GH-BETTIS

GENERAL

OPERATING & MAINTENANCE INSTRUCTIONS

FOR

M2 HYDRAULIC MANUAL CONTROL

PROCEDURE NUMBER: Service - 084

RELEASE DATE: October, 1987

REPLACES: OPER INST - 001 (Dated 7/83)

1.0 INTRODUCTION

1.1 The M2 Hydraulic Manual Override is a self contained, hand operated, power source which provides power and directional control for operating a Bettis valve actuator, without an external energy source.

1.2 The system is composed of the following components:

1.2.1 Hand Pump & Reservoir

Provides a source of fluid power and a fluid storage receptacle.

1.2.2 Control Valve

Controls direction of actuator travel when held in either actuated position. Valve is spring loaded to the center 'free flow' position.

1.2.3 Return Flow Control Valve

Provides a resistance to fluid returning to the reservoir. Allows free flow of 'make up' fluid out of the reservoir.

1.2.4 Hydraulic Cylinder

Provides the means of converting the fluid energy to a rotational mechanical energy. It should be noted that less fluid volume is required to open the actuator than to close the actuator. This is due to the displacement of the piston rod on the opening end of the cylinder.

2.0 NORMAL POWER OPERATION

During power operation, fluid may circulate through the open center control valve between the ends of the manual cylinder and the reservoir. During the opening cycle, a greater quantity of fluid will flow from the closing end of the cylinder than can be contained in the opening end of the cylinder. This excess fluid flows through the return flow control valve to the pump reservoir. During the closing cycle, the closing end of the cylinder requires a greater quantity of fluid than can be provided by the opening end of the cylinder. The make up fluid flows out of the reservoir, through the return flow control valve, without restriction, and into the closing cylinder.

3.0 MANUAL OPERATION

CAUTION: Before attempting manual movement of the actuator, make certain that the power media has been isolated so power operation cannot be accomplished during the manual operation.

The actuator may be manually opened or closed by holding the directional control valve in the appropriate position and operating the pump until the desired position has been achieved. When the control valve is released, it will return automatically to the 'open' center position. You should note that the actuator is not locked in position.

4.0 TROUBLE SHOOTING

4.1 The reliability of the M2 Hydraulic Manual Override is exceptionally high. In all probability, the only trouble experienced, if any, will be the entrance of air into the system due to a leaking fitting, a seal, or a damaged line and the accompanying loss of fluid.

4.2 Existence of air in the system is usually indicated by the overflow of aerated oil from the reservoir or by a nonfunctioning pump; i.e. no resistance is felt when the pump is operated and the actuator will not move.

4.3 Correction of the above condition may be accomplished as follows:

4.3.1 Check all lines and fittings for signs of leakage, and repair.

4.3.2 Remove the breather and fill the reservoir to within 1/2 inch of the top, using a clean hydraulic fluid. GH-Bettis recommends Dexron II (Exxon) Automatic Transmission Fluid for service in a temperature range of -35°F to 350°F (Standard and high temperature service). For a temperature range of -65° to 180°F (low temperature service), GH-Bettis recommends Univis J13 (Exxon) Hydraulic Fluid.

4.3.3 Remove one of the bleed plugs in the manual cylinder. Actuate the directional control valve in the appropriate direction and pump fluid into the cylinder until only air free fluid comes out. Replace the bleed plug and tighten.

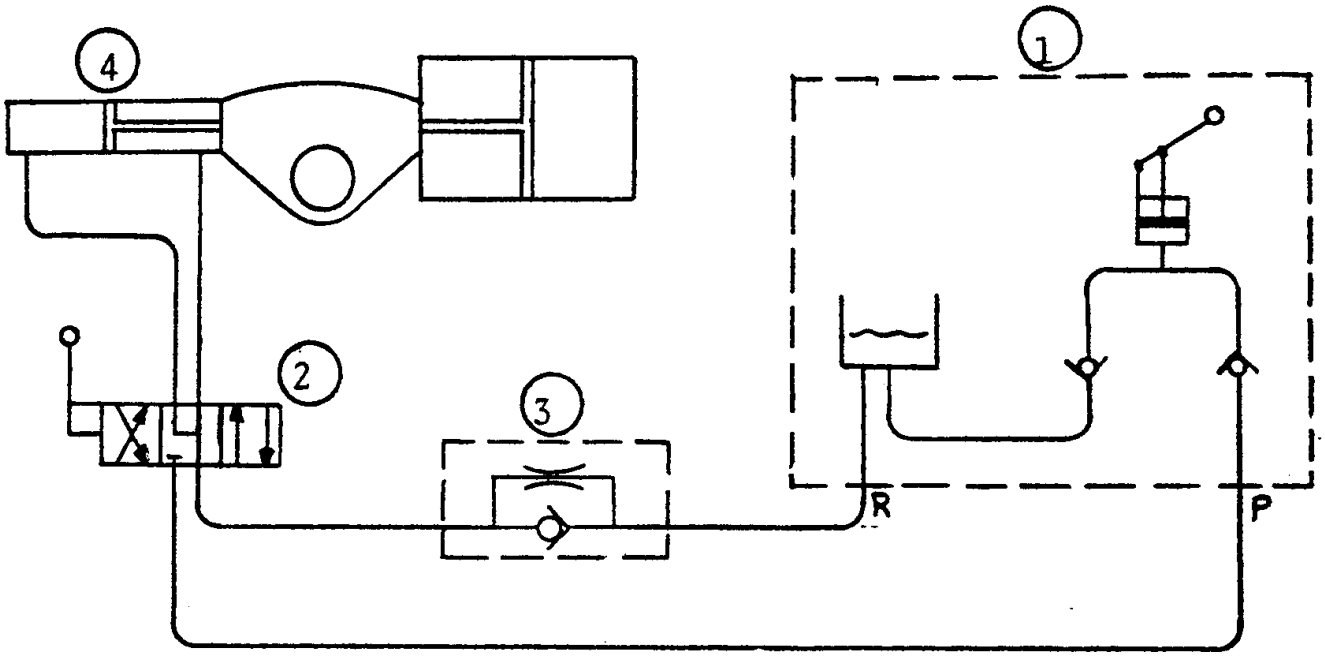
4.3.4 Check the reservoir fluid level and add fluid, if necessary.

4.3.5 Remove the remaining bleed plug and repeat the filling operation.

4.3.6 Cycle the actuator manually, several times, to assure that the air has been purged and the manual override is functioning properly. Repeat the bleed operation, if air is still present in the system.

4.3.7 Move the actuator to the full counter-clockwise position. Fill the reservoir to within 1/2 inch of the top and install the breather in the reservoir.

4.4 The actuator should now be ready to resume normal service.



1) **Hand Pump and Reservoir**

2) **Control Valve**

3) **Return Flow Control Valve**

4) **Hydraulic Override Cylinder**