

PULSA Series®

DIAPHRAGM METERING PUMPS

Installation Operation Maintenance Instruction

FOR

PNEUMATIC STROKE ADJUSTMENT

Bulletin No. 411—95



A Unit of IDEX Corporation

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Controls and Systems.

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THE FOLLOWING INSTRUCTIONS COVER PNEUMATIC STROKE LENGTH CONTROL FOR THE PULSA SERIES PUMP. BOTH THE PULSA 7120 VERSION AND PULSA 7440/7660/8480 VERSION ARE COVERED.

WHAT IT IS

Pulsa Series pumps equipped with Auto-Pneumatic stroke length adjustment use a piston actuator, regulator and controls manufactured by Conoflow Division of ITT Grinnel Valve Co., Inc., P.O. Box 768, St. George, S.C. 29477 (803-563-9281) TELEX 805062.

The air operated piston actuator responds to an instrument air signal supplied from the control process to position the sliding block in the pump oscillating arm assembly, Figure 1. A 3-15 psi signal range is used as the example in this bulletin. The actual unit supplied will respond to the range specified in the purchase specifications.

INSTALLATION

The pump and stroke length adjustment mechanism have been fully tested and calibrated before shipment. Follow the steps outlined below to complete final calibration under full process conditions.

For convenience in pump calibration and maximum flexibility, it is sometimes desirable to install an auto/manual control panel at the pump. This will enable the operator to vary the pump output independently of the control instrument.

Air Connections Figure 2

- A. Remove plastic plugs from all air supply and vent connections.
- B. Connect $\frac{1}{4}$ " NPT port (A) to the air signal line from the control instrument.
- C. Connect $\frac{1}{4}$ " NPT port (B) to a source of instrument quality (filtered and dried) air regulated to 40 psi supply pressure.
- D. Remove protective paper cover on plastic windows (C).

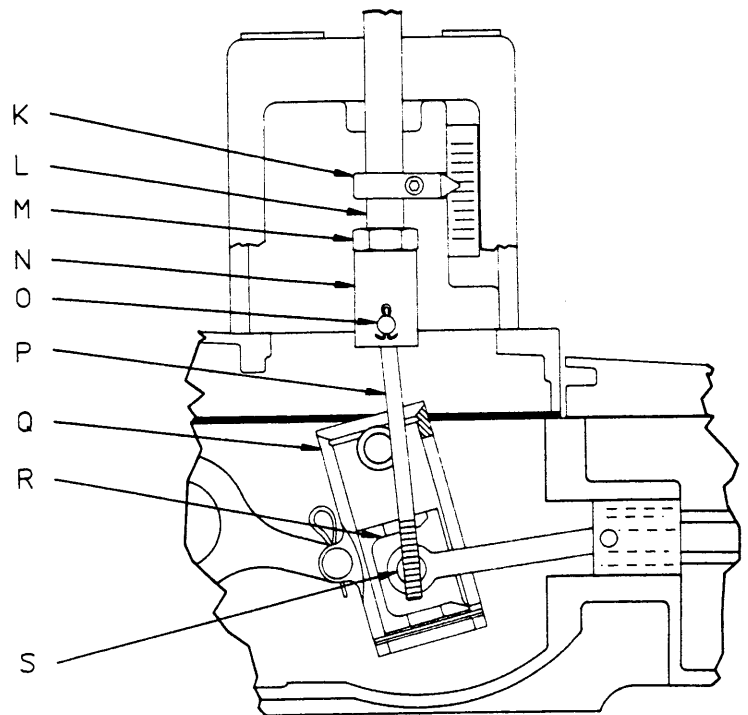


FIGURE 1

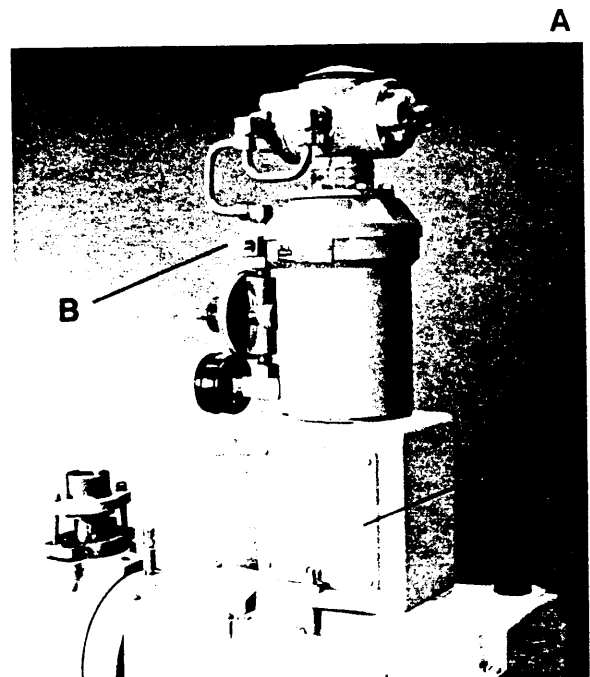


FIGURE 2

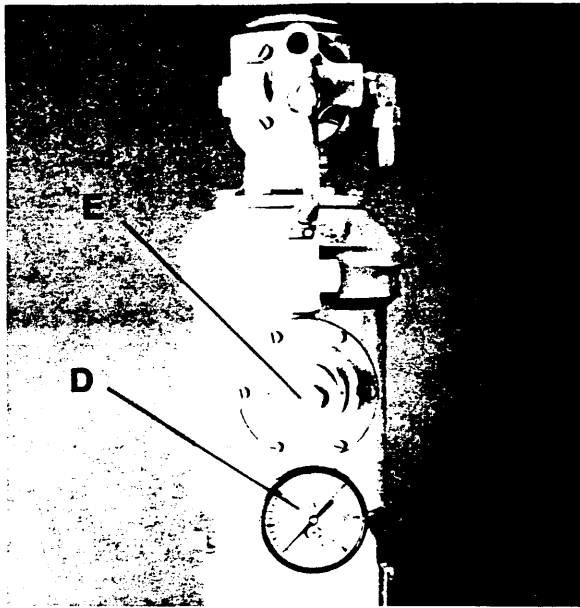


FIGURE 3

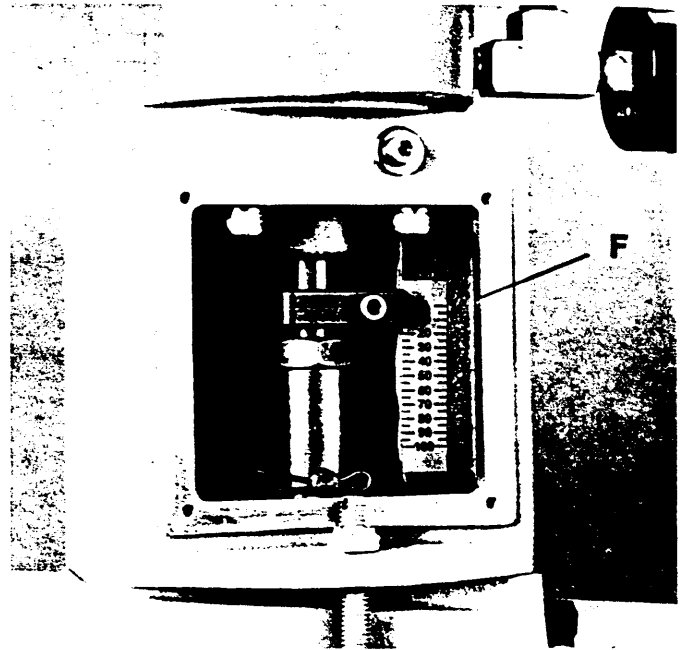


FIGURE 4

Adjustments

- A. Figure 3. Apply 40 psi supply pressure to unit. Cushion air, pressure gauge (D) should read 20 psi ($\frac{1}{2}$ the supply pressure). If it does not, adjust hexagon nut on regulator (E) until gauge reads correct pressure.
- B. Figure 4. Apply a 3 psi instrument air signal to the unit. Actuator should have stem retracted to zero stroke length setting on scale F. Every Auto-Pneumatic PULSA pump is pre-adjusted for zero adjustment based on the signal range specified. If the pointer does not register zero on Scale F, follow Steps 1 through 4.

Zero Adjustment Figure 5

1. Set supply air pressure at 40 psi.
2. Set instrument air signal at 3 psi.
3. Remove plastic cap (G).
4. Rotate zero adjusting coupling (H) until the pointer on Scale (F) starts to move down the scale. At 3 psi, it should remain at zero but should respond to any increase of air signal above 3 psi.

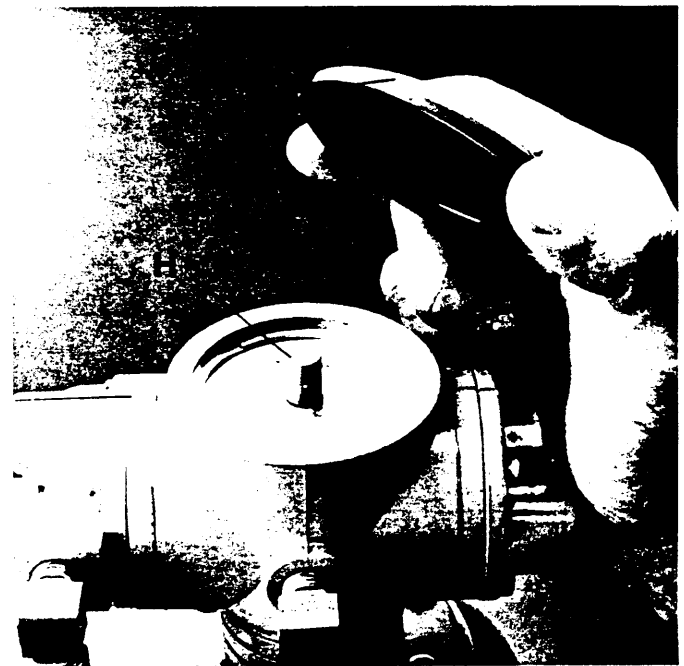


FIGURE 5

C. Actuator Stem Pulsation Suppression

For PULSA Series 7120 AP Figure 6

The stem of the piston actuator works through a friction bearing to dampen pulsations transmitted through the oscillating arm assembly. This friction bearing is adjusted by regulating the tightness of the adjustment screw (I). Tighten screw only enough to dampen pulsation but not enough to restrict movement of the actuator stem. Excessive tightness will cause the actuator to overshoot during operation and impede proper positioning.

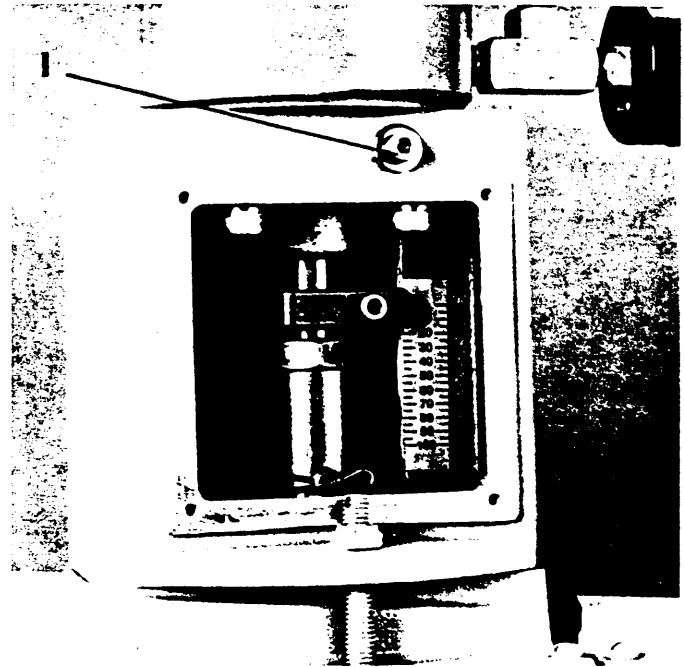


FIGURE 6

For PULSA Series 7440 AP, 7660 AP, and 8480 AP Figure 7.

The stem of the piston actuator is connected to a hydraulic buffer to dampen the pulsations transmitted by the oscillating arm assembly. This hydraulic buffer has been primed and calibrated at room temperature before shipment. The control valve (J) regulates damping action. A correct adjustment allows smooth traverse of the stroke adjustment and oil level fluctuation to the approximate levels shown. Outdoor ambient temperature extremes may require readjustment of setting to control traverse rate. Refer to MAINTENANCE before making adjustments.

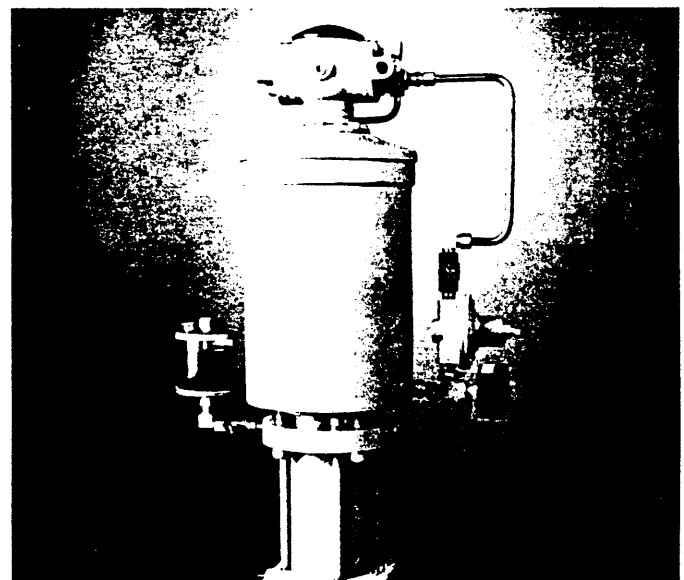


FIGURE 7

OPERATION

No further adjustments are required. The pump can now be placed on stream and a flow curve developed based on actual process conditions.

MAINTENANCE

Clevis Joint Figure 1

A needle bearing clevis joint connects the stem of the piston actuator to the oscillating arm assembly. The bearing should be inspected for adequate grease lubrication at least twice a year.

Piston Actuator Stem

The piston actuator stem requires periodic lubrication to prevent binding during operation. Under dry ambient conditions apply lubricant every 6 months. Under high humidity/condensation conditions apply lubricant every 3 months. Light application of LPS, WD40 or other similar lubricant will suffice.

Hydraulic Buffer Calibration 7440/7660/8480

Proper control valve (J) setting allows the actuator to decrease to zero position smoothly at a rate equal to the increase rate.

To find correct setting:

1. Apply a 100% air signal to positioner and allow the actuator to go to the maximum stroke length.
2. Turn the control valve (J) completely clockwise.
3. Reduce the instrument air signal to 0%.
4. Turn the control valve (J) counter clockwise until proper rate is achieved. Excessive rate of rise will cause the sight glass, which is approximately $\frac{1}{3}$ full at 100% stroke, to overflow. Too restrictive a setting will delay responsiveness.

For ambient temperature below 20°F a lighter

viscosity PULSAlube #5 oil must be used in the buffer. Consult factory for temperature below 0°F.

CONOFLOW Piston Actuator and Positioner

Under normal operation conditions, lip seal replacement on the piston actuator will seldom be necessary. The commandaire positioner likewise by design requires a minimum of maintenance. For servicing or replacement refer to CONOFLOW instruction booklet C-8000 for the piston actuator and booklet C31 for the Model 31 positioner.

ALIGNMENT PROCEDURE Figure 1

After disassembly, it is necessary to align the actuator per the following procedure.

1. Pin (O) must be removed from clevis (N).
2. Loosen jam nut (M) and pointer (K).
3. Position the actuator at its zero (fully retracted) position by applying a 3 psi instrument air signal.
4. With adjustment rod (P) disengaged from clevis (N), thread the adjustment rod clockwise into slider block adjusting pin (S) until it bottoms out. Depending upon the pump model, back it off as follows:

<u>Pump Model</u>	<u>Number of Full Turns</u>
7120	10
7440	5
7660 or 8480	1- $\frac{1}{2}$.

5. Raise adjustment rod (P) until it can go no further. At this point, slider block (R) is topped out against housing (Q).
6. Engage adjustment rod (P) and clevis (N) and check alignment. Correct alignment will permit free insertion of pin (O).
7. For coarse alignment, disengage the adjustment rod from clevis and rotate clevis on actuator stem (L). For fine

alignment, rotate the adjustment rod in slider block adjusting pin (S).

8. With the adjustment rod and clevis engaged, insert pin (O) and install its cotter pin.
9. While holding the clevis to prevent rotation and binding, tighten jam nut (M).
10. Position and tighten pointer (K) per the zero adjustment procedure under **INSTALLATION - ADJUSTMENTS** above.
11. With the pump operating, verify normal operation of the actuator by applying the instrument air signal over its full 3-15 psi range.

BASIC TROUBLESHOOTING FOR ERRATIC OPERATION

1. Look for varying control or supply air pressures and regulate accordingly.
2. Check for any leaks in air lines or connections and correct.
3. Dirt or ice in the air lines or positioner. Clean, defrost, dry and heat trace lines are required.
4. Restrictive friction bearing setting on 7120 or incorrect control valve setting on buffer of 7440/7660/8480.
5. Does the actuator stem require lubrication.
6. Air in hydraulic damper due to low oil level in sight glass.
7. Check for improper oil in buffer if pump is operating in low ambient temperatures.



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Controls and Systems.

Conoflow



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INSTRUCTION AND MAINTENANCE MANUAL GB50 Series Piston Actuator

These instructions should be read carefully before installation or maintenance.

This booklet describes the GB50 Series Piston Actuators. Actuators of various piston diameters and strokes or mounting arrangements other than shown here are available. Consult factory for complete information.

STANDARD MODELS

Series GB50XCA (figure 1)

Series GB51XCA/GB55XCA (figure 2)

Series GB52UC/GB53UC/GB54UC (figure 6)

Each model consists of an actuator assembly and integral positioner.

Series GB50XC (figure 1A)

Series GB51XC/GB55XC (figure 2A)

Each model consists of an actuator assembly, integral positioner, spacer bars and lower flange.

Series GB50XWA (figure 3)

Series GB51XWA/GB53XWA (figure 4A)

Series GB52UW/GB53UW/GB54UW (figure 6)

Each model consists of an actuator assembly only.

Series GB50XW (figure 3)

Series GB51XW/GB55XW (figure 2A)

Series GB54XW/GB55XW (figure 4A)

Each model consists of an actuator assembly only.

UNPACKING ACTUATOR

Check for accessory equipment packed with the actuator. Match all parts with items listed on packing list and record nameplate serial numbers. The actuator nameplate will provide necessary data required for complete identification. Always refer to model number when ordering spare parts, conversion parts, or accessory equipment.

INSTALLATION

The piston actuator can be mounted in any position. Regulator and gauge for loading one side of piston are mounted and piped. Air supply should be regulated and filtered.

Note: A Conoflow Airpak (filter-regulator) can be integrally mounted to provide constant regulation and filtration of air supply to the actuator.

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.

OPERATION

Normal range of the actuator positioner for full stroke is 3-15 PSI (21-103 kPa) (other ranges, including 3-9 PSI (21-62 kPa) and 9-15 PSI (62-103 kPa) are available). Connect the signal input to the connection marked "INST", on the positioner. Then connect a supply of clean, filtered air to the supply connection (see Piping Schematic, Positioner Instruction Manual*) to supply both the positioner and the cushion loading regulator. The supply pressure required is a function of the cylinder diameter and the force required. Air supply up to 100 PSI (690 kPa) can safely be used to insure a reserve of power and maximum speed. However, for economy of operation, use the lowest supply pressure with which satisfactory results can be obtained. The positioner has been tested and adjusted for operation with a supply pressure up to 100 PSI (690 kPa).

*Refer to Page 6 for Positioner Instruction Manual information.

ZERO ADJUSTMENT

To check zero adjustment (preset at factory), set the instrument output signal at the mid-point of its range (9 PSI (62 kPa) on a 3-15 PSI (21-103 kPa) range), turn zero adjustment coupling (figure 2) and note position of actuator stem. Continue rotation of zero adjustment coupling in proper direction until actuator stem is at the mid-point of stroke. Adjustment instrument out-put signal to low and high points in range and check the stem position at both ends of the stroke.

If stroke adjustment does not fall within specifications, refer to positioner manual for further instructions.

CUSHION LOADING REGULATOR

The cushion loading pressure has been arbitrarily set at approximately 20 PSI (138 kPa). This pressure may be adjusted by means of the cushion loading regulator when higher or lower return forces are required. The standard regulator supplied can provide settings up to 60 PSI (414 kPa) and as low as 5 PSI (35 kPa).

RANGE CHANGES

Standard range is 3-15 PSI (21-103 kPa). Other ranges are available, consult the factory.

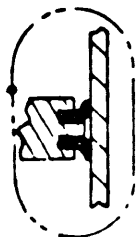


Figure 5 [Lipseal/Piston Arrangement]

MATERIALS OF CONSTRUCTION

Cylinder:	Aluminum
Piston:	Aluminum
Stem:	303 Stainless Steel
Lipseals:	Buna-N
Spacer Bars:	Steel
Yoke:	Ductile Iron (when required)

GB50	3"	(76 mm)	Piston Diameters
GB51	4"	(102 mm)	Piston Diameters
GB52	6"	(152 mm)	Piston Diameters
GB53	8"	(203 mm)	Piston Diameters
GB54	10"	(254 mm)	Piston Diameters
GB55	12.5"	(317.5 mm)	Piston Diameters

MAINTENANCE

POSITIONER

The positioner requires a minimum of maintenance. If servicing or replacements are necessary, refer to the appropriate Instructions and Parts List Booklets.

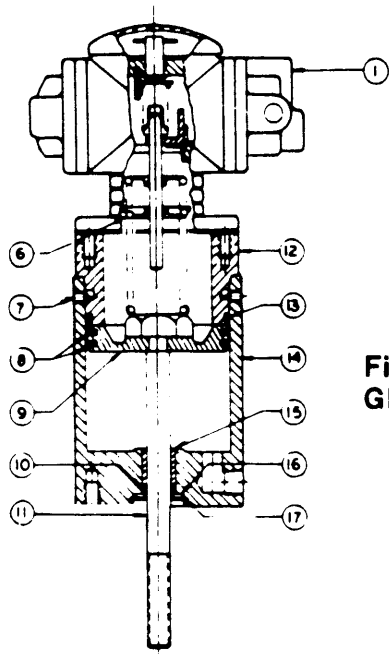
Refer to Page 6 for Positioner Instruction Manual information.

Disconnect actuator stem (11) from unit being serviced. Slide out piston (9) and actuator stem nut assembly (11). Lipseals (8) may now be inspected. Any water, dirt or sludge which may have accumulated inside the cylinder should be removed. "O"-ring (10) should be replaced each time by removing truarc ring (17) and retaining plate (16).

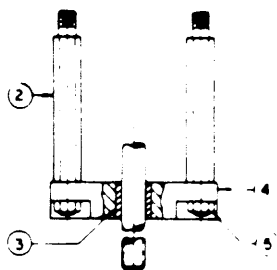
CYLINDER

Life of lipseals (8) is such that replacement will seldom be necessary under normal operating conditions. Should disassembly become necessary the following procedure must be followed. Piston [12] should be in "up" position. Disconnect tubing and bleed air out of unit. Remove cap from positioner (1) and spirolox ring directly under cap, so that positioner headplate can be lifted out. Loosen set screw and remove spring rod nut. Then remove six cap screws around positioner flange and lift positioner from headplate (12). Remove setscrews (7) and lift out cylinder headplate (12).

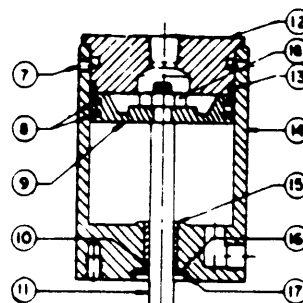
Before reassembling, apply a thin layer of grease (Dow-Corning #DC-33 light lubricant or equivalent) to inner wall of cylinder (14), actuator stem (11), lipseals (8) and the lipseal grooves in piston (9). Care should be exercised when inserting piston (9) into cylinder (14) because lipseal (8) flare is designed of a larger diameter than the cylinder bore. **If the piston will not enter the cylinder bore, run a shim [approximately .010" thick x 1/2" wide] between the lipseals and cylinder wall while applying slight pressure on the piston. [See figure 5].** Stem (11) should be carefully inserted through bearing (15) to prevent damage of bearing surface by thread of stem.



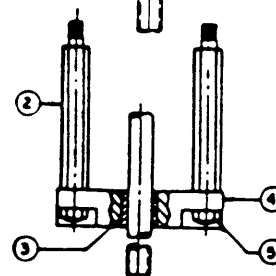
**Figure 1
GB50XCA**



**Figure 1A
GB50XC**



**Figure 3
GB50XWA**



**Figure 3A
GB50XW**

Item No.	No. Req'd	GB50 Series Description
1	1	Positioner
2	4	Spacer Bars—GB50XC/XW-2"(51 mm)
		Spacer Bars—GB50XC/XW-5"(127 mm)
		Spacer Bars—GB50XC/XW-8"(203 mm)
		Spacer Bars—GB50XC/XW-8"(203 mm)
3	1	Oilite Bearing (Note 3)
4	1	Lower Flange (Note 3)
5	4	Hex Nut—Steel 5/16"-18 N.C.
6	1	Range Spring Assembly (Note 2)
7	4	Setscrew
8	2	Lipseal (Note 1)
9	1	Piston
10	1	Stem "O" Ring (Note 1)
11	1	Stem—GB50XC/XW-2"(51 mm)
		Stem—GB50XC/XW-5"(127 mm)

Item No.	No. Req'd	GB50 Series Description
		Stem—GB50XC/XW-8"(203 mm)
		Stem—GB50XCA/XWA-2"(51 mm)
		Stem—GB50XCA/XWA-5"(127 mm)
		Stem—GB50XCA/XWA-8"(203 mm)
12	1	Headplate—Throttling XC/XCA)
		Headplate — (On-Off XW/XWA)
13	1	Headplate "O" Ring (Note 1)
14	1	Cylinder—2" (51 mm) Stroke (Note 3)
		Cylinder—5" (127 mm) Stroke (Note 3)
		Cylinder—8" (203 mm) Stroke (Note 3)
15	1	Oilite Bearing (Note 3)
16	1	Retaining Plate
17	1	Truarc Ring
18	1	Hex Jam Nut—SCP 3/8"-24

NOTES:

1. Recommended spare parts can be purchased individually or as a spare parts kit.
2. When ordering range spring assembly, specify model number (or serial number), stroke length and instrument signal range.
3. Lower Flange (4)/Oilite Bearing (3)
Cylinder (14)/Oilite Bearing (15)
These parts are to be ordered as a matched set.

MAINTENANCE

POSITIONER

The positioner requires a minimum of maintenance. If servicing or replacements are necessary, refer to the appropriate Instructions and Parts List Booklets. Refer to Page 6 for Positioner Instruction Manual information.

CYLINDER

Life of lipseals (10) is such that replacement will seldom be necessary under normal operating conditions. Should disassembly become necessary the following procedure must be followed. Piston (9) should be in "up" position. Disconnect tubing and bleed air out of unit. Remove cap from positioner (1) and spirolox ring directly under cap, so that positioner headplate can be lifted out. Loosen set screw and remove spring rod nut. Then remove six cap screws around positioner flange and lift positioner from headplate (9). Remove cover (2), spirolox retaining ring (3) and lift out cylinder headplate (9). Disconnect actuator

stem (5) from unit being serviced. Slide out piston (12) and actuator stem assembly (5). Lipseals (10) may now be inspected. Any water, dirt or sludge which may have accumulated inside the cylinder should be removed. "O"-ring (7) should be replaced each time by removing truarc ring (8) and retaining plate (14).

Before reassembling, apply a thin layer of grease (Dow-Corning #DC-33 light lubricant or equivalent) to inner wall of cylinder (11), actuator stem (5), lipseals (10) and the lipseal grooves in piston (12). Care should be exercised when reinserting piston (12) into cylinder (11) because lipseal (10) flare is designed of a larger diameter than the cylinder bore. **If the piston will not enter the cylinder bore, run a shim [approximately .010" thick x 1/2" wide] between the lipseals and cylinder wall while applying slight pressure on the piston. [See figure 5].** Stem (5) should be carefully inserted through bearing (6) to prevent damage of bearing surface by thread of stem (5).

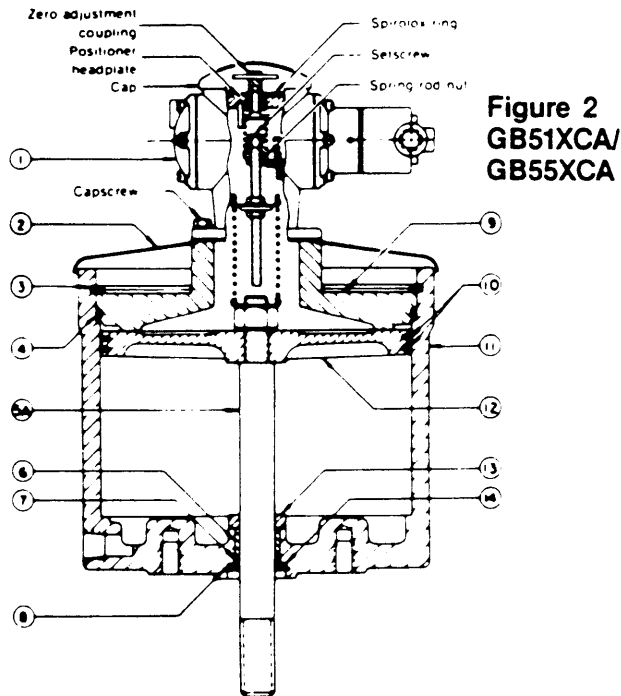


Figure 2
GB51XCA/
GB55XCA

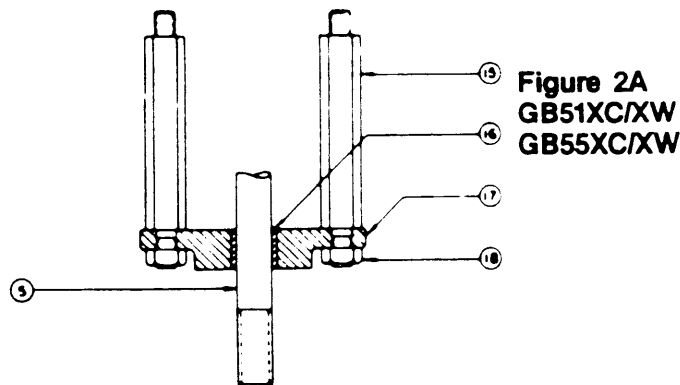


Figure 2A
GB51XC/XW
GB55XC/XW

Figure 4A
GB51XW/XWA
GB55XW/XWA

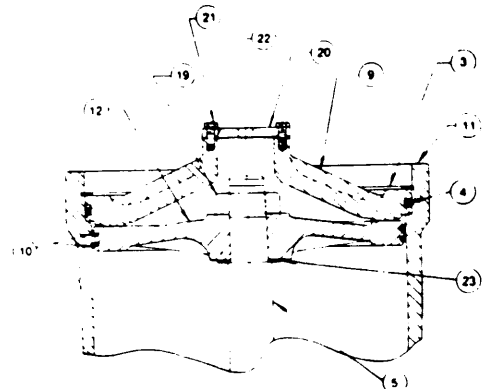
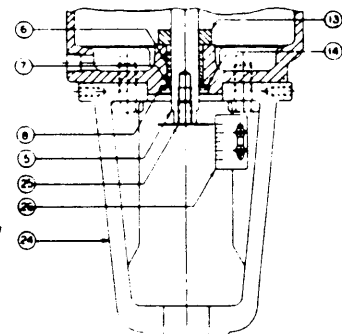


Figure 6
GB52/53/54UC
GB52/53/54UW



ITEM NO.	NO. REQ'D.	DESCRIPTION
1	1	Positioner
2	1	Cover
3	1	Spirolox Ring
4	1	Headplate O-Ring (Note 1)
5 and 5A	1	Stem B5_XCXW 1-1/8" (28.58mm) B5_XCA/XWA 1-1/8" (28.58mm) B5_XC/XW 1-1/2" (38.1mm) B5_XCA/XWA 1-1/2" (38.1mm) B5_XC/XW 2-1/2" (63.5mm) B5_XCA/XWA 2-1/2" (63.5mm) B5_XC/XW 3" (76.2mm) B5_XCA/XWA 3" (76.2mm) B5_XC/XW 4" (101.6mm) B5_XCA/XWA 4" (101.6mm) B5_XC/XW 6" (152.4mm) B5_XCA/XWA 6" (152.4mm) B5_XC/XW 8" (203.2mm) B5_XCA/XWA 8" (203.2mm) B5_XC/XW 10" (254mm) B5_XCA/XWA 10" (254mm) B52/53/54UC-UW
6	1	Oilite Bearing
7	1	Stem O-Ring (Note 1)
8	1	Truarc Ring
9	1	Headplate Throttling or On/Off
10	2	Lipseal (Note 1)
11	1	Cylinder 1-1/8" (28.58 mm) 1-1/2" (38.1 mm) 2-1/2" (63.5 mm) 3" (76.2 mm) 4" (101.6 mm) 6" (152 mm) 8" (203.2 mm) 10" (254 mm)
12	1	Piston
13	1	Collar
14	1	Retaining Plate
15	4	Spacer Bars B5_XC/XW 1-1/8" (28.38mm) B5_XC/XW 1-1/2" (38.1mm) B5_XC/XW 2-1/2" (63.5mm) B5_XC/XW 3" (76.2mm) B5_XC/XW 4" (101.6mm) B5_XC/XW 6" (152.4mm) B5_XC/XW 8" (203.2mm) B5_XC/XW 10" (254mm)
16	1	Oilite Bearing
17	1	Lower Flange
18	4	Hex Jam Nut 1/2"-13NC (3/8"-16 NC -GB 51 only)
19	1	Locknut GB50XW/XWA Series
20	1	Plate
21	6	Hex Head Capscrew 1/4"-20x3/4"
22	1	Gasket
23	1	Ring
24	1	Yoke UC/UW Series
25	1	Indicator Disc UC/UW Series
26	1	Indicator Scale UC/UW Series

- NOTES: 1. Recommended spare parts can be purchased individually or as a spare parts kit.
2. Lower Flange (17)/Oilite Bearing (16)
Cylinder (11)/Oilite Bearing (6)
These parts are to be ordered as a matched set.

Collars		"A"
		032"
		062"
		125"
		250"
		312"
		438"
		500"
	← A →	625"
		687"
		718"
		906"
		1 000"
		1 062"
		1 500"
		1 531"
		1 750"
		1 937"
		2 000"
		2 093"
		3 000"

Instruction Manuals

Positioners

XR-XS- XT- XU	
J11-J12-J13-J14	C-8032 & C-8032A
XC-C31	C-8033
XH-C32	C-8034
XK-C33	C-8035
XV-C34	C-8036
XN-J21	C-8037
XP-J22	C-8037
P50/P51/P52	C-8038

Regulators

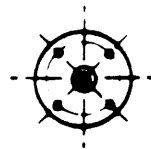
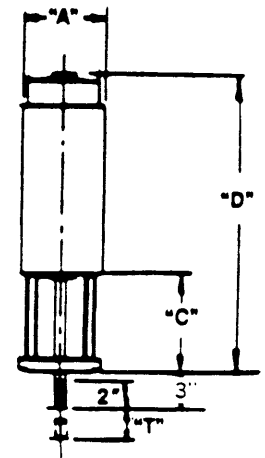
GH04	C-8025
GH20/H40	C-8015

Dimensional Drawings

Dimensional data for all GB5__ Series Actuators is contained on pages 7 and 9. For certified drawing requirements, refer to list below.

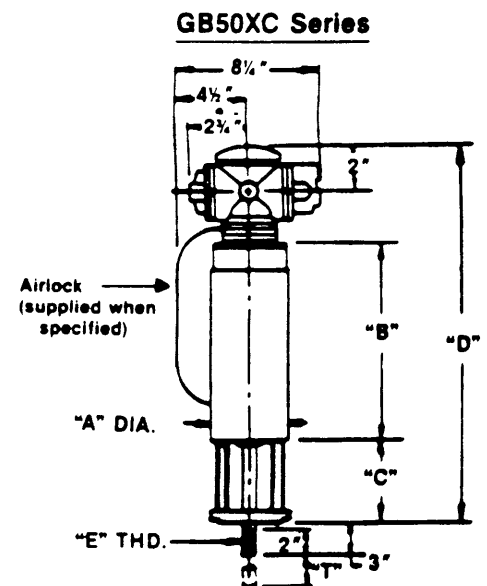
A6-41	GB50 ON-OFF	A7-114	GB51-GB55 w/GC31
A6-113	GB51-GB55 ON-OFF	A7-115	GB51-GB55 w/GC32
		A7-116	GB51-GB55 w/GC33
		A7-117	GB51-GB55 w/GC34
A7-100	GB52/53/54 w/Yoke		
A7-101	GB52/53/54 w/Yoke		
A7-102	GB52/53/54 w/Yoke	A50-4	Piping Schematic — J Positioner
A7-103	GB52/53/54 w/Yoke	A50-16	Piping Schematic — Full Reversal Positioner
		A50-48	Piping Schematic — Commandaire Positioner
A7-107	GB50 w/GC31		
A7-108	GB50 w/GC32		
A7-109	GB50 w/GC33		
A7-110	GB50 w/GC34		

GB50XW Series



NOTES:

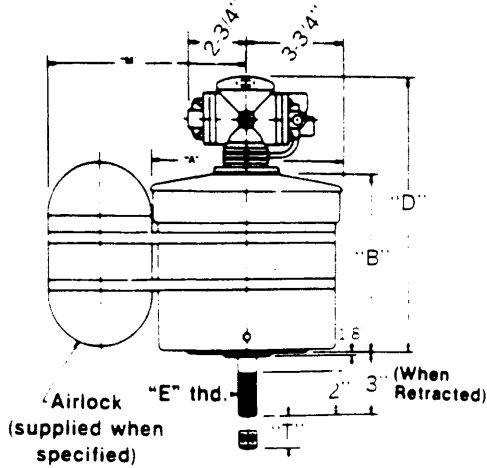
1. For piping arrangements see A50-48
2. Air connections $\frac{1}{4}$ N.P.T.
3. For complete positioner dims. see A50-49 through A50-52.



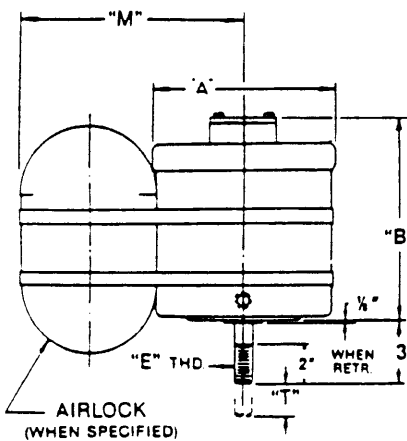
MODEL	Bore	A	B	C	D	E	F	G	H	J	K	L	M	T
GB50XC2	3"	3 1/2	6 1/8	3 3/4	13 15/16	1/2-20	5/16	11/32	2 3/4	—	—	—	5 1/4	2"
GB50XC5	3"	3 1/2	9 1/8	6 3/4	19 15/16	1/2-20	5/16	11/32	2 3/4	—	—	—	5 1/4	5"
GB50XC8	3"	3 1/2	12 1/8	9 3/4	25 15/16	1/2-20	5/16	11/32	2 3/4	—	—	—	5 1/4	8"
GB50XCA2	3"	3 1/2	6 1/8	—	10 3/16	1/2-20	—	—	—	5/16-18	1/2	2 3/4	5 1/4	2"
GB50XW2	3"	3 1/2	5	3 3/4	8 3/4	1/2-20	5/16	11/32	2 3/4	—	—	—	5 1/4	2"
GB50XW5	3"	3 1/2	8	6 3/4	14 3/4	1/2-20	5/16	11/32	2 3/4	—	—	—	5 1/4	5"
GB50XW8	3"	3 1/2	11	9 3/4	20 3/4	1/2-20	5/16	11/32	2 3/4	—	—	—	6 3/4	8"
GB50XWA2	3"	3 1/2	5	—	—	1/2-20	—	—	—	5/16-18	1/2	2 3/4	5 1/4	2"

SERIES GB51-GB55 PISTON ACTUATOR DIMENSIONS

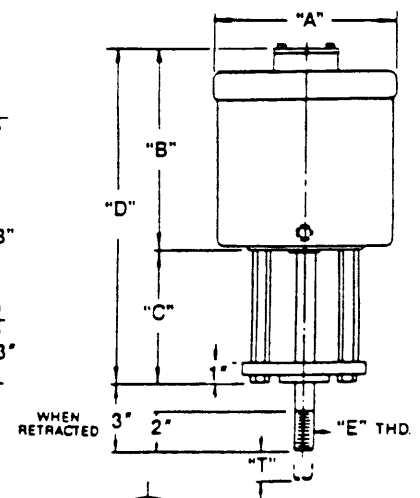
GB51XCA/GB55XCA Series



GB51XWA/GB55XWA Series

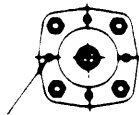
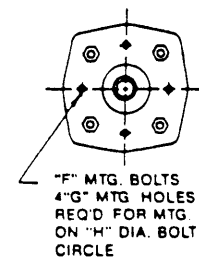
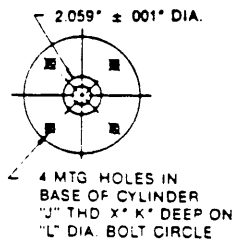


GB51XW/GB55XW Series



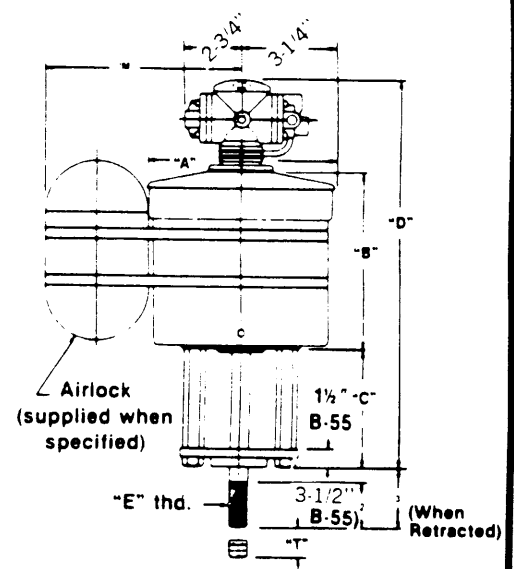
NOTE:

1. AIR CONNECTIONS 1/4 N.P.T.



"F" mtg. bolts 4 "G" mtg. holes req'd for mtg. on "H" bolt circle.
Inverted plane view of mounting base for XC & XW series.

GB51XC/GB55XC Series



- NOTES:
1. For piping arrangements see A50-48
 2. Air connections 1/4 N.P.T.
 3. For overall positioner dimensions see A50-49 through A50-52.

MODEL	BORE	A	B	C	D	E	F	G	H	J	K	L	M	T
B-51XC-3	4"	5-1/4	7-1/16	5	16-5/8	5/8-18	3/8	13/32	2-3/4	—	—	—	6	3"
B-51CX-4	4"	5-1/4	8-1/16	6	18-5/8	5/8-18	3/8	13/32	2-3/4	—	—	—	6	4"
B-51XC-A3	4"	5-1/4	7-1/16	—	11-5/8	5/8-18	—	—	—	3/8-16	1/2	3-1/4	6	3"
B-51XC-A4	4"	5-1/4	8-1/16	—	12-5/8	5/8-18	—	—	—	3/8-16	1/2	3-1/4	6	4"
B-51XW-3	4"	5	7-1/2	5	12-1/2	5/8-18	3/8	13/32	2-3/4	—	—	—	6	3"
B-51XW-4	4"	5	8-1/2	6	14-1/2	5/8-18	3/8	13/32	2-3/4	—	—	—	6	4"
B-51XW-A3	4"	5	7-1/2	—	—	5/8-18	—	—	—	3/8-16	1/2	3-1/4	6	3"
B-51XW-A4	4"	5	8-1/2	—	—	5/8-18	—	—	—	3/8-16	1/2	3-1/4	6	4"
B-52XC-1-1/8	6"	7-3/16	5-1/16	3-5/16	12-15/16	3/4-16	1/2	17/32	3-3/4	—	—	—	7	1-1/8"
B-52XC-4	6"	7-3/16	8-3/8	6	18-15/16	3/4-16	1/2	17/32	3-3/4	—	—	—	8-1/2	4"
B-52XC-6	6"	7-3/16	11-1/8	8	23-11/16	3/4-16	1/2	17/32	3-3/4	—	—	—	8-1/2	6"
B-52XC-A-1-1/8	6"	7-3/16	5-1/16	—	9-5/8	3/4-16	—	—	—	1/2-13	13/16	4-1/2	8-1/2	1-1/8"
B-52XC-A4	6"	7-3/16	8-3/8	—	12-15/16	3/4-16	—	—	—	1/2-13	13/16	4-1/2	8-1/2	4"
B-52XC-A6	6"	7-3/16	11-1/8	—	15-11/16	3/4-16	—	—	—	1/2-13	13/16	4-1/2	8-1/2	6"
B-52XW-1-1/8	6"	7	5-1/2	3-5/16	8-13/16	3/4-16	1/2	17/32	3-3/4	—	—	—	8-1/2	1-1/8"
B-52XW-4	6"	7	8-15/16	6	14-15/16	3/4-16	1/2	17/32	3-3/4	—	—	—	8-1/2	4"
B-52XW-6	6"	7	11-9/16	8	19-9/16	3/4-16	1/2	17/32	3-3/4	—	—	—	8-1/2	6"
B-52XW-A-1-1/8	6"	7	5-1/2	—	—	3/4-16	—	—	—	1/2-13	13/16	4-1/2	8-1/2	1-1/8"
B-52XW-A4	6"	7	8-15/16	—	—	3/4-16	—	—	—	1/2-13	13/16	4-1/2	8-1/2	4"
B-52XW-A6	6"	7	11-9/16	—	—	3/4-16	—	—	—	1/2-13	13/16	4-1/2	8-1/2	6"
B-53XC-1-1/2	8"	9-3/8	6-1/16	4	14-1/2	7/8-14	1/2	17/32	3-3/4	—	—	—	9-1/2	1-1/2"
B-53XC-4	8"	9-3/8	9-1/8	6	19-11/16	7/8-14	1/2	17/32	3-3/4	—	—	—	11-3/4	4"
B-53XC-6	8"	9-3/8	11-15/32	8	24-1/32	7/8-14	1/2	17/32	3-3/4	—	—	—	11-3/4	6"
B-53XC-8	8"	9-3/8	13-15/32	10	28-1/32	7/8-14	1/2	17/32	3-3/4	—	—	—	14-1/2	8"
B-53XC-10	8"	9-3/8	15-15/32	12	32-1/32	7/8-14	1/2	17/32	3-3/4	—	—	—	14-1/2	10"
B-53XC-A-1-1/2	8"	9-3/8	6-1/16	—	10-5/8	7/8-14	—	—	—	1/2-13	9/16	4-1/2	9-1/2	1-1/2"
B-53XC-A4	8"	9-3/8	9-1/8	—	13-11/32	7/8-14	—	—	—	1/2-13	13/16	4-1/2	11-3/4	4"
B-53XC-A6	8"	9-3/8	11-15/32	—	16-1/32	7/8-14	—	—	—	1/2-13	13/16	4-1/2	11-3/4	6"
B-53XC-A8	8"	9-3/8	13-15/32	—	18-1/32	7/8-14	—	—	—	1/2-13	13/16	4-1/2	14-1/2	8"
B-53XW-1-1/2	8"	9-1/8	6-3/8	4	10-3/8	7/8-14	1/2	17/32	3-3/4	—	—	—	9-1/2	1-1/2"
B-53XW-4	8"	9-1/8	9-17/32	6	15-7/32	7/8-14	1/2	17/32	3-3/4	—	—	—	11-3/4	4"
B-53XW-6	8"	9-1/8	11-25/32	8	19-25/32	7/8-14	1/2	17/32	3-3/4	—	—	—	11-3/4	6"
B-53XW-8	8"	9-1/8	13-25/32	10	23-25/32	7/8-14	1/2	17/32	3-3/4	—	—	—	14-1/2	8"
B-53XW-10	8"	9-1/8	15-25/32	12	27-25/32	7/8-14	1/2	17/32	3-3/4	—	—	—	14-1/2	10"
B-53XW-A-1-1/2	8"	9-1/8	6-3/8	—	—	7/8-14	—	—	—	1/2-13	9/16	4-1/2	9-1/2	1-1/2"
B-53XW-A4	8"	9-1/8	9-17/32	—	—	7/8-14	—	—	—	1/2-13	13/16	4-1/2	11-3/4	4"
B-53XW-A6	8"	9-1/8	11-25/32	—	—	7/8-14	—	—	—	1/2-13	13/16	4-1/2	11-3/4	6"
B-53XW-A8	8"	9-1/8	13-25/32	—	—	7/8-14	—	—	—	1/2-13	13/16	4-1/2	14-1/2	8"
B-54XC-4	10"	11-3/8	10-7/16	6	21	1-1/8-12	1/2	17/32	3-3/4	—	—	—	12-1/2	4"
B-54XC-A4	10"	11-3/8	10-7/16	—	15	1-1/8-12	—	—	—	1/2-13	13/16	4-1/2	12-1/2	4"
B-54XW-4	10"	11-3/8	11	6	17	1-1/8-12	1/2	17/32	3-3/4	—	—	—	12-1/2	4"
B-54XW-A4	10"	11-3/8	11	—	—	1-1/8-12	—	—	—	1/2-13	13/16	4-1/2	12-1/2	4"
B-55XC-4	12-1/2"	15	11-1/2	7-1/2	23-5/8	1-3/4-12	1	1-1/16	8	—	—	—	19-1/2	4"
B-55XW-4	12-1/2"	14-1/2	12-1/16	7-1/2	19-9/16	1-3/4-12	1	1-1/16	8	—	—	—	19-1/2	4"

*Maximum stroke for this unit is 5-3/8".

Millimeters = Dimension times (x) 25.4.

Conoflow



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WARNING: MANUFACTURED WITH (1, 1, 1-TRICHLOROETHANE),
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ENVIRONMENT BY DESTROYING OZONE IN THE UP-
PER ATMOSPHERE.

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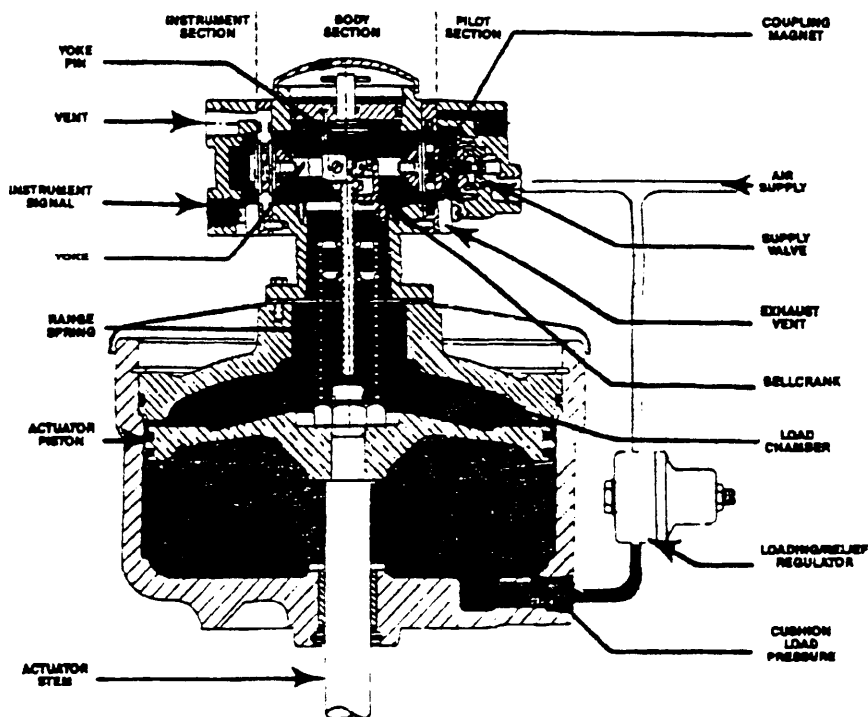
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WARNING

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.

INSTRUCTION AND MAINTENANCE MANUAL GC31 COMMANDAIRE POSITIONER



PRINCIPLE OF OPERATION

The COMMANDAIRE Model GC31 positions the actuator by applying sufficient air pressure above the piston to overcome cushion-loading pressure (pressure below piston set by an adjustable pressure reducing/relief type regulator) plus any external forces or load acting on the stem. An increase in air signal creates a force on the instrument diaphragm moving yoke to right, closing exhaust port and opening supply valve. Air flows through supply valve into chamber

above piston and moves it downward. This extends a calibrated range spring causing bellcrank to pivot counterclockwise, exerting force against yoke pin, restoring yoke to normal balanced position. A decrease in instrument air pressure reverses the procedure, closing supply valve and opening exhaust port venting to atmosphere excess air pressure above actuator piston.

SUPPLY PRESSURE (20 to 100 PSI)(138 to 690 kPa)

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(21 kPa) for a 3-15 PSI(21-143 kPa) 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)(e.g., 103 kPa for 21-103 kPa 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(21-103 kPa) range has a 12 PSI(83 kPa) span and is set with a 3 PSI(21 kPa) start point (retracted position). Positioner span has been factory calibrated as specified. Instrument signals of 3-9, 3-15 and 6-30 PSI(21-62, 21-103 and 41-207 kPa) are available. For field changes, refer to page 5.

REMOVING POSITIONER FROM ACTUATOR

Shut off supply and instrument air before performing any maintenance.

Piston or diaphragm should be in the fully retracted position. Disconnect tubing and bleed all air out of the actuator. Remove cap (1) from positioner and spirolox ring (3), so that head plate assembly (2) can be lifted out. Loosen setscrew (24) using 1/8" Allen Wrench and remove spring rod nut (16)*. Remove six capscrews (14) and lift positioner from actuator.

INSTALLING POSITIONER ON ACTUATOR

The Model GC31 Positioner is designed for actuators having a 2-1/4" 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.

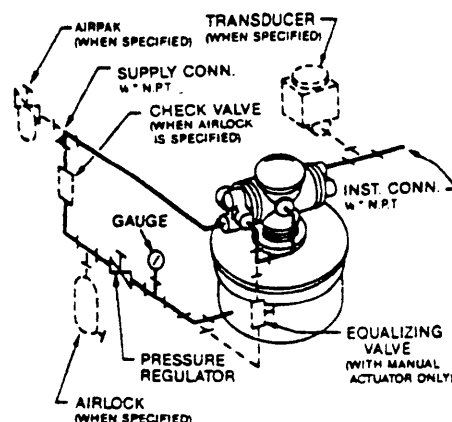
The range spring (8C) is adjusted and set at the factory for the proper range and spring rod (8A) extension as shown on page 6. With the actuator stem in the fully retracted position and the spring rod nut (16) removed from the spring rod (8C), thread the spring nut assembly (8D) onto the actuator stem. Hold the range spring assembly in a vertical position without applying any tension to the range spring (8C). Measure the distance between the positioner mounting surface on the actuator (without gasket) and the top of the spring rod (8A). This distance must be a 2-5/16" \pm 1/64" (58.75 mm \pm .41 mm) 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 spring clip is allowed to turn, the number of inactive coils on the range spring 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 2-5/16" (58.75 mm) dimension. Continue holding the lower clip (8B) and range spring (8C) while retightening the upper clip securely. Measure the

2-5/16" (58.75 mm) 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 (13) and the positioner on the actuator guiding the spring rod (8A) through the hole in the bell crack (17). Install the six 1/4"-20 screws (14) that secure the positioner to the actuator.

Turn the set screw (24) in the spring rod nut (16) such that the head of the screw is flush with the top of the nut as shown. Install this assembly onto the spring rod finger tight. Hold the spring rod nut with a wrench or suitable tool to prevent it from turning and tighten the set screw 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 (4) is properly centered on the spring rod nut (16) 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 GC31

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 depressing the 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.

*For positioner removal kit, order 6385266.

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.

INSTRUMENT AIR SIGNAL

Verify that the proper instrument signal is being applied using a pressure gauge or digital pressure readout.

YOKE (18) AND BELLCRANK (17) 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 (20) are not twisted. When replacing the headplate assembly, make sure that the zero spring is properly located on the spring rod nut.

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 (20) proceed as follows:

INSTRUMENT SIDE:

Remove instrument cap (9) by unscrewing the four fillister head screws. Removal of the instrument cap will free the instrument spring (6), diaphragm assembly (7) and magnet (5) for removal. Remove diaphragm screw (21) and the three flat head screws and lift off spacer (11). Then remove diaphragm plate (19) and diaphragm (20). Inspect the diaphragm for damage and replace if necessary.

PILOT SIDE:

Remove the pilot assembly (26) by unscrewing the four fillister head screws. Use caution when removing the pilot assembly to avoid damage to the exhaust plunger. Remove the exhaust plunger from magnet. Unscrew the three flat head machine screws and lift off spacer (11). Note that the magnet is bonded to diaphragm plate (19) which will not allow removal of diaphragm (20). Visually inspect the diaphragm for damage. If replacement is necessary, refer to "PILOT/INSTRUMENT SECTION".

To replace the yoke (18) or bellcrank (17), first remove the cap (1) and headplate assembly (2). To remove the headplate assembly,

use a small screwdriver to remove the spirolox ring (3), then pull the headplate assembly (2) out of the positioner with the zero spring (4). Note that the spring rod nut (16) must be removed. Refer to Page 2 - "REMOVING POSITIONER FROM ACTUATOR" for this procedure.

Next, rotate the yoke (18) to provide access to the inside stop block (22). Unscrew the two round head screws and remove the stop block. Slide the yoke through the pilot end of the positioner.

The flexure ring assembly (17) is now accessible and may be removed by unscrewing the three round head retaining screws.

INSTRUMENT SECTION

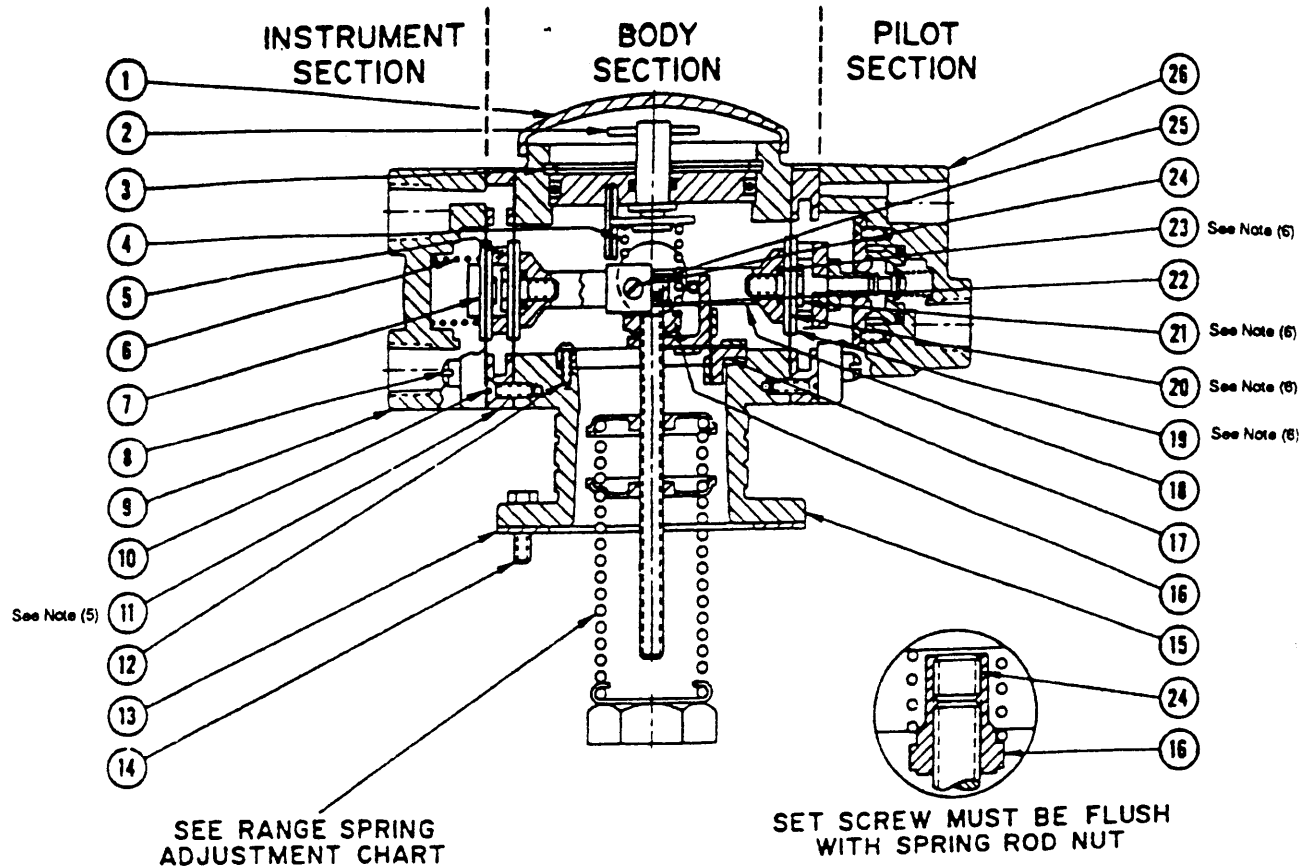
To examine the instrument section only, remove all air supply lines and the piping connections to the instrument section. Proceed as outlined above in "BODY SECTION - INSTRUMENT SIDE". When reassembling the instrument section, be sure the magnet (5) and instrument spring (6) are properly located. Also make sure the diaphragm holes are oriented correctly. The index grooves on the spacer, instrument cap and diaphragm must be in line.

PILOT/INSTRUMENT SECTION

Remove the pilot assembly (26) by unscrewing the four fillister head screws in the pilot assembly. Carefully remove the pilot assembly to avoid damaging the exhaust plunger. Remove the exhaust plunger from the magnet. Check the operation of the exhaust plunger and pilot valve 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.

To replace the diaphragm (20), insert a screwdriver in the center hole of the magnet and pry loose. Once magnet has been removed, loosen and remove diaphragm screw (21) and the three flat head screws, and lift off spacer (11). Then remove diaphragm plate (19) and diaphragm (20). Inspect the diaphragm for damage and replace if necessary.

When reassembling the pilot section, it is recommended that the magnet be bonded to diaphragm plate (19) with Loctite 326 or equivalent. This bonding process will prevent the magnet from shifting during operation or maintenance. Make sure that the magnet is centered on the diaphragm plate and the exhaust plunger is centered on the magnet. With the grooves in the diaphragm, spacer and pilot assembly aligned, carefully guide the pilot assembly over the exhaust plunger. Insert the four fillister head screws and tighten them securely.



Item No.	Description	Qty. Req'd.	Part No.	Item No.	Description	Qty. Req'd.	Part No.
1	Top Cap	1	6025969	14	Hex Hd. Capscrew 1/4" - 20 x 1/2" Lg.	6	6900095
2	Head Plate Assembly	1	6027130	15	Body	1	6026751
3	Spirolox Ring	1	6004691	16	Spring Rod Nut	1	6025803
4	Zero Spring	1	6025811	17	Flexure Ring Assembly (Bellcrank)	1	6025753
5	Magnet	1	6078307	18	Yoke Assembly	1	6026579
6	Instrument Spring	1	6026843	19	Diaphragm Plate	4	6026686
7 ⁽¹⁾	Instrument Diaphragm Ass'y	1	6026652	20 ⁽¹⁾	Diaphragm	2	6026553
8	Fillister Hd. Mach. Screw #10-32 x 3/4" Lg.	8	6900061	21	Diaphragm Screw	2	6026546
9	Instrument Cap	1	6026801	22	Inside Stop Block	1	6026538
10	Flat Hd. Mach. Screw #8-32 x 1/2" Lg.	6	6900574	23 ⁽¹⁾	"O" Ring	2	6076608
11	Spacer	2	6026785	24	Socket Setscrew (Dog Point) 1/4" - 28 x 1/4" Lg.	1	6900113
12	#4 Self Tap Screw x 3/4" Lg. (Slotted Head Type)	3	6900545	25	Round Hd. Mach. Screw #4-40 x 1/2" Lg.	2	6900007
13 ⁽¹⁾	Gasket	1	6001762	26	Pilot Assembly	1	6027148

NOTES:

- Recommended spare parts can be purchased individually or as a spare parts kit, under number 6385464, Spare Parts Kit GC31 (Consists of items 7, 13, 20 and 23).
- When ordering spare parts, specify complete catalog no., item no. and part no. This will permit positive identification and rapid handling of order.
- For body assembly order 6026504 (Consists of items 10 thru 12 and items 15 thru 25).
- For tapped exhaust use
6026819 for item 9
6027155 for item 26.
- Identical component used in pilot section.
Component is not numbered.
- Identical components used in instrument section.
Components are not numbered.

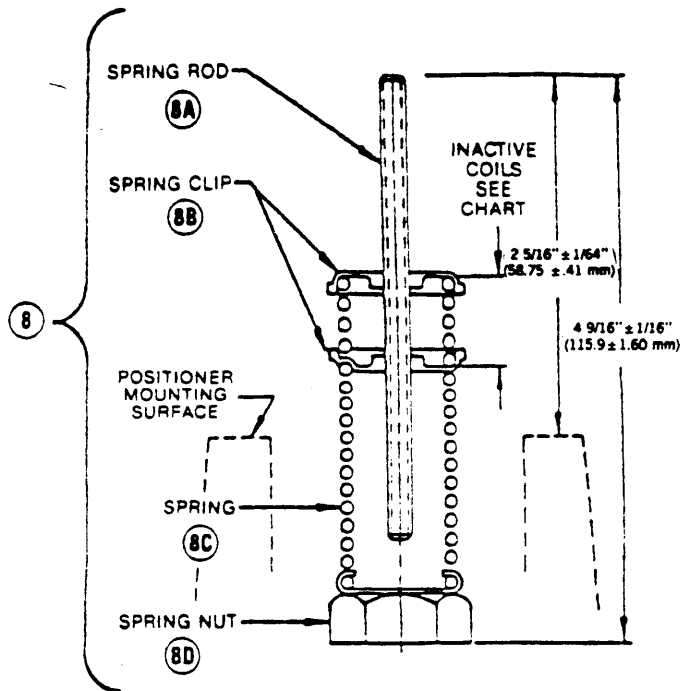


TABLE #1 STEM NUT IDENTIFICATION

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

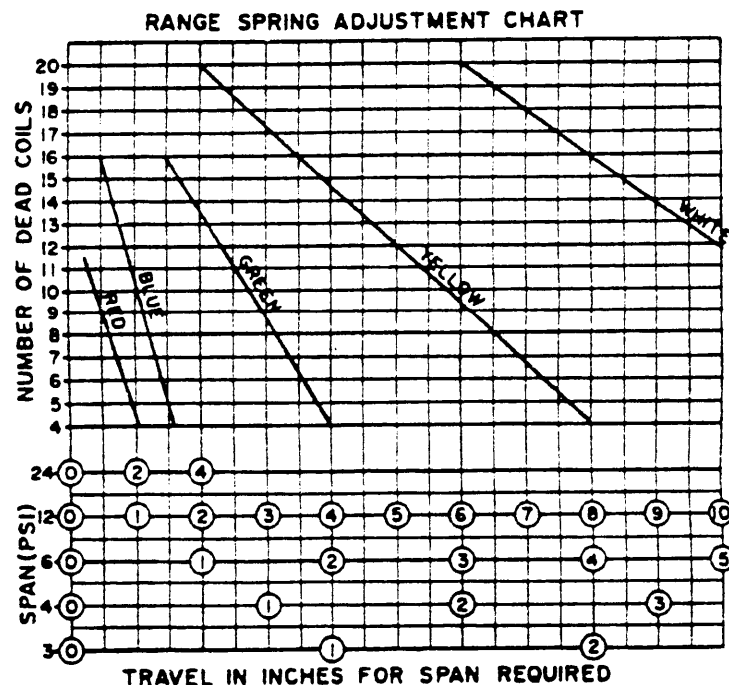
ORDERING INSTRUCTIONS AND RANGE SPRING ASSEMBLY IDENTIFICATION

EXAMPLE: Basic No. Stem Nut Ass'y. No. Stroke Length in 1/16"(1.60 mm) Units Specify Spring Color

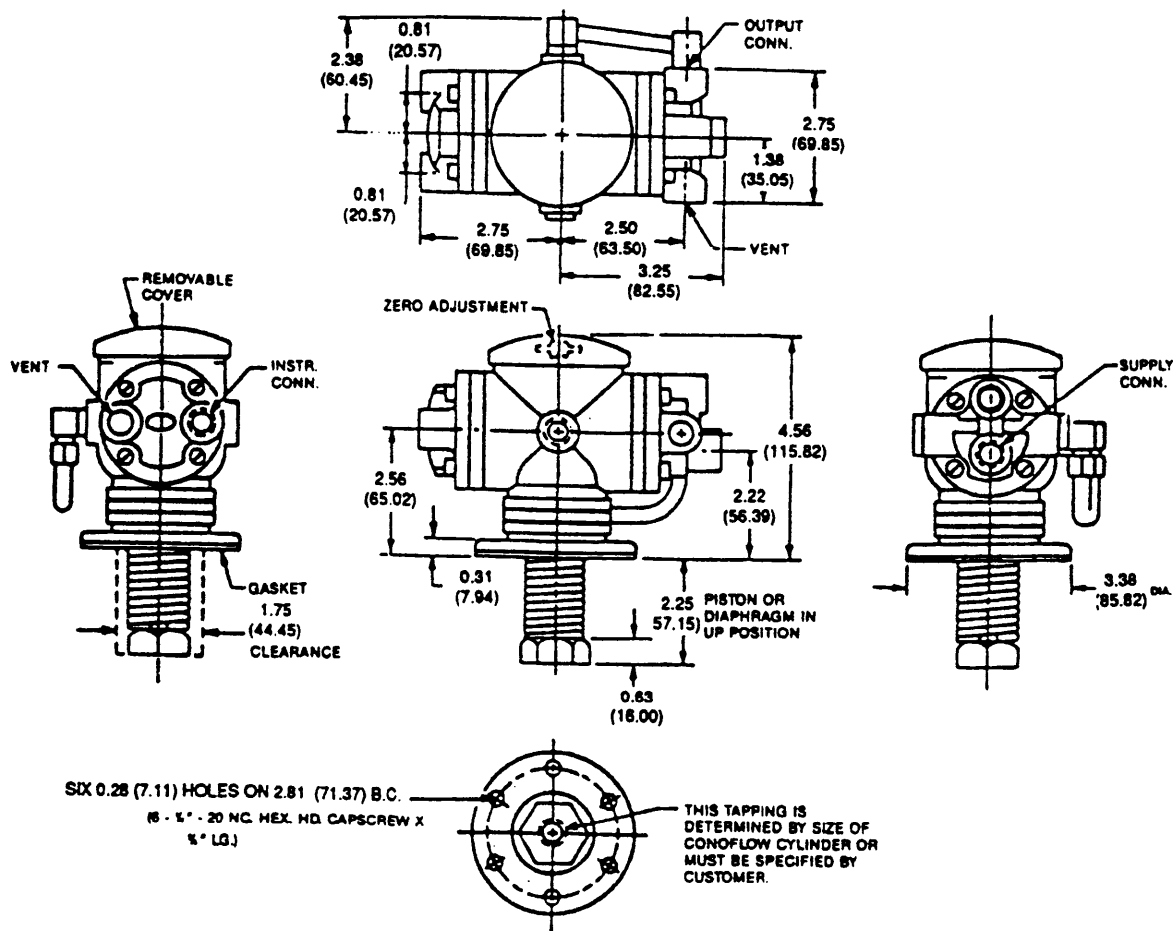
RANGE SPRING ASSEMBLY: GJ800 5 Y

This basic GJ800 Assembly with #5 Stem Nut Assembly (5/8"-18 thread); 6"(152 mm) Stroke: 12 PSI(83 kPa) 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" (58.75 ± 1.60 mm).

Refer to manual C-8053 for ordering information.



Note: For travels greater than 10" (254 mm), consult the factory.



NOTES:

1. ALL CONNECTIONS ARE 1/2" N.P.T. UNLESS OTHERWISE NOTED.
2. WHEN ORDERING, SPECIFY MODEL, RANGE AND STROKE.
3. FOR PIPING SCHEMATICS SEE A50-48.
4. VENTS CAN BE TAPPED 1/2" N.P.T. FOR GAS SERVICE.
5. () DIMENSIONS IN MILLIMETERS.

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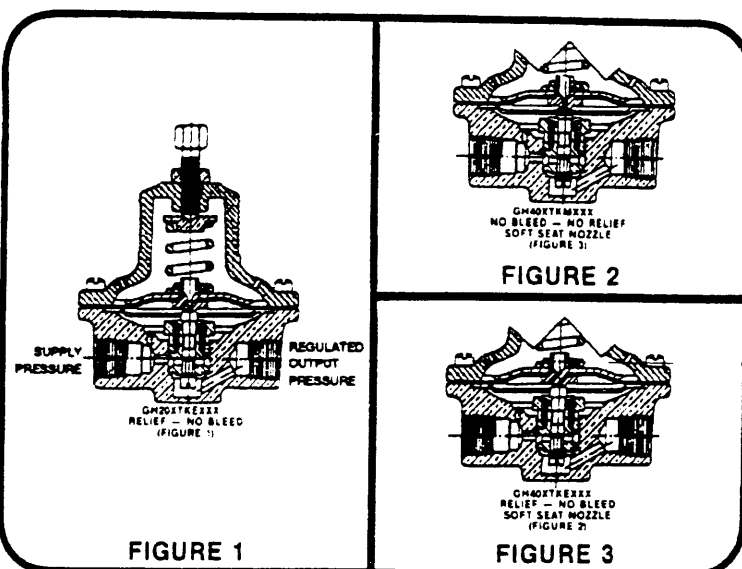
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WARNING

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.

INSTRUCTION AND MAINTENANCE MANUAL GH20/40 SERIES SERVICE REGULATORS



PRINCIPLE OF OPERATION

Refer To Figure 1

Turning the handwheel changes the force exerted by the range spring on the diaphragm assembly. In equilibrium, the force exerted by the range spring is balanced by the force from the output pressure acting underneath the diaphragm assembly.

An unbalance between the output pressure and the set pressure causes a corresponding reaction in the diaphragm and nozzle assemblies. If the output pressure rises above the set pressure, the diaphragm seat is lifted from the plug venting the excess pressure to atmosphere until equilibrium is reached. If the output pressure drops below the set pressure, the unbalanced force from the range spring acts through the diaphragm assembly unseating the nozzle plug. This allows supply pressure to flow through the nozzle to the downstream port increasing the output pressure. The output pressure increases until it balances the force on the diaphragm assembly by the range spring. At equilibrium, the plug assumes a position which supplies the required flow while maintaining the output pressure at the set pressure.

Refer to Figure 2

For applications where positive shut-off and minimum air consumption are required, molded rubber seats on the top and bottom of the nozzle plug are available.

Refer To Figure 3

A no bleed/no relief diaphragm assembly is used to prevent the process media from exhausting to atmosphere. This option is typically used with liquids and toxic gases. The principle of operation is the same as above except that excess output pressure is not vented to atmosphere. Instead, as the diaphragm seat lifts off of the plug and the nozzle closes, the excess pressure is relieved downstream.

A molded rubber seat on the nozzle plug is available for applications where positive shut-off is required.

INSTALLATION

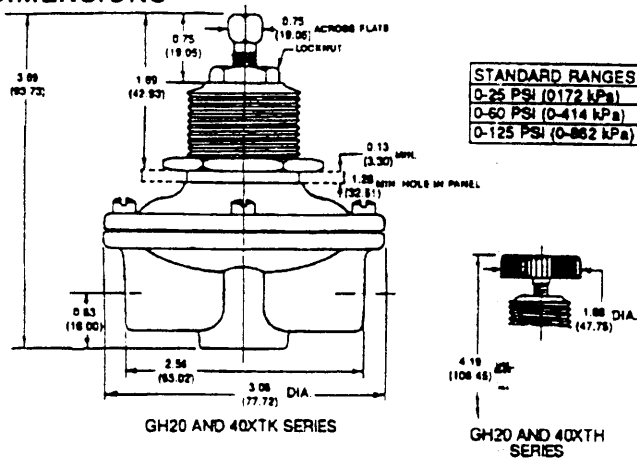
CAUTION: Maximum Supply Pressure is 200 PSI(1379 kPa). Stainless Steel Models 300 PSI(2068 kPa)

Unit has two 1/4" N.P.T. connections. The inlet connection is marked "IN". IT IS RECOMMENDED THAT A FILTERED AIR SUPPLY BE USED.

Check all connections for leakage after installation.

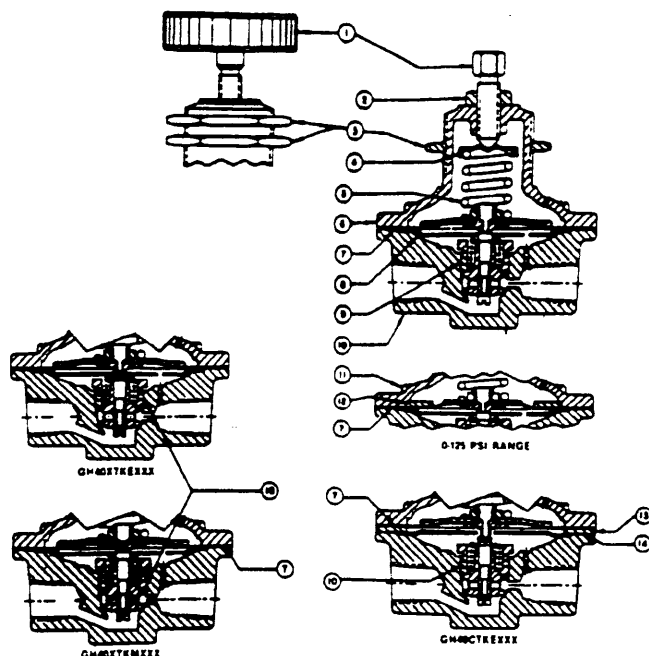
The adjusting screw should be kept well lubricated with grease.

DIMENSIONS



NOTES
1. ALL CONNECTIONS ARE 1/4" NPT
2. () DIMENSIONS IN MILLIMETERS
* OPTION ACCESSORY, ONLY SUPPLIED WHEN SPECIFIED

FOR CERTIFIED DIMENSIONAL DRAWING, REFER TO
A17-3



MAINTENANCE

Remove air supply pressure and bleed off output pressure prior to performing maintenance.

Periodic replacement of the diaphragm assembly and nozzle assembly is recommended for services where the unit is on stream continuously and where consistent, high accuracy regulation is required. The frequency of replacement will depend on the nature of the service, cleanliness of air, humidity of the air, etc.

To replace diaphragm assembly, loosen adjustment (knob or handwheel) until spring tension is relieved. Remove six screws (11) and lift off bonnet (6), spring plate (4), spring (5) and diaphragm assembly (7). Place new diaphragm assembly (7) over body (10) with diaphragm plate up. Place spring (5) and spring plate (4) on diaphragm assembly (7), re-install bonnet (6) and tighten down six screws (11). The six screws (11) should be tightened alternately.

NOTE: On the GH40CT version spacer (13) and gasket (14) must be placed over body prior to installing new diaphragm assembly.

To replace the nozzle assembly (9) proceed as above, also removing baffle plate (8). Use $\frac{1}{4}$ " socket wrench to remove and replace nozzle assembly to avoid damage to the nozzle. Nozzle assembly may be cleaned by immersion in a suitable solvent and blowing dry with air stream.

Item No.	Description	Qty. Req'd	GH20XTKEXXX(2) GH40XTKEAXX(2) GH40XTKMAXX(2)	GH20XTKEXBX(2) All Brass	GH20XTKHXXKX(2) 303 St. Stl.	GH20XTKHXSX (2) 316 St. Stl.	GH40CTKEAXX(2)
1	Knob-Wrench Style Handwheel Assembly	1	6017750	6017750	6017750	6384855	6017750
2	Hex Jam Nut 5/16"-24NF	1	6900212	6900212	6900211	6900211	6900212
3	Locknut (2 Req'd H Adjustment)	1	6017628	6017628	6017636	6017636	6017628
4	Spring Plate	1	6018857	6018857	6017172	6384765	6018857
5	Range Spring -Green 0-25 PSI(0-172 kPa)	1	6017347	6017347	6019780	6284838	6017347
	-Red 0-60,125 PSI(0-414, 862 kPa)	1	6019921	6019921	6021042	6384839	6019921
6	Bonnet	1	6017727	6017412	6021026	6021026	6018972
7(1)	Diaphragm Assembly 0-25/60 PSI(0-172/414 kPa) KEXXX	1	6019939	6019939	6020325	6384835	6018964
	0-125 PSI(0-862 kPa) KEXXX	1	6019947	6019947	6021075	6384837	.....
	0-25/60 PSI(0-172/414 kPa) KMXXX	1	6018766	.....	.....	.....	.....
	0-125 PSI(0-862 kPa) KMXXX	1	6018634	.....	.....	.....	.....
8	Baffle Plate	1	6319115	6319115	6021059	6021059	6319115
9	Nozzle Assembly H20-KEXXX	1	6347843	6347843	6020986	6384841	.....
	H40-KEXXX	1	6018758	6018758	.....	.....	6018758
	H40-KMXXX	1	6018741	.....	.....	.....	.....
10	Body	1	6320741	6320741	6021034	6021034	6320774
11	Fill. HD Screw #8-32 x 3/8" Lg.	6	6900039	6900039	6900046	6900046	6900185/1/2" Lg.
12	Restricting Plate (0-125 PSI [0-862 kPa] only)	1	6017487	6017487	6021083	6021083	.....
13	Spacer	1	.....	.....	.....	.....	6016935
14	Gasket	1	.....	.....	.....	.....	6017545

NOTES: 1. Recommended Spare Parts.

2. For definition of catalog number, refer to Sales Bulletin C-2004.

3. When ordering spare parts, specify complete catalog no., item no. and part no. This will permit positive identification and rapid handling of order.

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WARNING: MANUFACTURED WITH (1, 1, 1-TRICHLOROETHANE), A SUBSTANCE WHICH HARMS PUBLIC HEALTH AND ENVIRONMENT BY DESTROYING OZONE IN THE UPPER ATMOSPHERE.