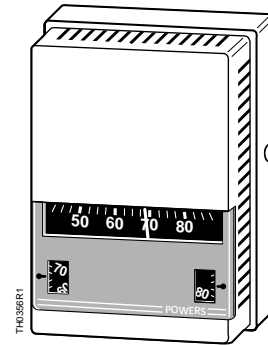


## Powers® Controls

### 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 (65-68°F, 10-20°C) to the cooling setpoint (76-80°F, 24-27°C). TH 192 HC thermostats are available with covers that conceal or expose the setpoint adjustment dials.

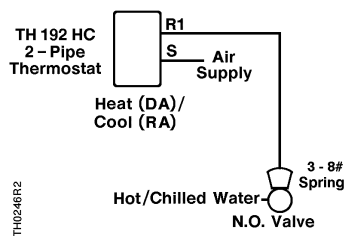


Figure 1. Typical TH 192 HC Thermostat Application.

## Piping

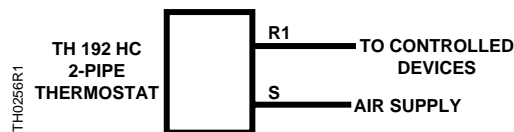


Figure 2. TH 192 HC Thermostat Connections.

## 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 bottom of 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 192-227 | 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**

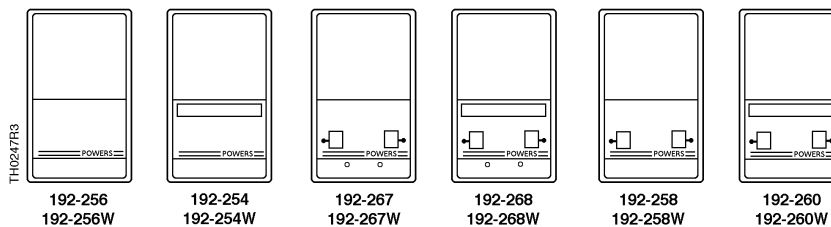
See Table 2 for product number and ordering information on TH 192 HC thermostat covers.

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 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 finish of cover standard or optional? The standard finish color for plastic and metal covers is Desert Beige.
  - a. For white plastic cover option, add "W" suffix code to cover part number (for example: 192-256W). See Table 2.
  - b. For white metal cover option, add "H" suffix code to cover part (for example: 192-356H). See Table 2.

**Table 2. TH 192 HC Thermostat Cover Part Numbers.**

| Setpoint Adjustment | Cover Configuration |                    | Cover Part Number<br>(See Note 2)      |                                      |
|---------------------|---------------------|--------------------|--|--------------------------------------|
|                     | Thermometer         | Setpoint Indicator | Standard Plastic Cover<br>Desert Beige | Standard Metal Cover<br>Desert Beige |
| Concealed           | Concealed           | Concealed          | 192-256                                | 192-356                              |
|                     | Exposed             |                    | 192-254                                | 192-354                              |
| Key<br>(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 the "W" suffix code. To order a metal cover with a white finish, add the "H" suffix code.



**Specifications**

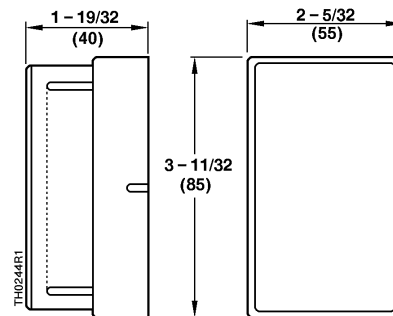
|                                    |                                 |
|------------------------------------|---------------------------------|
| Control action                     | See Table 1.                    |
| Operating ranges                   | 45 to 85°F (7 to 30°C)          |
| Supply 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**



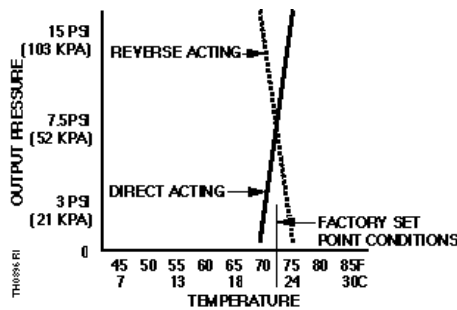
**Figure 3. TH 192 HC Dimensions in Inches (Millimeters).**

**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 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. Use of 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 a changeover relay operates in the cooling or heating mode respectively.



**Figure 4. TH 192 HC Input/Output Characteristics.**

## TH 192 HC Thermostat Details

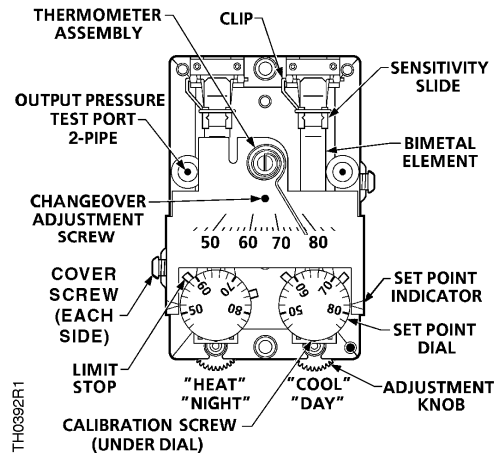


Figure 5. TH 192 HC Thermostat Details.

### 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 pointer tip indicates the correct room temperature.

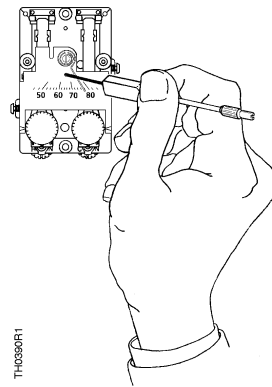
**NOTE:** Avoid breathing on or touching the bimetal spiral since this influences the temperature reading.

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

### Changeover Point Adjustment, Continued

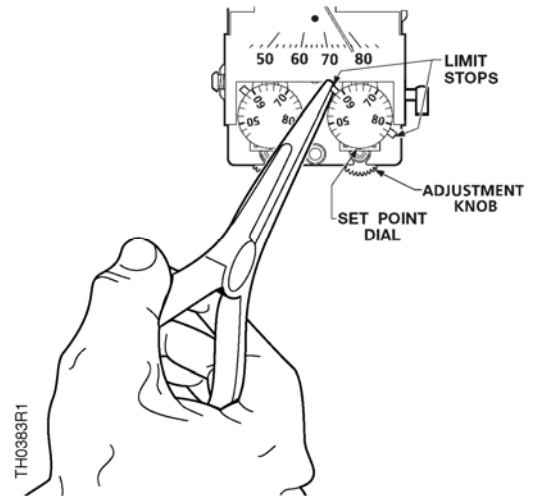


**Figure 6. Changeover Point Adjustment.**

### 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 limit stop between the setpoint cam gear teeth. Rotate limit stop to its new position. Do not pull 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.**

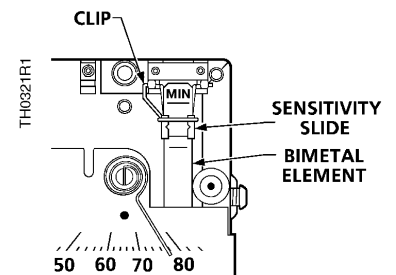
### Sensitivity Adjustment

To change 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)



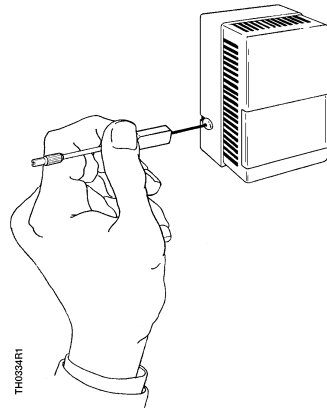
**Figure 8. TH 192 HC Sensitivity Adjustment.**

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

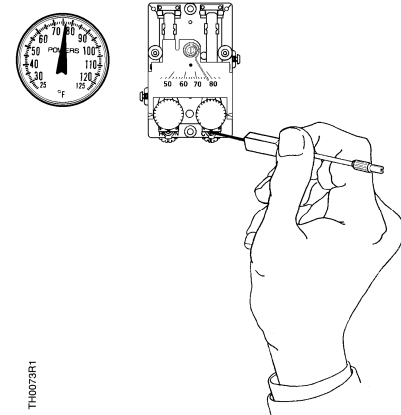
## Thermostat Calibration

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, the sensitivity changed, or is out of adjustment, use the following steps to re-calibrate the instrument.

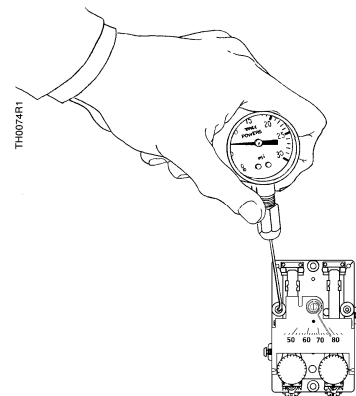
## Cooling Calibration



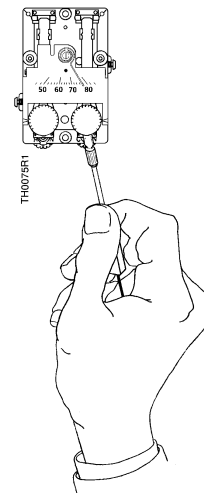
**Step 1 —**  
Remove cover using 192-632 calibration tool. Verify room temperature is between 70 and 80°F (21 and 27°C).



**Step 2 —**  
Verify that supply pressure is 18 psi (124 kPa). Set cooling 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.



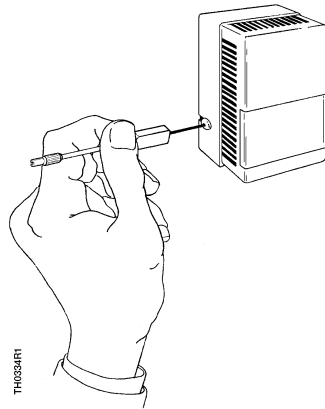
**Step 3 —**  
Moisten needle and insert 192-633 test gauge and needle adapter in the test port. Read control pressure.



**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.

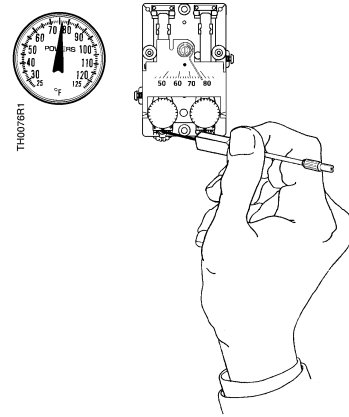


## Heating Calibration



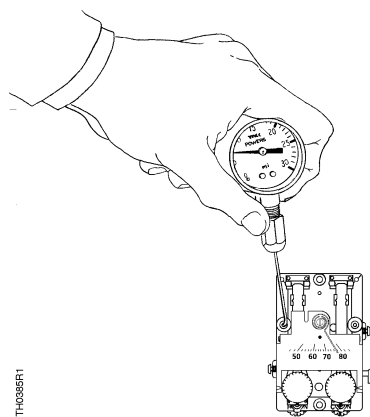
### Step 1 —

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



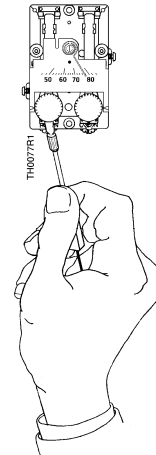
### Step 2 —

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.

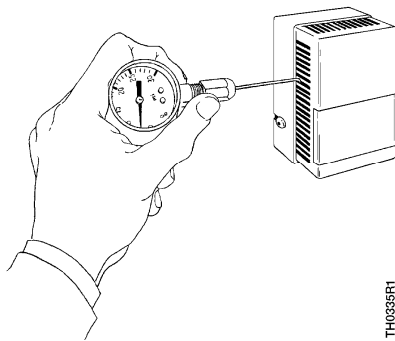
## Troubleshooting

Before troubleshooting thermostat per Table 4, make certain there is clean dry supply air at 18 psi (124 kPa) for cooling and 25 psi (172 kPa) for heating. Use test probe gauge and needle adapter to measure control pressure at 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 thermostat chassis from wall. 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 connector on back of thermostat chassis. Pull connector out of recess. If necessary, pry connector loose with a screw driver, but be careful not to damage restrictor plate and gasket.
3. Remove gasket from under connector. Remove restrictor. Remove second gasket from under restrictor.
4. Use restrictor replacement kit 192-321 to replace gasket, restrictor, and second gasket.

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

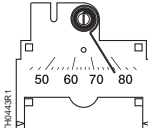
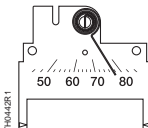


5. Remove filters from existing connector and insert in new connector. Or, if filters are dirty, use restrictor replacement kit 192-321 to replace filters.
6. Use chassis tube connector replacement kit 192-525 to replace connector and mounting screws.

**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 0-30 psig (0-200 kPa) and calibration/cover wrench                            | 192-633     |
| Needle probe, no gauge (package of five)  | 192-759     |
| 1-1/2" diameter gauge, 0-200 kPa, back connected 1/8" NPT male  | 142-0344    |
| 1-1/2" diameter compound gauge, 0-30 psig/0-200 kPa, back connected 1/8" NPT male                                     | 142-0373    |
| 1-1/2" diameter compound gauge, 0-30 psig/0-200 kPa, bottom connected 1/8" NPT male. Replacement for use with 192-633 | 142-0426    |
| 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) |  |             |   |
| <b>Scale Range</b>                                  | <b>Thermostat Model</b>  |             |   |
| 45° to 85°F   | <br>Model 3 and Up |             |   |
| 10° to 30°C   |  |             |   |
| 45° to 85°F   | <br>Models 1 and 2 |             |   |
| 10° to 30°C   |  |             |   |
| Replacement setpoint dials (packages of 10)         |  |             |   |
| °F, Direct Acting                                   | Right Side   |             |    |
| °F, Reverse Acting                                  |  |             |   |
| °C, Direct Acting                                   |  |             |   |
| °C, Reverse Acting                                  |  |             |   |
| °F, Direct Acting                                   | Left Side  |             |  |
| °F, Reverse Acting                                  |  |             |   |
| °C, Direct Acting                                   |  |             |   |
| °C, Reverse Acting                                  |  |             |   |

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