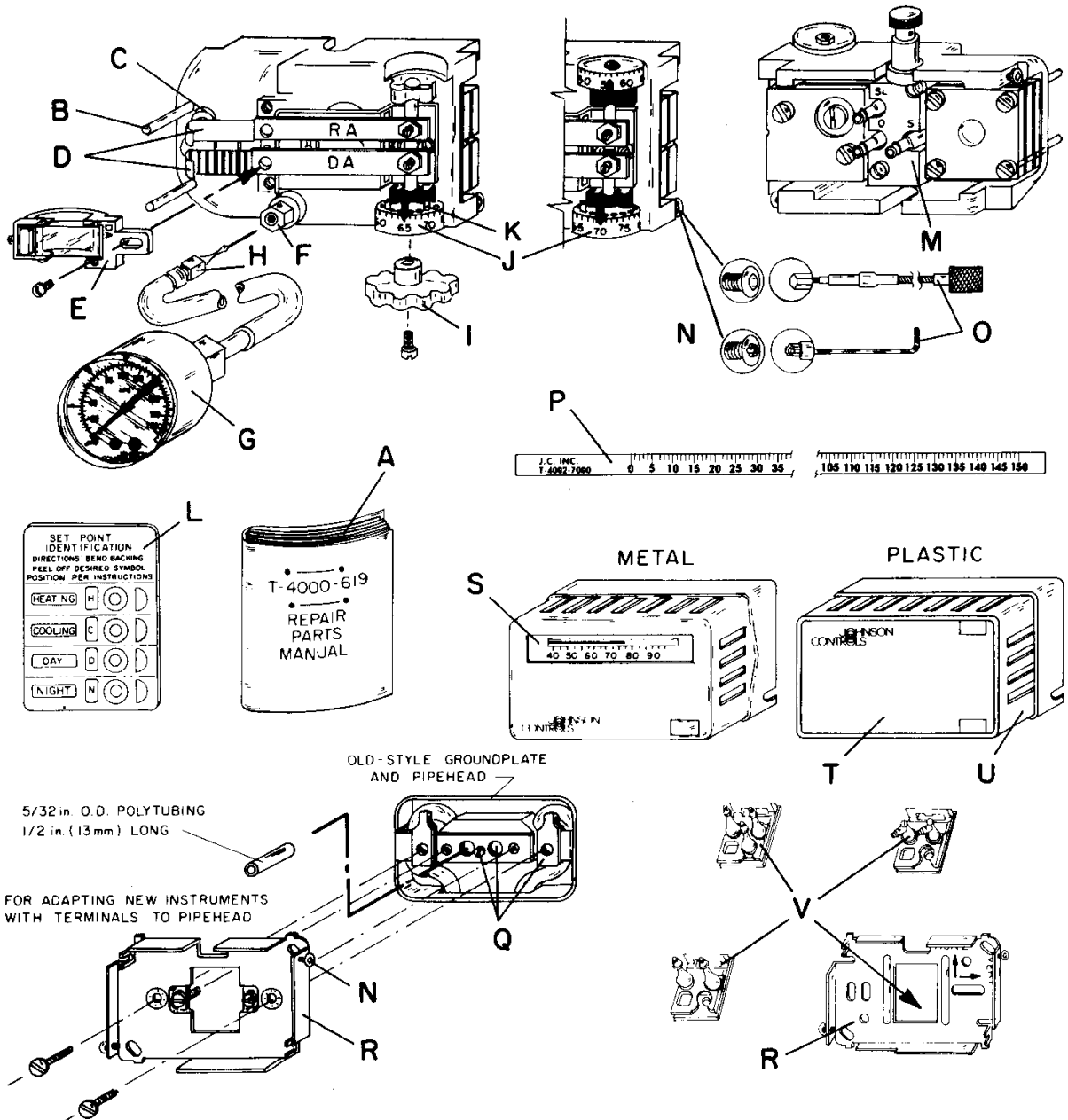
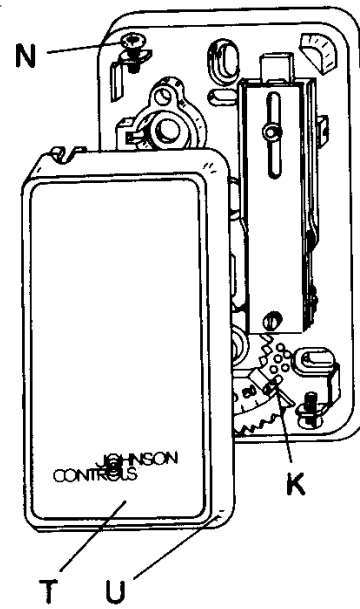
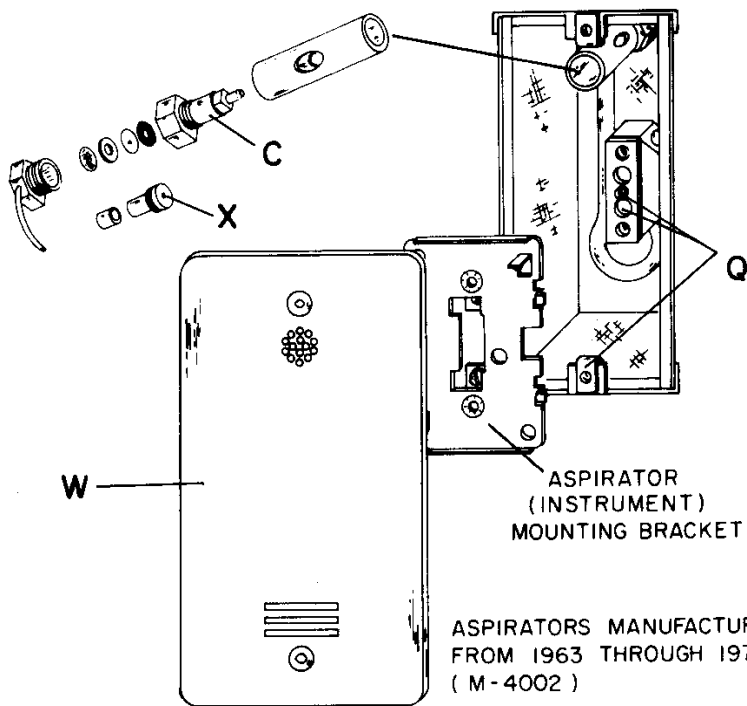


**T-4000-619 Repair Parts Manual
for H-4000, H-5000, T-4000, and
T-5000 Series Instruments**





ASPIRATORS MANUFACTURED FROM 1963 THROUGH 1974 (M-4002)

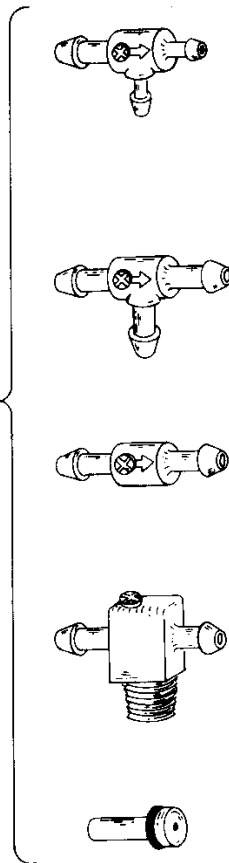
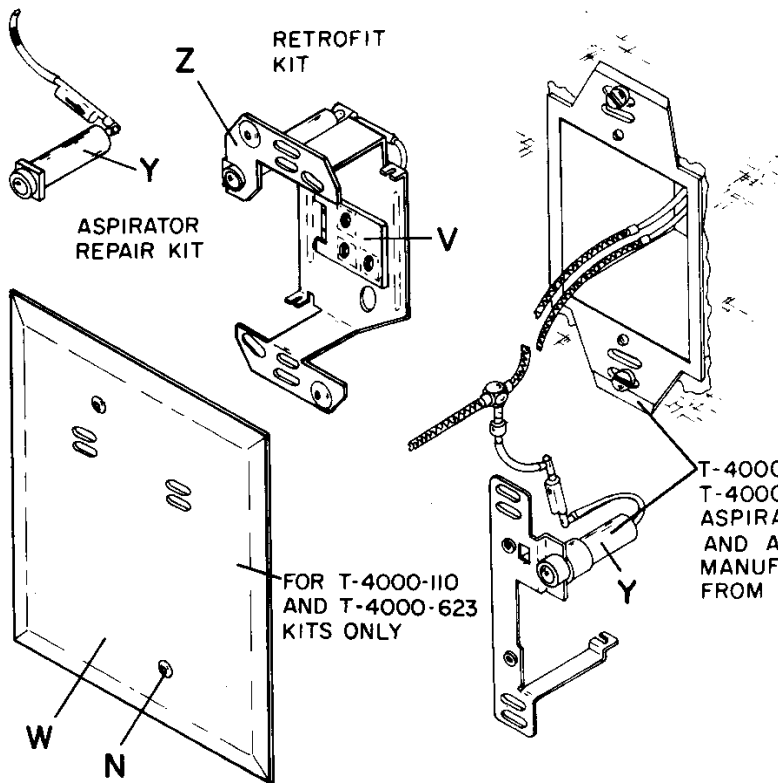


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Item	Description	Code Number	Where Used	Page Reference
A	Repair Parts Manual (Installation Data T-4000-A.8)	T-4000-619	All Instruments	None
B	Element Protection Screws (Order in Multiples of 50)	T-4506-608	All Instruments	7
C	Control Ports: Brass .014 in. (Order in Multiples of 10)	T-4002-600	All Instruments* Manufactured Before 1981	7-8
	Plastic (Order in Multiples of 10)	T-4002-624	All Instruments* Manufactured After 1981	
	Brass .010 in. (Order in Multiples of 2)	T-4004-600	M-4002 Aspirator	
D	Temperature Element Assemblies: Includes bimetal, lever, locknut, and adjusting screw (Order in Multiples of 10)			8
	Upper			
	DIR	T-4506-605	T-4052, T-4054, T-4502, T-4504, T-4506, T-4512, T-4514, T-4516, T-4752	
	REV	T-4506-607	T-4002, T-4003, T-4052, T-4054, T-4502, T-4506	
Lower				
DIR	T-4506-604	T-4002, T-4003, T-4052, T-4054, T-4502, T-4504, T-4506, T-4512, T-4514, T-4516, T-4752		
REV	T-4506-606	T-4052, T-4054, T-4502, T-4504, T-4506, T-4752		
E	Humidity Elements (CAB): For DIR or REV (Order in Multiples of 2)	H-4100-613	All H-4100 and H-4103 Series Humidistats	9
F	Test Port Fitting: Plug-In (Order in Multiples of 10)	T-4000-615	All Instruments	9
G	Test Gages: 0 to 30 PSIG (0 to 210 kPa)	X-200-19	All Controllers	9
	50 to 100F			
	40 to 240F 40 to 65F 60 to 85F	X-200-181	All Transmitters	
H	Hypodermic Test Probe: With 2 Needles	X-200-140	All Instruments Using the T-4000-615 Test Port Fitting	9
	Replacement Needles (Order in Multiples of 12)	X-200-179		
I	External Set Point Adjustment Knob w/Screw (Order in Multiples of 10)	T-4002-5012	All Instruments*	9
J	Dial and Cam: (Order in Multiples of 5) Single Dial (Horizontal Reading Only)			10
	DIR Upper, DIR Lower	T-4000-617	T-4002, T-4003, T-4502, T-4504, T-4512, T-4514	
	REV Upper, REV Lower	T-4000-618	T-4002, T-4003, T-4502, T-4504	
	DIR Upper, REV Lower	T-4752-619	T-4752	
	REV Upper, DIR Lower	T-4752-620	T-4002, T-4003, T-4752	
	Dual Dial (Horizontal Reading Only)			
	Upper Dial			
	DIR	T-4506-602		
REV	T-4506-603	T-4054, T-4506, T-4516, T-4756		
Lower Dial				
DIR	T-4506-600			
REV	T-4506-601			
K	Dial Stop Pins: For Restricted Adjustment (100 per kit)	T-4002-5003	All Instruments Except Transmitters and T-4600 Series Thermostats	10

*All Instruments Except Transmitters

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Item	Description	Code Number	Where Used	Page Reference
L	Set Point Identification Labels (Order in Multiples of 25)	T-4000-114	All Instruments*	10-11
M	Orifice Plates: (Order in Multiples of 1) With Gaskets	T-4000-606	All Instruments Except Day-Night Controllers	11-12
	With Gaskets and Pushbutton (Two-Pipe)	T-4502-631	T-4502, T-4504, T-4506	
	With Gaskets and Pushbutton (Three-Pipe)	T-4512-613	T-4512, T-4514, T-4516	
N	Screws for Cover and Bracket: #4-40 x 1/4 in. Hex Screws (Order in Multiples of 100)	T-4002-617	All Instruments and Aspirator Wallbox Covers	None
	#4-40 x 1/4 in. Torx Tamper Proof Screws w/Driver (Order in Multiples of 50)	T-4000-627		
	#4-40 x 1/4 in. Torx Tamper Proof Screws (Order in Multiples of 100)	T-4000-628		
O	Cover and Bracket Screwdrivers: Allen head Flex Driver (Order in Multiples of 1)	X-200-18	All Instruments Except Those Using Tamper Proof Screws (Item "N" Above)	None
	Torx Tamper Proof Driver (Order in Multiples of 5)	T-4000-629	All Instruments Using Tamper Proof Screws (Item "N" Above)	
P	Stick-On Dial Strips: (Order in Multiples of 5) Horizontal Thermostats			12
	Upper 0 to 150F	T-4506-100	Dual Dial Thermostats Only (Upper Dial)	
	-20 to 80°C	T-4506-102		
	Lower 0 to 150F	T-4000-115	Single or Dual Dial Thermostats (Lower Dial)	
	-20 to 80°C	T-4000-117		
	Vertical Thermostats			
	Right 0 to 150F	T-4000-116	Single or Dual Dial Thermostats (Right Dial)	
-20 to 80°C	T-4000-118			
Left 0 to 150F	T-4506-101	Dual Dial Thermostats Only (Left Dial)		
-20 to 80°C	T-4506-103			
Q	Pipehead Gasket and Holding Screw (Order in Multiples of 10)	T-4002-625	All Instruments With Pipeheads or Aspirator Wallboxes	12-13
	Cover and/or Bracket Holding Nut (Order in Multiples of 50)	M-4002-600		
R	Mounting Brackets: For Old-style Pipeheads	T-4002-6049	All Instruments With Old-style Pipeheads	13
	For Terminal Connectors (Order in Multiples of 10)	T-4002-124	All Instruments Without Pipeheads	
S	Thermometer/Faceplate Assemblies: For Metal Covers		All Instruments With Metal Covers	13
	Horizontal – Fahrenheit	T-4002-612		
	Vertical – Fahrenheit	T-4002-613		
T	Faceplates for Plastic Covers: (Order in Multiples of 10) Horizontal, Thermometer No Windows	T-4000-6140	All 4000 Series Instruments With 1-3/4 in. High Plastic Covers	14
	Horizontal, Thermometer Single Window	T-4000-6142		
	Vertical, Thermometer Single Window	T-4000-6146		
	Vertical, Thermometer Dual Windows	T-4756-6739		
	Horizontal, Thermometer Dual Windows	T-4756-6738		

* All Instruments Except Transmitters

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Item	Description	Code Number	Where Used	Page Reference	
T (cont'd)	Faceplates for Plastic Covers: (Order in Multiples of 10) Horizontal, No Thermometer Dual Windows	T-4756-6141	All 4000 Series Instruments With 1-3/4 in. High Plastic Covers Note: Faceplates with thermometer and dual window cutouts cannot be used on Old-style 1-5/8 in. high plastic covers. These faceplates can also be used on Old-style covers.	14	
	Vertical, No Thermometer Dual Windows	T-4756-6145			
	Horizontal Johnson Controls Logo Only	T-4000-6139			
	Vertical Johnson Controls Logo Only	T-4000-6144			
	Vertical, No Thermometer Single Window	T-4000-6145			
	Horizontal, No Thermometer Single Window	T-4000-6141			
	Blank	T-4000-6138			
	Horizontal Johnson Controls Logo Only	T-4100-101	All T-4100 and T-4600 Series Thermostats		
	Horizontal, Thermometer Johnson Controls Logo	T-4100-102			
	Blank	T-4100-100			
U	Beige Plastic Covers w/Faceplates: Blank	T-4000-2138	All Instruments Except T-4100 and T-4600 Series Thermostats	None	
	Horizontal, No Thermometer No Windows	T-4000-2139			
	Horizontal, Thermometer No Windows	T-4000-2140			
	Horizontal, No Thermometer Single Window	T-4000-2141			
	Horizontal, Thermometer Single Window	T-4000-2142			
	Vertical, No Thermometer No Windows	T-4000-2144			
	Vertical, No Thermometer Single Window	T-4000-2145			
	Vertical, Thermometer Single Window	T-4000-2146			
	Horizontal, No Thermometer Slot for Indexing Switch No Windows	T-4504-1737			
	Horizontal, Thermometer Slot for Indexing Switch Single Window	T-4504-1738			
	Vertical, Thermometer Slot for Indexing Switch Single Window	T-4504-1739			
	Horizontal, Thermometer Slot for Indexing Switch Dual Windows	T-4506-1738			
	Vertical, Thermometer Slot for Indexing Switch Dual Windows	T-4506-1739			
	Horizontal, Thermometer Dual Windows	T-4756-1738			
	Vertical, Thermometer Dual Windows	T-4756-1739			
	Horizontal, No Thermometer Dual Windows	T-4756-2141			
	Vertical, No Thermometer Dual Windows	T-4756-2145			
	Vertical, Thermometer No Windows	T-4100-600			T-4100 and T-4600 Series Thermostats

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Item	Description	Code Number	Where Used	Page Reference
V	Terminal Connectors: (Order in Multiples of 10)			14-15
	Three-Pipe Angle Fitting	T-4000-616	For T-4000-110 Aspirator Wallbox Kit	
	Two-Pipe Straight Fitting	T-4002-122	All Two-Pipe Instruments	
	Two-Pipe Angle Fitting	T-4002-123	All Two-Pipe Instruments	
W	Three-Pipe Straight Fitting	T-4512-100	All Three-Pipe Instruments	None
	Aspirator Wallbox Covers: Beige	T-4000-111	For T-4000-110 and T-4000-623 Aspirator Wallbox Kits Only	
	Stainless Steel	T-4000-112	For T-4000-110 and T-4000-623 Aspirator Wallbox Kits Only	
X	Silver	M-4002-1000	For Old-style M-4002 Aspirator Wallbox Kit Only	15
	Restrictors: (Order in Multiples of 10)			
	.005 in. Red	R-3710-1005	M-4002 Aspirator	
	.005 in. Red, 1/4 x 1/4 in. Straight Barbed Fitting	R-3710-2005	T-4100 Series Instruments: Choice of Any One	
	.007 in. Aqua, 1/4 x 1/4 in. Straight Barbed Fitting	R-3710-2007		
	.005 in. Red, 1/4 x 1/4 x 1/4 in. Barbed Tee	R-3710-3005		
	.007 in. Aqua, 1/4 x 1/4 x 1/4 in. Barbed Tee	R-3710-3007		
	.005 in. Red, 1/4 x 1/4 x 1/8 in. N.P.T. Barbed Tee	R-3710-3105		
.007 in. Aqua, 1/4 x 1/4 x 1/8 in. N.P.T. Barbed Tee	R-3710-3107			
.005 in. Red, 1/4 x 5/32 x 5/32 in. Barbed Tee	R-3710-3205			
.007 in. Aqua, 1/4 x 5/32 x 5/32 in. Barbed Tee	R-3710-3207			
Y	Aspirator Kit: Includes Aspirator, Elbow, Resistor, and 1/8 in. O.D. Poly tubing With Filter	T-4000-622	Repair of T-4000-110 and Old-style T-4000-105 and T-4000-106 Aspirator Wallbox Kits	15-16
Z	Aspirator Wallbox Retrofit Kit: Includes Instrument Mounting Bracket, Aspirator Subassembly, Terminal Connector, and Set Point Adjustment Wrench	T-4000-623	Used In Conjunction With T-4000-111 or -112 Wallplate Cover To Upgrade T-4000-105 and T-4000-106 Aspirator Wallbox Kits To T-4000-110 Aspirator Wallbox Kit	17

Notes:

For a complete trade-in exchange thermostat, humidistat, or transmitter movement, refer to the *Counterline Catalog* for the proper code number.

When replacing a single dial, dual element thermostat with a dual dial, dual element thermostat, a new 1-3/4 in. high cover must be ordered to avoid possible interference between the old cover and the second dial on the new thermostat.

Item

B: Element Protection Screws

T-4506-608:

Turn the two relay holding screws (on the control port end of the instrument) counterclockwise to remove them. Replace these screws with two element protection screws.

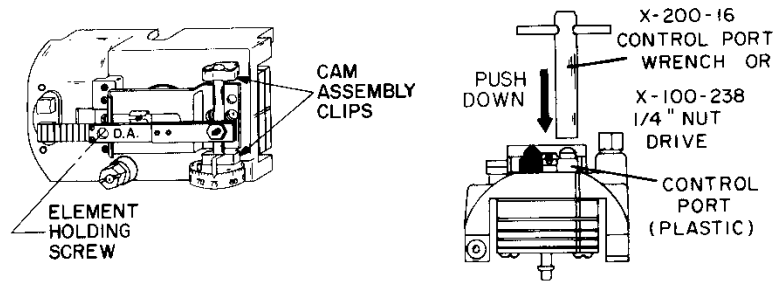


Fig. 1

Item

C: Control Ports

T-4002-600 (Brass) and T-4002-624 (Plastic):

To replace the control port(s), proceed as follows:

1. Remove the two cam assembly clips and the cam assembly (see Fig. 1).
2. Loosen the element holding screw(s) through the hole in the element(s). Slide the element(s) to the right and remove.
3. Remove the brass control port(s) using an X-200-16 control port wrench (ordered separately). Remove the plastic control port(s) by twisting and pulling straight outward with a pliers.
4. Screw the new brass control port(s) in place using the control port wrench. Install the new plastic control port(s) by pushing them tight in place. **Note: Do not use glue or other bonding compounds for the installation as these materials may plug the control port(s).**
5. Reinstall the element(s), being careful not to damage or bend the sensing portion.

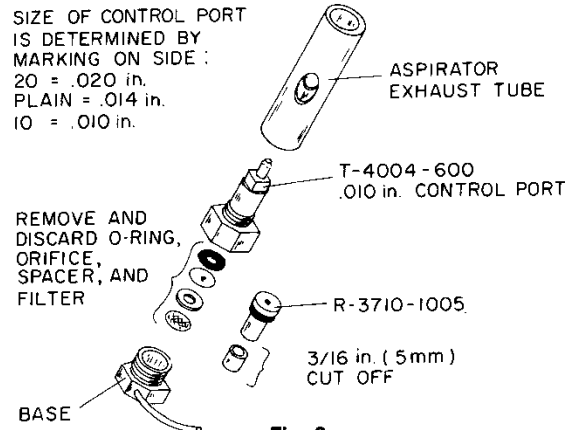


Fig. 2

T-4004-600 (Brass):

On aspirator wallboxes manufactured between 1963 and 1974, the aspiration of space air is accomplished with the flow of air provided by an orifice plate and a .010 in control port in the aspirator assembly (see Fig. 2). If the control port is plugged, the air flow will be cut off and the instrument will not sense the actual space condition. To remove the control port, proceed as follows:

1. Remove the aspirator exhaust tube (turn counterclockwise).
2. Using an X-200-16 control port wrench (ordered separately) or a common 3/16 in. wrench, remove the control port by turning it counterclockwise.

3. Tighten the new control port in place and check for leaks. Reconnect the aspirator exhaust tube. If the air flow through the control port is still cut off, the orifice may be plugged. Refer to the section entitled **Item X: Restrictors** for further instructions.

Operational Checkout

To check that the instrument operates properly after the replacement has been made, refer to Fig. 3 and proceed as follows:

1. Attach the instrument to the mounting bracket and furnish it with supply air.
2. Turn the output adjusting screw until approximately two threads are exposed above the locking nut.

3. Turn the sensitivity slider adjusting screw until the element assembly arm is parallel with the feedback arm.
4. Measure the ambient temperature or humidity at the element.
5. Turn the set point dial to the value noted in step 4.
6. Turn the output adjusting screw on the element in control until the output pressure reaches an intermediate pressure between 6 and 13 psig (42 and 91 kPa).
7. Rotate the dial from one end to the other. The output pressure should decrease to 0 psig (0 kPa) and increase to within ± 0.5 PSI (± 3.5 kPa) of the supply pressure.

If the output pressure does not decrease to 0 psig, there may be a blockage in the control port. If the output pressure does not increase to within ± 0.5 PSI of the supply pressure, the control port or output test point may not be tight enough.

If the required increase or decrease in output pressure still cannot be obtained, unit replacement is required.

8. Calibrate the instrument as described in Adjustment Data T-4000-B or the Operator's Manual.

Item

D: Temperature Element Assemblies

T-4506-604, -605, -606, -607:
To replace the temperature element(s), proceed as follows:

1. Remove the two cam assembly clips and the cam assembly (see Fig. 1).

2. Loosen the element holding screw(s) through the hole in the element(s). Note the position of the notch on the element mounting base in relation to the element holding screw. Slide the element(s) to the right and remove.
3. Slide the new element(s) into position (being careful not to damage or bend the sensing portion) and tighten in place with the holding screws. **Note: Be sure to locate the element(s) in the correct position (upper or lower, left or right) with reference to the notch as noted in step 2.** For horizontally mounted thermostats, elements with a notch on the lower portion of the

element assembly should be installed in the upper position and those with a notch on the upper portion should be installed in the lower position. On vertically mounted thermostats, elements with a notch on the left portion of the element assembly should be installed in the right position and those with a notch on the right portion should be installed in the left position (see Fig. 4).

4. Reinstall the cam assembly and the two cam assembly clips. **Note: To identify the proper cam relative to the action, take note of the rise of the cam (see Fig. 5).**
5. Proceed to **Operational Checkout**, page 7.

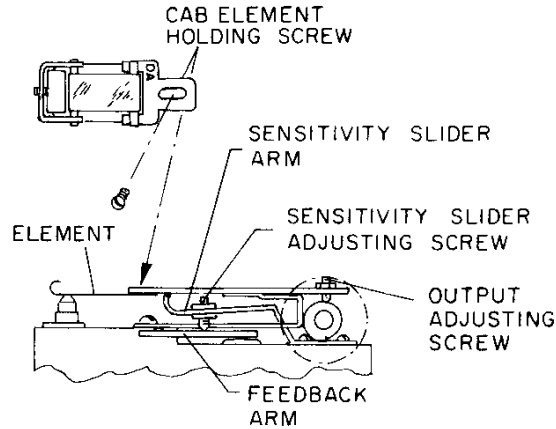


Fig. 3

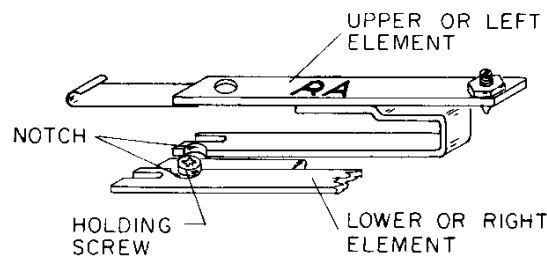


Fig. 4

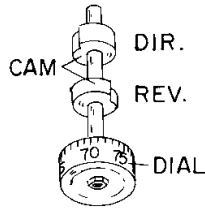


Fig. 5

Item E: Humidity Elements

H-4100-613:

To replace the humidity element on a humidistat, proceed as follows:

1. Remove and retain the element holding screw. Discard the old humidity element.
2. Install the new humidity element and tighten the holding screw in place.

Note: The action symbol (DIR or REV) that is molded on the humidity element assembly must match the action of the humidistat. When installed properly, this symbol should be facing upward.

3. Proceed to **Operational Checkout**, page 7.

Item F: Test Port Fitting

T-4000-615:

This test port fitting is used to update a controller for easy checkout using a hypodermic needle test probe (X-200-140 ordered separately). The fitting is simply screwed tight in place using a 1/4 in. nut driver (X-100-238 ordered separately) or similar tool. Check the new test port fitting for leaks after installation.

Item G: Test Gages

X-200-19:

This 0 to 30 psig (0 to 210 kPa) test gage and adapter is used to calibrate or check out all thermostats and humidistats. It can be screwed directly into the threaded connection on the controller body or it can be used in conjunction with a hypodermic needle test probe.

X-200-181:

All transmitters should be checked out or calibrated using the proper transmission gage (X-200-181 is suggested). Contact the local branch office for the correct gage that matches the transmitter span and range for the type of transmitter being used.

Item H: Hypodermic Test Probe

X-200-140:

This hypodermic test probe assembly is used with a test gage to obtain a reading from any pneumatic instrument utilizing a T-4000-615 plug-in test port fitting. Using the hypodermic test probe is a convenient way of taking a reading without disturbing the control signal.

Since the needle is sharp and can be bent quite easily, care must be exercised during its usage and storage. When not in use, it is suggested that the needle be covered with a sealing cap (F-1000-5 ordered separately). Replacement needles are available; order X-200-179.

To replace a damaged needle, refer to Fig. 6 and proceed as follows:

1. Grasp the base of the needle with a 1/4 in. wrench and the holder with a pliers.

1/4 in. (6 mm)

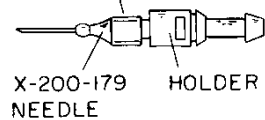


Fig. 6

2. Rotate the holder in a counterclockwise direction to separate it from the needle.
3. Replace the damaged needle with a new needle and check the connection for leaks.

Item I: External Set Point Adjustment Knob

T-4002-5012:

To install the external set point adjustment knob, refer to Fig. 7 and proceed as follows:

1. Install the cover over the instrument and secure it in place with the two cover holding screws.
2. Pass the set point adjustment knob through the access hole in the cover. **Note: If the cover does not have an access hole, one can be made by cutting away the first rib over the set point adjustment dial (see Fig. 7).**
3. Secure the set point adjustment knob in place with the knob holding screw.

Item

J: Dial and Cam

**T-4000-617, -618,
T-4752-619, -620,
T-4506-600, -601, -602, -603:**

To replace the dial and cam, refer to Fig. 1 and proceed as follows:

1. Remove the two cam assembly clips.
2. Remove the dial and cam assembly.
3. Install the new dial and cam assembly making sure that the output adjusting screw(s) rest on the cam.
4. Attach the new cam assembly clips. The clip with the pointer goes near the dial.
5. Proceed to **Operational Checkout**, page 7.

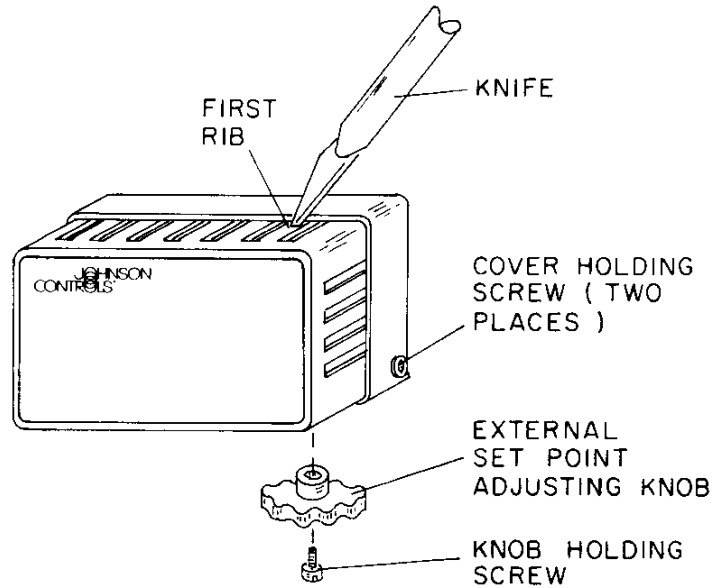


Fig. 7

Item

K: Dial Stop Pins

T-4002-5003:

When dial stop pins are used, a minimum span of 3F° for thermostats and 3% RH for humidistats can be set across the dial range. Using a needle nose pliers, insert the extrusion end of the stop pins into the holes molded in the dial (see Fig. 8). **Note:** On T-4100 series thermostats, the holes are molded directly in the body of the instrument (see Fig. 9).

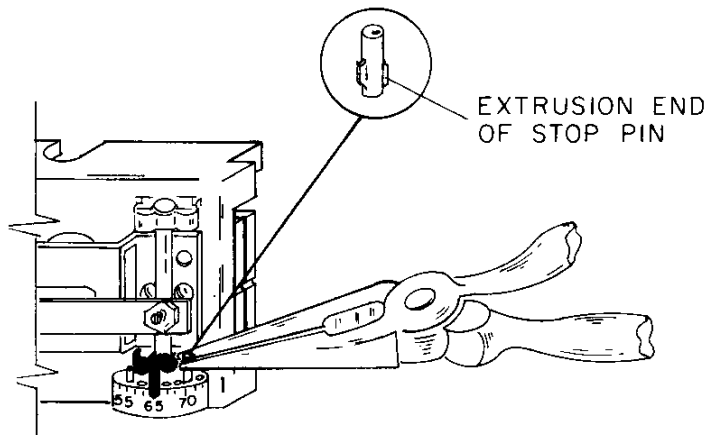


Fig. 8

Item

L: Set Point Identification Labels

T-4000-114:

Using a knife or similar tool, remove the desired set point identification label and attach it to the instrument as shown

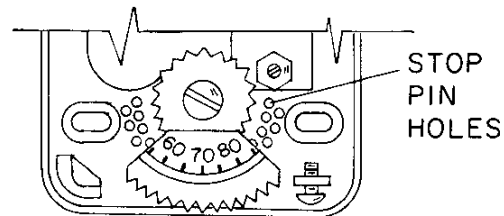


Fig. 9

in Fig. 10. **Note: Be sure that the mounting surface is clean before positioning the label.** These labels are designed to be attached to the cover faceplate, the set point dial, or the bimetal element. **Note: When attaching a label to an element, press lightly to avoid altering the factory calibration.**

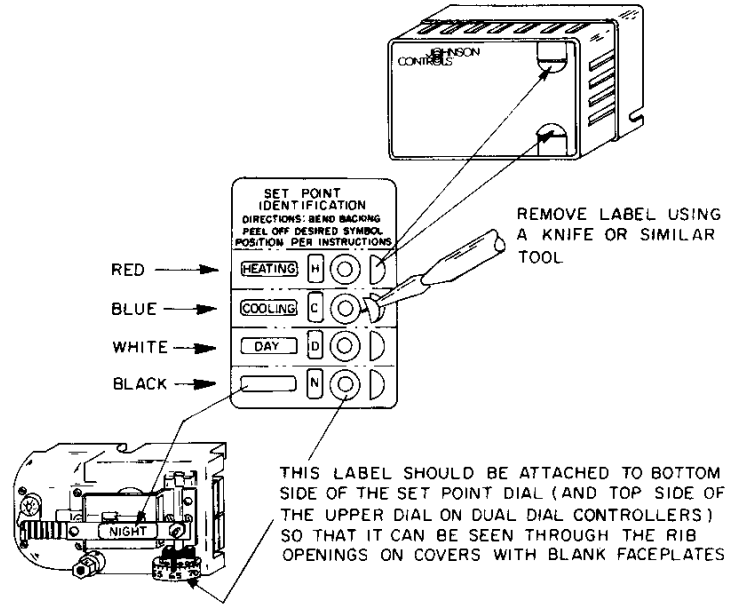


Fig. 10

Item M: Orifice Plate and Gaskets

T-4000-606, T-4502-631, T-4512-613:

To replace the orifice plate and gaskets, refer to Fig. 11 and proceed as follows:

1. Remove the instrument from the mounting bracket and disconnect the air lines.
2. Remove the two adapter plate holding screws and the adapter plate. On day-night instruments with indexing switches, be sure not to lose the ball and disc contained in the adapter plate. Retain these parts for reassembly. **Note: On older instruments where the rubber gaskets have become bonded to the body, it may be necessary to pry the adapter plate loose using a screwdriver.**
3. Remove and discard the old orifice plate and gaskets.
4. Check that the body surface is clean. If oil or corrosion is present, passageways inside the relay may be clogged and the instrument should be replaced.
5. Attach the inner orifice gasket "A" to the body.

"X" Indicates Parts Used

Controllers	Gasket "A"	Orifice Plate	Gasket "B"	Gasket "C"
T-4002	X	X	X	—
T-4003	X	X	X	—
T-4502, T-4504, T-4506 with Manual Index	X	X	—	X
T-4512, T-4514, T-4516 with Manual Index	X	X	—	X
T-4752	X	X	X	—
T-5002	X	X	X	—
H-4100	X	X	X	—
H-5100	X	X	X	—

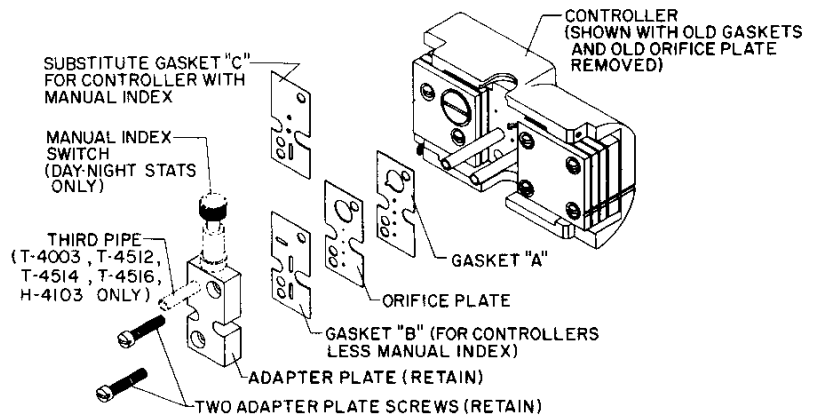


Fig. 11

6. Attach the orifice plate.
7. Attach the outer orifice gasket. On day-night instruments with an indexing switch, use gasket "C". On all other instruments, use gasket "B".
8. Attach the adapter plate and screws and tighten in place.
9. Proceed to **Operational Checkout**, page 7.

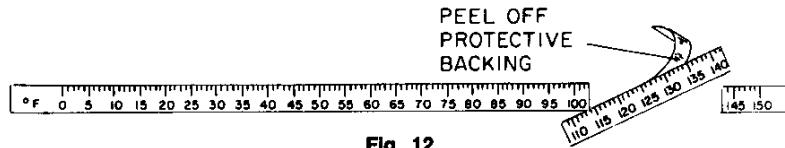


Fig. 12

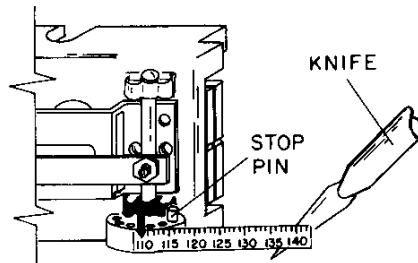


Fig. 13

Item

P: Stick-On Dial Strips

T-4506-100, -101, -102, -103, T-4000-115, -116, -117, -118:

Stick-on dial strips are used to change a thermostat from horizontal to vertical, Fahrenheit to Celsius, or vice versa. These strips can also be used to indicate a 30F° (16C°) set point span anywhere within the temperature limits of the thermostat. To attach the strip to a set point dial, proceed as follows:

1. Turn the set point dial clockwise until the stop pin keeps it from turning any further.
2. Cut out the portion of the dial strip that corresponds to the new set point, allowing a 15F° (8C°) span on either end. Example: If the set point is 125F, the span should be 110 to 140F° (see Fig. 12).
3. Using a knife or similar tool, peel off the protective backing on the dial strip.
4. Attach the dial strip to the set point dial, positioning the lowest number of the span over the lowest number on the dial. (see Fig. 13).

Note: Make sure

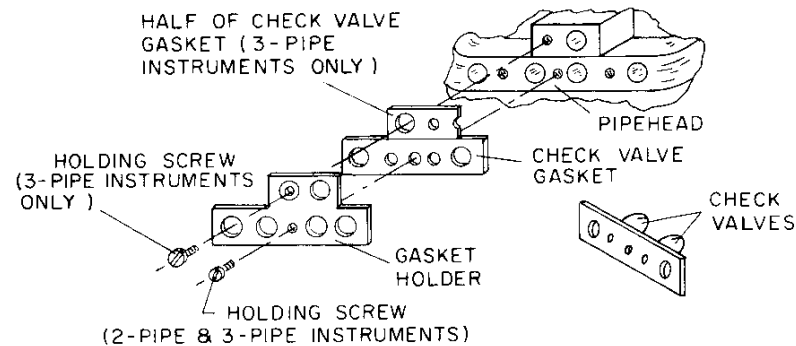


Fig. 14

the surface of the dial is clean before attaching the dial strip and avoid touching the sticky backing. Turn the dial counterclockwise while positioning the remainder of the dial strip.

5. Calibrate the instrument as described in Adjustment Data T-4000-B or the Operator's Manual.

were made to permanently installed pipeheads. These pipeheads featured a rubber check valve gasket which sealed the supply, control, and master or switchline when the instrument was disconnected. To replace an old or worn check valve, refer to Fig. 14 and proceed as follows:

1. Remove the instrument from the mounting bracket.
2. Remove the gasket holding screw. On 3-pipe instruments, retain the second screw for reassembly.
3. Remove and discard the old check valve gasket(s).
4. Install the new check valve gasket into the pipehead. **Note: For 3-pipe instruments,**

Item

Q: Gaskets, Holding Screws, and Holding Nuts

T-4002-625 (Pipehead Gasket and Holding Screw):

During the 1960's and early 1970's, air connections for the 4000 series controllers

cut a second gasket in half for the third pipe. For oldstyle T-4004 thermostats, use a whole gasket even though there is only one pipe.

M-4002-600 (Cover and/or Bracket Holding Nut): This self-locking nut is used on all aspirator wallbox, pipehead, and wall assemblies which require the attachment of a T-4002-6049 mounting bracket and/or an M-4002-1000 aspirator cover (ordered separately). To install the nut, bend the two sides outward just enough so that the nut can slide over the surface where it is required (see Fig. 15).

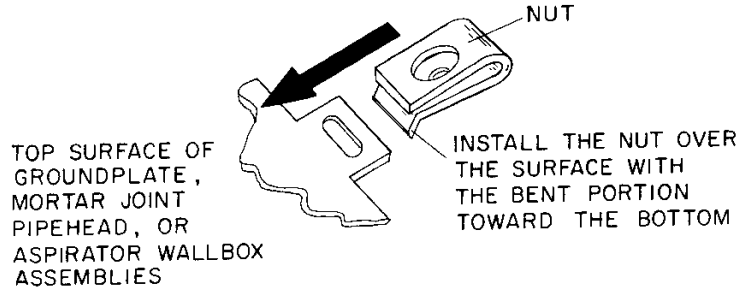


Fig. 15

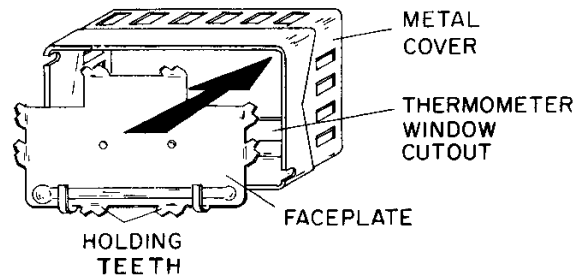


Fig. 16

Item

R: Mounting Brackets

T-4002-6049 (For Old-style Pipeheads):

This bracket is a replacement for older pipehead installations. Attach the bracket to the pipehead and secure it in place with the two furnished inner screws, allowing the controller terminals to make the proper connection with the pipehead gasket. The two remaining #6-32 x 1/2 in. flat head screws attach the mounting bracket snug against the surface of the wall via the clips on the groundplate, mortar joint pipehead, and/or aspirator wallbox assembly.

Note: Any 4000 series cover (except those manufactured between 1963 and 1966) and any 4000 series controller can be attached to the T-4002-6049 mounting bracket. Covers manufactured between 1963 and 1966 have the holding screw located on

the bottom of the cover.

These covers must be replaced with one of the newer versions (See Item U on the Table of Contents).

When installing a new 4000 series controller to an existing pipehead, the brass terminal connector on the controller must be extended to adapt it to the pipehead gasket. The extension should be 1/2 in. (13 mm) long, cut from a section of 5/32 in. O.D. x 3.32 in. I.D. polytubing (F-1000-324, field supplied).

T-4002-124:

This style of mounting bracket is used in conjunction with a snap-in two-pipe or three-pipe terminal connector. The bracket comes with two #4-40 x 1/4 in. hex instrument mounting screws and is marked with the direction for horizontal or vertical mounting.

Item

S: Thermometer/ Faceplate Assemblies (For Metal Covers)

T-4002-612 (Horizontal) and T-4002-613 (Vertical):

To replace an old or damaged thermometer/faceplate assembly, refer to Fig. 16 and proceed as follows:

1. Using a screwdriver and working from within the cover, bend the faceplate holding teeth back and remove the old thermometer/faceplate assembly.
2. Insert the new thermometer/faceplate assembly into the cover, making sure that the thermometer lines up with the cutout.
3. Press the assembly firmly in place and bend the faceplate holding teeth down with the screwdriver. **Note:** Be careful when working near the thermometer.

Item

T: Faceplates (For Plastic Covers)

T-4000-6138, -6139, -6140, -6141, -6142, -6144, -6145, -6146, T-4100-100, -101, -102, T-4756-6141, -6145, -6738, -6739:

Faceplates are used to change a cover from horizontal to vertical, to cover up an unwanted window or thermometer cutout, or to replace an existing faceplate.

Note: Faceplates with thermometer and dual window cutouts cannot be used on old-style 1-5/8 in. high plastic covers.

When replacing an existing faceplate (see Figs. 17 and 18), the new faceplate can be installed right over the old one provided that the old faceplate is not distorted in any way. If there are two faceplates already installed on the cover, it is suggested that one or both of the old faceplates be removed before installing the new faceplate. **Note: The surface where the new faceplate is being attached must be clean. Avoid touching the sticky backing of the new faceplate.** When the installation is complete, peel the protective film off the front of the faceplate.

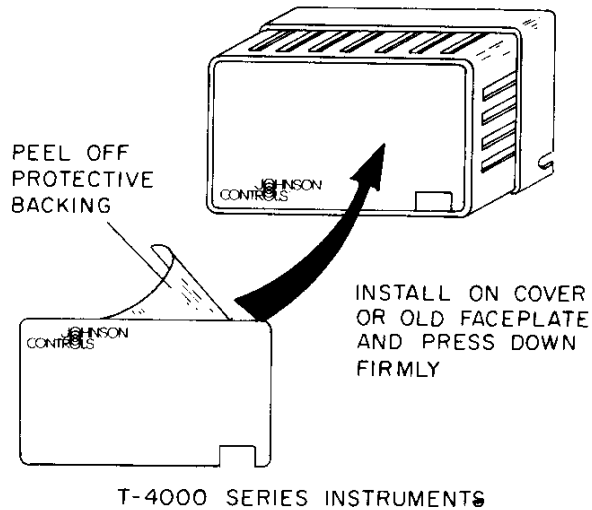


Fig. 17

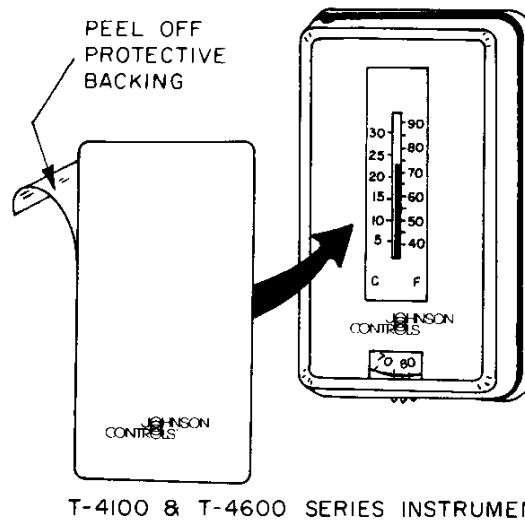


Fig. 18

Item

V: Terminal Connectors

T-4000-616, T-4002-122, -123, T-4512-100:

Terminal connectors are used in conjunction with a mounting bracket (T-4000-110 bracket for the T-4000-616 connector; T-4002-124 bracket for the T-4002-122 and -123 connectors), and provide a quick and easy method of connecting air lines to a 4000 series instrument. To upgrade an installation or replace an old terminal

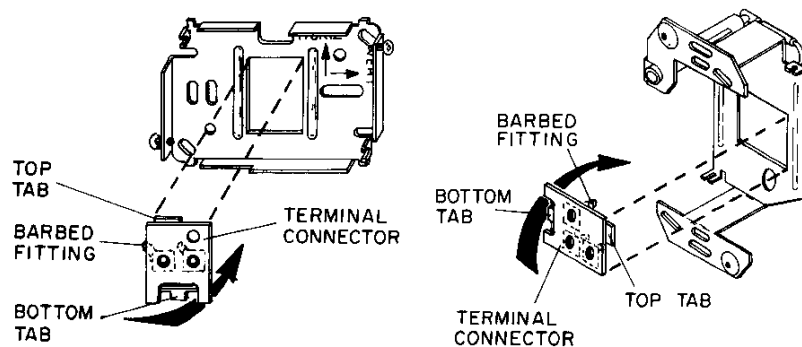


Fig. 19

connector, refer to Fig. 19 and proceed as follows:

1. Remove the old terminal connector from the mounting bracket. Working from the back side of the mounting bracket, push up on the bottom tab of the terminal connector through the hole in the mounting bracket.
2. Install the new terminal connector. Working from the front side of the mounting bracket, insert the top tab of the terminal connector through the hole in the mounting bracket and push on the terminal connector until it snaps into place. The barbed fittings should be facing outward.

The position of the barbed fittings can be changed to suit the application by sliding them out of their sockets, turning them to the desired position, and sliding them back into their sockets (see Fig. 20). **Note: Be careful not to lose the O-ring on the barbed fittings.**

Item

X: Restrictors

R-3710-1005:

This restrictor is designed to replace the O-ring, orifice, spacer, and filter on M-4002 aspirator assemblies. To install the R-3710-1005, refer to Fig. 21 and proceed as follows:

1. Remove the aspirator exhaust tube (turn counterclockwise).
2. Using an X-200-16 control port wrench (ordered separately) or a common 3/16 in. wrench, remove the

control port by turning it counterclockwise.

3. Remove and discard the O-ring, orifice, spacer, and filter.
4. Cut 3/16 in. (8 mm) off the end of the R-3710-1005 restrictor as shown in Fig. 21 and insert the restrictor into the base.
5. Attach the control port and tighten it in place using the wrench.
6. Attach the aspirator exhaust tube and tighten it in place.

R-3710-2005, -2007, -3005, -3007, -3105, -3107, -3205, -3207:

The R-3710 series in-line restrictors come in several styles and sizes to suit every application.

The red restrictors have a .005 in. orifice that, with a 20 psig (140 kPa) supply, will pass approximately 25 SCIM (6.8 mL/s) of air. These restrictors are used to keep the total air consumption of a system at a minimum and are best suited for applications where the control line is less than 10 ft. (3 m) long and only one actuator is being controlled.

The aqua restrictors have a .007 in. orifice that, with a 20 psig supply, will pass approximately 45 SCIM (12.3 mL/s) of air. These restrictors are used in applications where two actuators, longer control lines, and/or faster response times are required.

When replacing a restrictor, the tip of the tubing where the old restrictor was attached should be cut off. The supply air should enter the restrictor on the side where "X" is molded on the body. Push the tubing

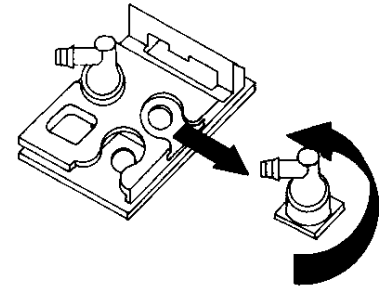


Fig. 20

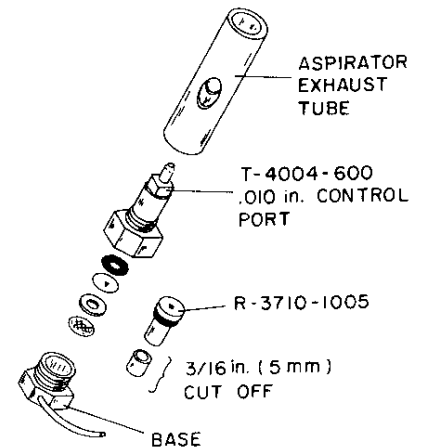


Fig. 21

onto the restrictor until it reaches the shoulder on the body. Check the connection for air leaks.

Item

Y: Aspirator Repair Kit

T-4000-622:

This kit is used to replace an aspirator, restrictor, and/or filter on T-4000-105, -106, and -110 aspirator wallbox assemblies. To install the parts contained in this kit, refer to Figs. 22 and 23 and proceed as follows:

1. Using an X-200-18 flexible Allen head screwdriver (ordered separately), remove the wallplate cover.
2. On T-4000-105 and -106 assemblies, remove the

two bracket holding screws and the instrument.

On T-4000-110 assemblies, remove the instrument first, then remove the two bracket holding screws.

3. Slide the aspirator out of the notch in the mounting bracket.
4. On T-4000-105 and -106 assemblies, remove and discard the aspirator, restrictor, filter, and tubing up to the tee fitting. Attach the T-4000-622 assembly to the tee fitting and slide the aspirator into the notch in the mounting bracket (see Fig. 22).

Note: The square lip on the aspirator should be in front of the notch in the mounting bracket.

On T-4000-110 assemblies, remove and discard the aspirator, restrictor, filter and tubing from the terminal connector. Attach the T-4000-622 assembly to the terminal connector and slide the aspirator into the notch in the mounting bracket (see Fig. 23). **Note: The square lip on the aspirator should be behind the notch in the mounting bracket.**

5. Calibrate the instrument as described in Adjustment Data T-4000-B or the Operator's Manual.
6. Reattach the instrument and mounting bracket to the wallbox.
7. Reattach the wallplate cover.

Item

Z: Aspirator Wallbox Retrofit Kit

T-4000-623:

This kit, in conjunction with a T-4000-111 or -112 wallplate

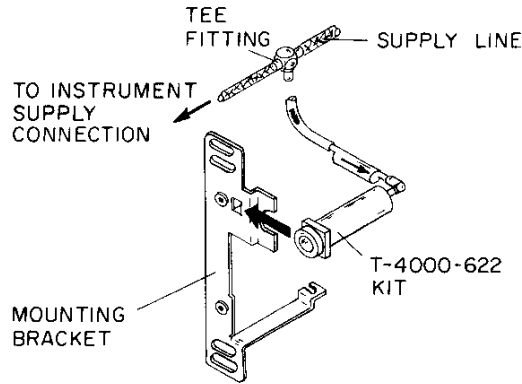


Fig. 22: T-4000-105 & 106 Assemblies

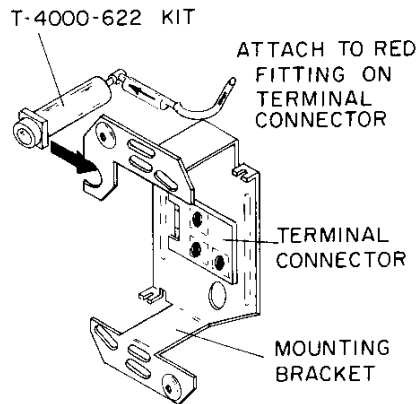


Fig. 23: T-4000-110 Assembly

cover, is used to upgrade old-style T-4000-105 or -106 installations or replace damaged parts on T-4000-110 installations. The parts in this kit are designed to fit into existing white or green plastic wallboxes.

Note: If the T-4000-105 or -106 installation was made inside a T-4000-104 metal rough-in box, the new T-4000-110 kit will not fit. To make the retrofit, refer to Fig. 24 and proceed as follows:

1. Using an X-200-18 flexible Allen head screwdriver (ordered separately), remove and discard the old wallplate cover.
2. Remove and discard the old instrument mounting bracket. Save the two #6 x 3/8 in. sheet metal screws for reassembly.

3. Remove the instrument from the mounting bracket.
4. Disconnect the supply tubing from the instrument and the control tubing at the tee fitting.
5. Cap the supply line.
6. Check the plastic wallbox for damage. If the wallbox is cracked, external temperature or humidity conditions may affect the actual temperature or humidity reading of the room. Tape over all holes and cracks in the wallbox or replace the entire assembly with a T-4000-110 aspirator wallbox kit.

7. Uncap the supply line and attach it to the red fitting on the terminal connector.
8. Attach the control line to the yellow fitting on the terminal connector.
9. Attach the room instrument to the new mounting bracket so that when properly secured, the aspirator will be in the upper left and the dial(s) will be in the lower left or lower left and right. The room instrument supply "S" and output "O" terminals simply plug into the terminal connector on the mounting bracket. Secure the room thermostat tight against the mounting bracket with the Allen head screws on the corners of the unit.

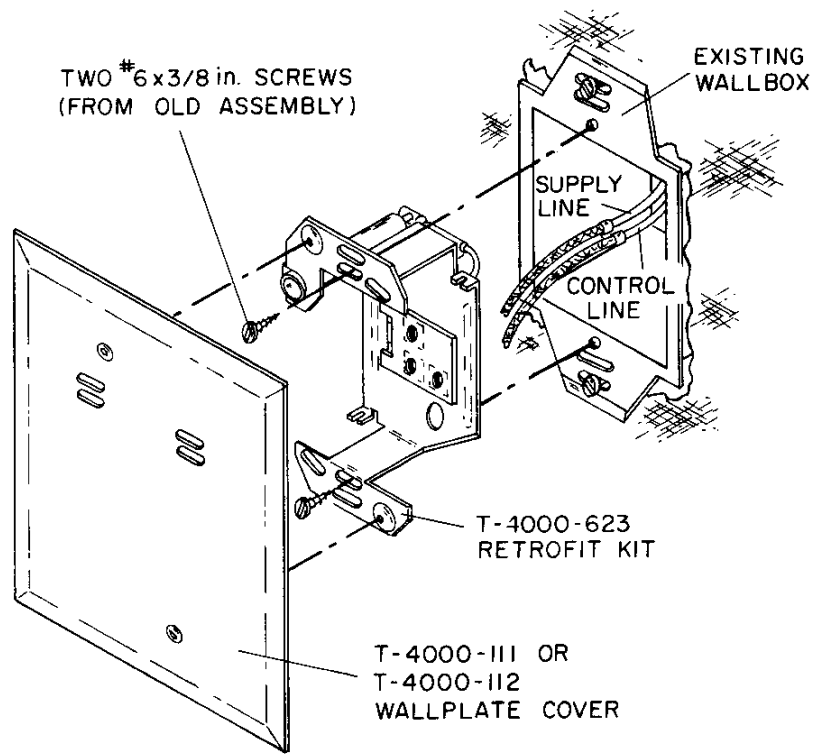


Fig. 24

10. Position the whole assembly into the wallbox. Secure the assembly with the two #6 x 3/8 in. sheet metal screws retained in step 2.

11. Using the X-200-18 flexible Allen head screwdriver, attach the wallplate cover (beige T-4000-111 or stainless steel T-4000-112) to the

Note: Make sure that the mounting bracket is aligned vertically with the wallbox.

mounting bracket by securing the wallplate mounting screws into the bracket threaded fasteners. **Note: Visually check that the aspirator lines up behind the aspirator exhaust slots. If not, remove the wallplate cover and reposition the aspirator.**

Notes

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