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 Chapter 2, *"Installation",* Chapter 4, *"Advanced Operations: Process-Control" ,*or Chapter 5, *"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 of this manual
- 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! <u>NEVER</u> 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.

Problem:	***Washer will not start***
Check This:	**Probable Cause(s)**
APE pressure switch (obsolete as of Sept, 2016)	Misadjusted/Failed Insufficient compressed-air supply Air Pressure too low
Clock override	Set to *OFF* (must be *ON or set to By-Pass*)
7-day clock	Not programmed; program 1 must be *ON*
Compressed-air supply	Shut-off Disconnected Air Pressure too low Quick disconnect air fittings restricting flow
Door	Not closed 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.
Door limit switch	Trip-tab is not closing the switch (adjust)
Power	No power to machine, disconnect off, main fuses or circuit breaker tripped.
Water Level	Water is shut off, water level too low

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.

Problem:	***Ineffective cleaning of parts***
Check This:	**Probable Cause(s)**
PBM	Linkage not connected or broken Not rotating, swivel locked-up, motor burned-out Manifold crank arm slipping on Shaft (Tighten) (Note: for older washers an updated crank arm is available to prevent slippage
Turntable sprocket drive	Turntable not rotating Shafts not spinning (watch during wash cycle, or "jog")
Nozzles	Clogged or worn, not aligned properly
Pumps	Not operating (see *"Wash Pump System"* below) Unusual sounds (cavitation, see Fig. 6-8 Low amperage
Temperature	Incorrect for chemical being used – too low (raise)
Chemical concentration	Incorrect (run a titration test) Too low (increase concentration)
Parts Position	Poor positioning of parts (re-position – align dirtiest parts toward vertical manifold blast)
Time	Wash cycle too short (increase)

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

Problem:	***Wash pump motor won't start***
Check This:	**Probable Cause(s)**
Power	Not *ON*
Motor Starter	Overload tripped (reset it)
Voltage	Too low
Fuses	Blown (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

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

Fig. 6 - 4: Troubleshooting: Wash Pump Surges

Problem:	***Wash pump fails to deliver solution***
Check This:	**Probable Cause(s)**
Pump impeller	Partially clogged or loose
Pump suction	Partially clogged (clean suction filter)
Motor	Incorrect [counterclockwise] rotation
Motor Coupling	Broken coupling or spider damaged (replace)
Reservoir	Low solution level (check float assembly & solenoid)
Nozzles	Clogged
Manifold	Piping Disconnected or broken

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

Problem:	***Wash pump motor trips overload -- high amperage reading***
Check This:	**Probable Cause(s)**
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 gravity Chemical reaction with contaminates (jelling)
Nozzles	Missing or excessively worn (replace) Incorrect number of nozzles.
Manifold Piping	Leaking (clean-out plugs are missing or loose) 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

Problem:	***Seal leakage at wash pump mounting plate***
Check This:	**Probable Cause(s)**
Pump	Mechanical defects: Throttle bushing failure Seal failed
Shaft	Shaft-slinger failure

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

Problem:	***Wash pump or motor vibrates or is noisy***
Check This:	**Probable Cause(s)**
Pump or motor	Bearings: Need lubrication Need to be replaced Damaged
Pump	Throttle bushing failure, impeller failure Impeller unbalanced due to foreign object –bolt or rock or other object jammed in impeller
Pump Shaft	Shaft bent or broken
Pump & motor	Coupling: Loose/dropped Wearing out Spider damaged – worn out
Pump	Impeller: Loose Damaged Bearings –failed Pump is running backwards- verify CW looking down
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)

StingRay Electric Heating System

Problem:	***Water does not heat (gas/oil burner does not ignite)***
Check This:	**Probable Cause(s)**
Gas burner	Check for 120 volts at burner Not burning enough fuel - Check for gas at specified pressures
Blower motor not running	Check for fan obstruction (blower motor must be running)
No ignition	Flameproving rods Corroded (replace) Igniter rods Corroded (replace) Burner controller defective (replace)
Poor combustion	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
Hi-Limit	Hi-Limit tripped. Check for overtemp condition. Reset Hi-Limit controller. If problem continues contact StingRay Immediately.
Temperature controller	Not set high enough to call for heat. (Increase temp) Loose wires. (tighten). Thermocouple (sensor) not functioning. (Replace) Thermocouple wires backwards, incorrect wire type Controller failed
Reservoir	Low solution level (check float assembly and solenoid)
Float assembly	Not working (clean assembly) Cam slipped, limit switch failed (verify relays trip)
7-day clock	Incorrect setting

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

Problem:	***Water does not heat (steam)***
Check This:	**Probable Cause(s)**
Steam System	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
Temperature controller	Not set high enough to call for heat. (Increase temp) Loose wires, (tighten). Thermocouple (sensor) not functioning. (Replace)
Reservoir	Low solution level (check float assembly & solenoid)
Float assembly	Not working (clean assembly)
7-day clock	Incorrect setting

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

Problem:	***Water does not heat (electric)***
Check This:	**Probable Cause(s)**
Electric heaters	Defective element. (Replace) Defective wires, (loose, burned) Check for voltage Check for proper amperage Blown fuse. (Replace)
Temperature controller	Not set high enough to call for heat. (Increase temp) Loose wires, Tighten Thermocouple (sensor) not functioning. (Replace)
Reservoir	Low solution level (check float assembly & solenoid)
Float assembly	Not working (clean assembly)
7-day clock	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. If probe is positioned properly, refer to temperature controller instructions for increasing the hysteresis.

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

Problem:	***Turntable does not rotate***
Check This:	**Probable Cause(s)**
Drive-gear motor	Not operating
Fuse/ overload	Blown/tripped
Slip clutch	Not operating – slipping- clutch plate worn or loose Turntable bearing jammed or failed Turntable bearings tight (grease)
Jack shaft	Not turning (not driven)
Sprocket	Not engaging table teeth (check with door open and "jog") Not lined up
Turntable	Not rotating freely: Defective bearings Loose bearings
Load on table	Shifted, and is causing imbalance or jam
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.

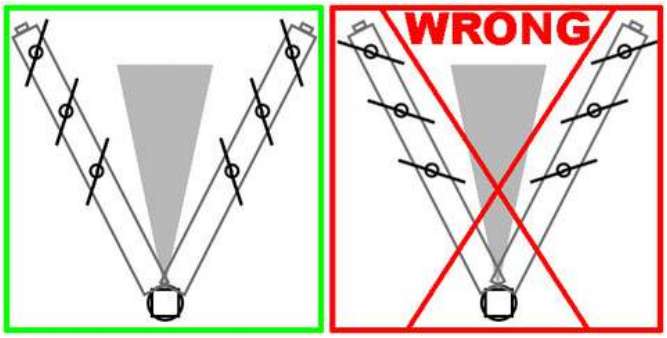
Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

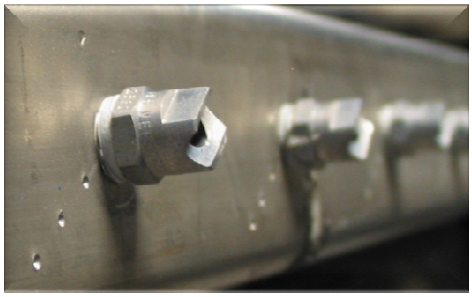
This section contains tables on the following problems:

- Nozzles: ineffective cleaning

Problem:	***Nozzles -- Ineffective cleaning***
Check This:	**Probable Cause(s)**
Nozzles	Missing
	Nozzles plugged—inspect and clean
	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

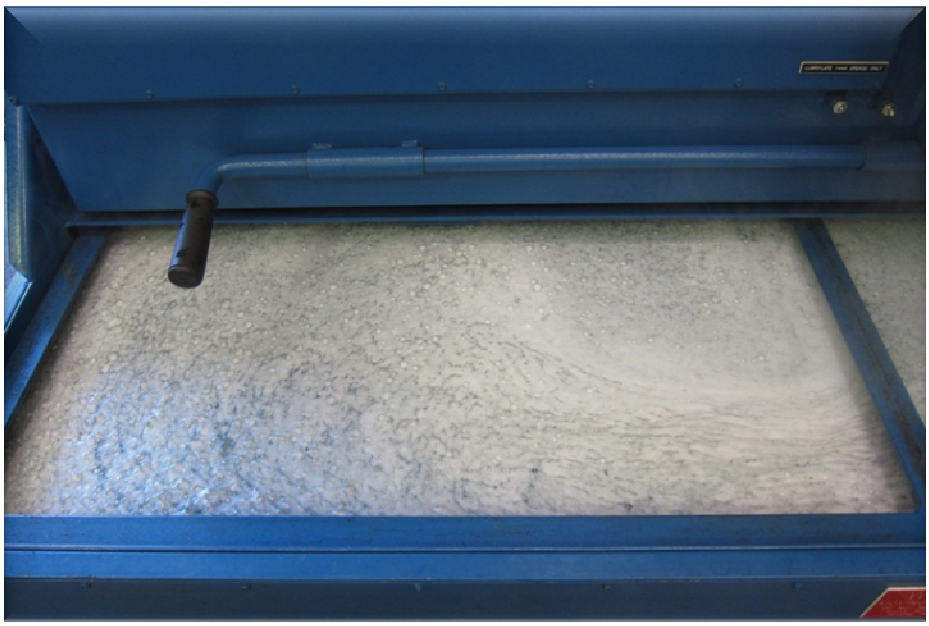
Use procedures in chapters *"Installation", "Advanced Operations: Process-Control",* or *"Maintenance"* to correct a problem after you have diagnosed it.

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

NOTE: Visit support website for foaming trouble-shooter

Problem:	***Foaming***
Check This:	**Probable Cause(s)**
Operating temperature	Too low (raise temperature)
Chemical	Concentration: Wrong type of chemical Concentration too low Visit www.StingRayService.com for additional information
Defoamant	Not enough (add some defoamer 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.

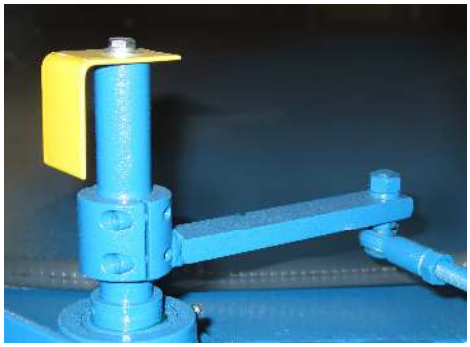
Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

This section contains tables on the following problems:

- PBM not oscillating

Problem:	***PBM not oscillating***
Check This:	**Probable Cause(s)**
Linkage	Not connected
	Out of adjustment
	Loose – slipping on shaft
	Not connected to shaft
	Broken (replace)
Bearings	Failed
Swivel	Not properly adjusted
	Not lubricated
	Not moving freely
	Wore out (replace)
PBM gear motor	Not rotating (check wires/fuses/overload tripped)
	Motor failed (replace)
PBM mounting plate	Motor not securely attached to it
PBM Arms	Not adjusted properly- hitting wall (adjust)
	Parts jamming under turntable (remove parts)

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

Problem:	***Water not filling reservoir*** ***Water overflowing reservoir*** ***System not heating***
Check This:	**Probable Cause(s)**
Float rod	Binding
Limit switches	Not connected
	Dislocated
	Failed (replace)
Torpedo cam	Slipped
Float	Dirty or jammed (clean)
	Missing ball
7-day clock	Incorrect setting
Clock override	Not set to *ON or By-Pass*
Solenoid valves	Clogged
	Failed (replace)
Water Strainer	Clogged
Water Supply	Off (turn on water)

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.

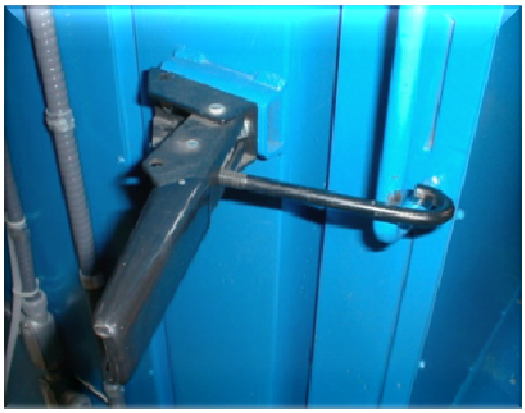
Or, refer to your vendor-supplied manuals or cut sheets for instructions on correcting problems.

This section contains tables on the following problems:

- Washer will not start

Problem:	***Washer will not start***
Check This:	**Probable Cause(s)**
Door limit switch (does not activate)	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 contacts transfer indicating proper operation. Switch failed (replace) Activation tab broken or jammed

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

Problem:	***No rinse cycle***
Check This:	**Probable Cause(s)**
Rinse timer	Not set above "0"
Steam-exhaust fan	Not operating
Rinse solenoid	Not energizing
	Failed (replace)
	Clogged
Power	Not *ON*
Float assembly	(see section *"Solution-Level Control System"*)
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

Problem:	***ASE will not operate***
Check This:	**Probable Cause(s)**
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

Problem:	***ASE leaks liquid***
Check This:	**Probable Cause(s)**
Piping	Clogged
Installation	Not done properly (re-read chapter *"Installation"*)
Motor	Too small for work environment/conditions
	Not positioned properly (see *"Installation")*
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.

This section contains tables on the following problems:

- Electrical control system failure

> ***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.

Problem:	***Electrical control system failure***
Check This:	**Probable Cause(s)**
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 Failure

Also be sure to check:

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