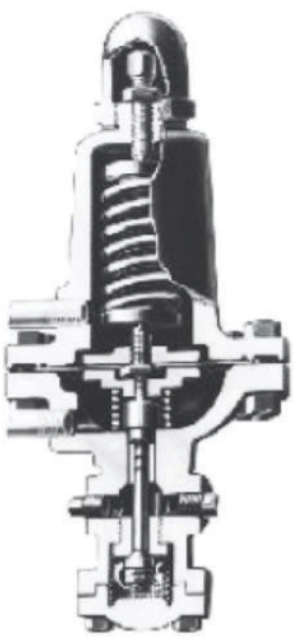
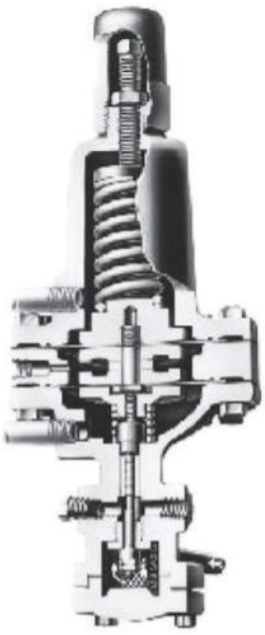
Spence N Series Differential Pressure Pilots



TYPE N PILOT



TYPE N33 PILOT

Figure 1. *N Series Differential Pressure Pilots*

Features

- Spring Operated
- Packless Construction
- Accurate to ±1 psi / 0.07 bar
- Four Adjustable Spring Ranges
- Fluid, Gas and Vapor Applications
- Loading Pressure Supplied by any Fluid
- Accurate Regulation Unaffected by Service Conditions
- Easy In-line Maintenance

Introduction

The combination of a Type N with a Type E main valve produces a differential pressure regulator in a single pilot-operated valve. Type N is designed to control the pressure of the fluid discharged at a constant, adjustable differential above some separate source of pressure.

Specifications

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

Available Configurations
See Table 1

Body Sizes
NPS 1/4 x 1/8 / DN 8 x 6

End Connection Styles
NPT

Maximum Inlet Pressure(1)
Cast iron: 250 psig / 17.2 bar
Cast steel: 600 psig / 41.4 bar

Maximum Operating Temperature(1)
Cast iron: 450°F / 232°C
Cast steel: 750°F / 399°C

Outlet Pressure Ranges

Types N, N20 and N33:
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 6.90 bar
20 to 150 psig / 1.38 to 10.3 bar

Construction Materials
Body: Cast Iron and Cast Steel(2)
Stem, Disk, Seat and Diaphragm: Stainless steel
Gasket: Graphite
Spring: Inconel®

Option
Integral Mount(3)

Approximate Weights
8 to 11 lbs / 3.6 to 5.0 kg

1. The pressure/temperature limits in this Bulletin and any applicable standard or code limitation should not be exceeded.
2. Available for Type N33 only.
3. Available for Types N and N33 only.

Typical applications:

1. Steam atomizing oil burners–to maintain a constant excess of atomizing steam pressure over oil pressure.
2. Mechanical atomizing oil burners–where it is required to maintain a constant oil pressure drop across the burner tip.
3. Motor-driven centrifugal boiler feed pumps–to maintain a constant excess of feedwater pressure over boiler steam pressure.
4. Connection between high and low pressure boiler feed systems–to reduce the feedwater pressure and to maintain a constant excess pressure over the steam of the low pressure boilers.

Principle of Operation

The combination of the Type N and the Type E main 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 (see pilot instructions), initial pressure flows through the pilot to the 8B tee. 4A bleed port 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 thrust of the adjusting spring, 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.

Table 1. *N Series Available Configurations*

TYPE	APPLICATION
N	For delivery pressure at set differential above loading pressure. Includes integral stainer.
N20	For fixed differential between regulator's inlet pressure and some other lower pressure.
N33	For delivery pressure at set differential above loading pressure where it is essential that there be no mixing of two fluids. Ensured by two diaphragms, separated by a vented space. Includes integral strainer.

Installation

1. On boiler feed systems, locate the differential regulator as near the boiler as possible but leave a space of about 20 pipe diameters between it and the feedwater regulator.
2. Install the main valve in a straight run of horizontal pipe with diaphragm chamber down and arrow on the body pointing in the direction of flow.
3. Carefully clear the piping system of foreign matter at assembly. Provide a three-valve bypass to facilitate inspection of the valve without interrupting service. Avoid damaging effects of scale and dirt in pipelines by using a strainer ahead of the regulator.
4. Mount the pilot on either side of the main valve, connecting it to the 1/4 in. / 6.35 mm pipe tap on the inlet end with the nipple and union provided.
5. Assemble the auxiliary fittings and tubing as shown on the connection drawing. Bleedport fitting and restriction elbow No. 5A (or Restriction Tee No. 7C) contain orifices which must not be obstructed.

   Note

   The delivery pressure control pipe should be as short as practical and must enter the delivery line at a point of minimum turbulence. Avoid a control point near a turn or an expanding fitting.

6. The differential control pipe should be run from the pilot spring chamber as directly as possible to the source of independently varying pressure. When connecting to boiler steam pressure, tie into the main steam header in preference to a branch line. If to a heavy fuel oil line, keep the control pipe short and in the warmest possible location.
7. Insulation may be applied to the upper portion (globe and flanges) of the main valve. Do not insulate the diaphragm chamber or any part of the pilot.

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 N
- ☐ Type N20
- ☐ Type N33

Body Material (Select One)
- ☐ Cast Iron
- ☐ Cast Steel (For Type N33 only)

Pressure Ranges (Select One)
- ☐ 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 6.90 bar
- ☐ 20 to 150 psig / 1.38 to 10.3 bar

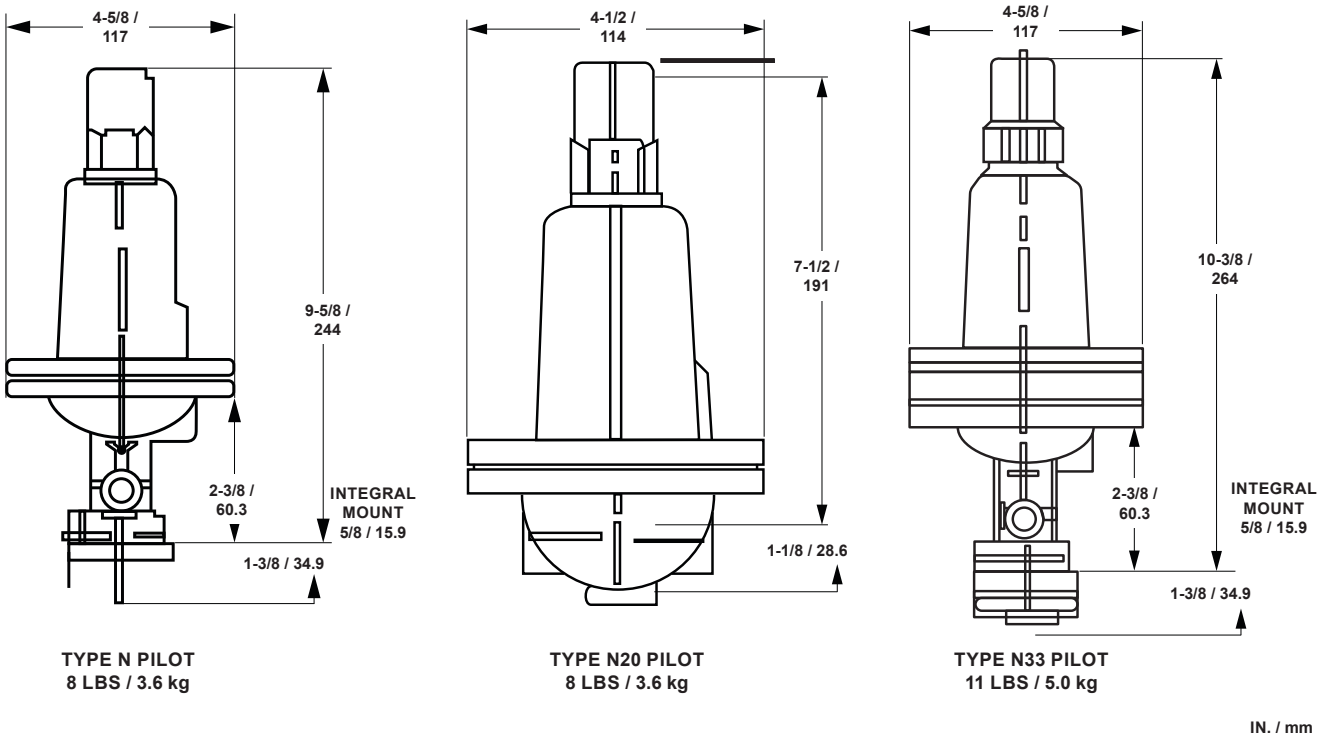


Figure 2. *N Series Differential Pressure Pilots Dimension*

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