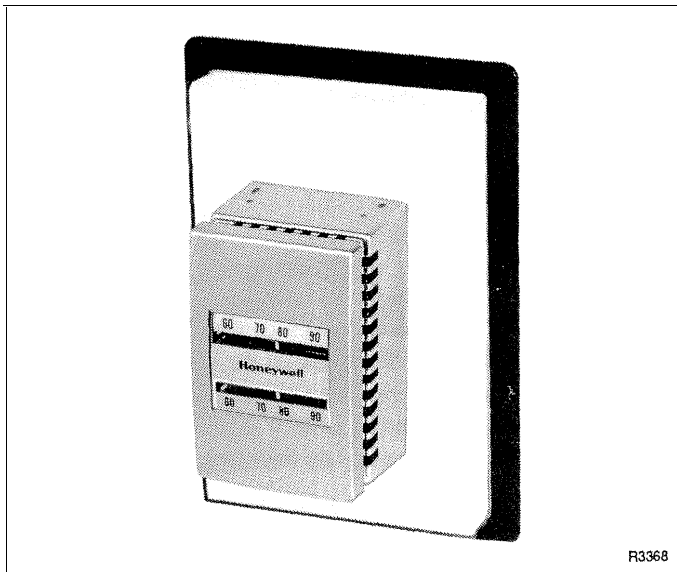


TP970 Series Thermostat Modernization Kit with Universal Adapter

Replacement Data



R3368

General

The Modernization Kits listed in Table 1 replace most one- and two-pipe pneumatic thermostats.

Application

These kits include a universal wall plate adapter with hardware and a TP970 Series Thermostat to fit the application.

The TP973 replaces a one- or two-pipe thermostat. For one-pipe applications, replace the restrictor and pipe it as shown in Figure 1. Pipe a two-pipe thermostat replacement like the TP970.

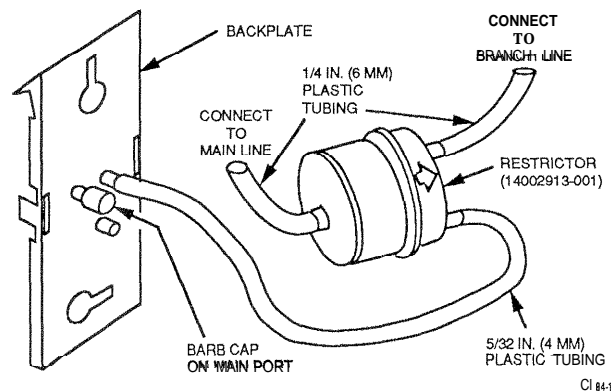


Fig. 1. Connections for TP973 One-Pipe Operation.

Replacement Procedure

These procedures are for replacement of all thermostats. See Table 1 for replacement thermostat model.

1. Remove thermostat and rings or old adapters from the wall.
2. Remove existing airhead and gasket from the fitting. Do not remove springs from airhead tubes.
3. Clean the fitting surface.
4. Install the air connector from the kit that fits the wall fitting of the thermostat being replaced (Fig. 2 through 6).
5. Install universal mounting plate, optional black spacer rings, and decorative wall ring to existing wall fitting. See Figures 2 through 6 for slot numbers for the screws.

6. Feed the tubing through the adapter parts (Fig. 7). Use black spacer rings as necessary to provide room for tubing connections. Mount the necessary adapter parts and discard all others.
7. Push tubing onto tubing connections on the backplate (Fig. 8). Attach foam spacer, coverplate, and backplate to the universal mounting plate with screws provided.
NOTE: If the branch and main connections are reversed, interchange the tubes on the backplate.
8. Remove shipping stops (Fig. 9) and press the thermostat onto the backplate until it is fully seated and the retaining clips (Fig. 8) on the backplate have engaged.

Table 1. TP970 Series Modernization Kit Replacement Cross-Reference.

Order	Description	Johnson	Powers	Barber-Colman	Robertshaw	Honeywell
TP970A2038	Direct acting, single temp, two-pipe. 60 to 90F (15 to 32C).	T400, T401, T403, T4002 direct or reverse acting to match replacement.	Type D, Type HS, Type T21, TH180D	TK1001	T-10, T-15, T-18, TP2210, TP2212	TO900A, TP900A, TO901A, TP901A, TP910A, TP923A*, TP931B
TP970A2087	Direct acting, single temp, two-pipe. Controls at 72F (22C) max.					
TP970A2095	Same as A2038 except 40 to 70F (4 to 21C).					
TP970B2028	Same as A2038 except reverse acting.					
TP971A2037	Two-temp, two-pipe. Independent setpoint knobs for "DAY" and "NITE". 60 to 90F (15 to 32C) (DAY). 50 to 75F (10 to 23C) (NITE). 13/18 psi (90/124 kPa). Field changeable to 16/21 psi (110/145 kPa).	T460, T461, T465, T4502	Type DN, TH180DN	TK1301, TK1601	T-20, T-21, T-25, T-26, TP2214, TP2216	TO900B, TP900B, TP911A, TP913B
TP972A2028	Single temp, two-pipe, proportioning; RA Summer 13 psi (90 kPa), or 9 psi (62 kPa) (unit vent); DA Winter 18 psi (124 kPa).	T432 (models that operate direct at 19 psi [131 kPa] reverse at 15 psi [103 kPa]).	Type HC, TH180C	TK1201	T-30, T-31, TP2218	TO900D, TP900D, TP913A, TP915A
TP973A2068	Direct acting, single temp, one- or two-pipe 60 to 90F (15 to 32C) (contains instructions for replacing two-pipe models).	T400, T401, T403, T4002, T4004 direct acting.	Type D, Type HS, TH180D	TK5001, TK1001	T-10, T-15, T-18	TO900A, TP900A, TP901C, TP910A, TP923A

* Can be used only if two-pipe wall fittings originally installed.

POWERS TH180

POWERS HC, HR, HS, D, DN

POWERS T21

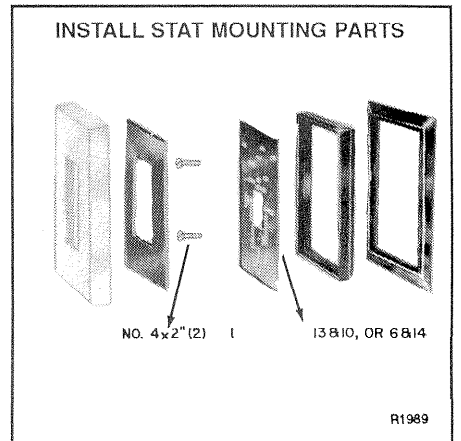
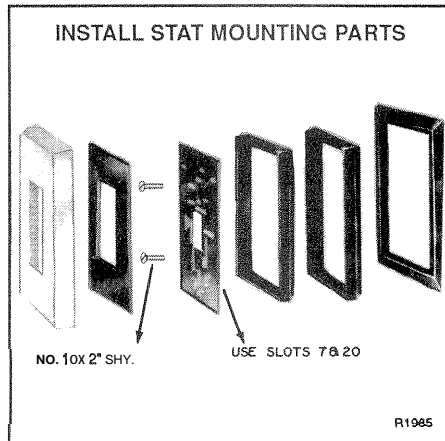
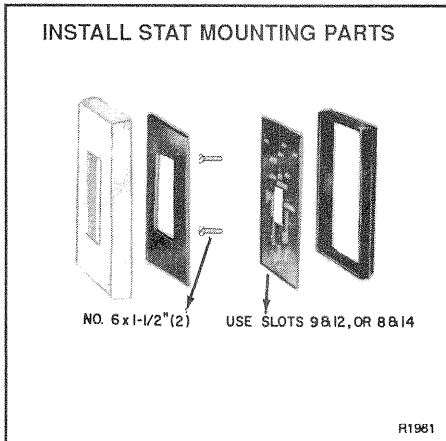
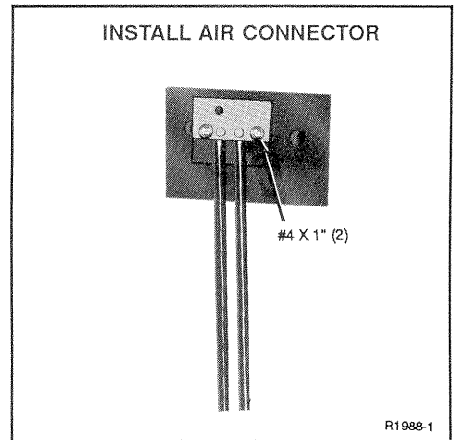
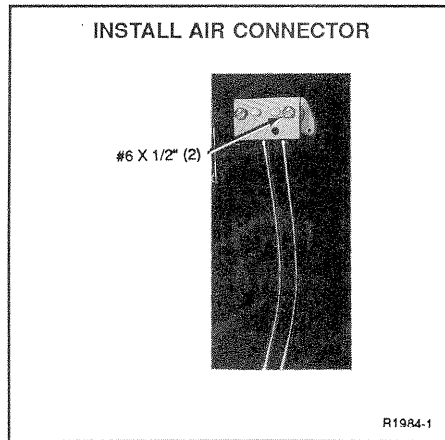
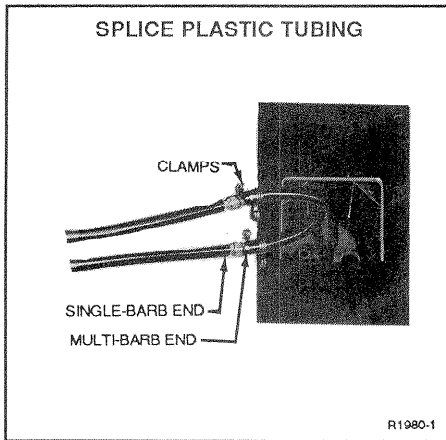
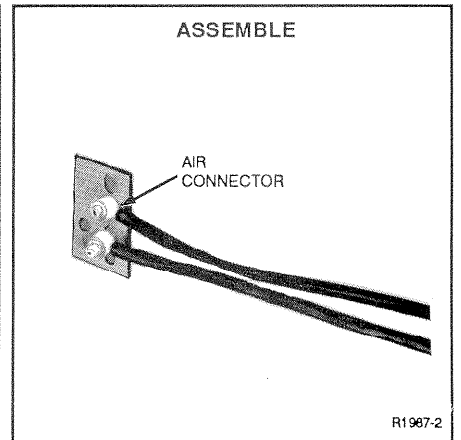
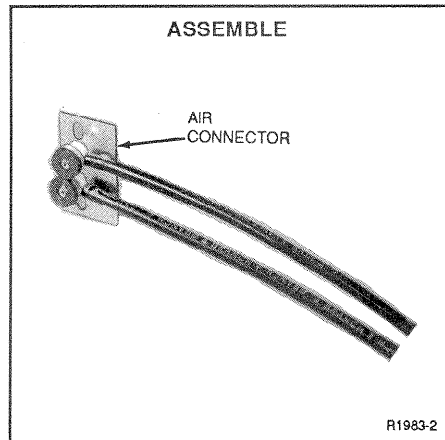
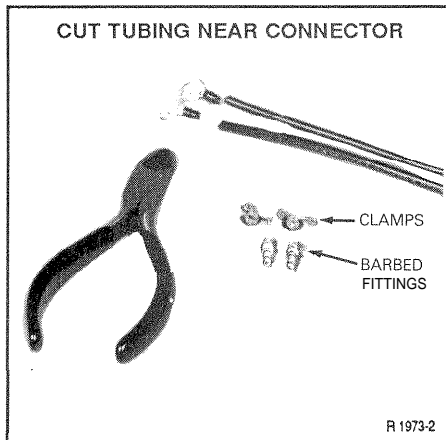
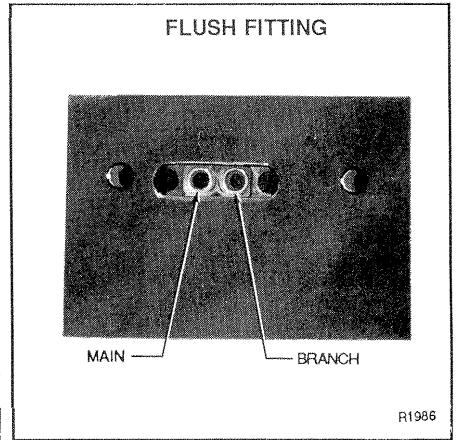
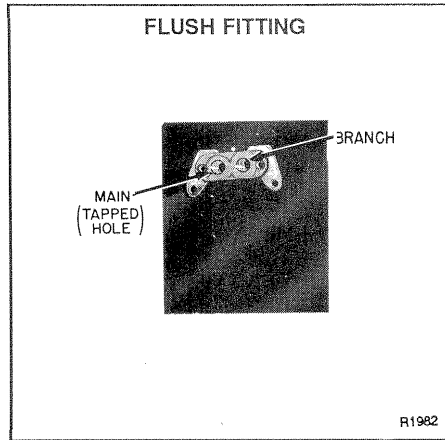
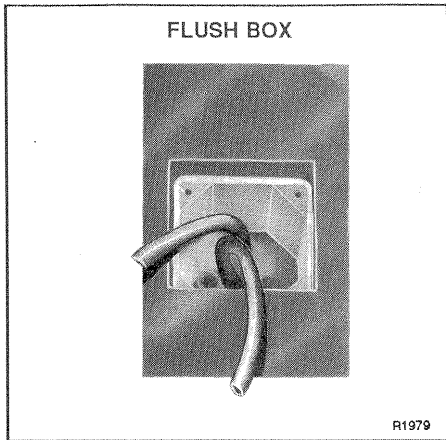
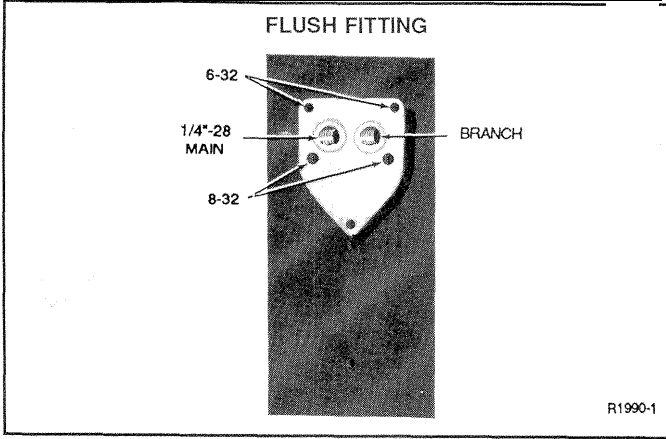


Fig. 2. Powers Installations.

JOHNSON T400 SERIES



JOHNSON 4000 SERIES

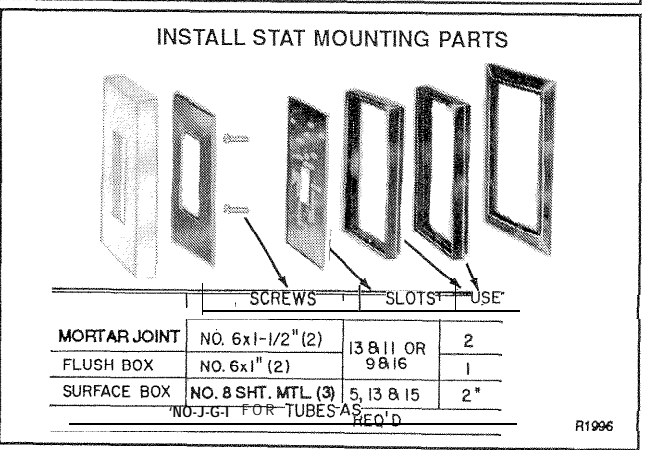
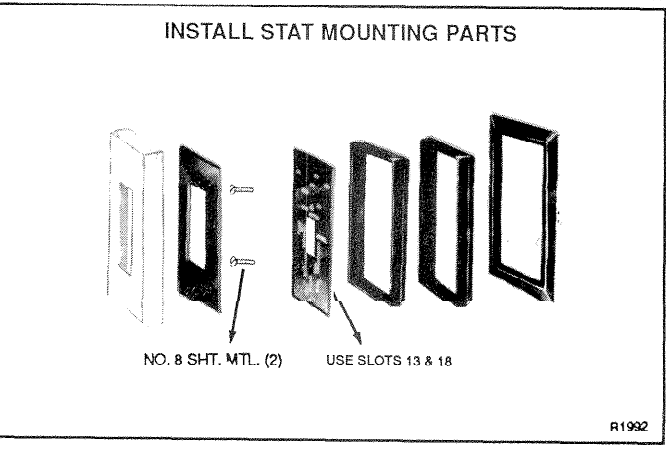
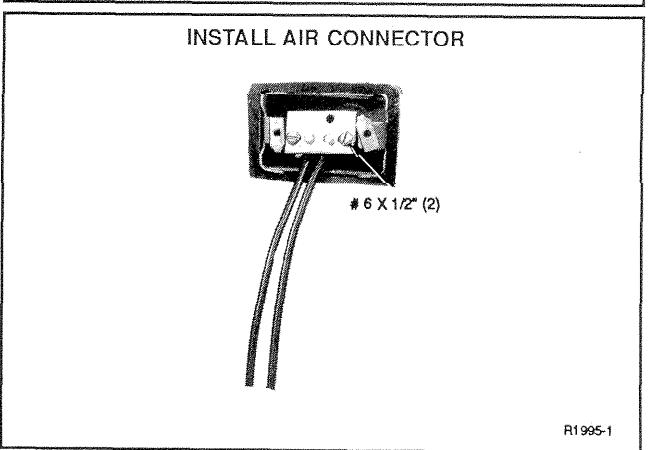
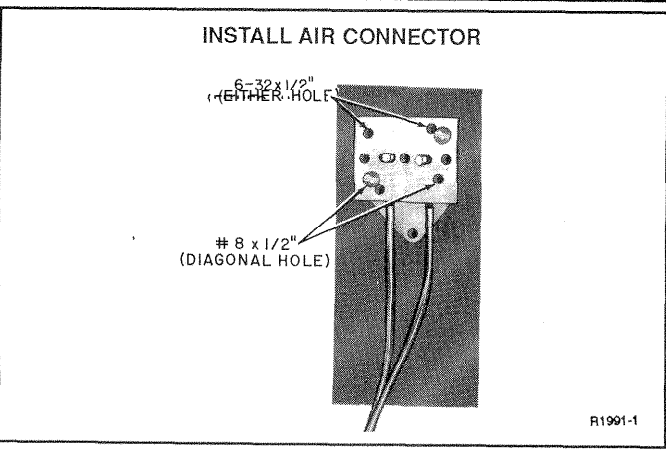
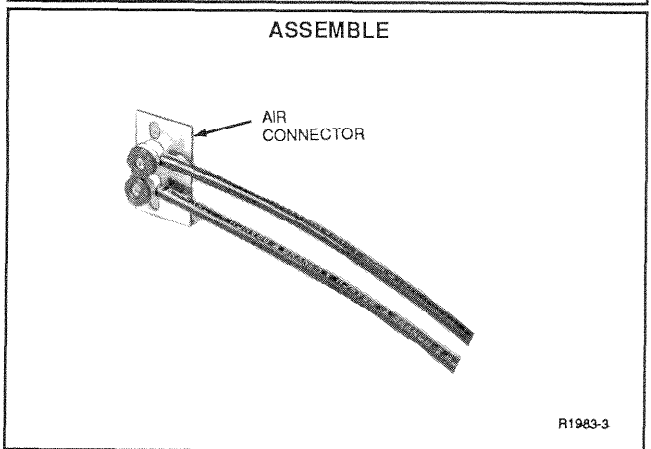
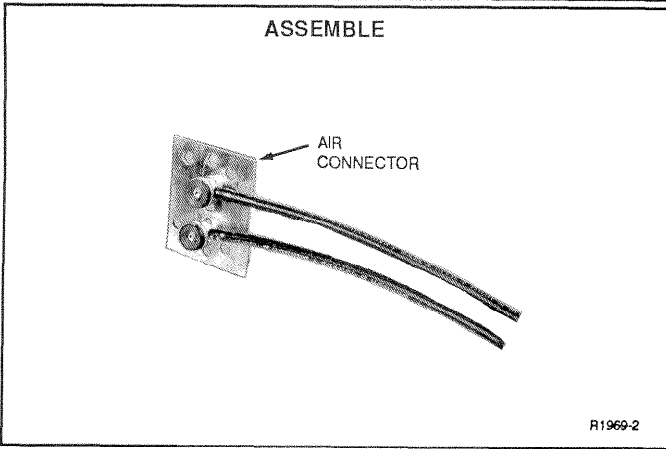
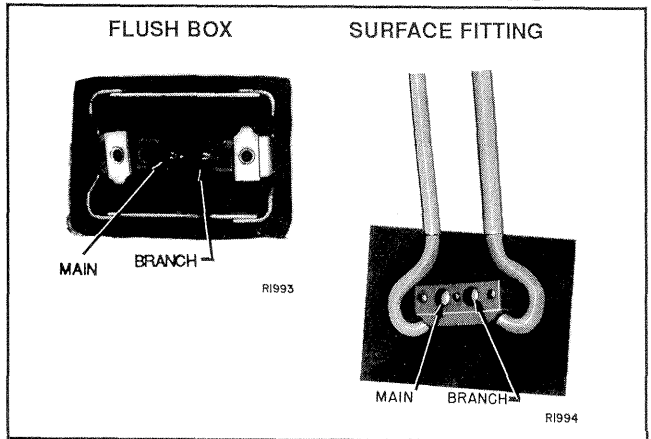


Fig. 3. Johnson Service Installations,

BARBER COLMAN TK1001, 1101, 1201, 1301, 1601

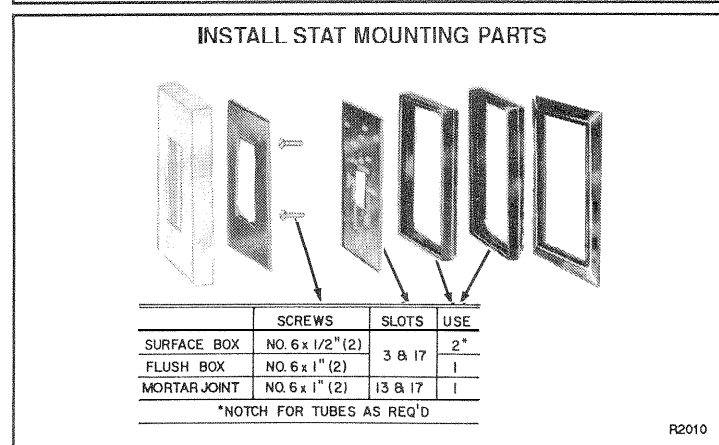
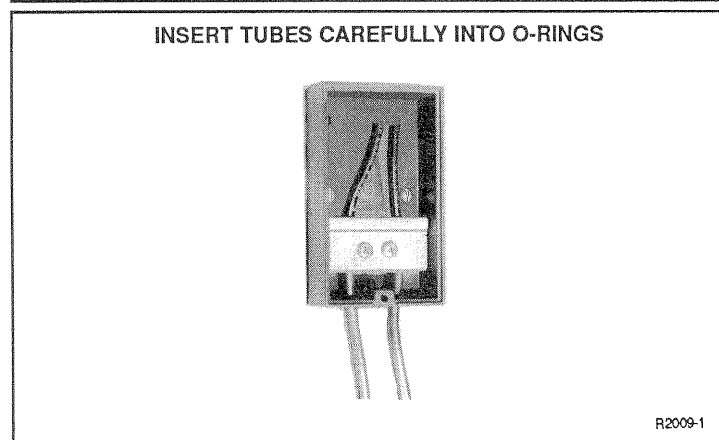
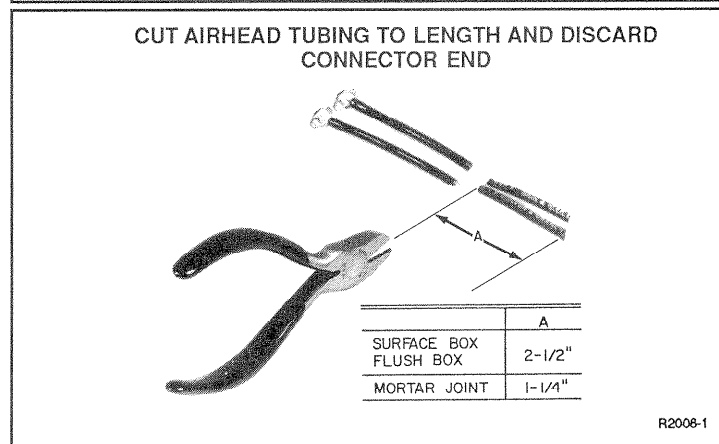
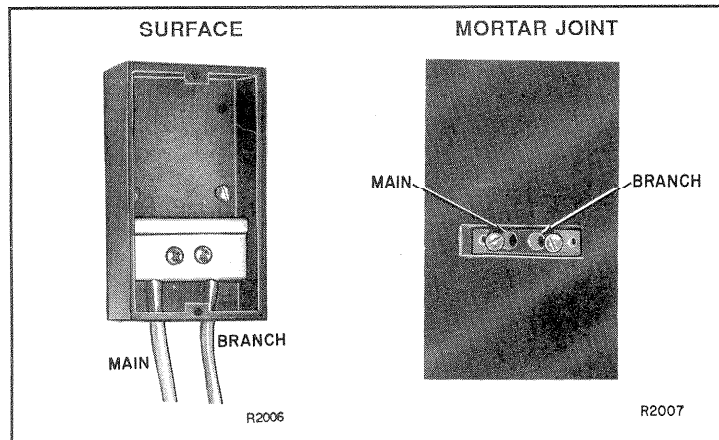
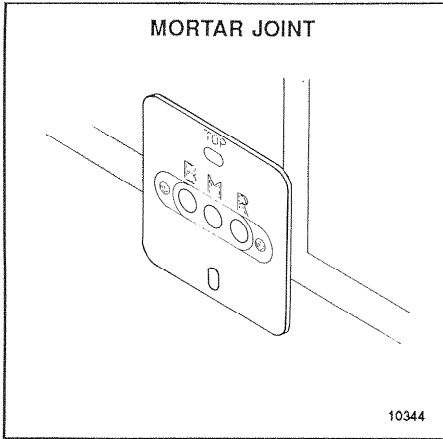
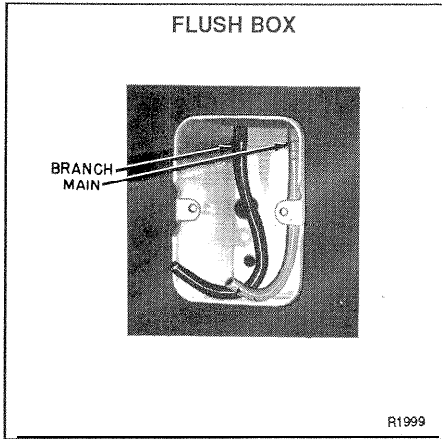


Fig. 4. Barber Colman Installations.

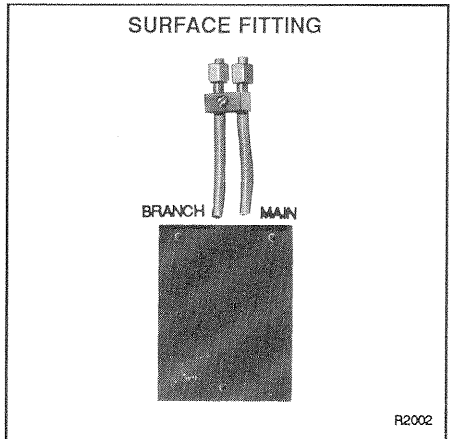
ROBERTSHAW



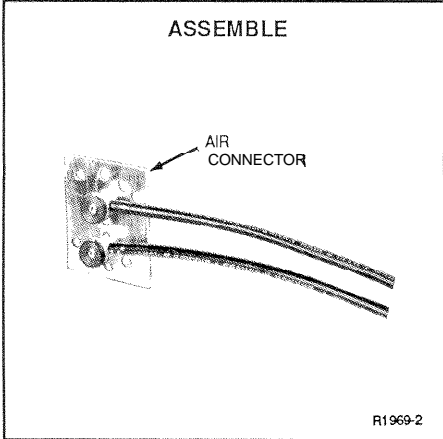
ROBERTSHAW



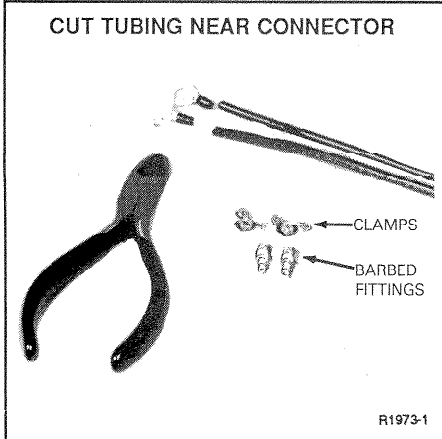
ROBERTSHAW



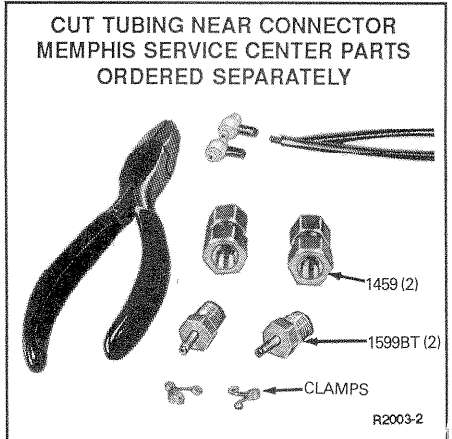
ASSEMBLE



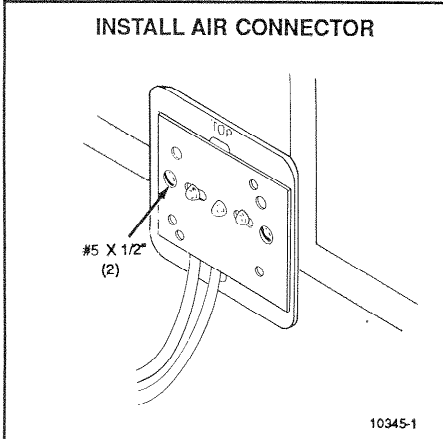
CUT TUBING NEAR CONNECTOR



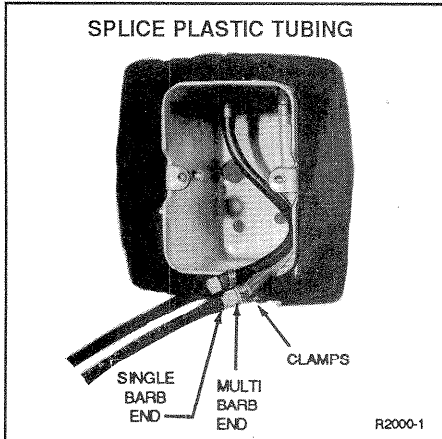
**CUT TUBING NEAR CONNECTOR
MEMPHIS SERVICE CENTER PARTS
ORDERED SEPARATELY**



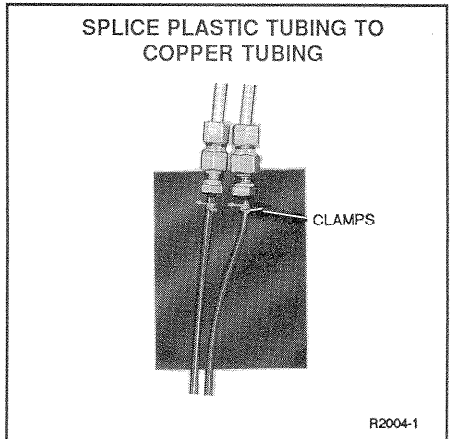
INSTALL AIR CONNECTOR



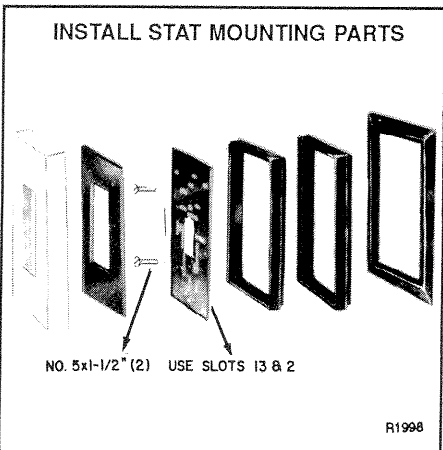
SPLICE PLASTIC TUBING



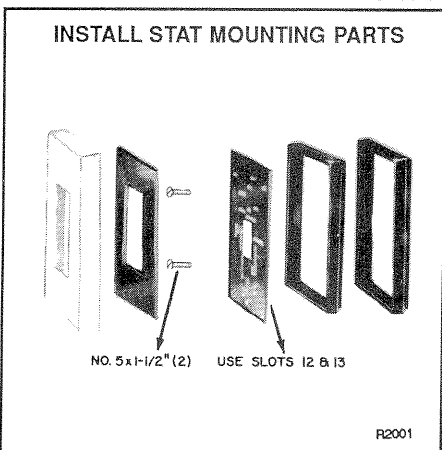
**SPLICE PLASTIC TUBING TO
COPPER TUBING**



INSTALL STAT MOUNTING PARTS



INSTALL STAT MOUNTING PARTS



INSTALL STAT MOUNTING PARTS

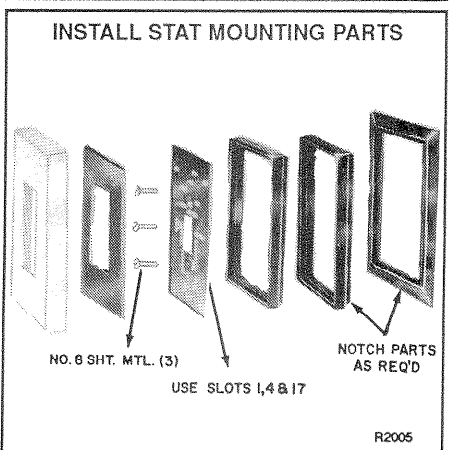
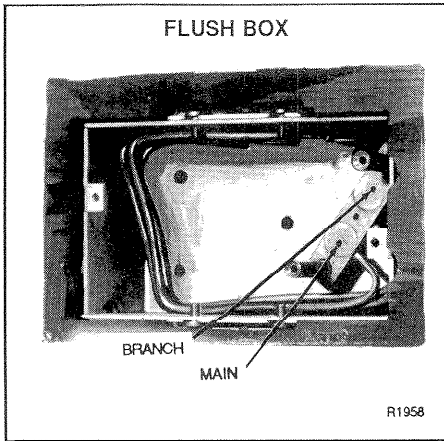
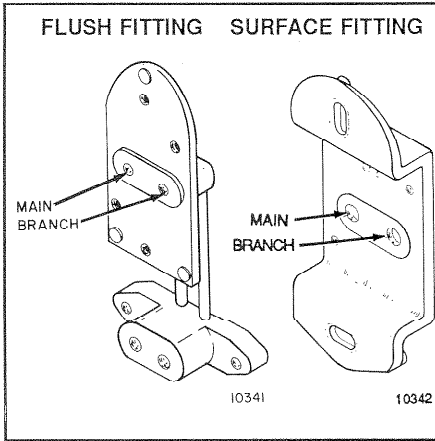


Fig. 5. Robert Shaw Installations.

HONEYWELL TP900, TO900



HONEYWELL TP901A,B, TO901A,B



HONEYWELL TO901C

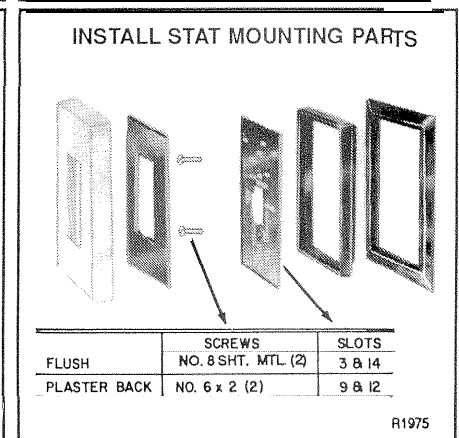
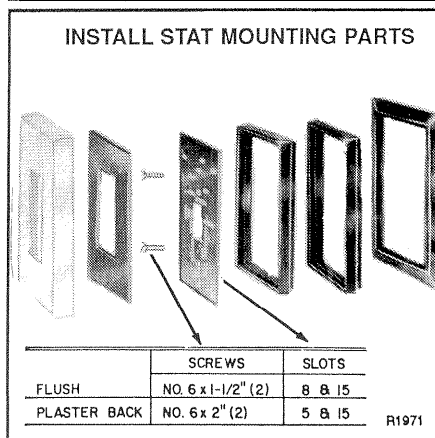
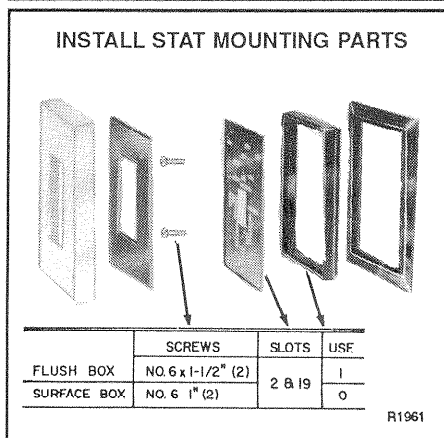
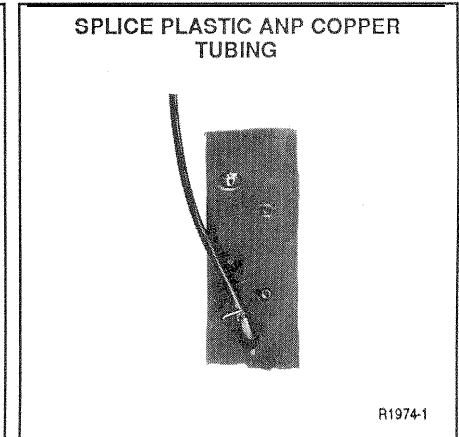
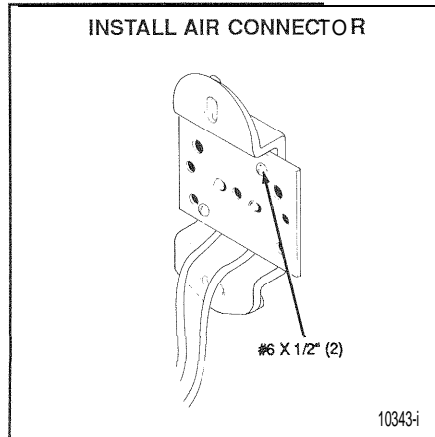
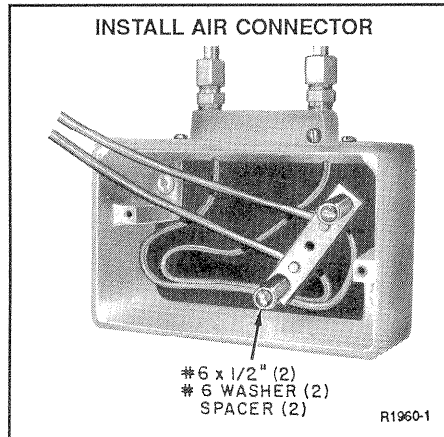
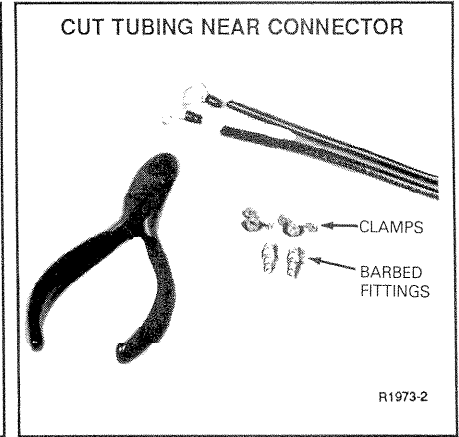
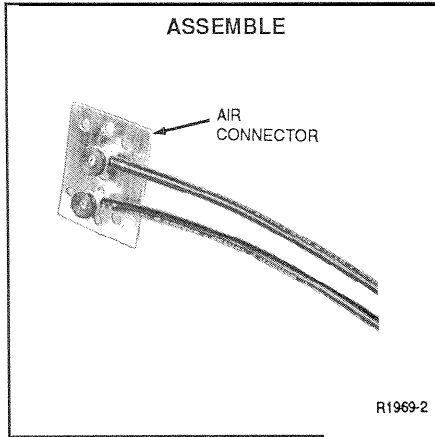
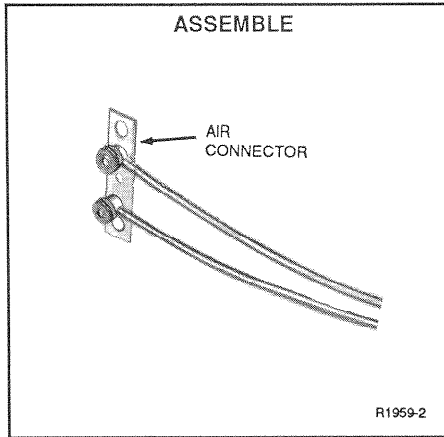
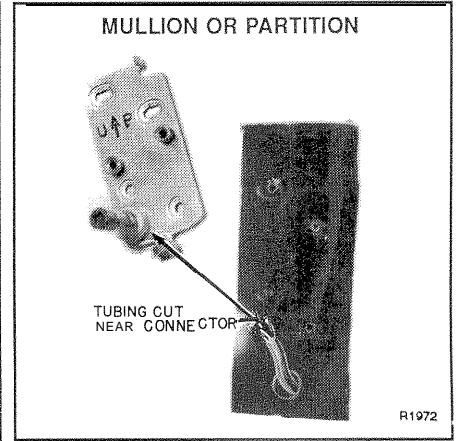
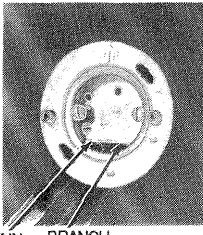


Fig. 6. Honeywell Installations.

HONEYWELL TP910 THROUGH TP923

HONEYWELL TP931

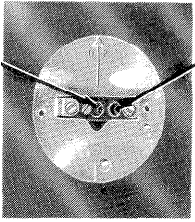
FLUSH BANJO



MAIN BRANCH

R1962

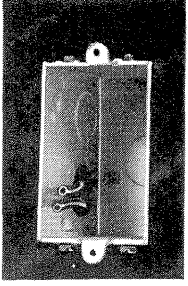
MORTAR JOINT



MAIN BRANCH

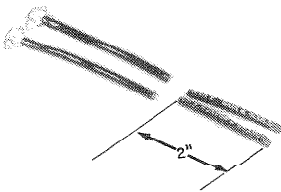
R1963

FLUSH ELECTRICAL BOX



R1976

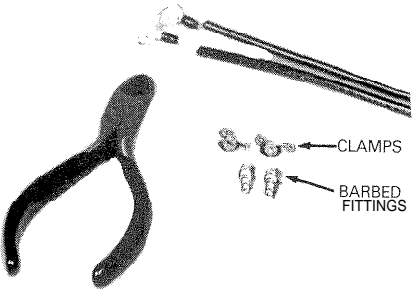
**CUT TUBING.
DISCARD CONNECTOR END**



2"

R1964-1

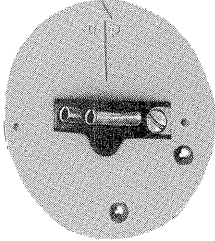
CUT TUBING NEAR CONNECTOR



CLAMPS
BARBED FITTINGS

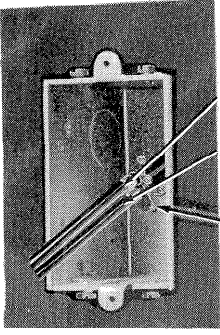
R1973-2

INSERT TUBES CAREFULLY INTO O-RINGS LEFT IN WALL FITTING. USE NEW O-RINGS ONLY IF NECESSARY



R1965

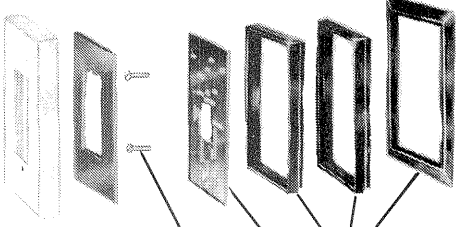
SPLICE PLASTIC TUBING



MULTI-BARBED END
SINGLE-BARBED END
CLAMPS

R1977-1

INSTALL STAT MOUNTING PARTS

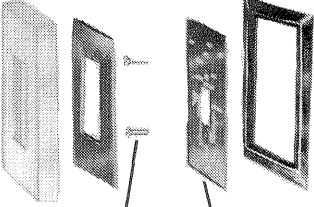


TP910-24 HP901	SCREWS	SLOTS	USE
FLUSH BANJO	NO. 6 x 1/2" (2)	13 & 10 OR	0 1
SURFACE BANJO	NO. 6 x 1" (2)	13 & 12	2* 1*
MORTAR JOINT	NO. 6 x 1/2" (2)	13 & 12	0 1

*NOTCH FOR TUBES AS REQ'D

R1966

INSTALL STAT MOUNTING PARTS



NO. 6 X 1" (2) USE SLOTS 3 & 17

R1978

Fig. 6. Honeywell Installations. (Continued)

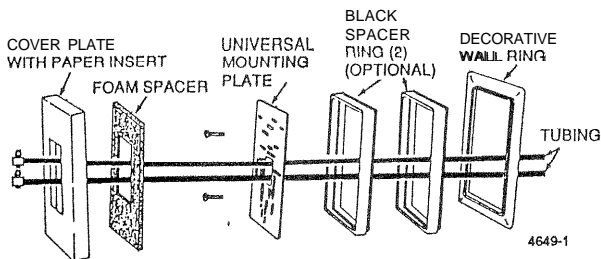


Fig. 7. Adapter Parts and Tubing.

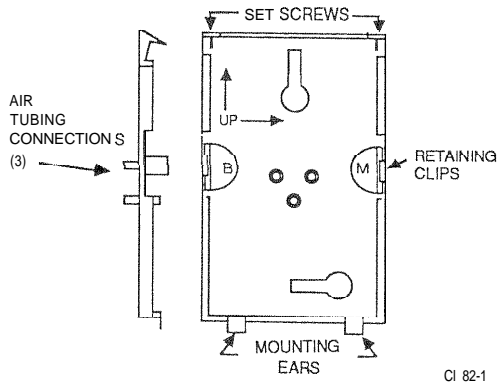


Fig. 8. Backplate.

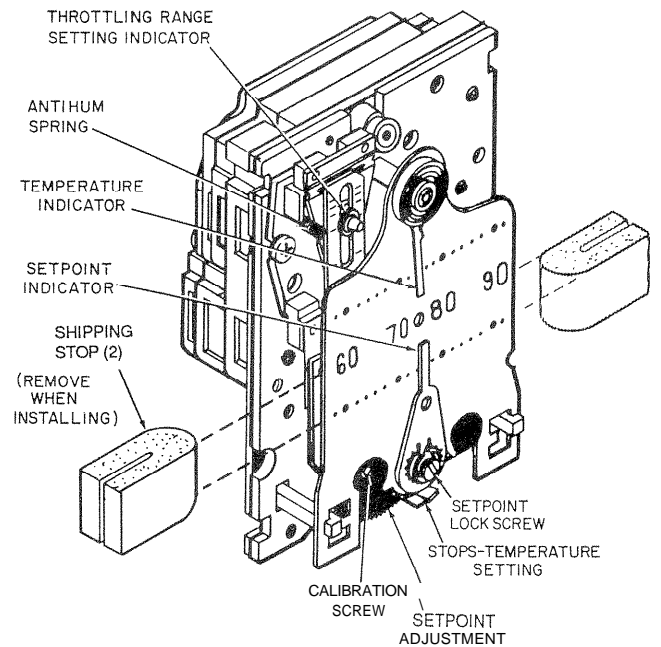


Fig. 9. TP970 Series Thermostat with Cover Removed.

Thermostat Cover Mounting

1. Remove caution card from cover.
2. Select the correct window (vertical or horizontal/dual or blank) and peel release liner from window back.

CAUTION

Before installing window, carefully check window selection and orientation. Once assembled, disassembly may damage the window.

3. Insert top edge of window into the slot in the top of the window hole (Fig. 10). Bend the window slightly and pop the bottom edge into the slot in the bottom of the window hole. Press in place to secure window. Be careful that the window is oriented correctly for the installation. When viewed from the front of the cover, the setpoint and day/auto openings are on the bottom for a vertical thermostat or on the right for a horizontal thermostat. The cover has slots which must mate with the mounting ears on the backplate.

4. Mount the cover by hooking the two slots on the cover bottom (right end for horizontal mounting) to the ears on the backplate. Swing the cover into place. Back out (counterclockwise) the setscrews with a thermostat tool or a 0.050-inch Allen wrench to secure the cover in place.

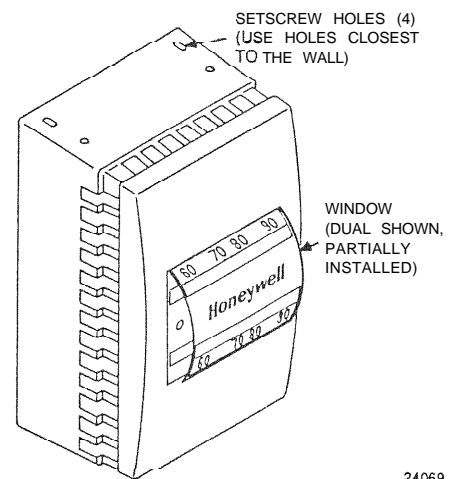


Fig. 10. Assembly of Cover with Window and Insert.

Adjustments

After installation, set the thermostat to the desired setpoint and let the system operate long enough to stabilize. Make certain that the system is stable before checking calibration.

NOTE: All thermostats are accurately factory calibrated and should require only the CALIBRATION CHECK to ensure correct operation.

Equipment Required

The following equipment is available from the Memphis Service Center:

- Gage 305965, 0 to 30 psi (0 to 207 kPa).
- Tool Kit MQT 3863 (includes gage adapter, TO900/TP900 Series Thermostat Key, and TP970 Series Thermostat Tool).

Throttling Range

Throttling ranges (TR) are factory set at 4F (2.2C) and should not require any change under normal operating conditions.

If a change in throttling range is necessary, use the following procedure to reset the throttling range to the value specified on the job drawings.

TP970-TP973

1. Remove cover and install 0 to 30 psi (0 to 2 10 kPa) gage in gage tap (Fig. 11).
2. Slide the throttling range adjustment to the desired position on the throttling range scale.
3. Mechanically check the TR by turning setpoint adjustment until branchline pressure (BLP) is 3 psi (21 kPa), note the setpoint. Turn the setpoint adjustment until BLP is 13 psi (90 kPa), note the setpoint. The difference in setpoints is the throttling range.

NOTE: The ambient temperature $\pm 1/2$ of the throttling range must not exceed the minimum or maximum setpoints of the thermostat. That is, with a throttling range of 6F (3.3C) and an ambient temperature of 62F (16C), This procedure will not work for a TP970A2038 which has a minimum setpoint of 60F (15C) and a throttling range of 6F (3.3C) if the ambient temperature is 62F (16D).

4. Recalibrate using RECALIBRATION procedures.

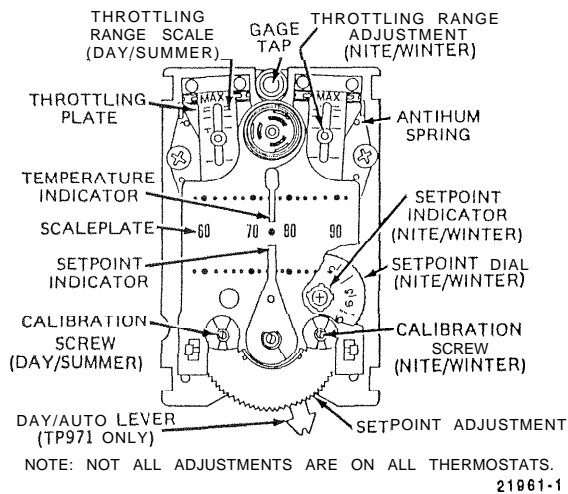


Fig. 11. TP971 and TP972 Controls and Indicators, Front View with Cover Removed.

Setpoint Lock

To set minimum or maximum setpoint limits:

1. Loosen the setpoint lockscrew (Fig. 9).
2. Move the stops to the desired position.

3. Tighten the setpoint lockscrew.
4. Check the positioning of the stops by changing the setpoint.

Changeover

TP971 and TP972 thermostats have changeover features. The TP971 has day/night changeover and the TP972 has summer/winter changeover. TP971 controls direct acting at day setting with 13 psi (90 kPa) main air pressure and direct acting at the night setting with 18 psi (124 kPa) main air pressure. The TP972 controls reverse acting (RA) for summer cooling at 13 psi (90 kPa) main air pressure and direct acting (DA) for winter heating at 18 psi (124 kPa) main air pressure.

The BLP drops as the temperature drops when the thermostat is operating DA. The BLP drops as the temperature rises when the thermostat is operating RA.

Changeover Conversion

On some systems the lower main air pressure is 14 or 15 psi (97 or 103 kPa). On these systems turn the changeover adjustment screw (Fig. 12) one-half turn clockwise for each 1 psi (7 kPa) over 13 psi (90 kPa).

TP971s or TP972s used on systems having 16 1/2 psi (1 10/145 kPa) or 13/16/21 psi (90/110/145 kPa) main air pressure require a different spring for proper changeover operation. Change the spring as follows:

1. Remove the changeover adjustment screw (Fig. 12).
2. Replace the gold-colored spring with the silver-colored spring furnished in the TP971 kit, Order 14002373-001 Spring for TP972 conversion.
3. Install the changeover adjustment screw and set flush with the top of the spring chamber.
4. Follow CHANGEOVER CALIBRATION CHECK procedures and recalibrate if necessary.

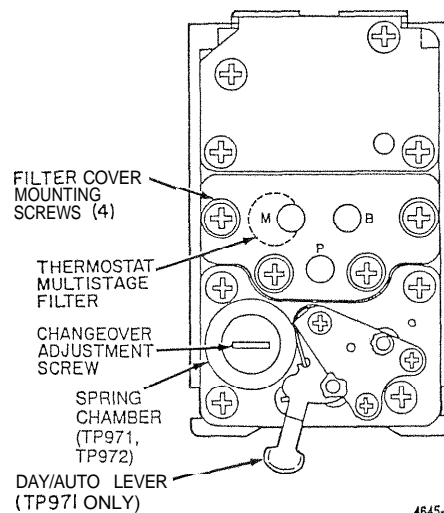


Fig. 12. TP970 Series Thermostat—Back View.

Changeover Calibration Check

1. Set main air pressure to the higher pressure setting (night or winter).
2. Insert gage using gage adapter into branchline pressure gage tap (Fig. 11). If the results in Steps 3 or 5 are not correct, go to CHANGEOVER CALIBRATION.
3. TP971:
Turn day setpoint adjustment until setpoint indicator reads approximately 10F (5.6C) degrees above the space temperature and turn the night setpoint dial until setpoint indicator reads below space temperature. The gage should indicate main air pressure. Push the day/auto lever to the day (left) position; it should stay there and the BLP should go to 0 psi (0 kPa).
TP972:
Turn the setpoint adjustment until setpoint indicator reads approximately 10F (5.6C) degrees above space temperature. BLP should go to 0 psi (0 kPa).
4. Set main air pressure to lower pressure setting (day or summer). Use 16 psi (110 kPa) on 13/16/21 psi (90/110/145 kPa) systems.
5. TP971:
Set day setpoint adjustment and night setpoint dial as in Step 3. BLP should go to zero. Push the day/auto lever to the day (left) position; it should return to the auto position when released.
TP972:
Set setpoint adjustment as in Step 3. BLP should go to main air pressure.

Changeover Calibration

1. Remove thermostat from the wall.
2. Loosen screws holding backplate in position. Do not disconnect piping from backplate.
3. Plug thermostat into backplate.
4. Use following changeover procedures for calibration with or without a branchline pressure gage.

With Branchline Pressure Gage

If the thermostat changeover was not correct at Step 3 of the CHANGEOVER CALIBRATION CHECK, use the screwdriver end of the thermostat tool to turn the changeover adjustment screw (Fig. 13) one-quarter turn counterclockwise. Make a calibration check. Continue with one-quarter turn adjustments followed by a calibration check until the changeover is correct.

If the thermostat changeover was not correct at Step 5 of the CHANGEOVER CALIBRATION CHECK, use the TP970 Series thermostat tool to turn the changeover adjustment screw (Fig. 13) one-quarter turn clockwise. Make a calibration check. Continue with one-quarter turn adjustments followed by a calibration check until the changeover is correct.

Without Branchline Gage (TP971 Only)

1. Set system pressure to 18 psi (124 kPa) (night pressure).
2. Hold the day/auto lever in the day (left) position. Turn the changeover adjustment screw counterclockwise until the lever holds in place.
3. Release the lever and slowly turn the changeover adjustment screw clockwise until the lever snaps back to the auto position.
4. Turn the changeover adjustment screw an additional one-eighth to one-quarter turn clockwise. This places the changeover in calibration and allows for normal main air pressure fluctuations.

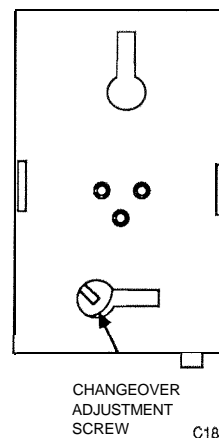


Fig. 13. Location of Calibration Adjustment Screw with Backplate Attached.

Calibration Check

The TP970A2087 has an internal setpoint limit of 72F (22C) maximum for heating. To check its calibration, the control space temperature must be 77F (25C) or above for cooling applications and 73F (23C) or below for heating applications.

NOTE? The 72F (22C) limitation is not adjustable.

TP970A, B, TP971A, TP972A, AND TP973

Direct-acting, bimetal elements:

1. Turn setpoint adjustment until setpoint indicator reads 5F (2.8C) below actual space temperature and allow thermostat to build up BLP.
2. Turn setpoint indicator adjustment (Fig. 11) up slowly,
3. If thermostat begins to bleed off between 1 and 3F (0.5 and below space temperature, no calibration is necessary.

Reverse-acting, bimetal elements:

1. Turn setpoint adjustment until setpoint indicator reads 5F (2.8~) above actual space temperature as measured by a test thermometer, and allow thermostat to build up BLP.
2. Turn adjustment (Fig. 11) down slowly.
3. If thermostat begins to bleed off between 1 and 3F (0.5 and 1.7C) above space temperature, no calibration is necessary.

Recalibration

NOTE: Before proceeding with recalibration, be sure the (Fig. 11) just touches the throttling plate and is not wedged against it.

CAUTION

The thermostat is very sensitive and should not be heated by excessive handling during calibration.

NOTE: The 30 psi gage referred to in the following procedures means the gage with gage adapter listed in the EQUIPMENT REQUIRED section.

TP970, TP973

1. Remove the cover and install a 30 psi gage into the gage tap.
2. Turn the setpoint adjustment until the setpoint indicator reads the space temperature.
3. Turn the calibration screw (Fig. 9) until the gage indicates 0 psi.
4. Turn the calibration screw in the opposite direction until the gage indicates 8 ± 1 psi (56 ± 7 kPa). The thermostat is now calibrated.
5. Remove the gage and replace the cover.

TP971

1. Remove the cover and install a 30 psi gage into the gage tap.
2. Turn the setpoint adjustment until the setpoint indicator reads the indicated temperature.
3. With 13 psi (90 kPa) day main air pressure, turn the day (left) calibration screw (Fig. 11) until the gage indicates 0 psi.
4. Turn the calibration screw in the opposite direction until the gage indicates 8 ± 1 psi (56 ± 7 kPa).
5. With 18 psi (126 kPa) night main air pressure, rotate the night setpoint dial until its setting agrees with the indicated temperature.
6. Repeat Steps 3 and 4 using the night (right) calibration screw. The thermostat is now in calibration.
7. Remove the gage and replace cover.

TP972

1. Remove the cover and install a 30 psi gage into the gage tap.
2. Turn the setpoint adjustment until the setpoint indicator reads the indicated temperature.
3. With 13 psi (90 kPa) summer main air pressure, turn the summer (left) calibration screw (Fig. 11) until the gage indicates 0 psi.
4. Turn the calibration screw in the opposite direction until the gage indicates 8 ± 1 psi (56 ± 7 kPa).
5. With 18 psi (126 kPa) winter main air pressure, repeat Steps 3 and 4, using the winter (right) calibration screw, NOTE: If the thermostat has a setpoint dial (Fig. 11), it must be set to the indicated temperature before returning to Steps 3 and 4.
6. The thermostat is now in calibration.
7. Remove the gage and replace the cover.

By using this Honeywell literature, you agree that Honeywell will have no liability for any damages arising out of your use or modification to, the literature. You will defend and indemnify Honeywell, its affiliates and subsidiaries, from and against any liability, cost, or damages, including attorneys' fees, arising out of, or resulting from, any modification to the literature by you.

Honeywell

Group
Honeywell **Inc.**
Honeywell Plaza
P.O. Box 524
Minneapolis, MN 55408-0524

Commercial Buildings Group
Honeywell Limited-Honeywell Limitée
740 Ellesmere Road
Scarborough, Ontario

Helping You Control