

2 *Installation*

Purpose

This chapter gives operating instructions/procedures for installation and startup of the *MART Power Washer*. Correct installation of the washer is important for the following reasons:

- To ensure that the washer will function properly.
- To ensure that placement of the washer on your shop floor will fit into the workflow pattern.
- To ensure that you have a valid warranty.

Prerequisites

Before you begin to install the power washer, be sure you have followed the recommendations in this section.

- Information:** Read the entire manual before installation.
- Expert Help and Equipment:** For leveling, anchoring, installing, and startup have the following on hand:
 - Qualified, trained personnel
 - Proper lifting equipment
 - Anchoring materials
 - Steel shims
 - Flue pipe
 - Auto steam exhaust (ASE) pipe
 - Rain cap(s)
 - Tools, including masonry drill
 - Voltmeter and amp meter
- Steam-Exhaust PVC Kit:** Order your kit through MART. Refer to section "*Steam Exhaust (Output)*" in this chapter.

- ❑ **1/2-inch NPT water regulator**, if your water pressure is greater than 125 PSI (862 kilopascals).
- ❑ **Air Filter and Regulator:** 1/2-inch NPT size. (You will need this only if compressed air is required for your washer.)
- ❑ **Placement Planning:** Refer to your *Services to be Provided by Others and Service Requirements (SBO)* letter from MART for specific utilities required for your power washer, and its overall dimensions. Here is a checklist to use as you plan placement:
 - **Route:** Plan the route you intend to use to move the washer from the loading dock to its installation location. Refer to the SBO for the washer's overall dimensions and weight. Be sure the washer will fit through all doorways.
 - **Maintenance and Service Access:** Leave enough access room around the washer in the installation location to reach all system components for maintenance and service, especially the pump area (pump removal). Allow for cleanout with the door in full-open position (180° angle from the cabinet doorframe).
 - **Operations Access:** Leave adequate room to work with the washer during normal operations. Allow sufficient room for loading and unloading the washer with the door in a half-open position (90° angle from the cabinet doorframe).
 - **Overhead:** Allow for easy installation of flue pipes and steam-exhaust pipes. Be sure the area is clear of overhead shop equipment. Plan for the shortest and most direct run, to avoid needing a larger steam-exhaust motor or more complex piping.
 - **Roof:** If you intend to run the steam-exhaust and gas flue pipes through the roof, be sure this is feasible. Plan for the shortest and most direct run, to avoid needing a larger steam-exhaust motor or more complex piping.

Ensure that flue-pipe clearances from combustible material are in accordance with NFPA or the flue manufacturer's instructions.

- **Utilities:** Check how far utility sources are from the washer -- gas, fuel oil, water, compressed air, and electricity. Plan for the *exact* route you intend to use -- the shortest and most direct run -- to avoid complex wiring and piping.

CAUTION! Do not ever run conduits to the control panel over the pump motor.

- **Combustion Air:** If you have a combustion-type burner as a heat source, ensure there is an adequate supply of combustion air in

the area in which the burner is located to assure complete combustion at all times.

If the power washer is installed in a room by itself, the room should have its own combustion air supply. This should take the form of louvers through an outside wall, or, if the room is in the center of a building, properly sized ductwork to a source of outside air.

If the power washer is located in a large open area of a plant, it will normally draw its combustion air from inside the plant. However, problems may arise if there is an imbalance between exhaust and makeup air in the plant.

Refer to the latest issue of the *National Fuel Gas Code* (American National Standard ANSI Z223.1) for details. In general, it specifies that a permanent opening or openings having a total free area of not less than 1 square inch (2.5 sq. cm) per 4,000 BTU per hour total input rating of all appliances is required.

- *Floor*: Plan to set the washer flat on the floor, so that it can be anchored for safe door loading.
- *Options*: If you have ordered optional equipment, such as the Clean Machine, allow adequate space in the washer area. See chapter "*Options*" in this manual for more information on any options you have purchased.
- *Grounding -- Electrical*: Plan for a grounding system to reduce the risk of electric shock.
- *Earthground -- Corrosion*: Plan for an earthground to prevent corrosion.

Results of Correct Installation

If you plan the placement of your washer and follow other MART-recommended installation procedures, you should achieve the following results:

- A safe installation
- Proper accessibility to the washer for operations and maintenance
- Proper and efficient functioning of all utilities
- Proper functioning of all cycles, according to specifications
- Assurance that your warranty is valid and in effect

Safety/Precautions

Before you begin installation, read and follow these recommended safety/precaution instructions.

CAUTION! GROUNDING INSTRUCTIONS: The washer must be grounded! Grounding provides a path of least resistance for electric current, thus reducing the risk of electric shock during maintenance, troubleshooting, or repair.

CAUTION! GROUNDING INSTRUCTIONS: The washer must be connected to a grounded, metal, permanent wiring system; OR an equipment-grounding conductor must be run with the circuit conductors and connected to the equipment-grounding terminal or lead on the washer.

WARNING! IF YOUR POWER WASHER USES A GAS BURNER: If you do not follow installation and operating instructions exactly, a fire or explosion may result, causing loss of life, personal injury, or damage to property. Do not store or use gasoline or other flammable vapors and liquids in the vicinity of the Power Washer.

WARNING! VENTING OF EXHAUST GASES: Do NOT vent exhaust gases into a wall, a ceiling, or a concealed space of a building. Refer to the instructions in this chapter for correct vent installation instructions.

WARNING! Be sure that the people installing the equipment and the power washer are qualified and trained for the task. They should meet any licensing standards required in your area.

WARNING! Set up your power washer installation to conform to all local code requirements.

WARNING! Do NOT add water, chemical, or turn on the power during installation! These steps are part of the startup procedure: Wait until "Startup Procedure," at the end of this chapter, to add water, chemical, or turn on the power!

WARNING! The power washer is designed to be installed inside a building, not outside.

What You Will Learn In This Chapter

In this chapter you will learn the following about installing the washer:

- Lifting and moving
- Placement
- Unpacking
- Leveling and anchoring
- Services and connections
- Startup procedure
 - * Power-up
 - * 7-Day clock initialization

1. *Lifting and Moving*

After you have planned the placement of the washer and selected a suitable site, use one of the following methods to lift and move the washer:

1. Use a **forklift** *only on the washer base frame* to lift and move the washer.
Note: You may also use **machinery rollers**.

Or

Use a **crane** to raise the washer by the *lifting eyes*, located on the top left and top right sides of the cabinet, as shown in FIG. 2-1.

WARNING! Use lifting equipment rated for the weight of your power washer. To find out the weight, refer to the *MART Power Washer specification section in the Services to be Provided by Others and Service Requirements (SBO) letter that you received from MART.*

WARNING! Lift the washer by the *lifting eyes only*. **DO NOT** attach chains or cables to a central point, or the sidewalls and roof of the cabinet may collapse. Use a spreader beam to divide/spread the vertical load to each eye.

WARNING! Stand clear of the washer during lifting and moving.

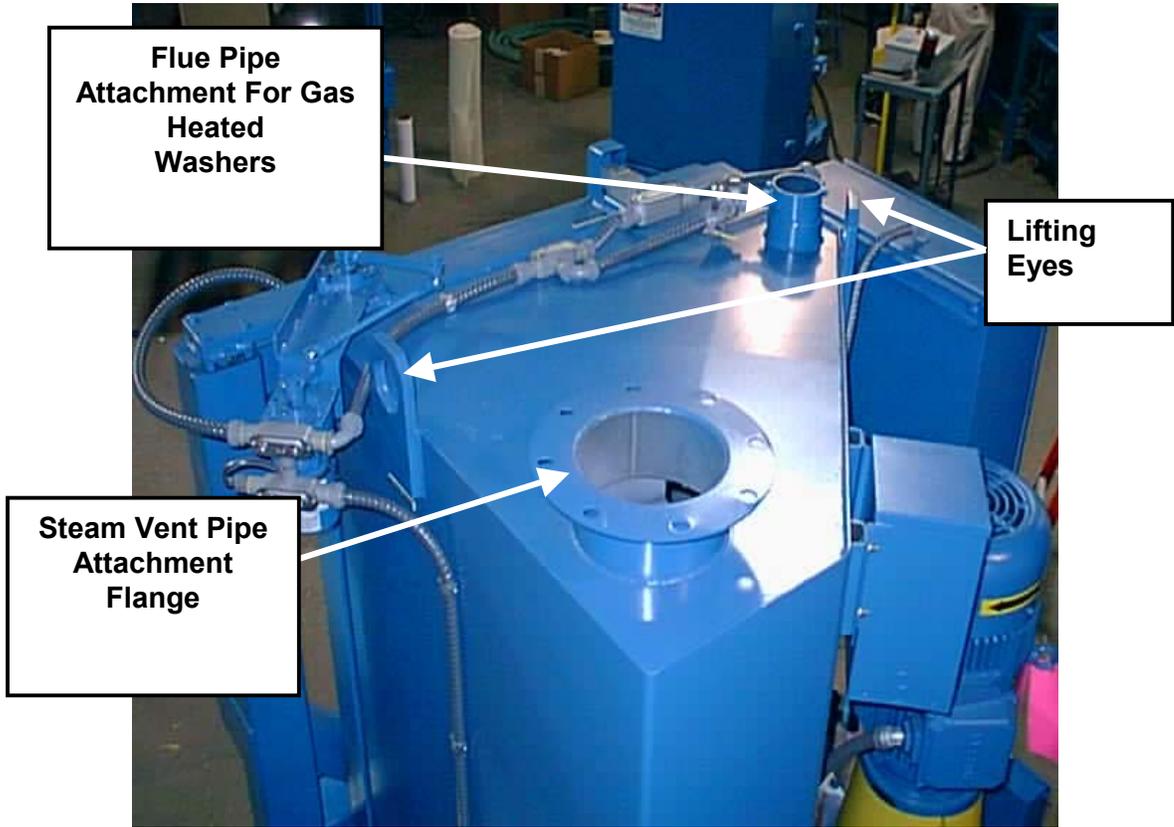


Fig. 2 - 1: Raising the Power Washer by the Lifting Eyes

2. Placement

After you have moved the washer to the installation location, place it according to your plan. Watch the overhead and side areas around the washer as you place it. Walk around the washer and verify clearances.

Refer to section "*Prerequisites, Placement Planning*" at the beginning of this chapter for placement guidelines and recommendations.

You may want to jot down special placement notes here as you plan:

3. *Unpacking*

After you have placed the washer in the installation site, unpack it. Check the packing slip (attached to the washer) to see *what* to look for.

Note: Most items and accessories are shipped in the washer cabinet on the turntable.

Follow this general procedure:

1. Remove the packing material from the outside of the washer cabinet.
2. Unlatch the cabinet door and open door slowly and carefully.
Note: Some items secured to turntable may have shifted during shipment.
3. Remove the cartons strapped to the turntable.
4. Check all standard items, accessories, and documentation against the packing slip. Refer to Fig. 1-1 and Fig. 1-2 to identify major components.
5. Open the electrical control panel. In a pocket on the inside of the door you should find the following:
 - Vendor cut sheets and manuals
 - *Field Startup Procedure (FSP)* form
 - SBO (Service By Others)
 - Electrical Ladder Diagram
 - Washer Manual
 - BOM (Bills Of Material)
 - Cover Letter
 - Sample Warranty
6. Look on the outside of the electrical-control-panel door to find the service schedule.

After you have moved, placed, and unpacked the washer you are ready to perform the following parts of the installation process:

- **Leveling and anchoring**
- **Connection procedures**
- **Services and connections verification**
- **Startup procedure**

IMPORTANT! Before you go any further, get the *Field Startup Procedure (FSP)* form (it is in a pocket on the inside of the electrical-control-panel door). You will use the form as a checklist to ensure correct installation as you follow the steps in the next several sections.

Use the Field Startup Procedure (FSP) form in this way:

1. As you install the washer, fill in the *Field Startup Procedure (FSP)* form.
2. After you have completed a successful installation, sign and date the form.
3. Make 1 copy and keep for your records. Mail/FAX to MART the other copies being sure it is properly signed and dated.
4. Keep your copy in your maintenance records. You will need it during maintenance procedures, and any time you call MART.

NOTE: Information gathered on the **FSP is critical** in verifying initial performance and in providing a benchmark for future diagnostic and troubleshooting efforts! ***Be sure to fill in the FSP during installation!***

4. Leveling and Anchoring

The power washer should be placed on a flat floor suitable for "anchoring" the washer. For example:

- Concrete floor
- Concrete pad
- Steel structure

4.1. Leveling

Follow this procedure:

1. Find the leveling and anchoring feet (at each corner of the washer at floor level).
2. Find the leveling bolt/nut and the anchor hole on each leveling and anchoring foot. Refer to the following figure.

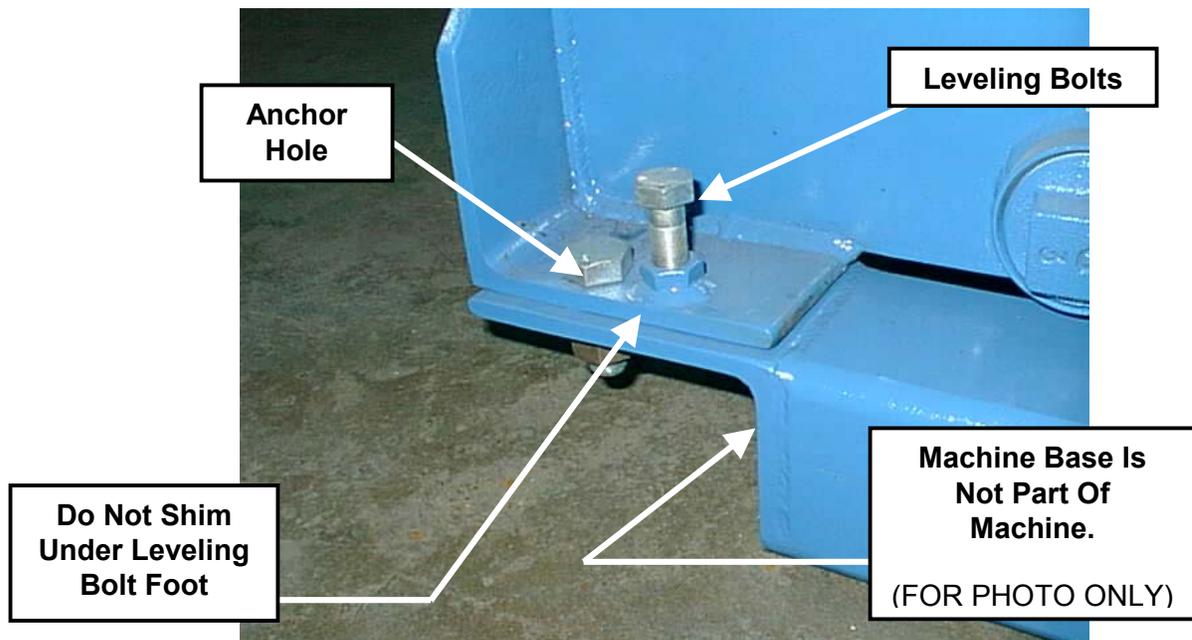


Fig. 2 - 2: Leveling and Anchoring Feet

3. Adjust the leveling bolts so the cabinet door will stop and remain in any open position with minimum "creeping" to a more open or closed position. Do **NOT** level the machine using a bubble level on the reservoir or other part of the machine.

Turn the leveling bolt *clockwise* to *raise* the corner of the cabinet. Turn the leveling bolt *counterclockwise* to *lower* the corner of the cabinet.

4. After leveling, **shim under the frame** of the washer, so that the washer frame is supported by the shims, *not* by the leveling bolts.

WARNING! Do not shim under the leveling/anchoring feet. This will interfere with the leveling bolts. Shim under the frame of the washer only.

5. When the washer is level and the shims are in place, back off the tension of the screws on the leveling bolts, so that the washer rests solidly on the shims.
6. Re-check the door to be sure it does not "creep." If it does, repeat the leveling and shimming procedure.

4.2. Anchoring

After you have properly placed, leveled, and shimmed the power washer, anchor it to the floor.

Follow this procedure:

1. Use the anchor holes provided on each leveling/anchoring foot.
2. Use bolts whose diameter equals the diameter of the anchor holes.
3. Anchor the bolts solidly and completely into the floor, so that each bolt can carry its full tensile strength. (MART recommends an epoxy-injection bolt-anchoring system.)
4. Consult your local distributor of anchoring products for an anchoring system that meets your requirements.

5. You may wish to grout the washer's base angle. If so, keep the following in mind:

Grouting is designed to fill the area between the base angle and the concrete -- permanently and completely -- and securely bond the base angle to the concrete. However, grout is not "glue," nor does it do the work of the anchor bolts. It is meant to provide vertical support and absorb operating forces. Additionally, grout seals the base angle to the floor, so that water and moisture cannot get under the washer and cause corrosion.

When placing grout, follow the manufacturer's detailed instructions to the letter! This will help prevent voids and other grout-repair problems later.

In general, use only *non-shrink grout*. The distributor should be able to tell you whether the grout has been tested for shrinkage, before and after hardening. And remember that most epoxy grouts require bone-dry concrete.

For example, for concrete flooring, MART recommends an epoxy grout. To test for dryness of concrete, tape a rubber mat or plastic sheet to the concrete; check for condensation after 24 hours. Don't apply the epoxy if there is any moisture.

Your distributor should give you the *manufacturer's detailed instructions* for:

- Preparing the base angle
- Equipment needed
- Mixing the grout
- Application

5. *Services and Connections*

Begin services and connections *only after* you have leveled and anchored the washer.

5.1. Introduction

You are now ready to connect the utilities to the washer, and install options. To do this, use your utilities connection plan, devised during placement planning. (Refer to section "*Prerequisites, Placement Planning*" at the beginning of this chapter.)

Your plan and the SBO tell you which of the following utility connections and options' installations you must make. Use this manual to locate the connections on the power washer.

WARNING! Be sure that the people who install the power washer and make connections are qualified and trained for the task. They should meet all licensing standards required in your area.

Utility connection procedures are divided into two major parts:

- Input
- Output

These are discussed in the sections that follow.

After you have connected utilities, install any options you may have purchased from MART.

5.2. Connection Procedures - Input

This section describes *input* connection procedures. The next section describes *output* connection procedures.

Use your placement plan and the SBO form to determine which of the following utility connections you must make.

Input Utility Connections:

- Heat source
 - Gas (natural and propane)
 - Electric
 - Steam
- Water
- Compressed air
- Electricity

Depending on your power washer configuration and optional equipment, refer to the applicable sections in this manual for information on making the necessary connections.

5.2.1. Heat Source

Depending on the washer's configuration and options, it will use one of the following heat sources:

- Gas (natural and propane)
- Electric
- Steam

A description of each type of heat source follows.

Gas & Oil Heat Source

For proper connection of the gas heat source, natural or propane, refer to the specifications in the SBO and to the vendor manual provided with the burner.

Burner Mounting

The power washer is equipped with a burner, as shown in one of the following figures. Locate the figure that refers to your burner size. **NOTE:** After burner mounting is completed, check to be sure there is an airtight seal between the burner and the combustion chamber.

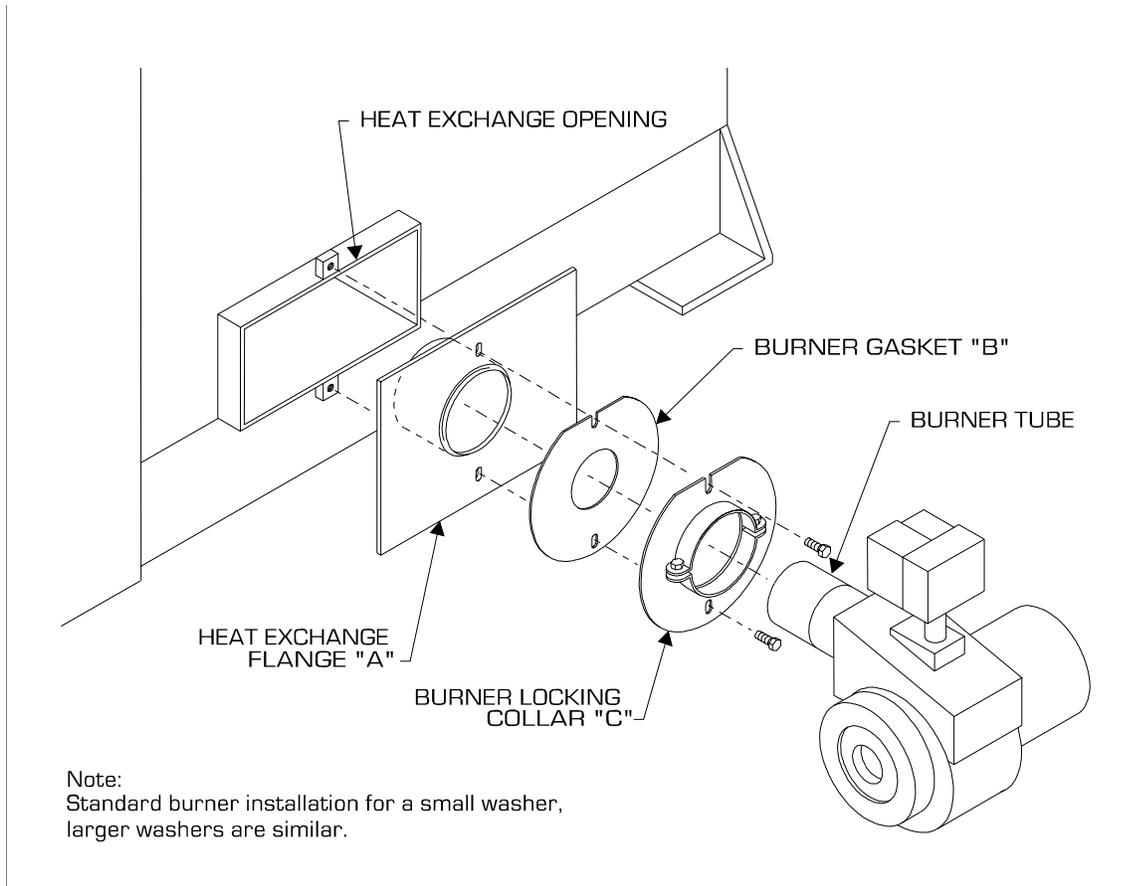


Fig. 2 - 3: Mounting the Combustion Burner (Up to 180,000 BTU)

For combustion burners up to 180,000 BTU, follow this procedure (refer to the previous figure):

1. Attach:
 - *Heat exchanger flange A*
 - *Burner gasket B*
 - *Burner locking collar C*
 to the *heat exchanger opening* located on the right side of the washer. Use the *mounting bolts* provided.
2. Insert the *burner tube* into and through:
 - *Burner locking collar C*
 - *Burner gasket B*
 to the *stop block* welded into the *heat exchanger flange A*.
3. Tighten the *burner-locking collar C* around the *burner tube*.

Now go to the "*Burner Fuel and Electrical Connection*" section.

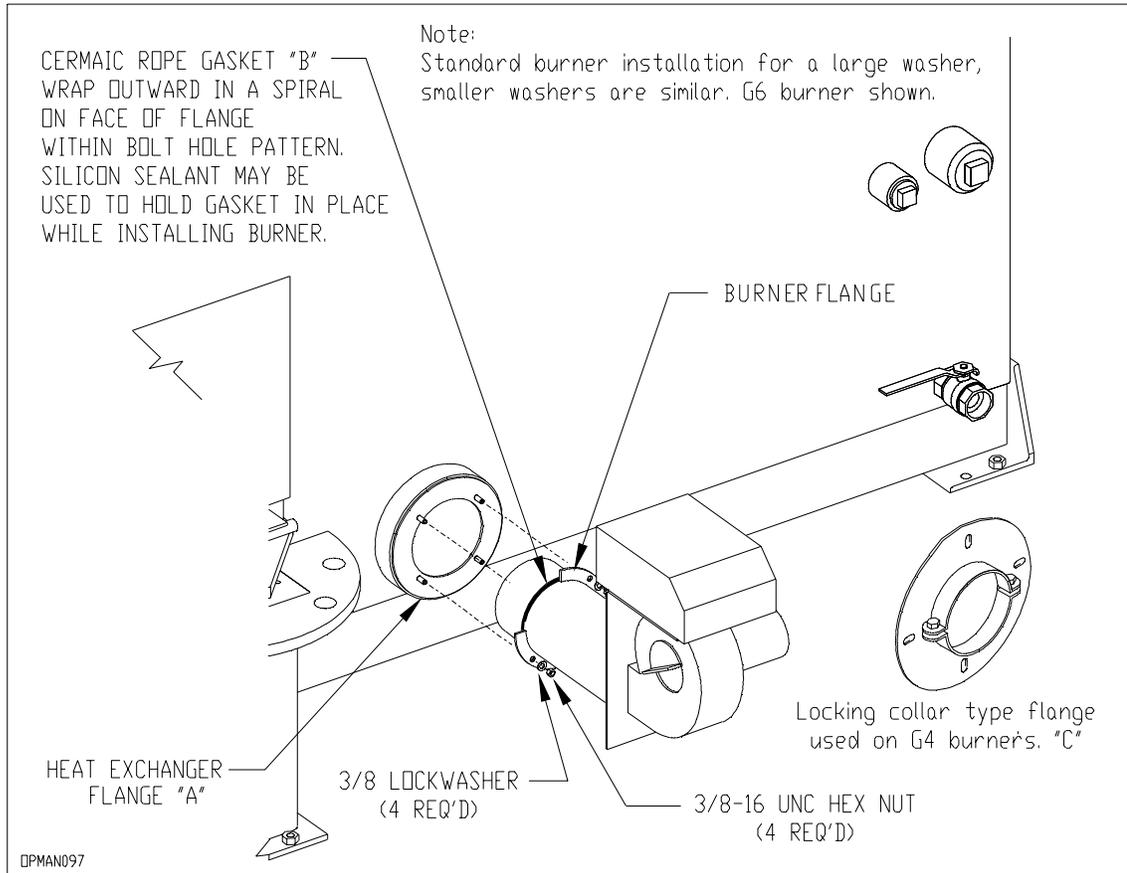


Fig. 2 - 4: Mounting the Combustion Burner (Up to 400,000 and 800,000 BTU)

For combustion burners up to 400,000 BTU and 800,000 BTU, follow this procedure (refer to the previous figure):

1. Install the ceramic-fiber rope gasket supplied with the burner: Wind it in a spiral on the face of the burner flange, inside the bolthole circle, in a single layer. Cut off the excess rope. **NOTE:** The rope may be held in place by masking tape or RTV adhesive.
2. Insert the burner nose into the end of the heat exchanger. Align the boltholes.
3. Install 4 burner mounting bolts. **CAUTION:** Do NOT over-tighten these bolts to the point where the burner flange distorts!

Now go to the "Burner Fuel and Electrical Connection" section.

Burner Fuel and Electrical Connection

For all combustion burners, *follow this procedure*:

1. Locate the *unconnected 1/2-inch (13-mm) PVC conduit* containing:
 - One orange wire
 - One white wire
 - One green wire
 and install it in the *burner junction box*. (The conduit was secured for shipment to the right side of the cabinet.)
2. Splice the orange, white, and green wires to the wires in the burner junction box as shown in the following figure. (Please note that for Riello Burners the orange wire lead connects to L , the white wire connects to N, and the green wire connects to the green ground screw in burner junction box. For Gordon Piatt burners the orange wire connects to #1, the white wire connects to #2, and the green wire connects to the green ground screw in the junction box of the burner.)

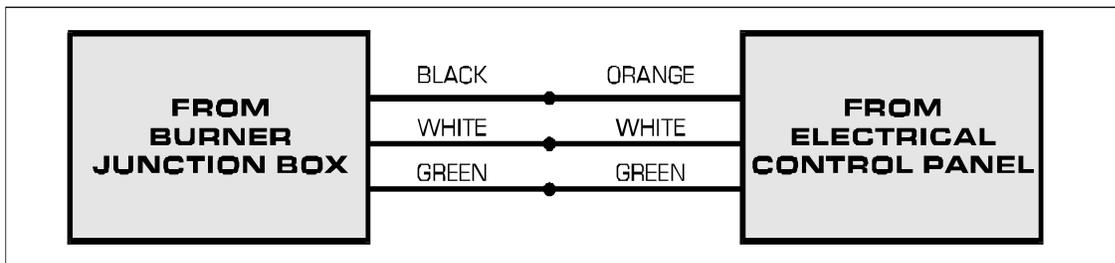


Fig. 2 - 5: Burner Junction Box -- Wiring

3. **(Gas)** Connect the gas supply pipe to the *combination gas valve inlet* (natural or propane gas). **NOTE:** Larger burners have a separate gas train that you must connect to the burner *before* connecting the supply pipe to the inlet.

Note: *Be sure the gas supply line is of adequate size for the firing rate of your burner and for the length of the gas pipe supply run. Refer to the gas burner vendor manual for information on pipe capacities versus run lengths.*

Or

(Oil) Connect the *fuel-oil supply tube* to the *fuel-oil pump inlet*.

WARNING! *Refer to your fuel-oil burner manual to determine if a fuel-oil return line is required.*

WARNING! Do not allow gas pressure in excess of 12.0 WCI to be applied to the combination gas valve inlet, or damage may occur. If gas pressure in the branch line supplying the burner is above 12.0 WCI, then a lock-up type gas pressure regulator of the correct size and range MUST be installed.

4. Turn ON the *main gas supply*.

WARNING! Do NOT try to start the burner at this time! NEVER operate the burner unless the washer reservoir is at "full-water" level. You will start the burner later, during the startup procedure.

5. Perform leak tests at all fuel pipefittings and joints, including all connections on the burner, and all piping installed to the burner. To do this, smear a solution of soap and water around all fittings and look for bubbles. If you see bubbles, the fittings and joints are not tight, and are leaking.
6. Turn OFF the *main gas supply*.

Electric Heat Source

The electric heating elements have already been installed at the factory. No further connection procedures are required.

Steam Heat Source

For proper connection of the steam heat source, refer to the specifications in the SBO.

Follow this procedure:

1. Install the *steam solenoid* on the upstream side (the right side of the washer) of the steam heat exchanger, as shown in the following figure.
2. Install the *steam trap* on the downstream side (the left side of the washer) of the steam heat exchanger, as shown in the following figure.

3. Make *connections* to your in-plant steam power system, according to plant and other local codes.

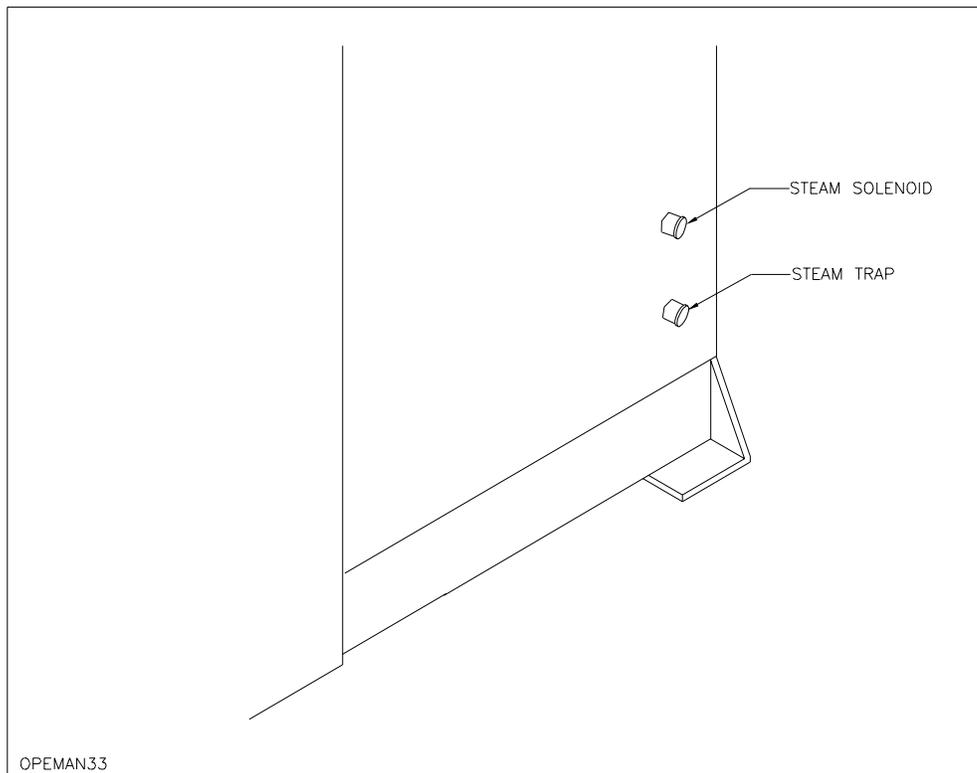


Fig. 2 - 6: Steam Solenoid and Steam Trap Installation

5.2.2. Water (Input)

Refer to the specifications in the SBO form for correct water-line sizes. A 1/2-inch-diameter (13 mm) water line is required for automatic water-fill and the optional Auto Rinse Cycle (ARC).

Follow this procedure:

1. Install a *water regulator*, if incoming water pressure is greater than 125 PSI (862 kilopascals). The regulator should regulate water pressure to 100-125 PSI (690-862 kilopascals). (**NOTE:** The water regulator is *not* provided by MART.)
2. Connect a 1/2-inch-diameter (13 mm) water supply line to the regulator or the washer inlet. **NOTE:** The washer water supply inlet is a **BRASS** fitting. Do not use Teflon tape if you have a plastic filter: use a liquid pipe dope. Refer to the following figure for the connection location.

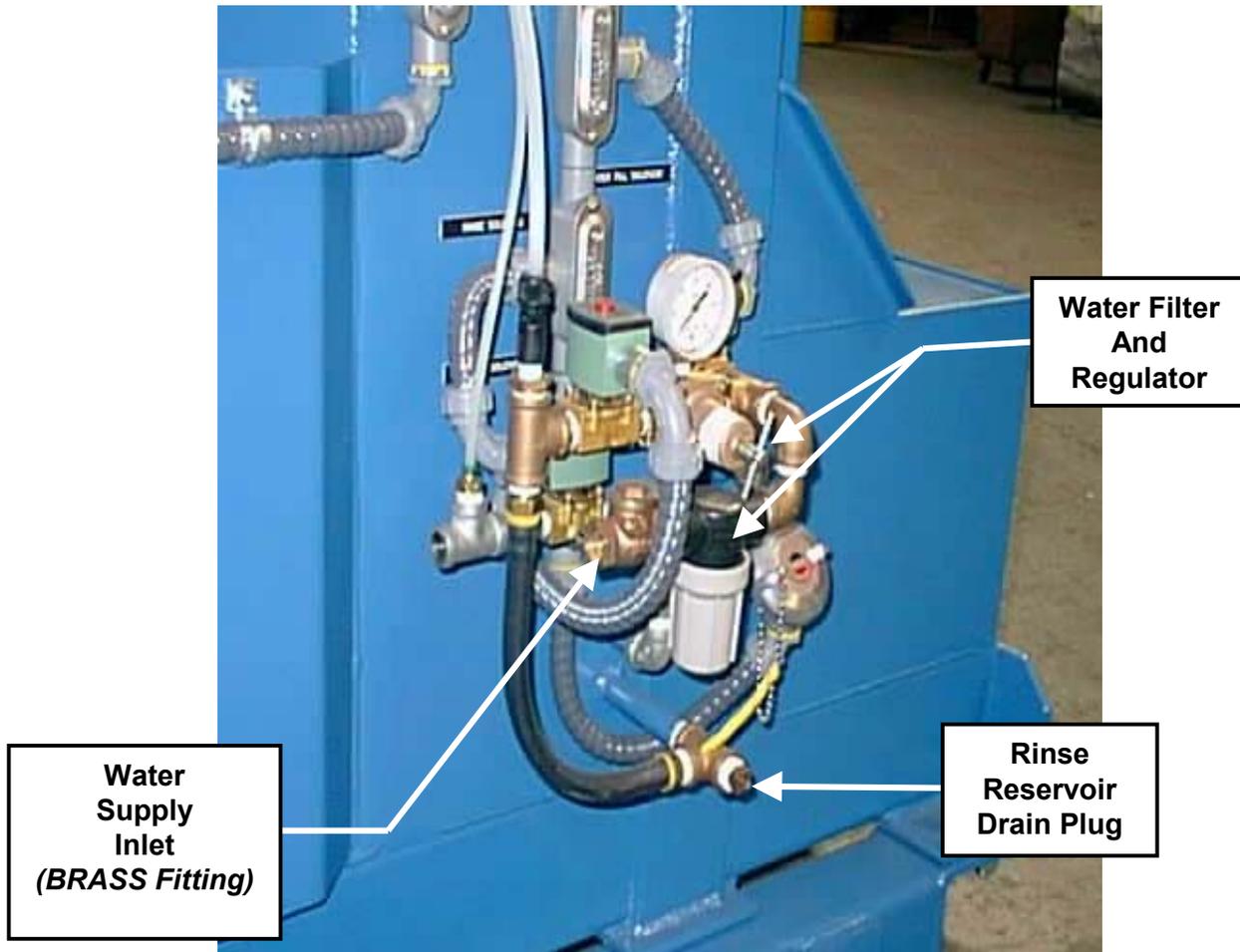


Fig. 2 - 7: Water Connection Location

5.2.3. Compressed Air (Input)

If your washer is equipped with an Automatic Pressure Equalization (APE) unit, you will need compressed air for it. (Single-pump systems smaller than 20 HP and duplex-pump systems do not have an APE.)

NOTE! Do NOT connect a compressed air line to a BRASS fitting on the machine. The compressed air-line connection is a GALVANIZED fitting. If you do NOT have a galvanized fitting you may not need a compressed air line.

Follow this procedure:

1. Install a 1/2-inch-diameter (13 mm) compressed-air line to the washer. (The incoming pressure range should be between 60-125 PSIG 414-860 kilopascals). **NOTE:** The factory setting for the APE pressure switch is 30 PSI (207 kilopascals).
2. Connect an air filter and regulator in-line with the washer's compressed-air inlet. Refer to the following figure. Note: The compressed air inlet is a 1/2" **Galvanized** fitting.
3. Connect the air-supply line to the filter.

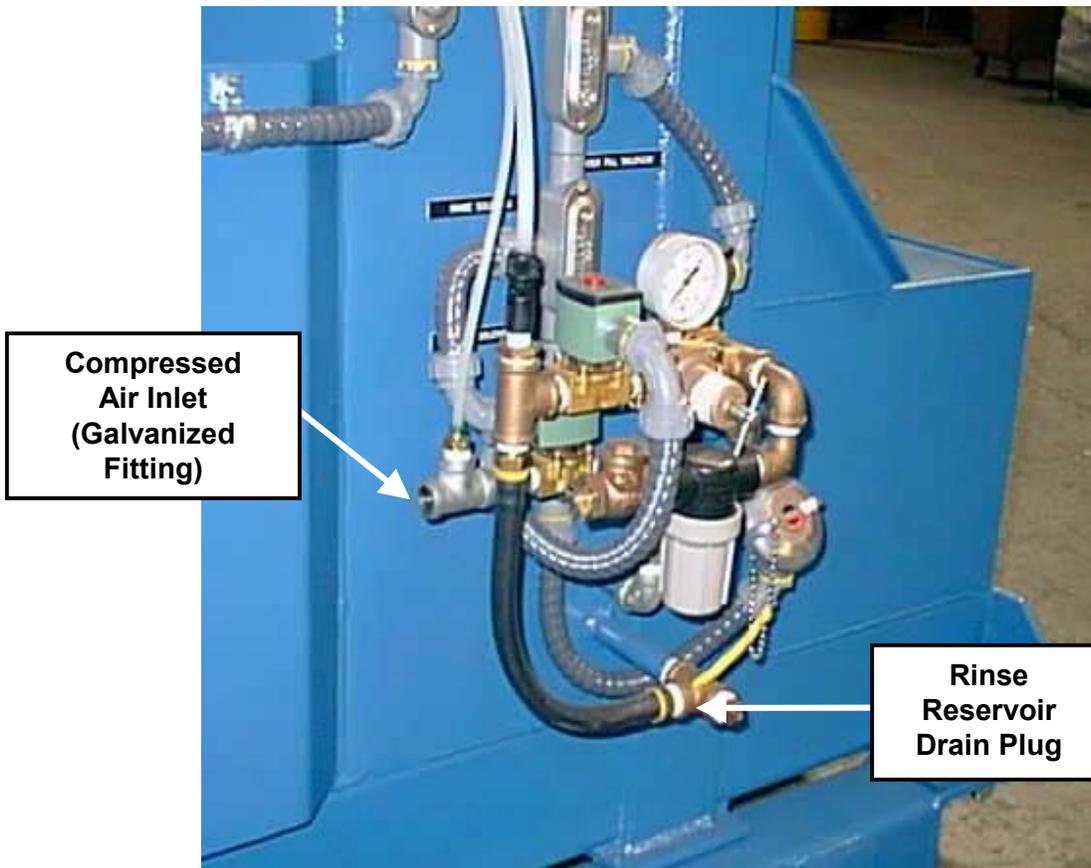


Fig. 2 - 8: Compressed-Air Connection

5.2.4. Electricity (Input)

NOTE: You are responsible for meeting all local and national electrical codes that apply to the power source and to the wiring from the power source to the MART Power Washer. *Be sure that people who are qualified and trained for the task do all electrical installation and connections. They should meet all local licensing requirements.*

NOTE: If your washer is not equipped with a disconnect, NEC (*National Electrical Code*) requires a main disconnect.

CAUTION! GROUNDING WARNING: *The washer must be grounded! Grounding provides a path of least resistance for electric current, thus reducing the risk of electric shock during maintenance, troubleshooting, or repair.*

CAUTION! GROUNDING INSTRUCTIONS: *The washer must be connected to a grounded, metal, permanent wiring system; OR an equipment-grounding conductor must be run with the circuit conductors and connected to the equipment-grounding terminal or lead on the washer.*

Earthgrounding to Prevent Corrosion

The washer must be securely grounded to help prevent stray electrical fields from causing galvanic-type corrosion. Under some circumstances, such corrosion can very quickly cause serious structural damage to the washer (in only several months).

WARNING! *Use the proper equipment-grounding circuit per the National Electrical Code Article 250.*

The Power Washer must be grounded using a copper conductor. Do **NOT** depend on raceways or a conduit as an equipment ground. Install an equipment-grounding conductor connected to the Power Washer's ground lug in the Control Panel *and* connected to your electrical service system ground according to the National Electrical Code Article 250. Use a conductor **EQUAL or GREATER** in size to the equipment service conductor to reduce the resistance to ground. A low-resistance path-to-ground is required to minimize galvanic corrosion.

To connect power to the washer, follow this procedure:

1. Verify washer *voltage* and *amperage* requirements (in the SBO form).
2. Select a *feeder-wire size* that meets approved *national* and *local code* requirements.
3. Use a ground conductor of **EQUAL** or **GREATER** size (to the feeder wire).
4. Connect *power* from the *main power supply* to the *washer*, following NEC methods. Use proper size *wires* in the conduit, and make watertight connections to the *electrical control panel*.
5. Attach the *feeder wires* to the *power distribution block*, located in the *electrical control panel*. (Refer to the following figure for the location of the power distribution block.)

WARNING! Do NOT turn the main power supply ON at this point!

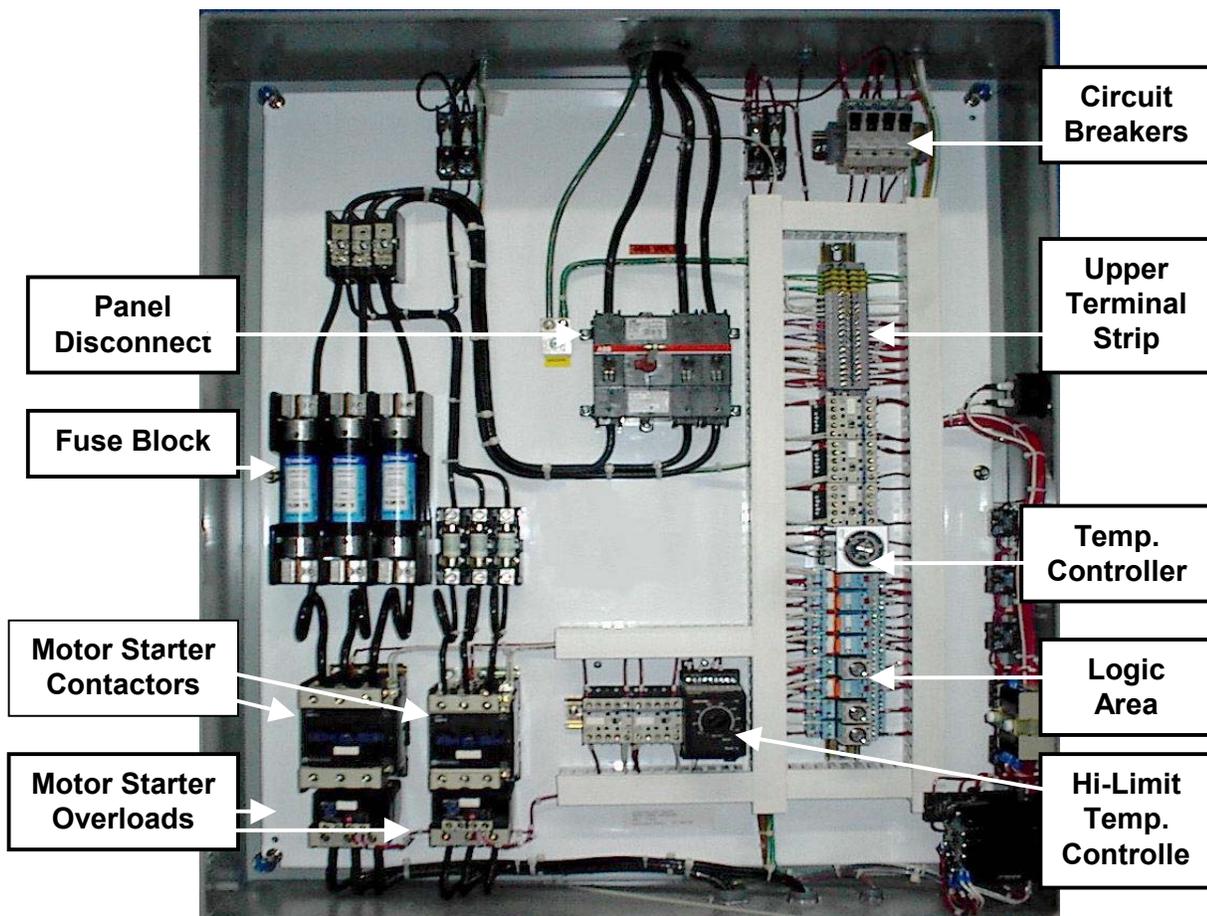


Fig. 2 - 9: General Layout of the Electrical Control Panel (Block Diagram)

5.3. Connection Procedures - Output

This section describes *output* connection procedures. The previous section describes *input* connection procedures.

Use the SBO form to determine which of the following utility connections you must make.

Output Utility Connections:

- Steam exhaust
 - Pipe
 - Fan
- Flue pipe
- Drain

Depending on your power washer configuration and optional equipment, refer to the applicable sections in this manual for information on making the necessary connections.

5.3.1. Steam Exhaust (Output)

For the size of the steam exhaust, refer to the specifications in the SBO.

The following materials can be used for steam pipe:

- **Schedule 40 or 60 PVC pipe** (see "*Prerequisites, PVC Kit,*" at the beginning of this chapter). MART washers are set up for using PVC pipe for the steam exhaust. Your washer and ASE (auto steam exhaust) blower unit arrive equipped for using PVC fittings. **MART highly recommends PVC**, because it is simpler to install, requires no welding, is lighter, and does not rust.
- Schedule 20 or 40 black iron pipe can be used instead of PVC. However, it lacks PVC's advantages. If you opt to use iron pipe, you will need special adapters to modify the flanges on the ASE blower unit.

*The following steam-exhaust **installation instructions assume the use of PVC pipe.** If you use iron pipe instead, installation steps will be similar to those given here. However, you will have to adapt and modify flanges and fittings as necessary to complete the assembly.*

NOTE: *If your washer is equipped with a hot-air blow-off (HABO) system, refer to that option for special instructions for steam-exhaust installation.*

General installation consists of the following procedures:

1. Install piping.
2. Install the ASE blower unit in piping.
3. Provide rain cap.

WARNING! The steam-exhaust pipe connection must be independent of any other pipe connection. It can not share a steam vent pipe with any other equipment.

Steam-Exhaust Pipe

Refer to the following figure for the location of the steam-exhaust vent pipe flange. The pipe flange is located on the roof of the washer cabinet for steam vent attachment.

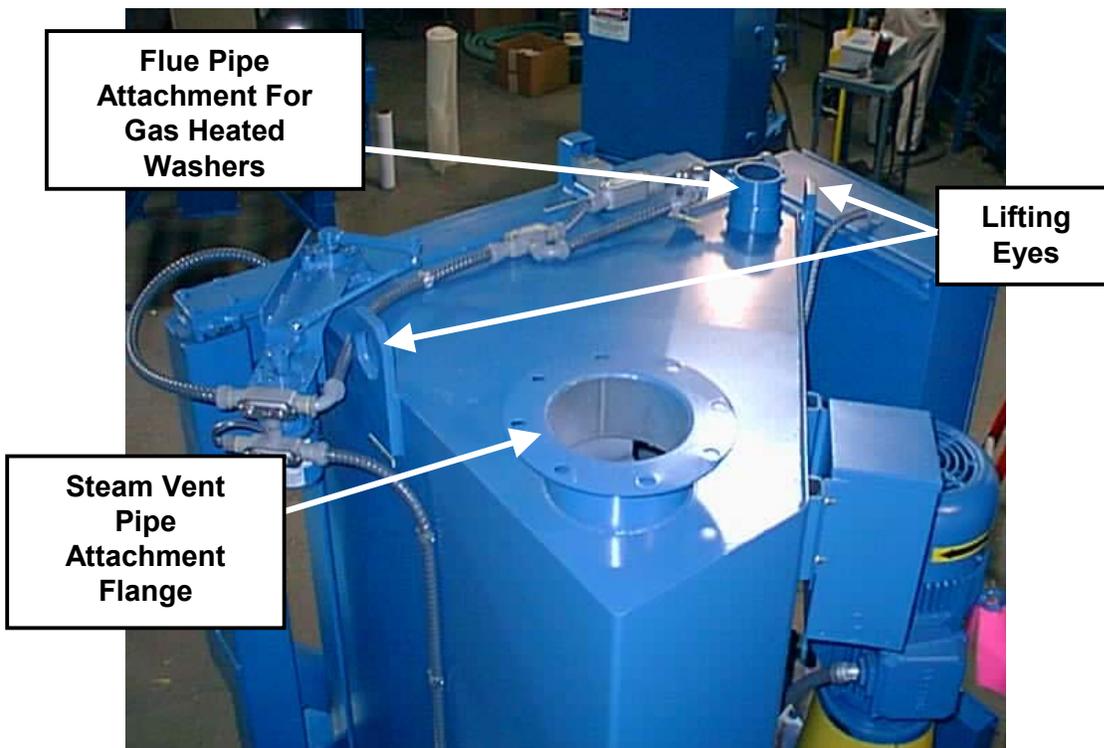


Fig. 2 - 10: Steam-Exhaust Vent Pipe and Flue Pipe Attachments

The steam-exhaust pipe may exit your building either vertically or horizontally, as shown in the following figure. This figure does not show you how to install the ASE blower unit in the piping (see ASE Assembly Figure 2-13) rather, it represents a general view of the two possible configurations (vertical or horizontal). You will select one of these configurations when you install the piping and blower. Note: Install venturi such that fan motor shaft is horizontal. Use a twist transition supplied from MART if required.

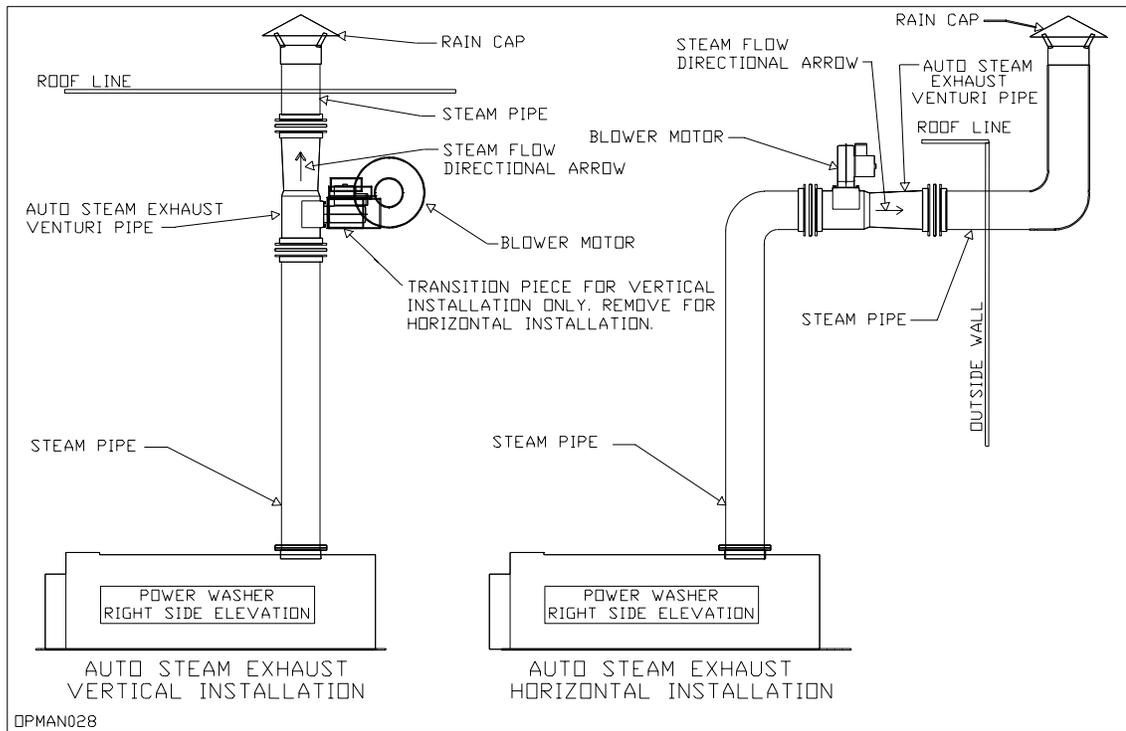


Fig. 2 - 11: Auto Steam Exhaust (ASE) Piping and Blower Installation Configurations

Note: Any horizontal section of steam exhaust pipe must rise by 1/2-inch (13 mm) per foot (30.5 cm) of pipe. This is necessary for proper condensation drainage back to the washer.

Steam-Exhaust Fan

The auto steam exhaust (ASE) Venturi blower assembly is provided by MART. It comes unassembled and must be mounted in the steam-exhaust piping. Mount blower and fan as shown in diagrams. Do not mount fan housing below venturi blower inlet, condensation may collect in blower housing.

Note: The ASE blower assembly comes with a 1/12-HP motor. If your steam exhaust vent pipe exceeds 30 feet (9 m), a 1/4-HP motor is required and can be obtained from MART. If your vent pipe is extremely long, or if there is extreme negative pressure in your shop area, MART may need to assist you in determining the proper size venturi blower and motor assembly. (When calculating pipe length, each 90°-angle bend equals 10 feet [3 m] of straight pipe.)

CAUTION! You must mount the ASE assembly in line with the steam-exhaust pipe, and as far away from the washer as possible, at least 20ft. if possible. – It's best to install where the steam-exhaust pipe leaves the building. Do not install ASE assembly directly on top of the washer!

CAUTION! If you are mounting the Venturi Tube in a horizontal position, mount it such that the fan is above the tube 45° from the vertical, as shown in the following figure.

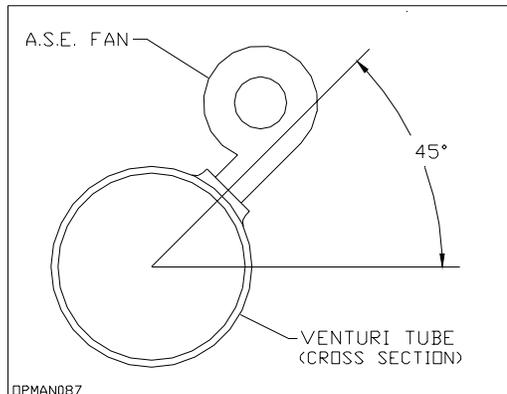


Fig. 2 - 12: Mounting the ASE Fan on a horizontal mounted Venturi Tube

Refer to the following figure for instructions on piping and blower installation.

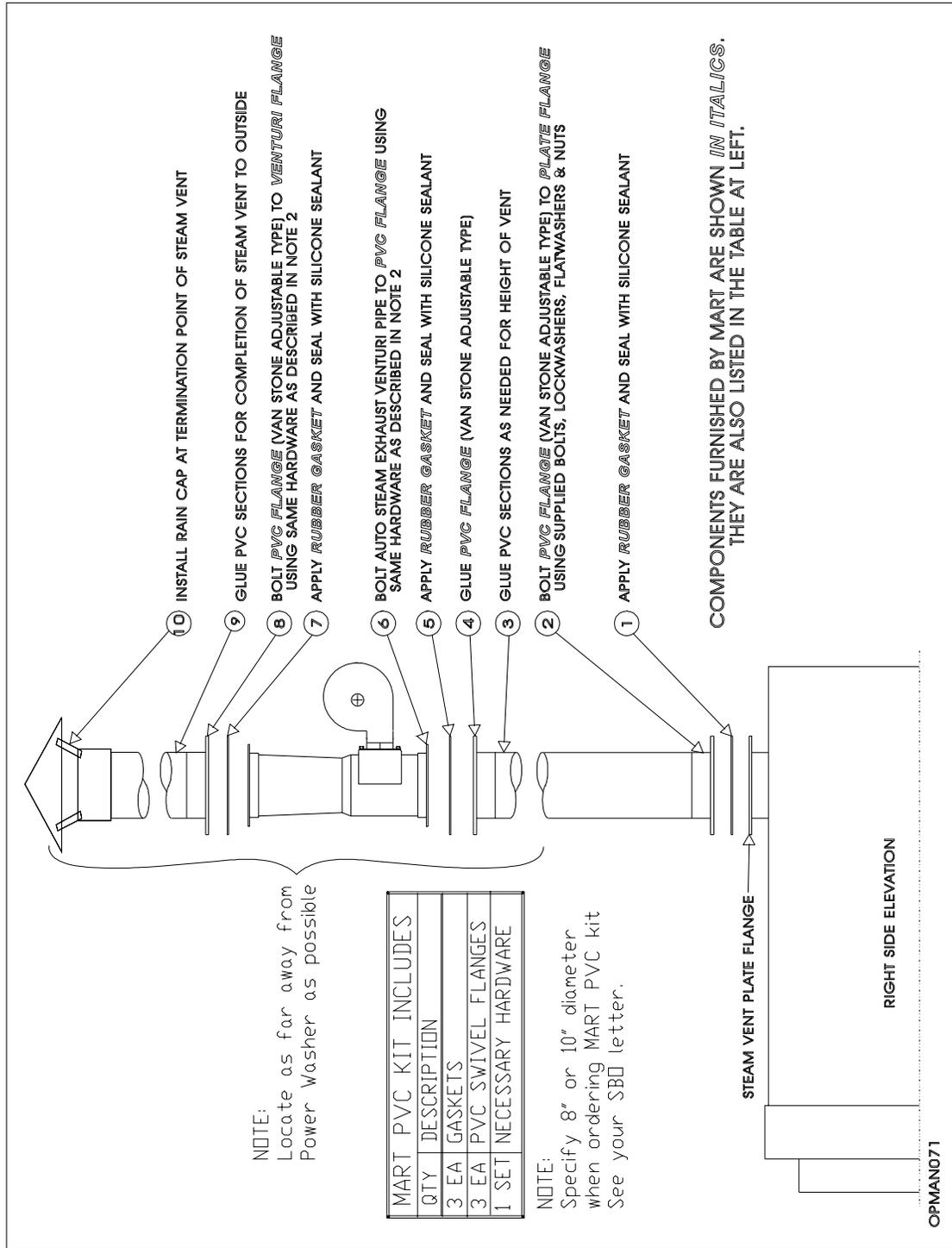
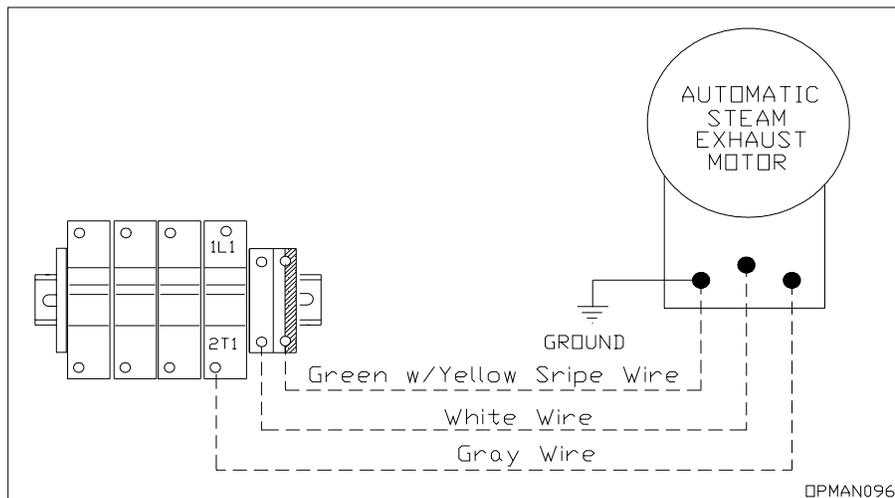


Fig. 2 - 13: Auto Steam Exhaust (ASE) Piping and Blower Assembly

After you have installed the piping and the blower; follow this procedure to connect the blower to the washer.

1. Install an approved liquid-tight *conduit* containing *three wires* (red - hot; white - neutral; green - ground; all wires #14-gauge copper, minimum) from the ASE *blower assembly* to the upper terminal block in the Control Panel. (Attach the *three wires* as indicated in the accompanying figure.)
2. Attach one end of the red wire (hot) to the ASE motor circuit protector device located at the top of the control panel next to the terminal blocks. Refer to your machine's panel layout drawing on the inside of the enclosure door for the exact location. Splice the other end of the red wire to one of the black wires on the ASE motor.
3. Attach one end of the white wire (neutral) to an N (Neutral) terminal. Splice the other end of the white wire to the second black wire on the ASE motor.
4. Attach one end of the green wire (ground) to a green ground terminal. Connect the other end of the green wire to a screw on the ASE motor.

NOTE: You must supply the length of wire, fittings and conduit required to extend from the ASE motor to the Control Panel.



Note: The wiring diagram as shown is for the standard 115 volt A. C. motor. If your system utilizes a variable speed D. C. motor please refer to the electrical Schematics supplied with your machine for wiring information.

Fig. 2 - 14: Wiring the ASE Blower Assembly

5.3.2. Flue Pipe (Output)

NOTE: A flue pipe is used ONLY for gas or oil burners.

WARNING! *The flue-pipe connection must be independent of any other pipe connection. It can not share a heating-system pipe with any other equipment.*

WARNING! *Be sure that people who adjust the burner are qualified and trained for the task. Be sure they use appropriate flue-gas monitoring instruments for measuring oxygen, carbon dioxide, AND CARBON MONOXIDE.*

WARNING! VENTING OF EXHAUST GASES: *Do NOT vent exhaust gases into a wall, a ceiling, or a concealed space of a building. Refer to the instructions in this chapter for correct vent installation instructions.*

Flue Pipe installation

Your MART Power Washer is capable of producing exhaust gas temperatures up to 1000 degrees F.

The gas burner flue installation must comply with all applicable local and/or national gas codes for **materials**, **pipe size**, and **installation** procedures.

Note: (MART recommends a minimum of 16-gauge material for the flue pipe.)

IMPORTANT:

The flue pipe system installed on the MART Power Washer must be sized to create the proper draft during burner firing. The draft required is $\pm .25$ WCI pressure at the flue-pipe stub during burner firing.

Typical installations with an equivalent 10-50 foot flue exhaust run generally will function properly with a flue pipe size 2" larger than the exhaust stub to obtain the required draft pressures of $\pm .25$ WCI at the flue pipe stub.

The MART Corporation does not recommend the use of draft inducers or barometric dampers in a properly designed exhaust system.

To install the flue, follow this procedure

1. Find the *flue pipe attachment* on top of the *washer* cabinet. (Refer to Fig. 2-10 for the location of the pipe stub. On some washers, the flue pipe attachment is by the steam-exhaust pipe attachment.)
2. Route the approved flue pipe from the Power Washer to the outside of the building, taking care to maintain minimum clearances to combustible materials as specified by the National Fuel Gas Code (American National Standard ANSI Z223.1) and other applicable codes.

Refer to "*Placement Planning/Roof*" at the front of this chapter.

Note: All horizontal flue-pipe sections must rise a minimum of 1/4-inch (6 mm) per pipe foot (per 30.5 cm of pipe).

3. Be sure the exhaust vent ends in a *vertical* position. The vent termination point must be above the roof peak by the required height as stated by local and/or national codes.
4. Install a *rain cap* at the *end* of the pipe. (**NOTE:** The rain cap is *not* supplied by MART.)

5.3.3. Drain (Output)

A capped drainpipe connection is located on the right side of the washer at floor level.

You may use the drain to hook up the washer to a water-treatment system, or to a pumping system.

However, your washer is easily serviced using a diaphragm pump equipped with a hose and an appropriate strainer. This configuration will allow you to pump solution from the washer into approved containers for disposal according to government codes.

For more information, refer to chapters "*Advanced Operations: Process Control*," and "*Maintenance*" in this manual.

5.4. Installation of Options

If you have purchased any options with your washer, such as a Clean Machine, refer to chapter "*Options*" later in this manual for information on installation.

5.5. Inspection and Verification

Now you have completed the services and connections required for your washer. Before performing the startup procedure, inspect all services and connections made on the washer during installation. Use the following information:

- *Services to be Provided by Others and Service Requirements (SBO)* letter from MART
- *Field Startup Procedure (FSP)* form

Fill in the *Physical Installation* section of the *Field Startup Procedure (FSP)* form as you inspect what you have done and ensure that all connections have been properly made. During this inspection you will inspect the following items and document your inspection results on the *FSP*:

- Visual inspection
 - Leveling
 - Anchoring
- Physical Inspection of Installation
 - Water Supply
 - Electrical Supply
 - Gas Supply
 - Gas Burner Flue
 - Steam Exhaust

- Check placement and leveling. Fill out the FSP form
- If a combustion burner is used complete "Gas Burner Test " in the FSP form
- Inspect electrical connections. Fill out the FSP form
- Inspect the ASE assembly. Fill out the FSP form
- Verify your water connection. Fill out the FSP form
- Inspect the drain and pump systems. Fill out the FSP form

Fig. 2 - 15: Services and Connection Inspection

If you note any problems that cannot be solved by making minor adjustments, refer to chapter "*Troubleshooting*," or call MART.

6. *Startup Procedure*

A MART factory-trained technician is optionally available to perform startup and customer training. Call MART to request this service. As part of this service, the MART technician will fill in the *Field Startup Procedure (FSP)* form to begin your one-year warranty coverage.

If you perform the startup, training your staff to operate the power washer is your responsibility.

The startup procedure consists of the following activities, in this order:

- Electrical connections inspection
- Lubrication procedure
- Power-up Procedure
 - Preliminary checks
 - Supply Voltage
 - Water Fill
 - Water Level Control
 - Control Voltage
 - Heat – Gas, Electric, Steam, Oil
 - Pump/s Rotation Direction
 - Temperature Control
 - Voltage Readings
 - Amp Readings
 - Water Hammer Test
 - Standard Operational Checks
 - Pump Low-Low Water Shutdown
 - Door Close Limit Switch Operation
 - Heater Low-Low Water Shutdown
- Chemical-charging procedure
- Test-wash procedure

NOTE: Fill in the *Field Startup Procedure (FSP) form* as you perform startup. Send it to MART. After it has been verified and accepted, your one-year warranty period will begin. ***This form must be received by MART within 60 days after receipt of your washer!***

WARNING! ***Be sure that people who perform the startup procedure are qualified and trained for the task. They must follow all procedures exactly as described.***

6.1. Electrical Connections Inspection

WARNING! *Be sure the electrical power to the washer is turned OFF.*

Open the electrical-control-panel door.

Check electrical connections and components for tightness. Some of them may have loosened during shipping.

Inspect timers and relays in the electrical control panel to be sure they are "seated" in their sockets.

Close the electrical-control-panel door.

6.2. Lubrication Procedure

Your power washer was pre-lubricated at the factory. If you install the washer within a six-month period after delivery, no lubrication is necessary before startup.

However, *you must establish a lubrication schedule*, based on hours of operation. Refer to chapters "*Advanced Operations: Process-Control*" and "*Maintenance*."

If the washer has been sitting for more than one year after delivery, see chapter "*Maintenance*" later in this manual for information on the proper lubrication procedure before startup.

6.3. Power-up Procedure

NOTE: If you need to stop the power-up procedure at any point, press the *stop button* on the washer's control panel, or *turn off the main power supply*.

Follow this procedure:

Preliminary Checks:

1. Is the cabinet *door closed*?
2. Is the *clock-override switch set OFF*?
3. Is the *wash timer* set to "0"?

Supply Voltage:

CAUTION: *This procedure exposes personnel to dangerous voltages and the risk of electrocution. Be sure the people performing this task are qualified and trained for the task.*

1. Verify that the electrical panel door is closed and latched.
2. Turn on the building main power supply to the Power Washer.
3. Turn electrical disconnect located on the MART Washer Control Enclosure door to the "OFF" position.
4. Open electrical enclosure door.
3. Measure and record incoming voltage available to the washer. Perform this test at the *supply side* of the *main disconnect*.

Water-Fill:

1. Set the *temperature controller adjustment* to "0." This will prevent the burner or heating elements from activating when the washer is empty of water, should damage to the washer have occurred in shipping. Refer to chapter "*Advanced Operations: Process-Control*" for more information.
2. Close electrical panel door.
3. Turn the electrical disconnect located on the MART Washer Control Enclosure door to the "ON" position. If the pump/s come on, turn the disconnect "OFF" and **immediately** contact the MART Corp. for additional instructions.
4. Turn the 7-day clock control switch to *Bypass*.

5. Verify by visual inspection or by sound that the washer reservoir begins to fill with water (the water-fill solenoid should open when you turn the main power supply and the clock-override switch ON). Refer to Fig. 2-7 for the water-supply connection location.
6. Set the ASE Timer to 1 minute or any desired time between 0-10 minutes.
7. After about two hours, check the washer reservoir to verify or adjust the set-point water level. (While the reservoir fills, you can continue with the power-up procedure.)

Water-Level Control:

The water-level control system is fully installed in the power washer and requires only verification that the set-point water level is correct for operation of the machine. Follow these steps to verify or adjust the set-point water level:

1. Remove the float control box cover by removing four (4) screws. Refer to the following figure:

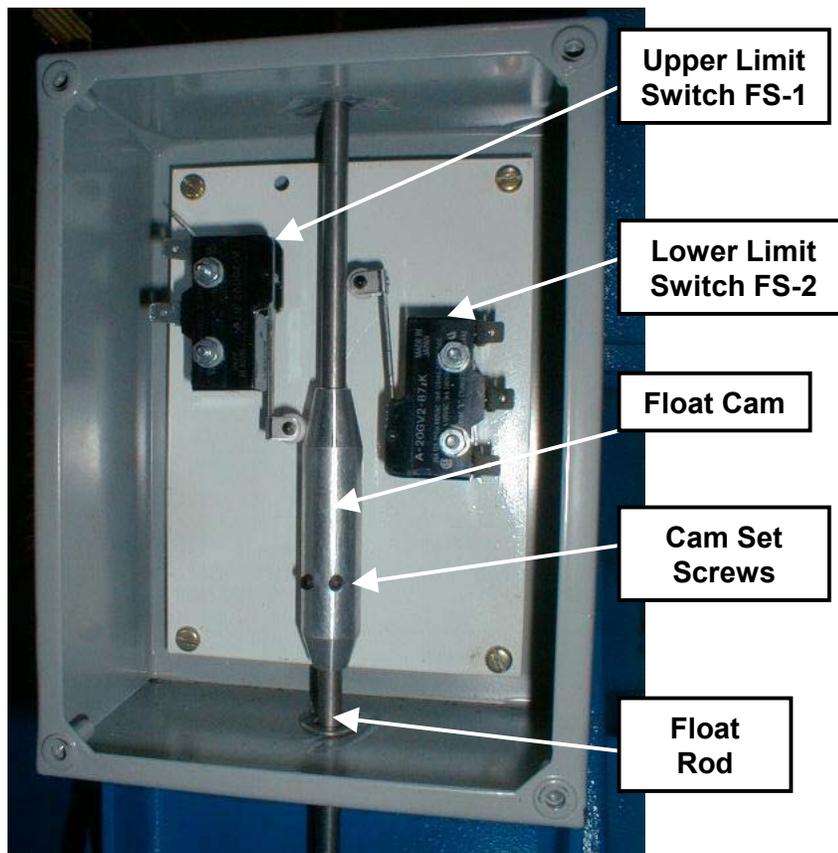


Fig. 2 - 16: Float Control Box

- During the initial startup of your power washer the washer will fill itself to the set-point water level. This water level is controlled by the position of the cam on the float rod.

Moving the cam **down** on the float rod will **raise** the water level, while moving the cam **up** on the float rod will **lower** the water level.

When the washer has completed filling to the set-point water level, the cam and float limit switches should appear as shown in the following figure.

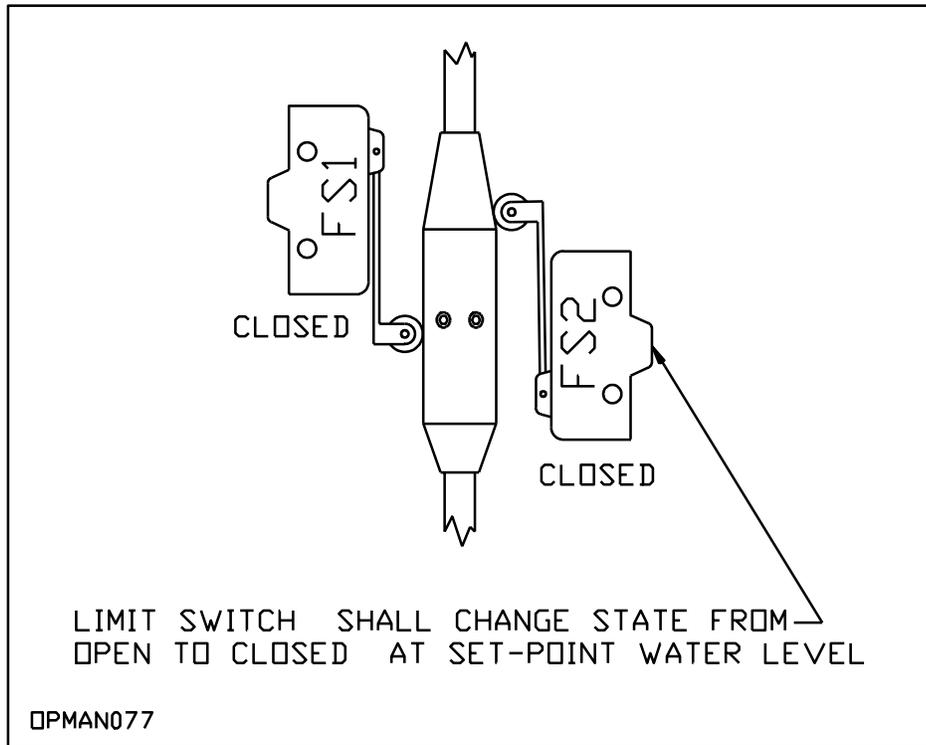


Fig. 2 - 17: Float Cam at SET-POINT Water Level

Turn *OFF* power to the washer.

Make sure the water is calm.

Remove the front reservoir cover.

Verify the water level in the machine when the cam is in relationship to the limit switches as shown in the figure above.

Find the water-level indicator (a 3/8"-square rectangular bar) welded to the right wall at the front of the reservoir. Refer to the following figure.

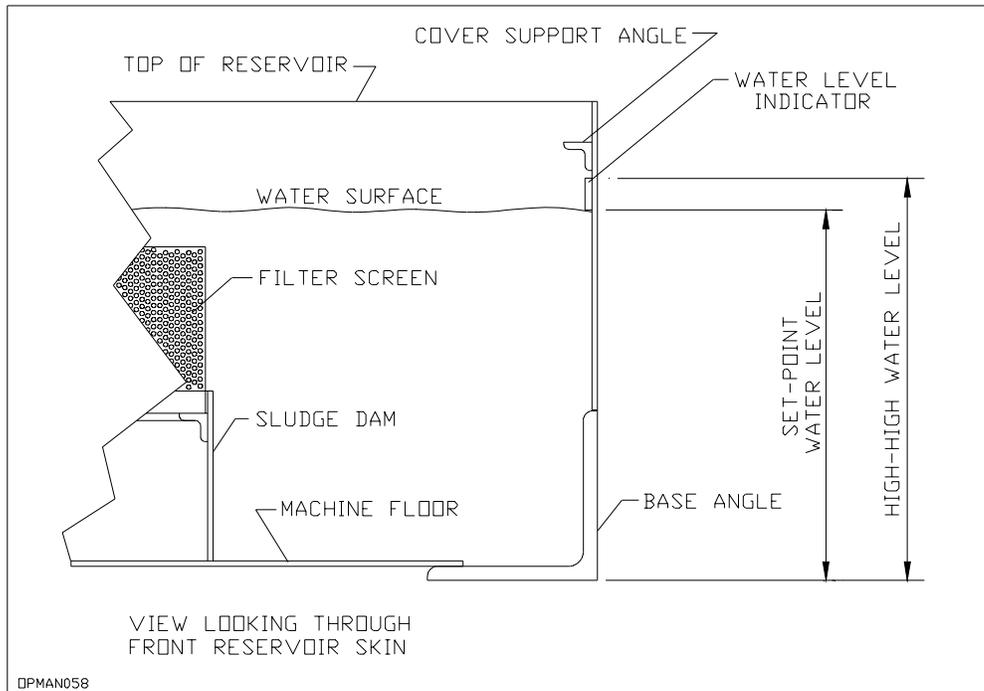


Fig. 2 - 18: Water-Level Set-Point Dimensions and Measurement Location

NOTE: The top of the water-level indicator shows the **HIGH HIGH** water level. The bottom shows the **SET POINT**.

3. *If the water level is more than 1/8" inch above or below the bottom of the water-level indicator, you will need to adjust the cam on the float rod. Follow the steps below.*

-Or-

If your water level is correct, skip to step 6.

4. Mark the current location of the cam on the float rod with a marker or a piece of tape before making any adjustments.

*If the water-level measurement you made is higher than the indicator, you will need to move the cam **up** the float rod by the difference between the indicator and the measured value*

*If the measurement is lower than the indicator, you will need to move the cam **down** the float rod by the difference between the indicator and the measured value.*

Measure the distance to the new position and mark it on the float rod.

Next, loosen the two set-screws on the cam with an Allen wrench.

Finally, slide the cam to the new location, and re-tighten **both** set-screws.

5. Turn power on to the washer and test the new level by allowing the washer to fill to the new set point.

NOTE: It will be necessary to remove water from the washer if the new level is lower than the old set point.

Verify that the set-point level is correct. If necessary, repeat the above steps until the set-point level is at the indicator, plus or minus 1/8" inch.

6. Replace the cover on the float box and tighten the four screws.

NOTE: *If your washer has a rinse system, once operations have started water levels in the washer can be higher than the set-point water level. This happens whenever the washer automatically uses the rinse-bank for longer rinses.*

To verify the correct set-point water level after operations have started, you must allow the washer to fill to the set point. You can check this by observing the position of the float cam relative to the limit switches in the float box. (Refer to Fig. 1-3: Float-Level Mechanics) If the cam is higher than the set point, you will have to remove solution from the washer and allow the washer to fill to the set point to check set-point water level.

Control Voltage:

CAUTION: *This procedure exposes personnel to dangerous voltages and the risk of electrocution. Be sure the people performing this task are qualified and trained for the task.*

1. Measure and record the control voltage to establish a baseline reading by taking readings from #10 wire on fuse #3 to any neutral terminal (on the terminal strip at the top of the electrical control panel). Refer to Fig. 2-9 for terminal-strip location.
2. Verify that voltage readings at each additional #10 terminal are 120 volts, $\pm 10\%$.

Heat - Gas: (if applicable)

WARNING! IF YOUR POWER WASHER USES A GAS BURNER: If you do not follow installation and operating instructions exactly, a fire or explosion may result, causing loss of life, personal injury, or damage to property.

WARNING! Proper setup and adjustment of gas-combustion equipment requires combustion-analysis tools (gas manometers, gas combustion analyzer) and knowledge of gas combustion.

If you do not have the proper expertise or equipment, seek professional help.

Improper adjustment of gas-combustion equipment can cause carbon monoxide discharge, fire, or explosion, resulting in loss of life, personal injury, or property damage.

1. Measure and record the incoming gas pressure to the burner. (**NOTE:** In the power-up procedure, the burner will not fire until correct water level is reached, and the clock-override switch is turned *ON*.)
2. Verify that the incoming pressure is within the range specified in the table below. Lower gas pressures can reduce the burner firing rate and increase the time it takes for the machine to heat. Gas differential pressures other than those in the table below will cause firing rates other than those obtained at the factory. Use the gas pressures in Fig. 2-18 as an initial starting point for burner adjustments.
3. If your washer has a burner with one of the firing rates listed in Fig-2-18, make initial flue damper and burner air-inlet shutter settings as shown.

NOTE: Gas pressures below are expressed in WCI.

Firing Rate K/BTU	Burner No.	Maximum Incoming Gas Pressure Unfired	Minimum Incoming Gas Pressure Unfired	Incoming Gas Pressure Fired	Minimum Incoming Gas Pressure Fired	Manifold Gas Press Firing	Machine Flue Damper Opening	Burner Air Shutter Opening
80	GT2	12	11	10.5	7.5	n/a	n/a	n/a
180	G2/T6	12	11	10.5	7.5	3.8	30 Deg.	n/a
180	40P200	12	11	10.5	7.5	2.96	30 Deg.	3.25
180	40N200	12	11	10.5	7.5	1.6	30 Deg.	3.25
380	X4-400-9	12	11	10.5	7.5	4-4.7	30 Deg.	8
380	GR 4	12	11	10.5	7.5	4-4.7	30 Deg.	No. 11
780	X4-700-9	12	11	10.5	7.5	3.7-4.8	30 Deg.	8
780	G 6	12	11	10.5	7.5	3.7-4.1	30 Deg.	3/4"

Fig. 2 - 19: Initial Burner Settings

Refer to the startup procedure in the burner vendor's manual.

NOTE: At this point, all manual gas valves should be closed.

4. Verify that the washer reservoir is filled to the factory pre-set level with water. The burner cannot fire until correct water level is reached.
5. Set the temperature controller, according to the following table. After you set the controller, the burner will come on and attempt to fire. (The controller is labeled inside the electrical control panel.) **NOTE:** *The set-point on the controller can differ from the actual temperature.*

At this point you should follow the startup procedure in the burner vendor's manual.

Note: Due to various installation variables, it may be necessary to adjust operating parameters to obtain consistent burner performance.

Maximum Actual Operating Temperature		
<u>Altitude in Feet</u>		<u>Temperature ° F</u>
0	- 2000	190° F (88° C)
2000	- 4000	185° F (85° C)
4000	- 5000	180° F (82° C)
5000 and above		call MART

WARNING! *Do NOT exceed recommended settings, or serious damage can occur in the wash pump (cavitation).*

Fig. 2 - 20: Maximum Operating Temperature

6. Take a sample of flue gases where the flue pipe attaches to the roof of the washer cabinet. There is a port at the flue damper for this measurement.

WARNING! *A certified burner technician, using flue-gas-analyzing equipment must make any adjustments to the burner.*

7. Verify that the fuel/air mixture is correct, by comparing your readings with the following table. Refer also to your vendor-supplied burner manual.

WARNING! *Proper air/fuel mixture is imperative for efficient operation and safety.*

Correct Air/Fuel Mixture

Unburned combustibles	0%
Carbon dioxide (natural gas)	9% -10%
Carbon dioxide (propane gas)	10% -12%
Oxygen	3% to 5%
Combustion efficiency	70% or more
Stack temperature	350° F to 1000° F (177° C to 371° C)
Carbon monoxide	200 PPM or less

8. Record the water temperature and time of day for reference. Refer to the following figure for gauge location. **NOTE:** Generally, it takes about two hours for water to heat from 70° F (21° C) up to 190° F (88° C). While the water is heating, you may continue with the power-up procedure.

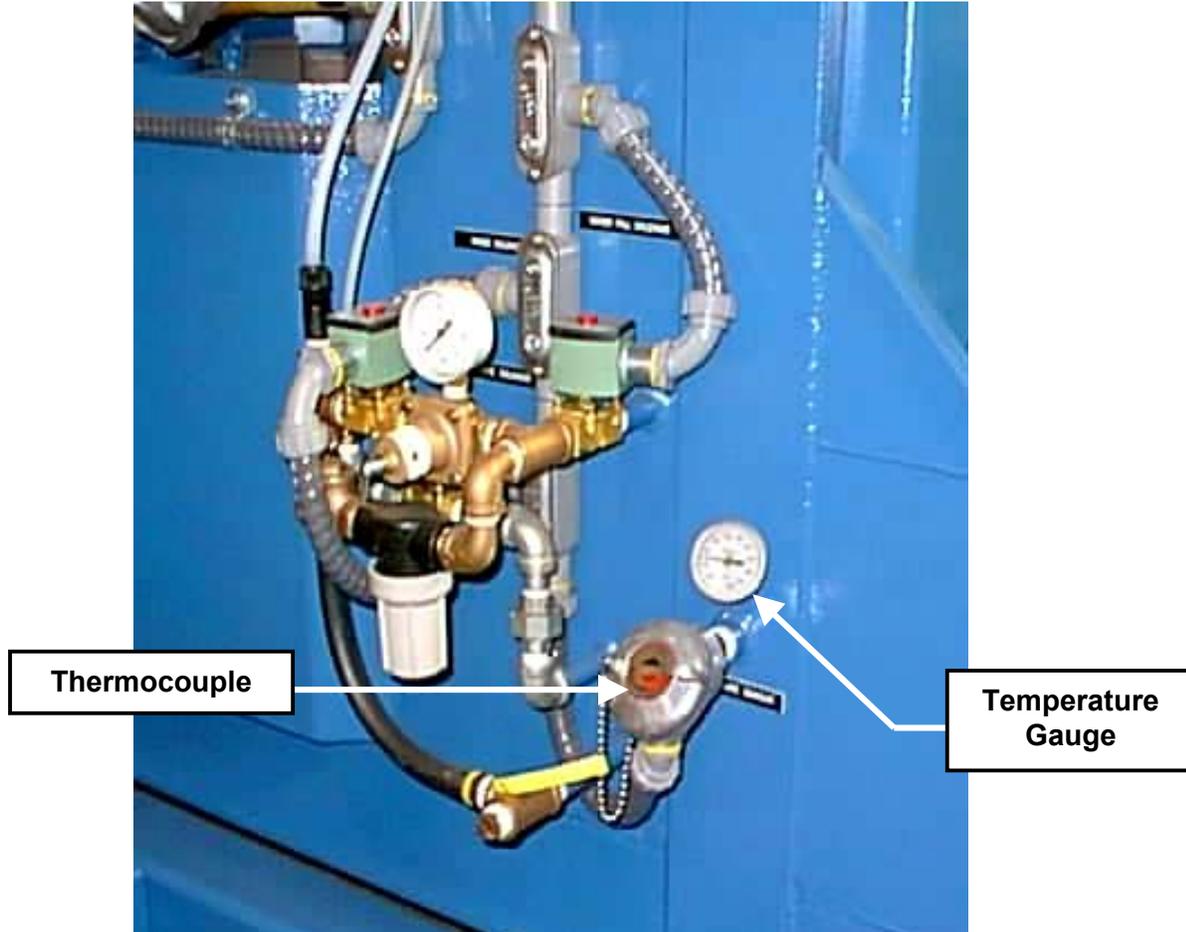


Fig. 2 - 21: Water Temperature Gauge Location

Hi-Limit Controller Adjustment:

MART Power Washers are equipped with a safety control system to prevent over temperature of the gas heating system. A temperature sensor is located in the flue gas stack and connected to a hi-limit controller in the electrical control enclosure. If the flue temperature exceeds the set point on the hi-limit controller, the heating system will shut down.

NOTE: MART Power Washers are shipped with the Hi-Limit control set to a predetermined value for your machine size. YOU ARE RESPONSIBLE for accurate adjustment of the Hi-Limit controller. All set-up adjustments are to be done only by people who are qualified and trained for the task.

NOTE: The Hi-Limit control adjustment should be preformed as an integral part of the burner start-up procedure.

To set-up the Hi-Limit controller, proceed as follows:

1. Adjust the temperature control unit to 220 degrees F.
2. Allow the burner to operate until the water temperature reaches 200 degrees F.
3. Measure and record the exhaust stack temperature.
4. Adjust the Hi-Limit controller 100 degrees F. over the measured exhaust temperature.
5. Reset the temperature control unit to the proper temperature (see Fig. 2 – 19).

The Hi-Limit control is now properly adjusted.

NOTE: The set-up and proper adjustment of the HI-LIMIT controller is the responsibility of the end user. Failure to perform the proper set-up will render the hi limit control system inoperative and may violate local codes.

Heat - Electric: (if applicable)

1. Set the temperature controller. Refer to Fig. 2-20.
2. Check to be sure that the washer is heating.

Heat - Steam: (if applicable)

1. Set the temperature controller. Refer to Fig. 2-20.
2. Check to be sure that the washer is heating.

Heat - Oil: (if applicable)

1. Set the temperature controller. Refer to Fig. 2-20.
2. Follow the instructions in your vendor-supplied oil-burner manual.

Temperature:

1. Verify that the washer continues to heat up properly. Refer to Fig. 2-21 to find the temperature gauge. **NOTE: Generally, it takes about two hours for**

water to heat from 70° F (21° C) up to 190° F (88° C). While the water is heating, you may continue with the power-up procedure.

Pump Rotation Direction:

1. Close and latch the washer cabinet door. (Door to remain closed for balance of this test).
2. Verify proper rotation of the pumps by the following procedure:
 - Set any wash time on the *0-30 minute timer*.
 - Press the *start* button.
 - Immediately press the *stop* button.
 - Observe rotation direction of the wash pump shafts. Verify the *clockwise rotation of the pumps*. (**NOTE:** If not correct, have an electrician reverse the direction of the pump by swapping any 2 of the 3 power-supply wires.)
 - Repeat test to verify correct rotation of pump/s.
3. If the pump direction is correct, set the *wash time* for *10 minutes*.

CAUTION: *This procedure exposes personnel to dangerous and hazardous voltages. Be sure the people performing this task are qualified and trained for the task.*

4. Turn the electrical disconnect on the control enclosure door OFF. Open electrical enclosure door. With door open, turn the disconnect ON
5. Press start. Measure and record the incoming voltage to the washer *with wash pump(s) running, and all equipment on the washer operating*, so you have the maximum amperage draw.

NOTE: Take the measurements inside the electrical control panel, at the power distribution block. Refer to Fig. 2-9. If the voltage is more than 10% below the voltage stated on the nameplate of the washer, stop the startup procedure. You must correct the low voltage condition before proceeding with the start-up.

6. With pumps running, measure and record the amp draw from the wash pump motor(s), using a clamp-on amp meter.

NOTE: Take the amperage measurement at the load side of the wash pump starter(s) on each power leg. If the washer is equipped with a duplex pump system, take amp readings separately on each wash pump motor, with both pumps running.

7. Compare amperage readings with the maximum amp load, which is calculated as follows:

On each pump motor, find the manufacturer's specification tag. The tag indicates two things: **(1)** Full-load amperage draw at your specified voltage; and **(2)** The service factor, which is stamped on the motor nameplate

Multiply the full-load draw (as indicated on the motor tag) by the service factor in order to calculate the maximum allowable amp load.

The actual amperage draw reading on each motor is to fall *below* the maximum calculated allowable amp load.

Cycling Test:

Perform the cycling test *after* the reservoir has filled, and after the washer has fully heated. **During winter**, "water hammer" may occur more frequently, or be more severe, due to lower ambient temperatures. If these conditions are true, increment the Wash Delay timer settings until "water hammer" stops. Refer to steps #8 and #9 below.

Note: Water hammer is the result of cool air entering a hot enclosure. When the pump system comes on, this cool air is rapidly heated by the hot water solution, which results in a rapid expansion in excess of the normal exhaust system capacity. The excess air pressure generated may cause hot solution to be ejected from the washer.

8. Open washer cabinet door wide open for a minimum of 30 seconds. Close and latch the door.
9. Stand to the side of the washer, and press the *start* button.
10. If water is ejected from under the front reservoir cover:
 - Press the *stop* button.
 - Add additional time to the wash delay timer
 - Repeat steps #8 thru #10 until the water ejection stops.
11. Verify the factory pre-set times for the optional Auto Rinse Cycle (ARC), and the Auto Steam Exhaust (ASE) timers per the following tables.

<u>Timer for:</u>	<u>Factory Setting:</u>
Auto Rinse Cycle, (ARC)	1 minute
Auto Steam Exhaust, (ASE)	1 minute

Additional Operational Checks:

11. With machine running a wash cycle, manually depress the float rod down. Verify wash cycle stops immediately. Wash cycle should not be able to be able to be restarted until float rod is released and allowed to return to it's

normal position and the wash door is opened and re-closed.

WARNING! Stand to side of machine for this test.

12. With machine running a wash cycle, CAREFULLY release the door latch handle only enough to allow the door to open slightly (1/4"). Wash cycle should stop immediately. Wash cycle cannot be restarted until door is properly closed and secured.
13. With machine not running a wash cycle, but system heat on, manually depress the float rod down. The heating system should immediately shut off. When rod is allowed to return to its normal position, the heating system should again become functional.

If any of the proceeding operational checks steps 11, 12 and 13 do not function as described, correct the problem before proceeding.

6.4. Chemical-Charging Procedure

If you have successfully completed the startup procedure to this point, you are ready to charge the washer with chemical.

When you charge the washer with chemical, always follow the chemical manufacturer's recommendations.

In general, most manufacturers recommend 4-6 oz. (120ml - 180ml) of chemical per gallon of water.

WARNING! When handling chemicals, always wear gauntlet-type thermally protected and water-repellent protective gloves, protective eyewear, a filter-type air mask, and a full body apron that is thermally protected and water-repellent. Use a long-handled shovel only, when working with or dispensing granular chemical. (Some chemical is liquid.)

For granular chemical, follow this procedure:

1. Open and secure Power Washer door.
2. Using a Long-handled shovel and wearing protective gear and clothing, slowly place chemical on the false floor in the rear of the MART Power Washer. Do not dump chemical directly into washer reservoir. Violent exothermic (heat released) reactions, splashing of chemically and physically

heated solutions and the premature release of fumes may occur. Avoid contact with chemical and solution. Avoid inhaling dust and fumes.

3. Close the washer door and start the pump to dissolve the detergent. Operate the wash cycle @ 160 to 190 degrees F.

For liquid chemical, follow this procedure:

1. Turn the ***main power supply OFF***.
2. Pump out the amount of water that is to be replaced by liquid chemical.
3. Pump the liquid chemical ***SLOWLY*** from drums onto the false floor, or over the doorframe.

CAUTION! Use extreme caution when pumping liquid chemical! The operator should stand back from the washer and wear gauntlet-type thermally protected and water-repellent protective gloves, protective eyewear, a filter-type air mask, and a full body apron that is thermally protected and water-repellent.

WARNING! Do NOT pour liquid chemical into the front reservoir.

4. Turn the ***main power supply ON***.

6.5. 7-Day Dual-Circuit Clock Initialization

After you have completed the chemical-charging procedure, initialize the 7-day dual-circuit clock.

Follow these instructions:

1. Set the 7-day clock. Refer to the vendor-provided manual for details. Also refer to section “*Setting the 7-Day Dual-Circuit Clock*” in chapter “*Advanced Operations: Process-Control*” in this manual.
2. Re-set the clock-override switch, located on the control panel, from the *on* position to the *off* position: this allows the 7-day clock to automatically operate the heating circuit.
3. To perform a test wash of actual parts, see chapter “*Basic Operations.*”

6.6. Rinse System (optional)

This option arrives factory-installed. All you have to do is open a chemical barrel, place the strainer tube in the bottom of the barrel, and prime the injector pump.

To prime the injector pump, follow these guidelines:

1. Shut off the incoming water supply.
2. Turn off the main-power-supply disconnect switch, located on the outside of the door of the electrical control panel and open the door.
3. Set the rinse timer to the maximum rinse time. (The rinse timer is located inside the electrical control panel.)
4. Close the door of the electrical control panel.
5. Turn on the main-power-supply disconnect switch.
6. Put the washer in to the rinse cycle.
To do this, press *start*, then turn the wash timer to *0*.
(When the washer begins a rinse cycle, the injector pump turns on.)
7. Turn injector-pump speed to *10*, until solution enters injector discharge.

CAUTION! Do not adjust injector-pump speed unless you have already put the washer in to the rinse cycle! Adjust injector-pump speed control ONLY while the injector pump is running.

The injector pump is now primed.

8. Press *stop*.
9. Turn off the main-power-supply disconnect switch, located on the outside of the door of the electrical control panel.
10. To set the rinse timer and injector-pump speed control, refer to chapter "*Advanced Operations: Process-Control.*"

6.7. Startup Problems

If you have any problems during the startup procedure, do the following:

- Re-read this chapter ("*Installation*")
- Refer to chapter "*Troubleshooting*"
- Call MART

After you have completed startup with no problems, you are ready to run a wash cycle. Refer to chapter "*Basic Operations.*"