

Sure Start System Manual

The Sure Start System will ensure the vehicle operator an engine start even in the coldest and harshest environments. ESPAR has developed a system that will not only pre heat your engine but also pre heat the vehicles fuel tanks to provide the operator a sure start even in the most extreme conditions. The system includes our Hydronic 5 coolant heater along with Artic Fox's Hot Fox fuel tank heaters. The result is a warm engine and warm fuel tank every time.

The Sure Start Package includes the ESPAR "Hydronic 5" diesel fired coolant heater, the Artic Fox "Hot Foxes" and all the required fittings for proper installation. The Hydronic 5 coolant heater circulates coolant through the extended coolant hose loop into the engine. The coolant line is also connected in a parallel circuit to the Arctic Fox "Hot Fox" that drops into the fuel tank. The Hydronic heater is thermostatically controlled to prevent overheat and to maintain optimum efficiency. There is also a Shut-off Valve on the Hot Fox coolant lines to prevent overheating of the fuel. The ESPAR 7 Day Controller is an automatic timer so it can be programmed to come on in the early hours of the morning.

Our Hydronic 5 compact coolant heater offers an affordable heating solution to many applications. It features automatic heat regulation while being fuel and power efficient. Since the heater runs on fuel and 12 volt power, it is able to perform this completely independently of the vehicle engine. The unit regulates the coolant temperature between a low of 65°C (149°F) and a high of 80°C (176°F) by automatically cycling the heater between heat levels. The Hydronic 5 can be operated from the vehicle cab by a pre-select 7 day timer. A flame sensor, temperature regulating sensor and overheat sensor are among the safety features which makes the Hydronic D5 a safe and dependable heating system.

Artic Fox "Hot Fox" fuel warmer is an in-line warmer that installs in the fuel tank. The simple 1 ½ " diameter stainless steel tube inserts in the tank through a standard USA fuel gauge sending unit opening. Coolant passages inside the tube surround the fuel standpipe to provide excellent heat rise. The internal fuel line features an exclusive spiral design to offer larger heat exchange surface from warm coolant to cold fuel.

Warnings

This manual is designed to show the installer how to plumb the coolant and fuel lines after the heater and hot foxes have been installed. The installation manuals for both the coolant heater and hot foxes are included in there packages. Follow the outlined instructions in these manuals carefully.

Shut off valves are recommended in the plumbing of the coolant lines. This will allow the vehicle operator to shut off the coolant lines during the heater off season.

Insultube Line Insulation is also recommended to further insulate the fuel and coolant lines. Any exposed lines may be susceptible to gelling during the winter season.

Hot Fox Hydronic 5 Components Kit

25 2800 90 50 00.0A

Includes all necessary fittings for proper installation of coolant lines, tank fuel lines and Hydronic fuel lines.

ESPAR Heater Options

CA 2219 57 Boxed Truck Kit

Airtronic D2/ Hydronic 5 Heaters

Boxed truck kit includes

7 Day Timer with Bracket

Mini Controller

CA 1520 57 Combo Kit

Hydronic 5 Coolant Heater

Boxed truck kit includes

7 Day Timer with Bracket

Required Parts

5/8" Coolant Hose

5/8" Hose Clamps

Recommended Parts

5/8" Shut-off Valves

Insultube Line Insulation

Installation Process:

Important Precautions: Read these instructions before you begin the installation.

Tools needed for Hot Foxes

- Needle-nose pliers
- 5/32" hex wrench (3/8" drive preferred)
- 3/8" drive air wrench and 5/16" socket
- High speed drill with 7/32" drill bit
- 400 rpm drill with 1/2" chuck
- 1-5/8" hole saw

Tools needed for Hydronic Coolant Heater

- Screw Drivers
- Torque Drive Set
- Standard and Metric Wrenches
- Standard and Metric Sockets
- Standard Drill and Hole Saw
- Pipe Sealant and Grease
- Standard Drill Bits
- Wire Cutters and Strippers
- Utility Knife
- Wire Crimpers

Tools and parts required/ recommended for plumbing

- 5/8 Coolant Hose
- Hose Clamps
- Hose Cutter
- 5/8 Shut Off Valves
- Insultube Line Insulation

Important

Follow the guidelines provided in each manual for proper installation of the Hydronic 5 Coolant Heater and the Artic Fox Hot Foxes.

Hydronic Coolant System

The Hydronic Coolant Heater must only be used and operated for the range of application stated by ESPAR in compliance with the “Operating Instructions” included with every heater.

Each Coolant Heater has several redundant safety features to ensure engine protection, comfort and security of the user.

Correct installation of the Coolant Heater is necessary to ensure safe and proper operation.

Read and understand the Hydronic manual that comes with the heater before attempting the install.

Most of the information you will need can be found in the installation, troubleshooting and parts manual supplied with each kit.

Hot Foxes

Avoid mistakes. Read the instructions below.

Before you cut a hole in the fuel tank:

- Know where all the baffles are located.
- Verify the swing radius of the fuel gauge arm.
- Determine precisely where the plumbing lines will run.

Check all parts against the parts listing to ensure everything is included in your package.

Now that both the Hydronic 5 and the Hot Foxes have been properly installed we can take a closer look at how we're going to plumb our coolant lines and fuel lines.

Hot Fox Install

On dual tank single draw systems with a 1" I.D. or smaller crossover line, we recommend that the hot fox draw and fuel return be in the same tank. If you don't do this, fuel could possibly discharge from the non' draw tank's vent. Also the tank could be damaged due to "pressurizing" if the crossover line becomes obstructed or if the crossover line valves are inadvertently shut off. Never return the fuel line to the opposite tank from which it is drawn unless the fuel crossover line is 1" I.D. or larger, or if the crossover line is equipped with manual shut-off valves.

The spacing of the hot fox warmer mounting holes is the same as the standard spacing for most fuel gauge sending units. You can either:

1. Mount the Warmer in an existing unused sending gauge opening.
2. Install the warmer in a new location, cutting holes as outlined below.

Caution;

To insure proper sealing of the hot Fox when direct mounting to the tank, the A834 back-up plate must be used. Attempting to secure the Hot Fox to the tank with sheet metal screws or fasteners other than those provided with the kit may result in gasket leakage.

On the aluminum fuel tanks having a wall thickness of 0.100" or less, or steel tanks having a wall thickness of 0.075" (14 Gauge) or less, which don't have a reinforced opening available, use the appropriate Adapter Kit from Artic Fox. On thicker-walled tanks, mount the Hot Fox directly in the tank wall using the A-834 Backing Plate.

Plan the Installation

1. On dual tank systems, determine which tank will be the "draw tank." Dual-suction dual-return systems require two Hot Foxes. In the respective tanks, locate the fuel gauge, baffles, and any other potential obstructions for the warmer. Choose a location for the warmer where there will be no contact with any of these items.

2. Dual-tank systems with dual hot foxes should also have dual fuel return lines. When plumbing dual tank dual draw systems, it is critical that the suction lines leading to the left and right tanks be of equal length and elevation, and that the return lines also be of equal length and elevation – to help assure fuel draw from each tank.
3. Remove the original fuel draw hose from the tank (or crossover line) and plug the tank (or crossover line) opening. Route the draw hose to the potential “Hot Fox” location to be sure it will be long enough.
4. Determine where you are going to run the hoses to plumb the warmer to the engine cooling system. The Warmer’s hoses should tap into the same passages as the cab heater. Also determine the types of fittings required to connect the plumbing to the Hot Fox.
5. The end of the Warmer should be 1” above the bottom of the tank. Install the 2” long extension nipple if necessary, and cut it to the proper length. If you are going to use an optional Spacer Kit available from Artic Fox you must compensate for the spacer thickness when cutting the nipple. Deburr the end of the nipple.
6. Clean the tank area where the Warmer will be installed.

Drill Holes for the backing Plate

7. Set the backing plate on the fuel tank in the location you chose to install the Warmer (in step 1), with the longer side of the threaded nuts facing up. For future reference, the notch on the backing plate should point toward the front of the vehicle. Using the two A-608 self-drilling self-tapping screw provided, temporarily attach the backing plate to the tank.
8. Drill 7/32” holes through the tank at the four remaining unthreaded hole locations on the backing plate.
9. Remove the two self-tapping screws and lift off the backing plate. Redrill the self-tapping screw holes to 7/32”.

Cut the Opening for the Warmer

10. Using the center self-tapping screw’s hole as a pilot, cut a 1-5/8” dia. Hole in the tank with a hole saw. See Fig. 5. Deburr the hole.

Important: To keep most of the saw cuttings out of the tank, grease the inside and outside edges of the hole saw blade. Blow away chips as they accumulate.

Caution: If the fuel system doesn’t have a filter between the tank and the transfer pump. All chips **MUST BE REMOVED** from inside the fuel tank to avoid damaging the fuel pump!

Install the Backing Plate

11. With a needle-nose pliers, grip the center washer of the backing plate as shown in Fig. 6. Using a twisting motion break the washer out of the plate.

12. Hold the backing plate with the threaded nuts facing downward. Bend the tabs up at about a 45 degree angle.

13. Hold one of the tabs with a needle-nose pliers, and insert the backing plate into the 1-5/8" hole in the tank. When installing, insert the end without a notch into the tank opening first.

14. Again position the backing plate so the notch points toward the front of the vehicle. Hold the plate in place, using the tank with the holes in the plate. Install the 5 mounting bolts finger-tight to temporarily secure the plate in place.

15. With the needle nose pliers, bend all three tabs up and over the tank edge as shown in Fig. 10. You don't have to bend the tabs over tightly, as long as they will hold the plate in place the Hot Fox is installed. However, they must be pulled far enough to allow the Warmer to slide into the opening.

16. Remove the five bolts (but don't discard them).

17. Lay the A-841 gasket over the tank opening, with its notch pointing toward the front of the vehicle.

Make sure all five holes in the gasket line up with the holes in the tank (and backing plate)

18. Hold the Warmer over the tank opening and verify the direction that its plumbing connections are pointed. Verify what type (barbed, threaded) and orientation (straight, 90, 45) of fittings will be required.

19. The "Hot Fox" is designed with a low profile to fit where clearance above the tank is limited. However, if the plumbing connections must be raised higher above the tank, an optional A-875 Spacer Kit is available with longer bolts and an extra gasket.

20. Install the appropriate plumbing fittings determined in Step 18. To install a fitting, place the fitting into a vise and turn the "Hot Fox" onto the fitting. Then tighten using a 1" open-end wrench on the hex coupling of the warmer.

Caution: Never squeeze the "Hot Fox" body in a vise, as its electro polished surface may be scarred.

21. Insert the Warmer partway into the tank opening, in the same orientation determined in Step 18. Slide the gasket up the warmer tube (without turning it).

22. Insert the five mounting bolts (with washers) through the slots in the Warmer flange, and use a hex (Allen) wrench to “pop” them through the gasket.

23. Insert the Warmer with gasket all the way into the tank opening, lining up the bolts with the threaded holes in the tank.

Verify that the Warmer is still oriented in the direction determined in Step 18, and partially screw the five bolts into the backing plate. Finger-tighten the bolts with an Allen wrench.

24. Gradually tighten alternate bolts until they are all securely tightened and the gasket is partially “squeezed out” all around the mounting plate (torque the bolts to 90 in.-lbs maximum).

Connect the Fuel Line

25. Connect the original fuel line to the fuel port on the “Hot Fox”

Note: Artic Fox Insultube is available to insulate the fuel line. It will minimize temperature drop between the engine and the fuel tank. For more information, refer to the Artic Fox product catalog.