flanges it must be positioned at a 90° angle to the gasket.
- · The bushes must be refitted.
- When the actuator is mounted, the disk must be in the correct position:
 For non-actuated position closed, disk closed.
 For non-actuated position open, disk in 90° position.
- Spring-closing actuators size DN 150 must not be converted to springopening actuators.

Assembly

- Assemble the butterfly valve in reverse order.
- ✓ Done.



Disposal

General Notes

Dispose of the machine at the end of its life cycle in an environmentally friendly manner. Observe the statutory waste disposal regulations applicable at the place of installation.

The valve 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 operating manuals for the individual components.

Valve Actuator Disposal



DANGER

The spring forces in the actuator can be as much as 3.5 kN.

The pre-stressed spring can cause serious personal injury or death.

- Never open the actuator.
- GEA Tuchenhagen accepts unopened actuators and arranges for proper disposal free of charge.

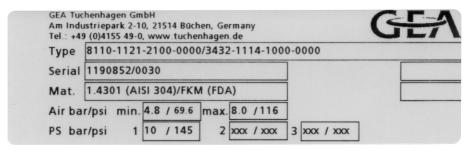
- 1. Remove the actuator, see "Detaching the Actuator" (Page 40).
- Safely pack the actuator and send it to GEA Tuchenhagen GmbH.



Technical Data

Type Plate

The type plate clearly identifies the valve.



Type plate of the valve

The type plate provides the following key data:

Key data of the valve

,	
Туре	Butterfly Valve, Series 8000
Serial	Serial number
Material	1.4301/FKM
Control air pressure bar/psi	min. 4.8/69.6 max. 8.0/116
Product pressure bar/psi	10/145/EG

Technical Data

Refer to the following tables for the key technical data of the valve:

Technical data: Valve

Designation	Description
Size	DN 15 to DN 150 ½" to 4" OD
Material of product contact parts	Stainless steel 1.4301/1.4404 Check corrosion resistance with respect to media and detergents.



Technical data: Ambient temperatures

Designation	Description
Valve	0 to 45 °C, standard < 0 °C: use control air with a low dew point. Protect valve stems against free- zing.
Proximity switch	-20 to +80 °C
Control module type T.VIS M-1, A-7	-20 to +50 °C
Control module type T.VIS P-20	0 to +50 °C
Product temperature and operating temperature	Depend on the sealing material

Technical data: Compressed air supply

Designation	Description
	Description
Air hose	
- Metric	Material PE-LD Outside dia. 6 mm Inside dia. 4 mm
- Inch	Material PA Outside dia. 6.35 mm Inside dia. 4.3 mm
Air consumption (depending on the operating pressure)	2 to 3.8 l for DN 25 to DN 125 3.5 to 6.5 l for DN 150
Product pressure	10 bar
Control air pressure	min. 4.8 bar max. 8 bar
Control air	acc. to ISO 8573-1:2001
- Solid particle content:	Quality class 6 Particle size max. 5μm 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 max. 5 mg oil in 1m ³ air

Air requirement per switching operation

Actuator type	Actuator diameter (mm)	Air requirement (dm³ _n /stroke) dm³ _n at 1.01325 bar at 0°C as per DIN 1343
BFV 125	89	0.325
BFV 150	114.3	0.53

Equipment

Proximity switches – actuator without T.VIS

Operating voltage (V)	1065 DC	2025 AC
Switching distance (mm)	5	5
Max. continuous current (mA)	>3<100	>3<100
Ambient temperature (°C)	-25+80	-25+80
Protection class	IP 67	IP 67

Pipe Ends

Metric DN	Outside diameter	Wall thickness	Inside diameter	Outside diameter acc. to DIN 11850
15	19	1.5	16	x
20	23	1.5	20	x
25	29	1.5	26	x
40	41	1.5	38	x
50	53	1.5	50	x
65	70	2.0	66	x
80	85	2.0	81	x
100	104	2.0	100	x
125	129	2.0	125	x
150	154	2.0	150	х

Inch OD	Outside diameter	Wall thickness	Inside diameter	Outside diameter acc. to BS 4825 Part 1
1/2"	12.7	1.6	9.5	x
3/4"	19.0	1.6	15.8	x
1	25.4	1.6	22.2	x
1 1/2"	38.1	1.6	34.9	х



Inch OD	Outside diameter	Wall thickness	Inside diameter	Outside diameter acc. to BS 4825 Part 1
2	50.8	1.6	47.6	x
2 1/2"	63.5	1.6	60.3	x
3	76.2	1.6	73	x
4	101.6	2	97.6	х

Resistance of Sealing Materials

The resistance of sealing materials depends on the type and temperature of the medium conveyed.

Medium	Sealing material EPDM (standard)	FKM (optional)	HNBR (optional)
Product	-40 +135 °C	-10+200 °C	-25+140 °C
Caustics at 25%	up to 80 °C	up to 40 °C	conditionally resistant
Strong caustics	sufficiently resistant	not resistant	not resistant
Acids at 25%	up to 80 °C	up to 100 °C	conditionally resistant
Strong acids	not resistant	not resistant	not resistant
Saturated steam up to 135 °C	resistant	conditionally resistant	resistant
Fuels/hydrocarbons	not resistant	conditionally resistant	not resistant
Oils/fats	not resistant	very good resis- tance	good resistance

Tools

Tool	Part no.
Hose cutter	407-065
Open end spanner Size 8; 9; 10; 12; 13; 14, 15; 16; 17; 24	
Pin punch dia. 4	403-209
Belt wrench	408-142

Tool	Part no.
Face pin wrenchØ 4, adjustable 80	408-197
Hollow hexagon wrench Size 3; 4; 5	
Pilot shaft	229-000061

Lubricant

Lubricant	Part no.
Rivolta F.L.G. MD-2	413-071
PARALIQ GTE 703	413-064

Weights

TYPE GS

Size	Butterfly valve with actuator (kg)					
	Manual actuator	Pneumatic actuator without control module	Pneumatic actuator with T.VIS control module			
DN 25, 1"	1.6	5.5	6.7			
DN 40, 1 1/2"	1.7	5.7	6.9			
DN 50, 2"	2.2	6.1	7.3			
DN 65, 2 1/2"	2.4	6.7	7.8			
DN 80, 3"	3.6	7.5	8.7			
DN 100, 4"	4.8	8.7	9.9			
DN 125	7.4	11.4	12.5			
DN 150	8.8	13.2	14.4			

TYPE SS

Size	Butterfly valve with actuator (kg)					
	Manual actuator	Pneumatic actuator without control module	Pneumatic actuator with T.VIS control module			
DN 15, 1/2"	1.4	5.3	6.5			
DN 20, 3/4"	1.4	5.3	6.5			
DN 25, 1"	1.4	5.3	6.5			
DN 40, 1 1/2"	1.5	5.5	6.7			
DN 50, 2"	1.9	5.8	7.0			



TYPE SS (continued)

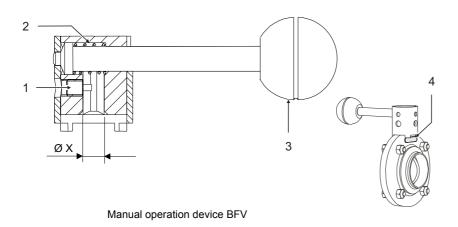
Size	Butterfly valve with actuator (kg)					
	Manual actuator	Pneumatic actuator without control module	Pneumatic actuator with T.VIS control module			
DN 65, 2 1/2"	2.0	6.3	7.5			
DN 80	3.1	7.0	8.2			
3"	3.4	7.3	8.5			
DN 100, 4"	4.4	8.3	9.5			
DN 125	6.2	10.2	11.3			
DN 150	7.0	11.4	12.6			

TYPE VV

Size	Butterfly valve with actuator (kg)				
	11101110111		Pneumatic actuator with T.VIS control module		
DN 15, 1/2"	2.5	6.5	7.7		
DN 20, 3/4"	2.5	6.5	7.7		
DN 25, 1"	2.5	6.5	7.7		
DN 40, 1 1/2"	3.0	6.9	8.1		
DN 50, 2"	3.6	7.6	8.8		
DN 65, 2 1/2"	4.6	8.6	9.7		
DN 80, 3"	5.3	9.2	10.4		
DN 100, 4"	7.7	11.6	12.8		
DN 125	9.6	13.5	14.7		
DN 150	13.0	17.0	18.2		

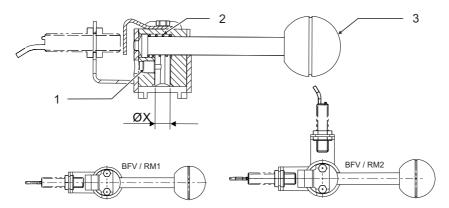
Spare Parts Lists

Manual Operation Device for T-smart Butterfly Valve



Item	Designation		Type BFV	Type BFV	Type BFV
			DN 25 - DN 65 1"OD - 2.5"OD	DN 80 / 3" OD DN 100 / 4"OD	DN 125 DN 150
Manua	al operation device, complete	;	224-000130	224-000131	224-000132
1	Adjusting screw	1.4301	224-000123	224-000123	224-000123
2	Pressure spring	1.4310	931-304	931-304	931-304
3	Ball handle		941-005	941-005	941-005
4	Сар	PP	224-000159	224-000159	
X	Square end		10 mm	12 mm	14 mm





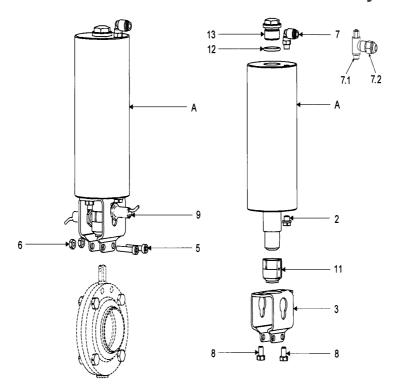
Manual operation device BFV / RM1 / RM2

Item	Designation	Material	DN 25 - DN 65		Type BFV		Type BFV	
					DN 80 / 3" OD DN 100 / 4"OD		DN 125 DN 150	
			RM1	RM2	RM1	RM2	RM1	RM2
Manu	Manual operation device, complete		224- 000245	224- 000248	224- 000246	224- 000249	224- 000247	224- 000250
1	Adjusting screw	1.4301	224-000123		224-000123		224-000123	
2	Pressure spring	1.4310	931-304		931-304		931-304	
3	Ball handle		941-005		941-005		941-005	
4	Сар	PP	224-000159		224-000159		224-000159	
9	Proximity switch M12x1, 10 - 65 V / DC	1.4301	505-088 505-096		505-088 505-096		505-088 505-096	
Х	Square end		10 mm	10 mm	12 mm	12 mm	14 mm	14 mm

TIP

Items 4 and 9 are not included in the manual operation device, complete and must be ordered separately.

Pneumatic Actuators for T-smart Butterfly Valves

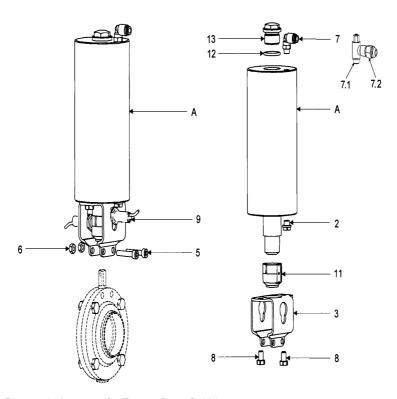


Pneumatic Actuators for T-smart Butterfly Valves

Item	Designation	Material	DN 25 1" OD	DN 40 1 1/2" OD	DN 50 2" OD	DN 65 2 1/2" OD		
Α	Actuator BFV/NC/NO		224-000485					
A	Actuator BFV/NC/NO EX		224-000491					
(opt.)	Actuator BFV AA		224-000482					
	Actuator BFV AAEX		224-000488	224-000488				
2	Vent screw	PP black	221-133.14					
3	Mounting bracket	1.4301	224-000136					
5	Cheese head screw	A2-70	902-120					
6	Hex nut	A2	910-013					



Item	Designation	Material	DN 25 1" OD	DN 40 1 1/2" OD	DN 50 2" OD	DN 65 2 1/2" OD	
7	Elbow screw-in plug connection (1/8 " - 6/4)		933-475	933-475	933-475	933-475	
7.2	Screw-in plug connection (1/8 " - 6/4)	Brass/ nickel- plated	933-330	933-330	933-330	933-330	
7	Elbow screw-in plug connection (1/8 "-6.35/4.1)	_	933-979	933-979	933-979	933-979	
7.2	Screw-in plug connection (1/8 " - 6.35/4.1)	Brass/ nickel- plated	933-144	933-144	933-144	933-144	
7.1	Throttle non-return valve exhaust air	Brass/ nickel- plated	603-042				
8	Cheese head screw	A2-70	901-371				
9	Proximity switch M12x1;10-30V/DC/3-wire	1.4301	505-088 (electrical connection with mating terminal) 505-096 (electrical connection with M12 plug)				
11	Switching ring		224-000133				
12	O-ring	NBR	930-029				
13	Locking screw	1.4301	224-000151				

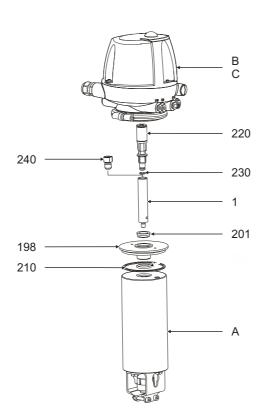


Pneumatic Actuators for T-smart Butterfly Valves

Item	Designation	Material	DN 80 3" OD	DN 100 4" OD	DN 125	DN 150
Α	Actuator BFV/NC/NO		224-000486		224-000487	*
Α	Actuator BFV/NC/NO EX		224-000492		224-000493	*
(opt.)	Actuator BFV AA		224-000483		224-000484	
	Actuator BFV AAEX		224-000489		224-000490	
2	Vent screw	PP black	221-133.14			
3	Mounting bracket	1.4301	224-000136			*
5	Cheese head screw	A2-70	902-120			
6	Hex nut	A2	910-013	910-013		
7	Elbow screw-in plug connection (1/8 " - 6/4)	Brass/nickel -plated	933-475	933-475	933-475	933-475
	Screw-in plug connection (1/8 " - 6/4)		933-330	933-330	933-330	933-330
	Elbow screw-in plug connection (1/8 "-6.35/4.1)	Brass/nickel -plated	933-979	933-979	933-979	933-979
	Screw-in plug connection (1/8 " - 6.35/4.1)		933-144	933-144	933-144	933-144



Item	Designation	Material	DN 80 3" OD	DN 100 4" OD	DN 125	DN 150	
7.1	Throttle non-return valve exhaust air	Brass/nickel -plated	603-042				
8	Cheese head screw	A2-70	901-371			*	
9	Proximity switch M12x1;10-30V/DC/3-wire	1.4301	505-088 (electrical connection with mating terminal) 555-096 (electrical connection with M12 plug)				
11	Switching ring		224-000134		224-000135	*	
12	O-ring	NBR	930-029				
13	Locking screw	1.4301	224-000151				
* On r	* On request						



Pneumatic Actuators for T-smart Butterfly Valves

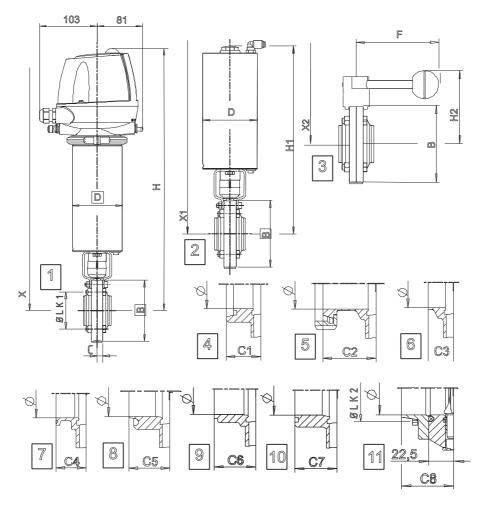
		Item	Material	Designation	Part no.	
			Accessories for T.VIS A-7 and M-1			
В	Control module	1	1.4301	T.VIS switch bar	224-000214	
	T.VIS A-7 and M-1	198	1.4301	T.VIS mounting base	224-000213	
		201	IGLIDUR-G	Plain bearing	704-047	
		210	NBR	O-ring	930-093	
		220	PA6/GK30	T.VIS switch bar	221-589.01	

		Item	Material	Designation	Part no.				
			Accessories for	Accessories for T.VIS P-20					
C Control module	1	1.4301	T.VIS switch bar	224-000214					
	T.VIS P-20	198	1.4301	T.VIS mounting base	224-000213				
		201	IGLIDUR-G	Plain bearing with collar	704-047				
		210	NBR	O-ring	930-093				
		240		T.VIS switch bar P-20 incl. magnet and O-ring	221-589.39				

		Item	Material	Designation	Part no.
D	D Control module EX	198	1.4301	T.VIS mounting base	224-000213
		201	IGLIDUR-F	Plain bearing EX	704-065
		210	NBR	O-ring	930-093
		220	1.4305/PA12	Switch bar	221-405.03



Dimension Sheet T-smart Butterfly Valves



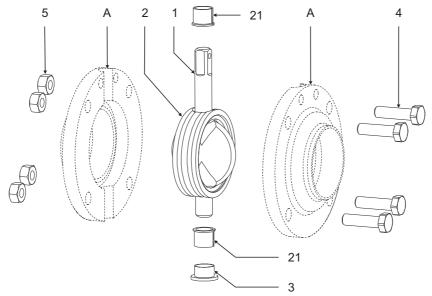
Dimension sheet T-smart butterfly valve

Key	
Item	Designation
1	Pneumatic actuator with T.VIS control module, installation dimension X
2	Pneumatic actuator without control module, installation dimension X1
3	Manual operation device, installation dimension X2
4	Male part DIN 11887
5	Liner DIN 11851
6	Welding end
7	Clamp flange
8	Male part RJT
9	Male part IDF
10	Male part SMS
11	Intermediate flange design

Dimension	DN 25 1" OD	DN 40 1 ½"OD	DN 50 2" OD	DN 65 2 ½"OD	DN 80 3" OD	DN 100 4" OD	DN 125	DN 150
В	84	94	109	127	141	168	198	218
Ø DIN	26	38	50	66	81	100	125	150
ø "OD	22.2	34.9	47.6	60.3	72.9	97.7		
∅ "IDF	22.6	35.6	48.6	60.3	72.9	97.7		
С	10	10	10	10	10	10	13	14
C1 DIN	35	35	35	38	43	43	50	80
C2 DIN	47	51	53	57	77	84	74	77
C3 DIN	25	25	25	25	40	40	40	40
C4 DIN	30	30	30	30	30	30	68	68
C3 "OD	25	25	25	25	40	40		
C4 "OD	30	30	30	30	30	30		
C5 "OD	40	40	40	40	40	40		
C6 "OD	40	40	40	40	40	40		
C7 "OD	35	40	40	43	43	48		
C8 DIN	47.5	47.5	47.5	47.5	47.5	47.5	47.5	52.5
C8 "OD	47.5	47.5	47.5	47.5	47.5	47.5		
D	89	89	89	89	89	89	89	114.3
F	118	118	118	118	156	156	156	156
Н	456	461	469	478	485	498	513	528
H 1	294	299	307	316	323	336	351	369
H 2	92	97	105	114	121	134	149	159
ø LK 1 Screws	69 4 x M8	79 4 x M8	94 4 x M8	112 4 x M8	126 6 x M8	153 6 x M8	179 6 x M10	218 8 x M12
ø LK 2/DN Screws	53 4 x M8	65 4 x M8	77 4 x M8	95 8 x M8	110 8 x M8	137 8x M10	161 8x M10	188 8 x M12
Ø LK 2/OD	49	62	74	88	101	134		
X	476	481	489	498	510	523	538	553
X 1	314	319	327	336	348	361	376	394
X 2	112	117	125	134	146	159	174	184
Stroke	56	56	56	56	56	56	56	56
Butterfly valve square end	10	10	10	10	12	12	14	14

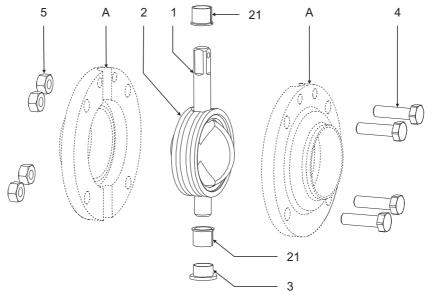


T-smart Butterfly Valve



T-smart Butterfly Valve

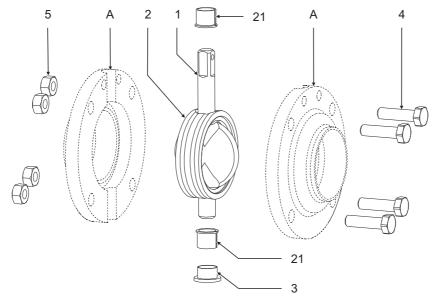
Item	Designation	Material	DN 15	DN 20	DN 25	DN 40	DN 50
		1.4301/ EPDM	224-805.20	224-805.21	224-805.22	224-805.24	224-805.25
		1.4404/ EPDM	224-805.01	224-805.02	224-805.03	224-805.05	224-805.06
1	Disk	1.4301	224-000112	224-000112	224-000112	224-000113	224-000114
		1.4404	224-000103	224-000103	224-000103	224-000104	224-000105
2	Seal	EPDM	224-170.41	224-170.41	224-170.41	224-170.42	224-170.43
		FKM	224-170.51	224-170.51	224-170.51	224-170.52	224-170.53
		HNBR	224-170.19	224-170.19	224-170.19	224-170.20	224-170.21
3	Plug	PE	922-338	922-338	922-338	922-338	922-338
4	Hex screw	A2-70	901-054	901-054	901-054	901-054	901-054
5	Hex nut	A2	910-018	910-018	910-018	910-018	910-018
21	Plain bearing	IGLIDUR F	704-045	704-045	704-045	704-045	704-045
Α	Flange	see overview	of flanges				



T-smart Butterfly Valve

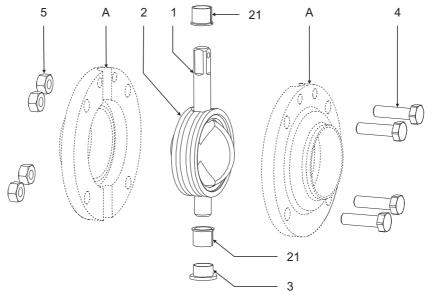
Item	Designation	Material	DN 65	DN 80	DN 100	DN 125	DN 150
T-sma	art Butterfly valve SS compl.	1.4301/ EPDM	224-805.26	224-805.27	224-805.28	224-805.29	224-805.30
		1.4404/ EPDM	224-805.07	224-805.08	224-805.09	224-805.10	224-805.11
1	Disk	1.4301	224-000116	224-000118	224-000119	224-000120	224-000212
		1.4404	224-000107	224-000109	224-000110	224-000111	224-000192
2	Seal	EPDM	224-170.48	224-170.46	224-170.47	224-170.49	224-170.50
		FKM	224-170.55	224-170.57	224-170.58	224-170.18	224-170.29
		HNBR	224-170.23	224-170.25	224-170.26	224-170.27	224-170.30
3	Plug	PE	922-338	922-338	922-338	922-339	922-339
4	Hex screw	A2-70	901-054	901-054	901-054	901-104	901-153
5	Hex nut	A2	910-018	910-018	910-018	910-026	910-029
21	Plain bearing	IGLIDUR F	704-045	704-045	704-045	704-046	704-046
Α	Flange	see overview	of flanges	-			





T-smart Butterfly Valve

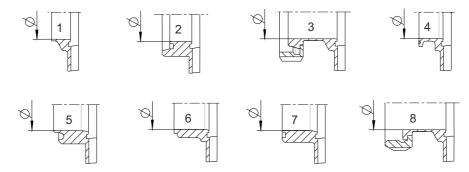
	ъ : ::		1,10", 0.0	0/4" 00	4" 05	4.4/0" 0.5		
Item	Designation	Material	1/2" OD	3/4" OD	1" OD	1 1/2" OD		
	rfly valve art SS cpl.	1.4301/ EPDM	224-805.31	224-805.32	224-805.33	224-805.34		
		1.4404/ EPDM	224-805.12	224-805.13	224-805.14	224-805.15		
1	Disk	1.4301	224-000112	224-000112	224-000112	224-000113		
		1.4404	224-000103	224-000103	224-000103	224-000104		
2	Seal	EPDM	224-170.41	224-170.41	224-170.41	224-170.42		
		FKM	224-170.51	224-170.51	224-170.51	224-170.52		
		HNBR	224-170.19	224-170.19	224-170.19	224-170.20		
3	Plug	PE	922-338	922-338	922-338	922-338		
4	Hex screw	A2-70	901-054	901-054	901-054	901-054		
5	Hex nut	A2	910-018	910-018	910-018	910-018		
21	Plain bearing	IGLIDUR F	704-045	704-045	704-045	704-045		
Α	Flange	see overview of flanges						



T-smart Butterfly Valve

Item	Designation	Material	2" OD	2 1/2" OD	3" OD	4" OD			
	fly valve art SS cpl.	1.4301/ EPDM	224-805.35	224-805.36	224-805.37	224-805.38			
		1.4404/ EPDM	224-805.16	224-805.17	224-805.18	224-805.19			
1	Disk	1.4301	224-000114	224-000115	224-000117	224-000119			
		1.4404	224-000105	224-000106	224-000108	224-000110			
2	Seal	EPDM	224-170.43	224-170.44	224-170.45	224-170.47			
		FKM	224-170.53	224-170.54	224-170.56	224-170.58			
		HNBR	224-170.21	224-170.22	224-170.24	224-170.26			
3	Plug	PE	922-338	922-338	922-338	922-338			
4	Hex screw	A2-70	901-054	901-054	901-054	901-054			
5	Hex nut	A2	910-018	910-018	910-018	910-018			
21	Plain bearing	IGLIDUR F	704-045	704-045	704-045	704-045			
Α	Flange	see overview	see overview of flanges						

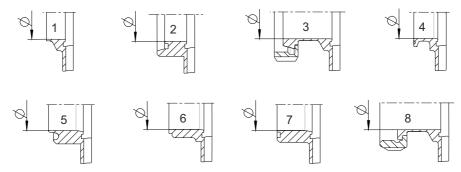




Scheibenventil T-smart - Flansche

Pos.	Benennung	Werkstoff	DN 15	DN 20	DN 25	DN 40	DN 50
1	Schweißflansch	1.4301	224-000418	224-000415	224-000015	224-000021	224-000025
		1.4404	224-000416	224-000416	224-000016	224-000022	224-000026
2	Gewindeflansch DIN	1.4301			224-000001	224-000003	224-000005
		1.4404			224-000002	224-000004	224-000006
3	Kugelflansch DIN	1.4301					
		1.4404					
4	Klemmflansch	1.4301			224-000509	224-000508	224-000507
		1.4404			224-000510	224-000511	224-000512

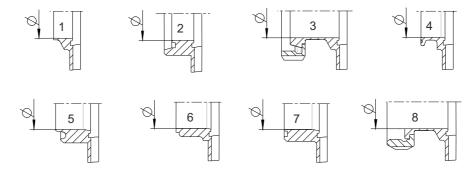
Pos.	Benennung	Werkstoff	DN 65	DN 80	DN 100	DN 125	DN 150
1	Schweißflansch	1.4301	224-000029	224-000033	224-000037	224-000039	224-000210
		1.4404	224-000030	224-000034	224-000038	224-000040	224-000194
2	Gewindeflansch DIN	1.4301	224-000007	224-000009	224-000011	224-000013	224-000222
		1.4404	224-000008	224-000010	224-000012	224-000014	224-000440
3	Kugelflansch DIN	1.4301					
		1.4404					
4	Klemmflansch	1.4301	224-000506	224-000505	224-000504		
		1.4404	224-000513	224-000514	224-000515		



Scheibenventil T-smart - Flansche

Pos.	Benennung	Werkstoff	1/2" OD	3/4" OD	1" OD	1 1/2" OD
1	Schweißflansch	1.4301	224-000430	224-000427	224-000017	224-000019
		1.4404	224-000431	224-000028	224-000018	224-000020
2	Gewindeflansch DIN	1.4301			224-000455	224-000458
		1.4404/316L			224-000456	224-000459
4	Klemmflansch	1.4301			224-000065	224-000067
		1.4404			224-000066	224-000068
5	Gewindeflansch RJT	1.4301			224-000041	224-000043
		1.4404			224-000042	224-000044
6	Gewindeflansch IDF	1.4301			224-000053	224-000055
		1.4404			224-000054	224-000056
7.1	Gewindeflansch SMS	1.4301			224-000349	224-000351
		1.4404			224-000350	224-000352
7.2	Gewindeflansch DS	1.4301			224-000547	224-000548
		1.4404			224-000553	224-000554
8	Kegelflansch SMS	1.4301				
		1.4404				





Scheibenventil T-smart - Flansche

Pos.	Benennung	Werkstoff	2" OD	2 1/2" OD	3" OD	4" OD
1	Schweißflansch	1.4301	224-000023	224-000027	224-000031	224-000035
		1.4404	224-000024	224-000028	224-000032	224-000036
2	Gewindeflansch DIN	1.4301	224-000461	224-000464	224-000467	224-000470
		1.4404	224-000462	224-000465	224-000468	224-000471
4	Klemmflansch	1.4301	224-000069	224-000071	224-000073	224-000075
		1.4404	224-000070	224-000072	224-000074	224-000076
5	Gewindeflansch RJT	1.4301	224-000045	224-000047	224-000049	224-000051
		1.4404	224-000046	224-000048	224-000050	224-000052
6	Gewindeflansch IDF	1.4301	224-000057	224-000059	224-000061	224-000063
		1.4404	224-000058	224-000060	224-000062	224-000064
7.1	Gewindeflansch SMS	1.4301	224-000223	224-000257	224-000259	224-000347 224-000441
		1.4404	224-000256	224-000258	224-000260	224-000348 224-000442
7.2	Gewindeflansch DS	1.4301	224-000549	224-000550	224-000551	224-000552
		1.4404	224-000555	224-000556	224-000557	224-000558
8	Kegelflansch SMS	1.4301				
		1.4404				

Designation	Material	DN 25	DN 40	DN 50	DN 65
T-smart Butterfly valve GG compl.	1.4301 / EPDM	224-807.22	224-807.24	224-807.25	224-807.26
	1.4404 / EPDM	224-807.03	224-807.05	224-807.06	224-807.07
T-smart butterfly valve GG compl.	1.4301 / EPDM	224-809.22	224-809.24	224-809.25	224-809.26
	1.4404 / EPDM	224-809.03	224-809.05	224-809.06	224-809.07

Designation	Material	DN 25	DN 40	DN 50	DN 65
T-smart butterfly valve CC compl.	1.4301 / EPDM	224-811.39	224-811.40	224-811.41	224-811.42
	1.4404 / EPDM	224-811.33	224-811.34	224-811.35	224-807.36
T-smart butterfly valve	1.4301 / EPDM	224-811.51	224-811.52	224-811.53	224-811.54
CS compl.	1.4404 / EPDM	224-811.45	224-811.46	224-811.47	224-811.48

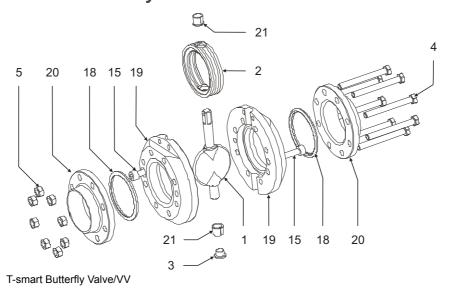
Designation	Material	DN 80	DN 100	DN 125	DN 150
T-smart butterfly valve	1.4301 / EPDM	224-807.27	224-807.28	224-807.29	224-807.30
GS compl.	1.4404 / EPDM	224-807.08	224-807.09	224-807.10	224-807.11
T-smart butterfly valve	1.4301 / EPDM	224-809.27	224-809.28	224-809.29	
GG compl.	1.4404 / EPDM	224-809.08	224-809.09	224-809.10	
T-smart butterfly valve	1.4301 / EPDM	224-811.43	224-811.44		
CC compl.	1.4404 / EPDM	224-811.37	224-811.38		
T-smart butterfly valve	1.4301 / EPDM	224-811.55	224-811.56		
CS compl.	1.4404 / EPDM	224-811.49	224-811.50		

Designation	Material	1" OD	1 1/2" OD	2" OD
T-smart butterfly valve	1.4301 / EPDM	224-807.33	224-807.34	224-807.35
GS compl.	1.4404 / EPDM	224-807.14	224-807.15	224-807.16
T-smart butterfly valve	1.4301 / EPDM	224-847.43	224-847.44	224-847.45
GS-SMS compl.	1.4404 / EPDM	224-847.19	224-847.20	224-847.21
T-smart butterfly valve	1.4301 / EPDM	224-847.31	224-847.32	224-847.33
GS-DS compl.	1.4404 / EPDM	224-847.07	224-847.08	224-847.09
T-smart butterfly valve	1.4301 / EPDM	224-809.33	224-809.34	224-809.35
GG compl.	1.4404 / EPDM	224-809.14	224-809.15	224-809.16
T-smart butterfly valve	1.4301 / EPDM	224-849.43	224-849.44	224-849.45
GG-SMS compl.	1.4404 / EPDM	224-849.19	224-849.20	224-849.21
T-smart butterfly valve	1.4301 / EPDM	224-849.31	224-849.32	224-849.33
GG-DS compl.	1.4404 / EPDM	224-849.07	224-849.08	224-849.09
T-smart butterfly valve	1.4301 / EPDM	224-811.11	224-811.12	224-811.13
CC compl.	1.4404 / EPDM	224-811.03	224-811.04	224-811.05
T-smart butterfly valve	1.4301 / EPDM	224-811.27	224-811.28	224-811.29
CS compl.	1.4404 / EPDM	224-811.19	224-811.20	224-811.21



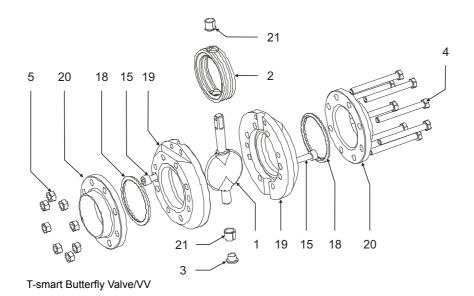
Designation	Material	2 1/2" OD	3" OD	4" OD
T-smart butterfly valve	1.4301 / EPDM	224-807.36	224-807.37	224-807.38
GS compl.	1.4404 / EPDM	224-807.17	224-807.18	224-807.19
T-smart butterfly valve	1.4301 / EPDM	224-847.46	224-847.47	224-847.48
GS-SMS compl.	1.4404 / EPDM	224-847.22	224-847.23	224-847.24
T-smart butterfly valve	1.4301 / EPDM	224-847.34	224-847.35	224-847.36
GS-DS compl.	1.4404 / EPDM	224-847.10	224-847.11	224-847.12
T-smart butterfly valve	1.4301 / EPDM	224-809.36	224-809.37	224-809.38
GG compl.	1.4404 / EPDM	224-809.17	224-809.18	224-809.19
T-smart butterfly valve	1.4301 / EPDM	224-849.46	224-849.47	224-849.48
GG-SMS compl.	1.4404 / EPDM	224-849.22	224-849.23	224-849.24
T-smart butterfly valve	1.4301 / EPDM	224-849.34	224-849.35	224-849.36
GG-DS compl.	1.4404 / EPDM	224-849.10	224-849.11	224-849.12
T-smart butterfly valve	1.4301 / EPDM	224-811.14	224-811.15	224-811.16
CC compl.	1.4404 / EPDM	224-811.06	224-811.07	224-811.08
T-smart butterfly valve	1.4301 / EPDM	224-811.30	224-811.31	224-811.32
CS compl.	1.4404 / EPDM	224-811.22	224-811.23	224-811.24

T-smart Butterfly Valve/VV

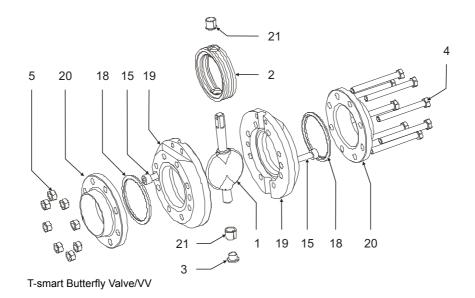


Item	Designation	Material	DN 15	DN 20	DN 25	DN 40
T-sma	art Butterfly valve/VV compl.	1.4301/ EPDM	224-806.20	224-806.21	224-806.22	224-806.24
		1.4404/ EPDM	224-806.01	224-806.02	224-806.03	224-806.05
1	Butterfly valve disk	1.4301	224-000112	224-000112	224-000112	224-000113
		1.4404	224-000103	224-000103	224-000103	224-000104
2	Butterfly valve seal	EPDM	224-170.41	224-170.41	224-170.41	224-170.42
		FKM	224-170.51	224-170.51	224-170.51	224-170.52
		HNBR	224-170.19	224-170.19	224-170.19	224-170.20
3	Plug	PE	922-338	922-338	922-338	922-338
4	Hex screw	A2-70	901-078	901-078	901-078	901-078
5	Hex nut	A2	910-018	910-018	910-018	910-018
15	Cheese head screw	A2-70	902-101	902-101	902-101	902-101
18	O-ring	EPDM	930-376	930-376	930-393	930-545
		FKM	930-593	930-593	930-564	930-566
		HNBR	930-851	930-851	930-551	930-552
19	Intermediate flange base	1.4301	224-000077	224-000077	224-000089	224-000091
	body with TU groove	1.4404	224-000078	224-000078	224-000090	224-000092
20	Flange V	1.4301	224-000424	224-000421	752-168	752-170
		1.4404	224-000425	224-000422	752-724	752-726
21	Plain bearing	IGLIDUR F	704-045	704-045	704-045	704-045



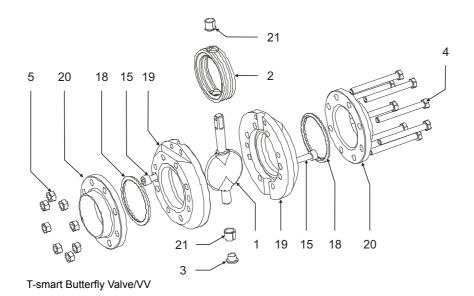


Item	Designation	Material	DN 50	DN 65	DN 80
T-sma	art Butterfly valve/VV compl.	1.4301/ EPDM	224-806.25	224-806.26	224-806.27
		1.4404/ EPDM	224-806.06	224-806.07	224-806.08
1	Butterfly valve disk	1.4301	224-000114	224-000116	224-000118
		1.4404	224-000105	224-000107	224-000109
2	Butterfly valve seal	EPDM	224-170.43	224-170.48	224-170.46
		FKM	224-170.53	224-170.55	224-170.57
		HNBR	224-170.21	224-170.23	224-170.25
3	Plug	PE	922-338	922-338	922-338
4	Hex screw	A2-70	901-078	901-078	901-078
5	Hex nut	A2	910-018	910-018	910-018
15	Cheese head screw	A2-70	902-101	902-101	902-101
18	O-ring	EPDM	930-546	930-547	930-450
		FKM	930-567	930-526	930-527
		HNBR	930-553	930-554	930-555
19	Intermediate flange base	1.4301	224-000093	224-000095	224-000097
	body with TU groove	1.4404	224-000094	224-000096	224-000098
20	Flange V	1.4301	752-171	752-172	752-173
		1.4404	752-727	752-728	752-729
21	Plain bearing	IGLIDUR F	704-045	704-045	704-045

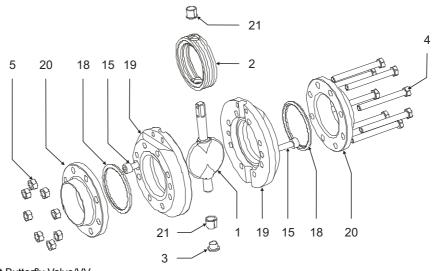


Item	Designation	Material	DN 100	DN 125	DN 150
T-sma	irt Butterfly valve/VV compl.	1.4301/ EPDM	224-806.28	224-806.29	224-806.30
		1.4404/ EPDM	224-806.09	224-806.10	224-806.11
1	Butterfly valve disk	1.4301	224-000119	224-000120	224-000212
		1.4404	224-000110	224-000111	224-000192
2	Butterfly valve seal	EPDM	224-170.47	224-170.49	224-170.50
		FKM	224-170.58	224-170.18	224-170.29
		HNBR	224-170.26	224-170.27	224-170.30
3	Plug	PE	922-338	922-339	922-339
4	Hex screw	A2-70	901-126	901-126	901-376
5	Hex nut	A2	910-026	910-026	910-029
15	Cheese head screw	A2-70	902-101	902-101	902-101
18	O-ring	EPDM	930-549	930-550	930-574
		FKM	930-568	930-559	930-575
		HNBR	930-556	930-557	930-872
19	Intermediate flange base	1.4301	224-000099	224-000101	224-000211
	body with TU groove	1.4404	224-000100	224-000102	224-000193
20	Flange V	1.4301	752-174	752-175	752-180
		1.4404	752-730	752-731	752-733
21	Plain bearing	IGLIDUR F	704-045	704-046	704-046





Item	Designation	Material	1/2" OD	3/4" OD	1" OD	1 1/2" OD
T-sma	art Butterfly valve/VV compl.	1.4301/ EPDM	224-806.31	224-806.32	224-806.33	224-806.34
		1.4404/ EPDM	224-806.12	224-806.13	224-806.14	224-806.15
1	Butterfly valve disk	1.4301	224-000112	224-000112	224-000112	224-000113
		1.4404	224-000103	224-000103	224-000103	224-000104
2	Butterfly valve seal	EPDM	224-17041	224-170.41	224-170.41	224-170.42
		FKM	224-170.51	224-170.51	224-170.51	224-170.52
		HNBR	224-170.19	224-170.19	224-170.19	224-170.20
3	Plug	PE	922-338	922-338	922-338	922-338
4	Hex screw	A2-70	901-078	901-078	901-078	901-078
5	Hex nut	A2	910-018	910-018	910-018	910-018
15	Cheese head screw	A2-70	902-101	902-101	902-101	902-101
18	O-ring	EPDM	930-376	930-376	930-376	930-497
		FKM	930-593	930-593	930-593	930-570
		HNBR	930-851	930-851	930-851	930-852
19	Intermediate flange base	1.4301	224-000077	224-000077	224-000077	224-000079
	body with TU groove	1.4404	224-000078	224-000078	224-000078	224-000080
20	Flange V	1.4301	224-000436	224-000433	761-462	761-463
		1.4404	224-000437	224-000434	752-739	752-740
21	Plain bearing	IGLIDUR F	704-045	704-045	704-045	704-045



T-smart Butterfly Valve/VV

Item	Designation	Material	2" OD	2 1/2" OD	3" OD	4" OD
T-smart Butterfly valve/VV compl.		1.4301/ EPDM	224-806.35	224-806.36	224-806.37	224-806.38
		1.4404/ EPDM	224-806.16	224-806.17	224-806.18	224-806.19
1	Butterfly valve disk	1.4301	224-000114	224-000115	224-000117	224-000119
		1.4404	224-000105	224-000106	224-000108	224-000110
2	Butterfly valve seal	EPDM	224-170.43	224-170.44	224-170.45	224-170.47
		FKM	224-170.53	224-170.54	224-170.56	224-170.58
		HNBR	224-170.21	224-170.22	224-170.24	224-170.26
3	Plug	PE	922-338	922-338	922-338	922-338
4	Hex screw	A2-70	901-078	901-078	901-078	901-126
5	Hex nut	A2	910-018	910-018	910-018	910-026
15	Cheese head screw	A2-70	902-101	902-101	902-101	902-101
18	O-ring	EPDM	930-559	930-560	930-319	930-561
		FKM	930-571	930-572	930-666	930-573
		HNBR	930-853	930-854	930-652	930-855
19	Intermediate flange base	1.4301	224-000081	224-000083	224-000085	224-000087
	body with TU groove	1.4404	224-000082	224-000084	224-000086	224-000088
20	Flange V	1.4301	761-464	761-465	961-466	761-467
		1.4404	752-741	752-742	752-743	752-744
21	Plain bearing	IGLIDUR F	704-045	704-045	704-045	704-045





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