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912N Series Pressure Regulators



WARNING

To avoid injury or equipment damage, these regulators should be installed, operated and maintained in accordance with federal, state and local codes, rules and regulations and Emerson Process Management Regulator Technologies, Inc. instructions.

Only a qualified person must install or service a regulator. Be certain the control spring range label is updated to accurately indicate any field changes in equipment, materials, service conditions or pressure settings.

Immediately call a qualified technician in case of trouble. If venting occurs, or a leak develops in the system, it indicates that service is required. Failure to correct the situation immediately may create a hazardous condition.



P1024

Figure 1. Type 912N Regulator

Introduction

Scope of the Manual

This manual provides installation, maintenance, and parts information for the 912N Series pressure regulators (Figure 1) as used in industrial/natural gas applications.

Description

The 912N Series pressure regulators are direct-operated, spring-loaded devices built to provide accurate, sensitive control suited to a variety of applications.

As outlet pressure begins to exceed the set pressure, the diaphragm inside the regulator lifts, operating a lever to close the inlet. Pressure in excess of the relief valve spring force opens the relief valve, allowing excess pressure to bleed through the screened vent in the spring case.

Specifications

Specifications for the 912N Series regulators are given on page 2.

Installation



WARNING

Personal injury or equipment damage may result if the regulator is installed where service conditions could exceed the pressure or temperature specifications in Specifications section. The regulator must not be used for hazardous gas service in a closed area unless the vent is piped to a safe area. The vent opening on the regulator or the opening on the remote vent pipe (if one is used) should be pointed down to minimize clogging from collected moisture, corrosive chemicals and other foreign material. Overpressuring the downstream system (and risk of explosion) could result from a clogged vent.

Overpressuring any portion of a regulator or associated equipment may cause leakage, part damage, or personal injury due to bursting of pressure-containing parts or explosion of accumulated gas.

912N Series

Specifications

Available Configuration

See Table 1

Body Sizes and End Connection Styles

Inlet: 1/4 NPT

Outlet: 1/4 or 3/8 NPT

Maximum Allowable Inlet Pressure⁽¹⁾

250 psig / 17.2 bar

Outlet Pressure Ranges⁽¹⁾

See Table 1

Maximum Allowable Outlet Pressure⁽¹⁾

Emergency Outlet Pressure:

20 psig / 1.4 bar

Recommended Outlet Pressure to Avoid Internal Part

Damage: 3 psi / 0.21 bar differential above outlet pressure setting; provide external relief if start-to-discharge point exceeds 3 psid / 0.21 bar differential (see Table 1)

Internal Relief Performance

Approximate Internal Relief Valve Start-to-Discharge Point:

See Table 1

Capacity: Adequate only for relieving minor build-up situations such as caused by chips or dirt blocking the seat partly open; for major malfunctions, external relief is required according to the Installation section.

Temperature Capabilities

-20 to 160°F / -29 to 71°C

Pressure Registration

Internal

Vent Size

1/8 NPT tapped with removable screen

Approximate Weight

1.3 lbs / 0.6 kg

Options

- Up to 25% Hydrogen Blend (By Volume) Construction

1. The pressure/temperature limits in this Instruction Manual or any applicable standard limitation should not be exceeded.

Table 1. Outlet Pressure Range Data

AVAILABLE CONSTRUCTION	OUTLET PRESSURE RANGE	APPROXIMATE POINT ABOVE OUTLET PRESSURE SETTING AT WHICH INTERNAL RELIEF STARTS TO DISCHARGE	CONTROL SPRING SELECTION			
			Part Number	Color Code	Spring Free Length, In. / mm	Spring Wire Diameter, In. / mm
912N Series without handwheel	3 to 7 in. w.c. / 7 to 17 mbar 5 to 10 in. w.c. / 12 to 25 mbar 9.25 to 13 in. w.c. / 23 to 32 mbar 12 to 24 in. w.c. / 30 to 60 mbar	5 to 21 in. w.c. / 12 to 52 mbar 8 to 30 in. w.c. / 20 to 75 mbar 16 to 39 in. w.c. / 40 to 97 mbar 17 in. w.c. to 3 psig / 42 mbar to 0.21 bar	1B784327222	Red	1.09 / 27.7	0.035 / 0.89
			1B784427222	Orange	1.37 / 34.8	0.037 / 0.94
			1L507937022	Unpainted	1.78 / 45.2	0.038 / 0.97
			1B784527222	Blue	1.34 / 34.0	0.047 / 1.19
912N Series with handwheel	0.5 to 2.7 psig / 0.03 to 0.18 bar 2.7 to 5 psig / 0.18 to 0.34 bar	0.70 to 6.80 psig / 0.05 to 0.47 bar 3.80 to 12.5 psig / 0.26 to 0.86 bar	1B784627222	Yellow	1.19 / 30.2	0.075 / 1.91
			1B784727222	Green	1.31 / 33.3	0.080 / 2.03
	8 to 2 in. w.c. / 20 to 60 mbar	30.3 to 35.4 in. w.c. / 75 to 88 mbar	1B784527222	Blue	1.34 / 34.0	0.047 / 1.19
			1B784727222	Green	1.31 / 33.3	0.080 / 2.03

1. Internal Relief Performance is only adequate for relieving minor buildup situations. External relief is required if start-to-discharge point exceeds 3 psid / 0.21 bar differential.

Like most regulators, the 912N Series regulators have an outlet pressure rating lower than the inlet pressure rating. Downstream protection is required if the actual inlet pressure can exceed the regulator outlet pressure rating or the pressure rating of any downstream equipment.

Regulator operation within ratings does not preclude the possibility of damage from external sources or from debris in the lines. A regulator should be inspected for damage periodically and after any overpressure condition.

Ensure that the regulator is undamaged and contains no foreign material. Install the regulator so that the flow through it leaves the outlet port (marked on the body). The regulator may be installed in any position. However, the spring case vent should be pointed down. Spring case/vent orientation can be changed by rotating the spring case with respect to the body.

For an indoor installation, if the regulator controls a gas that is flammable or otherwise hazardous, a spring case with the standard vent line should be used so that the exhaust can be piped away.

Provide protection on a remote vent by installing a screened vent cap into the remote end of the vent pipe. The vent should be pointed down.

Apply a good grade of pipe compound to the pipe threads before making the connections. Install piping into the 1/4 NPT inlet connection and the 1/4 or 3/8 NPT outlet connection.

Each regulator is factory-set for the pressure setting specified on the order. If no setting was specified, the outlet pressure is factory-set at the mid-range of the control spring. The procedure for adjusting the output pressure is given in the Startup section.

Startup

Key numbers are referenced in Figure 2.

With installation completed and downstream equipment properly adjusted, slowly open the upstream and downstream shut-off valves while monitoring the regulator output pressure.



WARNING

For the 912N Series construction with no drive screw in the spring case, never adjust the control spring to produce an outlet pressure higher than the outlet pressure range for that particular spring. Doing so could overpressure the system and cause personal injury or equipment damage. If the desired outlet pressure is not within the range of the control spring, install a spring of the proper range according to the Maintenance section.

If outlet pressure adjustment is necessary, monitor the outlet pressure with a gauge while performing the following procedures:

1. For units without a handwheel, unscrew the closing cap (key 3) and insert a screw driver blade into the adjusting screw (key 4).
2. Slowly turn the adjusting screw or handwheel clockwise to increase or counterclockwise to decrease the output pressure setting.
3. With the output pressure adjusted to the desired value, replace the closing cap on units without a handwheel.

Shutdown

Close the nearest upstream shut-off valve, then close the nearest downstream shut-off valve and vent pressure from the outlet of the regulator.

Maintenance

Regulator parts are subject to normal wear and must be inspected and replaced as necessary. The frequency of inspection and replacement of parts depends on the severity of service conditions or the requirements of local, state, and federal rules and regulations.



WARNING

To avoid personal injury or equipment damage, do not attempt any maintenance or disassembly without first isolating the regulator from system pressure and relieving all internal pressure from the regulator.

This procedure is to be performed if changing the control spring for one of a different range, or for inspecting, cleaning or replacing any other parts. Key numbers are referenced in Figures 2 and 3.

Note

If sufficient clearance exists, the regulator body (key 1) can remain in the line during spring replacement or other maintenance procedures.

Control Spring Replacement

Refer to Figure 2 on units without the handwheel, unscrew the closing cap (key 3) and turn the adjusting screw out of the spring case. Lift out the control spring (key 5).

Refer to Figure 3 on units with a handwheel (key 4), turn the handwheel counterclockwise until the tension is relieved from the control spring (key 5). Unscrew the nut at the base of the handwheel and lift the handwheel off the spring case (key 2). Lift out the adjusting screw (key 4) and the control spring.

Replace the control spring and complete the assembly by replacing the adjusting screw and the closing cap or handwheel. Adjust the spring tension as described in the Startup section.

Diaphragm and Relief Valve Replacement

Remove cap screws (key 14) and separate the spring case from the valve body. Remove the control spring (key 5) and the diaphragm (key 15) along with the diaphragm head (key 10), the relief valve seat (key 9) and the relief valve spring (key 6). Separate these parts by removing the pin (key 8) and the spring seat (key 7).

To reassemble the regulator, first assemble the relief valve spring assembly, then replace the relief valve spring assembly, the diaphragm, the diaphragm head and fit the spring case to the body. Install and tighten cap screws (key 14) in a crisscross manner. Adjust the control spring tension as described in the Startup section.

Parts Ordering

When corresponding with the local Sales Office about this regulator, include the type number, date of manufacture and all other pertinent information from the labels. Specify the eleven-character part number when ordering new parts from the following parts list.

Parts List

Key	Description	Part Number
1	Body, Zinc 1/4 x 1/4 NPT 0.073 in. / 1.9 mm port diameter 1/4 x 3/8 NPT 0.073 in. / 1.9 mm port diameter 1/4 x 1/4 NPT 0.094 in. / 2.4 mm port diameter 1/4 x 3/8 NPT 0.094 in. / 2.4 mm port diameter	3D377144042 3B782444042 T4000544042 3B892744042 3E294444042
2	Spring Case	
3	Closing Cap 912N Series with handwheel, Brass All others, Plastic	1C234414012 T13269T0012
4	Adjusting Screw 912N Series with handwheel, Zinc/Steel All others, Plastic	14B7140X022 T1027706992
5	Regulator Spring, Steel	See Table 1
6	Relief Valve Spring, Steel	1B784827012
7	Spring Seat, Steel	1B783425072
8	Pin, 302 Stainless steel	1B783535032
9	Relief Valve Seat, Zinc pusher (relieve valve post)	2B783044012
10	Diaphragm Plate, Zinc-plated Steel	1B783824132
11	Disk Holder	GE19397X012
12	Fulcrum Rod, 302 Stainless steel	0U091435032
13	Machine Screw, Steel (2 required)	T12748T0012
14	Machine Screw, Steel (6 required)	1V4131X0012
15	Diaphragm, Nitrile (NBR) 3 to 24 in. w.c. / 7 to 60 mbar 0.5 to 5 psi / 0.03 to 0.34 bar	1B7837T0022 1B783702012
16	Vent Screen, 304 Stainless steel	0W086343062
17*	Closing Cap Gasket, Composition	1E765204022
18	Closing Spring, 302 Stainless steel, 912N Series with handwheel only	1E302037022
19	Spacer Ring, Brass, 912N Series with handwheel only	1C580714012
20	Lockwheel, Brass, 912N Series with handwheel only	1C234614012
25	Spring Seat, Brass, 912N Series with handwheel only	1C234514012
29*	Disk	GE12677T012

*Recommended spare part

912N Series

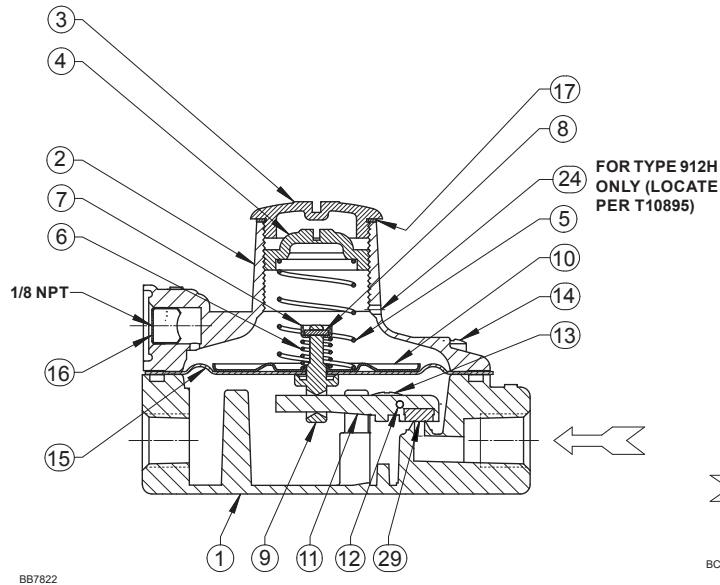


Figure 2. 912N Series Pressure Regulator Assembly

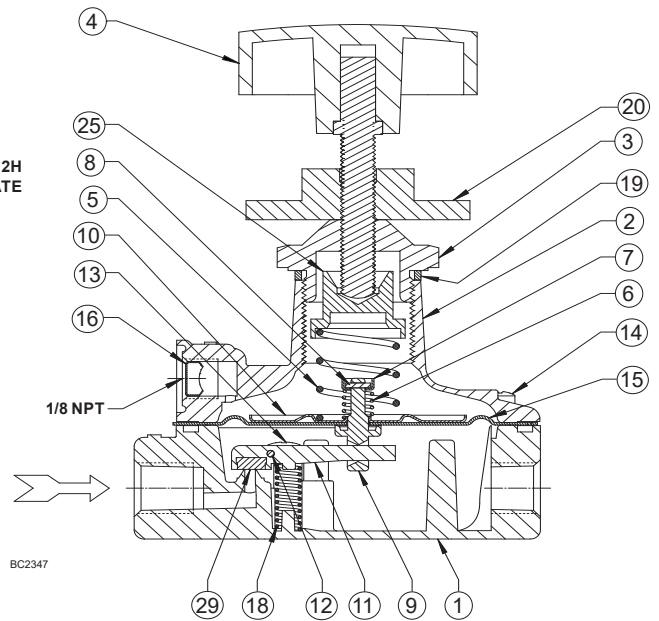


Figure 3. 912N Series with Handwheel Construction Assembly

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