

# 6 *Troubleshooting*

## **Purpose**

This chapter contains information about troubleshooting the power washer. Key components are listed, along with symptoms of problems and their causes. In the unlikely event that your washer malfunctions, use this chapter to help diagnose and correct the problem.

In many cases, you can use procedures in chapters "*Installation*," "*Advanced Operations: Process-Control*," or "*Maintenance*" to correct a problem after you have diagnosed it.

In other instances, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

## **Prerequisites**

Before you read this chapter, we recommend that you read the following thoroughly:

- "*Important Safety Instructions and Warnings*" (in the front material)
- Chapter 1, "*Overview*"
- Chapter 4, "*Advanced Operations: Process-Control*"
- Chapter 5, "*Maintenance*"

## Safety/Precautions

Before you take any corrective action or attempt to repair the power washer, read and follow these recommended safety/precaution instructions:

***WARNING! NEVER get inside the washer cabinet when the main power supply is ON. This could result in severe injury or death.***

***WARNING! Be sure that people who perform repairs are qualified and trained for the task.***

## What You Will Learn In This Chapter

In this chapter you will learn about troubleshooting the following:

- Startup
- Ineffective cleaning
- Wash pump system
- Heating system
- Turntable drive
- Nozzles
- Foaming
- Power blast manifold (PBM)
- Solution-level control system
- Door limit switch
- Rinse system
- Automatic steam exhaust (ASE)
- Electrical control system

# 1. Startup

Use procedures in chapters "Installation," "Advanced Operations: Process-Control," or "Maintenance" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

<b>Problem: Washer will not start</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
APE pressure switch	Misadjusted Insufficient compressed-air supply
Clock override	Set to <i>OFF</i> (must be <i>ON</i> )
7-day clock	Not programmed; program 1 must be <i>ON</i>
Compressed-air supply	Shut-off Disconnected
Door	Not closed
Door limit switch	Trip-tab is not closing the switch (adjust) Door limit switch is interlocked with start circuit. To reset start circuit, washer door must be opened and closed so start circuit detects door limit switch
contacts	transfer indicating proper operation.

**Fig. 6 - 1: Troubleshooting: Startup**

## 2. *Ineffective Cleaning*

Use procedures in chapters "*Installation*," "*Advanced Operations: Process-Control*," or "*Maintenance*" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems. Use procedures in chapters "*Installation*," "*Advanced Operations: Process-Control*," or "*Maintenance*" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

<b>Problem: <i>Ineffective cleaning of parts</i></b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
PBM	Linkage not connected
Turntable sprocket drive	Shafts not spinning (watch during wash cycle, or "jog")
Nozzles	Clogged
Pumps	Not operating (see " <i>Wash Pump System</i> " below) Unusual sounds (cavitation) Low amperage
Temperature	Incorrect for chemical being used
Chemical concentration	Incorrect (run a titration test)
Parts Position	Poor positioning of parts (re-position)

**Fig. 6 - 2: Troubleshooting: Ineffective Cleaning of Parts**

### 3. Wash Pump System

Use procedures in chapters "Installation," "Advanced Operations: Process-Control," or "Maintenance" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

This section contains tables on the following problems:

- Wash pump motor won't start
- Wash pump surges
- Wash pump fails to deliver solution
- Wash pump motor trips overload -- high amperage reading
- Seal leakage at wash pump mounting plate
- Wash pump or motor vibrates or is noisy

<b>Problem: Wash pump motor won't start</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Power	Not ON
Starter	Overload tripped (reset it)
Voltage	Too low
Fuses	Not intact (remove and measure continuity)
Wires	Not tight enough
Wash timer	Not set to a value above "0"
Door limit switch	Not activating (door not closed)

**Fig. 6 - 3: Troubleshooting: Wash Pump Motor Won't Start**

<b>Problem: Wash pump surges</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Reservoir	Low solution level (check float assembly & solenoid)
Filter	Screen clogged

**Fig. 6 - 4: Troubleshooting: Wash Pump Surges**

<b>Problem: Wash pump fails to deliver solution</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Pump impeller	Partially clogged or loose
Pump suction	Partially clogged (clean suction filter)
Motor	Incorrect [counterclockwise] rotation
Reservoir	Low solution level (check float assembly & solenoid)
Nozzles	Clogged

**Fig. 6 - 5: Troubleshooting: Wash Pump Fails to Deliver Solution**

<b>Problem: Wash pump motor trips overload -- high amperage reading</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Pump or motor	Mechanical defects (rotate pump shaft by hand to verify if one of the following is causing the problem): Bent shaft Loose impeller Pump casing unbolted Throttle bushing failure
Solution	Too viscous (drain and replace) Chemical concentration too high Chemical has a high specific Chemical reaction with contaminates (jelling)
Nozzles	Missing or excessively worn (replace) Incorrect number of nozzles.
Manifold	Leaking (clean-out plugs are missing or loose)
Piping	Leaking high-pressure piping passing excess water. Loose pipefittings Union not tight Swivel leaking at packing gland. (tighten)
Voltage	Low Voltage or service capacity (amp capacity)

**Fig. 6 - 6: Troubleshooting: Wash Pump Motor Trips Overload -- High Amperage Reading**

<b><i>Problem: Seal leakage at wash pump mounting plate</i></b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Pump	Mechanical defects: Throttle bushing failure
Shaft	Shaft-slinger failure

**Fig. 6 - 7: Troubleshooting: Seal Leakage at Wash Pump Mounting Plate**

<b><i>Problem: Wash pump or motor vibrates or is noisy</i></b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Pump or motor	Bearings: Need lubrication Need to be replaced Damaged
Pump	Throttle bushing failure
Pump & motor	Coupling: Loose/dropped Wearing out
Pump	Impeller: Loose Damaged
Pump	Clogged -- restricts impeller
Pipes	Pipe strains - discharge piping improperly connected
Thrust bearing	Snap ring has worn a groove in the bearing frame & is spinning
Temperature too high	Pump cavitation

**Fig. 6 - 8: Troubleshooting: Wash Pump or Motor Vibrates or Is Noisy**

## 4. Heating System

Use procedures in chapters "Installation," "Advanced Operations: Process-Control," or "Maintenance" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

This section contains tables on the following problems:

- Water does not heat (gas/oil burner does not ignite)
- Water does not heat (steam)
- Water does not heat (electric)

<b>Problem: Water does not heat (gas/oil burner does not ignite)</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
<u>Gas burner</u>	Check for 120 volts at burner Check for gas at specified pressures Blower motor not running, Check for fan obstruction <u>No ignition:</u> (blower motor must be running) Flameproofing rods Corroded (replace) Igniter rods Corroded (replace) Burner controller defective (replace) <u>Poor combustion:</u> Fuel/gas mixture Incorrect Main gas valve Defective Check for proper gas pressures Obstruction in flue. (clean out) Burner unit dirty. Clean Flue Damper Misadjusted
<u>Hi-Limit</u>	Hi-Limit tripped. Check for overtemp condition. Reset Hi-Limit controller. If problem continues contact MART Immediately.
<u>Temperature controller</u>	Not set high enough to call for heat. (Increase temp) Loose wires, (tighten). Thermocouple (sensor) not functioning. (Replace)
<u>Reservoir</u>	Low solution level (check float assembly & solenoid)
<u>Float assembly</u>	Not working (clean assembly)
<u>7-day clock</u>	Incorrect setting

**Fig. 6 - 9: Troubleshooting: Water Does Not Heat (Gas/Oil Burner Does Not Ignite)**



<b>Problem: Water does not heat (steam)</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
<u>Steam System</u>	Steam solenoid not activated Steam source Steam not available from in-plant source Steam trap not operating -- may be clogged
Steam-heat exchanger, hole in exchanger -- steam escaping	
<u>Temperature controller</u>	Not set high enough to call for heat. (Increase temp) Loose wires, (tighten). Thermocouple (sensor) not functioning. (Replace)
<u>Reservoir</u>	Low solution level (check float assembly & solenoid)
<u>Float assembly</u>	Not working (clean assembly)
<u>7-day clock</u>	Incorrect setting

**Fig. 6 - 10: Troubleshooting: Water Does Not Heat (Steam)**

<b>Problem: Water does not heat (electric)</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
<u>Electric heaters</u>	Defective element. (Replace) Defective wires, (loose, burned) Check for voltage Check for proper amperage Blown fuse. (Replace)
<u>Temperature controller</u>	Not set high enough to call for heat. (Increase temp) Loose wires, Tighten Thermocouple (sensor) not functioning. (Replace)
<u>Reservoir</u>	Low solution level (check float assembly & solenoid)
<u>Float assembly</u>	Not working (clean assembly)
<u>7-day clock</u>	Incorrect setting

**Fig. 6 - 11: Troubleshooting: Water Does Not Heat (Electric)**

***Rapid ON/OFF Cycling of heat system:***

This condition is caused by the temperature sensor probe being too close to the heat source. Position sensor probe tip to maintain a minimum of 4-6" from heat source.

## 5. Turntable Drive

Use procedures in chapters "*Installation*," "*Advanced Operations: Process-Control*," or "*Maintenance*" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

This section contains tables on the following problems:

- Turntable does not rotate

<b>Problem: Turntable does not rotate</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Drive-gear motor	Not operating
Fuse/ overload	Blown/tripped
Slip clutch	Not operating -- slipping
Jack shaft	Not turning (not driven)
Sprocket	Not engaging table teeth (check with door open & "jog") Not lined up
Turntable	Not rotating freely: Defective bearings Loose bearings
Load on table	Shifted, and is causing imbalance
Securing devices	Caught on washer structure below table

**Fig. 6 - 12: Troubleshooting: Turntable Does Not Rotate**

## 6. *Nozzles*

Use procedures in chapters "*Installation*," "*Advanced Operations: Process-Control*," or "*Maintenance*" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

This section contains tables on the following problems:

- Nozzles: ineffective cleaning

<b><i>Problem: Nozzles -- Ineffective cleaning</i></b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Nozzles	Missing Worn out (check amperage draw) Not aligned with marks on PBM
Pump amperage	Nozzles worn out (amperage too high)
Manifold	Swivel is leaking Clean-out plugs are missing

**Fig. 6 - 13: Troubleshooting: Nozzles -- Ineffective Cleaning**

## 7. *Foaming*

Use procedures in chapters "*Installation*," "*Advanced Operations: Process-Control*," or "*Maintenance*" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

<b>Problem: <i>Foaming</i></b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Operating temperature	Too low (raise temperature)
Chemical	Concentration: Wrong type of chemical Wrong concentration
Deferment	Not enough (add some to solution)
Oil skimmer removing defoamant	(adjust skimmer timer to skim when solution is cooler)

**Fig. 6 - 14: Troubleshooting: Foaming**

## 8. *Power Blast Manifold (PBM)*

Use procedures in chapters "*Installation*," "*Advanced Operations: Process-Control*," or "*Maintenance*" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

This section contains tables on the following problems:

- PBM not oscillating

<b>Problem: PBM not oscillating</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Linkage	Not connected Out of adjustment Loose
Bearings	Not connected to shaft Failed
Swivel	Not properly adjusted Not lubricated Not moving freely
PBM gear motor	Not rotating (check wires/fuses/overload tripped)
PBM mounting plate	Motor not securely attached to it

**Fig. 6 - 15: Troubleshooting: PBM Not Oscillating**

## 9. *Solution-Level Control System*

Use procedures in chapters "*Installation*," "*Advanced Operations: Process-Control*," or "*Maintenance*" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

This section contains tables on the following problems:

- Water not filling reservoir
- Water overflowing reservoir
- System not heating

<b>Problem:</b> <i>Water not filling reservoir</i> <i>Water overflowing reservoir</i> <i>System not heating</i>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Float rod	Binding
Limit switches	Not connected Dislocated
Torpedo cam	Slipped
Float	Dirty or jammed (clean) Missing ball
7-day clock	Incorrect setting
Clock override	Not ON

**Fig. 6 - 16: Troubleshooting: Water Not Filling Reservoir, or Water Overflowing Reservoir, or System Not Heating**

## 10. Door Limit Switch

Use procedures in chapters "Installation," "Advanced Operations: Process-Control," or "Maintenance" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

This section contains tables on the following problems:

- Washer will not start

<b>Problem: Washer will not start</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Door limit switch (does not activate) contacts	Door not closed Loose bolts (switch has slipped from mounting) Door tab not closing against switch (bend tab toward switch to make contact) Door limit switch is interlocked with start circuit. To reset start circuit, washer door must be opened and closed so start circuit detects door limit switch transfer indicating proper operation.

**Fig. 6 - 17: Troubleshooting: Washer Will Not Start**

## 11. Rinse System

Use procedures in chapters "*Installation*," "*Advanced Operations: Process-Control*," or "*Maintenance*" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

This section contains tables on the following problems:

- No rinse cycle

<b>Problem: No rinse cycle</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Rinse timer	Not set above "0"
Steam-exhaust fan	Not operating
Rinse solenoid	Not energizing
Power	Not ON
Float assembly	(see section " <i>Solution-Level Control System</i> ")
Wash-cycle timer	Cycle times too short to allow evaporation -- no makeup water needed (so no rinse cycle is possible)
Supply/Discharge hoses	Deteriorated
	Leaking
Nozzles	Clogged
Gauge reading	Water turned OFF
Regulator	Adjusted too low (adjust to higher pressure)

**Fig. 6 - 18: Troubleshooting: No Rinse Cycle**



## 12. Automatic Steam Exhaust (ASE)

Use procedures in chapters "Installation," "Advanced Operations: Process-Control," or "Maintenance" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

This section contains tables on the following problems:

- ASE will not operate
- ASE leaks liquid

<b>Problem: ASE will not operate</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Wires	Not tight enough
Fuses	Blown
Blower fan	Wheel off shaft Corroded
ASE motor	Not operating - overload tripped
Piping	Clogged Collapsed
ASE timer	Not set above "0"

**Fig. 6 - 19: Troubleshooting: ASE Will Not Operate**

<b>Problem: ASE leaks liquid</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Flapper	Not letting steam exhaust
Piping	Clogged
Installation	Not done properly (re-read chapter "Installation")
Motor	Too small for work environment/conditions
Rain cap	Missing (and required for your configuration)

**Fig. 6 - 20: Troubleshooting: ASE Leaks Liquid**

## 13. Electrical Control System

Use procedures in chapters "*Installation*," "*Advanced Operations: Process-Control*," or "*Maintenance*" to correct a problem after you have diagnosed it.

Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

**CAUTION!** Always turn the main power supply OFF before working on the electrical control system.

**NOTE:** Use your electrical schematics to work on the electrical control system.

**NOTE:** If a part or assembly on the power washer will not work, check the "probable cause" electrical components given below.

<b>Problem: Electrical control system</b>	
<b>Check This:</b>	<b>Probable Cause(s)</b>
Overload(s)	Need to be reset
Relay(s)	Need to be tightened or replaced
Fuse(s)	Need to be replaced
Timer(s)	Need to be tightened
	Need to be reset

**Fig. 6 - 21: Troubleshooting: Electrical Control System**

Also be sure to check:

- Facility fuses - If defective, replace
- Source voltage - If OFF, turn ON