

# RS Series

## Pressure Regulator Manual

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### **WARNING**

Failure to follow these instructions or to properly install and maintain this equipment could result in an explosion, fire and/or chemical contamination causing property damage and personal injury or death.

Jeon regulators must be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and Emerson Process Management Regulator Technologies, Inc. instructions.

If the regulator vents gas or a leak develops in the system, service to the unit may be required. Failure to correct trouble could result in a hazardous condition.

Installation, operation and maintenance procedures performed by unqualified personnel may result in improper adjustment and unsafe operation. Either condition may result in equipment damage or personal injury. Call qualified personnel when installing, operating and maintaining the RS Series regulator.

# RS Series Pressure Regulator

## 1. Introduction

RS Series pressure regulator is a direct-operated regulator which is highly accurate device for natural gas distribution networks, with two-stage pressure reduction, inlet filter, relief and shut-off capabilities. It provides an accurate, safe and long lasting pressure regulating solution for residential and commercial installations. The integral slam-shut device provides overpressure protection and an option of underpressure protection.

## 2. Features and Benefits

- Two-stage Regulation
- High Accuracy
- Internal Relief Valve
- Slam-shut Valve
- Inlet Filter
- Flow Capacity up to 100 SCMH / 3500 SCFH

## 3. Specifications

<b>Inlet Pressure Range<sup>(1)</sup>:</b>	0.2 to 5.00 bar / 2.9 to 72.25 psig
<b>Outlet Pressure Range<sup>(1)</sup>:</b>	15 to 300 mbar / 0.22 to 4.35 psig (in 6 distinct spring ranges)
<b>Overpressure Protection Set Range:</b>	25 to 400 mbar / 0.36 to 5.8 psig
<b>Underpressure Protection Set Range:</b>	5 to 240 mbar / 7.25 to 3.48 psig
<b>Regulating Accuracy :</b>	Up to AC 5
<b>Lockup Accuracy:</b>	Up to SG 10
<b>Temperature Capability<sup>(1)</sup>:</b>	-10 to 60°C / 14 to 140°F
<b>Body Size and End Connection:</b>	See Table 1
<b>Flow Capacity:</b>	See Table 2
<b>Construction Materials</b>	
<b>Body and Cover:</b>	Cast aluminum
<b>Diaphragm:</b>	Nitrile (NBR)
<b>Other Internal Parts:</b>	Stainless steel and brass

**Table 1. RS Series Body Size and End Connection**

TYPE	INLET CONNECTION STYLE AND SIZE <sup>(2)</sup>	OUTLET CONNECTION STYLE AND SIZE <sup>(2)</sup>
RS25 or RS40	1-inch NPT	1-inch NPT
	1-inch BSPT	1-inch BSPT
	1-inch ISO7-1	1-inch ISO7-1
RS50, RS80 or RS100	1-inch NPT	1-1/2-inch NPT
	1-inch BSPT	1-1/2-inch BSPT
	1-inch ISO7-1	1-1/2-inch ISO7-1

**Table 2. Flow Capacity for Set Pressure of 30 mbar / 0.44 psig, SCMH / SCFH**

TYPE	INLET PRESSURE, bar / psig													
	0.2 / 2.90		0.5 / 7.25		1 / 14.5		2 / 29.01		3 / 43.51		4 / 58.02		5 / 72.52	
	SCMH	SCFH	SCMH	SCFH	SCMH	SCFH	SCMH	SCFH	SCMH	SCFH	SCMH	SCFH	SCMH	SCFH
RS25	10	353	15	530	27	953	30	1059	30	1059	30	1059	30	1059
RS40	12	424	24	848	42	1483	45	1589	45	1589	45	1589	45	1589
RS50	14	495	28	989	52	1836	60	2119	60	2119	60	2119	60	2119
RS80	21	742	40	1413	80	2825	90	3178	90	3178	90	3178	90	3178
RS100	30	1060	55	1493	100	3533	120	4240	120	4240	120	4240	120	4240

Note: For other outlet setpoints, the actual capacity differences are very small.

1. The pressure/temperature limits in this Manual and any applicable standard or code limitation for valve should not be exceeded.

2. Other connection styles may be available as options. Please contact your local Sales Office or the factory for details.

NOTE: The inlet pipe diameter cannot be less than inlet connection size and outlet pipe diameter cannot be less than outlet connection size.

# RS Series Pressure Regulator

## 4. Principle of Operation

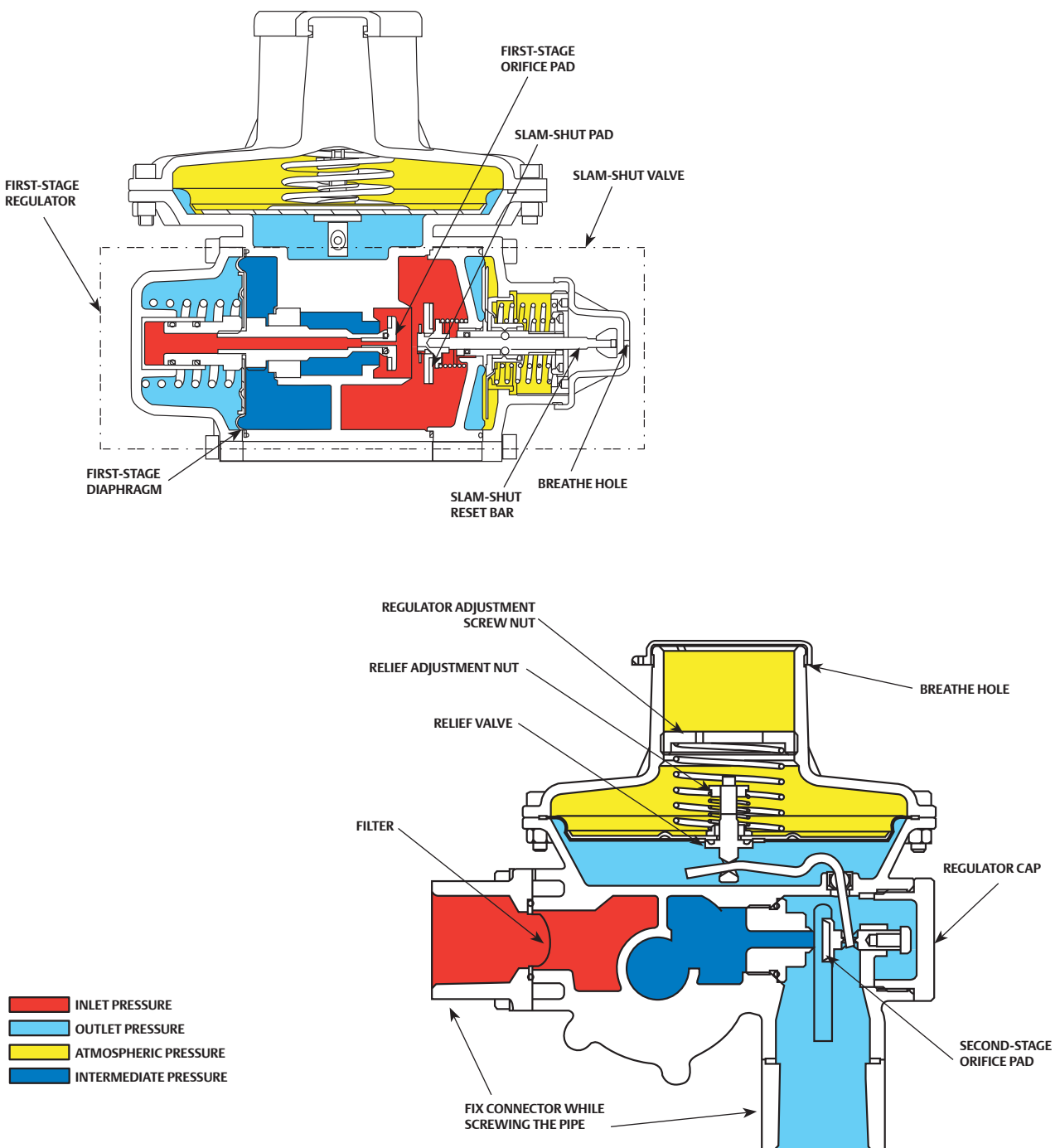
Regulator operational schematic (See Figure 1): After the gas flowed through the first-stage regulator, it will be reduced to intermediate pressure. After the intermediate pressure has stabilized, it will then pass through the second-stage regulator. The second-stage regulator will reduce the pressure to the final desired outlet pressure, P2 (setpoint).

When P2 exceeds the relief valve set pressure, the relief valve will open to release the excess pressure surge caused by temperature fluctuation or other factors. This is to prevent false shutoff or unintended trip by the slam-shut valve.

When P2 exceeds the slam-shut valve set pressure, the latching mechanism of the slam-shut valve is released. The slam-shut spring will accelerate the shut-off action to seal the slam-shut orifice with the pad tightly and instantaneously. This will cut off the gas flow in the regulator and prevent damages to downstream equipment.

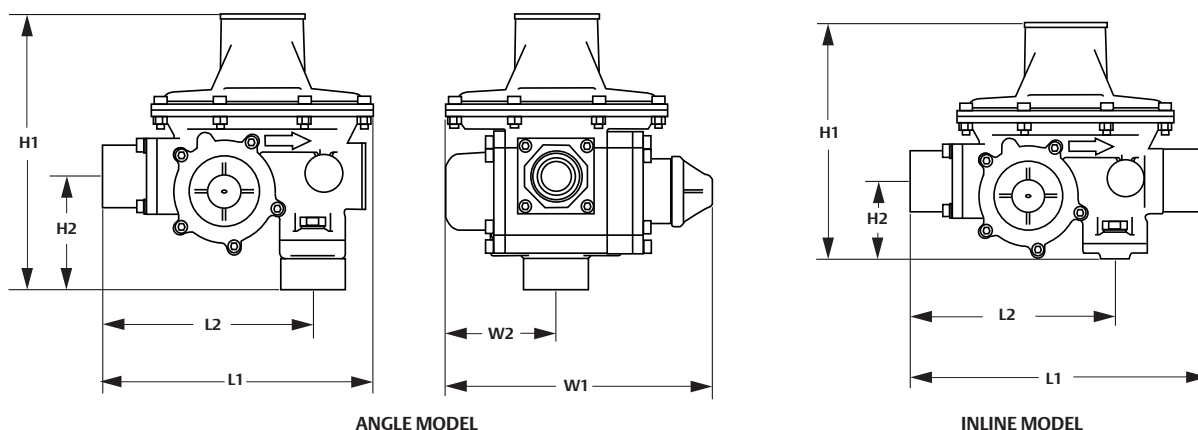
Upon correcting the cause of overpressure, reset the regulator by pulling and by latching the reset bar to allow normal operation again.

Figure 1. RS Series Operational Schematic



# RS Series Pressure Regulator

Figure 2. Dimensions



## 5. Dimensions and Weight

Table 3. RS Series Regulator Dimensions and Weight

TYPE		DIMENSIONS											WEIGHT		
		L1		L2		H1		H2		W1		W2		kg	Pound
		mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch	mm	Inch		
RS25 or RS40	Angle	176	6.9	137	5.4	180	7.1	74	2.9	174	6.9	72	2.8	2.5	5.5
	Inline	210	8.3			158	6.2	52	2.0						
RS50, RS80 or RS100	Angle	176	6.9			198	7.8	92	3.6						
	Inline	210	8.3			158	6.2	52	2.0						

## 6. Selection

Table 4. Regulator Spring Selection

TYPE	REGULATING SPRING RANGE		SPRING WIRE DIAMETER		PART NUMBER	COLOR
	mbar	psig	mm	Inch		
RS Series	15 to 33	0.22 to 0.48	2.50	0.10	JJJJ86CXT01	Galvanized
	30 to 60	0.44 to 0.87	2.50	0.10	JJJJ86CXT02	Yellow
	60 to 100	0.87 to 1.45	2.80	0.11	JJJJ86CXT03	Red
	90 to 150	1.31 to 2.18	3.00	0.12	JJJJ86CXT13	Black
	150 to 220	2.18 to 3.19	3.5	0.14	ERAA15524A0	Blue
	220 to 300	3.19 to 4.35	3.5	0.14	ERAA15525A0	White

Warning: Choose the spring with a spring range that corresponds to the required pressure setting. Failure to do so would cause damage to the regulator and slam-shut valve.

Table 5. Slam-Shut Spring Selection

TYPE	PAIR	SLAM-SHUT SPRING RANGE			SPRING WIRE DIAMETER		PART NUMBER	COLOR
		Slam-shut	mbar	psig	mm	Inch		
RS Series	A	OPSO	35 to 60	0.51 to 0.87	1.40	0.06	JJJJ86CXT18	White
		UPSO	5 to 15	0.07 to 0.22	1.00	0.04	JJJJ86CXT14	
	B	OPSO	50 to 90	0.73 to 1.31	1.50	0.06	JJJJ86CXT19	Green
		UPSO	8 to 30	0.12 to 0.44	1.00	0.04	JJJJ86CXT15	
	C	OPSO	90 to 220	1.31 to 3.19	1.60	0.06	JJJJ86CXT20	Blue
		UPSO	23 to 75	0.33 to 1.09	1.20	0.05	JJJJ86CXT16	
	D	OPSO	220 to 400	3.19 to 5.5	2.0	0.08	ERAA18813A0	Black
		UPSO	75 to 145	1.09 to 2.1	1.4	0.06	ERAA18755A0	
	E	OPSO	220 to 400	3.19 to 5.5	2.0	0.08	ERAA18813A0	Gray
		UPSO	145 to 240	2.1 to 3.48	1.6	0.06	ERAA18856A0	

Warning: Choose the spring with a spring range that corresponds to the required pressure setting. Failure to do so would cause damage to the regulator and slam-shut valve.  
Notes: The OPSO and UPSO springs must be selected by the pair (Pair A, B or C). Do not select individual springs from different pairs.

Table 6. Slam-Shut Spring Selection for Single OPSO

TYPE	SLAM-SHUT SPRING RANGE		SPRING WIRE DIAMETER		PART NUMBER	COLOR
	mbar	psig	mm	Inch		
RS Series	25 to 50	0.36 to 0.73	1.20	0.05	JJJJ86CXT06	Galvanized
	50 to 100	0.73 to 1.45	1.50	0.06	JJJJ86CXT07	Yellow
	100 to 150	1.45 to 2.18	2.00	0.08	JJJJ86CXT08	Red
	150 to 240	2.18 to 3.19	2.2	0.09	ERAA15381A0	Blue
	240 to 400	3.19 to 5.8	2.5	0.1	ERAA15382A0	White

Warning: Choose the spring with a spring range that corresponds to the required pressure setting. Failure to do so would cause damage to the regulator and slam-shut valve.

# RS Series Pressure Regulator

## ⚠ WARNING

Installation, operation and maintenance performed by non-qualified personnel may result in unsafe operation, equipment damage or personal injury. Call a qualified personnel when installing, operating and maintaining the unit.

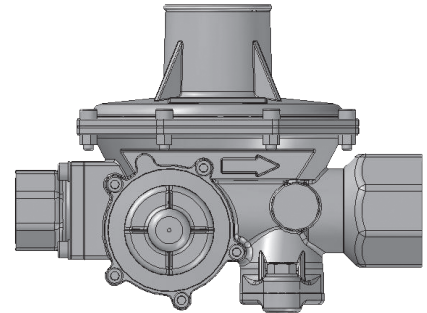
## 7. Installation

The regulator installation and usage must only be carried out by qualified and trained personnel. Otherwise, please contact the company. The company will not be responsible for any consequences due to non-standard operations/compliance of usage.

Note: Keep the covers closed while using. Do not block the Breathe Hole.

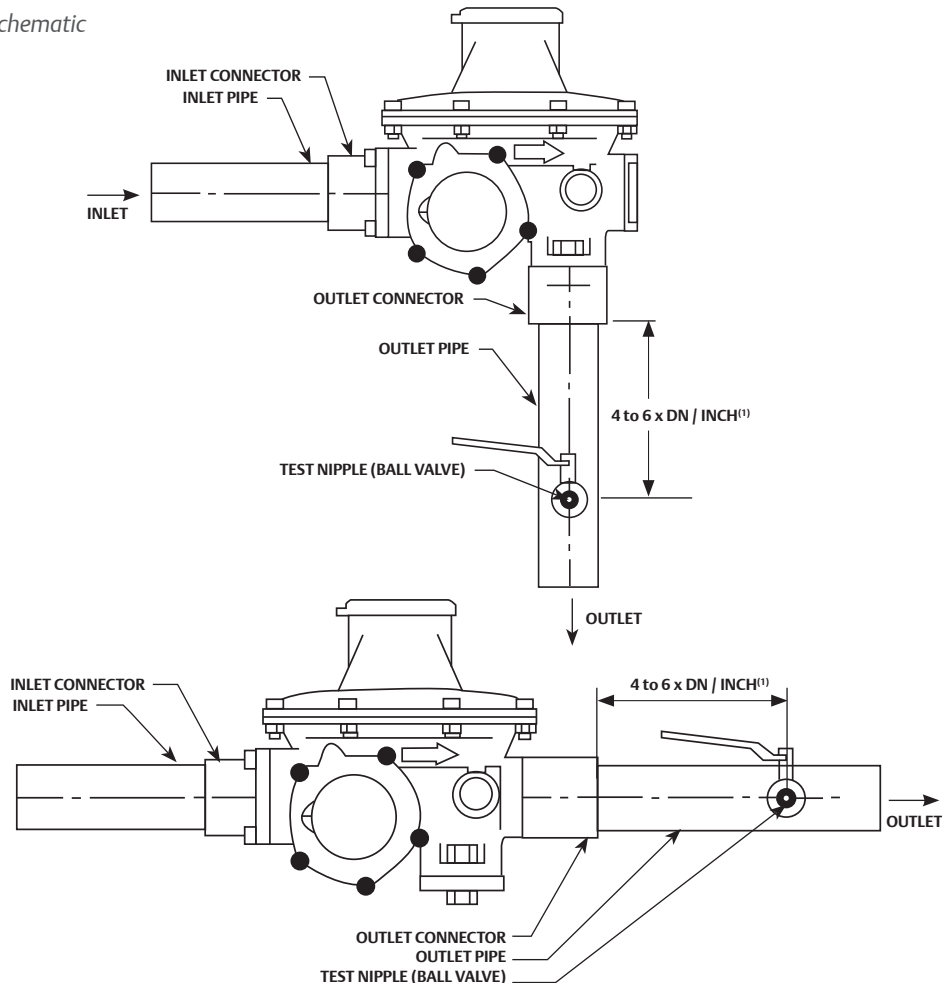
1. Install the regulator in ambient temperature, away from sources of fire and away from vibrations.
2. Check if the pressure in the pipeline is within the pressure range stated on the regulator nameplate.
3. Make sure that the flow direction of the pipeline matches the arrow stamped on the regulator body. See Figure 3.
4. Purge and clean the pipeline before installation.
5. Do not use exceedingly strong force while connecting the screw ends.
6. Fix the connector while screwing the pipe.
7. Place a suitable distance between the regulator and any quick alternating pressure equipment (e.g. burner or solenoid valve) to prevent any "false shutoff".

Figure 3. Arrow Cast Direction



Note: Remove the regulator when the pipeline is undergoing pressure test or purging to avoid damaging the regulator.

Figure 4. Installation Schematic



1. The Test Nipple should be located 4 to 6 nominal pipe diameters downstream of the regulator.

# RS Series Pressure Regulator

## 8. Usage

### 1. Commissioning Procedure

1. Ensure that the outlet valve is closed.
2. Slowly turn the handle counterclockwise to open the inlet valve partially.
3. Slowly pull the reset bar and hold on for a few seconds until it is latched on. Refer to Figure 5.
4. Fully open the inlet valve and slowly open the outlet valve until it is in wide-open position.

### 2. Setting the Outlet Pressure and the Slam-shut Set Pressure

Use the adjusting tool (Figure 6) to set the desired slam-shut set pressure and setpoint, P2. Turning clockwise will increase the set pressure while turning counterclockwise will decrease the set pressure.

### 3. Resetting the Slam-Shut Valve

1. Ensure that the outlet valve is in the closed position.
2. Check and correct the root cause that activated the slam-shut valve to shut off.
3. Slowly turn the handle counterclockwise to open the inlet valve partially.
4. Slowly pull the Reset bar and hold on for a few seconds until it is latched on. Refer to Figure 5.
5. Fully open the inlet valve and slowly open the outlet valve until it is in wide-open position.

Note: For the Reset bar to be latched on smoothly, check and keep the setpoint, P2 from exceeding the lock-up pressure.

Figure 5. Reset Tool

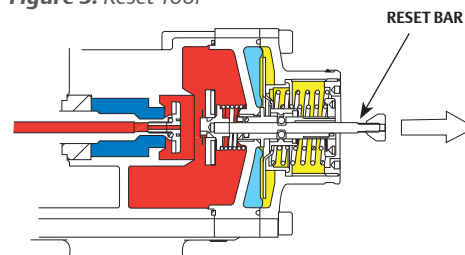


Figure 6. Adjusting Tool



## CAUTION

Use tool to fix the connector while screwing pipe into the connector. Do not use too much power while installing Type RS and/or with the Type RS on the gas pipe net. Align the end connectors before Type RS or the system with the Type RS installed on gas pipe net.

## 9. Maintenance

### 1. Regular maintenance

1. Use soap solution as gas detector to ensure that there is no leakage on the regulator.
2. Observe the outlet pressure to make sure that the desired outlet pressure is maintained.
3. Ensure the pipeline system is clean, free of foreign materials.

### 2. Periodic maintenance

Due to normal part wear or damage that may occur from external sources, this regulator should be inspected and maintained periodically. The frequency of inspection, maintenance, and replacement of parts depend upon the severity of service conditions or the requirements of local, state, and federal rules and regulations.

1. Based on the gas quality, check the pressure set point and sealing on a 3 to 6-month interval. If there is anything irregular, clean the inside of the regulator and change the spare parts like disks, diaphragm, O-ring, etc.
2. If the gas is dirty and/or with too much water, the maintenance interval is 1 to 3 months.

## 10. Ordering Guide

### Type (Select One)

- RS25
- RS40
- RS50
- RS80
- RS100

### Connection Style (Select One)

- Inline connection
- Angle connection

### Regulating Spring (Select One)

- 15 to 33 mbar / 0.22 to 0.48 psig, Galvanized
- 30 to 60 mbar / 0.44 to 0.87 psig, Yellow
- 60 to 100 mbar / 0.87 to 1.45 psig, Red
- 90 to 150 mbar / 1.31 to 2.18 psig, Black
- 150 to 220 mbar / 2.18 to 3.19 psig, Blue
- 220 to 300 mbar / 3.19 to 5.8 psig, White

### Slam Shut Spring Selection (Select One)

#### For Slam shut with UPSO and OPSO

- OPSO 35 to 60 mbar / 0.51 to 0.87 psig  
UPSO 5 to 15 mbar / 0.07 to 0.22 psig
- OPSO 50 to 90 mbar / 0.73 to 1.31 psig  
UPSO 8 to 30 mbar / 0.12 to 0.44 psig
- OPSO 90 to 220 mbar / 1.31 to 3.19 psig  
UPSO 23 to 75 mbar / 0.33 to 1.09 psig
- OPSO 220 to 400 mbar / 3.19 to 5.5 psig  
UPSO 75 to 145 mbar / 1.09 to 2.1 psig
- OPSO 220 to 400 mbar / 3.19 to 5.5 psig  
UPSO 145 to 240 mbar / 2.1 to 3.48 psig

**Slam Shut Spring Selection** (Select One) (continued)

**For Slam shut with OPSO only**

- OPSO 25 to 50 mbar / 0.36 to 0.73 psig
- OPSO 50 to 100 mbar / 0.73 to 1.45 psig
- OPSO 100 to 220 mbar / 1.45 to 3.19 psig
- OPSO 150 to 220 mbar / 2.18 to 3.19 psig
- OPSO 220 to 400 mbar / 3.19 to 5.8 psig

**End Connection Standard** (Select One)

- NPT
- BSPT
- ISO 7-1

**Spare Part Kit, JJJJ86BX051** (Recommended)

- Yes, send one replacement part kit to match this order.

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