

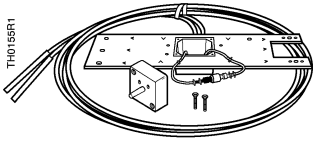
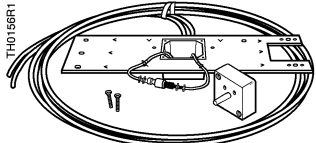
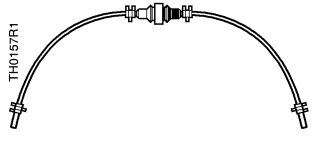
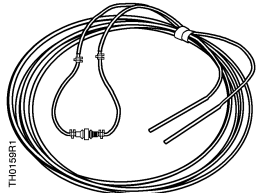
## Powers™ Controls

### Accessories for Installing TH 192, TH 194 or Free Energy Band™ TH 193 HC Room Thermostats

**Purpose** This technical bulletin covers installation instructions for all terminal kits and mounting of all TH 192, TH 193 and TH 194 room thermostats.

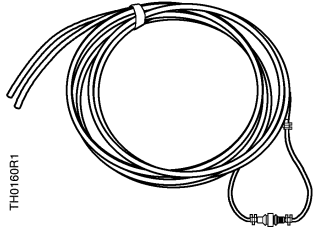
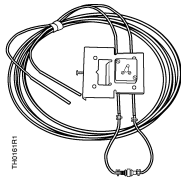
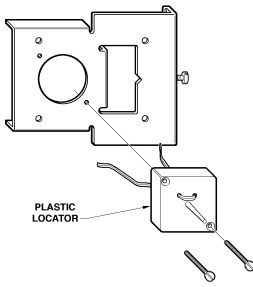
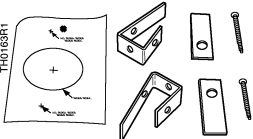
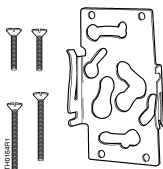
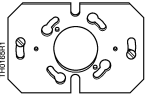
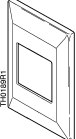
**Description** The TH 192, TH 193 and TH 194 thermostats are rectangular, 3-11/32 inch x 2-3/16 inch (8.5 cm x 5.6 cm) and may be mounted either horizontally or vertically. The desired position does not have to be determined at the rough-in stage. The position is determined by placement of the thermostat on the terminal, not the position of the terminal itself. Therefore, any change from horizontal to vertical or vice versa is possible after the wall surface is finished.

**Product Numbers** The following terminal kits cover all types of wall material found in modern construction:

Kit No.	Description	Used For	Figure	Illustration
192-478	Wall Box Kit * 8 ft. (2.4 m) Copper Tubing 2-Pipe	Plaster Wall, Block Wall, Concrete Form	1, 2, 3, 5, 8, 14	
192-498	Wall Box Kit * 8 ft. (2.4 m) Copper 3-Pipe	Plaster Wall, Block Wall, Concrete Form	1, 2, 3, 5, 8, 14	
192-480	Wall Box Kit* 8 ft. (2.4 m) Polyethylene 2-Pipe	Plaster Wall, Block Wall	1, 2, 5, 8, 14	
192-499	Wall Box Kit* 8 ft. (2.4 m) Polyethylene 3-Pipe	Plaster Wall, Block Wall	1, 2, 5, 8, 14	
192-481	Tubing Terminal Kit 1/4-in. (4 mm) (Package of 10 Units)	Hollow Walls	4, 15, 12, 6	
192-505	Tubing Terminal Kit 5/32-in. (4 mm) (Package of 10 Units)	Hollow Walls	4, 15, 12, 6	
192-479	Copper Tubing Kit 8 ft. (2.4 m)	Finished Wall Sheathing Material or Exposed Installation	7, 12, 19	

\*These kits include all necessary parts to rough in.

**Product Numbers,  
 Continued**

Kit No.	Description	Used For	Figure	Illustration
192-600	1/4-in. (4 mm) Polyethylene Tubing Kit 8 ft. (2.4 m) Twin (2-Pipe)	Finished Wall Sheathing Material	12, 20	 <p>TH192BRT1</p>
192-601	5/32-in. (4 mm) Polyethylene Tubing Kit 8 ft. (2.4 m) Triple (3-Pipe)	Finished Wall Sheathing Material	12, 20	
192-750	5/32-in. (4 mm) Polyethylene Tubing Kit 40 ft. (12.2 m) Twin (2--Pipe)	Finished Wall Sheathing Material	12, 20	
192-753	5/32-in. (4 mm) Polyethylene Tubing Kit 40 ft. (12.2 m) Triple (3-Pipe)	Finished Wall Sheathing Material	12, 20	
192-755	1/4-in. (4 mm) Polyethylene Tubing Kit 40 ft. (12.2 m) Twin (2-Pipe)	Finished Wall Sheathing Material	12, 20	
192-482	Bracket Mounting Kit * with 8 ft. (2.4 m) Copper Tubing	Drywall (rough-in before wall is up)	10, 11	 <p>TH192BRT1</p>
182-683	Bracket Mounting Kit * No Tubing (Package of 5 Units)	Drywall (rough-in before wall is up)	10, 11	 <p>TH192BRT1</p> <p>PLASTIC LOCATOR</p>
182-685	Spring Clip Mounting Kit * (Package of 10 Sets)	Finished Drywall or Wall Sheathing Material	12, 6	 <p>TH192BRT1</p>
192-644	Wall Plate Kit	Furnished with each Thermostat Chassis	16	 <p>TH192BRT1</p>
192-506	Electrical Box Adapter Plate Kit (Package of 5 Units)	Electrical Box Installation	13	 <p>TH192BRT1</p> <p><b>192-506</b></p>  <p>TH192BRT1</p> <p><b>192-507</b> <b>192-507H</b></p>
192-507	Electrical Box Adapter Base Kit, Desert Beige (Package of 5 Units)	Electrical Box Installation	13	
192-507H	Electrical Box Adapter Base Kit, White (Package of 5 Units)			

**Product Numbers,  
 Continued**

Kit No.	Description	Used For	Figure	Illustration
192-307	Electrical Box, Desert Beige Adapter Base	Electrical Box Installation	7, 21	
192-307W	Electrical Box, White Adapter Base			
192-308	Adapter Frame, Desert Beige	Covering up over- sized holes, paint lines, broken walls, spots, etc.	21	
192-308H	Adapter Frame, White			

**Caution Notations**

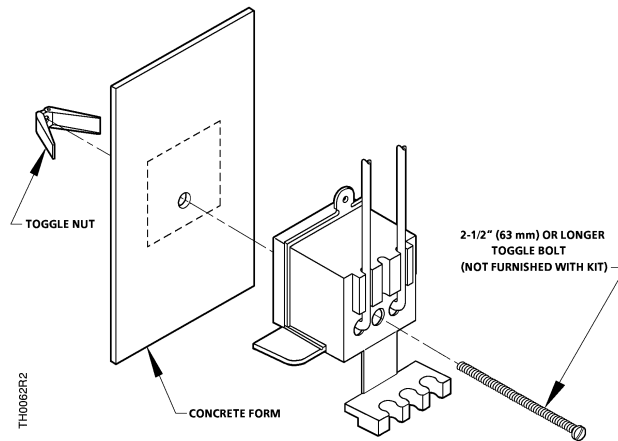
<b>CAUTION</b>		Equipment damage, or loss of data may occur if the user does not follow a procedure as specified.
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**Installation In New  
 Construction**

- Concrete Walls, See Figure 1.
- Plaster Walls, See Figure 2.
- Block Walls, See Figure 3.
- Hollow Walls (Wall Board, Metal Partitions, etc.), See Figure 4.

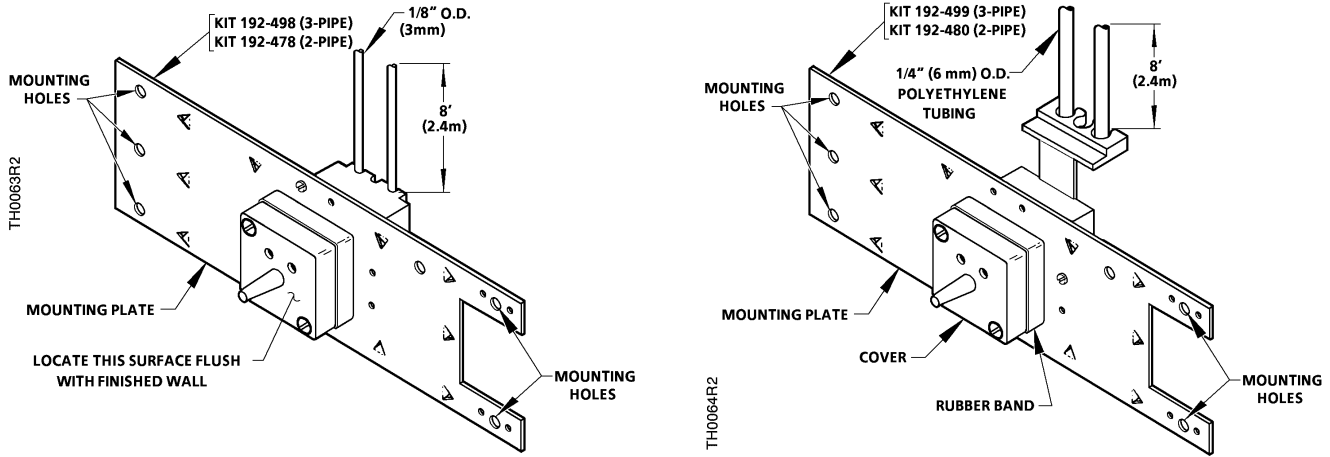
**Concrete Walls**

Use the wall box from Kit No. 192-478 or 192-498 only. Remove the mounting plate. After the concrete has set, remove the concrete form and break off the toggle bolt near the back of the wall box.

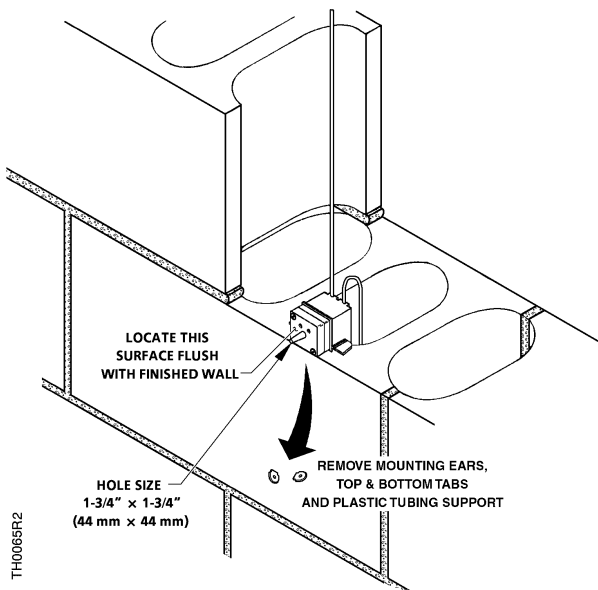


**Figure 1. In Concrete Forms Use Wall Box Kit No. 192-478 or 192-498 Only.**

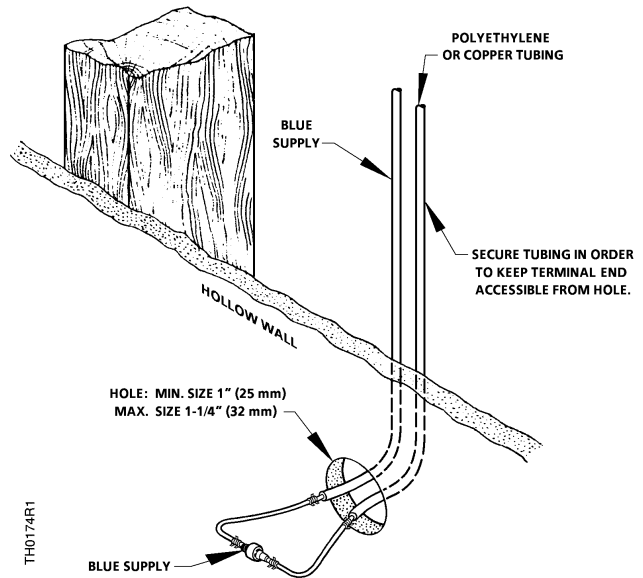
### Installation In New Construction, Continued



**Figure 2. In Plaster Walls Use Wall Box Kits No. 192-478, 192-498, 192-480, or 192-499.**



**Figure 3. In Block Walls Use Wall Box Kit No. 192-478, 192-498, 192-480, or 192-499 After Removing the Mounting Plate.**

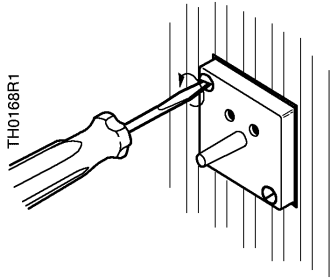


**Figure 4. For Hollow Walls Use Tubing Terminal Kit No. 192-481.**

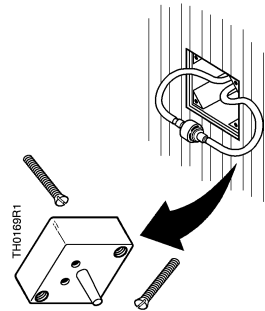
## Installation of TH 192, TH 193, and TH 194 Thermostats

The thermostat can be vertically mounted to the wall box kits or to the wall using various tubing terminal kits. A typical installation procedure consists of the following steps:

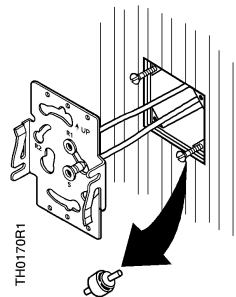
### General



1. After the wall is finished, remove the locator using a screwdriver to remove the two screws and lightly rock the locator while pulling to free it from the plaster.



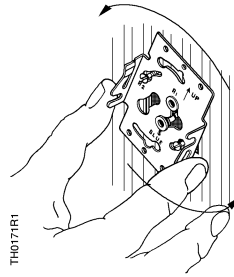
2. Pull out the terminal tubing. The terminal tubing has a supply (blue) and a return plug-in adapter connected with an air link. This provides a pressure-tight connection between supply and return for testing air lines for leakage.



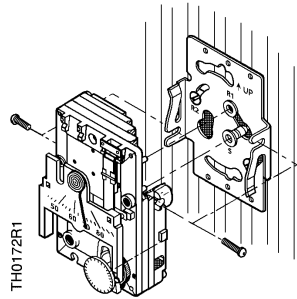
3. Remove the air link and install plug-in adapters on the wall plate.

## Installation of TH 192, TH 193, and TH 194 Thermostats

### General, Continued

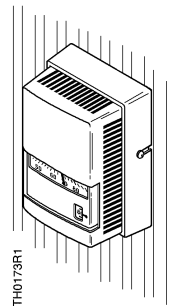


4. Install the wall plate on the wall box using the screws furnished with the instrument. Note that the wall plate has key slotted holes to allow insertion of the screws prior to installation of the wall plate and also to allow leveling of the wall plate.



5. Carefully plug the thermostat into the wall plate.

**NOTE:** To facilitate plugging the thermostat into the O-rings in the adapter, wet or moisten the thermostat supply and return ports. This wetting or moistening will lubricate and allow the thermostat to slip through the O-rings more easily.



6. Install the cover.

The installation is now complete.

## Disassembly

When removing the thermostat from the wall plate, hold the thermostat firmly at the top and bottom and start to pull the thermostat from the wall plate. At the same time, use a screwdriver to pry the wall plate latch arm away from the thermostat chassis to release it. Do the same for the other side of the thermostat and pull the thermostat away from the wall plate.



### CAUTION:

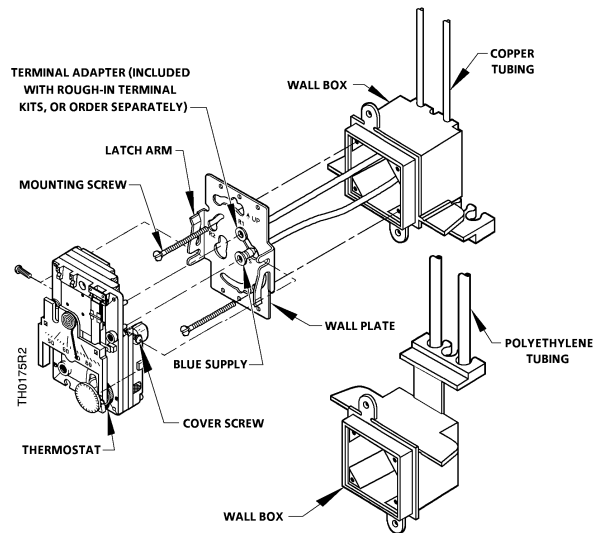
Frequent removal and installation of the thermostat may bend the latch arms beyond their operating positions. If this happens, bend the latch arms back to their operating position before mounting the thermostat.

## Installation in Existing Construction

**Solid or Semisolid Walls**—If the wall in which the thermostat is to be located is solid, or the terminal leads cannot be "snaked" through the wall, a portion of the wall must be removed to accept the terminal and tubing. Generally, the wall box Kit No. 192-478 or 192-480 is more suitable for this type of installation.

## Concealed Piping

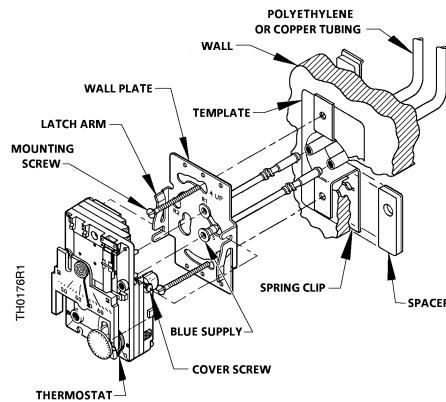
**Hollow Walls** -- Many types of wall construction are sufficiently hollow so that the thermostat terminal can be installed without damaging the finished surface. Generally, the tubing Kit No. 192-481 is best suited for this installation. Other tubing kits suitable for finished wall installation may also be used.



**Figure 5. Mounting Wall Plate and Thermostat with Wall Box Kit No. 192-478, 192-480, 192-498 or 192-499.**

## Installation in Existing Construction

### Concealed Piping, Continued



**Figure 6. Mounting Wall Plate and Thermostat with Kit Nos. 192-481 and 192-685.**

### Exposed Piping

- For exposed piping installations, use Kit No. 192-479 and adapter Kit No. 192-483. See Figure 7. A typical installation procedure to mount the thermostat to the surface of the wall consists of the following steps:
  1. Install the tubing.
  2. Attach the multi-slotted metal plate using the screws and slots indicated.
  3. Notch the adapter base as required to fit over the exposed tubing.
  4. Obtain the thermostat wall plate and screws from the thermostat box.
  5. Loosely screw the adapter base to the multi-slotted plate.
  6. Draw the plastic tubing through the multi-slotted plate and the adapter base.
  7. Remove the straight adapters from the plastic tubing and install 90° plug-in adapters provided in the 192-483 kit. Use the blue adapter for the air supply line.
  8. Install the plug-in adapters on the wall plate.
  9. Using the key slotted holes, install the wall plate on the adapter base and fasten the screws to secure the wall plate and the adapter base.
  10. Carefully plug the thermostat into the wall plate.

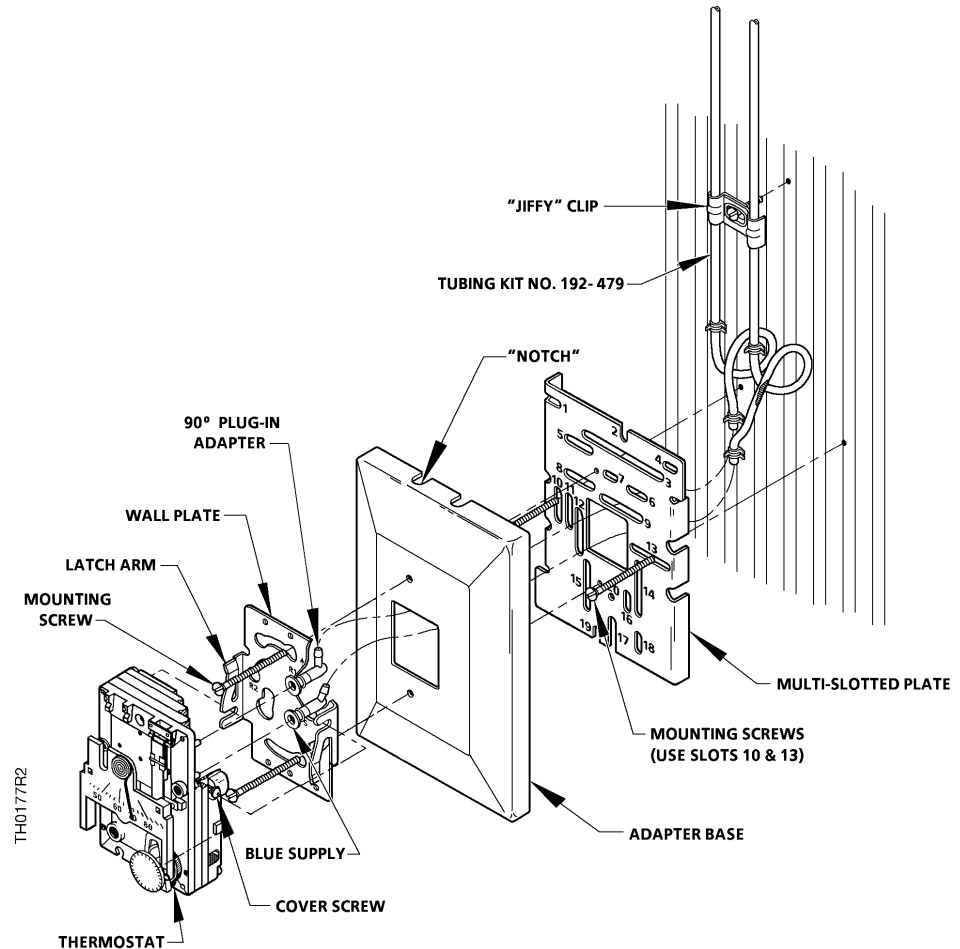
**NOTE:** To facilitate plugging the thermostat into the O-rings in the adapter, wet or moisten the thermostat supply and return parts. This wetting or moistening will lubricate and allow the thermostat to slip through the O-rings more easily.
  11. Install the cover.

The installation is now complete.



## Installation in Existing Construction

### Exposed Piping, Continued



**Figure 7. Exposed Piping Installation Using Kits No. 192-479 and 192-483.**

### **TH 192 DNV (or Three-pipe) Thermostats (See Figure 8)**

The installation of a DNV Thermostat is identical to other thermostats except that a third line, "R2," is required.

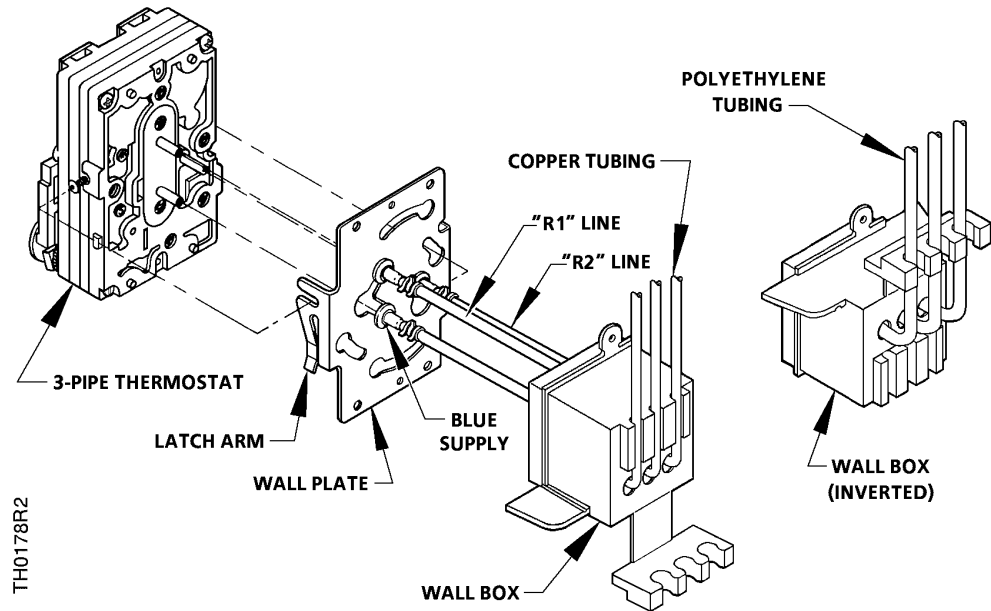
### **TH 192 One-pipe Thermostat**

The one-pipe thermostat uses one pneumatic connection. The connection is made to "R1" and the "S" connection is not utilized.

Otherwise, the installation of the thermostat terminals as well as the installation of the thermostat itself, is identical to installations requiring two pneumatic connections.

## Installation in Existing Construction

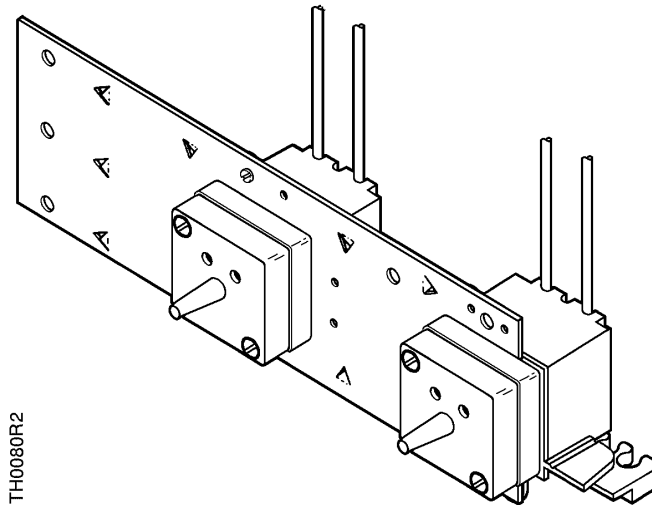
### Exposed Piping, Continued



**Figure 8. Installing "DNV" Thermostat Using No. 192-498 or 192-499 Wall Box Terminal.**

### Dual Box Installation

Occasionally, two devices, thermostats, hygrometers, or transmitters will be located together. Figure 9 shows how two wall boxes can be mounted on one plaster plate for vertically-installed thermostats



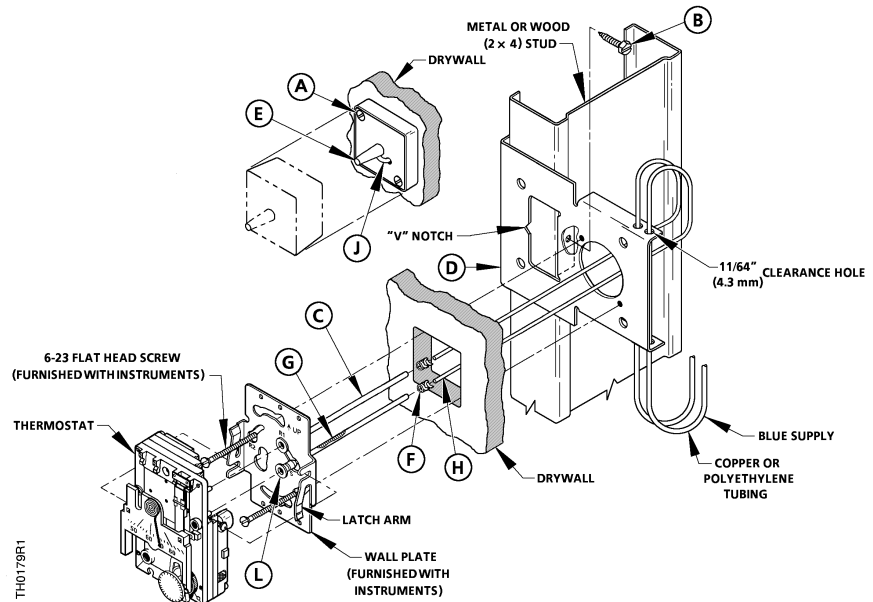
**Figure 9. Terminal for Two Vertical Thermostats.**

## Drywall Installation

The roughing-in procedure depends on whether or not drywall is up at installation time.

### Rough-in before drywall is up

If roughing-in can be done before drywall is up, see Figure 10.



**Figure 10. Mounting Wall Plate and Instrument with Bracket Mounting Kit.**

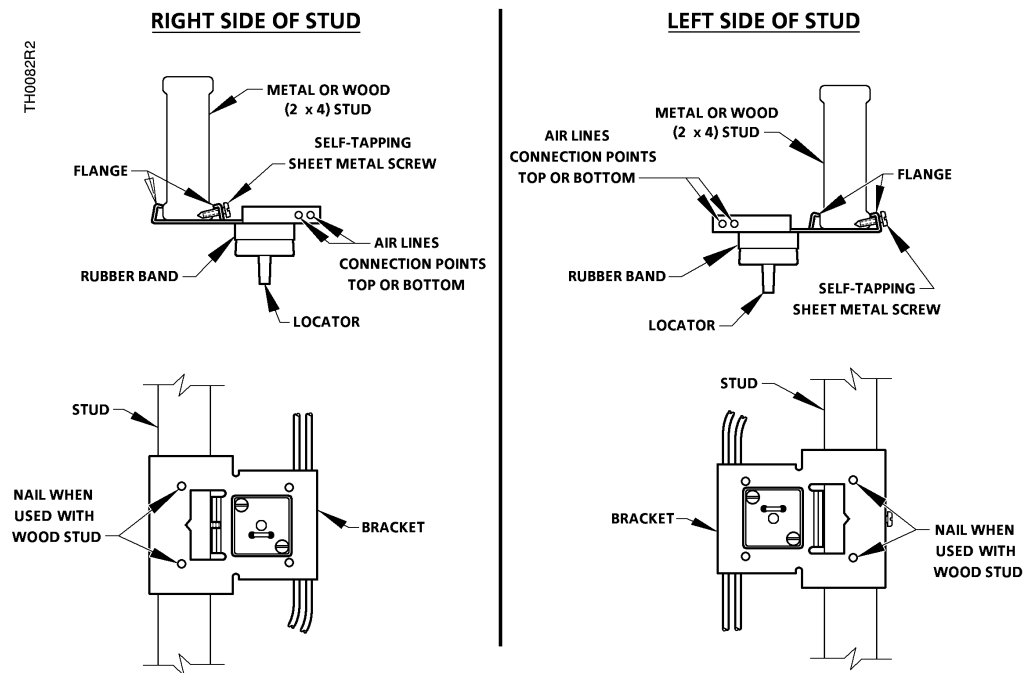
The drywall kit for installations where roughing-in can be done before drywall is up consists of:

- A. No. 6-32 x one-inch long flat-head steel screw (2)
- B. No. 10 x 3/4-inch long type "A" hex head screw
- C. Connecting tube -- 9-1/2-inches long
- D. Drywall mounting bracket
- E. Locator
- F. Tube retainer (2)
- G. Coil
- H. Copper tubing -- 8 feet (2.4 m)
- J. Wire Tie ("Twist-ems")
- K. Air Link
- L. Plug-in adapter

This kit is designed to be used on metal studs (metal 2 x 4s), but can also be used on conventional wooden 2 x 4s. The quick mounting bracket (D) provided with this kit permits it to be fastened securely to the stud with a single self-tapping sheet metal screw. As shown in Figure 11, the bracket can be mounted on either side of the stud. Ideally, the self-tapping screw should always be driven through the appropriate flange on the bracket so that the screw point bears against or pierces the solid (as opposed to open) side of the stud. However, if the situation requires it, the screw can be driven through the opposite flange and into the lip on the open side of the stud.

## Drywall Installation, Continued

**Rough-in before drywall  
 is up**



**Figure 11. Drywall Mounting Bracket Positions.**

A typical installation procedure consists of the following steps:

1. Attach the drywall mounting bracket (D) to the stud per the position selected at the desired location. The "V" notch on the bracket indicates the centerline of the instrument to be mounted.
2. Make all air line connections to the bracket. For installations with 1/4-inch O.D. polyethylene tubing, it is necessary to use tubing terminal kit No. 192-481 to adapt to the connections at the wall plate. In this case, after the tubing terminal kit is attached to the 1/4-inch tubing, it must be tied to the Locator (E) using wire tie (J) provided. Leave at least four to six inches of slack in the terminal tubing since it must be pulled into the room at a later stage to attach it to the wall plate. Notify the drywall installer to make a square hole (1-5/8 inch x 1-5/8 inch) in the drywall so the Locator (E) can project through the wall into the room.
4. After the drywall is finished, remove the locator (E) using a screwdriver to remove the two screws (A) and lightly rock the locator while pulling to free it from the drywall.
5. Removal of the Locator will pull out the terminal tubing. The terminal tubing has a supply (blue) and a return plug-in adapter connected with an air link. This provides a pressure-tight connection between the supply and return for testing air lines for leakage.
6. Remove the air link (K) and install the plug-in adapters (L) on the wall plate.

## Drywall Installation, Continued

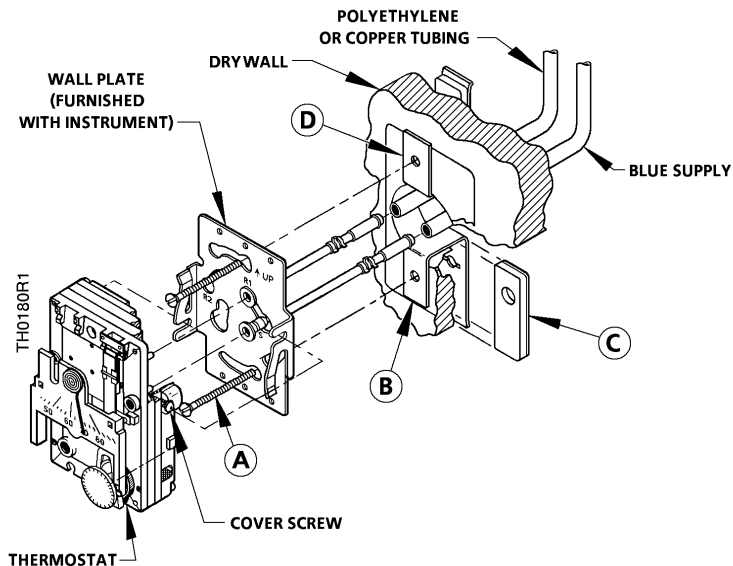
### Rough-in before drywall is up

7. Install the wall plate on the bracket (D) using the screws furnished with the instrument. Note that the wall plate has key slotted holes to allow insertion of the screws prior to installation of the wall plate and also to allow leveling of the wall plate.
8. Attach the thermostat.

The installation is now complete

### Installation after drywall is up

If drywall is already installed, see Figure 12.



**Figure 12. Mounting Wall Plate and Instrument with Spring Clip Mounting Kit.**

The spring clip mounting kit for finished drywall consists of:

- A. No. 6 × 1-1/4 inch long type "AB" flat-head steel screws (2)
- B. Spring Clip (2)
- C. Spacer (2)
- D. Template

This kit is designed specifically for 5/8-inch thick drywall, but it can also be used on 1/2-inch thick drywall. The stick-on spacers provided with the kit fill in the gap between the drywall and clip to provide more holding power. It can also be used on plywood, paneling, or other types of wall sheathing material.

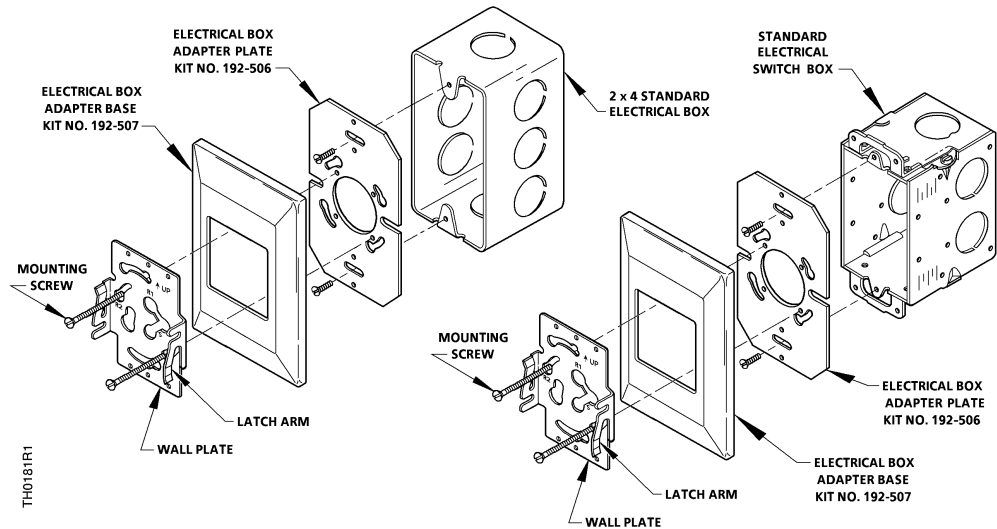
## Drywall Installation, continued

### Installation after drywall is up

A typical installation procedure consists of the following steps:

1. Place the template (D) on the wall at the desired location. The template has adhesive on the back, protected by paper; remove the paper backing and make sure the template is level before it sticks to the wall surface.
2. Drill two 5/32-inch diameter holes for No. 6 wall plate mounting screws.
3. Use a 1-1/4 inch diameter hole saw to drill an access hole in the drywall where indicated on the template.
4. For 5/8-inch thick drywall, insert the clips (B) with the long leg going through the 1-1/4 inch access hole. Make sure they rest flat against the back surface of the drywall. The wall is held between the two legs of the spring clips. Align the screw holes in the clips (B) with the holes on the wall.
5. Fish the air lines through the 1-1/4 inch access hole (using tubing kit No. 192-481, or any tubing kit suitable for finished wall installation).
6. Remove the air link and install the plug-in adapters on the wall plate.
7. Install the wall plate on the wall using the screws (A). Note that the wall plate has key slotted holes to allow insertion of the screws prior to installation of the wall plate and also to allow leveling of the wall plate.
8. Attach the thermostat.

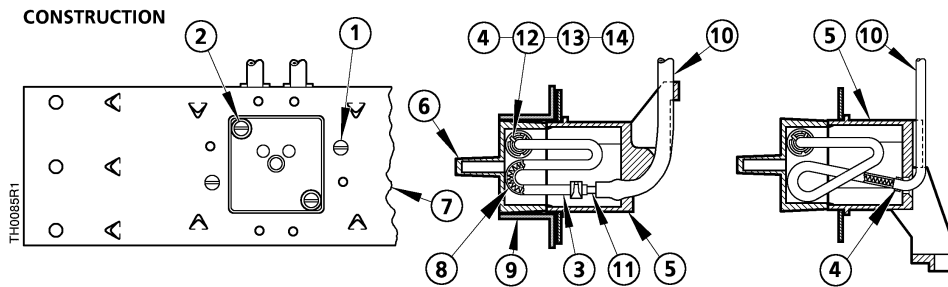
The installation is now complete.



**NOTE:** Adapter frame, Part Number 192-308, may be used in conjunction with the adapter base to cover up oversized holes, paint lines, broken walls, spots etc.

**Figure 13. Electrical Box Wall Plate Installation.**

## Mounting and Installation Kits

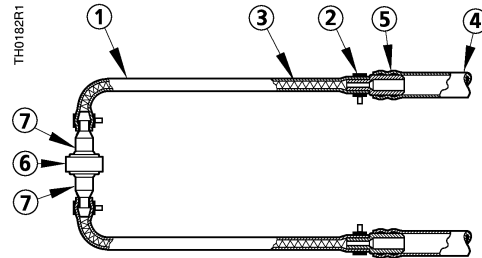


**Figure 14. Terminal Kit Nos. 192-478, 192-480, 192-498, and 192-499.**

Kit No.	Type of Terminal	Type of System
192-478	Wall Box with 8-foot (2.4 m) Copper Tubing	2-Pipe
192-498		3-Pipe
192-480	Wall Box with 8-foot (2.4 m) 1/4-in. (6.3 mm) Polyethylene Tubing	2-Pipe
192-499		3-Pipe

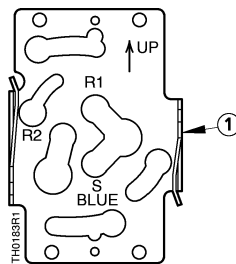
Item No.	Part Number	Description	Quantity/Unit			
			192-478	192-480	192-498	192-499
1	—	No. 4-40 x 3/16-inch Long Pan Head St. Screw	2	2	2	2
2	—	No. 6-32 x 1-inch Long Flat-head. St. Screw	2	2	2	2
3	163-463	Connecting Tube	2	2	3	3
4	—	Tube Retainer -- Kit No. 141-388 (Package of 100)	4	4	6	6
5	192-835	Wall Box	1	1	1	1
6	182-687	Locator	1	1	1	1
7	182-119	Plaster Plate	1	1	1	1
8	192-513	Coil	2	2	3	3
9	182-122	Rubber Band	2	2	2	2
10	—	Copper Tubing – 8-foot Long	2		3	
	—	Polyethylene Tubing – 8-foot Long		2		3
11	182-258	Connector to 1/4-inch Polyethylene Tubing		2		3
12	—	Air Link -- Kit No. 192-501 (Package of 20)	1	1	1	1
13	—	Plug-in Adapter (Blue) -- Kit No. 192-485 (Package of 20)	1	1	1	1
14	—	Plug-in Adapter (White) -- Kit No. 192-486 (Package of 20)	1	1	2	2

## Mounting and Installation Kits, Continued



**Figure 15. Tubing Kit No. 192-481 (10/Kit) and 192-505 (10/Kit).**

Item No.	Part Number	Description	Quantity/Kit	
			Kit 192-481	Kit 192-505
1	163-463	Connecting Tube -- 4 inch (101.6 mm) (2 required)	40	40
2	—	Tube Retainer (4 req'd) Kit No. 141-388 (Package of 100)	40	40
3	192-513	Coil - (2 required) (3-3/4 inch Long)	20	20
4	—	Polyethylene Tubing (2 required) (not furnished)	—	—
5	141-246	Connector to 1/4-inch (4 mm) Polyethylene Tubing (2 req'd)	20	—
5	141-247	Connector to 5/32 inch (4 mm) Polyethylene Tubing (2 req'd)	—	20
6	—	Air Link -- Kit No. 192-501 (Package of 20)	10	10
7	—	Plug-in Adapter (Blue) Kit No. 192-485 (Package of 20)	10	10
7	—	Plug-in Adapter (White) Kit No. 192-501 (Package of 20)	10	10



**Figure 16. Wall Plate Kit No 192-644.**

Item No.	Part Number	Description
1	192-636	Wall Plate
*2	—	No. 6-32 x 3/4-inch Long Flat Head Steel Screw (2 req'd)
*3	—	No. 6-32 x 1-1/4 inch Long Flat Head Steel Screw (2 req'd)

\* Not Shown in Figure 16.



## Mounting and Installation Kits, Continued

Dimensions in inches  
 (mm)

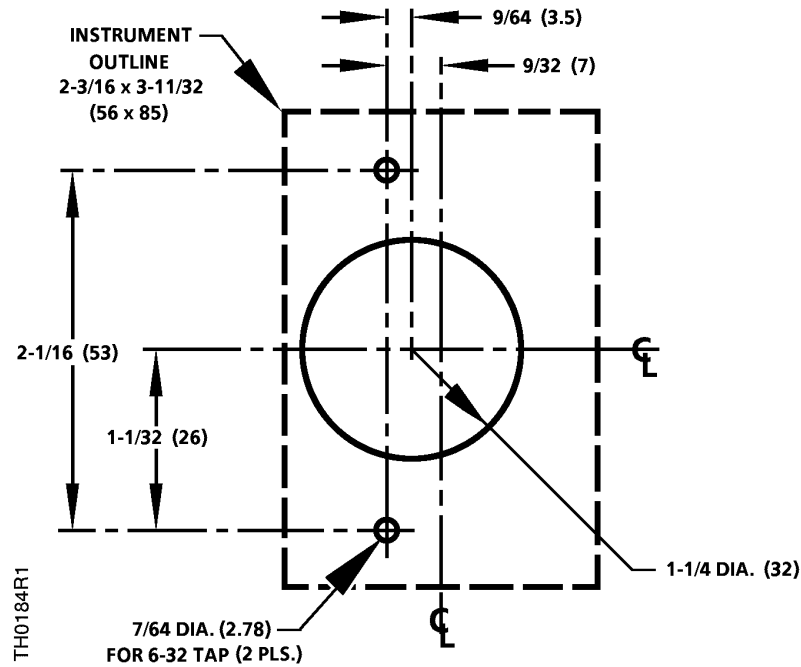


Figure 17. Panel Mounting or Standard Mullion Cut-out for TH 192, TH 193, and TH 194 Thermostats.

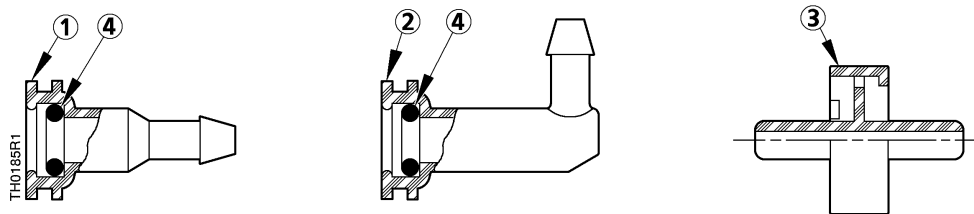


Figure 18. Plug-in Adapters.

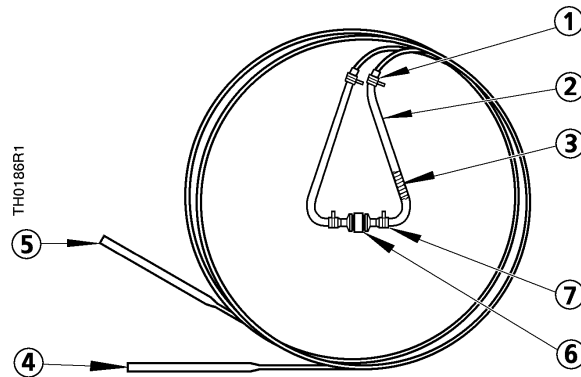
Item No.	Kit Number	Description
*1	192-485	Plug-in Adapter – Straight (Blue)
	192-486	Plug-in Adapter – Straight (White) (Package of 20)
*2	192-487	Plug-in Adapter - 90° (Blue) (Package of 20)
	192-488	Plug-in Adapter - 90° (White) (Package of 20)
*3	192-501	Air Link
*4	—	O-ring

\*Adapter Part Numbers include O-ring, Item 4.

**Replacing O-rings**

If leaks are detected around the O-rings, new rings should be installed. To install, insert a pencil in the O-ring, pry out and replace with a new ring. It is not necessary to remove the wall plate.

**NOTE:** To facilitate installation, wet or moisten the new ring when installing. This wetting acts as a lubricant, allowing the ring to slide in more easily.



**Figure 19. Copper Tubing Kit No. 192-479.**

Item No.	Kit Number	Description
1	—	Tube Retainer (4 required)
2	163-463	Connecting Tube 4 inches long (2 required)
3	192-513	Coil
4	854-066A	Copper Tubing 8 feet long
5	854-066B	Copper Tubing 8 feet long
6	—	Air Link Kit No. 192-501
7	—	Plug in Adapter (Blue) Kit No 192-485 (Pkg of 20)
	—	Plug in Adapter (White) Kit No 192-486 (Pkg of 20)

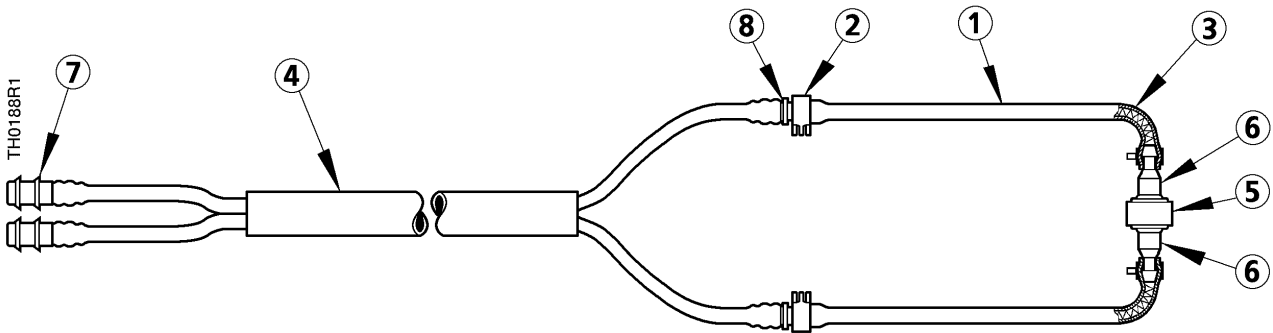


Figure 20. Tubing Kit Nos. 192-600, 192-601, 192-750, 192-753, and 192-755.

Item No.	Kit Number	Description	Quantity / Kit				
			Kit 192-600 2-Pipe	Kit 192-601 3-Pipe	Kit 192-750 2-Pipe	Kit 192-753 3-Pipe	Kit 192-755 2-Pipe
1	163-463	Connecting Tube – 4-inch (101.6 mm)	2	3	2	3	2
2	—	Tube Retainer Kit No. 141-388 (Package of 100)	4	6	4	6	4
3	192-513	Coil	2	3	2	3	2
4	—	1/4-inch (4 mm) Polyethylene Twin Tubing 8 feet Long (2.4 m)	1	—	—	—	—
4	—	5/32-inch (4 mm) Polyethylene Triple Tubing - 8 feet Long (2.4 m)	—	1	—	—	—
4	—	5/32-inch (4 mm) Polyethylene Twin Tubing 40 ft. Long (12.2 m)	—	—	1	—	—
4	—	5/32-inch (4 mm) Polyethylene Triple Tubing - 40 feet Long (12.2 m)	—	—	—	1	—
4	—	1/4-inch (4 mm) Polyethylene Twin Tubing 40 feet Long (12.2 m)	—	—	—	—	1
5	—	Air Link Kit No. 192-501	1	1	1	1	1
6	—	Plug-in Adapter (Blue) Kit No. 192-485 (Package of 20)	1	1	1	1	1
6	-	Plug-in Adapter (White) Kit No. 192-486 (Package of 20)	1	2	1	2	1
7	141-246	Connector to 1/4-inch (4 mm) Polyethylene Tubing	2	3	2	3	2
8	141-247	Connector to 5/32-inch (4 mm) Polyethylene Tubing	2	3	2	3	2

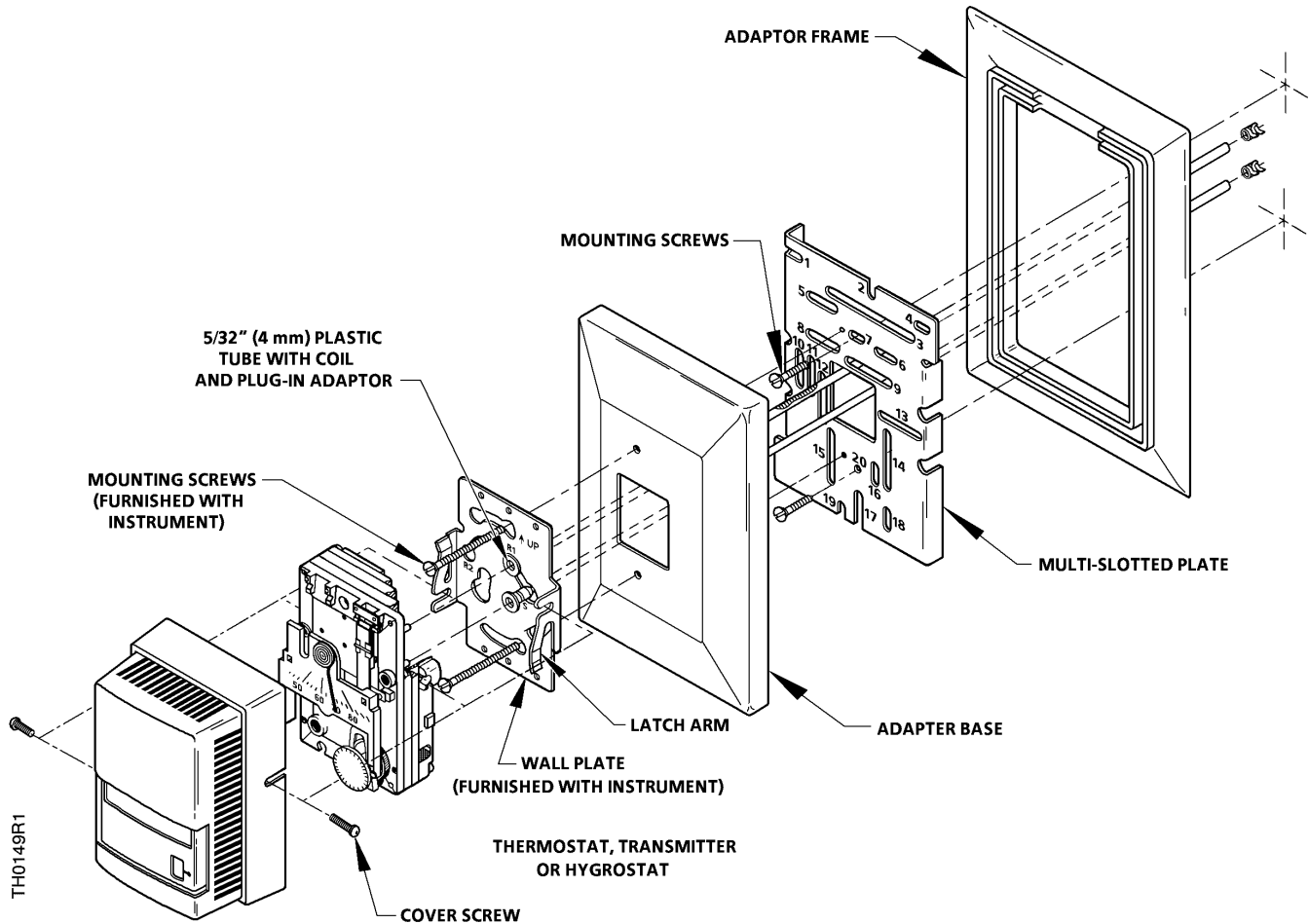


Figure 21. Adapter Kit.

*Kit No.	Description	Used For
192-300	Universal Adapter	See TB 214 For Specific Adaptation and Kit Selection Chart
192-483	Adapter Kit "A"	
192-484	Adapter Kit "B"	

\*These kits are used to convert most existing pneumatic room thermostats to the Powers TH 192, TH 193, and TH 194 Thermostats

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