Conoflow®

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WARNING

Conoflow's products are designed and manufactured using materials and workmanship required to meet all applicable 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.

To avoid personal injury or equipment damage resulting from 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
# GB50 Series Piston Actuator

**CAUTION:** These instructions should be read and understood prior to installation, use, or maintenance.

**WARNING**: Forces generated during actuator operation are significant. Keep clear of moving parts during actuator operation.

This manual describes the GB50 Series Piston Actuators. Actuators of various piston diameters, strokes, and mounting arrangements are available. These piston actuators are typically equipped with a top mounted positioner and range (control) spring assembly. Other configurations are available, including on-off (full extend / retract) operation, failsafe operation, and different mounting or lever operation. See sales literature for these standard offerings.

## UNPACKING ACTUATOR

Check for accessory equipment packed with the actuator. The actuator nameplate will provide necessary data required for complete identification. Always refer to actuator model number when ordering spare parts, conversion parts or accessory equipment.

## INSTALLATION

The piston actuator can be mounted in any position. In most configurations, a regulator and gauge for loading one side of the 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.

## OPERATION

Normal range of the actuator positioner for full stroke is 3-15 PSI (21-103kPa) (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 port to supply both the positioner and the cushion loading device. 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).

## ZERO ADJUSTMENT

To check the 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 and note the position of the actuator stem. Continue rotation of the zero adjustment coupling in the proper direction until the actuator stem is at the midpoint of stroke. Adjust the instrument output signal to low and high points in the range and check the stem position at both ends of the stroke.

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

## CUSHION LOADING REGULATOR

Fixed 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.

## MATERIALS OF CONSTRUCTION

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

| Model Number | Piston Diameters |
|---|---|
| GB50 | 3” (76 mm) |
| GB51 | 4” (102 mm) |
| GB52 | 6” (203 mm) |
| GB53 | 8” (203 mm) |

## MAINTENANCE

## POSITIONER / ACCESSORIES

The positioner requires a minimum of maintenance. If positioner or accessory servicing or replacements are necessary, refer to the appropriate instructions.

## PISTON ACTUATOR

The service life of the seals is such that replacement will seldom be necessary under normal operating conditions.

**Should disassembly become necessary, the following procedure must be followed. The piston should be in the “up” position. Disconnect tubing and bleed air out of the unit.**

Remove the cap from the positioner and the Spirolox type retaining ring, directly under the cap, so that the positioner head plate can be lifted out. Loosen the set screw and remove the spring rod nut. Then remove the six cap screws around the positioner flange and lift the positioner from the head plate.

**GB50:** Remove the set screws and lift out the cylinder head plate.

**GB51/55:** Remove the cover, Spirolox type retaining ring, and lift out the cylinder head plate.

Disconnect the actuator stem from the unit being serviced. Slide out the piston and actuator stem nut assembly. The piston seal(s) may now be inspected. Any water, dirt, or sludge which may have accumulated inside the cylinder should be removed. The stem o-ring should be replaced each time by removing the retaining ring (Tru-Arc ring) and retaining plate.

Before reassembling, apply a thin layer of grease (Dow-Corning #DC-33 light lubricant or equivalent) to the inner wall of the cylinder, actuator stem, piston seal(s) and the seal groove(s) in the piston. Care should be exercised when inserting the piston into the cylinder because the seal is designed for some interference with the cylinder bore and must pass over a small step to enter the cylinder bore.

**If the piston will not enter the cylinder bore, run a shim (approximately .010” thick x 1/2” wide) between the seal(s) and cylinder wall while applying slight pressure to the piston.**

The stem must be carefully guided and inserted through the bearing to prevent damage of the bearing surface by the thread of the stem.

## PISTON ACTUATOR SERVICE KITS

Standard spare parts kits are available that contain all the seals required to service GB50-GB53 size cylinders. These kits contain older and improved seals (lip seals and quad ring) to install on older or newer pistons, as well as replacement o-rings for the stem seal and the head plate seal.

| Actuator Model | Spare Parts Kit |
|---|---|
| GB50 | G6385343 |
| GB51 | G6385344 |
| GB52 | G6385345 |
| GB53 | G6385346 |

## CATALOG PART NUMBER KEY / CONTROL ENGINEERING (CONFIGURATION) DATA

The following catalog configuration data describes standard configuration options of the GB50 series piston actuators

**Characters 1-4 (Model No.)**

GB50 = 3.0" Piston Diameter
GB51 = 4.0" Piston Diameter
GB52 = 6.0" Piston Diameter
GB53 = 8.0" Piston Diameter

**Character 5 (Standard Options)**

A = Yoke type
N = Airlock on Yoke (GB52 and GB53 Only)
P = Airpak Filter Regulator Mounted to Positioner (GB52 and GB53 Yoke Style)
R = Airpak Filter Regulator Mounted to Positioner, with Airlock (GB52 and GB53 Yoke Style)
S = Lever Operation (GB52 and GB53 Only)
T = Airpak Filter Regulator Mounted to Positioner (Except Lever and Yoke Styles)
U = Yoke Type - GB52 1 1/4" Yoke Mount
- GB53 1 11/16" Yoke Mount
*NOTE: These same Yoke dimensions apply to options A, N and P*
W = Lever Operation with Airpak Filter Regulator Mounted to Positioner
X = Standard (if none of the above options are chosen)

**Character 6 (Positioner)**

C = GC31 Commandaire Positioner with Cushion Load Regulator
H = GC32 Commandaire Positioner with Cushion Load Regulator
K = GC33 Commandaire Positioner with Cushion Load Regulator
V = GC34 Commandaire Positioner with Cushion Load Regulator
F = GC31 Commandaire Positioner with full reversal (GH232T Reversing Relay), and GFX04 Supply Filter
G = GC33 Commandaire Positioner with full reversal (GH232T Reversing Relay), and GFX04 Supply Filter
W = On / Off (Full Extend or Retract Operation Only)
6 = On / Off (Throttling type Head Plate without Positioner)

**Character 7 (Spacer Bars)**

A = No Spacer Bars or Lower Flange (for Type T or Type X in Character 5)
X = Standard configuration (Spacer Bars, Yoke, Lever)

**Character 8 (Range Selection)**

| | | |
|---|---|---|
| A = 3-7 PSI | F = 6-18 PSI | K = 14-22 PSI |
| B = 3-9 PSI | G = 6-30 PSI | L = 18-30 PSI |
| C = 3-15 PSI (Standard) | H = 7-11 PSI | M = 22-30 PSI |
| D = 3-27 PSI | J = 9-15 PSI | K = On/Off Operation Only |

**Character 9 (Airlock)**

For GC31 through GC34, and On/Off Only

| | |
|---|---|
| A = 57 cu. in System | C = 180 cu. in. System |
| E = 400 cu. in. System | G = 1000 cu. in. System |

For Full Reversal Series – Extends Stem on Air Supply Failure

| | |
|---|---|
| B = 57 cu. in System | D = 180 cu. in. System |
| F = 400 cu. in. System | H = 1000 cu. in. System |

For Full Reversal Series – Retracts Stem on Air Supply Failure

| | |
|---|---|
| T = 57 cu. in System | M = 180 cu. in. System |
| N = 400 cu. in. System | P = 1000 cu. in. System |

L = Airlock – Lock in Last Position (includes GVB12AB Relay)
X = Absence of Specification – No Airlock function

**Character 10**

X = Absence of Specification

**Characters 11-15 Stroke Length**

Stroke, in Inches (example, a 4 inch stroke would be 04000)

Standard stroke lengths are as follows, however optional collars are used to reduce piston stroke from standard stroke length, as applicable for the specified stroke length.

| | | | |
|---|---|---|---|
| GB50 | 2", 5" and 8" | GB52 | 1 1/8", 4" and 6" |
| GB51 | 3" and 4" | GB53 | 1 ½", 4", 6", 8" and 10" |

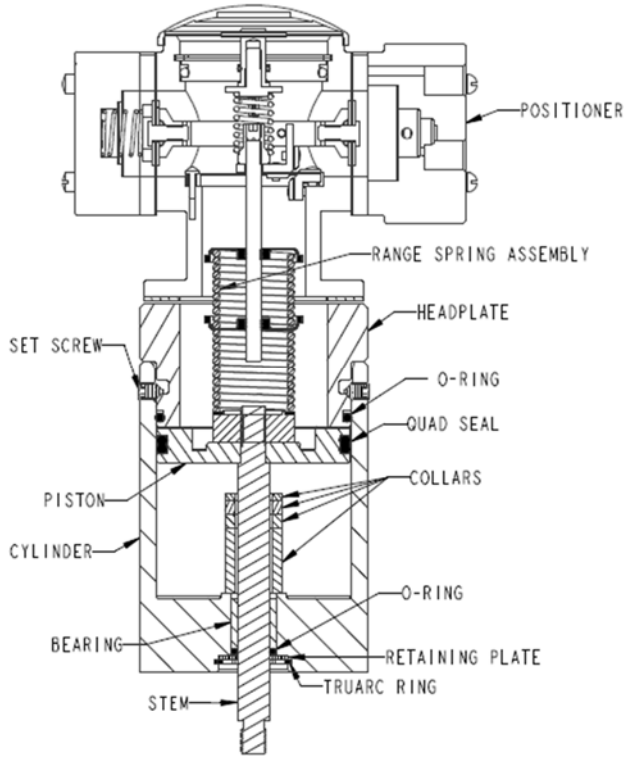



FIGURE 1: GB50 SERIES ACTUATOR LABELED SECTION VIEW, SHOWING CURRENT PISTON SEAL (GB50 SIZE)

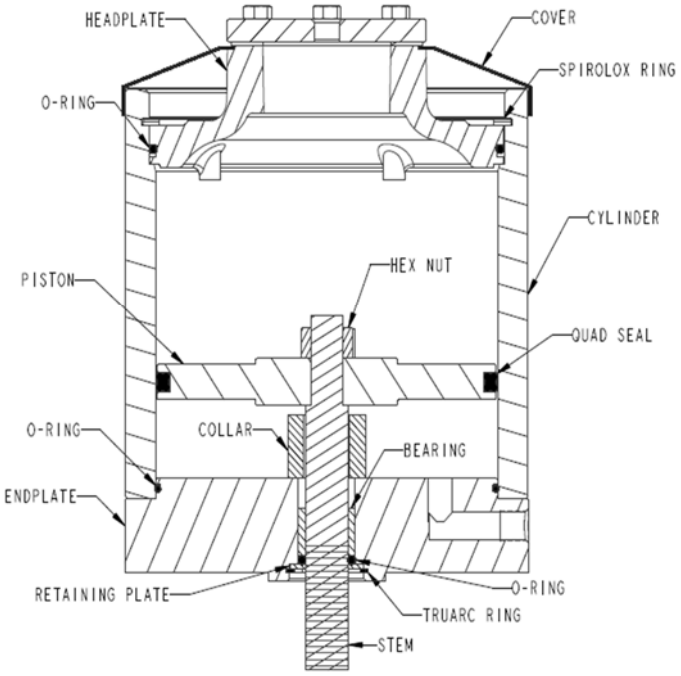



FIGURE 2: GB51/53 SERIES ACTUATOR LABELED SECTION VIEW (GB52XW SHOWN)

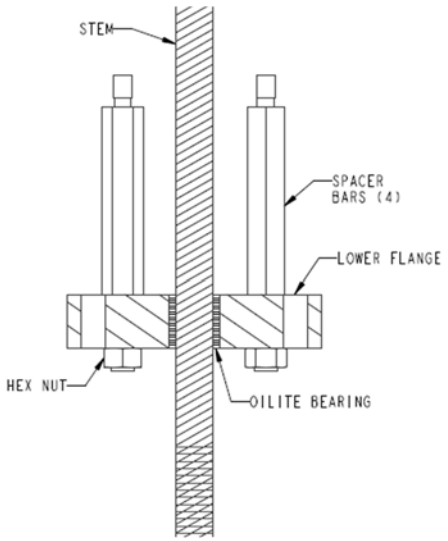



FIGURE 3: GB50/53 SERIES ACTUATOR OPTIONAL SPACERBAR ASSEMBLY

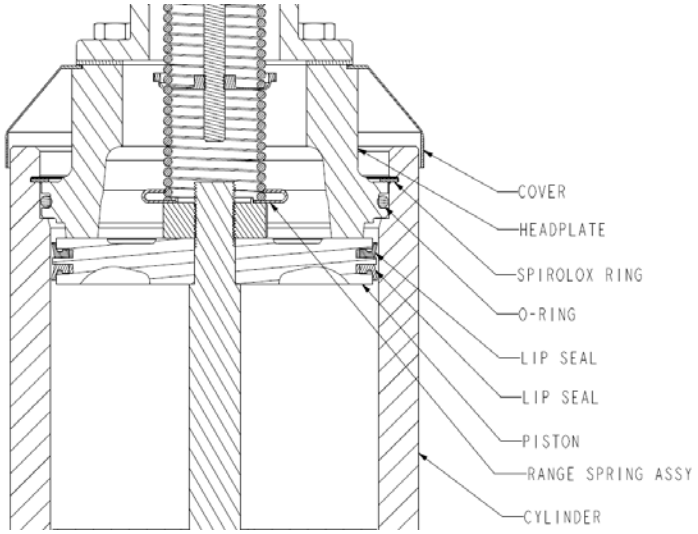
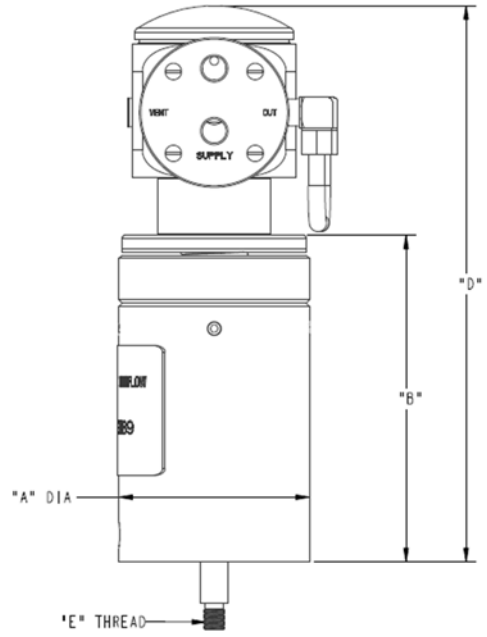
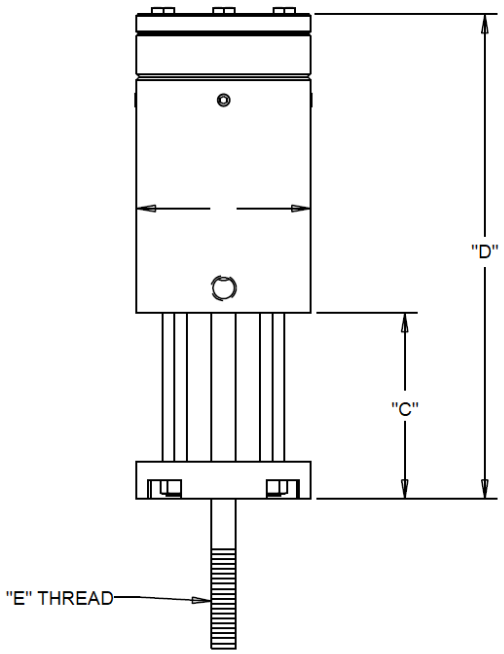



FIGURE 4: GB50 SERIES ACTUATOR LABELED SECTION VIEW SHOWING LIP SEALS USED PRIOR TO 11/2016 PRODUCTION (GB51 SIZE SHOWN FOR ILLUSTRATIVE PURPOSES)

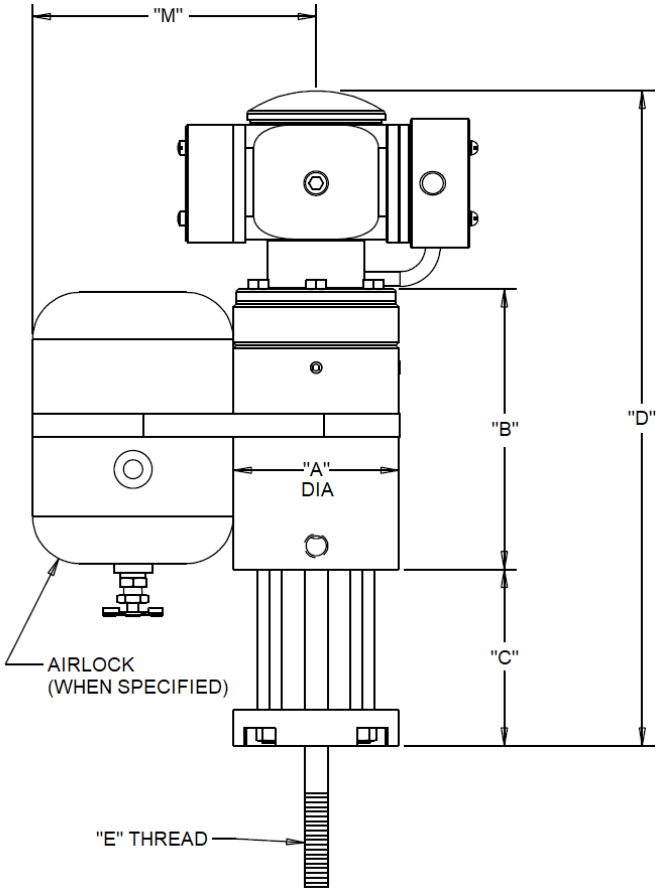
GB50XCA SERIES

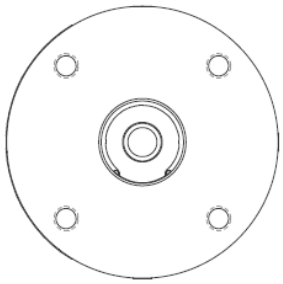



GB50XW SERIES

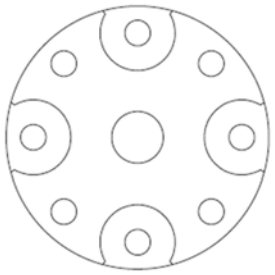



GB50XC SERIES





4 MOUTNING HOLES IN BASE OF CYLINDER
'J' THREAD, "K" DEPTH, ON "L" DIAMETER BOLT CIRCLE

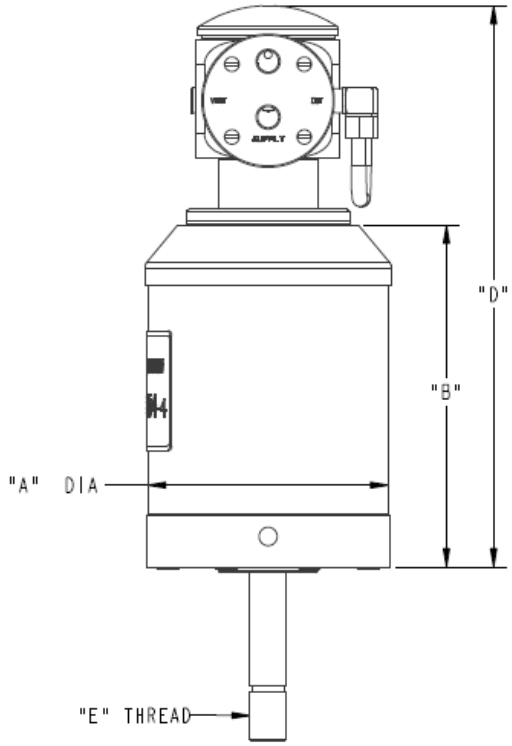


MOUNTING HOLES IN BASE OF XC & XW MODELS
"F" MOUNTING BOLTS AND 4 "G" MOUNTING HOLES REQUIRED
FOR MOUNTING ON "H" DIAMETER BOLT CIRCLE

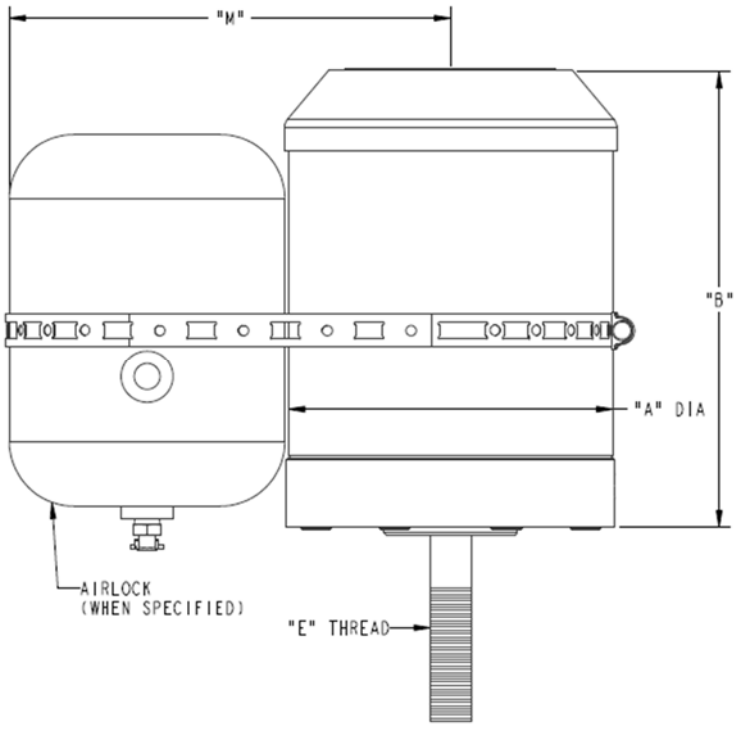
| MODEL | BORE | A | B | C | D | E | F | G | H | J | K | L | M | STROKE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GB50XC2 | 3" | 3-1/2" | 6-1/8" | 3-3/4" | 13-15/16" | 1/2-20 | 5/16" | 11/32" | 2-3/4" | - | - | - | 5-1/4" | 2" |
| GB50XC5 | | | 9-1/8" | 6-3/4" | 19-15/16" | |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

NOTE 1: DIMENSION "M" REPRESENTS THE DISTANCE FROM CENTER OF CYLINDER BORE TO THE OUTERMOST WALL OF THE AIRLOCK (WHEN APPLICABLE)

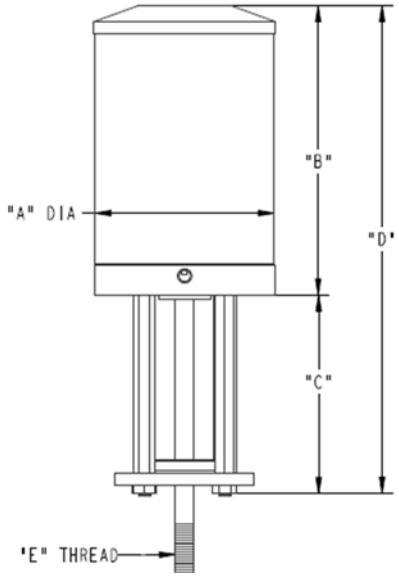
GB51XCA/GB53XCA SERIES

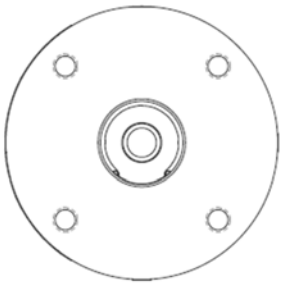



GB51XWA/GB53XWA SERIES



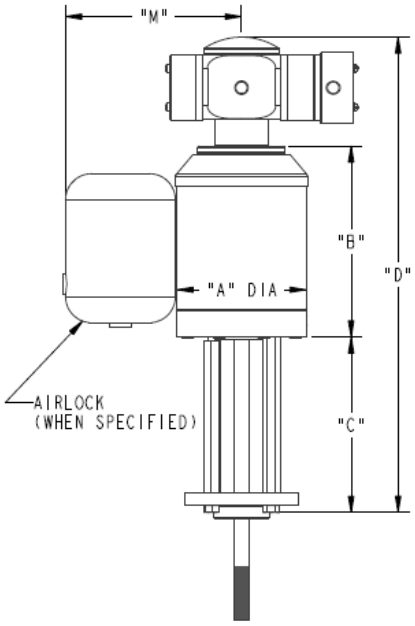
GB51XC/GB53XW SERIES

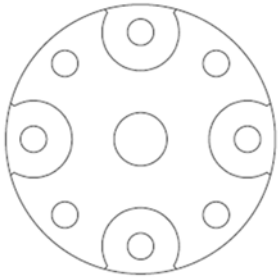


4 MOUTNING HOLES IN BASE OF CYLINDER
'J' THREAD, "K" DEPTH, ON "L" DIAMETER BOLT CIRCLE

GB51XC/GB53XC SERIES



MOUNTING HOLES IN BASE OF XC & XW MODELS
"F" MOUNTING BOLTS AND 4 "G" MOUNTING HOLES REQUIRED
FOR MOUNTING ON "H" DIAMETER BOLT CIRCLE

| MODEL | BORE | A | B | C | D | E | F | G | H | J | K | L | M | STROKE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GB51** | | | | | | | | | | | | | | |
| GB51XC3 | 4" | 5-1/4" | 7-1/16 | 5" | 16-5/8" | 5/8-18 | 3/8" | 13/32" | 2-3/4" | - | - | - | 6" | 3" |
| GB51CX4 | | | 8-1/16 | 6" | 18-5/8" | | | | | - | - | - | | 4" |
| GB51XCA3 | | | 7-1/16 | - | 11-5/8" | | - | - | - | 3/8-16 | 1/2" | 3-1/4" | | 3" |
| GB51XCA4 | | | 8-1/16 | - | 12-5/8" | | - | - | - | | | | | 4" |
| GB51XW3 | | 5" | 7-1/2 | 5" | 12-1/2" | | 3/8" | 13/32" | 2-3/4" | - | - | - | | 3" |
| GB51XW4 | | | 8-1/2 | 6" | 14-1/2" | | | | | - | - | - | | 4" |
| GB51XWA3 | | | 7-1/2 | - | - | | - | - | - | 3/8-16 | 1/2" | 3-1/4" | | 3" |
| GB51XWA4 | | | 8-1/2 | - | - | | - | - | - | | | | | 4" |
| **GB52** | | | | | | | | | | | | | | |
| GB52XC11/8 | 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" |
| GB52XC4 | | | 8-3/8" | 6" | 18-15/16" | | | | | - | - | - | 8-1/2" | 4" |
| GB52XC6 | | | 11-1/8" | 8" | 23-11/16" | | | | | - | - | - | | 6" |
| GB52XA118 | | | 5-1/16" | - | 9-5/8" | | - | - | - | 1/2-13 | 13/16" | 4-1/2" | | 1-1/8" |
| GB52XA4 | | | 8-3/8" | - | 12-15/16" | | - | - | - | | | | | 4" |
| GB52XA6 | | | 11-1/8" | - | 15-11/16" | | - | - | - | | | | | 6" |
| GB52XW118 | | 7" | 5-1/2" | 3-5/16" | 8-13/16" | | 1/2" | 17/32" | 3-3/4" | - | - | - | | 1-1/8" |
| GB52XW4 | | | 8-15/16" | 6" | 14-15/16" | | | | | - | - | - | | 4" |
| GB52XW6 | | | 11-9/16" | 8" | 19-9/16" | | | | | - | - | - | | 6" |
| GB52XWA118 | | | 5-1/2" | - | - | | - | - | - | 1/2-13 | 13/16" | 4-1/2" | | 1-1/8" |
| GB52XWA4 | | | 8-15/16" | - | - | | - | - | - | | | | | 4" |
| GB52XWA6 | | | 11-9/16" | - | - | | - | - | - | | | | | 6" |

| MODEL | BORE | A | B | C | D | E | F | G | H | J | K | L | M | STROKE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **GB53** | | | | | | | | | | | | | | |
| GB53XC112 | 8” | 9-3/8” | 6-1/16” | 4” | 2-1/2” | 7/8-14 | 1/2” | 17/32” | 3-3/4” | - | - | - | 9-1/2” | 1-1/2” |
| GB53XC4 | | | 9-1/8” | 6” | 19-11/16” | | | | | - | - | - | 11-3/4” | 4” |
| GB53XC6 | | | 11-15/32” | 8” | 24-1/32” | | | | | - | - | - | 11-3/4” | 6” |
| GB53XC8 | | | 13-15/32” | 10” | 28-1/32” | | | | | - | - | - | 14-1/2” | 8” |
| GB53XC10 | | | 15-15/32” | 12” | 32-1/3” | | | | | - | - | - | 14-1/2” | 10” |
| GB53XCS112 | | | 6-1/16” | - | 10-5/8” | | - | - | - | 1/2-13 | 9/16” | 4-1/2” | 9-1/2” | 1-1/2” |
| GB53XCA4 | | | 9-1/8” | - | 13-11/32” | | - | - | - | | 13/16” | | 11-3/4” | 4” |
| GB53XCA6 | | | 11-15/32” | - | 16-1/32” | | - | - | - | | | | 11-3/4” | 6” |
| GB53XCA8 | | | 13-15/32” | - | 18-1/32” | | - | - | - | | | | 14-1/2” | 8” |
| GB53XW112 | | 9-1/8” | 6-3/8” | 4” | 10-3/8” | | 1/2” | 17/32” | 3-3/4” | - | - | - | 9-1/2” | 1-1/2” |
| GB53XW4 | | | 9-17/32” | 6” | 15-7/32” | | | | | - | - | - | 11-3/4” | 4” |
| GB53XW6 | | | 11-25/32” | 8” | 19-25/32” | | | | | - | - | - | 11-3/4” | 6” |
| GB53XW8 | | | 13-25/32” | 10” | 23-25/32” | | | | | - | - | - | 14-1/2” | 8” |
| GB53XW10 | | | 15-25/32” | 12” | 27-25/32” | | | | | - | - | - | 14-1/2” | 10” |
| GB53XWA112 | | | 6-3/8” | - | - | | - | - | - | 1/2-13 | 9/16” | 4-1/2” | 9-1/2” | 1-1/2” |
| GB53XWA4 | | | 9-17/32” | - | - | | - | - | - | | 13/16” | | 11-3/4” | 4” |
| GB53XWA6 | | | 11-25/32” | - | - | | - | - | - | | | | 11-3/4” | 6” |
| GB53XWA8 | | | 13-25/32” | - | - | | - | - | - | | | | 14-1/2” | 8” |

## DIMENSIONAL DRAWINGS

Dimensional data for GB5_ Series Actuators is contained on pages 4 through 8.

For specific configuration drawings refer to the list below.

| | |
|---|---|
| A6-41 | GB50 ON-OFF |
| A6-113 | GB51-GB55 ON-OFF |
| A7-100 | GB52/53/54 WITH YOKE |
| A7-101 | GB52/53/54 WITH YOKE |
| A7-102 | GB52/53/54 WITH YOKE |
| A7-103 | GB52/53/54 WITH YOKE |
| A7-107 | GB50 WITH GC31 |
| A7-108 | GB50 WITH GC32 |
| A7-109 | GB50 WITH GC33 |
| A7-110 | GB50 WITH GC34 |
| A7-114 | GB51-55 WITH GC31 |
| A7-115 | GB51-55 WITH GC32 |
| A7-116 | GB51-55 WITH GC33 |
| A7-117 | GB51-55 WITH GC34 |
| A50-16 | PIPING SCHEMATIC, FULL REVERSAL POSITIONER |
| A50-48 | PIPING SCHEMATIC, COMMANDAIRE POSITIONER |