

# Spence™ Types T124 and T134 Temperature and Pressure Pilots



*Figure 1. Types T124 and T134 Temperature and Pressure Pilots*

## Features

- Precise and Rapid Response
- Vapor Tension Thermostat Spring-Operated
- Self Contained
- Normally Open
- Packless Construction
- Fluid, Gas and Vapor Applications
- Strainer Screen Built-in
- Easy in-line Maintenance
- Temperature and Pressure in One Pilot

## Introduction

The steam pressure reducing valve and temperature regulator in a single pilot-operated valve is a combination of Type T124 or T134 Pilot and a Type E Main Valve. Steam pressure is modulated in proportion to temperature and load variations. Pressure control provides fast, accurate adjustment of heat transfer rate to demand requirements.

This pilot is primarily intended for use on instantaneous heaters. By combining both temperature and pressure control in one pilot, unusually close regulation of temperature is achieved through the anticipation of fast load changes. An additional benefit of this pilot is that pressure reduction and temperature control can be provided with a single regulator. For pressures not to exceed 20 psi / 1.38 bar, Type T134 should be used. For pressures between 20 and 125 psi / 1.38 and 8.62 bar, Type T124 should be used.

# Types T124 and T134

## Specifications

This section lists the specifications for Types T124 and T134. Factory specifications are stamped on the nameplate fastened on the pilot at the factory.

|   |  |
|---|--|
| <p><b>Available Configurations</b></p> <p><b>Type T124:</b> Operating pressures between 20 to 125 psi / 1.38 to 8.62 bar</p> <p><b>Type T134:</b> Operating pressures up to 20 psi / 1.38 bar</p> <p><b>Available Thermostats</b><br/>See Table 1</p> <p><b>Maximum Inlet Temperature<sup>(1)</sup></b></p> <p><b>Cast Iron:</b> 450°F / 232°C</p> <p><b>Cast Steel (Type T134 only):</b> 750°F / 400°C</p> <p><b>Temperature Control Ranges<sup>(1)</sup></b></p> <p>20 to 120°F / -7 to 49°C<br/>50 to 150°F / 10 to 66°C<br/>70 to 170°F / 21 to 77°C<br/>120 to 220°F / 49 to 104°C<br/>150 to 300°F / 66 to 149°C<br/>170 to 270°F / 77 to 132°C<br/>250 to 350°F / 121 to 177°C<br/>290 to 390°F / 143 to 199°C<br/>300 to 400°F / 149 to 204°C<br/>330 to 430°F / 166 to 221°C<br/>400 to 500°F / 204 to 260°C</p> | <p><b>Maximum Inlet Pressure<sup>(1)</sup></b></p> <p><b>Cast Iron:</b> 250 psi / 17.2 bar</p> <p><b>Cast Steel (Type T134 only):</b> 600 psi / 41.4 bar</p> <p><b>Construction Materials</b></p> <p><b>Body:</b> Cast Iron, Steel</p> <p><b>Stem, Disk, Seat and Diaphragm:</b> Stainless steel</p> <p><b>Gasket:</b> Graphite</p> <p><b>Spring:</b> Steel</p> <p><b>Approximate Weights</b></p> <p><b>Type T124:</b> 16 lbs / 7.3 kg</p> <p><b>Type T134:</b> 18 lbs / 8.2 kg</p> <p><b>Options</b></p> <p>Bronze or Stainless steel Thermostat<br/>Tubing from 5 to 50 ft / 1.52 to 15.2 m<br/>Thermostat Well<br/>Dial Thermometer<br/>Integral Mount Body</p> |
|---|--|

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 is opened by compressing the pressure limit spring.

When steam is turned on, it flows to the pilot through the connecting nipple and union (see Figure 2). At 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.

Steam flowing to the heater creates a rising delivery pressure which is feed back through the control pipe to the underside of the pilot diaphragm. As the pressure on this diaphragm approaches a balance with the thrust of the pressure limit spring, the pilot throttles. This, in turn, allows the main valve to assume a position where just enough steam flows to maintain the set maximum delivery pressure.

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.

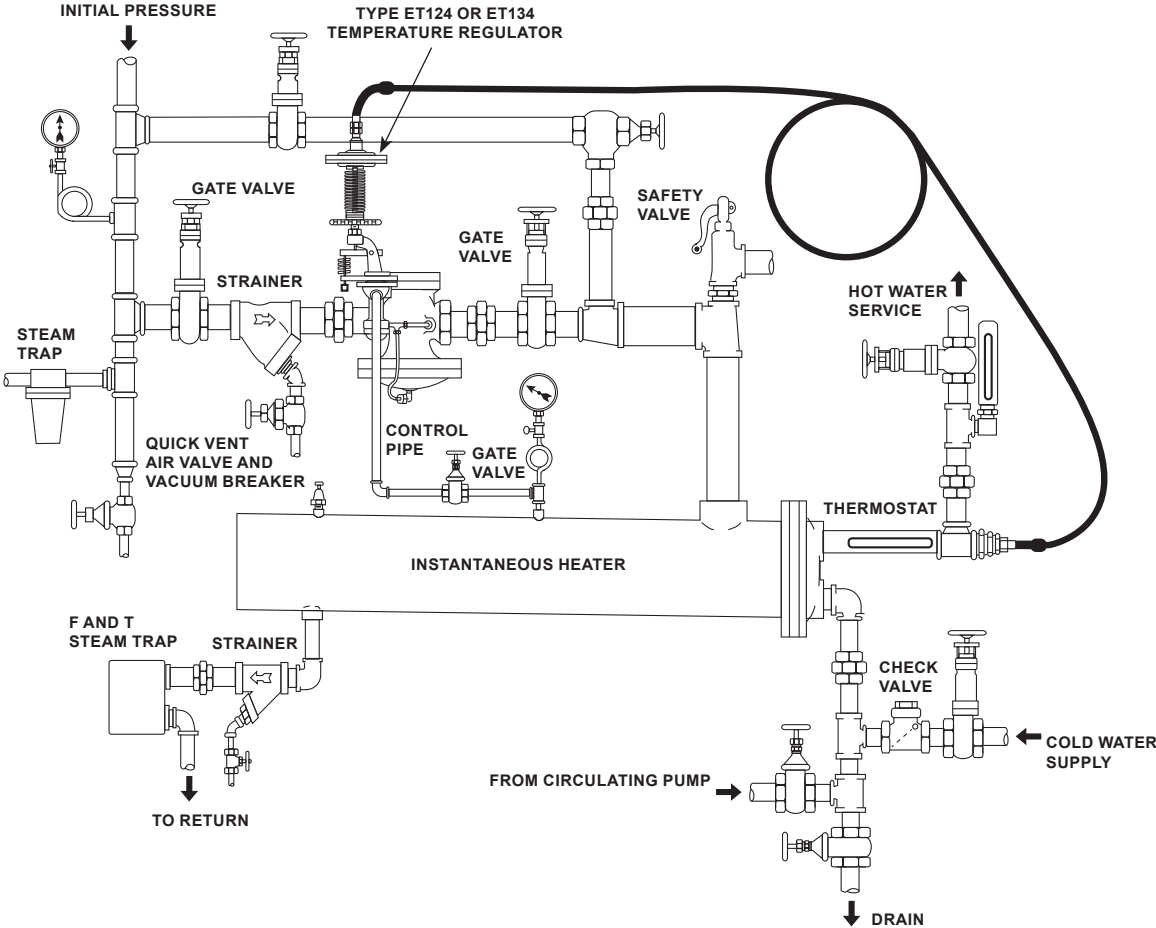


Figure 2. Typical Heater Installation

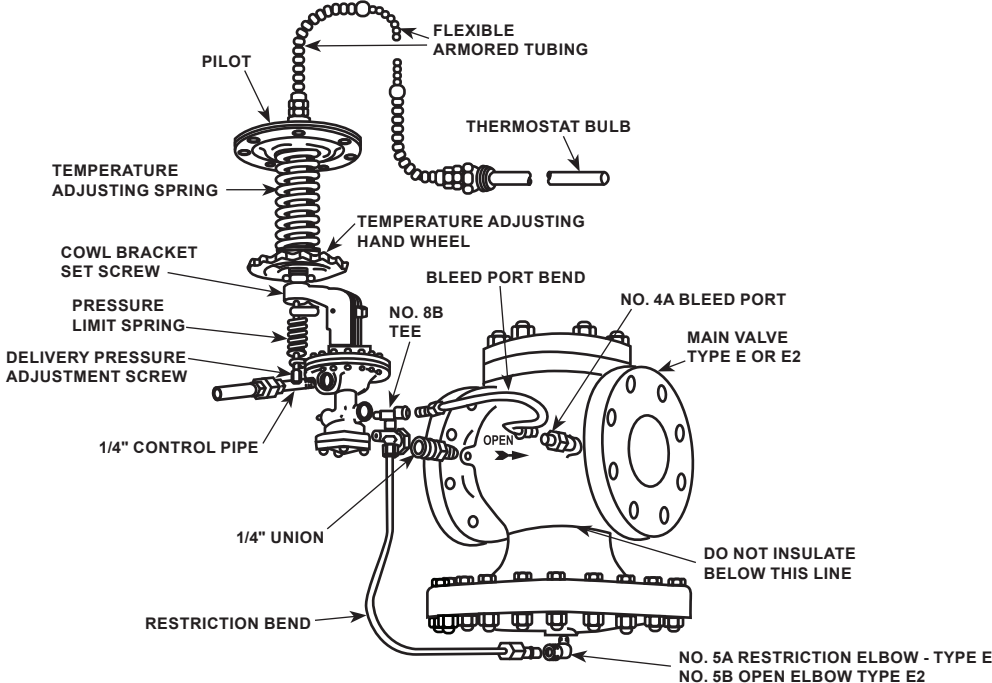


Figure 3. Type T124 Tubing Bends Connection

# Types T124 and T134

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## 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

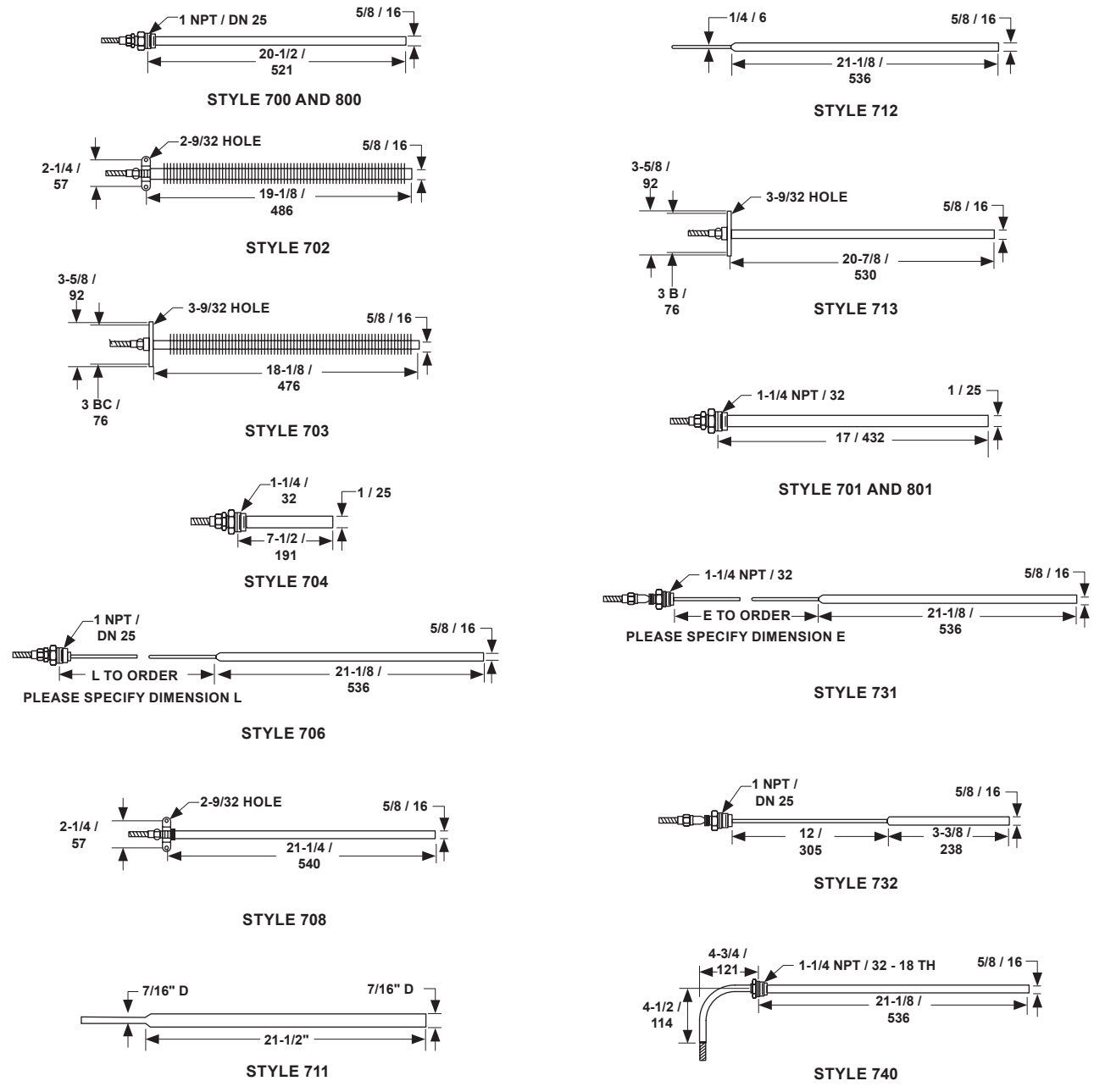
1. Use 1/4 in. / 6.35 mm pipe for this line which connects the pilot pressure diaphragm chamber (Figure 3) to the desired point of pressure control.

#### Note

**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.**

2. Pitch the control pipe away from the pilot and avoid water pockets.

# Types T124 and T134



IN. / mm

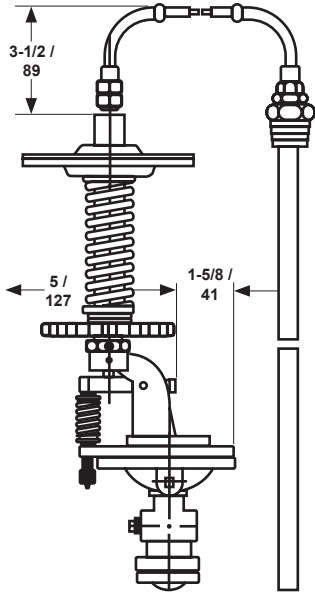
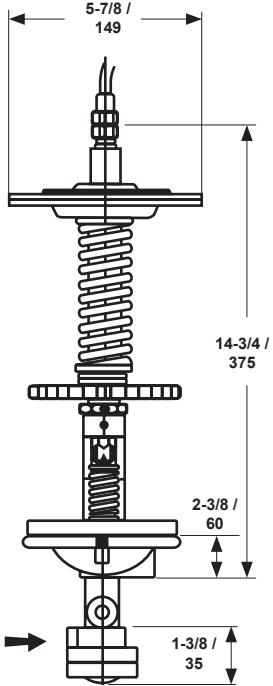
Figure 4. Available Thermostats for Types T124 and T134 Pilots

# Types T124 and T134

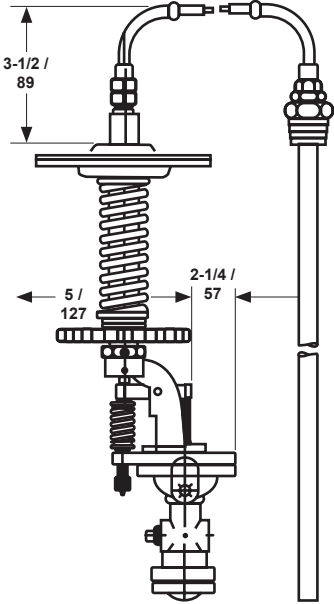
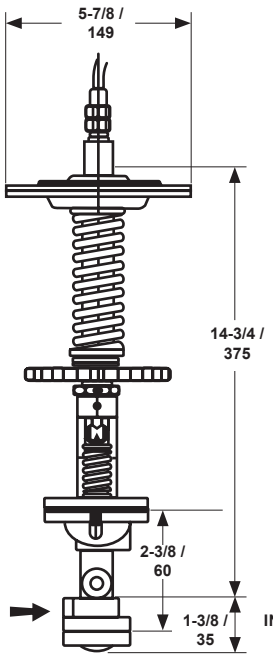
**Table 1. Available Thermostats**

| 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   |
| 800              | Plain Bulb with 1 in. / 25.4 mm Union Connection.  |
| 801              | 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. |

# Types T124 and T134



TYPE T124 PILOT



TYPE T134 PILOT

IN. / mm

Figure 5. Types T124 and T134 Pilots Dimensions

# Types T124 and T134

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## 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

### Type (Select One)

- Type T124
- Type T134

### Body Material (Select One)

- Cast Iron
- 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
- 800
- 801

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