

Spence D Series Pressure-Reducing Pilot



Figure 1. D Series Pressure Regulator

Features

- **Self Contained and Spring Operated**
- **Packless Construction**
- **Fluid, Gas and Vapor Applications**
- **Accurate Regulation Unaffected by Service Conditions**
- **Easy In-line Maintenance**

Introduction

Spence Pressure Regulator is a combination of D Series pilot and a Type E or C main valve. This regulator reduces a steady or varying initial pressure to a constant, adjustable delivery pressure.

Principle of Operation

The regulator is operated by initial steam or fluid pressure. It is normally closed, being held so by initial pressure on the disk and by an internal main spring.

When the pilot is opened, initial pressure flows through the pilot to the 8B tee. Bleedport 4A restricts the flow and pressure builds under the diaphragm and opens the main valve. The 5A restriction elbow steadies the operation of the regulator.

Delivery pressure feeds back through the control pipe to the pilot diaphragm. As this pressure approaches a balance with the air loading signal, the pilot throttles the loading pressure. In turn, the main valve takes a position established by the loading pressure where just enough steam flows to maintain the set delivery pressure.

D Series

Specifications

The Specifications section gives some general specifications for the D Series pilot. The nameplates give detailed information for a specific pilot as built in the factory.

Available Configurations

Type D: For ± 1 psi / 0.07 bar control of delivery pressures between 3 and 150 psi / 0.21 and 10.3 bar.

Type D2: For control of delivery pressures between 100 and 300 psi / 6.90 and 20.7 bar.

Type D5: For $\pm 1/2$ psi / 0.03 bar control of delivery pressures between 1 and 25 psi / 0.07 and 1.72 bar.

Type D120: Fast response controlling delivery pressures between 5 and 300 psi / 0.35 and 20.7 bar. Used on large Type E main valves.

Maximum Inlet Temperature⁽¹⁾

Cast Iron: 450°F / 232°C

Steel: 750°F / 400°C

Maximum Inlet Pressure⁽¹⁾

Cast Iron: 250 psig / 17.2 bar

Steel: 600 psig / 41.4 bar

Pressure Ranges⁽¹⁾

See Table 1

Construction Materials

Body: Cast Iron, Steel

Stem, Disk, Seat and Diaphragm: Stainless steel

Gasket: Graphite

Spring: Inconel®

Approximate Weights

Type D: 7 lbs / 3.2 kg

Type D2: 10 lbs / 4.5 kg

Type D5: 14 lbs / 6.4 kg

Type D120: 16 lbs / 7.3 kg

Optional Accessories

Spring Chamber

Adjusting Handwheel

Wall Bracket

Locking Device

Composition Disk

Integral Mount Body

Vacuum Spring Assembly

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

Table 1. D Series Spring Pressure Ranges

TYPE	PRESSURE RANGE, psig / bar	ADJUSTING SPRING	
		Wire Diameter, In. / mm	Color
D	3 to 20 / 0.21 to 1.38 ⁽¹⁾	3/16 / 4.76	Aluminum
	5 to 50 / 0.35 to 3.45 ⁽¹⁾	1/4 / 6.35	Orange
	10 to 100 / 0.69 to 6.89	5/16 / 7.94	Green
	20 to 150 / 1.38 to 10.3	11/32 / 8.73	Black
D2	100 to 300 / 6.89 to 20.7	7/16 / 11.1	Aluminum
D5	1 to 10 / 0.07 to 0.69	3/16 / 4.76	Aluminum
	5 to 25 / 0.35 to 1.72	1/4 / 6.35	Orange
D120	5 to 25 / 0.35 to 1.72	7/32 / 5.56	Not Specified on Purchasing Specification, Item Details or Drawing.
	10 to 75 / 0.69 to 5.17	5/16 / 7.94	
	40 to 150 / 2.76 to 10.3	3/8 / 9.53	
	100 to 300 / 6.89 to 20.7	7/16 / 11.1	Aluminum

1. Vacuum Spring Assembly, minimum range is 30 in. Hg / 1.02 bar; maximum is reduced by 15 psig / 1.03 bar.

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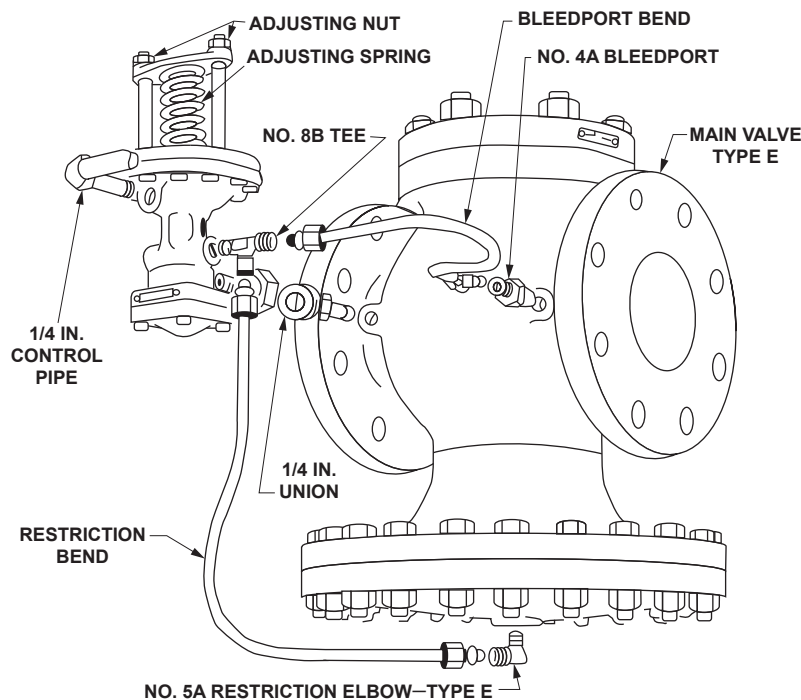


Figure 2. D Series with Type E Main Valve Installation

Installation

Planning

1. Locate the regulator in a horizontal pipe.
2. Provide a trap ahead of the regulator to prevent water hammer and erratic operation.
3. Use strainer to protect the regulator and avoid damaging effects of scale and dirt in pipelines.
4. Provide a three valve bypass to facilitate inspection of the regulator without interrupting service.

Main Valve

1. Flush the main piping system thoroughly to clear it from welding beads, scale, sand, etc.
2. Mount main valve with diaphragm chamber down and arrow on body pointing in the direction of flow.
3. Screwed end valve should be mounted in unions.

Pilot

1. Mount the pilot on either side of the main valve by means of a 1/4 in. / 6.35 mm nipple and union.
2. Make this connection to the 1/4 in. / 6.35 mm pipe tap on the inlet of the main valve.

Note

As a general rule of thumb, tighten 1.5 to 3 turns past hand tight all NPT connection and use thread sealant with a temperature range up to 750°F / 400°C.

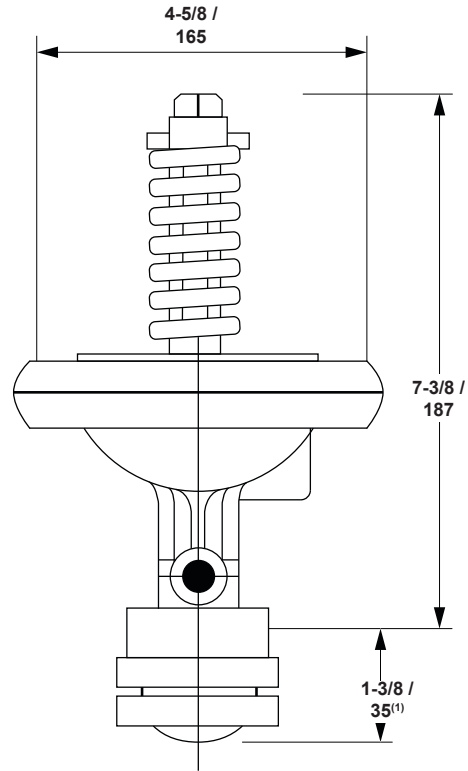
3. Screw No. 4A bleedport fitting into 1/8 in. / 3.18 mm pipe tap on the outlet of the main valve body.

Note

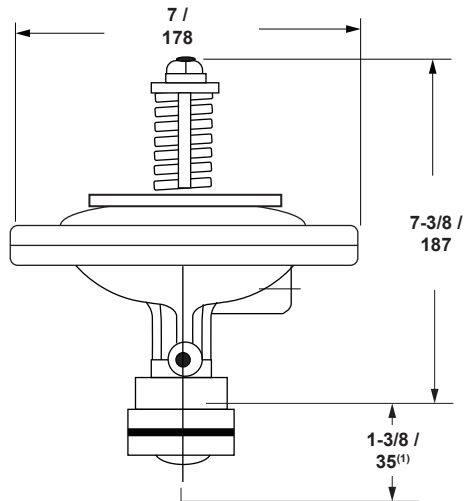
Bleed orifice in this fitting is vital to operation of regulator.

4. Screw No. 8B tee into 1/8 in. / 3.18 mm pipe tap in pilot. Select tap facing downstream.
5. Screw No. 5A elbow containing restriction orifice into 1/8 in. / 3.18 mm pipe tap on underside of main valve diaphragm chamber. If initial pressure or pressure drop is less than 15 psi / 1.03 bar, a No. 5B open elbow without orifice is used.
6. Connect tubing bends.

D Series



**TYPE D
(STANDARD PILOT)**

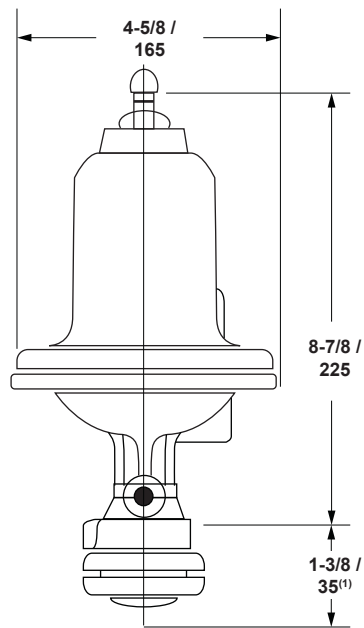


TYPE D5

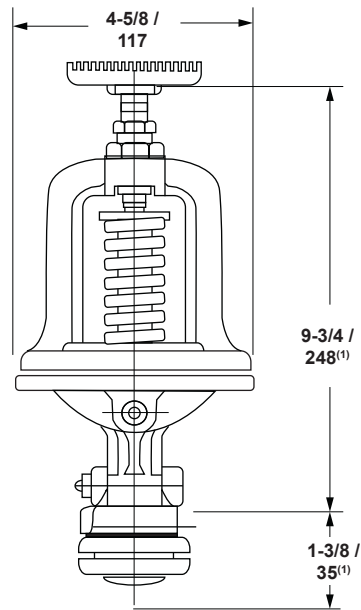
IN. /
mm

1. For Integral Mount Pilot, this dimension is $5/8$ in. / 16 mm.

Figure 3. D Series Pressure Regulators Dimension



SPRING CHAMBER



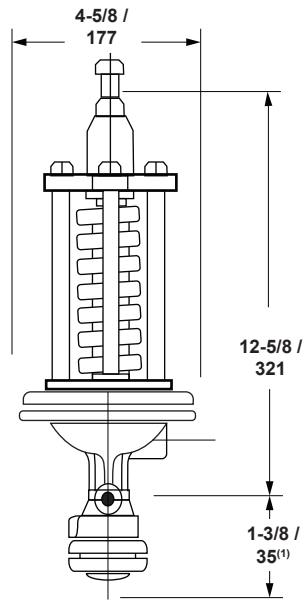
TYPE D
ADJUSTING HANDWHEEL

IN. /
mm

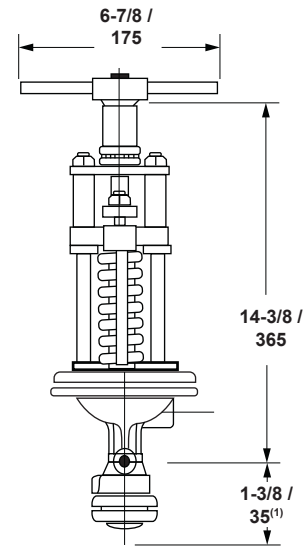
1. For Integral Mount Pilot, this dimension is 5/8 in. / 16 mm.

Figure 3. D Series Pressure Regulators Dimension (continued)

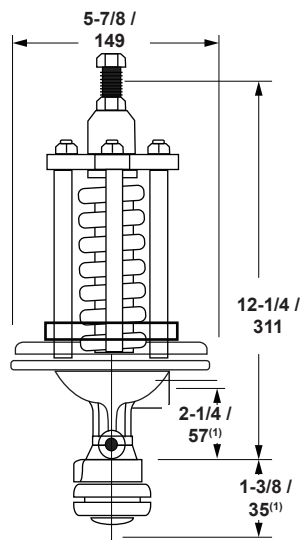
D Series



TYPE D2



TYPE D2
ADJUSTING HANDWHEEL



TYPE D120

IN. /
mm

1. For Integral Mount Pilot, this dimension is 5/8 in. / 16 mm.

Figure 3. D Series Pressure Regulators Dimension (continued)

Ordering Information

When ordering, complete the ordering guide on this page. Refer to the Specifications section. Review the description to the right of each specification and the information in each referenced table or figure. Specify your choice whenever a selection is offered.

Ordering Guide

Available Configurations (Select One)

Type D

- 3 to 20 psig / 0.21 to 1.38 bar
- 5 to 50 psig / 0.35 to 3.45 bar
- 10 to 100 psig / 0.69 to 6.89 bar
- 20 to 150 psig / 1.38 to 10.3 bar

Type D2

- 100 to 300 psig / 6.89 to 20.7 bar

Type D5

- 1 to 10 psig / 0.07 to 0.69 bar
- 5 to 25 psig / 0.35 to 1.72 bar

Type D120

- 5 to 25 psig / 0.35 to 1.72 bar
- 10 to 75 psig / 0.69 to 5.17 bar
- 40 to 150 psig / 2.76 to 10.3 bar
- 100 to 300 psig / 6.89 to 20.7 bar

Body Materials (Select One)

- Cast Iron
- Steel

Options

- Spring Chamber
- Adjusting Handwheel
- Wall Bracket
- Locking Device
- Composition Disk
- Integral Mount Body
- Vacuum Spring Assembly

D Series

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