

**GH BETTIS**

**OPERATING & MAINTENANCE INSTRUCTIONS**

**DISASSEMBLY & ASSEMBLY**

**FOR THE FOLLOWING MODELS**

**H251.5 & H352.1**

**DOUBLE ACTING SERIES**

**HYDRAULIC ACTUATORS**

PART NUMBER 74780

REVISION "A"

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## 1.0 INTRODUCTION

- 1.1 This service procedure is offered as a guide to enable general maintenance to be performed on GH Bettis H251.5 and H352.1 "Scotch-Yoke" type hydraulic actuators.
- 1.2 The maximum recommended service interval for this actuator is five years. Storage time is counted as part of the service interval.

COMPLETE ACTUATOR REFURBISHMENT  
REQUIRES THAT THE ACTUATOR BE  
DISMOUNTED FROM THE VALVE

## 2.0 BASIC TOOLS

All tools are American Standard inch. Large adjustable wrench, two each medium standard screwdriver, small standard screwdriver with edges removed, allen wrench set, 1/2" drive socket set, and non-hardening thread sealant.

## 3.0 REFERENCE GH BETTIS MATERIALS

- 3.1 Assembly Drawing 36239 for H251.5 actuators.
- 3.2 Assembly Drawing 36241 for H352.1 actuators.
- 3.3 Exploded detail 65011 for H25 actuators.
- 3.4 Exploded detail 65012 for h35 actuators.
- 3.5 General Operating & Maintenance Instructions Part Number 74651.

## 4.0 GENERAL

- 4.1 Numbers in parenthesis, (), indicate the bubble number (reference number) used on the GH Bettis Assembly Drawings and actuator Parts List.
- 4.2 This procedure is written using the stop screw side of the housing (1-10) as the front side of the actuator and the housing cover (1-20) as the top of the actuator.
- 4.3 When removing seals from seal grooves, use a small screwdriver with the sharp edges rounded off or use a commercial seal removing tool.

- 4.4 Use a non-hardening thread sealant on all pipe threads.
- 4.5 Disassembly of actuator should be done in a clean area on a work bench.

4.6 Fluid Requirements:

4.6.1 Standard and high temperature service (-20°F to +350°F) use Dexron II Automatic Transmission Fluid.

4.6.2 Low temperature service (-50°F to +150°F) use Exxon Univis J13 Hydraulic Fluid.

4.7 LUBRICATION REQUIREMENTS

4.7.1 Standard and high temperature service (-20°F to 300°F) use Kronaplate 100 lubricant. This lubricant is furnished in the GH Bettis Service/Seal Kit.

4.7.2 Low temperature service (-50°F to +150°F) use Kronaplate 50.

4.7.3 For distributors of Kronaplate lubricants in your area call 800-428-7802.

5.0 GENERAL DISASSEMBLY

- 5.1 Remove all operating pressure from actuator rod cover (3).
- 5.2 Remove all piping and accessories mounted on actuator.
- 5.3 The setting of stop screws (1-60) should be checked and setting recorded before stop screws are loosened or removed.
- 5.4 Remove actuator from valve and valve mounting bracket.
- 5.5 Remove the socket cap screws (1-120) from the position indicator (1-110).
- 5.6 Remove the position indicator (1-110) and the yoke weather cover (4-90).

## 6.0 ROD COVER DISASSEMBLY

- 6.1 Unscrew and remove the rod cover socket head cap screws (2-30) on each rod cover (3).
- 6.2 Remove both of the rod covers (3), taking care not to disengage the rod bushings (2-20).

## 7.0 HOUSING GROUP DISASSEMBLY

- 7.1 Remove the snubber (1-130) from the housing (1-10).
- 7.2 Remove cover screws (1-30) and seal gaskets (4-20).
- 7.3 Remove the housing cover (1-20).
- 7.4 Move the yoke arms to the center position.
- 7.5 Remove the upper yoke roller (1-50).
- 7.6 Life out and remove yoke pin (1-40).
- 7.7 Holding rod bushings (2-20) in place, pull the ram rod (2-10) out through the rod bushings (2-20).
- 7.8 Remove both rod bushings (2-20) from housing (1-10).
- 7.9 Lift the yoke (1-140) from the housing cavity.
- 7.10 Remove the lower yoke roller (1-50).
- 7.11 Remove the stop screws (1-60), jam nuts (1-70) and gasket seals (4-40). Be sure to identify stop screws as left and right.
- 7.12 It is not necessary to remove housing pipe plug (1-100) or the bleed valves (2-60) from the rod covers.

## 8.0 GENERAL RE-ASSEMBLY

- 8.1 Remove all old seals and gaskets, taking care not to scratch or damage seal grooves.
- 8.2 Before starting the assembly of an actuator, all parts should be thoroughly inspected, cleaned and de-burred. Particular attention should be directed to threads, sealing surfaces and areas that will be subjected to sliding motion.

- 8.3 After inspection, the parts should be carefully cleaned to remove all dirt, gaskets and other foreign material.
- 8.4 Coat all seals with lubricant, before installing into seal grooves.

#### 9.0 CENTER HOUSING GROUP RE-ASSEMBLY

- 9.1 If removed, install a pipe plug (1-100) into the drain port of the housing (1-10).
- 9.2 Apply lubricant to the yoke bore in the body and arrange the body with the yoke bore nearest you. Lubricate the raised ribs in the bottom of the housing.
- 9.3 Coat the yoke o-ring seals (4-60) with lubricant and install into the housing (1-10).
- 9.4 Apply a generous amount of lubricant to the slots in the upper and lower yoke arms of yoke (1-140).
- 9.5 Coat the bearing surfaces of the yoke (1-140) with lubricant and install into the body. The wide yoke arm should be installed toward the top of the housing.
- 9.6 Install the rod seal (4-50) into the groove on the I.D. of the rod bushings (2-20). Note: The rod seal is to be installed with the energizer ring facing the ram rod cover (3).
- 9.7 Install the o-ring seals (4-70) and backup rings (4-80) into the groove on the O.D. of the rod bushings (2-20).
- 9.8 Coat the ram rod bushings (2-20) with lubricant and install into both sides of the housing (1-10).
- 9.9 Coat one of the yoke rollers (1-50) with lubricant and place into the lower yoke arm slot nearest the cylindrical portion of the yoke.

- 9.10 Apply a light coat of lubricant to the ram rod (2-10) and install thru the bushings, in the housing.
- 9.11 Coat the yoke pin (1-40) with lubricant and install thru the ram rod (2-10) into the lower yoke roller (1-50).
- 9.12 Coat the remaining yoke roller (1-50) with lubricant and install over the yoke pin and into the slot in the upper yoke arm.
- 9.13 Install the stop screws (1-60) gasket seals (4-40), and stop screw jam nuts (1-70).
- 9.14 Coat the yoke bore in the cover (1-20) with lubricant.
- 9.15 Install the remaining yoke o-ring seal (4-60) into the housing cover (1-20).
- 9.16 Place the cover gasket (4-10) onto the housing (1-10).
- 9.17 Install the housing cover (1-20) and the four cover screws (1-30) with gasket seals (4-20) onto the housing (1-10).

#### 10.0 RAM ROD COVER RE-ASSEMBLY

- 10.1 Install one gasket (4-30) on the right side of the housing (1-10) and the remaining gasket (4-30) on the left side of the housing.
- 10.2 Rotate the actuator to the full clockwise position.
- 10.3 Install one rod cover (3) over the exposed ram rod end (2-10) on the right side of the housing (1-10) and the other rod cover (3) on the left side of the housing (1-10).
- 10.4 Install the rod cover socket head cap screws (2-30) into each rod cover (3).

- 10.5 If removed, install bleed valves (2-60) into each rod cover (3).
- 10.6 With the yoke rotated to the full clockwise (cw) position, install the yoke weather cover (4-90) and the position indicator (1-110) on to the top of the yoke with the pointer pointing perpendicular to the ram rod (2-10) and secure with socket cap screws (1-120).

#### 11.0 ACTUATOR TESTING

- 11.1 All sources of leakage to atmosphere and across the piston are to be checked using hydraulic pressure.
- 11.2 Cycle the actuator five (5) times at 10% of the operating pressure. This allows the seals to seek their proper working attitude.
- 11.3 Apply 100% operating pressure to one ram rod cover and allow the unit to stabilize.
- 11.4 If there is any notable leakage to atmosphere or across the piston, the unit must be disassembled and the cause of leakage must be determined and correct.
- 11.5 Repeat the above procedure for the other ram rod cover.

#### 12.0 RETURN TO SERVICE

- 12.1 Replace software components of snubber (1-130).
- 12.2 Install the snubber (1-130) into the housing (1-10).
- 12.3 Re-install actuator to valve mounting bracket and valve.
- 12.4 Adjust both stop screws (1-60) back to settings recorded in step 5.3 under General Disassembly.
- 12.5 Tighten both jam nuts (1-70) securely, while holding stop screws (1-60).
- 12.6 Reinstall any piping and accessories that were removed.
- 12.7 All accessories, including solenoid valves, positioners, pressure switches, etc., should be hooked up and tested for proper operation and replaced, if found defective.

CHART 1

PRESSURE REQUIREMENTS & LIMITATIONS  
FOR MODELS  
H251.5 & H352.1 SERIES DOUBLE ACTING ACTUATORS

<u>ACTUATOR MODEL</u>	<u>NOMINAL OPERATING PRESSURE (NOP)</u>	<u>MAXIMUM OPERATING PRESSURE (MOP)</u>	<u>MAXIMUM HYDROSTATIC TEST PRESSURE</u>
H251.5	(1)	3000	3000
H352.1	(1)	3000	4000

(1) Per customer specification or not applicable.



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