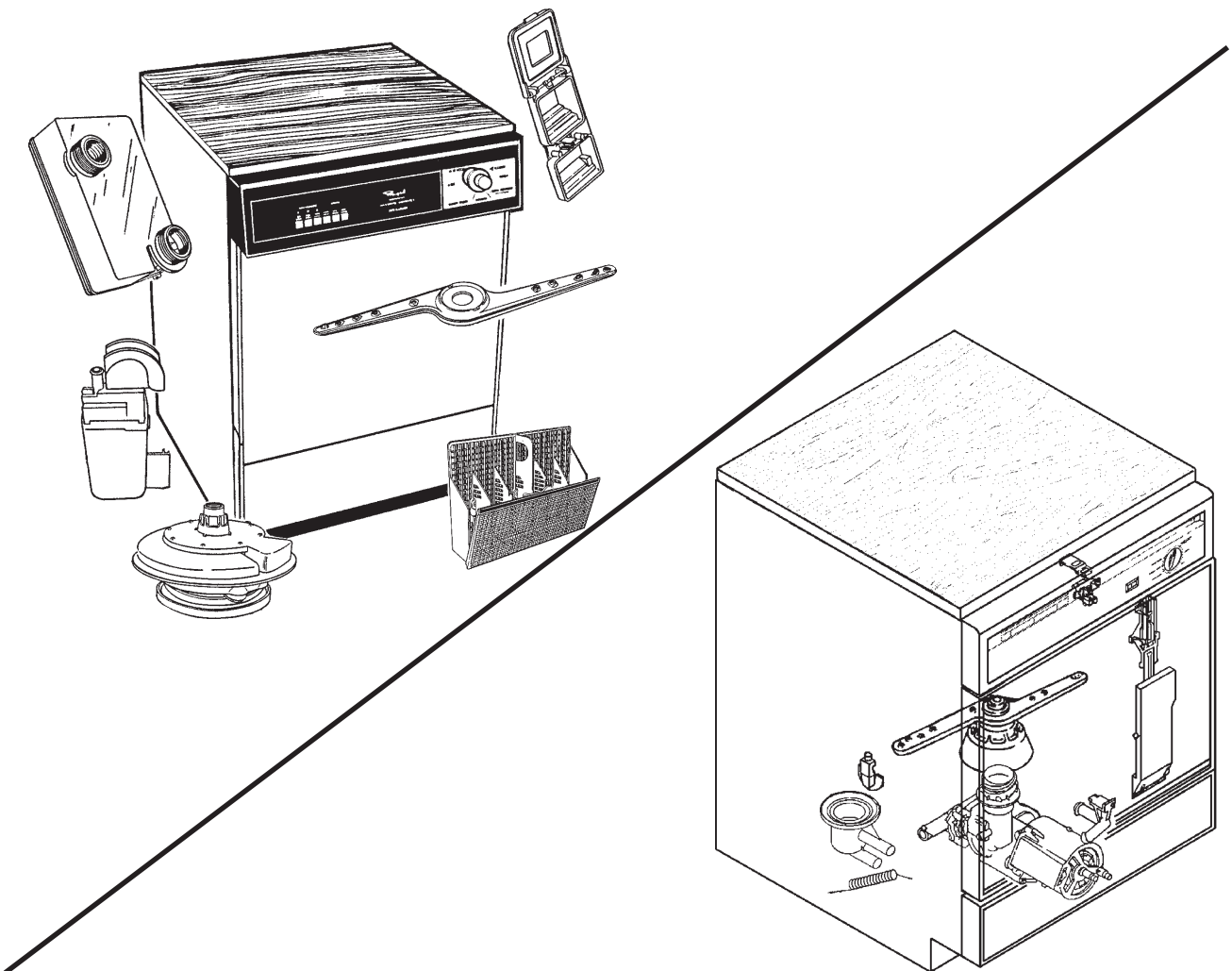


DISHWASHER and COMPACTOR

STUDY COURSE

UNDERSTANDING DISHWASHER:

- *MECHANICAL COMPONENTS*



Module 1

LIT 4314189 Rev. A

WHIRLPOOL CORPORATION does not assume any responsibility or any liability in connection with the use of this manual.

© 1990, 1998 WHIRLPOOL CORPORATION

All rights reserved. No portion of this book may be reproduced in any form without written permission from WHIRLPOOL CORPORATION.

® The trademarks WHIRLPOOL,  Whirlpool,  Whirlpool, and *FSP* are registered trademarks of Whirlpool Corporation.

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 today's sophisticated appliances. This training can best be obtained through organized classroom study and application. However, much of the knowledge necessary to service today's 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).

TABLE of CONTENTS

	PAGE
CHAPTER 1	3
MECHANICAL COMPONENTS for Porcelian Liner Models-1986 and Older.	
CHAPTER 2	15
MECHANICAL COMPONENTS for Plastic Liner Models-1986 and Newer.	
*TEST	See Test Book LIT4314204

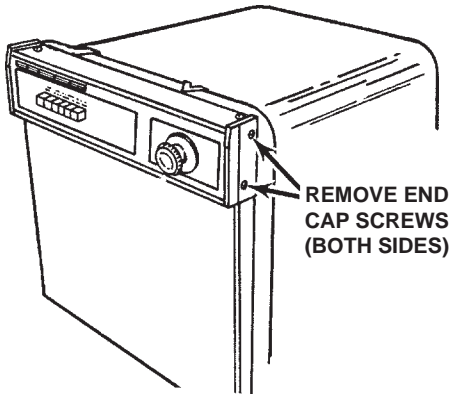
****NOTE: We recommend taking the TEST for MODULE 1, right after studying it.***

CHAPTER 1

MECHANICAL COMPONENTS

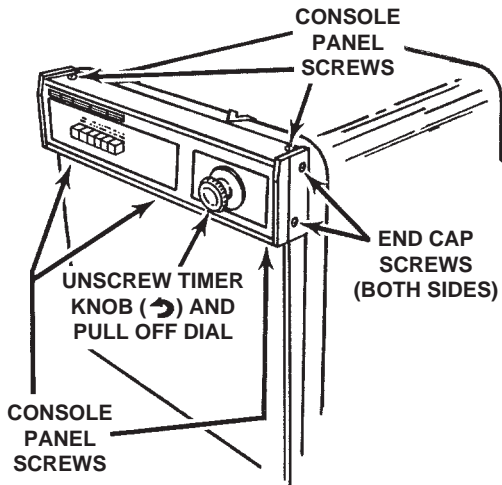
(for Porcelain Liner Models: 1986 and Older)

END CAPS



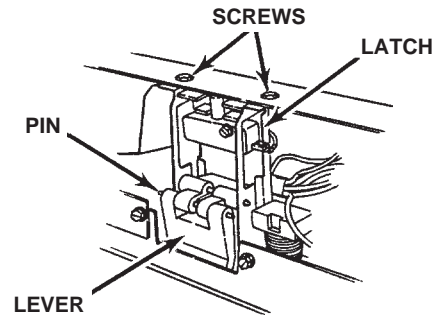
These plastic end caps are located on each side of the console escutcheon and are held on by screws.

CONSOLE ACCESS



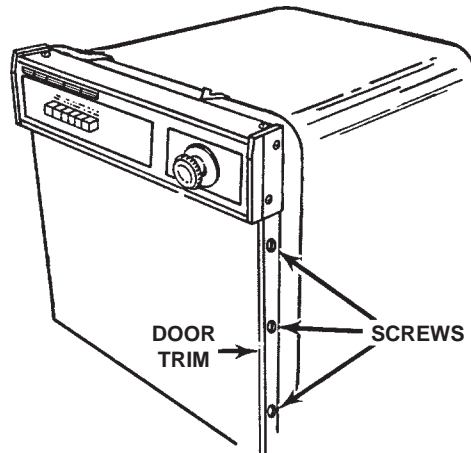
To get to parts behind the console panel, first; open the door. Remove the screws holding the end caps then the screws on top and underneath the panel. Remove the timer knob and dial, and possibly the handle (screwed on) if used in this area.

RELEASE LEVER / DOOR LATCH



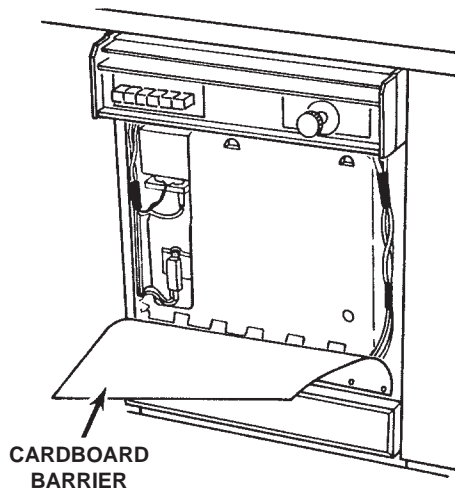
These parts are located in the middle under the console and can be removed through the console access procedure. To remove the lever, pull the pin holding the lever to the door latch. The door latch is held on by screws.

DOOR TRIMS



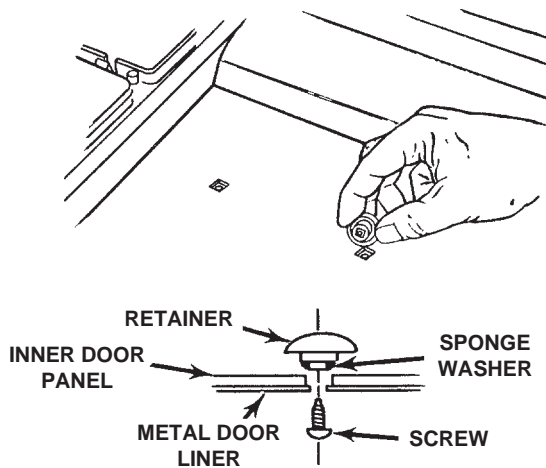
These parts are made of aluminum and are used on each side of the door. Not only used for decorative purposes it also holds the front panel on. They can be removed by removing the end caps, then remove the screws holding the door trims to the door frame.

DOOR ACCESS



To get at some parts on the door, one end cap must be removed first, this is screwed in place. Next on the same side, remove the screws holding the door trim on. Slide the door panels (if used) out of the door frame. Remove the metal clips on each side then bend the cardboard door barrier down to expose the parts.

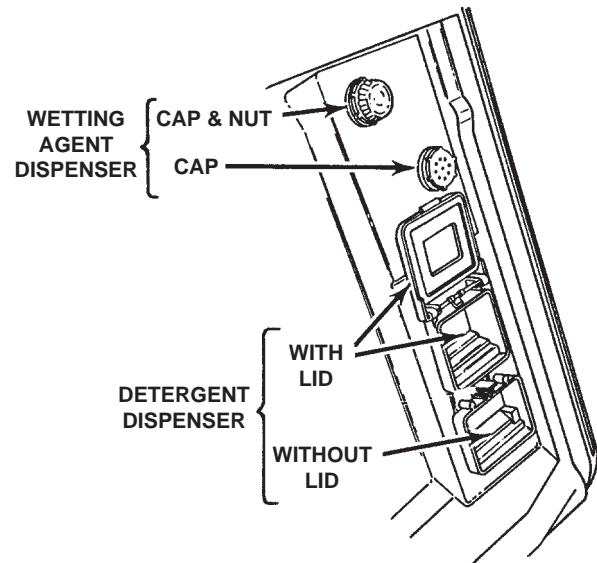
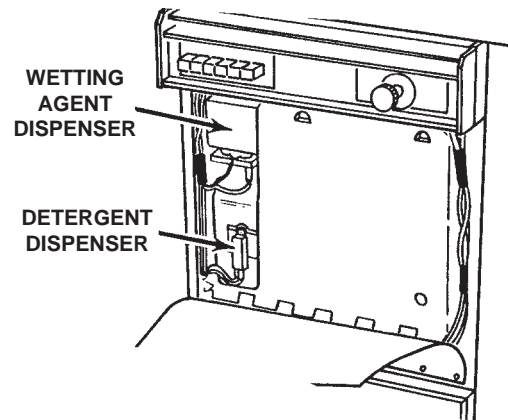
RETAINER BUTTONS



This part is located on the door and is used to hold the silverware and utensil baskets to the door. These parts can be reached through the door access procedure. These parts are held on by screws. When replacing, make sure there is a clear sponge washer glued to the back of the button to eliminate any leaking.

WETTING AGENT DISPENSER

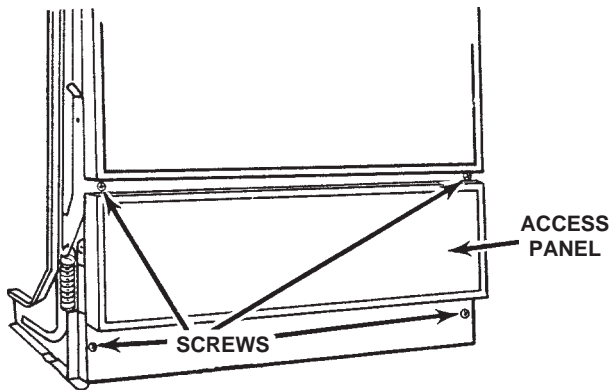
This part is located on the left side of the door. It dispenses a wetting agent just before the final rinse. This causes water breakdown during rinse. The water then runs off the dishes and silverware, leaving fewer or no spots. This part can be reached through the door access procedure. Then open the door and unscrew the nut and cap (see below).



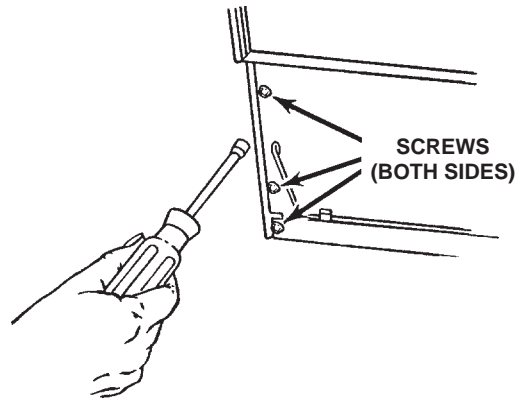
DETERGENT DISPENSER

Located on the left side of the door, detergent is placed either in the open compartment, the compartment with a door or both. This part can be reached through the door access procedure. Then remove the screws holding the dispenser to the door (see above).

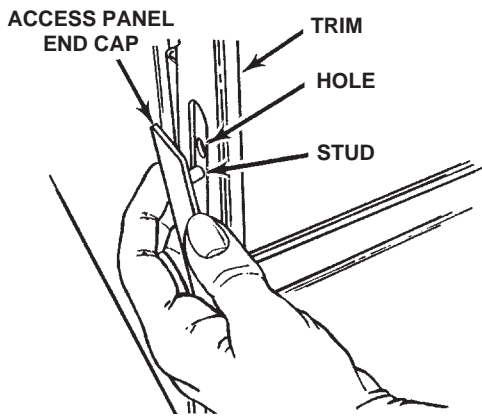
BELOW THE TUB ACCESS



On built-in-models, lower parts are accessed by removing screws holding the access panel to the frame.

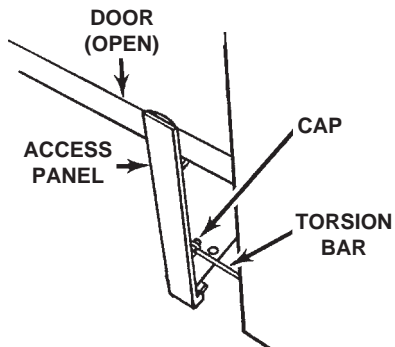
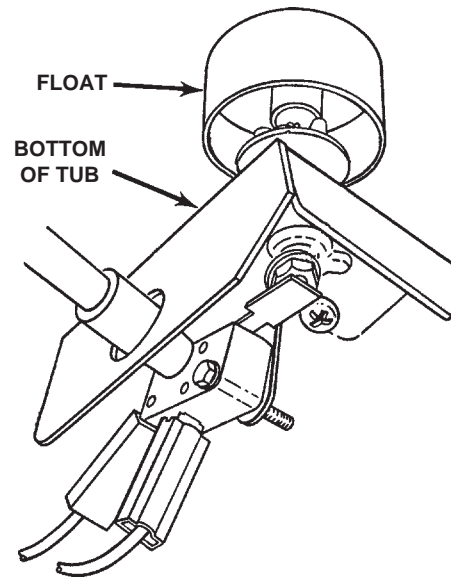


Now remove the coverplate which is held on with screws and once removed, parts will be exposed.



To get to some of the lower parts on portable models, first; remove the access panel end caps from the hole in the side trim.

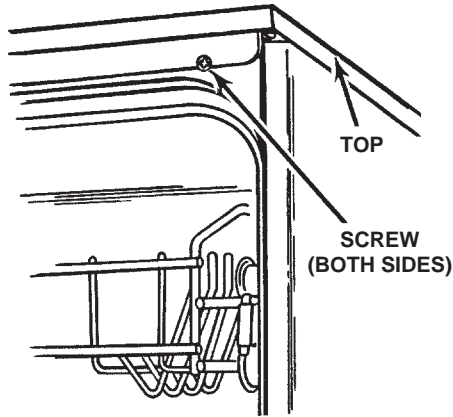
FLOAT SWITCH



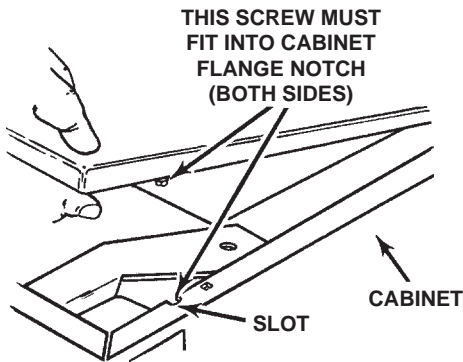
Next, remove the rubber caps and torsion bars from the access panel.

Located inside the tub in the right-front corner, this float rises as the water rises and stops the water fill before it leaks onto the floor. It can be removed through the access panel (see below the tub access procedure). This part is held to the tub by screws. Make sure the rubber gasket is in place when replacing.

TOP

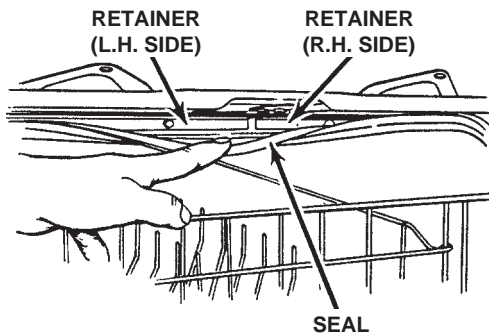


This top is made of hard maple and can be removed by opening the door and removing the screws that are located on each side of the cabinet.



Lift and slide the top toward the front. This will release the special screws, in the back of the top, from the slots in the cabinet.

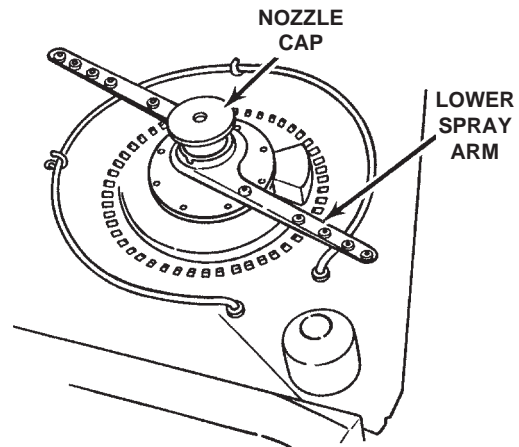
DOOR GASKET



This part is mounted on the tub between the front of the tub and behind the door. It acts as a seal to keep water from leaking out of the dishwasher. Pull the rubber down somewhat to expose the metal retainer and screws. NOTE: On portable models the tub MUST be supported before removing the gasket. Remove the access panel (below the tub access procedure) and place a block of wood under the motor to keep the tub from falling.

NOZZLE CAP

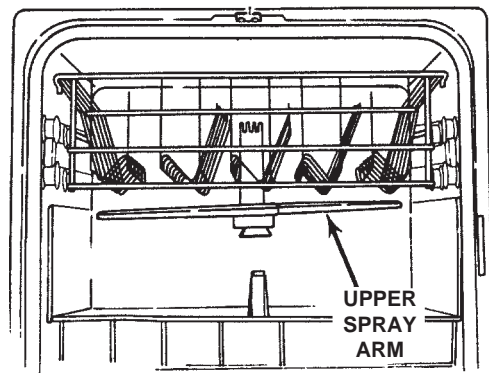
The nozzle cap (see below) is located below the lower dishrack and screws on, holding the lower spray arm to the pump and motor. It also expands from water pressure and seals to the bottom of the tower during the wash cycle. This causes a water stream upward, to the upper spray arm. This cap is hollow and is made from a flexible black rubber boot with a large center hole.



LOWER SPRAY ARM

This part (see above), located under the lower dishrack, has domed jets that enable the nozzle openings to be aimed at wide angles in all directions. The jet streams from these nozzles give a balanced combination of water pressure and water volume to "chisel" the soil off and give a thorough washing action throughout the tub without abusing the dishes.

UPPER SPRAY ARM



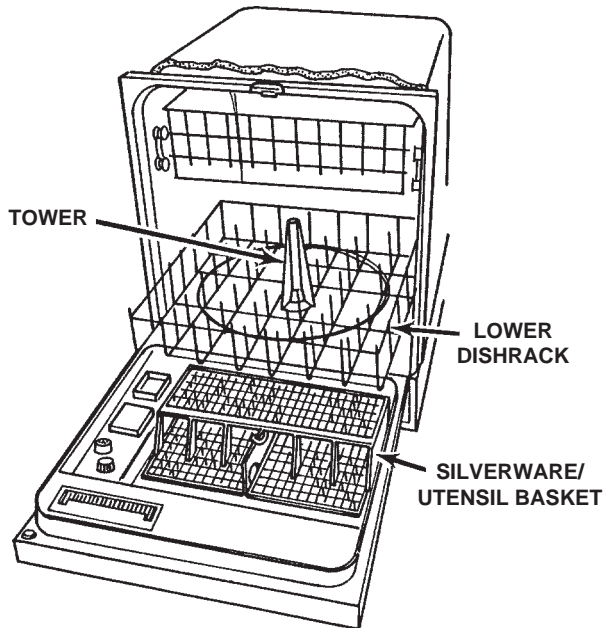
Located on the bottom of the upper dishrack, this upper spray arm helps eliminate dead spots caused by large bowls or pots in the bottom rack, blocking the water action to dishes in the upper rack.

SPRAY ARM ROTATION

A jet at each end of both spray arms causes the arms to revolve during wash and rinse. The lower arm turns clockwise and the upper arm turns counterclockwise.

LOWER DISHRACK / TOWER

The lower dishrack rides in and out of the tub by wheels mounted in each corner. Dishes are placed in the rack for cleaning.

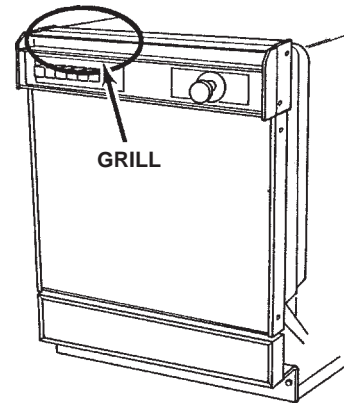


The tower is located in the middle of the rack and is used to keep water in a jet-like stream, forcing the water up into the upper spray arm.

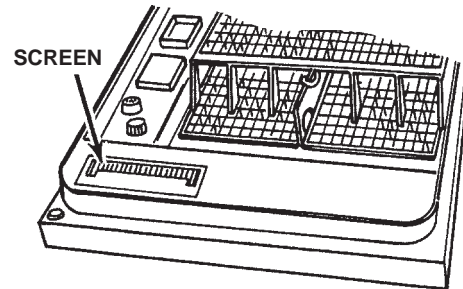
SILVERWARE / UTENSIL BASKETS

These parts (see above) are mounted to the door and can be removed by lifting them off the retainer buttons.

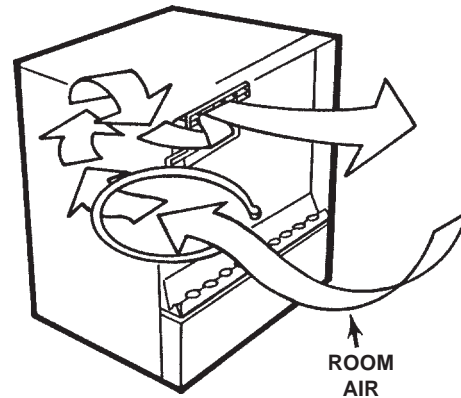
VENT GRILL / VENT SCREEN



The grill on the outside (see above) and the screen on the inside (see below), are located in the upper corner of the door. During the wash and dry cycles, hot air comes out this opening.

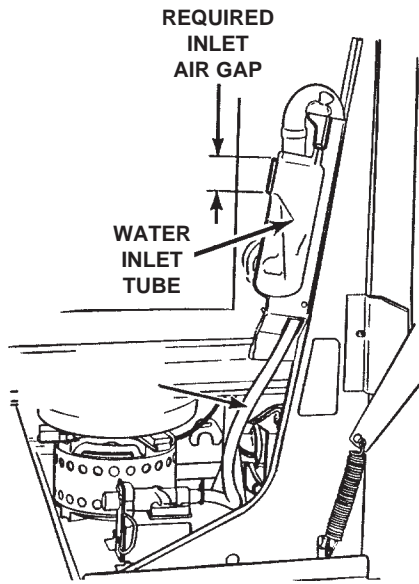


Remove by using a small blade screwdriver, inserting it between the upper part of the vent or screen and pry the tabs out the holes. To replace, place the bottom in the slot first, then push the top part back until it snaps into place.

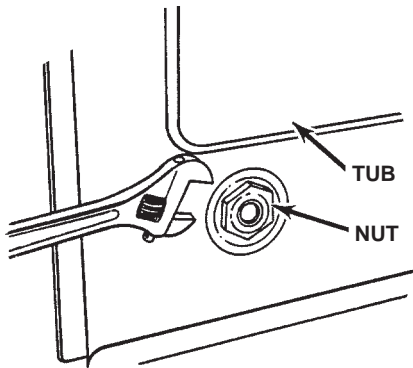


The vent and screen allows air to circulate. This is required to dry dishes. Dry room air is pulled in at the bottom of the door. It flows upward by convection, picking up moisture from the wet dishes, and escapes through the vent and screen.

WATER INLET



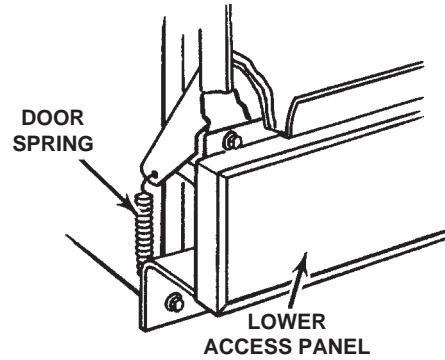
This part is located on the outside of the tub, lower-left front corner and creates an air gap for incoming water.



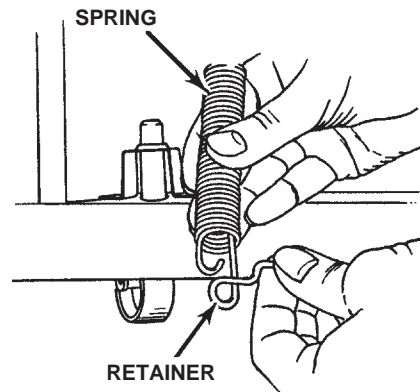
By removing the nut inside the tub, it can be pulled down between the tub and cabinet to be replaced. Be sure the rubber gasket is on the replacement.

DOOR SPRINGS and ADJUSTMENT

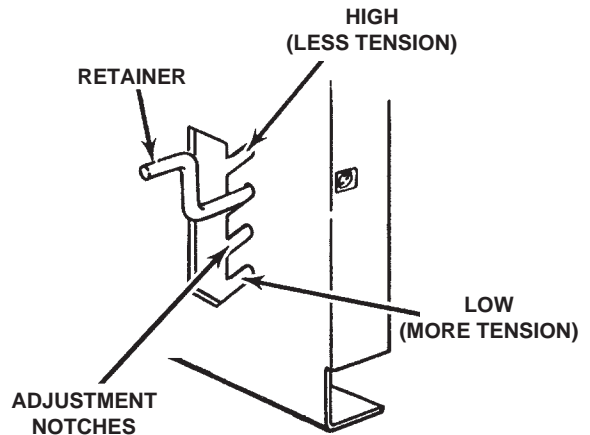
This part is located behind the access panel (see below) on Portable models and on the outside frame on Built-In models.



Adjust the door springs so the door closes easily without slamming and stays open with its own weight.

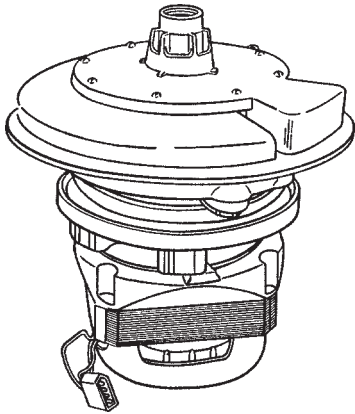


The retainer goes through the spring and attaches to the door support at one end and the frame at the other end. This spring and retainer supply tension to the door.



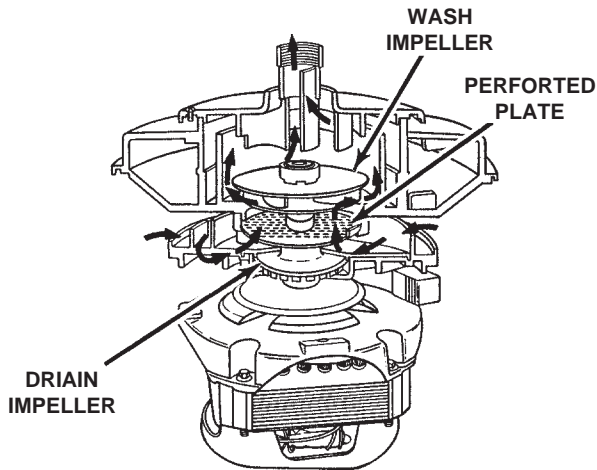
Move the spring down for more tension, up for less tension.

PUMP and MOTOR (POWER CLEAN)

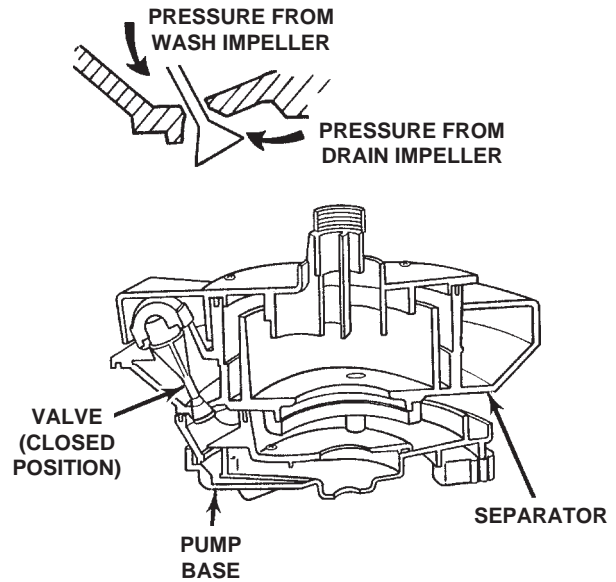


The Power Clean Pump washing system includes a “food grinder” and system for separating the food particles from the recirculating wash/rinse water. The food particles are “collected” by centrifugal force in a “settling” chamber. During pumpout (drain) the draining action of the power clean module flushes the food particles down the drain.

WASHING AND RINSING

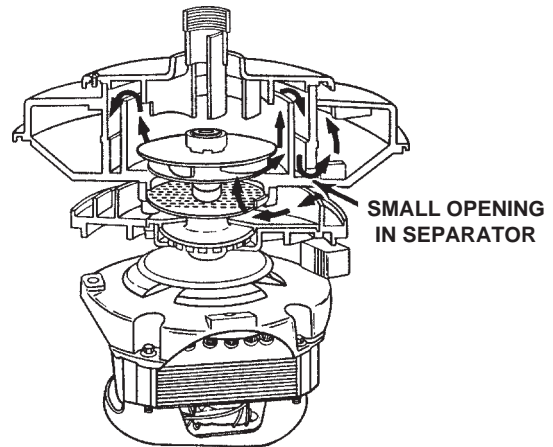


Operation of the power clean module is as follows: Water is drawn into the power clean module by the clockwise rotation of the wash impeller. This water is drawn up past the chopper blade, then through the perforated plate. Any large food particles are broken down by the food grinder. **THIS PROCESS MAY RESULT IN A GRINDING SOUND BEING HEARD.** Items like olive pits or egg shells can result in a grinding sound being heard for most of a cycle. If the grinding sound is heard for several cycles, an item that cannot be ground up may have gotten into the Power Clean Module.

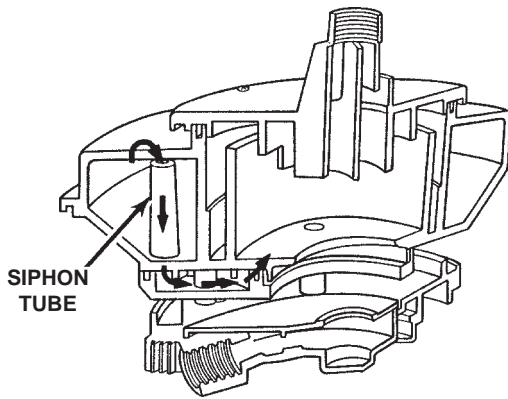


At the start of wash, the drain impeller rotation causes a small amount of pressure which resists the pressure being built up by the wash impeller. This allows the wash impeller to pressurize the separator. The pressure actuates the drain valve diaphragm, overcoming the resistance of the valve spring and closing the drain valve. The separator is now isolated from the drain pump.

The pump automatically separates the soil from the water. This is how it's done.

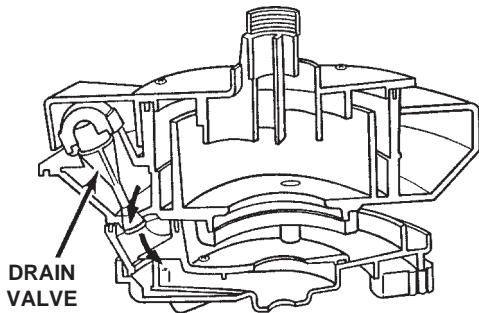


The centrifugal force caused by the wash impeller distributes the soil on the inside wall and is concentrated in the annular chamber and forced through a small opening into the separator. The soil in the concentrate or “slurry” settles out in the separator. The water leaving the separator is pumped on through the spray arms. This system quickly removes the soil from the water charge.

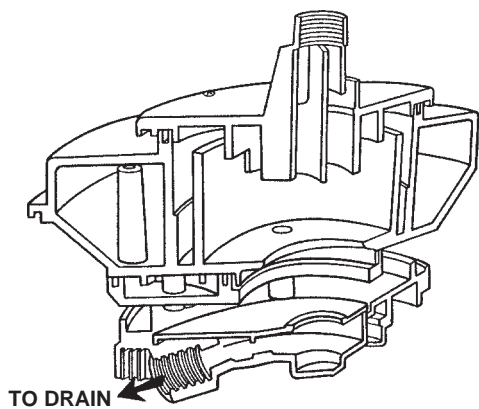


Water in the separator is fed down the siphon tube and ball check, through the inlet base and enters the washer impeller chamber through a small bleed hole in its base.

DRAIN



As the motor pauses before going into counterclockwise drain rotation, the wash impeller is no longer rotating and pressurizing the separator. The drain valve (which is normally open) opens and the separator is now open to drain.

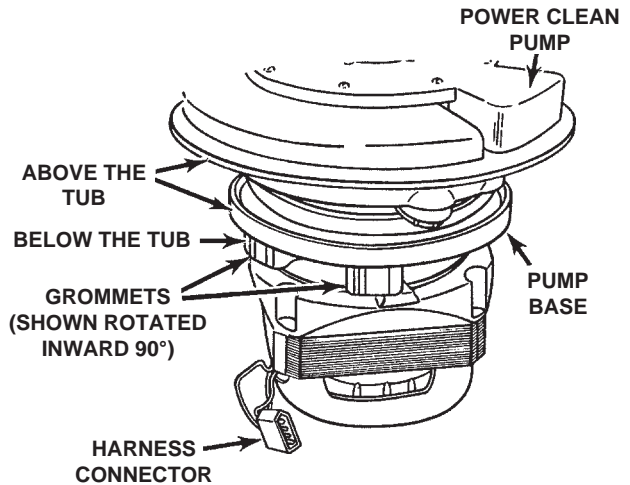


The pressure difference pulls the ball check closed. Even though the wash impeller is turning opposite its normal rotation, it still forces a water supply through the separator, which washes the soil past the open drain valve and out the drain.

TEAR DOWN

IMPORTANT: All seals and/or gaskets that are exposed during partial or complete teardown **SHOULD** be replaced.

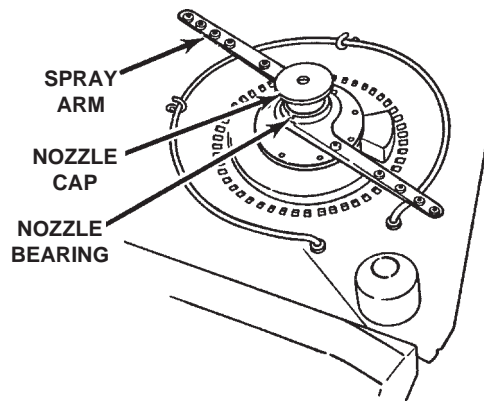
See **BELOW THE TUB ACCESS PROCEDURE** to disassemble some of the parts.



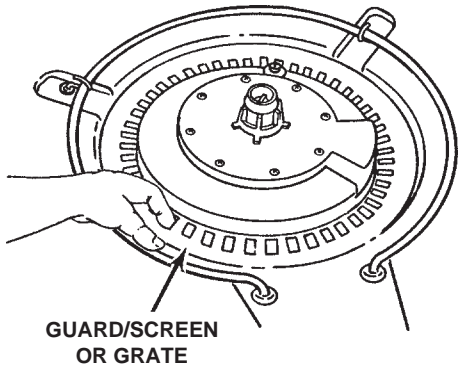
There are four rubber grommets securing the pump and motor assembly to the underside of the tub. Rotate these inward 90°.

Disconnect the motor harness connectors and the green ground wire.

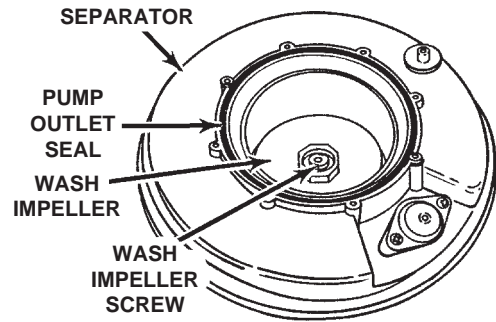
Remove the clamp and drain hose off the check valve, then remove the check valve. **NOTE:** There should be a round rubber "O" ring on the check valve when it's removed from the pump. If not, it could be stuck in the hole in the pump. It will have to be removed and put on the check valve.



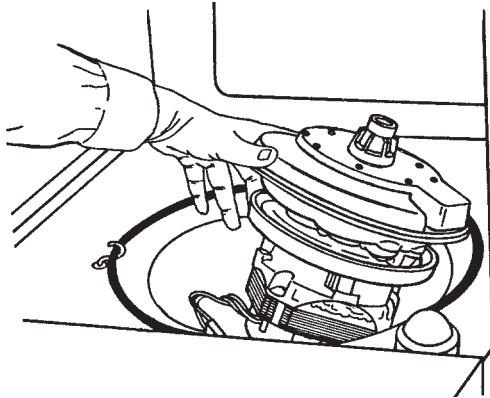
Open the door and remove the lower dishrack, then unscrew and remove the nozzle cap, bearing, and the spray arm.



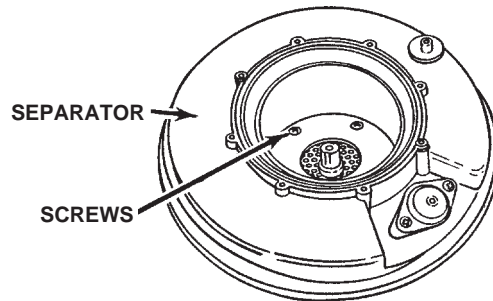
Remove the sump guard, sump screen, or grate, whichever is used on your model.



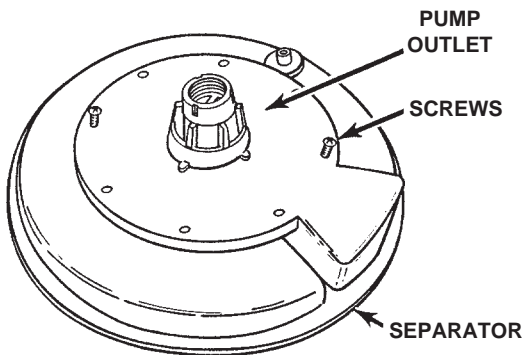
Remove the impeller screw. Use a wrench on the hexagon flats molded on the impeller to keep it from turning when the screw is removed. Then remove the wash impeller.



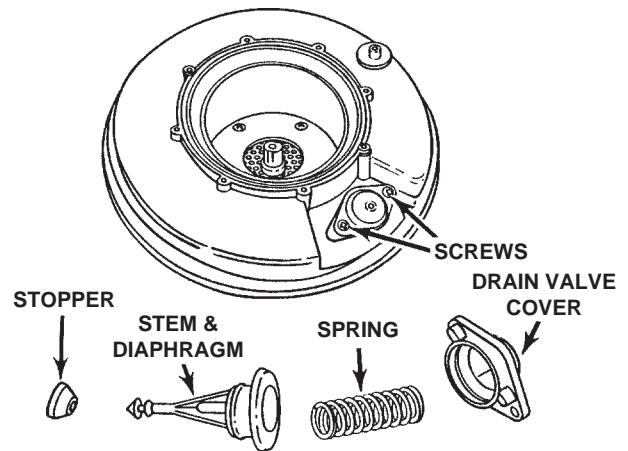
Remove the pump and motor by pulling up through the inside of the tub.



Remove the screws holding the separator to the base.

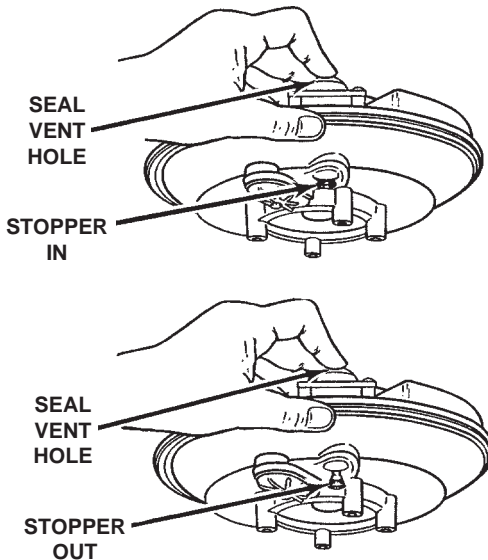


Remove the screws holding the pump outlet to the separator. Then remove the pump outlet.

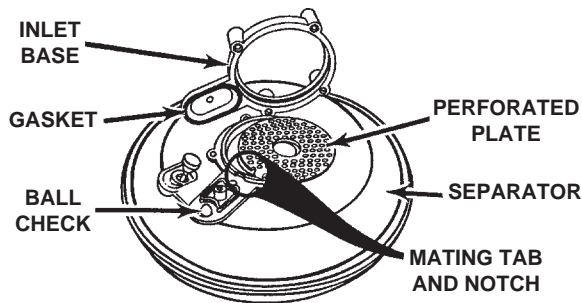


A leaking drain valve diaphragm and/or a damaged stopper requires replacing the drain valve stopper, stem and diaphragm, and spring.

To test, push the drain valve stopper in to seal the vent hole.

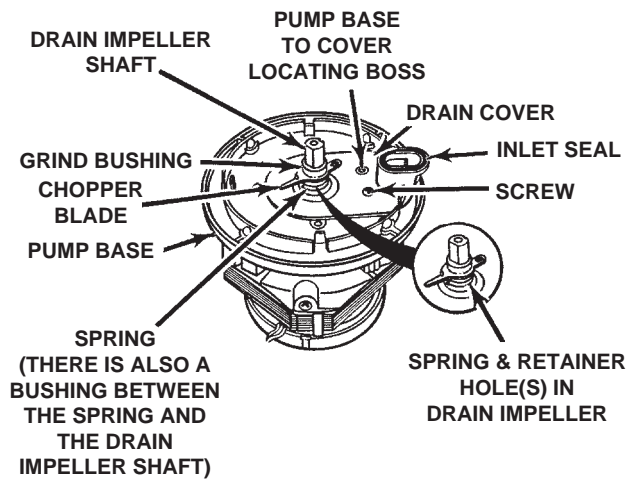


If stopper stays in, the diaphragm is good. If it comes back out, it is leaking and must be replaced.



If the perforated plate is damaged, it must be replaced. Remove the screws holding the inlet base to the bottom of the separator. Remove the gasket located in the groove in the inlet base and throw away.

NOTE: Do not lose the ball check.

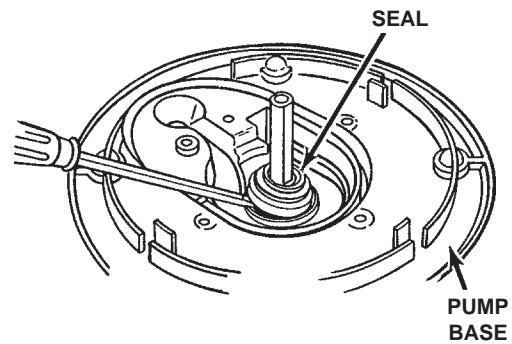


A damaged bushing, chopper blade, and/or spring can be lifted off the drain impeller shaft.

If the spring retaining holes in the drain impeller are damaged, the impeller must be replaced.

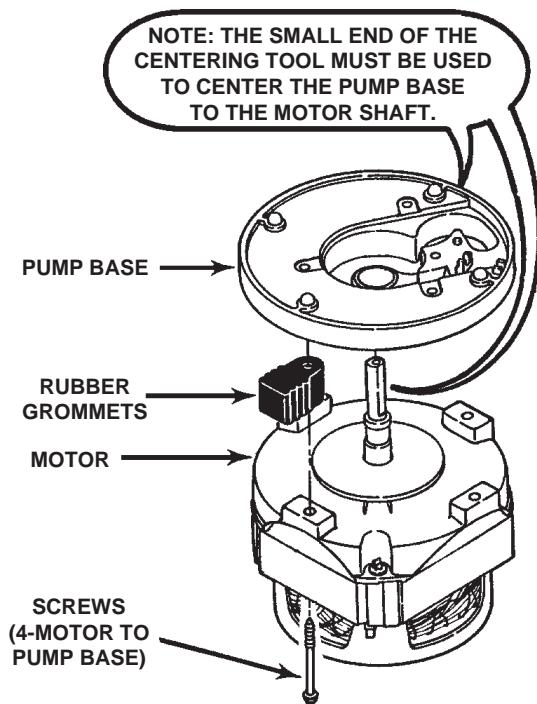
NOTE: The drain impeller and its mating seal head assembly, must be replaced in pairs.

To replace the drain impeller and seal head assembly, first remove the screw holding the drain cover to the pump base. Remove the cover then lift the drain impeller off the motor shaft.

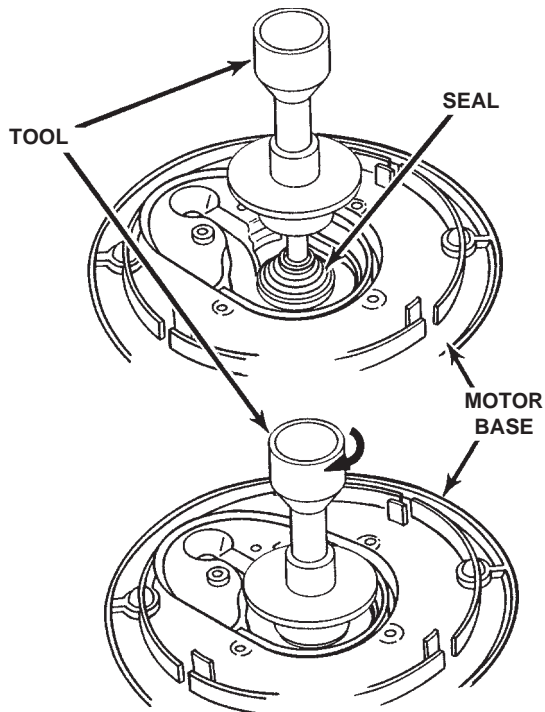


Next pry the seal off the motor shaft. Check the pump base, if it's cracked or damaged in any way, the base must be replaced. Remove the screws holding the base to the motor.

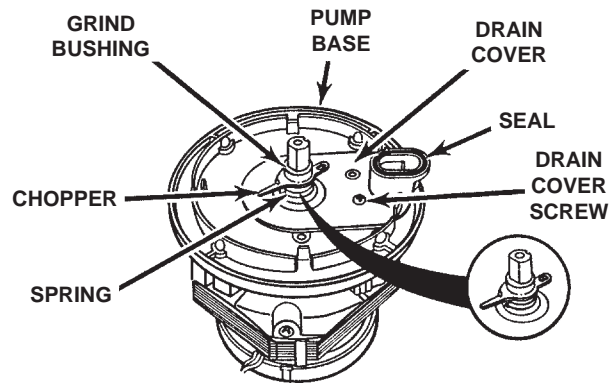
A SPECIAL CENTERING TOOL IS REQUIRED TO REBUILD THIS PUMP ASSEMBLY



Reassemble the pump base to the motor.

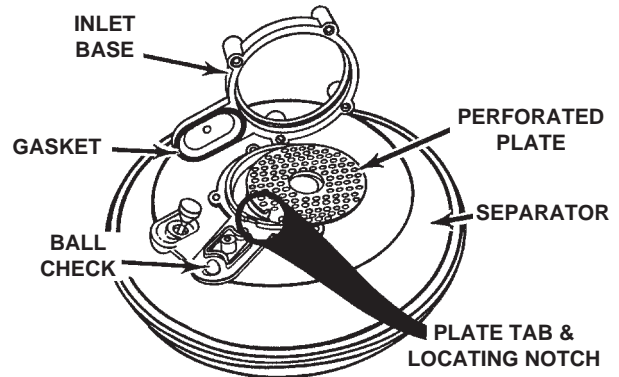


Lubricate the seal head with a non-detergent soap (DO NOT USE DETERGENT OR PETROLEUM PRODUCTS) before installing, then using the large end on the special centering tool, press the seal down (turning the tool approximately 1/4 turn) firmly over the motor shaft.



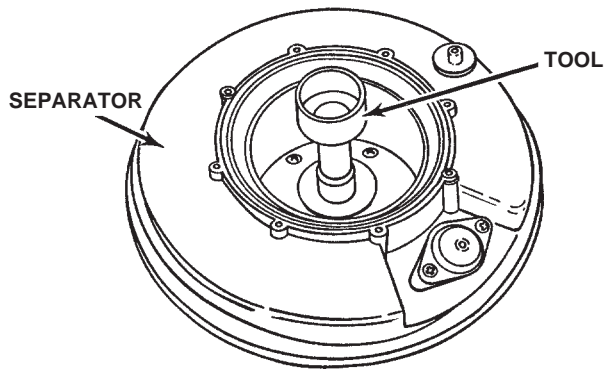
Replace the drain impeller, then screw the drain cover on the base.

Assemble the sleeve, spring, chopper and grind bushing, also make sure the spring is properly assembled to the chopper blade and seated in one of two retaining holes in drain impeller. Insert new drain cover seal.

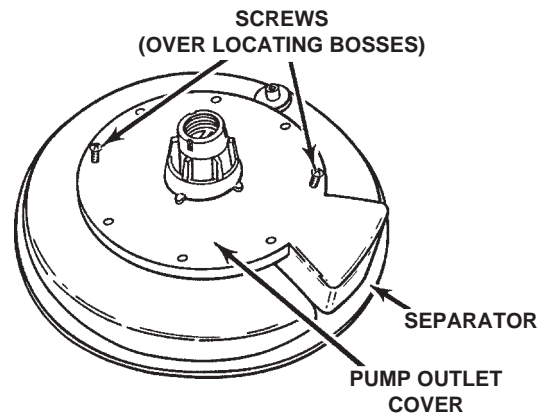


Assemble new gasket to the inlet base, make sure the ball check is in its proper place, then reassemble the perforated plate making sure the tabs are in locating notches. Assemble the inlet base to the separator with the two screws by carefully starting the screws to avoid stripping. The recommended way is to turn the screw counterclockwise until you can feel the threads backing off or "bumping", then turn clockwise to tighten.

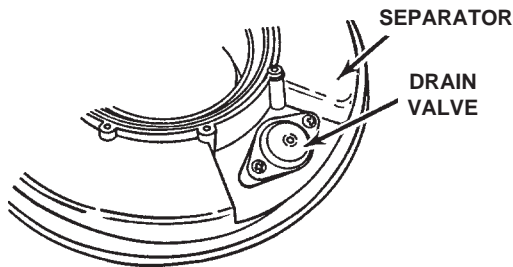
Reassemble the separator to the base by using screws, carefully starting the screws to avoid stripping. The recommended way is to turn the screw counterclockwise until you can feel the threads backing off or "bumping", then turn clockwise but, DO NOT TIGHTEN yet.



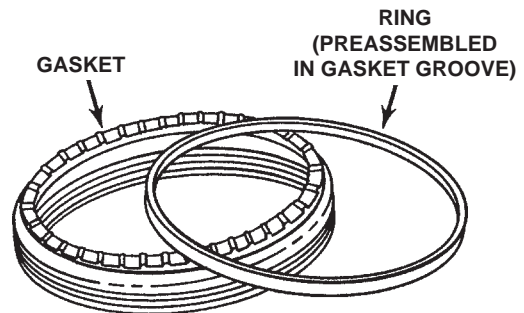
Place the large end of the special centering tool down over the drain impeller shaft so that flange of tool fits into opening of accumulator. This centers accumulator to the rest of assembly. Now **TIGHTEN** the screws.



Place the pump outlet cover over the separator making sure it is seated over the two locating bosses on the separator. Carefully start the screws to avoid stripping. The recommended way is to turn the screw counterclockwise until you can feel the threads backing off or "bumping", then turn clockwise to tighten.

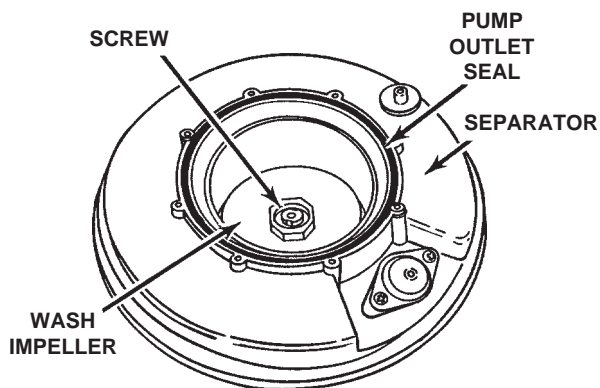


Reassemble the drain valve parts to the separator.



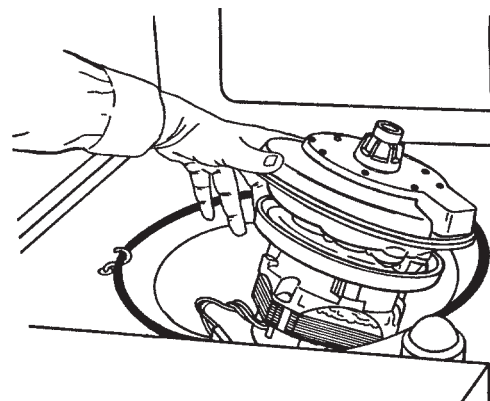
Replace the pump gasket whenever the pump and motor assembly is removed from the tub. Lubricate the gasket with a non-detergent soap.

DO NOT USE DETERGENT OR PETROLEUM PRODUCTS.



Reassemble the wash impeller, then the impeller screw. Rotate impeller and listen for rubbing noise, also check to see if impeller can be moved up and down. If either occurs, parts have been left out or not tightened during reassembly.

Insert a new pump outlet seal into the separator retaining groove.



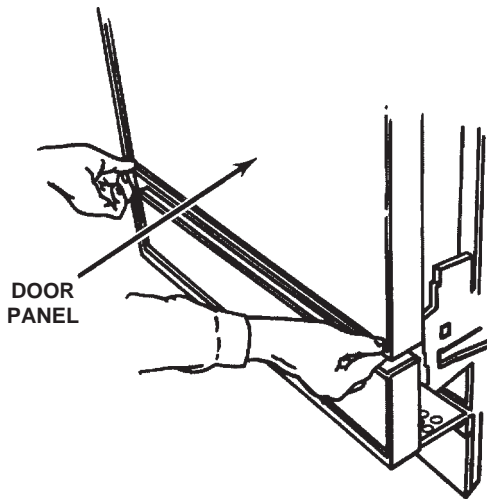
Place the pump and motor back into the tub, and don't forget to turn the rubber clamps outward 90°. Replace the check valve and hook up the wiring and hose connections.

CHAPTER 2

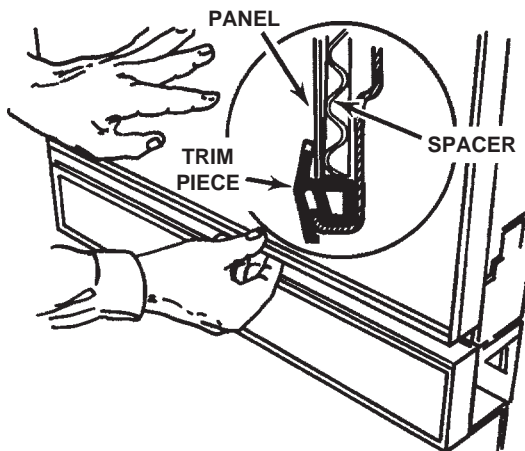
MECHANICAL COMPONENTS

(for Plastic Liner Models: 1986 and Newer)

DOOR PANEL ACCESS

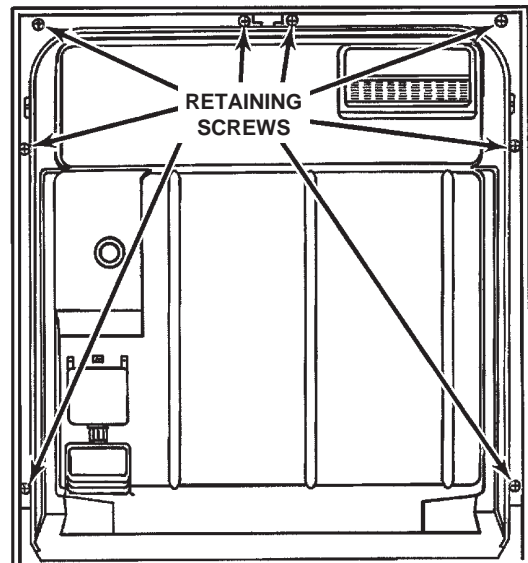


To change the door panel, slide the door panel up as high as possible. Lift up at each end of the trim piece at the bottom of the door panel and pull the trim piece toward you.



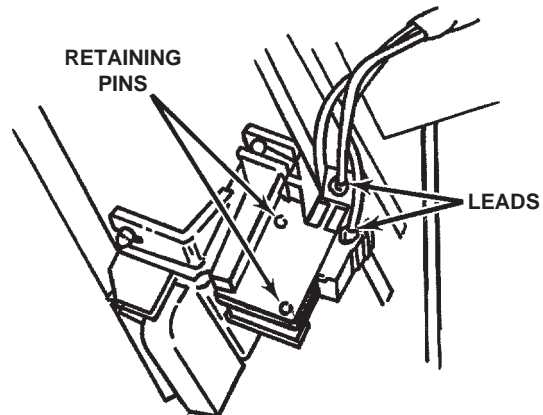
Use both hands to bow the panel outward and remove the panel from the door. Bow the new panel outward with the desired color facing out and insert into the door trim. Make sure the door panel and the spacer fit under the top edge of the door trim. Hold the panel up and insert the bottom piece. It will snap down in place. Slide the door panel down into the bottom trim piece.

DOOR and CONSOLE ACCESS



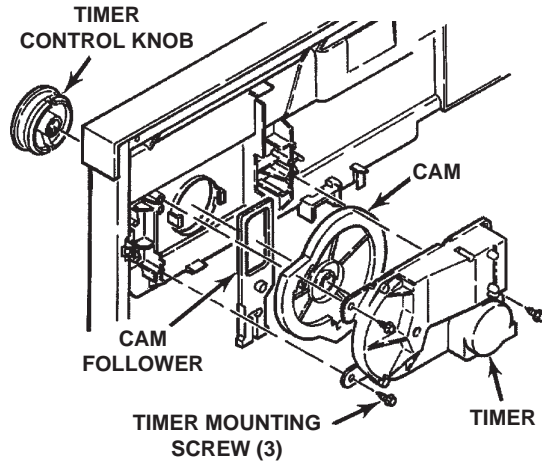
To access the components in the door and the console areas, remove the eight (no. T-15) torx screws which hold the inner door panel to the door frame and console.

RELEASE LEVER / DOOR LATCH



These parts are located in the middle under the timer cover which can be removed by releasing the two retaining tabs. Remove the wiring harness leads. Remove the two switch retaining pins and remove the switches. The latch lever and bolt can be separated at this time by prying apart the locking tabs and separating the two pieces.

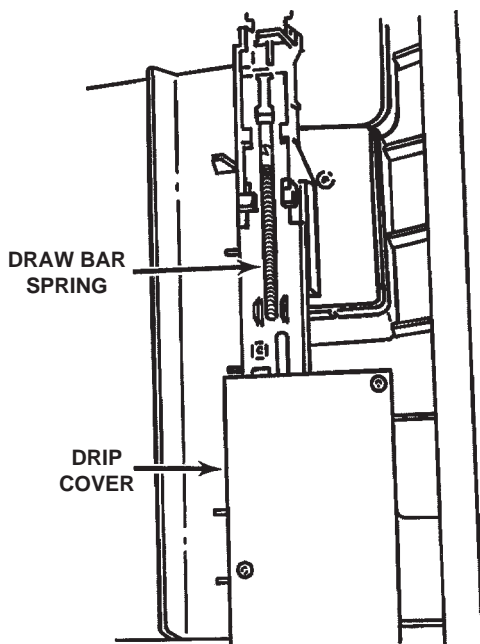
TIMER



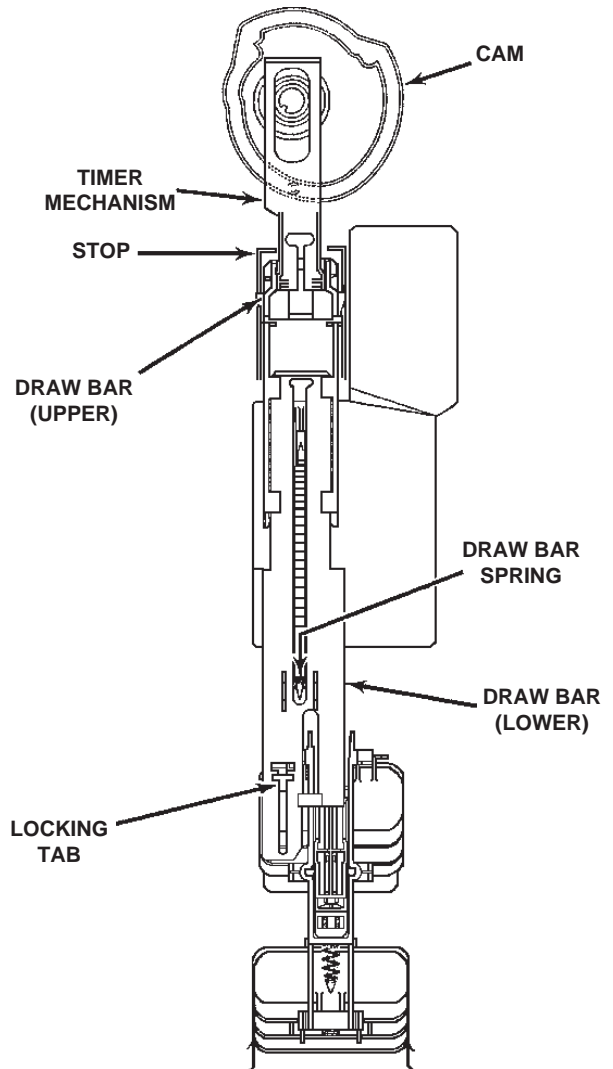
Remove the timer wiring harness. The timer, cam, and cam follower can be accessed by removing the three timer retaining screws.

NOTE: When reinstalling the cam, be sure it is aligned with the keyed shaft on the timer. When reinstalling the timer, be sure the cam follower post is positioned inside the cam's groove.

DISPENSER MECHANISM

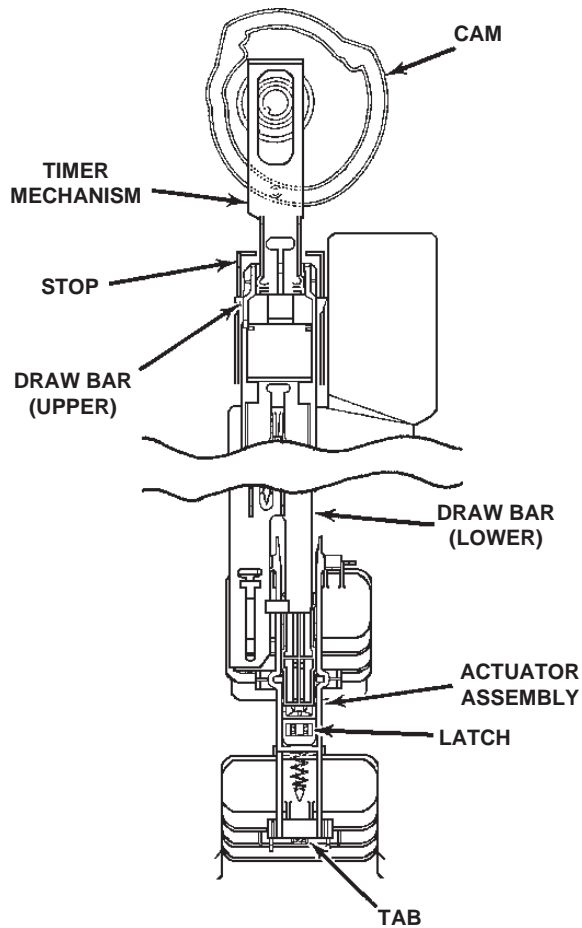


To access the draw bars, first remove the drip cover. Remove the draw bar spring. Slide the lower dispenser draw bar down as far as it will go to release it from the locking tabs.



Remove the upper and lower draw bars. Once they are removed, the upper and lower draw bars can be separated from each other.

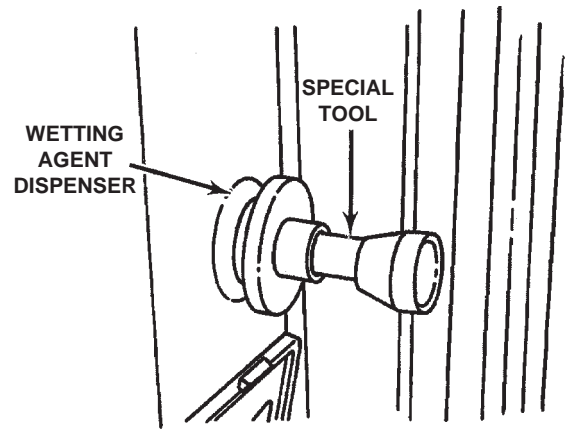
ACTUATOR ASSEMBLY



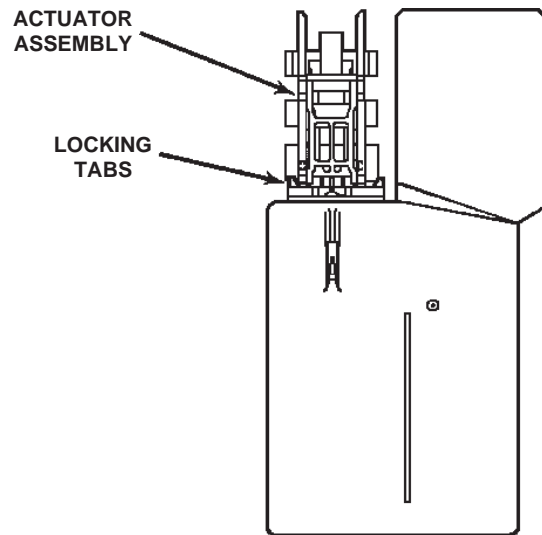
The actuator assembly can be removed by prying the bottom with a screwdriver and pivoting the assembly up and off.

NOTE: When reinstalling the actuator assembly, be sure that the latch is positioned as shown here, to insure proper operation of the detergent dispenser.

WETTING AGENT

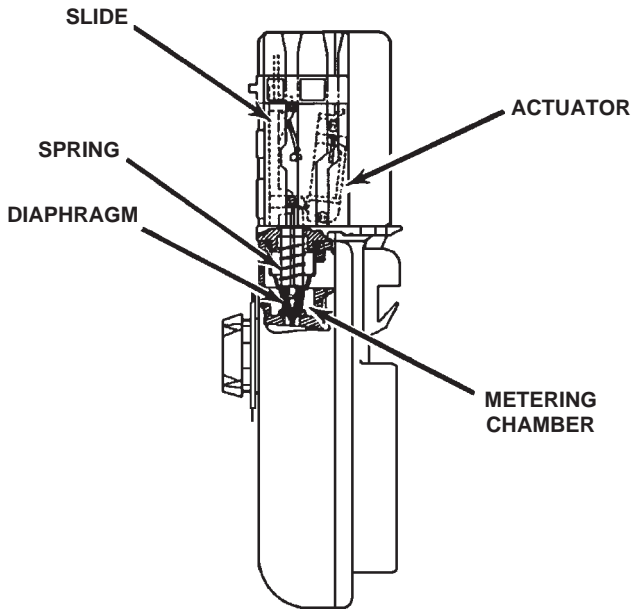


This part is located on the right side of the door. It dispenses a wetting agent just before the final rinse. This causes water breakdown during rinse. The water then runs off the dishes and silverware, leaving fewer or no spots. To remove the wetting agent dispenser, unscrew and remove the wetting agent cap assembly. Use a dishwasher special pump tool to release the locking tabs on the inside of the door and remove the wetting agent dispenser from the door.



The wetting agent actuator can be removed from the wetting agent dispenser by releasing the two locking tabs and removing the actuator.

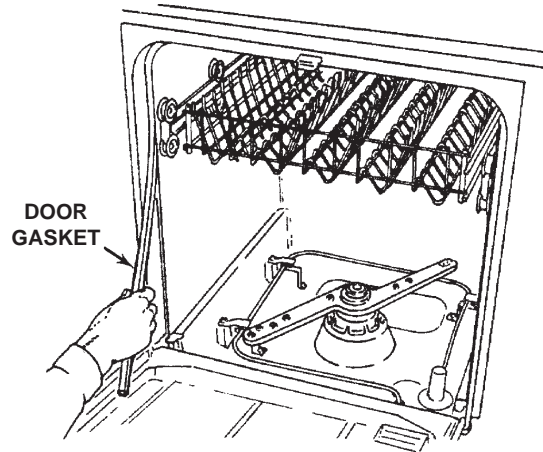
To reassemble the wetting agent actuator assembly, the components should be replaced in the following manner.



Insert the diaphragm in the wetting agent reservoir making sure the bottom of the diaphragm is centered and seated on the seal surface. Insert the spring into the diaphragm. Lock the guide onto the reservoir using the two locking tabs. Insert the slide into the guide and press on the end until it snaps into the diaphragm. Insert the actuator into the guide until the actuator snaps over the slide. Snap the wetting agent dispenser into the inner door panel and replace the cap.

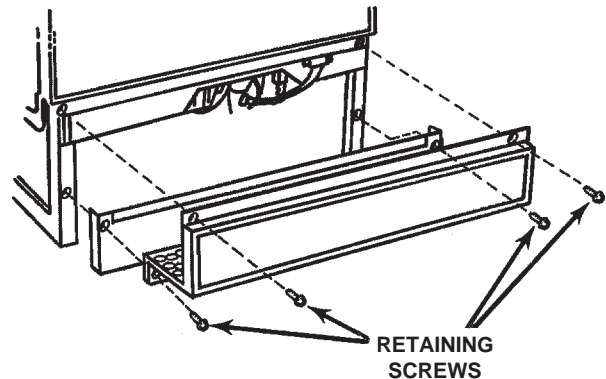
NOTE: When reinstalling the dispenser mechanism it is important to cycle the timer through a complete cycle in order to reset the dispenser mechanism.

DOOR GASKET



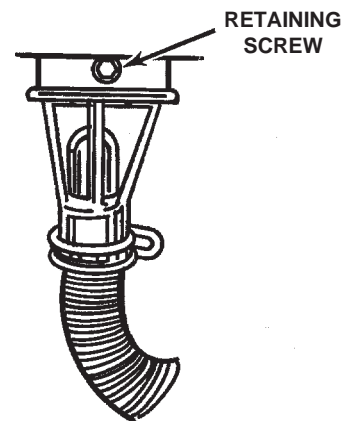
Starting at one end, pull the gasket out of the groove and remove. Press the new gasket into the groove, being sure to position the gasket so that the ends are even with the ends of the groove, otherwise leaks will occur.

BELOW THE TUB ACCESS



To access the components under the dishwasher, the toe panel and access panel must be removed. Remove the four access panel retaining screws.

CHECK VALVE

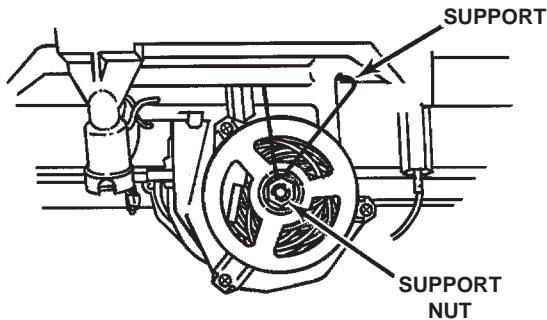


The check valve can be replaced by removing the hoses and removing the retaining screw.

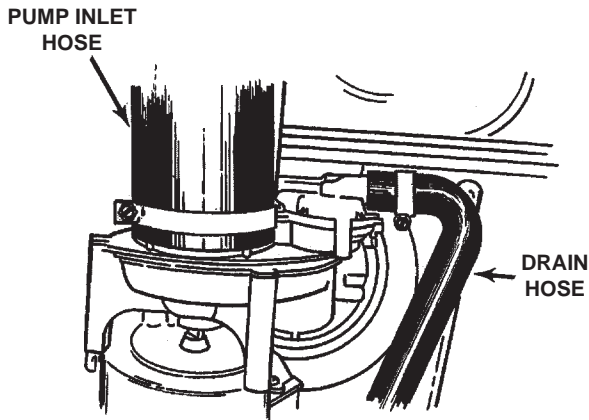
SOME MODELS MAY USE THE POWER CLEAN PUMP-SEE PAGE 9; OR SEE BELOW.

PUMP and MOTOR (HORIZONTAL)

To remove the pump and motor assembly, first remove the dishwasher from the cabinet. Lay the dishwasher on its back and disconnect the wiring harness.

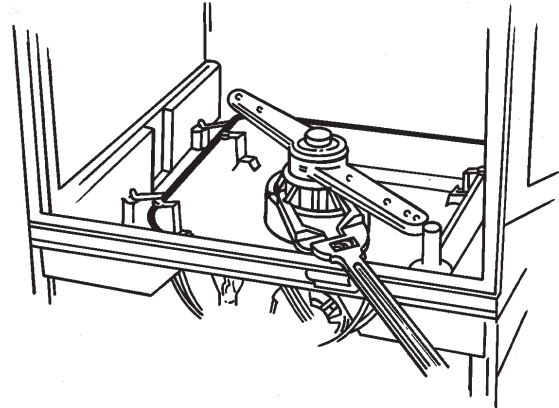


Remove the motor support nut and then remove the motor support.

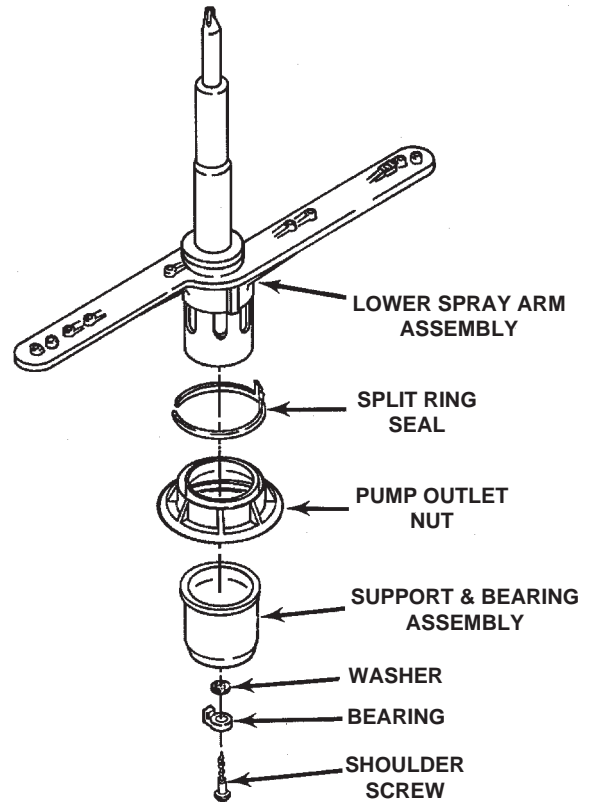


Disconnect the drain hose coupler from the tub and disconnect the pump inlet hose from the pump and motor assembly.

Open the dishwasher door and remove the lower rack.



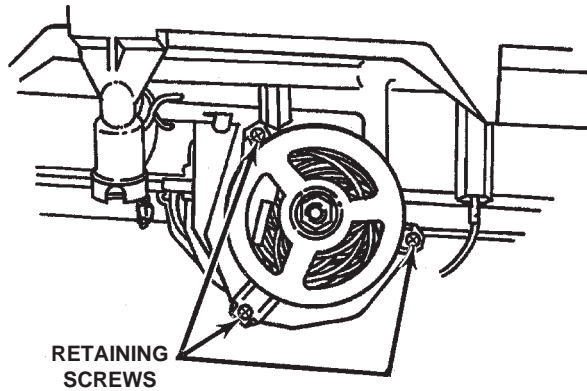
Using an adjustable slip nut wrench, loosen the pump outlet nut and remove the spray arm assembly and the grommet washer.



The spray arm assembly can be disassembled by removing the (no. T-20) torx screw on the bottom of the assembly. Remove the support bearing assembly, the pump outlet nut, and the split ring seal.

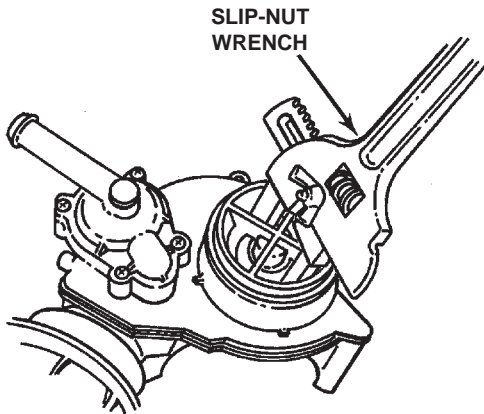
At this point the pump and motor assembly can be removed from the bottom of the dishwasher. The pump outlet grommet can be removed from the inside of the tub.

NOTE: Check the grommet for wear or damage and replace it if necessary.

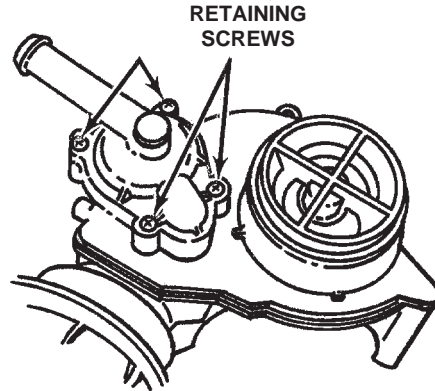


Remove the three motor retaining (no. T-20) torx screws and carefully remove the motor.

NOTE: When reinstalling the motor make sure the keyed motor shaft lines up with the pump impeller.



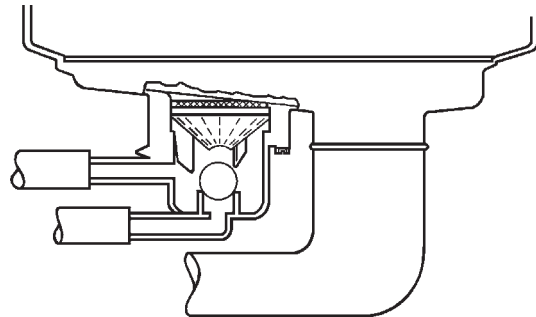
The pump impeller can be accessed by using the adjustable slip-nut wrench to remove the grey disk mount assembly. The impeller can then be removed.



The drain valve can be accessed by removing the four (no. T-20) torx retaining screws by the drain outlet and removing the cover. From this point the drain cover seal, diaphragm, and diaphragm ring can be removed and replaced.

SOIL SETTLER

Some models may contain a soil settler assembly. It is located next to the pump inlet hose on the bottom of the tub.



It can be accessed by removing the four retaining screws. Disconnect the hoses and remove the assembly. The funnel grate, funnel, ball, and collector can be easily replaced at this point.

BLANK

BLANK