

TorqPlus Spring Return Actuator Installation & Operating Instructions

Actuator Models: SR5

Bulletin: 51961 – 09/00



This bulletin provides installation and operating information for the Bettis TorqPlus Spring Return Actuator. Should you have any questions about the actuator that are not covered under this bulletin, please contact an authorized Bettis Valve Automation Center or Bettis Electric Division, Mansfield, Ohio U.S.A.

1.0 CAUTION

Electrical shock and/or explosion hazard. To avoid serious injury, death, or property damage due to electrical shock and/or ignition of hazardous atmosphere, **SHUT OFF ALL POWER** to the actuator before removing the actuator cover. Additionally, the spring return pack contains a wound up spring that stores a large amount of energy which, if suddenly released can be dangerous. The spring is not a user serviceable device. It must be returned to the factory for repair or replacement. Removing or opening the spring pack or gear train by anyone other than Bettis Electric or a Bettis Electric authorized Valve Automation Center will void the warranty.

2.0 INSPECTION

Since many models look alike, review of the actuator's nameplate and all accompanying instructions to insure correct model number, torque, operating speed, voltage, and enclosure type before installation or use.

3.0 STORAGE

The actuator must be stored in a clean, dry, temperature controlled area. Additionally, storage must be off the floor, covered with an unsealed dust protector which allows side and bottom ventilation. Care must be taken to guard the actuator from condensation. If no other means are available, internal heaters must be installed and activated.

4.0 MAINTENANCE

Once your Bettis TorqPlus electric actuator is properly installed, formal maintenance is normally not required since it is totally enclosed and the gear train is permanently lubricated. Some preventative maintenance however, will extend operating life. These procedures should include:

4.1 Insure that alignment, relative to the load on the actuator, is maintained. Mis-alignment is the primary cause of premature drive and/or actuator problems.

4.2 Check for housing integrity and for factory installed O-Ring to insure factory seal is maintained. Replace O-Ring if required.

4.3 Conduits and conduit entrances shall be sealed and/or potted to prevent entrance of foreign materials into the actuator. Any condensation (if found inside) shall be removed. Ensure that the heater and thermostat are installed, wired, and working properly.

Under normal conditions this inspection may be at six month intervals, but where conditions are severe more frequent inspections may be advisable.

5.0 ACTUATOR ATTACHMENT

5.1 Prior to mounting your Bettis actuator, manually operate the driven device several times to insure smooth trouble free operation and place in the failsafe position as viewed from above.

5.2 Double check the actuator nameplate to be sure its rated output torque is greater than the torque required to manually operate the driven device.

5.3 When possible, any mechanical stop which is part of the driven device and located in the failsafe position should be removed. If this is not possible, care should be taken to note this and to set the travel limit cams and actuator spring return mechanical stop short of the driven device stop's contact points. See Section 8.0 Mechanical Stop And Cam Adjustment.

5.4 The actuator is shipped in the spring return fail safe position. When mounting the actuator to the driven device care should be take to maintain alignment. If the actuator and the driven device are not in alignment repeat step 5.1 as required.

5.5 Carefully follow all instructions supplied with the device and/or interconnecting hardware. When attachment is complete, all connections should be tight but not binding.

6.0 COVER REMOVAL

6.1 Remove the indicator knob on the top of the unit by loosening the #10 socket head set screw.

6.2 Remove all cover attachment screws located around the flange and carefully lift the cover up and off.

7.0 WIRING INSTRUCTIONS

CAUTION: Electrical operation of each actuator must be through an individual single pole switch to isolate the unused motor windings.

7.1 Each actuator is supplied with a wiring diagram which is included in the shipping box along with these Instructions

7.2 The actuator is equipped with a terminal strip to which all internal connections have been made.

Route all field wiring through the actuators conduit connections and, **using the wiring diagram supplied with this specific actuator**, make connections to the terminal strip. Properly sized wire should be used for all interconnections.

This bulletin provides installation and operating information for the Bettis TorqPlus Spring Return Actuator. Should you have any questions about the actuator that are not covered under this bulletin, please contact an authorized Bettis Valve Automation Center or Bettis Electric Division, Mansfield, Ohio U.S.A.

7.3 All wiring, conduit connections, and materials should be made in accordance with local and national codes and consistent with good practices.

7.4 Securely tighten all screws and check all other connections.

8.0 MECHANICAL STOP AND CAM ADJUSTMENT

8.1 Travel Limit Switches

The actuator is supplied with two travel limit switches, each operated by an independent cam with one cam/switch controlling the actuator's CW rotation and the other CCW rotation. To make a position adjustment in either extreme:

8.1.1 Operate actuator to place driven device to the position needing adjustment.

8.1.2 See Section 1.0 and **shut off all power** to the actuator.

8.1.3 As required, remove cover and indicator knob as indicated in Section 6.0

8.1.4 Determine which cam/switch is controlling the position by reviewing the wiring diagram supplied with the actuator and close examination of the unit.

8.1.5 Insert a 3/32" allen wrench into cam set screw and loosen.

To increase travel, rotate cam in the **same** direction needing increase (i.e. if you want the actuator to rotate further CW, rotate the cam CW).

To decrease travel, rotate cam in the **opposite** direction needing decrease (i.e. if you want the actuator not to rotate so far CW, rotate cam CCW).

8.1.6 Tighten the set screw. Operate the actuator electrically to verify the new cam settings.

8.1.7 Repeat Steps 8.1.1 to 8.1.6 as required until both travel limit switches are properly set.

8.2 Mechanical Stop

The actuator is supplied with a mechanical stop which limits the travel of failsafe rotation of the actuator due to the spring pack. To make an adjustment of the stop:

8.2.1 Electrically operate the actuator to the extreme position in the same direction as the failsafe operation of the unit.

8.2.2 Electrically operate the actuator approximately 30° in the opposite direction of the failsafe operation of the unit. Ensure that electrical power is applied to the "Stop" terminal of the actuator and that the brake on top of the motor is engaged.

8.2.3 Loosen the lock nut on the mechanical spring stop screw.

To increase spring return travel in the failsafe direction, screw out the mechanical stop of the adapter. (Do not remove the mechanical stop screw from the housing.)

To decrease spring return travel in the direction opposite to failsafe rotation, screw the mechanical stop into the adapter (Do not remove the mechanical stop screw from the housing.)

8.2.4 Retighten the locking nut on the mechanical stop screw.

8.2.5 Verify setting of stop by shutting off all power to the actuator which allows the spring pack to return to the failsafe position. Repeat Steps 8.2.1 to 8.2.3 as required to adjust the failsafe mechanical stop. Note: Ensure that the actuator's mechanical stop rather than any stop on the driven device is being used to absorb the actuator's inertia (if possible).

8.3 Mechanical Stop And Travel Limit Switch Interaction

To achieve proper operation of the actuator the mechanical stop and failsafe direction travel limit switch must be sequenced properly. The failsafe direction limit switch must turn off the power to the motor prior to engaging (reaching) the end of travel mechanical stop. If the mechanical stop is engaged before the failsafe direction travel limit switch, the motor will run continuously. During normal operation the torque of the spring pack will move the driven device in the failsafe direction between the failsafe limit switch engagement and the mechanical stop engagement.

8.4 Always check cam/switch and mechanical stop operating points by careful observation of electric power operation before connecting to the automatic system.

8.5 When all adjustments are complete, replace cover per Section 9.0 COVER REPLACEMENT.

9.0 COVER REPLACEMENT

9.1 To re-assemble the actuator and place in service, begin by inspecting the actuator to insure that all seals are in place and in intact and that neither the cover or base of the actuator has been mis-handled or damaged. Then, carefully replace the cover on the actuator, thread in cover screws and tighten all screws evenly.

9.2 Replace the indicator knob on the actuator shaft and secure with the set screw.

**TorqPlus Spring Return Actuator
Installation & Operating Instructions**

Actuator Models: SR5
Bulletin: 51961 – 09/00



This bulletin provides installation and operating information for the Bettis TorqPlus Spring Return Actuator. Should you have any questions about the actuator that are not covered under this bulletin, please contact an authorized Bettis Valve Automation Center or Bettis Electric Division, Mansfield, Ohio U.S.A.

10.0 TROUBLESHOOTING

The following problems and instructions are offered as a guide to the most common difficulties encountered during installation and startup.

10.1 Problem: Actuator is receiving power but the motor does not respond.

10.1.1 Check actuator nameplate to insure correct model and voltage being used.

10.1.2 Check all wiring against diagram supplied with actuator.

10.1.3 Measure line voltage to insure that actuator is receiving full rated voltage.

10.1.4 Check cam/switch limit and mechanical stop settings and sequencing to insure proper rotational setting and to insure that the motor is powered.

10.2 Problem: Actuator motor rotates but output shaft does not rotate.

10.2.1 Verify mechanical stop and travel limit switches are sequenced per Step 8.3.

10.3 Problem: Actuator is receiving power but motor only hums.

10.3.1 Review steps 10.1.1 through 10.1.4 listed above.

10.3.2 Check for power reaching both the CW and CCW terminal points at the same. Additionally, check to see if power is reaching the stop terminal and either the CW or CCW terminal points at the same time. The terminal point should always be verified with the wiring diagram supplied with the actuator.

10.3.3 Verify motor brake completely disengages when power is applied to CW or CCW terminal points.

10.3.4 Check torque requirements of driven device to insure that it is less than that shown on the actuators nameplate.

10.4 Problem: Actuator runs properly when CW or CCW power is applied but goes into failsafe operation when CW or CCW power is removed.

10.4.1 Verify power is applied to the stop terminal when power is removed from the CW or CCW terminal. Review wiring against wiring diagram supplied with actuator.

10.5 Problem: Actuator runs but its operation is erratic.

10.5.1 Check ambient temperature. Standard actuators have a maximum ambient operating temperature rating of 140°F. Modulating actuators and/or actuators with electronic controls may be lower.

10.5.2 Check frequency of operation.

10.5.3 Check to insure that actuator is not running into a continuous stall condition.

10.5.4 Check to insure that each actuator's control signal is isolated from all other actuators.

10.6 Note: All AC voltage Bettis TorqPlus EM-Series actuator are standard with built in thermal overload motor protectors. Should any of the above cause the protector to open, it will automatically reset when the motor temperature is lowered to a safe level. Please consult the Bettis authorized Valve Automation Center or Bettis Electric Division, Mansfield, Ohio U.S.A.

11.0 PARTS ORDERING AND GETTING MORE INFORMATION

Each Bettis TorqPlus actuator is manufactured complete with a nameplate containing important and detailed information. This information will be needed anytime parts or additional data is requested. Please use the following to record this information for further use.

Model: _____

Speed/90°: _____

Voltage: _____

Locked Rotor Amps: _____

Duty Cycle %: _____

Serial Number: _____

Manufacturer Date: _____

Enclosure Type: _____

Date Installed: _____

Purchased From: _____

**TorqPlus EM-Series Actuator
Product Modification Report**

Forms: ESO-01

Note: Failure to report modifications will result in loss of Bettis warranty



Completion of this form will allow Bettis to maintain records on every actuator to prevent warranty problems & protect our customers. Please fax form to Bettis Electric Division, Mansfield, OH (USA) at (419) 529-4296. ALL MODIFICATIONS MUST BE MADE USING BETTIS KITS, REPORTED ON THIS FORM AND ARE SUBJECT TO BETTIS APPROVAL.

From: _____ Date: _____
Address: _____ Contact: _____
_____ Tel No: _____
_____ Fax No: _____

1. Original "As Manufactured" Product Data

Please enter the following information from the actuator's nameplate.

Model Number: _____
Serial Number: _____
Date of Manufacturer (MM/YY): _____

2. Bettis Kit(s) / Parts Used In Modification

Please enter the following information from the data contained in each Kit or part package.

Description: _____ Description: _____
Pt. Number: _____ Pt. Number: _____
Date of Manufacture (MM/YY): _____ Date of Manufacture (MM/YY): _____

3. Some modifications, such as changing motor voltage, will require a revised actuator nameplate. In these cases, notification of the Bettis Sales Order number(s) on which the Kit(s) / Part(s) was supplied will also be required.

Bettis Sales Order Number(s): _____

Bettis Internal Use Only

Date Received: _____ Reviewed By: _____ Action: _____
Final Model Number: _____
Other: _____
