THD-SERIES S09DA200 THRU S09DA385 & S09SR200 THRU S09SR385 DOUBLE ACTING & SPRING RETURN SCOTCH YOKE ACTUATORS

INTRODUCTION

A-T Controls THD scotch yoke actuators have been designed and engineered to provide high cycle-life to meet the demands of our customers. The actuators are equipped with dual travel stops and accessory mounting.

!!!WARNING!!!

FOR YOUR SAFETY, IT IS IMPORTANT THAT BEFORE REMOVING ANY COMPONENTS OF THE ACTUATOR, ENSURE THAT ALL PNEUMATIC AND ELECTRICAL SUPPLIES ARE DISCONNECTED AND LOCKOUT AND TAGOUT PROCEDURES ARE IMPLEMENTED. PLEASE CONSULT FACTORY IF YOU HAVE ANY QUESTIONS ON ANY OF THE PROCEDURES LISTED BELOW.

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1. Installation of Actuator

Triac actuators are adapted to the valve by means of an intermediate bracket and coupler. The coupler adapts the output of the actuator to the valve shaft. Standard mounting kits provide for mounting the actuator in the direction of the pipe. If different orientations are required please consult the factory when the order is placed.

Before mounting the actuator on the valve insure that both units are in the proper orientation, i.e. both units open or closed. Make sure the coupler fits into the actuator and onto the valve before assembly. Also check the bracket for proper fit. After mounting the actuator, it may be necessary to adjust the travel stops for proper open and closed valve position. Always consult the manufactures installation manual for specific details before proceeding. Pneumatically stroke the actuator several times to assure smooth proper operation.

2. Air Supply

Pneumatic piping to the actuator and associated accessories should follow the best practices for instrument pneumatic piping systems, I.E. lines free of water, oil, pipe sealant or other contaminants. The operating medium is to be filtered dry air or inert gas which is filtered to 50 micron particles size or less. It is extremely important that the actuator be powered with the proper air pressure and air volume. Maximum working pressure is 100 PSI. Consult the THD series catalog for a complete listing of MOP (maximum operating pressure) and MAWP (Maximum Allowable Working Pressure) Spring return actuators are vented to the atmosphere through the adapter. The Pressure Cylinder must be purged if a corrosive atmosphere exists. Please contact Triac Controls for possible solutions if this condition exists.

3. Lubrication

Triac actuators are factory lubricated for life and additional lubrication is not normally required. However, for actuators performing 100,000 cycles or more, an oil mist lubricator is recommended. Oil mist lubrication requires a mineral oil type ISO VG32 Class 1 for usage in temperature range 15 to 158 Deg. F. Oil mist lubricator must be set to the lowest setting. Once begun, the oil mist lubrication cannot be discontinued.

CAUTION

If the actuator is equipped with a pneumatic positioner or pneumatic controller, oil mist lubricated air cannot be used unless the instrument manufacturer indicates that the instrument is compatible with lubricated air.

4. Actuators in Storage or infrequently cycled.

Actuators in storage should be kept dry and protected from adverse conditions until installed. Original port protectors must be kept in the ports during storage. Actuators must be cycled every 90 days in storage or in operation. Actuators that do not cycle in 90 days should have a provision to jog the actuator to check for operation if a full cycle cannot be achieved.

5. Double Acting Operation

Applying air pressure to the CCW Port drives the piston toward the adapter which turns the yoke counterclockwise when viewed from the accessory side of the actuator. When pressure is applied to the CW Port the piston is driven towards

the end cap which turns the yoke clockwise. This is shown in Figure 1

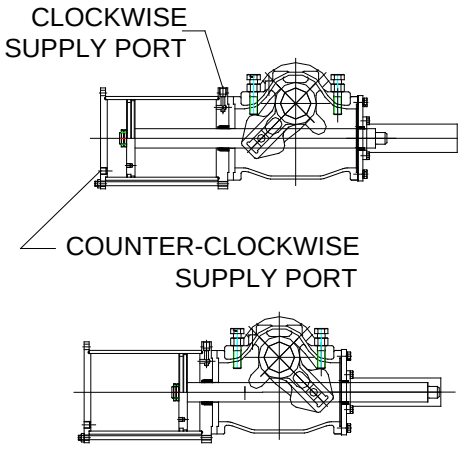

Figure 1

6. Spring Return Operation

Applying air pressure to the CCW Port drives the piston toward the adapter as the spring is compressed. This rotates the yoke counterclockwise when viewed from the accessory side of the actuator. When pressure is relieved at the CCW Port the spring drives the piston towards the end cap which turns the yoke clockwise. This is shown in figure 2. To reverse the failure mode the spring and pressure cylinder are swapped end for end.

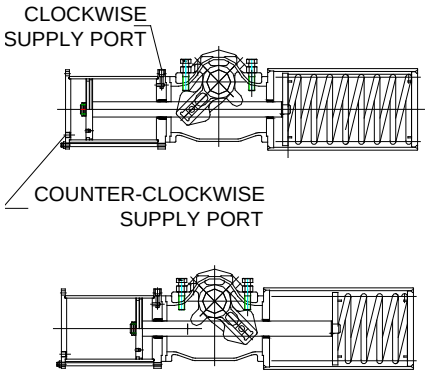

Figure 2

7. Travel Adjustment

The Triac THD actuators have + or - 8 degree adjustment of the end of travel stops in both the open and close directions. **CAUTION: DO NOT ATTEMPT TO ADJUST STOP BOLT WITH AIR PRESSURE OR SPRING FORCE APPLIED TO THE STOP BOLT. ALWAYS JOG ACTUATOR AWAY FROM STOP BOLT BEFORE ADJUSTING.**

The stop bolts are in the center body of the actuator. Figure 3 shows the stop bolt locations loosen the lock nut and adjust stop bolt as required then retighten lock nut.

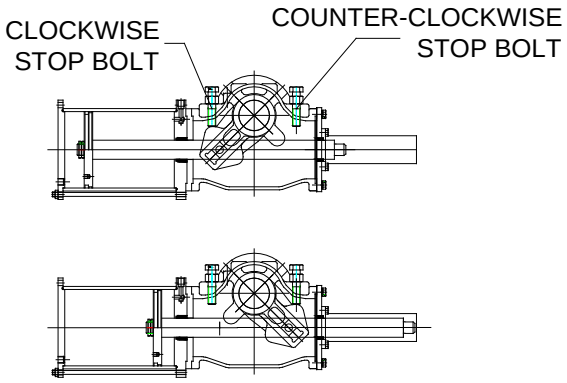

Figure 3

!!!WARNING!!!

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8. Replacement of Cylinder Seals

When the cylinder seals must be replaced, because of leakage or a preventive scheduled maintenance, the following procedure must be followed. Note only the soft parts indicated on page 5 are included in a seal kit. If additional parts are required they must be ordered separately.

Due to the continuing improvement of the Heavy Duty Actuators, seal kits provided by A-T Controls may contain extra o-rings so that all revisions of the actuators are able to be repaired. When disassembling the actuator, it is recommended to match the old o-ring with the new o-ring from the repair kit by comparing the o-ring diameter and cross section.

1. Disconnect electrical supplies and shut off pneumatic supply, vent actuator and remove from valve or damper.
2. For spring return actuators the spring tension must be relieved before starting. Apply air pressure until the piston moves off the stop bolt. Loosen the hex nut (item 12) then back out the stop bolt (item 11) until the preload is relieved. For double acting units the actuator should be in the clockwise position with the piston next to the rear flange.
3. Vent all air pressure from the cylinder (item 14).
4. Attach a lifting device to the lifting hook on the spring cylinder and remove the 4 bolts on the spring cartridge. Then carefully slide the spring cartridge off the piston rod not to lose the thrust bearing on the end of the piston rod.
5. Remove the tie rod nuts (item 19) from the tie rods (item 23).
6. Remove the end cap (item 18) from the cylinder (item 14).
7. Remove the cylinder from the adapter (item 25) by pulling over the piston (item 21). Use caution not to scratch the cylinder bore when sliding over piston.
8. Bend the safety tab on the lock nut retainer up and out of the groove. Remove the outer hex nut (item 20) holding the piston on the piston rod (item 15). Then remove the safety tab and then the inner nut.
9. Remove the piston (item 21), rod washer and o-ring (item 22).
10. Remove 2 each flat head screws in the adapter and remove the cover plate.
11. Remove the o-ring seal assembly (item 24) from the counter-bore.
12. Remove the o-rings from the piston and both flanges.
13. Clean all parts with a mild solvent that will not attack the coating on the parts.
14. The center body assembly should be inspected before the pressure group is rebuilt.
15. Remove the rod cover adapter (item 30).
16. Remove the pinion cover or any accessories mounted on top of actuator. Remove snap ring on pinion and remove upper pinion spacer and thrust washer. Slide pinion (item 2) down thru body and carefully remove from bottom of actuator as not to damage the upper and lower bearings and o-rings. Remove the piston rod and yoke assembly thru the pressure port opening.
17. Inspect the Yoke pin bushing (bronze slider) (item 10) for wear along with the slot in the yoke arm.
18. Inspect the upper and lower yoke bearings (item 4, 7) for wear.
19. Wipe out old grease and replace with new grease on all sliding surfaces.
20. Reinstall piston rod and yoke assembly into housing.
21. Then reinstall Pinion into yoke aligning the key into the keyway and bearing careful not to harm the bearings or the o-rings.
22. Reinstall the pinion thrust washer and snap ring washer followed by the snap ring and pinion cover.
23. Lightly grease new o-ring rod seal assembly (item 26) and install in front flange. Replace cover plate and install 2 each flat head socket cap screws.
24. Install adapter gasket on actuator using a gasket adhesive.
25. Reinstall adapter over piston rod and slide into position and torque bolts in a diagonal pattern.
26. Install rod cover adapter gasket on actuator using a gasket adhesive
27. Reinstall rod cover adapter and bushing over piston rod and slide into position and torque bolts in a diagonal pattern.
28. Lightly grease the o-ring for the front flange and install in the groove.
29. Place piston rod washer on piston rod with countersink facing out toward the end cap. Lightly grease o-ring (item 22) and slide over piston rod. Slide piston over piston rod and install inner hex nut then lock tab and outer hex nut then align outer hex nut with tab and bend into groove.
30. At this point the piston should be able to be pushed back and forth to insure that all parts are in proper alignment and working properly.
31. Lightly grease piston grooves and install o-ring and back-up strip.
32. Lightly grease cylinder completely on the inside surface and carefully slide over the piston until seated on the adapter.

33. Lightly grease the o-ring for the end cap and install in the groove. Place end cap over the tie rods and seat on the cylinder. Be sure to keep the original alignment of the NPT port and the lifting eye on the cylinder. If the tie rods were removed from the adapter be sure the two longer tie rods are at the top of the cylinder for the lifting eye.
34. Reinstall the tie rod nuts and tighten in a diagonal pattern.
35. To pressure test a double acting actuator proceed to the next step for a spring return go the step 39.
36. Connect 2 psig air to the adapter and cycle the actuator then connect to the end cap and cycle the actuator several times.
37. Apply 100 psig air to the adapter and check for leakage at the adapter/cylinder connection. Place a flexible tube in the end cap NPT port and check for leakage across the piston by checking for bubbles in a cup of water. Relieve air pressure on cylinder.
38. Apply 100 psig air to the end cap and check for leakage at the end cap/cylinder connection. Place a flexible tube in the front flange NPT port and check for leakage across the piston. Relieve air pressure on cylinder.
39. Apply supply pressure to the end cap and check for leakage at the end cap/cylinder connection and check for leakage across the piston by using the method in step 37 above.
40. Position stop bolts back to 90 degrees position and tighten lock nuts.
41. The actuator is now ready to return to service.

9. Converting from Double Acting to Spring Return

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1. Disconnect electrical supplies and shut off pneumatic supply, vent actuator and remove from valve or damper.
2. Loosen the stop bolt nut on the clockwise stop bolt and back out the stop bolt. The stop bolt must be backed off so that when 10 psig of air is applied to the adapter there is no load on the stop bolt. Remove the rod cover adapter bolts and remove assembly.
3. Remove the old gasket and replace with new gasket and secure with gasket adhesive.
4. Install thrust bearings (item 27) on end of piston rod.
5. Lift Spring Cartridge and slide over piston rod and align with holes in center body.
6. Install the 4 cap screws, lock washers and nuts provided with the spring cartridge.
7. Apply air pressure and check for smooth operation.
8. Adjust both stop bolts as necessary for proper travel.

10. Changing from “Spring Closed” to “Spring Open”

To convert from spring closed to spring open requires that the air cylinder be removed and the spring cartridge removed and placed on the opposite side of the actuator. Complete instructions for rebuilding the air cylinder are listed above along with instructions for installing the spring. On the S09 the yoke and piston rod assembly must be removed from the housing and the piston rod rotated end for end by removing the yoke pin and yoke pin bushings so that the pneumatic piston end is on the opposite side of the housing.

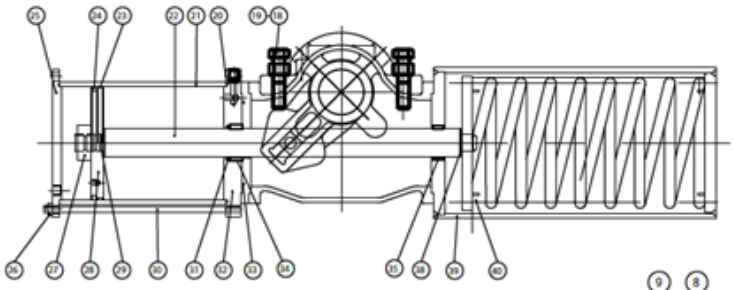
11. Seal kits and Repair Parts

To order replacement seal kits or spare parts please provide the following information:
Actuator Model Number
Serial Number
Type of seal kit (Nitrile standard, low temperature, Viton)
Item Number, Description and quantity for repair part

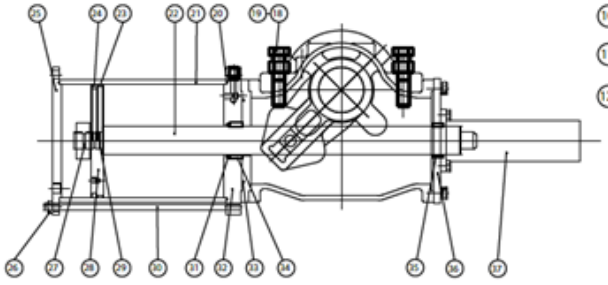
THD SERIES
S09

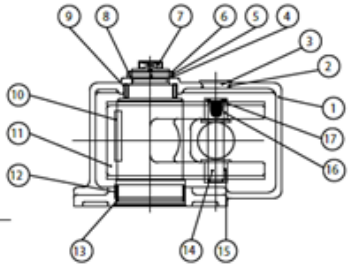
NO	QTY	SEAL KIT	DESCRIPTION	MATERIAL
1	1		HOUSING	A536 GR 65-45-12 DUCTILE IRON
2	1	*	YOKE PIN ACCESS PLUG O-RING	NBR NITRILE RUBBER
3	1		YOKE PIN ACCESS PLUG	304 STAINLESS STEEL
4	1	*	PINION TEFLON WASHER	RTFE
5	1	*	PINION SST WASHER	304 STAINLESS STEEL
6	1	*	PINION SNAP RING	STEEL ELECTROLESS NICKEL PLATED
7	1		PINION	ANSI 1045CARBON STEEL
8	1	*	UPPER PINION O-RING	NBR NITRILE RUBBER
9	1	*	UPPER PINION BEARING	PTFE TEFLON
10	1		YOKE / PINION KEY	ANSI 1045 CARBON STEEL
11	1		YOKE	A216 WCC CAST STEEL
12	1	*	LOWER PINION BEARING	PTFE TEFLON
13	1	*	LOWER PINION O-RING	NBR NITRILE RUBBER
14	1		YOKE PIN	17-4 PH STAINLESS STEEL
15	1		LOWER YOKE PIN BUSHING	B505 C836 BRASS
16	1		UPPER YOKE PIN BUSHING	B505 C836 BRASS
17	1		YOKE PIN SNAP RING	STEEL ELECTROLESS NICKEL PLATED
18	2		STOP BOLT	ASTM A193 GRADE B7
19	2		STOP BOLT NUT	ASTM A194 GR 2H
20	2	*	CYLINDER O-RING	NBR NITRILE RUBBER
21	1		CYLINDER	A106 GR. A CHROME PLATED SEAMLESS CARBON PIPE
22	1		PISTON ROD	ANSI 1045 CHROME PLATED CARBON STEEL
23	1		BACK UP RING	PTFE
24	1	*	PISTON O-RING	NBR NITRILE RUBBER
25	1		END CAP	ASTM A36 CARBON STEEL
26	**		TIE ROD NUT	ASTM A194 GRADE 2H
27	1		PISTON NUT WITH SET SCREWS	ASTM A194 GRADE 2H
28	1		PISTON	ASTM A36 CARBON STEEL
29	2	*	PISTON ROD O-RING	NBR NITRILE RUBBER
30	**		TIE ROD	ANSI 1045 CARBON STEEL
31	1	*	PISTON ROD SEAL	NBR NITRILE RUBBER W/ TEFLON SLEEVE
32	1		ADAPTER	ASTM A36 CARBON STEEL
33	1	*	S09200 ADAPTER O-RING	NBR NITRILE RUBBER
34	1	*	ADAPTER ROD BEARING	PTFE TEFLON
35	1	*	ROD COVER BEARING	PTFE TEFLON
36	1		ROD COVER ADAPTER	ASTM A36 CARBON STEEL
37	1		ROD COVER	A106 GR. A SEAMLESS CARBON STEEL PIPE
38	1		THRUST BEARING	B505 C836 BRASS
39	1		SPRING CARTDRIGE WELDMENT	A106 GR. A SEAMLESS CARBON STEEL PIPE
40	1		SPRING	SAE 9254 HEAT TREATED CARBON STEEL SPRING STEEL

SPRING RETURN



DOUBLE ACTING





A-T Controls product, when properly selected, is designed to perform its intended function safely during its useful life. However, the purchaser or user of A-T Controls products should be aware that A-T Controls products might be used in numerous applications under a wide variety of industrial service conditions. Although A-T Controls can provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser / user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of A-T Controls products. The user should read and understand the installation operation maintenance (IOM) instructions included with the product, and train its employees and contractors in the safe use of A-T Controls products in connection with the specific application.

While the information and specifications contained in this literature are believed to be accurate, they are supplied for informative purposes only. Because A-T Controls is continually improving and upgrading its product design, the specifications, dimensions and information contained in this literature are subject to change without notice. Should any question arise concerning these specifications, the purchaser/user should contact A-T Controls.

For product specifications go to http://download.a-tcontrols.com/

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