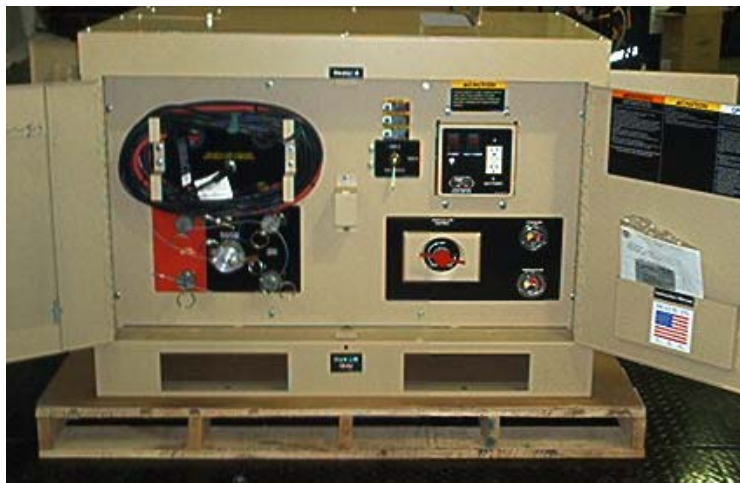




Small shelter patient decontamination system Water Heater



OPERATION & MAINTENANCE MANUAL

READ MANUAL BEFORE OPERATING

Failure to follow the operating procedures described in this manual may result in serious injury or death and damage to the equipment which is not covered under warranty.

This manual contains privileged and confidential information. Any copying, disclosure, dissemination, or distribution of its contents is strictly forbidden without the written consent from REEVES EMS, LLC. Additional copies of this manual are available from REEVES EMS, LLC.

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Warning Summary

This Warning Summary explains the use of general safety Note, Caution, Warning and Danger notices present in this Technical Manual that must be understood and applied during the operation and maintenance of this equipment. Failure to observe these precautions could result in serious injury or death to personnel.

Equipment Specific Safety Issues

General

The cautions and warnings point out known conditions that are potentially hazardous. However, no manual can cover every possible situation. If in doubt, contact Reeves.

Service and repair procedures not covered in this manual should be performed only by authorized Reeves technicians.

General Precautions

REMEMBER SAFETY FIRST. If unsure of the instructions or proper operating procedures, contact Reeves before continuing.

This manual emphasizes the safety precautions necessary during the operation and maintenance of the Small Shelter Patient Decontamination System (SSPDS) Water Heater. Each section uses caution and warning messages for both the safety of the operator as well as the durability of the equipment. If any of the cautions or warnings is not readily understood, contact REEVES EMS, before proceeding.

When an abnormal condition is observed and procedures in the manual do not specifically describe the condition, all operations should be stopped and REEVES EMS should be contacted immediately for assistance.

REEVES EMS, Contact Information

Phone: 800-328-5563
FAX: 301-698-1599
E-mail: info@reevesdecon.com

Qualified Personnel

A qualified person is someone who is familiar with this manual, the operation of the Small Shelter Patient Decontamination System (SSPDS) Water Heater, the hazards involved in its operation and maintenance, and who has been certified by the REEVES EMS training program.

This manual is not intended to be a substitute for proper training. REEVES EMS strongly recommends that all receive training directly from REEVES EMS

IMPORTANT

**READ ALL OF THE INFORMATION CONTAINED IN THIS MANUAL BEFORE OPERATING
THE SSPDS WATER HEATER**

Warning Box Words & Icons

Warning Boxes are provided throughout this Technical Manual and are used to call attention to various details about either the equipment that are important enough to separate from the normal operating descriptions, procedures and / or a safety-related situation that the operator must be aware of. The appearance of the basic Warning Box is shown in Figure A. There are generally four information points provided by each Warning Box that follow a defined pattern. Figure A defines the positions of the information points.

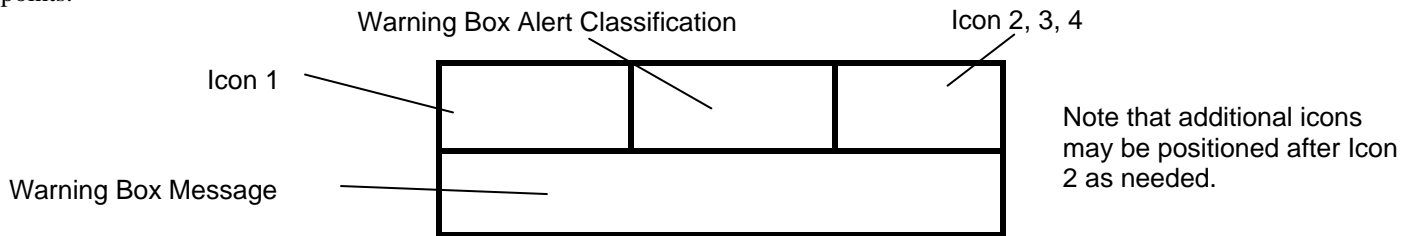


Figure A - Warning Box Definition

Icon 1:

Icon 1 is the primary indication of the contents of the Warning Box. The Icon is meant to visually alert the reader to the level of importance of the Warning.

Icons 2, 3, 4:

The icons that appear to the right of the Warning Box Classification provide a secondary indication of the contents of the Information Box. The position is labeled Icon 2, 3, 4 in Figure a (above) because there may be multiple types of alerts associated with the warning. The types of Icons found in Icon Box 2 are as follows:

When Icon 2 is the same as Icon 1, it means that there is no further specific information about the type of Alert.

If Icon 2 is different than the icon shown in Icon Box 1, it means that there is more specific information available about the type of Alert. An example of an Warning Box where there would be two different Icons shown in Icon Box 1 and Icon Box 2 would be that of a burn hazard. In this case, Icon Box 1 will show an Icon representing a burn hazard. If the burn hazard was created by a particular substance such as gasoline, Icon Box 2 would be an Icon indicating a Flammable Fluid.

In certain instances, additional icons will appear after Icon #2. These icons will either enhance the definition of the warning or they will indicate the presence of additional hazards that may exist either because of the original condition or in addition to the original condition.

Warning Box Alert Classifications

The Warning Box Alert Classification is an indication of the level of importance of the Warning Box. The various levels of Alert Types are defined below, from the most important (Danger) to items of lesser importance.

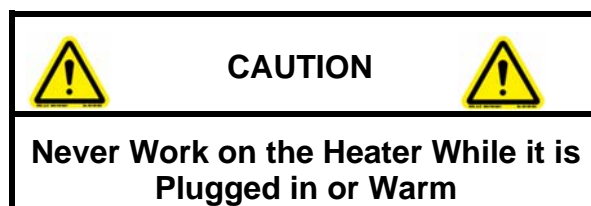







Figure B - Example of a Generic Warning

Common Warning Symbols Definitions

The following symbols are commonly used to indicate that a task requires precautionary measures be understood and practiced during the execution of the task.

Icon	Definition	Notes
	<p>CAUTION</p> <p>The exclamation point is intended to alert the user to the presence of important operating and/or maintenance (servicing) information in the literature accompanying the product.</p>	
	<p>PRESENCE OF ELECTRICITY</p> <p>The lightning bolt is intended to alert the user to the presence of electricity. The electricity can be directly related to the specific operation or it can be in the area of the operation.</p>	This icon is typically used with another, more specific, icon that identifies the nature of the warning.
	<p>HAZARDOUS VOLTAGE</p> <p>The lightning bolt and human figure is intended to alert the user to the presence of voltages that can serious or fatal shock to a person.</p>	
	<p>EXPLOSION</p> <p>The explosion is intended to alert the user to the possibility that something associated with or in the area of the particular operation presents the risk of an explosion.</p>	This icon is typically used with another, more specific, icon that identifies the nature of the warning.
	<p>EXPLOSION</p> <p>The explosion with a face is intended to alert the user that a particular operation or task exposes the individual(s) to a risk of explosion within close proximity to the immediate work location.</p>	This icon is more specific than the previous EXPLOSION icon.
	<p>HOT SURFACE</p> <p>The open flame and heat lines are a generic icon to alert the user that there is or could be an exposed source of flame in the immediate vicinity of the particular operation.</p>	This icon is not the same as the FLAMMABLE icon described below.
	<p>HOT SURFACE w/BURN HAZARD</p> <p>The radiating surface with a hand alerts the user to the risk that there is or could be a potential for being burned by contact with a surface.</p>	Hot surfaces are not always associated with a flame. An engine exhaust pipe is one example of a hot surface with no flame.








Icon	Definition	Notes
	<p>FLAMMABLE</p> <p>The large open flame indicates that the associated operation involves working with fluids and/or gases that are flammable.</p>	<p>Burning gases and liquids can cause severe burns.</p> <p>Keep ignition sources away.</p>
	<p>HAND ENTANGLEMENT</p> <p>The image of a hand being trapped between two rollers indicates that there is a risk of a hand being trapped and possibly injured by one or more pieces of moving machinery.</p>	
	<p>PINCH POINT</p> <p>The image of a hand being crushed between two objects indicates that the particular piece of equipment or the particular operation presents the possibility that a hand or other part of the body can be pinched during the task.</p>	
	<p>STOP</p> <p>The uplifted hand within a red circle indicates that the person should stop and identify all possible risks and hazards associated with the particular operation before proceeding. Failure to observe this warning can lead to serious problems and the risk of injury or death.</p>	<p>Other warnings that use this same icon include:</p> <p>STAY CLEAR</p>
	<p>HAZARDOUS GASSES</p> <p>The image of a person inhaling gasses is intended to alert the user to the possible presence or release of gasses in the immediate area that can be harmful if inhaled.</p>	
	<p>FIRE EXTINGUISHER</p> <p>The image of a fire extinguisher indicates that the person should have an extinguisher ready or be aware of the location of the nearest fire extinguisher during a particular operation or task.</p>	
	<p>FIRST AID</p> <p>The cross in a circle is the international standard icon for a first aid kit. When used within an Operation & Maintenance Technical Manual, the First Aid icon indicates that the person should be aware of the location of such a kit.</p>	

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1 SCOPE

This Operator's (SSPDS) Manual describes the safe operation and field maintenance for the small shelter patient decontamination system (SSPDS) Water Heater. You can be assured your hot water heater was constructed and designed with quality and performance in mind. Each component has been rigorously tested to ensure the highest level of acceptance.

This operator's manual was compiled for your benefit. By reading and following the simple safety, installation, operation, maintenance, and troubleshooting steps described in this manual, you will receive years of trouble free operation from your new hot water heater.

1.1 Receipt of the Small Shelter Patient Decontamination System Water Heater

Once the unit has been uncrated, immediately write the model and serial number in the space provided below.

Model Number _____

Serial Number _____

Inspect for signs of obvious or concealed freight damage. If damage does exist, file a claim with the transportation company immediately. Be sure that all damaged parts are replaced and that the mechanical and electrical problems are corrected prior to operation of the unit. If you require service, contact REEVES EMS, Customer Service. Have the model number and serial number available for all service calls.

1.2 Equipment Descriptions

The small shelter patient decontamination system is a stationary water heater, with a heating output of 425,000 BTU. It also has a 6.6 gallon polyethylene decontamination solution holding tank and has the capability of supplying hot water up to 28 gallons per minute.

The SSPDS Water Heater has an enclosed fan-cooled electric motor with manual thermal overload protection, and is capable of using No.1 or No. 2 Diesel / Kerosene for the burner. This water heater has a built-in Anti-Scald Protection device and a Heat Dump Valve to protect the coils and components

1.2.1 Solution Injector System

For best possible performance from the injector, read this manual carefully and keep it in a safe place for further reference. Your injector is made with high quality materials and includes the following features:

- A non-electric, volumetric proportional injector system.
- Injector system designed to operate upon water flow.
- Built-in mixing chamber.
- Red manual bypass (ON / OFF) knob.
- Pressure regulator.
- In-line 100 micron filtration system.
- Automatic air relief valve
- Flow range: 2.6 to 660 gallons per hour (GPH).
- Injection rate: 2% (1:50) to 10% (1:10).
- Operating pressure: 7 – 80 PSI.

1.2.2 Thermostatic Mixing Valve

The mixing valve is carefully assembled, tested at the factory, and set to deliver water at any temperature between full cold and 110 degrees F. Failure of the cold water supply will cause the hot water seat to close. The label on the valve is marked "Hot-Cold", so that the handle can be set accordingly. When the unit is not being used, turn the handle towards the Cold position fully to shut off all flow.

1.2.3 Thermostatic Stop and Check Valves

At each inlet of the valve, there is a screwdriver operated check valve. Both the cold and hot water stop and check valves must be open at all times for proper function of the valve. These stops are checked and opened fully before the unit is shipped.

2 SAFETY

2.1 Scope

This chapter contains general information for the safe operation and maintenance requirements for the SSPDS Water Heater. The cautions and warnings point out known conditions that are potentially hazardous. However, no manual can cover every possible situation. When in doubt, contact REEVES EMS, (Phone: 800-328-5563, fax: 301-698-1599 or Email: info.reevesdecon.com). Before calling for assistance, please have the model number and serial number available.

2.2 Signal Words and Labels

Signal words and labels are used throughout this manual. The words and symbols convey the following advice:

Danger: Danger refers to immediate hazards that will result in severe personal injury or death.

Warning: Warning refers to a hazard or unsafe method or practice that may result in severe personal injury or death.

Caution: Caution refers to a hazard or unsafe method or practice that may result in equipment damage or personal injury.

Important: Important refers to a hazard or unsafe method or practice that can result in equipment damage.

2.3 General Precautions

PLEASE REMEMBER SAFETY FIRST. If you are not sure of the instructions or procedures, contact REEVES EMS, before continuing.

This manual emphasizes the safety precautions necessary during the operation and maintenance of your SSPDS Water Heater. Each section has caution and warning messages. These messages are for your safety and the safety of the equipment involved. If any of the cautions or warning is not readily understood, contact REEVES EMS, before proceeding.

When an abnormal condition is observed and the procedures in the manual do not specifically cover the condition, all work should be stopped. Contact REEVES EMS for assistance. An authorized REEVES EMS technician should give guidance on the abnormal condition before any work can be continued.

The following safety precautions should always be observed for the following hazards.

Risk of Electric Shock or Electrocution – Serious injury or death could occur if the heater is not properly grounded. Your heater is powered by electricity and may cause electric shock or electrocution if not used properly.

- This unit **must** be grounded. Make sure the water heater is equipped with a GFCI built into the power supply cord. If this is not available, the heater **must** be plugged into a receptacle that is protected by a GFCI.
- **Do Not** modify the electrical plug. If the plug will not fit into the outlet, have a proper outlet installed by a qualified electrician.
- Check power cord for signs of crushing, cutting or heat damage. If replacement is required, **only use** identical replacement parts.
- **Do Not** allow metal components of the water heater to come in contact with live electrical components.
- **Never** operate the water heater with safety guards / covers removed, missing, or damaged.
- Before opening any electrical enclosure, always shut off the water heater, relieve pressure and unplug the water heater from the power source

Risk of Explosion or Fire – Serious injury or death may occur from normal sparks in the multiple ignition sources or burner exhaust.

- **Always** operate the water heater in a well ventilated area free of flammable vapors, combustible dust, gases, or other combustible materials.
- **Do Not Smoke** while filling burner fuel tank.

- **Never** fill the burner fuel tank while the water heater is running or hot. Allow to cool a minimum of two minutes before refueling.
- **Only use** #1 or #2 fuel oil / diesel or kerosene. **DO NOT USE** gasoline, crankcase draining or oil containing gasoline or solvents

Risk of Asphyxiation – Serious injury or death may occur from inhaling burner exhaust or dangerous vapors.

- **Never** operate this water heater in an enclosed area. **Always** make certain there is adequate ventilation (fresh outside air) for breathing and combustion. This will prevent the buildup of dangerous carbon monoxide gases. Beware of poorly ventilated areas or areas with exhaust fans which can cause poor air exchange.

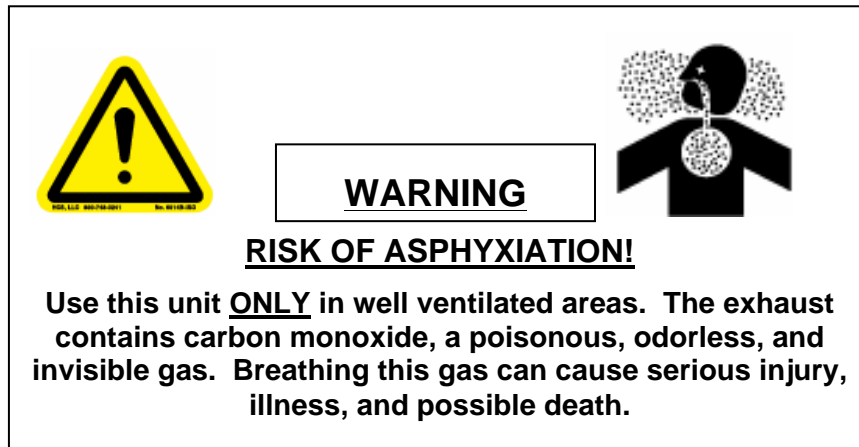
Risk of Bodily Injury – Serious injury or death may occur.

- **Never** allow any part of you body to contact the heat exchanger.
- Stay alert – watch what you are doing. **Do Not** operate the unit when fatigued or under the influence of drugs or alcohol.
- Know how to stop the water heater and bleed pressures quickly. Be thoroughly familiar with all controls.
- **Do Not** leave pressurized unit unattended. Shut off water heater and release trapped pressure before leaving.
- Before performing any maintenance work:
 - (a). Wait for the water heater to cool down.
 - (b). Turn power switch to the OFF position.
 - (c). Unplug the power cord.

3 WATER HEATER PREPARATION

3.1 Setup

- 1) **Do Not** use this unit in an area:
 - a) With insufficient ventilation.
 - b) Where there is a combustible ceiling unless suitable exhaust stack is installed.
 - c) Where there is evidence of oil or fuel leaks.
 - d) Where flammable gas vapors may be present.
- 2) Allow sufficient clearances of no less than four feet around the water heater for accessibility.
- 3) **Do Not** allow the water heater to be exposed to rain, snow, or freezing temperatures. If any part of the unit becomes frozen, excessive pressure may build up in the water heater which could cause it to burst resulting in possible serious injury to the operator or bystanders.



3.2 Ventilation Instructions

- a) Installation of this unit in an indoor or enclosed environment should be performed by a qualified HVAC technician. Additionally, venting must conform to all local, state, and federal codes. Refer to NFPA 31 and CAN/CSA B139-M91, where applicable.
- b) Exhaust gases **must not** be vented into a wall, ceiling, or a concealed space of a building.
- c) An eight (inch) flue pipe must be used to match the size of the stack. The flue pipe should be kept as short as possible and be installed so that it has a continuous rise to the chimney. Elbows **must** be kept to an absolute minimum to maintain the forced air draft in the system and ensure good burn quality.
- d) If the unit is being installed in an enclosed room, an adequate air supply **must** be provided to the burner by installing openings near the floor. These openings should be at least one square inch per 1000 BTU input of the machine. Also, a ventilation opening **must** be installed near the ceiling. This opening should be at least the same size as the supply opening near the floor. Refer to NFPA 31 and CAN/CSA B139-M91, where applicable.
- e) If the burner is located in a tightly constructed building where there is inadequate outside air infiltration, outside combustion air **must** be supplied by some other means. One method to accomplish this is through a permanent opening(s) which must not be less than one square inch per 5,000 BTU input. All appliances **must** be taken into consideration. Refer to NFPA 31 and CAN/CSA B139-M91, where applicable.

3.3 Power Cord Connection



DANGER



RISK OF ELECTROCUTION

To reduce the risk of electrocution, keep all connections dry and off the ground, unit must be connected to a properly grounded outlet, do not touch plug with wet hands and do not use an adapter or remove the third grounding prong.

1. Make certain the power switch is in the OFF position.
2. Ensure the electrical supply is a minimum of 15 amp / 110V.
3. **GROUNDING INSTRUCTIONS:**
 - a) This unit **must be** grounded. If it should malfunction or breakdown, grounding provides a path of least resistance for electric current to reduce the risk of electric shock. This unit is equipped with a cord having an equipment-grounding conductor. The plug must be plugged into an appropriate outlet that is properly installed and grounded in accordance with all local codes and ordinances.
4. **DANGER:**
 - a) Improper connection of the equipment-grounding conductor can result in a risk of electrocution. Check with a qualified electrician or REEVES EMS, if you are in doubt as to whether the outlet is properly grounded. **Do not modify the plug**, if it will not fit the outlet; have a proper outlet installed by a qualified electrician. **Do not** use any type of adapter with this unit.
5. **GROUND FAULT CIRCUIT INTERRUPTER PROTECTION:**
 - a) SINGLE PHASE – if this water heater is provided with a Ground Fault Circuit Interrupter (GFCI) built into the plug or power supply cord, test the GFCI each time it is plugged into an outlet according to the instructions on the GFCI. **Do not** use the water heater if the test fails. The GFCI provides additional protection from the risk of electrical shock. Should replacement of the plug or power cord become necessary, use only identical replacement parts that include GFCI protection.
6. **EXTENSION CORDS:**
 - a) **Using extension cords is not recommended.** If an extension cord must be used, it must be plugged into a GFCI found in circuit boxes or protected receptacles. When using an extension cord, consult a qualified electrician to determine the proper wire gauge needed for the length of the extension cord.
 - b) SINGLE PHASE – use only three wire extension cords that have three prong grounding type plugs and three pole cord connectors that accept the plug from the water heater.
*If the use of an extension cord is a **must**, only use extension cords that are intended for outdoor use.* These extension cords are identified by a marking “Acceptable for use with Outdoor Appliances”. Use only extension cords having an electrical rating not less than the rating of the water heater. **Do Not Use Damaged Extension Cords.** Examine extension cord before using and replace if damaged. Do not abuse extension cords and do not pull on any cord to disconnect. Always connect or disconnect the extension cord from the receptacle before connecting or disconnecting the unit from the extension cord.
7. Ensure the area between the water heater power cord and outlet is kept dry.
8. Insert the male plug into a grounded AC outlet. **DO NOT use an adapter or remove the grounding plug.**

3.4 Burner Fuel Tank



DANGER



RISK OF FIRE OR EXPLOSION

DO NOT smoke while fueling. DO NOT fill the fuel tank while unit is running or hot. Allow two minutes before refueling. DO NOT fill fuel tank to point of overflowing. Always store fuel away from the water heater while the unit is operating or hot

1. Before fueling, review the following “Risks of Explosion or Fire”:
 - a) **Always** operate water heater in a well ventilated area free of flammable vapors, gases, or other combustible materials.
 - b) **Do Not** store the water heater near an open flame or any equipment such as stoves, furnace, water heater, etc., which utilizes a pilot light or sparking device
 - c) **Do Not** use the water heater to spray flammable materials.
 - d) **Do Not** smoke while filling burner fuel tank.
 - e) **Never** fill the burner fuel tank while the water heater is operating or hot. **Always** allow to cool two minutes before refueling.
 - f) **Do Not** refuel in a poorly ventilated area.
 - g) **Always** refuel slowly to avoid the possibility of spilled fuel which may cause a risk of fire.
2. Locate all the Safety Decals on your water heater and heed their warnings.
3. Fill the burner fuel tank with good quality, clean No. 1 or No. 2 fuel oil / diesel or kerosene. **Do Not Use Gasoline.**

3.5 Water Supply

NOTE

Always flush water supply hose before attaching to the water inlet of the water heater

1. This system accepts water supplied from commercial buildings, standard hydrant, or truck with adequate pressure and flow. The hose should be a quality grade of fire hose with 1 ½ inch NFT.
2. Connect one end of the water supply hose to the water heater inlet. Connect the other end of the hose to the pressurized water supply.
3. Follow the incoming water requirements listed below:
 - a) Water pressure **must** be between a minimum of 60 pounds per square inch (PSI) and a maximum of 125 PSI.
 - b) Incoming water temperature **must** not exceed 125 degrees F.
4. **Never** allow the water heater to operate without the incoming water supply hose attached and the water supply completely turned on.

3.6 Heat Dump Valve

A “heat dump valve” has been added to this unit to protect the coil and components. This valve will open and release water if the water temperature in the pump exceeds 220 degrees F. This will allow fresh, cool water to enter the system, and prevent premature failure. To ensure the water temperature does not exceed acceptable levels, never allow the water heater to operate with the unit running and the temperature control valve shut off more than five minutes.

3.7 Pre-Start Inspection Procedures

Before starting the water heater, perform the following procedures:

1. Inspect the electrical cords for damages. If cord is damaged, **DO NOT TOUCH OR USE CORD**. Replace cord before starting water heater.
2. Check all hose connections to ensure they are securely tightened.
3. Inspect for system water leaks and fuel leaks. If fuel leak is detected, **DO NOT START THE UNIT**. Be sure that all damaged parts are replaced and that the mechanical problems are corrected prior to operation of the unit. If you require service, contact REEVES EMS.

4 OPERATING INSTRUCTIONS



IMPORTANT



THIS SECTION CONTAINS THE OPERATING PROCEDURES OF THE SSPDS WATER HEATER, P/N RDHW0012. DO NOT ATTEMPT TO OPERATE THIS WATER HEATER UNTIL YOU HAVE READ AND UNDERSTOOD ALL SAFETY PRECAUTIONS AND OPERATING PROCEDURES LISTED IN THIS MANUAL.

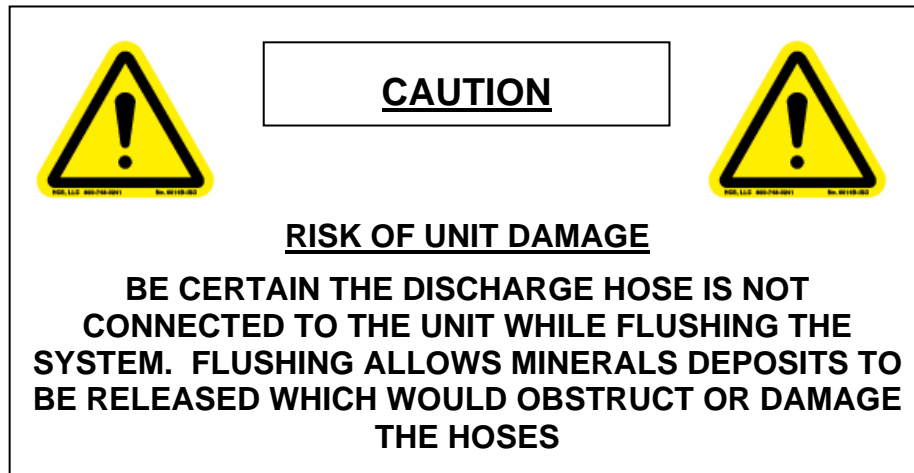


WARNING



INCORRECT OPERATION OF THIS WATER HEATER COULD RESULT IN SERIOUS INJURY AND OR DAMAGE TO THE EQUIPMENT. DO NOT ALTER OR MODIFY THIS EQUIPMENT IN ANY MANNER

4.1 Flushing the System



This unit has a steel coil which, after setting, will cause any water remaining in the coil from the previous usage to turn brown or black. This water **must be** flushed from the system before start-up. This procedure should be performed **without** any of the discharge hoses attached.

1. Turn the water supply ON.
2. Turn the temperature control valve counter clockwise (CCW) until water begins to flow. This allows the unit to flush any particles from the system. The unit is flushed when the water is clear.
3. Once the system has been flushed, turn off the temperature control valve and connect the discharge hoses to the water heater outlets.

NOTE: Make sure injector switch is in the off position

4.2 Start-Up Procedures

1. Locate safety decals on the water heater and heed their warnings
2. Fill the burner fuel tank with #1 or #2 fuel oil, diesel or kerosene.
3. Plug the water heater into an outlet matching the plug on the cord. (If connected to a circuit protected with fuse, use time delay fuses with this water heater).
4. Connect the inlet water supply to the unit.

NOTE: Flush water supply before connecting to unit.

5. Connect fresh rinse discharge hose (Black) and decon solution discharge hose (Red) to the corresponding discharges on the unit. Connect the “male” end of the hose to the shower system.
6. Turn the temperature control valve clockwise (CW), to the OFF position.
7. Open the water supply completely to charge the water heater.
8. Open the temperature control valve, counter-clockwise (CCW), until water begins to flow from the shower heads.
9. Allow the water to flow until all air is released from the supply hoses.
10. Once the system is in full flow, turn the power switch to the ON position.

4.3 Hot Water Operation



1. Once the unit has started, perform the following procedures with the temperature control valve open **but, in the cold position.**
 - a) Inspect the system for any water, oil, or fuel leaks. If a leak is noted, **Turn The Unit OFF Immediately.** Be sure that all damaged parts are replaced and that all mechanical problems have been corrected prior to proceeding.
 - b) Inspect discharge hoses for kinking, cuts and leaks. If a cut or leak has been noted, **Turn the Unit OFF Immediately.** Replace damaged hose and ensure all mechanical problems have been corrected prior to proceeding.
2. Turn the temperature control valve counter-clockwise (CCW) to the desired temperature.

NOTE: Upon initial start-up, water will begin to heat and will reach maximum temperature in approximately 2 ½ minutes. During initial temperature setting, move the temperature control valve slowly allowing time for the thermometer to register the accurate temperature. Be extremely cautious when adjusting the temperature to avoid the possibility of burns.

4.4 Solution Injector Operation

1. Turn the water heater ON and begin flowing heated water to the showerheads and spray wands.
2. Fully immerse solution pickup in the solution container.
3. Once the unit is running and the solution has been filled, turn the red knob clockwise to activate the injector.
4. When the unit is operating, liquid will be drawn from the solution container and a ‘clicking’ sound will be heard.
5. When finished using the decon solution, siphon water through the system, to flush the decon solution.
6. When finished flushing the injector system, turn off the injector by turning the red knob counter-clockwise (CCW) until the “clicking” stops. **Do not unscrew knob all the way out.**

4.4.1 Injector Settings

Solution Concentration	Injector Stem Settings
5.25% Bleach	9.5
10.0% Bleach	5.0
14.0% Bleach	3.6
Soap	7.0

4.5 Thermostatic Temperature Adjustment

Units are preset for maximum temperature of 110 degrees F. If a temperature adjustment is needed, follow the steps below. Failure to follow these steps properly will **void the valve warranty** and can cause serious damage.


1. Remove handle screw.
2. Turn the valve handle counterclockwise (CCW) to the hot position. Valve handle **must** be in the hot position before adjusting screw.
3. Using a narrow blade, screwdriver, turn the adjusting screw, (located inside the handle), clockwise (CW) to decrease maximum outlet temperature and counterclockwise (CCW) to increase maximum outlet temperature. Adjusting screw should not be turned more than ½ turn at a time without testing water temperature.
4. When temperature is correct, replace handle screw.




CAUTION: It is not recommended to set the maximum outlet temperature above 110 degrees F.

NOTE: Adjusting screw may not be turned counterclockwise (CCW) more than 1 ½ turns.

4.6 Shutdown Procedures



DANGER



RISK OF INJECTION CAUSING SEVERE INJURY

To prevent accidental high pressure discharge, Do Not leave the unit unattended until system has cooled and the temperature control valve is in the OFF position

1. Turn the power switch OFF. Run cold water through the system for 3-5 minutes to cool the heat exchanger and components. (**NOTE: Insufficient cool down period of complete system, will cause excessive wear and strain on the system.**)
2. While unit is cooling, empty the decon solution tank; clean and refill with clean water.
3. Submerge injection hose pickup, turn the injector to the “ON” position, and allow clean water to flush the injector and decon solution discharge hose.
4. Turn the water supply “OFF”. Disconnect supply hose from the water heater and drain the system.
5. Disconnect all discharge hoses and attach the supplied “blowout cap” to the intake of the unit. Purge the system of remaining water with compressed air and cap all openings.
6. Store all hoses and electrical cords in their proper locations.
7. Wipe the unit clean and if necessary, winterize the water heater.

5 MAINTENANCE SCHEDULE

MAINTENANCE CHART

PROCEDURE*	BEFORE OPERATION	DAILY	3 MONTHS	6 MONTHS	9 MONTHS	12 MONTHS
Inspect Electrical Cord	X	X	X	X	X	X
Test GFCI (See Instructions)	X	X	X	X	X	X
Test Gauges (Temp & Pressure)	X	X	X	X	X	X
Check Fuel Level	X	X	X	X	X	X
Decon Solution	X	X	X	X	X	X
Visual Inspect for Fuel Leaks	X	X	X	X	X	X
Visual Inspect for Water Leaks	X	X	X	X	X	X
Visual Inspect all Hoses	X	X	X	X	X	X
Inspect Injector Strainer	X	X	X	X	X	X
Inspect all Hose Connections	X	X	X	X	X	X
Check Burner Air Adjustment			X	X	X	X
Test Water Temperature			X	X	X	X
Replace Fuel Filter				X		X
Test Fuel Pressure**						X
Test Voltage & Amp Draw**						X
Inspect Fuel Pump Filter**						X
Check Burner Electrodes**						X
Replace Fuel Nozzles**						X
Clean Fuel Pickup In-line Screen**						X

***SEE PROCEDURE EXPLANATIONS ON THE FOLLOWING PAGES**

****SHOULD BE PERFORMED BY AN AUTHORIZED SERVICE TECHNICIAN**

5.1 Maintenance – Daily

- ✓ **Inspect Electrical Cord** – Detach unit from power source and inspect electrical cords to ensure they are serviceable. If damage is noted, replace cord before operating the unit.
- ✓ **Test GFCI** – If applicable, test the GFCI. Testing varies according to the specific GFCI.
- ✓ **Test Gauges** – If gauges do not operate properly, contact REEVES EMS, for replacement gauges.
- ✓ **Fuel Level** – Check for proper fuel level. If fuel is low, fill tank according to manufacture recommendations.
- ✓ **Fuel Leak Inspection** – If a fuel leak is noted, shut down the unit **immediately**. Be sure that all damaged parts are replaced and all mechanical problems are corrected before restarting. If additional assistance is needed, contact REEVES EMS.
- ✓ **Water Leak Inspection** – If a leak has been found, promptly eliminate any leaks found in the pumping system by removing suspected parts. Apply thread sealant to the threads and reinstall. If additional assistance is needed, contact REEVES EMS.
- ✓ **Hose Inspection** – Inspect hoses for kinks, cuts, or leaks. If a cut and / or leak is found, replace hose before restarting the unit. **Do not use hose if damage is present.** If additional assistance is needed, contact REEVES EMS.
- ✓ **Water Strainer Inspection** – Ensure the water strainer is clean and free of any foreign objects. The system is standard with an injector strainer, located on the inlet side of the injector and has an optional main water supply strainer. Periodic cleaning of the water strainer will help prevent problems. As a strainer becomes clogged with foreign material, it restricts proper flow of water to pump. This can result in cavitations which will cause premature failure. Remove strainer screens, inspect, clean, and or replace.
- ✓ **Quick Coupler Inspection** – There are o-ring seals inside the couplers which will deteriorate. To replace, simply install a replacement o-ring to correct the leak. (Additional o-rings can be purchased from your dealer).
- ✓ **Decontamination Solution Level** – Check the solution level in the tank located under the unit. If level is low, refill with proper decontamination solution

5.2 Maintenance – Every 3 Months

- ✓ **Burner Air Adjustment:** The air shutter has been factory preset to the proper operation between sea level and 2000 feet elevation at standard conditions, (60 degree F ambient water, and air temperatures). In cooler temperatures or higher altitudes, it may be necessary to adjust the air supply to the combustion chamber. This adjustment will maximize burner efficient operation or excessive sooting of the heat exchanger coil. A smoke spot test is recommended during any air shutter and band adjustment. If you do not have the equipment to perform a smoke spot test, follow the procedures listed below.
 - a) The water heater must be operating and heating water.
 - b) Loosen the locking screw on the shutter.
 - c) Check for smoke from the heat exchanger exhaust. If smoke is not present, slowly close the Air Shutter by moving the dial counterclockwise (CCW) to a lower number. Continue moving the dial until smoke appears.
 - d) Record the setting.
 - e) Open Air Shutter by two increments. (Example- If Air Shutter was set at 2, then move it to 4).
 - f) Repeat steps ‘E’ and ‘F’ until a smoke puff is noticed. Record the Air Shutter setting.



- g) The difference between the recorded settings in step 'D' and 'F' is the combustion window. Set the dial half way between these settings.

NOTE: If you are unable to detect a setting on either step "C" or step "G", more or less air may be needed to achieve a proper combustion window. Loosen the bolt and open the Air Band in 1/4 increments. Repeat steps "C"- step "G" until proper combustion window is achieved.

- ✓ **Test Fuel Pressure** – This procedure should be performed by an authorized service technician.
- ✓ **Test Water Temperature** – Turn unit on and begin heating the water. Adjust the temperature control valve to the proper temperature. Once the desired temperature is reached, take a thermometer and test the discharge water. There should be a 5-10 degree temperature difference between the gauge and discharge depending on the location of the test discharge water.

NOTE: To get the most accurate reading attach discharge hoses and then measure the temperature.

5.3 Maintenance – Every 6 Months

- ✓ **Replace Fuel Filter** – Loosen and remove the old fuel filter by turning it counterclockwise (CCW). If needed, an oil filter wrench can be used to loosen the filter. Install new fuel filter and turn it clockwise (CW) until it is secured.

5.4 Maintenance – Every 12 Months

- ✓ **Test Voltage & Amp Draw** – Use volt and amp meters to test for correct voltage and amperage. If you do not have these instruments or do not know how to use them; this procedure should be performed by an authorized service technician.
- ✓ **Inspect Fuel Pump Internal Filter** – This procedure must be performed by an authorized service technician.
- ✓ **Check Burner Electrodes** – This procedure should be performed by an authorized service technician.
- ✓ **Replace Fuel Nozzle** – This procedure should be performed by an authorized service technician.

5.5 Maintenance – Seasonal

- ✓ **Winterizing** – For storage and transportation purposes in subfreezing ambient temperatures, it will be necessary to winterize the unit. This unit must be protected to the lowest incurred temperature for the following reasons:
 1. If any part of the system becomes frozen; excessive pressure may build up in the unit which could cause the unit to burst resulting in possible serious injury to the operator or bystanders.
 2. **Freeze damage is not covered by warranty.**
- ✓ If you must store the unit in an area where the temperature may fall below 32 degree F, you can protect the unit by following the procedures below.

1. Remove all discharge and supply hoses.
2. Connect an air fitting from an air hose to the water inlet side of the unit.
3. Ensure injector knob is in the off position. Blow compressed air into the system to remove all water from the unit.
4. Remove the injector strainer cup, drain the remaining water, and replace the cup loosely.
5. Remove injector outer cylinder; push straight up on the piston to drain the remaining water. Replace the outer cylinder on the injector.



5.6 Solution Injector Maintenance

- ✓ Rinse the injector areas after using the unit by inserting the suction tube into a container of clean water and inject for 5 minutes.
- ✓ Replace injection seals annually to ensure precise injection.
- ✓ Complete maintenance and seal kits are available.
- ✓ Do not use tools when servicing or disassembling unit.

6 TROUBLESHOOTING

TROUBLESHOOTING		
SYMPTOM	PROBABLE CAUSE	REMEDY
Motor will not operate	Circuit overload	Check wall breaker or fuse
	GFCI tripped	Reset
	Motor overload	Reset thermal overload button on pump motor or inside electrical control panel
No discharge at shower heads	Inadequate water supply	Ensure hose is 1 ½" dia. and incoming water supply is turned on
Low or fluctuating pressure	Water inlet hose is kinked	Remove kink
	Water inlet screen is blocked or clogged	Remove screen, clean and or replace
Water is leaking from Heat Dump Valve	Water inlet temperature is too high	Incoming water temperature must be less than 125 degree
	Water temperature is too high	Do not allow unit to operate with water supply OFF
	Defective valve	Replace
Oil leaking from unit	Worn O-ring or seals	Contact REEVES EMS
Decon solution will not siphon	Solution strainer is not completely submerged	Check and submerge if necessary
	Solution strainer obstructed	Inspect, clean and or replace
	Solution hose is cut, obstructed or kinked	Inspect, clean and or replace
	Solution adjusting stem turned to closed position or bypass switch is OFF	Adjust stem or turn on the bypass switch
Water leaking from under unit	Safety relief valve is releasing caused by an unloaded or pressure switch malfunction	<ol style="list-style-type: none"> 1. Detect and correct unloaded or pressure switch problem 2. Replace safety relief valve. NEVER run unit without safety relief valve. May cause an explosion
Burner will not ignite	Power switch is defective or not in the ON position	Ensure switch is ON or replace power switch
	No voltage	Contact REEVES EMS
	Out of fuel	Refuel

	TROUBLESHOOTING	
SYMPTOM	PROBABLE CAUSE	REMEDY
	Fuel tank inlet tube screen obstructed	Remove, inspect and clean or replace tube
	Pressure switch over-ride	Pressure should be over 250 PSI / 15 Bar to allow burner to come on. (Pressure should be checked by an authorized service technician)
Burner will not ignite	Fuel pickup inlet screen is obstructed	Contact REEVES EMS
	High temp switch over-ride	Unit will automatically reignite when unit is cool
	Flexible coupler broken	Replace
	Dirty or clogged fuel filter	Replace
	Fuel Pump sucking air	Tighten all fuel intake connections. Eliminate leaks in intake line
	Fuel Pump inoperative	Check pressure, replace if needed. (Pressure should be checked by an authorized service technician)
	Dirty or clogged fuel nozzles	Replace
	Improper burner air adjustment	Adjust accordingly to the procedures listed in Maintenance every 3 months
	Ignition transformer failure	Replace
	Ignition electrodes not set properly, damaged or worn	Contact REEVES EMS
	Fuel solenoid valve failure	Replace
Burner motor will not run	Power switch is defective or not in the ON position	Check switch position or replace
	No voltage	Contact REEVES EMS
	Motor overload	Reset when unit is cool
	Fuel Pump seized	Allow motor to cool; repair or replace
Burner runs erratically	Water in the fuel	Replace fuel filter; drain fuel tank and replace with clean fuel
	Fuel pickup inlet screen is obstructed	Contact REEVES EMS
	Dirty fuel filter	Replace
	Dirty fuel nozzles	Replace

	TROUBLESHOOTING	
SYMPTOM	PROBABLE CAUSE	REMEDY
	Improper air adjustment setting	Adjust. (See procedures listed in Maintenance every 3 months)
Burner runs erratically	Fuel Pump malfunctioning	Replace
Burner runs, but will not heat	Low Fuel Pump pressure	Check fuel pump pressure, adjust or replace if needed
	Dirty fuel nozzle	Replace
	Improper air adjustment setting	Adjust. (See procedures listed in Maintenance, every 3 months)
Burner discharges white smoke	Low fuel	Refuel. If white smoke persists, contact REEVES EMS
Burner discharges white smoke	Low fuel pressure	Check Fuel Pump pressure, adjust or replace, if needed. (Pressure should be checked by an authorized service technician)
	Fuel pickup inlet screen is obstructed	Contact REEVES EMS
	Dirty fuel nozzles	Replace
	Improper air adjustment setting	Adjust. (See procedures listed in Maintenance, every 3 months)
	Cold combustion chamber start-up	Run burner for several minutes
	Excessive air supply	Adjust as explained in Maintenance, every 3 months
Burner discharges black smoke	Insufficient air supply	Adjust as explained in Maintenance, every 3 months
	Fuel nozzle orifice is too large	Replace with correct nozzle
	Fuel pressure is too high	Contact REEVES EMS
	Combustion chamber loaded with unburned fuel	Contact REEVES EMS

For all other questions, please contact REEVES EMS at 800-328-5563.

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7 ILLUSTRATION PARTS BREAKDOWN



Figure 7-A

<u>Index Number</u>	<u>Description</u>	<u>Part Number</u>
Fig. 7-A, Ind. 1	Valve, Mixing with Check Stops	RD300415
Fig. 7-A, Ind. 8	Switch, High Limit	RDSP0140



Figure 7-B

<u>Index Number</u>	<u>Description</u>	<u>Part Number</u>
Fig. 7-B	Assembly, Injector	RDSA2070

For individual part numbers of attaching components, see **Figure 7-C**.



Figure 7-C

<u>Index Number</u>	<u>Description</u>	<u>Part Number</u>
Fig. 7-C, Ind. 3	Injector	RD300001
Fig. 7-C, Ind. 4	Valve, Pressure Regulator	RD300010
Fig. 7-C, Ind. 5	Filter, 100 Micro with Screen	RD300005
Fig. 7-C, Ind. 6	Adapter, Copper	RD300235F
Fig. 7-C, Ind. 7	Elbow, Brass	RD30390F

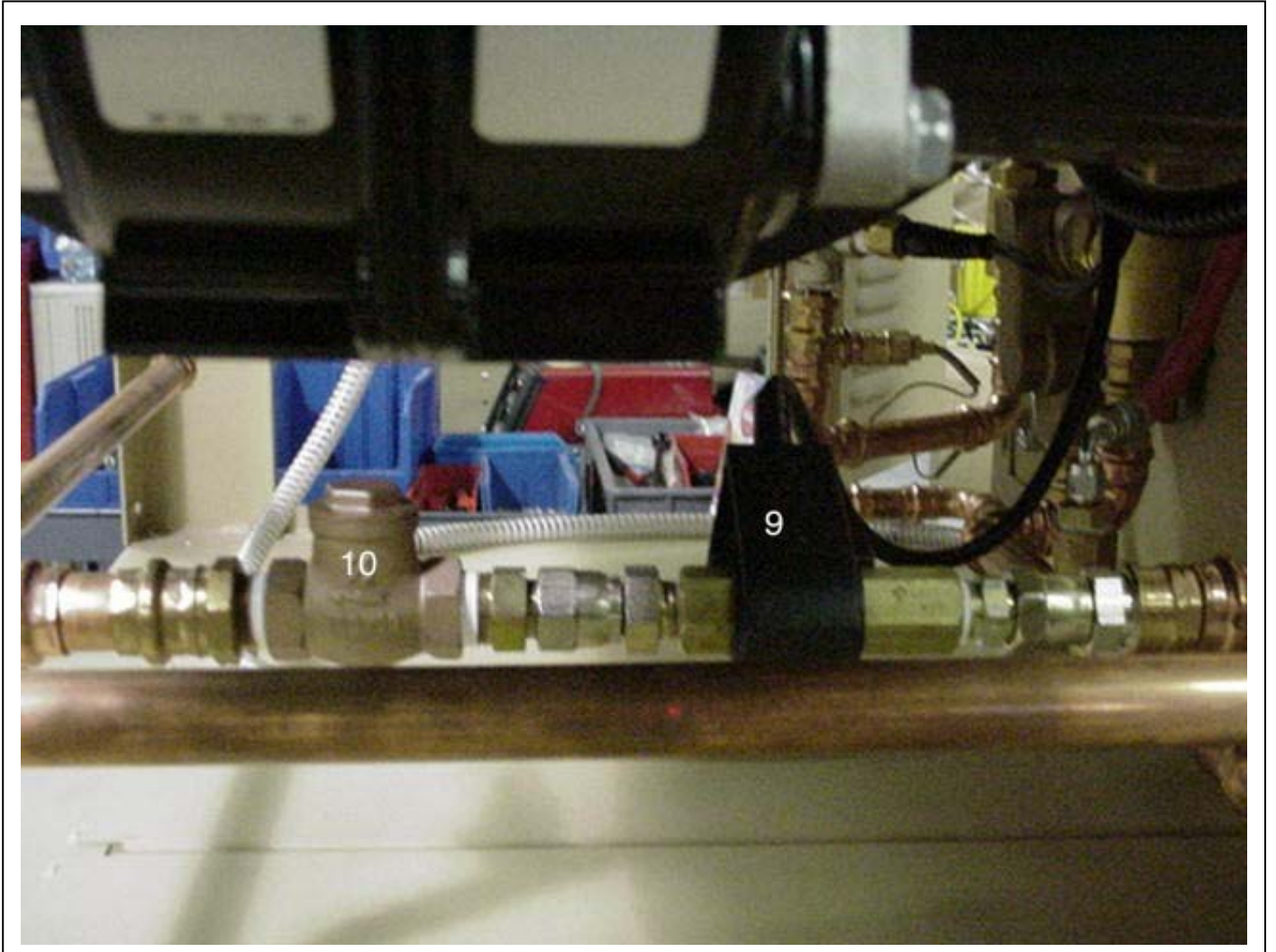


Figure 7-D

<u>Index Number</u>	<u>Description</u>	<u>Part Number</u>
Fig. 7-D, Ind. 9	Switch, Flow	RDSP0080
Fig. 7-D, Ind. 10	Valve, Check	RD300085



Figure 7-E

<u>Index Number</u>	<u>Description</u>	<u>Part Number</u>
Fig. 7-E, Ind. 11	Assembly, Burner	RDSP0145



Figure 7-F

<u>Index Number</u>	<u>Description</u>	<u>Part Number</u>
Fig. 7-F, Ind. 12	Valve, Watts Pressure Relief	RDSP0170



Figure 7-G

<u>Index Number</u>	<u>Description</u>	<u>Part Number</u>
Fig. 7-G, Ind. 13	Filter, Fuel	RDSP0150



Figure 7-H

<u>Index Number</u>	<u>Description</u>	<u>Part Number</u>
Fig. 7-H, Ind. 14	Switch, Fuel	RD300410



Figure 7-I

<u>Index Number</u>	<u>Description</u>	<u>Part Number</u>
Fig. 7-I, Ind. 15	Can, Jerry	RD300400
Fig. 7-I, Ind. 16	Adapter, Cap, Jerry Can	RD300320



Figure 7-J

<u>Index Number</u>	<u>Description</u>	<u>Part Number</u>
Fig. 7-J, Ind. 17	Gauge, Temperature	RD300055
Fig. 7-J, Ind. 18	Gauge, Pressure	RD300060

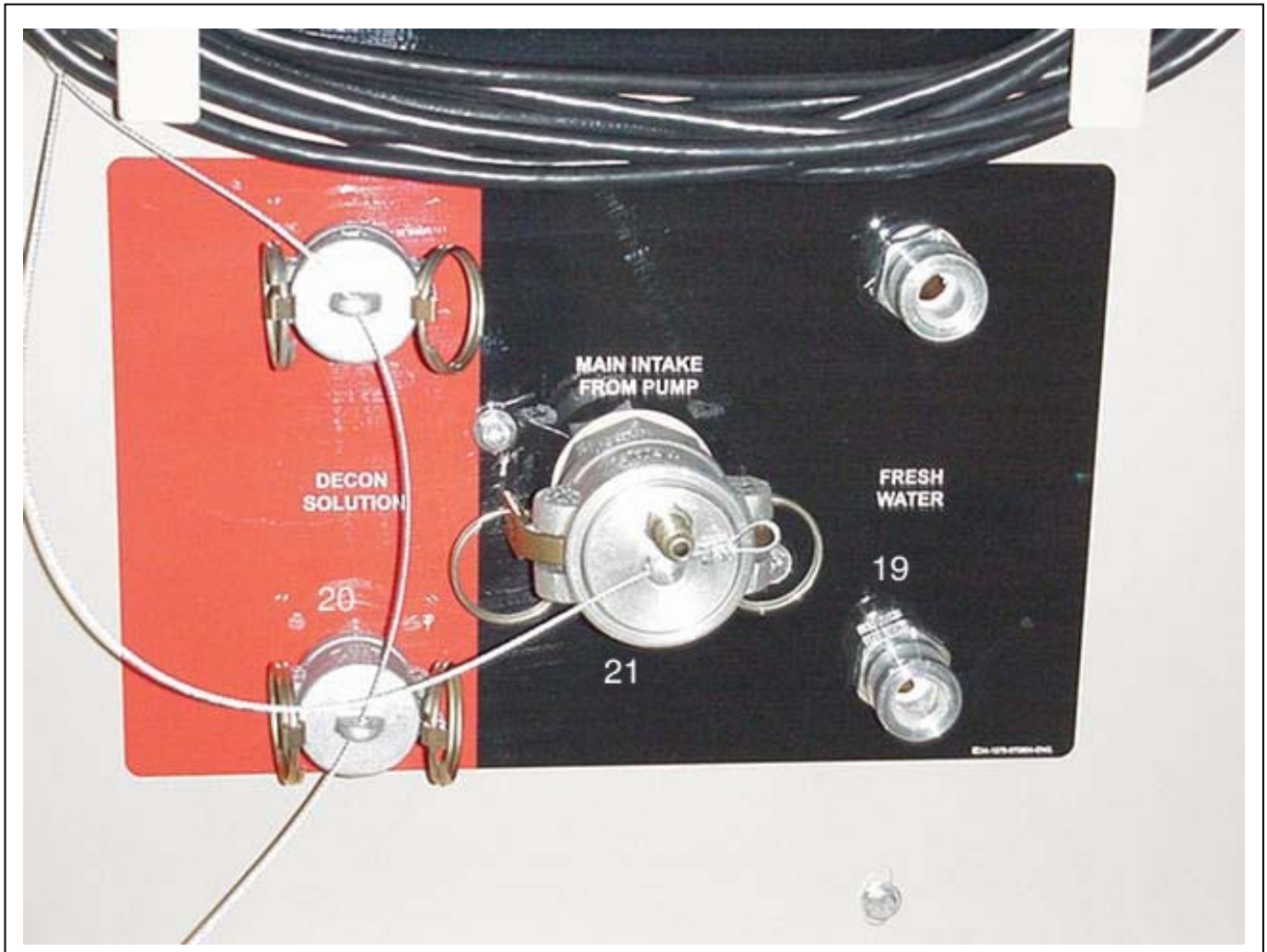


Figure 7-K

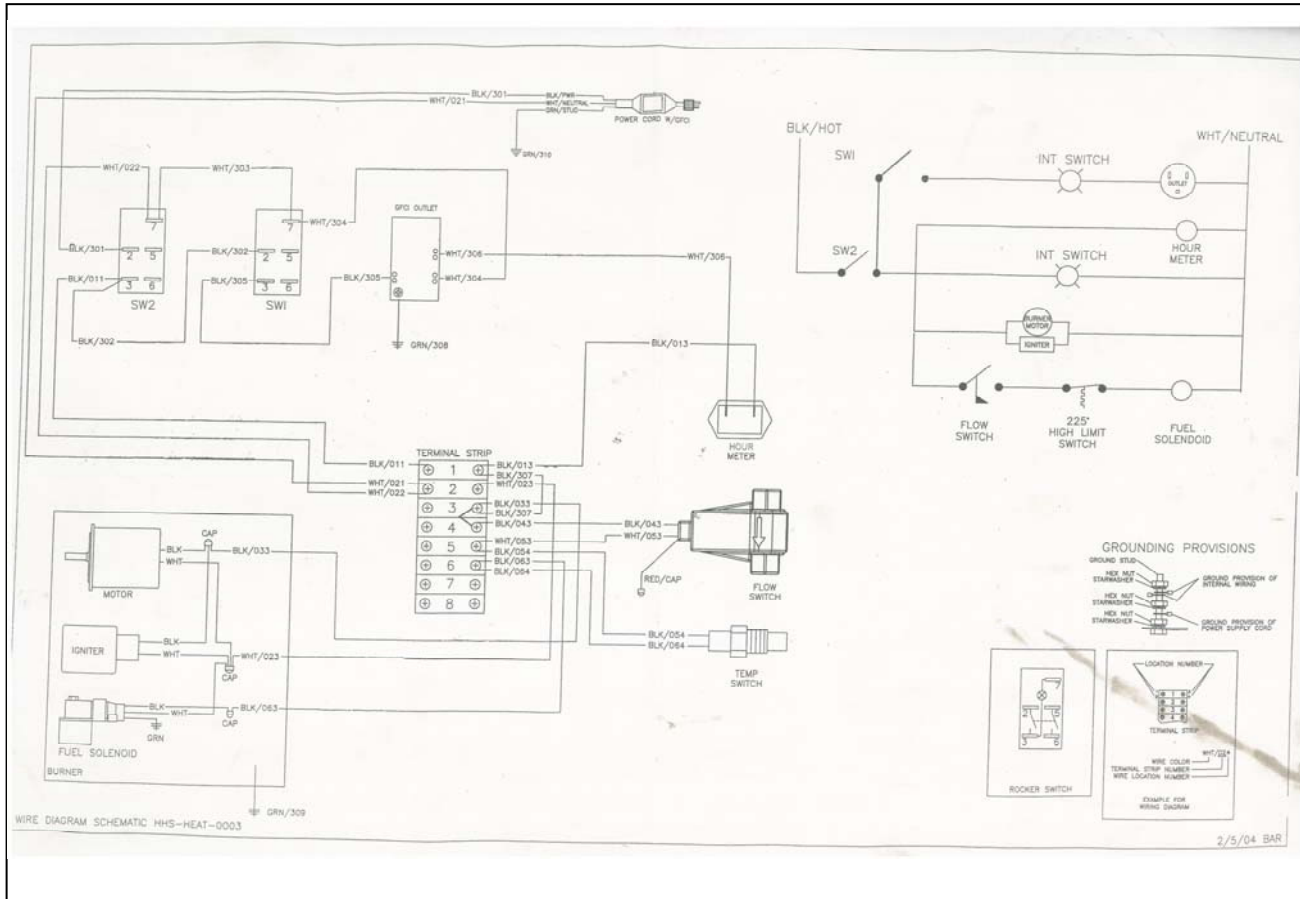
<u>Index Number</u>	<u>Description</u>	<u>Part Number</u>
Fig. 7-K, Ind. 19	Cam, Male	RD30125Q
Fig. 7-K, Ind. 20	Cap, Female Dust	RD30130Q
Fig. 7-K, Ind. 21	Plug, Male (1.5 inch)	RD30140Q



Figure 7-L

<u>Index Number</u>	<u>Description</u>	<u>Part Number</u>
Fig. 7-L, Ind. 22	Switch, Power Auxiliary	RDSP0155
Fig. 7-L, Ind. 23	Receptacle	RDSP0160
Fig. 7-L, Ind. 24	Meter, Hour	RDSP0165

Wire schematic



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8 WARRANTY



A DHS TECHNOLOGIES COMPANY

REEVES EMS LLC LIMITED WARRANTY

REEVES EMS LLC warrants that all decontamination systems and products purchased hereunder will be free from defects in materials and workmanship. This warranty shall extend to the ultimate user as well as original equipment purchasers and shall be valid for the elapsed time beginning with the date of shipment to original purchaser according to the following schedule:

WARRANTY SCHEDULE

REEVES/DRASH Shelters and Decontamination Products: 24 Months

REEVES Water Heaters: 12 Months

REEVES Internal Plumbing Divider Curtains, Hose, Harnesses, Shower-heads and Spray Wands: 12 Months

The liability of Reeves EMS LLC under this warranty is limited to the repair or replacement of any defective part or component due to a material defect or substandard workmanship. Damage due to excessive wear and tear, improper use, or carelessness is not covered under this limited warranty.

Furthermore, it should be understood that this warranty does not constitute a guarantee that the products under warranty identified in the Schedule above will function without following instructions, including reading of the Operators Manual, and following proper maintenance procedures as well as using reasonable care for the periods stated in the above Schedule. On-site repair without prior discussion and approval from Reeves EMS LLC may void the warranty.

Warranty claims must contain a detailed explanation of the defect and be supported by summary extracts of pertinent service and maintenance records if applicable. Reeves EMS LLC shall have the right to examine the alleged defect and may require the claimant, at the claimant's expense, to return the product for such an examination. If Reeves EMS' personnel are required to visit the claimant's site to confirm any alleged defect, all expenses for travel and accommodations may be charged to the claimant.

Any warranty claims must be filed with Reeves EMS LLC within 90 days after the alleged defect has been identified. All claims must be e-mailed or faxed to the following:

*Reeves EMS, LLC
4510-A Metropolitan Court
Frederick, Maryland 21704
JKH@REEVESDECON.COM
Tele: 301-698-1596 Fax: 301-698-1599*

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