

GH-BETTIS
OPERATING INSTRUCTIONS
M4
HYDRAULIC CONTROL SYSTEM

PART NUMBER: 074950

REVISION: "A"

RELEASE DATE: May, 1991

REPLACES: Service - 085 (Dated 10/87)

SYSTEM DESCRIPTION

The M4 Hydraulic Control System is a compact, modular system designed for use with GH-Bettis double acting actuators. The system utilizing a bi-directional rotary pump (which disengages during power operation), individually adjustable speed control and a make up oil reservoir necessitates by the differential volume of the hydraulic cylinder due to the piston rod.

The unit must be mounted upright with handle shaft horizontal. The reservoir fill plug must be removed and replaced with the breather supplied before operation.

POWER OPERATION:

Power operation requires that hydraulic fluid be dislocated during each stroke as the piston moves within the hydraulic control cylinder. Two individually field adjustable flow controls integrally mounted in the control module provide controlled opening and closing speeds. Adjustments are made by loosening the locknut and turning the control valve stem with a screwdriver. Turn the stem clockwise to decrease the operating speed (increases time per stroke). Turning the adjustments fully clockwise will prevent fluid flow and actuator rotation provided fluid relief pressure are not exceeded.

MANUAL OPERATION:

Before attempting to manually operate the M4 bleed off and remove all pressure to the actuator. **NOTE:** Make sure both ends of the cylinder(s) are exhausted and vented to the atmosphere.

Manual operation is accomplished by rotating the pump handle. Clockwise rotation of the pump handle produces clockwise rotation of the actuator and drives the valve closed. Counterclockwise rotation of the pump handle produces counterclockwise rotation of the actuator and drives the valve open.

GENERAL INFORMATION:

The fluid level within the reservoir will fluctuate slightly during operation. Operate the unit manually while observing the fluid level. It is important that the lowest fluid level not be less than approximately 1/4 of the reservoir volume. Allowing the fluid supply to be depleted causes air to enter the system and actuator cylinders. Air in the system will cause the pump to cavitate, rendering it useless. Erratic speed control characteristics will be noticed.

FLUID REQUIREMENTS

1. Standard and high temperature service (-35°F to 350°F) use Dexron II Automatic Transmission Fluid.
2. Low temperature service (-65°F to 180°F) Use Exxon Univis J13 Hydraulic Fluid.

REFILLING INSTRUCTIONS:

1. Put the actuator in the closed position (CW).
2. Remove the breather from the reservoir.
3. Fill the reservoir approximately three-fourths (3/4) full (see "Fluid Requirements" for proper fluid specification).
4. Open both speed control valves.
5. Open the bleed valves on the outboard end of the hydraulic cylinder only.
6. Rotate the pump handle slowly, clockwise, until all air has escaped from the system.
7. Close the bleed valve opened in step 5.

NOTE: During the fill procedure, it is important the lowest fluid level be not less than approximately one-fourth (1/4) of the reservoir volume at any time.

8. Open the bleed valve on the inboard end of the hydraulic cylinder.
9. Rotate the pump handle slowly, counterclockwise, until all air has escaped from the system.
10. Close the bleed valve opened in step 8.

NOTE: During the fill procedure, the piston will not move. This may be determined by observing the position indicator on the actuator.

11. Adjust fluid level to 1½" (40mm) from top of reservoir with actuator in open (CCW) positions.

12. To insure air is removed from the system (most likely air in pump) and to test the operating of the M4 system do steps 12.1 through 12.3.
 - 12.1 Rotate the M4 pump handle CW. The actuator should move clockwise as well. Adjust outboard bleed valve to remove air from system.
 - 12.2 Rotate the M4 pump handle CCW. The actuator will move counterclockwise. Adjust inboard bleed valve to remove air from system.
 - 12.3 With bleed valves closed, stroke actuator full 90°, CW and CCW, using M4 Hydraulic Control System.
13. Re-install breather removed in step 2.

MAINTENANCE:

GH-Bettis does not recommend periodic field maintenance for the M4 module and pump. The **only** time the M4 module and pump should be disassembled is when the system fails to perform its hydraulic control function. If maintenance is required and when possible the M4 package should be returned to the factory for maintenance.

More detailed information concerning you particular application may be obtained by writing or faxing GH-Bettis, P.O. Box 507, Waller, Texas 77484, USA, Telephone 713/463-5100 or 409/372-3606, FAX: 713/463-5103, Telex: 686804