

CENTRAL HYDRAULIC SYSTEM SPECIFICATIONS

**MUNCIE POWER PRODUCTS MP2 ADVANTAGE+ SYSTEM**

TOTAL INTEGRATED ELECTRO/MECHANICAL SYSTEM FOR SNOW AND ICE VEHICLES

**GENERAL STANDARDS AND EXPECTATIONS:**

It is the intent of the following specifications to describe a complete and integrated electro/mechanical hydraulic system to power the vehicle’s front snow plow with angle, a dump body hoist, and a hydraulic spreader system. Other vehicle equipment functionality such as pre/wet, anti-icing, wing or underbody scraper blades can also be accommodated within the same system platform. This system employs a standard of technology that will be expected from all vendors and system acceptance will be based on TOTAL compliance that is detailed in the following language.

**PUMP DRIVE:**

The system shall be capable of accommodating either a variable displacement piston pump or a fixed displacement gear pump drive. Factory recommended fixed displacement size: 2.96-3.94 CID. Variable displacement piston pump size: 4.5 CID. Specify what is being supplied:

- PTO DRIVE: MAKE, MODEL AND % OF ENGINE SPEED \_\_\_\_\_.
- BELT DRIVE: MAKE, MODEL AND DISPLACEMENT \_\_\_\_\_.
- CRANKSHAFT DRIVE: MAKE, MODEL, TYPE, DRIVELINE \_\_\_\_\_.

**HYDRAULIC VALVE SOLUTION:**

Hydraulic functional control will be accomplished with a manifold / cartridge valve assembly. The manifold/cartridge valve assembly shall be designed for easy installation into a complete valve/tank assembly. The enclosure will be made of powder coated mild steel with stainless shown as a price point upgrade. The enclosure will hold 35 gallons of hydraulic oil with a sight/temperature gauge, stand tube/fill cap assembly mounted on a cleanout cover, and two over center chrome latches holding the perimeter gasket style sealed lid assembly. A 50 GPM, 10 micron drop in style return filter will also be included in the enclosure. This unit shall mount to the vehicle’s frame rail in a properly fabricated “cradle” to fully support the unit. All cylinder hoses will connect to the back (frame side) of the enclosure with SAE “O” ring from the cartridge manifold. A “step” in the back of the enclosure will create a galley to allow for easy hose connection and service.

- COMPLY  EXCEPTION: \_\_\_\_\_.

Flow Sharing design will allow for simultaneous operation of two pieces of equipment such as plow and spreader. Spreader will function even when the hydraulic pump is in a low flow condition.

- COMPLY  EXCEPTION: \_\_\_\_\_.

Electronically controlled pressure relief valves shall be installed in manifold assembly. This feature will allow for PRV's to be set, changed, or controlled from "up/down" arrow controls in the System Configuration Menus. The system shall also use this technology to control pressure spikes in the hydraulic system to minimize potential wear and damage to all of the hydraulic components on the vehicle.

COMPLY  EXCEPTION:\_\_\_\_\_.

Pressure transducers will be installed in the Advantage+ Hydraulic Manifold. Hydraulic Pump and Load Pressures are to be displayed on the Operator Control Panel and are part of the measured data sent on the Advantage+ Support Link to Muncie Engineers (see section on Advantage+ **REAL TIME SUPPORT LINK**).

COMPLY  EXCEPTION:\_\_\_\_\_.

### **OPERATOR CONTROL CENTER:**

The Advantage+ System will utilize a Color Touch-Screen that creates highly intuitive and vivid displays. System Configuration Menus shall consist of easily adjustable and user friendly configuration variables. "Up/down" arrows shall be directly adjustable from the touch screen. Tactile rotary switches for spreader operation will provide for easy hands- on control of the systems groundspeed control feature as well as pre-wet and other basic functionality. System Configuration Menus shall be pass code protected and will be accessible from the Operator Control Touch-Screen or remotely via Wi-Fi from PC's or laptops. System development will allow access to extend this access to Tablets and Smartphones.

COMPLY  EXCEPTION:\_\_\_\_\_.

The Operator Control Center shall be mounted with Factory Supplied Mounting Hardware allowing for 3 axis adjustment positioning.

COMPLY  EXCEPTION:\_\_\_\_\_.

### **DATA-LOGGING & GPS**

The system will have built in GPS which records into the data-log output. The data-log will transmit automatically by the Advantage+ WI-Fi to a designated host and it shall be capable of retrieving data with a thumb drive inserted into the Operator Control Panel.

A Fleet Manager's data-log report software package shall be standard with filtering options for specific information, data range, etc. There will also be a menu option that generates a Google map with the truck route highlighted. Positioning a mouse cursor on a route waypoint will generate a pop-up with recorded data.

COMPLY  EXCEPTION:\_\_\_\_\_.

**DIAGNOSTIC DATA-LOGGER**

Diagnostic problems will be captured in the data-log system. This will allow for events such as intermittent problems to be captured, stored, and reviewed. This system will run continuous in the background and it shall monitor controls, inputs, outputs, and certain microprocessor activities at very high sampling rates. This will allow MP2 Advantage+ Engineers to see the entire system in Real Time – Support Link. This may include: momentary power glitches, intermittent connection problems, and possible operator errors or menu configuration issues.

COMPLY  EXCEPTION: \_\_\_\_\_.

**ADVANTAGE+ REAL TIME SUPPORT LINK**

The entire system will have factory support through REAL TIME SUPPORT LINK. Built in WI-Fi and an App on the operator’s touch screen will connect the vehicle and the system to Muncie Engineering through a dedicated web server. The system will allow specific troubleshooting for Control Operation, Hydraulic Pressure, Current Values to Valves, All input Microprocessor Activity, Configuration Menus and Adjustments, History Error Messages, and Current Software and Updates. Adjustments can be made from a remote location and this support link shall be a total integrated software/hardware package from Muncie Power Products.

COMPLY  EXCEPTION: \_\_\_\_\_.

**GROUNDSPEED CONTROL**

The system shall be capable of open or closed loop groundspeed control of the spreader output. The output will be visually displayed on the operator’s control screen and the spreader rates will be adjustable through the rotary rate selector. A manual setting will also be available along with pre-wet output, pause, and blast.

COMPLY  EXCEPTION: \_\_\_\_\_.

**CYLINDER CONTROLS**

Touch style actuators shall control the plow lift, plow angle, and dump hoist cylinders and additional functions as required. Proportional Joy-Stick controls shall be available options. These controls shall be backlit and will also serve operational feedback for troubleshooting.

COMPLY  EXCEPTION: \_\_\_\_\_.

**LIQUID PRODUCT APPLICATION**

System is designed to drive pre-wet or anti-icing operation with either open or closed loop configuration. Pre-Wet dispensing will be measured in gallon per ton of granular material and Anti-Icing shall be dispensed in terms of gallons per lane mile of material.

COMPLY  EXCEPTION: \_\_\_\_\_.

**WING PLOW / SCRAPER OPTION**

A separate manifold for either wing plow or scraper operation shall be integrally plumbed and wired with the host Advantage Plus base system. It shall be housed in either the same, larger, enclosure as the Advantage Plus base system or in its own separate enclosure to conserve frame rail space. Control of the wing functions shall be through the Advantage Plus controls.