## MOD H10: Replacement Procedure ActCont G-H to Hyd

05-04-11

# Actuator Control Gas Over Oil to Central Hydraulic Power Unit

Replacement Procedure on a Rotary Vane Actuator





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The purpose of this procedure is to guide the replacement of an existing Actuator Control with Electric Remote 2-way, Failsafe feature using the gas over oil principle and a power media of stored nitrogen gas.

The replacement Actuator Control has Electric Remote 2-way with Failsafe feature using hydraulic fluid as a power media supplied by a Central Hydraulic System via an Accumulator Bank. Power oil, supplied by the Central Hydraulic System, is stored in the Accumulator Bank until required for operation of the Actuator.

This procedure is to be used in conjunction with the following Maintenance and Service Manuals.

Shafer Poppet Block Control Maintenance and Service Manual	Bulletin PBC-01102001
Shafer Hand Pump Maintenance and Service Manual	Bulletin MHP-01102001
Electric Remote 2-Way with Failsafe Reature Schematic	10559-S

WARNING: 1. Close the valve in the power nitrogen line.



2. Bleed off the pressure in the control by operating the manual handles on the poppet block control until the gauge in the poppet block reads 0 PSI.

## **Remove the Old Control Box**

- 1. Remove the piping to the power port and exhaust port of the old control block.
- 2. Remove tubing from the lower fittings in the hand pump going to the Gas Hydraulic Tanks, both sides.
- 3. Remove the tubing from the cylinder port of the closing solenoid valve to the closing pilot piston of the control block and to the shuttle valve.
- 4. Remove the tube run from the cylinder port of the isolation valve going to the pressure ports of the opening solenoid valve and the 2-way normally open limit valve located and actuated at the end of the closing stroke of the actuator.
- 5. Remove the tube lines from the output ports of the Hand Pump, or optional speed controls above the Hand Pump, that run to the actuator.
- 6. This should complete the pipe/tube connections and free the old control box for removal. Remove the control box. Set the old parts aside for reference.

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Figure 1: Old Components Removed

7. Remove the tube fittings in the diffuser at the top and drain at the bottom of the gas hydraulic tanks. Leave the ports open.



Figure 2: Installing New Control

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## Install the New Control Box

The new control box mounts to the same holes in the bracket on the gas hydraulic tanks as the old control.

- 1. With the four new mounting bolts and lock washers install the new control box using the 9.5" x 11.25" hole pattern in the control box back plate. Tighten the bolts.
- 2. Apply an appropriate pipe sealant to the threads and install new Swagelok<sup>®</sup> fittings:
  - a. In the Hand Pump (2) [or optional speed control valves (5)].
  - b. In the tee fitting above the Isolation Valves (8).
  - c. In both sides of the Actuator upper head.
  - d. In the Open and Close ports of the Control Block (2) and Pilot Pressure Port, on the back of the Control.
  - e. In the pressure port of the Limit Valve (18)
  - f. In the pressure port of the Open Solenoid Valve (16)

. (See Figures 2, 3 and 4)

- 3. Use Schematic Drawing 10559-S for direction and install the following components connected as shown on the Schematic. All tubing and piping used must be high-pressure stainless steel.
- 4. Connect Power Shutoff Valve (31) to the supply Line coming from the Central Hydraulic Unit.
- 5. Connect Filter With By-pass (29), Differential Pressure Switch, two Differential Pressure Switch Isolation Valves and Pressure Drain Valve (30) as shown on the Schematic 10559-S.
- 6. Connect Check Valve (25) and Accumulator Hydraulic Isolation Valve (26) as shown on the Schematic 10559-S.
- 7. Run a tube line from the tee in the power line, just constructed, to the Customer Power Oil Connection for the Control Block (9), shown in Figure 3 below.
- 8. Connect the Return Line Shutoff Valve (22) to the Return Line going to the Central Hydraulic system.
- 9. Connect the Hydraulic Thermal Relief Valve (23) and the Accumulator By-pass Valve (24) as shown on the Schematic 10559-S.
- 10. Run a tube line from the tee in the return line, just constructed, to the Return Oil Connection for the Control Block (9), shown in Figure 3 below.

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Figure 3: View of the Control from the Front

- 11. Run tubing from the discharge ports located on top of the Hand Pump (2) valve body or optional Speed Control Valves (5). (See Figures 3 and 4) The right side of the pump runs to the port on the right in the upper head of the actuator. The left side of the pump runs to the port on the left in the upper head of the actuator.
- 12. Mount the Reservoir Tank (3) to one of the Gas Hydraulic Tanks or in another suitable position, with the bottom of the Reservoir tank even with the bottom of the Hand Pump (2).
- 13. Run tubing from the empty port in the tee to the reservoir tank. Tee is shown above the left hand isolation valve in Figure 3. It may be above either isolation valve.

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Figure 4: View of the Control from the Back

- 14. Run a tube line from the Pilot pressure port on the Control Block (9) to the Pressure Port of the Limit Valve (18) mounted on the Actuator and continue that line on to the Pressure Port of the Open Solenoid Valve (16).
- 15. Run a tube line from the Cylinder Port of the Close Solenoid (17) to the empty port in the tee connected to the Close Pilot Connection of the Control Block (9).
- 16. Run a tube line from the Cylinder Port of the Open Solenoid (16) to the empty port in the tee connected to the Open Pilot Connection of the Control Block (9).
- 17. This should take care of all the plumbing for the conversion. Electrical connections should remain intact. If there are any questions feel free to contact Shafer Valve Company.

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## **Test the Installation**

- 1. Fill the Reservoir Tank (3) to the proper fluid level.
- 2. Use the Hand Pump (2) to close or open the actuator to purge the actuator and hydraulic lines. To manually stroke the actuator, either open or close, place the isolation valve handles in the horizontal position (see Figure 3 and select the appropriate knob on the selector valve located on the hand pump. This knob is selected by pressing inward toward the pump center.

**Note:** The pump has a label designating which knob is open and close.

- 3. Using the supplied pump handle, raise the hand pump clevis, which will draw hydraulic fluid into the pump. Pull the handle downward to discharge hydraulic fluid into the actuator. Repeat this process until the actuator reaches its end of stroke.
- 4. When the pumping cycle is completed, depress the manual relief valve located on the top of the selector valve on the pump and pull the pump ram back into the pump body.
- 5. Return the isolation valve handles to the vertical position.
- 6. The automatic features of the control circuit can now be used.
- 7. The hand pump will automatically shift to neutral when either the OPEN cylinder line or the CLOSE cylinder line is pressurized during an automatic cycle of the control circuit.
- 8. Turn the power oil from the central hydraulic power unit on.
- Check to see the isolation valve handles are in the vertical position, as shown in Figure
  Use the manual handles on the poppet block control to open and close the actuator.
- 10. Carefully check over system to insure there is no leakage. Repair any leaks found.
- 11. Leave the actuator in the desired position.

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