

**BETTIS**

**SERVICE INSTRUCTIONS**

**REMOVING AND REINSTALLING**

**F4212-S ACTUATORS**

**AT THE PHILLIPS 66**

**POLYETHYLENE HDPE PLANT**

**HOUSTON CHEMICAL COMPLEX**

**PASADENA, TEXAS**

PART NUMBER: 114564

REVISION: "A"

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## 1.0 PURPOSE

1.1 These instructions describe suggested removal and reinstallation procedures for Bettis F4212-S actuators located at the Phillips 66 Polyethylene HDPE Plant Pasadena, Texas.

1.2 **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 actuators, this procedure should be reviewed and implemented for safe actuator removal and reinstallation. Close attention should be noted to the **WARNINGS, CAUTIONS and NOTES** contained in this procedure.

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

### 1.3 DEFINITIONS:

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

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

**NOTE:** Advisory and information comments provided to assist maintenance personnel to carry out maintenance procedures.

## 2.0 GENERAL

2.1 This procedure should only be implemented by technically competent personnel who should take care to observe good workmanship practices.

2.2 This procedure is written using the stop screw side of the housing as a reference and this side will be considered the front of the actuator. The housing cover will be the top of the actuator.

2.3 System is separated into two major components:

2.3.1 **Actuator** - comprised of two twelve inch diameter cylinders and the actuator housing which is mounted to the valve stem.

2.3.2 **Control Panel** - Comprised of pilot valves, solenoids, filters/regulators, cycle counter, junction box isolation valve, and adjustable exhaust ports (for speed adjustment).

**NOTE:** The two components are connected by pneumatic air hoses with color coded connections.

### **3.0 ACTUATOR REMOVAL**

3.1 Place the valve in the full closed position.

NOTE: If the ACTUATOR has failed and it is not possible to place the valve in the closed position then make certain that the replacement actuator is placed in this same position at time of installation.

3.2 Ensure that actuator system lockout is established by Plant Operations.

3.3 Instrument Disconnect:

3.3.1 Turn off air supply to control panel at isolation valve on control panel.

3.3.2 Detach limit switch bracket from actuator and swing same bracket (with limit switches still attached to bracket) out of the way.

3.3.3 Bleed off pressure from system, i.e., Air Tank, Actuator cylinder, etc.

3.3.4 Record, tag and disconnect flexible air supply lines on actuator (lines are color coded at connection).

3.4 Scribe mark and record the actuator mounting orientation on the valve flange and valve/actuator mounting adapter (This will allow the reinstalling person to match flange mounting bolt holes during reinstallation).

3.5 Remove the position indicator from the top of the actuator. This will expose the top of the actuator yoke.

3.6 Make sure that the actuator yoke and the valve stem are marked in such a manner that the reinstalling person will be able to match items back to the correct orientation during actuator reinstallation.

NOTE: If a different actuator and valve/actuator mounting adapter is going to be used then the orientation markings must be transferred to the new valve/actuator mounting adapter.

3.7 Remove the mounting bolts from the valve flange to actuator valve mounting adapter.

3.8 Using support equipment remove the actuator/actuator valve mounting adapter from the valve mounting flange by sliding the actuator off of the valve stem.

### **4.0 ACTUATOR REINSTALLATION**

NOTE: Refer to step 3.1 for information note.

4.1 Place the actuator in the full clockwise (closed) position.

4.2 If the actuator is not the same actuator removed in step 3.8 then transfer the information recorded in steps 3.4 and 3.6 to the new actuator.

4.3 Make sure that the actuator is in its correct orientation.

4.4 Using support equipment install the actuator/actuator valve mounting adapter on to the valve mounting flange by sliding the actuator on to the valve stem.

- 4.5 With the actuator properly aligned, Refer to step 3.4, install the mounting bolts into the valve flange to actuator valve mounting adapter.
- 4.6 If the replacement actuator has the position indicator still mounted on the actuator yoke then remove the position indicator from the top of the actuator. This will expose the top of the actuator yoke and insure proper valve alignment during actuator stop screw adjustment.

**5.0 ACTUATOR STOP SCREW ADJUSTMENTS**

- 5.1 Operate the actuator with pneumatic operation pressure and check to see that the actuator and the valve cycle in a smooth even stroke.
- 5.2 Check the setting of the actuator body stops as follows:
  - 5.2.1 With the valve in the closed position and looking at the front of the actuator adjust the housing stop screw on the right (the valve closed position stop) in or out until the milled line on top of the valve stem is at 90 degrees or perpendicular to the flow of the valve.
  - 5.2.2 If possible verify that the valve is in its closed position.
  - 5.2.3 Operating the actuator with pneumatic pressure, move the valve to the open position and check the position of the milled line on the top of the valve stem. The milled line should be parallel or in line with the flow the valve. To adjust housing stop screw on the left (the valve open position stop) turn stop screw in or out until the milled line is in the correct position.
  - 5.2.4 Holding the open and closed housing stop screws in position tighten the hex jam nuts.

**6.0 RETURN TO SERVICE**

- 6.1 Reinstall the position indicator onto the top of the actuator yoke and retain with screws.
- 6.2 Reinstall limit switch bracket with limit switches that was removed in step 3.3.2.
- 6.3 Reinstall all flexible supply lines to actuator which were disconnected in step 3.3.4.

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\* Signatures on file Waller, Texas