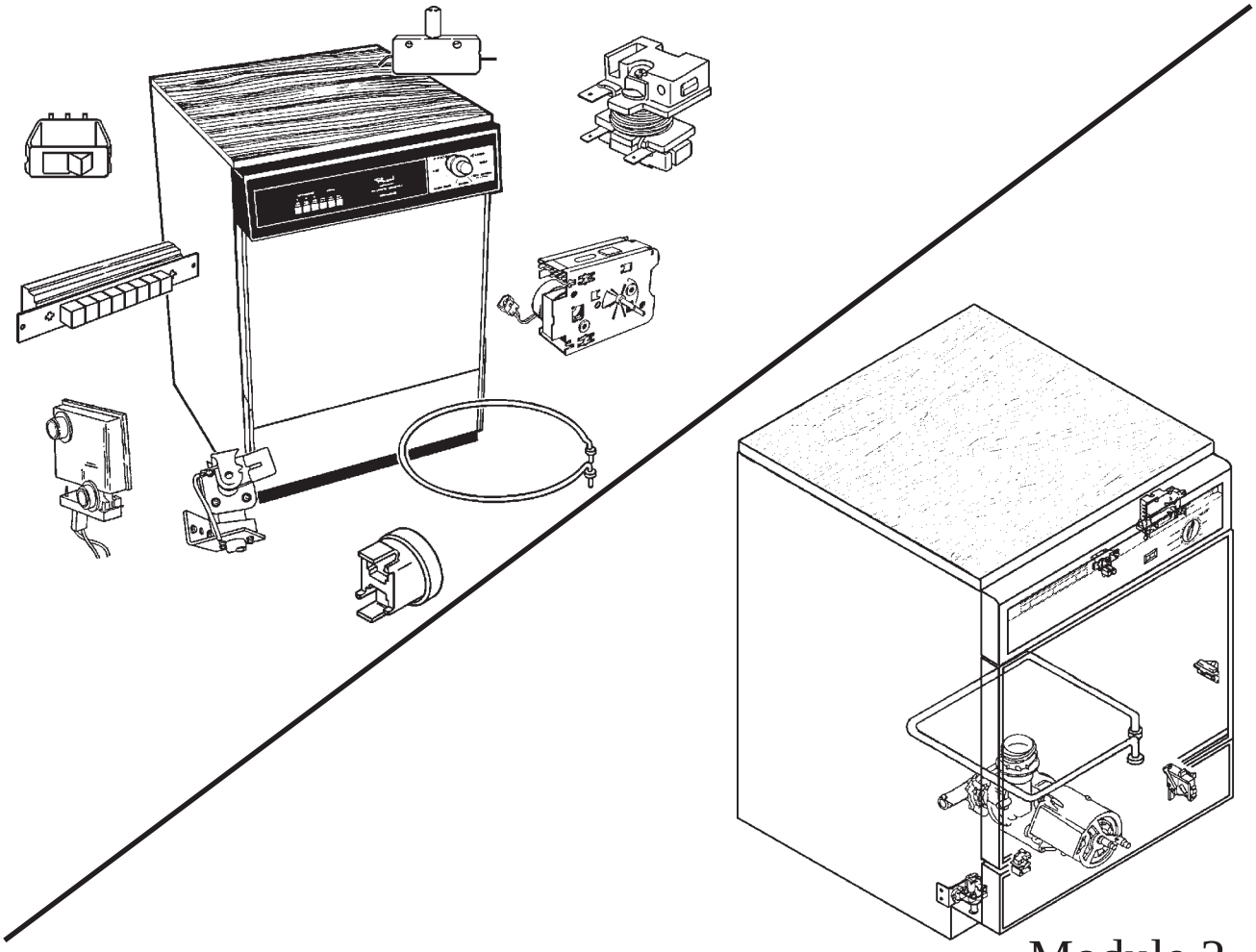
DISHWASHER and COMPACTOR

STUDY COURSE

UNDERSTANDING DISHWASHER:

- *ELECTRICAL COMPONENTS and CHECKING PROCEDURES*



Module 2

LIT 4314190 Rev. A

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INTRODUCTION

The material presented in this module is intended to provide you with an understanding of the fundamentals of dishwasher and trash masher® compactor servicing.

Major appliances have become more sophisticated, taking them out of the screwdriver and pliers category. Their electrical circuits include several different types of automatic controls, switches, heaters, valves, etc.. Semiconductors, solid-state controls, and other components usually associated with radio and television electronic circuits are being engineered into automatic washers, dryers, dishwashers, and refrigerators.

The appliance technician is emerging into a professional status of his own. He must prepare himself now to be able to perform his duties today as well as to retain his professionalism in the future.

No longer is on-the-job training sufficient to prepare technicians for the complicated procedures required for todays sophisticated appliances. This training can best be obtained through organized classroom study and application. However, much of the knowledge necessary to service todays appliances can be obtained through study courses. Completion of this and other courses will provide you with sufficient understanding of appliances and their operation to enable you to do minor service. It will also serve as a valuable stepping stone to more advanced study and on-the-job training to improve your servicing skills.

Information contained in this module is used on WHIRLPOOL® appliances. It is separated into two sections for your convenience. Chapter 1 covers porcelain liner models (1986 and older), and Chapter 2 covers plastic liner models (1986 and newer).

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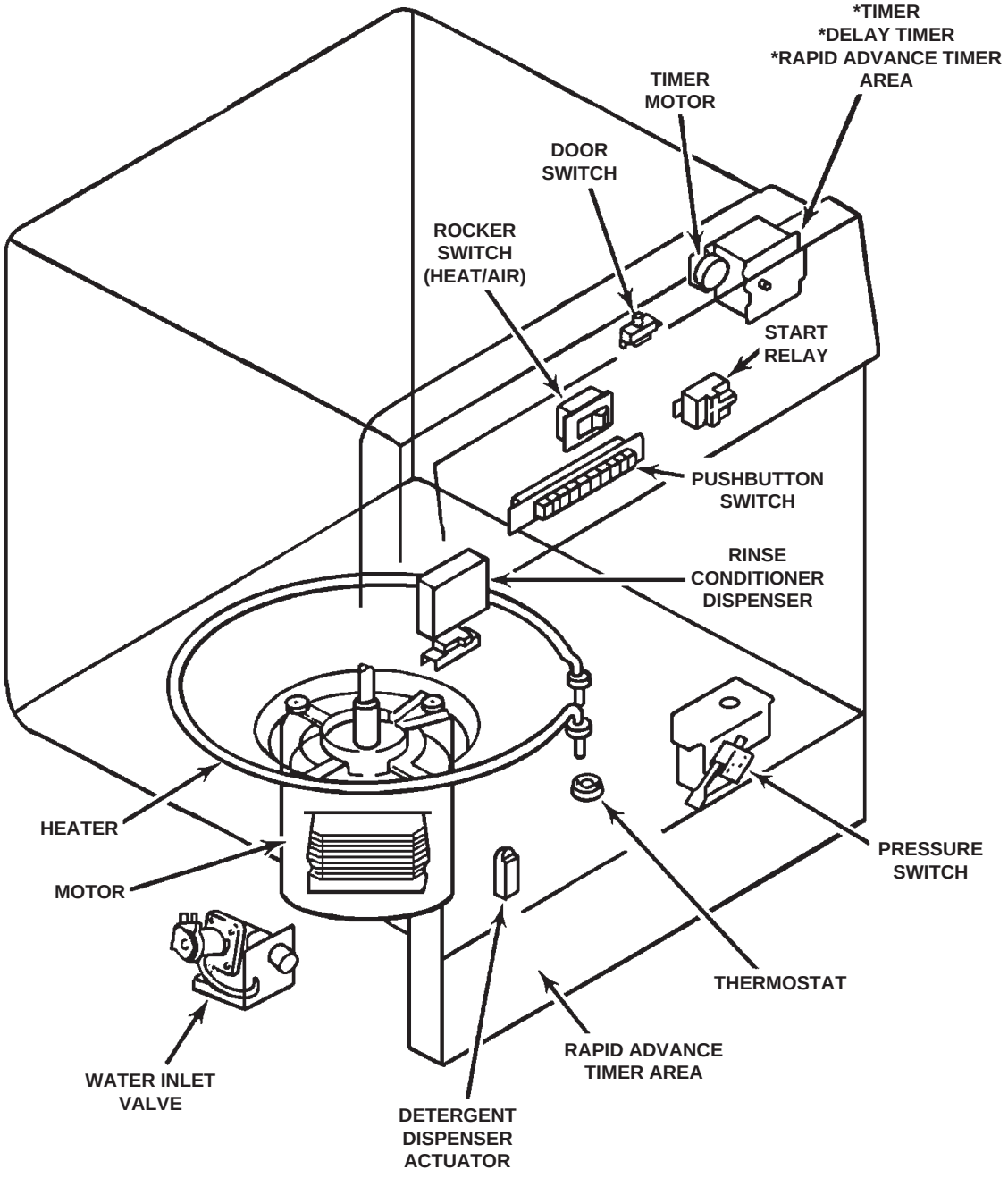
NOTE:** ***We recommend taking the TEST for MODULE 2, right after studying it.

CHAPTER 1

ELECTRICAL COMPONENTS

(for Porcelain Liner Models: 1986 and Older)



TIMER

The timer is located in the console and is the heart of the dishwasher. Its function is to control the timing of the dishwasher.

All timers used on dishwashers operate the same but are somewhat different in looks. Due to functions or features of different models, some timers have more terminals and internal switches (contacts) than others.

The dash line represents the actual timer where as the bold lines indicate internal switches within the timer.

On quick-disconnect timers, the different colored harness wires are placed inside either a black or white block which plugs into the timer. These blocks are colored to match the words BLACK or WHITE stamped on the timer. The possibility of wiring the timer wrong is greatly reduced.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step 1 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

Step2 See example in steps 7-10. Turn the timer knob to the point in the cycle you suspect is bad.

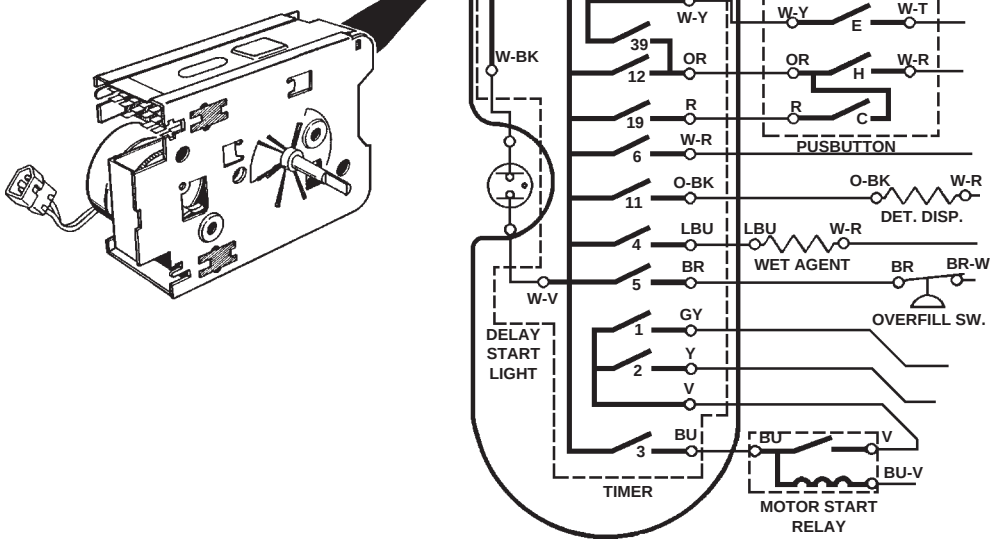
Step3 Remove both the white and black disconnect blocks. Some models only have the (black) disconnect block. The blocks have tabs on each end which must be pressed while pulling on the block.

Instead of coding timer terminals like the standard frame timers, a chart of each wiring block is printed on the back of the timer. The line through the chart separates the two blocks. Letters indicate active terminals while the black dots identify blank terminals.

Step4 Touch and hold one ohmmeter probe to the terminal specified for this function.

Step5 Touch the other ohmmeter probe to the other terminal specified for this function.

Step6 The ohmmeter should show ZERO resistance (continuity). If not, the timer is bad and needs replacing.

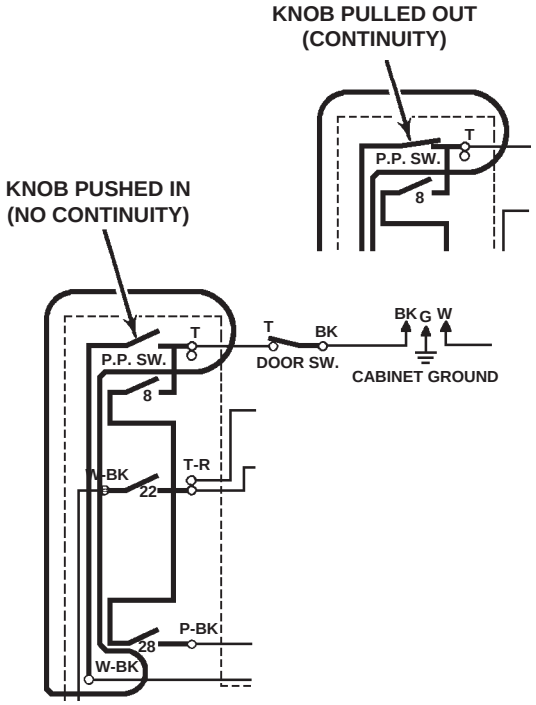


Step7 EXAMPLE: Move the timer to the start of NORMAL wash. PROBLEM: Dishwasher does not fill.

Step8 Touch and hold one ohmmeter probe to the terminal T.

Step9 Touch the other ohmmeter probe to the terminal BR.

Step10 The ohmmeter should show ZERO resistance (continuity). If not, the timer is bad and needs replacing.



Step11 If the door switch is good but the dishwasher still won't start when the timer knob is pulled out, check the internal timer push/pull switch (P.P.SW.) contacts.

Step12 Pull the timer knob out.

Step13 Touch and hold one ohmmeter probe to the terminal T.

Step14 Touch the other ohmmeter probe to the terminal W-BK.

Step15 The ohmmeter should show ZERO resistance (continuity) with the timer knob pulled out. If not, the timer is bad and needs replacing.

The ohmmeter should show an open circuit with the timer knob pushed in.

Step16 Place the colored blocks in their proper end marked BLACK or WHITE on the timer.

RAPID ADVANCE TIMER

This part, used with a pushbutton switch, has no dial or knob to turn. As the pushbutton switch is pressed for the cycle you want, the rapid advance timer motor quickly advances the timer to the proper start-up cycle. At this point, the regular timer motor takes over.

There are two areas in which this rapid advance timer could be located: either behind the access panel/toeplate (Built-In Models), behind the access panel/coverplate (Portable Models), or in the console area for both types of dishwashers.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

Step2 Disconnect any timer motor wires, marking them as to where they were.

Step3 Remove both the white and black disconnect blocks. Some models only have the (black) disconnect block. The blocks have tabs on each end which must be pressed while pulling on the block.

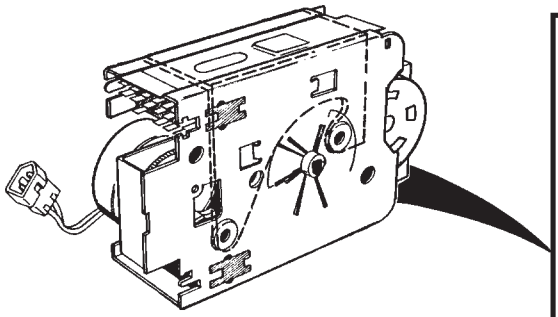
Instead of coding timer terminals like the standard frame rapid advance timers, a chart of each wiring block is printed on the back of the timer. The line through the chart separates the two blocks. Letters indicate active terminals while the black dots identify blank terminals.

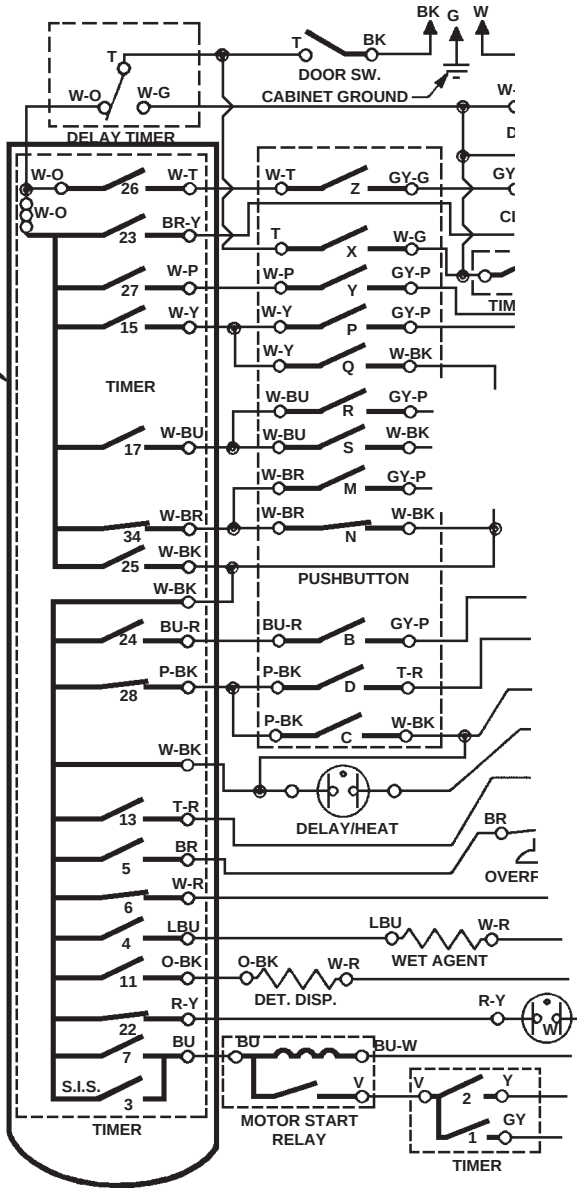
Step4 See example in steps 8-11. Using a screwdriver, place it in the slot on the shaft of the rapid advance timer and turn it to the cycle you suspect is bad.

Step5 Touch and hold one ohmmeter probe to the terminal specified for this function.

Step6 Touch the other ohmmeter probe to the other terminal specified for this function.

STEP7 The ohmmeter should show ZERO resistance (continuity). If not, the timer is bad and needs replacing.





Step8 EXAMPLE: Move the timer to the start of NORMAL wash. PROBLEM: Dishwasher does not fill.

Step9 Touch and hold one ohmmeter probe to the terminal T.

Step10 Touch the other ohmmeter probe to the terminal BR.

Step11 The ohmmeter should show ZERO resistance (continuity). If not, the rapid advance timer is bad and needs replacing.

Step12 If you know the door switch is good but the dishwasher still won't start, check the internal timer push/pull switch (P.P.SW.) which are contacts (T to W-BK).

Remember: There is no push/pull switch although the timer contacts are there. Also, since there is no timer shaft for a dial and knob, a square hole has been provided in the cam shaft to use for rotating the timer through its cycles.

The timer cycles are printed on the timer plus there is a raised step on the cam shaft that is a pointer to indicate where the timer is in the cycle.

Step13 Touch and hold one ohmmeter probe to the terminal T.

Step14 Touch the other ohmmeter probe to the terminal W-BK.

Step15 The ohmmeter should show ZERO resistance (continuity) with the rapid advance timer in the "ON" position. If not, the timer is bad and needs replacing.

The ohmmeter should show an open circuit with the rapid advance timer in the "OFF" position.

STEP16 Replace the colored blocks in the proper end marked BLACK or WHITE on the timer.

STEP17 Replace the timer motor wires.

DELAY TIMER

This part is located in the console. Its purpose, when selected, is to delay the start-up of the dishwasher up to eight hours.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the delay timer. This procedure should assure that the right wire is reconnected to the right terminal.

Step2 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

Step3 Touch and hold one ohmmeter probe to the terminal T.

Step4 Touch the other ohmmeter probe to the terminal W-O.

Step5 The ohmmeter should show ZERO resistance (continuity). If not, the delay timer is bad and needs replacing.

Step6 Touch and hold one ohmmeter probe to the terminal W-G.

Step7 Touch the other ohmmeter probe to the terminal W-O.

Step8 The ohmmeter should show an open circuit. If not, the delay timer is bad and needs replacing.

Step9 Touch and hold one ohmmeter probe to the terminal W-G.

Step10 Touch the other ohmmeter probe to the terminal T.

Step11 The ohmmeter should show an open circuit. If not, the delay timer is bad and needs replacing.

Step12 Rotate the delay timer dial so that a TIME is shown on the dial.

Step13 Touch and hold one ohmmeter probe to the terminal T.

Step14 Touch the other ohmmeter probe to the terminal W-G.

Step15 The ohmmeter should show ZERO resistance (continuity). If not, the delay timer is bad and needs replacing.

Step16 Touch and hold one ohmmeter probe to the terminal W-O.

Step17 Touch the other ohmmeter probe to the terminal W-G.

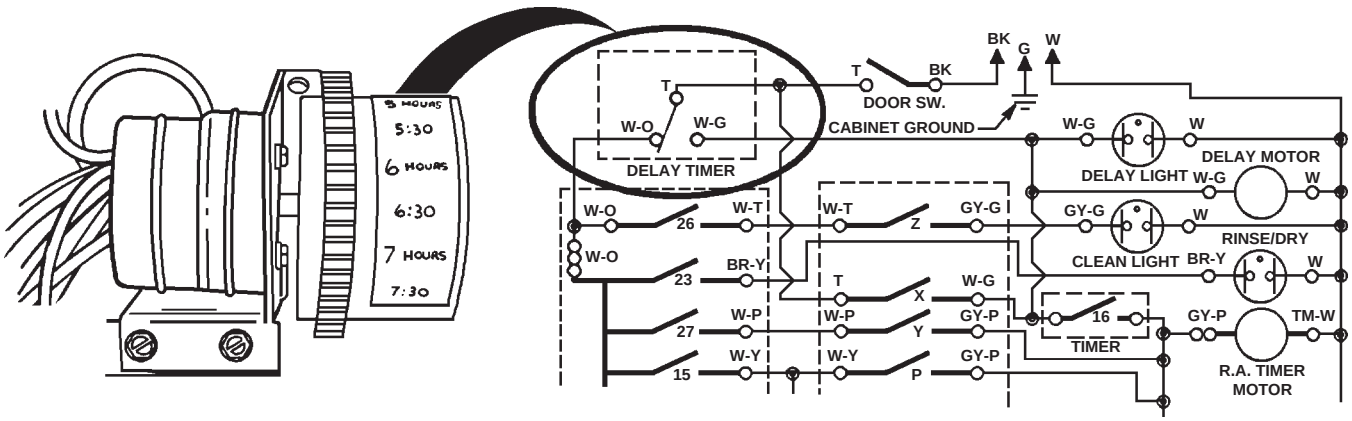
Step18 The ohmmeter should show an open circuit. If not, the delay timer is bad and needs replacing.

Step19 Touch and hold one ohmmeter probe to the terminal W-O.

Step20 Touch the other ohmmeter probe to the terminal T.

Step21 The ohmmeter should show an open circuit. If not, the delay timer is bad and needs replacing.

Step22 Reconnect all the wires to the proper terminals as previously marked.



TIMER MOTOR

Timer motors may vary slightly in appearance, but regardless of the differences each functions in the same manner as the others. It is a synchronous-type motor, similar to those used in electrical clocks, with a small pinion which drives a gear. This part is located on the timer assembly and is used to advance the timer through the cycles.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Disconnect the two wires coming from the motor, marking them as to what terminals they were on. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

OR

Pull apart the two connectors.

Step2 Refer to the instructions that came with your ohmmeter to find the proper scale to measure 1,500 to 3,000 ohms. Set the ohms scale and ZERO the meter.

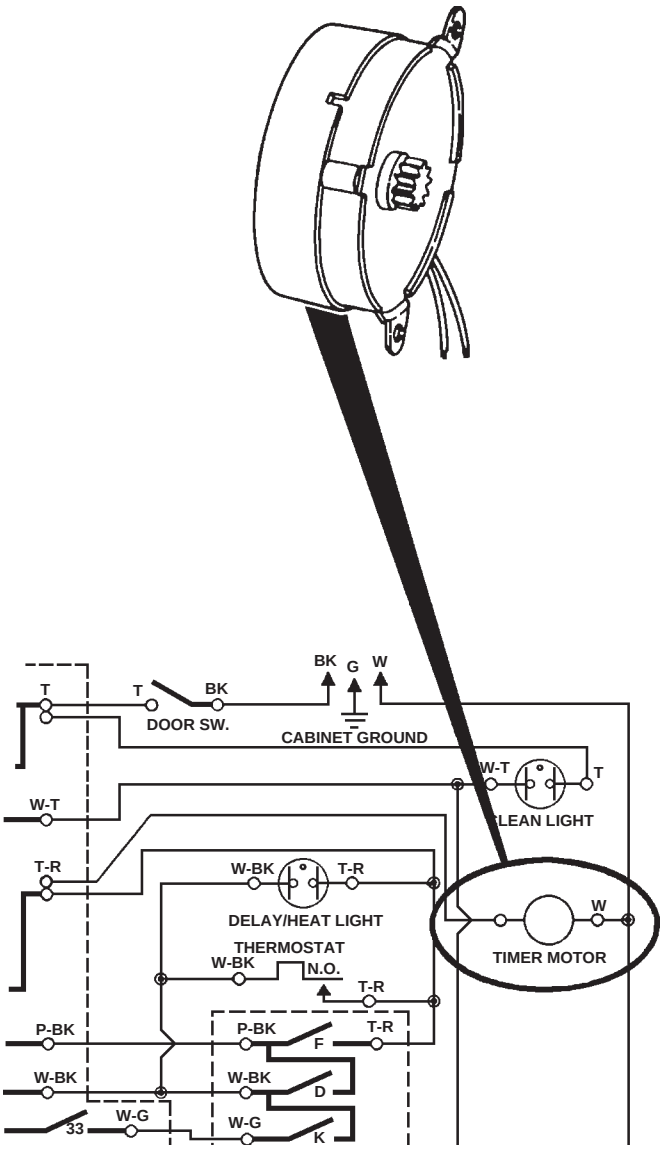
Step3 Touch and hold one ohmmeter probe to one of the timer motor wire terminals.

Step4 Touch the other ohmmeter probe to the other timer motor wire terminal.

Step5 The ohmmeter should show a reading between 1,500 to 3,000 ohms on the ohms scale. If not, the timer motor is bad and needs replacing.

STEP6 Reconnect all the wires to the proper terminals as previously marked.

NOTE: If you get this reading, the timer motor could still be bad from a mechanical problem inside the motor. This condition can only be checked by running a voltage check.



DOOR SWITCH

The purpose of the single-pole, double-throw door switch is to stop the dishwasher when the door is opened. A bad door switch could cause the dishwasher to keep running with the door open or not to run with the door closed.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the door switch. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

Step2 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

Step3 With the door closed, touch and hold one of the ohmmeter probes to one of the terminals.

Step4 Touch the other ohmmeter probe to the other terminal.

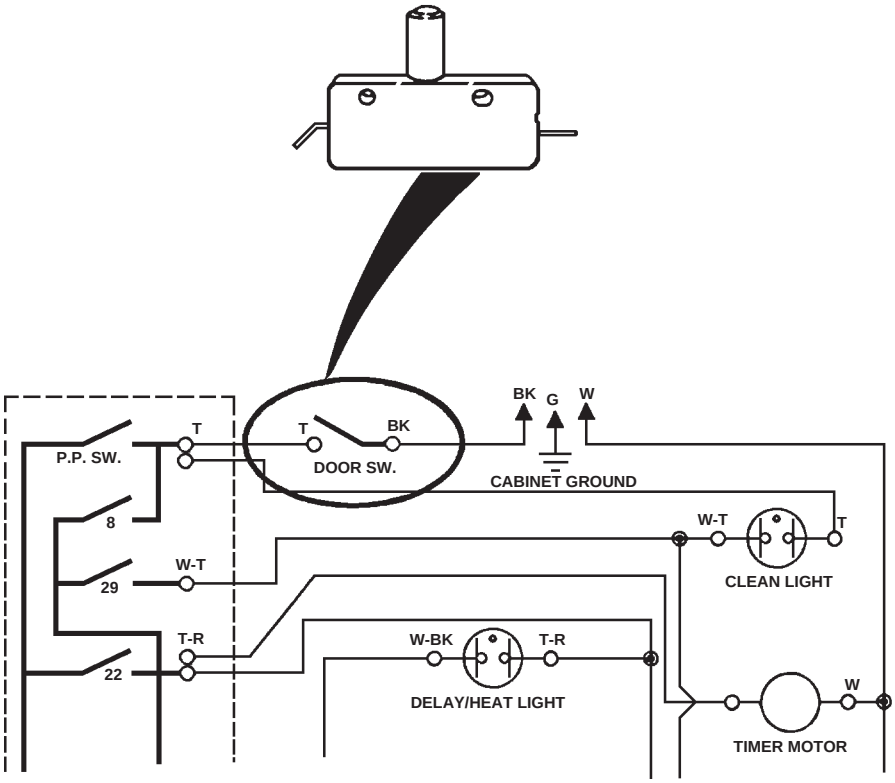
Step5 The ohmmeter should show ZERO resistance (continuity). If not, the door switch is bad and needs replacing.

Step6 With the door open, touch and hold one of the ohmmeter probes to one of the terminals.

Step7 Touch the other ohmmeter probe to the other terminal.

Step8 The ohmmeter should show an open circuit. If not, the door switch is bad and needs replacing.

Step9 Reconnect all the wires to the proper terminals as previously marked.



ROCKER SWITCH

This part is located in the console and is used to select the type of drying you prefer. Either the energy saving AIR DRY or HEAT DRY.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the rocker switch. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

Step2 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

Step3 Move the rocker switch to the “AIR DRY” setting.

TWO TERMINAL SWITCH

Step4 Touch and hold one ohmmeter probe to one of the terminals.

Step5 Touch the other ohmmeter probe to the other terminal.

Step6 The ohmmeter should show an open circuit. If not, the rocker switch is bad and needs replacing.

THREE TERMINAL SWITCH

This closes contact "B"

Step7 Touch and hold one ohmmeter probe to the terminal R-W.

Step8 Touch the other ohmmeter probe to the terminal BU-OR.

Step9 The ohmmeter should show ZERO resistance (continuity). If not, the rocker switch is bad and needs replacing.

Step10 Move the rocker switch to the “HEAT DRY” setting.

TWO TERMINAL SWITCH

Step11 Touch and hold one ohmmeter probe to one of the terminals.

Step12 Touch the other ohmmeter probe to the other terminal.

Step13 The ohmmeter should show ZERO resistance (continuity). If not, the rocker switch is bad and needs replacing.

THREE TERMINAL SWITCH

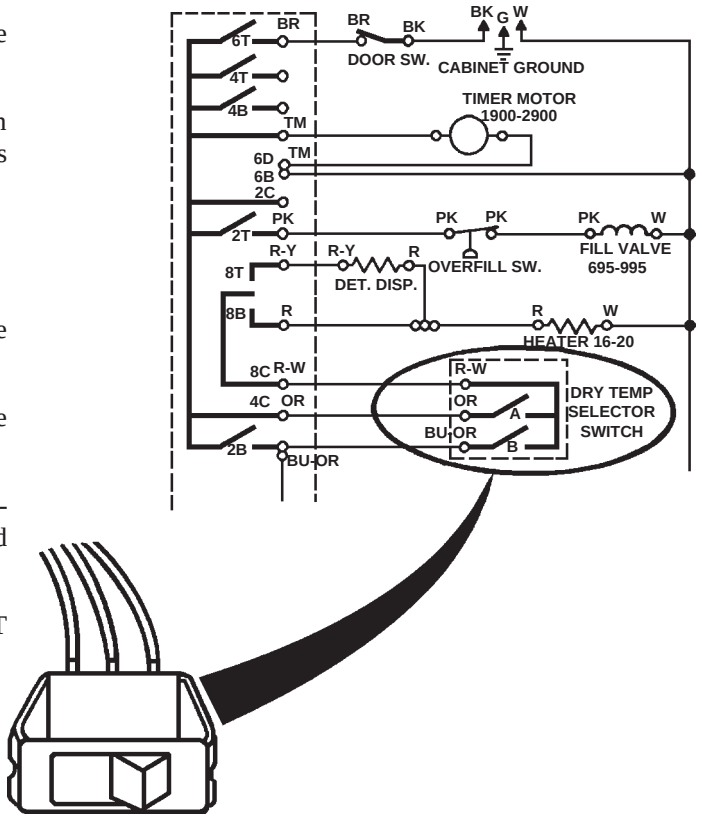
This closes contact "A"

Step14 Touch and hold one ohmmeter probe to the terminal R-W.

Step15 Touch the other ohmmeter probe to the terminal OR.

Step16 The ohmmeter should show ZERO resistance (continuity). If not, the rocker switch is bad and needs replacing.

Step17 Reconnect all the wires to the proper terminals as previously marked.



WETTING AGENT DISPENSER

This part is located on the left side of the door. It dispenses a wetting agent just before the final rinse. This causes water breakdown during rinse. The water then runs off the dishes and silverware, leaving fewer or no spots.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Pull the connector off the pin type terminals.

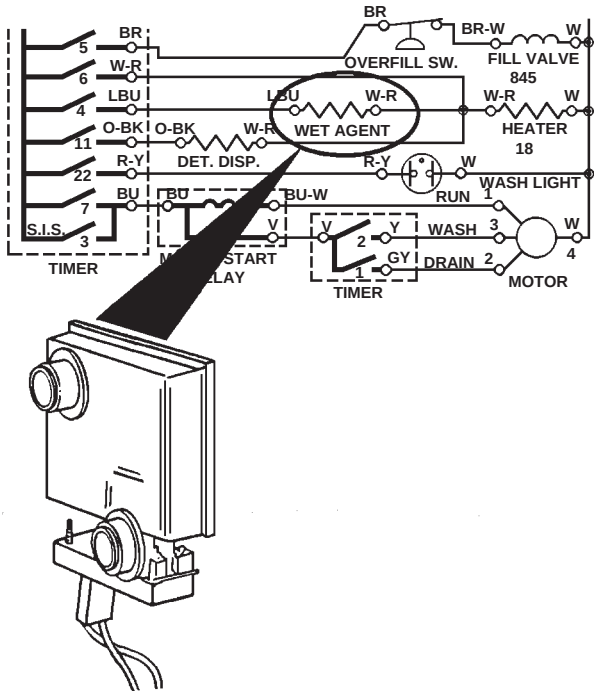
Step2 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

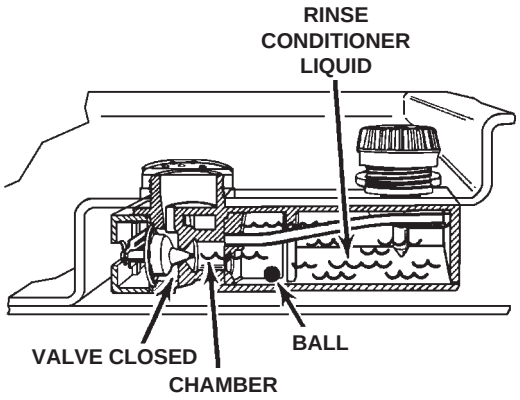
Step3 Touch and hold one ohmmeter probe to one of the pin-type terminals.

Step4 Touch the other ohmmeter probe to the other pin-type terminal.

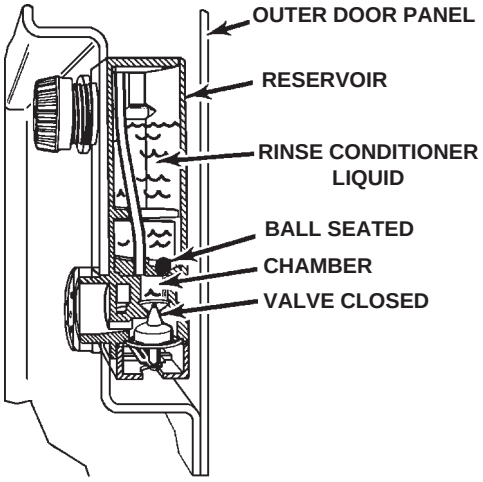
Step5 The ohmmeter should show a reading between .100 to .500 ohms on the ohms scale. If not, the wetting agent actuator is bad and needs replacing.

Step6 Reconnect the connector by pushing this over the pin type terminals.

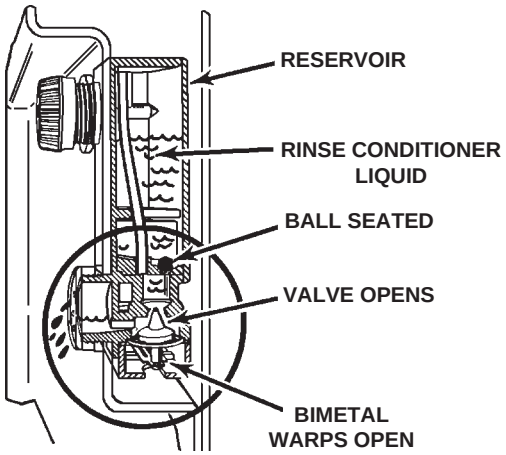




When the door is opened for loading, the wetting agent flows into the dispensing chamber because the sealing ball has fallen away from its sealing position.



When the door is closed, the sealing ball rolls back into its sealing position and seals the now full dispensing chamber.



During the final rinse, current flows to the bimetal heater. This causes it to warp downward. The valve then opens and a small amount of wetting agent (approximately 1 cc or .03 oz.) flows into the dishwasher.

DETERGENT DISPENSER

This part is located on the left side of the door. It has two dispenser cups, one with a cover and one without. The cup without a cover, dispenses its detergent as soon as the door is closed. This helps remove heavier deposits at the beginning of the cycle. At the proper time in the selected cycle, the timer completes a circuit to the magnets or bimetal heater (whichever is used) of the dispenser with a cover. The bimetal warps and releases the spring loaded cover latch, releasing the detergent into the dishwasher.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the detergent dispenser. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

OR

Pull apart the connectors from the coil (magnets) and the wiring harness.

Step2 If you have the magnets, refer to the instructions that came with your ohmmeter to find the proper scale to measure 1,500 to 2,000 ohms. Set the ohms scale and ZERO the meter.

OR

If you have the bimetal heater, set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

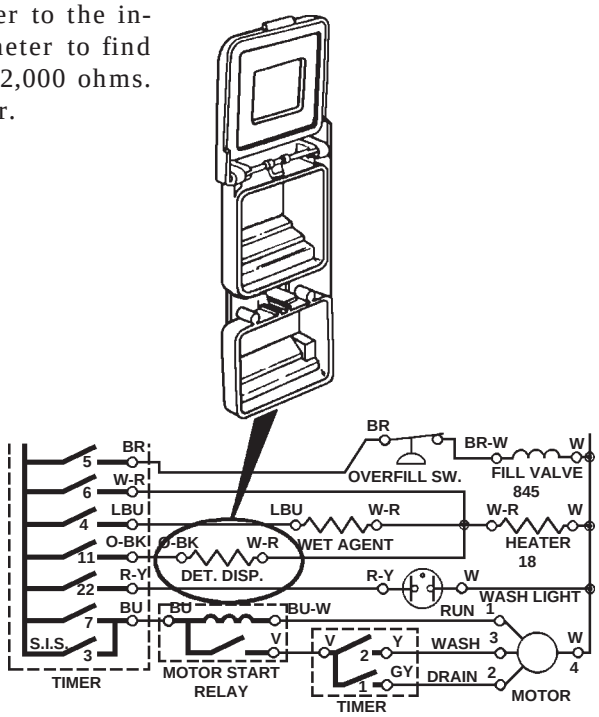
Step3 Touch and hold one ohmmeter probe to one of the terminals either inside the connector or on the bimetal.

Step4 Touch the other ohmmeter probe to the other terminal either inside the connector or on the bimetal.

Step5 The ohmmeter should show a reading between 1,500 to 2,000 ohms when checking the connector (magnets) or ZERO resistance (continuity) or less than one ohm, when checking the bimetal. If not, the coil (connector) or the actuator (bimetal) is bad and needs replacing.

Step6 Reconnect all the wires to the proper terminals as previously marked.

NOTE: On the bimetal type DO NOT connect it across 120VAC. It takes 20 to 30 seconds for the bimetal to open the valve.



PUSHBUTTON SWITCH

This part located in the console, is used in selecting the type of wash and dry cycles. Pushbuttons are mechanically linked to the various switches. When the selected cycle or energy option button is pushed, it causes the proper switch or switches to open or close to select the required fill, number of washes and rinses, water action, heat or no-heat, and the minimum water temperatures when required. The timer switch or switches, in series with the push-button switches, control the sequence of these various functions and the time they are operable in the cycle.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the pushbutton switch. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

Step2 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

Step3 Check each circuit by pushing in on the pushbutton to each setting and check the proper terminals.

Use the following chart. Your pushbutton switch may not have all the settings shown.

Terminals shown in each setting must show ZERO resistance (continuity).

This is a typical diagram; refer to your own wiring diagram for proper terminal markings.

PUSHBUTTON NO.	TERMINAL MARKING ON SWITCH
1	W-BK to W-G, OR to R
2	W-BK to P-BK, W-BK to W-G W-G to P-BK, OR to R
3	W-BK to P-BK, OR to R
4	W-BK to P-BK, OR to R
5	W-BK to P-BK, W-Y to W-T
6	W-BK to P-BK, W-Y to W-T
7	Must be open P-BK to T-R
8	Must be open OR to W-R

Step4 **EXAMPLE:** Push the number 3 button (from the left). This closes contacts inside the switch, W-BK to P-BK and OR to R.

Step5 Touch and hold one ohmmeter probe to the terminal W-BK.

Step6 Touch the other ohmmeter probe to the terminal P-BK.

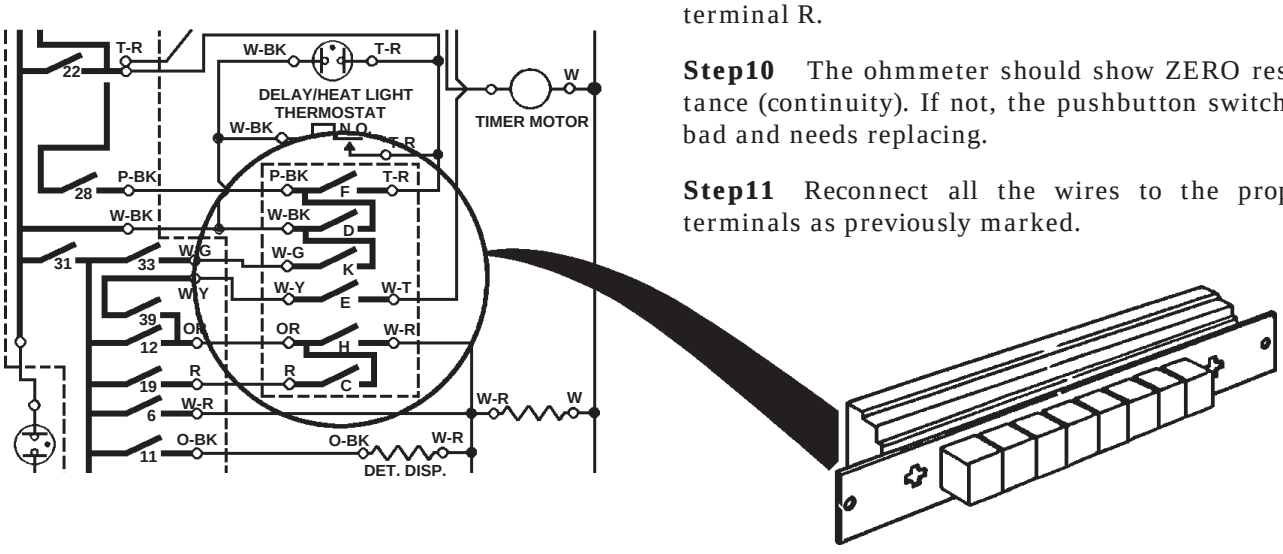
Step7 The ohmmeter should show ZERO resistance (continuity). If not, the pushbutton switch is bad and needs replacing.

Step8 Touch and hold one ohmmeter probe to the terminal OR.

Step9 Touch the other ohmmeter probe to the terminal R.

Step10 The ohmmeter should show ZERO resistance (continuity). If not, the pushbutton switch is bad and needs replacing.

Step11 Reconnect all the wires to the proper terminals as previously marked.



WATER INLET VALVE

This part is located behind the bottom access panel. On Built-In Models, the valve is located on the left side and on Portable Models, the valve is located on the right. This single coil inlet valve is mainly a shut-off valve for controlling water entering the dishwasher.

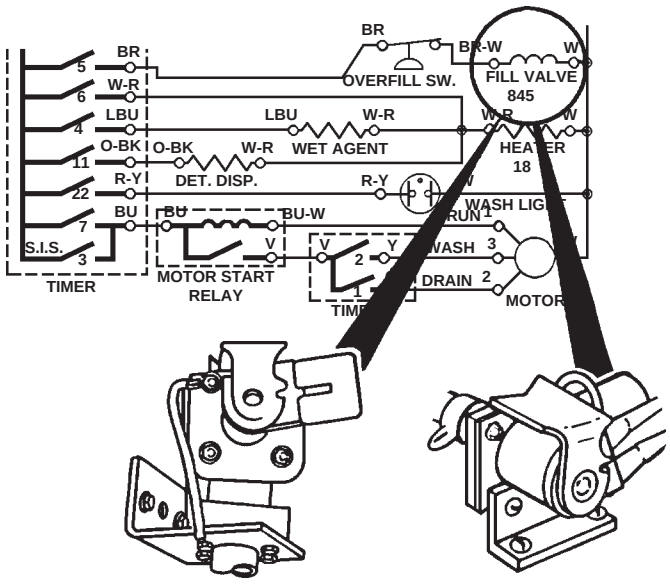
CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the inlet valve. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

OR

Pull the connectors apart.



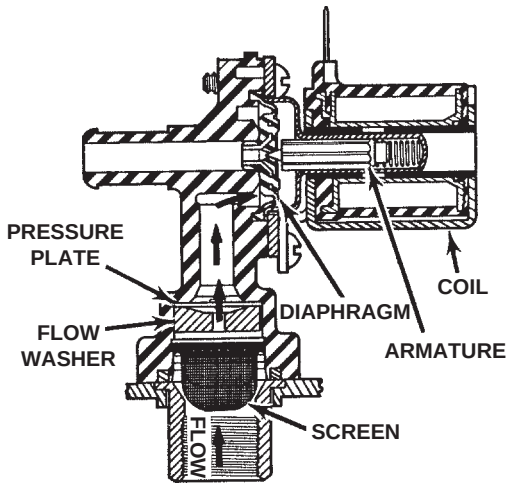
Step2 Refer to the instructions that came with your ohmmeter to find the proper scale to measure 500 to 2,000 ohms. Set the ohms scale and ZERO the meter.

Step3 Touch and hold one ohmmeter probe to one of the terminals.

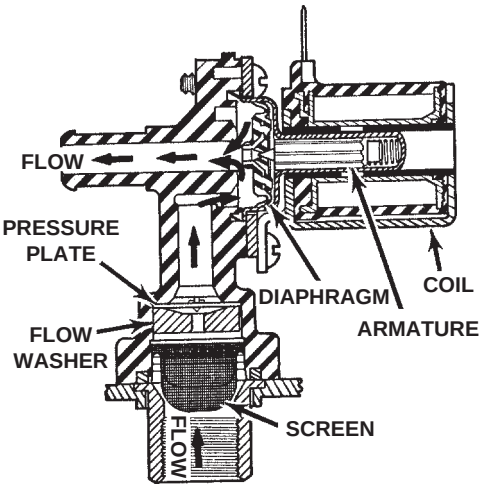
Step4 Touch the other ohmmeter probe to the other terminal.

Step5 The ohmmeter should show a reading between 500 to 2,000 ohms on the ohms scale. If not, the water inlet valve is bad and needs replacing.

Step6 Reconnect all the wires to the proper terminals as previously marked.



VALVE CLOSED



VALVE OPEN

OVERFILL SWITCH

This switch is located behind the access panel, on the right side, underneath the tub. This is a normally open (N.O.) switch that is kept closed by the weight of the float. This switch is in series with the fill valve. This switch is used as an overfill protection safety switch only. It does not control the water fill as this is time-controlled through the timer. If an overfill situation occurs, this switch opens, breaking the circuit to the inlet valve and shutting it off. The float is located in the tub, in the front right corner under the lower dishrack.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the overfill switch. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

Step2 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

Step3 With the float or lever in the down position, touch and hold one ohmmeter probe to one of the terminals.

Step4 Touch the other ohmmeter probe to the other terminal.

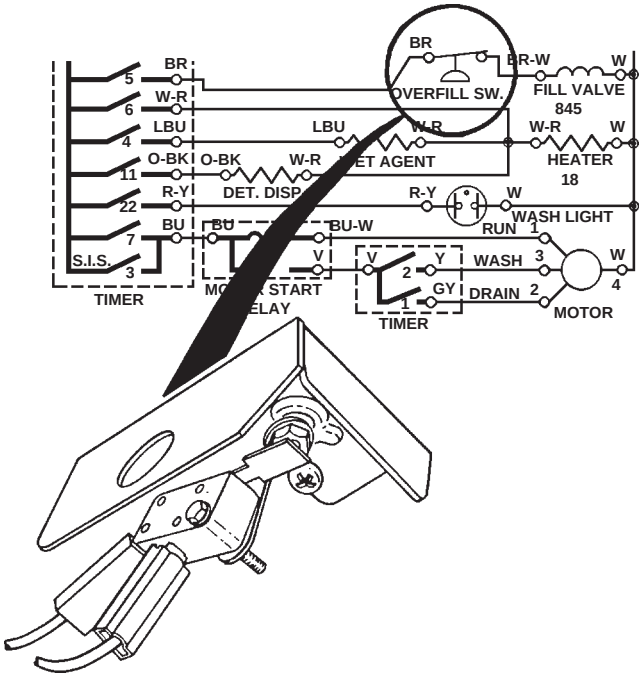
Step5 The ohmmeter should show ZERO resistance (continuity) with the float or lever down. If not, the overfill switch is bad and needs replacing.

Step6 With the float or lever in the up position, touch and hold one ohmmeter probe to one of the terminals.

Step7 Touch the other ohmmeter probe to the other terminal.

Step8 The ohmmeter should show an open circuit with the float or lever up. If not, the overfill switch is bad and needs replacing.

Step9 Reconnect all the wires to the proper terminals as previously marked.



HEATER

This heater is located in the middle, inside the tub. It keeps the water temperature at 140˚F during washing and rinsing and also helps dry the dishes during the dry cycle. This heating element serves as a resistance and is in series with the detergent and wetting agent dispensers. When the heater element is used in drying, dry room air is pulled in at the bottom of the door and heated by the heating element. Air flows upward by convection (like a chimney), picking up moisture from the wet dishes, and escapes through a screened exhaust vent in the top front of the door.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the heater. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

Step2 Refer to the instructions that came with your ohmmeter to find the proper scale to measure 10 to 30 ohms. Set the ohms scale and ZERO the meter.

Step3 Touch and hold one ohmmeter probe to one of the heater terminals.

Step4 Touch the other ohmmeter probe to the other terminal.

Step5 The ohmmeter should show a reading around 10 to 30 ohms on the ohms scale. If not, the heater is bad and needs replacing.

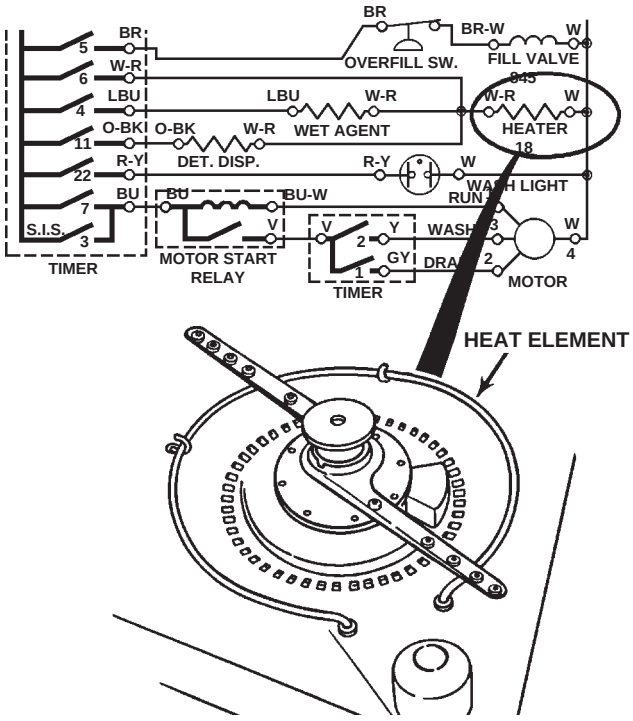
GROUNDING CHECK

Step6 Touch and hold one ohmmeter probe to one of the heater terminals.

Step7 Touch the other ohmmeter probe to the frame of the dishwasher.

Step8 The ohmmeter should show an open circuit. If not, the heater is bad and needs replacing.

Step9 Reconnect all the wires to the proper terminals as previously marked.



THERMOSTAT

This part is located behind the access panel and held against the bottom of the tub by a spring type bracket. This thermostat keeps turning the timer "OFF" and the heater "ON" to keep the water temperature at 140˚F. When the thermostat is open, the circuit must go through the high-resistance neon light which does not pass enought current to run the timer motor. This stops the timer from advancing through the cycle.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the thermostat. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

Step2 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

Step3 Touch and hold one ohmmeter probe to one of the terminals.

Step4 Touch the other ohmmeter probe to the other terminal.

Step5 The ohmmeter should show an open circuit. If not, the thermostat is bad and needs replacing.

Step6 Place the thermostat face down (terminals up) in an electric skillet.

Step7 Turn the electric skillet "ON" to 155˚F. When the electric skillet reaches this temperature, we can test the thermostat.

NOTE: Be careful not to touch the thermostat and electric skillet which are very hot.

NOTE: To avoid damage to the ohmmeter, do not let the wires touch the sides of the electric skillet.

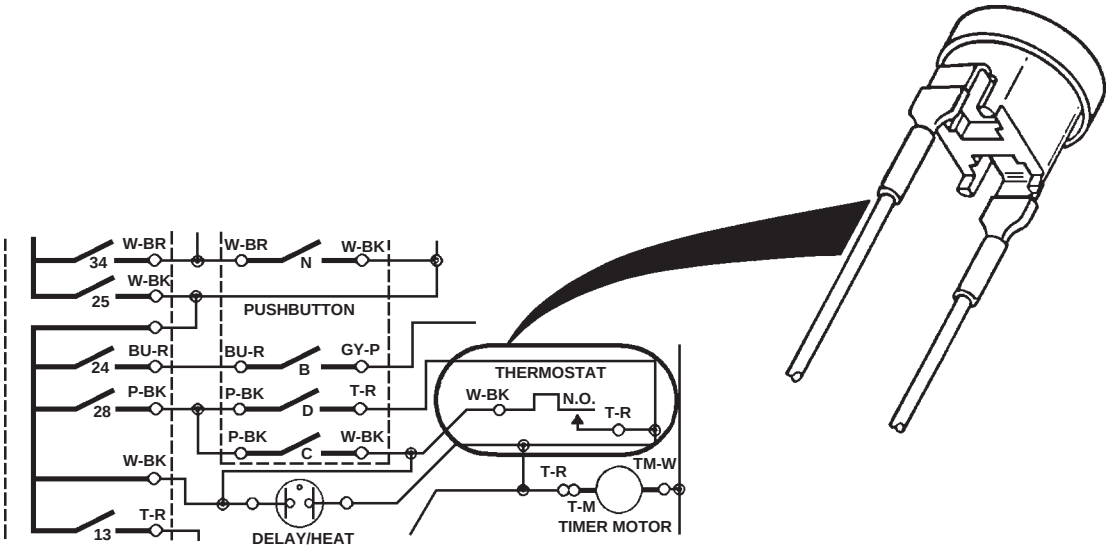
Step8 Touch and hold one ohmmeter probe to one of the terminals.

Step9 Touch the other ohmmeter probe to the other terminal.

Step10 The ohmmeter should show ZERO resistance (continuity). If not, the thermostat is bad and needs replacing.

Step11 Reconnect all the wires to the proper terminals as previously marked.

NOTE: Don't forget to turn the skillet "OFF" and let the thermostat cool before removing it from the skillet.



DRIVE MOTOR

This part is located behind the access panel and in the middle of the tub. This motor provides the driving force for the pump. It is a reversible type motor driving a pump impeller (clockwise) in one direction, washing the dishes, then changes direction and drives the impeller (counterclockwise) in the other direction for draining of the water.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the drive motor. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

OR

Pull apart the two connectors.

Step2 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

GROUNDING CHECK

Step3 Touch and hold one ohmmeter probe to the motor housing.

Step4 One at a time, touch the other ohmmeter probe to terminals 1, 2, 3, and 4.

Step5 The ohmmeter should show an open circuit when each of the terminals is checked. If not, the drive motor is bad and needs replacing.

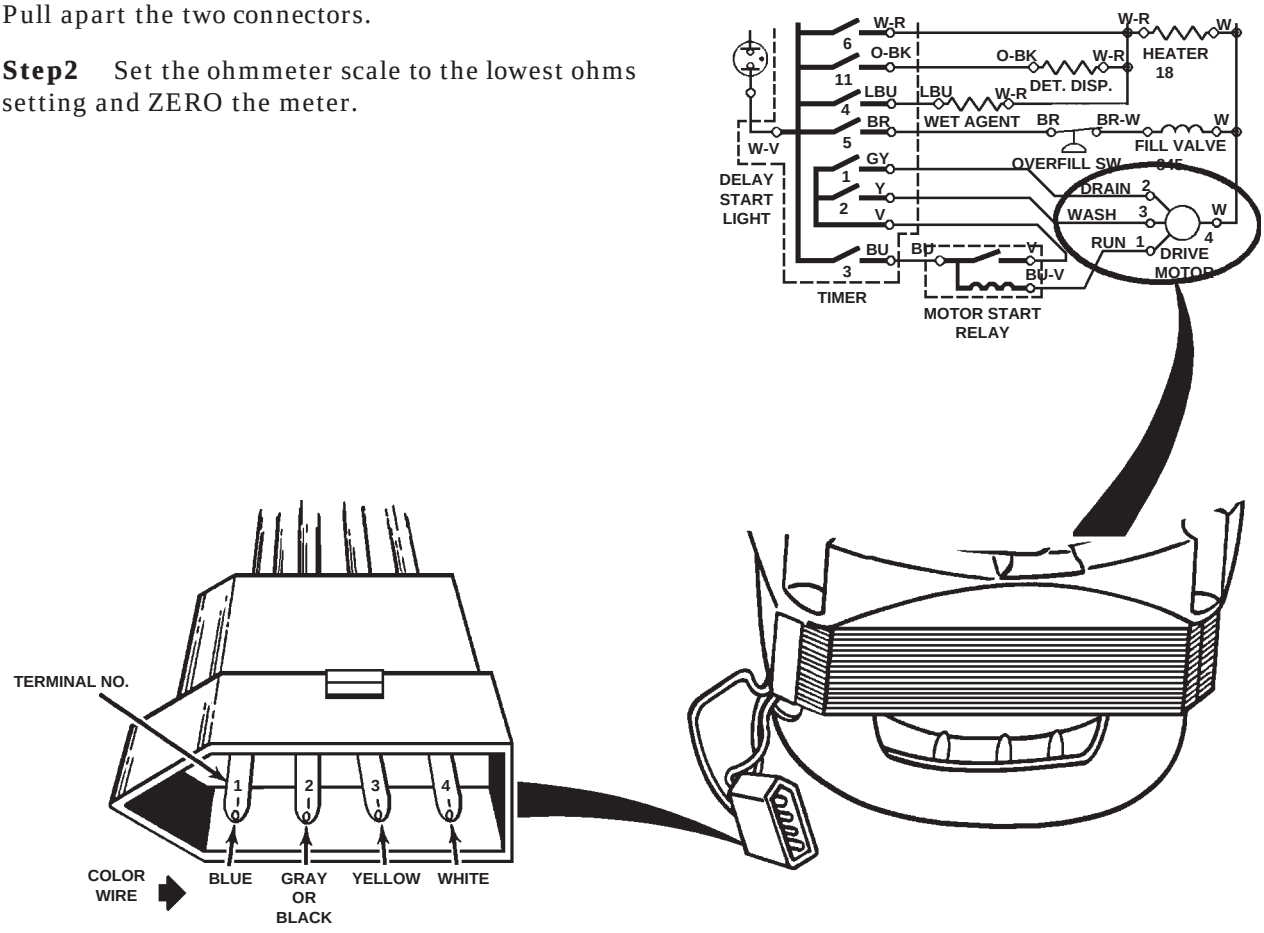
RUN WINDING

Step6 Touch and hold one ohmmeter probe to the terminal no. 1 (Blue).

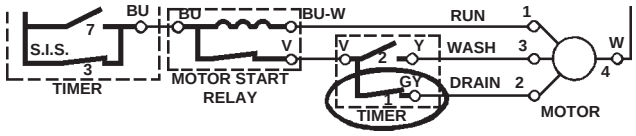
Step7 Touch the other ohmmeter probe to the terminal no. 4 (White).

Step8 The ohmmeter should show a reading between 1-4 ohms on the ohms scale.

Step9 If you do not get this reading, the drive motor is bad and needs replacing.



START WINDING-DRAIN



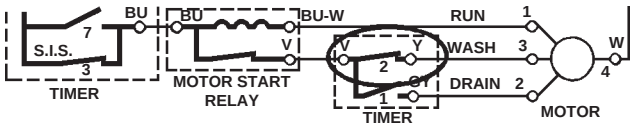
Step10 Touch and hold one ohmmeter probe to the terminal no. 2 (Gray or Black).

Step11 Touch the other ohmmeter probe to the terminal no. 4 (White).

Step12 The ohmmeter should show a reading between 3-8 ohms on the ohms scale.

Step13 If you do not get this reading, the drive motor is bad and needs replacing.

START WINDING-WASH



Step14 Touch and hold one ohmmeter probe to the terminal no. 3 (Yellow).

Step15 Touch the other ohmmeter probe to the terminal no. 4 (White).

Step16 The ohmmeter should show a reading between 3-8 ohms on the ohms scale.

Step17 If you do not get this reading, the drive motor is bad and needs replacing.

Step18 Reconnect all the wires to the proper terminals as previously marked.

START RELAY

The start relay is used in getting voltage to the start wash winding or the start drain winding.

The initial starting current passes through the relay coil since it is in series with the motor's RUN windings. The starting current surge causes the relay coil to produce a strong magnetic force, attracting the steel armature and closing the switch in the relay. As the motor approaches full speed, the initial surge of current will diminish. The magnetic force of the relay will also diminish, since the relay coil carries the same amperage. At about 2/3 motor speed, the magnetic force weakens to the point that the weight of the armature overcomes the magnetic force, allowing the armature to drop and open the relay contacts. This de-energizes the start winding, and the motor continues running on the run winding.

This start relay could be located in one of the following places. Either behind the toe panel (built-in models), or behind the access panel and coverplate (portable models).

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the start relay. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

Step2 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

Step3 Touch and hold one ohmmeter probe to the terminal marked M, BU, or 3.

Step4 Touch the other ohmmeter probe to the terminal marked M, BU (different terminals), or 4.

Step5 The ohmmeter should show ZERO resistance (continuity). If not, the start relay is bad and needs replacing.

Step6 Touch and hold one ohmmeter probe to the any terminal marked M, BU, 3, or 4.

Step7 Touch the other ohmmeter probe to the terminal marked S, V, or 2.

Step8 The ohmmeter should show an open circuit. If not, the start relay is bad and needs replacing.

Step9 Remove the start relay and turn it upside down.

Step10 Touch and hold one ohmmeter probe to the terminal marked M, BU, or 3.

Step11 Touch the other ohmmeter probe to the terminal marked M, BU (different terminals), or 4.

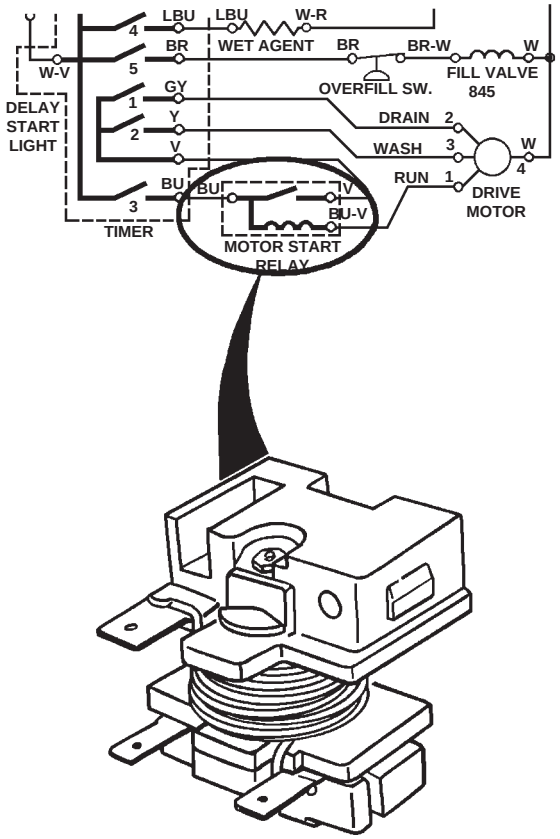
Step12 The ohmmeter should show ZERO resistance (continuity). If not, the start relay is bad and needs replacing.

Step13 Touch and hold one ohmmeter probe to the terminal marked S, V, or 2.

Step14 Touch the other ohmmeter probe to each terminal marked M, BU, 3, and 4.

Step15 The ohmmeter should show ZERO resistance (continuity). If not, the start relay is bad and needs replacing.

Step16 Reconnect all the wires to the proper terminals as previously marked.

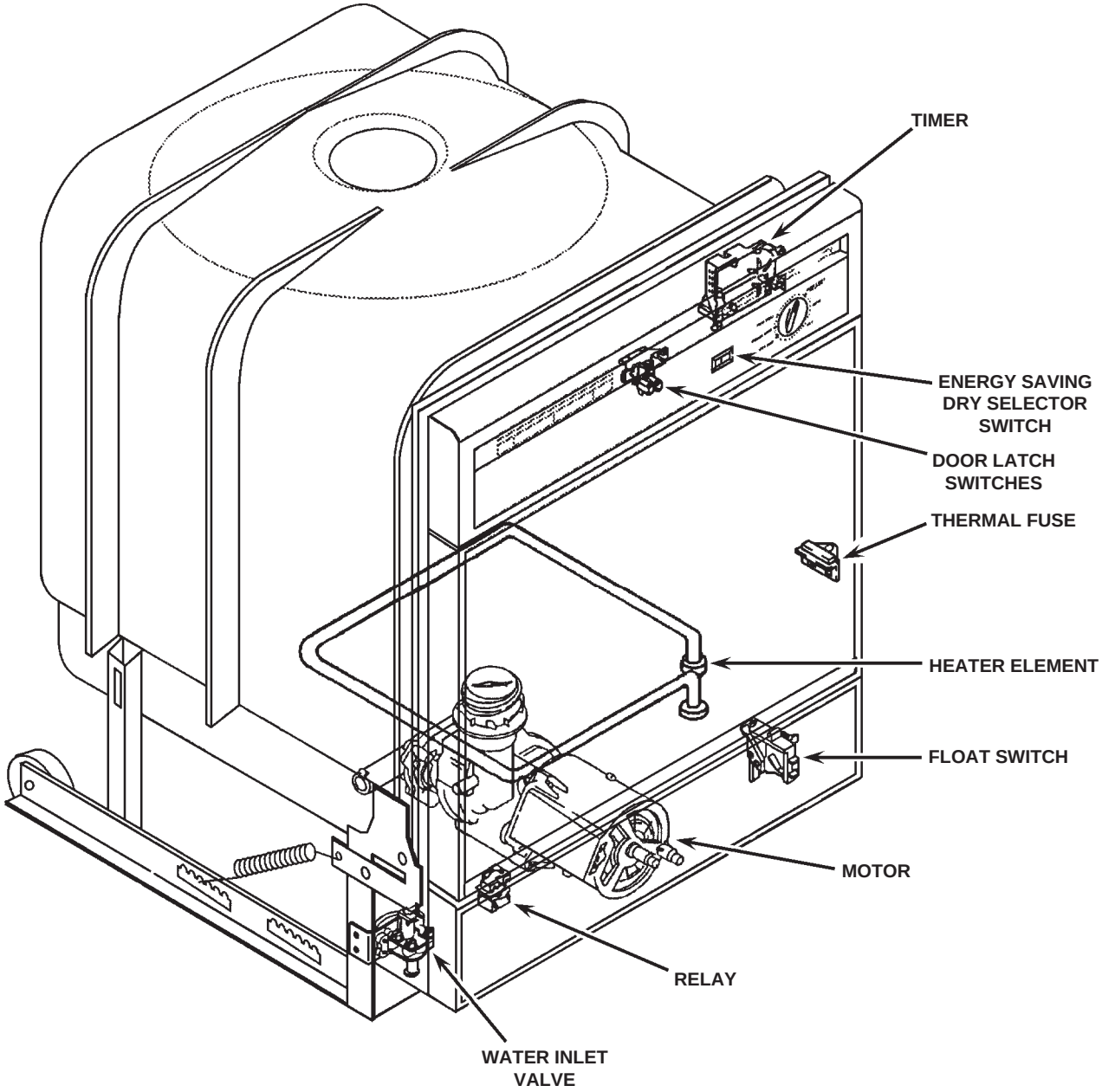


CHAPTER 2

ELECTRICAL COMPONENTS

(for Plastic Liner Models: 1986 and Newer)

See Chapter 1 for all components not covered in this section.



TIMER

The timer is located in the console and is the heart of the dishwasher. Its function is to control the timing of the dishwasher.

All timers used on dishwashers operate the same but are somewhat different in looks. Due to functions or features of different models, some timers have more terminals and internal switches (contacts) than others.

The dash line represents the actual timer where as the bold lines indicate internal switches within the timer.

On quick-disconnect timers, the different colored harness wires are placed inside a block which plugs into the timer. The possibility of wiring the timer wrong is greatly reduced.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

Step2 Remove the disconnect block. The blocks have tabs on each end which must be pressed while pulling on the block.

Step3 EXAMPLE: Move the timer to the start of NORMAL wash. PROBLEM: Dishwasher does not fill.

Step4 Touch and hold one ohmmeter probe to the terminal T.

Step5 Touch the other ohmmeter probe to the terminal BR.

Step6 The ohmmeter should show ZERO resistance (continuity). If not, the timer is bad and needs replacing.

Step7 If the door switch is good but the dishwasher still won't start when the timer knob is pulled out, check the internal timer push/pull switch (PB. SW.) contacts.

Step8 Pull the timer knob out.

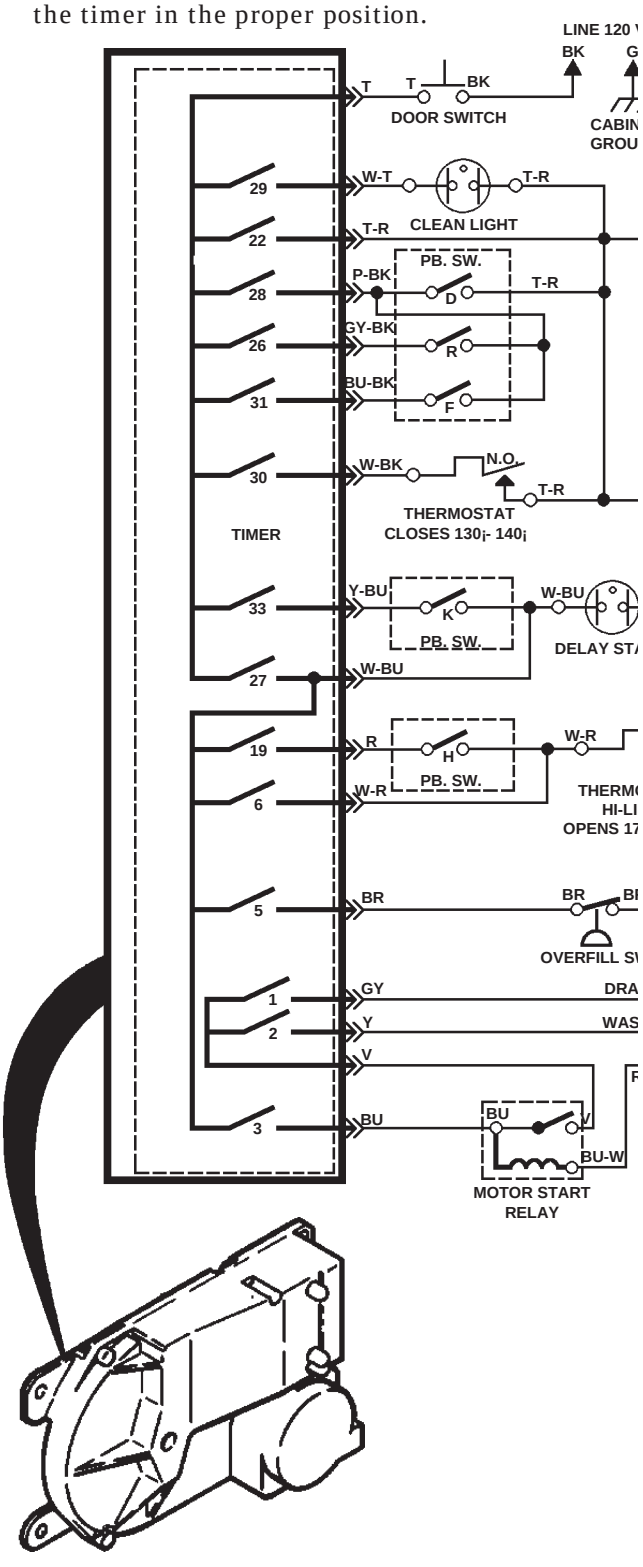
Step9 Touch and hold one ohmmeter probe to the terminal T.

Step10 Touch the other ohmmeter probe to the terminal W-BK.

Step11 The ohmmeter should show ZERO resistance (continuity) with the timer knob pulled out. If not, the timer is bad and needs replacing.

The ohmmeter should show an open circuit with the timer knob pushed in.

Step12 Place the colored terminal block back on the timer in the proper position.



DOOR SWITCH

The purpose of the single-pole, double-throw door switch is to stop the dishwasher when the door is opened. A bad door switch could cause the dishwasher to keep running with the door open or not to run with the door closed.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the door switchs. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

Step2 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

tep3 With the switch actuator pressed, touch and hold one of the ohmmeter probes to one of the switch terminals.

Step4 Touch the other ohmmeter probe to the other terminal on the same switch.

Step5 The ohmmeter should show ZERO resistance (continuity). If not, the door switch is bad and needs replacing.

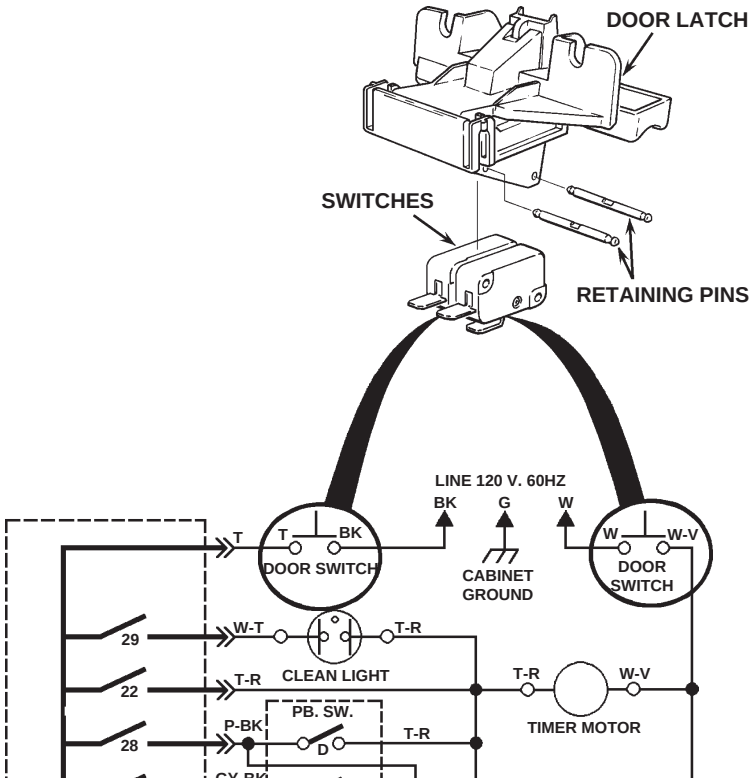
Step6 With the actuator open, touch and hold one of the ohmmeter probes to one of the terminals.

Step7 Touch the other ohmmeter probe to the other terminal.

Step8 The ohmmeter should show an open circuit. If not, the door switch is bad and needs replacing.

Step9 Repeat steps 2-8 with the other door switch.

Step10 Reconnect all the wires to the proper terminals as previously marked.



HEATER

This heater is located in the middle, inside the tub. It keeps the water temperature at 140˚F during washing and rinsing and also helps dry the dishes during the dry cycle. When the heater element is used in drying, dry room air is pulled in at the bottom of the door and heated by the heating element. Air flows upward by convection (like a chimney), picking up moisture from the wet dishes, and escapes through a screened exhaust vent in the top front of the door.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove one wire at a time, carefully labeling each wire according to the terminal marking on the heater. This procedure should assure that the right wire is reconnected to the right terminal after checking or replacement.

Step2 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

Step3 Touch and hold one ohmmeter probe to one of the heater terminals.

Step4 Touch the other ohmmeter probe to the other terminal.

Step5 The ohmmeter should show a reading around 15 to 25 ohms on the ohms scale. If not, the heater is bad and needs replacing.

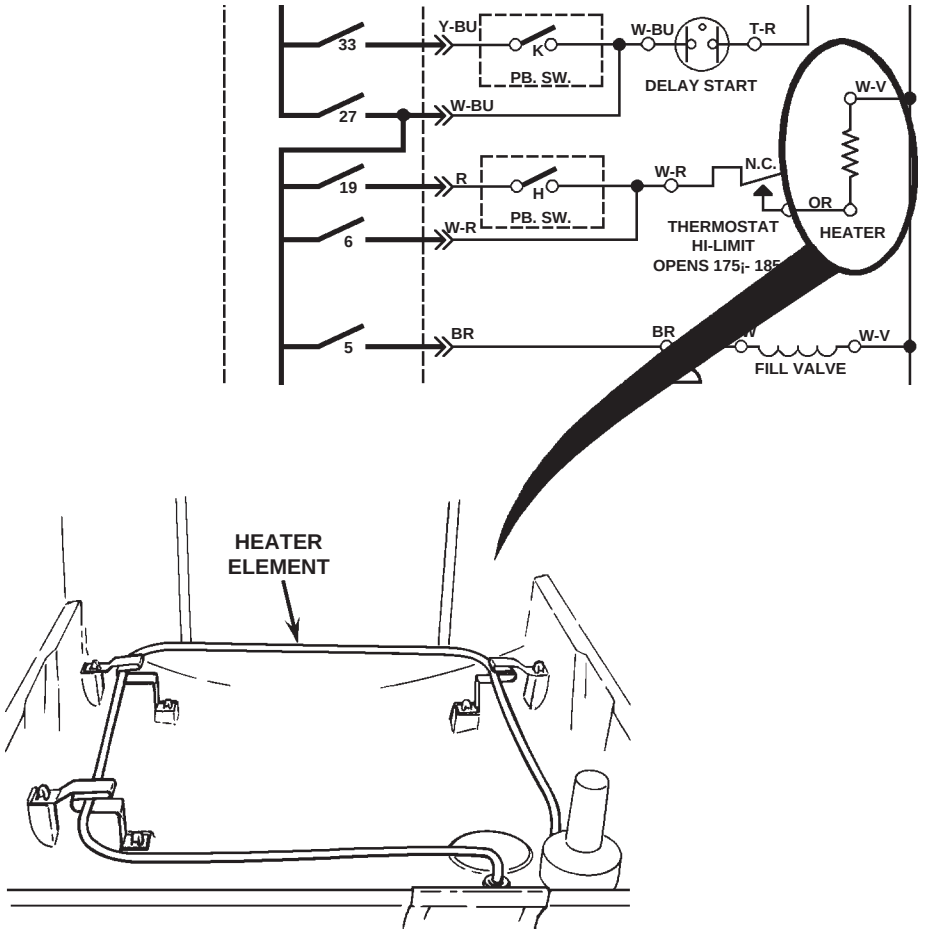
GROUNDING CHECK

Step6 Touch and hold one ohmmeter probe to one of the heater terminals.

Step7 Touch the other ohmmeter probe to the frame of the dishwasher.

Step8 The ohmmeter should show an open circuit. If not, the heater is bad and needs replacing.

Step9 Reconnect all the wires to the proper terminals as previously marked.



WATER INLET VALVE

This part is located behind the bottom access panel on the left side. This single coil inlet valve is mainly a shut-off valve for controlling water entering the dishwasher.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove the harness connector from the inlet valve.

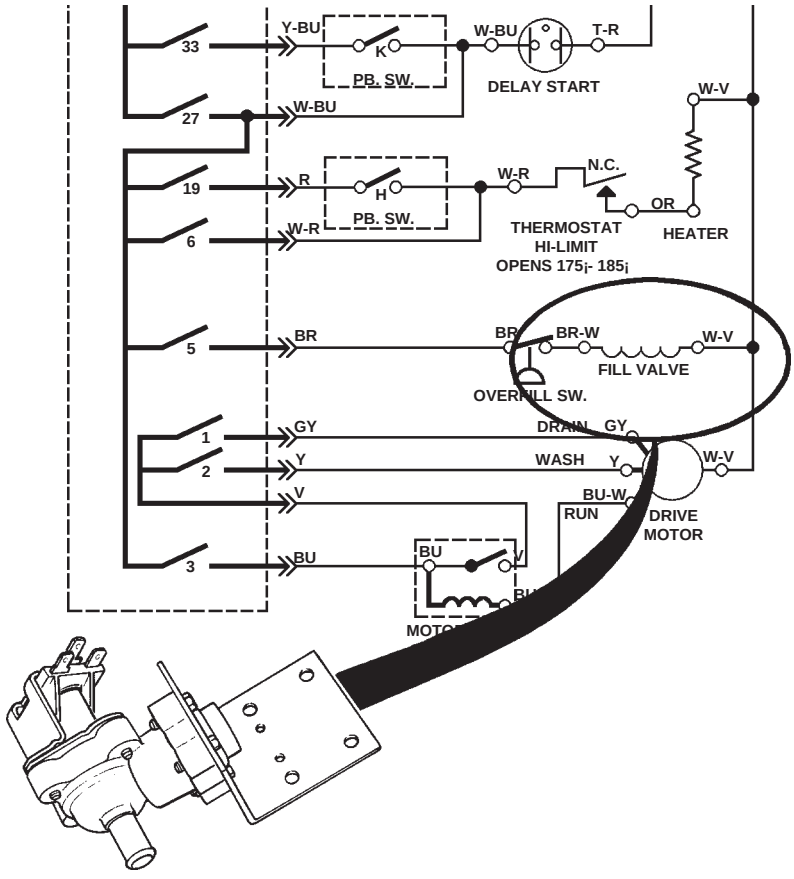
Step2 Refer to the instructions that came with your ohmmeter to find the proper scale to measure 500 to 2,000 ohms. Set the ohms scale and ZERO the meter.

Step3 Touch and hold one ohmmeter probe to one of the terminals.

Step4 Touch the other ohmmeter probe to the other terminal.

Step5 The ohmmeter should show a reading between 500 to 2,000 ohms on the ohms scale. If not, the water inlet valve is bad and needs replacing.

Step6 Replace the harness wire connector onto the inlet valve and push on until it snaps into place.



DRIVE MOTOR

For the (Power Clean) pump and motor, see page 18 and for the (Horizontal) pump and motor, see below.

This part is located behind the access panel and in the middle of the tub. This motor provides the driving force for the pump. It is a reversible type motor driving a pump impeller (clockwise) in one direction, washing the dishes, then changes direction and drives the impeller (counterclockwise) in the other direction for draining of the water.

CHECKING PROCEDURE

Obtain an ohmmeter from your local store. We will be doing RESISTANCE checks. This is the safest way because the dishwasher is unplugged from the power source and avoids the possibility of receiving an electrical shock.

Step1 Remove the wire connector from the motor by pressing the tab, then pull.

Step2 Set the ohmmeter scale to the lowest ohms setting and ZERO the meter.

GROUNDING CHECK

Step3 Touch and hold one ohmmeter probe to the motor housing.

Step4 One at a time, touch the other ohmmeter probe to terminals W-V, BU-W, Y, and GY.

Step5 The ohmmeter should show an open circuit when each of the terminals is checked. If not, the drive motor is bad and needs replacing.

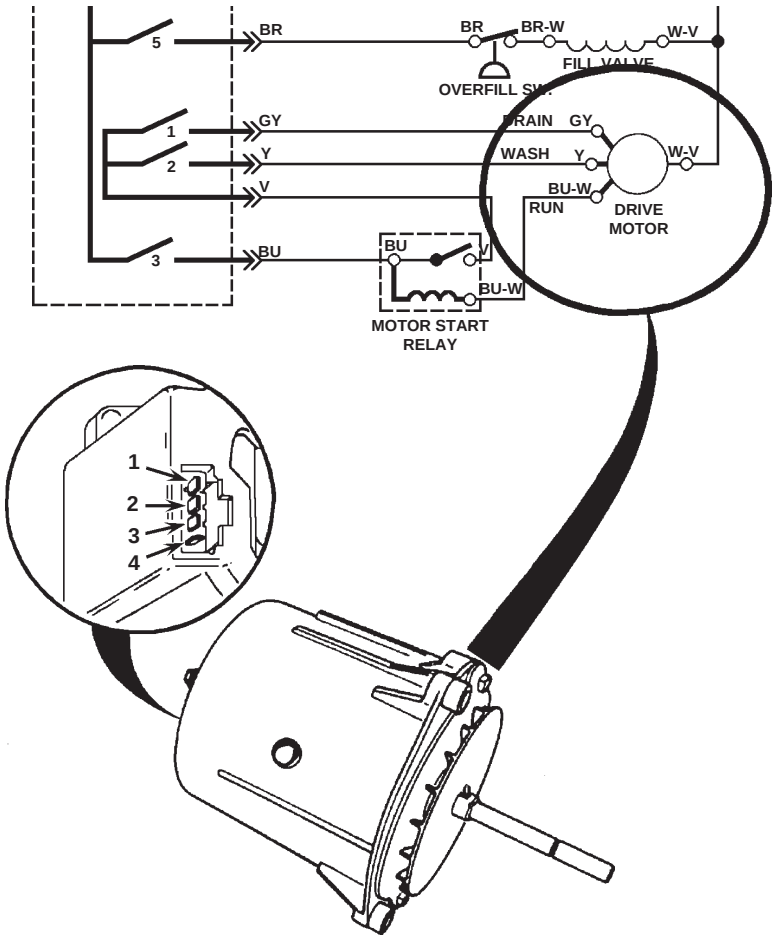
RUN WINDING

Step6 Touch and hold one ohmmeter probe to the terminal W-V.

Step7 Touch the other ohmmeter probe to the terminal BU-W.

Step8 The ohmmeter should show a reading between 2-12 ohms on the ohms scale.

Step9 If you do not get this reading, the drive motor is bad and needs replacing.



START WINDING-WASH

Step10 Touch and hold one ohmmeter probe to the terminal W-V.

Step11 Touch the other ohmmeter probe to the terminal Y.

Step12 The ohmmeter should show a reading between 1-7 ohms on the ohms scale.

Step13 If you do not get this reading, the drive motor is bad and needs replacing.

START WINDING-DRAIN

Step14 Touch and hold one ohmmeter probe to the terminal W-V.

Step15 Touch the other ohmmeter probe to the terminal GY.

Step16 The ohmmeter should show a reading between 2-12 ohms on the ohms scale.

Step17 If you do not get this reading, the drive motor is bad and needs replacing.

Step18 Replace the harness wire connector onto the motor and push on until it snaps into place.

NOTES

BLANK

BLANK