

## T-4000 Series Pneumatic Room Thermostats

### Features

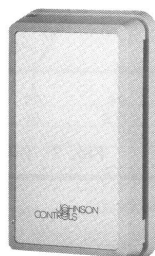
- Adjustable Sensitivities and Set Points
- Individual Set Points on Dual Temperature Controllers
- Pneumatic Feedback for Greater Accuracy
- Vibration and Shock Resistant
- Meets Governmental and Commercial Requirements
- Single or Dual Bimetal Sensing Elements
- Element Identification Labels
- Rugged Construction and Decorative Design

The T-4000 Series Pneumatic Room Thermostats provide individual space temperature control in all types of heating and cooling applications. By producing a proportional output signal, these thermostats modulate controlled devices in response to load changes in the space. This imposes the least demand on mechanical heating and cooling apparatus. A variety of high volume output and low volume output controllers are available to meet the functional requirements of any control system. Auxiliary devices are available to perform functions such as two-position action, high-low pressure selection, sequencing, etc.

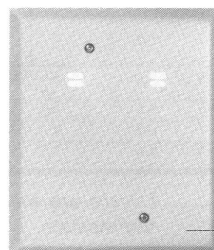
### High Volume Output Thermostats

The high volume output thermostats feature pneumatic feedback and volume amplification to provide fast and accurate proportional response. All models feature an output test connection which can be used for service and calibration.

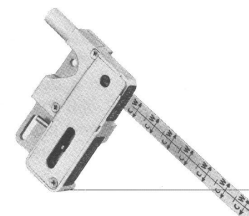
A variety of covers (see Page 3) and mounting accessories (see



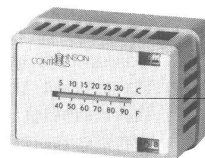
Typical Low Volume Output Thermostat



Concealed Mounted Thermostat



Typical Diffuser Mounted Thermostat



Typical High Volume Output Thermostat

Table 1) for horizontal and vertical mounting are available and must be ordered separately.

### Model Descriptions

The **T-4002** is a single temperature thermostat available in direct and reverse acting models.

The **T-4003** submaster thermostat can be reset from a remote location or in accordance with a reference temperature variation. An increase in master pressure from a remote source will increase (direct readjustment) or decrease (reverse readjustment) the set point of the direct or reverse acting model respectively.

The **T-4054** energy manager heating-cooling room thermostat features an adjustable deadband of 0 to 30°F (0 to 16°C) between heating and cooling set points (see Fig. 1). This deadband encourages energy conservation and prevents

energy waste by eliminating heating and cooling overlap.

The **T-4506** is a dual temperature, dual dial thermostat designed to provide individual day and night or two set point temperature control. The set point change is accomplished with a change in supply pressure. A 15 PSIG (105 kPa) supply represents the lower element and a 20 PSIG (140 kPa) supply represents the upper element. The action of both elements is the same. A change in either set point does not affect the other set point. On day-night applications with 20 PSIG representing the night set point, an optional manual indexing switch is available to restore the day temperature of the individual thermostat without affecting the other system thermostats. The indexing switch can be unlatched manually or will automatically reset with the day cycle.

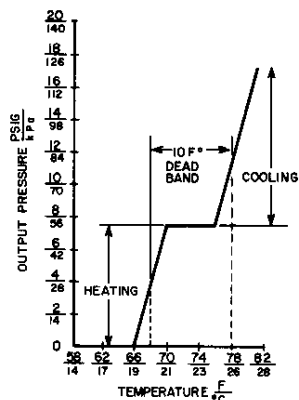


Fig. 1: T-4054 Operational Graph

The **T-4516** is also a dual temperature, dual dial thermostat for individual day and night control or weekend setback. Functionally it is similar to the T-4506; however, it features an additional output air terminal which can be used as an on-off switchline pressure. The manual indexing switch is standard on this thermostat. Depressing the switch exhausts the switchline pressure and restores day operation of the individual thermostat without affecting other system thermostats. The switch can be unlatched manually or will automatically reset with the day cycle.

The **T-4756** is a dual temperature, dual dial heating-cooling thermostat which accomplishes mode switchover between direct and reverse actions, with a change in supply pressure from 15 to 20 PSIG (105 to 140 kPa). An energy conservation model is available with factory stops to limit the set points to 75°F (24°C) maximum for heating and 75°F minimum for cooling. This model is furnished with WARM and COOL dials.

### Low Volume Output Thermostats

The low volume output thermostats employ a ball type, force balance control port to provide proportional feedback and stable control. These thermostats are electrically non-conductive and allow test probe access without removal of the cover. Attractive low profile

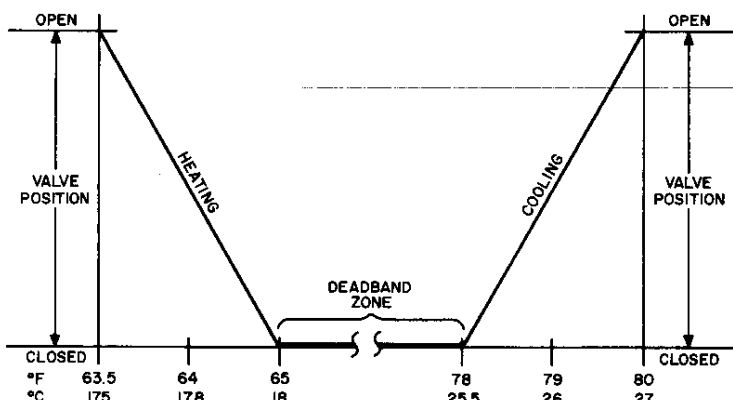


Fig. 2: T-4600 Operational Graph

covers are included with these thermostats.

### Model Descriptions

The **T-4100** is a single temperature thermostat. The unit features exposed or concealed set point adjustment and a standard Fahrenheit and Celsius thermometer. With the use of a remote restrictor, this instrument requires only one air connection.

The **T-4110** is a single temperature thermostat designed specifically for mounting in ceiling terminal units. This thermostat may be located within a room air sampling chamber, return air grille, or is available with an optional protective cover which incorporates an aspirator feature to be powered by the duct air pressure when mounted in a diffuser. Available in direct or reverse models, the unit features a long flexible plastic lever, connected to its set point adjuster, which extends through the ceiling or diffuser allowing adjustment from inside a room.

The **T-4600** is an energy manager heating-cooling thermostat which features two outputs and individually adjustable sensitivities and set points for heating and cooling. Available in dual direct, dual reverse, or direct and reverse action models, the independent set points can result in a deadband to encourage energy conservation and prevent energy waste by eliminating heating and cooling overlap (see Fig. 2).

**Note: All dual temperature thermostats come equipped with element identification labels indicating the function of the element.**

### Installation

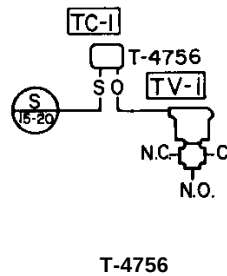
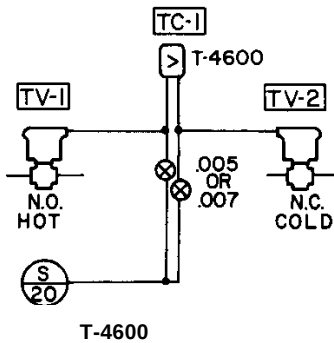
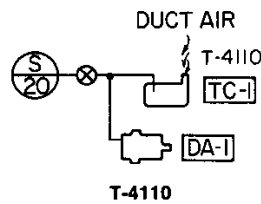
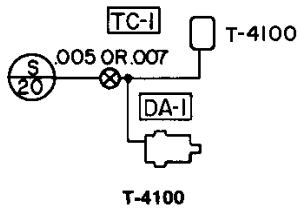
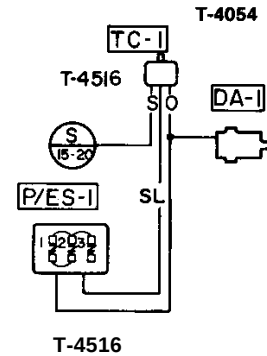
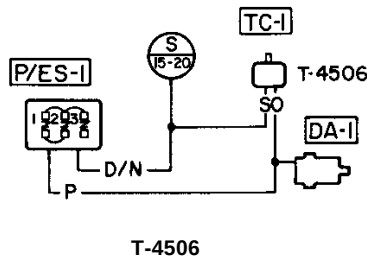
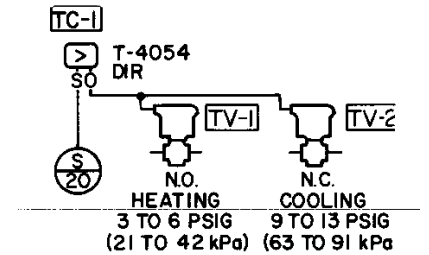
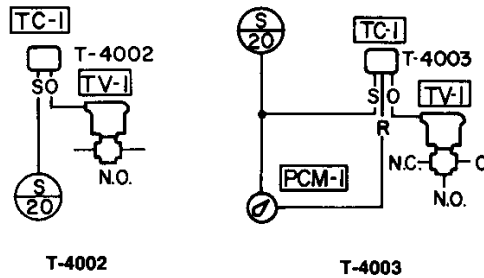
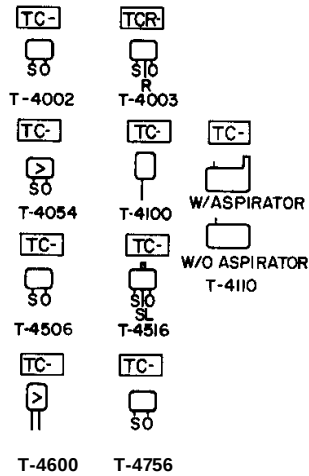
Thermostat installation procedures vary between the high volume output and low volume output units. Various accessories are available (see Table 1) to facilitate mounting room thermostats on virtually any wall surface. For a complete list of accessory repair parts, refer to Installation Data T-4000-A.8.

All thermostats can be mounted horizontally or vertically; air connections are made with 5/32 in. O.D. polytubing to barbed fittings furnished on the units. Only high volume output thermostats that do not have manual indexing switches can be concealed mounted with the use of an aspirator wallbox and flush wallplate. Other accessories can be used for ceiling suspended mounting. Several kits are also available for converting existing thermostats. For complete mounting instructions, refer to Installation Data T-4000-A.

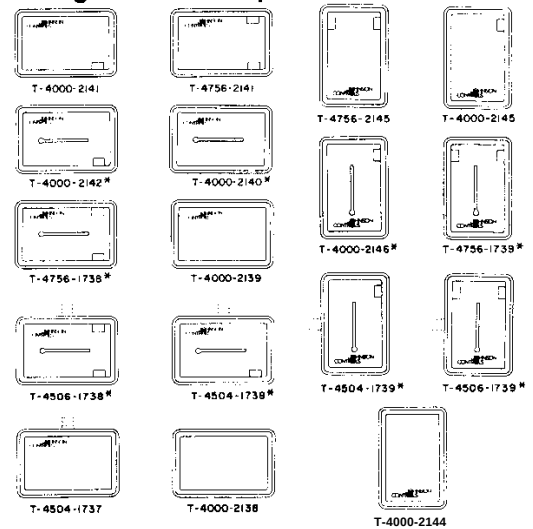
### Adjustment

The procedure for set point and sensitivity adjustment depends on the type of thermostat and method of mounting. For detailed adjusting instructions, refer to Adjustment Data T-4000-B.

## Application and Drawing Identification



### Beige Plastic Cover Selection Guide for High Volume Output Thermostats



\* Covers with Thermometers have both °F and °C scales.

### Thermostat Specification and Selection Guide (table rows continued on facing page)

|               | Type                                                      | Action-Proportional                                                   | Sensitivity                                                                                        | Flow Capacity                                                                                          | Air Consumption                                        | Supply Pressure *                                                                                                                       |
|---------------|-----------------------------------------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| <b>T-4002</b> | Single Temperature                                        | Direct or Reverse                                                     | Adjustable from .75 to 4 PSI/F° (9 to 50 kPa/C°)<br>Factory set at approx. 2.5 PSI/ F° (32 kPa/C°) | 400 SCIM (107 mL/s)                                                                                    | 20 SCIM (5 mL/s)                                       | 13 to 25 PSIG (91 to 175 kPa)<br>Nominal 20 PSIG (140 kPa)                                                                              |
| <b>T-4003</b> | Submaster                                                 | Direct-Direct Readjustment<br>Reverse--Reverse Readjustment           | Fixed at approx. 2.5 PSI/ F° (32 kPa/C°)                                                           | 400 SCIM (107 mL/s)                                                                                    | 20 SCIM (5 mL/s)                                       | Supply Pressure: 13 to 25 PSIG (91 to 175 kPa) Nominal 20 PSIG (140 kPa)<br>Master Pressure: Variable input 0 to 20 PSIG (0 to 140 kPa) |
| <b>T-4054</b> | Dual Temperature Heating/Cooling                          | Direct or Reverse                                                     | Adjustable from 1 to 3 PSI/F° (12 to 38 kPa/C°), Factory set at approx. 2.5 PSI/ F° (32 kPa/C°)    | 400 SCIM (107 mL/s)                                                                                    | 38 SCIM (10 mL/s)                                      | 13 to 25 PSIG (91 to 175 kPa)<br>Nominal 20 PSIG (140 kPa)                                                                              |
| <b>T-4100</b> | Single Temperature                                        | Direct or Reverse                                                     | Adjustable from 1 to 3 PSI/F° (12 to 38 kPa/C°), Factory set at approx. 2.5 PSI/ F° (32 kPa/C°)    | 45 SCIM (12 mL/s) with .007 in. Restrictor, 25 SCIM (7 mL/s) with .005 in. Restrictor                  | 45 or 25 SCIM (12 or 7 mL/s) Depending on Restrictor   | 13 to 25 PSIG (91 to 175 kPa)<br>Nominal 20 PSIG (140 kPa) restricted                                                                   |
| <b>T-4110</b> | Single Temperature                                        | Direct or Reverse                                                     | Adjustable from 1 to 3 PSI/F° (12 to 38 kPa/C°), Factory set at approx. 2.5 PSI/ F° (32 kPa/C°)    | 45 SCIM (12 mL/s) with .007 in. Restrictor, 25 SCIM (7 mL/s) with .005 in. Restrictor                  | 45 or 25 SCIM (12 or 7 mL/s) depending on restrictor   | 13 to 25 PSIG (91 to 175 kPa)<br>Nominal 20 PSIG (140 kPa) restricted                                                                   |
| <b>T-4506</b> | Dual Temperature Day/Night Switched Supply                | Dual Direct or Dual Reverse with Auto Switchover at 17 PSIG (119 kPa) | Adjustable from .75 to 4 PSI/F° (9 to 50 kPa/C°)<br>Factory set at approx. 2.5 PSI/ F° (32 kPa/C°) | 400 SCIM (107 mL/s)                                                                                    | 20 SCIM (5 mL/s)                                       | 13 to 25 PSIG (91 to 175 kPa),<br>Nominal Day: 15 PSIG (105 kPa)<br>Nominal Night: 20 PSIG (140 kPa)                                    |
| <b>T-4516</b> | Dual Temperature Day/Night Switched Supply and Switchline | Dual Direct with Auto Switchover at 17 PSIG                           | Adjustable from .75 to 4 PSI/F° (9 to 50 kPa/C°)<br>Factory set at approx. 2.5 PSI/ F° (32 kPa/C°) | 400 SCIM (107 mL/s)                                                                                    | 20 SCIM (5 mL/s)                                       | Supply Pressure (nominal): 15 PSIG (105 kPa)<br>20 PSIG (140 kPa)<br>Switchline Pressure (nominal): 0 PSIG (0 kPa)<br>20 PSIG (140 kPa) |
| <b>T-4600</b> | Dual Temperature Heating/Cooling                          | Dual Direct, Dual Reverse, or Direct/Reverse                          | Adjustable from 1 to 3 PSI/F° (12 to 38 kPa/C°)<br>Factory set at approx. 2.5 PSI/ F° (32 kPa/C°)  | 45 SCIM (12 mL/s) with .007 in. Restrictor 25 SCIM (7 mL/s) with .005 in. Restrictor (for each output) | 50 or 90 SCIM (14 or 24 mL/s) Depending on Restrictors | 13 to 25 PSIG (91 to 175 kPa)<br>Nominal 20 PSIG (140 kPa) restricted                                                                   |
| <b>T-4756</b> | Dual Temperature Heating/Cooling Switched Supply          | Direct/Reverse                                                        | Adjustable from .75 to 4 PSI/F° (9 to 50 kPa/C°)<br>Factory set at approx. 2.5 PSI/ F° (32 kPa/C°) | 400 SCIM (107 mL/s)                                                                                    | 20 SCIM (5 mL/s)                                       | 13 to 25 PSIG (91 to 175 kPa)<br>Nominal 15 PSIG (105 kPa) Direct, 20 PSIG (140 kPa) Reverse, or Vice Versa                             |

## Thermostat Specification and Selection Guide (table rows continued from facing page)

|               | Air Connections**                                    | Dial Ranges                                            | Special Features                                                                                         | Code No.             | Suffix                                                                                                               | Shipping Weight lb.*** |
|---------------|------------------------------------------------------|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------------|------------------------|
| <b>T-4002</b> | Two Supply and Output                                | 55 to 85° F                                            | Volume Amplifier, Pneumatic Feedback                                                                     | T-4002-              | Action Vert. Horiz<br>DIR 201 203<br>REV 202 204                                                                     | 0.4                    |
| <b>T-4003</b> | Three Supply, Output, and Remote Reset Input         | 55 to 85° F                                            | Volume Amplifier, Remote Readjustment--from .15 to 2.5°F/PSI (1.8 to 30°C/kPa)                           | T-4003-              | DIR,DR Horiz<br>REV,RR 201 203 Mtg.                                                                                  | 0.4                    |
| <b>T-4054</b> | Two Supply and Output                                | Two dials 55 to 85° F                                  | Energy Manager, Pneumatic Feedback, Adjustable Deadband--between 5 and 12 PSIG (35 and 84 kPa)           | T-4054-              | Horiz or Vert.<br>DIR 1<br>REV 2                                                                                     | 0.4                    |
| <b>T-4100</b> | One Restricted Supply/Output                         | 55 to 85°F or 13 to 29°F                               | Pneumatic Feedback, °F and °C Thermometer                                                                | T-4100- (Vert. Mtg.) | F° Dial C° Dial<br>DIR 1 3<br>REV 2 4                                                                                | 0.2                    |
| <b>T-4110</b> | Two Control and Aspirator                            | 66 to 82°F (19 to 28°C)                                | Ball Control Port , Flexible Setpoint, Lever, Adjustable Sensitivity                                     | T-4110-              | w/o aspirator w/aspirator<br>DIR 1 2<br>REV 3 4                                                                      | 0.2                    |
| <b>T-4506</b> | Two Supply and Output                                | Two dials 55 to 85°F                                   | Volume Amplifier, Pneumatic Feedback, Manual Indexing Switch (optional), Element Identification Labels   | T-4506-              | mtg. w/switch w/o switch<br>DIR Horiz. 201 203<br>Vert. 202 204<br>REV Horiz. 209 217                                | 0.4                    |
| <b>T-4516</b> | Three Supply, Output, and Switchline                 | Two dials 55 to 85°F                                   | Volume Amplifier, Pneumatic Feedback, Manual Indexing Switch (standard), Element Identification Labels   | T-4516-              | DIR Horiz. 201<br>Vet. 202                                                                                           | 0.4                    |
| <b>T-4600</b> | Two-Restricted Supply/Output for Heating and Cooling | 50 to 80°F and 63 to 93°F or 10 to 27°C and 17 to 34°C | Energy Manager, Individual Adjustments for Heating and Cooling, Element Identification Labels            | T-4600- (Vert. Mtg.) | Action F° Dial C° Dial<br>DIR 1 3<br>REV 2 4<br>DIR and REV 5 6                                                      | 0.3                    |
| <b>T-4756</b> | Two Supply and Output                                | Two dials 55 to 85°F                                   | Volume Amplifier, Models Available with Factory Stops and WARM-COOL dials, Element Identification Labels | T-4756-              | Action Mtg. F° Dial W-C Dial<br>DIR Horiz. 201 216<br>@15 PSIG Vert. 202<br>DIR Horiz. 205 217<br>@20 PSIG Vert. 206 | 0.4                    |

### Elements

#### \*Supply Pressure

#### \*\*Air Connections

#### Ambient Operating Temp Limits

#### Ambient Storage Temp Limits

#### \*\*\*lb x 0.454 = kg

Single or Dual Bimetal Strips

Air Supply Must Be Clean, Dry, and Oil Free

Barbed Fittings for 5/32 in. O.D. Polytubing

-20 to 130°F (-29 to 54°C)

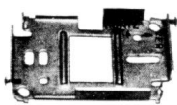
-20 to 150°F (-29 to 66°C) or -20 to 130°F for Units with Thermometers

*The performance specifications are nominal and conform to acceptable industry standards. For application at conditions beyond these specifications, consult the local Johnson Controls office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.*

**Table 1: Accessories (Order Separately)**

| Thermostat, Mounting or Air Connection<br>Accessory Description |                        |       | Application    |               | Shipping<br>Weight<br>lb* | Code<br>Number | Function                                                                                        |
|-----------------------------------------------------------------|------------------------|-------|----------------|---------------|---------------------------|----------------|-------------------------------------------------------------------------------------------------|
|                                                                 |                        |       | High<br>Volume | Low<br>Volume |                           |                |                                                                                                 |
| Room Instrument Mounting Bracket                                |                        |       | X              |               | 0.3                       | T-4002-124     | For surface mounting all thermostats and covers                                                 |
| Plaster Groundplate                                             |                        |       | X              |               | 0.2                       | T-4002-6038    | For rough-in of surface mounted thermostats in masonry                                          |
| Metal Wallbox                                                   |                        |       | X              | X             | 0.3                       | T-4002-6029    |                                                                                                 |
| Cover for Groundplate or Metal Wallbox                          |                        |       | X              | X             | 0.2                       | T-4002-5010    | To keep dirt out of ground-plate and wallbox during construction                                |
| Restricted Adjustment Pin<br>(Order in Multiples of 100)        |                        |       | X              | X             | 0.2                       | T-4002-5003    | To restrict adjustment of set point dial                                                        |
| Universal Wallplate Adapter Kit                                 |                        |       |                | X             | 0.1                       | T-4100-103     | Mounts on standard electrical wallboxes and some competitor's hardware                          |
| Plastic Screw Anchors<br>(Order in Multiples of 100)            |                        |       | X              | X             | 0.5                       | F-1000-321     | For mounting brackets and wallboxes                                                             |
| Wire Guard                                                      | For Exposed Tubing     |       | X              | X             | 0.3                       | T-4002-3000    | For surface mounted thermostat protection after construction                                    |
|                                                                 | For Concealed Tubing   |       | X              | X             | 0.3                       | T-4002-3001    |                                                                                                 |
| Optional Wire Guard Mounting Plate                              |                        |       | X              | X             | 0.2                       | T-4002-6045    |                                                                                                 |
| Cast Aluminum Guard and Mounting Bracket                        |                        |       | X              | X             | 0.3                       | T-4002-3004    |                                                                                                 |
| Plastic Guard                                                   |                        |       | X              | X             | 0.4                       | GRD10A-608     |                                                                                                 |
| Concealed Thermometer                                           |                        |       | X              |               | .01                       | T-4000-108     | For concealed thermometer cover applications                                                    |
| Plastic Surface Mounting Back                                   |                        |       | X              |               | 0.5                       | T-4002-125     | For surface mounted thermostats with exposed tubing                                             |
| Terminal Connector with Two Angle Fittings                      |                        |       | X              |               | 0.1                       | T-4002-123     |                                                                                                 |
| Aspirator Wallbox Kit                                           |                        |       | X              |               | 0.5                       | T-4000-110     | For concealed mounted thermostats without pushbuttons                                           |
| Wallplate Cover Kit                                             | Beige Finish           |       | X              |               | 0.4                       | T-4000-111     |                                                                                                 |
|                                                                 | Stainless Steel Finish |       | X              |               | 0.4                       | T-4000-112     |                                                                                                 |
| Two-Tube Sheathed Polyethylene Strain Relief Bushing            |                        |       | X              | X             | 0.1                       | T-4000-101     | For rough-in box or metal wallbox to instrument air system tubing adaptation (1/2 in. knockout) |
| Three-Tube Sheathed Polyethylene Strain Relief Bushing          |                        |       | X              |               | 0.1                       | T-4000-102     |                                                                                                 |
| 1/2 in. Conduit (EMT) Connector                                 |                        |       | X              | X             | 0.1                       | T-4000-103     |                                                                                                 |
| Set Point Label Card                                            |                        |       | X              | X             | 0.1                       | T-4000-114     | To identify the control function                                                                |
| Wallbox Mounting Kit                                            |                        |       | X              |               | 0.2                       | TE-1800-9600   | To adapt 4000 series brackets and covers to standard conduit wallboxes                          |
| Terminal Connector with Two Straight Fittings                   |                        |       | X              |               | 0.1                       | T-4002-122     |                                                                                                 |
| Terminal Connector with Three Straight Fittings                 |                        |       | X              |               | 0.1                       | T-4512-100     | For optional plug-in connection to 5/32 in. O.D. polyethylene tubing                            |
| Terminal Connector Protector Cap (For Rough-in Only)            |                        |       | X              |               | 0.1                       | T-4000-100     |                                                                                                 |
| Two 5/32 x 5/32 in. Elbow Fittings                              |                        |       |                | X             | 0.1                       | F-500-45       |                                                                                                 |
| Ceiling Suspended Mounting Kit<br>(See T-4000-A Bulletin)       |                        |       | X              |               | 0.5                       | T-4002-100     | To provide a method of installing a 4000 series thermostat other than wall mounting             |
| Adjusting Knob Kit                                              |                        |       | X              |               | 0.5                       | T-4002-5012    | To provide a means of external set point adjustment                                             |
| 0 to 150°F Dial Strip (Select 30°F Span for Special Range)      | Horizontal             | Lower | X              |               | 0.5                       | T-4000-115     | To provide dial ranges other than the standard ranges                                           |
|                                                                 |                        | Upper | X              |               | 0.5                       | T-4506-100     |                                                                                                 |
|                                                                 | Vertical               | Right | X              |               | 0.5                       | T-4000-116     |                                                                                                 |
|                                                                 |                        | Left  | X              |               | 0.5                       | T-4506-101     |                                                                                                 |
| -20 to 80°C Dial Strip (Select 15°C Span for Special Range)     | Horizontal             | Lower | X              |               | 0.5                       | T-4000-117     |                                                                                                 |
|                                                                 |                        | Upper | X              |               | 0.5                       | T-4506-102     |                                                                                                 |
|                                                                 | Vertical               | Right | X              |               | 0.5                       | T-4000-118     |                                                                                                 |
|                                                                 |                        | Left  | X              |               | 0.5                       | T-4506-103     |                                                                                                 |
| Plain Faceplate Kit                                             |                        |       |                | X             | 0.1                       | T-4100-100     | For T-4100 and T-4600 series thermostat covers                                                  |
| Horizontal Faceplate Kit                                        |                        |       |                | X             | 0.1                       | T-4100-101     |                                                                                                 |
| Thermometer: °F and °C                                          |                        |       |                | X             | 0.1                       | T-4100-102     |                                                                                                 |
| Restrictor - .005 in. (Red)                                     |                        |       |                | X             | 0.1                       | R-3710-1005    | For restricted supply source                                                                    |
| Restrictor - .007 in. (Aqua)                                    |                        |       |                | X             | 0.1                       | R-3710-1007    |                                                                                                 |
| Restrictor Tee - .005 in. 1/4 x 5/32 (Red)                      |                        |       |                | X             | 0.1                       | R-3710-3205    |                                                                                                 |
| Restrictor Tee - .007 in. 1/4 x 5/32 x 5/32 (Aqua)              |                        |       |                | X             | 0.1                       | R-3710-3207    |                                                                                                 |
| Hypodermic Needle Test Probe                                    |                        |       | X              | X             | 0.2                       | X-200-140      | Calibration                                                                                     |
| Screw-in Gage                                                   |                        |       | X              |               | 0.3                       | X-200-19       |                                                                                                 |

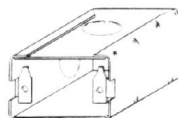
\*lb x 0.454 = kg



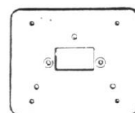
T-4002-124



F-1000-321



T-4002-6029



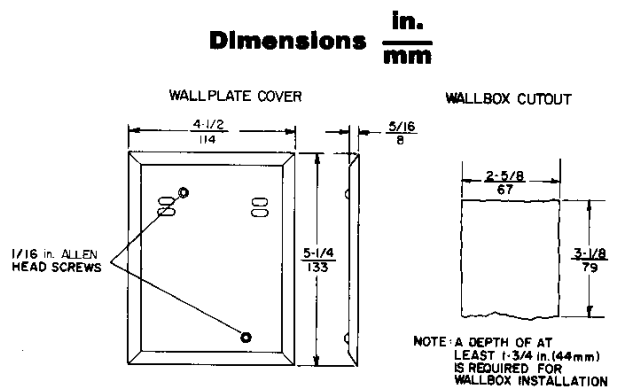
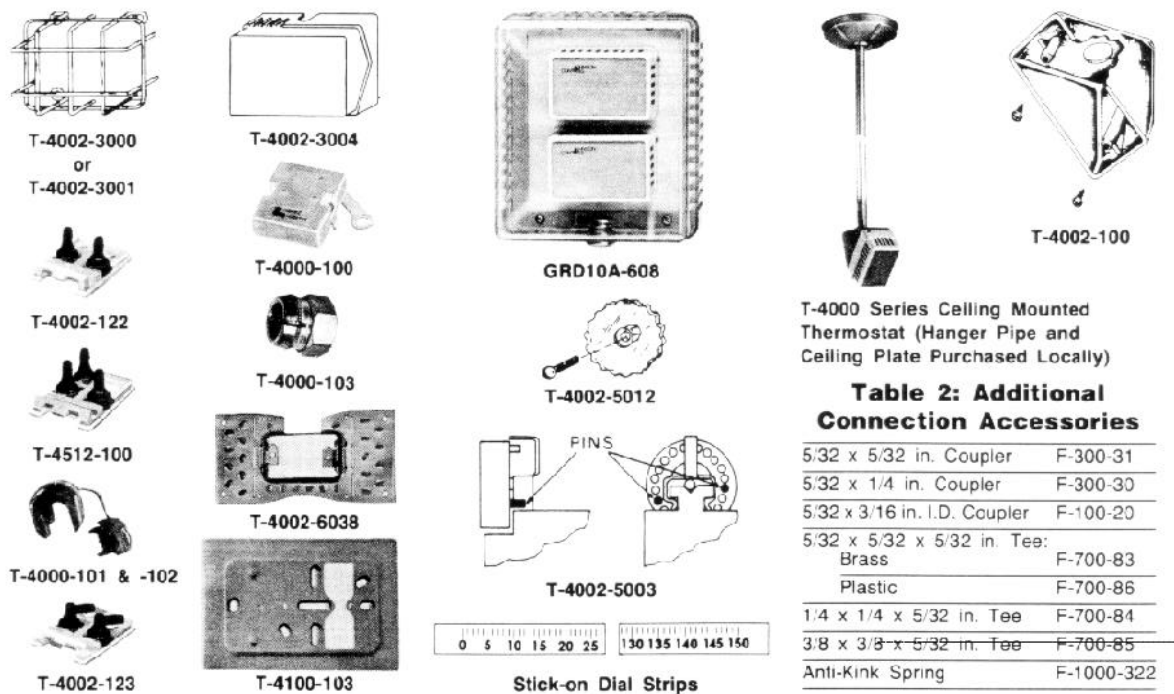
T-4002-6045



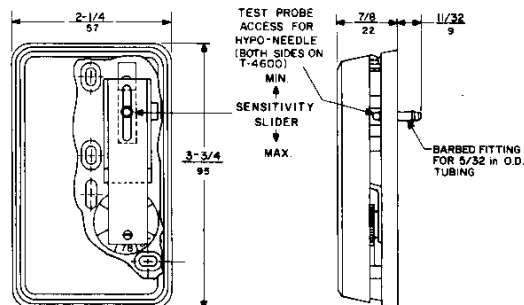
T-4002-5010



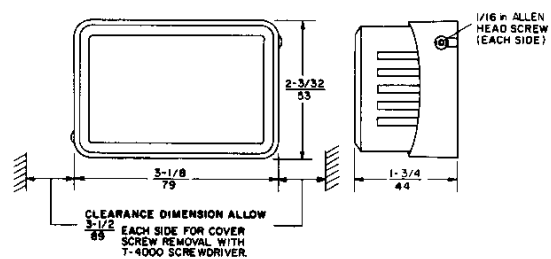
T-4002-125



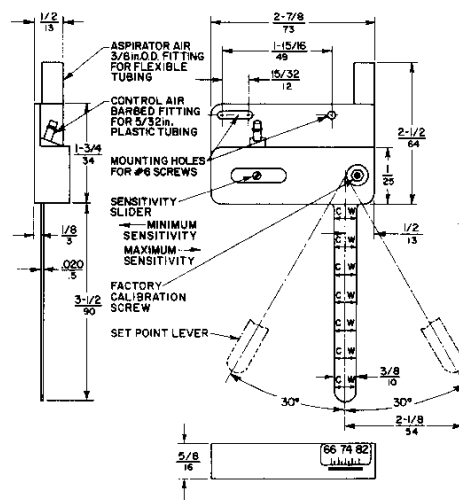
**Concealed Mounted Thermostat Wallplate and Wallbox Cutout**



**Low Volume Output Thermostat**



**High Volume Output Thermostat**



**Diffuser Mounted Thermostat**

---

## Notes



**Controls Group**  
507 E. Michigan Street  
P.O. Box 423  
Milwaukee, WI 53202

Printed in U.S.A.