



By Vehicle Systems, Inc.

Motor Coach Heating Specialists

OWNER'S MANUAL

MODEL NUMBERS

HHE-200-07E

HHE-500-07M

OWNER'S INFORMATION

Owner's Name: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Telephone: _____

Coach Model: _____

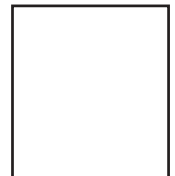
Coach Date of Purchase: _____

Hydro-Hot Model No: _____

Hydro-Hot Serial No: _____

Please Mail To: **Vehicle Systems Warranty Department**
 15549 East Highway 52
 Ft. Lupton, CO 80621

Hydro-Hot™ Motor Coach Heating System Owner's Manual 06/02



Vehicle Systems, Inc.
Warranty Department
15549 East Highway 52
Ft. Lupton, CO 80621

TABLE OF CONTENTS

1.0 Overview

2.0 Operating Instructions

- 2.1 Identifying your model of Hydro-Hot
- 2.2 Activating the Hydro-Hot Heating System
- 2.3 Zone Thermostat(s) Operation
- 2.4 Using the Domestic Hot Water System
- 2.5 Using the Engine Preheat System (**HHE-200 Model Only**)
- 2.6 Precautions

3.0 Maintenance

- 3.1 Maintenance Schedule

4.0 Winterization

- 4.1 Domestic Hot Water System

5.0 Troubleshooting

6.0 Electronic Controller Diagnostic

Hydro-Hot™ Motor Coach Heating System Owner's Manual 06/02

SECTION 1: OVERVIEW

Hydro-Hot Overview

The Hydro-Hot Motor Coach Heating System is an on-board Hydronic Heating System (heating with hot water) that provides a continuous, on-demand supply of domestic hot water, as well as interior zone heating where and when it is needed. Both heating features are accomplished by a unique Diesel-Fired Burner and an AC powered Electric Heating Element (120 VAC). These two heating sources maintain the temperature of the Hydro-Hot's solution of water and antifreeze. In addition, the Hydro-Hot has been designed to preheat the vehicle's engine prior to starting (**HHE-200 Model Only**). This optional feature provides easy engine start-up whenever cool weather conditions are present. Be sure to review **Figures 1 and 2** for complete component overview.

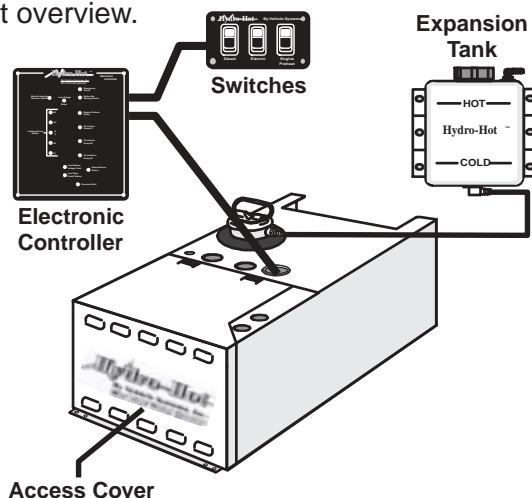


Figure 1

SECTION 2: OPERATING INSTRUCTIONS

Please read the complete Owner's Manual prior to operating your Hydro-Hot Heating System. Also, be sure to fill out and mail in your Owner's Information Card located at the front of this manual.

Model I.D.

2.1 Identifying Your Model Of Hydro-Hot

The Hydro-Hot is available in three different models. All three models of Hydro-Hot come standard with the continuous Domestic Hot and Interior / Bay Heating features. The Engine Preheat and Motoraide options are available on the HHE-200 and HHE-500 series, respectively. Be sure to identify your specific model of Hydro-Hot prior to reading this manual.

HHE-200 - Equipped with the Engine Preheat feature.

HHE-500 - Equipped with the Motoraide feature.

To find out what model Hydro-Hot you have, simply locate the Heater and find the I.D. Sticker (located on the right-hand corner on top of the Heater) and locate the rectangle box that is labeled "**Model Number.**"

Page 2-1

Hydro-Hot™ Motor Coach Heating System Owner's Manual 06/02

SECTION 2: OPERATING INSTRUCTIONS

Heat Source

2.2 Activating The Hydro-Hot Heating System

Diesel-Burner

Turn the "**Diesel**" Control Switch **ON**, **Figure 3**. This procedure will activate the Diesel-Burner and the Indicator Light located on the Switch. Please contact your specific motorhome manufacturer for the exact Diesel Control Switch location. Allow 10-20 minutes for the System to reach operating temperature. Please note that the Diesel-Burner is the **main heat source** for heating both the interior and the domestic hot water. So, be sure to leave this switch **ON** during normal heating requirements.

Electric Heating Element

Turn the "**Electric**" Control Switch **ON**, **Figure 3**. This procedure will activate the Electric Heating Element and the Indicator Light located on the Switch. The 120 VAC Electric Heating Element is wired directly into your coaches 120 VAC electrical system and is operational whenever VAC power is available. Allow 1-2 hours for the System to reach operating temperature. Please note that the Electric Heating Element will adequately provide all your heating needs **only** for low heating demand situations, such as when moderate ambient temperatures exist and/or when there is a low demand for domestic hot water.

Page 2-2

Hydro-Hot™ Motor Coach Heating System Owner's Manual 06/02

SECTION 2: OPERATING INSTRUCTIONS

Heat Source, continued

NOTE: Both the Diesel Burner and the 120 VAC Electric Heating Element are thermostatically controlled. Either, or both, heating sources will automatically maintain the temperature of the Hydro-Hot's water and antifreeze solution between approximately 160-190 degrees Fahrenheit. So simply choose how you want to heat your coach/hot water and just leave the Switch(s) (Diesel, Electric, or both) **ON**.

Comfort Control

2.3 Zone Thermostat(s) Operation

Interior Room Thermostats

Simply adjust each Room Thermostat to the desired temperature. Then whenever a Room Thermostat **"calls-for-heat"** the Hydro-Hot's Circulation Pump(s) and Interior Zone Fans will be activated. These devices together will supply warmth and comfort to each interior heating zone. Please contact your specific motorhome manufacturer for the exact room thermostat location(s).

NOTE: Interior zone heating and bay heating will not operate if the Hydro-Hot's water and antifreeze solution is cold or if domestic hot water is being used on a continuous basis (i.e. during showers).

Bay Thermostat

Simply adjust the Bay Thermostat to approximately 40 degrees Fahrenheit. This will prevent freezing of the domestic water storage system. Please contact your specific motorhome manufacturer for the exact Bay Thermostat location.

Page 2-3

Hydro-Hot™ Motor Coach Heating System Owner's Manual 06/02

SECTION 2: OPERATING INSTRUCTIONS

Hot Water

2.4 Using the Domestic Hot Water System

When the Hydro-Hot is at operating temperature, the domestic water is automatically heated as it is being used. Because the Hydro-Hot does not store any hot water simply open any hot water faucet and a continuous supply of domestic hot water will be present within a few seconds. This hot water feature is **continuous** and is accomplished by the Hydro-Hot's Mixer Valve and Intergal Domestic Hot Water System. Please note that the **"Diesel"** Control Switch must be **ON** to get an unlimited supply of hot water (i.e. during showers).

NOTE: The Hydro-Hot's **"Domestic Water Priority System"** disables the interior Zone Heating Fans, Zone Circulation Pumps, and the Engine Preheat Pump (if applicable) whenever domestic hot water is being used on a continuous basis (i.e. during showers). The Hydro-Hot will automatically enable these systems, within a few minutes, after the demand for continuous domestic hot water ceases.

Engine Preheat

2.5 Using the Engine Preheat System

Engine Preheat (HHE-200 Model Only)

When the Hydro-Hot is at operating temperature, and the **"Diesel"** and/or **"Electric"** Switch(s) is **ON**, follow these simple instructions:

A. Turn the Hydro-Hot's **"Engine Preheat"** Switch **ON**, **Figure 3**. This procedure will activate the Engine Preheat Circulation Pump and the

Page 2-4

Hydro-Hot™ Motor Coach Heating System Owner's Manual 06/02

SECTION 2: OPERATING INSTRUCTIONS

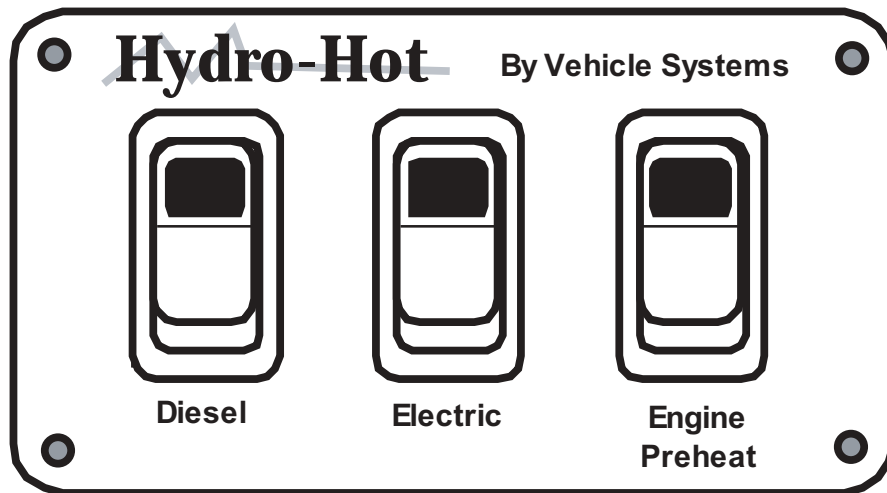
Engine Preheat, continued

indicator light located on the Switch. Circulating the engine's coolant through the Engine Preheat System will adequately warm the engine for easy start-ups on cool mornings. Please contact your specific motorhome manufacturer for exact “**Engine Preheat**” Switch location.

NOTE: Allow approximately 1 to 2 hours of engine preheating run time. Time will be shortest when the “**Diesel**” Switch is “**ON**.”

B. Turn **OFF** the Hydro-Hot's “**Engine Preheat**” whenever engine preheating is not desired.

Figure 2



Page 2-5

Hydro-Hot™ Motor Coach Heating System Owner's Manual 06/02

SECTION 2: OPERATING INSTRUCTIONS

Engine Preheat, continued

NOTE: Supplemental Heat (HHE-200 & HHE-500 Models Only)

The Hydro-Hot's Engine Preheating System acts as a **supplemental heating source**, in addition to the Diesel Burner and the 120 VAC Electric Heating Element. While traveling, the engine's heated coolant will automatically pass through the Engine Preheat / Motoraide System, transferring heat into the Hydro-Hot's Heat Tank. This design feature reduces the total operating hours of the Diesel-Burner and the 120 VAC Electric Heating Element.

Important Information



2.6 Precautions

CAUTIONS:

- **The Hydro-Hot's Exhaust is HOT!**
- **DO NOT** park in areas where dry conditions exist underneath the vehicle, as a fire may result (i.e. dry grassy fields) .
- **DO NOT** operate the Hydro-Hot's Diesel-Fired Burner inside an enclosed building.
- Operating the Hydro-Hot Diesel Burner or the 120 VAC Electric Heating Element without the water and antifreeze solution will cause **serious damage** to the Heater.
- The Heater should be switched **OFF** when refueling.

Page 2-6

Hydro-Hot™ Motor Coach Heating System Owner's Manual 06/02

SECTION 3: MAINTENANCE

■ Upkeep

3.1 Maintenance Schedule

Monthly

Check the Hydro-Hot's solution of water and antifreeze to ensure that it is at the proper level. Do this by visually checking the coolant level in the Hydro-Hot's Expansion Tank, **Figure 1**. This should be checked only when the Hydro-Hot is at operating temperature, **HOT**.



Annually

CAUTION: Before cleaning or servicing, disconnect all power supplies.

It is ideal to have your Hydro-Hot tuned-up yearly. A tune-up should consist of a Fuel Nozzle and Fuel Filter replacement and a thorough cleaning of the Combustion Chamber, if necessary. This simple tune-up will keep your Hydro-Hot running smoothly throughout the year. This annual tune-up will also allow service personnel to inspect for wear and tear of other components.



CAUTION: Operating the Hydro-Hot's Diesel Burner or the 120 VAC Electric Heating Element without the water and antifreeze solution will cause **serious damage** to the Heater.

SECTION 4: WINTERIZATION

■ Storage

4.1 Domestic Hot Water System

The Hydro-Hot's domestic hot water system must be completely drained of domestic water any time the heater is stored where freezing temperatures may be experienced.



NOTE: The Hydro-Hot can still be used for interior zone heating even if the domestic hot water system has been drained and winterized.

CAUTION: Not winterizing your Hydro-Hot, when freezing temperatures are present, **will result in serious damage** to the Hydro-Hot's domestic hot water system.

Follow the instructions listed below when winterizing the Hydro-Hot's domestic water system:

A. Completely drain the fresh water storage tank.

NOTE: If your coach is equipped with appliances that use fresh water (i.e. ice makers, water purifiers, etc.) follow the manufacturer's recommendation for winterization.

B. Disconnect the domestic water demand pump's suction line from the fresh water storage tank.

C. Attach an adequate piece of hose onto the suction side of the domestic water demand pump.

D. Place the opposite end of the hose into an adequate supply of FDA approved RV-Antifreeze; approximately 2 gallons will be required.

SECTION 4: WINTERIZATION

■ Storage, continued

- E. Open/close all interior and exterior water faucets, one at a time, until only pure RV-Antifreeze is present. Perform this procedure for both hot and cold faucets.
- F. Remove the hose and reconnect the domestic water demand pump's suction line to the fresh water storage tank.
- G. Disconnect all electrical power supplies to the Hydro-Hot during storage.

NOTE: 1. For de-winterization, fill the fresh water storage tank with fresh water. Open/close all interior and exterior water faucets, one at a time, until only clear water is present/visible.

2. The Hydro-Hot's Electronic Controller must be reset anytime VDC power is too low for the Hydro-Hot to properly operate or anytime this power source has been switched off or disconnected. To reset the Electronic Controller simply depress the "**Low Voltage Reset**" button located on the Electronic Controller (use a small screwdriver or thin straight object to access the reset button through the small hole on the Faceplate).



CAUTION: If you're disinfecting your potable water system, after de-winterizing, be sure to follow RVIA's "**Instruction for Disinfection of Potable Water Systems on Recreation Vehicles.**" These instructions can be found in the ANSI A119.2 Handbook for Recreational Vehicle Standards. To receive a copy of this RVIA Standard, write to: **Recreation Vehicle Industry Association, 1896 Preston White Drive, P.O. Box 2999, Reston, VA 20195-0999**, or visit the RVIA website at **www.rvia.com**.

Page 4-2

Hydro-Hot™ Motor Coach Heating System Owner's Manual 06/02

SECTION 5: TROUBLE SHOOTING

If the Hydro-Hot's Diesel Switch "**Indicator Light**" does not illuminate and the Diesel Burner is not functioning locate the Electronic Controller, **Figure 4**, and check the following:

- A. Check the Hydro-Hot's Electronic Controller for any RED lights indicating a fault condition. See **Figure 4** and **Section 6** to identify these fault conditions.
- B. Check for loose wire connections or plugs on the Electronic Controller's plug-in terminals. Please note that the Electronic Controller's cover panel can be easily removed by unscrewing the four cover screws.
- C. Remove the Hydro-Hot's Access Cover and check for loose plug connectors on the Diesel Burner's control unit (located on the under side), see **Figure 1**.
- D. If your Hydro-Hot still fails to operate, contact **Vehicle System's Technical Support Department** at **1-800-685-4298** for additional trouble shooting information or visit our website at **www.hydro-hot.com**.

Page 5-1

Hydro-Hot™ Motor Coach Heating System Owner's Manual 06/02

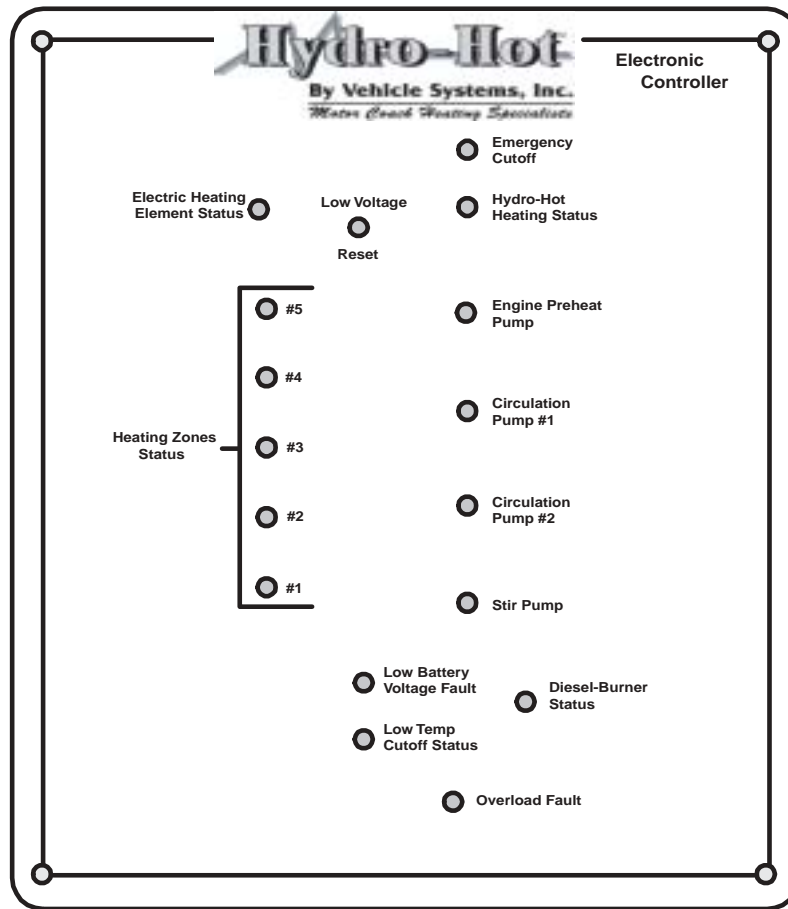


Figure 3

SECTION 6: ELECTRONIC CONTROLLER DIAGNOSTICS

Emergency Cutoff:

This indicator light will illuminate RED when the 120 VAC Electric Heating Element and Diesel Burner are off due to a low water and antifreeze solution level inside the Hydro-Hot's Heat Tank. This fault will automatically reset when the low level condition is corrected.

Low Battery Voltage Fault:

This indicator light illuminates RED when VDC voltage is too low for the Hydro-Hot properly operate. The fault must be manually reset once proper voltage is restored to the VDC battery system, **see Low Voltage Reset**.

Low Voltage Reset:

The Hydro-Hot must be manually reset whenever the Low Battery Voltage Fault Indicator has been activated. To reset the Electronic Controller simply depress the "**Low Voltage Reset**" button located on the Electronic Controller (use small screwdriver or thin straight object to access the reset button through the small hole on the Faceplate).

Low Temperature Cutoff Status:

This indicator light illuminates GREEN whenever heat is available for interior zone heating. Whenever this indicator light is **OFF** this indicates domestic hot water is being used on a continuous basis (i.e. during showers).

NOTE: The Hydro-Hot will not supply both interior zone heating and a continuous supply of domestic hot water simultaneously. This is what is called the "**Domestic Water Priority System**".

SECTION 6: ELECTRONIC CONTROLLER DIAGNOSTICS

Overload Fault:

This indicator light will illuminate RED under the following conditions:

1. The Hydro-Hot is off due to an electrical overload condition (short) in the main VDC power supply circuit.
2. The Hydro-Hot is off due to a combination of high electrical VDC power loads and a high surface temperature of the Electronic Controller.

The Hydro-Hot will automatically restart once the electrical overload (short) and/or high heat condition is corrected.

Heating Zones Status:

These five indicator lights (separately) illuminate GREEN whenever a Zone Thermostat calls-for-heat. The GREEN light also indicates that DC power is being supplied to the interior Zone Heating Fans. If any of the five indicator lights are illuminating RED this indicates an electrical overload condition (short) in that particular heating zone.

NOTE: A short in either the Zone Thermostat or a particular Zone Heating Fan circuit can cause the indicator light to illuminate RED.

SECTION 6: ELECTRONIC CONTROLLER DIAGNOSTICS

Circulation Pumps #1, #2, and the Stir Pump:

These indicator lights (separately) illuminate GREEN whenever a Zone Circulation Pump is operating. If any of the lights are illuminating RED this indicates an electrical overload condition (short) in that particular pump's electrical circuit.

NOTES:

1. The Circulation Pumps (separately) are activated whenever a Zone Thermostat calls for heat.
2. The Stir Pump is activated whenever domestic hot water is being used on a continuous basis (i.e. during showers).

SECTION 6: ELECTRONIC CONTROLLER DIAGNOSTICS

Engine Preheat Pump: (HHE-200 Model Only)

This indicator light illuminates GREEN whenever the Engine Preheat Pump is activated. If the light is illuminating RED this indicates an electrical overload condition (short) in the pump's electrical circuit.

Hydro-Hot Heating Status:

This indicator light illuminates GREEN whenever the Hydro-Hot's Heat Tank is being heated by either the Diesel-Burner or the 120 VAC Electric Heating Element. When the light is off, no heat is being supplied to the Hydro-Hot's Heat Tank.

NOTE: The Hydro-Hot will automatically activate either or both heating sources (i.e. Diesel-Burner, 120 VAC Electric Heating Element, or both) providing that both switches are in their **ON** position. So simply choose how you want to heat your coach/hot water and just leave the switch(s) (Diesel, Electric, or both) **ON**.

Electrical Heating Element Status:

This indicator light illuminates GREEN whenever VAC Power is being supplied to the Hydro-Hot's 120 VAC Electric Heating Element. If the light is illuminating RED this indicates an electrical overload condition (short) in the Electric Heating Element's **VDC** powered electrical circuit.

WARRANTY POLICY

- FOR HYDRO-HOT MODELS -

Vehicle Systems Inc. warrants the HYDRO-HOT Heater, to the original owner, to be free from defects in material and workmanship under design usage and service conditions for a period of two (2) years on parts and labor beginning on the date of purchase of the vehicle. Replacement parts are covered for the remainder of the heating systems warranty or for six months (180 days) which ever is greater.

This warranty does not apply to damage or failure of the HYDRO-HOT Heater or the vehicle into which it was installed due to improper installation, assembly, maintenance, abuse, neglect, accident, or the use of parts not supplied by Vehicle Systems Inc. Vehicle Systems is not responsible for incidental or consequential damages.

The intent of this warranty is to protect the end user of the heating system from such defects, which would occur in the manufacture of the product. The warranty is not intended to protect the end user from problems, which are outside the ability of Vehicle Systems' control.

To obtain warranty repair authorization or for additional information please contact our **Technical Support Department** at **1-800-685-4298 (8 AM to 5 PM) Mountain Standard Time.**

OWNER'S SERVICE LOG:

Date	Scheduled Service	Service Center

Hydro-Hot™ Motor Coach Heating System Owner's Manual 06/02

(Continued)

OWNER'S SERVICE LOG:

Date	Scheduled Service	Service Center

Hydro-Hot™ Motor Coach Heating System Owner's Manual 06/02

(Continued)

OWNER'S SERVICE LOG:

[illegible]

(Continued)

OWNER'S SERVICE LOG:

[illegible]

Vehicle Systems

I N C O R P O R A T E D

Motor Coach Heating Specialists • Manufacturers and Distributors

15549 East Highway 52 • Fort Lupton, Colorado 80621 • 1-800-685-4298 • Fax: 303-857-9000

© Copyright 2002 Vehicle Systems, Inc. All rights reserved

www.hydro-hot.com

LTE-VHS-222