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# Chapter 7

## Troubleshooting

### General

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This chapter provides information for diagnosing and correcting machine malfunctions.

#### NOTE

The controller displays error codes in the event of a malfunction. *Always* check the display for any messages before proceeding.

If there is a main power failure the memory will hold the selected program for about 8-10 minutes. The machine will **not** restart automatically when power is restored.

Always check AC voltage across phases, never to ground!

Depending on machine options, some error messages may not be displayed.

Always start troubleshooting by making a thorough visual inspection of the equipment. Check the controller display for messages. Check circuit breakers, electrical connections, and switches for evidence of overheating and damage. Check all plumbing and pneumatic connections for leakage or damage.

Engineering drawings (pneumatic, electrical, etc., as required) are supplied with the machine and located in the back pocket of this manual for future reference. Refer to these drawings for specific machine information which is essential to the troubleshooting process.

Table 7-2 lists the various controller error messages, possible causes, and suggested remedies. The following Troubleshooting Table has information for diagnosing and correcting machine malfunctions that may not display an error message.

Maintenance prompts and other text prompts can be programmed. If a message is displayed that is not listed in Table 7-2 check to see if the message is a preventive maintenance prompt. The preventive maintenance prompt will be displayed, along with the message "Call Maintenance" at the programmed interval. Do not confuse a preventive maintenance prompt with an actual fault/error condition.

# Machine Trouble Shooting Table

**Table 7-1 Washer Trouble Shooting Table**

No.	Symptom	Operator Action	Maintenance Action
<b>Washer Does Not Start or Machine Operation Problem</b>			
1.	Machine will not start.	<ul style="list-style-type: none"> <li>a. Check controller display panel for message and for power applied status.</li> <li>b. Press the START key on the formula controller.</li> <li>c. Check the Emergency Stop switch.</li> <li>d. Check the washer circuit breakers.</li> <li>e. Check incoming air pressure for 100 PSI (7 bar).</li> </ul>	<ul style="list-style-type: none"> <li>a. Check operation of shell door limit switches.</li> <li>b. Check motor overloads for fault or error condition.</li> <li>c. Check electrical power source.</li> </ul>
2.	Formula will not run, incompatible step.	Programming error. Controller will display the step and the line number containing the instructions that are not compatible (example: fill and drain). Programmer must insert a step ending instruction between the incompatible steps.	
3.	Machine does not operate at process speed.	<ul style="list-style-type: none"> <li>a. Call Maintenance</li> </ul>	<ul style="list-style-type: none"> <li>a. Check drive motor and belts.</li> <li>b. Check the dwell time setting. The dwell time is the time programmed between wash forward and wash reverse. This time can be set between 4-999 seconds.</li> </ul>
4.	Machine shuts off or does not extract.	<ul style="list-style-type: none"> <li>a. Check for excessively unbalanced load.</li> <li>b. Call Maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check for actuated or defective unbalance switch/sensor.</li> <li>b. Check adjustment of shell height and centering, and the unbalance switch/sensor.</li> <li>c. Check to see if the shell door, or the sample door interlock limit switches are dropping out (possibly due to machine vibration).</li> <li>d. Make sure the drain valve is fully open during extraction.</li> <li>e. Check the main air pressure switch. Switch may open if air pressure is too low.</li> <li>f. Check low brake pressure switch.</li> <li>g. Check motor overloads for fault or error condition.</li> <li>h. Make sure a water level signal does not remain prior to extract.</li> </ul>

**Table 7-1 Washer Trouble Shooting Table (continued)**

No.	Symptom	Operator Action	Maintenance Action
<b>Washer Does Not Start or Machine Operation Problem (continued)</b>			
5.	Machine fails to restart after extraction.	<ul style="list-style-type: none"> <li>a. Check display panel for power applied.</li> <li>b. Press the START key on the formula controller.</li> <li>c. Check the main disconnect switch.</li> <li>d. Check incoming air supply for 100 psi (7 bar).</li> </ul>	<ul style="list-style-type: none"> <li>a. Check motor overloads for fault or error condition.</li> <li>b. Check all washer circuit breakers.</li> <li>c. Check door interlock.</li> <li>d. Check that shell door limit switch is activated.</li> <li>e. Make sure the shell is in the down/wash position.</li> </ul>
6.	Variable Speed Drive Inverter (If Equipped) does not operate, or experiences fault during washer operation.	<ul style="list-style-type: none"> <li>a. Check display on controller. If an inverter fault is displayed, "Variable Speed Drive Is Faulted" a level seven password has to be entered in the controller before the fault is reset. (refer to variable speed manual).</li> <li>b. Check if machine is loaded beyond maximum capacity.</li> <li>c. Call Maintenance.</li> </ul>	<ul style="list-style-type: none"> <li>a. Enter a level 7 password to clear/reset the inverter fault. NOTE: Some inverter faults can not be reset. In this case, call the Washex Service Department.</li> <li>a. Check that the drain valve is fully open during extraction.</li> <li>b. Check if the cylinder bearings are overheated.</li> <li>c. Check electrical phases for low voltage.</li> <li>d. Check motor for grounded or loose connection.</li> <li>e. Make sure the brake is releasing after the start button is pressed.</li> </ul>
<b>Water Related Problem</b>			
1.	Water level is too high.	<ul style="list-style-type: none"> <li>a. Check formula.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check air trap canister and tubing for leaks. Check all connections.</li> <li>b. Check water inlet valves for leakage.</li> <li>c. Calibrate water system, or adjust programmed level settings. Refer to page 6-51.</li> <li>d. Check level deadband. Refer to page 6-53.</li> <li>e. Check for loose electrical connection.</li> </ul>
2.	Water does not enter washer.	<ul style="list-style-type: none"> <li>a. Make sure that the manual shut off valve is open.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check for blocked air trap canister or tubing.</li> <li>b. Make sure water inlet valves are functioning properly.</li> <li>c. Check electrical connections.</li> <li>d. Check for power at solenoid valve.</li> </ul>
3.	Water or supplies enter the washer all the time.	<ul style="list-style-type: none"> <li>a. Call Maintenance.</li> </ul>	Check that inlet valve is fully closed and operates properly.

**Table 7-1 Washer Trouble Shooting Table (continued)**

No.	Symptom	Operator Action	Maintenance Action
<b>Water Related Problem (continued)</b>			
4.	Water drains from the washer involuntarily.	a. Call Maintenance	<ul style="list-style-type: none"> <li>a. Check drain valve gasket.</li> <li>b. Check electrical connections.</li> <li>c. Check for debris in drain valve.</li> </ul>
5.	Water will not heat.		<ul style="list-style-type: none"> <li>a. Check steam valve.</li> <li>b. Check for faulty temperature probe or wiring.</li> <li>c. Check for proper steam pressure.</li> </ul>
6.	Water inlet valve(s) not shutting off.		<ul style="list-style-type: none"> <li>a. Check for blocked air trap canister or tubing.</li> <li>b. Make sure water inlet valve is functioning properly.</li> <li>c. Check electrical connections.</li> <li>d. Check for power at solenoid valve.</li> <li>e. Make sure water inlet valve is not stuck open.</li> </ul>
<b>Draining Problem</b>			
1.	Washer does not drain.	a. Call Maintenance	<ul style="list-style-type: none"> <li>a. Check drain valve and solenoid for proper operation.</li> <li>b. Check drain output.</li> <li>c. Check DRAIN LEDs for indication. If ON, check for loose wire.</li> </ul>
<b>Loading/Unloading Shell Door Problem</b>			
1.	Shell door does not open or close.	<ul style="list-style-type: none"> <li>a. Check and drain water from washer. Door will not open if a water level is sensed inside the washer.</li> <li>b. Check internal washer temperature, door will not open until temperature drops below 135° F or 57°C.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check door open switch.</li> <li>b. Check if door air cylinders have pushed the door locking bands forward.</li> <li>c. Check for proper air pressure.</li> <li>d. Check door interlock and solenoid wiring.</li> <li>e. Check water level system and calibration. Refer to page 6-51.</li> </ul>
<b>Drive Belt Related Problem</b>			
1.	Drive belts squeal.	a. Call Maintenance	<ul style="list-style-type: none"> <li>a. Check tension of belts.</li> <li>b. Check that belts are dry and clean.</li> <li>c. Check sheave grooves for wear.</li> </ul>
<b>Excessive Washer Vibration</b>			
1.	Machine or pedestals vibrate excessively.	<ul style="list-style-type: none"> <li>a. Check load distribution.</li> <li>b. Make sure the washer is not under loaded.</li> </ul>	<ul style="list-style-type: none"> <li>a. Check that machine is level in all directions and is properly grouted.</li> <li>b. Tighten anchor bolts. Refer to page 4-4 for bolt torque values.</li> <li>c. Check height and centering of shell and Floataire® system adjustments.</li> </ul>

**Table 7-1 Washer Trouble Shooting Table (continued)**

No.	Symptom	Operator Action	Maintenance Action
<b>Chemical / Supply Problem</b>			
1.	Chemicals or supplies enter washer without being programmed.	a. Call Maintenance	Check that inlet valve is fully closed and operates properly.
2.	Chemical pumps 1-8 do not operate.		a. Check Machine Setups in Appendix 2C, and the chemical section in Chapter 5 (Start-Up). b. Make sure the chemical system is installed correctly. Refer to the chemical supply section in the Installation Chapter. c. The chemical instruction will be ignored until the calibration has been performed. Make sure the chemicals have been calibrated. Refer to page 5-39.
3.	Manual flush 6-7 instructions do not appear as an instruction choice.		Check the Machine Setups in Appendix 2C.
4.	Incorrect amount of automatic chemical injected.		a. Calibrate chemical pumps, page 5-39. b. Make sure the appropriate units are assigned. Refer to page 5-36 in the Start-Up Chapter.
5.	Manual chemicals not totaled.		Insert a chemical instruction prior to the flush instruction. A chemical instruction must be programmed before the flush instruction. The chemical instruction reports the amount of chemical so this can be added to the totals.

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**Notes:**

# Controller Error Codes

**NOTE**

The controller will will display error codes in the event of a malfunction. Refer to the following table for the display message, possible cause, and action to take if a machine malfunction.

Use the status keys (1-9) while a formula is running to obtain more information.

Some error messages might not be displayed, depending on machine options.

## 1. Error Messages

Maintenance prompts can be programmed by the customer. If a message is displayed that is not listed in Table 7-2, then check to see if the message is a preventive maintenance prompt. The preventive maintenance prompt will be displayed, along with the message “Call Maintenance” at the programmed interval. Text prompt can also be programmed. This will be displayed along with a signal. *Do not* confuse a preventive maintenance prompt or other text prompt with an actual trouble.

**Table 7-2 Error Messages**

Message	Possible Cause	Action
Checksum <sup>1</sup>	Error on I <sup>2</sup> C bus.	Check EEPROM, I/O racks 1-8, ribbon cable, processor card, and motherboard.
Start Error	Memory invalid or program corrupted, missing end of formula marker.	Clear all programs, operations, and vocabs (formula may have been programmed prior to initializing memory by clearing all programs, operations and vocabs).
Memory Card Might be Corrupted	User setup corrupted.	Perform user setup, clear all programs, operations, and vocabs. Refer to Clearing Memory Corrupt procedure in Appendix 2C, page 2C-31 .
Incompatible Steps Error	Group 1 and 2 instructions programmed on the same step.	Change program.
I/O Rack No. 1-8 Fault <sup>2</sup>	I/O card bad.	Clear watchdog and check I/O card.
Check Power Circuit	Wiring short, blown 24 VAC control fuse.	Repair wiring short and replace fuse.
P.B. (Pushbutton) Chip No.1-4 Fault <sup>2</sup>	Chip not responding.	Check ribbon cable and P.B. chip in display enclosure.
Access Denied	Password does not have access to selected function.	Enter correct level password.
RPM too Low <sup>2</sup>	RPM sensor check prior to extract failed. Drive slipping or sensor bad.	Check belt tension, check rpm sensor.

**Table 7-2 Error Messages (continued)**

Message	Possible Cause	Action
Invalid Memory Copy		
Sample Door Open		Close sample door.
Chemical Watchdog (Chemical 1-16) <sup>2</sup>	Automatic chemical pump on too long.	Check supply inlets and pumps.
Extract Retry	Unbalanced load.	Machine will retry 3 times, if programmed.
Extract Unbalance	Unbalanced load.	Extract retry failed or no retry selected. Check loading, raise extract retry level (if programmed), raise water level, check mounting bolts, check unbalance switch adjustment.
Low Air Pressure <sup>2</sup>	Pressure below 70 psi.	Check compressed air supply.
Variable Speed Drive Fault <sup>2</sup>	Variable speed drive error.	Check display on drive controller for messages. Check error history in drive controller. Refer to variable speed drive manual.
Water Fill Watchdog <sup>2</sup>	Machine did not fill to programmed level.	Check manual shut-off, water, drain valves, and water pressure.
Steam Injection Watchdog <sup>2</sup>	Machine did not heat to programmed level.	Check steam manual shut-off and steam valves.
Steam Gradient Watchdog <sup>2</sup>	Machine unable to reach the desired programmed gradient.	Check: steam pressure, manual shut-off and steam valve.
Cooldown Watchdog <sup>2</sup>	Polyrinse not operating.	Check valve.
Level Halt High <sup>2</sup>	Level too high.	Check water valve, sensor, and drain.
Temp. Halt Low <sup>2</sup>	Temperature too low.	Check steam valve, sensor, and temperature probe.
Temp. Halt High <sup>2</sup>	Temperature too high.	Check steam valve and temperature probe.
Reset 15A Circuit Breaker	15 amp breaker tripped.	Reset breaker.
Reset Overloads	Motor overload tripped.	Wait 5 minutes then reset overload. If overload trips again, check: drain is open during extract, voltage level, clutch released.
Clutch Speed Too Low <sup>2</sup> (if equipped)	Clutch (if installed) sensor check prior to extract failed. Belts loose, sensor bad.	Check clutch operation and clutch sensor.
Clutch Overspeed <sup>1</sup> (if equipped)	Clutch not releasing properly.	Call Washex. Check clutch quick exhaust valve, and clutch sensor adjustment.
Door Not Closed	Door closed switch open.	Close door. Check door interlock proximity switch.
Sensor 1-3 Leak		Check automatic chemical flow sensor system for leaks.

<sup>1</sup> Contact Washex service department to clear error.

<sup>2</sup> Requires maintenance password to clear error.

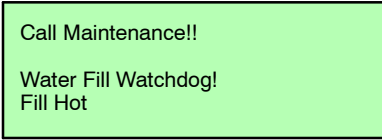
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## 2. Clearing Watchdog Errors


A fault watchdog (error message) will be displayed any time the controller detects an error condition. The error message will indicate the type of fault. Machine operation will be halted until a level five password or above is entered.

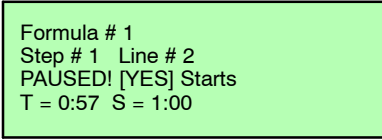
Many watchdog functions are programmable. If excessive errors are encountered, the watchdog setting may be incorrect. Also refer to the Maintenance Chapter, page 6-2, for information on preventive maintenance watchdogs.

Refer to Table 7-2 for a list of error messages and possible corrective actions.



Call Maintenance!!  
Water Fill Watchdog!  
Fill Hot




- a. Check the machine to try to determine why the fault occurred. Try to note as much information about the condition of the machine as possible. This information will help the maintenance technician determine the cause of the fault, if necessary.
- b. If the machine is equipped with variable speed drive and a drive fault message is displayed, check the variable speed drive controller display for additional messages. The technician may also check the error history in the drive controller.
- c. Press the “Clear”  key then enter a valid password, level five (default = 555555) through level seven (default = 777777). The following display will appear.



Formula # 1  
Step # 1 Line # 2  
PAUSED! [YES] Starts  
T = 0:57 S = 1:00

**NOTE**

The machine is programmed with default passwords at the factory, but they can be reprogrammed after the machine is entered into service.

- d. The watchdog message disappears. Press the “Yes”  key to restart the formula. The display will show current formula, step, and line number.
- e. If the error is still present, press the “Enter”  and “No”  keys to cancel the formula.
- f. If the error persists, the watchdog message will be displayed again. The error must be corrected before the machine can be operated.



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## Diagnostics

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Use this procedure to manually test the operator console and inputs to the controller. This procedure is also used to display the number of times each I/O rack board failed to respond to a request from the controller.

Waiting for Washer  
to Receive Load!!  
Depress [YES] Key to  
Select Formula

1. Enter a valid password (level 3, default = 333333, through level 7, default = 777777) from the Waiting to Load menu. If the Waiting to Unload message is displayed, press the “No”  and “Enter”  keys simultaneously.

The main password protected menu is displayed.

1 = Setup                    2 = Program  
3 = Maint.                  4 = Calib.  
5 = Totals                  6 = Clock  
Selection?                  0=exit

2. Select item 3, Maintenance.

1 = Manual Outputs  
2 = Diagnostics  
3 = Maintenance  
Selection?                  0=exit

3. Select item 2, Diagnostics.

1 = Test Front Panel  
2 = Display Inputs  
3 = Board Responses  
Selection?                  0=exit

### 1. Test Front Panel

- a. Select item 1, Test Front Panel.

Press Any Key Or  
Pushbutton To Test.  
  
YES+NO = Exit

- b. The time display will show a number corresponding to the location of the active switch. If no number is displayed, either the switch is faulty or the corresponding electrical circuit has a bad component.

Refer to Figure 7-37 for the correct numbering sequence for the front panel test.

This test is also useful for isolating burned out bulbs in the manual switches. If the switch number is displayed (controller receiving signal) but the light is not illuminated, either the bulb is burned out, or the corresponding electrical circuit is faulty.

- c. Press the “Yes”  and “No”  keys to terminate the front panel test.

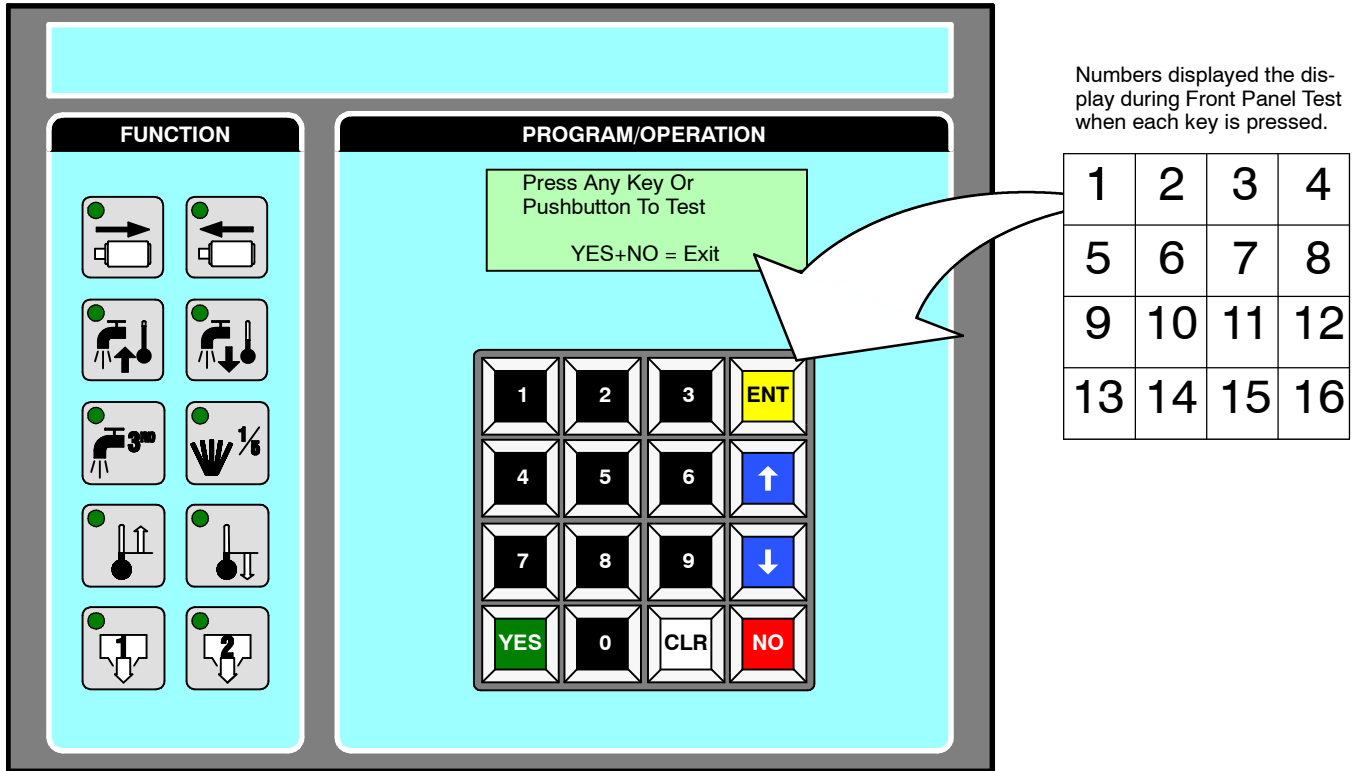
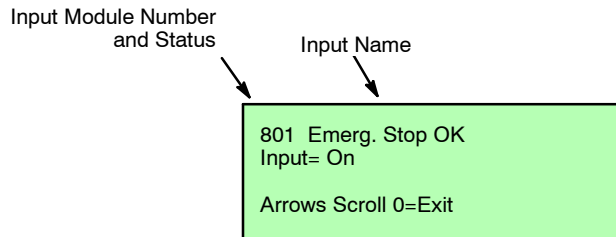







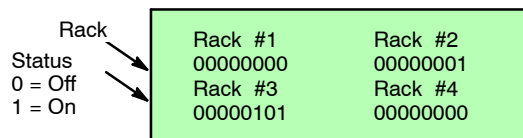
Figure 7-37 Correct Display for Front Panel Test

## 2. Display Inputs and Outputs

- a. Select item 2, Display Inputs. Refer to the control circuit diagram for the description of each input and output.



- b. Use the “Up”  and “Down”  arrow keys to scroll to the desired input. The corresponding LED, on the input module should be on if the status indicator shows the input is on.
- c. To view the status of the outputs, press the “Up”  and “Down”  arrow keys at the same time. If required, use the arrow keys to scroll to see the remainder of the inputs. The outputs can be viewed at any time. Press the “Enter”  key to return to the Input display.



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d. Press 0 to terminate the test.



### 3. Board Responses

Due to the nature of the electronic timing signals, the I/O racks and boards will fail to respond to the controller a small percentage of the time.

The controller will repeat the request until the board responds. If the controller receives four sequential no-responses, an error message is displayed. An excessive number of repeat requests may indicate a failing auxiliary I/O rack or a bad connection.

a. Select item 3, Board Responses. “No responses = 0” means the board is working perfectly.

```
I/O Rack #1
No Responses = 0
Use arrows to scroll
0 = exit
```

b. Use the “Up”  and “Down”  arrows to scroll through the boards. Auxiliary I/O racks, analog boards, and push button boards are shown.

c. Press 0 to exit the board response test.

```
1 = Test Front Panel
2 = Display Inputs
3 = Board Responses
Selection?           0=exit
```

#### 4. Serial Communication Board for Variable Speed Drive Inverter (if equipped)

**NOTE**

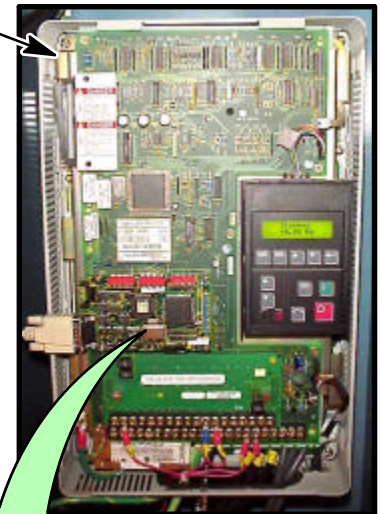
This section is for machines equipped with a variable speed drive inverter.

**CAUTION**

Disconnect the main power from the machine before removing the variable speed drive (inverter) cover.

The controller communicates to the variable speed drive inverter using a serial signal. This signal tells the inverter how fast or slow the drive motor is supposed to turn. Due to this means of communication, there is not a variable voltage - drive RPM reference like in an analog signal. To locate the communication card, disconnect the electrical power from the washer and remove the front cover from the inverter. Refer to the illustration below for more information.

Variable Speed Drive Inverter,  
with Cover Removed

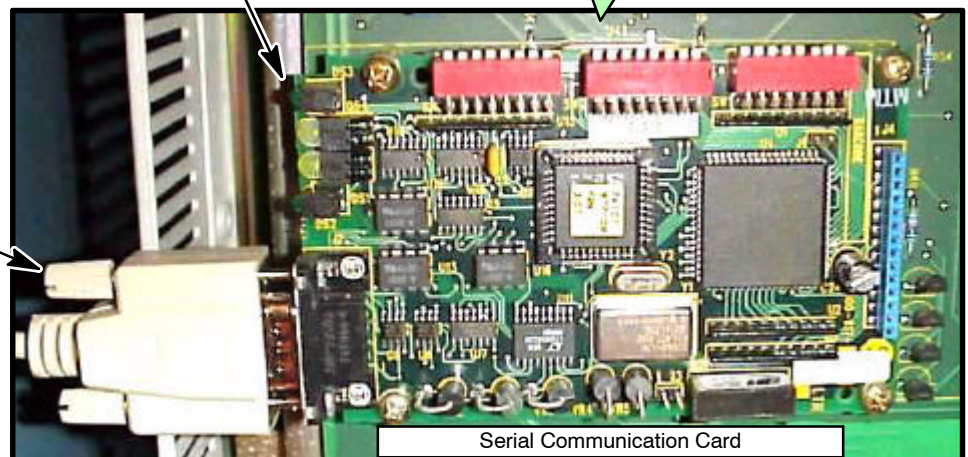


There are four communication LEDs located on the serial communication card. Under normal machine operations, the outside LEDs will be blinking. This is a visual indication that the controller is transmitting signals to the inverter, and that the inverter is responding to the signals. Only during a fault or error condition will one or both of the inner LEDs be illuminated. If an error or fault condition is discovered, call the Washex Service Department at 1-940-855-3990.

Outer LEDs Blinking = Normal Operations  
Inner LED(s) Illuminated = Fault or Error Condition

Communication LEDs

Serial Communication Cable  
and Plug, from Controller



**Figure 7-38 Serial Communication Board**

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## 5. Preventive Maintenance

Refer to the Maintenance Chapter for information concerning the preventive maintenance watchdog system capabilities.