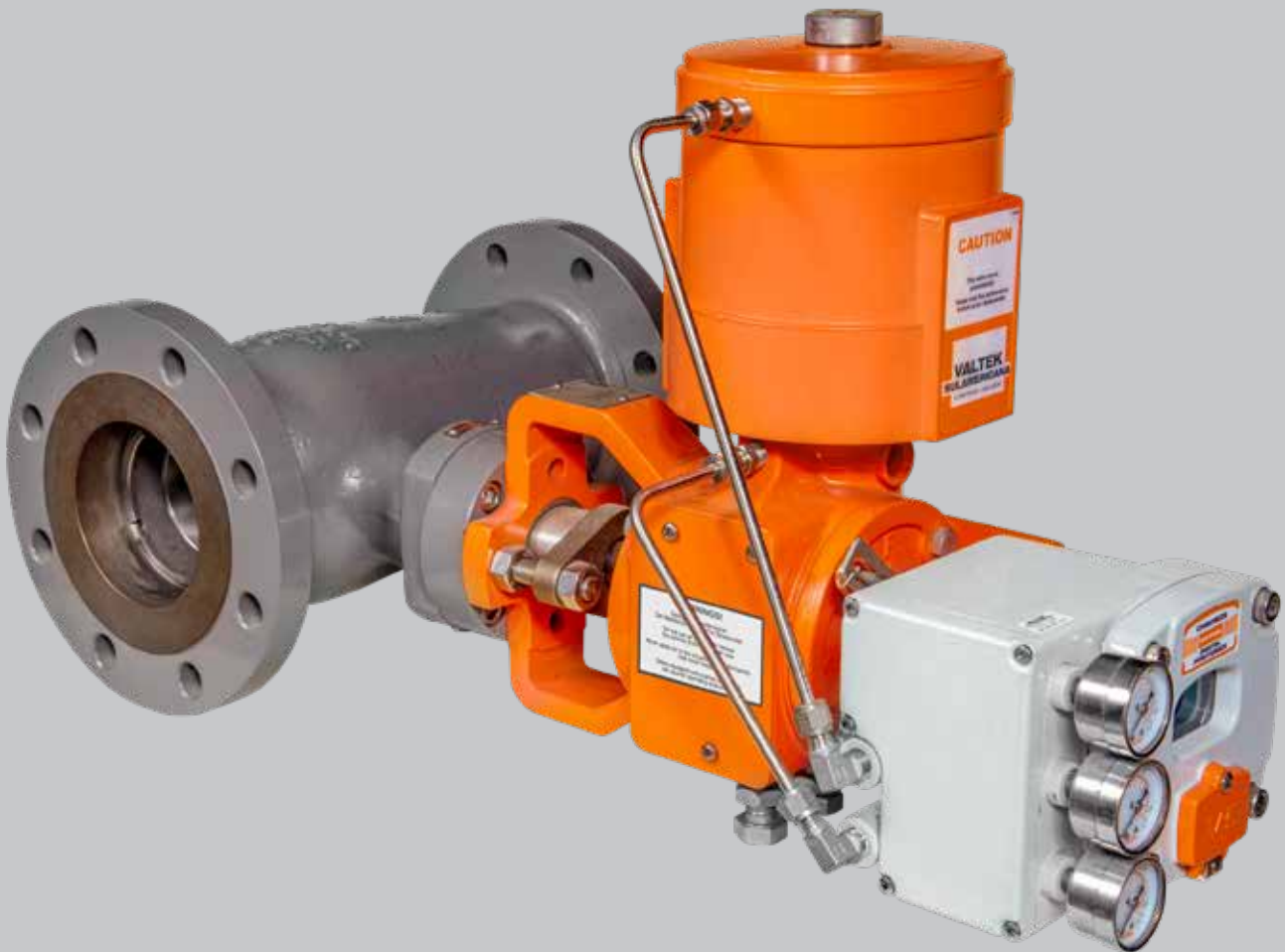


# EXL<sup>®</sup>

## ECCENTRIC PLUG CONTROL VALVE

LONG PATTERN



**VALTEK<sup>™</sup>**  
**SULAMERICANA**



## Eccentric Rotary Plug Valve ExL - Long Pattern

### Long Pattern: ANSI/ISA 75.08.01

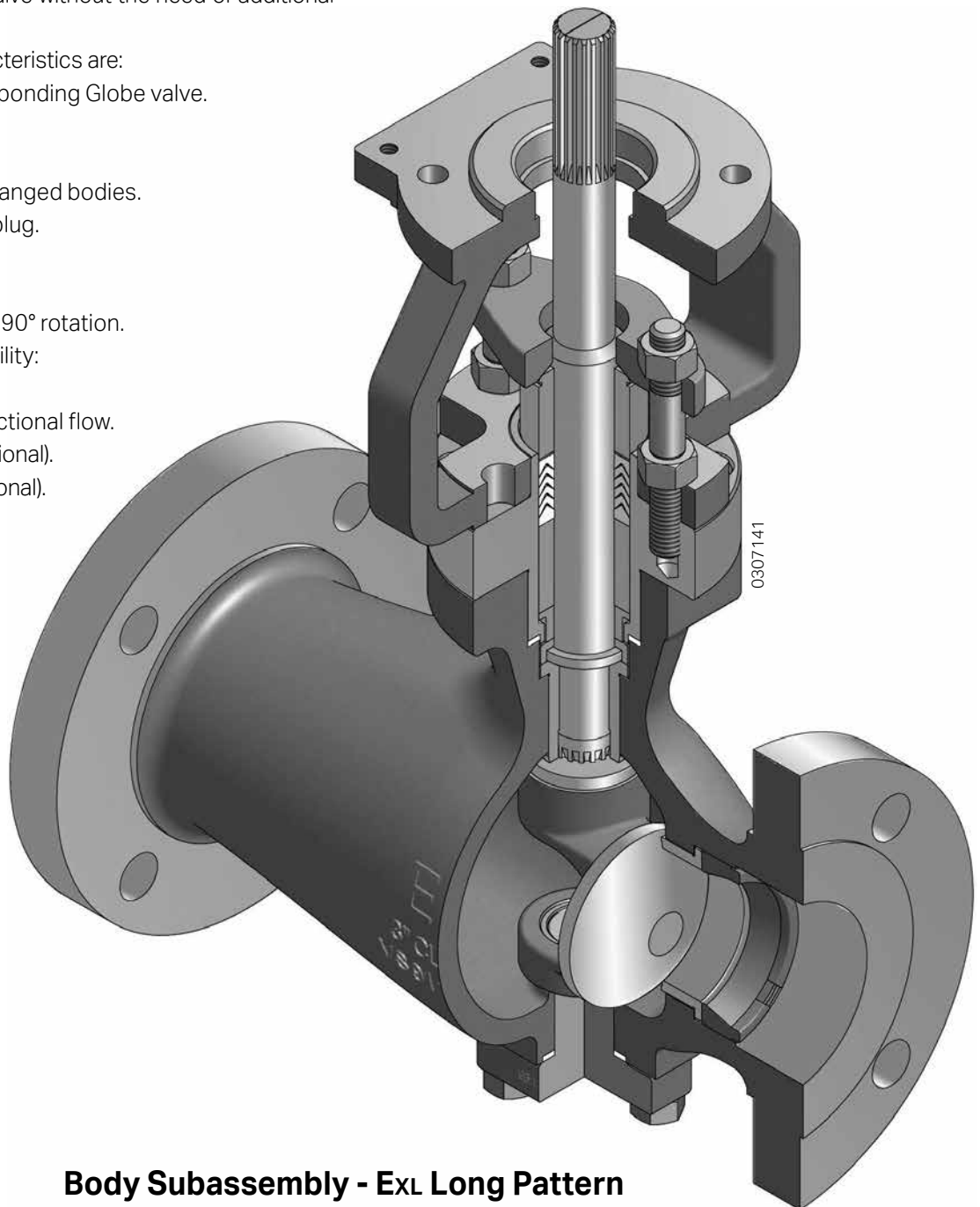
The rotary plug control valves are being more used each day due to their great flow capacity, high rangeability, compact size and superior sealing capacity by the shaft assembly. The eccentric rotary plug valve, ExL model with long pattern, has an advanced technological concept that combines the strength of a Globe type valve and the operational efficiency of a rotary valve.

Its constructive design permits its installation in replacement of a globe style valve without the need of additional adjustments.

Some of its main characteristics are:

- Lighter than a corresponding Globe valve.
- Better cost/C<sub>v</sub> ratio.
- Easy installation.
- Compact and light. Flanged bodies.
- Double eccentricity plug.
- Low starting torque.
- High flow capacity.
- Non crossover shaft, 90° rotation.
- High control rangeability:  
Superior to 160:1.
- Flow direction: Bidirectional flow.
- Anti-noise plates (optional).
- Sealed bearings (optional).
- Steam jacket (optional).

- Tightness: Class IV (Metal-Metal) or VI (Soft Seat).
- Splined shaft coupling:  
More accuracy and safety.
- Anti-blowout shaft system:  
Prevents accidents.
- Fugitive emissions packing: ISO 15848.



**Body Subassembly - ExL Long Pattern**

## Eccentric Rotary Plug Valve ExL - Long Pattern Characteristics and Additional Advantages

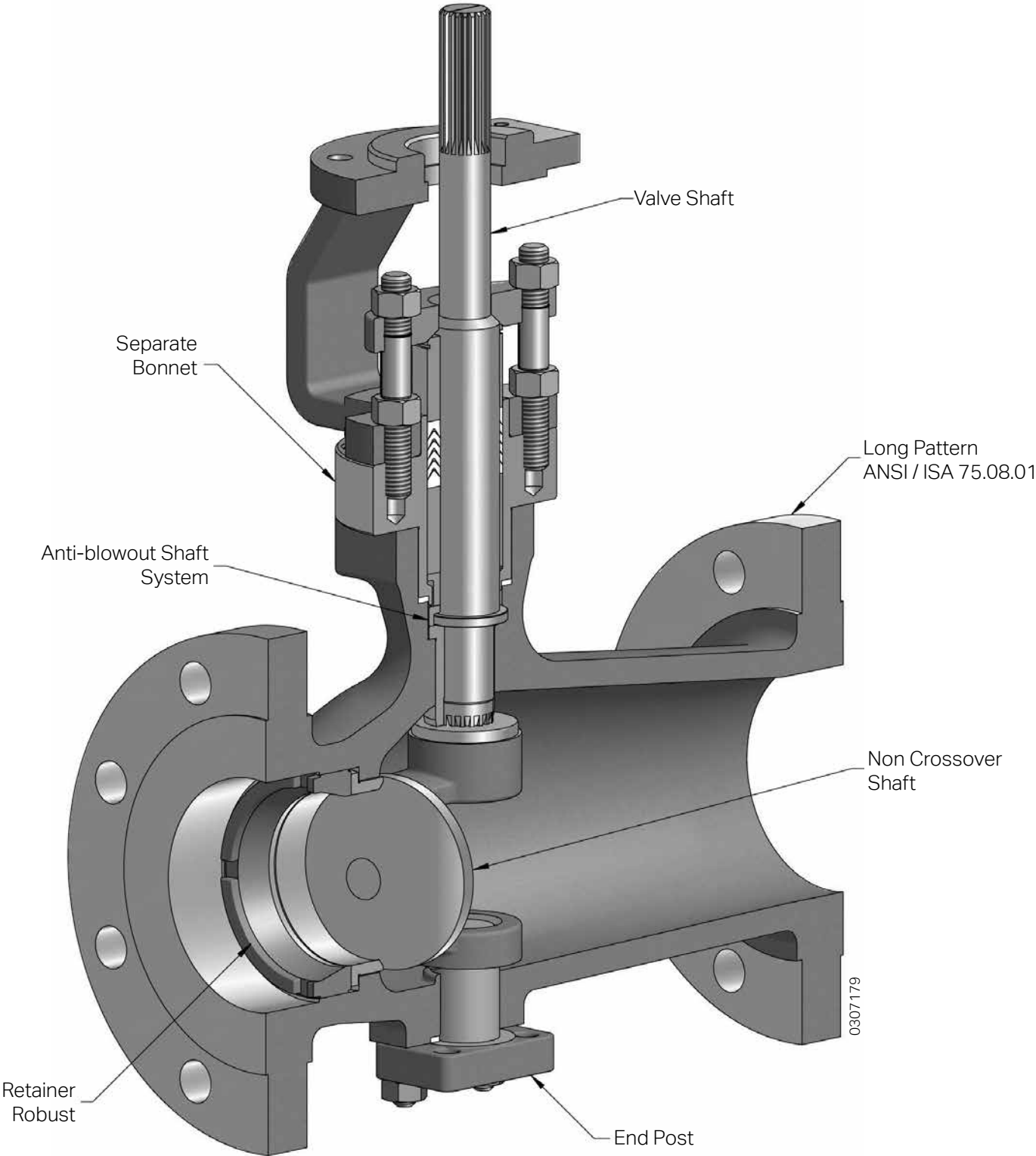
The superior project design of the ExL valve presents a robust trim and non crossover shaft set that prevents fluid obstruction. When the valve is open, the fluid is not diverted to the seat ring and seat retainer area, thus providing higher performance, even after years of operation.

A complete and advanced hardened trim technology expands its use to a wide range of applications, such as fluids in vaporization regime (flashing), erosive services, medium cavitations, oil and gas, petrochemical and steam operations in general. The long pattern ExL valve represents a modern replacement to the use of Globe control valves, as their employment in some applications are based solely on tradition.

Options	ASTM Specification	DIN Specification
<b>Diameter</b>	2, 3, 4, 6, 8, 10, and 12"	DN 50, 80, 100, 150, 200, 250 and 300
<b>ANSI Pressure Class</b>	150, 300 and 600	PN 10, 16, 25, 40 and 63
<b>Ends</b>	Flanged B 16.5 (RF - RTJ)	Flanged EN 1092-1 (Regulation B1; D; F B2)
<b>Face to face</b>	Long pattern ISA 75.08.01 (Globe type)	Long pattern 2012-03 Series 1 (same as Globe)
<b>Body Materials</b>	Carbon Steel ASTM A 216 WCC	Carbon Steel 1.0619
	Carbon Steel ASTM A 216 WCC NACE	Carbon Steel 1.0619 NACE
	Stainless Steel ASTM A 351-CF3M NACE (316L)	Stainless Steel 1.4409 NACE (316L)
	ASTM A 995 Gr. 6A-CD3MWCuN (Super-Duplex)	Duplex 1.4508
<b>Plug Materials</b>	ASTM A 351 CF3M (316L SST/Hardened Chrome)	Stainless Steel 1.4409/Hardened Chrome
	ASTM A 747-CB7Cu1 (17-4PH)H1025 D) / H 1025D	Stainless Steel 1.4542
	ASTM A 5387 (Solid Alloy #6 ) Diam. 2 to 4 in.	Alloy #6 (solid from 2 to 4 in.)
	ASTM A 351 CF3M/Alloy #6 (316L SST/Alloy #6)	Stainless Steel 1.4409 / Alloy #6
	ASTM A 995 Gr. 6A-CD3MNCuN (Super-Duplex)	Duplex 1.4508
<b>Packing</b>	PTFE "V" rings; braided PTFE ; Graphite; Fugitive emissions PT; PTG and PTG-XT (according to EPA* requirements)	
<b>Operation Temperature</b>	-148°F to 750°F (-100°C to 400°C)	
<b>Tightness Class</b>	Metal-metal ANSI/FCI 70-2-2006 Class IV Soft Seat ANSI/FCI 70-2-2006 Class VI	
<b>Trim</b>	Full and reduction of 70% and 40% from 2" to 6" (DN 20-150) Full and reduction of 75% from 8" to 12" (DN 200 - 300)	
<b>Noise reduction plates</b>	Noise reduction capacity in gases of up to 16 dBA Plate integrated to body	

\*EPA: Environmental Protection Agency

# Eccentric Rotary Plug Valve ExL - Long Pattern Manufacturing Characteristics



**Body Subassembly - ExL Long Pattern**

# Eccentric Rotary Plug Valve ExL - Long Pattern

## Competitive advantages

### Tightness

The plug double eccentricity permits the plug to move away from the seat ring without contact. This assembly minimizes wear and tear and the need for frequent maintenance, reducing costs. At the same time, class VI tightness is easily achieved with the use of soft seat.

### Anti-blowout shaft system

The anti-blowout shaft system prevents accidents and answers to the ASME B16.34 safety standard, allowing the actuator removal even when the valve is installed and pressurized. This mechanical system increases the reliability and safety of the ExL design, preventing accidents and non scheduled process stops.

### High flow capacity

The ExL exclusive design permits a  $C_v$  up to 70% higher than other models of eccentric rotary plug control valves. The robustness of the seat ring, rigid and extra-strong, enables the ExL to a superior performance in high differential pressure applications.

### Deep packing box

The ExL packing box presents great depth and excellent surface finishing. The bonnet is made of forged bars and not cast surfaces, providing a longer service life to the entire packing set. Due to its design, the ExL packing box permits the use of all packing models, including those exceeding the EPA\* requirements.

Characteristics	
<b>Eccentric Plug</b>	<ul style="list-style-type: none"> <li>■ Built in hardened steel as standard</li> <li>■ Control characteristic: Inherent linear</li> <li>■ Double eccentricity: Do not cause friction in seat ring: Zero breakaway torque</li> <li>■ Bidirectional flow</li> <li>■ Flow direction that aids the valve to fail safe position</li> <li>■ Robust with high dynamic coefficient</li> </ul>
<b>Non crossover shaft</b>	<ul style="list-style-type: none"> <li>■ At open position, do not obstruct fluid flow</li> <li>■ It is not eroded by fluid particles</li> <li>■ Higher flow capacity than other eccentric plug valve models</li> <li>■ Operates with fluids containing up to 3% of fibers, slurry or viscuous fluids</li> </ul>
<b>Bonnet</b>	<ul style="list-style-type: none"> <li>■ Eases maintenance. Included the anti-blowout shaft system according to ASME B 16.34 standard, section 6.5.1</li> <li>■ Permits the actuator disassembly with valve installed and pressurized in the piping</li> </ul>
<b>Rangeability</b>	<ul style="list-style-type: none"> <li>■ Superior to 160:1</li> </ul>
<b>Bodies</b>	<ul style="list-style-type: none"> <li>■ RF and RTJ flanged</li> </ul>
<b>Various trim sizes</b>	<ul style="list-style-type: none"> <li>■ Full area</li> <li>■ Reduced area 75%, 70% and 40%</li> <li>■ Facilitates changes in flow capacity at low costs</li> </ul>
<b>Various packing models</b>	<ul style="list-style-type: none"> <li>■ Permits the assmby to various packing models and answers to EPA*, Ta-Luftand ISO requirements for fugitive emissions control</li> </ul>
<b>Noise reduction plates</b>	<ul style="list-style-type: none"> <li>■ Permits the use of reduction plates of up to 15 dBA assembled in the body</li> </ul>
<b>Certification</b>	<ul style="list-style-type: none"> <li>■ NACE</li> </ul>

\*EPA: Environmental Protection Agency

# Eccentric Rotary Plug Valve ExL - Long Pattern

## Materials Technology - Trim Options

### Body: Carbon Steel - Standard Manufacturing

ASTM A 216 Gr. WCC; DIN 1.0619

Components	Materials	Temperature Range		Trim Code
		°F	°C	
Plug	ASTM A351 CF3M (316L SST) / Hardened Chrome	-20 to 400 <sup>(1)(2)</sup>	-29 to 204 <sup>(1)(2)</sup>	CSA
Seat Ring	ASTM A182 316L (UNS S 31603)			
Seat Retainer	ASTM A351 CF3M (316L SST)			
Shaft and Post	ASTM A564 Gr.631 (17-4PH H1025)			
Bearing	MBT <sup>(2)</sup>			
Plug	ASTM A351 CF3M (316L SST) / Hardened Chrome	-20 to 400 <sup>(1)(2)</sup>	-29 to 204 <sup>(1)(2)</sup>	CSB
Seat Ring	ASTM A182 316L (UNS S 31603) / PTFE			
Seat Retainer	ASTM A351 CF3M (316L SST)			
Shaft and Post	ASTM A564 Gr.631 (17-4PH H1025)			
Bearing	MBT <sup>(2)</sup>			
Plug	ASTMA747-CB7Cu1 (17-4PH H1025D)	-20 to 750 <sup>(1)</sup>	-29 to 400 <sup>(1)</sup>	CSC
Seat Ring	Stainless Steel AISI 420 HT (UNS S 42600)			
Seat Retainer	ASTM A 182 F6A (UNS S 41000)			
Shaft and Post	ASTMA564 Gr.631 (17-4PH H1025)			
Bearing	Stainless Steel 440C HT (UNS 44004)			
Plug	ASTMA747-CB7Cu1 (17-4PH H1025D)	-20 to 400 <sup>(3)</sup>	-29 to 204 <sup>(3)</sup>	CSD
Seat Ring	Stainless Steel AISI 420 HT (UNS S 42600) / PTFE			
Seat Retainer	ASTM A 182 F6A (UNS S 41000)			
Shaft and Post	ASTMA564 Gr.631 (17-4PH H1025)			
Bearing	Stainless Steel 440C HT (UNS 44004)			

(1) Carbon steel limitations for body and bonnet.

(2) MBT limitations (PTFE/ carbon inserted in metal bearing)

(3) PTFE limitations

## Materials Technology - Trim Options

### Body: Carbon Steel - NACE Manufacturing MRO 175/ISO 15156 and MRO 103

ASTM A 216 Gr. WCC; DIN 1.0619

Components	Materials	Temperature Range		Trim Code
		°F	°C	
Plug	ASTM A351 CF3M (316L) w/ Alloy 6 <sup>(3)</sup>	-20 to 750 <sup>(1)</sup>	-29 to 400 <sup>(1)</sup>	CNA
Seat Ring	ASTM A182 - 316L SST (UNS 31603) w/Alloy 6			
Seat Retainer	ASTM A 182 F6A (UNS S 41000)			
Shaft and Post	ASTM A564 Gr.660 (17-4PH H11150D)			
Bearing	ASTM A 182 F 51 (UNS S 31803)			

(1) Carbon steel limitations for body and bonnet.

(3) Solid Alloy 6 (sizes from 2 to 4 in.), Stainless Steel 316 L SST with Alloy #6 coating (sizes from 6 to 12 in.)

## Eccentric Rotary Plug Valve ExL - Long Pattern Materials Technology - Trim Options

### Body: Stainless Steel - Standard Manufacturing

ASTM A 351 - CF3M; DIN 1.4581

Components	Materials	Temperature Range		Trim Code
		°F	°C	
<b>Plug</b>	ASTM A351 CF3M (316L SST) / Hardened Chrome	-148 to 400	-100 to 204 <sup>(2)</sup>	<b>CSA</b>
<b>Seat Ring</b>	ASTM A182 F316L (UNS S 31603)			
<b>Seat Retainer</b>	ASTM A351 CF3M (316L SST)			
<b>Shaft and Post</b>	ASTM A564 Gr.631 (17-4PH H1025)			
<b>Bearing</b>	MBT <sup>(2)</sup>			
<b>Plug</b>	ASTM A351 CF3M (316L SST) / Hardened Chrome	-148 to 400	-100 to 204 <sup>(2)</sup>	<b>CSB</b>
<b>Seat Ring</b>	ASTM A182 316L (UNS S 31603) / PTFE			
<b>Seat Retainer</b>	ASTM A351 CF3M (316L SST)			
<b>Shaft and Post</b>	ASTM A564 Gr.631 (17-4PH H1025)			
<b>Bearing</b>	MBT <sup>(2)</sup>			

(2) MBT limitations (PTFE/ carbon inserted in metal bearing)

### Body: Stainless Steel - Anti-Corrosion Manufacturing

ASTM A 351 - CF3M; DIN 1.4581

Components	Materials	Temperature Range		Trim Code
		°F	°C	
<b>Plug</b>	ASTM A747 CB7Cu 1 (17-4PH H 1150D)	-148 to 750	-100 to 400	<b>SSA</b>
<b>Seat Ring</b>	ASTM A182 316L (UNS S 316003)			
<b>Seat Retainer</b>	ASTM A351 CF3M (316L SST)			
<b>Shaft and Post</b>	ASTM A453 Gr.660 (UNS S 66286)			
<b>Bearing</b>	ASTM A182 F 51 (UNS S 31803)			

(3) Solid Alloy 6 (sizes from 2 to 4 in.), Stainless Steel 316 L SST with Alloy #6 coating (sizes from 6 to 12 in.).

### Body: Stainless Steel - NACE Manufacturing MRO 175/ISO 15156 and MRO 103

ASTM A 351 - CF3M; DIN 1.4581

Components	Materials	Temperature Range		Trim Code
		°F	°C	
<b>Plug</b>	ASTM A351 CF3M (316L) w/ Alloy 6 <sup>(3)</sup>	-148 to 750	-100 to 400	<b>CNA</b>
<b>Seat Ring</b>	ASTM A182 (316L SST) w/ Alloy 6			
<b>Seat Retainer</b>	ASTM A351 CF3M (316L SST)			
<b>Shaft and Post</b>	ASTM A564 Gr.660 (17-4PH H 1150D)			
<b>Bearing</b>	ASTM A F 51 (UNS S 31803)			

(3) Solid Alloy 6 (sizes from 2 to 4 in.), Stainless Steel 316 L SST with Alloy #6 coating (sizes from 6 to 12 in.).



# Eccentric Rotary Plug Valve ExL - Long Pattern Packing Box

## Standard Packing

The standard ExL valve packing box is formed by PTFE "V" rings. The PTFE "V" rings are the most used packing system nowadays, with excellent tightness results. Due to their attributes, such as lower friction coefficient, good mechanical resistance and excellent corrosion resistance, they are the most used material for packing sets. The PTFE "V" rings are employed at operating temperatures of -150 to 450°F (-100 to 232°C).

## High Temperatures Packing

The ExL valve packing box with molded rings is an alternative when the operating temperature exceeds the limits for PTFE "V" rings use. The materials employed at the ExL valve molded packing are the braided PTFE, for temperatures up to 500°F (260°C), and the graphite, for temperatures up to 752°F (400°C). The packing box with graphite molded rings is an excellent solution for high temperatures use. However, the great thrust required for its shutoff causes a substantial increase in valve rotation friction.

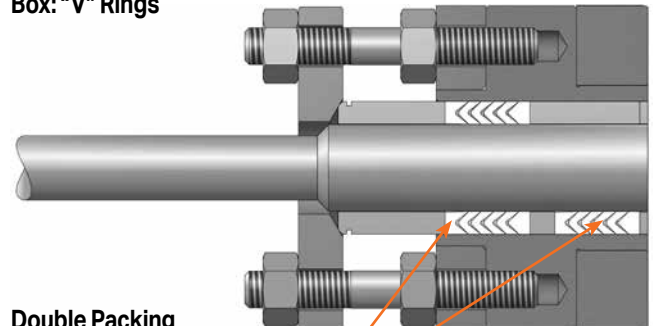
## Fugitive Emissions Packing

The PT packing is formed by a set of "V" rings subjected to a tightening by a set of spring washers, causing a "live-loaded effect". This system reaches a tightness level below 500 ppm.

The PT packing combines the superior quality of virgin PTFE "V" rings and PTFE "V" rings with carbon filaments. The PTG packing is formed by an advanced packing set capable of maintaining the tightness below 500 ppm (around 10 ppm).

The PTG packing is formed by a combination of PTFE "V" rings with carbon filaments and Kalrez® "V" rings, an advanced material that provides superior performance to the packing. For temperatures above 450°F (232°C), the PTG-XT packing is employed, which is formed by Zymax® rings instead of the PTFE rings with carbon.

Standard Packing Box: "V" Rings

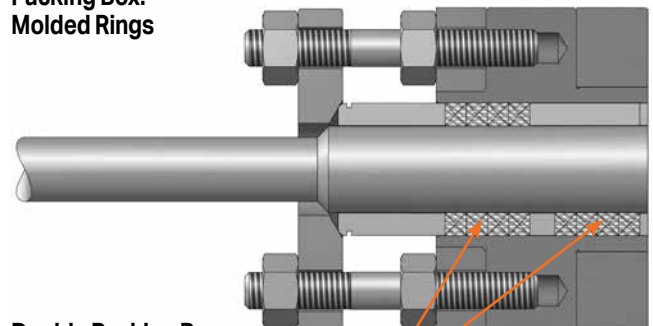


0307132

Double Packing Box: "V" Rings

Virgin PTFE

Packing Box: Molded Rings

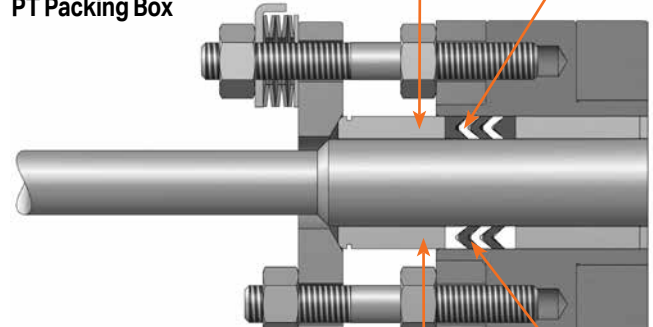


0307133

Double Packing Box: Molded Rings

Braided PTFE or Graphite

PT Packing Box



0307134

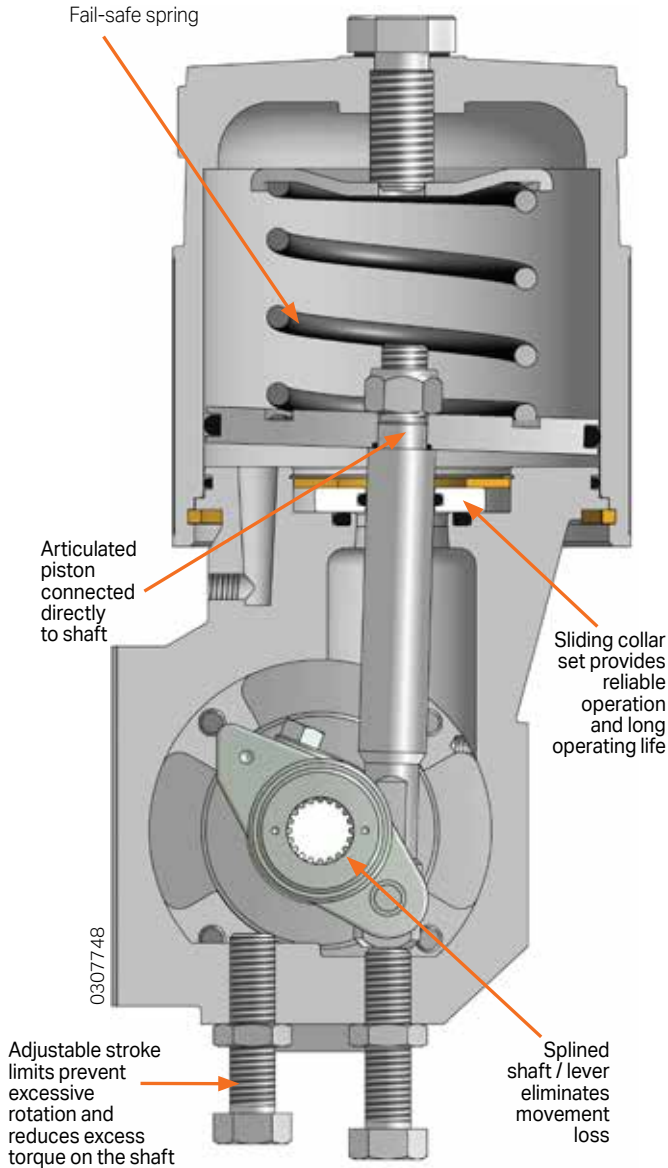
PTG Packing Box

PTFE/Carbon or Zymax®

Kalrez®



# Eccentric Rotary Plug Valve ExL - Long Pattern Actuator - Specifications



**RA Series Rotary Actuator**

**High interchangeability** – Reduces the need for spare parts

**Compact and light design** – Facilitates handling and occupies limited space

The RA Series piston-cylinder rotary actuator with fail-safe spring combines high torque and pneumatic stiffness with excellent controllability.

These characteristics are integrated in a unique light, robust and compact set that is the ideal choice to rotary valves actuation.

The RA Series double acting piston-cylinder actuator was designed to operate with supply pressures of up to 150 psi (10.3 bar), achieving a great operating torque. The RA Series actuator has a proven service life of over one million cycles, being the most reliable in the market. The double acting positioner directs the air to both cylinder chambers, maintaining an exceptional stiffness. This pneumatic stiffness makes the RA Series actuator unmatched and indispensable when a precise control of the valve is necessary, even operating with small openings.

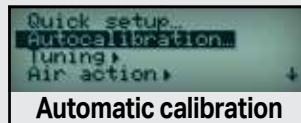
Due to these characteristics, the RA Series actuator performance is more superior than the diaphragm and spring actuators.

Specifications	
<b>Type</b>	<ul style="list-style-type: none"> <li>■ Double-acting piston-cylinder with fail-safe spring</li> <li>■ Field reversible</li> </ul>
<b>Sizes</b>	<ul style="list-style-type: none"> <li>■ 25, 50, 100, 200</li> </ul>
<b>Action</b>	<ul style="list-style-type: none"> <li>■ Air-to-open</li> <li>■ Air-to-close</li> <li>■ Fixed in last position</li> </ul>
<b>Air Supply Pressure</b>	<ul style="list-style-type: none"> <li>■ Maximum 150 psig (10.3 bar)</li> </ul>
<b>Operating Temperature</b>	<ul style="list-style-type: none"> <li>■ -40 to 350°F (-40 to 175°C)</li> </ul>
<b>Auxiliary Handwheel</b>	<ul style="list-style-type: none"> <li>■ Side-mounted declutchable</li> <li>■ Gear operated manual</li> <li>■ Lever</li> </ul>
<b>Positioners</b>	<ul style="list-style-type: none"> <li>■ IDP 7600 Chronos Digital</li> <li>■ HPP 2000 Analog</li> </ul>

# Eccentric Rotary Plug Valve ExL - Long Pattern Chronos Digital Positioner



## LCD Interface



The Chronos IDP7600 positioner is a digital-pneumatic device with microprocessor technology, which employs the HART® (Highway Addressable Remote Transducer) communications protocol for remote communication. The two wire power supply, performed by the control loop itself, significantly contributes for costing reductions at the electrical installation.

The advanced technology provided by the two-stage relay and microprocessor guarantees that the Chronos IDP7600 presents high responsiveness and precise control. With a local PID algorithm with ultra-fast loop execution time and less deviation to set point, this positioner increases significantly the quality in the process control.

Reliability, intuitive use and quick setup and calibration make the Chronos IDP7600 a very functional and advanced HART® positioner. Besides the setup and calibration, which can be performed in the Chronos IDP7600 local interface, the HART® technology allows that the positioner is set and calibrated with the use of software tools based on the EDDL® and FDT/DTM® open technologies.

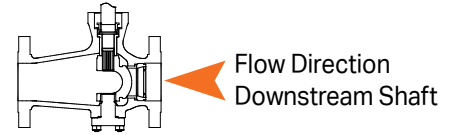
## Characteristics

The main Chronos IDP7600 characteristics are:

- HART® communication protocol, version 7.
- Temperature and pressure sensors.
- Large and backlit graphical LCD display.
- High bright warning LEDs
- Quick setup assistant menu.
- Local interface with protected setup buttons.
- DTM with diverse setup parameters, graphics and diagnosis.
- Configurable characterization curve.
- Autocalibration and autotune.
- Automatic or manual gain adjustment of the local PID control.
- Execution of diverse signatures tests, such as ramp test (with friction analysis), step test, multi step test and the valve partial stroke test.
- RFI and EMI immune.
- Explosion proof housing Exd IIC T5/T6 (IECEX/ATEX/INMETRO), IP66.
- Advanced two-stage relay technology. Modular design, with the electronic part separated from the pneumatic part.

# Eccentric Rotary Plug Valve ExL - Long Pattern

## Maximum Differential Pressures (bar)



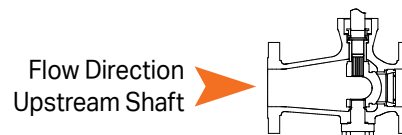
**Flow Direction: Downstream Shaft** <sup>(1)</sup>

Component	Material	Temperature (°C)	Valve Nominal Diameter (in.)							
			2	3	4	6	8	10	12	
Bearings	440C HT or Ultimet or Alloy 6	-100 to 149	98	98	88	87	52	52	52	
		149 to 204	96	96	86	75	52	52	52	
		204 to 260	95	95	85	74	52	52	52	
		260 to 316	94	94	84	73	52	52	52	
		316 to 400	89	89	80	69	52	52	52	
	UNS S 31803	-100 to 149	87	87	78	60	52	52	52	
		149 to 204	82	82	74	56	52	52	52	
		204 to 260	78	78	70	54	52	52	52	
		260 to 316	74	74	67	52	52	52	52	
		316 to 400	65	65	58	52	52	52	52	
	MBT A182 (316 SST) - PTFE or Sealed Bearing	-100 to 38	80	80	52	52	32	32	32	
		38 to 93	64	64	41	41	25	25	25	
		93 to 149	51	51	32	32	25	25	25	
Seat Ring	A182 (316 SST) or 410/416 SST or A182 (316L)/Alloy 6	-100 to 149	76	76	76	71	65	59	55	
		149 to 204	70	70	70	66	60	55	50	
		204 to 260	66	66	66	62	56	42	47	
		260 to 316	62	62	62	59	54	40	45	
		316 to 400	59	59	59	55	51	38	42	
	A182 (316L) / PTFE	-100 to 38	52	52	52	52	52	52	52	
		38 to 93	31	31	31	31	31	31	31	
		93 to 149	17	17	17	17	17	17	17	
		149 to 204	10	10	10	10	10	10	10	
	Plug	A182 (316L SST) & Alloy 6	-100 to 149	76	76	40	32	18	18	14
			149 to 204	70	70	36	29	17	17	13
			204 to 260	66	66	34	28	16	16	12
			260 to 316	62	62	32	26	15	15	12
316 to 400			59	59	31	25	14	14	11	
-100 to 149			97	97	87	76	45	30	30	
149 to 204			94	94	85	73	43	29	29	
204 to 260			91	91	82	71	42	28	28	
260 to 316			88	88	79	69	40	27	27	
316 to 400		82	82	74	64	38	25	25		
17-4PH (H 1025) or 17-4PH (H1150D)		-100 to 149	97	97	87	73	36	23	19	
		149 to 204	94	94	85	70	35	22	19	
		204 to 260	91	91	82	68	34	21	18	
	260 to 316	88	88	79	65	33	20	18		
	316 to 400	82	82	74	61	31	19	16		
A564 Gr. 630	-100 to 149	97	97	87	57	33	22	15		
	149 to 204	94	94	85	56	33	22	15		
	204 to 260	91	91	82	55	32	21	15		
	260 to 316	88	88	79	54	31	21	15		
	316 to 400	82	82	74	52	31	20	14		

Notes: 1 - The values indicated above are related to the internal components. The pressure/temperature must not exceed the limits of the ANSI B16.34 regulation for the body subassembly.

# Eccentric Rotary Plug Valve ExL - Long Pattern

## Maximum Differential Pressures (bar)



Flow Direction: Upstream Shaft <sup>(1)</sup>

Component	Material	Temperature (°C)	Valve Nominal Diameter (in.)						
			2	3	4	6	8	10	12
Bearings	440C HT or Ultimet or Alloy 6	-100 to 149	98	98	88	87	52	52	52
		149 to 204	96	96	86	75	52	52	52
		204 to 260	95	95	85	74	52	52	52
		260 to 316	94	94	84	73	52	52	52
		316 to 400	89	89	80	69	52	52	52
	UNS S 31803	-100 to 149	87	87	78	60	52	52	52
		149 to 204	82	82	74	56	52	52	52
		204 to 260	78	78	70	54	52	52	52
		260 to 316	74	74	67	52	52	52	52
		316 to 400	65	65	58	52	52	52	52
	MBT A182 (316 SST) - PTFE or Sealed Bearing	-100 to 38	52	50	50	32	32	32	32
		38 to 93	52	30	30	18	18	18	18
		93 to 149	31	20	20	12	12	12	12
		149 to 204	21	14	14	8	8	8	8
Seat Ring	A182 (316 SST) or 410/416 SST or A182 (316L)/Alloy 6	-100 to 149	76	76	76	71	65	59	55
		149 to 204	70	70	70	66	60	55	50
		204 to 260	66	66	66	62	56	42	47
		260 to 316	62	62	62	59	54	40	45
		316 to 400	59	59	59	55	51	38	42
	A182 (316L) / PTFE	-100 to 38	52	52	52	52	52	52	52
		38 to 93	31	31	31	31	31	31	31
		93 to 149	17	17	17	17	17	17	17
		149 to 204	10	10	10	10	10	10	10
		-100 to 149	76	76	40	32	18	18	14
Plug	A182 (316L SST) & Alloy 6	149 to 204	70	70	36	29	17	17	13
		204 to 260	66	66	34	28	16	16	12
		260 to 316	62	62	32	26	15	15	12
		316 to 400	59	59	31	25	14	14	11
		-100 to 149	97	97	87	76	45	30	30
		149 to 204	94	94	85	73	43	29	29
		204 to 260	91	91	82	71	42	28	28
		260 to 316	88	88	79	69	40	27	27
		316 to 400	82	82	74	64	38	25	25
		Shaft and Post	17-4PH (H 1025) or 17-4PH (H1150D)	-100 to 149	97	97	87	76	45
149 to 204	94			94	85	73	43	29	19
204 to 260	91			91	82	71	42	28	18
260 to 316	88			88	79	69	40	27	18
316 to 400	82			82	74	64	38	25	16
A638 Gr.660	-100 to 149		97	97	87	67	39	27	27
	149 to 204		94	94	85	66	39	26	26
	204 to 260		91	91	82	65	38	26	26
	260 to 316		88	88	79	63	37	25	25
	316 to 400		82	82	74	62	36	25	25

Notes: (1) The values indicated above are related to the internal components. The pressure/temperature must not exceed the limits of the ANSI B16.34 regulation for the body subassembly.

# Eccentric Rotary Plug Valve ExL - Long Pattern

## Specification and Selection: RA Series Actuator

**Maximum Acceptable Differential Pressures <sup>(1)(2)</sup> Actuator Versus Air Supply Pressure (bar/psi)**

Valve Nominal Diameter (in.)	Trim Area	Valve Fail Position	Actuator Size																
			25								50								
			Air Supply Pressure																
			psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	
60	4.1	80	5.5	100	6.9	150	10.3	60	4.1	80	5.5	100	6.9	150	10.3				
2	100%	Open	725	50.0	725	50.0	725	50.0	725	50.0									
		Closed	540	37.2	540	37.2	540	37.2	540	37.2									
	70 and 40%	Open	725	50.0	725	50.0	725	50.0	725	50.0									
		Closed	725	50.0	725	50.0	725	50.0	725	50.0									
3	100%	Open	356	24.6	548	37.8	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0	
		Closed	112	7.7	112	7.7	112	7.7	112	7.7	369	25.4	369	25.4	369	25.4	369	25.4	
	70%	Open	481	33.2	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0	
		Closed	159	11.0	159	11.0	159	11.0	159	11.0	499	34.4	499	34.4	499	34.4	499	34.4	
	40%	Open	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0	
		Closed	256	17.7	256	17.7	256	17.7	256	17.7	725	50.0	725	50.0	725	50.0	725	50.0	
	4	100%	Open	206	14.2	322	22.2	439	30.3	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0
			Closed	58	4.0	58	4.0	58	4.0	58	4.0	214	14.8	214	14.8	214	14.8	214	14.8
70%		Open	298	20.6	461	31.8	624	43.0	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0	
		Closed	91	6.3	91	6.3	91	6.3	91	6.3	309	21.3	309	21.3	309	21.3	309	21.3	
40%		Open	427	29.4	655	45.2	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0	725	50.0	
		Closed	139	9.6	139	9.6	139	9.6	139	9.6	443	30.6	443	30.6	443	30.6	443	30.6	
6	100%	Open									298	20.6	445	30.7	592	40.8	706	48.7	
		Closed									65	4.5	65	4.5	65	4.5	65	4.5	
	70%	Open									396	27.3	588	40.6	725	50.0	725	50.0	
		Closed									90	6.2	90	6.2	90	6.2	90	6.2	
	40%	Open									613	42.3	725	50.0	725	50.0	725	50.0	
		Closed									147	10.1	147	10.1	147	10.1	147	10.1	
8	100%	Open									169	11.7	255	17.6	341	23.5	408	28.1	
		Closed									N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	75%	Open									228	15.7	342	23.6	456	31.4	544	37.5	
		Closed									N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10	100%	Open									61	4.2	97	6.7	133	9.2	160	11.0	
		Closed									N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
	75%	Open									84	5.8	131	9.0	179	12.3	215	14.8	
		Closed									N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

(1) With downstream shaft and PTFE standard packing set.

(2) The limits of the pressure class for body and flanges must be obeyed.

# Eccentric Rotary Plug Valve ExL - Long Pattern Specification and Selection: RA Series Actuator

**Maximum Acceptable Differential Pressures <sup>(1)(2)</sup> Actuator Versus Air Supply Pressure (bar/psi)**

Valve Nominal Diameter (in.)	Trim Area	Valve Fail Position	Actuator Size															
			100								200							
			Air Supply Pressure															
			psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar	psi	bar
60	4.1	80	5.5	100	6.9	150	10.3	60	4.1	80	5.5	100	6.9	150	10.3			
6	100%	Open	706	48.7	706	48.7	706	48.7	706	48.7							For size 200 actuators the maximum air supply pressure is limited to 80 psi (5.5 bar)	
		Closed	403	27.8	403	27.8	403	27.8	403	27.8								
	70%	Open	725	50.0	725	50.0	725	50.0	725	50.0								
		Closed	533	36.8	533	36.8	533	36.8	533	36.8								
	40%	Open	725	50.0	725	50.0	725	50.0	725	50.0								
		Closed	725	50.0	725	50.0	725	50.0	725	50.0								
8	100%	Open	408	28.1	408	28.1	408	28.1	408	28.1								
		Closed	230	15.9	230	15.9	230	15.9	230	15.9								
	75%	Open	544	37.5	544	37.5	544	37.5	544	37.5								
		Closed	309	21.3	309	21.3	309	21.3	309	21.3								
10	100%	Open	160	11.0	160	11.0	160	11.0	160	11.0	160	11.0	160	11.0				
		Closed	87	6.0	87	6.0	87	6.0	87	6.0	87	6.0	87	6.0				
	75%	Open	215	14.8	215	14.8	215	14.8	215	14.8	215	14.8	215	14.8				
		Closed	118	8.1	118	8.1	118	8.1	118	8.1	118	8.1	118	8.1				
12	100%	Open	116	8.0	178	12.3	216	14.9	216	14.9	216	14.9	216	14.9				
		Closed	59	4.1	59	4.1	59	4.1	59	4.1	59	4.1	59	4.1				
	75%	Open	156	10.8	239	16.5	290	20.0	290	20.0	290	20.0	290	20.0				
		Closed	82	5.7	82	5.7	82	5.7	82	5.7	82	5.7	82	5.7				

(1) With downstream shaft and PTFE standard packing set.

(2) The limits of the pressure class for body and flanges must be obeyed.



# Eccentric Rotary Plug Valve ExL - Long Pattern

## Specification and Selection

Flow Direction		
Assembly	Direction	Application
<b>Standard</b>	Downstream Shaft Fluid towards the plug convex face	Clean Fluids No cavitation or flashing fluids
<b>Reverse</b>	Upstream Shaft Fluid towards the plug posterior face	Fluids with abrasive particles, flashing or cavitation

Packing - Temperature Limits		
Material Type	Temperature*	
	°F	°C
<b>PTFE "V" Rings</b>	-150 to 450	-100 to 232
<b>Braided PTFE</b>	-150 to 500	-100 to 260
<b>Graphite</b>	-20 to 752	-28 to 400
<b>PT</b>	-20 to 450	-28 to 232
<b>PTG</b>	-20 to 450	-28 to 232
<b>PTG XT</b>	-20 to 550	-28 to 288

Maximum Acceptable Differential Pressure - Seat Ring					
Seat Type	Process Fluid	Open Position		Closed Position	
		psi	bar	psi	bar
<b>Metal Seat</b>	Liquids, steam	363	25	725	50
	Gases	725	50	725	50
<b>Soft Seat</b>	Liquids, steam	145	10	725	50
	Gases	290	20	725	50

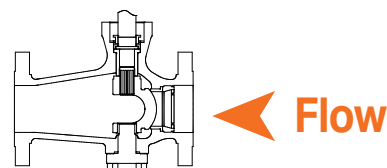
Note: The limits of the pressure class for body and flanges must be obeyed.

Application Recommendation				
Fluid	Plug	Seat Ring	Guides	Flow Direction
<b>Clean Air and Gases*</b>	17-4PH	AISI 316	440C	Upstream Shaft
<b>Liquid and Gaseous Hydrocarbons</b>	17-4PH	AISI 316	440C	Downstream Shaft
	Alloy 6	Alloy 6	440C	Downstream Shaft
<b>Industrial Liquids</b>	17-4PH	AISI 316	440C	Downstream Shaft
<b>Clean Liquids, Cavitating or Flashing</b>	17-4PH	AISI 420	440C	Upstream Shaft
	Alloy 6	Alloy 6	440C	Upstream Shaft
<b>Unclean Liquids, Slurry and Abrasive Unclean Liquids, Cavitating or Flashing</b>	Alloy 6	Alloy 6	440C	Upstream Shaft
	Alloy 6	Alloy 6	440C	Upstream Shaft
<b>Non-corrosive chemicals</b>	17-4PH	AISI 316	440C	Downstream Shaft
<b>Corrosive chemicals</b>	17-4PH	AISI 316	S 31803	Downstream Shaft
	Alloy 6	Alloy 6		Downstream Shaft
<b>Water Steam - 150 psi</b>	17-4PH	AISI 420	440C	Downstream Shaft
<b>Water Steam - 300 psi</b>	Alloy 6	Alloy 6	444C	Downstream Shaft

# Eccentric Rotary Plug Valve ExL - Long Pattern

## Flow Coefficients - $C_v$

### Downstream Shaft

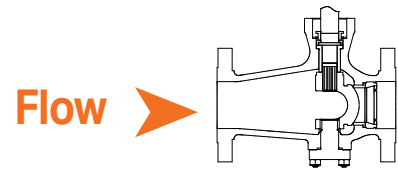


Flow Coefficients ( $C_v$ ) - Downstream Shaft																							
Valve Nominal Diameter (in.)	Trim Area	Opening Percentage																					
		100		90		80		70		60		50		40		30		20		10		5	
		Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft
2	100	78	70	76	69	72	65	65	58	56	50	46	41	36	32	26	24	15	13.8	6.7	6.0	3.5	3.1
	70	43	43	42	42	39	40	36	36	31	31	25	25	20	20	14.3	14.4	8.4	8.4	3.8	3.7	1.9	1.9
	40	24	24	24	24	22	22	20	20	17	17	14.2	14.1	11.0	11.0	8.1	8.1	4.8	4.7	2.0	2.0	1.1	1.1
3	100	213	213	209	209	197	197	178	178	153	153	125	125	97	97	72	72	42	42	18	18	9.4	9.4
	70	166	166	162	162	153	153	138	138	119	119	97	97	76	76	55	55	33	33	14.0	14.0	7.3	7.3
	40	94	94	92	92	87	87	79	79	67	67	55	55	43	43	32	32	19	19	8.1	8.1	4.2	4.2
4	100	308	308	302	302	284	284	257	257	221	221	180	180	141	141	104	104	61	61	26	26	13.6	13.6
	70	220	220	216	216	203	203	184	184	158	158	129	129	100	100	74	74	44	44	19	19	9.4	9.4
	40	148	148	146	146	137	137	124	124	106	106	88	88	68	68	49	49	29	29	12.7	12.7	6.6	6.6
6	100	735	735	721	721	678	678	613	613	526	526	431	431	336	336	247	247	145	145	63	63	32	32
	70	564	564	553	553	521	521	470	470	404	404	331	331	257	257	189	189	111	111	48	48	25	25
	40	326	326	320	320	301	301	272	272	234	234	191	191	149	149	109	109	64	64	28	28	14	14
8	100	1127	1127	1106	1106	1040	1040	940	940	807	807	661	661	514	514	379	379	222	222	96	96	49	49
	75	850	850	834	834	785	785	710	710	609	609	499	499	388	388	286	286	168	168	73	73	38	38
10	100	1787	1787	1753	1753	1650	1650	1491	1491	1279	1279	1048	1048	816	816	601	601	352	352	153	153	79	79
	75	1338	1338	1312	1312	1234	1234	1117	1117	958	958	785	785	610	610	450	450	263	263	114	114	59	59
12	100	2555	2555	2506	2506	2358	2358	2132	2132	1830	1830	1498	1498	1167	1167	858	858	503	503	219	219	113	113
	75	1918	1918	1881	1881	1771	1771	1601	1601	1373	1373	1125	1125	876	876	644	644	378	378	164	164	85	85

# Eccentric Rotary Plug Valve ExL - Long Pattern

## Flow Coefficients - $C_V$

Upstream Shaft

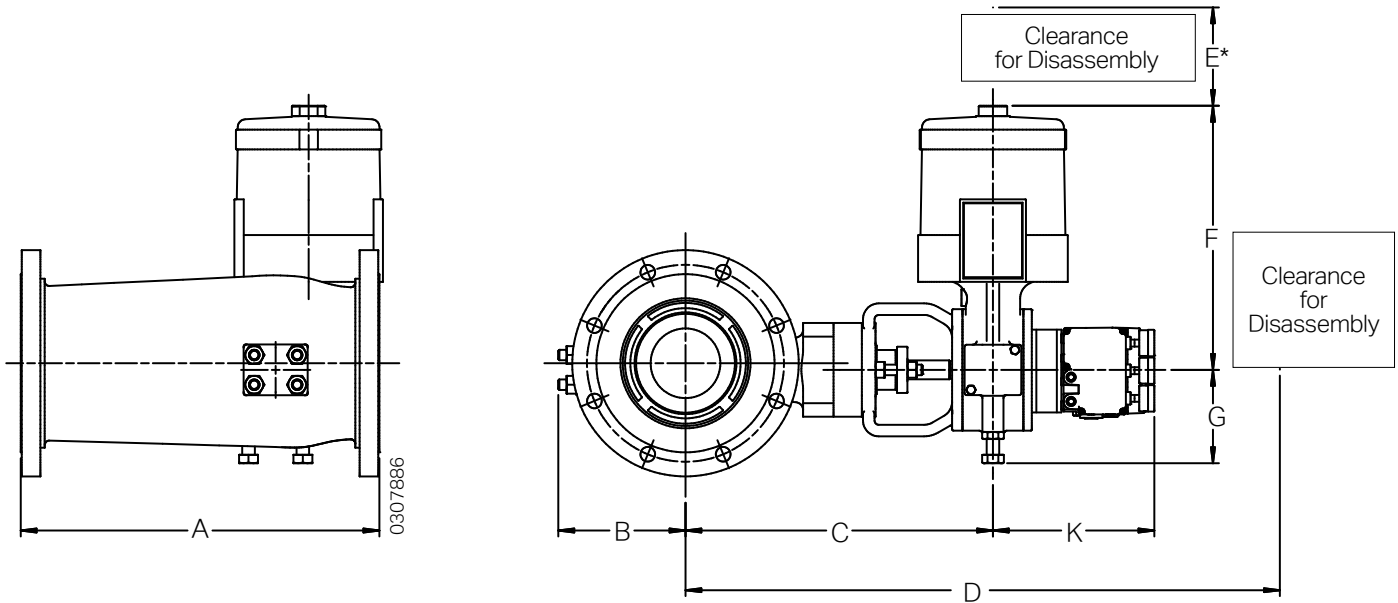


Flow Coefficients ( $C_V$ ) - Upstream Shaft																							
Valve Nominal Diameter (in.)	Trim Area	Opening Percentage																					
		100		90		80		70		60		50		40		30		20		10		5	
		Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft	Metal	Soft
2	100	80	71	78	70	73	66	66	59	57	51	47	42	36	32	27	24	16	13.9	6.8	6.1	3.5	3.1
	70	51	51	50	50	47	47	42	43	36	37	30	30	23	23	17	17	10.0	10.0	4.3	4.4	2.3	2.2
	40	32	32	31	31	29	30	27	27	23	23	19	19	14.5	14.6	10.7	10.8	6.3	6.3	2.7	2.7	1.4	1.4
3	100	240	240	235	235	222	222	200	200	172	172	141	141	110	110	81	81	47	47	21	21	10.6	10.6
	70	178	178	175	175	164	164	148	148	128	128	104	104	81	81	60	60	35	35	15	15	7.8	7.8
	40	103	103	101	101	95	95	86	86	74	74	60	60	47	47	35	35	20	20	8.8	8.8	4.7	4.7
4	100	404	404	396	396	373	373	337	337	290	290	237	237	184	184	135	135	80	80	35	35	18	18
	70	266	266	261	261	245	245	222	222	191	191	156	156	121	121	89	89	52	52	23	23	11.4	11.4
	40	169	169	165	165	156	156	141	141	121	121	99	99	77	77	57	57	33	33	14.3	14.3	7.4	7.4
6	100	950	950	932	932	877	877	793	793	680	680	557	557	434	434	319	319	187	187	81	81	42	42
	70	665	665	651	651	613	613	553	553	475	475	389	389	303	303	223	223	131	131	57	57	29	29
	40	380	380	373	373	350	350	317	317	272	272	223	223	173	173	128	128	75	75	33	33	17	17
8	100	1697	1697	1665	1665	1566	1566	1416	1416	1215	1215	995	995	775	775	570	570	334	334	145	145	75	75
	75	1274	1274	1250	1250	1176	1176	1063	1063	912	912	747	747	581	581	428	428	251	251	109	109	56	56
10	100	2502	2502	2454	2454	2309	2309	2088	2088	1792	1792	1467	1467	1142	1142	841	841	490	490	214	214	110	110
	75	1876	1876	1840	1840	1731	1731	1566	1566	1343	1343	1100	1100	856	856	630	630	370	370	160	160	83	83
12	100	3604	3604	3535	3535	3326	3326	3007	3007	2581	2581	2114	2114	1645	1645	1211	1211	710	710	308	308	159	159
	75	2702	2702	2651	2651	2494	2494	2255	2255	1935	1935	1585	1585	1234	1234	908	908	532	532	231	231	119	119

# Eccentric Rotary Plug Valve ExL - Long Pattern

## Dimensions - Valve with Actuator and Chronos Positioner

### Long Pattern (ANSI/ISA - 75.08.01)



Dimensions																					
Valve Nominal Diameter (in.)	Actuator Size	A						B		C		D*		F		G		K		E*	
		150		300		600		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
		in.	mm	in.	mm	in.	mm														
2	25	10.0	254	10.5	267	11.3	286	2.9	74	11.7	296	21.3	541	11.3	286	4.6	117	10.4	265	6.0	152
	50	11.8	298	12.5	318	13.3	337	4.0	102	13.8	350	23.4	595	11.3	286	4.6	117	10.4	265	6.0	152
3	25	11.8	298	12.5	318	13.3	337	4.0	102	13.8	350	23.4	594	15.8	402	5.6	142	10.4	265	8.0	203
	50	13.9	353	14.5	368	15.5	394	4.2	107	14.0	356	23.6	600	11.3	288	4.6	117	10.4	265	6.0	152
4	25	13.9	353	14.5	368	15.5	394	4.2	107	14.0	356	23.6	600	15.8	402	5.6	142	10.4	265	8.0	203
	50	17.8	451	18.6	473	20.0	508	6.7	171	17.9	455	27.7	704	15.8	402	5.6	142	10.4	265	8.0	203
6	25	17.8	451	18.6	473	20.0	508	6.7	171	17.9	455	27.7	704	22.6	575	7.3	185	10.6	270	12.1	307
	50	21.4	543	22.4	568	24.0	610	7.4	189	18.3	465	28.2	716	15.8	402	5.6	142	10.4	265	8.0	203
8	25	21.4	543	22.4	568	24.0	610	7.4	189	18.3	465	28.2	716	22.6	574	7.3	185	10.6	270	12.1	307
	50	26.5	673	27.9	708	29.6	752	9.4	239	18.8	478	28.7	728	22.6	574	7.3	185	10.6	270	12.1	307
10	25	26.5	673	27.9	708	29.6	752	9.4	239	18.8	478	28.7	728	23.2	589	7.3	185	10.6	270	12.6	320
	50	29.0	737	30.5	775	32.2	819	10.4	264	19.8	503	29.7	753	22.6	574	7.3	185	10.6	270	12.1	307
12	25	29.0	737	30.5	775	32.2	819	10.4	264	19.8	503	29.7	753	23.2	589	7.3	185	10.6	270	12.6	320
	50	29.0	737	30.5	775	32.2	819	10.4	264	19.8	503	29.7	753	23.2	589	7.3	185	10.6	270	12.6	320

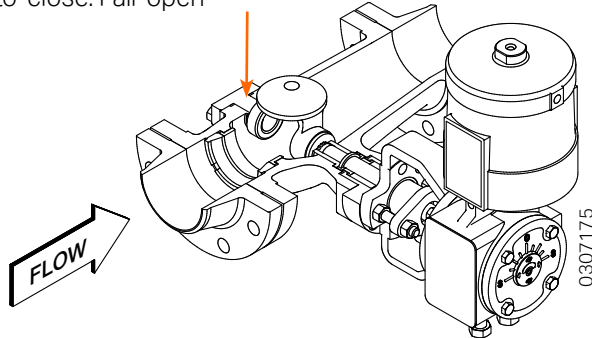
\* Clearance needed for disassembly of standard actuator. K: with Chronos positioner.  
RTJ Flanged connection: Consult ValtekSul Engineering.

# Eccentric Rotary Plug Valve ExL - Long Pattern Actuator Assembly Guidance

## Standard Right-sided Assembly – Downstream Shaft

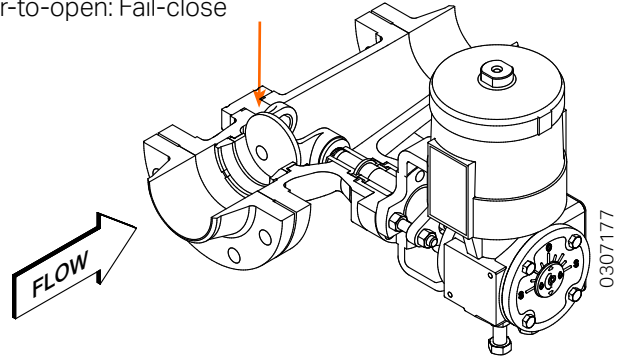
**Assembly A**

Air-to-close: Fail-open



**Assembly B**

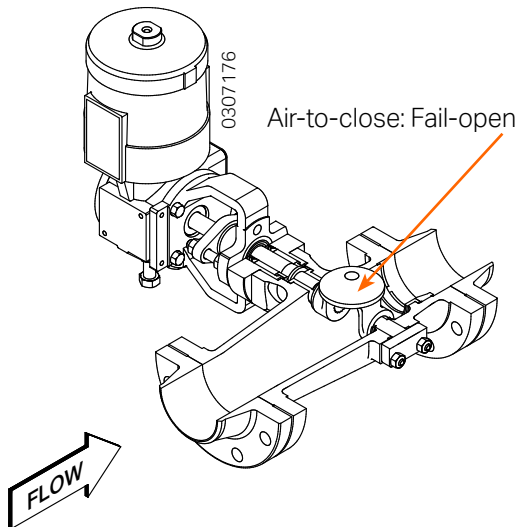
Air-to-open: Fail-close



## Standard Left-sided Assembly – Upstream Shaft

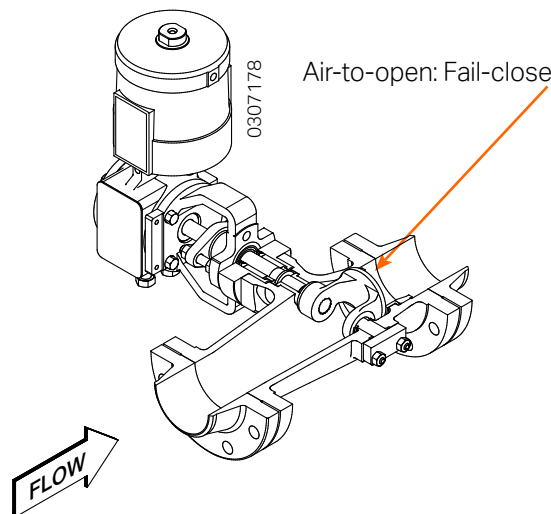
**Assembly C**

Air-to-close: Fail-open



**Assembly D**

Air-to-open: Fail-close



## Quality Management System



**ISO 9001-2015**

Certificate nº 31001 QM 15

DQS GmbH

DQS Brazil

ISO 14001™ Certified

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