

BETTIS

SERVICE INSTRUCTIONS

OPERATION, TESTING,

REMOVAL AND INSTALLATION

LOCKING DEVICE

MODEL STR10 AND STRQ10

PART NUMBER: 112155

REVISION "A"

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CONTENTS

SECTION 1.0 INTRODUCTION

- 1.1 Safety Statement
- 1.2 General Details
- 1.3 General Notes

SECTION 2.0 LOCKING DEVICE OPERATION

- 2.1 Engagement Of The Lock Screw
- 2.2 Disengagement Of The Lock Screw
- 2.3 Test Stop Operation

SECTION 3.0 ACTUATOR REMOVAL FROM LOCKING DEVICE

- 3.1 General Notes
- 3.2 Disassembly of Actuator from Locking Device

SECTION 4.0 INSTALLING ACTUATOR TO LOCKING DEVICE

- 4.1 Reinstalling Actuator To Original Locking Device
- 4.2 Initial Installation of Actuator on Locking Device

SECTION 1.0 - INTRODUCTION

- 1.1 **SAFETY STATEMENT:** Products supplied by Bettis, in its "as shipped" condition, are intrinsically safe if the instructions contained within this Service Instruction are strictly adhered to and executed by well trained, equipped, prepared and competent personnel.

WARNING: FOR THE PROTECTION OF PERSONNEL WORKING ON BETTIS PRODUCTS, THIS PROCEDURE SHOULD BE REVIEWED AND IMPLEMENTED. CLOSE ATTENTION SHOULD BE NOTED TO THE WARNINGS, CAUTIONS AND NOTES CONTAINED IN THIS PROCEDURE.

DEFINITIONS:

WARNING: If not observed, user incurs a high risk of severe damage to Bettis product and/or fatal injury to personnel.

CAUTION: If not observed, user may incur damage to Bettis product and/or injury to personnel.

NOTE: Advisory and information comments provided to assist personnel in implementing this procedure.

1.2 **GENERAL DETAILS**

1.2.1 **TOOLS:** All required tools are American Standard inch. Two large adjustable wrenches, 12" or 18" and 1/2" drive socket set with allen sockets.

1.2.2 **REFERENCE MATERIALS:**

1.2.2.1 Refer to locking device parts list for part number of the locking device assembly drawing.

1.2.2.2 Refer to actuator parts list for part number of the actuator assembly drawing.

1.2.3 **SUPPLIES:** Small tube of Master Gasket.

1.3 **GENERAL NOTES**

WARNING: On spring return actuators, the locking device is not intended to lock the actuator in any other position than it's fail position.

1.3.1 Numbers in parentheses (), indicate the bubble number (reference number) used on assembly drawing and parts list.

1.3.2 On double acting actuators, the locking device can lock the actuator in the position specified at the time of purchase.

1.3.3 The purpose of the test stop is to test the actuator, controls, and valve for proper operation without allowing the valve to close, while limiting the actuator stroke.

SECTION 2.0 - LOCKING DEVICE OPERATION

2.1 ENGAGEMENT OF THE LOCK SCREW:

- 2.1.1 Make sure that the actuator is in the proper position for locking. NOTE: If the actuator is spring return then refer to the warning in step 1.3.2.
- 2.1.2 Unlock and remove the lock cover assembly (40).
- 2.1.3 Loosen the hex jam nut (30) and turn the stop screw (10) clockwise until resistance is encountered, then tighten stop screw (10) to approximately 100 foot pounds.
- 2.1.4 Tighten the hex jam nut (30) to 100 foot pounds.
- 2.1.5 Replace the lock cover assembly (40).
- 2.1.6 Lock the lock cover assembly (40) in place and tag if desired.

2.2 DISENGAGEMENT OF THE LOCK SCREW:

- 2.2.1 Make sure that there is no torque being applied to the locking device by the actuator or the valve.
- 2.2.2 Unlock and remove the lock cover assembly (40).
- 2.2.3 Loosen the hex jam nut (30).
- 2.2.4 Screw the stop screw (10) counter clockwise until the threads disengage. The resistance should drop rapidly!

CAUTION: After the stop screw threads disengage do not over tighten the hex jam nut (30)! Tightening the hex jam nut more than hand tight may damage the retaining ring (100).

- 2.2.5 Replace the lock cover assembly (40) and lock in place.
- 2.2.6 The actuator is ready for normal service.

2.3 TEST STOP OPERATION

NOTE: The following steps are for actuators equipped with a test stop. If the locking device has no test stop ignore this section.

- 2.3.1 Make sure the actuator is in the correct position to install the test pin (usually opposite the fail position).
- 2.3.2 Unlock and remove the test pin cover (170).
- 2.3.3 Place the test pin (160) in the test pin hole and hold in place by hand while testing.

- 2.3.4 After testing is completed, return the actuator to the position described in step 2.3.1, and remove the test pin.
- 2.3.5 Replace the test pin cover (190) and lock.
- 2.3.6 The actuator is ready for normal service.

SECTION 3.0 - ACTUATOR REMOVAL FROM LOCKING DEVICE

3.1 GENERAL NOTES

WARNING Prior to removing the actuator from the locking device the actuator must be in the full fail position, all operating pressure removed from the actuator and the key removed from the actuator's yoke/locking device stem adapter.

- 3.1.1 The actuator is heavy and will require a means of assistance to lift it from the locking device/valve assembly. NOTE: For approximate weight of the actuator refer to the actuator's Bettis Base I Standard Dimensional Drawing.
- 3.1.2 Remove all supply pressure, and insure that the actuator is in the full fail position.
- 3.1.3 Record the orientation of the actuator, in relation to the locking device, and mark appropriately. NOTE: Marking the actuator's position indicators orientation on the actuator cover is helpful.

NOTE: As a reference use the actuator's assembly drawing for steps 3.1.4 through 3.1.8.

- 3.1.4 Remove position indicator pin (1-290) from the position indicator drive assembly (1-260).
- 3.1.5 Unscrew and remove eight in number hex cap screws (1-280) with gasket seals (4-100) from position indicator cover (1-270).
- 3.1.6 Remove position indicator cover (1-270).
- 3.1.7 NOTE: Mark the hole, on the yoke, that the socket set screw (1-250) is removed from. Unscrew and remove set screw (1-250) from position indicator drive assembly (1-260).
- 3.1.8 Remove position indicator drive assembly (1-260) from the top of the yoke (1-30).

3.2 DISASSEMBLY OF ACTUATOR FROM LOCKING DEVICE

- 3.2.1 The actuator can be removed from the locking device with the locking device in either the lock screw engaged or disengaged position.
- 3.2.2 On spring return actuators only, Remove stop screw pipe plug (2-150) and SR cartridge stop pipe plug.

NOTE: The stop screw (2-130) and SR stop screw have a 1/2" Square X 7/8" deep female hole in their outboard end.

- 3.2.3 Hold the stop screw (2-130) in place by accessing the stop screw through the pipe plug hole in the end of the stop nut. Using a 1/2 inch square male drive extension hold the stop screw in place, remove stop nut (2-140).
- 3.2.4 Repeat the stop nut removal procedure used in step 3.2.4 on the spring cartridge SR stop screw and stop nut.
- 3.2.5 Measure and record the exposed length of the power cylinder stop screw (2-130) and SR cartridge stop screw.
- 3.2.6 Adjust the stop screws until the key that is mating the actuator yoke and the locking device stem adapter becomes free. Remove the key. NOTE: If unable to remove key consult the local Bettis representative or Bettis.
- 3.2.7 Remove the twenty in number hex cap screws (80) from the actuator housing. In case of the HD73X series actuators remove four hex cap screws (100) from the adapter plate (20).
- 3.2.8 Using heavy duty lifting equipment slowly lift the actuator off of the locking device.

SECTION 4.0 - INSTALLING ACTUATOR TO LOCKING DEVICE

4.1 REINSTALLING ACTUATOR TO ORIGINAL LOCKING DEVICE

- 4.1.1 Using heavy duty lifting equipment, install the actuator on the locking device in the position recorded or marked in step 3.1.3.
 - 4.1.2 Install the twenty in number hex head cap screws (80) through the locking device and into the actuator housing.
 - 4.1.3 Using the stop screws on the actuator align the key way and install the key.
- NOTE: As a reference use the actuator's assembly drawing for steps 4.1.4 through 4.1.12.
- 4.1.4 Position the position indicator drive assembly (1-260) onto the top of the yoke (1-30) with the slot positioned over the hole that was marked in step 3.1.7. Fasten with socket set screw (1-250).
 - 4.1.5 If damaged replace o-ring seal (4-80). If removed, install the o-ring seal (4-80) over the position indicator drive assembly shaft and down against the flat cover plate.
 - 4.1.6 If damaged replace o-ring seal (4-70). If removed, install the o-ring seal (4-70) into the bottom seal groove inside the position indicator cover (1-270).
 - 4.1.7 Install the wiper ring (4-60) into the top groove inside the position indicator cover (1-270).

- 4.1.8 Prepare the mounting surfaces of the position indicator cover (1-270) and the housing cover (1-130) per master gasket instructions (reference step 9.6 under General Reassembly).

- 4.1.9 If damaged replace o-ring seal (4-90). Install the o-ring seal (4-90) into the bottom seal groove on the bottom of the position indicator cover (1-270).
- 4.1.10 Install the position indicator cover (1-270), being careful not to damage the o-ring seals (4-90), (4-70) and wiper ring (4-60).
- 4.1.11 If damaged replace gasket seals (4-100). Install and tighten the position indicator cover screws (1-280) with gasket seals (4-100).
- 4.1.12 Install the position indicator pointer (1-290) into the taped hole in the position indicator drive assembly (1-260).
- 4.1.13 Return the actuator stop screws to the length noted in step 3.2.5.
- 4.1.14 Reconnect all supply pressure.
- 4.1.15 Replace lock cover assembly (40) and lock into place.

4.2 INITIAL INSTALLATION OF ACTUATOR ON LOCKING DEVICE

- 4.2.1 Before starting with this section refer to section 3.0 (Actuator removal from Locking Device) and do all of 3.1 (General Notes) steps. If the actuator is a spring return, then also complete all of steps 3.2.2 through 3.2.6.
- 4.2.2 Using heavy duty lifting equipment, install the actuator on the locking device.
- 4.2.3 Install twenty four in number hex head cap screws (80) through the locking device and into the housing.
- 4.2.4 Using the actuator stop screws align the key way in the yoke and the locking device stem adapter, then install the key.

NOTE: As a reference use the actuator's assembly drawing for steps 4.1.5 through 4.1.13.

- 4.2.5 Position the position indicator drive assembly (1-260) onto the top of the yoke (1-30) with the slot positioned over the hole that was marked in step 3.1.7. Fasten with socket set screw (1-250).
- 4.2.6 If damaged replace o-ring seal (4-80). If removed, install the o-ring seal (4-80) over the position indicator drive assembly shaft and down against the flat cover plate.
- 4.2.7 If damaged replace o-ring seal (4-70). If removed, Install the o-ring seal (4-70) into the bottom seal groove inside the position indicator cover (1-270).
- 4.2.8 Install the wiper ring (4-60) into the top groove inside the position indicator cover (1-270).
- 4.2.9 Prepare the mounting surfaces of the position indicator cover (1-270) and the housing cover (1-130) per master gasket instructions (reference step 9.6 under General Reassembly).
- 4.2.10 If damaged replace o-ring seal (4-90). Install the o-ring seal (4-90) into the bottom seal groove on the bottom of the position indicator cover (1-270).

- 4.2.11 Install the position indicator cover (1-270), being careful not to damage the o-ring seals (4-90), (4-70) and wiper ring (4-60).
- 4.2.12 If damaged replace gasket seals (4-100). Install and tighten the position indicator cover screws (1-280) with gasket seals (4-100).
- 4.2.13 Install the position indicator pointer (1-290) into the taped hole in the position indicator drive assembly (1-260).
- 4.2.14 Return the actuator stop screws to the length noted in step 3.2.5.
- 4.2.15 Reconnect all supply pressure.
- 4.2.16 Replace lock cover assembly (40) and lock into place.

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