

CAMERA WASH™

U.S. Patents 6,554,210 & 6,199,773

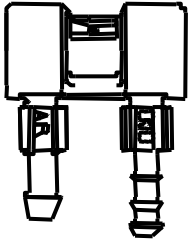
Installation Guide



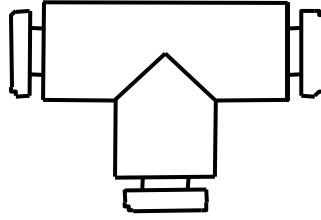
Another Convenience Product from

M. S. Foster & Associates, Inc.

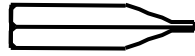
1866 N. Country Lane, Michigan City, IN 46360
Phone 219-380-3266 or 219-879-9225 • Toll Free 888-452-4053
Fax 219-879-9313 • email: sales@msfoster.com
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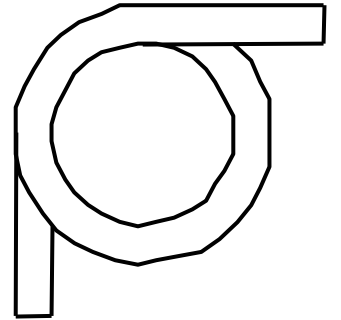
Nozzle (1)
847-0026-000



Tee, 1/4" D.O.T. Air Line (1)
017-0015-001



Nozzle Adjustment Bit (1)
145-0002-000

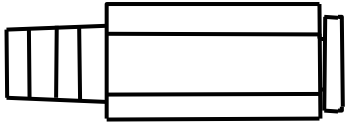


3/32" I.D. Tubing x 18"
100-0028-018

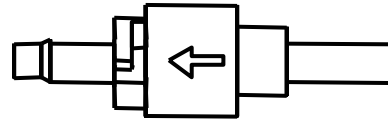


Retaining Washer (2)
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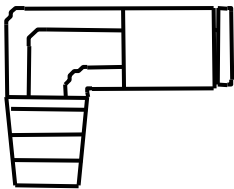
Wire Harness (2)
434-0083-000 &
434-0084-000



Fitting, 1/4 Tube to 1/8 NPT (1)
017-0018-002



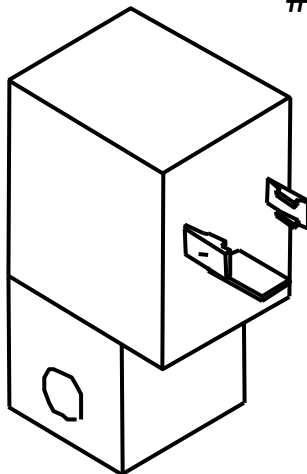
Check Valve (Fluid) (1)
W-534



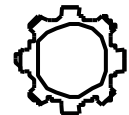
Elbow, 1/4 Tube to 1/8 NPT (1)
017-0034-000



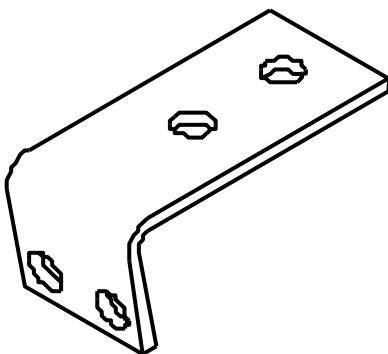
10-32 x 3/8" Screw (2)
603B



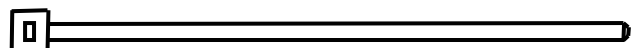
Solenoid Valve (Air) (1)
142-0007-000



Lock Washer (2)
#015-0011-001

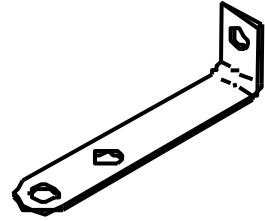


Nozzle Bracket (1)
#112-0060-000

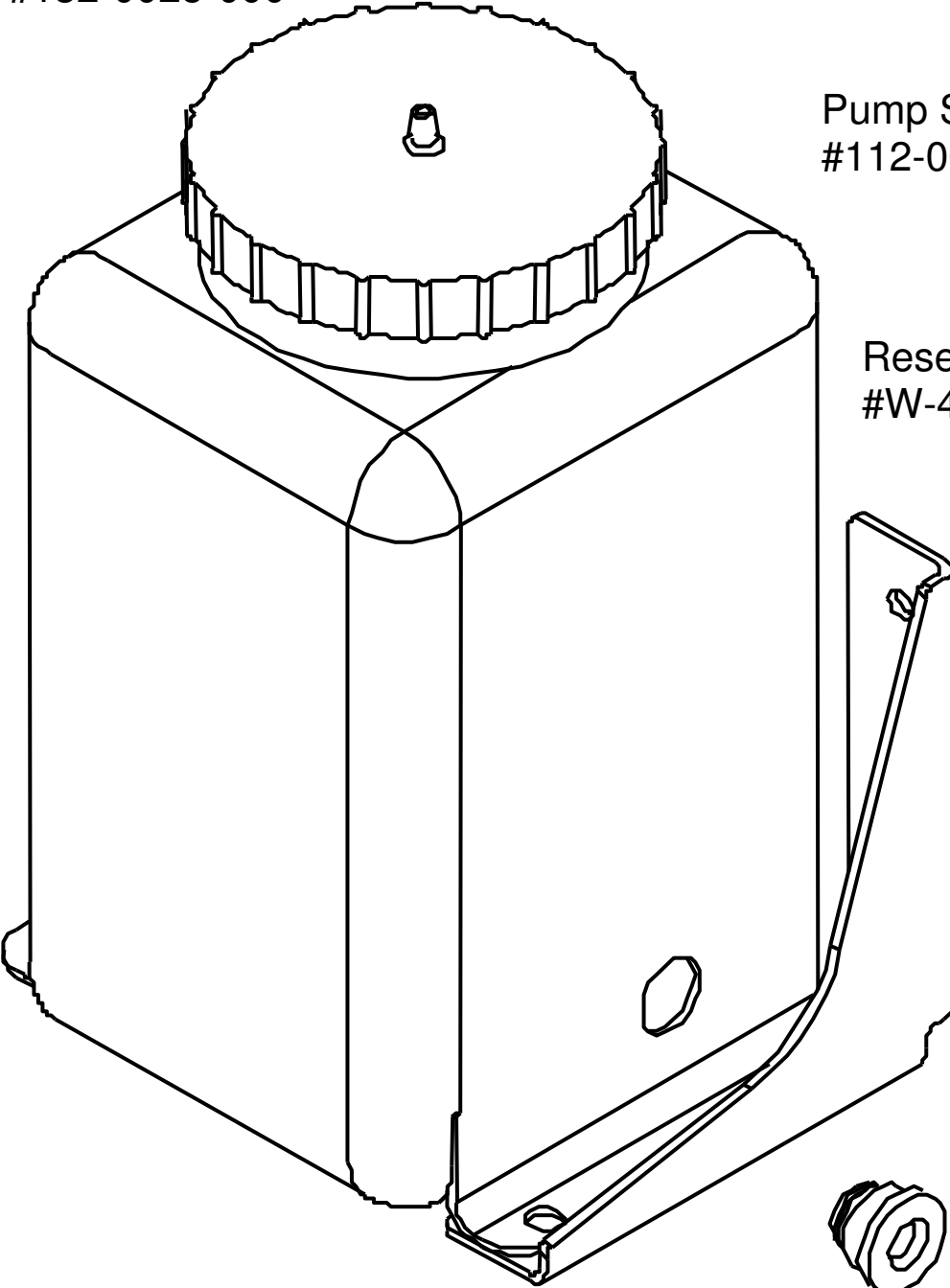


Cable Tie
012-0001-002

Reservoir Cover (1)
#132-0025-000



Pump Support Bracket (1)
#112-0047-000

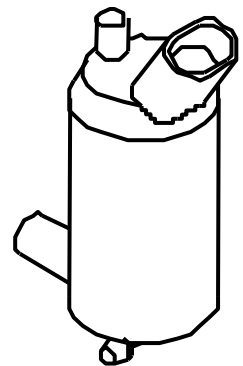


Reservoir, 1 Gallon (1)
#W-411-1

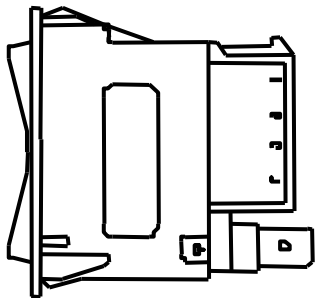
Reservoir Bracket (2)
#112-0046-000



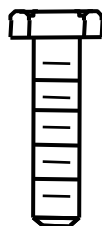
Pump Grommet (1)
#22110984



Pump (1)
#24010738



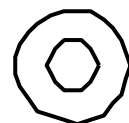
Rocker Switch (1)
#832-0044-000



1/4-20 x 1" Bolt (10)
#021-0001-001



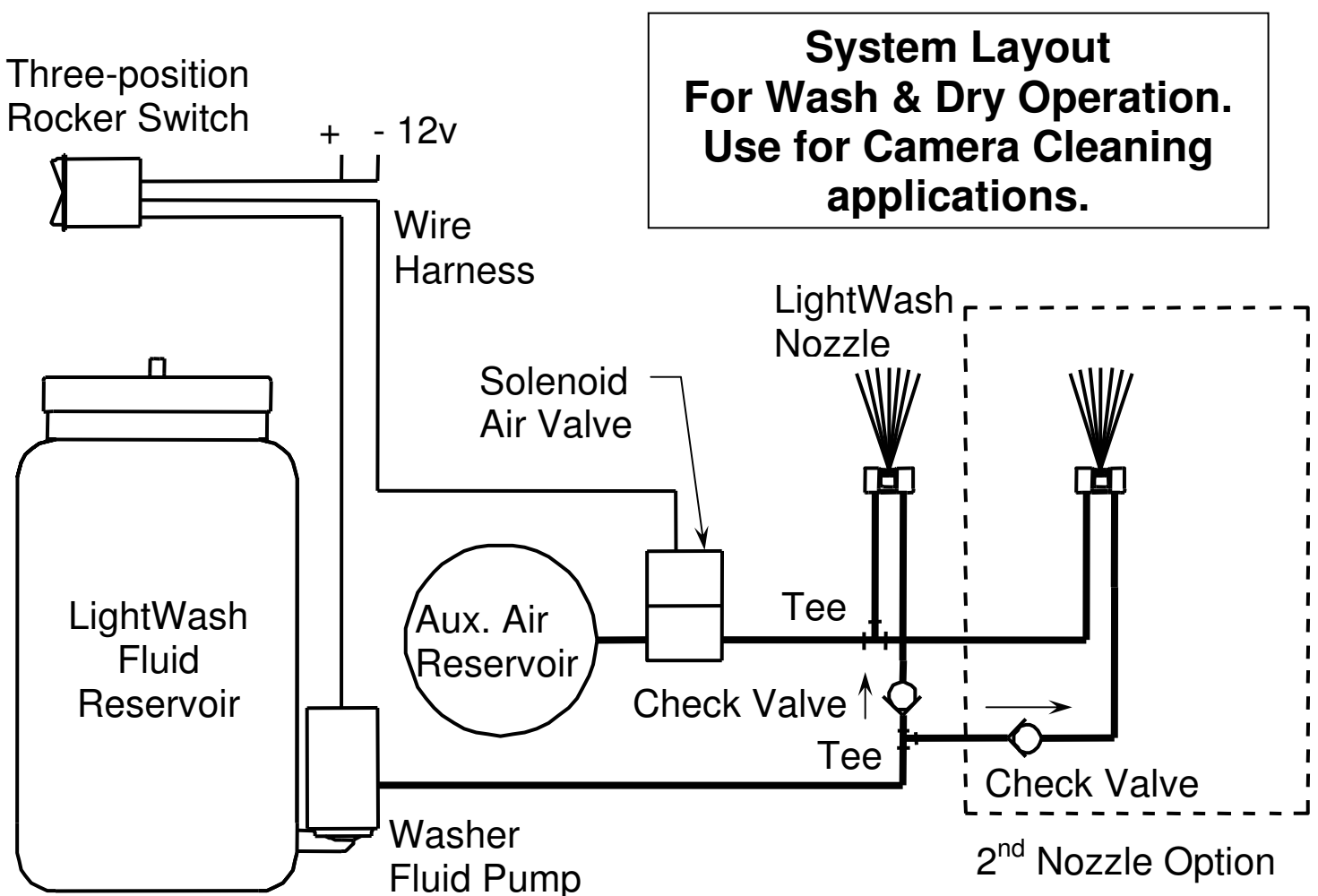
1/4-20 Lock Nut (10)
#027-0006-003



1/4" Flat Washer (4)
#015-0010-000

Installation Instructions

CAMERAWASH™



Thank you for purchasing this LightWash® system. These instructions describe the installation of an independent fluid and air cleaning system for vehicle-mounted cameras.

Required Tools

- 8mm or 5/16" hex deep socket only (for installing nozzle retainer washers)
- Tubing Cutter (or *sharp* Utility Knife)
- Phillips head screw driver
- Flat screw driver, 5/16 wide, in good condition for nozzle adjustment (bit supplied), or right angle flat screw driver.
- Portable drill with bits
 - 3/32 inch bit
 - 7/32 inch bit
 - 9/32 inch bit
- Center Punch
- Socket and drive set
- Wire Terminal Crimp Tool

Installation Instructions

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Step 1. **RESERVOIR:** Locate an area where you can mount the 1-gallon Fluid Reservoir. It should be mounted in an area that is easily accessible for refilling, away from direct impact of tire debris, such as rocks, etc., and away from high heat sources such as engine exhaust. If possible, mount it near the cab to keep the electrical wiring within reach of the harness that is supplied.

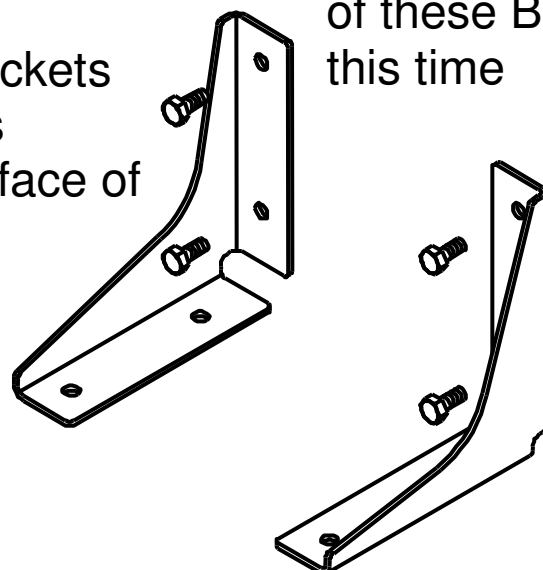
NOTE: The reservoir lid must be removed for filling. Make sure that the necessary clearance is available above the reservoir.

Step 2. Once you have determined your mounting location, use a center punch to mark the hole locations. Use the Reservoir as a template for the mounting holes in order to prevent misalignment. (The Mounting Brackets and the Reservoir use the same hole spacing).

Step 3. Drill four (4) mounting holes with a 9/32" drill. It may be necessary to drill a small (3/32") pilot hole first. Use of cutting oil is recommended.

NOTE: *Be sure to check behind the mounting surface for wiring, hydraulic lines, or tubing before drilling. You may need to pull away tubing or wiring to allow clearance for drilling.*

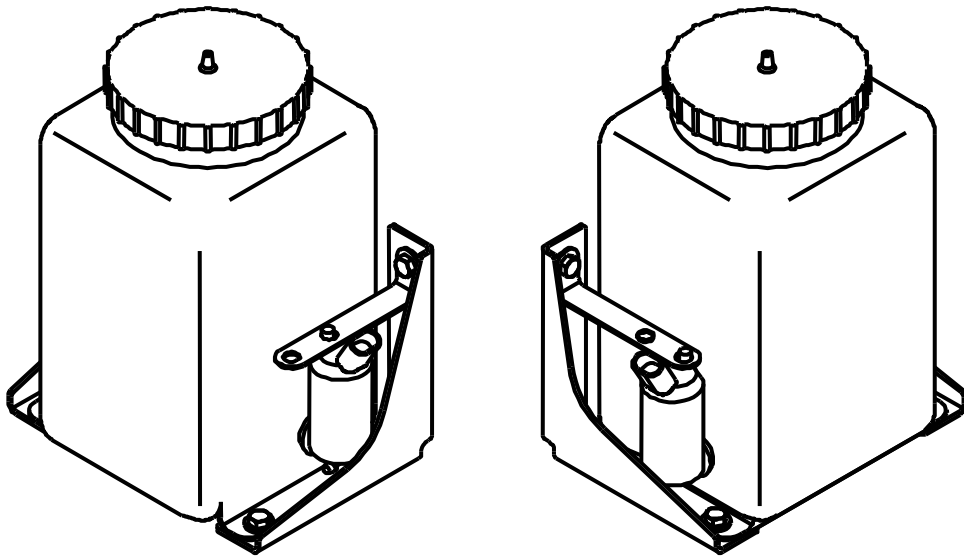
Step 4. Fasten the Mounting Brackets using 3 of the 1/4-20 Bolts provided, on the vertical face of the brackets.



Installation Instructions

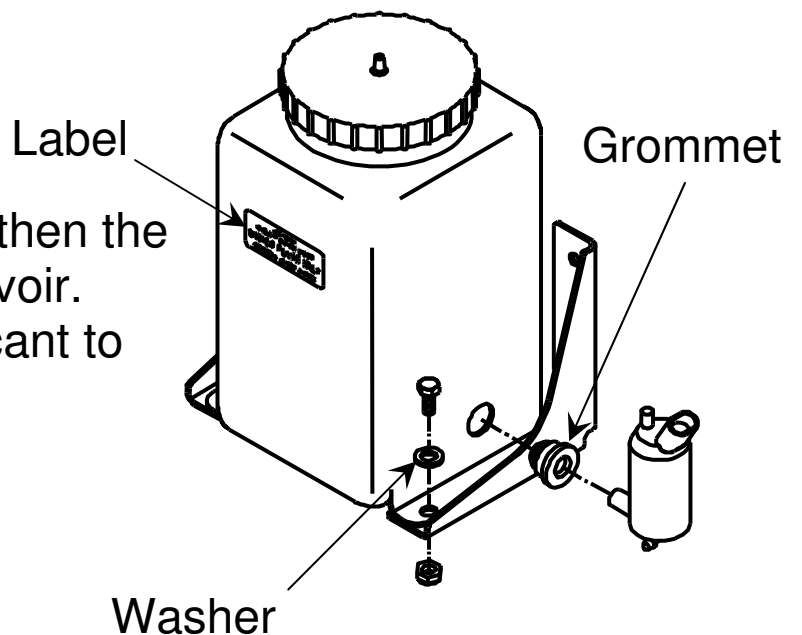
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NOTE: Leave the top Bracket hole open on the side of the Reservoir where the Pump will be installed. Note that the Pump can be installed on either side of the Reservoir (see below).



- Step 5. Fasten the Reservoir to the Mounting Brackets using 4 of the $\frac{1}{4}$ -20 Bolts provided. Be sure to place the Flat Washers between the plastic Reservoir and the Bolts.

- Step 6. Insert the Grommet, then the Pump into the Reservoir. Use water as a lubricant to aid in insertion.

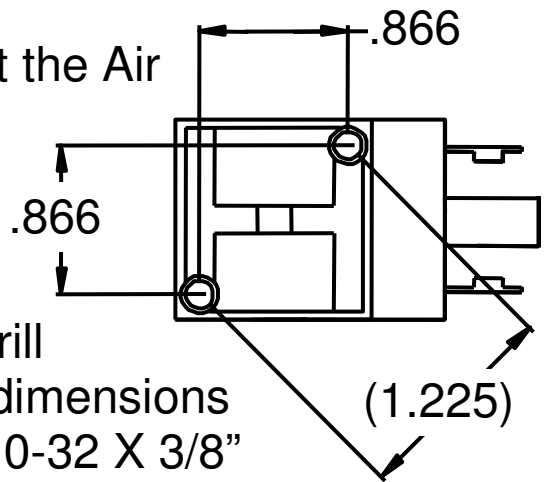


- Step 7. Mount the supplied Pump Support Bracket using the last $\frac{1}{4}$ -20 Bolt provided. Apply the "Washer Fluid Only" Label to the Reservoir, in a place where it is easily seen.

Installation Instructions

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- Step 8. **Air Solenoid Valve** : Mount the Air Solenoid Valve in a convenient location, such as to the Reservoir Bracket. It may be mounted in any position. Drill two (2) 7/32" holes per the dimensions shown. Attach using the #10-32 X 3/8" Mounting Screws and Lock Washers supplied.



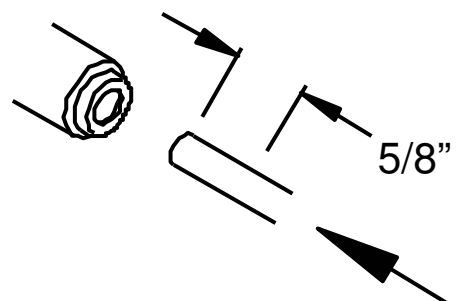
Solenoid Hole Pattern

- Step 9. Route 1/4" Nylon Air Line from the secondary air supply to the Solenoid. Use the Tee Fitting supplied to connect to an existing 1/4" line. Insert the tubing into the push-to-connect fitting (Port A) on the Solenoid. See below for tubing handling.

Nylon Tubing Handling: Prior to installation, the tubing end **MUST** be clean and free of contamination, with no nicks or burrs for the first 1/2". The air tubing is supplied in this condition. When length adjustments need to be made, the tubing should be cut-off clean and square to the length, using a sharp utility knife or a tubing cutter. *Do Not Use Pliers.*

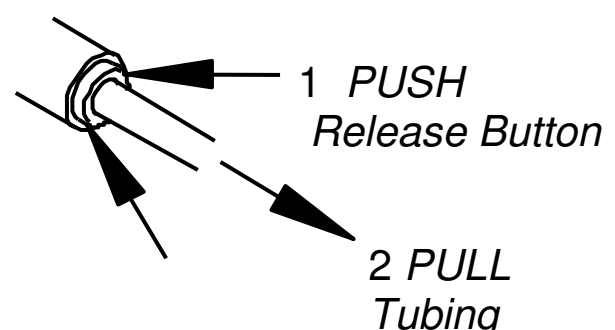
- **To install the tubing:** push the tubing into the fitting approximately 5/8" and "bottom out"

Tubing Installation



- **To remove the tubing:** with air supply off, hold the plastic Push-To-Release button TIGHT against the Valve, and while holding in, pull the tubing out.

Tubing Removal

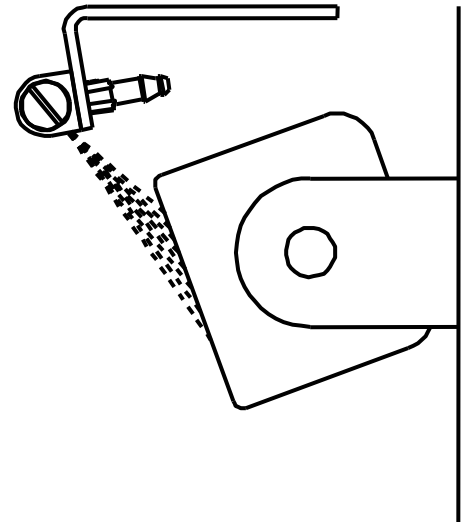


Installation Instructions

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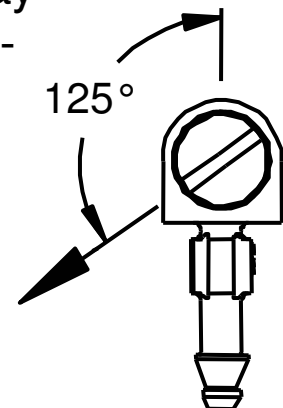
Step 10. Route the air and fluid delivery lines from the Reservoir and Solenoid to the Nozzle location. Avoid sharp edges and kinks. Route so as to avoid tubing damage during normal use.

Step 11. **Nozzle Location:** The Nozzle can be aimed up, down, or sideways. The Nozzle must be within 4 inches of the lens, and 1" to 2" ahead of it. The spray should be aimed near the center of the camera lens, avoiding directly impacting microphone or speaker openings.



Step 12. **Nozzle Adjustment:** The Nozzle spray direction is adjustable over 125°. Pre-adjust the Nozzle before installing to spray in the direction needed. Always use the supplied Screwdriver Bit or a 5/16" wide, flat head screwdriver (in good condition) to adjust the Nozzle.

**Adjustable
Spray
Direction**



Hold the Nozzle securely, against a solid surface and turn slowly, applying generous downward force to prevent the bit from slipping out of the slot.

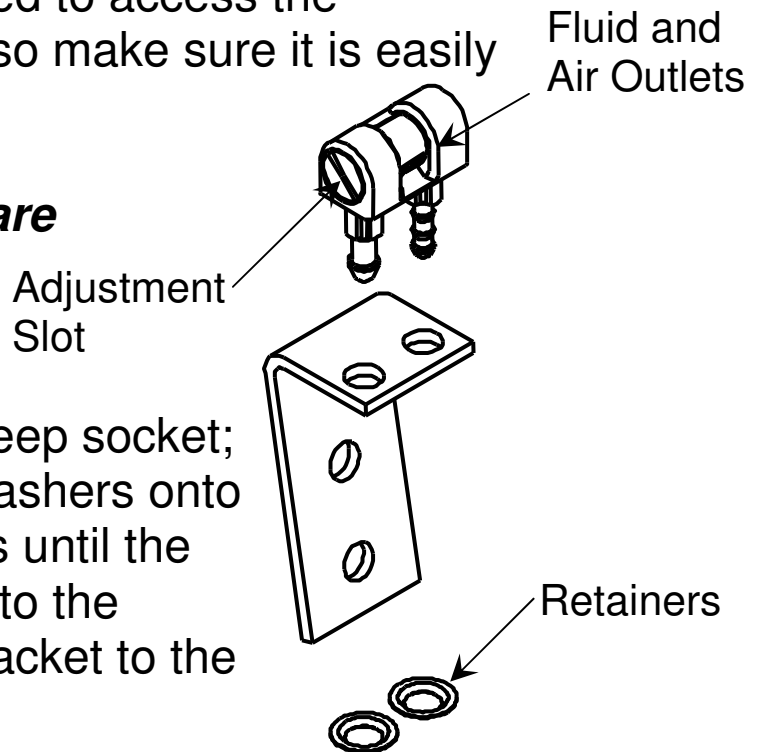
Installation Instructions

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- Step 13. Insert the Nozzle into the Nozzle Bracket. Position the Nozzle so that the fluid and air outlets are facing the camera. You may need to access the adjustment slot later, so make sure it is easily accessible.

Once the Retainers are installed, they cannot be reused.

To install them, use a 5/16" or 8mm hex deep socket; push the Retaining Washers onto the Nozzle hose barbs until the Nozzle fits snugly onto the bracket. Attach the bracket to the vehicle.



Up to four (4) Nozzles may be operated from one Pump and Solenoid pair. If additional Nozzles are needed, contact your dealer.

- Step 14. Install the 18" of 3/32" ID rubber Tubing to the Nozzle fluid fitting. (The fluid fitting has three barbs.) Attach the nylon Tubing to the Nozzle air fitting. The air fitting is shorter, has one single barb, and is label "AIR". Check to make sure that the air and fluid lines are connected to the correct barbs. Install the Check Valve between the small rubber tubing to the nozzle and the larger rubber tubing from the pump. Make sure the arrow is pointing away from the Pump.

NOTE: If more tubing is needed, use .156" (5/32") I.D. Windshield Washer Tubing for the rubber tubing and use 1/4" O.D. SAE J844 Nylon tubing for the air lines.

- Step 15. **Switch:** Install the switch in the dash. The hole size for the switch is 1.732" x .866" (44mm x 22mm). Panel thickness must be .04" to .10".

Installation Instructions

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Step 16. **Switch Wire Harness:**

Connect the loose red (+) wire to a fused circuit (8 to 10 amp). Attach the loose black (-) wire to a clean ground attachment point. Use the appropriate crimp terminals and tools.

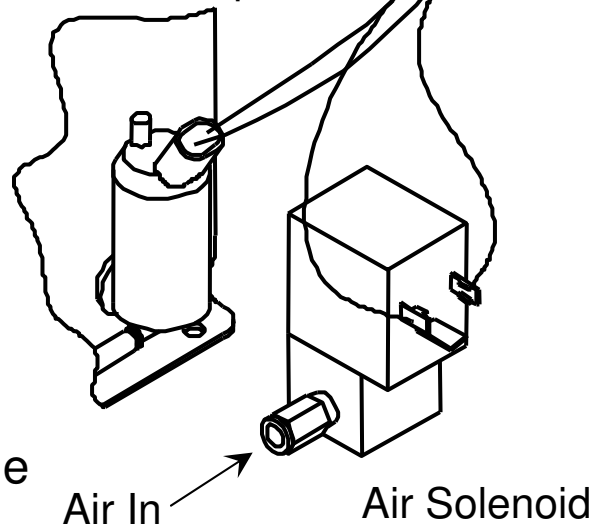


Step 17. Attach the wire harness to the switch.

LightWash Fluid Reservoir & Pump

Step 18. Route the **Pump Harness**

from the Pump and Solenoid area to the cab. Feed the pin terminal ends through a grommet (not supplied). Insert the pins into the connector housing using as a guide the mating connector on the Switch Harness. The green wire goes in socket #1, the black in socket #2 and the gray in socket #3. Connect the two harnesses.



Step 19. Connect the Harness to the Pump and Solenoid. At the Solenoid Valve, attach the gray and black wire connectors to the two terminals that are "C" shaped. (See picture.) It does not matter which wire color goes on which terminal.

Installation Instructions

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System Check

Step 1 The system is now ready to check

Step 2 Make sure the washer bottle is filled with washer fluid.



WARNING: SOME WASHER FLUIDS CONTAIN POTENTIALLY HAZARDOUS SUBSTANCES. FOLLOW SUPPLIER'S INSTRUCTIONS.

- Wear safety glasses or goggles at all times when observing Headlamp Washer Nozzle spray patterns.
- Operate your Headlamp Washer only in a well-ventilated area outdoors.

Step 3 Check to make sure that the vehicle has sufficient air pressure (90 psi or greater)

Step 4 Start the engine and operate the Camera Wash switch in the wash direction. It will take 10 to 20 seconds to prime the system. When the system has primed itself, fluid and air spray will come out the nozzles.

Step 5 Operate the switch in the opposite direction to apply an air blast that removes most of the fluid off of the lens for clearer vision.

Step 6 Adjust the Nozzle if necessary. It will be necessary to have someone activate the system from inside the cab while the Nozzle spray pattern is observed.

Step 7 To adjust the Nozzle, use the supplied screwdriver bit or a 5/16" wide flat head screwdriver (in new condition) to raise and lower the pattern. On some installations it may be necessary to use an angled screwdriver.

Step 8 Tie wrap (or tape) the tubing and wire Harnesses so that they are secure and clear of moving parts, including the hinge points of the hood. Make sure that they do not come in contact with hot or moving engine components. It is recommended to fasten the Tubing Harnesses to existing harnesses where possible.

Installation Instructions

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Trouble Shooting

- Step 1 Check to see that the Solenoid Valve and Check Valve are plumbed correctly.
- Step 2 If there is no fluid at the Nozzle:
- Be sure there is washer fluid in the reservoir. Run the washer pump for 15 seconds more to prime the system with fluid.
 - Examine the check valve to see that the arrow on it is pointing toward the nozzle. Operate pump again. If there is no fluid:
 - Check for kinked or pinched tubing.
 - Check that fluid is flowing when the pump is running. If not, the pump may be wired backward. Reverse the + and – wires that supply the switch and check again.
 - Make sure that all connections are properly engaged and are sealing.
 - Check the Nozzle for debris. To clear debris, remove the fluid tubing below the Nozzle, and blow compressed air back through the small Nozzle opening to clear it.
- Step 3 If the Nozzles spray fluid but not air:
- Check the air inlet connection to the Solenoid Valve, to make sure that the Valve is pressurized and plumbed with air supplied to port 2/A.
 - Make sure all air fittings are securely connected.
 - Check for kinked or pinched tubing.

Installation Instructions

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Wiring Schematic

