

BETTIS

GENERAL

OPERATING AND MAINTENANCE

INSTRUCTIONS

FOR

HYDRAULIC ROTARY

VALVE ACTUATORS

PART NUMBER: 074651E

REVISION: "D"

DATE: June 2007

1.0 GENERAL

- 1.1 Bettis ninety degree rotary actuators are designed for use with quarter turn devices of a broad range of sizes and types, and are applicable over a wide range of pressures, temperatures and environments.
- 1.2 This service procedure is offered as a general guide for the following Bettis Double Acting and Spring Return Series Hydraulic Actuators: 121, 221, 231, 331, 2210, 25420, 2521, 2542, 3420, 3531, 3542, 35310, 35420, 4031, 4515, 4531, CRD3515, H35, HD521, HD522, HD721, HD722, HD731, HD732, F, FQ, G, GC, GH, GHC, GTD, GTO, MR2150, MR3150,T, TRQ10, AND STRQ10. NOTE: The listed actuator series include M2, M3, M4, M6, M7, M9, and M11 overrides plus the early Bettis model numbers that have an alpha character following the basic model letters and numbers (i.e. HD732A, 301B, T402.0A etc).

2.0 STORAGE

- 2.1 For applications where a hydraulic actuator is not put into immediate service it is recommended the actuator be cycled (i.e. two complete strokes – one clockwise, one counterclockwise) a minimum of 5 times with regulated clean/dry pneumatic pressure once a month. Care should be taken to plug all open ports on the actuator and all controls to keep out foreign contaminants. Some plugged pressure ports need to be unplugged during each months cycling procedure to enable un-pressured areas to vent to atmosphere. After each cycling procedure is complete care should be taken to replace any removed plugs to keep out foreign contaminants during storage.
- 2.2 Indoor storage, if available, is recommended. Actuators should not be stored in an atmosphere harmful to resilient seals.
- 2.3 After long term storage the actuator may require the installation of a service kit before being placed into service.

3.0 INSTALLATION

- 3.1 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 guess work out of installation.
- 3.2 Actuators are shipped from the factory with the travel stops adjusted for approximately ninety degree rotation. Generally it is necessary to make slight travel 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.

- 3.3 Good instrument practices are also recommended. Clean/dry regulated pneumatic pressure is essential for long service life and satisfactory operation. It should be noted that new pneumatic lines often have scale and other debris in them and these lines should be purged of all foreign material. NOTE: Scale and debris can damage control valves, solenoids, seals, etc.

4.0 START-UP

- 4.1 When actuator is first put into service it should be cycled with regulated hydraulic pressure. This is necessary because the seals have been stationary, causing them to take a "set". Therefore, the actuator should be operated through several cycles, exercising the seals, resulting in a service ready condition

- 4.2 The actuator speed of operation is determined by a number of factors including:

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|---|-------------------------------------|
| 1. Power supply line length | 5. Torque requirements of the valve |
| 2. Power supply line size | 6. Size of the actuator |
| 3. Power supply line pressure | 7. Setting of speed controls |
| 4. Control valve and fitting orifice size | 8. Hydraulic Manual Override |

- 4.3 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:

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|-------------------------|-----------------------------|
| 1. Larger supply lines | 3. Higher supply pressure * |
| 2. Larger control valve | 4. Quick exhaust valves |

* Not to exceed maximum operating pressure of actuator or control components

- 4.4 Slower operating times may be obtained by using flow control valves to meter the return fluid. Excessive exhaust flow metering may cause erratic operation. Normally, incoming supply should not be metered.

5.0 OPERATION OF BETTIS ACTUATORS

- 5.1 Controlled Operation: Controlled operation is accomplished by pressurizing and/or de-pressurizing the appropriate cylinder inlet(s) of a double acting or spring return unit by means of an appropriate control valve. Do not exceed pressures indicated on actuator nameplate.
- 5.2 Manual Operation: All pressure must be vented or equalized on both sides of the hydraulic piston prior to manual operation.

6.0 MAINTENANCE

6.1 Service Interval

- 6.1.1 Routine maintenance is generally unnecessary. Normal recommended service interval for Bettis actuators is five years or maximum actuator life cycle, whichever occurs first.

NOTE: Storage time is considered as part of the Service Interval

6.1.2 It is recommended that Service Kits be ordered approximately three (3) months prior to scheduled maintenance to assure availability

6.2 Lubrication Requirements For use in all areas of the actuator

NOTE: Lubricant, other than listed in step 6.2.1 should not be used without prior written approval of Bettis Product Engineering.

6.2.1 All temperature services (-40°F to +350°F)/(-40° C to +176.6°C) use Bettis ESL-5 lubricant. ESL-5 lubricant is contained in the Bettis Module Service Kit in tubes and the tube is marked ESL-4, 5 & 10 lubricant

6.3 Hydraulic Fluid For Actuator, Hydraulic Power Module, Power Cylinder, M11, M2, M4, M7, and M9 Override Systems: Hydraulic fluids, other than those listed in steps 6.3.1 and 6.3.2 should not be used without prior written approval of Bettis Product Engineering.

6.3.1 Standard and high temperature service (-20F to +350F) / (-28.9°C to +176.6°C) use Dexron II Automatic Transmission Fluid or Shell Tellus T-32 Fluid.

6.3.2 Low temperature service (-40°F to +150°F)/(-4 0°C to +65.6°C) use Exxon Univis J13 Hydraulic Fluid.

7.0 SPARE PARTS

7.1 For availability of replacement parts, contact Bettis or nearest Bettis authorized representative. Assembly drawings are available that identify each individual part by a generic number applicable to each actuator series. NOTE: When ordering spare Service Kits for shelf storage note that the seals are made of resilient material and have a limited shelf life.

7.2 When ordering replacement parts, it is important to include the Actuator Serial Number and if Serial Number is not available then the complete actuator model number and part number. This information is on the actuator name tag.

7.3 More detailed information may be obtained by contacting any of the following locations:

Headquarters

Bettis Actuator & Controls
P.O. Box 508
Waller, Texas 77484 U.S.A.
Telephone: 01 281/463-5100
Fax: 01 281/463-5153

Website: www.bettis.com

ECN	DATE	REV	BY *	DATE	
Released	October 1998	A	COMPILED	L.Ramirez	6/6/2007
18190	December 2001	C	CHECKED	C.Ross	6/6/2007
19636	June 2007	D	APPROVED	D.McGee	6/6/2007

* Signatures on file Bettis, Waller, Texas