KS-88 Rack Washer

CINCINNATI

This machine was installed by

_____

(lead installer)

on the day of

_____

(month / day / year).

Serial #: _____

Customer PO #: _____

Manufacturer SO #: _____

For parts and services, call

ARMOR AFTERMARKET

at

1-800-725-9957

or email partsandservice@armoraftermarket.com

Version 1.07
March, 2025

4600 N. Mason Montgomery Road · Mason, OH 45040
800-677-0076 · Fax: 513-923-5694
www.CinInd.com · sales@CinInd.com
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Dear Valued Customer,

Thank you for your trust in, and relationship with **CINCINNATI INDUSTRIAL MACHINERY**, a division of **THE ARMOR GROUP, INC**. We hope you have many years of uninterrupted service from our product.

If, however, you find you need service, our Spare Parts Department at **ARMOR AFTERMARKET** will be glad to serve you. Some advantages of contacting **ARMOR AFTERMARKET** to fill your replacement parts orders are:

- Being the original manufacturer of this equipment offers simplicity in order replacement.
- We are entitled to original equipment manufacturer discounts, which are passed on to our customers.
- Non-stock items are available for direct shipment.
- It is our primary responsibility to serve you in a timely and professional manner.

Sincerely,

THE ARMOR GROUP, INC

Documentation and Manual Team and The Parts and Service Department

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Warranty

CINCINNATI INDUSTRIAL MACHINERY warranties the machine to be free of defects in material and workmanship for a period of 12 months from shipment. During the warranty period, if parts become defective that are easily replaceable (e.g., heaters, motors, switches, sensors, etc.), these items will be quick shipped for the end user to replace. Component parts are made by reputable manufacturers and carry their respective guarantees. This warranty is valid as long as proper maintenance has been performed and equipment operates under normal design conditions. Cincinnati Industrial Machinery will not assume responsibility for improper installations, start-ups, or training completed by others. As such, the customer assumes all related risks. If the installation, start-up, or training is done by a third-party, and there are issues or damage to the equipment during or after the warranty period that in Cincinnati Industrial Machinery's opinion are due to improper installation, start-up, or training, Cincinnati Industrial Machinery will not be held liable or cover parts or repair under our warranty. While a third-party may have authority to sell Cincinnati Industrial Machinery's equipment, their representation of Cincinnati Industrial Machinery stops after the sale. Customers should contact Cincinnati Industrial Machinery prior to using a third-party to determine if they are certified by Cincinnati Industrial Machinery.

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OVERVIEW

The model KS-88 is an automatic, walk-in type, washers for cleaning pans, bowls, racks, carts, and delivery cabinets. The washer is fully assembled and tested at the factory, then knocked down and crated for shipment and re-assembly at the job site. The machine is designed for installation in a shallow pit. When constructing a pit is not desired, a floor-mounted option with load ramp or a side-mounted tank can be ordered.

The machine subjects work to a recirculating high-pressure spray wash through two rotating spray arms followed by a fresh water rinse. The wash tank is manually filled with cold or hot water which is heated by one of the optional systems: a steam injector, steam heated coils, electric immersion heaters, or a natural gas or propane burner. The wash water temperature is thermostatically controlled.

AVAILABLE OPTIONS

- Rinse water booster heater - electric, gas or steam
- Exhaust fan with controls - factory wired
- Higher capacity pump
- Second door for pass through operation
- Double capacity with two additional wash arms
- Insulated housing
- Carts, racks, and baskets
- Floor-mounted tank and load ramp
- Side-mounted tank
- Auto Drain Valve
- Drain Water Tempering Kit

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Selecting a Location

When selecting the location to install your Alvey KS-88 Rack washer, review the dimension sheets and consider access to the utility requirements. Determine the minimum distance from outside wall or roof to optimize ventilation. Ensure there is ample floor space for maintenance and for storage of cleaned and soiled work. Finally, confirm whether the machine is pit or floor mounted. If pit mounted, ensure that the pit for the tank has been constructed. If floor mounted, confirm that there is sufficient space for the machine loading ramp.

Receiving the Machine

The machine will be received disassembled. The wash chamber and attached equipment have been removed from the tank in preparation for shipment. The panel flanges and tank are match-marked before disassembly of wash chamber.

Wiring is disconnected at junction boxes with leads marked; piping is disconnected at unions. Solenoid coils are slipped off valves and remain attached to conduit assemblies.

Mounting hardware is left attached to studs on cabinet panels. An assembly kit contains an adequate length of sealing strip, tubes of silicone caulk, and sufficient hardware to secure chamber panels.

Examine equipment for agreement with packing slip and dimension sheet. Notify factory immediately concerning any shortages or shipping damage.

Preparation for Assembly

Inspect pit to assure agreement with drawing and dimension print. Examine panels; determine assembled location of each panel by noting match marks and equipment mounting stud locations. Note that flange shape determines order of assembly of panels. Clean flange faces of tank and chamber panels after removing protective paper.

Tank Assembly

Locate tank assembly in desired positions and levels. If unit is suspended on edge of pit by a boundary angle, leveling is not required.

Sealing Strip

Place sealing strip on tank and chamber panel flanges. One strip is required per joint. Avoid door area. Strip is tacky and will remain in place. Applying a liquid soap solution to exposed surface of strip will allow panels to be more easily shifted during bolting. Use silicon caulk at corners where sealing strips join and other areas where leaks might occur.

Chamber Panels

Install chamber panels.

1. After removing door, locate front panel assembly in position on tank.
2. Locate right and left rear corner panels in position on tank. (If washer has pass through option, repeat steps 1 for second door.)
3. Temporarily position rinse manifolds in chamber, before continuing, as they will not easily fit through door.
4. Continue setting the remaining vertical panels in position and loosely bolt.
5. Now place front and rear top panels in position before installing center top panel. Be certain to apply caulk at corners as before. Loosely bolt.
6. Reinstall door into front panel assembly. Align assembly so that door will latch and seal properly; tighten only those bolts holding front assembly to the tank.
7. Align next adjacent panels and tighten bolts attaching them to the front panel assembly. Start at the bottom. Repeat for each successive vertical panel until all are secure. If washer has second door, repeat step 6 for rear panel assembly.
8. Now tighten the remaining bolts holding the vertical panels to tank and to top.
9. Tighten bolts securing top panels to each other.

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Interior Piping

1. Attach interior rinse piping to rinse manifolds at unions and extend threaded nipple through chamber wall. Secure with pipe nuts and rubber and metal washers. Bolt rinse manifold brackets to chamber panel flanges.
2. Screw vertical wash pipes tightly into wash manifold and then bolt spray elbows to wash pipes and chamber flanges.
3. Install wash arms assemblies and align with chamber wall to avoid interference with rinse manifolds and guard rails. Be sure all pipe joints are tight.
4. Install guard rails and verify that they do not interfere with wash arms.

Control Panel

Install control panel and conduit assemblies and attach related wiring.

1. Attach control panel and conduit assemblies to housing with studs and nuts provided. Connect wires at appropriate locations on terminal strip. See wiring diagram.
2. Attach proximity switch 1PROX to bracket by door and associated magnet and bracket to studs provided on door. With pass through option, repeat with second door.
3. Connect flexible conduit to motor (leads IT1, IT2, IT3) and to gas burner (leads 14, 16, 17, 2) (Gas heated tank only.)
4. Attach flexible conduit from float switches to fittings on conduit assembly; connect tagged wires(3, 12). Only washers with electric and gas tank heat have a low-level float and a high-level float.
5. Assemble STEAM HEAT solenoid coil (2, 15) onto steam solenoid valve. (Steam heated tank only.)

Gauge Panels

Install gauge panel and related temperature and pressure probes.

1. Attach panel to chamber on studs provided.
2. Install probe from wash temperature gauge into bracket provided in tank.
3. Install probe from rinse temperature gauge into fitting on external rinse manifold.
4. Install fitting on wash pressure gauge tubing into tapped hole on wash pump.
5. Install capillary tube from temperature control into bracket next to wash temperature probe.

Exterior Piping

Install exterior rinse piping assembly (and booster heater when provided).

1. Place booster heater, when provided, in required position.
2. Attach external rinse piping assembly to nipple extending through chamber wall. Attach rinse solenoid coil to valve on piping assembly with clips provided.
3. Steam booster heater option - Attach water inlet, steam inlet and condensate piping assemblies to booster heater. Attach rinse booster solenoid coil to steam valve. Attach piping assembly between booster and external rinse manifold.
4. Electric and gas booster heater option - Attach piping assembly between booster and external rinse manifold.
5. Verify that all rinse water and steam connections are tight.
6. Pressure regulation of gas, steam, and water utilities is required for proper operation of this equipment. Pressure regulators are not included and are the customer's responsibility to provide to ensure the above specified operating pressures and ranges are maintained.

Exhaust Fan

Install exhaust fan and draft inducer. Position fan assembly and attach with gasket and hardware provided. Draft inducer must be installed in exhaust stack above draft hood by customer. Connect the flexible conduit provided to each motor and attach leads.

Caulk

Caulk cabinet and trim sealing strip. Caulk around base of machine between tank and floor and between tank and cabinet. After initial start up, caulk as required, to eliminate leaks. The sealing strip used at housing seams will tend to extrude out during the first few weeks of service. This can be trimmed back with a utility knife.

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Service Connections

TANK WATER FILL
Connect cold water line to 1" ball valve on side of washer.

FRESH WATER RINSE
Connect 1" hot water line to strainer on rinse water manifold. The rinse flow rate is controlled by the quantity and size of rinse nozzles. See dimension sheet for rated flow. Recommended rinse temperature: 180 – 195° F.

When optional booster heater is provided, connect hot water line directly to booster. Consult dimension prints for size and location of connection. Both the electric and gas boosters come complete with pressure regulators.

DRAIN
Note *To maintain a consistent rise flow rate, install pressure regulator and adjust for 20 PSI.*

Provide pit with a 3" minimum drain located to allow access when washer is in position. Tank drain and overflow empty into pit.

With floor mounted machine, a common 2" outlet for tank and overflow is provided for direct connection to customers drain line. Use union or flanged connection to allow washer to be easily disconnected.

STEAM SERVICE—STEAM HEATED TANK
Connect service to steam inlet valve. Minimum operating pressure is 10 PSI. Maximum operating pressure is 40 PSI. When steam grid coil heat is supplied, a $^{3}/_{4}$" condensate return line is required.

STEAM SERVICE—BOOSTER HEATER
Note *If there is backpressure in the condensate return line, install a check valve after steam trap for satisfactory performance of the steam coil.*

Connect 1-$^{1}/_{2}$" line with 10-15 PSI pressure to the valve on booster inlet. A $^{3}/_{4}$" condensate return line is required.

Note *High booster steam pressure will cause an excessive amount of rinse water to flash into steam. Install a steam pressure regulator to control the rinse temperature.*

GAS SERVICE
Connect 1-$^{1}/_{4}$" gas line with manual shut off valve and drip leg to burner inlet of gas heated washers. Make a similar connection to gas booster heater when provided. Consult dimension prints for line size.

FIRE TUBE EXHAUST—GAS HEATED TANK
Connect 8" dia. stack and draft hood to 6 5/8" outside diameter burner exhaust tube. The stack should have no horizontal run; stack sections should be lapped in the direction of flow. It may be advisable to install damper in exhaust stack to control draft.

Note A draft inducer will be required under any of the following conditions:
- Building is under negative pressure
- Outside air currents produce down drafts
- Exhaust stack design causes excessive restriction
- Required by local codes

Caution *Stack temperature can exceed 600° F. Selection of proper material is the customer's responsibility.*

VENTILATION
Use 15" inside diameter watertight duct with inside lapping of joints in direction of flow. Use gasket between fan and washer housing to prevent condensate from seeping.

ELECTRICAL—WASHER
Connect outside power line to L-1, L-2 and L-3 on the terminal block in the control panel. A fused disconnect must be provided within sight of washer to prevent danger of shock. See dimension sheet for power requirements.

ELECTRICAL—GAS & ELECTRICAL BOOSTER HEATERS
A separate power line with a fused safety switch must be provided for gas and electric booster heaters. See dimension sheet for power requirements. See booster heater installation and operating manual enclosed.

Note *Do not obstruct loading area with service connections.*

Local sales or factory representative will assist in initial start up unless otherwise stated in order.

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Tank Preparation

1. Remove grip strut walkway from inside of machine. Open drain valve. Remove filter and pump protection screens.
2. Flush out tank and inside walls, preferably with high-pressure hose, to remove contaminants, which may remain from fabrication, shipment, or installation. With subsequent cleaning, after washer operation, care must be taken to clean float switches, heating elements, tank corners, and pump compartment.
3. When cleaning is completed, close drain and replace screens and walkway.
4. To fill tank open manual valve and allow water to rise to the overflow level. If option included on washer, press AUTOMATIC WATER FILL button on the control panel.

Note During first week of operation, closely inspect spray nozzles and hub assemblies for debris which may have collected. Clean as per IX.B.

Rotation of Motors

On initial start-up, check rotation of all motors.

Activating Tank Heat Assembly

1. Verify that tank is filled. Low level cutoff float, provided with gas and electric heat, will prevent tank heat from being activated when water is low.
2. Set desired wash temperature 150° F.
3. Turn on power to washer at disconnect switch.
4. Steam Heat - Open manual steam valve; turn control panel heat switch to ON.
5. Electric Heat-Turn control panel HEAT switch to on.

Note Gas burner delay timer (1TR) in control panel prevents buildup of fumes in burner prior to ignition. Timer is preset at five seconds.

6. Gas Heat
   a. Open manual gas valve and turn combination gas valve to ON.
   b. Turn control panel heat switch to ON.
   c. Burner is automatically lit. The draft inducer will be energized.
   d. A damper in exhaust stack should be used to control the amount of draft.

Note We recommend adjustments to the burner be made by your local gas company or a reputable service company.

Caution Shut off power at the disconnect before opening the control panel.

Rinse Water Temperature Control

When hot water is supplied directly to the washer rinse manifold, customer's heater must be adjusted to provide the desired temperature on the rinse temperature gauge in the control panel.

The electric and gas booster heaters are thermostatically controlled and preset at time of manufacture to provide a (180°-195° F) rinse. Consult the respective operating manual enclosed.

The steam booster heater is sized to provide a (180°-195° F) rinse at rated flow and pressure when supplied with 10-15 PSI. of steam. See General Assembly drawings. Further temperature adjustment can be made by use of a steam pressure regulator.

The booster must be supplied with 120° F water.

Detergent

When the wash water reaches operating temperature, add desired amount of cleaning compound. Consult chemical supplier for recommendations.

Use of an automatic detergent dispenser is recommended. To insure economical use of the compounds, sensing probes must be kept clean of any foreign matter. If in powder form, pour detergent into wash tank, close door, and run wash cycle until compound has been dissolved. Avoid rinse cycle to prevent unnecessary dilution. Consult chemical supplier for equipment recommendations.

Important For satisfactory cleaning the proper detergent must be used.

Note Cleaning compound should be the non-foaming type, and not contain substances that will react with copper or aluminum.

Note See note on electrical diagram for soap dispenser hookup.

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Sequence of Operation

A. Turn on power at disconnect switch. Electric or gas booster will be connected to a disconnect separate from washer

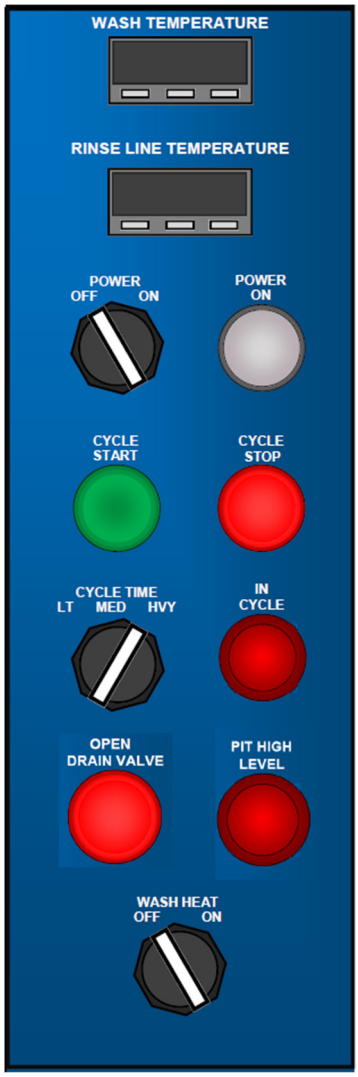
B. Fill the tank, open manual valve and proceed as follows:

1. Close door. Door switch (1prox) signals the programmable relay (1RLY).
2. The tank fill solenoid (1SOL) will energize.
3. When correct water level is reached, high level cutoff float (1FS) will de-energize (4SOL).

C. Machine Operation - Wash & Rinse

1. Check temperatures of wash and rinse water.
2. Load machine and close door. All items should be placed in racks or baskets and positioned so that soiled side is exposed to spray. Items of similar size should be washed together.
3. Press the CYCLE START pushbutton. A wash time of 2-7 minutes is selected by turning the Cycle Time selector switch on operator's station to LT(2 Minutes), MED(5 Minutes) or HVY(7 Minutes). The wash timer and wash pump motor (1M), and red light will be energized. When the wash timer completes its cycle, a 30 second Dwell Cycle begins. At the end of the Dwell Cycle the rinse timer and rinse water solenoid valve (1SOL) will then be energized. When steam booster is provided, booster solenoid valve (2SOL) will also be energized. When the rinse timer completes its cycle the valve or valves are de-energized a 30 second Exhaust Cycle begins. If the door is opened during operation of wash pump or rinse cycle, these systems will be de-energized.

D. Exhaust Fan - When door is opened, exhaust fan (2M) will energize. The exhaust fan will continue to run either until the door is closed or the exhaust fan shutdown timer times out.



Note *When washer is connected to central exhaust system, means must be provided to prevent the exhaust of moist air during the operation of the washer.*

Note *When the machine is in operation, the exhaust fan may generate a negative vacuum inside the washer. This may prevent the door from being opened in mid-cycle. Do not open the door in mid-cycle without first shutting down the machine.*

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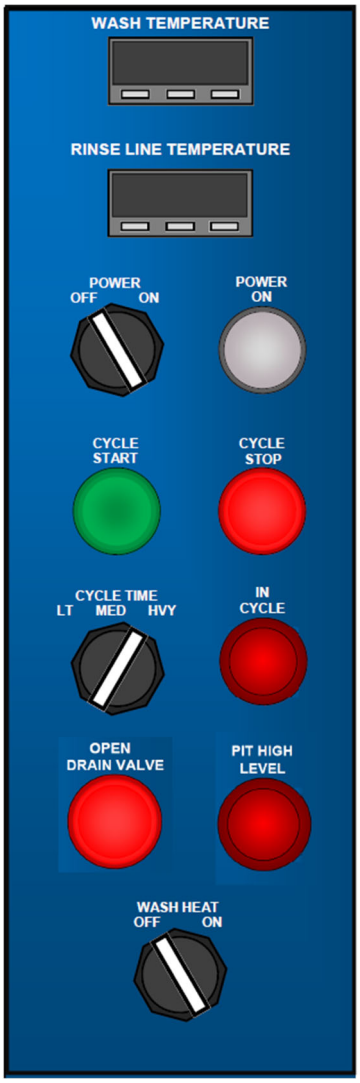

1. Turn on power.

2. Fill tank.
A. Open manual valve.
B. Allow water to rise to overflow level.
C. Close door.
D. Allow wash tank water temperature to reach set point (150° F min).

3. Load Machine.

4. Close door.

5. Select Wash Time.

6. Press 'CYCLE START' button.

1. Encienda la alimentación.

2. Llene el tanque.
a. Abra la válvula manual.
b. Levante el agua para alcanzar el nivel de desbordamiento.
c. Cierre la puerta.

3. Coloque los platos sucios en la máquina.

4. Cierre la puerta.

5. Seleccione el tiempo de lavado.

6. Presione el boton "Cycle Start".

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Shut-Down

A. Turn heat switch to OFF.

B. Drain machine completely. Open 2” drain valve manually or press the “OPENDRAIN VALVE” button at control panel. (If “Auto Drain feature was provided). After the tank is drained. The “POWER” selector switch needs to be turned “Off” to close the actuated drain valve.

C. Remove the filter and pump protection screens; flush tank and inside walls with water. Clean sludge and scale from the heating system and float switches. The drain valve should remain open during this step.

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PUMP

Your Alvey Pan Washer is equipped with a vertical immersion pump without seals. Pump discharge pressure is 35 to 45 PSI. To help prevent pump damage periodically check pump casing for any foreign matter. Grease pump motor every six months. Check direction of rotation after electrical maintenance.

NOZZLE CLEANING AND ADJUSTMENT

1. Poke debris clogging the nozzles back into the spray arm.
2. Remove nozzle at end of spray arm.
3. Close door and run pump for 5 seconds. Debris will be flushed out.
4. Replace nozzle.

CLEANING OF HUB ASSEMBLIES

Remove spray arm assembly and flush out bearing with clean water. Rotate by hand until hub moves freely.

Note When nozzles are removed, care must be taken to adjust them to their original position when replacing. See sketch.

OPTIONAL EXHAUST FAN

The exhaust fan removes steam vapors from cabinet when door is open. Two types of fans can be furnished: a squirrel cage and a tube axial type. The squirrel cage fan is equipped with sealed bearings, which will not need grease. The tube axial fan bearings should be greased at regular intervals. See fan operating and maintenance instructions included with this manual.

OPTIONAL RINSE WATER BOOSTER HEATERS

The booster heater raises the water temperature to meet sanitation requirements for rinsing (180° - 195° F). Each booster has been designed and selected to operate on specific pressures, temperatures and volumes. Operating conditions must be known at time of order to assure a booster is selected that will give satisfactory performance.

PERIODIC SERVICE AND MAINTENANCE

1. Check filter screens twice daily. Check more frequently with heavy cleaning load.
2. Check wash nozzles for clogging twice daily. This can done at noon break and after shut down.
3. Check twice daily to see that spray hubs turn freely.
4. Drain solution from the tank and flush at least once daily.
5. Keep washer exterior free from an accumulation of items, which may block air circulation to pump. The exterior appearance may be maintained by wiping with a damp cloth. Stainless steel wax or polish may be applied if desired.

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Wash Pump

PROBLEM	DIAGNOSIS
Low Pressure	Pump is running backwards.
	Nozzles missing.
	Leak in discharge piping.
	Faulty pressure gauge.
	Excessive soap suds.
	Pump suction clogged.
High Pressure	Clogged nozzles or discharge piping.
	Faulty pressure gauge.
Pump Vibration	Worn impeller.
	Worn wear ring.
	Bent shaft.
	Clogged impeller.
Pump not starting (‘In Cycle’ light flashing)	Circuit breaker is tripped.

Wash Motor

PROBLEM	DIAGNOSIS
Motor overheating.	Low voltage.
	High current draw - missing spray nozzles.
	Faulty motor or motor cooling fan.
	Motor running backwards.
Motor vibration.	Bent shaft.
	Worn bearings.
Motor will not start.	Blown fuse on transformer secondary.
	Overload has dropped out.
	Faulty door switch—door not fully closed.
	Faulty programmable relay.

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Spinning Arm Assembly

PROBLEM	DIAGNOSIS
Arms will not turn.	Foreign materials in hub assembly.
	Interference with guard rails.
Excessive play in arm.	Worn bushing in hub assembly.

Rinse

PROBLEM	DIAGNOSIS
Will not shut off.	Faulty programmable relay.
	Dirty rinse valve (piston sticking open).
Will not turn on.	Faulty programmable relay.
	Dirty rinse valve (piston sticking closed).
	Faulty valve coil.
Excessive water vapor.	Water temperature too high.
Rinse temperature too low.	Water pressure/flow too high.
	Inlet water temperature too low—does not match design conditions.
	Gas/Electric booster—temperature controller improperly adjusted.
	Steam Booster—low steam pressure.
	Steam Booster—clogged strainer.
	Steam Booster—back pressure in condensate line.
	Steam Booster—faulty steam trap.

Exhaust Fan / Motor

PROBLEM	DIAGNOSIS
Fan/motor vibration.	Worn bearings.
	Wheel out of balance.
	Bent shaft.
Motor overheating.	Low voltage.
	Bent shaft.
	Worn bearing.
	Running backwards.

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Steam Injector and Plate Coil

PROBLEM	DIAGNOSIS
Will not heat.	Low steam pressure.
	Clogged injector.
	Clogged strainer.
	Back pressure in condensate line. (Plate coil only.)
	Faulty steam trap.
Overheats.	Temperature controller improperly adjusted.
	Faulty temperature controller.

Gas Burner

PROBLEM	DIAGNOSIS
Will not light.	Gas turned off.
	Faulty temperature controller.
	Faulty thermocouple.
	Faulty igniter, igniter module, or plug. (See Burner manual for more.)
	Faulty low level float switch.
Shuts off periodically.	Loss of gas (Low/High Pressure).
	Improper adjustment of complete unit.
	Negative air pressure.
Fire will not enter tube.	Negative air pressure—draft inducer required.
Overheats.	Temperature controller set too high.
	Faulty temperature controller.
Does not heat.	Low gas pressure.
	Temperature set too low.
	Mixture too lean.
	Mixture too rich.
	Faulty temperature controller.

Control Panel

A qualified electrician should be called in for troubleshooting and repair of the washer controls.

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