

Bettis™ Nuclear Series Actuators



Table of Contents

Section 1: General	1
Section 2: Storage	2
Section 3: Installation	3
Section 4: Start-Up	4
Section 5: Operation of Emerson Actuator	5
5.1 Controlled Operation.....	5
5.2 Manual Operation.....	5
Section 6: Maintenance	6
6.1 Service Interval	6
6.2 Lubrication Requirements.....	7
Section 7: Spare Parts	8
Section 8: Document Revision	9

Section 1: General

All Nuclear qualified actuators have a model number starting with an **N** prefix. In order to ensure and maintain the present level of qualification and auditability to the Emerson Qualification Report Number VA037274 and VA600529, Emerson requires that any maintenance or service work be performed by well-trained, equipped, prepared and competent personnel.

Section 2: Storage

For applications where the actuator is not put into immediate service, it is recommended that the actuator be cycled by clean dry air or nitrogen pressure at least once a month. Indoor storage, if available, is recommended for all actuators. Care should be taken to plug the cylinder ports, control valve ports and body ports to keep out foreign particles and moisture. Also, actuators should not be stored in an atmosphere harmful to resilient seals. For extended storage, contact the factory.

Section 3: Installation

1. Since there are many valve and actuator combinations, it is not practical to include detailed instructions for each type. Mountings are designed to be as simple as possible to keep guesswork out of installation. Actuators are shipped from the factory with the travel stops adjusted for approximately ninety degree rotation. Generally, it is necessary to make slight stop adjustments once the actuator is installed on the valve. Refer to the valve manufacturer's recommendations for specific requirements. When the valve has internal stops, the actuator should be adjusted at the same points.

NOTE:

The actual "**stopping**" should be done by the actuator. If the valve does not have internal stops, adjust the actuator to the full-open position. Using this as a reference point, rotate the valve closed and adjust to the valve manufacturer's specifications for total rotation.

2. Good instrument practices are also recommended. Clean, dry air or gas is essential for long-service life and satisfactory operation. It should be noted that new air lines often have scale and other debris in them. This debris can damage control valves, solenoids, seals, and others.

Section 4: Start-Up

1. When the actuator is first put into service, it should be stroked. This is necessary because the seals and packings having been stationary, causing them to take a "**set**". Therefore, the actuator should be operated through several cycles, exercising the seals and packings, resulting in a service ready condition.
2. The actuator speed of operation will be determined by a number of factors including:
 - a. Power supply line length
 - b. Power supply line size
 - c. Power supply line pressure
 - d. Control valve and fitting orifice size
 - e. Torque requirements of the valve
 - f. Size of actuator
 - g. Setting of speed controls
 - h. Pressure of hydraulic manual override with internal adjustable speed controls
3. Due to the interaction of these variables, it is difficult to specify a "**normal**" operating time. Faster operating times may be obtained by using one or more of the following:
 - a. Larger supply lines
 - b. Larger control valves
 - c. Higher supply pressure (not to exceed minimum operating pressure of actuator or control components)
 - d. Quick exhaust valves
4. Slower operating times may be obtained by using flow control valves to meter the exhaust. Excessive exhaust flow metering may cause erratic operation; incoming supply should not be metered.

Section 5: Operation of Emerson Actuator

5.1 Controlled Operation

Controlled operation is accomplished by pressurizing and depressurizing to the appropriate cylinder inlet(s) of a double-acting or spring-return unit(s) by means of an appropriate control valve. Do not exceed pressures indicated on the actuator nameplate.

5.2 Manual Operation

All pressure must be vented or equalized on both sides of the power piston prior to manual operation. Lubricate the exposed screw threads with ESLN-6 lubricant, loosen jam nut and rotate drive screw in appropriate direction to operate actuator and valve.

Section 6: Maintenance

6.1 Service Interval

1. Routine maintenance is generally unnecessary. "N"-Series actuators are qualified with a specific cycle life between service intervals. Six hundred twenty five (625) cycles or five (5) years is the required service interval for legacy "N"-Series actuators and three thousand (3,000) or fifteen (15) years for the new generation "N"-Series actuators. The actuator must be removed from the valve to perform the required service and maintain qualification. The actuator must be disassembled, cleaned, wear inspected, all worn parts replaced, re-lubricated, and all seal/gaskets replaced. Failure to observe required service intervals will void the qualification of the actuator. It is recommended that service kits be ordered approximately three (3) months prior to scheduled maintenance to ensure availability.

NOTE:

Storage time counts as service time.

NOTE:

Legacy actuators include NCB, NHD, and NT Series actuators.
New generation actuators include NCBB, NCBA300 and NG Series actuators.

2. For availability of technicians and equipment to perform required actuator service, contact Emerson or their authorized nuclear representative.
3. For actuators normally used in nuclear service, all bearing surfaces are generally coated with a molybdenum disulfide or Ryton coatings and corrosion inhibitor.
All threaded fasteners, bearing surfaces, tracks, rollers, pins, yoke bores, gaskets and seals are coated with the provided ESLN-6.
4. On "NT" Series actuators only, lubricant fittings are provided as a means of supplemental lubrication of the yoke trunnion bearing surfaces. Lubrication of the yoke trunnion is accomplished most effectively by applying lubricant while actuator is in motion. This assures maximum dispersion of the lubricant.
5. If the speed of operation changes, becoming increasingly slower, the supply line filter should be checked for possible collection of debris.
6. All control valves, filter regulators, positioners, limit switches, and others, require periodic maintenance. Consult manufacturers operating and maintenance instructions for their requirements, procedures, and maintenance intervals.

6.2 Lubrication Requirements

For nuclear service, use Emerson provided **ESLN-6**.

NOTE:

This product is only intended for use in large-scale fixed installations excluded from the scope of Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS 2).

Section 7: Spare Parts

1. For availability of replacement parts, contact Emerson or the nearest Emerson authorized nuclear representative. Assembly drawings are available that identify each individual part by a generic number applicable to each actuator Series. It should be remembered when ordering spare seal kits for shelf storage that the seals are made of resilient material and have a limited shelf life.
2. When ordering replacement parts, it is important to include the complete actuator model number, part number and serial number. This information is on the actuator name tag.
3. More detailed information concerning your particular application may be obtained by writing Emerson, 19200 Northwest Freeway, Houston, TX 77065, telephone: 281-477-4100.

Section 8: Document Revision

Table 1. Revision Overview

ECN	DATE	REV		BY*	DATE
8689	23 January 1986	B	COMPILED CHECKED APPROVED	O. Jimenez N. Mundy K. Chin	10 June 2014
9042	03 December 1986	C			10 June 2014
10207	20 June 1989	D			10 June 2014
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*Signatures on file Emerson, Houston, Texas

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