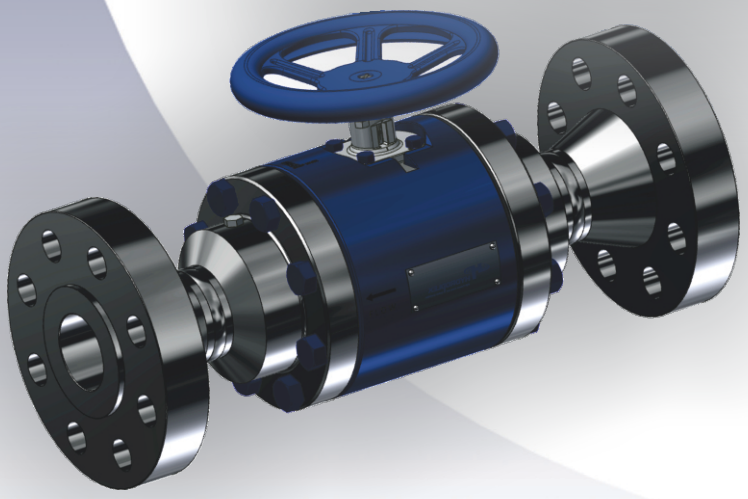
HYDROPLEX

High Pressure Pump, Valve, and System Specialists

HYDRAMAX

Throttling Valve



***Patent Pending and Issued*

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HydraMax Inline Throttling Valve

The Twin Disc Valve was initially designed to manage injection fluids in Enhanced Oil Recovery (EOR) projects, as well as to control the production of crude oil and natural gas wells. It is now used a variety of applications when precision control fluids is required. Applications such as gas lift, gas-assisted plunger lift, automated well control and set point control, essentially any situation that requires the management of high-pressure fluids.

As flow or pressure is regulated, wear is inevitable in any throttling valve. This typically occurs on the control surface and around the orifice, especially in globe, gate, butterfly, ball, and plug valves. However, in the Twin Disc, the control surfaces and seal surfaces are separate and distinct. The disc rotation exposes a minimum amount of control surface to the high velocity flow stream compared to other valve types. There are no obstructive shapes in the flow path, which are common in globe style and “needle and seat” valves. As a result, the Twin Disc experience reduced wear on throttling and shut-off surfaces.

The differential pressure across the discs secures them together, providing a stable control element. There are no loose or unsupported parts that could cause vibration, noise, or fatigue failures. Each time the valve is rotated, the exposed part of the disc’s surface is cleaned of foreign deposits.

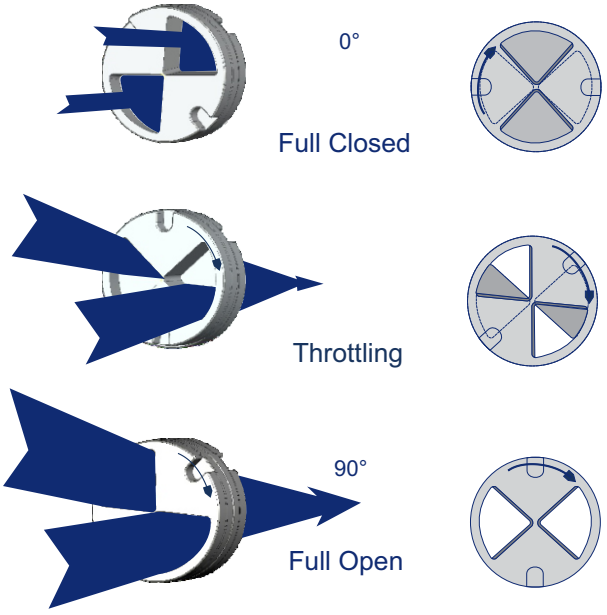
Principle of Operation

The valve features two adjacent twin discs, each fitted with two precision orifices that can be either round hole or pie-shaped.

When the valve is in the fully closed position, the orifices are positioned 90 degrees out of alignment, forming an ANSI Class IV seal.

When the valve is in the throttling position, the orifices align with each other, forming a precision orifice that supports the flow or pressure requirements for the process. It is recommended that for sustained operation, the opening should not be less than 30% for gas and 40% for liquid service.

When the valve is in the full open position, the orifices align with each other, facilitating the maximum rated flow through the valve.

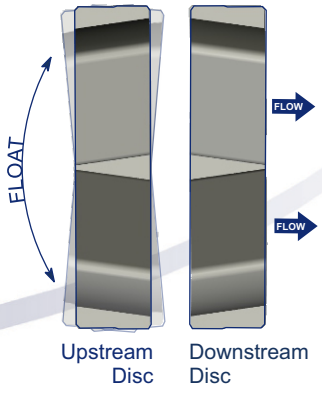


ANSI Class IV Seal

The control discs are lapped to within two light-bands of flatness (+/- 0.00002”) to achieve a positive shut-off and maintain precise control.

The upstream disc as a result of differential pressure floats against the downstream disc creating a mated interface and assures a Class IV seal.

Additionally, the differential pressure across the disc stabilizes the control surface and eliminates trim noise and vibration.

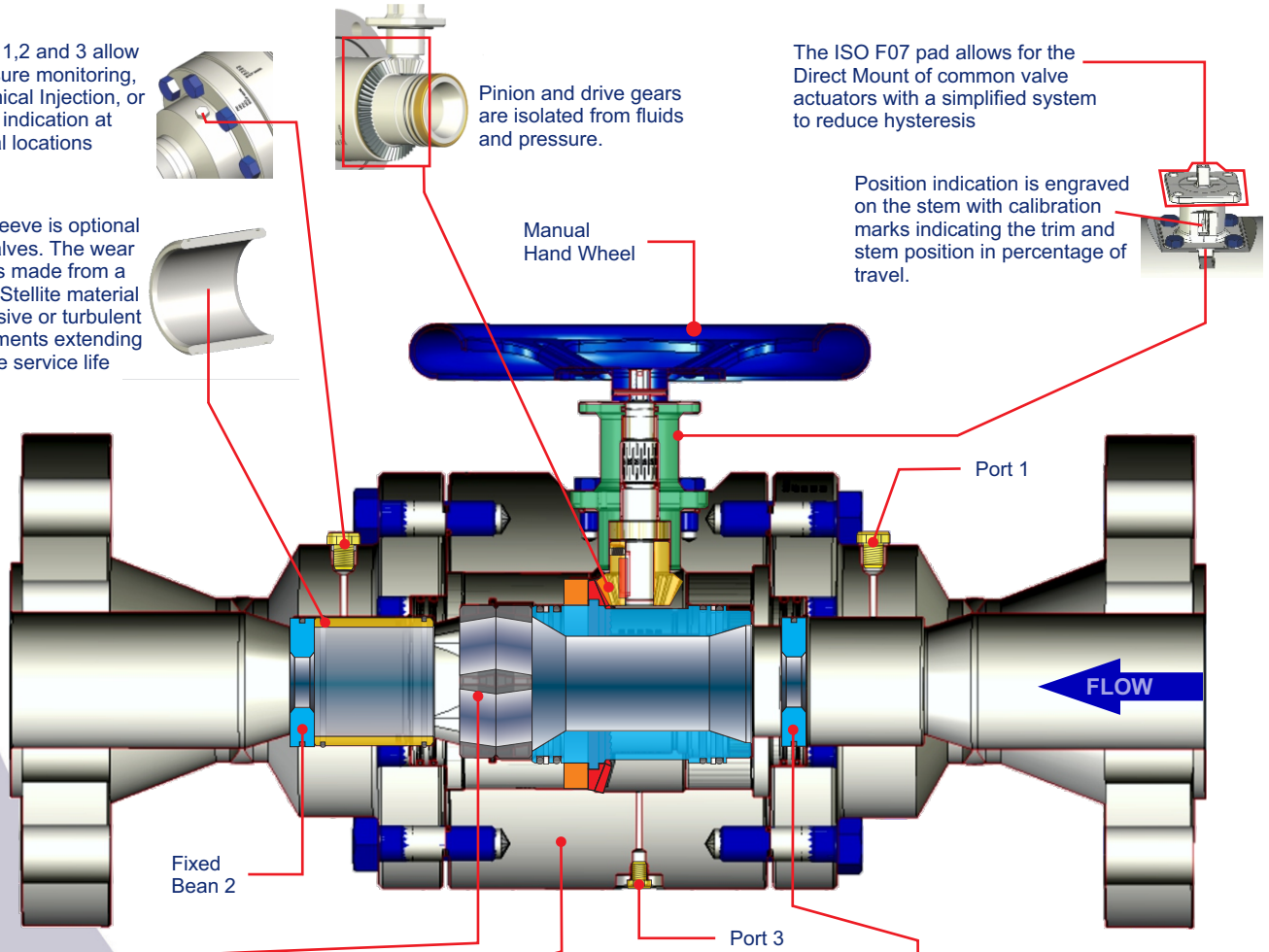


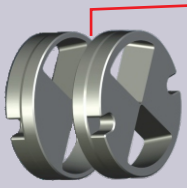
HydraMax Inline Throttling Valve

The HydraMax *Wafer* is a versatile control valve that can be tailored to address sophisticated and simple pressure and flow requirements. Its Wafer construction requires minimum space for installation. The Inline flow path minimizes turbulence reducing erosion potential and increases efficiency of the valve. The 3:1 gear ratio provides for precision control, reduces torque and power requirement for automation. The gear set is isolated from the fluid stream preventing contact with contaminates and debris which could compromise the valve operation.

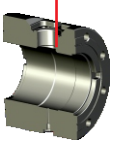
All valve and trim components are designed to fit in place seamlessly, allowing for quick configuration to meet specific user process needs. The valve trim is fully guided and stable, minimizing vibration and mechanical noise. The free float design of the disc provides the user with enhanced and extended valve shut-off performance. The Twin Disc and Multistage system can achieve full pressure drops. The simplicity of the build also means that maintenance is quick and easy, with no special tools required to maintain the valve.

Valve Component Description And Purpose

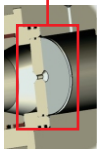




TWIN DISC control elements are available in a variety of sizes to accommodate flow and pressure requirement. Standard material is Tungsten Carbide



EXOBODY provides for pressure containment but is isolated from the process flow and is not subject to corrosion or solids contained in the process fluids



FIXED BEAN 1 AND 2
The hub design allows for the placement of fixed orifice beans to achieve either a two or three stage drop within the

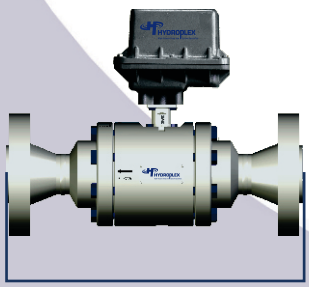
HydraMax Inline Throttling Valve

Optional Features

Actuation for automated control
Wear Sleeve for high pressure and abrasive fluids
Multistage DP system utilizing fixed orifice beans for pressure control

HydraMax Assembly Dimensions

Style	Size	Connection	End To End
RTJ	4	2500 sch xxs	33.271
		1500 sch xxs	27.779
		900 sch 80	27.019
		600 sch 80	26.019
		400 sch 80	25.019
		300 sch 80	24.659
		150 sch 80	23.775
	3	2500 sch xxs	31.385
		1500 sch 80	27.259
		900 sch 80	26.019
		600 sch 80	24.519
		300 sch 80	24.139
		150 sch 80	23.275
RFF	4	2500 sch xxs	32.895
		1500 sch xxs	27.655
		900 sch 80	26.895
		600 sch 80	25.895
		400 sch 80	24.515
		300 sch 80	24.155
		150 sch 80	23.395
	3	2500 sch xxs	31.135
		1500 sch 80	27.135
		900 sch 80	25.895
		600 sch 80	24.395
		300 sch 80	23.635
		150 sch 80	22.895
B/WI	4	.	17.145
	3		17.145
NPT	3	FNPT	17.145



Major Component Standard** Materials

Description	Material**
Hub Assemblies	4140 Alloy Steel 316 Stainless Steel
O-Rings	HNBR 90 d
Backup Rings	PTFE
Control Discs	Tungsten Carbide
Rotator	17.4PH H900 SS
Bolts	A193 Grade 8 zinc/PTFE
Body	4140 Alloy Steel
Wear Sleeve*	Stellite 6
End Caps	SA 479 316 Stainless Steel
Stem	17.4 H 900 Stainless Steel
Stem Housing	SA 479 316 Stainless Steel
Gear	High Alloy Steel
Fix Beans*	17.4 H 900 Stainless Steel

* *Optional*
** *For material other then Standard consult factory*

Tungsten Carbide Trim Options

Orifices	Cv	64th inch Equiv. Dia.	Orifice Geometry
1.75 Inch Diameter Disc			
2 ea. - 1/8”	0.74	11.3	Round
2 ea. - 1/4”	2.95	22.6	Round
2 ea. - 3/8”	6.63	33.9	Round
2 ea. - 1/2”	11.78	45.3	Round
2 ea. - 3/4”	22.31	62.3	Pie
3.25 Inch Diameter Disc			
2 ea. - 1”	48.79	92	Round
2 ea. - 1 1/4”	73.78	113	Pie
2 ea. - 1 3/8”	98.20	125	Pie

Applications

Liquid and Gas Pressure or Flow Control
Water And Gas Injection
Manifold Flow or Pressure Control
Pressure Maintenance
Disposal Well
Pump Startup Bypass
ESP/H Pump Back-pressure Control
Disposal Wells
Reverse Osmosis

HydraMax Inline Throttling Valve

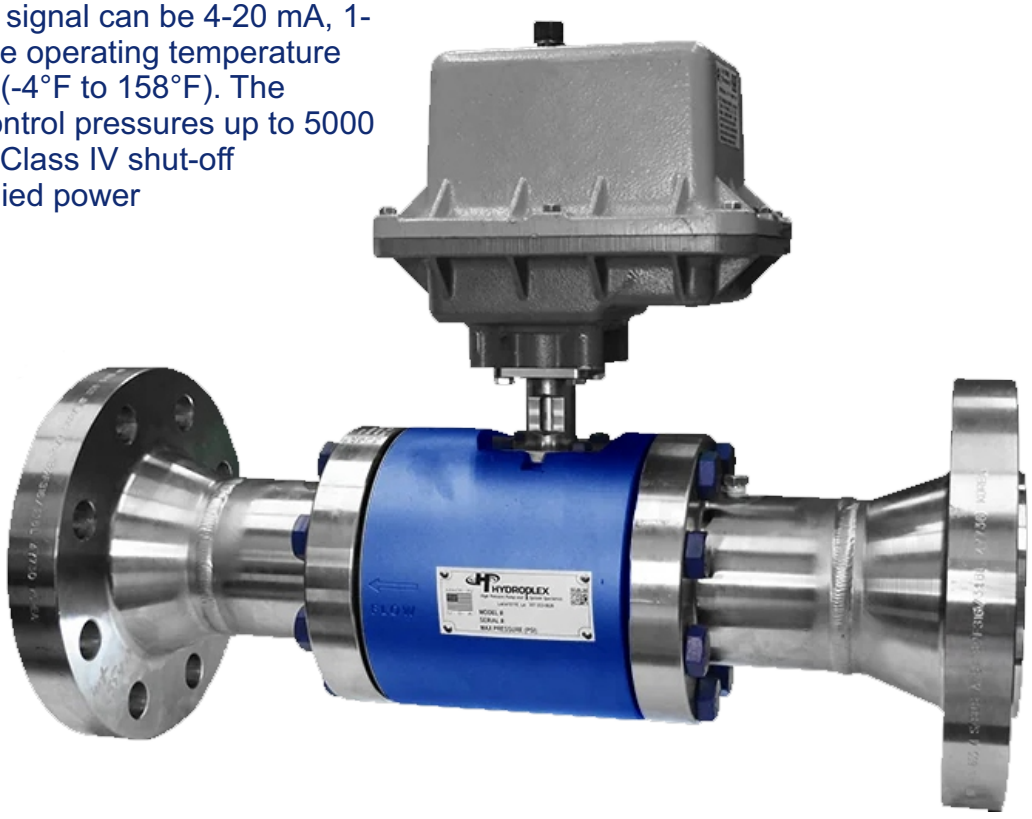
Automation

The HydraMax Twin Disc Throttling valves are specifically designed for applications involving control of water, oil, or natural gas. They are sometimes equipped with electric actuators, which protect the environment from the atmospheric venting of control gas typically associated with conventional diaphragm operated control valves. This design also offers a significant improvement in reliability and precision over pneumatics that rely on native gas sources, which can be contaminated with liquids and solids.

The HydraMax coupled with an electric actuator is designed for low energy requirements, operating at 12 or 24VDC with minimal current draw during movement. The control signal can be 4-20 mA, 1-5V, or a dry contact. The operating temperature range is -20°C to 70°C (-4°F to 158°F). The HydraMax valve can control pressures up to 5000 psi and can maintain a Class IV shut-off indefinitely without applied power

Torque Rating

Differential Pressure	Operating Torque
1,000 lbs.	240 in.-lbf
2,000 lbs.	360 in.-lbf
3,000 lbs.	480 in.-lbf
4,000 lbs.	600 in.-lbf
5,000 lbs.	720 in.-lbf



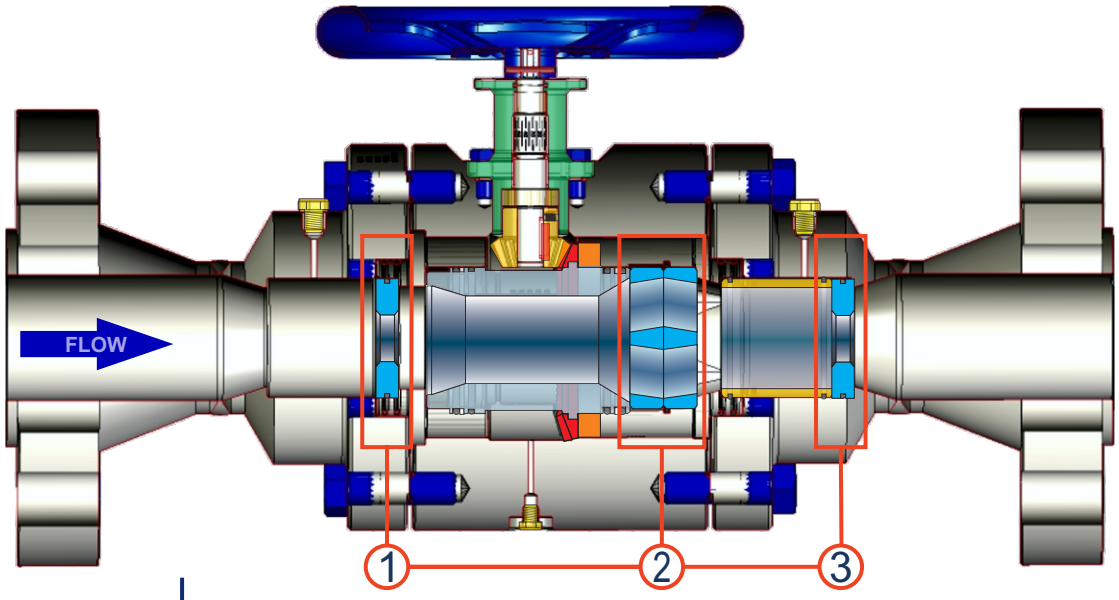
The HydraMax valve can be easily modified from a manual operation to an automated valve in the field without interrupting service. The Direct Mount ISO F07 pad and ISO stem facilitate mounting of most electric and pneumatic actuation systems, it really is just removing the handwheel, dropping the actuator on and tightening the four mounting bolts. The low torque requirements reduce the power draw making this product ideal for low voltage applications such as solar powered installations.

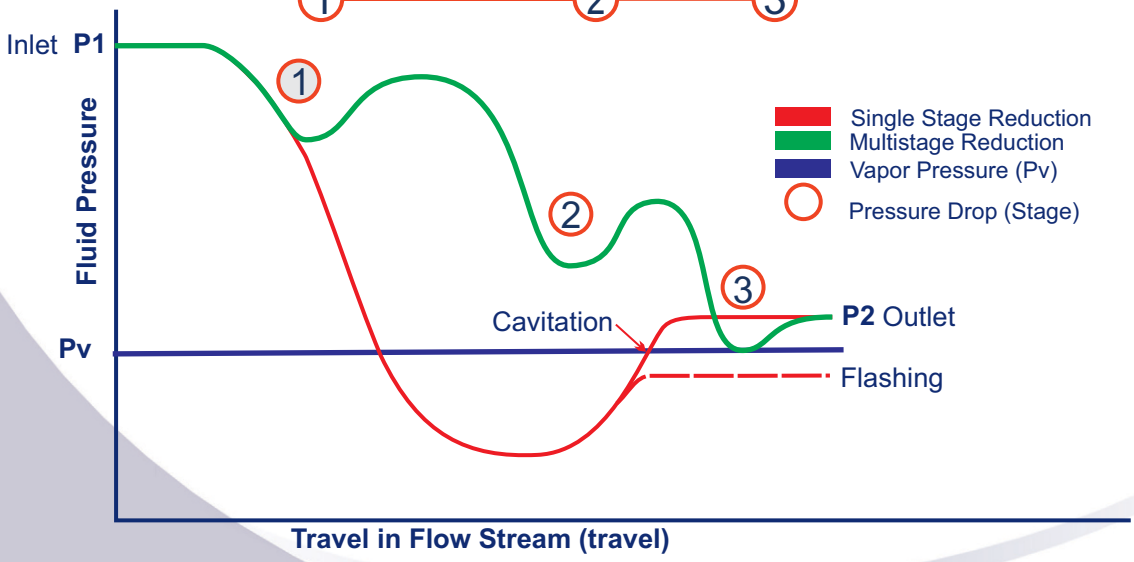
Multistage Pressure Drop (MPD)

Engineered to regulate fluid pressure or flow velocity, Multistage Pressure Drop (MPD) Configurations are a solution for scenarios where a single-stage trim is insufficient due to specific process conditions. In these cases, an MPD valve is a more effective alternative. The main reason for using multiple restrictions is to manage the pressure drop, irrespective of the fluid's state (liquid or vapor/gas). A high pressure drop can lead to increased velocities, which may result in erosion, vibration, and noise issues.

Where high pressure drops in liquid flows are required, the use of MPD assemblies should be considered. This allows the pressure drop to be achieved while reducing the potential for issues such as cavitation, flashing, and increased noise levels. In situations with intense cavitation, the optimal approach is to gradually decrease pressure from the inlet to the outlet. By staging the pressure reduction, the stages can prevent the process pressure from falling below the vapor pressure, thus avoiding the creation of harmful vapor bubbles.

For gas applications that experience critical flow, careful evaluation is necessary. If the process condition indicates critical flow with a single pressure drop, MPD valves can be used to prevent operation at or beyond the critical pressure. The term "critical" refers to a pressure drop across the device exceeding 50% of the absolute upstream pressure, which results in sonic velocity being achieved.





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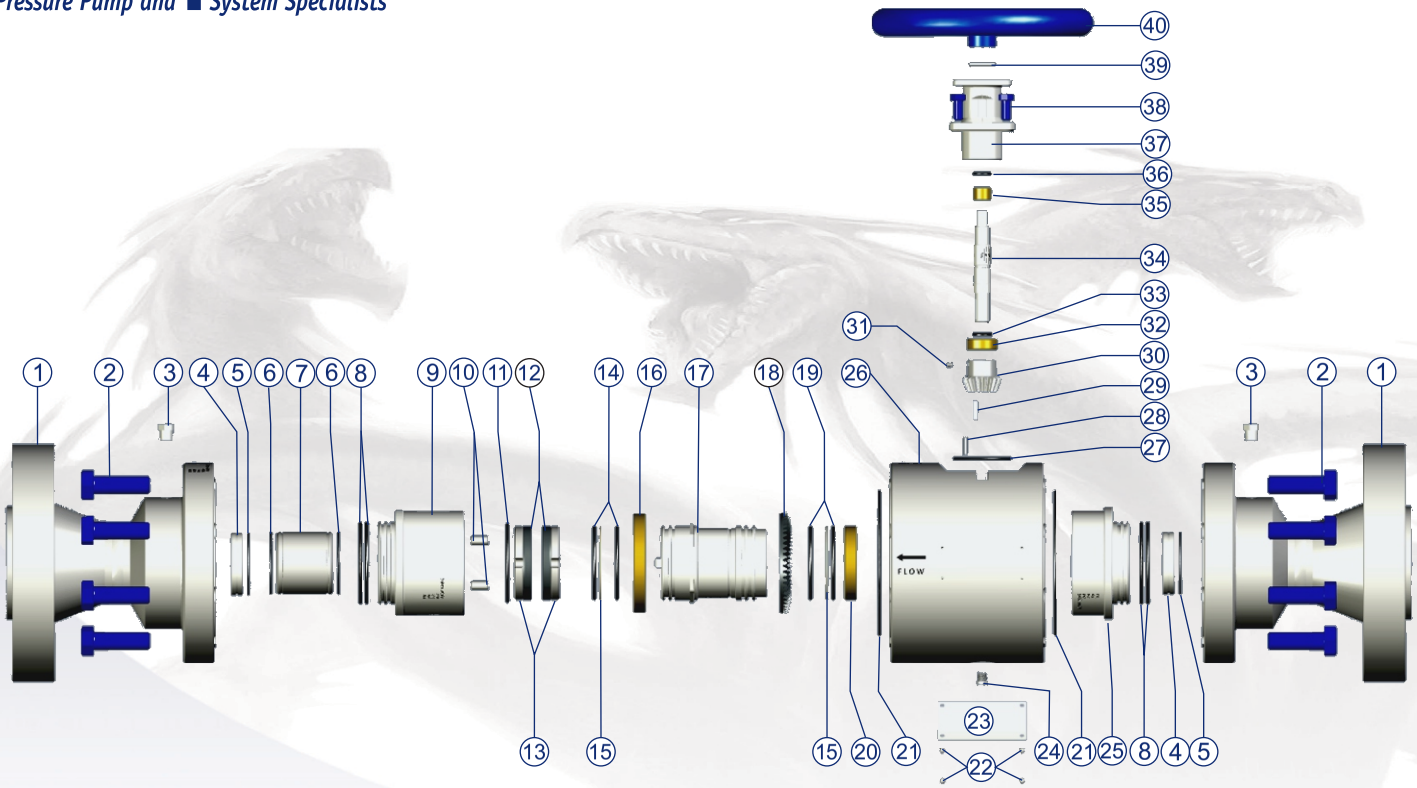
HydraMax Exploded View



#	DESCRIPTION	#	DESCRIPTION	#	DESCRIPTION	#	DESCRIPTION
1	Hub	11	O-Ring	21	O-Ring	31	Set Screw
2	Bolts Hex	12	Control Disc	22	Drive Screw	32	Bushing
3	Plug 1/4”	13	Disc Carrier**	23	Valve Data Label	33	O-Ring
4	Fix Bean*	14	O-Ring	24	Plug, 1/4”	34	Stem
5	O-Ring*	15	Backup Ring	25	End Cap, Upstream	35	Bushing
6	O-Ring	16	Bushing	26	Exobody	36	O-Ring
7	Wear Sleeve	17	Rotator	27	O-Ring	37	Stem Housing
8	O-Ring	18	Drive Gear	28	Pin, Dowel	38	Bolt, Hex
9	End Cap, Downstream	19	O-Ring	29	Key, Square	39	Pin, Roll
10	Pin, Dowel	20	Bushing	30	Drive Gear	40	Handwheel

* Optional on both inlet and outlet

** Disc carrier is used for Small Disc Sizes

HYDROPLEX VALVE SUMMARY

HCI THROTTLING VALVE

Configuration:	Inline Segmented Body Thru port
Pressure:	5000 PSI
Nominal Size:	2 Inch
Material Construction:	316 Stainless Steel (Bar)
End Connections:	1” and 2” Threaded / 1”, 2” and 3” Flanged
Operation:	Manual / Automated
MultiStage Construction:	1 or 2 Stages
Design Function:	Fluid Maintenance (WOG)
Application:	Oil / Gas Production and Injection
Location:	Upstream gathering system

HCA THROTTLING VALVE

Configuration:	Angle 90 degree body highly configurable
Pressure:	5000 PSI
Nominal Size:	2 Inch
Material Construction:	316 Stainless Steel (CF8M cast)
End Connections:	1” and 2” Threaded / 1”, 2” and 3” Flanged
Operation:	Automated / Manual
MultiStage Construction:	1, 2 or 3 Stage
Design Function:	Fluid Maintenance (WOG)
Application:	Oil / Gas Production and Injection
Location:	Upstream gathering system

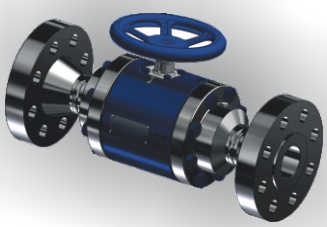
HCY THROTTLING VALVE

Configuration:	Inline “Y” body highly configurable
Pressure:	5000 PSI
Nominal Size:	2 Inch
Material Construction:	316 Stainless Steel (CF8M cast)
End Connections:	1” and 2” Threaded / 1”, 2” and 3” Flanged
Operation:	Automated / Manual
MultiStage Construction:	1, 2 or 3 Stage
Design Function:	Fluid Maintenance (WOG)
Application:	Oil / Gas Production and Injection
Location:	Upstream gathering system

CSX CONTROL VALVE

Configuration:	Inline Globe Style body
Pressure:	5000 PSI
Nominal Size:	2 Inch
Material Construction:	Carbon Steel (WCB cast)
End Connections:	1” and 2” Threaded / 2” Flanged
Operation:	Automated / Manual
MultiStage Construction:	1, 2 or 3 Stage
Design Function:	Fluid Maintenance (WOG)
Application:	Oil / Gas Production and Injection
Location:	Upstream gathering system Gaslift and Plunger Lift

HYDRAMAX CHOKE VALVE



Configuration:	Inline Segmented EXO Body
Pressure:	5000 PSI
Nominal Size:	3 Inch
Material Construction:	Carbon Steel (Bar) Body / 316 Stainless Steel (Bar) Wetted
End Connections:	3” and 4” Flanged
Operation:	Automated / Manual
MultiStage Construction:	1, 2 or 3 Stage
Design Function:	Fluid Maintenance (WOG)
Application:	Oil / Gas Production and Injection
Location:	Upstream gathering system, pump pressure maintenance Midstream Plant and Facility fluid control

MINIMAX THROTTLING / DUMP VALVE

Configuration:	Inline or Angle Body Field configurable
Pressure:	3000 PSI
Nominal Size:	2 Inch
Material Construction:	Carbon Steel (WCB cast)
End Connections:	1” and 2” Threaded
Operation:	Automated / Manual
Design Function:	Fluid Maintenance (WOG)
Application:	Oil / Gas Production and Injection
Location:	Upstream gathering system, Separator let down

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