

**Day/Night Pneumatic Room Thermostats
General Instructions**

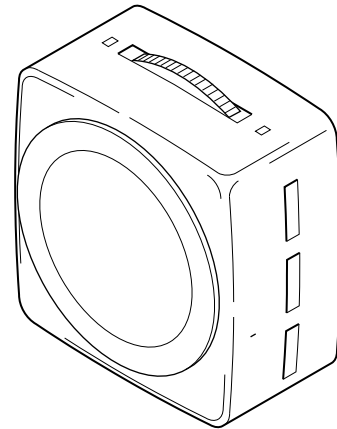
Application

The 2214 Series Pneumatic Room Thermostats are designed for applications requiring separate control points due to varying occupancy or seasonal loads. They are particularly well suited to day/night control in buildings such as schools and hospitals.

These thermostats have a serrated thumb wheel for setpoint adjustment. They utilize dual bimetals and are available in both direct and reverse acting models. One temperature (day) is controlled when the main pressure is 15 to 17 psig, and the other temperature (night) is controlled when the main pressure is 21 to 25 psig. Both control points are adjustable and either may be set to control higher or lower than the other, using a ball feedback system and a 2:1 relay. Thermostat covers are available in various styles to meet particular requirements. Cover options include models with a setpoint scale and a thermometer, a setpoint scale only, a thermometer only, or blank. An external setpoint adjustment cover is available on some models, or can be field-installed on covers where desired.

Features

- Factory-calibrated, stainless steel ball-in-seat provides pneumatic feedback for stable, linear operation.
- Separate factory-calibrated night bimetal and setpoint dial, with fixed 4 °F night throttling range for accurate "night" operation.
- Snap-acting (not gradual) changeover from "day" to "night" operation and vice versa.
- Easy-to-use throttling range adjustment and recalibration.
- Adjustable (patented) bimetal shows actual throttling range in both °F and °C. Adjustable 2 to 12 °F (1 to 6.7 °C).
- Leak-proof, self-closing branch gauge tap.



Full Dial Cover Shown
(Covers must be ordered separately except as noted.)

SPECIFICATIONS

Action: Proportional.

Setpoint Range:

Day, 55 to 85 °F (13 to 29 °C)

Night, 50 to 80 °F (10 to 27 °C).

Throttling Range:

Day, Adjustable 2 to 12 °F

Night, Adjustable 3 to 5 °F.

Supply Air Pressure:

Below 17 psig, Operates at day setpoint.

Above 21 psig, Operates at night setpoint.

Maximum Air Pressure: 30 psig.

Main Air Consumption: 30 scim at 16 psig; 43 scim at 25 psig.

Calibration Point: 9 psig branch line pressure when ambient equals setpoint (factory-set).

Day/Night Indexing: Remote, by change in main air pressure.

Setpoint Adjustment: Serrated thumbwheel.

Construction:

Mechanical Components, Die cast aluminum, stainless steel, and glass-filled nylon.

Diaphragm, Fabric-reinforced Neoprene.

Air Lines, Connect to thermostat nipples with spring-reinforced plastic tubes.

Branch Connections, Equipped with internal filters.

Environment

Humidity: 5 to 95% relative humidity, non-condensing.

Locations: NEMA Type 1.

ORDERING DATA

Table-1 Model Chart — Thermostats.

Wholesale Number	Replaces Model	Day/Night Action	Description
2214-121	T23-301	Direct/ Direct	Includes (2) 1/4" x 3/16" tubing reducers, 20-693 tubing, 20-714 wall plate, 20-711 mounting plate, and mounting screws.
2214-131 ^a	T23-3011		
2214-122	T24-301	Reverse/ Reverse	
2214-132 ^a	T24-132		

^a These models include factory-installed 20-712 dial stop kits.

Table-2 Model Chart — TAC Uni-Kits®.

Wholesale Number	Replaces Model	Action	Description
2214-521 ^a	T23-3011	Direct/ Direct	Includes thermostat with stops, 21-933 full dial cover with blank cover conversion, and 22-022 conversion kit.
2214-522 ^a	T24-3011		
2214-621	T23-301	Reverse/ Reverse	Includes thermostat, 22-1033 full dial cover with blank cover conversion, and 22-023 conversion kit.
2214-622	T24-301		

^a These models include factory-installed 20-712 dial stop kits.

Table-3 Covers.

Wholesale Number	Replaces Model	Color	Material	Dial Markings	Setpoint Adjustment	Thermometer			
21-923	C1-42	Satin Chrome	Metal	55 to 85 °F	Yes	No			
22-923	C1-46		Plastic						
22-823	C1-47	Beige							
22-1023	C1-48	Euro-white	10 to 30 °C						
21-928 ^a	C2-42	Satin Chrome		Metal	Blank		Concealed		
22-928 ^a	C2-46		Plastic						
22-828 ^a	C2-47	Beige							
22-1028 ^a	C2-48	Euro-white	10 to 30 °C						
21-933	C3-42	Satin Chrome		Metal		55 to 85 °F		Yes	Yes (External)
22-933	C3-46		Plastic						
22-833	C3-47	Beige							
22-1033	C3-48	Euro-white	10 to 30 °C						
21-939 ^a	C4-42	Satin Chrome		Metal	55 to 85 °F	Concealed			
22-939 ^a	C4-46		Plastic						
22-839 ^a	C4-47	Beige							
22-1039 ^a	C4-48	Euro-white	10 to 30 °C						
21-943	C5-42	Satin Chrome		Metal			Cooler - Warmer	Yes	No
22-943	C5-46		Plastic						
22-843	C5-47	Beige							
22-1043	C5-48	Euro-white	10 to 30 °C						
21-948	C6-42	Satin Chrome		Metal	None	Concealed			
22-948	C6-46		Plastic						
22-848	C6-47	Beige							
22-1048	C6-48	Euro-white	10 to 30 °C						
21-957 ^a	C11-42	Satin Chrome		Metal			Blank	Concealed	Yes (Internal)
22-957 ^a	C11-46		Plastic						
22-857 ^a	C11-47	Beige							
22-1057 ^a	C11-48	Euro-white	10 to 30 °C						
21-960 ^a	C14-42	Satin Chrome		Metal	55 to 85 °F or Blank	Yes or Concealed			
22-960 ^a	C14-46		Plastic						
22-860 ^a	C14-47	Beige							
22-1060 ^a	C14-48	Euro-white	10 to 30 °C or Blank						
2890-010 ^a	Kit	Satin Chrome		Metal					
2890-011 ^a	Kit		Plastic						
2890-012 ^a	Kit	Beige							
2890-013 ^a	Kit	Euro-white							

^a Thermostat covers with concealed setpoint adjustment, and thermostat cover kits include setpoint adjustment cover 21-800 (black) or 21-801 (Euro-white).

Table-4 Accessories.

Wholesale Number	Replaces Model	Description
20-676	10-18	Aspirating box, stainless steel
20-695	10-15	Aspirating box, satin finish
20-707	10-53	Metal thermostat guard
20-712	10-59	Internal stop kit
20-715	10-62	Clear cover thermostat guard
20-850	—	Thermostat mounting plate
20-881	N2-4	Thermostat calibration wrench
21-473	10-73	Drywall mounting bracket
21-800	10-72	Setpoint adjustment cover (black)
21-801	10-81-48	Setpoint adjustment cover (Euro-white)
21-876	10-76	Opaque cover thermostat guard
22-022	—	Thermostat conversion kit
22-023	—	Thermostat conversion kit
22-138	MCS-GA	Branch tap gauge adaptor
900-002	—	Thermostat calibration kit

TYPICAL APPLICATIONS (Piping Diagram)

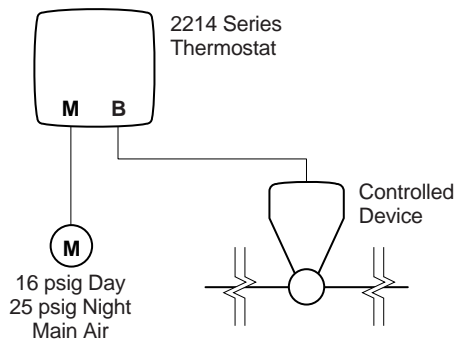


Figure-1 Typical Application.

INSTALLATION

Inspection

Inspect the package for damage. If damaged, notify the appropriate carrier immediately. If undamaged, open the package and inspect the device for obvious damage. Return damaged products.

Requirements

- Tools (not provided):
 - Appropriate screwdriver for mounting the thermostat
 - 20-881 Thermostat calibration and cover screw wrench (or 1/16" and 1/4" hex wrenches)
- Training: Installer must be a qualified, experienced technician
- Appropriate accessories
- Piping diagrams

Location

Caution:

- Do not locate the thermostat near sources of heat or cold, such as lamps, motors, sunlight, or concealed ducts or pipes. Doing so will affect the accuracy of the thermostat.
- Avoid installing the thermostat on outside walls. If such a location is necessary, mount the thermostat on an insulated back plate (accessory item).
- Mount thermostats *only after the wall surfaces have been finished.*

Locate the thermostat where it will be exposed to an unrestricted circulation of air, which represents the average temperature of the controlled space.

Mounting

Standard Mounting Options

1. Mount the thermostat according to the applicable figure (Figure-2 through Figure-8). See Figure-10 for mounting dimensions.

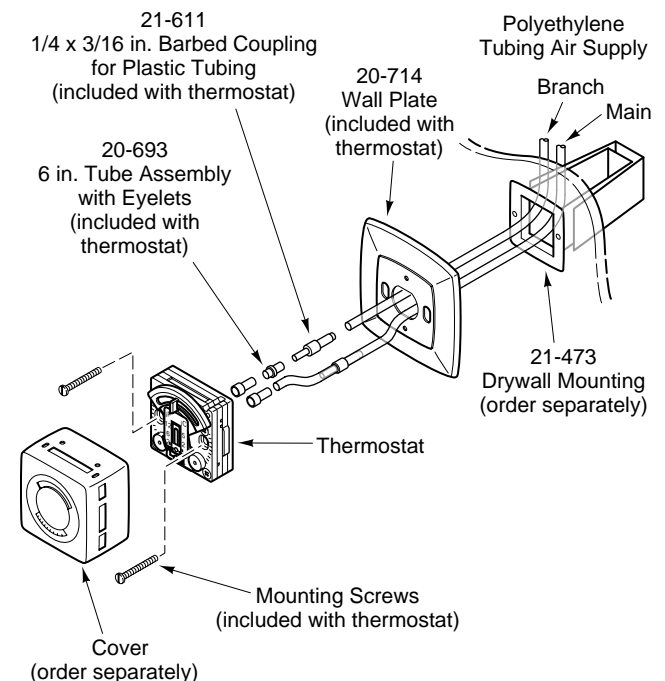


Figure-2 Flush Mounting of Thermostat, Using Drywall Mounting Bracket.

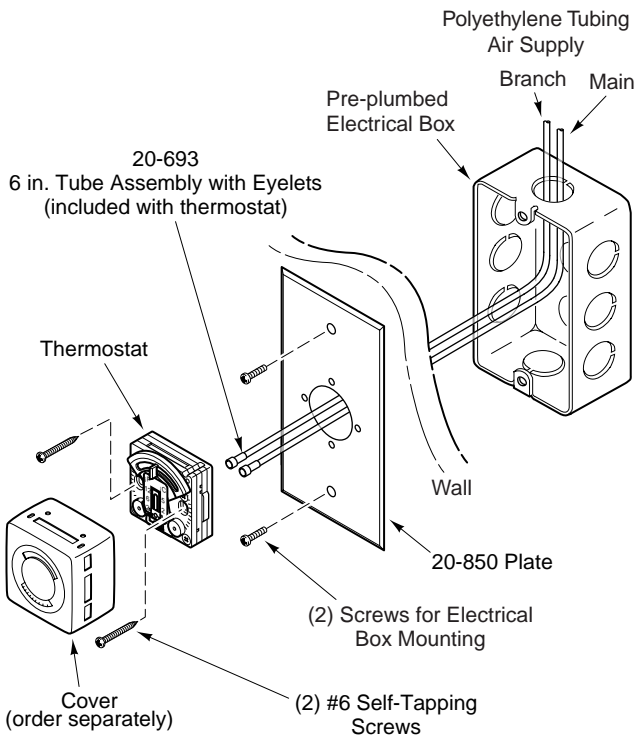


Figure-3 Flush Mounting of Thermostat, Using 20-850 Plate and Pre-Plumbed Electrical Box.

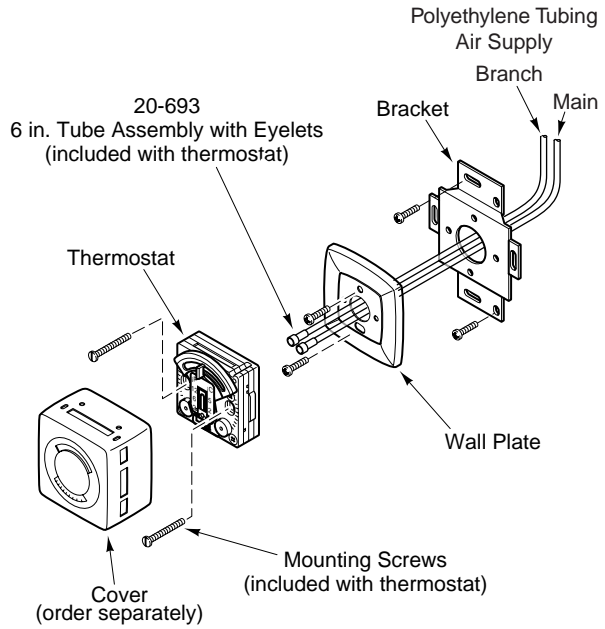


Figure-5 Thermostat Mounted with 22-022 Conversion Kit, Using Wall Plate Only, to Replace Competitive Thermostats.

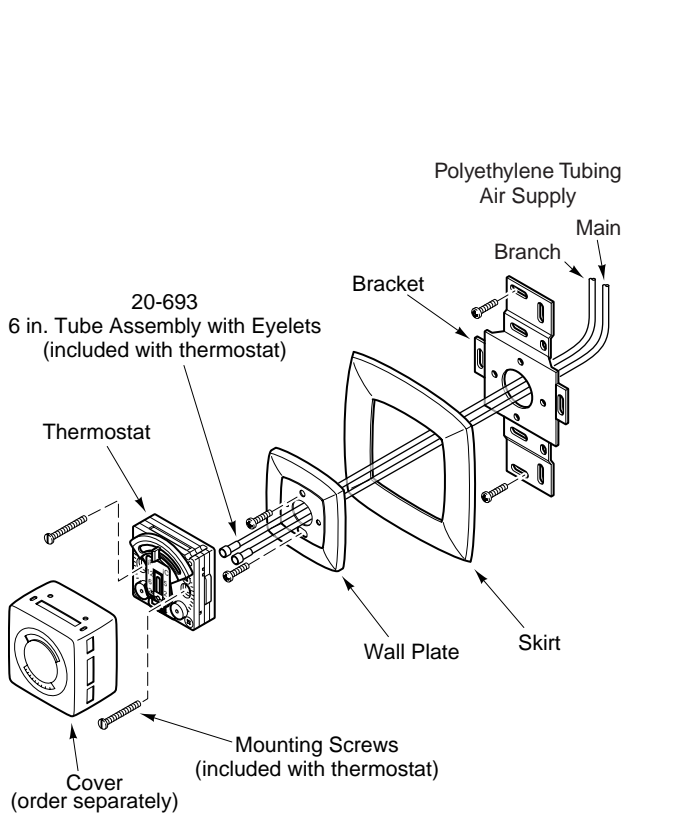
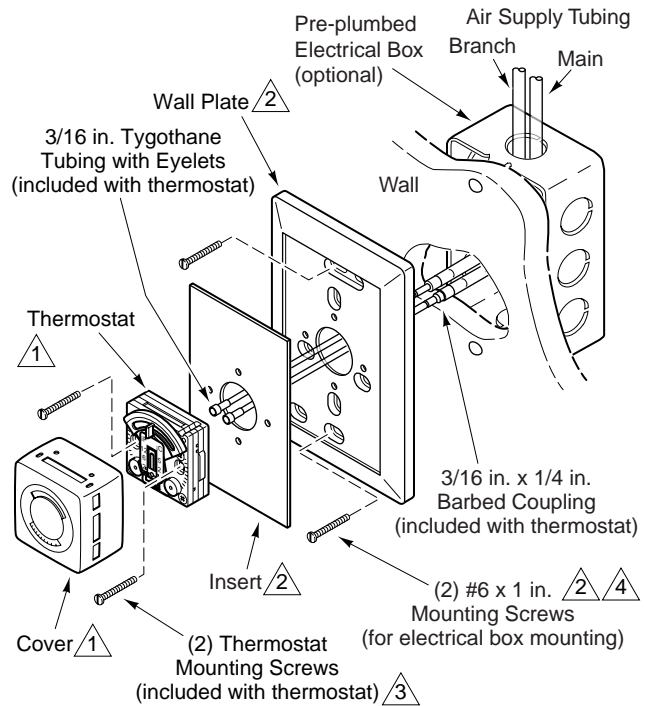


Figure-4 Thermostat Mounted with 22-022 Conversion Kit, Using Wall Plate and Skirt, to Replace Competitive Thermostats.



- 1 The pneumatic thermostat replacement kits 2214-621 and 2214-622 include a thermostat, a 22-1033 Euro-white cover, and a 22-023 thermostat conversion kit.
- 2 Provided in the 22-023 thermostat conversion kit.
- 3 Optionally, the thermostat may be mounted with the #6 x 1 in. self-tapping screws provided in the 22-023 kit.
- 4 Use the #8 x 1 in. mounting screws provided in the 22-023 kit when mounting the wall plate directly to the wall, without an electrical box.

Figure-6 Thermostat Mounted with 22-023 Thermostat Conversion Kit.

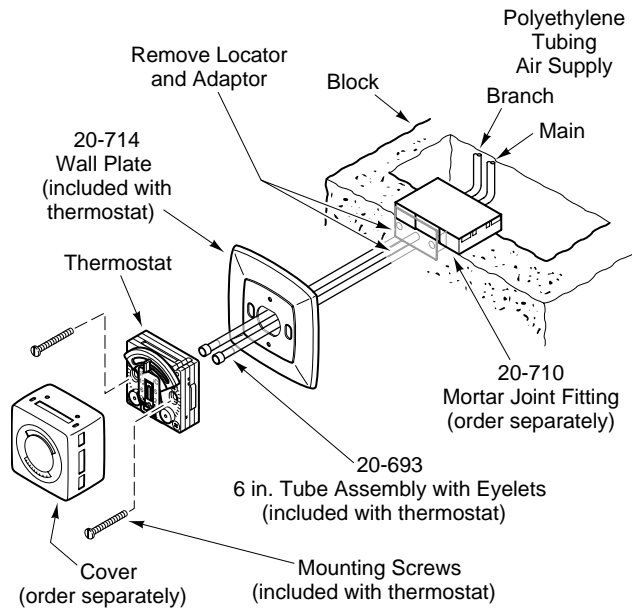


Figure-7 Thermostat Installation Using Pipehead in Masonry Wall.

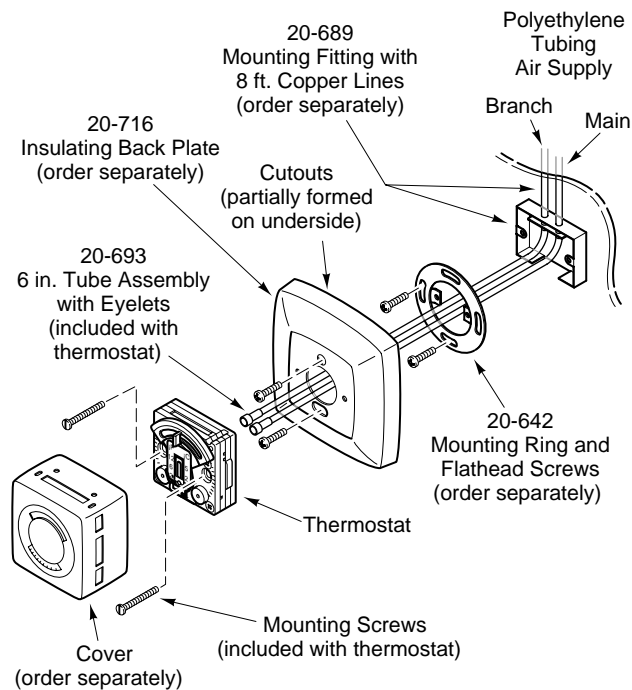


Figure-8 Surface Mounting of Thermostat, Pipehead Application.

Optional Mounting

Eliminate the pipehead fitting by using the 22-022 thermostat conversion kit and the included instructions, plus the following:

1/4" Plastic Air Lines: Install the 1/4" barbed couplings into the air lines. Connect the tube assembly to the 3/16" end of these couplings.

1/4" Copper Air Lines: Solder the barbed couplings into the copper lines. The tube assembly can then be connected to the 3/16" end of the couplings.

CALIBRATION

The 2214 series thermostats are factory calibrated with day sensor throttling range set at 3 °F. They should not require calibration upon installation. However, if it is necessary, change the throttling range, calibration, or switch point setting as follows:

1. Remove the thermostat cover and install a 22-138 branch tap gauge adaptor into the branch pressure tap hole (Figure-9).
2. Measure the ambient temperature with an accurate thermometer. This temperature *must be within the range of the thermostat*. Take care not to breathe on, or place a hand near the bimetals, as this will result in an inaccurate reading.

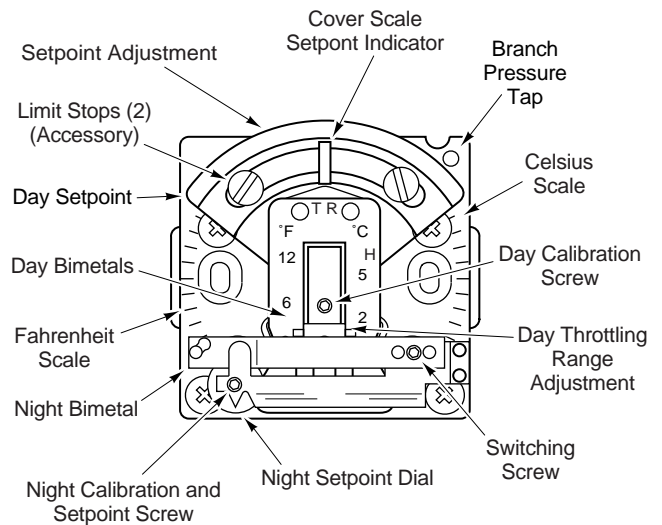


Figure-9 Thermostat Calibration Features and Limit Stop Accessory.

Day Setpoint Calibration

1. Position the day setpoint cam (Figure-9) to match the ambient temperature.
2. Set the main air pressure to 15 psig and adjust the day calibrating screw using a 20-881 thermostat wrench (1/16" hex wrench) until the branch tap gauge reads 9 ± 1 psig. Clockwise rotation increases the branch line pressure. Counterclockwise rotation lowers the branch line pressure.

Night Setpoint Calibration

1. Increase the main line pressure to 25 psig.
2. Using a 20-881 thermostat wrench (1/16" hex wrench) in the night setpoint screw (Figure-9), position the night setpoint dial to match the ambient temperature.
3. Firmly hold the night setpoint dial with your fingers and adjust the night calibrating screw until the branch tap gauge reads 9 ± 1 psig.
4. Release the dial and allow it to rotate with the night calibrating screw to the desired night control point.

Switching Adjustment

The 2214 series thermostats are factory calibrated to switch from day to night action at a pressure between 17 and 21 psig. If necessary, adjust the switch point as follows:

Note:

- The switch point adjustment should be made on a test bench at which a variable main air supply is available.
- It is necessary to read the branch line pressure while making the switch point adjustment.

1. Set the main air supply to the thermostat to the desired switch over point. For example, if system pressure is 13 psig day and 18 psig night, the desired switch over point would be between 15 and 16 psig.
2. Position the day and night setpoints according to Table-5.

Table-5 Day and Night Setpoints.

Thermostat Model	Day	Night
2214-121, 2214-131, 2214-521, 2214-621	55 °F	80 °F
2214-122, 2214-132, 2214-522, 2214-622	85 °F	50 °F

3. Verify that the branch line pressure gauge or branch pressure tap reads approximately the main air pressure being fed to the thermostat. If not, recheck the day setpoint calibration.
4. To lower the switch over point, use a 20-881 thermostat wrench (1/16" hex wrench) to turn the switching screw clockwise, 1/8 turn at a time, until the branch line pressure falls. To raise the switch over point, turn the switching screw counterclockwise in the same manner.

Caution: Do not force the calibrating screws. If the desired action is not obtained when the screws are rotated, check to be sure the direction of rotation is correct.

5. Lower the main air pressure to the desired system day pressure and observe the branch line pressure. The branch line pressure should rise to approximately the main air pressure.
6. Raise the main air pressure to the night setting and observe the thermostat for proper function. As the main air pressure rises past the switch over point, the branch line pressure should drop off to zero. Lower the main air pressure and verify that the branch line pressure rises from zero as the main air pressure drops below the switch over point.
7. Reinstall the thermostat cover and recheck the calibration at both day and night settings.

Internal Stop Kit (Accessory)

The internal stop kit, model 20-712, consists of two screws and two nuts (Figure-9). Install this kit as follows:

1. Move the setpoint adjustment to one extreme limit.
2. Place a nut in the depression in the top plate and move the adjustment cam over the nut, to where the slot in the cam exposes the threads of the nut.
3. Thread a stop screw into the nut far enough to allow the stop to slide in the slot. Repeat on the other side.
4. Move the setpoint adjustment to the desired temperature, using the internal setpoint indicator.
5. Slide the stops to the desired limits and tighten both screws.

MAINTENANCE

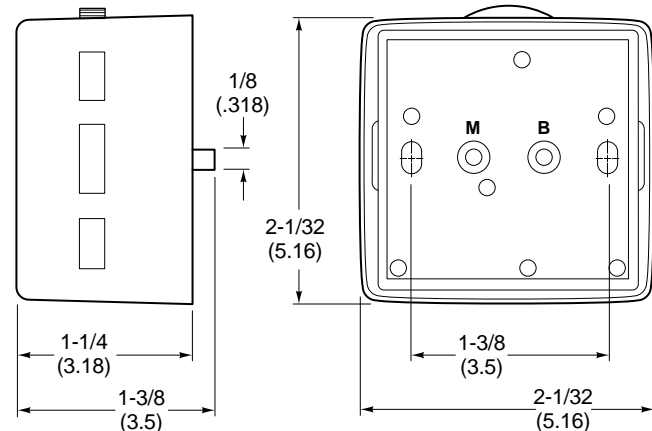
The thermostat requires no maintenance.

Regular maintenance of the total system is recommended to assure sustained, optimum performance.

FIELD REPAIR

None. Replace an inoperative thermostat with a functional unit.

DIMENSIONAL DATA



Dimensions are in inches (mm).

Figure-10 Mounting Dimensions.

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