

T-4000 Pneumatic Room Thermostat Installation

All Johnson Controls pneumatic relay-type room instruments, temperature and humidity controllers and transmitters, are now furnished with barbed air terminals (Fig. 1) which may be either directly connected to 5/32 in. O.D. polyethylene tubing or plugged into an optional Terminal Connector. These unique barbed air terminals provide flexibility in applications to new installations or in adapting to existing or converted installations. The T-4004 non-relay room thermostat is also equipped with a barbed air terminal for direct connection only with 5/32 in. O.D. polyethylene tubing.

The primary connection to either the instrument barbed air terminals or to the plug-in terminal connector is made with 5/32 in. O.D. polyethylene. Dual temperature thermostat supply line lengths with 5/32 in. polyethylene are limited to the first 15 ft from the stat; beyond 15 ft, 1/4, in. tubing must be used to allow proper switching of the stat.

Instrument Air Connections

Two methods are now possible:

1. Direct Tubing Connection (See Fig. 2)

The barbed air terminals on the instrument body can be directly connected to 5/32 in. polyethylene (black) tubing. No clamp is required. However, to remove the instrument, the tubing must be cut.

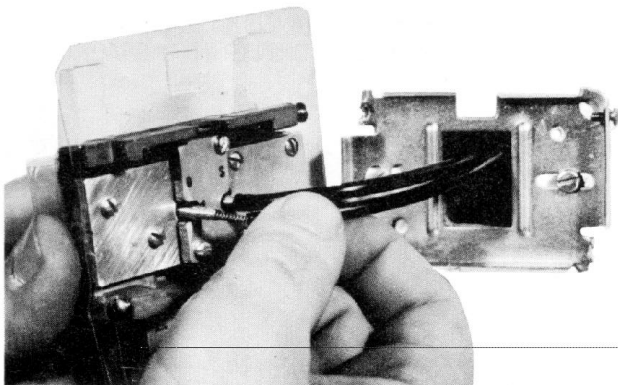


Fig. 2: Direct Tubing Connection

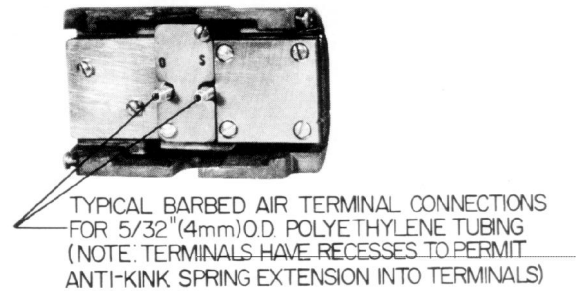
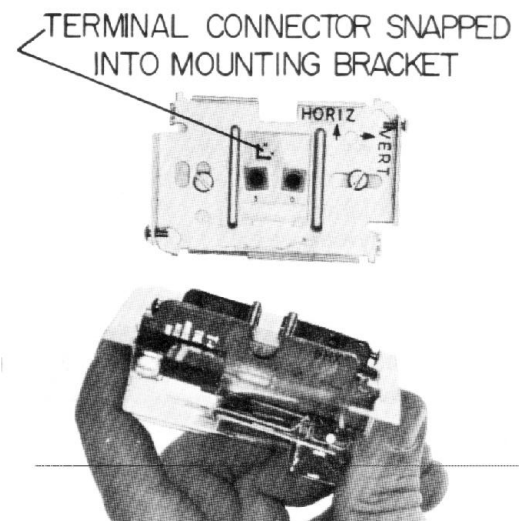


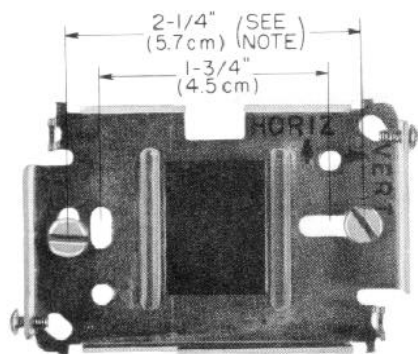
Fig. 1: Typical Pneumatic Room
Instrument Air Connections

2. Terminal Connector (See Fig. 3)

The terminal connector contains barbed fittings on the back side which can also be connected to 5/32 in. polyethylene (black) tubing. The terminal connector snaps into the room instrument mounting bracket and then the room instrument can be plugged into the terminal connector. This method allows for easier

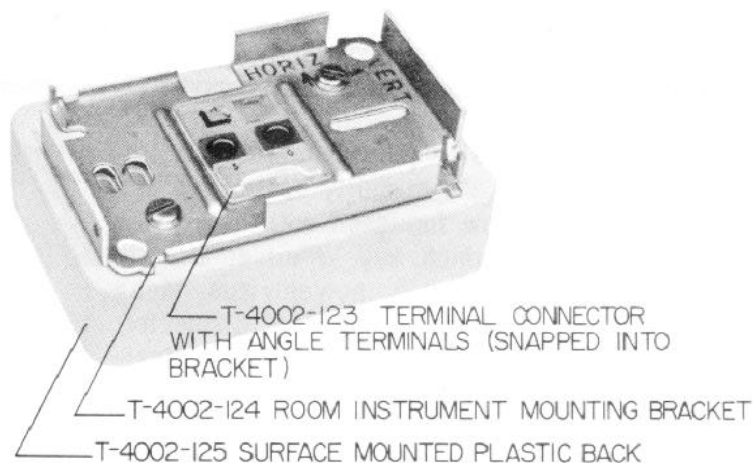


assembly and removal of the instrument.



NOTE: For drywall installations, make a 1-3/8 in. diameter hole in the wall for the air line opening and attach the room instrument mounting bracket to the wall in the 2-1/4 in. mounting centers with the (2) #6 x 1-1/4 in. screws (furnished) with F-1000-321 anchors.

Fig. 3: Plug-in Connection with Optional Terminal Connector



4004 thermostat installations, an anti-kink spring must be used on the direct 5/32 in. polyethylene air line connection.

Fig. 4

Method of snapping in (optional) Terminal Connector

Instrument Mounting (See Fig. 4)

The T-4002-124 room instrument mounting bracket is a versatile counter-part to the barbed air terminals on the instrument. The air connection opening in the bracket is specifically designed to accept the snap-in terminal connector. Mounting holes in the bracket are slotted for flexibility in anchoring and leveling. The bracket can be conveniently anchored directly onto drywall, attached to the T-4002-6029 Wallbox in concrete or masonry, attached to the T-4002-6038 Ground-plate for plaster walls (where required), or attached onto the T-4002-125 Surface Mounted Plastic Back in exposed tubing applications.

Air Tubing (See Table 1)

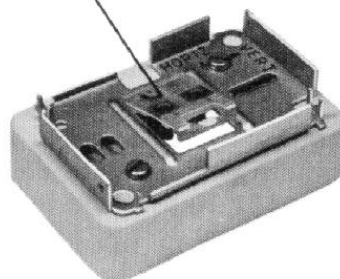
Air tubing for standard pneumatic room instrument installations should always be either bundled (Poly-Cor) or bare 5/32 in. polyethylene (black) tubing. Use surface mounted metal race-way (purchase locally) for exposed tubing installations and EMT for poured concrete or masonry installations when additional protection is required.

Existing 3/16 in. O.D. copper tubing must be adapted to 5/32 in. polyethylene, for instrument air connection, using F-100-20 Solder Fittings.

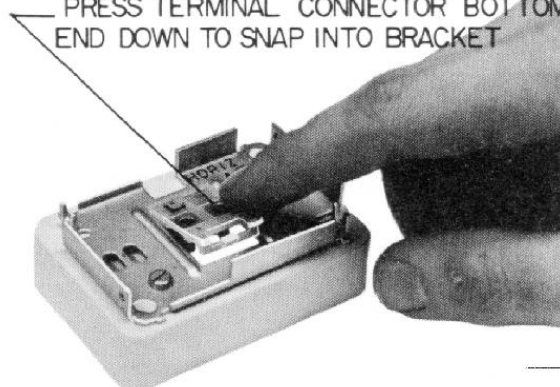
New Instrument Installations

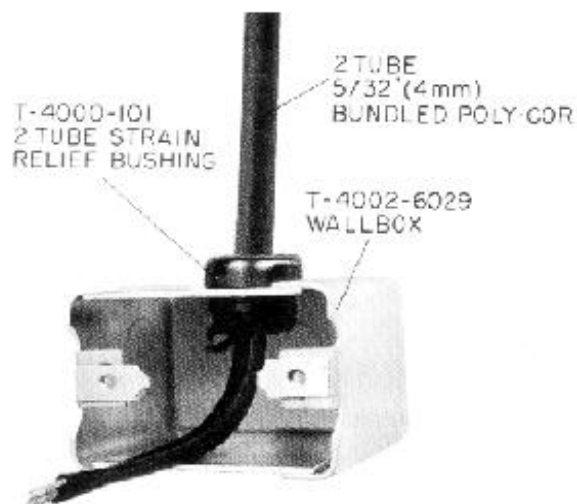
The following illustrations explain the fittings and other parts necessary to connect the various types of tubing to the instrument or terminal connector. For parts and fittings used in these illustrations refer to Table 1 and the Accessories Chart. **Note: On T-**

T-4002-123 TERMINAL CONNECTOR (PLACE TOP END INTO BRACKET FIRST)

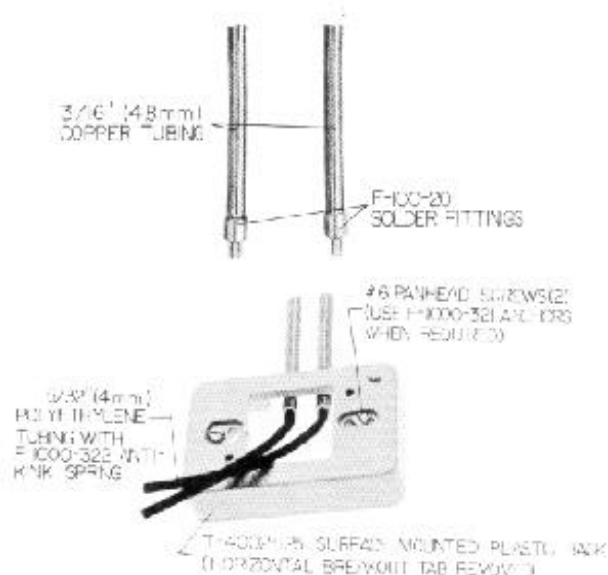


PRESS TERMINAL CONNECTOR BOTTOM END DOWN TO SNAP INTO BRACKET

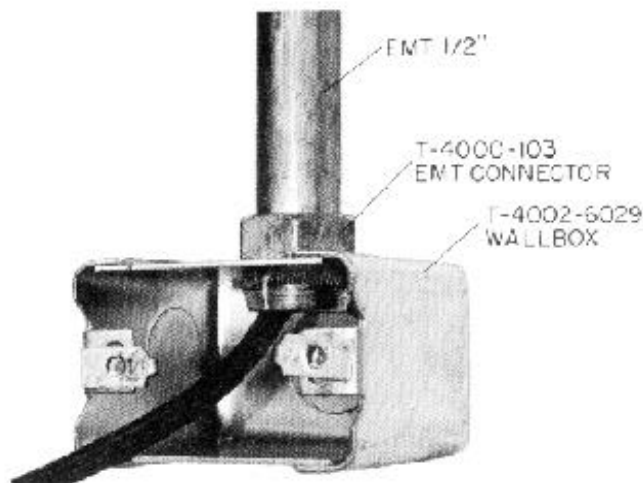




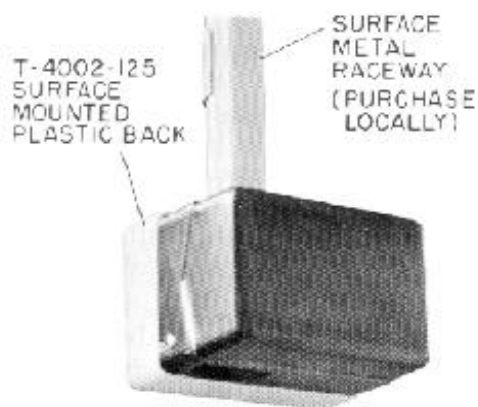
Recommended concrete or masonry
installation method.



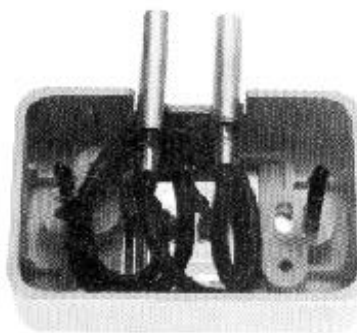
Method of making an optional "Surface
Mounting" or instrument replacement
with exposed copper tubing.



Recommended method of polyethylene protection
with EMT.



"Surface Mounted" installation with
exposed tubing protection.



Rear view of copper tubing adaptation.
Note: 5/32 in. polyethylene with anti-
kink springs must be used between the
F-100-20 Solder Fittings and the angle
terminals on the T-4002-123 Terminal
Connector.

Existing Installations - Instrument Replacement

In existing installations, where a Johnson Controls pneumatic room instrument is to be replaced, one of several situations and procedures may apply:

1. If the existing instrument is plugged into a T-4000 style pipehead, to adapt the new instrument for plug-in, cut one 5/8 in. length of 5/32 in. O.D. polyethylene tubing for each new instrument terminal and slide it over each terminal at least 1/8 in. beyond the barb. The new instrument can then be plugged back into the existing T-4000 style pipehead, see Fig. 5.

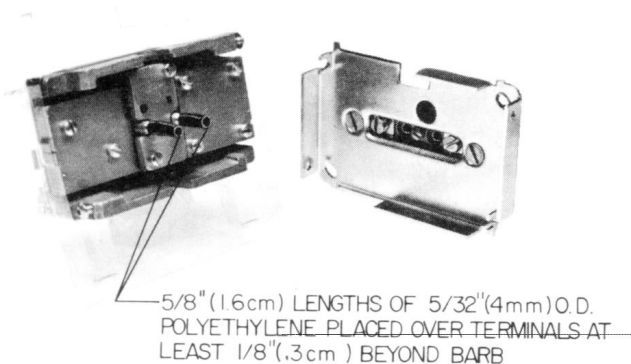


Fig. 5

2. If the existing instrument is directly connected with 1/4 in. flexible tubing, direct connection or plug-in connection can be made as follows:
 - a. Cut the tubing connections from the old instrument close to the instrument terminals. Cut one 5/8 in. length of 5/32 in. O.D. polyethylene tubing for each new instrument terminal and slide it over each terminal at least 1/8 in. beyond the barb. The new instrument can then be adapted to the existing tubing connection provided the existing 1/4 in. tubing is not deformed, cracked or otherwise damaged, see Fig. 6.
 - b. Remove the old instrument and flexible tubing and make the adaptation to 5/32 in. O.D. polyethylene tubing from the copper tubing building air line termination or larger size polyethylene tubing air line termination with the appropriate fittings listed in the Accessories Chart.

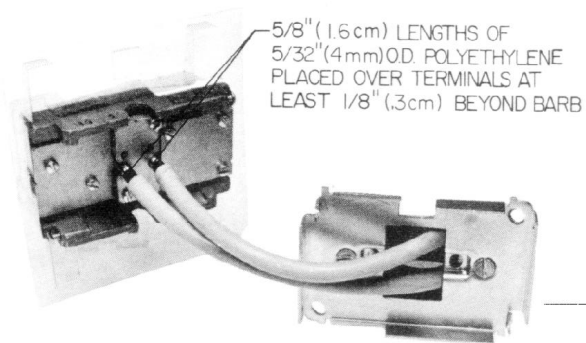


Fig. 6

3. If the existing instrument is a former conversion kit application, two procedures can be followed:
 - a. Make the new instrument adaptation using the appropriate conversion kit (refer to the "Conversion Installations" section in this literature).
 - b. Where the converted installation used 1/4 in. or smaller, O.D. flexible tubing, the new instrument might be tubed directly onto the existing flexible tubing or adapted with appropriate fittings listed on page 7, see Fig. 7.

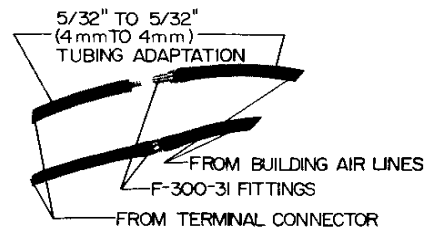


Fig. 7

Conversion Installations

Several types of instrument conversions can be made depending upon the type and quantity of instruments (Johnson Controls or non-Johnson Controls) to be converted. Several kits are available that are specifically designed for the conversions listed below. These kits contain instructions for applying the parts included with each. Installation Data literature is also available (as noted) for each specific type of conversion:

1. T-4000-610 Conversion Kit for Single Temperature T-400 Series to T-4000 Series Thermostats and H-100 Series to H-4100 Humidostats Using Existing Bakelite Back (refer to Inst. Data T-4000-A.1).

2. T-4000-611 Conversion Kit for Dual Temperature T-400 Series to T-4000 Series Thermostats Using Existing Bakelite Back (refer to Inst. Data T-4000-A.2).
3. T-4000-612 Conversion Kit for Single or Dual Temperature T-400 Series to T-4000 Series Thermostats and H-100 Series to H-4100 Humidostats Using Metal Back Supplied (refer to Inst. Data T-4000-A.3).
4. T-4000-605 Universal Pneumatic Room Instrument Conversion Kit (refer to Inst. Data T-4000-A.5).

Some conversions (Johnson Controls or non-Johnson Controls) may be made with exposed tubing. If so, treat the conversion the same as a new instrument installation with exposed tubing, after unfastening and literally cutting the old instrument off of the wall. Also, some non-Johnson Controls instrument conversions can be conveniently accomplished without one of the kits listed above. These conversions are limited to particular non-Johnson Controls instruments whose wall space requirements are equal to or less than that of a T-4000 room instrument (3-1/16 in. by 2-1/32 in.). Use the T-4002-125 Surface Mounted Plastic Back and other accessories listed in the accessories chart, as required, to make the adaptations for conversion.

Air Line Testing

On existing installations, it might be necessary to check for air line leakage (when such problems are suspected or as part of routine maintenance). On new installations, a check for leaks may be part of contract requirements even though barbed fittings used in conjunction with polyethylene tubing offer the most leakproof system known to date. Several aids are available for use in the performance of such tests.

The Test Gage Adapter, T-4002-5004, which was plugged into former copper tube pipeheads, can be connected to 1/4 in. O.D. flexible tubing, F-1000-231, to adapt to 5/32 in. polyethylene tubing for pressure readings, See Fig. 8. F-1000-231 tubing can be used to jumper 5/32 in. polyethylene as well.

The Terminal Connector, on plug-in installations, can be dead-ended by attaching a Connector Protector Cap, T-4000-100, or jumpered with a piece of 1/8 in. O.D. flexible tubing, F-3120-11, inserted into the O-ring seals. Pressure tests can be made by using a special fitting, F-3120-68 Straight Barbed Adapter, to adapt between sizes of flexible tubing, see Fig. 9.

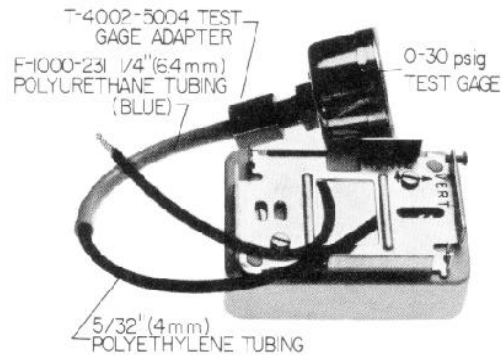


Fig. 8

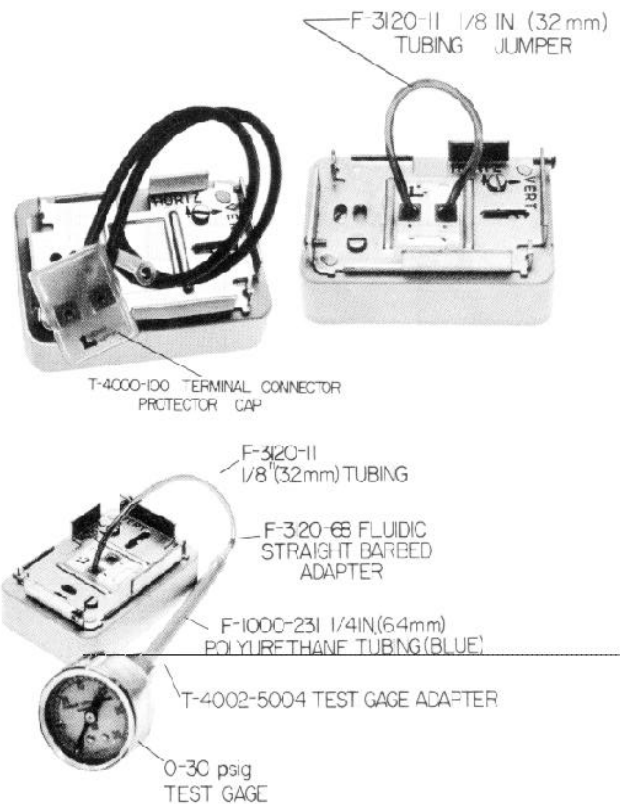
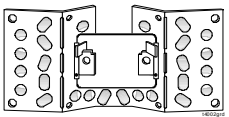
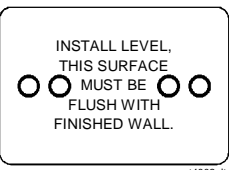
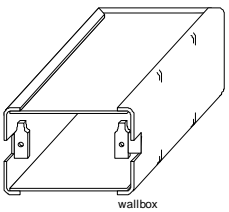
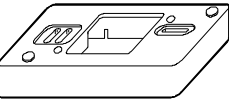


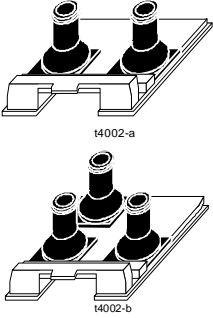
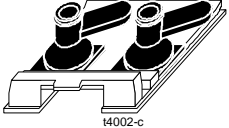
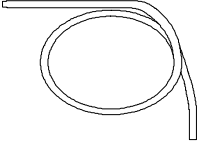
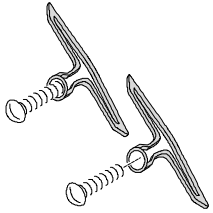
Fig. 9: Utilization of T-4000-100 Protector Cap to dead-end air lines (top) or F-3120-11 Tubing to jumper terminal connector (center) and pressure testing terminal connector (bottom)

Table 1 (Application Guide)

INSTALLATIONS*	HOLLOW WALLS		PREFABRICATED PARTITIONS	CONCRETE OR MASONRY	EMT (USED IN MASONRY OR CONCRETE WHERE REQUIRED FOR PROTECTION)	EXPOSED TUBING
	DRYWALL	PLASTER				
POLYETHYLENE TUBING (PURCHASE FROM VENDOR)	5/32 IN. (4mm) BARE POLY-ETHYLENE	2 OR 3 TUBE POLY-COR	5/32 IN. (4mm) BARE POLY-ETHYLENE	2 OR 3 TUBE POLY-COR	5/32 IN. (4mm) BARE POLY-ETHYLENE	2 OR 3 TUBE POLY-COR
 PLASTER GROUND-PLATE T-4002-6038	NO	OPTIONAL	NO	NO	NO	NO
 COVER PLATE T-4002-5010 FOR GROUNDPLATE OR WALLBOX	NO	OPTIONAL	NO	OPTIONAL	OPTIONAL	NO
 METAL WALLBOX T-4002-6029	NO	NO	NO	YES	YES	NO
 SURFACE MOUNTED PLASTIC BACK T-4002-125	NO	NO	NO	NO	NO	YES

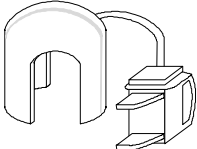
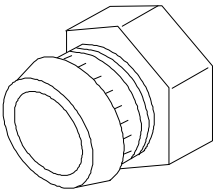

* INSTRUMENT, MOUNTING BRACKET, AND COVER MUST BE ORDERED SEPARATELY.

Table 1 (Application Guide) – Continued

INSTALLATIONS*	HOLLOW WALLS		PREFABRICATED PARTITIONS	CONCRETE OR MASONRY	EMT (USED IN MASONRY OR CONCRETE WHERE REQUIRED FOR PROTECTION)	EXPOSED TUBING
	DRYWALL	PLASTER				
 <p>TERMINAL CONNECTORS WITH STRAIGHT TERMINALS (FITTINGS) T-4002-122 (TOP) T-4512-100 (BOTTOM)</p>	OPTIONAL	OPTIONAL	NO	OPTIONAL	OPTIONAL	NO
 <p>TERMINAL CONNECTOR WITH ANGLE TERMINALS (FITTINGS) T-4002-123 (2 TERMINALS ONLY)</p>	NO	OPTIONAL	YES	NO	NO	YES
 <p>ANTI-KINK SPRING F-1000-322</p>	NO	YES	OPTIONAL	YES	OPTIONAL	YES
 <p>WALL ANCHORS F-1000-321</p>	YES	OPTIONAL	NO	NO	NO	OPTIONAL

* INSTRUMENT, MOUNTING BRACKET, AND COVER MUST BE ORDERED SEPARATELY.

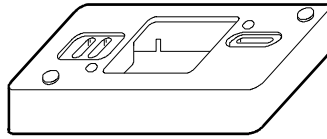
Table 1 (Application Guide) – Continued

INSTALLATIONS*	HOLLOW WALLS		PREFABRICATED PARTITIONS	CONCRETE OR MASONRY	EMT (USED IN MASONRY OR CONCRETE WHERE REQUIRED FOR PROTECTION)	EXPOSED TUBING
	DRYWALL	PLASTER				
 STRAIN RELIEF BUSHINGS T-4002-101 (2-TUBE) T-4002-102 (3-TUBE)	NO	NO	NO	YES	NO	NO
 1/2 IN. EMT CONNECTOR T-4002-103	NO	NO	NO	NO	YES	NO
 SURFACE MOUNTED METAL RACEWAY (PURCHASE LOCALLY ie. WIRE MOLD NO. 200 OR NATIONAL 333, ETC.)	NO	NO	NO	NO	NO	OPTIONAL

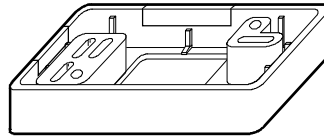
* INSTRUMENT, MOUNTING BRACKET, AND COVER MUST BE ORDERED SEPARATELY.

Accessories Chart

T-4002-125 SURFACE MOUNTED PLASTIC BACKS (10 PER PACKAGE)



Top View



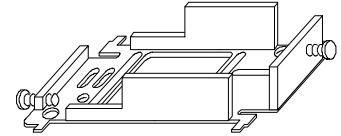
Bottom View

(2 vertical slotted holes on left and single horizontal slotted hole on right provide 1-3/4 in. to 2-1/4 in. mounting centers.)

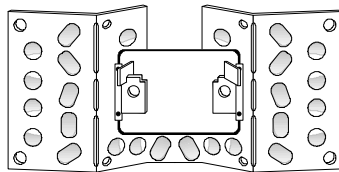
(Backs furnished with 2 ea. #6 x 3/8 in. and 2 ea. #6 x 1-3/4 in. pan head self-tapping screws.)

(Horizontal and Vertical breakout tabs provided, as shown, to clear surface mounted tubing.)

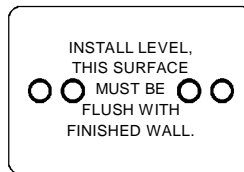
T-4002-124 ROOM INSTRUMENT MOUNTING BRACKET (10 PER PACKAGE)



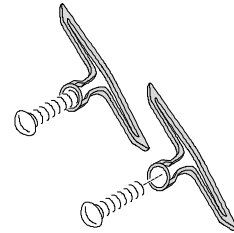
(Brackets furnished with 2 ea. #6 x 1/4 in. panhead self-tapping screws.)



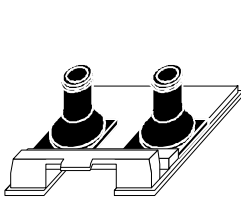
**T-4002-6038 PLASTER GROUND PLATE (left) and
T-4002-5010 COVER PLATE (right)
(1 PER PACKAGE ORDER SEPARATELY)**



F-1000-321 WALL ANCHORS (100 PER PACKAGE)

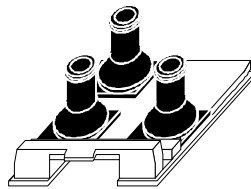


(Anchors use #6 screws and require 5/16 in. dia. mtg. holes)



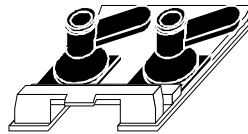
T-4002-122 TERMINAL CONNECTOR

(Provided with 2 straight snap-in terminals or fittings.)



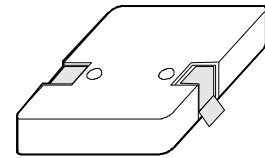
T-4512-100 TERMINAL CONNECTOR

(Provided with 3 straight snap-in terminals or fittings.)



T-4002-123 TERMINAL CONNECTOR

(Provided with 2 angle snap-in terminals or fittings.) (Must be used for plugin exposed tubing installations with T-4002-125 Surface Mounted Plastic Backs.)



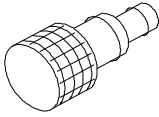
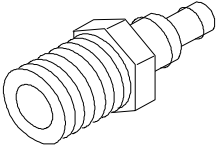
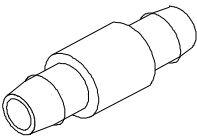
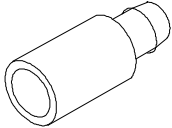
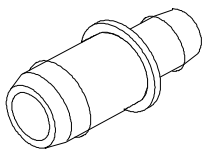
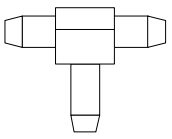
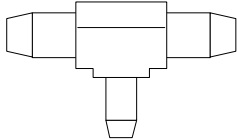
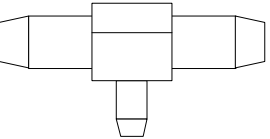
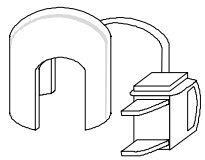
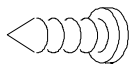
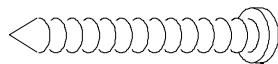
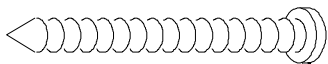
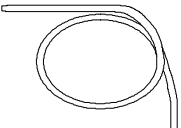
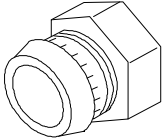
T-4000-100 PROTECTOR CAP

(Snaps onto any one of the terminal connectors.)

(10 EACH PER PACKAGE)

(Terminals or fittings have integral recesses to permit anti-kink spring extension into fittings.)

Accessories Chart – (Continued)

<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> F-1000-323 5/32 OR 1/4 in. PLUG  </div> <div style="text-align: center;"> F-100-21 5/32 OR 1/4 IN. X 1/8 IN. M.P.T. FITTING  </div> <div style="text-align: center;"> F-300-31 5/32 X 5/32 IN. COUPLER FITTING (100 EA. PER PACKAGE)  </div> <div style="text-align: center;"> F-100-20 5/32 X 3/16 IN. I.D. SOLDER FITTING  </div> <div style="text-align: center;"> F-300-30 5/32 X 1/4 IN. COUPLER FITTING  </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <p>(Fitting furnished on most pneumatic controlled devices.)</p> <p>(Couplers and solder fittings have integral recesses to permit anti-kink spring extension into fittings.)</p> </div>				
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> F-700-83 SUPPLY LINE TEE  <p>5/32 x 5/32 x 5/32 in. Barbed Fittings</p> </div> <div style="text-align: center;"> F-700-84 SUPPLY LINE TEE (100 EACH PER PACKAGE)  <p>1/4 x 1/4 x 5/32 in. Barbed Fittings</p> </div> <div style="text-align: center;"> F-700-85 SUPPLY LINE TEE  <p>3/8 x 3/8 x 5/32 in. Barbed Fittings</p> </div> </div>				<div style="text-align: center;"> T-4000-101 (2-TUBE) OR T-4000-102 (3-TUBE) STRAIN RELIEF BUSHINGS FOR POLY-COR TUBING TO WALLBOX CONNECTION (10 EA. PER PACKAGE)  </div>
<div style="text-align: center;"> F-1000-325 (left) - 326 (center) - 327 (right) #6 SELF-TAPPING PAN HEAD SCREWS (100 EACH PER PACKAGE) <div style="display: flex; justify-content: space-around; align-items: center;">    </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <div style="text-align: center;"> (F-1000-325) 3/8 in. long) </div> <div style="text-align: center;"> (F-1000-326) 1-1/4 in. long) </div> <div style="text-align: center;"> (F-1000-327) 1-3/4 in. long) </div> </div> </div>			<div style="text-align: center;"> F-1000-322 ANTI-KINK SPRING (10-8 IN. LENGTHS PER PACKAGE)  </div>	<div style="text-align: center;"> T-4000-103 EMT CONNECTOR (10 PER PACKAGE)  </div>

Notes

Notes

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