Rack Washers

Operation Manual

NEMA 4X Controls

DOUGLAS MACHINES CORP.

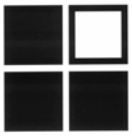
PREAMBLE

We congratulate you on the purchase of your new rack, pan, and utensil washer.

In order to understand the proper operation and maintenance of your new machine, please read this manual carefully. A Reference Guide is mounted on the side of the machine for your convenience.

You have also received a Recommended Installation Guide. Please review this guide and confirm that the machine has been installed correctly.

If you have any questions or need any further information, now or in the future, please do not hesitate to contact us.



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Please Note: Specifications are subject to change without notice.

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IMPORTANT

Pre-Installation

Qualified installation personnel, individuals, firms, corporations, and companies are responsible for:

- The installation or replacement of the gas piping and connection, installation, repair or servicing of the equipment. Qualified installation personnel must be experienced in such work, familiar with all precautions required, and have complied with all requirements of state or local authorities having jurisdiction. Reference National Fuel Gas Code, NFPA 54 or latest edition or ANSI Z223.1 or latest edition, Section 1.4.
- The installation of electrical wiring from the electric meter, main control box, or service outlet, to the appliance. Qualified installation personnel must be experienced in such work, familiar with all precautions required, and have complied with all requirements of state or local authorities having jurisdiction. Reference National Electrical Code, ANSI/NFPA 70 or latest edition. In Canada, Canadian Electrical Code Pan I (Std. 22.1 or latest).
- The installation of gas heated units in Canada. Qualified installation personnel should comply with the Installation Codes for Gas Burning Appliances and Equipment, (CAN-I-B 149.1 and B-149.2) and any local codes or approvals.
- The installation of washers equipped with casters. These washers shall be made with a connector that complies with the Standard for Connectors for Movable Gas Appliances, ANSI Z2 1.69 or latest, and a quick-connect device that complies with the Standard for Quick-Disconnect Devices for use with gas fuel, ANSI Z2 1.41 or latest.

Note: A fixed restraint must be provided if casters are used in conjunction with a flexible connector for movable appliances. This restraint must secure the washer to a non-movable surface to eliminate stress on the connector. If the washer is moved, the restraint must be reconnected after the washer is returned to its normal position.

DELIVERY

Upon delivery of your Douglas washer:

- Inspect the machine for any external damage. Any evidence of damage should be noted on the delivery receipt and signed by you and the driver.
- Remove packaging from the washer and check for any concealed damage. Carrier must be notified of damage immediately. Please retain packaging for inspection if claim is filed.

Douglas Machines Corp. cannot accept responsibility for lost or damaged merchandise suffered in transit. The carrier assumes full responsibility for delivery in good order; however, we are prepared to assist you in any action needed regarding shipping damage.

START UP

Initial Start Up

Important: Remember where your electrical disconnect is located. This will be the main disconnect switch located on the Electrical Panel in the rear of the unit.

Some of the following steps will be performed in the electrical panel enclosure. We recommend disconnection of all incoming power before doing any service in the electrical enclosure. **Please Be Cautious!**

1. With the incoming electrical power disconnected or turned off, remove the front lower panel and electrical panel enclosure cover. Turn all thermostats to the lowest or off position (turning knobs in the counter clockwise direction).
2. Locate and make sure the drain and pump petcock is in the closed position. The pump petcock will remain in the closed position unless service is needed on the pump.
3. Shut off all breakers going to the heaters, if electrically heated. Breakers will be marked WASH HEATER and RINSE HEATER.
4. With the electrical enclosure panel cover still off, turn incoming power back on. Make sure the circuit breaker marked PUMP and circuit breaker marked 120 is in the on position (BE VERY CAUTIOUS - THIS IS NOW A HOT PANEL).
5. Turn the On/Off/Fill Switch to the Fill position and release it. At this point the machine will start to fill. If it does not fill to the overflow, (this is a mushroom shaped cap located in the inside of the wash cabinet) reprogramming of the auto fill may be necessary (refer to Programming the 1827 Board). You must also make sure the incoming water pressure is in between 2Opsi and 3Opsi flow pressure as stated in the Recommend Installation Guide.

Note: Incoming water pressure over 30psi will void warranty on related items.

6. Select the Short Wash Cycle and push the Start Button; the wash pump should start running at this point. If the pump doesn't start running, check that all fuses (if applicable) and all breakers marked PUMP and 120 are in the on position. With the pump running, check the pump rotation (Look at the rear of the pump motor; the fan should be rotating in a clockwise direction.) If the pump is not rotating in the correct direction, reversal of electrical phases will be necessary. (Contact your electrician or Douglas Machines for details.)
7. Now its time to fill the rinse tank. Push the Start Button; the machine will now run through a complete cycle. A complete cycle entails wash (pump running), rinse (pump not running, rinse solenoid valve open), and a one minute dwell and steam extraction (during dwell the machine cannot be restarted). Please note while the machine is in the rinse and dwell period you will not see any readings on the jet pressure gauge.

To ensure the rinse tank is filled, you need to hear water spraying inside the wash cabinet after the wash pump has stopped running. You may need to run more than one cycle to accomplish this.

CAUTION: Before proceeding to the next step, make sure you can hear water spraying in the cabinet after the wash pump stops running and the Steam Extraction Fan has stopped. If not, heater damage may occur and the warranty will become void for related items.

8. Now it is time to set the thermostats. We are looking for a reading on the temperature gauges to be 150 degrees wash temperature and 190 degrees rinse temperature. Turning the thermostat knobs in a clockwise motion and using top dead center as our indicator, increase the thermostat marked WASH to 150 degrees. Now, increase the thermostat marked RINSE to 190 degrees. Allow 30 to 60 minutes for heat up time.

   Note: There can be as much as 12 to 15 degrees difference between the thermostat and the temperature gauge. Always set the thermostats to accommodate the desired temperature gauge reading.

9. At this point your heat source should be engaged. If electrically heated, the wash and rinse heater contactors will be engaged. If gas heated, the burner or burners will fire. If steam heated, the steam solenoids will open. If you are not sure, or if the specific heat source is not on and the unit is not heating up, contact Douglas Machines for assistance.

10. Now that everything is working fine. It is time to put the electrical enclosure panel and front panel back on the machine and start washing.

OPERATION

1. With the machine turned on, filled to the overflow, and heated up to the correct operating temperatures, we will now be able to add detergent.

Note: You must use a non-foaming, non-caustic, low chlorine type of soap (unless the machine has been specifically manufactured for caustic use). If the machine is fitted with an automatic soap dispenser, ensure the dispenser is turned on and filled up. If machine is not equipped with an automatic soap dispenser, follow your detergent manufacturers' recommended specifications for application and concentration.

2. When loading bowls, buckets, or any similar type of object, all items should be facing the wash arms. The open end should be facing down. Lighter objects such as plastic buckets may need to be weighted down. This can be accomplished by using the utensil rack hold down that is supplied with the machine.

   When loading sheet pans into a sheet pan rack (model designations starting with 1527). You will notice that the sheet pan rack is built with angled pan supports. Load the rack so that the face or open side of the sheet pan is facing towards the door of the unit.

   If you are planning to wash cake pans and you have purchased a cake pan rack, you will need to load the cake pans into the area built on the outside of the rack. The cake pans will need to be loaded with the open side of the pan facing out towards the wash arms.

   If you are planning to wash smaller utensils, such as spoons, scrappers, and whisks you will need to purchase a model specific utensil basket (contact Douglas Machines Corp. for details).

3. Now that we've filled the machine, let it heat up, put detergent in it, and loaded it. It's time to start washing! All you have to do is choose your desired wash cycle time. To do this, use the Short setting for a 4 min wash, the Med. for a 6 min. wash or the Long for a 8 min. wash. Let the machine run through its entire cycle (wash, rinse, and dwell). If you open the door or hit the stop button any time during the cycle, the machine will shut off. When you restart the machine it will not start from where it stopped, it will start from the beginning of the cycle.

DOCKING CART

GENERAL INFORMATION

The docking cart is designed to transport the machine wash racks and allow easy loading of the rack without the use of ramps or a machine pit.

The docking cart docks to the front face of the machine and can be secured with a hook ring type latch.

SEQUENCE OF OPERATION

1. Load empty wash rack onto docking cart.
2. Secure wash rack hook clamp.
3. Load product in wash rack.
4. Transport wash rack / cart to machine and open machine door.
5. Dock cart to machine and secure hook docking latch.
6. Release wash rack hook clamp.
7. Roll wash rack into machine and close door.
8. Run complete machine cycle and open machine door.
9. Roll wash rack out of machine onto docking cart.
10. Secure wash rack hook clamp.
11. Release hook docking latch from machine.
12. Remove rack / cart.
13. Close machine door.

MAINTENANCE

Daily Maintenance

Note: As a precaution, you must disconnect or turn off all incoming power to the machine before proceeding with any maintenance.

Regular maintenance is essential in keeping your machine in good working order and operating at maximum efficiency. The following maintenance items are a minimum requirement. Frequency of maintenance is dependent on the number of hours the machine is in use and the amount and type of soil being removed.

These daily maintenance items need to be done at the end of a regular shift, or if the machine is not cleaning to its normal standards.

1. Unless the machine is equipped with an electric drain, you may start to drain it when the power is turned off. If the machine does have an electric drain, leave the power on until drained. After the machine has drained, use the spray off hose to clean the inside of the wash cabinet. Direct all debris toward and into the filter baskets. Remove and clean the filter baskets, then leave them out for the following steps.
2. With the filter baskets removed, finish cleaning the wash tank reservoir. Direct all remaining debris into the open drain located in the bottom of the reservoir tank.
3. Now you need to clean the low water probe. This probe will be a white plastic item mounted into the side of the wash reservoir tank under the filter basket location. It is 3/8” in diameter and 2 1/2” long with a 3/16” x 1/4” metal tip. The purpose of this probe is to prevent the heat source and pump motor from turning on unless the wash tank is full of water. Clean the metal tip of this probe with some sort of scouring pad. Remove all scale and residue. Failure to do this will void warranty to related items.
4. If your machine has an electric heater or heaters in the wash tank, it is now time to clean them. The heater coils will be located directly under the low water probe. Use a wire brush or scouring pad to clean the exposed heating coils on the heater or heaters. Direct all debris into the drain.
5. When the wash cabinet, filters, wash tank reservoir, low water probe, and electric heater or heaters (if applicable) have been cleaned, you can put the filters back in place.
6. Inspect all the spray jets and look for any that might be missing, obstructed, or worn out. If you find any missing or worn out jets, contact Douglas Machines Corp. for a replacement. If you find any jets obstructed, try to remove the obstruction by pulling it out or by forcing it back into the jet pipe. If you need to force it back into the jet pipe, you will need to remove the jet pipe end cap in order to remove the obstruction from the pipe.
7. Clean the outside of the machine. Use a stainless steel cleaner or a soft cloth with a mild detergent to wipe down the outside of the machine.

8. Close the drain valve, check that the filters are back in place, and turn the main power back on. Wait to refill the machine until you are ready to wash again (it's easier and less expensive to heat warm water then cold). The machine is now ready for the next shift or next day of washing.

1. Wash pump motor lubrication. You will find two (2) grease fittings on the top of the wash pump motor and one (1) at each end. You will need to grease these under normal conditions every 90 days. Use an electric motor bearing grease similar to Shell Dollum or Chevron Sill.

1. If you have purchased the steam extraction option. You may need to grease the 12” steam extraction fan bearings.

Note: Some of these fans are equipped with sealed bearings and do not require greasing. You will need to determine if your fan is equipped with the sealed bearings or if the bearings will need to be greased. Refer to your parts manual to identify the steam extraction fan and the grease fitting location. If greasing is required, it should be performed every 90 days. Use high temperature food grade grease such as Sentinel Slntht #2.

2. The removal of lime and or scale may be necessary at certain times. This will vary due to the condition of your water. If you are finding lime and scale building up on the interior walls of the machine chances are they are also building up in the piping. This could impair washing ability. You will need to use a lime and scale removal chemical. Whatever you decide to use, be sure it is safe to use on stainless steel, bronze, and brass. If you have any questions on what to use or how to use it, do not hesitate to contact Douglas Machines Corp.

PROGRAMMING

1827 PC Board
Technical Information

The controller is an open board construction intended to be installed inside of an electrical panel. The board operates on nominal 120 VAC line.

The basic function of the board is to control the operation of the unit, going through a cycle of Wash, Rinse, and then Fan (Dwell).

The six relays on the board control six outputs. One relay controls two of the outputs, and the sixth relay is a master control relay.

The outputs include a ready light, a fan, a heater contactor, a Wash pump motor contactor, a rinse solenoid valve, and a fill valve.

Three potentiometers control Wash time: Short, Medium, and Long. Two switch inputs control which pot is selected. The Long switch selects the long pot, the Medium switch selects the medium pot, and the Short switch selects the short pot.

Routine Operation/Connections

Be aware that the board also controls a Fill cycle.

Note that the Fill cycle turns on the Fill valve and waits until the water level in the machine reaches the level probe.

At this point, the Fill valve is left on for the pre-programmed time to fill above the probe and then turned off.

Setting the Times

To set times on the 1827 PC board, several steps are required:

Open the control box.

Locate the PC board, a device approximately 8” x 5” with 6 relays and a transformer.

The timer settings are located to the right of the transformer and are ½” blue squares with a white dial. They are labeled Long, Medium, Short, and Rinse.

To decrease the time, turn the timer counter-clockwise.

To increase the time, turn the timer clockwise**.**

Factory Settings

Cycle	Duration
Rinse	30 seconds
Long	8 minutes
Medium	6 minutes
Short	4 minutes

Note that the Rinse pot is fixed @ 30 sec. for NSF, and that non-NSF Rinse time is adjustable.

Programming the Auto Fill

Before starting, make sure there is no water in the machine and that the drain valve is closed.

Turn the Off/On/Fill switch to the On position, but make sure not to turn all the way to Fill.

Locate the Program button on the PC board.

This black button is located on the right hand side just below the Program LED and labeled with the letters PGM.

Push in the PGM button but do not hold the button down, as it will then execute a test Mode.

When the Program light located above the button begins to flash, turn the Off/On/Fill switch to the Fill position.

The solenoid valve then opens and the machine begins to fill.

When the water reaches the overflow level, turn the Off/On/Fill switch again to the Fill position.

Observe that the Fill Time is set.

TROUBLE SHOOTING

Note: Some of the following remedies may need to be performed in the electrical panel. **Before you perform any task in the electrical panel**, **please make sure all incoming power is disconnected or turned off.**

Problem	Things to check
Machine will not turn on	- Incoming power turned on - Machine circuit breakers and/or fuses in place and turned on
Machine will not heat up (gas heated)	- Machine is filled to correct level - Low water probe is clean - Gas supply is on - Thermostats set to desired temperature
Machine will not heat up (electric heated)	- Machine is filled to correct level - Low water probe is clean - Circuit breakers and or fuses marked heaters - Thermostats set to desired temperature
Wash pump will not start	- Machine is filled to correct level - Low water probe is clean - Door is in the closed position - Circuit breakers and or fuses marked wash pump motor
Wash pressure is low	- Machine is filled to correct level - Filters are clear and in place - All wash jets and end caps are in place - Excessive amount of foam is present - Pump is rotating in correct direction - Pressure gauge
Not rinsing	- Incoming water pressure - Door is closed - Rinse solenoid valve

TROUBLE SHOOTING

Note: Some of the following remedies may need to be performed in the electrical panel. **Before you perform any task in the electrical panel, please make sure all incoming power is disconnected or turned off.**

Problem	Things to check
Rinse temperature not hot enough.	- Incoming water temperature (120° - 140°max.) - Incoming water pressure (no less than 20psi. and no more than 30psi. of flow) - Thermostat set to correct temperature (180° - 210°max.) - Heat source engaged
Not cleaning.	- Detergent level - Wash pressure (see door sticker for minimum pressure) - Wash temperature - Wash jets (clogged) - Water Level - Filters clear - If rotary table, check if table turning freely

If you are experiencing any other problems or have any questions or concerns, please do not hesitate to contact the Service Department at 1-800-331-6870.

Troubleshooting

To aid in troubleshooting, the PGM LED also serves as an error code indicator. In case of error, the LED flashes on and off at ½ second on and ½ second off and then pauses for 3 seconds.

The flashing pattern continues as long as the controller is in Idle Mode. The number of times the LED flashes between 3 second pauses indicates the number of the error.

Error Code Value Table

	PGM Error	Interpretation
1	Watchdog timeout on filling to level probe	When the controller is in either a Fill cycle or a Teach Fill cycle, there is a 15 minute time limit until the water level reaches the level probe. If the fill valve is on for 15 minutes, the valve shuts off and the Fill cycle aborts. The controller reverts to Idle Mode.
2	Watchdog timeout on filling above the level probe	When in a Fill cycle or a Teach Fill cycle, there is a 5 minute limit for which the fill valve may be on after the water reaches the level probe. This error could occur in a Fill cycle only if an incorrect time were stored in the EEPROM or read from the EEPROM. In Teach Mode, this could occur if the operator walked away from the machine while it was in Teach Mode. If this timeout occurs, the fill valve turns off and the machine returns to Idle Mode.

Error Code Value Table, cont'd

	PGM Error	Interpretation
3	Loss of master control relay during machine cycle	This error could occur if the door was opened or if the motor overloads opened during a Wash or Rinse cycle.
4	Loss of water level during a machine cycle	This could occur in two situations: a) If the water in the machine drops during a cycle because a large container being washed is collecting wash water, or b) The water level in the machine is very low and the wash water circulating in the pump and plumbing is enough to lower the water level below the probe. The water level must be low for 5 seconds for the cycle to be aborted. The heater output will, however, be turned off immediately when the water level is below the probe.
5	EEPROM read error	Data stored in the EEPROM is redundant, and the two redundant numbers are compared. If they don't match, a read error is generated. This error could occur if a Fill cycle is started, but a Teach cycle has not been done to program the Fill time. It should not occur, as Douglas will program a Fill time as part of the test procedure. The error could also occur if installing a new board.

Error Code Value Table, cont'd

	PGM Error	Interpretation
6	Attempt to start a Fill cycle or Teach Fill cycle when the water level is already at the level probe	Clear the code by starting a new cycle.
7	Attempt to start machine cycle without water to the level probe	If unit has water and a clean, low water probe, see *Low Water Section*.

1. Note that when one of these errors occurs, the controller reverts to Idle Mode.

2. Note that the error code flashes on the LED as long as it is in Idle Mode.

3. Note that as soon as a successful machine cycle, Fill cycle, or Teach Fill cycle executes, the error LED goes out.

4. There is no need to reset anything by turning the machine off.

   For example, if the operator were to try to fill the machine a second time and the water were already at the level probe, nothing would happen. The error would flash on the PGM LED, but if the cover were on the electrical box, no one would see it. If the start button were then pressed, the error LED would go out and a normal machine cycle would be executed.

Troubleshooting Table for the 1827 PC Board

Problem	Likely source of problem	Corrective Procedures
Wash pump will not start.	Door	Make certain that the door is closed. Make certain that the door is contacting the door switch, or is within 1/8" of Prox switch. Check to see if the door switch is bad. If using a door switch, perform a continuity check. If using a Prox switch, jump out connections at PC board. Check to see if the OK LED on the PC board is illuminated. To see if the spring-loaded Stop button is stuck in, press it in again to make it return to an outward position.
	Pump Motor	Check to see if the pump motor overload has tripped. Press the Reset button on the overload (blue button located in the electrical panel). See *Overloads* in the Reference Section.

Troubleshooting Table for the 1827 PC Board, cont'd

Problem	Likely source of problem	Corrective Procedures
Wash pump will not start, cont'd.	Circuit Breaker	Check to see if the circuit breaker for the pump motor has tripped. Try resetting the breaker.
	Pump motor fuses	Check to see if any of the fuses for the pump motor are blown. Check all fuses.
	Water	Check to see if there is water in the tank. Low water protection component may be preventing the Wash pump from running. If there is water in the tank and the pump motor will not start, the low water probe in the tank may not be sensing the water. Clean the probe. Check the level LED on the PC board. It should be illuminated. If the PGM LED is flashing 7 times, it means that an attempt has been made to start a wash cycle without water to the level probe. See *Low Water Circuit: Control Type*.

Troubleshooting Table for the 1827 PC Board, cont'd

Problem	Likely source of problem	Corrective Procedures
Machine will not go into Rinse cycle.	Door	Make certain that the door is closed. Make certain that the door is contacting the door switch.
	Rinse Solenoid	Check to see that the rinse solenoid is being energized when the Wash cycle times out. See *1827 PC Board: Routine Operation/ Connections Table*.
	Rinse LED	Check to see that the Rinse LED is illuminated on the PC board. If it is, then the problem is most likely at the solenoid.
Machine will not fill.	Water	If there is already water in the machine and it is above the water probe but the machine is not full, drop the water level below the probe. Restart the Fill. This condition will give an error code of 6 flashes on the PC board PGM LED (located in the electrical panel).

Troubleshooting Table for the 1827 PC Board, cont'd

Problem	Likely source of problem	Corrective Procedures
Machine will not fill, cont'd.	Water, cont'd.	Ensure low water probe is clean. It may be necessary to re-program Auto Fill time. Refer to *1827 PC Board: Setting the Times*.
Wash tank will not fill completely.	Water pressure	If water pressure in the building has changed, the Fill cycle can be affected because the Fill cycle is timed. Fill time may need to be reprogrammed. See *1827 PC Board: Programming the Auto Fill*. Proper water pressure to the machine is 60 psi static and 25 psi flow.
	Auto Fill Power	If there is no power to the Auto Fill solenoid, refer to *1827 PC Board: Routine Operation/Connections.*

Troubleshooting Table for the 1827 PC Board, cont'd

Problem	Likely source of problem	Corrective Procedures
Wash tank will not heat up.	Low water	If there is no water in the tank, the low water protection component may be preventing the heaters or the gas burner from turning on. Refer to *Low Water Circuit: 1827 PC Board*. If there is water in the tank, the low water probe may need to be cleaned if it is not sensing the water level.
	Wash T-stat power	Power to the Wash T-stat should be 120V ± 10 V from the PC board, J1-6 Wire # 16.
	Wash contactor coil power	Power to the Wash contactor coil should be 120V ± 10 V from the T-stat, Wire # 6.
	Heater circuit breaker	If the circuit breaker for the heaters has tripped, try to reset the breaker.
	Heater fuses	Check all heater fuses to see if they have blown.
	Gas heat	Refer to the *Gas Heating: Maxon or Infrared: Troubleshooting*.
	LED	Verify that the level and HTR LED's are illuminated on the PC board.

Troubleshooting Table for the 1827 PC Board, cont'd

Problem	Likely source of problem	Corrective Procedures
Wash pump turns off during Wash cycle.	Pump motor overload	If the pump motor overload has tripped, press the Reset button on the overload (blue button, located in the electrical panel). Refer to *Overloads* in the Reference Section.
	PGM LED on PC board	If the PGM LED on the PC board is flashing 4 times, it is indicating that there is not enough water in the machine. Lower the water level below the level probe. Reprogram the Fill time. Refer to *1827 PC Board: Programming the Auto Fill.*.
	Excess water pressure	When the Wash pump is started, the water pressure may be pushing against the door and causing the door switch to open. In this condition, the OK LED on the PC board would not be illuminated.

Troubleshooting Table for the 1827 PC Board, cont'd

Problem	**Likely source of problem**	**Corrective Procedures**
Rinse tank will not heat up.	Heater circuit breaker	If the circuit breaker for the heaters has tripped, try to reset the breaker.
	Heater fuses	Check all fuses in case any have blown.
	Rinse T-stat power	Power to the Rinse contactor should be 120V ± 10 V from the T-stat Wire # 4. **Note:** Rinse tank should be full of water at all times.