

High Pressure and Severe Service Valve

U.S. Type 1711HD (Includes RC300)

DESCRIPTION

The U.S. Type 1711HD High Pressure Severe Service Control valve has a working pressure up to 10,000 psi (689 bar). The 1711HD features a high pressure bar stock body with a union bonnet. This unit features an oversized stem and extra heavy duty guided innervalue for added strength and longevity. The stem packing is designed for tight sealing, long life and easy maintenance. The union bonnet with a graphite gasket provides excellent sealing without having bonnet threads in contact with the process fluid. The multi-spring, field adjustable 35 square-inch, diaphragm actuator can be either ATO or ATC action. Maximum corrosion protection on all non-stainless actuator components are standard.

APPLICATION

The valve has performed in some of the most extreme environments in the world. Tough applications within the chemical and the oil and gas markets is where you can find this valve.

CONSTRUCTION

Body – Bonnet	
Standard	316 stainless steel
Optional	Exotic alloys
Body Gasket	Grafoil® Gr GTA
Innervalue	
Standard	316 stainless steel or Stellite® inlaid seat and plug
Optional	Titanium nitride coating, exotic alloys
Packing	
Standard	TFE chevron rings
Optional	Reduced Emission Kalrez® (REK) Grafoil, others; consult factory

ACTUATOR

Standard	Air-to-open, fail close Air-to-close, fail open
Optional	Side-mounted positioner
Standard Signals	3-15#, 3-27#, 6-30#
Optional Signals	3-9#, 9-15# with positioner
Accessories	Filter regulator, gauges, I/P converter, limit switches, solenoids



Type 1711HD Valve

STANDARD FEATURES

- 1/2 in. (12 mm) model
- Interchangeable trim sets
- Heavy duty union bonnet
- Different trim characteristics available (linear, equal percent, quick open or double taper)
- TFE chevron packing
- Stellite inlaid innervalue
- ANSI Class IV shutoff
- High pressure and temperature rating
- Encapsulated graphite body bonnet gasket
- Dual IEC 534 (NAMUR) accessory mounts
- Adjustable spring preload and up-travel stop

OPTIONAL FEATURES

- Butt and socket weld ends, BSPP, tube connection and others
- Bonnet extensions for different temperature extremes
- Bellows packing solutions
- Reduced Emissions Kalrez (REK), graphite, spring loaded chevron and others
- Exotic alloys available for complete valves or trims
- Stellite trims & Soft seats (PTFE & Kel-F) available
- TiN coating of innervalue stem and seat
- Purge or leak ports available

SPECIFICATIONS

Pressure vs Temperature Rating for Valve Superstructure Excluding Packing or End Fittings

Temp (° F)	1/2 in. (12.7 mm) (psig)	Temp (° C)	1/2 in. (12.7 mm) (bar)
100	10,000	38	689
200	8597	93	593
300	7750	149	534
400	7100	204	490
500	6632	260	457
600	6250	316	431
700	5972	371	412
800	5833	427	402
900	5750	482	396
1000	4858	538	335

The pressure/temperature ratings listed above are for the valve body/bonnet (excluding packing and/or end connections). When proper assembly torque is used, the valve should not experience rupture of the joint or the material. When flanges, fittings or other pressure containing elements are added to the valve, the pressure rating of the total valve assumes the rating of the weakest component.

Consult factory for high temperatures.

INNERVALVE CHART

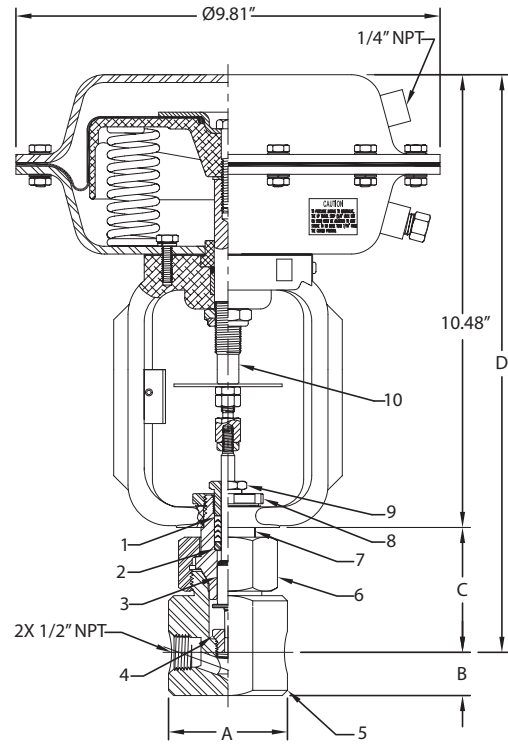
Valve Size	Trim	Nominal Cv	Theoretical Turbulent Cv	Orifice Dia. in. (mm)	Orifice Area in. ² (mm ²)	Maximum Rangeability	
						Linear	Equal %
1/2 in. (12.7 mm)	A	2.5	2.5	0.375 (9.5)	0.1105 (71.3)	50:1	50:1
	B	2.0	2.0	0.375 (9.5)	0.1105 (71.3)	40:1	50:1
	C	1.25	1.25	0.281 (7.1)	0.0621 (40.1)	40:1	50:1
	D	0.8	0.8	0.250 (6.4)	0.0491 (31.7)	40:1	50:1
	E	0.5	0.5	0.250 (6.4)	0.0491 (31.7)	40:1	50:1
	F	0.32	0.32	0.156 (4.0)	0.0191 (12.3)	30:1	40:1
	G	0.2	0.2	0.156 (4.0)	0.0191 (12.3)	30:1	40:1
	H	0.13	0.13	0.156 (4.0)	0.0191 (12.3)	30:1	40:1
	I	0.08	0.08	0.156 (4.0)	0.0191 (12.3)	30:1	40:1
	J	0.05	0.05	0.156 (4.0)	0.0191 (12.3)	30:1	40:1

Maximum Shutoff

Valve Size	Trim	Maximum Shutoff	
		1/2 in. (12.7 mm) (psig (bar))	3/4 in. (19.1 mm), 1 in. (25.4 mm) (psig (bar))
1/2 in. (12.7 mm)	A	4700 (324)	4700 (324)
	B	4700 (324)	4700 (324)
	C	7500* (517)	5000* (344)
	D	7500* (517)	5000* (344)
	E	7500* (517)	5000* (344)
	F	7500* (517)	5000* (344)
	G	7500* (517)	5000* (344)
	H	7500* (517)	5000* (344)
	I	7500* (517)	5000* (344)
	J	7500* (517)	5000* (344)

* Maximum allowable shutoff is determined by the maximum force that can be preloaded using six springs loaded to 525 psig (36 bar). Although the unit will close the valve, this is no guarantee that the metal will not erode. Life of the innervalve is related to the fluid, temperature, nature of the media and the pressure.

DIMENSIONS



Items in Drawing

1	2	3	4	5
Packing set	Adapter	Innervalve	Seat	Body
6	7	8	9	10
Union nut	Bonnet	Lock nut	Packing gland	Stem

Dimensions

PS	A	B	C	D	Stroke
0.50 in. (12.7 mm)	2.75 in. (70.0 mm)	1.00 in. (25.4 mm)	2.89 in. (73.4 mm)	13.37 in. (339.6 mm)	0.562 in. (14.3 mm)
Removal clearance:	1.75 in. (44.4 mm)				
Valve stem travel:	0.563 in. (14.3 mm)				

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DESCRIPTION

The Type NRMA Non-Rotating Manual Actuation design is used in applications where either our low-flow trims, cooling fins or bellows are needed and when applications demand human interaction. The manual actuator can be mounted on all RC series valves, including all "P" Trims and all Bonnets. Exchanging between electrical, pneumatic and manual actuators is therefore possible at any time with simple additions. The actuator is encapsulated and completely maintenance-free—designed for fine control.

APPLICATIONS

When you turn the hand wheel, the valve interior moves in a linear motion. This linear movement, from the hand wheel to the internal coupling, prevents damage to the trim and seat, distinguishing this design from conventional manual control valves.

FEATURES

- Hand drive, linear
- Suitable for Badger Meter® modular construction

MATERIALS

Case	1.4404 (316L)
Yoke	1.4404 (316L)
Hand Wheel	Duroplast

SPECIFICATIONS

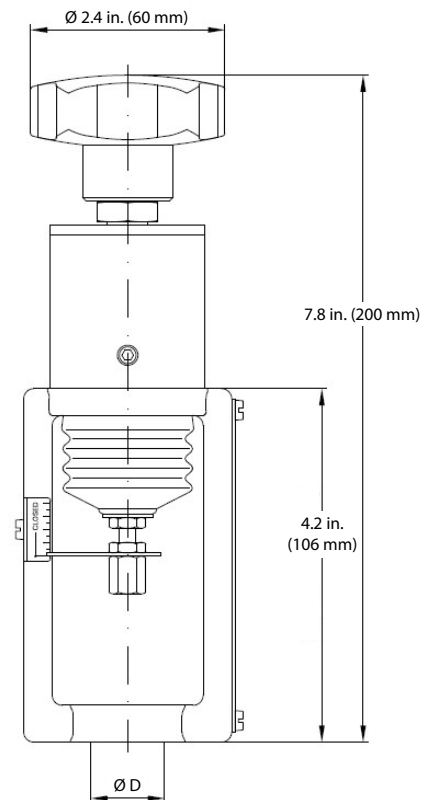
Weight	Approximately 3.3 lb (1.5 kg)
Temperature	-40...176° F (-40...80° C)
Valve Lift	0.04 in. (1 mm) / 360° turn

SIZES FOR RESEARCH CONTROL VALVES

Sizes	Ø Average	Stroke
1/4 in. standard	0.625 in.	11.1 mm
1/2 in., 3/4 in., 1 in. standard	0.875 in.	14.3 mm
1/2 in., 3/4 in., 1 in. heavy duty guiding	0.875 in.	14.3 mm



DIMENSIONS



RCV Valves		Trim Sizes Equal %															
% Lift	% Cv	6.0	5	4.5	4	3.5	A	B	C	D	E	F	G	H	I	J	% Lift
0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
5%	1.0%	0.06	0.05	0.04	0.04	0.03	0.02	0.02	0.01	0.008	0.005	0.003	0.002	0.001	0.001	0.000	5%
10%	1.9%	0.11	0.10	0.09	0.08	0.07	0.05	0.04	0.02	0.015	0.010	0.006	0.004	0.002	0.002	0.001	10%
20%	3.8%	0.23	0.19	0.17	0.15	0.13	0.10	0.08	0.05	0.031	0.019	0.012	0.008	0.005	0.003	0.002	20%
25%	4.8%	0.29	0.24	0.22	0.19	0.17	0.12	0.10	0.06	0.038	0.024	0.015	0.010	0.006	0.004	0.002	25%
30%	5.9%	0.35	0.29	0.26	0.23	0.20	0.15	0.12	0.07	0.047	0.029	0.019	0.012	0.008	0.005	0.003	30%
40%	8.8%	0.53	0.44	0.40	0.35	0.31	0.22	0.18	0.11	0.070	0.044	0.028	0.018	0.011	0.007	0.004	40%
50%	13.2%	0.79	0.66	0.59	0.53	0.46	0.33	0.26	0.16	0.105	0.066	0.042	0.026	0.017	0.011	0.007	50%
60%	19.8%	1.19	0.99	0.89	0.79	0.69	0.49	0.40	0.25	0.158	0.099	0.063	0.040	0.026	0.016	0.010	60%
70%	29.6%	1.78	1.48	1.33	1.19	1.04	0.74	0.59	0.37	0.237	0.148	0.095	0.059	0.039	0.024	0.015	70%
75%	36.3%	2.18	1.81	1.63	1.45	1.27	0.91	0.73	0.45	0.290	0.181	0.116	0.073	0.047	0.029	0.018	75%
80%	44.4%	2.67	2.22	2.00	1.78	1.56	1.11	0.89	0.56	0.356	0.222	0.142	0.089	0.058	0.036	0.022	80%
90%	66.7%	4.00	3.33	3.00	2.67	2.33	1.67	1.33	0.83	0.533	0.333	0.213	0.133	0.087	0.053	0.033	90%
100%	100%	6.00	5.00	4.50	4.00	3.50	2.50	2.00	1.25	0.800	0.500	0.320	0.200	0.130	0.080	0.050	100%
Valve Sizes		1"	1"	1"	1", 3/4"	1", 3/4"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	

Trim Sizes O through P-18 are available only in linear characteristic. See Product Data Sheets for maximum Cvs.

RCV Valves		Trim Sizes Equal %															
% Lift	% Cv	6.0	5	4.5	4	3.5	A	B	C	D	E	F	G	H	I	J	% Lift
0%	0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0%
5%	1.0%	0.30	0.25	0.23	0.20	0.18	0.13	0.10	0.06	0.040	0.025	0.016	0.010	0.007	0.004	0.003	5%
10%	1.9%	0.60	0.50	0.45	0.40	0.35	0.25	0.20	0.13	0.080	0.050	0.032	0.020	0.013	0.008	0.005	10%
20%	3.8%	1.20	1.00	0.90	0.80	0.70	0.50	0.40	0.25	0.160	0.100	0.064	0.040	0.026	0.016	0.010	20%
25%	4.8%	1.50	1.25	1.13	1.00	0.88	0.63	0.50	0.31	0.200	0.125	0.080	0.050	0.033	0.020	0.013	25%
30%	5.9%	1.80	1.50	1.35	1.20	1.05	0.75	0.60	0.38	0.240	0.150	0.096	0.060	0.039	0.024	0.015	30%
40%	8.8%	2.40	2.00	1.80	1.60	1.40	1.00	0.80	0.50	0.320	0.200	0.128	0.080	0.052	0.032	0.020	40%
50%	13.2%	3.00	2.50	2.25	2.00	1.75	1.25	1.00	0.63	0.400	0.250	0.160	0.100	0.065	0.040	0.025	50%
60%	19.8%	3.60	3.00	2.70	2.40	2.10	1.50	1.20	0.75	0.480	0.300	0.192	0.120	0.078	0.048	0.030	60%
70%	29.6%	4.20	3.50	3.15	2.80	2.45	1.75	1.40	0.88	0.560	0.350	0.224	0.140	0.091	0.056	0.035	70%
75%	36.3%	4.50	3.75	3.38	3.00	2.63	1.88	1.50	0.94	0.600	0.375	0.240	0.150	0.098	0.060	0.038	75%
80%	44.4%	4.80	4.00	3.60	3.20	2.80	2.00	1.60	1.00	0.640	0.400	0.256	0.160	0.104	0.064	0.040	80%
90%	66.7%	5.40	4.50	4.05	3.60	3.15	2.25	1.80	1.13	0.720	0.450	0.288	0.180	0.117	0.072	0.045	90%
100%	100%	6.00	5.00	4.50	4.00	3.50	2.50	2.00	1.25	0.800	0.500	0.320	0.200	0.130	0.080	0.050	100%
Valve Sizes		1"	1"	1"	1", 3/4"	1", 3/4"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	

Numbers are for reference or comparison only.

% Lift	% Maximum Cv	
	Linear	Equal %
0%	0%	0%
5%	5%	1%
10%	10%	2%
20%	20%	4%
25%	25%	5%
30%	30%	6%
40%	40%	9%
50%	50%	13%
60%	60%	20%
70%	70%	30%
75%	75%	36%
80%	80%	44%
90%	90%	67%
100%	100%	100%

% Cv vs. % Lift

