

SPECIFICATIONS
CENTRAL HYDRAULIC SYSTEM
(Muncie Mid Size MP2 Advantage)

SECTION I: (General Description)

It is the intent of the hydraulic specifications contained herein to operate a snow and ice control vehicle with a dump body, front snow plow, and material spreader. Should the vehicle be equipped with liquid reservoirs for pre-wet operations then this system shall also provide the electronic driver to power the liquid pump.

All hydraulic functionality will be performed through electronic control. No cable, air, or hydraulic shifting of valveing will be accepted. Also note the hydraulic valve platform will be accomplished with cartridge valves mounted within a manifold assembly. All Cylinders will be proportional within the manifold assembly and controlled with a single in-cab Joy-Stick Assembly.

SECTION II: (Hydraulic Valves)

The Circuit Design shall include LOAD SENSE communication from all work valves. The Construction Style shall be SOLENOID OPERATED CARTRIDGE STYLE within a COMMON MANIFOLD. The cartridge solenoids shall be rated IP69. FLOW PRIORITY will be incorporated to insure operation of the cylinder functions whenever the spreader is operating and pump flow is critically low. PROPORTIONAL CYLINDER CONTROL shall be employed on the power sequence to afford cylinder speed control.

PRESSURE RELIEVE VALVES will be independent within the circuit and stem adjustable. Pressure protection shall be included for the manifold inlet, the spreader, and the down-side of all double acting cylinders and plow angle cylinders.

The PLOW LIFT AND ANGLE functions will be capable of Four-Way control and the raise side of the circuit shall be rated for ZERO leakage. The

ANGLE functions will have Load-Locking Check Valves. Motor Spool design shall be included as required to support the angling mechanism used. Plow FLOAT feature shall be incorporated into the plow down function.

The DUMP HOIST VALVES will also be capable of Four-Way control. The Hoist, Plow Lift, Plow Angle, and Spreader Valves shall have Manual Override Capability in conjunction of the Unloader and Flow Control Circuits.

SPREADER VALVES will include proportional flow control to provide the capacity for Groundspeed Control of the Conveyor (or Auger) System. These valves will have flow capacities of 15 GPM for the Conveyor and 7 GPM for the spinner circuits.

DESCRIBE ANY EXCEPTIONS IN SECTION OF THE SPECIFICATION (Hydraulic Valves)

SECTION III. (In-Cab Operator Controls and Seat Mounting)

The OPERATOR CONTROL PANEL will have a digital display for the spreader functionality. The Auger and Spinner motors will be adjustable from infinite rotary rate selectors which are fully programmable. The center rotary rate selector will provide functionality for control of Liquid Material that may be on board the vehicle. (see separate specification for Liquid System). The lower portion of the panel assembly will incorporate “Touch Pad” Control Switches for the DUMP HOIST and PLOW ANGLE AND LIFT functionality. These switches will serve as an alternative control and provide circuit fault feedback with or without the PROPORTIONAL JOY-STICK CONTROLLER. The cylinder control speeds will be programmable through the system’s MENU which is accessible within the panel assembly

(no other peripheral device will be required to access and control the system program). There will also be FAULT DISPLAYS to indicate “short or “open” circuits as part of a troubleshooting package.

A SINGLE, 3-FUNCTION, PROPORTIONAL DUAL AXIS JOY-STICK:

This option will be available as a “plug and play” add on for CYLINDER CONTROLS. The single JOY-STICK will have a “Dead-Man” trigger for safety and the Dump Body, Plow Raise and Angle functions will be selected in the head of the JOY-STICK Assembly. The PROPORTIONAL JOY-STICK will have add-on capability through a cable that attaches from the Operator Control Panel to the base of the JOY-STICK Controller. There will also be an AUXILLIARY selection in the head of the JOY-STICK for the addition of an UNDERBODY SCRAPER or a WING PLOW add-on (two additional cylinder functionality (see UNDERBODY OR WING specification, if applicable).

The Placement and connectivity of the Operator Control Panel and Optional Joy-Stick will be accomplished with “Factory Provided” Hardware. These components will allow for full 3-Deminsional movement and placement of the panel and optional control joy-stick. The entire assembly will attach to the sub-frame of the vehicle’s operator seat and therefore provide for additional adjustability and operator safety and comfort.

DESCRIBE ANY ACCEPTIONS TO THIS SECTION OF THE SPECIFICATION (In-Cab Operator Controls and Seat Mounting)

SECTION IV. (Electronic Connectivity Platform):

All electronic connectivity shall be accomplished with TWO-WIRE interface. Two MICRO-PROCESSORS will be mounted within the Manifold/Valve System. A POWER and GROUND connection will carry the DATA MESSAGING to the MICRO PROCESSOR located in the in-cab OPERATOR CONTROL PANEL. The command messages will be carried

through the vehicles 12V System by means of POWER LINE CARRIER TECHNOLOGY. The connectivity and subsequent execution of the command will include a verification encoded message transfer. Exiting from the Valve/Tank enclosure for the functionality described will be POWER, GROUND, AND GROUNDSPED INPUTS. Any other connectivity offering will not be accepted.

**DESCRIBE ANY ACCEPTIONS TO THIS SECTION
OF THE SPECIFICATION (Electronic Connectivity Platform)**

SECTION V. (System Integration to the Vehicle)

The Valve/Manifold System will be mounted in a Valve/Tank Enclosure. The Manifold will mount to the back wall of the Enclosure to provide for hose connectivity directly into the manifold assembly. The Valve/Enclosure will include an in-tank filter, Fill cap-breather assembly with a “stand tube.” The Enclosure will be made of powder-coated mild steel with a lid assembly that has a perimeter sealing method. TWO over-center chrome latches will allow for easy access to the Manifold, Filter, and Breather/Fill Cap. The enclosure will serve as the hydraulic oil reservoir and will hold approximately 35 gallons of oil. A Sight/Temperature Gauge will be mounted to the front face bulkhead wall of the reservoir portion of the assembly. The entire Modular Unit will mount to the vehicles frame rail with proper support which will be fabricated by the installer. The Communication Electronic Control Modules will be mounted within the Valve/Tank Enclosure with Plug and Play solenoid connections to the modules. POWER, GROUND, and GROUNDSPED CONTROL CONDUCTORS (3) will exit the back wall of the enclosure for their respective connections to the Transmission TCM (for groundspeed interface), and connection to the same power and ground source for the in-cab control panel assembly.

DESCRIBE ANY EXCEPTIONS TO THIS SECTION OF THE SPECIFICATIONS (System Integration to the Vehicle)

SECTION VI (Groundspeed Control System)

The Spreader Functionality shall incorporate a highly accurate Groundspeed Control System. Groundspeed Control of Material Output will be accomplished from the operator's control panel and the infinite rotary rate selector for the "feed rate" will be the type of actuator. There will be High Brightness LED numerical display to indicate 1 of 11 reference control positions for both the conveyor (or auger) and spinner assembly. A FEEDBACK SENSOR shall NOT be required to achieve accurate and consistent operation of the spreader functions (CLOSED LOOP SYSTEMS WILL NOT BE ACCEPTED). A PAUSE AND BLAST FUNCTION will also be part of the operator control system. Performance variations of the system will be achieved through a programmable menu which will be accessed directly through the in-cab operator panel assembly. A PASS CODE will secure these MENU SELECTIONS previous to and following calibration of the system.

DESCRIBE ANY EXCEPTIONS TO THIS SECTION OF THE SPECIFICATION (Groundspeed Control System)

SECTION VII (Pre-Wet Liquid Dispensing)

The system shall be capable of controlling a hydraulic or electric liquid pump drive. The control console will contain a rotary rate selector “driver” to accomplish liquid material dispensing. There shall be programmable adjustability to allow various electric or hydraulic pump manufactures to interface to the operator’s control panel assembly. The adjustable liquid output will be subject to the ganular output and will be groundspeed controlled.

DESCRIBE BE ANY EXCEPTIONS TO THIS SECTION OF THE SPECIFICATIONS (Pre-Wet Liquid Dispensing)
