

MAYTAG

Maytag

MFR18
MFR25
MFR35
MFR50
MFR80

**Front Load Washer
Service Manual**

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GENERAL SAFETY PRECAUTIONS

Information contained in this manual is intended for use by a qualified service technician familiar with proper and safe procedures to be followed when repairing an electrical appliance. All tests and repairs should be performed by qualified service technicians equipped with proper tools and measuring devices. All component replacements should be made by a qualified service technician using only factory approved replacement parts.

Improper assembly or adjustment may occur if service or repair is attempted by persons other than qualified service technicians or if parts other than approved replacement parts are used. Improper assembly or adjustment can create hazardous conditions.

There can be risk of injury or electrical shock while performing services or repairs. Injury or electrical shock can be serious or even fatal. Consequently, extreme caution should be taken when performing voltage checks on individual components of a product. **PLEASE NOTE**: Except as necessary to perform a particular step in servicing a product, the electrical power supply should **ALWAYS** be disconnected when servicing a product.

Further, this appliance **MUST** be properly grounded. Never plug in or direct wire an appliance unless it is properly grounded and in accordance with all local and national codes. See installation instructions that accompany the product for grounding.

INTRODUCTION

The information contained in this manual pertains to the service procedures involved in maintaining and/or servicing the Maytag "MFR") models. These models are front load washers intended for use in commercial installations.

Specifications and installation requirements are included in this manual as a guide to assist in performance and servicing the product. As on other front washer models, the importance of proper installation cannot be over emphasized. For additional information, refer to the installation instructions that accompanies each front load washer.

This manual is divided into five sections covering the front load washer. Refer to those sections for general information. If additional information is required, contact your commercial distributor.

- Section 1** - Covers general information on ordering parts, how to operate the washer, electrical test equipment, safety rules and maintenance.
- Section 2** - Provides information on the location of components and service procedures.
- Section 3** - Provides information on programming and set-up procedures.
- Section 4** - Covers general troubleshooting using a list of general complaints.
- Section 5** - Provides general specifications, installation and wiring diagram information.

MODELS COVERED IN THIS MANUAL

MFR18
MFR25
MFR35
MFR50
MFR80

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SECTION 1. GENERAL INFORMATION

HOW TO ORDER PARTS

Spare parts can be ordered from the authorized Maytag commercial distributor who sold the machine or from a commercial distributor designated service firm.

IT IS RECOMMENDED THAT GENUINE FACTORY REPAIR PARTS BE USED. USE OF OTHER PARTS MAY HARM UNIT OR CAUSE OPERATIONAL PROBLEMS.

When contacting or ordering parts from your distributor regarding the machine or service, always have the following information ready:

Insert Your Information Below:

Machine Model Number:	
Machine Serial Number:	
Installation Date:	
Distributor's Name:	
Address:	
City, State, Zip Code:	
Person To Contact & Telephone Number:	

Note: *It is also often helpful to maintain service records associated with each product.*

UNCRATING

Before removing packaging, inspect for and note any carton damage. Carefully remove any packaging materials. The bottom skid is secured with carriage bolts to the bottom frame of the washer.

Inspection

As soon as the crating material is removed, the washer/extractor and each component should be inspected. If any parts are found to be damaged, they must be replaced before installation.

NOTE: *Never install a machine having damaged parts expecting to replace them at a later date.*

If damage is noticed when the machine is delivered, notation should be placed on the transportation company's freight bill. If damage is discovered, the transportation company must be called to make an inspection. This request should be made within fifteen (15) days of date of delivery. Claims should be filed against the transportation company for this damage after the machine has been repaired. If the machine is damaged beyond repair, it should be refused.

Note: Our responsibility for shipment reaching its destination in a satisfactory condition ends with the delivery of the machine in good order to the transportation company. All machines should be inspected upon receipt before they are signed for.

HOW TO OPERATE THE WASHER

1. Open the loading door by pulling out on the end of the door handle.
2. Load clothing loosely about 2/3 of the way up and evenly distribute front to back into the wash basket.
3. Close the loading door and push in on the door handle to lock the door.
4. Choose a wash cycle.
 - A. Mechanical timer coin models: Select desired cycle by fully depressing one of the five cycle selection buttons. Insert coins to satisfy the vend price; the washer will start.
 - B. Microprocessor controlled models: Press the cycle selector button to advance to desired cycle. Insert coins to satisfy the vend price, the washer will start automatically.
 - C. Microprocessor non-coin models: Make sure the safety stop (on-off) switch is on. Press cycle selector button to advance to the desired cycle. Press start button to begin selected cycle.
 - D. The mechanical timer coin models can be converted to manual operation by installing an OPL conversion kit:

Press the right side of the lower rocker switch to the on position. Press the cycle selector button for

the desired cycle. Press the left side start rocker switch to begin cycle. The advance switch can be used to move ahead in the cycle.

5. Add detergent and fabric softener. The left detergent box compartment is for the prewash detergent. The center compartment is for the main wash detergent. The small compartment on the right is for liquid fabric softener.

Use powdered laundry detergent for properly timed injection. Liquid detergents will drain into the washer as soon as they are poured into the detergent box compartments one or two.

Some versions of the OPL (manual) machines are set up for use with liquid chemical dispenser pumps. See washer electrical schematic and timer sequence chart for proper terminal number on the liquid aids connector strip (in the controls tray) and time of injection.

6. End of Cycle. After a short "shake out" period the washer will stop and the door lock will release. For mechanical timer models, a "Door Locked" indicator lamp will go out and the door can be opened.
7. Rapid Advance of Timer Controlled Washers. A rapid advance pushbutton is located at the rear of the washer back panel. Depressing this button will advance a cycle in process. It will not start the washer.
8. Manual Door Release. **Disconnect Electrical Power!** A pull cord is hidden behind the lower service access panel at the left corner. Remove the service access panel and pull down on the cord while pulling on the end of the door handle.

ELECTRICAL TEST EQUIPMENT

The equipment required to service Maytag products depends largely upon the conditions you encounter. Locating a malfunction will often require the use of electrical testing equipment such as:

Description	Part Number
Analog Test Meter	20000005
Digital Test Meter	20001001
Clamp-On Ammeter	20000002
AC Voltage Sensor	20000081

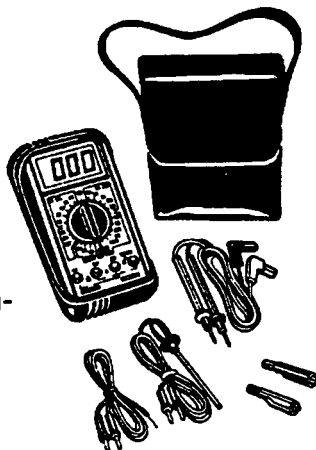


Analog Test Meter can be used to check for open or closed circuits, measure resistance, AC and DC volts, and temperature.

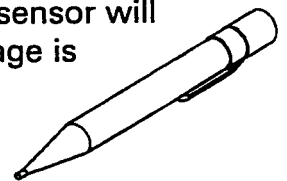
Clamp-On Ammeter can be used to detect shorts. Overloads on the circuit breaker or fuse can be traced to either the washer or circuit breaker by checking the washer current draw.



Digital Test Meter can be used to check for open or closed circuits, measure resistance, AC and DC volts, and temperature.



AC Voltage Sensor can be used to alert you if AC voltage is present so proper safety precautions can be observed. The tip of the sensor will glow bright red, if voltage is between 110-600 volts AC.



SAFETY RULES

This is the most important section in the manual. It describes the safety and maintenance rules applicable to anyone servicing or operating the machine, including the owner of the machine. **Please read this information and retain for reference.**

Warning: This machine is equipped with devices and features relating to its safe operation. To avoid injury or electrical shock, **DO NOT** perform any service unless qualified to do so.

Information to owners, operators and dealers:

Warning: Improper and inadequate maintenance, poor machinery housekeeping and neglect or bypassing of safety devices may result in accidents involving personal injury and/or property damage.

To ensure the safety of machine operators, the following maintenance checks **MUST** be performed on a **DAILY BASIS.**

1. Prior to operating the machine, check to make certain that all warning signs are present and legible. Missing or illegible ones must be replaced immediately. Be sure you have spares available at all times.
2. Check the door safety interlock as follows:
 - Open the door of the machine and attempt to start in the normal manner.
 - Close the door to start machine operation and while it is operating attempt to open the door. The door must remain locked.

- Upon completion of the cycle, immediately check that the cylinder has stopped and cycle indicator is off.

Warning: DO NOT, under any circumstances, attempt to bypass any of the machine safety devices as this can result in accidents involving personal injury and/or property damage.

3. Be sure to keep the machine(s) in proper working order; follow all maintenance and safety procedures. Use only genuine factory repair parts.

ASSISTANCE: All requests for assistance must include the model, serial number and the electrical characteristics as they appear on the machine identification plate.

Warning: DO NOT OPERATE MACHINE(S) WITH SAFETY DEVICES BYPASSED OR INOPERATIVE.

DO NOT ATTEMPT TO OPEN MACHINE DOOR UNTIL CYLINDER HAS STOPPED ROTATING.

SAFETY RULES CHECK LIST

- Thoroughly review with the appropriate section of the service manual before attempting any repair or maintenance of the machine.
- Always shut off power and water supply before maintenance or servicing.
- Do not overload the machine.
- Do not attempt to open the door when the cylinder is in motion or if it contains water.

- Do not bypass the safety devices in this machine.
- Immediately repair any seepage in the system due to faulty gaskets, etc.
- Do not spray the machine with water; it may cause short circuit and serious damage.
- Do not use volatile or flammable substances in or near this machine.
- Keep all panels in place. They protect against shock and injury and add rigidity to the machine.
- Make sure all warning signs are present and legible. Replace immediately if lost or damaged.
- Do not replace fuses with those of greater value or amperage.

Do not attempt to operate a machine if any of the following occurs:

- Excessively high water level.
- Machine is not connected to a properly grounded circuit.
- Door does not remain securely locked during the entire cycle.

MAINTENANCE

General

This section covers preventative maintenance. Even though preventative maintenance has been reduced to a minimum by the careful design of this machine and the choice of components, it is necessary to maintain and keep the machine clean. This will prolong the life of the machine and avoid hours of possible servicing to the machine.

Warning: BEFORE PERFORMING ANY SERVICE MAINTENANCE, MAKE SURE THAT MAIN POWER TO THE MACHINE IS SWITCHED OFF.

Daily:

- Check door lock and interlock before starting operation.
- Clean soap dispenser and lid.
- Clean the cabinet.
- Check drain for leakage and proper opening.
- Check the loading door for leaks. Clean the door seal of all foreign matter.
- Leave loading door open to air out the entire washer at the end of the cycle and at the end of the day.

Quarterly:

- Check V-belts for wear and proper tension.
- Check motor hinge system and clean lint from motor.

- Check all water connections and hose connections for leaks. Tighten or replace as needed.
- Check mounting bolts. Retighten if necessary.
- Remove and clean water inlet valve and hose filters. Replace if necessary.
- Wipe and clean the inside of the washer and check that all electrical components are free of moisture and dust.
- Check/tighten contactor terminal screws and inspect connections in control panel area.

IMPORTANT

Replace any and all panels that were removed to perform daily and/or quarterly maintenance.

Semi-annually:

- Clean water inlet filter
- Check mounting bolts and retighten if necessary.

SECTION 2. SERVICE PROCEDURES

IMPORTANT

- **Extreme caution should be taken when performing voltage checks due to possible danger of electrical shock.**
- **Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.**

CABINET

The cabinet consists of left and right side panels, a back panel and a three part front panel assembly. To remove the cabinet you must first remove several of the separate panels.

1. **Disconnect machine from power supply.**
2. Remove the lower service access panel.
3. Remove the top cover panel (locks, detergent box screws rear bolts, and/or rear hinges, etc.) and remove the top panel assembly.
4. Remove the rear service panel from the washer.
5. Remove the bolts and nuts securing the lower corners of the main front panel to the frame (10mm socket).
6. Loosen the front panel screws, it is not necessary to remove the screws as panel spacers will drop out of place.
7. From the top, remove the two bolts that secure the control panel to top lip of the front panel (10mm socket).
8. Disconnect the wiring harness plugs from the connectors at the controls tray for the motor, drain valve motor and door lock. **It is a very good idea to mark these plugs!**
9. Disconnect the hoses connecting the detergent box to the tub and to the drain valve (7mm socket).
10. Disconnect the lower hose to the air vent (7mm socket).
11. Disconnect the water level switch air dome hose (7mm socket).
12. Remove the side panel bolts at the bottom edge of the side panels.
13. Lift the cabinet up and forward to lift it from the frame.

TOP PANEL

The top panel is secured with bolts, screws and a key operated service lock. (Two locks on larger washers).

Note: All fasteners used in MFR models are metric.

1. **Disconnect machine from power supply.**
2. Unlock the service lock(s). This is typically a keyed lock.
3. Raise the detergent box cover and remove four screws that secure the top panel to the detergent box rim.
4. On the **MFR18 & 25** models, remove two hex head bolts at the corners of the rear flange of the top panel. Lift

the top up at the back and bump forward to remove.

On the **MFR35, 50 & 80** models, unlock the two service locks and raise the hinged top panel. A "prop" rod is provided to hold the top open.

With the top removed the servicer has access to:

The control tray containing the timers, motor contactors and the bulk of the washer's electrical components.

The detergent box assembly and associated hoses.

The rear side of the front control (facia) panel provides access to panel switches and in the microprocessor models, the control boards.

The coin acceptor mechanism and coin counter control or manual switch panel.

The rear water valve panel (rear bridge) and the water fill valves.

LOWER SERVICE ACCESS PANEL

Disconnect machine from power supply.

The lower panel is secured by two screws to the cabinet side panel flanges. It is not necessary to completely remove the screws in order to remove the panel. A spacer is on each screw shaft and will fall if the screws are removed from the panel. Pull out on the panel as you loosen the screws and the panel will come off easily. Removing the lower access panel gains access to the drain valve and associated hoses.

Single phase versions of the 35 and 50 pound machines use a mechanical centrifugal motor switch which is serviced from the front through the service access panel. When replacing the lower panel, check to see that the spacers are in place.

FRONT PANEL

Disconnect machine from power supply.

The main front panel is secured both at the top and at the bottom by bolts located on each side and by four panel screws. The bottom bolts are reached through the access panel opening and the top bolts are reached from the top panel area. Removal of the front panel provides access to the door panel which covers the door lock assembly and hinge.

Remove the six screws and washers to remove the shield.

COIN METER (MC & PC)

The coin acceptor mechanism mechanically checks inserted coins for size (diameter and thickness), magnetic properties (U.S. coins - non-magnetic, Canadian coins - magnetic) weight and drop velocity. As with most coin acceptor mechanisms, yearly cleaning should be considered.

After a coin has passed through the acceptor, it drops out of the acceptor rear chute, the coin deflects an actuator wire to operate the microswitch. Each coin (each switch closure) is sensed by the coin counter control board.

FUNCTION OF THE DIP SWITCHES

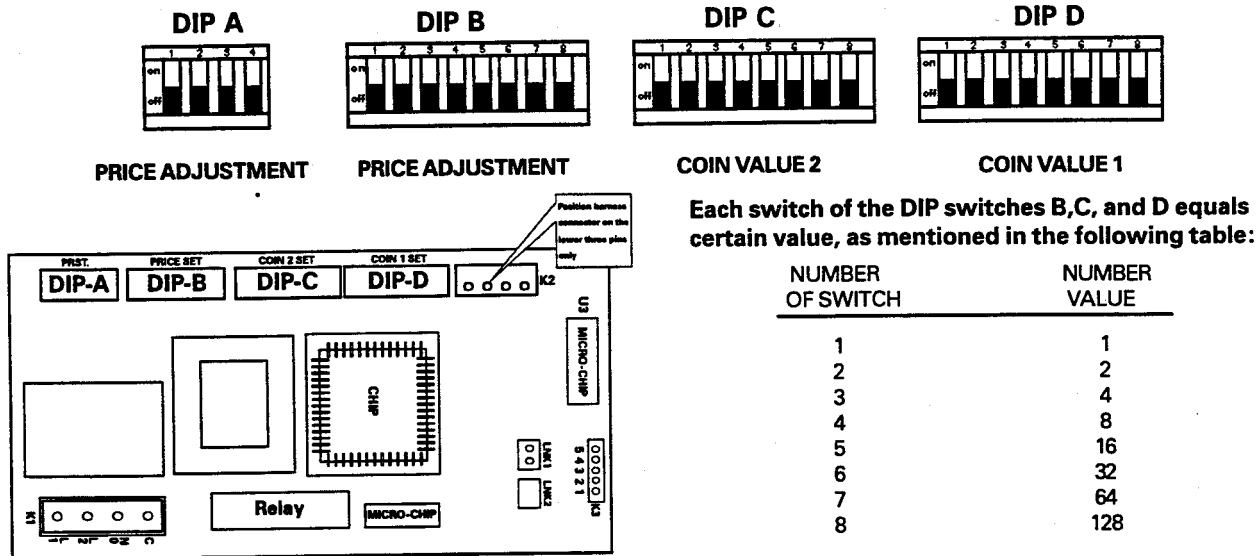


Figure 2-1

COIN COUNTER BOARD (MC Models)

The coin counter boards used in the MFR models feature a light emitting diode (LED) display to show vend price as well as programming information. The control board will accept either single coin or dual coin inputs. The vend price will decrease as coins are inserted. When the display price equals zero, the counter will produce an output signal to start the washer. The display will then go blank until the end of the cycle.

The control uses binary logic set by four DIP (dual in-line packaged) switches. The switches are located along one edge of the board and consist of one four position switch and three eight position switches. The four position and the eight position switch next to it are used to set the vend price in one cent increments. There is a provision for setting a decimal point using jumpers also. The two remaining eight position switches are used to set the value of the coin(s) to be used. Except for the four position switch, the

values increase from one cent to 128 cents using switch numbers one through eight. If all eight switches are set to the on position, the total value of the switch will be 255 cents.

Positions one and two of the four position switch carry values of 256 and 512 respectively. Positions 3 and 4 are not connected. The switch numbers 1 and 2 of the DIP switch A, have the following value:

number of switch	number value
1	256
2	512

You can form any number (for the price and for the coin value), by making a combination of the number values mentioned previously. A number value is selected by switching the switch to "on". (See Figure 2-1)

It is also possible to show a decimal point on the display. This can be done by placing a jumper on LNK 1 of the two jumper feet, then you'll obtain 1 digit after the decimal point. If you place the jumper on the LNK2 jumper feet, then you'll always obtain two digits after the decimal point. If you do not place a jumper, no decimal point will appear.

Setup:

Disconnect machine from power supply. Using switches "A" and "B" set the desired vend price. The price you set must be obtainable with the coin values you use. Do not set the vend price to end in an odd cents increment such as \$3.59 if the coins to be used are quarters.
(See Table 2-1)

EXAMPLE: Set vend price to \$3.50

Start with switch "A" and set switch one to the on position=256 cents. We need to get 94 cents out of switch "B" to complete the vend price. Switch 7 is worth 64 cents. Add switches 5 (16 cents), 4 (8 cents), 3 (4 cents) and 2 (2 cents) to reach the needed 94 cents ($64+16+8+4+2=94$). A pre-installed jumper on the coin counter board has positioned the decimal point at two places from the right. Moving the jumper will move or eliminate the decimal point from the display.

Set Coin Value

The washer coin board is preset to accept quarters (U.S. or Canada). Coin one is set using switch "D" and coin two if used is set using switch "C". For quarters (25 cents), switches 1, 4 and 5 are on ($1+8+16=25$).

PRICE DENOMINATIONS

PRICE			Coin Two Value	Coin Two Value
	DIP - A	DIP - B	DIP - C	DIP - D
.25		1,4,5		1,4,5
.50		2,5,6		1,4,5
.75		1,2,4,7		1,4,5
1.00		3,6,7		1,4,5
1.25		1,3,4,5,6,7		1,4,5
1.50		2,3,5,8		1,4,5
1.75		1,2,3,4,6,8		1,4,5
2.00		4,7,8,		1,4,5
2.25		1,6,7,8		1,4,5
2.50		2,4,5,6,7,8		1,4,5
2.75	1	1,2,5		1,4,5
3.00	1	3,4,6		1,4,5
3.25	1	1,3,7		1,4,5
3.50	1	2,3,4,5,7		1,4,5
3.75	1	1,2,3,5,6,7		1,4,5
4.00	1	5,8		1,4,5
4.25	1	1,4,6,8		1,4,5
4.50	1	2,7,8		1,4,5
4.75	1	1,2,4,5,7,8		1,4,5
5.00	1	3,5,6,7,8		1,4,5

Note: *Dip A - switch #1 has a value of 256 cents.

switch #2 has a value of 512 cents.

*Dip B - switch number (value in cents)

#one(1), #two(2), #three(4), #four(8), #five(16), #six(32), #seven(64), #eight(128). This also applies to Dip-C and Dip-D switches.

*Dip C - is not used [coin value 2].

*Dip D - is used [value of coin 1].

Table 2-1

CONNECTIONS ON COIN BOARD

The following information pertains to the location of connections on the coin board. Also, on your schematic the word "stepper" is used for the connection areas (K1) on the coin board. Familiarize yourself with the connection points on the coin board and their basic function. (See Figure 2-2)

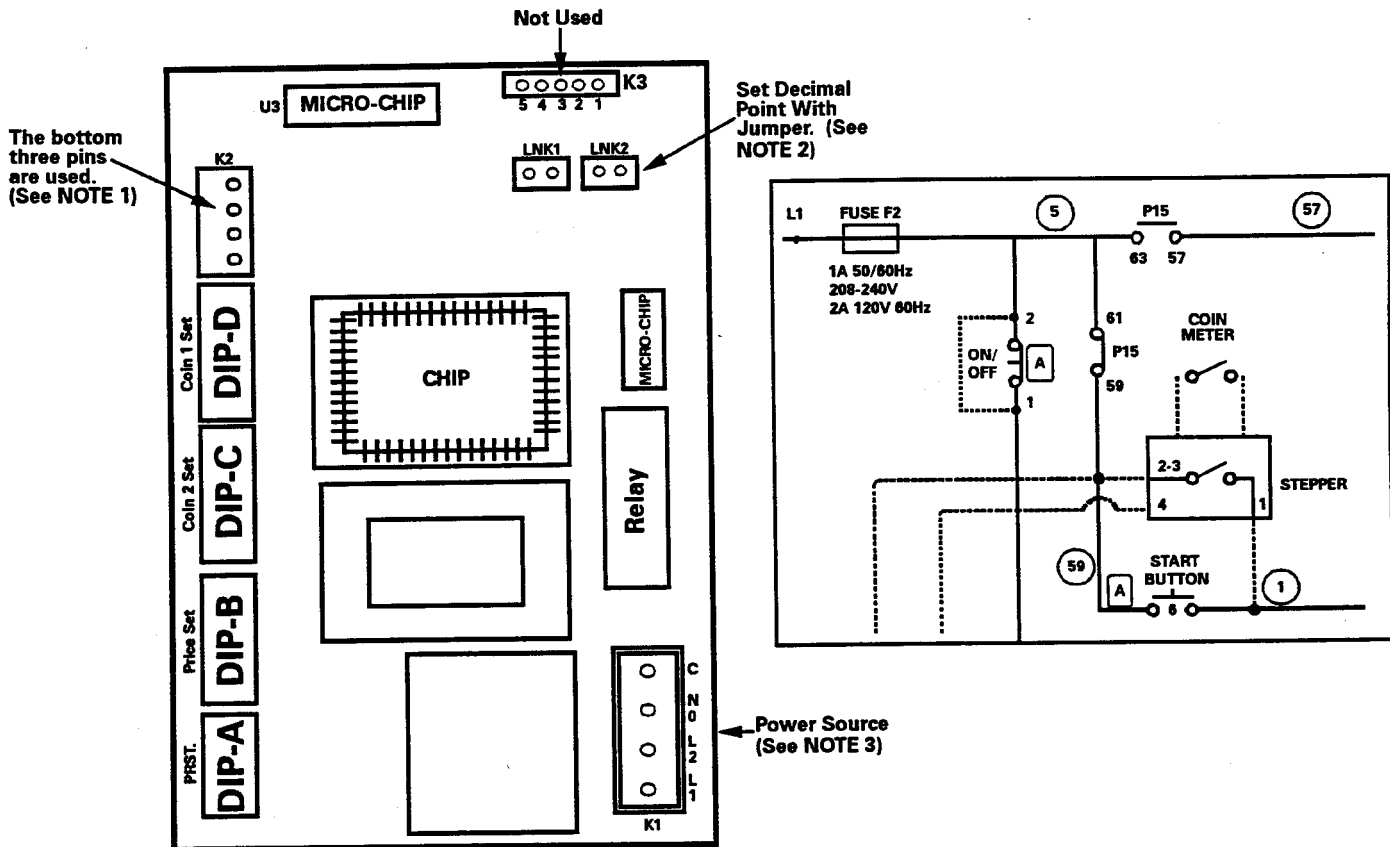


Figure 2-2

NOTES:

- 1) Only the bottom three pins are used for the harness connection. This connection area is used for sensing the coin. The top pin is not used at this time.
- 2) This area is used for the placement of a jumper (small blue square looking item) for determining the decimal point position. If the jumper is not in place, the coin board display will not show a decimal point. Generally, the placement of the jumper should be on LNK2 which will give you the correct decimal placement. Example: No jumper in place display reads 300; jumper on LNK1 display reads 30.0; and on LNK2 display reads 3.00 which is the correct setting.
- 3) This connection is the main power source to the coin board. Check for voltage across the following connections on the coin board: L1 to L2 equals 220 volts; L1 to NO equals 220V; and L1 to C equals zero volts. The only time you will see voltage across L1 to C is when the last coin is inserted. The voltage will pulse from 0-100 volts and then return back to 0 volts (relay closes momentarily).

The following is a chart to help identify the connection on the coin board and the connection points on the schematic. On the schematic, the word stepper is referring to the coin board. In addition, the wire color and function on the coin board is referenced in the chart. Words of caution: do not assume L1 and L2 on the coin board represent L1 and L2 on the schematic, because they are reversed on the coin board.
(See Table 2-2)

COIN BOARD CONNECTION	STEPPER NUMBER	WIRE COLORS	FUNCTION
C	1	White-Purple	Output of relay contactor to timer motor
NO	2	White	Input to relay contactor
L2	3	White	Power to Board-L1 of Diagram
L1	4	Blue	L2 of Diagram may be referred to as common

Table 2-2

TIMER (MC & MN MODELS)

Program Timer Connections

The following will help in connecting the correct wire to the correct terminal on the part numbers **23001065** (230 volt) and **23001351** (115 volt) timers used in the MFR (MC & MN) models.

Terminal Numbers

The timer connection terminals are identified by numbers that are printed on the connection separators of the timer. These numbers are best seen by looking from the rear of the timer. For our purposes the timer is viewed from the front of the washer (shaft side is front) and the gear drive assembly is on the top side of the timer. (See Figure 2-3)

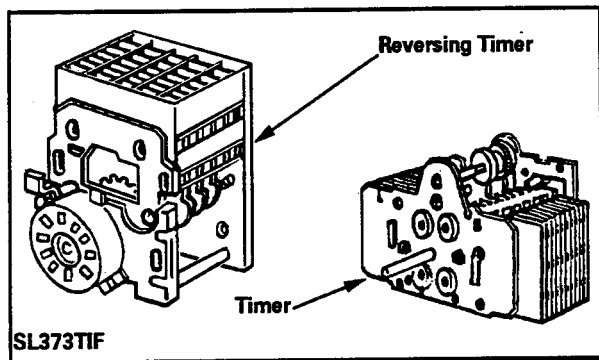


Figure 2-3

Even numbered terminals are on the left side of the timer and odd numbered terminals are located on the right side of the timer.

The terminals are numbered from one (1) to seventy-two (72) with an additional connection strip positioned vertically along the rear left of the timer for timer motor and line two (common) connections.

Wire Numbers

Washer wiring is identified by a printed number on the wires close to the terminal ends. The wire number is underlined for proper orientation. (example 6 or 9)

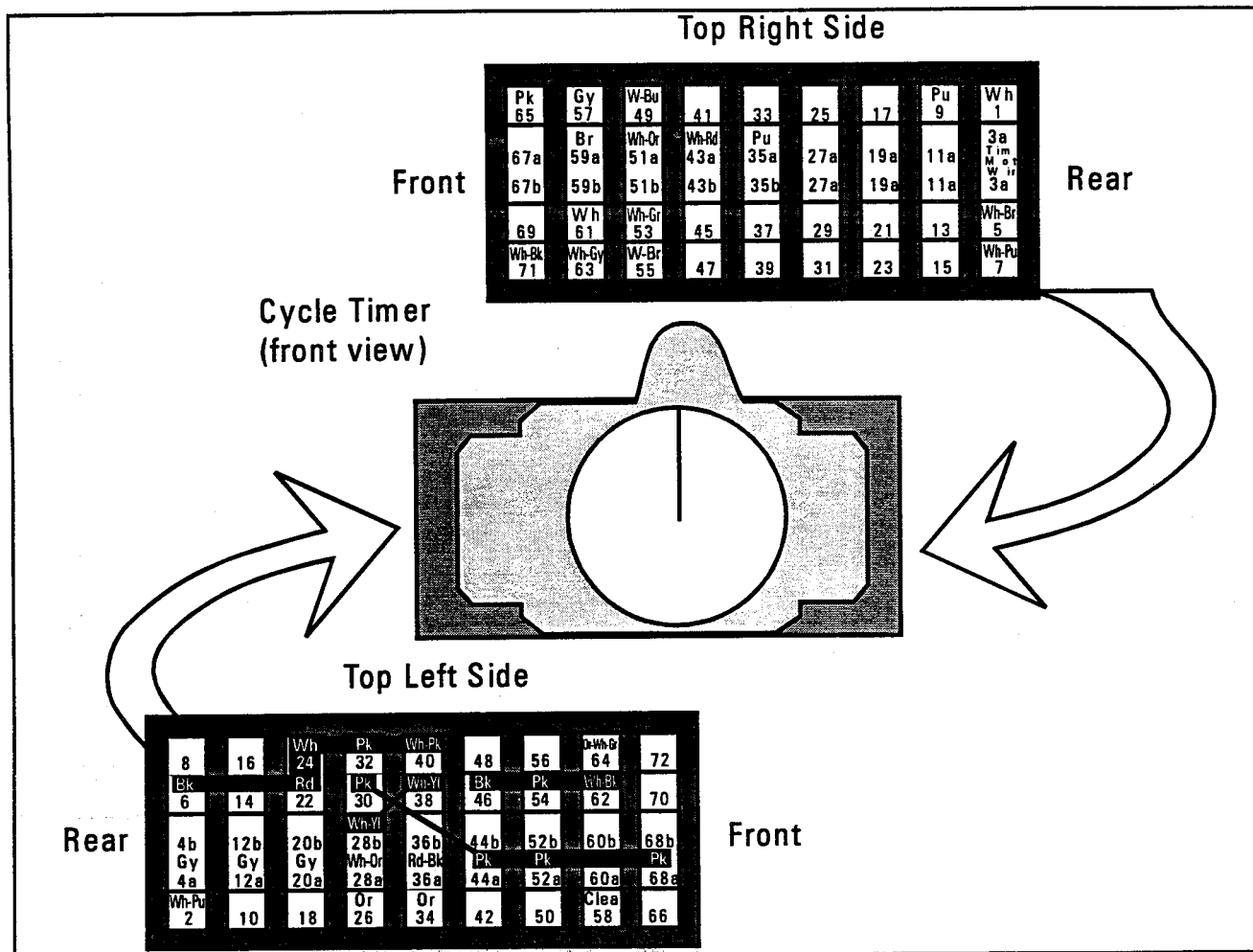
For the most part the wire number will go to the timer terminal with that same number **except** in the case of connected jumper wires that connect to other terminal numbers.

Use Needle Nosed Pliers to Pull Wires From Terminals

Do not pull on the wires to remove them from the terminals! Use needle-nose pliers to grip the terminal connector when removing wire from a timer or switch terminal. Pulling on the wire may only pull it from the end terminal and you will need to re-install a terminal end on the wire.

In the Case of Connected Wires Plus Jumpers

In case of a wire number that has one or more jumpers it will not matter which timer terminals the wire and jumpers go to first as they are electrically the same. As an example wire number one (1) is found on terminals 1 and 35 on the right side of the timer and on terminal 10 on the left side of the timer. The preferred routing would be for the main wire 1 to go to terminal number one and the jumpers (also labeled 1) would then go to the other two terminals. (See Figure 2-4 for timer terminal locations)



CIRCUIT ANALYSIS

The timer and circuit operation can best be understood by using the machine schematic/wiring diagram along with the timer contact sequence charts to follow each circuit one timer increment at a time. For the purposes of this explanation, we will follow the steps involved in starting a washer set up with a coin acceptor and the normal five cycle selections. These same machines can be converted to manual (OPL) operation by removing the coin acceptor assembly and adding the manual switch package in place of the coin acceptor. There is a prewash / no prewash rocker switch mounted in the control tray. We will assume it to be in the "prewash" position.

A preceding cycle will end with the timer positioned in increment number 52. Increment number 51 would have released the door lock and the stepper motor for the program timer would have moved the timer to increment 52. At this point only program timer contact P15 (program timer 15) 59 to 61 is closed. This provides power to the coin acceptor and to the coin block solenoid coil to allow coin insertion. At all other points in the cycle and when there is no power to the coin block solenoid, coins cannot be inserted. When the vend price is satisfied (proper number of coins have been inserted), the coin acceptor will provide an output on terminal 1 to power the main timer motor. This will rapidly advance the timer to increment number 1.

Increment One

P15 is open from 59 to 61 so the coin acceptor and coin block solenoid are not energized. P15 closes 63 to 57 to power the machine-in-use lamp and the door switches. If the door is not closed, nothing else happens. When (or if) the door is closed, door switches DS1 and DS2 come into play. As the door is closed, the DS1 door hinge switch closes just slightly ahead of the DS2 door pin switch. DS1 and DS2 are wired in series. With the door closed, DS1 and DS2 feed wire 8, which feeds the 240 volt AC current to a bridge rectifier which changes the AC to approximately 200 volts DC for solenoid operation. P13 (55 to 49) is closed to power DL, the door locking solenoid. The door lock solenoid pushes the door lock arm to the right and at the same time actuates the door lock safety switch, DS3. The door lock safety switch controls power output to wire two, the main power to the washer control circuits. With DS3 closed power is then supplied to the "door locked" lamp, to the door lock bimetal safety delay unit, cycle select switch, and to the drain value circuit via timer contact P16 (64 to 58). At this point, neither timer motor (rapid advance/program motor M1 or the stepper motor) is energized. Wire two also feeds the cycle selector switch and depending on the selection made (which button is pushed in), feeds back to the timer P2 or P4 and to the water level pressure switch. **Note: A button must be pressed in for the washer to operate.**

With the water level pressure switch in the "empty" position, contacts are made to terminals 22 and 32 and to wires 34 and 36. Wire 34 feeds timer contacts P8 and P12. Again, depending on cycle selector switch position, power is fed to water valve solenoids SV1 through SV6.

At increment one, contact P8 (26 to 32) is closed to power SV2, the cold water inlet valve for prewash and rinse. P10 (34 to 40) is also closed to power SV3, the bottom fill hot water valve, depending on cycle selector switch position. Selector switch J3/K3 and E1/F1 are normally closed except when button 5 or 3 is pushed. This wire also feeds timer contacts P12 and P14 and selector switch J2/K2 and E2/F2 (these contacts are normally open except when button 5 or 3 is pushed). Examination of the circuit diagram and selector switch "truth table" contact chart will show which solenoid and which water valves will be energized. For prewash, this is usually either cold or cold plus hot for a "warm" fill. As the water level rises, the low level of the pressure switch will switch first. Then power to wire 34 will be lost and the pressure switch will toggle over to terminal 24 (loses 22 and switches to terminal 24). This feeds wire 7 and through timer contact P1 (7 to 1), feeds the rapid advance motor of the timer. The timer will move 1 increment to increment 2. At that point the timer motor again loses power.

Increment Two

At increment two, timer P1 opens 7 to 1 and closes 3 to 5. This powers the timer stepper motor M2. Contact P2 remains closed but with the prewash selector switch in the prewash position, P2 has no effect. P3 (11 to 13) is closed to use the 30 second stepper, so the timer rapid advance motor will be powered for a couple of seconds every 30 seconds. This is how the timer normally advances through the cycle. With the other contacts closed; P4 (10 to 16) would rapidly advance through prewash, but with the selector in the prewash position it is not used. P6 (18 to 24) is closed to feed the liquid supply strip for the first supply. P9 is closed to allow use of the manual rapid

advance switch. P13 remains closed to maintain the door lock solenoid. P14 is closed but is an unused contact set. P17 is closed (67 to 69) to feed through to the auxiliary, normally closed set of contacts 22 to 21 in the spin contactor to the reversing timer motor M3, to the reversing timer contact set RP10 (M to N) and to selector switch 5, K1/J1 to reversing timer set RP8 (K to L). RP10 provides delicate wash action, RP8 provides normal wash action. CM1 is the wash contactor and as our previous front loading washers, is in the series with thermal overload protectors in the motor windings.

WIRING CONNECTIONS TO MFR/MC REVERSING TIMER

The reversing timer provides the switching necessary to change the motor direction for reversing wash action in the timer-controlled washers. (See Figure 2-3) The terminal connections are identified by letters printed on the terminal separators. This timer has only one connection block. The terminal layout is listed in Table 2-3.

C RED	A BLACK	B BROWN	D
G RED	E BLACK	F BROWN	
	I GRAY	J	
	K 21	L 47	
V	M 16	N 47	W
R 33	O	P	S 26 & 33
	U	T	

Table 2-3

CONTROL BOARD (PC MODELS)

The control board provides signals to a number of components. It also senses input information from a variety of components (i.e. water level, safety switches, temperature sensor, etc). In general, the control board is divided into a series of inputs and outputs.

Removal of Control Board:

1. Disconnect power to the machine.
2. Remove all connectors from the control board.
3. Remove the nuts securing the control board to the panel.
4. Remove the control boards.
5. Make sure the SW1 switch of the new control board is in the same position as on the old control board. See Figure 2-5 for position of SW1 (machine type selection).

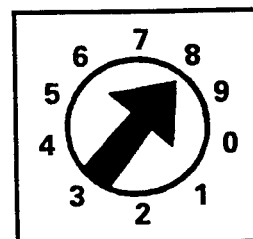


Figure 2-5

6. Install microprocessor chip (memory chip) from the old control board or with the same software. See Microprocessor Chip Replacement Section (make sure all pins are in socket).
7. Mount the new control board in place and secure with nuts. Make sure that the display does not touch the front stainless steel plate (keep at least .08 inches (2mm) away from plate).
8. Reconnect all connectors before restoring power to the washer.

MICROPROCESSOR CHIP (MEMORY CHIP)

The microprocessor chip is sensitive to electrostatic charges. Careless manipulation or strong electrostatic fields can damage the software.

Removal of Microprocessor Chip:

1. Disconnect machine from power supply.
2. Remove the microprocessor chip from its mounting base.
3. Place the new microprocessor chip correctly into the mounting base making sure the pins are not bent (align positioning mark). Generally the alignment notch is on the top side.
4. Restore power to washer.
5. Complete initialization procedures covered in the Programming and Operation Manual.

WASH SELECTOR SWITCH (MC & MN MODELS)

The machines are provided with a selector switch controlling a number of contacts. When each button is pressed, the other buttons are released. The various wash programs and water temperatures are selected by the switch in conjunction with the program timer.

The cycle selector switch has pairs or sets of contacts that are activated by the five front panel push-buttons. These switch sets are arranged in columns and rows. (See Figure 2-6)

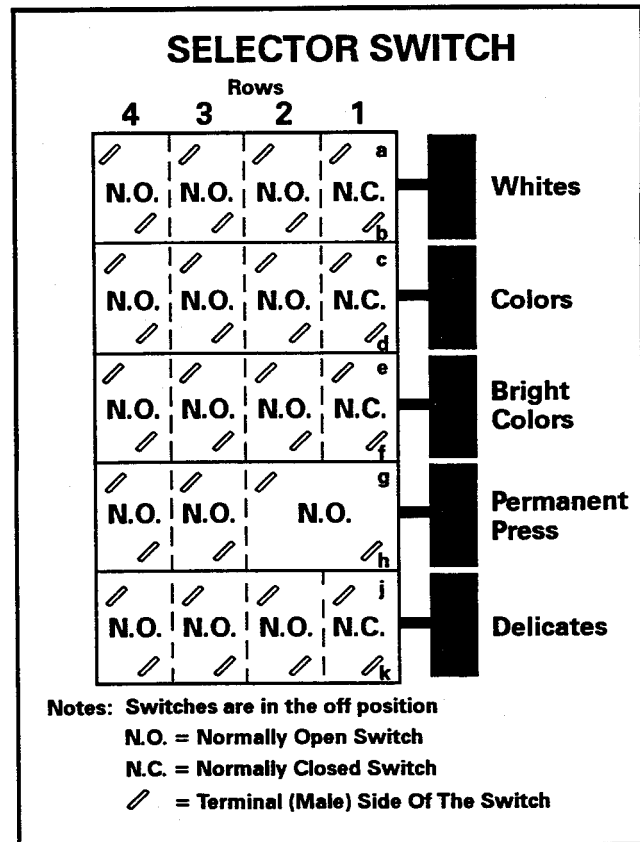


Figure 2-6

The rows are numbered from the front, one through four. The columns, on the other hand, are identified by letter sets AB, CD, EF, GH, and JK. The individual connection terminals for the switch can be stated by column and row.

NOTE: *The washer will not operate with all of the buttons in the out position! Also, it is possible to install the switch upside down.*

CONTACTORS

The contactor consists of a movable core, a solenoid and a contact assembly. The contactors are designed to handle the motor loads and the current inrush at start for all models of machines, three phase or single phase. (See Figure 2-7)

Auxiliary contact sets may be piggybacked on top of the spin contactor on single phase models to bypass the pressure switch in extract.

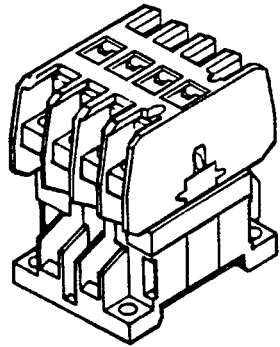


Figure 2-7

Service Tips

Disconnect from power supply.

1. Only complete contactors are available as spare parts.
2. If the contactor does not energize, check the coil for continuity or short circuit.
3. If the contacts are burned or pitted, replace complete contactor.
4. If the contactor hums, it indicates a problem with the core system. Replace complete contactor.
5. If contactor sticks, check for sticky substance on core surfaces. Clean core carefully with a grease dissolving solvent; also check the contact. Replace contactor if problem still exists.
6. If a short circuit occurs in the motor or anywhere downstream of the contactor, the contacts should be inspected for damage. The contacts may be welded or severely burned. Replace complete contactor.
7. Don't operate the contactors manually with the unit in operation.
8. Periodically check contactor screws and tighten if needed.

OVERLOAD PROTECTOR

Single phase machines are provided with an overload protector mounted by the spin contactor. This overload protector protects the motor from overheating in case the start switch malfunctions.

WATER LEVEL PRESSURE SWITCH

The machines are provided with a three contact water level pressure switch.

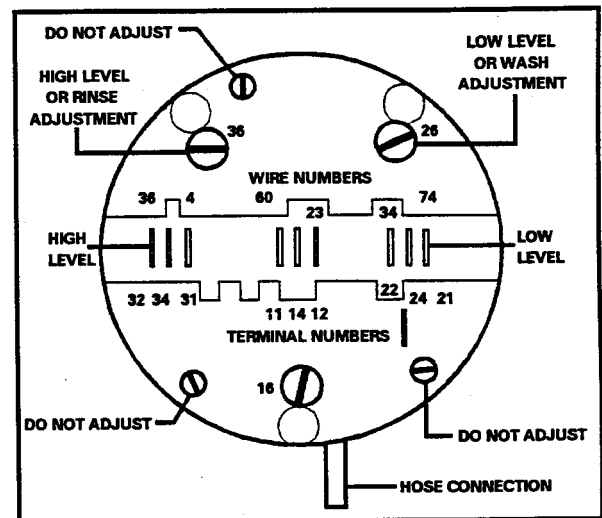


Figure 2-8

The switch is set for a predetermined low and high water level in the machine. It is controlled by the program timer which determines whether the low or high level is utilized. The switch then activates the water inlet valves and keeps them on until the predetermined level is reached in the machine. The level switch is connected to a rubber air chamber attached to the drain valve. The air chamber acts as an air reservoir so that water does not rise into the tube connecting the switch.

The pressure switch has a preset trip point and a reset point. The low reset point acts as a safety for spin. The spin contactor cannot energize until the low level reset point is reached, thus preventing the machine from going into spin with water in the machine. (See Figure 2-8)

INLET VALVES

The various models are provided with different sizes of inlet valves. However, the principal operation of these valves is the same (see the following figure). In clean water, the valve will work problem free. (See Figure 2-10)

The water valves used on all models are designed to operate within a pressure range (of 30 lbs to 120 lbs). (See Figure 2-9)

The water at the inlet (G) pushes against the diaphragm (H). The solenoid plunger (B) and the spring (A) by themselves are not strong enough to keep the water pressure from raising the diaphragm. Therefore, it is necessary to equalize this pressure on both sides of the diaphragm in order to keep the diaphragm in a closed position. Pressure builds up in the guide tube above the diaphragm and keeps it in a closed position. The flow of water is blocked until the solenoid is energized.

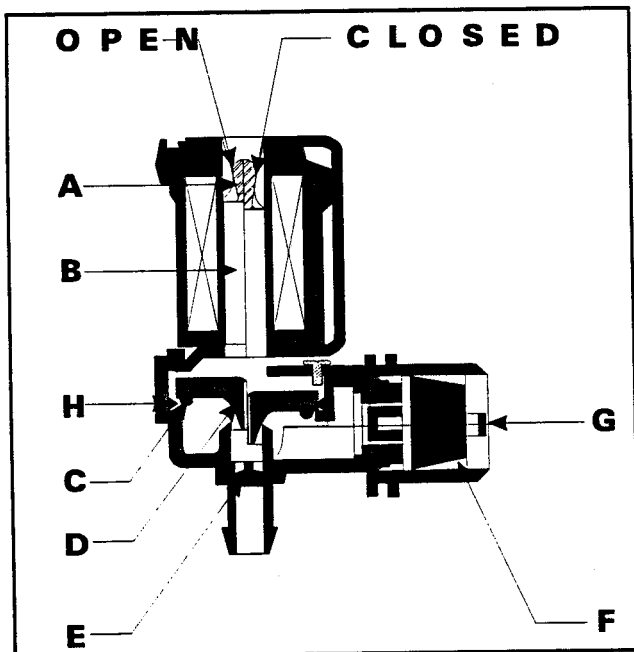


Figure 2-9

To do this, a small pilot hole (C) is provided in the diaphragm to allow water to flow into the plunger area. The water in the plunger area equalizes the pressure on both sides of the diaphragm. The spring pushes the plunger down into the center hole (D) of the diaphragm and closes it until the solenoid is energized. When the machine is in the fill positions of the cycle, the solenoid is energized (see previous figure), creating an electromagnetic field which pulls the plunger (b) away from the center hole of the diaphragm. This allows water to escape through the center hole in the diaphragm, reducing the pressure in the plunger area. The water pressure from the supply forces the diaphragm (H) upward and allows the water to run under the diaphragm through the outlet of the valve.

When the predetermined water level is reached, the solenoid is de-energized and the plunger spring (A) pushes the plunger (B) back into the diaphragm opening. Water is forced through pilot hole (C) until pressure is attained on the back side of the diaphragm, thus stopping the flow of water through the valve.

Some of the valves have a flow control (F,E) mounted in the inlet and outlet. This flow control gives a constant flow through the valve independent of the water pressure (over a reasonable range of water line pressure).

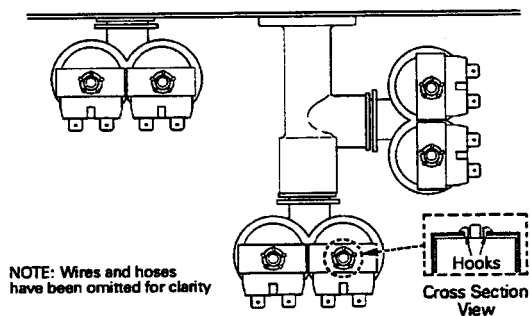
Service Tips

If the valve does not open or close, check the following:

Use caution when working with live circuits.

1. Check power to the solenoid - use voltmeter. Check for abnormal drop in voltage.

2. Check the solenoid for open circuit (failure in the coil).
3. Check that the water pressure corresponds to the rated pressure of the valve.
4. Check the filter screen in the water inlet and clean if necessary.
5. Check the pilot hole in the diaphragm to be sure it is not closed by foreign particles.
6. Check plunger and diaphragm for damage.
7. Check to see that the pilot hole in the diaphragm is positioned over the water inlet opening in the valve body. When replacing diaphragm, see that the pilot hole is in the correct position.



SL377TIF

8. Make sure you have the correct replacement valve for the model you are servicing.

VALVE REPAIR

In most cases, only the diaphragms require replacement. Valve diaphragm kits provide a means for quick repair of these valves.

Disconnect from power supply.

1. Push upward on the base of the solenoid to release from valve guide tube.
2. Turn valve guide tube to gain access to diaphragm (Turn counter clockwise).

WATER AND SUPPLY INJECTION

Detergent Dispenser

The detergent box in the MFR models uses a box-in-a-box design in which an inner three compartment supply box is mounted within a large container. The outer container is separated so that chemicals supplied from a pump-feeder system will be injected into the outer container and enter the outer tub (shell) at the bottom. A liquid supply hose runs from a connection at the back of the detergent box down to a "T" connection in the drain valve body just below the shell outlet. Undiluted chemicals are prediluted before coming in contact with the tubs or clothing load.

User-added powder is flushed out of the inner box into the front area of the outer box and into the top of the outer shell. MFR models use six water valve solenoids to inject hot and cold water from the supply into the washer. All water enters through the detergent box.

Four solenoid operated valves feed the detergent box and direct hot and cold water into the user supply area (inner box). Two separate hoses feed water into the rear of the detergent box and down the supply hose to the drain valve. These two separate hose lines are called "direct" fill and are primarily intended to flush chemicals in from the bottom of the tank.

Provision is made for up to five liquid supply lines into the rear of the dispenser box. The installer would have to drill the plugs from the nipple openings before connecting 3/8" supply hoses. A siphon tube is provided for liquid fabric systems in compartment 3. This siphon device will need periodic cleaning.

DOOR LOCK OPERATION

There are three switches, two direct current operated solenoids and mechanical interlatches involved in closing and locking of the loading door.
(See Figure 2-11 & 2-12)

As the door is closed:

A door hinge switch is depressed by a door hinge tab. This switch is identified as DS2 (door switch 2). At the door handle side, a tongue on the door handle lever enters the door lock housing and straddles a roller pin as the door closes. As this door lever tongue moves over the door lock roller pin, it moves in and pivots around the door roller pin. This provides a "toggle" action that pulls the door fully closed. At the same time it causes the tip of the door handle tongue to lift a flat "leaf" spring clear of the door handle lock arm. This lock arm will be moved by the door lock solenoid to lock the door when the machine is "in cycle". Additionally, an alignment pin on the

door lines up with and enters a socket (hole) just below the door lock roller pin. As this pin goes through the locating hole, the end of the pin presses an actuator leaf on the door switch, DS1 (door switch). Door switch 1 is connected in series with door switch 2 and closes just slightly behind it. Refer to the schematic and the following explanation for help in understanding how this works.

Program timer contact P15b (59 to 61) is closed at the end/start of increment number 52. This provides power to the coin acceptor and upon satisfaction of the vend price, the coin acceptor feeds power to the timer program motor. The timer motor will drive the timer ahead to increment #1; the beginning of the cycle. At increment 1, timer P15B opens and P15T closes (63 to 57). The timer motor is dropped out as a circuit from line one and is made through 63 to-57 to the DS1 door switch, through the DS2 door hinge switch to wire #8 which feeds the door lock bridge rectifier. As mentioned previously, the door lock solenoid pushes the door lock arm (moves it to the right) behind the tongue of the door handle. With the door lock arm positioned behind the door handle tongue, the door handle cannot be rotated back to the open position. The door is locked as long as the arm remains in this position. The door lock solenoid is energized for the majority of every cycle.

The operating voltage of these circuits is 240 volts AC (except on the 120V 18 pound models). The bridge rectifier changes this AC voltage to direct current for operation of the solenoids at around 200 volts DC. A line voltage operated bi-metal actuator is used to provide a safety time delay period in case of power failure during an operating cycle.

This bi-metal heater is fed from the door safety switch DS3, along with most of the operating circuits of the washer. DS3 (door switch 3) is actuated by the action of the handle latch bar movement. When the door lock solenoid armature moves over to the right as it pulls in, the snap ring engages a leaf on the door lock switch. The washer will not operate unless the door is closed and locked.

Door lock assemblies produced after series 10 (first two digits of the serial number) use a roller-arm switch to follow movement of the handle latch bar to determine locked position. The original "straight" handle latch bar was modified to add a "tee" on the left side. The roller switch rests on this "tee" and is activated

as the latch bar is pushed to the right by the lock solenoid. The switch returns to its normal position when the door lock is released (unlocked).

Pay attention when ordering door lock parts to refer to the serial number of the washers series 11 and later use the roller switch.

As the bi-metal warms up (about 30 seconds) it pushes the lock solenoid blocking arm down behind the solenoid armature. With the arm so positioned, the lock solenoid cannot react and therefore the door cannot be opened (even if you turn the power off). When power is removed from the bi-metal, it lifts the blocking arm out of the way as it cools. **NOTE: This can take up to two minutes.**

DOOR LOCK ASSEMBLY (Original)

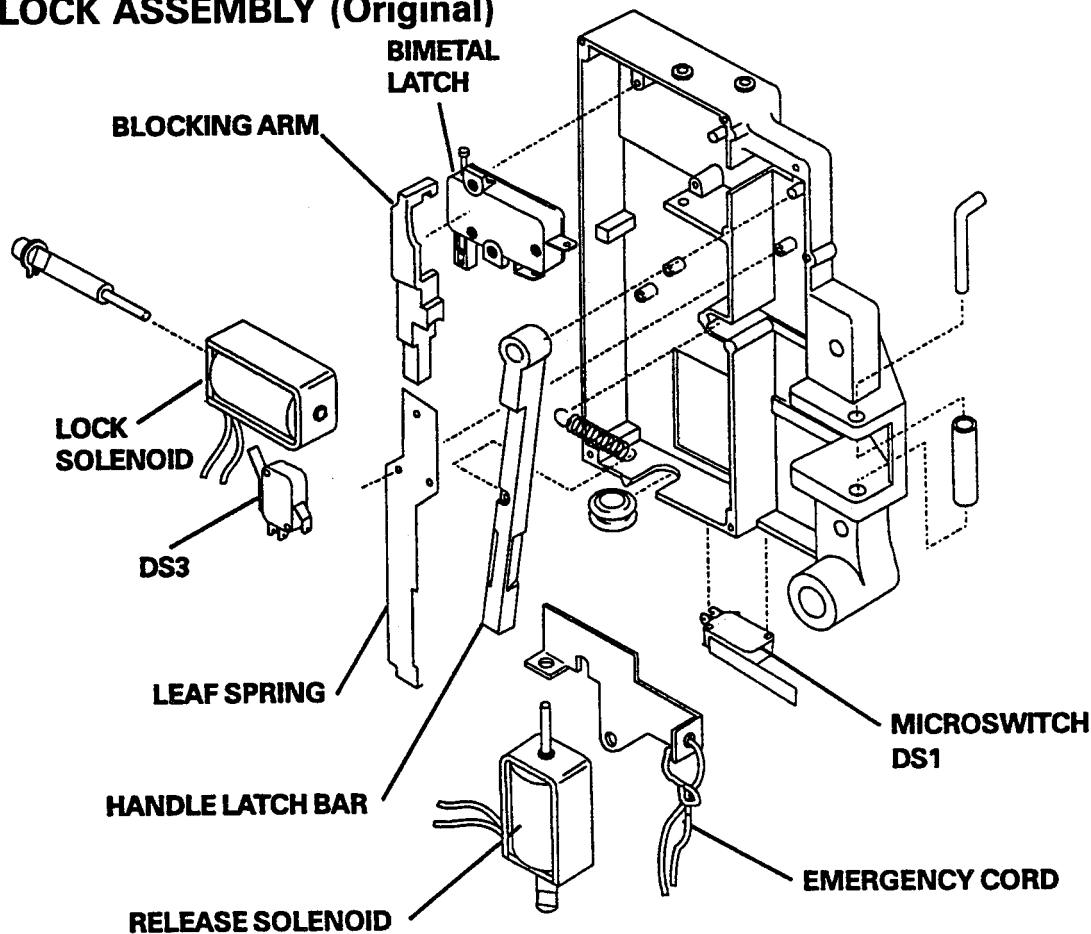


Figure 2-11

EMERGENCY DOOR RELEASE

Provisions have been made to manually release the door lock in case of component failure. **With electrical power removed from the machine**, remove the lower service access panel. Located at the upper left corner of the service compartment is a nylon release cord which may be pulled down to lift the door lock sole-

noid blocking arm. This will be easier to pull if you give the bi-metal a little time to cool before using the manual release. This will only work if the power is off.

Door Release

At the end of the cycle, the release solenoid lifts the blocking arm to allow the lock solenoid to move to the unlocked position. There is no delay in normal operation.

DOOR LOCK ASSEMBLY (Revised)

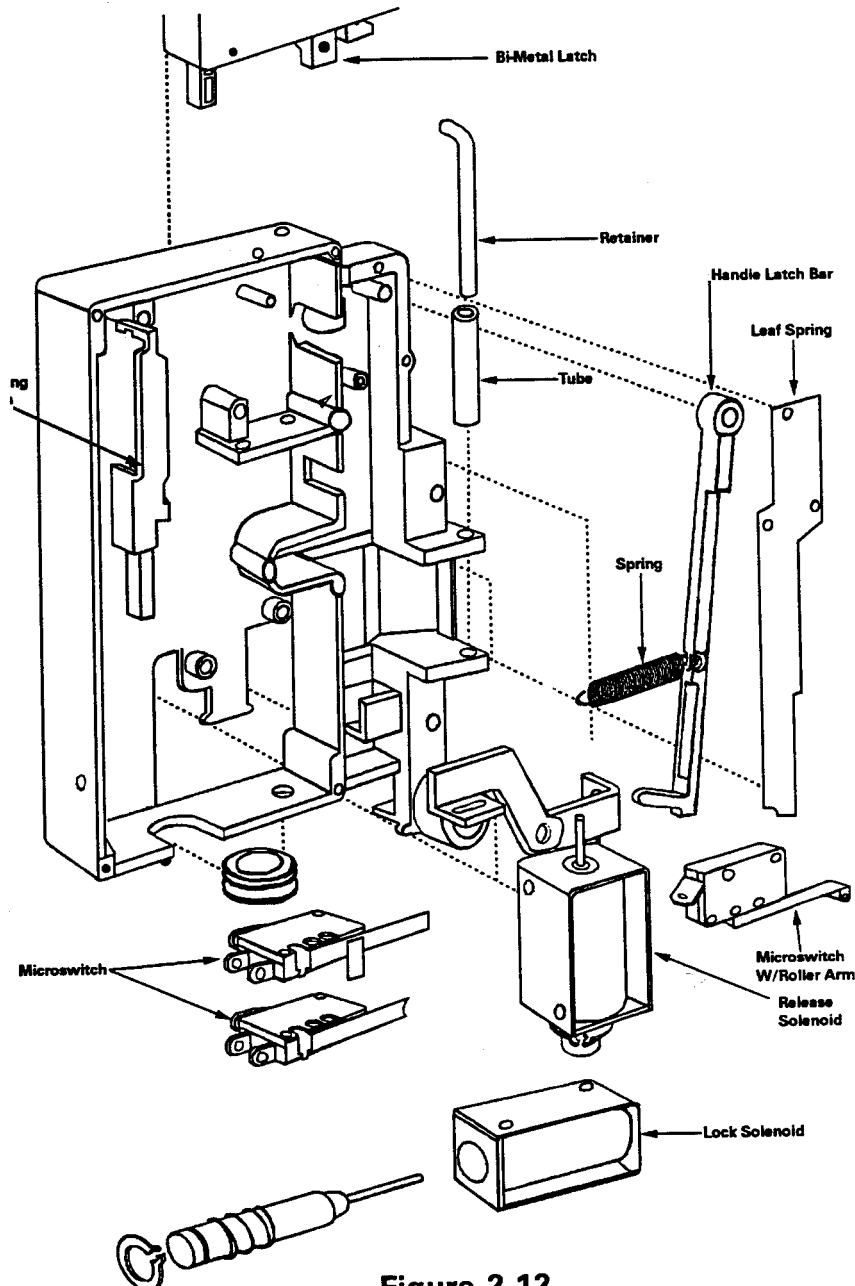


Figure 2-12

DOOR LOCK BI-METAL LATCH

Microprocessor Models:

Unlike the timer based models in which the bi-metal door lock latch is powered from a separate wire than the door lock solenoid, the door lock solenoid coil and the bi-metal latch are wired in parallel. (See Figure 2-11) In order to test the function of the bi-metal latch, the microprocessor (and the program) allows one and a half minutes from the start of the cycle for the bi-metal to heat. It then drops relay RL-18 out of the circuit for about 15 seconds.

If the bi-metal was not functioning, or if it was slow to heat, the door lock micro-switch would be released when RL-18 drops the DC power to the solenoid and the bi-metal (remember they are wired in parallel). This would also result in a door lock fault with the fault LED on.

Since most of the MFR (PC version) models are rated for 240 volts, there could be some bi-metal problems when these are installed on 208 volt supplies that run less than 200 volts. This type of installation would be a good candidate for a boost transformer.

Timer Models:

The timer models use a different method of checking the bi-metal function. For most of the cycle, except for one increment of the second rinse, the door lock solenoid is constantly powered. At that one increment, the door lock solenoid contact in the timer opens. If the bi-metal is not doing its job, the door will be released and the cycle will be terminated. If the bi-metal is properly heated, the blocking arm will be down and will keep the door locked through the "check increment."

DOOR LOCK ASSEMBLY

Removal:

1. Disconnect machine from power supply.
2. Remove the front and lower service access panels.
3. Remove the upper front panel.
4. Disconnect the wiring harness plug and wiring.
5. Remove the two screws that hold the lock assembly to the shell (tub) front.
6. A plate covers the internal parts of the door lock assembly. In general, the door lock assembly is removed from the shell front. In either case removal of the mounting bolts is all that is required.

DOOR ASSEMBLY

Disconnect machine from power supply.

The door may be removed from the door hinge or the hinge assembly may be removed from the shell front. In either case removal of the mounting bolts is all that is required.

When reassembling the door, the door lock should be in place for proper alignment of the door locating pin with the door lock locating socket.

LOADING DOOR GLASS AND DOOR GASKET

MFR 18-50:

The door glass is held in place by the door glass gasket.

The door gasket is held in place in the door rim by tension. It is forced over the lip of the door rim and the door glass is forced into a groove in the gasket.

A tension wire and spring are used around the door gaskets of the larger washers to maintain seal pressure against the shell front opening lip.

MFR80:

The door glass is held in place by a retaining ring and eight fasteners.

WASHBASKET, SHELL, REAR PLATE AND BEARINGS

Removal:

1. Disconnect machine from power supply.
2. Remove cabinet or at least the front panels (control panel, main panel and lower service panel) and top panel from the washer.
3. Remove the back panel.
4. Remove the tub support brace between the shell rear plate and the frame. This is on the left side looking from the back.
5. Remove the hoses from the tub (over flow and drain hoses).
6. Mark the shell position with a pen by drawing lines up against the shell bands (marks front to back position) and mark the shell and frame cradle at the bottom for rotation position.
7. Remove the shell bands and by using a couple of 4x4s to protect the front of the shell, "flip" the washbasket and shell assembly onto its front in front of the washer. (Get some help for this, it's heavy!)
8. Mark the position of the shell to rear plate and of the clamp rings to see that they are in the same position at reassembly.
9. Remove the basket drive pulley. You will probably need a puller. Thread a bolt into the shaft to protect the threads. The bolt should be long enough to allow pulling the drive pulley off of the shaft before the puller center bolt hits the pulley hub. A 3 to 4 inch long 12mm bolt works well. See a later step for removing the pulley for the MFR35. A taper-bushing and drive key are used in that model.
10. When replacing the drive pulley, use a new tolerance ring on the basket shaft (except on the MFR35).
11. Mark the position of the rear plate clamp rings, brackets and hoses. It is **very easy** to have one hole misaligned when reassembling the rear shell plate assembly.
12. Remove the clamp ring bolts from the perimeter of the shell rear plate.
13. Use your puller to remove the entire back plate assembly from the basket shaft. Using a bolt to protect the threads in the washbasket shaft, hook the puller over the bearing housing rim and tighten the puller center bolt. This will lift the assembly from the basket shaft.
14. After the rear plate has been separated from the back of the shell, get some help to lift the rear plate assembly off of the basket shaft and shell or lay the shell and basket assembly on its side and pull the rear plate free. We can now address the bearing housing, bearings and water seal assemblies.

15. Once the rear plate is lifted free of the shell and basket, the washbasket can be lifted out for inspection and/or service.

Rear Plate Assembly

1. **Disconnect from power supply.**

2. The rear plate assembly is made up of the inner stainless steel rear shell plate (this plate comes in contact with wash water), the thick (and very heavy) rear support plate, the bearing housing assembly (contains the seal and bearings) and the supporting spokes. These plates are referred to in the parts catalog as back plates or basis plates.

3. Check and mark the position of these parts if you have not already done so.

4. Remove the support spokes (not a bad idea to number the spoke and the rear plate so you put each spoke in the same position at reassembly).

New copper seal washers are required when the bearing housing and spokes are reassembled.

5. The spokes in the 50 pound washer are "rod" type as compared to the "welded bracket" type used in the 18, 25 and 35 pound models.
6. Remove the bearing housing to a bench area for bearing and seal replacement.
7. The bearing for the MFR50 is considerably heavier than those used in the smaller models. When servicing the MFR50, after removing the basket drive pulley, remove the bearing housing. "Jack bolts" are used to lift the housing free of the back plate assembly.

8. For the MFR35, first remove the drive pulley. The taper-lock bushing will allow you to remove the two bushing bolts and move one of them to the threaded "jack-bolt" hole in the bushing. The pulley can then be removed. Remove the drive key from the basket shaft keyway.

9. After removing the six bolts that secure the spoke rods to the bearing housing, insert three 12mm by 2 or 3 inch hardened bolts into the jack bolt holes in the lower rim of the housing. Alternately tighten these jack-bolts to force the bearing housing free of the basket shaft.

10. The bearing housing assembly (trunnion assembly) may now be serviced.

BEARINGS

MFR18

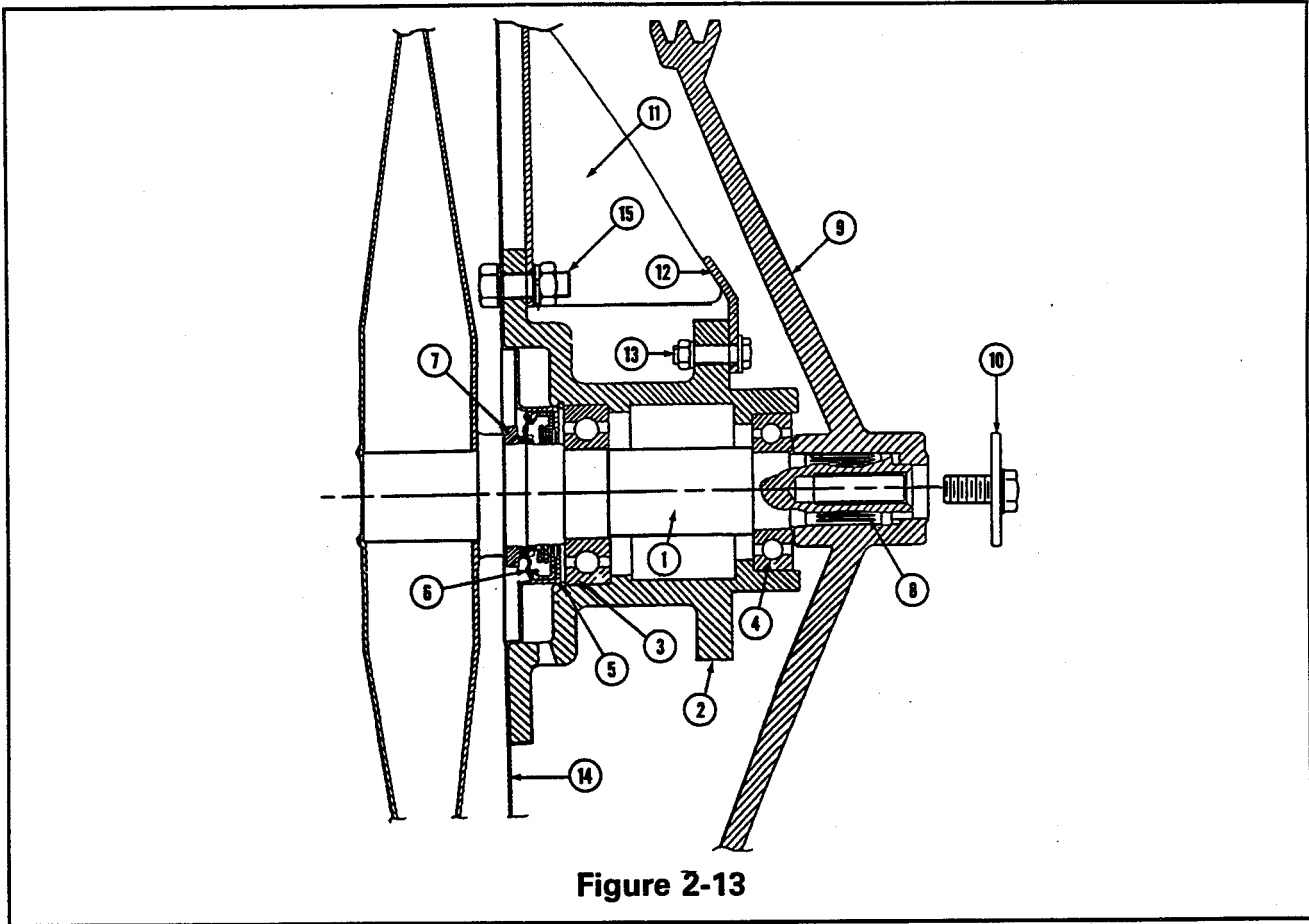


Figure 2-13

- | | |
|-----------------------------|------------------------------------|
| 1. Main shaft | 9. Basket drive pulley |
| 2. Bearing Housing | 10. Bolt M12 x 25 |
| 3. Bearing 6207 2Z | 11. Spoke |
| 4. Bearing 6206 2Z | 12. Spoke bracket bearing housing |
| 5. Snap ring | 13. Bolt M8 x 35 |
| 6. Axial joint ring | 14. Stainless steel rear tub plate |
| 7. Counter ring (seal face) | 15. Bolt M10 x 25 |
| 8. Tolerance ring | |

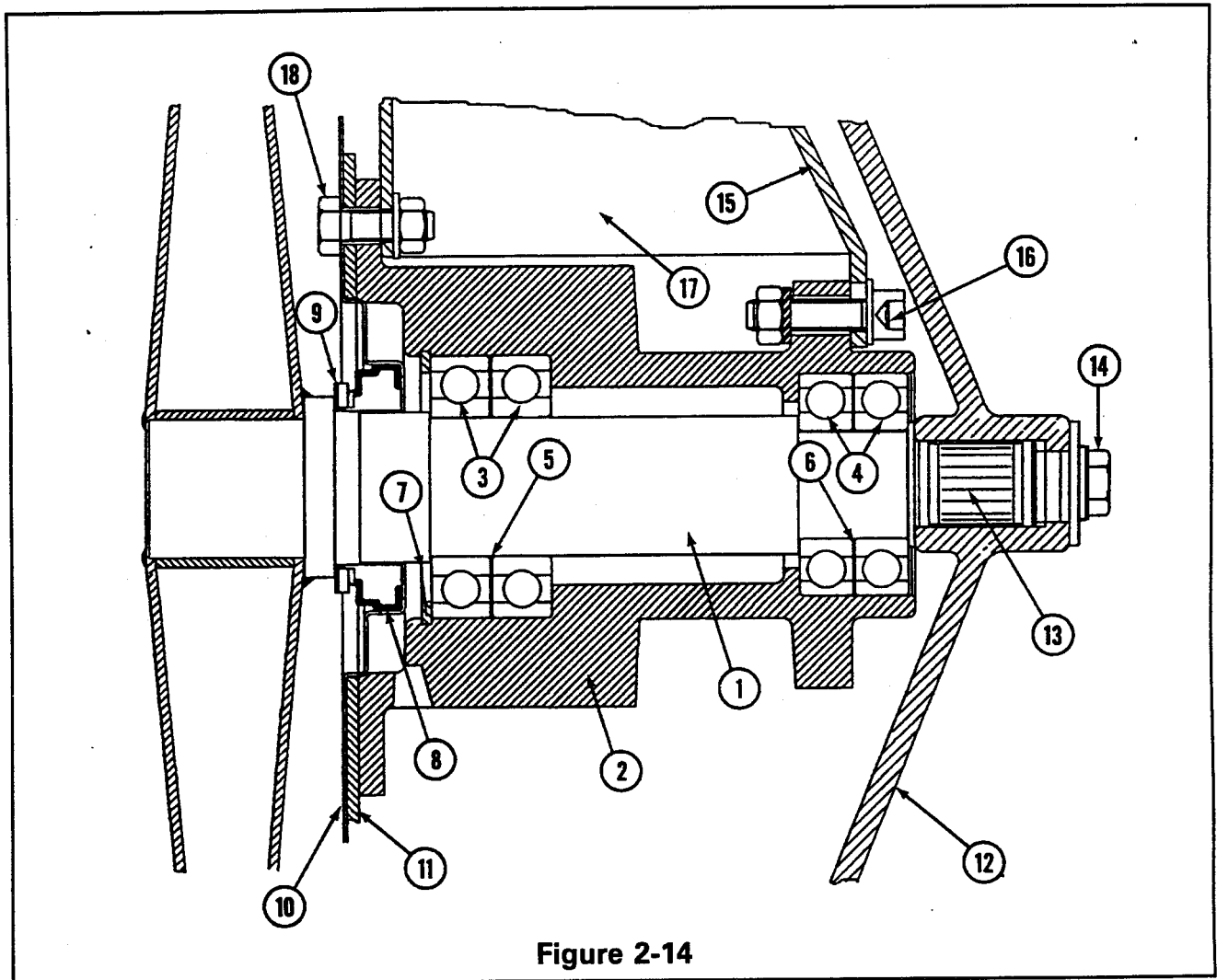


Figure 2-14

- | | |
|---|---------------------------------|
| 1. Main bearing basket shaft | 10. Back plate, stainless steel |
| 2. Bearing housing | 11. Back plate, steel |
| 3. Bearing 6209 2Z | 12. Basket drive pulley |
| 4. Bearing 6207 2Z | 13. Tolerance ring |
| 5. Washer Ø48 x 60 x 0.5
(Removed on later models) | 14. Bolt M12 x 25 |
| 6. Washer Ø36 x 47 x 0.5
(Removed on later models) | 15. Spoke bracket |
| 7. Snap ring | 16. Bolt M10 x 40 |
| 8. Seal assembly | 17. Spoke |
| 9. Seal face ring | 18. Bolt M10 x 30 |

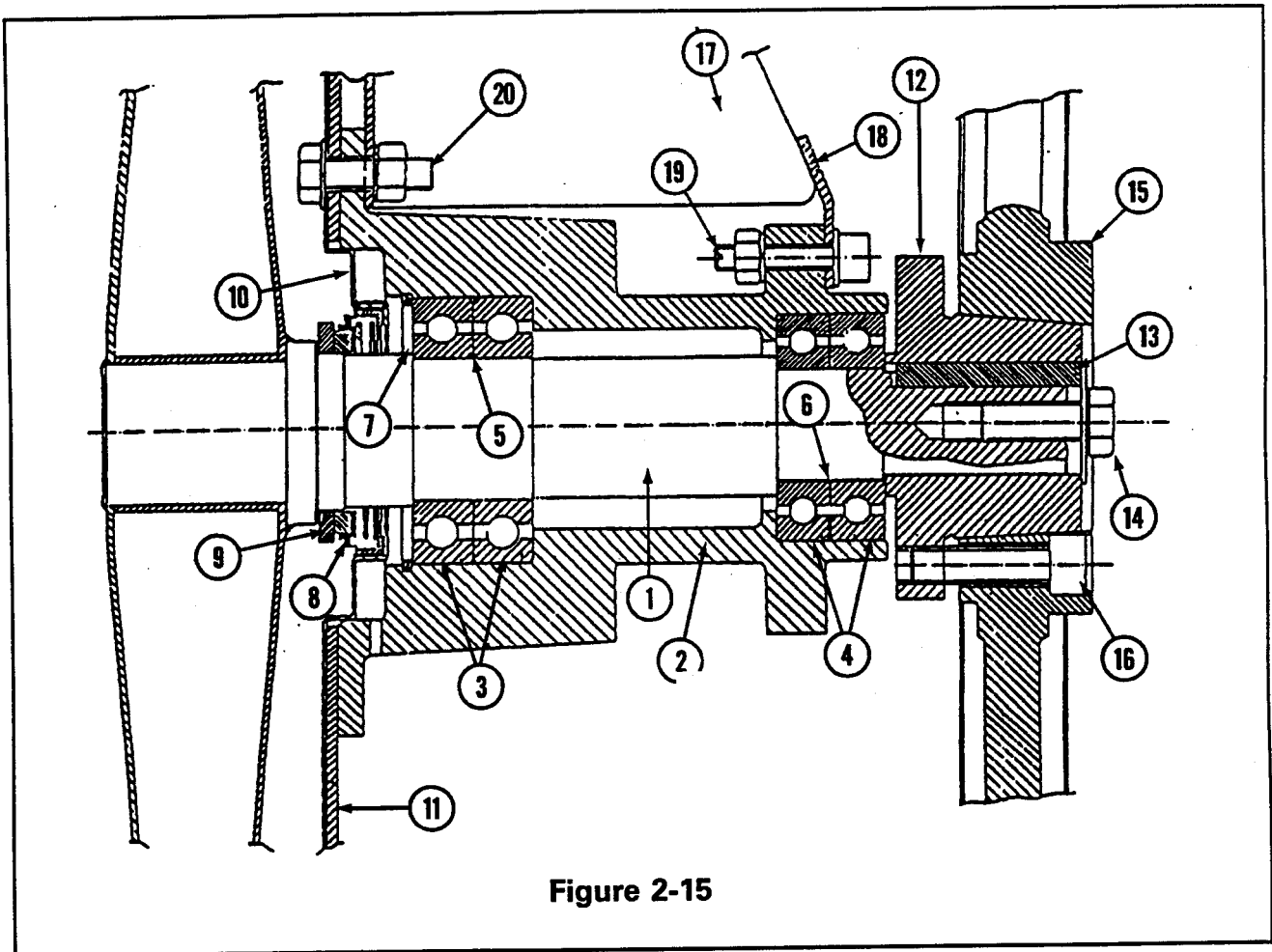


Figure 2-15

- | | |
|---|--------------------------------------|
| 1. Basket shaft | 10. Back plate, stainless steel |
| 2. Bearing housing | 11. Back plate, steel |
| 3. Bearing 6209 2Z | 12. Taper lock bushing, drive pulley |
| 4. Bearing 6207 2Z | 13. Wedge |
| 5. Washer Ø60 x 45 x 0.5
(Removed on later models) | 14. Bolt M10 x 35 |
| 6. Washer Ø47 x 36,5 x 0.5
(Removed on later models) | 15. Basket drive pulley |
| 7. Snap ring | 16. Bolt M10 x 50 |
| 8. Seal assembly | 17. Spoke |
| 9. Seal face | 18. Spoke bracket, bearing housing |
| | 19. Bolt M10 x 40 |
| | 20. Bolt M10 x 35 |

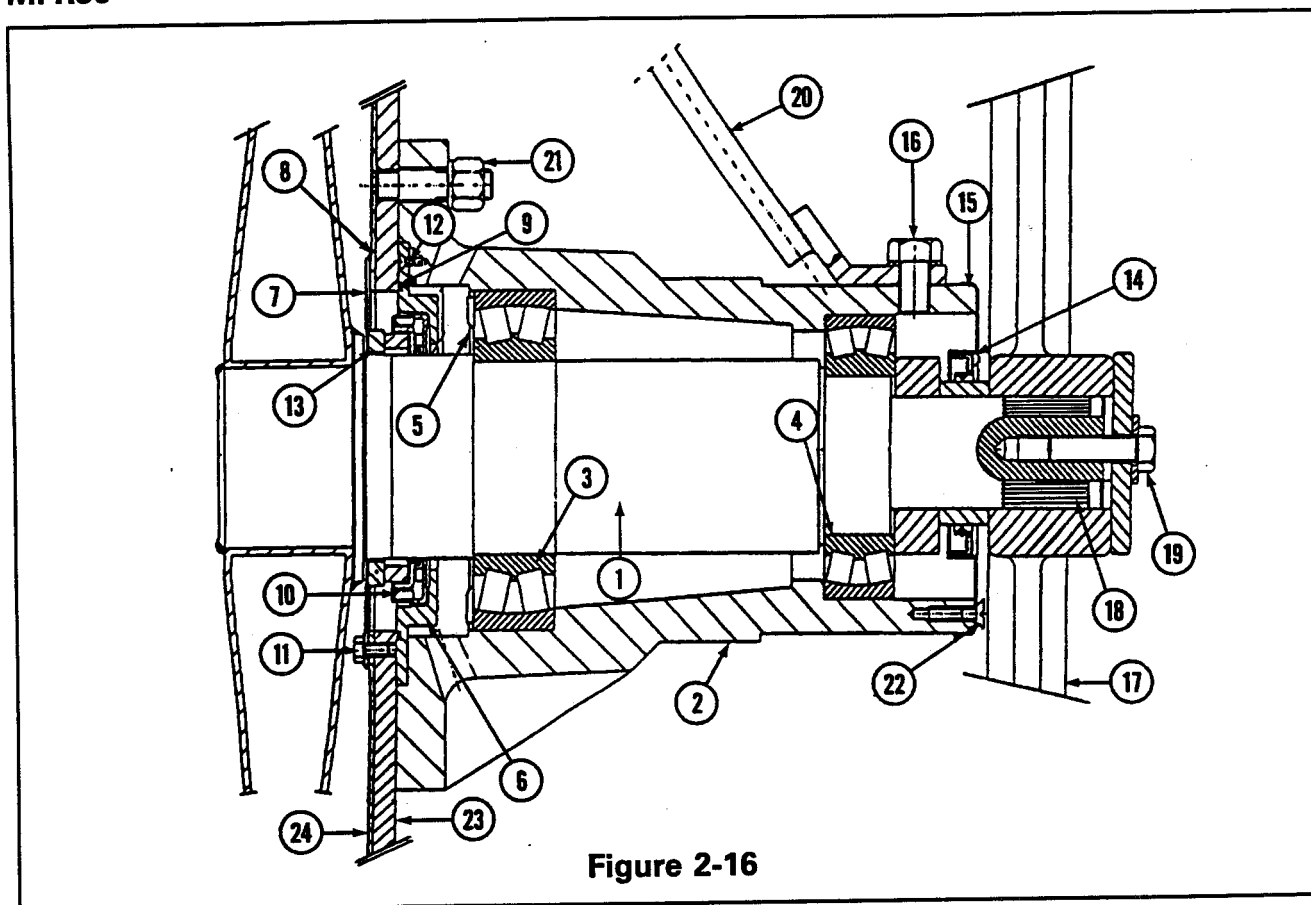


Figure 2-16

- | | |
|---|--------------------------------------|
| 1. Main shaft | 13. Seal face ring |
| 2. Bearing housing | 14. Spacer ring |
| 3. Bearing 22217 CC/C3 W33 | 15. Seal holder |
| 4. Bearing 22214 CC/C3 | 16. Bolt M14 x 25 |
| 5. Nilos ring 6217 AV | 17. Bracket drive pulley |
| 6. Seal holder bronze | 18. Tolerance ring Ø50/40 for pulley |
| 7. Stainless steel ring 18/8 Ø148 x 215 x 3 | 19. Bolt M14 x 50 |
| 8. Rubber gasket, 6 holes | 20. Spoke |
| 9. O-ring Viton Ø150 x 3 | 21. Nut M14 |
| 10. Seal assembly | 22. Screw M5 x 7 |
| 11. Bolt M6 x 12 | 23. Back plate, steel |
| 12. Screw stainless steel M4 x 12 | 24. Back plate, stainless steel |

BEARING HOUSING AND WATER SEALS

Seal and Bearing Replacement MFR18, MFR25, MFR35 and MFR50

The water seal uses a spring loaded carbon faced ring against a stainless steel seal ring which is sealed to and rotates with the washbasket shaft.

1. **Disconnect from power supply.**
2. Gain access to the bearing housing and basket shaft to service or replace the seal parts.
3. Remove the seal from the front of the bearing housing by pulling or prying out on the bearing seal.
4. On the MFR50, the seal is mounted in a seal holder which in turn is mounted to the front of the bearing housing by screws.
5. Use a thin coating of silicone RTV in the seal recess and press the new seal into position. It is important that the seal be pressed into place straight.
6. When replacing the seal in the MFR50, wet the seal in a 50% water/ 50% methanol mixture and press into place in the seal holder.

Bearing Replacement

7. The front bearings are locked in place by an internal snap ring retainer. Remove the snap ring before attempting bearing removal.
8. The bearings can be tapped out by using a drift pin (section of water pipe, steel rod, etc.) inserted from the back and moved in a circular motion against the bearing rim so as to evenly push the bearing(s) out the front. We are not concerned here with saving the bearings as much as we are with avoiding damage to the housing.
9. Reversing the drift pin will allow the rear bearing(s) to be removed in a similar manner.
10. With seal and bearings removed, the next step is a thorough cleaning (and de-greasing) of the housing. If this is a "shop job", consider repainting the housing if needed.
11. With the housing de-greased and cleaned, new bearings are pressed into place using a bearing press if available. In the field this may be a large diameter threaded rod and some large washers and nuts. It is important to press the bearings into the housing straight using pressure only on the outer rim of the bearing so as to avoid excessive loading of the inner race of the bearing.
12. Use Loctite 638 on the outer circumference of the new bearings.
13. On the 25 and 35 pound washers, two bearings are used both at the front and at rear of the housing. Press the first bearings into position, place the spacer washers in next (if used) and then press the outside bearings into place. Use a new internal snap ring in front of the front bearing(s).
14. The bearing weep hole must be clear and positioned at the bottom when reinstalled.
15. Use new copper seal washers under the bearing housing bolt heads on the inside of the shell back plate.
16. Use a new shell back gasket when reassembling the shell components.

SEAL AND BEARING REPLACEMENT MFR50

The MFR50 uses wide roller bearing assemblies front and rear in the bearing housing. Even though the bearings appear to be single bearings, each roller bearing has two rows of roller bearings against the bearing race. The water seal is glued (silicone sealant) into a seal holder along with an "O" ring. The seal holder is held to the front of the bearing housing by stainless steel screws. A spacer ring is used between the seal assembly and the front bearing.

WASHBASKET SEAL FACE REPLACEMENT

1. **Disconnect from power supply.**
2. The stainless steel ring is pressed into the washbasket shaft and sealed by means of a rubber "O"ring.
3. Remove the old seal ring and "O"ring (by prying if off) from the basket and clean the shaft.
4. Install a new "O" ring on the shaft.
5. When installing the new ring note that one edge is beveled. This beveled side must be placed next to the back of the basket. Check that the seal ring surface is clean before re-assembling the back plate assembly back into the washbasket.
6. Check the alignment marks that were made in disassembly and set the shell back plate into the correct position. The overflow hose will be in approximately the 9:00 o'clock to 10:00 o'clock position as viewed from the back.
7. Replace the assembly using the location marks made at disassembly.
8. Recheck the belt alignment before completing the tightening of the shell bands. The front to back position of the shell affects the pulley position and affects the belt alignment.
9. Continue reassembly in reverse order of disassembly paying close attention to shell position marks made earlier.
10. Reconnect the harness plugs disconnected earlier and replace any wire ties that were cut during disassembly.
11. Replace and check all hose connections.

REASSEMBLY OF BACK PLATE, BEARING HOUSING AND BASKET

1. **Disconnect from power supply.**
12. If the cabinet was removed, check the front to back alignment to be sure the cabinet is in alignment with adjacent machines.
13. Restore electrical power and check for proper machine operation.

DRAIN VALVE

The drain valve (see following figure) consists of a motor, a valve body, shaft, return spring and a pivoting ball inside the body. (See Figure 2-17)

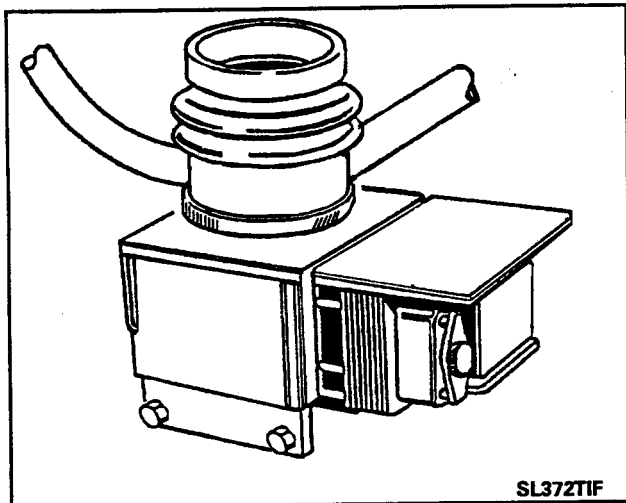


Figure 2-17

The drain valve is normally open which means it closes when power is applied; and when power is removed the valve reopens automatically. The drain valve is controlled by the program timer or control board in MFR (PC/PN models). The normally open drain valve permits the machine to drain in the event of a power failure.

Service Tips

Disconnect from power supply.

1. Check the motor winding for continuity, short circuit or abnormal drop in voltage.
2. Check for leaks if the valve has failed.
3. Check that the shaft and rotor of the motor turn freely.
4. Check that the internal valve is closing and does not bind. Foreign matter may be stuck inside the valve.

OVERFLOW

The machine has overflow protection via the overflow system. The overflow system consists of a nipple fitting in the back of the shell assembly (outer tub), overflow hose, and nipple fitting on the drain outlet connection.

In case of overflow, water is routed from the overflow nipple fitting (note: the overflow outlet is located several inches higher than the normal fit height in the shell assembly) and out the drain. The outlet of the overflow hose connection is on the outlet side of the drain valve and allows the overflow to work even if the drain is closed.

Vents

There is one vent located on the machine. The vent is used as an air break for the soap compartment and outer tub. The purpose of the vent is to prevent an air tight compartment from siphoning and/or to prevent contaminated water from entering a fresh water supply. Vapors from hot water may escape from the vents into the atmosphere. Use caution in this area due to the possibility of hot vapors.

DRIVE MOTOR

Standard models, are equipped with either three phase or single phase two-speed asynchronous motors with two separate windings. (See Figure 2-18) The wash speed winding is 18 pole and the spin speed winding is 2 pole.

400/3600 (Theoretical)
360/3450 (Nominal)

There is a thermal overload protector embedded in each winding. This acts as a normally closed switch which will open when the winding overheats. When the overload protector opens, the power to the motor contactor coil is switched off. Power remains on for the program timer, thus advancing it in normal mode to the end of the cycle.

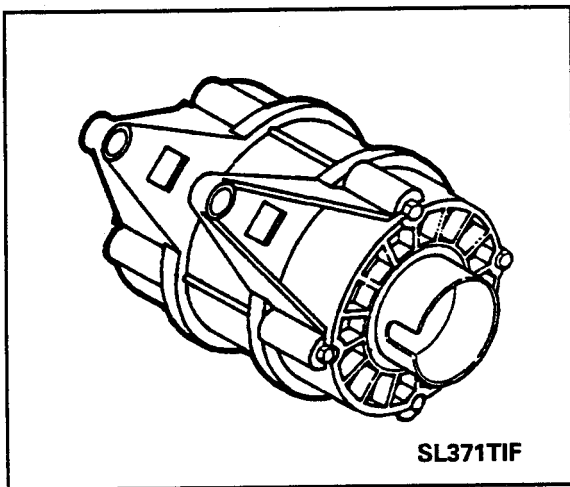


Figure 2-18

3-Phase Motors

Three phase motors are two (2) and eighteen (18) pole Y-connected with an idling rpm of 360 on wash speed and 3450 rpm at spin speed. The wash speed reversing operation is achieved by changing two of the phases every 15 seconds. This is done by timer contacts in the electromechanical timer models

and by a pair of relays (contactors) in the microprocessor models.

Single Phase Motors

Single phase motors used on the Maytag models have two sets of windings. For spin (extract speed), a two pole winding set (main or run winding and auxiliary or start winding) is used. The wash or tumble speed windings are 18 pole delta connected (three windings connected end to end in a triangle configuration). A capacitor is permanently connected across one of the windings to effect a phase shift to the supply voltage.

Single Phase Wash Speed Operation (18 pole windings)

As single phase power is applied, counteracting magnetic fields are produced which provide starting torque and determine running direction of the motor. The power input is applied across one of the windings with the remaining two windings in series and in parallel with the "main" winding. In effect, the "main" winding receives full applied line voltage and the two remaining windings being in series with each other divide the applied line voltage.

A run capacitor of selected value is connected across one of the two "phase" windings. The addition of the capacitor provides an additional current path, thereby increasing the current that is passed by the remaining phase winding that does not have a capacitor across it. This results in magnetic fields in the motor that cause the motor to start and run in a favored direction. The apex of the windings opposite the winding that is paralleled by the run capacitor is used as

the "common" for the wash windings. By alternating the remaining input line from one side of the capacitor to the other, the resulting phase shifts will reverse the motor direction.

The capacitor value is selected to balance capacitive reactance to the inductance of the wash winding. This is usually not a problem over small variations in line voltage. This can be a problem with the motors in the 208 to 240 volt models. The rule of thumb is to increase capacitance for lower voltage and decrease for higher voltage.

Single Phase Spin Speed Operation (2 Pole Windings)

Two windings are used for the spin operation: a main winding and an auxiliary winding. They are connected in an "L" configuration, with the point of the "L" being the common.

Because of the torque requirements to rotate the washbasket in spin, an extra capacitor is used in the 208 to 240 volt models to provide additional starting torque. This extra capacitance cannot be left in the motor circuit for very long or overheating of the motor would result. A separate starting circuit is used to switch the extra capacitor(s) out of the motor circuit as the motor attains running speed.

The ELMO brand motor is manufactured in Sweden and can be recognized as having cast aluminum end bells and an open appearance. The ELMO motor uses a centrifugal starting switch mounted to the front of the motor.

DRIVE BELTS AND DRIVE MOTOR

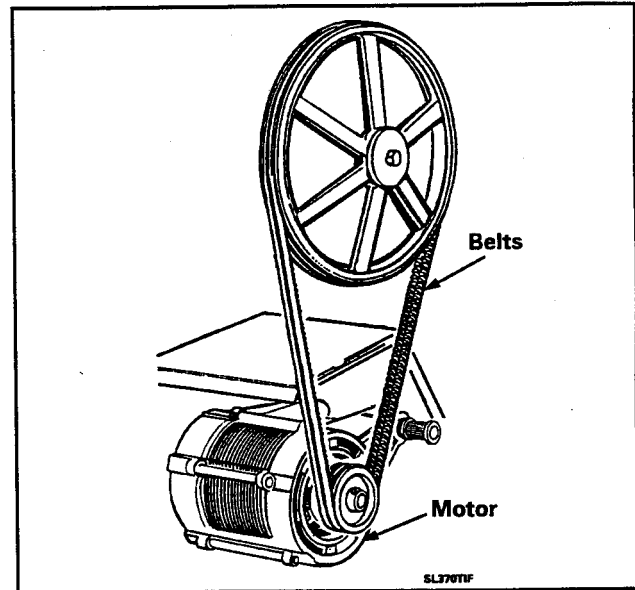


Figure 2-19

Removal:

1. Disconnect from power supply.
2. Rear panel must be removed if cabinet is still in place.
3. Lift motor to relieve belt tension and roll belts off of the basket drive pulley. (See Figure 2-19)
4. Remove the drive motor tension spring. Use locking pliers to remove the spring.
5. Disconnect wiring harness plug from motor.
6. Remove motor ground wires.
7. Remove the two wires from the centrifugal switch on the front of the single phase motors.
8. Loosen the set screws in the front shaft collar and remove the front bolt and washer from the motor support shaft.

9. Slide the pivot shaft out of the motor brackets toward the back and slide the motor out the back. Hint: use a steel plate under the motor to make it slide easier.
10. When replacing the motor be sure to check belt alignment. The motor positioning collars will allow you to move the motor forward or back on the pivot shaft.
11. Replace belts when they show signs of fraying or cracking. (Replace belts in complete sets).

CENTRIFUGAL SWITCH

The ELMO motor uses a mechanical switch to disconnect the starting capacitor(s) as the motor reaches extraction speed. A three section governor weight assembly is secured to the motor shaft by an Allen set screw. This governor assembly must be positioned on the motor shaft close enough to the motor end bell to engage the fingers of the centrifugal switch but not so close as to hit during wash speed operation.

The governor assembly is designed to keep the centrifugal switch closed below motor speeds of 1100 rpm. At wash speed, the switch remains closed.

In spin, centrifugal force overcomes the three governor springs and the fly weight segments move to the outer position. As the segments move out, they move the fingers on the stationary switch plate, opening the start switch contacts. As the motor slows to stop, the springs will overcome the centrifugal force moving the switch back to the closed position.

MFR ("PD" VERSION) ENHANCEMENTS

The following covers the enhancements of the MFR35-80PD

CONTROL BOARD

All fill and run operations are controlled by a Maytag designed microprocessor control board and low voltage relays. (See *Figure 2-20*) Inputs from the door switch work in conjunction with a membrane "touch pad" selector to select and start cycles.

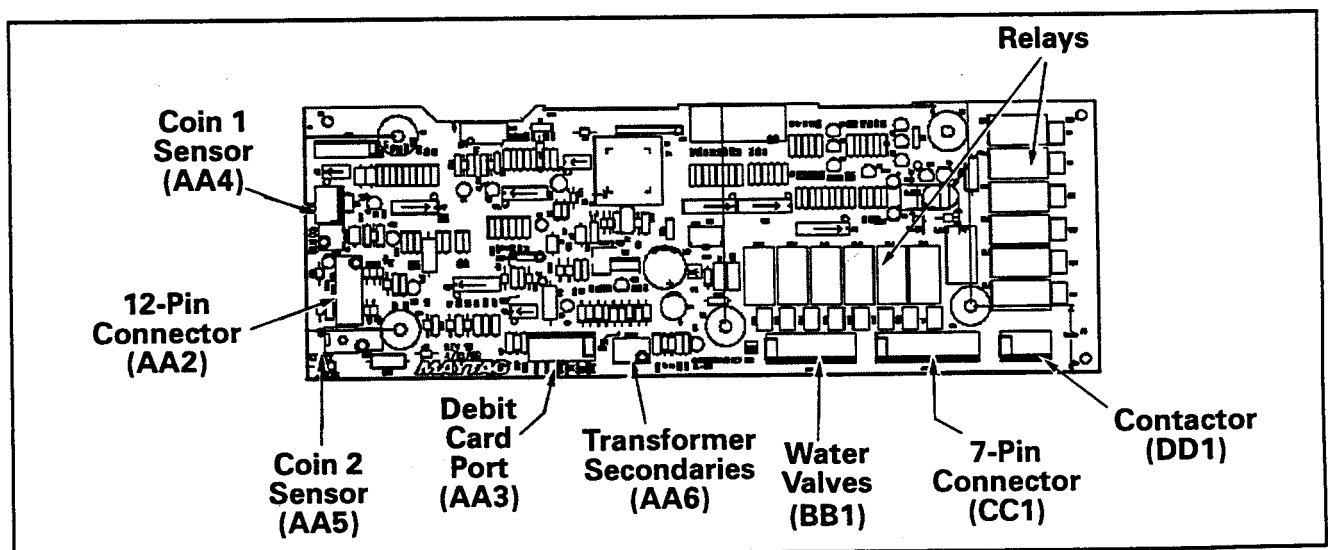


Figure 2-20

Removal:

Disconnect the power to the machine before servicing. The control board is secured to the back of the control panel. To gain access the top cover by turning the two service keys after removing the four screws securing the soap box to the top cover.

Observe the position of the harness connections plugged into the control board. If you place the connector on backwards, the washer will not function properly.

Control Board Harness Connection		
Connector	Wire #	Component
Temp-Probe Connection		
AA1-1		Not Used
AA1-2		Not Used
AA1-3		Not Used
12-Pin Connector		
AA2-1	23	Pressure Switch/ "Wash" Level
AA2-2	7	Door Lock Sense
AA2-3	27	Motor Overcurrent
AA2-4	14	Motor Overtemp
AA2-5	6	Motor Overcurrent
AA2-6	23	Not Used
AA2-7	21	Common - 23VDC
AA2-8	5	Vault Switch
AA2-9		Not Used
AA2-10	8	Pressure Switch/ "Drain" Level
AA2-11	4	Service Switch
AA2-12		Not Used
Debit Card Reader Port		
AA3	1	Avail 2
	2	Avail 1
	3	Enable 1
	4	Enable 2
	5	Power
	6	Common

Figure 2-21

Coin 1 Sensor		
AA4-1	Blue	L.E.D.
AA4-2	Red	Photo-Transistor
AA4-3	White	Photo-Transistor
AA5-4	White/Blue	L.E.D.
Connector	Wire #	Component
Coin 2 Sensor		
AA5-1	Blue	L.E.D.
AA5-2	Red	Photo-Transistor
AA5-3	White	Photo-Transistor
AA5-4	White/Blue	L.E.D.
Transformer Secondaries		
AA6-1	Yellow	2.65 VAC (To AA6-2 or AA6-5)
AA6-2	Orange	2.65 VAC (To AA6-1)
AA6-3	White	22.5 VAC (To AA6-6)
AA6-4		Not Used
AA6-5	Orange	2.65 VAC (To AA6-1)
AA6-6	White	22.5 VAC (To AA6-3)
Water Valve		
BB1-1	30	Last Rinse "Cold" (SV1)
BB1-2	32	Prewash "Cold" (SV2)
BB1-3	20	Hot Water Direct (SV3)
BB1-4	42	Wash "Hot" (SV4)
BB1-5	35	Wash "Cold" (SV5)
BB1-6	46	Cold Water direct (SV6)
7-Pin Connector		
CC1-1	22	Pressure Switch
CC1-2		"L2" Power
CC1-3	45	Door Switch
CC1-4	58	Drain Valve (DV)
CC1-5	36	Door Unlock Solenoid
CC1-6	38	Door Lock Solenoid/Bi-Metal Latch
CC1-7		Not Used
Contactors		
DD1-1	26	Spin Contactor (CM3 or CM9)
DD1-2	52	Wash Contactor Left (CM1L)
DD1-3	53	Wash Contactor Right (CM1R)
Power Source		
EE1-1	Gray/Black	L2
EE1-2	Brown	Voltage Selector Switch 208-220V
EE1-3	Blue	Voltage Selector Switch 230-240V

Figure 2-21

TOUCH PAD ASSEMBLY

The touch pad may be checked with an ohmmeter according to the following drawing. (See Figure 2-22)

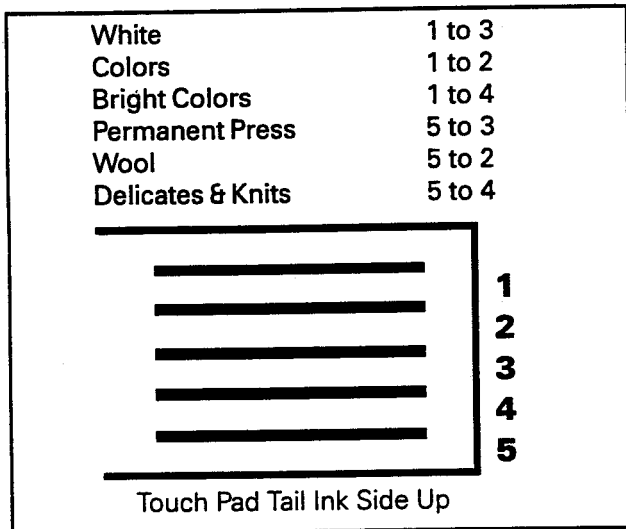


Figure 2-22

With the control board removed and the ribbon disconnected, the touch pad can be removed by removing the four screws securing the escutcheon and removing the two screws securing the touch pad in place.

Spacer sleeves are used on studs to aid in proper installation of the control board.

TRANSFORMER

The transformer is located next to the contactors in the control tray. The transformer is used to power the control board. The transformer has three secondary windings. Voltage readings may vary but target voltage at proper line voltage should be within 10%.

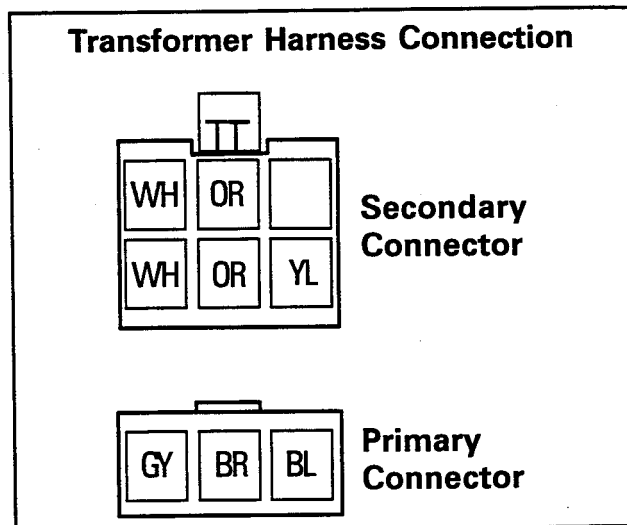


Figure 2-23

TRANSFORMER SECONDARIES	
Connection on Control Board	Mesuring To
AA6-1 (Yellow)	AA6-2 or AA6-5 (2.65 VAC) Center Tap
AA6-2 (Orange)	AA6-1 (2.65 VAC) or AA6-5 (5.3 VAC)
AA6-3 (White)	AA6-6 (22.5 VAC)
AA6-4	Not Used
AA6-5 (Orange)	AA6-1 (2.65 VAC or AA6-3 (5.3 VAC)
AA6-6 (White)	AA6-3 (22.5) VAC)

TRANSFORMER PRIMARIES		
Connection on Transformer	Wire Color on Transformer	Measuring To
EE1-1 (Gray)	Gray (Black)	EE1-2 Brown Wire (208-220 VAC)
EE1-2 (Brown)	Brown	EE1-1 Gray (Black) Wire (208-220 VAC)
EE1-3 (Black)	Blue	EE1-1 Gray (Black) Wire (230-240 VAC)

COIN DROP ACCEPTOR

This is a mechanical coin drop assembly with a coin sensor attached. In normal use, occasional cleaning in hot water will be all that is needed to maintain reliable operations of the coin drop acceptor. The coin drop does not need to be oiled for this will only cause dust or dirt build up which could disrupt the operation of the acceptor. Remove sensor before cleaning in water.

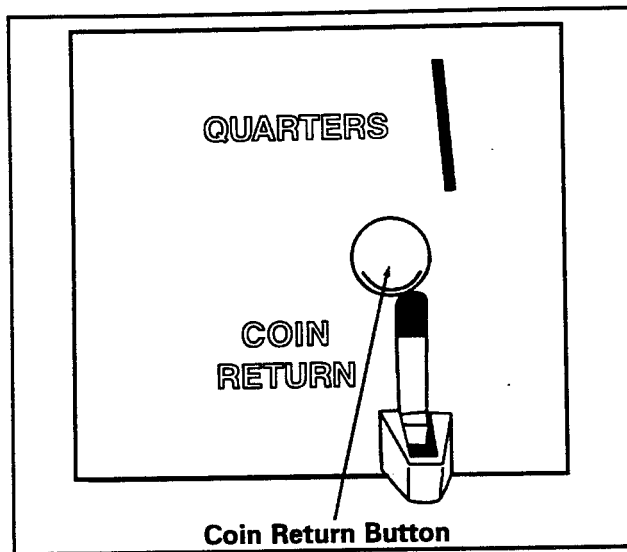


Figure 2-24

The coin drop assembly checks coin for diameter, thickness and magnetic properties.

There is a coin return button that can be pressed if a coin jams in the coin acceptor. When it is pressed, the button presses against a tab, which is pushed to one side spreading the coin acceptor plates apart. This allows the coin to fall and roll into the coin return bail area. The faceplate has a coin bail (*arched area for coin*) which is located at the base of coin return slot. The faceplate can be removed from the coin acceptor by removing the screws from the backside of the faceplate.

The coin sensor is mounted to a bar located at the back of the coin acceptor. There is a time period for a coin to pass the coin sensor. If the coin fails to pass through the coin sensor at a certain speed then the microprocessor may assume someone is tampering with the machine or it is a non-valid coin. The control will then go into a standby mode and not accept any more coins. The coin sensor is set in position at the time of manufacturing for the proper reading of coins.

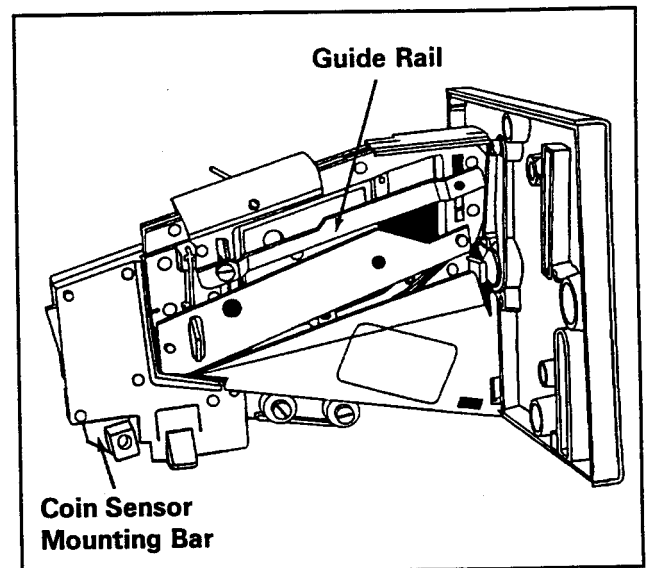


Figure 2-25

A guide rail on the left side of the coin drop assembly is adjustable (both at the front and rear) to accept proper diameter coins, yet reject oversized coins. Adjust the front pin in the guide rail to just miss the quarter and tighten the front guide rail screw. Set the back guide rail pin to just allow the quarter by, and tighten the back guide rail screw.

Removal:

1. Disconnect power from machine.
2. Raise top cover by removing screws securing soapbox to top cover and turn service keys.
3. Remove two screws securing coin drop to control panel.
4. Disconnect coin sensor and remove coin drop from machine.

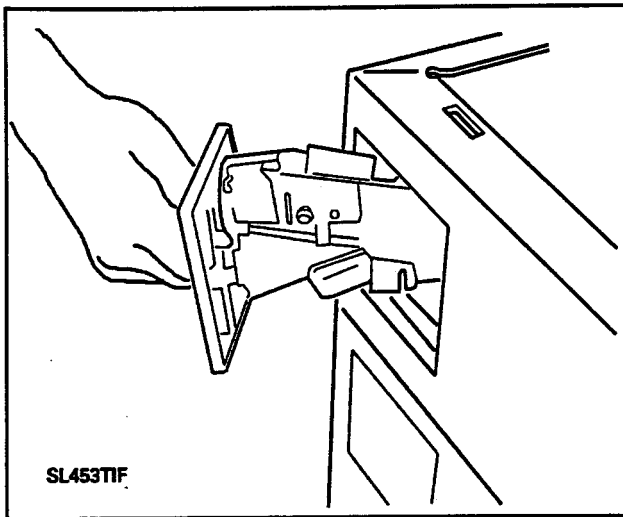


Figure 2-26

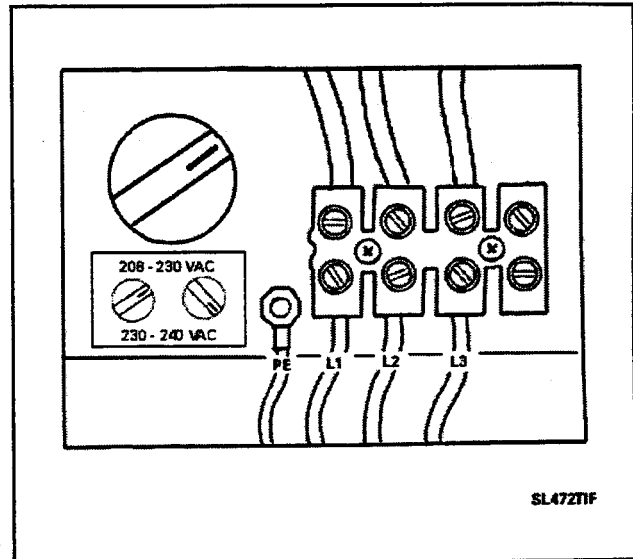


Figure 2-27

VOLTAGE SELECTOR SWITCH

The voltage selector switch is located at the back of the machine. There are two voltage selections to choose from: 208-220 Volts or 230-240 Volts. Turn the knob and select the voltage range closest to the input voltage being provided to the machine from the main power source. This provides the proper input power signal to the primary side of the transformer being supplied to the control board.

SECTION 3. PROGRAMMING & SET-UP PROCEDURES

WASH PROGRAMS (MC & MN Models) Cycle Sequences

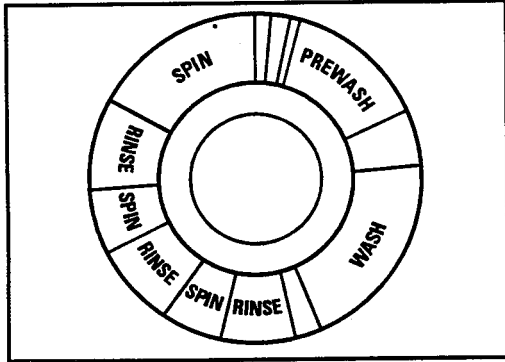


Figure 3-1

The Maytag MFR washers offer five user selectable cycles which can be varied depending upon wire jumper configuration at the program timer. The factory set up has been chosen as the most commonly used in coin laundry operations.

- Prewash times can be set for 0, 4 or 6 minutes.
- Main wash times can be set for 6.5, 8, 9.5, or 15.5 minutes.
- Rinse times cannot be changed (2 minutes).
- Final spin can be set for 5 or 9 minutes.
- Total cycle times can vary up to 43 1/2 minutes plus the times required to fill the washbasket.

PROGRAM TIMER JUMPER SETUP

All jumper setups are made using the odd numbered terminals located on the right side of the program timer (as viewed from the front). The terminals used are located in the upper two rows of terminals (see drawing on this page).

There are three typical jumper configurations. It is unlikely you will need to change from the factory set up. The drawing shows the program timer right side panel and the three common set ups (see the following page for times). (See Figure 3-2)

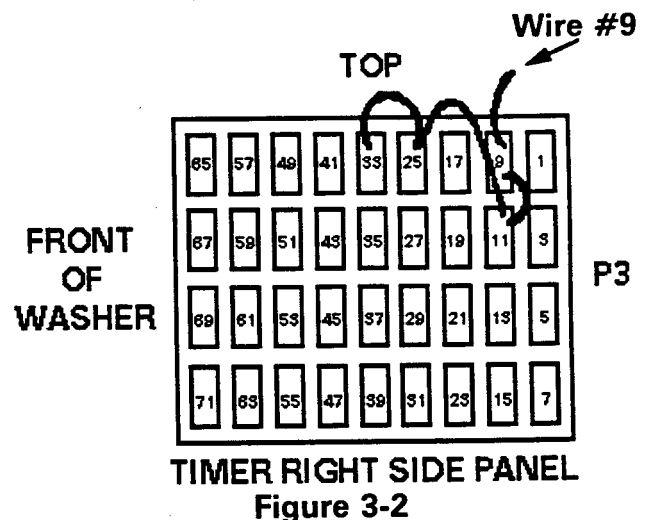
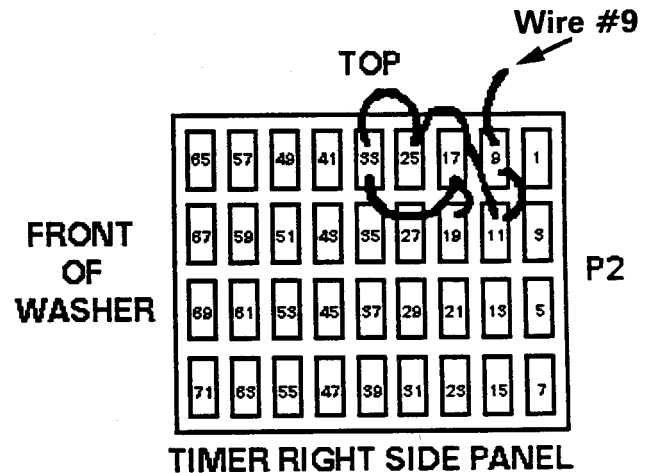
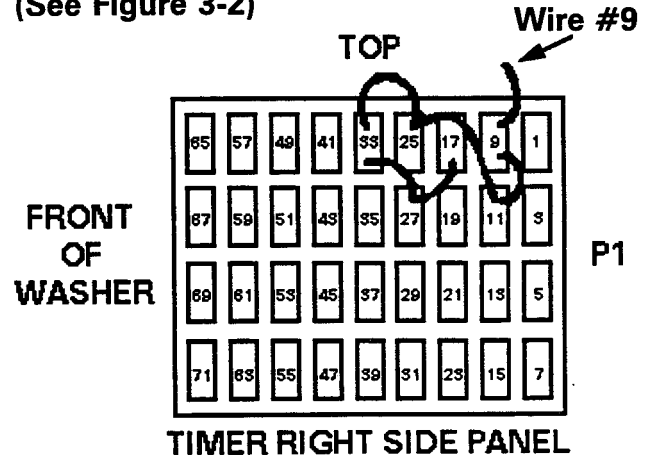


Figure 3-2

PROGRAM SELECTION #1 (P1)*					
Jumpers require connection between 9-11-25-33-27-17	WHITES	COLORS	BRIGHT COLORS	PERM. PRESS	DELICATE
PREWASH	3:20	3:20	3:20	---	---
DRAIN / SPIN	1:15	1:15	1:15	---	---
WASH	6:15	6:15	6:15	6:40	6:40
DRAIN	:25	:25	:25	:25	:25
RINSE 1	1:40	1:40	1:40	1:40	1:40
DRAIN / SPIN	1:15	1:15	1:15	:25	:25
RINSE 2	1:40	1:40	1:40	1:40	1:40
DRAIN / SPIN	1:15	1:15	1:15	:25	:25
RINSE 3	2:05	2:05	2:05	2:05	2:05
SPIN	4:35	4:35	4:35	1:40	1:40
TUMBLE	:25	:25	:25	:25	:25
SHAKE-OUT	:25	:25	:25	:25	:25
TOTAL CYCLE TIME	24:35	24:35	24:35	15:50	15:50

PROGRAM SELECTION #2 (P2)*					
Jumpers require connection between 9-11-25-33-19-17	WHITES	COLORS	BRIGHT COLORS	PERM. PRESS	DELICATE
PREWASH	3:20	3:20	3:20	---	---
DRAIN / SPIN	1:15	1:15	1:15	---	---
WASH	9:35	9:35	9:35	10	10
DRAIN	:25	:25	:25	:25	:25
RINSE 1	1:40	1:40	1:40	1:40	1:40
DRAIN / SPIN	1:15	1:15	1:15	:25	:25
RINSE 2	1:40	1:40	1:40	1:40	1:40
DRAIN / SPIN	1:15	1:15	1:15	:25	:25
RINSE 3	2:05	2:05	2:05	2:05	2:05
SPIN	4:35	4:35	4:35	1:40	1:40
TUMBLE	:25	2:05	:25	:25	:25
SHAKE-OUT	:25	2:05	:25	:25	:25
TOTAL CYCLE TIME	27:55	27:55	27:55	19:10	19:10

PROGRAM SELECTION #3 (P3)*					
Jumpers require connection between 9-11-25-33	WHITES	COLORS	BRIGHT COLORS	PERM. PRESS	DELICATE
PREWASH	5	5	5	---	---
DRAIN / SPIN	1:15	1:15	1:15	---	---
WASH	12:55	12:55	12:55	13:45	13:45
DRAIN	:25	:25	:25	:25	:25
RINSE 1	1:40	1:40	1:40	1:40	1:40
DRAIN / SPIN	1:15	1:15	1:15	:25	:25
RINSE 2	1:40	1:40	1:40	1:40	1:40
DRAIN / SPIN	1:15	1:15	1:15	:25	:25
RINSE 3	2:05	2:05	2:05	2:05	2:05
SPIN	7:55	7:55	7:55	2:55	2:55
TUMBLE	:25	:25	:25	:25	:25
SHAKE-OUT	:25	:25	:25	:25	:25
TOTAL CYCLE TIME	36:15	36:15	36:15	24:10	24:10

* All times are approximate and do not include fill times.

PROGRAMMING INSTRUCTIONS FOR "PC" & "PNA", MKIIA-LC

CAUTION!

For more information other than what is listed in this section, please see programming and operating manual MKIIA-LC Controller (MFR Models) part number 16007855. This manual can be obtained from your commercial distributor or Maytag Appliance Sales Company - Customer Service, 240 Edwards Street, S.E., Cleveland, Tennessee 37311.

BASIC DESCRIPTION OF CONTROL BOARD FUNCTIONS

The controller offers:

- 5-15 programs which offer a wide range of cycle options.
- Easy operations.
- Wash programs can be manually advanced (OPL version).
- Some programs enable selection of reduced water levels for economy.
- Switching from coin operation to OPL operation and vice versa.
- Software can be changed to accommodate desired wash programs.
- Water Temperature can be displayed.
- Software version can be displayed.

Coin-operated version:

- Shows which cycle is selected.
- Time remaining in cycle.
- The price of the selected cycle.
- Programmable coin value.
- Displays information about inserted coins.
- Special price options.

OPL version:

- 5 programmable liquid soap signals and option of direct control pumps.
- Programmable advance function.
- Number of cycles can be displayed.

During the wash cycle, the display shows the following:

- The wash program that was selected.
- Time remaining until the end of the wash program.
- With coin-operated washers, information about the coins that were inserted.
- Current step of the wash program.
- Fault codes in case of failure.

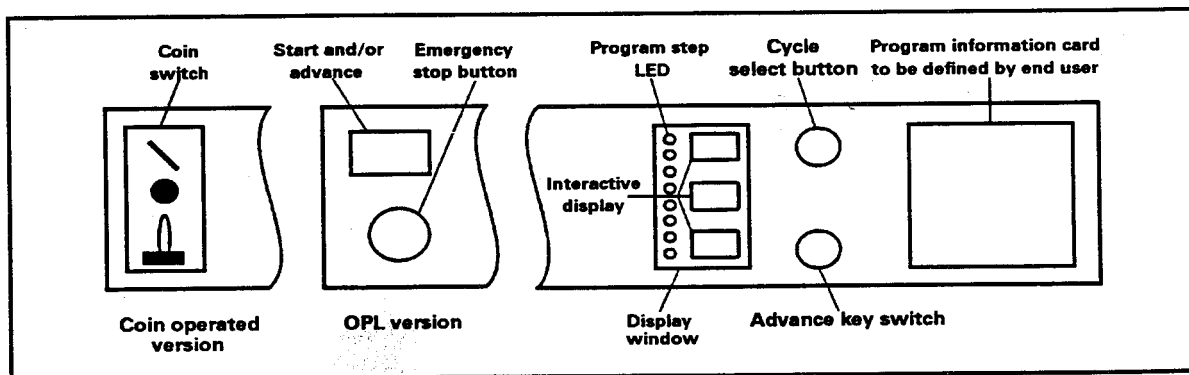


Figure 3-3

GENERAL BOARD SPECIFICATIONS OF THE MKII-LC CONTROL

The control board may be changed from 220/240VAC to 120 VAC. The manufacturer presents the board according to the voltage indicated on the data plate.
 (See Figure 3-4)

Technical specifications of control board

Measurements:	12.8" x 2.5" x 5.1", 325 x 65 x 130 mm
Voltage:	120 VAC, 220/240 VAC 60 Hz selectable by link to PCB
Power:	Max. 12 VA
Microprocessor:	NEC upd78cp18
Memory:	1K bytes static RAM
	32K bytes EEPROM
	2K bytes EEPROM
Output:	19 relay outputs 204V, 2A
	Serial interface port
Input:	8 optically insulated inputs 12 VDC
Display:	6 display, composed of seven segments LEDs
Analog Input:	For temperature sensor input

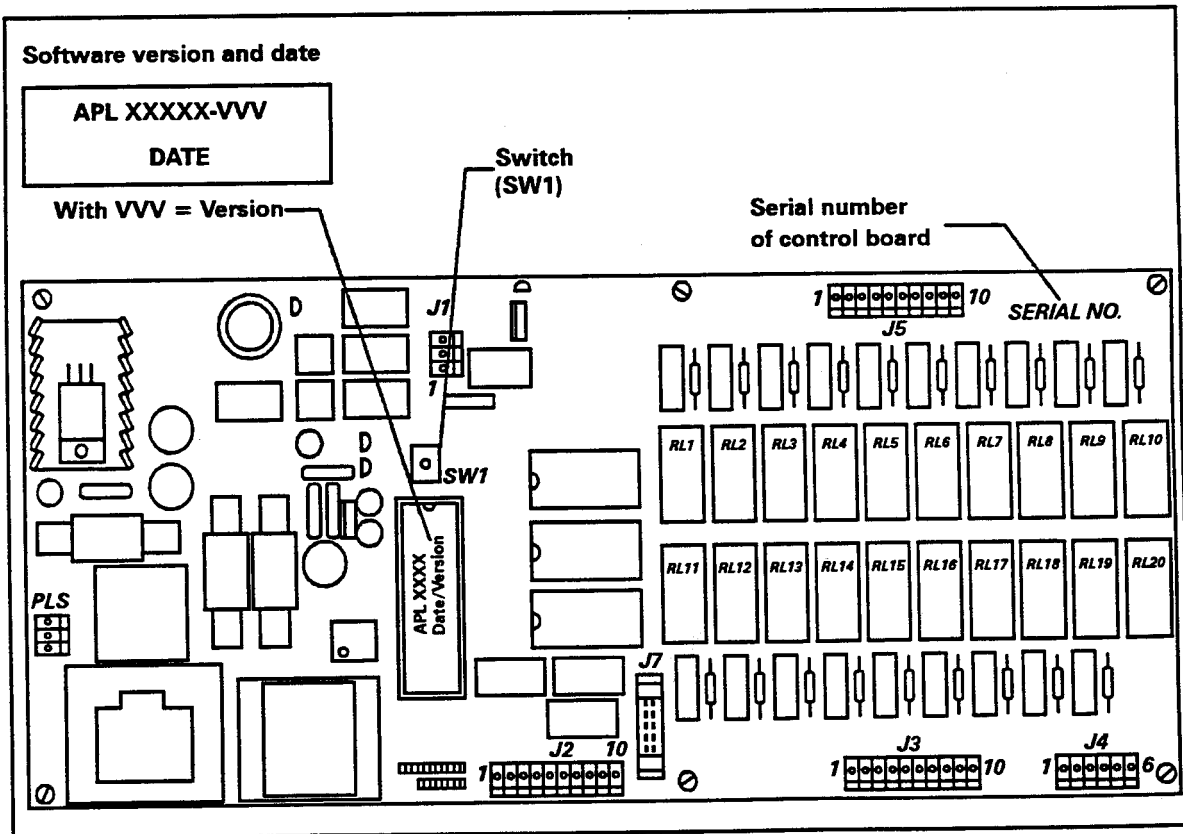


Figure 3-4

INITIALIZING THE WASHER

When the washer or the control board is installed for the first time, the control system has to be initialized. During this process, the control system can be adapted to the desired settings.

First the SW1 switch (See Figure 3-4) on the back of the MKIIA-LC board has to be set to the correct position.

Setting options:

Switch No.	Washer Model	Temperature Unit	Time Function
5	MFR	display temperature in C	wait for heating
6	MFR	display temperature in C	do not wait for heating
7	MFR	display temperature in F	wait for heating
8*	MFR	display temperature in F	do not wait for heating

NOTE:

1. * FACTORY SETTING.
2. SWITCH POSITIONS 0-4 AND 9, SHOULD NOT BE USED.

IMPORTANT NOTE!

1. Disconnect the washer power supply before opening the washer.
2. If the washer does not have an internal heating source, the SW1 switch has to be set to **"DO NOT WAIT FOR HEATING."** If not, the washer will not finish the selected wash program.
3. Restore power to the washer.

FAULT MESSAGES

The control board reports faults by means of an LED lighting up an fault code in display (C). (See Figure 3-5) This code can be any number between 1 and 8: each number stands for a particular type of fault (See Table 3-5).

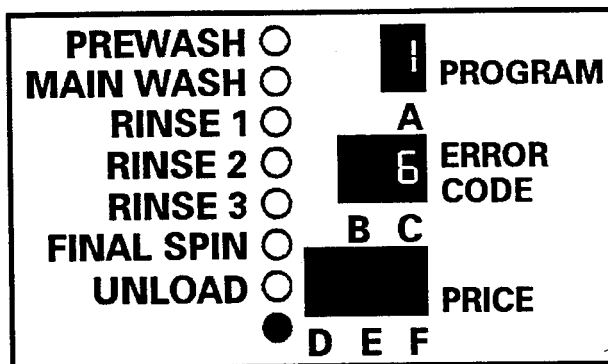


Figure 3-5

Once the fault has been corrected, press the advance key button to remove the error code. Sometimes you might need to disconnect the power supply for a short time and then reconnect. If an error code appears again when you restart the washer, contact your distributor.

Fault Code	Type of Fault	Fault Code	Type of Fault
1	Water drain failure	5	Water fill failure
2	Out of balance	6	Heating failure
3	Motor overload	7	Coin input fault
4	Door lock failure	8	Memory failure

Table 3-5

FAULT MESSAGE CODE:

Fault code 1- This fault will occur if the machine does NOT see an empty level (via the water level switch) within 30 seconds after entering a drain step. Check for slow or blocked drain.

Fault code 3 - This fault occurs when there is an open circuit between Line (line 2 typically) and the terminal connector J4.6 while the machine is operating in a cycle. The open circuit could occur in motor current overload circuit, motor thermal overload circuit, or door-closed switch in the door lock assembly (door switch activated by the pin on the door assembly when the door is closed). Check electrical connections and for proper operation of the devices in these circuits.

Fault code 4 - This fault occurs when the door-locked switch circuit is open (after a cycle has been successfully started). The most common cause of this code is a failed bi-metal device that is tested after approximately 90 seconds from the start of a cycle.

Fault code 5 - This fault occurs when the machine does not see full to proper water level (via the water level switch) in less than 10 minutes after the machine has entered a step calling for a fill. Check for sediment clogging filters in fill hoses, low water pressure, drain valve (leaking drain), air dome (blockages or leaks in the line) or water level switch circuit, check water valves for proper operation.

Fault code 6 - This fault occurs when there is a problem in the temperature sensor circuit. Check for loose connections, or shorted wire connections, in the temperature sensor circuit (between J1.1 and J 1.3). Also, check to see if the temperature sensor wires are connected properly at the J1 terminal connection (not reversed). Check/replace temperature probe.

Fault code 7 - This fault normally only occurs in PC model machines. The coin switch (microswitch that is activated when a coin successfully passes through the coin meter unit) may be held open by a jammed coin, full coin box, or coin meter. Remove cause of the microswitch staying activated to correct problem.

NOTE: *This problem can also be caused by loose wire connections in the J2.10/J2.1 circuit (J2.9, J2.10/J2.1 circuit on machines with dual coin meters) or loose wire connections in the "Start" switch circuit on PN models.*

Fault code 8 - The fault can occur due to severe EMI in the power supply line, faulty programming, or "scrambled" memory in the computer. If removing power the machine does not correct the problem, try reprogramming the computer (be sure to go through ALL of the steps in programming ("n", "u", "p", etc.) and try operating the machine again.

PROGRAMMING INSTRUCTIONS FOR MFR35-50PNB MODELS

For more information other than what is listed in this section, please see programming and operating manual MKIIA-20 Controller part number 16007856. This manual can be obtained from your commercial distributor or Maytag Appliance Sales Company - Customer Service, 240 Edwards Street, S.E., Cleveland, Tennessee 37311.

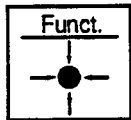
TOUCHPAD FUNCTIONS

During the wash process it is possible to check certain details by pressing certain keypads. A brief description of these keypad functions are given below.



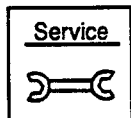
TEMPERATURE AND WATER LEVEL KEYPAD

If this keypad is pressed, the programmed temperature and water level is displayed for the current step in the process. In addition, the temperature and water level that is actually reached is shown.



FUNCT. (Function) KEYPAD

The currently active function of the current step in the process is displayed.



SERVICE KEYPAD

Shows the number of cycles the washing machine has already completed. "CYCLES XXXX" is displayed. You are also given the number of times that a particular error has occurred.



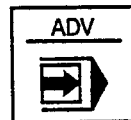
PROG. (Program) KEYPAD

Enter a process number for "SELECT PROCESS --".
By pressing "Prog." you get an overview of the whole process.



TIME + KEYPAD

This keypad enables you to extend the time of the current step of the process. This function only works if you answered "Yes" to the question "MANUAL OVERRIDE ?" in the initialization mode.



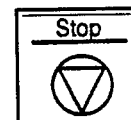
ADV (Advance) KEYPAD

This keypad enables you to shorten the time of the current step of the process. This function only works if you answered "Yes" to the question "ALLOW ADVANCE ?" in the initialization mode.

Pressing this keypad rapidly twice, enables you to skip over any current step of the process, except the steps "EXTRACT" and "SPRAY," if "Yes" was answered to the "Allow Advance?" message during the initialization mode.

IMPORTANT NOTE:

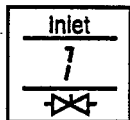
THE "ADV" KEYPAD DOES NOT WORK WITH THE "EXTRACT," HIGH SPIN," "SPRAY RINSE" AND "SPRAY FLUSH" FUNCTIONS.



STOP KEYPAD

It may be necessary to stop the execution of all functions during the wash cycle. You can do this by pressing the "Stop" keypad.

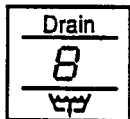
1. To stop the process temporarily and then restart from the step where the interruption occurred. If you have pressed "Stop," "STOP PRESSED" will appear on the display for a few seconds, followed by "RE-START ?". You may now continue from "RE-START ?"



INLET 1...INLET 6 KEYPAD

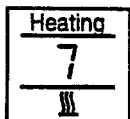
If in the initialization mode you have answered "Yes" to the question "MANUAL OVERRIDE ?," you can activate a water inlet valve during the washing process by pressing the corresponding keypad. The inlet valve remains operational as long as you keep the keypad pressed.

On the circuit diagram that is supplied with the machine you can check which type of water (cold hard, cold soft or hot soft) corresponds with which water inlet (inlet 1,...inlet 2, etc.)



DRAIN KEYPAD

If in the initialization mode you have answered "Yes" to the question "MANUAL OVERRIDE ?," you can activate the drain valve by pressing the "Drain" keypad. The valve keeps draining the water as long as you keep the keypad.



HEATING KEYPAD

If in the initialization mode you have answered "Yes" to the question "MANUAL OVERRIDE ?," you can activate the steam valve (heating contactor) by pressing the "7" keypad, if the machine turns on the heating according to the water level (up to a temperature that is approximately 10°C/50°F higher than the programmed temperature, approximate maximum 92°C/197.6°F).

ENTERING THE TYPE OF MACHINES

The MKIIA-20 software contains standard wash programs. In order to set up the correct values, the correct type of machine must be entered. When the display shows "SELECT" PROCESS --" enter code 52, then the following will be displayed:

ENTER
MACHINE _____

and will be waiting for the type of machine to be entered:

RIGID-MOUNT (MFR) TYPE MACHINES 35-50 LBS (16-35 KG)	
2	For 35-50 lbs. capacity machines

After entering the type of machines, the standard wash programs will be stored into the EEPROM memory.

CODE OVERVIEW

Codes Entered:

When "SELECT PROCESS --" appears on the display, it is possible to modify or change programming functions by inputting 2 digit codes. (See Table 3-3)

50	Selection of fault announcement time " <u>FILL FAIL</u> " 1-10 MIN and " <u>HEATING FAIL</u> " 5-20 MIN, if you answered "No" to " <u>FAULT SUPPRESSION</u> " in the initialization mode.
52	Standard wash programs.
60	Software version number appears on the display after entering code 60.
62	Initialization (see section 3).
74	For zeroing out all cycle counters. This can be done only if " <u>SELECT PROCESS --</u> " is on the display. Then "CYCLE RESET" will appear and all counters are zeroed out.
78	Allows "tweaking" the water level \pm 1-9
79	Allows "tweaking" the temperature \pm 1-9
89	Programming mode.

Table 3-3

"PD" PROGRAMMING AND SET-UP PROCEDURES

Control Set-Up Procedures

IMPORTANT

Read all instructions before operating.

Introduction

The lower fabric setting pads and the digital display are used to set-up the controls (See *Figure 3-1*).

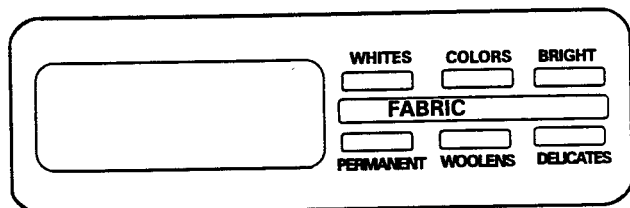


Figure 3-1

Following is a step by step procedure which may be used to change control settings.

How To Read The Display

After the unit has been installed and plugged in, the display will show "0" minutes remaining (See *Figure 3-2*).

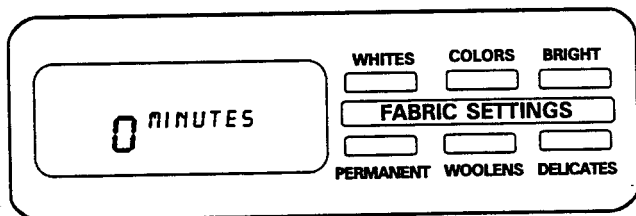


Figure 3-2

The display can contain four (4) numbers and/or letters and a decimal point following the first character. The far left character and the decimal point are used to indicate one (1) of several set-up codes available for use in programming the appliance. The other digits are used to provide information about the code set-up shown (See *Figure 3-3*).

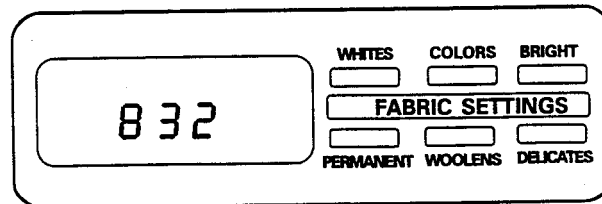


Figure 3-3

How To Use The Key Pads To Program The Controls

1. The **Permanent Press** key pad is used to advance within the codes permitting adjustment for programming. Pressing the key pad will change the characters by one (1) increment. Rapid adjusting is possible by holding the key pad down.
2. The **Woolens** key pad will advance you through the codes that are set-up in the appliance. (Pressing the key pad will advance you through the programmed codes.) Holding the key pad down will automatically advance through programs at a rate of one (1) increment per second.
3. The **Delicates & Knits** key pad is used to select options for Cycle Count, Money Count and Special Pricing. This is essentially an "OFF" or "ON" selection.

START OPERATING SET-UP

Insert service key from top cover and turn.

You are now ready to enter the set-up mode.

NOTE: Units are preset at the factory. The washer is set for a 4 minute wash, plus two (3) rinses for \$1.75.

SET-UP CODES

CODE		EXPLANATION
620	6 20	<p>REGULAR CYCLE PRICE</p> <p>Represents the number of quarters (coin 1); may adjust from 0-39. (See VALUE OF COIN 1). Advance from 0-39 by pressing <u>Permanent Press</u>. Presently set for 20 quarters = \$5.00</p> <p>Press <u>Woolens</u> key pad once to advance to next code.</p>
714	7 14	<p>WASH LENGTH</p> <p>This is the number of minutes for WASH. Unit comes from the factory pre-set with 14 minutes. Choose from 8-20 minutes by pressing the <u>Permanent Press</u> key pad.</p> <p>Press <u>Woolens</u> key pad once to advance to next code.</p>
800	8 00 Ar	<p>ADDITIONAL RINSE OPTION</p> <p>This option is either SELECTED "ON" or NOT SELECTED "OFF". Not Selected "OFF". Selected "ON".</p> <p>Press <u>Delicates & Knits</u> key pad once for this selection.</p> <p>Press <u>Woolens</u> key pad once to advance to next code.</p>
900	9 00 0C	<p>CYCLE COUNTER OPTION</p> <p>This option is either SELECTED "ON" or NOT SELECTED "OFF". Not Selected "OFF". Selected "ON" and not able to be deselected. Press <u>Delicates & Knits</u> key pad 3 consecutive times to select "ON". Once selected "ON" it cannot be deselected.</p> <p>Press <u>Woolens</u> key pad once to advance to next code.</p>
1.00	1. 00 0C	<p>MONEY COUNTER OPTION</p> <p>This option is either SELECTED "ON" or NOT SELECTED "OFF". Not Selected "OFF". Selected "ON".</p> <p>Press <u>Delicates & Knits</u> key pad 3 consecutive times to select "ON" and 3 consecutive times to remove (Not Selected "OFF".) Counter resets by going from "OFF" to "ON".</p> <p>Press <u>Woolens</u> key pad once to advance to next code.</p>
	C0	<p>Selected "ON" and not able to be deselected. To select "ON" and not able to be deselected, first select "ON", then within two seconds press <u>Delicates & Knits</u> twice, <u>Permanent Press</u> once, and exit the set-up mode.</p>

CODE**EXPLANATION**

2.00 2. **SPECIAL PRICING OPTIONS**
 This option is either SELECTED "ON" or NOT SELECTED "OFF".
 00 Not Selected "OFF".
 SP Selected "ON".

Press *Delicates & Knits* key pad once for this selection.

If SPECIAL PRICING OPTION IS selected, you have access to codes 3. thru 9.

Press *Woolens* key pad once to advance to next code.

Options to use if SPECIAL PRICING is selected.

3.20 3. **SPECIAL CYCLE PRICE**
 20 Represents the number of quarters (coin 1); may adjust from 0-39. (See
 VALUE OF COIN 1).
 Advance from 0-39 by pressing *Permanent Press*. Presently set for 20
 quarters = \$5.00

Press *Woolens* key pad once to advance to next code.

5.00 5. **TIME-OF-DAY CLOCK, MINUTES**
 00 This is the TIME-OF-DAY CLOCK, minute setting; select 0-59 minutes by
 pressing PERMANENT PRESS key pad.

Press *Woolens* key pad once to advance to next code.

6.00 6. **TIME-OF-DAY CLOCK, HOURS (NOTE: Uses military time or 24 hr. clock)**
 00 This is the TIME-OF-DAY CLOCK, hour setting; select 0-23 hours by
 pressing *Permanent Press* key pad.

Press *Woolens* key pad once to advance to next code.

7.00 7. **SPECIAL PRICE START HOUR (NOTE: Uses military time or 24 hr. clock)**
 00 This is the start hour; 0-23 hours. Select START HOUR by pressing
 Permanent Press key pad.

Press *Woolens* key pad once to advance to next code.

8.00 8 **SPECIAL PRICE STOP HOUR (NOTE: Uses military time or 24 hour clock).**
 00 This is the stop hour; 0-23 hours. Select STOP HOUR by pressing
 Permanent Press key pad.

Press *Woolens* key pad once to advance to next code.

9.00 9. **SPECIAL PRICE DAY**
 10 This represents the day of the week and whether special pricing is selected
 for that day. A number followed by "0" indicates no selection that particular
 day (9.10). A number followed by an "S" indicates selected for that day (9.1S).

Days of the week (1-7) are selected by pressing *Permanent Press* key pad.

Press *Woolens* key pad once to advance to next code.

CODE	EXPLANATION
A.00	<p>A. VAULT VIEWING OPTION This option is either selected "ON" or not selected "OFF".</p> <p>00 Not selected "OFF". SC Selected "ON". Press <u><i>Delicates & Knits</i></u> key pad once for this selection. When selected, the money and/or cycle counts will be viewable (if counting is selected), when the coin box is removed.</p> <p>Press <u><i>Woolens</i></u> key pad once to advance to next code.</p>
b.05	<p>b. VALVE OF COIN 1 05 This represents that value of coin 1 in number of nickels. 05 = \$0.25. By pressing <u><i>Permanent Press</i></u> key pad you have the option of 1-199 nickels. Example: b.30 is equal to \$1.50.</p> <p>Example: b-30 is equal to \$1.50.</p> <p>Press <u><i>Woolens</i></u> key pad once to advance to next code.</p>
C.20	<p>C. VALUE OF COIN 2 20 This represents the value of coin 2 in number of nickels. 20 = \$1.00.</p> <p>By pressing <u><i>Permanent Press</i></u> key pad you have the option of 1-199 nickels.</p> <p>Press <u><i>Woolens</i></u> key pad once to advance to next code.</p>
d.00	<p>d. COIN SLIDE OPTION This option is either selected "ON" or not selected "OFF".</p> <p>00 Not selected "OFF". CS Selected "ON". Press <u><i>Delicates & Knits</i></u> key pad 3 consecutive times to toggle this selection. When coin slide mode is selected, set b. equal to value of slide in nickels. Set step 6 (regular cycle price) and step 3. (special cycle price) to number of slide operations. If the installer sets up "CS" on a coin drop model, it will not register coins.</p> <p>NOTE: There are no provisions to add a coin slide to this model. Be sure this is set on d.00</p> <p>Press <u><i>Woolens</i></u> key pad once to advance to next code.</p>
E.00	<p>E. ADD COINS OPTION This option is either selected "ON" or not selected "OFF". This option causes the customer display to show the number of coins (coin 1) to enter, rather than the dollars-and-cents amount.</p> <p>00 Not selected "OFF". AC Selected "ON". Press <u><i>Delicates & Knits</i></u> key pad 3 consecutive times for this selection.</p> <p>Press <u><i>Woolens</i></u> key pad once to advance to next code.</p>

CODE

EXPLANATION

F.00	F. 00 CP Su	<p>ENHANCED PRICING OPTION Not selected "OFF". Cycle-Based pricing enable. This option allows configuration of different prices for cold, warm, and hot water cycles. Super Cycle pricing enabled. This option allows customers to upgrade cycles by depositing extra money. Setup codes "H." and "h." will only display when this option is enabled. Press <u><i>Delicates & Knits</i></u> key pad once for this selection.</p> <p>Press <u><i>Woolens</i></u> key pad once to advance to next code.</p>
H.01	H. 01	<p>SUPER CYCLE UPGRADE PRICE (Skipped unless super cycle pricing is enabled). This represents the number of coin 1 required to upgrade a base cycle to a super cycle. Advance from 0-39 by pressing Permanent Press key pad.</p> <p>Press <u><i>Woolens</i></u> key pad once to advance to next code.</p>
h.01	h. 01	<p>SUPER CYCLE TYPE (Skipped unless super cycle pricing is enabled) This represents the super cycle upgrade option. Press <u><i>Permanent Press</i></u> key pad to setp through upgrade options 1-3 as follows: 01 - enhanced wash, extra 3 minutes of wash tumble in addition to the programmed wash time. 02 - extra rinse for all cycles. 03 - both 01 and 02.</p> <p>Press <u><i>Woolens</i></u> key pad once to advance to next code.</p>
J.Cd	J. Cd C_ _d	<p>COIN/DEBIT OPTION Both coin & debit selected. Coins selected, debit disabled. Debit Card selected, coins disabled. Press <u><i>Delicates & Knits</i></u> key pad 3 consecutive times for this selection.</p> <p>NOTE: When using a debit card or operating in the non-coin (free) mode this must be set on J._d. If sensor is not connected to board in the coin mode the counter will fault and the display will blank.</p> <p>Ed Enhanced debit is self-selected when a Generation 2 card reader is installed in the washer. The Ed option cannot be manually selected or deselected.</p> <p>Press <u><i>Woolens</i></u> key pad once to advance to next code.</p>
L.00	L. 00 PS	<p>PRICE SUPPRESSION OPTION This option causes the customer display to show "ADD" or "AVAILABLE" rather than the amount of money to add. (Used mainly in debit installations.) Not selected "OFF". Selected "ON". Press <u><i>Delicates & Knits</i></u> key pad once to advance to next code.</p>

CODE		EXPLANATION
n.CE	n. 00 CE	<p>CLEAR ESCROW OPTION When selected, money held in escrow for 30 minutes without further escrow or cycle activity will be cleared.</p> <p>Not selected "OFF". Selected "ON". Press <i>Delicates & Knits</i> key pad once for this selection.</p> <p>Press <i>Woolens</i> key pad once to advance to next code.</p>
U.00	U. 00	<p>PENNY INCREMENT OFFSET-DEBIT CARD MODE ONLY This represents the penny increment price offset used in generation 2 (enhanced debit).</p> <p>Choose from 0-4 pennies by pressing the <i>Permanent Press</i> key pad.</p> <p>Press <i>Woolens</i> key pad once to advance to next code.</p>
A1.00	A1. 00	<p>PREWASH LENGTH This is the number of minutes of Prewash. The prewash is followed by a one minute tumble drain. Choose from 0-10 minutes by pressing the <i>Permanent Press</i> key pad.</p> <p>Press <i>Woolens</i> key pad once to advance to next code.</p>
A2.04	A2 04	<p>FINAL SPIN LENGTH This is the number of minutes of final high speed spin when the max extract option is selected. Choose from 3-10 minutes by pressing the <i>Permanent Press</i> key pad.</p> <p>Press <i>Woolens</i> key pad once to advance to next code.</p>
A3.00	A3. 00	<p>COLD WASH TEMP This is the percent of hot water mixed with cold water. Chose from 0 to 90 percent by pressing the <i>PERMANENT PRESS</i> key pad.</p> <p>Press <i>WOOLENS</i> key pad once to advance to next code.</p>
A4.00	A4. 00	<p>WARM WASH TEMP This is the percent of cold water mixed with hot water. Choose from 0 to 90 percent by pressing the <i>PERMANENT PRESS</i> key pad.</p> <p>Press <i>WOOLENS</i> key pad once to advance to next code.</p>
A5.00	A5. 00 dS	<p>DECIMAL SELECTION This option is either Selected 'ON' or Not Selected 'OFF'.</p> <p>Not Selected "OFF". Selected "ON". Press <i>DELICATES & KNITS</i> key pad once for this selection. When selected the decimal in the price will be displayed.</p> <p>Press <i>WOOLENS</i> key pad once to advance gto next code.</p> <p>EXIT FROM SET-UP MODE PD Models: Lock top cover</p>

SPECIAL PRICING DAYS

In reference to the "Special Price Days" the following will appear when programming that sequence: (The number "5" is read as an "S" to represent special pricing in effect.)

Not Selected	Selected	Day Number	Day of Week
9.10	9.15	Day 1	Sunday
9.20	9.25	Day 2	Monday
9.30	9.35	Day 3	Tuesday
9.40	9.45	Day 4	Wednesday
9.50	9.55	Day 5	Thursday
9.60	9.65	Day 6	Friday
9.70	9.75	Day 7	Saturday

NOTE: Remember you must show current day of week before preceding to next code.

Cycles and Money Counter Options

The following will appear if you selected "0C" in the cycle counter option "900." This is a "View Only" and cannot be altered.

When cycle counter is selected, the numbers will "flash" in sequence.

Example:

100	Represents number of cycles in HUNDREDS	102 = 200
200	Represents number of cycles in ONES	225 = 25
		Total = 225 Cycles

Press Woolens key pad once to advance to next code.

The following will appear if you selected "0C" in the money counter option "1.00." This is a "View Only" and cannot be altered. The money counter can be reset by going to OFF (00) and ON (0C).

When money counter option is selected, the numbers will flash in sequence.

Example:

300	Number of dollars in HUNDREDS	302 =	200.00
400	Number of dollars in ONES	425 =	25.00
500	Number of CENTS	575 =	.75
		Total =	\$225.75

DIAGNOSTIC MODE

The mode is entered by depressing **Delicates & Knits** keypad for one second while in any of the set-up modes one through six or with a diagnostic code present. Diagnostic codes are cleared on entry and all display segments should flash.

If a diagnostic code persists, it must be corrected before the diagnostic cycle will start. With all segments flashing, the diagnostic cycle is started by depressing the **Woolens** key pad.

There are three possible ways to initiate cycle activity from diagnostic mode as follows:

1. **Field Diagnostic Cycle** - With the entire display flashing, this cycle is started by pressing the **Woolens** key pad which is in the middle of the bottom row. This cycle provides a quick verification that the machine components are working.

30 second warm fill (valves 2 and 3) to wash level while tumbling, "**PREWASH**" displayed.

30 second tumble drain, "**PREWASH SPIN**" displayed.

30 second hot fill (valves 3 and 4) to wash level while tumbling, "**HOT WASH**" displayed.

60 second cold fill (valves 2, 5, and 6) to rinse level while tumbling "**COLD RINSE**" displayed.

30 second tumble drain, "**RINSE SPIN**" displayed.

120 second cold fill (valves 1 and 6) to rinse level while tumbling, "**COLD RINSE**" displayed.

180 second spin and drain, "**RINSE SPIN**" displayed.

45 or 90 second (depending on model) drain coastdown, "**RINSE**" displayed.

30 second tumble drain, "**RINSE**" displayed.

2. **Spin Cycle** - With the entire display flashing, this cycle is started by pressing the **Colors** keypad which is the upper middle keypad. This cycle is used to spin out the clothes quickly.

30 second tumble drain, "**RINSE SPIN**" displayed.

270 second spin and drain, "**RINSE SPIN**" displayed.

45 or 90 second (depending on model) drain coastdown, "**RINSE**" displayed.

30 second tumble drain, "**RINSE**" displayed.

3. **Cycle Credit** - With the entire display flashing a cycle may be credited by pressing the **PERMANENT PRESS** keypad (CC will display). When the service mode is exited "**SELECT CYCLE**" will be displayed unless the end-of-cycle door opening is required.

Pressing the **DELICATES & KNITS** keypad will exit diagnostic mode and cancel a diagnostic cycle in process.

Pressing the **BRIGHT COLORS** keypad will alternately pause and restart a cycle in process.

Cycle Advance - Pressing the **COLORS** key pad will advance the cycle to the next function of the cycle, e.g. pressing the key during a wash will advance the cycle to a spin.

DIAGNOSTIC CODES

If the set-up mode is entered and one of the following circumstances has occurred, the appropriate diagnostic code will be in the display.

DIAGNOSTIC CODES	
d4	Washer door sense error on control board or due to power line interference (cycles and customer display disabled until diagnostic code is manually cleared).
d5	Blocked coin 1 or coin drop control circuit failure (coin recognition and price display disabled while blockage persists).
d7	Slow fill detected during previous cycle (cycle paused but can be re-started).
d8	Last drain was slow.
d9	Voltage detected below 185 vac for 8 seconds.
d10	Door lock sense error or due to power line interference (spins un-inhibited until corrected).
d11	Motor overtemp or overcurrent detected (cycle paused but can be re-started).
d13	Blocked coin 2 or coin drop control circuit failure (coin recognition and price display disabled while blockage persists). Check J.Cd
d16	Not receiving communications from installed debit card reader in Generation 2 debit mode.

HELP MODE

This mode is entered by pressing the "**Permanent Press**" keypad while in special pricing option mode 2.XX (or while dAS displays if operating with Maytag Data Acquisition set-up). In help mode, "**Woolens**" can be used to advance through three help codes (displayed as 1h.XX, 2h.XX, and 3h.XX) the extended fill option (displays hF.00 when not selected, hF.EF when selected) the software revision, the model code (CXX) and the number of seconds that the motor will be turned off during a coast down (LXX).

Pressing "**Delicates & Knits**" keypad while any of the help codes are displayed clears the three help codes. Pressing "**Delicates & Knits**" keypad while the extended fill option is displayed selects or deselects that option. When selected, the time allowed for filling to the wash level prior to the cycle being paused is doubled. Press the "**Permanent Press**" keypad at anytime to exit help mode.

HELP MODE SYMBOLS

In the help mode, other display symbols and elements are mapped to reflect the state of various inputs and outputs as follows:

WASH	Water sensed at water level
*	Low voltage present (below about 185 vac)
Soak	Motor over temp sensed
CIRCLE Above Digit	Door closed
DOOR LOCKED	Door sensed locked
COLD	Cold water relay on
HOT	Hot water relay on
Detergent	Door unlock relay on
Spin	Water below spinner, ok to spin
BLEACH	Drain relay on
SOFTENER	Door lock relay on
PRE	80 lb. machine sensed
OR	Motor overcurrent sended

HELP CODES

- (3) Door seen unlocked when it should be locked. "d10" in diagnostic codes.
- (4) Door unlocked during lock check. "d10" in diagnostic codes.
- (19) Water level was reached during the wash cycle, but water level was not maintained during cycle. "Slow Fill" or water draining out of tub, "d7" in diagnostic codes.
- (1b) Slow fill, water level never reached. Resulting in water valve being turned off during the cycle, causing the machine to pause in cycle. "d7" in diagnostic codes.
- (31) Spin cycle was delayed due to wash level being sensed for more than 120 seconds at the start of the spin. "d8" in diagnostic codes. Check drain valve and drain hoses.
- (42) Shutdowns due to overtemp condition, with water in the tub. Paused the cycle. "d11" in diagnostic codes.
- (43) Shutdowns due to overtemp condition, with no water in the tub. Paused the cycle. "d11" in diagnostic codes.
- (44) Shutdown due to overcurrent condition, with water in the tub. Paused the cycle. "d11" in diagnostic codes.
- (45) Shutdown due to overcurrent condition, with no water in the tub. Paused the cycle. "d11" in diagnostic codes.

- (71) Debit card reader messaging problem. Consult debit card reader's manufacturing troubleshooting information.
- (74) Debit card reader messaging problem. Consult debit card reader's manufacturing troubleshooting information.
- (75) Debit card reader messaging problem. Consult debit card reader's manufacturing troubleshooting information.

GENERAL USER INFORMATION

BLANK DISPLAY - This condition indicates the washer is inoperative. Enter set-up mode to view diagnostic code.

"0 MINUTES" SHOWING IN DISPLAY - This condition indicates the washer cannot be operated. Coins dropped or debit inputs during this condition will be stored in escrow but cannot be used until normal operation is restored by opening and closing the door. If a door switch fails, it must be replaced before normal operation can be restored.

COLD START (initial first use) - Washer is programmed at the factory as follows:

- 14 minute wash period
- 3 rinses (extra rinse not enabled)

\$5.00 wash price (PD models)

WARM START (after power failure) - A few seconds after power is restored, if a cycle was in progress at the time of the power failure, "RESELECT CYCLE" will flash in the display, indicating the need for a key press to restart the washer. While the cycle can immediately be restarted, the motor will not run until power has been present for two minutes.

DEBIT CARD READY - This washer is debit card "reader" ready. It will accept a variety of debit card systems; but does NOT come with a debit card reader. Refer to the debit card reader manufacturer for proper machine set-up. In models con-

verted to a Generation 1 debit card system, debit pulses represent the equivalent of one coin.

DISPLAY - After the unit has been installed and plugged in, the display will show "0 MINUTES." Once the unit has been plugged in and the door opened and closed, the display will show the price. In units set for free cycles, the display will flash "SELECT CYCLE."

PRICING - After the door is opened following the completion of a cycle, the display indicates the cycle price (unless set for free operation). As coins are dropped or debit inputs arrive, the display will change to lead the user through the initiation of a cycle.

FREE CYCLES - This is established by setting the cycle price to zero. When this happens "SELECT CYCLE" will appear rather than a cycle price.

TO OPERATE WASHER

1. Insert coins until "SELECT CYCLE" flashes in display.
2. Door must be closed **before** cycle selection is made.
3. Press fabric setting keypad for the wash cycle desired. After the cycle is started, the time will display and count down. Time advance is paused for slow fill or slow drain.

SECTION 4. TROUBLESHOOTING

GENERAL INFORMATION

The malfunction of an electrical circuit cannot easily be diagnosed unless you first understand how it functions when operating normally.

Components

There are two basic categories for electrical components, switches and loads.

A switch controls the current path to a load component. Door switches, water level switches and relays are examples of switching components.

An electrical load uses electricity to perform some function. Motors convert electricity to magnetic fields and then to mechanical motion. Solenoids use magnetic fields to push or pull. Lamps convert electricity to light.

The schematic wiring diagram is followed much like a road map. The lines represent the wiring connections between components. Connections in the wiring are indicated by a small dot. If the lines cross but no dot is present at the intersection, there is no connection. As much as possible, switches are shown in their normal or most common configuration.

CAUTION:

*Some of the tests in this section involve checking for voltages with the product live. **Use caution when working with live circuits.***

Resistance or continuity testing is done with the product disconnected from power. Failure to do so can result in damage to your meter.

Please keep in mind that except for the single phase 18 pound model, the control voltages are 208 to 240 volts AC. Use caution when making any test.

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

ELECTRICAL & MECHANICAL TROUBLESHOOTING

Coin meter will not accept coins.

- Manually push in on coin block solenoid armature. If unit will then accept coins and start normally, the problem is either in the coin block coil or the power to it.
- Check fuses.
- Check for jammed or dirty coin meter.

Coin meter accepts coin but does not start washer.

- Check coin meter program for number and value of coins to be accepted.
- Check coin counter board.

Door will not open

- Jammed mechanism.
-Open door manually turn power off remove lower access panel. Pull release cord while pulling on door handle.
- Failed Bi-metal latch.
-In control tray, pull door harness connector P1-S1 apart Check for about 17K ohms at 2 and 8.
- Door release solenoid.
-At P1-S1 check between 51 and 10 for about 7k to 8k ohms.
- Check diode bridge rectifier.

Door will not unlock at end of cycle.

Note: Door latch will normally release itself within 2 to 3 minutes after power is turned off.

- If the door is locked then the bridge rectifier circuit is working (on PC/PN models check bridge rectifier in door unlock circuit.)
-Check the door release solenoid circuit.

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

**Door does not lock "on "
indicator must be lighted**

- Check door release coil for continuity at connector S1/P1 (white, common) and wire #51 (white). The coil will be about 1800 ohms for 120 volt models or 7900 ohms for 240 volt models.
- Check program timer contact P13 (53 to 51) at the last increment of the cycle. See timer chart. (on PC/PN models, check operation of relay RL16 on Control Board).
- Turn power off, remove lower access panel and pull door release cord while pulling out on the end of the door handle to open manually.
- Remove the front panel and door lock cover to check for bind in door lock mechanism.
- Check for line voltage at S1/P1 (top - left connector in controls tray) between wire 8 and the blue line 2 wire.
- Check for line voltage at the bridge rectifier assembly (on the left side of the control tray) between wire 8 (white) and the blue line 2 wire.
- Check for DC voltage at the bridge rectifier assembly for wires 49(-) and 10(+). Approximately 100 volts in the 18 pound 120 volt models and about 200 volts for the 208 - 240 volt models.
- Remove power and disconnect plug P1 from connector S1. Check for door lock solenoid coil continuity between wire 49 (white) and 10 (white) 120 volt coils are about 1.8k ohms 240 volt coils are about 7.9k replace coil if open.
- Remove front panel and check lock mechanism for mechanical bind.
- Check reversing timer motor for power and then continuity - replace if open.
- Check reversing timer for stuck contacts.
PC/PN Models: Check contactors for defects.
Check operation of relays RL2 & RL3 on control board.

**Motor runs at wash speed in
one direction only.**

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

Motor will not run in wash

- Check for power at rear terminal block. Line 1 (brown) and line 2 (blue)
- Manually press down on wash contactor armature (CMI) front contactor. If motor runs, release this contactor.
- Check for open thermal overload protector circuit in motor.
 - Check for voltage between S8/P8 wires 14 to 17. If voltage is present the overload is open. Find out why.
 - Check for continuity (power removed) between S8/P8 connector terminals 14 and 17 should be closed. If open the terminals have opened. Find out why.
- If motor does not run when you manually press wash contactor-
 - Check for line voltage at input side of motor contactor.
 - Check for line voltage at output (load) side at contactor with contactor pushed down.
 - Check motor winding resistance (power removed) see motor resistance chart in motor section. Generally, wash motor winding will be very close to each other in resistance.
- Check the reversing timer controls RP1 and RP3. These contact sets should alternate for motor reversing. See reversing timer contact chart.
- Check program timer contact P16, P17.
- Check selector switch contact.
- Check capacitor(s) on single phase models.
- Check for a nail or other object jammed in washbasket.
- Wash contactor coil circuit is routed through a normally closed contact set on the spin contactor not energized.

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

Motor will not run in spin

- Momentarily push down on spin contactor armature (CM3). If motor runs check contactor coil circuits.
- Washer will not spin until the lowest level of the pressure switch is reset to empty. Check for continuity at pressure switch terminals 11 and 12.
- Check connector S2 and plug P2 for continuity of 23/33 jumper.
- Check reversing timer RP12 contact set.
- Check contactor coil resistance to be near 120 ohms for 120V models or 500 ohms for 240 volt models.
- Check thermal overload protector at S8/P8 wires 14 to 17 for continuity.
- On single phase models check capacitors.
- On single phase models, check motor centrifugal switch at connector S7 and plug P7 (this connector and plug are not on models without the centrifugal switch) should have continuity with motor not running.

NOTE: Centrifugal switch handles only the coil current for capacitor contactor CM9. All three sets of CM9 contactor points are wired in parallel for capacitor switching. The centrifugal switch sees only mechanical wear.

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

Washer does not fill

- Are shut-off valves open?
- Check to see that one of the selector switch buttons is fully depressed and latched. No fill will occur unless a button is pressed.
- Pressure switch must be reset to "empty" position. Make sure washer is draining properly (empties in less than 1/2 minute).
- Water valve harness is connected through connector S8 and plug P8 at back right corner at the controls tray.
 - Blue wire is Line 2 / common
 - 30 (white) is valve 1-cold
 - 32 (white) is valve 2-cold
 - 20 (white) is valve 3-hot
 - 42 (white) is valve 4-hot
 - 35 (white) is valve 5-cold
 - 46 (white) is valve 6-cold

- Check selector switch (see Truth Table).
- Check timer contacts P2, P4, P8, P10, P11, P12 and P14 (see timer sequence chart).
- Check water valve solenoid coil for continuity / resistance 120 volt coils are approximately 1.2k ohms 240 volt coils are approximately 4.5k ohms.
- If unit fills but does not hold water check drain valve.
- Check drain valve power at connection S6 / plug P6 blue wire #58 white.

Washer will not hold water

- Check drain valve continuity (power off; plug disconnected) blue to 58 white 120 volt drain motor approximately 27 ohms. 240 volt drain valve motor approximately 105 ohms.
- Check for debris in drain valve. You should be able to see into the drain valve from inside the washbasket by using a bright flashlight through the tub perforations.

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

**Washer appears "dead"
display not lighted**

- Check power source (circuit breaker, fuses).
- Check for line voltage at the two fuse holders at the rear wall of the control tray. Check both sides of the fuse holders for voltage in case one of the fuses is open.
- Check P3/S3 connector and jumper plug at the left front bottom of the controls tray. Wire 5 (line 1) and the blue line 2 wire go through this contactor and jumper plug.
- At connector S4/P4 (bottom center, front) check between blue (line 2) and wire 59 (white) for line power. This is fed through the program timer P15, 61 to 59.
 - If power is present, suspect the coin acceptor assembly.
 - If power is not present, check that timer is in the "off" / "start" position.
 - Jumper 59 (white) to 1 (white / purple) at the connector S4/J4. This is same function as a manual start button. If washer starts, suspect coin acceptor board. Once the timer has moved from the "off /start" position, no power is available to the coin acceptor. If the "on" indicator is lit, the timer has moved from the start increment.

**Washer will accept money
and will move to the
beginning of the cycle ("on"
indicator lighted) but
nothing else happens**

- Check push-button selector switch. If no button is fully depressed and latched, there will be no circuit to the water valve solenoid.
- Check door switch circuit. At the top - left - front connector SVP1, check for continuity between 57 and 8. **NOTE:** This is a continuity check to be made with power removed. This checks the door switches DS1 and DS2.
- If door has locked (and has been locked for several minutes to allow the bi-metal latch to warm), there may also be continuity between 57 and 8 and 2 indicating the door switch D53 has closed.
- Push-button 5 should advance timer.

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should **ALWAYS** be disconnected when servicing a product.

Washer starts in spin but drops back to tumble speed

- Check for drain obstruction - water level safety switch will drop the spin contactor if water backs up into the pressure switch hose.

Washer will accelerate to spin speed only when empty has no "guts" when loaded

- Check centrifugal switch, capacitor switching contactor CM9 and capacitors on single phase models.

PC & PN MODELS

Washer appears "dead" display not lit

- Check power source for line voltage.
- Check fuse 1 and 2 at rear panel of washer.
- Check for line voltage at control board connector "PLS" at left end of control board.
- If line voltage is present but control is still not lighted, then check door switch and water level switch.

Touchpad does not work

- Substitute another key pad and check operation.
- Check for continuity.

Selected output does not work

- Each output is controlled by a separate relay mounted on the control board. First check the load to see if it has continuity. The individual "load" can be powered by means of a jumper to see if it will function.
- Voltage checks can be made at each output as well. Look for full line voltage at each output of relays.

Cycle select button does not work

- Check operation of switch
- Check wiring to switch
- Check connection on control board J2.1 and J2.8.

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

Display shows "d-o-o-r":

- Check to be certain door is properly closed.
- Check current overload protector.
- Check for loose connection(s) in the door closed switch, thermal overload in motor, and in J4 plug connections.

Display goes blank when cycle is started:

- Check to be certain door is closed properly and that there is no mechanical bind in the door lock assembly.
- If clicking sound is heard, check connections to door lock assembly circuit.

- Check diode bridge rectifier.

- Check door lock solenoid.

Machine stops 90 seconds after starting a cycle and displays fault code 4:

- Check bi-metal device in door lock assembly.

Machine fills with improper water temperatures:

- Check for proper hot and cold water supply connections at back of the machine.

- Check water valve operation.

- Check programming

- Check temperature sensor operation.

Door does not unlock at end of cycle:

- Check for bind in door lock assembly

- Check diode bridge output to door unlock solenoid.

- Check door unlock solenoid circuit.

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

DISPLAY MESSAGES (MFR35 & 50 PNB MODELS)

Messages may appear on the display at the start, during or at the end of a wash cycle. An explanation of these messages will be given below:

- Which message appear on the display
- Possible cause of the message
- How to solve the problem

CLOSE DOOR PRESS START

Message: "CLOSE DOOR PRESS START" appears on the display.

Explanation: This happens when a wash cycle is selected and the "Start" keypad is pressed while the door is still open.

Solution: Close the door and press the "Start" keypad.

DOOR FAIL

Message: "DOOR FAIL" appears on the display and the buzzer sounds.

Explanation: This happens when the door safety system fails during the wash cycle. All other machine functions are switched off.

Possible causes:

- Electrical fault in the door lock.
- The door lock may be broken.

Possible solution:

- If the door lock is broken, consult your commercial distributor. To cancel message: press "Stop" to stop the buzzing. When the problem has been solved, press "Start" to continue.

DRAIN FAILURE

Message: "DRAIN FAILURE" appears on the display and the buzzer sounds.

Explanation: This happens when the water is not drained away from the machine within a set time. The drain valve stays open and all other machine functions are switched off.

Possible causes:

- The drain may be blocked.
- The drain valve may be blocked.
- The drain valve may be broken.

Possible solution:

- Unblock the drain.
- If the drain valve is broken, consult your commercial distributor. To cancel message: Press "Stop" to stop the buzzing. When the problem has been solved, press "Start" to continue.

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should **ALWAYS** be disconnected when servicing a product.

EEPROM FAIL

- Message:** "EEPROM FAIL" appears on the display.
- Explanation:** This happens when a storage location in the EEPROM memory does not function properly.
- Possible causes:**
- There may have been a temporary problem.
 - There may have been a failure in the EEPROM memory.
- Possible solution:**
- Turn off the power to the washing machine. Turn the power on again a little while later. The failure should not occur again.
 - If it appears again contact your commercial distributor.

FILL FAIL

- Message:** "FILL FAIL" appears on the display and the buzzer sounds.
- Explanation:** This happens when the water level does not reach the programmed level within a time that has been pre-set in the microprocessor. All other machine functions are switched off.
- Possible causes:**
- The pressure in the water lines may be too low.
 - The filters of the water valves may be blocked.
 - The water supply may still be shut off.
- Possible solution:**
- Clean the filters of the water valves.
 - Open the water supply. To cancel message: press "Stop" to stop the buzzing. When the problem has been solved, press "Start" to continue.

HEAT FAIL

- Message:** "HEAT FAIL" appears on the display and the buzzer sounds.
- Explanation:** This happens when the registered temperature does not reach the programmed target temperature within the time that has been pre-set in the microprocessor. All other machine functions are switched off.
- Possible causes:**
- A heating sensor may be broken or disconnected.
 - In the case of steam heating, the steam valve may be broken or plugged.
 - If any part of the heating system breaks down, contact your commercial distributor.
- To cancel message: Press "Stop" to stop the buzzing. When the problem has been solved, press "Start" to continue.
- NOTE: Target times for "HEAT FAIL" and "FILL FAIL" can be set by the technician.

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

NO PROCESS

- Message:** "NO PROCESS" is displayed for a few seconds.
- Explanation:** This happens when a non-programmed wash cycle is selected and the "Start" keypad pressed.
- Solution:** Enter an existing process number.

OUT OF BALANCE

- Message:** "OUT OF BALANCE" is displayed.
- Explanation:** Non-Cabinet type and soft-mount type washing machines are equipped with a safety switch, which prevents the machine from operating while the load is out of balance. When the washing machine gets out of balance, extracting stops immediately. The laundry is automatically redistributed in the drum and the washing machine starts extracting again. However, if the washing machine gets out of balance approximately eight times in a row. "OUT OF BALANCE" appears on the display and the buzzer sounds.
- Possible causes:**
- Badly distributed laundry in the drum.
 - The load is either too large or too small
 - Broken suspension or out of balance switch not properly adjusted.
- Possible solutions:**
- Redistribute the laundry in the drum.
 - Take out or put in some more laundry.
 - If the suspension is broken, contact your commercial distributor.
 - If the problem has been solved, you may continue from "SELECT PROCESS --".

OVERLOAD FAULT

- Message:** "OVERLOAD FAULT" appears on the display and the buzzer sounds.
- Explanation:** This happens when the motor has become thermally overloaded or the motor contactor is overloaded. All other machine functions are switched off.
- Possible causes:**
- The motor may be overheated, the motor may have failed due to high current.
- Possible solutions:**
- Allow the motor to cool down, if the motor has failed, consult your commercial distributor.
- To cancel message: Press "Stop" to stop the buzzing. When the problem has been solved, press "Start" to continue.

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

PAUSE

- Message:** "PAUSE" appears on the display and the buzzer sounds.
- Explanation:** This happens when the "SIGNAL ?" function has been programmed in a particular step.
- Solution:** Press "Start" to continue the process.

PROCESS COMPLETE PLEASE WAIT

- Message:** "PROCESS COMPLETE PLEASE WAIT" appears on the display.
- Explanation:** This happens when the wash cycle is completed.
- Solution:** When the wash cycle is completed, you may remove the laundry from the washing machine from the moment "SELECT PROCESS --" appears on the display and the wash basket has stopped.

PROCESS MEMORY EXCEED

- Message:** "PROCESS MEMORY EXCEED" appears on the display.
- Explanation:** This message is displayed if the memory has been exceeded during programming of a wash cycle. This will happen if a step is inserted into a program that exceeds memory capacity.
- Solution:** After pressing the "Yes" button, you can continue with programming but no further steps can be added to the program. If you press the "No" keypad, the programming will be finished.

SERVICE DUE

- Message:** "SERVICE DUE" appears on the display.
- Explanation:** When the number of completed wash cycles reaches the target figure (pre-set in the initialization mode) the following message will appear: "SERVICE DUE." This means the machine is due for service.
- Solution:** The message can be canceled by pressing the "Start" keypad.

TOO HOT

- Message:** "TOO HOT" appears on the display and the buzzer sounds.
- Explanation:** This happens when the temperature probe records a temperature above 50°C or (122°F) at a moment when the door may normally be opened, or if the temperature probe fails, or if water temperature in cage exceeds target temperature by 2.5°C (25°F). All other machine functions are switched off.

CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.

Possible causes: • This may sometimes happen if "Stop" was pressed during the heating portion of a cycle.

Solution: Wait to open the door until the temperature has gone down sufficiently. This may take up to approximately 15 minutes.

TOO HOT CHECK HEATING

Message: "TOO HOT CHECK HEATING" appears on the display.

Explanation: The heating sensor recorded a temperature that is 2.5°C (25°) higher than programmed.

Causes: • Possible temperature probe failure or it water temperature in cage exceeds target temperature by 2.5°C (25°F).
• Interruption in cold water supply.
• Check the heating setting and the thermostat.
• Clean cold water supply screens.

WATER IN CAGE

Message: "WATER IN CAGE" appears on the display and the buzzer sounds.

Explanation: This happens when there is still water in the cage at the moment when the door may already be normally opened. Door lock stops activated and all other machine functions are switched off.

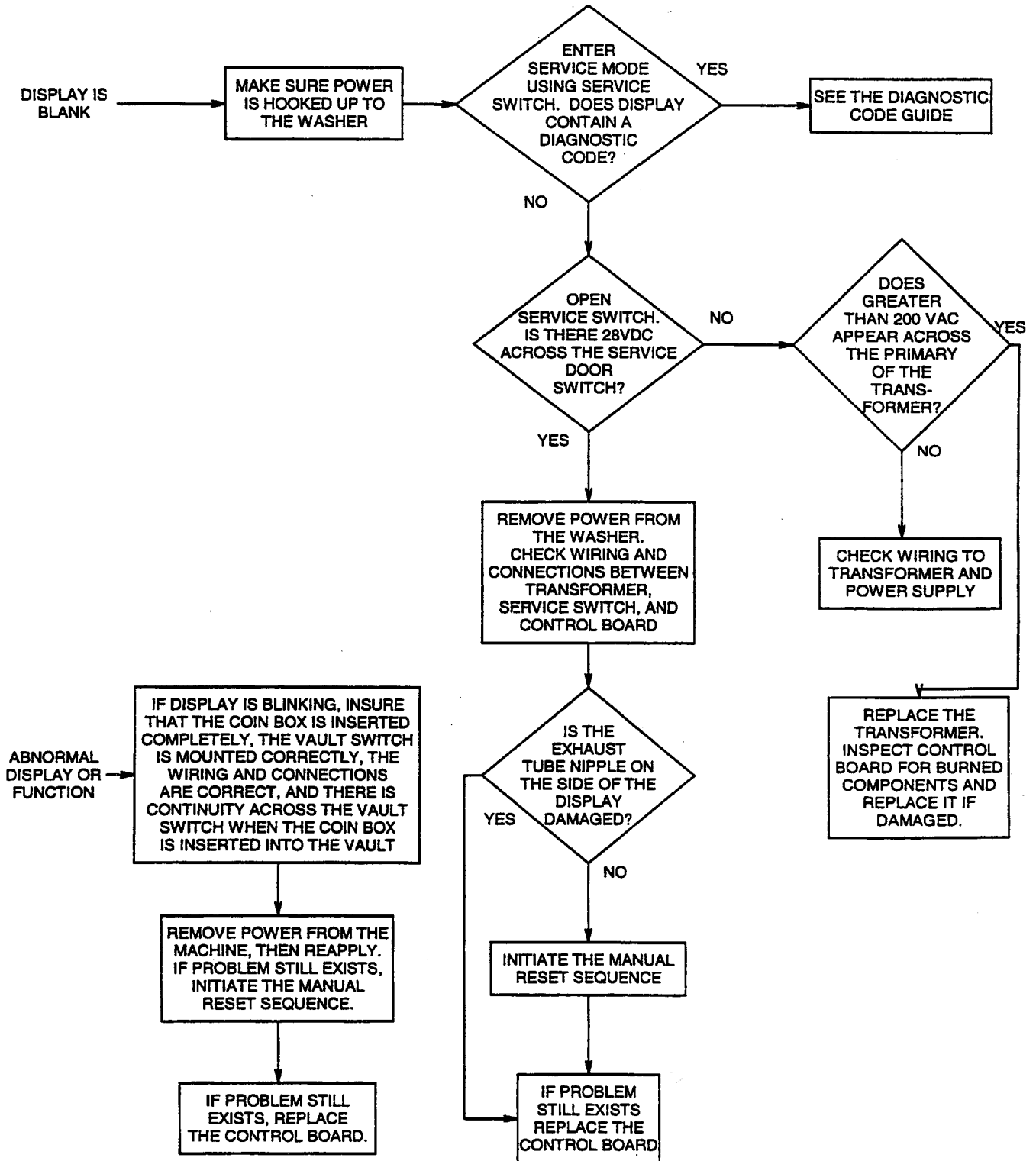
Possible causes: • Happens when "Stop" is pressed and then "No" is answered to the question "RESTART" while there is still water in the drum.
• Plugged drainage, blocked drain valve, cracked drain valve, interruption in cold water supply or faulty thermostat.

Solution: • When the water has run out of the machine, you may continue to operate the MKIIA-20.
• Clean the drainage, consult the commercial distributor if the drain valve is broken.

CAUTION

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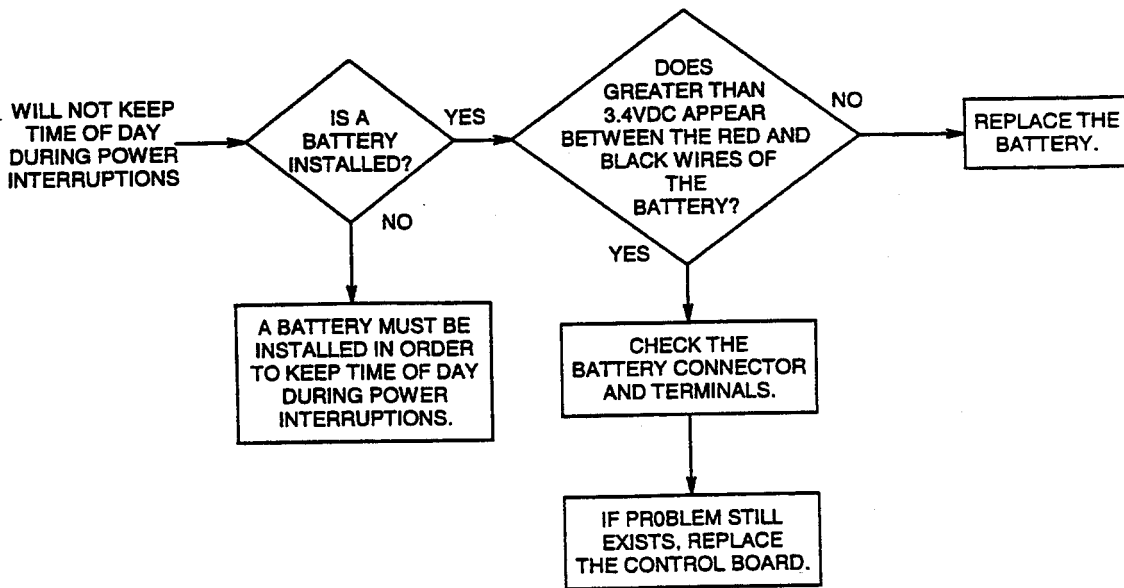
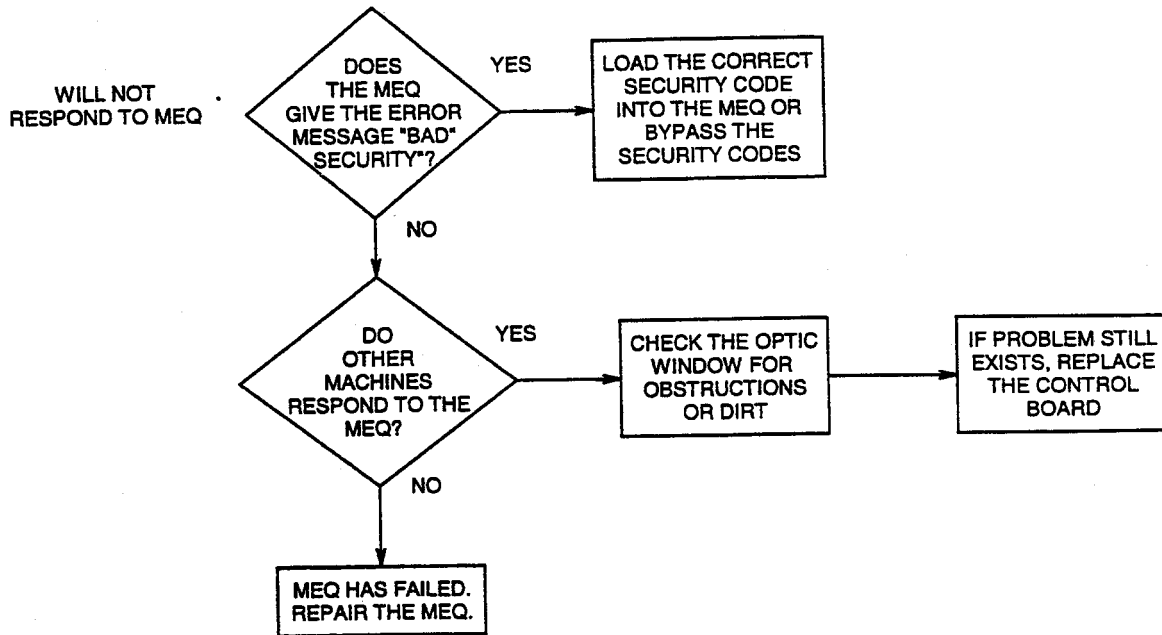
"PD" WASHER TROUBLESHOOTING GUIDE



Continued...

CAUTION

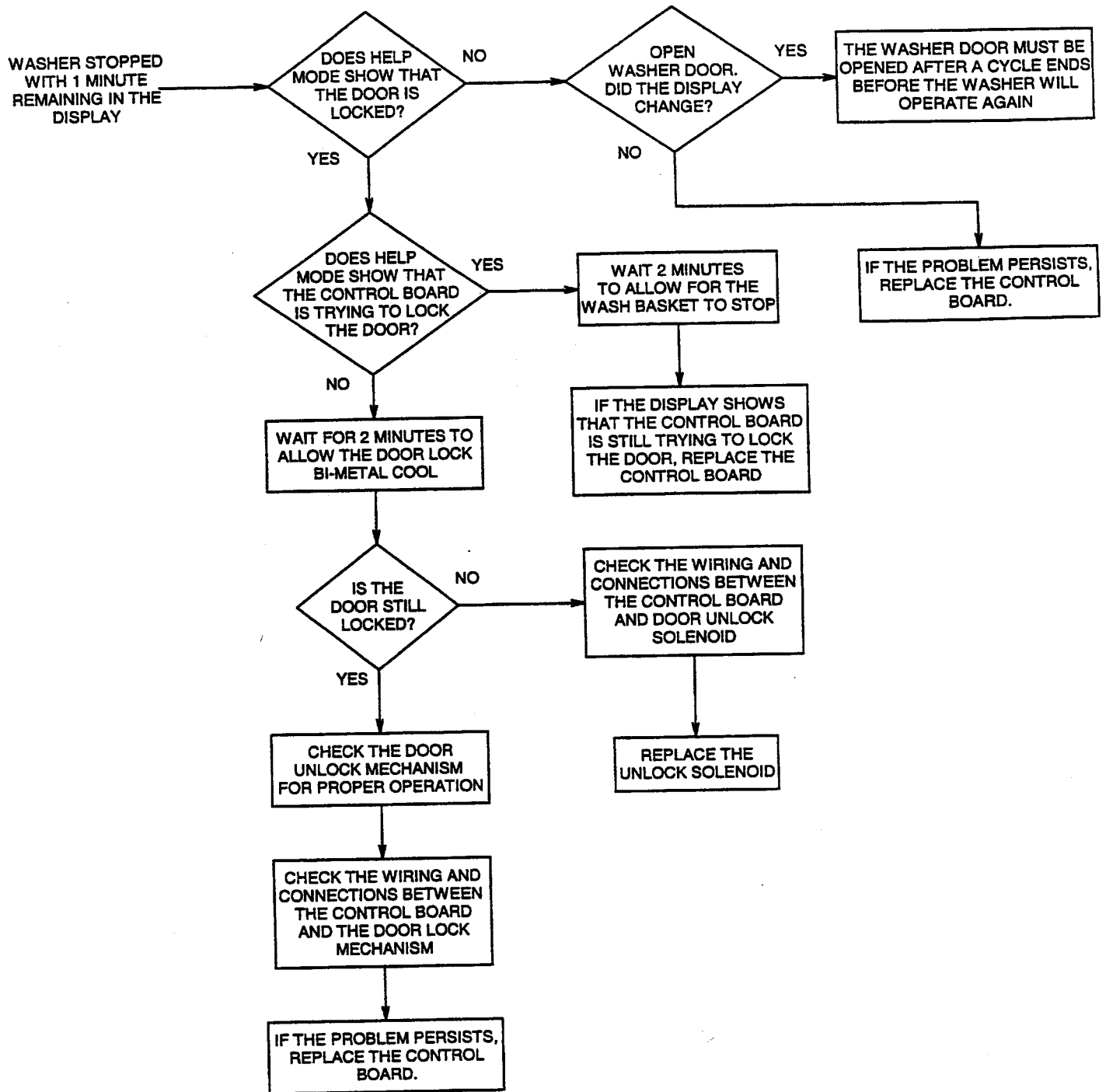
Except as necessary to perform a particular step in servicing a product, the electrical power supply should **ALWAYS** be disconnected when servicing a product.



Continued...

CAUTION

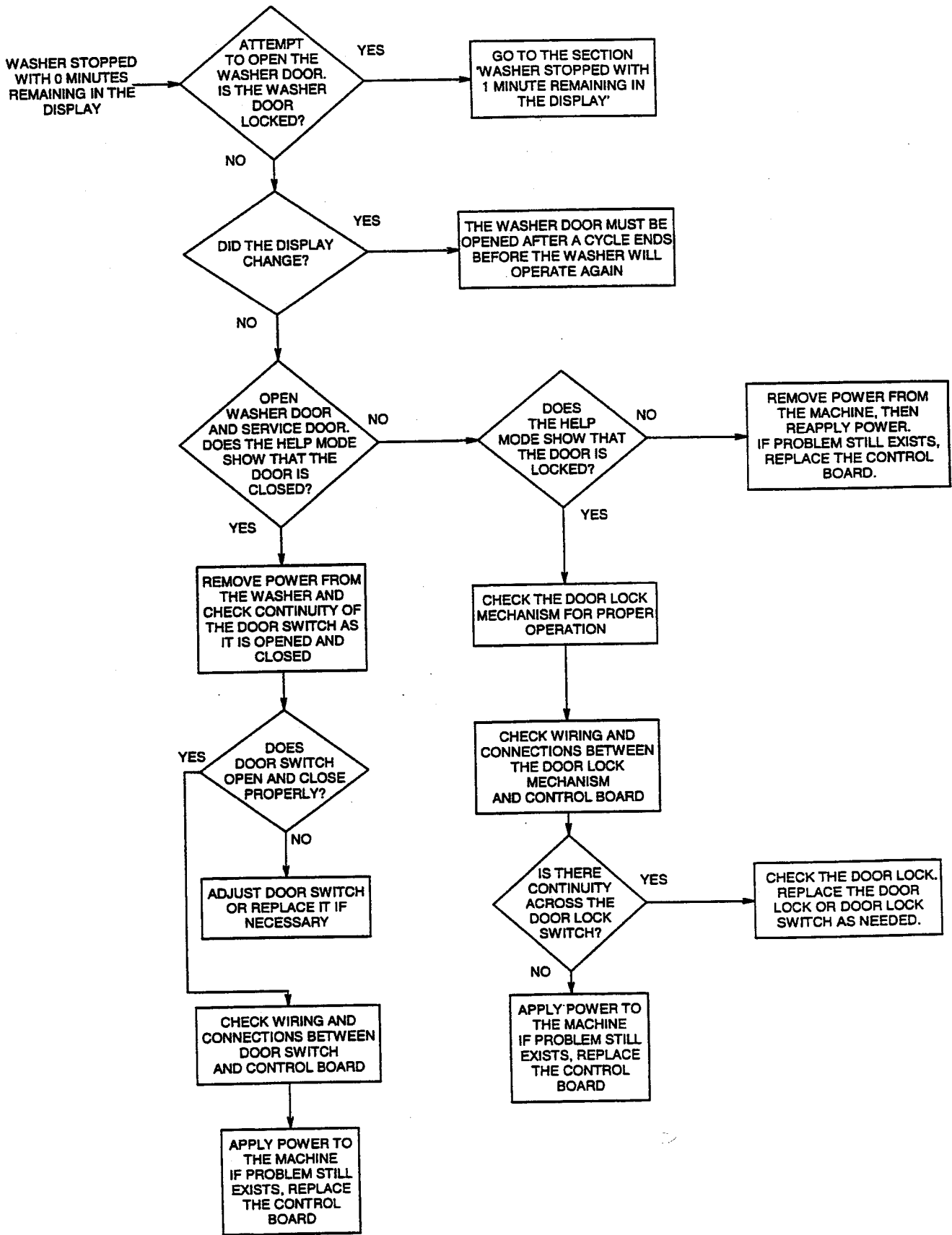
Except as necessary to perform a particular step in servicing a product, the electrical power supply should **ALWAYS** be disconnected when servicing a product.



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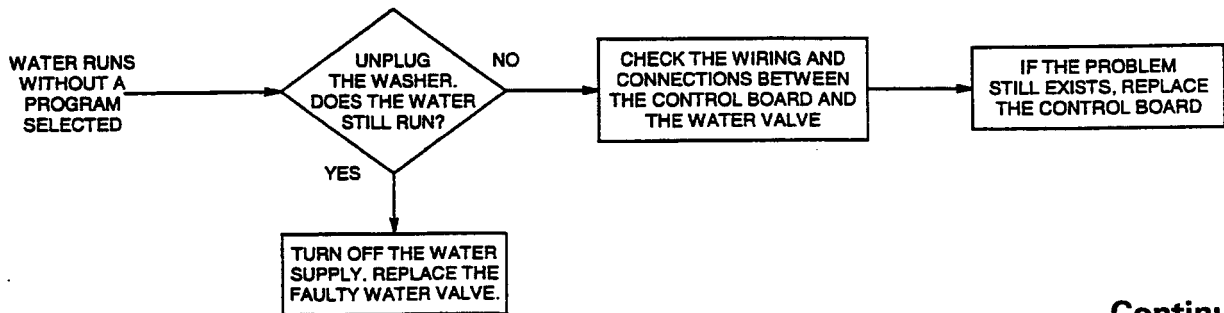
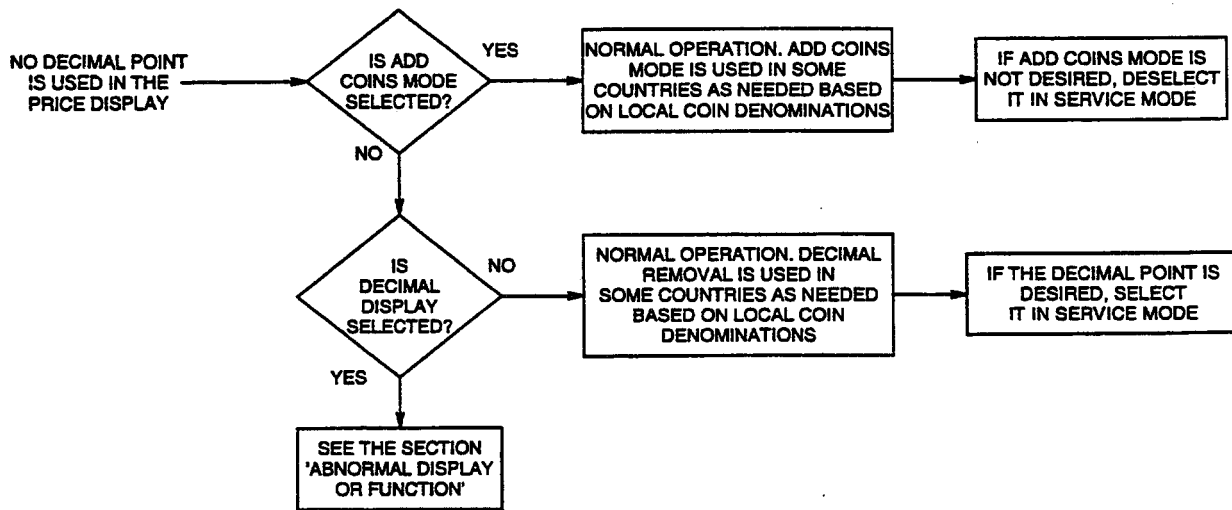
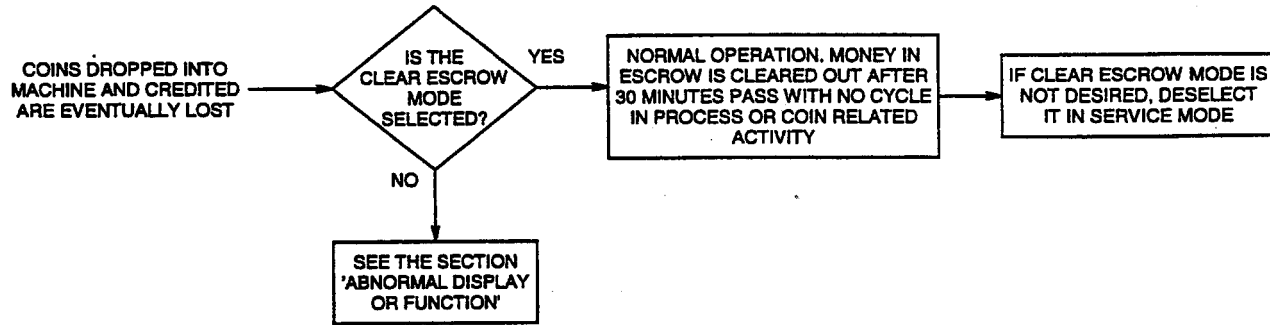
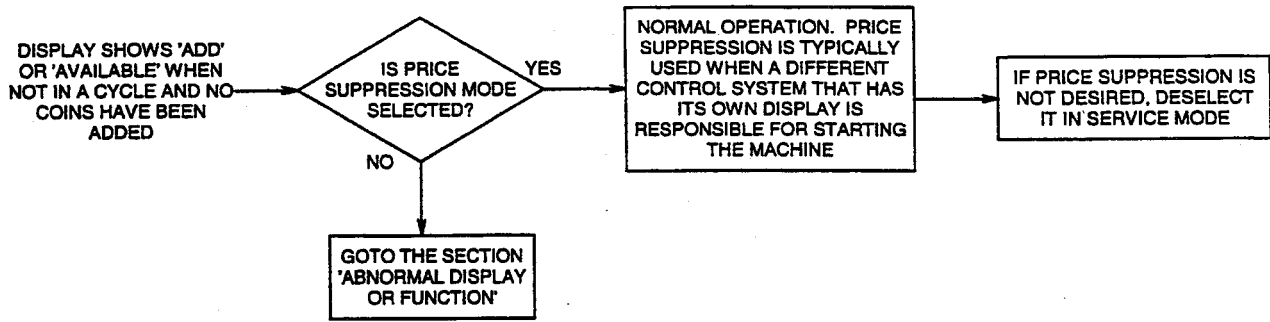
CAUTION

Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.



Continued...

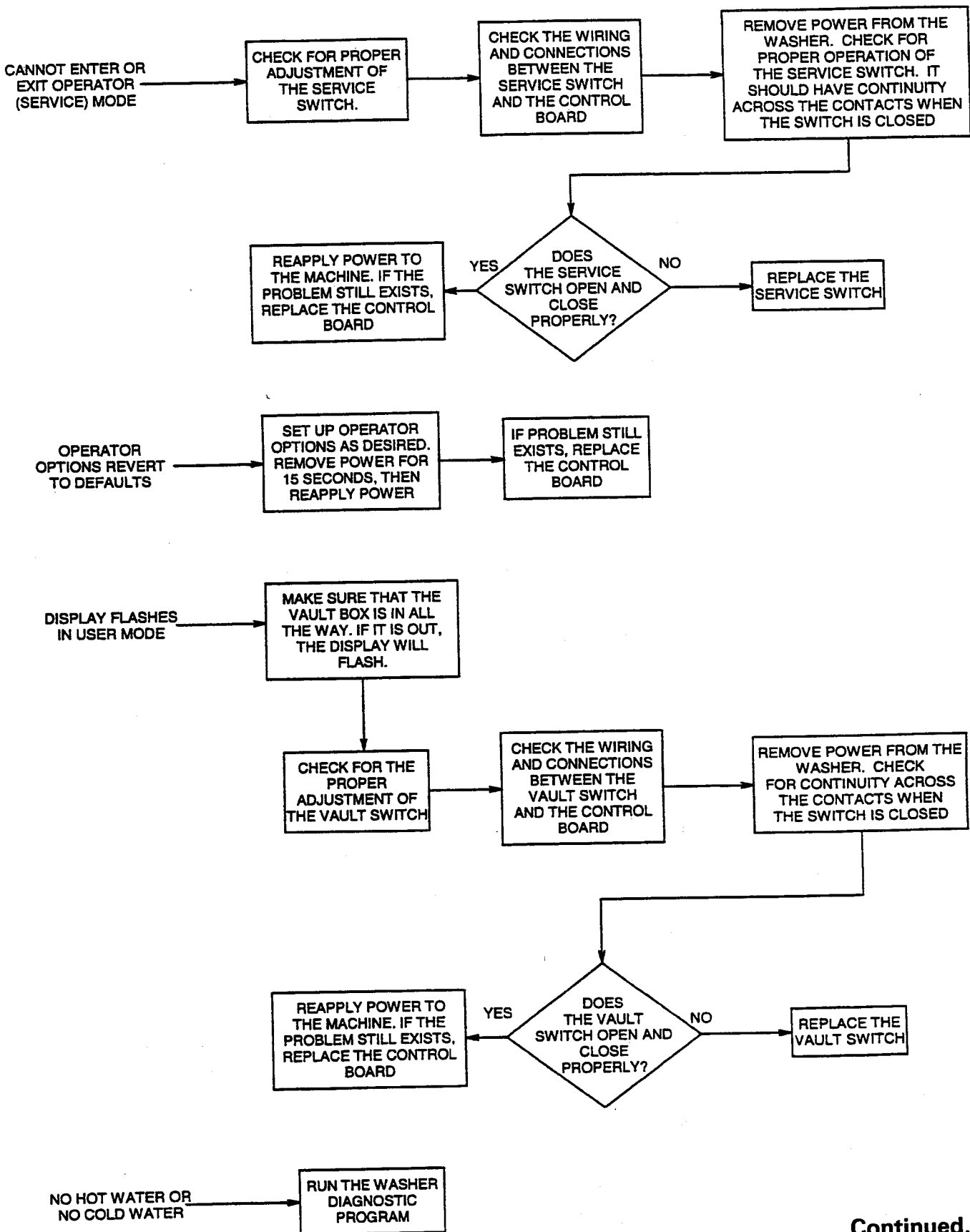
CAUTION
 Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.



Continued...

CAUTION

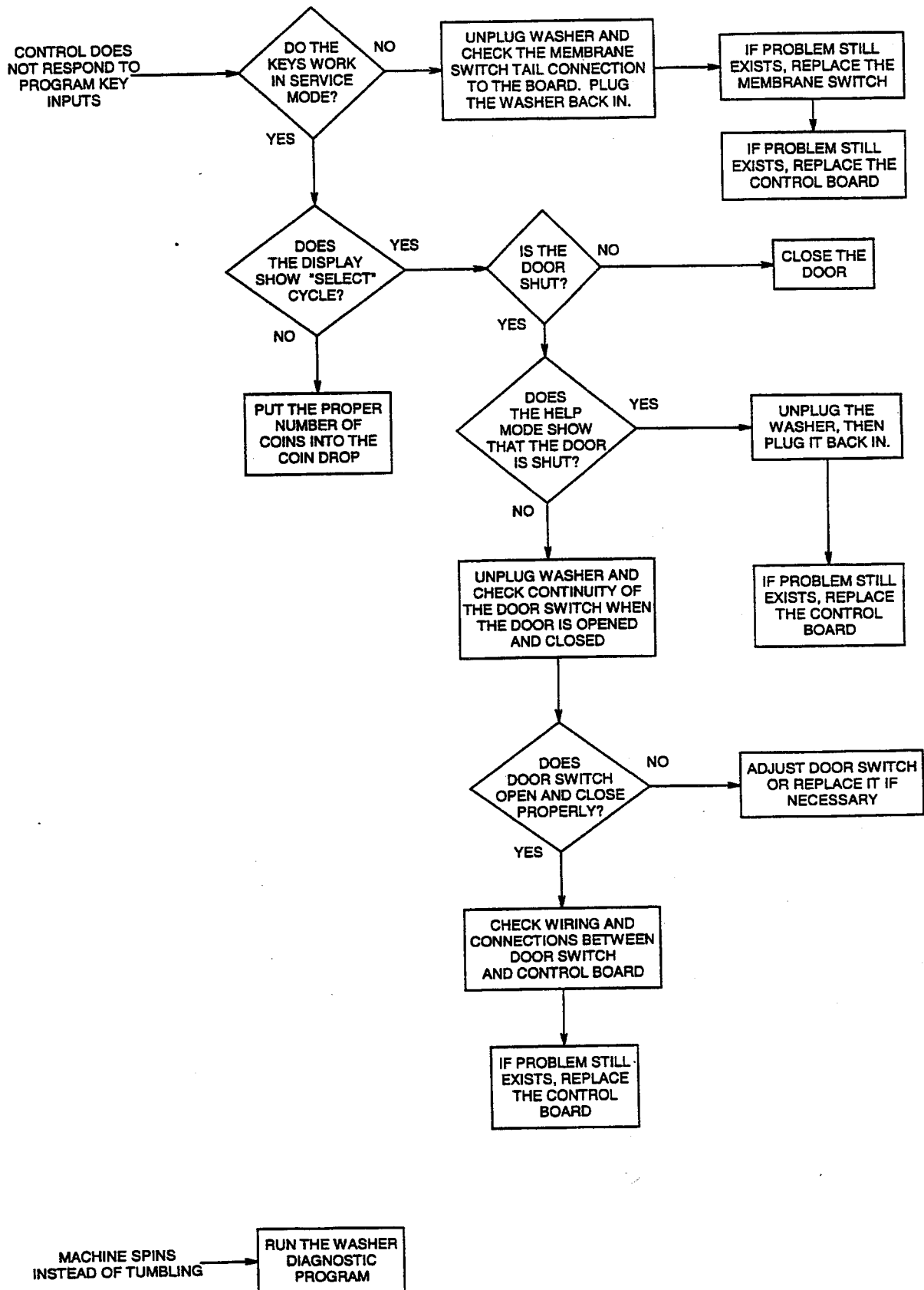
Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.



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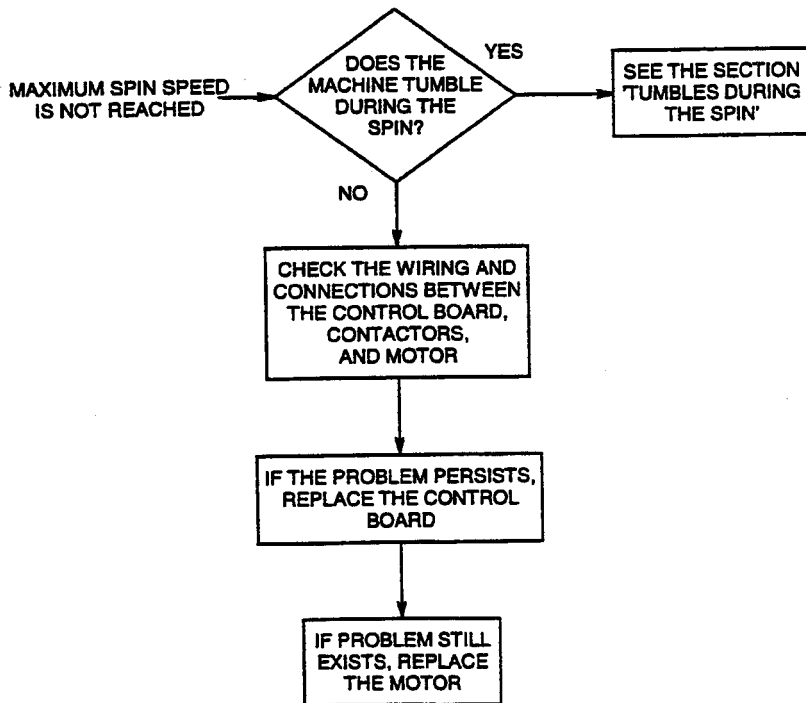
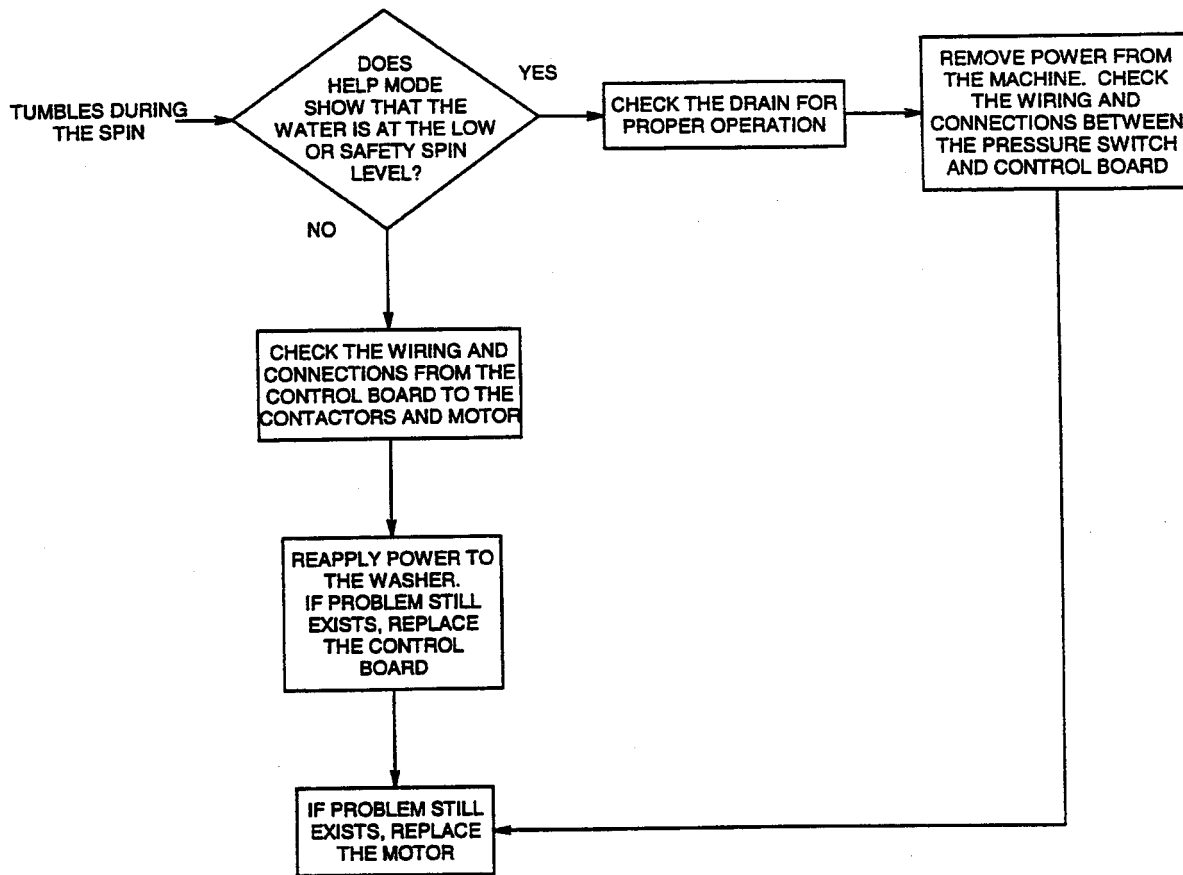
CAUTION

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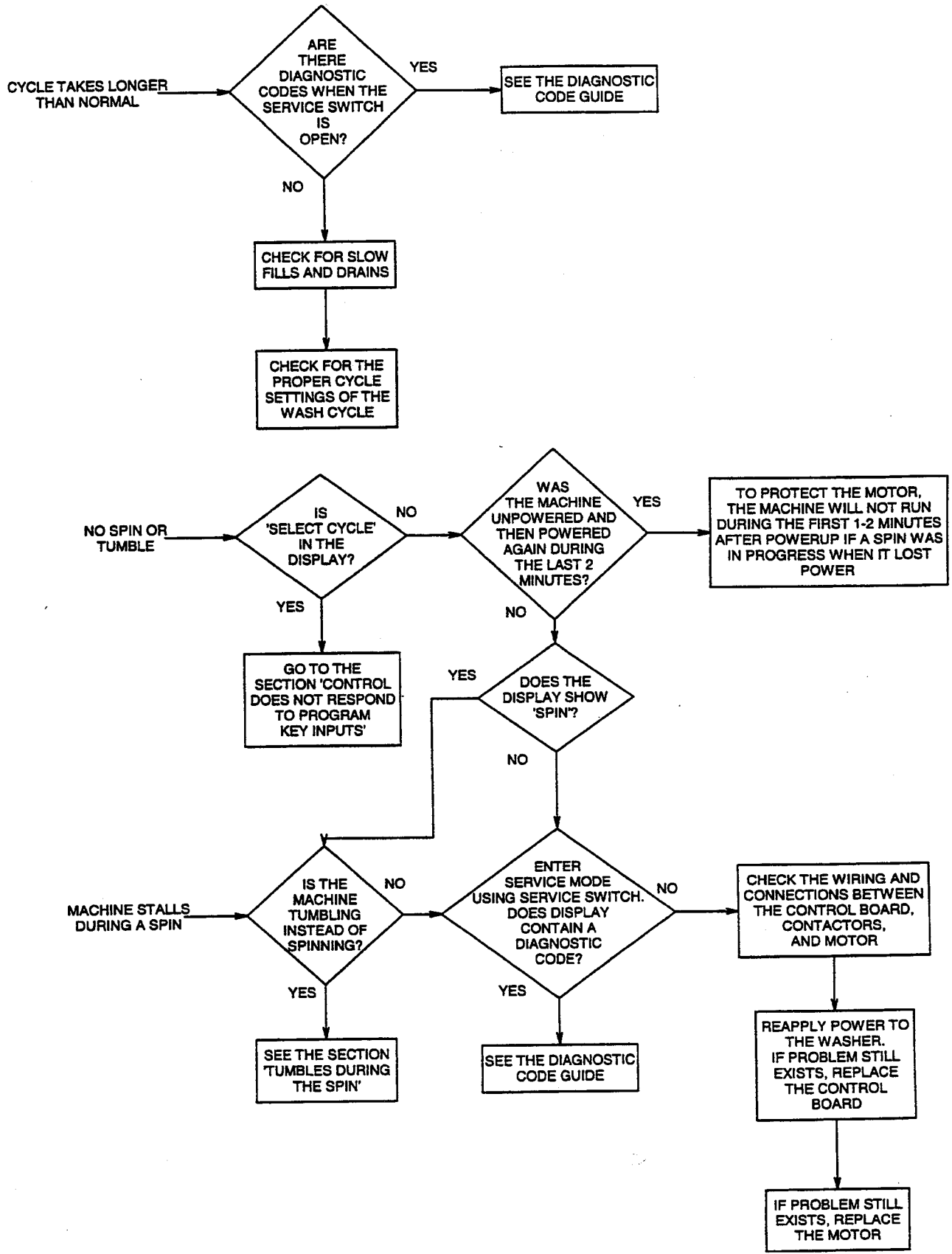
CAUTION
 Except as necessary to perform a particular step in servicing a product, the electrical power supply should **ALWAYS** be disconnected when servicing a product.



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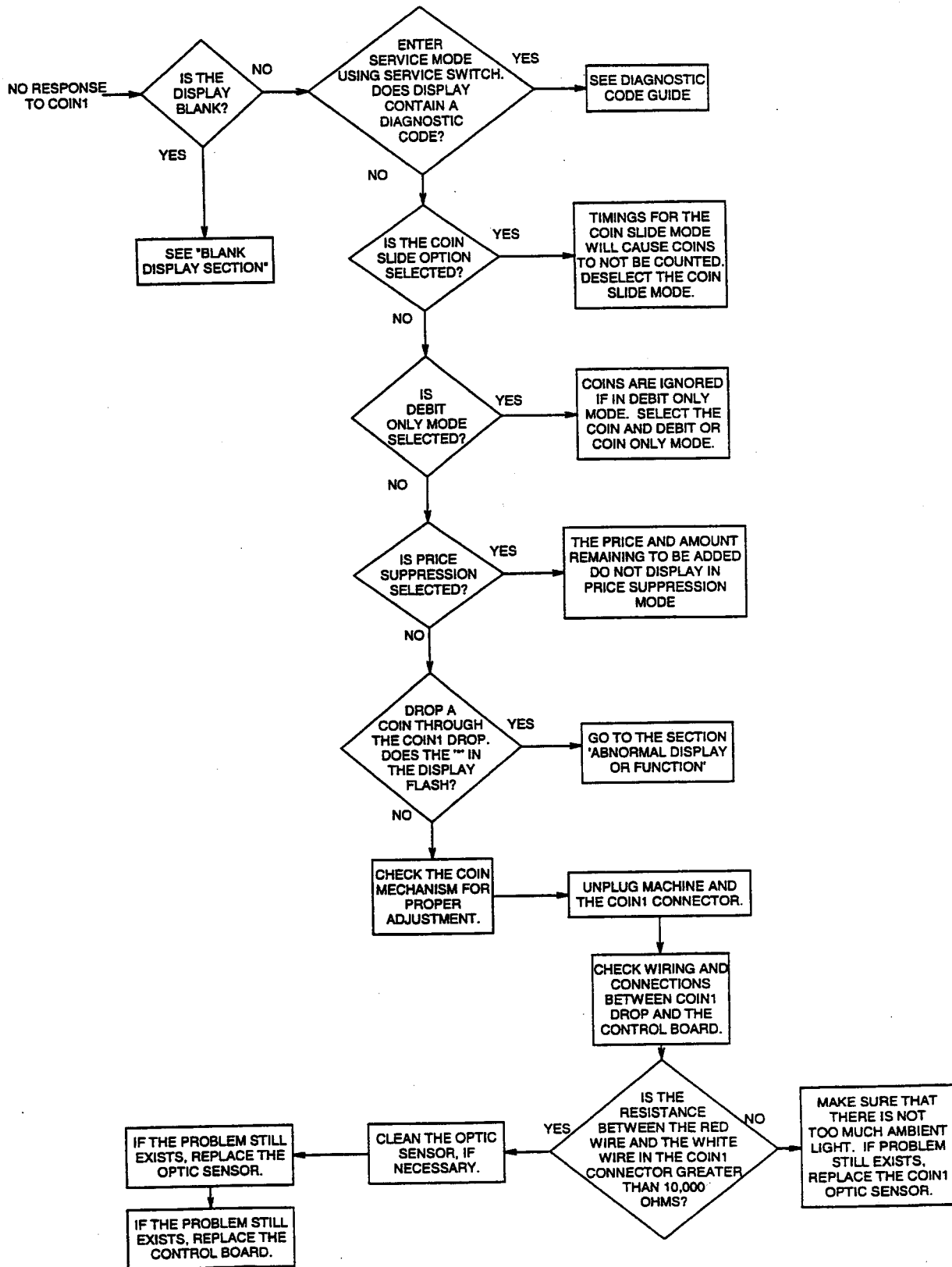
CAUTION

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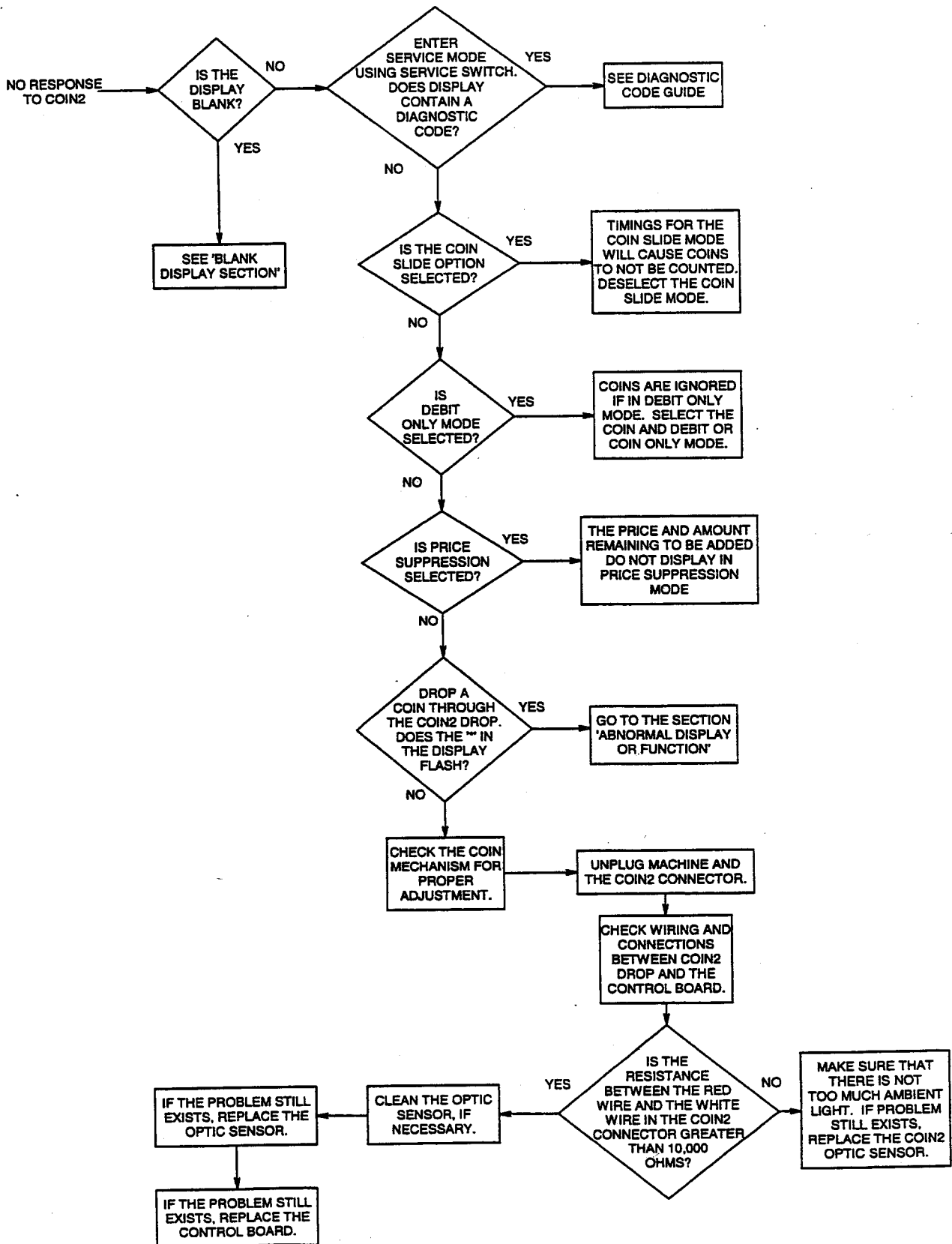
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CAUTION
 Except as necessary to perform a particular step in servicing a product, the electrical power supply should **ALWAYS** be disconnected when servicing a product.



CAUTION

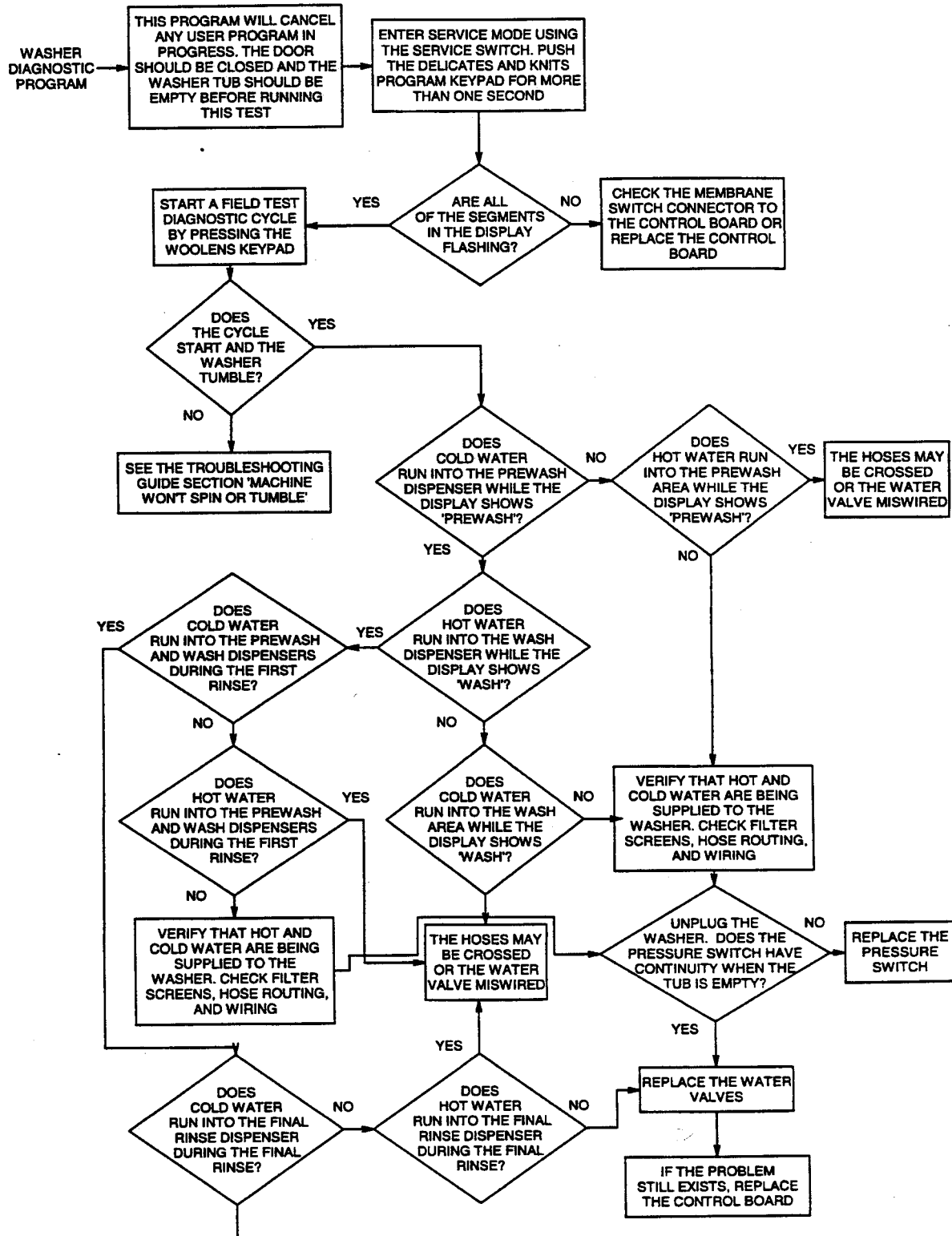
Except as necessary to perform a particular step in servicing a product, the electrical power supply should ALWAYS be disconnected when servicing a product.



CAUTION

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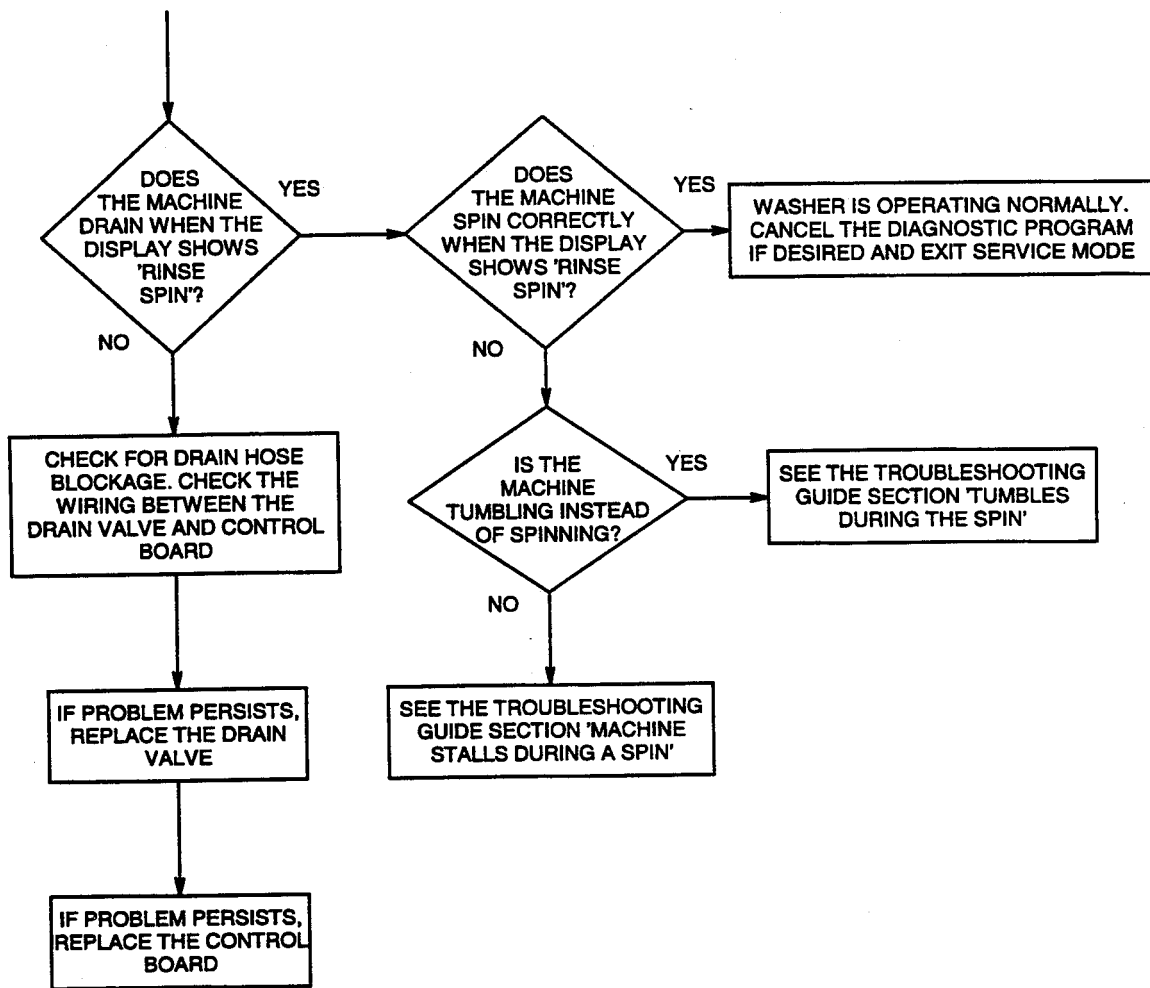
"PD" FIELD DIAGNOSTIC PROGRAM



Continued...

CAUTION

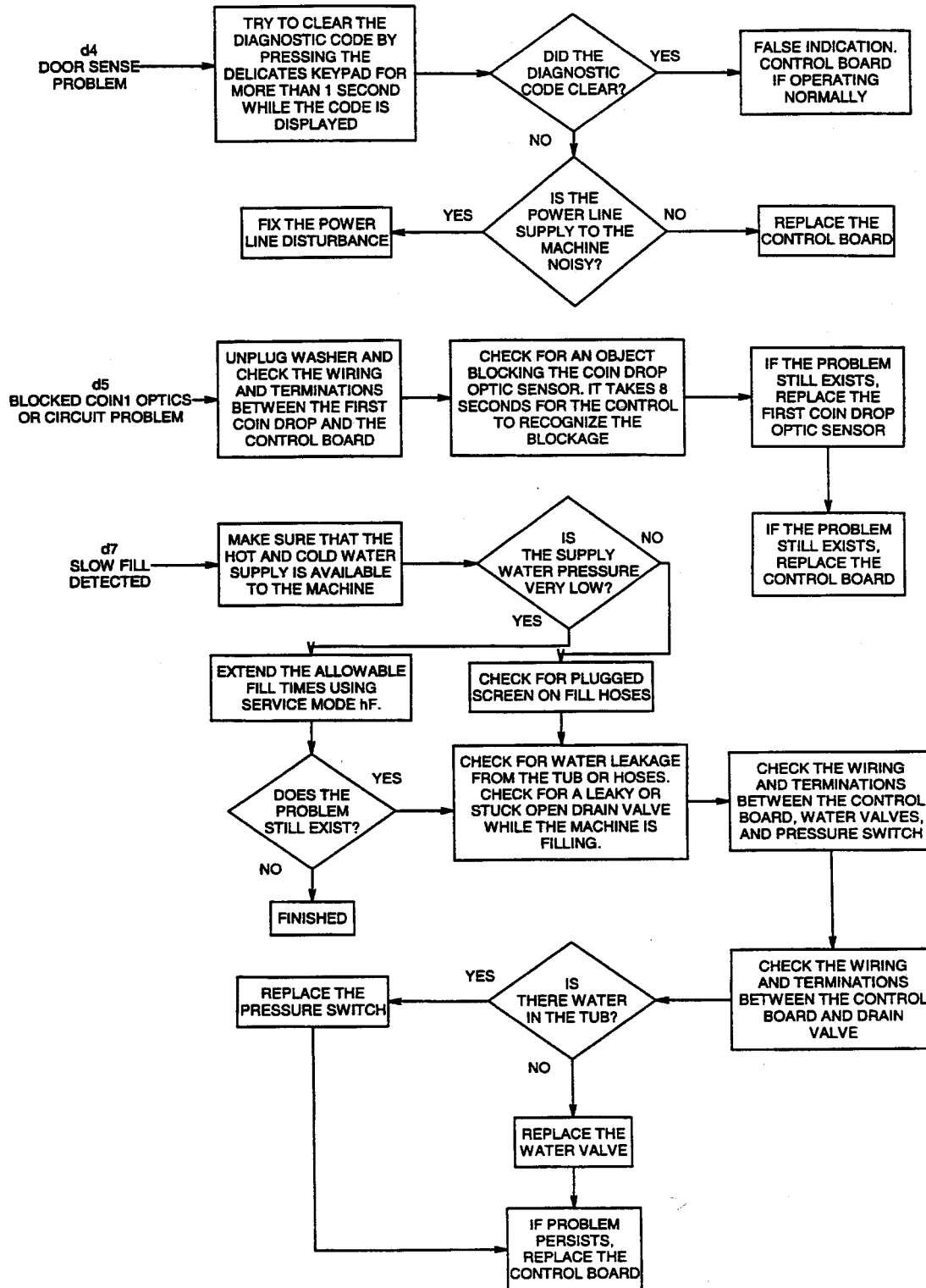
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CAUTION

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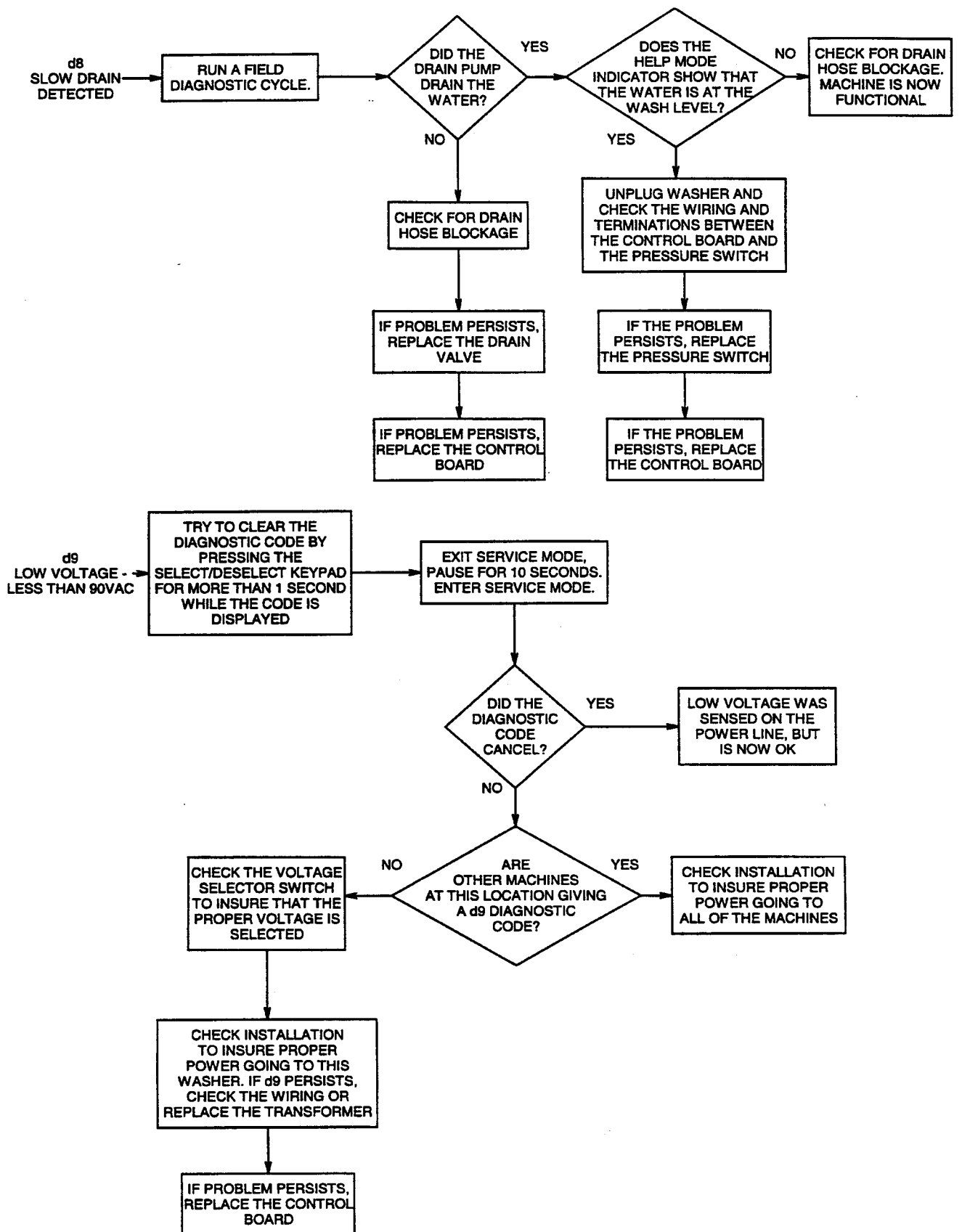
DIAGNOSTIC CODE GUIDE



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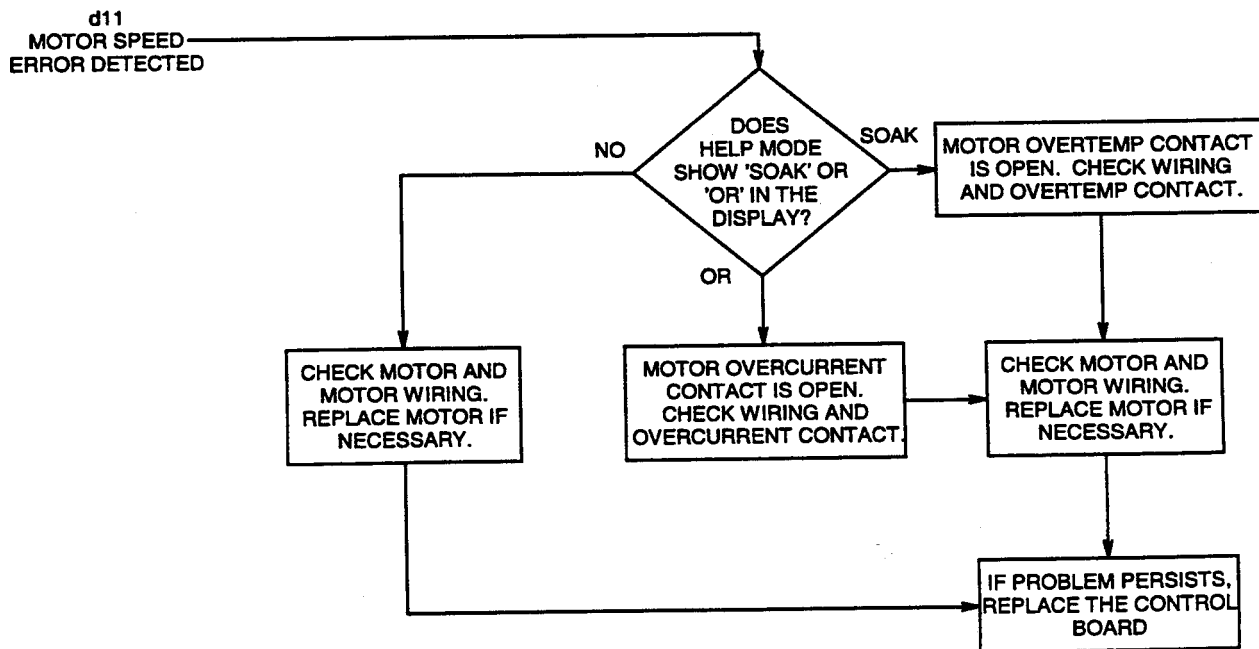
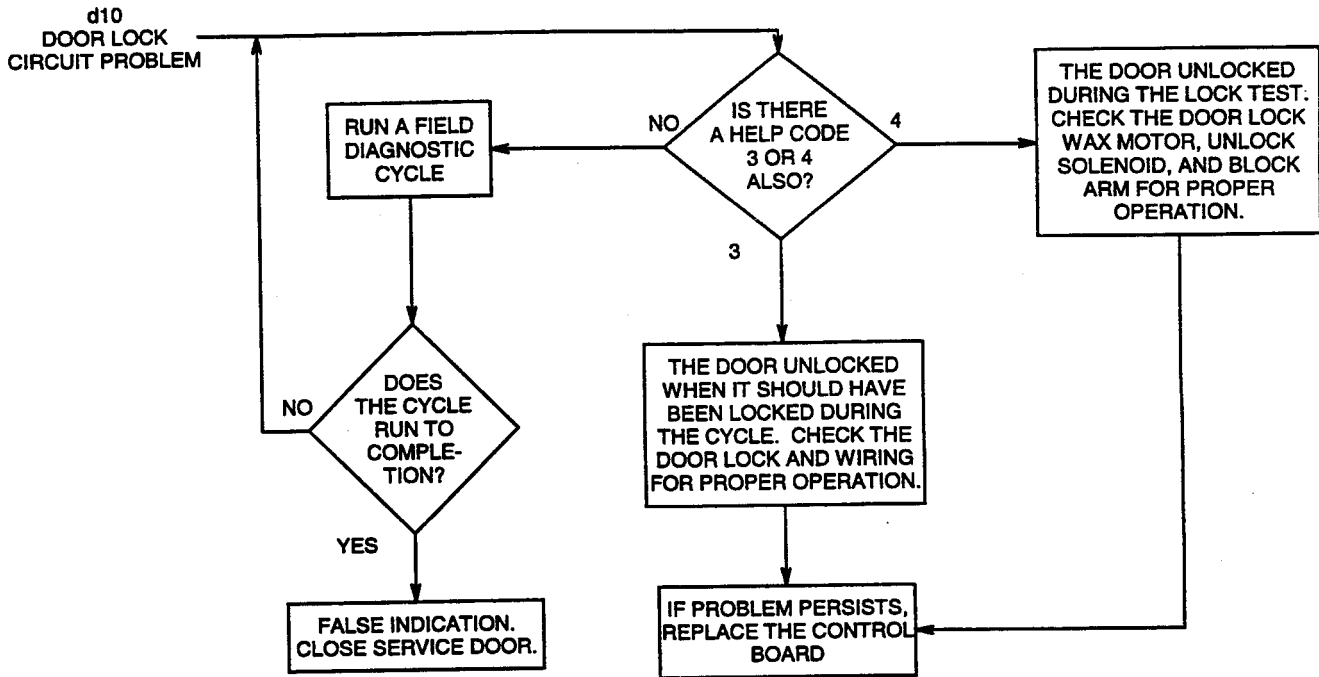
CAUTION

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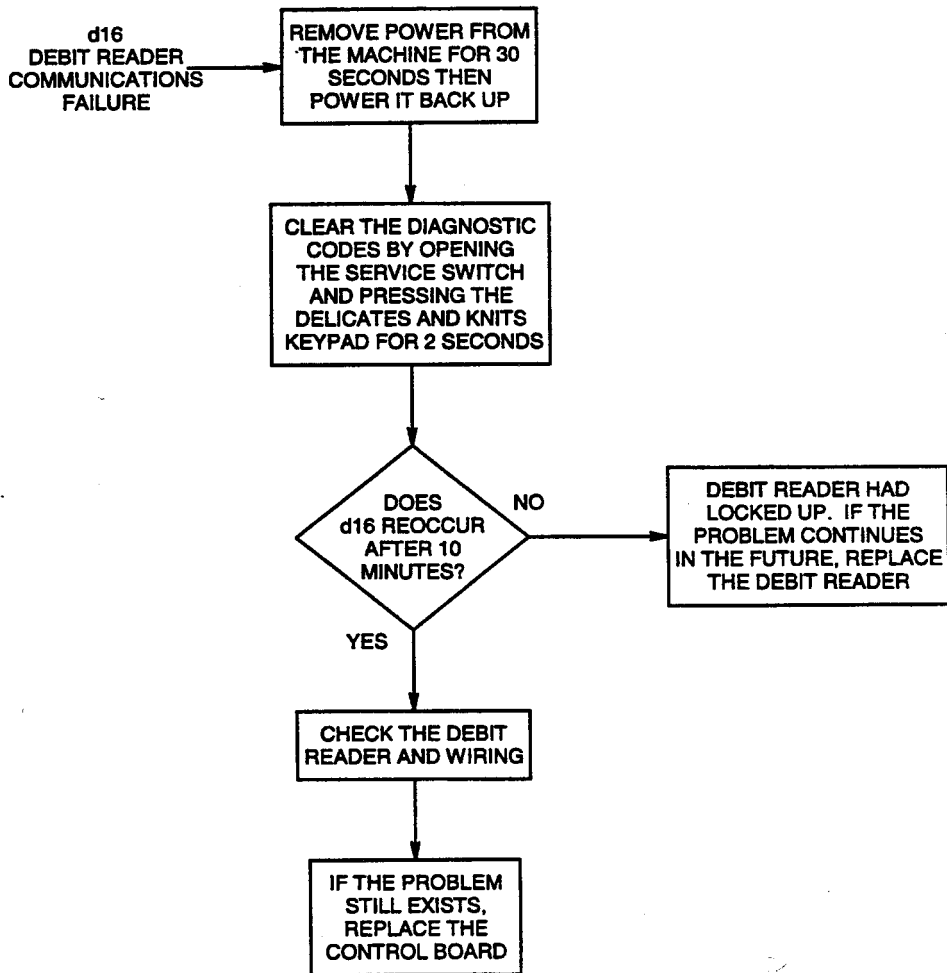
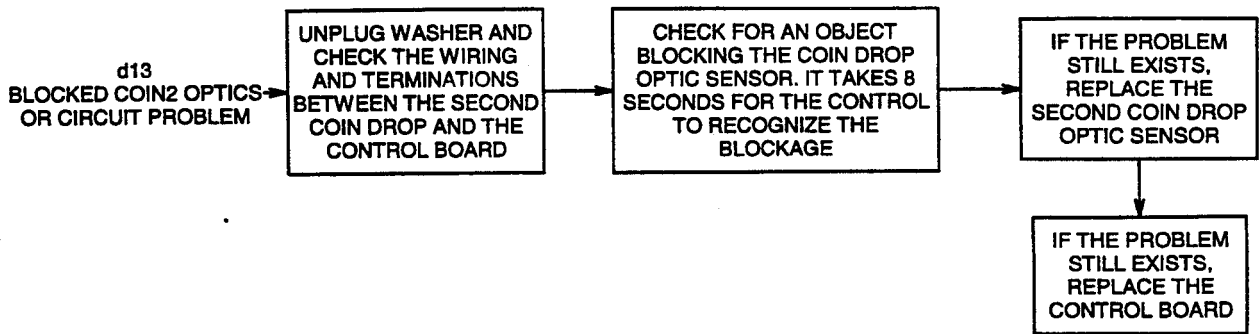
CAUTION
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SECTION 5. SPECIFICATIONS & WIRING SCHEMATICS

NOTE

See installation instructions for proper installation. Specifications are approximate and subject to change without notice. This section is a general guide.

SPECIFICATIONS FOR VARIOUS MODELS					
MODEL	MFR18	MFR25	MFR35	MFR50	MFR80
Capacity-lbs	18	25	35	50	80
Cabinet Dimensions - inches (cm)					
Width	26" (66)	26" (66)	33 5/8" (85.4)	33 5/8" (85.4)	43 1/2" (110.4)
Height	41 3/8" (105.1)	45" (114.3)	51 3/4" (131.4)	51 3/4" (131.4)	57" (144.7)
Depth	24 1/4" (62.2)	31" (78.7)	31 3/4" (80.6)	41" (104.1)	41 1/2" (105.4)
Door Opening	11" (27.9)	11" (27.9)	14 1/2" (36.8)	14 1/2" (36.8)	20" (50.8)
Door Height from Floor	14" (35.6)	18 1/8" (46)	20 5/8" (52.4)	20 5/8" (52.4)	17 1/2" (44.4)
Weight - lbs (kg)					
Created	342 (155)	408 (185)	656 (298)	877 (390)	1150 (520)
Uncrated	320 (145)	373 (169)	612 (278)	783 (355)	1060 (480)
Cylinder Dimensions-inches (cm)					
Width	21" (53.3)	21" (53.3)	27 9/16" (70)	27 9/16" (70)	36 (91.4)
Depth	13 3/4" (34.9)	17" (43.2)	17 5/16" (44)	22 3/4" (57.8)	20" (50.8)
Volume (cubic feet)	2.75	3.5	5.98	7.85	11.79
Cylinder - RPM					
Wash	48	48	45	45	41
Spin	550	550	450	450	510
G-Factor					
Spin	80	80	80	80	130

Model	MFR18	MFR25	MFR35	MFR50	MFR80
Motor - Horsepower					
1 PH - Wash	.15	.18	.45	.45	N/A
1 PH - Spin	.50	.90	2.0	2.0	N/A
3 PH - Wash	.14	.18	.45	.50	1.0
3 PH - Spin	.75	1.0	2.0	2.5	5.0
Amperage Draw (Full Load)					
1 PH - Wash 120/240	4.0 (120V)	2.3	4.2	4.2	N/A
1 PH - Spin 120/240	10 (120V)	4.8	10.0	10.0	N/A
3 PH - Wash 240	2.0	2.1	4.6	5.5	9.0
3 PH - Spin 240	2.6	3.1	6.5	6.8	16.0
Water Considerations					
Water Pressure psi (bar)	30-120 (2-8)	30-120 (2-8)	30-120 (2-8)	30-120 (2-8)	30-120 (2-8)
Recommended Minimum Water Pressure psi (bar)	30-85 (2-6)	30-85 (2-6)	30-85 (2-6)	30-85 (2-6)	30-85 (2-6)
Water Connection (inches)	3/4"	3/4"	3/4"	3/4"	3/4"
Drain Connection (inches O.D.)	3"	3"	3"	3"	2x3"

Note:

All figures are approximate, specifications are subject to change without notice.

CIRCUIT SIZING

Model	Voltage			Max. Rating Amps.	USA & Canada	
	Volt	Phase	Cycle		Circuit Breaker Amp	Wire Size Awg*
MFR18	120	1	60	12	20	12
	208-240	3	60	3.1	15	12
MFR25	208-240	1	60	5.1	20	12
	208-240	3	60	3.8	15	12
MFR35	208-240	1	60	10.8	20	10
	208-240	3	60	6.8	15	12
MFR50	208-240	1	60	10.8	20	10
	208-240	3	60	7	15	12
MFR 80	208-240	3	60	16	30	10

* Recommended wiring size or larger Awg.

Note:

Do not attempt to use a smaller wire size than specified, even though the wire size may have a current carrying capacity greater than the required circuit breaker. When making electrical connections, use the wire size indicated in the chart when runs are up to 50 feet. Use the next larger size for runs 50 to 100 feet from circuit panel to washer.

RESISTANCE CHART FOR MOTORS

Model	Resistance Measurement: (in Ohms)
18 (1 phase)	Wash -- 4.6, 4.6, 4.6
	Spin -- 2.2, 2.2, 2.2
18 (3 phase)	Wash -- 26.5, 26.5
	Spin -- 10.2, 10.2, 10.2
25 (1 phase)	Wash -- 13.6, 13.6
	Spin -- 4.0, 8.1 *
25 (3 phase)	Wash -- 20.2, 20.2
	Spin -- 6.7, 6.7, 6.7
35 (1 phase)	Wash -- 4.4, 4.4, 4.4
	Spin -- 1.4, 2.4*
35 (3 phase)	Wash -- 5.5, 5.5, 5.5
	Spin -- 2.8, 2.8, 2.8
50 (1 phase)	Wash -- 4.4, 4.4, 4.4
	Spin -- 1.2, 2.4 *
50 (3 phase)	Wash -- 4.0, 4.0, 4.0
	Spin -- 2.2, 2.2, 2.2
80 (3 phase)	Wash -- 3.2, 3.2, 3.2
	Spin -- 1.3, 1.3, 1.3
Note: 1) The measurements are approx. 2) * Main & Phase windings	

MOTOR CURRENT (amperage) OVERLOAD SETTINGS (3 phase models)

Model	Setting at 230 volts:	Setting at 208 volts:
18	4.0 amps	5.0 amps
25	4.5 amps	6.5 amps
35	7.0 amps	9.0 amps
50	8.0 amps	10.0 amps
80	18.0 amps	22.0 amps

COMPONENT RESISTANCE CHART

The following is a chart showing the resistance measurements for the MFR (120/230 volt machines).

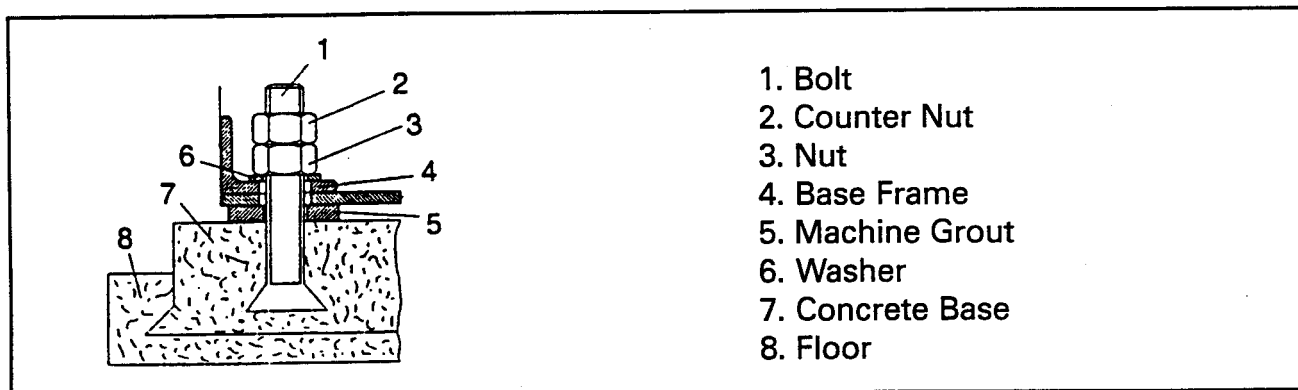
Resistance Measurements		
Component	Resistance (120v appr.)	Resistance (230v appr.)
Bimetal	4.5K	17K
Water valve solenoid	1.2K	4.6K
Contactora (Coil)	130	525
Reversing Timer Motor	2.6K	8.8K
Rapid Advance Motor	2.8K	9K
Stepper Motor	2.6K	8.9K
Coin Blocking Solenoid	1.5K	8.5K
Door Lock Solenoid	1.9K	7.7K
Door Unlock Solenoid	1.9K	7.7K
Drain Valve	28	120

Note:
"K" equals 1000 ohms
* Door lock and door unlock (release) solenoids are interchangeable.

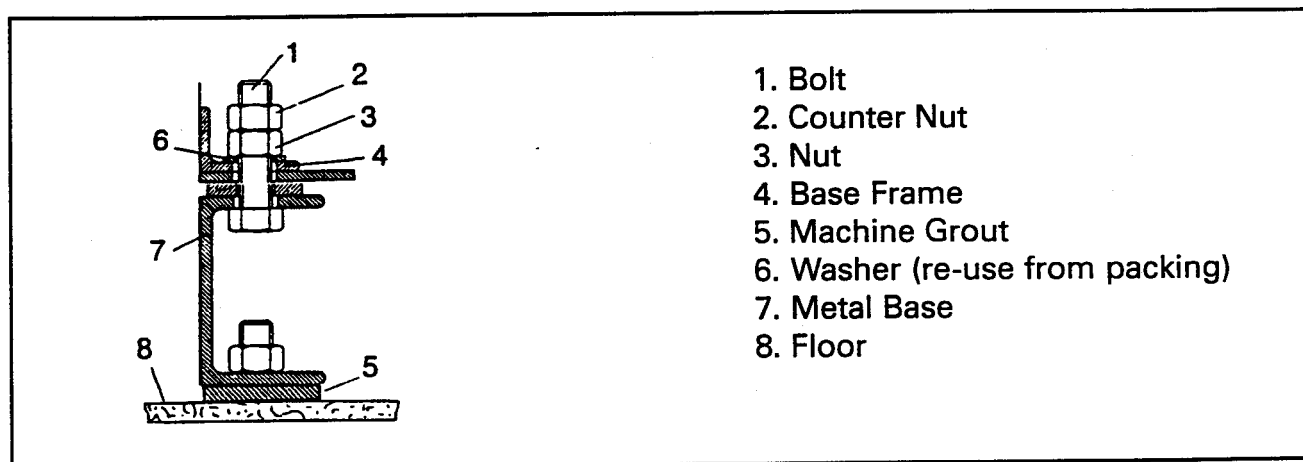
ANCHORING THE WASHER

How to anchor the washer to the foundation

The washer is installed by means of bolts directly on a concrete base.



A metal base is fixed to the floor by means of bolts. The washer is placed upon the metal base (**Do Not Mount MFR80 On a Metal Base**).



If the washer is a rigid-mount model, it **MUST** be securely mounted to a foundation or adequate floor structure.

The mounting structure **MUST** be engineered to handle all loads and stresses created during the spin cycle by the front-load washer.

NEVER install the washer on an upper floor or over a basement without load support designed by a structural engineer. It is required that installation be on a concrete foundation. Metal reinforced wood floors are not recommended due to a potential for excessive vibration.

Improper installation will void the warranty. Maytag is not responsible for damage or injury caused by improper installation.

HOW TO MOUNT THE WASHER

Lift washer and lower it onto the bolts or steel base. Precisely level the washer with shims for optimum life and performance. Use machinery grout to "fill" the area between the machine (or base) and the floor.

Securely fasten the washer to the mounting base or foundation with lock washers and double nuts to assure safety.

RETIGHTEN these nuts AFTER THE WASHER HAS BEEN OPERATING for several days. And, re-check at six month intervals.

WATER CONNECTIONS

The washer is equipped with 3/4" hot and cold water inlet valves. Use the water inlet hoses that accompany the washer, as they are properly adapted to the water valves.

For best operation of the washer, water pressure must be between 30 - 120 P.S.I. (pounds per square inch). Water pressure that is below minimum requirements can unnecessarily lengthen the wash cycle.

To Install:

Flush the water system in order to remove any particles that may be in the water.

Insert the screen hose washer into the faucet connection end of the inlet hose and the standard hose washer at the opposite end of the inlet hose.

When connecting inlet hoses, be sure hose connections are not cross-threaded on the water valves. Tighten securely by hand plus turn with pliers. DO NOT overtighten as this will strip threads on the water valve(s).

The HOT water connection will be the lower valve, the COLD water connection goes on the upper valve.

DRAIN CONNECTION

The washer is equipped with a 3" O.D. drain valve (MFR80 machines have two drains) which should be connected to the main drain pipe or into a drain sump.

The main drain pipe must have adequate capacity to handle the total output of all connected washers.

If the washers are properly connected to the drain, a washer should drain empty of water in approximately 30 seconds or less.

ELECTRICAL REQUIREMENTS

120 VOLT - 60 Hz Single Phase Models

This washer should be connected with a #12 gauge wire and equipped with an in-line on-off switch. A grounded 120 volt, 60Hz approved electrical service protected by the recommended amperage fuse or comparable circuit breaker. We do not recommend using a power cord.

To prevent the possibility of electrical shock, this washer (as is the case with other electrical appliances) must be adequately grounded.

It is the responsibility of the installer to ensure the washer is adequately grounded at the installation taking into consideration the local conditions and requirements. **ALL GROUNDING MUST BE DONE IN ACCORDANCE WITH NATIONAL AND LOCAL CODES.**

208/240 VOLT - 60 Hz Single & Three Phase Models

NOTE: The wiring diagram for each washer is located in the customer package.

WARNING: To prevent unnecessary risk of fire, electrical shock or personal injury, *all grounding must be done in accordance with local codes, with the National Electrical Code, ANSI/NFPA (for the United States) or the Canadian Electrical Code CSA C22.1 (for Canada).*

Grounding

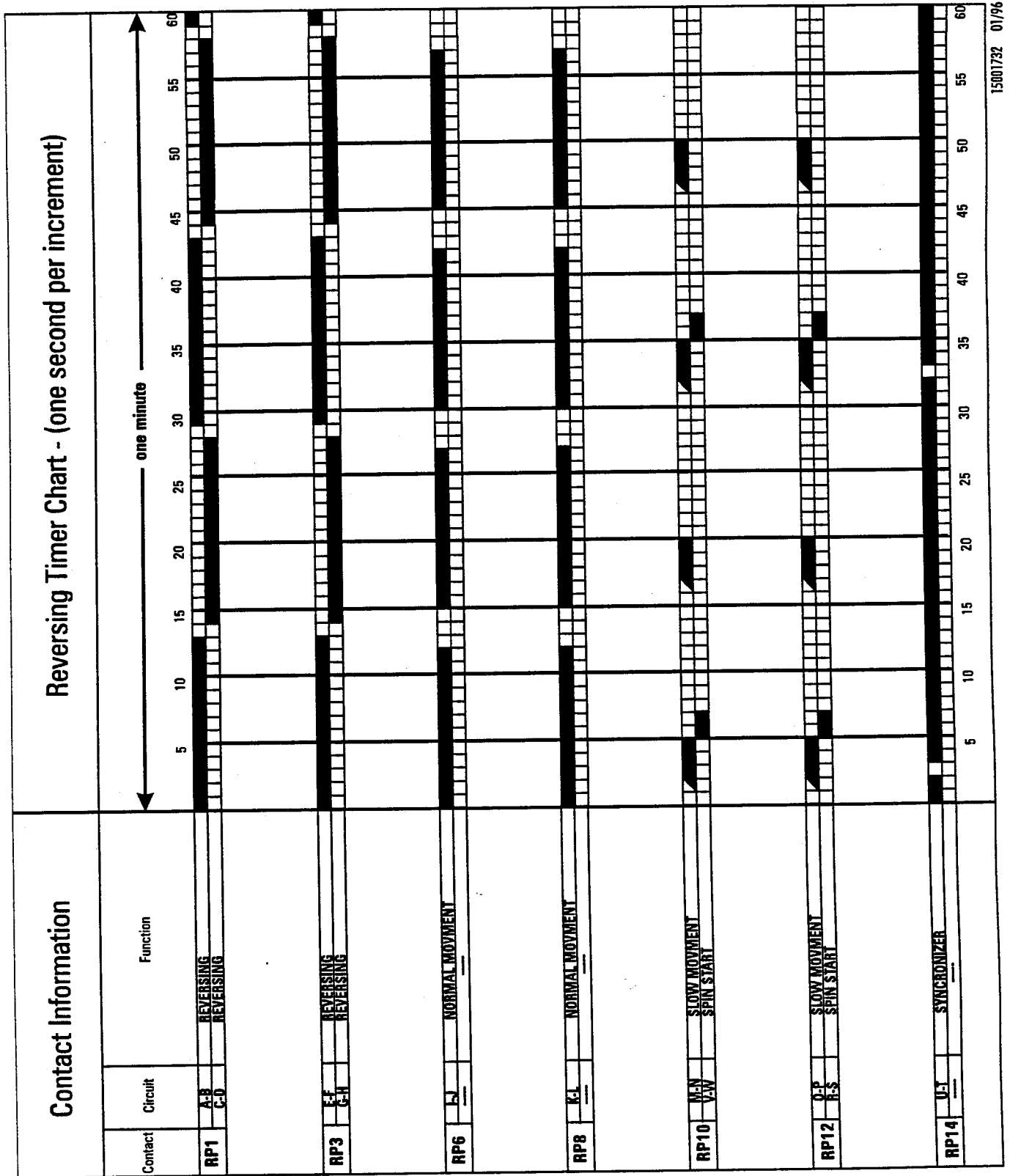
This washer must be grounded. In the event of malfunction or breakdown, the ground will reduce the risk of electrical shock by providing a path of least resistance for electric current.

This washer must be connected to a grounded metal, permanent wiring system or an equipment grounding conductor must be run with the circuit conductors and connected to the equipment grounding terminal on the back panel.

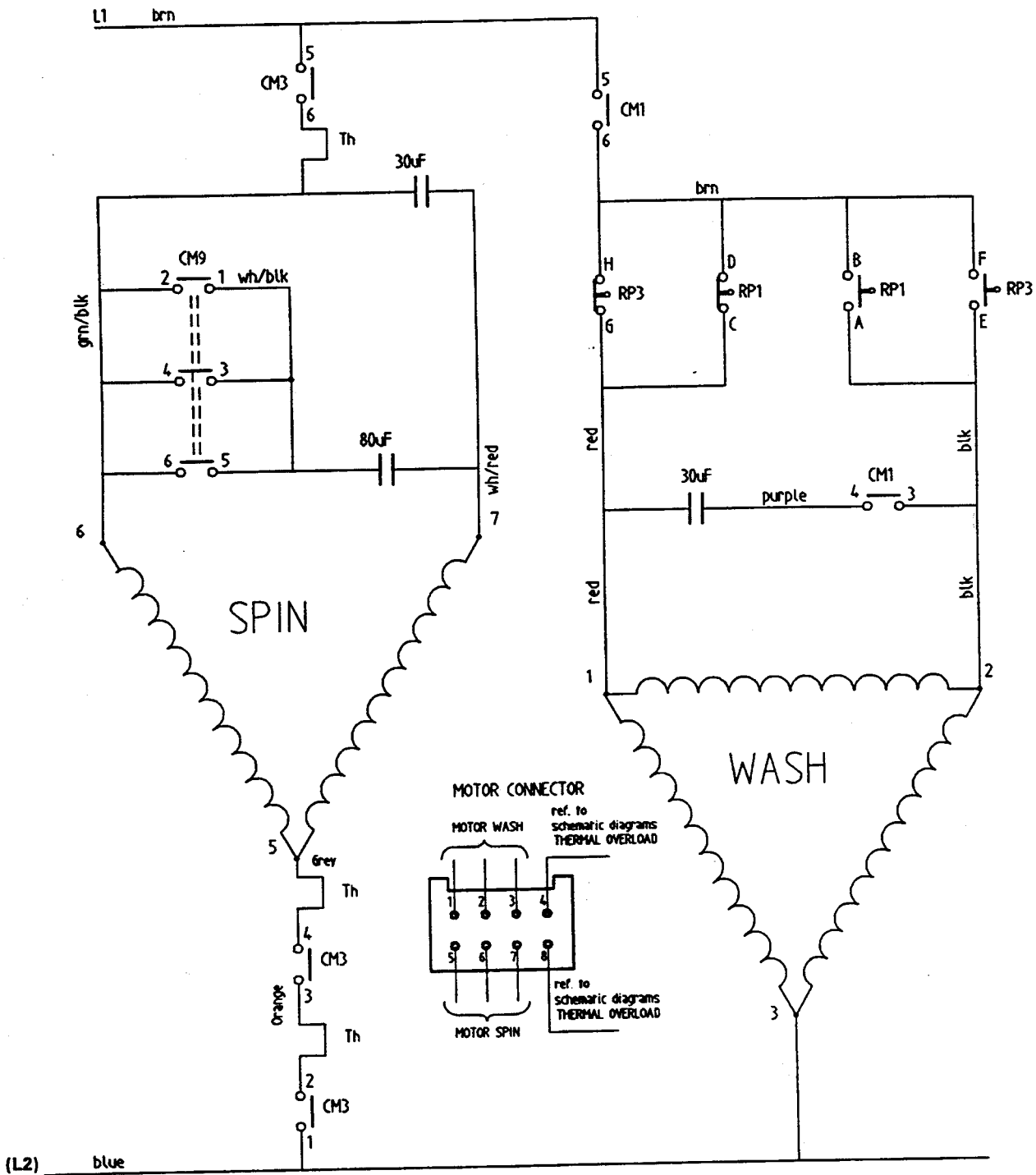
TIMER CHARTS AND WIRING DIAGRAMS

- **Sequence Time Chart**
- **Reversing Timer Chart**
- **Single Phase Motor Schematic 240V (Original)**
- **Single Phase Motor Schematic 120V (Original)**
- **Single and Three Phase Motor Connections (Original)**
- **MFR 18 Single Phase Motor Circuits**
- **MFR 25 Single Phase Motor Circuits**
- **MFR 35 & 50 Single Phase Motor Circuits**
- **MFR 3-Phase Motor Circuits (Revised)**
- **MFR 80 Motor Circuits (Original)**
- **MFR 18-50 MC & MN Control Circuits (Original)**
- **MFR 18-50 MC & MN Control Circuits (Revised)**
- **MFR (PC & PN Version) > MKIIA-LC Legend**
- **MFR 18-50 PC & PN Control Circuits (Original)**
- **MFR 18-50 PC & PN Control Circuits (Revised)**
- **MFR 18-80 Control Circuits (PC & PN Version)**

CONTACT INFORMATION / REVERSING TIMER CHART



SINGLE PHASE 240V - 60Hz MOTOR (Original)

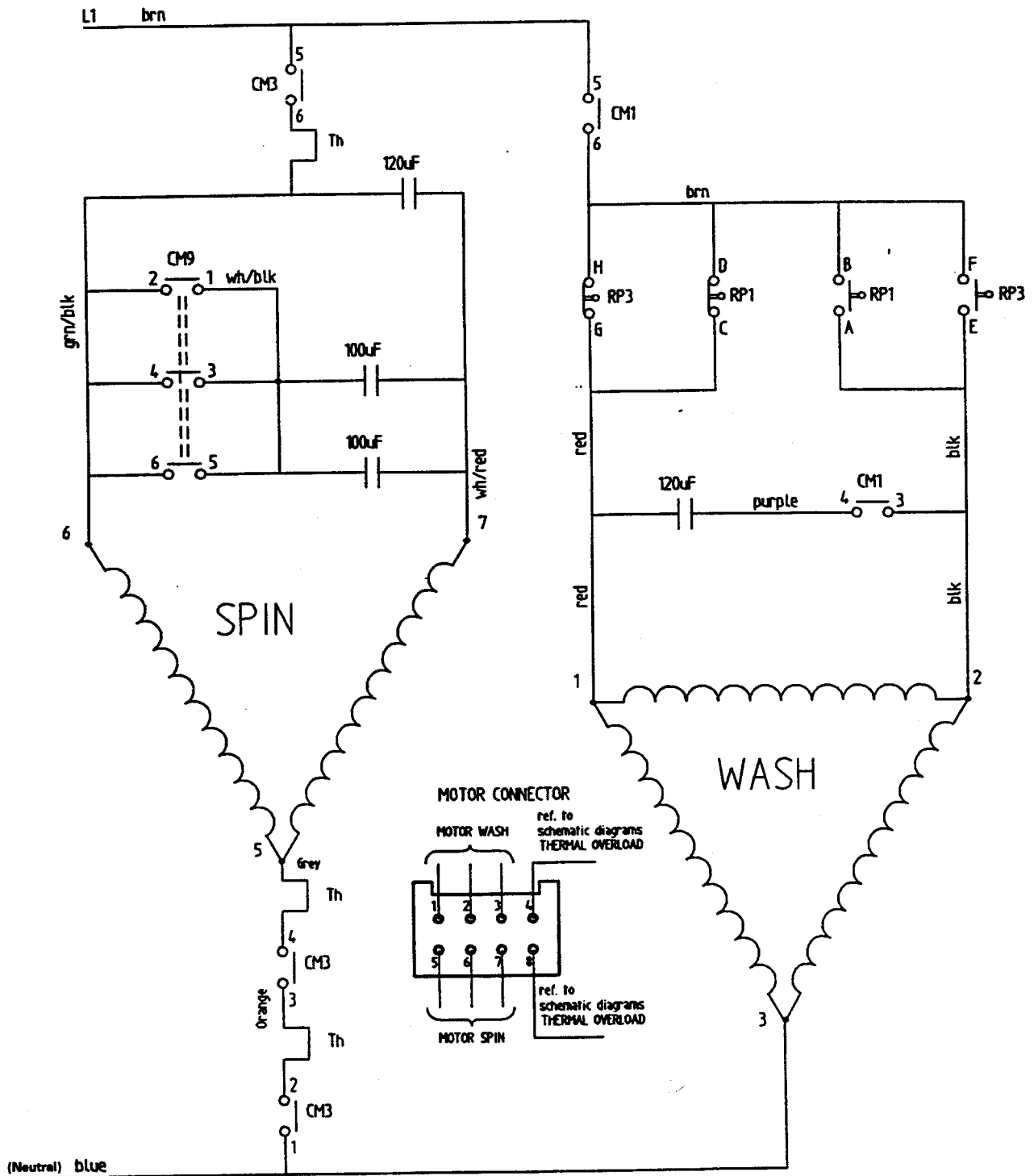


MOTOR TYPES
 CVE 112 E /2-18-R-2T-CS 240V/60Hz 1Phase

RP1
 = Contact reverser switch

NOTE: Capacitor values may change, depending on models.

SINGLE PHASE 120V - 60Hz MOTOR (Original)

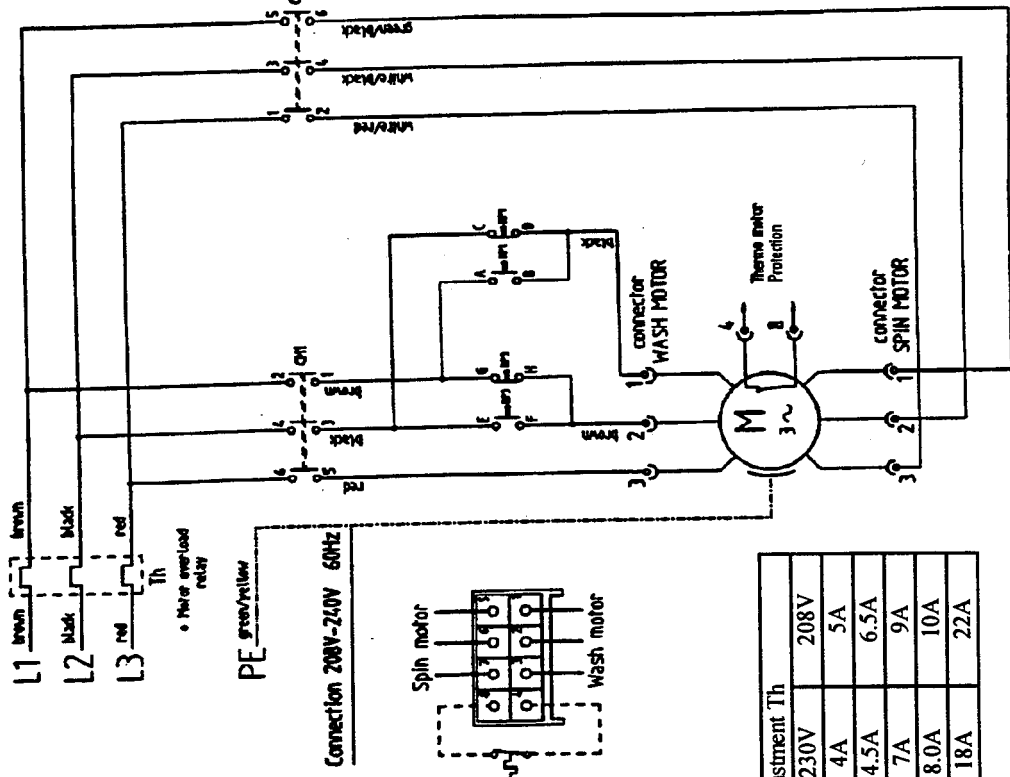


RP1
 A — B = Contact reverser switch

Ajustment of Th: 16 AMP.

SINGLE AND THREE PHASE (Original)

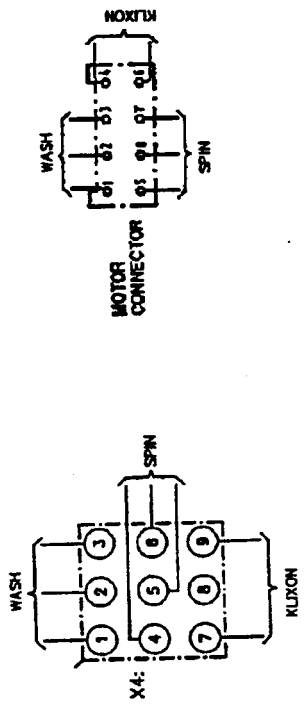
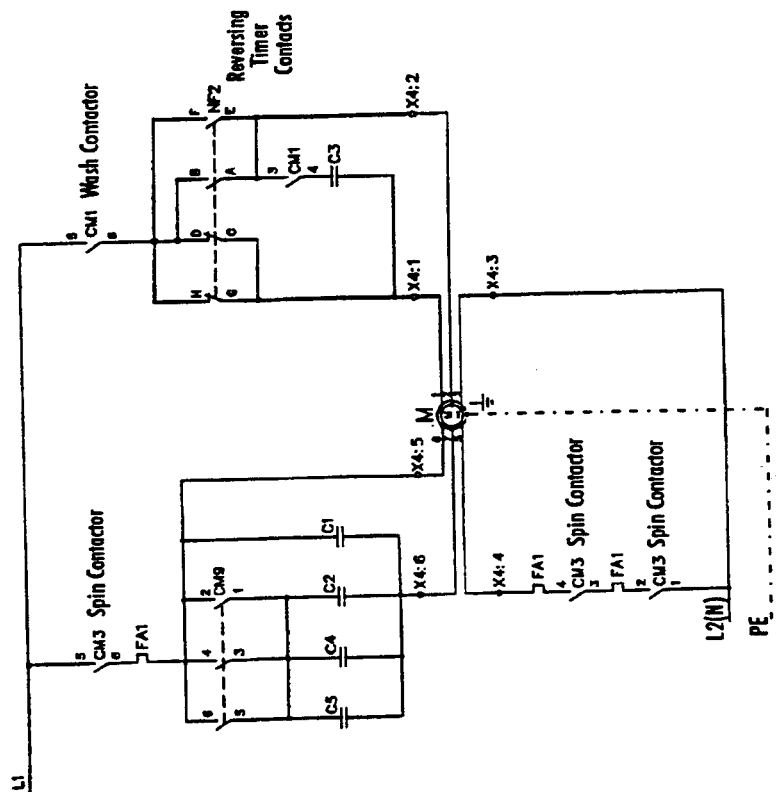
THREE PHASE



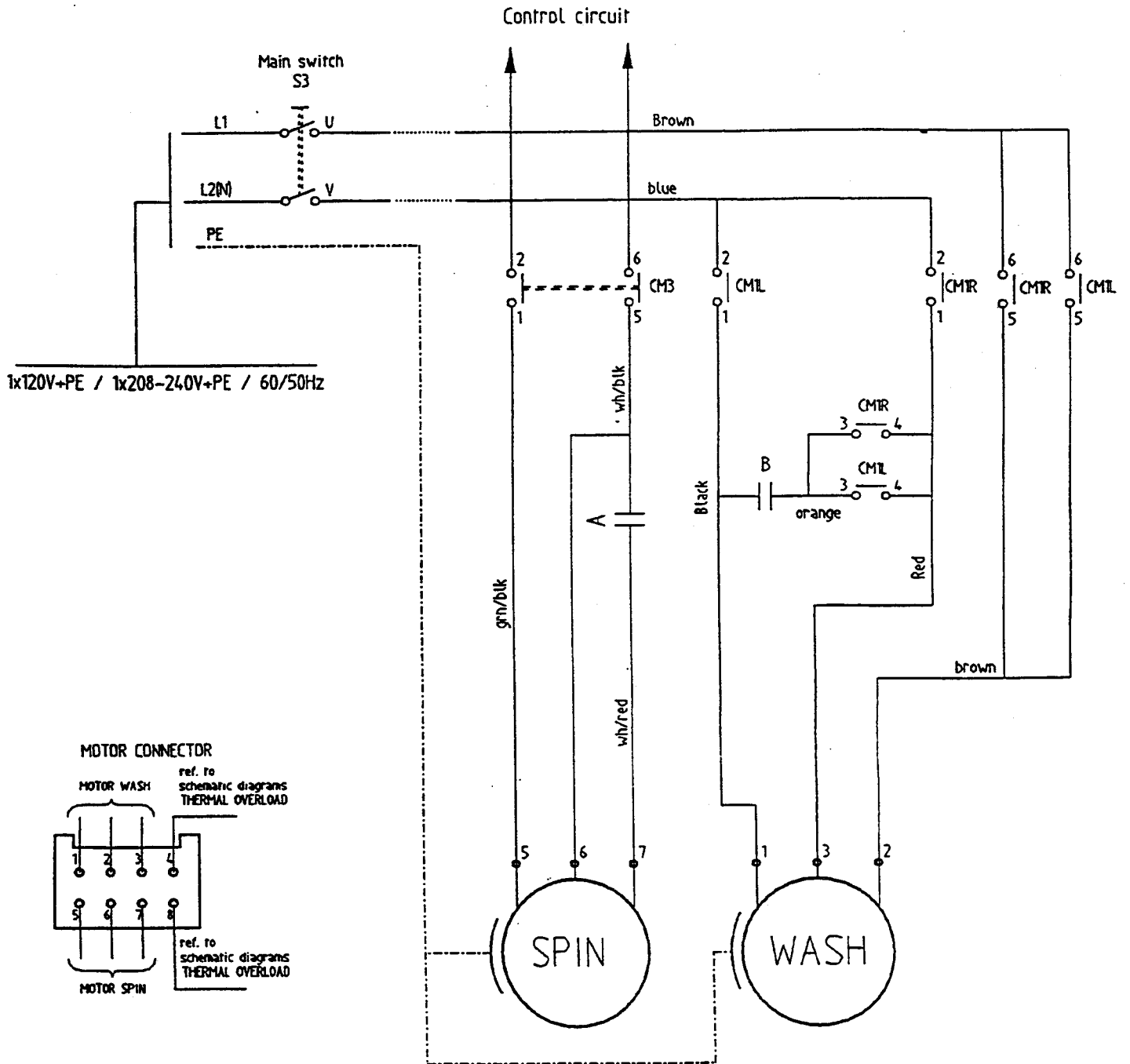
Model	Adjustment Th	230V	208V
18	4A	5A	
25	4.5A	6.5A	
35	7A	9A	
50	8.0A	10A	
80	18A	22A	



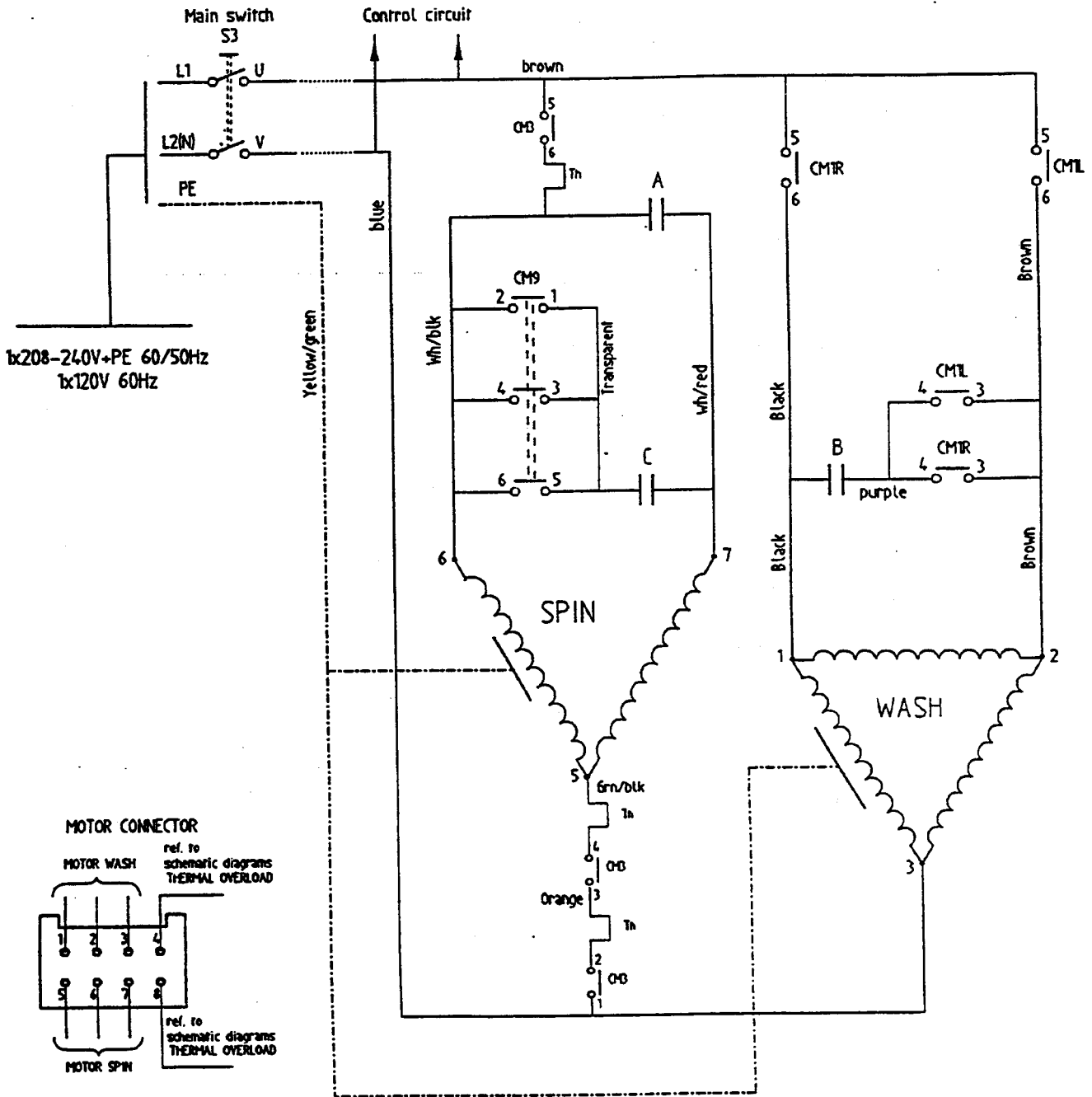
SINGLE PHASE



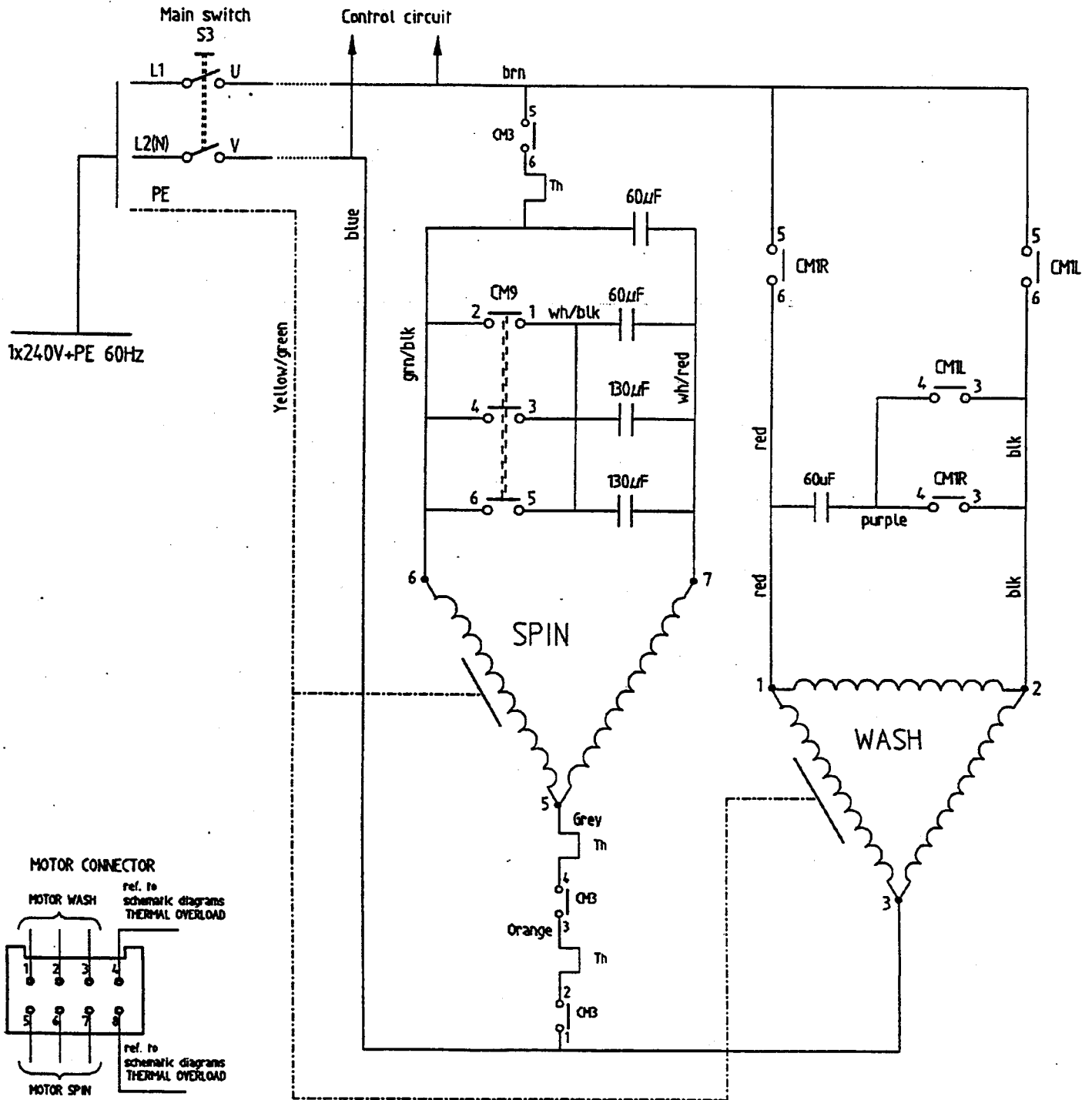
MFR18 SINGLE PHASE MOTOR CIRCUITS

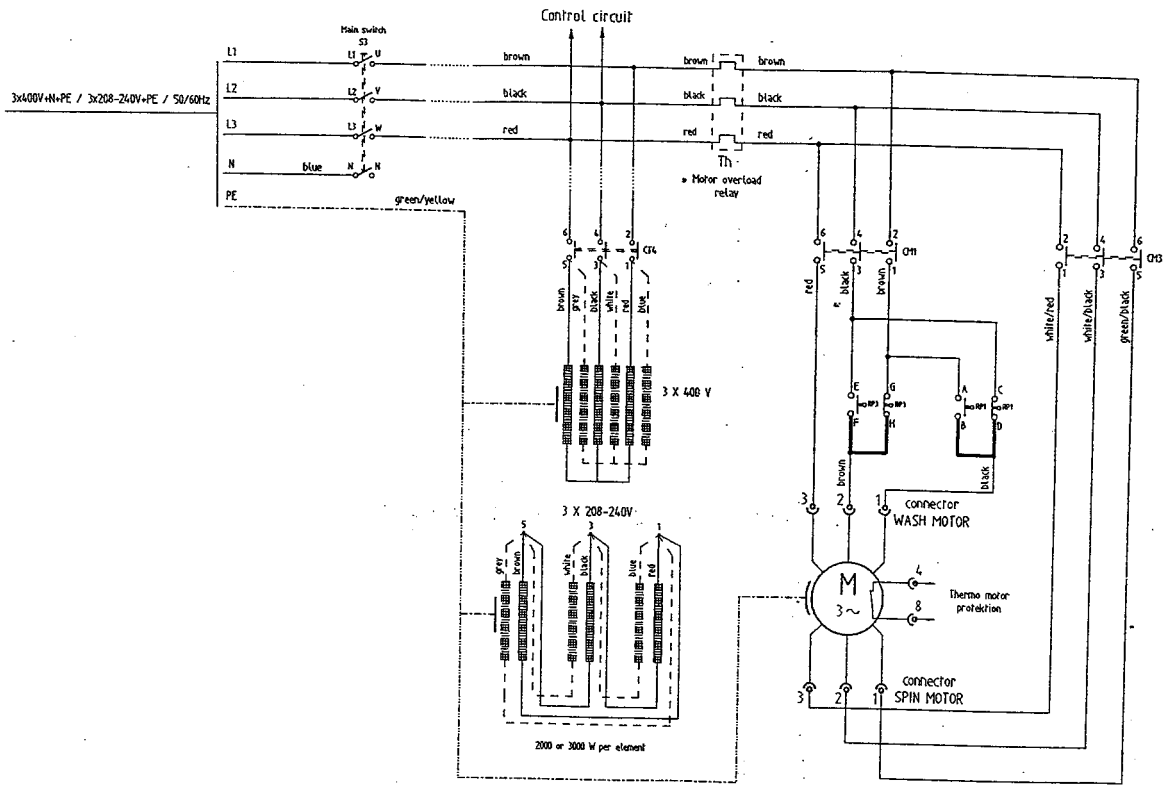


MFR25 SINGLE PHASE MOTOR CIRCUITS

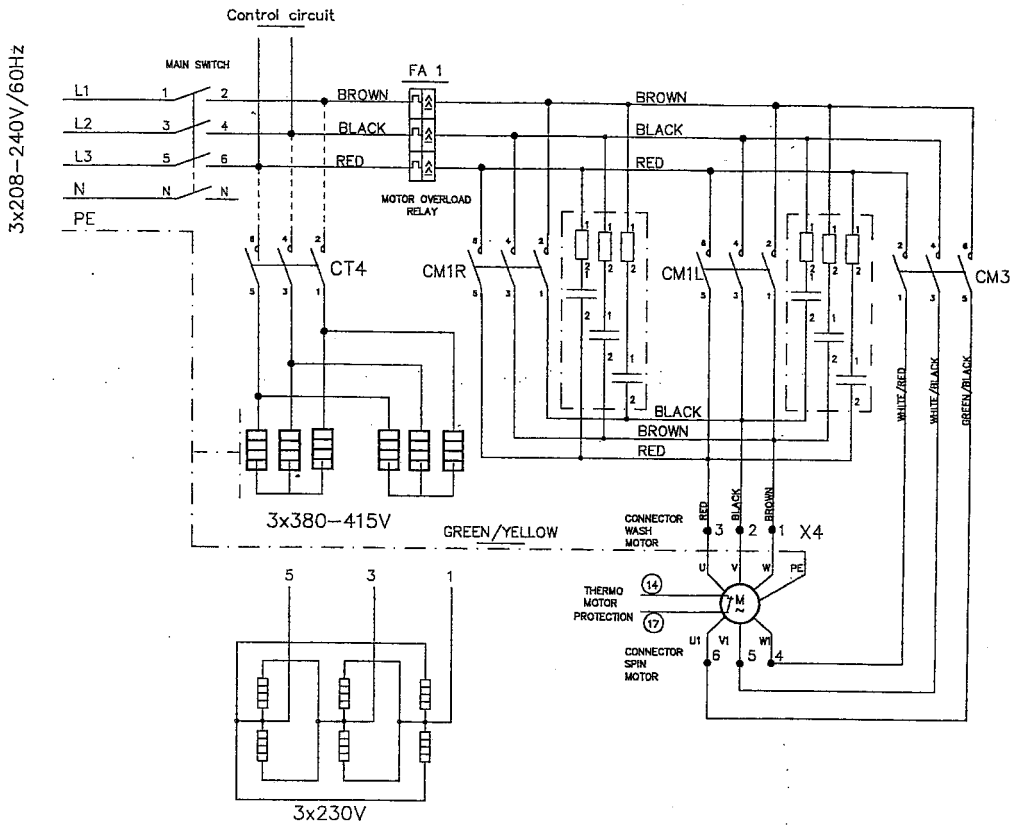


MFR35 & MFR50 SINGLE PHASE MOTOR CIRCUITS



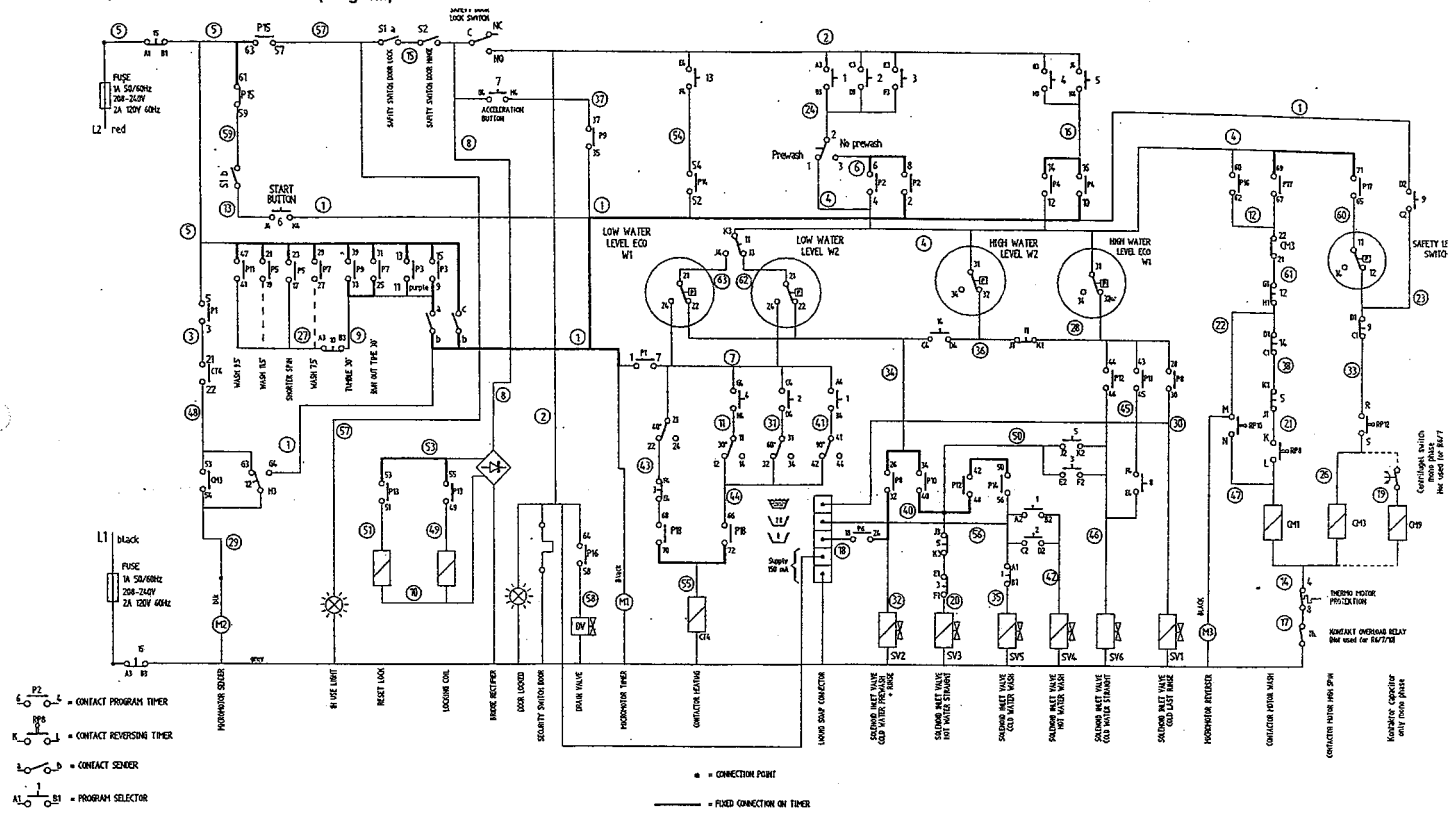


MFR80 MOTOR CIRCUITS (Original)



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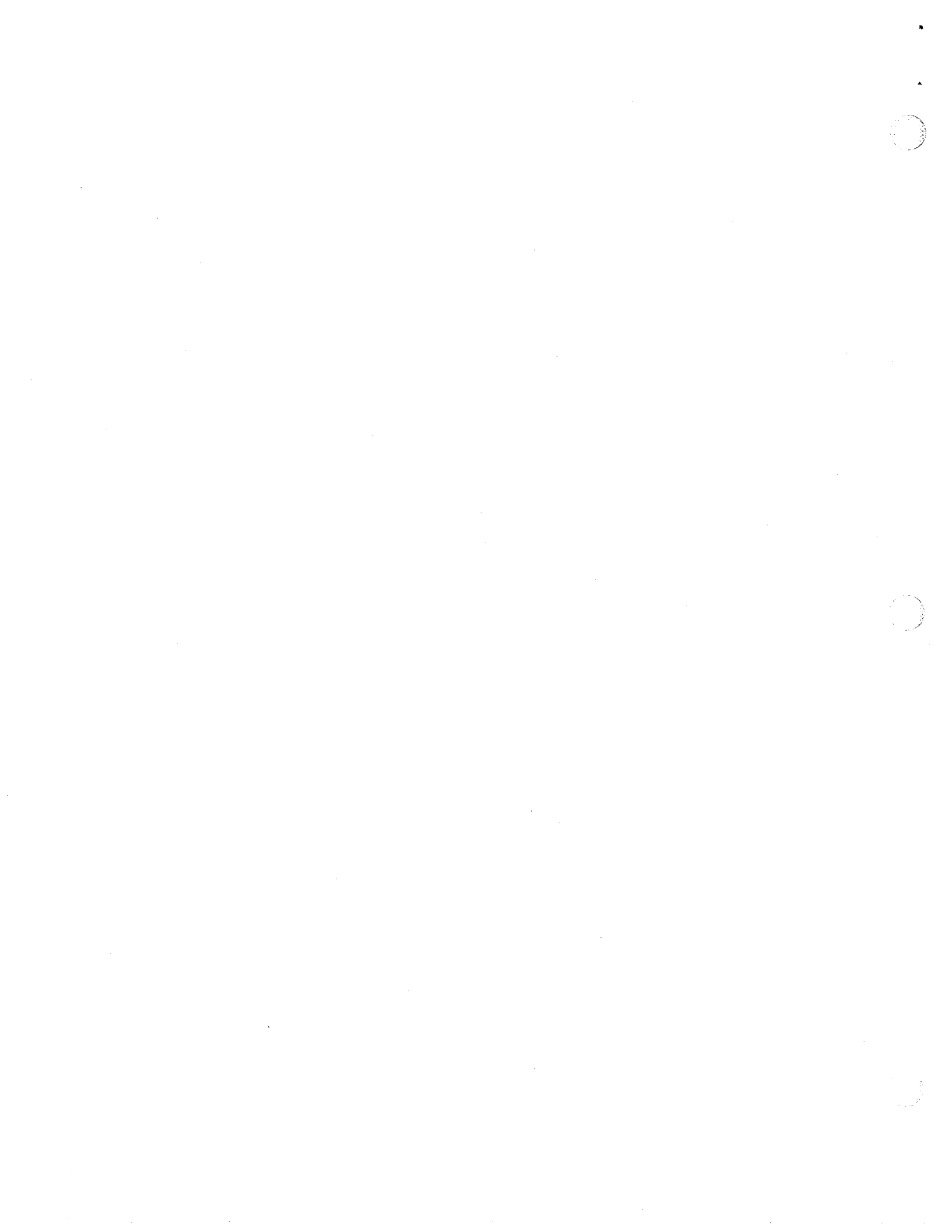
MFR18-50 MC, MN CONTROL CIRCUITS (Original)

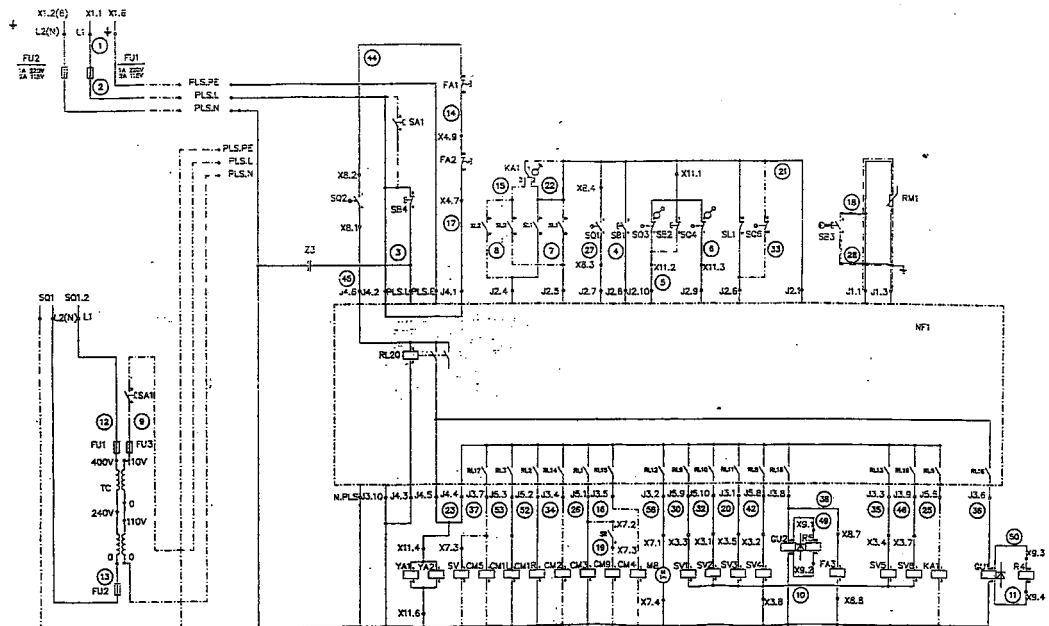


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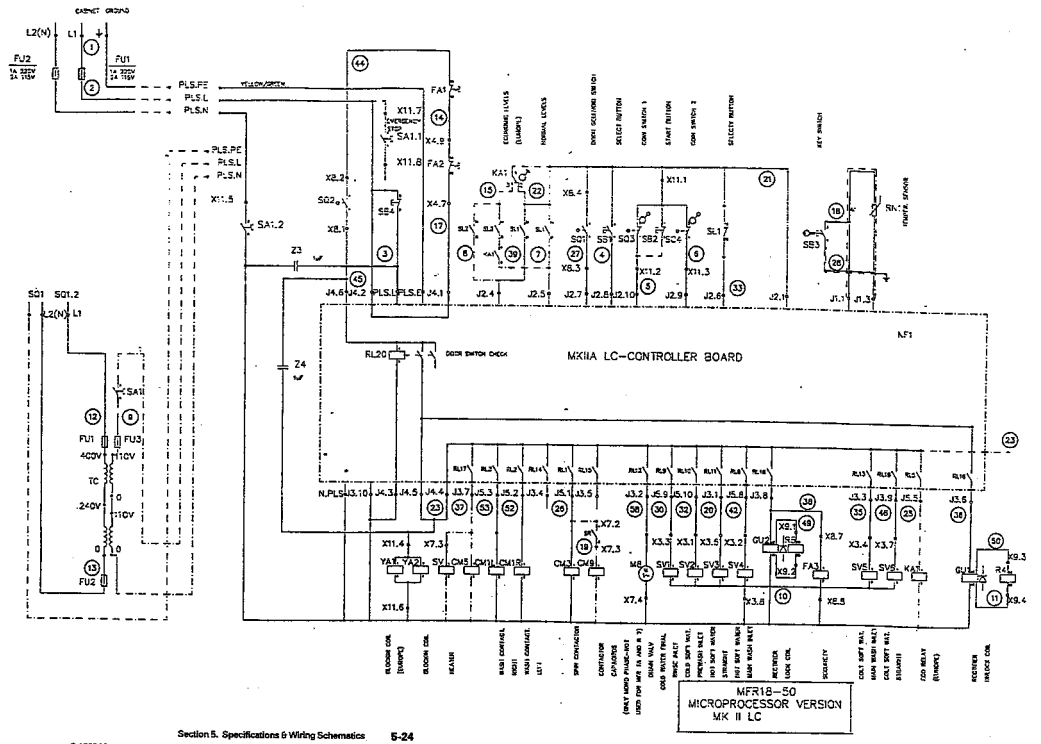
MFR (PL & PN VERSION)

CM1L	WASHING MOTOR CONTACTOR - LEFT ROTATION
CM1P	WASHING MOTOR CONTACTOR - RIGHT ROTATION
FA	PROTECTING SWITCH
FA1	MOTOR OVERLOAD CURRENT CIRCUIT BREAKER
FA2	MOTOR KLIXON
FA3	DOOR THERMICAL SWITCH (BIMETAL)
FU1,2	FUSES 1A
FU3	FUSE 0,5A
GU1,2	RECTIFIERS
KA1	ECO RELAY
CM2	DISTRIBUTION CONTACTOR
CM3	LOW SPIN CONTACTOR
CM4	HIGH SPIN CONTACTORS
CM9	SPIN CONTACTORS OF 1 PHASE MACHINES
CM5	HEATING CONTACTOR
M1	MOTOR
M8	OUTLET VALVE
NF1	PROGRAMMER
RN1	TEMPERATURE SENSOR
R4,5	DOORLOCK COILS
SA1	CENTRALSTOP
SB1	SELECT SWITCH
SB2	OPL START SWITCH
SB3	ADVANCE SWITCH
SB4	KEYSWITCH OF PROGRAMMER
SL1,2	WATER LEVEL SWITCH
SQ1	DOORLOCK TERMINAL SWITCHES
SQ2	DOOR SWITCH
SQ3	COINMETER SWITCH 1
SQ4	COINMETER SWITCH 2
SQ6	VIBRATION SWITCH
TC	TRANSFORMER
W1 - W3	ELECTRIC HEATING ELEMENTS
X1	SUPPLY TERMINAL BOARD
X3	OUTLET VALVE TERMINAL BOARD
X4	MOTOR TERMINAL BOARD
X7	TERMINAL BOARD DISCONNECTOR, OUTLET VALVE
X8,9	DOORLOCK TERMINAL BOARD
X11	COINMETER TERMINAL BOARD
YA1,2	COINMETERS
SV	STEAM VALVE
SV1	INLET VALVE - PREWASH
SV2	INLET VALVE - SOFT WATER
SV3	INLET VALVE - MAIN WASH
SV4	INLET VALVE - WARM WATER
SV5	INLET VALVE - HARD WATER, LAST RINSE
SV6	INLET VALVE - HARD WATER
Z1,2	RC MEMBER
Z3	CONDENSER



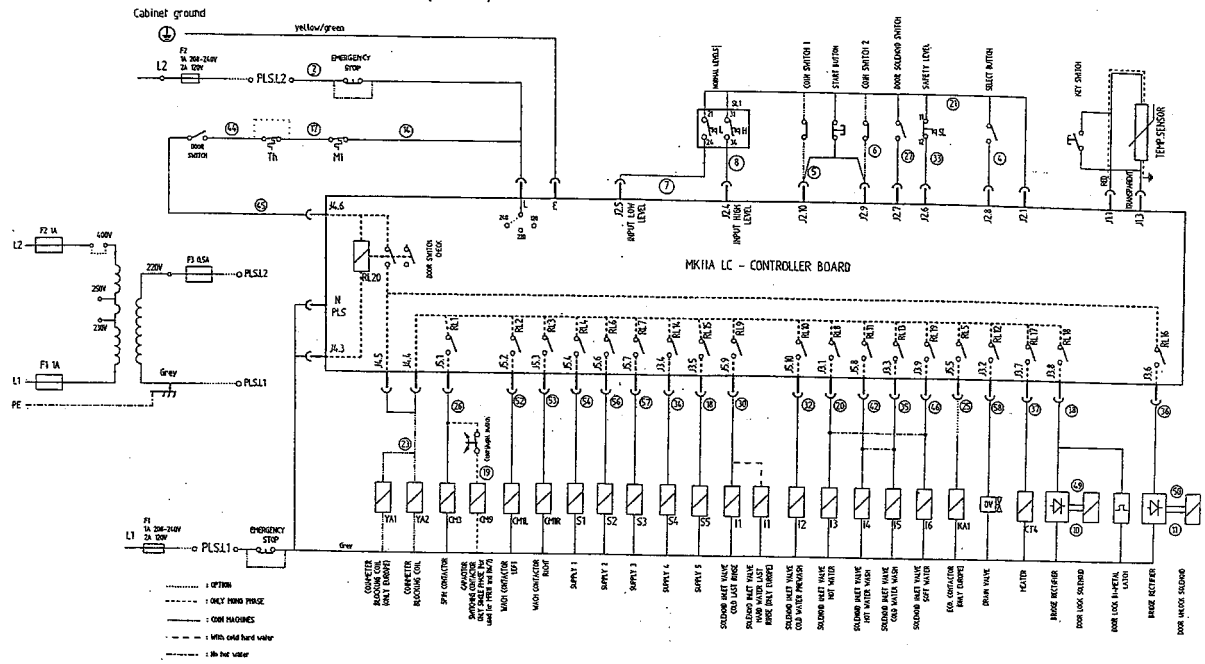


MFR18-50 PC, PN CONTROL CIRCUITS (Revised)

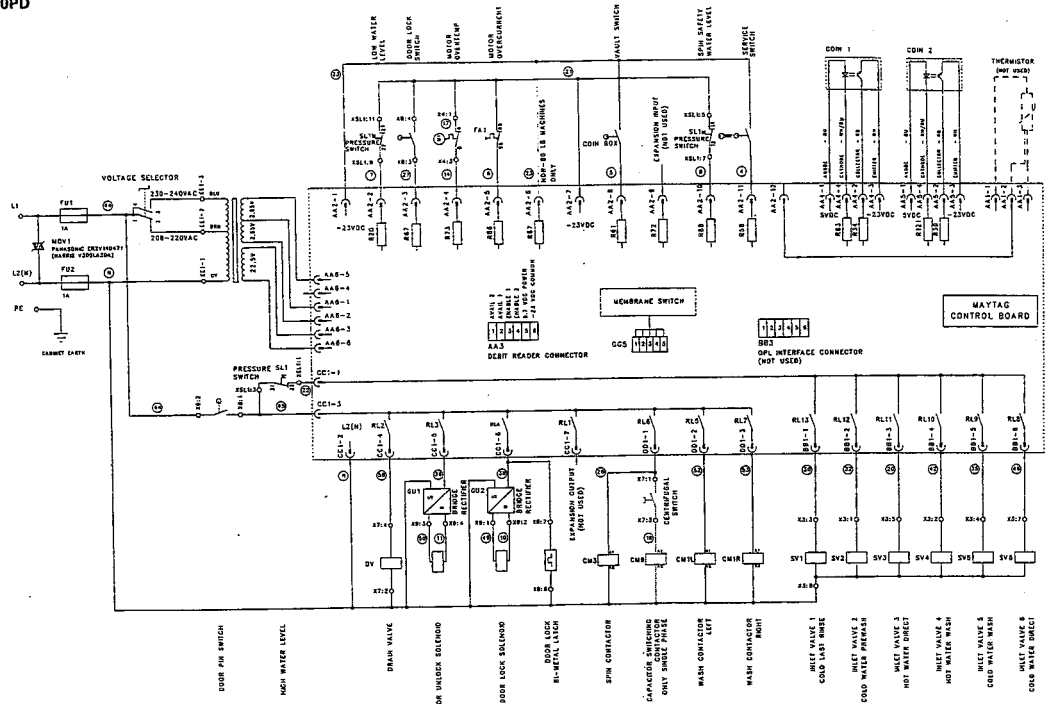


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MFR18-80 SINGLE PHASE - OPL OR COIN CONTROL CIRCUITS (Revised)



16007803-01



16007803-02

MAYTAG

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