

# OPERATING, INSTALLATION AND SERVICE MANUAL

## DIRECT SPARK IGNITION - ELECTRIC ASSIST DIRECT VENT

### GAS WATER HEATER

MODELS VEDSI-10 • VEDSI-10M



FOR INSTALLATION IN RECREATIONAL  
VEHICLES AND MOBILE HOUSING

#### FOR YOUR SAFETY

##### WHAT TO DO IF YOU SMELL GAS

1. DO NOT TRY TO LIGHT ANY APPLIANCE.
2. DO NOT TOUCH ANY ELECTRIC SWITCH; DO NOT USE ANY PHONE IN YOUR BUILDING.
3. IMMEDIATELY CALL YOUR GAS SUPPLIER FROM A NEIGHBOR'S PHONE. FOLLOW THE GAS SUPPLIER'S INSTRUCTIONS.
4. IF YOU CANNOT REACH YOUR GAS SUPPLIER, CALL THE FIRE DEPARTMENT.

#### FREEZE WARNING

DRAIN HEATER IF SUBJECT TO FREEZING TEMPERATURES.

**WARNING:** IMPROPER INSTALLATION, ADJUSTMENT, ALTERATION, SERVICE OR MAINTENANCE CAN CAUSE INJURY OR PROPERTY DAMAGE. REFER TO THIS MANUAL. FOR ASSISTANCE OR ADDITIONAL INFORMATION CONSULT A QUALIFIED INSTALLER, SERVICE AGENCY OR THE GAS SUPPLIER.

#### FOR YOUR SAFETY

DO NOT STORE OR USE GASOLINE, OR OTHER COMBUSTIBLE MATERIALS OR LIQUIDS NEAR OR ADJACENT TO THIS HEATER OR ANY OTHER APPLIANCE. THIS APPLIANCE SHALL NOT BE INSTALLED IN ANY LOCATION WHERE FLAMMABLE LIQUIDS OR VAPORS ARE LIKELY TO BE PRESENT.

AN ODORANT IS ADDED TO THE GAS USED BY THIS WATER HEATER.

INSTALLER: AFFIX THESE INSTRUCTIONS TO OR ADJACENT TO WATER HEATER.  
OWNER: RETAIN THESE INSTRUCTIONS AND WARRANTY FOR FUTURE REFERENCE.

ALL TECHNICAL AND WARRANTY QUESTIONS SHOULD BE DIRECTED TO THE COMPANY LISTED ON THE WARRANTY, OR RATING PLATE WHICH CAME WITH YOUR WATER HEATER.



SUBURBAN MANUFACTURING COMPANY  
Post Office Box 399  
Dayton, Tennessee 37321  
(615) 775-2131  
Fax: (615) 775-7015

## INSTALLATION REQUIREMENTS

**CAUTION:** If possible, do not install the water heater to where the vent can be covered or obstructed when any door on the trailer is opened. If this is not possible, then the travel of the door must be restricted in order to provide a 6" minimum clearance between the water heater vent and any door whenever the door is opened.

This installation must conform with the requirements of the authority having jurisdiction or in the absence of such requirements with the latest edition of the National Fuel Gas Code ANSI Z223.1; and the latest edition of the American National Standard For Recreational Vehicles-501C: in Canada the installation should conform with the following standards.

### A. For installation in Recreational Vehicles

1. Gas - CSA standard CSA Z240.4.2 Installation requirements for Propane Appliances and equipment in Recreational Vehicles.
2. Electrical - CSA standard C22.2 No. 148/Z240.6.2 Electrical Requirements for Recreational Vehicles.
3. Plumbing - CSA standard CSA Z240.3.2 Plumbing Requirements for Recreational Vehicles

### B. For installation in Mobile Housing

1. Gas - CSA standard CSA Z240.4.1 Installation Requirements For Gas Burning Appliances and Equipment in Mobile Homes.
2. Electrical - CSA standard CSA C22.1 Canadian Electrical Code Part 1.
3. Plumbing - CSA standard CSA Z240.3.1 Plumbing Requirements for Mobile Homes

Au Canada, l'installation doit satisfaire aux normes suivantes:

#### A. Pour installation dans les vehicules de loisir

1. Gaz - Norme ACNOR Z240.4.2 Exigences d'installation des appareils et de l'equipement a propane dans les vehicules de loisir.
2. Electricite - Norme ACNOR C22.2 No. 148/Z240.6.2 Exigences electriques des vehicules de loisir.
3. Plomberie - Norme ACNOR Z240.3.2 Exigences de plomberie des vehicules de loisir.

#### B. Pour Installation Dans Une Maison Roulante

1. Gaz - Norme ACNOR Z240.4.1 Exigences d'installation des appareils et de l'equipement a gaz dans les maisons roulantes.
2. Electricite - Norme ACNOR C22.1 Premiere partie du Code electrique Canadien.
3. Plomberie - Norme ACNOR Z240.3.1 Exigences de plomberie des maisons roulantes.

(1) The appliance shall be disconnected from the gas supply piping system during any pressure testing of the system.

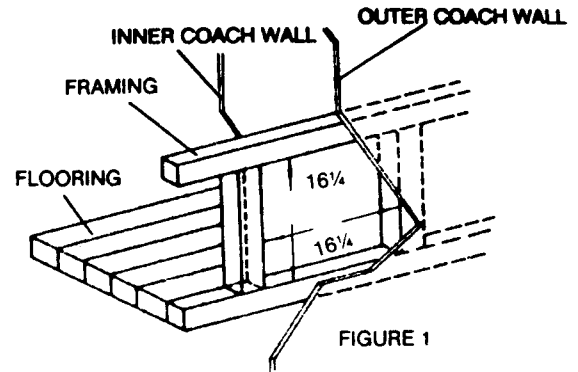
(2) The appliance and its gas connection shall be leak tested before placing the appliance in operation.

(3) All air for combustion must be supplied from outside the structure. Air for combustion must not be supplied from occupied spaces.

## INSTALLATION INSTRUCTIONS

Minimum clearance from combustible construction on sides, top, floor and rear = 0 inches. Provide room for access to rear of heater for servicing.

Degagement minimal de constructions combustibles les cotes, le dessus, le plancher et a l'arriere = 0 pouces. Prevoyez suffisamment d'espace pour qu'un technicien puisse avoir acces & l'arriere du chauffe-eau.



Provide an opening flush with floor in outer wall of coach as shown. Wall of coach should be framed as shown in Figure 1. Maintain inside dimensions listed below. Do not install on carpet unless the carpet is covered by a metal or wood shield covering the entire area underneath the water heater. If you prefer, you may cut away the carpet from this area.

Quand le chauffe-eau est installé directement sur le tapis, la tuile, ou sur autre matière combustible autre que parquet de bois, le chauffe-eau aura installé sur panneau du métal ou de bois au moins que deux pouces plus grand que la largeur et la longueur du chauffe-eau. Si vous préférez, vous pouvez couper le tapis ou matière du parquet, si n'est pas bois, d'au-dessous du chauffe-eau et étendant deux pouces de la largeur et la longueur du chauffe-eau.

## STANDARD MODELS (HINGED DOOR)

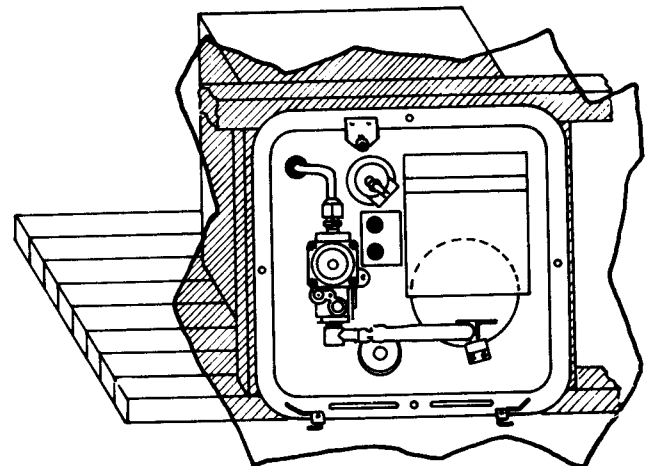


FIGURE 3

A. Insert heater into framed opening. Place caulking sealant between heater flange and outer wall of coach to insure water-tight bond. Secure heater to wall using twelve No. 8 x 3/4" wood screws, screwed through holes, in front mounting panel of heater.

B. To install door, slip one hinge pin into slot on each side of door. Then insert other end of hinge pins behind spring brackets on heater frame, close door so that latch protrudes through slot in door. Turn latch 90 degrees to fasten the door.

## REAR CONNECTIONS

A. Connect water lines to fittings provided, 1/2" female pipe threads. NOTE: Inside each fitting is a plastic fill tube. Its purpose is to enhance water circulation. **DO NOT REMOVE PLASTIC FILL TUBE.**

B. Connect 3/8" gas supply piping to gas connection supplied with heater. Turn on gas and check leaks, using a soap and water solution. Be sure there are no gas leaks.

C. Fill tank with water. Open hot water faucet to expel air from tank. When tank is filled, turn off faucet and check for leaks at connections. **CAUTION: If you use air pressure to check for leaks, the pressure must not exceed 30 PSI. (In accordance with 4-9.1.1 of ANSI A119.2.)**

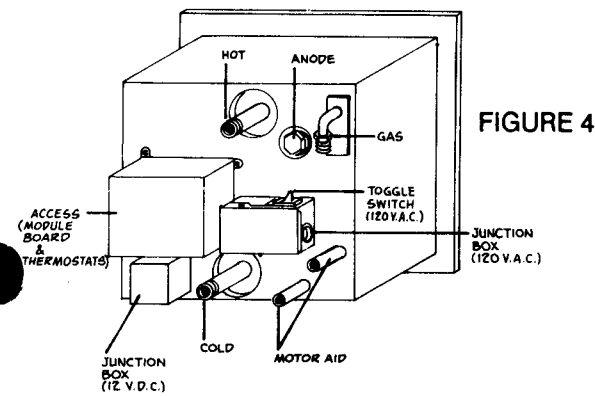


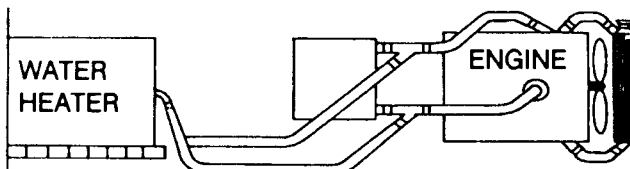
FIGURE 4

## INSTALLATION OF MOTOR-AID EXCHANGER

- (1) Place copper "Y"s in heater lines as shown in sketch.
- (2) Secure hoses to "Y" s with hose clamps.
- (3) Attached hose from motor-aid heat exchanger to "Y"s.
- (4) Secure hoses to motor-aid and "Y"s with clamps.
- (5) Check all connections for water leaks and proper water circulation through motor-aid heat exchanger, with engine running.

The motor-aid heat exchanger is designed to operate safely and efficiently for an indefinite period of time and should require no maintenance. Be sure to check your heater hoses for cracks after the first year of operation, since a cracked or broken hose could cause a great deal inconvenience on an outing.

FIGURE 5



## ELECTRICAL CONNECTIONS

Refer to the following codes when making electrical connections. Make sure water heater is filled with water before making electrical connections. Make electrical connections shown on the following diagram. (Figure 7-12 volt; Figure 7A-120 volt)

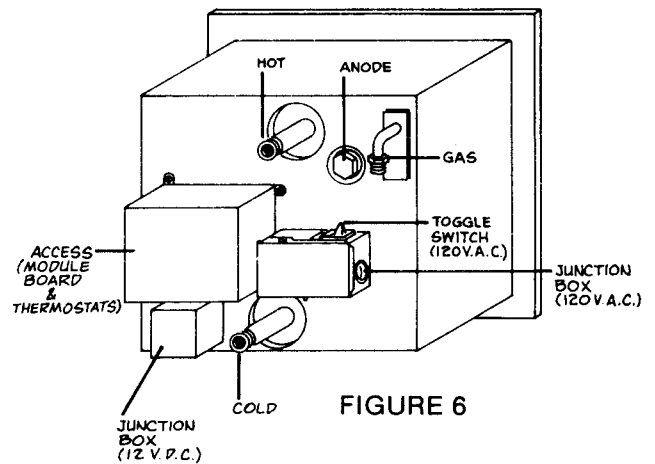


FIGURE 6

In Canada, the electrical installation should conform with CSA standard CSA C22.2 No.148/Z240.6.2 Electrical Requirements for Recreational Vehicles and CSA C22.1 Canadian Electrical Code Part I when installing the unit in Recreational Vehicles and Mobile Homes respectively.

Au Canada, l'installation électrique doit satisfaire a la norme ACNOR 22.2 N 148/Z240.6.2 Exigences électriques des vehicules de loisir ou a la norme ACNOR C22.1 Premeire partie du Code électrique Canadien selon que l'appareil est installé dans un vehicule de loisir ou une maison roulante.

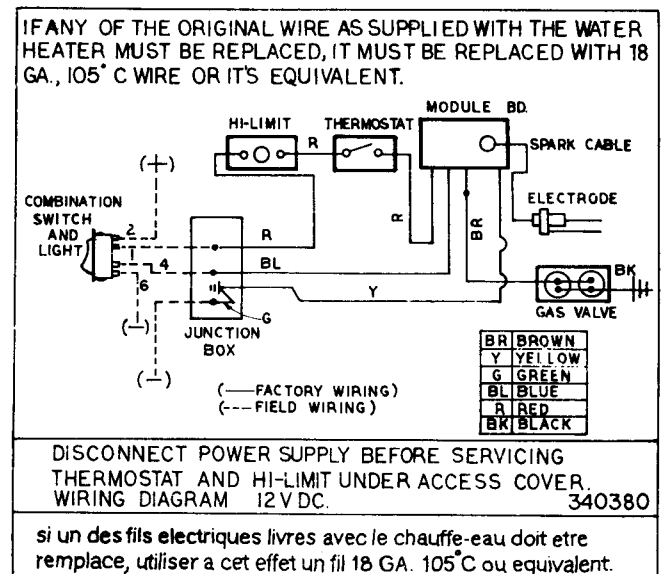
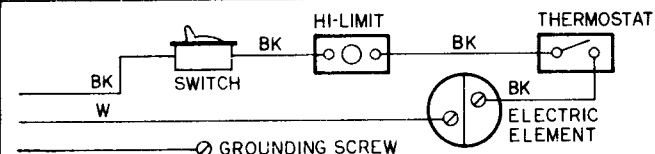


FIGURE 7

DISCONNECT POWER SUPPLY BEFORE REMOVING COVER

SUBURBAN MANUFACTURING COMPANY, DAYTON, TENNESSEE  
 120 V.A.C. SINGLE PHASE 1000 WATT ELEMENT 60 CYCLE  
 TOTAL CONNECTED WATTS=1000 AMPS=LESS THAN 12

| CODE | COLOR |
|------|-------|
| BK   | BLACK |
| W    | WHITE |



IF ANY OF THE ORIGINAL WIRE AS SUPPLIED WITH THE HEATER MUST BE REPLACED, IT MUST BE REPLACED WITH 14GA 105°C WIRE OR ITS EQUIVALENT.

SI UN DES FILS ELECTRIQUES LIVRES AVEC LE CHAUFFE-EAU DOIT ETRE REMPLACE, UTILISER A CET EFFET UN FIL 14GA 105°C OU EQUIVALENT.

WIRING DIAGRAM 120 V.A.C. FIGURE 7A 340379

## SAFETY WARNINGS

Should overheating occur, or the gas supply fail to shut off, shut off the manual gas valve to the appliance before shutting off the electrical supply.

Do not use this appliance if any part has been submerged under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control that has been submerged under water.

Do not alter the operation of your water heater nor change the design/construction of your water heater. Accessories are being marketed for RV products which we do not recommend. For your safety, only factory authorized parts are to be used on your water heater.

Periodically inspect the vent for obstructions or presence of soot. Soot is formed whenever combustion is incomplete. This is your visual warning that the water heater is operating in an unsafe manner. If soot is present, immediately shut the water heater down and contact your dealer or a qualified service person.

When considering add-on rooms, porch or patio, attention must be given to the venting of your water heater. For your safety, do not terminate the vent on your water heater inside add-on rooms, screen porch or onto patios. Doing so will result in products of combustion being vented into the room or occupied areas.

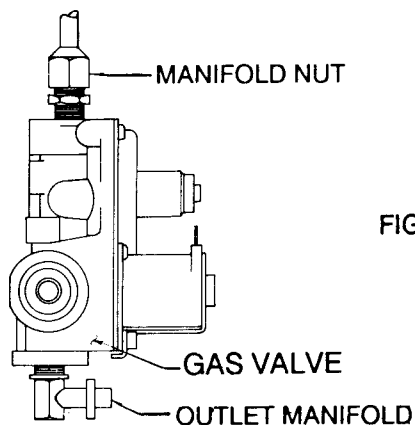


FIGURE 8

## MANUAL RESET LIMITS

(Switches located under access cover on front of water heater)

This water heater is provided with two high temperature limits as a cut-off device. Temperature above 180 degrees F will cause manual reset button to trip shutting down main burner and/or electric element.

To activate burner, the water temperature must be below 100 degrees F, push reset button to re-activate burner and/or electric element.

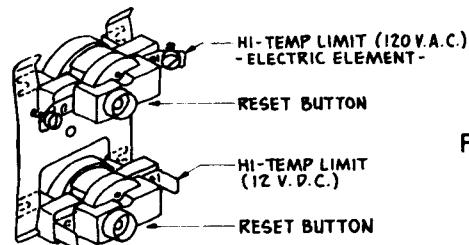


FIGURE 9

## THERMOSTATS

(Located under access cover on rear of water heater)

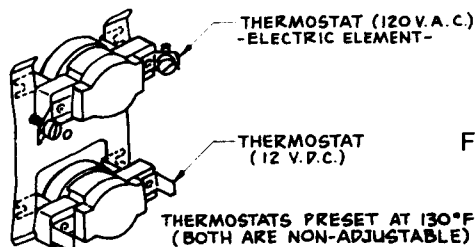


FIGURE 9A

## BURNER

All air shutters are pre-set at the factory to obtain a blue or orange-blue flame. If it is necessary to adjust the air shutter, be sure to maintain the blue or orange-blue flame color. Do not allow the burner flame to burn with a yellow flame, because sooting will occur.

In cases where sooting has occurred, there is a possibility that this condition may be corrected by making the correct air shutter adjustment. If the burner flame continues to burn yellow after adjusting the air shutter, check for an obstruction in the burner or the flue box. A stiff brush is recommended for the removal of soot deposits. If there is soot in the burner, check to make sure the gas valve is shutting off clean. This can be checked by turning the off-on switch to the off position. There should be no flame at the burner orifice or at the burner.

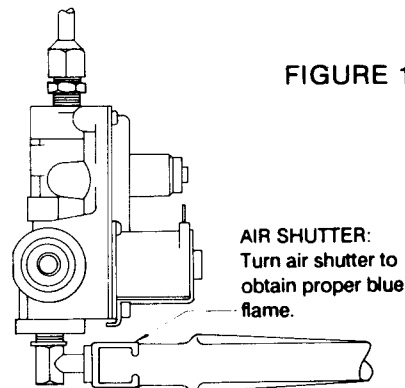
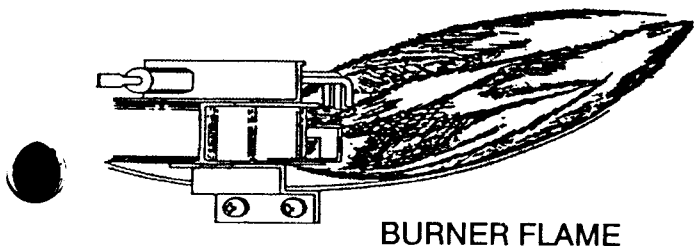


FIGURE 10



BURNER FLAME

FIGURE 11

## BURNER COMPARTMENT

Periodically check control compartment and screen in door to see that no foreign material has accumulated to prevent flow of combustion and ventilating air. Periodically check burner flame visually, and compare with sketch under the burner adjustment section.

### WARNING:

Do not store or use combustible materials or liquids near or adjacent to this heater. The appliance shall not be installed in any location where flammable liquids or vapors are likely to be present.

## TEMPERATURE AND PRESSURE RELIEF VALVE

The temperature and pressure relief valve is designed to open if the temperature of the water within the heater reaches 210 degrees F, or if the water pressure in the heater reaches 150 pounds. Recreational vehicle water systems are closed systems and during the water heating cycle, the pressure build-up in the water system will reach 150 pounds. When this pressure is reached, the pressure relief valve will open and water will drip from the valve. This dripping will continue until the pressure is reduced to below 150 pounds, and the valve closes. This condition is normal and does not indicate a defective relief valve.

## ANODE PROTECTION

The tank in this water heater is protected by a magnesium or aluminum anode to prolong the life of the tank. Removal of the anode will decrease tank life and will void the warranty on the inner tank.

## DRAINING AND STORAGE INSTRUCTION

If RV is to be stored during winter months, the water heater must be drained to prevent damage from freezing.

1. Turn off power and gas.
2. Turn off pressure pump on water system.
3. Open both hot and cold water faucets.
4. Remove drain plug from tank.
5. Follow RV manufacture instructions for draining entire water system.

**NOTE: Be certain to refill water heater with water before re-lighting.**

## DESCRIPTION

The Fenwal series 05-30 direct spark ignition systems operate through a thermostat to provide a means of ignition for the main burner. This system provides three (3) tries for ignition. This is accomplished by generating a spark between high voltage electrode and ground. Once the flame is established, a flame rod monitors the main burner flame (see Figure 12).

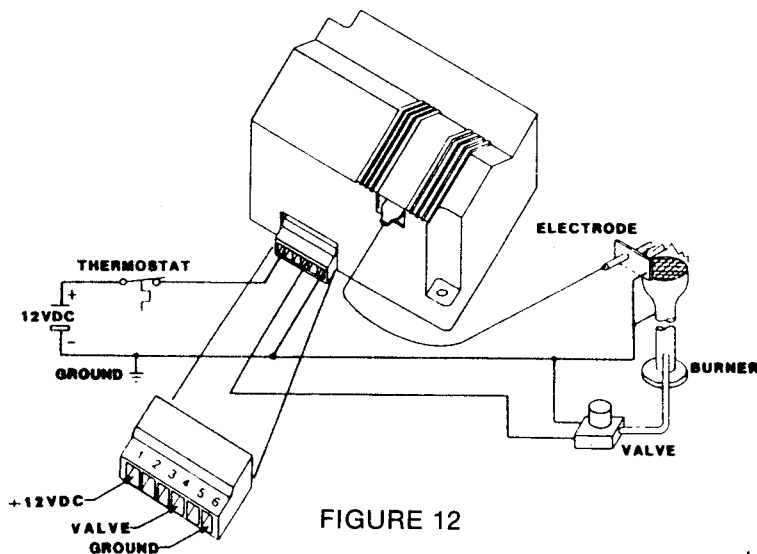


FIGURE 12

## SEQUENCE OF OPERATION

On a call for heat, voltage is applied to the ignitor across terminals 1 (power) and 6 (ground) of the input connector. A high voltage spark is then generated from the spark electrode to ground. Simultaneously, the gas valve is energized.

At the start of each heating cycle, there is a 15 second purge followed by a 6.8 second trial for ignition. Sparking ceases as soon as a constant flame is present. Should no flame be detected within 6.8 seconds on the first try for ignition the system will automatically retry for ignition two (2) more times before going into lockout. Each trial for ignition is preceded by a 15 second purge. Once the flame is established, sparking will cease and the "flame rod" will provide flame monitoring for the remainder of the heat cycle. If the flame is extinguished during this cycle, the ignitor will start sparking automatically in an attempt to re-establish the flame. If this does not occur within the "trial for ignition period" the system will go into lockout, closing the gas valve, and turning on the red light in the ON/OFF switch.

## FOR YOUR SAFETY READ BEFORE OPERATING

**WARNING: If you do not follow these instructions exactly, a fire or explosion may result causing property damage, personal injury or loss of life.**

A. This appliance does not have a pilot. It is equipped with an ignition device which automatically lights the burner. Do not try to light the burner by hand.

B. BEFORE LIGHTING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.  
**WHAT TO DO IF YOU SMELL GAS**

- \* Do not try to light any appliance
- \* Do not touch any electric switch
- \* Do not use any phone in your building
- \* Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.

\* If you cannot reach your gas supplier, call the fire department.

C. This is an automatic gas valve, no adjustments are necessary. Do not attempt to repair the gas valve, this may result in a fire or explosion.

D. Do not use this appliance if any part has been under water. Immediately call a qualified service technician to inspect the appliance and to replace any part of the control system and any gas control which has been under water.

E. Before operating the water heater, check the location of the vent to make sure it will not be blocked by the opening of any door on the trailer. If it can be blocked, do not operate the water heater with the door open.

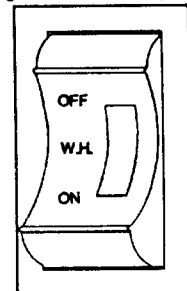
## OPERATING INSTRUCTIONS

- (1) STOP! Read the safety information provided.
- (2) Turn off all electrical power to the appliance.
- (3) Turn "OFF" gas supply.
- (4) Wait five (5) minutes for gas to clear the area. If you smell gas then, STOP! Follow instructions in item B of the safety information. If you don't smell gas, go to next step.
- (5) Turn "ON" gas supply.
- (6) Turn on electrical power to the appliance.
- (7) Turn switch to "ON" position, there will be a 15 second purge before spark. If burner does not light on first try, there will automatically be 2 more tries for ignition before lockout. Each ignition cycle will have a 15 second purge before spark.

(8) If lockout occurs before main burner lights, turn switch to "OFF" position, wait five (5) seconds and turn switch to "ON" position. This will re-start the ignition cycle. The first start-up of the heater may require several ignition cycles before all air is purged from the gas lines.

If the burner will not come on, the following items should be checked before calling a service man.

1. Switch turned off.
2. Gas supply to heater is empty or turned off.
3. Reset button on ECO is tripped.



## TO TURN OFF WATER HEATER

- (1) Turn switch to "OFF" position.
- (2) Turn off electrical power to the appliance
- (3) Turn off gas supply.

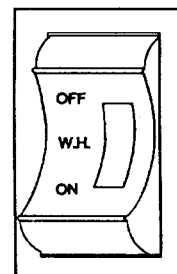
(4) If vehicle is to be stored or heater is going to be turned off while subject to freezing temperatures, drain water heater (see **DRAINING AND STORAGE INSTRUCTION PAGE 4**).

## DIRECTIVES DE FONCTIONNEMENT

1. **ARRETEZ!** Lisez attentivement les renseignements de securite fournis.
2. Coupez toute alimentation electrique vers l'appareil.
3. Coupez l'alimentation en gaz.
4. Attendez cinq minutes que les vapeurs de gaz se dissipent. Si vous sentez le gaz, **ARRETEZ!** Suivez les directives de l'article B sous "Renseignements de securite". Si vous ne sentez pas le gaz, passez a la prochaine etape.
5. Allumez le gaz.
6. Allumez l'electricite vers l'appareil.
7. Mettez le commutateur en position "ON". Il faudra 15 secondes pour que l'air soit evacue des conduits avant que l'etincelle ne jaillisse. Si le chauffe-eau ne s'allume pas des le premier essai, vous disposez automatiquement de deux autres essais d'allumage avant que le mecanisme ne se bloque. Chaque cycle d'allumage comporte un temps d'evacuation de l'air de 15 secondes avant que l'etincelle ne jaillisse.
8. Si le blocage survient avant que le bruleur principal ne s'allume, placez le commutateur en position "OFF", attendez cinq (5) secondes et remettez-le en position "ON". Cette manoeuvre recommencera le cycle d'allumage. L'allumage initial peut necessiter plusieurs cycles d'allumage avant que l'air ne soit entierement evacue des conduits de gaz.

Si vous n'arrivez pas a mettre le chauffe-eau en marche verifiez ce qui suit avant d'appeler un technicien.

1. Le commutateur est en position "OFF".
2. L'alimentation en gaz vers le chauffe-eau est vide ou coupee.
3. La remise a zero (ECO) est declenchee.



## POUR ARRETER LE CHAUFFE-EAU

1. Mettez le commutateur en position "OFF".
2. Coupez toute alimentation electrique vers l'appareil.
3. Coupez toute alimentation en gaz vers l'appareil.
4. Si vous comptez entreposer l'appareil ou arreter le chauffe-eau de sorte qu'il soit expose au gel, videz-le (VOIR "DIRECTIVES DE DRAINAGE ET D'ENTREPOSAGE")

# SERVICE HINTS, DIAGNOSIS AND CORRECTIVE MEASURES

The only tools required to service the 05-30 series are a Phillips head screwdriver and a 20,000 OHMS/volt multimeter (Radio Shack 28-4013, Allied WV-5518A, triplet model 310-C or equivalent). Refer to the Trouble shooting guide for the specified paragraph.

| WHAT'S WRONG                                    | WHY   | WHAT TO DO  |
|---|---|---|
| (1) Lockout occurs after 3 trials for ignition  | (1) Reverse polarity<br>(2) System improperly grounded<br>(3) Gas pressure too high causing flame to lift off burner<br>(4) Sensor Probe incorrectly positioned in flame pattern. | Paragraph 1, Preliminary Checks<br>Paragraph 2<br><br>Check to insure input pressure as specified on manufacturers data plate.<br>Paragraph 6 |
| (2) Flame not established<br>Arcing to Ground   | Spark gap too small<br>Spark Gap too large  | Paragraph 3A<br>Paragraph 3A  |
| (3) No Spark                                    | Corroded Connector  | Paragraph 3B  |
| (4) Arcing Other Than Across Gap/<br>Weak Spark | (1) Cracked or Dirty Insulator<br><br>(2) Broken High Voltage Lead<br>(3) High Voltage Lead Too Close To Metal Surface  | Paragraph 3C<br>Paragraph 3C<br>Paragraph 3E  |
| (5) No Flame                                    | Valve Malfunction<br>Electrode Improperly Placed  | Paragraph 4<br>Paragraph 5  |
| (6) Low Flame Current and/or Nuisance Lockouts  | (1) Flame Current Falls Below 1.0 UA<br>(2) Low Gas Pressure  | Paragraph 6<br>Check to Ensure That Manifold Pressure Meets Manufacturer's Specifications   |

## TROUBLESHOOTING

Although the following tests can be made using a standard volt meter, it is quicker and more convenient to use a Fenwal model 05-125539-001 test adaptor. (see Figure 13)

### PRELIMINARY CHECKS

#### (1) Input polarity-

If a spark is present and the gas valve opens for the flame establishing period but then locks out at the end of three to ten seconds, check the input voltage at terminal 1 and 6 for the proper polarity. Terminal 1 should be "hot"; (12-VDC) with respect to ground. Terminal 6 is neutral, or zero voltage, with respect to ground. (see Figure 12)

#### (2) Improper grounding-

If a flame is present during the trial for ignition period but the system shuts down, insure that the burner is properly grounded. If the burner is not grounded, the flame monitoring signal will not function and the system will go into lockout. Check for loose or corroded terminals and replace if necessary. Ensure good electrical connection by scraping paint or any other foreign matter off the area where ground connection is made.

It is equally important to be certain that the electrode bracket assembly is properly grounded. The bracket should be com-

mon with the ground lead on the input connector (ground terminal 6). If the bracket is not properly grounded, damage to the ignitor can result.

#### (3) Inoperative high voltage-

If there is no spark or sparking is intermittent, check the following, after disconnecting voltage to the system.

A. Check spark gap. Gap should be 1/8" to 1/32" from H.V. to ground. CAUTION: Never replace the component board without first checking to insure that the electrode has the proper gap. If the gap is too wide, damage to the ignitor can result.

B. Check electrode leads and determine that there is no corrosion at the terminals. If there is corrosion, clean it off.

C. Check ceramic insulator for cracks, foreign matter and carbon. If there are cracks replace electrodes. If there is carbon or foreign matter clean it off.

D. Check high voltage lead wire for cracks or breaks. If there are cracks, breaks, or chaffing, replacing high voltage wire.

E. Check that the high voltage lead wire is not too close to metal surface to insure that arcing will not occur at any point other than across the H.V. electrode. Also insure that the high voltage lead wire is not taped or connected to a metal frame



along its length, or crossing sharp metal edges. Do not bundle with other wires. Always leave one inch spacing between the high voltage lead wire and any other metal or wires.

F. For best operation, the high voltage wire (brown wire) should be as short as possible and should not exceed 42 inches in length.

G. Check to ensure that the high voltage terminal is clear of dust, moisture or any foreign matter that could create high voltage leakage to ground.

#### (4) Valve malfunction-

With power applied to the ignitor, sparking should occur and the solenoid valve should open simultaneously. If sparking occurs, but the valve does not open, place a volt meter between terminal 4 on the input connector and ground (or across valve). Recycle the ignitor by turning the thermostat down for five seconds minimum and then back up and determine if voltage is present at the valve, (terminals 4 (valve) and 6 (ground) in Figure 12). If voltage is present, and the valve does not open, remove wires from the valve terminals and re-test the valve on a known voltage source. If valve does not function still, it should be replaced. If the voltage is not present at terminals 4 and 6, the ignitor should be replaced. Check P.C. connector area. (Clean with soft rubber eraser only.) Also, check the terminals in the plastic connector for good contact.

The valve relay is rated for 12 VDC on the 05-30 series at 5 amps. If a valve is used with a higher current rating than that specified, damage can result to the relay contacts.

#### (5) Electrode placement-

A. Electrode should be placed so optimum flame current is achieved for proper application.

B. Flame should not impinge on any portion of ceramic insulator.

#### (6) Flame current-

The flame detector circuit used the ionized gases flame to conduct the flame signal. This signal is a small DC current which can be measured directly with a 0 to 50 microamp meter.

Although the minimum flame current necessary to keep the 05-30 series ignitor from going into lockout is 1.0 microamps, the meter reading should be 3.0 microamps or higher. These ignitors can stand flame currents as high as 30 to 40 microamps.

To measure flame current, first shut off the power to the system and then remove the flame sensing lead wire from the electrode terminal and insert a 0-50 DC microamp meter in series with the sensor electrode and ground. "Plus" terminal of meter to component board and "negative" terminal to sense electrode. Energize the ignitor. If the meter reads below zero, shut the system off and reverse meter leads.

Once the flame is established, assure that the flame current is above the minimum specified. If not assure that the system has the proper input voltage, and then relocate the sensor electrode in the flame pattern until flame current is increased.

Once the flame has been established and the system is in its heat cycle, occasional sparking may occur. This is common in some installations and is not significant. Sparking will not damage the ignitor.

#### (7) Ambient temperatures

The 05-30 series is designed to operate over the temperature range of -40 to 155 degrees F. Care should be taken to insure that it operates within range.

#### (8) Relative humidity-

The 05-30 series is epoxy-coated to insure proper operation at 90 percent relative humidity. Caution should be taken to insure that the control is not exposed to or immersed in water.

NOTE: This test adaptor is available from Fenwal Inc., Ashland, Mass.

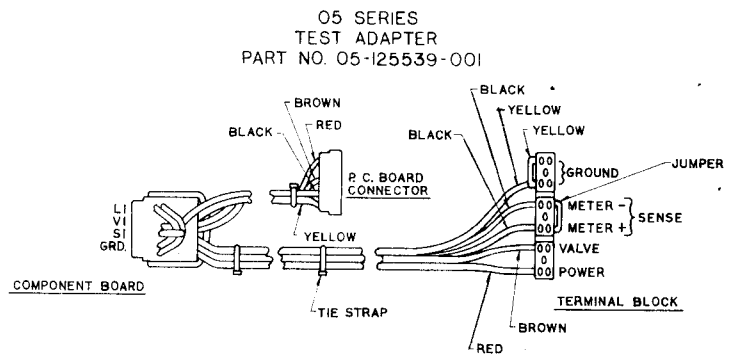


FIGURE 13

## WARRANTIES

If the ignitor is damaged due to mishandling, or is not applied or installed properly, warranties will be voided. The 05 series ignitors are not field repairable. All ignitors that fail to function properly should be returned to the attention of customer service.

## CAUTION

The Fenwal series 05-30 direct spark ignition systems are designed for use on new gas fired equipment or for replacements for an existing Fenwal spark ignitor. Any substitution or other application must be expressly approved in writing by the manufacturer of the equipment. Improper substitution or application may result in a malfunction of equipment, and the creation of an explosive atmosphere.

## ELECTRIC ASSIST MODELS MAINTENANCE AND SERVICE

Electric water heaters are designed to operate with a minimum amount of service problems, and with proper operation and care can be expected to outlast other types of water heaters similar in size.

The most common trouble with electric water heaters results from energizing the heater before it is filled with water. Even momentary operation of the heater without water in it will burn out the heating element and render the heater inoperative.

**CAUTION: POWER MUST BE TURNED OFF BEFORE DRAINING THE TANK.**

If the heater is full of water (check this by running water from the hot water faucet) and the water fails to heat, always check the following items before requesting service or parts:

- (1) Check incoming power to make sure 120 volt AC electricity is available.
- (2) Check the circuit breaker in the coach to make sure it has not tripped.
- (3) Remove the water heater electrical access cover and press the red reset button on the heater. (NOTE: Power should be turned off when removing the door cover.)
- (4) If, after pressing the reset button and turning the power back on, the heater still fails to operate the power should be turned off and all wires and connections should be checked to make sure they are not loose.
- (5) After the first four steps have been followed, the heating element should be checked for continuity with an amprobe or other testing device. If the element is defective, it can be replaced with any other 120 volt AC element of the same or lower wattage as shown on the water heater instruction decal, provided, of course, its mounting holes and gasket will adjust to the element mounting bracket on the water heater. Secondary problems with electric water heaters are rare; however, they can be corrected by minor thermostat adjustments. If the water heater becomes too hot and activates the reset control, reset by pressing the red reset button.

If the foregoing procedures are followed carefully, it should rarely be necessary to seek outside service or parts. If service or parts are required, contact Suburban Manufacturing CO. or any of the factory representatives listed in the manual, or return the defective part(s) to the factory for replacement.

This water heater will operate with a minimum of attention. Should occasion arise that the water be drained, be certain to turn off the gas and power to the water heater, close the valve on the cold water inlet supply and open the hot water faucet to allow air to enter the system.

In cases where the water is too hot and the high limit control is not shutting off the heater, it is possible that the thermostat is loose from the holding bracket and is not being held tightly against the tank. This condition can be detected by applying slight hand pressure to the thermostat, but make sure the power is off. To remedy this problem, remove the bracket and bend it slightly so that it will hold the thermostat against the tank. Make sure that the insulation is covering the thermostat completely.

In Canada, the electrical installation should conform with CSA standard CSA C22.2 No. 148/Z240.6.2 Electrical requirements for Recreational Vehicles and CSA C22.1 Canadian Electrical Code Part 1 when installing the unit in recreational vehicles and mobile homes respectively.

Au Canada, l'installation électrique doit satisfaire à la norme ACNOR 22.2N 148/Z240.6.2. Exigences électriques des véhicules de loisir ou à la norme ACNOR C22.1 Première partie du Code électrique Canadien selon que l'appareil est installé dans un véhicule de loisir ou une maison roulante.

## LIMITED WARRANTY

### SUBURBAN RECREATIONAL VEHICLE WATER HEATER

#### LIMITED ONE YEAR WARRANTY

This Suburban product is warranted to the original purchaser to be free from defects in material and workmanship under normal use and maintenance for a period of one year from date of purchase whether or not actual use begins on that date. It is the responsibility of the consumer/owner to establish the warranty period. Suburban does not use warranty registration cards for its standard warranty. You are required to furnish proof of purchase date through a Bill of Sale or other payment record.

Suburban will replace any parts that are found defective within the first year and will pay a warranty service allowance directly to the authorized Suburban Service Center at rates mutually agreed upon between Suburban and its authorized service centers. Replacement parts will be shipped FOB the shipping point within the Continental United States, Alaska and Canada to authorized service centers performing such repairs. All freight, shipping and delivery costs shall be the responsibility of the owner. The exchanged part or unit will be warranted for only the unexpired portion of the original warranty. Before having warranty repairs made, confirm that the service agency is an authorized service center for Suburban. DO NOT PAY THE SERVICE AGENCY FOR WARRANTY REPAIRS; SUCH PAYMENTS WILL NOT BE REIMBURSED.

Suburban reserves the right to examine the alleged defect in the water heater or component parts, and it is the owner's obligation to return the water heater and/or component parts to Suburban or its representative. When returning a water heater, it must include all component parts and the serial number plate. Returned component parts must be individually tagged and identified with the water heater's model number, serial number and date of installation.

For warranty service, the owner/user should contact the nearest authorized Suburban Service Center, advising them of the model and serial numbers (located on the water heater) and the nature of the defect. Transportation of the unit to and from the service center and/or travel expenses of the service center to your location are the responsibility of the owner/user. A listing of authorized service centers is included in the owner's packet supplied with the water heater and a current listing may be obtained from Suburban. If you cannot locate an authorized service center locally, the service agency chosen to perform warranty repairs must contact our Service Department at 615-775-2131 for authorization. Unauthorized repairs made will not be paid by Suburban.

#### LIMITED THREE YEAR WARRANTY ON TANK

The inner tank is further warranted to be free from defects in material and workmanship for three years from the date of original purchase. A replacement water heater will be provided under the same conditions as stated in the one year warranty EXCEPT no labor reimbursement will be provided.

#### LIMITATION OF WARRANTIES

ALL IMPLIED WARRANTIES (INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY) ARE HEREBY LIMITED IN DURATION TO THE PERIOD FOR WHICH EACH LIMITED WARRANTY IS GIVEN. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU. THE EXPRESSED WARRANTIES MADE IN THIS WARRANTY ARE EXCLUSIVE AND MAY NOT BE ALTERED, ENLARGED, OR CHANGED BY ANY DISTRIBUTOR, DEALER OR OTHER PERSON WHOMSOEVER.

#### SUBURBAN WILL NOT BE RESPONSIBLE FOR:

1. Normal maintenance as outlined in the installation, operating and service instructions owner's manual including cleaning of component parts and cleaning or replacement of the burner orifice. Any water damage arising, directly or indirectly, from any defect in the water heater or component parts or from its use.
2. Initial checkouts and subsequent checkouts which indicate the water heater is operating properly, or diagnosis without repair.
3. Damage or repairs required as a consequence of faulty or incorrect installation or application not in conformance with Suburban instructions.
4. Failure to start and/or operate due to loose or disconnected wires; water or dirt in controls, fuel lines and gas tanks; improper gas pressure; low voltage.
5. Cleaning or adjustment of components: electrode, burner tube, pilot and thermocouple.
6. Costs incurred in gaining access to the water heater.
7. Parts or accessories not supplied by Suburban.
8. Freight charges incurred from parts replacements.
9. Damage or repairs needed as a consequence of any misapplication, abuse, unreasonable use, unauthorized alteration, improper service, improper operation or failure to provide reasonable and necessary maintenance.
10. Suburban products whose serial number has been altered, defaced or removed.
11. Damage as a result of floods, winds, lightning, accidents, corrosive atmosphere or other conditions beyond the control of Suburban.
12. ANY SPECIAL, INDIRECT OR CONSEQUENTIAL PROPERTY, ECONOMIC OR COMMERCIAL DAMAGE OF ANY NATURE WHATSOEVER. Some states do not allow the exclusion of incidental or consequential damages, so the above limitation may not apply to you.

NO REPRESENTATIVE, DEALER OR OTHER PERSON IS AUTHORIZED TO ASSUME FOR SUBURBAN MANUFACTURING COMPANY ANY ADDITIONAL, DIFFERENT OR OTHER LIABILITY IN CONNECTION WITH THE SALE OF THIS SUBURBAN PRODUCT.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

#### IF YOU HAVE A PRODUCT PROBLEM

##### FIRST:

If your RV has its original water heater and is still under the RV manufacturer's warranty, follow the steps described in your RV owner's manual.

##### SECOND:

Contact a conveniently located authorized Suburban Service Center. A list of such service centers is enclosed with Suburban's Installation, Operating and Service Instructions book. Describe to them the nature of your problem, make an appointment, if necessary, and provide for delivery of the water heater to the selected service center.

##### THIRD:

Contact: Suburban Manufacturing Company  
Customer Service Department  
Post Office Box 399  
Dayton, Tennessee 37321  
Telephone: (615) 775-2131