WASCOMAT

FRONT LOAD WASHER

SERVICE MANUAL

Models:
WE16A
WE16M
WE16N

NOTICE TO SERVICE PERSONNEL

INSTALLATION

Improper installation of Wascomat laundry and wet cleaning equipment can result in personal injury and severe damage to the machine.

REFER INSTALLATION TO QUALIFIED PERSONNEL!

RISK OF ELECTRIC SHOCK

The equipment utilizes high Voltages. Disconnect electric power before servicing.
The use of proper service tools and techniques, and the use of proper repair procedures, is essential to the safety of service personnel and equipment users.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL!

RISK OF PERSONAL INJURY

This equipment contains moving parts, and some components that may have sharp edges. Improper or careless service procedures may result in serious injury to service personnel.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL!

ABOUT THIS MANUAL

This manual is intended to provide service guidance to qualified service personnel. Wascomat and its authorized dealers make no determination regarding the qualification of individuals requesting this service manual. The service provider assumes all risks inherent to the servicing of this equipment and any risks that arise as result of the lack of knowledge or ability of any person servicing this equipment.

REFER SERVICING TO QUALIFIED SERVICE PERSONNEL!

NOTE:

Improper installation or servicing of Wascomat equipment will void the manufacturer's warranty!

CONTENTS

WARNING

This service manual is intended for use by persons having electrical and mechnical training and a level of knowledge of these subjects generally considered acceptable in the appliance repair trade. Wascomat cannot be responsible, nor assume any liability, for injury or damage of any kind arising from the use of this manual.

TECHNICAL SPECIFICATIONS

MODEL SPECIFICATIONS	WE16
Electronic Speed Control	yes
(Operational Speeds)	
Wash Speed	52 RPM
Spin Speed - slow	450 RPM
Spin Speed - fast	850 RPM
Drain Pump Motor (Detached 120 VAC Motor)	
Pump Out Height Maximum (inches)	96
Drain Hose Length to Pump (Inches)	60
Pump Out Time	60 sec. max.
Pump Speed - RPM	3400
Pump Output	
@ 3 ft.	13.0 GPM
@ 6 ft.	10.0 GPM
@ 8 ft.	8.0 GPM
Drive Motor (16 Pole Universal DC Motor)	
Drive Belt (Poly-V, 6 rib)	yes
Pulley Ratio (Pulley to Motor RPM)	1 to 16
Water Supply	
Water Pressure - Maximum (PSI)	120
Water Pressure - Minimum (PSI)	20
Total Water Usage (max. gallons approx.)	25
Water Level (no load - measured from bottom of tub)	4-5/8" ± 3/8"
Electrical Data	
Drive Motor (16 Pole DC Type Motor)	
Volts (120, 60 Hz.) 15 amp	yes
Wash R.P.M.	832
Spin R.P.M.	13600
Wattage	
Agitate (with 10 pound clothes load)	370 max.
Spin (with 10 pound clothes load)	850 max.
Plumbing Requirements	
Drain 1-1/2" Standpipe (minimum height 24")	yes
Water Supply - Separate Hot & Cold Faucets	yes
(3/4", 11-1/2 threads per inch)	
Capacity (Inner Tub)	
Cubic feet	2.65
Max clothes load	14 lbs.
Dimensions (Inches Minimum)	
Height	34-5/8
Width	26-7/8
Depth	27 1/4

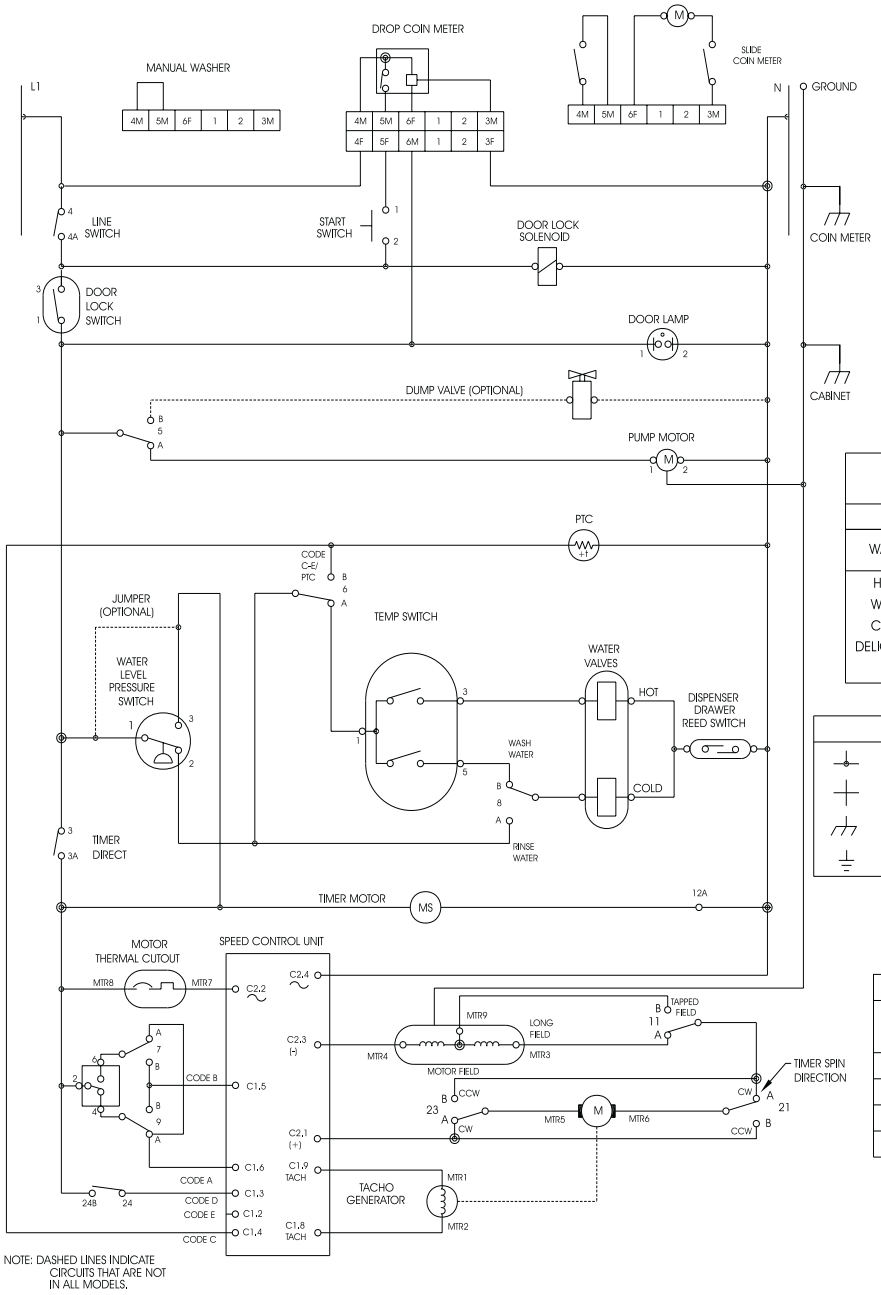
TORQUE REQUIREMENT TABLE

TORQUE REQUIREMENT TABLE	
DESCRIPTION	TORQUE
Counterweight to Tub	60 - 75 in. lbs.
Door Hinge to Cabinet	30 - 45 in. lbs.
Door Hinge to Door	25 - 35 in. lbs.
Door Latch	10 - 15 in. lbs.
Door Lock Switch	15 - 25 in. lbs.
Door Frame Assembly Screws	10 - 15 in. lbs.
Drain Pump to Pump Bracket	25 - 35 in. lbs.
Tub Support to Tub	24 ft. lbs.
Motor to Tub	25 - 35 in. lbs.
Outer Tub Halves (front to rear)	70 - 85 in. lbs.
Pressure Switch Mounting	15 - 20 in. lbs.
Tub Pulley to Shaft	310 - 350 in. lbs.
Timer Mounting	20 - 40 in. lbs.
Water Temperature Switch	15 - 20 in. lbs.
Water Valve Mounting	25 - 35 in. lbs.
Coin Meter Housing to Top Panel	45 - 60 in. lbs.

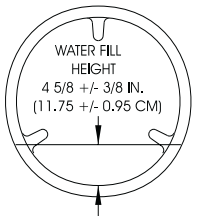
RESISTANCE TABLE

RESISTANCE TABLE	
Resistance Ohm value ±10% @ 77∞F (25∞C)	
Door Lock Solenoid	380
Drive Motor	
Stator Winding (Tapped Field)	0.37
Stator Winding (Full Field)	1.26
Tachogenerator	135
Motor Thermal Protector	less than 1
Armature (Rotor)	less than 5
Pump Motor	4.6
Timer Motor	2070
Water Valve Solenoids	880

SCHEMATIC DIAGRAM



NOTE: DASHED LINES INDICATE CIRCUITS THAT ARE NOT IN ALL MODELS.



NO LOAD, START POSITION OF PERMANENT PRESS

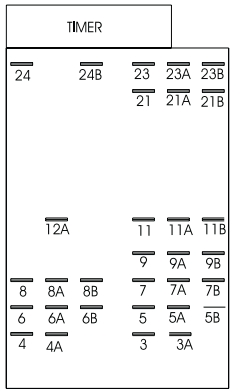
SPEED CONTROL UNIT OPERATION

DRUM RPM	PHASES DESCRIPTION	CODE	E 6B	D 24	C 6B	B 7B/9B	A 7A/9A
0	NO ACTION	/	0	0	0	0	0
0	NO ACTION	/	0	1	0	0	0
0	NO ACTION (AGIT OFF)	/	0	0	0	0	1
52	AGIT - CONTINUOUS	N	0	1	0	0	1
0	NO ACTION (AGIT OFF)	/	0	0	0	1	0
52	AGIT - DUTY CYCLE	D	0	1	0	1	0
450	SPIN - CONTINUOUS	S1	1	X	0	0	0
450	SPIN - CONTINUOUS	S1	0	X	1	0	0
450	INTERVAL SPIN	S1+S1	1	X	0	0	1
450	INTERVAL SPIN	S1+S1	0	X	1	0	1
650	SPIN - CONTINUOUS	S2	1	X	0	1	0
850	SPIN - CONTINUOUS	S3	0	X	1	1	0

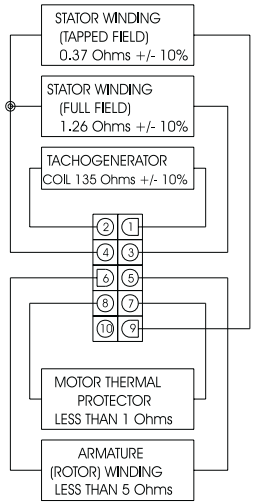
1=120 VAC, 0=0 VAC, X=DON'T CARE

WATER TEMPERATURE SWITCH CIRCUIT				
WASH	1-3	1-5	2-4	2-6
HOT	X		X	
WARM	X	X	X	
COLD		X	X	
DELICATE	X	X		X

CONNECTION POSITION



WIRING CODES	
CONNECTION	RED
NO CONNECTION	BROWN
CHASSIS (CABINET) GROUND	BLUE
EARTH GROUND	WHITE



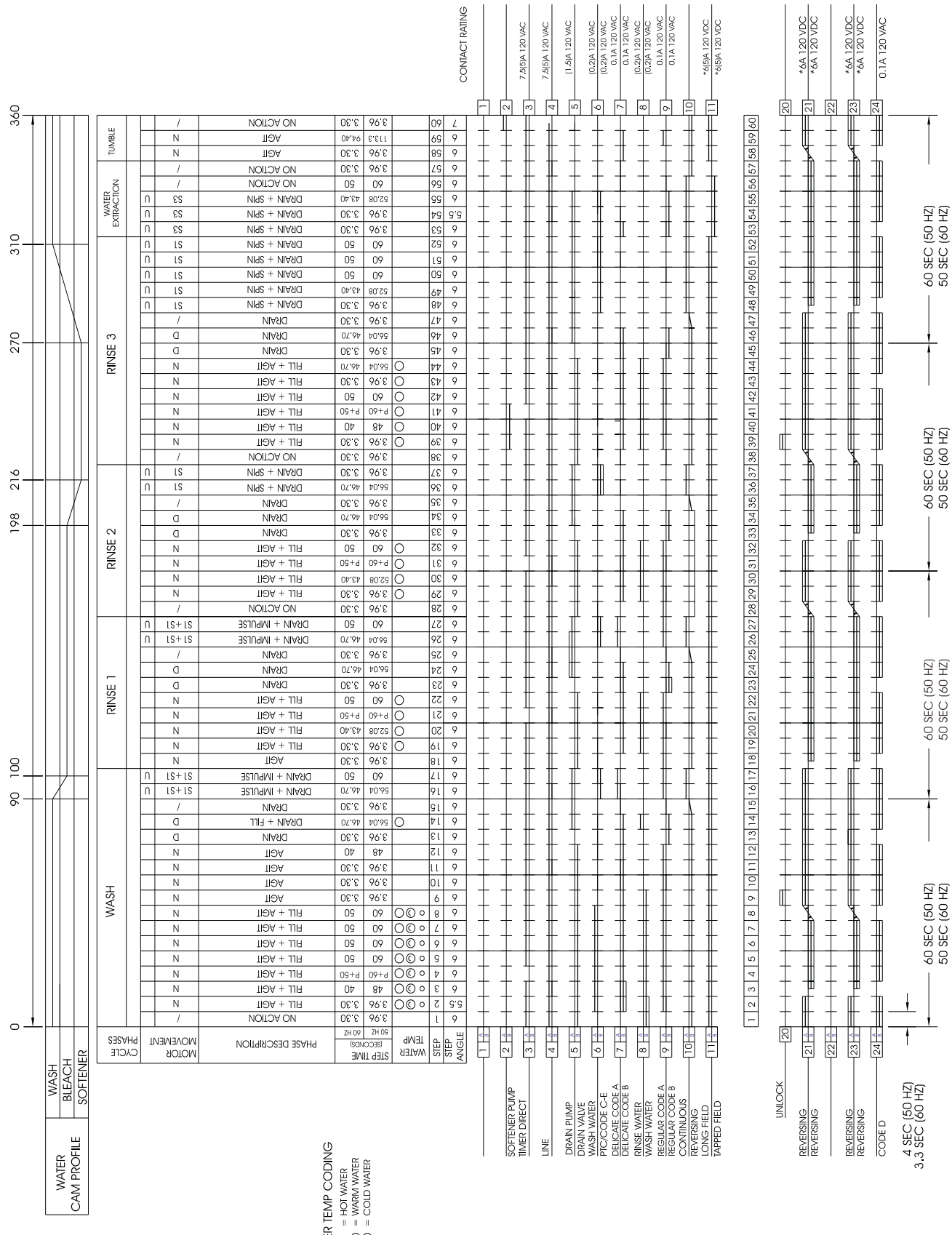
MOTOR CONNECTOR

COMPONENT RESISTANCE TABLE	
ELECTRICAL COMPONENT	RESISTANCE Ohms VALUE 10% @ 77F(25C)
WATER VALVE SOLENOIDS	880
DOOR LOCK SOLENOID	380
TIMER MOTOR	2070
PUMP MOTOR	4.6

⚠ WARNING TO REDUCE THE RISK OF ELECTRICAL SHOCK DISCONNECT THIS APPLIANCE FROM THE POWER SUPPLY BEFORE ATTEMPTING ANY USER MAINTENANCE. TURNING THE CONTROLS TO THE OFF POSITION DOES NOT DISCONNECT THIS APPLIANCE FROM THE POWER SUPPLY.

WIRING DIAGRAM
P/N 131680200

TIMER CYCLE CHART



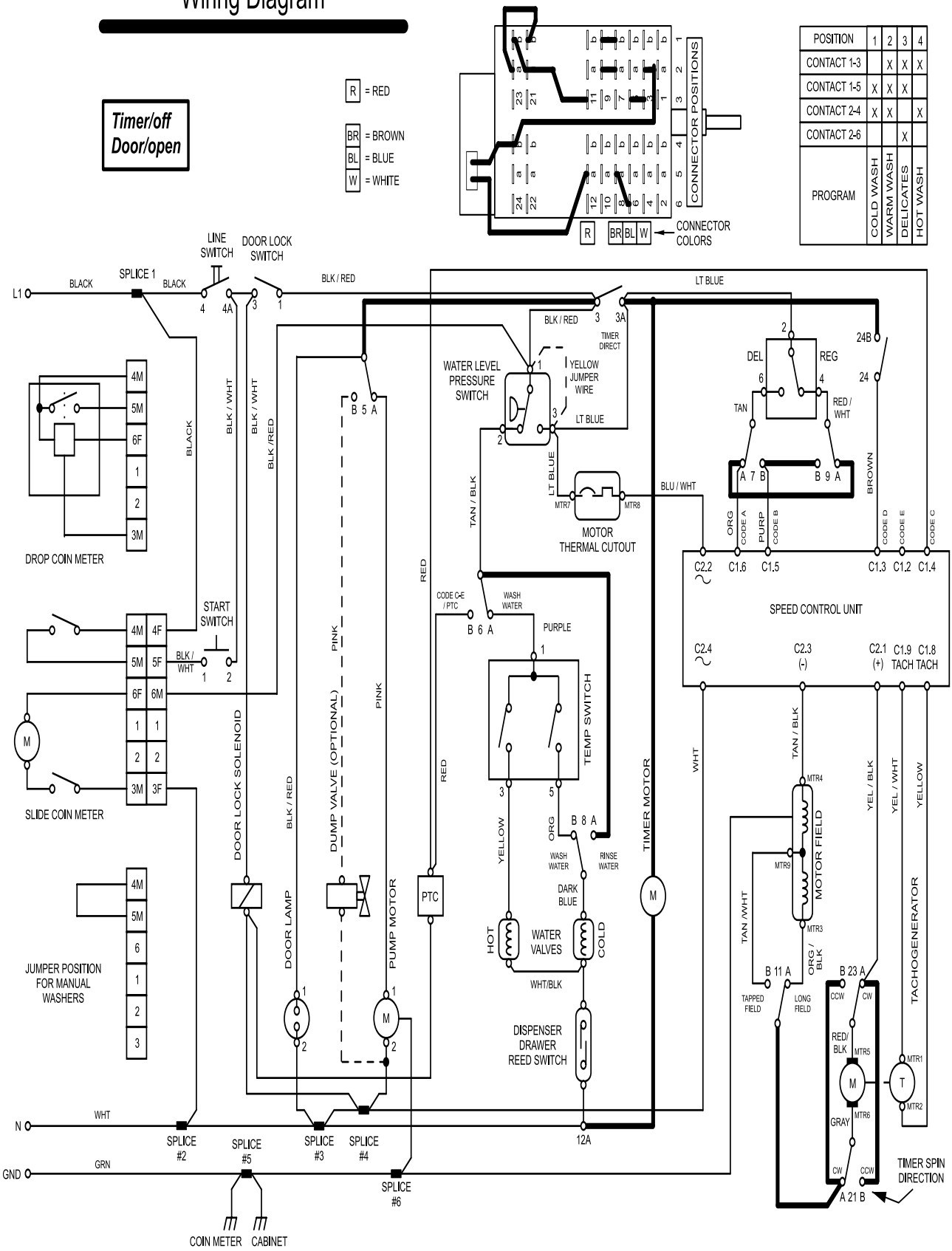
ELECTRONIC SPEED CONTROLLER

SPEED CONTROL OPERATION		NECTOR NUMBER	C1 .2	C1 . 3	C1 . 5	C1 . 6
		ED CONTROL CODE	E	D	B	A
		R CONTACT	4 B	24 B	9 B	9 A
DRUM RPM	TUB OPERATION	MOTOR MOVEMENT				
52	AGITATE - CONTINUOUS (NORMAL)	N	0	1	0	1
52	AGITATE - DELICATE (& DRAIN) CYCLE	D	0	1	1	0
450	SPIN - CONTINUOUS	S1	1	X	0	0
450	INTERVAL SPIN	S1+S1	1	X	0	1
850	SPIN - CONTINUOUS	S3	1	X	1	0

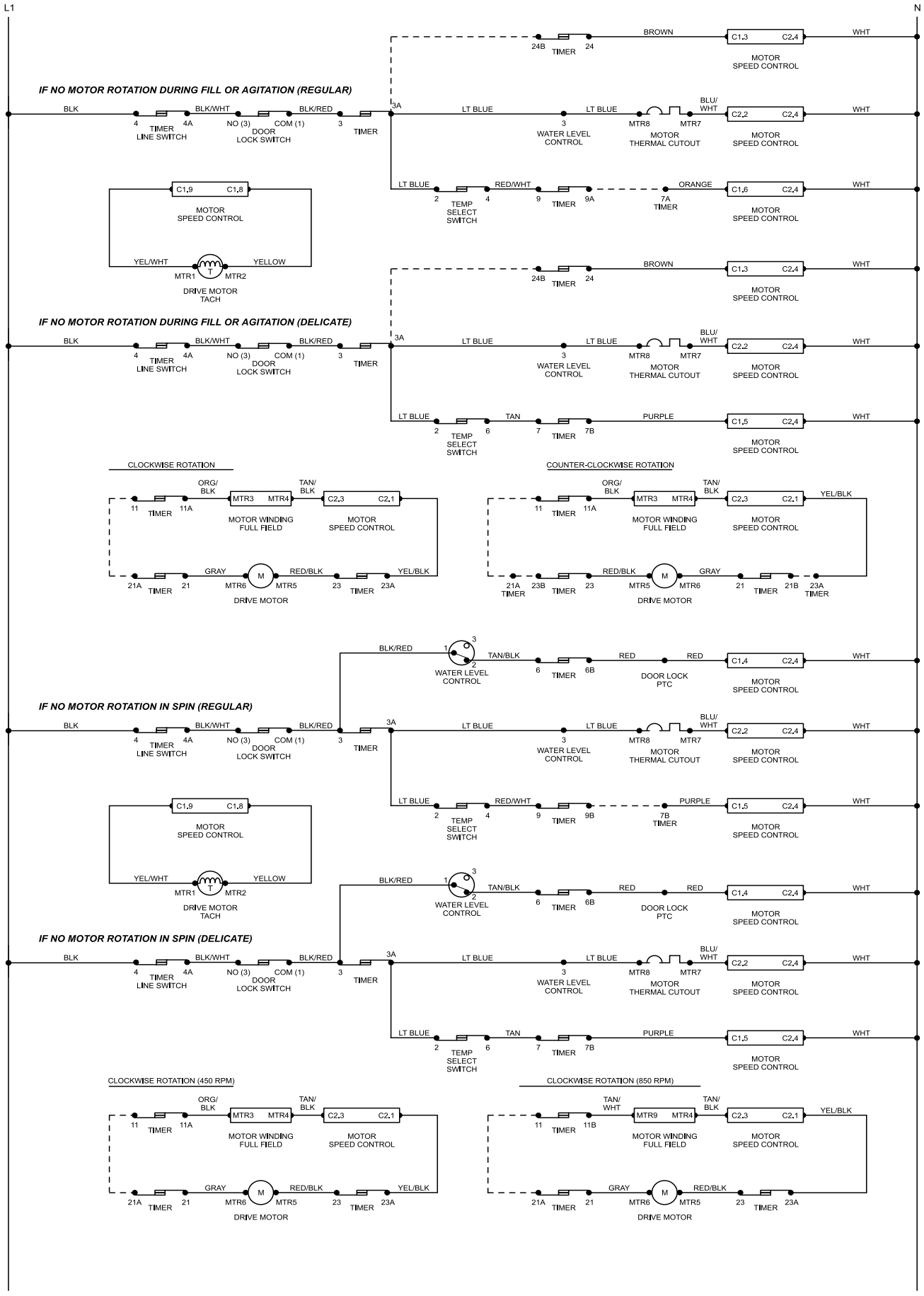
1 = 120 VAC, 0 = 0 VAC, X = DON'T CARE

WIRING DIAGRAM

Wiring Diagram



TROUBLESHOOTING DIAGRAMS


L1
N
IF NO MOTOR ROTATION DURING FILL OR AGITATION (REGULAR)
BLK
BLK/WHT
BLK/RED
TIMER LINE SWITCH
DOOR LOCK SWITCH
TIMER
3A
LT BLUE
WATER LEVEL CONTROL
MOTOR THERMAL CUTOUT
BLU/WHT
MOTOR SPEED CONTROL
WHT
BROWN
TIMER
MOTOR SPEED CONTROL
C1,9
C1,8
YEL/WHT
YELLOW
DRIVE MOTOR TACH
TEMP SELECT SWITCH
RED/WHT
ORANGE
IF NO MOTOR ROTATION DURING FILL OR AGITATION (DELICATE)
TAN
PURPLE
CLOCKWISE ROTATION
COUNTER-CLOCKWISE ROTATION
ORG/BLK
TAN/BLK
MOTOR WINDING FULL FIELD
GRAY
RED/BLK
YEL/BLK
DRIVE MOTOR
IF NO MOTOR ROTATION IN SPIN (REGULAR)
WATER LEVEL CONTROL
TAN/BLK
RED
DOOR LOCK PTC
IF NO MOTOR ROTATION IN SPIN (DELICATE)
CLOCKWISE ROTATION (450 RPM)
CLOCKWISE ROTATION (850 RPM)
TAN/WHT

CONSTRUCTION AND OPERATION

CONSTRUCTION

The front loading, tumble action clothes washer consists of a perforated, cylindrical tub suspended horizontally on its axis within a larger solid cylindrical tub. This assembly is suspended by springs within a four piece steel cabinet. A see through door and a flexible bellows (seal) provides access for loading and unloading clothes.

CONSOLE

The controls are mounted on the front of the cabinet and are accessible for service by removing the washer top panel.

CABINET

The cabinet is made of heavy steel in a four piece design with an enamel finish. The sides and front are riveted at the front corners and base. The rear of the cabinet is galvanized steel and is secured with screws.

FRONT PANEL AND DOOR ASSEMBLY

The front panel is riveted to the side panels for maximum strength and structural rigidity.

BELLOWS

The bellows is a rubber sleeve that seals the suspended outer tub to the stationary cabinet front at the tub opening. Its purpose is to provide a water tight opening into the tub that can be sealed by the cabinet door, yet allow flexibility for the oscillation of the tub during the wash and spin cycles.

OUTER TUB ASSEMBLY

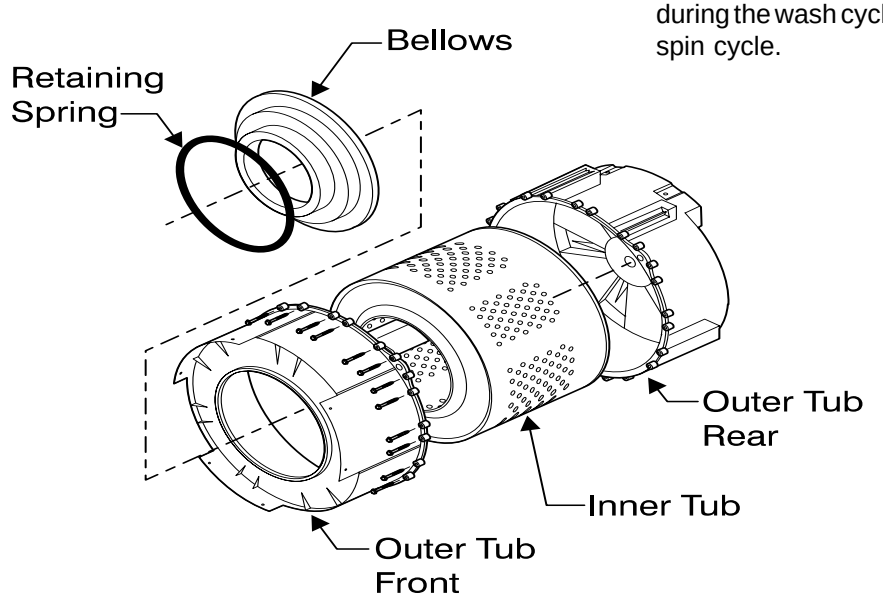
The outer tub assembly is supported by two suspension springs and stabilized by two air shock assemblies. Cement counter weights are mounted to the outer tub front (top & bottom), and the rear top. These counter weights prevent excessive oscillation of the entire suspended assembly during an unbalanced spin cycle.

INNER TUB ASSEMBLY

The inner tub is constructed of stainless steel. The circumference of the tub is perforated to allow water to flow through the tub as it revolves. A heavy steel shaft is pressed into the tub support which is bolted to the tub. The tub is supported by two ball bearings pressed into the rear of the outer tub.

A large drive pulley is mounted to the free end of the shaft that extends through the rear of the outer tub.

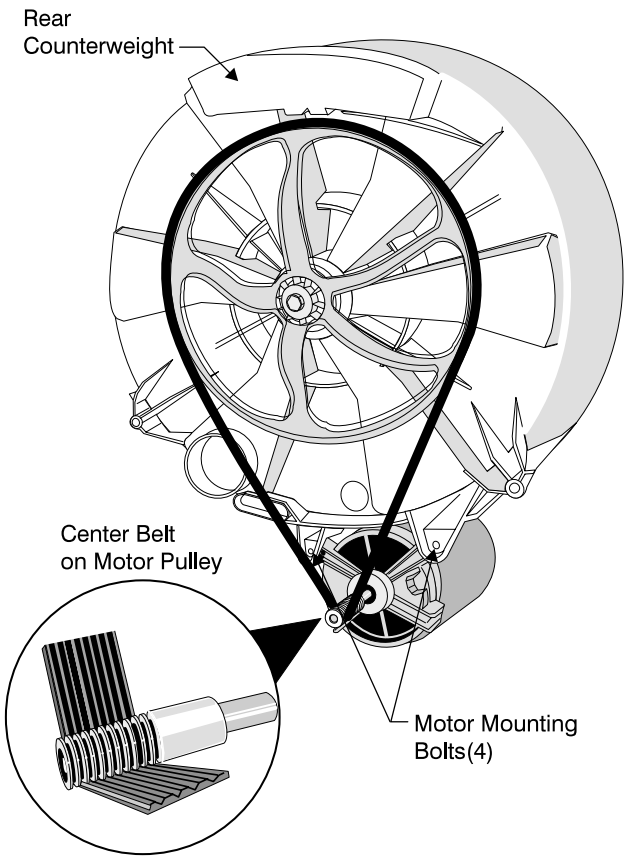
There are three plastic vanes mounted to the tub to aid in the washing action during the wash cycle. The rotation of the tub provides both the washing action during the wash cycle, and water extraction during the spin cycle.



DRIVE SYSTEM

The drive system consists of a reversible, variable speed, 16 pole DC motor coupled with an electronic speed control unit and timer. The motor drives the tub pulley with a 6 rib Poly-V belt. The motor rotates the tub at 52 RPM in a 16 second clockwise/counterclockwise motion with a 4 second pause at the end of each tumbling wash action.

The drive motor rotates the tub counterclockwise up to 850 RPM for further water extraction after certain drain cycles. If an unbalanced wash load prevents the washer from reaching full spin speed, the electronic speed control adjusts the spin speed back to agitate speed to allow the wash load to self adjust. Then the motor will again attempt to drive the spin basket up to 850 RPM This procedure continues to repeat as necessary.



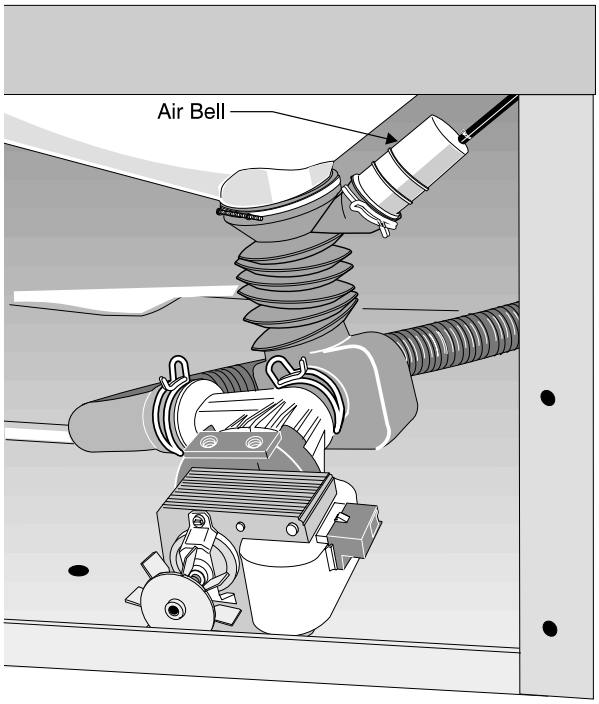
ELECTRONIC SPEED CONTROL

The electronic speed control monitors current draw and a built-in tachogenerator in the drive motor, to control RPM of the tub during wash and spin cycles.

DRAIN SYSTEM

The drain system consists of an air cooled, AC motor pump assembly, a bellows type sump hose, air bell, and a ribbed drain hose.

The drain pump and motor assembly is located in the right front corner and is mounted on the base. When the washer rinse cycle is completed, the timer energizes the pump motor to remove water from the tub before the spin cycle starts. The pump motor remains in operation throughout the spin cycle. The pump out rate is approximately 8 GPM under full load operation, which empties the tub within 60 seconds.

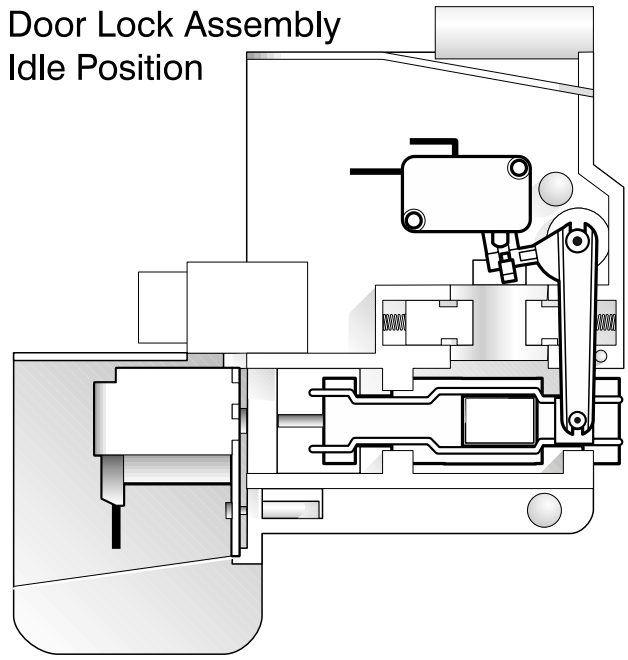


SUSPENSION AND STABILIZER SYSTEM

The entire tub assembly is suspended by two springs. The stabilizer system consists of two air shocks that are located between the outer tub and base, one per side. They provide a dampening action to stabilize tub assembly during spin cycles.

DOOR SAFETY SWITCH ASSEMBLY (Door Lock)

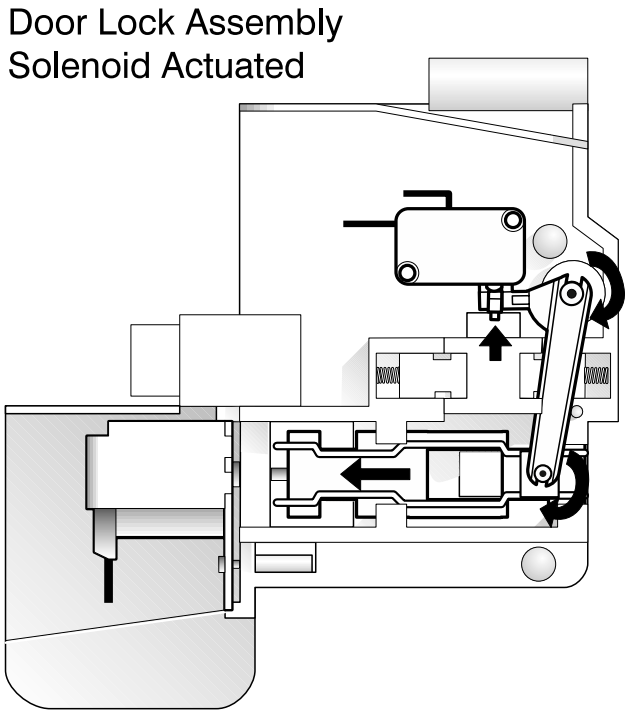
The door lock consists of a bracket to which is mounted a solenoid, door switch, and PTC. When the door is closed and the timer selector knob is pulled out, the solenoid is energized, which locks the door and closes the door lock switch through a series of levers on the door lock assembly. The door is locked whenever the washer is in operation to prevent the door from being opened.



Door Switch

The door switch is snapped into the door lock mounting bracket and is secured with two spring tabs. The switch is actuated by the solenoid rather than the door. Closing the door causes the door strike to push the small lever upward into the "standby" position. When the user starts the machine, the solenoid is energized which pulls the spring loaded bracket and locks the door. This locking motion is transferred by the vertical lever to the door lock switch. Using the door locking motion to actuate the switch ensures that the door is closed and locked before the switch is closed.

If the user attempts to start a cycle with the door open, the solenoid is actuated but the washer will not start for two reasons. One, the door will not close because the lower door strike cannot pass through the opening while the solenoid is energized, the door just bounces open when attempting to close. Two, the door lock switch cannot close because the small lever is not in the



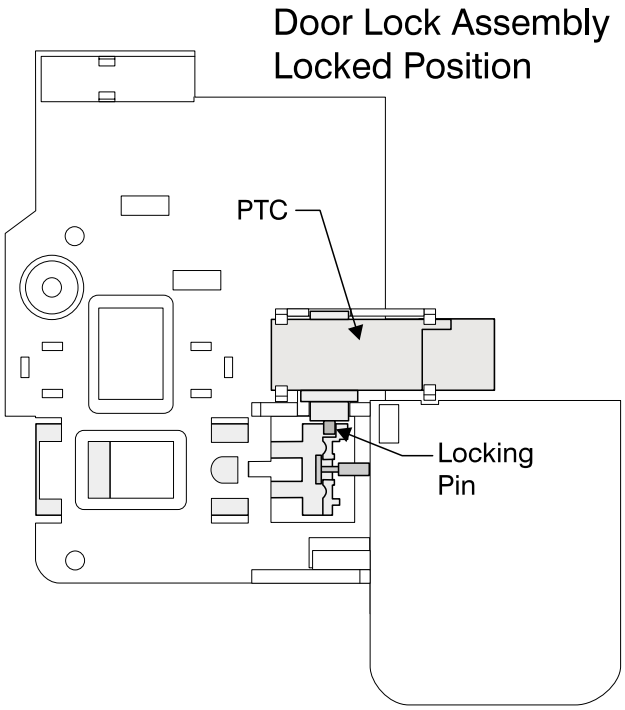
"standby" position with the door open.

Solenoid

The solenoid is energized whenever the washer is in operation to prevent the door from being opened.

Door Lock PTC (Positive Thermal Coefficient)

The PTC acts as a resistor or heat source to warm a bimetal that actuates a small rectangular pin which holds the solenoid in its retracted position even when the solenoid is de-energized. During spin, the PTC locking pin engages a catch in the spring loaded bracket that locks the loading door in the closed position. This locking pin will remain in this position long enough for the tub to come to a complete stop (approximately 40 - 65 seconds). As the bimetal cools, the solenoid will release, and the door may be opened.



TIMER

Contacts within the timer control the direction of the drive motor, water fill, drain pump and door lock.

Wash Cycle

The Regular wash cycle provides up to 6 minutes of reversing tumble action. Three rinses and a high-speed final spin complete the cycle.

The delicate wash cycle provides up to 6 minutes of reversing tumble action. Three rinses and a low speed final spin complete the cycle.

For best results, follow fabric care label directions on specific items to be washed. Check Operating Instructions if the care label is not available.

WATER TEMPERATURE CONTROL

The water temperature control gives the choice of washing and rinsing water temperatures, Hot/Cold, Warm/Cold, or Cold/Cold, in the regular cycle or the use of a Delicate cycle with a warm fill and cold rinse.

Correct water temperature is necessary for good washing results. To help determine the best wash temperature for particular loads of clothes, refer to the fabric care label directions on items to be washed. Check Operating Instructions if the care label is not available.

WATER LEVEL CONTROL

The water level control provides the proper amount of wash and rinse water, but is not user adjustable. The bulkiness of clothes is often more important than their dry weight when determining a water level. Articles that absorb a large amount of water, such as pillows, blankets, and rugs require more water than indicated when they are weighed. The water level control will automatically provide more water with these loads.
The water level control is a pressure activated single-pole, double-throw switch connected to an air bell at the sump housing. A black rubber hose connects the pressure switch to the air bell. Its purpose is to determine the water level within the tub and control the operation of the water fill valve.

The water level control is factory-equipped with a yellow jumper wire between terminals 1 and 3. This jumper provides power to the timer motor regardless of the level control's switch position (tub full or empty). In locations where inlet water pressure is very low (fill time is long) this jumper may be removed, allowing the timer to pause in the cycle during fill. DISCONNECT ELECTRICAL POWER FROM THE WASHER BEFORE ATTEMPTING TO REMOVE THIS JUMPER WIRE!

WATER FILL VALVE

The two coil valve assembly is mounted on a bracket and fastened to a brace at the upper right rear inside the cabinet. Raise the top panel for access to water valve.

Under normal operating conditions, it takes several seconds for the valve to completely close and stop the water flow after the solenoid circuit is opened. This prevents water hammer. The water valve flow rate is 4.50 GPM at 20 PSI and 7.0 GPM at 120 PSI. WATER VALVE INLET SCREENS MUST BE KEPT CLEAN AND IN GOOD CONDITION. A PLUGGED BLEEDER HOLE IN WATER VALVE DIAPHRAGM OR MINERAL DEPOSITS ON THE ARMATURE MAY CAUSE THE WATER VALVE TO FAIL AND RESULT IN CONTINUAL WATER FILL.

NOTES

FUNCTIONAL COMPONENTS AND PARTS

SAFETY PRECAUTIONS

Always turn off the electric power supply before servicing any electrical component, making ohmmeter checks, or making any parts replacement. Refer to safe servicing procedures at the front of this service manual before servicing the clothes washer.

All voltage checks should be made with a voltmeter having a full scale range of 130 volts or higher.

After service is completed, be sure all safety grounding circuits are complete, all electrical connections are secure, and all access panels are in place.

A NOTE ABOUT QUADREX® SCREWS

Quadrex® screws are used in many areas of this product. They may be removed with a # 2 phillips bit or a # 2 square drive (Robertson) bit. Square drive bits are used on the assembly line because they do not slip as easily when the screw is tightened.

TOP PANEL

The top panel is constructed of powder painted steel and is secured to the cabinet by brackets in the front and rear.

To Remove Top Panel:

1. Disconnect washer from electrical supply.
2. If manual model, proceed to Step 4. If coin-op model, remove coin box from housing.
3. Remove security nut inside housing.
4. Remove screws (4) at rear securing top panel brackets to rear support brackets.
5. Slide top panel forward to disengage from front mounting brackets.
6. Lift up rear of top panel (If coin-op model, disengage molex connector) and remove top panel.
7. Reverse procedure to reinstall.

SERVICE PANEL

To Remove or Replace Front Service Panel:

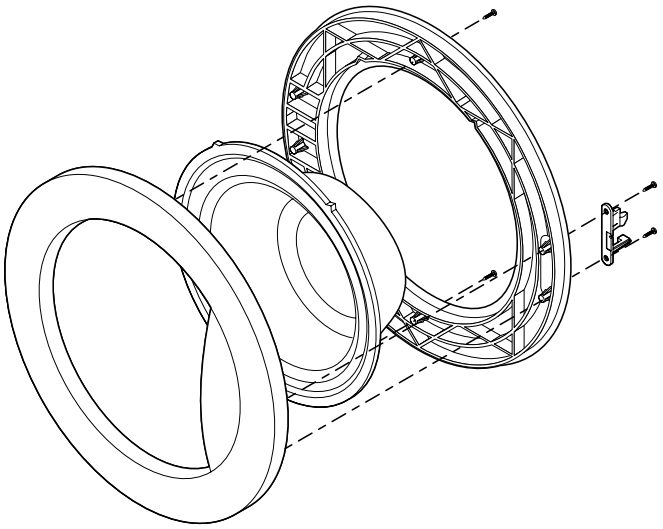
1. Remove the two 1/4" hex screws located at each bottom corner. Pull down and remove panel.

NOTE: The washer wiring diagram and tech data sheet are in an envelope attached to the back side of the service panel.

LOADING DOOR

To Remove Loading Door or Door Glass:

1. Disconnect washer from electrical supply.
2. Remove door by removing door to hinge mounting screws (2).
3. Remove door front cover mounting screws (2).
4. Pull or gently pry off front cover. There is a rib molded on the outer edge of the front cover that snaps into a groove on the door.
5. Remove glass by depressing release tabs (3) one at a time until glass is free.
6. Snap glass into door frame by pressing into place. Note locating notches on glass which ensures correct position.



DOOR STRIKE

To Remove or Replace Door Strike:

1. Disconnect washer from electrical supply.
2. Open loading door.
3. Remove screws (2) which secure strike to inner door panel.
4. Install new strike and reverse procedure to reinstall.

DOOR HINGE

To Remove Door Hinge

1. Disconnect washer from electrical supply.
2. Remove door by removing door to hinge mounting screws (2).
3. Pull loose left side of rubber bellows to gain access to hinge.

4. Slip hand through opening between front panel and bellows and hold hinge while removing hinge mounting screws (2).
5. Pull hinge arm out of slot in front panel and remove hinge.
6. Reverse procedure to reassemble.

DOOR SAFETY SWITCH ASSEMBLY (Door Lock)

To Remove or Replace Door Safety Switch:

1. Disconnect washer from electrical supply.
2. Remove top panel.
3. Pull loose right side of bellows from front to access switch assembly.
4. If necessary, to provide enough slack to gain access to switch assembly, remove timer wiring harness wire ties from their anchoring points (3) inside front corner of cabinet. Wire ties are most easily released by using a small 7/32" box end wrench. Press the wrench over the expandable part of the wire tie to compress, and while compressed, pull to remove. It may be helpful to remove lower service panel for better access also.
5. Remove switch assembly mounting screws and remove wires from switch, solenoid, and PTC.
6. Reverse procedure to reassemble.

TIMER

The timer interfaces with the electronic speed control unit and the drive motor, and performs the following functions:

1. Provides AC power to the electronic speed control unit.
2. Reverses the direction of the DC drive motor, by reversing the polarity on the motor brushes.
3. Controls the entire timing sequence during the cycle selected.

To Test the Timer

If the timer is suspected of faulty operation, check the washer's timer cycle chart and electrical schematic diagram.

1. Let the timer advance or index forward to the portion of the cycle in question.
2. If a component controlled by the timer fails to function as the timer advances through the cycle, check for voltage at the timer terminal. See the appropriate wiring diagram. If voltage is supplied to the component, check the component as described in this section.
3. Disconnect power to washer and check continuity through timer contacts.
4. If the timer contacts fail to close in the sequence shown in the timer chart, or are burned (have resistance measurable with an ohmmeter), replace the timer.

To Remove or Replace Timer:

1. Disconnect the washer from electrical supply.
2. If manual model, proceed to Step 4. If coin-op model, remove coin box from housing.
3. Remove security nut inside housing.
4. Remove screws (4) at rear securing top panel brackets to rear support brackets.
5. Slide top panel forward to disengage from front mounting brackets.
6. Lift up rear of top panel (If coin-op model, disengage molex connector) and remove top panel.
7. Remove water temperature rotary knob.
8. Remove dispenser drawer (See Automatic Dispenser).
9. Remove screws securing console frame to control mounting bracket and remove console frame.
10. Pull indicator off timer shaft, turn dispensing cam clockwise(CW) to locate holes at 3 o'clock and 9 o'clock position over timer mounting screws and remove screws.
11. Slide timer rearward to remove (dispensing cam does not have to be removed). Disconnect timer terminal blocks to free timer. Note that timer and terminal blocks are color coded and keyed (to slot in timer) to ensure correct placement.
12. Install new timer, noting shaft and dispensing cam are keyed to assure correct orientation.
    NOTE: Ensure wiring to new timer is correct before applying power and testing Timer has AC and DC connections. Timer terminal blocks are color coded to indicate correct positioning on timer.
13. Reverse procedure to reassemble.

WATER LEVEL CONTROL

The water level control is a pressure activated single-pole, double-throw switch connected to an air bell at the sump hose. A black plastic tube connects the pressure switch to the air bell. Its purpose is to determine the water level within the tub and control the operation of the water fill valve. As the water level rises in the tub, air in the pressure tube is compressed and forced against the diaphragm in the water level control switch.

DO NOT ATTEMPT TO ADJUST THE RANGE OF THE WATER LEVEL CONTROL.

To Test Water Level Control:

Do not condemn a water level control until the entire system has been examined and tested. For example, if the air bell, located at the sump area, has filled with water, the water level control will overfill the tub.

1. If any water is remaining in the tub, empty by advancing timer to a drain cycle (see cycle chart).
2. After water has drained out, turn off washer and remove front service panel.
3. Examine the air bell. There should not be any water or foreign objects visible in the air bell.
4. Press start button (if coin-op model, coin-meter must be activated). After water level control has been satisfied, unplug washer, open door and measure depth of water. Depth should be 4 1/4" to 5". If not, drain washer.
5. Disconnect the washer from electrical supply.
6. Remove the top panel.
7. Remove the wire from the terminal "1" on the water level control.
8. Check continuity between terminals 1 and 2. Continuity should exist. If no continuity exists, replace the water level control.
9. Remove the pressure tube from water level control and attach a short piece of scrap pressure tube to water level control. Blow into tube until water level control “trips” and tightly clamp end of tubing shut.
10. Recheck continuity between terminals 1 and 2. No continuity should exist. Check for continuity between terminals 1 and 3. Continuity should exist. Leave the clamped scrap tubing attached to the water level control for a few minutes. If water level control “trips” during this time frame, the internal diaphragm is leaking and the water level control must be replaced.

To Remove or Replace Water Level Control:

1. Disconnect washer from electrical supply.
2. Remove top panel.
3. Remove screw securing water level control switch to control mounting bracket.
4. Remove wiring to water level control
5. Remove water level control pressure tube.
6. Reverse procedure to install new water level control.

WATER TEMPERATURE CONTROL

The water temperature control gives the choice of washing and rinsing water temperatures, Hot/Cold, Warm/Cold or Cold/Cold, in the regular cycle or the use of a Delicate cycle with a warm fill and cold rinse.

To Test Water Temperature Control Switch:

Continuity of the water temperature control switch contacts can be checked using the chart or the wiring and schematic diagram on the back side of the service panel.

To test, remove wires from switch and check continuity between terminals as indicated on the water temperature control switch chart found on the unit’s electrical diagram.

WATER TEMPERATURE SWITCH				
CIRCUIT				
WATER TEMP	1-3	1-5	2-4	2-6
Hot	X		X	
Warm	X	X	X	
Cold		X	X	
Delicates	X	X		X

To Remove or Replace Water Temperature Control Switch:

1. Disconnect the washer from electrical supply.
2. Remove the top panel.
3. Remove knob from water temperature control switch.
4. Remove two screws securing the water temperature control switch to cabinet.
5. Remove wiring to the water temperature control switch and remove the switch.
6. Reverse procedure to install new water temperature control switch.

WATER INLET VALVE

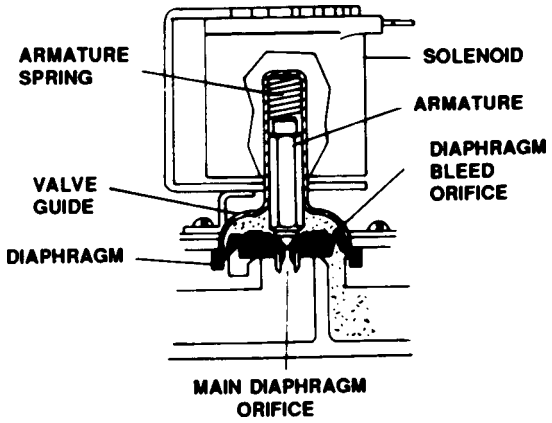
The water inlet valve is actually two solenoid operated valves in one body. A hot water inlet and a cold water inlet valve discharge into a common mixing chamber. The flow of water out of the chamber is controlled by a rubber flow washer capable of maintaining a flow rate of 4.2 gallons per minute ± 10%, with incoming water pressure of 20 to 120 P.S.I. The inlet valves are controlled by the timer and water temperature selector switch, individually or together, to provide hot, cold, or warm water for washing and cold water for rinsing. The temperature of the warm mixture will be dependent upon the temperature and pressure of the hot and cold water supply lines.

Valve Operation

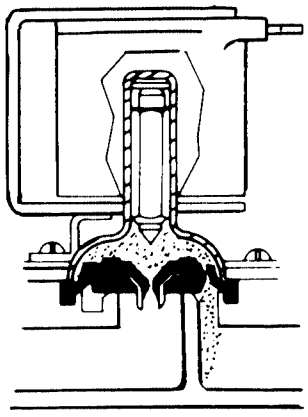
Both inlet solenoid valves are identical in construction and operation. The valve body provides an air passage with a large orifice and seat where the water can be stopped. The outlet of the valve body empties into the mixing chamber. A moveable rubber diaphragm operates against the valve seat to start and stop the flow of water. The diaphragm is operated by water pressure. It has a small bleed orifice outside the seat contact area, and a large main orifice at its center. The armature of the solenoid serves to open and close the main orifice. The armature operates within a closed metal tube (valve guide) which is sealed by the outer edge of the diaphragm to the valve body. A coil spring holds the armature down against the diaphragm main orifice when the solenoid is not energized.

The following line drawings and text explains basic valve operation.

When the valve is in a closed position, the solenoid is not energized. Water has bled through the diaphragm bleed orifice placing incoming line pressure on top of the diaphragm. The bottom of the diaphragm is essentially at atmospheric pressure (open to the outlet) and the pressure differential holds the valve shut.



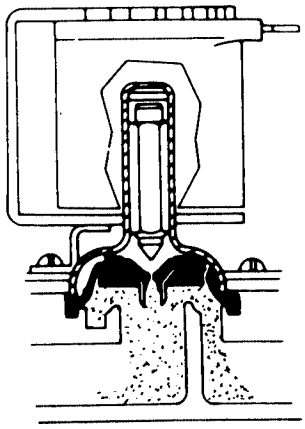
Water Valve Closed



Water Valve-Open

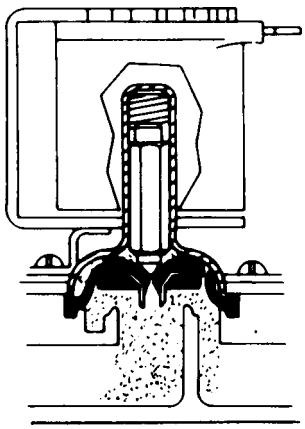
When the solenoid is energized, the resulting magnetic field pulls the armature up into the valve guide. The armature spring is compressed by this action. When the armature moves up, it allows the water on the top of the diaphragm to drain through the main orifice.

The diaphragm bleed orifice is much smaller than the main orifice and will not admit enough water to maintain pressure on the top side of the diaphragm. Thus, as the pressure on the top of the diaphragm is reduced to almost zero, the pressure on the bottom lifts the diaphragm off the valve seat, allowing a full flow of water.

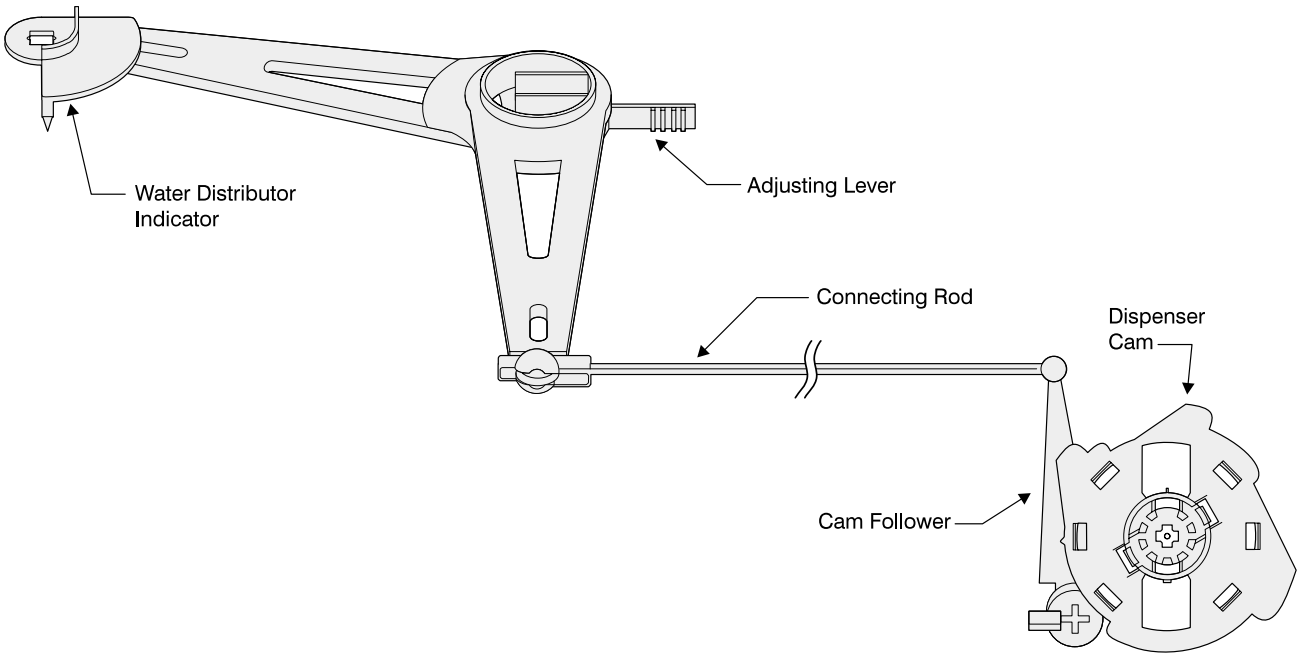


Water Valve- Diaphragm Up

When the solenoid is de-energized, the armature drops down, closing the diaphragm main orifice. Water continues to flow through the diaphragm bleed orifice, equalizing the pressure and allowing the spring to push the diaphragm down against the valve seat.



Water Valve-Closing



To Test Water Valve:

1. Disconnect the washer from electrical supply.
2. Make a continuity check of the valve harness to determine whether or not a circuit exists.
3. Use an ohmmeter. Resistance of the solenoid should be approximately 880 ohms ±10% @ 77°F.
4. If harness and solenoid test OK, simulate a normal valve operation by testing solenoid coil, using a separate 115 volt power source directly, with a properly fused and grounded service cord.
5. If water valve operates on both solenoids, check timer, water level control, and water temperature selector switch circuits. If water valve fails to operate, check valve inlet screens for debris and/or replace water valve.

To Remove or Replace Water Valve:

The water valve is mounted on the cabinet at the left rear of the washer. The valve may be replaced by removing either the top or rear service panel.

1. Disconnect washer from electrical supply and turn off the water supply.
2. Remove hot and cold fill hoses from water valve.
3. Remove top or rear service panel.
4. Remove two screws securing water valve to cabinet brace.
5. Remove the wiring harness connector plugs.
6. Remove clamp securing water valve to air gap hose.
7. Reverse procedure to install the new water valve. Check for operation.

AUTOMATIC DISPENSER

The dispenser assembly provides automatic dispensing of detergent, bleach, and fabric softener as long as the user fills the compartments prior to starting the washer.

The products added to the drawer are diluted with water before they are dispensed into the tub. This is accomplished by a water distributor that sprays a controlled jet of water into the proper compartment at the correct time. The water distributor movement is controlled by a cam located on the timer shaft. A cam follower "reads" this information and transmits the movement to the water distributor with the aid of a plastic rod and an "L" shaped arm.

The dispenser drawer also houses a magnet that is used to actuate a small magnetic reed switch mounted on the console. This switch is used to stop the washer operation if the dispenser drawer is opened more than 1 inch (approx.).

To Remove or Repair Dispenser Drawer:

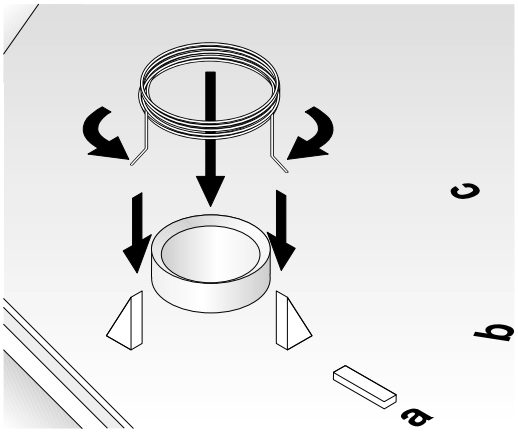
1. Remove the drawer by first sliding the safety latch to the right, then pulling the drawer out until it stops.
2. Remove screw from retaining plate under drawer.
3. Using a small flat bladed screwdriver, release drawer catch located on bottom of dispenser drawer.
4. Reach back to left rear corner of drawer cavity and press down firmly on locktab (left rear portion of drawer). Pull out drawer.
5. Reassemble retaining plate to bottom of drawer (using original screw) before sliding drawer back into washer.

6. Drawer front can be removed from drawer by carefully disengaging the three locking tabs.
   NOTE: If drawer front is being replaced, remember to transfer small magnet to new drawer front. This magnet activates the reed switch and washer will not operate without it. Pry magnet out using a small flat bladed screwdriver.
7. To remove drawer latch, slide latch handle all the way to the left to compress the latch spring and pull handle from drawer front.

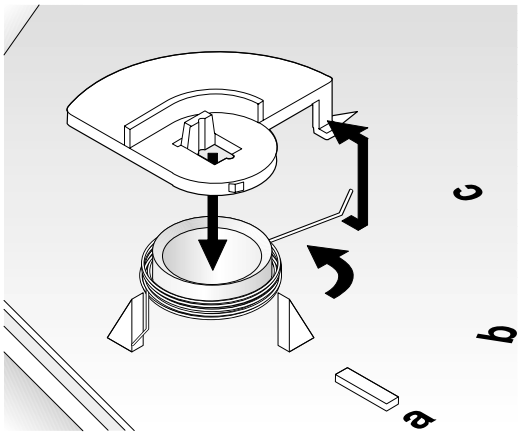
To Remove or Replace Dispenser Linkage:

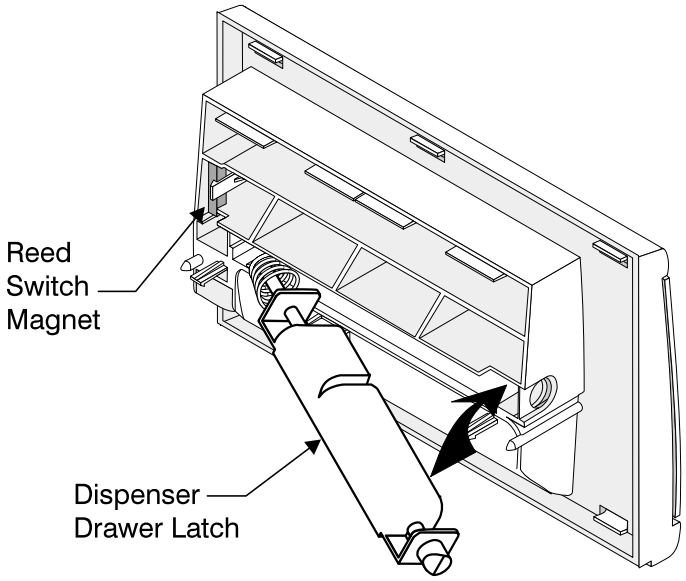
1. Disconnect the washer from electrical supply.

2. Remove the top panel and the top panel front mounting brackets.
3. Remove screws securing the control panel. Five of the screws are located on the rear of the control panel and one screw is on the front side, located behind the bottom left corner of the fabric dispenser drawer.
4. Remove indicator lamp and reed switch from control panel by prying gently with a small screwdriver, being careful not to distort or damage control panel securement tabs.
5. Remove the long dispenser connecting rod by pulling gently at each end to remove.
6. Remove cam follower at timer by turning phillips head fastener counter clockwise about 1/8 turn, and pull to release.
7. Remove pivoting arm on dispenser by depressing catch and pulling up on arm.
8. Remove water distributor by prying catch out slightly with small screwdriver while lifting up.
9. To reassemble, use the triangular projections to preload the spring before installing. Place the spring on the rear projection then wind spring 3/4 turn and hook on small projection.
10. Next install water distributor by inserting hand into the dispenser shell and hold water distributor in place while pressing top portion into place. Water distributor shaft is keyed and will only fit in one position.

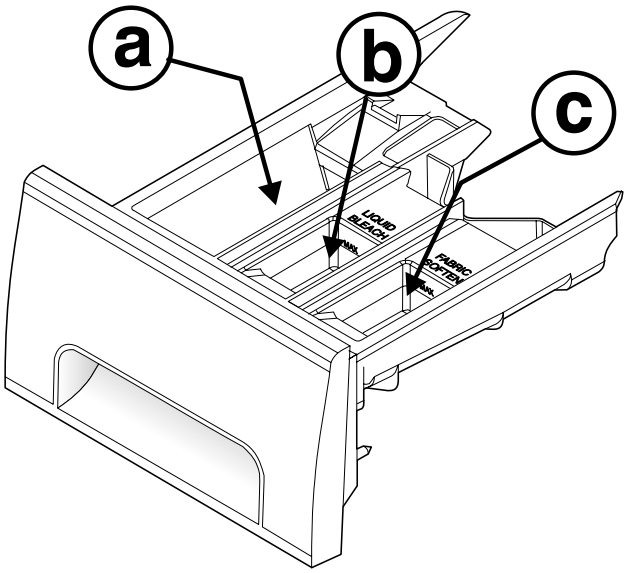


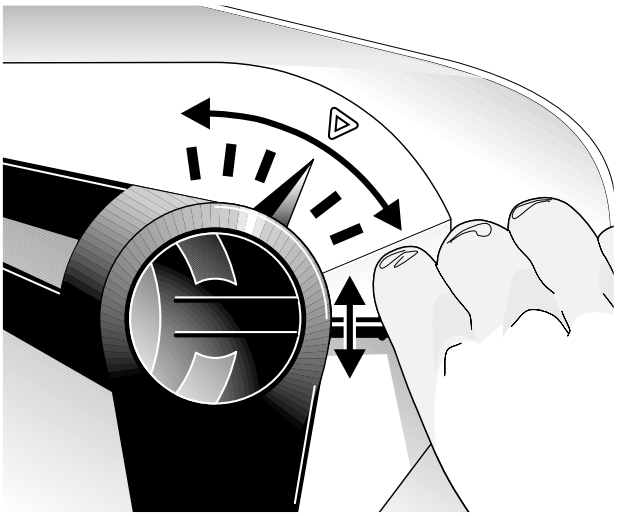
11. Release spring off front (smaller) projection to put tension on cam follower.





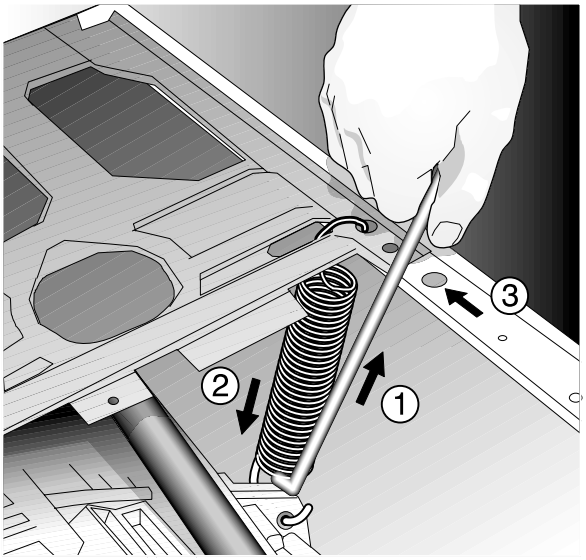
12. The "a", "b", "c", notations on the dispenser housing refer to:
    a = detergent chamber
    b = bleach chamber
    c = fabric softener chamber
    The eccentric pointer should stop in the middle of each chamber's bandwidth. If this is not possible, center the pointer to areas "b" and "c", at the expense of area "a" using the adjusting lever beside center of pivoting arm.

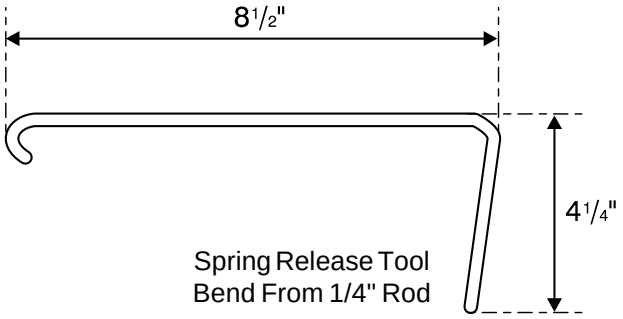




To Remove or Replace Automatic Dispenser Assembly:

1. Disconnect the washer from electrical supply.
2. Remove the top panel and the top panel front mounting brackets.
3. Remove screws securing the control panel. Five of the screws are located on the rear of the control panel and one screw is on the front side, located behind the bottom left corner of the fabric dispenser drawer.
4. Remove indicator lamp and reed switch from control panel by prying gently with a small screwdriver, being careful not to distort or damage control panel securement tabs.
5. Remove the long dispenser connecting rod by pulling gently at each end to remove.
6. Remove pivoting arm on dispenser by depressing catch and pulling up on arm.
7. Remove the suspension spring retainers and reinstall the rear screws without the spring retainer. This will hold the control mounting panel down when the springs are lifted. Unhook tub support springs and move them to the next large hole back on the side panel flange. The springs may be removed by grasping the tub assembly on the lower tub reinforcement area and lifting (4:00 and 7:00 position approx.) while guiding the top end of the spring with the other hand to the new location. Or a simple tool may be bent from ˘" round rod that will simplify this task. Use the tool to hook the bottom of the spring and lift to remove.





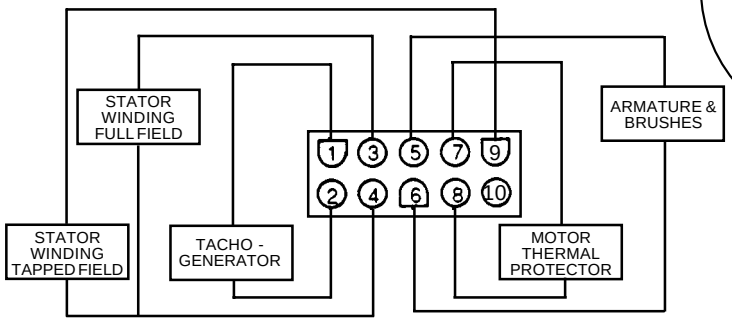
Spring Release Tool
Bend From 1/4" Rod

8. Remove screws (3) from dispenser assembly, two at rear and one on front.
9. Push to release catches on upper front corners of dispenser assembly and push dispenser rearward slightly.

10. Remove screws that were re-installed at rear of control mounting panel to remove springs and lift control mounting panel from cabinet. Pivot control mounting panel away from dispenser to gain access to dispenser. It may be necessary to remove the water level control for greater mobility if sufficient clearance cannot be obtained.
11. Remove bellows from lip of front panel.
12. Remove screws (2) from fill spout above door hinge.
13. Remove drip tray from dispenser assembly.
14. Disconnect vent hose from right side of dispenser assembly by pulling to remove.
15. Remove fill hoses from rear of dispenser.
16. Remove one of the clamps from rubber connector securing dispenser to fill nozzle.
17. Reverse procedure to reassemble.

DRIVE MOTOR

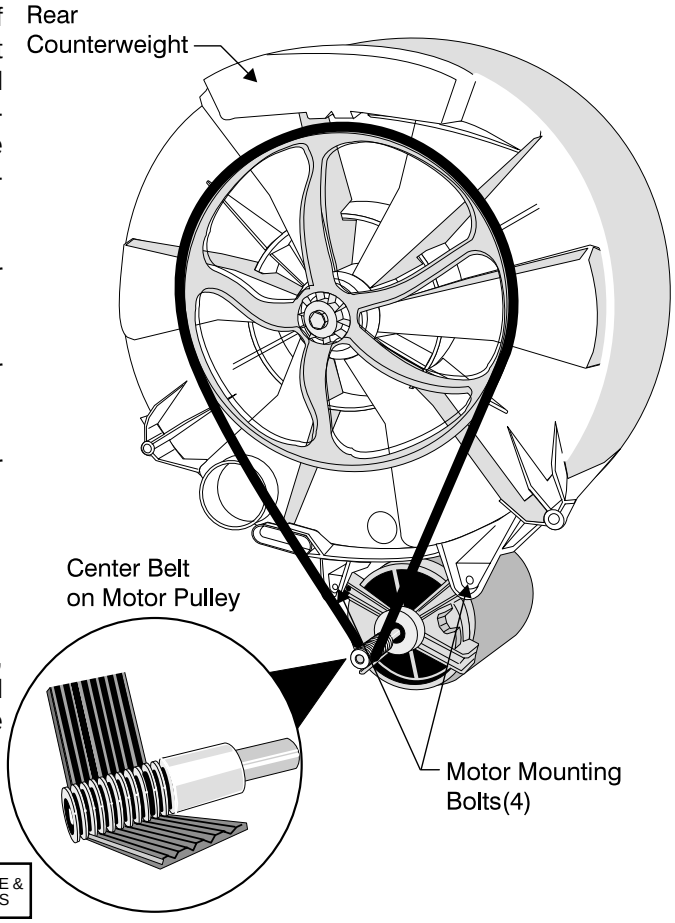
The drive motor is a 120 volt, reversible, variable speed, 16 pole, D.C. motor coupled with an electronic speed control unit and timer. The motor drives the tub drive pulley with a 6 rib Poly-V belt.



To Test Drive Motor:

The drive motor can be tested from the rear by using an ohmmeter (with the power disconnected and the rear panel removed). Disconnect the wiring harness connector block. All resistances have a tolerance of ±10% @ 77°F.

1. Check resistance of stator (field) windings between terminals 3 and 4. Resistance should be 0.37 ohms. See motor diagram above.
2. Check resistance of armature (rotor) windings between terminals 5 and 6. Resistance value should be less than 5 ohms (the wide range of resistance is due to measuring through the brushes of the motor.)
3. Check resistance of tachogenerator between terminals 1 and 2. Resistance value should be 135 ohms.
4. Check the continuity of the motor protector between terminals 7 and 8. Resistance should be less than 1 ohm.



To Remove or Replace the Drive Motor

1. Disconnect washer from electrical supply.
2. Remove rear service panel.
3. Remove belt by turning tub drive pulley and rolling belt off pulley. The belt is elastic and is designed to "give" enough to remove and install in this manner.
4. Disconnect the wiring harness connector block and ground wire.
5. Remove motor mounting bolts (4).
6. Slide motor to front while supporting to remove.
7. Reverse procedure to reinstall, making sure that belt tracks in the center of the tub pulley. Adjust by moving belt on motor pulley if required.

DRIVE BELT

The drive belt (6 rib flat Poly-V) is used to transmit power from the motor pulley to the tub. The belt is constructed of a material that stretches, which makes belt tension adjustments unnecessary.

To Remove or Replace the Drive Belt

1. Disconnect washer from electrical supply.
2. Remove rear service panel.
3. Remove belt by turning tub drive pulley and rolling belt off pulley. The belt is elastic and is designed to "give" enough to remove and install in this manner.
4. Reverse procedure to reinstall, making sure that belt tracks in the center of the tub pulley. Adjust tracking, if required, by moving belt on motor pulley.

ELECTRONIC SPEED CONTROL

The Electronic Speed Control monitors a tachogenerator built into the DC drive motor. Its purpose is to control the motor (tub) RPM during the wash and spin cycles. The speed control is mounted on the base at right rear.

The Electronic Speed Control serves the following functions:

1. Converts AC voltage to DC voltage for use by the drive motor.
2. Maintains spin basket speeds during wash (52 RPM) and spin (850 RPM max.) by monitoring the drive motor tachogenerator output, and then varying the DC voltage output to the drive motor to regulate the spin basket speed independently of load size.
3. Provides initial speed ramps to prevent excessive machine vibrations and/or cabinet walking.
4. Redistributes unbalanced loads until corrected and/or desired speeds are achieved.

To Remove or Replace Electronic Speed Control:

1. Disconnect washer from electrical supply.
2. The electronic speed controller may be removed from either the front or rear of the washer, the rear being a little easier if access to the washer is not restricted.
3. If easily accessible, remove rear service panel, go to step 5. If rear service panel is not easily accessed, as in a stacked or undercounter installation, go to step 4.
4. Remove lower front access panel.
5. Remove two screws securing speed control housing to base, and pull housing up to disengage housing locating pins from base.
6. Remove wiring to the electronic speed control.
7. Unsnap catch on speed control housing to release speed control board.
8. Install new motor speed controller, making sure that the edge connector terminals are touching the silver contact area, and reverse procedure to reassemble.

DRAIN PUMP AND MOTOR ASSEMBLY

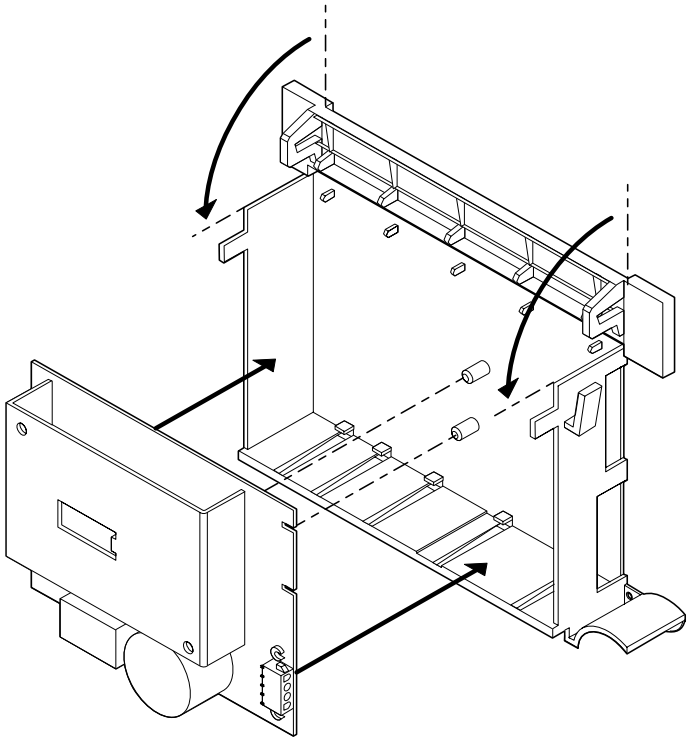
The pump system consists of an AC motor and pump assembly, a bellows type sump hose, air bell, and an external cabinet drain hose.

The drain pump and motor assembly is mounted on the base at the right front corner of the cabinet.

When the wash or rinse cycle is completed, the timer energizes the pump motor to remove water from the tub. The pump motor remains in operation throughout the spin cycle.

To Test Drain Pump Motor Windings:

1. Disconnect the washer from electrical supply.
2. Remove front access panel from washer.
3. Disconnect harness plug from pump motor.
4. Check resistance of motor windings. Resistance should be approximately 4.8 ohms ±10% @ 77°F.



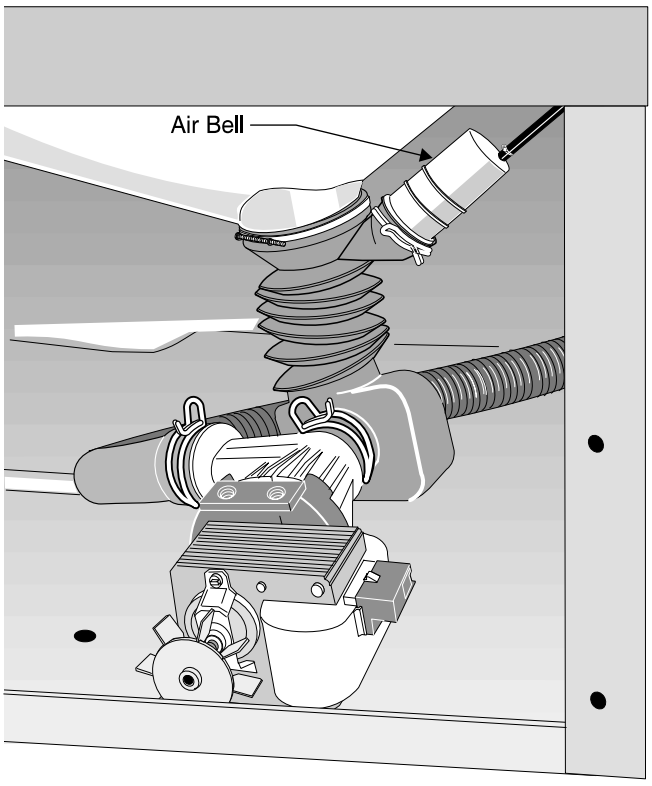
To Remove or Replace Drain Pump Motor:

1. Disconnect the washer from electrical supply.
2. Remove front access panel from washer.
3. Remove bolts (2) securing motor cover to pump.
4. Disconnect electrical harness plug from pump motor.
5. Remove clamp securing sump hose to pump.
6. Remove clamp securing exterior drain hose to pump.
7. Remove two hex head screws securing the drain motor and pump assembly to cabinet base.
8. Reverse procedure to install new drain motor and pump assembly.

AIR BELL AND PRESSURE CONNECTING TUBE

In order to provide enough air pressure to activate the water level control switch, a large volume of air must be compressed and transferred to the water level control. This is accomplished by using an air bell and black rubber tubing.

The air stored in the air bell is compressed by the weight of the water in the tub. The resulting pressure is then transferred to the water level control through the black rubber tubing.



To Remove or Replace Air Bell:

1. Disconnect washer from electrical supply.
2. Remove two screws securing the front service panel.
3. Remove the service panel by pulling down.
4. Remove drain hose from drain and empty any remaining water in hose. Use a large pot or pan.
5. Remove clamp securing air bell to sump hose and remove connecting tube from air bell.
6. Install new air bell and connecting tube.
7. Reverse procedure to reassemble.

NOTE: Seal air connecting tube to air bell and air bell to sump hose using waterproof glue such as p/n 5364709100. DO NOT plug connecting tube opening.

TUB COUNTERWEIGHTS

To Remove or Replace Rear Counterweight:

1. Disconnect the washer from electrical supply.
2. Remove rear access panel from washer.
3. Remove locking nuts (2), washers, and reinforcement plates from bolts securing weights.
4. Reverse procedure to reassemble.

To Remove or Replace Front Counterweights:

To access the front counterweights, remove the complete outer tub assembly first. Reference "To Remove or Replace Outer or Inner Tub" under "OUTER TUB" section and complete steps 1 - 23 to gain access to front counterweight mounting bolts.

AIR SHOCK ABSORBER

To Remove or Replace Air Shock Absorber:

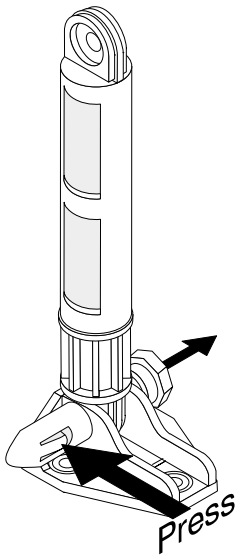
Air shock absorbers may be removed or replaced from the front of the washer if access to the rear of the washer is restricted or the dryer is stacked above the washer.

1. Disconnect the washer from electrical supply.
2. Remove rear access panel from washer.
3. Remove air shock securement pins by depressing locking tab while pulling pin to remove. This proceudre is much easier if a deep 1/2", 6 point socket (or 13 millimeter, 6 point) is used to compress the locking tab of the plastic pin. Push the socket onto the tapered end of the pin as far as it will go to compress the locking tab.
4. Use pliers to grasp head of pin and pull to remove. As the pin is removed the socket will drop free.
5. When replacing the air shock make sure to position it with the bell end facing downward.
6. Lubricate the securement pins with Sil-Glide before installing.

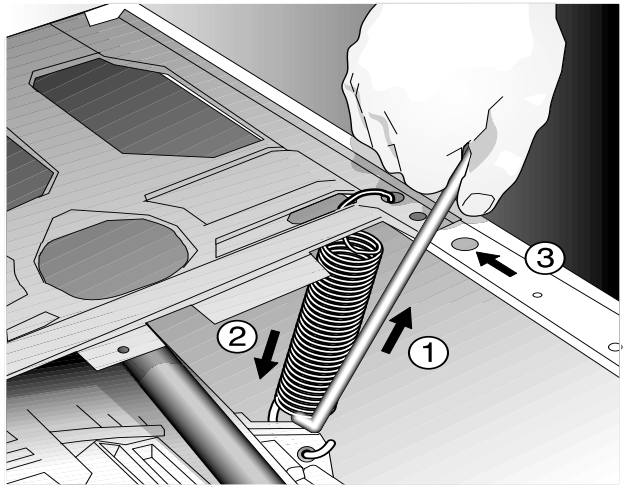
DOOR BELLOWS

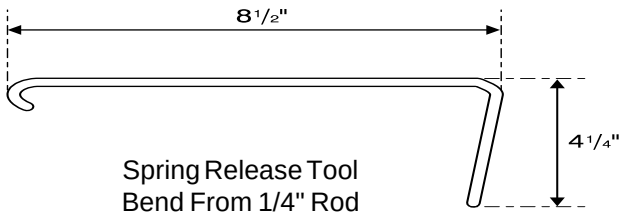
To Remove or Replace Bellows

NOTE: To have better access to the bellows than this procedure provides, remove the complete outer tub assembly first. If this optional method is preferred, reference "To Remove or Replace Outer or Inner Tub" under "OUTER TUB" section and complete steps 1 - 16, then begin at step 12 below.



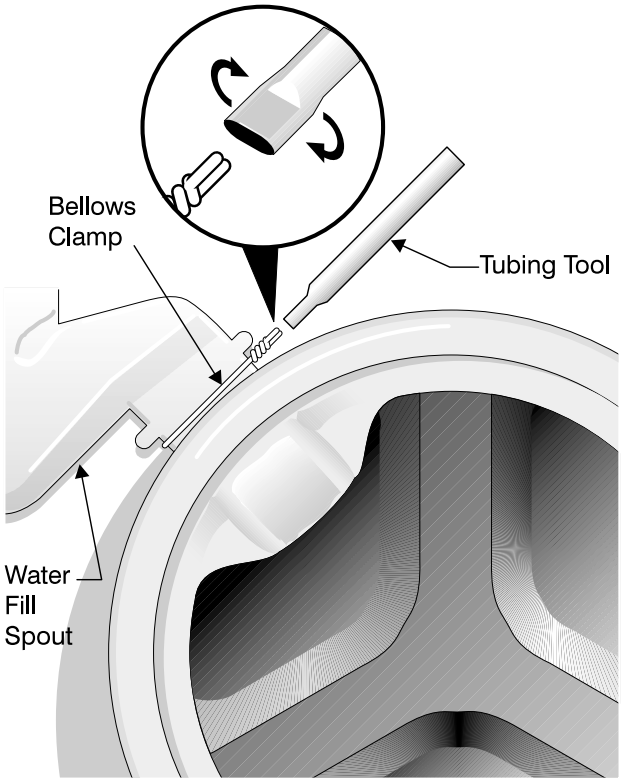
1. Disconnect the washer from electrical supply.
2. Remove the top panel.
3. Remove door from hinge for better access.
4. Remove the spring retainers and re-install the rear screws without the spring retainer. This will hold the control mounting panel down when the springs are lifted. Unhook tub support springs and move them to the next large hole back on the side panel flange. The springs may be removed by grasping the tub assembly on the lower tub reinforcement area and lifting (4:00 and 7:00 position approx.) while guiding the top end of the spring with the other hand to the new location. Or a simple tool may be bent from 1/4" round rod that will simplify this task. Use the tool to hook the bottom of the spring and lift to remove.
5. Remove fill spout mounting screws from panel.
6. Remove screws (6) securing the control panel. Five of the screws are located on the rear of the control panel and one screw is on the front side, located behind the bottom left corner of the fabric dispenser drawer.
7. Remove indicator lamp and reed switch from control panel by prying gently with a small screwdriver, being careful not to distort or damage control panel securement tabs.
8. Remove the long dispenser connecting rod by pulling gently at each end to remove.
9. Remove pivoting arm on dispenser by depressing catch and pulling up on arm.
10. Remove screws (3) from dispenser assembly, two at rear and one on front. Release dispenser mounting tabs and push dispenser rearward to clear front opening. After dispenser assembly has cleared the front opening, push dispenser assembly down as far as possible.

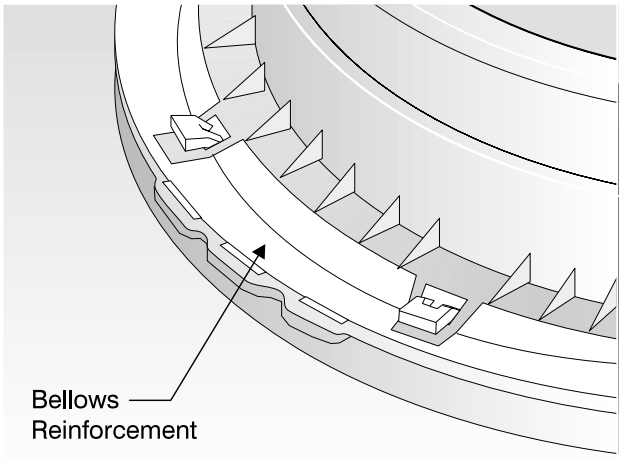




Spring Release Tool
Bend From 1/4" Rod

11. Pull outer lip of bellows from front panel. Remove wire clamp securing bellows to fill spout. Removing and installing the fill spout clamp will be a great deal easier if a simple tool is constructed from a scrap piece of tubing. Partially squeeze one end of a short piece of 3/8" or 1/2" O.D. tubing. Slip the collapsed end of tubing over the twisted ends of the clamp and rotate the tool one full turn to unlock the clamp. If tool is hard to turn, wrap with friction tape or duct tape to improve grip.
12. Remove bellows, reinforcement, and retaining spring by pulling loose.
13. Install bellows reinforcement on new bellows.
14. Lubricate groove in replacement bellows with a liberal application of liquid soap.
15. Install bellows by using a turning motion starting at the top of the tub. At the same time apply pressure to prevent the portion of the bellows already engaged in the groove from popping out.
16. Once bellows is fully engaged in its mounting groove, rotate to the proper location by lining up the pointer (on bellows) with the 12:00 position on the outer tub.
17. Install bellows retaining spring. This is done by slipping the spring in the groove at the bottom of the outer tub opening first. Stretch the spring while guiding it into the groove all the way around the tub opening and work toward top





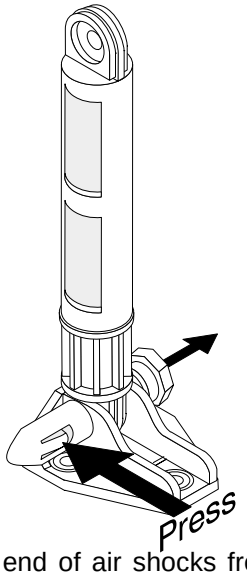
18. Insert fill spout into the bellows. Reinstall wire clamp on fill nozzle using tubing tool to twist clamp. Make certain fill spout is pulled down as far as possible which will aid in reinstalling clamp.
19. Reverse procedure to reassemble.

OUTER TUB

To Remove or Replace Outer or Inner Tub

1. Disconnect the washer from electrical supply.
2. Remove the top panel.
3. Shut off water supply and disconnect water supply hoses from water valve.
4. Remove rear access panel from washer.
5. Disconnect the motor wiring harness connector block and ground wire. Remove wire tie to free harness from tub.
6. Remove pressure fill tube from water level control.
7. Remove the front access panel.
8. Loosen clamp securing sump hose from tub and remove bellows style hose from tub.
9. Remove wire spring clamp from air bell.

10. Remove air shock upper securement pins by depressing locking tab while pulling pin to remove. This procedure is much easier if a deep 1/2", 6 point socket (or 13 millimeter, 6 point) is used to compress the locking tab of the plastic pin. Push the socket onto the tapered end of the pin as far as it will go to compress the locking tab. Use pliers to grasp head of pin and pull to remove. As the pin is removed the socket will drop free.

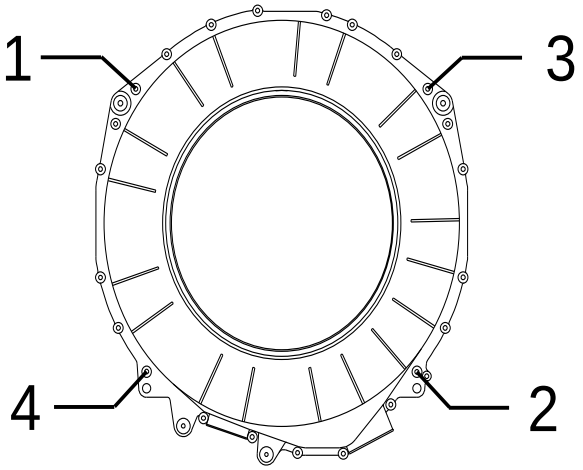


11. Pull upper end of air shocks free from tub and position shocks upright away from tub for clearance.
12. Protect floor and carefully lay washer on its back.
13. Remove fill spout mounting screws from front panel.
14. Pull outer lip of bellows from flange on front panel.
15. Remove one screw of the suspension spring retaining strap and loosen the other one. Pivot strap out of the way to permit access to spring. Remove suspension springs from washer cabinet and then from outer tub. **NOTE:** Green end of spring connects to cabinet.
16. Carefully lift cabinet to clear tub assembly and set aside. Automatic dispenser will remain connected to tub assembly.
17. Reverse procedure to reassemble.

INNER TUB AND BEARINGS

To Remove or Replace Inner Tub or Bearings:

1. Remove outer tub assembly. See "To Remove or Replace Outer or Inner Tub" under "OUTER TUB" section and complete steps 1 - 16.
2. Remove the screws (23) securing the outer tub halves together. Rotate tub assembly so that front opening is face down.
3. Remove belt by turning tub drive pulley and rolling belt off pulley. The belt is elastic and is designed to "give" enough to remove and install in this manner.
4. Remove pulley from tub shaft.
5. Remove rear motor mounting screws.
6. Separate outer tub halves. **CAUTION:** Use caution in handling the inner tub, the outer surface is very sharp! The replacement rear outer tub comes with new bearings, water seal, and seal between halves already installed.
7. Reverse procedure to reassemble using illustration below to show outer tub screw tightening sequence. After these four, any sequence OK. Torque to 75 - 85 in. lbs.



TUB VANES

To Remove or Replace Tub Vanes:

There are three plastic vanes mounted to the tub to aid in the washing action during the wash cycle. Two of the vanes are secured by a screw and a tab bent into place on the tub. To remove these vanes the tub has to be removed. The third vane is secured only by a single screw and may be removed through the door opening.

1. Identify the vane that is located **on the seam of the tub** and remove the mounting screw.
2. Slide vane forward toward door opening until it stops.
3. Pull vane upwards to disengage tabs on vane from slots in tub.
4. Reverse procedure to replace. If screw hole on tub is stripped, drive screw into other hole on vane to secure.