

MSC/MST-OPS-1



GENUINE **MEGA**

# OPERATORS MANUAL



**MEGA WORLDWIDE**  
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# SECTION 1

## Definitions and Abbreviations

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### MANUAL USAGE

This technical manual only contains information required to safely install or service an MST/MSC. See the appropriate Maintenance and Operators Safety Manual for specific vehicle system information and maintenance procedures. If your system is not covered in this manual or you are experiencing difficulties, please contact MEGA Corp. Product Support Group at:

US toll free: 1-800-345-8889  
Direct: 1-505-345-2661

Or visit our website at [www.megacorpinc.com](http://www.megacorpinc.com) for more detailed contact information.

The exact location of the hazards and description of the hazards are reviewed in this section. All personnel working on or operating the machine must become familiarized with all the safety messages.

### ⚠ WARNING

Due to the nature of these processes, ensure that all safety information, warnings and instructions are read and understood before any operation or any maintenance procedures are performed. Some procedures take place with heavy components and at moderate heights, ensure proper safety procedures are maintained when performing these actions. Failure to use and maintain proper safety equipment and procedures will cause injury, death or damage to equipment.

### WARNING, CAUTION AND NOTES

The following definitions are found throughout the manual and apply as follows:

#### ⚠ WARNING

Operating procedures and techniques, which could result in personal injury and/or loss of life if not carefully followed.

#### CAUTION

Operating procedures and techniques, which could result in damage to equipment if not carefully followed.

#### NOTE

Operating procedures and techniques that are considered essential to emphasize.

### USE OF SHALL, WILL, SHOULD AND MAY

**Shall** and **Will** – Used when application of a procedure is mandatory.

**Should** – Used when application of a procedure is recommended.

**May** - Used to indicate an acceptable or suggested means of accomplishment.

## SECTION 1

### Definitions and Abbreviations

#### SAFETY MESSAGES

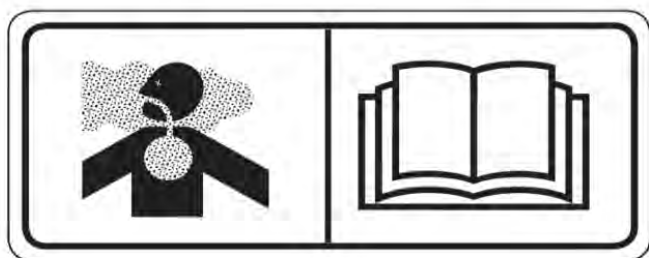
There are several specific safety messages on this machine. The exact location of the hazards and description of the hazards are reviewed in this section. All personnel working on or operating the machine must become familiarized with all the safety messages.

Make sure that all of the safety messages are legible. Clean the safety messages or replace the safety messages in you cannot read the words. Replace the illustrations if the illustrations are not legible. When you clean the safety messages, use a cloth, water and soap. Do not use solvent, gasoline or other harsh chemicals to clean the safety messages. Solvents, gasoline or harsh chemicals could loosen the adhesive that secures the safety messages. Loose adhesive will allow the safety messages to detach.

Replace any safety message that is damaged or missing. If a safety message is attached to a part that is replaced, install a new safety message on the replacement part.

#### Toxic Gas Hazard (1)

This safety label is located on the side of the tank and at all water fill entrances.

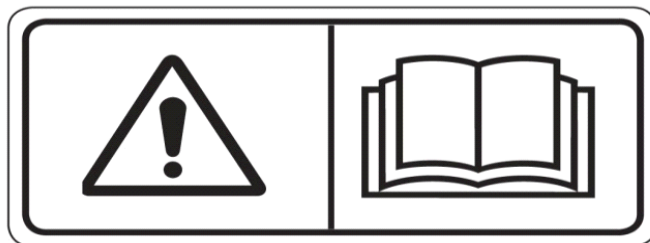


#### ⚠ WARNING

Cutting or welding operation on the inside of the tank can cause the accumulation of toxic gases. Read and understand instructions and warnings in the Maintenance Manual. Failure to provide proper ventilation or breathing apparatus while conducting these operations may result in serious injury or death.

#### Do Not Operate (2)

This safety label is located on the outside of the front and rear control boxes (if equipped).

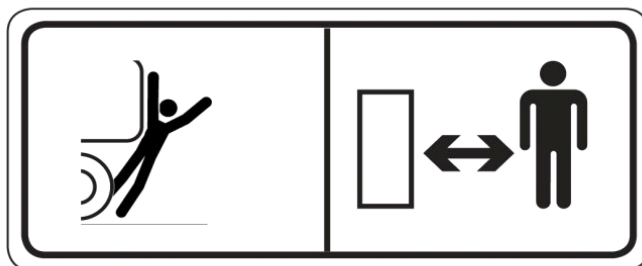


#### ⚠ WARNING

Do not open this control box unless you read and understand the instructions and warnings in the Operator and Maintenance Manual. Failure to follow instructions or heed the warnings could result in serious injury or death.

#### Backing Runover Hazard (3)

This safety label is located on the rear of the tank and inside the cab.



#### ⚠ WARNING

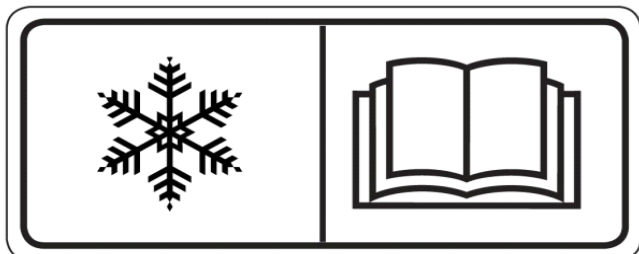
The vehicle is equipped with a back-up alarm. Alarm must sound when operating this vehicle in reverse. Failure to maintain a clear view in the direction of travel could result in serious injury or death.

## SECTION 1

### Definitions and Abbreviations

#### Freezing (4)

This safety label is located on the side of the tank, at the sump drain, and on the pump.

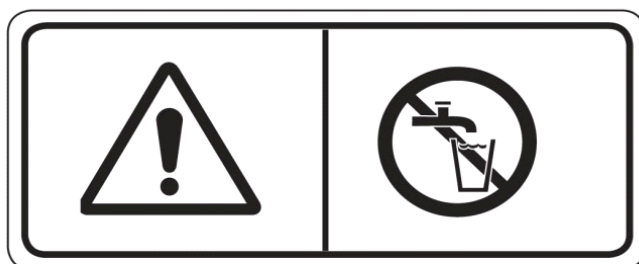


#### ⚠ WARNING

Drain tank, fill pipe and valve in freezing weather. Refer to the Operator and Maintenance Manual for the procedure to follow.

#### Non-Potable (5)

This safety label is located on the side of the tank and sump drain.



#### ⚠ WARNING

Water held within tank is not potable. Do not use tank for transport of water intended for human or animal consumption or serious injury or death may result.

#### Do Not Hoist While in Motion (6)

This safety label is located inside the cab.

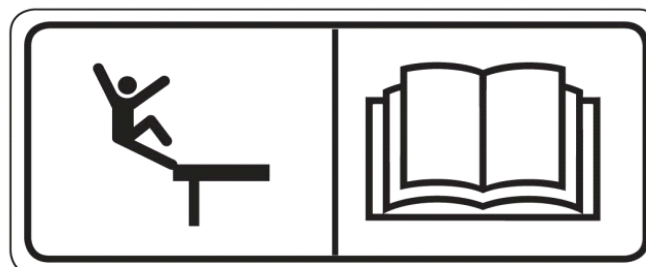


#### ⚠ WARNING

Do not engage hoist cylinders while vehicle is in motion. Before engaging hoist STOP the vehicle. Do not engage hoisting cylinders unless you read and understand the instructions and warnings in the Operator or Maintenance Manual. Failure to follow instructions or heed the warnings will result in injury or death.

#### Fall Hazard (7)

This safety label is located at the top of the front and rear of the tank.



#### ⚠ WARNING

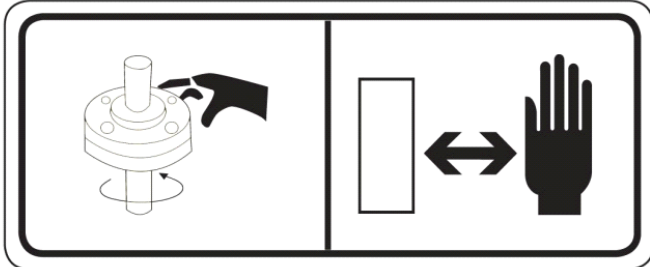
Do not walk on the top of tank without fall arrest PPE. Serious injury or death could occur from a fall.

## SECTION 1

### Definitions and Abbreviations

#### Rotating Shaft (8)

This safety label is located on the pump.

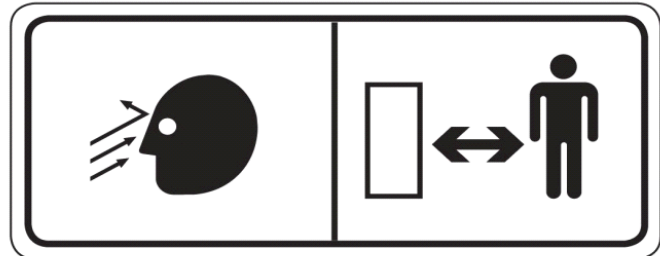


#### ⚠ WARNING

Do not place your hand or tools within pump bell while pump is rotating and/or pressure held within the motor supply hose. Refer to the Operator and Maintenance Manual for the procedures to operate and maintain the pump. Failure to follow proper procedures could result in serious injury.

#### High Pressure Water Cannon (10)

This safety label is located on top of the cab control box.

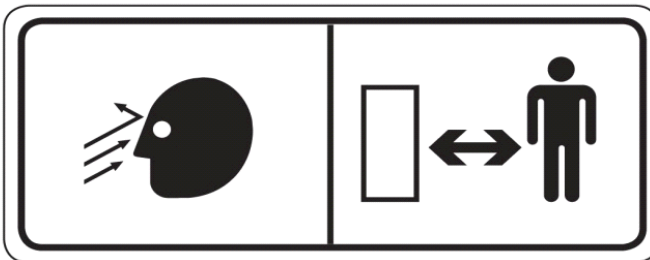


#### ⚠ WARNING

Do not operate the water cannon until all personnel are a safe distance away from the vehicle.

#### High Pressure Spray Heads (9)

This safety label is located on the spray bar.

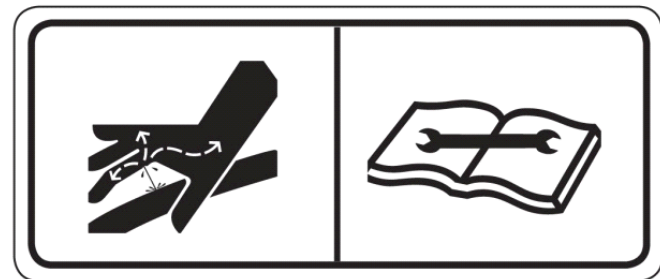


#### ⚠ WARNING

Do not operate spray heads until all personnel are a safe distance away from the vehicle.

#### High Pressure Motor (11)

This safety label is located on the hydraulic motor.



#### ⚠ WARNING

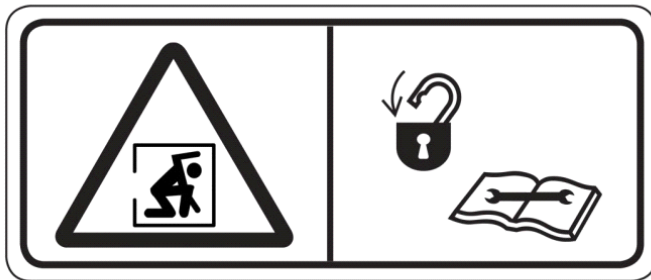
Hydraulic motor and supply lines contain oil under high pressure. Improper removal and repair procedures could cause severe injury. To remove or repair, instructions in the Maintenance Manual must be followed.

## SECTION 1

### Definitions and Abbreviations

#### Confined Space (12)

This safety label is located near the water tank access and fill ports.



#### **⚠ WARNING**

Do not enter confined spaces without following established site specific procedures. Failure to follow proper safety procedures will result in serious injury or death.

#### ABBREVIATIONS

BFV	Butterfly Valve
cc	Cubic Centimeters
CCW	Counter Clockwise
CW	Clockwise
fl. oz	Fluid Ounce
FT	Feet
FPM	Feet Per Minute
GPM	Gallons Per Minute
IN/SQ FT	inches per Square Feet
KM-H	Kilometers Per Hour
Kg	kilograms
Kpa	Kilopascals
l	liters
lpm	Liters per minute
LT	Left as viewed from the operators position facing forward
m	meters
MPH	Miles Per Hour
MST/MSC	Mega Scraper Conversion
Nm	Newton meters of torque
psi	pounds per square inch
RPM	Revolutions Per Minute
RT	Right as viewed from the operators position facing forward
SQ FT	Square Feet
VDC	Volts, Direct Current

#### SYMBOLGY

Symbol	Name
	POWER
	PUMP
	INTMNT /AUTO2
	LIGHTS
<b>F1</b>	F1
<b>F2</b>	F2
	PAUSE

Symbol	Name
	WATER LEVEL
	AUTO
	AUX 1
	AUX 2
	HOSE
	LT VSS

Symbol	Name
	DRAIN
	DUMP BAR
	RT VSS
	LT REAR
	LT CTR
	RT CTR
	RT REAR

#### IN-CAB SUPPLEMENTS

##### Checklists

A pocket size Operator's Checklist of all MTT/MWT procedures is contained in the Appendix for use in the vehicle cab, and an Inspections Checklist is located at the end of this section.

#### NOTE

Place copies of both the Appendix Operator's Checklist and the Section 4 Inspections Checklist within the cab for daily use.

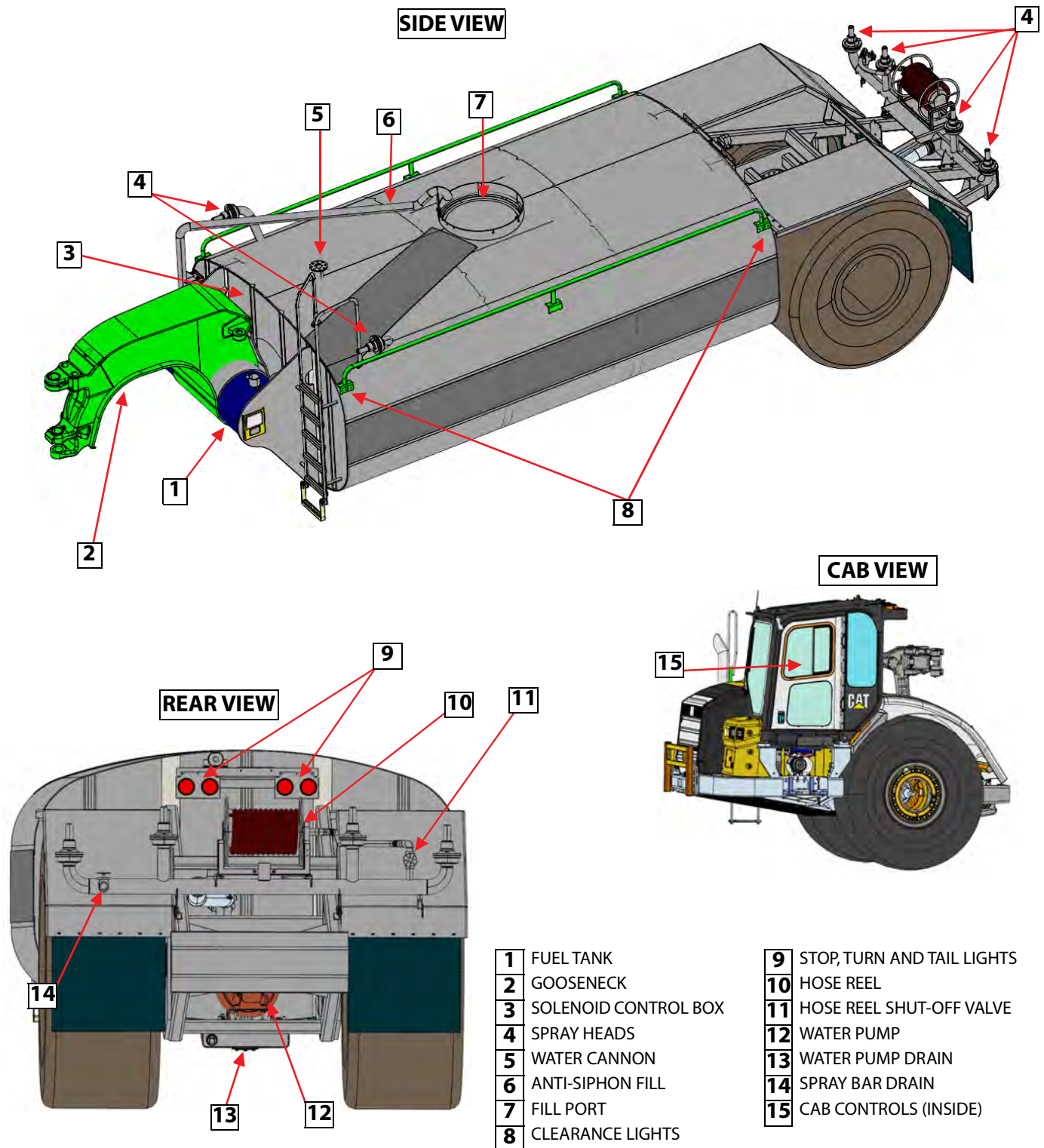
##### Instructional Decals

Instructional decals are included at the beginning of the Appendix. These decals may be cut out and placed in the cab wherever is most convenient for the operator.



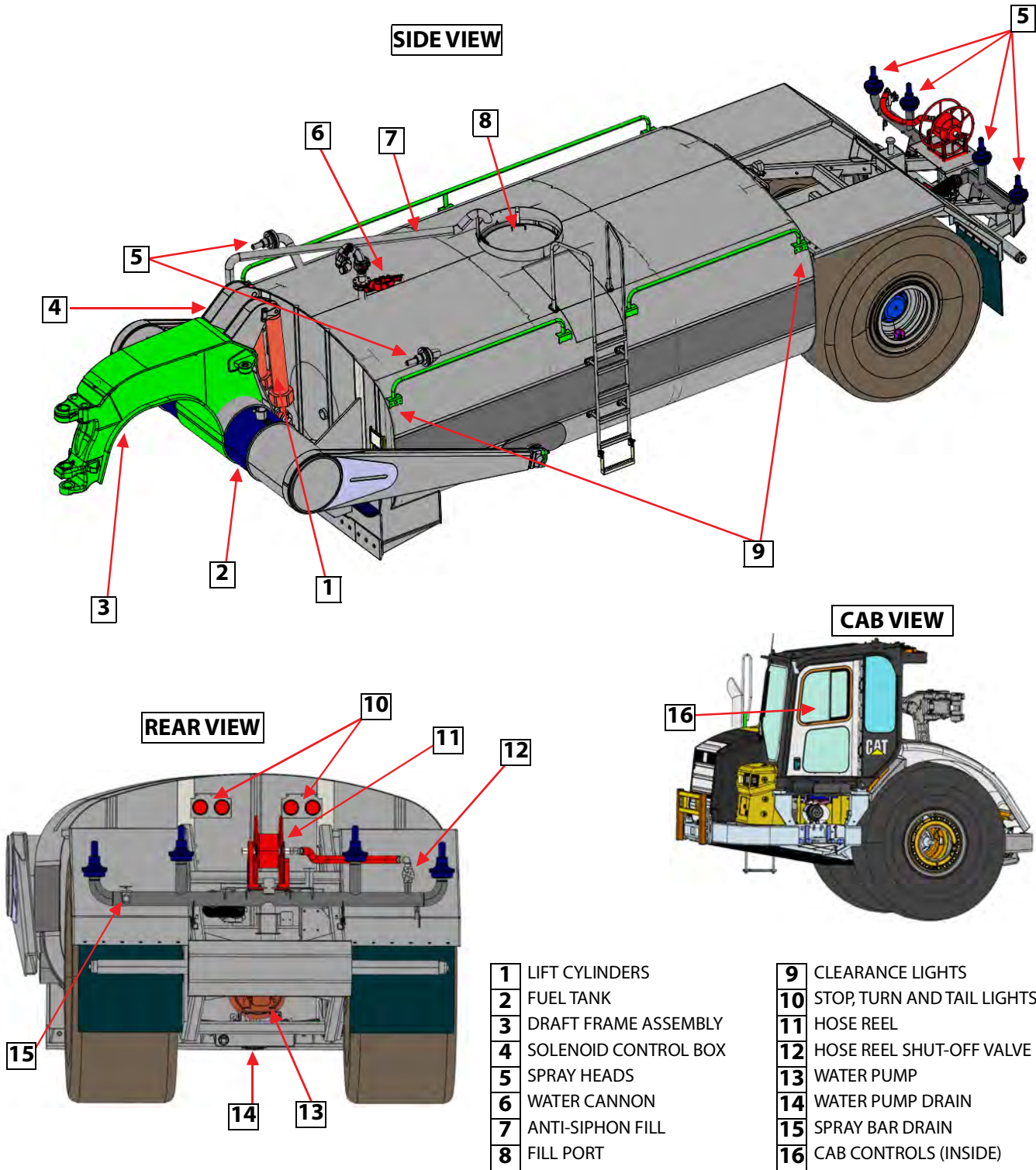
## SECTION 1 Definitions and Abbreviations

### RIGID HITCH MST/MSC OVERVIEW (TYPICAL)



# SECTION 1 Definitions and Abbreviations

## DROP HITCH MST/MSC OVERVIEW (TYPICAL)



**SECTION 1**  
**Definitions and Abbreviations**

## SECTION 2

### System Description

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#### WATER TANK (MST/MSC)

The MEGA Water Tank consists of a water tunnel, primary floor, vertical baffles, bulkheads, outer skins, internal piping and external piping. The tank design is patented and known as the MEGA Anti-surge Stabilization Tube (MAST).

The MAST is the backbone of the structure and provides mounting for transverse baffles. The baffles add to tank strength and dampen water surges. The forward and rear baffles are reinforced with vertical beams to provide mounting for the gooseneck and rear trailing axle respectively. External and internal piping is also used to carry water from the water pump to spray heads, water cannon, spray bar, hose reel, dump bar and tank drain.

#### NOTE

Early MST/MSCs may have a Berkley water pump (B4J) installed. Contact MEGA Corp for more information.

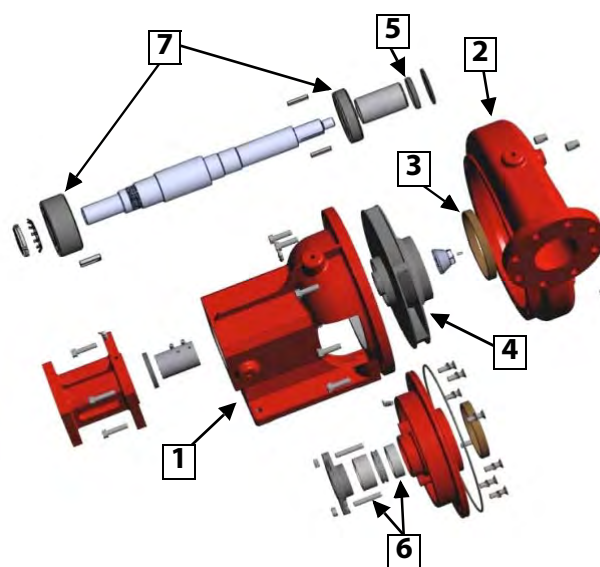
#### WATER PUMP

MST/MSC units are configured with different types of water pumps and are based on the size of the water tank. Typically, 5,000 - 7,000 gallon tanks are configured with smaller pumps (4 inch inlet & 3 inch outlet), while 8,000 - 12,000 gallon tanks are configured with larger water pumps (6 inch inlet & 4 inch outlet). The water pumps are very similar in design. For the purposes of this manual, the M-4 (6 inch inlet & 4 inch outlet) is used to present component information.

#### M-4 Water Pump



#### M-4 Water Pump Major Components And Functions



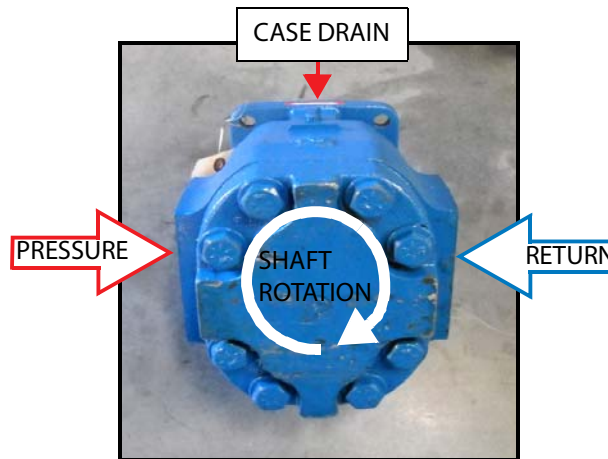
1. **BRACKET** – Main frame of the pump that allows a pump to be bolted to the tanker and provides the means to direct mount the hydraulic drive motor.

## SECTION 2

### System Description

2. VOLUTE CASE – A “snail shell” shaped case that encloses the impeller. It is narrow at the center and enlarges from there to the discharge area.
3. WEAR RING – Acts as a bearing surface between the impeller and volute case. Constructed of bronze material.
4. IMPELLER – Rotating wheel attached to the shaft that accelerates the speed of the water producing water flow and pressure.
5. SHAFT SEAL – Confines grease to the inner and outer bearing area while keeping foreign material from entering the bearing area and seals water inside the volute case.
6. ROPE SEAL – Provides a seal around the rotating pump shaft at the volute case. Constructed of a graphite rope material that is designed to drip water and allow shaft lubrication.
7. UPPER/LOWER BEARINGS - Provide roller surface for the pump shaft.

The hydraulic drive motor may be installed in 4 different orientations depending on the water pump location or application.



#### Hydraulic Drive Motor Port Identification

The hydraulic drive motor requires hydraulic flow from a valve to the motor pressure port, return oil flow to the hydraulic reservoir and a free to tank case drain.

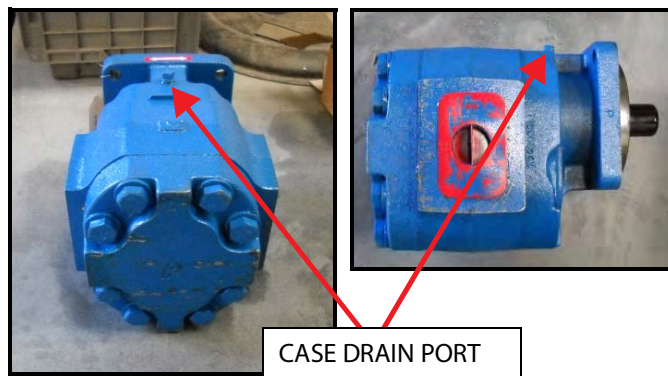
#### HYDRAULIC DRIVE MOTOR

##### M-4 Pump Drive Motor And Crossover Assembly

The M-4 pump rotates clockwise as viewed from the drive end of the assembly.



Clockwise rotation as viewed from the drive end of the water pump assembly.

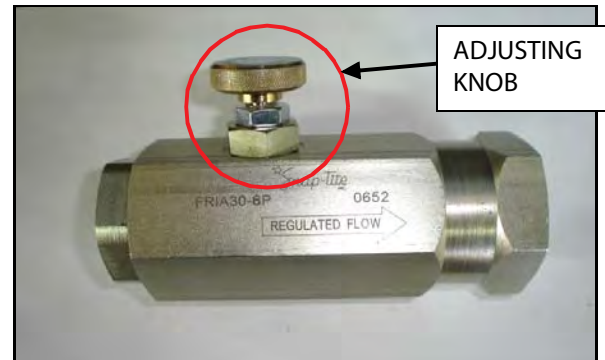
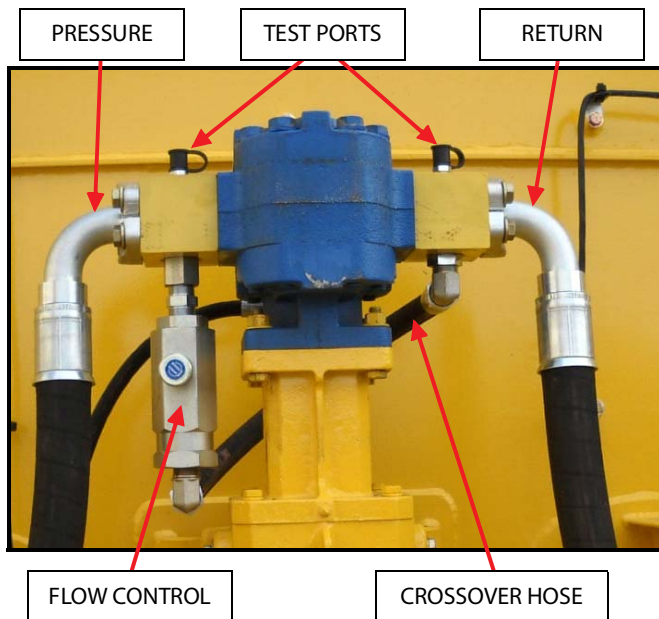


## SECTION 2

### System Description

#### Hydraulic Drive Motor Speed Control (Crossover Assembly)

The hydraulic drive motor speed control (Crossover Assembly) consists of a flow control valve, 2 hydraulic manifolds, a crossover hose and test ports.



Typical 135 lpm (35 gpm) Adjustable Hydraulic Flow Control

HYDRAULIC DRIVE MOTOR ACTIVATION - The hydraulic drive motor on MST/MSCs are typically driven by the chassis implement hydraulic system. The activation can be controlled by the valves listed below.

PILOT OPERATED DIVERSION VALVE - A remote mounted diversion valve that, upon receiving an electric signal from the cab control pump switch, activates a pilot control to move a spool within the diversion valve. This spool redirects the hydraulic oil to flow to the water pump drive motor. Typically this type of valve is installed between the hoist pump and the hoist valve.

EXISTING MECHANICALLY OPERATED IMPLEMENT VALVE - Typically used on early model trucks with a pneumatic system. This system is operated by the existing cab control lever. When the lever is moved, a spool valve diverts hydraulic oil to the water pump drive motor.

#### Hydraulic Flow Control Valve

The hydraulic flow control is directional. The arrow on the body indicates the direction of oil flow to meter the bypassing oil. The adjusting knob on the valve will allow adjustment of the oil flow to bypass the drive motor, up to 135 LPM (35 GPM) or up to 700 RPMs (RPM increase/decrease will vary depending on the size of hydraulic drive motor the unit is equipped with).

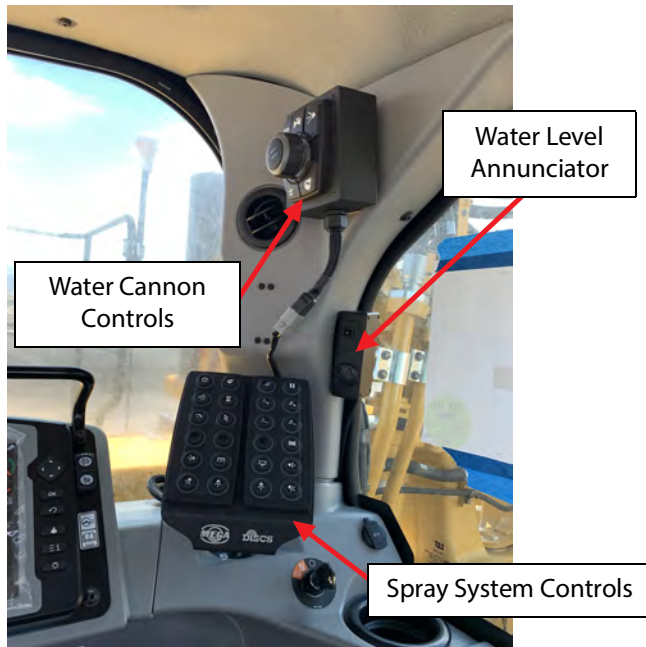
If the flow control is reversed, the flow control adjusting knob will not function and the full flow capacity of the valve will bypass. This can result in water pump rpm being below specifications with no adjustment capability of the adjusting knob.

By turning the adjusting knob clockwise, the hydraulic oil that is bypassing will be reduced, increasing the speed of the water pump. Turning the knob counter-clockwise will increase the volume oil being bypassed reducing the water pump speed. The flow control valve is typically mounted on the PRESSURE manifold of the hydraulic drive motor.

## SECTION 2

### System Description

#### CAB CONTROL SYSTEM (DIGITAL GEN 2.0)



This system is designated as a Digital Spray Control System, (DiSCS®). The newest version is generation 2.0 with improvements in network communication (CAN bus), durability, mounting, lighting, system indications and fault conditions. The system is comprised of a spray system and water cannon controls, controller, sensors, and cabling. The in-cab control panels operate the water pump, spray heads, intermittent spray, work lights, hose reel, dump bar, suction loading, tank drain valve and GPS.

The system also provides indications of tank water level, water pump protection features and indications of system faults. The water cannon joystick assembly operates the water cannon, adjustable nozzle, foam suppression and water pump. The system is powered by 24 VDC from the chassis battery bus. Chassis switched power is used to activate the system.

## SECTION 2

### System Description

#### SPRAY SYSTEM CONTROL TABLE (DIGITAL, GEN 2.0)








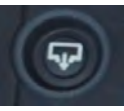

SYMBOLGY	DESCRIPTION	FUNCTION
	System Power	Turns power on/off for all spray system controls: <ul style="list-style-type: none"> <li>Steady Green Light - SYSTEM ON</li> </ul>
	Water Level	If water level is: <ul style="list-style-type: none"> <li>Greater than 90%, FLASHING GREEN</li> <li>50% to less than 90% STEADY GREEN</li> <li>25% to less than 50%, STEADY YELLOW</li> <li>5% to less than 25%, STEADY RED</li> <li>Less than 5%, FLASHING RED</li> </ul>
	Speed Based Spraying	Turns on/off speed based programming: <ul style="list-style-type: none"> <li>Green Light-PROGRAMMING ON</li> <li>Alternating Red/Green Light-NO LOCK</li> <li>Alternating Yellow/Blue Light-INPUT REJECTED</li> </ul>
	Suction Load	Controls auxiliary function if installed: <ul style="list-style-type: none"> <li>Green Light-FUNCTION ON</li> <li>Yellow Light-PAUSE (may not be possible based on configuration).</li> </ul>
	Left Vertical Side Spray (LVSS)	Turns water on/off. <ul style="list-style-type: none"> <li>Steady Green Light - VALVE OPEN</li> </ul>
	Left Rear (LR)	Turns water on/off. <ul style="list-style-type: none"> <li>Steady Green Light - VALVE OPEN</li> <li>Steady Blue Light - VALVE CLOSED (timer in OFF cycle)</li> </ul>
	Pump Power	Turn pump on/off. <ul style="list-style-type: none"> <li>Steady Green Light - PUMP ON</li> </ul>
	Time Based Spraying	Activates on/off timer for rear spray head and dump bar. <ul style="list-style-type: none"> <li>Steady Green Light - TIMER ACTIVE</li> </ul>

**Spray System Control Table 2-1**



## SECTION 2



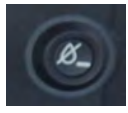
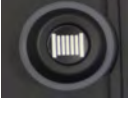
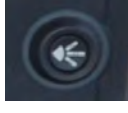
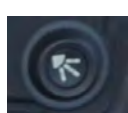
### System Description

SYMBOL	DESCRIPTION	FUNCTION
	Distance Based Spraying	Turns on/off distance based programming. <ul style="list-style-type: none"> <li>• Steady Green Light - PROGRAMMING ON</li> <li>• Alternating Red/Green-NO LOCK</li> <li>• Alternating Yellow/Blue Light - INPUT REJECTED</li> </ul>
	Dump Bar	Turns water function on/off. <ul style="list-style-type: none"> <li>• Steady Green Light - VALVE OPEN</li> <li>• Steady Blue Light -VALVE CLOSED (timer in OFF cycle)</li> </ul>
	Left Rear Center (LT RC)	Turns water on/off. <ul style="list-style-type: none"> <li>• Steady Green Light - VALVE OPEN</li> <li>• Steady Blue Light-VALVE CLOSED (timer in OFF cycle)</li> </ul>
	Left Rear (LT R)	Turns water on/off. <ul style="list-style-type: none"> <li>• Steady Green Light - VALVE OPEN</li> <li>• Steady Blue Light-VALVE CLOSED (timer in OFF cycle)</li> </ul>
	Work Lights	Turns power on/off for lights. <ul style="list-style-type: none"> <li>• Steady Green Light - LIGHTS ON</li> </ul>
	Wet +	Adjusts spray head for time based, speed based and distance based programming.
	Wet -	Adjusts spray head for time based, speed based and distance based programming.
	Quick Drain	Turns water function on/off. <ul style="list-style-type: none"> <li>• Steady Green Light - VALVE OPEN</li> </ul>
	Right Rear Center (RT RC)	Turns water on/off. <ul style="list-style-type: none"> <li>• Steady Green Light - VALVE OPEN</li> <li>• Steady Blue Light-VALVE CLOSED (timer in OFF cycle)</li> </ul>

**Spray System Control Table 2-1 (Continued)**

## SECTION 2

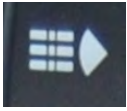




### System Description

SYMBOLOLOGY	DESCRIPTION	FUNCTION
	Pause	Any active water spraying function is paused. <ul style="list-style-type: none"> <li>Flashing Yellow Light - ACTIVE FUNCTIONS PAUSED</li> <li>All deleted function switches -YELLOW LIGHT</li> </ul>
	Dry +	Increases adjustment for either time, distance or speed based programming.
	Dry -	Decreases adjustment of time, distance and speed based programming.
	Hose Reel	Allows use of hose reel <ul style="list-style-type: none"> <li>Flashing Yellow Light - HOSE REEL ACTIVE (will not time out).</li> <li>Disables all dispensing functions</li> </ul>
	Right Vertical Side Spray (RVSS)	Turns water ON/OFF. <ul style="list-style-type: none"> <li>Steady Green Light - VALVE OPEN</li> </ul>
	Right Rear (RR)	Turns water ON/OFF. <ul style="list-style-type: none"> <li>Steady Green Light - VALVE OPEN</li> <li>Steady Blue Light- VALVE CLOSED (timer in OFF cycle)</li> </ul>

**Spray System Control Table 2-1 (Continued)**

## SECTION 2 System Description

### WATER CANNON CONTROLS TABLE (DIGITAL GEN. 2.0)

SYMBOL	DESCRIPTION	FUNCTION
	Stream	(If equipped) adjustable nozzle moves to stream.
	Butterfly Valve (BFV)	Open or closes waterway valve.
	Fog/Fan	(If equipped) adjustable nozzle moves to fog or fan.
	Foam	(If equipped) opens/closes foam valve. Must hold for three seconds to open. BFV & Pump must be on. *If closed, joystick light will blink.
	Pump	Turn pump on/off. • Steady Green Light - PUMP ON

**Water Cannon Controls Table 2-2**

## SECTION 2

### System Description

#### Basic System Theory of Operation

Spray system power is provided by chassis 24 volt DC power via the battery bus. The system is actuated by switched power when turning on the ignition key switch.

When the chassis ignition switch is turned on, the switch pads and joystick will undergo a functional self-test. During this process, ALL switch pad functions will flash RED four times then remain off. The joystick control will illuminate GREEN then adjust to a DIMMED GREEN.

System power is then activated by depressing the POWER switch. Cab controls will operate normally when water level is at a 5% capacity or more. Activation of a specific function is accomplished by depressing the appropriate function switch on the switch panel or joystick.

Depressing a switch sends a signal to the logic control in the solenoid box to activate the associated function. The controller receives the signal and provides output voltage to the given coil to shuttle the selected hydraulic spool valve or electrical function.

Once voltage is sensed at the coil or electrical device, the controller sends a signal back to the switch pad to illuminate the LED on the selected function switch.

#### NOTE

Any function switch that flashes alternately RED and YELLOW indicates an open or faulty circuit.

#### Switch Pad Dimming

The switch pads can be dimmed for day and night operations by using the work light switch. Simply depress and hold the work light switch and the system will sequence through 4 different light levels. Once the desired light level is obtained, release the switch.

#### Water Pump Protection Features

SOFT START AND STOP – The water pump is protected from sudden starts and stops whenever the pump is turned on or off. This protection is contained in the controller and commands the appropriate chassis or Mega proportional hydraulic control valve to open or close slowly. This prevents hard starts or stops that reduce water pump service life.

LOW WATER PROTECTION – The water pump is automatically turned off when a low water condition is detected. The water pump switch LED will turn off when this condition is sensed. This prevents the water pump from overheating due to running dry.

#### NOTE

- In order to re-activate the water pump after low-water shut-off, first fill the water tank with sufficient water capacity to permit pump operation. Then press the PUMP switch ON.
- Certain terrains and water level fluctuations may allow low water protection to capture a low water level condition, causing the pump to stop. If conditions allow water pump activation after water level/terrain fluctuations have ceased, then the water pump may be re-activated by pressing the PUMP switch ON.

NO-FLOW CONDITIONS – When all water discharge valves are closed, the water pump is automatically turned off after approximately 100 seconds. This feature prevents the water from heating up as a result of the water pump impeller spinning in a sump with no flow. The heating of the static water will heat the water pump, causing deterioration of grease and premature bearing failure. The water pump switch LED will turn off when this condition is sensed. To reset pump, simply turn on a function water pump.

## SECTION 2 System Description

### Water Level Indicator




Low Level Warning-Water level switch will flash RED indicating that the water is below a 5% level. In addition, an in-cab annunciator will sound. The flashing condition can be suppressed by pressing and releasing the water level switch, and the annunciator can be silenced by pressing momentary switch on annunciator box.

High Water level Warning Water level switch will flash GREEN indicating that water in the tank is above a 90% level. This feature is used to alert the operator when filling the tank. The flashing can be suppressed by pressing and releasing the switch.

### Joystick Box Function Descriptions



The joystick controls elevation and rotation of the water cannon as well as foam, BFV, nozzle and dump evolutions.

 FOAM – Sends request for FOAM agent valve to open or close.

### NOTE

The FOAM switch is protected from unintentional activation. In order to activate FOAM press and hold the FOAM switch for 3 seconds to open the valve.

### Other Functions



SUCTION LOAD STATION: If equipped, AUX 1 sends a request to the hydraulic water pump drive circuit to allow suction load pump drive motor operation during a low water level condition while also disabling the pump time-out feature. When turned ON, this also disables use of any other spray system function.

AUX 2 – Controls customer-requested special features. This feature is unique to specific tank serial numbers.

AUX 3 – Customer -requested special features. This feature is unique to special tank serial number.

### SPRAY PATTERN PROGRAMMING

The control system provides 3 different adjustable spray pattern programs that allow flexibility in watering applications. They are:

- Timed Based: Allows setting a specific time (seconds) for selected spray head(s) to be on and off. This produces a pattern of wet and dry “bands”.
- Speed Based: Allows setting a specific percentage of reduced watering and maximum watering for selected spray heads. The program provides setting of desired reduced watering (more or less water) and a ground speed (Kmh) for maximum watering. The system uses its own embedded GPS signal to determine ground speed.
- Distance Based: Allows setting a specific length (meters) of a wet and dry patch. The program automatically alternates selected right and left spray heads to produce a “checkerboard” pattern. System uses its own GPS signal to determine distance.

See detailed description, use and employment contained below and in the Employment section.

### Time Based



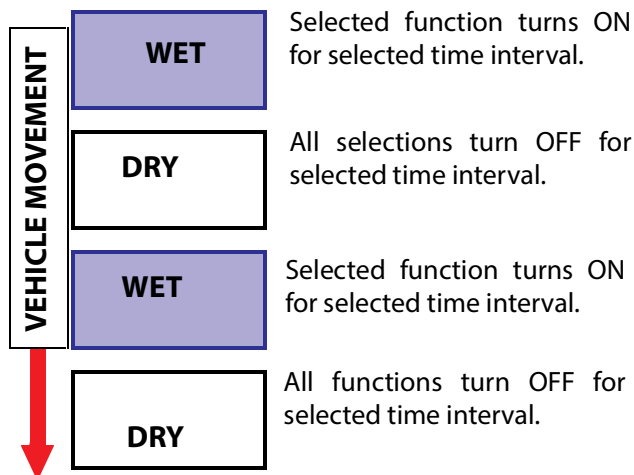
Time based spray system functions are controlled by turning on time based, selecting spray heads or dump bar and using the Wet +/- (time on) and Dry +/- (time off) switches. This program will only operate if at least 1 function (spray head or dump bar) switch is activated. Water can be stopped at any time by turning function switches OFF.

## SECTION 2

### System Description

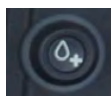

Time On	Time (Seconds)	Color	Time Off
	3	White	
	6	Blue	
	9	Yellow	
	20	Green	
	30	Magenta	

Time based programming will turn selected spray heads or dump bar on and off. When a selected function switch (spray head or dump bar) is operating during an ON cycle, the selected function switch LED will be illuminated. When program cycles to an OFF cycle, the selected spray head or dump bar function switch LED will turn blue.



#### Speed Based

The MEGA ground speed sensing control system is an independent and self-contained GPS unit that provides speed information to the existing DiSCS®. The DiSCS® logic control uses the ground speed signal to automatically cycle and pulse spray heads to obtain a desired lay-down of water regardless of ground speed. This automatic control reduces water usage and prevents over-watering of haul roads and intersections.

Coverage	%	Color	kph/ mph	Time Off
	15	White	8 kph/ 5 mph	
	30	Blue	16 kph/ 10 mph	
	50	Yellow	24 kph/ 15 mph	
	75	Green	32 kph/ 20 mph	
	90	Magenta	40 kph/ 25 mph	

Near or below 4.8 KPH/3 MPH, the program will pause all selected spray functions. When vehicle speed rises above 4.8 KPH/3 MPH, all selected spray functions will resume control of the system. The system warns the operator of malfunctioning systems and provides full manual control of all spray system functions in the event of GPS failure.

#### NOTE

When the function switch is turned on, the GPS module will attempt to make a satellite connection. A GPS lock may take up to 10 minutes in some locations due to satellite availability,

## SECTION 2 System Description

**PWM Mode**

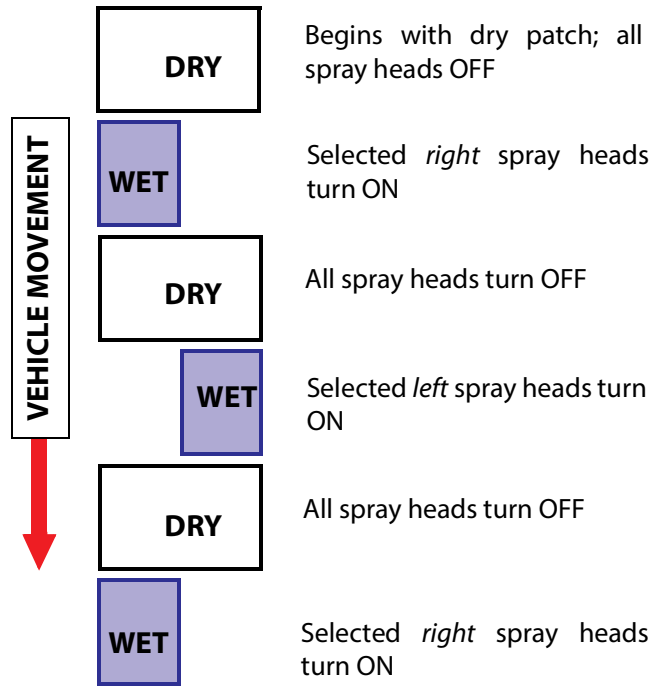
Coverage (percentage) – Commands spray head ON cycle for pulse or continuous.

Speed – This setting dictates the vehicle speed above which all spray heads are on continuously. Below this vehicle speed, reduced coverage comes into effect and spray heads may pulse on and off rather than spraying continuously. The program may also reduce numbers of spray heads on at a given speed.

**Distance-Based**

The distance based program also uses an independent and self contained GPS unit to calculate distance. The system will automatically alternate right and left selected sprayheads on or off to produce a “checkerboard” pattern. Controls are provided to control length of the wet patch and length of dry band between wet patches. This pattern reduces water usage and provides a dry patch for traction.

Near or below 5kph/3 mph the program will pause all selected spray head functions. When vehicle speed increases above 5 kph/3mph, all selected program functions will resume.



If the system is PAUSED, spray head functions will resume beginning with a dry patch once unpaused.

Wet	Meters	Color	Meters	Dry
	15	White	0	
	20	Blue	5	
	30	Yellow	10	
	45	Green	20	
	60	Magenta	30	

## SECTION 2

### System Description

#### CAB CONTROLS (ANALOG)

MST/MSC units can be configured with a manual pneumatic, electro-pneumatic or electro-hydraulic control system.

#### Manual Pneumatic



Multi-function control box mounted in the vehicle cab controls all water tank functions. Spray system head and auxiliary functions are controlled by using manual pneumatic levers, accessory switches and embedded joystick. The cab control requires 24 VDC power to operate.

#### Compact Analog



Multi-function control box and joystick mounted in vehicle cab control all water tank functions. The cab controls requires 24 VDC vehicle power to operate.

The control box and joystick have a modular design, which allows the joystick to be detached from its holding bracket and operated separately as needed. Older hydraulic control boxes, which resemble the “Manual Pneumatic” design, do not have this functionality, but they can be upgraded to the latest design by MEGA.

The cab control system functions as follows:

Control	Function
Joystick	Sends command signals to the logic box (electric water cannon) or hydraulic control valve assembly (hydraulic water cannon) to move the water cannon left, right, up and down.
FOAM	Open or closes the foam concentrate tank in-line control valve.
FOG	On adjustable nozzle water cannons, adjusts cannon for less concentrated flow (HOLD for adjustment)
STREAM	On adjustable nozzle water cannons, adjusts cannon for more concentrated flow (HOLD for adjustment)
TIMER OFF	Sets OFF time (variable adjustment 5-100 sec) between timer cycles of selected spray heads and dump bar when the timer switch is in the intermittent position.
TIMER ON	Sets ON time (variable adjustment 5-100 sec) of selected spray heads and dump bar when the timer switch is in the intermittent position
PUMP	Routes vehicle hydraulic system pressure and flow to the water pump hydraulic drive motor.
MONITOR	Opens the water cannon BFV.
LIGHTS	Provides power to work lights.
TIMER	Activates or deactivates system timer function.



## SECTION 2

### System Description

Control	Function
DRAIN	Opens or closes tank drain BFV.
DUMP BAR	Opens or closes dump bar BFV.
WATER LEVEL	Indicates tank water level.
SYSTEM	Provides power for all cab control functions.
LT BUMPER	Opens or closes left front bumper spray head.
LT VSS	Opens or closes left vertical side spray head.
LT REAR	Opens or closes left rear spray head.
LT CENTER	Opens or closes left center rear spray head.
RT CENTER	Opens or closes right center rear spray head.
RT REAR	Opens or closes right center rear spray head.
RT VSS	Opens or closes right vertical side spray head.
RT BUMPER	Opens or closes right front bumper spray head.
AUX 1	Reserved for specialized functions.
AUX 2	Reserved for specialized functions.

#### WATER CANNON SYSTEM

The system is comprised of a water cannon (hydraulic or electric), hydraulic control valve assembly or logic box, butterfly valve assembly, nozzle and controls.

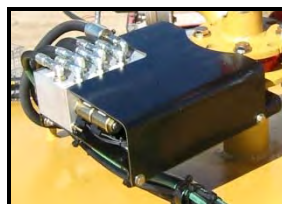
##### Water Cannon (Hydraulic)



A metal waterway that directs a stream of water in both elevation (up-down) and rotation (right-left). Hydraulic motors move the waterway based upon hydraulic flow from the hydraulic control valve assembly as commanded by the cab control joystick. The water

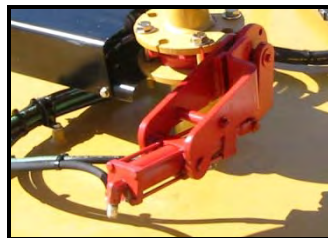
cannon is threaded to a flanged pipe that mounts directly above the BFV. The water cannon also provides mounting for a variety of different nozzles.

##### Hydraulic Control Valve Assembly



The assembly contains three hydraulic solenoid valves that direct hydraulic pressure to the hydraulic motors on the water cannon and BFV cylinder as commanded by the cab control box. A pressure relief valve is incorporated in the manifold block to protect the water cannon system against any over pressurization conditions. The assembly is mounted to the tank lower flange and receives hydraulic pressure from the vehicle hydraulic pump.

##### Hydraulic BFV Assembly



A hydraulically operated valve that opens or closes to control water flow to the water cannon. The hydraulic cylinder receives hydraulic pressure from the hydraulic control valve or solenoid control box assembly as commanded by the cab control water cannon switch. The assembly is clamped between upper and lower pipe flanges.

## SECTION 2

### System Description

#### Water Cannon (Electric)



A metal waterway that directs a stream of water in both elevation (up-down) and rotation (right-left). 24 VDC electric motors move the waterway based upon filtered electronic signals from the logic box as commanded by the cab control joystick. The water

cannon is threaded to a flanged pipe that mounts directly above the BFV. The water cannon also provides mounting for a variety of different nozzles.

#### Electro-Pneumatic BFV Assembly



An electro-pneumatic valve that controls the flow of water to the water cannon. A 24 volt DC solenoid receives commands from a cab control MONITOR / BFV switch through the logic

box to route pressurized air to an air chamber which opens or closes a 3" valve. The assembly is clamped between upper and lower pipe flanges.

#### Water Cannon Nozzles And Stream Shapers

##### Smooth Bore Nozzle



A cone shaped 1.5" diameter nozzle that directs water flow. The nozzle has a built in stream shaper that smooths water flow to increase water stream distance.

##### Smooth Bore (Stackable)



A segmented cone shaped nozzle that directs water flow. The nozzle opening is adjusted by removing segments to acquire the most efficient nozzle opening for a given water pump operating pressure. Nozzle segment diameters are 1", 1½", 1¾" and 2". The nozzle requires an in-line stream

shaper to increase water stream distance.

#### In-Line Stream Shaper



A performance enhancer that is mounted between the water cannon outlet and the selected straight bore nozzle. The stream shaper pathway is a honeycomb style channel designed to efficiently shape a water stream to maximum water stream distance.

#### Manual Adjustable Nozzle



FOG/STREAM: A modified straight bore nozzle that allows the operator to manually adjust selected water stream patterns from fog to stream. Some nozzles are configured for fire suppression foam education.

FAN/STREAM: A modified straight bore nozzle that allows the operator to manually adjust selected water stream patterns from flat fan to stream. The flat fan pattern orientation is adjustable from horizontal to vertical by reorienting the nozzle on the water cannon.

#### Remote Adjustable Nozzle (Electric/Hydraulic)



A modified straight bore nozzle that allows the operator to remotely adjust selected water stream patterns from fog to stream from the cab control. The nozzle inner or outer barrel is moved by an electric or hydraulic actuator to obtain the fog or stream pattern. Some nozzles are configured for fire suppression foam education.

## SECTION 2

### System Description

#### Fan/Stream



A modified straight bore nozzle that allows the operator to remotely adjust selected water stream patterns from flat fan to stream from the cab control. The nozzle inner or outer barrel is moved by an electric actuator to obtain the fan or stream pattern. The flat fan pattern orientation is adjustable from horizontal to vertical by reorienting the nozzle on the water cannon.

#### SPRAY SYSTEM

The spray head system consists of 4, 6 or 8 hydraulic or pneumatic actuated spray heads, cab controls, solenoid control box assembly, and hydraulic or pneumatic hosing.

#### Pneumatic Spray Head



A two piece aluminum valve body and adjustable ring mounted to a water supply header pipe. The upper portion of the valve body is an air chamber with a diaphragm and guide disk assembly attached to the bottom. The air chamber receives pressurized air from the solenoid control box as commanded by the cab control switch. When the upper portion of the valve body is pressurized the guide disk will seal the opening on the lower portion of the valve and stop water flow.

When the cab control system is OFF and the water pump is OFF the air chamber incorporates a spring that will apply pressure to the guide disk assembly and seal the opening on the lower portion of the valve and stop flow. When air pressure is removed from the upper portion of the valve body when the water pump is ON and the cab control switch ON, pressurized water from the header pipe will unseat the guide disk and water will flow from the lower portion of valve.

#### Hydraulic Spray Head



A two piece aluminum valve body, hydraulic cylinder and adjustable ring mounted to a water supply header pipe. The upper portion of the valve body contains a hydraulic cylinder that receives hydraulic pressure

from the system solenoid control box as commanded by the cab control switch. When the hydraulic cylinder on the upper portion of the valve body is pressurized the cylinder extends to contact the guide disk and seal the opening on the lower portion of the valve and stop water flow. When the cab control system is OFF and the water pump is OFF the upper valve body incorporates a spring to apply pressure to the guide disk to seal the opening on the lower portion of the valve and stop flow. When the spray head switch is turned on hydraulic pressure retracts the hydraulic cylinder and pressurized water from the header pipe will unseat the guide disk and water will flow from the lower portion of valve.

#### Spray Head Adjustable Rings

The adjustable ring is used to control fan width and water flow. The ring may be loosened and rotated to expose more or less of the lower valve opening to control water fan width from 15° to 90°. The ring also may be used rotated to a 1/4" or 3/8" slot (as shown below) to increase or decrease overall water flow. The greater the opening, the greater the water flow.



1/4" Opening

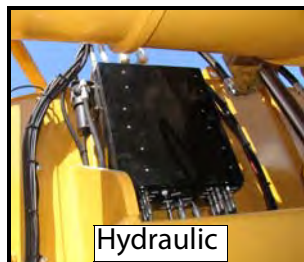
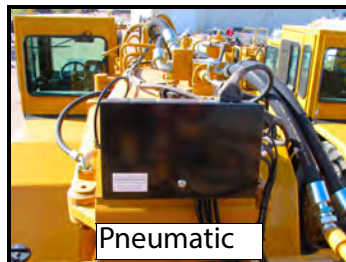


3/8" Opening

## SECTION 2

### System Description

#### Solenoid Control Box



The control box assembly is mounted to the forward bulkhead or the rear of the gooseneck of the MST/ MSC. The assembly contains pneumatic or hydraulic solenoid valves that direct pneumatic or hydraulic pressure to the spray head as commanded by the cab control box. The solenoids receive pneumatic pressure from the vehicle or hydraulic pressure from water pump oil circuit and 24 VDC power from the cab control box.

#### DUMP BAR



A spray bar that contains several rows of 3/8" drain holes to dispense water. A hydraulically operated BFV controls the water supply to the dump bar. The BFV is controlled electrically from the cab control box and is actuated by a hydraulic cylinder. The actuators receive hydraulic pressure from the solenoid control box assembly. Dump bars can be either gravity or pressure fed.

#### HOSE REEL



A reel assembly that is located on the bottom aft end of the water tank fitted with a 1" or 1.5" diameter reinforced rubber hose and a fire fighting style nozzle. The hose reel assembly receives pressurized water from the pressurized manifold on the back of the tank to operate.

#### TANK DRAIN



A hydraulic BFV attached to the water tank pressure pipe is used to drain water from the water tank. The BFV is controlled electrically from the cab control box and is actuated by a hydraulic actuator. The actuators receive hydraulic pressure from the solenoid control box assembly. Tank drains can be either gravity or pressure fed.

#### FIRE SUPPRESSION SYSTEM

A system that consists of a 120 or 60 gallon stainless steel holding tank, an electric or pneumatic actuated shut-off valve, in-cab control switch, hosing and a foam education nozzle mounted to the water cannon.

#### Foam Concentrate Tank



A stainless steel tank mounted in the forward upper portion of the water tank. The holding tank contains a supply tube that extends to the bottom of the tank and connected to a flexible hose at the top of the tank and then routed to the foam agent shut-off valve. The tank also contains a pressure/vacuum cap which keeps foreign matter out of the tank while providing for pressure relief and air displacement during temperature changes.

#### Electric/Pneumatic Shut-off Valve

The in-line shut-off valve is mounted on the foam tank upper lip and is controlled by the in-cab control FOAM switch. The shut-off valve is actuated by either an electric or pneumatic actuator that is controlled by the in-cab control switch. Once the shut-off valve is opened, foam concentrate will flow from the holding tank to the water cannon nozzle if the water cannon and water pump switches are ON.

## **SECTION 2**

### **System Description**

#### **Foam Eduction Nozzle**



A manual or remote adjustable (fog/stream) nozzle is attached to the water cannon waterway. The nozzle inner housing uses high pressure water to create a venture effect that will create a suction force, pulling foam concentrate from the holding tank. Once foam concentrate is flowing, the nozzle proportions foam concentrate, water and air to produce finished foam. The nozzle can be adjusted to allow control of foam solution at a rate of 1%, 3% or 6%. Rate adjustment is obtained by replacing a removable disk.

#### **SUCTION LOADING (IF EQUIPPED)**



A second water pump mounted typically to the water pump sump at the rear of the tank. The suction loading station is equipped with a manual diversion valve that will switch the hydraulic oil flow from the main discharge pump drive motor to the suction loading pump drive motor. When oil is diverted to the suction loading drive motor, it can pull water from a holding pond and fill the tank. The suction loading option includes lengths of 4" suction hose equipped with quick couplers and a check valve inlet foot with a debris screen. The suction hoses are typically stored in tubes either built into the tank or a hanging tube arrangement.

#### **BRAKING SYSTEM**

##### **MST/MSC Prime Movers**

See the prime mover Operator and Service Manual for brake system information.

##### **MST/MSC 611/615**

See the CAT 611/615 Operator and Service Manual for brake system information.

##### **MST/MSC 613**

See the CAT 613 Operator and Service Manual for braking system information

##### **MST/MSC 621H/K**

See the CAT 621H/K Operator and Service Manual for braking system information.

For further information contact MEGA Corp. Product Support Group at:

US toll free: 1-800-345-8889

Direct: 1-505-345-2661

Or visit our website at [www.megacorpinc.com](http://www.megacorpinc.com) for more detailed contact information.

##### **MST/MSC 621G & 631G**

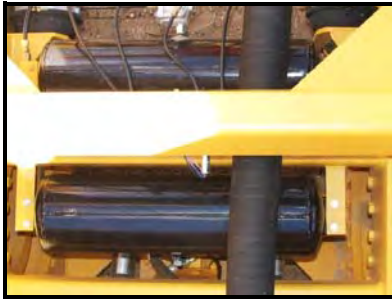
The MST/MSC rear brake system is integrated with the existing tractor parking, service and emergency brakes. All three systems are activated with the existing brake controls located in the tractor cab. See the CAT operator and service manual for additional tractor brake information.

The MST/MSC rear brake system consists of a wheel group, two additionally air tanks, pneumatic manifold assembly, pneumatic brake relay valve, brake pods, solenoid valve, pressure switch, pressure sending unit and hosing.

## SECTION 2

### System Description

#### Air Tanks

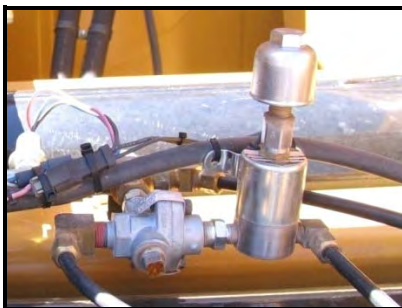


The MST/MSC is equipped with two 8 inch x 32 inch air cylinder mounted to the MST/MSC rear trailing axle that store 110-130 psi air. The cylinders receive pressurized air from the tractor primary air tank mounted under the tractor cab.

#### Tank Pressure Sending Unit

A 24 VDC pressure sending unit is mounted to the rear MST/MSC air tank and is wired into existing tractor brake pressure indicating and warning systems. The sending unit provides air pressure sensing for the tractor air pressure gauge mounted in the dash. The sending unit also provides a signal to the brake low pressure warning system that sounds an audible warning tone when brake supply pressure drops below allowable limits.

#### Pneumatic Manifold Assembly



A pneumatic manifold mounted in the rear trailing axle used to route air pressure for service, parking and emergency brake operation. The manifold also provides mounting for a check valve, parking brake/emergency solenoid valve and parking brake pressure switch.

#### Check Valves

A spring operated valve allowing air flow in a predetermined direction. A one-way check valve is located at the MST/MSC rear air tank tractor air supply in. A double-check valve is located on the pneumatic manifold.

#### Parking /Emergency Brake Solenoid



A 24 VDC electrical solenoid that opens or closes to control the parking or emergency brake function. The solenoid valve responds to electrical signals as commanded by the parking or emergency brake in the tractor cab. The solenoid valve will open to bleed off parking/emergency brake release pressure from the brake pods. This release of air pressure will cause the parking/emergency brakes to be applied.

#### Parking Brake Pressure Switch



A 24 VDC pressure switch used to illuminate the parking brake warning light in the tractor cab. The sensor will turn on the parking brake warning light when parking brake release pressure drops below allowable limits.

#### Service Brake Relay Valve



A pneumatic relay that controls and routes air tank activation pressure to both brake pods. The relay controls air pressure applied to the brake pods as commanded by a pneumatic signal generated by activating the service brake pedal located in the tractor cab.

## **SECTION 2**

### **System Description**

#### **Brake Pods**



A pneumatic cylinder designed to extend or retract and apply service, parking or emergency brakes. The pods are mounted to the MST/MSC rear trailing axle and are connected to the wheel group brake activation lever. The pod contains a coil spring and responds to pressure received from the brake relay valve as commanded by service brake pedal. The pod will also apply parking or emergency brakes when one side of the cylinder is depressurized when commanded by the activation of the parking or emergency brakes. Lose of pneumatic pressure allows the brake pod coil spring to extend the rod end.

#### **Theory Of Operation**

##### **Parking Brake**

The parking brake is applied by activating the parking brake switch in the tractor cab. Once the switch is moved to the park position an electrical signal is sent to the parking brake solenoid valve mounted on the rear trailing axle pneumatic manifold. The sent signal will open the solenoid valve allowing pneumatic pressure to decrease from one side of the brake pod. The brake pod coil spring can now overcome air pressure and extend the brake pod rod end attached to the wheel group brake lever and apply the brakes. Once parking brake pneumatic pressure drops below allowable limits, the parking brake pressure switch mounted on the pneumatic manifold will close and illuminate the parking brake warning light in the cab of the tractor.

The parking brake is released by activating the parking brake switch. Once the switch is moved an electric signal is sent to close the parking brake solenoid valve. The valve closing will allow pneumatic pressure from the pneumatic manifold to be routed to the brake pod. This pressure increase will eventually overcome the brake pod coil spring and retract the brake pod cylinder rod end attached to the brake pod releasing the brakes. As pressure increases above allowable limits, the parking brake pressure switch will turn off the parking brake warning light in the tractor cab once pressure is above allowable limits.

##### **Service Brake**

The service brake is applied by pressing down on the service brake pedal in the tractor cab. Pressing down on the pedal will send a pneumatic pressure signal to the service brake relay valve mounted on the rear trailing axle. The sent signal will release pneumatic pressure from the brake pod chamber allowing the pod coil spring to extend the rod end and apply service brakes.

The service brake is released by releasing the brake pedal. Once the pedal released a pneumatic signal is received by the brake relay to increase air pressure to the brake pod. As pneumatic pressure increases the force of the brake pod coil spring is overcome and the service brake is released.

##### **Emergency Brake**

The emergency brake theory of operation is the same as the parking brake except for the means of activation. Activation is accomplished by using the emergency brake foot switch located on the floor of the tractor cab just left of the service brake pedal.

## SECTION 3

### Limitations

#### Contents

Water Pump.....3-1

#### WATER PUMP

The following cautions are operational limitations of Mega water pumps. Failure to heed these cautions may result in reduced pump life and severe water pump damage.

#### CAUTION

- Do not operate the water pump in a dry sump. Operating the water pump with a dry sump will result in water pump component damage and reduced service life.
- Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.
- Limit water pump operation to 2.5 minutes when in a no-flow condition (not flowing water through spray heads, dump bar, water cannon, drain valve or hose reel). Water pump operation in a no flow condition will cause overheating of the water pump and damage to the shaft bearings and seals.
- Avoid any sudden stoppage of water pump e.g.; disengaging water pump above LOW IDLE. Stopping water pump suddenly above LOW IDLE will result in shaft, impeller and drive motor damage.

#### CAUTION

Water pump RPM must not exceed the specifications listed below with engine at HIGH IDLE. Failure to ensure water pump speed is at or below specifications will result in reduced spray system component service life.

PUMP MODEL	RPM
M-3 PUMP	2350 ± 50
M-4 PUMP	1,950 ± 50
M-4B PUMP	1,950 ± 50

If water pump RPM is to out of the desired range, adjust the water pump hydraulic drive motor flow control valve to obtain specified RPM.

#### NOTE

The suction loading pump has a maximum vertical lift capability of 8-10 feet. Attempting to pump water into the tank from a reservoir that is more than 8-10 feet below the pump station will result in reduced suction loading performance.



**SECTION 3**  
**Limitations**

## SECTION 4

### Normal Operations

#### Contents

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Before Operations .....	4-1	Cold Weather Operation And Storage .....	4-7
Operations .....	4-1	Inspections Checklist .....	4-8

#### DESCRIPTION

This section provides the vehicle operator with step by step operating procedures for the installed MST/MSC system. The information is separated into before operations, operations, and after operations. A pocket size checklist of all listed procedures is also provided in the Appendix for use in the vehicle cab.

A pocket size Operator's Checklist of all MST/MSC procedures is contained in the Appendix for use in the vehicle cab, and an Inspections Checklist is located at the end of this section.

#### NOTE

Place copies of both the Appendix Operator's Checklist and the Section 4 Inspections Checklist within the cab for daily use.

#### BEFORE OPERATIONS

These procedures are used to perform a walk-around inspection of the MEGA water tanker system before use or the beginning of a shift. This inspection is in addition to, and does not replace, the vehicle manufacturer's inspection requirements.

1. Chocks – As Required
2. Vehicle Parking Brake – ON
3. Cab Control Switches – SET OFF
4. Bumper Spray Heads – SECURED & SET
5. Vehicle Hydraulic Tank – SERVICED
6. Gooseneck Lines & Hoses – CHECKED & SECURED
7. Solenoid Control Box – CHECKED AND SECURED
8. Water Cannon – CHECKED & SECURED
  - a. Nozzle – Check for security and kinking of foam concentrate supply line.

9. **(If Equipped)** Foam Concentrate Level – at least 1" from the top of the foam tank.

#### ⚠ WARNING

Ensure PPE fall arrest harness is worn, adjusted properly and attached to an anchor point. Failure to use PPE properly may result in personnel injury or death.

10. Tank Drain Petcocks – CLOSED
11. Spray Heads – SECURED & SET
12. Water Pump Assembly – CHECKED
  - a. Water Pump – Check to ensure volute case drain valve is closed.
  - b. Water pump and drive motor for evidence of overheating.
13. Hose Reel – CHECKED

#### OPERATIONS

Use these procedures to safely operate the standard and optional systems installed on the MEGA water tanker.

#### CAUTION

Limit water pump operation to 2.5 minutes when in a no-flow condition (not flowing water through spray heads, dump bar, water cannon, drain valve or hose reel). Water pump operation in a no flow condition will cause overheating of the water pump and damage to the shaft bearings and seals.

## SECTION 4

### Normal Operations

#### Spray Head System

#### NOTE

Operating more than 4 spray heads simultaneously will greatly reduce the width and flow of active spray heads.

1. Cab Control SYSTEM/POWER Switch – ON
2. INTERMITTENT TIMER – SET
  - a. TIMER ON/OFF Dials – SET
  - b. INTERMITTENT Switch – SET
3. PUMP Switch – ON

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

4. Individual Spray Heads – SELECTED

*Once operations are complete:*

5. PUMP Switch – OFF

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

6. Cab Control SYSTEM/POWER Switch – OFF

#### GPS Auto Mode

1. Cab Control POWER Switch – ON
2. PUMP Switch ON

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

3. AUTO – SET AS REQUIRED
  - a. **(GEN 1.0)** RATE and SPEED Dials – SET
  - b. **(GEN 1.5)** F1 and F2 Dials – SET
  - c. AUTO Switch – ON
4. Individual Spray Head Switches – ON

*Once operations are complete:*

5. Individual Spray Head Switches – OFF
6. PUMP Switch – OFF

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

7. Cab Control POWER Switch - OFF

#### Dump Bar

1. Cab Control SYSTEM/POWER Switch – ON
2. INTERMITTENT – SET AS REQUIRED
  - a. TIMER ON/OFF Dials – SET
  - b. INTERMITTENT Switch – SET

## SECTION 4

### Normal Operations

3. PUMP Switch – ON

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

4. DUMP Bar Switch – ON

*Once operations are complete:*

5. PUMP Switch – OFF

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

6. Cab Control SYSTEM/POWER Switch – OFF

#### **Water Cannon**

1. Cab Control SYSTEM/POWER Switch – ON
2. PUMP Switch – ON

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

3. Water Cannon – Pointed in a safe direction.
4. MONITOR/BFV Switch – ON
5. Water Cannon Joystick – As Required.
6. MONITOR/BFV Switch – OFF

*Once operations are complete:*

7. Water Cannon Nozzle - STOW

#### CAUTION

Manual and remote adjustable nozzles must be stowed pointing vertically to reduce wear on water cannon joints. Leaving the nozzle in any other position will cause increased wear on water cannon joints and result in premature joint failure.

8. PUMP Switch – OFF

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

9. Cab Control SYSTEM/POWER Switch – OFF

#### **Fire Suppression System**

1. Cab Control SYSTEM/POWER Switch – ON
2. PUMP Switch – ON

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

3. Water Cannon – Pointed in a safe direction.
4. FOAM Switch – ON
5. MONITOR/BFV Switch – ON
6. Water Cannon Joystick – As Required.

## **SECTION 4**

### **Normal Operations**

*Once operations are complete:*

7. FOAM Switch – OFF
8. Water Cannon – Flow water through the water cannon nozzle with the FOAM switch off to flush foam from the nozzle.
9. MONITOR/BFV Switch – OFF
10. Water Cannon Nozzle – STOW

#### **CAUTION**

Manual and remote adjustable nozzles must be stowed pointing vertically to reduce wear on water cannon joints. Leaving the nozzle in any other position will cause increased wear on water cannon joints and result in premature joint failure.

11. PUMP Switch – OFF

#### **CAUTION**

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

12. Cab Control SYSTEM/POWER Switch – OFF
13. Vehicle – Wash or fresh water rinse areas exposed to the foam spray.

#### **Tank Drain**

1. Cab Control SYSTEM/POWER Switch – ON
2. PUMP Switch – ON

#### **CAUTION**

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

3. DRAIN Switch – ON

4. Water Level – Drain to desired level.

#### **CAUTION**

Do not operate the water pump in a dry sump. Dry running operation will cause water pump failure.

*Once operations are complete:*

5. DRAIN Switch – OFF
6. PUMP Switch – OFF

#### **CAUTION**

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

7. Cab Control SYSTEM/POWER Switch – OFF

#### **Hose Reel**

1. Hose Nozzle – CLOSED
2. Hose – Deploy desired length.
3. Gate Valve – OPEN
4. Cab Control SYSTEM/POWER Switch – ON
5. PUMP Switch – ON

#### **CAUTION**

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

6. Vehicle RPM – SET
7. Hose Nozzle – OPEN as desired.

## SECTION 4

### Normal Operations

Once operations are complete:

8. Hose Nozzle – CLOSE
9. Vehicle RPM – LOW IDLE
10. PUMP Switch – OFF

### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

11. (If Equipped) Cab Control SYSTEM/POWER Switch- OFF
12. Gate Valve – CLOSED
13. Hose – Reel in and stow hose nozzle.

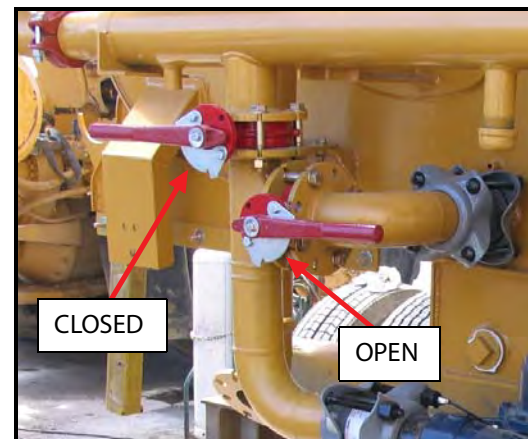
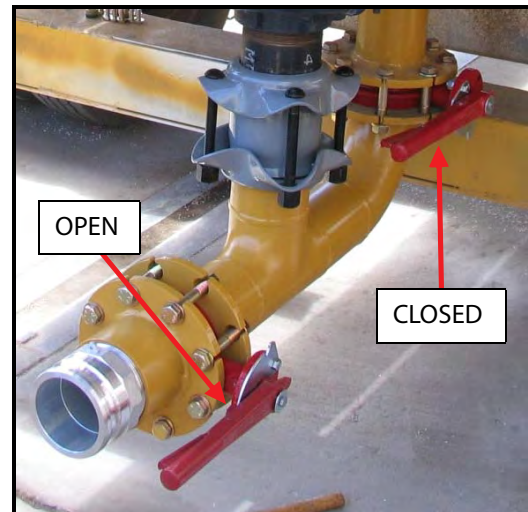
### Suction Load Station

1. Place vehicle near water holding pond.
2. Secure vehicle and make unit safe for exiting cab.
3. Foot Valve – Serviceable
4. Suction Hoses – Inspect suction hoses for serviceability. Ensure suction hoses are connected properly to each other and the suction load inlet to prevent air leaks while in use.
5. Suction Hoses – Immerse in water supply.

### NOTE

The suction loading pump has a maximum vertical lift capability of 8-10 feet. Attempting to pump water into the tank from a reservoir that is more than 8-10 feet below the pump station will result in reduced suction loading performance.

6. Position all butterfly valves as indicated in the following pictures and in the order as follows:
  - a. SUMP VALVE - **CLOSE**
  - b. SUCTION VALVE - **OPEN**
  - c. SPRAY BAR VALVE - **CLOSE**
  - d. TANK FILL VALVE - **OPEN**



### NOTE

Opening and closing valves in this sequence allows the water in the suction loading sump built inside of the tank to flood the water pump and suction hose. This will allow water pump to lift water from pond.

## **SECTION 4**

### **Normal Operations**

7. Ensure water pump and suction hoses are full of water before operating pump.

#### **CAUTION**

Do not operate the water pump in a dry sump. Operating the water pump in a dry sump will result in shaft seal damage.

8. Ensure foot valve remains submerged in water.
9. Start chassis engine.
10. At LOW IDLE, turn SYSTEM/POWER switch ON.
11. (DiSCS Only) AUX2 - ON
12. Turn PUMP Switch – ON

#### **CAUTION**

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

13. Increase engine RPM to HIGH IDLE.

*When unit is full of water*

14. Reduce engine RPM to LOW IDLE.
15. PUMP Switch – OFF

#### **CAUTION**

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

16. AUX2 - OFF
17. SYSTEM/POWER Switch OFF.
18. Turn engine OFF.
19. Disconnect, drain and stow suction hoses.

#### **AFTER OPERATIONS**

These procedures are used to perform a walk-around inspection after using the MEGA water tanker systems. This inspection is in addition to, and does not replace, the vehicle manufacturer's inspection requirements.

1. Vehicle parking brake – ON
2. Cab Control Switches – SET OFF
3. Chocks – As Required
4. Bumper Spray Heads – SECURED & SET
5. Gooseneck Hoses & Lines – CHECKED & SECURED
6. Solenoid Control Box – CHECKED
7. Water Cannon – CHECKED & SECURED
8. Vehicle Hydraulic Tank - CHECKED AS REQUIRED
9. Tank Drain Petcocks – As Required.
10. Tank Lines and Hoses – SECURED
11. Spray Heads – SECURED & SET
12. Water Pump – CHECKED
  - a. Water Pump – Check for damage and volute case drain valve set as required.
13. Hose Reel – CHECKED

## SECTION 4

### Normal Operations

#### COLD WEATHER OPERATION AND STORAGE

### CAUTION

Ensure **all water is drained** from system when the temperatures are expected to fall **below 4.4°C (40°F)** for any period of time. Failure to ensure all systems are drained and free from standing water will result in ice formation, which will cause serious damage to shaft, operator, diaphragm, drive motor, water pump, or butterfly valve.

To ensure all water is drained from tank check the following:

1. Park unit on a slight nose up angle to allow water to flow to the rear of the tank.
2. Drain the tank using an appropriate method until the Water Level Gauge reads EMPTY.
3. Open all drain petcocks (water pump, spray bars, etc.).
4. Remove water pump sump cover.
5. Start engine.
6. Cab Control SYSTEM/POWER Switch – ON
7. MONITOR/BFV Switch – ON
8. DUMP BAR Switch – ON
9. DRAIN Switch – ON
10. Water Cannon Nozzle – Pointed fully DOWN
11. Turn engine off.
12. Cab Control SYSTEM/POWER Switch – OFF

13. Hose Reel – DRAIN
  - a. Hose – UNWIND
  - b. Nozzle – Fully OPEN
  - c. Gate Valve – OPEN
  - d. Allow water to drain.
  - e. Hose – REWIND
  - f. Gate Valve – CLOSED
  - g. NOZZLE – CLOSED

14. Check to ensure all water has drained from tank.

#### To Reactivate Unit

1. Lubricate water pump bearings as instructed in -2 technical manual.
2. Inspect tank interior to ensure it is clean, if the tank is coated, ensure coating integrity, clean or repair as required.
3. Install sump cover with new gasket.
4. Close all drain valves and petcocks.
5. Start engine.
6. Control SYSTEM/POWER Switch – ON
7. Individual Spray Head Switches – OFF
8. DUMP BAR Switch – OFF
9. DRAIN Switch – OFF
10. MONITOR/BFV Switch – OFF
11. Turn engine off.
12. Cab Control SYSTEM/POWER Switch – OFF



## SECTION 4 Normal Operations

**Place copies of this Inspections Checklist and the Appendix Operator's Checklist within the cab for daily use.**

### INSPECTIONS CHECKLIST

**MACHINE #** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**NAME:** \_\_\_\_\_ **HOUR METER:** \_\_\_\_\_

Pre-Operations Inspection	OK	NOT	Comments and Corrective Action
SERVICE REQUIRED	<input type="checkbox"/>	<input type="checkbox"/>	
Foam Concentrate Level	<input type="checkbox"/>	<input type="checkbox"/>	
Water Cannon – Damage & Security	<input type="checkbox"/>	<input type="checkbox"/>	
Solenoid Control Box – Security	<input type="checkbox"/>	<input type="checkbox"/>	
MST/MSC Front Mounts – Security	<input type="checkbox"/>	<input type="checkbox"/>	
Hydraulic Tank Fluid Levels	<input type="checkbox"/>	<input type="checkbox"/>	
Hydraulic Hoses and Cabling – Leaks and Security	<input type="checkbox"/>	<input type="checkbox"/>	
Chassis Pivot Bore Pins – Security	<input type="checkbox"/>	<input type="checkbox"/>	
Tank Drain Petcocks CLOSED	<input type="checkbox"/>	<input type="checkbox"/>	
Spray Heads – Damage, Security, Adjustments	<input type="checkbox"/>	<input type="checkbox"/>	
Water Pump Assembly – Damage and Security	<input type="checkbox"/>	<input type="checkbox"/>	
Hose Reel – Damage and Security	<input type="checkbox"/>	<input type="checkbox"/>	
After Operations Inspection	OK	NOT	Comments and Corrective Action
Water Cannon – Damage & Security	<input type="checkbox"/>	<input type="checkbox"/>	
Hydraulic Tank Fluid Levels	<input type="checkbox"/>	<input type="checkbox"/>	
Hydraulic Hoses and Cabling – Leaks and Security	<input type="checkbox"/>	<input type="checkbox"/>	
Tank Drain Petcocks CLOSED	<input type="checkbox"/>	<input type="checkbox"/>	
Spray Heads – Damage and Security	<input type="checkbox"/>	<input type="checkbox"/>	
Water Pump Assembly – Damage and Security	<input type="checkbox"/>	<input type="checkbox"/>	
Hose Reel – Damage and Security	<input type="checkbox"/>	<input type="checkbox"/>	

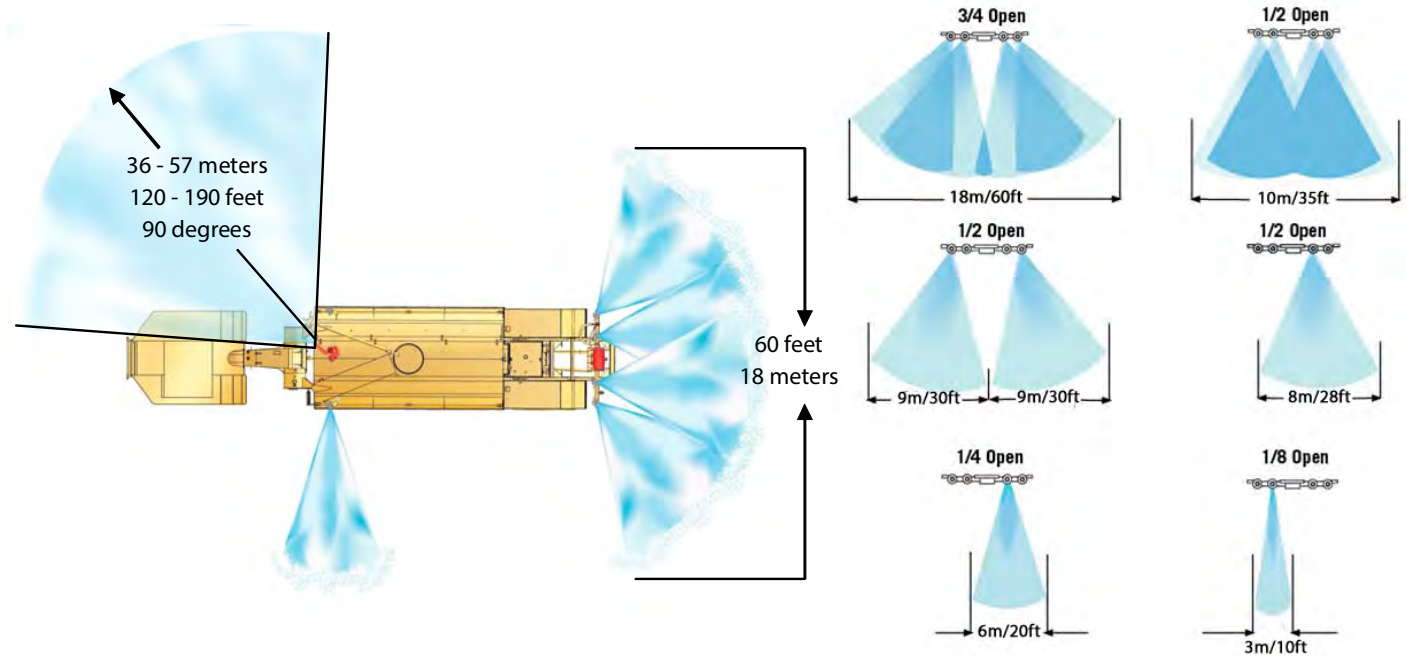
## SECTION 5 Performance

### Contents

Spray Pattern And Reach (Typical) .....5-1	Precision Watering .....5-3
Typical Spray Distance .....5-1	Fire Suppression System .....5-6
Typical Spray Duration and Flow .....5-2	

### SPRAY PATTERN AND REACH (TYPICAL)

The figures below illustrate the typical width and reach of spray heads and water cannon. Typical spray head deflector fan adjustments are also depicted.



### TYPICAL SPRAY DISTANCE

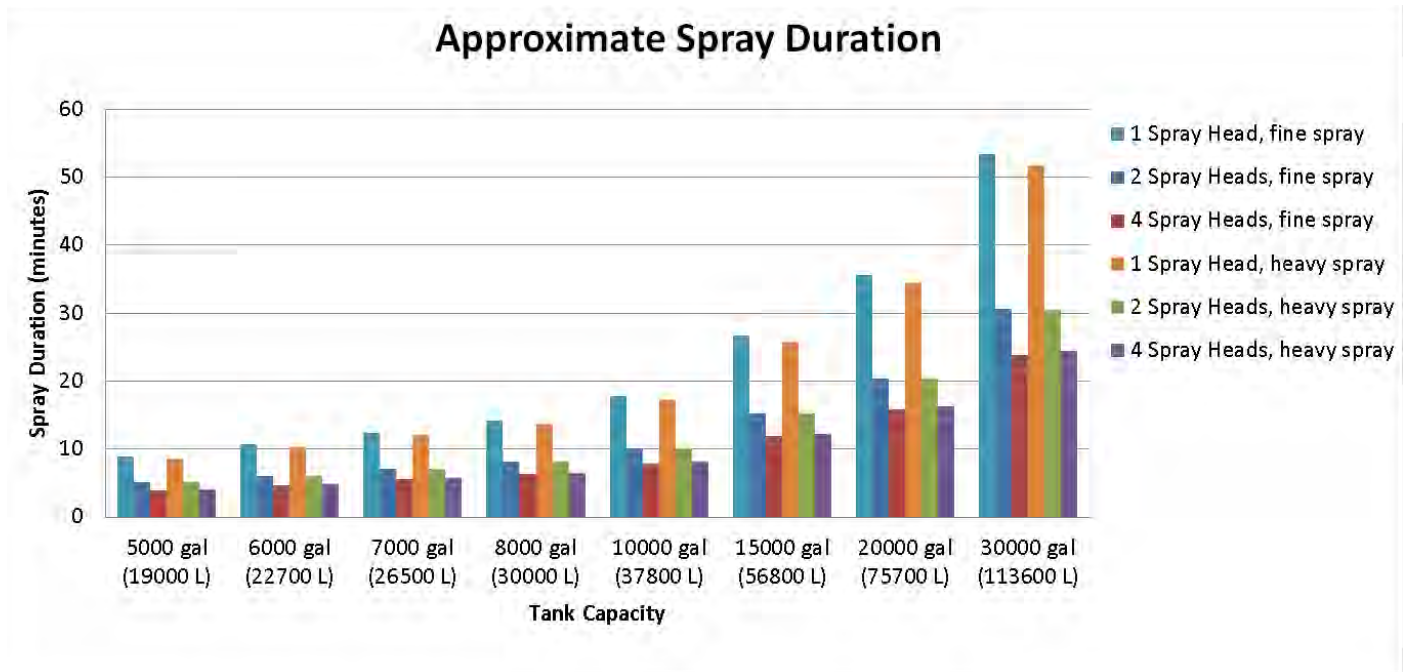
The table below contains a standard vehicle spray duration based on spray head deflector opening, vehicle speed and 18,927 liter (5,000 gallon) capacity.

Number of Spray Heads and Opening Width	LPM/GPM	Ground Speed (KPH/MPH)	Max. Distance (Km./Miles)
2 Spray Heads@ 1/4"	3611/954	16/10	2.4/1.5
2 Spray Heads@ 1/4"	3611/954	24/15	3.3/2.1
2 Spray Heads@ 3/8"	4705/1243	16/10	1.7/1.1
2 Spray Heads@ 3/8"	4705/1243	24/15	2.5/1.6
4 Spray heads @ 1/4"	5693/1504	16/10	1.4/0.9
4 Spray heads @ 1/4"	5693/1504	24/15	2.0/1.3
4 Spray heads @ 3/8"	5950/1572	16/10	1.2/0.8
4 Spray heads @ 3/8"	5950/1572	24/15	2.0/1.3

## SECTION 5 Performance

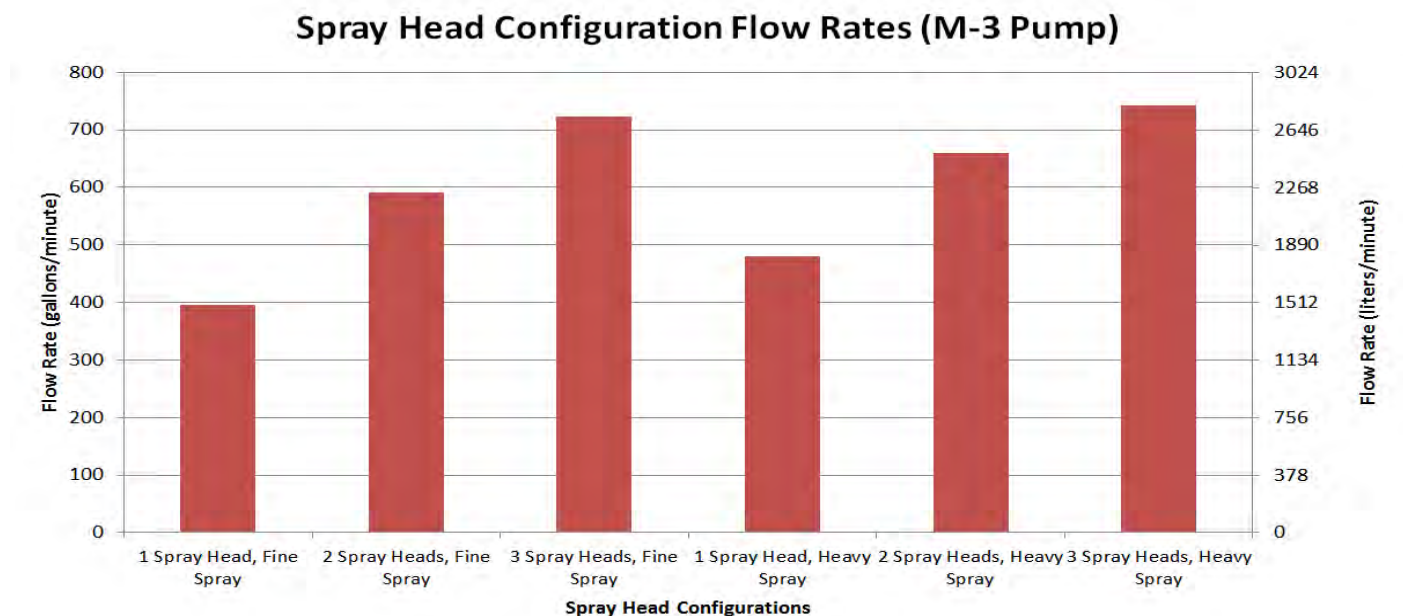
### TYPICAL SPRAY DURATION AND FLOW

#### Duration



**Estimated spray duration for various capacity tanks with four different spray head configurations.** Spray duration in minutes is shown on the vertical axis. The 'fine' setting is 1/4 inches in height, and the 'heavy' setting is 3/8 inches in height. These flow rates were recorded on an MSC8 with an M-4 Pump.

#### Flow Rates



**Total flow rates of different spray head configurations.** The approximate total flow rates in gallons/minute (left vertical axis) and liters/minute (right vertical axis) of four possible spray head configurations. The 'fine' setting is 1/4 inches in height, and the 'heavy' setting is 3/8 inches in height. These flow rates were recorded on a MACHINE HERE with an PUMP TYPE HERE.

## SECTION 5

### Performance

#### PRECISION WATERING

The following tables provide precision watering calculations for the installed spray system. Each table is categorized by size of spray head deflector opening at a full fan width for 2 or 4 spray heads.

#### 1/4 OPENING & FULL FAN (18,927 lit/5,000 gal TANK)

SPEED		2 SPRAY HEADS (FLOW 3611 lpm/954 gpm)				4 SPRAY HEADS (FLOW 5693 lpm/1504 gpm)				
		SPRAY DISTANCE	TOTAL COVERAGE	DISPERSAL	WATER LAYER	MAX DISTANCE	TOTAL COVERAGE	DISPERSAL	WATER LAYER	
		(FT)	(SQ FT)	(GAL/SQ FT)	(IN/SQ FT)	(FT)	(SQ FT)	(GAL/SQ FT)	(IN/SQ FT)	
MPH	FPM									
<b>U S</b>	2	176	1600	96000	0.052	0.084	880	52800	0.095	0.152
	5	440	4000	240000	0.021	0.033	2200	132000	0.038	0.061
	10	880	8000	480000	0.010	0.017	4400	264000	0.019	0.030
	15	1320	12000	720000	0.007	0.011	6600	396000	0.013	0.020
<b>M E T R I C</b>	KPM	MPM	(METER)	(M SQ)	(L/M SQ)	(MM)	(METERS)	(M SQ)	(M/M SQ)	(MM)
	3	53	675	12147	2.181	2.67	371	6679	3.968	4.65
	8	134	1706	30712	0.863	1.07	938	16885	1.569	1.84
	16	268	3412	61423	0.431	0.53	1876	33771	0.785	0.94
24	402	5119	92135	0.288	0.35	2814	50656	0.523	0.61	

#### 3/8 OPENING & FULL FAN (18,927 lit/5,000 gal TANK)

SPEED		2 SPRAY HEADS (FLOW 4705 lpm/1243 gpm)				4 SPRAY HEADS (FLOW 5950 lpm/1572 gpm)				
		SPRAY DISTANCE	TOTAL COVERAGE	DISPERSAL	WATER LAYER	MAX DISTANCE	TOTAL COVERAGE	DISPERSAL	WATER LAYER	
		(FT)	(SQ FT)	(GAL/SQ FT)	(IN/SQ FT)	(FT)	(SQ FT)	(GAL/SQ FT)	(IN/SQ FT)	
MPH	FPM									
<b>U S</b>	2	176	1354	81231	0.062	0.099	880	57200	0.087	0.140
	5	440	3385	203077	0.025	0.039	2200	143000	0.035	0.056
	10	880	6769	406154	0.012	0.020	4400	286000	0.017	0.028
	15	1320	10154	609231	0.008	0.013	6600	429000	0.012	0.019
<b>M E T R I C</b>	KPM	MPM	(METER)	(M SQ)	(L/M SQ)	(MM)	(METERS)	(M SQ)	(M/M SQ)	(MM)
	3	53	571	10276	2.579	3.68	371	6679	3.968	5.59
	8	134	1443	25980	1.020	1.47	938	16885	1.569	2.23
	16	268	2887	51960	0.510	0.74	1876	33771	0.785	1.11
24	402	4330	77940	0.340	0.48	2814	50656	0.523	0.74	

## SECTION 5 Performance

### 1/4 OPENING & FULL FAN (30,283 lit/8,000 gal TANK)

SPEED		2 SPRAY HEADS (FLOW 3611 lpm/954 gpm)				4 SPRAY HEADS (FLOW 5693 lpm/1504 gpm)				
		SPRAY DISTANCE	TOTAL COVERAGE	DISPERSAL	WATER LAYER	MAX DISTANCE	TOTAL COVERAGE	DISPERSAL	WATER LAYER	
		(FT)	(SQ FT)	(GAL/SQ FT)	(IN/SQ FT)	(FT)	(SQ FT)	(GAL/SQ FT)	(IN/SQ FT)	
MPH	FPM									
<b>U S</b>	2	176	1476	122499	0.065	0.105	936	70213	0.114	0.183
	5	440	3690	306247	0.026	0.042	2340	175532	0.046	0.073
	10	880	7379	612495	0.013	0.021	4681	351064	0.023	0.037
	15	1320	11069	918742	0.009	0.014	7021	526596	0.015	0.024
<b>M E T R I C</b>	KPM	MPM	(METER)	(M SQ)	(L/M SQ)	(MM)	(METERS)	(M SQ)	(M/M SQ)	(MM)
	3	53	444	11112	2.725	2.67	282	6484	4.670	4.65
	8	134	1124	28094	1.078	1.07	713	16394	1.847	1.84
	16	268	2248	56188	0.539	0.53	1426	32788	0.924	0.94
	24	402	3371	84283	0.359	0.35	2138	49183	0.616	0.61

### 3/8 OPENING & FULL FAN (30,283 lit/8,000 gal TANK)

SPEED		2 SPRAY HEADS (FLOW 4705 lpm/1243 gpm)				4 SPRAY HEADS (FLOW 5950 lpm/1572 gpm)				
		SPRAY DISTANCE	TOTAL COVERAGE	DISPERSAL	WATER LAYER	MAX DISTANCE	TOTAL COVERAGE	DISPERSAL	WATER LAYER	
		(FT)	(SQ FT)	(GAL/SQ FT)	(IN/SQ FT)	(FT)	(SQ FT)	(GAL/SQ FT)	(IN/SQ FT)	
MPH	FPM									
<b>U S</b>	2	176	1133	88354	0.091	0.145	896	58219	0.137	0.220
	5	440	2832	220885	0.036	0.058	2239	145547	0.055	0.088
	10	880	5664	441770	0.018	0.029	4478	291094	0.027	0.044
	15	1320	8496	662655	0.012	0.019	6718	436641	0.018	0.029
<b>M E T R I C</b>	KPM	MPM	(METER)	(M SQ)	(L/M SQ)	(MM)	(METERS)	(M SQ)	(M/M SQ)	(MM)
	3	53	341	8187	3.699	3.68	270	5395	5.613	5.59
	8	134	862	20699	1.463	1.47	682	13640	2.220	2.23
	16	268	1725	41399	0.731	0.74	1364	27280	1.110	1.11
	24	402	2587	62098	0.488	0.48	2046	40920	0.740	0.74

## SECTION 5 Performance

### 1/4 OPENING & FULL FAN (37,854 lit/10,000 gal TANK)

SPEED		2 SPRAY HEADS (FLOW 3611 lpm/954 gpm)				4 SPRAY HEADS (FLOW 5693 lpm/1504 gpm)				
		SPRAY DISTANCE	TOTAL COVERAGE	DISPERSAL	WATER LAYER	MAX DISTANCE	TOTAL COVERAGE	DISPERSAL	WATER LAYER	
		(FT)	(SQ FT)	(GAL/SQ FT)	(IN/SQ FT)	(FT)	(SQ FT)	(GAL/SQ FT)	(IN/SQ FT)	
MPH	FPM									
<b>U S</b>	2	176	1845	153124	0.065	0.105	1170	87766	0.114	0.183
	5	440	4612	382809	0.026	0.042	2926	219415	0.046	0.073
	10	880	9224	765618	0.013	0.021	5851	438830	0.023	0.037
	15	1320	13836	1148428	0.009	0.014	8777	658245	0.015	0.024
<b>M E T R I C</b>	KPM	MPM	(METER)	(M SQ)	(L/M SQ)	(MM)	(METERS)	(M SQ)	(M/M SQ)	(MM)
	3	53	556	13890	2.725	2.67	352	8105	4.670	4.65
	8	134	1405	35118	1.078	1.07	891	20493	1.847	1.84
	16	268	2809	70236	0.539	0.53	1782	40986	0.924	0.94
24	402	4214	105354	0.359	0.35	2673	61479	0.616	0.61	

### 3/8 OPENING & FULL FAN (37,854 lit/10,000 gal TANK)

SPEED		2 SPRAY HEADS (FLOW 4705 lpm/1243 gpm)				4 SPRAY HEADS (FLOW 5950 lpm/1572 gpm)				
		SPRAY DISTANCE	TOTAL COVERAGE	DISPERSAL	WATER LAYER	MAX DISTANCE	TOTAL COVERAGE	DISPERSAL	WATER LAYER	
		(FT)	(SQ FT)	(GAL/SQ FT)	(IN/SQ FT)	(FT)	(SQ FT)	(GAL/SQ FT)	(IN/SQ FT)	
MPH	FPM									
<b>U S</b>	2	176	1416	110442	0.091	0.145	1120	72774	0.137	0.220
	5	440	3540	276106	0.036	0.058	2799	181934	0.055	0.088
	10	880	7080	552212	0.018	0.029	5598	363868	0.027	0.044
	15	1320	10619	828319	0.012	0.019	8397	545802	0.018	0.029
<b>M E T R I C</b>	KPM	MPM	(METER)	(M SQ)	(L/M SQ)	(MM)	(METERS)	(M SQ)	(M/M SQ)	(MM)
	3	53	426	10234	3.699	3.68	337	6744	5.613	5.59
	8	134	1078	25874	1.463	1.47	853	17050	2.220	2.23
	16	268	2156	51749	0.731	0.74	1705	34100	1.110	1.11
24	402	3234	77623	0.488	0.48	2558	51151	0.740	0.74	

**SECTION 5**  
**Performance**

**FIRE SUPPRESSION SYSTEM**

The table below shows consumption rates and duration of foam suppression concentrate and water based upon a standard flow rate 1893 lpm/500 gpm and 3% foam proportioning.

<b>Foam Concentrate liters/gallons</b>	<b>Water liters/gallons</b>	<b>Duration</b>
57/15	1893/500	1 minute
114/30	3786/1000	2 minutes
228/60	7571/2000	4 minutes
341/90	11,357/3000	6 minutes
455/120	15,142/4000	8 minutes

## SECTION 6 Employment

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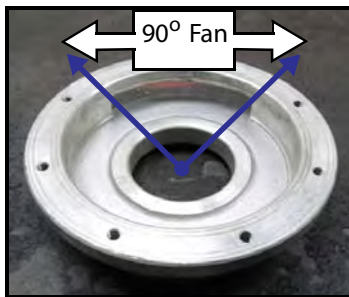
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### DESCRIPTION

This section provides descriptions, guidance, and techniques used when employing the MEGA spray system features. These best practices will provide operators with several different choices that will result in maximum system performance in most applications with ever changing conditions.

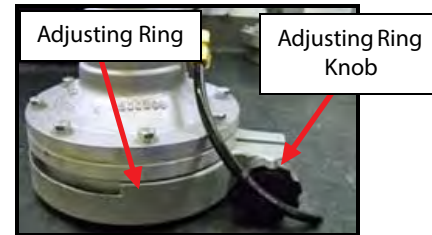
### SPRAY HEADS

Spray head adjustment and fine tuning techniques are key factors in optimizing water distribution and preventing over-watering of roadways. The MEGA spray heads are mounted to base plate assemblies connected to the water discharge piping. MEGA spray heads can be rotated on the base plate to direct the discharge fan in the necessary directions for optimum spray pattern. The spray heads incorporate an adjustable ring to control the spray intensity and fan width. The opening in the base of the MEGA spray head will allow for approximately a 90° maximum fan width as illustrated below.



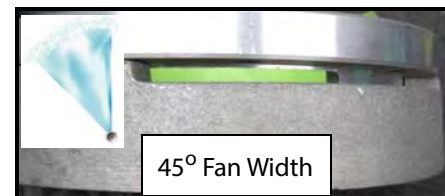
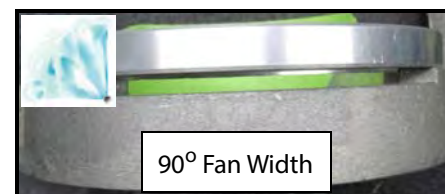
### Fan Width And Spray Intensity Adjustment

The spray head adjusting ring is used to control the fan width and spray intensity to match most applications. These settings can be changed by first loosening the adjusting ring knob and then rotating the adjusting ring to the desired position.



The following images are examples of the adjustment ring at the "fine spray" setting with varying fan widths.

#### Fine Spray (1/4" Slot Height)



The "fine spray" setting is typically used for reduced water volumes and a larger pattern, and is best suited for lower vehicle speeds and low water pump rpm.



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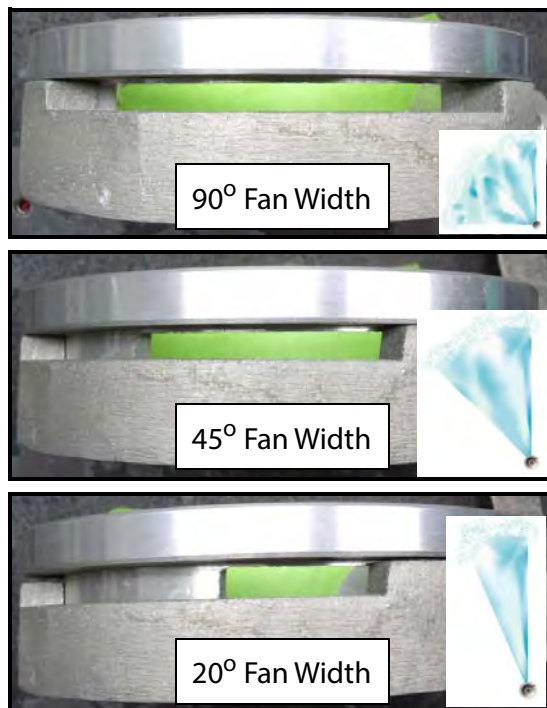
### Employment

#### NOTE

- Adjusting the ring for narrower fan widths will increase the length of the spray pattern; this may also increase the closure delay of the spray head.
- The “fine spray” setting produces smaller water droplets ideal for low wind and high humidity conditions.

The following images are examples of the adjustment ring at the “heavy spray” setting with varying fan widths.

#### Heavy Spray (3/8” Slot Height)



The “heavy spray” setting is typically used for heavy watering and discharging large quantities of water a short distance from spray head, and is best suited for higher vehicle speeds and high engine rpm.

#### NOTE

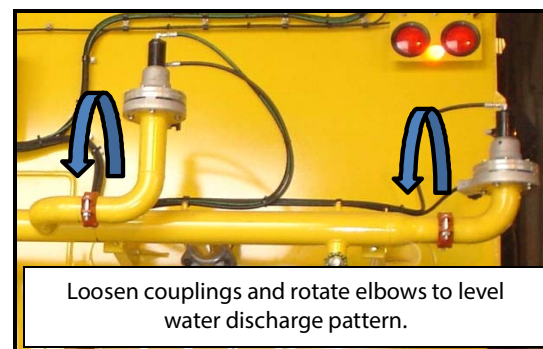
- When the spray head is set for “heavy spray”, water pressure is decreased and the reach of the discharge is reduced.
- The heavy spray setting produces larger water droplets ideal for high wind and low humidity conditions.

- When more than 2 spray heads are operated at the same time, the performance of the spray system is reduced.

#### Spray Head Vertical Tilt Adjustment

Swivel joints are an optional feature for spray head mounting. The joint allows the spray head to be tilted up or down to suit a given application. In their default positions, the spray heads discharge water at an angle of 10° above level. This results in more uniform droplet formation and subsequent water coverage. However, in drier climates or high wind conditions where evaporation is a significant source of water loss, it may be desirable to adjust the tilt of the spray heads towards the ground, thus reducing the amount of water lost to the effects of wind and low humidity.

To adjust the vertical tilt of spray heads, loosen the elbow couplings and adjust the swivel elbows (as shown below) down to the desired angle.



#### NOTE

Angling the spray heads down is typically used for high wind conditions and narrow watering strips.

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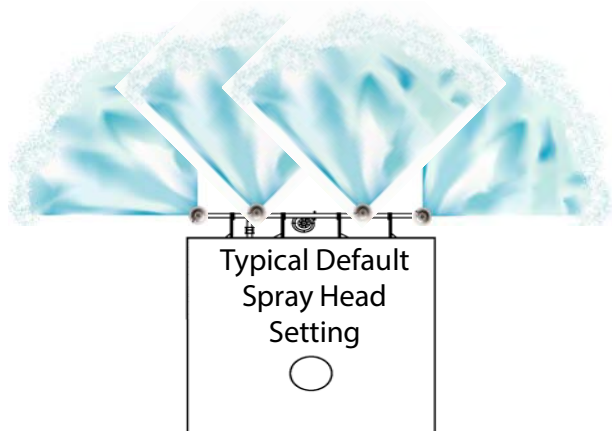
### Employment

#### Spray Head Fan Pattern

Proper employment of the spray system includes spray head adjustments to best suit the desired application. 'Best practices' are adjustments to the procedures that address the situation more accurately. Every application has specific conditions that must be addressed, such as safety, wind and weather conditions, terrain, traffic, traction, and proximity to sensitive equipment and personnel.

Steps for accurate spray system employment are as follows:

1. Select spray head fan height to meet road and watering pattern requirements.
2. Set spray head adjusting ring to the maximum fan width.
3. Evaluate road conditions for width, grade, vehicle traffic and optimum travel speed.
4. Locate an isolated section of road to test spray pattern.
5. Follow Operator's Manual steps for water pump activation and spray head operation.
6. Operate water truck and turn all spray heads ON. Ensure uniform water distribution and coverage.



7. Apply a test pattern by operating 1 spray head at a time on road surface traveling at a safe and average speed until all spray heads have been cycled. Note engine rpm while discharging water.

#### NOTE

- Water discharge pressure and volume are dependent on engine rpm. The higher the engine rpm, the higher the water pressure. Adjustments to vehicle speed, engine rpm, and spray head angle may be required.
- Adjusting the vehicle gear shift selector may be required in order to obtain the engine rpm necessary for the desired water pump performance level.

8. Observe applied watering pattern. Adjust spray head discharge angle, and fan opening height and width to suit 'best practices' for the haul road application.

#### NOTE

During initial spray pattern testing, observe spray head closure delay. Delayed spray head closure is caused by the mechanical limitations of the hydraulic spray system. These noted delays will be helpful in predicting the actual closure rate of the spray heads when adjusting the spray pattern for oncoming traffic, obstacles and setting up strip watering or scotching patterns either manually or if equipped with the intermittent spray timer.

## SECTION 6 Employment

### Vertical Side Spray Heads



Vertical side spray heads are typically located on the front or rear of the top skin of the water tank. The discharge opening is vertical to the tank and sprays to the side. Vertical side spray heads can be employed for applying water to high walls, reaching over berms, or watering opposing traffic lanes. Vertical side spray heads can be controlled using the intermittent function.

### WARNING

Vertical side spray is not recommended for use when high winds are present. Due to the spray head locations on the top of the water tank, the wind will unevenly distribute the water and may carry the water where it obstructs the view from the operator's position, potentially impairing visibility and thereby creating dangerous operating conditions.



### Front Bumper Spray Heads

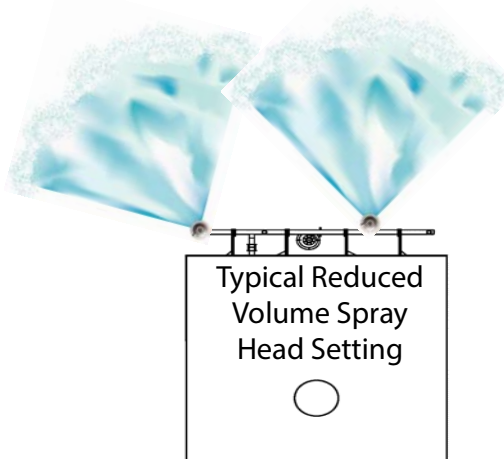
Front bumper spray heads are used and adjusted like any other spray head for haul road and berm operations. Spray heads mounted to a swiveling coupling allow the fan pattern to be pointed down towards the road and perform as a street sweeper. This same configuration is very effective when water patterns are needed to penetrate the ground surface for compaction operations.

### DUST SUPPRESSION

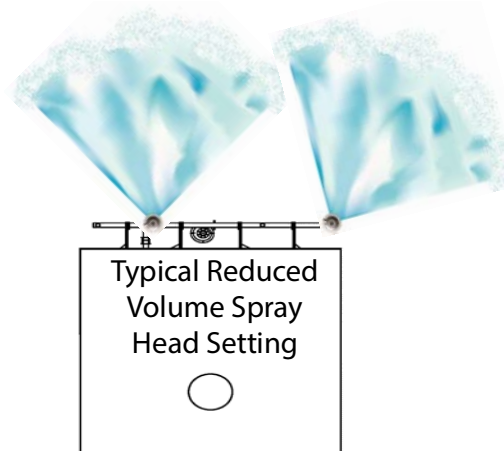
For dust suppression, it is recommended that a light coating of water be applied to the road surface. This can be achieved by monitoring and adjusting the engine rpm and vehicle speed with properly adjusted spray heads that allow an even coating of water to fall onto the road surface. Typically 1 or 2 spray heads are employed for this application.

Examples for light water distribution:

- Adjusting Ring Opening - FULL WIDTH, FINE SPRAY
- Right Rear Spray Head - ON
- Right Center Spray Head - OFF
- Left Center Spray Head - ON
- Left Rear Spray Head - OFF



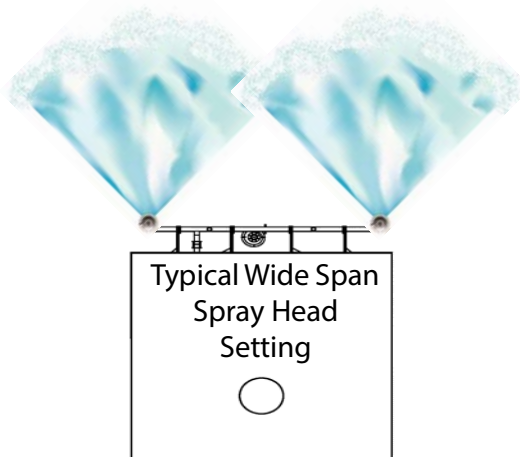
- Adjusting Ring Opening - FULL WIDTH, FINE SPRAY
- Right Rear Spray Head - OFF
- Right Center Spray Head - ON
- Left Center Spray Head - OFF
- Left Rear Spray Head - ON



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Adjusting Ring Opening - FULL WIDTH, FINE SPRAY  
 Right Rear Spray Head - ON  
 Right Center Spray Head - OFF  
 Left Center Spray Head - OFF  
 Left Rear Spray Head - ON



#### INTERMITTENT SPRAY

Intermittent spray is a time based function. Individual controls knobs set the ON and OFF time of the spray heads based on the desired length of time needed to apply wet/dry strips on the road. The standard MEGA spray system with intermittent spray has a timer range of 5 to 100 seconds. The DiSCS spray system intermittent spray has a timer range of 3 to 30 seconds.

Intermittent spray control is best suited for light watering and pit ramps, where it is desired to have definite wet and dry sections of road, and where additional driver attention to road conditions is required. This wet and dry strip watering provides for better traction, allowing haul trucks and other vehicles to drag water down the haul road while also increasing water truck duration between tank refills.

#### NOTE

Due to the mechanical limitations of the spray system, the timer control range refers to the requests to open and close the spray head; delays in closure may be experienced.

1. Ensure tank is full of water.
2. Adjust spray head openings to desired settings.
3. Turn SYSTEM/POWER switch ON.
4. Set intermittent timer knobs to desired time of spray pattern.
5. Turn INTERMITTENT switch ON.
6. Turn PUMP switch ON.

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

7. Select spray heads required for desired road condition.
8. Operate water tanker on desired route and observe spray pattern.
9. Adjust timing as desired to create the necessary wet/dry strips.

#### NOTE

While in intermittent mode all discharge functions can be turned OFF by turning off the corresponding function switch. If the function is turned ON while the timer is in the OFF cycle, the function will stay OFF until the next ON cycle. The illustrations below are examples of strip watering:



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#### TROUBLESHOOTING

If the following conditions occur, adjust as follows and re-test spray patterns until the optimal pattern is achieved.

Discharge spray extends to and beyond berms or into oncoming traffic.

1. Adjust spray head width toward center of truck by loosening the 4 retaining bolts on the bottom of the spray heads and rotating the spray head on the base plate to the desired position.
2. Re-tighten spray head retaining bolts.

Insufficient water on roadway.

1. Increase engine rpm by shifting to a lower gear.
2. Increase the number of spray heads activated.
3. Reduce vehicle speed.
4. Increase the spray intensity by rotating the adjusting ring to the "heavy spray" setting (3/4" slot height).

Excessive water on roadway.

1. Decrease engine rpm by selecting a higher gear.
2. Increase vehicle travel speed.
3. Reduce the number of spray heads activated.
4. Reduce the spray intensity by rotating the adjusting ring to the "fine spray" setting (1/4" slot height).

#### GPS GROUND SPEED SENSING

The resident software provides a consistent layer of water on haul roads regardless of ground speed. The software minimizes water usage and prevents puddling at stops and haul ramps. Nominal settings produce about 3 liters per cubic meter regardless of ground speed. This maximizes water usage and extends the duration of a given load of water.

Adjustments are provided to increase or decrease the layer of water dispersed, as well as setting maximum water flow at a desired ground speed. All automatic system protection features are active regardless of auto or manual modes. Below are several examples of initial system setup and adjustments:

#### Example 1 (Medium Speed & High Winds)

##### Setup:

1. RATE - Set at midpoint (50%)
2. SPEED - Set at mid-point (approximately 24 KPH/15 MPH)
3. AUTO - ON
4. SPRAY HEADS - Select all 4 spray heads
5. VEHICLE SPEED - Less than 21 KPH/14 MPH

##### Observed Operation:

1. 2 Outer spray heads on with a timed cycle, **shortened** ON cycle durations
2. 2 Center spray heads OFF (reduced volume)

#### Example 2 (High Speed & Low Winds)

##### Setup:

1. RATE - Set at midpoint (50%)
2. SPEED - Set at mid-point (approximately 24 KPH/15 MPH)
3. AUTO - ON
4. SPRAY HEADS - Select all 4 spray heads
5. VEHICLE SPEED - Greater than 27 KPH/16 MPH

##### Observed Operation:

1. All 4 requested spray heads ON, NO timed cycle

#### Example 3 (Medium Speed & Low Winds)

##### Setup:

1. RATE - Set LESS than midpoint ( $\leq 50\%$ )
2. SPEED - Set at mid-point (approximately 24 KPH/15 MPH)
3. AUTO - ON
4. SPRAY HEADS - Select all 4 spray heads
5. VEHICLE SPEED - Less than 21 KPH/14 MPH

##### Observed Operation:

1. 2 Outer spray heads on with a timed cycle, **shortened** ON cycle durations
2. 2 Center spray heads OFF (reduced volume)

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#### Example 4 (High Speed & High Winds)

##### Setup:

1. RATE - Set at GREATER than midpoint ( $\geq 50\%$ )
2. SPEED - Set at mid-point (approximately 24 KPH/15 MPH)
3. AUTO - ON
4. SPRAY HEADS - Select all 4 spray heads
5. VEHICLE SPEED - Less than 21 KPH/14 MPH

##### Observed Operation:

1. 2 Outer spray heads on with a timed cycle, **increased** ON cycle durations
2. 2 Center spray heads OFF (reduced volume)

#### TANK DRAIN



Remote or manually operated drain valves are typically used to drain water from the tank after daily operations or when the water tank is prepared for maintenance. Gravity or pressure tank drains are also employed very successfully in water haulage or supply operations. Pressurized drains systems work very well when performing bulk water haulage from a main supply site to remote fill sites or established holding ponds. This pressurized system is also very effective in providing water for drilling and fire suppression operations.

#### DUMP BAR



The dump bar application is for laying a heavy defined pattern of water directly onto the roadway. This application can be used for increasing the moisture content of road beds for compaction, confined areas for which the use of the spray heads is not desired, narrow haul roads where discharge beyond the side of the tanker is not required, confined application in high wind conditions, and preparation of roadways for grader applications. The dump bar function is capable of being operated in the intermittent mode.

The pressure dump bar is designed to force water into the upper layer of the road. The pressure feature is also useful for high wind conditions at high ground speeds.

#### CAUTION

If the dump bar is activated (pressure or gravity) and the water tanker has stopped, damage to the road surface can occur. Ensure that the dump bar is OFF when coming to a stop to prevent road surface damage. Physical and mechanical delays will occur when turning the dump bar OFF.

#### NOTE

The gravity dump bar can also be used as a tank drain.

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#### WATER CANNON



The water cannon system is a very versatile for many different mining and construction applications. The straight bore nozzles work very well in producing a straight stream of water able to reach out at long distances. The water cannon will obtain maximum reach when the nozzle is at about 32 degrees of elevation with the chassis RPM at high idle. Reach can further be increased with the addition of in-line stream shaper when extreme reach is required for "high wall" or "stockpile" operations.

The water cannon system is also very useful for "wash down" operations. The system is best suited for wash down when configured with a remote adjustable "stream to fan/fog" nozzle. The operator can adjust the fan or stream pattern as needed while directing the stream or fan towards the components for wash down. The operator may also control water flow and pressure by simply increasing or decreasing the chassis RPM to obtain desired water flow and pressure.

#### CAUTION

Do not point straight streams directly at cab windows, exhausts or sensitive components. Damage can be caused when water cannon is flowing at maximum flow and pressure.

#### FIRE SUPPRESSION SYSTEM



The fire suppression operations are never typical and the environment is ever changing. Operators must always be aware of the type of fire they are suppressing, wind conditions, the potential hazards surrounding the fire, the potential heat generated by the fire and the duration of the fire suppression system.

General guideline for fire suppression operations are:

1. Have a basic understanding of the different classes of fires (A, B, C, and D) and how to extinguish them.
2. Be familiar with site specific standard operating procedures for fire suppression.
3. Understand basic fire suppression techniques for applying foam blankets (rain-down, and bounce-up).
4. Ensure fire suppression holding tank is full, system components are serviceable and the entire system is operational before employing the system for an actual fire.
5. Obtain Situational Awareness of the site:
  - a. On scene commander and establish communication.
  - b. People and equipment involved in the fire.
  - c. Duration of the fire suppression system.
  - d. Wind direction at the site.
  - e. Hazards and restrictions at the site.
  - f. Emergency Support people and equipment.

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6. Head to the site and perform operational check of the fire suppression system.
7. Activate the water pump.
8. Approach the site from a safe direction based on observed winds and know hazards.
9. Activate the fire suppression system as contained in Section 2 "Normal Operations".
10. Lay down an initial foam protective blanked as required.
11. Maintain a foam protective blanket as required or as duration allows.
12. Always be aware of hazards, wind conditions and remaining fire suppression duration.
13. Once fire suppression is completed, secure system as contained in Section 2 "Normal Operations".
14. Ensure water truck is completely washed down after fire suppression operations.



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Place copies of this Operator's Checklist and the Inspections Checklist at the end of Section 4 in the cab.

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# MST/MSC OPERATOR'S CHECKLIST

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### **BEFORE OPERATIONS**

These procedures are used to perform a walk-around inspection of the MEGA water tanker system before use or beginning of a shift. This inspection is in addition to and does not replace the vehicle manufacturer's inspection requirements.

1. Chocks – As Required
2. Vehicle Parking Brake – ON
3. Cab Control Switches – SET OFF
4. Bumper Sprayheads – SECURED & SET
5. Vehicle Hydraulic Tank – SERVICED
6. Gooseneck Lines & Hoses – CHECKED & SECURED
7. Solenoid Control Box – CHECKED AND SECURED
8. Water Cannon – CHECKED & SECURED
  - a. Nozzle – Check for security and kinking of foam concentrate supply line.

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9. (If Equipped) Foam Concentrate Level – CHECKED. At least 1” from the top of the foam tank.

#### **WARNING**

Ensure PPE fall arrest harness is worn, adjusted properly and attached to an anchor point. Failure to use PPE properly may result in personnel injury or death.

10. Tank Drain Petcocks – CLOSED
11. Spray Heads – SECURED & SET
12. Water Pump Assembly – CHECKED
  - a. Water Pump – Check to ensure volute case drain valve is closed.
  - b. Water pump and drive motor for evidence of overheating.
13. Hose Reel – CHECKED

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### OPERATIONS

Use these procedures to safely operate the standard and optional systems installed on the MEGA water tanker.

### CAUTION

Limit water pump operation to 2.5 minutes when in a no-flow condition (no flow from spray heads, dump bar, water cannon, drain valve or hose reel). Water pump operation in a no-flow condition will cause overheating of the water pump and damage to the shaft bearings.

### SPRAY HEAD SYSTEM

### NOTE

Operating more than 4 spray heads simultaneously will greatly reduce the width and flow of active spray heads.

1. Cab Control SYSTEM/POWER Switch – ON
2. INTERMITTENT – SET AS REQUIRED
  - a. TIMER ON/OFF Dials – SET
  - b. INTERMITTENT Switch – SET

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3. PUMP Switch – ON

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

4. Individual Spray Head Switches – ON

*Once operations are complete:*

5. Individual Spray Head Switches – OFF

6. PUMP Switch – OFF

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

7. Cab Control SYSTEM/POWER Switch – OFF

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### GPS AUTO MODE

1. Cab Control POWER Switch – ON
2. RATE and SPEED Dials - SET
3. AUTO – ON AS REQUIRED
4. Desired Spray Head Switches – ON
5. PUMP Switch ON

### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

*Once operations are complete:*

6. PUMP Switch OFF

### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

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7. AUTO – OFF
8. Individual Spray Head Switches – OFF
9. Cab Control POWER Switch - OFF

#### DUMP BAR

1. Cab Control SYSTEM/POWER Switch – ON
2. INTERMITTENT – SET AS REQUIRED
  - a. Timer ON/OFF Dials – SET
  - b. INTERMITTENT Switch – SET
3. PUMP Switch ON

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

4. DUMP BAR Switch – ON

*Once operations are complete:*

5. DUMP BAR Switch – OFF

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6. PUMP Switch OFF

### **CAUTION**

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

7. Cab Control SYSTEM/POWER Switch – OFF

### **WATER CANNON**

1. Cab Control SYSTEM/POWER Switch – ON
2. PUMP Switch ON

### **CAUTION**

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

3. Water Cannon – Pointed in a safe direction.
4. MONITOR/BFV Switch – ON
5. Water Cannon Joystick – As Required.

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6. MONITOR/BFV Switch – OFF

*Once operations are complete:*

7. Water Cannon Nozzle - STOW

#### CAUTION

Manual and remote adjustable nozzles must be stowed pointing vertically to reduce wear on water cannon joints. Leaving the nozzle in any other position will cause increased wear on water cannon joints and result in premature joint failure.

8. PUMP Switch OFF

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

9. Cab Control SYSTEM/POWER Switch – OFF

#### FIRE SUPPRESSION SYSTEM

1. Cab Control SYSTEM/POWER Switch – ON
2. PUMP Switch ON

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### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

3. Water Cannon – Pointed in a safe direction.
4. FOAM Switch – ON
5. MONITOR/BFV Switch – ON
6. Water Cannon Joystick – As Required.

*Once operations are complete:*

7. FOAM Switch – OFF
8. Water Cannon – Flow water through the water cannon nozzle with the FOAM switch off to flush foam from the nozzle.
9. MONITOR/BFV Switch – OFF

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10. Water Cannon Nozzle - STOW

#### CAUTION

Manual and remote adjustable nozzles must be stowed pointing vertically to reduce wear on water cannon joints. Leaving the nozzle in any other position will cause increased wear on water cannon joints and result in premature joint failure.

11. PUMP Switch OFF

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

12. Cab Control SYSTEM/POWER Switch – OFF

13. Vehicle – Wash or fresh water rinse areas exposed to the foam spray.

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### TANK DRAIN

1. Cab Control SYSTEM/POWER Switch – ON
2. PUMP Switch ON

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

3. DRAIN Switch – ON
4. Water Level – Drain to desired level.

#### CAUTION

Do not operate the water pump in a dry sump. Dry running operation will cause water pump failure.

*Once operations are complete:*

5. DRAIN Switch – OFF

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6. PUMP Switch OFF

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

7. Cab Control SYSTEM/POWER Switch – OFF

#### HOSE REEL

1. Hose Nozzle – CLOSED
2. Hose – Deploy desired length.
3. Gate Valve – OPEN
4. Cab Control SYSTEM/POWER Switch – ON
5. PUMP Switch ON

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

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6. Vehicle RPM – SET
7. Hose Nozzle – OPEN as desired.

*Once operations are complete:*

8. Hose Nozzle – CLOSED
9. Vehicle RPM – LOW IDLE
10. PUMP Switch OFF

### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

11. Cab Control SYSTEM/POWER Switch – OFF
12. Gate Valve – CLOSED
13. Hose – Reel in and stow hose nozzle.

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#### SUCTION LOAD STATION

1. Place vehicle near water holding pond.
2. Secure vehicle and make unit safe for exiting cab.
3. Foot Valve – Serviceable
4. Suction Hoses – Inspect suction hoses for serviceability. Ensure suction hoses are connected properly to each other and the suction load inlet to prevent air leaks while in use.
5. Suction Hoses – Immerse in pond or water supply.
6. Position all butterfly valves as indicated in the following pictures and in the order as follows:
  - a. SUMP VALVE - **CLOSED**
  - b. SUCTION VALVE - **OPEN**
  - c. SPRAY BAR VALVE - **CLOSED**
  - d. TANK FILL VALVE - **OPEN**

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## SECTION 7 Appendix

### MSC/MST-OPS(CL)-1

12 JULY 2019

7. Ensure water pump and suction hoses are full of water before operating pump.

#### CAUTION

Operating the water pump in a dry sump will result in shaft seal damage.

8. Ensure foot valve remains submerged in water.
9. Start chassis engine.
10. At LOW IDLE turn SYSTEM/POWER switch ON.
11. (DiSCS Only) AUX2 - ON
12. PUMP Switch ON

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

13. Increase engine RPM to HIGH IDLE.

*When unit is full of water*

14. Reduce engine RPM to LOW IDLE.

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## SECTION 7

### Appendix

#### MSC/MST-OPS(CL)-1

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15. PUMP Switch OFF

#### CAUTION

Do not engage/disengage the water pump above LOW IDLE. Engaging/disengaging the water pump above low idle will result in water pump component damage and reduced service life.

16. AUX2 - OFF

17. SYSTEM/POWER Switch OFF.

18. Turn engine OFF.

19. Disconnect, drain and stow suction hoses.

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## SECTION 7 Appendix

**MSC/MST-OPS(CL)-1**  
**12 JULY 2019**

### **AFTER OPERATIONS**

These procedures are used to perform a walk-around inspection after using the MEGA water tanker systems. This inspection is in addition to and does not replace the vehicle manufacturer's inspection requirements.

1. Vehicle parking brake – ON
2. Cab Control Switches – SET OFF
3. Chocks – As Required.
4. Water Cannon – CHECKED AND SECURED
5. Vehicle Hydraulic Tank – CHECKED
6. Tank Lines and Hoses – SECURED
7. Tank Drain Petcocks – As Required.
8. Spray Heads – SECURED AND SET
9. Water Pump Assembly – Check for damage and volute case drain valve set as required.
10. Hose Reel – CHECKED
11. Solenoid Control Box – CHECKED

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## SECTION 7

### Appendix

#### MSC/MST-OPS(CL)-1

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#### COLD WEATHER OPERATION AND STORAGE

### CAUTION

Ensure **all water is drained** from system when the temperatures are expected to fall **below 4.4°C (40°F)** for any period of time. Failure to ensure all systems are drained and free from standing water will result in ice formation, which will cause serious damage to shaft, operator, diaphragm, drive motor, water pump, or butterfly valve.

To ensure all water is drained from tank check the following;

1. Park unit on a slight nose up angle to allow water to flow to the rear of the tank.
2. Drain the tank using an appropriate method until the Water Level Gauge reads EMPTY.
3. Open all drain petcocks (water pump, spray bars, etc.).
4. Remove water pump sump cover.
5. Start engine.
6. Cab Control SYSTEM/POWER Switch – ON

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## **SECTION 7**

### **Appendix**

**MSC/MST-OPS(CL)-1**  
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7. MONITOR/BFV Switch – ON
8. DUMP BAR Switch – ON
9. DRAIN Switch – ON
10. Water Cannon Nozzle – Pointed fully DOWN
11. Turn engine off.
12. Cab Control SYSTEM/POWER Switch – OFF
13. Hose Reel – DRAIN
  - a. Hose – UNWIND
  - b. Nozzle – Fully OPEN
  - c. Gate Valve – OPEN
  - d. Allow water to drain.
  - e. Hose – REWIND
  - f. Gate Valve – CLOSED
  - g. NOZZLE – CLOSED
14. Check to ensure all water has drained from tank.

## **SECTION 7**

### **Appendix**

#### **MSC/MST-OPS(CL)-1**

**12 JULY 2019**

##### **TO REACTIVATE UNIT:**

1. Lubricate water pump bearings as instructed in the Maintenance (-2) technical manual.
2. Inspect tank interior to ensure it is clean, if the tank is coated, ensure coating integrity, clean or repair as required.
3. Install sump cover with new gasket.
4. Close all drain valves and petcocks.
5. Start engine.
6. Control SYSTEM/POWER Switch – ON
7. Individual Spray Head Switches – OFF
8. DUMP BAR Switch – OFF
9. DRAIN Switch – OFF
10. MONITOR/BFV Switch – OFF
11. Turn engine off.
12. Cab Control SYSTEM/POWER Switch – OFF

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