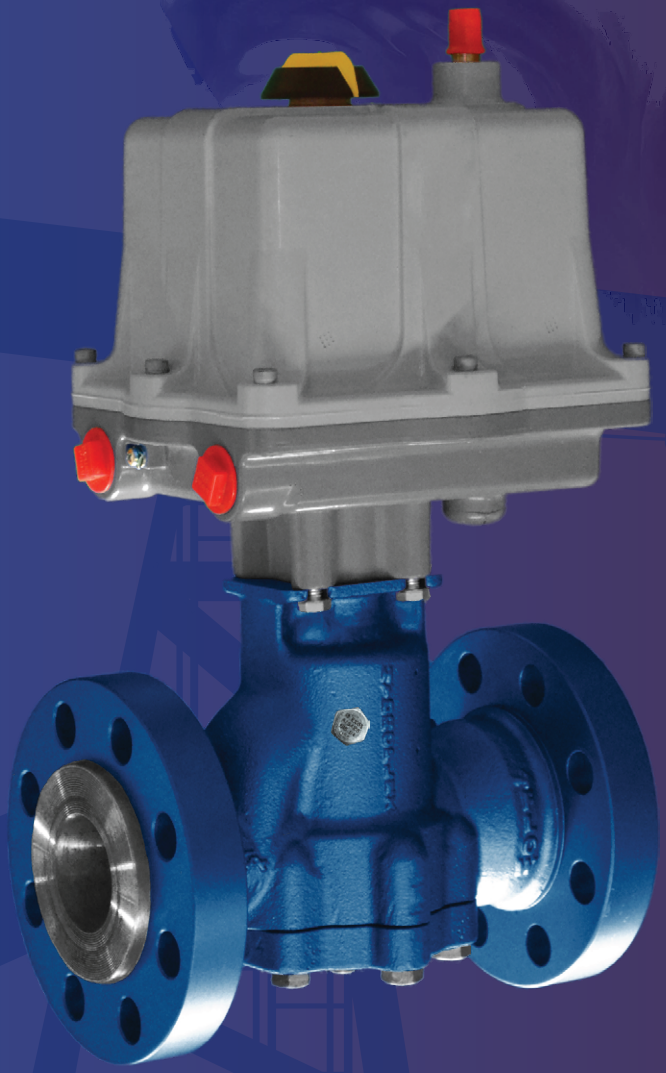
# HYDRA CSX

## THROTTLING VALVE

HYDROPLEX

*High Pressure Pump, Valve, and System Specialists*





# RELIABILITY WITHOUT COMPROMISE.

**At Hydroplex, excellence is more than a goal—it's the standard that drives everything we do.** Every Hydroplex valve is proudly made in America, reflecting our commitment to superior quality, dependable performance, and American manufacturing excellence.

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CERTIFICATION
ISO 9001
INTERCERT

# HYDRA CSX 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 in a variety of applications when precision control of 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, can be successfully managed using our twin disk valve.**

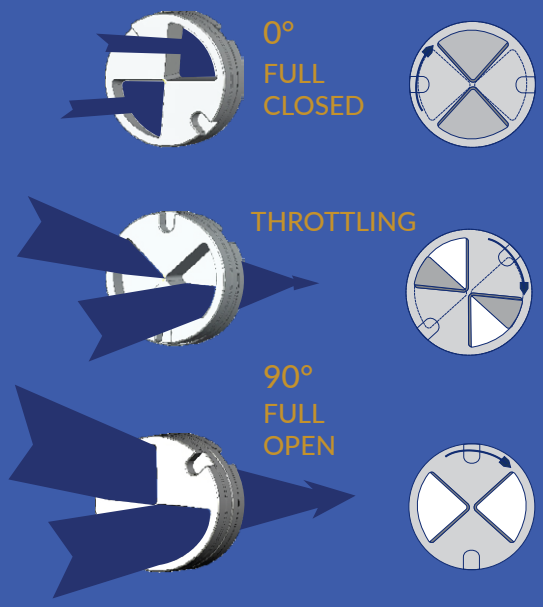
As flow or pressure is regulated, wear is inevitable in any throttling valve. This typically occurs on the control surface and around the orifice, especially in globe, gate, butterfly, ball, and plug valves. However, in the Twin Disc arrangement, the control surfaces and seal surfaces are separate and 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, a common problem in globe style and "needle and seat" valves. As a result, the Twin Disc arrangement experiences reduced wear on throttling and shut-off surfaces.

The differential pressure across the discs secures them together, providing a stable control element, eliminating 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

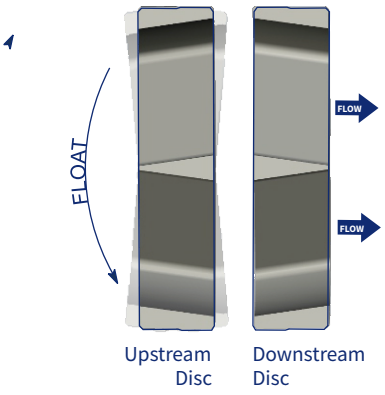
**The valve features two adjacent twin discs, each fitted with two precision orifices that can be either round hole or pie-shaped.**

- 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.

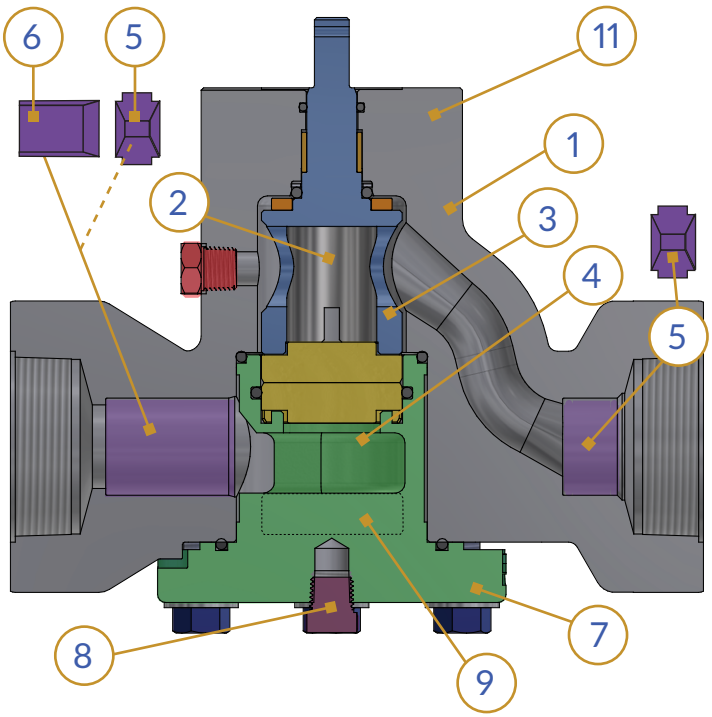


# The Hydra CSX throttling valve is a highly adaptable control valve engineered to meet a wide range of pressure and flow control requirements. Its robust construction ensures durability and ease of maintenance.

All valve and trim parts are designed for a perfect fit, enabling quick trim changes to accommodate varying process conditions. The valve trim and stem are fully guided and stable, minimizing vibration and mechanical noise. The free floating design of the upstream disc provides the user with enhanced and extended valve shut-off performance. The Twin Disc and Multistage system is capable of controlling pressure or flow of gas, liquid or vapor. The design's simplicity also translates to easy and fast maintenance, without the necessity for specialized tools .

## VALVE COMPONENT DESCRIPTION AND PURPOSE

| | |
|---|---|
| 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 |

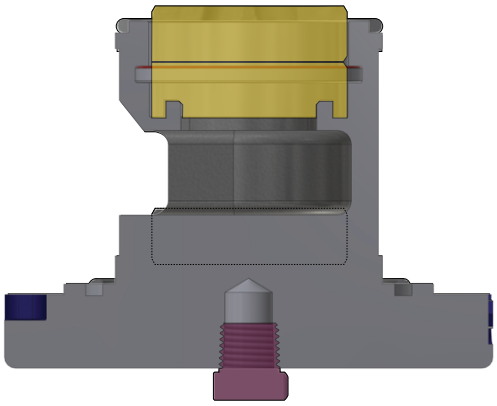



| KEY | DESCRIPTION | PURPOSE |
|---|---|---|
| 1 | **Body** | Pressure containment housing for trim and end connections |
| 2 | **Turning Fork** | Adjustment of disc to control fluid |
| 3 | **Thrust Bearing** | Support bearing for upthrust on turning fork |
| 4 | **Control Discs Set** | Fluid Control Element |
| 5 | **Choke Bean** | Control element to create additional fluid pressure reduction |
| 6 | **Wear Sleeve** | Wear element to reduce damage to outlet |
| 7 | **Cartridge** | Structural housing for control discs and wear disc |
| 8 | **Instrument Port** | Pressure sensing access point / Trim Wear Indication |
| 9 | **Wear Pad** | Sacrificial wear surface with instrument port (8) for early wear detection |
| 10 | **Injection Port** | Chemical Injection Port |
| 11 | **Direct Actuator Mounting** | Direct mount of actuator without coupling or brackets |

# HYDRA CSX 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.**



## CARTRIDGE ASSEMBLY

**The CSX cartridge assembly allows for valve service and trim change in-place.**

Field service can be performed without removing the valve or valve/actuator assembly from the production line. The application of a pressure sensor/ gauge in the 1/8” pressure port will notify the operator of pending maintenance requirements.

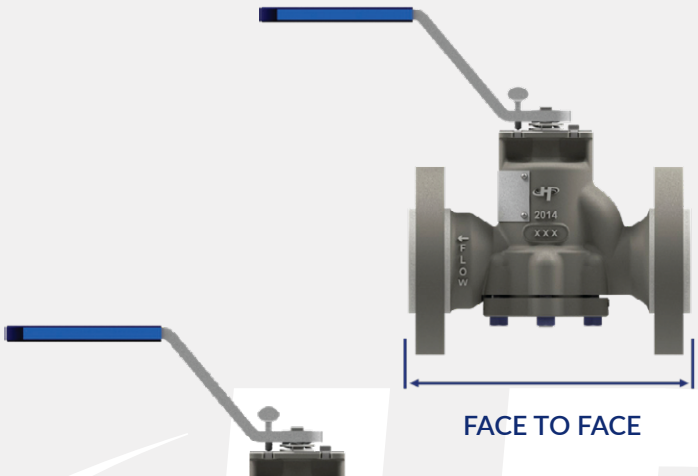
The most significant benefit of this design is that the valve body will not wear out under normal operating conditions. All potential wear components are contained in the cartridge, protecting the body from high velocity fluids and solids. The valve can be rebuilt to like new condition in the field.

## END TO END DIMENSIONS

Consult factory for further information.

| SIZE | CONNECTION | CSX |
|---|---|---|
| 1 in. | 1 FNPT | 10.375 |
| 2 in. | 2 FNPT | 8.625 |
| | 150 RF | 13.625 |
| | 300 RF | 14.125 |
| | 400/600 RF | 9.75 |
| | 900/1500 RF | 17.125 |
| | 150 RTJ | 14 |
| | 300 RTJ | 14.625 |
| | 400/600 RTJ | 15 |
| | 900/1500 RTJ | 17.25 |

*Dimensions listed in inches.



# HYDRA CSX INLINE THROTTLING VALVE

## MAJOR COMPONENT STANDARD** MATERIALS

| DESCRIPTION | MATERIAL |
|---|---|
| Body | ASTM A216 WCB CS |
| O-Rings | PC Buna N 90D |
| Backup Rings | PTFE |
| Control Discs | Tungsten Carbide |
| Turning Fork | 17-4PH H900 SS |
| Bolts | A193 Grade 8 Zinc/PTFE |
| Cartridge | ASTM A216 WCB CS |
| Wear Sleeve* | Stellite 6 |
| Fix Beans* | 17-4 H 900 SS |

*Optional
** For material other then Standard consult factory

## TUNGSTEN CARBIDE TRIM OPTIONS

| ORIFICES | CV | 64TH INCH EQUIV. DIA. | STAMPED ALPHA |
|---|---|---|---|
| 2 ea: 1/8" | 0.74 | 11.3 | A |
| 2 ea: 3/16" | 1.66 | 16.97 | I |
| 2 ea: 1/4" | 2.95 | 22.6 | B |
| 2 ea: 3/8" | 6.63 | 33.9 | C |
| 2 ea: 1/2" | 11.78 | 45.3 | D |
| 2 ea: 5/8" | 18.60 | 56.85 | K |
| 2 ea: 3/4" | 22.31 | 62.3 | E |

Note: Generally, under high pressure drops, the valves would be set at:

Not less than 40% open for liquids.
Not less than 30% open for gas.

# APPLICATIONS

- **Well Site Automation**
- **Blow Down and Dump Valve**
- **Heater Choke**
- **Pump Bypass**
- **Gas Lift Injection Control**
- **Plunger Lift**
- **Pressure Maintenance Disposal Well**
- **Pump Startup**
- **Water Injection**
- **Enhanced Oil Recovery**
- **Throttling Valve**
- **High DP Valve**
- **Remote Control for directional drilling**
- **Manual and Automated Applications**

# AUTOMATION

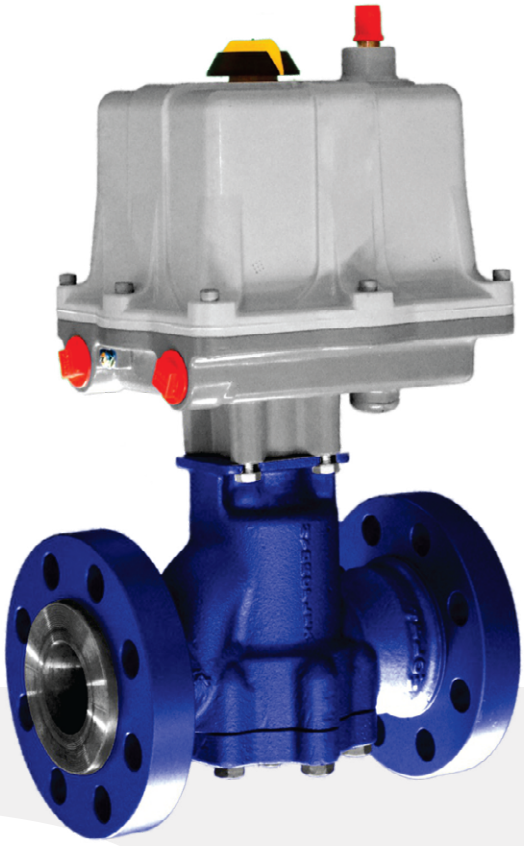
The CSX Twin Disc Throttling valves are specifically designed for applications involving control of water, oil, or natural gas. They are often equipped with electric actuators, protecting the environment from atmospheric venting of control gas, typically associated with conventional diaphragm operated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

The CSX  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 CSX valve can control pressures up to 5000 psi and maintain a Class IV shut-off indefinitely without applied power.

**The assembly is highly responsive offering full open to closed in seconds. In the power failure mode valve can be configured to open, close, or remain in position. No power is required to maintain the selected mode.**

## TORQUE RATING

| DIFFERENTIAL PRESSURE | OPERATING TORQUE |
|---|---|
| 1,000 lbs. | 160 in.-lbf |
| 2,000 lbs. | 210 in.-lbf |
| 3,000 lbs. | 270 in.-lbf |
| 4,000 lbs. | 360 in.-lbf |
| 5,000 lbs. | 480 in.-lbf |



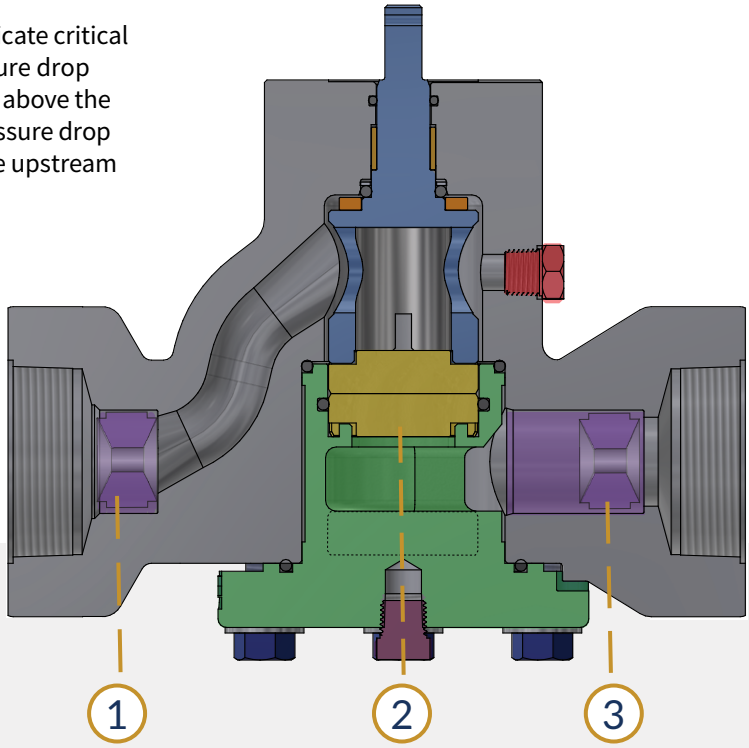
The Hydra CSX valve can be easily modified from manual operation to an automated valve in the field without interrupting service. The Direct Mount ISO F07 pad and ISO stem facilitate mounting of most electric and pneumatic actuation systems by removing the handwheel, dropping the actuator on and tightening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

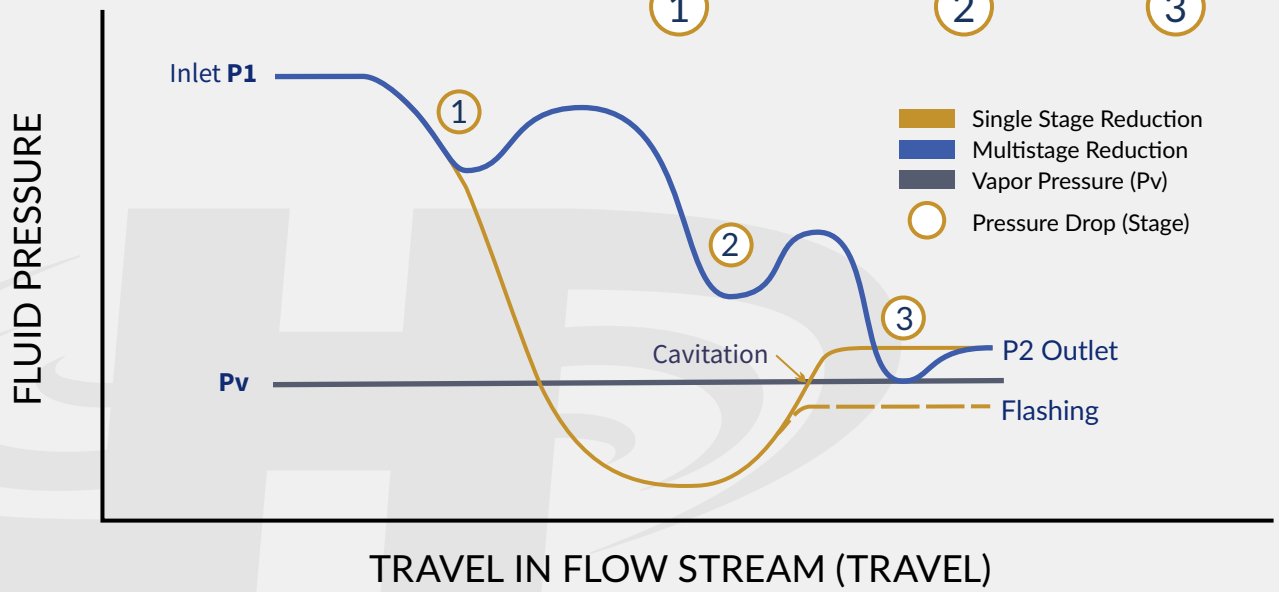
# MULTISTAGE PRESSURE DROP

Multistage Pressure Drop Configurations are utilized to decrease fluid pressure or flow (velocity). While single-stage trims often suffice, there are instances where a single pressure drop is not suitable due to process conditions. In these cases, an multistage pressure drop valve is a more effective solution. The primary factor for using multiple restrictions is the pressure drop, irrespective of whether the fluid is a liquid or vapor/gas. A higher pressure drop leads to higher velocities, which can result in erosion, vibration, and noise issues.

For gas applications where process conditions indicate critical flow with a single pressure drop, multistage pressure drop valves can be employed to prevent operating at or above the critical pressure. The term “critical” refers to a pressure drop across the device that exceeds 50% of the absolute upstream pressure, at which point sonic velocity is attained.

In situations where high pressure drops in liquid flows are necessary, multistage pressure drop assemblies should be employed. This allows for the pressure drop to be achieved while minimizing potential issues such as cavitation, flashing, and high noise levels.

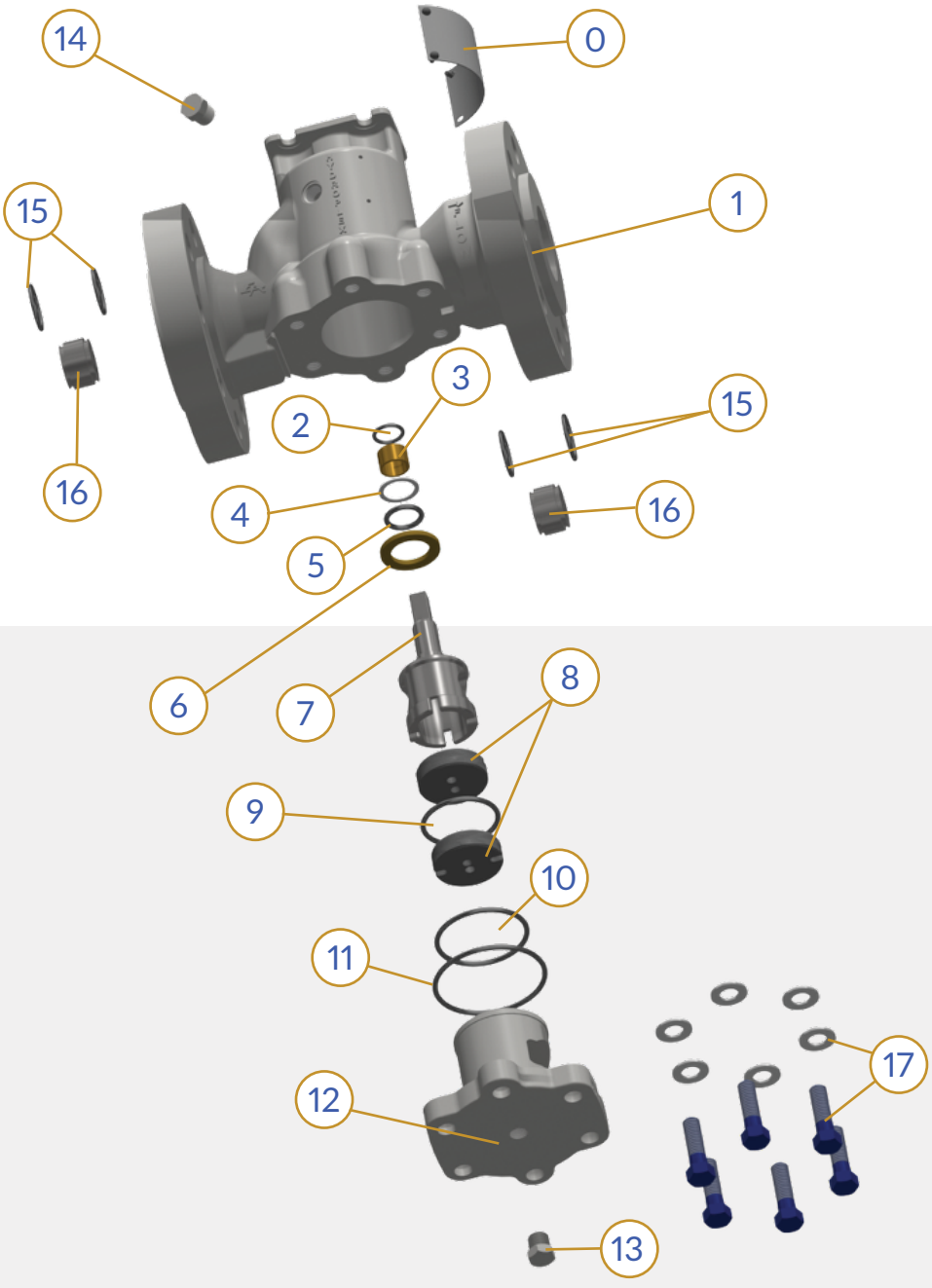


# HYDRA CSX INLINE THROTTLING VALVE

## CSX EXPANDED VIEW

| # | DESCRIPTION |
|---|---|
| 0 | DATA PLATE |
| 1 | BODY |
| 2 | O-RING |
| 3 | BUSHING |
| 4 | BACKUP RING |
| 5 | O-RING |
| 6 | THRUST BEARING |
| 7 | TURNING FORK |
| 8 | CONTROL DISC |
| 9 | O-RING |
| 10 | O-RING |
| 11 | O-RING |
| 12 | CARTRIDGE |
| 13 | PLUG |
| 14 | PLUG |
| 15 | O-RING |
| 16 | FIX BEAN |
| 17 | CARTRIDGE WASHER & BOLTS |



# 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 |
| Multi-Stage Construction: | 1 or 2 Stages |
| Design Function: | Pressure/ Flow Control |
| 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: | Manual / Automated |
| Multi-Stage Construction: | 1, 2 or 3 Stage |
| Design Function: | Pressure/ Flow Control |
| 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: | Manual / Automated |
| Multi-Stage Construction: | 1, 2 or 3 Stage |
| Design Function: | Pressure/ Flow Control |
| 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: | Manual / Automated |
| Multi-Stage Construction: | 1, 2 or 3 Stage |
| Design Function: | Pressure/ Flow Control |
| 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: | Manual / Automated |
| Multi-Stage Construction: | 1, 2 or 3 Stage |
| Design Function: | Pressure/ Flow Control |
| Application: | Application: Oil / Gas Production and Injection |
| Location: | Upstream gathering system,<br>pump pressure maintenance<br>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 |
| Multi-Stage Construction: | 1, 2 or 3 Stage |
| Design Function: | Pressure/ Flow Control |
| Application: | Oil / Gas Production and Injection |
| Location: | Upstream gathering system Gaslift and Plunger Lift |

HYDROPLEX

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