

Emergency Suppression Systems

**INSTALLATION & RECHARGE
INSTRUCTIONS**



EMERGENCY SUPPRESSION SYSTEMS
534 Old Farm Ct.
Danville, CA. 94526
www.ESSfire.com

These instructions are designed to help you to install and charge/recharge the **ESS** 2.3. and 5.0 liter Aqueous Film Forming Foam (AFFF) fire suppression systems. This guidance is general in nature due to the wide variety of vehicles that it may be installed in. The manufacturer will not be responsible for improper installation. To attain proper performance, follow these instructions carefully. Any questions may be e-mailed to our tech rep at techsupport@ESSfire.com or call us at 925-389-6181.

Tools Needed

7/16" box end wrench
1/2" open end wrench
9/16" open end wrench
5/8" open end wrench
Teflon tape
Electric drill and bits
37° flaring tool
Small crescent or adjustable wrench
Diagonal or side cutter pliers
Funnel
Measuring cup
Safety Glasses – **PUT THEM ON NOW!**

Contents:

A	Mounting the Cylinder	Page 2
B	Mounting the T-handle Pull Cable	Page 3
C	Installing the Discharge Lines	Page 12
D	Recharge / Charging Instructions	Page 20

Section A) Mount the Cylinder

1. It is preferable to position the cylinder horizontal in the car with the head facing forward. This position makes it easier to install and maintain. The location chosen must be within the reach of the 6' actuating cable. Lay out the brackets, pull cable, and the empty cylinder in the location you've chosen. If everything fits, mark the mounting holes.

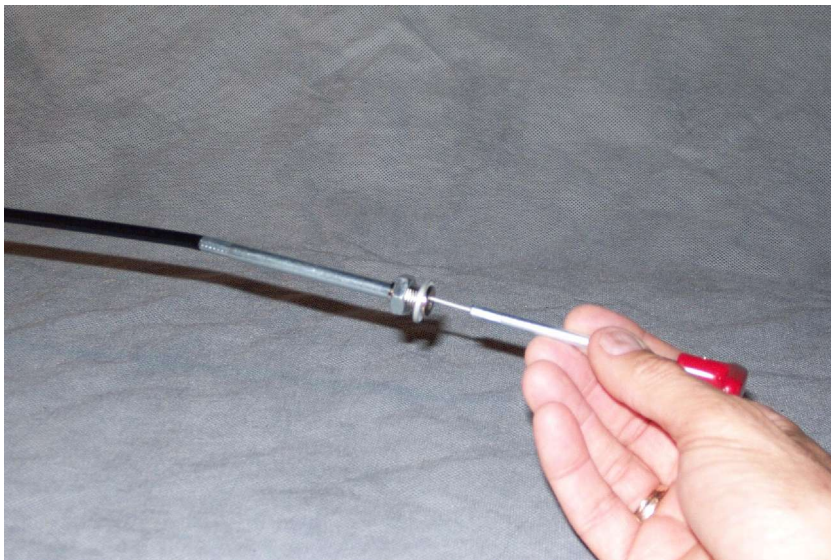
2. Mark and drill holes to install the brackets. Use a Minimum of 5/16", Grade 5 bolts, nuts, and lock washers. (Figure 1) These brackets may be welded to the vehicle if required or desired.



A Figure 1

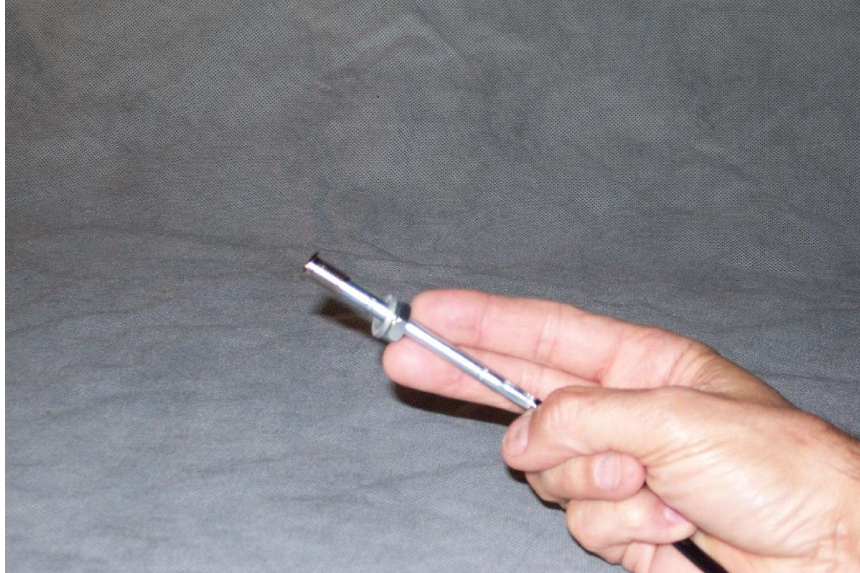
3. After bolting down the mounting, place the cylinder loosely in the brackets until the T-handle is mounted.

Section B) Mounting the T-handle pull cable



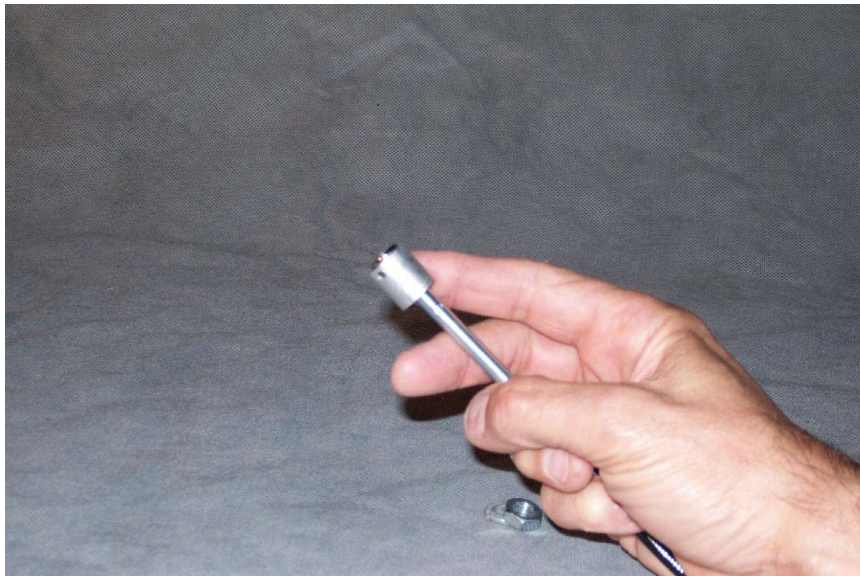
B Figure 1

1. Hold the actuator cable and remove the “T” handle and the attached inner wire.



B Figure 2

2. Remove the jamb nut and washer from the "T" handle.



B Figure 3

3. Slide the Safety Pin "Cup" over the cable and up to the end.



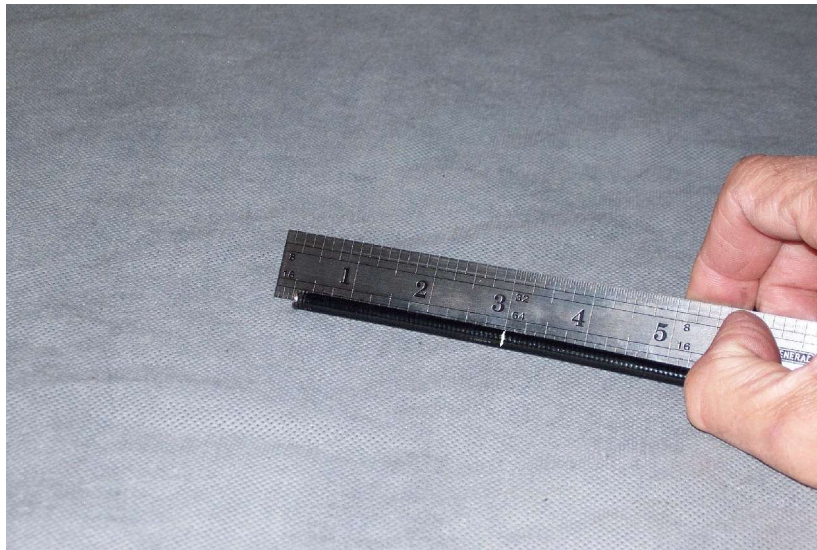
B Figure 4

4. Find a location on the dash and drill a 3/8" – 7/16" hole. Thread the release cable through the mounting hole in the dash or mounting plate keeping the cup on the front face.



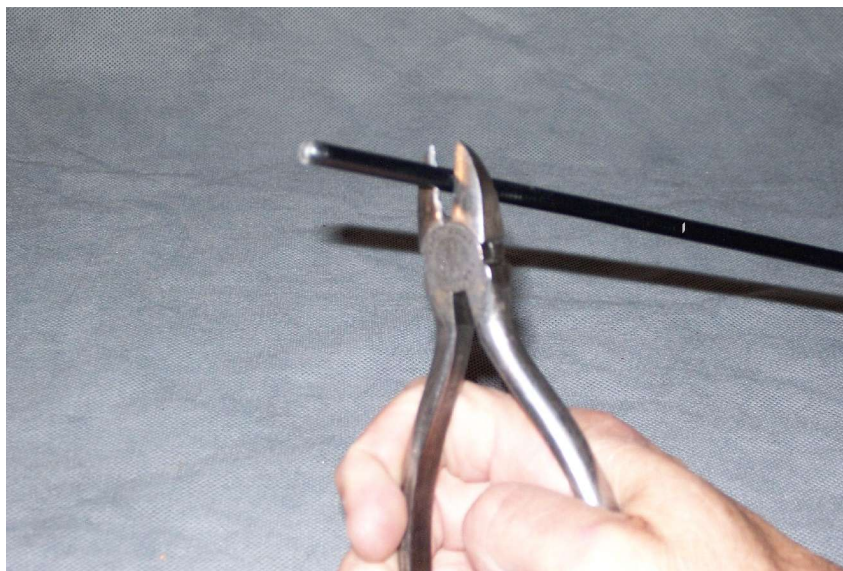
B Figure 5

5. Thread the lock washer and jamb nut onto the release cable and tighten securely against the back side of the panel or bracket. You may want to verify the position of the T-handle by sliding it into place before tightening the cable. Be sure to remove the handle/wire before proceeding.



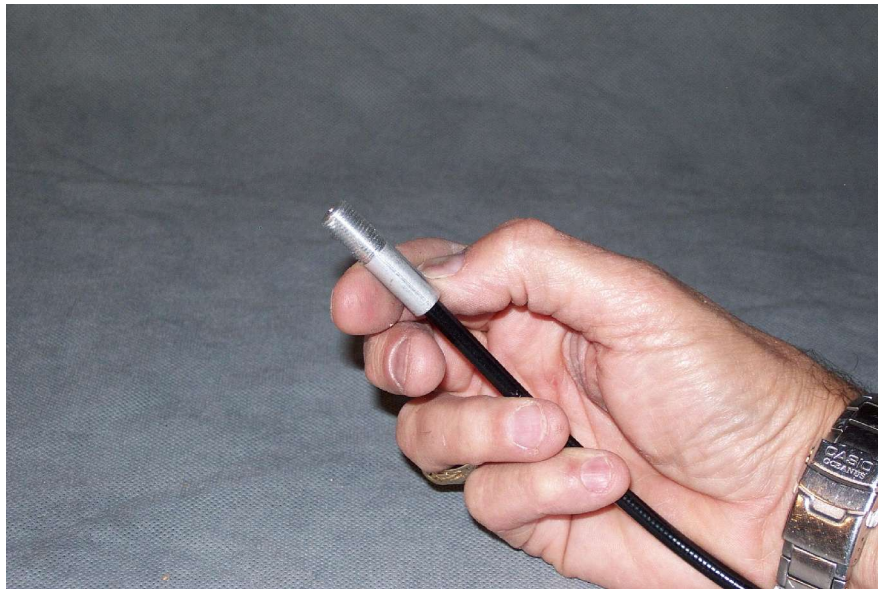
B Figure 6

6. Measure the desired length of conduit (from the back of the dash or bracket to the actuator lever) and add a minimum of 2" for slack.



B Figure 7

7. Cut the conduit (remember to add the slack).



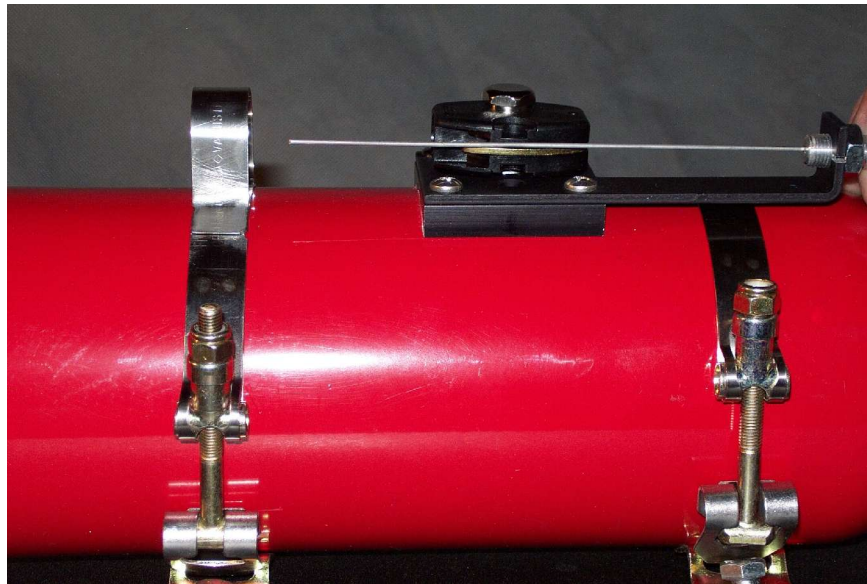
B Figure 8

8. Thread on the mounting stud.



B Figure 9

9. Re-install the "T" handle and actuator wire into the conduit and push the safety pin into place.



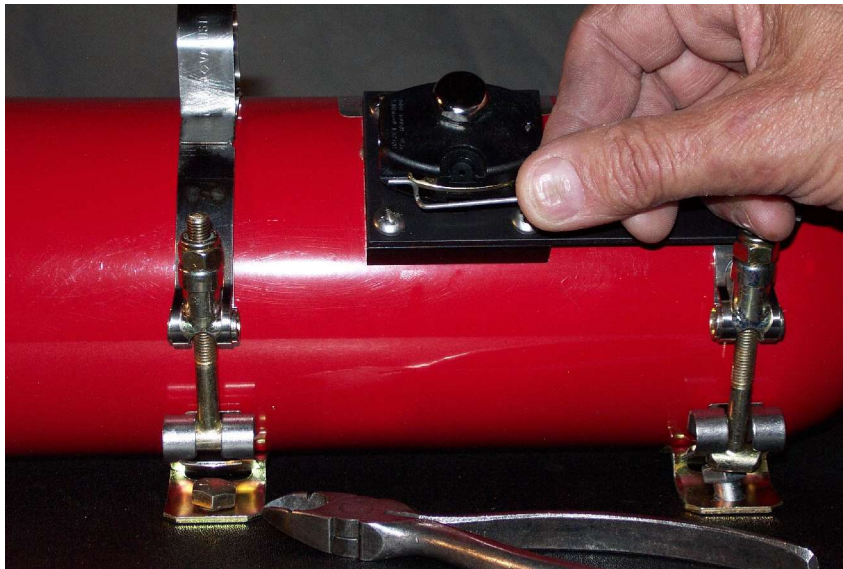
B Figure 10

10. Now, thread one jamb nut onto the stud. Slide the actuator wire through the slot cut in the mounting bracket and fit as shown (B Figure 10).



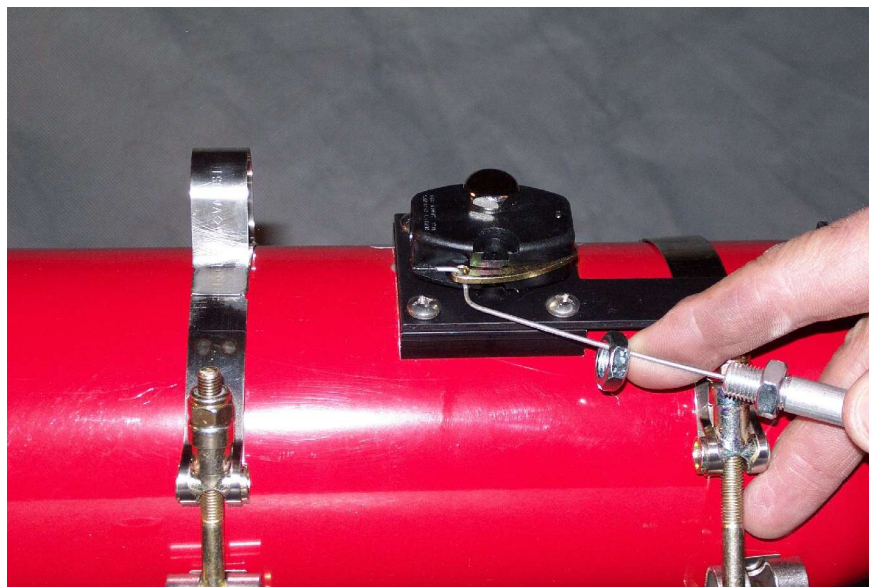
B Figure 11

11. Cut the wire approximately $\frac{1}{2}$ " beyond the end of the actuator lever. Mark the wire for the first bend directly across from the hole in the end of the actuator arm.



B Figure 12

12. Using sturdy pliers, bend a “Z” in the actuator wire. You may remove the cable from the bracket to make the bends.



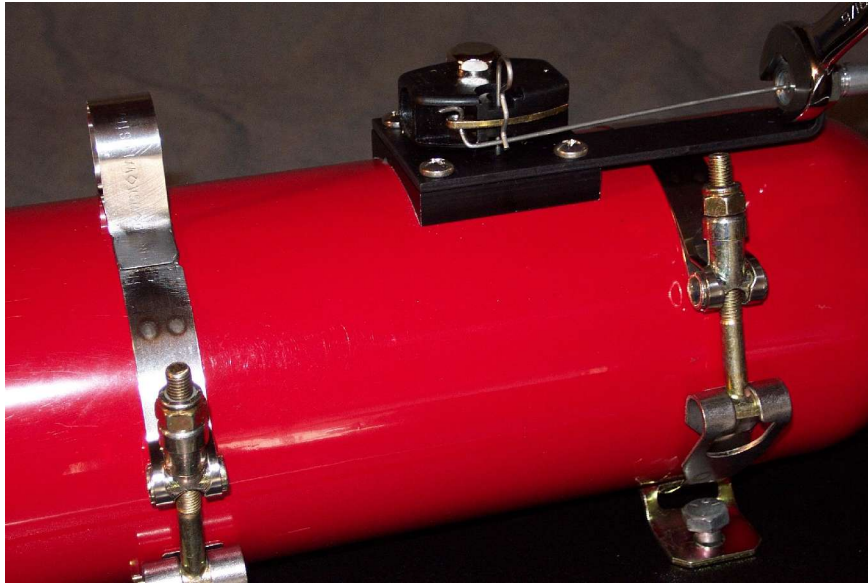
B Figure 13

13. Next, slide the second jamb nut onto the wire and hook the actuator wire into the actuating lever.



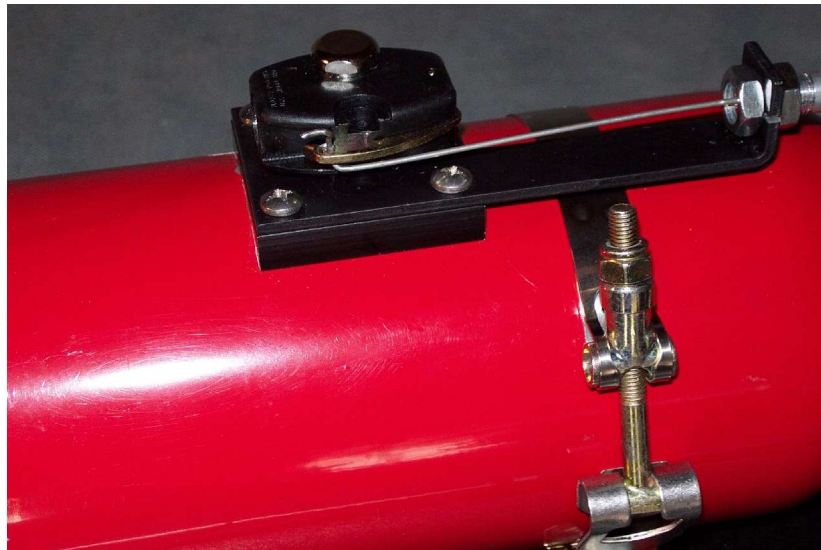
B Figure 14

14. Pulling back the lever, install the stud back onto the mounting bracket.



B Figure 15

15. Re-install the actuator safety pin. Using the jamb nuts on the cable mounting stud, adjust the cable until the actuator wire is just beginning to put tension on the actuator. (B Figure 15)



B Figure 16

16. Next, remove the actuator safety pin. If the actuator lever moves, loosen up on the stud until it returns and the safety pin can be reinstalled without difficulty. (B Figure 16). Now, tighten the stud jamb nuts securely (remember the stud is aluminum – do not over tighten or you will strip the threads).



B Figure 17

17. Now remove both safety pins and pull the “T” handle until it stops. Check to see if the actuator lever is in the “operated” position. (B Figure 17) If it is not, return to Step 15 and readjust until the proper position is obtained. Re-install the safety pins when you are satisfied that the actuation lever is adjusted properly.

WARNING!
DO NOT NEGLECT TO REMOVE THE ACTUATOR SAFETY PIN AFTER THE SYSTEM IS COMPLETELY INSTALLED! FAILURE TO DO SO WILL PREVENT THE SYSTEM FROM ACTUATING!

Section C) Installing the discharge lines

There are at least two discharge ports on each cylinder discharge head. Each port can support a maximum of 2 nozzles. Plumb each nozzle with 1/4" aluminum tubing and AN fittings provided. (Braided stainless steel lines or steel lines and AN fittings may be substituted if desired or required – use AN -4 or 1/4" ID tubing). If a port is not used, be sure to plug the unused outlet with an aluminum 1/4" NPT plug.



C Figure 1

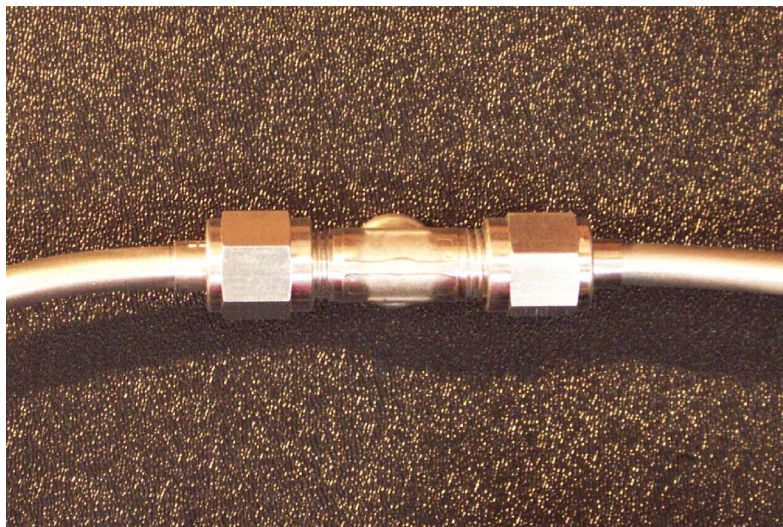
1. Use a piece of Teflon tape and wrap the pipe fittings before installing them into the discharge head. The rounded portions (AN fitting) should not be assembled with tape.
2. Lay out your discharge lines from the cylinder discharge head to each zone, keeping in mind that the tubing should be in a position where it is protected from accidental damage once the lines are fully installed. Each nozzle will give 180° coverage (half circle pattern).

Note: Your **ESS** system is supplied with 2 nozzles for the engine compartment and a bulkhead tee to facilitate splitting the line.



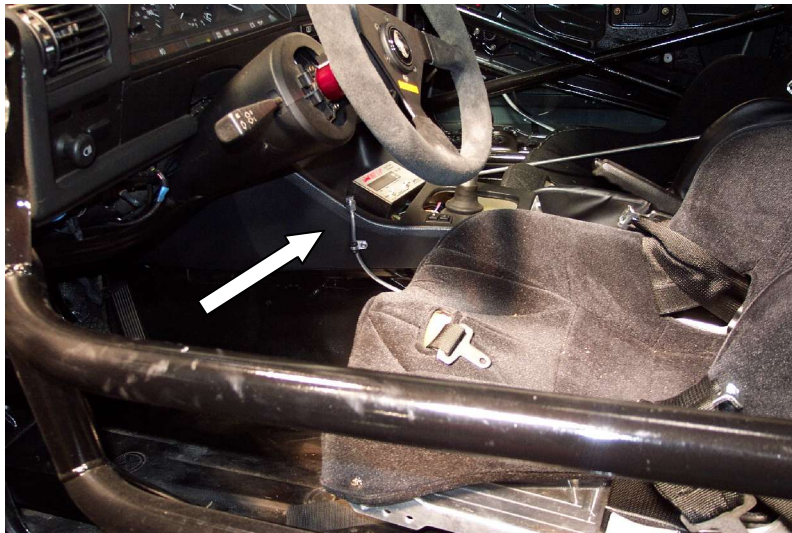
C Figure 2

3. A single line is recommended from the cylinder to the engine bulkhead. To pass through the bulkhead, use the bulkhead tee. (C Figure 2 and 3)



C Figure 3

4. C Figure 3 shows the engine side of the bulkhead tee with the lines already attached.



C Figure 4

5. The drivers discharge line should be placed in a position that gives full coverage to the lower part of the torso and the feet. As shown in C Figure 4 the line is to the side at about knee height. Under the dash and off to one side is also acceptable.

6. Once the lines are in place, bend tubing to the basic shape and proceed with the flaring and installation of the fittings. **Note: If the end to be flared will be close to a tight radius in the tubing – install the fitting and flare to the end prior to bending that radius.**



C Figure 5

7. To flare the lines, slide on the tube sleeve and nut as shown in C Figure 5.



C Figure 6

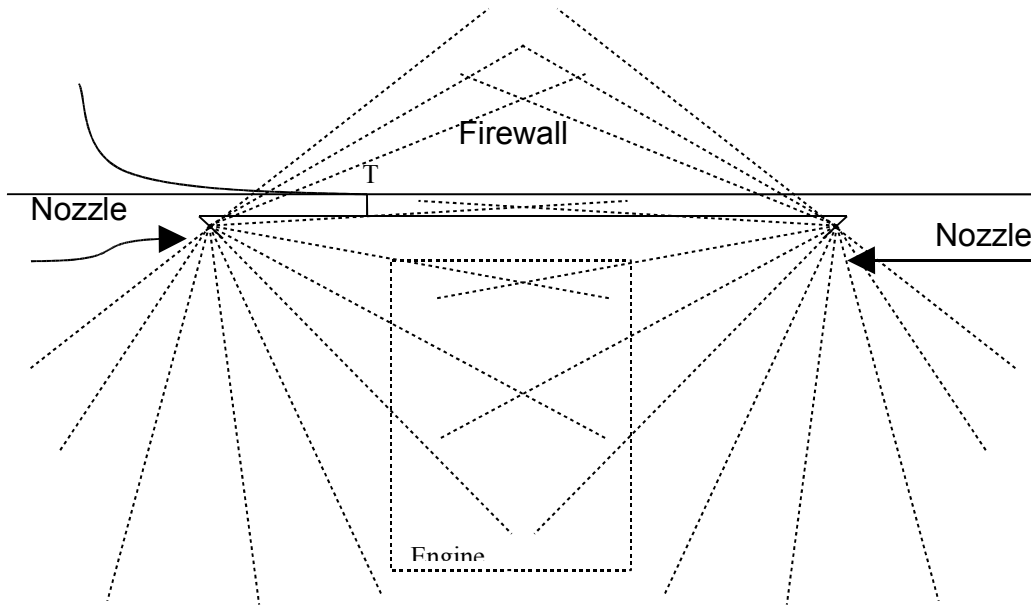
8. Using a 37° flaring tool, flare the ends of the tubing (C Figure 6).



C Figure 7

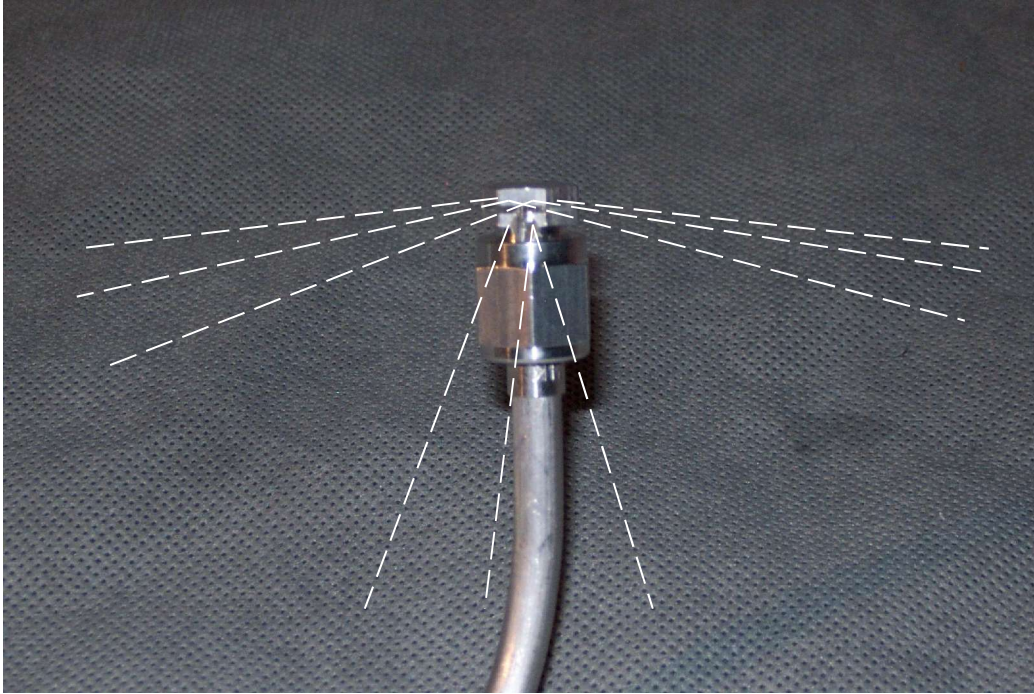
9. Pull the nut and sleeve up to the flare and it is ready to be installed. (C Figure 7) The nozzles or AN fittings will thread onto the nut. Snuggly tightening the nut will give you a permanent seal.

The engine compartment should be covered by two, overlapping nozzle sprays as illustrated below. Mounted up to the firewall the nozzles should give overlapping protection to the entire engine bay by angling the slits of the nozzles toward each other.



C Figure 8

The new T-style nozzles are directional and must be installed vertically.



C Figure 9

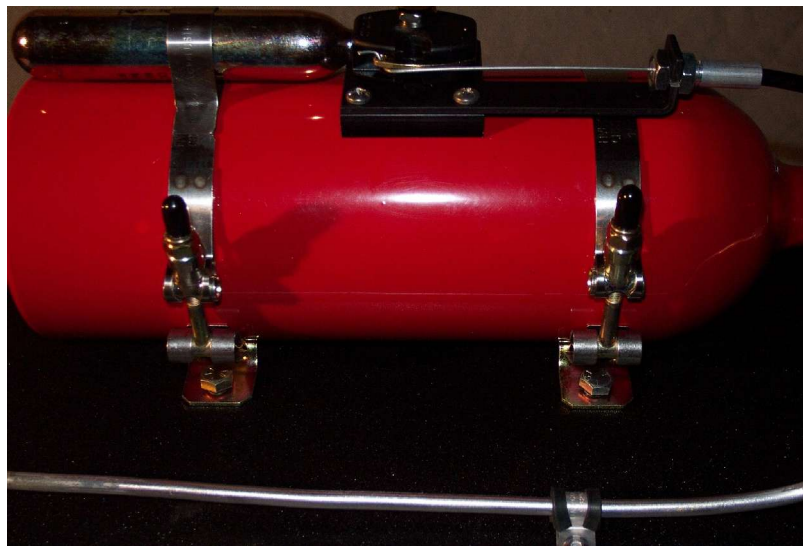
10. Each nozzle has a 180° fan shaped pattern and a downward coverage. Aim the nozzle(s) to “**blanket**” the area to be protected. The most common placement for engine protection is close to the firewall, at the corners, and above the engine (as high as possible). Now tighten the nozzles and fittings securely.



C Figure 10

11. Attach all tubing and nozzles securely to the vehicle using the supplied padded clamps. **Be sure to prevent chaffing or rubbing of the lines** (C Figure 10).

12. Disconnect the discharge lines now and charge the system per the instructions in “Section D – Recharge Instructions”. **Return here when charging is complete.**



C Figure 11

After charging, re-mount the cylinder in the mounting bracket and tighten the “T bolt” clamps securely (C Figure 11).

If your cylinder is mounted vertically, you must attach and adjust the actuator cable while the cylinder is horizontal and prior to re-mounting the cylinder. Removal of the CO₂ cartridge with the cylinder mounted vertically will result in leakage of the AFFF agent.



C Figure 12

13. Remove the CO₂ cartridge and re-attach the pull cable per steps 13 through 17 in Section B

Note: The discharge cable may need adjusting slightly. Be sure to leave enough slack so that the safety clip will insert in the actuator lever.



C Figure 13

14. Re-connect the discharge lines to the discharge head. (C Figure 13)



C Figure 14

15. Install the safety pin in the actuator, THEN re-attach the CO₂ cartridge. Be sure to apply all applicable decals and informational stickers to the system and the vehicle.

Important: The safety pins must be removed before the vehicle enters the track. Failure to do so will prevent the pull cable from operating!

Your ESS System is now fully installed and ready use. Please refer to the Tech Inspection Directions for any questions about operational readiness.

Section D

Recharge Instructions



EMERGENCY SUPPRESSION SYSTEMS

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The *ESS AFFF Fire Suppression System* is unique in several ways. However, the ability to be recharged in the field by someone with basic mechanical skills and tools is, without a doubt, it's most unique feature. Before you begin it is necessary to **read these step-by-step instructions completely**. They are very simple and easy to perform, however, for the system to operate properly; it must be recharged **exactly** as shown. Technical assistance and questions concerning installation or recharging can be directed to Tom Turner at 800-709-4ESS or techsupport@ESSfire.com

The recharge kit and new systems contain the following items:

One new CO₂ cartridge

One new “non-fragmenting” rupture disc (taped to the concentrate bottle)

One bottle of AFFF concentrate

Tools you will need:

A measuring cup

A funnel

An adjustable wrench

Safety glasses

Let's Begin.....

1. Disconnect the discharge lines and the actuation cable from the system and remove the system from the vehicle (if not already removed). Make sure both the actuator and “T” handle safety pins are installed.



D Figure 1



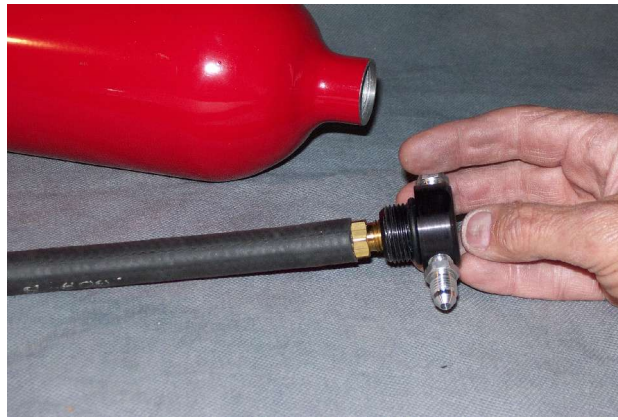
D Figure 2

2. Remove and discard the spent CO₂ cartridge. Next thread the new cartridge into the actuator.

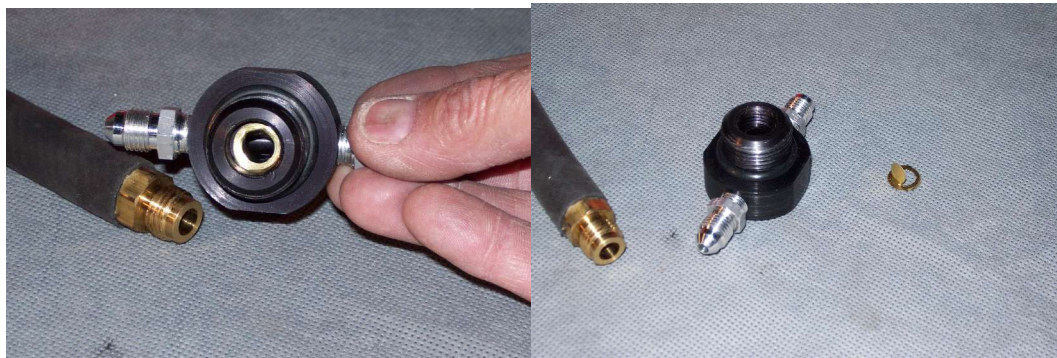


D Figure 3

3. Remove the discharge head from the cylinder. (D Figure 3)

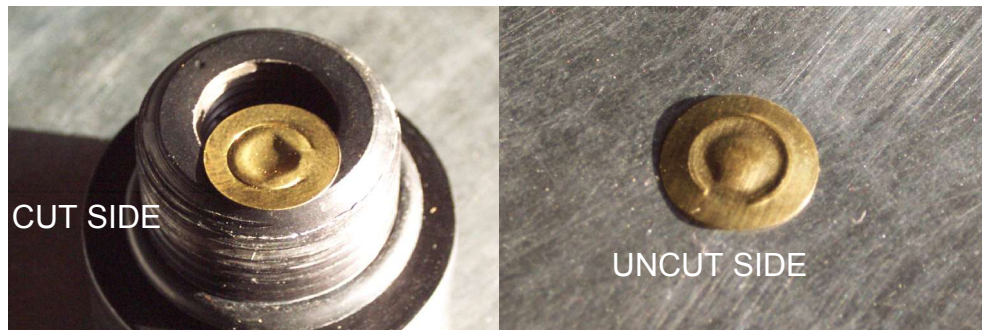


D Figure 4



D Figure 5

4. Remove the hose assembly from the head and remove the rupture disc. Look inside the discharge head and you will see the ruptured disc on the seat. Remove this disc and discard. (D Figure 4,5)



D Figure 6

5. Look carefully at the rupture disc after removing it from the concentrate bottle. Note that there is a "C" cut on one side of the disc. This side must be installed so that you can see the "C" cut after it is placed into the discharge head.



D Figure 7

6. Insert the new “non-fragmenting” rupture disc as directed in Step 5



D Figure 8

7. Once the rupture disc is positioned properly, re-install the rupture disc seat and rubber hose assembly. (D Figure 8) Tighten the hose assembly firmly to prevent leakage.



D Figure 9

Note: Make sure that the new cartridge is threaded into position

8. Place the cylinder upright on a table or workbench. (It is advisable to lay a towel under the cylinder as the cylinder might overflow). Now, using the funnel, fill the cylinder with pure water. (D Figure 9) Dipping the rubber hose assembly into the bottle a few times will force out excess water and bring it to the proper level.

Caution: If you are not already wearing safety glasses, please put them on now! In the following steps you will be handling the AFFF concentrate. If this concentrate splashes into your eyes, **IMMEDIATELY FLUSH WITH CLEAN WATER AND CALL A PHYSICIAN!** The diluted solution will only cause a minor eye burning and irritation at most. However, **the AFFF concentrate is very strong and can cause damage to your eyes! Please wear your safety glasses and be careful!!**



D Figure 10

9. Once leveled, pour out **exactly 12 ounces for the 2.3 liter system, and 19 ounces for the 5.0 liter system.** (D Figure 10)



D Figure 11

10. **Make sure you have your safety glasses on** and, using the funnel, pour the concentrate into the cylinder. (D Figure 11)



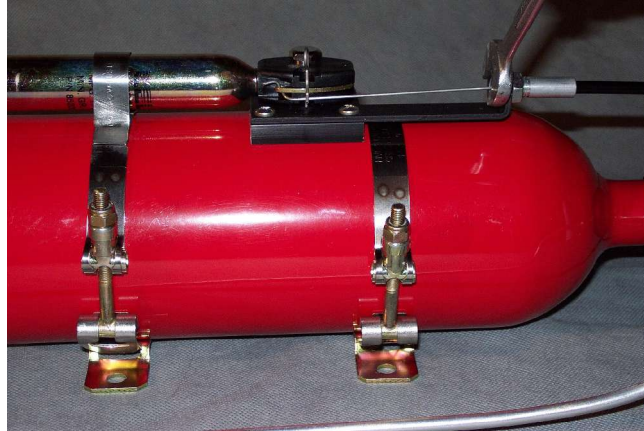
D Figure 12

11. Next, insert the discharge head and hose assembly into the cylinder. (D Figure 12) Sometimes a small amount of AFFF solution will overflow, especially the foamy bubbles. This is normal.

12. Once the discharge head is in contact with the cylinder, thread and tighten the discharge head into place. Because of the “o-ring” seal, only 25 to 30 lbs is required.

Wipe any spillage from the cylinder and your work surface; wash your hands to remove any AFFF concentrate that you might have come in contact with.

If this is a first time charging, return to Section C step 12. If not, continue.



D Figure 13

13. Re-install the cylinder (make sure the safety pin is properly inserted) into the mounting brackets and tighten the t-bolt clamps. (D Figure 13)

Now, re-connect the discharge lines and return to steps 13-16 Section B of the installation instructions to re-connect and adjust the actuation cable.

To test and verify that the actuation cable is adjusted properly do the following:

1. Remove the CO₂ cartridge
2. Remove the safety pin
3. Now, operate the pull cable to ensure that the actuator lever moves through the entire range. **Important: For proper actuation, the actuator lever must completely pierce the CO₂ cartridge.** If it does not, re-adjust the cable and test again. (D Figure 14)



D Figure 14

4. Once you are certain the actuator cable is adjust properly, reset the cable to “normal” position and re-install the safety pins.
5. Re-install the CO₂ cartridge finger tight.

In less than 20 minutes you have successfully re-charged the *ESS* AFFF Fire Suppression System. There is no other system on the market that will permit you to be “back in the race” in such a short time. Any questions may be sent to techsupport@ESSfire.com or call 800-709-4ESS.

NOTE TO RACE OFFICIALS AND TECH INSPECTORS:

VERIFICATION OF READINESS:

1. Remove the CO₂ cartridge by unscrewing it from the actuator. A good cartridge is NOT punctured.
2. Have the driver or crew:
 - a. Safety pin the actuator
 - b. Disconnect the discharge lines
 - c. Unhook the actuation cable
 - d. Remove the cylinder from the t-bolt brackets
3. Weigh the cylinder. The weight is listed on the label.
 - i. 2.3 liter = 7lbs. 10 oz.
 - ii. 5.0 liter = 16 lbs. 2. oz.
4. After re-installation verify that the actuator pin and pull cable pin are removed before going on track.

Note to Fire Safety Crews

AFFF is most effective when used on pooling liquid. If at all possible, do not disturb the foam blanket until all sources of heat and ignition are removed. Plain water hose streams should not be used on the surface being foamed as they will dilute the effectiveness of the foam.

The best plan is to not walk across the flammable liquid spill, but if you must, be sure to drag your feet and not lift them as you walk. This reduces the chance of breaking the blanket and creating a cloud of vapor around you. If the blanket is broken and does ignite momentarily, it should quickly reseal and go out. It is a natural inclination to run, but this will only disturb the blanket more increasing the intensity of the fire.