MEGA WATER CANNON INSTALLATION
(Hydraulic)
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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 a MEGA Hydraulic Water Cannon Kit or Water Cannon Retrofit Kit. 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 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 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 DiSCS 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 pertinent to the installation and operation of this kit in conjunction with a Mega water tank. The exact locations of the hazards and descriptions 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 if 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.

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
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.
**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.

HIGH PRESSURE WATER CANNON (10)
This safety label is located on top of the cab control box.

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<tr>
<td>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.</td>
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<table>
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<th>! WARNING</th>
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<tr>
<td>Do not operate spray heads until all personnel are a safe distance away from the vehicle.</td>
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HIGH PRESSURE SPRAY HEADS (9)
This safety label is located on the spray bar.

HIGH PRESSURE MOTOR (11)
This safety label is located on the hydraulic motor.

<table>
<thead>
<tr>
<th>! WARNING</th>
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<tr>
<td>Do not operate the water cannon until all personnel are a safe distance away from the vehicle.</td>
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<tr>
<td>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.</td>
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SECTION 1
Definitions and Abbreviations

CONFINED SPACE (12)
This safety label is located near the water tank access and fill ports.

ABBREVIATIONS
BFV - Butterfly Valve
cc - Cubic Centimeters
CCW - Counter Clockwise
CW - Clockwise
DiSCS - Digital Spray Control System
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
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

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.
SECTION 1
Definitions and Abbreviations

WATER CANNON SYSTEM COMPONENT LOCATION (TYPICAL)
SECTION 2
Component Descriptions

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**DESCRIPTION**

The hydraulic water cannon system consists of a water cannon, electric cabling to connect the cab control or joystick box to the water cannon hydraulic control valve, hydraulic hosing for water cannon drive motors, hydraulic hosing to supply pressure and return to hydraulic control valve, 3" pipe flange adapter for mounting the Water Cannon, 3" weld flange to weld to water pipe work on tank, and hardware to mount the water cannon to the butterfly valve.

The water cannon directs the water stream as commanded by a joystick that is mounted in the cab control box or a standalone joystick box. These command signals pass to a hydraulic control valve located near the water cannon, this control valve supplies the hydraulic drive motor with hydraulic pressure to move the water cannon water ways. The hydraulic control valve is equipped with over-pressure protection. The system also controls a BFV that opens or closes the water supply for the water cannon and a hydraulic adjustable nozzle.

The MEGA water cannon is equipped with elevation and rotation stops. The water cannon is shipped clocked to the full LEFT stop and has a clockwise rotation of 95° to the RIGHT and the elevation stops are adjusted for 120° of elevation movement from vertical. The rotation stops are adjustable to 320° of rotation.

**HYDRAULIC WATER CANNON SYSTEM**

DESCRIPTION

A stainless steel waterway that directs a stream of water in both elevation (up-down) and rotation (right-left). Hydraulic Drive motors move the waterway based upon joystick command signals that are sent to the hydraulic control valve. The water cannon also provides mounting for straight bore, adjustable, foam eduction nozzles and a variety of stream shapers for enhanced performance.

**HYDRAULIC CONTROL VALVE**

The hydraulic control valve receives an electrical signal from the joystick box or existing cab control box, to activate an electric solenoid that opens or closes a hydraulic spool valve, diverting hydraulic oil pressure to the commanded component for operation. The water cannon hydraulic control valve receives hydraulic oil pressure from the chassis hydraulic system. Return oil is routed to a very low pressure case drain that returns to the tank.

The hydraulic control valve is equipped with UP/DOWN/RIGHT/LEFT water cannon functions, Butterfly valve OPEN/CLOSE, hydraulic adjustable nozzle FOG/STREAM functions and over pressure protection.
SECTION 2
Component Descriptions

CONTROL CABLING
WATER CANNON CABLING (8 CONDUCTOR)

A 35' 16 gauge 8 conductor cable that carries signal commands from the joystick to the hydraulic manifold valve.

HYDRAULIC HOSING

The kit contains 6 manufactured hydraulic hoses for the basic water cannon functions (U/D/R/L) and bulk hoses and loose ends that must be assembled on site for the hydraulic pressure and return at the control valve.

UPPER FLANGE

Provides a 2-1/2” NPT for the mounting of the water cannon and a bottom disk as a clamping surface for four mounting bolts. The four mounting bolts engage the lower flange to provide sealing of the BFV which is mounted between the upper and lower flange.

LOWER PIPE FLANGE

A lower mating surface for the BFV that is welded to the water tank supply line. The flange contains 8 holes for the upper flange mounting bolts and is field welded to an existing 3” pipe.

OPTIONAL COMPONENTS
JOYSTICK BOX

Mega’s Digital Spray Control System (DISCS) includes a joystick box for water cannon operation. If your machine is equipped with DISCS, you do not need to purchase the standalone joystick box.

The standalone joystick box contains a joystick and switches for controlling the water cannon, butterfly valve and adjustable nozzle. The joystick box receives 24 VDC from the chassis to operate. The joystick box can be remote mounted to dash or existing cab control box.

NOTE
SECTION 2
Component Descriptions

BUTTERFLY VALVES

The hydraulically actuated 3" butterfly valve is mounted below water cannon flange to control water to the water cannon.

NOZZLES

Nozzles are available in smooth bore with 1" or 1 ½" orifice, hydraulic adjustable fog/stream, fog/stream foam educing and stackable stream shapers. The performance of straight bore nozzle can be enhanced by using an additional stream shaper. Nozzles are used for precise control of water/foam steam exiting from the water cannon water way.
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DESCRIPTION
These procedures are designed to assist with installation of the MEGA hydraulic water cannon system on any water truck or tanker regardless of water pipe configuration, or to be used as an upgrade (Retrofit) for older style hydraulic water cannons. The MEGA basic installation kit consists of a hydraulic water cannon, upper and lower pipe flanges, control cabling, hosing, and hardware. The customer may use an existing 3" hydraulic butterfly valve (BFV) and cab control/ joystick box to complete the system, or purchase either component separately. If you do not have an existing compatible hydraulic butterfly valve and joystick box to complete the water cannon installation, be sure to include these optional components in your kit purchase.

NOTE
Mega's Digital Spray Control System (DISCS) includes a joystick box for water cannon operation. If your machine is equipped with DiSCS, you do not need to purchase the standalone joystick box.

NOTE
Procedures are generic in nature and in most cases not written for a specific tanker application. Procedural steps will present basic component installation and may contain accompanying pictures to assist in the assembly process. Some of these pictures and references may not be specific to your machine.

If further assistance is required 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 for more detailed contact information.

1. (If replacing cab control box equipped with break out connectors) Remove old cable and install and secure new cable in existing location.

2. Install new joystick box to existing cab control or secure joystick box to dash using pattern below.
SECTION 3
Installation Procedures

HYDRAULIC CONTROL VALVE

1. Remove all electrical and hydraulic power from unit and make sure unit is safe for maintenance.

2. Ensure lower weld flange has been welded in proper location and weld is complete.

3. Locate and install butterfly valve and adapter flange to mount. Ensure that the 4 bolts are evenly spaced. Do not tighten yet.

4. Using 2 holes on hydraulic control valve bracket, secure to bottom side of the LOWER flange as shown below. Ensure butterfly valve shaft is oriented as shown below. Tighten the 4 bolts evenly to prevent flange distortion.

CABLING

1. Remove all electrical and hydraulic power from unit and make safe for maintenance.

2. Refer to Section 5 Appendix for illustrated view of suggested cable routing.

3. Locate switched 24VDC power capable of handling a 15 amp load, if installing optional joystick control box.

4. Connect YELLOW wire from joystick box to switched 24 VDC power.

5. Examples of switched power hook up points shown below.
SECTION 3
Installation Procedures

6. Connect joystick 8 pin PLUG (or cab control 8 pin PLUG) to 8 pin extension cable RECEPTACLE.

7. Connect PLUG end of 35’ cable to the RECEPTACLE end of the cable attached to the water cannon hydraulic control valve.

   OR

   (If using existing cab control box)

8. Connect PLUG end of control cable from existing spray head solenoid control box to water cannon hydraulic control valve RECEPTACLE.

   NOTE

   If you are having difficulties with locating a reliable switched power source or are having issues with installation of this kit please contact The 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 for more detailed contact information.

WATER CANNON

1. Remove all electrical and hydraulic power from unit and make safe for maintenance.

2. Inspect butterfly valve mounting flange to determine if replacement is required. If replacement is required, remove butterfly valve flange and weld new flange into position.

3. Install butterfly valve and upper flange adapter using 4 supplied bolts, nuts and washers.

   NOTE

   Flanges supplied have 8 holes for mounting, only 4 are required. The 8 hole flanges offer a wide range of adjustment.

4. Apply liquid pipe sealant to threaded nipple on adapter flange.

5. Thread water cannon on adapter until tight.

   CAUTION

   Use proper size wrench to tighten water cannon on adapter. Using a pipe wrench on water cannon inlet pipe will result in damage to water cannon and the flange adapter.

6. Ensure water cannon has sufficient travel to the RIGHT (95°) to not spray water on any item that may be damaged by the discharge of the water cannon when activated.

   NOTE

   MEGA Water Cannons are clocked to the full LEFT stop. When tightening the water cannon it may be necessary to unbolts the adapter flange and re-clock the water cannon adapter flange to prevent water spray on cab, mirrors or tank when using water cannon.

7. Locate four -4 hoses, install according to control valve labeling, refer to Section 5 for hydraulic hook up information and suggested routing.

8. (If using drive motor circuit) Locate hydraulic PRESSURE port on water pump hydraulic drive motor manifold or torque tube manifold.

   NOTE

   For consistent water cannon operation and performance, locate a pilot oil source that is not related to service brakes or steering. Adapting into a pilot oil source will allow water cannon to function with water pump OFF and the operation of the water cannon will be consistent at any engine speed. If there are any questions or assistance is needed in finding a suitable pilot oil source, please contact Mega Product Support at: 1-800-345-8889 or 1-505-345-2661.

9. Install and seal proper adapter fittings in ports.

10. Measure and manufacture hydraulic PRESSURE hose.
SECTION 3
Installation Procedures

11. Route and secure PRESSURE hose to top -6 port of hydraulic control valve as shown below.

12. Locate water pump drive motor CASE DRAIN port on drive motor manifold, torque tube manifold or an unrestricted port on hydraulic oil tank.

13. Locate RETURN port on water cannon hydraulic control valve as shown below.


15. Measure and manufacture hydraulic RETURN (Case Drain) hose.

16. Route and secure RETURN hose from water cannon control valve to case drain fitting.

17. Ensure vehicle is safe for operation.

18. Restore electrical power to chassis.

19. Ensure vehicle is safe for operation.
SECTION 3
Installation Procedures

20. Ensure tank has sufficient water to perform functional system check.

**WARNING**

Ensure MTT and truck is configured for water truck application before proceeding with this test. Damage to chassis and tank may result.

**CAUTION**

- Ensure the MTT is filled with sufficient water to perform operational test. Maximum capacity is recommended.
- Operating the water pump in a dry sump will result in shaft seal damage.
- Use caution when performing this test. Water may be discharged from any of the available openings when performing this test function.

21. Ensure all spray system switches are in the OFF position.

22. Start engine.

23. Turn SYSTEM switch ON.

24. Turn PUMP switch ON.

**CAUTION**

Engaging/disengaging the water pump above LOW IDLE may result in water pump component damage and reduced service life.

25. Operate joystick to ensure water cannon functions correctly. While operating water cannon ensure the nozzle does not aim directly at any component that may be damaged by the discharge of water from the nozzle when the water cannon is activated. Adjust as required.

26. Turn PUMP switch OFF.

**CAUTION**

Engaging/disengaging the water pump above LOW IDLE may result in water pump component damage and reduced service life.

27. Turn SYSTEM switch OFF.

28. Turn Engine OFF.

29. Check hydraulic system for leaks, fluid levels. Correct as required.

30. If water cannon travel needs to be adjusted due to water spray on chassis or tank component, adjust as required.

**WATER CANNON STOP ADJUSTMENT**
The water cannon is factory set for 95° of rotation (left to right) it is shipped clocked at the full LEFT stop and 120° in elevation (up to down) to vertical.

1. If factory set rotation range (right to left) is not sufficient for your application adjust range of motion as follows:

**NOTE**
The water cannon stop adjustment can only be accomplished with a fully functional water cannon control system.

a. **(180° rotation adjustment)**
   1. Use the joystick/cab control box to position the water cannon full right against mechanical stop.
   2. Remove rotation stop bolt as shown below.
   3. Use joystick/cab control box to position water cannon full left against mechanical stop.
   4. Reinstall rotation stop bolt.
   5. Operate water cannon through full range of motion to ensure desired range of motion is obtained and water cannon hydraulic hose length is sufficient.
SECTION 3
Installation Procedures

b. **(320° rotation adjustment)**

6. Remove rotation stop bolt and replace with plastic plug.

   **CAUTION**

   Failure to install plastic cap will cause bearing joint failure due to water and dirt ingestion.

7. Operate water cannon through full range of motion to ensure desired range of motion is obtained and water cannon hydraulic hose length is sufficient.

2. After stop adjustment is complete, water cannon final desired position may need to be adjusted by re-indexing water cannon waterway flange.

**RETRO KIT**

Install hydraulic Retro Kit as shown in the appendix (Drawing number 039885) to complete kit installation.
SECTION 4  
Daily Operations

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DESCRIPTION
This section provides the vehicle operator with step by step operating procedures for the installed water cannon system. The information is separated into before operations, operations and after operations.

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

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

CAUTION
Engaging/disengaging the water pump above LOW IDLE may result in water pump component damage and reduced service life.

4. MONITOR/BFV Switch – ON
5. Operate water cannon (ON/OFF) switch to ensure water cannon BFV is opening and closing.
6. Fill tank with appropriate water level for dynamic water check of water cannon, and cab control/ joystick box.
7. Turn on cab control/ joystick box System Power switch.
8. Move water cannon through full range of motion (right-left & up-down) to ensure proper operation.
9. Operate water cannon through full range of motion while spraying water. Ensure cab or tanker/truck sensitive equipment is not in the water cannon’s water spray pattern during operation.
10. While spraying water with the water cannon, ensure that the BFV is not leaking.
11. Operate all remaining cab control box functions to ensure proper operation.
12. Secure water cannon and turn off cab controls/ joystick box.
13. If any part of the operational check fails, see Section 7: Troubleshooting.
14. 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.
SECTION 4
Daily Operations

15. PUMP Switch – OFF

**CAUTION**

Engaging/disengaging the water pump above LOW IDLE may result in water pump component damage and reduced service life.

16. Cab Control SYSTEM/POWER Switch – OFF

**FIRE SUPPRESSION SYSTEM**
1. Cab Control SYSTEM/POWER Switch – ON

2. PUMP Switch – ON

**CAUTION**

Engaging/disengaging the water pump above LOW IDLE may result in water pump component damage and reduced service life.


4. FOAM Switch – ON

5. MONITOR/BFV Switch – ON


*Once operations are complete:*

7. FOAM Switch – OFF

8. Water Cannon – Flow water through the monitor 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

12. Cab Control SYSTEM/POWER Switch – OFF

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

**AFTER OPERATIONS**

These procedures are used to perform a walk-around inspection after using the MEGA water cannon. 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 & SECURED

5. Vehicle Hydraulic Tank - CHECKED

6. Tank Lines and Hoses – SECURED

7. Tank Drain Petcocks – As Required.

8. Water Pump – CHECKED
   a. Water Pump – Check for damage and volute case drain valve set as required.

9. Solenoid Control Box – CHECKED
SECTION 5
Inspection

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INSPECTION
1. Check water cannon for security and mounting.

2. Check hydraulic manifold assembly hoses and connections for security, condition, and routing.

3. Check hydraulic motors for security, condition and evidence of water or hydraulic oil leakage.

4. Check elevation and rotation joints for play and evidence of water leakage.

5. Check elevation and rotation operation, ensuring water cannon operates smoothly without binding.

6. Check butterfly valve operation to ensure butterfly valve opens and closes fully.

7. Check nozzle to ensure nozzle is tight and flow straightener grid is intact and undamaged.

CAUTION

- Ensure when unit is not operating the water cannon, the nozzle is stowed vertical. Stowing the nozzle vertical will reduce excessive wear on water cannon joints, gears and seals. If water cannon nozzle is not stowed in the vertical position and unit is driven over rough haul roads, reduced service life and component damage may occur.

- Ensure water cannon and waterway is drained if below freezing temperatures are expected. Lower nozzle to the full lower position and open butterfly valve until all of the water has drained from water cannon and waterway, if unit is not operating, leave nozzle in the full lower position to prevent water from entering water cannon through nozzle. Move nozzle to the vertical position and CLOSE butterfly valve before operation. Failure to properly drain water cannon will cause water to freeze in water cannon joints, butterfly valve and waterway causing damage and failure to water cannon system.
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MOTOR REPLACEMENT
1. Disconnect hydraulic hoses.

2. Remove 4 mounting bolts from lower motor base plate as shown below.

3. Manually rotate the joint to allow worm gear to disengage joint as shown below.

4. Inspect inside joint for evidence of water leakage.

5. Install new motor by rotating the joint to reengage the motor in the joint.

6. Install and tighten mount bolts.

7. Connect hydraulic hoses.

8. Apply power to the water cannon system and check for proper water cannon operation.

JOINT REBUILD
1. Remove hydraulic motor as described in Motor Replacement procedures.

2. Remove inner and outer bolt stops as shown below.
SECTION 6
Repair

3. Remove joint mount bolts as shown below.

4. Remove joint assembly as shown below.

5. Remove lower joint mount bolts and remove worm gear and waterway assembly.

6. Remove poly bearing from joint housing and inspect housing for cracks, corrosion and damage.

7. Disassembly while inspecting worm gear and waterway assembly as follows:
   a. Remove 3 worm gear set screws and remove worm gear as shown below.
   b. Remove all o-rings and remaining poly bearing.
   c. Inspect worm gear for cracks, wear and condition.

8. Inspect waterway for cracks, corrosion and condition.

9. Repeat steps 1-8 for other joint.
SECTION 6
Repair

10. Reassemble worm gear and waterway assembly as follows:

   a. Waterway.
   b. O-rings (2 each).
   c. Waterway cap.
   d. O-ring.
   e. Lower poly bearing.
   f. Alignment plug.
   g. Worm gear assembly with grease.
   h. Install 3 set screws.
   i. Joint housing.
   j. Rotation/Elevation stop bolt (2 each).
   k. Upper poly bearing.
   l. O-ring.

11. Install waterway and housing assembly mount bolts.

12. Install motor as described in Motor Replacement procedures.

13. Repeat step 10 for other joint assembly.

14. Once both joints are reassembled and installed apply hydraulic or electrical power to the water cannon and perform a functional check of the water cannon.

15. Check water cannon for full range of travel. Ensure full rotation and elevation of the water cannon and nozzle do not contact any part of the vehicle. If required perform elevation and rotation adjustments of the water cannon.

COIL REPLACEMENT (HYDRAULIC MANIFOLD)

1. Remove all power from the water cannon system.

2. Remove control valve assembly upper cover to gain access to control components.

3. Loosen coil/solenoid valve retaining nut as shown below.

4. Remove old coil and install new coil with spacer if required. Torque coil/solenoid retaining nut to 4-6 ft-lbs (5-8 nm).

5. Trace old coil wires to the appropriate 8 conductor cable and ground post. Remove old coil wires and splice new coil wires to their respective locations.


7. Perform water cannon functional check.

8. Install upper assembly cover and secure mount bolts.
**SECTION 6**

**Repair**

**SOLENOID VALVE REPLACEMENT**

1. Remove all power from the water cannon system.

2. Remove control valve assembly upper cover to gain access to control components.

3. Remove retaining nut on solenoid and remove both coils and spacer.

4. Remove solenoid from hydraulic manifold.

5. Install new solenoid with o-ring.

6. Reinstall coil, spacer, coil stack-up as shown below. Torque retaining nut to 4-6 ft-lbs (5-8 nm).

7. Perform water cannon functional check while checking for leaks.

8. Install upper assembly cover and secure mount bolts.

9. Service vehicle hydraulic system as required.

**PRESSURE REDUCING VALVE REPLACEMENT**

1. Remove all power from the water cannon system.

2. Remove control valve assembly upper cover to gain access to control components.

3. Remove old pressure reducer.

4. Install new pressure reducer.

**CAUTION**

Pressure reducer must be set to no more than 450 PSI (3,100 kpa). Damage will occur to the water cannon hydraulic motors if system is pressurized above 450 PSI (3,100 kpa).

5. Install pressure gauge on water cannon hydraulic drive motor supply line (up-down-right or left) to observe system pressure while adjusting pressure relief valve.

6. Loosen pressure reducer jam nut and insert Allen wrench in the pressure reducing valve adjustment stem.
SECTION 6
Repair

7. Apply hydraulic and electrical power to the water cannon system.

8. Move and hold the joystick to the same direction you installed the pressure gauge (up-down-right or left). While holding the joystick to that direction, adjust the pressure reducer adjustment stem to set 450 PSI (3,105 kpa).

9. Operate the water cannon in all directions checking for full range of motion.

10. Reinstall control valve assembly upper cover.

11. Service vehicle hydraulic system as required.

CONTROL VALVE ASSEMBLY REMOVAL
1. Label and disconnect all hydraulic hoses.

2. Remove 2 mount bolts on the water cannon waterway flange and remove control valve assembly.

CONTROL VALVE INSTALLATION
1. Install control valve assembly on waterway lower flange and install mount bolts.

2. Tighten waterway mount bolts evenly to secure the control valve assembly and provide equal clamp up of flange to BFV.

3. Connect all labeled hoses to the appropriate function/location.

4. Pressurize the hydraulic water cannon system and check for hydraulic leaks.

5. Perform a water cannon functional check while inspecting for leaks and proper operation.

6. Service vehicle hydraulic system as required.

OPERATIONAL CHECK
1. Ensure all panels are closed and secured.

2. Apply electrical and hydraulic power to system.

3. Operate water cannon (ON/OFF) switch to ensure water cannon BFV is opening and closing.

4. Fill tank with appropriate water level for dynamic water check of water cannon, and cab control/joystick box.

5. Turn on cab control/joystick box System Power switch.

6. Move water cannon through full range of motion (right-left & up-down) to ensure proper operation.

7. Operate water cannon through full range of motion while spraying water. Ensure cab or tanker/truck sensitive equipment is not in the water cannon’s water spray pattern during operation.

8. With water cannon spraying water ensure BFV is not leaking.

9. Operate all remaining cab control box functions to ensure proper operation.

10. Secure water cannon and turn off cab control/joystick box.

11. If any part of the operational check fails see Section 4 FIP (Fault Isolation Procedures).
SECTION 6
Repair
SECTION 7
Troubleshooting

Contents

Description .................................................................7-1

DESCRIPTION
These procedures are designed to assist customers in locating root causes for water cannon system malfunctions identified during the functional check of a newly installed system. The troubleshooting procedures will provide suggestions in order from simpler solutions to the more complex, with potential reference to drawings or schematics.

If further assistance is required after troubleshooting is complete, contact The 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 for more detailed contact information.

No power to cab controls/joystick box

1. Check that cab control box fuse is installed and not burned out, and cab control or joystick box is receiving proper 24 VDC signals.

2. If installed, ensure RED cab control box power wire is connected to 24 Volt switch and BLACK ground wire is grounded properly to the cab fuse panel terminal, or ensure YELLOW power wire for joystick box is receiving proper 24 VDC power.

3. Re-seat cab control/joystick box 40 or 8 pin connector.

4. Disconnect cab control/joystick box 40 pin or 8 pin connector and inspect for dislodged pins or sockets. If sockets or pins are found dislodged remove connector secondary lock and carefully move socket or pin to the locked position. Reinstall secondary lock and re-seat the connector.

Water cannon functions are opposite to joystick commands

1. Ensure 15 amp water cannon fuse is installed and not burned out and cab control or joystick box is receiving proper 24 VDC signals.

2. Ensure water cannon hydraulic control valve is properly grounded to water cannon flange.

3. Ensure tank is grounded properly to chassis.

4. Ensure all water cannon system cables are connected correctly from the cab control/joystick box to the water cannon hydraulic control valve.

5. Check that water cannon hydraulic motor hydraulic hoses are connected to correct port at motor and hydraulic manifold.

6. Check water cannon joints for damage or wear.

7. Check hydraulic pressure and return hose to ensure correct configuration.

8. Ensure hydraulic control valve is receiving sufficient hydraulic pressure to operate the water cannon motors.

9. Ensure hydraulic solenoids are receiving proper electrical commands from the joystick.

10. If 8 conductor water cannon cables were modified at your location, check water cannon wire schematic in appendix to ensure proper wiring of installed connectors.

Water cannon will not respond to joystick commands, or operation is slow

1. Ensure hydraulic hosing is in accordance with the drawings in the Appendix. Re-plumb as required.

2. Ensure sufficient water is in tank before performing operational checks.
SECTION 7
Troubleshooting

3. Ensure proper hydraulic oil pressure is being transferred to water cannon control valve.

4. Ensure water pump is engaged and in proper operating condition if water pump circuit is supplying water cannon system with hydraulic pressure.

5. Ensure hydraulic drive motor gears are not damaged.

6. Ensure water cannon joints are not damaged and binding.

7. Ensure butterfly valve opens completely.

Water cannon butterfly valve will not operate

1. Ensure hydraulic control valve is receiving sufficient hydraulic pressure to operate hydraulic butterfly valve.

2. Ensure cab control or joystick box have 24 VDC power.

3. Ensure water cannon hydraulic control valve mounting plate is grounded to tank.

4. Ensure tank is grounded to chassis.

5. Ensure butterfly valve shaft is not broken or disengaged.

6. Ensure butterfly valve shaft is not frozen inside of housing.

7. Ensure butterfly valve opens with no flange obstructions.

Water cannon performs poorly, has insufficient water reach, or low volume of water output

1. Ensure tank has sufficient water for proper water cannon operation.

2. Ensure no ice exists in water ways for water cannon or in water cannon joints.

3. Ensure water pump operation is as specified in -2 and -4 technical manuals.
SECTION 8
Recommended Support Parts & Illustrated Parts Breakdown

Contents

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DESCRIPTION

This section contains a listing of recommended support parts that should be available in the supply warehouse. The tables are categorized by specific sub-system of the machine. Do not forget that there are several variations of water pumps, hydraulic drive motors, water cannons, and BFVs. Ensure that machine serial numbers and actual component part numbers are checked before ordering any parts. Once parts are issued from warehouse stock, ensure depleted quantities are replenished to keep the recommended support parts package at 100%.

Several support parts are designated as a "Quick Change Component" (QCC) and should be used to minimize repair time of an operational Mega hydraulic water cannon. Broken assemblies can be repaired by maintenance repair facilities and later returned to the supply warehouse as a serviceable part.

A. WATER CANNON SUPPORT PARTS

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<tr>
<th>PART DESCRIPTION</th>
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<td>2. Valve, Butterfly, 3”</td>
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<td>3. Motor, Hydraulic</td>
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<td>5. Solenoid Valve, 4W-3P</td>
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<td>6. Coil, 24VDC</td>
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<td>7. Coil, 24VDC w/Connector</td>
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<td>9.</td>
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</table>

If your system is not covered in this manual or are having difficulties locating the necessary components please contact MEGA Corp. Product Support Group at:
US Toll Free: 1-800-345-8889 or
Direct: 1-505-345-2661 or visit our website at www.megacorpinc.com for more detailed contact information.
### Recommended Support Parts & Illustrated Parts Breakdown

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**Joint Rebuild Kit: 305141**

**Specifications:**
- 450 PSI
- Stainless Steel
## SECTION 8
### Recommended Support Parts & Illustrated Parts Breakdown

#### CONTROL VALVE ASSEMBLY, HYDRAULIC

**PART NO. 045080**
- Hydraulic Water Cannon Controller
- 550 PSI

### Recommended Support Parts

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*Units produced after Feb 2011 will use items 28*

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### Illustrated Parts

- Solenoid Valve
- Coil, 24 VDC
- Coil, 24 VDC w/Plug
- Regulator

*Units produced after Feb 2011 will use items 28*
SECTION 8
Recommended Support Parts & Illustrated Parts Breakdown

NOZZLE, STRAIGHT BORE
- 1” and 1.5”
- Built-in Stream Shaper
- Reach: 145-175 ft.

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SECTION 8
Recommended Support Parts & Illustrated Parts Breakdown

STREAM SHAPER, SHORT (STRAIGHT BORE ONLY)
- Increases Straight Bore Performance
- Increases Reach by 20-30%

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**NOZZLE, REMOTE ADJUSTABLE (FAN PATTERN)**
- 24 Volt DC
- Fan Pattern
- Stream Reach: approximately 140 ft.

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SECTION 8
Recommended Support Parts & Illustrated Parts Breakdown

NOZZLE, REMOTE ADJUSTABLE (FOG PATTERN)
- 24 Volt DC
- Fog Pattern
- Stream Reach: approximately 150 ft.

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### SECTION 8
Recommended Support Parts & Illustrated Parts Breakdown

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** This part is not included with nozzle and must be ordered separately if required.
SECTION 8
Recommended Support Parts & Illustrated Parts Breakdown

BUTTERFLY VALVE, 3” (WATER CANNON)
- 3"
- Hydraulic

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SECTION 8
Recommended Support Parts & Illustrated Parts Breakdown

JOYSTICK BOX, STANDALONE
- Analog
- Adjustable Nozzle Control
- BFV Control

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SECTION 8
Recommended Support Parts & Illustrated Parts Breakdown

8-12 (Blank)
SECTION 9
Appendix: Installation Drawings

DESCRIPTION
This section contains all of the drawings required to assemble and install the Mega hydraulic water cannon. These drawings are serial number specific and designed to be used in conjunction with previous section information to successfully produce a fully operational Mega hydraulic water cannon.

If your system is not covered in this manual, you are having difficulties with the installation or need additional information or assistance, please contact The MEGA Corp. Product Support Group at:
U.S. Toll Free: 1-800-345-8889
Direct: 1-505-345-2661
or visit our website at www.megacorpinc.com for more contact information.
SECTION 9
Appendix: Installation Drawings

9-B (Blank)
IF KIT TANK SEND BULK NOSE W/LOOSE ENDS
CHECK LENGTH BEFORE FABRICATING
REPORT LENGTH TO ENGINEERING.
NOTE: BAG ITEMS 1, 4 & 9 FOR ASSEMBLY AT INSTALL

WHITE/BLACK - MONITOR AUX (8)
RED/BLACK - MONITOR AUX (7)
GREEN - BFV CLOSE (6)
RED - BFV OPEN (5)
(1) BLUE - MONITOR LEFT
(2) ORANGE - MONITOR RIGHT
(3) WHITE - MONITOR UP
(4) BLACK - MONITOR DOWN

VIEW A-A
### BILL OF MATERIAL

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### FOR WIRING REFERENCE ONLY

#### JOYSTICK BOX

- **White/Black**: Adj. nozzle stream (0)
- **Red/Black**: Adj. nozzle fog (7)
- **Green**: Spv. (Ground) (6)
- **Red**: Spv. (Ground) (5)
- **Black**: Adj. nozzle down

### JOYSTICK BOX WIRING

- 5A Fuse
- B.P.V.
- Adj. nozzle switch
- Terminal strip

- 12' yellow (14 GA) to vehicle power (+24 V OC)

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**THIS DRAWING CREATED FROM 040599**

**NAME OF JOYSTICK**: HYDRAULIC MONITOR JOYSTICK BOX

**DATE**: 11-20-07

**DRAWING**: 1 of 1

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**SECTION 9**

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**REV  9-8**

**REVISIONS**

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**DRAWING NO.**: 041489