

## **Muncie Hybrid Valve Assembly**

Vehicle's hydraulic system will be comprised of a combination of a cartridge valve manifold fully integrated with Muncie V080 sectional valves for cylinder operations. System controls will be an electronic controller for Spreader operations and cable or air shift controls for the cylinders. Special design features of the integrated cartridge valve manifold assembly will automatically provide for all pump flow to either the cylinders or the spreader when not used in unison. An automatic flow division will occur when cylinders are operated simultaneously with the spreader.

Details of each component as follows:

To operate cylinder functions:

The directional control valve shall be a Muncie V080 stackable series. Valve shall be capable of 30 GPM maximum flow and 3,000 PSI. Open center, parallel circuit design shall accommodate the necessary work sections to power the plow raise, plow angle and dump.

The valve bank shall be mounted to the spreader manifold inside of a weather-tite enclosure, and shall be shifted by heavy duty, cable/lever assemblies, Muncie RVC Series. The cables shall be vinyl covered and both ends shall be bonneted to resist contamination. The cable control shall be equipped with an in-cab lever assembly located in a position convenient to the operator.

OR

The valve bank shall be mounted to the spreader manifold inside of a weather-tite enclosure, and shall be shifted by air. Air cylinders, air shift control levers, air line and fittings shall be supplied.

To operate spreader functions:

Both solenoid valves shall have direct acting wet armature solenoid operators and manual overrides. Both valves shall be mounted to a common manifold.

Valves shall be proportional flow controls with infinite resolution from 0 - 8 GPM and 0 - 17 GPM for the spinner and auger/conveyor respectively. Independent pressure compensation shall be provided for each with individual cartridge compensators mounted in the manifold assembly.

Manifold assembly shall include a relief cartridge assembly screw adjustable from 300 - 3,000 PSI, rated for 30 GPM of flow. This relief cartridge shall provide isolated spreader system protection. Pump bypass cartridge shall also be part of manifold assembly to provide automatic oil flow unloading.

Manifold circuit design shall include a hydraulic logic shuttle cartridge valve to prevent interactions of spinner and conveyor regardless of independent or simultaneous

operations.

Manifold to be anodized aluminum and include pressure gauges for relief adjustment. All manifold work porting to be #12 SAE o'ring type contained on one manifold side. Test port shall be for easy accessibility of pressure gauge installation. The manifold shall be mounted in a weather resistant powder-coated steel or stainless steel enclosure.

### Control Console

Electronic operator control console shall be mounted in cab environment to provide easy access for operator use. Console dimensions to be of approximate size 4" length, 4" height, and 1.5" width. Console housing to contain all electronic circuits and operator controls. Electronics shall be contained on a printed circuit board format with micro-processor logic.

### Operator Controls

Operator controls shall consist of switches, slew controls and displays with the following descriptions:

- Slew Controls shall be used to adjust Auger feed rate and Spinner spread width.
- Shall operate in either Auto or Manual mode
- Blast condition shall apply when button is depressed and for 5 seconds after release.
- Pause button shall latch until pressed again.
- Digital readout shall display Feed rate and Spinner rate.

### Electronic Operating Logic

Electronic circuitry to perform the following:

Groundspeed Orientation Control - The auto selection shall cause the hydraulic flow of the auger/conveyor valve to respond proportionally to the truck velocity.

The relationship of the hydraulic flow to the truck velocity (GPM/MPH) shall be adjustable and thereby establish the maximum auger/conveyor speed at the 100% rate selection for any truck velocity 0 -60 MPH. Other rate selections shall be proportionally less.