



SERVICE INSTRUCTIONS
M/P CONTROL STATIONS
External-Set Circuits
With Local Bias
(“A6” and “A68”)

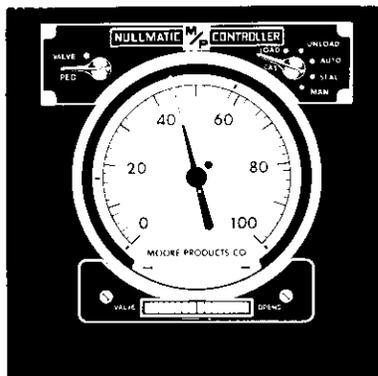


TABLE OF CONTENTS

GENERAL DESCRIPTION	2	PRE-STARTUP INSPECTION	12
MODEL DESIGNATION	2	STATION FUNCTIONAL TEST	15
SPECIFICATIONS	2	OPERATING INSTRUCTIONS	16
COMPONENT FUNCTION	2	MAINTENANCE	17
CIRCUIT FUNCTION	5	CALIBRATION	19
INSTALLATION	8	PARTS LISTS	

GENERAL DESCRIPTION

The Moore M/P External-Set Biasing Control Station monitors and controls one process variable. The station provides three modes of control: Manual, Local/Automatic, and Cascade (External-Set/Automatic with local bias). A switch at the front of the station is used to select the control mode. This switch also provides the means for bumpless transfer between control modes.

In Manual control, the process is controlled by an operator adjustable valve loading pressure. In Local/Automatic control, the process is controlled at a setpoint that is adjustable from the panel front. In Cascade control, the process is controlled at a setpoint that is generated outside of the station, with the station providing the means to bias the incoming setpoint.

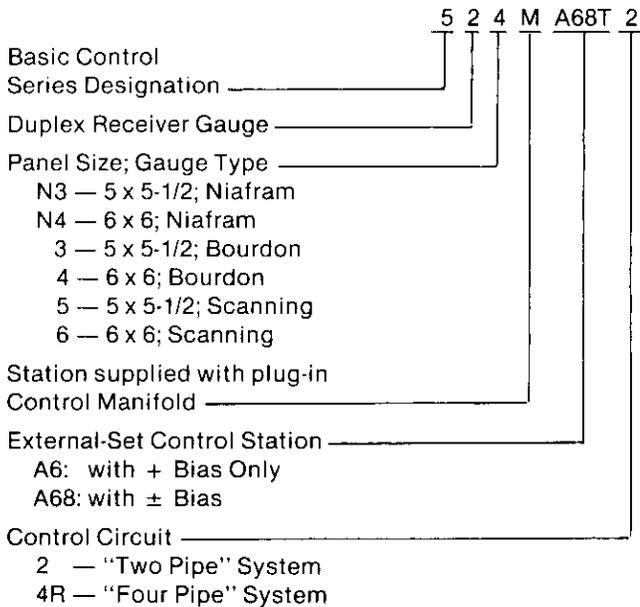
The station's readouts are: continuous display of the process, and selected display of the station output or the setpoint (local or locally biased).

The station's built-in Nullmatic Regulator provides the station output for Manual Control, and it provides the setpoint to the controller for Local/Automatic Control. The Regulator, in conjunction with the switching function of the station provides the bias to the External Setpoint for Cascade Control. A thumbwheel at the front of the station is used to adjust the regulator.

The station is available with a rear-mounted manifold block which permits a plug-in controller to be mounted directly on the back of the station.

The station is available in two panel sizes: 6" x 6" or 5" x 5-1/2". The station's duplex receiver gauge is available with either Bourdon tube or Niafram capsule elements. The Niafram gauge is also used in those stations that incorporate the scanning feature.

MODEL DESIGNATION



SPECIFICATIONS

Supply Pressure	20 psig normal; 18 psig minimum; 30 psig maximum
Operating Range	3 to 15 psig
Indicating Function	Duplex Receiver Gauge Black Pointer: Process Red Pointer: Setpoint or Valve Pressure Calibration Accuracy: ± 0.5% of span
Dimensions	
Model Series 523, 52N3, 525	Bezel: 5" x 5-1/2" Panel Cutout: 4-9/16" x 4-9/16"
Model Series 524, 52N4, 526	Bezel: 6" x 6" Panel Cutout: 5-7/16" W x 5-11/16" H
Mounting	Flush Panel: 1/8" to 3/4" thick
Ambient Temp. Limits	- 40°F to + 140°F (- 40°C to + 60°C)

COMPONENT FUNCTION

RECEIVER GAUGE

This 3 to 15 psig gauge displays the setpoint and process values. The gauge provides over 6-1/2" of scale length on the dial for the readouts.

The black pointer displays the process. The red, peripheral pointer displays the setpoint or valve pressure, depending upon the position of the Selector Switch.

PANEL SWITCHES

Each of the switches at the front of the panel operates a multi-cammed shaft in the Switch Block.

Transfer Switch

The Transfer Switch has six positions; it is used to select the station's control mode. The MAN, AUTO, and CAS positions select a control mode. The SEAL, LOAD, and UNLOAD positions provide the capability for bumpless switching between control modes. Switching procedures are outlined in the OPERATING INSTRUCTIONS section of this instruction.

Selector Switch

The Selector Switch has two positions; it determines which signal is displayed by the red gauge pointer. The REG position connects the regulator output to the red pointer. The VALVE position connects the station output to the red pointer.

THUMBWHEEL

The Thumbwheel is used to change the setting of the station's Regulator. It drives a belt which turns the regulator pulley. Moving the Thumbwheel to the right increases the regulator output; moving it to the left decreases the output.

The Valve Action Nameplate surrounds the Thumbwheel. This plate is reversible to indicate in which direction the Thumbwheel must be turned to open the control valve; refer to the INSTALLATION section for details.

REGULATOR/SWITCH BLOCK ASSEMBLY

Regulator Description

The station's Regulator is a Nullmatic Pressure Regulator which performs one of two functions, depending upon the station's control mode. In Manual control, it provides the station output. In Local/Automatic Control and Cascade Control, it provides the setpoint to the Controller.

In Local/Automatic or Manual Control, the regulator output depends on the Thumbwheel setting only. In Cascade Control, the regulator output depends on the

External Setpoint and the amount of bias added to it by the regulator.

Regulator Operation

A6 CIRCUITS (See Fig. 1) — The A6 control circuits utilize an air-loaded regulator that provides the capability of plus (+) bias only.

The regulator pulley turns the adjusting screw which loads the range spring. The combined forces due to the range spring and the input (External Setpoint) act on one side of the regulating diaphragm assembly. This diaphragm assembly incorporates a nozzle seat which acts on the pilot nozzle. The pilot nozzle/nozzle seat clearance is determined by the forces due to the range spring and External Setpoint in opposition to the force due to the output pressure (which acts on the opposite side of the diaphragm). A change in nozzle/seat clearance changes the nozzle back pressure (pilot air pressure). Pilot pressure acts on the booster diaphragm. The booster diaphragm section moves the pilot plunger to allow the output pressure to change. The output pressure will continue to change until the forces acting on the regulating diaphragm assembly are balanced.

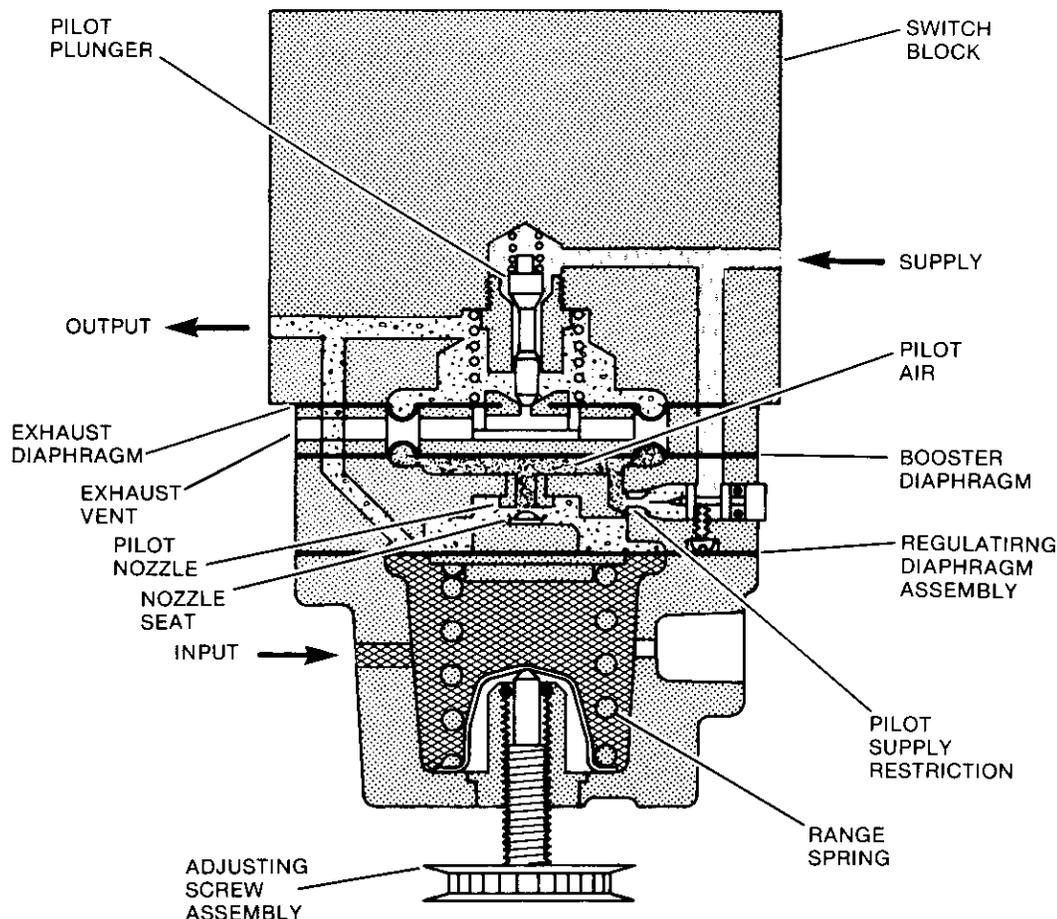


FIGURE 1 Air Loaded Regulator (A6 Circuits)

A68 CIRCUITS (See Fig. 2) — The A68 circuits utilize an air loaded regulator that provides the capability of plus and minus (\pm) bias to the External Setpoint.

The principle of operation for this regulator is essentially the same as that of the plus-bias only regulator. However, the force due to the output pressure and the force due to the bias spring oppose the External Setpoint and range spring. This allows the regulator to bias the External Setpoint by ± 12 psig.

Switch Block

The Switch Block routes pneumatic signals to and from the station's other components. It also serves as a base for the Regulator. In a station without a plug-in controller manifold, the Switch Block provides 1/8" N.P.T. ports for customer connections to the station.

The Switch Block contains two multi-cammed shafts that are operated by the switches at the front of the station. The shafts operate spring loaded plunger valves which open and close passages within the block.

Two plates and gaskets are located on the lower face of the Switch Block. The position of one gasket is reversible; as shipped, the Model Number suffix indicates the gasket position. The "T2" suffix indicates

that the station is to be used with a Model Series 50X-2, 50, or 509 Controller. The "T4R" suffix indicates that the station is to be used with a Model Series 561 or 569 Controller. A view of each of these gasket positions can be found in the INSTALLATION section.

CONTROLLER MANIFOLD BLOCK

The Controller Manifold Block is supplied with those stations that contain the letter "M" in the Model Number (see MODEL DESIGNATION). This block, however, can be added to the control station at any time.

The Controller Manifold Block routes pneumatic signals to and from the Controller and other station connections. The plug-in ports have self-sealing shut-offs. This allows for controller removal without interrupting the station output when in Manual control.

All external pneumatic connections are made at the Controller Manifold Block. The connections provided are 1/8" N.P.T.: Supply, Process, External Setpoint (Reg Load) and Output.

NULLMATIC CONTROLLER

The Controller provides the automatic control. It compares the process to the setpoint, and changes its

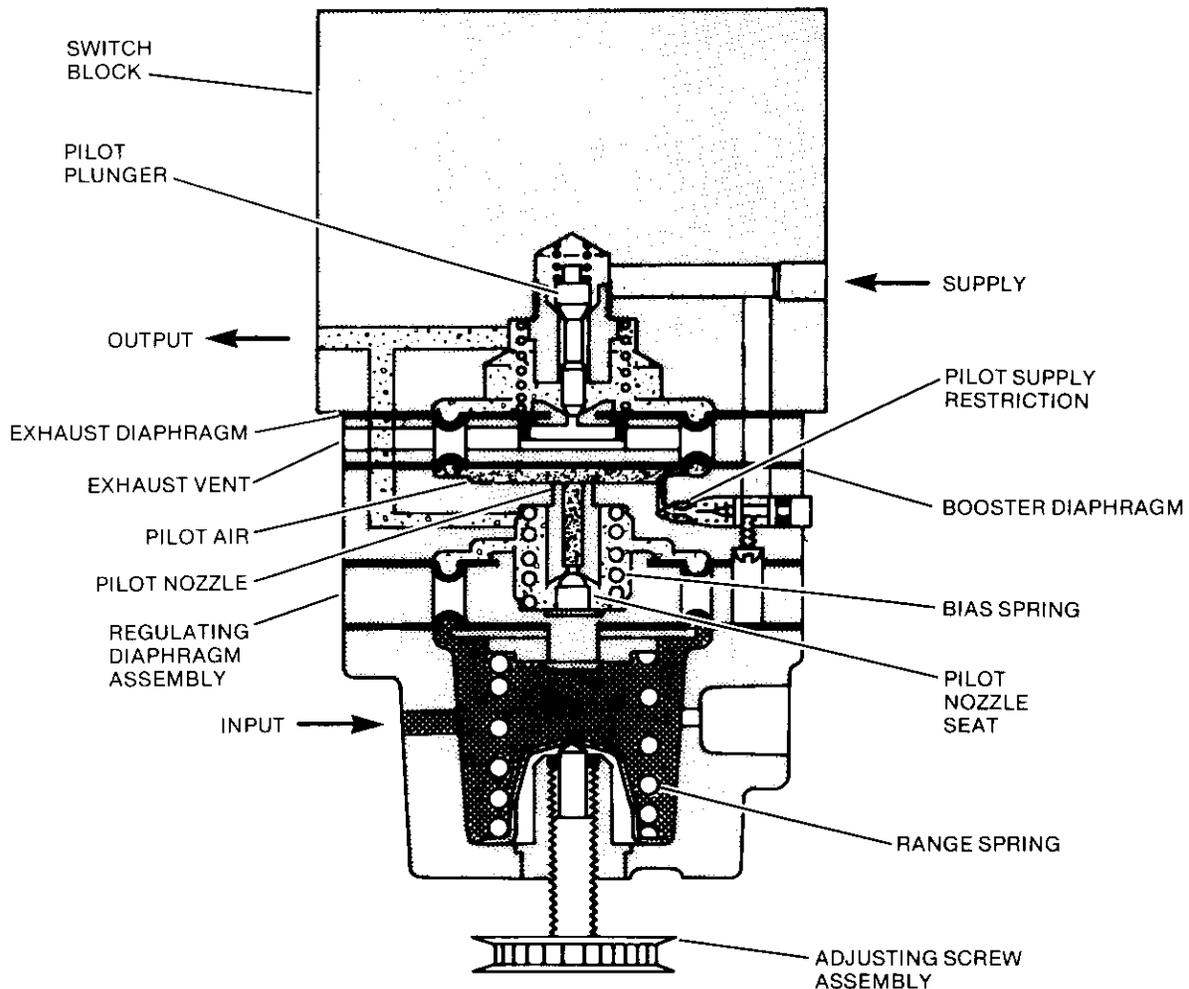


FIGURE 2 Biasing Regulator (A68) Circuits)

2. Blocks the External Setpoint (E) at the switch and vents the external setpoint loading from the Regulator (IN).
3. Connects the regulator output (O) to the station output (A) and the controller feedback (A).

The Thumbwheel is used to adjust the output.

Seal

The SEAL position of the Transfer Switch provides the means for bumpless Transfer between Manual and Local/Automatic Control. The SEAL position traps the pressure in the station output line to hold the control valve at its last position. The switching circuit accomplishes the following:

1. Blocks the controller output (B) from the station output (A) and the controller feedback (A).
2. Blocks the regulator output (O) from the station output (A) and the controller feedback (A).
3. Blocks the external setpoint (E) at the switch and vents the external setpoint loading from the Regulator (IN).

Before switching to Local/Automatic, the Thumbwheel is adjusted until the setpoint matches the process. When these are matched, the blocked controller output (B) equals feedback (trapped station output pressure). The Controller is thus balanced, ready to take over control of the process, with its output equal to the last, manually set, station output pressure.

Local/Automatic

The AUTO position of the Transfer Switch allows the Regulator to be used to adjust the setpoint to the controller; the Controller provides the station output. The switching circuit accomplishes the following:

1. Blocks the regulator output (O) from the station output (A) and the controller feedback (A).
2. Blocks the external setpoint (E) at the switch, and vents the external setpoint loading from the Regulator (IN).
3. Connects the controller output (B) to the station output (A) and the controller feedback (A).

The Thumbwheel is used to adjust the setpoint to the Controller. The Controller compares process to setpoint, and changes its output, as required, to make the process match the setpoint.

Unload

The UNLOAD position of the Transfer Switch provides the same circuit as the SEAL position. It provides the means for bumpless transfer when switching from Cascade to Local/Automatic Control.

By venting the External Setpoint (E) from the regulator, the regulator is prepared for its function in Local/Automatic Control. In Local/Automatic, the Regulator must be independent of the External Setpoint.

Before switching to Local/Automatic, the Thumbwheel is adjusted until the setpoint matches the process. When these are matched, the blocked controller output (B) equals feedback (trapped station output pressure). The Controller is thus balanced, ready to take over control of the process, with its output equal to the trapped station output pressure.

Load

The LOAD position of the Transfer Switch provides the means for bumpless transfer when switching from Local/Automatic to Cascade Control. The LOAD position's function is similar to the SEAL position, since it traps the pressure in the station output line. Additionally, it prepares the Regulator for its biasing function before switching to Cascade Control. The switching circuit accomplishes the following:

1. Blocks the controller output (B) from the station output (A) and the controller feedback (A).
2. Blocks the regulator output (O) from the station output (A) and the controller feedback (A).
3. Connects the External Setpoint (E) to the Regulator (IN).

Before switching to Cascade Control, the Thumbwheel is adjusted until the setpoint matches the process. When these are matched, the blocked controller output (B) equals feedback (trapped station output pressure). The Controller is thus balanced, ready to take over control of the process with its output equal to the trapped station output pressure.

Cascade

The CAS position of the Transfer Switch allows the Regulator to bias the External Setpoint. This biased setpoint is the Controller's setpoint, and the controller output is the station output. The CAS position accomplishes the following:

1. Blocks the regulator output (O) from the station output (A) and from the controller feedback (A).
2. Connects the External Setpoint (E) to the regulator (IN).
3. Connects the controller output (B) to the station output (A) and the controller feedback (A).

The Thumbwheel is used to adjust the amount of bias which is to be applied to the external setpoint. The Controller compares the process to the biased setpoint, and changes its output, as required, to make the process match the setpoint.

T4R CIRCUIT

General

Figure 4 is a schematic of the T4R circuit. The T4R Circuit requires use of a Model Series 561 or 569 Controller.

The following are common applications of the T4R circuit:

1. When a field mounted controller is required to reduce the effect of transmission lag.
2. When the process has long time constants, the T4R circuit will facilitate bumpless transfer between control modes.

Model Series 561 and 569 Controllers have a built-in relay. When supply pressure is applied to the Controller's relay operating connection (B), the relay performs the following:

1. Cuts off the controller output within the Controller.
2. Opens a by-pass around the Controller's reset needle valve. This permits the feedback to appear

instantly in the Controller's reset reference chamber. The time constant which is due to the reset needle valve is eliminated.

The Controller's relay is operated when the Transfer Switch is in the MAN, SEAL, LOAD, and UNLOAD positions. When changing control modes, the switching circuit allows the operator to match the setpoint to the process. When these are matched, the controller output equals feedback (trapped station output pressure). This provides for bumpless transfer between control modes.

Manual

The MAN position of the Transfer Switch allows the Regulator to provide the station output. The switching circuit accomplishes the following:

1. Applies supply pressure to the Controller's relay operating connection (B). This isolates the controller output from the station output (A).
2. Blocks the External Setpoint (E) at the switch and vents the external setpoint loading from the Regulator (IN).

3. Connects the regulator output (O) to the station output (A) and the controller feedback.

The Thumbwheel is used to adjust the output.

Seal

The SEAL position of the Transfer Switch provides the means for bumpless Transfer between Manual and Local/Automatic control. The SEAL position traps the pressure in the station output line to hold the control valve at its last position. The switching circuit accomplishes the following:

1. Applies supply pressure to the Controller's relay operating connection (B). This isolates the controller output from the station output (A).
2. Blocks the regulator output (O) from the station output (A) and the controller feedback.
3. Blocks the External Setpoint (E) at the switch and vents the external setpoint loading from the Regulator (IN).

Before switching to Local/Automatic, the Thumbwheel is adjusted until the setpoint matches the process.

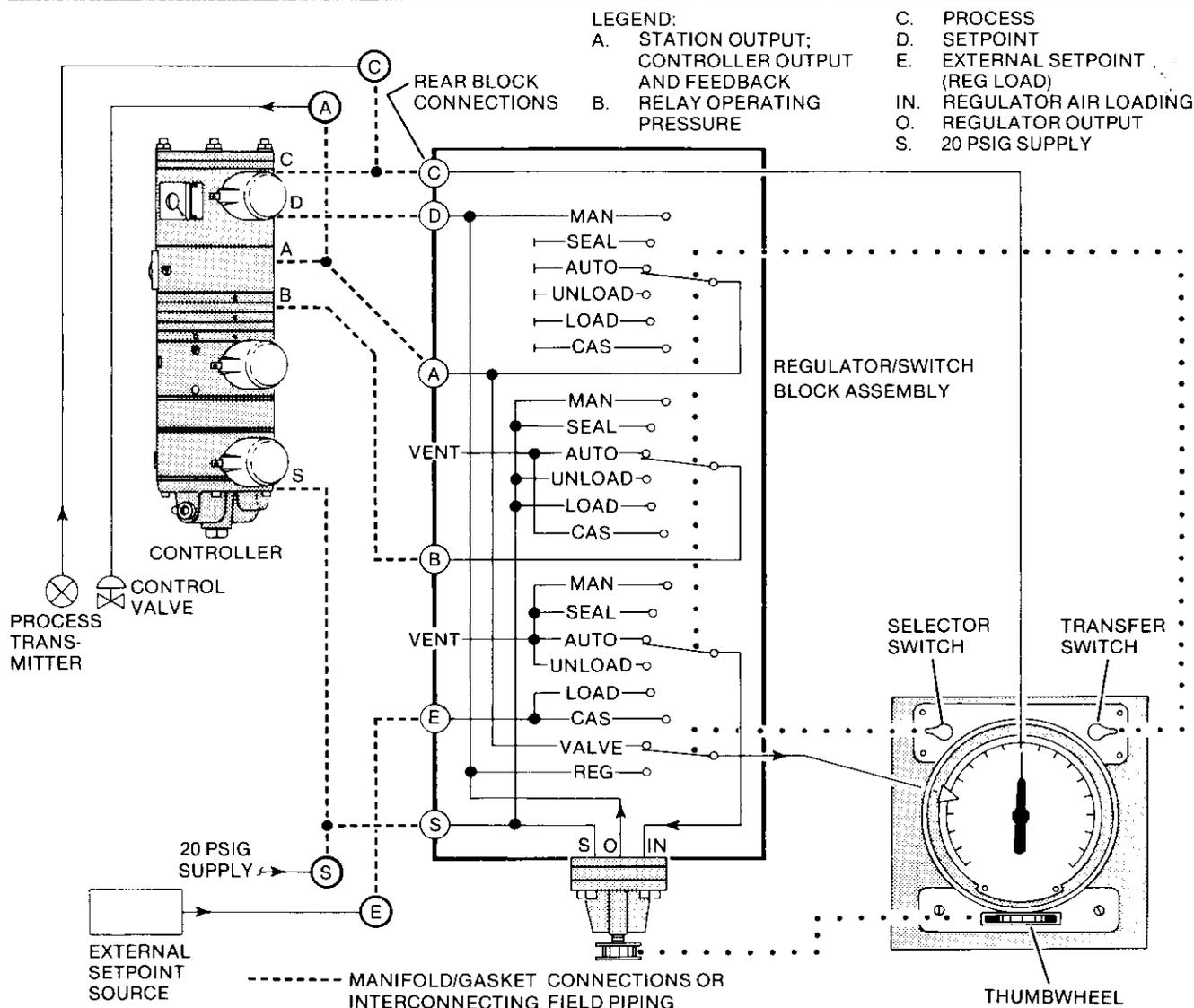


FIGURE 4 T4R Circuit Diagram

When these are matched, the blocked controller output equals feedback (trapped station output pressure). The Controller is thus balanced, ready to take over control of the process, with its output equal to the last, manually set, station output pressure.

Local/Automatic

The AUTO position of the Transfer Switch allows the Regulator to be used to adjust the setpoint to the Controller; the Controller provides the station output. The switching circuit accomplishes the following:

1. Blocks the regulator output (O) from the station output (A) and the controller feedback.
2. Blocks the External Setpoint (E) at the switch, and vents the external setpoint loading from the regulator (IN).
3. Vents supply pressure from the Controller's relay operating connection (B). This connects the controller output to the station output (A).

The Thumbwheel is used to adjust the setpoint to the Controller. The Controller compares process to setpoint, and changes its output, as required, to make the process match the setpoint.

Unload

The UNLOAD position of the Transfer Switch provides the same circuit as the SEAL position. It provides the means for bumpless transfer when switching from Cascade to Local/Automatic Control.

By venting the External Setpoint (E) from the Regulator, the Regulator is prepared for its function in Local/Automatic Control. In Local/Automatic, the Regulator must be independent of the external setpoint.

Before switching to Local/Automatic, the Thumbwheel is adjusted until the setpoint matches the process. When these are matched, the blocked controller output equals feedback (trapped station output pressure). The Controller is thus balanced, ready to take over control of the process, with its output equal to the trapped station output pressure.

Load

The LOAD position of the Transfer Switch provides the means for bumpless transfer when switching from Local/Automatic to Cascade Control. The LOAD position's function is similar to the SEAL position, since it traps the pressure in the station output line. Additionally, it prepares the Regulator for its biasing function before switching to Cascade Control. The switching circuit accomplishes the following:

1. Applies supply pressure to the Controller's relay operating connection (B). This isolates the controller output from the station output (A).
2. Blocks the regulator output (O) from the station output (A) and the controller feedback.
3. Connects the External Setpoint (E) to the regulator (IN).

Before switching to Cascade Control, the Thumbwheel is adjusted until the setpoint matches the process. When these are matched, the blocked controller output equals feedback (trapped station output pressure). The Controller is thus balanced, ready to take over control

of the process with its output equal to the trapped station output pressure.

Cascade

The CAS position of the Transfer Switch allows the Regulator to bias the external setpoint. This biased setpoint is the Controller's setpoint, and the controller output is the station output. The CAS position accomplishes the following:

1. Blocks the regulator output (O) from the station output (A) and from the controller feedback.
2. Connects the External Setpoint (E) to the Regulator (IN).
3. Vents supply pressure from the Controller's relay operating connection (B). This connects the controller output to the station output (A).

The Thumbwheel is used to adjust the amount of bias which is to be applied to the external setpoint. The Controller compares the process to the biased setpoint, and changes its output, as required, to make the process match the setpoint.

INSTALLATION

STATION AND CONTROLLER CONSIDERATIONS

General

The station can be used in either the T2 or T4R circuit. The T2 circuit is used in conjunction with a Model Series 50, 50X-2, or 509 Nullmatic Controller. The T4R circuit is used with a Model Series 561 or 569 Nullmatic Controller.

Field Mounted Controller

A field mounted controller is recommended only when the controller is to be located at a considerable distance from the station, and is closer to the valve than to the station. The term "Field Mounted Controller" does, however, describe any controller that is not plugged into the Controller Manifold Block at the rear of the station.

A Model Series 561 or 569 Controller is recommended for this application; the controller output is transmitted directly to the control valve.

Model Series 50, 50X-2 and 509 should not be used for this application. Their output transmission distance is doubled, since the output must be piped through the station and back to the valve.

External Relays

When external relay circuits (e.g., valve limit or anti-windup devices) are used in conjunction with a Model Series 561 or 569 controller, the controller must be altered for external feedback. Refer to the applicable controller Service Instructions for details, and pipe the feedback signal to the controller's "EXT. FEEDBACK" port.

Model Series 50 and 509 Controllers can be field mounted if external relays are used; no special steps need be taken. If the Controller is to be station mounted, however, a Manifold Block with a separate controller feedback connection must be used; specify Part No. 8878-47.

For additional information concerning reset feedback requirements, use of external relay circuits, and typical applications, request Bulletin AD50-7.

MOUNTING CONSIDERATIONS

The station is intended for mounting in a single cutout.

The mounting clamp will accommodate panel thicknesses from 1/8" to 3/4".

MOUNTING DIMENSIONS

General

Panel cutout dimensions for a single station are shown in Figure 5.

Overall dimensions of the station are shown in Figure 6.

Vertically Mounted Controllers

Figure 7 shows the recommended minimum spacing between cutout centers for stations with vertically mounted controllers.

Angle Mounted Controllers

Maximum panel density (with station mounted controllers) can be achieved when the stations are equipped with an Adapter Block Kit, Part No. 7915-131. This kit is used to mount the Controller at a 45° angle. Figure 8 shows the recommended minimum spacing between cutout centers when using angle mounted controllers.

MOUNTING INSTRUCTIONS

1. Loosen the mounting clamp.
2. Insert the station into the panel cutout.
3. Partially tighten the mounting clamp.
4. Square the station with the panel.
5. Square the mounting clamp with the panel.
6. Alternately tighten the mounting clamp screws until the station is secured to the panel.

SUPPLY AIR REQUIREMENTS

Air Quality

The station should be connected to a source of clean, dry, oil-free, instrument air. Failure to do so will increase the possibility of a malfunction or a deviation from the specified performance.

The requirements for a quality air supply can be found in the Instrument Society of America's "Quality Standard for Instrument Air" (ISA-S7.3). Basically, this standard calls for the following:

1. Particle Size — The maximum particle size in the air stream at the instrument should be no larger than 3 microns.

2. Dew Point — The dew point, at line pressure, should be at least 18°F (10°C) below the minimum temperature to which any part of the instrument air system is exposed, at any season of the year. Under no circumstances should the dew point, at line pressure, exceed 35.6°F (2°C).
3. Oil Content — The maximum total oil or hydrocarbon content, exclusive of noncondensibles, should not exceed 1 ppm under normal operating conditions.

CAUTION

Synthetic compressor lubricants in the air stream at the instrument may cause the station to fail.

There are many types of synthetic lubricants. Some may not be compatible with the materials used in construction of the station. Wetting of these materials by such an oil mist or oil vapor, etc., may cause them to deteriorate. This may ultimately result in failure of the station. The following materials are in contact with the instrument air: Aluminum, Bakelite, Brass, Buna-N, Cadmium Plated Steel, Corprene, Delrin, Neoprene, Ni-Span C, Phosphor Bronze, Polyurethane, Stainless Steel, Vinyl, and Zinc.

Supply Pressure

The recommended supply pressure is 20 psig (18 psig min.; 30 psig max.).

CAUTION

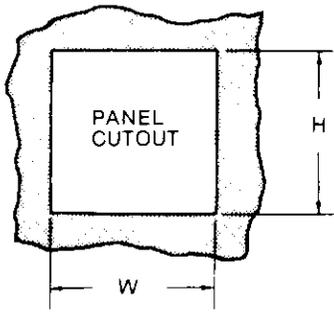
Supply pressure in excess of 100 psig can cause damage.

PNEUMATIC CONNECTIONS

1. All pipe connections at the rear of the station are 1/8" N.P.T. (see Fig. 6).
2. 1/4" O.D. tubing is recommended for piping to the station.
3. Use pipe sealant sparingly, and then only on the male threads. A non-hardening sealant is strongly recommended.

CAUTION

Input pressure in excess of 45 psig may cause damage. Input pressures in excess of 30 psig can cause a calibration shift.

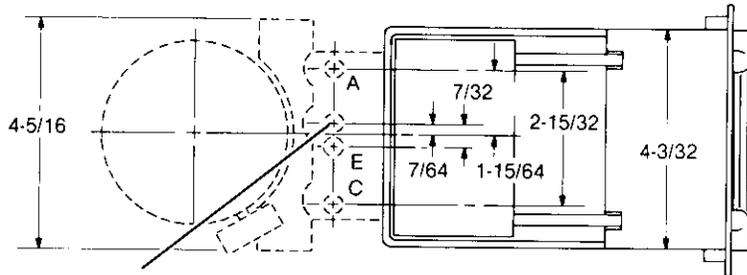


MODEL SERIES	W	H
523 52N3 525	4-9/16	4-9/16
	See Note 1	
524 52N4 526	5-7/16	5-11/16
	See Note 2	

NOTES:

1. THE STATION'S ADAPTER CLIPS, PART NO. 7915-3, CAN BE REPOSITIONED TO ACCOMMODATE A PANEL CUTOUT OF:
 W = 4-5/32
 H = 5-1/32
2. AN ADAPTER BEZEL, PART NO. 12997-4, IS AVAILABLE TO MOUNT THE STATION IN A 6" X 6" CUTOUT.

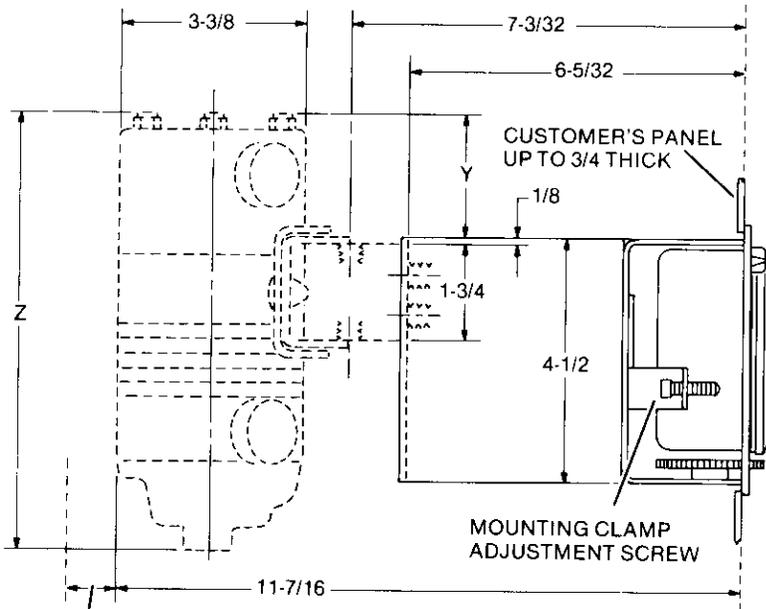
FIGURE 5 Panel Cutout



SUPPLY CONNECTION "S" ON BOTTOM OF MANIFOLD BLOCK

CONTROLLER MODEL SERIES	DIMENSION	
	Y	Z
50M	2-3/8	8-1/8
50MX-2	5/8	6-3/8
509M	2-7/16	11-1/16
509MH	2-3/8	11-7/16
561M	3-3/16	8-15/16
569M	3-3/16	11-13/16
569MH	3-1/4	12-5/16

CONTROL STATION MODEL SERIES	A	B
523 52N3 525	5-1/2	5
524 52N4 526	6	6

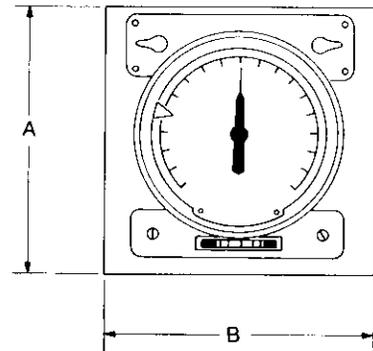
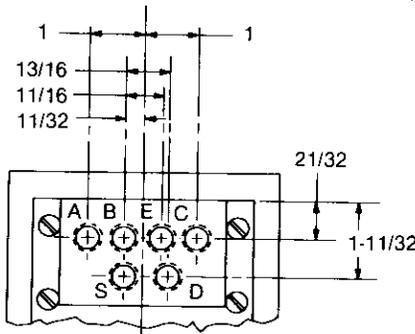


CUSTOMER'S PANEL UP TO 3/4 THICK

MOUNTING CLAMP ADJUSTMENT SCREW

7/8 REQUIRED TO REMOVE CONTROLLER

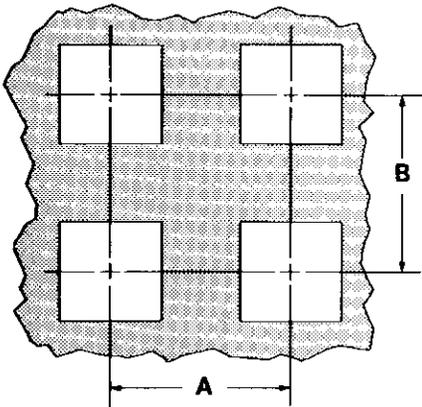
REAR VIEW OF STATION WITHOUT PLUG-IN CONTROLLER MANIFOLD



PNEUMATIC CONNECTIONS

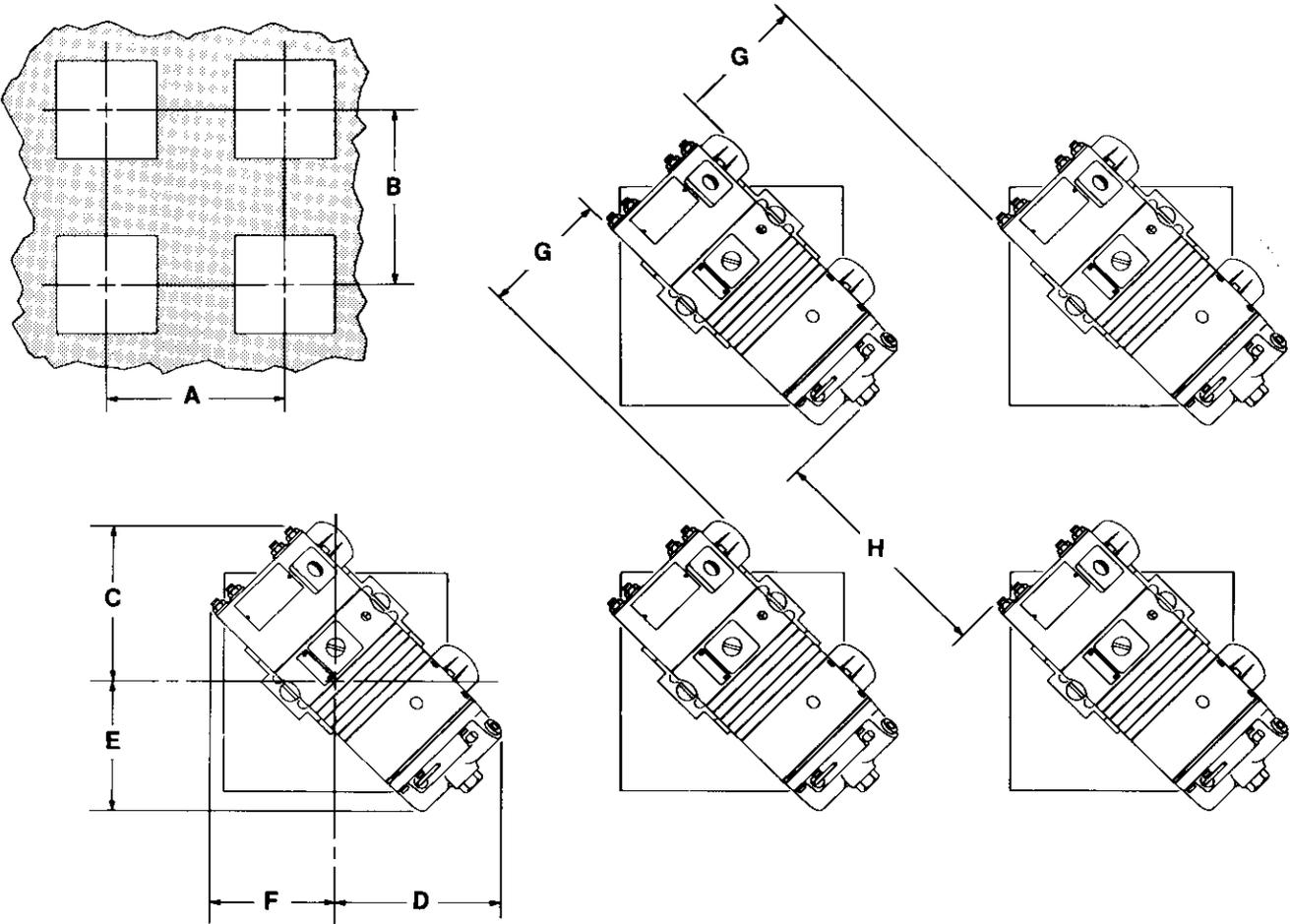
- A STATION OUTPUT — "VALVE"
(CONTROLLER FEEDBACK - T2)
(CONTROLLER OUTPUT/FEEDBACK - T4R)
- B CONTROLLER OUTPUT - T2
RELAY OPERATING PRESSURE - T4R
- C PROCESS
- D SETPOINT
- E EXTERNAL SETPOINT - "REG LOAD"
- S SUPPLY

FIGURE 6 Installation Dimensions



CONTROLLER MODEL SERIES	CONTROL STATION MODEL SERIES			
	523; 52N3; 525		524; 52N4; 526	
	A	B	A	B
50M	6	9-1/8	7	9-1/8
50MX-2	6	7-3/8	7	7-3/8
509M	6	12	7	12
509MH	6	12-1/2	7	12-1/2
561M	6	10	7	10
569M	6	12-3/4	7	12-3/4
569MH	6	13-3/8	7	13-3/8
NONE	6	6-1/2	7	7

FIGURE 7 Minimum Spacing for Stations with Vertically Mounted Controllers



CONTROLLER MODEL SERIES	DIMENSION (INCHES)							
	A	B	C	D	E	F	G	H
50M	7	7	4-3/4	4-5/16	2-3/4	3-3/8	1-1/2	1-7/8
50MX-2	7	7	3-5/8	4-5/16	2-3/4	—	1-1/2	3-5/8
509M	8-1/2	8-1/2	4-3/4	6-9/16	4-15/16	3-7/16	2-5/8	15/16
509MH	8-3/4	8-3/4	4-3/4	6-13/16	5-3/16	3-3/8	2-13/16	15/16
561M	7	7	5-5/16	4-7/16	2-7/8	3-15/16	1-1/2	15/16
569M	9	9	5-5/16	6-9/16	4-15/16	4	2-15/16	7/8
569MH	9-1/2	9-1/2	5-5/16	6-13/16	5-3/16	4	3-3/8	1-1/8

FIGURE 8 Minimum Spacing for Stations with Angle Mounted Controllers

PIPING DIAGRAMS

Station Mounted Controllers

Figure 9 shows the typical piping arrangements when using a station mounted controller. Note that when an external relay circuit is used with a Model Series 50 or 509 Controller, the station must be equipped with a Part No. 8878-47 Manifold Block.

Field Mounted Controllers

Figure 10 shows the typical piping arrangements when using a field mounted controller.

PNEUMATIC ALIGNMENT

Controller Reversing Plate

The controller reversing plate must be set to give the valve action required by the control system. Controllers are set for reverse action as shipped from the factory.

The INCREASE INPUT/DECREASE OUTPUT (reverse action) position causes the controller output to decrease when the process variable increases. The INCREASE INPUT/INCREASE OUTPUT (direct action) position causes the controller output to increase when the process variable increases.

To change the action, loosen the reversing plate screw and turn the plate so that the arrow points to the action desired.

Valve Action Nameplate

The Valve Action Nameplate surrounds the Thumb-wheel; it is reversible. Each side is printed with the legend VALVE OPENS and an arrow. The plate is secured to the panel with two screws.

As shipped from the factory, the plate is positioned so that the arrow pointing to the right is exposed. This position is used if the control valve is air-to-open. If the control valve is air-to-close, turn the plate over so that the arrow points left.

Circuit Gasket

Two plates and gaskets are located on the lower face of the Switch Block. The position of the Circuit Gasket

depends on the control circuit (and thus the type of controller) to be used.

One corner of the gasket is cut away. When the gasket is placed on the block, the "2" or "4R" designation is exposed. Figure 11 illustrates the two gasket positions.

The gasket must be positioned to expose the "2" if the controller does not have a built-in cut-off and bypass relay (i.e., Model Series 50, 50X-2, or 509). The gasket must be positioned to expose the "4R" if the Controller does have the built-in relay (i.e., Model Series 561 or 569).

NOTE

As shipped from the factory, the gasket is positioned according to the Model Number suffix (e.g., 524A68T2 or 524A68T4R).

PRE-STARTUP INSPECTION

The following items should be checked before starting the process:

1. All tubing must be connected to the proper ports.
2. Leak test all fittings and tube connections. Repair all leaks.
3. Verify that the Controller's reversing plate is set to give the required valve action.
4. Verify that the Valve Action Nameplate is properly positioned.
5. Verify that the Circuit Gasket on the switch block is properly positioned.

In addition to the preceding items, it is always a good practice to check the gauge and Controller calibrations after the station is installed.

A more thorough checkout is detained in the next section, STATION FUNCTIONAL TEST.

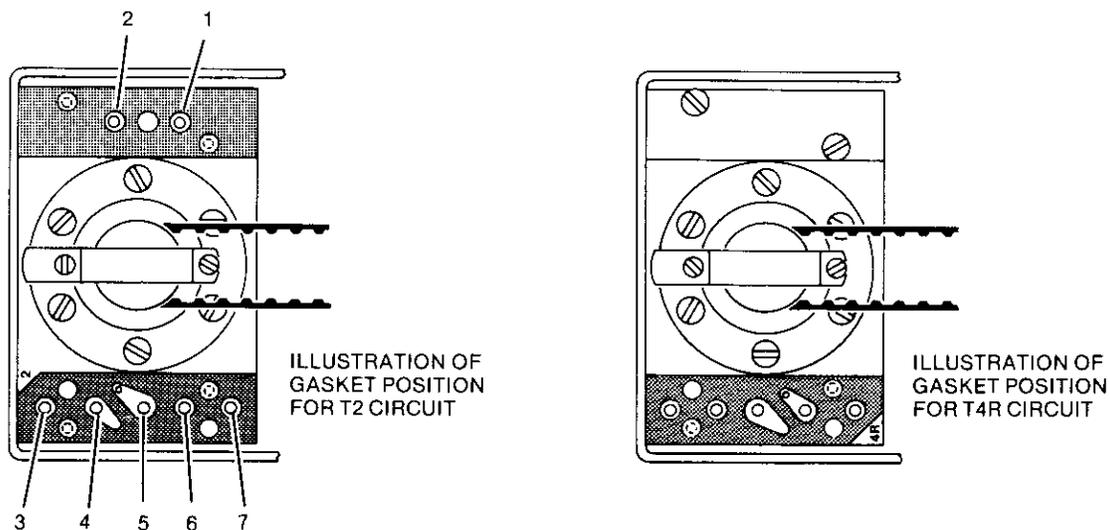


FIGURE 11 Circuit Gasket

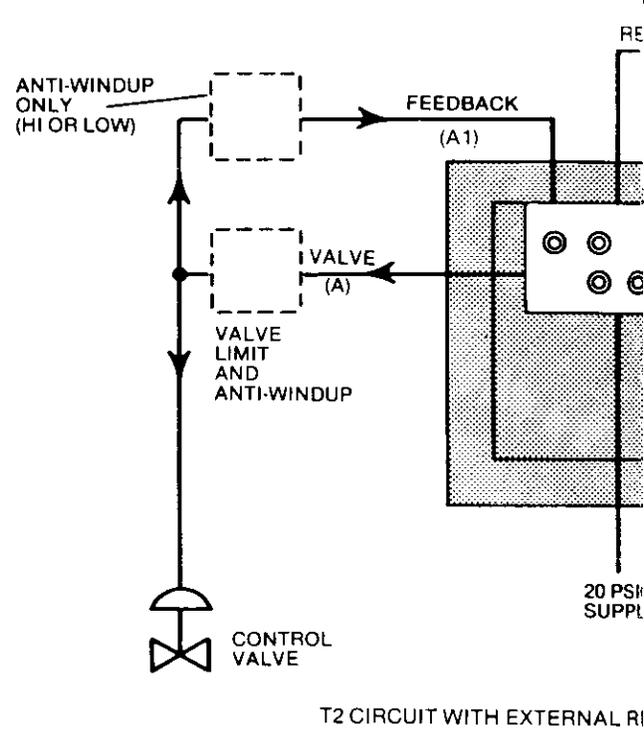
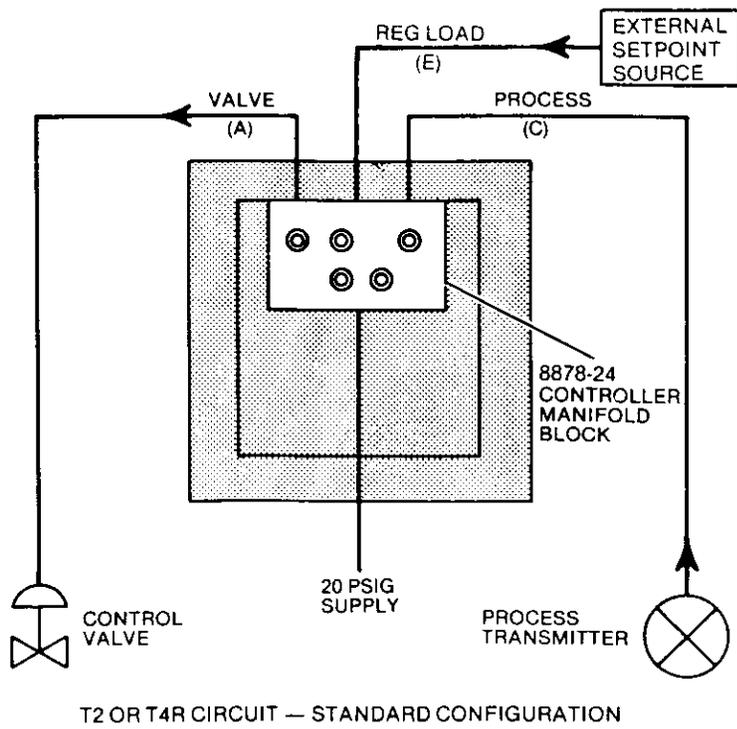


FIGURE 9 Piping Diagrams - Station Mounted Controllers

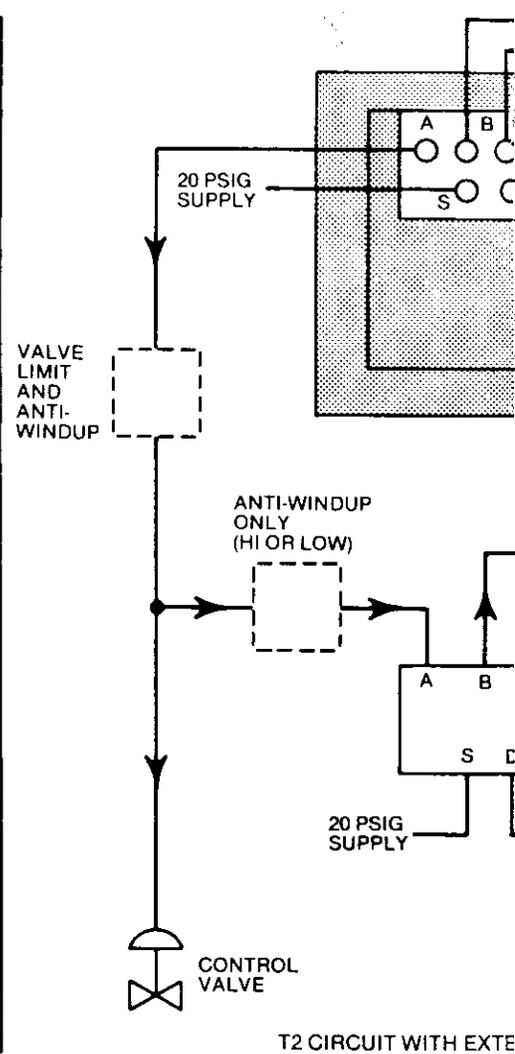
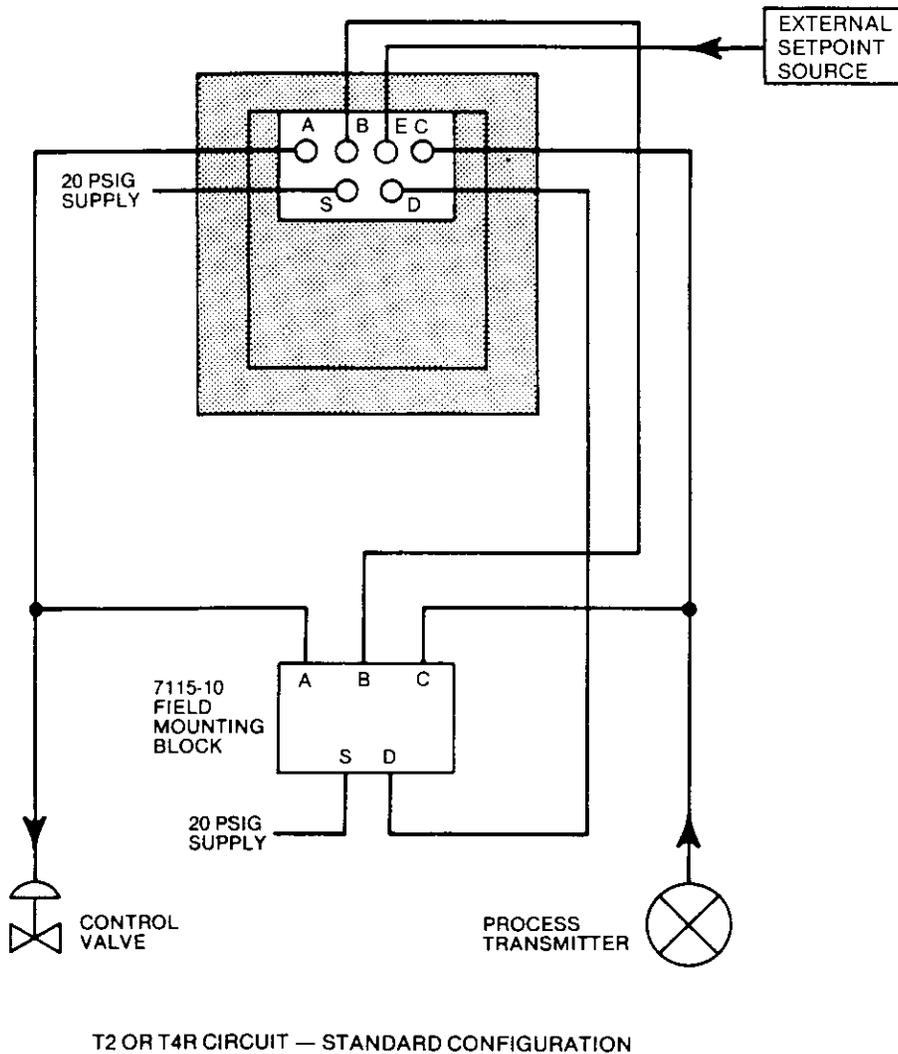
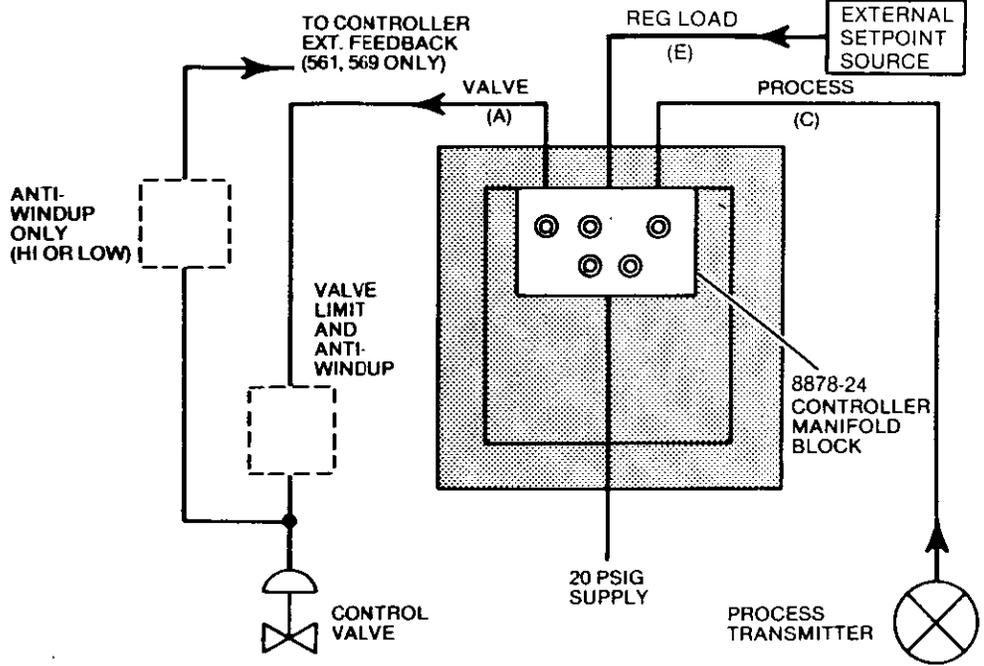
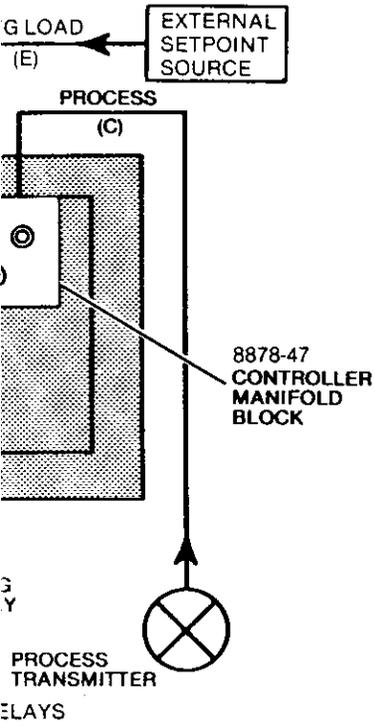
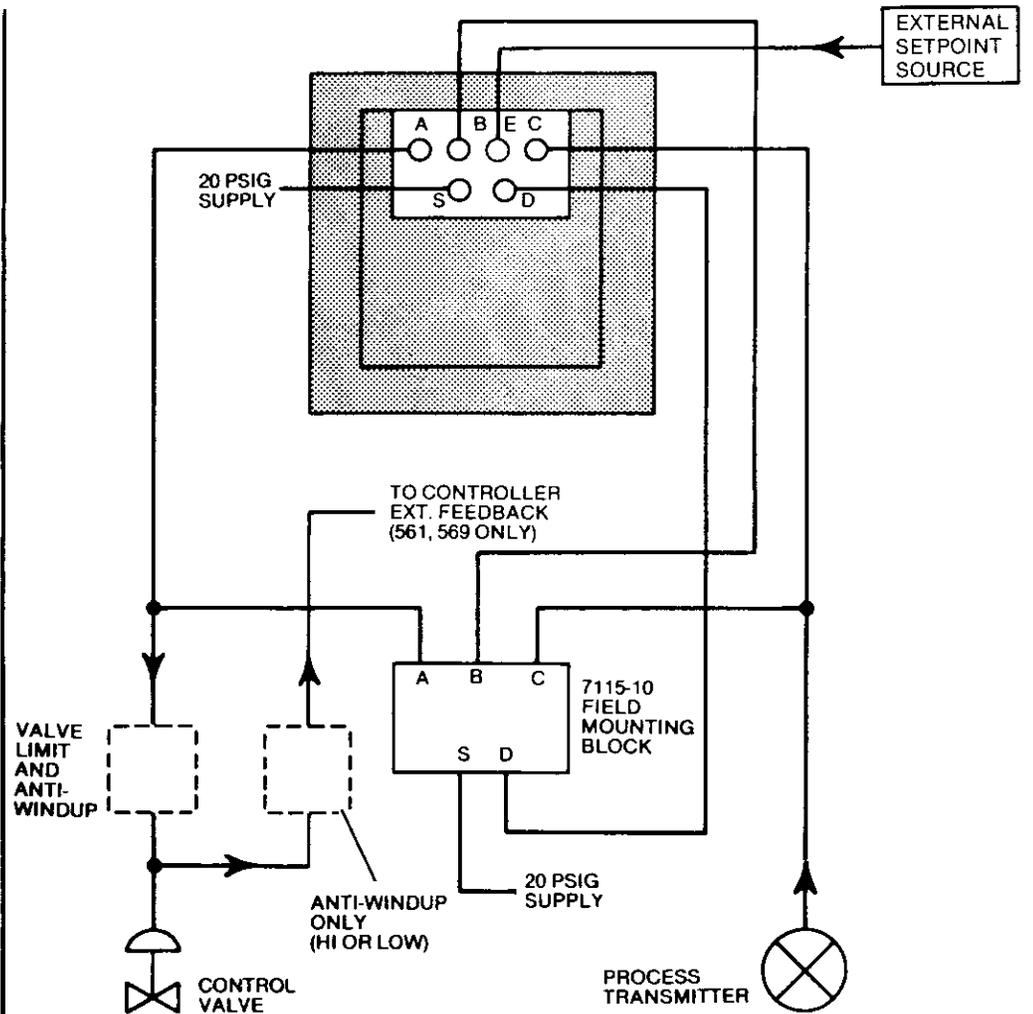
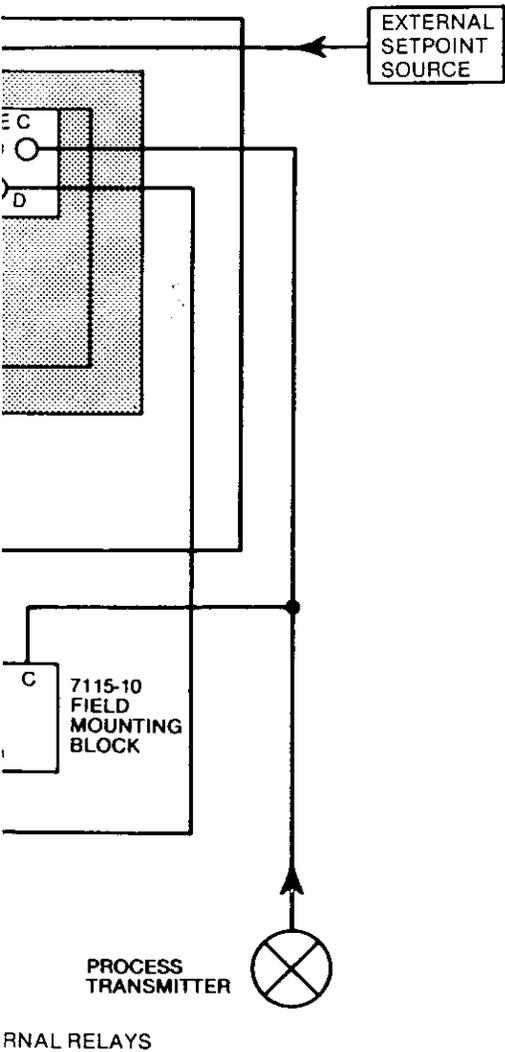


FIGURE 10 Piping Diagrams - Field Mounted Controllers



T4R CIRCUIT WITH EXTERNAL RELAYS



T4R CIRCUIT WITH EXTERNAL RELAYS

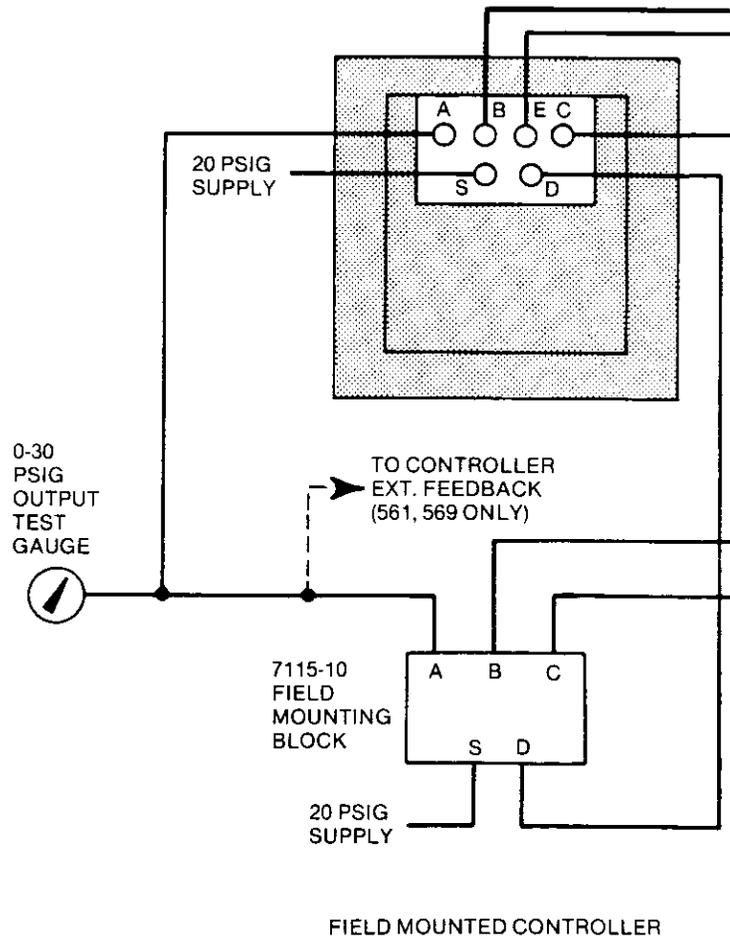
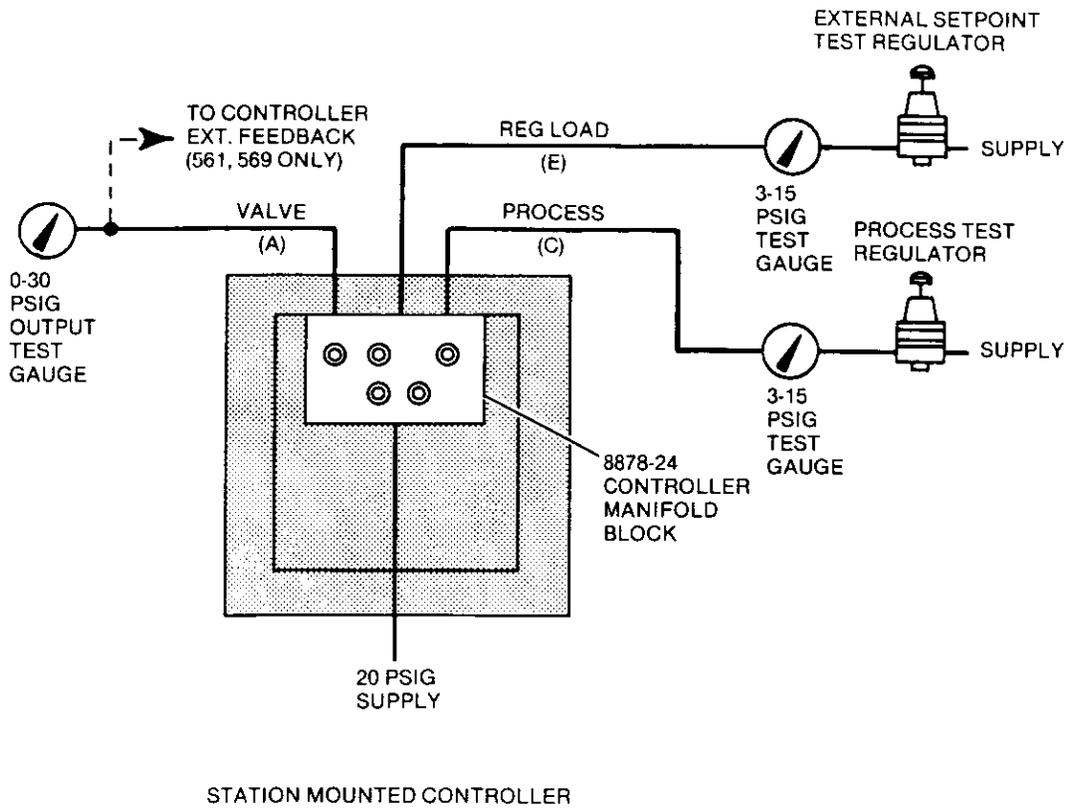
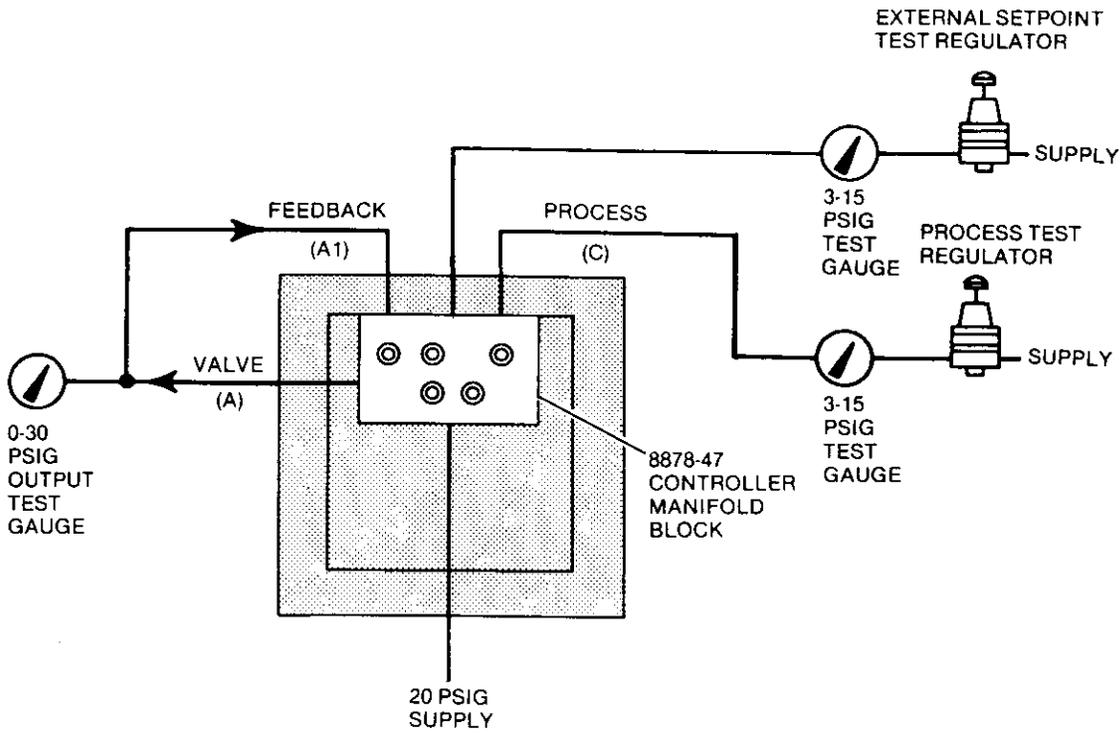
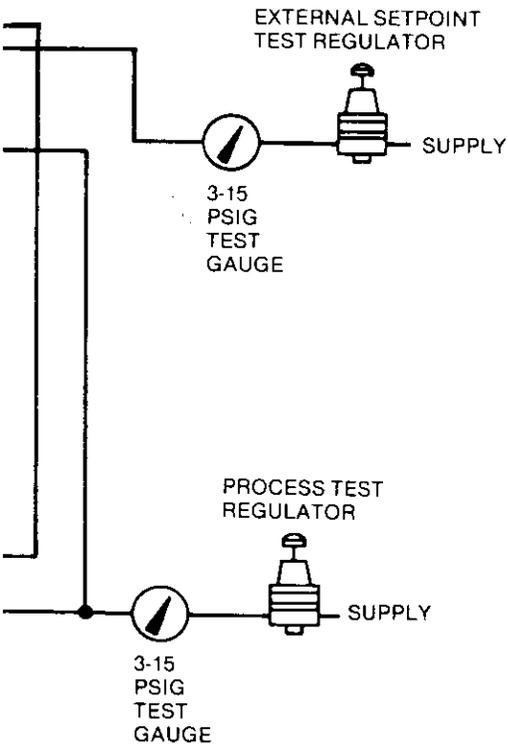


FIGURE 12 Test Circuits



T2 CIRCUIT WITH STATION MOUNTED CONTROLLER AND EXTERNAL FEEDBACK



STATION FUNCTIONAL TEST

GENERAL

The following test procedure can be used during panel checkout or commissioning, or it can be used as an aid when troubleshooting the station.

The Station Functional Test should show proper operation of the control station, particularly the switching circuit and the operating components.

The MAINTENANCE section describes the cleaning and inspection of the Switch Block Assembly. In some of the steps that follow, the plunger which might be at fault is identified. Figure 11 shows the position of each plunger. Remove the cover plate to gain access to the plungers.

PREPARATION

1. Connect the appropriate test circuit as shown in Figure 12.
2. T4R Circuits only: If external feedback is required, alter the test circuit as shown by the dashed lines in Figure 12; alter the Model Series 561 or 569 controller for external feedback.
3. Perform the preceding PRE-STARTUP INSPECTION.
4. Set all of the controller's tuning knobs at the lowest numerical setting.

TEST

1. Study the preceding General information, and perform the preceding Preparation steps.
2. Turn the switches to REG and MAN.
3. Adjust the EXTERNAL SETPOINT test regulator to 0 psig.
4. Adjust the Thumbwheel until the station output is 15 psig. If this cannot be attained, do the following:
 - a. Check that supply pressure is 20 psig.
 - b. Check that the regulator belt is turning the regulator pulley.
 - c. Depress the pushbutton restriction cleaner at the rear of the station.
 - d. Check for a clogged filter screen in the base of the supply port at the rear of the station.
5. Adjust the Thumbwheel to read 3 psig on the output test gauge. If the output cannot be reduced, check the Regulator.
6. Adjust the Thumbwheel to check the calibration of the red gauge pointer. The red pointer must agree ($\pm 0.5\%$) with the output test gauge. Check the calibration at the reference points marked on the dial (in 1 psi increments from 3 psig).
7. Adjust the PROCESS test regulator to check the calibration of the black gauge pointer. The black pointer must agree ($\pm 0.5\%$) with the process test gauge. Check the calibration at the reference points marked on the dial (in 1 psi increments from 3 psig).
8. Adjust the Thumbwheel to read 9 psig on the output test gauge.

9. Adjust the PROCESS test regulator to 3 and then to 15 psig. The output test gauge must not change. If it does, check the following:
 - a. T2 Circuits — check plunger #5.
 - b. T4R Circuits —
 - (1) Check for supply air at the Controller's "B" port.
 - (2) Check the operation of the Controller's cut-off relay.
 - (3) Check plunger #5 if air exhausts continuously from the cover plate vent hole.
 - (4) Check the position of the circuit gasket.
10. Adjust the Thumbwheel until the output test gauge reads 15 psig.
11. Turn the Transfer Switch to SEAL.
12. Adjust the Thumbwheel to read 3 psig on the red pointer; the output test gauge must remain at 15 psig. If it drops off, check the following:
 - a. Check for leaks in the valve line and fittings.
 - b. Check for leaks around the switch block gaskets.
 - c. Check plungers #2 and #4.
13. Turn the Selector Switch to VALVE. Adjust the Thumbwheel fully in both directions. If the output test gauge changes, check plunger #1.
14. Turn the Selector Switch to REG. Adjust the Thumbwheel until the red pointer reads 9 psig.
15. Turn the Transfer Switch to AUTO.
16. Adjust the PROCESS test regulator to 8, then to 10, and then back to 8 psig. The output test gauge should show full scale changes each time the adjustment is made.
 - a. If the output does not change, check the Controller.
 - b. If the direction of output change is incorrect, change the position of the Controller's reversing plate.
 - c. T2 Circuits: If air continuously exhausts from the cover plate vent, check the position of the circuit gasket.
 - d. T4R Circuits:
 - (1) If the output will go no higher than 10 or 11 psig, check the position of the circuit gasket.
 - (2) If air exhausts continuously from the cover plate vent, check plunger #6.
17. Turn the Transfer Switch to UNLOAD.
18. Adjust the EXTERNAL SETPOINT test regulator to 15 psig. If air exhausts continuously from the drilled vent hole in the right hand side of the switch block, check plunger #7.
19. Turn the Transfer Switch to LOAD. If air exhausts continuously from the drilled vent hole in the right hand side of the switch block, check plunger #3.

20. A68 Circuits only: Adjust the Thumbwheel until the red gauge pointer reads 3 psig. If the red pointer readout cannot be reduced, check the operation of the Regulator.
21. Adjust the EXTERNAL SETPOINT test regulator to 3 psig.
22. Adjust the Thumbwheel until the red gauge pointer reads 15 psig. If this cannot be attained, check the Regulator.
23. Turn the Transfer Switch to CAS. The control station operation should be the same as when in AUTO (steps 14, 16). The controller's setpoint can be changed by adjusting the EXTERNAL SETPOINT test regulator, or the Thumbwheel.

OPERATING INSTRUCTIONS

GENERAL

The Moore M/P External Set Biasing Control Station monitors and controls one process variable.

The station provides three modes of control: Manual, Local/Automatic, and Cascade (External-Set/Automatic with local bias of the External Setpoint). A procedure is required for bumpless transfer between control modes.

CONTROLS

Selector Switch

The Selector Switch is a "read only" switch; it has no effect on control. The REG position connects the regulator output to the red gauge pointer. The VALVE position connects the station output (valve pressure) to the red pointer.

Transfer Switch

The Transfer Switch is used to select the station's control mode. The MAN, AUTO, and CAS positions select a control mode. The SEAL, UNLOAD and LOAD positions provide the capability for bumpless switching between control modes. When switching between control modes, follow the instructions outlined under SWITCHING PROCEDURES.

Thumbwheel

The Thumbwheel is used to change the output of the station's regulator. Move the Thumbwheel to the right to increase the regulator output; move it to the left to decrease the output.

Scanning Knob

Model Series 525 and 526 Control Stations are equipped with a Scanning Gauge. To position the desired dial marking at 12 o'clock, pull the scanning knob out, and turn as needed. Release the spring-loaded knob to return it to its stored position.

READOUTS

The duplex Receiver Gauge displays the setpoint and process values. The black pointer displays the process. The red pointer displays the setpoint or valve pressure, depending upon the position of the Selector Switch.

MANUAL CONTROL

The switch positions for this mode are MAN and REG.

Adjust the Thumbwheel to change the station output.

The process is displayed by the black gauge pointer.

The station output is displayed by the red gauge pointer.

LOCAL/AUTOMATIC CONTROL

The switch positions for this mode are AUTO and REG.

Adjust the Thumbwheel to change the setpoint. The setpoint is displayed by the red gauge pointer.

The process is displayed by the black gauge pointer.

The Selector Switch can be turned to VALVE at any time for a reading of the station output on the red pointer. The switch should be returned to REG to display the setpoint.

CASCADE CONTROL

The switch positions for this mode are CAS and REG.

Adjust the Thumbwheel to change the amount of bias which is to be applied to the external setpoint. The biased setpoint is displayed by the red gauge pointer.

- a. A6 Circuits: The station provides for plus (+) bias only. The biased setpoint can be greater than the External Setpoint, but it cannot be lower.
- b. A68 Circuits: The station provides for plus or minus (\pm) bias. The biased setpoint can be less than, equal to, or greater than the External Setpoint.

The process is displayed by the black gauge pointer.

The Selector Switch can be turned to VALVE at any time for a reading of the station output on the red pointer. The switch should be returned to REG to display the setpoint.

SWITCHING PROCEDURES

Manual to Local/Automatic

1. Turn the Selector Switch to REG.
2. Turn the Transfer Switch to SEAL.
3. Adjust the Thumbwheel until the gauge pointers match.
4. Turn the Transfer Switch to AUTO.

Local/Automatic to Cascade

1. Turn the Selector Switch to REG.
2. Turn the Transfer Switch to LOAD.

NOTE

When the switch is turned, the red pointer may move to display its new readout. This movement is a normal function; it does not cause any process bump.

3. Adjust the Thumbwheel until the gauge pointers match.
4. Turn the Transfer Switch to CAS.

Cascade to Local/Automatic

1. Turn the Selector Switch to REG.
2. Turn the Transfer Switch to UNLOAD.
3. Adjust the Thumbwheel until the gauge pointers match.
4. Turn the Transfer Switch to AUTO.

Local/Automatic to Manual

1. Turn the Selector Switch to VALVE, and note the red pointer readout.
2. Turn the Selector Switch to REG.
3. Turn the Transfer Switch to SEAL.
4. Adjust the Thumbwheel until the red pointer matches the readout noted in step 1.

NOTE

A check of the pressure match can be made by turning the Selector Switch back and forth between VALVE and REG.

5. Turn the Transfer Switch to MAN.

MAINTENANCE**GENERAL**

Most problems associated with pneumatic instruments can be prevented by providing a clean, dry, oil-free, instrument air supply. An instrument air filter should be provided in the supply air system. Regular blowdown of the filter dripwell, and a periodic check of the filter element are recommended.

The calibration of the Receiver Gauge should be checked on a periodic basis (per your established periodic cycle). An occasional application of light grease to the regulator's adjusting screw will facilitate turning of the Thumbwheel.

Refer to the applicable Parts List at the rear of this instruction to identify the parts discussed in this section.

DUPLEX NIAFRAM GAUGE**Removal**

1. Remove the gauge tubing from the front of the regulator block.
2. Loosen the set screw that secures the large gear to the back of the gauge (Scanning Gauge only).
3. Remove the locknut and pull the gauge out from the front of the station.

Installation

1. Feed the gauge tubing through the components, as shown on the Parts List.
2. Install the locknut.
3. Tighten the set screw on the large gear (Scanning Gauge only).
4. Connect the tubing.

DUPLEX BOURDON GAUGE**Removal**

1. Remove the tubing from the barbed hose connectors at the rear of the gauge.
2. Remove the locknut and pull the gauge out from the front of the panel.

NOTE

The gauge input connections contain a built-in restriction. It is a good practice to remove these fittings and pass a cleaning wire through them, whenever the gauge is removed.

Installation

1. Place the gauge in the panel, as shown on the Parts List.
2. Install the locknut.
3. Connect the tubing.

REGULATOR/SWITCH BLOCK ASSEMBLY**Removal**

1. Remove the set screws which fasten the switch shafts to the cam shafts. Remove the switch shafts.
2. Remove the tubing from the Switch Block.
3. Disengage the regulator belt from the regulator pulley.
4. Remove the four mounting screws at the rear of the station; remove the Switch Block Assembly from the station.
5. The regulator may be removed from the Switch Block, if desired. (e.g., if the block is to be thoroughly cleaned).

Installation

1. Reinstall the regulator, if it has been removed from the block.
2. Place the Switch Block Assembly in the station and install the four mounting screws.
3. Replace the Regulator drive belt.
4. Connect the tubing.
5. Install the Switch Shafts.

Regulator**DISASSEMBLY**

1. Remove the Regulator/Switch Block Assembly as described previously.
2. Refer to Parts List No. 15169-8PL (A6 Circuits) or to Parts List No. 10145-26PL (A68 Circuits).
3. Mark the side of the regulator components to assure proper component reassembly.
4. Remove the six regulator assembly screws and separate the components.
5. Unscrew the pilot seat from the switch block; remove the pilot seat, plunger and spring.

ASSEMBLY

Reassemble the regulator and block as shown on the applicable Parts List. Be sure that the parts are in proper orientation.

CLEANING

The regulator's metal parts (e.g., valve plunger, supply and exhaust seats) can be cleaned with non-abrasive solvents. The restriction in the pilot ring can be cleaned mechanically by pressing the pushbutton at the rear of the station.

LUBRICATION

An occasional application of light grease to the adjusting screw threads and the screw-end socket, will facilitate turning of the Thumbwheel.

Switch Block

SERVICE

Servicing the switch block consists of removing, cleaning and lubricating the plungers and cam shafts. The internal passages of the block should also be cleaned. Figure 13 shows the removal of the plungers and cam shafts. Use non-abradants for cleaning. Inspect the plunger "O" rings for damage. Lubricate only the small "O" ring with a suitable lubricant (e.g., silicone).

NOTE

If a cam shaft is to be removed, the plungers must be removed first. Service the shaft as shown in Figure 13 and reinstall it before replacing the plungers.

When reinstalling the circuit gasket, be sure it is replaced in the proper position. Be sure the cover plate arrow points to the rear of the station.

Belt Tension Adjustment

1. Be sure that the belt is properly engaged with the regulator pulley and the Thumbwheel.
2. Loosen the belt tension adjuster screw.
3. Position the belt tension adjuster so that there is a slight resistance when the thumbwheel is turned; tighten the screw.

FILTER SCREENS

The supply (S) and output (A) ports at the rear of the station have 100-mesh filter screens which protect the station's components. The screens stop particles .006" and larger. Therefore, dirt, scale, thread shavings, Teflon tape, etc. should not clog the restrictions or foul the plungers.

A screen can be cleaned mechanically or chemically. Each screen is retained by a fiber washer. If a screen is to be removed for cleaning, have additional washers on hand. A damaged screen should be replaced; use a new fiber washer to retain the screen at the bottom of its port.

TUBING

The station uses 3/16" O.D. tubing. To remove a tube, pry from the end of the tube until it clears the first rib of the barb; then pull.

When installing tubing, push the tubes until the barbs are completely covered.

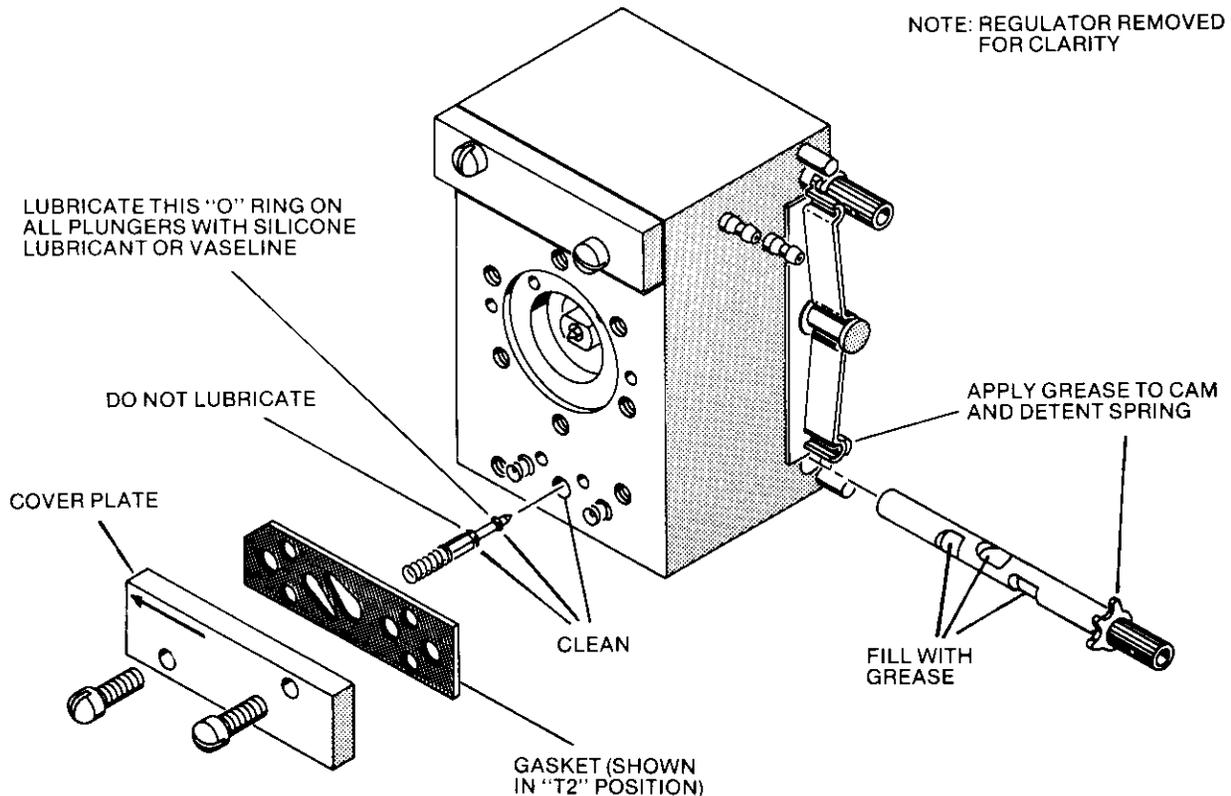


FIGURE 13 Switch Block Service

CALIBRATION

GENERAL

The Receiver Gauge should be calibrated in the same relative position as that in which it will be used. Most often the gauge can be calibrated in the station. The following items are helpful in calibrating:

1. Pointer Puller — Part No. 3189-38.
2. Pointer Adjusting Tool — Part No. 6847-3.
3. Dummy Scale — See Figure 14.

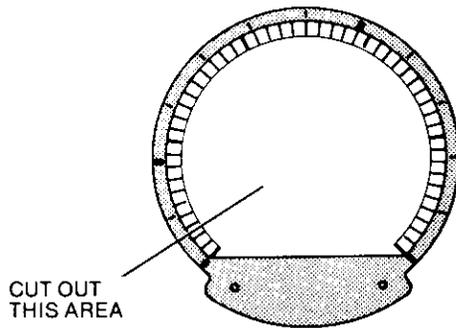


FIGURE 14 "Dummy" Scale

ZERO ADJUSTMENT

1. Connect a jumper from the VALVE (A) port to the PROCESS (C) port at the rear of the station; tee a test gauge into the jumper.
2. Remove the bezel and gauge lens.
3. Verify the gauge's calibration range; note the tag on the back of the gauge, or the nameplate on the back of the station.
4. Turn the Transfer Switch to MAN.
5. Adjust the Thumbwheel to read mid-scale pressure.

6. Adjust the pointer(s) as needed; the zero adjustment for the red pointer is accessible through a hole in the dial face. This adjustment must be made with the test regulator output reduced to 3 psig.
7. Verify the gauge calibration at other points. Adjust the Thumbwheel through full scale. The gauge must agree with the test gauge, $\pm 0.5\%$. If calibration is not correct, proceed to the next heading, Complete Calibration.

COMPLETE CALIBRATION

1. Remove the gauge from the station as described previously.
2. Remove the black pointer.
3. Remove the gauge movement from its case.
4. Remove the dial.
5. Install the "dummy dial".
6. Position and set the black pointer on the shaft.
7. Apply 3 psig to the black pointer element and adjust the pointer until it points to the first red increment on the left side of the dial.
8. Adjust the pressure element overload stops.
 - a. Bourdon Gauge — None.
 - b. Niafram Gauge —
 - (1) Apply 15 psig to both elements.
 - (2) Position the stops to within approximately $1/32''$ of the elements.
9. Apply 18 psig to both elements and adjust the high sector stops so that both pointers stop approximately $1/8''$ beyond full scale.
10. Reduce pressure on both elements to atmospheric and adjust the low sector stops so that both pointers rest approximately $1/8''$ below zero.
11. Zero both pointers at 3 psig.

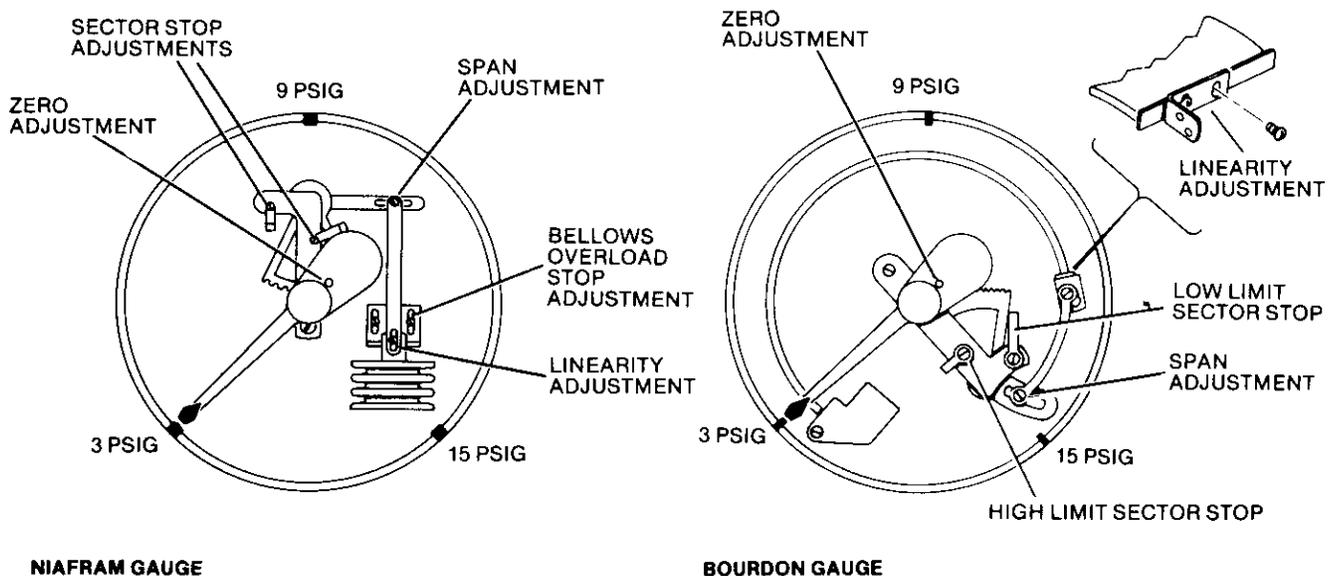
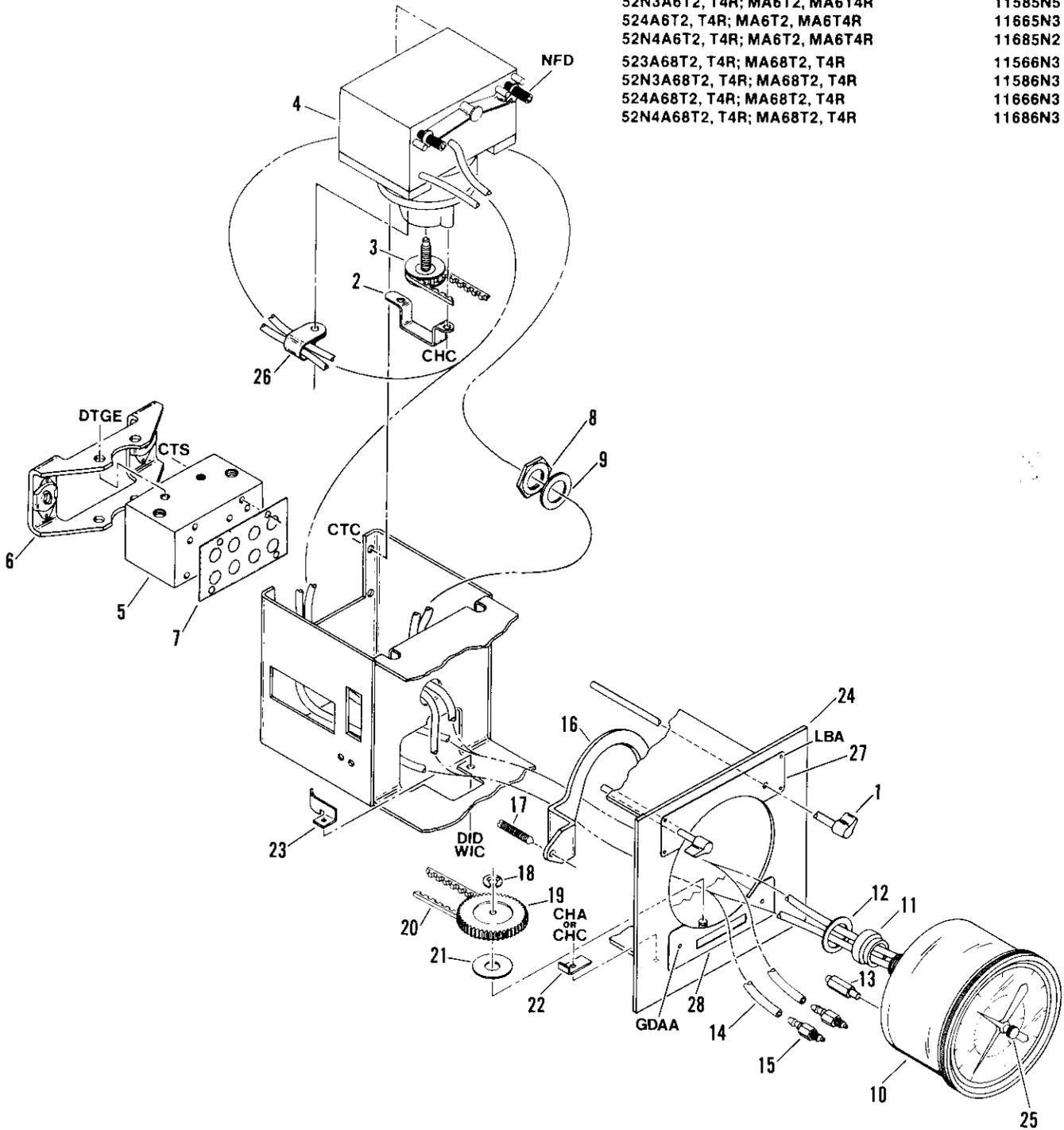


FIGURE 15 Gauge Calibration Adjustments

12. Check span at 15 psig. Span is adjusted by loosening the span adjustment screw and repositioning the link.
13. Re-zero the pointer at 3 psig after making a span adjustment and re-check the span setting. Repeat steps 11 and 12 until the span is properly set.
14. Check linearity at 9 psig; adjust if necessary.
15. Re-zero the pointer at 3 psig after making a linearity adjustment.
16. Re-check the gauge calibration at 3, 9 and 15 psig and repeat the adjustment procedures until the gauge calibration is correct.
17. If the gauge movement was removed from the case, re-install it at this time.
18. Remove the black pointer and "dummy" dial.
19. Mount the permanent dial and set the black pointer on the shaft.
20. Apply 3 psig to the black pointer element and re-zero the pointer.
21. Install the gauge in the station.

PARTS LIST
 M/P CONTROL STATIONS
 REMOTE SET CIRCUITS WITH BIAS

MODELS	B/M
523A6T2, T4R; MA6T2, MA6T4R	11565N4
52N3A6T2, T4R; MA6T2, MA6T4R	11585N5
524A6T2, T4R; MA6T2, MA6T4R	11665N3
52N4A6T2, T4R; MA6T2, MA6T4R	11685N2
523A68T2, T4R; MA68T2, T4R	11566N3
52N3A68T2, T4R; MA68T2, T4R	11586N3
524A68T2, T4R; MA68T2, T4R	11666N3
52N4A68T2, T4R; MA68T2, T4R	11686N3



* Recommended On - Hand Spare Parts. Always Specify Range, Serial No., or Other Nameplate Information When Ordering Spare Parts.

PARTS LIST
M/P CONTROL STATIONS
REMOTE SET CIRCUITS WITH BIAS

MODELS

523A6T2, T4R; MA6T2, MA6T4R
52N3A6T2, T4R; MA6T2, MA6T4R
524A6T2, T4R; MA6T2, MA6T4R
52N4A6T2, T4R; MA6T2, MA6T4R
523A68T2, T4R; MA68T2, T4R
52N3A68T2, T4R; MA68T2, T4R
524A68T2, T4R; MA68T2, T4R
52N4A68T2, T4R; MA68T2, T4R

B/M

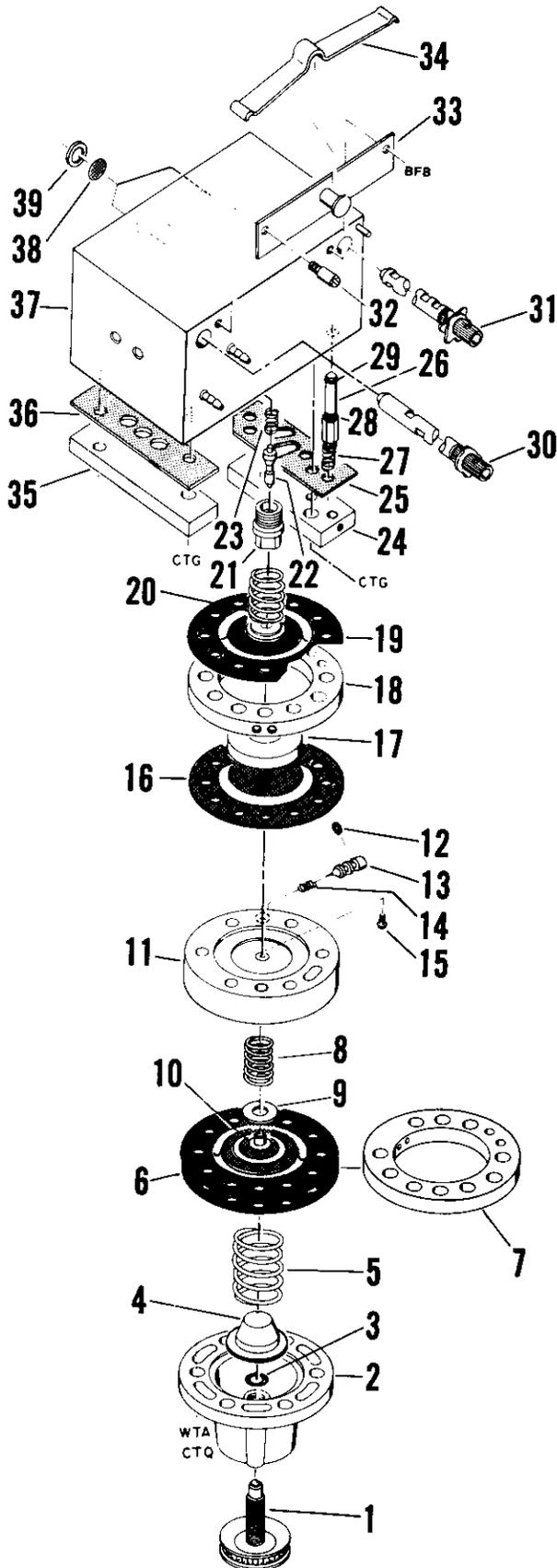
11565N4
11585N5
11665N3
11685N2
11566N3
11586N3
11666N3
11686N3

Item No.	Part No.	Description	Req'd.			
COMMON PARTS						
1	7916-91	Switch Knob Assy.				2
2	7916-17	Bracket				1
3	8878-33	Adjusting Screw				1
4a	10145-26	Biasing Regulator & Switch Block Assy. (A68 only) (See Parts List 10145-26PL)				1
4b	15169-8	Air Loaded Regulator & Switch Block Assy. (A6 only) (see Parts List 15169-8PL)				1
5	8878-24	Manifold Block (Incl. Item 6, 7 & DTGE)				1
6	7915-6	Mounting Bracket				1
7	7916-63	Gasket				1
11	7916-73	Washer (If Required)				1
14	M1166	3/16 O.D. x 3/32 I.D. Tubing				As Req'd.
17	8877-2	Mounting Screw				2
18	7044-2	Retainer				1
19	8878-27	Thumbwheel				1
*20	8878-37	Drive Belt				1
21a	8878-38	Washer (A68 only)				1
21b	8878-43	Washer (A6 only)				1
23	8878-41	Belt Tension Adjuster				1
25	7913-15	Memory Pointer (If Required)				1
27	7917-11	Nameplate				1
28	7917-30	Nameplate				1
523 524 52N3 52N4						
VARIABLE PARTS						
8a	3189-11	Locknut	1	1	—	—
8b	3603-14	Locknut	—	—	1	1
9	4568-10	Washer	1	1	—	—
10a	6847-7	Gauge (3-15 PSI Bourdon)	1	1	—	—
10b	8850-9	Gauge (3-15 PSI Niafram)	—	—	1	1
10c	3960-Item	Gauge Dial (As Specified on Order; See Bulletin 9003)	1	1	1	1
12	7916-70	Spacer	1	1	—	—
13	4568-3	Locating Stud	1	1	—	—
15a	7916-181	Hose Connector	2	2	—	—
15b	2938-5	"O" Ring	2	2	—	—
16a	8877-1	Mounting Bracket	1	—	1	—
16b	8877-110	Mounting Bracket	—	1	—	1
22a	7915-3	Adapter Clip	2	—	2	—
22b	7915-4	Adapter Clip	—	2	—	2
24a	8877-71	Panel	1	—	1	—
24b	8877-73	Panel	—	1	—	1
26	9105-7	Tube Clip	—	—	1	1
Code		Hardware	Req'd.			
CHA	#6-32 x 1/8 Lg. Fill. Hd. Screw		2			
CHC	#6-32 x 1/4 Lg. Fill. Hd. Screw		4			
CTC	#10-32 x 1/4 Lg. Fill. Hd. Screw		4			
CTS	#10-32 x 2 Lg. Fill. Hd. Screw		4			
DID	#8-32 x 5/16 Lg. Flat Hd. Screw		1			
DTGE	#10-32 x 1/2 Lg. Flat Hd. Undercut Screw		4			
NFD	#4-40 x 5/16 Lg. Cup Point Set Screw		2			
WIC	#8-32 Ext. Tooth Lockwasher		1			
LBA	#0 x 1/8 Lg. Drive Screw Type "U"		4			
GDA	#2-56 x 1/8 Lg. Bind. Head Type "F"		2			

* Recommended On - Hand Spare Parts. Always Specify Range, Serial No., or Other Nameplate Information When Ordering Spare Parts.

PARTS LIST
BIASING REGULATOR
AND SWITCH BLOCK ASSEMBLY
FOR "A68" CIRCUITS

P/N 10145-26 ISS. 3



USED ON MODELS:

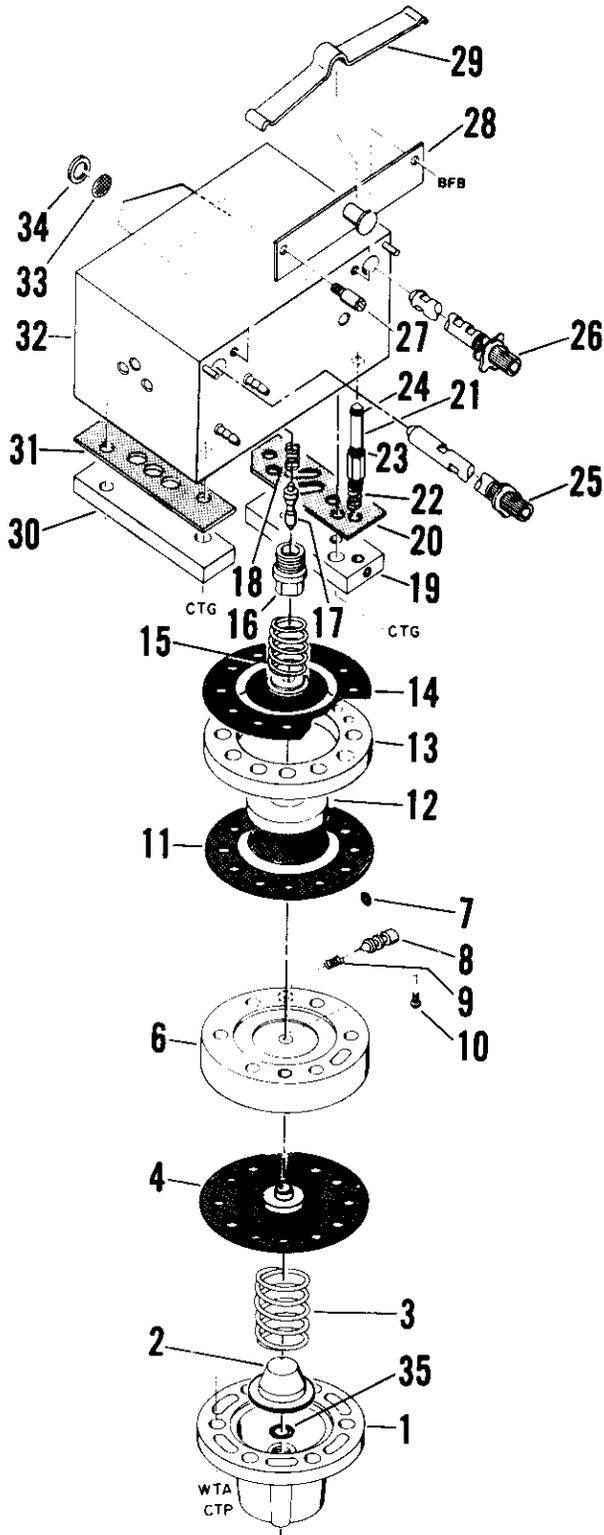
- 52N3A68T2, T4R; MA68T2, T4R
- 52N4A68T2, T4R; MA68T2, T4R
- 523A68T2, T4R; MA68T2, T4R
- 524A68T2, T4R; MA68T2, T4R
- 525A68T2, T4R; MA68T2, T4R
- 526A68T2, T4R; MA68T2, T4R

Item No.	Part No.	Description	Req'd.
1	8878-33	Adjusting Screw	1
2	7916-102	Housing (Incl. Item 3)	1
*3	2938-4	"O" Ring	1
4	6750-6	Spring Seat	1
5	6750-37	Range Spring (Red - White)	1
*6	10145-34	Diaphragm	1
7	6750-62	Exhaust Ring	1
8	10105-12	Bias Spring	1
*9	10145-39	Retaining Washer	1
*10	10145-30	Spring Seat	1
11	10145-35	Pilot Ring	1
*12	2938-16	"O" Ring	1
*13	10320-17	Pushbutton Cleaning Plunger	1
*14	10320-10	Plunger Spring	1
*15	10320-25	Plunger Stop Screw	1
*16	6750-17	Diaphragm	1
17	6750-14	Spacer	1
18	6750-62	Exhaust Ring	1
*19	6750-18	Diaphragm	1
20	6750-45	Differential Spring (Black)	1
21	7916-36	Pilot Seat	1
*22	6750-21	Plunger	1
*23	7916-164	Spring	1
24	7916-35	Cover Plate	1
*25	7916-65	Gasket	1
*26a	7916-95	Valve Plunger (Incl. Items 26b, 27, 28 & 29)	7
26b	7916-9	Valve Plunger	7
*27	7916-8	Plunger Spring	7
*28	2938-15	"O" Ring	7
*29	2938-20	"O" Ring	7
30	7916-119	Switch Shaft	1
31	7916-104	Switch Shaft	1
32	7916-27	Cam Stop	1
33	7916-138	Spring Plate	1
34	7916-202	Detent Spring	1
35	7916-33	Cover Plate	1
*36	7916-64	Gasket	1
37	7916-103	Switch Block (Incl. Items 38 & 39)	1
38	7115-43	Screen	2
39	7115-44	Washer	2
Code	Hardware	Req'd.	
BFB	#4-40 x 3/16 Lg. Rd. Hd. Screw	1	
CTG	#10-32 x 1/2 Lg. Fill. Hd. Screw	4	
CTQ	#10-32 x 1-1/2 Lg. Fill. Hd. Screw	6	
WTA	#10 Lockwasher	6	

* Recommended On - Hand Spare Parts. Always Specify Range, Serial No., or Other Nameplate Information When Ordering Spare Parts.

PARTS LIST
AIR LOADED REGULATOR
AND SWITCH BLOCK ASSEMBLY
FOR "A6" CIRCUITS

P/N 15169-8 ISS. 1



USED ON MODELS:

52N3A6T2, T4R; MA6T2, T4R
 52N4A6T2, T4R; MA6T2, T4R
 523A6T2, T4R; MA6T2, T4R
 524A6T2, T4R; MA6T2, T4R
 525A6T2, T4R; MA6T2, T4R
 526A6T2, T4R; MA6T2, T4R

Item No.	Part No.	Description	Req'd.
1	7916-102	Housing (Incl. Item 35)	1
2	6750-6	Spring Seat	1
3	6750-40	Range Spring (Red)	1
*4	6750-125	Diaphragm	1
6	7916-153	Pilot Ring	1
*7	2938-16	"O" Ring	1
*8	10320-17	Pushbutton Cleaning Plunger	1
*9	10320-10	Plunger Spring	1
*10	10320-25	Plunger Stop Screw	1
*11	6750-17	Diaphragm	1
12	6750-14	Spacer	1
13	6750-62	Exhaust Ring	1
*14	6750-18	Diaphragm	1
15	6750-45	Differential Spring (Black)	1
16	7916-36	Pilot Seat	1
*17	6750-21	Plunger	1
*18	7916-164	Spring	1
19	7916-35	Cover Plate	1
*20	7916-65	Gasket	1
*21a	7916-95	Valve Plunger (Incl. Items 21b, 22, 23 & 24)	7
21b	7916-9	Valve Plunger	7
*22	7916-8	Plunger Spring	7
*23	2938-15	"O" Ring	7
*24	2938-20	"O" Ring	7
25	7916-119	Switch Shaft	1
26	7916-104	Switch Shaft	1
27	7916-27	Cam Stop	1
28	7916-138	Spring Plate	1
29	7916-202	Detent Spring	1
30	7916-33	Cover Plate	1
*31	7916-64	Gasket	1
32	7916-103	Switch Block (Incl. Items 34 & 35)	1
33	7115-43	Screen	2
34	7115-44	Washer	2
*35	2938-4	"O" Ring	1
Code	Hardware	Req'd.	
BFB	#4-40 x 3/16 Lg. Rd. Hd. Screw	1	
CTG	#10-32 x 1/2 Lg. Fill. Hd. Screw	4	
CTP	#10-32 x 1-1/4 Lg. Fill. Hd. Screw	6	
WTA	#10 Lockwasher	6	

* Recommended On-Hand Spare Parts. Always Specify Range, Serial No., or Other Nameplate Information When Ordering Spare Parts.