

# NDA® VHG

# **OPERATOR'S MANUAL**

- VHG3-1100
- VHG4-3000
- VHG8-3000
- VHG4-2000
- VHG5-3000
- VHG4-2200
- VHG6-3000



### **CONTENTS**

Introduction	4
Important Safety Information	4-5
Installation Guide VHGL 3-4-5 GPM	6
Installation Guide VHGL 6-8 GPM	7
Installation	
Start-up	11
Check List Before Starting	
Component Identification VHGL 3-4-5 GPM	
Component Identification VHGL 6-8 GPM	
Operating Instructions	15
Preventatative Maintenance	15
General Washing Techniques	15-16
Maintenance & Service	16
Heating Coils	16-17
Propane Gas	17-18
Burner Features	18
Burner Troubleshooting	
Exploded View VHGL 3-4-5 GPM, Left Side	20
Exploded View VHGL 3-4-5 GPM, Right Side	21
Exploded View VHGL 3-4-5, Parts List	22-23
Burner Assembly VHGL 3-4-5, Exploded View	
Burner Assembly VHGL 3-4-5, Exploded View & Parts List	25
Exploded View VHGL 6-8 GPM, Left Side	26
Exploded View VHGL 6-8 GPM, Right Side	27
Exploded View VHGL 3-4-5, Parts List	28
VHGL 6-8 GPM Pump Assemblies and Parts List	29
Burner Assembly VHGL 6-8, Exploded View	30
Burner Assembly VHGL 6-8, Exploded View & Parts List	31
Float Tank VHGL 3-4-5, Exploded View & Parts List	32
Float Tank VHGL 6-8, Exploded View & Parts List	33
Control Panel VHGL 3-4-5 Exploded View & Parts List	34
Control Panel VHGL 6-8 Exploded View & Parts List	35
VHGL 3-4-5 Electrical Box	36
VHGL 6-8 Electrical Box	37
VHGL 3-4-5-6-8 Electrical Box, Parts List	38
Electrical Box Assembly	39-40
Electrical Box Assembly, Parts List	
Hose & Spray Gun Assembly	

#### **CONTENTS**

Burner Specifications	43
Pump Specifications	
Basic Facts	46
Pressure Equivalents	
Preventative Maintenance Schedule	
Oil Change Record	
Troubleshooting	
Warranty	

Model Number	
Serial Number	
Date of Purchase	

The model and serial numbers will be found on a decal attached to the pressure washer. You should record both serial number and date of purchase and keep in a safe place for future reference.

#### INTRODUCTION

Thank you for purchasing a Landa Pressure Washer.

This manual covers the operation and maintenance of the VHG3-11024D, VHG4-20021A, VHG4-20024A, VHG4-22021A, B, C, VHG4-22024A, B, C, N, VHG4-30021A, B, C, VHG4-30024A, B, C, VHG5-30021B, C, VHG5-30024B, C, VHG6-30024B, C, H, VHG8-30024B, C, H washers. All information in this manual is based on the latest product information available at the time of printing.

Landa, Inc. reserves the right to make changes at any time without incurring any obligation.

The VHG Series was designed for maximum use of 4 hours per day, 5 days per week.

#### Owner/User Responsibility:

The owner and/or user must have an understanding of the manufacturer's operating instructions and warnings before using this Landa pressure washer. Warning information should be emphasized and understood. If the operator is not fluent in English, the manufacturer's instructions and warnings shall be read to and discussed with the operator in the operator's native language by the purchaser/owner, making sure that the operator comprehends its contents.

Owner and/or user must study and maintain for future reference the manufacturers' instructions

This manual should be considered a permanent part of the machine and should remain with it if machine is resold.

When ordering parts, please specify model and serial number.

# IMPORTANT SAFETY INFORMATION



CAUTION: When using this machine basic precautions should always be followed, including the following:

CAUTION: To reduce the risk of injury, read operating instructions carefully before using.

1. Read the owner's manual thoroughly. Failure to follow instruc-

tions could cause malfunction of the machine and result in death, serious bodily injury and/or property damage.

2. All installations must comply with local codes. Contact your electrician, plumber, utility company or the selling distributor for specific details.

To comply with the National Electrical code (NFPA 70) and provide additional protection from risk of electric shock, this pressure washer is equipped with a UL approved ground fault circuit interrupter (GFCI) power cord for machines rated 250V 30 amp or less, single phase.

- 3. Know how to stop the machine and bleed pressures quickly. Be thoroughly familiar with the controls.
- 4. Stay alert. Watch what you are doing.



WARNING

KEEP WATER SPRAY AWAY FROM

ELECTRICAL WIRING.

WARNING: Flammable liquids can create fumes which can ignite causing property damage or severe injury.

 Risk of explosion - Do not spray flammable liquids or operate in an explosive location. Operate only where open flame or torch is permitted.

WARNING: Keep water spray away from electrical wiring or fatal electric shock may result. Read warning tag on electrical cord.

 To protect the operator from electrical shock, the machine must be electrically grounded. It is the responsibility of the owner to connect this machine

to a UL grounded receptacle of proper voltage and amperage ratings. Do not spray water on or near electrical components. Do not touch machine with wet hands or while standing in water. Always disconnect power before servicing.

WARNING: Spray gun kicks back. Hold with both hands.

Grip cleaning wand securely with both hands before starting the cleaner. Failure to do this could result in injury from a whipping wand.



WARNING: Equipment can produce a high pressure stream of fluid that can pierce skin and its underlying tissues, leading to serious injury and possible amputation.

 High pressure developed by these machines can cause personal injury or equipment damage. Use caution when operating. Do not direct discharge stream at anyone or at any part of the body, or severe injury or death will result. This machine is to be used only by qualified operators.



CAUTION: Hot discharge fluid. Do not touch or direct discharge stream at persons.

9. Never make adjustments on machine while in operation.



OPENING LID.

WARNING: High pressure can cause paint chips or other particles to become airborne and fly at high speeds.

 Eye safety devices and foot protection must be worn when using this equipment.



WARNING: Risk of asphyxiation. Use this product only in a well ventilated area.

- When the machine is working, do not cover or place in a closed space where ventilation is insufficient.
- 12. Machines with spray guns should not be operated with the

trigger in the off position for extensive periods of time as this may cause damage to the pump.

- 13. Protect from freezing.
- 14. Be certain all quick coupler fittings are secured before using pressure washer.
- 15. Do not allow acids, caustic, or abrasive fluids to pass through the pump.
- 16. Inlet water must be cold and clean fresh water.
- 17. To reduce the risk of injury, close supervision is necessary when a machine is used near children. Do not allow children to operate the pressure washer. This machine must be attended during operation.
- 18. The best insurance against an accident is precaution and knowledge of the machine.
- 19. Do not operate this product when fatigued or under the influence of alcohol or drugs. Keep operating area clear of all persons.
- 20. Do not replace LP tank while machine is running. Serious injury could result.



#### WARNING: Use only vapor fuel.

- 21. This equipment is designed to run on vapor fuel. Do not use liquid fuel. Have a qualified serviceman install and service your equipment.
- 22. Never expose a spark or flame where unburned gas may be present.
- 23. Never attempt to light pilot unless pilot manual valve has been shut off for 5 minutes.
- 24. A conversion kit, as supplied by the manufacturer, shall be used to convert natural gas to propane.
- 25. L.P. gases are heavier than air and will spill out on the floor. Therefore always provide adequate space and ventilation around these machines. Install machine 18" above the floor.
- 26. Landa will not be liable for any changes made to our standard machines, or any components not purchased from Landa.
- 27. Do not overreach or stand on unstable support. Keep good footing and balance at all times.
- Follow maintenance instructions specified in the manual.
- 29. When making repairs disconnect from electrical source and shut off gas valve.



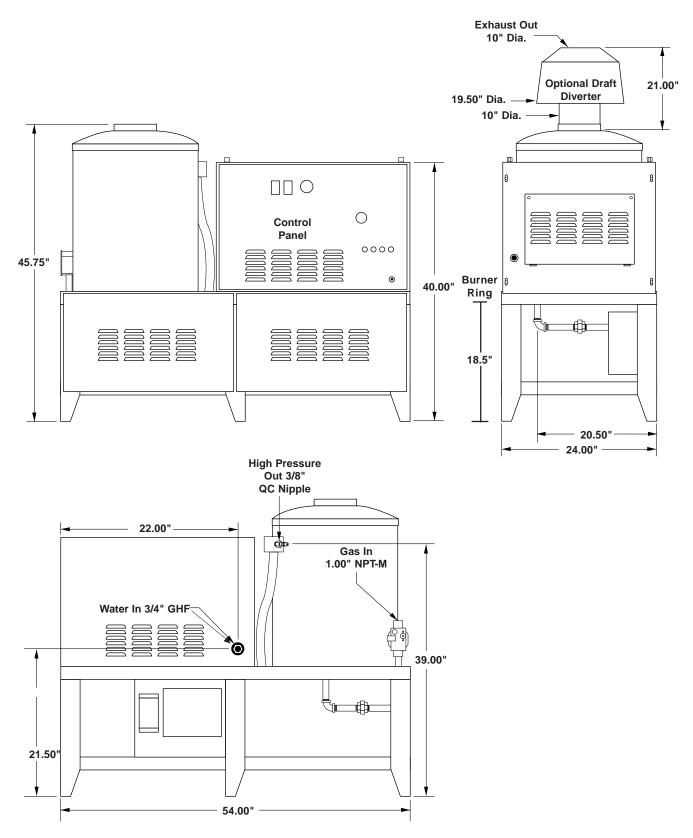
- 30. Turn burner off and cool to 100° F before turning machine off.
- If gas odor is present extinguish any open flame and test all joints with a soap solution. If odor persists, call your gas supplier immediately.
- 32. Not suitable for connection to Type B gas vent if the stack

temperature exceeds 243° C (470° F).

33. A draft hood shall be installed if this machine is going to be permanently installed and vented to the outside of the building.

#### **INSTALLATION GUIDE**

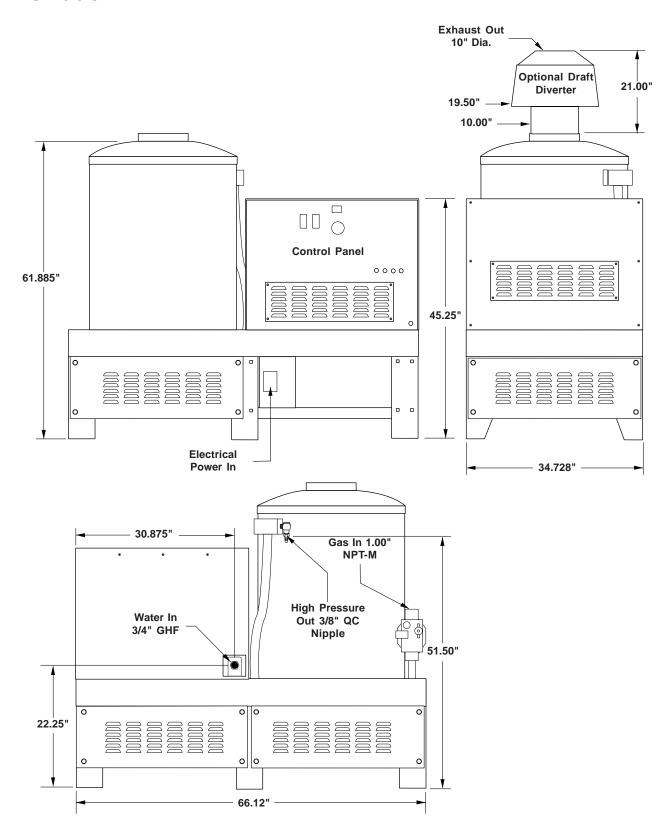
VHG-L 3-4-5 GPM



LANDA VHG-L • 96-6185 • Rev. 3/04

#### **INSTALLATION GUIDE**

VHG-L 6-8 GPM



#### INSTALLATION

Place machine in a convenient location providing ample support, drainage and room for maintenance (see page 5).

#### Location:

The location should protect the machine from damaging environmental conditions, such as wind, rain and freezing.

- 1. The machine should be run on a level surface where it is not readily influenced by outside sources such as strong winds, freezing temperatures, rain, etc. The machine should be located considering accessibility for the replacing of components and the refilling of detergents, adjustments and maintenance. Normal precautions should be taken by the operator of the machine to prevent excess moisture from reaching the power unit or electrical controls.
- It is recommended that a partition be made between the wash area and the machine to prevent direct spray from the spray gun from coming in contact with the machine. Excess moisture reaching the power unit or electrical controls will reduce the machine's life and may cause electrical shorts.
- 3. During installation of the machine, beware of poorly ventilated locations or areas where exhaust fans may cause an insufficient supply of oxygen. Sufficient combustion can only be obtained when there is a sufficient supply of oxygen available for the amount of fuel being burned. If it is necessary to install a machine in a poorly ventilated area, outside fresh air may have to be piped to the burner and a fan installed to bring the air into the area.
- 4. Do not locate near any combustible material. Keep all flammable material at least 20 feet away. Allow enough space for servicing the machine. Local code will require certain distances from floor and walls. (Two feet away should be adequate).

WARNING: Avoid small areas or near exhaust fans.

#### Gas Codes:

Confer with local gas company and with proper municipal officials regarding any specific code or regulations governing the installation. The installation must conform to local codes.

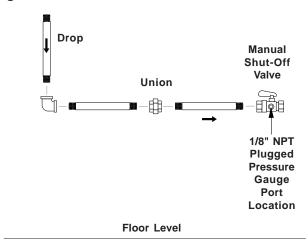
#### **Electrical:**

The machine, when installed, must be electrically grounded in accordance to local codes. Check for proper power supply using a volt meter; check the serial plate for the correct requirements.

Install a gas union in the gas line adjacent to and upstream from the control manifold and downstream from the manual main shut-off valve. A 1/8" NPT plugged tapping accessible for test gauge connection shall be installed immediately upstream of the gas supply connection for the purpose of determining the gas supply pressure to the burner, and to prevent damage to gas valve.

If a manual gas shut off valve is not in the gas supply line within six feet of the machine and in an accessible location, one shall be installed.

Figure 1: Union Location



#### **Union Connection**

The following pipe and stack sizes are just recommendations. Always consult a local plumber and venting contractor for local codes and regulations during installation.

The following tables show maximum capacity for final stage pipe in thousands of BTU/HR of comerical propane.

### From first stage regulator (at tank) to second stage regulator.

The chart below is based on incoming gas pressure of 10 PSI and a pressure drop of 1 PSI. Numbers are for straight schedule 40 pipe; fittings further reduce capacity.

Length of Pipe	lron Pipe Size		
(ft.)	1/2"	3/4"	
10	3339	6982	
20	2295	4799	
30	1843	3854	
40	1577	3298	
50	1398	2923	
60	1267	2649	
70	1165	2437	
80	1084	2267	
90	1017	2127	
100	961	2009	
150	772	1613	
200	660	1381	
250	585	1224	
300	530	1109	
350	488	1020	
400	454	949	
450	426	890	
500	402	841	

#### From second stage regulator to machine:

The following chart is based on incoming gas pressure of 11 w.c.i. and a pressure drop of 5 w.c.i. Numbers are for straight schedule 40 pipe; fittings further reduce capacity.

Length of	Iron Pipe Size			
pipe (ft.)	1/2"	3/4"	1"	
10	291	608	1146	
20	200	418	788	
30	161	336	632	
40	137	287	541	
50	122	255	480	
60	110	231	435	
70	102	212	400	
80	94	198	372	
90	87	185	349	
100	84	175	330	

The chart below is based on gas pressure in the range of 0-.5 PSI, specific gravity of .6 and a pressure loss of .5 w.c.i. Numbers are for straight schedule 40 pipe; fittings further reduce capacity.

Length of Pipe (ft.)	Iron Pipe Size				
ripe (it.)	3/4"	1"	1 1/4"	1 1/2"	2"
10	360	680	1400	2100	3950
20	250	465	950	1460	2750
30	200	375	770	1180	2200
40	170	320	660	990	1900
50	151	285	580	900	1680
60	138	260	530	810	1520
70	125	240	490	750	1400
80	118	220	460	690	1300
90	110	205	430	650	1220
100	103	195	400	620	1150
150	84	160	325	500	950
200	72	135	280	430	800

#### Venting:

If the machine is used indoors, regulations or ventilation concerns may call for a chimney or furnace pipe.

When venting the machine, if the machine is to be in an enclosed area with a chimney on it, be sure the chimney is the same size as the stack on the machine. Poor draft will cause the machine to soot and not operate efficiently. When placing the machine for installation, position the stack to be as straight as possible and to protrude through the roof of the building at a proper location and at sufficient height to eliminate down-draft. The chimney of a gas fired machine shall be installed with a down-draft diverter located about 3 ft. above machine.

Input - BTU Per Hour	Draft Hood & Flue Pipe Size
250,000 - 320,000	8 inch
320,000 - 410,000	9 inch

410,000 - 600,000 10 inch 600,000 - 750,000 12 inch

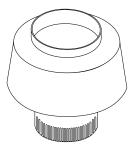
**NOTE**: If the flue pipe exceeds 10 ft. in length, or contains more than two elbows, use next size larger pipe and draft hood or the burner will not ignite. No movable flue pipe damper should be used on any installation.

#### **Draft Diverter:**

The draft diverter shall be installed above the heating coil. The diverter enhances the draft through the burner by severing the chimney effect created in sections of furnace pipe positioned below. It also helps prevent freezing of the coil due to wind chill factors.

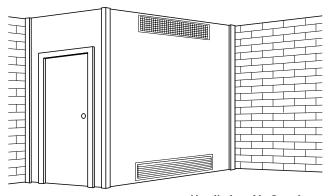
Figure 2: Draft Diverter

**Optional** 



When the heating appliance is installed in a tightly closed room without ventilation openings to the outdoors or other rooms, provisions shall be made for supplying air for combustion through special openings, one near the floor line and the other near the ceiling, each to be sized on the basis of one square inch or more of free area for each 1,000 BTU input per hour (see Figure 3).

Figure 3: Ventilation



Ventilating Air Opening. 1 square inch for each 1000 BTU per hour input.

Illustration showing air openings necessary to supply air for combustion when installed in an enclosed room.

When a room is of unusually tight construction and has a kitchen and/or bathroom ventilating fan, which may be used for exhausting air outdoors -or has a vented fire-place — it is recommended that combustion air be supplied to the enclosed room through intakes extending to the outside of the building and terminating in down-turned fittings. These should be suitably arranged to prevent obstruction from snow or rain, and include a protecting screen not smaller than 1/4 inch mesh.

#### Water Source:

The water source for the machine should be supplied by a 5/8" I.D. garden hose with a city water pressure of not less than 30 PSI. If the water supply is inadequate, or if the garden hose is kinked, the machine will run very rough and the burner will not fire.

#### **Water Connection:**

Connect the high pressure hose by pulling the coupler collar back and then inserting it onto the discharge nipple. Secure it by pushing the collar forward.

Attach the wand into the spray gun using teflon tape on the pipe threads to avoid leaks.

#### **Inspection and Testing Gas Piping:**

The building structure should not be weakened by installing the gas piping. The piping should not be supported by other piping, but should be firmly supported with gas hooks, straps, bands or hangers. Butt or lap welded pipe should not be run through or in an air duct or clothes chute.

Before turning gas under pressure into piping, all openings from which gas can escape should be closed. Immediately after turning on gas, the system should be checked for leaks. This can be done by watching the 1/2 cubic foot test dial for 5 minutes for any movement or by soaping each pipe connection and watching for bubbles. If a leak is found, make the necessary repairs and repeat the above test.

Defective pipes or fittings should be replaced and not repaired. Never use a flame or fire in any form to locate gas leaks — use a soap solution.

After the piping and meter have been checked completely, purge the system of air. **DO NOT** bleed the air inside an enclosed room.

During pressure testing of the system at test pressures in excess of 1/2 PSIG, the appliance and its individual shut-off valve must be disconnected from the gas supply piping system or damage to the gas valve will occur.

#### Gas Pressure:

The ideal incoming gas pressure is 11 w.c.i (water column inches). Minimum is 9 w.c.i., maximum is 14 w.c.i. or 1/2 PSIG. The correct operating manifold pressure for natural gas is 3.5 w.c.i. The operating manifold pressure for propane gas is 10 w.c.i. By adjusting the gas valve pressure regulator between 3 and 4 w.c.i. a side range can be achieved for natural gas.

If the desired input rating cannot be obtained within the above manifold pressure adjusting range, then the next size larger or smaller burner orifice should be used.

#### START-UP



WARNING: Read and follow instructions carefully when installing or servicing machine. Failure to do so may result in damage to property or personal injury.

 Installation or servicing of gas appliances and controls must only be performed by qualified personnel. After installation or servicing, test the manual

valve, operating valves, pressure regulation, and automatic shut-off valve for proper operation.

- 2. Install in a suitable dry location. The machine must be located in an area properly protected from the weather.
- 3. Shut off gas and electricity before starting installation or service. Turn back on to test or operate.
- DO NOT connect appliances before pressure testing the gas piping. Damage to gas valve may result. (9" - 14" W.C.P. or 1/2 PSIG)
- DO NOT insert any object other than suitable pipe or tubing in the inlet or outlet of the gas valve. Internal damage may occur and result in a hazardous condition.
- DO NOT grip gas valve body with a pipe wrench or vise. Damage may result causing gas leakage. Use inlet or outlet bosses or a special body wrench.
- 7. **DO NOT** short the gas valve terminals.
- DO NOT allow any flame to impinge on the regulator vent tubing if supplied. It may clog and cause gas valve malfunction.
- 9. DO NOT use the gas cock to adjust gas flow.
- 10. If main burner fails to shut off, turn off gas supply.
- Keep all combustible materials away from gas appliances. DO NOT allow lint or dust to collect in burner area.
- 12. Dials must only be operated by hand. Never use pliers, wrenches or other tools to turn dials.
- 13. Leak test with a soap solution after installation or service with the main burner on. Coat pipe and tubing joints, gaskets, etc.
- 14. If the machine is installed in an enclosed room, care should be taken to ensure that an adequate supply of air is available for combustion and ventilation. (1 sq. inch per 1000 BTU).

#### **Check List Before Starting:**

CAUTION! If "NO" has been checked on any of the following sixteen questions, do not operate this machine.

YES

NO

	ILO	NO
Has gas supply been inspected by an authorized contractor to meet local codes?		
Is machine protected from downdraft and excessive wind?		
Is machine shielded from moisture or water spray?		
Is the voltage correct and are the circuit breaker and supply cord adequate according to specifications and serial plate notation?		
Is the machine electrically grounded?		
Is there ample water supply?		
Have all flammable liquids or gases been removed from installation location?		
Is there adequate gas supply for the BTU rating of the burner?		
Is incoming gas supply pressure between 6" - 14" water column inches or 1/2 PSIG?		
Has the proper gas regulator been installed for pressure and volume?		
Is the machine properly vented to allow adequate air flow?		
Are the propane tanks large enough, according to rating to prevent freezing?		
Have gas lines been checked for gas leaks?		

Have gas lines been checked with local

Have all operators using this machine been instructed properly and have they

Has the machine been installed according to operator's manual instructions?

codes?

read the manual?

#### FOR YOUR SAFETY READ BEFORE LIGHTING

#### **WARNING**

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

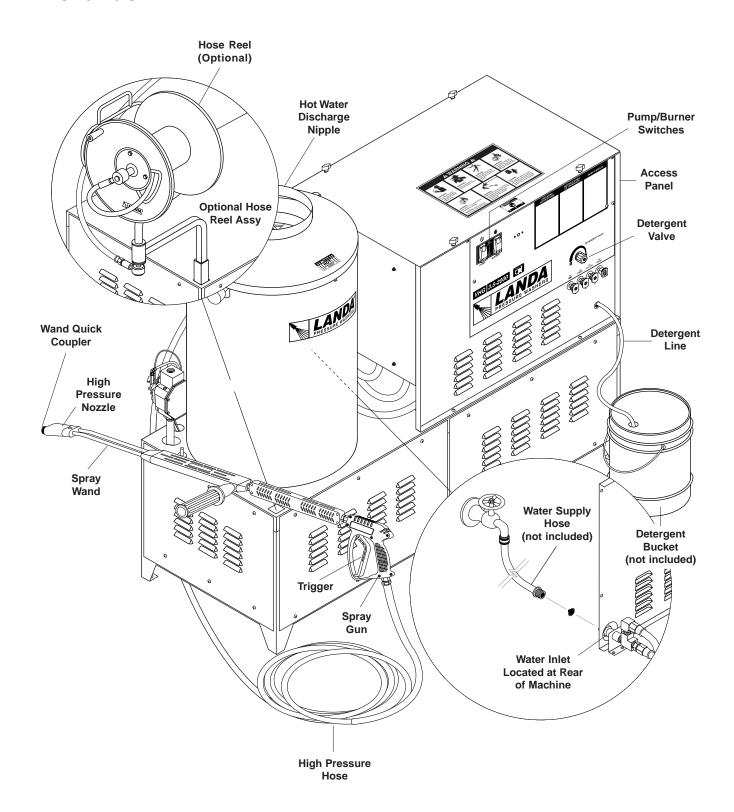
- A. This appliance has a pilot which must be lighted by hand. When lighting the pilot, follow these instructions exactly.
- B. BEFORE LIGHTING smell all around the appliance area for gas. Be sure to smell next to the floor because some gas is heavier than air and will settle on the floor.

### FOR YOUR SAFETY "WHAT TO DO IF YOU SMELL GAS"

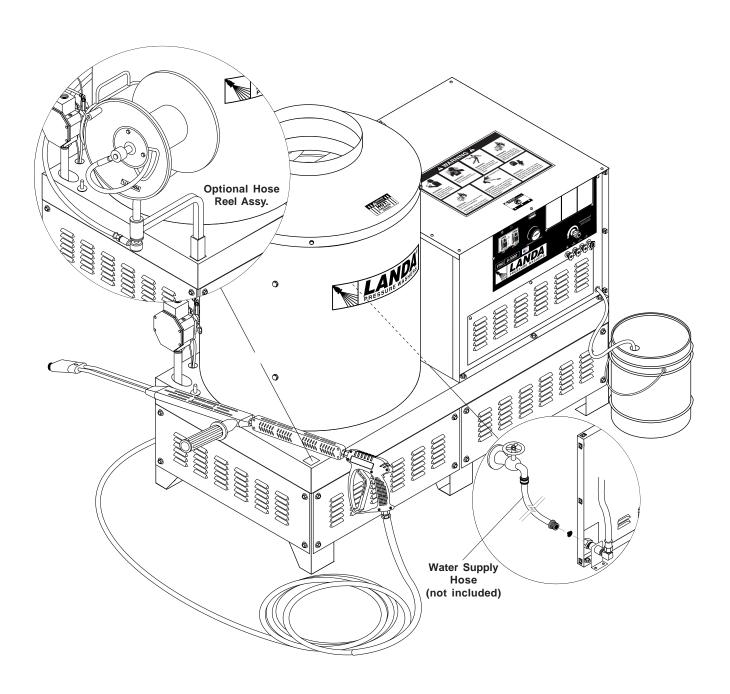
- Do not try to light any appliance.
- Do not touch any electrical switch, do not use any phone in your building.
- Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
- If you cannot reach your supplier, call the fire department.
- C. Use only your hand to push in or turn the gas control knob. Never use tools. If the knob will not push in or turn by hand, don't try to repair it; call a qualified service technician. Forced or attempted repair 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.

#### **COMPONENT IDENTIFICATION**

**VHGL 3-4-5 GPM** 



### COMPONENT IDENTIFICATION VHGL 6-8 GPM



#### **OPERATING INSTRUCTIONS**



CAUTION: STOP! Read operators manual before operating this machine.

- Failure to read operation and warning instructions may result in personal injury or property damage.
- 2. Turn all switches off.
- 3. Review installation instructions.
- Connect the water supply hose to the inlet connector and turn the water on. Check for water leaks and tighten as needed.
- Have an electrician connect power supply into junction box according to information shown on the serial plate.
- 6. Turn on the main gas supply.
- 7. Partially depress and turn control knob to the "OFF" position (see figure 5).
- Wait five minutes to allow gas, which may have accumulated in the main burner compartment, to escape.
- 9. Turn gas cock dial to "PILOT" position.
- 10. Depress the control knob all the way and hold it in. After five (5) seconds, depress the red ignitor until you hear a loud click. Repeat 3 or 4 times if necessary until pilot is lit. If pilot does not remain lit, repeat the operation allowing a longer period of time before releasing the gas valve knob. After the pilot lights, continue to hold the control knob down for about one (1) minute before releasing.

**NOTE**: Sufficient time must be allowed for a proper size pilot flame to heat the thermocouple and hold the safety magnet in a locked-up position. Also, time must be allowed for air to escape from the lines during the first operation.

- 11. Release dial and turn to full ON.
- Attach the desired high pressure nozzle into the wand quick coupler by pulling the coupler collar back and then inserting the nozzle and securing it by pushing the coupler collar forward.
- Push ON switch, or turn to pump position and pull the trigger on the spray gun allowing cold water to flow
- 14. To activate the gas control valve for hot water, push the burner switch to the ON position and pull the trigger on the spray gun.
- 15. To apply detergent, open the detergent valve counter clockwise making sure that the detergent pick up tube is in the detergent solution and not sucking air.

- 16. To Stop: Turn the burner switch OFF and place the detergent pick up tube into fresh water. Open the detergent valve and spray gun allowing detergent lines to be flushed and the burner to cool. Otherwise coil damage will result.
- 17. After water has cooled, push or turn pump switch to OFF position. If the machine is going to be off for an extended period of time, put the gas cock dial on the gas valve into the "OFF" position.
- 18. Turn water off. Prevent from freezing.

#### PREVENTATIVE MAINTENANCE

- 1. Check to see that the water pump is properly lubricated.
- 2. Follow Winterizing Procedures to prevent freeze damage to the pump and coils.
- Always neutralize and flush detergent from system after use.
- If water is known to be high in mineral content, use a water softener in your water system or descale as needed.
- 5. Do not allow acidic, caustic or abrasive fluids to be pumped through system.
- Always use high grade quality Landa cleaning products.
- 7. Never run pump dry for extended periods of time. If equipped with time delay, set shutdown timer for 1-2 minutes.
- 8. Periodically delime coils per instructions.

It is advisable, periodically, to visually inspect the burner. Check air inlet to make sure it is not clogged or blocked. Wipe off any oil spills and keep this equipment **clean** and dry.

The areas around the Landa washer should be kept clean and free of combustible materials, gasoline and other flammable vapors and liquids.

The flow of combustion and ventilating air to the burner must not be blocked or obstructed in any manner.

# GENERAL WASHING TECHNIQUES

If dirt comes off relatively easy and no grease and oil are present, cleaning with cold water will normally suffice. However, when grease and oil are present, hot water will greatly speed up the process.

Clean with the spray nozzle a foot or so from the surface being cleaned. For more difficult cleaning, move the nozzle in closer. **NOTE:** Do not allow unit to run in by-pass for more than 2-minutes or pump damage may occur.

If the machine is equipped with a shut-off spray gun and various nozzle patterns, use the wide patterns for easy soil removal jobs and the narrow patterns on the more difficult jobs or for tight areas such as cracks and holes.

In most cases, faster results and better detergent economy is obtained by applying the detergent and letting it "set" for a few minutes, prior to rinsing. This enables the detergent to do its soil penetrating and loosening work.

Most cleaning work terminates with a high pressure rinse as part of the normal cleaning procedure. In some cases, however, the last operation may be application of a detergent (a sanitizer, for example). After such work, run the machine for 20-30 seconds to clear pump and lines.

#### MAINTENANCE AND SERVICE

#### **Spray Nozzles:**

Each machine is equipped with one or more spray nozzles, depending on the model. Different spray nozzles are calibrated for each machine, depending on the flow and pressure of that particular model. Spray nozzles vary in bore size and angle of spray. Popular spray angles are 0°, 15°, 25°, 40°. When ordering, please specify size and angle of nozzle. Nozzle size for each machine is located on the serial plate.

#### **Unloader Valves:**

Unloader valves relieve pressure in the line when a spray gun is closed. Unloader valves are preset and tested at the factory before shipping. Occasional adjustment of the unloader may be necessary to maintain correct pressure. For valve adjustment contact your nearest Landa dealer or call Landa technical support.

#### Winterizing Procedure:

Damage due to freezing is not covered by warranty. Adhere to the following cold weather procedures whenever the washer must be stored or operated outdoors under freezing conditions.

It is necessary to protect your machine against freezing when temperatures drop below 32° F. Siphoning a small amount of antifreeze into the system is recommended. This is done by pouring a 50-50 mix of antifreeze and water into the float tank and then siphoning 100% antifreeze through the detergent line with the pump on. If compressed air is available, an air fitting can be screwed into the float tank strainer fitting, and by injecting compressed air, all water will be blown out of the system. The use of a draft diverter will prevent the wind chill factor from freezing the coil.

#### **Low Pressure Diagnosis:**

#### (Machines with spray gun)

Refer to Troubleshooting Chart for low pressure. If the trouble is found to be either the unloader or the pump, your next step is to determine which is the problem. This can be done by eliminating the unloader from the system and attaching the 50' discharge hose directly to the pump. If high pressure is developed in this manner, the pump is good and the unloader needs to be repaired or replaced. If low pressure is still present, then the pump needs repairing.

CAUTION: When using this procedure to test components keep the spray gun open at all times.

#### **High Limit Hot Water Thermostat:**

For safety, each machine is equipped with a high limit control switch. In the event the temperature of the water should exceed its operating temperature, the high limit control will turn the burner off until the water cools.

#### **Pumps:**

Use only SAE30 weight non-detergent oil. Change oil after first 50 hours of use. Thereafter, change oil every three months or at 500 hour intervals. Oil level should be checked through use of the dipstick found on the top of the pump or by the red dot visible through the oil gauge window. Oil should be maintained at that level.

#### **HEATING COILS**

#### To Check Water Heater Coil for Leaks:

With the main burners "OFF" start the pumping unit and allow it to run for a few minutes. Check into the burner compartment with a drop light or flashlight. If no leaks are visible, then water dripping from coils is condensation from the flue gases when the burners are on.

#### **Condensation from Heating Coil:**

When cold water is being pumped into the water heater coils, and the burners are on, condensation will form on the coils and drip down into the burner compartment, giving the appearance of a leaking coil, particularly on cold humid days.

#### **Deliming Coils:**

In alkaline water areas, lime deposits can accumulate rapidly inside the coil pipes. This growth is increased by the extreme heat build up in the coil. The best prevention for liming conditions is to use high quality cleaning detergents. In areas where alkaline water is an extreme problem, periodic use of Landa Deliming Powder (part #9-028008) will remove lime and other deposits before coil becomes plugged. (See th following instructions for use of Landa Deliming Powder.)

Periodic flushing of coils is recommended.

- 1. Fill a container with 4 gallons of water, then add 1 lb. of deliming powder. Mix thoroughly.
- Remove nozzle from spray gun assembly and put spray gun into container. Secure the trigger on the spray gun into the open position.
- Attach a short section (3-5 ft.) of garden hose to machine to siphon solution from an elevated container, or add mixture to the float tank. Turn pump switch on allowing solution to be pumped through coils and back into the container. Solution should be allowed to circulate 2-4 hours.
- 4. After circulating solution, flush entire system with fresh water. Reinstall wand assembly to spray gun.

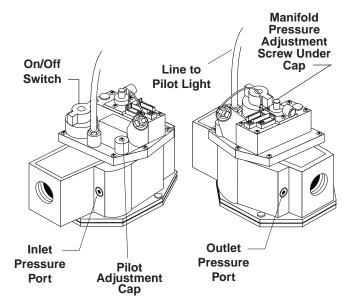
#### **Gas Valve Regulator Adjustment:**

(See Fig. 4)

Adjustment of the built-in regulator isn't normally necessary, since it is preset at the factory. However, field adjustment may be accomplished as follows:

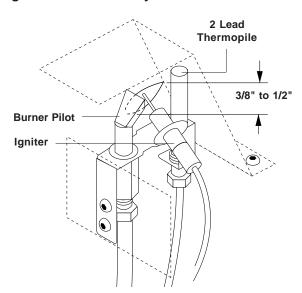
- 1. Attach manometer at pressure tap port.
- 2. Remove regulator adjustment screw cap.
- With small screwdriver, rotate adjustment screw clockwise to increase or counterclockwise to decrease gas pressure.
- 4. Replace regulator adjustment screw cap.

Figure 4: Gas Valve Adjustment



Inlet View Outlet View

Figure 5: Pilot Assembly



#### **Pilot Burner Adjustment:**

- 1. Remove pilot adjustment cap. (See Figure 4.)
- 2. Adjust pilot key to provide properly sized flame.
- 3. Replace pilot adjustment cap.

#### **Pressure Relief Valve:**

Each machine is equipped with a relief valve to relieve pressure in the system when higher than normal operating pressures are encountered. Unusually high pressures are caused by an object plugging the spray nozzle. This problem is easily remedied by removing the obstruction. If operating pressure of machine is found to be normal and relief valve continues to leak, repair or replace the

CAUTION: Open this valve annually to prevent obstruction.

#### PROPANE GAS (Vapor Fuel Only)

#### **General Safety Precautions:**

Have a qualified gas service person assist in any gas burner installation or service. Few maintenance people or mechanics are knowledgeable in gas controls or related safety practices. Propane gas is heavier than air, unburned propane gas will gravitate to the floor rather than rise out of the stack. Hence, adequate floor space and good ventilation are especially important with propane systems.

#### **Gas Pressure Requirements:**

All propane fired machines operate on gas vapor only. They are designed to operate at a pressure of 11 w.c.i. (between 1/3 and 1/2 of one PSI), and are often operated at even higher pressures when extra heat is needed.

Exterior regulators are needed to control the system. Propane bottles are not included with the machine. A high pressure regulator should be installed on the propane bottle and a low pressure regulator attached to the pressure washer.

#### **Propane Cylinder Capacity:**

An important consideration with propane systems is the capacity of the supply cylinder relative to the needs of the burner. The burner operates on propane as a gas; as gas is used from the propane cylinder, the liquid in the cylinder boils to maintain gas pressure. This boiling process cools the liquid, and in a heavy, continuous-demand situation, the liquid temperature can fall to the point at which it cannot provide gas as rapidly as is needed. In this case, it may be necessary to warm the propane cylinder by directing a warm spray, not over 120°, on the cold cylinder, or by manifolding two propane bottles together to increase total vaporization capacity. It is recommended that a minimum 100 lb. propane bottle be used on the machine, depending on the length of running time desired.

#### **BURNER FEATURES**

#### **Operated Automatic Valve:**

This machine is equipped with a thermopile self-powered combination gas control. This system is designed as a constant burning pilot. Lighting of the pilot is accomplished by manually lighting the pilot. A thermostat and flow switch control the main solenoid valve.

#### **Care of Main Burner:**

Due to condensation from heater coils dripping down on the burners, a scale buildup may occur in the burner jet orifices.

### 1. TO REMOVE BURNER MANIFOLD FROM WATER HEATER COIL:

Turn off the gas at the main burner by turning the knob to the "OFF" position on the gas valve and main gas supply.

Disconnect the pilot and ignition lines from the gas valve. Disconnect union in main burner line. (Remove the nuts from the U-bolts, item 20 on page 22). Slide burner manifold out through shell opening.

#### 2. TO CLEAN BURNER JETS:

Select proper size drill for type of gas involved. Use vise to hold drill and ream out each jet orifice.

If the water heater will be exposed to freezing weather, an antifreeze solution should be circulated through the coils by whatever means are available for the particular system the water heater is used on.

#### BURNER TROUBLESHOOTING

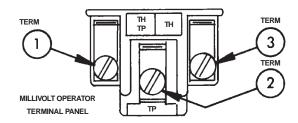
#### Millivolt System Check:

This machine has a thermopile self-powered combination gas control. Before checking the millivolt system, the following operations should be performed and observations made:

- 1. Inspect system for proper wiring.
- The switch leads and all wire connections should be cleaned and tightened to eliminate all unnecessary resistance.
- 3. Clean and/or adjust pilot for maximum flame impingement on the thermopile.
- 4. If pilot will not remain lit when gas cock dial is released, check automatic pilot (Step D).

The millivolt system and individual components may be checked with a DC millivolt meter having a 0-1000 MV range. Conduct each check as shown in the chart below by connecting the meter test leads to terminals as indicated. All readings are closed circuit.

#### Figure 6



Check Test	To Test	Connect Meter Leads To Terminals	Switch Flow & Burner Contacts	Meter Reading Should Be
А	Complete System	2 & 3	Closed	100 MV or More
В	Thermopile Output	1 & 2	Open	Greater than 250
С	System Resistance	1 & 3	Closed	Less than 35
D	Auto/Pilot Dropout	1 & 2	Open	Between 120 - 30 MV

#### A. Complete Millivolt System Check

("A" Reading = Switch contacts CLOSED - Gas Cock Dial "ON" - Main burner should come ON).

- If the reading is more than 100 millivolts and the automatic valve still does not come on, replace the automatic valve operator.
- 2. If the closed circuit reading ("A" Reading) is less than 100 millivolts, determine cause for low reading proceed as follows:

#### **B. Thermopile Output Reading Check**

("B" Reading = Switch contacts OPEN - Main burner OFF).

If the minimum 250 millivolt reading is not obtainable, readjust pilot for maximum millivolt output. If millivolt reading is still below minimum specified, replace thermopile.

#### C. System Resistance Check

("C" Reading = Switch contacts CLOSED - Gas Cock "ON" - Main burner should be ON)

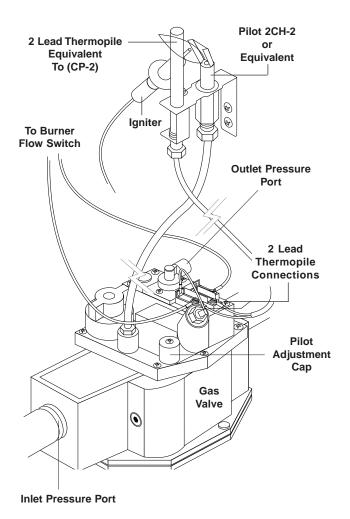
If the "C" Reading is more than that specified for the system being checked, this indicates the resistance in the system is excessive and must be reduced. To correct:

- Clean and tighten switch leads and connections.
- b. Shorten switch lead wires and/or replace with heavier gauge wire.
- c. Cycle switch rapidly to clean contacts.

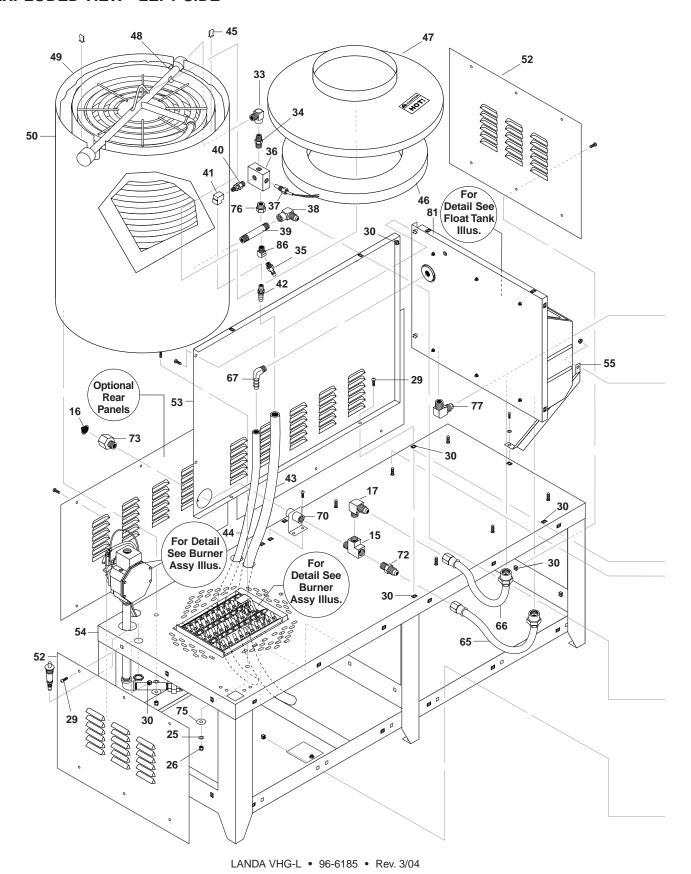
#### D. Automatic Pilot Dropout Check

- Hold gas cock dial depressed in pilot position until maximum output is observed. Then extinguish pilot and observe meter.
- Dropout of automatic pilot magnet (sound should be audible) should occur between 120 millivolts and 30 millivolts. If dropout occurs outside these limits, change the automatic pilot magnet assembly.

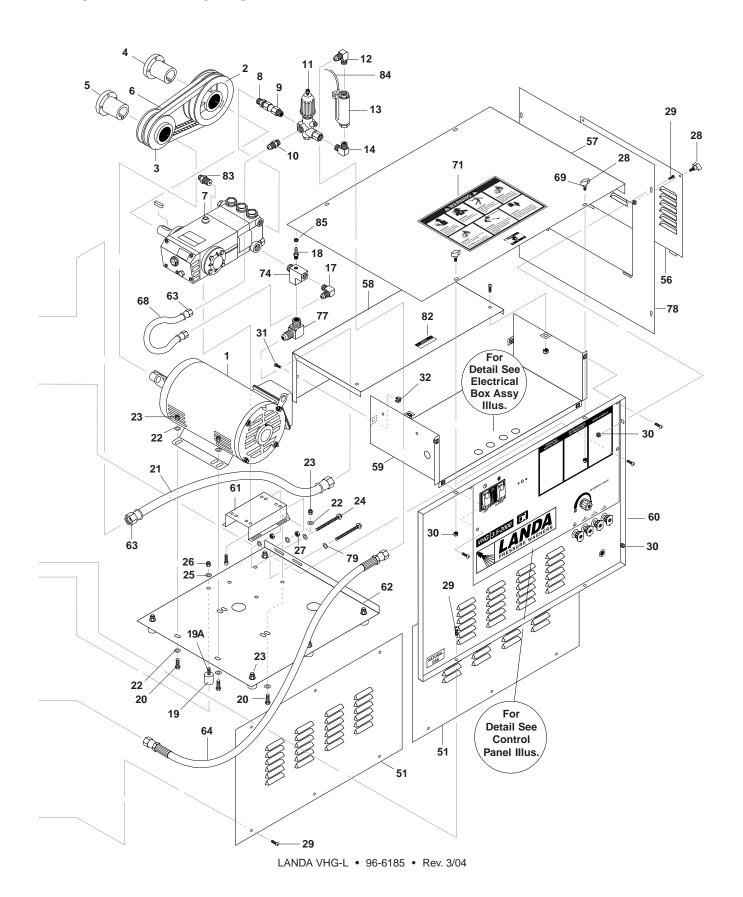
Figure 7: Gas Valve with Pilot Assembly



#### VHG-L 3-4-5 GPM EXPLODED VIEW - LEFT SIDE



#### VHG-L 3-4-5 GPM EXPLODED VIEW - RIGHT SIDE



### VHG-L 3-4-5 GPM EXPLODED VIEW PARTS LIST

1 Motor, See Page 32-33 6-0102	ITEM	PART NO.	DESCRIPTION	QTY
Coleman (4-3A) 4.25 ft.  6-0104	1		Motor, See Page 32-33	
(3-11D) 4.25ft. 6-0105		6-0102		.25 ft.
Coleman (4-22B/C/N, 5-3C) 4.25 ft. 6-0108		6-0104		.25ft.
6-0108       ▲ Cord, Service, SEO 10/3, Coleman (4-2A, 4-22A)       4.25 ft.         6-0109       ▲ Cord, Service, SEO 10/4, Coleman (4-3B/C)       4.25 ft.         6-01021       ▲ Service Cord, 8/4 (5-3B) 4.25 ft.         2       Pulley, Pump, See Page 32-33         3       Pulley, Motor, See Page 32-33         4       Bushing, Pump, See Page 32-33         5       Bushing, Motor, See Page 32-33         6       Belt, Pump/Motor, See Page 32-33         7       Pump, See Page 32-33         8       2-0051       Nipple, 1/2" JIC, 3/8" Pipe       1         9       2-0079       Swivel, 1/2" JIC x 3/8" Pipe       1         10       2-1052       Nipple, 1/2" JIC x 3/8" Pipe       1         11       5-3208       Unloader, AL607, 7.8GPM @ 4200 PSI       1         12       2-0053       Elbow, 1/2" JIC, 3/8", 90°       1         13       6-021730       Switch, Flow MV 60, Yellow       1         14       2-00270       Elbow, 3/8", Male, Pipe       1         15       2-1042       Tee, 1/2" Street       1         16       2-1902       Strainer, Inlet, Garden Hose       1         17       2-1062       Elbow, 1/2" JIC x 1/2", 90°       2         18 </td <td></td> <td>6-0105</td> <td>Coleman (4-22B/C/N,</td> <td>.25 ft.</td>		6-0105	Coleman (4-22B/C/N,	.25 ft.
Coleman (4-3B/C) 4.25 ft.  6-01021		6-0108	▲ Cord, Service, SEO 10/3,	.25 ft.
2 Pulley, Pump, See Page 32-33 3 Pulley, Motor, See Page 32-33 4 Bushing, Pump, See Page 32-33 5 Bushing, Motor, See Page 32-33 6 Belt, Pump/Motor, See Page 32-33 7 Pump, See Page 32-33 8 2-0051 Nipple, 1/2" JIC, 3/8" Pipe 1 9 2-0079 Swivel, 1/2" JIC x 3/8" Pipe 1 10 2-1052 Nipple, 1/2" JIC x 3/8" Pipe 1 11 5-3208 Unloader, AL607, 7.8GPM @ 4200 PSI 1 12 2-0053 Elbow, 1/2" JIC, 3/8", 90° 1 13 6-021730 Switch, Flow MV 60, Yellow 1 14 2-00270 Elbow, 3/8", Male, Pipe 1 15 2-1042 Tee, 1/2" Street 1 16 2-1902 Strainer, Inlet, Garden Hose 1 17 2-1062 Elbow, 1/2" JIC x 1/2", 90° 2 18 2-1084 Hose Barb, 1/4" Barb x 1/8" ML Pipe 1 19 2-01011 Isolator, 5/16" THRD, Fem x Fem, 1" x 1" 6 19A 90-10331 Stud, 5/16" - 18 x 1" B7 TFL Zinc 6 20 90-1006 Bolt, 5/16" x 3/4" NC HH (3-11D) 4 90-1016 Bolt, 3/8" x 1", NC HH 8 (3-11D, 4-2A) 4		6-0109		.25 ft.
3 Pulley, Motor, See Page 32-33 4 Bushing, Pump, See Page 32-33 5 Bushing, Motor, See Page 32-33 6 Belt, Pump/Motor, See Page 32-33 7 Pump, See Page 32-33 8 2-0051 Nipple, 1/2" JIC, 3/8" Pipe 1 9 2-0079 Swivel, 1/2" JIC Fem., 3/8" Male1 10 2-1052 Nipple, 1/2" JIC x 3/8" Pipe 1 11 5-3208 Unloader, AL607, 7.8GPM @ 4200 PSI 1 12 2-0053 Elbow, 1/2" JIC, 3/8", 90° 1 13 6-021730 Switch, Flow MV 60, Yellow 1 14 2-00270 Elbow, 3/8", Male, Pipe 1 15 2-1042 Tee, 1/2" Street 1 16 2-1902 Strainer, Inlet, Garden Hose 1 17 2-1062 Elbow, 1/2" JIC x 1/2", 90° 2 18 2-1084 Hose Barb, 1/4" Barb x 1/8" ML Pipe 1 19 2-01011 Isolator, 5/16" THRD, Fem x Fem, 1" x 1" 6 19A 90-10331 Stud, 5/16" - 18 x 1" B7 TFL Zinc 6 20 90-1006 Bolt, 5/16" x 3/4" NC HH (3-11D) 4 90-1016 Bolt, 5/16" x 3/4" NC HH 8		6-01021	▲ Service Cord, 8/4 (5-3B) 4	.25 ft.
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5         Bushing, Motor, See Page 32-33           6         Belt, Pump/Motor, See Page 32-33           7         Pump, See Page 32-33           8         2-0051         Nipple, 1/2" JIC, 3/8" Pipe 1           9         2-0079         Swivel, 1/2" JIC Fem., 3/8" Male1           10         2-1052         Nipple, 1/2" JIC x 3/8" Pipe 1           11         5-3208         Unloader, AL607, 7.8GPM @ 4200 PSI 1           12         2-0053         Elbow, 1/2" JIC, 3/8", 90° 1           13         6-021730         Switch, Flow MV 60, Yellow 1           14         2-00270         Elbow, 3/8", Male, Pipe 1           15         2-1042         Tee, 1/2" Street 1           16         2-1902         Strainer, Inlet, Garden Hose 1           17         2-1062         Elbow, 1/2" JIC x 1/2", 90° 2           18         2-1084         Hose Barb, 1/4" Barb x 1/8" ML Pipe 1           19         2-01011         Isolator, 5/16" THRD, Fem x Fem, 1" x 1" 6           19A         90-10331         Stud, 5/16" - 18 x 1" B7 TFL Zinc 6           20         90-1006         Bolt, 5/16" x 3/4" NC HH (3-11D) 4           90-1016         Bolt, 3/8" x 1", NC HH 8 (3-11D, 4-2A) 4	3		Pulley, Motor, See Page 32-33	3
6       Belt, Pump/Motor, See Page 32-33         7       Pump, See Page 32-33         8       2-0051       Nipple, 1/2" JIC, 3/8" Pipe       1         9       2-0079       Swivel, 1/2" JIC Fem., 3/8" Male1         10       2-1052       Nipple, 1/2" JIC x 3/8" Pipe       1         11       5-3208       Unloader, AL607, 7.8GPM @ 4200 PSI       1         12       2-0053       Elbow, 1/2" JIC, 3/8", 90°       1         13       6-021730       Switch, Flow MV 60, Yellow       1         14       2-00270       Elbow, 3/8", Male, Pipe       1         15       2-1042       Tee, 1/2" Street       1         16       2-1902       Strainer, Inlet, Garden Hose       1         17       2-1062       Elbow, 1/2" JIC x 1/2", 90°       2         18       2-1084       Hose Barb, 1/4" Barb x 1/8" ML Pipe       1         19       2-01011       Isolator, 5/16" THRD, Fem x Fem, 1" x 1"       6         19A       90-10331       Stud, 5/16" - 18 x 1" B7 TFL Zinc       6         20       90-1006       Bolt, 5/16" x 3/4" NC HH (3-11D)       4         90-1016       Bolt, 3/8" x 1", NC HH 8 (3-11D, 4-2A)       4	4		Bushing, Pump, See Page 3	2-33
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9 2-0079 Swivel, 1/2" JIC Fem., 3/8" Male1 10 2-1052 Nipple, 1/2" JIC x 3/8" Pipe 1 11 5-3208 Unloader, AL607, 7.8GPM @ 4200 PSI 1 12 2-0053 Elbow, 1/2" JIC, 3/8", 90° 1 13 6-021730 Switch, Flow MV 60, Yellow 1 14 2-00270 Elbow, 3/8", Male, Pipe 1 15 2-1042 Tee, 1/2" Street 1 16 2-1902 Strainer, Inlet, Garden Hose 1 17 2-1062 Elbow, 1/2" JIC x 1/2", 90° 2 18 2-1084 Hose Barb, 1/4" Barb x 1/8" ML Pipe 1 19 2-01011 Isolator, 5/16" THRD, Fem x Fem, 1" x 1" 6 19A 90-10331 Stud, 5/16" - 18 x 1" B7 TFL Zinc 6 20 90-1006 Bolt, 5/16" x 3/4" NC HH (3-11D) 4 90-1016 Bolt, 3/8" x 1", NC HH 8 (3-11D, 4-2A) 4	7		Pump, See Page 32-33	
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14       2-00270       Elbow, 3/8", Male, Pipe       1         15       2-1042       Tee, 1/2" Street       1         16       2-1902       Strainer, Inlet, Garden Hose       1         17       2-1062       Elbow, 1/2" JIC x 1/2", 90°       2         18       2-1084       Hose Barb, 1/4" Barb x 1/8" ML Pipe       1         19       2-01011       Isolator, 5/16" THRD, Fem x Fem, 1" x 1"       6         19A       90-10331       Stud, 5/16" - 18 x 1" B7 TFL Zinc       6         20       90-1006       Bolt, 5/16" x 3/4" NC HH (3-11D)       4         90-1016       Bolt, 3/8" x 1", NC HH 8 (3-11D, 4-2A)       8	12	2-0053	Elbow, 1/2" JIC, 3/8", 90°	1
15       2-1042       Tee, 1/2" Street       1         16       2-1902       Strainer, Inlet, Garden Hose       1         17       2-1062       Elbow, 1/2" JIC x 1/2", 90°       2         18       2-1084       Hose Barb, 1/4" Barb x 1/8" ML Pipe       1         19       2-01011       Isolator, 5/16" THRD, Fem x Fem, 1" x 1"       6         19A       90-10331       Stud, 5/16" - 18 x 1" B7 TFL Zinc       6         20       90-1006       Bolt, 5/16" x 3/4" NC HH (3-11D)       4         90-1016       Bolt, 3/8" x 1", NC HH 8 (3-11D, 4-2A)       8	13	6-021730	Switch, Flow MV 60, Yellow	1
16       2-1902       Strainer, Inlet, Garden Hose       1         17       2-1062       Elbow, 1/2" JIC x 1/2", 90°       2         18       2-1084       Hose Barb, 1/4" Barb x 1/8" ML Pipe       1         19       2-01011       Isolator, 5/16" THRD, Fem x Fem, 1" x 1"       6         19A       90-10331       Stud, 5/16" - 18 x 1" B7 TFL Zinc       6         20       90-1006       Bolt, 5/16" x 3/4" NC HH (3-11D)       4         90-1016       Bolt, 3/8" x 1", NC HH       8 (3-11D, 4-2A)	14	2-00270	Elbow, 3/8", Male, Pipe	1
17       2-1062       Elbow, 1/2" JIC x 1/2", 90°       2         18       2-1084       Hose Barb, 1/4" Barb x 1/8" ML Pipe       1         19       2-01011       Isolator, 5/16" THRD, Fem x Fem, 1" x 1"       6         19A       90-10331       Stud, 5/16" - 18 x 1" B7 TFL Zinc       6         20       90-1006       Bolt, 5/16" x 3/4" NC HH (3-11D)       4         90-1016       Bolt, 3/8" x 1", NC HH 8 (3-11D, 4-2A)       8	15	2-1042	Tee, 1/2" Street	1
18       2-1084       Hose Barb, 1/4" Barb x 1/8" ML Pipe       1         19       2-01011       Isolator, 5/16" THRD, Fem x Fem, 1" x 1"       6         19A       90-10331       Stud, 5/16" - 18 x 1" B7 TFL Zinc       6         20       90-1006       Bolt, 5/16" x 3/4" NC HH (3-11D)       4         90-1016       Bolt, 3/8" x 1", NC HH       8 (3-11D, 4-2A)       4	_16	2-1902	Strainer, Inlet, Garden Hose	1
ML Pipe 1  19 2-01011 Isolator, 5/16" THRD, Fem x Fem, 1" x 1" 6  19A 90-10331 Stud, 5/16" - 18 x 1" B7 TFL Zinc 6  20 90-1006 Bolt, 5/16" x 3/4" NC HH (3-11D) 4  90-1016 Bolt, 3/8" x 1", NC HH 8 (3-11D, 4-2A) 4	17	2-1062	Elbow, 1/2" JIC x 1/2", 90°	2
Fem x Fem, 1" x 1" 6  19A 90-10331 Stud, 5/16" - 18 x 1" B7 TFL Zinc 6  20 90-1006 Bolt, 5/16" x 3/4" NC HH (3-11D) 4  90-1016 Bolt, 3/8" x 1", NC HH 8 (3-11D, 4-2A) 4	18	2-1084		1
Zinc 6  20 90-1006 Bolt, 5/16" x 3/4" NC HH (3-11D) 4  90-1016 Bolt, 3/8" x 1", NC HH 8 (3-11D, 4-2A) 4	19	2-01011		6
(3-11D) 4 90-1016 Bolt, 3/8" x 1", NC HH 8 (3-11D, 4-2A) 4	19A	90-10331	•	6
(3-11D, 4-2A) 4	20	90-1006		4
90-1007 Bolt, 5/16" x 1" NC (4-2A) 4		90-1016		
		90-1007	Bolt, 5/16" x 1" NC (4-2A)	4

ITEM	PART NO.	DESCRIPTION	QTY
21	4-02110000	Hose, 1/2", Push-On	29"
	4-02120000	Hose, 3/4" Push-On (5-3B/C)	29"
22	90-4002	Washer, 3/8", SAE, Flat (3-11D, 4-2A)	20 12
	90-4001	Washer, 5/16", Flat (3-11, 4-2	A)8
23	90-2002	Nut, 3/8" ESNA, NC (4-2A, 3-11D)	8 4
	90-2001	Nut, 5/16" ESNA NC (4-2A, 3-11D)	4
24	90-1025	Bolt, 3/8" x 5-1/2", NC HH Tap	2
25	90-4001	Washer, 5/16" Flat, SAE	8
26	90-2001	Nut, 5/16" ESNA, NC	9
27	90-2007	Nut, 3/8" Hex, NC	2
28	90-1043	Screw, Thumb, 1/4" - 20 x 1/2	' 6
29	90-1995	Screw, 1/4" x 1/2" BH SOC CS	5 54
30	90-20231	Nut, Cage, 1/4" x 12 Gauge	39
31	90-1991	Screw, 10/32" x 1/2" BHSOC Blk	5
32	90-2018	Nut, Cage, 10/32" x 16 Gauge	e 5
33	2-0032	Elbow, 1/2" Street	1
34	2-0008	Nipple, 1/2" Hex Steel	1
35	2-2007	Nipple, 3/8" x 3/8" NPT ST Fen	n 1
36	95-07101226	Block, Discharge, Brass, 1/2" x 1/2"	1
37	4-0509	Switch, Snap, 225 OR	1
38	2-00602	Elbow, 1/2" JIC x 1/2" Fem, 90	)° 1
39	2-00091	Nipple, 1/2" x 3", Galv. SCH. 8	80 1
40	2-3409	Disk, Rupture Assy, 7000 PSI	1
41	2-1019	Elbow, 3/8" Female	1
42	2-1108	Hose Barb, 1/2" Barb x 3/8" N Push-On	IPT, 1
43	4-02110000	Hose, 1/2" Push-On	.8 ft.
44	4-02120000	Hose, 3/4" Push-On	18.5"
45	90-50045	Retainer Clip	4
46	7-01415	Insulation, Tank Head, 20 VNH/ENG, 10 Opening	1
47	95-07163099	Top, Burner Wrap, 20", ENG/VNG-S	1

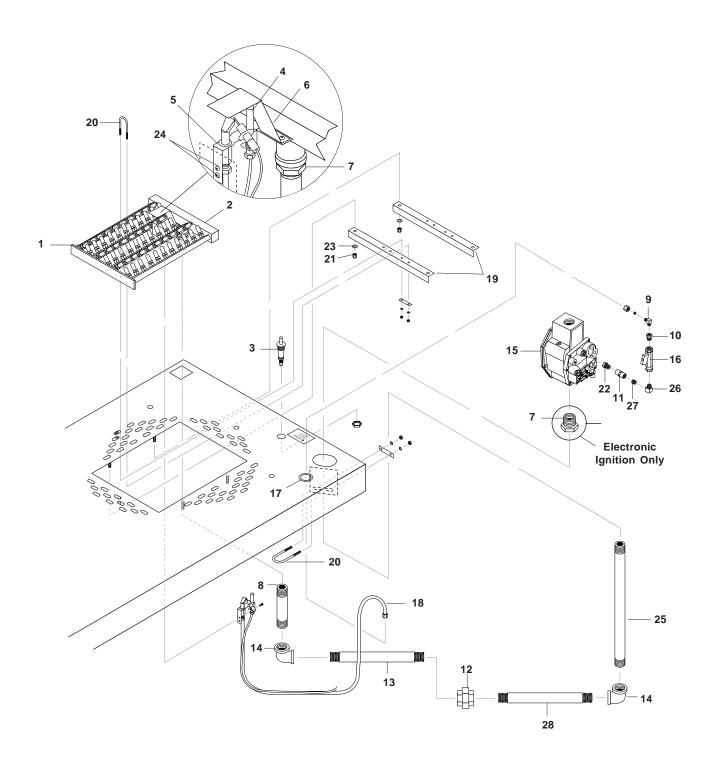
### VHG-L 3-4-5 GPM EXPLODED VIEW PARTS LIST

ITEM	PART NO.	DESCRIPTION Q	TY
48	95-07121220	Coil, Dura, 20" Dia., As of 4/99 SCH 80, VNG Small	, 1
49	7-014300	Insulation, Blanket 11.	5 ft.
50	95-07163152	Wrap, Outer SM, 20" Coil, Assy LRG VHG	/, 1
51	95-07163150	Panel Side, LRG, VHG LRG (rear panels optional)	2
52	95-07163151	Panel Side, SM, VHG LRG	2
53	95-07163156	Panel, Back/Side, VHG LRG	1
54	95-07163158	Base, Assembly, VHG LRG	1
55	95-07400221	Brace, Base, 45°, WB-120	1
56	95-07163175	Panel, Access, VHG Large (Yellow)	1
	95-071631751	Panel, Access, VHG Large, SS (Optional)	1
57	95-07163179	Cover, Top, VHG, Yellow	1
	95-071631791	Cover, Top, VHG SS (Optional)	1
58	95-07163157	Cover, LRG Electrical Box, VHG LRG	1
59	95-07163153	Box, Electrical, Large, VHG LRC	31
60	95-07163154	Panel, Control, VHG LRG	1
61	95-07121112	Rail, Pump or Generator Comb (PHW/SKID)	0 1
62	95-071210136	Platform, Motor 3/16", PHW/VNG	1
63	2-1105	Swivel, 1/2" JIC Fem, Push-On	4
	2-11050	Swivel, 3/4" JIC Fem, Push-On (5-3B/C)	2
64	4-02047740	Hose, 3/8" x 40" 2 Wire	1
65	4-02100013	Inlet Hose, 13"	1
66	4-02100008	Inlet Hose, 8"	1
67	2-0100379	Adpater, 3/4" x 3/4" MT, 90°	1
68	4-02110000	Hose, 1/2", Push-On, per 1.2	5 ft.
69	90-40006	Washer, 1/4" Retainer	6
70	95-07162007	Hose Connection Bracket, PHW/PHWS/OHW	1
71	10-07994	Label, Warning, VHG Large	1
72	2-1053	Nipple, 1/2" JIC x 1/2" Pipe	1
73	2-10942	Swivel, 1/2" MP x 3/4" GHF w/Strainer	1

ITEM	PART NO.	DESCRIPTION	QTY
74	2-10421	Tee, 1/2" w/1/8" Hole, Street	1
75	90-4007	Washer, 3/8" x 1-1/2", Fende SAE	er, 3
76	2-00681	Bushing, 1/2" x 3/8" Steel	1
77	2-1062	Elbow, 1/2" JIC x 1/2", 90°	1
	2-10630	Elbow, 3/4" JIC x 1/2", 90° (5-3B/C)	1
78	95-07163177	Cover, Side, VHG Large, Yel	low 1
	95-071631771	Cover, Side, VHG Large, SS (Optional)	1
79	90-4002	Washer, 3/8"	4
80	6-0102	▲ Cord, Service, SO, 8/3, P Coleman (4-3A)	ower 7.5 ft.
	6-0104	▲ Cord, Service, 12/3 (3-11D)	7.5 ft.
	6-0108	▲ Cord, Service, SEO, 10/3, Power, Coleman (4-2A,4-22A)	7.5 ft.
	6-0109	▲ Cord, Service, SEO, 10/4, Power, Coleman (4-3B,C)	7.5 ft.
	6-0105	▲ Cord Service, SEO, 12/4 Power, Coleman (4-22B,C,N; 5-3C)	7.5 ft.
	6-01021	Cord, Service 8/4 (5-3B)	7.5 ft.
81	95-07163162	Panel, Side, VHG Large	1
82	10-08021	Label, Disconnect Power	1
83	2-30082	Pump Protector, 1/2"	1
84	6-021740	Switch, Reed Replacement, MV 60	1
85	2-9040	Clamp, Hose, UNI .4654	1
86	2-00575	Elbow, 3/8" STL, Steel, 45°	1
		A NI-4 Ob	

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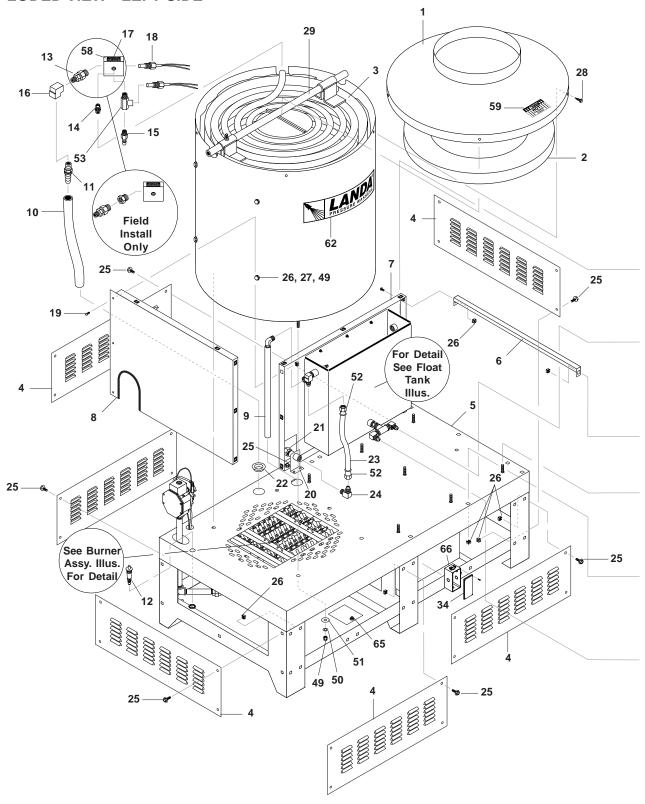
### VHG-L BURNER ASSEMBLY 3-4-5 GPM EXPLODED VIEW

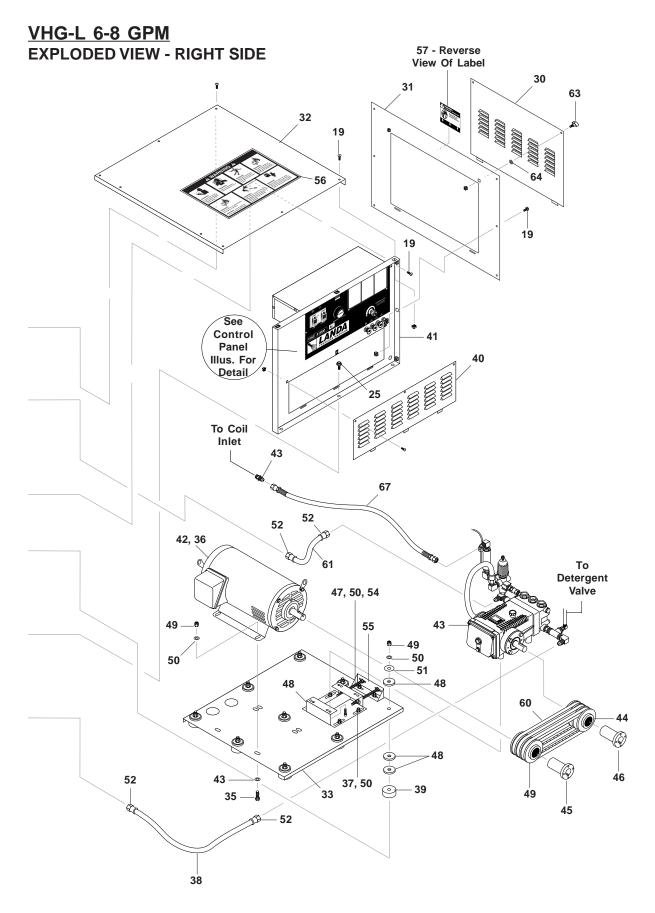


## VHG-L BURNER ASSEMBLY 3-4-5 GPM PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	7-7021	Jet Orifice, #54 Natural Gas	44
	7-7022	Jet Orifice #69 LP	2
2	95-031610/54	Small SQ. Burner Ring/#54, VHG Large 4-5	1
3	7-70162	Ignitor, Piezo #1244-42	1
4	7-7036	Thermopile, VNG	1
5	7-70237	Pilot, Natural Gas Electronic (Optional)	1_
6	95-07163085	Splash Guard, Pilot Light	1
7	2-001359	Bushing, 1"x 3/4" Blk Steel He	x 1
8	2-00164	Nipple, 3/4" x 6", Black Pipe	1
9	2-1116	Elbow, 1/4" Tube x 1/8"	1
10	2-1072	Bushing, 1/4" x 1/8" Pipe	1
11	2-1014	Coupling, 1/4" Hex	1
12	2-0087	Union, 3/4", Black Pipe	1
13	2-00167	Nipple, 3/4" x 7", Black Pipe	1
14	2-00293	Elbow, 3/4", Black, 90°	2
15	7-7000HC	Valve, Gas, 7000 MVRHC	1
	7-70002	Valve, Gas, 7000 DERHC (Optional) Electronic	1
16	2-3006	Valve, Ball, 1/4" Fem x 1/4" Fe	m 1
17	2-01413	Snap Bushing, 5/8"	1
18	7-015	Tubing, Aluminum	36"
19	95-07163159	Strap, Burner, VHG LRG 4-5GPM	2
	95-07163259	Strap, Burner, VHG Large 6-8	2
20	90-10130	U-Bolt, 5/16" x 1" Pipe	5
21	90-2001	Nut, 5/16" ESNA, NC	4
22	2-1118	Connector, 1/4" Tube x 1/4" MPT	1
23	90-4001	Washer, 5/16" Flat, SAE	4
24	90-199940	Screw, 10/32" x 1/4" Hex	2
25	2-001681	Nipple, 3/4" x 9", Black Pipe	1
26	2-1022	Elbow, 1/4" Street	1
27	2-1002	Nipple, 1/4" Close	1
28	2-001680	Nipple, 3/4" x 8" Black Pipe	1

#### VHG-L 6-8 GPM EXPLODED VIEW - LEFT SIDE



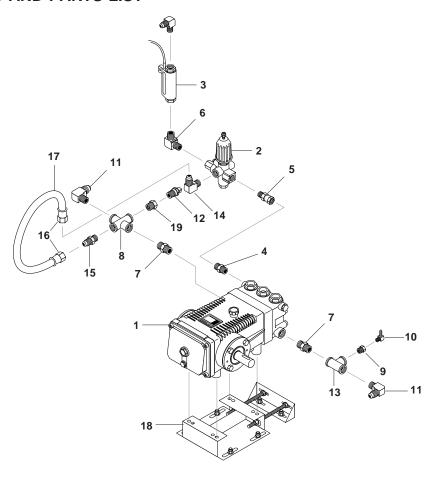


### VHG-L 6-8 GPM EXPLODED VIEW PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	95-071630751	Top, Burner Wrap, 30 VNG	1
2	7-014834	Insulation, Tank Head, 30"	1
3	95-07121224	Coil Assy., Modulating, VNG-LM	1
	7-014844	▲ Insul. Blanket, 33" x 89" x 1	1/2"1
4	95-07163251	Cover, Side Bottom, VHG 6-8	6
5	95-07163258	Assy., Base, VHG 6-8	1
6	95-07163282	Support, Control, Panel, 6-8	1
7	95-07163256	Panel, Back, VHG Large 6-8	1
	10-09003	▲ Label, Cold Water Inlet	1
8	95-07163262	Panel, Side, VHG Large 6-8	1
9	4-02120000	Hose, 3/4" Push-On	3 ft.
10	4-02110000	Hose, 1/2" Push-On 3	.33 ft.
11	2-1108	Hose Barb, 1/2" Barb x 3/8" N Push-On	ИРТ, 1
12	7-70162	Ignitor, Piezo	1
13	2-3409	Disk, Rupture Assy, 7000 PS	l 1
14	2-00091	Nipple, 1/2" x 3" Galvanized	1
15	2-2007	Nipple, 3/8" x 3/8" NPT ST M	ale1
16	2-1019	Elbow, 3/8" Female	1
17	95-07101226	Block, Discharge, Brass	1
18	4-0509	Switch, Snap, 225 DR Hi Lim	it 2
19	90-1995	Screw, 1/4" x 3/4" BH SOC	34
20	95-07162007	Bracket, PHW Hose Connection	1
21	2-10942	Swivel, 1/2" MP x 3/4" GHF w/Strainer	1
22	2-01040	Grommet, 2-5/16", Rubber	2
23	4-02120000	Hose, 3/4" Push-On	2 ft.
24	2-10630	Elbow, 3/4" JIC x 1/2", 90°	1
25	90-1996	Screw, 3/8" x 3/4" HH NC, Whiz	29
26	90-2020	Nut, Cage 3/8" x 12 Gauge	37
27	90-1016	Bolt, 3/8" x 1" NC HH	8
	90-4002	Washer, 3/8" SAE	8
28	90-2499	Screw, #10 x 1/2" Tek, Hex Head	12
29	95-07121225	Cross Hanger, 1" SCH 80	1
30	95-07163175	Panel, Access, VHG Large	1
31	95-07163277	Cover, Side, VHG Large 6-8	1
32	95-07163279	Cover, Top, VHG Large 6-8	1
33	95-07163281	Platform, Pump/Motor 6-8	1
34	6-0411	Cover, 2" x 4", Waterproof	1

ITEM	PART NO.	DESCRIPTION	QTY
35	90-1016	Bolt, 3/8" x 1" NC	16
36	6-01031	▲ Service Cord, 6/4 (6-3000B,H)	5 ft.
	6-0109	▲ Service Cord, 10/4 (6-3000C)	5 ft.
	6-01033	▲ Service Cord, 4/4 (8-3000B,H)	5 ft.
	6-01021	▲ Service Cord, 8/4(8-3000C	)5 ft.
37	90-2002	Nut, 3/8" ESNA, NC	16
38	4-02120000	Hose, 3/4" Push-On	3 ft.
39	2-01041	Pad, Soft Rubber, 50 Duro	9
40	95-07163276	Cover, Access	1
41	95-07163254	Panel, Control Assy.	1
42	See Parts	Specs Pages 46, 47	
	6-05171	▲ Strain Relief, 1" Metal	1
43	See Parts	Specs Pages 46, 47	
44	See Parts	Specs Pages 46, 47	
45	See Parts	Specs Pages 46, 47	
46	See Parts	Specs Pages 46, 47	
47	90-1025	Bolt, 3/8" x 5-1/2"	2
48	2-0108	Bumper Pad, Engine	9
49	See Parts	Specs Pages 46, 47	
50	90-4002	Washer, 3/8" SAE, Flat	18
51	90-4007	Washer, 3/8" x 1-1/2" Fender, SAE	9
52	2-11050	Swivel, 3/4" SAE Female	6
53	2-0046	Tee, 1/2" Street	1
54	2-2007	Nut, 3/8" Hex	2
55	95-07141112	Bracket, Pump Take-Up	1
56	10-07994	Label, Warning	1
57	10-02028	Label, Warn Exposed Pulleys	1
58	10-09004	Label, Hot Water Outlet	1
59	10-02025A	Label, Hot/Caliente	1
60	See Parts	Specs Pages 46, 47	
61	4-02120000	Hose, Push-On	12"
62	10-03014	Label, Landa	1
63	90-1043	Screw, Thumb, 1/4"-20 x 1/2"	2
64	90-40006	Washer, 1/4" Retainer	2
65	95-07290025	Reflector, Pilot Light	1
66	6-04100	Box, Junction, 3 Hose	1
67	4-02067736	Hose, 3/8" x 36", 2 Wire Pressure Loop	1
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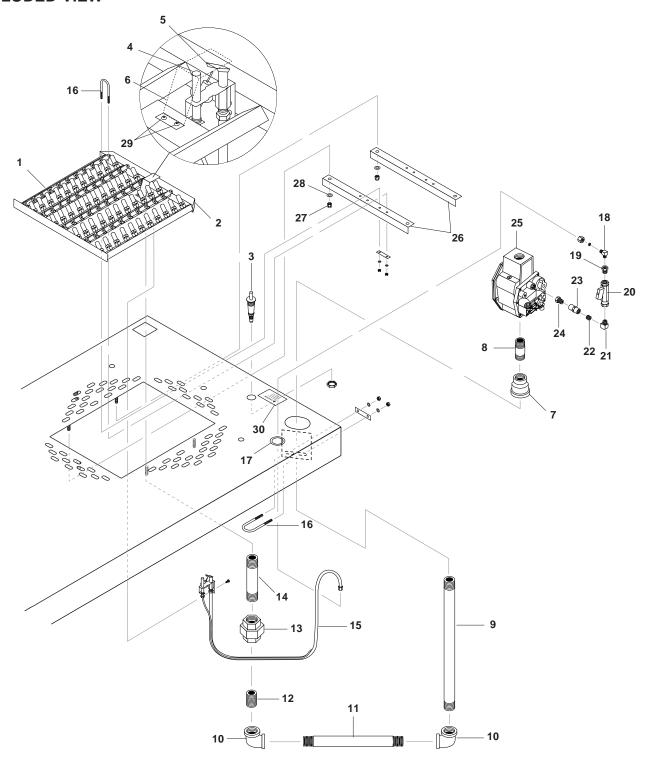
## VHG-L 6-8 GPM PUMP ASSEMBLIES EXPLODED VIEW AND PARTS LIST



	ITEM	PART NO.	DESCRIPTION	QTY
	1	5-1733	Pump, Landa, LX6035/L (6-3	) 1
		5-1743	Pump, Landa, LX8030/L (8-3	) 1
	2	5-3208	Unloader, AL-VRT 607, 7.8GPM	1
	3	6-021730	Switch, Flow MV60, Yellow	1
	4	2-0051	Nipple, 1/2" JIC x 1/2" M (6-3)	) 1
•		2-0052	Nipple, 1/2" JIC x 3/8" Pipe (8	-3)1
	5	2-0079	Swivel, 1/2" JIC Fem, 3/8" Ma	ıle 1
	6	2-00270	Elbow, 3/8", Male, Pipe	1
	7	2-1007	Nipple, 1/2" Hex (6-3)	2
		2-1008	Nipple, 3/4" Close (8-3)	2
	8	2-1035	Cross 1/2" Female, Cast, Inle (6-3)	t 1
		2-1036	Cross, 3/4" Pipe (8-3)	1
	9	2-1076	Bushing, 1/2" x 1/4" Brass (6-	3) 1
		2-1079	Bushing, 3/4" x 1/4" (8-3)	1
	10	2-1089	Hose Barb, 1/4" Barb x 1/4" F	Pipe,

ITEM	PART NO.	DESCRIPTION	QTY
11	2-10620	Elbow, 3/4" SAE x 3/4", 90° (8	3-3)2
	2-10630	Elbow, 3/4" JIC x 1/2", 90° (6	6-3) 2
12	2-30082	Pump Protector, 1/2" PTP	1
13	2-1042	Tee, 1/2" Street (6-3)	1
	2-1033	Tee, 3/4" Female Pipe (8-3)	1
14	2-1060	Elbow, 1/2" JIC x 3/8", 90° (6	6-3) 1
	2-10622	Elbow, 3/4" JIC x 3/8", 90° (8	3-3) 1
15	2-1052	Nipple, 1/2" JIC x 3/8" Pipe (6-3)	1
	2-10636	Nipple, 3/4" JIC x 3/4" Pipe (8-3)	1
16	2-1105	Swivel, 1/2" JIC Fem, Push-0	On 2
	2-11050	Swivel, 3/4" SAE, Female	2
17	4-02110000	Hose, 1/2", Push-On (6-3)	18"
	4-02120000	Hose, 3/4" Push-On(8-3)	18"
18	95-071211129	Rail, Pump	1
19	2-1081	Bushing, 3/4" x 1/2" (8-3)	1

### VHG-L BURNER ASSEMBLY 6-8 GPM EXPLODED VIEW

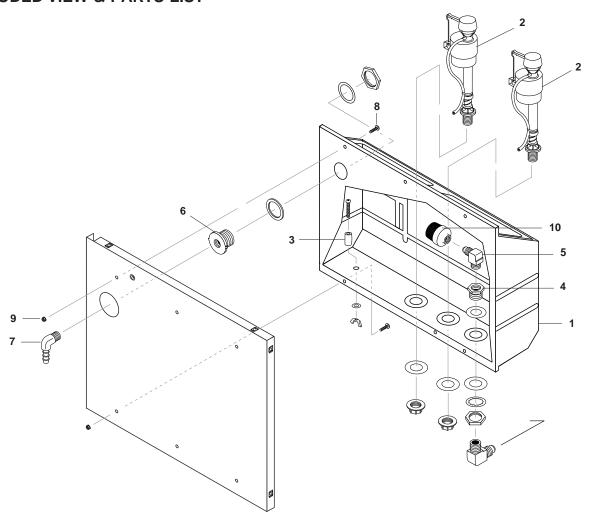


## VHG-L BURNER ASSEMBLY 6-8 GPM PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	95-031610/54L	Burner Ring w/54 Jets, VHG-Large	1
2	95-031610/65L	Burner Ring w/65 Jets (LP Option)	1
3	7-70162	Ignitor, Piezo #1244-42	1
4	7-7036	Thermopile, VNG	1
5	7-70237	Pilot, Natural Gas, Electronic (Option)	1
6	95-07163085	Splash Guard, Pilot Light	1
7	2-00141	Reducer, 1" x 3/4", Bell, Black Pipe	1
8	2-00163	Nipple, 3/4" x 2", Black	1
9	95-07163081	Nipple, 1" x 15" Black, SCH 4	lO 1
10	2-00291	Elbow, 1" Black Pipe, 90°	2
11	2-001314	Nipple, 1" x 12-1/2" Black	1
12	2-00172	Nipple, 1" Close, Black Pipe	1
13	2-0086	Union, 1" Black Pipe	1
14	2-00132	Nipple, 1" x 6", Black Pipe	1
15	7-015	Tubing, Aluminum	48"

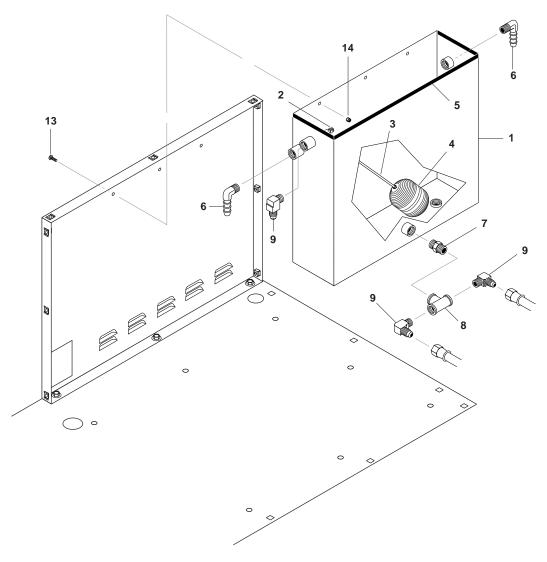
ITEM	PART NO.	DESCRIPTION	QTY
16	90-10130	U-Bolt, 5/16" x 1" Pipe	5
17	2-01413	Snap, Bushing, 5/8"	1
18	2-1116	Elbow, 1/4" Tube x 1/8"	1
19	2-1072	Bushing, 1/4" x 1/8" Pipe	1
20	2-3006	Valve, Ball 1/4" Fem x 1/4" I	Fem 1
21	2-1022	Elbow, 1/4" Street	1
22	2-1002	Nipple, 1/4" Close	1
23	2-1014	Coupling, 1/4" Hex	1
24	2-1118	Connector, 1/4" Tube x 1/4" MPT	1
25	7-7000HC	Valve, Gas, 7000 MVRHC	1
	7-70002	Valve, Gas, 7000 DERHC (Option)	1
26	95-07163259	Strap, Burner, VHG Large	2
27	90-2001	Nut, 5/16" ESNA	4
28	90-4001	Washer, 5/16" Flat, SAE	4
29	90-199940	Screw, 10/32" x 1/4" Hex	2
30	10-02024	Label, Natural Gas	1
	10-02023	Label, Liquid Propane (LP Option)	1

## VHG-L FLOAT TANK 3-4-5 GPM EXPLODED VIEW & PARTS LIST



ITEM	PART NO.	DESCRIPTION	QTY
1	2-01164	Tank, Universal Float	1
2	2-3014	Valve, Float Fluid Master 400	A 2
3	2-0151	Plug, Float Tank	1
4	2-11041	Connector, Anchor, 1/2"	1
5	2-1062	Elbow, 1/2" JIC x 1/2", 90°	1
	2-10061	Nipple, Modified, Close	1
6	2-010058	Bulkhead, 3/4" Poly Pro	1
7	2-0100379	Adaptor, 3/4" x 3/4" MTX Inser	t 1
8	90-1999	Screw 10/32" x 3/4"	6
9	90-017	Nut, 10/32" Keps	6
10	2-1906	Strainer, 1/2", Basket	1

### VHG-L FLOAT TANK 6-8 GPM EXPLODED VIEW & PARTS LIST

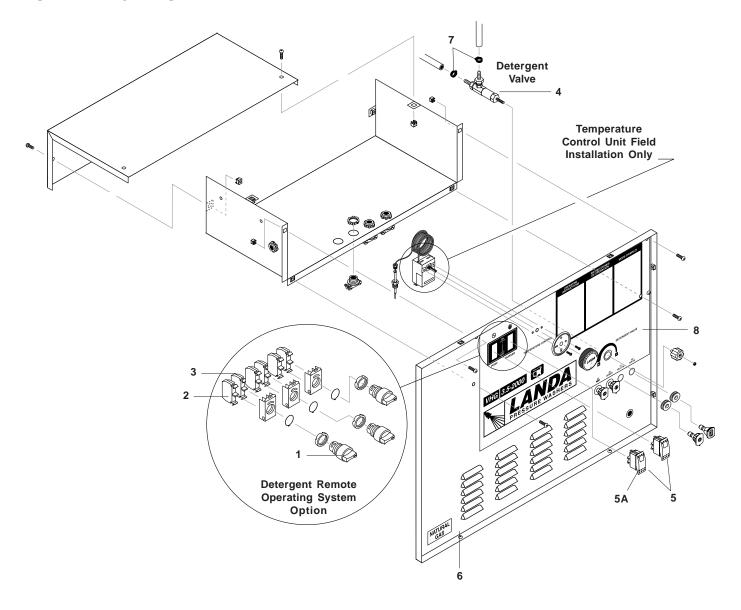


ITEM	PART NO.	DESCRIPTION	QTY
1	95-07163021	Assy., Float Tank S.S.	1
2	2-30110	Valve, 3/4" Brass Float	1
3	2-1112	Stem, 10" Float	1
4	2-0102	Ball, Float, Black Plastic	1
5	2-01104	Trim, 750 B2 x 1/16" Black	3 ft.
6	2-0100379	Adapter, 3/4" x 3/4" MT x	
		Insert 90°	2
7	2-1009	Nipple, 3/4" Hex	1

ITEM	PART NO.	DESCRIPTION	<u>QTY</u>
8	2-1033	Tee, 3/4" Female Pipe	1
9	2-10620	Elbow, 3/4" SAE x 3/4", 90°, Brass	3
10	2-1081	▲ Bushing, 3/4" x 1/2" Pipe	1
11	2-1906	▲ Strainer, 1/2" Basket	1
12	2-1053	▲ Nipple, 1/2" JIC x 1/2" Pipe	1
13	90-1998	Screw, 1/4" x 3/4"	3
14	90-2000	Nut, 1/4" ESNA	3

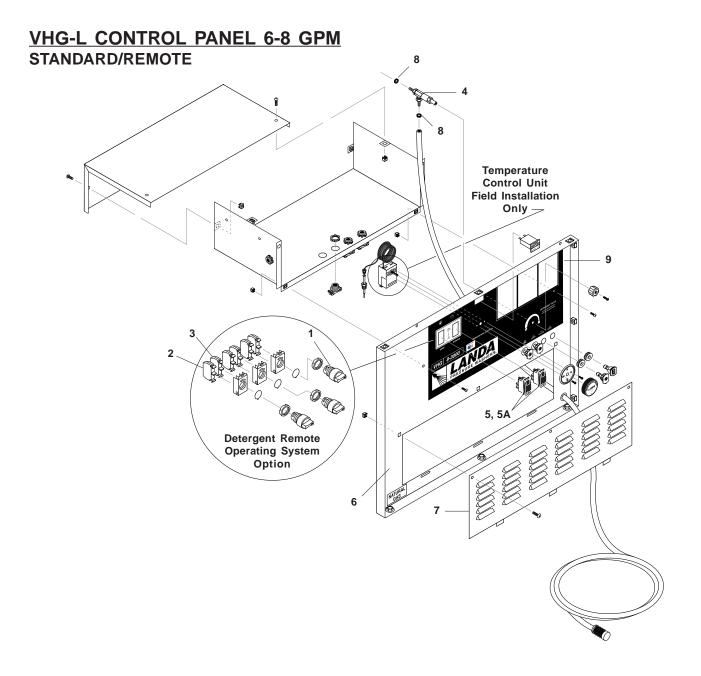
▲ Not Shown

### VHG-L CONTROL PANEL 3-4-5 GPM STANDARD/REMOTE



PART NO.	DESCRIPTION	QTY
6-2020	Switch Selector, w/Red Lever	3
6-2000	Block, Contact, NC	3
6-2001	Block, Contact, NO	3
2-30152	Valve, Metering, 1/4" Hose	1
6-020240	Switch, Rocker, Carling	2
6-020241	Switch Rocker, Carling M-Circ (Time Delay Option Only)	cuit,
	6-2020 6-2000 6-2001 2-30152 6-020240	6-2020 Switch Selector, w/Red Lever 6-2000 Block, Contact, NC 6-2001 Block, Contact, NO 2-30152 Valve, Metering, 1/4" Hose 6-020240 Switch, Rocker, Carling 6-020241 Switch Rocker, Carling M-Circ

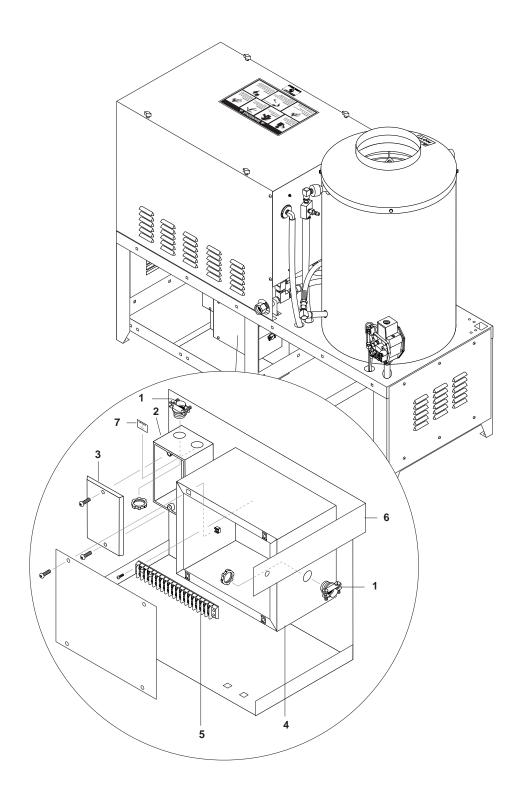
ITEM	PART NO.	DESCRIPTION	QTY
6	95-07163154	Panel, Control, VHG Large	1
	95-07163155	Panel, Control, Remote, VHG Large	1
7	2-9040	Clamp, Hose, UNI .4654	2
8	10-07996	Label, Control Panel	1



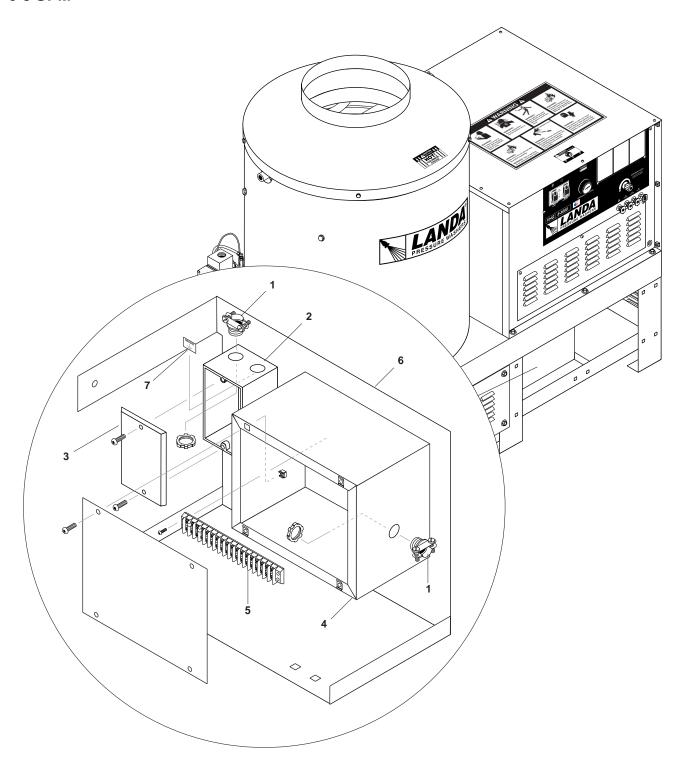
ITEM	PART NO.	DESCRIPTION	QTY
1	6-2020	Switch Selector w/Red Lever	3
2	6-2000	Block, Contact, WC	3
3	6-2001	Black, Contact, NO	3
4	2-30152	Valve, Metering, 1/4" Hose	1
5	6-020240	Switch, Rocker, Carling	2
5A	6-020241	Switch, Rocker, Carling, M-Circuit (Time Delay Option	) 1
6	95-07163254	Panel, Control, VHG Large	1
	95-07163255	Panel, Control, Remote	1
7	95-07163276	Cover, Access	1

ITEM	PART NO.	DESCRIPTION	QTY
8	2-9040	Clamp, Hose, UNI .4654	2
9	10-07996	Label, Control Panel	1
10	6-01031	▲ Service Cord, 6/4 (6-3000B, H)	6.5 ft.
	6-0109	▲ Service Cord, 10/4 (6-3000C)	6.5 ft.
	6-01033	▲ Service Cord, 4/4 (8-3000B, H)	6.5 ft.
	6-01021	▲ Service Cord, 8/4 (8-3000C)	6.5 ft.

## VHG-L POWER IN/REMOTE ELECTRICAL BOX 3-4-5 GPM



## VHG-L POWER IN/REMOTE ELECTRICAL BOX 6-8 GPM

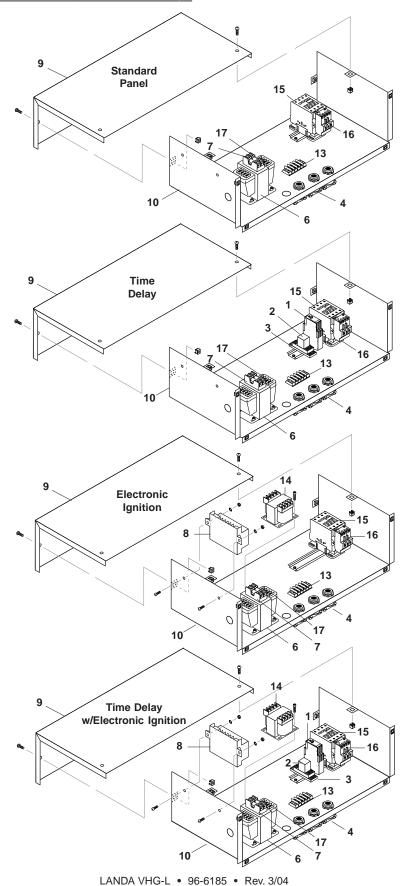


## VHG-L ELECTRICAL BOX PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY
1	6-0517	Strain Relief, Standard (6-30024C; 8-30024C) Remote Option	2
	6-05171	Strain Relief, 1" (6-30024B,F 8-30024B,H Models)	l; 2
2	6-04110	Box, Junction, 3 Hole, 3/4" (6-30024C; 8-30024C)	1
	6-041100	Box, Electric, 4" x 2", 3 Hole (6-30024B,H; 8-30024B,H)	1
3	6-0411	Cover Plate, Junction Box, 2" x 4"	1

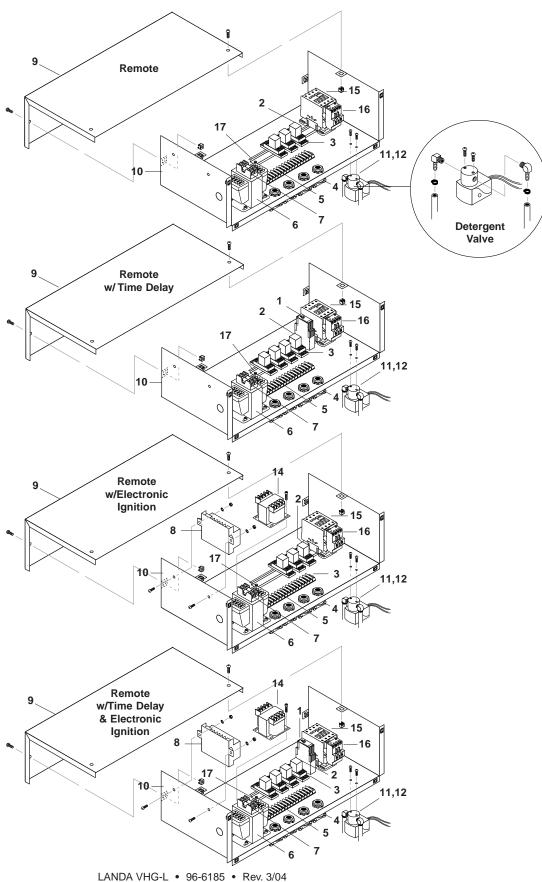
ITEM	PART NO.	DESCRIPTION	QTY
4	6-039021	Box, Metal Junction, 8" x 10" x 4", Remote Option	1
5	6-05041	Block, Terminal, 16 Pole, Remote Option	1
6	95-07163167	Elec/Remote Box Panel, VHG Large (3-4-5 GPM)	1
	95-07163267	Bracket, Remote Box, VHG Large (6-8 GPM)	1
7	11-1042	Label, Ground	1

## **VHG-L ELECTRICAL BOX ASSEMBLY**



**VHG-L ELECTRICAL BOX ASSEMBLY (CONT.)** 

ALL MODELS

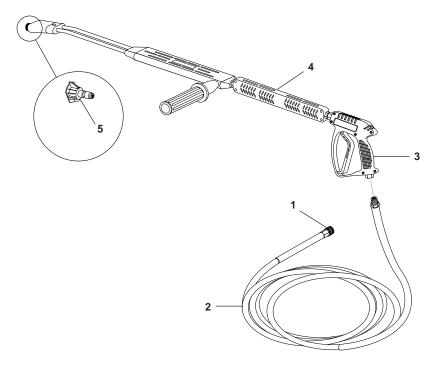


# VHG-L ELECTRICAL BOX ASSEMBLY (CON'T) ALL MODELS - PARTS LIST

ITEM	PART NO.	DESCRIPTION	QTY	
1	6-03700	Timer, Multi-Function, 24V-120/240	1	
2	6-03621	Relay, 120V, See Option		
3	6-03541	Base, Relay, See Option		
4	6-0517	Strain Relief, 3/4", Standard Remote	3 4	
5	6-05041	Block, Terminal, 16 Pole	1	
6		Transformer, Micron, 240/480 120V, .075KVA See Page 32-33	)-	
7		Fuse, 1 Amp, See Page 32-3	3	
8	7-70151	Ignition, Electronic Control	1	
9	95-07163157	Cover, Electrical Box, VHG Large		
1				
10	95-07163153	Box, Electrical, VHG Large	1	
11	6-1401590	Valve, Detergent, Less Solenoid	1	
12	6-140160	Solenoid Coil, 120V	1	
13	6-0504	Block, Terminal, 4 Pole	1	
14		Transformer, 120V/240V-24V See Page 32-33	, 1	
15		Contactor, 120V, See Page 3	2-33	
16		Overload, Relay, See Page 3	32-33	
17		Fuse, Secondary, See Page 32-33		
	11-1042	▲ Label, Ground	1	
		A N. ( O)		

<sup>▲</sup> Not Shown

## HOSE & SPRAY GUN ASSEMBLY ALL MODELS



ITEM	PART NO.	DESCRIPTION Q	TY
1	2-2002	Coupler, 3/8" Female	1
2	4-02033450C	Hose 50' x 3/8", 1 Wire w/Coupl Tuff Skin (4-2200, 4-3000, 4-2000)	ler,
	4-02083450C	Hose 50' x 3/8", 2 Wire w/Coupl Tuff Skin (5-3000)	ler, 1
	4-02043450C	Hose, 3/8" x 50', 2 Wire, Tuff Ski w/Coupler (6-3000)	in 1
	4-02063450C	Hose, 1/2" x 50', 2 Wire, Tuff Ski w/Coupler (8-3000)	in 1
3	4-01212	Spray Gun, Shut-Off Series 2000	1
4	4-011351A	Lance, Spray Insulated	1
5	4-12805500	Nozzle, 0005.5, Red (4-2200, 5-3000)	1
	4-12805515	Nozzle,1505.5, Yellow (4-2200, 5-3000)	1
	4-12805525	Nozzle, 2505.5, Green (4-2200, 5-3000)	1
	4-12805540	Nozzle, 4005.5, White (4-2200, 5-3000)	1
	4-12804500	Nozzle, 0004.5, Red (4-3000)	1
	4-12804515	Nozzle,1504.5, Yellow (4-3000)	1
	4-12804525	Nozzle, 2504.5, Green (4-3000	)1

ITEM	PART NO.	DESCRIPTION	QTY
5	4-12804540	Nozzle, 4004.5, White (4-30	00) 1
	4-12805000	Nozzle, 0005, Red (3-1100, 4-2000A)	1
	4-12805015	Nozzle, 1505, Yellow (3-1100, 4-2000A)	1_
	4-12805025	Nozzle, 2505, Green (3-1100, 4-2000A)	1
	4-12805040	Nozzle, 4005, White (3-1100, 4-2000A)	1
	4-12804000	Nozzle, 0004, Red (4-3000F	) 1
	4-12804015	Nozzle, 1504, Yellow (4-3000	OF) 1
	4-12804025	Nozzle, 2504, Green (4-3000	OF) 1
	4-12804040	Nozzle, 4004, White (4-3000	F) 1
	4-12807000	Nozzle, 0007, Red (6-3000)	1
	4-12807015	Nozzle, 1507, Yellow (6-300)	0) 1
	4-12807025	Nozzle, 2507, Green (6-300)	0) 1
	4-12807040	Nozzle, 4007, White (6-3000	)) 1
	4-12809000	Nozzle, 0009, Red (8-3000)	1
	4-12809015	Nozzle, 1509, Yellow (8-300)	0) 1
	4-12809025	Nozzle, 2509, Green (8-3000	0) 1
	4-12809040	Nozzle, 4009, White (8-3000	)) 1
	<u> </u>		

### **BURNER SPECIFICATIONS**

MODEL	BURNER ASSEMBLY	JET SIZE	GAS VALVE	PILOT ORIFICE CONVERSION
VHG3-1100	X - 46	#54	7000 MVRHC 3/4" x 3/4"	No
VHG4-2000	X - 46	#54	7000 MVRHC 3/4" x 3/4"	No
VHG4-2200	X - 46	#54	7000 MVRHC 3/4" x 3/4"	No
VHG4-3000	X - 46	#54	7000 MVRHC 3/4" x 3/4"	No
VHG5-3000	X - 46	#54	7000 MVRHC 3/4" x 3/4"	No
VHG6-3000	X - 98	#54	7000 MVRHC 3/4" x 3/4"	No
VHG8-3000	X - 98	#54	7000 MVRHC 3/4" x 3/4"	No

## **LP CONVERSION SPECIFICATIONS**

MODEL	BURNER ASSEMBLY	JET SIZE	GAS VALVE	PILOT ORIFICE CONVERSION
VHG3-1100 LP	X - 46	#65	7000 MVRHC 3/4" x 3/4"	Yes
VHG4-2000 LP	X - 46	#65	7000 MVRHC 3/4" x 3/4"	Yes
VHG4-2200 LP	X - 46	#65	7000 MVRHC 3/4" x 3/4"	Yes
VHG4-3000 LP	X - 46	#65	7000 MVRHC 3/4" x 3/4"	Yes
VHG5-3000 LP	X - 46	#65	7000 MVRHC 3/4" x 3/4"	Yes
VHG6-3000 LP	X - 98	#65	7000 MVRHC 3/4" x 3/4"	Yes
VHG8-3000 LP	X - 98	#65	7000 MVRHC 3/4" x 3/4"	Yes

### PUMP PARTS SPECIFICATIONS: LANDA PUMP

				<b>PUMP</b>						МОТО	₹		
Machine	Pump			Pulley		Bushing						Pulley	
Model	Model	Part#	Pulley	Part#	Bushing	Part#	Size	Voltage/pH	Hertz	Part#	Pulley	Part#	Bushing
3-11024D	LM4035	5-1720	AK84	5-40108401	24MM	5-512024	2 HP	120V/1PH	60	5-1047	AK20-5/8	5-40102058	N/A
4-20024A	LM4035	5-1720	ВК90Н	5-40409001	24mm	5-512024	5HP	230V/1PH	60	5-1053	BK30	5-40403001	3/4"
4-22024A	LT5030	5-1728	2AK84H	5-40208401	25mm	5-512025	6 HP	230V/1PH	60	5-10401	2AK41H	5-40204101	1-1/8"
4-22024B	LT5030	5-1728	2AK84H	5-40208401	25mm	5-512025	6 HP	230V/3PH	60	5-1011	2AK41H	5-40204101	1-1/8"
4-22024C	LT5030	5-1728	2AK84H	5-40208401	25mm	5-512025	6 HP	460V/3PH	60	5-1011	2AK41H	5-40204101	1-1/8"
4-22024N	LT5030	5-1728	2BK67H	5-40506701	25mm	5-512025	7.5 HP	380V/3PH	50	5-1063	2BK40H	5-40504001	1-1/8"
4-30024A	LT5030	5-1728	2BK80H	5-40508001	25mm	5-512025	8 HP	230V/1PH	60	5-1082	2BK34H	5-40503401	1-3/8"
4-30024B	LT5030	5-1728	2BK80H	5-40508001	25mm	5-512025	8 HP	208V/3PH	60	5-1083	2BK34H	5-40503401	1-3/8"
4-30024C	LT5030	5-1728	2BK80H	5-40508001	25mm	5-512025	8 HP	460V/3PH	60	5-1083	2BK34H	5-40503401	1-3/8"
5-30024B	LT5030	5-1728	2BK65H	5-40506501	25mm	5-512025	10 HP	230V/3PH	60	5-1018	2BK36H	5-40503601	1-3/8"
5-30024C	LT5030	5-1728	2BK65H	5-40506501	25mm	5-512025	10 HP	460V/3PH	60	5-1018	2BK36H	5-40503601	1-3/8"
6-30024B	LT6035	5-1733	3BK70H	5-41007001	25mm	5-512025	15 HP	230V/3PH	60	5-1025	3TB56	5-407056	P1x1-5/8"
6-30024C	LT6035	5-1733	3BK70H	5-41007001	25mm	5-512025	15 HP	460V/3PH	60	5-1025	3TB56	5-407056	P1x1-5/8"
6-30024H	LT6035	5-1733	3BK70H	5-41007001	25mm	5-512025	15 HP	208V/3PH	60	5-10251	3TB56	5-407056	P1x1-5/8"
8-30024B	LT8030	5-1734	3BK80H	5-41005001	25mm	5-512025	20 HP	230V/3PH	60	5-1030	3TB60	5-407060	P1x1-5/8"
8-30024C	LT8030	5-1734		5-41005001	25mm	5-512025	20 HP	460V/3PH	60	5-1030	3TB60	5-407060	P1x1-5/8"
8-30024H	LT8030	5-1734	3BK80H		25mm	5-512025	20 HP	208V/3PH	60	5-1031	3TB60	5-407060	P1x1-5/8"
							-						

### PUMP PARTS SPECIFICATIONS: GENERAL PUMP

			PU	MP						MOTOR				
Machine	Pump	Dort#	Dulloy	Pulley	Duching	Bushing	Si=o	Voltogo/ol I	Llower	Dort #	Dulloy	Pulley	Duching	
Model	Model	Part#	Pulley	Part#	Bushing	Part#	Size	Voltage/pH	Hertz	Part#	Pulley	Part#	Bushing	
4-20021A	TX-1812	5-23123	BK75H	5-40407501	24mm	5-512024	5 HP	230V/1PH	60	5-1053	BK36H	5-40403601	3/4" x H	
4-22021A	T-1011	5-2304	2AK84H	5-40208401	24mm	5-512024	6 HP	230V/1PH	60	5-10401	2AK51H	5-40205101	1-1/8"	
4-22021B	T-1011	5-2304	2AK84H	5-40208401	24mm	5-512024	6 HP	230V/3PH	60	5-1011	2AK51H	5-40205101	1-1/8"	
4-22021C	T-1011	5-2304	2AK84H	5-40208401	24mm	5-512024	6 HP	460V/3PH	60	5-1011	2AK51H	5-40205101	1-1/8"	
4-30021A	TS-2021	5-2307	2BK80H	5-40508001	24mm	5-512024	8 HP	230V/1PH	60	5-1082	2BK50H	5-40505001	1-3/8"	
4-30021B	TS-2021	5-2307	2BK80H	5-40508001	24mm	5-512024	8 HP	230V/3PH	60	5-1083	2BK50H	5-40505001	1-3/8"	
4-30021C	TS-2021	5-2307	2BK80H	5-40508001	24mm	5-512024	8 HP	460V/3PH	60	5-1083	2BK50H	5-40505001	1-3/8"	
5-30021B	TS-2021	5-2307	2BK70H	5-40507001	24mm	5-512024	10 HP	230V/3PH	60	5-1018	2BK57H	5-40505701	1-3/8"	
5-30021C	TS-2021	5-2307	2BK70H	5-40507001	24mm	5-512024	10 HP	460V/3PH	60	5-1018	2BK57H	5-40505701	1-3/8"	

## PUMP PARTS SPECIFICATIONS: LANDA PUMP (CON'T)

			— мото	or <del></del>					cc	NTROLS .		
Model	Bushing	Belt	Belt		Switch			Stepdown	Primary	Primary	Secondary	Secondary
(Con't)	Part#	Size/Qty	Part#	Switch	Part#	Contactor	Overload	Transformer	Fuse	Fuse Part#	Fuse	Fuse Part#
3-11D	N/A	AX34 (1)	5-602034	Rocker	6-020240	6-4000	N/A	N/A	N/A	N/A	N/A	N/A
4-2A	5-511075	BX38 (1)	5-604038	Rocker	6-020240	6-4013	N/A	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
4-22A	5-511113	AX36 (2)	5-602036	Rocker	6-020240	6-4018	N/A	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
4-22B	5-511113	AX36 (2)	5-602036	Rocker	6-020240	6-4010	6-5011	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
4-22C	5-511113	AX36 (2)	5-602036	Rocker	6-020240	6-4004	6-5009	6-60111	1/2 Amp	6-02295 (2)	3/4 Amp	6-0229810
4-22N	5-511113	BX32 (2)	5-604032	Rocker	6-020240	6-4010	6-5010	6-6028	1/2 Amp	6-02295 (2)	3/4 Amp	6-0229810
4-3A	5-511138	BX34 (2)	5-604034	Rocker	6-020240	6-4021	6-5015	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
4-3B	5-511138	BX34 (2)	5-604034	Rocker	6-020240	6-4013	6-5012	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
4-3C	5-511138	BX34 (2)	5-604034	Rocker	6-020240	6-4007	6-5010	6-60111	1/2 Amp	6-02295 (2)	3/4 Amp	6-0229810
5-3B	5-511138	BX32 (2)	5-604032	Rocker	6-020240	6-4013	6-5013	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
5-3C	5-511138	BX32 (2)	5-604032	Rocker	6-020240	6-4007	6-5011	6-60111	1/2 Amp	6-02295 (2)	3/4 Amp	6-0229810
6-3B	5-522158	BX50 (3)	5-604050	Rocker	6-020240	6-4018	6-5015	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
6-3C	5-522158	BX50 (3)	5-604050	Rocker	6-020240	6-4010	6-5012	6-60111	1/2 Amp	6-02295 (2)	3/4 Amp	6-0229810
6-3H	5-522158	BX50 (3)	5-604050	Rocker	6-020240	6-4021	6-5016	6-60151	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
8-3B	5-522158	BX44 (3)	5-604044	Rocker	6-020240	6-4021	6-5018	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
8-3C	5-522158	BX44 (3)	5-604044	Rocker	6-020240	6-4013	6-5013	6-60111	1/2 Amp	6-02295 (2)	3/4 Amp	6-0229810
8-3H	5-522158	BX44 (3)	5-604044	Rocker	6-020240	6-4021	6-5018	6-60151	1 Amp	6-02294 (2)	3/4 Amp	6-0229810

## PUMP PARTS SPECIFICATIONS: GENERAL PUMP (CON'T)

MOTOR									co	NTROLS =		
Mode	I Bushing	Belt	Belt		Switch			Steptdown	Primary	Primary	Secondary	Secondary
(Con't	Part#	Size/Qty	Part#	Switch	Part#	Contactor	Overload	Transformer	Fuse	Fuse Part#	Fuse	Fuse Part#
4-2A	N/A	BX34 (1)	5-604034	Rocker	6-020240	6-4013	N/A	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
4-22	5-511113	AX37 (2)	5-602037	Rocker	6-020240	6-4018	N/A	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
4-22E	5-511113	AX37 (2)	5-602037	Rocker	6-020240	6-4010	6-5011	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
4-220	5-511113	AX37 (2)	5-602037	Rocker	6-020240	6-4004	6-5009	6-60111	1/2 Amp	6-02295 (2)	3/4 Amp	6-0229810
4-3A	5-511138	BX36 (2)	5-604036	Rocker	6-020240	6-4021	6-5015	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
4-3B	5-511138	BX36 (2)	5-604036	Rocker	6-020240	6-4013	6-5012	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
4-3C	5-511138	BX36 (2)	5-604036	Rocker	6-020240	6-4007	6-5010	6-60111	1/2 Amp	6-02295 (2)	3/4 Amp	6-0229810
5-3B	5-511138	BX36 (2)	5-604036	Rocker	6-020240	6-4013	6-5013	6-60111	1 Amp	6-02294 (2)	3/4 Amp	6-0229810
5-3C	5-511138	BX36 (2)	5-604036	Rocker	6-020240	6-4007	6-5011	6-60111	1/2 Amp	6-02295 (2)	3/4 Amp	6-0229810

#### **BASIC FACTS**

Based on 60°		Propane	Butane
1 Cu. Ft. NG Approx 1,1000 BTU			
Formula		C3H8	C4H10
Vaporization Point (°F)		-43.7	31.1
Specific Gravity (Vapor)		1.522	2.006
Specific Gravity (Liquid)		0.508	0.584
Lbs. per Gal. (Liquid)		4.23	4.87
BTU per Cu. Ft. (Vapor)		2.563	3.39
BTU per Gal. (Liquid)		91.547	102.032
BTU per Lb. (Liquid)		21.591	21.221
Cu. Ft. per Lb. (Liquid)		8.607	6.53
Cu. Ft. per Gal. (Liquid)		36.45	31.8
Octane Number		125	91
Molecular Weight		44.09	58.12
To Calculate Running Cost:	1,000 BTU = 1 Cu. Ft.		
	100 Cu. Ft. = 1 Therm		
	1 Therm = 1 Hour		
	Cost of Gas per Therm = Cost to R	un	
Example Using Natural Gas at 50¢ Therm:	400,000 BTU Machine		
	400 Cu. Ft. (400,000 / 1,000)		
	$4 \times 50$ ¢ = \$2.00 / Hour to Run ((	(400 / 100) x cost	of gas)

#### **PRESSURE EQUIVALENTS**

Simply stated, pressure is the force exerted by a gas or liquid attempting to escape from a container. It is useful to know how strong this "attempt to escape" is. Pressure can be measured with a manometer or with a pressure gauge. At the lower levels, it is expressed in " water column inches" i.e. 11 w.c.i. Higher pressures are expressed in terms of the force exerted against a square inch of area, for example, 125 lbs. per square inch (125 psi).

1" Water Column	II	50 oz./sq. in.	11" Water Column	II	6.35 oz./sq. in.
11" Water Column	II	4 lb./sq. in.	1 lb./sq. in.	II	27.71" Water Column
1 lb./sq. in.	II	14.73 lbs./sq.in	1" Mercury	II	.39 lb./sq. in
1 Std. Atmosphere	II	14.73 lbs./sq. in.			

#### PREVENTATIVE MAINTENANCE

This pressure washer was produced with the best available materials and quality craftsmanship. However, you as the owner have certain responsibilities for the correct care of the equipment. Attention to regular preventative maintenance procedures will assist in preserving the performance of your equipment. Contact your Landa, Inc. dealer for maintenance. Regular preventative maintenance will add many hours to the life of your pressure washer. Perform maintenance more often under severe conditions.

MAINTENANCE SCHEDULE			
Replace Fuel Lines		Annually	
Dunan Oil	Inspect	Daily inspect the oil level	
Pump Oil	Change	After first 50 hours, then every 500 hours or annually	
Clean Burner Filter		Annually	
Remove Burner Soot From Heating Coil		Annually	
Check Belt Tension		Monthly	
Descale Coil		Annually - (more often if required)	
Replace High Pressure Nozzle		Every 6 months	
Replace Quick Connects		Annually	
Clean Water and Chemical Screen/Filter		Weekly	
Clean Float/Supply Tank		Every 6 months	
Replace HP Hose		If there is any sign of wear	
Grease Motor		Every 10,000 hours	
Check Burner Pilot Jets		Annually	
Pressure Relief Valve		Annually	

### **OIL CHANGE RECORD**

Date Oil Changed Month/Day/Year	Estimated Operating Hours Since Last Oil Change

## **TROUBLESHOOTING**

PROBLEM	POSSIBLE CAUSE	SOLUTION	
WATER	Incoming water to machine warm or hot	Lower incoming water temperature.	
TEMPERATURE	Gas pressure too high	See page 8 for specifications for proper gas pressure.	
ТОО НОТ	Detergent line sucking air	Tighten all clamps. Check detergent lines for holes.	
	Defective high limit switch	Replace.	
	Incorrect burner nozzle size	See serial plate.	
	Insufficient water supplied Check water GPM to machine.		
	Restricted water flow	Check nozzle for obstruction, proper size.	
PRESENCE OF	Oil seal worn	Check and replace if necessary.	
WATER IN OIL	High humidity in air	Check and change oil twice as often.	
WATER DRIPPING FROM UNDER	Piston packing worn	Check and replace if necessary.	
PUMP	O-Ring plunger retainer worn	Check and replace if necessary.	
DETERGENT NOT	Air leak	Tighten all clamps. Check detergent lines for holes.	
DRAWING	Detergent metering valve packing not tight or packing worn	Tighten nut. Replace valve or packing.	
	Filter screen on detergent suction hose plugged	Clean or replace.	
	Dried up detergent plugging metering valve	Disassemble and clean thoroughly.	
	High viscosity of detergent	Dilute detergent to specifications.	
	Restriction behind float tank screen removed	Install restriction.	
	Hole in detergent line(s)	Repair hole.	
	Strainer basket plugged	Remove and clean.	
	Connections on selector valve loose	Put teflon tape on all pipe connections.	
	Detergent solenoid not opening (where applicable)	Check flow switch, replace detergent solenoid.	
PUMP RUNNING	Pump sucking air	Check water supply and possibility of air seepage.	
NORMALLY BUT	Valves sticking	Check and clean or replace if necessary.	
PRESSURE LOW ON INSTALLATION	Unloader valve seat faulty	Check and replace if necessary.	
	Nozzle incorrectly sized	Check and replace if necessary (See serial plate for proper size).	
	Worn piston packing	Check and replace if necessary.	
FLUCTUATING	Valves worn	Check and replace if necessary.	
PRESSURE	Blockage in valve	Check and replace if necessary.	
	Pump sucking air	Check water supply and air seepage at joints in suction line.	
	Worn piston packing	Check and replace if necessary.	
PUMP NOISY	Air in suction line	Check water supply and connections on suction line.	
	Broken or weak inlet or discharge valve springs	Check and replace if necessary.	
	Excessive matter in valves	Check and clean if necessary.	
	Worn bearings	Check and replace if necessary.	
OIL DRIPPING	Oil seal worn	Check and replace if necessary.	
EXCESSIVE VIBRATION IN	Irregular functioning of the valves	Check and replace if necessary.	
DELIVERY LINE RELIEF VALVE LEAKS WATER	Relief valve defective	Replace or repair.	

## **TROUBLESHOOTING**

PROBLEM	POSSIBLE CAUSE	SOLUTION		
NO SPARK - NO	No main power	Restore power.		
PILOT GAS	Faulty limit switch	Test/replace.		
	Faulty wiring	Test wiring.		
SPARK - BUT NO	No gas supplied to pilot valve	Check for availability of gas.		
PILOT LIGHT	Manual valves in "OFF" position	Turn manual valve and gas cock to full "ON". Check		
		pilot key adjustment.		
	Faulty pilot valve	Test gas valve.		
	Faulty wiring	Test wiring.		
	Restricted pilot line or clogged pilot orifice	Clean pilot tubing and orifices.		
PILOT GAS - BUT NO SPARK	Broken or shorted electrode assembly	Test/replace.		
PILOT LIT - BUT	Faulty wiring	Test wiring.		
MAIN BURNER	Low pilot flame	Check inlet pressure, pilot oriface.		
WON'T COME ON	Improper alignment of sensor in pilot flame	Adjust alignment - see figure 5, page 14.		
	Faulty main gas operator in gas control	Test gas valve - repair/replace.		
	Faulty flame sensor	Test sensor, wiring - repair/replace.		
PILOT CYCLES	Faulty pilot valve	Test gas valve.		
OFF AND ON BY ITSELF	Faulty wiring	Test wiring.		
MAIN BURNER	Low pilot flame	Check inlet pressure, pilot oriface.		
SHUTS DOWN	Improper alignment of sensor in pilot flame	Adjust alignment - see figure 5, page 14.		
	Faulty main gas operator in gas control	Test gas valve - repair/replace.		
	Faulty flame sensor	Test sensor, wiring - repair/replace.		
LOW OPERATING	Faulty pressure gauge	Install new gauge.		
PRESSURE	Insufficient water supply	Use larger garden hose. Clean filter washer at water inlet.		
	Old, worn or incorrect spray nozzle	Match nozzle number to machine and/or replace with new nozzle.		
	Belt slippage	Tighten or replace. Use correct belt.		
	Plumbing or hose leak	Check plumbing system for leaks. Retape leaks with teflon tape.		
	Faulty or misadjusted unloader valve (where applicable)	Adjust unloader for proper pressure. Install repair kit when needed.		
	Worn packing in pump	Install new packing kit.		
	Fouled or dirty inlet or discharge valves in pump	Clean inlet and discharge valve.		
	Worn inlet or discharge valves	Replace with valve kit.		
	Obstruction in spray nozzle	Remove obstruction.		
	Leaking pressure control valve (where applicable)	Rebuild or replace as needed.		
	Detergent metering valve left open sucking air or faulty metering valve	Close and/or replace metering valve.		
	Slow motor RPM	Check incoming voltage.		
LOW WATER	Improper size of gas lines	See page 7 for sizing of gas lines.		
TEMPERATURE	Low gas pressure	Increase gas pressure to machine.		
	Improper pressure regulator	Specify BTU, building gas pressure 11 w.c.i. to machine for correct sizing of regulator.		
	Low gas pressure	Increase gas pressure as described on page 8.		
	Soot buildup on coils not allowing heat transfer	Clean coils.		
	Improper burner nozzle	See serial plate.		
	LANDA VHG-L • 96-6185 • Rev. 3/04			



## LANDA LIMITED NEW PRODUCT WARRANTY PRESSURE WASHERS

#### WHAT THIS WARRANTY COVERS

All LANDA pressure washers are warranted by LANDA, INC. to the original purchaser to be free from defects in materials and workmanship under normal use, for the periods specified below. This Limited Warranty is subject to the exclusions shown below, is calculated from the date of the original purchase, and applies to the original components only. Any parts replaced under this warranty will assume the remainder of the part's warranty period.

#### FIVE YEAR PARTS AND ONE YEAR LABOR WARRANTY:

Components manufactured by Landa, such as frames, handles, top and bottom wraps, float tanks, fuel tanks, belt guards, and heating coils. Internal components on the oil-end of all branded pumps have a 5 year warranty.

#### ONE YEAR MINIMUM ON PARTS AND ONE YEAR LABOR WARRANTY:

All other components, excluding normal wear items as described below, will be warranted for one year on parts and labor. Parts and labor warranty on these parts will be for one year regardless of the duration of the original component manufacturer's part warranty.

#### WARRANTY PROVIDED BY OTHER MANUFACTURERS:

Motors, generators, and engines, which are warranted by their respective manufacturers, are serviced through these manufacturers' local authorized service centers. LANDA cannot provide warranty on these items.

#### WHAT THIS WARRANTY DOES NOT COVER

This warranty does not cover the following items:

- 1. Normal wear items, such as nozzles, guns, discharge hoses, wands, quick couplers, seals, filters, gaskets, O-rings, packings, pistons, pump valve assemblies, strainers, belts, brushes, rupture disks, fuses, pump protectors.
- 2. Damage or malfunctions resulting from accidents, abuse, modifications, alterations, incorrect installation, improper servicing, failure to follow manufacturer's maintenance instructions, or use of the equipment beyond its stated usage specifications as contained in the operator's manual.
- 3. Damage due to freezing, chemical deterioration, scale build up, rust, corrosion, or thermal expansion.
- 4. Damage to components from fluctuations in electrical or water supply.
- 5. Normal maintenance service, including adjustments, fuel system cleaning, and clearing of obstructions.
- 6. Transportation to service center, field labor charges, or freight damage.

#### WHAT YOU MUST DO TO OBTAIN WARRANTY SERVICE

While not required for warranty service, we request that you register your LANDA pressure washer by returning the completed registration card. In order to obtain warranty service on items warranted by LANDA, you must return the product to your Authorized LANDA Dealer, freight prepaid, with proof of purchase, within the applicable warranty period. If the product is permanently installed, you must notify your Authorized LANDA Dealer of the defect. Your Authorized LANDA Dealer will file a claim with Landa, who must subsequently verify the defect. In most cases, the part must be returned to LANDA freight prepaid with the claim. For warranty service on components warranted by other manufacturer's, your Authorized LANDA Dealer can help you obtain warranty service through these manufacturers' local authorized service centers.

#### LIMITATION OF LIABILITY

LANDA'S liability for special, incidental, or consequential damages is expressly disclaimed. In no event shall LANDA'S liability exceed the purchase price of the product in question. LANDA makes every effort to ensure that all illustrations and specifications are correct, however, these do not imply a warranty that the product is merchantable or fit for a particular purpose, or that the product will actually conform to the illustrations and specifications. THE WARRANTY CONTAINED HEREIN IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. LANDA does not authorize any other party, including authorized LANDA Dealers, to make any representation or promise on behalf of LANDA, or to modify the terms, conditions, or limitations in any way. It is the buyer's responsibility to ensure that the installation and use of LANDA products conforms to local codes. While LANDA attempts to assure that its products meet national codes, it cannot be responsible for how the customer chooses to use or install the product.

#### LANDA INC.

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