

# CASH VALVES CRYOGENIC VALVES AND CONTROLS

## FR, FR-6 BACK PRESSURE OR ECONOMIZER SERVICE

### Construction

Threaded ends; 3-way, 2 side inlets-bottom outlet; bronze body, spring chamber and diaphragms; brass body seat; stainless steel seat disc, seat ring and pressure spring; PTFE O-ring and diaphragm gasket; stainless steel bolts; pressure-tight closing cap. All parts are commercially cleaned for cryogenic service. Also available with BSP threads.

FR Series valves are available in various pressure control and temperature ranges and are designated as follows:

- Type FR has a bronze body as standard, is suitable for pressure of 0 to 400 psig (0 to 27.6 barg) and maximum temperatures 200°F to 600°F (93°C to 316°C)\*.
- Type FR-6 incorporates a diaphragm ring mounted above the diaphragm to accommodate higher back pressure ranges: 200 to 600 psig (13.8-41 barg); 200°F to 600°F (93°C to 316°C)\*.

**Note:** Also available in stainless steel and special construction for hi-purity systems. Contact your sales representative.

Temperature rating: +150°F to -320°F (339K to 78K)

### MAXIMUM INITIAL PRESSURE

Type	psi	kg/cm <sup>2</sup>
FR	250	17.58
FR-1/2"	400	28.12
FR-3/4"	265	18.64
FR-1"-2"	250	17.58
FR-6	400	28.12
	600	42.18 on 1/2"

Maximum set pressure: See below. For higher pressures, contact your sales representative.

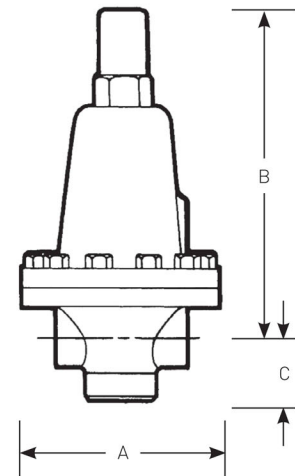
### DIMENSIONS

Size in. (mm)	Dimensions						Shipping weight	
	A		B		C		lbs	(kgs)
1/2 (15)	4 3/4 (120.65)	6 3/4 (171.45)	1 5/8 (41.28)	9 1/2 (4.27)				
3/4 (20)	5 5/8 (142.88)	8 (203.20)	2 (50.80)	14 3/4 (6.64)				
1 (25)	6 1/2 (165.1)	10 5/16 (261.94)	2 1/4 (57.15)	23 1/2 (10.58)				
1 1/4 (32)	6 1/2 (165.1)	10 7/8 (276.23)	2 3/8 (60.33)	24 1/2 (11.03)				
1 1/2 (40)	7 1/2 (190.5)	10 3/4 (273.05)	2 5/8 (66.68)	33 (14.85)				
2 (50)	7 1/2 (190.5)	11 (279.40)	2 5/8 (66.68)	35 1/2 (15.98)				

### PRESSURE RANGES

Valve size inches (mm)	Maximum working ranges		Valve size inches (mm)	Maximum working ranges	
	psi	(kg/sq cm)		psi	(kg/sq cm)
1/2 (15)	0-20	(0-1.41)	1/4 (15)	0-15	(0-1.06)
	10-50	(0.70-3.52)		20-85	(1.41-5.98)
	40-90	(2.81-6.33)		40-125	(2.81-8.79)
	75-200	(5.27-14.06)		50-250	(3.52-17.58)
	100-400	(7.03-28.12)		200-400*	(14.06-28.12)*
3/4 (20)	0-10	(0-.70)	1 1/2 (40)	0-15	(0-1.06)
	10-70	(0.70-4.92)		10-55	(0.70-3.87)
	50-175	(3.52-12.30)		30-100	(2.11-7.03)
	100-265	(7.03-18.63)		40-160	(2.81-11.25)
	200-400*	(14.06-28.12)*		100-250	(7.03-17.58)
1 (25)	0-15	(0-1.06)	2 (50)	0-15	(0-1.06)
	20-75	(1.41-5.27)		10-55	(0.70-3.87)
	40-200	(2.81-14.06)		30-100	(2.11-7.03)
	50-250	(3.51-17.58)		40-160	(2.81-11.25)
	200-400*	(14.06-28.12)*		100-250	(7.03-17.58)
			200-400*	(14.06-28.12)*	

\* Note: requires special diaphragm ring and pressure plate.



# CASH VALVES CRYOGENIC VALVES AND CONTROLS

## FR SERIES SELECTION GUIDE

Example	FR-	Z	A	W	S	S	Z	Z	B	H	01	-	E	1
<b>Model</b>														
<b>FR-</b> FR														
<b>FR6</b> FR-6														
<b>Material of construction</b>														
<b>Z</b> Bronze (FR, FR-6)														
<b>G</b> 316 SST (FR, FR-6)														
<b>Valve size</b>														
<b>C</b> 1/2"														
<b>D</b> 3/4"														
<b>E</b> 1"														
<b>F</b> 1 1/4"														
<b>G</b> 1 1/2"														
<b>H</b> 2"														
<b>Service</b>														
<b>C</b> Cryogenic service														
<b>Body/connection style</b>														
<b>S</b> 2 side inlets/bottom outlet - w/ NPT connections														
<b>Spring chamber style</b>														
<b>S</b> Standard														
<b>C</b> w/ pressure screw cap														
<b>D</b> w/ differential connection														
<b>V</b> Vented														
<b>W</b> Vent in wall / no cap														
<b>Spring chamber material</b>														
<b>Z</b> Bronze														
<b>G</b> 316 Stainless steel														
<b>Diaphragm material</b>														
<b>Z</b> Bronze (cryo)														
<b>G</b> 316 Stainless steel (cryo)														
<b>Body seat material</b>														
<b>E</b> 303 Stainless steel														
<b>G</b> 316 Stainless steel														
<b>Z</b> Brass														
<b>Pressure screw style</b>														
<b>S</b> Standard														
<b>Variation</b>														
<b>04</b> 303 Stainless steel trim w/ Teflon O-ring and teflon diaphragm gasket (ball seat, seat ring)														
<b>14</b> 316 Stainless steel trim w/ Teflon O-ring and teflon diaphragm gasket (ball seat, seat ring)														
<b>Design revision</b>														
<b>(-)</b> Indicates original design														
<b>Spring material</b>														
<b>E</b> Stainless steel														
<b>Spring range</b>														
Refer to tables below														

### STANDARD SPRING RANGES (psig)

Spring Material	Type	Size	1	2	3	4	5	6
SST	FR	1/2"	0 - 20	10 - 50	40 - 90	75 - 200	100 - 300	100 - 400
		3/4"	0 - 10	0 - 15	10 - 70	50 - 175	100 - 265	----
		1"	0 - 15	10 - 35	20 - 75	40 - 200	50 - 250	----
	FR-6	1 1/4"	0 - 15	10 - 30	20 - 85	40 - 125	50 - 250	----
		1 1/2", 2"	0 - 15	5 - 20	10 - 55	30 - 100	40 - 160	100 - 250
FR-6		1/2"	200 - 600	----	----	----	----	----
		3/4", 1", 1 1/4", 1 1/2", 2"	200 - 400	----	----	----	----	----