

Triple-eccentric Butterfly Valves
by SAMSON LEUSCH

LEUSCH SINCE 1974

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SAMSON LEUSCH: innovation, development, design, machining and manufacture of first-rate triple-eccentric control and shut-off butterfly valves

At the company headquarters in Neuss, Germany, LEUSCH produces standard valves for industrial applications as well as versions tailored to specific customer specifications. SAMSON LEUSCH stands for German engineering and customized manufacturing of control and shut-off butterfly valves to meet specific customer requirements. Our valves fulfill highest expectations.

The triple-eccentric Type LTR 43 Control and Shut-off Butterfly Valve is the key product in our portfolio. Additionally, the product range includes special valves, also versions fitted with integrated handwheel gearing as well as pneumatic, hydraulic or electric actuators.

LEUSCH was founded in 1974 and joined forces with SAMSON in 2003. SAMSON AKTIENGESELLSCHAFT headquartered in Frankfurt am Main, Germany is a worldwide leader in the manufacture of expertly engineered control valves. With subsidiaries in over 80 countries, SAMSON is represented all across the world to assist customers on all continents. LEUSCH customers also benefit from this network as it guarantees worldwide sales and after-sales service for our products as well.

SAMSON LEUSCH butterfly valves are used in all major industrial applications, such as oil and gas, refineries, the chemical industry, seawater desalination, pulp and paper, gas extraction and transport, power plant construction, ship building as well as onshore and offshore technology.

A technical line drawing of a butterfly valve, showing the circular body with several bolt holes around the perimeter and the internal disc mechanism. The drawing is rendered in a light blue color against a darker blue background.

PRIME QUALITY

The prime quality that the SAMSON LEUSCH products are known for is based on the commitment and hard work of our highly skilled staff: they do their best to get better every day. Our staff make sure that our butterfly valves are sized, configured, designed and manufactured to perfectly meet the specific customer requirements.

SAMSON LEUSCH butterfly valves feature high flow capacities and an excellent control accuracy.

Quality is our tradition. To meet the high quality requirements placed on our products, our construction and production are based on the ISO 9001:2015, HP 0/TRD 201 quality management systems as well as on international standards, such as the European Pressure Equipment Directive 2014/68/EU.

All valves leaving our works have been subjected to a 100 % leak, function and quality testing procedure. Thanks to production planning and scheduling, customers know the manufacturing and testing status of their valves at any time.

The special design characteristics, the use of high-quality materials and their specific machining make our high-performance valves suitable for extreme operating conditions, such as high and low temperatures, high pressures and other challenging applications.

As standard, our valves comply with strictest requirements concerning fire safety and fugitive emissions (TA Luft, ISO 15848) and they shut off tightly in both directions of flow.

As a modern manufacturer, SAMSON LEUSCH stands for sustainability and continuity. We use our commitment and technical expertise to achieve the highest level of safety, reliability and durability with our control and shut-off butterfly valves. Every control valve that we make is the result of decade-long experience, continuous development and compliance with the strictest standards.



SAMSON's LEUSCH product line includes:

- **Control and shut-off butterfly valves**
NPS 3 to 96 (DN 80 to 2400)
Class 150 to 2500 (PN 10 to 420)
- **Ball valves**
NPS ½ to 60 (DN 15 to 1500)
Class 150 to 2500 (PN 10 to 420)
- **Three-way or four-way valves**
NPS ½ to 36 (DN 15 to 900)
Class 150 to 2500 (PN 10 to 420)
- **Special constructions**
According to customer requirements
- **Actuators and accessories**

On request, all valves are available with soft or metal seat, with low-noise trims, and made of special materials.



Flanges,
NPS 4

Welding ends,
NPS 64

A technical drawing of a butterfly valve, showing the circular body with multiple bolt holes around the perimeter and the internal disc mechanism. The drawing is rendered in a light blue color against a darker blue background.

TYPE LTR 43 BUTTERFLY VALVE

Triple-eccentric control and shut-off butterfly valve

■ **Valve size** **NPS 3 to 100 (DN 80 to 2400)**

■ **Pressure rating** **Class 150 to 2500 (PN 6 to 420)**

Wafer, lug, double flanged, or welding ends

Metal or soft seated

Leakage class VI acc. to ANSI FCI 70-2/IEC 60534-4
(EN 12266-1 Class A)

Seat of laminated 1.4404/graphite
or 316L/graphite, or special materials

Designed acc. to EN 12516, ANSI B16.34,
and API 609

Materials: C steel, stainless steel, titanium, Hastelloy®,
Inconel®, Monel®, duplex steel, SMO, bronze,
zirconium, etc.

■ **Options:**

– Low-emissions packing acc. to TA Luft/
ISO 15848

– Low-noise and anti-cavitation trims

– Heating jacket

– Anti-surge design

– ESD version

– Outer bearings, inner packing

– Cryogenic and high-temperature versions

– Fire-safe design acc. to API 607/ISO 10497

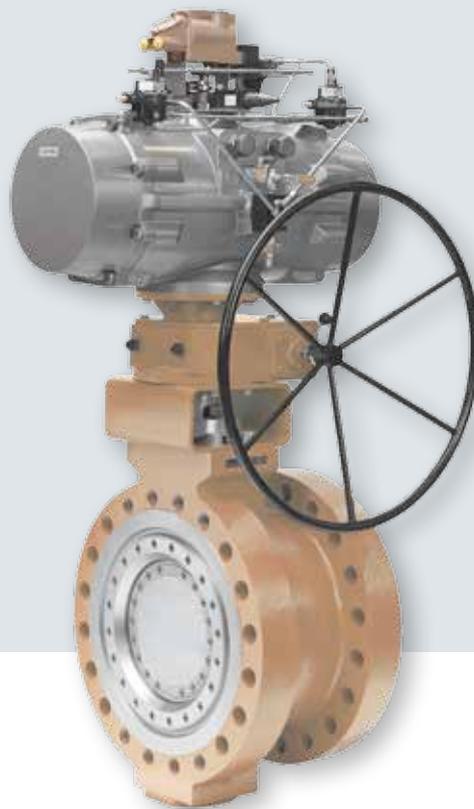
– Quick-closing version (< 0.5 s)

– NACE version acc. to MR0103/MR0175/
ISO 15156



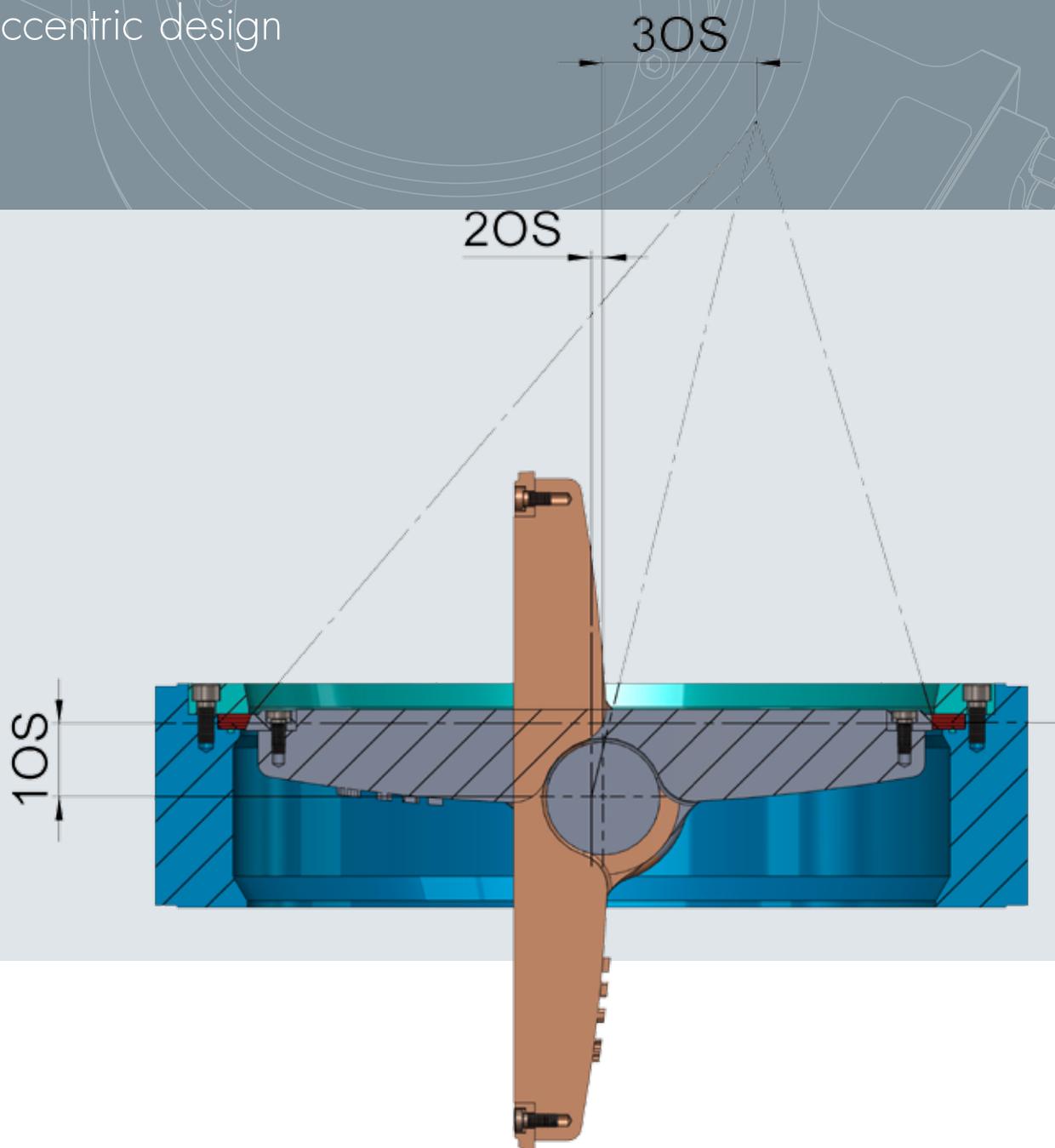
■ **Applications:**

- Refineries
- LNG, cryogenics
- Petrochemicals
- Steel works
- Solar
- Compressors
- Ammonia, urea
- Chemicals
- Power plants
- Steam and gas turbines



TRIPLE-ECCENTRIC DESIGN OF TYPE LTR 43

Triple-eccentric design





The conical triple-eccentric seat of the Type LTR 43 Control and Shut-off Butterfly Valve provides various benefits:

- At the slightest rotary motion, the seal is lifted off the body seat, which means that there is no transition from static to dynamic friction between the seat and plug.
- The conical shape prevents the butterfly disk from getting jammed.
- The control and shut-off butterfly valve can be used for both directions of flow:
FTO = flow-to-open (the medium opens the disk)
FTC = flow-to-close (the medium closes the disk)
- The seat's conical shape ensures maximum shut-off performance even at extreme temperature fluctuations and pressure peaks.
- The valves have an extraordinarily long service life since they open and close almost without friction and mechanical initial breakaway torque.
- Thanks to their patented disk profile (patent no. DE 10 2012 102 4720 A1), the control and shut-off butterfly valves are also suitable for use in supercritical processes.

Triple-offset design principles:

- First offset: The shaft is positioned fully in front of the facing of the disk and seat. The result is one continuous, uninterrupted facing. This allows a high degree of tightness to be achieved as there are no more transitions between disk and shaft in the sealing area.
- Second offset: The shaft is slightly offset from the centerline of the body. This gives the butterfly valve a flow-to-close (FTC) and a flow-to-open (FTO) closing direction. If the butterfly valve is installed in the standard FTC direction, the process medium helps keep the valve shut.
- Third offset: The beveled conical seat geometry prevents friction, and thus wear and tear, when the valve is opened or closed. The initial breakaway torques are minimized. The large facing allows strictest leakage requirements to be met.

DIFFERENT SEAT DESIGNS OF TYPE LTR 43

Triple-eccentric design

■ Standard series 2

The seat (labyrinth seal, 4), which is protected inside the body, and the massive seat ring (3) can be replaced as the retaining ring (5) is removable.
Best solution for critical applications, such as control to meet strict leakage requirements

■ Optional series 3

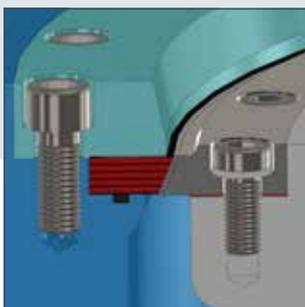
The massive seat ring (3) with optional Stellite® facing used in the standard version can be replaced. Additionally, the body seat comes with a Stellite® armor for better wear protection
Preferred use in welded-in versions

■ Optional series 4

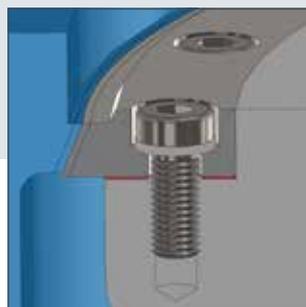
Only the seat ring (labyrinth seal, 3) can be replaced.
The body seat comes with a Stellite® armor for better wear protection
Main application for manual, non-critical service

■ Optional series 5

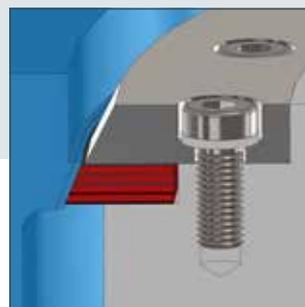
The massive seat and retaining ring assembly (5) as well as the massive seat ring (3) can be replaced.
For very high flow velocities, abrasive media and high pressure drops



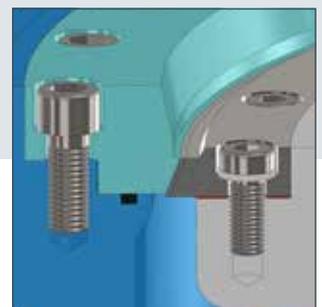
Optional series 2



Optional series 3



Optional series 4



Optional series 5

SPECIAL APPLICATIONS OF TYPE LTR 43

Triple-eccentric control butterfly valves

- **Type LTR 43 Control Butterfly Valve, NPS 24, Class 150 with low-noise and anti-cavitation trims**

Exchangeable partial attenuation plates
Anti-surge trim design
Metal seated
Seat and seat ring with Stellite® facing
With double-acting DR 10000-A actuator and Type 3730-5 Electropneumatic Positioner with FOUNDATION™ fieldbus communication



- **Type LTR 43 Control Butterfly Valve, NPS 16, Class 300 with low-noise and anti-cavitation trims**

With downstream silencer including perforated attenuation plates in the outlet
Metal seated
Seat and seat ring with Stellite® facing
With single-acting actuator (air-to-open) and electropneumatic positioner



SPECIAL ESD APPLICATION OF TYPE LTR 43

Triple-eccentric shut-off butterfly valves



Fire protection/enclosure

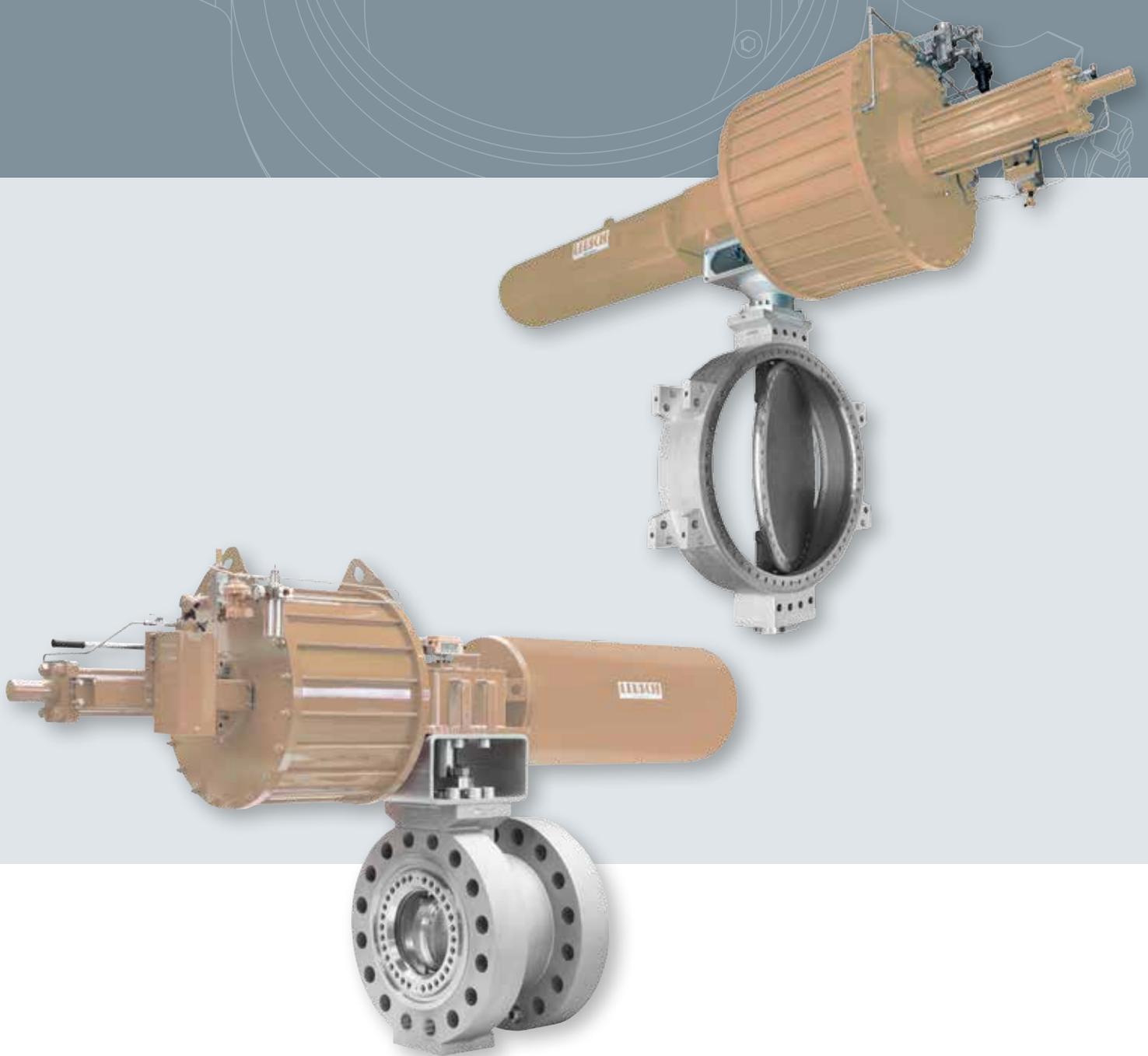


- **ESD (Emergency Shutdown) butterfly valve**
 Metal seated, fire-safe certification according to API 607
 Pneumatic (double-acting or single-acting) actuator

- **Options:**
 - Fire resistance of actuator and accessories according to UL 1709
 - Manual or automatic partial stroke test (PST)
 - Switching cabinet for remote or on-site operation
 - Reservoir for emergency air supply
 - Emergency manual override



SPECIAL BUTTERFLY VALVES





■ **Control butterfly valve, NPS 64, Class 300**

Type LTR 43, wafer style

Metal seated

With single-acting actuator (air-to-close)

and Series 3730 Electropneumatic Positioner

■ **Control butterfly valve, NPS 20, Class 1500**

Type LTR 43, with flanged ends

Metal seated

With single-acting actuator (air-to-open),

manual hydraulic pump,

and Series 3730 Electropneumatic Positioner

BUTTERFLY VALVES FOR CRYOGENIC APPLICATIONS

■ Top-entry butterfly valve

Type LTR 43, with welding ends
Can be serviced while installed in the pipeline
Cryogenic extension bonnet (-196 °C)
Metal seated
With single-acting actuator (air-to-close)
and Type 3730-3 Electropneumatic Positioner
with HART® communication



■ Shut-off butterfly valve, NPS 16, Class 900

Type LTR 43, with flanged ends
Cryogenic extension bonnet (-196 °C)
Metal seated
Leakage class VI
With single-acting actuator including damping system
Less than 0.5 s stroking time





■ **Butterfly valve**

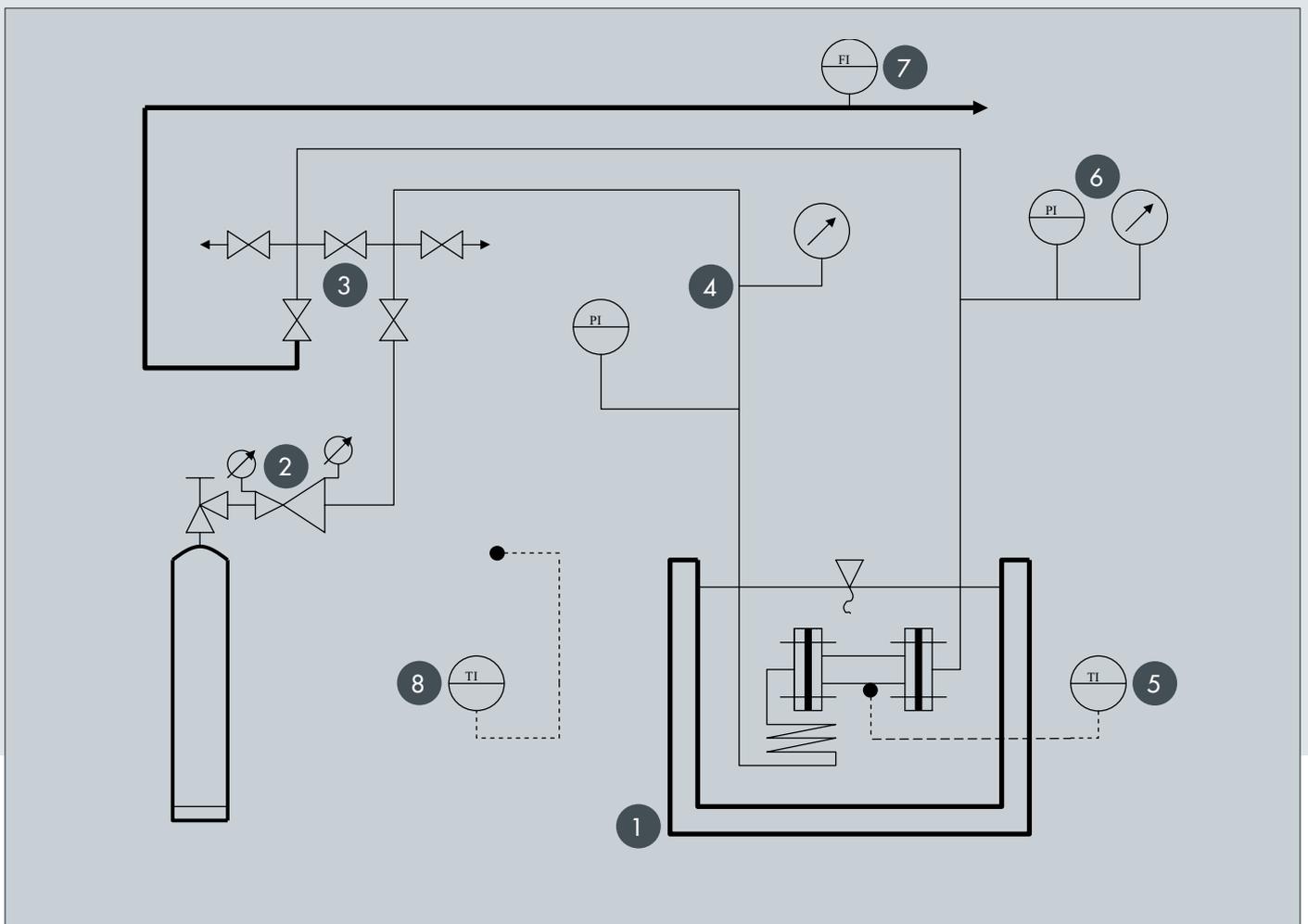
Type LTR 43, with welding ends
cryogenic extension bonnet (insulating section)
for cryogenic service (-196 °C)
including cold-box flange

BUTTERFLY VALVES FOR CRYOGENIC APPLICATIONS

Cryogenic testing: test setup

- 1 Insulated tank (filled with liquid nitrogen)
- 2 Pressure-reducing valve on the helium tank with indicators
- 3 Five-way valve
- 4 Pressure indicator at the valve inlet (digital and analog)
- 5 Temperature indicators inside and on the valve body
- 6 Pressure indicator at the valve outlet (digital and analog)
- 7 Leakage meter
- 8 Temperature indicator for ambient temperature (as reference)





SPECIAL BUTTERFLY VALVES

- **Shut-off butterfly valve, NPS 20, Class 600**

Type LTR 43, with welding ends

Metal seated

Seat with Stellite® facing

With single-acting actuator (air-to-close)



- **Shut-off butterfly valve with heating jacket**

Type LTR 43, wafer style or double-flanged version

Metal seated





- **Anti-surge butterfly valve, NPS 24, Class 300**
Type LTR 43, with flanged ends
With low-noise trim for start-up service
With outer bearings and inner packing
With single-acting actuator (air-to-open)
and Series 3731 Electropneumatic Positioner (Ex d)

SPECIAL BUTTERFLY VALVES

- **Control butterfly valve, NPS 48, Class 150 with low-noise trim and silencer**

The patented low-noise components for Type LTR 43 are effective, reliable and cost-effective solutions to minimize noise emissions, cavitation and erosion. The components can be adapted to the specific operating conditions and retrofitted on existing butterfly valves.

With flanged ends

Metal seated

With double-acting actuator and reservoir for emergency air supply

- **Shut-off butterfly valve, NPS 54, Class 150**

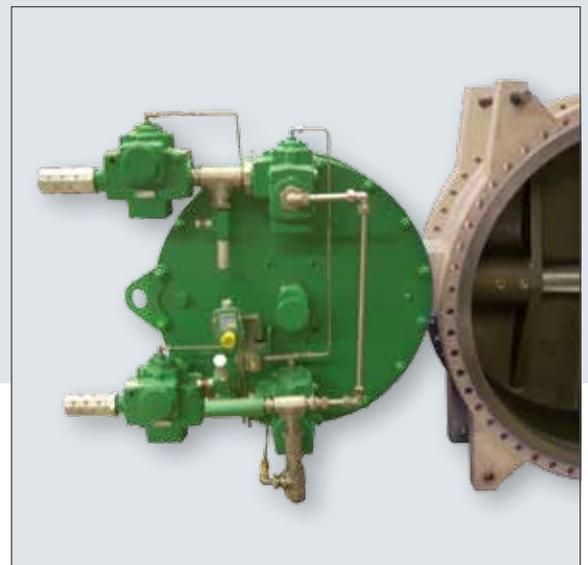
Type LTR 43, with flanged ends

Metal seated

Leakage class VI

With single-acting actuator including damping system

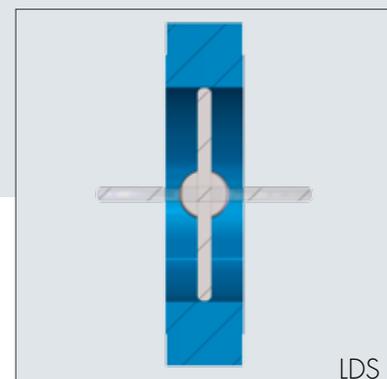
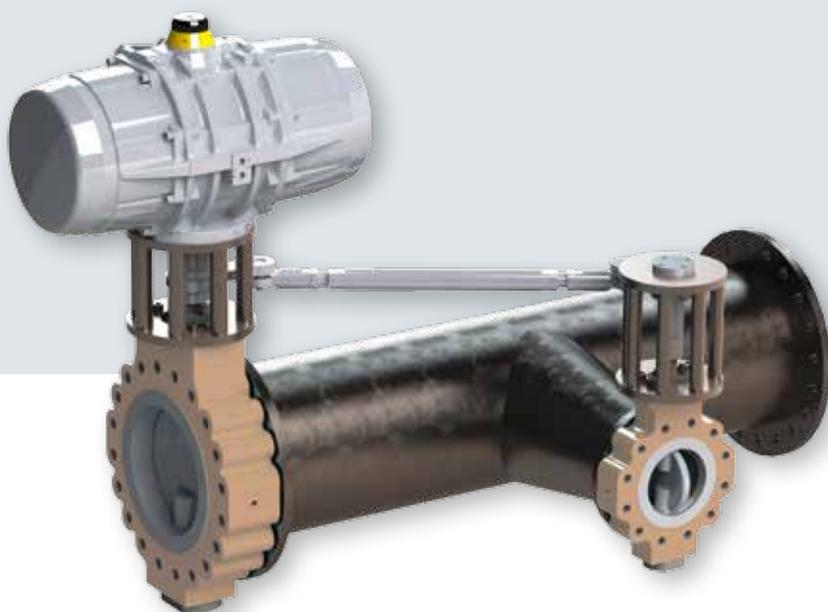
Less than 1 s stroking time



SPECIAL BUTTERFLY VALVES

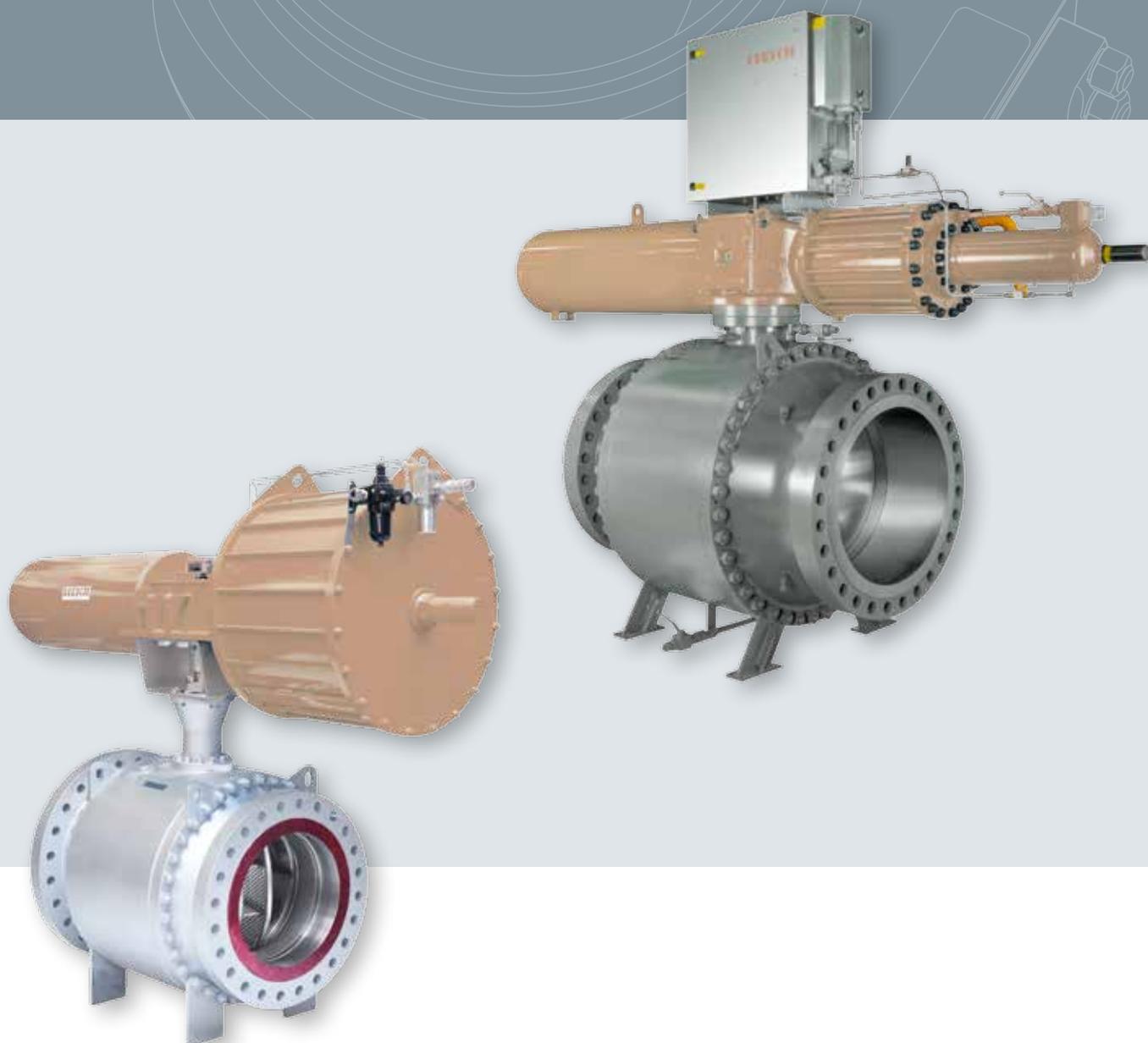
Centric control butterfly valves

- The Type LAS centric, step-seated butterfly valves and the Type LDS swing-through butterfly valves are mainly used for control applications.
- The step-seated LAS valves come with two additional stop rings welded into the body to minimize leakage by covering the annular clearance between the body and butterfly disk.
- They can also be used for three-way applications as a linked system.



BALL VALVES (TRUNNION DESIGN)

On/off and control applications





- **Valve size** **NPS 1 to 60 (DN 25 to 1500)**
- **Pressure rating** **Class 150 to 2500 (PN 10 to 420)**
 - Flanged or welding ends
 - Trunnion-mounted ball
 - Side-entry or top-entry design
 - Leakage class IV to VI acc. to ANSI FCI 70-2/IEC 60534-4
 - Seat: PTFE, stainless-steel-filled PTFE, PEEK, nylon, or Stellite®
 - Materials: steel, stainless steel, titanium, Hastelloy®, duplex steel, etc.

- **Options:**
 - Low-emissions packing acc. to TA Luft
 - Low-noise and anti-cavitation trims
 - Heating jacket
 - Anti-surge design
 - ESD version
 - Cryogenic and high-temperature versions

SPECIAL BALL VALVES

- **Control ball valve, NPS 16 or 24, Class 300 with low-noise (LN-TRIM) trim and NPS 16 or 24 diffuser**

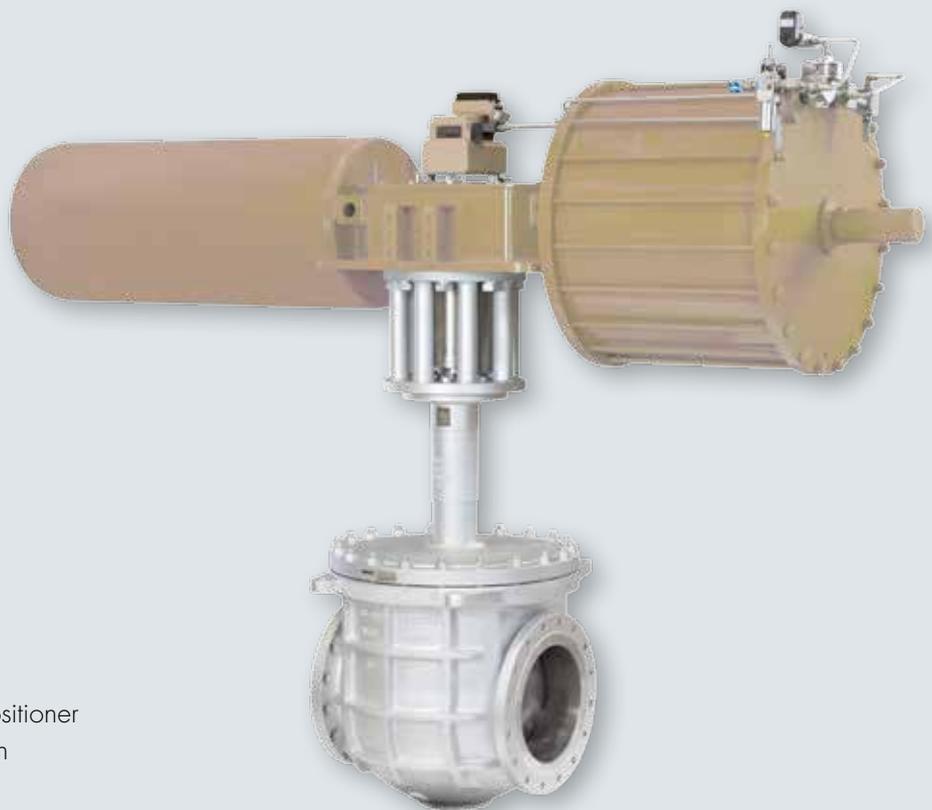
Type BVL 63-LN, with flanged ends
Split-body design
Metal seated



- **Ball valve, DN 200 or 100, PN 16 for high-temperature applications up to 800 °C**

Type BVL 63-HT
Top-entry design





■ **ESD ball valve, NPS 16, Class 300**

Top-entry design

Metal seated

With single-acting actuator

and Series 3730 Electropneumatic Positioner

with partial stroke testing (PST) function

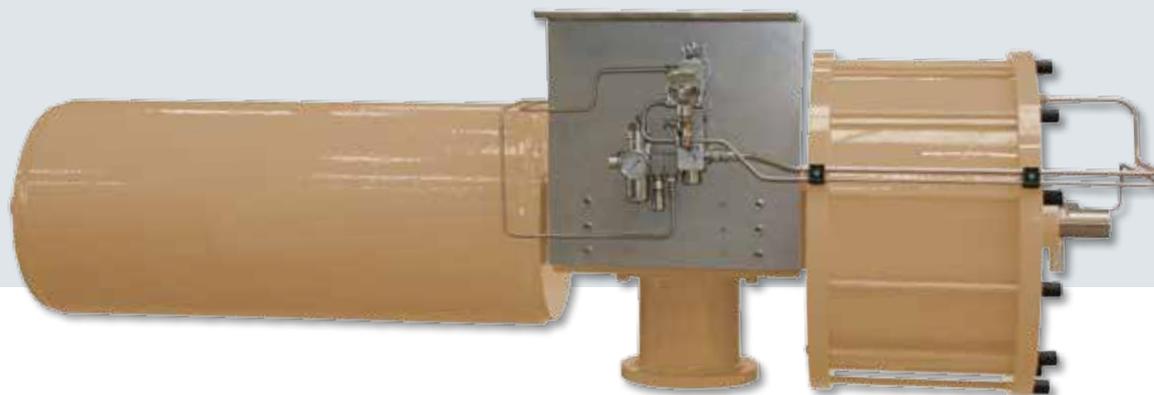
ACTUATORS

Different actuator versions

- **Single-acting pneumatic actuators with spring or double-acting actuators in standard, high-temperature, or low-temperature versions**

Rack-and-pinion actuators for smaller torques

Scotch-yoke actuators for higher torques

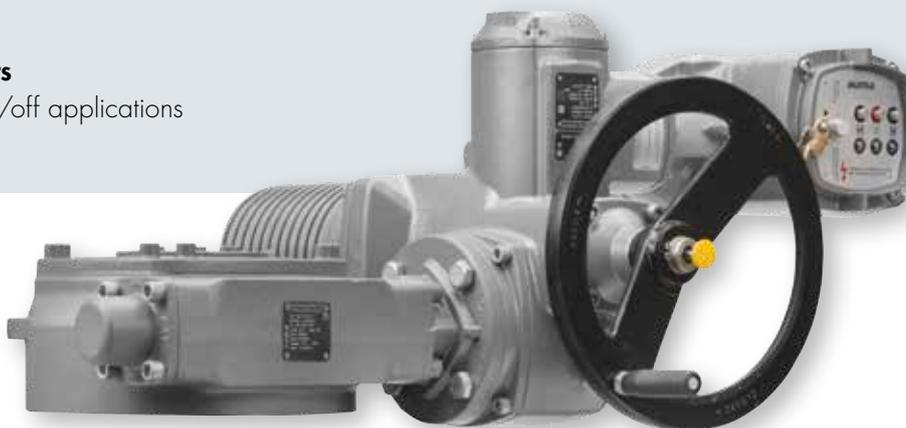




- **Hydraulic or electrohydraulic actuators**
For high torques at low actuator weights

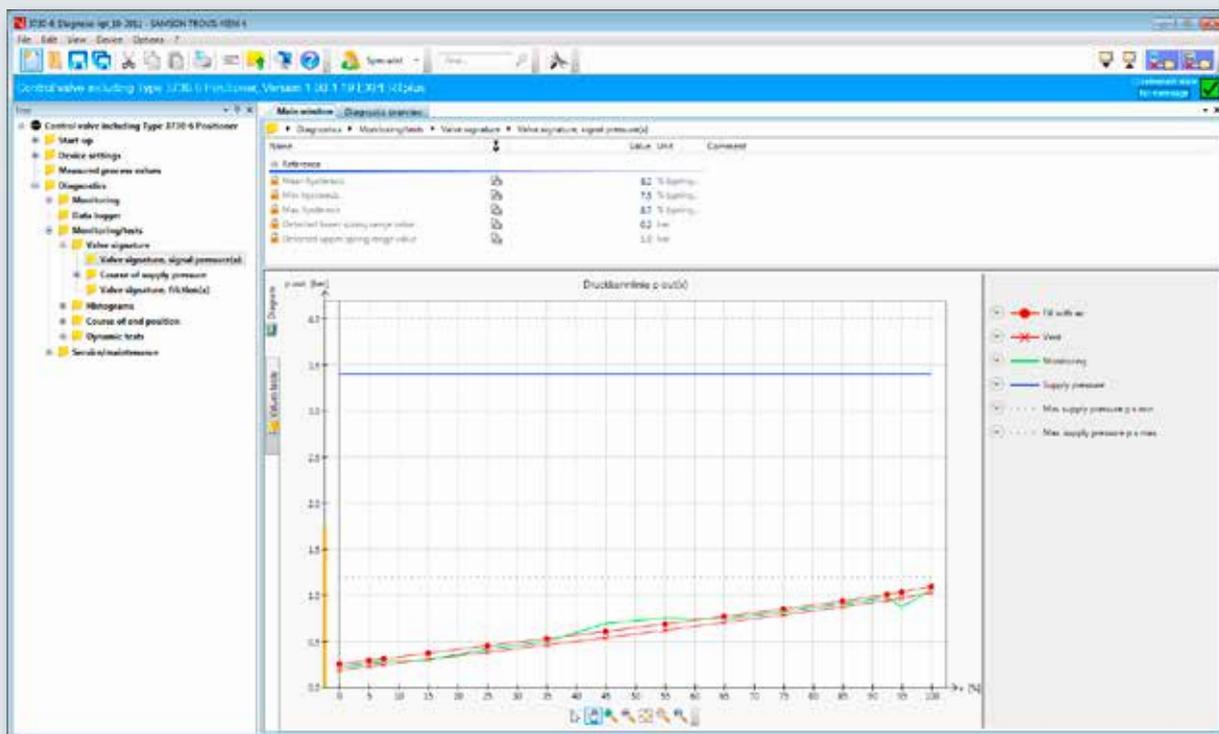


- **Electric actuators**
For control or on/off applications



EVERYTHING FROM A SINGLE SOURCE

Control valves, actuators, and accessories





Control valves

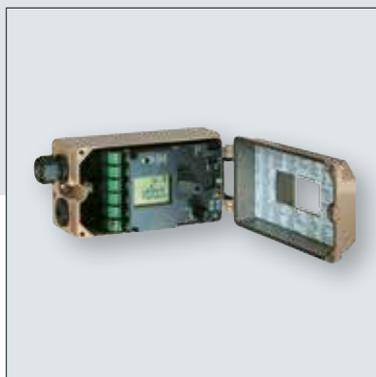
- **Valve size** **NPS ½ to 28 (DN 15 to 700)**
- **Pressure rating** **Class 150 to 2500 (PN 10 to 420)**
 - Flanged, threaded, or welding ends
 - Globe, angle, or three-way valves
 - Metal or soft seated
 - Cryogenic and high-temperature versions

■ Options:

- Metal bellows seal
- Heating jacket
- Low-noise and anti-cavitation trims

■ Actuators and accessories

- Double-acting and single-acting pneumatic actuators
- Emergency manual override
- Pneumatic or electropneumatic positioners
- TROVIS-VIEW configuration software
- Valve signature recorded by Type 3730-6 Positioner with pressure sensors
- Boosters
- Solenoid valves
- Limit switches
- Filter regulators



SAMSON AT A GLANCE

STAFF

- Worldwide 4,300
- Europe 3,300
- Asia 500
- Americas 200
- Frankfurt am Main, Germany 1,800

MARKETS

- Chemicals and petrochemicals
- Power and energy
- District heating and cooling, building automation
- General industry
- Industrial gases
- Food and beverages
- Metallurgy and mining
- Oil and gas
- Pharmaceuticals and biotechnology
- Marine equipment
- Water and wastewater
- Pulp and paper

PRODUCTS

- Valves
- Self-operated regulators
- Actuators
- Valve accessories
- Signal converters
- Controllers and automation systems
- Sensors and thermostats
- Digital solutions

SALES SITES

- More than 50 subsidiaries in over 40 countries
- More than 200 representatives

PRODUCTION SITES

- SAMSON Germany, Frankfurt, established 1916
Total plot and production area: 150,000 m²
- SAMSON France, Lyon, established 1962
Total plot and production area: 23,400 m²
- SAMSON Turkey, Istanbul established 1984
Total plot and production area: 11,053 m²
- SAMSON USA, Baytown, TX, established 1992
Total plot and production area: 9,200 m²
- SAMSON China, Beijing, established 1998
Total plot and production area: 10,138 m²
- SAMSON India, Pune district, established 1999
Total plot and production area: 18,000 m²
- SAMSON Russia, Rostov-on-Don, established 2015
Total plot and production area: 5,000 m²
- SAMSON AIR TORQUE, Bergamo, Italy
Total plot and production area: 27,684 m²
- SAMSON CERA SYSTEM, Hermsdorf, Germany
Total plot and production area: 14,700 m²
- SAMSON KT-ELEKTRONIK, Berlin, Germany
Total plot and production area: 1,060 m²
- SAMSON LEUSCH, Neuss, Germany
Total plot and production area: 18,400 m²
- SAMSON PFEIFFER, Kempen, Germany
Total plot and production area: 35,400 m²
- SAMSON RINGO, Zaragoza, Spain
Total plot and production area: 18,270 m²
- SAMSON SED, Bad Rappenau, Germany
Total plot and production area: 10,370 m²
- SAMSON STARLINE, Bergamo, Italy
Total plot and production area: 26,409 m²
- SAMSON VDH PRODUCTS, the Netherlands
- SAMSON VETEC, Speyer, Germany
Total plot and production area: 27,090 m²



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