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1 Purpose of this manual

Purpose of this manual is to provide service engineers, who already have the required basic knowledge to carry out repair operations on domestic washing machines, with general information on the new range of washing machines with mobile RIM.

More detailed information concerning specific models such as:

- Electric diagrams
- Timer charts
- Exploded views of spare parts
- Spare part lists

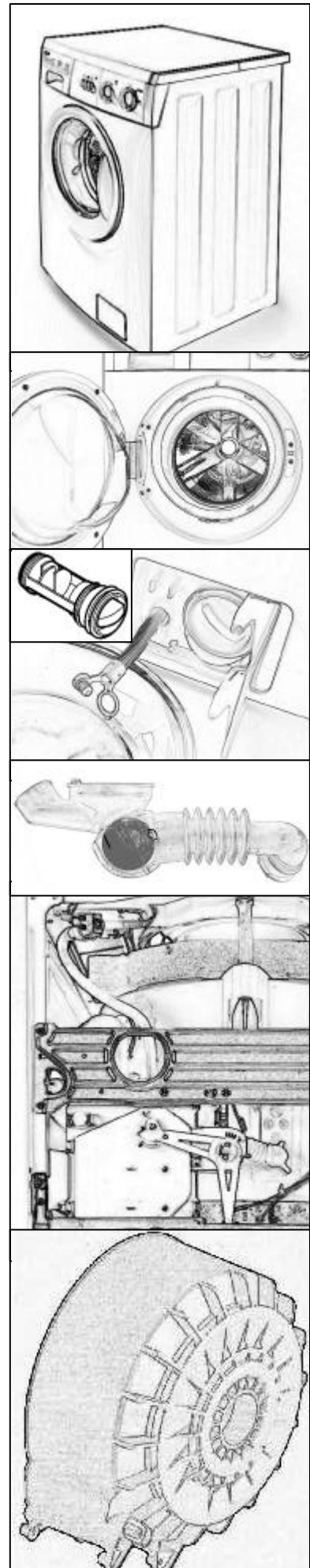
may be obtained from the Service Notes, issued separately for each specific model.

2 Safety notes

- Repair operations on electric appliances must be carried out only by professionals.
- Before gaining access to the internal parts of the appliance, remove the power supply plug from the mains socket.
- As far as possible carry out ohmic measurements, instead of direct voltage and current measurements.

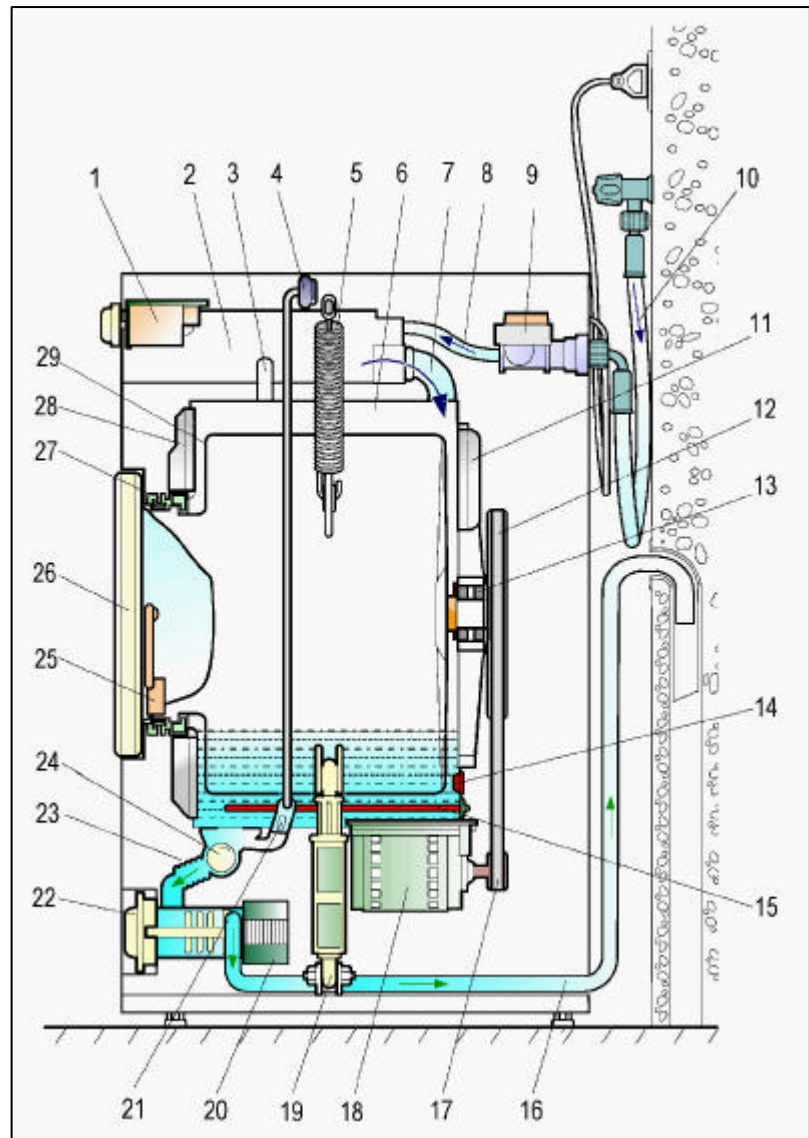
3 GENERAL FEATURES

- Cabinet: it is characterised by the arched front.
 - The control panel has a new design, like the cabinet one.
- The door has greater dimensions to facilitate the loading of the clothes.
- New drain circuit with:
 - Drainage tube,
 - Self-cleaning filter,
 - “Ball” valve (Eco-ball).
- Detergent dispenser with rotary water distributor
- Tub in Carboran:
 - Drum volume: 42 l
 - Spin speed: 400÷1000 rpm.



3.1 OPERATING PRINCIPLE

1. Timer
2. Detergent dispenser
3. Steam tube (some models)
4. Pressure switch
5. Tub suspension spring
6. Tub
7. Soap inlet tube
8. Solenoid-tub tube
9. Solenoid
10. Water inlet tube
11. Rear counterweight
12. Drum pulley
13. Bearings
14. Thermostat / Temperature probe
15. Heating element
16. Outlet tube
17. Motor pulley
18. Motor
19. Damper
20. Drain pump
21. Pressure chamber
22. Drain filter
23. Tub drain tube
24. Ball (eco-ball)
25. Door safety device
26. Door
27. Door seal
28. Front counterweight
29. Drum



Removing dirty from clothes is obtained through a mechanical and chemical action.

The solenoid valve fills water in the tub, where the soap is taken and then goes to the inside of the tub. The correct level is determined by one or more pressure switches.

The fabrics loaded into the appliance are kept in continuous movement by the drum rotation.

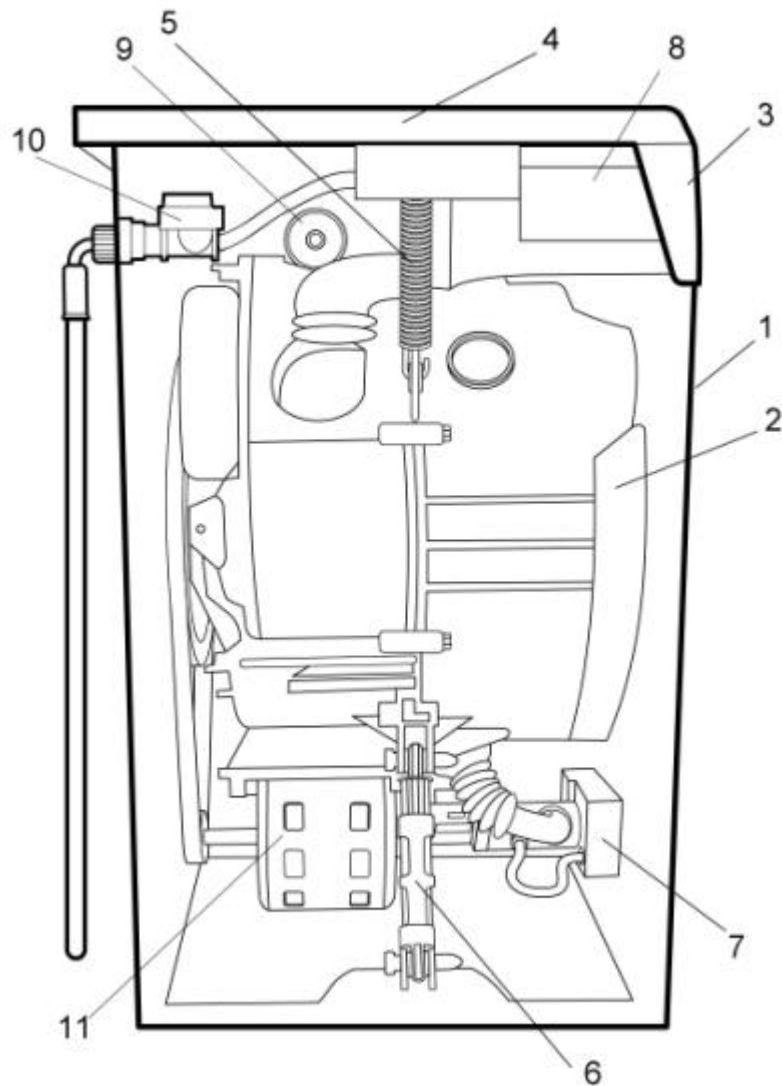
The dirty particles, separated from the fabrics fibres by the soap chemical action and by the temperature are removed by the water flux through the fibres themselves.

This action is obtained by continuous immersions and agitations of the fabrics to be washed in a lye bath.

The heating element is powered till the reaching of the prefixed temperature, which is controlled by thermostats or sensors.

Once the washing is completed, the dirty water is drained by the special pump.

4 CONSTRUCTIONAL FEATURES



1. Cabinet
2. Washing unit
3. Control panel
4. Cover
5. Tub suspension spring
6. Damper
7. Drain filter body
8. Detergent dispenser
9. Pressure switch
10. Solenoid valve
11. Motor

4.1 CABINET

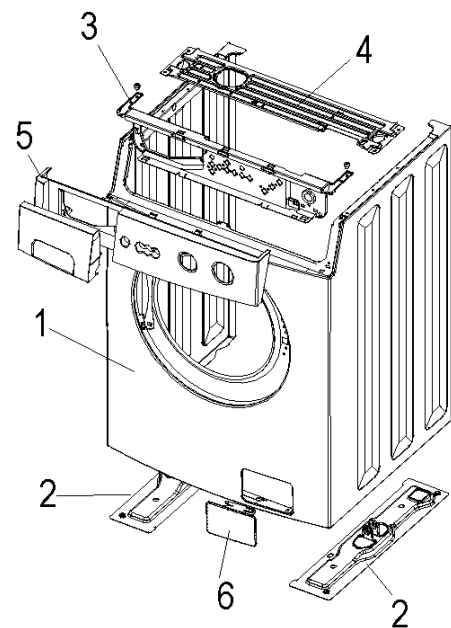
The cabinet consists of a steel metal-plate shell on which are screwed the inferior crossbars and the back side; the rear panel is screwed to the cabinet to facilitate the access to the components.

To the cabinet are screwed:

- control panel
- sieve flap
- door
- supporting crossbar



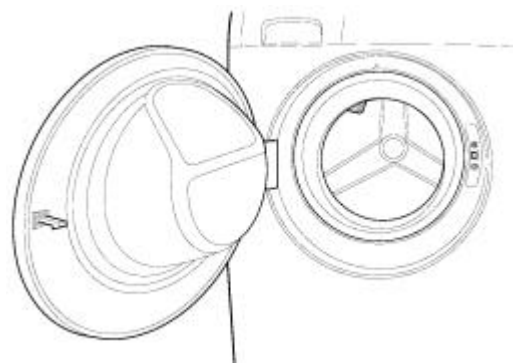
1. Cabinet front shell
2. Lower crossbars
3. Controls support
4. Tub support and tub springs
5. Control panel
6. Sieve flap



4.2 Door

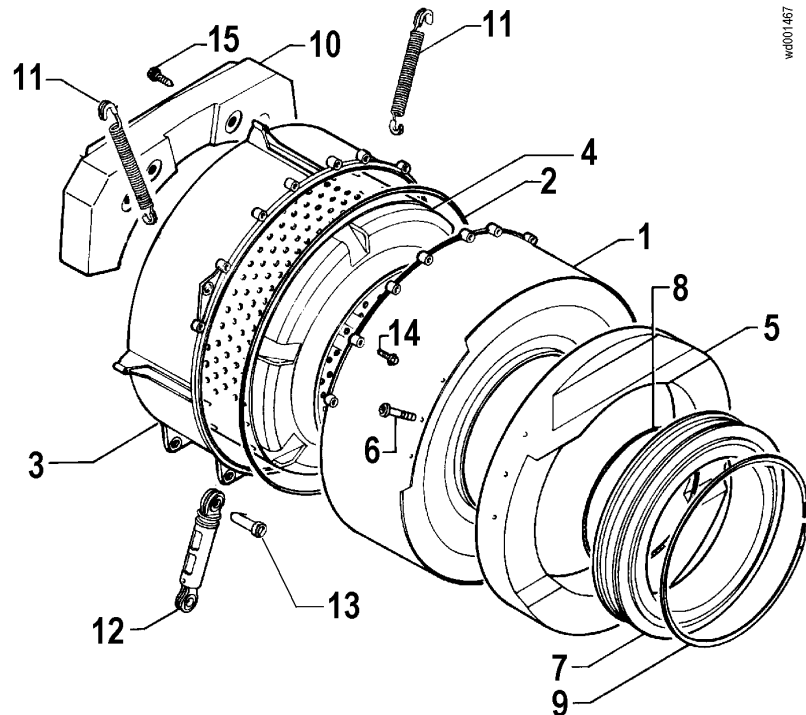
The door, available in two different stylings, is of great dimensions to facilitate the loading operations of the clothes.

The version with 180° opening is available in some models.



4.3 WASHING UNIT

1. Front shell
2. Gasket (OR)
3. Rear shell
4. Drum
5. Front counterweight
6. Counterweight fixing screw
7. Door gasket
8. Tub gasket fixing ring
9. Cabinet gasket fixing ring
10. Rear counterweight
11. Washing unit suspension springs
12. Damper
13. Damper pin
14. Shells fixing screws
15. Counterweight fixing screw

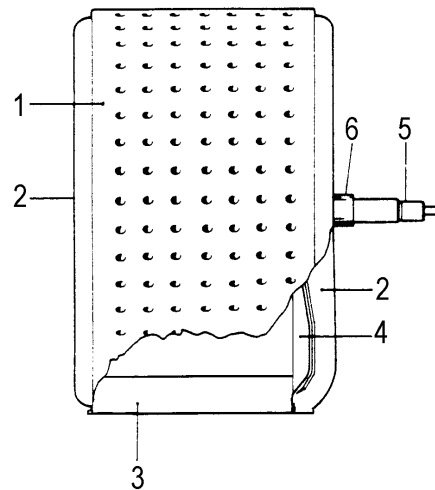


The tub consists of two Carboran shells screwed among them with a series of self-tapping screws. The two counterweights are fixed to the shells with screws. The door gasket is fixed to the front shell through a metal spring ring. The drum volume is 41 litres, which allows a load nominal capacity of 4,5 (maximum 5Kg). The spin speed can be, according to each model from 400 to 1000 rpm.

4.3.1 Drum

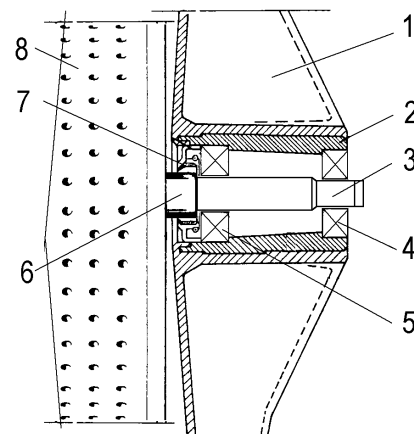
The drum consists of a stainless-steel shell to which the two flanges are fastened. Inside the drum there are the lifters. The drum cross-piece, made of aluminium alloy is screwed to the drum flange. A brass bush is pressed into the drum shaft.

1. Drum housing
2. Flange
3. Lifter
4. Drum cross-piece
5. Drum shaft
6. Drum shaft bush



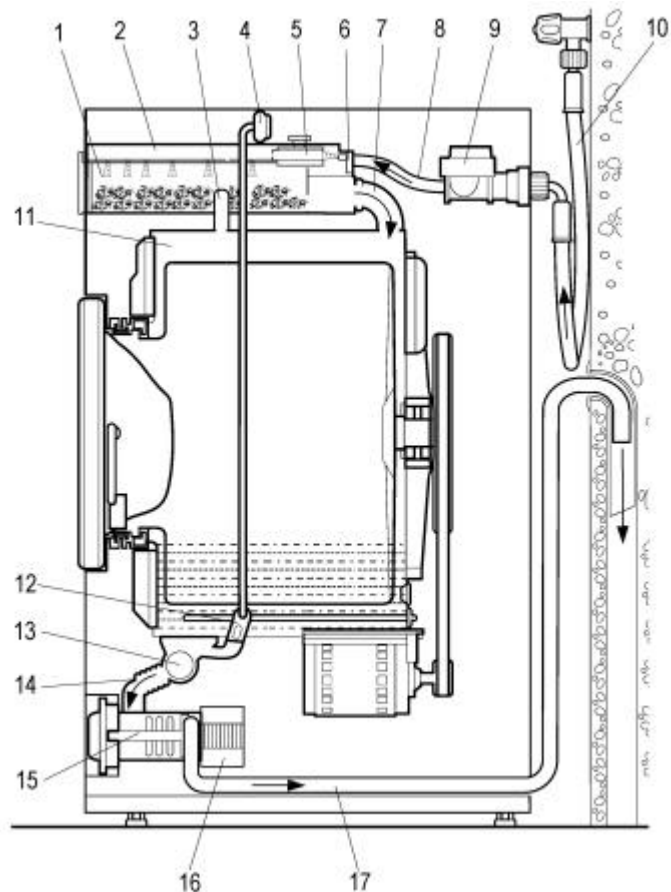
4.3.2 Bearings support

1. Tub rear shell
2. Bearings support
3. Drum shaft
4. External bearing
5. Internal bearing
6. Drum shaft bush
7. Drum shaft gasket
8. Drum



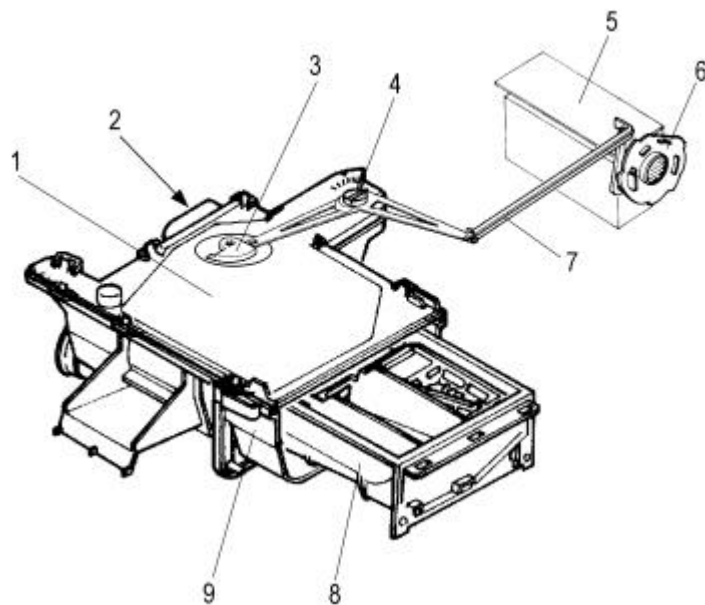
5 HYDRAULIC CIRCUIT

1. Detergent drawer
2. Dispenser conveyor
3. Steam tube (some models)
4. Pressure switch
5. Water distributor
6. Nozzle
7. Detergent inlet tube
8. Solenoid-to-dispenser tube
9. Water inlet solenoid
10. Water inlet tube
11. Tub
12. Pressure chamber
13. Ball
14. Tub-to-filter body tube
15. Drain filter
16. Drain pump
17. Drain tube







5.1 DETERGENT DISPENSER

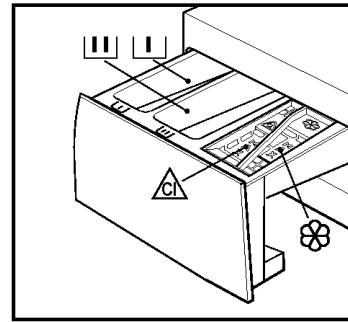
1. Conveyor
2. Water intake
3. Water distributor
4. Regulation cam
5. Timer
6. Cam
7. Levers
8. Detergent drawer
9. Detergent dispenser



The water is conveyed to the water distributor through the intake nozzle. The distributor conveys water only through one of the conveyor channels, according to the position of the timer cam during the washing cycle, so as to draw the detergent from the relevant dispenser.

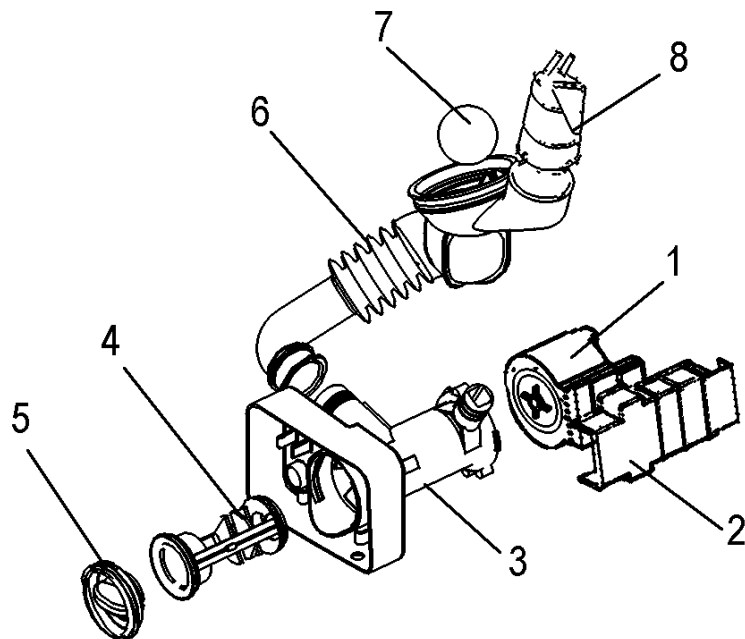
5.1.1 Detergent drawer

-  Pre-wash compartment
-  Wash compartment
-  Whiteners compartment (some models)
-  Softeners compartment

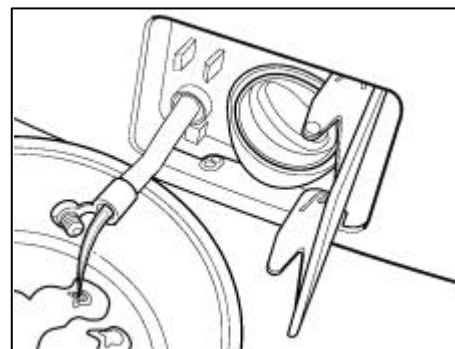


5.2 DRAIN CIRCUIT

- 1. Drain pump
- 2. Pump protection
- 3. Filter body
- 4. Drain filter
- 5. Filter knob
- 6. Tub-to-filter body tube
- 7. Ball
- 8. Pressure chamber

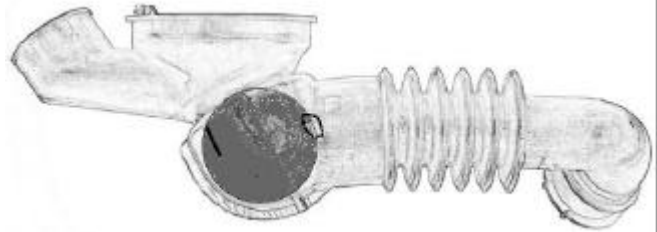


The drain system is self-cleaning: the filter holds only objects of a certain dimension.
The pump wheel can be inspected after unscrewing the filter.
A draining tube enables the emptying of the drain circuit.



5.3 “BALL” VALVE (ECO-BALL)

The “Eco-ball” valve consists of a ball inserted into a tube which links the tub to the filter body and has the function of keeping the washing water (contained in the tub) separated from the water of the drain circuit.

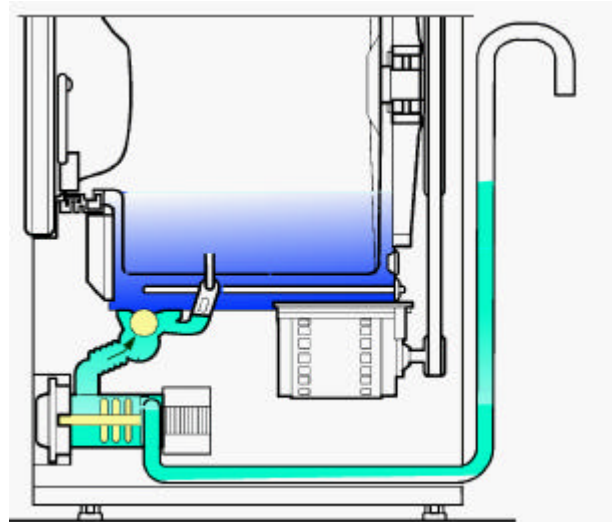
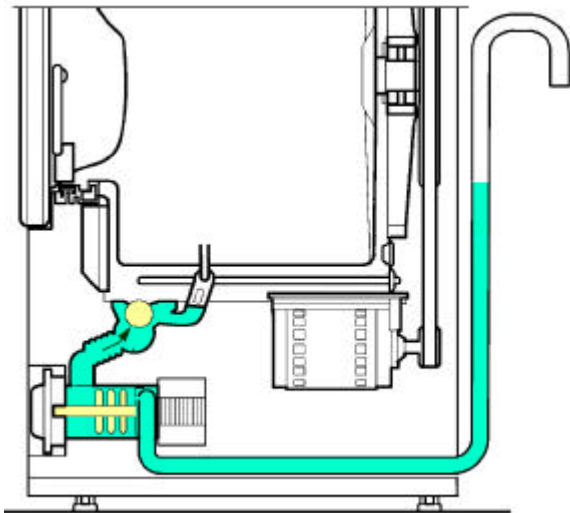


Advantages compared to a traditional circuit:

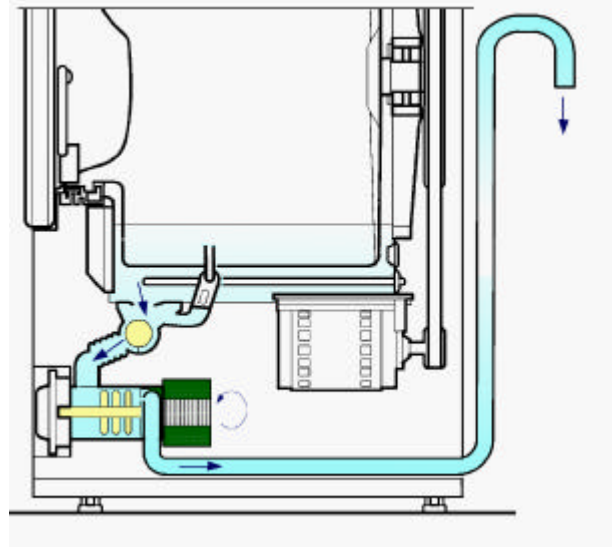
- energy conservation as the water inside the drain circuit is not warmed up
- the detergent does not deposit inside the filter body and so the washing quality is improved (reduction of detergent mechanical leakage)
- better rinse efficiency

5.3.1 Ball operation principle

- During water inlet and washing phases the ball, raised by the water contained in the drain circuit, is in the higher position and therefore closes the water flow between the tub and the filter body. It is important for the correct operation of the system, to keep the drain tube hooked to the support placed in the back panel (60 cm minimum height).



- During drain phases, the suction generated by the operating pump lowers the ball, enabling the water defluxion through the drain circuit.



6 ELECTRIC COMPONENTS

6.1 CHECKS TYPOLOGY

The functionality of the appliances depends on the type of control used, that controls the various operations of a washing cycle.

- **Electromechanic timers:** the controls are actuated through commutator contacts, placed on a board and actionated by a series of cams. The movement is transmitted to the cams by a synchronous motor by means of a series of gears and levers.
- **Hybrid timers:** they are constituted by two components: the electromechanic timer and a control electronic board. The electronic board is sealed directly to the timer connectors and carry out the following functions:
 - controls the washing programmes and their relative options
 - supplies the timer motor
 - supplies and controls the drum rotation motor.
- **Electronic checks:** the electronic board, where the microprocessor is fitted, supplies the appliance components through triacs and relays and controls the various parameters to make the washing programme operate functionally.

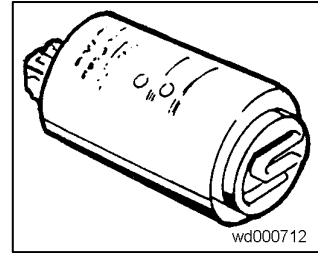
Functionality	Type	Spin speed (rpm)
F52	Electromechanic	400-500
VD54	Hybrid	600-1000
VS81	Hybrid	600-1000
EWM1000 (available in 2002)	Electronic	800-1000

More detailed information on the different functionalities are available in the specific Service Manuals issued separately.

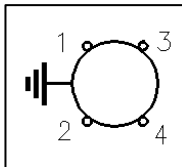
6.2 INTERFERENCE SUPPRESSOR

6.2.1 General features

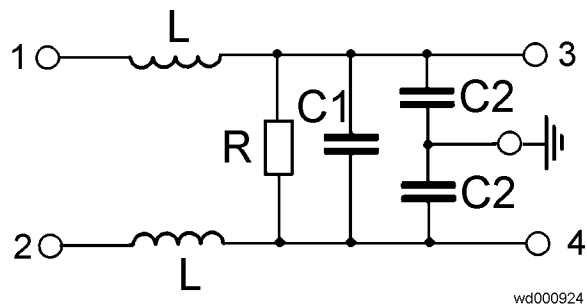
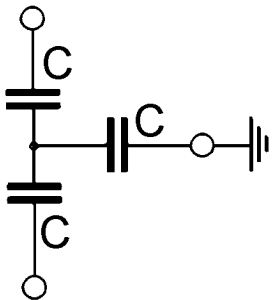
This device is connected to the entrance of the supply line of the washing machine and prevents radio interference emissions.



6.2.2 Electric symbol



6.2.3 Wiring diagrams



6.2.4 Efficiency check

APPLIANCE PRODUCES RADIO INTERFERENCE EMISSIONS:

- Check ground system efficiency

APPLIANCE DOES NOT OPERATE:

- Check with an ohm-meter if the component is interrupted:
 - between 1 - 3 approx $0\ \Omega$
 - between 2 - 4 approx $0\ \Omega$

PROTECTIONS OF THE ELECTRIC SYSTEM OPERATE:

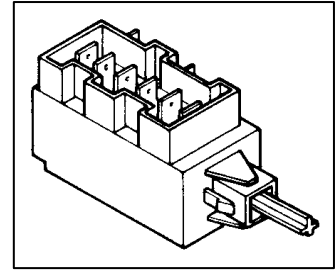
- check with an ohm-meter (capacity meter) if the component is short-circuited between 3 - 4 ($>500K\Omega$)
- check if there are ground leakages

6.3 PUSH-BUTTON

6.3.1 General features

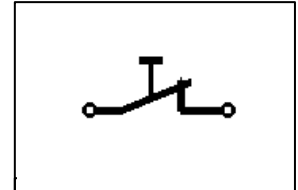
Push-buttons differ from one another in the number of contacts and their functionality:

- switch
- changeover switch (unipolar-bipolar)

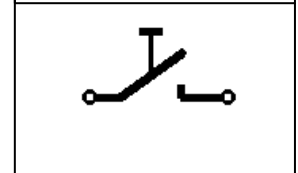


6.3.2 Electric symbol

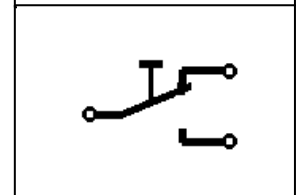
Switch normally off



Switch normally on



Changeover switch



6.3.3 Check efficiency

IT DOES NOT SUPPLY THE APPLIANCE OR DOES NOT CARRY OUT THE SPECIFIC FUNCTION:

- With a tester measure the correct closure (or opening) of the various contacts.
- Press the push-button and check the contacts switching.

NO CHANCE OF ACTIONING THE PUSH-BUTTON

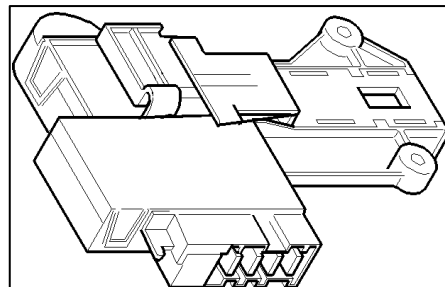
- Check if the shaft is broken or if there are other mechanical problems (friction/break of crossbar fixing hooks)

6.4 DOOR SAFETY DEVICE

6.4.1 General features

An electromechanical device is used as door safety and carries out the following functions:

- When powered, the voltmetric device closes the main switch which supplies the electric components of the washing machine, only if the door is closed.
- During operation the slider remains mechanically locked, thus preventing the door opening when the appliance is in operation. Once the device is switched off, the door is locked for 1-2 minutes to assure that the drum has stopped before opening it.



1. P.T.C.
2. Bimetal plates
3. Contact in rest position
4. Closed contact

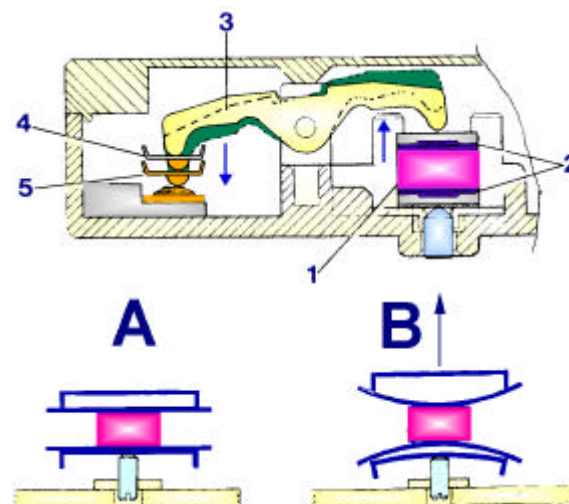
The PTC is a resistor made of ceramic material. Its main feature is that its resistance increases as temperature increases.

In this device the PTC is used to heat the two bimetal plates. Temperature causes the two metal strips to bend (from **A** to **B**) and move the lever which closes the contact of the main switch.

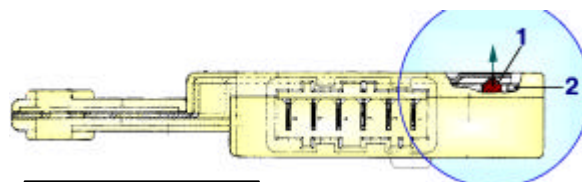
Simultaneously the pawl, controlled by the contact, is pushed out and locks the slider.

The entire operation takes place in approx. 5 seconds after it started to be powered.

Once it is not powered anymore, the PTC cools (1-2 min.) and the plates return to their original place, thus opening the contact and unlocking the slider.

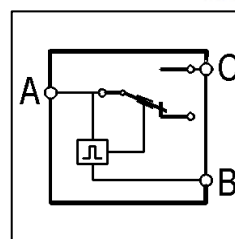


1. Pawl
2. Slider



6.4.2 Electric symbol

- A Common contact
B PTC Supply contact
C General switch contact



6.4.3 Efficiency check

THE DOOR DOES NOT OPEN AT THE END OF THE CYCLE:

- Operate the appliance so as to power the delayer for about 30 sec.
- Switch off the appliance. The door must open in about 2 min.; if this does not occur the device is faulty.

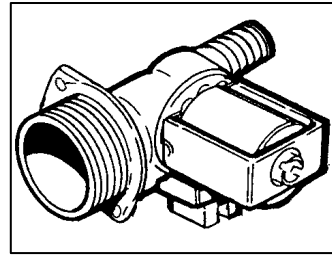
THE APPLIANCE DOES NOT START AND/OR THE DOOR DOES NOT REMAIN LOCKED

- Operate the appliance for about 5 min.
- Switch off the appliance for 2 minutes.
- Switch on the appliance. Within 5 seconds (max. time) the appliance must start and the door must be locked. If this does not occur, check if the device is powered correctly (wiring-general switch-timer) and eventually replace it.

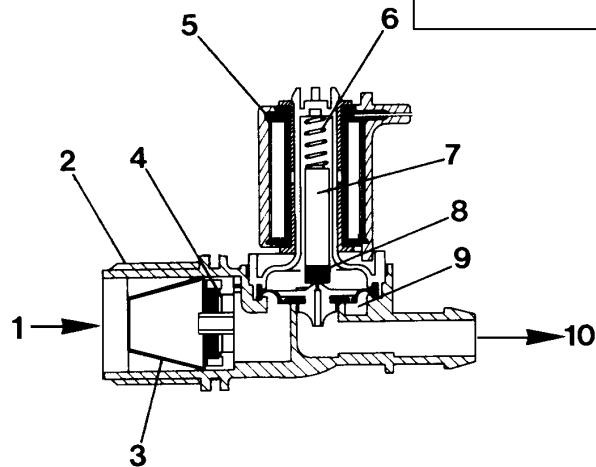
6.5 SOLENOID

6.5.1 General features

This element provides water to the detergent dispenser and it is electrically controlled by the pressure switch.



1. Water inlet
2. Solenoid body
3. Filter
4. Capacity reducer
5. Coil
6. Spring
7. Movable core
8. Rubber
9. Membrane
10. Water outlet



In rest condition, the core, pushed by a spring, keeps the central hole of the membrane closed and so this membrane seals hermetically the access to the water intake duct.

When the coil is powered, the core is pulled and the central hole of the membrane is freed and the valve opens.

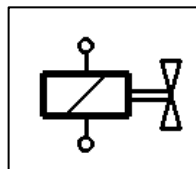
Cold water solenoid

It is used on all the washing machines models and has a nominal capacity of about 6.5-9.5 litres per minute. The water pressure must be between 3 and 100 N/cm².

Warm water solenoid

It is mounted, together with the cold water one, in the models in which there is also the warm water supply. The nominal capacity is about 5-6 litres per minute.

6.5.2 Electric symbol



6.5.3 Efficiency check

IT ALWAYS FILLS WATER EVEN IF THE APPLIANCE IS OFF:

- Mechanically solenoid locked, replace solenoid

IT ALWAYS FILLS WATER DURING WASHING CYCLE:

- Check pressure switch hydraulic circuit and pressure switch

IT DOES NOT FILL WATER:

1. The solenoid vibrates (coil hum) but it does not fill water:

- Check the hydraulic circuit of solenoid supply (closed cock, insufficient water pressure, blocked supply tube)
- Mechanically locked solenoid: replace solenoid

2. Solenoid does not vibrates:

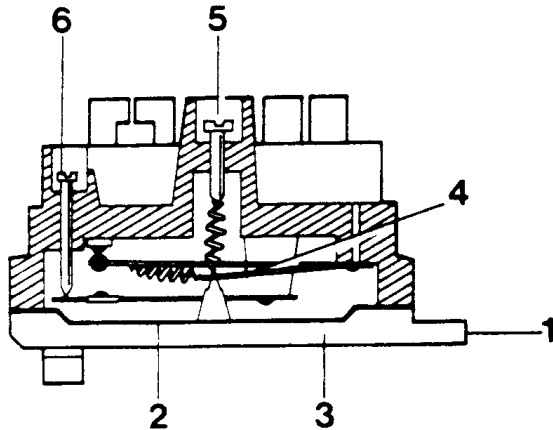
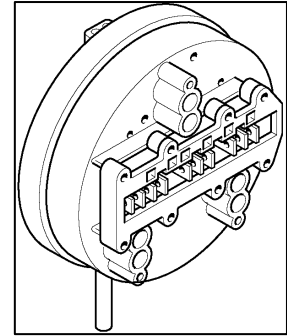
- Measure coil continuity (3500 - 4500 ohm): if faulty replace solenoid
- Mechanically locked solenoid: replace solenoid
- Check pressure switch hydraulic circuit and pressure switch
- Check correct operating of the timer or of the main electronic board

6.6 PRESSURE SWITCH

6.6.1 General features

The pressure switch has the function to determine the water quantity that must be filled in the tub and therefore:

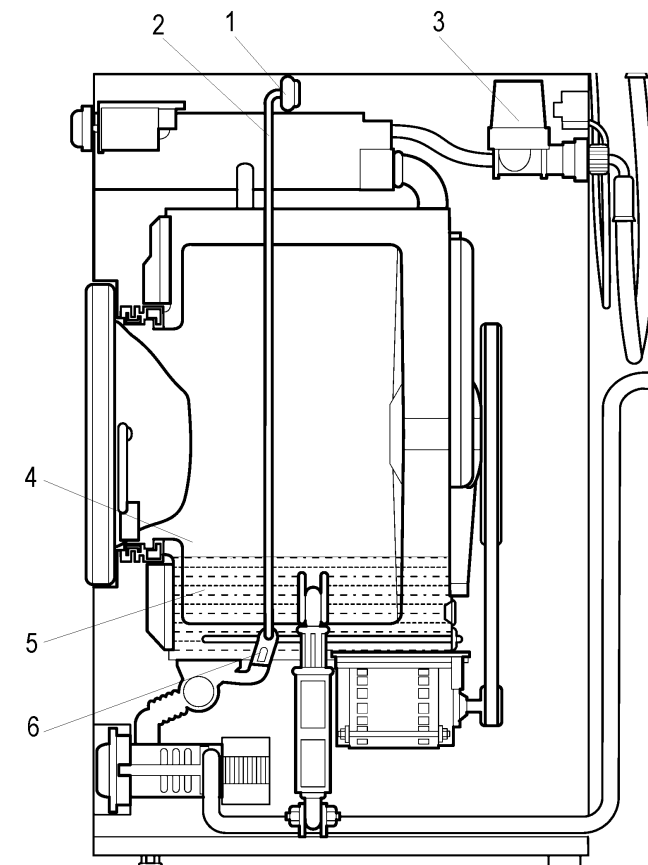
- it checks the water levels during washing phases
- it carries out the overheat protection function when it is connected in series to the heating element
- it may carry out the antioverflow safety function if connected in series to the drain pump



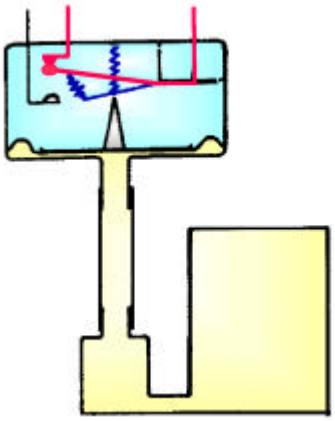
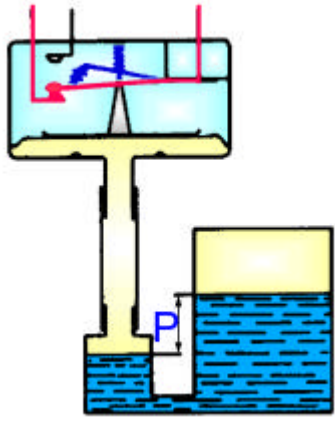
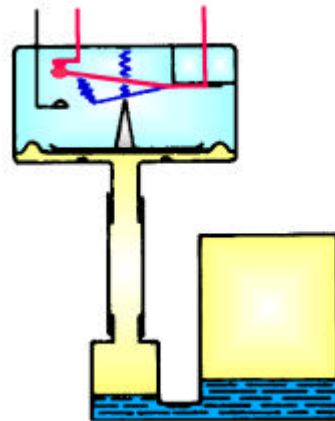
1. Air inlet hole
2. Diaphragm
3. Internal chamber
4. Contact blade (rapid trip)
5. Level adjustment screw
6. Differential adjustment screw

The internal chamber is connected through a small tube to the pressure chamber. When the water is filled in the tub, pressure in the chamber increases. When the pressure reaches the prefixed value, the membrane causes the blade to trip (rapid trip) which switches the contact from “empty” to “full” position. Over the cap there are two adjustment screws, one for the level and one for the differential, that is to say the point of rest position where the blade returns when the water level in tub reduces.

1. Pressure switch
2. Pressure switch tube
3. Solenoid
4. Tub
5. Water
6. Pressure chamber

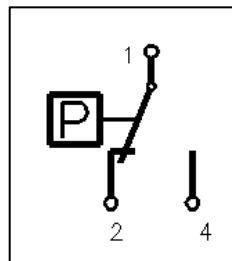


6.6.2 Operating principle

Empty tub	Water flows in the tub	Water decreases in tub
As there is no water in tub, the diaphragm is not pressed, so it remains in its lower position because of the pressure practiced by the antagonist spring. In this position the contact is closed on "empty".	When the connection between tub and pressure chamber is interrupted by the water, the pressure between the pressure chamber and the internal chamber increases. This pressure increase will continue till the diaphragm has risen so as to actionate the switch (rapid trip). In this position the contact is closed on "full".	The more the water level decreases, the more the pressure on the diaphragm decreases. The diaphragm is pushed down by the antagonist spring till the switch resets ("empty" position).
		

6.6.3 Electric symbol

1. Common contact
2. Contact closed on "empty"
4. "Full" contact



6.6.4 Efficiency check

A CORRECT OPERATING OF THE PRESSURE SWITCH DEPENDS ON ITS HYDRAULIC CIRCUIT:

- Check if there are leakages (in this case it would be filled too much water as the switch would not close in "full" position).
- Check if there are obstructions (in this case contacts could lock in "full" or "empty" position)

AFTER CHECKING HYDRAULIC CIRCUIT:

- Fill water in tub to the higher level and check the correct contacts closure in "full" position.
- Drain water from tub and check the correct contacts closure in "empty" position.

6.7 INDUCTION MOTORS (ASYNCHRONOUS)

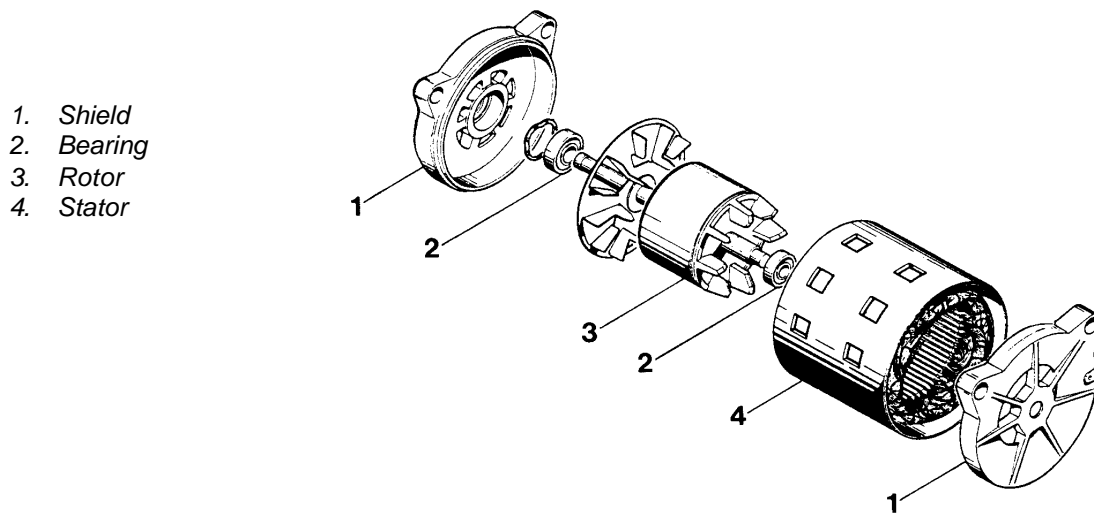
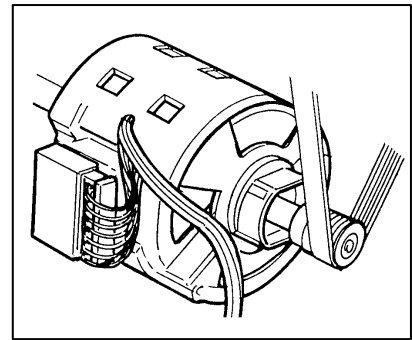
6.7.1 General features

The motor has the function of giving different rotation speeds to the drum:

- high speed for spin phases
- low speed for washing

The characteristic of these motors is that they do not require pick-up current but develop, by induction, the current in the rotor.

That is why they are called **induction**. They are also called **asynchronous** because the rotation speed is not the same as the synchronism speed.



The rotor is like a "squirrel cage", with windings obtained by aluminium pressure die-casting housed in special slots provided in the blades pack.

In single phase asynchronous motors the starting torque is very low; it is assured though by adding a starting circuit, shifted by 90° compared to the running circuit.

The 90° shifting of the current is carried out by a capacitor connected in series to the starting winding; therefore it generates a rotating field sufficient to create the starting torque.

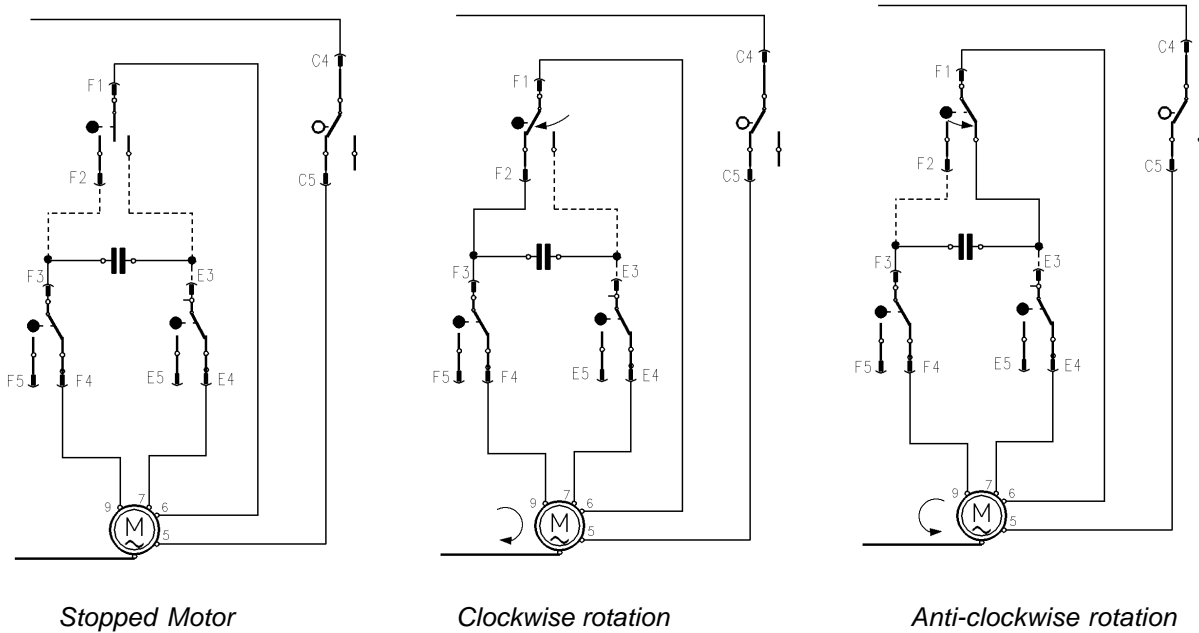
The stator consists of four windings:

- 2 high speed windings (two polarities) for operation during spin phases: a running winding and a starting one, with the capacitor in series. The high speed drum rotation occurs always towards the same direction (anti-clockwise).
- 2 low speed windings for operation during washing phases. From a constructional point of view the two windings are the same, with 12 or 16 polarities.

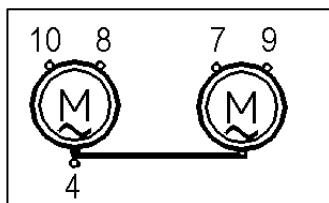
Type of motor	Capacitor (mF)	Motor speed (g/ a 50Hz)		Drum rotation speed (rpm)	
		Washing	Spin	Washing	Spin
2/12 poles	14	~ 400	~ 2800	~ 55	~ 400
2/16 poles	16	~ 300	~ 2800	~ 55	~ 500

6.7.2 Washing rotation inversion

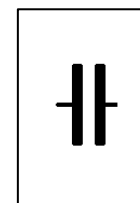
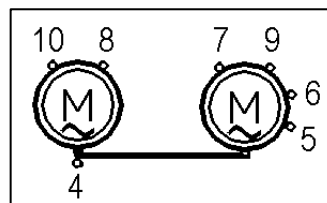
The windings are built to obtain the rotation towards the two directions, according to how the capacitor is connected: one time the winding will function as the running one and the other as the starting one. When the rotation must be reversed, the timer inversion contact connects the capacitor between the two windings in the opposite way, inverting the function.



6.7.3 Electric symbols



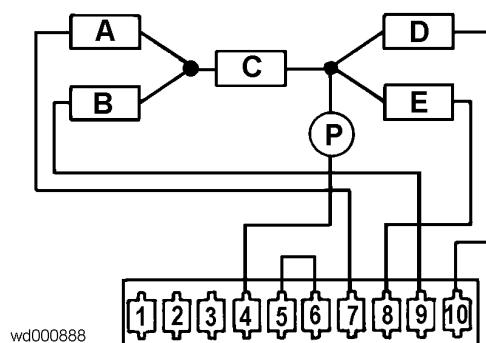
Motor



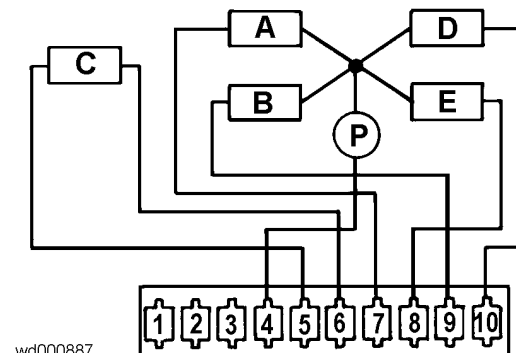
Capacitor

6.7.4 Wiring diagrams

Motor with traditional connection



Motor with anti-interference connection



A - B Low speed windings
D - E High speed running winding
P - Overheat protection

C - Low speed common winding
E - High speed starting winding

6.7.5 Efficiency check

IT DOES NOT WORK BY LOW SPEED:

- measure the resistance windings, if correct check capacitor.

IT DOES NOT WORK BY HIGH SPEED:

- measure the resistance windings, if correct check capacitor.

IT DOES NOT WORK BY LOW AND HIGH SPEED:

- measure the resistance windings, if correct check capacitor.

IRREGULAR OPERATION (moto-protection):

- make the appliance work till the problem occurs and measure the resistance windings.

OPERATION OF MAINS PROTECTIONS:

- use a tester with a minimum scale of 40 Mohm across each terminal and the casing (read ∞) to check for windings or other components that are connected to mass or poorly earthed.

NOISE (bearings-belt):

- disconnect the belt from the wheels to identify the source of the noise better.

Check efficiency of motor capacitor

IT DOES NOT START BY LOW AND HIGH SPEED (noise):

- check with an ohm-meter (capacity meter) if the capacitor is interrupted

SOMETIMES IT DOES NOT START BY HIGH SPEED (poor capacity):

- check with an ohm-meter (capacity meter) the capacitor capacity

MOTOR DOES NOT START:

- check with an ohm-meter (capacity meter) if the capacitor is in short-circuit

6.8 COMMUTATOR MOTOR

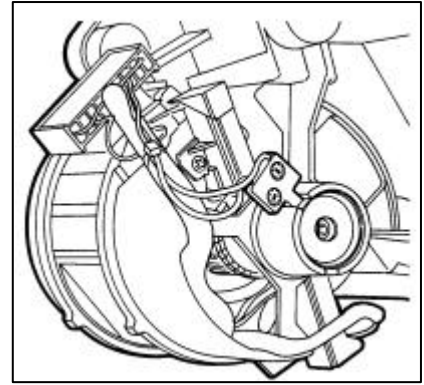
6.8.1 General features

The commutator motors are mounted on appliances with spin speed from 600 to 1000 rpm.

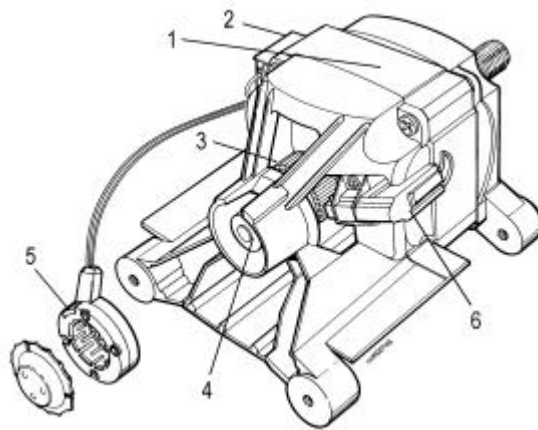
These motors can be produced by:

- SOLE
- FHP
- CESET

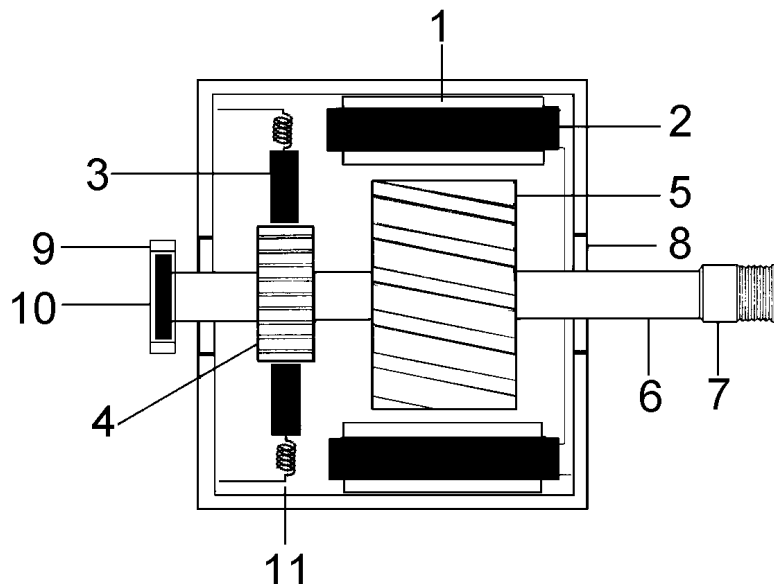
It is possible that with the same spare part code are handled motors of producers different from the one originally mounted, and they are perfectly interchangeable.



1. Stator
2. Junction box
3. Tachometric generator magnet
4. Tachometric generator coil
5. Brush



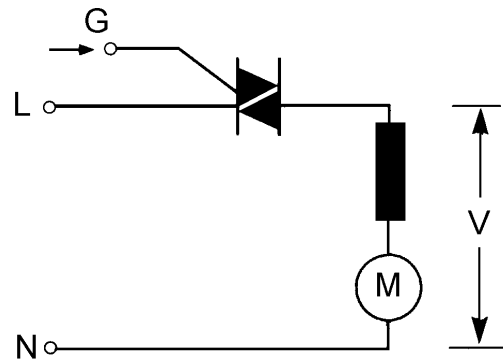
1. Stator
2. Stator winding
3. Brush
4. Commutator
5. Rotor winding
6. Motor shaft
7. Pulley
8. Bearing
9. Tachometric generator coil
10. Magnet
11. Spring



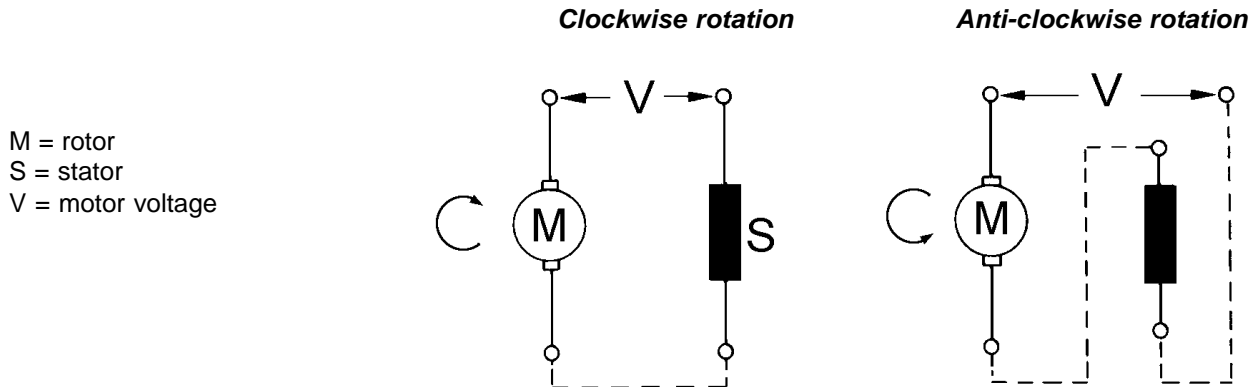
The stator winding is connected in series to the rotor one (excitation in series).

Every section of the rotor winding is connected to a couple of plates of the commutator. The electric contact between commutator and closed circuit is carried out by means of two sliding brushes on the commutator plates.

The motor rotation speed is proportional to the voltage (V), supplied by an electronic board.
This type of motor is also called "universal" because it can be fed both with alternate current and continuous.



The motor rotation direction depends on how the stator and rotor windings are connected between each other. This connection is carried out by means of two timer contacts or of the relays of the electronic board.

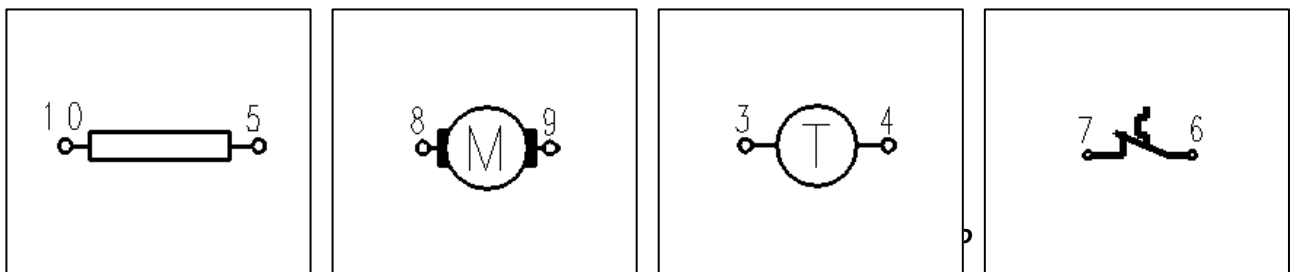


The commutator motor speed, like all motors with excitation in series depends on the charge, therefore it diminishes its speed the more it is charged. This makes it necessary that the motor voltage, and so its speed is constantly controlled by means of a speed electronic control.

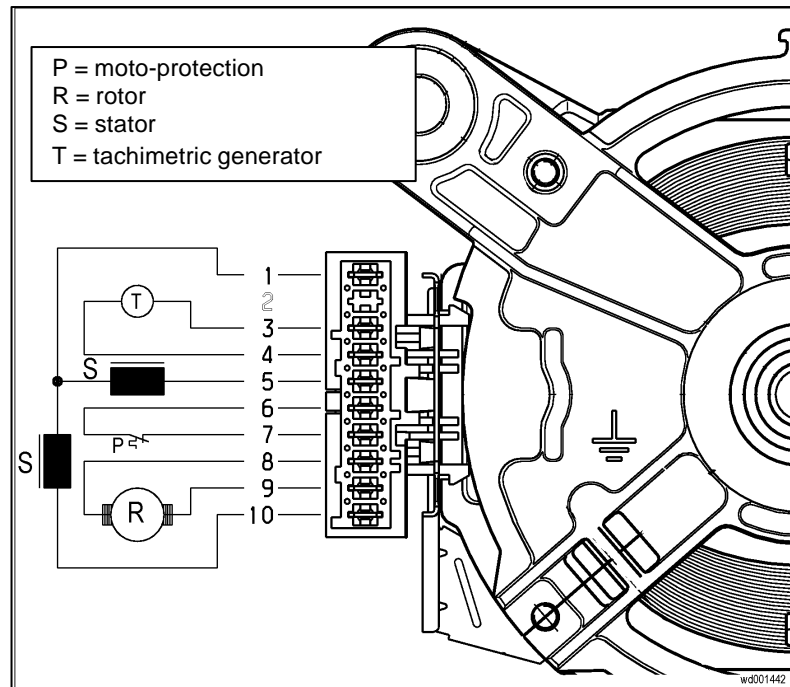
A tachimetric generator, which consists of a magnet fitted to the shaft and of a coil, generates a voltage related to the rotor speed that is transmitted to the speed electronic control.

All electronic controls have a protection system, more or less refined, to prevent the motor operation in case of faults of the tachimetric generator.

6.8.2 Electric symbols



6.8.3 Wiring diagram



6.8.4 Efficiency check

1. Check the connection blocks (wiring) and check for detached or bent terminals.
2. Check for the presence of traces / residues / build-up of water or detergent, and identify the source.
3. Use a tester with a minimum scale of 40 Mohm across each terminal and the casing (read ∞) to check for windings or other components that are connected to mass or poorly earthed.
4. Check for each winding as shown in the table below:

Motor Junction box Terminals	Check of :	SOLE Motor [W]	F.H.P. Motor [W]	CE.SE.T. Motor [W]
3 - 4	Tachimetric generator winding	171 ÷ 196	126 ÷ 147	64 ÷ 73
		469 ÷ 540		
5 - 10	Stator winding (full range)	1.0 ÷ 2.2	1.0 ÷ 3.0	1.0 ÷ 2.0
6 - 7	Overheat protection	0	0	0
8 - 9	Rotor winding	1.5 ÷ 3.0	1.5 ÷ 3.0	1.5 ÷ 3.0
1 - 10	Stator winding (half range, if terminal 1 is available)	0.5 ÷ 1.0	0.5 ÷ 1.5	0.5 ÷ 1.0

Notes

- While checking rotor winding, measurement must be taken around the entire perimeter, by turning the shaft very slowly and checking for the presence of short-circuits between the visible plates. Check also the BRUSHES for wear.
- In case of NOISE (bearings-belt): disconnect the belt from the wheels to identify better the source of noise.

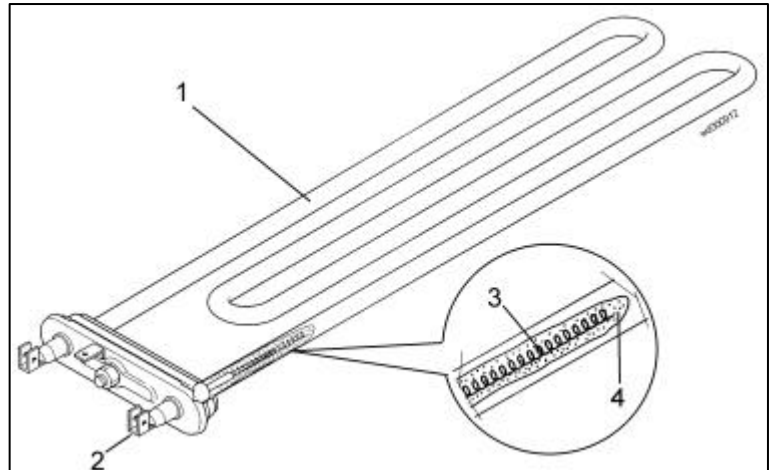
6.9 HEATING ELEMENT

6.9.1 General features

The heating element of the washing water is inserted into a tubular inox-steel watertight housing.

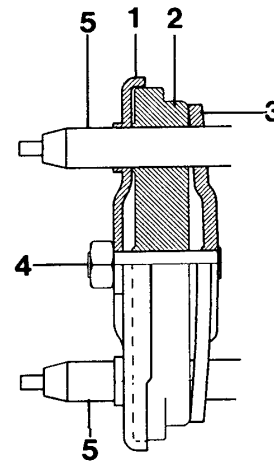
The electric power is normally 1950W, even if in some models you can find heating elements with different powers.

1. *Tubular housing*
2. *Connector*
3. *Filament heating element*
4. *Insulator*

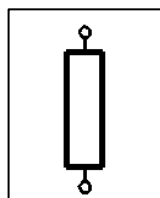


The seal between tub hole and heating element is guaranteed by a gasket which extends itself by tightening the fixing nut.

1. *Fixed flange*
2. *Gasket*
3. *Moveable flange*
4. *Fixing nut*
5. *Heating element terminals*



6.9.2 Electric symbol



6.9.3 Check efficiency

IT DOES NOT WARM UP:

- Check if the heating element is interrupted: measure the heating value between the two terminals.

OPERATION OF ELECTRIC SYSTEM PROTECTIONS:

- Check, with an ohm-meter, if the heating element is grounded or in dispersion (40 MΩ)

IT LEAKS WATER:

- Check the correct positioning and mounting of gasket.

VIBRATIONS/METALLIC NOISE WHEN THE DRUMS ROTATES:

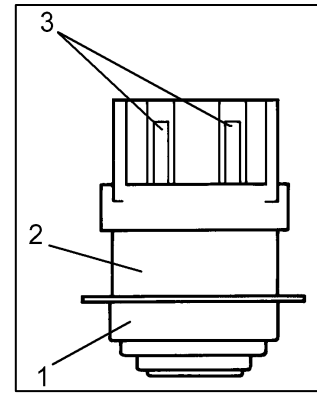
- Check the correct positioning inside the tub; in case the heating element is worn, replace it.

6.10 BIMETAL THERMOSTATS

6.10.1 General features

The thermostats adjust and control the temperature of washing water.

1. *Metallic bulb*
2. *Connectors*



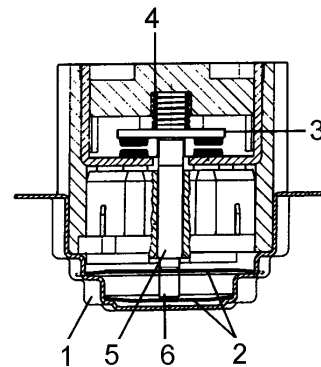
When the bimetal disk reaches the temperature at which the thermostat was calibrated, it trips and through a rod opens (or closes) the contacts.

During the cooling phases the bimetal returns to the starting position, to the prefixed reset temperature.

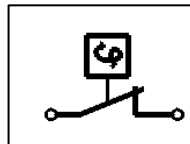
This type of thermostat, in the different versions with one or two contacts, normally closed or opened, can be used for:

- Temperature control of washing water.
- Overheat protection during washing phases.

1. *Steel cap*
2. *Bimetal*
3. *Contact*
4. *Spring*
5. *High temperature rod*
6. *Low temperature rod*



6.10.2 Electric symbol



6.10.3 Efficiency check

1. Check with a tester that the contacts (cold) are in correct position (normally closed).
2. Warm up the thermostat bulb and check for the commutation of contacts.
3. Cool down the thermostat and check that the contacts return to their reset position.

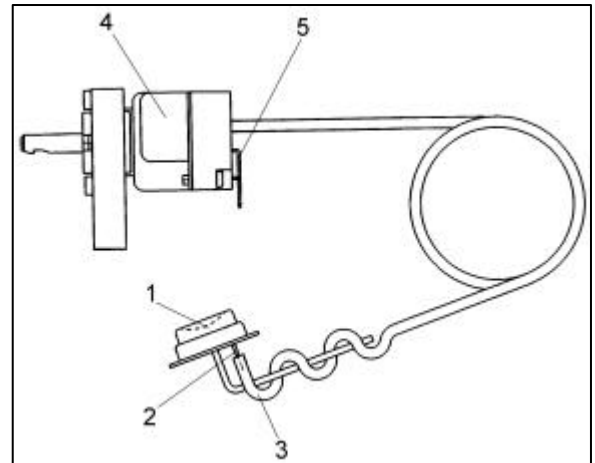
6.11 ADJUSTABLE THERMOSTAT

6.11.1 General features

The thermostats adjust and control the temperature of washing water.

They can be of a liquid expansion type with the possibility to adjust the operation temperature.

1. *Bulb*
2. *Capillary*
3. *Capillary sleeve*
4. *Thermostat body*
5. *Contact*

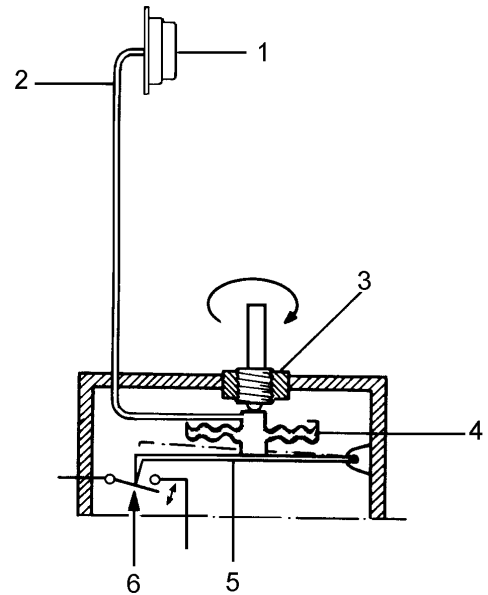


The thermostat works according to the liquid expansion principle contained in the hydraulic circuit.

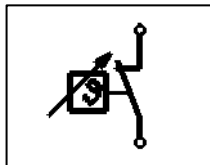
When the bulb is warmed up, the liquid expands in the membrane through the capillary tube.

The shifting of the membrane actions a device that causes the opening or closure of the contacts. It is possible to adjust the temperature at which the commutation (0-90°C) occurs by means of the shaft.

1. *Bulb*
2. *Capillary*
3. *Adjusting screw*
4. *Membrane*
5. *Balancing lever*
6. *Contact*



6.11.2 Electric symbol



6.11.3 Efficiency check

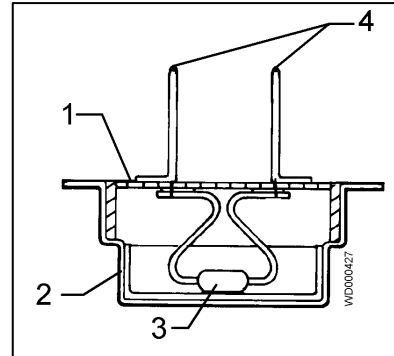
1. Check with a tester that the contacts (cold) are in correct position (normally closed).
2. Warm up the thermostat bulb and check for the commutation of contacts.
3. Let the thermostat cool and check that the contacts turn to reset position.
4. Check the correct fixing thermostat capillary on tub and the presence of turns.

6.12 NTC TEMPERATURE SENSOR

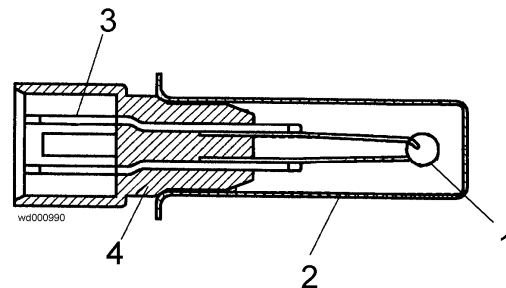
6.12.1 General features

In some models with hybrid or electronic timers a NTC sensor is used, to check the washing temperature: it is realised in such a way that its internal resistance decreases as the temperature increases. The resistance decrease is detected by the electronic control that disconnects the heating element when the desired temperature is reached. There are 2 types of sensor different for their shape, but not for their characteristics.

1. Plastic container
2. Metallic capsule
3. NTC Sensor
4. Terminals

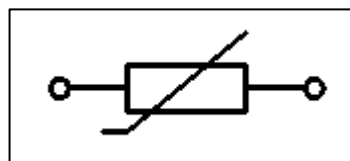


1. NTC Sensor
2. Metallic
3. Terminals
4. Plastic container



TEMPERATURE (°C)	RESISTANCE (W)		
	Nominal value	Maximum value	Minimum value
20	6050	6335	5765
60	1250	1278	1222
80	640	620	660

6.12.2 Electric symbol



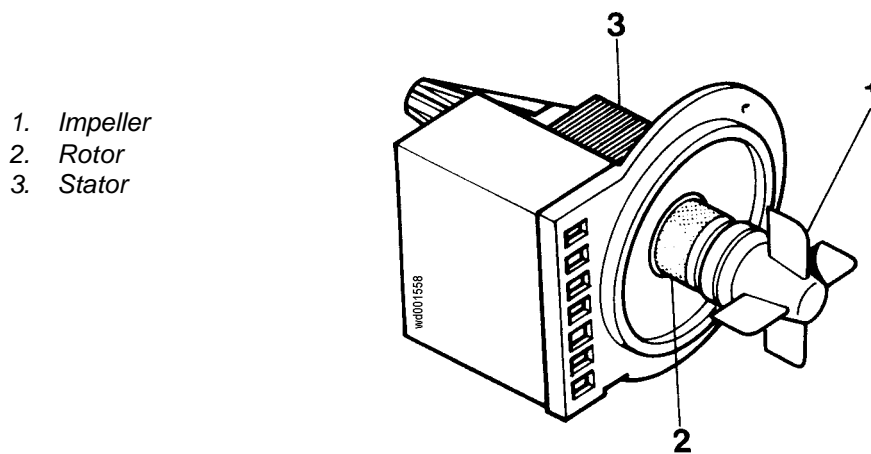
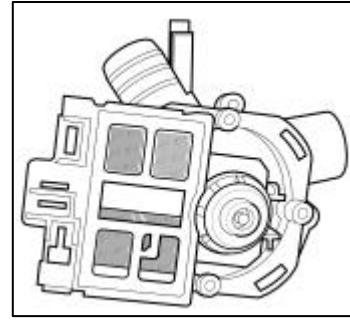
6.12.3 Efficiency check

Check with a tester that the sensor resistance value corresponds to the water temperature in the tub.

6.13 DRAIN PUMP

6.13.1 General features

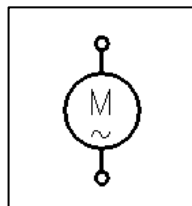
The pump whose function is to drain water at the end of the various washing phases, is centrifugal and it is actioned by a synchronous motor.



The rotor consists of a permanent magnet and the rotation direction can be either clockwise and anti-clockwise.

The rotor can turn for a quarter of turn without making the impeller rotate. Therefore, if the impeller is blocked by a foreign body, the rotor can make little movements clockwise and anti-clockwise till it looses. The capacity of these pumps is about 25 l/min., the maximum head is 90 cm.

6.13.2 Electric symbol



6.13.3 Efficiency check

1. Check if the impeller is blocked by some foreign bodies
2. Check the winding resistance of the stator. It should measure about 150/200 Ω .

Warning!

The pumps are of a synchronous type, if they are disconnected from the hydraulic circuit, in some cases they may not start since, as for their constructional features, they need an antagonist couple to be on the impeller to enable the rotor to move towards the two directions.

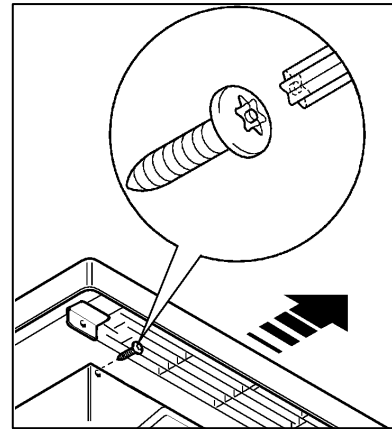
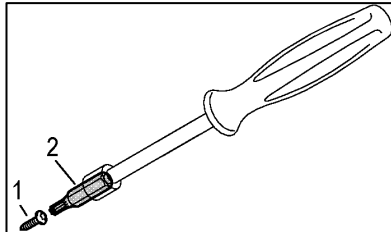
Therefore the pumps should be tested only on the appliance, after filling some water.

7 COMPONENTS ACCESSIBILITY

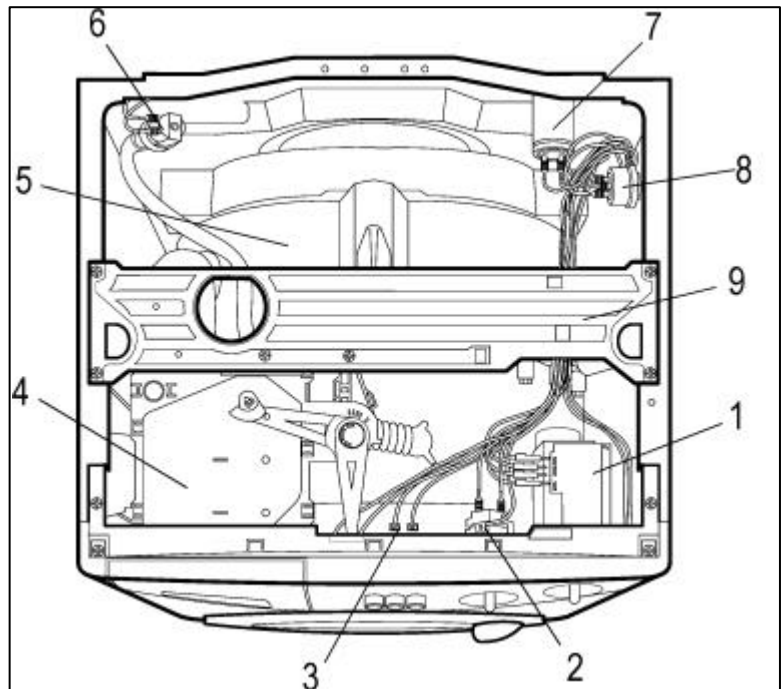
7.1 ACCESSIBILITY FROM LID/CONTROL PANEL

7.1.1 Lid

- a. Unscrew the two back screws, push it backwards and release it from the cabinet. *The screws (1) are of Torx T20 type with central peg. To unscrew the screw it can be used a Torx T20H (2torxbit), also available as equipment spare parts codes 50 24 88 01-00/8.*

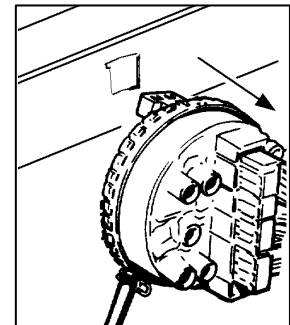
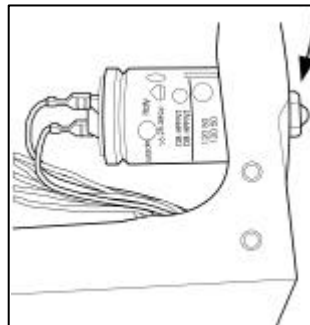


1. Timer
2. Adjustable thermostat
3. Push-buttons
4. Detergent dispenser
5. Tub
6. Water inlet solenoid
7. Motre capacitor or interference supressor
8. Pressure switch
9. Central crossbar



7.1.2 Interference suppressor/motor capacitor

- a. Unscrew the fixing screw
- b. Disconnect the connectors

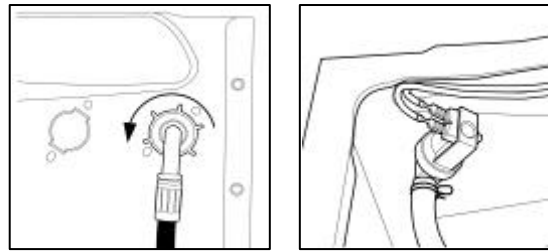


7.1.3 Pressure switch

- a. Disconnect the tube from the pressure switch
- b. Release the pressure switch from the cabinet
- c. Disconnect the wiring connectors

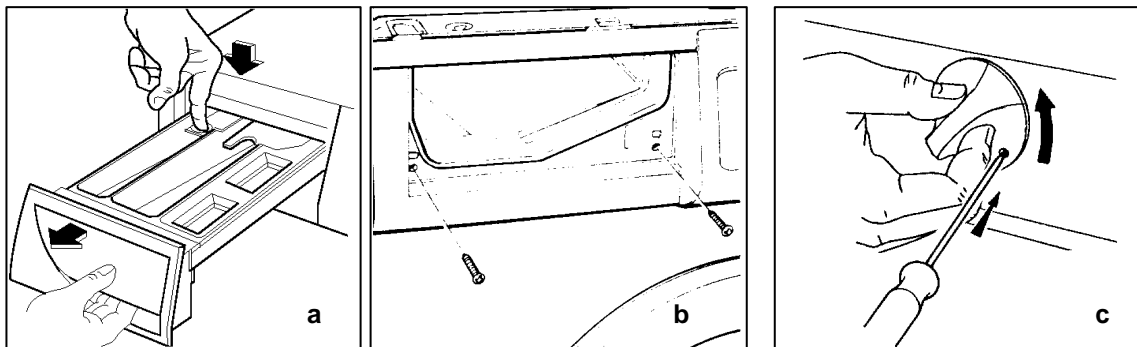
7.1.4 Solenoid

- Disconnect the drain tube
- Disconnect the solenoid-to-detergent dispenser tube
- Disconnect the wiring connectors
- Release the solenoid from the cabinet

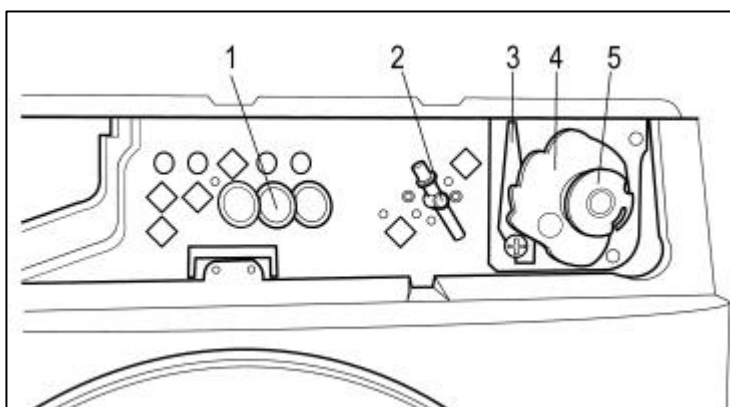
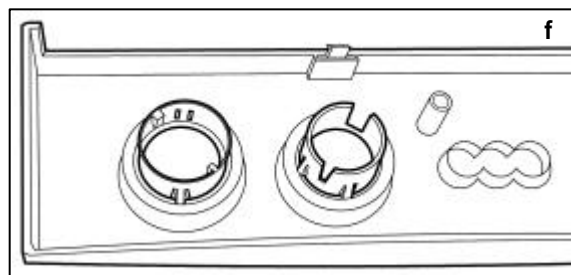
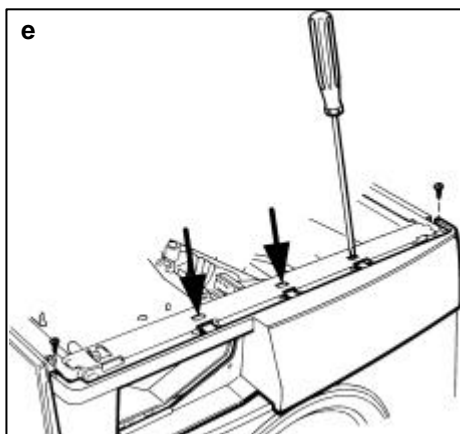


7.1.5 Control panel

- Remove the detergent drawer
- Unscrew the fixing screws of support control panel



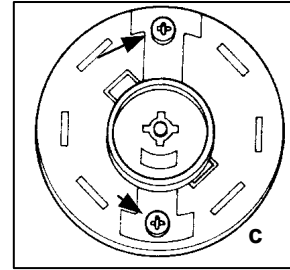
- In models with general switch on timer (push-roll): release the knob cover by gently pressing the hole with a small screwdriver and turn the knob cover anti-clockwise
- Unscrew the screws and release the fixing wings from the support
- Extract the control panel by releasing it from the right inferior rail
- The programmes knobs/flange are hooked to the control panel



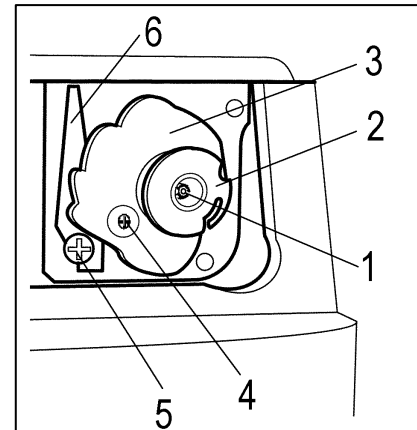
1. Push-buttons
2. Adjustable thermostat
3. Distribution lever
4. Cam
5. Timer knob

7.1.6 Timer

- a. Remove the knob: in models with general switch on timer see 7.1.5; in models with ON/OFF switch release the knob with the help of a screwdriver from the inside of the support crossbar.
- b. Unscrew the fixing drivers of knob body or joint and remove it
- c. Unscrew the two timer crossbar fixing screws
- d. Disconnect the wiring connectors and extract the timer



1. Knob fixing screw
2. Knob
3. Cam
4. Timer fixing screw
5. Fixing pawl of distribution lever
6. Distribution lever of tub levers



7.1.7 Water distribution cam

- a. Remove control panel and timer
- b. Release cam from the crossbar

7.1.8 Distribution lever

- a. Remove the cam (7.1.7)
- b. Rotate the pawl 90° with a cross screwdriver
- c. Release the pawl from the crossbar

7.1.9 Adjustable thermostat

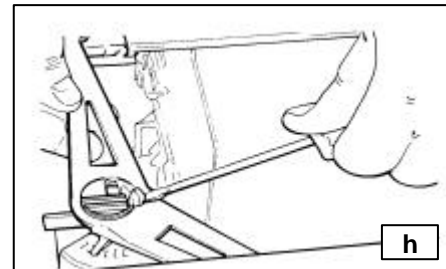
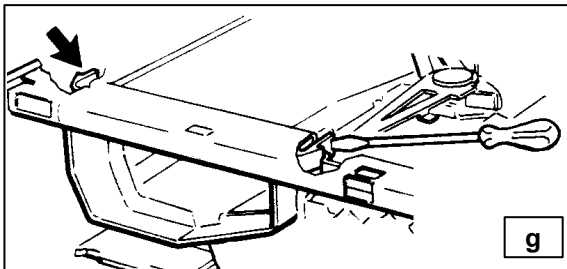
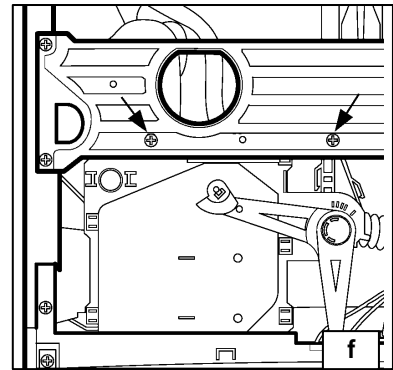
- a. Release the knob with the help of a screwdriver from the inside of the support crossbar
- b. Extract the joint from the thermostat shaft
- c. Unscrew the crossbar fixing screw
- d. Disconnect the connectors
- e. Release the thermostat body and extract it from the inside
- f. Release the bulb from the tub (see accessibility from back panel)
- g. Extract the capillary from the fixing clamps
Warning: while mounting again the bulb pay attention not to damage the capillary. Fix the capillary as it was originally by making appropriate turns.

7.1.10 Push-buttons

- a. Remove the control panel (see 7.1.5)
- b. Enlarge the push-button fixing shank with a screwdriver and extract it from the push-button.
- c. Extract the push-buttons. Tighten the push-buttons fixing wings to the crossbar with a pliers and push it towards the inside of the appliance.
- d. Disconnect the connector

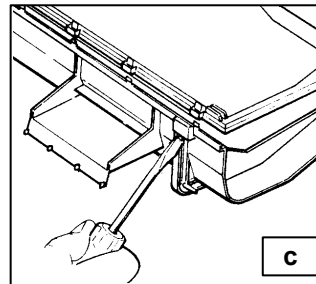
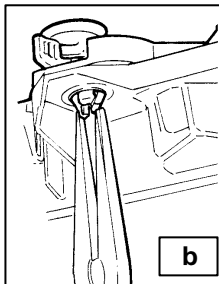
7.1.11 Detergent dispenser

- Disconnect the solenoid tube from the dispenser
- Unscrew the clamp and disconnect dispenser-to-tub tube
- Extract steam tube from the tub (if present)
- Extract detergent drawer
- Remove control panel-dispenser fixing screws
- Unscrew fixing screws of upper crossbar dispenser
- Release the tub from the crossbar, by pushing the two lateral wings
- Release the dispenser from the crossbar, pressing the lateral levers
- Lower the washing unit and extract the dispenser



7.1.12 Dispenser conveyor

- Extract the dispenser (7.1.11)
- Demount the levers adjustment pawl by pressing the two wings
- Unhook the conveyor fixing wings to the lower dispenser

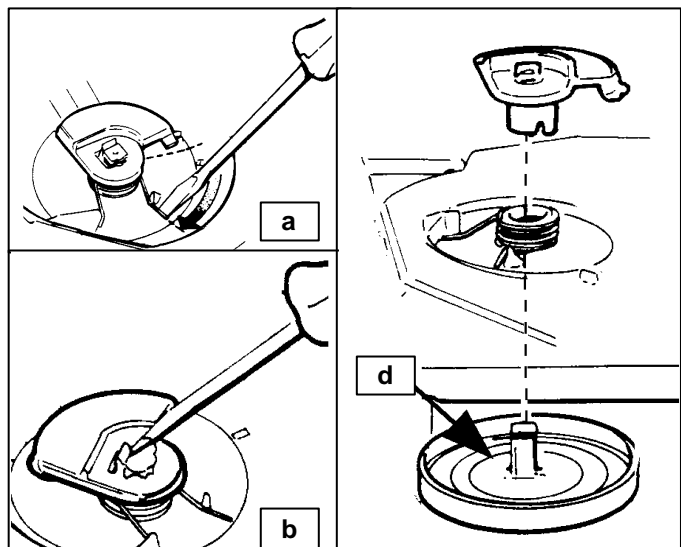


From the inside of the dispenser it is possible to access:

- Water intake nozzle which can be extracted by raising it from the dispenser
- Steam tube

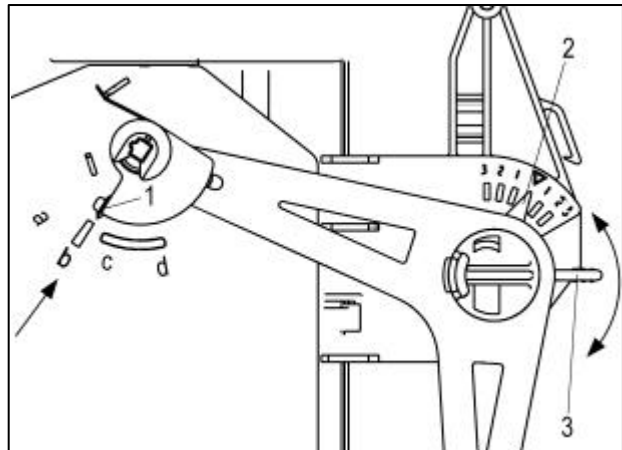
7.1.13 Water distributor

- The operation can be carried out even without removing the dispenser: unhook the spring
- Unhook and remove the holder
- Turn and extract the water distributor
- To mount it again, it is obligatory to put the specific grease on the distributor (spare parts code 5022 18 11-00/8)



7.1.14 Dispenser levers adjustment

- Position the timer knob at the start of the programme which fills water to the washing compartment
- Check if the index "1" corresponds to the reference notch "b". If not, raise index "2" and turn cam "3" till index "1" corresponds to notch "b"
- Positioning the timer on softener programme, check if index "1" corresponds to reference notch "d"



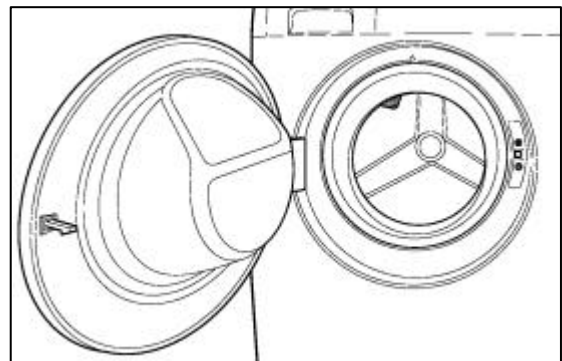
7.2 ACCESSIBILITY FROM DOOR

7.2.1 Porthole

- Unscrew the two fixing screws to the hinge
- Unscrew the frame-flange fixing screws and unhook the flange from the flange
- Remove porthole glass
- Remove handle-catch assembly

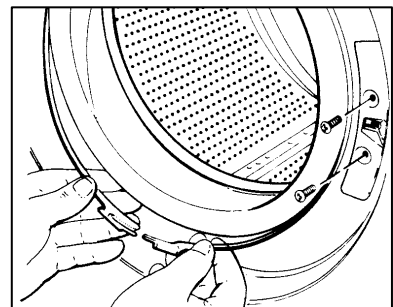
To mount it again:

- Position the handle assembly in the flange seat such as the springs loads
- Mount again the porthole glass on the flange
- Mount again frame and screws



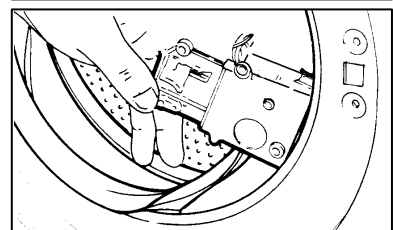
7.2.2 Porthole hinge

- Remove porthole (7.2.1)
- Unhook the gasket from the front panel
- Unscrew the front panel fixing screws
- Extract the hinge



7.2.3 Door safety device

- Unhook the gasket from the front panel
- Remove the two delayer fixing screws to front panel
- Disconnect wiring connectors



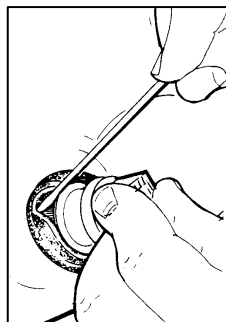
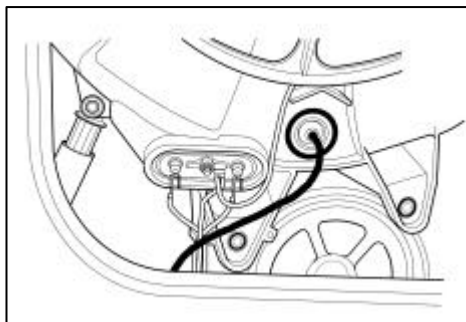
7.2.4 Bellows gasket

- Unhook fixing ring and the front panel gasket
 - Extract the gasket and the ring by pulling it down (it is kept in position by an elastic ring)
- To facilitate the reassembly, lubricate the gasket seat with some water and soap

7.3 ACCESSIBILITY FROM BACK PANEL

7.3.1 Back panel

- a. Unscrew the back panel fixing screws

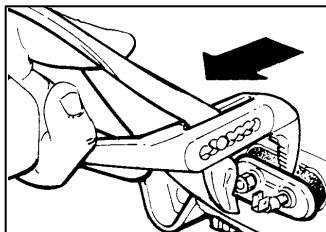
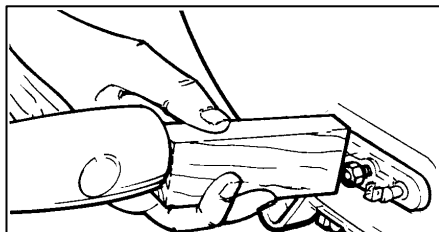


7.3.2 Thermostat/NTC Sensor

- b. Disconnect connectors (fixed thermostat)
- c. Release the thermostat from the gasket

7.3.3 Heating element

- a. Disconnect the belt from the pulleys
- b. Disconnect the connectors
- c. Unscrew the heating flange fixing screw
- d. Push the bolt towards the inside
- e. Extract the heating element



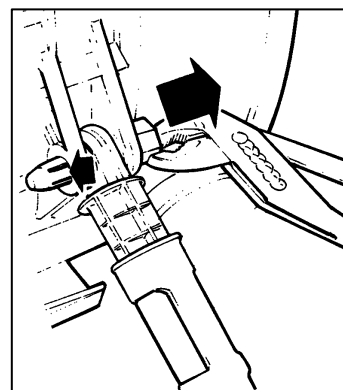
7.3.4 Dampers

- a. Press the lock tooth and at the same time release the pin with a pliers
- b. Extract the damper from the support

Notes for reassembly:

Check if the pin is damaged, in this case, replace it

Check if the holder wings stick out



7.3.5 Driven pulley

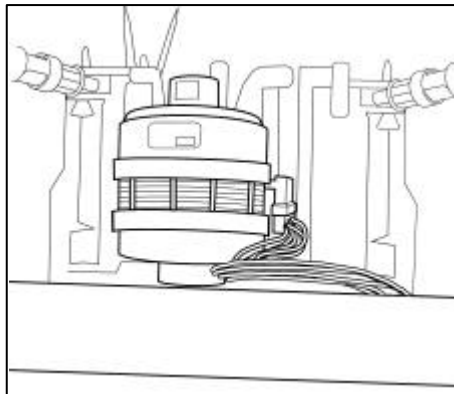
- a. Release the belt from the pulley
- b. Unscrew the fixing screw
- c. Extract the pulley

7.4 ACCESSIBILITY FROM THE BASE

Never position the washing machine on its right side panel to prevent water wetting the timer or the electronic control!

7.4.1 Motor

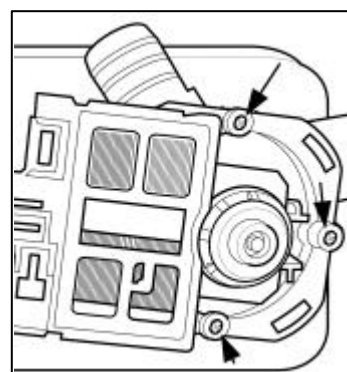
- Release the belt from the pulleys (7.3.1))
- Disconnect the connectors
- Unscrew the motor fixing screws to the tub
- Release the motor from the support by pushing it towards the front panel



7.4.2 Drain pump

Models with screw fixing:

- Release the protection
- Unscrew the fixing screws
- Extract the pump
- Disconnect the connectors

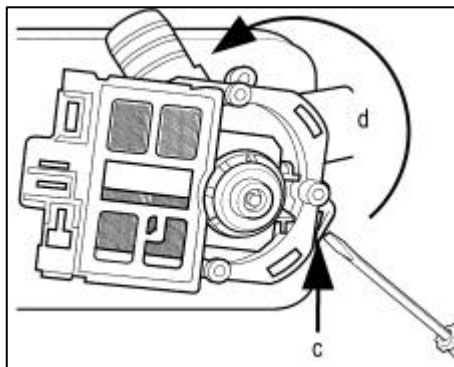


Models with clutch fixing:

- Release the protection
- Disconnect the connectors
- Press the fixing wing
- Turn the pump anti-clockwise

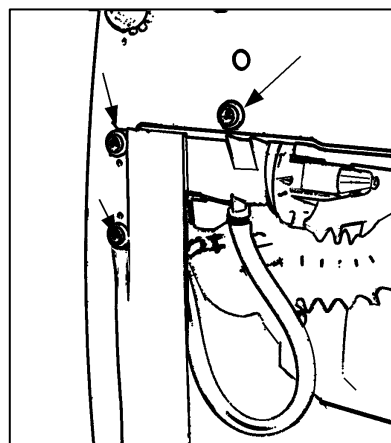
Note for reassembly:

Check if the filter body holder is damaged; in this case use a screw to block the pump



7.4.3 Filter body

- Disconnect the drain tube and tub tube
- Unscrew the fixing screws to the base
- Disconnect the connectors from the pump
- Extract the filter body assembly

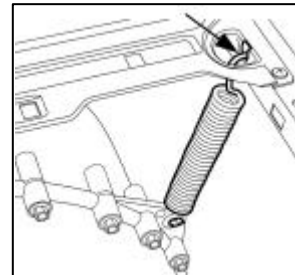


7.5 ACCESSIBILITY TO WASHING UNIT

7.5.1 Washing unit

- a. Remove fixing ring and unhook the bellows gasket from the front panel
- b. Remove the cover
- c. Remove the back panel
- d. Remove the two dumper fixing pins of the tub
- e. Disconnect all tubes from the tub (dispenser-tub, steam tube, tub-collector, etc.)
- f. Disconnect all wiring connectors from the components fitted to the tub (motor, resistance, thermostats) and eventual adjustable thermostat bulb
- g. To lighten the tub, remove motor
- h. The tub should be extracted from the upper side of the cabinet and therefore all components that could obstruct their extraction or could be damaged during operation should be demounted from the cabinet (solenoid-detergent dispenser-timer-thermostat-capacitor-wiring, etc.)
- i. Unscrew the central crossbar fixing screws and extract washing unit by raising it up.

Note for reassembly: put some grease between the spring suspension of washing unit and the support crossbar.



7.5.2 Drum and tub shells

- a. Extract the tub from the washing machine (7.5.1)
- b. Remove the driven pulley
- c. Remove the motor
- d. Remove the screws that joint two shells
- e. Release the drum from the bearings

Note for reassembly: it is advisable to replace seal gasket between the two shells every time the tub is opened.

7.5.3 Bearings

In case the bearings must be replaced, it is possible:

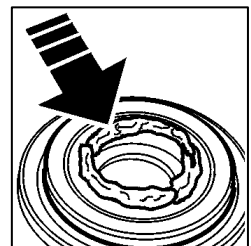
- To replace the back shell assembly full of bearings and gasket (7.5.2)
- To replace the bearings and the gasket.

In the latter case:

- a. Extract the tub from the washing machine (7.5.1) and remove the drum (7.5.2)
- b. Remove first the external bearing, then the internal one with the gasket

Notes for reassembly

- In order not to damage the bearings and the gasket during the insertion use distance pieces with an appropriate diameter
- Put some specific grease (spare parts code 5026 24 16-00/6) on the drum shaft gasket.
- Check if the drum bush is damaged, in this case replace also the drum or the cross piece.



7.5.4 Back counterweight

- a. Unscrew the fixing screws of back shell
- b. Extract the counterweight

Notes:

Check if the back shell fixing pegs are damaged, in this case replace shell and counterweight.

7.5.5 Front counterweight

- c. Unscrew the fixing screws of front shell
- d. Extract the counterweight

Notes:

Check if the screws seats in the front shell are damaged, in this case replace shell and counterweight.