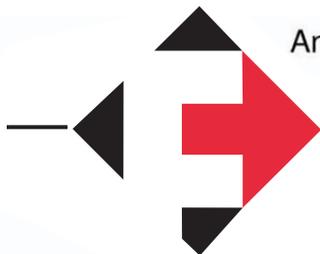


CAMERA WASH™

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

Installation Guide

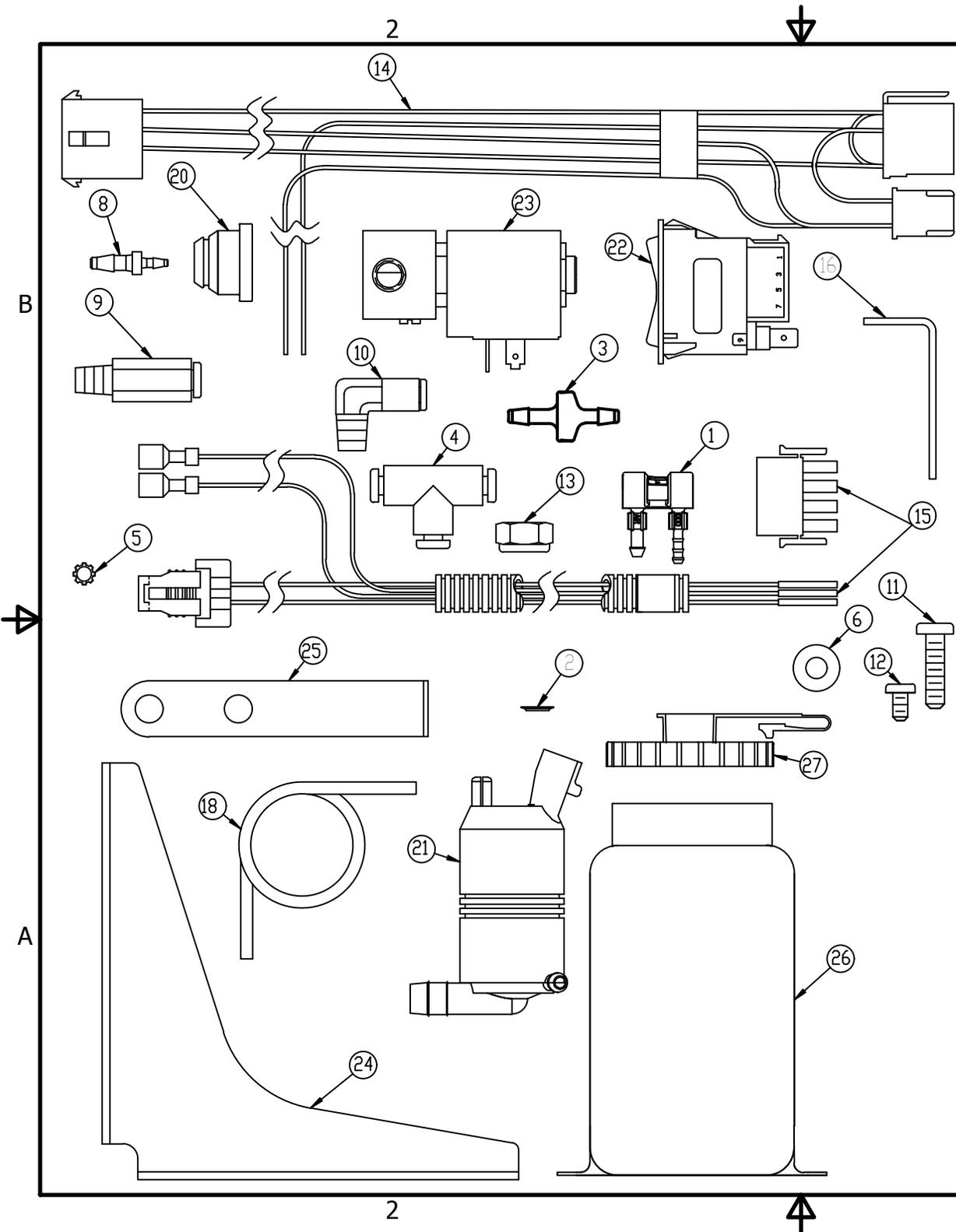
MSF8470037000A



Another Convenience Product from

M. S. Foster & Associates

1866 N. Country Lane, Michigan City, IN 46360
Phone 219-879-9225 • Toll Free 888-452-4053
Fax 219-879-9313 • email: sales@msfoster.com
www.msfoster.com



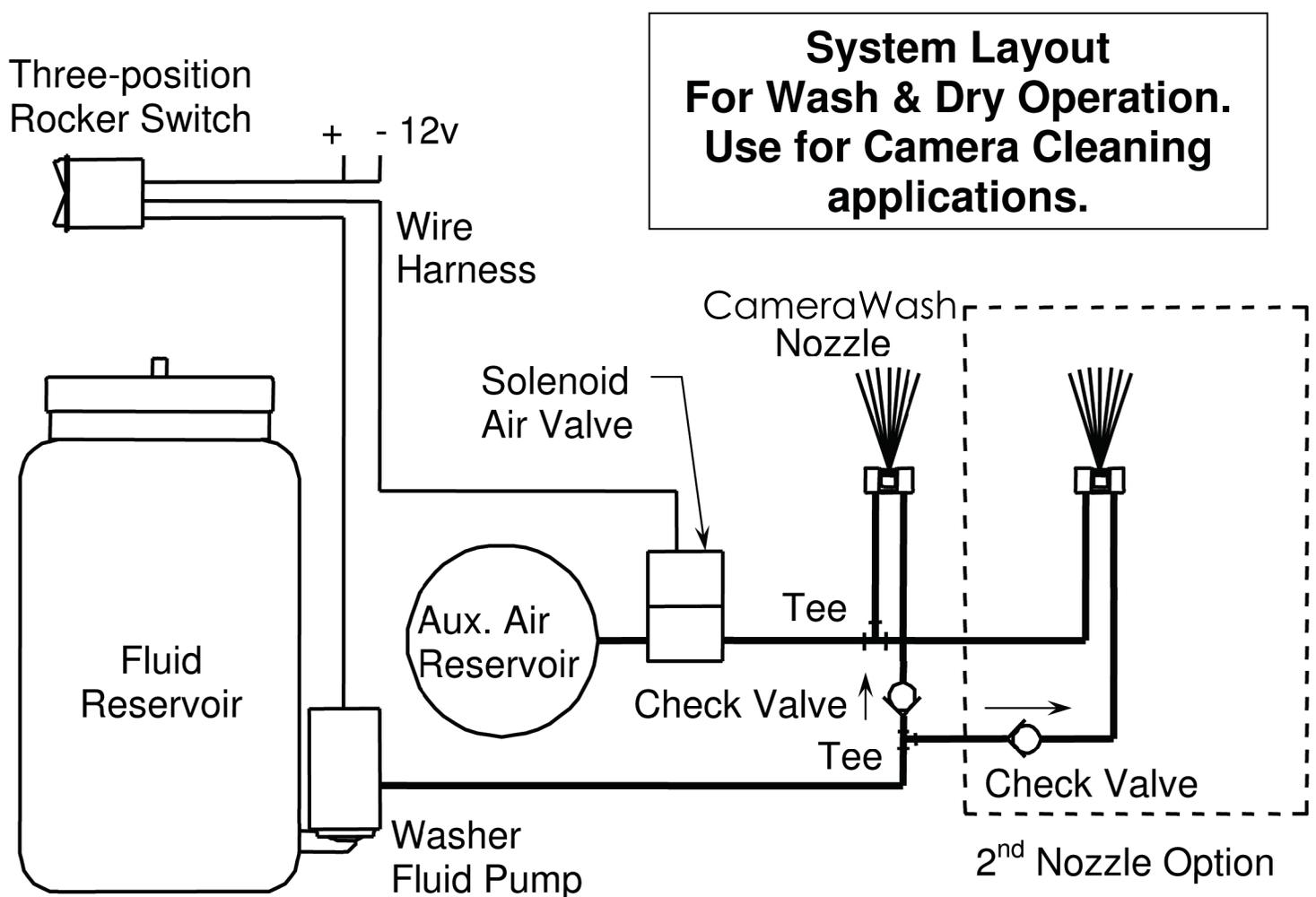
PARTS LIST			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	MSF847-0026-000	ASSEMBLY, NOZZLE, ADJUSTABLE
2	2	MSF027-0003-003	NUT, PUSH-ON RETAINER
3	1	MSFW-634	VALVE, IN-LINE CHECK
4	1	MSFKV2T07-00	FITTING, TEE, 1/4 D.O.T.
5	2	MSF98438A230	WASHER, #10 EXTERNAL STAR
6	8	MSF90108A413	WASHER, 1/4 FLAT
8	1	MSFW-538	FITTING, REDUCER, 5/32 TO 3/32
9	1	MSFKV2H07-34S	FITTING, ADAPTER, 1/8 NPT TO 1/4 TUBE
10	1	MSFKV2L07-34S	FITTING, ADAPTER ELBOW, 1/8 NPT TO 1/4 TUBE
11	8	MSF92865A540	BOLT, 1/4-20 X 1
12	2	MSF91735A827	SCREW, 10-32 X 3/8, PAN HEAD
13	8	MSF91831A029	NUT, 1/4-20, SELF-LOCKING
14	1	MSF434-0083-000	WIRE HARNESS, CAMERAWASH, SWITCH
15	1	MSF434-0084-000	WIRE HARNESS, CAMERAWASH, WASHER PUMP
16	1	MSF5174	BRACKET, NOZZLE MOUNTING
18	1	MSF9776T2	TUBING, .100 I.D., RUBBER, 12"
20	1	MSF22110984	GROMMET, WASHER PUMP
21	1	MSF24010738	PUMP
22	1	MSF832-0044-000	SWITCH, ROCKER, 12V, CAMERAWASH
23	1	MSF4200-04-5282	VALVE, SOLENOID
24	2	MSF112-0046-000	BRACKET, SUPPORT, RESERVOIR
25	1	MSF112-0047-000	BRACKET, SUPPORT, PUMP
26	1	MSFW-411	RESERVOIR, 1 GALLON
27	1	MSFGW-123-5	COVER, RESERVOIR
28	1	--	INSTALLATION MANUAL, CAMERAWASH

- NOTES:**
1. WHEN USED WITH S.S. CAMERA BOXES, REMOVE ITEMS 1, 2, 8, 16, & 18 FROM KIT PRIOR TO SHIPPING.
 2. ITEM 26 MUST BE DRILLED PER MSF146-0001-000 SPECIFICATIONS
 3. ITEM 28 NOT SHOWN

REVISION HISTORY		
REV	DESCRIPTION	DATE
B	CHGD NOTE 2 PART NUMBER	12/28/2013
DRAWN Ryan Kitkowski 8/17/2013		
CHECKED Mark Hubertz		
MFG		
APPROVED Michael Foster		
M. S. Foster & Associates, Inc. 1866 N. Country Lane, Michigan City, IN 46360 Phone 219-380-3266 or 219-879-9225 • Toll Free 1-888-452-4053 Fax 219-879-9313 • email: sales@msofoster.com • www.msofoster.com		
SINGLE CAMERA WASH KIT ASSEMBLY		
SIZE A	DWG NO MSF847-0037-000A	REV B
SCALE _____ SHEET 1 OF 1		

Installation Instructions

CAMERAWASH™



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, 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

CAMERAWASH™

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: Make sure that the necessary clearance is available above the reservoir for filling.

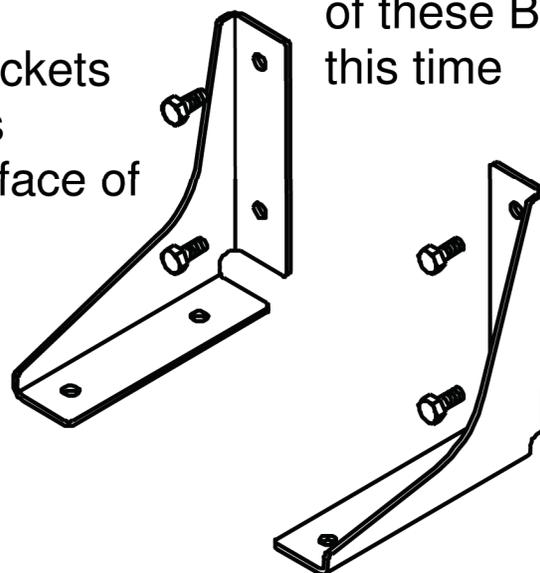
Step 2. Once you have determined your mounting location, use a center punch to mark the hole locations. Use the Reservoir as a template for the mounting holes in order to prevent misalignment. (The Mounting Brackets and the Reservoir use the same hole spacing).

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.

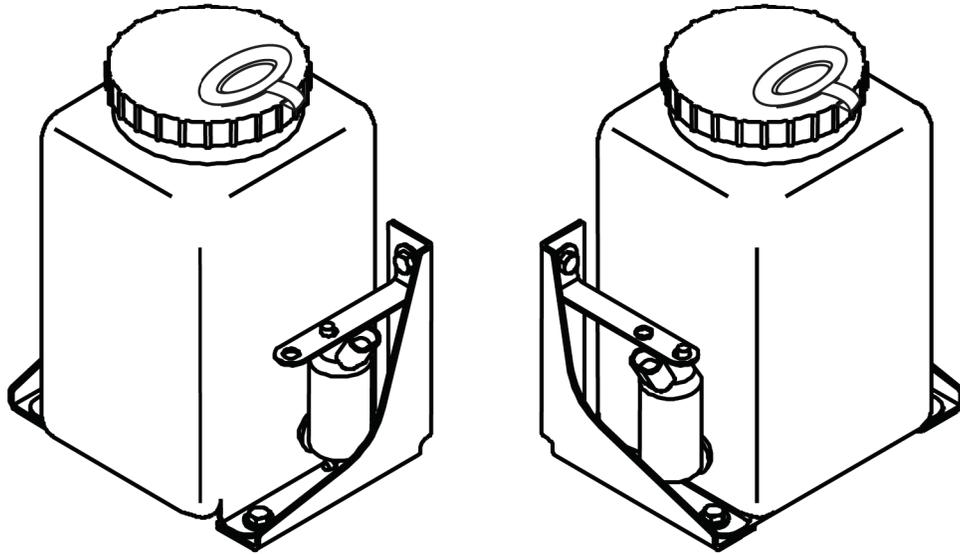
Install only three of these Bolts at this time



Installation Instructions

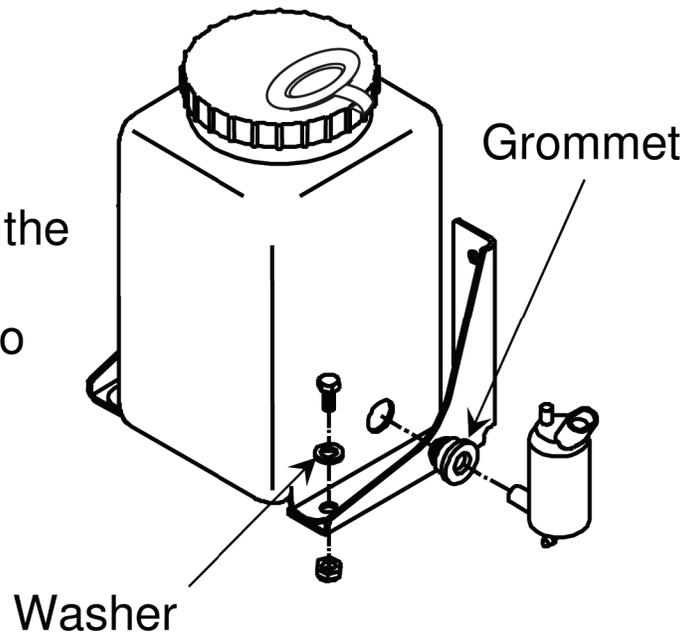
CAMERAWASH™

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 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.

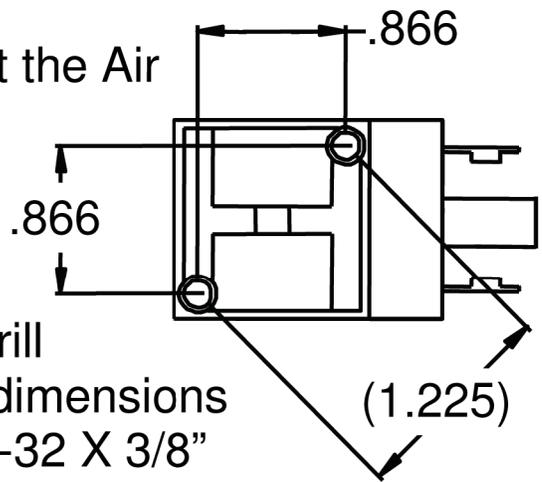


Step 7. Mount the supplied Pump Support Bracket using the last 1/4-20 Bolt provided.

Installation Instructions

CAMERAWASH™

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.

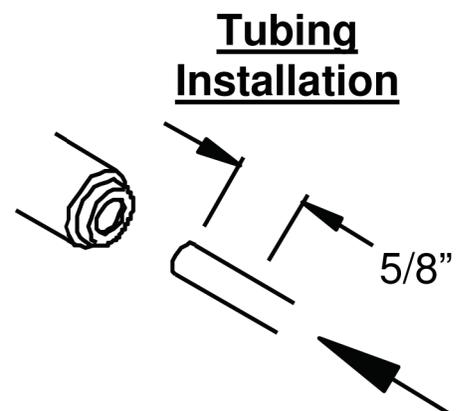


Solenoid Hole Pattern

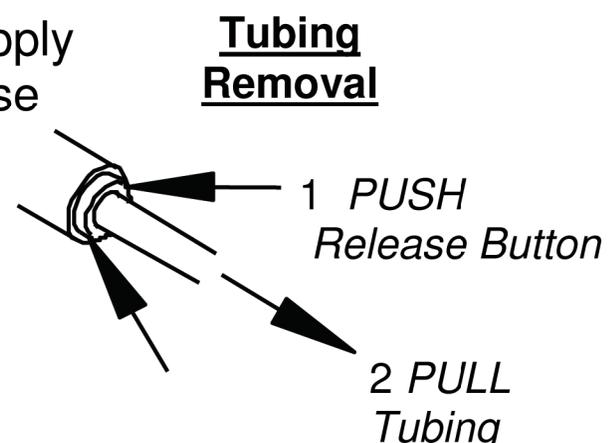
Step 9. Route 1/4" Nylon Air Line from the secondary air supply to the Solenoid. Use the Tee Fitting supplied to connect to an existing 1/4" line. Insert the tubing into the push-to-connect fitting (Port A) on the Solenoid. See below for tubing handling.

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"



- **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.

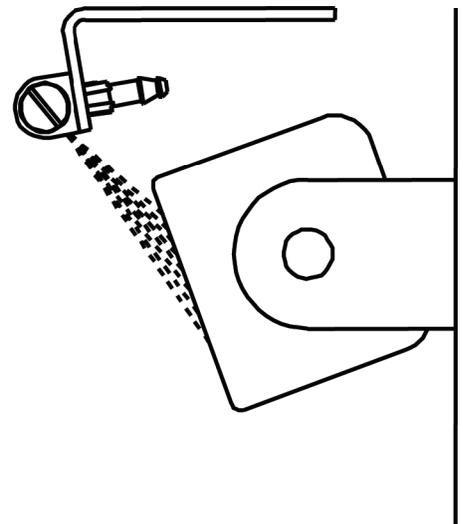


Installation Instructions

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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.

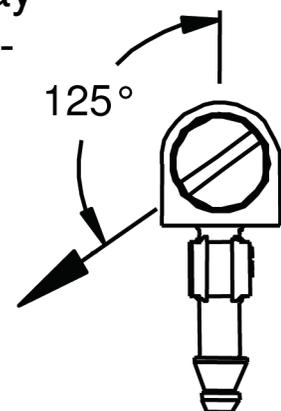
Step 11. **Nozzle Location:** The Nozzle can be aimed up, down, or sideways. The Nozzle must be within 4 inches of the lens, and 1" to 2" ahead of it. The spray should be aimed near the center of the camera lens, avoiding directly impacting microphone or speaker openings.



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 a 5/16" wide, flat head screwdriver (in good condition) to adjust the Nozzle.

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.

**Adjustable
Spray
Direction**



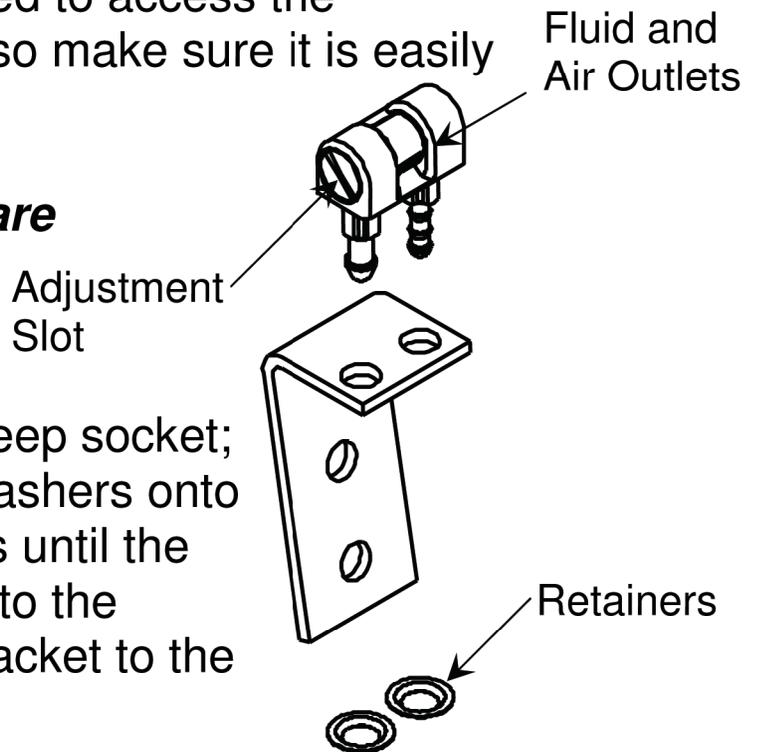
Installation Instructions

CAMERAWASH™

- 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 **M.S. Foster & Associates, Inc.**

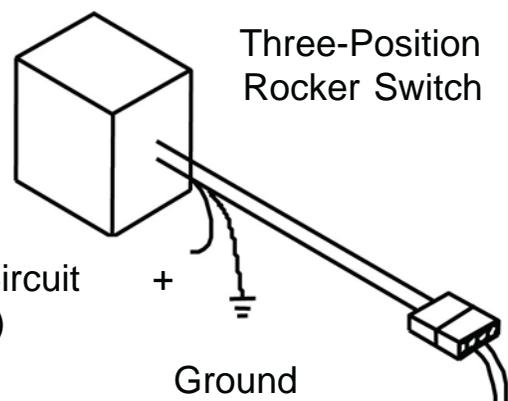
- Step 14. Install the 18" of 3/32" ID rubber Tubing to the Nozzle fluid fitting. (The fluid fitting has three barbs.) Attach the nylon Tubing to the Nozzle air fitting. The air fitting is shorter, has one single barb, and is label "AIR". Check to make sure that the air and fluid lines are connected 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".

Step 16. **Switch Wire Harness:**

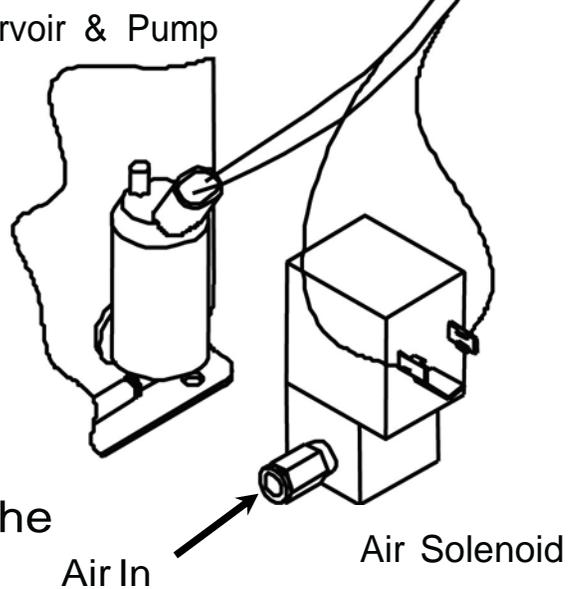
Connect the loose red (+) wire to a fused circuit (8 to 10 amp). Attach the loose black (-) wire to a clean ground attachment point. Use the appropriate crimp terminals and tools.



Step 17. Attach the wire harness to the switch.

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, the red in socket #3 and the white in socket #4. Connect the two harnesses.



Step 19. Connect the Harness to the Pump and Solenoid. At the Solenoid Valve, attach the red and white 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

CAMERAWASH™

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 Washer Nozzle spray patterns.
- Operate 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, 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

CAMERAWASH™

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

