

**T-4000-605 (Beige) and T-4000-630 (White)  
 Universal Conversion Kits  
 for Pneumatic Room Instruments**

The T-4000-605 (Beige) and T-4000-630 (White) Universal Pneumatic Room Instrument Conversion Kits are designed for remodeling existing room instrument installations; both Johnson Controls and non-Johnson Controls. These kits can be applied to both exposed and concealed tubing existing instrument installations. The procedures for application of these kits are described under appropriate sections titled: Exposed Tubing Installations, Non-Johnson Controls Installations and Johnson Controls T-400 Series and H-100 Series Installations.

All of the parts required and the instructions for converting 1, 2 and 3 tube existing instruments are contained in these kits (see Table 1); leftover or unused parts should be discarded. New thermostats, humidistats, temperature or humidity transmitters, covers and wire or cast guard kits (if required) must be ordered separately. Tables 2a and 2b list all of the known conversions. In all cases, if the existing installation is surface mounted or has exposed tubing, use the conversion procedure described in the "Exposed Tubing Installations" section.

**Table 1: Parts Included in Kit**

Description	Quantity	Contains
<b>Adapter Cover/Subplate</b>	1	(1) Cover plate with room instrument mounting bracket attached by (2) #6 x 3/8 in. pan head self-tapping screws, (1) subplate, and (2) #6-32 x 5/8 in. pan head taprite screws to mount cover plate to subplate.
<b>Terminal Connector and Tubing</b>	1	(1) Terminal connector (3-tube with angle terminals and o-rings assembled) and (3) 8 in. lengths of 5/32 in. O.D. (black) polyethylene tubing with anti-kink springs attached, (1) 8 in. length of 5/32 in. O.D. (amber) polyethylene tubing with anti-kink spring, and (1) 9 in. length of 1/4 in. O.D. (blue) polyurethane tubing with anti-kink spring.
<b>T-400 Air Fittings</b>	1	(1) Supply terminal: angle fitting with integral filter, (2) Control terminals: angle fittings with integral filters, (2) gaskets, (2) gasket plates, and (4) plate mounting screws.
<b>Adjustable Pipehead</b>	1	(1) Adapter plate, (5) #8 flat round washers, and (3) flat round washer gaskets.
<b>Tube Couplings and Clamps</b>	1	(3) 5/32 in. x 5/32 in. tubing couplers, (3) 5/32 in. x 1/4 in. tubing couplers, and (3) 5/32 in. tube clamps.
<b>Mounting Hardware</b>	1	(2) #4-40 x 1-5/8 in. pan head machine screws, (2) #5-40 x 3/4 in. studs, (4) #5-40 hex nuts, (2) #5-40 x 1-1/4 in. pan head machine screws, (2) #6 x 3/8 in. pan head self-tapping screws, (2 each) #6-32 x 7/16 in. x 1-1/4 in., and x 2 in. pan head machine screws, (2) #6 x 1-3/4 in. pan head self-tapping screws, (2) #6 star washers, (1) #8 x 1-1/2 in. pan head self-tapping screw, (2) #8-32 x 1-3/4 in. pan head machine screws, (2) #10-24 x 1-1/2 in. pan head machine screws, and (2) #10 star washers.
<b>Instruction Manual #24-1855-5</b>	1	

**Table 2a: Non-Johnson Controls Conversions**

Existing Installation for Conversion	Page
Barber-Colman “TK” Series Wallbox and Mortar Joint	5
Honeywell TO900 or TP900 Wallbox	6
Honeywell TO910 or TP910 Wallbox and Mortar Joint	7
Honeywell TP970 Shallow and Deep Wallboxes	9
Powers “D” Wallbox and Ground Plate	10
Powers T-21 Ground Plate, Wallbox and Mortar Joint	12
Powers TH-180 Wallbox and Drywall Mounting	13
Robertshaw T-15 (Metal) Early Wallbox and Mortar Joint	14
Robertshaw T-15 Later Wallbox and Mortar Joint	14
Robertshaw T-18 (Plastic) Drywall Mounting	16
Draeger (ITT) Wallbox	16
UPC	16

**Table 2b: Johnson Controls Conversions  
(See Pages 16, 17, & 18)**

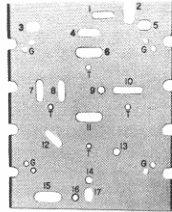
Original Controller		Recommended Conversion (Using this Kit)
Model	Pipehead Style	
T-315	V	T-4003
T-400	I	T-4002
T-401	I	T-4002
T-402	I	T-4002 and Two-Position Air Switching Device
T-403	I	T-4002
T-405	III	T-4502
T-408	I	No Direct Replacement *
T-411	V	No Direct Replacement *
T-418	III	No Direct Replacement *
T-423	III	T-4752
T-425	I	T-4002 and Two-Position Air Switching Device
T-431	VII	No Direct Replacement *
T-432	III	T-4752
T-435	VII	No Direct Replacement *
T-441	II a	T-4004
T-441	II b	No Direct Replacement *
T-445	II b	No Direct Replacement *
T-460	III	T-4502 with Manual Index Switch
T-461	III	T-4502 with Manual Index Switch
T-462	III	T-4502 and Two-Position Air Switching Device
T-465	IV	T-4512
T-1210	I	T-5002
H-101	V	No Direct Replacement *
H-102	I	H-4100
H-103	I	H-4100
H-104	I	H-4100 and Two-Position Air Switching Device
H-105	I	H-4100
H-107	I	H-4100
H-1210	I	H-5100

\* Contact Branch Office or Field Engineering for custom conversion possibility.

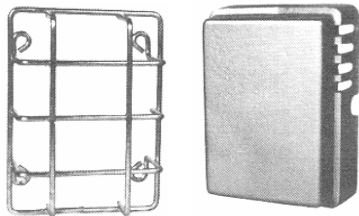
## Subplate and Cover Plate with Instrument Mounting Bracket

The subplate furnished with this kit is designed with specific pairs of slots and holes for attaching it to the existing installation wall, wallbox or mortar joint. Holes are also provided for attaching the plastic cover plate and guard kit (if required).

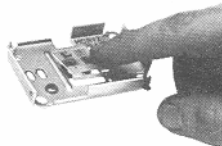
The plastic cover plate is furnished with the room instrument mounting bracket attached as shown. Generally, the new room instrument is mounted in the same horizontal or vertical position as the existing instrument to be converted. Thus, the bracket can be detached and rotated 90° for alternate horizontal and vertical mounting positions as shown. The plastic back is also marked on the reverse side with hole locations for mounting guard kits (when required) as shown.



**Figure 1: Subplate:**  
Holes and slots 1-17 for attaching to installation site.  
T-holes for attaching cover plate and room instrument mounting bracket and G-holes for guard mounting.



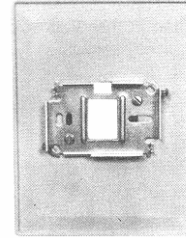
**Figure 2:**  
T-4002-3001 Wire Guard    T-4002-3004 Cast Guard



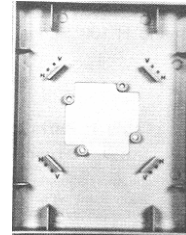
**Figure 3: Snap-In Terminal Connector:**  
Place top end into bracket first and press bottom end down to snap into bracket.

## Room Instrument Mounting Bracket and Terminal Connector

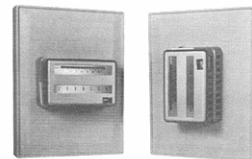
The room instrument mounting bracket is designed to accept the snap-in terminal connector as shown. Follow the orientation markings on both the bracket and the terminal connector when installing. All Johnson Controls pneumatic room instruments are furnished with barbed type air terminals which plug directly into the terminal connector, except for 1-tube instruments which are directly connected with the 5/32 in. polyethylene tubing.



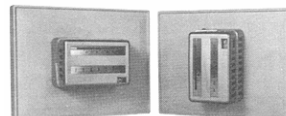
**Figure 4: Cover Plate:**  
Room instrument mounting bracket attached with (2) #6 x 3/8 in. self-tapping screws. (Detach and rotate 90° for alternate mounting requirements.)



**Figure 5: Cover Plate (Rear View):**  
Four pairs for holes marked H and V for drilling through to mount guard.



**Figure 6: Converted Installations (Above and Below):**  
Horizontal mounting (left) and vertical mounting (right)  
Note: Upper right and lower left views with alternate bracket mounting positions.



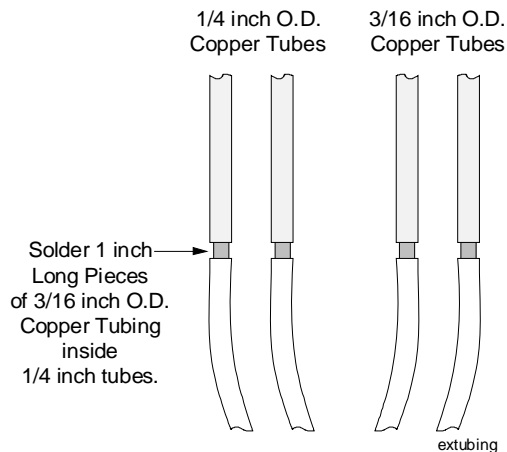
## Procedures for Conversion

The following illustrations show various installation situations, air connection alterations and subplate adaptations. Refer to Page 19 for the adapter cover plate and Johnson Controls replacement instrument mounting details.

### Exposed Tubing Installations

These installations consists of any type of room instrument mounting in which the supply, control (and switch) air lines to the instrument are exposed on the wall surface and terminated by the surface mounted instrument. Normally, these are copper tubing lines. Cut the instrument off and remove it from the wall. Adapt the conversion parts to the building air lines as shown. Use appropriate anchors to secure the subplate to the wall. Proceed to complete the new instrument mounting by following the procedure on Page 19 of this bulletin.

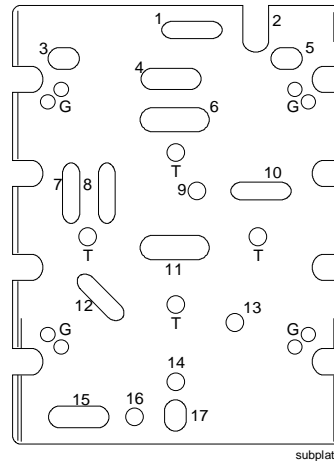
**Note:** The plastic cover plate must be notched as required to fit over the exposed tubing. It may also be necessary to bend the side legs of the subplate out of the way to clear the exposed tubing.



**Figure 7: Exposed Tubing (With Copper)**

Slide the 1/4 in. (blue) polyurethane with springs over the 3/16 in. copper at least 1/4 in. Adapt to the polyurethane with 5/32 x 1/4 coupler fittings and connect the 5/32 in. (black) polyethylene on the terminal connector directly. Mount the subplate with 2 (minimum) screws and star washers in any pair of holes and slots 1-17.

**Note:** Use wall anchors (order separately) as required. Refer to Page 19 for the adapter cover plate and Johnson Controls replacement instrument mounting detail.



**Figure 8: Subplate**

## Non-Johnson Controls Installations

These installations consist of the non-Johnson Controls instruments listed in Table 2a. Be sure to obtain the specific controller or transmitter replacement, matching cover and guard kit (if required) before proceeding with the conversion.

### Barber-Colman TK Series

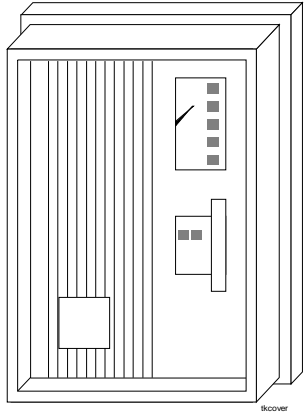


Figure 9: Cover

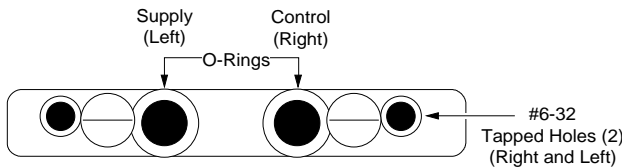
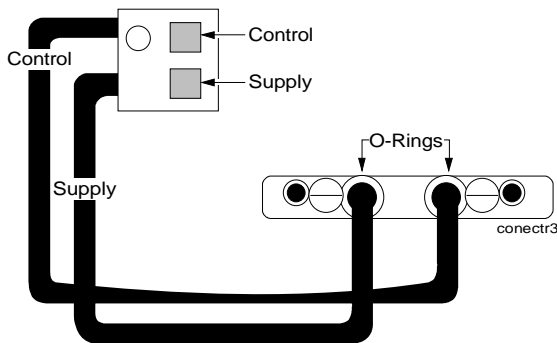


Figure 10: Mortar Joint



Note: Slide tubing with springs as far as possible into O-Rings.

Figure 11: Mortar Joint Connection

Plug Terminal Connector leads into O-rings of Mortar Joint above.

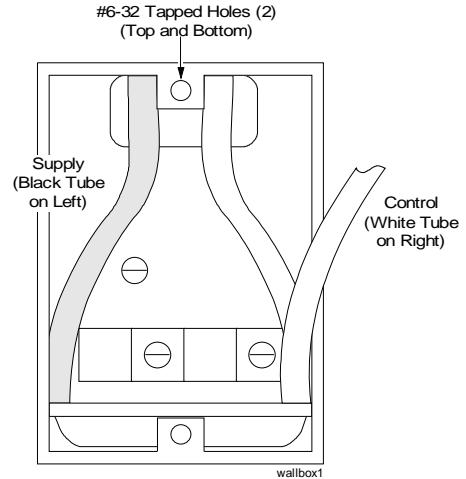


Figure 12: Wallboxes (Above and Below)

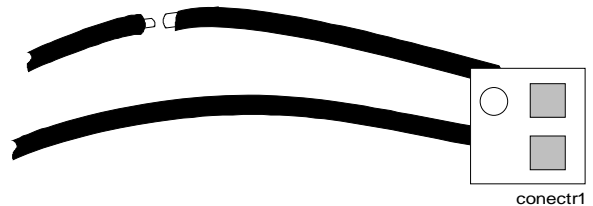
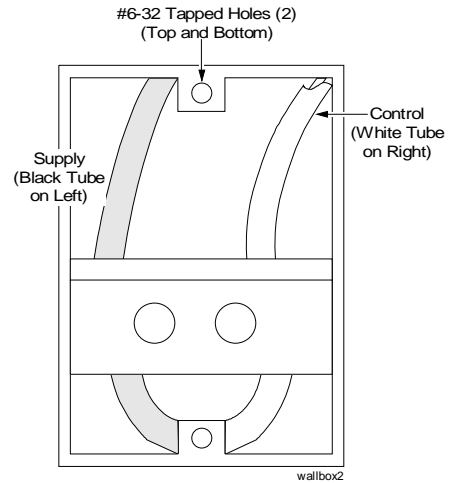
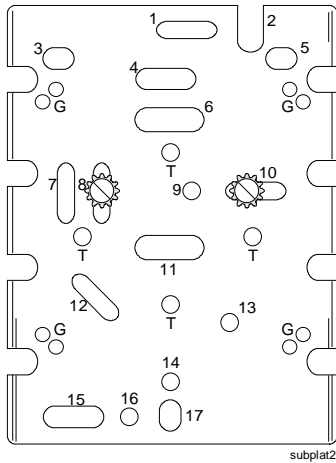
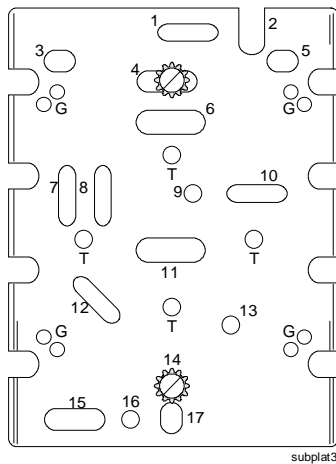


Figure 13: Terminal Connector

Adapt Terminal Connector to Wallboxes above with 5/32 x 5/32 Fittings.



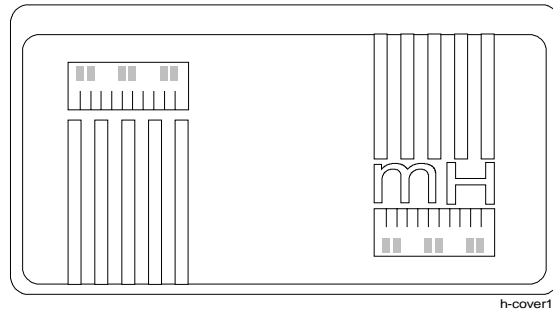
**Figure 14: Subplate for Mortar Joint  
(See Note Below)**



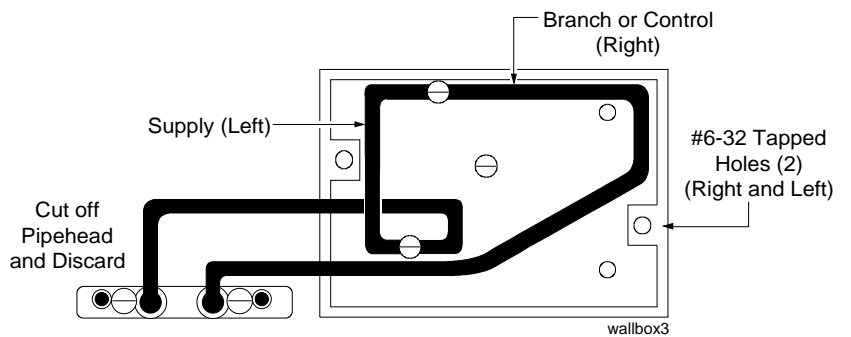
**Figure 15: Subplate for Wallboxes  
(See Note Below)**

**Note:** Attach subplate with (2) #6-32 x 1-1/4 in. screws with star washers in slots 8 & 10 for Mortar Joint and slot 4 and hole 14 for Wallboxes. Refer to Page 19 for the adapter cover plate and Johnson Controls replacement instrument mounting detail.

**Honeywell TO900 or TP900**

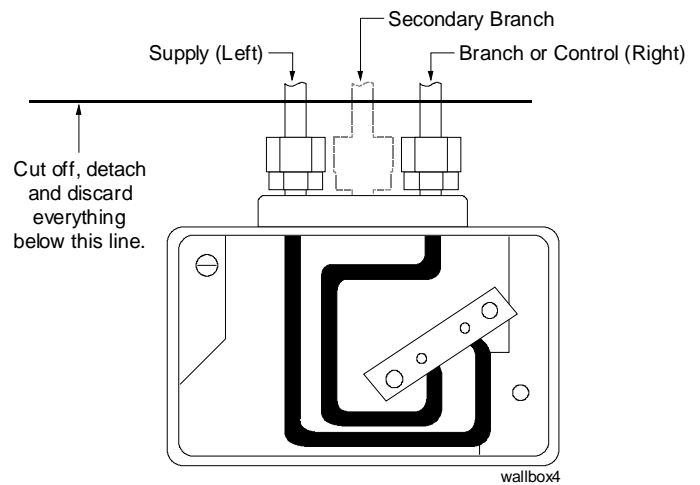


**Figure 16: Cover**



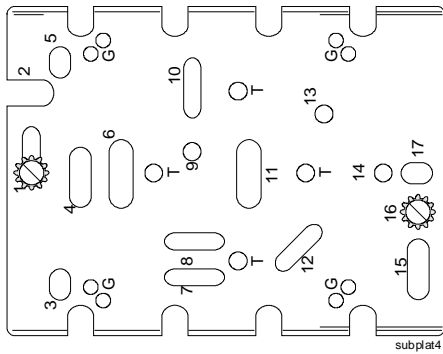
**Note:** Secondary branch line would always be positioned between the supply and control.

**Figure 17: Wallbox**



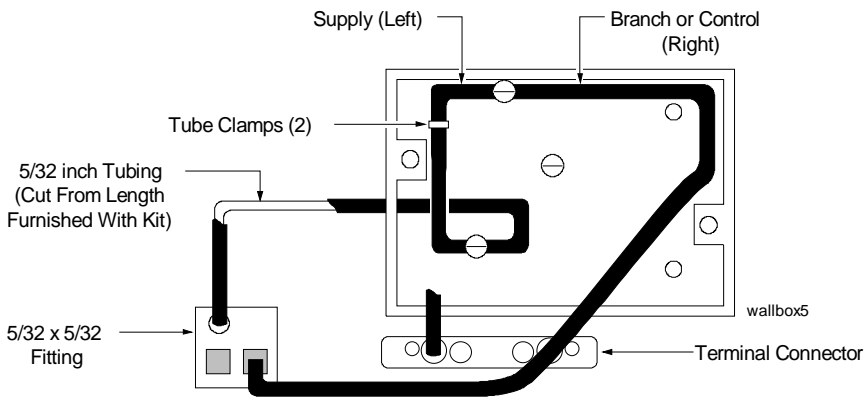
**Note:** Treat the conversion as described under the exposed tubing section.

**Figure 18: Exposed Tubing Unit**



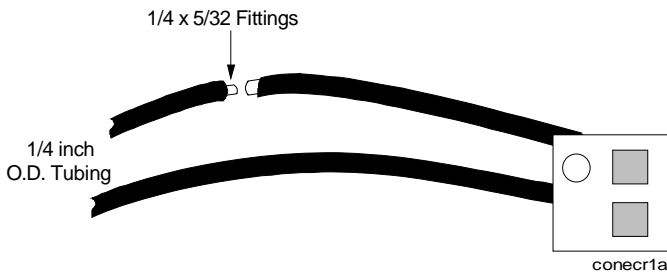
**Figure 19: Subplate (See Note Below)**

**Note:** Attach subplate to Wallbox with (2) #6-32 x 1-1/4 in. screws with star washers in slot 1 & hole 16. Refer to Page 19 or the adapter cover plate and Johnson Controls replacement instrument mounting detail.



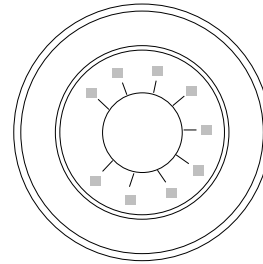
**Note:** Some conversion may already have 1/4 inch rubber tubing instead of copper, if so, make the 1/4 x 5/32 fitting adaptation directly to the rubber tubing.

**Figure 20: Terminal Connector Adaptation**

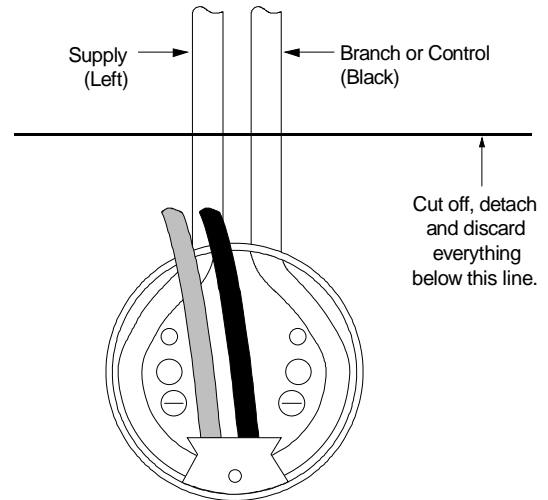


**Figure 21: Optional Terminal Connector Adaptation for Rubber Tubing**

**Honeywell TO910 or TP910**

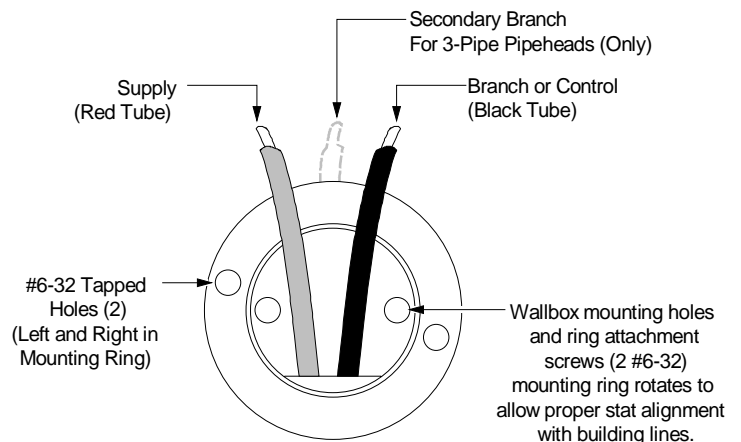


**Figure 22: Cover**



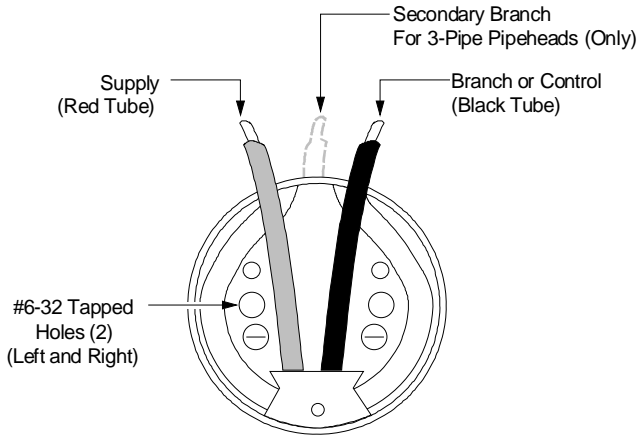
**Note:** Treat the conversion as described under the exposed tubing section.

**Figure 23: Exposed Tubing Unit**



**Note:** Retain ring if attachment screws are not properly aligned horizontally or vertically.

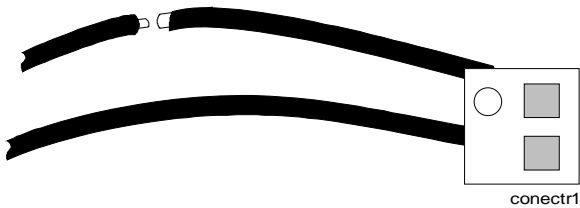
**Figure 24: Wallbox with Mounting Ring**



Note: Two tapped holes can be used for conversion and ring can be discarded only if holes in wallbox are in proper alignment with building lines.

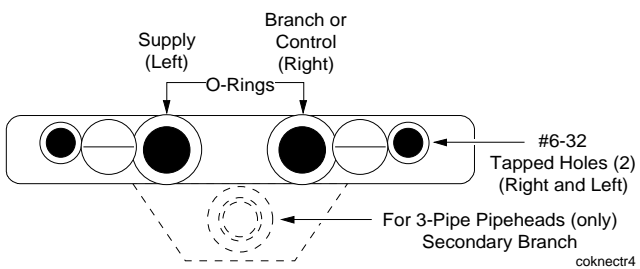
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**Figure 25: Wallbox with Mounting Ring Discarded**

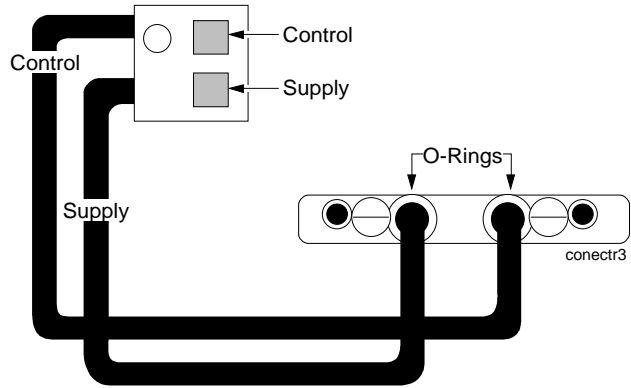


**Figure 26: Terminal Connector**

Adapt Terminal Connector to Wallboxes (see wallbox diagrams) with 5/32 x 5/32 Fittings.



**Figure 27: Mortar Joint**

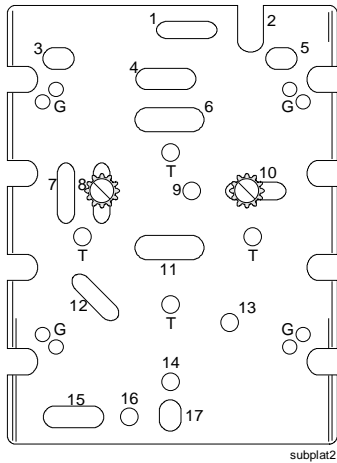


Note: Slide tubing with springs as far as possible into O-Rings.

**Figure 28: Mortar Joint Connection**

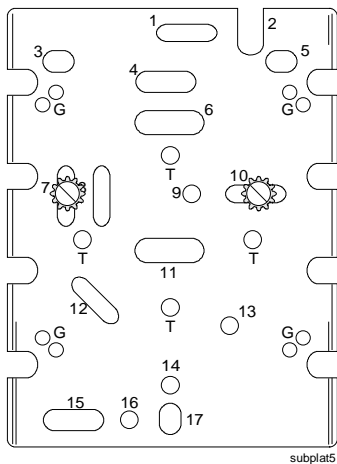
Plug Terminal Connector leads into O-rings of Mortar Joint.





**Figure 29: Subplate for Mortar Joint or Wallbox Less Mounting Ring**

Use (2) #6-32 x 1-1/4 in. screws with star washers in slots 8 & 10. (See Note below.)

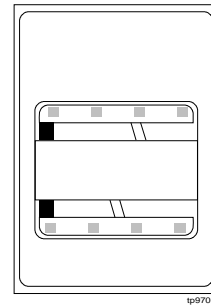


**Figure 30: Subplate for Wallbox with Mounting Ring**

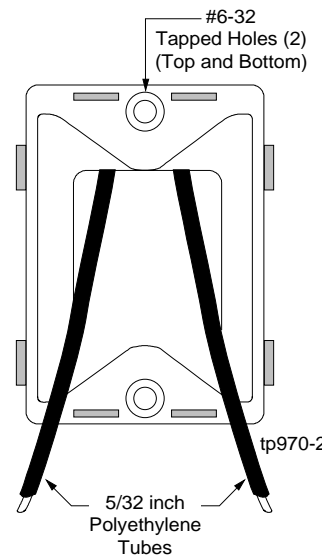
Use (2) #6-32 x 7/16 in. screws with star washers in slots 7 & 10. (See Note below.)

**Note:** Refer to Page 19 for adapter cover plate and Johnson Controls replacement instrument mounting details.

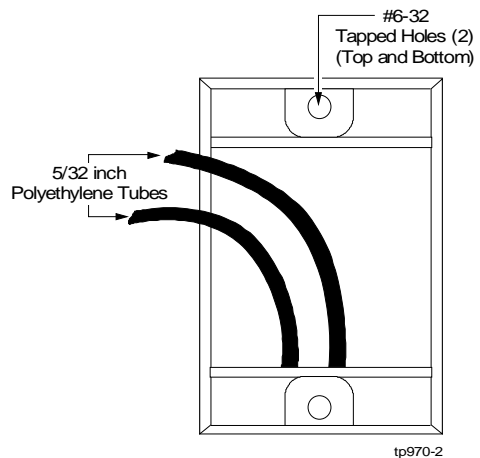
**Honeywell TP970**



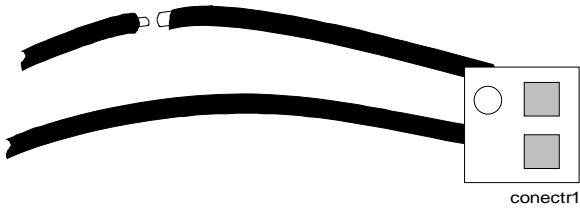
**Figure 31: Cover**  
(Also available in horizontal mounting style.)



**Figure 32: Shallow Wallbox**

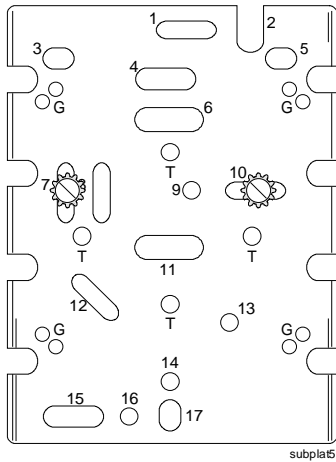


**Figure 33: Deep Wallbox**



**Figure 34: Terminal Connector**

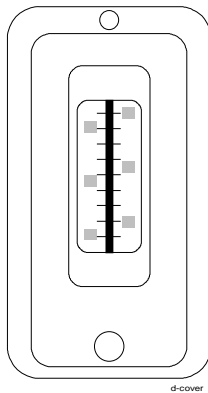
Adapt Terminal Connector to Wallboxes with 5/32 x 5/32 Fittings.



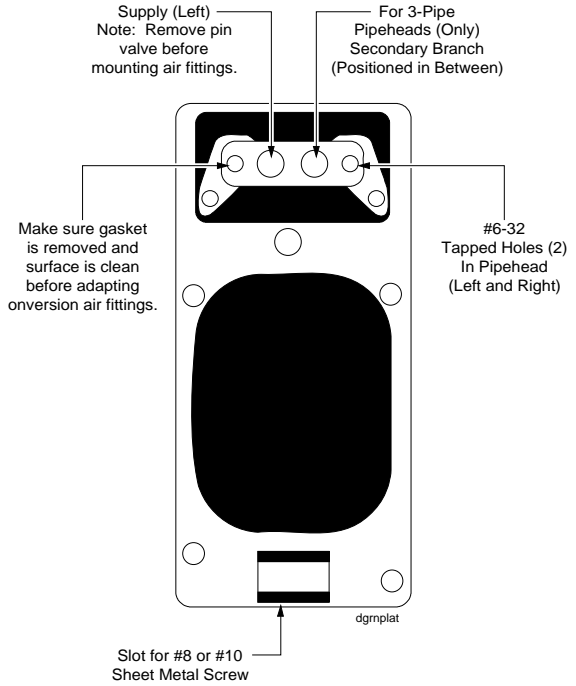
**Figure 35: Subplate (see Note)**

**Note:** Mount Subplate to either wallbox using (2) #6-32 x 1-1/4 in. or 7/8 in. screws with star washers in slots 7 & 10. Refer to Page 19 for adapter cover plate and Johnson Controls replacement instrument mounting detail.

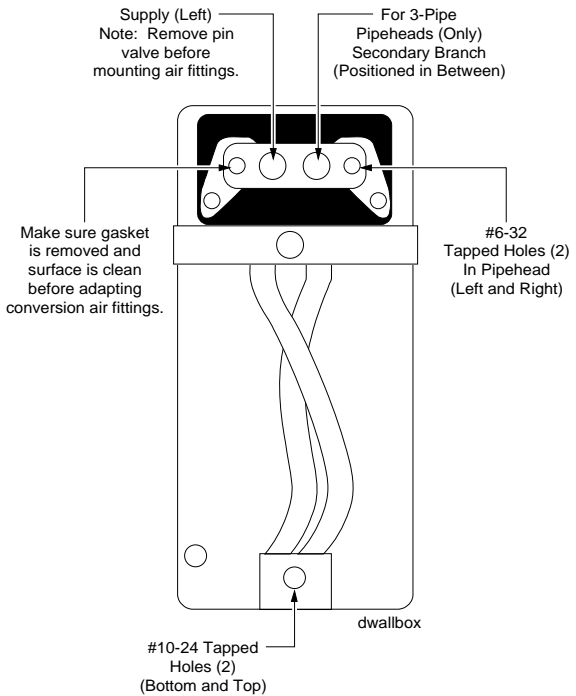
**Powers “D”**



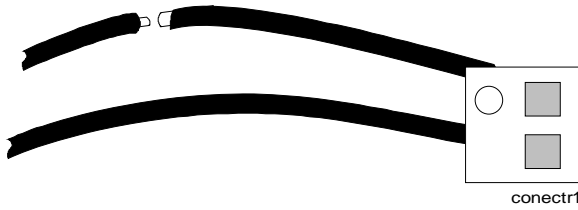
**Figure 36: Cover**



**Figure 37: Groundplate**

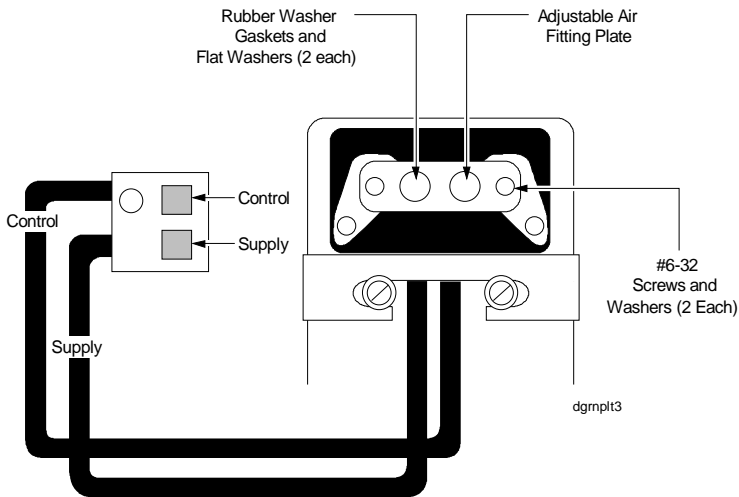


**Figure 38: Wallbox**



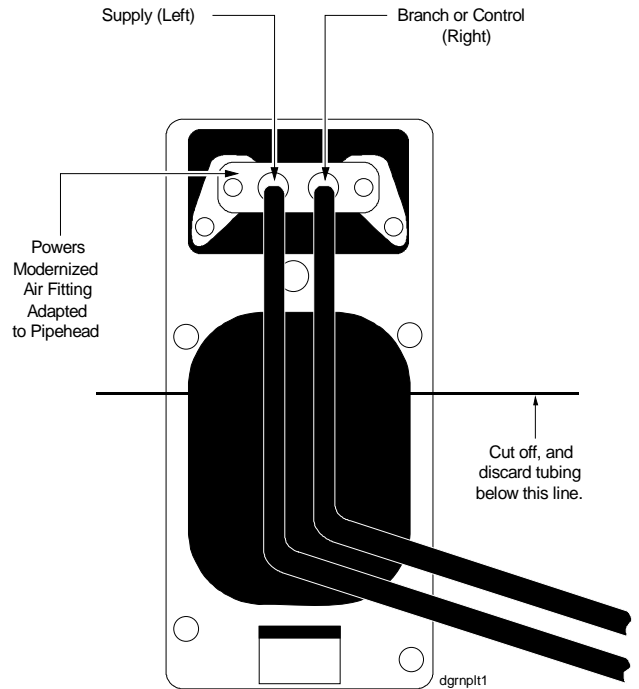
**Figure 39: Terminal Connector**

Adapt Terminal Connector leads to tubing on groundplate with modernized air fitting using 5/32 x 5/32 fittings.



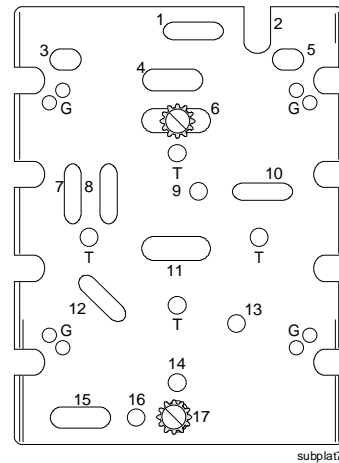
**Figure 40: Terminal Connection**

Make Terminal Connector Adaptation with Adjustable Pipehead for groundplate or wallbox installations.



Note: Make adaptation to terminal connector with 5/32 x 5/32 fittings.

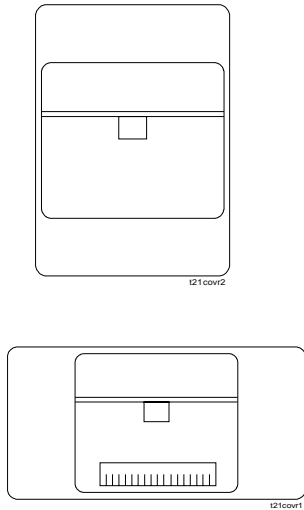
**Figure 41: Groundplate with Modernized Air Fitting Adapter**



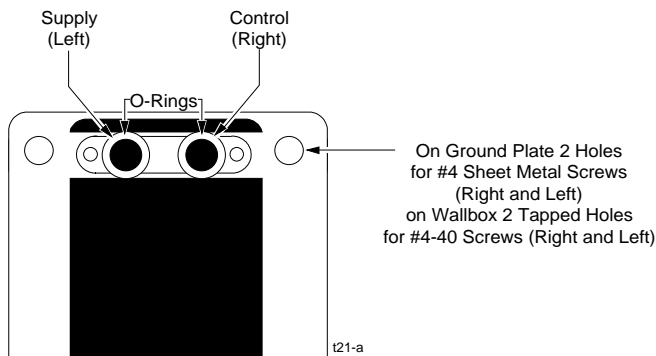
**Figure 42: Subplate (see Note)**

**Note:** On groundplate, mount subplate with (1) #10-24 x 1-1/2 in. screw with star washer in slot 6 & (1) #8 sheet metal screw with star washer in hole 17. On wallbox, mount subplate with (2) #10-24 x 1-1/2 in. screws with star washers in slot 6 & hole 17. Refer to Page 19 for adapter cover plate and Johnson Controls replacement instrument mounting detail.

## Powers T-21

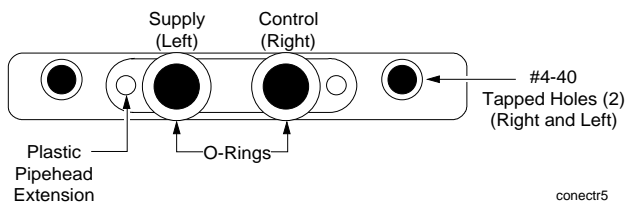


**Figure 43: Covers**



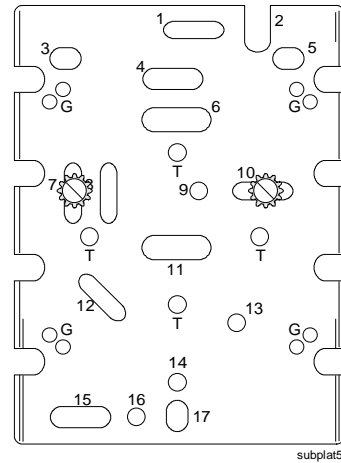
Note: Integral steel ball check valve seals supply when instrument is removed.

**Figure 44: Groundplate or Wallbox**



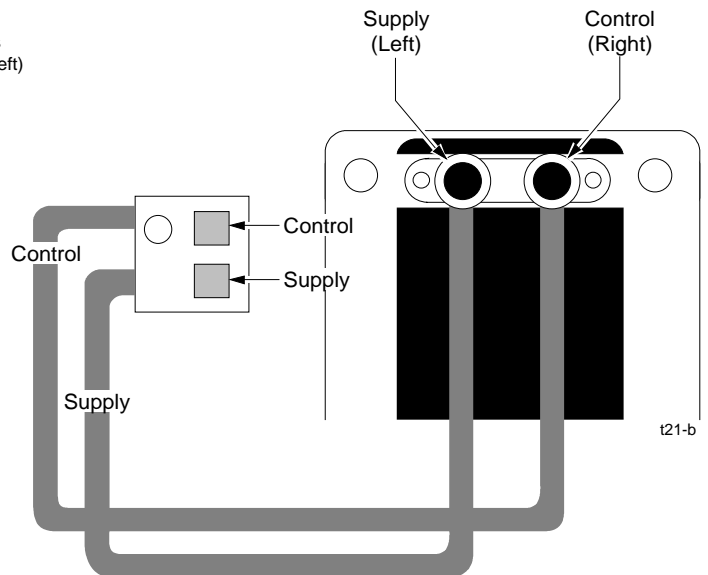
**Figure 45: Mortar Joint**

Plug Terminal Connector leads into O-rings of groundplate, wallbox or mortar joint pipehead.



**Figure 46: Subplate (see Note)**

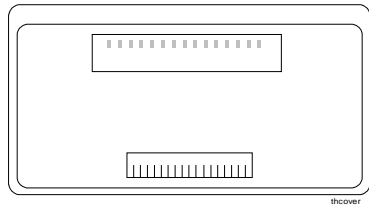
**Note:** On groundplate, mount subplate with (2) #6 x 1-1/2 in. sheet metal screws with star washers in slots 7 & 10. On wallbox or mortar joint, mount subplate with (2) #4-40 x 1-5/8 in. machine screws with star washers in slots 7 & 10. Refer to Page 19 for the adapter cover plate and Johnson Controls replacement instrument mounting detail.



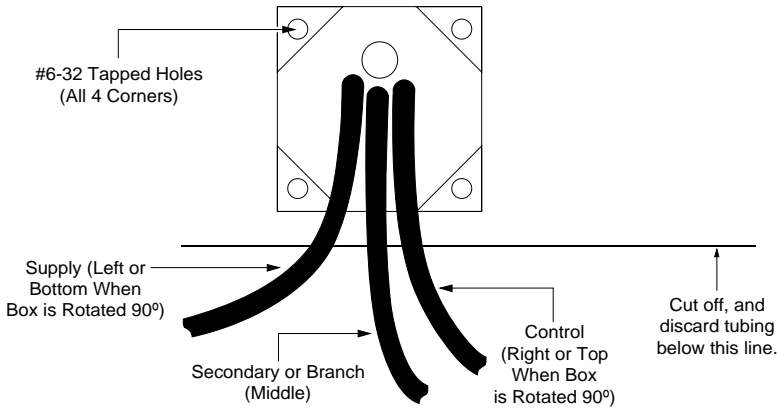
Note: Cut 5/32 Tubing at a 45° angle before inserting into o-rings. Also, it may be necessary to moisten tubing to facilitate insertion into o-rings.

**Figure 47: Terminal Connection**

**Powers TH-180**



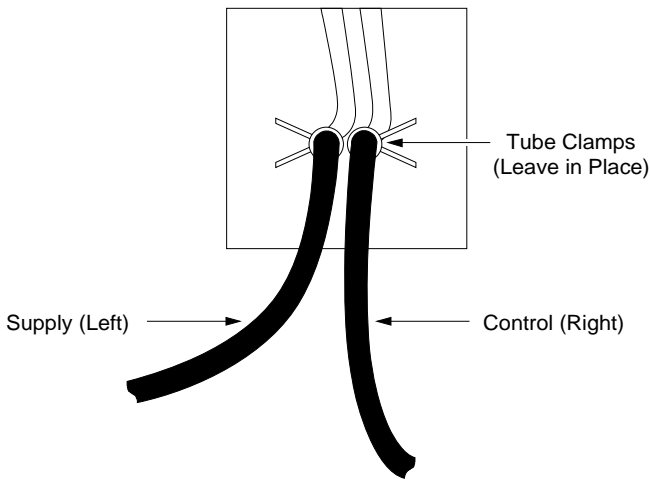
**Figure 48: Cover**



Note: Make adaptation to terminal connector with 5/32 x 5/32 fittings.

th180-a

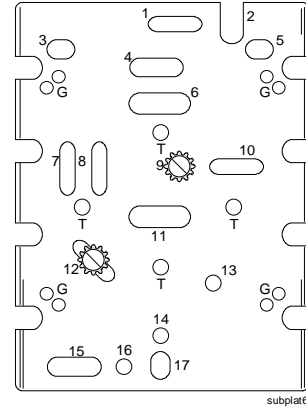
**Figure 49: Plaster or Brick Wallbox**



Note1: On 3-Pipe installations secondary branch is in between.  
 Note2: Make adaptation to terminal connector with 5/32 x 5/32 fittings.

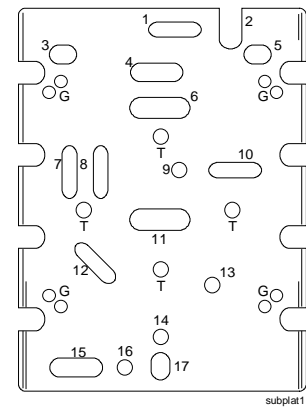
th180-b

**Figure 50: Drywall**



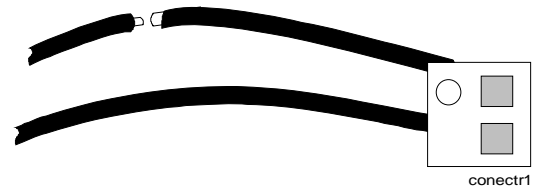
**Figure 51: Subplate for Wallbox (see Note below)**

**Note:** Mount subplate using (2) #6-32 x 1-1/4 in. screws with star washers in hole 9 & slot 12. Refer to Page 19 for the adapter cover plate and Johnson Controls replacement instrument mounting detail.



**Figure 52: Subplate for Drywall (see Note below)**

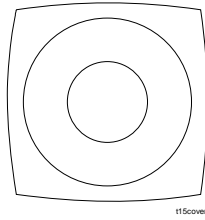
**Note:** Mount the subplate with 2 (minimum) screws and star washers in any pair of holes and slots 1-17. Use wall anchors (order separately) as required. Refer to Page 19 for the adapter cover plate and Johnson Controls replacement instrument mounting detail.



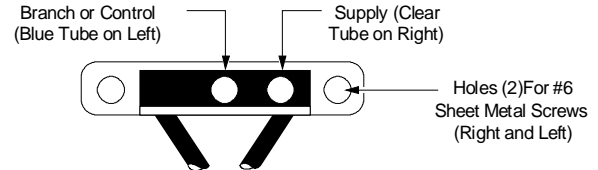
**Figure 53: Terminal Connector**

Adapt terminal connector to existing tubing with 5/32 x 5/32 fittings.

## Robertshaw T-15



**Figure 54: Cover**

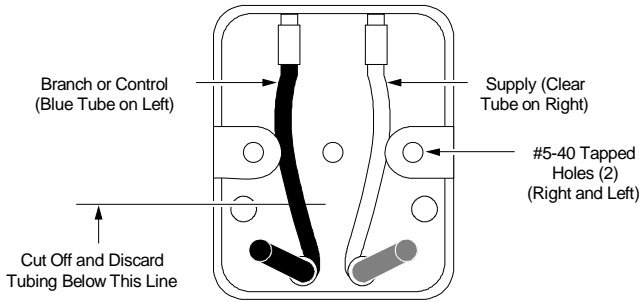


Note1: On 3-Pipe conversions, tube positions and colors are:  
 Supply-Clear (Middle)  
 Branch or Control-Blue (Left)  
 Reset-Red (Right)

Note2: Make adaptation to terminal connector with 5/32 x 5/32 fittings.

t15-c

**Figure 57: Later Style Mortar Joint**

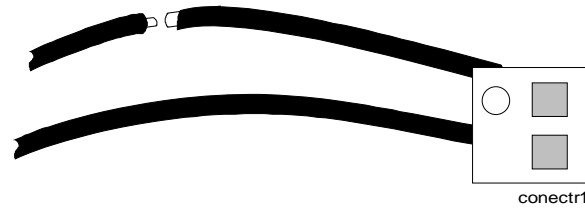


Note1: On 3-Pipe conversions, tube positions and colors are:  
 Supply-Clear (Middle)  
 Branch or Control-Blue (Left)  
 Reset-Red (Right)

Note2: Make adaptation to terminal connector with 5/32 x 5/32 fittings.

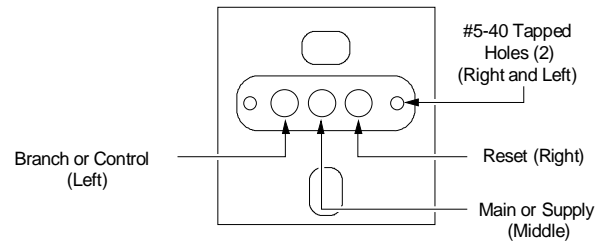
t15-a

**Figure 55: Early Style Shallow or Deep Wallbox**



**Figure 58: Terminal Connector**

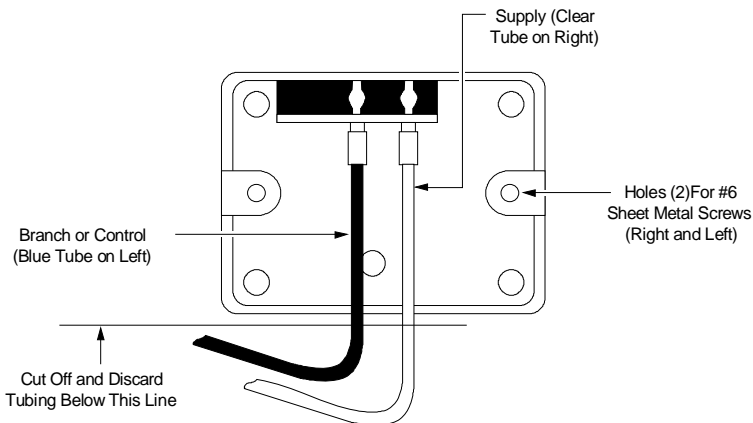
Adapt Terminal Connector leads to existing tubing with 5/32 x 5/32 fittings.



Note: Make sure gasket is removed and surface is clean before adapting conversion air fittings.

t15-d

**Figure 59: Early Style Mortar Joint**

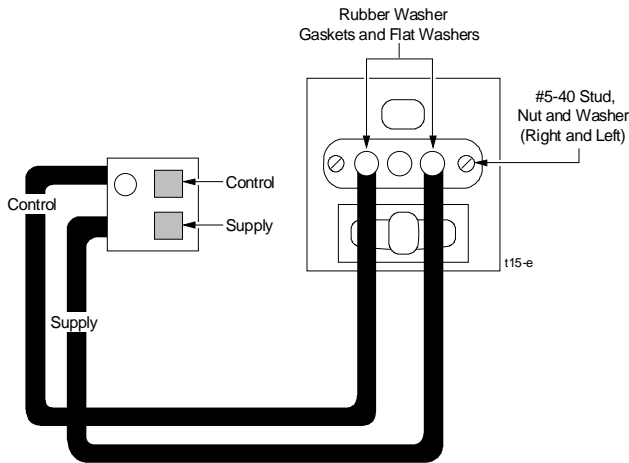


Note1: On 3-Pipe conversions, tube positions and colors are:  
 Supply-Clear (Middle)  
 Branch or Control-Blue (Left)  
 Reset-Red (Right)

Note2: Make adaptation to terminal connector with 5/32 x 5/32 fittings.

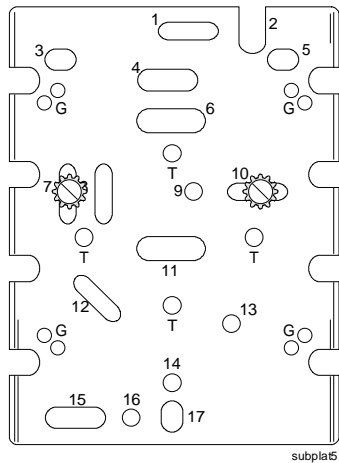
t15-b

**Figure 56: Later Style Wallbox**



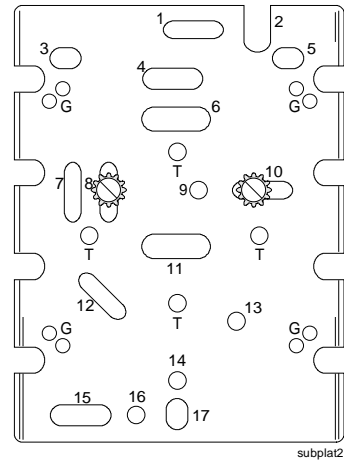
**Figure 60: Early Style Mortar Joint Connection**

Make Terminal Connector Adaptation with Adjustable Pipehead.



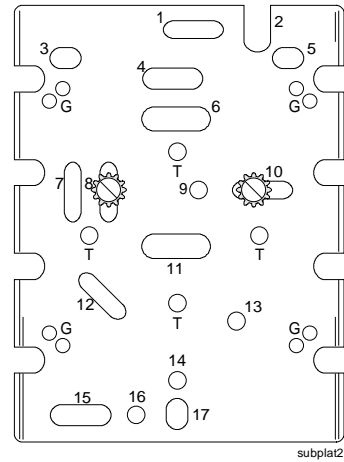
**Figure 61: Subplate for Later Style Wallbox Joint and Mortar Joint**

Mount subplate with (2) #6 x 7/8 in. sheet metal screws with star washers in slots 7 & 10. (See Note on the right.)



**Figure 62: Subplate for Early Style Wallboxes**

Mount subplate with (2) #5-40 x 1-1/4 in. screws with star washers in slots 8 & 10. (See Note below.)



**Figure 63: Subplate for Early Style Mortar Joint**

Mount subplate over studs and secure with #5 hex nuts and star washers in slots 8 & 10. (See Note.)

**Note:** Refer to Page 19 for the adapter cover plate and Johnson replacement instrument mounting detail.

## Draeger (ITT), UPC, and Robertshaw T-18

Some of the details on the following non-Johnson Controls instruments are not completely known. Therefore, a definite procedure for conversion is not provided. However, the following characteristics are known:

**Note:** Refer to Page 19 for the adapter cover plate and Johnson Controls replacement instrument mounting detail.

**On Draeger,** the air lines are normally 1/4 in. O.D. and the subplate can be mounted to the installation site in slot 3 and hole 13.

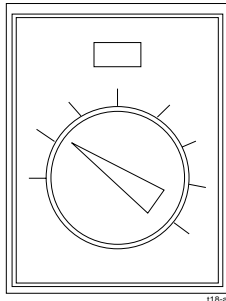


Figure 64: Draeger (ITT)

**On Robertshaw T-18 Plastic,** the air lines are normally 5/32 in. O.D. plastic tubing and the subplate can be mounted to the installation site in slots 8 and 10.

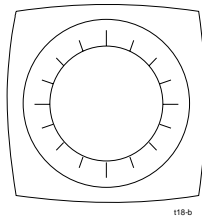


Figure 65: Robertshaw T-18 (Plastic)

**On U P C,** the air lines are normally 1/4 in. O.D. plastic tubing and the subplate can be mounted to the installation site in slots 8 and 10.

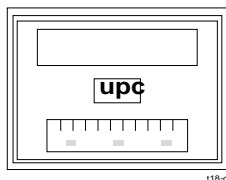


Figure 66: UPC

## Johnson Controls T-400 Series and H-100 Installations

To make the Johnson Controls instrument conversions, refer to the illustrations shown and to the chart.

**Note:** In the chart, under the column titled "Pipe-head Adapter", the tubing shown is terminated by the Terminal Connector. Be sure to slide the tubing over the terminals at least 1/8 in. beyond the barb.

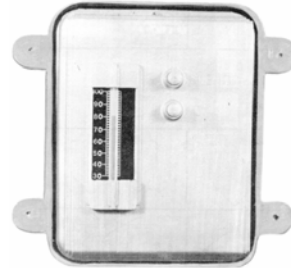


Figure 67: Typical Dual Temperature Thermostat with Guard Removed

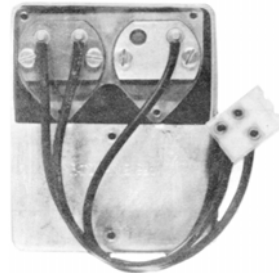


Figure 68: Typical Installation Site with T-400 Air Fittings Adapted (see Chart on Page 19).

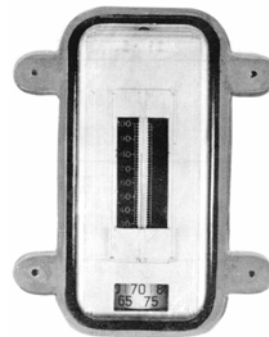
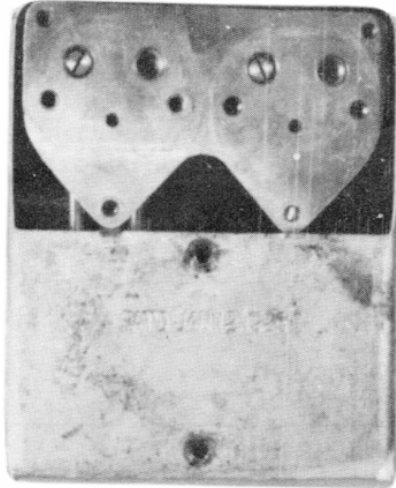
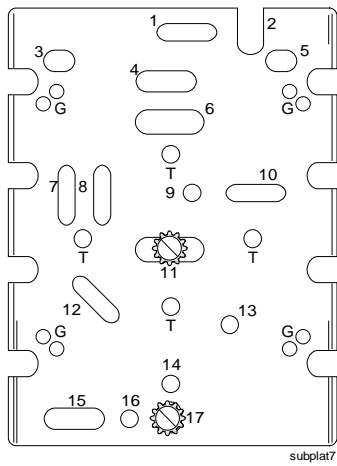


Figure 69: Typical Single Temperature Thermostat with Guard Removed





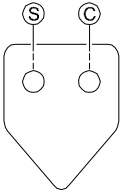
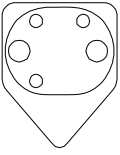
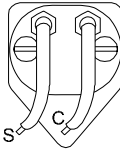
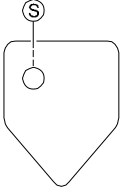
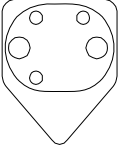
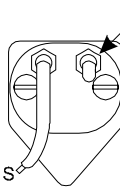
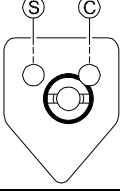
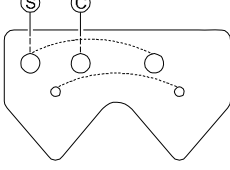
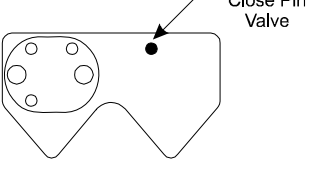
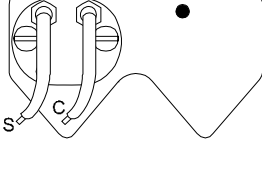
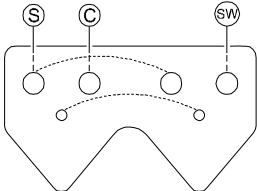
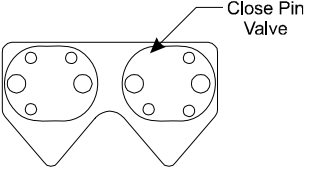
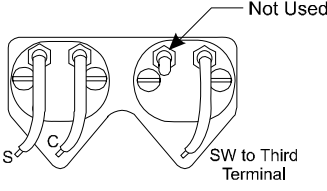
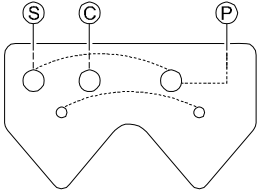
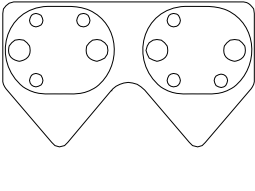
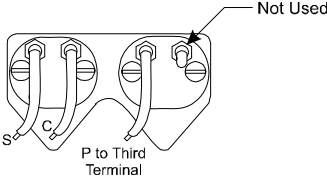
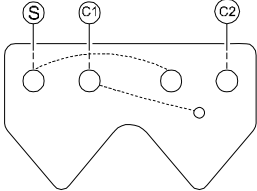
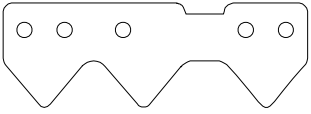
**Figure 70: Typical Stripped-Down Installation Site**



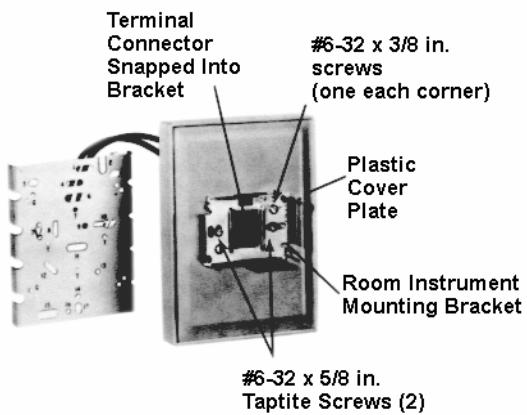
**Figure 71: Subplate**

Mount with (2) #8-32 x 1-1/4 in. screws with star washers in slot 11 and hole 17. Refer to Page 19 for the adapter cover plate and Johnson replacement instrument mounting detail.

**Table 3: Chart of Pipehead, Gasket, and Adapter Arrangements**

Style	Basic Pipehead *	Description	Gasket Replacement	Pipehead Adapter
I		Single size pipehead, 2-pipe		
IIa		Single size pipehead, 1-pipe, (non-relay)		
II b		Single size pipehead, 2-pipe with integral restrictor for non-relay controllers	Contact branch office or field engineering for customized conversion possibilities.	
III		Dual size pipehead, 2-pipe (heating, cooling or dual temp)		
IV		Dual size pipehead, 3-pipe (day-night with switch line)		
V		Dual size pipehead, 3-pipe (sub-master)		
VI		Dual size pipehead, 3-pipe (two single controllers or single controller plus two-position relay)	This special pipehead can be converted several ways, depending on the controller to be used and the heating system to be converted. For example: a) Use T-4002 with control air to C <sub>1</sub> only or to C <sub>1</sub> and C <sub>2</sub> (a 5/32 in. brass tee, F-700-83, is required if both C <sub>1</sub> and C <sub>2</sub> are used.) b) Use T-4512 with the third terminal connected to C <sub>2</sub> . c) Use T-4003 with the third terminal connected to C <sub>2</sub> .	
VII		Triple size pipehead, 3-pipe (or more)	Contact branch office or field engineering for customized conversion possibilities.	

\* S= Main Supply Air Lines C, C<sub>1</sub>, C<sub>2</sub> = Control (Branch) Air Lines P=Pilot Air Line SW=Switch Air Line



**Figure 72: Installation Example**

Mount adapter cover plate to subplate with (2) #6-32 x 5/8 in. taptite screws. Plug Johnson Controls replacement instrument into terminal connector. Attach cover to room instrument mounting bracket to complete the conversion.

---

# Notes

JOHNSON  
CONTROLS

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