

# T-smart Butterfly Valves

Product Group Flow Components  
Catalog 2018



## Legal notice

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

**GEA Group Aktiengesellschaft**

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

**GEA Flow Components**

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

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



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



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



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

## State-of-the-art hygienic design

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

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

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

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

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

## Applikationen

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



### Hygienic Valve Technology

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



### Aseptic Valve Technology

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



### Hygienic Pump Technology

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



### Cleaning Technology

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



GEA products are based on future-oriented company and product design principles that include an obligation to economic viability, sustainability and service.

Your investment pays off

The current generation of GEA butterfly valves provide users with considerable cost savings. Compact actuators and efficient control technology keep energy consumption as low as possible.

Carefully designed flow paths free from dead corners minimize product loss. Long-life gaskets reduce operating costs. Consumption of time, water and resources is considerably reduced, with a positive impact on staff and process productivity.

Your investment in modern process technology from GEA thus provides special advantages to pay off in the shortest time.

**Economical**

Higher product quality

Reduced consumption of energy, water and cleaning media

Reduced time and personnel costs for maintenance and cleaning





**You score points with environmental protection**

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

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

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

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

**Our support is your gain**

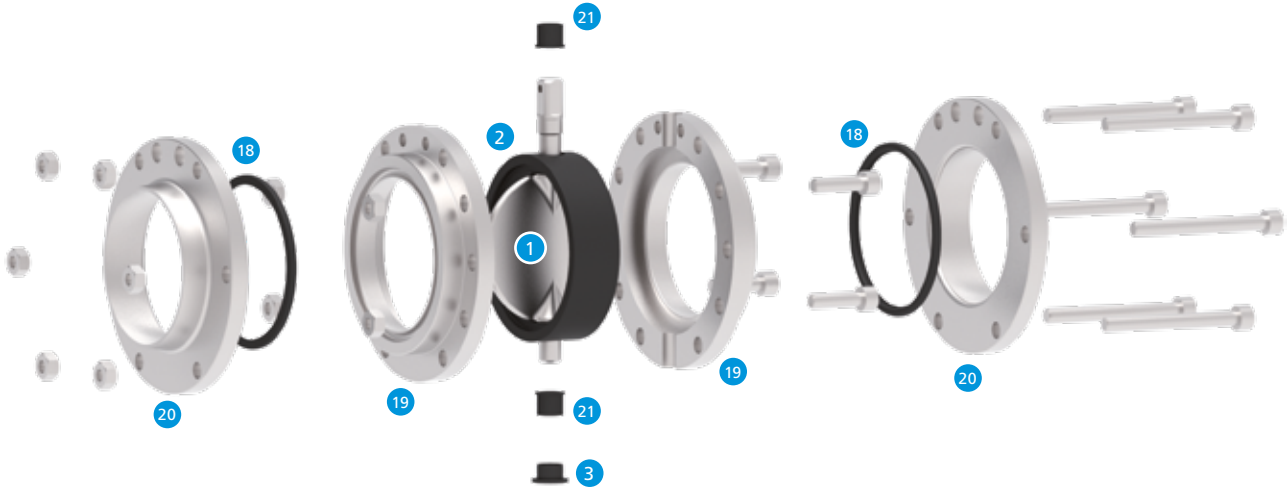
In addition to our product range, you can also make use of the individualized engineering support from GEA. Even before you have started using our products, this support provides you with extensive digital tools – from technical drawings through to 3-D models.

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

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

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

Butterfly Valves T-smart 7



- 1 Butterfly valve disk
- 2 Butterfly valve gasket
- 3 Plug
- 18 VARIVENT® O-ring

- 19 Body flanges (intermediate flange with O-ring groove)
- 20 Welding flange (outside flange)
- 21 Bearings

Butterfly valves in the new T-smart 7 series provide a complete range of variants to serve any application. They are used as cost-effective shut-off elements on valve blocks, panels and pipe fences for product and cleaning.

The T-smart 7 series offers the benefits of good hygienic design, higher ease of assembly, shorter assembly and maintenance times and thus higher production uptimes.

The Butterfly Valves T-smart 7 are characterized by their hygienic design without dome and sump. The product flow meets little resistance, product areas drain automatically and cleaning proceeds efficiently.

| Significant product features                                    |
|---|
| Robust valve disk   |
| Low switching torque  |
| One-piece flange design   |
| Selection of 2 metallic product wetted materials                |
| Product wetted parts in AISI 304 (1.4301) or AISI 316L (1.4404) |
| Vacuum-proof  |

### Pneumatic actuators

For narrow mounting situations and low air consumption the pneumatic actuators have been made even more compact. The gap-free design ensures optimum cleanability and fulfils highest demands to hygiene.

Torque maxima towards both end positions enable application on both normally closed and normally open valves. Metallic stops ensure exact disk positioning. There are air-to-spring and air-to-air variants.

The integrated T.VIS® interface also safely accommodates optional accessories – booster cylinder, two-position stop and limit stop. The internal pneumatic system reduces the risk of failures, being without external tubing.

All actuators are by default applicable for Ex zones. Compliance of any electric accessories with Ex regulations must be ensured.



| Features  |
|---|
| Compact, hygienic design  |
| Metallic stops  |
| Torque maxima towards both end positions  |
| Air-to-spring and air-to-air variants available   |
| Integrated T.VIS® interface   |
| 2 actuator dimensions available   |
| <ul style="list-style-type: none"> <li>• DN 15 to DN 100 and ½" OD to 4" OD</li> <li>• DN 125 and DN 150</li> </ul> |

### Actuator bracket

The new actuator bracket can be attached to the flanges more easily because of its one-sided design and integrated threads for the mounting screws.

Two integrated proximity switch holders are located at a 45° angle above one of the two flanges. Turning the bracket 180° places the switches above the other side. This means one side of the valve is always free from structures mounted on top, thus allowing free access to male flanges, for example.

The switches are plugged into half-open holders on the side, which allows for easy mounting since the counter nuts only need to be loosened, not removed.



### Intermediate flange variant

The intermediate flange variant offers simple plant extension even during operation while the butterfly valve safely shuts off the process from the atmosphere.

The intermediate flange variant comes as an open design. By screw-by-screw re-clamping, an outside flange can be separated from the inside flange during system operation, so it can be welded to a system extension unit. Upon installation of the extension unit this process is reversed and both parts are again connected.

As before, the actuator is mounted on the inner flanges, as a result of which the valve insert can be removed conveniently without the actuator having to be dismantled first. Apertures in the outer flanges allow the actuator to be mounted or changed at any time without removing the valve from the process line.

The additional intermediate flange seals are built in the proven VARIVENT® seal design.



The open flange design permits a screw-by-screw re-clamping from four to three flanges during operation in order for the removed outer flange to be welded, for example, onto a piping extension.

| Technical advantages T-smart 788                                    |
|---|
| Simple valve servicing  |
| System extension at the valve during process operation              |
| Actuator exchange at the valve in the piping                        |
| Intermediate flange seals built in the proven VARIVENT® seal design |

### Gaskets

The vacuum-proof gasket has been completely redeveloped and offers maximum stability and service life. The double-sided valve disk bearing provides a defined seal compression and lowest switch torque. Each nominal size between DN 25 and DN 150, or 1" OD and 4" OD, has its own seal seat geometry. Gaskets of nominal sizes DN 15, DN 20 and ½" OD and ¾" OD are based on the geometry of the 1" OD valve.



#### Gaskets with decisive advantages

|  |
|--|
| Low torque   |
| Double-sided valve disk bearing  |
| Long service-life  |
| Vacuum-proof   |
| Selection of FDA-approved seal materials   |
| <ul style="list-style-type: none"> <li>• EPDM</li> <li>• FKM</li> <li>• HNBR</li> <li>• VMQ</li> </ul> |

Selection of dimensions and connection fittings

| Flange variant |  |    |    |    |    |    |    |    |    |     |     |     |
|----------------|--|----|----|----|----|----|----|----|----|-----|-----|-----|
| Code           | Nominal diameter   | DN | 15 | 20 | 25 | 40 | 50 | 65 | 80 | 100 | 125 | 150 |
| 8              | Intermediate flange V  |    | •  | •  | •  | •  | •  | •  | •  | •   | •   | •   |
| 1              | Welded flange S  |    | •  | •  | •  | •  | •  | •  | •  | •   | •   | •   |
| 2              | Male flange G (DIN 11851)  |    |    |    | •  | •  | •  | •  | •  | •   | •   | •   |
| 4              | Liner K (DIN 11851)  |    |    |    | •  | •  | •  | •  | •  | •   | •   | •   |
| 3              | Clamp flange C<br>Standard seal outline: DIN 32676<br>Standard inside diameter: DIN 11866 series A |    |    |    | •  | •  | •  | •  | •  | •   |     |     |

| Flange variant |   |    |    |    |    |      |    |      |    |    |  |
|----------------|---|----|----|----|----|------|----|------|----|----|--|
| Code           | Nominal diameter  | OD | ½" | ¾" | 1" | 1 ½" | 2" | 2 ½" | 3" | 4" |  |
| 8              | Intermediate flange V   |    | •  | •  | •  | •    | •  | •    | •  | •  |  |
| 1              | Welded flange S   |    | •  | •  | •  | •    | •  | •    | •  | •  |  |
| 2              | Male flange G (based on DIN 11851)  |    |    |    | •  | •    | •  | •    | •  | •  |  |
| 2              | Male flange SMS (SMS 1146)  |    |    |    | •  | •    | •  | •    | •  | •  |  |
| 4              | Liner K (based on DIN 11851)  |    |    |    | •  | •    | •  | •    | •  | •  |  |
| 3              | Clamp flange C<br>Standard seal outline: DIN 32676 / ISO 2852<br>Standard inside diameter: DIN 11866 series C |    |    |    | •  | •    | •  | •    | •  | •  |  |



8 (T-smart 788)



1 (T-smart 711)



2 (T-smart 722)



4 (T-smart 714)



3 (T-smart 733)



## Pipe classes

Dimensions of weld connections comply with the following standards:

- **Metric:** Outside diameter acc. to DIN 11850, series II, DIN 11866, series A
- **Inch OD:** Outside diameter acc. to BS 4825
- **Inch SMS:** Outside diameter acc. to SMS 1146

## Surfaces

Product wetted surfaces are by default finished to  $R_a \leq 0.8 \mu\text{m}$ . Higher-quality surfaces finished to  $R_a \leq 0.4 \mu\text{m}$  are optionally available.

Non product wetted surfaces (flanges) are metal blank.

## Materials

Product wetted parts of the Butterfly Valves T-smart 7 are built in AISI 304 (1.4301) or AISI 316L (1.4404). Other materials are available on request, e.g. for applications handling aggressive media.

For detailed information regarding properties of the materials consult the **material properties** table.

## Test report and inspection certificate

Flanges and disks of the Butterfly Valves T-smart 7 are available with test report 2.2 or inspection certificate 3.1 in compliance with EN 10204 (on request).

## Seal materials

Product wetted seals are EPDM (default), HNBR, FKM or VMQ.

Mixing components of our seal materials are included in the FDA "**White List**" and comply with the "**FOOD and DRUG**" (FDA) regulations 21 CFR Part 177.2600 and 21 CFR 177.1550: "Rubber Articles intended for repeated use".

The resistance of the sealing material depends on the type and temperature of the medium conveyed. The contact time can negatively affect the service life of the seals.

For detailed information regarding properties of the seal materials consult the **seal material properties** table.

## Conditions for operation

Butterfly Valves T-smart 7 can be operated at ambient temperatures from 0 to 45 °C (32 to 113 °F). The proximity switches are approved for ambient temperatures from -20 to 80 °C (-4 to 176 °F). The Butterfly Valves T-smart 7 can be operated in outdoor areas. However, they need to be protected from frost in those areas or must be de-iced before switching.

Butterfly Valves T-smart 7 must be mounted stress-free. Horizontal lateral forces, e.g. thermal pipe elongation, cannot be compensated for in the valve, which makes damages to the valve a possibility. In such cases, suitable measures to compensate the elongation are recommended, such as using a VARICOMP® expansion compensator.

The clearance required for mounting and demounting Butterfly Valves T-smart is listed together with the respective technical data and dimensions.

## Control air

The control air pressure is for air / spring actuators min. 4.8 bar, max. 8 bar and for air / air actuators min. 4.0 bar and max. 8.0 bar. For lower control air pressure, a booster cylinder can be applied. The quality of the control air must comply with the requirements acc. to ISO 8573-1:2010:

| ISO 8573-1:2010  |  |
|------------------|--|
| Particle content | <b>Quality class 6</b>   |
|                  | Particle size max. 5 µm  |
|                  | Particle density max. 5 mg/m <sup>3</sup>  |
| Water content    | <b>Quality class 4</b>   |
|                  | Max. dew point 3 °C  |
|                  | For operation locations in higher regions or at low ambient temperatures, the dew point must be re-calculated accordingly. |
| Oil content      | <b>Quality class 3</b>   |
|                  | Max. 1 mg oil for 1 m <sup>3</sup> air, ideally oil-free   |

## Operating pressure

The valves are vacuum proof up to 0.05 bar (abs). The maximum product pressure for which the valves can be configured is 10 bar.

## Actuator selection

The modular concept of the Butterfly Valves T-smart 7 allows for a variety of actuator variants to be fitted. Different manual and pneumatic actuators are available.

The pneumatic actuators are optimized for long-term operation and are maintenance-free. To prevent damages in the pipe-work, the closing speed of the pneumatic actuators can be reduced per air throttle.

For partial opening or closure an optional limit stop and a two-position stop are available.

## Feedback signal

Proximity switches of M12×1 size indicate the positions "open" and/or "closed". The actuator bracket for pneumatic actuators has two sensor casings, an optional and retro-fittable proximity switch holder is available for standard manual actuators.

All pneumatic actuators can be fitted with the proven T.VIS® control top with all options.

Material properties

| Material number | Short name                    | Similar materials |           |        | PREN*** | Main alloy elements in % by mass |             |                 |                 |
|-----------------|-------------------------------|-------------------|-----------|--------|---------|----------------------------------|-------------|-----------------|-----------------|
|                 |                               |                   |           |        |         | Cr (Chrome)                      | Ni (Nickel) | Mo (Molybdenum) | C max. (Carbon) |
| AISI 304* and** | X5CrNi18-10                   | 1.4301            | BS 304S15 | SS2332 | 18      | 17.5–19.5                        | 8.0–10.5    | –               | 0.07            |
| AISI 316L**     | X2 CrNiMo 17-12-2             | 1.4404            | BS 316S11 | SS2348 | 25      | 16.5–18.5                        | 10.0–13.0   | 2.0–2.5         | 0.03            |
| 1.4410          | X2 CrNiMoN 22-5-3             | SAF 2507®         | –         | SS2328 | 39      | 24.0–26.0                        | 6.0–8.0     | 3.0–4.5         | 0.03            |
| AL-6XN®         | –                             | –                 | –         | –      | 43      | 20.0–22.0                        | 23.5–25.5   | 6.0–7.0         | 0.03            |
| 2.4602          | NiCr21Mo14W<br>HASTELLOY C-22 | –                 | –         | –      | 69      | 20.0–22.5                        | Rest        | 12.5–14.5       | 0.01            |

\* Standard material for components not in contact with the product  
 \*\* Standard material for components in contact with the product (other materials available on request)  
 \*\*\* Pitting Resistance Equivalent Number = % Cr + 3.3 × (% Mo + 0.5 W) + 20 N

Seal material properties

| Seal material                    |               |                                    | EPDM                           | FKM                           | HNBR                           | VMQ                            |
|----------------------------------|---------------|------------------------------------|--------------------------------|-------------------------------|--------------------------------|--------------------------------|
| General application temperature* |               |                                    | –40 to 135 °C<br>–40 to 275 °F | –10 to 200 °C<br>14 to 392 °F | –25 to 140 °C<br>–13 to 284 °F | –50 to 200 °C<br>–58 to 392 °F |
| Medium                           | Concentration | At permitted operating temperature |                                |                               |                                |                                |
| Alkali                           | ≤ 3 %         | up to 80 °C                        | +                              | ○                             | +                              | ○                              |
|                                  | ≤ 5 %         | up to 40 °C                        | +                              | ○                             | ○                              | ○                              |
|                                  | ≤ 5 %         | up to 80 °C                        | +                              | –                             | –                              | ○                              |
|                                  | > 5 %         |                                    | ○                              | –                             | –                              | ○                              |
| Inorganic acid**                 | ≤ 3 %         | up to 80 °C                        | +                              | +                             | +                              | ○                              |
|                                  | ≤ 5 %         | up to 80 °C                        | ○                              | +                             | ○                              | ○                              |
|                                  | > 5 %         | up to 100 °C                       | –                              | +                             | –                              | ○                              |
| Water                            |               | up to 80 °C                        | +                              | +                             | +                              | +                              |
|                                  |               | up to 100 °C                       | +                              | +                             | +                              | ○                              |
| Steam                            |               | up to 135 °C                       | +                              | ○                             | ○                              | ○                              |
| Steam, approx. 30 min            |               | up to 150 °C                       | +                              | ○                             | –                              | ○                              |
| Hydrocarbons / fuels             |               |                                    | –                              | +                             | ○                              | –                              |
| Products containing grease       | ≤ 35 %        |                                    | +                              | +                             | +                              | ○                              |
|                                  | > 35 %        |                                    | –                              | +                             | +                              | ○                              |
| Oils                             |               |                                    | –                              | +                             | +                              | ○                              |






+ = Good resistance  
 ○ = Reduced service life  
 – = Not resistant

Other applications on request  
 \* Depending on the installation situation  
 \*\* Inorganic acids include hydrochloric acid, nitric acid, sulphuric acid



The certificates listed here are valid for T-smart 7 butterfly valves. Valves conform to the requirements of the European Hygienic Engineering and Design Group (EHEDG) and the




Canadian Registration Number (CRN); further national and international standards are available for numerous fields of applications.

| Index     |   | Standard certificates   |   |   | Optional certificates |  |             |   |                  |              |
|-----------|---|---|---|---|-----------------------|--|-------------|---|------------------|--------------|
|           |   | CE*   | EHEDG   | FDA   | ADI free              | ATEX   | CRN         | EG Nr. 1935/2004  | TA-Luft VDI 2440 | USP Class VI |
|           |   |  |  |  |                       |  |             |  |                  |              |
| T-smart 7 | 1 | •   | •   | •   | •                     | II 2G c IIB<br>II 2D c IIB   | OC16912.5CL | •   | •                | •            |
|           | 1 | •   | •   | •**   | •**                   | II 2G c IIB<br>II 2D c IIB   |             | •**   | •                | •**          |
|           | 1 | •   | •   | •**   | •**                   | II 2G c IIB<br>II 2D c IIB   |             | •**   | •                | •**          |
|           | 1 | •   | •   | •**   | •**                   | II 2G c IIB<br>II 2D c IIB   |             | •**   | •                | •**          |
|           | 1 | •   | •   | •   | •                     | II 2G c IIB<br>II 2D c IIB   |             | •   | •                | •            |
|           | 1 | •   | •   | •   | •                     | II 2G c IIB<br>II 2D c IIB   | OC16912.5CL | •   | •                | •            |
|           | 1 | •   | •   | •   | •                     | II 2G c IIB<br>II 2D c IIB   | OC16912.5CL | •   | •                | •            |
|           | 1 | •   | •   | •   | •***                  | II 2G c IIB<br>II 2D c IIB   | OC16912.5CL | •***  | •                | •***         |

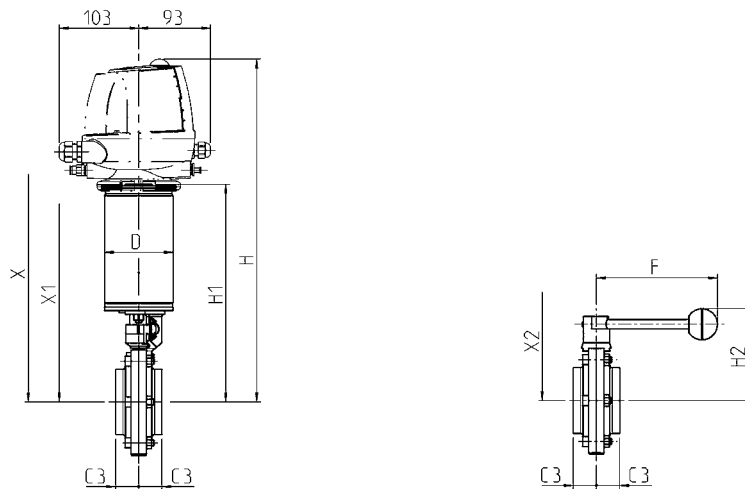
\* only for valves with pneumatic actuator  
 \*\* only for center seals  
 \*\*\* for HNBR and VMQ restricted to the center seal





| Technical data of the standard version |   |
|--|---|
| Product wetted materials               | AISI 304  |
| Non product wetted materials           | AISI 304  |
| Product wetted gasket material         | EPDM  |
| Ambient temperature                    | 0 to 45 °C  |
| Control air pressure                   | 4.8 to 8 bar  |
| Max. product pressure                  | 10 bar  |
| Product wetted surface                 | R <sub>a</sub> 0.8 µm   |
| Non product wetted surface             | Metal blank   |
| Pneumatic Actuator                     | Air-to-spring   |
| Certificates                           |    |

\* The CE-marking is valid for a T-smart Butterfly Valve with pneumatic actuator.

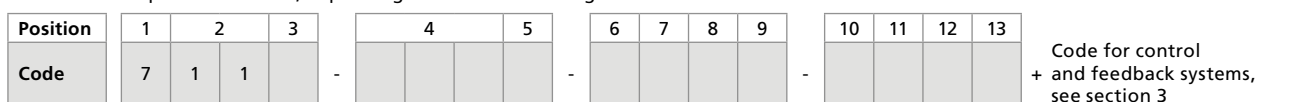


| Nominal size | Pipe        | Actuator |        | Dimensions |         |         | Removal space |         |         | Flange width | Valve      |                                |
|--------------|-------------|----------|--------|------------|---------|---------|---------------|---------|---------|--------------|------------|--------------------------------|
|              | Ø [mm]      | Ø D [mm] | F [mm] | H [mm]     | H1 [mm] | H2 [mm] | X [mm]        | X1 [mm] | X2 [mm] | C3 [mm]      | KVS [m³/h] | Weight (without actuator) [kg] |
| DN 15        | 19 × 1.5    | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 25           | 10.0       | 0.7                            |
| DN 20        | 23 × 1.5    | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 25           | 12.0       | 0.7                            |
| DN 25        | 29 × 1.5    | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 25           | 21.0       | 0.6                            |
| DN 40        | 41 × 1.5    | 88.9     | 116    | 418.5      | 256.5   | 86.5    | 438.5         | 276.5   | 106.5   | 25           | 72.0       | 0.8                            |
| DN 50        | 53 × 1.5    | 88.9     | 116    | 427.0      | 265.0   | 95.0    | 447.0         | 285.0   | 115.0   | 25           | 130.0      | 1.2                            |
| DN 65        | 70 × 2.0    | 88.9     | 116    | 434.5      | 272.5   | 103.0   | 454.5         | 292.5   | 123.0   | 25           | 250.0      | 1.5                            |
| DN 80        | 85 × 2.0    | 88.9     | 160    | 440.5      | 278.5   | 114.5   | 460.5         | 298.5   | 134.5   | 30           | 340.0      | 2.0                            |
| DN 100       | 104 × 2.0   | 114.3    | 160    | 456.5      | 294.5   | 128.0   | 476.5         | 314.5   | 148.0   | 30           | 750.0      | 2.5                            |
| DN 125       | 129 × 2.0   | 114.3    | 220    | 472.0      | 310.0   | 146.0   | 492.0         | 330.0   | 166.0   | 35           | 1,100.0    | 5.4                            |
| DN 150       | 154 × 2.0   | 114.3    | 220    | 486.0      | 324.0   | 159.0   | 506.0         | 344.0   | 180.0   | 40           | 1,800.0    | 6.9                            |
| OD ½"        | 12.7 × 1.6  | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 25           | 3.5        | 0.8                            |
| OD ¾"        | 19.05 × 1.6 | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 25           | 10.0       | 0.8                            |
| OD 1"        | 25.4 × 1.6  | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 25           | 23.0       | 0.7                            |
| OD 1 ½"      | 38.1 × 1.6  | 88.9     | 116    | 420.0      | 258.0   | 88.0    | 440.0         | 278.0   | 108.0   | 25           | 87.0       | 0.8                            |
| OD 2"        | 50.8 × 1.6  | 88.9     | 116    | 428.0      | 266.0   | 96.0    | 448.0         | 286.0   | 116.0   | 25           | 170.0      | 1.1                            |
| OD 2 ½"      | 63.5 × 1.6  | 88.9     | 116    | 436.5      | 274.5   | 105.0   | 456.5         | 294.5   | 125.0   | 25           | 240.0      | 1.5                            |
| OD 3"        | 76.2 × 1.6  | 88.9     | 160    | 444.0      | 282.0   | 118.0   | 464.0         | 302.0   | 138.0   | 30           | 400.0      | 1.8                            |
| OD 4"        | 101.6 × 2.0 | 114.3    | 160    | 454.0      | 292.0   | 130.5   | 474.0         | 312.0   | 150.5   | 30           | 880.0      | 2.8                            |




Weld Connection/Weld Connection 711

| Position  | Description of the order code  |
|---|--|
| 1   | <b>Valve type</b>  |
|   | 7 Butterfly Valve  |
| 2   | <b>Flange connection</b>   |
|   | 11 Weld connection/weld connection   |
| 3   | <b>Pipe standard</b>   |
|   | 0 OD    1 DN                         |
| 4   | <b>Nominal size</b>  |
|   | 012 OD ½"    015 DN 15               |
|   | 075 OD ¾"    020 DN 20               |
|   | 010 OD 1"    025 DN 25           |
|   | 112 OD 1 ½"    040 DN 40             |
|   | 200 OD 2"    050 DN 50           |
|   | 212 OD 2 ½"    065 DN 65             |
|   | 300 OD 3"    080 DN 80           |
|   | 400 OD 4"    100 DN 100          |
|   | 125 DN 125   |
|   | 150 DN 150   |
|   | 5  |
| 1 AISI 304 (1.4301)                                 |  |
| 2 AISI 316L (1.4404)                                |  |
| 6   | <b>Product wetted gasket material</b>                                      |
|   | 0 EPDM   |
|   | 1 HNBR   |
|   | 2 FKM  |
|   | 6 VMQ  |
| 7   | <b>Actuator type</b>   |
|   | 0 Manual actuator  |
|   | 1 Pneumatic for T.VIS®   |
|   | 2 Pneumatic incl. 2 proximity switch holders                               |
|   | 5 Manual actuator stepless   |
|   | 6 Manual actuator with scissors handle (up to OD 4"/DN 100)                |
|   | 9 Without actuator   |
| 8   | <b>Air connection</b>  |
|   | 0 Without  |
|   | 1 Metric (only for actuator type 2)  |
|   | 2 Inch (only for actuator type 2)  |
|   | 3 Metric with air throttle (only for actuator type 2)                      |
| 4 Inch with air throttle (only for actuator type 2) |  |
| 9   | <b>Fail position of valve</b>  |
|   | 0 Closed   |
|   | 1 Open   |
|   | 2 Air-to-air (actuator types 1 and 2 only)                                 |
| 10  | <b>Accessories</b>   |
|   | 0 Without  |
|   | 1 Extension piece +80 mm   |
|   | 2 Lockable bracket incl. 4 proximity switch holders (actuator type 0 only) |
|   | 3 Limit stop (actuator types 1 and 2 only)                                 |
|   | 5 Two-position stop (actuator type 2 only)                                 |
|   | 7 Booster cylinder (actuator types 1 and 2 only)                           |
| 11  | <b>Product wetted surface</b>  |
|   | 0 0.8 µm   |
|   | 1 0.4 µm   |
| 12  | <b>Certificate</b>   |
|   | 0 Without  |
|   | 1 Test report 2.2  |
|   | 2 Inspection certificate 3.1   |
| 3 Certificates 2.2 and 3.1                          |  |
| 13  | <b>ATEX approval</b>   |
|   | 0 No   |
| 1 Yes   |  |

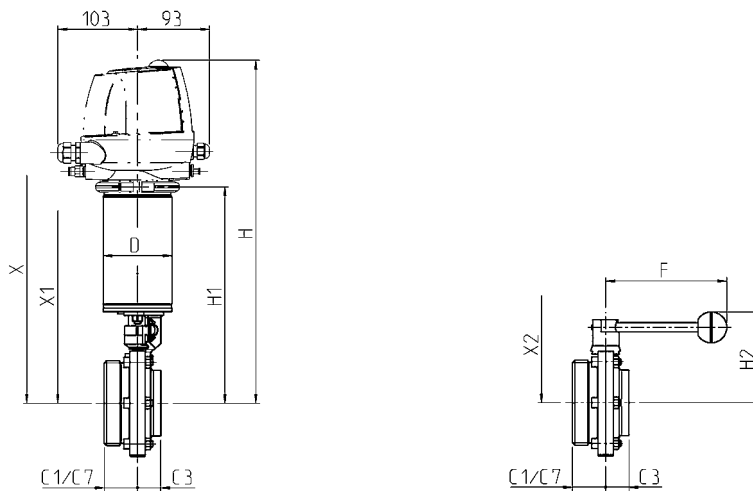
The code is composed as follows, depending on the chosen configuration:





| Technical data of the standard version |   |
|--|---|
| Product wetted materials               | AISI 304  |
| Non product wetted materials           | AISI 304  |
| Product wetted gasket material         | EPDM  |
| Ambient temperature                    | 0 to 45 °C  |
| Control air pressure                   | 4.8 to 8 bar  |
| Max. product pressure                  | 10 bar  |
| Product wetted surface                 | R <sub>a</sub> 0.8 µm   |
| Non product wetted surface             | Metal blank   |
| Pneumatic Actuator                     | Air-to-spring   |
| Certificates                           |    |

\* The CE-marking is valid for a T-smart Butterfly Valve with pneumatic actuator.



| Nominal size | Pipe      |               | Actuator |        | Dimensions |         |         | Removal space |         |         | Flange width |         | Valve      |                                |
|--------------|-----------|---------------|----------|--------|------------|---------|---------|---------------|---------|---------|--------------|---------|------------|--------------------------------|
|              | Ø [mm]    | Thread        | Ø D [mm] | F [mm] | H [mm]     | H1 [mm] | H2 [mm] | X [mm]        | X1 [mm] | X2 [mm] | C1 [mm]      | C3 [mm] | KVS [m³/h] | Weight (without actuator) [kg] |
| DN 25        | 29 × 1.5  | Rd 52 × 1/8"  | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 35           | 25      | 21         | 0.8                            |
| DN 40        | 41 × 1.5  | Rd 65 × 1/8"  | 88.9     | 116    | 418.5      | 256.5   | 86.5    | 438.5         | 276.5   | 106.5   | 35           | 25      | 72         | 1.1                            |
| DN 50        | 53 × 1.5  | Rd 78 × 1/8"  | 88.9     | 116    | 427.0      | 265.0   | 95.0    | 447.0         | 285.0   | 115.0   | 35           | 25      | 130        | 1.5                            |
| DN 65        | 70 × 2.0  | Rd 95 × 1/8"  | 88.9     | 116    | 434.5      | 272.5   | 103.0   | 454.5         | 292.5   | 123.0   | 38           | 25      | 250        | 1.9                            |
| DN 80        | 85 × 2.0  | Rd 110 × 1/4" | 88.9     | 160    | 440.5      | 278.5   | 114.5   | 460.5         | 298.5   | 134.5   | 43           | 30      | 340        | 2.5                            |
| DN 100       | 104 × 2.0 | Rd 130 × 1/4" | 114.3    | 160    | 456.5      | 294.5   | 128.0   | 476.5         | 314.5   | 148.0   | 43           | 30      | 750        | 3.2                            |
| DN 125       | 129 × 2.0 | Rd 160 × 1/4" | 114.3    | 220    | 472.0      | 310.0   | 146.0   | 492.0         | 330.0   | 166.0   | 55           | 35      | 1,100      | 6.8                            |
| DN 150       | 154 × 2.0 | Rd 190 × 1/4" | 114.3    | 220    | 486.0      | 324.0   | 159.0   | 506.0         | 344.0   | 180.0   | 80           | 40      | 1,800      | 9.0                            |

|           |             |               |       |     |       |       |       |       |       |       |    |    |     |     |
|-----------|-------------|---------------|-------|-----|-------|-------|-------|-------|-------|-------|----|----|-----|-----|
| OD 1"     | 25.4 × 1.6  | Rd 52 × 1/8"  | 88.9  | 116 | 415.0 | 253.0 | 83.0  | 435.0 | 273.0 | 103.0 | 47 | 25 | 23  | 0.8 |
| OD 1 1/2" | 38.1 × 1.6  | Rd 65 × 1/8"  | 88.9  | 116 | 420.0 | 258.0 | 88.0  | 440.0 | 278.0 | 108.0 | 47 | 25 | 87  | 1.0 |
| OD 2"     | 50.8 × 1.6  | Rd 78 × 1/8"  | 88.9  | 116 | 428.0 | 266.0 | 96.0  | 448.0 | 286.0 | 116.0 | 48 | 25 | 170 | 1.4 |
| OD 2 1/2" | 63.5 × 1.6  | Rd 95 × 1/8"  | 88.9  | 116 | 436.5 | 274.5 | 105.0 | 456.5 | 294.5 | 125.0 | 50 | 25 | 240 | 1.9 |
| OD 3"     | 76.2 × 1.6  | Rd 104 × 1/4" | 88.9  | 160 | 444.0 | 282.0 | 118.0 | 464.0 | 302.0 | 138.0 | 55 | 30 | 400 | 2.2 |
| OD 4"     | 101.6 × 2.0 | Rd 130 v 1/4" | 114.3 | 160 | 454.0 | 292.0 | 130.5 | 474.0 | 312.0 | 150.5 | 60 | 30 | 880 | 3.5 |

| Nominal size | Pipe        |               | Actuator |        | Dimensions |         |         | Removal space |         |         | Flange width |         | Valve      |                                |
|--------------|-------------|---------------|----------|--------|------------|---------|---------|---------------|---------|---------|--------------|---------|------------|--------------------------------|
|              | Ø [mm]      | Thread        | Ø D [mm] | F [mm] | H [mm]     | H1 [mm] | H2 [mm] | X [mm]        | X1 [mm] | X2 [mm] | C7 [mm]      | C3 [mm] | KVS [m³/h] | Weight (without actuator) [kg] |
| SMS 1"       | 25.4 × 1.6  | Rd 40 × 1/8"  | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 36           | 25      | 23         | 0.8                            |
| SMS 1 1/2"   | 38.1 × 1.6  | Rd 60 × 1/8"  | 88.9     | 116    | 420.0      | 258.0   | 88.0    | 440.0         | 278.0   | 108.0   | 41           | 25      | 87         | 1.0                            |
| SMS 2"       | 50.8 × 1.6  | Rd 70 × 1/8"  | 88.9     | 116    | 428.0      | 266.0   | 96.0    | 448.0         | 286.0   | 116.0   | 41           | 25      | 170        | 1.4                            |
| SMS 2 1/2"   | 63.5 × 1.6  | Rd 85 × 1/8"  | 88.9     | 116    | 436.5      | 274.5   | 105.0   | 456.5         | 294.5   | 125.0   | 45           | 25      | 240        | 1.9                            |
| SMS 3"       | 76.2 × 1.6  | Rd 98 × 1/8"  | 88.9     | 160    | 444.0      | 282.0   | 118.0   | 464.0         | 302.0   | 138.0   | 45           | 30      | 400        | 2.2                            |
| SMS 4"       | 101.6 × 2.0 | Rd 132 × 1/8" | 114.3    | 160    | 454.0      | 292.0   | 130.5   | 474.0         | 312.0   | 150.5   | 56           | 30      | 880        | 4.2                            |

| Position | Description of the order code   |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
|----------|---|-----|--------|-----|---------|-----|-------|-----|---------|-----|-------|-----|---------|-----|-------|-----|-------|-----|-------|-----|---------|-----|-------|-----|---------|-----|-------|-----|-------|-----|-------|-----|-------|-----|--------|-----|-------|--|--|-----|--------|--|--|--|--|-----|--------|--|--|
| 1        | <b>Valve type</b><br>7 Butterfly Valve  |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 2        | <b>Flange connection</b><br>21 Male/weld connection   |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 3        | <b>Pipe standard</b><br>0 OD                      1 DN                      7 SMS   |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 4        | <b>Nominal size</b><br><table border="1"> <tr> <td>010</td><td>OD 1"</td> <td>025</td><td>DN 25</td> <td>010</td><td>OD 1"</td> </tr> <tr> <td>112</td><td>OD 1 ½"</td> <td>040</td><td>DN 40</td> <td>112</td><td>OD 1 ½"</td> </tr> <tr> <td>200</td><td>OD 2"</td> <td>050</td><td>DN 50</td> <td>200</td><td>OD 2"</td> </tr> <tr> <td>212</td><td>OD 2 ½"</td> <td>065</td><td>DN 65</td> <td>212</td><td>OD 2 ½"</td> </tr> <tr> <td>300</td><td>OD 3"</td> <td>080</td><td>DN 80</td> <td>300</td><td>OD 3"</td> </tr> <tr> <td>400</td><td>OD 4"</td> <td>100</td><td>DN 100</td> <td>400</td><td>OD 4"</td> </tr> <tr> <td></td><td></td> <td>125</td><td>DN 125</td> <td></td><td></td> </tr> <tr> <td></td><td></td> <td>150</td><td>DN 150</td> <td></td><td></td> </tr> </table> | 010 | OD 1"  | 025 | DN 25   | 010 | OD 1" | 112 | OD 1 ½" | 040 | DN 40 | 112 | OD 1 ½" | 200 | OD 2" | 050 | DN 50 | 200 | OD 2" | 212 | OD 2 ½" | 065 | DN 65 | 212 | OD 2 ½" | 300 | OD 3" | 080 | DN 80 | 300 | OD 3" | 400 | OD 4" | 100 | DN 100 | 400 | OD 4" |  |  | 125 | DN 125 |  |  |  |  | 150 | DN 150 |  |  |
| 010      | OD 1"   | 025 | DN 25  | 010 | OD 1"   |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 112      | OD 1 ½"   | 040 | DN 40  | 112 | OD 1 ½" |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 200      | OD 2"   | 050 | DN 50  | 200 | OD 2"   |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 212      | OD 2 ½"   | 065 | DN 65  | 212 | OD 2 ½" |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 300      | OD 3"   | 080 | DN 80  | 300 | OD 3"   |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 400      | OD 4"   | 100 | DN 100 | 400 | OD 4"   |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
|          |   | 125 | DN 125 |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
|          |   | 150 | DN 150 |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 5        | <b>Product wetted material</b><br>1 AISI 304 (1.4301)<br>2 AISI 316L (1.4404)   |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 6        | <b>Product wetted gasket material</b><br>0 EPDM<br>1 HNBR*<br>2 FKM<br>6 VMQ*   |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 7        | <b>Actuator type</b><br>0 Manual actuator<br>1 Pneumatic for T.VIS®<br>2 Pneumatic incl. 2 proximity switch holders<br>5 Manual actuator stepless<br>6 Manual actuator with scissors handle (up to OD 4"/DN 100)<br>9 Without actuator  |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 8        | <b>Air connection</b><br>0 Without<br>1 Metric (only for actuator type 2)<br>2 Inch (only for actuator type 2)<br>3 Metric with air throttle (only for actuator type 2)<br>4 Inch with air throttle (only for actuator type 2)  |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 9        | <b>Fail position of valve</b><br>0 Closed<br>1 Open<br>2 Air-to-air (actuator types 1 and 2 only)   |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 10       | <b>Accessories</b><br>0 Without<br>1 Extension piece +80 mm<br>2 Lockable bracket incl. 4 proximity switch holders (actuator type 0 only)<br>3 Limit stop (actuator types 1 and 2 only)<br>5 Two-position stop (actuator type 2 only)<br>7 Booster cylinder (actuator types 1 and 2 only)   |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 11       | <b>Product wetted surface</b><br>0 0.8 µm<br>1 0.4 µm   |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 12       | <b>Certificate</b><br>0 Without<br>1 Test report 2.2<br>2 Inspection certificate 3.1<br>3 Certificates 2.2 and 3.1  |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |
| 13       | <b>ATEX approval</b><br>0 No<br>1 Yes   |     |        |     |         |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |         |     |       |     |         |     |       |     |       |     |       |     |       |     |        |     |       |  |  |     |        |  |  |  |  |     |        |  |  |




\* For SMS dimensions the seal ring G is not part of the delivery.

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

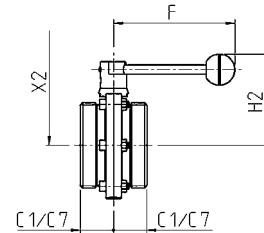
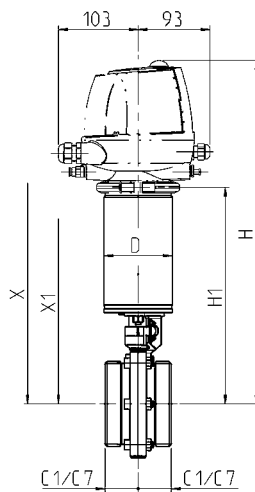
| Position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|
| Code     | 7 | 2 | 1 |   |   |   |   |   |   |    |    |    |    |

+ Code for control and feedback systems, see section 3



| Technical data of the standard version |   |
|--|---|
| Product wetted materials               | AISI 304  |
| Non product wetted materials           | AISI 304  |
| Product wetted gasket material         | EPDM  |
| Ambient temperature                    | 0 to 45 °C  |
| Control air pressure                   | 4.8 to 8 bar  |
| Max. product pressure                  | 10 bar  |
| Product wetted surface                 | R <sub>a</sub> 0.8 µm   |
| Non product wetted surface             | Metal blank   |
| Pneumatic Actuator                     | Air-to-spring   |
| Certificates                           |    |

\* The CE-marking is valid for a T-smart Butterfly Valve with pneumatic actuator.



| Nominal size | Pipe        |               | Actuator |        | Dimensions |         |         | Removal space |         |         | Flange width | Valve      |                                |
|--------------|-------------|---------------|----------|--------|------------|---------|---------|---------------|---------|---------|--------------|------------|--------------------------------|
|              | Ø [mm]      | Thread        | Ø D [mm] | F [mm] | H [mm]     | H1 [mm] | H2 [mm] | X [mm]        | X1 [mm] | X2 [mm] | C1 [mm]      | KVS [m³/h] | Weight (without actuator) [kg] |
| DN 25        | 29 × 1.5    | Rd 52 × 1/8"  | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 35           | 21         | 1.0                            |
| DN 40        | 41 × 1.5    | Rd 65 × 1/8"  | 88.9     | 116    | 418.5      | 256.5   | 86.5    | 438.5         | 276.5   | 106.5   | 35           | 72         | 1.3                            |
| DN 50        | 53 × 1.5    | Rd 78 × 1/8"  | 88.9     | 116    | 427.0      | 265.0   | 95.0    | 447.0         | 285.0   | 115.0   | 35           | 130        | 1.8                            |
| DN 65        | 70 × 2.0    | Rd 95 × 1/8"  | 88.9     | 116    | 434.5      | 272.5   | 103.0   | 454.5         | 292.5   | 123.0   | 38           | 250        | 2.4                            |
| DN 80        | 85 × 2.0    | Rd 110 × 1/4" | 88.9     | 160    | 440.5      | 278.5   | 114.5   | 460.5         | 298.5   | 134.5   | 43           | 340        | 3.1                            |
| DN 100       | 104 × 2.0   | Rd 130 × 1/4" | 114.3    | 160    | 456.5      | 294.5   | 128.0   | 476.5         | 314.5   | 148.0   | 43           | 750        | 3.9                            |
| DN 125       | 129 × 2.0   | Rd 160 × 1/4" | 114.3    | 220    | 472.0      | 310.0   | 146.0   | 492.0         | 330.0   | 166.0   | 55           | 1,100      | 8.1                            |
| DN 150       | 154 × 2.0   | Rd 190 × 1/4" | 114.3    | 220    | 486.0      | 324.0   | 159.0   | 506.0         | 344.0   | 180.0   | 80           | 1,800      | 11.0                           |
| OD 1"        | 25.4 × 1.6  | Rd 52 × 1/8"  | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 47           | 23         | 0.9                            |
| OD 1 1/2"    | 38.1 × 1.6  | Rd 65 × 1/8"  | 88.9     | 116    | 420.0      | 258.0   | 88.0    | 440.0         | 278.0   | 108.0   | 47           | 87         | 1.1                            |
| OD 2"        | 50.8 × 1.6  | Rd 78 × 1/8"  | 88.9     | 116    | 428.0      | 266.0   | 96.0    | 448.0         | 286.0   | 116.0   | 48           | 170        | 1.6                            |
| OD 2 1/2"    | 63.5 × 1.6  | Rd 95 × 1/8"  | 88.9     | 116    | 436.5      | 274.5   | 105.0   | 456.5         | 294.5   | 125.0   | 50           | 240        | 2.2                            |
| OD 3"        | 76.2 × 1.6  | Rd 104 × 1/4" | 88.9     | 160    | 444.0      | 282.0   | 118.0   | 464.0         | 302.0   | 138.0   | 55           | 400        | 2.6                            |
| OD 4"        | 101.6 × 2.0 | Rd 130 × 1/4" | 114.3    | 160    | 454.0      | 292.0   | 130.5   | 474.0         | 312.0   | 150.5   | 60           | 880        | 4.2                            |

| Nominal size | Pipe        |               | Actuator |        | Dimensions |         |         | Removal space |         |         | Flange width | Valve      |                                |
|--------------|-------------|---------------|----------|--------|------------|---------|---------|---------------|---------|---------|--------------|------------|--------------------------------|
|              | Ø [mm]      | Thread        | Ø D [mm] | F [mm] | H [mm]     | H1 [mm] | H2 [mm] | X [mm]        | X1 [mm] | X2 [mm] | C7 [mm]      | KVS [m³/h] | Weight (without actuator) [kg] |
| SMS 1"       | 25.4 × 1.6  | Rd 40 × 1/8"  | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 36           | 23         | 0.9                            |
| SMS 1 1/2"   | 38.1 × 1.6  | Rd 60 × 1/8"  | 88.9     | 116    | 420.0      | 258.0   | 88.0    | 440.0         | 278.0   | 108.0   | 41           | 87         | 1.1                            |
| SMS 2"       | 50.8 × 1.6  | Rd 70 × 1/8"  | 88.9     | 116    | 428.0      | 266.0   | 96.0    | 448.0         | 286.0   | 116.0   | 41           | 170        | 1.6                            |
| SMS 2 1/2"   | 63.5 × 1.6  | Rd 85 × 1/8"  | 88.9     | 116    | 436.5      | 274.5   | 105.0   | 456.5         | 294.5   | 125.0   | 45           | 240        | 2.2                            |
| SMS 3"       | 76.2 × 1.6  | Rd 98 × 1/8"  | 88.9     | 160    | 444.0      | 282.0   | 118.0   | 464.0         | 302.0   | 138.0   | 45           | 400        | 2.6                            |
| SMS 4"       | 101.6 × 2.0 | Rd 132 × 1/8" | 114.3    | 160    | 454.0      | 292.0   | 130.5   | 474.0         | 312.0   | 150.5   | 56           | 880        | 5.6                            |



| Position  | Description of the order code   |            |
|---|---|------------|
| 1   | <b>Valve type</b>   |            |
|   | 7 Butterfly Valve   |            |
| 2   | <b>Flange connection</b>  |            |
|   | 22 Male/male  |            |
| 3   | <b>Pipe standard</b>  |            |
|   | 0 OD                      1 DN                      7 SMS                   |            |
| 4   | <b>Nominal size</b>   |            |
|   | 010 OD 1"                      025 DN 25                      010 OD 1"     |            |
|   | 112 OD 1 ½"                      040 DN 40                      112 OD 1 ½" |            |
|   | 200 OD 2"                      050 DN 50                      200 OD 2"     |            |
|   | 212 OD 2 ½"                      065 DN 65                      212 OD 2 ½" |            |
|   | 300 OD 3"                      080 DN 80                      300 OD 3"     |            |
|   | 400 OD 4"                      100 DN 100                      400 OD 4"    |            |
|   |   | 125 DN 125 |
|   |   | 150 DN 150 |
|   |   |            |
| 5   | <b>Product wetted material</b>  |            |
|   | 1 AISI 304 (1.4301)   |            |
|   | 2 AISI 316L (1.4404)  |            |
| 6   | <b>Product wetted gasket material</b>                                       |            |
|   | 0 EPDM  |            |
|   | 1 HNBR*   |            |
|   | 2 FKM   |            |
|   | 6 VMQ*  |            |
| 7   | <b>Actuator type</b>  |            |
|   | 0 Manual actuator   |            |
|   | 1 Pneumatic for T.VIS®  |            |
|   | 2 Pneumatic incl. 2 proximity switch holders                                |            |
|   | 5 Manual actuator stepless  |            |
|   | 6 Manual actuator with scissors handle (up to OD 4"/DN 100)                 |            |
|   | 9 Without actuator  |            |
| 8   | <b>Air connection</b>   |            |
|   | 0 Without   |            |
|   | 1 Metric (only for actuator type 2)   |            |
|   | 2 Inch (only for actuator type 2)   |            |
|   | 3 Metric with air throttle (only for actuator type 2)                       |            |
| 4 Inch with air throttle (only for actuator type 2) |   |            |
| 9   | <b>Fail position of valve</b>   |            |
|   | 0 Closed  |            |
|   | 1 Open  |            |
|   | 2 Air-to-air (actuator types 1 and 2 only)                                  |            |
| 10  | <b>Accessories</b>  |            |
|   | 0 Without   |            |
|   | 1 Extension piece +80 mm  |            |
|   | 2 Lockable bracket incl. 4 proximity switch holders (actuator type 0 only)  |            |
|   | 3 Limit stop (actuator types 1 and 2 only)                                  |            |
|   | 5 Two-position stop (actuator type 2 only)                                  |            |
|   | 7 Booster cylinder (actuator types 1 and 2 only)                            |            |
|   |   |            |
| 11  | <b>Product wetted surface</b>   |            |
|   | 0 0.8 µm  |            |
|   | 1 0.4 µm  |            |
| 12  | <b>Certificate</b>  |            |
|   | 0 Without   |            |
|   | 1 Test report 2.2   |            |
|   | 2 Inspection certificate 3.1  |            |
| 3 Certificates 2.2 and 3.1                          |   |            |
| 13  | <b>ATEX approval</b>  |            |
|   | 0 No  |            |
|   | 1 Yes   |            |

\* For SMS dimensions the seal ring G is not part of the delivery.

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

|                 |   |   |   |   |   |   |  |   |   |   |   |   |    |    |    |    |  |
|-----------------|---|---|---|---|---|---|--|---|---|---|---|---|----|----|----|----|--|
| <b>Position</b> | 1 | 2 | 3 |   | 4 | 5 |  | 6 | 7 | 8 | 9 |   | 10 | 11 | 12 | 13 |  |
| <b>Code</b>     | 7 | 2 | 2 | - |   |   |  |   |   |   |   | - |    |    |    |    | + Code for control and feedback systems, see section 3 |



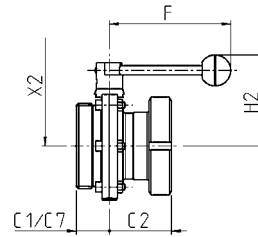
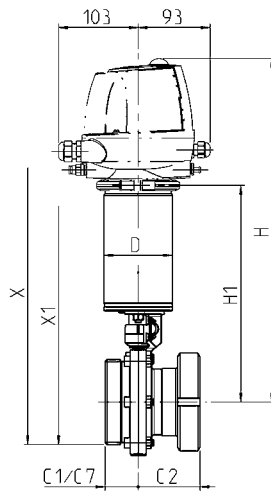
Technical data of the standard version

|                                |                       |
|--------------------------------|-----------------------|
| Product wetted materials       | AISI 304              |
| Non product wetted materials   | AISI 304              |
| Product wetted gasket material | EPDM                  |
| Ambient temperature            | 0 to 45 °C            |
| Control air pressure           | 4.8 to 8 bar          |
| Max. product pressure          | 10 bar                |
| Product wetted surface         | R <sub>a</sub> 0.8 µm |
| Non product wetted surface     | Metal blank           |
| Pneumatic Actuator             | Air-to-spring         |

Certificates



\* The CE-marking is valid for a T-smart Butterfly Valve with pneumatic actuator.



| Nominal size | Pipe      |               | Actuator |        | Dimensions |         |         | Removal space |         |         | Flange width |          | Valve      |                                |
|--------------|-----------|---------------|----------|--------|------------|---------|---------|---------------|---------|---------|--------------|----------|------------|--------------------------------|
|              | Ø [mm]    | Thread        | Ø D [mm] | F [mm] | H [mm]     | H1 [mm] | H2 [mm] | X [mm]        | X1 [mm] | X2 [mm] | C1 [mm]      | C2* [mm] | KVS [m³/h] | Weight (without actuator) [kg] |
| DN 25        | 29 × 1.5  | Rd 52 × 1/8"  | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 35           | 47       | 21         | 1.2                            |
| DN 40        | 41 × 1.5  | Rd 65 × 1/8"  | 88.9     | 116    | 418.5      | 256.5   | 86.5    | 438.5         | 276.5   | 106.5   | 35           | 51       | 72         | 1.6                            |
| DN 50        | 53 × 1.5  | Rd 78 × 1/8"  | 88.9     | 116    | 427.0      | 265.0   | 95.0    | 447.0         | 285.0   | 115.0   | 35           | 53       | 130        | 2.2                            |
| DN 65        | 70 × 2.0  | Rd 95 × 1/8"  | 88.9     | 116    | 434.5      | 272.5   | 103.0   | 454.5         | 292.5   | 123.0   | 38           | 57       | 250        | 3.2                            |
| DN 80        | 85 × 2.0  | Rd 110 × 1/4" | 88.9     | 160    | 440.5      | 278.5   | 114.5   | 460.5         | 298.5   | 134.5   | 43           | 67       | 340        | 4.2                            |
| DN 100       | 104 × 2.0 | Rd 130 × 1/4" | 114.3    | 160    | 456.5      | 294.5   | 128.0   | 476.5         | 314.5   | 148.0   | 43           | 74       | 750        | 5.5                            |
| DN 125       | 129 × 2.0 | Rd 160 × 1/4" | 114.3    | 220    | 472.0      | 310.0   | 146.0   | 492.0         | 330.0   | 166.0   | 55           | 69       | 1,100      | 9.9                            |
| DN 150       | 154 × 2.0 | Rd 190 × 1/4" | 114.3    | 220    | 486.0      | 324.0   | 159.0   | 506.0         | 344.0   | 180.0   | 80           | 77       | 1,800      | 13.5                           |

|           |             |               |       |     |       |       |       |       |       |       |    |    |     |     |
|-----------|-------------|---------------|-------|-----|-------|-------|-------|-------|-------|-------|----|----|-----|-----|
| OD 1"     | 25.4 × 1.6  | Rd 52 × 1/8"  | 88.9  | 116 | 415.0 | 253.0 | 83.0  | 435.0 | 273.0 | 103.0 | 47 | 47 | 23  | 1.0 |
| OD 1 1/2" | 38.1 × 1.6  | Rd 65 × 1/8"  | 88.9  | 116 | 420.0 | 258.0 | 88.0  | 440.0 | 278.0 | 108.0 | 47 | 51 | 87  | 1.4 |
| OD 2"     | 50.8 × 1.6  | Rd 78 × 1/8"  | 88.9  | 116 | 428.0 | 266.0 | 96.0  | 448.0 | 286.0 | 116.0 | 48 | 53 | 170 | 1.9 |
| OD 2 1/2" | 63.5 × 1.6  | Rd 95 × 1/8"  | 88.9  | 116 | 436.5 | 274.5 | 105.0 | 456.5 | 294.5 | 125.0 | 50 | 57 | 240 | 2.8 |
| OD 3"     | 76.2 × 1.6  | Rd 104 × 1/4" | 88.9  | 160 | 444.0 | 282.0 | 118.0 | 464.0 | 302.0 | 138.0 | 55 | 67 | 400 | 3.3 |
| OD 4"     | 101.6 × 2.0 | Rd 130 × 1/4" | 114.3 | 160 | 454.0 | 292.0 | 130.5 | 474.0 | 312.0 | 150.5 | 60 | 74 | 880 | 5.3 |

| Nominal size | Pipe        |               | Actuator |        | Dimensions |         |         | Removal space |         |         | Flange width |          | Valve      |                                |
|--------------|-------------|---------------|----------|--------|------------|---------|---------|---------------|---------|---------|--------------|----------|------------|--------------------------------|
|              | Ø [mm]      | Thread        | Ø D [mm] | F [mm] | H [mm]     | H1 [mm] | H2 [mm] | X [mm]        | X1 [mm] | X2 [mm] | C7 [mm]      | C2* [mm] | KVS [m³/h] | Weight (without actuator) [kg] |
| SMS 1"       | 25.4 × 1.6  | Rd 40 × 1/8"  | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 36           | 47       | 23         | 1.0                            |
| SMS 1 1/2"   | 38.1 × 1.6  | Rd 60 × 1/8"  | 88.9     | 116    | 420.0      | 258.0   | 88.0    | 440.0         | 278.0   | 108.0   | 41           | 51       | 87         | 1.4                            |
| SMS 2"       | 50.8 × 1.6  | Rd 70 × 1/8"  | 88.9     | 116    | 428.0      | 266.0   | 96.0    | 448.0         | 286.0   | 116.0   | 41           | 53       | 170        | 1.9                            |
| SMS 2 1/2"   | 63.5 × 1.6  | Rd 85 × 1/8"  | 88.9     | 116    | 436.5      | 274.5   | 105.0   | 456.5         | 294.5   | 125.0   | 45           | 57       | 240        | 2.8                            |
| SMS 3"       | 76.2 × 1.6  | Rd 98 × 1/8"  | 88.9     | 160    | 444.0      | 282.0   | 118.0   | 464.0         | 302.0   | 138.0   | 45           | 67       | 400        | 3.3                            |
| SMS 4"       | 101.6 × 2.0 | Rd 132 × 1/8" | 114.3    | 160    | 454.0      | 292.0   | 130.5   | 474.0         | 312.0   | 150.5   | 56           | 74       | 880        | 6.0                            |

\* Flange width C2 measures from center line to liner end





| Position  | Description of the order code   |
|---|---|
| 1   | <b>Valve type</b>   |
|   | 7 Butterfly Valve   |
| 2   | <b>Flange connection</b>  |
|   | 24 Male/liner   |
| 3   | <b>Pipe standard</b>  |
|   | 0 OD                      1 DN                      7 SMS                   |
| 4   | <b>Nominal size</b>   |
|   | 010 OD 1"                      025 DN 25                      010 OD 1"     |
|   | 112 OD 1 ½"                      040 DN 40                      112 OD 1 ½" |
|   | 200 OD 2"                      050 DN 50                      200 OD 2"     |
|   | 212 OD 2 ½"                      065 DN 65                      212 OD 2 ½" |
|   | 300 OD 3"                      080 DN 80                      300 OD 3"     |
|   | 400 OD 4"                      100 DN 100                      400 OD 4"    |
|   | 125 DN 125  |
| 150 DN 150  |   |
| 5   | <b>Product wetted material</b>  |
|   | 1 AISI 304 (1.4301)   |
|   | 2 AISI 316L (1.4404)  |
| 6   | <b>Product wetted gasket material</b>                                       |
|   | 0 EPDM  |
|   | 1 HNBR*   |
|   | 2 FKM   |
|   | 6 VMQ*  |
| 7   | <b>Actuator type</b>  |
|   | 0 Manual actuator   |
|   | 1 Pneumatic for T.VIS®  |
|   | 2 Pneumatic incl. 2 proximity switch holders                                |
|   | 5 Manual actuator stepless  |
|   | 6 Manual actuator with scissors handle (up to OD 4"/DN 100)                 |
|   | 9 Without actuator  |
| 8   | <b>Air connection</b>   |
|   | 0 Without   |
|   | 1 Metric (only for actuator type 2)   |
|   | 2 Inch (only for actuator type 2)   |
|   | 3 Metric with air throttle (only for actuator type 2)                       |
| 4 Inch with air throttle (only for actuator type 2) |   |
| 9   | <b>Fail position of valve</b>   |
|   | 0 Closed  |
|   | 1 Open  |
| 2 Air-to-air (actuator types 1 and 2 only)          |   |
| 10  | <b>Accessories</b>  |
|   | 0 Without   |
|   | 1 Extension piece +80 mm  |
|   | 2 Lockable bracket incl. 4 proximity switch holders (actuator type 0 only)  |
|   | 3 Limit stop (actuator types 1 and 2 only)                                  |
|   | 5 Two-position stop (actuator type 2 only)                                  |
|   | 7 Booster cylinder (actuator types 1 and 2 only)                            |
| 11  | <b>Product wetted surface</b>   |
|   | 0 0.8 µm  |
|   | 1 0.4 µm  |
| 12  | <b>Certificate</b>  |
|   | 0 Without   |
|   | 1 Test report 2.2   |
|   | 2 Inspection certificate 3.1  |
| 3 Certificates 2.2 and 3.1                          |   |
| 13  | <b>ATEX approval</b>  |
|   | 0 No  |
| 1 Yes   |   |

\* For SMS dimensions the seal ring G is not part of the delivery.

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

|                 |   |   |   |   |   |   |  |   |   |   |   |   |    |    |    |    |  |
|-----------------|---|---|---|---|---|---|--|---|---|---|---|---|----|----|----|----|--|
| <b>Position</b> | 1 | 2 | 3 |   | 4 | 5 |  | 6 | 7 | 8 | 9 |   | 10 | 11 | 12 | 13 |  |
| <b>Code</b>     | 7 | 2 | 4 | - |   |   |  |   |   |   |   | - |    |    |    |    | + Code for control and feedback systems, see section 3 |



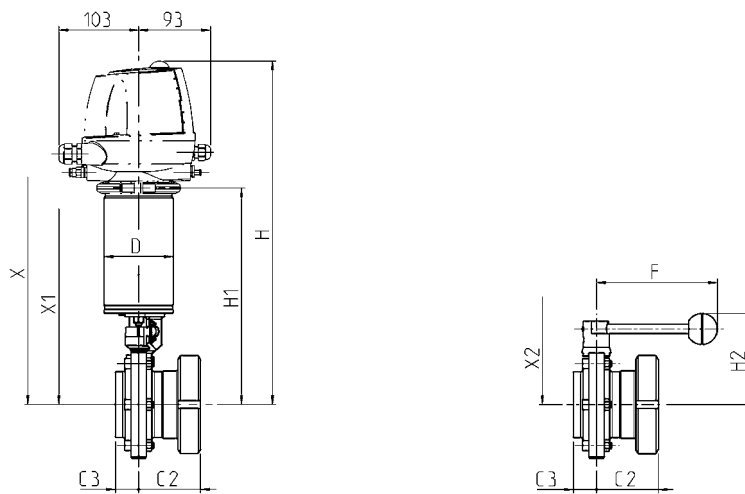
Technical data of the standard version

|                                |                       |
|--------------------------------|-----------------------|
| Product wetted materials       | AISI 304              |
| Non product wetted materials   | AISI 304              |
| Product wetted gasket material | EPDM                  |
| Ambient temperature            | 0 to 45 °C            |
| Control air pressure           | 4.8 to 8 bar          |
| Max. product pressure          | 10 bar                |
| Product wetted surface         | R <sub>a</sub> 0.8 µm |
| Non product wetted surface     | Metal blank           |
| Pneumatic Actuator             | Air-to-spring         |

Certificates



\* The CE-marking is valid for a T-smart Butterfly Valve with pneumatic actuator.



| Nominal size | Pipe      |               | Actuator |        | Dimensions |         |         | Removal space |         |         | Flange width |          | Valve      |                                |
|--------------|-----------|---------------|----------|--------|------------|---------|---------|---------------|---------|---------|--------------|----------|------------|--------------------------------|
|              | Ø [mm]    | Thread        | Ø D [mm] | F [mm] | H [mm]     | H1 [mm] | H2 [mm] | X [mm]        | X1 [mm] | X2 [mm] | C3 [mm]      | C2* [mm] | KVS [m³/h] | Weight (without actuator) [kg] |
| DN 25        | 29 × 1.5  | Rd 52 × 1/8"  | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 25           | 47       | 21         | 0.9                            |
| DN 40        | 41 × 1.5  | Rd 65 × 1/8"  | 88.9     | 116    | 418.5      | 256.5   | 86.5    | 438.5         | 276.5   | 106.5   | 25           | 51       | 72         | 1.3                            |
| DN 50        | 53 × 1.5  | Rd 78 × 1/8"  | 88.9     | 116    | 427.0      | 265.0   | 95.0    | 447.0         | 285.0   | 115.0   | 25           | 53       | 130        | 1.9                            |
| DN 65        | 70 × 2.0  | Rd 95 × 1/8"  | 88.9     | 116    | 434.5      | 272.5   | 103.0   | 454.5         | 292.5   | 123.0   | 25           | 57       | 250        | 2.8                            |
| DN 80        | 85 × 2.0  | Rd 110 × 1/4" | 88.9     | 160    | 440.5      | 278.5   | 114.5   | 460.5         | 298.5   | 134.5   | 30           | 67       | 340        | 3.6                            |
| DN 100       | 104 × 2.0 | Rd 130 × 1/4" | 114.3    | 160    | 456.5      | 294.5   | 128.0   | 476.5         | 314.5   | 148.0   | 30           | 74       | 750        | 4.9                            |
| DN 125       | 129 × 2.0 | Rd 160 × 1/4" | 114.3    | 220    | 472.0      | 310.0   | 146.0   | 492.0         | 330.0   | 166.0   | 35           | 69       | 1,100      | 8.5                            |
| DN 150       | 154 × 2.0 | Rd 190 × 1/4" | 114.3    | 220    | 486.0      | 324.0   | 159.0   | 506.0         | 344.0   | 180.0   | 40           | 77       | 1,800      | 11.5                           |

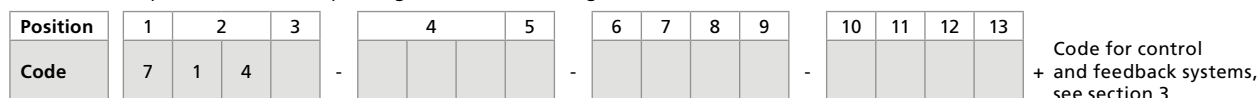
|           |             |               |       |     |       |       |       |       |       |       |    |    |     |     |
|-----------|-------------|---------------|-------|-----|-------|-------|-------|-------|-------|-------|----|----|-----|-----|
| OD 1"     | 25.4 × 1.6  | Rd 52 × 1/8"  | 88.9  | 116 | 415.0 | 253.0 | 83.0  | 435.0 | 273.0 | 103.0 | 25 | 47 | 23  | 0.9 |
| OD 1 1/2" | 38.1 × 1.6  | Rd 65 × 1/8"  | 88.9  | 116 | 420.0 | 258.0 | 88.0  | 440.0 | 278.0 | 108.0 | 25 | 51 | 87  | 1.2 |
| OD 2"     | 50.8 × 1.6  | Rd 78 × 1/8"  | 88.9  | 116 | 428.0 | 266.0 | 96.0  | 448.0 | 286.0 | 116.0 | 25 | 53 | 170 | 1.7 |
| OD 2 1/2" | 63.5 × 1.6  | Rd 95 × 1/8"  | 88.9  | 116 | 436.5 | 274.5 | 105.0 | 456.5 | 294.5 | 125.0 | 25 | 57 | 240 | 2.4 |
| OD 3"     | 76.2 × 1.6  | Rd 104 × 1/4" | 88.9  | 160 | 444.0 | 282.0 | 118.0 | 464.0 | 302.0 | 138.0 | 30 | 67 | 400 | 2.9 |
| OD 4"     | 101.6 × 2.0 | Rd 130 × 1/4" | 114.3 | 160 | 454.0 | 292.0 | 130.5 | 474.0 | 312.0 | 150.5 | 30 | 74 | 880 | 4.6 |

| Nominal size | Pipe        |               | Actuator |        | Dimensions |         |         | Removal space |         |         | Flange width |          | Valve      |                                |
|--------------|-------------|---------------|----------|--------|------------|---------|---------|---------------|---------|---------|--------------|----------|------------|--------------------------------|
|              | Ø [mm]      | Thread        | Ø D [mm] | F [mm] | H [mm]     | H1 [mm] | H2 [mm] | X [mm]        | X1 [mm] | X2 [mm] | C3 [mm]      | C2* [mm] | KVS [m³/h] | Weight (without actuator) [kg] |
| SMS 1"       | 25.4 × 1.6  | Rd 40 × 1/8"  | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 25           | 47       | 23         | 0.9                            |
| SMS 1 1/2"   | 38.1 × 1.6  | Rd 60 × 1/8"  | 88.9     | 116    | 420.0      | 258.0   | 88.0    | 440.0         | 278.0   | 108.0   | 25           | 51       | 87         | 1.2                            |
| SMS 2"       | 50.8 × 1.6  | Rd 70 × 1/8"  | 88.9     | 116    | 428.0      | 266.0   | 96.0    | 448.0         | 286.0   | 116.0   | 25           | 53       | 170        | 1.7                            |
| SMS 2 1/2"   | 63.5 × 1.6  | Rd 85 × 1/8"  | 88.9     | 116    | 436.5      | 274.5   | 105.0   | 456.5         | 294.5   | 125.0   | 25           | 57       | 240        | 2.4                            |
| SMS 3"       | 76.2 × 1.6  | Rd 98 × 1/8"  | 88.9     | 160    | 444.0      | 282.0   | 118.0   | 464.0         | 302.0   | 138.0   | 30           | 67       | 400        | 2.9                            |
| SMS 4"       | 101.6 × 2.0 | Rd 132 × 1/8" | 114.3    | 160    | 454.0      | 292.0   | 130.5   | 474.0         | 312.0   | 150.5   | 30           | 74       | 880        | 4.6                            |




\* Flange width C2 measures from center line to liner end

| Position  | Description of the order code   |
|---|---|
| 1   | <b>Valve type</b>   |
|   | 7 Butterfly Valve   |
| 2   | <b>Flange connection</b>  |
|   | 14 Weld connection/liner  |
| 3   | <b>Pipe standard</b>  |
|   | 0 OD                      1 DN                      7 SMS                   |
| 4   | <b>Nominal size</b>   |
|   | 010 OD 1"                      025 DN 25                      010 OD 1"     |
|   | 112 OD 1 ½"                      040 DN 40                      112 OD 1 ½" |
|   | 200 OD 2"                      050 DN 50                      200 OD 2"     |
|   | 212 OD 2 ½"                      065 DN 65                      212 OD 2 ½" |
|   | 300 OD 3"                      080 DN 80                      300 OD 3"     |
|   | 400 OD 4"                      100 DN 100                      400 OD 4"    |
|   |   |
|   |   |
|   |   |
|   |   |
| 5   | <b>Product wetted material</b>  |
|   | 1 AISI 304 (1.4301)<br>2 AISI 316L (1.4404)                                 |
| 6   | <b>Product wetted gasket material</b>                                       |
|   | 0 EPDM  |
|   | 1 HNBR  |
|   | 2 FKM   |
| 6 VMQ   |   |
| 7   | <b>Actuator type</b>  |
|   | 0 Manual actuator   |
|   | 1 Pneumatic for T.VIS®  |
|   | 2 Pneumatic incl. 2 proximity switch holders                                |
|   | 5 Manual actuator stepless  |
|   | 6 Manual actuator with scissors handle (up to OD 4"/DN 100)                 |
| 9 Without actuator                                  |   |
| 8   | <b>Air connection</b>   |
|   | 0 Without   |
|   | 1 Metric (only for actuator type 2)   |
|   | 2 Inch (only for actuator type 2)   |
|   | 3 Metric with air throttle (only for actuator type 2)                       |
| 4 Inch with air throttle (only for actuator type 2) |   |
| 9   | <b>Fail position of valve</b>   |
|   | 0 Closed  |
|   | 1 Open  |
| 2 Air-to-air (actuator types 1 and 2 only)          |   |
| 10  | <b>Accessories</b>  |
|   | 0 Without   |
|   | 1 Extension piece +80 mm  |
|   | 2 Lockable bracket incl. 4 proximity switch holders (actuator type 0 only)  |
|   | 3 Limit stop (actuator types 1 and 2 only)                                  |
|   | 5 Two-position stop (actuator type 2 only)                                  |
|   | 7 Booster cylinder (actuator types 1 and 2 only)                            |
| 11  | <b>Product wetted surface</b>   |
|   | 0 0.8 µm  |
|   | 1 0.4 µm  |
| 12  | <b>Certificate</b>  |
|   | 0 Without   |
|   | 1 Test report 2.2   |
|   | 2 Inspection certificate 3.1  |
| 3 Certificates 2.2 and 3.1                          |   |
| 13  | <b>ATEX approval</b>  |
|   | 0 No<br>1 Yes   |

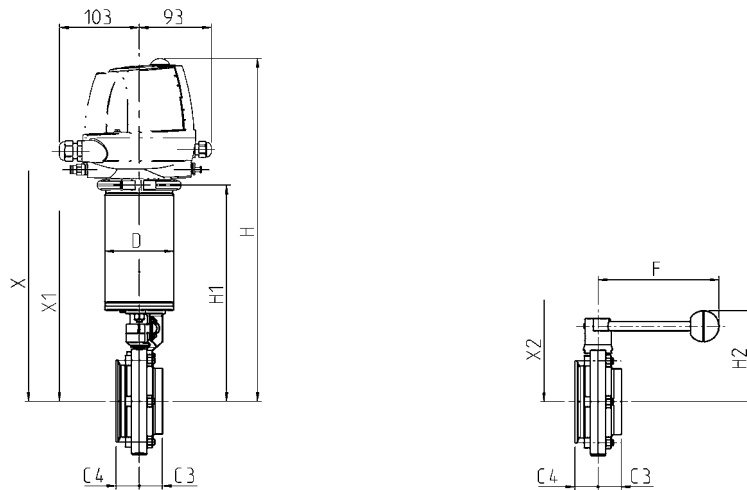
The code is composed as follows, depending on the chosen configuration:





| Technical data of the standard version |   |                      |
|--|---|----------------------|
| Standard seal outline                  | DN  | DIN 32676            |
|  | OD  | DIN 32676 / ISO 2852 |
| Standard inside diameter               | DN  | DIN 11866, series A  |
|  | OD  | DIN 11866, series C  |
| Product wetted materials               | AISI 304  |                      |
| Non product wetted materials           | AISI 304  |                      |
| Product wetted gasket material         | EPDM  |                      |
| Ambient temperature                    | 0 to 45 °C  |                      |
| Control air pressure                   | 4.8 to 8 bar  |                      |
| Max. product pressure                  | 10 bar  |                      |
| Product wetted surface                 | R <sub>a</sub> 0.8 µm   |                      |
| Non product wetted surface             | Metal blank   |                      |
| Pneumatic Actuator                     | Air-to-spring   |                      |
| Certificates                           |    |                      |

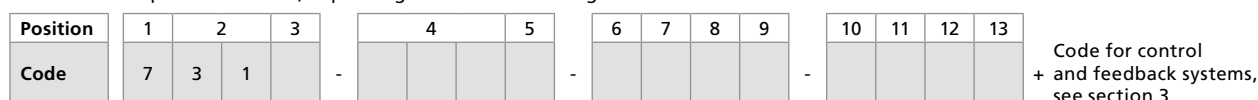
\* The CE-marking is valid for a T-smart Butterfly Valve with pneumatic actuator.






| Nominal size | Pipe        |          | Actuator |        | Dimensions |         |        | Removal space |         |         | Flange width |            | Valve                          |  |
|--------------|-------------|----------|----------|--------|------------|---------|--------|---------------|---------|---------|--------------|------------|--------------------------------|--|
|              | Ø [mm]      | Ø D [mm] | F [mm]   | H [mm] | H1 [mm]    | H2 [mm] | X [mm] | X1 [mm]       | X2 [mm] | C3 [mm] | C4 [mm]      | KVS [m³/h] | Weight (without actuator) [kg] |  |
| DN 25        | 29 × 1.5    | 88.9     | 116      | 415.0  | 253.0      | 83.0    | 435.0  | 273.0         | 103.0   | 25      | 40           | 21         | 0.8                            |  |
| DN 40        | 41 × 1.5    | 88.9     | 116      | 418.5  | 256.5      | 86.5    | 438.5  | 276.5         | 106.5   | 25      | 30           | 72         | 0.9                            |  |
| DN 50        | 53 × 1.5    | 88.9     | 116      | 427.0  | 265.0      | 95.0    | 447.0  | 285.0         | 115.0   | 25      | 30           | 130        | 1.2                            |  |
| DN 65        | 70 × 2.0    | 88.9     | 116      | 434.5  | 272.5      | 103.0   | 454.5  | 292.5         | 123.0   | 25      | 30           | 250        | 1.7                            |  |
| DN 80        | 85 × 2.0    | 88.9     | 160      | 440.5  | 278.5      | 114.5   | 460.5  | 298.5         | 134.5   | 30      | 30           | 340        | 2.1                            |  |
| DN 100       | 104 × 2.0   | 114.3    | 160      | 456.5  | 294.5      | 128.0   | 476.5  | 314.5         | 148.0   | 30      | 30           | 750        | 2.6                            |  |
| OD 1"        | 25.4 × 1.6  | 88.9     | 116      | 415.0  | 253.0      | 83.0    | 435.0  | 273.0         | 103.0   | 25      | 40           | 23         | 0.9                            |  |
| OD 1 ½"      | 38.1 × 1.6  | 88.9     | 116      | 420.0  | 258.0      | 88.0    | 440.0  | 278.0         | 108.0   | 25      | 30           | 87         | 0.8                            |  |
| OD 2"        | 50.8 × 1.6  | 88.9     | 116      | 428.0  | 266.0      | 96.0    | 448.0  | 286.0         | 116.0   | 25      | 30           | 170        | 1.2                            |  |
| OD 2 ½"      | 63.5 × 1.6  | 88.9     | 116      | 436.5  | 274.5      | 105.0   | 456.5  | 294.5         | 125.0   | 25      | 30           | 240        | 1.5                            |  |
| OD 3"        | 76.2 × 1.6  | 88.9     | 160      | 444.0  | 282.0      | 118.0   | 464.0  | 302.0         | 138.0   | 30      | 30           | 400        | 1.9                            |  |
| OD 4"        | 101.6 × 2.0 | 114.3    | 160      | 454.0  | 292.0      | 130.5   | 474.0  | 312.0         | 150.5   | 30      | 30           | 880        | 3.0                            |  |

| Position  | Description of the order code  |
|---|--|
| 1   | <b>Valve type</b>  |
|   | 7 Butterfly Valve  |
| 2   | <b>Flange connection</b>   |
|   | 31 Clamp flange/weld connection  |
| 3   | <b>Pipe standard</b>   |
|   | 0 OD   1 DN  |
| 4   | <b>Nominal size</b>  |
|   | 010 OD 1"   025 DN 25  |
|   | 112 OD 1 ½"   040 DN 40  |
|   | 200 OD 2"   050 DN 50  |
|   | 212 OD 2 ½"   065 DN 65  |
|   | 300 OD 3"   080 DN 80  |
|   | 400 OD 4"   100 DN 100   |
|   |  |
| 5   | <b>Product wetted material</b>   |
|   | 1 AISI 304 (1.4301)  |
|   | 2 AISI 316L (1.4404)   |
| 6   | <b>Product wetted gasket material</b>                                      |
|   | 0 EPDM   |
|   | 1 HNBR   |
|   | 2 FKM  |
|   | 6 VMQ  |
| 7   | <b>Actuator type</b>   |
|   | 0 Manual actuator  |
|   | 1 Pneumatic for T.VIS <sup>®</sup>   |
|   | 2 Pneumatic incl. 2 proximity switch holders                               |
|   | 5 Manual actuator stepless   |
|   | 6 Manual actuator with scissors handle (up to OD 4"/DN 100)                |
|   | 9 Without actuator   |
| 8   | <b>Air connection</b>  |
|   | 0 Without  |
|   | 1 Metric (only for actuator type 2)  |
|   | 2 Inch (only for actuator type 2)  |
|   | 3 Metric with air throttle (only for actuator type 2)                      |
| 4 Inch with air throttle (only for actuator type 2) |  |
| 9   | <b>Fail position of valve</b>  |
|   | 0 Closed   |
|   | 1 Open   |
|   | 2 Air-to-air (actuator types 1 and 2 only)                                 |
| 10  | <b>Accessories</b>   |
|   | 0 Without  |
|   | 1 Extension piece +80 mm   |
|   | 2 Lockable bracket incl. 4 proximity switch holders (actuator type 0 only) |
|   | 3 Limit stop (actuator types 1 and 2 only)                                 |
|   | 5 Two-position stop (actuator type 2 only)                                 |
|   | 7 Booster cylinder (actuator types 1 and 2 only)                           |
| 11  | <b>Product wetted surface</b>  |
|   | 0 0.8 µm   |
|   | 1 0.4 µm   |
| 12  | <b>Certificate</b>   |
|   | 0 Without  |
|   | 1 Test report 2.2  |
|   | 2 Inspection certificate 3.1   |
|   | 3 Certificates 2.2 and 3.1   |
| 13  | <b>ATEX approval</b>   |
|   | 0 No   |
|   | 1 Yes  |

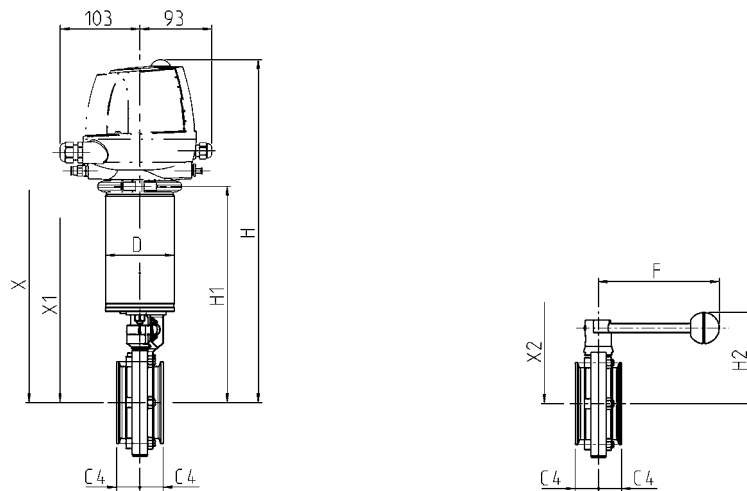
The code is composed as follows, depending on the chosen configuration:





| Technical data of the standard version |   |                      |
|--|---|----------------------|
| Standard seal outline                  | DN  | DIN 32676            |
|  | OD  | DIN 32676 / ISO 2852 |
| Standard inside diameter               | DN  | DIN 11866, series A  |
|  | OD  | DIN 11866, series C  |
| Product wetted materials               | AISI 304  |                      |
| Non product wetted materials           | AISI 304  |                      |
| Product wetted gasket material         | EPDM  |                      |
| Ambient temperature                    | 0 to 45 °C  |                      |
| Control air pressure                   | 4.8 to 8 bar  |                      |
| Max. product pressure                  | 10 bar  |                      |
| Product wetted surface                 | R <sub>a</sub> 0.8 µm   |                      |
| Non product wetted surface             | Metal blank   |                      |
| Pneumatic Actuator                     | Air-to-spring   |                      |
| Certificates                           |    |                      |

\* The CE-marking is valid for a T-smart Butterfly Valve with pneumatic actuator.



| Nominal size | Pipe        |          | Actuator |        | Dimensions |         |         | Removal space |         |         | Flange width | Valve      |                                |
|--------------|-------------|----------|----------|--------|------------|---------|---------|---------------|---------|---------|--------------|------------|--------------------------------|
|              | Ø [mm]      | Ø D [mm] | Ø D [mm] | F [mm] | H [mm]     | H1 [mm] | H2 [mm] | X [mm]        | X1 [mm] | X2 [mm] | C4 [mm]      | KVS [m³/h] | Weight (without actuator) [kg] |
| DN 25        | 29 × 1.5    | 88.9     | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 40           | 21         | 1.0                            |
| DN 40        | 41 × 1.5    | 88.9     | 88.9     | 116    | 418.5      | 256.5   | 86.5    | 438.5         | 276.5   | 106.5   | 30           | 72         | 0.9                            |
| DN 50        | 53 × 1.5    | 88.9     | 88.9     | 116    | 427.0      | 265.0   | 95.0    | 447.0         | 285.0   | 115.0   | 30           | 130        | 1.3                            |
| DN 65        | 70 × 2.0    | 88.9     | 88.9     | 116    | 434.5      | 272.5   | 103.0   | 454.5         | 292.5   | 123.0   | 30           | 250        | 1.9                            |
| DN 80        | 85 × 2.0    | 88.9     | 88.9     | 160    | 440.5      | 278.5   | 114.5   | 460.5         | 298.5   | 134.5   | 30           | 340        | 2.3                            |
| DN 100       | 104 × 2.0   | 114.3    | 114.3    | 160    | 456.5      | 294.5   | 128.0   | 476.5         | 314.5   | 148.0   | 30           | 750        | 2.7                            |
| OD 1"        | 25.4 × 1.6  | 88.9     | 88.9     | 116    | 415.0      | 253.0   | 83.0    | 435.0         | 273.0   | 103.0   | 40           | 23         | 1.1                            |
| OD 1 ½"      | 38.1 × 1.6  | 88.9     | 88.9     | 116    | 420.0      | 258.0   | 88.0    | 440.0         | 278.0   | 108.0   | 30           | 87         | 0.9                            |
| OD 2"        | 50.8 × 1.6  | 88.9     | 88.9     | 116    | 428.0      | 266.0   | 96.0    | 448.0         | 286.0   | 116.0   | 30           | 170        | 1.3                            |
| OD 2 ½"      | 63.5 × 1.6  | 88.9     | 88.9     | 116    | 436.5      | 274.5   | 105.0   | 456.5         | 294.5   | 125.0   | 30           | 240        | 1.6                            |
| OD 3"        | 76.2 × 1.6  | 88.9     | 88.9     | 160    | 444.0      | 282.0   | 118.0   | 464.0         | 302.0   | 138.0   | 30           | 400        | 2.0                            |
| OD 4"        | 101.6 × 2.0 | 114.3    | 114.3    | 160    | 454.0      | 292.0   | 130.5   | 474.0         | 312.0   | 150.5   | 30           | 880        | 3.1                            |

Clamp Flange/Clamp Flange 733




| Position  | Description of the order code  |
|---|--|
| 1   | <b>Valve type</b>  |
|   | 7 Butterfly Valve  |
| 2   | <b>Flange connection</b>   |
|   | 33 Clamp flange/clamp flange   |
| 3   | <b>Pipe standard</b>   |
|   | 0 OD   1 DN  |
| 4   | <b>Nominal size</b>  |
|   | 010 OD 1"   025 DN 25  |
|   | 112 OD 1 ½"   040 DN 40  |
|   | 200 OD 2"   050 DN 50  |
|   | 212 OD 2 ½"   065 DN 65  |
|   | 300 OD 3"   080 DN 80  |
|   | 400 OD 4"   100 DN 100   |
| 5   | <b>Product wetted material</b>   |
|   | 1 AISI 304 (1.4301)  |
|   | 2 AISI 316L (1.4404)   |
| 6   | <b>Product wetted gasket material</b>                                      |
|   | 0 EPDM   |
|   | 1 HNBR   |
|   | 2 FKM  |
|   | 6 VMQ  |
| 7   | <b>Actuator type</b>   |
|   | 0 Manual actuator  |
|   | 1 Pneumatic for T.VIS®   |
|   | 2 Pneumatic incl. 2 proximity switch holders                               |
|   | 5 Manual actuator stepless   |
|   | 6 Manual actuator with scissors handle (up to OD 4"/DN 100)                |
| 9 Without actuator                                  |  |
| 8   | <b>Air connection</b>  |
|   | 0 Without  |
|   | 1 Metric (only for actuator type 2)  |
|   | 2 Inch (only for actuator type 2)  |
|   | 3 Metric with air throttle (only for actuator type 2)                      |
| 4 Inch with air throttle (only for actuator type 2) |  |
| 9   | <b>Fail position of valve</b>  |
|   | 0 Closed   |
|   | 1 Open   |
| 2 Air-to-air (actuator types 1 and 2 only)          |  |
| 10  | <b>Accessories</b>   |
|   | 0 Without  |
|   | 1 Extension piece +80 mm   |
|   | 2 Lockable bracket incl. 4 proximity switch holders (actuator type 0 only) |
|   | 3 Limit stop (actuator types 1 and 2 only)                                 |
|   | 5 Two-position stop (actuator type 2 only)                                 |
|   | 7 Booster cylinder (actuator types 1 and 2 only)                           |
| 11  | <b>Product wetted surface</b>  |
|   | 0 0.8 µm   |
|   | 1 0.4 µm   |
| 12  | <b>Certificate</b>   |
|   | 0 Without  |
|   | 1 Test report 2.2  |
|   | 2 Inspection certificate 3.1   |
| 3 Certificates 2.2 and 3.1                          |  |
| 13  | <b>ATEX approval</b>   |
|   | 0 No   |
| 1 Yes   |  |

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

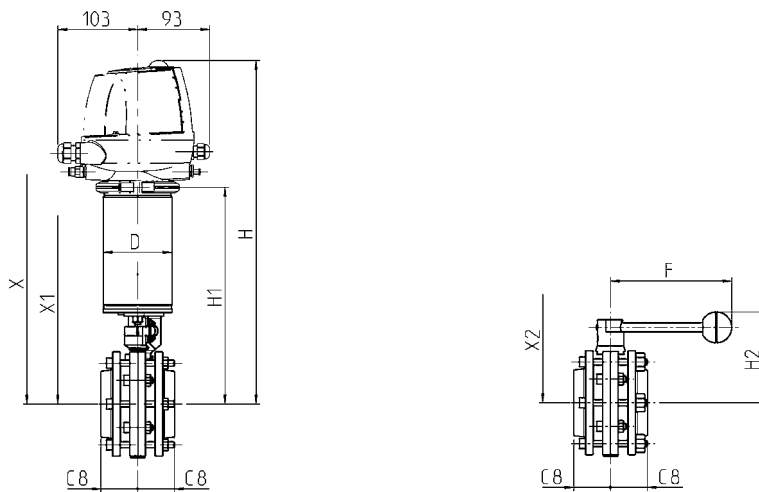
|                 |   |   |   |   |   |   |  |   |   |   |   |   |    |    |    |    |  |
|-----------------|---|---|---|---|---|---|--|---|---|---|---|---|----|----|----|----|--|
| <b>Position</b> | 1 | 2 | 3 |   | 4 | 5 |  | 6 | 7 | 8 | 9 |   | 10 | 11 | 12 | 13 |  |
| <b>Code</b>     | 7 | 3 | 3 | - |   |   |  |   |   |   |   | - |    |    |    |    | + Code for control and feedback systems, see section 3 |





| Technical data of the standard version |   |
|--|---|
| Product wetted materials               | AISI 304  |
| Non product wetted materials           | AISI 304  |
| Product wetted gasket material         | EPDM  |
| Ambient temperature                    | 0 to 45 °C  |
| Control air pressure                   | 4.8 to 8 bar  |
| Max. product pressure                  | 10 bar  |
| Product wetted surface                 | R <sub>a</sub> 0.8 µm   |
| Non product wetted surface             | Metal blank   |
| Pneumatic Actuator                     | Air-to-spring   |
| Certificates                           |    |

\* The CE-marking is valid for a T-smart Butterfly Valve with pneumatic actuator.



| Nominal size | Pipe        |          | Actuator |        | Dimensions |         |        | Removal space |         |         | Flange width | Valve                          |  |
|--------------|-------------|----------|----------|--------|------------|---------|--------|---------------|---------|---------|--------------|--------------------------------|--|
|              | Ø [mm]      | Ø D [mm] | F [mm]   | H [mm] | H1 [mm]    | H2 [mm] | X [mm] | X1 [mm]       | X2 [mm] | C8 [mm] | KVS [m³/h]   | Weight (without actuator) [kg] |  |
| DN 15        | 19 × 1.5    | 88.9     | 116      | 415.0  | 253.0      | 83.0    | 435.0  | 273.0         | 103.0   | 47.5    | 10.0         | 1.6                            |  |
| DN 20        | 23 × 1.5    | 88.9     | 116      | 415.0  | 253.0      | 83.0    | 435.0  | 273.0         | 103.0   | 47.5    | 12.0         | 1.6                            |  |
| DN 25        | 29 × 1.5    | 88.9     | 116      | 415.0  | 253.0      | 83.0    | 435.0  | 273.0         | 103.0   | 47.5    | 21.0         | 1.5                            |  |
| DN 40        | 41 × 1.5    | 88.9     | 116      | 418.5  | 256.5      | 86.5    | 438.5  | 276.5         | 106.5   | 47.5    | 72.0         | 1.8                            |  |
| DN 50        | 53 × 1.5    | 88.9     | 116      | 427.0  | 265.0      | 95.0    | 447.0  | 285.0         | 115.0   | 47.5    | 130.0        | 2.4                            |  |
| DN 65        | 70 × 2.0    | 88.9     | 116      | 434.5  | 272.5      | 103.0   | 454.5  | 292.5         | 123.0   | 47.5    | 250.0        | 3.2                            |  |
| DN 80        | 85 × 2.0    | 88.9     | 160      | 440.5  | 278.5      | 114.5   | 460.5  | 298.5         | 134.5   | 47.5    | 340.0        | 3.8                            |  |
| DN 100       | 104 × 2.0   | 114.3    | 160      | 456.5  | 294.5      | 128.0   | 476.5  | 314.5         | 148.0   | 47.5    | 750.0        | 4.7                            |  |
| DN 125       | 129 × 2.0   | 114.3    | 220      | 472.0  | 310.0      | 146.0   | 492.0  | 330.0         | 166.0   | 55.0    | 1,100.0      | 8.7                            |  |
| DN 150       | 154 × 2.0   | 114.3    | 220      | 486.0  | 324.0      | 159.0   | 506.0  | 344.0         | 180.0   | 60.0    | 1,800.0      | 12.2                           |  |
| OD ½"        | 12.7 × 1.6  | 88.9     | 116      | 415.0  | 253.0      | 83.0    | 435.0  | 273.0         | 103.0   | 47.5    | 3.5          | 1.6                            |  |
| OD ¾"        | 19.05 × 1.6 | 88.9     | 116      | 415.0  | 253.0      | 83.0    | 435.0  | 273.0         | 103.0   | 47.5    | 10.0         | 1.6                            |  |
| OD 1"        | 25.4 × 1.6  | 88.9     | 116      | 415.0  | 253.0      | 83.0    | 435.0  | 273.0         | 103.0   | 47.5    | 23.0         | 1.6                            |  |
| OD 1 ½"      | 38.1 × 1.6  | 88.9     | 116      | 420.0  | 258.0      | 88.0    | 440.0  | 278.0         | 108.0   | 47.5    | 87.0         | 1.7                            |  |
| OD 2"        | 50.8 × 1.6  | 88.9     | 116      | 428.0  | 266.0      | 96.0    | 448.0  | 286.0         | 116.0   | 47.5    | 170.0        | 2.3                            |  |
| OD 2 ½"      | 63.5 × 1.6  | 88.9     | 116      | 436.5  | 274.5      | 105.0   | 456.5  | 294.5         | 125.0   | 47.5    | 240.0        | 3.1                            |  |
| OD 3"        | 76.2 × 1.6  | 88.9     | 160      | 444.0  | 282.0      | 118.0   | 464.0  | 302.0         | 138.0   | 47.5    | 400.0        | 3.5                            |  |
| OD 4"        | 101.6 × 2.0 | 114.3    | 160      | 454.0  | 292.0      | 130.5   | 474.0  | 312.0         | 150.5   | 47.5    | 880.0        | 5.3                            |  |





| Position | Description of the order code         |  |
|----------|---------------------------------------|--|
| 1        | <b>Valve type</b>                     |  |
|          | 7                                     | Butterfly Valve  |
| 2        | <b>Flange connection</b>              |  |
|          | 88                                    | Intermediate flange variant  |
| 3        | <b>Pipe standard</b>                  |  |
|          | 0                                     | OD   |
|          | 1                                     | DN   |
| 4        | <b>Nominal size</b>                   |  |
|          | 012                                   | OD ½"  |
|          | 015                                   | DN 15  |
|          | 075                                   | OD ¾"  |
|          | 020                                   | DN 20  |
|          | 010                                   | OD 1"  |
|          | 025                                   | DN 25  |
|          | 112                                   | OD 1 ½"  |
|          | 040                                   | DN 40  |
|          | 200                                   | OD 2"  |
|          | 050                                   | DN 50  |
|          | 212                                   | OD 2 ½"  |
|          | 065                                   | DN 65  |
|          | 300                                   | OD 3"  |
|          | 080                                   | DN 80  |
|          | 400                                   | OD 4"  |
|          | 100                                   | DN 100   |
|          | 125                                   | DN 125   |
|          | 150                                   | DN 150   |
| 5        | <b>Product wetted material</b>        |  |
|          | 1                                     | AISI 304 (1.4301)  |
|          | 2                                     | AISI 316L (1.4404)   |
| 6        | <b>Product wetted gasket material</b> |  |
|          | 0                                     | EPDM   |
|          | 1                                     | HNBR   |
|          | 2                                     | FKM  |
|          | 6                                     | VMQ  |
| 7        | <b>Actuator type</b>                  |  |
|          | 0                                     | Manual actuator  |
|          | 1                                     | Pneumatic for T.VIS®   |
|          | 2                                     | Pneumatic incl. 2 proximity switch holders                               |
|          | 5                                     | Manual actuator stepless   |
|          | 6                                     | Manual actuator with scissors handle (up to OD 4"/DN 100)                |
|          | 9                                     | Without actuator   |
| 8        | <b>Air connection</b>                 |  |
|          | 0                                     | Without  |
|          | 1                                     | Metric (only for actuator type 2)  |
|          | 2                                     | Inch (only for actuator type 2)  |
|          | 3                                     | Metric with air throttle (only for actuator type 2)                      |
|          | 4                                     | Inch with air throttle (only for actuator type 2)                        |
| 9        | <b>Fail position of valve</b>         |  |
|          | 0                                     | Closed   |
|          | 1                                     | Open   |
|          | 2                                     | Air-to-air (actuator types 1 and 2 only)                                 |
| 10       | <b>Accessories</b>                    |  |
|          | 0                                     | Without  |
|          | 1                                     | Extension piece +80 mm   |
|          | 2                                     | Lockable bracket incl. 4 proximity switch holders (actuator type 0 only) |
|          | 3                                     | Limit stop (actuator types 1 and 2 only)                                 |
|          | 5                                     | Two-position stop (actuator type 2 only)                                 |
|          | 7                                     | Booster cylinder (actuator types 1 and 2 only)                           |
| 11       | <b>Product wetted surface</b>         |  |
|          | 0                                     | 0.8 µm   |
|          | 1                                     | 0.4 µm   |
| 12       | <b>Certificate</b>                    |  |
|          | 0                                     | Without  |
|          | 1                                     | Test report 2.2  |
|          | 2                                     | Inspection certificate 3.1   |
|          | 3                                     | Certificates 2.2 and 3.1   |
| 13       | <b>ATEX approval</b>                  |  |
|          | 0                                     | No   |
|          | 1                                     | Yes  |

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

|          |   |   |   |   |  |   |   |   |   |   |    |    |    |    |
|----------|---|---|---|---|--|---|---|---|---|---|----|----|----|----|
| Position | 1 | 2 | 3 | 4 |  | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| Code     | 7 | 8 | 8 |   |  |   |   |   |   |   |    |    |    |    |

+ Code for control and feedback systems, see section 3



| Manual actuator |              |   |                   |            |
|-----------------|--------------|---|-------------------|------------|
| <b>Material</b> |              | AISI 304 and phenolic resin (ball head) |                   |            |
| Dimensions      |              |   |                   |            |
| Nominal size    | OD/SMS<br>DN | ½" – 2 ½"<br>15–65                      | 3" – 4"<br>80–100 | 125–150    |
| Length of lever |              | 116 mm                                  | 160 mm            | 220 mm     |
| Weight          |              | 0.3 kg                                  | 0.4 kg            | 0.4 kg     |
| Article No.     |              | 224-001054                              | 224-001055        | 224-001056 |



| Pneumatic actuator with and without T.VIS®        |               |                    |            |              |            |
|---|---------------|--------------------|------------|--------------|------------|
| <b>Actuator type</b>                              |               | Air-to-spring      |            | Air-to-air   |            |
| <b>Material</b>                                   |               | AISI 304           |            | AISI 304     |            |
| <b>Ambient temperature</b>                        |               | 0 to 45 °C         |            | 0 to 45 °C   |            |
| <b>Control air pressure</b>                       |               | 4.8 to 8 bar       |            | 4.0 to 8 bar |            |
| <b>Surface</b>                                    |               | Metal blank        |            | Metal blank  |            |
| Dimensions  |               |                    |            |              |            |
| Nominal size                                      | OD/SMS<br>DN  | ½" – 2 ½"<br>15–65 | 3"<br>80   | 4"<br>100    | 125–150    |
| Ø Cylinder pipe                                   | Air-to-spring | 88.9 mm            | 88.9 mm    | 114.3 mm     | 114.3 mm   |
|   | Air-to-air    | 88.9 mm            | 88.9 mm    | 88.9 mm      | 88.9 mm    |
| Diameter Connection plate<br>(use without T.VIS®) |               | 97 mm              | 97 mm      | 97 mm        | 97 mm      |
| H   |               | 223.0 mm           | 223.0 mm   | 223.0 mm     | 223.0 mm   |
| Weight  | Air-to-spring | 4.1 kg             | 4.1 kg     | 5.5 kg       | 5.5 kg     |
|   | Air-to-air    | 2.9 kg             | 2.9 kg     | 2.9 kg       | 2.9 kg     |
| Article No  | Air-to-spring | 224-001503         | 224-001505 | 224-001660   | 224-001509 |
|   | Air-to-air    | 224-001504         | 224-001506 | 224-001506   | 224-001508 |



| Manual actuator stepless   |              |                    |                   |            |
|--|--------------|--------------------|-------------------|------------|
| <b>Material</b>  | AISI 304     |                    |                   |            |
| <p>With the stepless actuator it is possible to adjust the butterfly valve disk at any possible position. It can be loosened and tightened by hand via turning the knob.</p> |              |                    |                   |            |
| Dimensions   |              |                    |                   |            |
| Nominal size   | OD/SMS<br>DN | ½" – 2 ½"<br>15–65 | 3" – 4"<br>80–100 | 125–150    |
| Length of lever  |              | 109 mm             | 154 mm            | 154 mm     |
| Weight   |              | 0.6 kg             | 0.6 kg            | 0.6 kg     |
| Article No.  |              | 224-000235         | 224-000236        | 224-000237 |



| Manual actuator scissors handle   |              |                    |                   |
|---|--------------|--------------------|-------------------|
| <b>Material</b>   | AISI CF-8    |                    |                   |
| <p>The scissors handle allows the user to adjust the butterfly valve disk at several positions. Through the gear wheel the disk can be set every 15°.</p> |              |                    |                   |
| Dimensions  |              |                    |                   |
| Nominal size  | OD/SMS<br>DN | ½" – 2 ½"<br>15–65 | 3" – 4"<br>80–100 |
| Length of lever   |              | 162 mm             | 162 mm            |
| Weight  |              | 0.5 kg             | 0.5 kg            |
| Article No.   |              | 224-000544         | 224-000545        |

| Position  | Description of the order code  |            |             |
|---|--|------------|-------------|
| 1   | <b>Valve type</b>  |            |             |
|   | 7 Butterfly Valve  |            |             |
| 2   | <b>Flange connection</b>   |            |             |
|   | 99 Actuator only   |            |             |
| 3   | <b>Pipe standard</b>   |            |             |
|   | 0 OD   | 1 DN       | 7 SMS       |
|   |  |            |             |
| 4   | <b>Nominal size</b>  |            |             |
|   | 012 OD ½"  | 015 DN 15  |             |
|   | 075 OD ¾"  | 020 DN 20  |             |
|   | 010 OD 1"  | 025 DN 25  | 010 OD 1"   |
|   | 112 OD 1 ½"  | 040 DN 40  | 112 OD 1 ½" |
|   | 200 OD 2"  | 050 DN 50  | 200 OD 2"   |
|   | 212 OD 2 ½"  | 065 DN 65  | 212 OD 2 ½" |
|   | 300 OD 3"  | 080 DN 80  | 300 OD 3"   |
|   | 400 OD 4"  | 100 DN 100 | 400 OD 4"   |
|   |  | 125 DN 125 |             |
|   |  | 150 DN 150 |             |
| 5   | <b>Product wetted material</b>   |            |             |
|   | 9 Not applicable   |            |             |
| 6   | <b>Product wetted gasket material</b>                                      |            |             |
|   | 9 Not applicable   |            |             |
| 7   | <b>Actuator type</b>   |            |             |
|   | 0 Manual actuator  |            |             |
|   | 1 Pneumatic for T.VIS®   |            |             |
|   | 2 Pneumatic incl. 2 proximity switch holders                               |            |             |
|   | 5 Manual actuator stepless   |            |             |
|   | 6 Manual actuator with scissors handle (up to OD 4"/DN 100)                |            |             |
| 8   | <b>Air connection</b>  |            |             |
|   | 0 Without  |            |             |
|   | 1 Metric (only for actuator type 2)  |            |             |
|   | 2 Inch (only for actuator type 2)  |            |             |
|   | 3 Metric with air throttle (only for actuator type 2)                      |            |             |
| 4 Inch with air throttle (only for actuator type 2) |  |            |             |
| 9   | <b>Fail position of valve</b>  |            |             |
|   | 0 Closed   |            |             |
|   | 1 Open   |            |             |
| 2 Air-to-air (actuator types 1 and 2 only)          |  |            |             |
| 10  | <b>Accessories</b>   |            |             |
|   | 0 Without  |            |             |
|   | 1 Extension piece +80 mm   |            |             |
|   | 2 Lockable bracket incl. 4 proximity switch holders (actuator type 0 only) |            |             |
|   | 3 Limit stop (actuator types 1 and 2 only)                                 |            |             |
|   | 5 Two-position stop (actuator type 2 only)                                 |            |             |
|   | 7 Booster cylinder (actuator types 1 and 2 only)                           |            |             |
| 11  | <b>Product wetted surface</b>  |            |             |
|   | 9 Not applicable   |            |             |
| 12  | <b>Certificate</b>   |            |             |
|   | 0 Without  |            |             |
| 13  | <b>ATEX approval</b>   |            |             |
|   | 0 No   |            |             |
| 1 Yes   |  |            |             |



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

| Position | 1 | 2 | 3 |   | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |  |
|----------|---|---|---|---|---|---|---|---|---|---|----|----|----|----|--|
| Code     | 7 | 9 | 9 | - |   | 9 | - | 9 |   |   | -  | 9  | 0  |    | + Code for control and feedback systems, see section 3 |



### Extension piece

To encapsulate the valve together with the pipe the actuator interface needs to be relocated to the outside. The extension piece for all actuator types shifts the actuator 80 mm to the outside.

| Technical data |              |                          |                     |            |
|----------------|--------------|--------------------------|---------------------|------------|
| Material       |              | AISI 304                 |                     |            |
| Surface        |              | Metal blank              |                     |            |
| Dimensions     |              |                          |                     |            |
| Nominal size   | OD/SMS<br>DN | 1/2" – 2 1/2"<br>15 – 65 | 3" – 4"<br>80 – 100 | 125 – 150  |
| H              |              | 80 mm                    | 80 mm               | 80 mm      |
| Weight         |              | 0.8 kg                   | 0.8 kg              | 0.8 kg     |
| Article No.    |              | 224-001241               | 224-001242          | 224-001243 |



### Lockable bracket incl. 4 proximity switch holders

The fit-on bracket offers two horizontal and two vertical mounting options, which means up to eight different configurations for mounting proximity in M12x1 size. The bracket also features an eyelet to fit a padlock in order to secure the mechanical standard manual actuator in closed valve position. The depicted padlock is merely an example.

| Technical data |              |                          |                     |            |
|----------------|--------------|--------------------------|---------------------|------------|
| Material       |              | PA12                     |                     |            |
| Dimensions     |              |                          |                     |            |
| Nominal size   | OD/SMS<br>DN | 1/2" – 2 1/2"<br>15 – 65 | 3" – 4"<br>80 – 100 | 125 – 150  |
| Weight         |              | 36 g                     | 42 g                | 42 g       |
| Article No.    |              | 224-001057               | 224-001058          | 224-001058 |



### Limit stop

The mechanically adjustable limit stop is used to limit the stroke length of a butterfly valve. Both the opening and the closing stroke can be adjusted individually and separately.

| Technical data |              |                          |                     |            |
|----------------|--------------|--------------------------|---------------------|------------|
| Material       |              | AISI 304                 |                     |            |
| Surface        |              | Metal blank              |                     |            |
| Dimensions     |              |                          |                     |            |
| Nominal size   | OD/SMS<br>DN | 1/2" – 2 1/2"<br>15 – 65 | 3" – 4"<br>80 – 100 | 125 – 150  |
| H              |              | 182 mm                   | 182 mm              | 182 mm     |
| Weight         |              | 1.5 kg                   | 1.5 kg              | 1.5 kg     |
| Article No.    |              | 224-001249               | 224-001249          | 224-001249 |



### Limit stop for control and feedback system

The mechanically adjustable limit stop is used to limit the stroke length of a butterfly valve. Both the opening and the closing stroke can be adjusted individually and separately. This variant includes the T.VIS® connection for mounting a control and feedback system.

| Technical data     |              |                    |                   |            |
|--------------------|--------------|--------------------|-------------------|------------|
| Material           | AISI 304     |                    |                   |            |
| Surface            | Metal blank  |                    |                   |            |
| Dimensions         |              |                    |                   |            |
| Nominal size       | OD/SMS<br>DN | ½" – 2 ½"<br>15–65 | 3" – 4"<br>80–100 | 125–150    |
| H (without T.VIS®) |              | 103 mm             | 103 mm            | 103 mm     |
| Weight             |              | 1.7 kg             | 1.7 kg            | 1.7 kg     |
| Article No.        |              | 224-001250         | 224-001250        | 224-001250 |



### Two-position stop

Using a two-position stop, a pneumatically controlled valve can be driven – in addition to the opened and closed position – into one partial opening position with individually adjustable mechanical stop. Actuation is accomplished through a second air connection. The installation of a control and feedback system on the two-position stop is not possible.

| Technical data |              |                    |                   |            |
|----------------|--------------|--------------------|-------------------|------------|
| Material       | AISI 304     |                    |                   |            |
| Surface        | Metal blank  |                    |                   |            |
| Dimensions     |              |                    |                   |            |
| Nominal size   | OD/SMS<br>DN | ½" – 2 ½"<br>15–65 | 3" – 4"<br>80–100 | 125–150    |
| H              |              | 225 mm             | 225 mm            | 225 mm     |
| Weight         |              | 3.3 kg             | 3.3 kg            | 3.3 kg     |
| Article No.    |              | 224-001017         | 224-001017        | 224-001017 |



### Booster cylinder

The booster cylinder is used for enlarging the piston surface area that allows to open or close the valve with a lower air pressure. The booster cylinder can only be used with the air / spring actuator.

| Technical data                        |              |                    |                   |              |
|---------------------------------------|--------------|--------------------|-------------------|--------------|
| Material                              | AISI 304     |                    |                   |              |
| Surface                               | Metal blank  |                    |                   |              |
| Dimensions                            |              |                    |                   |              |
| Nominal size                          | OD/SMS<br>DN | ½" – 2 ½"<br>15–65 | 3" – 4"<br>80–100 | 125–150      |
| H                                     |              | 95 mm              | 95 mm             | 95 mm        |
| Weight                                |              | 2.3 kg             | 2.3 kg            | 2.3 kg       |
| Requested control air pressure (min.) |              | 3 bar/44 psi       | 3 bar/44 psi      | 3 bar/44 psi |
| Requested control air pressure (max.) |              | 4 bar/58 psi       | 4 bar/58 psi      | 4 bar/58 psi |
| Article No.                           |              | 224-001258         | 224-001258        | 224-001258   |





**Typical application and description**

If no alternative identification option is selected, the pneumatically activated valves are always provided with a nameplate for clear identification (option /52\*). All key information required for clear allocation of the valve, as well as technical data, is specified on the nameplate. The plate is glued onto the actuator. If the required identification number is specified, this is allocated to the valve by means of a separate sticker on the actuator or control and feedback system.

| Key data contained                    |                                   |
|---------------------------------------|-----------------------------------|
| Valve type                            |                                   |
| Serial number                         |                                   |
| Materials in contact with the product | Metallic material / seal material |
| Air supply pressure                   | Min./Max. [bar/psi]               |
| Product pressure                      | [bar/psi]                         |



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

In addition to the nameplate, the option /50 consists of an engraved labeling plate attached either to the bracket or to the handle using a key ring.



**Option /51\* – metal labeling plate US version cpl.**

The engraved labeling plate is attached either to the bracket or to the handle using a key ring. Additional information can be recorded as well as the TAG number, customer designation and the valve type. In addition, pneumatic valves are identified with a nameplate.

\* The option number is added to the end of the order code.

Seal kits for Butterfly Valves T-smart 711, 721, 722, 724, 714, 731, 733

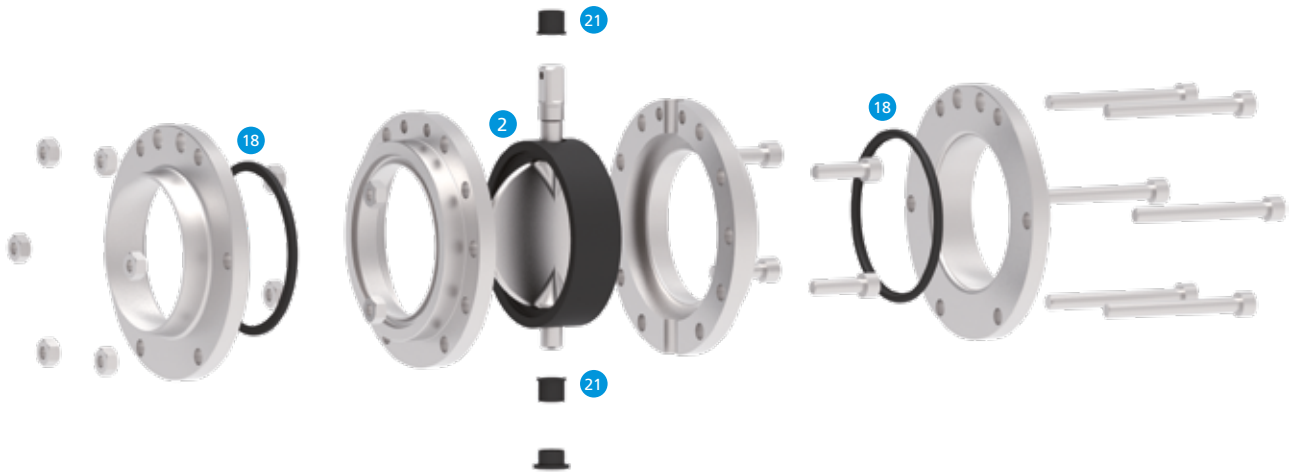


| Included in the seal kit |          |                        |
|--------------------------|----------|------------------------|
| Position                 | Quantity | Designation            |
| 2                        | 1        | Butterfly valve gasket |
| 21                       | 2        | Bearings               |

|              |      | EPDM        | HNBR        | FKM         | VMQ         |
|--------------|------|-------------|-------------|-------------|-------------|
| Nominal size |      | Article No. | Article No. | Article No. | Article No. |
| DN           | 15   | 224-001332  | 224-001334  | 224-001333  | 224-001335  |
| DN           | 20   | 224-001332  | 224-001334  | 224-001333  | 224-001335  |
| DN           | 25   | 224-001300  | 224-001302  | 224-001301  | 224-001303  |
| DN           | 40   | 224-001304  | 224-001306  | 224-001305  | 224-001307  |
| DN           | 50   | 224-001308  | 224-001310  | 224-001309  | 224-001311  |
| DN           | 65   | 224-001312  | 224-001314  | 224-001313  | 224-001315  |
| DN           | 80   | 224-001316  | 224-001318  | 224-001317  | 224-001319  |
| DN           | 100  | 224-001320  | 224-001322  | 224-001321  | 224-001323  |
| DN           | 125  | 224-001324  | 224-001326  | 224-001325  | 224-001327  |
| DN           | 150  | 224-001328  | 224-001330  | 224-001329  | 224-001331  |
| OD           | ½"   | 224-001332  | 224-001334  | 224-001333  | 224-001335  |
| OD           | ¾"   | 224-001332  | 224-001334  | 224-001333  | 224-001335  |
| OD           | 1"   | 224-001332  | 224-001334  | 224-001333  | 224-001335  |
| OD           | 1 ½" | 224-001336  | 224-001338  | 224-001337  | 224-001339  |
| OD           | 2"   | 224-001340  | 224-001342  | 224-001341  | 224-001343  |
| OD           | 2 ½" | 224-001344  | 224-001346  | 224-001345  | 224-001347  |
| OD           | 3"   | 224-001348  | 224-001350  | 224-001349  | 224-001351  |
| OD           | 4"   | 224-001352  | 224-001354  | 224-001353  | 224-001355  |



Seal kits for Butterfly Valves T-smart 788



| Included in the seal kit |          |                        |
|--------------------------|----------|------------------------|
| Position                 | Quantity | Designation            |
| 2                        | 1        | Butterfly valve gasket |
| 21                       | 2        | Bearings               |
| 18                       | 2        | VARIVENT® O-ring       |

|              | EPDM        | HNBR        | FKM         | VMQ         |
|--------------|-------------|-------------|-------------|-------------|
| Nominal size | Article No. | Article No. | Article No. | Article No. |
| DN 15        | 224-001388  | 224-001390  | 224-001389  | 224-001391  |
| DN 20        | 224-001388  | 224-001390  | 224-001389  | 224-001391  |
| DN 25        | 224-001356  | 224-001358  | 224-001357  | 224-001359  |
| DN 40        | 224-001360  | 224-001362  | 224-001361  | 224-001363  |
| DN 50        | 224-001364  | 224-001366  | 224-001365  | 224-001367  |
| DN 65        | 224-001368  | 224-001370  | 224-001369  | 224-001371  |
| DN 80        | 224-001372  | 224-001374  | 224-001373  | 224-001375  |
| DN 100       | 224-001376  | 224-001378  | 224-001377  | 224-001379  |
| DN 125       | 224-001380  | 224-001382  | 224-001381  | 224-001383  |
| DN 150       | 224-001384  | 224-001386  | 224-001385  | 224-001387  |
| OD ½"        | 224-001388  | 224-001390  | 224-001389  | 224-001391  |
| OD ¾"        | 224-001388  | 224-001390  | 224-001389  | 224-001391  |
| OD 1"        | 224-001388  | 224-001390  | 224-001389  | 224-001391  |
| OD 1 ½"      | 224-001392  | 224-001394  | 224-001393  | 224-001395  |
| OD 2"        | 224-001396  | 224-001398  | 224-001397  | 224-001399  |
| OD 2 ½"      | 224-001400  | 224-001402  | 224-001401  | 224-001403  |
| OD 3"        | 224-001404  | 224-001406  | 224-001405  | 224-001407  |
| OD 4"        | 224-001408  | 224-001410  | 224-001409  | 224-001411  |

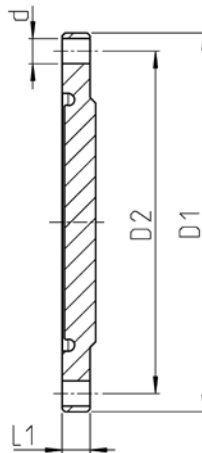




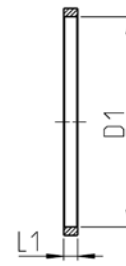
### Blind Grooved Flange

The range also contains blind grooved flanges for butterfly valves T-smart 7. The blind grooved flange can be set against the butterfly valve's outside flange in order to make a later installation of the butterfly valve possible.

| Technical data                      |                                   |
|-------------------------------------|-----------------------------------|
| Material                            | AISI 316 L (1.4404)               |
| Surface in contact with the product | $R_a \leq 0.8 \mu\text{m}$        |
| Certificates                        | 3.1/AD2000W2                      |
| Seal materials                      | EPDM (FDA), FKM (FDA), HNBR (FDA) |



Blind grooved flange

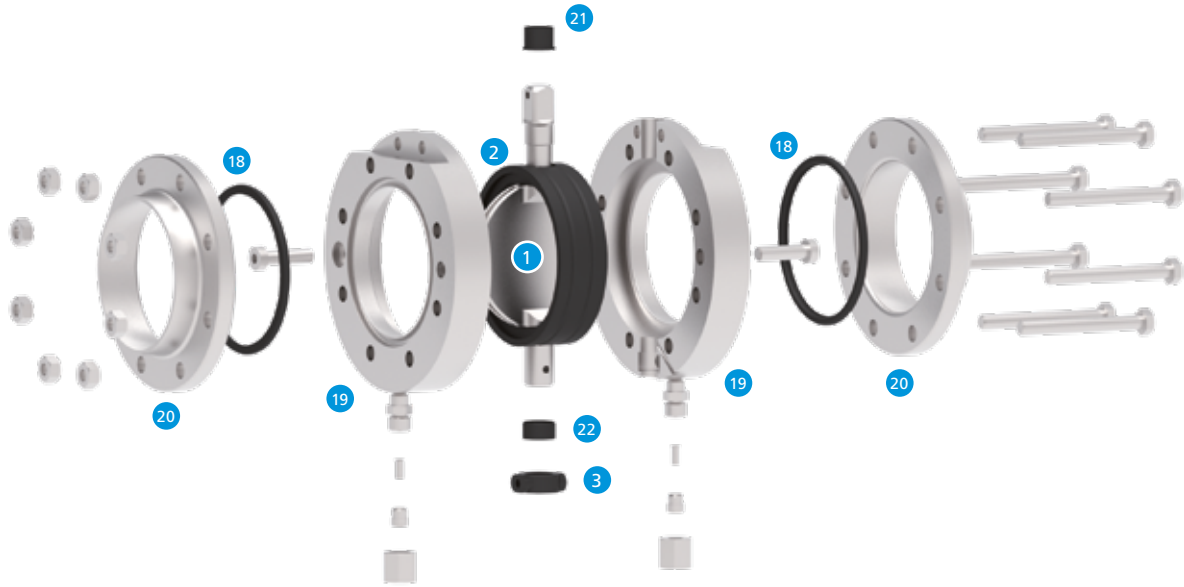


O-ring

| Nominal width | Blind grooved flange |         |          |         |    |             |             | O-ring       |          |             |         |  |
|---------------|----------------------|---------|----------|---------|----|-------------|-------------|--------------|----------|-------------|---------|--|
|               | Dimensions           |         |          |         | PN | Weight [kg] | Article No. | Dimensions   |          | Article No. |         |  |
|               | D1 [mm]              | D2 [mm] | d [mm]   | L1 [mm] |    |             |             | D1 × L1 [mm] | Material |             |         |  |
|               |                      |         |          |         |    |             |             | EPDM         | FKM      | HNBR        |         |  |
| DN 25         | 78                   | 68      | 4 × Ø 7  | 10      | 10 | 0.4         | 224-001673  | 25.0 × 5.0   | 930-393  | 930-564     | 930-551 |  |
| DN 40         | 87                   | 77      | 4 × Ø 7  | 10      | 10 | 0.4         | 224-001671  | 36.0 × 5.0   | 930-545  | 930-566     | 930-552 |  |
| DN 50         | 103                  | 90      | 4 × Ø 9  | 10      | 10 | 0.6         | 224-001669  | 47.0 × 5.0   | 930-546  | 930-567     | 930-553 |  |
| DN 65         | 120                  | 107     | 6 × Ø 9  | 10      | 10 | 0.9         | 224-001667  | 62.0 × 5.0   | 930-547  | 930-526     | 930-554 |  |
| DN 80         | 135                  | 122     | 6 × Ø 9  | 10      | 10 | 1.1         | 224-001665  | 75.0 × 5.0   | 930-450  | 930-527     | 930-555 |  |
| DN 100        | 155                  | 142     | 8 × Ø 9  | 10      | 10 | 1.5         | 224-001663  | 92.0 × 5.0   | 930-549  | 930-568     | 930-556 |  |
| DN 125        | 191                  | 175     | 8 × Ø 11 | 10      | 10 | 2.3         | 224-001661  | 115.0 × 5.0  | 930-550  | 930-569     | 930-557 |  |
| DN 150        | 219                  | 200     | 8 × Ø 13 | 15      | 10 | 4.6         | 224-001662  | 134.2 × 5.7  | 930-574  | 930-575     | 930-872 |  |
| OD 1"         | 78                   | 68      | 4 × Ø 7  | 10      | 10 | 0.4         | 224-001674  | 22.0 × 5.0   | 930-376  | 930-593     | 930-851 |  |
| OD 1 ½"       | 84                   | 74      | 4 × Ø 7  | 10      | 10 | 0.4         | 224-001672  | 33.5 × 5.0   | 930-497  | 930-570     | 930-852 |  |
| OD 2"         | 101                  | 88      | 4 × Ø 9  | 10      | 10 | 0.6         | 224-001670  | 45.0 × 5.0   | 930-559  | 930-571     | 930-853 |  |
| OD 2 ½"       | 116                  | 103     | 6 × Ø 9  | 10      | 10 | 0.8         | 224-001668  | 56.0 × 5.0   | 930-560  | 930-572     | 930-854 |  |
| OD 3"         | 128                  | 115     | 6 × Ø 9  | 10      | 10 | 1.0         | 224-001666  | 68.0 × 5.0   | 930-319  | 930-666     | 930-652 |  |
| OD 4"         | 160                  | 147     | 8 × Ø 9  | 10      | 10 | 1.6         | 224-001664  | 90.0 × 5.0   | 930-561  | 930-573     | 930-855 |  |



Mixproof Butterfly Valves T-smart 9



- 1 Butterfly valve disk
- 2 Butterfly valve gasket
- 3 Radial seal
- 18 VARIVENT® O-ring
- 19 Body flanges (intermediate flange with O-ring groove)
- 20 Welding flange (outside flange)
- 21 Upper bearing
- 22 Lower bearing

The Mixproof Butterfly Valve T-smart 9 offers an interesting valve variant for the mixproof separation of media. Highly functional, CIP/SIP-enabled and easy to service, this valve supplies continuous safety to production processes. In addition to the main opening, the rotating valve disk enforces the mechanical opening or closing of drain ports, depending on the valve position. This minimizes switching losses and ensures the functionality of four valve disks – without further actuation – and the need of the corresponding control system.

| Application examples                      |
|---|
| CIP systems                               |
| Flush-out processes                       |
| Water management                          |
| Use as CIP return valve in a valve matrix |

The Mixproof Butterfly Valves T-smart 9 are characterized by their hygienic design without dome and sump, offering all before mentioned advantages.



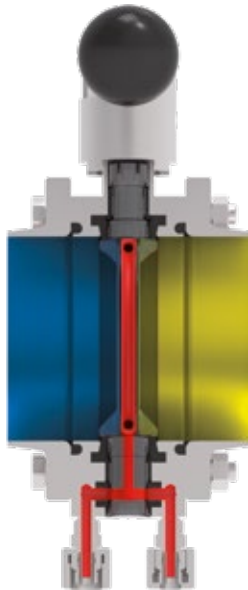
**Significant product features**

|   |
|---|
| Valve disk made from solid material                       |
| Compact build   |
| Minimum switching loss                                    |
| Optimum cleanability                                      |
| Simple and safe leakage indication                        |
| Only one product wetted seal                              |
| Hygienically placed drain paths                           |
| Product wetted parts in 316L (1.4404)                     |
| Intermediate flange seals in proven VARIVENT® seal design |
| Long service life, high productivity in process           |
| Vacuum-proof  |



Upon closing of the valve disk the drain ports are opened. Remaining product from the switching operation can drain, and be flushed out, immediately after switching.

Mixproof separation of the two product areas, when the valve disk is closed, is achieved through two peripheral sealing edges with the leakage cavity between them.

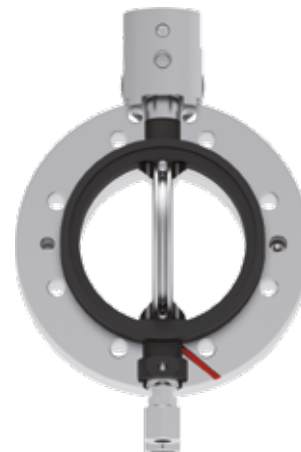


Mixproof product area separation with the leakage cavity open to the atmosphere so any leakage becomes visible immediately.

The leakage cavity itself drains automatically and is designed in such a way that it can be flushed, from one drain port to the other, without dead areas or short-cuts. With little resources applied, products are successfully and completely flushed out, for optimum cleanability.



Upon opening of the valve disk the drain ports are automatically closed and reliably prevent product loss.



Specially positioned leakage apertures allow immediate detection of any leakage between the two seals.



### Pneumatic actuators

For narrow mounting situations and low air consumption the pneumatic actuators have been made even more compact. The gap-free design ensures optimum cleanability and fulfils highest demands to hygiene.

Torque maxima towards both end positions enable application on both normally closed and normally open valves. Metallic stops ensure exact disk positioning. There are air-to-spring and air-to-air variants.

The integrated T.VIS® interface also safely accommodates optional accessories – booster cylinder, two-position stop and limit stop. The internal pneumatic system reduces the risk of failures, being without external tubing.

All actuators are by default applicable for Ex zones. Compliance of any electric accessories with Ex regulations must be ensured.



#### Features

- Compact, hygienic design
- Metallic stops
- Torque maxima towards both end positions
- Air-to-spring and air-to-air variants available
- Integrated T.VIS® interface

### Actuator bracket

The new actuator bracket can be attached to the flanges more easily because of its one-sided design and integrated threads for the mounting screws.

Two integrated proximity switch holders are located at a 45° angle above one of the two flanges. Turning the bracket 180° places the switches above the other side. This means one side of the valve is always free from structures mounted on top, thus allowing free access to male flanges, for example.

The switches are plugged into half-open holders on the side, which allows for easy mounting since the counter nuts only need to be loosened, not removed.



### Gaskets

The vacuum-proof gasket has been completely redeveloped and offers maximum stability and service life. The double-sided valve disk bearing provides a defined seal compression and lowest switch torque.

#### Gaskets with decisive advantages

|                                 |
|---------------------------------|
| Low torque                      |
| Double-sided valve disk bearing |
| Long service-life               |
| Vacuum-proof                    |
| FDA-approved EPDM seal material |

### Selection of dimensions and connection fittings

| Flange variant |                       |    |    |    |    |     |
|----------------|-----------------------|----|----|----|----|-----|
| Code           | Nominal size          | DN | 50 | 65 | 80 | 100 |
| 8              | Intermediate flange V |    | •  | •  | •  | •   |

| Flange variant |                       |    |    |     |    |    |
|----------------|-----------------------|----|----|-----|----|----|
| Code           | Nominal size          | OD | 2" | 2½" | 3" | 4" |
| 8              | Intermediate flange V |    | •  | •   | •  | •  |



8 (T-smart 988)



## Pipe classes

Dimensions of weld connections comply with the following standards:

- **Metric:** Outside diameter acc. to DIN 11850, series II, DIN 11866, series A
- **Inch OD:** Outside diameter acc. to BS 4825

## Surfaces

Product wetted surfaces are by default finished to  $R_a \leq 0.8 \mu\text{m}$ . Higher-quality surfaces finished to  $R_a \leq 0.4 \mu\text{m}$  are optionally available.

Non product wetted surfaces (flanges) are metal blank.

## Materials

Product wetted parts of the Mixproof Butterfly Valves T-smart 9 are built in AISI 304 (1.4301). Other materials are available on request, e.g. for applications handling aggressive media.

For detailed information regarding properties of the materials consult the **material properties** table.

## Test report and inspection certificate

Flanges and disks of the Mixproof Butterfly Valves T-smart 9 are available with test report 2.2 or material inspection certificate 3.1 in compliance with EN 10204 (on request).

## Seal materials

Product wetted seals are EPDM.

Mixing components of our seal materials are included in the FDA "**White List**" and comply with the "**FOOD and DRUG**" (FDA) regulations 21 CFR Part 177.2600 and 21 CFR 177.1550: "Rubber Articles intended for repeated use".

The resistance of the sealing material depends on the type and temperature of the medium conveyed. The contact time can negatively affect the service life of the seals.

For detailed information regarding properties of the seal materials consult the **seal material properties** table.

## Conditions for operation

Mixproof Butterfly Valves T-smart 9 can be operated at ambient temperatures from 0 to 45 °C (32 to 113 °F). The proximity switches are approved for ambient temperatures from -20 to 80 °C (-4 to 176 °F). The Butterfly Valves T-smart 9 can be operated in outdoor areas. However, they need to be protected from frost in those areas or must be defrosted before switching.

Mixproof Butterfly Valves T-smart 9 must be mounted stress-free. Horizontal lateral forces, e.g. thermal pipe elongation, cannot be compensated for in the valve, which makes damages to the valve a possibility. In such cases, suitable measures to compensate the elongation are recommended, such as using a VARICOMP® expansion compensator.

The clearance required for mounting and demounting Butterfly Valves T-smart is listed together with the respective technical data and dimensions.

## Control air

The control air pressure is min. 4.8 bar, max. 8 bar. For lower control air pressure, a booster cylinder can be applied. The quality of the control air must comply with the requirements acc. to ISO 8573-1:2010:

| ISO 8573-1:2010  |  |
|------------------|--|
| Particle content | <b>Quality class 6</b>   |
|                  | Particle size max. 5 µm  |
|                  | Particle density max. 5 mg/m <sup>3</sup>  |
| Water content    | <b>Quality class 4</b>   |
|                  | Max. dew point 3 °C  |
|                  | For operation locations in higher regions or at low ambient temperatures, the dew point must be re-calculated accordingly. |
| Oil content      | <b>Quality class 3</b>   |
|                  | Max. 1 mg oil for 1 m <sup>3</sup> air, ideally oil-free   |

## Operating pressure

The valves are vacuum proof up to 0.05 bar (abs). The maximum product pressure for which the valves can be configured is 10 bar.

## Actuator selection

The modular concept of the Mixproof Butterfly Valves T-smart 9 allows for a variety of actuator variants to be fitted. Different manual and pneumatic actuators are available.

The pneumatic actuators are optimized for long-term operation and are maintenance-free. To prevent damages in the pipe-work, the closing speed of the pneumatic actuators can be reduced per air throttle.

## Feedback signal

Proximity switches of M12×1 size indicate the positions "open" and/or "closed". The actuator bracket for pneumatic actuators has two sensor casings, an optional and retro-fittable proximity switch holder is available for standard manual actuators.

All pneumatic actuators can be fitted with the proven T.VIS® control top with all options.

Material properties

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

\* Standard material for components not in contact with the product  
 \*\* Standard material for components in contact with the product (other materials available on request)  
 \*\*\* Pitting Resistance Equivalent Number = % Cr + 3.3 × (% Mo + 0.5 W) + 20 N

Seal material properties






| Seal material                    |               |                                    | EPDM                           |
|----------------------------------|---------------|------------------------------------|--------------------------------|
| General application temperature* |               |                                    | –40 to 135 °C<br>–40 to 275 °F |
| Medium                           | Concentration | At permitted operating temperature |                                |
| Alkali                           | ≤ 3 %         | up to 80 °C                        | +                              |
|                                  | ≤ 5 %         | up to 40 °C                        | +                              |
|                                  | ≤ 5 %         | up to 80 °C                        | +                              |
|                                  | > 5 %         |                                    | ○                              |
| Inorganic acid**                 | ≤ 3 %         | up to 80 °C                        | +                              |
|                                  | ≤ 5 %         | up to 80 °C                        | ○                              |
|                                  | > 5 %         | up to 100 °C                       | –                              |
| Water                            |               | up to 100 °C                       | +                              |
| Steam                            |               | up to 135 °C                       | +                              |
| Steam, approx. 30 min            |               | up to 150 °C                       | +                              |
| Hydrocarbons/fuels               |               |                                    | –                              |
| Products containing grease       | ≤ 35 %        |                                    | +                              |
|                                  | > 35 %        |                                    | –                              |
| Oils                             |               |                                    | –                              |

+ = Good resistance  
 ○ = Reduced service life  
 – = Not resistant

Other applications on request  
 \* Depending on the installation situation  
 \*\* Inorganic acids include hydrochloric acid, nitric acid, sulphuric acid




The certificates listed here are valid for the T-smart 9 mixproof butterfly valves.

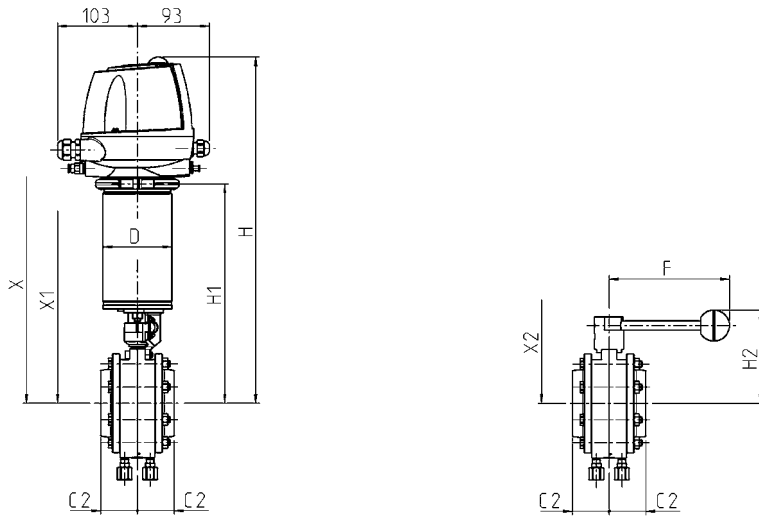
|           |          | Standard certificates   |   |   | Optional certificates |  |             |   |                     |                 |
|-----------|----------|---|---|---|-----------------------|--|-------------|---|---------------------|-----------------|
|           | Register | CE*   | FDA   | FDA   | ADI free              | ATEX   | CRN         | EG Nr.<br>1935/2004   | TA-Luft<br>VDI 2440 | USP<br>Class VI |
|           |          |  |  |  |                       |  |             |  |                     |                 |
| T-smart 9 | 2        | Mixproof Butterfly Valve<br>type 988  | •   | •   | •                     | II 2G c IIB<br>II 2D c IIB   | OC14737.5CL | •   |                     | •               |

\* only for valves with pneumatic actuator



| Technical data of the standard version |   |
|--|---|
| Product wetted materials               | AISI 316L   |
| Non product wetted materials           | AISI 304  |
| Product wetted gasket material         | EPDM  |
| Ambient temperature                    | 0 to 45 °C  |
| Control air pressure                   | 4.8 to 8 bar  |
| Max. product pressure                  | 10 bar  |
| Product wetted surface                 | R <sub>a</sub> 0.8 µm   |
| Non product wetted surface             | Metal blank   |
| Pneumatic Actuator                     | Air-to-spring   |
| Certificates                           |  |

\* The CE-marking is valid for a T-smart Butterfly Valve with pneumatic actuator.



| Nominal size | Pipe        |          | Actuator |        | Dimensions |         |        | Removal space |         |         | Flange width | Valve                          |  |
|--------------|-------------|----------|----------|--------|------------|---------|--------|---------------|---------|---------|--------------|--------------------------------|--|
|              | Ø [mm]      | Ø D [mm] | F [mm]   | H [mm] | H1 [mm]    | H2 [mm] | X [mm] | X1 [mm]       | X2 [mm] | C2 [mm] | KVS [m³/h]   | Weight (without actuator) [kg] |  |
| DN 50        | 53 × 1.5    | 88.9     | 160      | 469    | 310        | 105     | 520    | 360           | 130     | 47.5    | On request   | 4.0                            |  |
| DN 65        | 70 × 2.0    | 88.9     | 160      | 478    | 319        | 114     | 520    | 360           | 139     | 47.5    | On request   | 5.0                            |  |
| DN 80        | 85 × 2.0    | 114.3    | 220      | 488    | 329        | 121     | 535    | 380           | 146     | 47.5    | On request   | 5.9                            |  |
| DN 100       | 104 × 2.0   | 114.3    | 220      | 501    | 342        | 134     | 550    | 390           | 159     | 47.5    | On request   | 8.3                            |  |
| OD 2"        | 50.8 × 1.6  | 88.9     | 160      | 469    | 310        | 105     | 520    | 360           | 130     | 47.5    | On request   | 4.0                            |  |
| OD 2 ½"      | 63.5 × 1.6  | 88.9     | 160      | 478    | 319        | 114     | 520    | 360           | 139     | 47.5    | On request   | 5.1                            |  |
| OD 3"        | 76.2 × 1.6  | 114.3    | 220      | 485    | 329        | 121     | 535    | 380           | 146     | 47.5    | On request   | 6.1                            |  |
| OD 4"        | 101.6 × 2.0 | 114.3    | 220      | 501    | 342        | 134     | 550    | 390           | 159     | 47.5    | On request   | 8.3                            |  |

| Position  | Description of the order code  |
|---|--|
| 1   | <b>Valve type</b>  |
|   | 9 Mixproof Butterfly Valve   |
| 2   | <b>Flange connection</b>   |
|   | 88 Intermediate flange variant   |
| 3   | <b>Pipe standard</b>   |
|   | 0 OD   1 DN  |
| 4   | <b>Nominal size</b>  |
|   | 200 OD 2"   050 DN 50  |
|   | 212 OD 2 ½"   065 DN 65  |
|   | 300 OD 3"   080 DN 80  |
|   | 400 OD 4"   100 DN 100   |
| 5   | <b>Product wetted material</b>   |
|   | 2 AISI 316L (1.4404)   |
| 6   | <b>Product wetted gasket material</b>                                      |
|   | 0 EPDM   |
| 7   | <b>Actuator type</b>   |
|   | 0 Manual actuator  |
|   | 1 Pneumatic for T.VIS®   |
|   | 2 Pneumatic incl. 2 proximity switch holders                               |
|   | 9 Without actuator   |
| 8   | <b>Air connection</b>  |
|   | 0 Without  |
|   | 1 Metric (only for actuator type 2)  |
|   | 2 Inch (only for actuator type 2)  |
|   | 3 Metric with air throttle (only for actuator type 2)                      |
| 4 Inch with air throttle (only for actuator type 2) |  |
| 9   | <b>Fail position of valve</b>  |
|   | 0 Closed   |
| 10  | <b>Accessories</b>   |
|   | 0 Without  |
|   | 1 Extension piece +80 mm   |
|   | 2 Lockable bracket incl. 4 proximity switch holders (actuator type 0 only) |
|   | 7 Booster cylinder (actuator types 1 and 2 only)                           |
| 11  | <b>Product wetted surface</b>  |
|   | 0 0.8 µm   |
|   | 1 0.4 µm   |
| 12  | <b>Certificate</b>   |
|   | 0 Without  |
|   | 1 Test report 2.2  |
|   | 2 Inspection certificate 3.1   |
| 3 Certificates 2.2 and 3.1                          |  |
| 13  | <b>ATEX approval</b>   |
|   | 0 No   |
|   | 1 Yes  |

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

|                 |   |   |   |   |   |   |   |   |   |   |   |   |    |    |    |    |  |
|-----------------|---|---|---|---|---|---|---|---|---|---|---|---|----|----|----|----|--|
| <b>Position</b> | 1 | 2 | 3 |   | 4 | 5 |   | 6 | 7 | 8 | 9 |   | 10 | 11 | 12 | 13 |  |
| <b>Code</b>     | 9 | 8 | 8 | - |   | 2 | - | 0 |   |   | 0 | - |    |    |    |    | + Code for control and feedback systems, see section 3 |





| Manual actuator |   |                    |                   |
|-----------------|---|--------------------|-------------------|
| Material        | AISI 304 and phenolic resin (ball head) |                    |                   |
| Dimensions      |   |                    |                   |
| Nominal size    | OD/SMS<br>DN                            | 2" – 2 ½"<br>50–65 | 3" – 4"<br>80–100 |
| Length of lever |   | 160 mm             | 220 mm            |
| Weight          |   | 0.4 kg             | 0.4 kg            |
| Article No.     |   | 224-001055         | 224-001056        |



| Pneumatic actuator for T.VIS® |               |                    |                   |
|-------------------------------|---------------|--------------------|-------------------|
| Material                      | AISI 304      |                    |                   |
| Ambient temperature           | 0 to 45 °C    |                    |                   |
| Control air pressure          | 4.8 to 8 bar  |                    |                   |
| Surface                       | Metal blank   |                    |                   |
| Actuator type                 | Air-to-spring |                    |                   |
| Dimensions                    |               |                    |                   |
| Nominal size                  | OD/SMS<br>DN  | 2" – 2 ½"<br>50–65 | 3" – 4"<br>80–100 |
| Ø                             |               | 88.9 mm            | 114.3 mm          |
| H                             |               | 223 mm             | 223 mm            |
| Weight                        |               | 4.1 kg             | 5.5 kg            |
| Article No.                   |               | 224-001586         | 224-001509        |



| Pneumatic actuator   |               |                    |                   |
|----------------------|---------------|--------------------|-------------------|
| Material             | AISI 304      |                    |                   |
| Ambient temperature  | 0 to 45 °C    |                    |                   |
| Control air pressure | 4.8 bis 8 bar |                    |                   |
| Surface              | Metal blank   |                    |                   |
| Actuator type        | Air-to-spring |                    |                   |
| Dimensions           |               |                    |                   |
| Nominal size         | OD/SMS<br>DN  | 2" – 2 ½"<br>50–65 | 3" – 4"<br>80–100 |
| Ø Cylinder pipe      |               | 88.9 mm            | 114.3 mm          |
| Ø Connecting plate   |               | 97 mm              | 97 mm             |
| H                    |               | 223 mm             | 223 mm            |
| Weight               |               | 4.1 kg             | 5.5 kg            |
| Article No.          |               | 224-001586         | 224-001509        |



### Extension piece

To encapsulate the valve together with the pipe the actuator interface needs to be relocated to the outside. The extension piece for all actuator types shifts the actuator 80 mm to the outside.

| Technical data |              |                    |                   |
|----------------|--------------|--------------------|-------------------|
| Material       | AISI 304     |                    |                   |
| Surface        | Metal blank  |                    |                   |
| Dimensions     |              |                    |                   |
| Nominal size   | OD/SMS<br>DN | 2" – 2 ½"<br>50–65 | 3" – 4"<br>80–100 |
| H              |              | 80 mm              | 80 mm             |
| Weight         |              | 0.8 kg             | 0.8 kg            |
| Article No.    |              | 224-001608         | 224-001243        |



### Lockable bracket incl. 4 proximity switch holders

The fit-on bracket offers two horizontal and two vertical mounting options, which means up to eight different configurations for mounting proximity in M12x1 size. The bracket also features an eyelet to fit a padlock in order to secure the mechanical standard manual actuator in closed valve position. The depicted padlock is merely an example.

| Technical data |              |                    |                   |
|----------------|--------------|--------------------|-------------------|
| Material       | PA12         |                    |                   |
| Dimensions     |              |                    |                   |
| Nominal size   | OD/SMS<br>DN | 2" – 2 ½"<br>50–65 | 3" – 4"<br>80–100 |
| Weight         |              | 42 g               | 42 g              |
| Article No.    |              | 224-001057         | 224-001058        |



### Booster cylinder

The booster cylinder is used for enlarging the piston surface area that allows to open the valve with a lower air pressure.

| Technical data                        |              |                    |                   |
|---------------------------------------|--------------|--------------------|-------------------|
| Material                              | AISI 304     |                    |                   |
| Surface                               | Metal blank  |                    |                   |
| Dimensions                            |              |                    |                   |
| Nominal size                          | OD/SMS<br>DN | 2" – 2 ½"<br>50–65 | 3" – 4"<br>80–100 |
| H                                     |              | 95 mm              | 95 mm             |
| Weight                                |              | 2.3 kg             | 2.3 kg            |
| Requested control air pressure (min.) |              | 3 bar/44 psi       | 3 bar/44 psi      |
| Article No.                           |              | 224-001258         | 224-001258        |





Typical application and description

If no alternative identification option is selected, the pneumatically activated valves are always provided with a nameplate for clear identification (option /52\*). All key information required for clear allocation of the valve, as well as technical data, is specified on the nameplate. The plate is glued onto the actuator. If the required identification number is specified, this is allocated to the valve by means of a separate sticker on the actuator or control and feedback system.

| Key data contained                    |                                   |
|---------------------------------------|-----------------------------------|
| Valve type                            |                                   |
| Serial number                         |                                   |
| Materials in contact with the product | Metallic material / seal material |
| Air supply pressure                   | Min./Max. [bar/psi]               |
| Product pressure                      | [bar/psi]                         |



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

In addition to the nameplate, the option /50 consists of an engraved labeling plate attached either to the bracket or to the handle using a key ring.

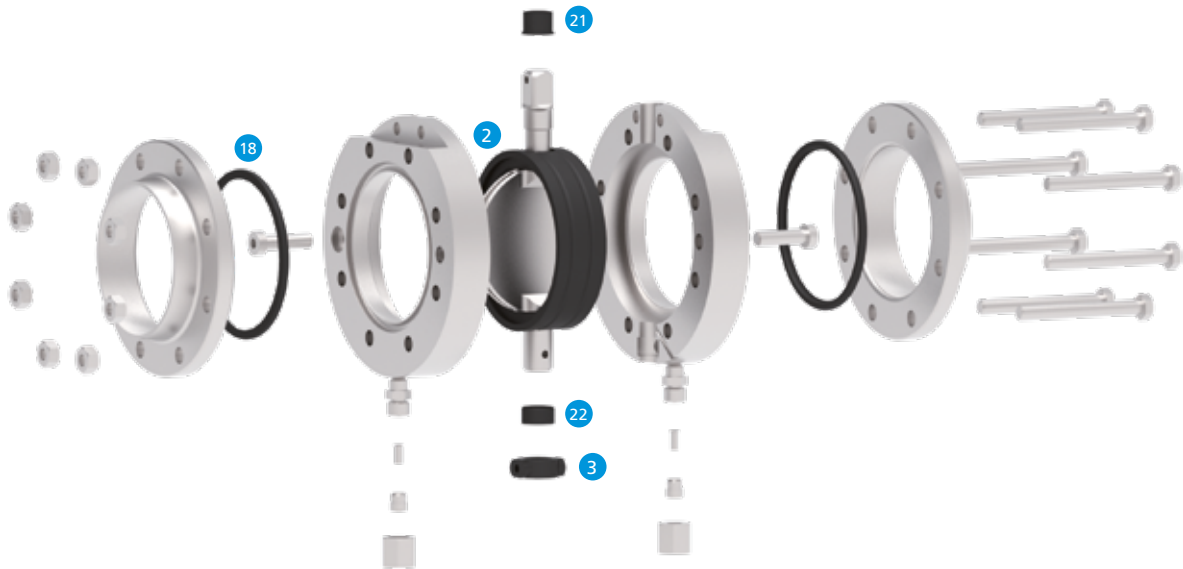


Option /51\* – metal labeling plate US version cpl.

The engraved labeling plate is attached either to the bracket or to the handle using a key ring. Additional information can be recorded as well as the TAG number, customer designation and the valve type. In addition, pneumatic valves are identified with a nameplate.

\* The option number is added to the end of the order code.

Seal kits



| Included in the seal kit |          |                        |
|--------------------------|----------|------------------------|
| Position                 | Quantity | Designation            |
| 2                        | 1        | Butterfly valve gasket |
| 3                        | 1        | Radial seal            |
| 18                       | 2        | VARIVENT® O-Ring       |
| 21                       | 1        | Upper bearing          |
| 22                       | 1        | Lower bearing          |

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| Nominal size |      | EPDM        |
|--------------|------|-------------|
|              |      | Article No. |
| DN           | 50   | 224-000696  |
| DN           | 65   | 224-000697  |
| DN           | 80   | 224-000698  |
| DN           | 100  | 224-000699  |
| OD           | 2"   | 224-000700  |
| OD           | 2 ½" | 224-000701  |
| OD           | 3"   | 224-000702  |
| OD           | 4"   | 224-000703  |



**T.VIS® control top**

The T.VIS® control top is an optimal system for controlling and monitoring GEA Tuchenhagen valves.

This is available in several variants depending on the valve type, tasks and user convenience.

**Common features of all T.VIS® variants are:**

- Flexible modular system for optimum variant configuration for the particular task (e.g. type of interface module, number of solenoid valves, etc.)
- Internal air supply for high security against failure of the main valve functions because no external air hose is required
- Characteristic design
- High Protection class (min. IP66, optional IP67 or IP69k)
- Ease of cleaning without dead zones, whatever the installation orientation
- Clear visualization of the valve status via a light dome visible 360°, which is illuminated by colored LEDs
- Low energy consumption
- Ease of handling
- Maintenance-free electronic modules
- Many special options, e.g.:
  - Air throttles
  - Cable connections, etc.

For maintenance work on the valve, the control tops can be removed from the valve actuator by loosening two bolts on the clamp, without electrical or pneumatic connections having to be disconnected.

**T.VIS® concept – for valves with pneumatic actuator**



**T.VIS® M-15 – control top with manual sensor setting**

- For open/close position feedback and actuator control
- Proven sensor technology
- Modules and solenoid valves can be retrofitted



**T.VIS® A-15 – control top with automatic set-up**

- For open/close position feedback and actuator control
- Automatic set-up
- Semi-automatic setup



**T.VIS® P-15 – positioning of the valve disc**

- For infinitely definable positioning of the valve disc between the open/close positions
- Automatic set-up



**SES – control top for potentially explosive areas**

- For open/close position feedback and actuator control
- Intrinsically safe sensors and solenoid valves



**Proximity switch holder in bracket**



- For 2 proximity switches M12x1

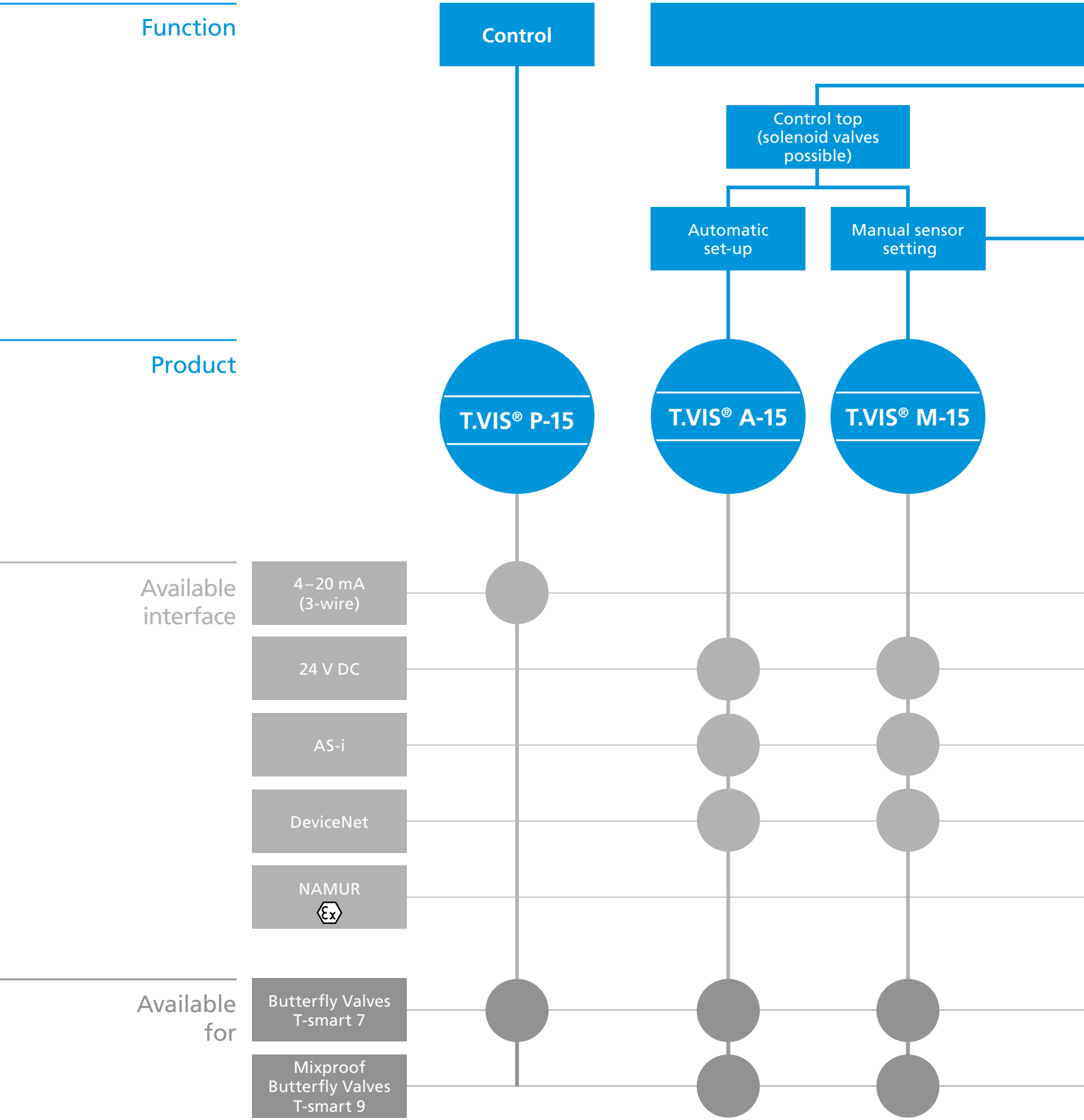


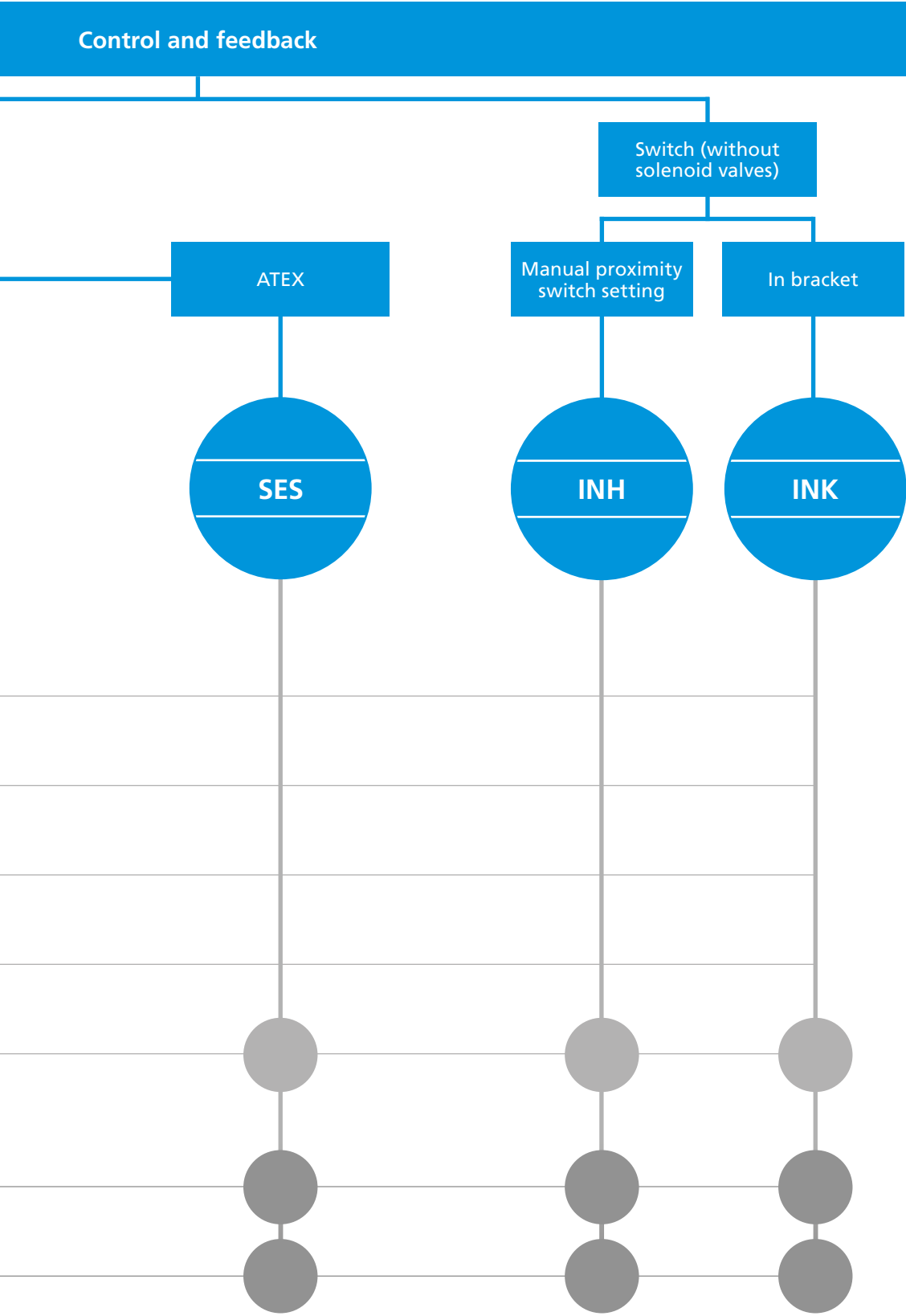
The certificates listed here are valid for corresponding GEA control and feedback systems. Components conforming to the requirements of the European Hygienic Engineering and Design Group (EHEDG) as well as 3-A Sanitary Standards, Inc. (3-A SSI) are available for numerous fields of applications.

Moreover, independent, standardized tests have confirmed the efficient, problem-free cleanability of numerous components – for optimum safety and economic gain.

EHEDG certificates apply only to the specific control head type as listed. However, they can be transferred to other types, owing to identical design characteristics.

|                              |       |             | Optional Certificates   |      |   |   |
|------------------------------|-------|-------------|---|------|---|---|
|                              | Index |             | ATEX  | GOST | International protection code IP67, IP66, IP69K | UL / CSA  |
|                              |       |             |  |      |   |  |
| Control and Feedback Systems | 10    | T.VIS® M-15 |   | •    | •   |   |
|                              | 10    | T.VIS® A-15 |   | •    | •   | •   |
|                              | 10    | T.VIS® P-15 |   | •    | •   |   |
|                              | 10    | SES         | •   | •    |   |   |
|                              | 10    | INH         | •   |      |   |   |
|                              | 10    | INK         | •   |      |   |   |





## Concept

The T.VIS® M-15 is equipped with manually adjustable sensors and a modular system of options, all of which form the basics of the T.VIS® feedback technology. This means it is optimally adapted to the basic requirements of the process system.

With proven sensor technology, it offers the advantages of the modern T.VIS® series in an inexpensive manner.

## Standard variant



- 1 Pneumatic block
- 2 24 V DC interface module
- 3 Sensors
- 4 Solenoid valves
- 5 LED lighting
- 6 Central compressed air connection with replaceable filter
- 7 Cable gland

## Features

|   |
|---|
| Flexible modular system                           |
| Use of proven sensor technology                   |
| Quick and easy adjustment of the sensors          |
| Valve status indication by LED                    |
| Various communication standards available         |
| Components can be upgraded/converted subsequently |
| Filter protects solenoid valves                   |
| High-quality pneumatic fittings                   |
| Exchangeable compressed air connection            |
| Supply and exhaust air throttles can be fitted    |
| Standard protection class IP66                    |

## Structure

The T.VIS® M-15 is characterized by proven sensor technology. The basic equipment of the control top comprises of the 24 V DC interface module with two sensors for feedback of the valve position and three solenoid valves which can be installed subsequently, if necessary.

In the interface types with DeviceNet and AS-Interface, an adapter module is connected ahead of the standard interface module, and can also be retrofitted or converted.

A replaceable filter in the supply air connection protects the solenoid valves.

## Position detection

**Inductive sensor system** – The valve positions are detected using two manually adjustable sensors.

## Setting

**Mechanical** – the sensors are calibrated mechanically using the positioning spindles, which are subsequently secured to prevent self-adjustment.

## Visualization

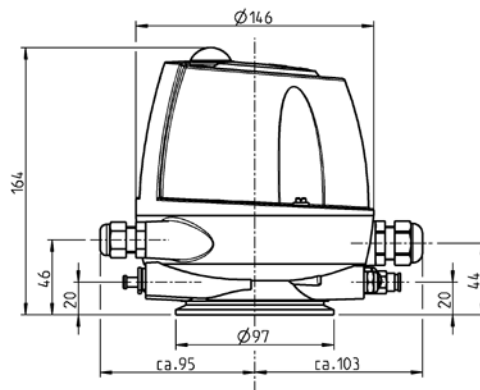
**LED display:**

- green
- yellow





| Technical data of the standard version        |                                       |                         |
|---|---------------------------------------|-------------------------|
| Position detection                            | Sensors                               |                         |
| Housing material                              | PA 12/L                               |                         |
| Ambient temperature                           | -20 to +55 °C                         |                         |
| Air supply                                    | Pressure range                        | 2 to 8 bar              |
|   | Standard                              | acc. to ISO 8573-1:2010 |
|   | Solid content                         | Quality class 6         |
|   | Water content                         | Quality class 4         |
|   | Oil content                           | Quality class 3         |
| Dimensions of air connections                 | Metric 6/4 mm, inch 6.35/4.31 mm (¼") |                         |
| Protection class                              | IP66 (powerful water jet)             |                         |
| Sound pressure level via exhaust air throttle | Max. 72 dB                            |                         |
| Visualization                                 | LED (green, yellow)                   |                         |



| Type of interface                            | 24 V DC, 3-wire, PNP<br>24 V DC, 3-wire, NPN |
|--|--|
| Supply                                       |  |
| Operating voltage                            | 24 V DC (+20 %, -12.5 %)                     |
| No-load current                              | ≤ 40 mA                                      |
| Maximum current consumption                  | 255 mA                                       |
| Polarity reversal protection                 | Yes  |
| Inputs                                       |  |
| Activation voltage                           | 21–28.8 V = high; < 16 V = low               |
| Current consumption per input                | ≤ 35 mA                                      |
| Activation "PV Y1"                           | Direct PV activation                         |
| Activation "PV Y2"                           | Direct PV activation                         |
| Activation "PV Y3"                           | Direct PV activation                         |
| Outputs                                      |  |
| Connection type                              | 24 V DC (PNP/NPN switchable)                 |
| Maximum current capacity per feedback output | 50 mA  |
| Voltage drop on the outputs                  | ≤ 3 V  |
| Feedback "start position"                    | Electronic outputs                           |
| Feedback "end position"                      | Electronic outputs                           |
| Feedback "seat lift position"                | Electronic outputs                           |

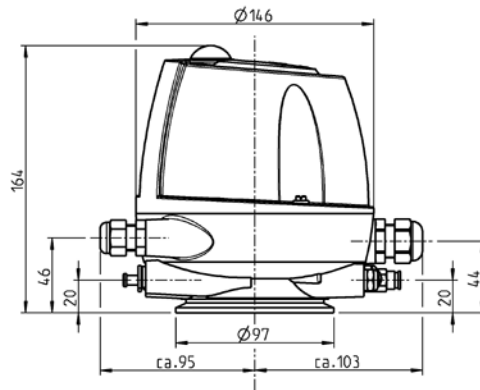
| Position | Description of the order code  |
|----------|--|
| 1        | <b>Feedback location</b><br>TM15 Control top T.VIS® M-15   |
| 2        | <b>Control top type</b><br>N Without solenoid valve<br>P 1 solenoid valve Y1<br>R 1 solenoid valve Y1 (retrofitable: Y2, Y3)<br>I 2 solenoid valves Y1, Y2 (retrofitable: Y3)<br>J 2 solenoid valves Y1, Y3 (retrofitable: Y2)<br>L 3 solenoid valves Y1, Y2, Y3   |
| 3        | <b>Feedback</b><br>2 2 feedbacks   |
| 4        | <b>Type of interface</b><br>B 24 V DC, 3-wire, PNP<br>N 24 V DC, 3-wire, NPN   |
| 5        | <b>Solenoid valve</b><br>A 24 V DC, 0.85 W<br>0 Without  |
| 6        | <b>Screw fitting</b><br>M Metric air connection, M20x1.5 cable gland<br>Z Inch air connection, 0.5" NPT cable gland<br>J Metric air connection, 5-pin M12 plug (1 solenoid valve, 2 feedbacks)<br>P Inch air connection, 5-pin M12 plug (1 solenoid valve, 2 feedbacks)<br>H Metric air connection, 8-pin M12 plug (> 1 solenoid valve, > 2 feedbacks)<br>I Inch air connection, 8-pin M12 plug (> 1 solenoid valve, > 2 feedbacks)<br>B Inch air connection, Brad Harrison 0.5" NPT 5-pin plug (US) |
|          | <b>Options (multiple selection possible)</b><br>/18 Supply Air throttle: regulates the opening speed of the valve<br>/19 Exhaust air throttle: regulates the closing speed of the valve<br>/22 5-pin M12 connection socket for screw fitting J, P (Article No. 508-963)<br>8-pin M12 connection socket for screw fitting H, I (Article No. 508-061)<br>/67 Protection class IP67 (temporary immersion)<br>/69k Protection class IP69k (high pressure spray down)<br>/UC Certification UL/CSA         |

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

| Position | 1    | 2 | 3 | 4 | 5 | 6 | Options |  |  |  |  |  |  |  |  |  |
|----------|------|---|---|---|---|---|---------|--|--|--|--|--|--|--|--|--|
| Code     | TM15 |   | 2 |   |   |   |         |  |  |  |  |  |  |  |  |  |



| Technical data of the standard version        |                                       |                         |
|---|---------------------------------------|-------------------------|
| Position detection                            | Sensors                               |                         |
| Housing material                              | PA 12/L                               |                         |
| Ambient temperature                           | -20 to +55 °C                         |                         |
| Air supply                                    | Pressure range                        | 2 to 8 bar              |
|   | Standard                              | acc. to ISO 8573-1:2010 |
|   | Solid content                         | Quality class 6         |
|   | Water content                         | Quality class 4         |
|   | Oil content                           | Quality class 3         |
| Dimensions of air connections                 | Metric 6/4 mm, inch 6.35/4.31 mm (¼") |                         |
| Protection class                              | IP66 (powerful water jet)             |                         |
| Sound pressure level via exhaust air throttle | Max. 72 dB                            |                         |
| Visualization                                 | LED (green, yellow)                   |                         |



| Type of interface                       | AS-Interface Bus                            | DeviceNet              |
|---|---|------------------------|
| Supply                                  |   |                        |
| Operating voltage                       | 25.0–31.6 V DC                              | 21.5–26 V DC           |
| No-load current                         | ≤ 62 mA                                     | ≤ 58 mA (at 24 V DC)   |
| Maximum current consumption             | 140 mA                                      | 140 mA                 |
| Polarity reversal protection            | Yes   | Yes                    |
| Specification                           | AS-i V3.0 (max. 62 slaves with master V3.0) |                        |
| Additional information                  | IO.ID.ID2-Code: 7.A.E                       | EDS-File: F1022_R4.eds |
| Conformity                              | AS-i Association                            | ODVA                   |
| Inputs                                  |   |                        |
| Feedback "start position"               | Data bit DI 0                               | Data bit I-0           |
| Feedback "end position"                 | Data bit DI 1                               | Data bit I-1           |
| Feedback "seat lift position" (ext. NI) | Data bit DI 2                               | Data bit I-2           |
| Collective fault                        |   | Data bit I-7           |
| Outputs                                 |   |                        |
| Activation "PV Y1"                      | Data bit DO 0                               | Data bit O-0           |
| Activation "PV Y2"                      | Data bit DO 1                               | Data bit O-1           |
| Activation "PV Y3"                      | Data bit DO 2                               | Data bit O-2           |



| Position | Description of the order code   |
|----------|---|
| 1        | <b>Feedback location</b><br>TM15 Control top T.VIS® M-15  |
| 2        | <b>Control top type</b><br>N Without solenoid valve<br>P 1 solenoid valve Y1<br>R 1 solenoid valve Y1 (retrofitable: Y2, Y3)<br>I 2 solenoid valves Y1, Y2 (retrofitable: Y3)<br>J 2 solenoid valves Y1, Y3 (retrofitable: Y2)<br>L 3 solenoid valves Y1, Y2, Y3  |
| 3        | <b>Feedback</b><br>2 2 feedbacks  |
| 4        | <b>Type of interface</b><br>A AS-Interface BUS<br>D DeviceNet   |
| 5        | <b>Solenoid valve</b><br>A 24 V DC, 0.85 W<br>0 Without   |
| 6        | <b>Screw fitting</b><br>A Metric air connection M20×1.5 cable gland with connection box on cable 1 m (AS-i)<br>S Inch air connection M20×1.5 cable gland with connection box on cable 1 m (AS-i)<br>L Metric air connection, 2-pin M12 plug (AS-i)<br>U Inch air connection, 2-pin M12 plug (AS-i)<br>D Metric air connection, 5-pin M12 plug (DeviceNet)<br>K Inch air connection, 5-pin M12 plug (DeviceNet)  |
|          | <b>Options (multiple selection possible)</b><br>/18 Supply air throttle: regulates the opening speed of the valve<br>/19 Exhaust air throttle: regulates the closing speed of the valve<br>/22 5-pin M12 connection socket for screw fitting L, U, D, K (A-coded, article no. 508-963)<br>/67 Protection class IP67 (temporary immersion)<br>/69k Protection class IP69k (high pressure spray down)<br>/81 AS-i connection box on cable 1 m with M12 connection socket (article no. 508-027) for screw fitting L, U<br>/82 AS-i connection box on cable 2 m with M12 connection socket (article no. 508-028) for screw fitting L, U<br>/UC Certification UL/CSA |

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

| Position | 1    | 2 | 3 | 4 | 5 | 6 | Options |  |  |  |  |  |  |  |  |  |
|----------|------|---|---|---|---|---|---------|--|--|--|--|--|--|--|--|--|
| Code     | TM15 |   | 2 |   |   |   |         |  |  |  |  |  |  |  |  |  |

## Concept

The T.VIS® A-15 is equipped with a high-precision path measuring system. This automatic open/close position recognition is available on any valve from GEA Tuchenhausen, along with a T.VIS® feedback system.

Development has focussed on the requirements and necessities of our customers from the fluid-processing industry. In addition to safe control and monitoring of all functions of the process valves in breweries, dairies, plants for manufacturing fruit juices as well as pharmaceuticals, the T.VIS® A-15 offers significant advantages that are directly reflected in lower total cost of ownership.

## Standard variant



- 1 Pneumatic block
- 2 Control unit
- 3 Path measuring system
- 4 Solenoid valves
- 5 LED lighting
- 6 2 push buttons
- 7 Central compressed air connection with replaceable filter
- 8 M12 plug connection

## Features

|  |
|--|
| Quick, automatic initialization                                |
| Tamper-proof setting of tolerances                             |
| Reduced energy consumption                                     |
| Reduction in operating costs                                   |
| Valve status display by LED                                    |
| Basic LED colors can be selected specifically for the customer |
| Filter protects solenoid valves                                |
| High-quality pneumatic fittings                                |
| Exchangeable compressed air connection                         |
| Supply and exhaust air throttles can be fitted                 |
| Semi-automatic setup   |
| Standard protection class IP66                                 |
| Semi-automatischer Setup                                       |

## Structure

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

The necessary wiring for control and feedback is performed, depending on the requirements, via the M12 plug connections accessible from the outside or through direct wiring and cable glands.

The control top can be opened for this.

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

A replaceable filter, in the supply air connection protects the solenoid valves.

## Position detection

**Path measuring system** – the valve position is registered by means of a highly modern path measuring system.

## Setting

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

Immediately following the set-up, it is possible to set the open/close position tolerances and signal attenuation in the parameter menu.

## Semi-automatic setup

As a new feature, our control top T.VIS® A-15 has the option of semi-automatic set-up that permits uncomplicated exchange in the current process.

For more information about the semi-automatic setup, refer to the end of this section.

## Visualization

### LED display:

- Green
- Yellow
- Red

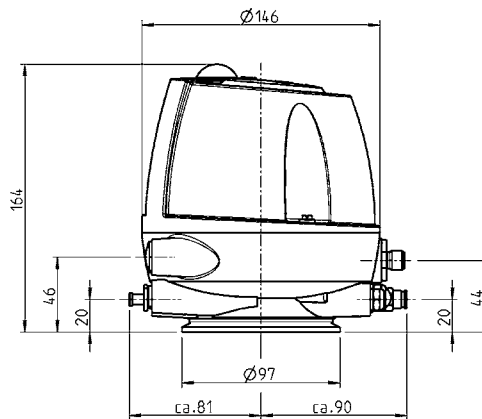


Protection class IP66

The programmable color change allows the display of colors yellow and green to be swapped over.



| Technical data of the standard version        |                                       |                         |
|---|---------------------------------------|-------------------------|
| Position detection                            | Path measuring system                 |                         |
| Housing material                              | PA 12/L                               |                         |
| Ambient temperature                           | -20 to +55 °C                         |                         |
| Air supply                                    | Pressure range                        | 2 to 8 bar              |
|   | Standard                              | acc. to ISO 8573-1:2010 |
|   | Solid content                         | Quality class 6         |
|   | Water content                         | Quality class 4         |
|   | Oil content                           | Quality class 3         |
| Dimensions of air connections                 | Metric 6/4 mm, inch 6.35/4.31 mm (¼") |                         |
| Protection class                              | IP66 (powerful water jet)             |                         |
| Sound pressure level via exhaust air throttle | Max. 72 dB                            |                         |
| Visualization                                 | LED (green, yellow, red)              |                         |



| Type of interface            | 24 V DC, 3-wire, PNP     | AS-Interface Bus           | DeviceNet                  |
|------------------------------|--------------------------|----------------------------|----------------------------|
| Supply                       |                          |                            |                            |
| Operating voltage            | 24 V DC (+20 %, -12.5 %) | 26.5–31.0 V DC             | 21.5–26.0 V DC             |
| No-load current              | ≤ 25 mA                  | ≤ 25 mA                    | ≤ 35 mA                    |
| Maximum current consumption  | 205 mA                   | 105 mA                     | 90 mA                      |
| Polarity reversal protection | Yes                      | Yes                        | Yes                        |
| Specification                |                          | AS-i V3.0 (max. 62 slaves) |                            |
| Additional information       |                          | IO.ID.ID2-Code: 7.A.E      | 221-002917DNET-TVIS_R1.eds |
| Conformity                   |                          | AS-i association           | ODVA                       |

| Inputs                                       |                   |               |              |
|--|-------------------|---------------|--------------|
| Connection type                              | 24 V DC (PNP)     |               |              |
| Short circuit proof                          | Yes               |               |              |
| Overload-proof                               | Yes               |               |              |
| Maximum current carrying per feedback output | 100 mA            |               |              |
| Voltage drop at the outputs                  | ≤ 1 V             |               |              |
| Feedback "start position"                    | Electronic output | Data bit DI 0 | Data bit I 0 |
| Feedback "end position"                      | Electronic output | Data bit DI 1 | Data bit I 1 |
| Feedback "seat lift position"                | Electronic output | Data bit DI 2 | Data bit I 2 |

| Outputs                       |                          |               |              |
|-------------------------------|--------------------------|---------------|--------------|
| Activation voltage            | > 13V = high; < 6V = low |               |              |
| Current consumption per input | < 10 mA                  |               |              |
| Activation "PV Y1"            | Electronic input         | Data bit DO 0 | Data bit O 0 |
| Activation "PV Y2"            | Electronic input         | Data bit DO 1 | Data bit O 1 |
| Activation "PV Y3"            | Electronic input         | Data bit DO 2 | Data bit O 2 |

| Position                       | Description of the order code   |
|--------------------------------|---|
| 1                              | <b>Feedback location</b>  |
|                                | TA15 Control top T.VIS® A-15  |
| 2                              | <b>Control top type</b>   |
|                                | N Without solenoid valve  |
|                                | P 1 solenoid valve Y1   |
|                                | I 2 solenoid valves Y1, Y2  |
|                                | J 2 solenoid valves Y1, Y3  |
| L 3 solenoid valves Y1, Y2, Y3 |   |
| 3                              | <b>Feedback</b>   |
|                                | 8 2 digital feedbacks   |
| 4                              | <b>Type of interface</b>  |
|                                | A AS-Interface BUS  |
|                                | B 24 V DC PNP   |
|                                | D DeviceNet   |
| 5                              | <b>Solenoid valve</b>   |
|                                | A 24 V DC, 0.85 W   |
|                                | 0 Without   |
| 6                              | <b>Screw fitting</b>  |
|                                | J Metric air connection, 5-pin M12 plug for 24 V DC (1 PV, 2 feedbacks), AS-i   |
|                                | P Inch air connection, 5-pin M12 plug for 24 V DC (1 PV, 2 feedbacks), AS-i   |
|                                | H Metric air connection, 8-pin M12 plug for 24 V DC (> 1 solenoid valve, > 2 feedbacks)   |
|                                | I Inch air connection, 8-pin M12 plug for 24 V DC (> 1 solenoid valve, > 2 feedbacks)   |
|                                | M Metric air connection, M20×1,5 cable gland with integrated terminal strip   |
|                                | Z Inch air connection, 0.5" NPT cable gland with integrated terminal strip  |
|                                | <b>Options (multiple selection possible)</b>  |
|                                | /18 Supply Air throttle: regulates the opening speed of the valves  |
|                                | /19 Exhaust air throttle: regulates the closing speed of the valves   |
|                                | /22 24 V DC/AS-i: 5-pin connection socket for screw fitting J, P (article no. 508-963)<br>24 V DC: 8-pin connection socket for for screw fitting H, I (article no. 508-061) |
|                                | /67 Protection class IP67 (temporary immersion)   |
|                                | /69k Protection class IP69k (high pressure spray down)  |
|                                | /81 AS-i connection box on cable 1 m with 5-pin M12 connection socket (article no. 508-027)   |
|                                | /82 AS-i connection box on cable 2 m with 5-pin M12 connection socket (article no. 508-028)   |
|                                | /UC Certification UL/CSA  |

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

| Position | 1    | 2 | 3 | 4 | 5 | 6 | Options |  |  |  |  |  |  |  |  |  |
|----------|------|---|---|---|---|---|---------|--|--|--|--|--|--|--|--|--|
| Code     | TA15 |   | 8 |   |   |   |         |  |  |  |  |  |  |  |  |  |

### Concept

As a controller based on the technology of the T.VIS® A-15 with path measuring system, the T.VIS® P-15 in combination with an air-spring actuator can move to any required valve position between the open/close positions.

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

### Standard variant



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

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

### Structure

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

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

The control top can be opened for this.

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

The T.VIS® P-15 is equipped as standard with adjustable supply and exhaust air throttles.

## Position control

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

## Setting

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

Directly following the set-up, the open/close position tolerances, the control hysteresis and control characteristics can be set in the parameter menu.



## Visualization

### LED display:

- Green
- Yellow
- Red
- Blue
- Blue flashing

## Feedback

- Standard: valve position 0–100 %, travel (4–20 mA)
- Optional: 24 V DC binary signals for closed and opened position

## Service mode

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

## Field of application

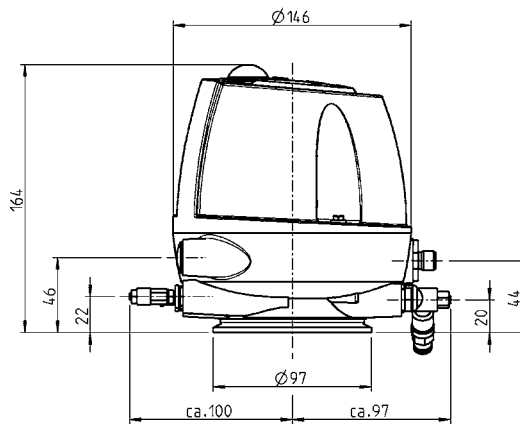
The T.VIS® P-15 can be used on VARIVENT® and ECOVENT® valves for controlling the valve disc position. Opening the valves to specific intermediate positions makes it possible to influence the hydraulic characteristics of the system. In N-valves, a control cone is available as an option which permits precise hydraulic setting.

## Flow control

The T.VIS® P-15 position controller offers not only linear position signal transformation, but also the possibility of equal percentage position signal transformation. This permits significantly more precise position control of the valve disc in positions close to the non-actuated position.



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



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





## Concept

The SES is characterized by proven sensor technology. The control top consists of an interface module, up to 2 sensors for valve position feedback and up to 3 solenoid valves which can also be installed subsequently.

The SES is only available in PA 12/L material, because conductivity of the material is required for use in ATEX/Ex areas.

### Features

|  |
|--|
| Proven NAMUR sensors                   |
| Simple and quick adjustment of sensors |
| Flexible modular system                |
| Selection of various solenoid valves   |
| Retro-fittable                         |



- 2 Interface module
- 3 Proximity switches
- 4 Solenoid valves
- 8 Cable gland

## Position detection

**Proximity switches** – the valve positions are recorded using two manually adjustable proximity switches for the non-actuated and actuated position.

## Setting

**Mechanical** – the sensors are calibrated mechanically using the positioning spindles, which are subsequently secured to prevent adjustment.

## Field of application

Use in potentially explosive atmospheres is permitted:\*

- **With proximity switch\*\* up to zone 1 and 20**
  - For connection to approved intrinsically safe equipment
  - ATEX identification:
    - II 2G Ex ia IIC T6, T1 Gb
    - II 1D Ex ia IIIC T135 °C Da
- **With solenoid valve up to zone 0 and 20**
  - For connection to approved intrinsically safe equipment
  - ATEX identification:
    - II 1 GD
    - Ex ia IIC T4, T5 or T6 Ga
    - Ex ia IIIC T85 °C, T100 °C or T135 °C Da
- **With interface module**
  - Not subject to Ex approval because it is a purely passive component

## Please note

- \*) There is no ATEX certification for the complete control top. Certifications can only be issued for the individual components of the control top. Please note that the permitted Ex-zone/ATEX category of the complete control top depends on the approval of the component with the lowest protection level. The entire control top with all components is optionally certified according to:
- CSA C22.2
  - ANSI/ISA 82.02.01-1999
  - UL 1203, 4th Ed.
  - UL 429, 6th Ed.
  - ISA/ANSI 12.12.01-2011
- \*\*\*) The intrinsically safe components are only allowed to be individually connected to an approved safety barrier. This arrangement permits use in a risk area.

## Visualization

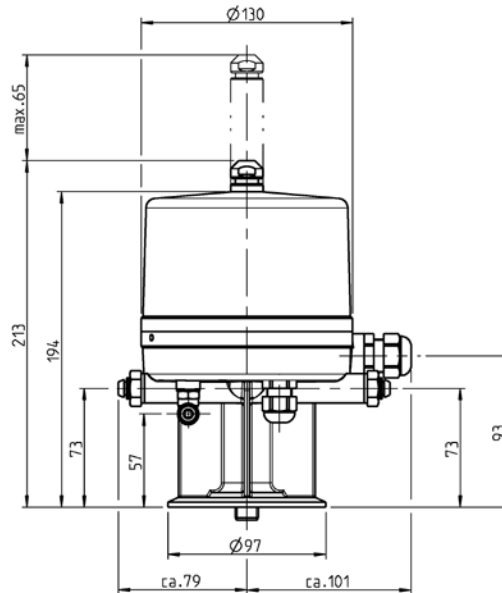
The position of the switch bar projecting from the control top makes it possible to detect what the position of the valve is.





| Technical data of the standard version        |                                       |                         |
|---|---------------------------------------|-------------------------|
| Position detection                            | Inductive proximity switches          |                         |
| Housing material                              | PA 12/L                               |                         |
| Ambient temperature                           | 0 to 45 °C                            |                         |
| Air supply                                    | Pressure range                        | 1.5 to 7 bar            |
|   | Standard                              | acc. to ISO 8573-1:2010 |
|   | Solid content                         | Quality class 6         |
|   | Water content                         | Quality class 4         |
|   | Oil content                           | Quality class 3         |
| Dimensions of air connections                 | Metric 6/4 mm, inch 6.35/4.31 mm (¼") |                         |
| Protection class                              | IP65*                                 |                         |
| Sound pressure level via exhaust air throttle | Max. 72 dB                            |                         |
| Visualization                                 | Position of switch rod                |                         |

\* Not for overhead installation



| Type of interface  | EEx / ATEX (12 V DC)   | EEx / ATEX (24 V DC)   |
|--------------------|--|--|
| Sensor             |  |  |
| Communication      | NAMUR 8.2 VDC<br>(operating voltage 6–30 V DC)                                   | NAMUR 8.2 VDC<br>(operating voltage 6–30 V DC)                                   |
| Equipment category | II 2 G Ex ia IIC T6...T1 Gb<br>II 1 D Ex ia IIIC T135 °C Da                      | III 2 G Ex ia IIC T6...T1 Gb<br>II 1 D Ex ia IIIC T135 °C Da                     |
| Article no.        | 505-093  | 505-093  |
| Solenoid valve     |  |  |
| Rated voltage      | 12 V DC –10 % / +25 %  | 24 V DC –10 % / +15 %  |
| Rated power        | 0.5 W  | 0.5 W  |
| Equipment category | II 1 GD<br>Ex ia IIC T4, T5 or T6 Ga<br>Ex ia IIIC T85 °C, T100 °C or T135 °C Da | II 1 GD<br>Ex ia IIC T4, T5 or T6 Ga<br>Ex ia IIIC T85 °C, T100 °C or T135 °C Da |
| Article no.        | 512-124  | 512-155  |

| Position | Description of the order code  |
|----------|--|
| 1        | <b>Feedback location</b><br>SES. Control top sensor technology   |
| 2        | <b>Control top type</b><br>N Without solenoid valve<br>P 1 solenoid valve Y1<br>I 2 solenoid valves Y1, Y2<br>L 3 solenoid valves Y1, Y2, Y3 |
| 3        | <b>Feedback</b><br>0 Without<br>1 1 feedback<br>2 2 feedbacks  |
| 4        | <b>Type of interface</b><br>E EEx/ATEX   |
| 5        | <b>Solenoid valve</b><br>0 Without<br>E 12 V DC, ATEX<br>X 24 V DC, ATEX   |
| 6        | <b>Screw fitting</b><br>E Metric air connection, Pg 13.5 cable gland<br>N Inch air connection, Pg 13.5 cable gland                           |
|          | <b>Options (multiple selection possible)</b><br>/UC Certification UL/CSA   |



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

|                 |      |   |   |   |   |   |         |
|-----------------|------|---|---|---|---|---|---------|
| <b>Position</b> | 1    | 2 | 3 | 4 | 5 | 6 | Options |
| <b>Code</b>     | SES. |   |   | E |   |   | /UC     |



### INK – Proximity switch holder with bracket for 2 proximity switches M12×1

The proximity switch holder with bracket can be used as an alternative to feedback systems if a control top is not desired above the actuator. The holders are integral parts of the bracket for the pneumatic actuator. The order code INK allows for a choice of proximity switches to be ordered for the valve.

#### Technical data

|          |             |
|----------|-------------|
| Material | AISI 304    |
| Surface  | Metal blank |



### INH – Proximity switch holder for manual actuator for 2 proximity switches M12×1

This clip-on bracket can be installed in two horizontal positions and two vertical positions, thereby offering up to 8 different configurations for proximity switches of size M12×1 as well as an eyelet for a padlock to secure the mechanical, standard manual actuator in the closed valve position. The depicted lock is only an example. The holders are integral parts of the optional bracket for the manual actuator. The order code INH allows for a choice of proximity switches to be ordered for the valve.

#### Technical data

|          |      |
|----------|------|
| Material | PA12 |
|----------|------|

| Position | Description of the order code  |
|----------|--|
| 1        | <b>Feedback location</b>   |
|          | INK. Proximity switch holder with bracket for 2 proximity switches M12x1 (only actuator type 2)        |
|          | INH. Proximity switch holder for manual actuator for 2 proximity switches M12x1 (only actuator type 0) |
| 2        | <b>Feedback</b>  |
|          | 0 Without  |
|          | 1 1 feedback   |
|          | 2 2 feedbacks  |
| 3        | <b>Type of switch</b>  |
|          | 0 Without  |
|          | B NI 24 V DC 3-wire PNP M12x1 with terminal chamber (Article No. 505-088)                              |
|          | F NI 24 V DC 2-wire M12x1 with terminal chamber (Article No. 505-104)                                  |
|          | E NI NAMUR M12x1 with terminal chamber (Article No. 505-085)   |
|          | X NI 24 V DC 3-wire opened with terminal chamber (Article No. 505-089)                                 |
|          | S NI 24 V DC 3-wire PNP M12x1 with connector (Article No. 505-096)                                     |



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

| Position | 1 | 2 | 3 |
|----------|---|---|---|
| Code     |   |   |   |

External proximity switches M12×1 for mounting on the actuator or in the lantern.



Electrical connection by M12×1 connector



Electrical connection by wiring in the terminal chamber

| Technical data                |               |
|-------------------------------|---------------|
| Protection class              | IP67          |
| Operating voltage             | 10–30 V DC    |
| Material                      | PA 12/VA      |
| Permitted ambient temperature | –25 to +85 °C |

| Proximity switch M12×1 for INA, LAT              | Nominal switching distance | Article no. |
|--|----------------------------|-------------|
| 2-wire (terminal chamber)                        | 2 mm                       | 505-104     |
| 3-wire PNP (terminal chamber)                    | 3 mm                       | 505-088     |
| 3-wire PNP (Connector M12×1)                     | 4 mm                       | 505-096     |
| 4-wire NPN/Changeover contact (terminal chamber) | 3 mm                       | 505-105     |

| Technical data                |               |
|-------------------------------|---------------|
| Protection class              | IP67          |
| Operating voltage             | 7.5–30 V DC   |
| Material                      | 316L/PEEK     |
| Permitted ambient temperature | –20 to +55 °C |

| Proximity switch M12×1 for T.VIS® | Nominal switching distance | Article no. |
|-----------------------------------|----------------------------|-------------|
| 2-wire/NAMUR (Connector M12×1)    | 4 mm                       | 505-098     |

| Technical data                |                           |
|-------------------------------|---------------------------|
| Protection class              | IP67                      |
| Operating voltage             | 8.2 V DC nom.             |
| Material                      | Brass, chrome-plated/PA12 |
| Permitted ambient temperature | –25 to +70 °C             |
| Marking                       | Ⓔ II 2 G EEx ia IIC T6    |

| Proximity switch M12×1 for SES  | Nominal switching distance | Article no. |
|---------------------------------|----------------------------|-------------|
| 2-wire/NAMUR (terminal chamber) | 2 mm                       | 505-085     |



Switch bars and adapters

The following components are required for subsequent installation of a control and feedback system on a Butterfly Valve T-smart.

| Butterfly Valve T-smart 7 |             |                             |            |
|---------------------------|-------------|-----------------------------|------------|
|                           | T.VIS® M-15 | T.VIS® A-15/<br>T.VIS® P-15 | SES        |
| Switch bar                | 224-001697  | 224-001696                  | 224-001548 |
| Adapter switch bar        | -           | -                           | 224-001549 |

| Mixproof Butterfly Valve T-smart 9 |             |             |            |
|------------------------------------|-------------|-------------|------------|
|                                    | T.VIS® M-15 | T.VIS® A-15 | SES        |
| Switch bar                         | 224-001697  | 224-001696  | 224-001548 |
| Adapter switch bar                 | -           | -           | 224-001549 |



Switch bar 224-001697  
for T.VIS® M-15



Switch bar 224-001696  
for T.VIS® A-15/T.VIS® P-15

The IP protection classes inform about the scope at which the housing of an electrical device is protected against ingress of solids (first number) and moisture (second number).

So called IP-codes are assigned to the protected systems. Their index figures represent common error options against which the system is protected. The code starts with the letters IP for "International Protection".

Meaning of the index numbers

|           |   |
|-----------|---|
| 1. Index* | Protection from solids  |
| 6         | Dust-tight  |
| 2. Index* | Protection from moisture                                      |
| 6         | Protection from powerful water jet                            |
| 7         | Protection from temporary immersion                           |
| 9k        | Protection from water at high pressure/<br>steam jet cleaning |

\* Further indices and more precise explanations can be found in the corresponding standard.

If an index number is not to be stated, it is replaced by the letter x (e.g. IPx6).

For the 2nd index figure (protection from moisture), the following applies:

- The protection class IPx6 includes all protection classes below.
- **This does not apply to the higher protection class IPx7.** If this protection class is to include a lower protection class, this is to be indicated by a combination of index figures (e.g. IP67/69k).

The TVIS® control top designs of the M-15 and A-15 comply with the requirements of protection class IP66 (DIN EN 60529) as standard. Designs in the stronger protection classes IP67 or IP69k (both DIN EN 60529) are also available.











## Semi-Automatic Setup

By means of the semi-automatic setup, a control top can be replaced without interrupting the current process.

For this, an employee only needs to perform the simple configuration once on site: in the version in protection class IP66 with two push buttons on the T.VIS® cap, and for the optional protection classes IP67 and IP69k with the cap removed right with the two buttons below.

For the semi-automatic set-up, the control top initially only learns the position of the valve disc on the non-actuated position and then remains until the valve is actuated in the scope of a running process. Only then will the end position of the valve be stored. The process thus does not need to be stopped!

The semi-automatic set-up is integrated into the T.VIS® A-15 as standard and does not require any additional hardware.

|   | Order code for air connection |      | In conjunction with screw fitting or plug            | Use  | Matching connection socket |             |   |
|---|-------------------------------|------|--|--|----------------------------|-------------|---|
|   | Metric                        | Inch |  |  | Option                     | Article no. | Designation   |
|    | M                             |      | M20x1.5 cable gland                                  | T.VIS® M-15<br>T.VIS® A-15   | -                          | -           | -   |
|    | E                             |      | Pg 13.5 cable gland                                  | SES  | -                          | -           | -   |
|    |                               | Z    | 0.5" NPT cable gland                                 | T.VIS® M-15<br>T.VIS® A-15   | -                          | -           | -   |
|    |                               | N    | Pg 13.5 cable gland                                  | SES  | -                          | -           | -   |
|    | A                             | S    | M20x1.5 cable gland with connection box on cable 1 m | T.VIS® M-15 (AS-i)   | -                          | -           | -   |
|  | L                             | U    | 2-pin M12-plug (A-coded)                             | T.VIS® M-15 (AS-i)   | /22                        | 508-963     | 5-pin M12 connection socket (A-coded)                                       |
|   |                               |      |  |  | /81                        | 508-027     | AS-i connection box on cable 1 m with 5-pin M12 connection socket (A-coded) |
|   |                               |      |  |  | /82                        | 508-028     | AS-i connection box on cable 2 m with 5-pin M12 connection socket (A-coded) |
|  | D                             | K    | 5-pin M12 plug (A-coded)                             | T.VIS® M-15 (DeviceNet)  | /22                        | 508-963     | 5-pin M12 connection socket (A-coded)                                       |
|  | J                             | P    | 5-pin M12-plug (A-coded)                             | T.VIS® M-15 (24 V DC)  | /22                        | 508-963     | 5-pin M12 connection socket (A-coded)                                       |
|   |                               |      |  | T.VIS® A-15 (24 V DC)<br>T.VIS® A-15 (AS-i)<br>T.VIS® A-15 (DeviceNet) |                            |             |   |
|   |                               |      | 5-pin M12 plug (B-coded)                             | T.VIS® P-15  |                            | 508-964     | 5-pin M12 connection socket (B-coded)                                       |
|  | H                             | I    | 8-pin M12-plug (A-coded)                             | T.VIS® M-15 (24 V DC)  | /22                        | 508-061     | 8-pin M12 connection socket (A-coded)                                       |
|   |                               |      |  | T.VIS® A-15 (24 V DC)  |                            |             |   |
|  |                               | B    | Brad Harrison 0.5" NPT 5-pin plug                    | T.VIS® M-15 (24 V DC)  | -                          | -           | -   |

## 24 V (PNP/NPN)

In 24 V parallel wiring digital signals are exchanged between a terminal unit and generally the corresponding input and output modules of a PLC. In this case, it is necessary to have a separate wire for each signal, usually in the form of a multi-core cable.

PNP (current-supplying) indicates signal transfer against reference potential L<sub>-</sub>.

NPN (current-drawing) indicates signal transfer against reference potential L<sub>+</sub>.

## BUS AS-Interface



AS-Interface (Actuator-Sensor Interface) is a standard in fieldbus communication that was developed for connecting actuators and sensors. This is to replace parallel cabling used in the past. The AS-Interface has been an international standard acc. to EN 50295 and IEC 62026-2 since 1999. AS-i products are certified by the AS International Association, thereby, ensuring that equipment from different manufacturers will work together in the same system. The transmission medium is an unshielded, two-core yellow cable which also carries the electrical power supply (24–30 V direct current voltage) for the communication electronics and the slaves. A maximum of 62 slaves can be used per AS-i master. The slaves are addressed manually using a manual addressing unit or automatically by the master. The maximum length of the AS-i cable is 100 m, although by using repeaters it is possible to extend the entire length up to 400 m.

## DeviceNet bus

DeviceNet is a CAN-based fieldbus that is chiefly used in automation engineering. DeviceNet was developed by Allen-Bradley (part of Rockwell Automation) and later transferred to the ODVA (Open DeviceNet Vendor Association) as an open standard. DeviceNet is chiefly used in the USA and, to a certain extent, Asia. A maximum of 64 network nodes can be used per fieldbus segment. The nodes address is set either using dial or DIP switches on the device, or can be configured using the bus on the basis of software. The maximum length of the DeviceNet cable depends on the selected cable type and baud rate, although it cannot exceed 500 m.

## NAMUR

The 2-wire NAMUR sensors and solenoid valves used here can be operated in the Ex area because of their “intrinsically safe” ignition protection type. Using external isolating switching amplifiers, it is possible to operate control tops with this communication technology up to zone 1 or 21.











## 4–20 mA (3-wire)

In industrial automation engineering, the 4–20 mA current signal is the one most frequently used for analog measured value transmission. The enormously widespread use of this type of signal is explained by its ease of handling and, above all, its resistance to interference.

Using 4 mA as the initial value instead of 0 mA makes it very easy to detect and evaluate a wire break. As a rule, 4–20 mA corresponds to 0–100 % of the physical measuring range of an analog sensor or the working range of an actuator set in the parameters; the nominal value is supplied or the actual value is returned via an interface of this kind.





|              |   |  |
|--------------|---|--|
| AS-i         |    | Actuator Sensor interface. BUS system for the lowest field level.  |
| ATEX         |    | Atmosphères Explosibles. ATEX comprises the directives of the European Union in the area of explosion protection. For one thing, this is the ATEX equipment directive 94/9/EC, for another, the ATEX workplace directive 1999/92/EC.   |
| cCSAus       |    | Test of a product by CSA according to applicable safety standards in Canada and the USA.   |
| CE           |    | Conformité Européenne. By affixing the CE mark, the manufacturer confirms that the product complies with the European directives applicable to the specific product.   |
| CSA          |    | Canadian Standards Association. A non-governmental Canadian organization which issues standards as well as checking and certifying the safety of products. It is now globally active.  |
| cULus        |   | Test of a product by UL according to applicable safety standards in Canada and the USA.  |
| DeviceNet    |   | BUS system of the ODVA organization for complex communication on various field levels.   |
| EG 1935/2004 |  | Materials in contact with the product used in valves from GEA Tuchenhausen GmbH are in accordance with EC regulation 1935/2004. This defines a general framework for materials and objects intended to come into contact with foodstuffs.  |
| EHEDG        |  | European Hygienic Engineering & Design Group. European supervisory authority for foodstuffs and pharmaceuticals. This authority issues approvals and certificates for products and materials that are used in the foodstuffs and pharmaceuticals industries.                                   |
| FDA          |  | Food and Drug Administration. US supervisory authority for foodstuffs and pharmaceuticals. This authority issues approvals and certificates for products and materials that are used in the foodstuffs and pharmaceuticals industries.   |
| ODVA         |   | ODVA is a worldwide association comprising leading automation companies. It develops network protocols and standards in the joint interests of its members, which are used for the international interoperability of production systems.   |
| TA-Luft      |   | If a product is certified according to TA Luft it meets the requirements for proof of high grade performance according to TA Luft of $1.0 \times 10^{-4}$ mbar $\times$ l / (s $\times$ m) at service conditions under the VDI guideline 2440. The product will hence be tested for tightness. |
| TÜV          |   | Technischer Überwachungs-Verein. The German TÜV is a private company which carries out technical safety checks as prescribed in national legislation or regulations.   |
| UL           |  | Underwriters Laboratories. An organization founded in the USA for checking and certifying products and their safety.   |



| Abbreviation | Meaning  |
|--------------|--|
| °C           | Degree Celsius, unit of measurement for temperature  |
| °F           | Degree Fahrenheit, unit of measurement for temperature   |
| A            | Ampere, unit of measurement of current intensity<br>or<br>Output, term used in automation  |
| AC           | Alternating Current  |
| AISI         | American Iron and Steel Institute,<br>association of the American steel industry   |
| ANSI         | American National Standards Institute,<br>American body for standardizing industrial processes   |
| AS-i         | Actuator Sensor interface,<br>standard for fieldbus communication  |
| ASME         | American Society of Mechanical Engineers,<br>professional association of mechanical engineers in the USA   |
| ASME-BPE     | Standard of the ASME's bioprocessing equipment association   |
| ATEX         | Atmosphères Explosibles,<br>synonymous with the directives of the European Union for potentially explosive areas   |
| bar          | Unit of measurement for pressure. All pressure values [bar/psi] refer to positive pressure [bar <sub>g</sub> /psi <sub>g</sub> ],<br>unless specifically stated otherwise. |
| CAN          | Controller Area Network; asynchronous serial bus system  |
| CE           | Conformité Européenne,<br>administrative symbol for the free movement of industrial products   |
| CIP          | Cleaning In Place,<br>designates a process for cleaning technical process systems.   |
| CSA          | Canadian Standards Association,<br>a non-governmental Canadian Standardization organization  |
| dB           | Decibel, one tenth of a bel, named after Alexander Graham Bell and used for<br>identifying levels and dimensions   |
| DC           | Direct Current   |
| DIN          | Deutsches Institut für Normung e. V. Standardization organization in the<br>Federal Republic of Germany, DIN = synonym for standards issued by the organization            |
| DIP          | Dual Inline Package, design of a switch  |
| DN           | Diameter Nominal, DIN nominal width  |
| E            | Input, term used in automation   |
| EHEDG        | European Hygienic Engineering and Design Group. Consortium of equipment manufacturers,<br>food industries, research institutes as well as public health authorities        |
| EN           | European standard,<br>rules of the European Committee for Standardization  |
| EPDM         | Ethylene propylene diene rubber,<br>acronym acc. to DIN/ISO 1629   |
| Ex           | Synonym for ATEX   |
| FDA          | Food and Drug Administration,<br>official foodstuffs monitoring in the United States   |

| Abbreviation      | Meaning   |
|-------------------|---|
| FKM               | Fluorinated rubber, acronym acc. to DIN/ISO 1629  |
| H                 | Henry, unit of measurement for inductance   |
| HNBR              | Hydrated acrylonitrile butadiene rubber, acronym acc. to DIN/ISO 1629   |
| Hz                | Hertz, unit of frequency named after Heinrich Hertz   |
| I                 | Formula symbol for electrical current   |
| IEC               | International Electrotechnical Commission, international standardization organization for electrical and electronic engineering   |
| IP                | Ingress Protection/International Protection, index of protection class acc. to IEC 60529  |
| ISA               | International Society of Automation, international US organization of the automation industry   |
| ISO               | International Organization for Standardization, international organization that produced international standards, ISO = synonym for standards from the organization                                     |
| kg                | Kilogram, unit of measurement for weight  |
| Kvs               | The Kv values of a valve at nominal stroke (100 % opening) is designated the Kvs value  |
| L                 | Conductive  |
| LED               | Light-Emitting Diode  |
| mm                | Millimeter, unit of measurement for length  |
| M                 | Metric, system of units based on the meter<br>or<br>Mega, one million times a unit  |
| m <sup>3</sup> /h | Cubic meters per hour, unit of measurement for volumetric flow  |
| max.              | Maximum   |
| NAMUR             | Standardization working association for measuring and control technology in the chemical industry, synonym for the interface type of the organization, especially for potentially explosive atmospheres |
| NPN               | Signal transmission against reference potential, current-consuming  |
| NPT               | National Pipe Thread, US thread standard for self-sealing pipe fittings   |
| OD                | Outside Diameter, pipe dimension  |
| ODVA              | Open DeviceNet Vendor Association, global association for network standards   |
| PA 12/L           | Polyamide   |
| Pg                | Armoured thread   |
| PLC               | Programmable Logic Controller, device for controlling a machine or system on a digital basis  |
| PNP               | Signal transmission against reference potential, current-supplying  |

| Abbreviation         | Meaning   |
|----------------------|---|
| PV                   | Solenoid valve  |
| R <sub>a</sub> in μm | Average roughness value, describes the roughness of a technical surface   |
| RM                   | Feedback  |
| SES                  | GEA Tuchenhagen control head for Ex areas, control top system of GEA Tuchenhagen  |
| SET-UP               | Self-learning installation, the SET-UP procedure carries out all necessary settings for generating messages during commissioning and maintenance. |
| SIP                  | Sterilization in Place, refers to a process for cleaning technical process systems  |
| SMS                  | Svensk Mjök Standard, Scandinavian pipe dimension   |
| T.VIS®               | GEA Tuchenhagen valve information system, control top system from GEA Tuchenhagen   |
| T-smart              | Valve series from GEA Tuchenhagen   |
| UL                   | Underwriters Laboratories, a certification organization established in the USA  |
| UV                   | Ultraviolet, ultraviolet radiation is a wavelength of light   |
| V                    | Volt, unit of measurement for voltage   |
| VARICOMP®            | Pipe expansion compensator from GEA Tuchenhagen   |
| VMQ                  | High-polymer vinyl methyl polysiloxane, silicone rubber, MVQ = synonym  |
| W                    | Watt, unit of measurement for power   |
| Y                    | Control air connection for the working cylinder, designation from pneumatic systems   |
| μ                    | Micro, one millionth of a unit  |
| Ω                    | Ohm, the unit of electrical resistance named after Georg Simon Ohm  |



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