

**BETTIS**

**SERVICE INSTRUCTIONS**

**OPERATION, TESTING,**

**REMOVAL AND INSTALLATION**

**OF THE SAF-T-LOK DEVICE**

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## **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.

**WARNING:** This procedure should not supersede or replace any customer's plant safety or work procedures. If a conflict arises between this procedure and the customer's procedures the differences should be resolved in writing between an authorized customers representative and an authorized Bettis representative.

### **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 **REFERENCE MATERIALS:** Refer to Saf-T-Lok parts list for part number of the Saf-T-Lok assembly drawing part.

### 1.3 **GENERAL NOTES**

**WARNING:** On Spring Return Actuators, the Saf-T-Lok is not recommended to lock the Actuator in any other position than its fail position.

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

**NOTE:** The reference numbers may vary slightly from one Saf-T-Lok drawing to another but item descriptions should be similar or the same.

- 1.3.2 On double acting actuators, the Saf-T-Lok 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 - SAF-T-LOK 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.
- 2.1.2 Unlock and remove the lock cover assembly (1-170).
- 2.1.3 Loosen the hex jam nut (1-70).
- 2.1.4 Turn the hex head set screw (1-100) counter clockwise until it is clear of the lock screw (1-50).
- 2.1.5 Turn the lock screw (1-50) clockwise until resistance is encountered, then tighten lock screw (1-50) to approximately 100 foot pounds.
- 2.1.6 Tighten the hex head set screw (1-100).
- 2.1.7 Tighten the hex jam nut (1-70).
- 2.1.8 Replace the lock screw cover (1-170).
- 2.1.9 Lock the lock screw cover (1-170) 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 Saf-T-Lok by the actuator or the valve.
- 2.2.2 Unlock and remove lock cover assembly (1-170).
- 2.2.3 Loosen hex jam nut (1-70).
- 2.2.4 Loosen hex head set screw (1-100) and turn lock screw (1-50) counter clockwise until it is clear of the lock screw (1-50).
- 2.2.5 Turn lock screw (1-50) counter clockwise until the lock screw loses thread engagement with housing (1-10).
- 2.2.6 Tighten hex head set screw (1-100).
- 2.2.7 Tighten hex jam nut (1-70).
- 2.2.8 Replace lock screw cover (1-170).
- 2.2.9 Lock the lock screw cover (1-170) in place and tag if desired.
- 2.2.10 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 Saf-T-Lok is not equipped with a 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 test pin cover (1-250).
- 2.3.3 Place test pin (1-240) in the test pinhole 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 test pin (1-240).
- 2.3.5 Replace test pin cover (1-250) and lock in place if desired.
- 2.3.6 The actuator is ready for normal service.

## SECTION 3.0 - ACTUATOR REMOVAL FROM SAF-T-LOK

### 3.1 GENERAL NOTES

**WARNING** Prior to separating the actuator from the Saf-T-Lok the actuator must be in the full fail position. This warning does not apply to actuators, which have no Fail Safe Feature. Failure to ensure compliance with this warning may cause the Actuator, Saf-T-Lok or other component to suddenly spin in a dangerous and uncontrolled manner.

- 3.1.1 Remove all supply pressure from the actuator power cylinder(s).
- 3.1.2 The actuator may be heavy and require a means of assistance in lifting it from the Saf-T-Lok/valve assembly.

**WARNING:** If actuator is a spring return model, insure that the actuator is in the full fail position.

- 3.1.3 Measure the exposed length of the actuator stop screws and record each. NOTE: Marking the position indicator's orientation on the cover is helpful.
- 3.1.4 Record the orientation of the actuator, and mark appropriately.
- 3.1.5 Remove the four hex cap screws and the position indicator and weather cover from the actuator.
- 3.1.4 Record the orientation of the actuator, and mark appropriately.

**3.2 SEPARATION OF ACTUATOR FROM SAF-T-LOK**

- 3.2.1 Double Acting actuators can be removed from the Saf-T-Lok with the Saf-T-Lok in either the lock screw engaged or disengaged position.
- 3.2.2 On spring return actuators, locate the stop screw that relieves the spring forces (refer to Stop Screw Location Table).
- 3.2.3 Back out and remove the stop screw(s), as identified in Stop Screw Location Table (below).

<b>STOP SCREW LOCATION TABLE</b>	
ACTUATOR MODEL SERIES	STOP SCREW IDENTIFICATION (If unable to identify proper stop screw(s) consult Bettis factory)
CB-SR & CBA-SR	Housing stop screw.
RPB-SR	Both outer end cap stop screws.
RPC-SR	Both housing stop screws.
HD-SR, T-SR & ST-SR	Stop screw located on opposite side of the actuator housing from the spring cartridge.
STR-SR, TR-SR, STRQ-SR, STRQ-SR	All cylinder stop screws.
G-SR	Stop screw located on same side of the actuator housing as the spring cartridge.

- 3.2.4 Remove the key that is mating the actuator yoke and the Saf-T-Lok.
- NOTE: If unable to remove mating key consult the local Bettis representative or the Bettis Actuators & Controls sales office.
- 3.2.5 While supporting the actuator remove four hex cap screws (1-200) from Saf-T-Lok housing (1-10)/from the adapter plate (1-300).
  - 3.2.6 Remove the actuator from the Saf-T-Lok.
  - 3.2.7 Remove ferry head cap screws (1-160) from the adapter plate and remove the Saf-T-Lok from actuator. NOTE: This step is not required if the actuator is only being removed and then re-installed on the same Saf-T-Lok.

## **SECTION 4.0 - INSTALLING ACTUATOR TO SAF-T-LOK**

### **4.1 INITIAL INSTALLATION OF ACTUATOR ON SAF-T-LOK**

- 4.1.1 Before starting with this section refer to Section 3.0 (Actuator Removal From Saf-T-Lok) paragraph 3.1 (General Notes) and complete steps 3.1.1 through 3.1.4.
- 4.1.2 Install adapter plate (1-300) to the actuator and fasten using ferry head cap screws (1-160).
- 4.1.3 Install the actuator on the Saf-T-Lok.
- 4.1.4 Install four hex head cap screws (1-200).
- 4.1.5 Return the actuator stop screws to the length noted in step 3.1.3 and align the marks on the torque shaft/housing.
- 4.1.6 Reconnect all supply pressure.
- 4.1.7 Replace lock cover assembly (1-170) and if desired lock into place.

### **4.2 REINSTALLING ACTUATOR TO ORIGINAL SAF-T-LOK**

- 4.2.1 If not already attached to the actuator, install adapter plate (1-300) to the actuator and fasten using ferry head cap screws (1-160).
- 4.2.2 Install the actuator on the Saf-T-Lok in the position recorded or marked in step 3.1.4.
- 4.2.3 Install hex head cap screws (1-200).
- 4.2.4 Return the actuator stop screws to the length noted in step 3.1.3 and align the marks on the torque shaft/housing.
- 4.2.5 Reconnect all supply pressure.
- 4.2.6 Replace lock cover assembly (1-170) and lock into place if desired.

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\* Signatures on file Bettis Actuator & Controls, Waller, Texas