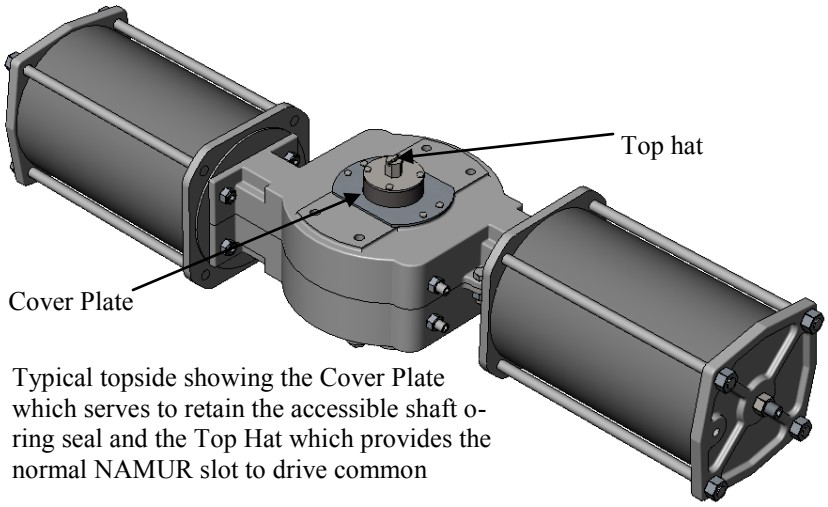
Double Acting FLAT YOKE ACTUATORS

Installation, Operating & Maintenance Instructions

IOM-FY-DA-070309

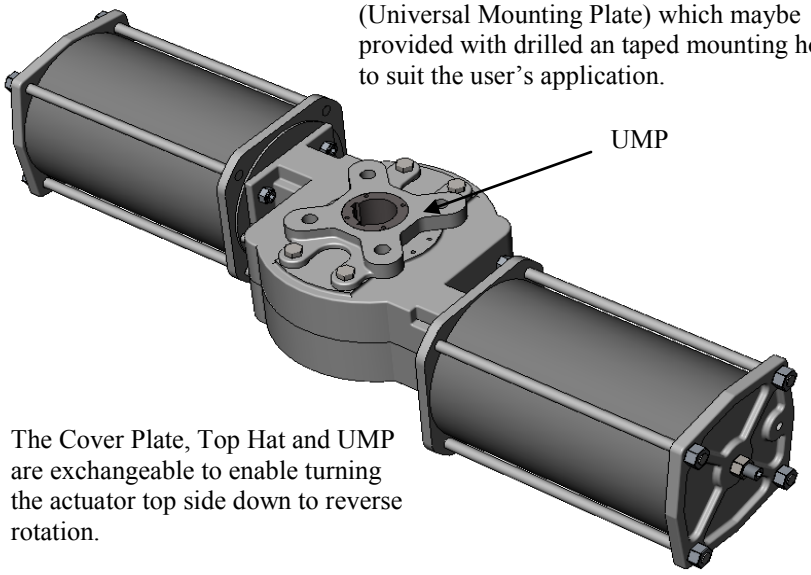
Basics:

- Flat Yoke actuators offer balanced weight, long life and 'in-place' seal replacement..
- Fully accessible, Bi-directional Travel Stops stop piston motion directly without incurring added stress on the shaft, yoke lever or piston rod - Unlike traditional scotch yoke designs which stop yoke rotation, thereby applying the full force of the piston to produce bending and compressive forces onto the shaft bushings, shaft, yoke lever, piston rod, rod seals and rod bushings.
- There are two opposing yoke levers in the FLAT YOKE actuator and two diametrically symmetric pistons that apply equal forces in opposite directions to the yoke arms, thereby eliminating side loading of the actuator shaft and shaft bushings.
- Seals are eliminated except for the piston o -rings, rod seals, and one weather seal o-ring at each end of the shaft. The piston o-rings are replaceable by removing the cylinder while the actuator remains mounted on the valve. Shaft o-rings are readily replaced without disassembly of the actuator as they are held in place by the UMP (bottom side) and cover plate (top side).

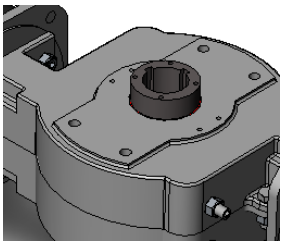


Typical topside showing the Cover Plate which serves to retain the accessible shaft o-ring seal and the Top Hat which provides the normal NAMUR slot to drive common

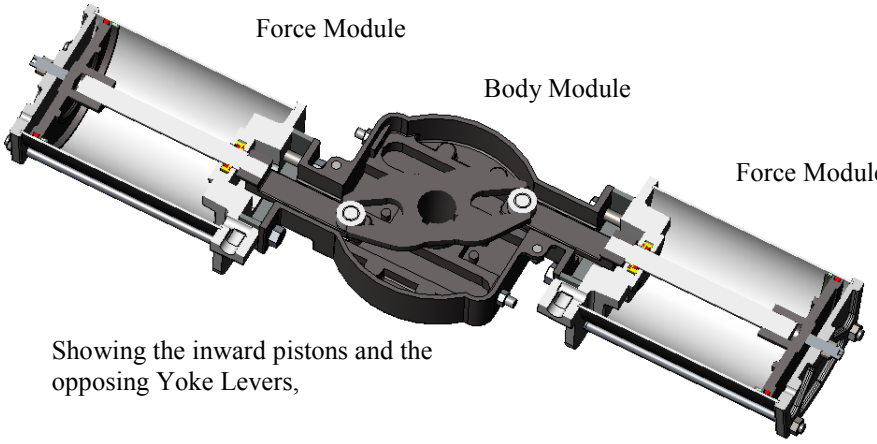
Typical bottom side showing the UMP (Universal Mounting Plate) which maybe provided with drilled an taped mounting holes to suit the user's application.



The Cover Plate, Top Hat and UMP are exchangeable to enable turning the actuator top side down to reverse rotation.



Top and Bottom sides of the body module are identical - shown without UMP or Cover Plate.



Showing the inward pistons and the opposing Yoke Levers,

QTRCO, Inc. 13120 Theis Lane Tomball, TX 77375
Ph: 281-516-0277 Fax: 281-516-0288
WWW.QTRCO.COM
Email: qtrco@qtrco.com

Installation:

- The FLAT YOKE weight balanced design allows easier lifting and handling than traditional scotch yoke actuators. Slings may be wrapped around the bodies, inward of the Force Module on smaller sizes. Sizes F375 and larger have 2 diametrically opposite lifting eye holes which pass entirely through the body module in a manner that places no tensile loading on the actuator components.
- Based on user requirements and valve mounting geometries, the FLAT YOKE actuator shaft may be machined to mate directly with the valve stem. Otherwise, they are typically bored and keyed as per applicable dimensional drawings.
- After installation to the valve, adjust inward and outward travel stop screws to obtain the desired valve travel. A minimum of 5 degrees of over travel is available on all FLAT YOKE actuators.

Travel Stop Adjustment:

Outward adjustment; Loosen jam nuts on the travel stop screws located on each end cap, back off one screw then the other (Apply 5 PSIG pressure to the body port to force the pistons outward) Continue until desired outward piston travel is obtained one stop screw will be looser than the other. Turn the looser screw inward until snug, then 1/4 additional turn. Tighten jam nuts.

Inward adjustment; Loosen jam nuts on all 4 inward travel stop screws and turn screws outward. Apply supply pressure (5 psig) until desired travel is achieved. Turn all 4 screws inward until each contacts their respective clevis end. Tighten jam nuts.

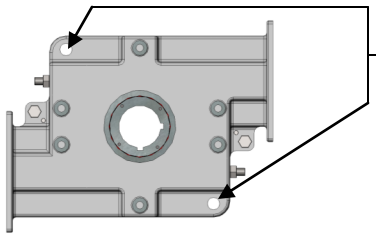
- FLAT YOKE actuators may be installed in any orientation.

Operation:

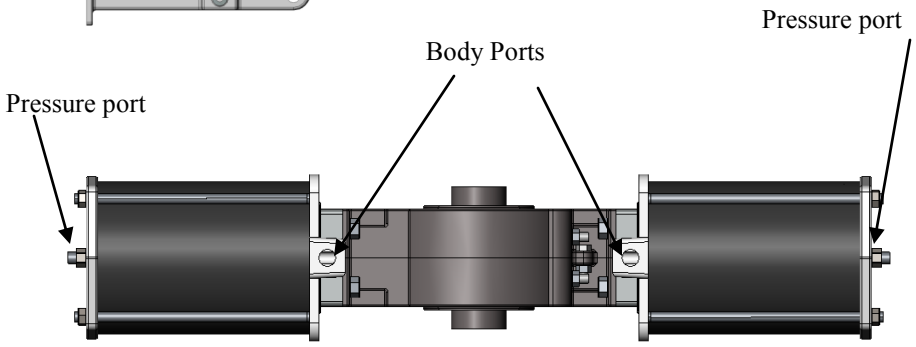
Water and Hydraulic fluid may be used to pressure FS/FD actuators provided the seal materials were selected accordingly.

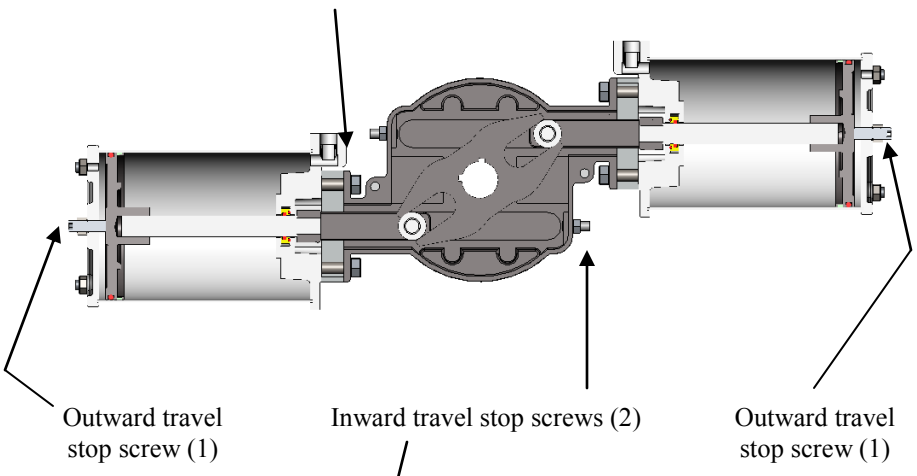
When fully inward, the ends of each clevis will contact individual travel stop screws to limit motion while applying no additional stress to the yoke arms and shaft bushings.

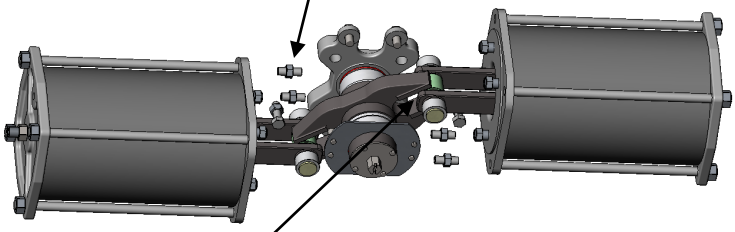
Air driven FS stainless steel actuators with stainless steel or Amalgon cylinders are not harmed by wet air (so long as freezing does not occur) . Available aluminum and chrome plated steel cylinders may be harmed by the presence of water.



Typical lifting eye holes of sizes F375 and larger pass entirely through the housing allowing lifting eye bolts and nuts in a non-stress inducing arrangement







Both ends of the Force Module Clevis make contact with individual travel stop screws to prevent side loading

Maintenance (Piston seal Replacement):

All dynamic pressure retaining seals subject to wear (the pistons o-ring seals are subject to wear) are replaceable while the actuator remains mounted on the valve.

If the actuator need is repaired on the valve, the calibration of mounted accessories is undisturbed during seal replacement and should not require readjustment.

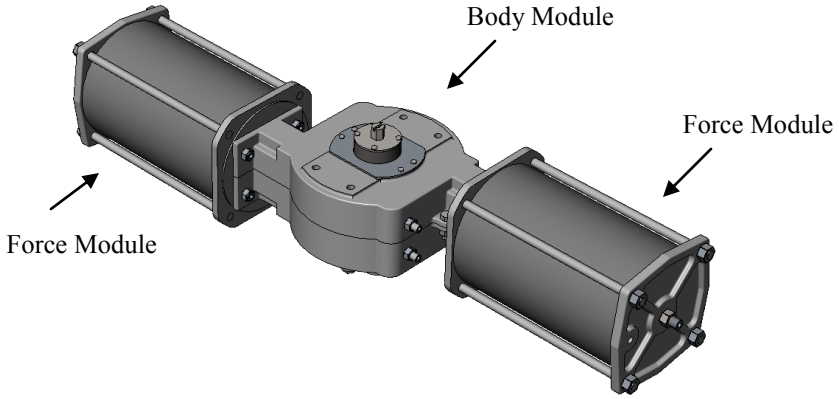
CAUTION: WHEN PRESSURE IS EXHAUSTED FROM THE PRESSURE PORTS IN PREPERATION FOR DISASSEMBLY, THE DA TYPE ACTUATOR NO LONGER EXERTS CONTROL ON THE VALVE. DO NOT ATTEMPT TO CHANGE PISTON SEALS WITH PRESSURE IN THE PIPELINE.

Instructions -

Complete the seal replacement, including reassembly on one force module, then do the other.

Release all supply pressure and disconnect all piping to the end cap ports.

1. Do not remove or change settings of the travel stops.
2. Remove the end cap tie rod nuts and the end cap (tie rods should remain in place for convenience, but no harm occurs should they be removed)
3. Remove the cylinder
4. Remove the piston o-ring, clean the o-ring groove and install a new lubricated o-ring.
5. Re-install end cap and tie rod nuts and tighten to 25 pound foot torque for each 1" of tie rod diameter
6. Proceed to second force module



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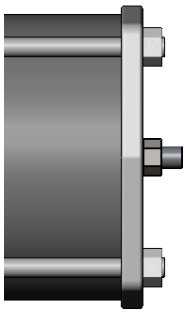

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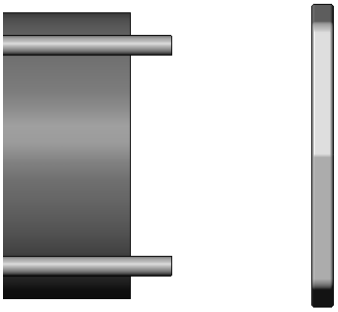

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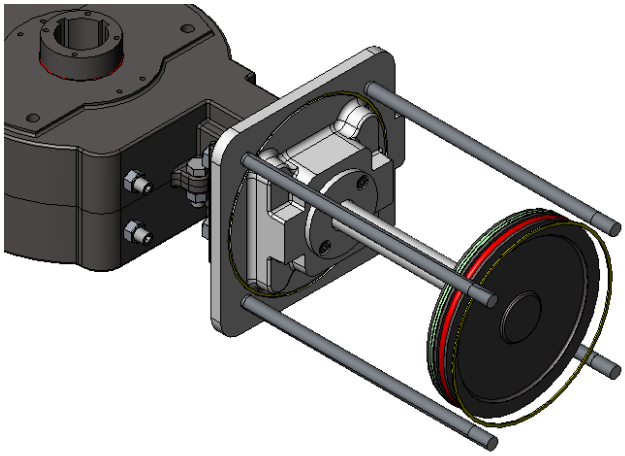

Maintenance (Complete Disassembly):

It is extremely unlikely that the complete disassembly of a FLAT YOKE actuator will be required.

Before beginning disassembly, remove the actuator from the valve and also remove all accessories.

Exhaust all pressure to the end caps and remove all piping.

Instructions -

1. Remove the hex nuts which secure each force module to the body module.
2. Simultaneously pull each force module away from the body module. Note that no mechanical disassembly is required between the force module drive components and body module components. Just pull the force modules away from the body module.

FLAT YOKE actuators are designed so that neither force module is removable if the other remains fastened to the body module. For either force module to disengage from the yoke lever, the yoke must over-rotate but it is prevented from doing so unless the second force module is simultaneously removed.

3. Remove the two fasteners used to join the body halves

4. Lift off the top body half

Note that neither the cover plate nor travel stop screws need be removed. Removal of the Top hat assembly is optional.

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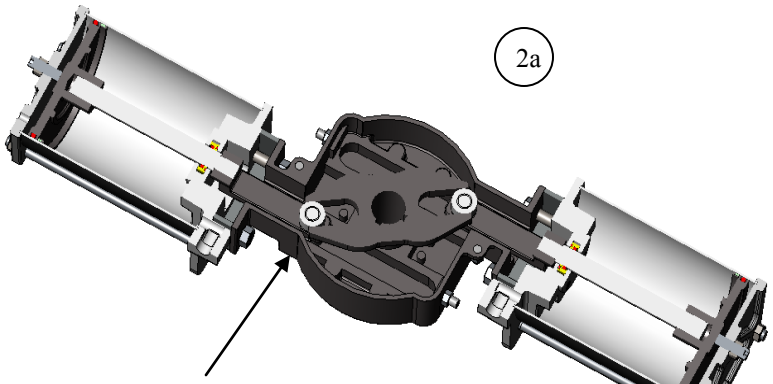
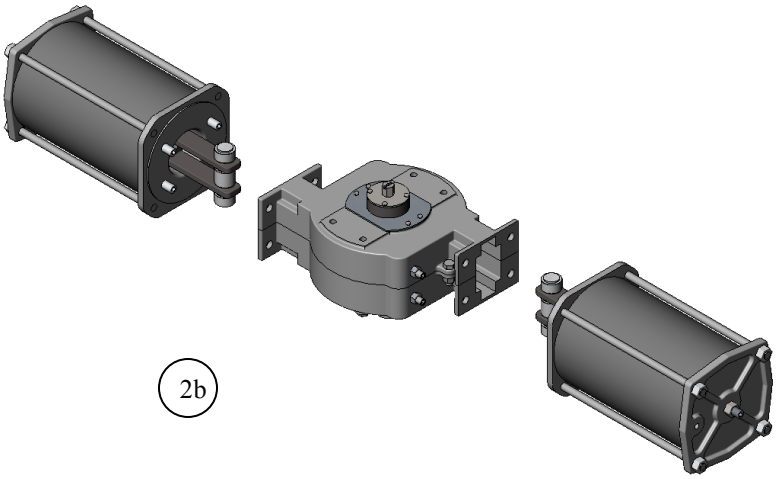
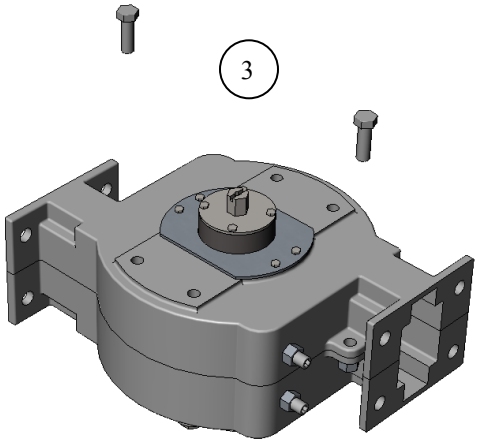
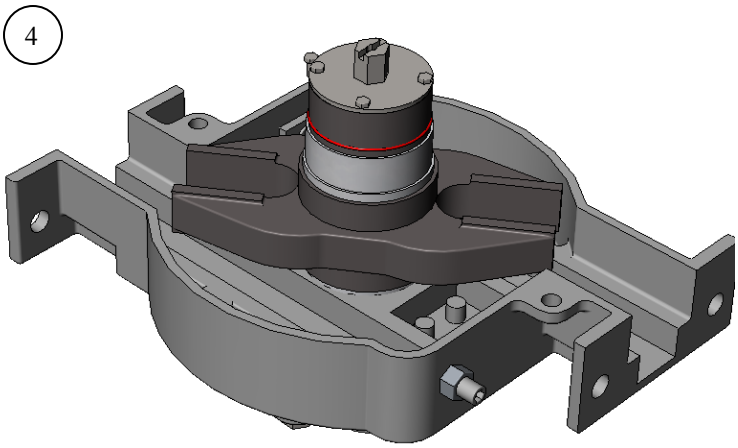


The yoke must over-rotate so that the yoke and body slots are aligned to enable withdrawal of the clevis pin assembly and force module - but this can occur only if both force modules are withdrawn simultaneously







Maintenance (continued):

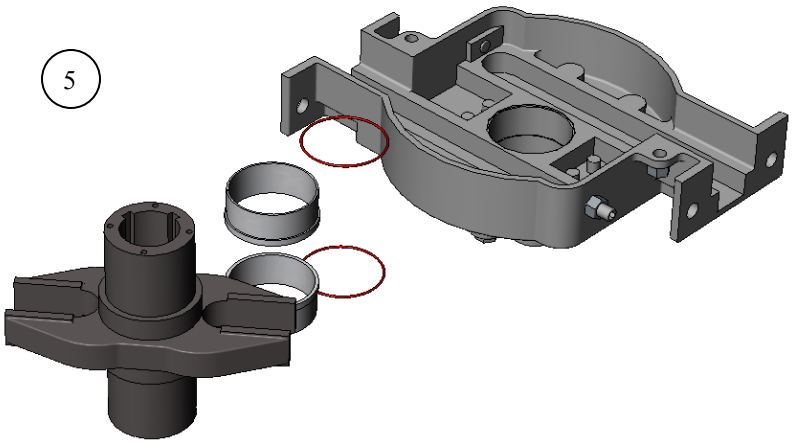
5. Remove the yoke/shaft along with shaft bushings and rain guard o-ring seals

6. Inspect parts for wear, replace as appropriate

Because of designed force balance, there is no side loading on the shaft or bushings, thus neither are likely to exhibit any wear.

As visible, the entire body module consists of 3 major parts (bottom body half, top body half and the yoke)

In addition there are two shaft bushings and two non-pressured o-rings and a few fasteners.

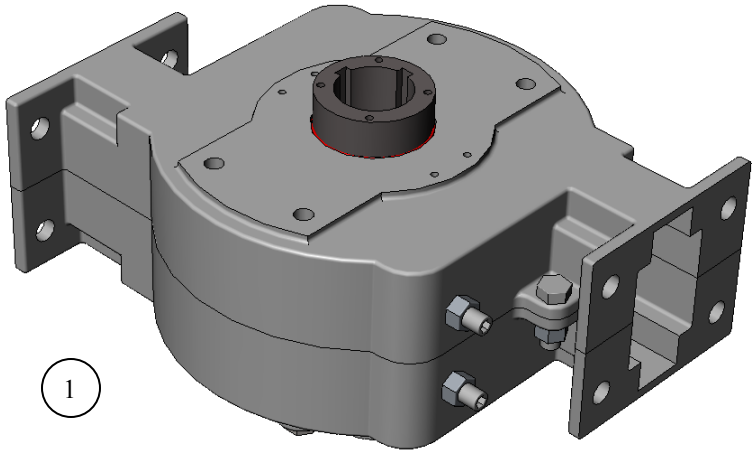


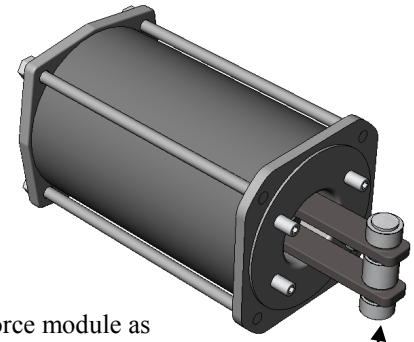
Re-Assembly:

Note that we have not changed the travel stop screw settings. If the screws are to be removed, first measure their respective extension from the body and reset them to these heights upon reassembly. It is likely that no adjustment will be required upon re-mounting on the valve.

Note also that no lubrication is required to reassemble FLAT YOKE actuators. In fact, only the piston o-ring seals are recommended to be lubricated.

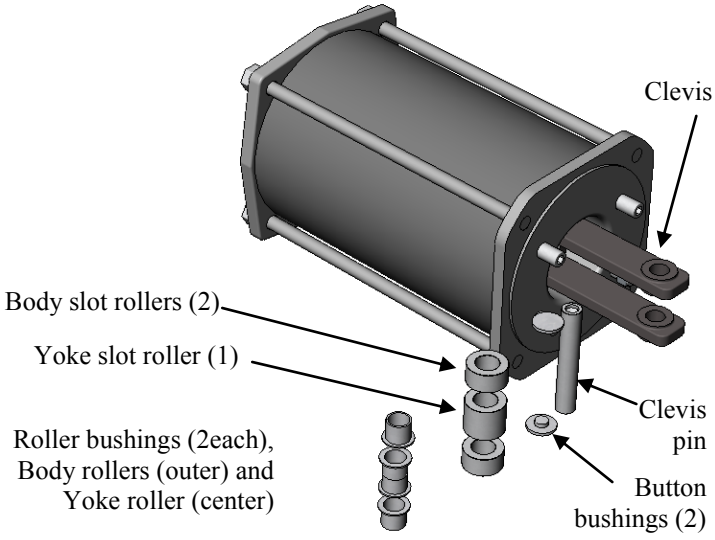
1. Reverse the above steps to reassemble the body module.
2. Before re-installing the force modules, inspect the clevis pin, rollers and bushings. Replace any components as necessary. The body module does not need to be disassembled to obtain access to the clevis pin assembly.
3. Over rotate the yoke arms to align the yoke slots with the body slots. Simultaneously install both force modules. As with disassembly, no mechanical attachment is required other than the exposed flange fasteners.





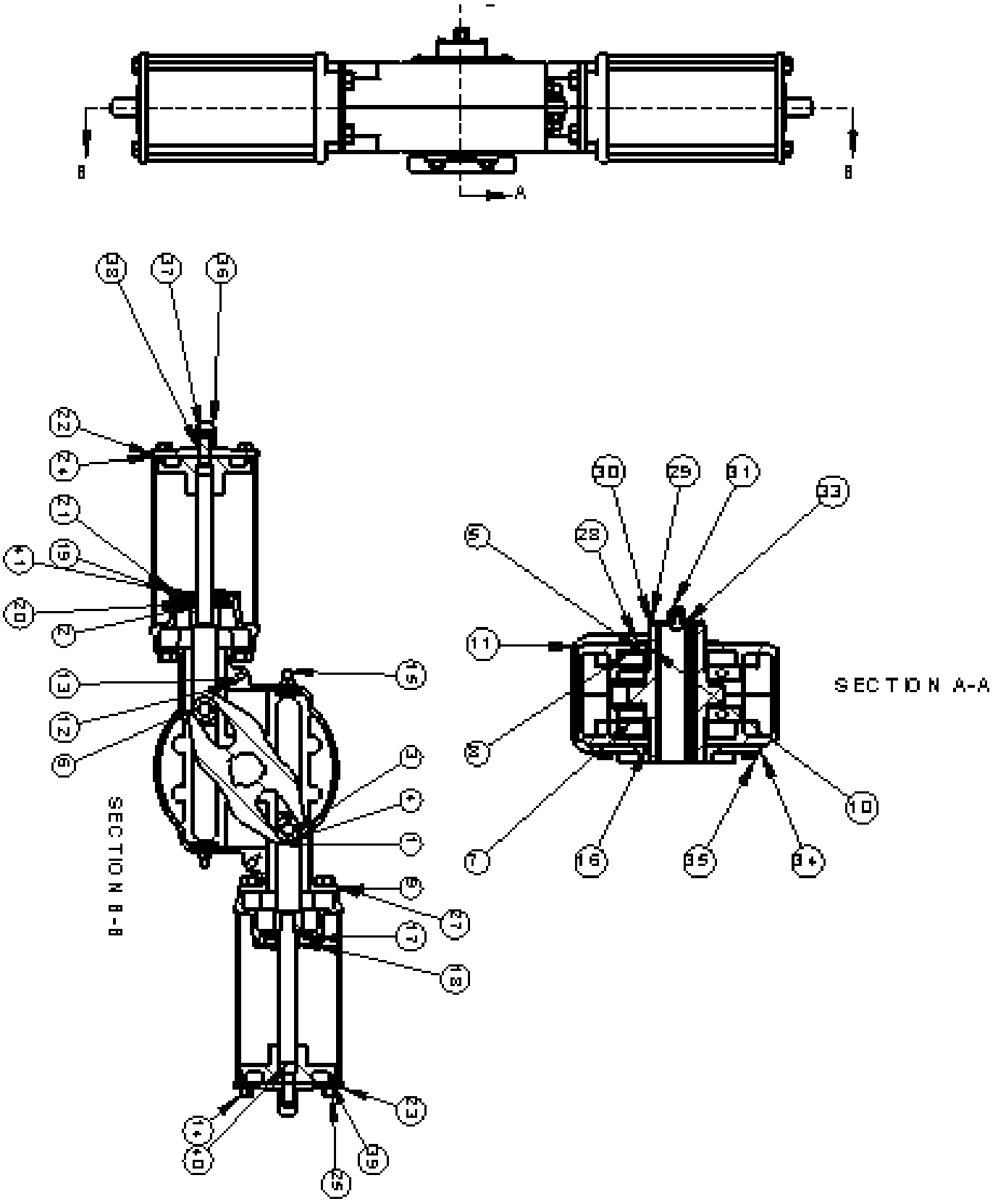
Force module as removed from the body module

Clevis, pin, rollers and bushings assembly



Note: depending upon the service, some FLAT YOKE actuators have no roller bushings as 316SS rollers roll directly on Nitronic 60 pins

IOM-FY-DA-070309 Typical Materials



QTRCO, Inc. 13120 Theis Lane Tomball, TX 77375
Ph: 281-516-0277 Fax: 281-516-0288
WWW.QTRCO.COM
Email: qtrco@qtrco.com

ITEM NO.	PART NUMBER	QTY.
1	FZ50030-871-1280-00 FZ.50 Yoke - Semi Mach	1
2	FZ50070-185-1280-00 FZ50 Cleuls Mach	2
3	FZ50100-477-1000-00 FZ50 Cleuls Pin	2
4	FZ50090-165-1000-00 FZ50 Yoke Roller	2
5	FZ50080-165-1000-00 FZ50 Body Roller	4
6	FZ50060-140-2500-00 FZ50 Bushing - yoke roller	4
7	FZ50050-140-2500-00 FZ50 Bushing - Body roller	4
8	FZ50065-140-2500-00 FZ50 Bullon Bushing - CleuPin	4
9	FZ50010-105-1280-01 FZ.50 Body bolside 091207	1
10	FZ50040-140-2500-00 Shanl Bushing	2
11	FZ50020-105-1280-01 FZ.50 Body lopside 091207	1
12	1x4 roll pin	2
13	H HC S 1x2-13 x 1.5	2
14	R H N1x2-13	14
15	S S S1x2-13 x 1.5 Socke l Sel Screw	4
16	R O R 20 4 1	2
17	FZ50310 FZ50 D A06 Base Plale	2
18	FZ50320-678-2651-00 Sliding Seal	2
19	FZ50330-852-0900-00 Washer lo relain sliding seal	2
20	R O R 2328	2
21	H HC S 1x4-20 x .375	6
22	R 10X 1218 Q 10 Cyl Seal	4
23	FZ50360 FZ50 D A06 End Cap	2
24	FZ50370-290-2515-00 Cylinder D A06	2
25	FZ50821 FZ50 D A06 Tie Rod	8
26	S S S5x8-11x2_Socke l_Se lS crew	8
27	R H N5x8-11	8
28	FZ50135 FZ.50 Couer plale	1
29	H HC S M5-10	4
30	FZ50150 FZ50 Top Hal Base Plale	1
31	K00352 FZ50 Top Hal	1
32	H HC S M5-15	4
33	H HC S 3x8-16 x.5	1
34	FZ50900-845-1280-00 UMP Masler - semi m ach	1
35	H HC S 1x2-13 x 1	4
36	R 10X2518 R10 Trauel Slop Couer	2
37	R S0625A Q 10 Trauel Slop Screw	2
38	R O R 201 4 Q 10 O-Ring TS Couer	2
39	FZ5034 0 Pis lon D A06	2
40	FZ50350 D A06 Pis lon Bol l	2
41	Polypaq 18701000-312 for 1.000 rod	2

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