July 2008

Type OSE Slam-Shut Valve

Figure 1. *Type OSE Slam-Shut Valve*

Features and Benefits

- **Overpressure and Underpressure Protection**—The Type OSE can be equipped for **O**ver**P**ressure **S**hut**O**ff (OPSO), **U**nder**P**ressure **S**hut**O**ff (UPSO), **O**verpressure and **U**nder**P**ressure **S**hut**O**ff (OUPSO), manual shutoff, or remote shutoff. In addition, the Type OSE utilizes limit switches for remote alarm upon shutoff when the valve is tripped.
- **Two-Stage Tripping Mechanism**—The Type OSE incorporates a two stage tripping mechanism that significantly reduces nuisance tripping caused by vibrations or inlet pressure variations, which is commonly found in other shutoff valves.
- **Sizes 1 through 6-inch (DN 25 through 150)**—When resetting the trip mechanism the internal bypass valve opens automatically allowing pressure on each side of the valve plug to equalize. External bypass valve **(Sizes 8 and 10-inch (DN 200 and 250))** is manually operated.
- **High Accuracy**—Rated at +/- 1% to 5% depending on types, pressures, and service conditions.
- **Easy In-Line Maintenance**—Top entry design reduces maintenance time and manpower requirements; parts can be inspected and replaced without removing the body from the line.
- **Water Tight**—The Type OSE is water tight to 10 feet (3,05 meters).
- **Positive Shutoff**—After closing, the slam-shut valve stays closed until the system is shut down and the valve is manually reset. An O-ring on the valve plug seal provides tight shutoff.

Introduction

The purpose of the Type OSE slam-shut device is to totally and rapidly cut the flow of gas when the inlet and/or outlet pressure in the system either exceeds or drops below setpoints. The Type OSE consists of a valve, either mechanism box, BM1 or BM2, and either one or two manometric sensing devices (BMS1 or BMS2).

Incorporated in the Type OSE valve plug is an automatic internal bypass valve mechanism, which balances pressures on both sides of the plug when resetting.

D102356X012

Specifications

Body Sizes and End Connection Style

WCC Steel
1 and 2-inch NPT; 1, 2, 3, 4, 6, 8, and 10-inch (DN 25, 50, 80, 100, 150, 200, and 250) CL150 RF, CL300 RF, or CL600 RF Flanged

Cast Iron
1 and 2-inch NPT; 1, 2, 3, 4, and 6-inch (DN 25, 50, 80, 100, and 150) CL125 FF or CL250 RF Flanged

Maximum Inlet Pressure[1][2]
1470 psig (101 bar) or maximum body rating, whichever is lower

Outlet Pressure Ranges
See Table 3

Maximum Set Pressure
1470 psig (101 bar) or maximum body rating, whichever is lower

Minimum Set Pressure
4.02-inches w.c. (10 mbar)

Manometric Sensing Device Specifications
See Table 3

Flow Capacities
See Table 4

Maximum Shutoff Pressure Differential
1470 psig (101 bar) or maximum body rating, whichever is lower

Representative Wide-Open Flow Coefficients

BODY SIZE, INCHES (DN)	PORT DIAMETER, INCHES (mm)	FLOW COEFFICIENTS			BYPASS FLOW COEFFICIENTS	
		C_g	C_v	C_1	C_g	C_1
1 (25)	1.83 (30,0)	505	14.4	35	25.7	35
2 (50)	2.00 (50,7)	2210	60.6	35	25.7	35
3 (80)	3.15 (80,0)	4670	141	33	25.7	35
4 (100)	3.94 (100)	7860	244	32	25.7	35
6 (150)	5.91 (150)	14,850	454	33	25.7	35
8 (200)	7.87 (200)	28,830	833	34.6	133	32.8
10 (250)	9.84 (250)	42,180	1188	35.5	133	32.8

Maximum Flowing Pressure Differential

BODY SIZE, INCHES (DN)	MAXIMUM FLOWING PRESSURE DROPS, PSIG (bar)
1 (25)	360 (24,8)
2 (50)	360 (24,8)
3 (80)	360 (24,8)
4 (100)	150 (10,3)
6 (150)	85 (5,86)
8 (200)	119 (8,20)
10 (250)	67 (4,60)

Pressure Registration
External

Accuracy
+/-2.5% for anything at or below 1.45 psig (0,10 bar),
+/-1% for anything above 1.45 psig (0,10 bar), or
+/-5% for the piston Types 27 and 17

Valve Plug Travel and Stem Diameter

BODY SIZE, INCHES (DN)	VALVE PLUG TRAVEL, INCHES (mm)	VALVE PLUG STEM DIAMETER, INCHES (mm)
1 (25)	1/2 (12,7)	0.138 (3,51)
2 (50)	1/2 (12,7)	
3 (80)	1-1/8 (28,6)	
4 (100)	2 (50,8)	
6 (150)	2 (50,8)	
8 (200)	2-3/4 (70)	0.276 (7,01)
10 (250)	3-1/4 (82)	

Maximum Temperature Capabilities[2]
-20° to 150°F (-29° to 66°C)

Pressure Sensing Connections
1/4-inch NPT

Vent Connection
1/4-inch NPT

Construction Materials
Body: WCC Steel or Cast iron
Bonnet: Steel
Valve Plug: 300 Series Stainless Steel
Valve Plug Seal O-Ring: Nitrile (NBR)
Seat Ring: 300 Series Stainless Steel
Mechanism Box: Aluminum
First and Second Stage Mechanism: Steel
Diaphragm: Reinforced Nitrile (NBR)
Bellows: 316 Stainless steel
Piston: 316 Stainless steel

Approximate Weight

BODY SIZE, INCHES (DN)	APPROXIMATE WEIGHT, POUNDS (kg)
1 (25)	36 (16,3)
2 (50)	70 (31,8)
3 (80)	121 (54,9)
4 (100)	216 (98,0)
6 (150)	445 (202)
8 (200)	785 (356)
10 (250)	1272 (577)

Options
- Explosion-proof switch
- Non-explosion-proof limit switch
- Solenoid
- Additional manometric device for extra pressure sensing

1. Relief pressure plus maximum allowable buildup over setting.
2. The pressure/temperature limits in this Bulletin or any applicable standard limitation should not be exceeded.

Table 1. *Main Valve Body Sizes, End Connection Styles, and Body Pressure Ratings*

MAIN VALVE BODY SIZE INCHES (DN)	MAIN VALVE BODY MATERIAL	END CONNECTION STYLE(1)	STRUCTURAL DESIGN RATING(2)
1 (25) 2 (50) 3 (80) 4 (100) 6 (150)	Cast iron	NPT (1 and 2-inch only)	400 psig (27,6 bar)
		CL125 FF Flanged	200 psig (13,8 bar)
		CL250 RF Flanged	500 psig (34,5 bar)
1 (25) 2 (50) 3 (80) 4 (100) 6 (150) 8 (200) 10 (250)	WCC Steel	NPT (1 and 2-inch only)	1500 psig (103 bar)
		CL150 RF Flanged	290 psig (20,0 bar)
		CL300 RF Flanged	750 psig (51,7 bar)
		CL600 RF Flanged	1500 psig (103 bar)

1. Ratings and end connections for other than ASME standard can usually be provided. Contact your local Sales Office for assistance.
2. See Specifications section and Table 3 for additional pressure ratings.

The Type OSE slam-shut valve can be used for all pressure ranges from 4.02-inches w.c. to 1470 psig (10 mbar to 101 bar) by simply replacing the manometric sensing device. In addition, the Type OSE can be configured for overpressure shutoff (OPSO), underpressure shutoff (UPSO), overpressure and underpressure shutoff (OUPSO), manual shutoff or remote shutoff. In addition, the Type OSE can utilize an optional limit switch for remote alarm upon shutoff when the valve is tripped.

Mechanism Box (BM1 or BM2)

The mechanism box (BM1 or BM2, see Figure 3) is designed to close the slam-shut valve. The detection of pressure variances is sensed by a double stage trip mechanism (see Figure 5). The first stage is the detection stage and will only trip when the system pressure reaches the set pressure of the manometric sensing device. The second stage is the power stage and once tripped by the first stage, the closing spring causes the valve plug to slam-shut and remains closed until the valve is manually reset. If there are any inlet pressure variances or vibrations subjected to the second stage components, they are not transmitted to the first stage trip mechanism. This unique double-stage trip mechanism virtually eliminates nuisance tripping commonly found in other shutoff devices.

Manometric Sensing Device (BMS1 or BMS2) (See Figure 3)

Pressure from the system is sensed through control lines into the manometric sensing devices (BMS1, BMS2, or BMS1 and BMS2). Depending on the configuration, the BMS1 and BMS2 will transmit these pressure fluctuations to the mechanism box. If these fluctuations reach the setpoint of the manometric sensing device, the device will activate the tripping mechanism in the mechanism box (BM1 or BM2) and cause the valve to slam-shut.

The BM1 can be configured with only the BMS1 to trip on high pressure (OPSO), low pressure (UPSO), or high and low (OUPSPO). The BM2 can be configured with the BMS1 to trip on high pressure only (OPSO) and the BMS2 to trip on high pressure (OPSO), low pressure (UPSO) and high/low pressure (OUPSO) (refer to application Table 2).

Principle of Operation

The Type OSE slam-shut valve serves to provide overpressure and/or underpressure protection by shutting down the flow to the downstream system. The slam-shut valve with external registration requires a sensing line. The slam-shut valve is installed upstream of a pressure reducing regulator as shown in Figure 4.

Pressure is registered on one side of the diaphragm, piston, or bellows and is opposed by the setpoint control spring of the manometric sensing device. The Type OSE slam-shut valve tripping pressure is determined by the setting of the control spring.

Overpressure: when the downstream pressure increases past the setpoint, the pressure on top of the diaphragm overcomes the spring setting and moves the manometric device stem.

Underpressure: when the downstream pressure decreases below the setpoint, the control spring pressure below the diaphragm overcomes the downstream pressure and pushes the diaphragm which moves the manometric device stem.

When the pressure of the downstream line increases above set pressure (or drops below the set pressure) the manometric device senses the pressure change and triggers the detection stage which activates the second stage releasing the slam-shut valve plug. A tight and total shutoff is ensured by the plug seal O-ring closing on the seat ring and is helped by the “dash pot” effect between the bonnet skirt and the valve plug. A “dash pot” effect occurs when the valve plug closes by having both the closing spring and the inlet pressure pushing on top of the valve plug. This is accomplished by ports around the skirt of the bonnet allowing inlet pressure above the valve plug.

Resetting the Trip Mechanism

Resetting of the Type OSE slam-shut valve is done manually. After the Type OSE has closed, it must be manually reset before it can be placed back in service. Before resetting the Type OSE, check for and correct the reason for the overpressure/underpressure condition.

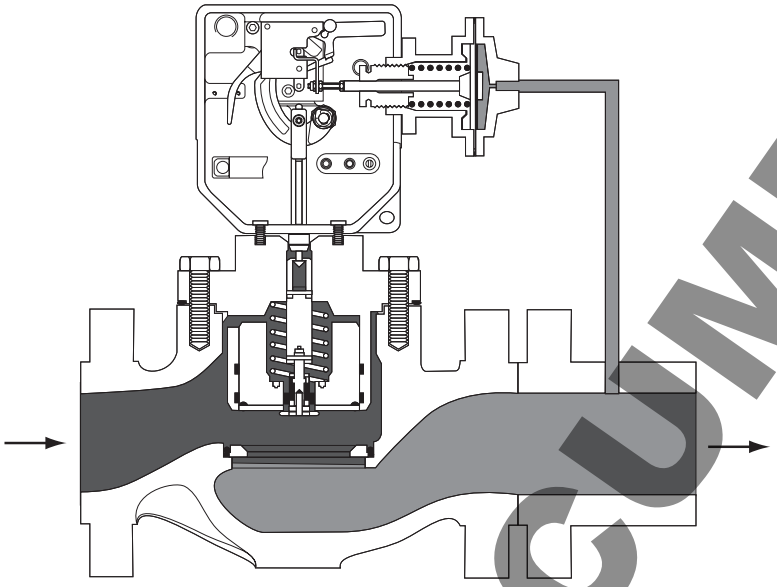


Figure 2. *Type OSE Operational Schematic*

Table 2. *Applications and Construction Guide (See Figure 3)*

APPLICATION	MECHANISM BOX REQUIRED		MANOMETRIC SENSING DEVICE REQUIRED	
	BM1	BM2	BMS1	BMS2
Overpressure Shutoff (OPSO)	Yes	No	Yes	No
Underpressure Shutoff (UPSO)	Yes	No	Yes	No
Overpressure Shutoff (OPSO) and Underpressure Shutoff (UPSO)	Yes	No	Yes(1)	No
Overpressure Shutoff (OPSO) and Underpressure Shutoff (UPSO)	No	Yes	Yes(2)	Yes
Overpressure Shutoff (OPSO), Overpressure Shutoff (OPSO) and Underpressure Shutoff (UPSO)	No	Yes	Yes(2)	Yes(1)

1. When using one BMS1 or BMS2 for both overpressure and underpressure shutoff, make sure that the difference between set pressures falls below the maximum range shown in Table 3.
2. When using a BMS1 and a BMS2, the BMS1 can only be used for high trip.

To reset the Type OSE, close the upstream and/or downstream block valves. Open the front cover of the mechanism box. In the top center location of the box, there is a reset pin with a white dot. Push this pin up and to the right. This action will lock in stage one. To reset the second stage use the square reset tool located in the lower left corner of the mechanism box. Place the square end of the tool on the square shaft in the center of the box and slowly rotate clockwise. When movement is started on the stem, the internal bypass will open and equalize the pressure on each side of the valve plug before the valve plug can be moved off the seat. Continue turning the reset tool, this will raise the valve plug, compress the closing spring, and latch the second stage mechanism. Replace the reset tool on its holder and replace the cover.

Installation

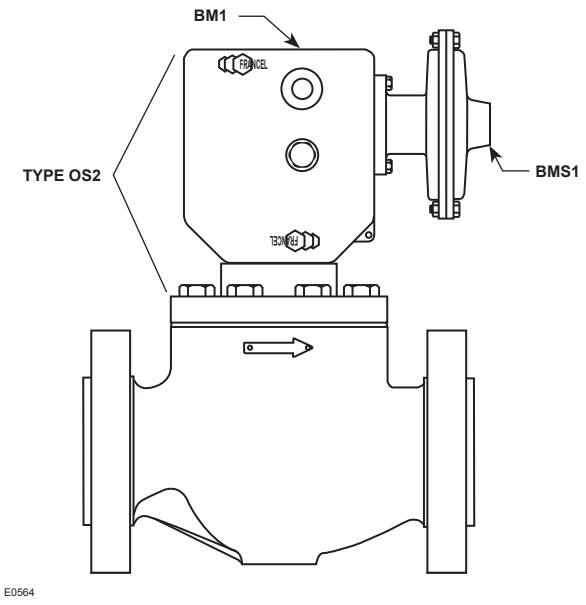
The Type OSE should be installed in a horizontal position only, with the flow going down through the seat ring (flow arrow on body) with the mechanism box above the body. See Figure 6 for typical piping installation.

The Type OSE can be used along with a token relief valve to minimize unnecessary shutoff. The relief valve is set to open before the Type OSE slam-shut valve activates. This arrangement allows the relief valve to handle minor overpressure problems such as gas thermal expansion or seat leakage due to dirt moving through the system which may move out of the regulator during the next operating cycle. The slam-shut valve will activate if the regulator has a major malfunction with excessive gas flow that exceeds the token relief capacity.

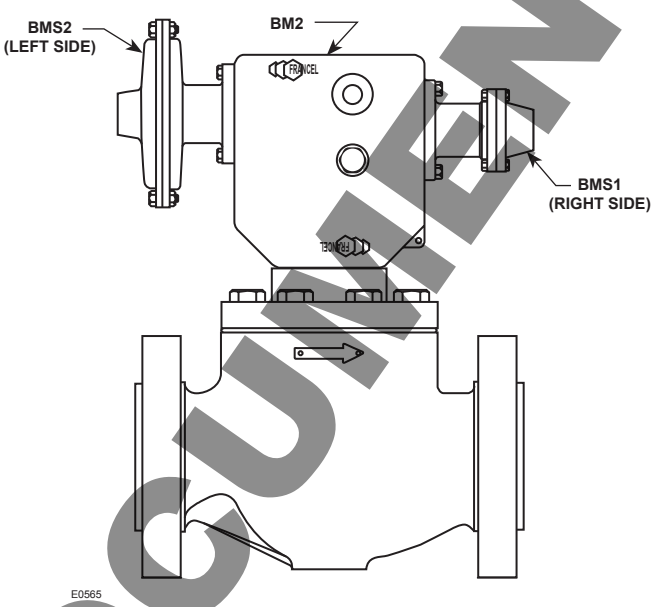
For gases of other specific gravities, multiply the given capacity by 0.775, and divide by the square root of the appropriate specific gravity. If the capacity is desired in normal cubic meters per hour (Nm^3/h) at 0°C and 1,01325 bar, multiply SCFH by 0.0268.

Capacity Information

Flows are in thousands of SCFH at 60°F and 14.7 psia and in thousands of Nm^3/h at 0°C and 1,01325 bar of 0.6 specific gravity natural gas.



MECHANISM BOX (BM1) WITH 1 MANOMETRIC SENSING DEVICE (BMS1)



MECHANISM BOX (BM2) WITH 2 MANOMETRIC SENSING DEVICES (BMS1 AND BMS2)

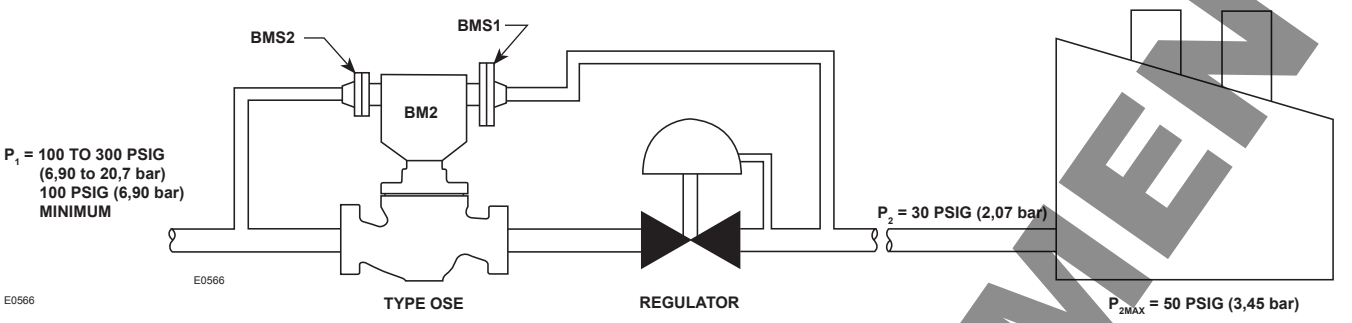
TOP-MOUNTED (STAND-ALONE TYPE OSE VALVE)

Figure 3. *Types of Installation (Mounting on Horizontal Pipeline Only)*

Table 3. *Spring Ranges, Part Numbers, and Maximum and Minimum Pressures for BMS1 and BMS2*

SPRING RANGE, PSIG (bar)	SPRING COLOR	SPRING PART NUMBER	MAXIMUM SENSING INLET PRESSURE, PSIG (bar)	MANOMETRIC SENSING DEVICE TYPE	MANOMETRIC SENSING DEVICE STYLE	SETPOINT TOLERANCE, PSIG (bar)[1]	MAXIMUM DIFFERENCE BETWEEN OVERPRESSURE AND UNDERPRESSURE[2], PSIG (bar)
4.02 to 14.1-inches w.c. (10 to 35 mbar)	Purple	T14232T0012	75 (5,17)	162	Diaphragm	0.058 (0,004)	0.145 (0,010)
9.97 to 33.2-inches w.c. (25 to 83 mbar)	Orange	T14233T0012				0.073 (0,005)	0.363 (0,025)
18-inches w.c. to 2.0 psig (45 mbar to 0,14 bar)	Red	T14234T0012				0.145 (0,010)	0.725 (0,050)
1.0 to 3.5 (0,07 to 0,24)	Yellow	T14235T0012				0.203 (0,014)	0.870 (0,060)
1.7 to 5.6 (0,12 to 0,39)	Green	T14236T0012				0.261 (0,018)	2.18 (0,150)
2 to 11 (0,14 to 0,76)	Gray	T14238T0012				0.725 (0,050)	5.08 (0,350)
4 to 19 (0,28 to 1,31)	Brown	T14239T0012				1.16 (0,080)	8.70 (0,600)
7 to 33 (0,48 to 2,28)	Black	T14240T0012				2.47 (0,170)	16.0 (1,10)
15 to 75 (1,03 to 5,17)	Blue	T14237T0012	235 (16,2)	71		5.08 (0,350)	36.3 (2,50)
31 to 161 (2,14 to 11,1)	Brown	T14239T0012				10.2 (0,703)	79.8 (5,50)
59 to 235 (4,07 to 16,2)	Black	T14240T0012				23.2 (1,60)	145 (10,0)
235 to 323 (16,2 to 22,3)	Brown	T14239T0012	1470 (101)	27	Piston	43.5 (3,00)	Requires use of a BMS1 and a BMS2
323 to 588 (22,3 to 40,5)	Black	T14240T0012				94.3 (6,50)	
588 to 808 (40,5 to 55,7)	Brown	T14239T0012	1470 (101)	17		102 (7,03)	
808 to 1470 (55,7 to 101)	Black	T14240T0012				174 (12,0)	
81 to 323 (5,59 to 22,3)	Brown	T14239T0012	514 (35,4)	236	Bellows	14.5 (1,00)	145 (10,0)
122 to 514 (8,41 to 35,4)	Black	T14240T0012				36.3 (2,50)	290 (20,0)
257 to 1058 (17,7 to 72,9)	Gray	T14238T0012	1058 (72,9)	315		72.5 (5,00)	479 (33,0)

1. Minimum suggested difference between slam-shut set pressure and normal operating pressure of the system.
2. Maximum difference between overpressure and underpressure when using one manometric device (BMS1) with tripping hook. For underpressure and overpressure points greater than this maximum number, use a second manometric device (BMS2) for underpressure protection.



LINE SIZE = 3-INCH (DN 80)
REGULATOR SIZE = 2-INCH (DN 50)
Q_{MAX} = 65 000 SCFH (1742 Nm³/h)

Figure 4. *Type OSE Sizing Example*

Table 4. *Capacities*

INLET PRESSURE, PSIG (bar)	PRESSURE DROP, PSIG (bar)	CAPACITIES IN THOUSANDS OF SCFH (Nm³/h) OF 0.6 SPECIFIC GRAVITY NATURAL GAS						
		1-Inch (DN 25)	2-Inch (DN 50)	3-Inch (DN 80)	4-Inch (DN 100)	6-Inch (DN 150)	8-Inch (DN 200)	10-Inch (DN 250)
10 (0,69)	5 (0,34)	11.1 (0,30)	46.6 (1,25)	103 (2,76)	173 (4,64)	344 (9,22)	644 (17)	923 (25)
50 (3,45)		19.2 (0,52)	80.4 (2,15)	178 (4,77)	325 (8,71)	597 (16,0)	1111 (30)	1587 (43)
100 (6,90)		26.0 (0,70)	109 (2,92)	240 (6,43)	441 (11,8)	810 (21,7)	1504 (41)	2147 (58)
200 (13,8)		36.0 (0,97)	150 (4,02)	332 (8,90)	611 (16,4)	1121 (30,0)	2079 (56)	2966 (80)
300 (20,7)		43.7 (1,17)	182 (4,88)	404 (10,8)	743 (19,9)	1365 (36,6)	2526 (68)	3603 (97)
400 (27,6)		50.3 (1,35)	210 (5,63)	465 (12,5)	855 (22,9)	1567 (42,0)	2905 (79)	4144 (112)
500 (34,5)		56.1 (1,50)	234 (6,27)	518 (13,9)	954 (25,6)	1748 (46,8)	3240 (88)	4621 (125)
600 (41,4)		61.3 (1,64)	256 (6,86)	567 (15,2)	1040 (27,9)	1912 (51,2)	3544 (96)	5054 (137)
800 (55,2)		70.7 (1,89)	295 (7,91)	654 (17,5)	1203 (32,2)	2204 (59,1)	4084 (110)	5824 (157)
1000 (69,0)		78.9 (2,11)	330 (8,84)	730 (19,6)	1343 (36,0)	2462 (66,0)	4560 (123)	6503 (176)
50 (3,45)	20 (1,38)	34.2 (0,92)	143 (3,83)	329 (8,82)	565 (15,1)	1047 (28,1)	1937 (52)	2834 (77)
100 (6,90)		48.8 (1,31)	204 (5,47)	473 (12,7)	817 (21,9)	1506 (40,4)	2756 (74)	4032 (109)
200 (13,8)		69.5 (1,86)	290 (7,77)	678 (18,2)	1173 (31,4)	2157 (57,8)	3922 (106)	5737 (155)
300 (20,7)		85.4 (2,29)	357 (9,57)	835 (22,4)	1446 (38,8)	2655 (71,2)	4815 (130)	7045 (190)
400 (27,6)		98.8 (2,65)	413 (11,1)	966 (25,9)	1675 (44,9)	3074 (82,4)	5568 (150)	8146 (220)
600 (41,4)		121 (3,24)	506 (13,6)	1187 (31,8)	2058 (55,2)	3775 (101)	6830 (185)	9992 (270)
800 (55,2)		140 (3,75)	585 (15,7)	1372 (36,8)	2380 (63,8)	4365 (117)	7892 (213)	11547 (312)
1000 (69,0)		156 (4,18)	655 (17,6)	1536 (41,2)	2664 (71,4)	4884 (131)	8828 (239)	12916 (349)

To determine equivalent capacities for air, propane, butane, or nitrogen, multiply the capacity by the following appropriate conversion factor: 0.775 for air, 0.628 for propane, 0.548 for butane, or 0.789 for nitrogen. For gases of other specific gravities, multiply the given capacity by 0.775, and divide by the square root of the appropriate specific gravity.

Sizing Example

In this example (see Figure 4) natural gas is being supplied to a single factory. The normal pressure supplied to the factory is 30 psig (2,07 bar), and maximum inlet pressure to the equipment in the factory is 50 psig (3,45 bar). A Type OSE slam-shut valve will be used to protect the equipment in case of an overpressure incident. The slam-shut valve will also be used to shutoff flow on underpressure in case the transmission line falls to 100 psig (6,90 bar) inlet pressure, (thus preventing further loss of transmission line pressure and possible loss of all line pressure). The regulator has been sized with the assumption that 5 psig (0,34 bar) will be the maximum pressure drop across the slam-shut valve.

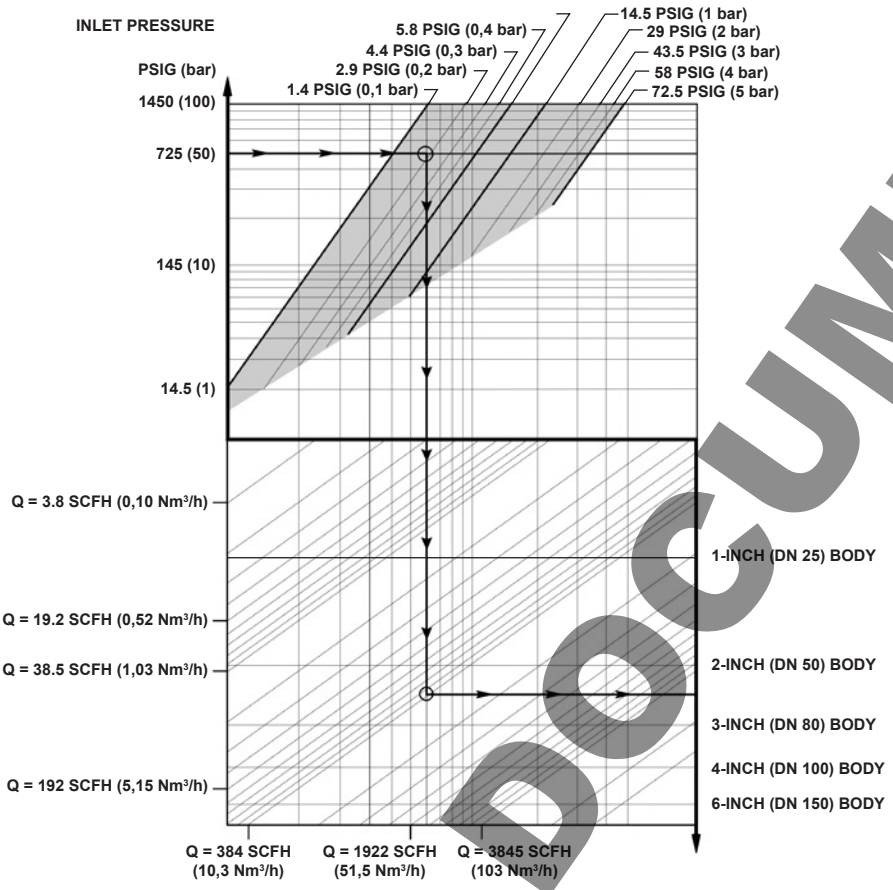
1. Gather necessary data:

   Conditions:

   P_{1max} = 300 psig (20,7 bar)
   P_{1min} = 100 psig (6,90 bar)
   $P_{2reg\ set}$ = 30 psig (2,07 bar)
   P_{2max} = 50 psig (3,45 bar)
   $\Delta P_{slam\text{-}shut}$ = 5 psig (0,34 bar)
   End connections: CL300 RF flanged
   Natural Gas
   SG = 0.6
   Q_{max} = 65 000 SCFH (1742 Nm³/h)

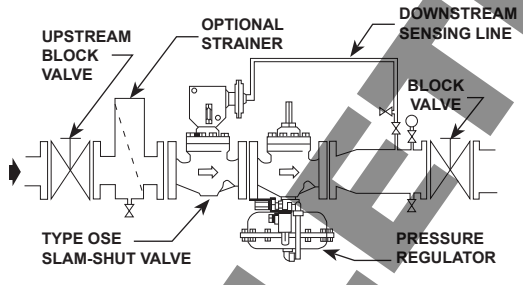
2. Determine appropriate body size of Type OSE:

   Using the maximum flow of 65 000 SCFH (1742 Nm³/h), and an allowable pressure drop of 5 psig (0,34 bar), Table 4 shows that the 2-inch (DN 50) Type OSE can pass a flow of 109 000 SCFH (2921 Nm³/h).

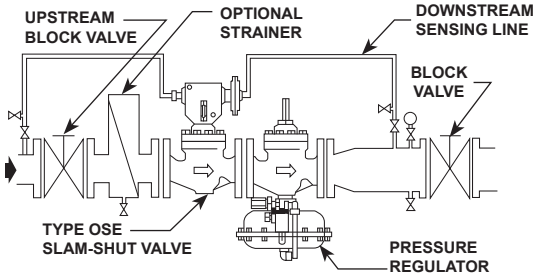


FLOW CAPACITIES IN THOUSANDS OF SCFH (Nm³/h) OF 0.6 SPECIFIC GRAVITY NATURAL GAS

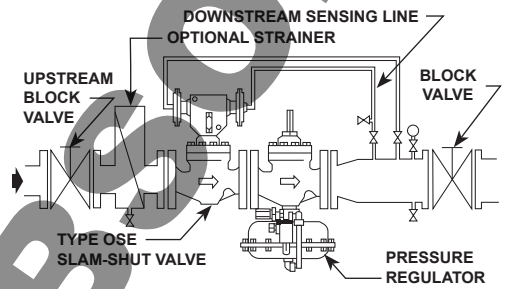
Figure 5. *Sizing Example*



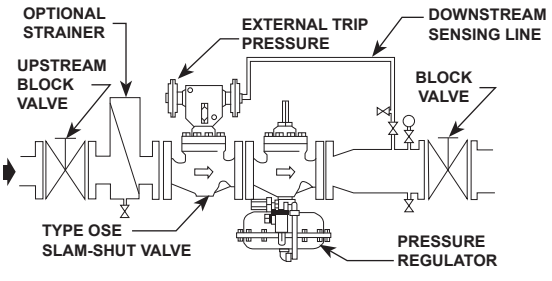
OVERPRESSURE AND UNDERPRESSURE SHUTOFF USING ONE MANOMETRIC DEVICE



MINIMUM/MAXIMUM UPSTREAM AND DOWNSTREAM PRESSURE

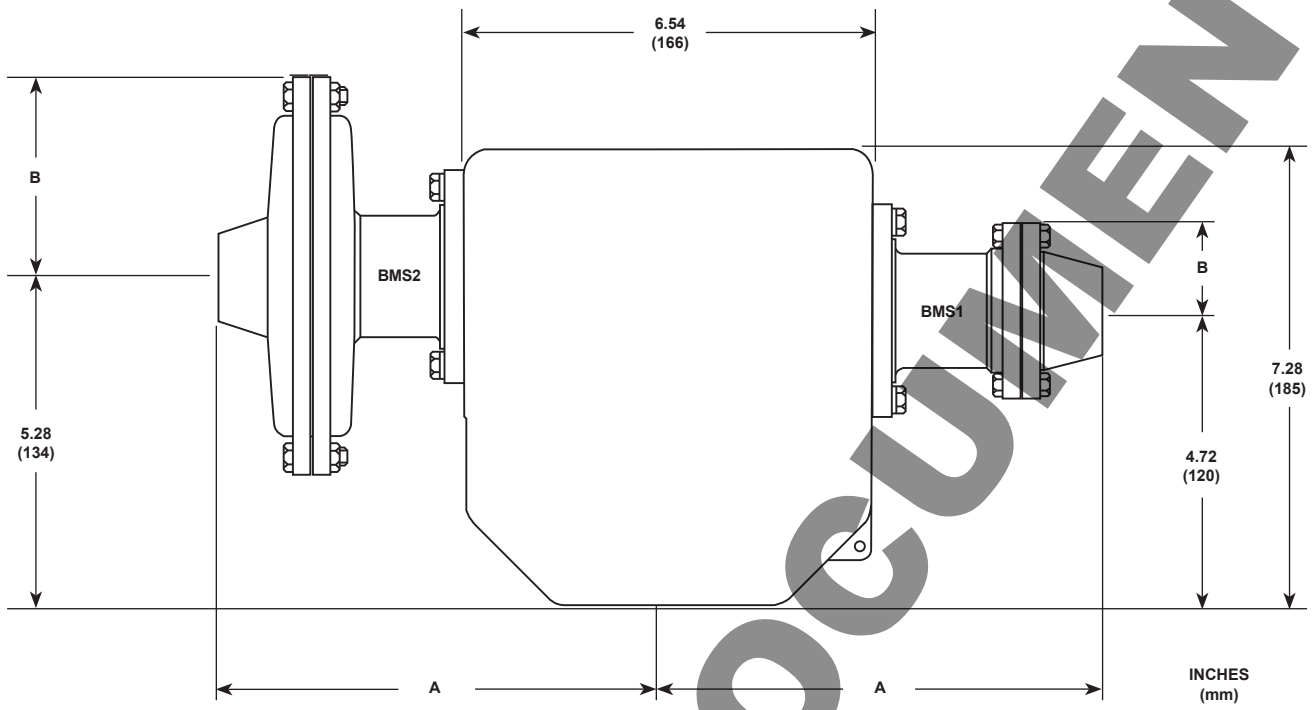


OVERPRESSURE AND UNDERPRESSURE SHUTOFF USING TWO MANOMETRIC DEVICES



EXTERNAL SIGNAL

Figure 6. *Typical Installations*



		TYPE	DIMENSIONS, INCHES (mm)		WEIGHT, POUNDS (kg)
			A	B	
Mechanism Box (BM)	BM1	for 1 BMS	----		5.51 (2,50)
	BM2	for 2 BMS			5.51 (2,50)
Manometric Device (BMS)	162	Diaphragm	7.13 (181)	3.27 (83,1)	5.73 (2,60)
	71		6.89 (175)	1.42 (36,1)	2.65 (1,20)
	27 or 17	Piston	8.03 (204)	1.42 (36,1)	5.07 (2,30)
	236	Bellows	7.95 (202)	1.42 (36,1)	5.29 (2,40)
	315		8.78 (223)	1.42 (36,1)	6.17 (2,80)

Figure 7. *Type OSE Dimensions*

3. Select appropriate manometric device:

   Table 3 lists the different selections for the manometric sensing device (BMS1 or BMS2). For the overpressure protection setting of 50 psig (3,45 bar), choose a Type 071 manometric device with a 15 to 75 psig (1,03 to 5,17 bar) spring. This spring is chosen because it has less setpoint drift than the 30 to 160 psig (2,07 to 11,0 bar) spring.

   For the underpressure protection of the transmission line, a separate manometric device must be used. A Type 236 manometric device can be used with a 81 to 323 psig (5,59 to 22,3 bar) spring setting for underpressure protection.

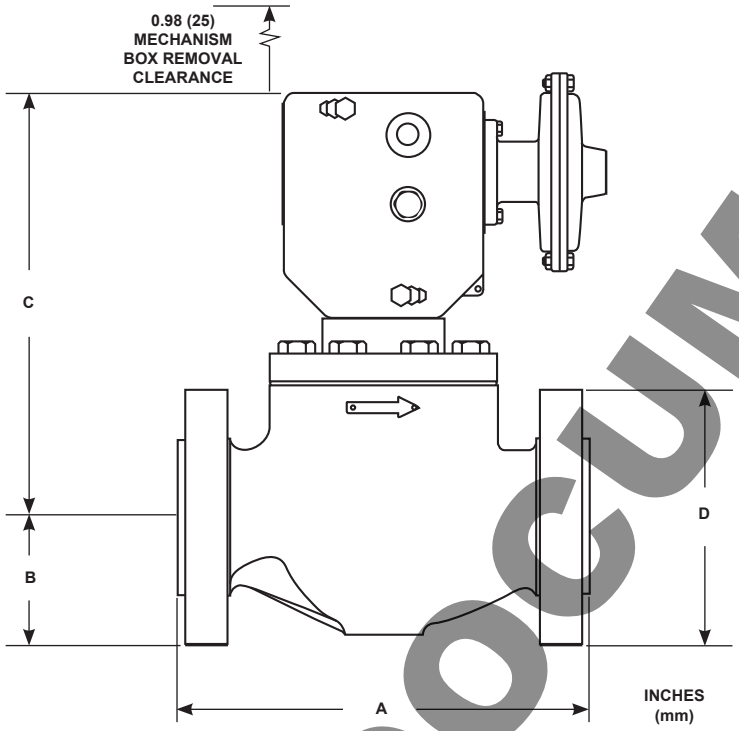
4. Check the pressure ratings:

   Because of the flange limitations Type OSE with CL300 RF flanged end connections has a maximum pressure rating of 750 psig (51,7 bar), which will safely handle the 300 psig (20,7 bar) maximum inlet pressure. The Type 071 manometric device will hold pressure up to 235 psig (16,2 bar) (see Table 3). The slam-shut valve will shut the pressure off at 50 psig (3,45 bar), preventing an overpressure of the Type 071 and the downstream equipment. The Type 236 for underpressure protection could see the full inlet pressure of 300 psig (20,7 bar). Table 3 shows that the maximum pressure rating for the Type 236 is 514 psig (35,4 bar), so it will safely handle the maximum inlet pressure.

Sizing Example Using Figure 5

The illustration in Figure 5 is an alternative way to size the Type OSE slam-shut valve. The following steps can be taken to determine the proper size valve for a given set of conditions. The arrows shown in Figure 5 follow the parenthesis example given in each step.

1. Find the minimum inlet pressure for the application on the upper portion of the graph (ie: 725 psig (50,0 bar)).

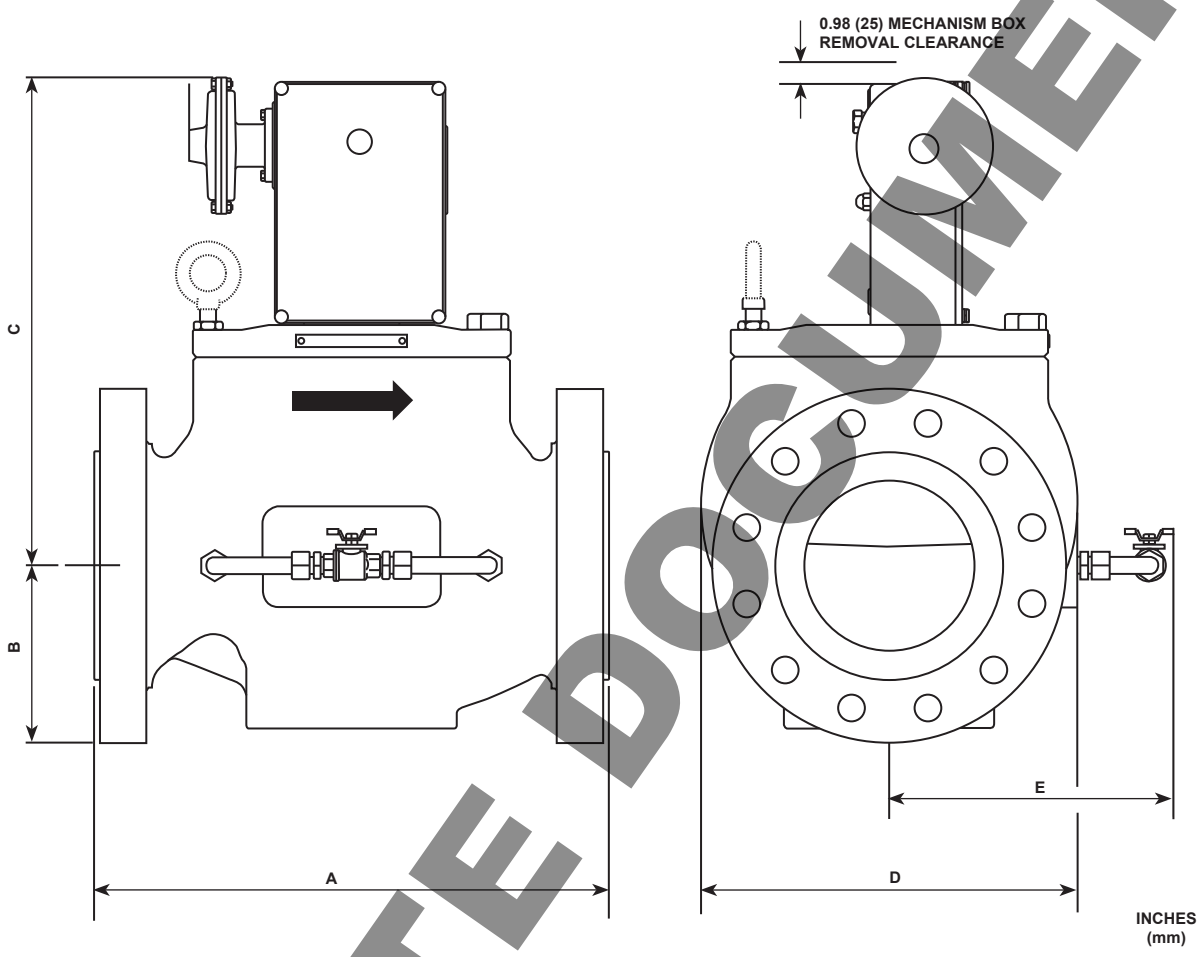


BODY SIZE, INCHES (DN)	DIMENSIONS, INCHES (mm)					
	A					
	NPT	CL125 FF	CL150 RF	CL250 RF	CL300 RF	CL600 RF
1 (25)	8.25 (209)	7.25 (184)	7.25 (184)	7.75 (197)	7.75 (197)	8.3 (211)
2 (50)	11.3 (287)	10.0 (254)	10.0 (254)	10.5 (267)	10.5 (267)	11.3 (287)
3 (80)	- - - -	11.8 (300)	11.8 (300)	12.5 (317)	12.5 (317)	13.3 (338)
4 (100)	- - - -	13.9 (353)	13.9 (353)	14.5 (368)	14.5 (368)	15.5 (394)
6 (150)	- - - -	17.8 (452)	17.8 (452)	18.6 (472)	18.6 (472)	20.0 (508)

BODY SIZE, INCHES (DN)	DIMENSIONS, INCHES (mm)					APPROXIMATE WEIGHT, POUNDS (kg)
	B		C	D		
	CL150 RF	CL300 RF or CL600 RF	CL150 RF, CL300 RF, or CL600 RF	CL150 RF	CL300 RF or CL600 RF	
1 (25)	2.2 (55,9)	2.5 (63,5)	12.6 (320)	4.6 (117)	4.9 (124)	36.0 (16,3)
2 (50)	3.0 (76,2)	3.3 (83,8)	13.2 (335)	6.0 (152)	6.5 (165)	70.0 (31,8)
3 (80)	3.7 (94,0)	4.1 (104)	14.2 (361)	7.5 (190)	8.3 (211)	121 (54,9)
4 (100)	4.5 (114)	5.0 (127)	16.0 (406)	9.0 (229)	10.0 (254)	216 (98,0)
6 (150)	5.5 (140)	6.6 (168)	16.2 (411)	14.0 (356)	14.0 (356)	445 (202)

Figure 7. *Type OSE Dimensions (continued)*

2. Move across to the maximum differential that can be tolerated across the valve for the given application (2.9 psig (0,20 bar)).
3. Trace down vertically to the diagonal line which shows the maximum flow required for the given application (384 000 SCFH (10,291 Nm^3/h)).
4. Move straight across to the right, and the closest body size below the last point is the smallest body size for the given application (3-inch (DN 80) body size).
5. Check pressure and temperature ratings of the slam-shut valve, and select the appropriate manometric devices and options.



BODY SIZE INCHES, (DN)	DIMENSIONS, INCHES (mm)					
	A			B		
	CL150 RF	CL300 RF	CL600 RF	CL150 RF	CL300 RF	CL600 RF
8 (200)	21.4 (543)	22.4 (569)	24.0 (610)	6.8 (173)	7.5 (190)	8.2 (208)
10 (250)	26.5 (673)	27.9 (709)	29.6 (752)	8.0 (203)	8.7 (221)	10.0 (254)

BODY SIZE INCHES, (DN)	DIMENSIONS, INCHES (mm)			
	C	D	E	APPROXIMATE WEIGHT, POUNDS (kg)
	CL150 RF, CL300 RF, or CL600 RF	CL150 RF, CL300 RF, or CL600 RF	CL150 RF, CL300 RF, or CL600 RF	
8 (200)	22.8 (579)	17.6 (447)	13.2 (335)	785 (356)
10 (250)	26.3 (668)	19.6 (498)	14.3 (363)	1272 (577)

Figure 7. *Type OSE Dimensions (continued)*

Ordering Guide

Body Size (Select One)

- ☐ 1-inch (DN 25)***
- ☐ 2-inch (DN 50)***
- ☐ 3-inch (DN 80)***
- ☐ 4-inch (DN 100)***
- ☐ 6-inch (DN 150)***
- ☐ 8-inch (DN 200) (WCC Steel Only)**
- ☐ 10-inch (DN 250) (WCC Steel Only)**

Body Material and End Connection Style (Select One)

Cast Iron Body

- ☐ NPT (1 and 2-inch only)***
- ☐ CL125 FF (1 to 6-inch (DN 25 to 150) only)**
- ☐ CL250 RF (1 to 6-inch (DN 25 to 150) only)**

WCC Steel Body

- ☐ NPT (1 and 2-inch only)***
- ☐ CL150 RF***
- ☐ CL300 RF**
- ☐ CL600 RF**
- ☐ PN 16/40**

Slam-Shut Trip Pressure Setting (Select One)

Overpressure Protection Only

- ☐ Supply setpoint required _____

Underpressure Protection Only

- ☐ Supply setpoint required _____

Overpressure Protection and Underpressure Protection

- ☐ Supply overpressure setpoint required _____
- ☐ Supply underpressure setpoint required _____

Overpressure Protection, Overpressure Protection and Underpressure Protection

- ☐ Supply overpressure setpoint required _____
- ☐ Supply overpressure setpoint required _____
- ☐ Supply underpressure setpoint required _____

Explosion-Proof Limit Switch (Optional)

- ☐ Yes**

Regulators Quick Order Guide	
* * *	Standard - Readily Available for Shipment
* *	Non-Standard - Allow Additional Time for Shipment
*	Special Order, Constructed from Non-Stocked Parts. Consult your local Sales Office for Availability.
Availability of the product being ordered is determined by the component with the longest shipping time for the requested construction.	

Specification Worksheet

Application:

Specific Use _____

Line Size _____

Gas Type and Specific Gravity _____

Gas Temperature _____

Relief Valve Size:

Brand of upstream regulator? _____

Orifice size of the upstream regulator? _____

Wide-open coefficient of the upstream regulator? _____

Pressure:

Maximum Inlet Pressure (P_{1max}) _____

Minimum Inlet Pressure (P_{1min}) _____

Downstream Pressure Setting(s) (P_2) _____

Maximum Flow (Q_{max}) _____

Performance Required:

Accuracy Requirements? _____

Need for Extremely Fast Response? _____

Other Requirements: _____

Industrial Regulators
Regulator Division
Emerson Process Management

USA - Headquarters
McKinney, Texas 75070 USA
Tel: 1-800-558-5853
Outside U.S. 1-972-548-3574

Asia-Pacific
Shanghai, China 201206
Tel: +86 21 2892 9000

Europe
Bologna, Italy 40013
Tel: +39 051 4190611

Natural Gas Technologies
Regulator Division
Emerson Process Management

USA - Headquarters
McKinney, Texas 75070
Tel: 1-800-558-5853
Outside U.S. 1-972-548-3574

Asia-Pacific
Singapore, Singapore 128461
Tel: +65 6777 8211

Europe
Bologna, Italy 40013
Tel: +39 051 4190611
Gallardon, France 28320
Tel: +33 (0)2 37 33 47 00

TESCOM
Regulator Division
Emerson Process Management

USA - Headquarters
Elk River, Minnesota 55330 USA
Tel: 1-763-241-3238

Europe
Selmsdorf, Germany 23923
Tel: +49 (0) 38823 31 0

For further information visit www.emersonprocess.com/regulators