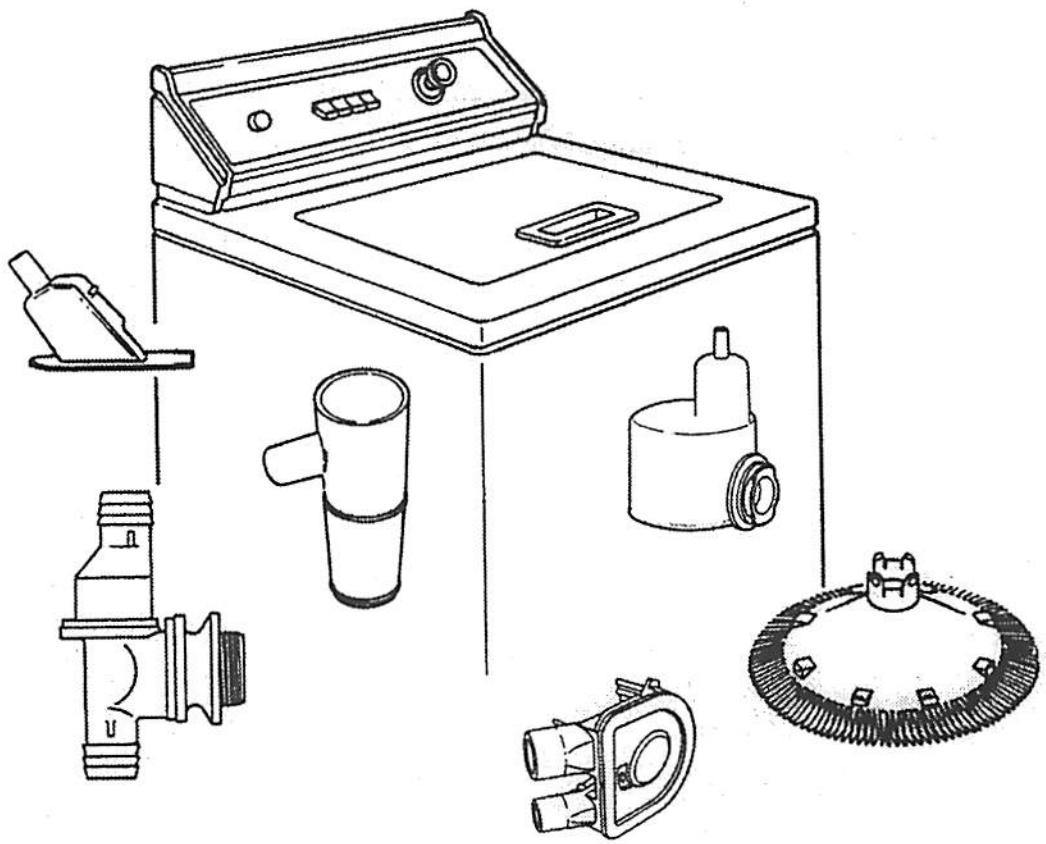
AUTOMATIC WASHER

STUDY COURSE

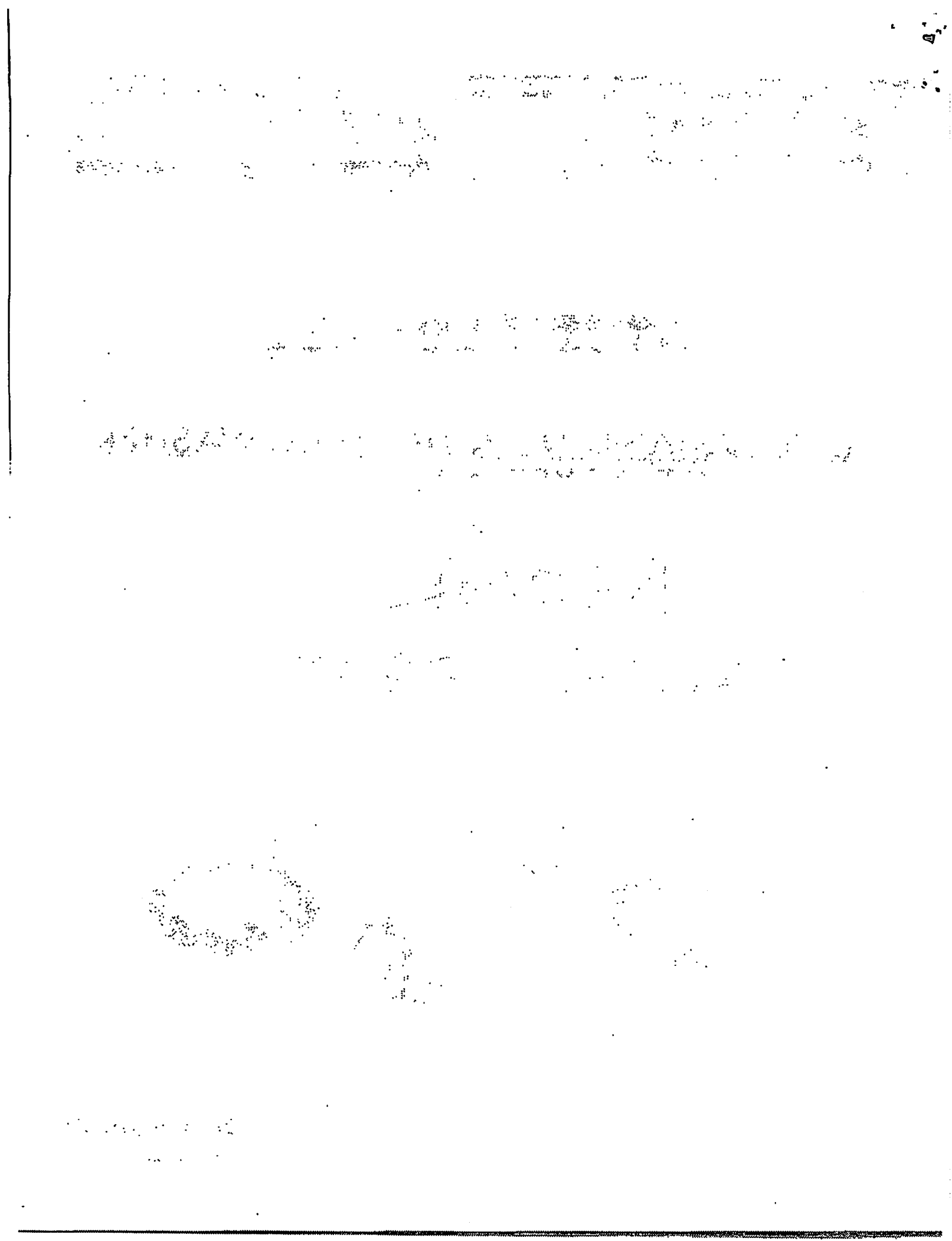
UNDERSTANDING AUTOMATIC WASHER:

- WATER SYSTEMS



MODULE 2

LIT787770 Rev. A



INTRODUCTION

The material presented in this module is intended to provide you with and understanding of the fundamentals of automatic washer servicing.

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

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

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

Information contained in this module is used on WHIRLPOOL® appliances.

TABLE of CONTENTS

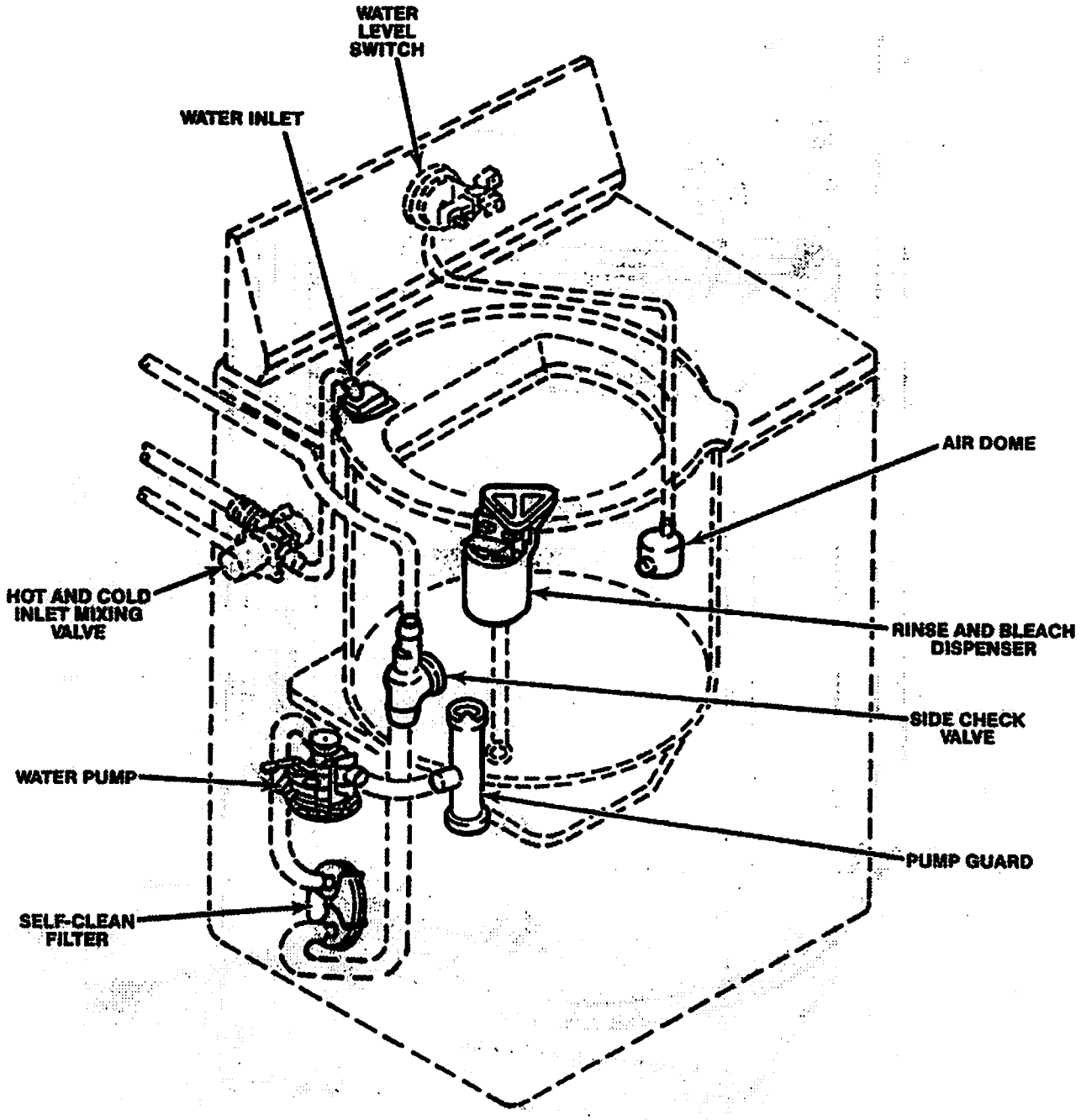
PAGE

CHAPTER 1 ..... **3**
WATER SYSTEM

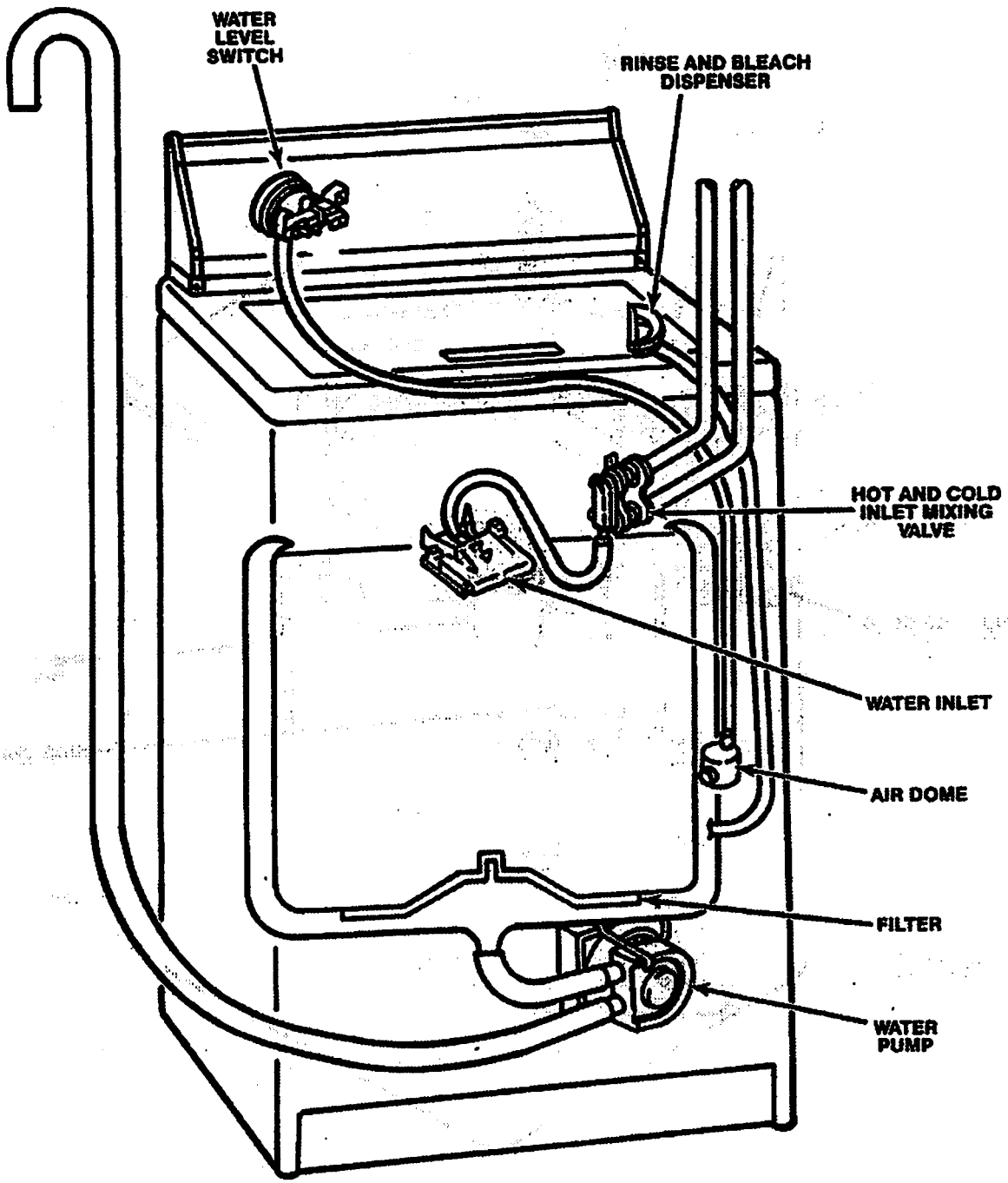
***TEST** ..... **SEE TEST BOOK #787774**

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

CHAPTER 1
WATER SYSTEM



VIEW OF BELT DRIVE AUTOMATIC WASHER SHOWING A TYPICAL WATER SYSTEM (SOME OF THESE PARTS MAY NOT BE USED ON ALL MODELS)



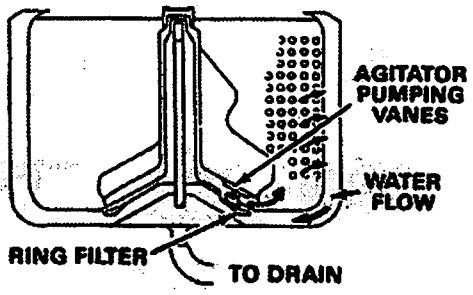
VIEW OF DIRECT DRIVE AUTOMATIC WASHER SHOWING A TYPICAL WATER SYSTEM (SOME OF THESE PARTS MAY NOT BE USED ON ALL MODELS)

WATER FLOW

Water systems contain valves, pumps, filters and hoses. Their function is to fill the tub with water, filter the water, send water to storage tubs, only to recall the water later, then to drain the water from the automatic washer.

SELF-CLEANING (RING) FILTER WATER FLOW
BELT AND DIRECT DRIVE WASHERS
(Non-Suds Saver Models)

FILTERING



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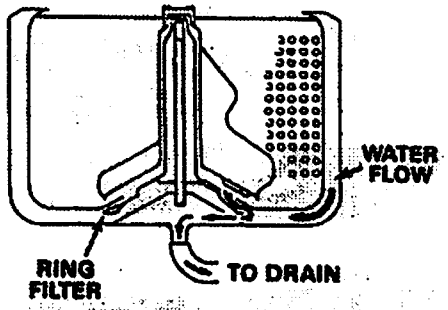
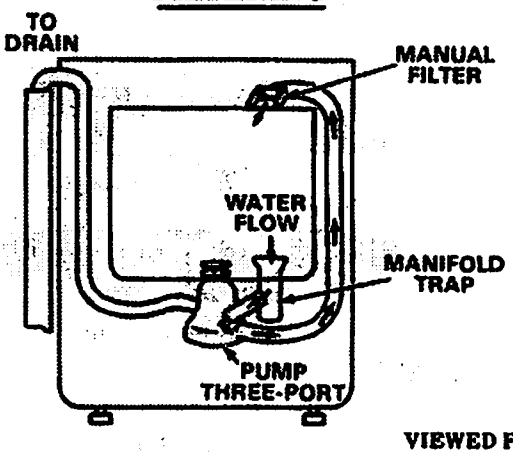


MANUAL CLEAN FILTER WATER FLOW
BELT DRIVE WASHERS
(Non-Suds Saver Models)

FILTERING



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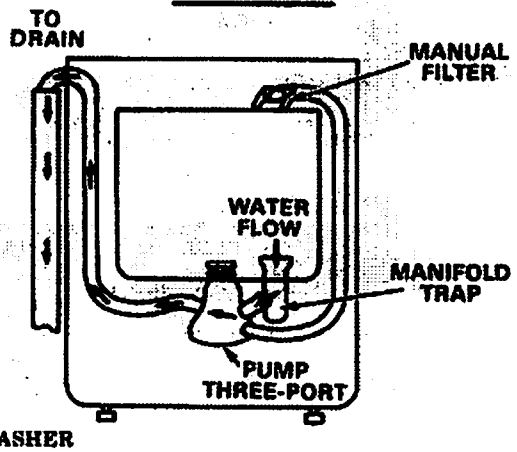
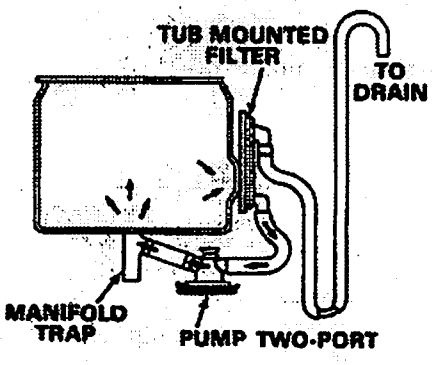


VIEWED FROM SIDE OF WASHER

SELF-CLEANING (TUB-MOUNTED) FILTER WATER FLOW
BELT DRIVE WASHERS
(Suds Saver Models)

FILTERING



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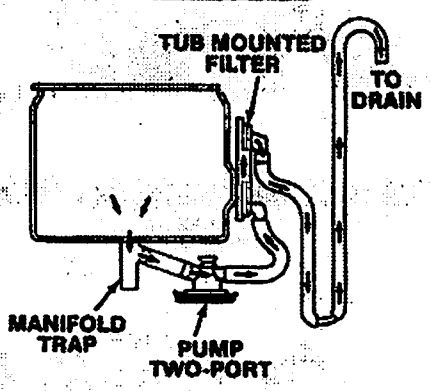

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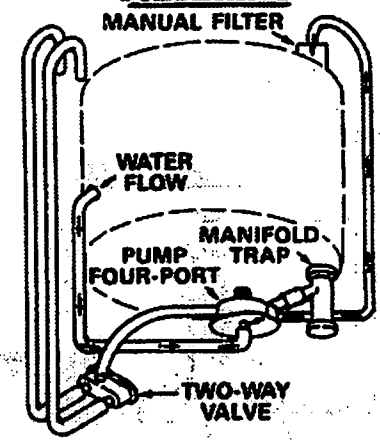
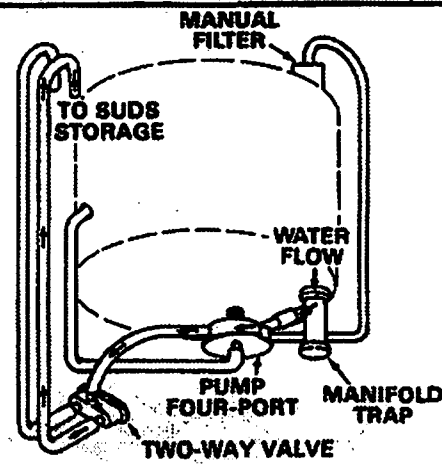
MANUAL CLEAN FILTER WATER FLOW
BELT DRIVE WASHERS
(Suds Saver Models)

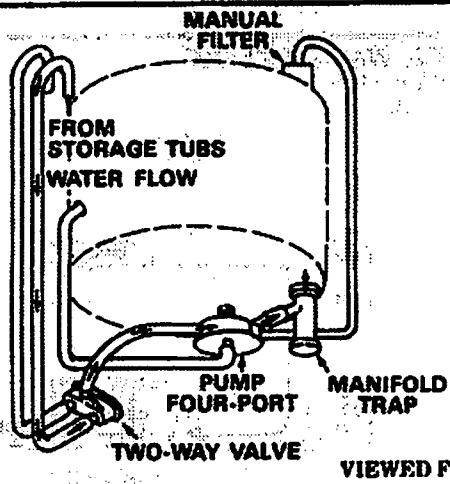
FILTERING



TO SUDS WATER STORAGE TUBS



FROM SUDS WATER STORAGE TUBS



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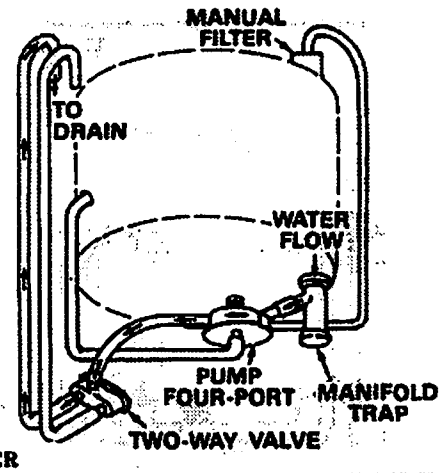
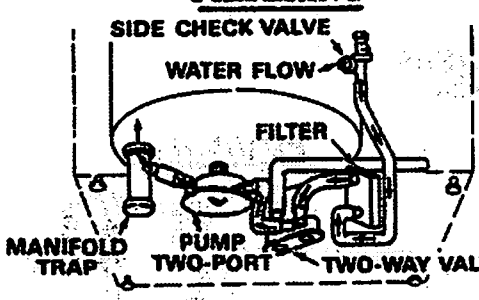


VIEWED FROM SIDE OF WASHER

SELF-CLEANING FILTER WATER FLOW
BELT DRIVE WASHERS
(Suds Saver Models)

FILTERING



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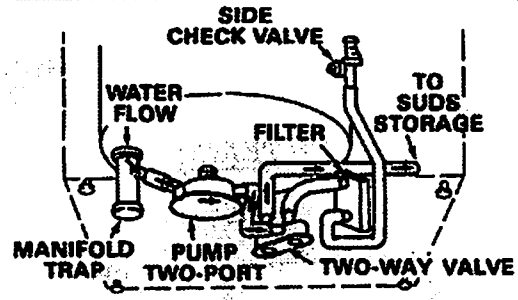

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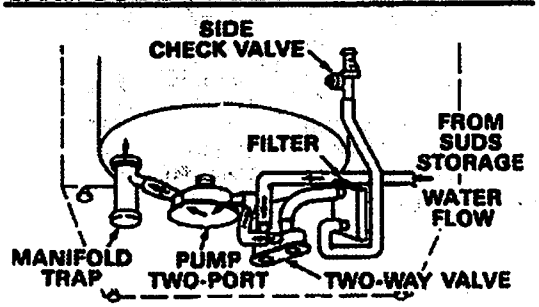

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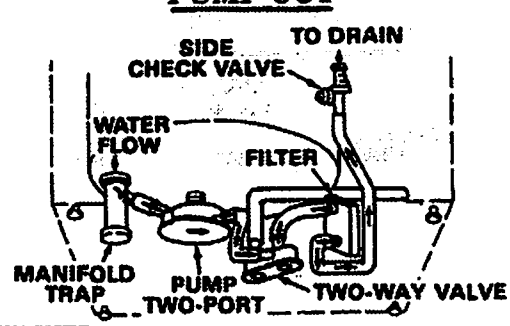
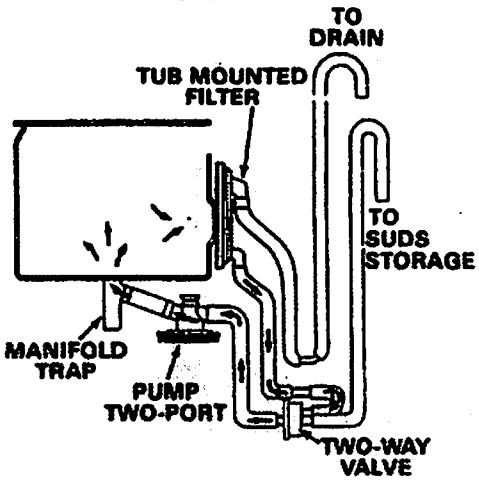


VIEWED FROM SIDE OF WASHER

SELF-CLEANING (TUB-MOUNTED) FILTER WATER FLOW
BELT DRIVE WASHERS
(Non-Suds Saver Models)

FILTERING



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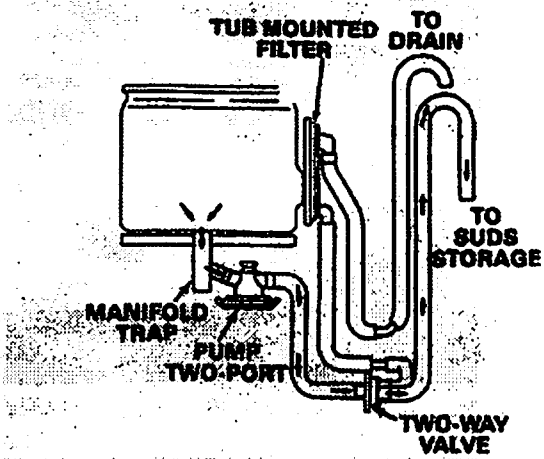

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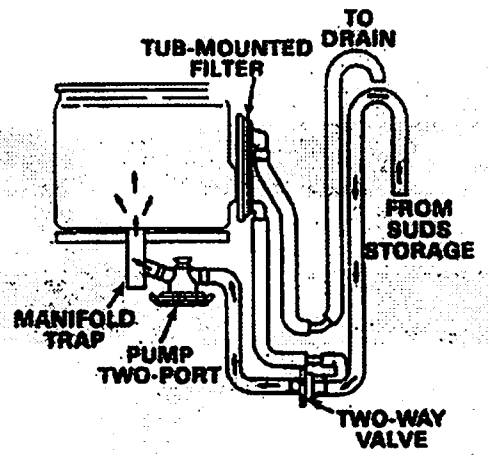

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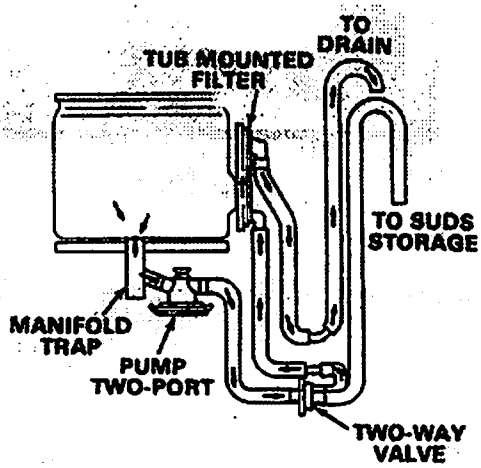
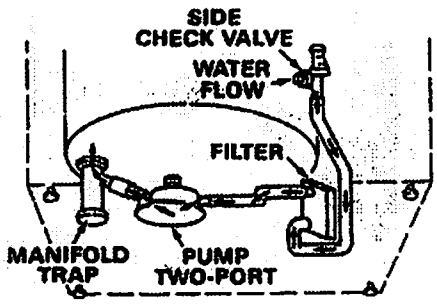


VIEWED FROM SIDE OF WASHER

SELF-CLEANING FILTER WATER FLOW
BELT DRIVE WASHERS

FILTERING



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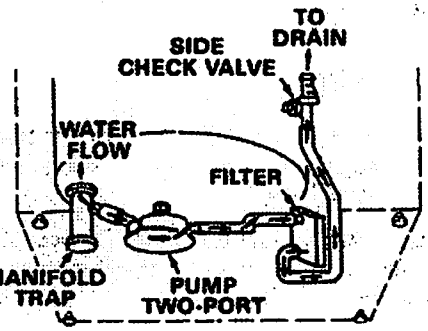

VIEW FROM SIDE OF WASHER

FILTER

Fig. 1. Filters.

There are two basic types of filters the self-cleaning and manual clean (Fig. 1). During the wash and rinse period, water is drawn from the tub by the pump or circulated by the agitator through the filter where lint is removed. The manually cleaned filter will have many fingers, or bristles, through which the water must pass before it enters the tub. This acts as a maze and removes the lint particles. The lint remains in the filter until such time as it is taken out by the consumer and cleaned.

For the self-cleaning filter, the same basic water circulation takes place as with the manually cleaned filter. The lint is collected by various methods. This filter is cleaned during the pump-out period of the cycle. Cleaning is accomplished by reversing the water flow through the filter, flushing it and carrying the lint out with the water.

AIR DOME

A plastic air dome on the side of the tub (Fig. 2) is connected to the water-level pressure switch by a clear plastic control hose.

Water entering the tub flows into the air dome. This action forces air already in the hose upward, tripping the pressure switch.

All automatics using plastic tubs, the air dome is not serviceable. These air domes are molded to the tub.

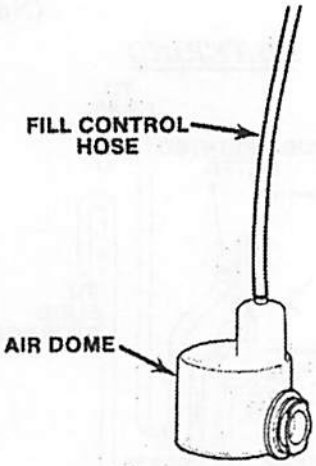

Fig. 2. Air dome.

To remove the dome, first remove the fill control hose. Then depress the dome toward the tub and turn it from the 12 o'clock to 9 o'clock position counterclockwise (Fig. 3). This releases the dome and its sealing gasket.

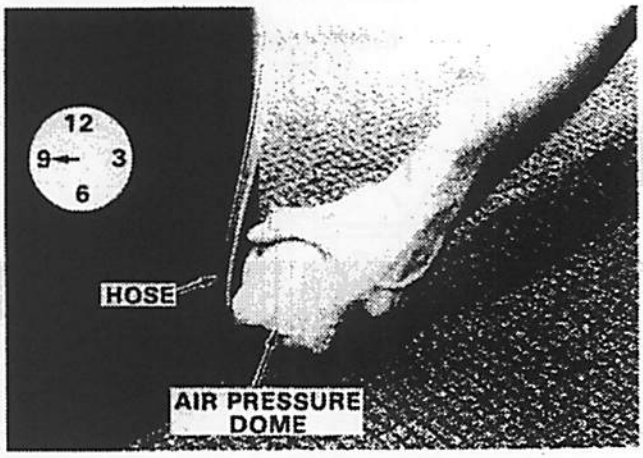

Fig. 3. Removal of air dome.

NOTE: When replacing the seal, the rubber protrusions shown in Fig. 4 must face the air dome body for a proper seal.

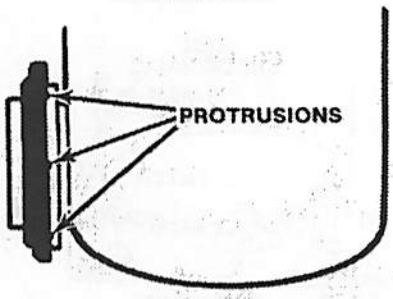

Fig. 4. Location of seal.

PUMP GUARD

Attached between the tub outlet hose and the pump is a "manifold and trap" or pump-guard (Fig. 5). This pump guard may be removed to clean any foreign objects which may be trapped in it. The baffle molded

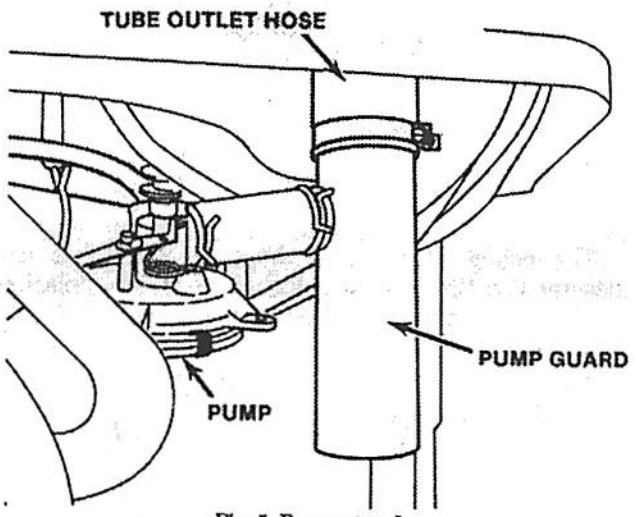

Fig. 5. Pump guard.

in the center reduces the sucking noise made by the pump during operation. The bleed hole in the baffle (Fig. 6) can become clogged with lint. This can cause an air locking condition of the pump and result in an incomplete pump-out. The obstruction can be removed through the top of the pump guard.

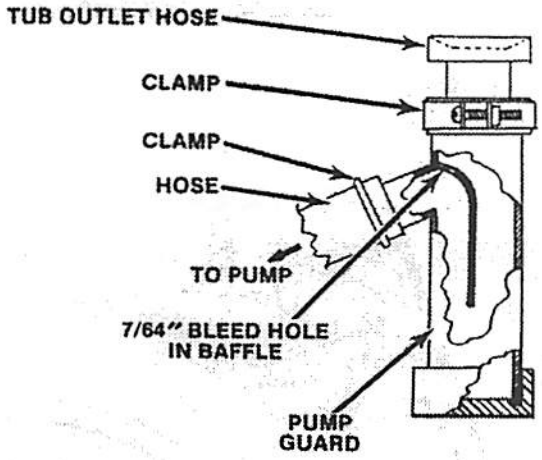

Fig. 6. Cut-away view of pump guard.

SIDE CHECK VALVE

The side check valve (Fig. 7) has two flapper valves within the body. The lower valve prevents water from entering the side of the tub during pump-out. The other valve prevents pump noise from being transmitted through the drain hose during recirculation.

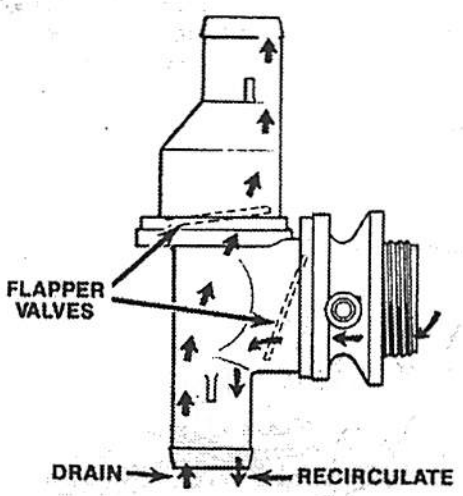

Fig. 7. Side check valve.

WATER INLET

A rubber molded hose is used to carry the water from the mixing valve to the water inlet funnel, vacuum break or nozzle (Fig. 8). This nozzle provides an air gap or vacuum break to prevent the wash water from being siphoned back into the water supply.

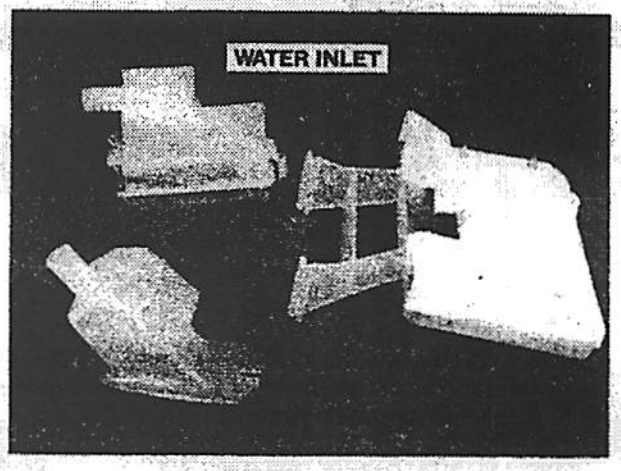

Fig. 8. Water inlet.

BLEACH/RINSE OR FABRIC CONDITIONER DISPENSER

The electric rinse/bleach or fabric dispensers are located at the left front corner of the machine under the lid and are single load type dispensers (Fig. 9). When rinse conditioner or bleach is to be used, pour the measured amount of liquid from a cup into the proper dispenser at the time when clothes are being added to the machine. The dispensers are electrically controlled

to add the liquid through the recirculating water system into the wash load at the proper time during the machine cycle. CAUTION: Use only liquid bleach in bleach dispenser. Dilute rinse conditioner before pouring into rinse conditioner dispenser.

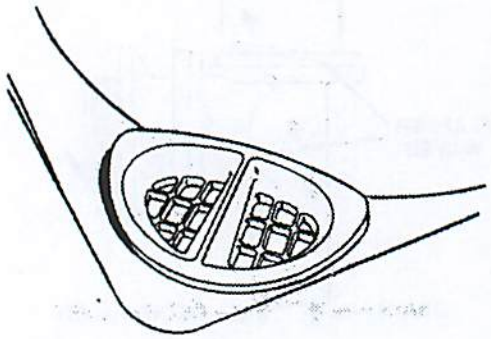

Fig. 9. Dispenser bezel.

A reservoir for holding the liquids is divided into two cavities. Each dispenser is operated by an independent solenoid which raises a plunger type plug, releasing liquid into the recirculating system (Fig. 10).

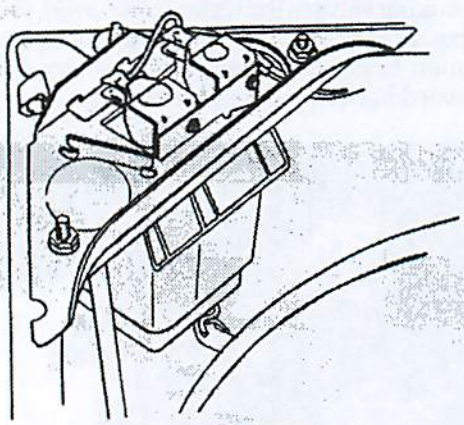

Fig. 10. Dispenser.

Bleach is dispensed two increments (or 4 minutes) before the end of the wash period. The rinse conditioner is dispensed during deep rinse fill.

Past manufacturing problems have instituted identification of the bleach dispenser hose for electric bleach dispensers. Note the ¼ inch raised protrusions on the top and bottom of the hose (Fig. 11). These protrusions must be at the top and bottom (Fig. 12).

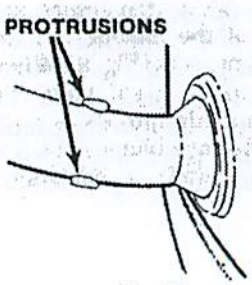

Fig. 11.

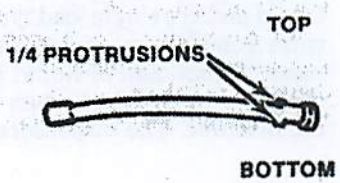

Fig. 12.

If the protrusions are in this position the slot in the hose will be perpendicular to the tub (Fig. 13). This will eliminate any possibility of water being forced back up the hose and overflowing the dispenser.

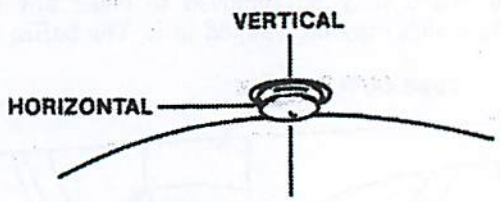

Fig. 13.

The non-electric bleach dispenser bezel has been designed so that during addition of bleach, splashing will not occur and cause damage to clothes in the basket (Fig. 14).

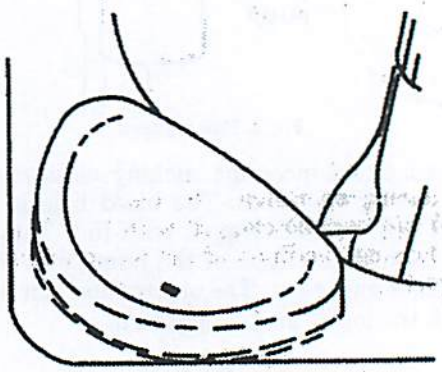

Fig. 14. Dispenser bezel.

This tray (Fig. 15) accepts the bleach and passes it to the outer tub.

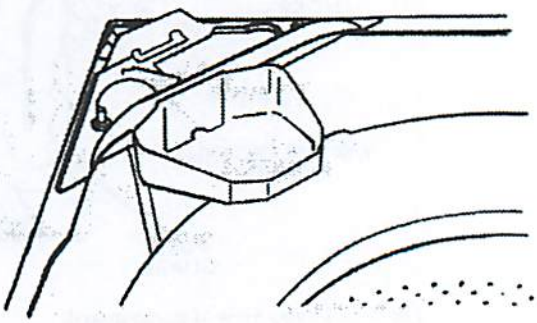

Fig. 15. Dispenser tray.

The agitator-mounted dispenser is non-electric and mounts on the agitator cap. When installing the dispenser, it should be slipped onto the agitator cap and pressed filmly in place.

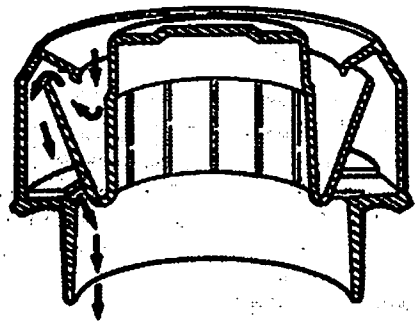

Fig. 16. Agitator mount dispenser.

Centrifugal force created in the first spray rinse causes the rinse conditioner (fabric softener) to leave the inner compartment and remain suspended in the outer compartment of the dispenser. When the basket stops spinning at deep rinse fill, the fabric softener then flows out holes in the bottom of the dispenser and into the basket (Fig. 16). For proper operation, the fabric softener should be diluted.

INLET MIXING VALVE

There are two basic types of water inlet valves used on automatic washers. There are: the single-solenoid type shut-off valve and the two-solenoid type mixing valve.

The main valve bodies are made of nylon and come equipped with plastic sealed solenoids.

The valve body has standard garden hose threaded inlets and a ½ inch non-threaded outlet. Monel screens are inserted in the inlets to prevent rust particles and other foreign matter often found in water, from entering the valve.

Water flow through the valves (both hot and cold) is controlled by individual rubber diaphragms. A spring-loaded armature, inserted in a solenoid guide, is secured over each diaphragm on the valve body by a mounting bracket and screws. A solenoid coil is mounted over each guide, which when energized pulls the armature away from the diaphragm, permitting water to flow into the machine.

SINGLE SOLENOID TYPE

The single inlet valve is mainly a shut-off valve for controlling water entering the machine. It requires only one inlet hose which is generally attached to a "Y" hose. The "Y" hose connects to both Hot and Cold faucets which allow adjustment of the water temperature entering the machine.

TWO-SOLENOID TYPE

Water inlet valves equipped with two inlets are called mixing valves because they actually mix the cold water with the hot water (Fig. 17).

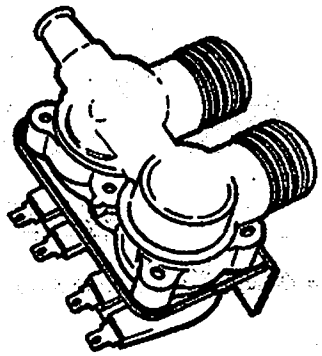

Fig. 17. Mixing valve.

Whirlpool Automatic Washers will have a revised water inlet valve (50-50 valve). When a "Warm" wash or rinse selection is made, this valve gives 50% hot water and 50% cold water. The previously used water inlet valve gave 60% hot water and 40% cold water.

The revised valve conserves energy (hot water) and at the same time does not affect the washing or rinsing ability of the washer.

PUMP (BELT DRIVE)

The water pump used on belt drive automatic washers serves two purposes. During the wash and rinse function it recirculates the water through the filter and back into the tub. At the end of the wash function, it discharges the water. On those models equipped with the suds-saving feature, it also acts to draw the suds water from the suds storage back into the machine for reuse. The pump operates throughout the cycle performing any of these functions as required by the cycle.

The unidirectional pump (as it is called) always turns in one direction and through a system of valves it can accomplish recirculation or drain. In the unidirectional pump the direction of flow is controlled by the flipping action of a flapper valve inside the pump (Fig. 18). This valve is actuated by the agitator cam bar. A toggle spring holds the valve in either of its two positions. The pump is mounted on the gear case and receives its power from the motor drive belt.

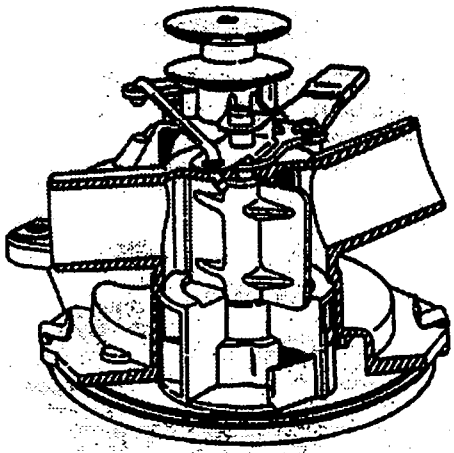

Fig. 18. Cut-away view of pump showing flapper valve.

The unidirectional pump contains two impellers driven by the same shaft. The large impeller discharges the wash and rinse water from the tub. (On those models equipped with a suds saver, it will return the suds water to the machine.) The small impeller is used to recirculate the water from the tub through the lint filter and back into the machine, during the wash and deep rinse functions.

Often a pump problem is due to a foreign object getting into the pump or its flapper valve and causing it to stick or bind. With minor disassembly, the object can be removed and the pump repaired. If the bearings have seized it is generally advisable to replace the pump, since the cost of the labor involved in replacing bearings can approach the cost of a new pump. Earlier pumps did have a bearing block assembly that could be replaced. The smaller impeller of the combination unidirectional pump on earlier models was made of an aluminum die casting and the action of detergent and water sometimes caused it to fail. It is easily replaced as it unscrews from the bottom of the pump shaft. Failure of the flapper valve in the unidirectional pump or the spring attached to the flapper valve lever can be field repaired.

Always carefully judge the cost of the part and labor involved in the repair versus the cost of a complete new pump before proceeding with field repairs. In most instances it is economically advisable to replace the entire pump. Whenever servicing any pump, always refer to the service manual for correct repair procedures.

PUMP (DIRECT DRIVE)

This type of water pump (Fig. 19) is used on direct drive automatic washers and is a non-repairable throw-away pump. It is designed with a ceramic seal for long life and a self-cleaning straight vained flexible rubber impeller. When the washer is in agitation the pump impeller is turning to the left (counterclockwise). With the impeller turning counterclockwise the water is forced back into the tub.

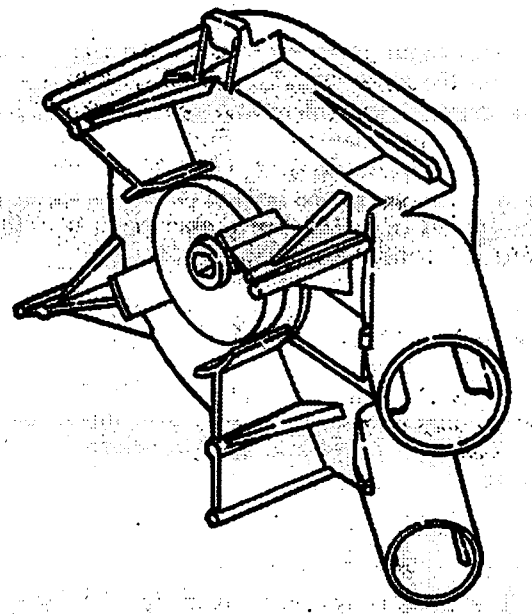

Fig. 19. View of direct drive pump.

During spin and pump-out the motor reverses, turning the pump impeller to the right (clockwise), forcing the water to drain.