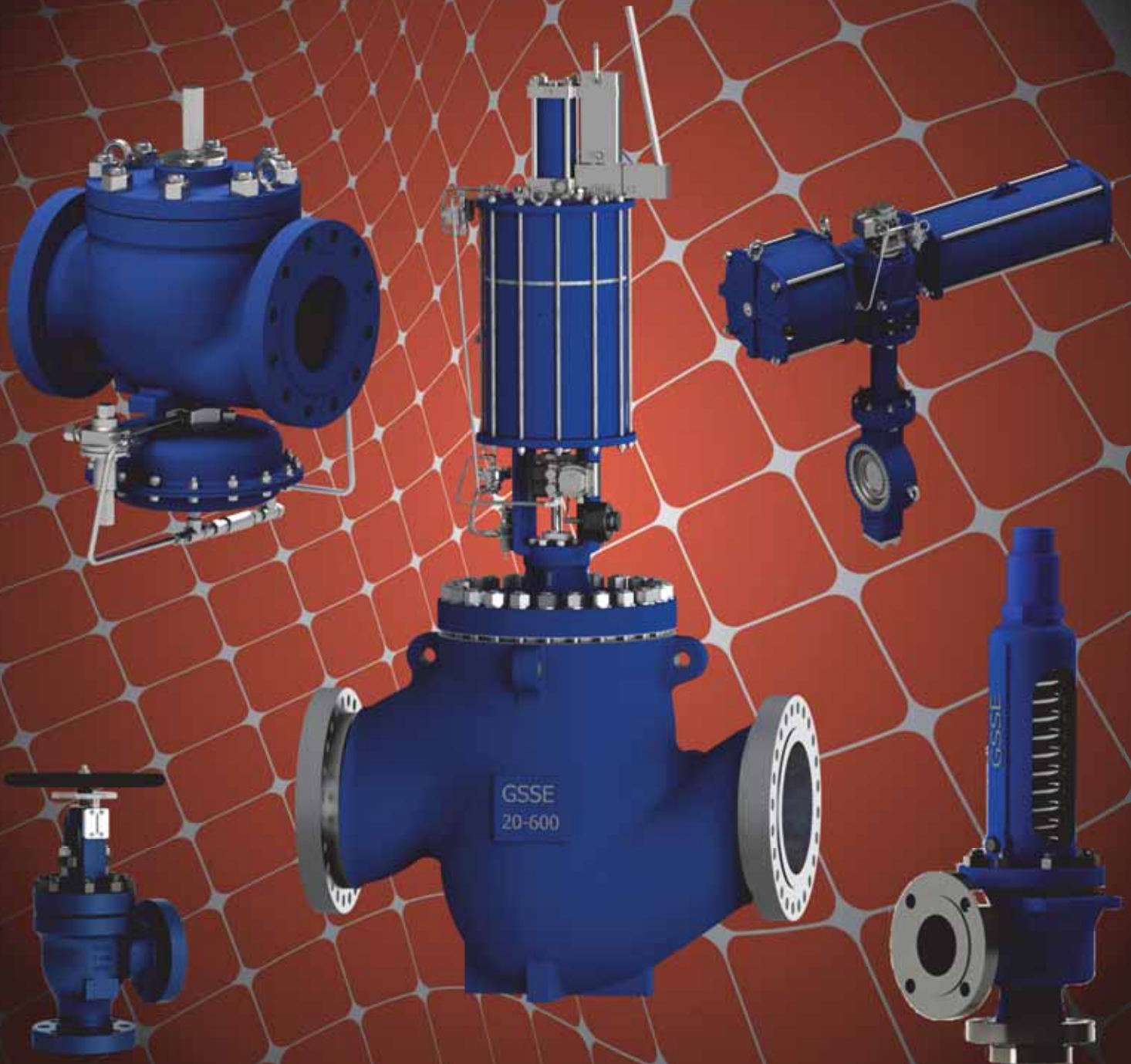


GSSE

GENERAL CATALOGUE

MADE IN IRAN



TOTAL SOLUTION FOR YOUR
PROCESS REQUIRMENTS

INNOVATIVE FLUID MANAGEMENT

Gorohe Sazandegan Sanat Espadana Company Overview

GSSE is a knowledge enterprise company active in design and manufacturing of valves for Oil and Gas, Power plant and industrial plants. Our skilled engineering team design and simulate all of our products while considering international standards **API, ASME, ANSI, MSS, NACE, ISO, ISA, BS, ATEX, IPS** and **IGS**. We use latest software for sizing and selection, design, simulation and manufacturing of our products.

GSSE is manufacturing various types of valve including:

- **Control Valves (Globe, Ball, Butterfly)**
- **Pressure Safety Valves (Conventional , Bellows, Pilot Operated)**
- **Pressure Regulator Valve (Back Pressure Regulator Valve, Pressure Reducing Regulator Valve & Tank Blanketing Regulator Valve)**
- **On-Off Valve (Ball valves, Orbit Ball Valves, ESDV, HIPPS)**

Our products have been in service in oil and gas refineries, petrochemicals, power plants and other industries for many years.

GSSE fully modernized CNC machining facilities assembly and test equipment enable us to offer best service to our clients.



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Quality

GSSE is totally committed to Quality and a smooth integration of all departments with the Quality Assurance and Quality Procedures.

GSSE is qualified to ISO 9001, 10668, 14001, HSE-MS, BS OHSAS 18001, ISO/TS 29001, 100004.

This guarantees that all our products are designed, manufactured and delivered in accordance with the most strict customer requirements. By this we achieve our main goal “to offer a high quality product and service to ensure a high degree of satisfaction and fidelity of our customers”.

Markets

Our Valves are used in many different applications such as oil and gas, upstream and downstream offshore, chemical, petrochemical & cryogenic services.

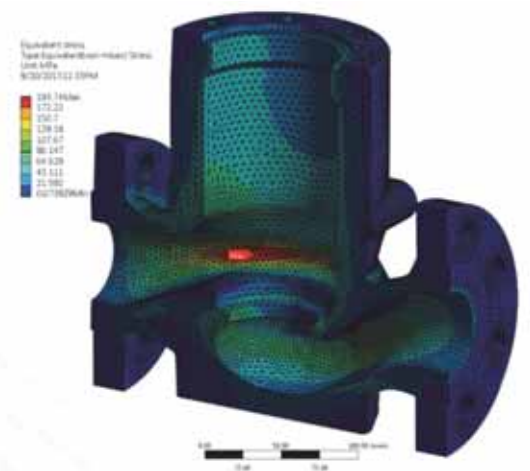
We provide spare parts to support our customers.

Design, Research and Development

Using advanced software applications including Finite Element Analysis (FEA), Computational Fluid Dynamics (CFD) and Casting Simulation helps GSSE’s engineers to design superior quality valves for any demanding performance requirement.

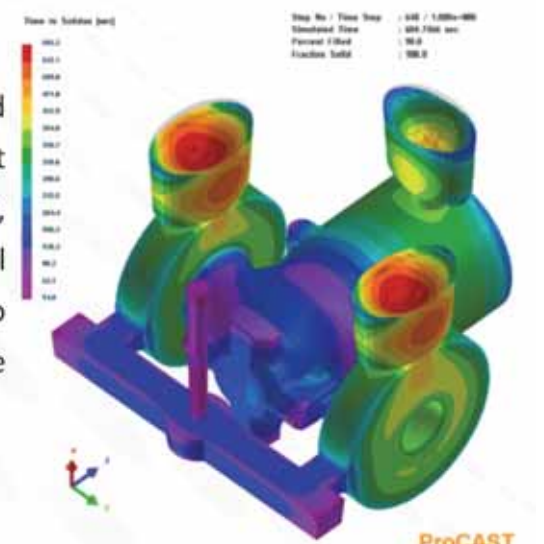
FEA Simulation

Stress calculation using 3D finite element analysis will be done for all GSSE products, specially for the pressure containing parts in control valves and pressure safety valves to make sure about safety factor in all required process conditions as well as testing criteria. We will also do custom design for our valuable clients .



Casting Simulation

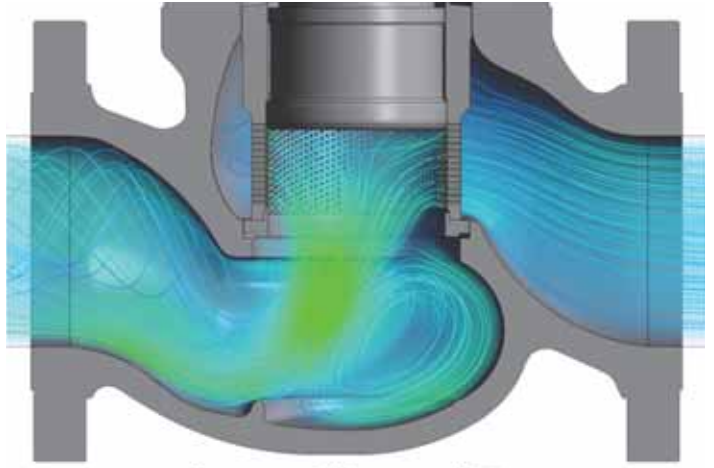
Casting process is simulated using the Finite Element Method (FEM). It allows the modeling of Thermal Heat Transfer (Heat flow), including Radiation with View Factors, Fluid flow, including mold filling, Stresses fully coupled with the thermal solution (Thermo-mechanics). Besides that, it includes also Microstructure/Heat treatment modeling, Grain structure modeling and Porosity modeling.



CFD Simulation

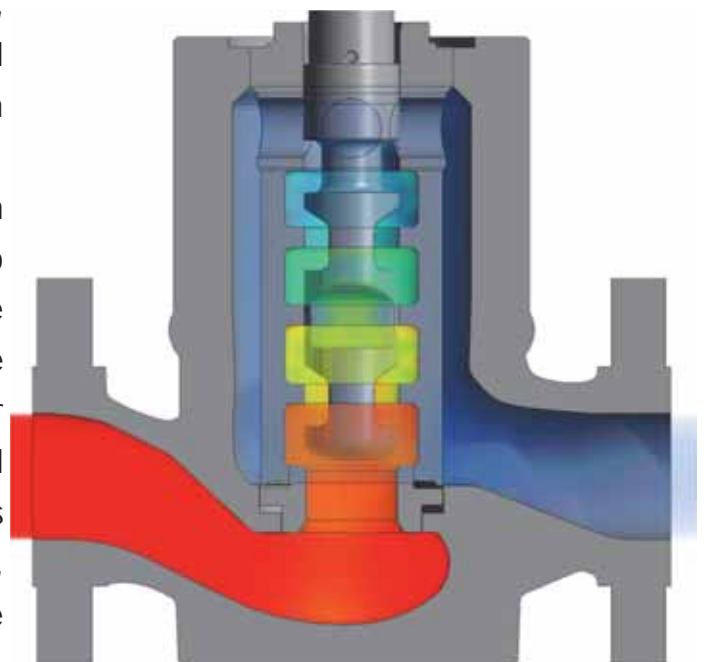
In a growing number of industries, numerical simulations of flow processes are becoming more and more popular and are increasingly used as a development tool. At the basis of this tool is a CFD (Computational Fluid Dynamics) code, which has already been integrated into numerous software programs.

Today, CFD tools are indispensable as a supplementary tool in control valve development in certain construction stages of a component CFD not only allows valve plugs and bodies to be optimized during the construction stages. It also permits to determine very high flow coefficients. This benefit plays a major role as only very few test benches are built to test valves in large sizes with the associated Cv coefficients. The increasing size of industrial plants, however; calls for higher flow capacities and consequently also larger valve sizes. Non-optimized valve geometry is usually the main cause for many problems related to response time, actuation force and energy consumption. To overcome these limitations and problems we have done a thorough numerical and experimental analysis of control valves. The main influential geometry parameters of the control valve are defined for numerical analyses. In the next step the basic theory of the numerical simulation, including the 3D modelling, meshing and parameterization, is used. The validation of the numerical fluid model of the valve is done by comparing simulation and experimental results.



In control valves regulating the flow of liquid media, cavitation may occur depending on the process data and valve type. Under cavitating conditions, the noise emission increases considerably and erosion can occur at the valve trim depending on the cavitation intensity.

Using CFD, the point of incipient cavitation can partly be determined. Cavitation is understood to mean the process during which the pressure at the narrowest cross-section inside the valve reaches vapor pressure and the first small vapor bubbles start to form. These bubbles are dragged along by the flow into areas of higher pressures where they implode. Expressed in numerical terms, the process occurs when the static pressure inside the valve falls below the vapor pressure.



Control Valve

Contrarily to other types of valves, the function of control valves is to absorb a fraction of the inlet pressure to modulate the fluid flow rate and maintain under control the plant conditions.

In this process an amount of energy proportional to the pressure drop and the flow rate is converted into turbulences, heat, vibration, noise and wearing of valve components.

Best approach to the problem is the cage guided valve. In the cage guided design, the plug is guided along its full stroke by the cage, with very small clearance, so that vibration is suppressed. Cage guided design is recognized as the best design in heavy duty service control valves.

Designs include unbalanced plug disc for valve sizes up to 4" and balanced plug disc for valve sizes 3" and larger. The use of balanced plugs allows achieving Class IV and V seat leak rates, whichever the pressure and the temperature. Also, if temperature does not exceed 250oC / 480oF, Class VI (bubble tight) can be given as an option.

GSSE control valves have been designed to be operated by pneumatic, electric or electro-hydraulic actuators, including any type of accessories, at request and accepting any type of control signals. When electric actuators / accessories are used all type of protections can be provided, including explosion proof or intrinsically safe.

Our designs have been successfully used in power plants as well as gas, oil, fertilizers and other process industries. Noise and vibration have been reduced, and valve internals life has been extended.

Sizing And Selection

We use latest version of CONVAL sizing software to calculates the flow properties based on client process specification, and select from the GSSE database the control valve which is the most accurate for this process.

Some of the possible parameters which can be calculated with this program are:

- Cv calculation
- Fluid properties and state in operation condition
- Noise level
- Fluid velocity
- Power loss inside the valve
- Two phase fluid conditions if it is required
- Actuator forces



Valve Materials

Body and Bonnet Materials

Selection of materials of body and bonnet are based on design pressure and design temperature as well as in the type of fluid.

As standard, carbon steel, stainless steel and alloy steel are commonly used. Special alloys material can also be provide for special application such as duplex, super duplex, Hastelloy, Inconel and Monel.

MATERIAL	FORGE		CAST	
	ASTM	DIN	ASTM	DIN
CARBON STEEL	A105	1.0460	A216 WCB	1.0619
ALLOY STEEL	A182 F11	1.7335	A217 WC6	1.7357
	A182 F22	1.7380	A217 WC9	1.7379
STAINLESS STEEL	A182 F316	1.4401	A315 CF8M	1.4408

Trim Materials

Selection of the internal material is based on two factors: corrosion resistance and wear resistance. Pressure drop and temperature condition are considered to choose the best ware resistance material. Our selection includes, but is not limited to:

Standard materials for seat, plug, cage and balancing cylinder are 316 stainless steel and hardened 410 or 420 corrosion resistant stainless steel alloys. Higher hardness in trims with Stellite overlay. Optional materials are hard faced series 300, 17-4PH and 440 stainless steel alloys. Other alloy trim available on application. (see page 34)

Tungsten carbide for extra high hardness is a good choice for high erosive fluids.

Hard Facing

Stellite No. 6 is the most common of all hard facing materials used in the control valve industry. It has one of the best combinations of corrosion, abrasion and impact resistance. In addition, it has a low coefficient of friction with itself and an even lower one with Stellite No. 12, for higher hardness, we use Stellite 6H which gives similar property like HVOF Tungsten Carbide.

We use PTA method for Stellite hard facing. The PTA process is easily automated, providing a high degree of reproducibility of the weld overlays. In addition, because of the highly concentrated heat source, this process benefits from high powder utilization and can achieve a very low level of iron dilution in the overlay.

Because the hard facing materials are in powder form, it is possible to produce overlays from many different materials and combinations of materials with a wide range of hardness and other properties.

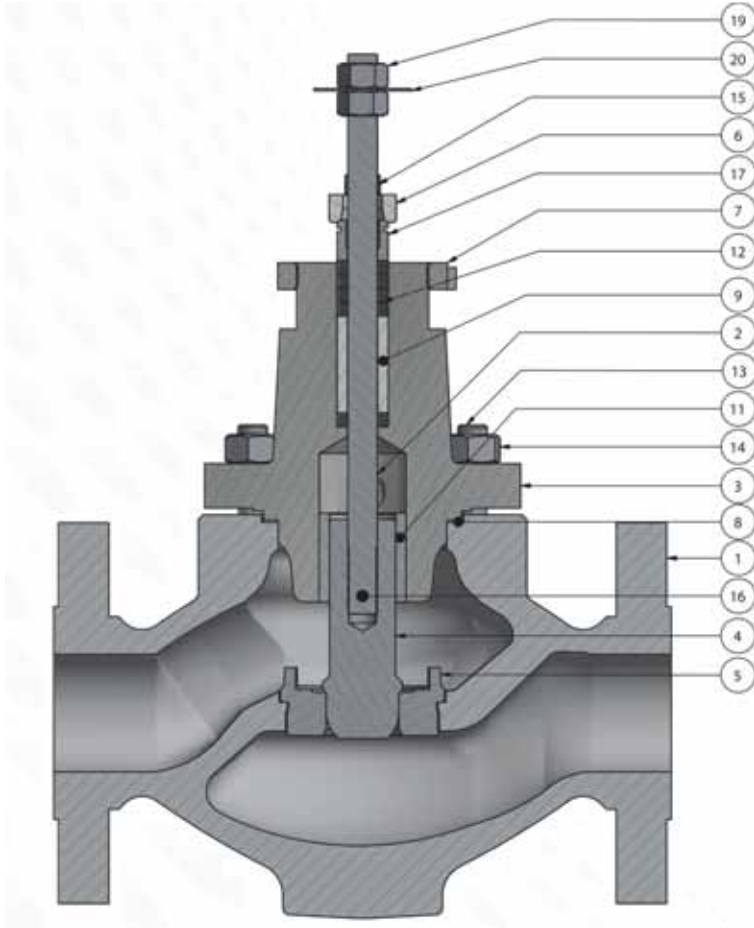


Control Valves

TG Series

Single ported, heavy top-guided control valves are designed with built-in versatility making them the most widely used control valve, well-suited to handle a wide variety of process applications.

Standard features include:



ITEM	PART NAME
1	Body
2	Stem
3	Bonnet
4	Plug
5	Seat Ring
6	Packing Flange
7	Drive Nut
8	Bonnet Gasket
9	Packing Spacer
10*	Packing Flange Stud
11	Guide Bushing
12	Packing
13	Stud
14	Nut
15	Packing Flange Nut
16	Plug Pin
17	Gland Packing
18	Bonnet Plug
19	Stem Luck Nut
20	Washer

*: Not Shown

Size, Rating and Connection:

Flanged (RF,RTJ,T&G,FF): 1/2"-10" , ANSI 150-2500

Welded: SW: 1/2"-2" , ANSI 150-2500 / BW: 3/4"-2" , ANSI 900-2500 3"-10" , ANSI 150-2500

Screwed: 1/2"-2" , ANSI 150-600

Body Materials:

Carbon Steel
Stainless Steel
Super-alloy

Actuators:

Model DS Spring Diaphragm
Model DM Multi Spring Diaphragm

Trim:

Single Seat Plug Top Guided
Anti-noise and Anti-cavitation Trims, Single or Double Stage Are Available

Characteristic:

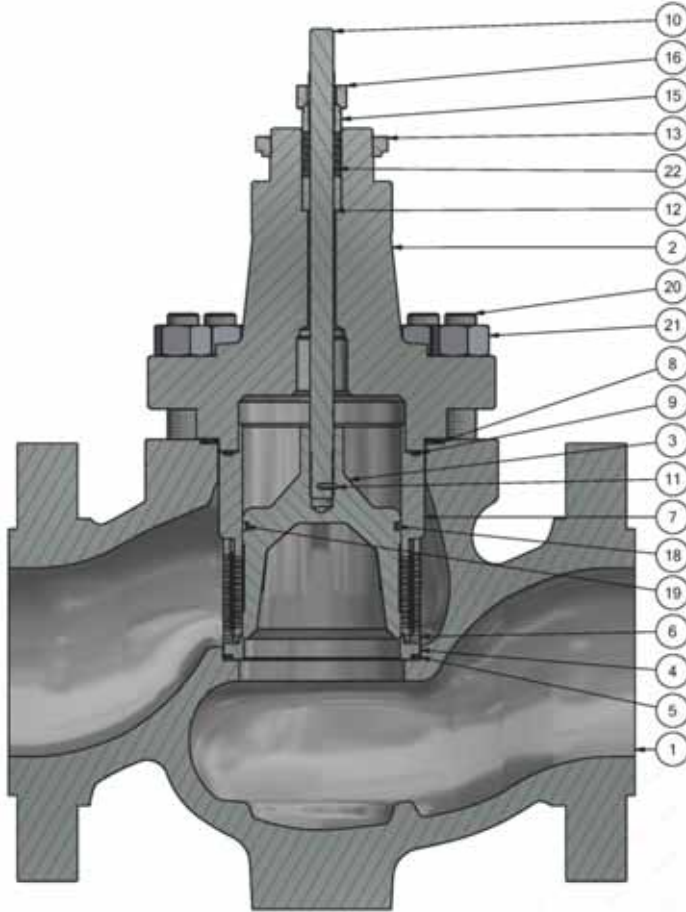
Standard: Linear or Equal% or Quick Opening
Anti-cavitation/Anti-noise: Linear



CG Series

The rugged cage guiding, optional pressure balancing and a host of custom engineered trim designs makes these valves suitable for higher pressure drops and other severe service applications, where conventionally designed control valves fail to perform satisfactorily.

Standard features include:



ITEM	PART NAME
1	Body
2	Bonnet
3	Plug
4	Seat Ring
5	Seat Ring Gasket
6	Cover cage
7	Cage
8	Body Gasket
9	Cage Gasket
10	Stem
11	Plug Pin
12	Guide Bushing
13	Drive Nut
14*	Packing Flange Stud
15	Packing Follower
16	Packing Flange
17*	Packing Flange Nut
18	Internal Seal Ring
19	External Seal Ring
20	Valve Body Stud
21	Valve body Nut
22	Packing

*: Not Shown

Size, Rating and Connection:

Flanged (RF,RTJ,T&G,FF): 3/4"-14" , ANSI 150-2500 / 16"-24" , ANSI 150-1500

Welded: SW: 3/4"-2" , ANSI 150-2500 / BW: 3/4"-16" , ANSI 150-2500 / 16"-24" , ANSI 150-600

Body Materials:

Carbon Steel
Stainless Steel
Super-alloy

Actuators:

Model DS Spring Diaphragm
Model DM Multi Spring Diaphragm
Model PS & PD Cylinder

Trim:

Single Stage (Anti-noise and Anti-cavitation) or
Multi- Stage (Anti-noise and Anti-cavitation)

Characteristic:

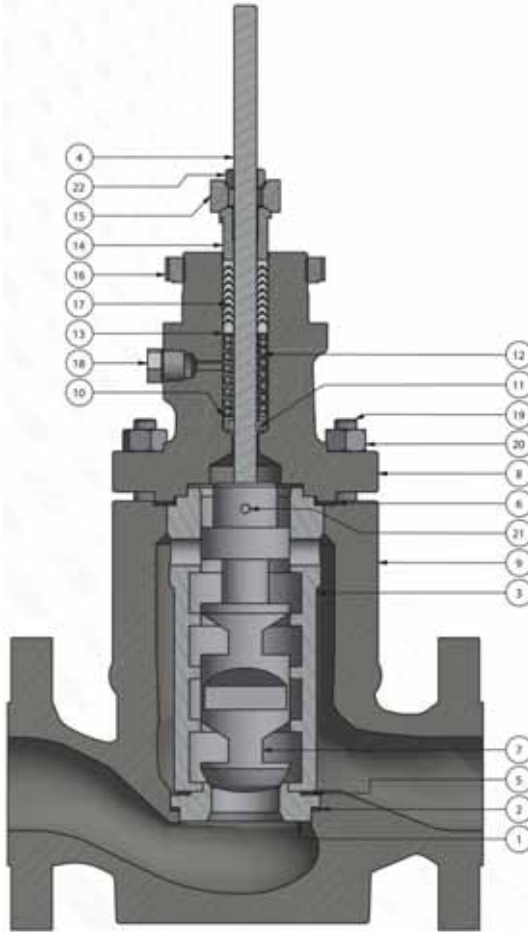
Standard: Linear or Equal%
Anti-cavitation/Anti-noise: Linear



LG Series

LG series control valves offer excellent control of liquid services with high pressure drops , and entrained particulate. The dirty service anti-cavitation trims feature multi-stage protection against damaging effects of cavitation and erosive solids. Suitable for Pump Minimum Flow service.

Standard features include:



ITEM	PART NAME
1	Seat Ring
2	Seat Gasket
3	Cage
4	Stem
5	Cage Gasket
6	Body Gasket
7	Plug
8	Bonnet
9	Body
10	Packing Ring
11	Lower Packing
12	Spring
13	Washer
14	Packing Follower
15	Packing Flange
16	Drive Nut
17	Packing
18	Bonnet Plug
19	Body Stud
20	Body Nut
21	Plug Pin
22	Packing Flange Nut
23*	Packing Flange Stud

*: Not Shown

Size, Rating and Connection:

Flanged (RF,RTJ,T&G,FF): 1"-8" , ANSI 300-2500
 Welded: SW: 1"-2" , ANSI 300-1500 / BW: 1"-8" , ANSI 300-2500
 Screwed: 1"-2" , ANSI 300-600

Body Materials:

Carbon Steel
 Stainless Steel
 Super-alloy

Actuators:

Model DS Spring Diaphragm
 Model DM Multi Spring Diaphragm
 Model PS & PD Cylinder

Trim:

Multi step axial flow (3, 4, 6, 8 and 10 stages)

Characteristic:

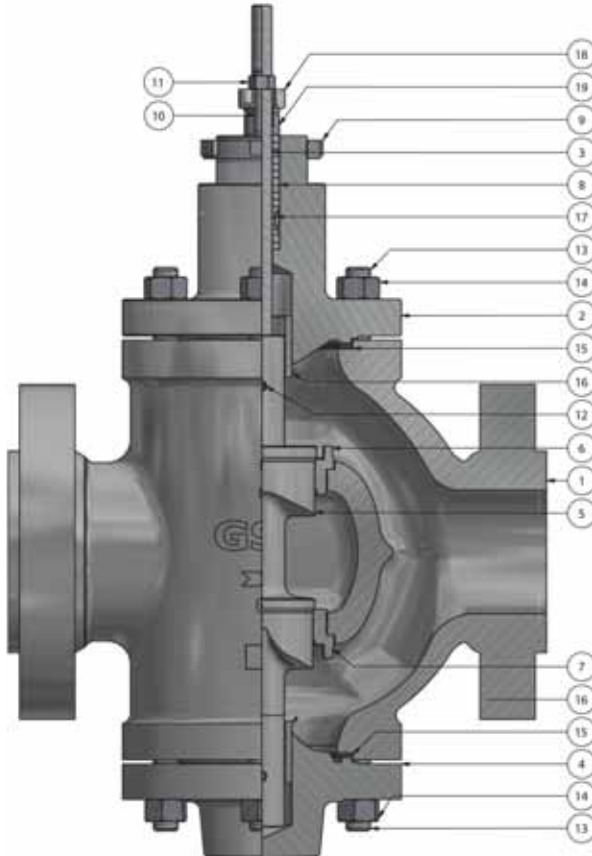
Standard: Linear
 Optional : Mod. Equal



DP Series

The DP series double ported control valves Construction features have been carefully selected to provide optimum performance. The concept of the top and bottom guided double seated design helps to improve the rigidity of the valve at higher flow rates and pressure drops.

Standard features include:



ITEM	PART NAME
1	Body
2	Bonnet
3	Stem
4	Blind Flange
5	Plug
6	Upper Seat Ring
7	Lower seat ring
8	Packing
9	Drive Nut
10	Packing Flange Stud
11	Packing Flange Nut
12	Plug Pin
13	Body Stud
14	Body Nut
15	Body Gasket
16	Guide Bushing
17	Packing Spacer
18	Packing Flange
19	Packing Follower
20*	Bonnet plug

*: Not Shown



Size, Rating and Connection:

Flanged (RF,RTJ,T&G,FF): 2"-12" , ANSI 150-1500 / 14"-24" , ANSI 150-600

Welded: SW: 3/4"-2" , ANSI 150-2500 / BW: 3"-12" , ANSI 150-1500 3"-10" , ANSI 150-2500

Screwed: 3/4"-2" , ANSI 150-600

Body Materials:

Carbon Steel
Stainless Steel
Super-alloy

Actuators:

Model DM Multi Spring Diaphragm
Model PS & PD Cylinder

Trim:

Double Seat, V-Port Or Contoured, Elastomer seat version for high leakage class.

Anti-noise trim for Steam management.

Characteristic:

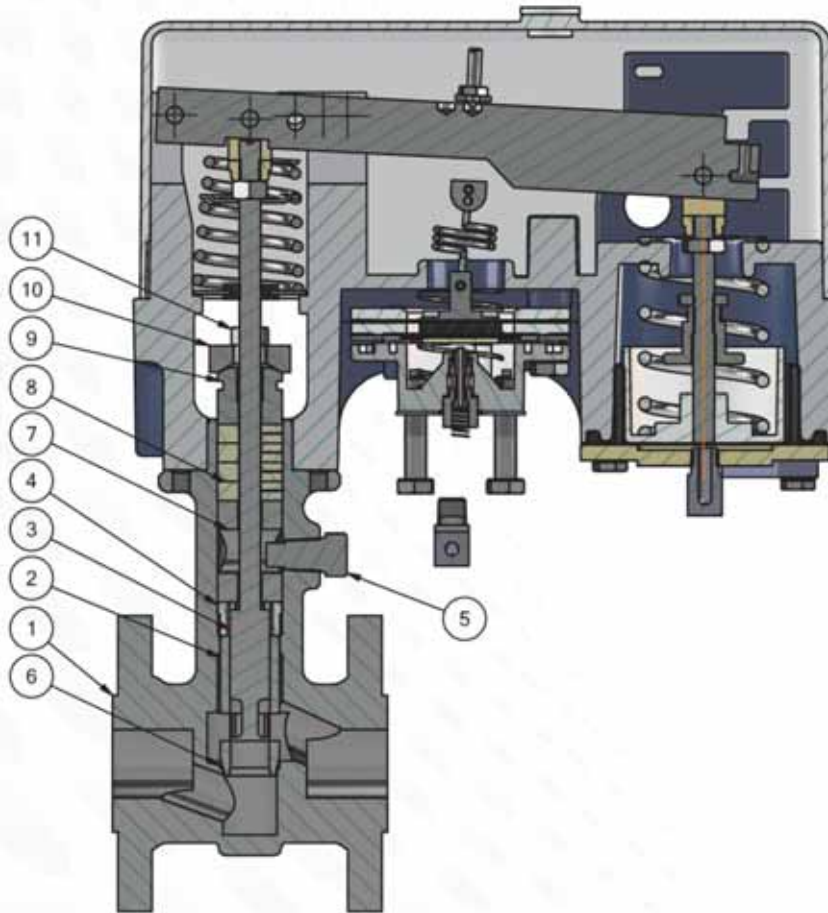
Standard: Linear or Equal% or Quick Opening

Anti-cavitation/Anti-noise: Linear

MF Series

MF series designed specifically for low flow applications, the micro flow series provides excellent throttling control performance with a wide range of options and capabilities. Design optimization has also resulted in an extremely integrated and compact assembly.

Standard features include:



ITEM	PART NAME
1	Body
2	Seat Ring
3	Plug
4	Seat Ring Retainer
5	Safety Pin
6	Seat Ring Gasket
7	Packing Spacer
8	Packing
9	Packing Follower
10	Packing Flange
11	Packing Flange Nut

Size, Rating and Connection:

Flanged: 1/2"-1" , ANSI 150-1500

Welded: SW: 1/2"-1" , ANSI 150-1500 / BW: 1" , ANSI 150-1500

Screwed: 1/2"-1" , ANSI 150-1500

Body Materials:

Stainless Steel

Super-alloy

Actuators:

Spring-opposed rolling diaphragm

Trim:

Contoured, heavy top guided

Characteristic:

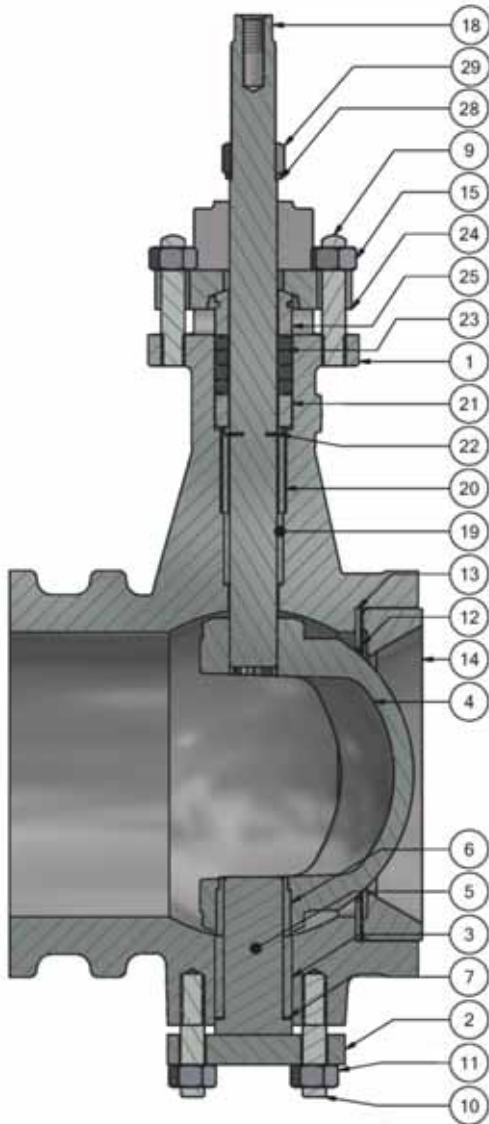
Standard: Linear



BA Series

A heavy duty ball control valve with parabolic segment ball, excellent solution for high viscosity fluid application.

Standard features include:



ITEM	PART NAME
1	Body
2	End Flange
3	Lower Bushing
4	Ball
5	Pin Shaft
6	Ball Bushing
7	Gasket
8*	Body Stud
9	Packing Flange Stud
10	End Flange Stud
11	End Flange Nut
12	Seal Ring
13	Backup ring
14	Retainer
15	Packing Flange Nut
16*	Set Screw
17*	Cap Nut
18	Stem
19	Upper Bushing
20	Cover Bushing
21	Packing Adapter
22	Shaft Ring
23	Packing
24	Packing Flange
25	Packing Follower
26*	Cap Nut Washer
27*	Safety Pin
28	Spring Washer
29	Body Nut

*: Not Shown

Size, Rating and Connection:

Flanged : 1"-12" , ANSI 150-300

Flangeless (Mounting Between Flanges): 1"-12" , ANSI 150-300

Body Materials:

Carbon Steel
Stainless Steel
Super-alloy

Actuators:

Model DM Spring Diaphragm

Trim:

high capacity "V" contoured segmented ball

Characteristic:

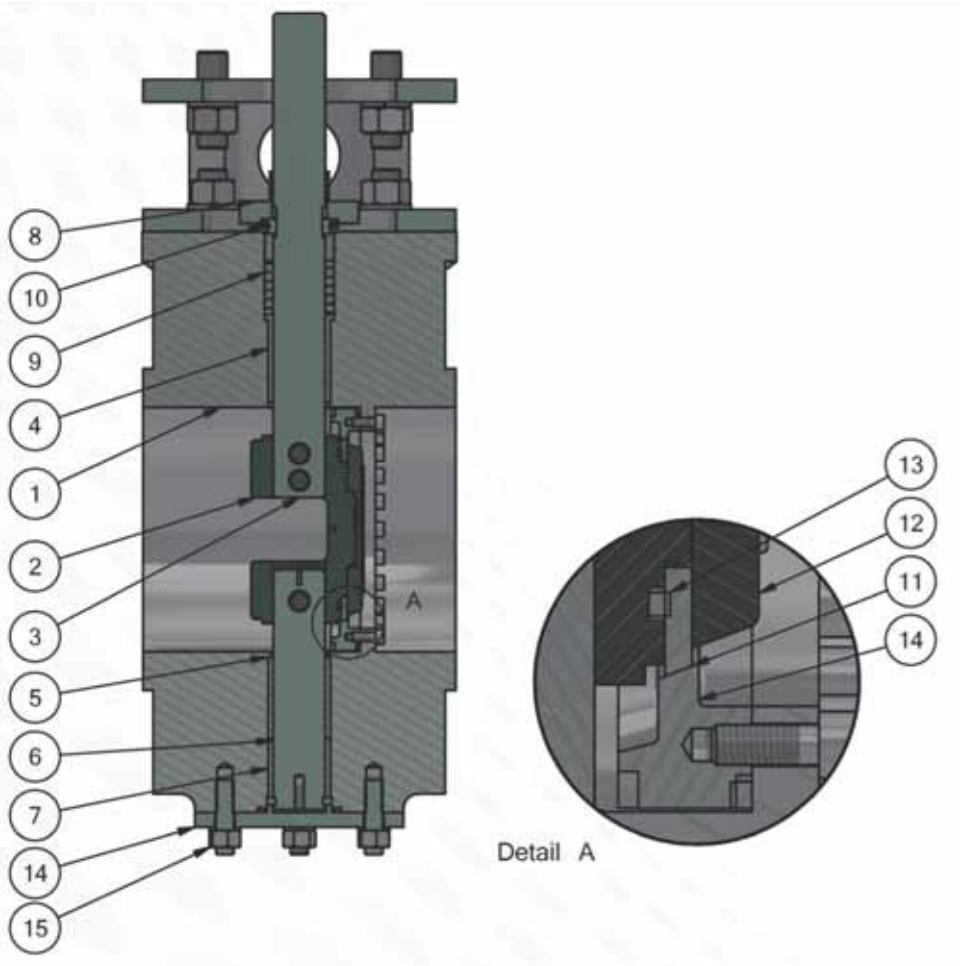
Equal%



BF Series

GSSE Triple Offset Butterfly Valve provides a bi-directional bubble tight shut-off. This geometry ensures that the disc seal contacts the body seat only at the final shut-off position without rubbing or galling, providing a torque generated resilient seal with sufficient "wedging" to ensure a uniform seal contact.

Standard features include:



ITEM	PART NAME
1	Body
2	Disc
3	Upper Stem
4	Upper Sleeve
5	Sleeve (Body)
6	Lower Stem
7	Spacer
8	Packing Flange
9	Packing
10	Spilt Collar
11	Seal Ring
12	Disk Pressure Ring
13	Seal Ring Gasket
14	Seat Ring
15	Flange Nut

Size, Rating and Connection:

2"-56" , ANSI 150-2500

(Wafer, Lug, Double Flange, Buttweld)

Body Materials:

Carbon Steel

Stainless Steel

Temperature Range:

-320°F to +1050°F (-196°C to +566°C)

Characteristic:

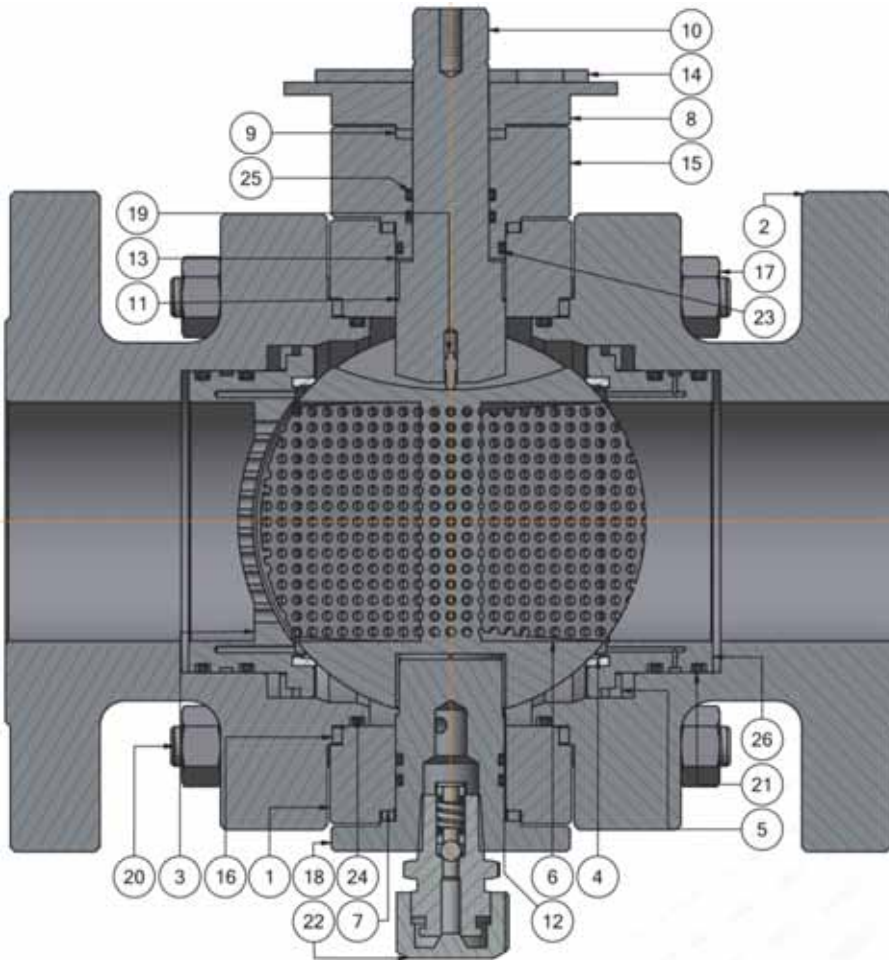
Equal%



NABA Series Multistage Cage Ball

Heavy duty automatic throttling control ball valve. Available in segment ball and full ball type.

Standard features include:



ITEM	PART NAME
1	Body
2	Closure
3	Drilled Seat Ring
4	Seat Insert
5	Seat Follower
6	Ball
7	Gasket
8	Top Flange
9	Gasket
10	Stem
11	Stem Bearing
12	Trunnion Bearing
13	Thrust Washer
14	Stop Plate
15	Gland Cap
16	Body Gasket
17	Body Nut
18	Bottom Flange
19	Grounding Plunger
20	Body Bolt
21	O-Ring
22	Vent Valve
23	O-Ring
24	O-Ring
25	O-Ring
26	Seat Ring

Size, Rating And Connection:

2"-56" ,ANSI 150-2500

Body Materials:

Carbon Steel
Stainless Steel
Super-alloy

Actuators:

GSSE Model DS Pneumatic Spring Diaphragm
GSSE Model PS Pneumatic Spring Cylinder
GSSE Model PD Pneumatic Double Acting Cylinder
Electrohydraulic
Electronic, CVA Rotork

Trim:

Segment, V port, Special

Characteristic:

Modified Linear, Modified Equal Percentage



SF Series

Steam conditioning or desuperheater control valve.

This package is designed to manage steam condition by injection of water into passing steam



Size, Rating and Connection:

1"-48" ,ANSI 150-4500

Body Materials:

Carbon Steel
Stainless Steel
Super-alloy

Trim:

Contoured, Heavy Top Guided, Multi-staged Anti-cavitation

Characteristic:

Linear

Actuators:

Model DS Pneumatic Spring Diaphragm
Model PS Pneumatic Spring Cylinder
Model PD Pneumatic Double Acting Cylinder
Electrohydraulic

Rising Stem Ball Valve Features

No Rubbing Between Sealing Surfaces: The tilt-and-turn action eliminates seal abrasion, which is the major cause of seat wear in conventional ball, gate and plug valves.

Injectable Packing: For in-service maintenance, stem packing material is injected through the packing fitting, giving complete control of fugitive emissions.

Single-seat Design: The single, stationary seat in the ORBIT valve seals in both directions and avoids the problems of trapped pressure between seals.

Long Life: ORBIT valves replace troublesome ball valves, gate valves, globe valves and plug valves. The ORBIT design has performance advantages that reduce plant outage and reduce the cost of ownership.

Optimum Flow: Full port or reduced port openings give high CV figures. System pumping efficiency is enhanced and erosion problems are reduced.

Top-entry Design: In-line inspection and repair, after system depressurizing, simplifies maintenance.



HIPPS (High Integrity Pressure Protection Systems) is a specific application of SIS (Safety Instrumented Systems). In other words HIPPS is an integrated set including some mechanical and electronic devices whose main function is high quality over-pressure protection by shutting off the source of the high pressure .

HIPPS package includes an instrument loop which consists 3 major section

1: Initiators: Process sensor that measures process variable such as pressure, Temperature or flow rate

2: Logic Solver: The programmable Electronic System (PES) receives signal from the initiators, preforms the required logics and drive the final element

3: Final Element: block valves such as ball , axial flow or slab gate valves with solenoid actuators working on logic solver

GSSE HIPPS PACKAGES covers full range of size 2-36 inch and pressure rating 150-2500 and API up to 10000 PSI



ESDV (Emergency Shutdown Valve)

- GSSE Emergency Shutdown Valve
- designed for accuracy and dependability
- Trunnion mounted ball valve
- Fail safe spring return actuator
- Anti-blow out stem design configuration
- Low emission
- Fast response time



Pneumatic Actuators

DS And DM Series

DS and DM series are Single and Multi spring diaphragm pneumatic actuators are designed to provide high performance. Their features include:

Heavy One-Piece Yoke

Provides maximum strength and rigidity.

Diaphragm Cases

Pressed steel upper and lower cases combine lightness, high mechanical strength and adequate protection in the event of severe over-pressurization.

Thrust Capability

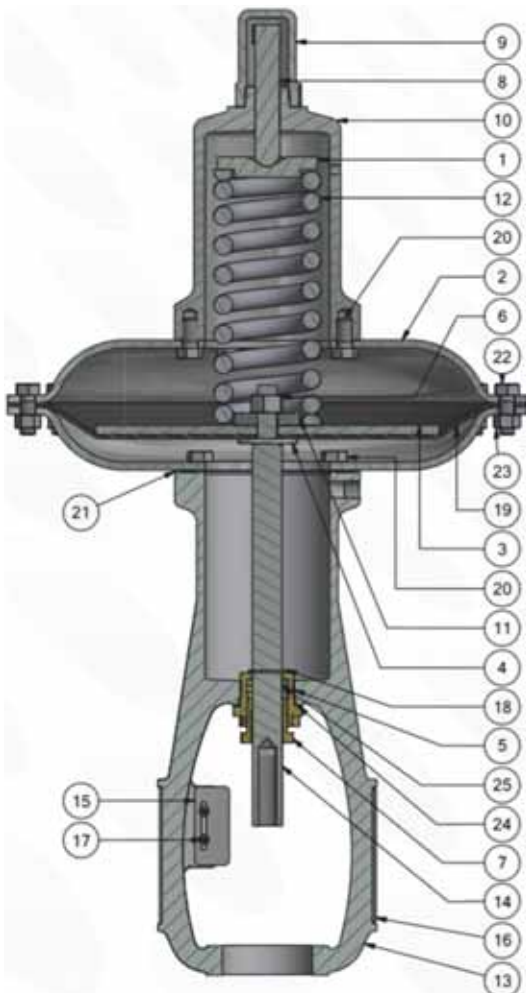
Two actuator types and seven sizes provide a wide range of applications.

Diaphragm

Molded elastomer with fabric insert for strength, long life and high sensitivity.

Linearity

The molded diaphragm and deep cases minimize area change and produce a linear relationship between travel and air pressure .



ITEM	PART NAME
1	Spring Guide
2	Diaphragm Case
3	Diaphragm Plate
4	Diaphragm Washer
5	Packing Box
6	Stem Hex Nut
7	Packing Nut
8	Spring Adjuster
9	Spring Barrel Cap
10	Spring Barrel
11	Spring Button
12	Spring
13	Yoke
14	Actuator Stem
15	Travel Indicator Scale
16	Name Plate
17	Machine Screw
18	Snap Ring
19	Diaphragm

ITEM	PART NAME
20	Cap Screw
21	Gasket
22	Case Screw
23	Case Nut
24	Packing Box Gasket
25	Yoke Packing

PS Series

PS series are cylinder pneumatic actuators with high power actuating units, for use in on/off or modulating service, have a thrust capability which is much greater than similar size diaphragm spring actuators due to air pressure up to 150 psi (10 bar) being used. Their fea-

High Thrust Capability

Multi sizes provide a wide range of applications.

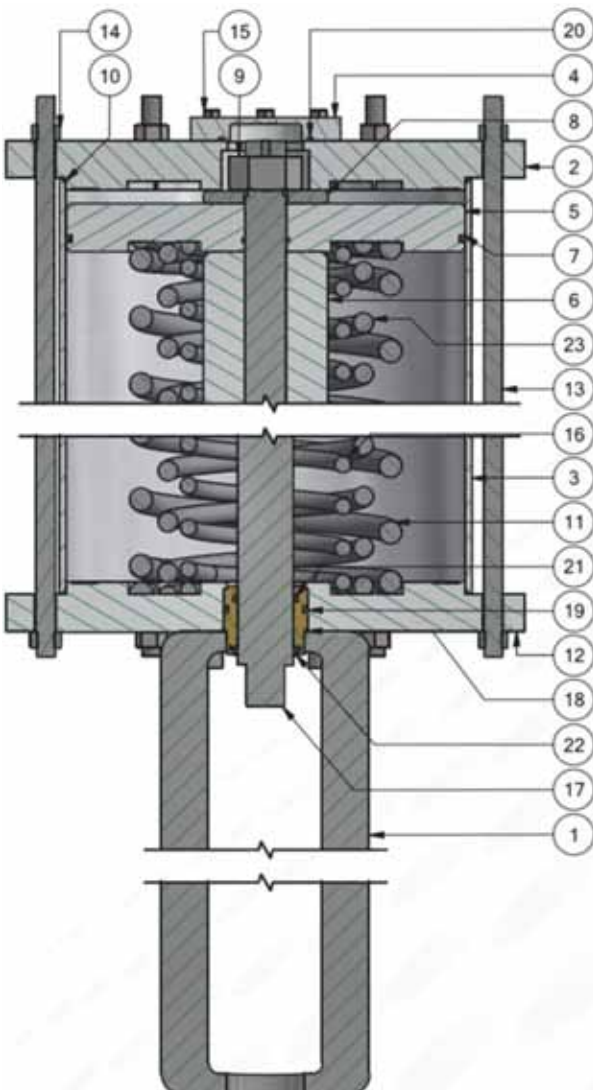
Long Stroke

Light weight And Corrosion Resistant Construction

Capable Of Using Air Supplies Up To 150 psig (10 bar)

Very Responsive With Minimum Latency On Positioning

High Stable Providing Inherent Stiffness Over Full Stroke



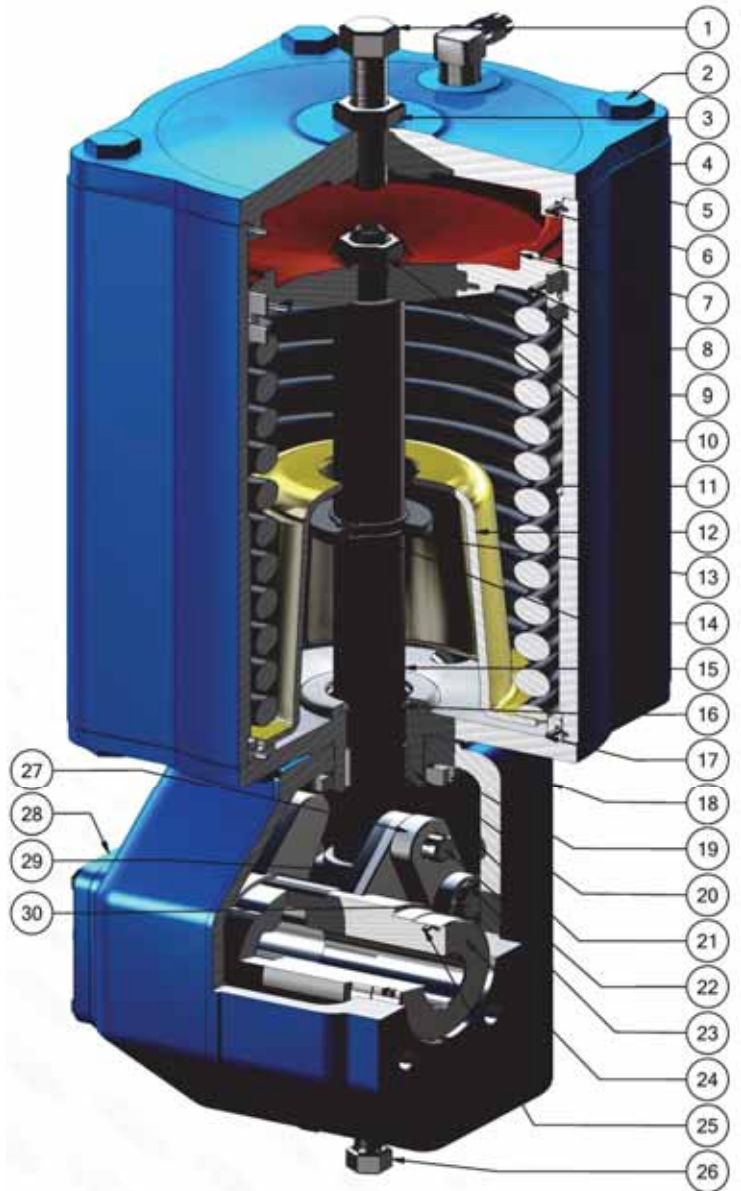
ITEM	PART NAME
1	Yoke
2	Top Plate
3	Cylinder
4	Cap
5	Piston
6	Spacer
7	O-Ring Seal
8	Washer
9	Nut
10	Cylinder Seal
11	Outer Spring
12	Lower Plate
13	Tie Rod
14	Tension Nut
15	Cap Screw
16	Inner Spring
17	Actuator Stem
18	Seal Bushing
19	O-Ring

ITEM	PART NAME
20	Cap Seal
21	O-Ring
22	Stem Wiper
23	Middle Spring

PQ Series

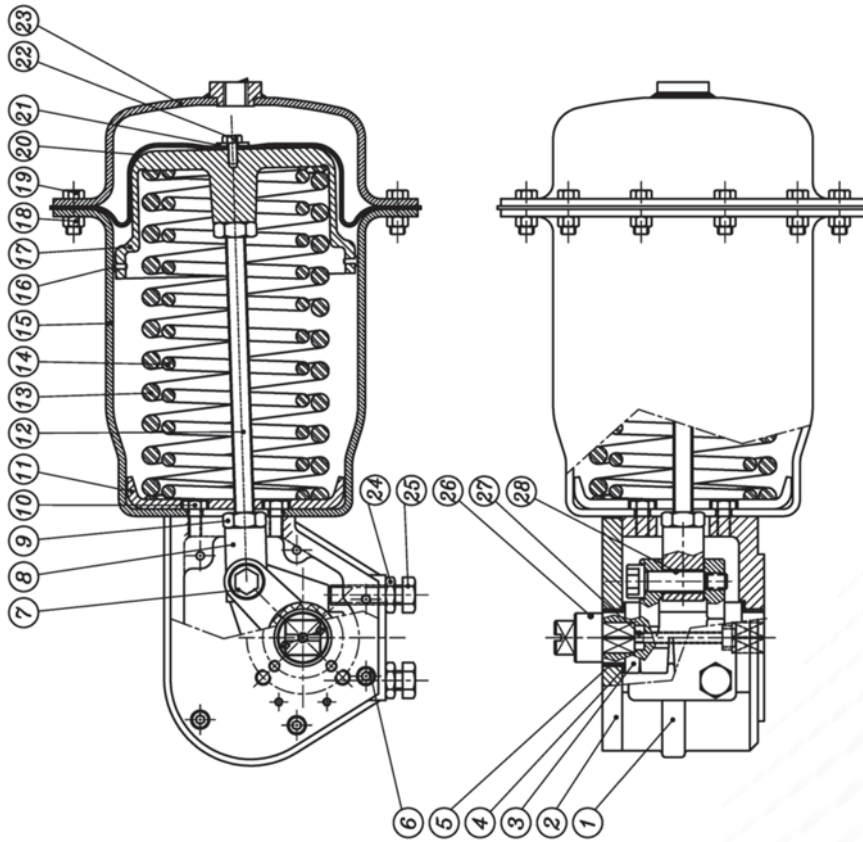
PQ series are quarter turn pneumatic Compact spring piston actuators. This series designed to provide high performance, reliability and long service life.

ITEM	PART NAME	MATERIAL
1	Adjust Screw	Stainless Steel
2	Screw	Stainless Steel
3	Nut	Stainless Steel
4	Cylinder End	Aluminum Alloy
5	Cylinder pipe	Aluminum Alloy
6	O-Ring	Nitrile
7	Piston	Cast Iron
8	O-Ring	O-Ring
9	Seal Ring	Nitrile
10	Nut	Stainless Steel
11	Spring	Steel
12	Spring Retainer	Steel
13	Washer	Steel
14	Retaining Ring	Steel
15	Piston Rod	Steel CP
16	O-Ring	Nitrile
17	O-Ring	Nitrile
18	Housing	Cast Iron
19	Slotted Round Nut	Steel
20	Cylinder Base	Ductile Iron
21	Bearing Strip	Bronze PTFE
22	Bearing	Steel
23	Bearing Strip	Bronze PTFE
24	Lever Arm	Ductile Iron
25	O-Ring	Nitrile
26	Screw (Stopper)	Stainless Steel
27	Connection Arm	Ductile Iron
28	Cover	Cast Iron
29	Bearing Unit	Ductile Iron
30	Bearing	Steel PTFE
31*	Name Plate	Stainless Steel



QT Series

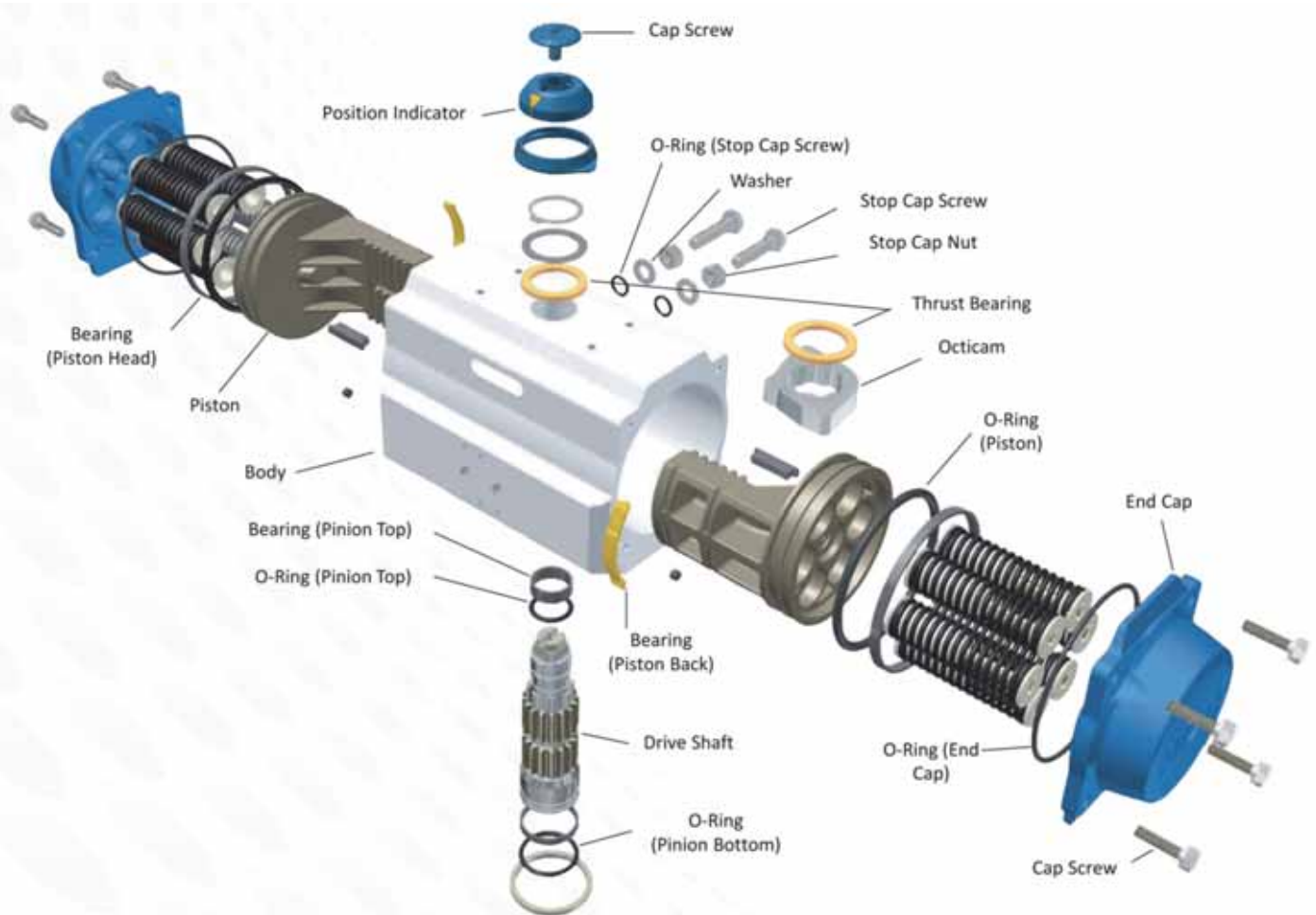
QT series are quarter turn pneumatic spring diaphragm actuators. This series designed to provide high performance, reliability and long service life.



ITEM	PART NAME	MATERIAL
1	Drive Housing	Ductile Iron
2	Cover	Carbon Steel
3	Drive Arm	Ductile Iron
4	Thrust Bearing	Nylon
5	Bearing	Stainless Steel
6	Socket Head Cap	Stainless Steel
7	Shoulder Screw	Carbon Steel
8	Clevis	Carbon Steel
9	Hex Jam Nut	Stainless Steel
10	Hex Head Cap	Carbon Steel
11	Spring Retainer	Carbon Steel
12	Actuator Rod	Alloy Steel
13	Spring	Spring Steel
14	Spring	Spring Steel
15	Spring Housing	Carbon Steel
16	Bearing	UHMW PE
17	Retainer	Carbon Steel
18	Nut	Stainless Steel
19	Hex Head Cap	Stainless Steel
20	Diaphragm	NBR
21	Washer	Stainless Steel
22	Hex Head Cap	Stainless Steel
23	Diaphragm Cover	Carbon Steel
24	Lock Nut	Stainless Steel
25	Set Screw	Stainless Steel
26	Stem	Carbon Steel
27	Drive Bush	Carbon Steel
28	Bearing	Stainless Steel

RP Series

RP series are pneumatic actuators with rack and pinion mechanism, opposed-piston actuator available in a double acting option for 90°, 135° and 180° rotations as well as a spring return option for 90° rotation. It is ideal for use on the BT Series in either automated on/off or throttling service.



Specifications

Actuator Size	Actuator Volumes (cubic cm)		Maximum Working Pressure (psi)		Weight (Kg)	
	Double Acting	Spring Return	RP	SY	Double Acting	Spring Return
63	157	220	140	200	1.8	2.2
83	406	534			3.3	4.2
93	570	752			4.5	5.8
119	1209	1565			8.8	11.6
128	1585	2143			11.2	14.6
160	3073	4254			20.4	28.2
210	5899	7374			34.8	51.1
255	12290	14748			77.2	103.2

SY N8 Series

SY series are pneumatic actuators with scotch yoke mechanism with Modular design , opposed-piston actuator available in a double acting option for 90°rotations as well as a spring return option for 90° rotation. It is ideal for use on the Butterfly , ball and other quarter turn valve Series in either automated on/off or throttling service as well as Modulating control valves.

Series	Size Code					Base Number				
N8	Actuator Size	Bore Size			Cylinder Size*	Spring Size	Base Code	Action		
N8	F	1			L	4	- 213	C		
A	VFK1	Refer to Table Below			A	2.5"	0	None (DA)	A	Double Acting, Single Cylinder
B	EZK2				B	4"	1	Spring 1	B	Double Acting, Dual Cylinder
C	EAK2				C	5"	2	Spring 2	C	Spring Return, Fail CW
D	VFK2				D	6"	3	Spring 3	D	Spring Return, Fail CCW
E	SDK2				E	7"	4	Spring 4		
F	EVK3				F	8"	5	Spring 5		
G	ZVK3				G	9"				
H	VFK3				H	10"				
J	ENK4				J	12"				
					K	14"				
					L	16"				
					M	18"				
					N	20"				
					P	22"				
					Q	24"				
					R	28"				
					S	32"				
					T	36"				

Actuator Bore Selection Table			
Actuator Size	X		
	1*	2	3
EZK2	0.87" A/F		
EAK2	1.378"	0.87" A/F	
VFK2	1.969"	1.378"	
SDK2	2.5"	1.969"	
EVK3	3"	2.5"	
ZVK3	4.5"	4.0"	3.5"
VFK3	6.0"	5.0"	
ENK4	7.0"	6.0"	

Select code that matches bore to valve stem.
 *Select 1 for other valve stems and pick a suitable mounting kit.

BILL OF MATERIALS			
ITEM	DESCRIPTION	MATERIAL	QTY
1	LEAK SCREW	AUTNA 216 SS, NICK	1
2	FLANGE NUT	AIN 304	1
3	SEALING O-RING	AUTNA 216 SS, NICK	1
4	SEALING O-RING	AUTNA 216 SS, NICK	1
5	SEALING O-RING	AUTNA 216 SS, NICK	1
6	SEALING O-RING	AUTNA 216 SS, NICK	1
7	SEALING O-RING	AUTNA 216 SS, NICK	1
8	SEALING O-RING	AUTNA 216 SS, NICK	1
9	SEALING O-RING	AUTNA 216 SS, NICK	1
10	SEALING O-RING	AUTNA 216 SS, NICK	1
11	SEALING O-RING	AUTNA 216 SS, NICK	1
12	SEALING O-RING	AUTNA 216 SS, NICK	1
13	SEALING O-RING	AUTNA 216 SS, NICK	1
14	SEALING O-RING	AUTNA 216 SS, NICK	1
15	SEALING O-RING	AUTNA 216 SS, NICK	1
16	SEALING O-RING	AUTNA 216 SS, NICK	1
17	SEALING O-RING	AUTNA 216 SS, NICK	1
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64	SEALING O-RING	AUTNA 216 SS, NICK	1
65	SEALING O-RING	AUTNA 216 SS, NICK	1
66	SEALING O-RING	AUTNA 216 SS, NICK	1
67	SEALING O-RING	AUTNA 216 SS, NICK	1
68	SEALING O-RING	AUTNA 216 SS, NICK	1
69	SEALING O-RING	AUTNA 216 SS, NICK	1
70	SEALING O-RING	AUTNA 216 SS, NICK	1

Gas Over Oil (GOV)

Pipeline actuators is designed to use pipeline gas as the motive power source. The gas is delivered to oil tanks that convert the gas into hydraulic pressure. This pressurized hydraulic oil is used to drive our industry recognized and proven scotch yoke quarter-turn or linear actuators. Using pressurized oil as the driving fluid provides powerful and smooth actuator control and isolates the cylinder from pipeline gas. This prevents contaminants from entering the hydraulic cylinder, eliminating corrosion and seal deterioration, and extending actuator life.

GOV SCOTCH YOKE SERIES:

This series is a high performance product which provide 500 N.M to 750,000 N.M torque to cover all pipeline valve requirement.

Operating Pressure :

12 bar to 150 bar

Temperature Range :

- 60 °C to + 80°C

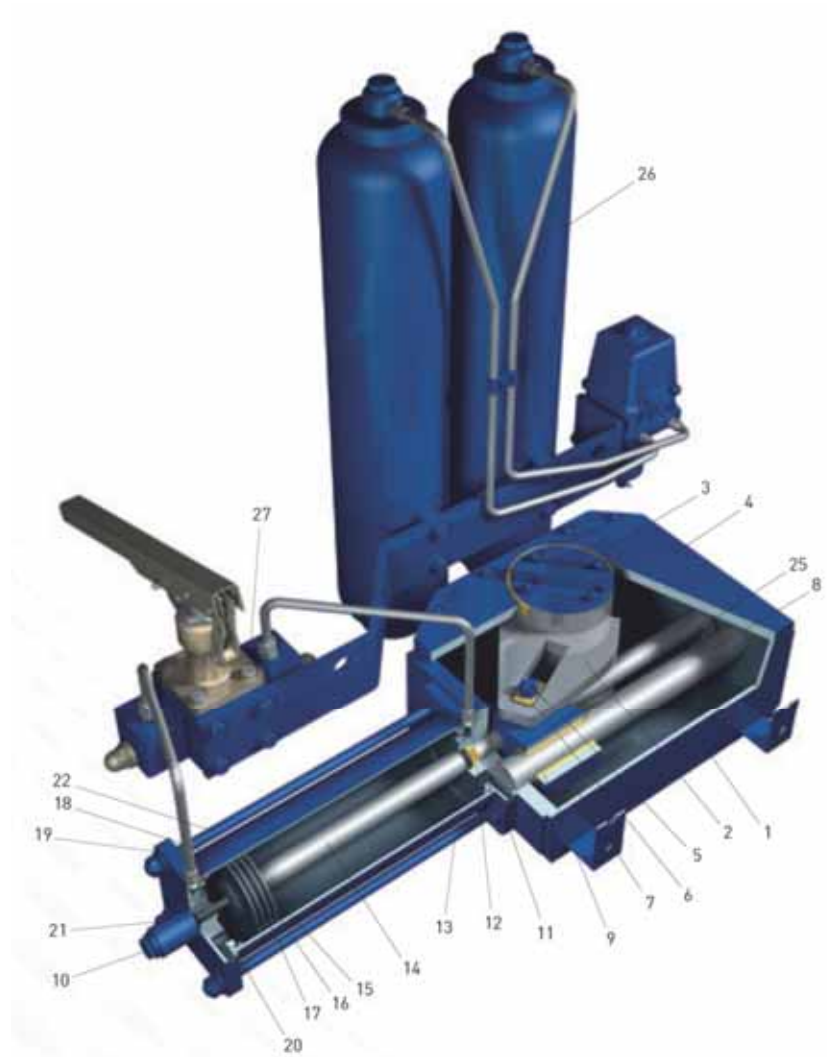
Standard Equipment:

Local control

Remote control

Optional Features:

- Low Pressure ESD
- High Pressure ESD
- Differential Pressure
- Line Break
- Solar Energy System Available upon request

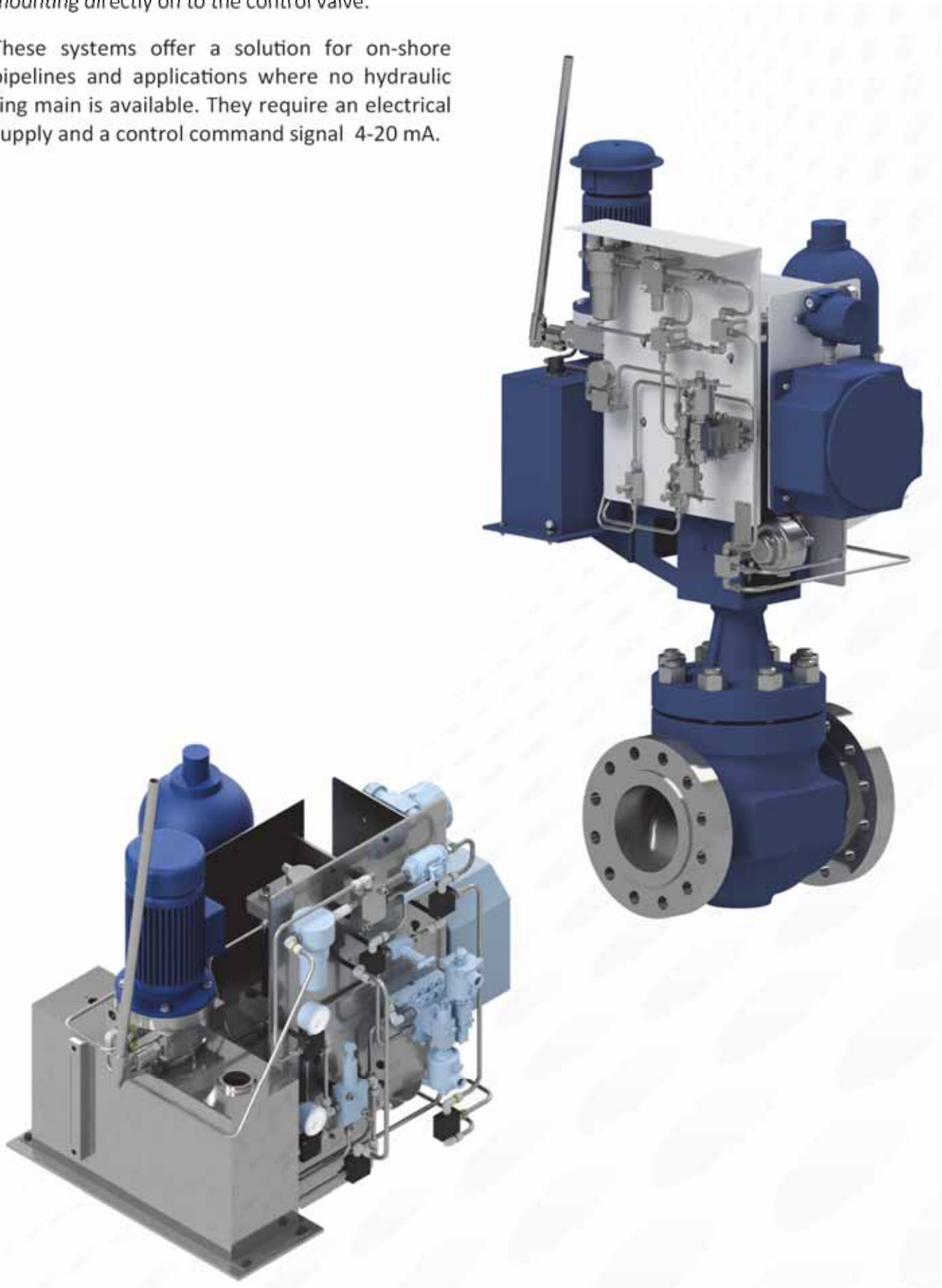


ELH Series

Positional Control Options – Self Contained

Generally all system components are mounted to the actuator assembly to form a compact solution for mounting directly on to the control valve.

These systems offer a solution for on-shore pipelines and applications where no hydraulic ring main is available. They require an electrical supply and a control command signal 4-20 mA.



Pressure Regulator Valve

Regulators are self-contained, control devices which use energy from the controlled system to operate where as control valves require external power sources, transmitting instruments and control instruments. Pressure regulator valves divided to two main types:

- Direct operated:

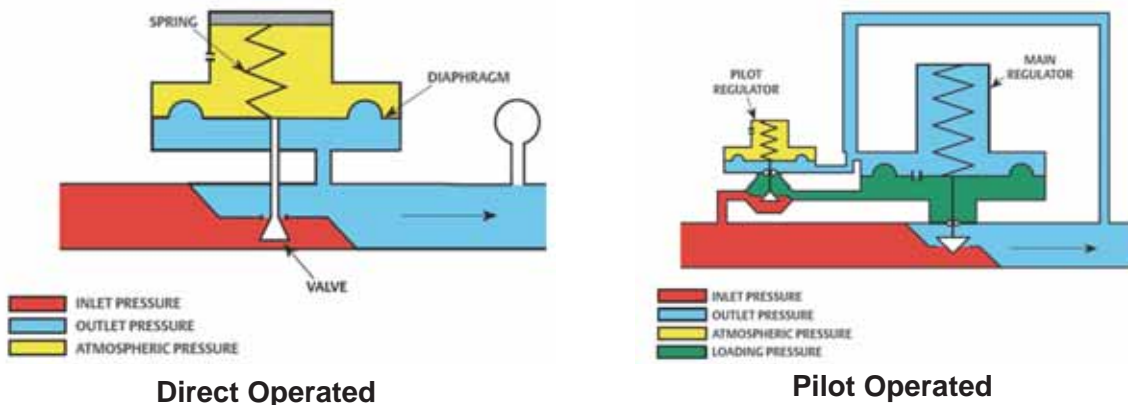
Direct-Operated regulators are the simplest style of the regulators. In operation, a direct-operated, senses the pressure through either internal pressure registration or external control line. This pressure opposes a spring which moves the diaphragm and valve plug to change the size of the flow path through the regulator. Direct-operated regulators have many commercial and residential uses. Typical applications include industrial, commercial and domestic gas service or instrument air.

- Pilot operated:

Pilot-Operated regulators are preferred for high flow rates or where precise pressure control is required. The pilot-operated regulator is a two-stage device. The first stage contains a spring-actuated pilot regulator that controls pressure on the diaphragm of the main regulating valve. The second stage contains a spring-actuated regulator that controls the main valve stem.

Pressure Reducing Regulators

A pressure reducing regulator maintains a desired outlet pressure while providing the required fluid flow to satisfy a downstream demand. The pressure which the regulator maintains is the outlet pressure setting (setpoint) of the regulator.



Selection Table:

Outlet Pressure Range psig / barg	Air	Steam	Tank Blanketing	Liquid	Process Gas	Fuel Gas	Model	Operation Method	Body Size, NPS	Maximum Inlet Pressure psig / barg
2 to 400 / 0.14 to 27.6	•	•		•	•	•	MN5R	Direct	¼ to 2	1000 / 68.9
½ in. w.c. to 7 / 2 mbar to 0.48	•		•		•	•	TZ05	Direct	¾ and 1	200 / 13.8
3 to 500 psig / 0.21 to 34.5 bar	•				•	•	Z30	Direct	1 and 2	1500 / 103
5 to 300 / 0.34 to 20.7	•			•	•	•	ME05R	Direct	1, 2, 3 and 4	400 / 27.6
0.25 in. wc to 7 / 0.6 mbar to 0.48	•		•		•		EF90	Pilot	1 to 12	400 / 27.6
4 in. w.c. to 300 / 10 mbar to 20.7	•		•	•	•	•	ZN98-TGC	Pilot	1 to 12	400 / 27.6
2 in. w.c. to 100 / 5 mbar to 6.9	•		•		•	•	N9	Pilot	2	1000 / 69.0

EF90

The Type EF90 low-pressure tank blanketing regulator is used for extremely accurate pressure control on very low-pressure blanketing systems. The regulator helps to control emissions and provides protection against any contamination from atmospheric conditions by providing a flushing action. The Type EF90 tank blanketing regulator maintains a positive vessel pressure thereby reducing the possibility of vessel wall collapse during pump-out operations.

Features:

- Quick-Change Trim Package
- In-Service Travel Inspection
- Easy In-Line Maintenance
- Factory-Piped Pilot Supply



ZN98-TGC

The Type ZN98-TGC regulators provide economical and accurate pressure control in a wide variety of applications: natural gas distribution systems; fuel gas supply to industrial boilers, furnaces, ovens and mixers; and large commercial/industrial establishments such as shopping centers and schools. They are also used in plant air service and in liquid service where a slow stroking time (approximately 30 to 90 seconds) is desired on both opening and closing the main valve.

Features:

- Quick-Change Trim Package
- In-Service Travel Inspection
- Easy In-Line Maintenance
- Differential as low as 1 psi / 70 mbar



ME05R

The Type ME05R regulators are direct-operated, pressure reducing, high-capacity, multi-purpose regulators. This product provides a simple, fast, reliable and economical way to control and reduce pressure in multi-purpose applications suitable for different flow media such as liquid, air and gas. Applications include lube oil systems and any application where speed of response is critical, minimum differential pressure is a concern or fluid is not free of impurities. Type ME05R regulator with a low-pressure actuator can be set up to 43 psig / 3.0 bar and the high-pressure actuator version can be set up to 300 psig / 20.7 bar.

Features:

- Large Flow
- In-Service Travel Inspection
- Fast Response
- Stability



Z30

The Type Z30 regulators are direct- operated, spring-loaded, pressure reducing regulators. They are available in 1 and 2-inch / DN 25 and 50 body sizes, and they are designed for maximum inlet pressures to 1500 psig / 103 bar and outlet pressures from 3 to 500 psig / 0.21 to 34.5 bar. This Type can be used with natural gas, air, or a variety of other gases for such applications as first-stage farm-tap regulators or high-pressure industrial regulators.

Features:

High-Pressure Capabilities
Rugged Construction
Better Low-Pressure Control



TZ05

TZ05 Series tank blanketing regulator is a direct-operated and spring-loaded regulator. The regulator prevents a stored liquid from vaporizing into the atmosphere, reduces liquid combustibility and prevents oxidation or contamination of the product by reducing its exposure to air. TZ05 Series maintains a slightly positive pressure and thereby reduces the possibility of tank wall collapse during pump out operation.

Features:

Low-pressure setting and fast speed of response
Accurate control and small lockup pressure
Multiple applications



MN5R

The MN5R Series regulators are compact, large-capacity, direct-operated pressure regulators. The units are available in 1/4 NPT through 2 in. / DN 50 sizes and are offered in several different end connection configurations. They are designed to handle pressures up to 1000 psig / 68.9 bar and temperatures up to 650°F / 343°C.

Features:

Tight Shutoff With Elastomer Seats
Rugged Construction



N9

The Type N9 gas regulators provide a broad capacity for controlled pressure ranges and capacities in a wide variety of distribution, industrial and commercial applications.

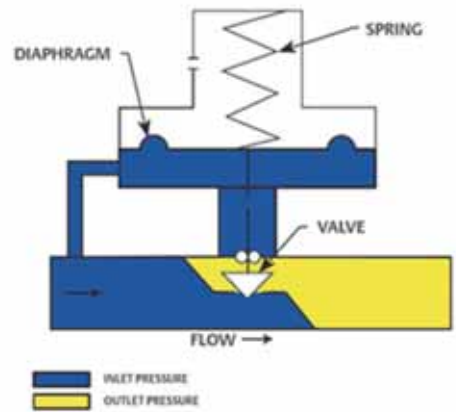
Features:

High Accuracy
No Atmospheric Bleed
Tight Shutoff



Back Pressure Regulators

Backpressure regulators control the inlet pressure rather than the outlet pressure. The selection criteria for the backpressure regulator is the same as for a pressure reducing regulator.



Selection Table:

Outlet Pressure Range psig / barg	Air	Steam	Tank Blanketing	Liquid	Process Gas	Fuel Gas	Model	Operation Method	Body Size, NPS	MAXIMUM INLET PRESSURE, psig / barg
½ in. w.c. to 7 / 5 mbar to 0.48	•		•		•		TZ08	Direct	¾ and 1	75 / 5.2
3 to 250 / 0.21 to 17.2	•				•	•	Z30R	Direct	1 and 2	550 / 37.9
5 to 300 / 0.34 to 20.7	•			•	•	•	ME08R	Direct	1, 2, 3 and 4	400 / 27.6
0.5 in. w.c. to 7 / 1 mbar to 0.48	•		•		•		ZF90	Pilot	1 to 12	12.5 / 0.86

MN8R

The MN8R Series regulators are compact, large-capacity, direct-operated pressure regulators. The units are available in 1/4 NPT through 2 in. / DN 50 sizes and are offered in several different end connection configurations. They are designed to handle pressures up to 1000 psig / 68.9 bar and temperatures up to 650°F / 343°C.

Features:

- Tight Shutoff With Elastomer Seats
- Rugged Construction



TZ08

The TZ08 Series vapor recovery regulators are direct operated. They are used to sense an increase in vessel pressure and vent excessive internal vessel pressure to an appropriate vapor recovery disposal or reclamation system. They may also be used as backpressure regulators or relief valves.

Features:

- Low-pressure setting and fast speed of response
- Accurate control
- Rugged Construction



Z30R

The Type Z30R is a general relief valve that is available in NPS 1 and 2 / DN 25 and 50 body sizes. It is frequently used at compressor stations, refineries and similar plants requiring a backpressure gas regulator for relief pressure settings up to 250 psig / 17.2 bar.

Features:

- High-Pressure Capabilities
- Rugged Construction
- Tight Shutoff
- Interchangeability



ME08R

The Type ME08R regulators are direct-operated, pressure reducing, high-capacity, multi-purpose regulators. This product provides a simple, fast, reliable and economical way to control and reduce pressure in multi-purpose applications suitable for different flow media such as liquid, air and gas. Applications include lube oil systems and any application where speed of response is critical, minimum differential pressure is a concern or fluid is not free of impurities. Type ME08R regulator with a low-pressure actuator can be set up to 43 psig / 3.0 bar and the high-pressure actuator version can be set up to 300 psig / 20.7 bar.

Features:

- Low-pressure setting and fast speed of response
- Accurate control and small lockup pressure
- Multiple applications



ZF90

The Type ZF90 vapor recovery regulator controls vessel blanketing gas pressure when the vessel is being filled with fluid or when ambient temperature causes the vapor gas to expand. The system monitors the increasing blanket pressure and throttles open to pass excess blanketing gas into a vapor disposal or reclamation system thus controlling the desired set pressure of the vessel.

Features:

- Quick-Change Trim Package
- Easy In-Line Maintenance
- In-Service Travel Inspection
- High Accuracy



Pressure Safety Valve

Pressure safety valves is an automatically actuated valve, when a sudden pressure increase happens in process control system to save other equipment from mechanical damage, release of excess pressure from the disk and nozzle bring the system pressure level to a safe pre set value.

GSSE pressure safety valves are the following types:

EN00

The EN00 series of pressure safety valve provides a wide scope of design in both pressure and temperature ranges.

Features:

Service: Liquid, Gas, Steam
 Design: Convectional, Bellows
 Orifice: D-T (API 526), D-W (ASME)
 Simple Blowdown Adjustment
 Seating Design: Metal, Soft
 Eductor Tube Reduces Bonnet Pressure

Specifications:

Flanged: 1"-12" , ANSI 150-2500

Accessories:

Lifting Mechanisms: Plain Lever, Packed Lever & Cap with Gag Jacketing



EN000

The EN000 series of pressure safety valves are ASME B & PVC, SECTION VIII compliant for liquid service applications. Seat tightness, blowdown and capacity on all types of media meets the industry need for overpressure protection in chemical, petrochemical, refinery, power generation (nuclear and conventional) and other commercial applications.

Features:

Service: Liquid
 Orifice: ASME
 Seating Design: Metal, Soft

Specifications:

Inlet: Flanged, Threaded, Butt weld, Socket Weld: 1/2"-2" , ANSI 150-2500
 Outlet: Flanged, Threaded, Socket Weld : 1/2"-2" , ANSI 150-300

Accessories:

Lifting Mechanisms: Plain Lever, Packed Lever & Cap with Gag



EN82

The EN82 series of pressure safety valves are ASME B & PVC, SECTION VIII compliant for vapor and steam service applications.

Features:

Service: Steam, Gas

Orifice: ASME

Seating Design: Metal, Soft

Specifications:

Inlet: Flanged, Threaded 1/2"-2" , ANSI 150-300

Outlet: Flanged, Threaded, Socket Weld : 1/2"-2" , ANSI 150-300

Accessories:

Lifting Mechanisms: Plain Lever, Packed Lever & Cap with Gag



ZN00

The ZN00 series is pop or modulating action with non-flowing pilot provides excellent performance with full lift in set pressure & minimum blowdown.

Features:

Service: Liquid, Gas, Steam

Design: Convectional, Bellows

Orifice: D-W (API 526), D-W (ASME)

Simple Blowdown Adjustment

Seating Design: Metal, Soft

Pop Action and Modulating Pilots

Seat Tightness up to 98% of Set pressure

Adjustable Blowdown to 2% of Set pressure

Specifications:

Flanged: 1"-12" , ANSI 150-2500



DN00

The DN00 series is pop or modulating action with non-flowing pilot provides excellent performance with full lift in set pressure & minimum blowdown.

Features:

Service: Liquid, Gas, Steam

Design: Convectional

Orifice: D-T (API 526), D-T (ASME) and Full bore options

Simple Blowdown Adjustment

Seating Design: Metal, Soft

Pop Action and Modulating Pilots

Seat Tightness up to 98% of Set pressure (99% for Modulating Pilot)

Adjustable Blowdown to 2% of Set pressure

Specifications:

Flanged: 1"-12" , ANSI 150-2500



Blowdown Valve

The primary function of a blowdown valve is to control the concentrations of suspended and total dissolved solids (TDS) in the boiler. Continuous Blowdown (CBD) valves are designed to operate in continuous open position by releasing water continuously, whereas Intermittent Blowdown (IBD) valves are designed to operate at predetermined intervals by releasing water and accumulated sludge periodically. Boiler blowdown is a severe service application owing to the high pressure drop in flashing water which results in rapid erosion and wearing out of conventional valves.

Features:

Service: Liquid

Angle type design

Specifications:

Size: 1" / 1 ½" / 2" / 2 ½" / 3"

Pressure Rating: ANSI #300 / #600 / #900 / #1500 / #2500

End Connection: Flanged / Socket Weld / Butt Weld

Accessories:

Micrometer dial indicator

Motorized



ARC Valve (Automatic Recirculation Control Valve)

If you use centrifugal pumps for any liquid– boiler feed water, condensate, or process fluids, a significant Investment has been made in the pump, driver and related controls. Minimum flow protection is vital upon start up and low demand conditions. If reliable protection does not exist, the following unfavorable effects can interfere with the performance and reliable operation of the pump.

The liquids temperature will rise due to friction and hydraulic losses within the pump. Figure 1a illustrates the temperature rise in relationship to the H-Q curve. The curve indicates that at or near the best efficiency point, the temperature rise is minimal and not significant to the pump operation.

The process flow removes the generated heat from the pump. The temperature increases as the flow through the pump is reduced. Frictional and hydraulic losses generate heat, while the quantity and fluid to which this heat is transmitted is reduced. The rise in temperature results in the formation of vapor. The elevated temperature / vapor pressure of the liquid results in problems ranging from damaged seals and bearing to complete failure of the rotating element.

Internal recirculation within the pump, often termed incipient recirculation, can cause a form of cavitation leading to impeller damage. High specific speed pumps have power curves which rise as the flow reduces. If adequate flow is not maintained, motor overload will result.



Quality Assurance

Quality and reliability are our first priority. All GSSE valve are subject to a continuous quality inspection from the planning and development during the production and up to the final inspection. Every valve is inspected in order to guarantee absolute reliability and plan safety, taking into consideration previous defined application condition.

Inspection and Test Plan

Sub Category	Requirements	Standard
Regulation & Design Code	ASME B16.34	
Pressure Containing Parts (Body ,Bonnet ,Cover ...)	Melt Chemical Analysis And Mechanical Properties	CMTR / EN 10204 3.1 / ISO 10474 3.1B
	Visual Examination Accessible Areas	MSS SP-55
Pressure Retaining Parts (Trim)	Melt Chemical Analysis And Mechanical Properties	COC / EN 10204 2.1 / ISO 10474 2.1
Body bonnet bolting	Melt Chemical Analysis And Mechanical Properties	COC / EN 10204 2.1 / ISO 10474 2.1
NDT/Inspection	Visual Inspection Of BW	ASME B31.3 / B31.1
Testing	Hydrostatic Test	ASME B16.34/EN 12266.1/IEC 60534-4/ISA S 75.19
	Plug/Seat Leakage Test	FCI 70.2/IEC 60534-4/EN 1349
	Packing Leakage Test	IEC 60534-4
	Standard Functional Test	IEC 60534-4
Final Inspection	Inspection of Assembled Product	Visual / Dimensional / Marking / Identification / Painting Visual Check and Document Review
Cleaning	Standard	
Painting	GSSE Standard	
Packaging	GSSE Standard	
Certification	NDT Operators Level II	SNT TC1A or EN 473 Or Equivalent
	Process & Welders Certified	ASME IX

Applicable International Standards For Inspection and Testing:

API (598, 589, 622, 591,)

ASME (16.34)

MSS (SP61, SP25, SP 53, SP55, SP117)

ISA (75.19.01, 75.02, 75.25, 75.17)

ISO (15848, 5208, 10497)

ANSI FCI (70.2)

Applicable International Standards (Design and Material)

API (6A, 6D, 600, 602, 599)

ASME (B16.34, B16.5, B16.10, 16.25, 16.47)

IPS (E-IN-160, C-IN-160, G-IN-160, M-IN-160)

BS (1873, 5353, 12516, 2080, 5351, 1414, 1868)

NACE (MR0175)

ATEX

PED

•Other Material and Special Design Applicable On Request.

Other Material Selection

Common Name	Main Ingredients	Casting	Forging
254-SMO	20Cr - 18Ni- 6Mo	A351-CK3MCuN	A182-F44
Duplex 2205	22Cr - 5Ni- 3Mo - N	A890 Gr.4A CD3MN	A182-F51
Super Duplex 2507	25Cr - 7Ni- 4Mo - N	A890 Gr.5A CE3MN	A182-f53
Super Duplex Zeron 100	25Cr - 7Ni- 3.5Mo - N	A890 Gr. 6A CD3MWCuN	A182-F55
Ferrailium 255 - Super Duplex	25Cr - 5.5Ni- 3Mo - Cu - N	A890 Gr. 1A CD4MCu A890 Gr. 1B CD4MCuN	A182-F61
Hastelloy C276	58Ni - 16Cr - 16Mo - 6Fe - 4W	A494 CW-12MW	B564-N10276
Hastelloy C (Modified)	54Ni- 20Cr - 20Mo - 3fe	A494 CW-6M	N/A
Hastelloy C4	62Ni- 16Cr - 16Mo - 2fe	A990 CW2M	N/A
Hastelloy C22	58Ni - 21Cr - 14Mo - 4Fe - 3W	A494 CX2MW	N/A
Inconel 600	78Ni- 15Cr - 5Fe	A494-CY40	B564- N06600
Inconel 625	65Ni- 22Cr - 9Mo - 3.5Nb	A494-CW6MC	B564- N06625
Incoloy 800	33Ni - 20Cr - 45Fe - Nb	A351-CT15C	B564- N08800
Monel 400	67Ni- 30Cu	A494 M35-1	B564- N04400

International Certificates:



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