CONOFLOW
REGULATORS & CONTROLS

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WARNING

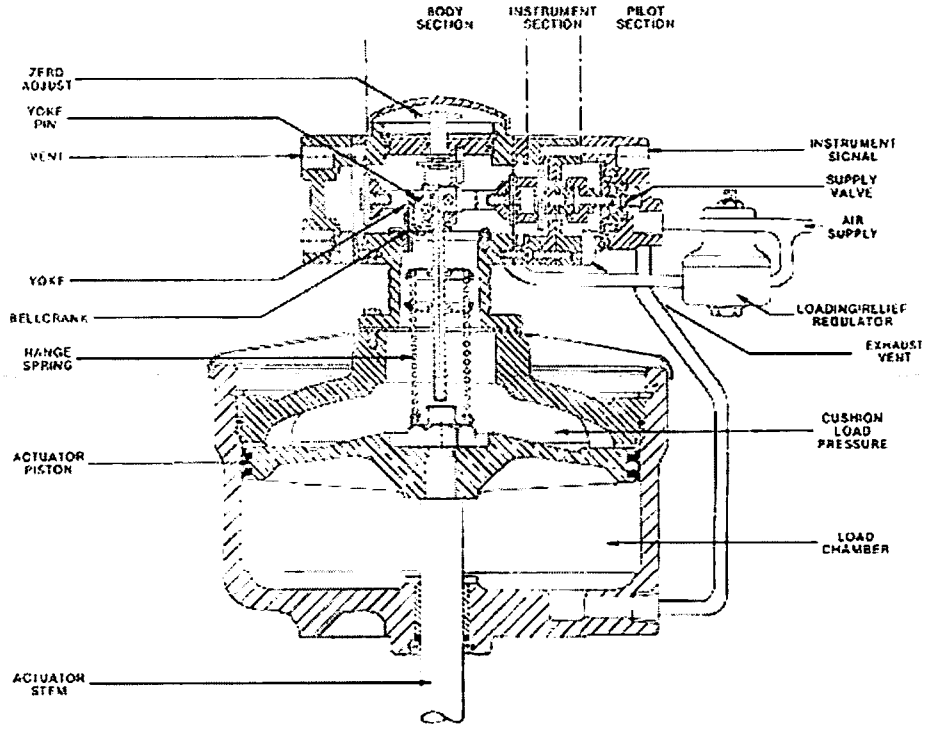
Conoflow's products are designed and manufactured using materials and workmanship required to meet all applicable industry standards. The use of these products should be confined to services specified and/or recommended in the Conoflow catalogs, instructions or by Conoflow application engineers (i.e. exceeding pressure-temperature rating or using device for services other than those specified).

To avoid personal injury or equipment damage due to misuse or misapplication of a product, it is necessary to select the proper materials of construction and pressure-temperature ratings which are consistent with performance requirements.

R&C

FOREMOST IN CONTROL ELEMENTS

INSTRUCTION AND MAINTENANCE MANUAL GC34 COMMANDAIRE POSITIONER



PRINCIPLE OF OPERATION

The COMMANDAIRE Model GC34 positions the actuator stem by applying sufficient air pressure below the piston to overcome cushion-loading pressure (pressure above piston set by an adjustable pressure reducing/relief type regulator) plus any external forces or load acting on the stem. An increase in instrument signal creates a force on the instrument diaphragm moving yoke to the left, opening exhaust port and closing supply valve. Air exhausts to atmosphere from chamber below piston, reducing the pressure and stem begins to extend. This extends a calibrated range spring causing bellcrank to pivot clockwise, increasing the force against yoke pin, restoring yoke to normal balanced position. A decrease in instrument signal pressure reverses procedure, opening positioner supply valve and closing exhaust port. Air flows through supply valve increasing pressure below piston to retract stem until a balanced condition is reached.

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SUPPLY PRESSURE (20 to 100 PSI)

A regulated - filtered air supply should be used. A Conoflow Model GFH60 Airpak - Filter Regulator or equal is recommended.

ZERO ADJUSTMENT

Zero adjustment can be made by turning the zero adjust coupling (2) clockwise or counterclockwise. Connect supply and instrument air to the positioner. Set the instrument signal to the 0% value (e.g. 3 psi for a 3-15 psi range). Turn the zero adjust coupling to bring the actuator slightly off of the fully retracted position. The starting point may then be checked by reducing the instrument signal below the 0% value and then slowly increasing it. As the 0% input signal is reached, extension of the actuator stem plus an audible increase in the air flow through the positioner should be observed.

Next, increase the instrument signal to the 100% value (e.g. 15 psi for 3-15 psi range). Verify that the actuator stem moves to the fully extended position.

Set the instrument signal to the 50% value. Using a suitable measuring device such as a scale, and verify that the actuator stem has extended to 50% of full stroke.

SPAN

Positioner span determines the control range. A positioner with a 3-15 psi range has a 12 psi span and is set with a 3 psi startpoint (retracted position). Positioner span has been factory calibrated as specified. Instrument signals of 3-9, 3-15 and 6-30 psi are available. For field changes, refer to page 5.

REMOVING POSITIONER FROM ACTUATOR

Piston or diaphragm should be in the fully retracted position. **Shut off supply and instrument air before performing any maintenance.** Disconnect tubing and bleed all air out of the actuator. Remove cap (1) from positioner and spirolox ring (3), so that headplate assembly (2) can be lifted out. Loosen setscrew (6) using ⅛" Allen Wrench and remove spring rod nut (13)*. Remove six capscrews (15) and lift positioner from actuator.

*For positioner removal kit, order 6385266.

INSTALLING POSITIONER ON ACTUATOR

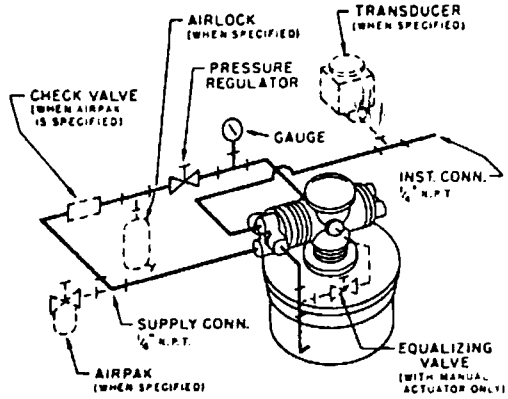
The Model GC34 Positioner is designed for actuators having a 2¼" dimension between the lower face of the stem nut (8D) (refer to page 6) and the positioner mounting flange with the actuator stem in a retracted position.

The range spring (8C) is adjusted and set at the factory for the proper range and spring rod (8A) extension as shown on page 6. With the actuator stem in the fully retracted position and the spring rod nut (13) removed from the spring rod (8A) thread the spring nut assembly (8D) onto the actuator stem. Hold the range spring assembly in a vertical position without applying any tension to the range spring. Measure the distance between the positioner mounting surface on the actuator (without gasket) and the top of the spring rod. This distance **must** be a 2⁵⁄₁₆" ± ¹⁄₆₄" for proper operation of the positioner. If adjustment is necessary, grasp the lower spring clip (8B) and range spring (8C) firmly in one hand. Loosen the upper spring clip (8B) making sure that the lower spring clip is not allowed to turn on the range spring (8A). If the lower clip (8B) is allowed to turn, the number of inactive coils on the range spring (8A) will have to be reset to obtain the proper range. After loosening the upper spring clip (8B), rotate the spring rod (8A) in the direction required to obtain the 2⁵⁄₁₆" dimension. Continue holding the lower clip and range spring while retightening the upper clip securely. Measure the 2⁵⁄₁₆" dimension again to make sure it is correct. Be sure that the actuator stem is fully retracted when making this measurement.

Remove the cap (1) from the positioner and, using a small screwdriver, remove the spirolox ring (3). Pull out the positioner headplate assembly (2) and set it aside. The zero spring (4) should be attached to the headplate assembly. If not, remove it also. Place the gasket (16) and the positioner on the actuator guiding the spring rod through the hole in the bellcrank. Install the six ¼" - 20 screws (15) that secure the positioner to the actuator.

Turn the set screw (6) in the spring rod nut (13) such that the head of the screw is flush with the top of the nut as shown. Install this assembly onto the spring rod (8A) finger tight. Hold the spring rod nut (13) with a wrench or suitable tool to prevent it from turning and tighten the set screw (6) securely. It is important to make sure that the spring rod nut does not turn while tightening the set screw to maintain calibration of the range spring assembly.

Insert the zero spring (4) onto the headplate and install the headplate assembly (2). Make sure the zero spring is properly centered on the spring rod nut (13) when inserting this assembly. Replace the spirolox ring (3) and the cap (1). Install the necessary piping per the schematic below. Proceed with the zero adjustment procedure outlined previously.



MODEL GC34

OPERATING CHECKS

With positioner installed and adjusted in accordance with the preceding instructions, the actuator stem should react to variations in input control signal. By removing the cap (1) and the depressing zero adjust coupling of the headplate assembly (2) while the control signal is applied, step excursions of the stem should take place and the stem should return accurately to its previous position. If the actuator does not appear to function properly, it is advisable to check the following.

SUPPLY AIR

A regulated - filtered air supply should be used. Check to make sure that the supply pressure and cushion loading pressure, where applicable, are set properly.

> **CAUTION:** Before the positioner headplate assembly (2) is removed for inspection, bleed all air from the actuator. Disconnect the supply air and instrument air connections.

YOKE (8) AND BELLCRANK (12) RELATIONSHIP

Remove the cap (1) and headplate assembly (2) by removing the spirolox ring (3). Inspect the parts visually for proper arrangement and connection. Note carefully that the diaphragms (23) are not twisted. When replacing the headplate assembly, make sure that the zero spring (4) is properly located on the spring rod nut (13).

DISASSEMBLY

The Commandaire Positioner consists of three main units: the body, the instrument section, and the pilot section.

Important: Remove all air supply lines to the positioner before performing any maintenance.

BODY SECTION

After disconnecting all air supply lines, disconnect any remaining tubing connections to the positioner. To examine the body diaphragms (23), remove the end cap (5) and the pilot assembly (24) by removing the four fillister head screws on each end. The instrument spacer assembly (25) should also be removed at this time. Use caution when removing the pilot assembly to avoid damage to the exhaust plunger.

To replace the yoke (8) or bellcrank (12), first remove the top cap (1) and headplate assembly (2). Use a small screwdriver to remove the spirolox ring (3) then pull the headplate assembly (2) out of the positioner along with the zero spring (4). With the end cap, instrument spacer assembly, and pilot assembly removed, remove both diaphragm screws (20) and then unscrew the three flat head screws on each side of the positioner. The spacers (11) on both ends of the positioner can now be removed. Also remove both diaphragms (23) and diaphragm spacers.

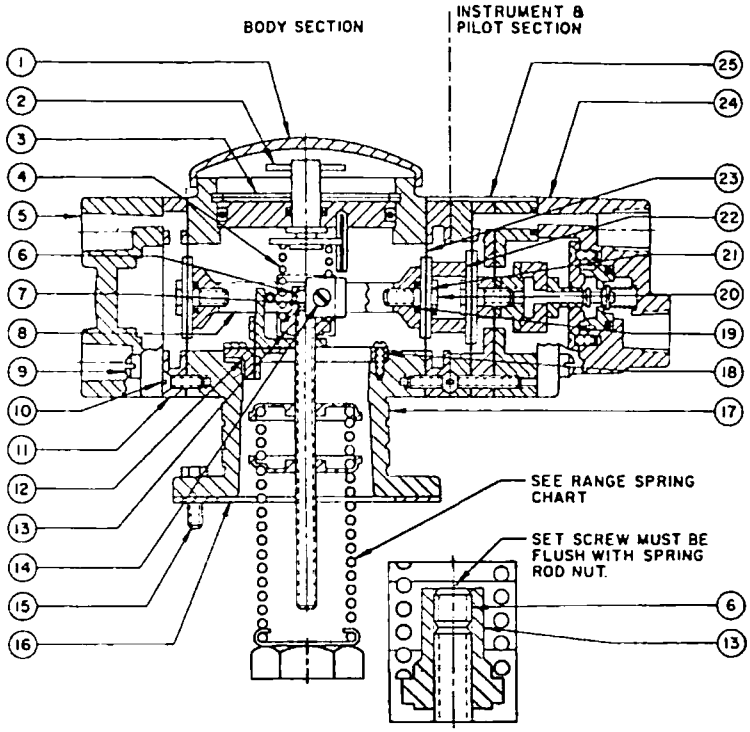
Next, rotate the yoke (8) to provide access to the inside stop block (7). Unscrew the two round head screws and remove the stop block. Slide the yoke through the instrument end of the positioner.

The flexure ring assembly (12) is now accessible and may be removed by unscrewing the three round head retaining screws.

PILOT/INSTRUMENT SECTION

To examine the pilot/instrument section only, unscrew the four fillister head screws in the pilot assembly. Carefully remove the pilot assembly (24) and instrument spacer assembly (25). Inspect the diaphragm in the instrument section. This spacer assembly may be further disassembled by removing the screw and nut through the center of the diaphragm stack and unscrewing the three flat head screws in the spacer rings. Separate the spacers paying close attention to the proper location of the various spacers and washers. Inspect all three diaphragms in this

(continued on page 6)



Item No.	Description	Qty. Req'd.	Part No.	Item No.	Description	Qty. Req'd.	Part No.
1	Top Cap	1	6025969	13	Spring Rod Nut	1	6025803
2	Head Plate Assembly	1	6027130	14	Round Hd. Mach. Screw #4-40 x ½" Lg.	2	6900007
3	Spirolox Ring	1	6004691	15	Hex Hd. Capscrew ¼" - 20 x ⅝" Lg.	6	6900095
4	Zero Spring	1	6025811	16(1)	Gasket	1	6001762
5	End Cap	1	6026793	17	Body	1	6026751
6	Socket Setscrew (Dog Pt.) ¼" - 28" x ¼" Lg.	1	6900113	18	#4 Self Tap Screw x ⅜" Lg. (Slotted Hd. Type)	3	6900545
7	Inside Stop Block	1	6026538	19(1)	"O" Ring	2	6076608
8	Yoke Assembly	1	6026579	20	Diaphragm Screw	2	6026546
9	Fillister Hd. Mach. Screw #10-32 x ¾" Lg.	4	6900061	21	Diaphragm Plate	4	6026686
	#10-32 x 1¾" Lg.	4	6900065	22	Magnet	1	6026975
10	Flat Hd. Mach. Screw #8-32 x ½" Lg.	6	6900033	23(1)	Diaphragm	2	6026553
11	Spacer	2	6026785	24	Pilot Assembly	1	6027163
12	Flexure Ring Assembly (Bellcrank)	1	6025753	25	Spacer & Diaphragm Assembly	1	6027189

Notes:
1. Recommended spare parts can be purchased individually or as a spare parts kit, under number 6385467 — spare parts kit — GC34 (consist of items 16, 19 and 23).
2. When ordering spare parts, specify complete catalog no., item no. and part no. This will permit positive identification and rapid handling of order.
3. For body assembly order 6026504
   Consist of items 6 thru 8, 10 thru 14, 17 thru 21 and 23.
4. For tapped exhaust use
   J63301 for item 5.
   J72403 for item 24.

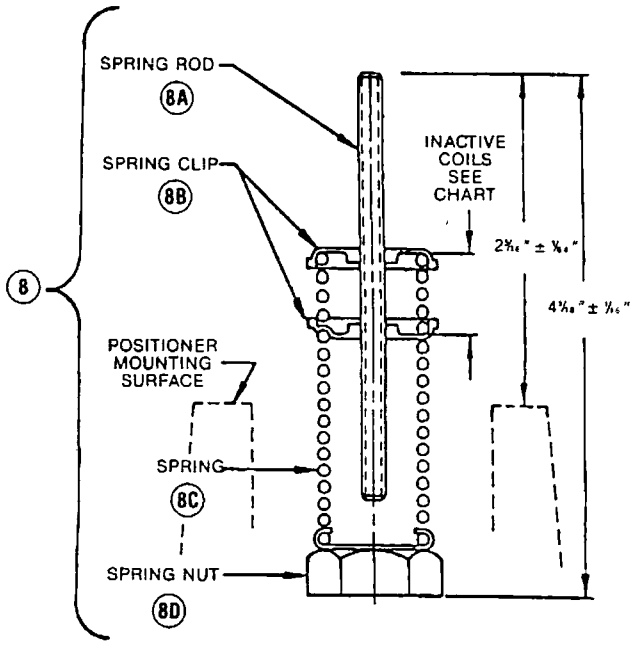


TABLE #1 STEM NUT IDENTIFICATION

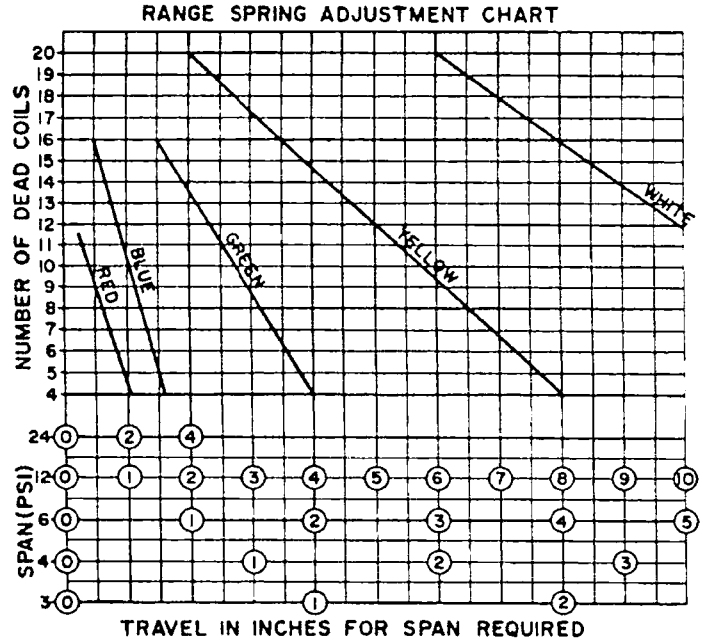
STEM NUT ASS'Y NO.	THREAD	ACTUATOR	CYLINDER BORE O.D.
1	3/8"-24	GB50 1/2" STEM DIA.	3"
2	1/2"-20	GB50 3/4" STEM DIA.	2 1/4"
3	1/2"-20	GB51	4"
4	9/16"-18	GB52	6"
5	5/8"-18	GB53	8"
6	3/4"-14	GB54 GB55	10" 12 1/2"
7	NOT THREADED	——	——

ORDERING INSTRUCTIONS AND RANGE SPRING ASSEMBLY IDENTIFICATION

EXAMPLE:

	Basic No.	Stem Nut Ass'y No.	Stroke Length in 1/16" Units	Instr. Span in psi
RANGE SPRING ASSEMBLY:	J800	5	96	12

This is basic J800 Assembly with #5 Stem Nut Assembly (5/8" - 18" thread); 6" Stroke: 12 psi Instrument Span. A Yellow Range Spring is selected (See Chart Below) and lower clip is turned to provide 9.5 inactive coils. Spring Rod Dimension from Positioner Mounting Flange is 2-5/16" ± 1/16".



Note: For travels greater than 10", consult the factory.

FIG. 4

assembly for signs of wear or damage. If a problem is observed, the entire instrument spacer assembly should be replaced. If no problem is apparent, reassemble the instrument section. Make sure that the grooves in the spacer rings and the notches in the diaphragms are aligned. Insert the screw through the center of the diaphragm stack and tighten the nut finger tight. Insert the three flat head screws and tighten them securely. Then tighten the screw and nut through the diaphragm stack.

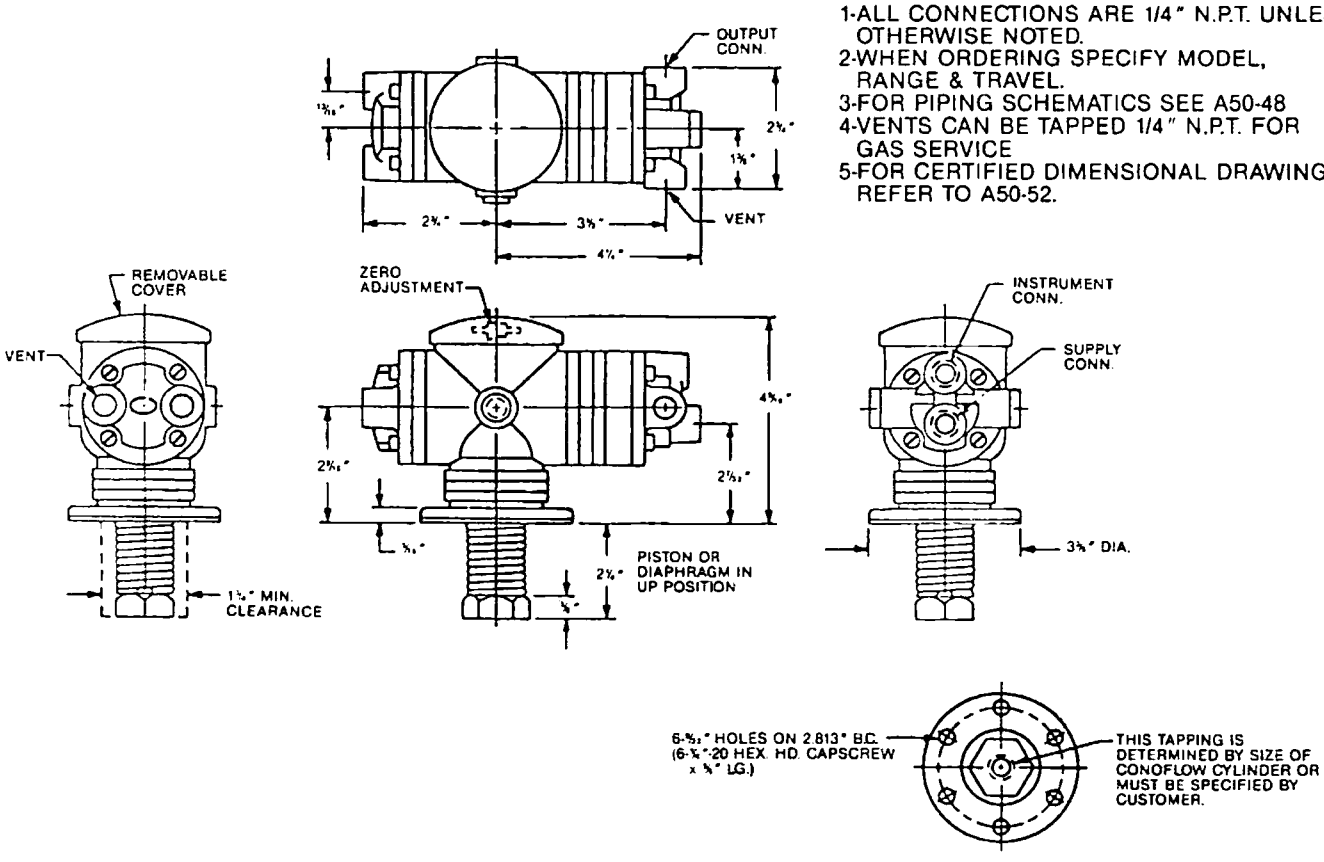
Check the operation of the pilot valve mechanism by inserting the exhaust plunger into the center hole inside the pilot assembly. Gently depress the plunger and allow it to return. The plunger should move freely with no binding or sticking.

Free movement of the exhaust plunger and pilot valve is essential to proper operation of the positioner. If there is any indication of wear on the end of the exhaust plunger or of the center hole in the pilot assembly, the parts should be replaced.

Before re-assembling the pilot/instrument section, install both magnets in their proper locations on the instrument spacer assembly. Center the exhaust plunger on the smaller magnet. Carefully guide the pilot assembly over the exhaust plunger. With the grooves in the pilot assembly, instrument spacer assembly, and spacer (11) aligned, mount the assemblies on the positioner body. Insert the four fillister head screws and tighten them securely.

NOTES:

1-ALL CONNECTIONS ARE 1/4" N.P.T. UNLESS OTHERWISE NOTED.
2-WHEN ORDERING SPECIFY MODEL, RANGE & TRAVEL.
3-FOR PIPING SCHEMATICS SEE A50-48
4-VENTS CAN BE TAPPED 1/4" N.P.T. FOR GAS SERVICE
5-FOR CERTIFIED DIMENSIONAL DRAWING, REFER TO A50-52.



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