Spence™ Type T14 Temperature Pilot

Figure 1. *Type T14 Temperature Pilot*

Features

- Precise, Rapid Response
- Normally Open, Direct Operation (Heating)
- Packless Construction
- Strainer Screen Built-in
- Easy in-line Maintenance

Introduction

The Spence™ Type T14 is a vapor tension temperature pilot regulator. When combined with the Spence Main Valves, it becomes a temperature regulator, Type ET14, or a combined pressure and temperature regulator in a single pilot-operated valve, Type ET14D.

Type T14 pilot is recommended for use with storage heaters, jacketed kettles and vats.

Specifications

This section lists the specifications for Type T14. Factory specifications are stamped on the nameplate fastened on the pilot at the factory.

Available Configurations
Type T14: Temperature Pilot

Available Thermostats
See Table 1

Maximum Inlet Temperature(1)
Cast Iron: 450°F / 232°C
Cast Steel: 750°F / 400°C

Maximum Inlet Pressure(1)
Cast Iron: 250 psig / 17.2 bar
Cast Steel: 600 psig / 41.4 bar

Temperature Ranges(1)
20 to 120°F / -7 to 49°C
50 to 150°F / 10 to 66°C
70 to 170°F / 21 to 77°C
120 to 220°F / 49 to 104°C
150 to 300°F / 66 to 149°C
170 to 270°F / 77 to 132°C
250 to 350°F / 121 to 177°C
290 to 390°F / 143 to 199°C
300 to 400°F / 149 to 204°C
330 to 430°F / 166 to 221°C
400 to 500°F / 204 to 260°C

Construction Materials
Body: Cast Iron, Cast Steel
Stem: Aluminum
Disc and Seat: Stainless steel
Gasket: Graphite
Diaphragm: Bronze
Spring: Steel

Approximate Weight
Type T14: 13 lbs / 6 kg

Application
Storage Heater
Jacketed Kettles
Vats

Optional Accessories
Bronze or Stainless steel Thermostat
Tubing from 5 to 50 ft / 1.52 to 15.2 m
Thermostat Well
Dial Thermometer
Adjustment Indicator
Integral Mount Body

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

Principle of Operation

The regulator is operated by its initial steam pressure. The main valve is normally closed, being held so by initial pressure on the disk and by an internal main spring. The pilot opens when the temperature at the thermostat bulb is lower than the setting of the temperature adjusting spring.

Steam flows to the pilot through the connecting nipple and union (see Figure 2). At the No. 8B tee on the pilot outlet, the flow divides. One branch is connected to bleedport No. 4A and the other to restriction elbow No. 5A and the underside of the main valve diaphragm. Bleedport No. 4A restricts the flow, builds pressure under the diaphragm and opens the main valve. Restriction No. 5A steadies the operation of the regulator.

As the temperature of the heated medium rises, vapor pressure is generated in the thermostat bulb and transmitted to the pilot temperature diaphragm. When the vapor pressure becomes sufficient to over-balance the combined thrust of the temperature adjusting and pressure limit springs, the regulator throttles to maintain the set temperature.

When a Type D Pressure Pilot is added (Type ET14D), the operation remains the same except the delivery pressure is limited to the setting of this pilot. On decreasing load, the temperature pilot reassumes the control and throttles the delivery pressure as required to maintain the desired temperature. For additional information on the Type D Pressure Reducing Pilot, please refer to VCIMD-14966.

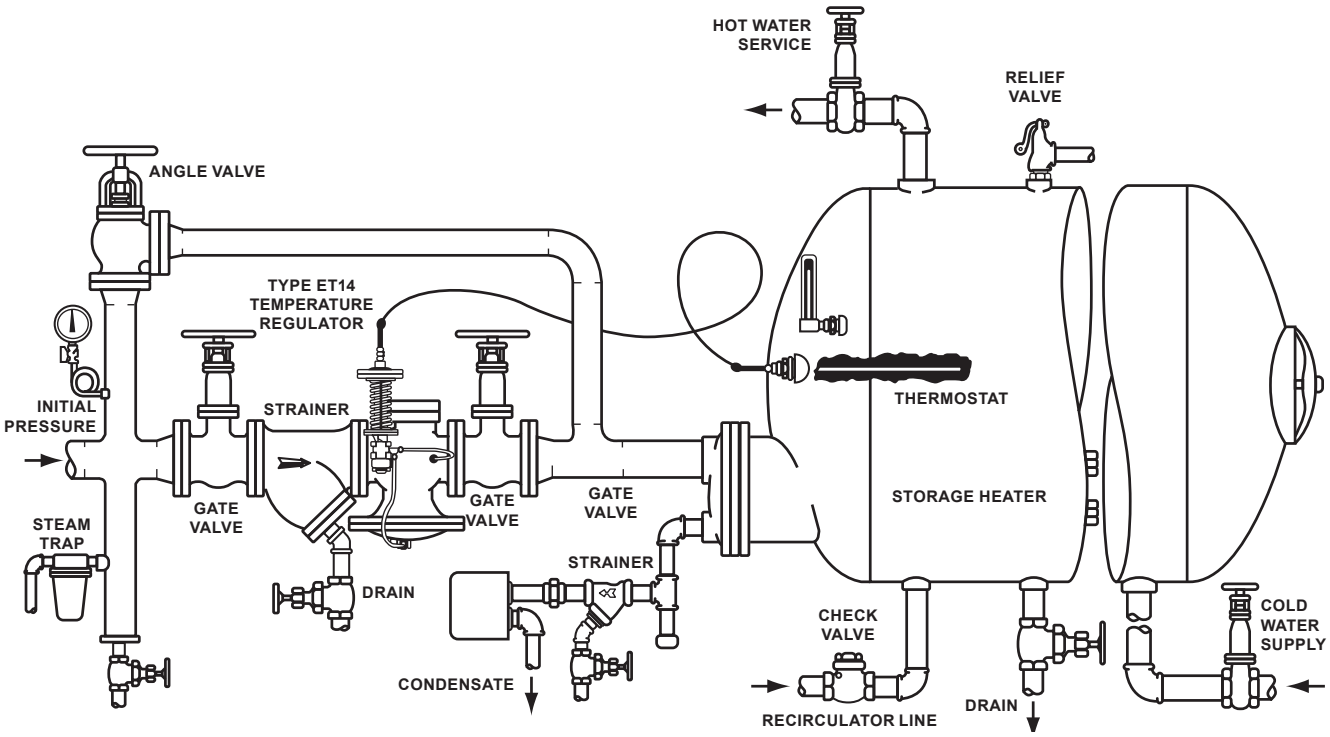


Figure 2. *Typical Installation*

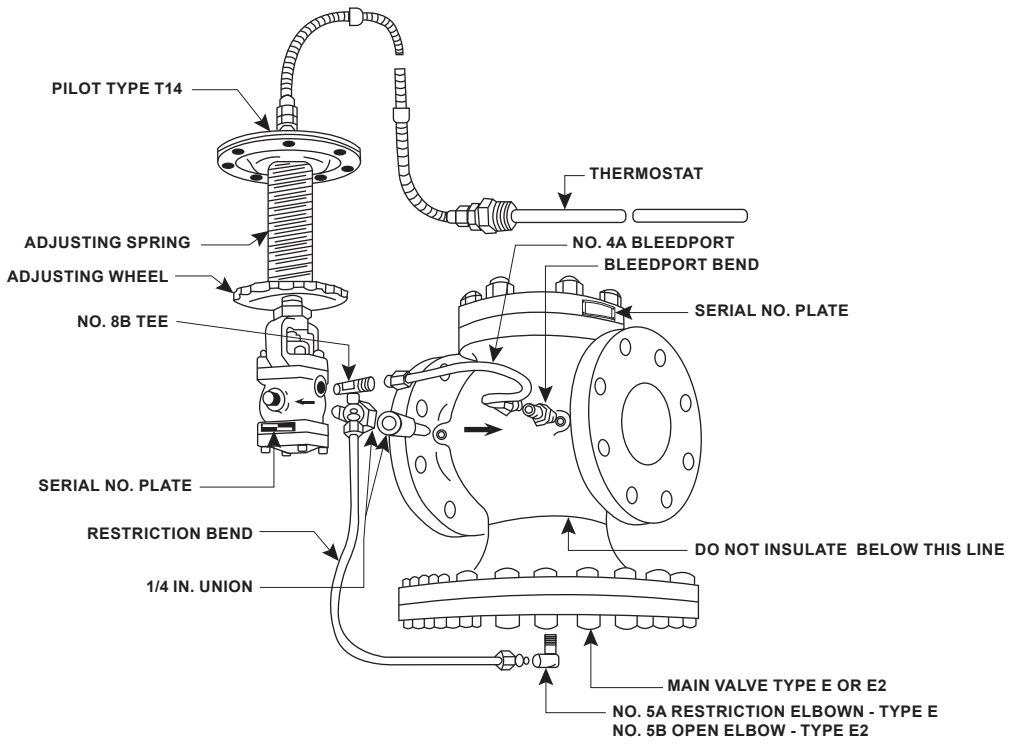


Figure 3. *Type T14 Tubing Bends Connection*

Installation

Planning

1. Locate the regulator in a horizontal pipe. Provide a trap ahead of the regulator to prevent water hammer and erratic operation.
2. Use a strainer to avoid damaging effects of scale and dirt in pipelines to protect the regulator.
3. Provide a three valve bypass to facilitate inspection of the regulator without interrupting service.
4. Position the thermostat horizontally. When vertical or slanting, the tip end of the bulb must point downward.
5. Locate the thermostat as close to the heater outlet as practical. Expose the entire length of the bulb to the active flow leaving the heater.
6. If the pressure rating of the heater or connected equipment is less than the initial steam pressure, provide a safety valve.

Main Valve

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

Pilot

1. Mount the pilot on either side of the main valve by means of 1/4 in. / 6.35 mm nipple and union provided.
2. Connect the 1/4 in. / 6.35 mm pipe tap at the inlet side of the main valve as shown in Figure 3.
3. Screw No. 4A bleedport fitting into the 1/8 in. / 3.18 mm pipe tap at the outlet side of the main valve body. Note that the 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 the underside of main valve diaphragm chamber. If the initial pressure or pressure drop is less than 15 psi / 1.03 bar, use No. 5B open elbow without orifice.
6. Connect tubing bends as illustrated in Figure 3. Valves with condensation chamber are fitted up according to Figure 4.

Control Pipe (Required for Type T14 and Type D Pilot Combination Only)

1. Use 1/4 in. / 6.35 mm pipe for this line which connects the pilot pressure diaphragm chamber (Figure 3) to the desired point of pressure control.
2. On instantaneous heaters with steam in shell, tap the control pipe into the shell. Otherwise, enter the delivery steam pipe at point of entrance to heater.
3. Pitch the control pipe away from the pilot and avoid water pockets.

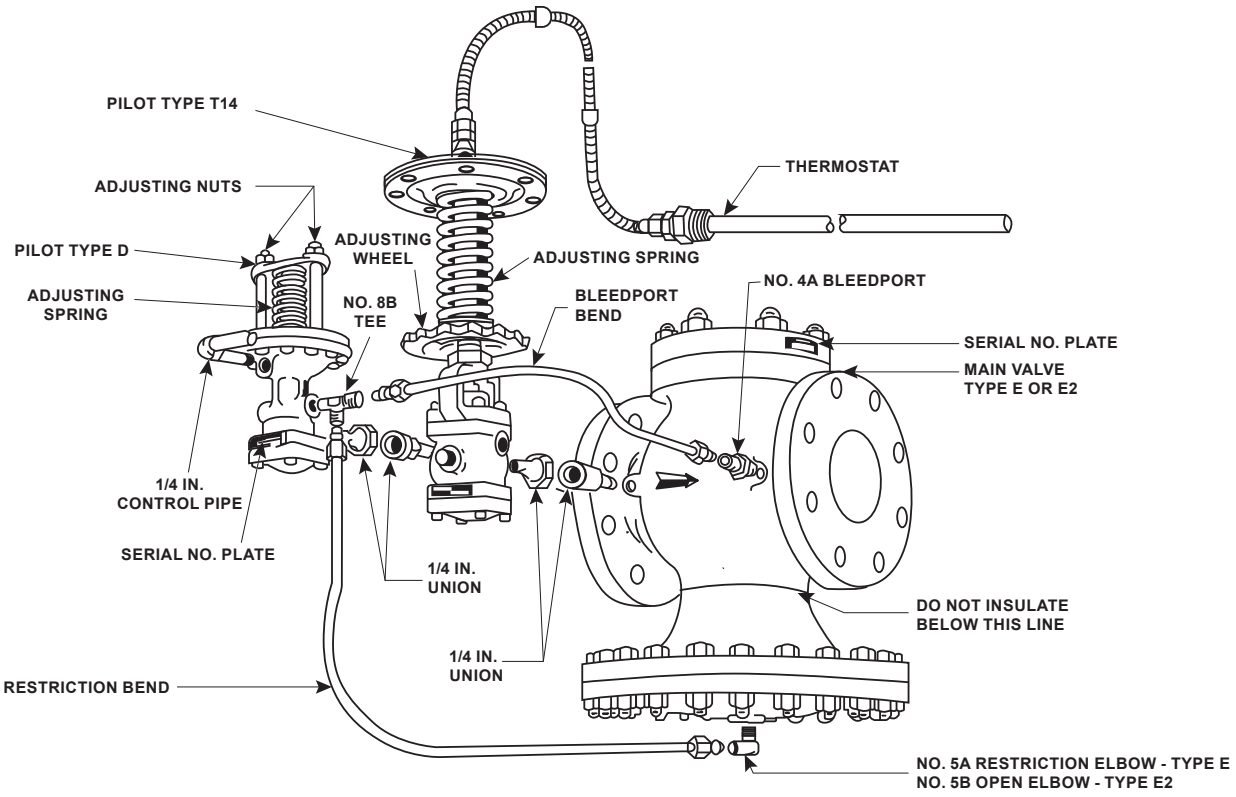
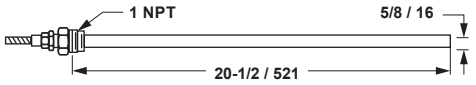


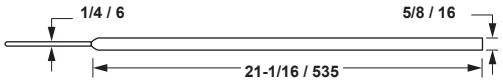
Figure 4. *Type ET14D Tubing Bends Connection*

Table 1. *Available Thermostats*

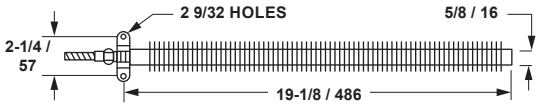
THERMOSTAT STYLE	DESCRIPTION
700	Plain Bulb with 1 in. / 25.4 mm Union Connection.
701	Large Plain bulb with 1-1/4 in. / 31.8 mm Union Connection. Used on pilots having more than 30 feet / 9.1 meter of flexible tubing and with dial thermometer having 20 to 120˚F / -6.67 to 48.9˚C range.
702	Finned Bulb with Wall Mounting Bracket. For space heating.
703	Finned Bulb with Duct Mounting Flange. For forced warm air heating.
704	Plain Short Bulb with 1-1/4 in. / 31.8 mm Union Connection. For installations where depth is limited.
706	Plain Bulb with 1 in. / 25.4 mm Union Connection and 1/4 in. / 6.35 mm OD Bendable Extension.
708	Plain Bulb with Wall Mounting Bracket. Used for space heating when dust is a problem
711	Bulb lead covered. Chemical lead covering homogeneously bonded to bulb and to lead sheathing on capillary.
712	Plain Bulb with 1/4 in. / 6.35 mm OD Bendable Tubing Cover for Capillary. Used in open tanks or where a mounting connection is not required
713	Plain Bulb with Duct Mounting Flange. For forced warm air heating when dust is a problem.
731	Plain Bulb with Adjustment dimension. Used in oil storage tanks or wherever it is desirable to change position of bulb.
732	Special with 12-in. / 305 mm hole Extension.
740	Sanitary Bulb for Milk Heaters. Threaded to fit standard No. 23A Thermometer Ferrule. Stainless Steel Bulb and Flexible Tubing



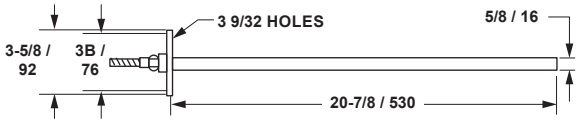
STYLE 700



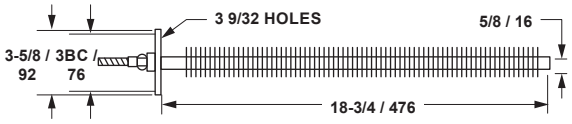
STYLE 712



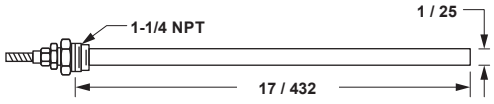
STYLE 702



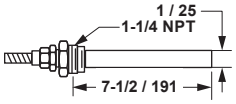
STYLE 713



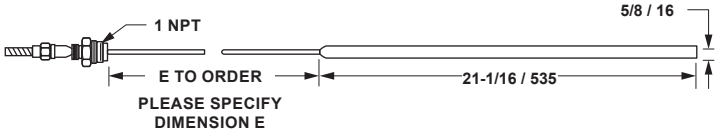
STYLE 703



STYLE 701



STYLE 704



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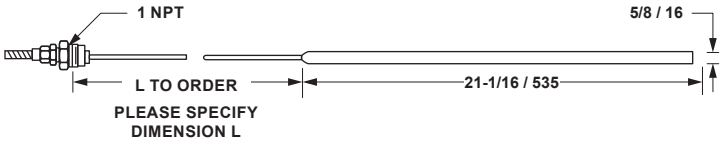
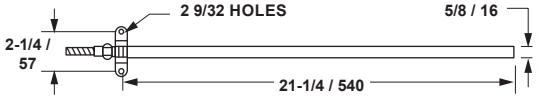
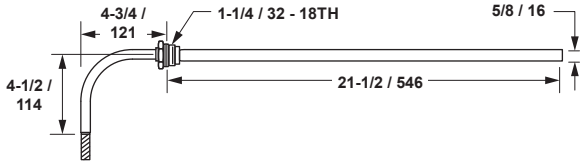


STYLE 706



STYLE 708



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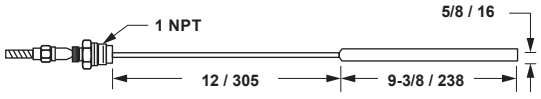

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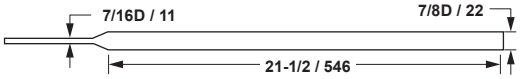

STYLE 711

IN. / mm

Figure 5. *Available Thermostats for Type T14 Pilot*

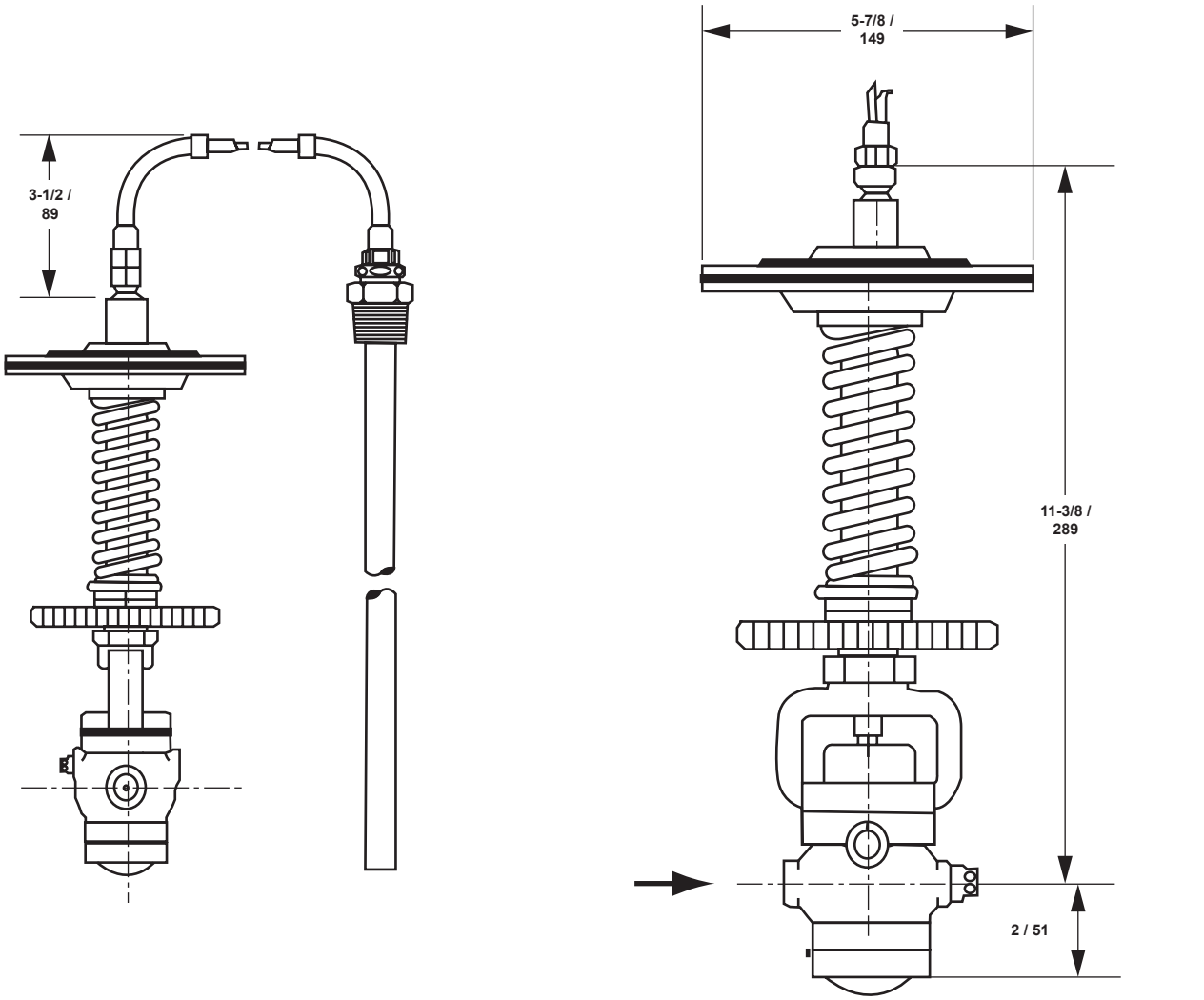

Figure 6. *Types T14 Pilot Dimensions*

Ordering Information

When ordering, complete the ordering guide on this page. Refer to the Specifications section on page 2.

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

Body Material (Select One)
- ☐ Cast Iron
- ☐ Cast Steel

Temperature Range (Select One)
- ☐ 20 to 120°F / -7 to 49°C
- ☐ 50 to 150°F / 10 to 66°C
- ☐ 70 to 170°F / 21 to 77°C
- ☐ 120 to 220°F / 49 to 104°C
- ☐ 150 to 300°F / 66 to 149°C
- ☐ 170 to 270°F / 77 to 132°C
- ☐ 250 to 350°F / 121 to 177°C
- ☐ 290 to 390°F / 143 to 199°C
- ☐ 300 to 400°F / 149 to 204°C
- ☐ 330 to 430°F / 166 to 221°C
- ☐ 400 to 500°F / 204 to 260°C

Option
- ☐ Bronze Thermostat
- ☐ Stainless steel Thermostat
- ☐ Tubing, please specify length: _____
- ☐ Thermostat Well
- ☐ Dial Thermometer
- ☐ Integral Mount Body

Thermostat Style (If applicable, select one)
- ☐ 700
- ☐ 701
- ☐ 702
- ☐ 703
- ☐ 704
- ☐ 706
- ☐ 708
- ☐ 711
- ☐ 712
- ☐ 713
- ☐ 731
- ☐ 732
- ☐ 740

SpenceValve.com

Emerson

Americas
McKinney, Texas 75069 USA
T +1 800 558 5853
+1 972 548 3574

Asia Pacific
Singapore 128461, Singapore
T +65 6777 8211

Europe
Bologna 40013, Italy
T +39 051 419 0611

Middle East and Africa
Dubai, United Arab Emirates
T +971 4 811 8100

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