FORCE 10
COZY CABIN HEATER

DIESEL/KEROSENE MODEL

OWNER'S MANUAL AND WARRANTY

INTRODUCTION

Thank you for selection the FORCE 10 Cozy Cabin Heater. Your unit was carefully inspected and tested at our factory. We take pride in producing one of the finest heaters manufactured for marine use.

Because of the continuing refinement of our product designs, your heater may posses features that are not discussed in the manual. We have tried to supply all the information you might need, so please take time to read this manual before installing and using your Cozy Cabin Heater.

Force 10 advises strongly against unauthorized modification of this product, but we do encourage you to correct problems which may arise by undertaking the simple repairs and maintenance described in the manual.

The most important reason to read this manual is that many of its instructions are essential to the safe operation of your Cozy Cabin Heater.

Should any questions arise requiring personal help, we ask that you contact your dealer or Force 10, quoting both the model and serial number printed on the product identification label.

We welcome any opportunity to be of assistance:

FORCE 10 MARINE LTD.
23080 Hamilton Road
Richmond, BC Canada V6V 1C9
Tel: (604) 522-0233
Fax: (604) 522-9608

Any recommendation or advice given by Force 10 Marine Ltd. or any of its employees is solely an accommodation to the customer, and should not be relied upon by the customer without an independent verification of its applicability to the customer's particular situation

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SAFETY AND INSTALLATION

General

The Cozy Cabin Heater, Model 10004, is designed to be fueled only by pressurized diesel or kerosene fuel. One US gallon of fuel will provide roughly 24 hours of burning, depending on your tank pressure.

Included with Your Heater

Deck Cap Assembly:
1 - Top Deck Cap w/Guard
1 - Bottom Deck Cap
1 - Inside Finishing Ring
2 - Chimney Washers 4 - Feet Spacers

Spare Parts Kit:
1 - Burner Wrench
1 - Blue Plastic Funnel
1 - Senior Parts Kit

Installation of Heater in Cabin

1. Choose a convenient location for optimum circulation, but not where someone might accidentally touch it.
2. The best height is such that the top is approximately 36" off the floor in a boat with 72" headroom. It is better closer to the ground than the bulkhead.
3. Allow a safe distance between the sides and the bottom of the heater and combustible materials. Usually 6" is sufficient, but if in doubt, protect combustible material with metal and/or insulating type material such as ceramic tile.
4. If the heater is mounted such that the stack length or clearance of combustible material above the heater is less than 24", the overhead surface should be protected with metal and/or insulating type material such as ceramic tile.
5. Place the insulating washers between the feet of the heater and the mounting surface. This is all the protection neccessary on normal bulkheads. However, if the bulkhead is painted or is soft vinyl, a stainless steel sheet larger than the area covered by the heater should also be installed. This would create further protection from heat discoloration. Hard insulation material behind the stainless steel sheet would also be recommended.
6. Screw heater in place temporarily. (It will be necessary to remove it to install the stack.)

Installation of Deck Cap and Stack

***You must exhaust the heater to the exterior to avoid carbon monoxide poisoning!*

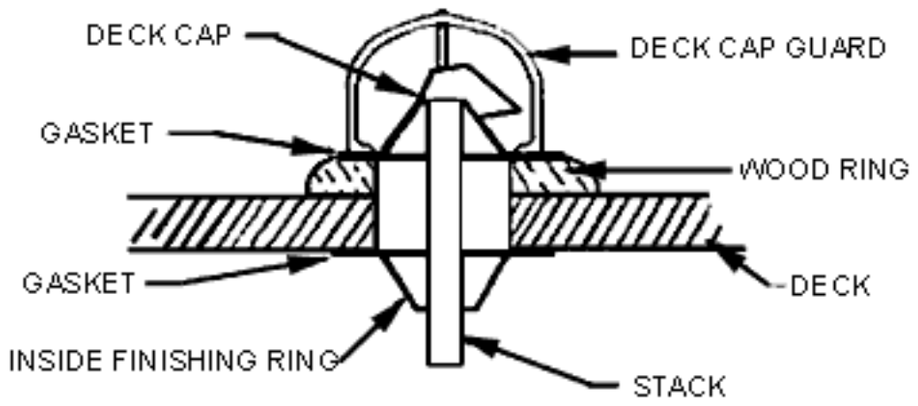

Diagram 1

1. Drill a 2" hole in the cabin for the stack to pass through.
    a. **Note:** Stack is not supplied in this kit as every installation is different, no need to ship 6" if you only need 2" of stack. The stack material is 1" OD (outer diameter) ornamental stainless steel tubing available from your dealer or boat builder. It is the same pipe used to make pulpits and railings (1"OD = 7/8" ID-inside diameter). If you are bending your stack, remember to take into account the radius of your bend in determining the overall length. Do **NOT** bend more than 45° at any one bend.
2. Fabricate a round wooden ring approximately 1/2 to 34 inches thick with a 2" hole drilled

through the middle on which to mount the deck cap. A thread winch pad is ideal, and available from local marine dealers.

3. Using suitable bedding compound, screw the dec cap and wooden ring in place using one of the white gaskets supplied as an insulator between the cap and the ring.
4. Determine the length of the stack required by measuring the distance between the top of the heater and half way up into the deck cap (stack should not contact cabin top). The stack may be bent up to a 45° angle with a 5" radius or more to by-pass deck beams or other obstructions (an electrician's conduit bender does a good job). You can easily make a mock-up using residential copper wire pipe before you bend the real thing.
5. The maximum recommended length of stack is 10'. If there are bends in the stack remove 18" from the maximum length for every bend.
6. Cut the stack to proper length, remove the heater, place the stack up into the deck rain cap. Install interior finishing ring with cone pointing downward, ensuring That the stack does not contact the cone and placing the other white gasket between the finishing ring and the cabin head liner.
7. Replace the heater and fasten it permanently, remembering to reinstall the the protective washers between the feet of the heater and the mounting surface.

Installation of the Fuel Tank

The tank must be mounted vertically (i.e. fittings on top), away from any sources of excessive heat or vibration and preferably lower than the heater. It should be located such that the operating instructions and gauge are easily visible and there is sufficient access room to refill the tank.

Installation of the Fuel Line

We recommend 1/4" rubber hose for flexibility and safety. It is available from your dealer or local plumber. Soft copper tubing may also be used, but can kink more readily than rubber. Connect the hose to the heater and tank with flare nuts, which are provided with both the heater and the Force 10 fuel tank. Measure the length of hose or copper tubing you require. If you decide to use copper, have the plumber flare both ends of the tubing to suit.

Install the fuel line using one 9/16" open wrench on the flare nut and one 7/16" wrench on the fitting on the burner. Do not use any pipe dope or Teflon tape etc., but make a proper flare. A good flare on a copper pipe will hold 1500 psi.

Installation Pressure Test

Before filling your tank, first pressurize it empty to 30 psi or 2 atm and check all fittings of the installation for leaks. Use a solution of 1/2 liquid detergent and 1/2 water and a small brush. Brush the solution liberally over each connection. The appearance of bubbles will indicate a leak. Repair leaks, if any. Leave pressurized for one hour and check to ensure that the pressure remains constant. If not, repeat the soapy water test on all connections. Also check the burner with soapy water.

OPERATING INSTRUCTIONS

IMPORTANT: Read these instructions carefully before attempting to operate the heater and tank.

Before you preheat your burner or pressurize your tank, familiarize yourself with the burner. Turn the burner handle to the left (counterclockwise). This is the CLEANING position, and you will observe the pricker (cleaning needle) coming through the nipple right in the center of the burner. If the burner plugs up during burning, you can use the cleaning cycle, but do not use force as it will be hot and expanded and it is possible to jam the pricker in the cleaning position. There is no air calibration to set on this burner. Note that burners using diesel or kerosene fuel require more preheating than alcohol burners.

Caution: The first few times you operate your heater, observe the unit running at full output and ensure that no materials in the vicinity of the heater are being overheated. Re- examine the installation to ensure that no drapes or curtains or combustible materials may come in contact with the heater or stack when the boat is heeled over or rocking violently.

Filling the Tank

1. Fill the tank approximately 3/4 full of clean filtered fuel. Dirty fuel will eventually plug up the burner, so use a screened funnel. If you do not have a screened funnel pour the fuel through a clean cloth.
2. Check the burner to be sure it is turned OFF.
3. Using a bicycle pump, pressurize the tank to approximately 30 psi or 2 atm.
4. For a cleaner burning heater add 1 part mineral spirits to 4 parts fuel.

Bleeding the Fuel Lines

This procedure is necessary the first time the heater is used or if you have allowed the tank to run dry during operation of the heater, thus emptying the fuel line. To save yourself extra work, always check to ensure there is sufficient fuel in the tank before operating the heater. All the air in the fuel line must be bled out before attempting to light the burner. This is accomplished as follows:

1. Turn the control knob approximately 1/4 turn to the left (counterclockwise) or until you are able to hear the air hissing out of the burner.
2. Leave the knob in this position and watch the small orifice in the center of the burner.
3. The hissing sound will continue for a while depending on the length of your line. Continue to watch the orifice until a small stream of fuel is seen shooting up. This can take approximately 1 to 2 minutes.
4. When the fuel is seen, immediately shut the burner off and follow normal lighting procedure. Wipe off any fuel on the burner, or you will get a smell during preheating.

Preheating and Lighting the Burner

1. Pour at least one ounce of alcohol into the burner cup and light. Note: until you gauge how much alcohol to use, always use too much. Allow the alcohol to burn out completely. Proceed with lighting the burner. Turn the control knob to the center position and light immediately. There is no set Hi-Med-Low position, so familiarize yourself with the flame and where the cleaning cycle is (see point 4). Never operate your burner in the cleaning cycle.
2. If the burner lights with a tall orange-yellow flame, shut the burner off right away and preheat again. It may have been drafty in your galley, so the alcohol flame did not heat your burner adequately. Remember - a hot burner lights readily, whereas a cool burner will flare up. A correct flame is short, non-smelling blue flame.
3. If you have to preheat your burner a second time, first allow it it to cool for a minute or two before adding more alcohol. if you pour alcohol on a hot burner, it will evaporate instantly and the alcohol fumes could create a flare up. Safety first -- allow burner to cool, add more alcohol, then re-light.
4. When you are ready to turn off your heater, turn the handle fully counterclockwise to the cleaning cycle. Leave in this position for 1 minute. This will allow your burner to cool down and clean the nipple to prevent coking inside the burner.

TROUBLESHOOTING

If something goes wrong with the operation of your Cozy Cabin Heater, do not despair! Read this section carefully for possible causes and cures.

Contact Force 10 directly, or consult your dealer, if these suggestions do not resolve the problem

The Burner Burns with a Yellow Smokey Flame

1. The burner was not preheated enough. Turn off the burner and preheat again with alcohol. Be careful when putting alcohol on a hot burner. Make sure the flame is completely out -- wait at least one minute after the burner is turned off.

2. If you often have problems with not getting the burner hot enough, try this trick. Take an empty can, about 3" - 4" in diameter. Remove the top and bottom of the can and place it around the preheating burner -- this will contain the heat and prevent any draft.
3. Perhaps you used methyl hydrate alcohol, which contains 40% water. We recommend that you use only denatured alcohol, which burns quite a bit hotter.
4. If your flame is blue with yellow tips, it may be that the inner cap is not properly seated. Remove the outer cap and push the inner cap all the way down.
5. If you want to start your burner in rough weather and have trouble keeping the alcohol cup full, you can use alcohol paste, available in some marine stores.
6. The fuel line may not have been purged. Therefore, when you turn the burner on after preheating, all you get is air for some time. When fuel finally arrives at the burner, the burner may have cooled off enough that it produces a yellow flame. We suggest that you purge the line first before preheating, by opening the burner and watching the nipple until liquid fuel appears. Wipe off the excess fuel before preheating.

The Burner Flame is Blue on One Side and Yellow on the Other

1. You may have carbon build-up in your nipple. Turn the control knob to the clean cycle a few times. This should clear the orifice. If the problem persists, try switching to a different fuel. Buy fuel that is as clear as possible and always filter your fuel.
2. Your outer or inner caps are not on straight or they may have carbon deposits on

   them. Wipe them clean and install them straight. Caution: Be sure the burner is cool before handling, or use oven mitts.
3. You may have a nipple with a bad pricker. Replace the pricker by following the instructions in 'Repairing the Burner'.

No Fuel is Getting to Your Burner

1. Check fuel level in tank.
2. Pressure gauge may be faulty. Check pressure using a tire gauge on the air fitting. Replace the pressure gauge if necessary.
3. For installations where a long fuel line is used, we install a restrictor in the bottom of the burner (in the burner fitting). This is to prevent surging of the burner. This restrictor may be plugged, so follow instructions in 'Repairing the Burner'.

The Flame Shrinks after Burning for a While

1. Some fuels contain more carbon than others. If you use yellow coloured fuel it has a higher content of carbon. This carbon will build up at the end of the spindle inside the burner, restricting the flow of vaporized fuel. You can fix this by tapping the burner with a screwdriver or other utensil. This will knock off the carbon build up. If a large piece of carbon is blocking the orifice, turn the control knob to the clean cycle to unplug the orifice. Note: If you operate the unit with clear fuel, you will eliminate this problem 75% of the time.
2. There is not enough pressure from the tank. Check to make sure the pressure gauge is working by using a tire gauge. The minimum pressure required is a constant 10 psi. Running the fuel straight off a fuel pump without a pressure tank will no work properly.
3. Do not fill the tank to the top. The less air in the tank, the quicker the pressure will drop. It is best to fill the tank 3/4 full and then pressurize.

Burner Leaks Slightly When Not in Use

1. The burner control knob may be in the clean position and not in the closed position.
2. If the knob has more than 180° of turn, your pricker will prevent the spindle from closing the burner. Look at the instructions in the repair kit to learn how to fix this problem.
3. The spindle may be worn at the tapered point. Inspect and replace if necessary. Follow the instructions in 'Repairing the Burner'.

Burner Creates a Smell

1. You may be using inferior fuel.
2. You may have a few small leaks around the burner connection, which are not visible. Use the procedure in 'Repairing the Burner' to find and repair the small leaks.

The Flame is Continuously too Small

1. Test the pressure gauge on the tank with a tire gauge. Replace the gauge if necessary. Run the burner between 10 and 20 psi or 3/4 to 1 1/2 atm.
2. Your burner may be plugged up internally with carbon. If cleaning does not help you may need to replace the burner.
3. If the control knob has only 90° of turn, the pricker is not installed properly. Refer to the directions in 'Repairing the Burner'.

The Flame Surges or Jumps

1. The flame will surge if the burner is attached to the tank with more that 2 feet or 60cm of fuel line. This length creates uneven fuel pressure. You may need a restrictor either in the base of the burner or at the burner fitting.

A Small Yellow Flame Burns around the End of the Handle

1. Tighten stuffing box nut with a crescent wrench, about half a turn.
2. If it does not want to tighten anymore replace the packing.

REPAIRING THE BURNER

Read over procedures before trying to repair your burner system. See diagram 2 below for further detail. **Never remove the entire burner from the stove or heater unless absolutely necessary.** Always attempt to fix it in place, as soon as the burner is removed it can be very difficult to re-seal the bottom. The only reason to ever remove a burner is if the body of the burner is leaking (very uncommon) or if it is plugged with carbon.

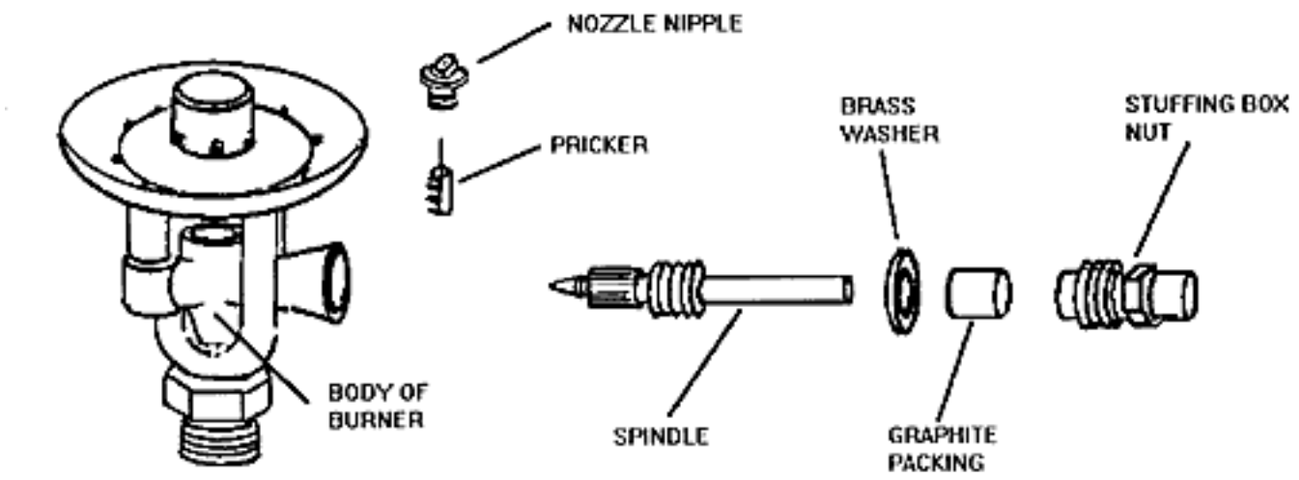

Diagram 2

Procedure For Dismantling The Burner

1. Ensure the pressure is released from the supply tank and the control knob is in the closed position (Clockwise).
2. Turn and remove the two steel caps on the top of the burner. Using the nozzle wrench, remove the nipple by inserting the wrench in through the top of the burner and unscrewing it. Be sure to press down firmly on the wrench.
3. Open the control knob 1/4 turn until you can see the needle appear where the nipple was.
4. Using a normal pencil with an eraser in the end, drop it in the tip of the burner and push the eraser onto the needle.
5. Continue to open the control knob until the needle and the pricker are free and may be

lifted out with the pencil. If the wire of the pricker is gone, use a small screwdriver from the side.

6. Remove the control knob by taking out the spring clip.
7. Using a 10mm or small crescent wrench, turn the stuffing box counter clockwise until it is free and can be removed.
8. Replace the control knob and turn the spindle counter clockwise until it is free and can be removed.
9. Inspect all parts for damage or excessive carbon build up.

Procedure For Re-Assembling The Burner

1. With the washer, packing and control knob on the spindle, screw the spindle all the way until it stops.
2. Remove the handle and put the stuffing box nut over the spindle.
3. Using the stuffing box nut, push the packing in until the thread on the stuffing box nut engages the thread on the burner.
4. Using a 10mm or small crescent wrench tighten the stuffing box nut until there is a perceptible drag felt when turning the control knob. This indicates it is compressing the packing against the shaft of the spindle.
5. Check the control handle is in the closed position (all the way clockwise).
6. Stick the pricker in the pencil. With the control knob pointing towards you, lower the pricker into the hole with the teeth facing to the left. Allow the pricker to rest on the spindle. Keep a slight downward pressure on the pencil and pricker and very slowly start opening the control knob (counter clockwise). Continue to open it until you feel four distinct clicks of the pricker through the pencil. This indicates you have passed four teeth on the spindle.
7. Close the control knob while keeping the slight downward pressure on the pencil. This action will draw the pricker into the burner.
8. Replace the nipple using the nozzle wrench (do not tighten it up hard until going through the check procedure outlined later in this document).
9. If the nipple keeps falling out of the wrench, use a little grease to keep it in the wrench.

CHECK PROCEDURE

A correctly assembled burner has about 135° of turn on the control knob from fully closed to the end of the clean cycle (between 1/2 and 1/4 turn). If the burner has more or less turn it indicates the teeth on the pricker have engaged the wrong teeth on the spindle.

Correction Procedure

If the burner has only 90° or one quarter turn on the knob this will cause the burner just to burn with a small flame

Close the valve(clockwise). Remove the nipple and open the control knob until the pencil can be placed on the pricker. Keep a slight downward pressure on the pencil and continue to open the control knob until you feel the pricker jump one more tooth. Close the valve (clockwise). Re-assemble and re-check.

If the burner has 180° or one-half turn on the knob this condition will cause the burner to leak slightly when fully closed as the pricker contacts the inside bottom of the burner before the control knob has turned far enough to close.

Turn burner to closed position (clockwise). Remove the nipple and open the control knob (counter clockwise) until the pencil can be placed on the pricker. Keep a slight upward pull on the pencil and continue to slowly open the control knob (CC) until the pricker is released. From this exact point where the control knob released the pricker, lift\ the pricker about a quarter inch and turn the control knob clockwise very slightly. Only enough to pass one more tooth on the spindle and re-insert the pricker. Close the control knob all the way (clockwise), this will draw the pricker in, and replace the nozzle and go through the check procedures again.

You must correct the amount of turn (between 1/2 and 1/4 turn) or you are wasting your time

and your burner will not work properly, so have patience and repeat the procedures if necessary.

If you now have the correct amount of turn on the control knob, tighten up the nozzle.

If you have removed your burner from your stove or heater and you re-installed it, drain your tank completely and pressurize the whole system with **air only**. Now test all your re-connections with soapy water and a small brush. If you see bubbles, you have a leak that needs to be corrected.
Small leaks can be dangerous, and evaporated liquid fuel can cause headaches. So be safe and make sure there are no leaks in your system.

Shut Off Valves

Force 10 does not include shut-off valves in their tanks as they are dangerous. People sometimes turn off the shut-off valves while everything is under pressure. The next time the burner is preheated, and the user has forgotten to open the shut-off valve, the pressurized liquid fuel in the line and burner may come under very high pressure because of preheating the burner. This often blows holes in the burner. if no shut-off valve exists the excess pressure is taken up by the air cushion in the tank. We recommend releasing the air pressure in the tank as better alternative to a shut-off valve when not on board.

REMOVAL OF THE BURNER FOR SERVICING

If Your Tank is Lower Than Your Heater

1. Release pressure by carefully releasing the set screw located on the filler cap gauge on the tank.
2. Turn burner knob to open position to allow fuel line to drain
3. Use a 9/16" open end wrench to take off the flare nut while holding the fitting with a 7/16" open end wrench.
4. Remove burner using a 3/4" open end wrench on the burner securing nut, holding the burner securely with your hand to prevent it from swiveling. Apply force only to the case nut on the base of the burner. Never try to twist the burner top.

If Your Tank is Above or Even with Your Heater

1. Release pressure by carefully releasing the set screw on the filler cap gauge on the tank.
2. Leave burner control knob in the closed position.
3. Disconnect fuel line at the tank using 7/16" and 9/16" open end wrenches.
4. Remove burner as per #4 above, but place a large flat container beneath the heater to catch the liquid fuel which will empty from the line when the burner is removed.

TESTING

If burner was removed from the heater it must be tested for leaks once it is re-installed.

Drain fuel tank completely and pressurize the whole system with air only. Test all connections with soapy water and a small brush. (It is a good idea to re-test all connections at this same time). If you see bubbles, there are leaks that will need to be corrected, Even small leaks can be dangerous. If you have a leak near your burner, the heat will evaporate the liquid fuel and create a headache-causing smell.

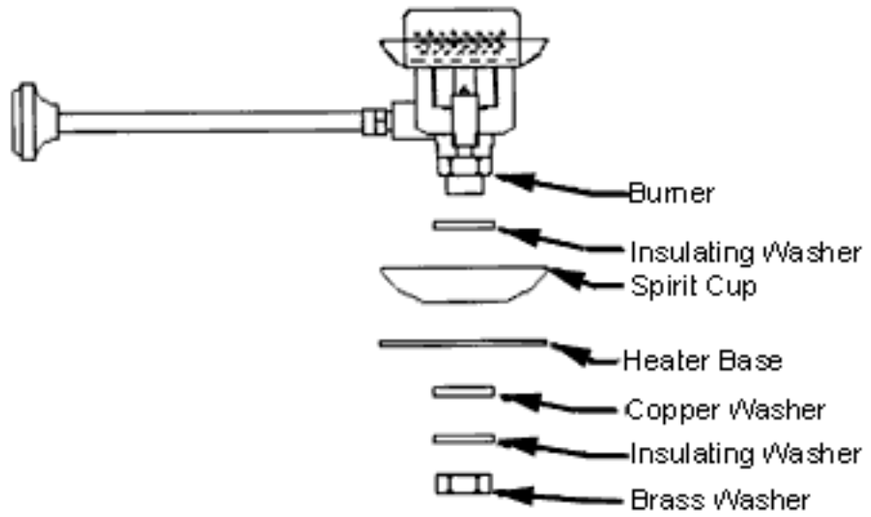

Diagram 3

LIMITED WARRANTY

Force 10 Marine Ltd. warranties new products to the original consumer to be free from defective material(s) and workmanship while under normal use and service. This limited warranty extends for the following periods:

Propane/CNG Gourmet Galley Ranges	Two (2) Years
Propane/CNG Cooktop Stoves	Two (2) Years
Propane/CNG/D-K Cozy Cabin Heaters	One (1) Year
Propane Slimline Cabin Heaters	One (1) Year
Barbecue Grills	One (1) Year