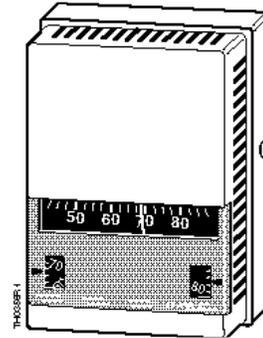


POWERS™ CONTROLS

TH 192 HC Heating/Cooling Room Thermostat



Description

The TH 192 HC thermostats are proportional single output, dual setpoint, 2-pipe (high air capacity) sensor controllers. Each thermostat includes a wall mounting plate for installation in a variety of rough-in terminal boxes. Sensitive bimetals respond to temperature change to modulate control air through a flapper nozzle. Two setpoint dials are provided. When the supply air pressure changes from 18 to 25 psi (124 to 172 kPa), the thermostat automatically switches from the cooling to the heating setpoint, respectively. Air connections are made with 5/32" (4 mm) O.D. plastic tubing, directly to the thermostat chassis for retrofit applications or with plug-in adapters (provided with the TH 192 rough-in terminal box or optional accessories) which slide into the wall mounting plate.

Features

- Direct and reverse acting models for heating and cooling modes.
- Separate adjustable temperature setpoint indicating dials for heating and cooling.
- Fahrenheit or Celsius setpoint dials.
- Highly sensitive bimetal thermostatic element.
- Individual field adjustable sensitivity with graduated scale.
- Operating mode automatically switches between heating and cooling on change of main air supply pressure.
- Integral field adjustable limit stops.
- Control pressure test port accessible without removing cover.
- Easily replaceable thermometer, setpoint dials, filters, and restrictor plate.
- Covers available for concealed or exposed thermometers and for either concealed, key, or exposed knob adjustment and setpoint indication.
- Standard plastic thermostat covers provide Desert Beige or white finish.

Optional Design Features

- Fixed temperature limit stops meet government specifications.
- Metal covers available in standard configurations provide Desert Beige or white finish.
- Competitor adapter mounting kits available.
- All thermostat chassis available with optional 1/2" large setpoint adjustment knobs.

Application

TH 192 HC thermostats provide all-season temperature control for two-pipe hot water/chilled water heating and cooling applications (Figure 1) such as air conditioners, space heaters, and unit ventilators. Thermostats maintain energy management (maximum economy) and occupant comfort automatically as seasons change from the heating setpoint (65 to 68°F, 10 to 20°C) to the cooling setpoint (76 to 80°F, 24 to 27°C). TH 192 HC thermostats are available with covers that conceal or expose the setpoint adjustment dials.

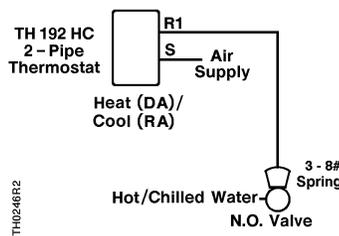


Figure 1. Typical TH 192 HC Thermostat Application.

Piping

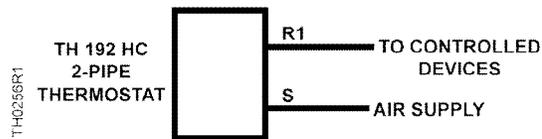


Figure 2. TH 192 HC Thermostat Connections.

Product Numbers and Ordering Information

See Table 1 for product number and ordering information on TH 192 HC thermostat chassis.

Chassis

1. Is a Fahrenheit or Celsius scale required?
2. Is the heating control direct or reverse acting?
3. Is the cooling control direct or reverse acting?
4. Where is setpoint adjustment knob located?
 - a. Adjustment knob located at the bottom of the chassis.
 - b. Adjustment knob on front, with 1/2" large exposed knob.

Table 1. TH 192 HC Thermostat Chassis Part Numbers.

Chassis with Wall Plate					
Connection Type	Setpoint Adjustment	Fahrenheit		Celsius	
		Heating DA	Heating RA	Heating DA	Heating RA
Two-Pipe Relay	Exposed at Bottom of Cover	Cooling DA 192-207	Cooling DA 192-209	—	Cooling DA 192-229
		Cooling RA 192-208	Cooling RA 192-210	Cooling RA 192-228	Cooling RA 192-230
	—	—	—	—	
	Exposed 1/2" Knob on Cover *	Cooling RA 192-208 K	—	—	—

* This feature requires a key setpoint adjustment cover (or key type cover). See Table 2.

Covers

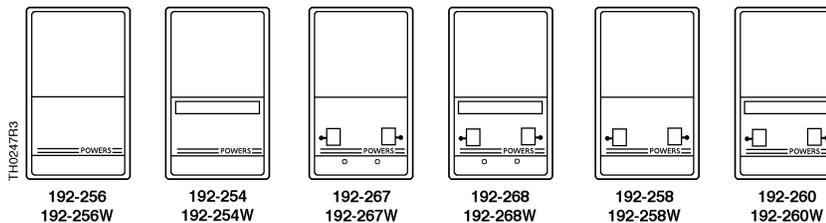
See Table 2 for product number and ordering information on TH 192 HC thermostat covers.

1. Is the setpoint adjustment exposed for customer adjustment or concealed to prevent alteration of setting?
2. Is the thermometer exposed or concealed?
3. Is the setpoint indication exposed or concealed behind a cover?
4. Is a plastic or zinc cast metal cover required?
 - a. Plastic covers order 192-2XX.
 - b. Metal covers order 192-3XX.
5. Is the cover finish standard or optional? The standard finish color for plastic and metal covers is Desert Beige.
 - a. For the white plastic cover option, add suffix code "W" to the cover part number (for example: 192-256W). See Table 2.
 - b. For the white metal cover option, add suffix code "H" to the cover part number (for example: 192-356H). See Table 2.

Table 2. TH 192 HC Thermostat Cover Part Numbers.

Setpoint Adjustment	Cover Configuration		Cover Part Number (See Note 2)	
	Thermometer	Setpoint Indicator	Standard Plastic Cover Desert Beige	Standard Metal Cover Desert Beige
Concealed	Concealed	Concealed	192-256	192-356
	Exposed		192-254	192-354
Key (See Note 1)	Concealed	Exposed	192-267	192-367
	Exposed		192-268	192-368
Exposed	Concealed	Exposed	192-258	192-358
	Exposed		192-260	192-360

1. Key setpoint adjustment cover required for all thermostat chassis with optional 1/2" large setpoint adjustment knobs.
2. To order a plastic cover with white finish, add suffix code "W". To order a metal cover with a white finish, add suffix code "H".



Specifications

Control action	See Table 1.
Operating ranges	45 to 85°F (7 to 30°C)
Supply air pressure, maximum	30 psi (207 kPa)
Normal air supply pressure	
Heating	25 psi (172 kPa)
Cooling	18 psi (124 kPa)
Sensitivity adjustment	1 to 4 psi/°F (12 to 50 kPa/°C)
Nominal air consumption (two-pipe)	25 scim (6.8 ml/sec)
Temperature	
Storage temperature	-10 to 140°F (-23 to 60°C)
Ambient operating temperature	40 to 140°F (4 to 60°C)
Temperature response	0.1°F (0.06°C)
Dial graduations	2°F (1°C)
Factory settings	
Calibration @ 72°F (22°C)	7.5 psi (52 kPa)
Sensitivity	2.5 psi/°F (31 kPa/°C)
Limit stop adjustment	45 and 85°F (7 and 30°C)
Standard cover	Cyclac, Desert Beige
Shipping weight	0.7 lbs. (0.3 kg)
Dimensions	See Figure 3.

Accessories

See the following Technical Bulletins for information on accessories:

Technical Bulletin	Document Number
TB 237 Terminal Kits	155-244
TB 213 Aspirator Wall Box Kit	155-245
TB 214 Adapter Kits	155-231
TB 193 Guard Kit	155-222
TB 241 Test Head Kit	155-255
TB 167 Restrictors	155-213

Dimensions

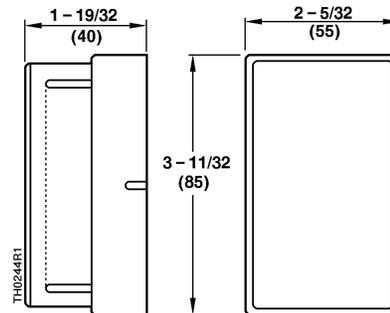


Figure 3. TH 192 HC Dimensions in Inches (Millimeters).

Operation

Heating-Cooling Operation

The TH 192 HC thermostat combines direct or reverse acting heating control with direct or reverse acting cooling control. In direct acting control, an increase in temperature increases the control air pressure and a decrease in temperature decreases the control air pressure. In reverse acting control, an increase in temperature decreases the control air pressure and a decrease in temperature increases the control pressure.

The TH 192 HC provides two separate bimetal elements; one for heating mode control and one for cooling mode control. Each bimetal element operates independently of the other. Using two different supply air pressures accomplishes changeover from heating to cooling modes. A supply pressure of 18 psi (124 kPa) or 25 psi (172 kPa) positions a changeover switch so that a changeover relay operates in the cooling or heating mode, respectively.

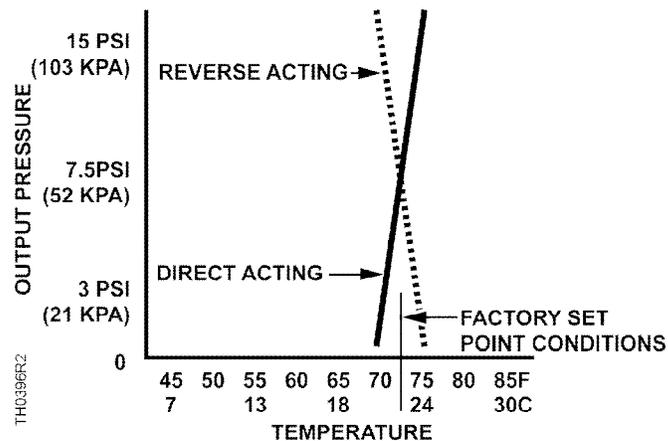


Figure 4. TH 192 HC Input/Output Characteristics.

TH 192 HC Thermostat Details

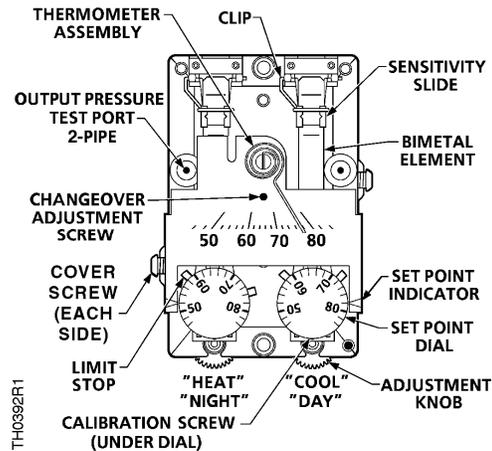


Figure 5. TH 192 HC Thermostat Details.

Thermometer Calibration

1. Use a test thermometer to read the current room temperature.
2. Place a screwdriver in the center of the thermometer assembly (Figure 5). Carefully rotate thermometer assembly until the pointer tip indicates the correct room temperature.

NOTE: Avoid breathing on or touching the bimetal spiral since this influences the temperature reading.

Changeover Point Adjustment

The changeover point is factory set to occur between 19 and 22 psi (131 and 152 kPa). The changeover point can be field adjustable to occur between 14 and 22 psi (96 and 152 kPa).

1. Connect the pressure gauge or manometer to measure the supply pressure to the thermostat. Use a 30 psi (207 kPa) supply through a positioning switch so that pressure can be fully variable.
2. Determine the current change over point. Turn the cooling dial so that cooling and heating control pressures are different. Then, note the changeover point on the control gauge as the supply pressure changes.
3. Remove the thermometer for access to the changeover adjustment screw. Use a 1/16" Allen Hex Key to adjust the changeover adjustment screw as follows:
 - a. If the changeover is too high, turn off the supply pressure and rotate the changeover adjustment screw clockwise. One turn decreases the changeover point by about 3 psi (20 kPa). Turn on the supply pressure and recheck to verify the new changeover point.
 - b. If the changeover is too low, turn off the supply pressure and rotate the changeover adjustment screw counterclockwise. One turn increases the changeover point by about 3 psi (20 kPa). Turn on the supply pressure and recheck to verify the new changeover point.

Changeover Point Adjustment, Continued

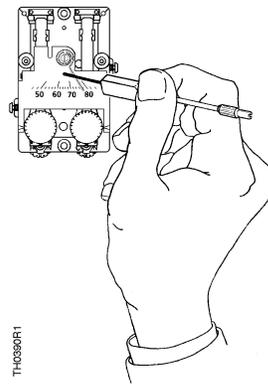


Figure 6. Changeover Point Adjustment.

Limit Stop Adjustment

Thermostat limit stops define the minimum and maximum thermostat setpoints. The limit stops engage in the setpoint cam gear teeth and cause interference between the setpoint cam gear and the adjustment knob gear.

To change limit stop settings, use needle nose pliers to pull the limit stop between the setpoint cam gear teeth. Rotate the limit stop to its new position. Do not pull the limit stop any more than necessary to clear the gear teeth. Changing the limit stop position one gear tooth changes the limit stop setting by 1-1/3°F (0.7°C).

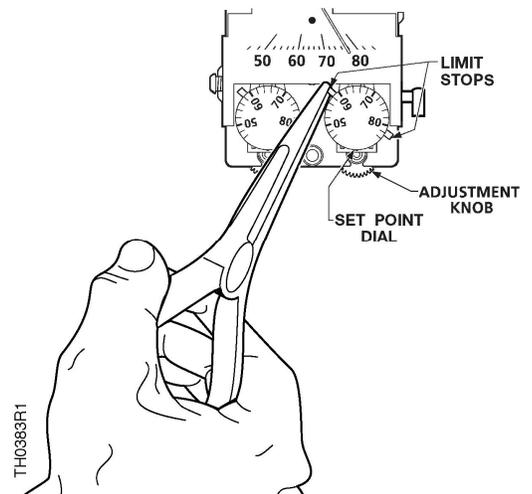


Figure 7. TH 192 HC Limit Stop Adjustments.

Sensitivity Adjustment

To change the thermostat sensitivity, use a flat blade screwdriver to carefully move the sensitivity slide to the desired position as follows:

Graduation closest to the rigid end of the bimetal element
 4 psi/°F
 (50 kPa/°C)



Graduation closest to the minimum (MIN) end of the bimetal element
 1 psi/°F
 (12 kPa/°C)

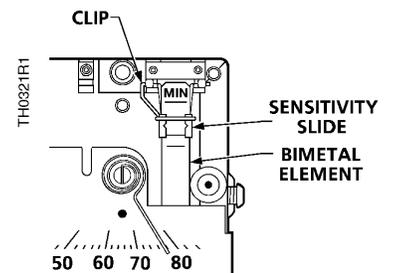


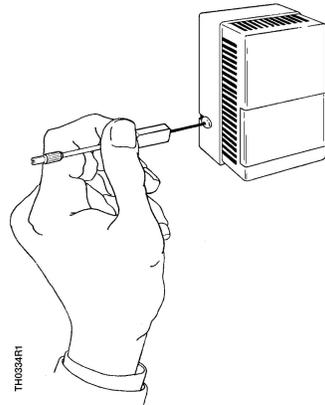
Figure 8. TH 192 HC Sensitivity Adjustment.

NOTE: If the thermostat sensitivity is adjusted, the thermostat must be recalibrated.

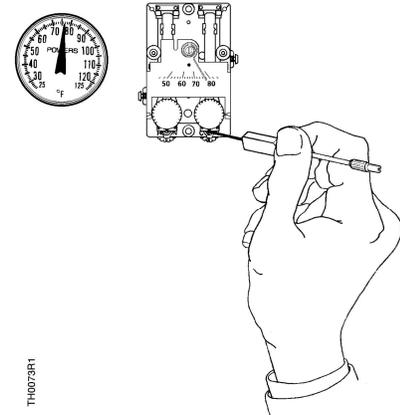
Thermostat Calibration

The thermostat is factory calibrated to a control pressure of 7.5 psi (52 kPa) when the setpoint and the ambient temperature are both at 72°F (22°C). The factory sensitivity setting is approximately 2.5 psi/°F (31 kPa/°C). No adjustments are required if these settings are appropriate for the application. If the thermostat has been tampered with, the sensitivity changed, or the thermostat is out of adjustment, use the following steps to re-calibrate the instrument.

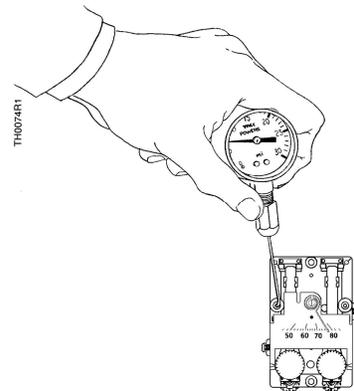
Cooling Calibration



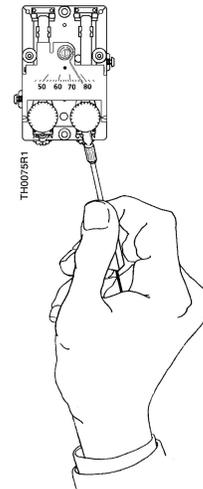
Step 1 —
Remove the cover using the 192-632 calibration tool. Verify the room temperature is between 70 and 80°F (21 and 27°C).



Step 2 —
Verify that the supply pressure is 18 psi (124 kPa). Set the cooling dial to room temperature by turning the exposed adjustment knob or using a hex key as shown. Allow the thermostat to stand for about five minutes to adjust to the new setting.

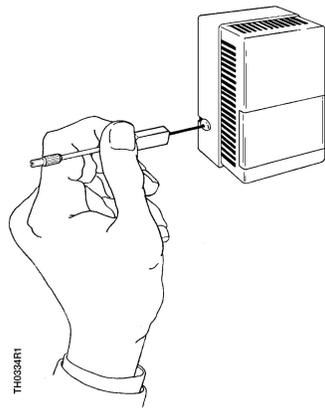


Step 3 —
Moisten the needle and insert the 192-633 test gauge and needle adapter in the test port. Read control pressure.



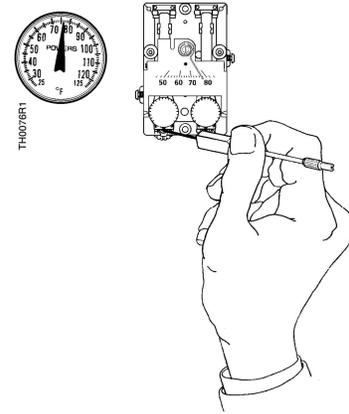
Step 4 —
If control pressure does not read 7 to 8 psi (48 to 55 kPa), turn calibration screw using 192-632 calibration tool or 1/8" (3.2 mm) wrench until pressure is 7 to 8 psi (48 to 55 kPa). The sensing element is now in calibration and the setpoint can be changed to the desired room temperature.

Heating Calibration



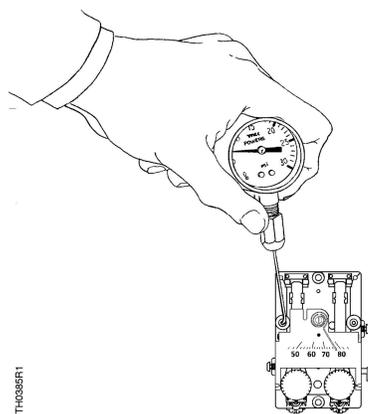
Step 1 —

If not already done, remove cover using 192-632 calibration tool. Verify room temperature is between 70 and 80°F (21 and 27°C).



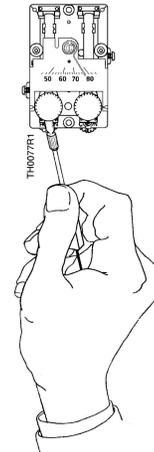
Step 2 —

Verify that supply pressure is 25 psi (172 kPa). Set heating dial to room temperature by turning the exposed adjustment knob or using a hex key as shown. Allow thermostat to stand for about five minutes to adjust to the new setting.



Step 3 —

Moisten needle and insert 192-633 test gauge and needle adapter in the test port. Read control pressure.



Step 4 —

If control pressure does not read 7 to 8 psi (48 to 55 kPa), turn calibration screw using 192-632 calibration tool or 1/8" (3.2 mm) wrench until pressure is 7 to 8 psi (48 to 55 kPa). The sensing element is now in calibration and the setpoint can be changed to the desired room temperature.

Troubleshooting

Before troubleshooting thermostat per Table 4, ensure that there is clean dry supply air at 18 psi (124 kPa) for cooling and 25 psi (172 kPa) for heating. Use a test probe gauge and needle adapter to measure the control pressure at the thermostat test port.

The output pressure test port is accessible without removing the thermostat cover through the 8th opening from the top left side for two-pipe thermostats.

Table 3. Troubleshooting Guide.

Problem	Check	Cause	Action
Control pressure stays at approximately zero	Air supply	Low supply pressure	As required
	Nozzle or flapper	Dirt on nozzle or flapper	Clean nozzle or replace thermostat
	Restrictor	Clogged restrictor	Replace restrictor
	Calibration	Out of calibration	Recalibrate
Control pressure stays at approximately supply pressure	Nozzle	Clogged nozzle	Clean nozzle or replace thermostat
	Calibration	Dirt on either supply or exhaust valve seat	Alternately close and open nozzle by gently pushing down the bimetal
Excessive air leakage from exhaust port on left side of thermostat	Supply and return line connection	Connections are interchanged or connection to port is incorrect	As required

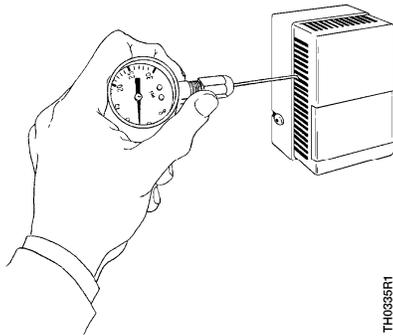


Figure 9. Accessing Output Pressure Test Port.

Chassis Tube Connector and Restrictor Plate Replacement

1. Remove the thermostat chassis from the wall. The terminal does not have a ball check valve.

NOTE: You must close off the supply air. For example, use a connector with the supply air terminal plugged.

2. Remove two Phillips head screws from the connector on the back of the thermostat chassis. Pull the connector out of recess. If necessary, pry the connector loose with a screwdriver, but be careful not to damage the restrictor plate and gasket.
3. Remove the gasket from under the connector. Remove the restrictor. Remove the second gasket from under the restrictor.
4. Use Restrictor Replacement Kit 192-321 to replace the gasket, restrictor, and second gasket.

NOTE: The restrictor plate is keyed to ensure proper orientation during installation.

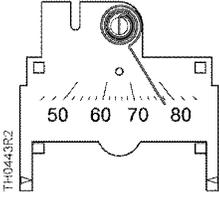
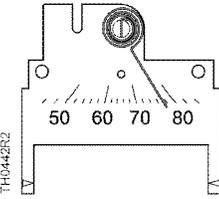
5. Remove filters from the existing connector and insert in the new connector. Or, if filters are dirty, use Restrictor Replacement Kit 192-321 to replace the filters.
6. Use Chassis Tube Connector Replacement Kit 192-525 to replace the connector and mounting screws.

Service Parts

The following chart lists accessory parts and tools available for thermostat service.

Description	Part Number
Dial thermometer (-40 to 140°F, -40 to 60°C) with pocket case	141-0573
Basic pneumatic calibration kit with thermometer, gauge, squeeze bulb, fittings, and case	832-177
Test head kit	832-179
Calibration tools	832-178
Test probe to check pressure with cover on	
Needle probe with 1-1/2" diameter gauge 0 to 30 psig (0 to 200 kPa) and calibration/cover wrench	192-633
Needle probe, no gauge (package of five)	192-759
1-1/2" diameter gauge, 0 to 200 kPa, back connected 1/8" NPT male	142-0344
1-1/2" diameter compound gauge, 0 to 30 psig/0 to 200 kPa, back connected 1/8" NPT male	142-0373
1-1/2" diameter compound gauge, 0 to 30 psig/0 to 200 kPa, bottom connected 1/8" NPT male.	142-0426
Replacement for use with 192-633	
Chassis tube connector replacement kit with mounting screws (material for 10 thermostats included)	192-525
Restrictor plate replacement kit with filters and gasket (material for 10 thermostats included)	192-321
Plug-in adapters for quick thermostat removal	
Straight, blue (package of 20)	192-485
Straight, white (package of 20)	192-486
Air link connects adapters for pressure tests (package of 20)	192-501
Compression ring (package of 100)	141-388
Elbow (provides quick return for wall surface mounting), blue (package of 20)	192-487
Elbow (provides quick return for wall surface mounting), white (package of 20)	192-488
20 scim (5.4 ml/sec) restrictors for 1-pipe systems (package of 5). (1/4", 6.4 mm, OD plastic barb unless noted.)	
Brass coupling, 1/8" NPT (1 only).	184-040
Coupling	184-116
Tee	184-113
Pre-piped dual tee for dual 1-pipe systems	184-130

Service Parts
 (Continued)

Description		Part Number	
Replacement thermometer kits, brown (packages of 5)			
Scale Range	Thermostat Model		
45° to 85°F	 <p>Model 3 and Up</p>	192-775	
10° to 30°C		192-776	
45° to 85°F	 <p>Models 1 and 2</p>	192-786	
10° to 30°C		192-785	
Replacement setpoint dials (packages of 10)			
°F, Direct Acting	Right Side		192-779
°F, Reverse Acting			192-780
°C, Direct Acting			192-783
°C, Reverse Acting			192-784
°F, Direct Acting	Left Side		192-777
°F, Reverse Acting			192-778
°C, Direct Acting			192-781
°C, Reverse Acting		192-782	

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