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INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

HBE AUTOMATIC RECIRCULATING VALVE

MODEL: NLPM SERIES

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NLPM SERIES AUTOMATIC RECIRCULATING VALVE

1.0 INTRODUCTION

The valve is a self-contained, fluid operated, modulating automatic recirculation valve, designed for protection of centrifugal pumps against low flow conditions.

2.0 FEATURES

Four basic functions in a single valve body:

- Check valve in main flow for reverse flow prevention
- Main flow sensing element for low flow detection
- Modulating bypass flow control for precise pump protection
- Bypass pressure reduction

3.0 HOW IT OPERATES

The most important element of the valve is the DISC-PISTON assembly. It functions as a check valve, a main flow sensing element, moving in accordance with the increase or decrease of the main flow.

With no main flow, the disc-piston assembly acts as a check valve for the main flow, thus preventing reverse flow through the centrifugal pump.

Main flow through the guided check valve overcomes the spring force, lifting the complete disc-piston assembly, which in turn reduces the bypass flow.

A reduction in main flows lowers the disc-piston assembly, increasing the bypass flow, thus maintaining a minimum flow through the centrifugal pump.

Construction details are such that when the main flow is greater than the minimum flow required by the pump, the bypass is closed, eliminating any waste of energy.

4.0 ADVANTAGES

- **No external power source is required, which simplifies system design and reduces installation costs.**
- **Energy conservation, since the recirculation is open only when the main flow is reduced.**
- **Compact, self-contained, tamper and shock proof, gives the valve an extremely long life without need of continuous supervision and maintenance.**
- **Modulating bypass gives superior stability to the pump and the process.**
- **Low main flow head loss, no leaking glands or seals, and fail-safe to open operation, makes the valves extremely reliable.**

5.0 STORING

They should store the valve in the original packing, with the end protectors in place to guard against the weather, humidity, contaminations, and mechanical damages.

6.0 UNPACKING AND VISUAL INSPECTION

Remove all packing material and flange protections. Place valve vertically with weight of disc against spring. Push the disc-piston assembly from its seat and inspect for any debris. Flush away any packing debris with compressed air. Disc-piston assembly should move freely.

7.0 TYPICAL INSTALLATION

- **The Automatic Recirculation Valve can be mounted with inlet/outlet flow direction vertical or horizontal.**
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- **The valve should be installed on or within 7 feet of the pump discharge.**
- **Piping should be sized for maximum fluid flow velocity of 15 feet per second. In the piping layout, follow the ISA Handbook of control valves, Section 12.**
- **The bypass flow direction may be chosen for the most convenient piping. It does not affect the valve operation.**

- All valve components are chosen accordingly, with the installation specifications supplied. Change in pressure, temperature, fluid, main flow, and pump minimum flow and installation position may need modifications in the valve internals. If specification changes are apparent, contact HBE prior to installation.

8.0 FIELD FUNCTIONAL TEST

The operation of the valve is extremely quiet. Consequently, the functional field test is done through the installation of auxiliary equipment that measures flow in the recirculation line.

Install a pressure gage in the recirculation piping, near the bypass flange, with range and scale double the required bypass backpressure.

If the valve is properly selected and installed, pump flow should always be equal or higher than the minimum flow specified.

The reading of the gage will indicate the following:

<u>Main Flow</u>	<u>Bypass Flow</u>	<u>Gage Reading</u>
High	Closed	Low
Closed	Open	High
Switch Point	Opening	Increasing

For exact figures, consult valve sizing and application data.

9.0 VALVE CARE

In most applications the valve will require very little maintenance and attention. Valve components such as disc-piston assembly, spring, check valve seating, and seal ring should be inspected, coinciding with other inspections.

10.0 DISASSEMBLY

- 1. Remove valve from line.**
- 2. Remove body upper guide hold down screws.**
- 3. Clear engagement between body and upper guide and lift the upper guide carefully until it disengages the disc-piston upper shaft.**
- 4. Remove the spring and lift disc-piston assembly from the bypass guide by lifting it from the body.**

11.0 REPAIR

- 1. Body-bonnet o-ring seal should be replaced every time the valve is disassembled.**
- 2. Inspect seal surfaces to ensure they are clean and free of debris.**
- 3. Inspect the check valve seat for evidence of defects, wear, or incrustations. If needed, the seat may be reconditioned by lapping, using very fine compound.**
- 4. Inspect upper and lower guide surfaces of disc-piston assembly for evidence of wear and replace, if necessary.**

12.0 REASSEMBLY

- 1. Introduce the disc-piston assembly into the bypass guide. Introduce the spring in the upper shaft of the disc-piston assembly.**
- 2. Lower the upper guide on the body carefully, introducing the upper guide in the disc-piston upper shaft.**
- 3. Coat screws with anti-seize grease or equivalent lubricant.**
- 4. Check if disc-piston assembly slides freely in its guides for entire stroke.**
- 5. The valve is ready to be reinstalled in the line. Be sure to use new flanges gaskets. Tighten flange bolts evenly.**

