

Power System: Gasoline or Diesel Driven

Problem	Probable Cause	Remedy
Engine will not start or crank over.	Battery dead.	Charge or replace battery, add electrolyte if battery is new
	Dirty Battery Contacts	Clean connections
	Battery cables disconnected	Connect or replace damaged cables.
	Engine, pump, or gearbox is seized.	Identify, Replace or repair seized part.
	Key switch, solenoid or starter on engine defective.	Repair or replace faulty component.
Engine will not start but will crank over	Engine power switch is off or defective.	Check engine power switch.
	Low oil shut down is activated.	Add oil to engine, check more frequently.
	Low on fuel.	Fill with the appropriate fuel, bleed injector pump on diesel engines.
	Fuel filter is clogged.	Replace or clean fuel filter, bleed injector pump on diesel engines.
	Engine flooded or starved.	Choke only as required (not applicable to diesels).
Engine bogs down under load, whenever spray gun is triggered.	Engine needs to be repaired or replaced.	See engine manual or engine dealer.
	Operating in high elevation.	Lower the pressure on the unit and check for correct engine speed (RPM).
	Carbon deposits on cylinder head.	Remove head and clean off deposits.

Power System: Electric Driven

Problem	Probable Cause	Remedy
Electric motor does not start.	No electric power.	Check cord, plug, socket, and breaker.
	Thermal overload in the motor/or starter has been tripped.	Reset manual overload by depressing the thermal switch on the outside of the motor or starter after the motor has cooled. CAUTION! Automatic overload will restart the motor automatically when it has cooled.
	Power switch inoperative.	Check power switch.
	Electric motor or wiring failure.	Replace or repair motor and/or wiring.
	No water pressure at inlet	Connect to appropriate water supply
Machine will not auto-start (if equipped)	Must have adequate water supply	25 psi minimum
	Coil scale build up	Descale coil for better water flow.
	Check filter screen and inlet pressure	Remove spray nozzle and pull trigger gun to check auto-start function.
	Inlet flow switch defective or jammed with debris	Check mechanical function and electrical signal to relay by testing for continuity on #2 and #4 of the time delay. If no continuity with the trigger pulled replace inlet flow switch. If continuity is present, remove wires from #1 and #5 of the time delay relay and make connection between the two wires and test the machine. If the machine works replace the time delay relay. If machine does not work check and replace the contactor or motor starter.

Pumping System

Problem

Probable Cause

Remedy

Trigger gun leaks or will not shut off.

Debris in gun valve assembly.

Clean valve assembly or replace gun.

Pump runs but there is no spray pressure.

Water turned off.

Turn water on.

Nozzle is plugged.

Clean or replace with proper size.

Inlet chemical injection valve is open, without the end of the pickup tube inserted into detergent.

Close soap valve or submerge detergent pickup tube into solution.

Coil on hot water machines is obstructed.

Clean obstruction or scale deposits from coil with coil cleaner.

Pump dry, needs to be primed.

Crack open fitting on the high pressure outlet of the pump until water flows out.

Pump runs but has low spray pressure.

Nozzle not installed.

Install proper sized nozzle.

Dual wand valve is open.

Dual wand valve must be closed and high pressure nozzle installed.

Leaky discharge hose or quick coupler.

Replace hose, quick coupler, or O-ring in the quick coupler.

Inlet strainer clogged.

Clean and check more frequently.

Worn or wrong size nozzle.

Replace nozzle of proper size.

Belt slippage

Tighten or replace with correct belt.

Unloader valve worn or improperly adjusted.

Install pressure gauge on pump head to adjust pressure. Check valve seat on Unloader.

Air leak in inlet plumbing.

Reseal fittings and inspect inlet hoses for air leaks.

Pump runs but there is erratic, fluctuating pressure.

Inadequate incoming water supply.

Increase water supply flow.

Stuck inlet or discharge valves.

Clean out or replace worn valves

Restricted inlet or air entering the inlet plumbing on the pump.

Check fittings and hose for air tight seal, clean inlet strainer screen.

Leaking H.P. seals.

Replace seals.

	Leaking L.P. seals.	Pressure feed the pump and replace LP seals if water leaks from the pump head.
Excessive crankshaft play or loud, knocking noise in pump.	Broken or worn bearing or connecting rod in crankcase.	Replace pump or bearing.
Oil leaking from pump.	Loose drain plug or damaged seal.	Locate point of oil leakage and replace damaged O-ring or seal.
Inlet injection will not siphon chemical.	Check valve in strainer clogged.	Clean or replace. Rinse after each use.
	Chemical valve not open or clogged.	Open chemical valve or clean.
	Strainer not submerged in solution.	Submerge strainer and replenish chemical.
	Detergent hose cut or kinked	Inspect hose, replace as necessary.
Water is emitted from the chemical pickup tube	Check valve malfunctioning.	Repair or replace check valve.
Downstream injector will not siphon chemical.	Brass knob on injector is closed.	Open by turning counter clockwise.
	Unit not in low pressure mode.	Open dual wand or install low pressure tip.
	Detergent hose cut or kinked.	Inspect hose, replace as required.
	Strainer plugged or not submerged.	Check screen on strainer pickup tube.
	Internal injector parts corroded or stuck.	Disassemble, clean or replace.
	Outlet water temperature too high.	Use with cold water (150° Maximum)
Pressure relief reliving water	Unloader failure / coil overheating / Excessive pressure	Turn machine off wait a few minutes and restart. If problem continues take to an authorized repair center for complete system check.
Burst disk relieving water	Excessive pressure and / or system spikes	Take in to an authorized repair center for a complete system check.

Heating Burner System – Diesel Fired

Problem	Probable Cause	Remedy
Burner will not fire. WARNING: High voltage on igniter can cause electrical shock. Disconnect power before servicing.	Burner switch not on.	Turn switch on; Thermostat on if equipped.
	Diesel fuel level low.	Fill burner tank with #2 diesel or other approved fuel.
	Trigger on spray gun not pulled.	Squeeze trigger to fire burner.
	Fuel filter plugged.	Clean and / or tighten fuel filter. (Check fuel pressure)
	Spray nozzle plugged.	Clean spray nozzle.
	Overload on burner motor tripped.	Reset overload, locate and correct source of overload.
	Nozzle not in wand.	Install nozzle in wand.
	Low water pump pressure.	See pumping systems trouble shooting.
	Fuel pump or nozzle stopped.	Check fuel pressure, filter, fuel lines. Replace fuel pump and/or nozzle.
	Vacuum, Flow, Pressure or Temperature switch faulty.	Check electrical continuity with pump spraying and burner on.
	Fuel solenoid valve faulty.	Replace fuel valve if it does not open when power is applied.
	Low generator voltage output.	Adjust generator RPM for proper voltage under full load conditions.
	Burner relay faulty (12-V Burner only)	Replace burner relay.
Burner will not fire, plus diesel fumes are emitted from the exhaust port. WARNING: Replace insulation. Unburned fuel can saturate it and cause a fire.	Fuel to air ratio out of adjustment.	Set air band and fuel pressure to specs.
	Fuel nozzle partially clogged.	Replace nozzle of proper size.
	Ignition transformer not providing spark to fuel.	Replace ignition transformer, clean and adjust electrodes.
Burner fires and smokes.	Fuel to air ratio out of adjustment.	Set air band and fuel pressure to specs.
	Excessive soot on coils.	Clean soot off to improve air flow.

	Improper voltage at burner	Adjust RPM of generator (if equipped)
Discharge water temperature exceeds recommended operating temperature.	Burner input too high for conditions.	Decrease fuel pump pressure and/or fuel nozzle size.
	Water flow restricted.	Clean or replace nozzle of proper size. Descale coil and clear obstructions.
	High temperature limit switch faulty or set too high.	Replace or reset temperature limit switch.
Burner continues to fire even when trigger on spray gun is released	Faulty Flow, Pressure or Vacuum switch.	Replace switch.
	Faulty fuel solenoid	Replace solenoid
Discharge water temperature not reaching maximum operating temperature.	Burner input too low for conditions	Increase fuel pump pressure and/or fuel nozzle size.
Battery keeps losing voltage. (For 12 volt burner systems)	Battery voltage Low.	Have battery checked and load test, charge if low and replace if necessary. Allow water to cool 2 min. before shutting off engine.
	RPM too low.	Engine RPM should be 3600 RPM w/no load.
	Engine charging system faulty.	Check engine charging system – Must have 16 Amp output.
	Electrodes misadjusted	Adjust electrodes to maximum 1/8" gap.
	Fuel pump pressure too high.	Fuel pump pressure should be approximately 100 to 110 PSI.
	Air band open too far.	Adjust for proper burn.
	Burner amp draw too high.	Check amp draw of burner motor – should be 13 amp or less. Check amp draw of transformer should be 4.2 or less.

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	Diesel fuel level low.	Fill burner tank with #2 diesel or other approved fuel.
	Trigger on spray gun not pulled.	Squeeze trigger to fire burner.
	Fuel filter plugged.	Clean and / or tighten fuel filter. (Check fuel pressure)
	Spray nozzle plugged.	Clean spray nozzle.
	Overload on burner motor tripped.	Reset overload, locate and correct source of overload.
	Nozzle not in wand.	Install nozzle in wand.
	Low water pump pressure.	See pumping systems trouble shooting.
	Fuel pump or nozzle stopped.	Check fuel pressure, filter, fuel lines. Replace fuel pump and/or nozzle.
	Vacuum, Flow, Pressure or Temperature switch faulty.	Check electrical continuity with pump spraying and burner on.
Fuel solenoid valve faulty.	Replace fuel valve if it does not open when power is applied.	
Low generator voltage output.	Adjust generator RPM for proper voltage under full load conditions.	
Burner relay faulty (12-V Burner only)	Replace burner relay.	
<p>Burner will not fire, plus diesel fumes are emitted from the exhaust port. WARNING: Replace insulation. Unburned fuel can saturate it and cause a fire.</p>	Fuel to air ratio out of adjustment.	Set air band and fuel pressure to specs.
	Fuel nozzle partially clogged.	Replace nozzle of proper size.
	Ignition transformer not providing spark to fuel.	Replace ignition transformer, clean and adjust electrodes.
<p>Burner fires and smokes.</p>	Fuel to air ratio out of adjustment.	Set air band and fuel pressure to specs.
	Excessive soot on coils.	Clean soot off to improve air flow.

Heating/Burner System – Natural Gas or Liquid Propane Fired

Problem

Probable Cause

Remedy

Pilot will not light, burner will not fire.	Burner switch not on.	Turn switch on.
	Trigger not pulled.	Pull trigger. Burner should fire <u>only</u> when trigger is pulled.
	Gas valve turned off.	Turn gas valve on.
	No voltage to valve.	Check for 24 VAC between pilot valve(PV) and PV/MV. Valve will operate between 20.5 and 28.5 VAC.
	Pilot orifice plugged.	Remove orifice & clean.
	Defective ignition module.	Check for 24 VAC incoming @ 24v & 24v ground. (If you get voltage to module, but not through module, replace.)
	Defective transformer	Check for 24v output. If no voltage, replace.
	Defective flow switch.	Replace.
	Defective thermostat.	Replace.
	Faulty rocker switch.	Replace.
Pilot lights, but burner will not fire.	Igniter not working.	Test for spark. Test for continuity between ignition wire and ground. WARNING: High voltage igniter can cause electrical shock.
	Check for 24 VAC between main valve (MV) and PV/MV.	If no VAC @ valve, replace module. If you get voltage, replace valve.
Burner fires, but goes out.	Check for continuity between ignition cable and ground wire.	Assure good ground.
	Faulty ignition module.	Replace module.
	Excess draft.	Protect from windy conditions.
NG or LP odor is present. WARNING: Check all NG / LP connections with soap solution before operation.	Gas leak ahead of valve.	Turn gas off. Call gas supplier.
	Lockout not working.	Replace module.
	Valve stuck.	Turn main gas valve off. Replace valve.

	Improper voltage at burner	Adjust RPM of generator (if equipped)
Discharge water temperature exceeds recommended operating temperature.	Burner input too high for conditions.	Decrease fuel pump pressure and/or fuel nozzle size.
	Water flow restricted.	Clean or replace nozzle of proper size. Descale coil and clear obstructions.
	High temperature limit switch faulty or set too high.	Replace or reset temperature limit switch.
Burner continues to fire even when trigger on spray gun is released	Faulty Flow, Pressure or Vacuum switch.	Replace switch.
	Faulty fuel solenoid	Replace solenoid
Discharge water temperature not reaching maximum operating temperature.	Burner input too low for conditions	Increase fuel pump pressure and/or fuel nozzle size.
Battery keeps losing voltage. (For 12 volt burner systems)	Battery voltage Low.	Have battery checked and load test, charge if low and replace if necessary. Allow water to cool 2 min. before shutting off engine.
	RPM too low.	Engine RPM should be 3600 RPM w/no load.
	Engine charging system faulty.	Check engine charging system – Must have 16 Amp output.
	Electrodes misadjusted	Adjust electrodes to maximum 1/8" gap.
	Fuel pump pressure too high.	Fuel pump pressure should be approximately 100 to 110 PSI.
	Air band open too far.	Adjust for proper burn.
	Burner amp draw too high.	Check amp draw of burner motor – should be 13 amp or less. Check amp draw of transformer should be 4.2 or less.

Valve stuck.

Turn main gas valve off. Replace valve.

Discharge water temperature to high.

Faulty thermostat.

Replace.

Water restriction.

Clean or replace spray nozzle, descale coil, remove obstructions.

Incoming gas pressure to high.

Lower gas pressure.

Discharge water temperature not reaching maximum operating temperature.

Worn spray nozzle.

Replace spray nozzle with proper size.

Gas pressure too low.

Increase gas pressure or install additional jets.

Draft under burner manifold.

Prevent down draft with installation of down draft diverter. Prevent side draft with nonflammable barrier.

Burner continues to fire even when water is not being sprayed.

Faulty flow switch.

Replace.

Main gas valve stuck open.

Replace main gas valve.

Valve has had water sprayed on it. Has been submerged in water and does not work.

Flood or accidental spraying.

Replace valve: Do not attempt to repair or clean out.

Ignition module has been subjected to water or moisture.

Flood or accidental spraying.

Replace module: Do not attempt to repair.