THD-SERIES S11DA280 THRU S27DA1020 & S11SR280 THRU S27SR1020 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 front flange. 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 front flange 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

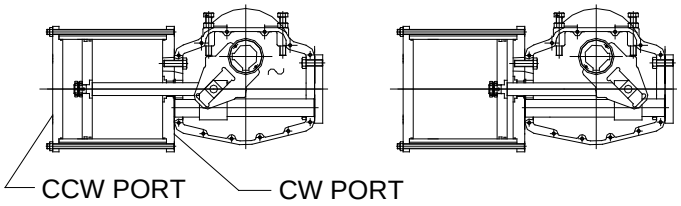

Figure 1

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.

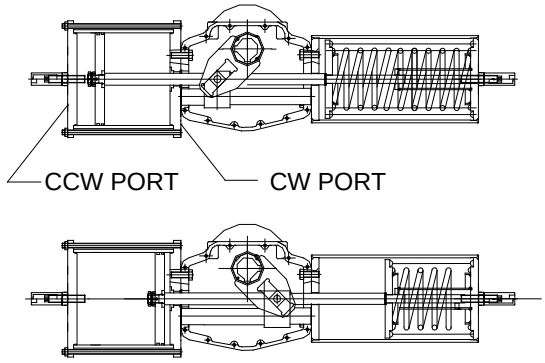

Figure 2

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.

On models S11 thru S13 the stop bolts are in the center body of the actuator. Figure 3 shows the stop bolt locations for the S11 thru S13. On models S16 thru S27 the stop bolts are located in the end caps / end plates. The stop bolt on the end cap is for Closed (clockwise rotation) and the stop bolt on the spring cylinder / end plate is the Open (counterclockwise) rotation. Loosen and remove the stop bolt cap first. The air supply must be removed before the stop bolt can be turned. Next loosen the hex nut and then position the stop bolt in or out to the correct position. Use care not to damage the o-ring seal. Retighten lock nut and replace stop bolt cap.

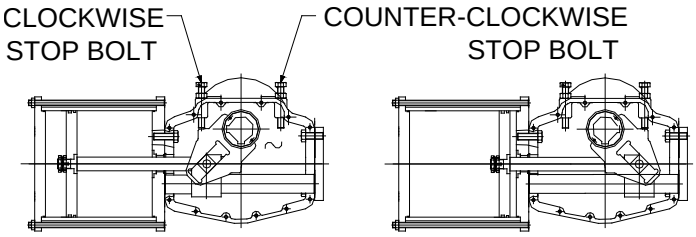

Figure 3

!!!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 pages 5 and 6 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. Remove the stop bolt cap (item 36) then loosen the hex nut (item 8) then back out the stop bolt (item7) until the preload is relieved. Do not remove the stop bolt with air pressure in the cylinder. For

double acting units the actuator should be in the clockwise position with the piston next to the end cap.
3. Vent all air pressure from the cylinder (item 10).
4. Remove the stop bolt, flat washer and seal (item 7, 8, 37).
5. Remove the tie rod nuts (item 16) from the tie rods (item 12).
6. Remove the end cap (item 15) from the cylinder (item 10).
7. Remove the cylinder from the adapter (item 18) by pulling over the piston (item 17). 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 30) holding the piston on the piston rod (item 11). Then remove the safety tab and then loosen and remove the inner nut.
9. Remove the piston, rod washer and o-ring (item 3).
10. Remove 2 each flat head screws in the adapter and remove the cover plate (item 32).
11. Remove the o-ring seal assembly (item 33) 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 indicator plate bolts and remove indicator plate (item 6).
16. Remove the cover bolts and clean out the jacking screw holes. Install a bolt into each jacking screw hole and alternately tighten the screws to bring the cover plate up so that it can be removed from the yoke bearing.
17. Inspect the bronze slider (item 20) for wear along with the slot in the yoke arm.
18. Inspect the upper yoke bearing (item 4) for wear.
19. Wipe out old grease and replace with new grease on all sliding surfaces.
20. Lightly grease new o-ring seal assembly (item 33) and install in adapter. Replace cover plate and install 2 each flat head socket cap screws.
21. Lightly grease the o-ring for the adapter and install in the groove.
22. Place rod washer on piston rod with countersink facing out toward the end cap. Lightly grease o-ring (item 31) and slide over piston rod. Slide piston over piston rod and install inner hex nut then keyed tab and outer locknut. Then align outer hex nut with locking tab and bend tab into slot.
23. Lightly grease piston grooves and install o-ring and back-up strip.
24. Lightly grease cylinder completely on the inside surface and carefully slide over the piston until seated on the adapter.
25. 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.
26. Reinstall the tie rod nuts and tighten in a diagonal pattern.
27. Reinstall the stop bolt, o-ring, flat washer and hex nut in the rear flange. Screw in to the approximate position for 90 degree operation. **On models S11 and S13 make sure that stop bolts are fully retracted before air is applied with the cover plate removed.**
28. To pressure test a double acting actuator proceed to the next step for a spring return go the step 33.
29. Connect 2 psig air to the adapter and cycle the actuator then connect to the end cap and cycle the actuator several times.
30. Apply 100 psig air to the adapter and check for leakage at the adapter/cylinder connection. Also check for rod seal leakage in the center body cavity. 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.
31. Place a light coating of permantex blue on cover gasket and install. Place cover over the alignment pins and install bolts and tighten. Remove any excess gasket sealer after it is dry.
32. Apply 100 psig air to the end cap and check for leakage at the adapter/cylinder connection. Place a flexible tube in the adapter NPT port and check for leakage across the piston. Relieve air pressure on cylinder.
33. To pressure test a Spring Return unit the cover must be installed before any air pressure is applied to the unit. Refer to step 31 for information on applying cover.
34. After cover is installed 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 30 above.
35. Make any final adjustments on the end cap stop bolt and check for leakage. Install the stop bolt cover and tighten. On models S11 and S13 set the stop bolts at 90 degrees.
36. 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. Remove the stop bolt cap on the end cap of the air cylinder and loosen the hex nut 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.
3. Remove the cover bolts and clean out the jacking screw holes. Install a bolt into each jacking screw hole and alternately tighten the screws to bring the cover plate up so that it can be removed from the yoke bearing.
4. Remove the end plate (item 35) also remove the stop bolt cover, hex nut and stop bolt as these will be used in the spring cartridge on models S16 thru S27.
5. Remove the set screws holding the stop screw pad in the sliding block (item 22).
6. Remove the stop screw pad.
7. Install the spring pusher rod into the spring cartridge.
8. Place a light coat of blue permantex on the flange gasket and apply to the actuator.
9. Lift Spring Cartridge and slide spring pusher rod into access hole and into hole in the sliding block.
10. Install the 4 cap screws and lock washers provided with the spring cartridge.
11. Place a light coating of permantex blue on cover gasket and install. Place cover over the alignment pins and install bolts and tighten. Remove any excess gasket sealer after it is dry.
12. Install indicator plate and tighten bolts.
13. Install stop bolt and hex nut in rear of spring cartridge.(models S16 thru S27)
14. Apply air pressure and check for smooth operation.
15. Adjust both stop bolts as necessary for proper travel and check for leakage before installing stop bolt covers.

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

11. Seal kits and Repair Parts

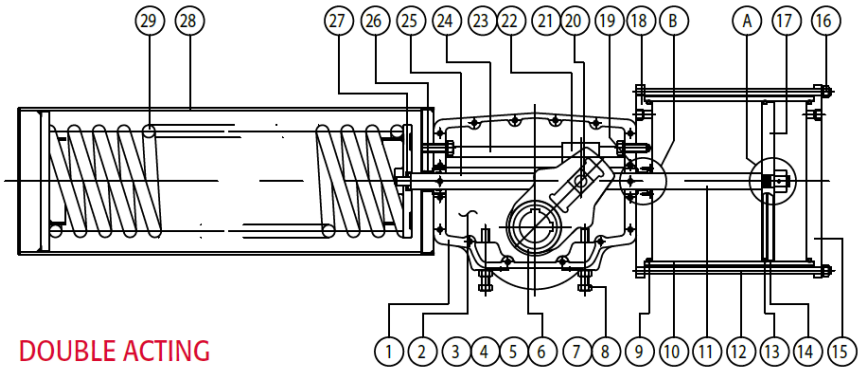
To order replacement seal kits or spare parts please provide the following information:
Actuator Model Number
Serial Number
Type of seal kit (Nitrile standard, low temperature, Viton
Item Number, Description and quantity for repair parts.

Bill of Materials

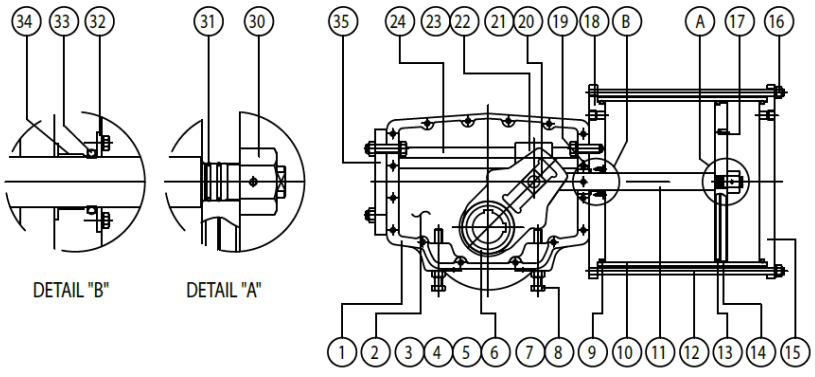
THD SERIES S11,S13

NO	QTY	SEAL KIT	DESCRIPTION	MATERIAL
1	1		HOUSING	A536 GR 65-45-12
2	1		HOUSING COVER	ASTM A36 CARBON STEEL
3	1		YOKE	CAST STEEL
4	2		YOKE BUSHING	B505 C836 BRONZE
5	4	*	YOKE O-RING	NBR NITRILE RUBBER
6	1		INDICATOR PLATE	ASTM A36 CARBON STEEL
7	2		STOP BOLT	A193 GR. B7
8	2		STOP BOLT NUT	A194 GR. 2H
9	2	*	CYLINDER O-RING	NBR NITRILE RUBBER
10	1		CYLINDER	A106 GR. A CHROME PLATED
11	1		PISTON ROD	ANSI 4140 ALLOY CARBON STEEL
12	**		TIE ROD	ANSI 1045 ALLOY CARBON STEEL
13	1	*	PISTON O-RING	NBR NITRILE RUBBER
14	1		BACK UP RING	PTFE
15	1		END CAP	ASTM A36 CARBON STEEL
16	**		TIE ROD NUT	A194 GR. 2H
17	1		PISTON	ASTM A36 CARBON STEEL
18	1		ADAPTER	ASTM A36 CARBON STEEL
19	1		ALIGNMENT RING	C1018 CARBON STEEL
20	2		YOKE PIN BUSHING	B505 C836 BRONZE
21	1		YOKE PIN	17-4 PH STAINLESS STEEL
22	1		SLIDING BLOCK	ASTM A36 CARBON STEEL
23	2		SLIDING BLOCK BEARING	Du BEARING BRONZE / TEFLON W/ STEEL BACKING
24	1		GUIDE BAR	ANSI 4140 ALLOY CARBON STEEL
25	1		SPRING PISTON ROD	ASNI 1045 ALLOY CARBON STEEL
26	1		SPRING PISTON ROD BEARING	Du BEARING BRONZE / TEFLON W/ STEEL BACKING
27	1		THRUST BEARING	B505 C836 BRONZE
28	1		SPRING CYLINDER WELDMENT	A106 GR. A CARBON STEEL PIPE
29	1		SPRING	SAE 9254 HEAT TREATED CARBON STEEL SPRING
30	1		LOCK NUT ASSY	A194 GR. 8
31	1	*	PISTON ROD O-RING	NBR NITRILE RUBBER / TEFLON
32	1		COVER PLATE	C1018 CARBON STEEL
33	1	*	ROD SEAL ASSEMBLY	NBR NITRILE RUBBER
34	1		ROD BEARING	Du BEARING BRONZE / TEFLON W/ STEEL BACKING
35	1		DA COVER PLATE	ASTM A36 CARBON STEEL

SPRING RETURN



DOUBLE ACTING



THD SERIES
S16,S20,S27

Bill of Materials

NO	QTY	SEAL KIT	DESCRIPTION	MATERIAL
1	1		HOUSING	A536 GR 65-45-12
2	1		HOUSING COVER	ASTM A36 CARBON STEEL
3	1		YOKE	CAST STEEL
4	2		YOKE BUSHING	B505 C836 BRONZE
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14	1		BACK UP RING	PTFE
15	1		END CAP	ASTM A36 CARBON STEEL
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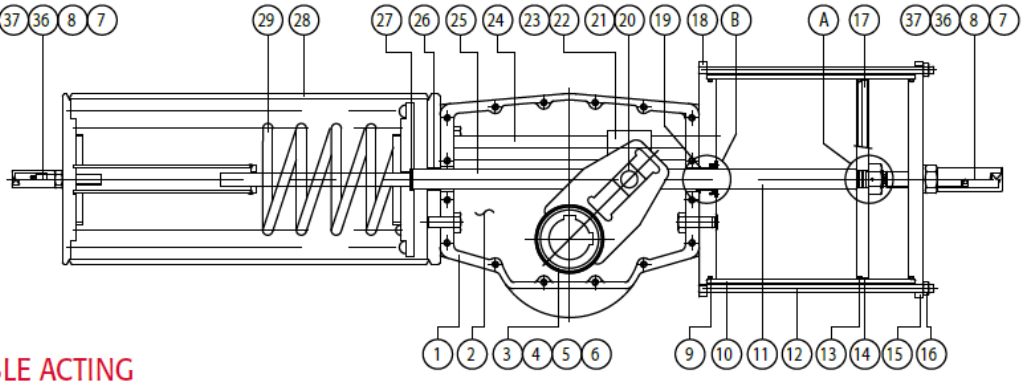
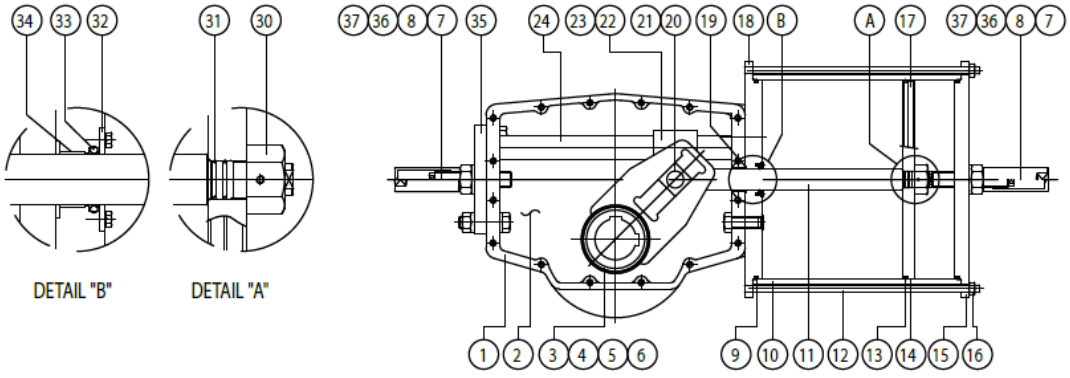
SPRING RETURN



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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