400 Series Pneumatic Actuator User Manual

For 89 Model Ball Valves

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This User Manual covers Gemini's Models: 400 Pneumatic Actuators with 89 Model Ball Valves. The publication of these instructions are intended as a guide only. Installation should only be performed by qualified personnel. **Additional support is also available by contacting Gemini Valve @ Telephone: 603 244-7931, Email: service@geminivalve.com.**

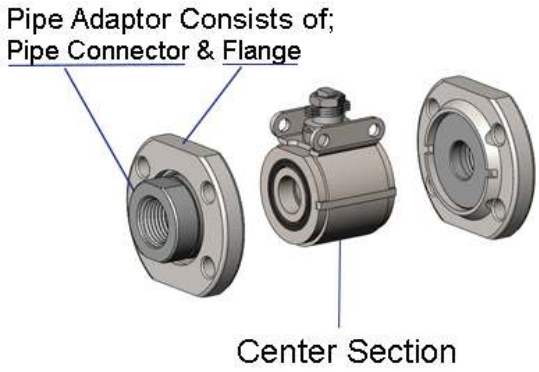
Contents

SL17-1808

Installation

Note: If the ball valve you are installing is equipped with an actuator, the actuator can be dismounted from the ball valve to facilitate ease of installation. For further instructions, see associated Pneumatic Actuator Models 400, Installation, Page 9.

A complete valve consists of three sub-assemblies; two Pipe Adaptor assemblies, and a Center Section assembly comprising functional elements such as the ball, seats, seals and stem.



Threaded

1. Ensure that both the male pipe and female valve threads are free from dirt, debris and corrosion. Wire brushing of the male pipe threads is recommended to ensure a good metal-to-metal joint.

2. Apply a good quality thread lubricant on the male threads. Lubricant reduces friction when making up the pipe joint. Note: thread lubricant is not intended to seal the joint and will not compensate for poor quality male pipe or fitting threads.

3. Turn the ball valve (female threads) onto the male pipe threads (or fitting) by hand. Continue to turn the valve as far up as it will go by hand. With the use of a wrench, continue to tighten the valve onto the pipe. The pipe joint seal should occur within 1-3 turns after wrenching begins. Care should be taken not to exceed 3 turns, in which damage to the threads can occur.

4. The pipe joint should be tested for leakage to ensure the pipe joint has been achieved.

5. Proceed: To Complete Installation.

Socket Weld

To avoid damaging seats and seals by exposure to welding temperature, the Center Section must be removed while the Pipe Adaptors are welded separately into line. Valves may be tack welded in place assembled, as long as the Center Section is removed while the welds are completed. (Seal temperature must never exceed 400°F). It is good practice to provide a gap of approximately 1/16” between the end of the pipe and the bottom of the socket, before welding.

To Complete Installation

1. Complete installation of the ball valve by securely and uniformly tightening the assembly bolts. Begin by tightening each bolt in succession, following diagonal pattern (Figure 1), until even contact is achieved between the Center Section and the Pipe Connectors. Tighten to Initial Torque value, see Table 1.

Figure 1

Installation (continued)

2. Continue tightening each bolt a small amount at a time, following the diagonal pattern, until each is brought to the Final Torque value, Table 1.

Table 1

Valve	Bolt		Initial Torque	Final Torque
Port Size	Thread	Hex Size	Inch - Pounds	Inch - Pounds
0.5	5/16-24	1/2	30	75
0.6	5/16-24	1/2	30	75
0.8	5/16-24	1/2	40	75
1.0	3/8 - 24	9/16	80	110
1.2	3/8 - 24	9/16	80	110
1.5	7/16 - 20	5/8	80	150

NOTES:

If the valve is in a long unsupported horizontal run, support the valve while hand-tightening the upper two assembly bolts until an even contact is achieved between the Pipe Connectors and Center Section seals. Finish the installation procedure by gradually bringing the bolts to the torque levels given in the chart.

Although an experienced fitter or mechanic will find no need to rely on a chart or torque wrench to ensure successful installation, the Final Torque value shown in Table 1 must not be exceeded. Failure to do so may result in bolts yielding (twisting). For this reason, even experienced personnel are advised to employ a torque wrench.

Specifications

TEMPERATURE*: -20°F to 400°F

VALVE BODY PRESSURE RATING*: 1,000 P.S.I**. C.W.P.**

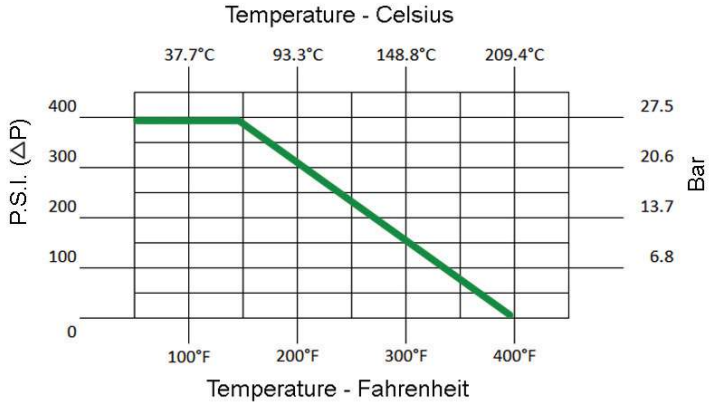
MAXIMUM PRESSURE DIFFERENTIAL: 400 P.S.I.***

VACUUM: 20 Micron

SATURATED STEAM: 150 P.S.I.

*also see Differential Pressure - Temperature Chart
** C.W.P. = Cold Working Pressure to 150°F
*** P.S.I. = Pounds Per Square Inch

DIFFERENTIAL PRESSURE - TEMPERATURE CHART



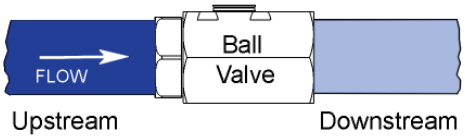
P.T.F.E. Glass Filled Reinforced Teflon®
Viton® Body Seals

To Use the Pressure - Temperature Chart

Draw an imaginary line from your media Differential Pressure to your media Temperature to confirm it falls within the valve rating based upon the type of seal materials to be used.

To Calculate Pressure Differential

Compare the Upstream media pressure to the Downstream. The pressure differential should not exceed 400 P.S.I. See examples below.



Examples:

Upstream Pressure of 1000 P.S.I. less Downstream of 625 P.S.I. equals 375 P.S.I. which is below 400 P.S.I. differential i.e. OK

Upstream Pressure of 600 P.S.I. Less Downstream of 0 P.S.I. equals 600 P.S.I. which is above 400 P.S.I. differential - outside of ratings not recommended.

Specifications (continued)

CONNECTION - STYLE:

Pipe / N.P.T.F. (Dryseal National Pipe Taper)
B.S.P.T. (British Standard Pipe Taper) Consult Gemini Valve for Availability
SW - Socket Weld
TSW - Tube Socket Weld

BODY DESIGN / SIZE RANGE

Three-Piece / Standard Port 1/4" - 2"
/ Full Port 1/2" - 1-1/2"

MATERIALS:

BODY & CONNECTORS: 316 / 316L Stainless Steel
BALL AND STEM: 316 Stainless Steel
FLANGES: CF8M Stainless Steel
SEATS AND STEM SEAL: Glass Reinforced P.T.F.E. (Teflon®)
BODY SEALS: Viton® (optional Teflon® Encapsulated Viton® available)

Cv:

The approximate flow rate through a valve can be calculated as follows:

$$Q = Cv\sqrt{\frac{\Delta P}{G}}$$

where;
Q = flow rate in gallons (U.S. Std.) per minute
Cv = valve constant
P = pressure drop across the valve in pounds per square inch (P.S.I.)
G = specific gravity of the media relative to water

Size	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2
Cv Value- Standard	-	-	8	12	32	46	82	120
Cv Value- Full Port	8	8	12	32	46	82	120	-

Maintenance

Typical ball valve designs will first show signs of wear via media leakage at the stem seal. Gemini's Serviceable Series Ball Valves feature a self-compensating stem seal design which uses a pair of Belleville Spring Washers that, when energized (flattened), maintain a preload (squeeze) of the stem seal to stem, providing an extended period of leak-tight service without any maintenance required.

Depending on the application media, temperature, pressure and cycles, the stem seal may eventually wear to the point that the Belleville Spring Washers can no longer compensate for stem seal wear i.e. loosen (de-energize). Evidence of this can be seen by media seepage and eventually leakage from between the top of the valve body and the bottom of the actuator bracket. Depending on the corrosive nature of the valve media, if left, damage to the valve and or actuator materials may require replacement of the complete assembly vs. simple maintenance or replacement of the worn valve.

In many cases, readjustment of the stem nut may enable the valve to remain in service. The following outlines the procedure to readjust the stem nut. If adjustment does not stop media leakage from the stem seal, and or ball seat leakage is noted, this would primarily indicate the ball valve seals are worn out and in need of replacement. Valve Repair Kits (VRKs), replacement Center Sections, as well as ball and stems can be purchased economically; see Repair, Page 6.

Caution: Before attempting any adjustment, isolate the valve media from the valve being adjusted i.e. no media pressure should be present. Protective clothing and eyewear is recommended.

1. Prevent the stem from turning as the nut is tightened by inserting a wooden or plastic dowel through the valve, or if the valve is in-line (service), hold the 'flats' of the stem then tighten the stem nut until the Belleville Spring Washers have just become fully compressed (flattened).

Although the stem nut may spin freely when first tightened, the torque needed to continue tightening will increase progressively after the stem nut contacts the drive key and the Belleville Spring Washers begin to deflect.

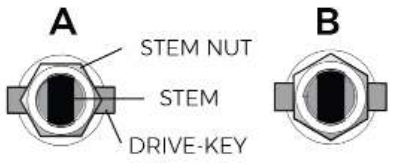
The torque required to tighten further will increase sharply once the Belleville Spring Washers have become fully flattened. Tightening beyond this point should not be attempted as damage to the stem seal will result. If a torque wrench is available, refer to the Stem Nut Torque Table.

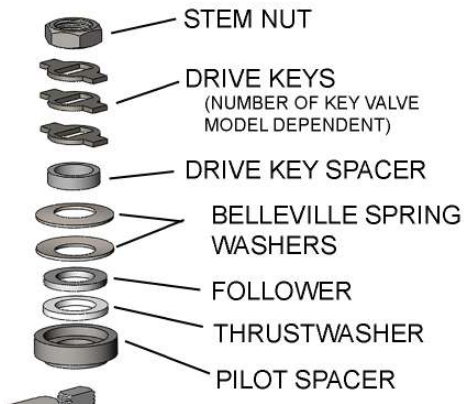
2. The correct orientation of the stem nut to the drive key is shown in Figure 1; this orientation is necessary to permit engagement with the twelve-point socket in the actuator pinion driver.

In order to achieve the desired orientation, loosen the stem nut until the nut / drive key relationship corresponds to either 'A' or 'B' in Figure. This adjustment should require less than one-twelfth (1/12) turn of the nut.

Port Size	Stem Nut Torque Inch - Pounds
0.5	40
0.6	50
0.8	50
1.0	80
1.2	80
1.5	80

Figure 1





Repair Instructions

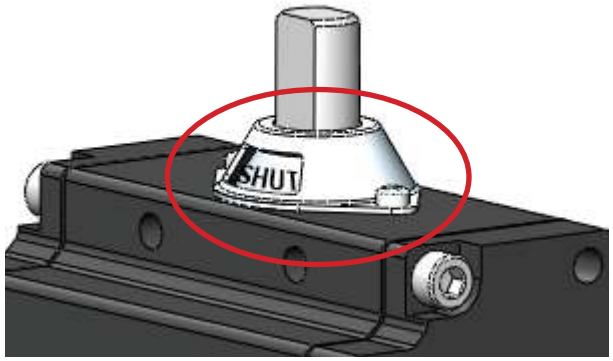
Gemini's Serviceable Series are ideal for those applications where ease of serviceability, and low, long-term maintenance cost is desired. If stem seal leakage has occurred and cannot be resolved following Maintenance instructions, Page 5, and / or seat leakage has occurred, replacement of the valve seals should enable the valve to be returned to service. In some cases, replacement of the ball or stem may also be required.

Model 89 Ball Valves can be readily removed from service for inspection or repair. Repairs may be made on site and the repaired valve quickly returned to service, or a spare center section may be substituted to minimize downtime.

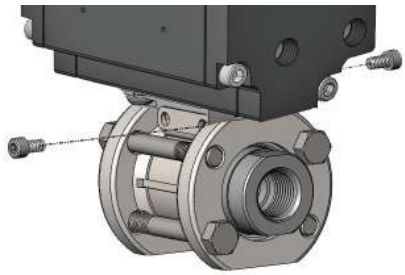
A few precautions should be observed before removing the valve center section: 1) Be certain that the system is not under pressure. 2) If spillage of media at the site of the valve would prove undesirable or dangerous, drain the system before beginning to repair. 3) Make sure that the pipe is supported on both sides of the valve before the center section is removed.

Removal of Center Section

1. Note actuator position, i.e. OPEN / SHUT, on installed valve.

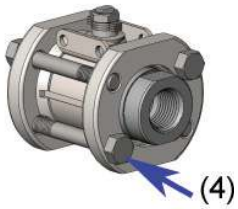


2. Remove the (2) screws which secure the actuator bracket to the valve bracket and remove the actuator from the valve.

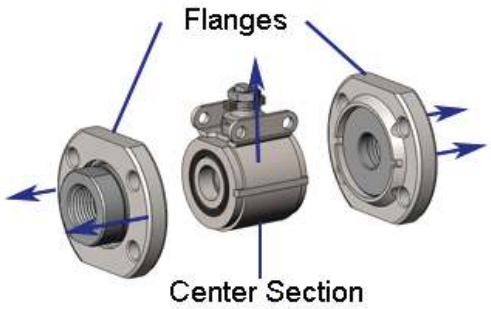


If using a new replacement center section ensure that the drive key is in the same position, i.e. opened / closed, as that of the center section being replaced.

3. Loosen each assembly bolt (4) one-half (1/2) turn. Then remove bolts from flange and set aside.



4. Grasp the Center Section by handle or bracket, push back each flange and lift center section clear.



Repair Instructions (continued)

Disassembly of Center Section (Figure 1.)

1. Turn valve to open position using a wrench on the 'flats' of the stem. Insert a wooden or plastic dowel through the Center Section (port) to prevent rotation of the Ball. Remove Stem Nut, Drive key(s), Drive key(s) Spacer, Belleville Spring Washers, Follower and Pilot Spacer with Thrustwasher .

2. Remove the Viton® Body Seals.

3. Remove the wooden or plastic dowel from Center Section and turn the Ball to closed position using 'flats' of the Stem. Hold the Center Section so that the Flange Alignment Key is at the 9:00 o'clock position with the Stem at 12:00 o'clock. With thumb pressure on the face of the ball, or by use of a soft dowel (wood, plastic, etc.) force the Ball and Insert from the Center Section.

4. Remove the Stem by pushing it into the Center Section (body). Remove the Stem. Remove the Stem Seal, which may have remained in the back recess of the Center Section (body) or which may have been carried from the Center Section by the Stem.

5. Remove the Seat from the Center Section (body). Remove the remaining Seat from the Insert.

6. Discard the Stem Seal, Ball Seats, Thrustwasher and Viton® Body Seals, these are all included in the VRK89 (Valve Repair Kit).

7. Inspect all other internal parts for damaged sealing surfaces and wear. Special attention should be given to the ball, Figure 2. If the ball has noticeable scoring that can be felt with your fingernail it should be replaced.

8. Clean if necessary and set aside those components which are not to be replaced.

Figure 1

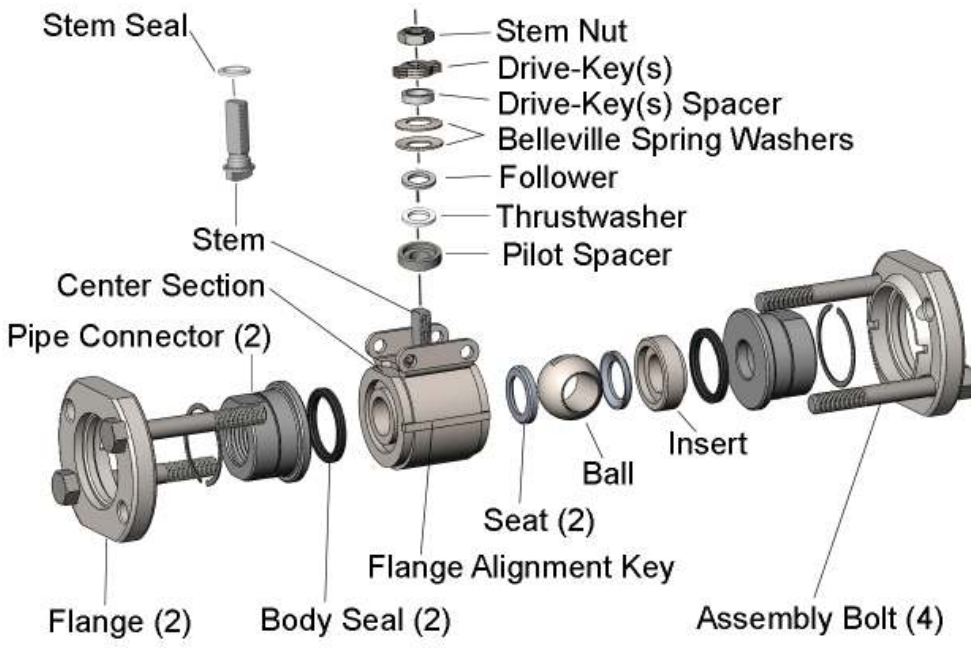
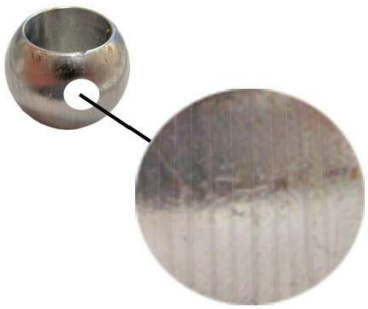


Figure 2



NOTE: Prior to disassembly of the Center Section for repair a Valve Repair Kit (VRK89) is required. Kits are supplied based upon valve port size. Each kit contains: (2) Body Seals, (2) Ball Seats, (1) Stem Seal and, (1) Thrustwasher. These are all of the seals contained within the valve. In some cases replacement of the ball may also be required, see Instruction 7.

Repair Instructions (continued)

Reassembly of Center Section (Figure 1.)

1. Position new Seat squarely in Center Section (body) recess. Press carefully into place, install second Seat in insert.

2. Place new Stem Seal on Stem, insert Stem in Center Section and up through stem hole. Turn Stem so that the Stem 'flats' are perpendicular to Center Section.

3. Insert Ball into Center Section so that the slot in the Ball engages the head of the Stem. Put the Insert with Seat installed into the Center Section. The Insert should be flush with the Center Section. Install the Center Section body seals.

4. Place Thrustwasher in Pilot Spacer counterbore. Place Pilot Spacer in position on Stem with the Thrustwasher facing up.

5. Place the Follower in position atop the Thrustwasher.

6. Place the Belleville Spring Washers on the Follower. The Belleville Spring Washers must be installed with their concave (cupped) surfaces facing each other.

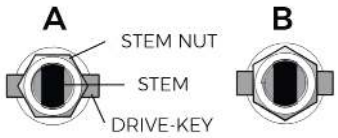
7. Place the Drive key(s) spacer on the Belleville Spring Washers.

8. Place the Drive Key(s) in position on the Drive Key(s) Spacer and assemble the Stem Nut.

10. Install a wooden or plastic dowel through the Center Section to prevent the Stem from turning as the Stem Nut is tightened. Tighten the Stem Nut to the torque listed below based upon the Center Section (valve) Port Size which can be found on the side of the Center Section.

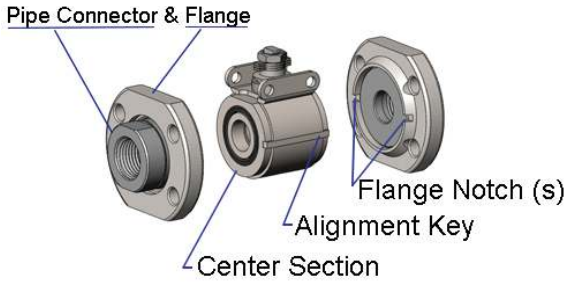
Port Size	Stem Nut Torque Inch - Pounds
0.5	40
0.6	50
0.8	50
1.0	80
1.2	80
1.5	80

12. Check the orientation of the stem nut to the drive key. In order to achieve desired orientation, loosen the nut until the nut / drive key relationship corresponds to Illustration A or B below. This should not require more than one-twelfth (1/12) turn of the nut.



Re-installation of Center Section

1. Place center section in position between pipe adaptors. Slide flanges over ends of body. Enter and engage tie-bolts.



2. Snug tie-bolts evenly. As bolts are tightened, be sure that the alignment key (fixed to the center section) is engaged in the pipe connector flange notches.

3. Rotate center section to intended final position.

4. Complete installation of the ball valve by securely and uniformly tightening the assembly bolts. Begin by tightening each bolt in succession, following diagonal pattern until even contact is achieved between the Center Section and the Pipe Connectors. Tighten to Initial Torque value.

5. Continue tightening each bolt, a small amount at a time following the diagonal pattern, until each is brought to the Final Torque value.

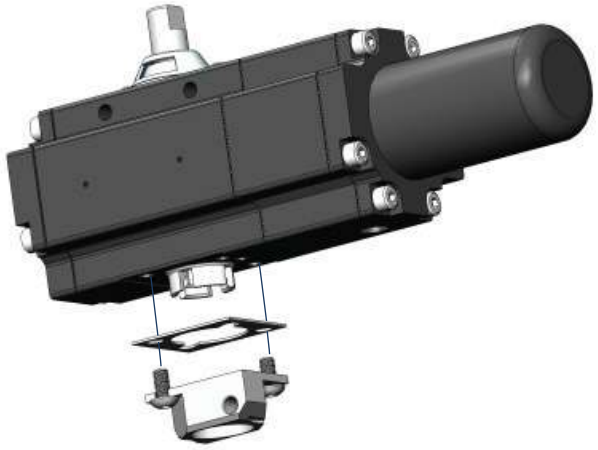
Valve Port Size	Bolt Thread	Bolt Hex Size	Initial Torque Inch - Pounds	Final Torque Inch - Pounds
0.5	5/16-24	1/2	30	75
0.6	5/16-24	1/2	30	75
0.8	5/16-24	1/2	40	75
1.0	3/8 - 24	9/16	80	110
1.2	3/8 - 24	9/16	80	110
1.5	7/16 - 20	5/8	80	150

Installation

These instructions detail the procedure for installing a Gemini Model A400 / B400 Pneumatic Actuator on a drive-key equipped Gemini Valve Model 89 Ball Valve.

Assemble Bracket to Actuator

1. Position the bracket gasket on the actuator mounting surface so that the alignment pins engage the slots (B410 Series) or holes (A420 Series) in the gasket.



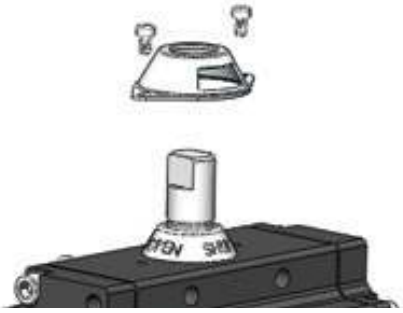
2. Place the bracket on the mounting surface over the gasket so that the alignment pins engage the blind holes in the bracket.

3. Assemble the bracket to the actuator with two fine-thread socket head screws. (The B410 Series uses button-head socket screws; the A420 Series, standard socket head screws.) Tighten securely.

Assemble Valve to Actuator

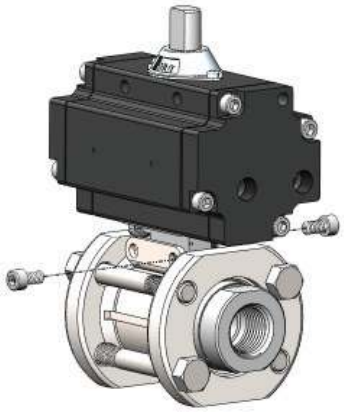
1a. Double Acting Actuators: Check the valve to be sure that it is either completely open or completely shut. Observe the OPEN / SHUT indicator mounted on the actuator shaft; turn the shaft if necessary so that the indicator corresponds to the position of the valve.

1b. Spring Return Actuators: Turn the valve stem to orient the ball in the desired for spring action, i.e. “spring to open” or “spring to close”. Observe the OPEN / SHUT indicator mounted on the actuator shaft to assure that it reads correctly. If it does not, remove the two screws which hold the indicator cover and rotate the cover 180 degrees, reinstall the screws.



2. Place the actuator, with the bracket attached, atop the valve so that the 12 point socket engages the stem nut, the shaft notch engages the drive-key. If the valve stem nut will not engage the socket in the coupling, reposition the nut slightly (this should require less than 1/12 turn). Force the actuator and valve together until the actuator bracket bottoms in the valve bracket.

3. Fasten the actuator to the valve with two sockethead mounting screws.



Pneumatic Actuator 400 Models

Specifications

TEMPERATURE: -20° F to 350° F

CYCLE (INDEX) TIME: Approximately 1/2-1 Second (Load Dependent)

AIR SUPPLY: 60 - 125 P.S.I air. Sufficient air delivery must be available at the actuator to ensure dependable operation. The following precautions should be observed: Air supply should be clean and free of moisture. When dirty or wet air is a problem, a filter / separator should be specified; these units are most effective when installed as close as possible to the actuator. A filter, when used, should permit a minimum flow of 4 scfm at an upstream pressure of 60 P.S.I. Eliminate severe restrictions to air flow (certain solenoid valves & fittings). The most restricted passage must have an area no smaller than .003 inches square, the area of 1/16" diameter orifice. If more than a single actuator is to be supplied by an individual pilot, the minimum passage requirement applies per actuator. All actuator models are permanently lubricated and are not recommended to be used with any other air supply lubricants.

TUBING: For short runs up to 5 feet 5/32" I.D. is suitable; 1/4" I.D. will serve up to 30 feet. For longer runs, use 3/8" I.D. or larger.

AIR CONNECTIONS: Female 1/8" NPT / NAMUR Interface

MATERIALS:

BODY, END CAPS: Aluminum with Teflon ® Impregnated Hard Anodized (Polylube ®) Surfaces

SPRING MODULES: Aluminum with Teflon ® Impregnated Hard Anodized (Polylube ®) Surfaces

SHAFT / DRIVER & EXTERNAL TRIM: 300 Series Stainless Steel

Operation

Double-Acting Models B411D / B412D / A421D / A422D
Use air to move the internal pistons in two directions which rotates the actuator pinion 90° which is attached to the ball valve stem. Air supplied to port 'A' causes counter clockwise rotation, which with a normally closed assembly, opens the ball valve. Air supplied to port 'B' causes clockwise rotation, which in turn closes the ball valve. For most applications, a four-way solenoid valve like the Gemini model 4GP is used to pilot the air. Remote piloting can also be achieved utilizing the 'A' & "B' air supply ports. In summary, the solenoid (pilot) valve uses an electric signal to cycle air in and out of the pneumatic actuator, subsequently opening / closing the ball valve.

Spring-Return Models B412SR / A422SR
Use air to move the internal pistons in one direction and springs in the other, which rotates the actuator pinion 90°. Air supplied to port 'A' causes counter clockwise rotation, which on a normally closed assembly opens the ball valve. Upon release of air, springs cause clockwise rotation, which closes the ball valve. For most applications, a three-way solenoid valve is used to pilot the air. Remote piloting can also be achieved utilizing the 'A' air supply port. In summary, the solenoid (pilot) valve uses an electric signal to cycle air in and out of the pneumatic actuator, subsequently opening / closing the ball valve.

Maintenance

Gemini's pneumatic actuators are engineered to be maintenance free. No adjustments or maintenance is required to achieve maximum service life. Care must be taken to ensure a clean / dry air supply is provided per the above AIR SUPPLY Specifications.

Installation

These instructions describe the operation and installation of the 4-way (4GP) Gemini pilot valve. The 4GP pilot valve can be mounted to 400 Series double acting actuators which have the optional NAMUR interface as designated by the suffix N in the model number confirmed by the 'N' stamped on the endcap.

4GP - Double Acting Models

Installation - Normally Closed Operation. Valve in closed position when coil is de-energized.

1. Fit the two o-ring seals into the pockets on the underside of the pilot valve body.

2. Install the orientation screw (M5X10) into the top, center tapped hole of the actuator end cap, identified as 'Normally Closed' in Figure 1, leaving 1/16" - 1/8" of the screw protruding above the surface of the actuator end cap.

3. Position the pilot valve so that actuator orientation screw fits into the shallow drilled hole in the GP body. The name plate on the pilot valve body should face the same direction as the name plate on the actuator.

4. Insert the mounting screws (M5X35) through the mounting holes in the pilot body valve and tighten until secure.

5. Connect the air supply (60 - 125 P.S.I.) to the 1/8" NPT inlet port and the wire for the voltage marked on the coil.

6. GP coil is usually equipped with a 'DS' DIN x Strain, Figure 2, or 'DC' DIN x Conduit electrical connector. To wire the connector, remove the center mounting screw, and with a small screwdriver, pry the inner element from the body of the connector to expose the terminal blocks inside. Route the wire through the hub of the connector. For the 'DS,' loosen the sealing nut and ensure the wire insulation passes through the rubber grommet inside the hub. Affix the wires to the appropriate terminal block. (Figure 2)Retighten sealing nut to secure the wire and provide a seal.

Installation - Normally Open Operation. Valve in open position when coil is de-energized.

Follow the same instructions for Normally Closed substituting item 2 as follows;

2. Install the orientation screw (M5X10) into the bottom, center tapped hole of the actuator end cap, identified as 'Normally Open' in figure 1.

Figure 1

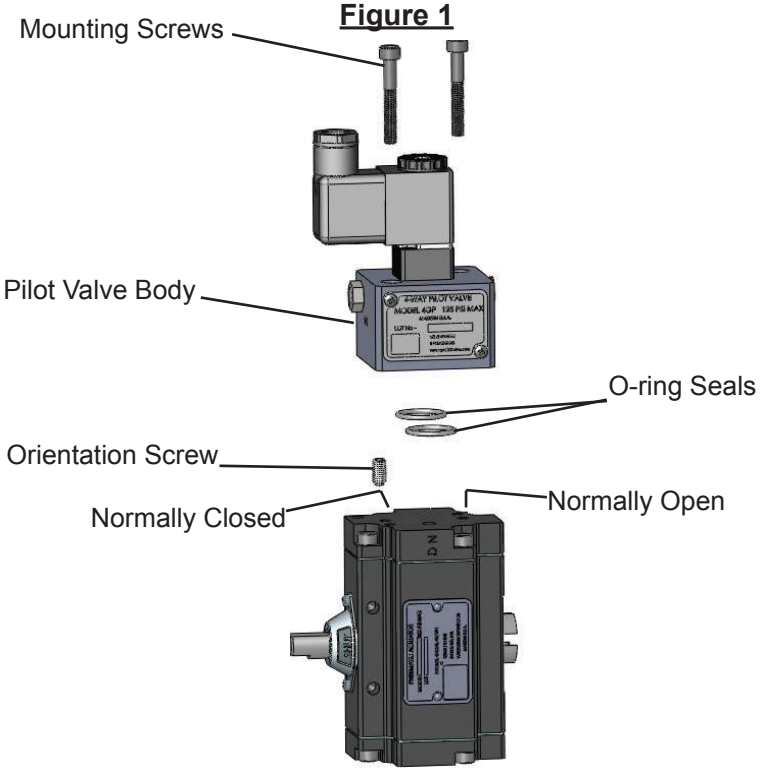


Figure 2

Pneumatic Actuator Accessory - Solenoid Model GP

Specifications

TEMPERATURE: -20° F to 350° F

AIR SUPPLY: 60 - 125 P.S.I air. Sufficient air delivery must be available at the actuator to ensure dependable operation. The following precautions should be observed: Air supply should be clean and free of moisture. When dirty or wet air is a problem, a filter / separator should be specified; these units are most effective when installed as close as possible to the actuator. A filter, when used, should permit a minimum flow of 4 scfm at an upstream pressure of 60 P.S.I. Eliminate severe restrictions to air flow (certain solenoid valves & fittings). The most restricted passage must have an area no smaller than .012 inches square, the area of 1/8" diameter orifice. If more than a single actuator is to be supplied by an individual pilot, the minimum passage requirement applies per actuator. All actuator models are permanently lubricated and are not recommended to be used with any other air supply lubricants.

TUBING: For short runs up to 5 feet 5/32" I.D. is suitable, 1/4" I.D. will serve up to 30 feet. For longer runs, use 3/8" I.D. or larger.

AIR CONNECTION: Female 1/8" NPT for Model 4GP, 1/4" NPT for Model 3GP

OPERATING COIL: Operating coil technical data is dependent on the specific model selected, however, all standard coils as designated by the 'SC' code and conform to the following:

Wattage: 5 Watts
Class: F, continuous duty
Protection: IP65 (with connector) dusttight, water resistant
Connection: Mini-DIN Standard

MATERIALS:
BODY - PTFE / Anodized Aluminum
SPOOL - 18-8 Stainless Steel
SEALS - Nitrile / Viton®
HARDWARE - 18-8 Stainless Steel
COIL / BODY - GF Nylon / GF Zytel

Maintenance

Gemini's model GP Solenoid Valves are engineered to be maintenance free. No adjustments or maintenance is required to achieve maximum service life. Care must be taken to ensure a clean / dry air supply is provided per the above AIR SUPPLY Specifications.

Installation

These instructions detail the procedure for mounting the Gemini Model LS-1 Limit Switch on Gemini A400 Series Pneumatic Actuators. See Pages 11 and 12 for electrical wiring information necessary to complete the installation. Before proceeding to the detailed instructions, check to insure that you have the appropriate LSM (Limit Switch Mounting) kit.

Mounting Instructions

Fitting of the Operating Cam and Limit Switch Mounting Bracket

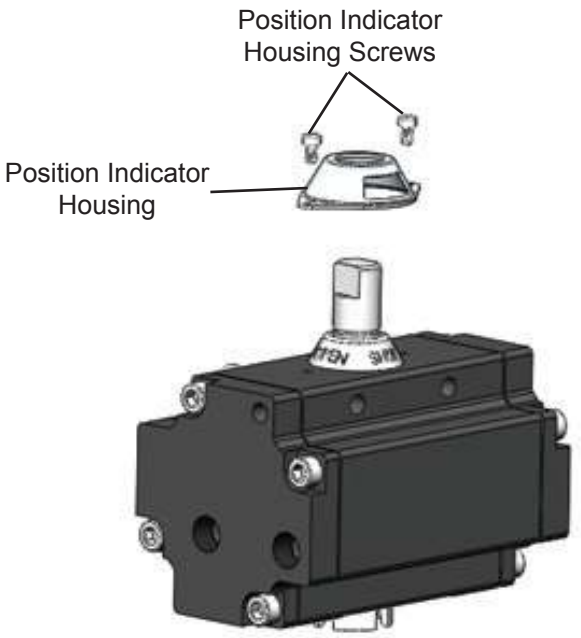
1. Remove the two position indicator housing screws, which secure the position indicator housing, from the top of the actuator to which the switch is to be mounted. Remove the position indicator housing. Figure 1.

2. Remove the retaining ring from the actuator shaft. Remove the position indicator and thrustwasher. A spare retaining ring has been provided in the mounting kit for use if the original becomes damaged during removal of the position indicator.) Figure 2.

3. Place the cam in position on the actuator shaft. The flat side of the cam hole must align with the long flat on the actuator shaft. Reinstall the retaining ring atop the cam or install the spare retaining ring from the kit. Tighten the cam setscrew. (Hex wrench in included in the LSM mounting kit.) Figure 3.

4. Place the limit switch bracket atop actuator so that the long side faces the side of the actuator on which the limit switch is desired. Secure the bracket with the socket head screws. All factory mounted units are assembled so that the long side is opposite the actuator nameplate side unless otherwise specified.

Figure 1



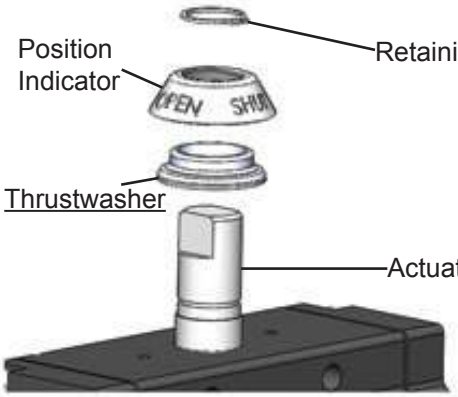


Figure 2

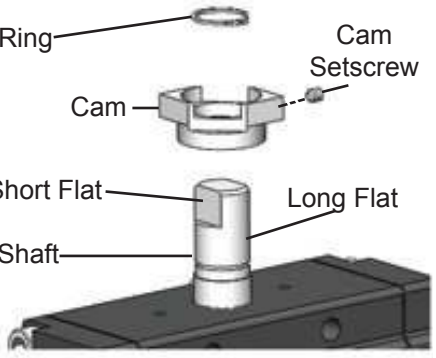


Figure 3

Attachment of Limit Switch

1. Fit the bushings, which extend from the Limit Switch housing, into the matching holes in the long side of the mounting bracket. Push switch housing against bracket and verify that switch body touches bracket. Secure switch body to bracket with two #10-24 setscrews using a medium strength (nonpermanent) thread locker (not included in mounting kit). Note: Hex wrench supplied with LSM Mounting Kit. Figure 5.

Wiring Instructions

1. Route the wire to be terminated through the conduit hub and up through the access space to the terminal block.

2. Strip insulation back 1/4", insert the stripped ends directly into the proper terminal clamps and tighten screws.

3. Internal interconnections between terminal-block and switches are diagrammed inside the Limit Switch Cover.

Wire Size

#12 AWG Max. #24 AWG Min.
Field Installed Conductors Must Have a Temperature Rating of 60C or 75C

Insulation Stripping Length: 1/4"

Note: If the Switch is installed in a hazardous location i.e. where flammable vapors or dust are present in the atmosphere, replace the cover and tighten securely before connecting the electrical supply circuit.

If necessary, a screwdriver shank or similar tool may be engaged in the cover wrenching lugs to assist removal and replacement.

Wiring Specifications

Switch Ratings
AC 250 volts; 10 amps
DC 250 volts; 0.25 amps
125 volts; 0.50 amps
Lamp Load 125 volts; 5 amps

Figure 4

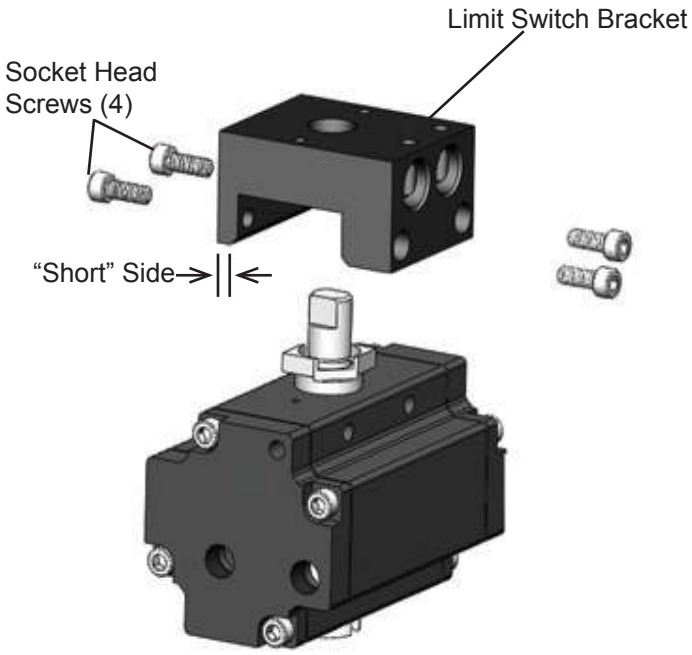
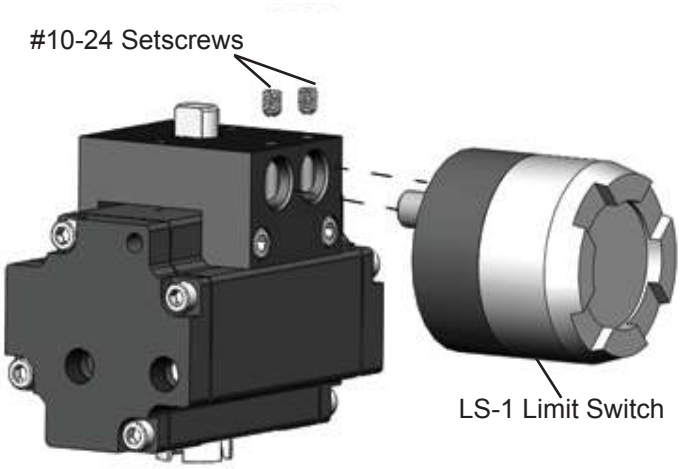


Figure 5



Wiring

Wiring Specifications

Wire Size
#12 AWG Maximum
#24 AWG Minimum

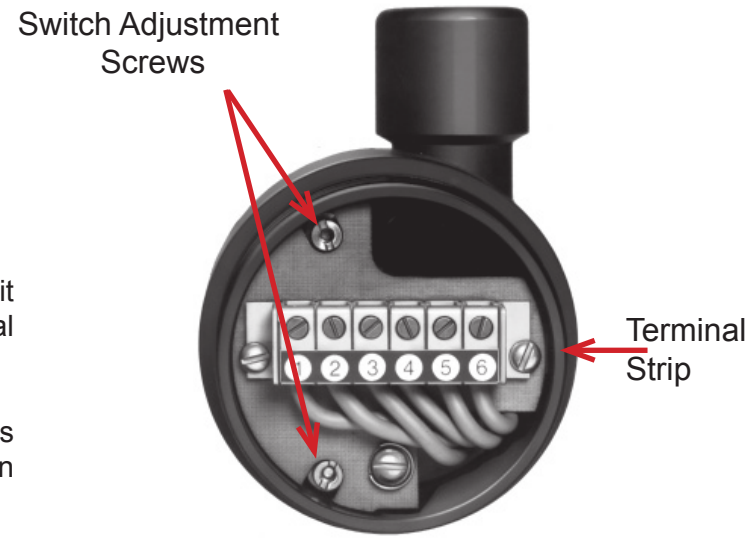
Wiring

1. Route the wire to be terminated through the conduit hub and up through the access space to the terminal block.

2. Strip insulation back 1/4", insert the stripped ends directly into the proper terminal clamps and tighten screws.

3. Internal interconnections between terminal-block and switches, Figure 1. A copy is also inside the Limit Switch Cover.

NOTE: If the Switch is installed in a hazardous location i.e. where flammable vapors or dust are present in the atmosphere, replace the cover and tighten securely before connecting the electrical supply circuit. If necessary, a screwdriver shank or similar tool may be engaged in the cover wrenching lugs to assist removal and replacement.



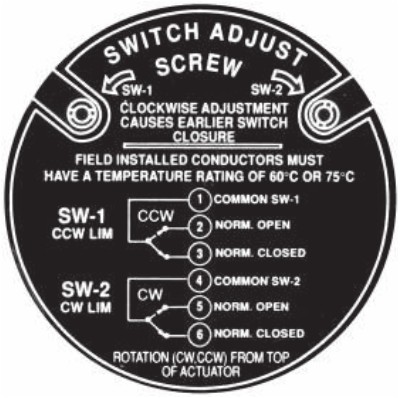


Figure 1

Specifications

MATERIALS:
Body / Cover - Aluminum with Teflon® Impregnated Hard Anodized (PolyLube®) Surfaces
Probes - 316 Stainless Steel
Cover Seal / Probes - Buna N

TEMPERATURE: 10° F to 180° F

CONDUIT CONNECTION: 1/2" NPT

ELECTRICAL RATING: 10 amp. 250VAC maximum; 1/2 amp. 125VDC; 1/4 amp. 250VDC; 5 amp. 125VAC lamp load. Note: each pole must be the same polarity to utilize these ratings.

MICROSWITCHES: Mechanical S.P.D.T. (Single Pole Double Throw)

INTERNAL WIRING CONNECTORS: Screw Clamp

NEMA STANDARDS: NEMA 1 (General Purpose); NEMA 4 (Watertight & Dusttight); NEMA 7 (Hazardous Locations, Class I Groups B, C, & D); NEMA 9 (Hazardous Locations, Class II, Groups E, F, & G); NEMA 12 (Oiltight and Driptight); and NEMA 13 (Oiltight and Dusttight).

UL® LISTINGS: Industrial Control Equipment for use in Hazardous Locations, Class I, Groups B,C, & D and Class II, Groups E, F, & G

Maintenance

Gemini's model LS-1 Limit Switch is engineered to be maintenance free.

Engineered Automated Ball Valve Solutions

Designed, Manufactured, Assembled, Tested, Supplied, and Supported
from our Raymond, NH USA Headquarters

All specifications herein are subject to change without notice or obligation.

Seller warrants its products for a period of one (1) year, to be manufactured in accordance with our written specifications and free from material defects in material and/or workmanship. Seller, at its option, will promptly repair or replace any products returned intact to the factory, transportation charges prepaid, which Seller determines to be defective in material and/or workmanship. The foregoing shall constitute the sole remedy for any breach of Seller's warranty. Care must be taken to assure that the internal media and external environment are compatible with the materials of the ball valve. For a complete copy of our Warranty please see our Standard Terms and Conditions at www.geminivalve.com

Customer Satisfaction Promise - If for any reason our product(s) or service do not meet / exceed your expectations please contact us for prompt support. T 603 244-7931 E service@geminivalve.com