

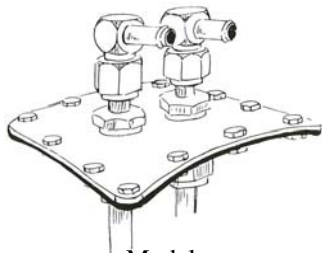


INSTALLATION INSTRUCTIONS

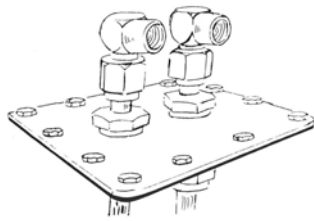
Arctic Fox In-Tank Fuel Warmer

B-103—09/10

READ INSTRUCTIONS COMPLETELY BEFORE BEGINNING INSTALLATION



Models
C-201 or F-203



Models
C-201P or F-203P

- **Warms fuel in tank and standpipe**
- **6 Inch (152mm) Square plate for solid mounting**
- **Heats close to standpipe**
- **Can be positioned in tank for easy hose alignment**
- **Can be plumbed with optional shut-off thermostat (Models S-400 or S-440)**

IMPORTANT PRECAUTIONS

- Avoid mistakes. Read these instructions completely **before you begin**.
- Before you cut a hole in the fuel tank:
 - Know where all 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 on Page 4.

TOOLS NEEDED

- Needle-nose pliers
- Two—Arctic Fox T-1781 Aligning Tools (optional)
- Center Punch
- Hack Saw
- Vise
- Torque wrench
- 1-1/4" and 1-1/8" open-end wrenches
- High speed drill with 5/16" and 1/8" drill bits
- T-520—3-3/4" hole saw
- 2" hole saw or T-518—4-1/2" hole saw (If also installing a Model 50 Standpipe option).

PREPARE THE TANK

1. In the fuel tank from which the engine draws its fuel, locate the fuel standpipe, fuel gauge sending unit, and all tank baffles. Determine a position for the heater tubes where there will be no contact with **any** of these items. For best results, locate the warmer very close to the fuel outlet. If this is not possible, the Arctic Fox Model 50 Standpipe Option is available to insure maximum efficiency. If the Model 50 Standpipe Option is used, locate the warmer as close as possible to the center of the tank.
2. The kit includes a template which will be placed on the fuel tank top help you to punch and drill the mounting holes accurately.

OPTION: For multiple tank installations, you can purchase steel, drill template kits:

KT-1916 Kit: for tanks 21" to 29" (533mm to 736mm) in diameter.

KT-1917 Kit: for tanks up to 20" (508mm) in diameter.

KT-1918 Kit: for flat top tanks.

IMPORTANT: Remove all grease from the area where the heater will be installed. Also determine which direction you are going to run the hoses to plumb the warmer to the engine.

After the mounting area has been cleaned, remove the paper backing from the template and affix it to the tank in the appropriate position. Note the arrow which points toward the engine.

3. Using the template as a guide, center-punch the 12 outside holes and the 3 3/4" center hole. If you are also installing a Model 50 Standpipe Option, center-punch the 2" hole for it as well.

CUT THE MOUNTING HOLES

4. Exact hole location is very important, so we recommend that you carefully pre-drill each hole location with a 1/8" drill bit.
5. Then use a 5/16" drill bit to drill the 12 outside holes. **NOTE:** In the following steps, you can keep most of the saw cuttings out of the tank if you apply a coating of grease on the inside edge of the hole saw blade.
6. If you are installing a Model 50 Standpipe Option use a 2" hole saw to cut the appropriate hole for it. **OPTION:** Instead of drilling a separate 2" hole for the Standpipe Option, you can use a 4 1/2" hole saw in step 7 below to make an opening that will accommodate both the warmer and the Standpipe.
7. Use a 3 3/4" hole saw to cut the large hole for the warmer.
8. Deburr each hole on the inside of the tank.
9. Remove the template from the tank.

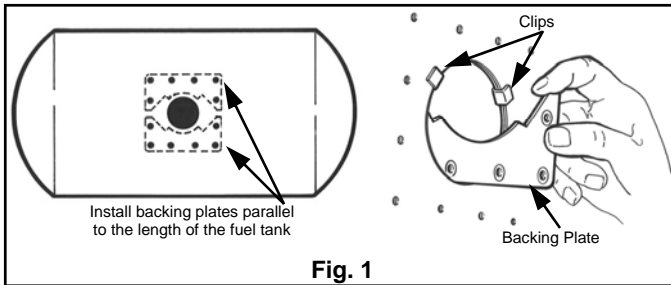
INSTALL THE BACKING PLATES

NOTE: For easier installation in the tank, the backing plates (Fig. 1) are supplied with insert nuts already installed.

10. Insert the backing plates (#12 in the warmer parts list drawing on page 4) inside the fuel tank. So they are parallel with the length of the tank. You can hold the backing plates in place with a needle nose pliers.

Install two clips (#1) as shown in Fig. 1 to hold each backing plate in position (so they don't fall into the tank).

OPTION: You can also purchase two T-1781 aligning tools from Arctic Fox. They allow you to more easily line up the backing plates before installing the clips.

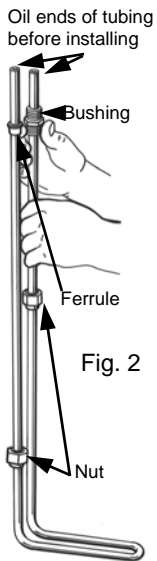


ASSEMBLE THE HEATER AND COVER PLATE

11. Unless ordered differently, the heater tubing (#9) is 28" (711mm) long. This should accommodate a 28" or larger diameter tank. For smaller diameter tanks, cut the tubing so that it is the same length as the diameter of the tank (the tubing will stick up out of the tank for a short distance as shown in Fig.3). **Deburr and dress up the tube ends.**

IMPORTANT: Both the inside and the outside surfaces of the tube ends must be deburred. If you don't, the O-rings will be cut when you install the bushings and the hose elbows.

12. Remove the nut (#8), split-ring ferrule (#7), and locking nut (#6) from each of the bushings (#11).



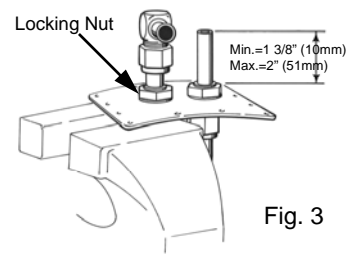
Slide a nut (#8) and ferrule (#7) onto each tube as shown in Fig. 2. The large end of the tapered ferrule should face the bushing (#11).

There is an O-ring inside one end of the bushings. This end of the bushing goes onto the tube first (down), to engage the nut (#8). **Oil the O-rings as well as the tube ends, then slide the bushings onto the tubes.**

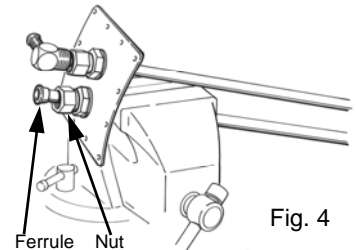
13. When the heater tube is secured to the cover plate, the dimension indicated in Fig. 3 must be a minimum of 1 3/8" (10mm) and a maximum of 2" (51mm). To accomplish this:

- a Hold the bushing at the appropriate position to get the dimension shown in Fig. 3.
- b Slide the ferrule (#7) up to the bushing (#11), and turn the nut (#8) onto the bushing hand tight. Do this to both bushings—making sure they are even.
- c Place one of the nuts (#8) into a vise, and with a 1 1/8" wrench, turn the bushing into the nut until the ferrule (#7) is just showing out of the bottom of the nut. Repeat this with the other bushing.
- d Place the cover plate (#4) onto the bushings as shown in Fig.3.
- e Install a washer (#2) over each tube end, and turn the locking nuts (#6) onto the bushings. With a 1 1/4" open end wrench, tighten each nut.

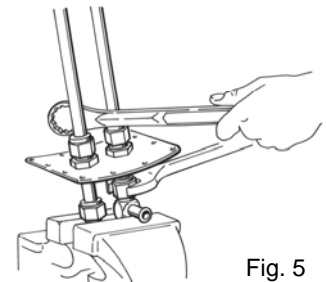
14. There is an O-ring in the threaded end of the hose elbows (#10). **Oil these O-rings and the tube ends.** Slide a top nut (#8) and tapered ferrule (#7) onto each tube end (see Fig. 4). The large end of the ferrule should be toward the elbow.



Determine the direction you want the hoses to run, and install one of the hose elbows (#10) accordingly. The tube should bottom out on a shoulder inside the elbow. Slide the ferrule to the elbow, and tighten the nut (#8) hand tight.



Secure the hose elbow in a vise as shown in Fig. 5. With a 1 1/8" open end wrench, and another wrench to offset any twisting, tighten the nut until the small end of the ferrule is flush with the nut. Repeat this step for the other hose elbow.



INSTALL THE HEATER INTO THE TANK

NOTE: If you will be using the Model 50 Standpipe Option, attach it to the heater assembly now, (before installing the heater into the tank). Refer to the standpipe assembly instructions below procedure # 18.

- 15. Lay the gasket (#5) over the opening in the tank.
- 16. Insert the heater into the tank, and make sure it will **not come into contact with anything else inside the tank**—such as the standpipe, fuel gauge, tank baffles, or the tank itself.
- 17. Tighten all of the plate bolts to 40—60 in. lbs. (4.5—6.8 nm) of torque, or until all the bolts are snug to the top of the plate surface. Then tighten all the bolts to 78—95 in. lbs. (8.8—10.2 nm). Then recheck the bolts in the sequence indicated in Fig. 6 for 78—95 in. lbs. (8.8—10.2 nm).

IMPORTANT: To insure that the gasket seals properly, the above torquing procedure MUST be followed.

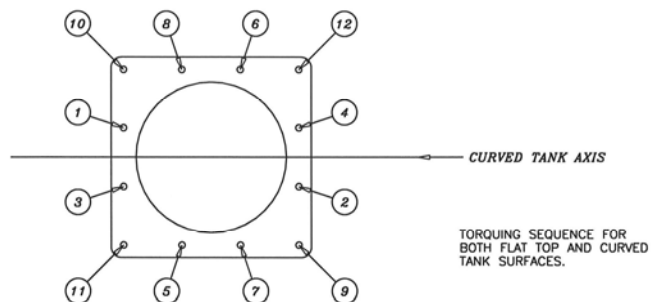


Fig. 6

CONNECT THE HEATER HOSES

NOTE: Arctic Fox Insultube is available to insulate your fuel and coolant lines. It will minimize temperature drop between the engine and the fuel tank, and protect the heater hose from chafing.

IMPORTANT: In the following procedure, keep all hoses as straight and short as possible.

- Using 5/8" (16mm) I.D. heater hose (silicone tubing preferred), plumb the water line to the heater according to the engine manufacturer's recommendations. For the return line, you will generally connect from the suction side of the water pump to a back port on the block.

ASSEMBLY INSTRUCTIONS FOR MODEL 50 STANDPIPE OPTION

The Model 50 Option allows you to get the maximum possible benefit from your Arctic Fox Warmer. It provides a fuel standpipe which is mounted so that fuel going to the engine is run close to the heater while leaving the tank.

TO INSTALL THE STANDPIPE OPTION

- After the heat unit has been assembled according to its installation instructions, assemble the model 50 Standpipe Option as shown in the Parts List Drawing on Page 4, but don't secure it to the mounting plate yet.
- Refer to the Standpipe Parts List drawing on Page 4. Insert the standpipe tube (#5) through parts A and B of the fitting (#3) and the copper washer (#4), then down through the hole in the mounting plate (#9). Tighten part C of the fitting to part A. Loosen the fitting nut (#3B) until you can tighten the elbow (#1) and copper gasket (#2) tightly into #3A. Orient the elbow in the desired direction, and tighten the nut (#3B) to the mounting plate.

IMPORTANT NOTES

COOLANT SUPPLY

Obtain hot coolant from a pipe plug opening on the engine pressure side of the cooling system. Route coolant to either COOLANT port on the warmer.

COOLANT RETURN

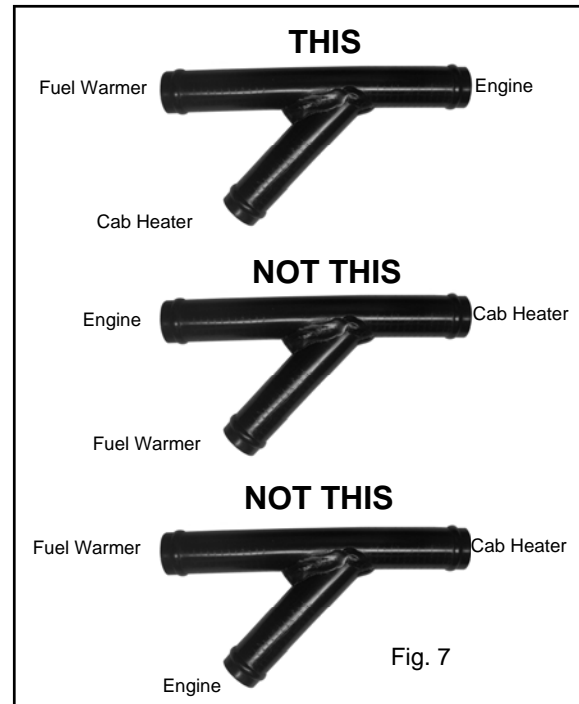
Route coolant from the unused COOLANT port on the warmer to the engine pipe plug on the suction side of the engine cooling system.

SUGGESTION: If you aren't sure which pipe plug ports on the engine are the coolant supply and return, locate the hose connections for the cab heater and plumb into ports in those same cavities.

TEES AND WYES IN COOLANT LINES

For most efficient warmer operation, install a separate coolant loop. Avoid using Tee or wye fittings in the coolant supply and return lines (thereby paralleling with another accessory). However, if all engine access ports are being used for other accessories (such as cab/sleeper heaters, temperature sensors, etc.) you may have to consider a tee or wye as an option.

Any tee or wye used MUST be at least 1/2" NPT or larger, and should be installed at the engine port—NOT in the coolant line itself. Any Wyes should be inserted into existing hoses as shown in Fig. 7—so they provide the least restriction of coolant flow to the warmer.



USING ADDITIONAL WARMERS

If an in-line fuel warmer or heated fuel/water separator is used along with the Fuel Tank Warmer, they can be plumbed in series in the same coolant loop. However, the hot coolant from the engine should first pass through the in-line warmer, then on to the Fuel Tank Warmer. This allows maximum anti-waxing protection for the primary fuel filter on initial startup after an extended "cold soak" period.

WHEN TO SHUT OFF THE WARMER

Shut off the hot coolant supply to the warmer when ambient temperatures reach +40°F (+5°C)

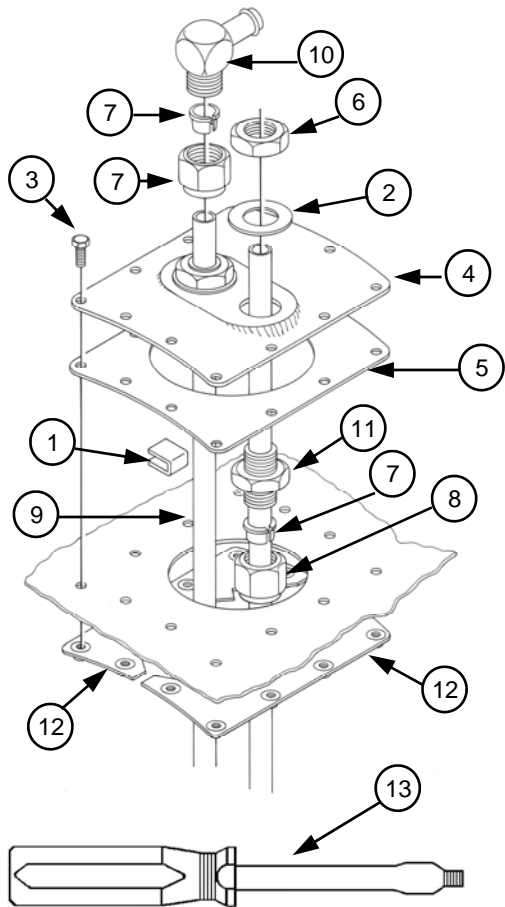
Series S-400 or S-440 automatic coolant shut-off thermostats, and manual shut-off valves such as the Arctic Fox Part Numbers A-275, A-276, A-461, A-526, or A-527 are available.

FIVE-YEAR OR 600,000-MILE WARRANTY

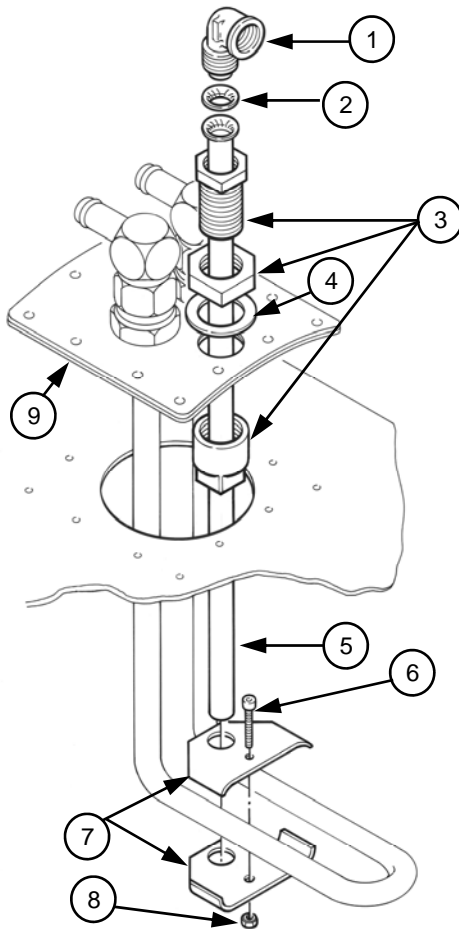
THIS WARRANTY IS EXPRESSLY LIMITED TO PERSONS WHO PURCHASE ARCTIC FOX FUEL TANK HEATERS

Arctic Fox Fuel Tank Warmers are warranted against defects in materials and workmanship for a period of five years or 600,000 miles from date of purchase by the user. This warranty does not cover fuel warmers which are altered or used for a purpose other than that for which they were intended or used in a manner inconsistent with any instructions regarding their use. The exclusive remedy for any unit found to be defective under this warranty is limited to the repair or replacement of the defective unit without charge, and Arctic Fox shall NOT be liable for any consequential or incidental damages, including labor charges. In order to qualify for this warranty, the alleged defective unit must be returned directly to the Arctic Fox factory postage or freight prepaid, and Arctic Fox will return the repaired or replaced unit postage or freight prepaid. Final determination of defects shall be made by Arctic Fox in accordance with procedures established by Arctic Fox. No agent, employee, or representative of Arctic Fox has any authority to bind any affirmation, representation or warranty concerning Arctic Fox products except as stated herein.

THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION OF THE EXPRESS NON-CONSUMER PRODUCT WARRANTY AS STATED ABOVE. THE ABOVE WARRANTY IS IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, AND EXPRESSLY EXCLUDES ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.



PARTS LIST		
Fuel Tank Warmer		
ITEM	PART NUMBER	DESCRIPTION
1	A-649	Clip (4)
2	A-616	Washer (2)
3	A-610	Screw, hex-head cap (12)
4	A-414-2 A-415-2	Plate, flat (flat tanks) (1) (F-203—F-203P) Plate, curved (round tanks) (1) (C-201—C-201P)
5	A-611	Gasket (1)
6	A-628	Nut, locking (2)
7	A-621	Ferrule, tapered split ring (pkg. of 4)
8	A-639	Nut, compression (4)
9	A-600	Heat exchanger (1)
10	A-613 A-619	Elbow, hose 5/8" (16mm) (2) (C-201—F-203) Elbow, 1/2" NPT (2) (C-201P—F-203P)
11	A-612	Bushing (2)
12	A-1795 A-2025	Plate, backing, curved (2) (with inserts) (C-201—C-201P) Plate, backing, flat (2) (with inserts) (F-203—F-203P)
13	T-1781	Tool, backing plate alignment (Optional)



PARTS LIST		
Model 50 Standpipe Option		
ITEM	PART NUMBER	DESCRIPTION
1	A-609	Elbow, female, #10 flare x 1/2" NPT
2	A-635	Gasket, #10 inverted flare
3	A-622	Fitting, standpipe (3 parts)
4	A-616	Washer, copper
5	A-624	Standpipe
6	A-632	Bolt, 1/4" UNC x 1 1/4"
7	A-623	Clip, standpipe
8	A-633	Nut, nylon stop, 1 1/4" UNC
9	A-415-3 A-414-3	Plate, 3-hole curved Plate, 3-hole flat