Fisher&Paykel
appliances

Service Manual

ECOSMART™

PHASE 7

ELECTRONIC WASHING MACHINES

517792A

The specifications and servicing procedures outlined in this manual are subject to change without notice.

The latest version is indicated by the reprint date and replaces any earlier editions.

FISHER & PAYKEL

PHASE 7
ELECTRONIC WASHING MACHINES

Covering the following product codes
GWL15-US - 96200

Fisher & Paykel Appliances Inc
5800 Skylab Road,
Huntington Beach,
California,
CA92647, USA
Ph: 888 936 7872 (F&P),
Ph: 888 396 2665 (DCS)

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1 SPECIFICATIONS

1.1 Dimensions

Height to lid	
Open	55.5in – 56.6in / 1410mm – 1440mm
Closed	37.4in – 38.5 / 950mm – 980mm
Height to console	39.7in – 41.3in / 1010mm – 1050mm
Width	25.5in / 650mm
Depth	25.5in / 650mm
Inlet hose length	47.24in / 1200mm
Packed weight	143.3lb / 60.5kg
Unpacked weight	114.64lb / 52.0kg

Note: Exact height of the machine is dependent on how far the feet are inserted into the base of the machine.

1.2 Maximum Capacity (Full Load)

Dry Weight	17.6lb / 7.5kg

1.3 Water Consumption

Fill (High)	23.7 gal / 90 liters
Spray & Deep Rinse	34.3 gal / 175 liters
Save Water	39.6 gal / 150 liters
Eco Rinse	27.7 gal / 105 liters
1 Deep Rinse	43.5 gal / 165 liters
2 Deep Rinse	56.79 gal / 215 liters

***Note: Approximate water consumption for a high water level load for each rinse option offered.**

1.4 Water Fill Temperature (Approximate Factory Settings)

Supply	**Water Fill Temp**
Hot	140°F / 60°C
Hot / Warm	122°F / 50°C
Warm	104°F / 40°C
Warm / Cold	95°F / 35°C
Cold Plus	68°F / 20°C
Cold	Supply temperature

Recommended hot water inlet temperature 149°F / 65°C. (Max)

1.5 Wash Motor

Electronically commutated direct drive 3 Phase brushless DC Motor' 36 Poles.
Motor Resistance per Phase 16Ω +/- 10% @ 68°F / 20°C. Refer Section 2.7.

1.6 Pump Motor

Part Number	**Voltage**	**Frequency**	**Resistance**
42032P	110V AC	60Hz	7Ω +/- 8% @ 68°F / 20°C

Note: Thermal cut-out fitted

1.7 Water Valves

Supply	Mode of Operation	Voltage	Resistance	Flow Rate
Cold	Digitally Operated	24V DC	64Ω @ 68 °F / 20°C	16 liters per minute
Hot	Digitally Operated	24VDC	64Ω @ 68 °F / 20°C	10 liters per minute

Note: Flow rate will vary slightly depending on pressure.

Operating pressures: Maximum 150psi / 1034 kPa - Minimum 5psi / 34 kPa

Note: Pressures below 5psi / 34kPa can create seating problems with the internal diaphragm of the valve, and may cause water to drip into the inner basket when the machine is not in use.

1.8 Thermistor

NTC-type temperature sensor (Thermistor) Resistance 10,000Ω @ 77 °F / 25°C

1.9 Cabinet

Pre-painted steel

1.10 Lid

ABS plastic (co-injected)

1.11 Top Deck

Polypropylene

1.12 Inner Basket

Stainless steel: Grade 430T
Basket base and balance ring: Polypropylene

The inner bowl on the large machine has a series of small bumps around the base of the inner bowl. These bumps are designed to improve wash performance by increasing load turnover and movement.

Note: The inner bowl is backwardly compatible with all earlier large machines.

Inner Basket Weight

Large	23.10 +/- 9.7oz / 10.480kg +/- 275g

Inner basket speed

Fast Spin	1,000 RPM
Medium Spin	700 RPM
Slow Spin	300 RPM
Stir Speed	25 RPM

1.13 Outer Basket

Aluminium insert over-moulded with polypropylene

1.14 Console

ABS plastic with ABS plastic insert for display module.

1.15 Agitator

Polypropylene

1.16 Fabric Softener Dispenser

Dosage 75cc

1.17 Electric Supply

Operating Voltage 110/120V AC 60Hz
Maximum Current 7.0 amps

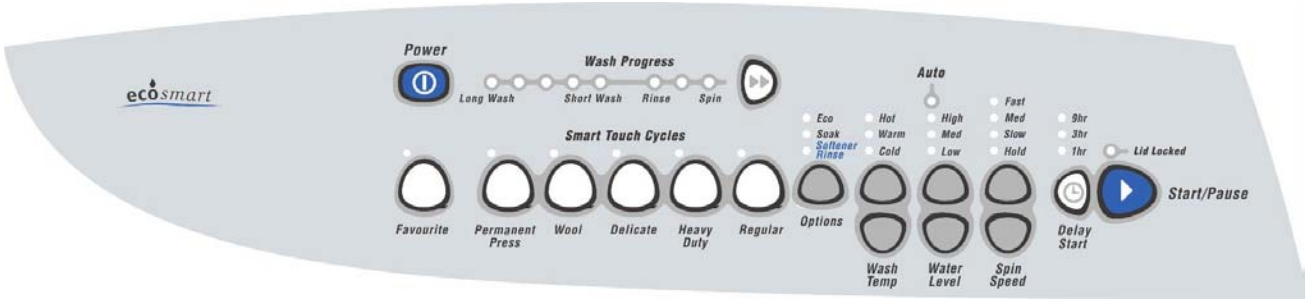
1.18 User Information

User Guide 420900
Compact Disk 420353

1.19 Lid Lock

Resistance 63Ω +/- 10% @ 68°F / 20°C
Note: Normally low voltage, potentially 110V if harness is grounded on the cabinet!

1.20 Control Panel – (EcoSmart™)



2 TECHNICAL OVERVIEW

This Service Manual contains information on the Product Specifications, Diagnostic Mode, Detailed Fault Codes and the complete disassembly and assembly instructions for the Phase 7 washing machines.

2.1 Electronics

2.1.1 Motor Control Module

The Motor Control microprocessor performs a wide variety of tasks. Primarily it controls the electronic switching hardware to control the three phase currents in the Smart Drive DC motor. The micro can accurately control not only the velocity of the motor but also the acceleration. This accurate control is required to perform all the different agitator profiles, or wash actions, that are used for caring for clothes. The Motor Control module performs the functions of spin, fill, wash, drain and spray rinse when commanded to by the Display.

The Motor Control module microprocessor has a wide range of control with great accuracy over spin speed, agitate action, fill temperature and water level. Having such control insures the wash cycle selected provides the optimum soil removal combined with appropriate gentleness for the washing and care of the clothes load.

The Motor Control Modules for the Phase 7 Washers are air-cooled in the same way as the Phase 5, and 6 machines are, and are colored brown, the same color that is used for Phase 6, Series 11 & 12 machines.

This Motor Control Module is **not inter-changeable** with other any other Phase or Series of machines.

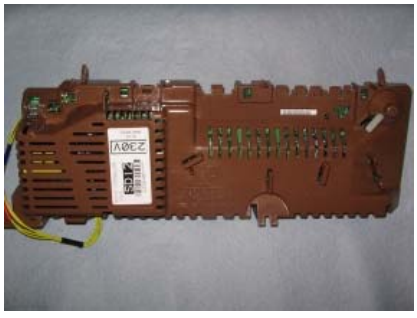
Identification

The physical shape of the Motor Control Module is different to the Phase 6 machines. The Phase 7 module also has a yellow label attached to the top of the housing stating P7CP (Phase 7, Conventional Pump).

Motor Control Module Phase 7

Identifier Label

Motor Control Module Phase 6 – Series 11 & 12

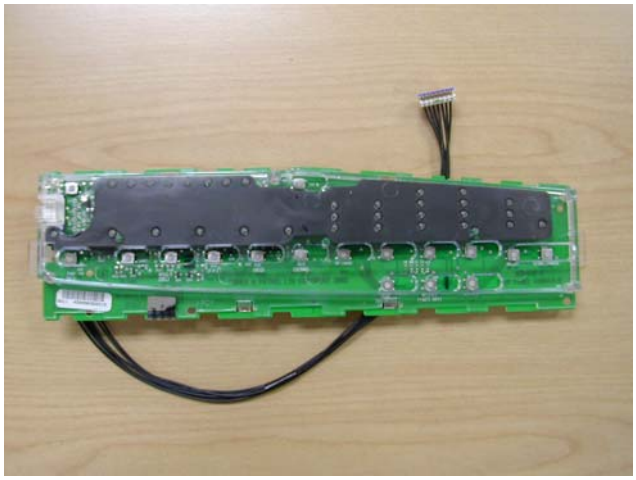


Note: When replacing a Motor Control Module ensure that the pressure tube is clear of any water droplets before operating the machine on a fill cycle. If the basket is full of water drain the water then blow down the tube.

2.1.2 Display Module

The Display Module provides the link between the washing machine electronics and the user. Input on wash type, water level, spin speed, start/stop and wash cycle time is given by the user via the display push buttons.

Feedback on selection is given to the user by Light Emitting Diodes (LEDs). Sound effects accompany button presses.



2.2 Stand By Mode

If a Phase 7 machine has not received any instructions for 10 minutes after being switched on at the power point, or after completing the cycle, it will automatically go into a low power “Stand By” mode. The control panel will be blank as if it was powered off at the wall.

Before entering the Diagnostic or Option Adjustment modes, the machine must be taken out of the Stand By mode. To do this, the **POWER** button will have to be pressed, or the machine turned off and back on at the power point.

2.3 Out of Balance Detection – ‘Bump Detect’

Past electronic machines have used a lever connected to a mechanical switch to detect if the load in the inner basket is out of balance. On Phase 7 machines this system has been replaced with electronic sensing known as ‘Bump Detect’. ‘Bump Detect’ is software written into the Motor Control Module, which looks at specific feedback from the Rotor Position Sensor.

No fault codes are associated with ‘Bump Detect’, and there are no hard and fast tests that can be carried out.

If a machine continually goes into an out of balance condition then the following needs to be checked in the order given.

1. Even distribution of the clothes load.
2. Ensure that the machine is both level and stable on the floor.
3. Check the weight of the inner basket (23.10 +/- 9.7oz / 10.480kg +/- 275g).
4. Check the RPS using a RPS Tester.

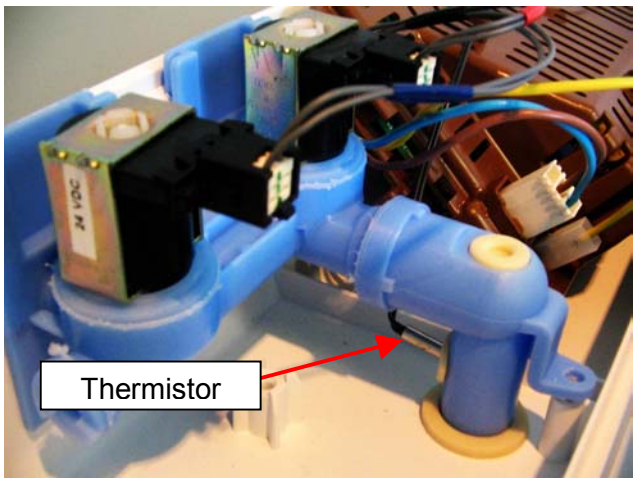
Note: If the OOB problem persists after checking the above, we would then recommend replacing both the suspension rods and the rotor. It is highly unlikely that the Motor Control Module will be the cause.

2.4 Water Temperature Sensing

The thermistor for sensing water temperature is located in the back of the outlet elbow on the valve assembly, and is connected directly to the Motor Control Module.

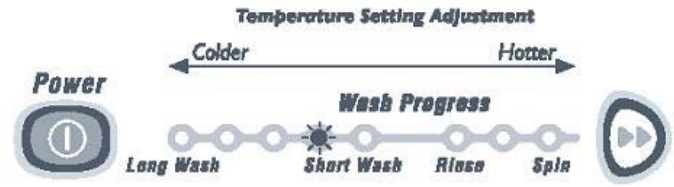
For details on the wash temperature adjustment Refer to Section 2.4.1 & 2.4.2.

Specifications
NTC-type temperature sensor (Thermistor)
Resistance 10,000Ω @ 77 °F / 25°C.



2.4.1 Wash Temperature Adjustment

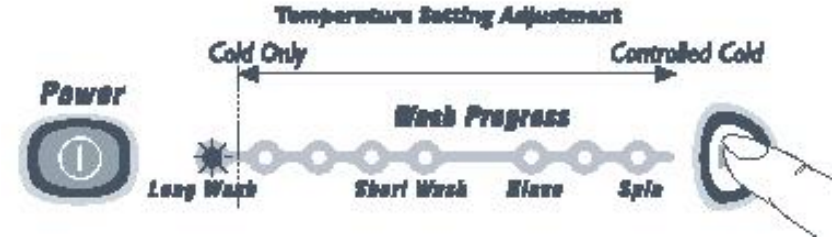
1. Turn machine on at the wall but do not press **POWER**.
2. Press **START/PAUSE** and hold down, then press **POWER**. Two quick beeps will be heard and the machine will show an unusual pattern of lights. In this mode the lights are used to indicate the different options available.
3. Select the **WASH TEMPERATURE** to be adjusted.
4. The wash progress lights show the temperature adjustment possible for that temperature. Pressing the **ADVANCE** will cause the wash progress light that is on to change. Advancing the Wash Progress light will increase the wash temperature. If the **ADVANCE** button is kept pressed, the light will scroll back to the coldest setting available for that wash temperature



2.4.2 Controlled Cold

If the cold water temperature is very low (below 68 °F / 20 °C), a very effective wash will not be obtained. The controlled cold option solves this problem by adding a small amount of hot water to raise the temperature of the wash. We have called this 'Controlled Cold'.

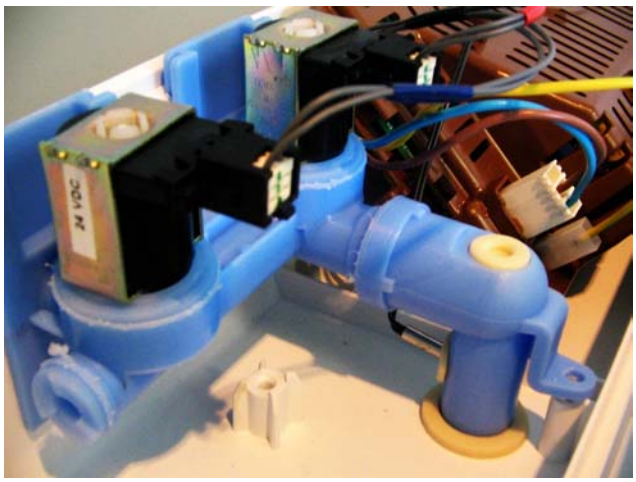
1. Turn machine on at the wall but do not press **POWER**.
2. Press **START/PAUSE** and hold down, then press **POWER**. Two quick beeps will be heard and the machine will show an unusual pattern of lights. In this mode the lights are used to indicate the different options available.
3. Select **COLD** wash temperature.
4. The Wash Progress lights show the temperature adjustment possible. When the first progress light is on, the machine will fill with cold water only. Press **ADVANCE** to select the second light and the EcoSmart® will control the temperature to approximately 68 °F / 20 °C . Each following light equals approximately a 33.8 °F / 1°C temperature rise.



2.5 Water Valves

The Phase 7 machines use a new dual valve block assembly. Independent coils control the hot and cold water supply, which feeds the water through a common outlet.

The valve block has a location feature for the thermistor.



2.6 Water Level Measurement

The machine is fitted with a pressure sensor, which can control the fill to any water level. The pressure sensor is incorporated within the Motor Control Module and cannot be removed. The pressure tube connects from the Motor Control Module to the air bell at the bottom of the outer basket, and is part of the harness assembly. Care must be taken when removing or refitting the pressure tube to the pressure sensor as too much force can damage this device.

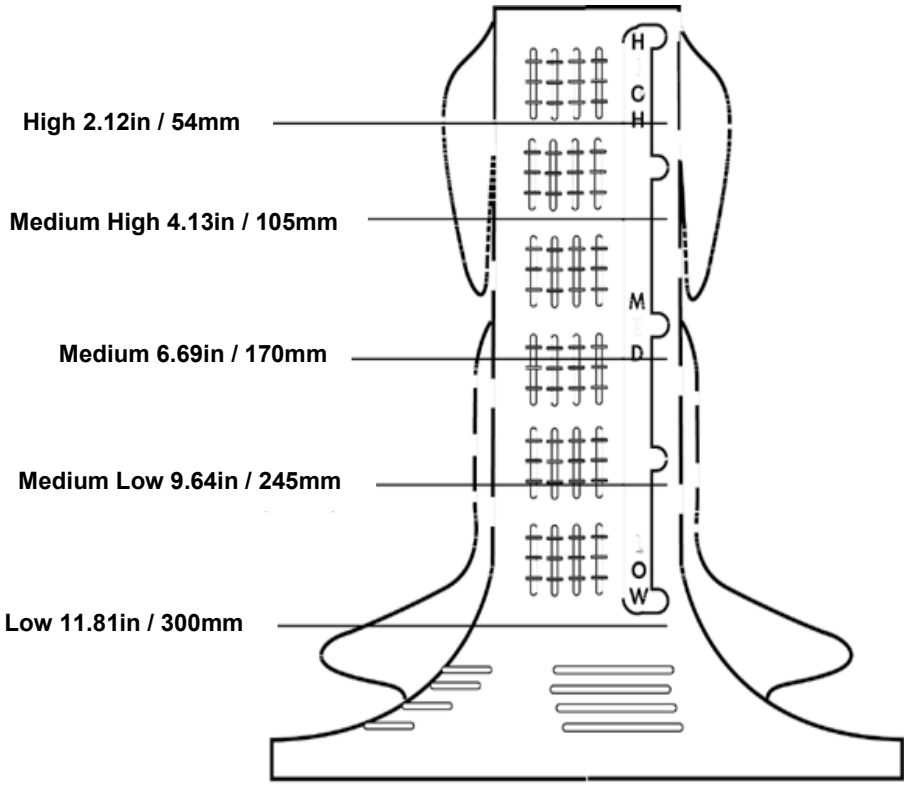
2.6.1 Manual Water Level

The agitator has 5 levels marked on its stem that can be used to help the user select the correct water level. Select the correct water level by using the mark nearest to the top of the clothes.

The levels marked on the agitator are a guide for the clothes and do not correspond exactly to the water level.

Occasionally water may be added during agitation. This is to maintain the water level due to the release of air trapped in the garments.

For example: If the garments sat between the medium and high marks on the agitator, choosing a medium water level would be better than choosing a high water level. Alternatively additional garments could be added so that the garments were brought closer to the high mark.



EcoSmart® Water Level Settings
Tolerance for each water level = +/- .59in / 15mm

2.6.2 Auto Water Level

The machine automatically selects the appropriate water level for the load when AUTO Water Level is selected, and will choose one of the pre-existing 5 water levels (low, medium low, medium, medium high and high). During fill the machine pauses occasionally to sense the water level. The machine checks if the water level is correct by using a series of 2 different agitate strokes. A slow stroke to sense the load and an agitate stroke to mix the load. If the machine detects that that water level is too low it will fill with more water and check the level again.

- When washing an unusual load eg. large bulky garments, pillows, it is recommend that the water level is manually selected.
- Manually select the water level if there is already water in the basket.

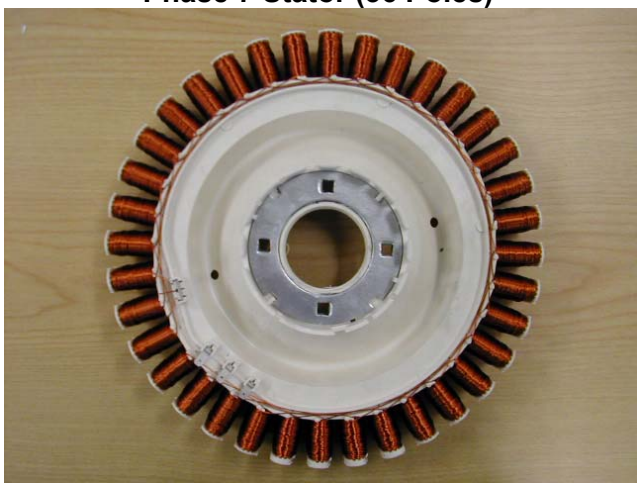
If the machine does not fill to the correct level, the auto water level can be adjusted in the Option Adjustment Mode.

2.7 Motor

2.7.1 Stator

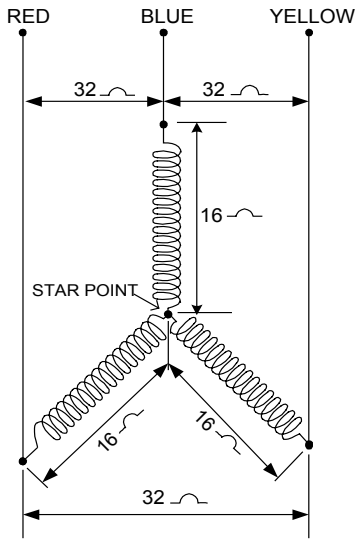
This stator used on the Phase 7 machines are unique to this phase only and therefore it is **not interchangeable** with any previous phase or series of machines. The stator has 36 poles instead of 42 poles, and the pole tips are curved. The resistance of the windings remains the same as for the Phase 5, Series 9, and Phase 6, Series 11 and 12 machines at 16Ω per winding. The rotor position sensor is also unique to this stator. (Refer to Section 2.7.3.)

Phase 7 Stator (36 Poles)



Curved pole tips

Wiring Diagram



2.7.1.1 Testing the Stator

If the stator needs to be tested we would first recommend testing the resistance of the windings from the harness that is connected to the Motor Control Module. (Refer to Section 7).

Note: Ensure that the Rotor or basket is stationary when measurements are made.

Testing the stator from the console

The resistance of each individual winding is approximately 16Ω, however when testing the stator from the console we are testing across two windings therefore the resistance should be approx. 32Ω +/- 10%.

To test all windings you will need to measure across:

- Red & Blue
- Red & Yellow
- Blue & Yellow

If the meter shows an incorrect reading we would then recommend testing the stator from underneath the machine as there could be a fault in the wiring harness. To test the stator, both rotor and stator need to be removed. Refer to Sections 9.16 and 9.17.

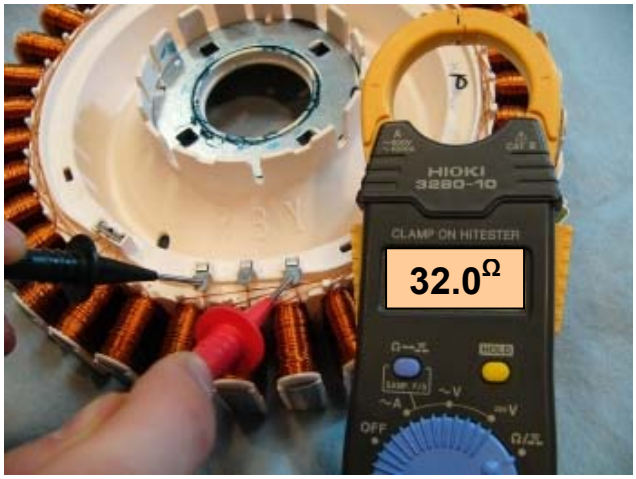
Note: Two clamp plates are used to secure the Stator, one on each side. The four bolts are tightened to a torque of 5Nm. The plastic bolt for securing the Rotor requires a 16mm socket and should be tightened to 8Nm.

Testing the Stator

After removing the Stator, it can now be tested.

Test points are:
Red / Blue
Red / Yellow
Blue / Yellow

The value should be approx. 32Ω +/- 10% across any of the two windings.



2.7.2 Rotor

The rotor is also unique to the Phase 7 machines. It has 16 blocks containing 3 individual magnets, as opposed to 14 blocks, containing 4 magnets for Phase 5, and Phase 6 machines.

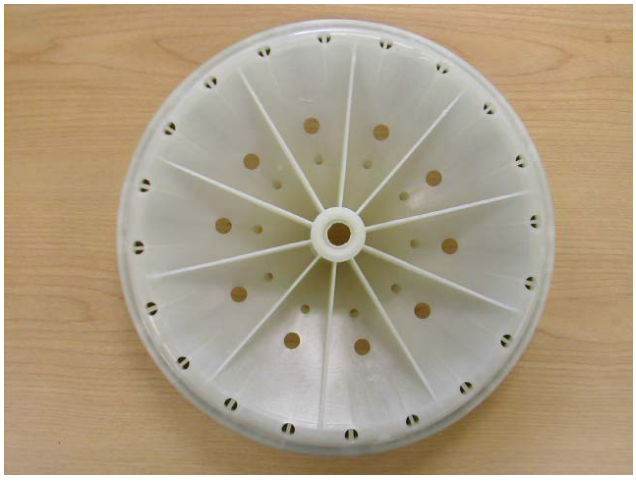
The rotors between Phase 7 and previous Phases of machines can physically be interchanged, however electrically they are **incompatible**.

If a Phase 7 rotor is fitted to a Phase 6 or earlier machine, fault code 240 will occur. Conversely fault code 240 will also occur if a rotor from a Phase 6 or earlier machine is fitted to a Phase 7 machine.

Apart from the number of magnets the other (and easiest) way to identify the Phase 7 rotor is by the number of holes. The Phase 7 rotor has larger holes around the outer perimeter and an additional set of large holes on the inner perimeter.

The photographs below show the difference between a Phase 7, and a Phase 6 Rotor.

Phase 7

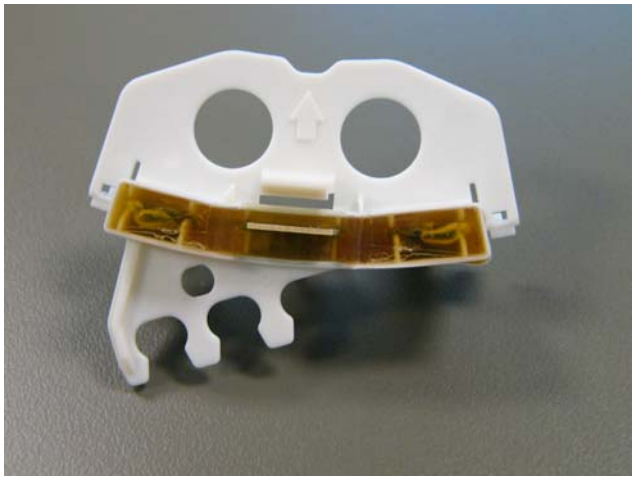


Phase 6

2.7.3 Rotor Position Sensor (RPS)

One of the inputs that the Motor Control Module needs in order to determine which switches to turn on is the position of the rotor. The rotor position sensor (RPS) supplies this information.

The RPS is a printed circuit board that contains three Hall Sensors. These detect the magnetic field of the individual magnets in the rotor. As the motor turns, the position of a group of magnets is detected. There are 5 wires on the RPS, 2 for power supply and 3 signal wires. Data on the position of the rotor is supplied to the microprocessor in the Motor Control Module via the three signal wires.
The printed circuit board sits in a plastic housing encapsulated by resin to protect the board. The only exposed area of the board is the connector for the main harness.



2.7.3.1 Testing the Rotor Position Sensor

To test the RPS use a RPS tester, part number 502105, which is powered by a 9V battery. To test the RPS of a Phase 7 Washer it will also require an adaptor harness, part number 420892. The tester has 3 LEDs, and the pattern of these LEDs will change as the magnetic field of the Rotor passes the hall sensors.

Connect the RPS tester to the RPS harness. Turn the basket and note the pattern of lights. A valid pattern is a pass. A fail will indicate a failure of either the harness or the RPS. If a failed pattern is showing, connect the RPS tester directly on to the RPS and retest.

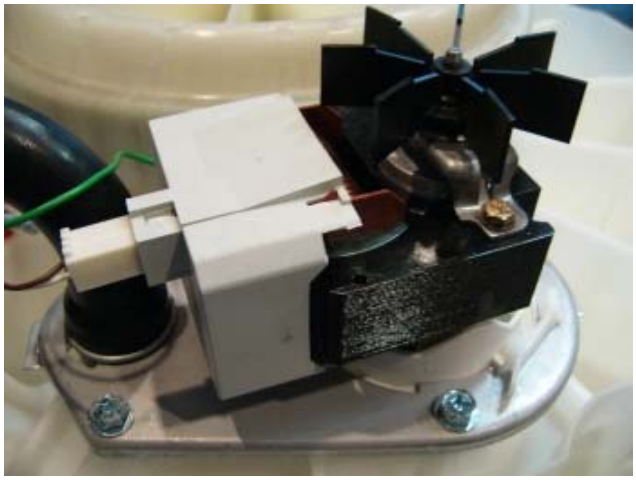
A pass is when 1 or 2 LEDs are illuminated at a time, 0 or 3 LEDs illuminated indicates fail. Any flickering of the fail LED will indicate that the RPS or rotor is faulty. A faulty rotor would give a fail at certain points of rotation.

Note: This tester does not test all the functionality of the RPS. It tests the 3 outputs but cannot indicate all faults, for example if a capacitor on the RPS is cracked.

The rotor may also be tested with a RPS Tester. A complete rotation will test all the magnets.

If the rotor has cracked or chipped magnets it will work fine, and does not need to be replaced.

2.8 Pump

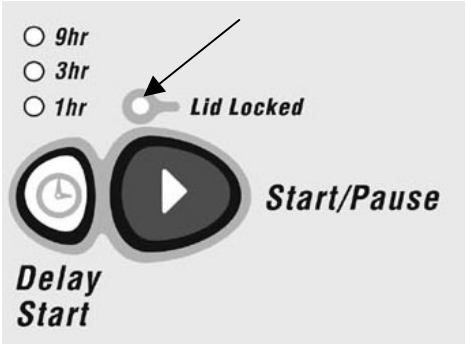


The pump is coupled directly to the outer basket. This eliminates basket to pump hoses and the accompanying seals, clips etc. The pump housing is an integral part of the outer basket.

When removing the pump up to a liter of water may leak from the pump cavity. When refitting the pump lubricate the seal face with liquid soap or detergent (do not use grease).

Blocked Pump Detection
This is achieved by monitoring the water level during drain. If the water level has not dropped by approximately 3mm within a predetermined time period (approximately 9-10 minutes), then the product will report a blocked pump fault.

2.9 Lid Lock



The Phase 7 Washer uses the same lid lock that is used on the Phase 6 series 11 & 12 machines. The difference being is that the lid is now locked for the entire cycle. When the lid is locked the Lid Locked LED will illuminate. Once the spin has completed, the lock will release and the lid can be opened. To open the lid during the cycle the **START/PAUSE** button must be pressed, the machine will come to a halt, and the lid locked LED will extinguish.

If the lid is left open, the machine will be unable to lock the lid and the cycle will be halted. The machine will play a tune and the lid lock will flash until the lid is closed and **START/PAUSE** is pressed.

- If the lid-lock fails in the closed position, the locked lid can be forced upwards and out of the lock. ***Note: This is the only time in which we would recommend doing this.***
- If the harness is damaged, the complete lid lock assembly will need to be replaced.

If the power supply is cut during the spin cycle, the machine will keep the lid locked until the rotor has ceased to turn (3 to 10 secs). Only then will it release the lock. The motor is acting like a generator and allows the lock to stay energized under the bowls inertia.

In a brown out situation, the machine will restart at the start of whatever section of the cycle it was on and continue the wash. The lid lock would then be reactivated if it happened to be on a spin cycle.

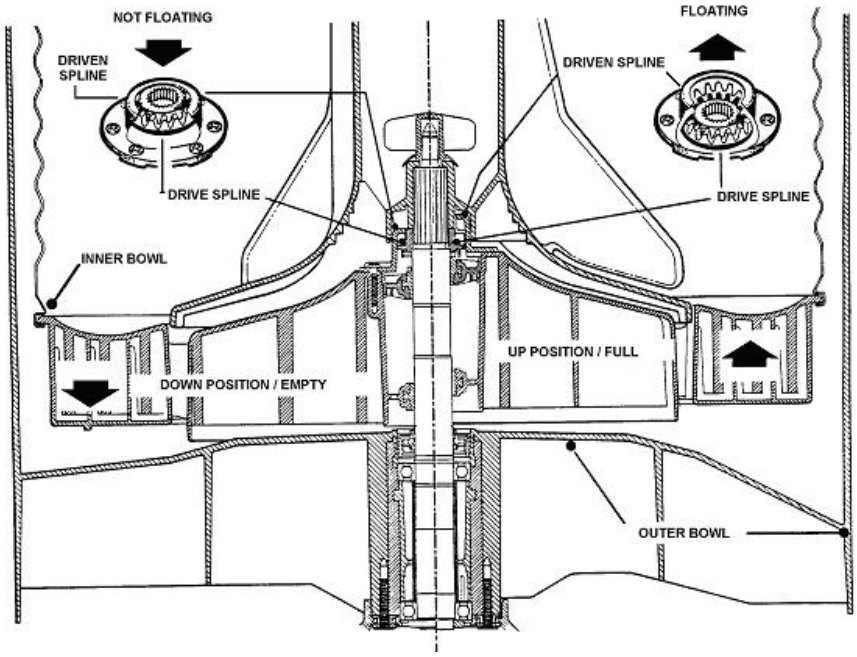
2.10 Inner and Outer Baskets

The outer basket is the assembly to which all the motor, pump system, suspension rods, etc are mounted. Within the outer basket are the inner basket and the agitator. During spin, the agitator and inner basket have to be coupled together and turn as a single unit. In agitate, the agitator and inner basket are free to rotate independently.

The inner basket is free to move in a vertical direction. The position of the inner basket is determined by the water level. At the base of the inner basket is a flotation chamber consisting of a number of individual cells. When the machine is filling with water, the pressure on the air in these cells increases as the water level rises until eventually the inner basket floats upwards and disengages the driven spline from the drive spline. This action frees the agitator from the inner basket and allows it to move freely in both directions.

When the water is draining, the pressure on the air trapped in the cells of the flotation chamber decreases allowing the inner basket to settle back down onto the drive spline and re-engage the driven spline, thus allowing the agitator and inner basket to turn as one unit. The floating basket is also used to detect if the user has selected the correct water level for the size of the clothes load.

The point at which the basket starts to float is determined by the water level and the size of the load. The greater the load, the more water is needed before the inner basket will float. By detecting the point at which the basket floats, the machine can determine whether the correct water level for the particular clothes load has been chosen by the operator. If the operator has chosen a level that is too low for the load, the machine will override that choice and fill to the correct level. This is to ensure optimum wash performance and minimal clothes wear. If the user has selected a level that is higher than necessary, the machine will still fill to the users selected level.



2.10.1 Detection Of Inner Basket Float Off Point – Basket Check

During fill the inner basket will rotate to ensure that the clothes are evenly saturated with water. When the chosen water level is reached, and before the agitate cycle is started, the machine will carry out inner basket float checks (basket check). The inner basket will stop and commence a number of small agitate type actions. During this action the machine determines if the inner basket has floated. If it has the machine will determine the required water level and check if the operator has selected the correct level. If the inner basket has not floated, the machine will continue filling and check again later. The water level at which the inner basket floats is not necessarily the same as the final water level.

2.10.2 Detection of Inner Basket Re-Engagement – Basket Check

After the water has drained, the inner basket will sink down and re-engage onto the drive spline. To ensure the inner basket has re-engaged correctly, the machine will carry out a basket re-engage test sequence (basket check). Basket check consists of a series of short agitate type actions before the spin cycle starts. A sound may be heard as the inner basket re-engages.

2.10.3 Balance Rings

The inner basket has 2 balance rings, one at the top, and one at the bottom. These are sealed compartments half full of water. This water allows the basket to balance. If one or both of these rings have lost water then the inner basket must be replaced. The easiest way to determine a loss of water is to weigh the baskets on n accurate set of scales.

Inner Basket Weight: 23.10 +/- 9.7oz / 10.480kg +/- 275g

2.11 Agitator

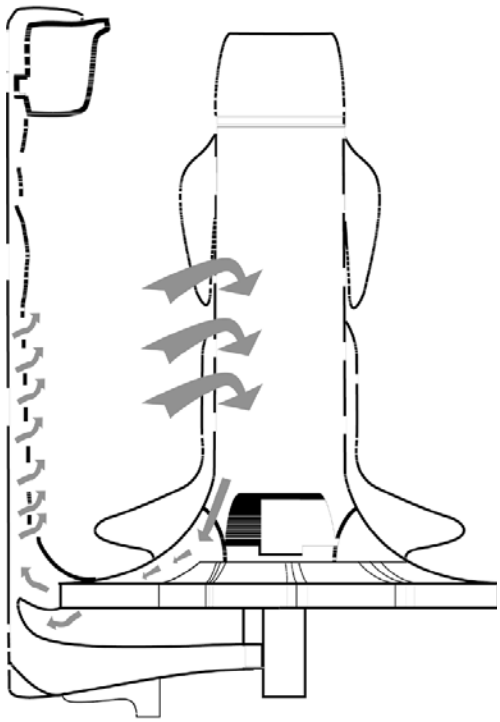
The agitator design differs from conventional designs in that it is made of very flexible plastic that bends and flexes as the clothes are moved around the basket. The agitator action is similar to that of a fish moving through the water, so the side-wards motion is translated to forward thrust. This is not only more forgiving on the clothes but helps to slowly move the clothes around the basket in a toroidal motion, ie. a vertical circular motion. The fins at the top of the agitator pull the clothes on the surface of the water inwards and then push them downwards. The bottom fins then push the clothes towards the outside of the basket again and back up to the surface.

The agitator also features guides on the side to help the user choose the correct water level for each load size. The guides relate to the level that the dry clothes come up to, which relates back to the correct water level. The agitator also gives the user information when measuring detergent, to ensure that they dose correctly for the load size.

2.12 Lint Removal System

The machines self cleaning lint removal system works by continuous water circulation, resulting in the separation of lint from the wash water. As the agitator moves, the specially designed vanes on the bottom create turbulence. The agitator acts as a centrifugal pump, circulating the wash water.

As a result of the agitator action, lint and wash water are sucked into the agitator stem and down to the base where they are directed into the cavity between the inner and outer baskets. The extruded holes of the inner basket are shaped to allow the wash water to flow back into the basket, but prevent the lint from following. The lint then floats to the surface of the water between the inner and outer basket and remains there until it is flushed out the drain at the end of the wash cycle.



Automatic L'nt Removal System

2.13 Fabric Softener Dispensing

TYPE: It is recommended that softener sheets should be used in the dryer rather than using liquid softener in the washing machine. Liquid softener has been known to produce a waxy build-up inside washing machines, called Scrud. We do however, provide a fabric softener dispenser for those who prefer liquids. It is recommended thinner varieties be used over thicker ones as they dispense more cleanly.

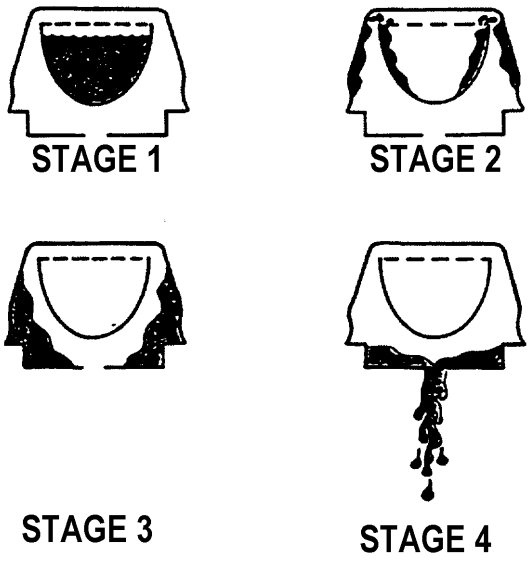
WHERE: The liquid fabric softener goes in the dispenser cup on top of the agitator. The fabric softener is automatically dispensed into the final deep rinse. In this way the fabric softener and detergent are separated, as they are not compatible.

Pour fabric softener into the dispenser as shown

The dispensing stages

1. Fabric softener remains in the dispenser cup during the fill, agitate and drain phase of the wash program.
2. During the first phase of the spray rinse it is centrifuged out of the cup into the body of the dispenser.
3. The fabric softener is held hard up against the sides of the dispenser body by centrifugal force throughout the spray rinse.
4. At the end of spray rinse the softener drains out of the dispenser, down the center of the agitator where it is dissolved in the incoming deep rinse water.

Note: To use fabric softener the **SOFTENER RINSE** must be selected on the control panel.



2.13.1 Scrud

If fabric softener is used regularly it will eventually cause a build up within the outer basket. This can result in black flakes present in the wash load that can stain garments. To remove scrud follow the procedure below.

Step1: Add a full cup of a good quality dishwashing powder in to the machine.

Step 2: Set the machine to a Heavy Duty cycle, select a Hot Wash temperature, High Water level and allow the machine to agitate for 10 minutes.

Step 3: Leaving the lid closed, turn the machine off and allow to soak overnight.

Step 4: The following day, turn the machine on and advance to the spin cycle to drain the water from the machine. After the water has drained, turn the machine off then back on again, and select a Heavy Duty cycle, Hot wash, High Water level, and allow the machine to complete a full cycle to ensure that all of the loose scrud and residual detergent has been flushed away.

Note: If there is an extremely heavy build up the above procedure may have to be repeated.

3 SIZE SETTING MODE

To set the size switch, turn the power on at the power point and off at the console. Press and hold **WASH TEMPERATURE SETTING UP** then press **POWER**. EcoSmart® will give 4 short beeps and the pattern of LEDs will change.

To lock the size into memory.

- Press **SPIN SPEED UP**, the **SPIN HOLD** LED is on for **7.5 / 8.0kg** (650mm wide).
- Press **POWER** to confirm the setting and also exit this mode.

If the size setting is wrong, EcoSmart® will have the following settings incorrect: -

- The Auto Water Levels chosen may be incorrect.
- The High Water Level may be incorrect by as much as 40mm.
- The wash profiles may be incorrect resulting in poor wash performance or vigorous wash actions causing tangling, splash over or excess linting.
- Water saver settings.

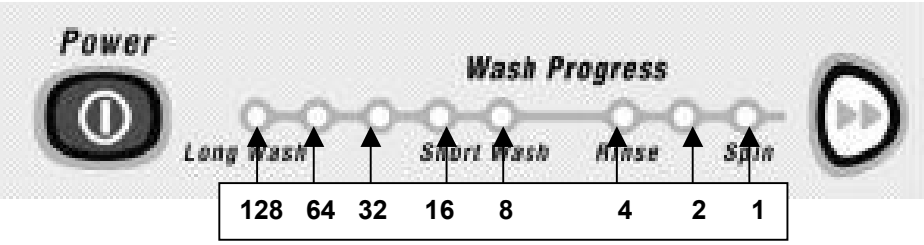
4 DIAGNOSTIC MODE

To enter diagnostic mode follow the steps below.

1. Turn the power on at the power point but off at the machine.
2. Press and hold **WASH TEMPERATURE SETTING DOWN** and then press **POWER** until the machine gives 2 short beeps and lights up.
3. Release the buttons after the beeps as the beeps indicate diagnostic mode has been entered.

4.1 Last Fault Data

When in diagnostic mode the last fault can be found by pressing the **SPIN SPEED UP** or **DOWN** buttons until the **HOLD** and **SLOW** lights are illuminated. Binary can then be read from the wash progress lights.



4.2 Drain Pump Test

GW Washer

When in diagnostic mode press **REGULAR** to activate the drain pump. To deactivate the pump, press **REGULAR** again.

4.3 Water Valve Test

The water valves can be activated in diagnostic mode by pushing **WASH TEMPERATURE SETTING UP** to activate the **Hot Valve** and **WASH TEMPERATURE SETTING DOWN** to activate the **Cold valve** as with previous models.

Pressing each button once will activate the valve. To de-activate valve press the same button again. This is also good to use when installing machines as it takes the shock out of the fittings and seals and allows checking for leaks on the inlet hoses, both machine end and tap or super-tub end.

Caution: Do not leave the machine unattended when either or both valves are operating.

4.4 Restart Feature

If a fault occurs in the machine, the diagnostic system will detect it. However, instead of displaying a fault code immediately, the machine will try to restart. If the fault was only of temporary nature, the machine will restart and finish the cycle. If there is a continuous fault the machine will try to restart a number of times.

This process could take up to 8 minutes depending on the type of fault. After this, if the machine still cannot restart, the fault code is displayed and the machine will beep continuously. The number of retries will depend on the fault that it has detected, however the maximum number or retries for any one fault is 32 times.

The restart feature is turned on when a machine leaves the factory. For servicing we strongly recommend that this feature be disabled.

To turn the restart feature on follow the procedures below:

1. Enter diagnostic mode (Refer to Section 4).
2. Press **WATER LEVEL DOWN** so that the low water level LED is lit.
3. Press **POWER** to turn the display off (the 5 leftmost wash progress LEDs will be flashing).
4. Press **POWER** to turn the machine on.
5. The machine can now be tested on any cycle.

To turn the restart feature off, either repeat the steps above or switch off the power to the machine.

The restart feature can be permanently programmed in to the machine's memory. When in diagnostic mode press and hold **ADVANCE** down at the same time as pressing **WATER LEVEL DOWN.** A long beep will acknowledge the setting has been retained in EEPROM. Press **POWER** to retain selection as with size switching. To remove from the permanent memory, repeat the above procedure.

Note: This feature is designed as a service aid only and should be left on in the customer's home. To return to normal operation, and to reset the restart feature to the factory setting, switch the machine off at the wall or disconnect from the mains supply.

4.5 Recycle Feature

The recycle feature, when enabled, will cause the machine to continuously repeat the cycle that has been selected. At the completion of the spin cycle the machine will power off briefly then power back up again and will start the cycle programmed.

This feature would be useful to help identify an intermittent problem, and would be best used if the machine had been taken back to a workshop for service.

To turn the recycle feature on follow the procedures below:

1. Enter diagnostic mode (Refer to Section 4).
2. Press **WATER LEVEL UP** so that the Medium water level LED is lit.
3. Press **POWER** to turn the display off (the 3 rightmost wash progress LEDs will be flashing).
4. Press **POWER** to turn the machine on.

The machine can now be tested on any cycle.

Note: This feature is designed as a service aid only and should be OFF in the customer's home. To return to normal operation, and to return the recycle feature to the factory setting, switch the machine off at the wall or disconnect from the mains supply.

4.6 Hot Basket Flag

If a EcoSmart® machine has been filled with hot water and has not had a cold rinse, it will not spin up to its full speed of 1000 RPM. Its maximum speed will instead be restricted to a maximum of 700 RPM. This is to prevent distortion of any internal plastic componentry that may occur at a high spin speed.

To check to see if this flag has been enacted, firstly enter diagnostic mode (Refer to Section 4). The LED adjacent to **SOFTENER RINSE** will be lit.

To clear this flag and allow EcoSmart® to spin to 1000RPM, either press the **OPTIONS** button while in diagnostic mode, or put EcoSmart® through a complete final rinse.

4.7 Data Download

Enter diagnostic mode. Press **START/PAUSE**. The Lid Lock LED will now be on and flickering. Place the download pen over this LED and follow the instructions supplied with the data download program.

4.8 User Warnings

There are a number of warnings which are generally caused by the user or poor installation. These warnings should be able to be corrected by the user. EcoSmart® signals user warnings by flashing LEDs and a rippling set of 5 beeps repeated every 6 seconds. This is the same tone that is heard when EcoSmart® is first plugged into the mains power.

Most of this information is available to the user in the 'Use and Care Manual'.

4.8.1 Hot Water Temperature LED Flashing (Insufficient Hot Water)

Possible causes:

1. Check that the hot water is connected and that the tap is turned on.
2. Check that the water temperature is not too low. The water temperature may need to be 140^{O}F / 60^{O}C for a hot wash.
3. Check that the hot water inlet hose is not connected to the cold water supply.
4. Check that there are no kinks in the inlet hoses.
5. Check that the filter on the hot inlet hose at the tap end is not blocked.
6. Check that the filter screen in the hot inlet valve is not blocked.
7. Check the resistance of the thermistor. Resistance is 10,000Ω @ 77 ^{O}F / 25 ^{O}C. Replace if well outside of this range.
8. Check the size is set correctly.

Note: If the machine is set to controlled cold, hot water may be required to achieve 68 ^{O}F / 20 ^{O}C.

4.8.2 Cold Water Temperature LED Flashing (Insufficient Cold Water)

Possible causes:

1. Check that the cold water is connected and that the tap is turned on.
2. Check that the flow rate is not too low. The product requires a minimum flow rate of 3 liters per minute.
3. Check that the cold water inlet hose is not connected to the hot water supply.
4. Check that there are no kinks in the inlet hoses.
5. Check that the filter on the cold inlet hose at the tap end is not blocked.
6. Check that the filter screen in the cold inlet valve is not blocked.
7. Check the resistance of the thermistor. Resistance is 10,000Ω @ 77 ^{O}F / 25 ^{O}C. Replace if well outside of this range.
8. Check the size is set correctly.

4.8.3 Hot & Cold Water Temperature LED's Flashing (No Water)

Possible causes:

1. Check that water is connected and that the taps are turned on.
2. Check that there are no kinks in the inlet hoses.
3. Check that the filters on the inlet hoses at the tap end are not blocked.
4. Check that the filter screens in the inlet valves are not blocked.
5. Check that the flow rate is not too low. The product requires a minimum flow rate of 3 liters per minute.
6. Check that the drain hose is not too low or the drain hose is not pushed into the standpipe too far and the water is siphoning out of the machine.
7. Check the size is set correctly.

4.8.4 High Water Level LED Flashing (Overloaded Product)

Possible causes:

1. Check that the product is not overloaded.
2. Check the user has not selected the wrong water level.
3. Check that the rotating basket assembly is not jammed to the agitator with any foreign object that may be caught under the agitator skirt.
4. Check that the clutch teeth are not locked together with dirt, detergent or lint. Check that the teeth are not broken.

4.8.5 First Rinse or Final Spin and Current Spin Speed LED Flashing (Out of Balance)

Possible causes:

1. Check that EcoSmart® is correctly installed, is level and does not rock on the floor.
2. Check the bias spring is fitted between the top of the neck ring and the front left hand suspension rod.
3. Check the suspension is not catching or bouncy. If so, replace all four suspension rods.
4. Check both balance rings on the inner basket contain water. The most accurate way is to check the weight of the inner basket (Refer to Section 1.12).
5. Check that the holes on the inner basket have been punched through or are not blocked.

4.8.6 Suds (First Rinse LED is flashing or Final Spin LED is flashing)

This warning is generated if the EcoSmart® senses too much drag on the inner basket.

1. Too much detergent generally causes this. If so, dissolve the suds by flushing water through the machine and re-test.
2. Check that the pump is not partially blocked, or that the drain hose is not kinked.
3. Check that a garment or foreign object is not restricting the movement of the inner basket.
4. Check that the main bearings are not tight.

4.8.7 Lid Lock LED Flashing

This warning is generated if the electronics have detected that the lid has not been closed.

1. Check that the tang on the lid is not bent or broken.
2. If the lid is closed and the tang is ok, replace the lid-lock assembly.

4.8.8 Demonstration Mode (All LEDs flashing in patterns)

This feature is designed for in store demonstration purposes. EcoSmart® can draw attention to itself with a selection of flashing LEDs. In this mode EcoSmart® cannot be started. To Select demonstration mode press and hold **Advance**, then press **Power**.

During demonstration mode the LEDs will alternate between all on, LEDs flashing, and all LEDs off. To return EcoSmart® to normal operation, the mains supply must be switched off.

4.9 Diagnostic Table

To use this table, firstly enter Diagnostic Mode (Refer to Section 4). The different levels of information can be extracted by using the Spin Speed up and down buttons.

Diagnostic Level	Spin Speed LEDs				Diagnostic Info Displayed
	Fast	Med	Slow	Hold	
0	OFF	OFF	OFF	OFF	Last User Warning Number
1	OFF	OFF	OFF	ON	Last User Warning Cycle Position
2	OFF	OFF	ON	OFF	*Factory use only – Not applicable to the field*
3	OFF	OFF	ON	ON	Fault Code at last fault (if within the last 8 cycles)
4	OFF	ON	OFF	OFF	*Factory use only – Not applicable to the field*
5	OFF	ON	OFF	ON	Cycle count at last fault (low byte)
6	OFF	ON	ON	OFF	Cycle count at last fault (high byte)
7	OFF	ON	ON	ON	Cycle position at last fault
8	ON	OFF	OFF	OFF	Water Temp (deg C)
9	ON	OFF	OFF	ON	Cycle count (low byte)
10	ON	OFF	ON	OFF	Cycle count (high byte)
11	ON	OFF	ON	ON	Motor speed (RPM)
12	ON	ON	OFF	OFF	Water Level
13	ON	ON	OFF	ON	EEPROM version number
14	ON	ON	ON	OFF	*Factory use only – Not applicable to the field*
15	ON	ON	ON	ON	*Factory use only – Not applicable to the field*

Diagnostic mode 0, Last User Warning Number:
When in this level, use the binary count on the Wash Progress LEDs as used to obtain the last fault data. Use the chart below to identify which was the last user warning.

Binary Count	User Warning
0	No warning
1	No taps
2	Overload
3	OOB
4	Suds
5	No Hot
6	No Cold
7	Agitate overloaded

Diagnostic mode 1: Last User Warning Cycle Position
To find out which stage in the cycle the last user warning occurred, use this level. A LED on the wash progress LEDs will identify the stage, ie if the user warning was suds (in diagnostic level 0) and the 1st Rinse LED was lit in this level, this was the stage in the cycle where the user warning occurred.

Diagnostic mode 3: Last fault data
This level is sometimes referred to as the detailed fault code. By adding up the LEDs on the wash progress in binary form (Refer to Section 4), this will relate to a fault code (fault codes are contained in the last section of this manual). If there are no LEDs lit, a fault code hasn't occurred in the last 8 cycles.

Diagnostic mode 5&6: Cycle count at last fault (Low byte, High byte).
These levels will indicate how many cycles ago the last fault occurred. Even though the last fault gets wiped from diagnostic level 3 after 8 cycles, the cycle where the fault occurred is permanently stored in the memory.

The low byte refers to binary numbers from 1 through to 128. The high byte Refers to numbers from 256 though to 32768. It always pays to check the low and high bytes.

Diagnostic mode 7: Cycle position at last fault
An LED that is illuminated on the Wash Progress will indicate the cycle where the last fault occurred.

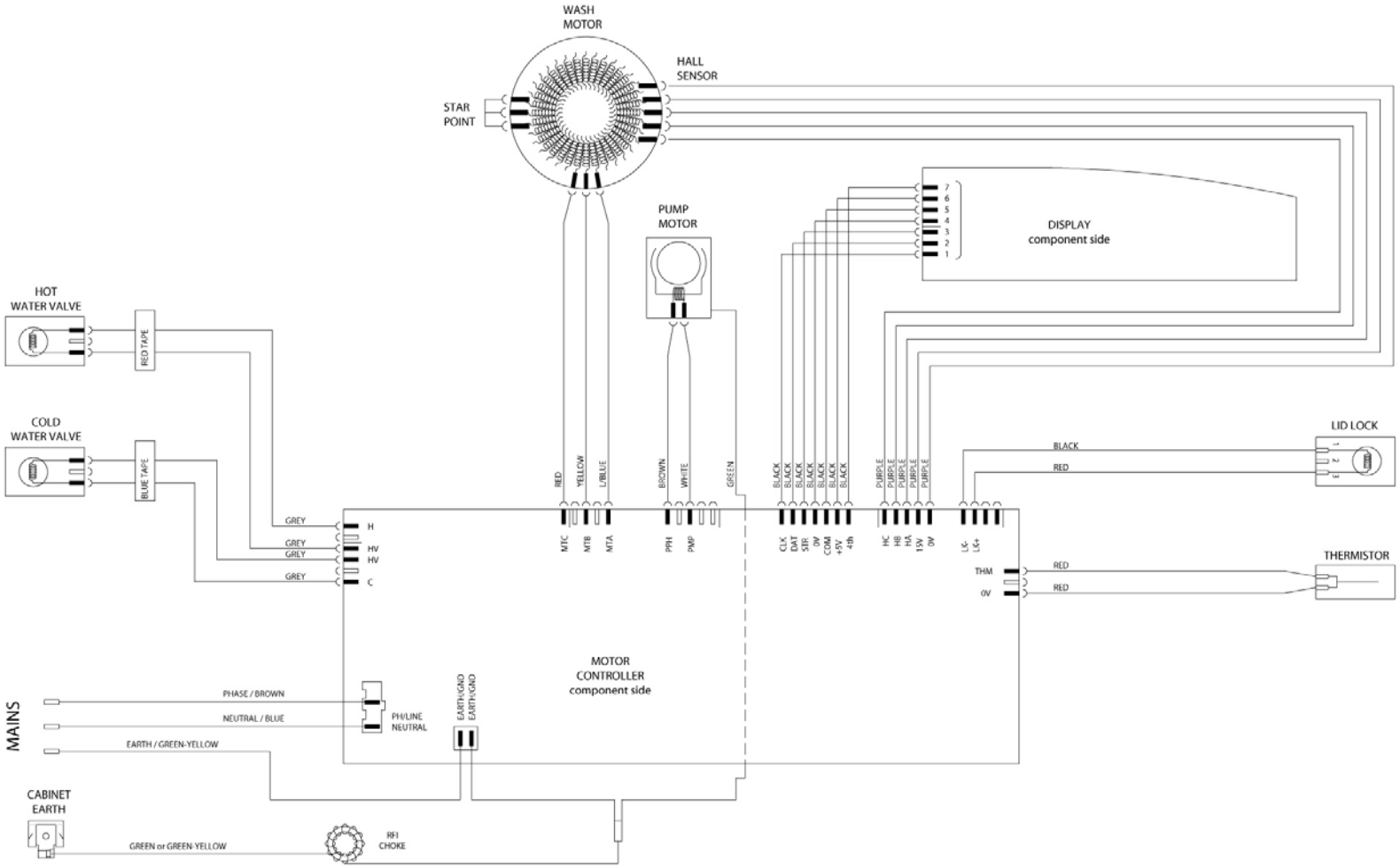
Diagnostic mode 8: Water Temperature (deg C)
By adding up the LEDs on the wash progress in binary form (Refer to Section 4), this will give the temperature of the thermistor in ^{O}C.
Note: This feature is not available on the MW model, as there it has no thermistor.

Diagnostic mode 9 & 10: Cycle count low byte & high byte
These levels work in the same way as for Diagnostic levels 5&6, which allows the Service Technician to establish how many cycles the machine has completed.
Note: A completed cycle is counted at the end of the spin cycle.

Diagnostic mode 11: Motor Speed (RPM)
Add up the LEDs on the wash progress, and multiply this figure by 10. The result will give the spin speed in RPM.

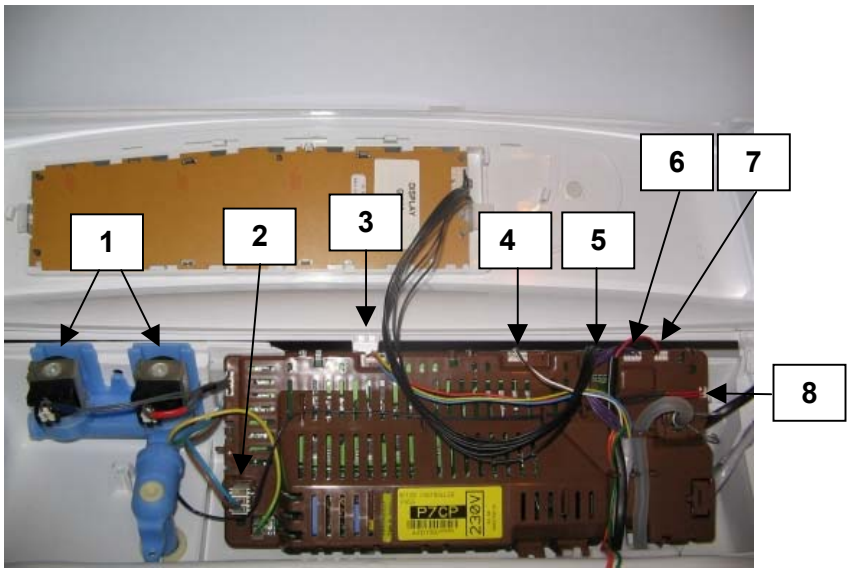
Diagnostic mode 12: Water Level
Add up the LEDs on the wash progress, and multiply this amount by 2. The result will give a reading of the water level in millimetres.

5 WIRING DIAGRAM



Fisher&Paykel appliances

6 VOLTAGE READINGS FROM CONTROLLER

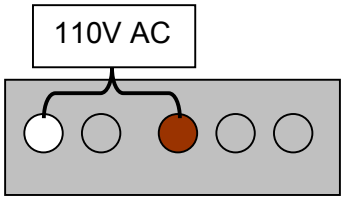


1. Water Valves
Varies between 13 – 22V DC
Note: Accurate voltages can only be obtained by using a True RMS multimeter.

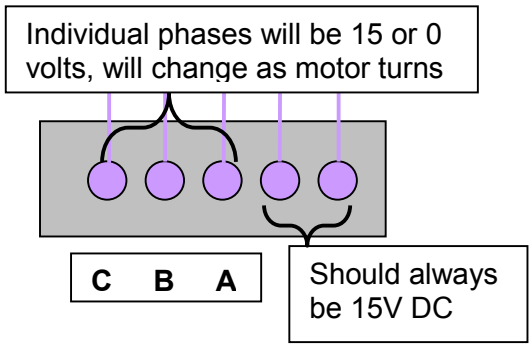
2. Supply voltage
230 VAC

3. Wash Motor
No accurate readings are possible.

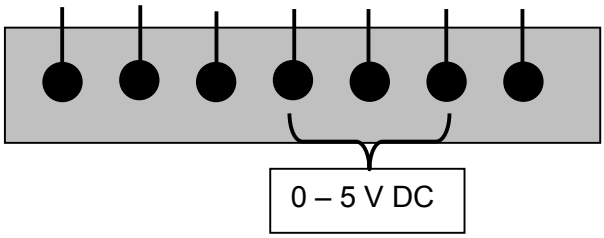
4. Pump Motor



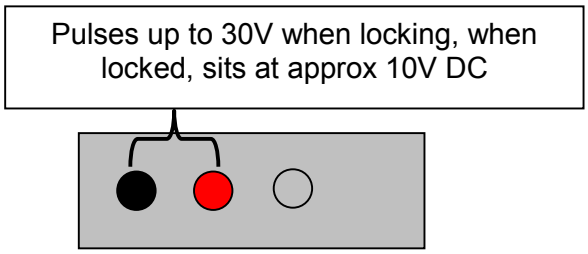
5. RPS



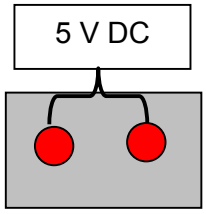
6. Display Module



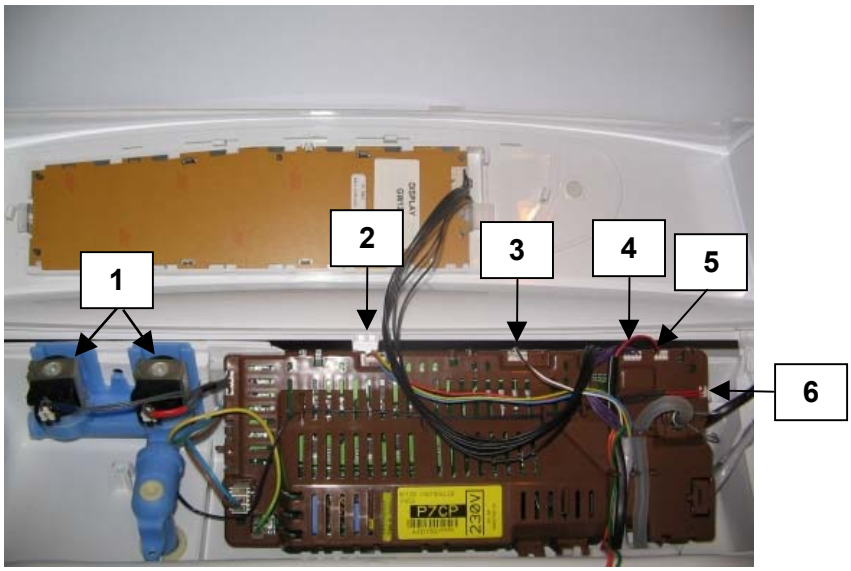
7. Lid lock



8. Thermistor

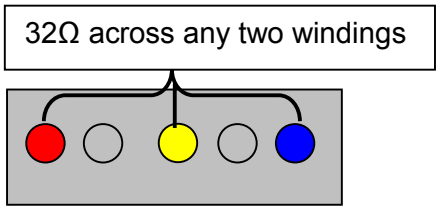


7 RESISTANCE READINGS FROM CONTROLLER

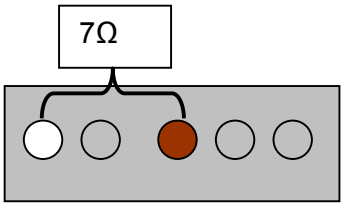


1. Water Valves
64 Ω +/- 10%

2. Wash Motor

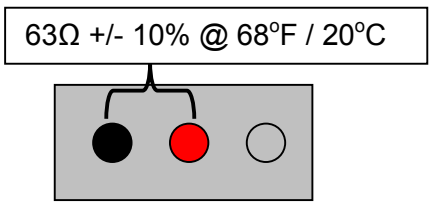


3. Pump Motor

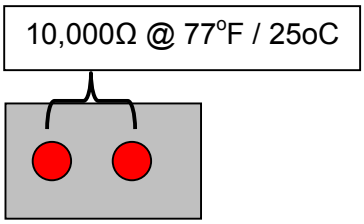


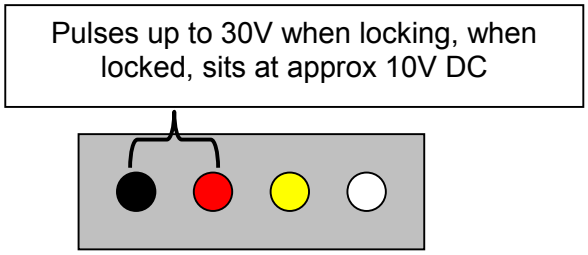
4. RPS - Unable to be tested with multimeter.

5. Lid lock

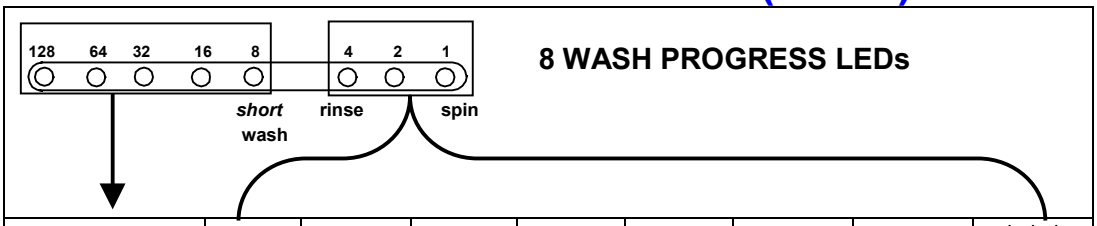


6. Thermistor





BINARY DECODING CHART – 8 BITS (0-255)



	OOO	OO✱	O✱O	O✱✱	✱OO	✱O✱	✱✱O	✱✱✱
OOOOO	0	1	2	3	4	5	6	7
OOOO✱	8	9	10	11	12	13	14	15
OOO✱O	16	17	18	19	20	21	22	23
OOO✱✱	24	25	26	27	28	29	30	31
OO✱OO	32	33	34	35	36	37	38	39
OO✱O✱	40	41	42	43	44	45	46	47
OO✱✱O	48	49	50	51	52	53	54	55
OO✱✱✱	56	57	58	59	60	61	62	63
O✱OOO	64	65	66	67	68	69	70	71
O✱OO✱	72	73	74	75	76	77	78	79
O✱O✱O	80	81	82	83	84	85	86	87
O✱O✱✱	88	89	90	91	92	93	94	95
O✱✱OO	96	97	98	99	100	101	102	103
O✱✱O✱	104	105	106	107	108	109	110	111
O✱✱✱O	112	113	114	115	116	117	118	119
O✱✱✱✱	120	121	122	123	124	125	126	127
✱OOOO	128	129	130	131	132	133	134	135
✱OOO✱	136	137	138	139	140	141	142	143
✱OO✱O	144	145	146	147	148	149	150	151
✱OO✱✱	152	153	154	155	156	157	158	159
✱O✱OO	160	161	162	163	164	165	166	167
✱O✱O✱	168	169	170	171	172	173	174	175
✱O✱✱O	176	177	178	179	180	181	182	183
✱O✱✱✱	184	185	186	187	188	189	190	191
✱✱OOO	192	193	194	195	196	197	198	199
✱✱OO✱	200	201	202	203	204	205	206	207
✱✱O✱O	208	209	210	211	212	213	214	215
✱✱O✱✱	216	217	218	219	220	221	222	223
✱✱✱OO	224	225	226	227	228	229	230	231
✱✱✱O✱	232	233	234	235	236	237	238	239
✱✱✱✱O	240	241	242	243	244	245	246	247
✱✱✱✱✱	248	249	250	251	252	253	254	255

The above table shows the 8 wash progress LEDs with the SPIN LED corresponding to the LED on the far right hand side.

8 bit binary calculations: Least Significant Byte (LSB) is the SPIN LED. If it is on this has a value of 1. The Most Significant Byte (MSB) is the first wash LED, this has a value of 128 if it is on. The intermediate LEDs have values of 64, 32, 16, 8,4 and 2.

By adding up the value of all the LEDs that are illuminated the 8 bit binary value may be calculated.

Note: If the Spin LED is optically downloading it will be 'flickering', this does not necessarily count as part of the 8 bit value.

To calculate a 16 bit value (eg. cycle count) TOTAL = (high byte x256) + (low byte).

8 DETAILED FAULT CODES

PHASE 7 EcoSmart™ & Intuitive Eco™

DETAILED FAULT CODES

INTRODUCTION

The format for fault description in this booklet follows the Primary, Secondary, Tertiary and Quaternary fault source system. These sources have mostly been arranged in order of most likely source of fault, but in some cases the sequence has been modified to aid the servicing procedure.

It should be noted that the fault source **Pump System** includes the pump and drain hose assembly.

These fault codes are specific to the Phase 7 machines.

Fault code shows the last recorded fault. Always confirm fault.

8.1 FAULT DESCRIPTIONS

1. (00000001) Motor Control Module Fault

The Motor Control Module has encountered an error when writing to an EEPROM address.
Primary Source: Motor Control Module.
Action: Replace Motor Control Module.

3. (00000011) Motor Control Module Fault

The Motor Control Module has found a memory error.
Primary Source: Motor Control Module.
Action: Replace Motor Control Module.

9. (00001000) Size Switch Error

The Display size switch setting does not match that which is stored in memory.
Action, GW Machines: Reselect the size of the machine by using the SIZE SETTING MODE.
To set the size switch, turn the power on at the power point and off at the console. Press and hold **Wash Temperature Setting Up** then press **Power**. EcoSmart® will give 4 short beeps and the pattern of LEDs will change.

- Press **Spin Speed Up**, the **Spin Hold** LED should be on for the **7.5 / 8.0kg** (650mm wide).
- Press **Power** to confirm the setting and also exit this mode.

Action, IW Machines: To access Size Setting Mode, push and hold the **Fabric Care** button and then press the **Power** button to enter **Size Setting** mode. Push the **Adjust** button to select the 650mm (L) size on the display screen. Pushing the **Power** button will lock the 'size' into the module's memory.

Note: Fault code 9 will only be logged into the memory of the Intuitive Eco™ machines. EcoSmart™ can display this fault but it will not be recorded.

10. (00001010) Temperature Sensor (Thermistor) Error

The temperature sensor may be open circuit or the ambient temperature is below 14°F / -10°C.

Primary Source: Thermistor
Secondary Source: Motor Control Module
Action:
1. Check the connection of the thermistor to the Motor Control Module.
2. Check resistance of temperature sensor. Resistance should be 10kΩ @ 77 °F / 25°C or 12.5kΩ @ 68°F / 20°C. Replace if faulty.
3. Replace Motor Control Module.

12. (00001100) Flood Protection Error

The Motor Control Module has found the water level to be above the flood level and tried to pump the excess water out. (Under extremely high flow rate conditions the machine may overfill during the "top-up" routine in agitate.) After pumping for 30 seconds, it has been unable to lower the water level below the flood level. Either the water valves have stuck on and are letting water in at a flow rate that is higher than the pump can handle, or the pump is blocked and can't remove the excess water.

Primary Source: Water Valves.
Action: If the water valves are on continuously, check that the water valves turn off mechanically (remove power from machine).
Secondary Source: Pump system.
Action: Check the pump for blockages and drain hose for correct height and kinking
Tertiary Source: Motor Control Module.
Action: If water valves are being driven on electrically, replace Motor Control Module.

36. (00100100) Water Leak Fault

The Motor Control Module has needed to top up the water level more than 4 times during agitate. This is excessive, as normally only one or two top ups are required to replace the air that has escaped from a full load during agitate. The most likely cause is that the machine is siphoning. The other alternative is that the machine has developed a leak.

Primary Source: Pump System.
Action
1) Check the height of the drain hose outlet. Minimum 33.46in / 850mm, maximum 47.24in / 1200mm.
2) Check that the hose guide is fitted and check that the hose does not protrude more than .78in / 20mm beyond the guide.

Secondary Source: Mechanical.
Action:
1) Check the pressure tube connections on the outer basket and Motor Control Module.
2) Check that the drive shaft seal and the pump housing seal have not developed a leak.

Tertiary Source: Motor Control Module.
Action: Replace Motor Control Module.

37. (00100101) Pump Blocked Error (No change in the water level)

While draining, the water level reading from the pressure sensor has not changed for over 3 minutes. There are three likely reasons for this fault. One is that the drain hose or the pressure switch hose has been squashed or kinked and the pump out rate has been dramatically reduced. The second possibility is that the pump is partially or fully blocked. The third is that the pump is not operating due to Motor Control Module, wiring or pump failure. This fault could also appear if the machine is pumping to an unusually high head of drain hose or into an extended length of drain hose. The fourth possibility is a diverter valve fault or blockage, water level is not altering as the diverter is stuck in the recirculation mode, giving the module the appearance the pump is not lowering the water level.

Primary Source: Pump System.

Action:1) Check that the drain hose has not been kinked.

2) Check the length of the drain hose and try to reduce the length if excessively long. A 39.36in / 1 metre extension hose of the same diameter fitted to the existing drain hose is the maximum allowable length.

3) Check for open circuit windings in the pump. (***Note: Pumps are fitted with a thermal cut-out, which will reset on cooling.)***

4) If the basket is empty of water, remove the pump from the pump housing and check that it is not blocked. Also check the drain hose is not blocked.

5) If the basket contains water, then service the pump from the top of the machine by removing the top deck and inner basket. Bail out the water, remove the pump cap and hood and clear the restriction.

Secondary Source: Wiring.

Action:

1) Check the pump harness is connected correctly to the pump.
2) Check continuity of the pump harness.

Tertiary Source: Motor Control Module module.

Action: Activate the pump by operating the machine in spin mode. Check the pump is rotating. If it is not operating, and Primary and Secondary checks have been performed, then replace the Motor Control Module.

38. (00100110) Pressure Sensor Fault

The Motor Control Module has recorded a water level of empty while it is agitating. The water level must have been greater than empty for the machine to enter the agitate mode initially. The most likely cause of this fault is that the pressure sensor hose has been severed or fallen off during agitate. Alternatively, the pressure sensor may be faulty.

Primary Source: Mechanical.

Action: Check that the pressure tube is intact and has not been cut.

Secondary Source: Motor Control Module.

Action: Replace the Motor Control Module if the pressure tube shows no sign of being faulty.

39. (00100111) Pressure Tube Fault

The probable cause of this fault is that the pressure tube has become blocked or kinked or has fallen off completely. Alternatively, the pressure sensor may be faulty.

Primary Source: Mechanical.

Action: Check that the pressure tube is intact and not blocked with water or dirt and is not kinked.

Secondary Source: Motor Control Module.

Action: Replace the Motor Control Module.

40. (00101000) Basket Dis-engage Fault

While carrying out a basket check, the Motor Control Module has found that the basket is not engaged even though the pressure sensor indicates that the basket is empty. The Motor Control Module continues to check for 2 minutes, after which time it displays this fault. The first two areas to check are the clutch and the pressure tube. If these two appear correct, then the fault could be in the pressure sensor in the Motor Control Module.

Primary Source: Mechanical.

Action:
1) Check that there are no clothes or other foreign objects preventing the clutch from re-engaging. Excessive suds can stop the basket rotating.
2) If the machine is empty of water, carry out a clutch disassembly procedure and check the spline drive.
3) Next check that the pressure tube has not come off and that it is not kinked.

Secondary Source: Motor Control Module.

Action: Replace Motor Control Module.

41. (00101001) Temperature Sensor Fault (Thermistor)

The temperature sensor is measuring temperatures above 230°F / 110 °C. The fault is probably due to a short circuit in the sensor line. This fault is only applicable in the GW models.

Primary Source: Thermistor.

Action:
1) Check the connection from the thermistor the Motor Control Module
2) Check the resistance of the thermistor. Resistance should be 10kΩ @ 77 °F / 25°C or 12.5kΩ @ 68°F / 20°C. Replace if faulty.
3) Replace the Motor Control Module.

45. (00101101) Display Memory Check Fault

On power up, the display has checked its memory against a known reference and found differences.

Primary Source: Display Module.

Action: Replace Display Module.

46. (00101110) Display Memory EEPROM Check

The Intuitive™ Display has detected a problem with its internal EEPROM.

Primary Source: Display Module.

Action: Replace Display Module.

48. (00110000) Hot and Cold Valve Coil Faulty

The Motor Controller module has measured voltages from the valve diagnostic circuit that indicate both the hot and cold valves are faulty. The most likely cause is that the valve harnesses have not been connected correctly or the valve is open circuit.

Primary Source: Wiring.

Action: Check the valve harnesses are correctly fastened to the valves or the pins are not bent backwards.

Secondary Source: Water Valves.

Action: Check the valve coils are not faulty (open circuit).

Tertiary Source: Motor Controller module.

Action: Replace the Motor Controller module.

49. (00110001) Cold Valve Coil Faulty

The Motor Control Module has measured a voltage from the valve diagnostic circuit that indicates the cold valve is faulty. The most likely cause is that the valve harness has not been connected correctly or the valve is open circuit. See fault 48 for service procedure.

50. (00110010) Hot Valve Coil Faulty

The Motor Control Module has measured a voltage from the valve diagnostic circuit that indicates the hot valve is faulty. The most likely cause is that the valve harness has not been connected correctly or the valve is open circuit. See fault 48 for service procedure.

51. (00110011) Diverter Valve Fault

The motor controller has registered a drop in water level in the recirculation phase of the wash cycle. Water is being drained instead of recirculated.

Primary Source: Diverter valve.
Action: Remove the diverter valve and check for blockages as well as checking that the hinge mechanism on the valve hasn't broken. Remove the hinge from the solenoid and check that the flap is free to move. Check that water hasn't been sprayed onto the valve from an external source and caused the solenoid to blow.
Secondary Source: Motor Control Module.
Action: Turn the power off at the machine but leave the power on at the wall, then measure the voltage across the terminals of the wax actuator. If a reading of 230V is achieved, the motor controller has failed due to a valve fault and both will need to be replaced.

52. (00110100) Diverter Top-up Fault

More than 6 attempts have been made to top-up the water level in the basket. This then signifies the valve has not closed and is diverting to drain, or the top-up was not increasing quickly enough, suggesting the valve has a blockage and is also draining.

Primary Source: Diverter valve.
Action: Remove the diverter valve and check for blockages as well as checking that the hinge mechanism on the valve hasn't broken. Remove the hinge from the solenoid and check that the flap is free to move.
Secondary Source: Wax solenoid
Action: Check the resistance of the wax solenoid. Also look for corrosion (greenish deposit) on the terminals. Resistance range will be between 0.7kΩ and 2.5kΩ. Resistance will depend on ambient temperature and when the valve was last actuated. Anything outside of these resistances and the valve should be automatically replaced.

56. (00111000) Basket Check No Valid Fault

While carrying out a basket check, the machine has not been able to determine a valid basket status and so the Display flags this fault. This fault differs from fault 40 in that a valid basket status could not be determined.

Primary Source: Loading.
Action: Remove items until the remaining ones can move freely, or rearrange the load so that the clothes are evenly distributed around the basket, or select a higher water level. If the load was to one side of the basket or too heavy, it can be possible for the agitator to bind in one direction when trying to sense basket float.
Secondary Source: Mechanical.
Action: 1. Check the machine is not siphoning.

2. Check that there are no clothes or other foreign objects preventing the clutch from re-engaging, and that there aren't any defects with the clutch mechanism.
3. Check that the pressure tube has not come off and that it is not kinked.

Tertiary Source: Rotor Position Sensor.
Action: Replace the Rotor Position Sensor.
Quaternary Source: Motor Control Module.
Action: Replace the Motor Control Module.

57. (00111001) Brown Out During Display EEPROM Write Fault

The Display has requested the Motor Control Module to perform an EEPROM write. Prior to writing, the Motor Control Module has tested the 15 Volt supply and found that it is below the safety level for writing EEPROM and has reported this to the Display. This may be due to transients at the time of writing or due to a faulty Motor Control Module.
Primary Source: Motor Control Module.
Action: Replace Motor Control Module.

60. (00111100) Motor Control Memory Check Fault

On power up, the Motor Control Module has checked its memory against a known Reference and found differences.
Primary Source: Motor Control Module Module.
Action: Replace Motor Control Module.

68. (01000100) Pressure Transducer Error – Count Too High

The pressure transducer has measured a water level far above what the machine should physically be able to measure. This suggests that the pressure sensor has been disconnected from the Motor Control Module, damaged or not actually placed on the PCB.
Primary Source: Motor Control Module.
Action: Replace Motor Control Module.

69 (01000101) Pressure Transducer Error – Zero Too Low

The pressure sensor is zeroed in the factory, but to compensate for zero-drift during the life of a product the zero is adjusted at the end of each cycle if required. The product only zeros the pressure sensor once, on first power up when the Pressure Transducer EEPROM locations are out of the expected zero bounds. During the zeroing process if the zero value is below what is expected then fault code 69 is flagged.
Primary Source: Motor Control Module.
Action: Replace Motor Control Module.

70 (01000110) Pressure Transducer Error – Zero Too Low

Similar to fault code 69, however, it protects against a zero, which is too high and could cause flooding.
Primary Source: Motor Control Module.
Action: Replace Motor Control Module.

72. (01001000) Pressure Transducer Error – Maximum Positive Drift

Over the life of a product it is expected that the pressure transducer characteristics will drift slightly. To compensate for this the zero is re-calibrated at the end of every cycle. If this zero is significantly different to the original factory programmed zero the fault code 72 is flagged.
Primary Source: Motor Control Module.
Action: Replace Motor Control Module.

104. (01101000) See Fault Code 106

105. (01101001) Comms Error Time Out

These faults are reported when the Display Module detects an error in the communications between the Display Module and the Motor Control Module.

Primary Source: Display Module.
Action: Replace Display Module.
Secondary Source: Motor Control Module.
Action: Replace Motor Control Module.
Tertiary Source: Rotor Position Sensor
Action: Replace Rotor position Sensor. If this corrects the fault refit the original Display Module and/or Motor Control Module.

106. (01101010) Display Module to Motor Control Module Communications Error

These faults are reported when the Display Module detects an error in the communications between the Display Module and the Motor Control Module.

Primary Source: Display Module.
Action: Replace Display Module.
Secondary Source: Motor Control Module.
Action: Replace Motor Control Module.

108. (01101100) Comms CRC Error – See Fault Code 106

107. (01101011) Motor Control Module Reset Error

The Display Module has detected that the Motor Control Module has reset when it should not have. This can be due to a Motor Control Module supply disturbance or microprocessor failure.

Primary Source: Motor Control Module.
Action: Replace Motor Control Module.

109. (01101101) AC Pump Triac Over Temperature

This fault occurs when the electronics have detected that the temperature of the pump Triac has exceeded what would be expected under normal conditions. The most likely cause of this is that the pump has gone low in resistance.

Primary Source: Pump
Action: Check the pump resistance (Refer to Section 1.6)
Secondary Source: Motor Control Module.
Action: Replace Motor Control Module.

110. (01101110) Motor Bridge Thermistor Open Circuit

The motor bridge thermistor has been detected as open circuit. This means that the Motor Control Module can no longer monitor motor bridge temperatures. This suggests that the motor bridge thermistor has been damaged or removed from the PCB.

Primary Source: Motor Control Module.
Action: Replace Motor Control Module.

111. (01101111) Motor Bridge Thermistor Short Circuit

Similar to Fault Code 110, however instead of detecting an open circuit, the motor bridge thermistor has been detected as being short circuit.

Primary Source: Motor Control Module.
Action: Replace Motor Control Module.

112. (01110000) Motor Current Sense Too High

This fault occurs if the Motor Control Module detects that the motor current has reached an unrealistically high level for greater than 2 seconds. This suggests that the motor current sense circuit is faulty.

Primary source: Motor Control Module.
Action: Replace Motor Control Module.

113. (01110001) AC Pump Thermistor Short Circuit

The AC Pump thermistor has been detected as being short circuit. This means that the Motor Control Module can no longer monitor AC pump Triac temperatures correctly.

Primary source: Motor Control Module.
Action: Replace Motor Control Module.

130. (10000010) Single Rotor Position Sensor Error

The Motor Control Module has found an error in the pattern received from the Rotor Position Sensor. Likely causes of this fault are a bad connection on the harness between the Rotor Position Sensor and the Motor Control Module, or a faulty Rotor Position Sensor.

Primary Source: Wiring.
Action: Check for corrosion on the RAST connector of the Rotor Position Sensor and the Motor Control Module connector.
Secondary Source: Rotor Position Sensor.
Action: Check the Rotor Position Sensor with an R.P.S. tester. Replace if faulty.
Tertiary Source: Motor Control Module.
Action: Replace Motor Control Module.
Quaternary Source: Rotor
Action: Ensure the correct rotor for this phase of machine has been fitted (Refer to Section 2.7.2).

136. (10001000) Motor Stall

The Motor Control Module has been unable to start the motor. Possible causes of this fault are: Faulty motor harness, faulty or jammed motor, seized bearings or seals, faulty Motor Control Module, faulty Rotor Position Sensor or harness.

Primary Source: Wiring.
Action: Measure/check the motor harness, connectors and motor for discontinuity. This can be done by taking a resistance measurement between phases of the motor harness at the Motor Control Module end. Nominal resistance should be around 32Ω.
Secondary Source: Motor.
Action:
1) Check free rotation of the agitator and basket by rotating by hand. Bearings and seals may be seized.
2) Check the Rotor Position Sensor and associated harness for water, mechanical damage or corrosion.

Tertiary Source: Motor Control Module.
Action: If the primary and secondary checks pass inspection, then replace the Motor Control Module.

160. (10100000) Basket Engaged

The basket has re-engaged itself during agitate. Possible causes for this are a leak in the air bell, the basket is over-loaded with clothes, the clutch has jammed or is fouled with a foreign object.

Primary Source: Mechanical.
Action:
1) Check that the rotating basket assembly is not jammed to the agitator with any foreign object that may be caught under the agitator skirt.

2) Check that the clutch teeth are not locked together with dirt, lint, etc.
3) Make sure the basket is not overloaded with too many clothes.
4) If none of the above appear to be at fault, then check the air bell at the bottom of the inner basket for leaks.

Secondary Source: Motor Control Module.
Action: If the machine is empty of water at fault, it is possible that the pump circuit is faulty and has caused a pump out during wash. This would cause the basket to re-engage during agitate and the Motor Control Module to display this fault. Replace Motor Control Module.

230. (11100110) EEPROM Value out of Range

Wrong version detected
Primary Fault: Motor Control Module is the wrong version.
Action: Change Motor Control Module.

232. (11101000) COMMS Timeout 5 Sec

IW only problem, either the Display or Motor Control Module has not responded in time.
Primary Fault: Display Module fault.
Action: Replace Display Module.
Secondary Fault: Motor Control Module fault.
Action: Replace Motor Control Module.

233. (11101001) EEPROM Read Error

Problem reading the EEPROM data coming from the Motor Control Module.
Primary Fault: Motor Control Module fault.
Action: Replace Motor Control Module.

234. (11101010) Lid Lock Open Circuit

Check Harness to Lid Lock and connections at the Motor Control Module and lid lock ends.
Primary Fault: Connector to the harness, either end could be at fault.
Action: Replace Harness.
Secondary Source: Lid Lock has failed to be activated.
Action: Replace Lid Lock.
Tertiary Source: Motor Control Module has not responded to the Lid Lock being activated.
Action: Check the lid has a tang and is fitted correctly to activate the Lid Lock. If this is all in order, the Motor Control Module must be at fault and needs to be replaced.

235. (11101011) Lid Lock Short Circuit

Lid Lock fault, not activated when instructed to by the Motor Control Module.
Primary Fault: Lid Lock mechanism has jammed or failed.
Action: Check resistance across the connections. If out of specification, replace the Lid Lock, (63Ω +/- 10% @ 20°C (68°F)).

236. (11101100) Incompatible EEPROM Version

Failure to start and fault immediately displayed.
Primary Fault: Motor Control Module is the wrong version.
Action: Replace Motor Control Module.

237. (11101111) Temperature Sensor Error

The electronics have picked up a continuity problem, same as fault code 10 or 41.
Primary Fault: The sensor has failed either in the harness or connection to the thermistor.

Action: Replace the Thermistor (temperature sensor).
Secondary Source: Motor Control Module has failed to read the temperature. Check connections.
Action: Replace Motor Control Module if connections look fine and the fault still occurs.

238. (11101110) Lid Lock Fail In-Line Test (1)

Final on line tests, final check before going to the field.

239. (11101111) Lid Lock Fail In-Line Test (2)

Final on line tests, final check before going to the field

240. (11110000) Hall Out Of Order. RPS Fault

Same as previous Hall Error faults See fault code130 for directions.

241. (11110001) Function Time Out

Display crashed.
Primary Fault: Display Module has failed.
Action: Replace Display Module.
Secondary Fault: Motor Control Module has failed.
Action: Replace Motor Control Module.

243. (11110011) Stepper Test Failure

Rotor Position Sensor fault. The Motor Control Module has attempted a motor step test and found the motor has not stepped to the correct position.
Primary Fault: Wiring.
Action: See Fault codes 53 and 54.

252. (11111100) Bridge Test Failure

The Motor Control Module has tested the motor bridge electronics and sensed current when there should not have been any.
Primary Fault: Motor Control Module
Action: Replace Motor Control Module

9 SERVICE PROCEDURES

In order to service and to gain access to components within EcoSmart™ and Intuitive Eco™ certain procedures must be followed. These procedures are set out below.

Servicing note

(a) To avoid stripping screws, do not overtighten when re-assembling parts. If using a power screwdriver, have the torque setting on low.
(b) Take care not to damage wire terminals on removal as some of these have release clips.
(c) On completion of any service carried out to the washing machine, all safety tests as required by law must be carried out.

9.1 Removal of Lid

(a) Open the lid fully, then lift off vertically.

Reassembly
Refit in reverse manner, ensuring that the hinge lugs on the lid are vertical.

9.2 Components in Console Area

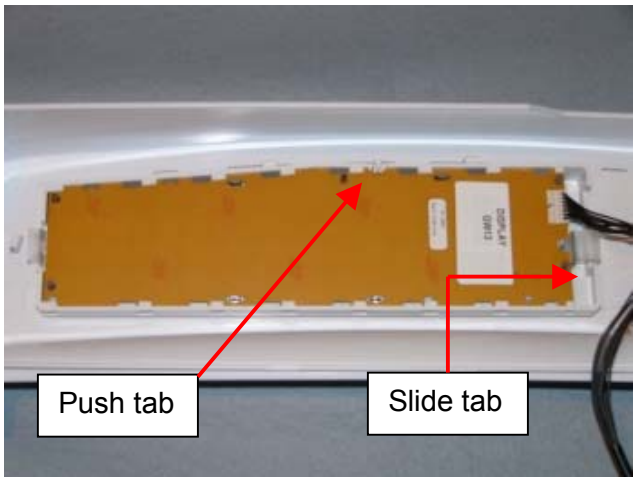
(a) Remove the lid. (Refer to Section 9.1).
(b) Remove the two screws at the rear of the console securing the console to the top deck.
(c) Tilt the console forward.

Reassembly:
Refit in reverse manner.

9.3 Removal of Display Module (EcoSmart™ only)

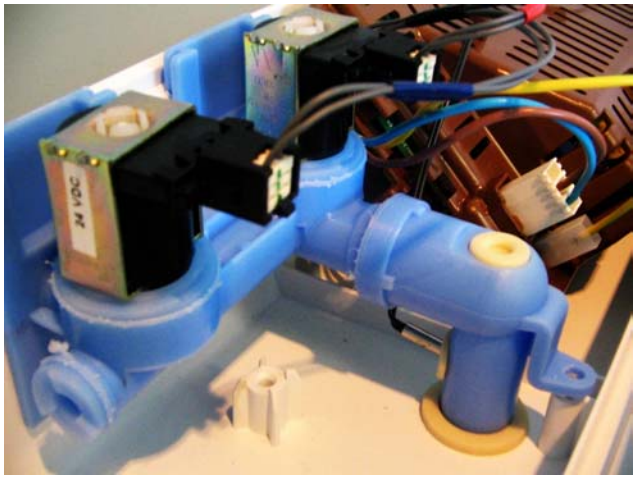
(a) Follow instructions for removal of console. (Refer to Section 9.2).
(b) Disconnect the wiring harness from the Motor Control Module.
(c) Push the tab clear and slide the module.
(d) Lift the display module clear of the console.

Reassembly:
Refit in reverse manner.



9.4 Removal of Water Valves

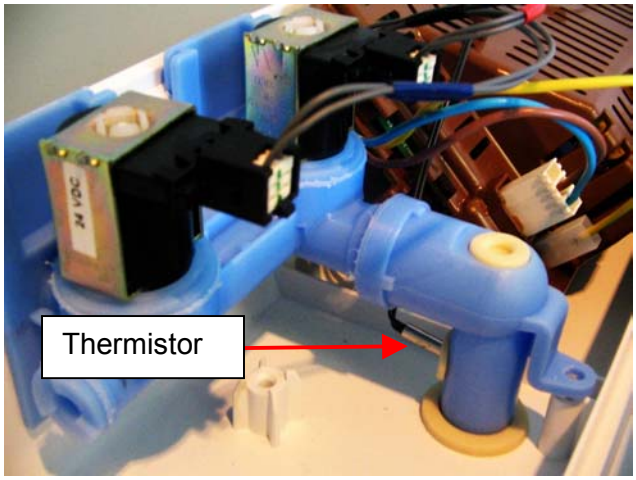
(a) Follow procedures for removal of Display Module. (Refer to Section 9.2).
(b) Disconnect wiring harness to each coil by first pulling downwards on the retaining clip.
(c) Remove screw securing the outlet nozzle to the top deck.
(d) Pull upwards on the spigot to release the nozzle from the seal in the top deck. As soon as the seal is broken most of the residual water will drain from the nozzle. Remove the water valves from the top deck ensuring no water comes in contact with any electrical connections.



Reassembly:
Refit in reverse manner.

9.5 Removal of Thermistor

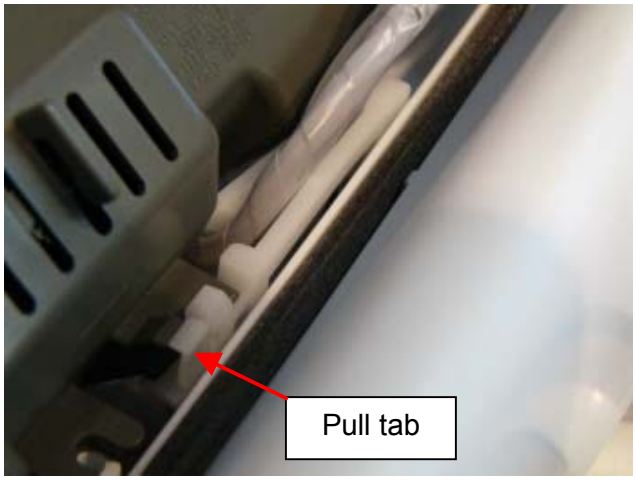
(a) Follow procedures for removal of Display Module. (Refer to Section 9.2).
(b) Disconnect thermistor wiring harness to the Motor Control Module.
(c) Slide body of thermistor out from the valve.



Reassembly:
Refit in reverse manner, ensuring when refitting the thermistor that the thermistor is pushed until it comes to a stop against the back wall of the elbow.

9.6 Removal of Motor Control Module

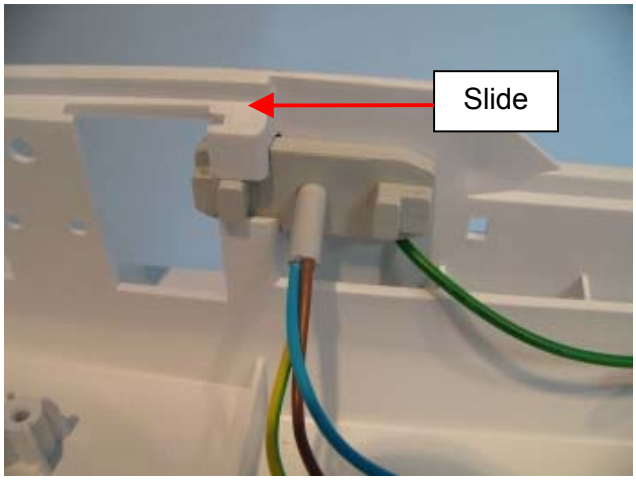
(a) Follow procedures for removal of Display Module. (Refer to Section 9.2).
(b) Disconnect all wiring harnesses to the Motor Control Module.
(c) Remove the pressure tube by squeezing on the legs of the spring clip. Pull gently on the tube to slide it off the spigot. ***Note: If too much force is used on removal or reinsertion, damage to the pressure transducer may occur.***
(d) Pull the tab on the top deck harness clamp towards the front to release the Motor Control Module.
(e) Lift the Motor Control Module upwards at the front and out.



Reassembly:
Refit in reverse manner. **Important**: When refitting pressure tube to pressure transducer ensure that the pressure tube is clear of any water droplets before operating the machine on a fill cycle. If the basket is full of water, drain the water then blow down the tube.

9.7 Removal of Cord Set

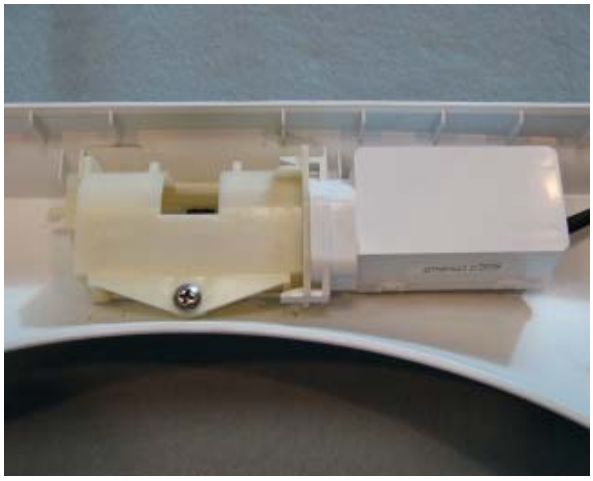
(a) Follow procedures for removal of water valves. (Refer to Section 9.4).
(b) Disconnect the mains plug to the Motor Control Module.
(c) Slide the strain relief to the left and slide out.



Reassembly:
Refit in reverse manner. When refitting the thermistor, ensure that the thermistor is pushed until it comes to a stop against the back wall of the elbow.

9.8 Removal of Lid Lock

(a) Follow procedures for components in console area. (Refer to Section 9.2).
(b) Disconnect lid lock wiring harness to the Motor Control Module.
(c) Remove Motor Control Module from the top deck (Refer to Section 9.6) leaving all remaining harnesses connected.
(d) Remove wiring cover from top deck.
(e) Carefully remove the two lid buffers from the front side top of the deck by levering upwards, taking care not to damage the top deck.
(f) Remove the two screws under the buffers securing the top deck to the cabinet.



(h)
(g) Lift the top deck upwards and remove the screw securing lid lock to the underside of the top deck.
(h) Move the front of the lid lock downwards and outwards.
(i) Unclip the right hand rear tab of the top deck from the cabinet and raise the corner of the top deck upwards slightly to allow the wiring harness to be removed.

Reassembly:
Refit in the reverse manner.

9.9 Removal of Top Deck

(a) Follow procedures for removal of Motor Control Module. (Refer to Section 9.6).
(b) Follow procedures for removal of water valves. (Refer to Section 9.4).
(c) Follow procedures for removal of cord set. (Refer to Section 9.7).
(d) Carefully remove the two lid buffers from the front side top of the deck by levering upwards, taking care not to damage the top deck.
(e) Remove the two screws under the buffers securing the top deck to the cabinet.
(f) Lift the top deck upwards and release the two rear tabs.
(g) Lift the top deck clear.

Reassembly:
Refit in reverse manner.
Note: The inlet nozzle can be removed when the top deck is lifted.

9.10 Removal of Neck Ring

(a) Follow procedures for removal of lid. (Refer to Section 9.1).
(b) Carefully remove the two lid buffers from the front side top of the deck by levering upwards, taking care not to damage the top deck.
(c) Remove the two screws under the buffers securing the top deck to the cabinet.
(d) Lift the top deck upwards.
(e) Release the bias spring from the front left suspension rod.
(f) Unclip the neck ring from the outer basket and remove.

Reassembly
Refit in reverse manner

9.11 Removal of Agitator

(a) Lift lid.
(b) Remove fabric softener dispenser.
(c) Release the agitator bolt by turning ant-clockwise.
(d) Lift agitator out and clear.

Reassembly:
Refit in the reverse manner.

9.12 Removal of Inner Basket

(a) Follow procedures for removal of Neck Ring. (Refer to Section 9.10).
(b) Follow procedures for removal of Agitator. (Refer to Section 9.11).
(c) Lift inner basket upwards and clear of machine.

Note: If the inner basket is tight on the shaft pressure may need to be placed on the top of the shaft, while at the same time jiggling the inner basket upwards.

Reassembly:
Refit in the reverse manner.

9.13 Removal of Clutch Mechanism (Spline Drive / Spline Driven)

(a) Follow procedures for removal of Inner Basket. (Refer to Section 9.12).
(b) Remove the 3 screws securing the spline driven to the inner basket.

Reassembly:
Refit in the reverse manner. Ensure that the screws are tightened sufficiently with out over tightening.

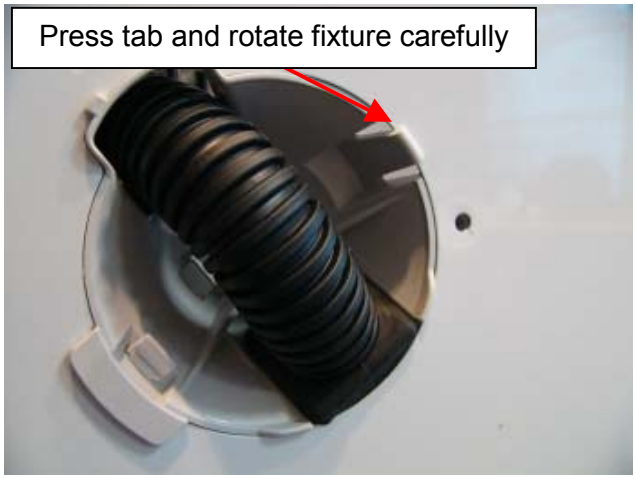
9.14 Removal of Pump Hood

(a) Follow procedures for removal of Inner Basket. (Refer to Section 9.12).
(b) Remove the bolt securing the pump hood to outer basket.

Reassembly:
Refit in the reverse manner. Ensure that the gasket is not pinched between the pump hood and outer basket.

9.15 Removal of Outer Basket From The Cabinet

(a) Follow procedures for removal of the Top Deck. (Refer to Section.9.9).
(b) Follow procedures for removal of Inner Basket. (Refer to Section 9.12).
(c) Thread the drain hose back in to the cabinet.
(d) Remove the screw securing the drain hose fixture to the cabinet.
(e) Press tab and rotate fixture carefully so remaining tabs clear the cabinet.



(f) Remove all four suspension rods, by lifting upwards on the top suspension bracket. Start with the suspension rod that attaches to the drain hose / wiring assembly, then do the opposing side.

Note: The pressure tube linkage will need to be unclipped from the suspension rod first.

(g) With the suspension rods removed from the cabinet carefully lift the outer basket assembly out of the cabinet, taking care not to cut the drain hose on any sharp edges of the cabinet.

Reassembly:
Refit in reverse manner.

9.16 Removal of Rotor

(a) Lay machine down or against a wall. If leaning the machine against a wall ensure that the machine is stable, and take necessary precautions not to damage the wall or the machine.
(b) Using 16mm or 5/8” socket, loosen Rotor bolt. As the Rotor bolt is loosened, the Rotor will withdraw off the base of the main shaft.

Note: Place the Rotor in a plastic bag as the Rotor has very strong magnets and can attract fine metal objects.

Reassembly
Refit in reverse manner. Tighten the Rotor bolt to a torque of 8Nm.

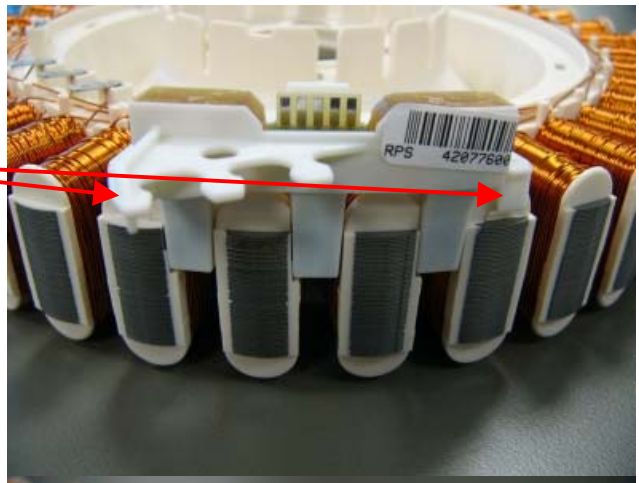
9.17 Removal of Stator

(a) Follow procedures for removal of Rotor. (Refer to Section 9.16).
(b) Unscrew the four bolts securing the Stator to the outer basket.
(c) Lift Stator off the base of the outer basket and clear of the shaft.
(d) Disconnect the wiring to the terminals.

Reassembly:
(a) Connect the wires to the Stator before locating the Stator on to the outer basket. Ensure that the correct color wire is fitted to the correct terminal. The Stator is marked RBY (Red, Yellow, and Blue).
(b) Ensure that there is a small amount of grease on the Stator side of the clamp plates.
(c) Fit the four bolts and only tighten to a torque of 5nm.

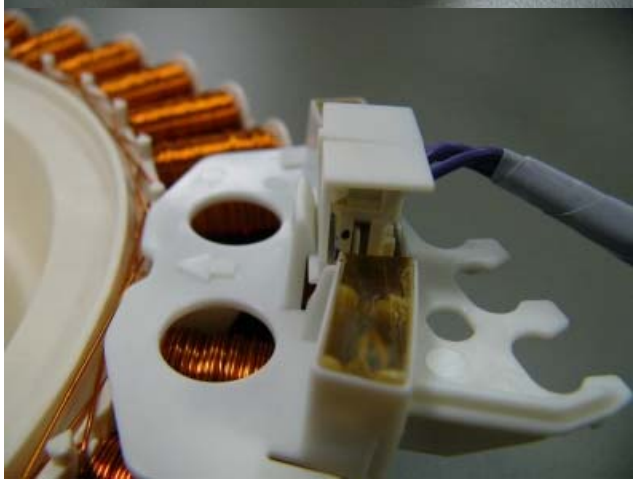
Note: The Stator should have a slight radial movement of approximately 0.5 – 1mm when correctly tightened, and should have a maximum axial (rocking movement) of 0.5mm.

9.18 Removal of Rotor Position Sensor



(a) Follow procedure for removal of Stator. Refer to Section 9.17.
(b) Disconnect the harness plug to the RPS.
(c) Unclip the RPS by releasing the tabs on either side of the RPS holder.
(d) Slide RPS upwards.

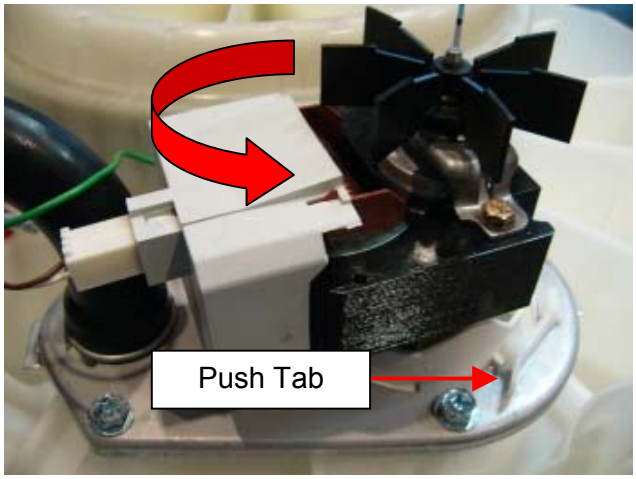
Reassembly:
(a) Slide the legs of the RPS housing into the Stator until the retaining clips engage.
(b) Refit RPS harness into strain relieving labyrinth.



The adjacent photo shows the main harness connected to the RPS. The plastic retaining clip is part of the main harness and is used to provide support to the connector as PCB is single sided.

9.19 Removal of Pump

(a) Lay machine down or against a wall. If leaning the machine against a wall ensure that the machine is stable, and take necessary precautions not to damage the wall or the machine.
(b) Remove the wiring harness to the pump and the earth wire.
(c) Release the locking tab by pulling it away from the pump. Keep pressure on the tab and turn the body of the pump in an anti-clockwise direction. Continue to turn until the pump disengages.



Note: Approximately 250mls of water remains in the pump sump after pump out and will spill when the pump is removed. Take care not to spill this water over electrical connections by using a towel or small container to catch the water.

Reassembly:
(a) Locate the bayonet fixture correctly, then turn the pump in a clockwise direction until you hear the locking tab clicks into place.
(b) Connect the earth wire ensuring that the tab is locked into place by applying gentle pressure on the wire.
(c) Connect main harness. Ensure that the wiring is routed correctly and will not foul on any moving components.

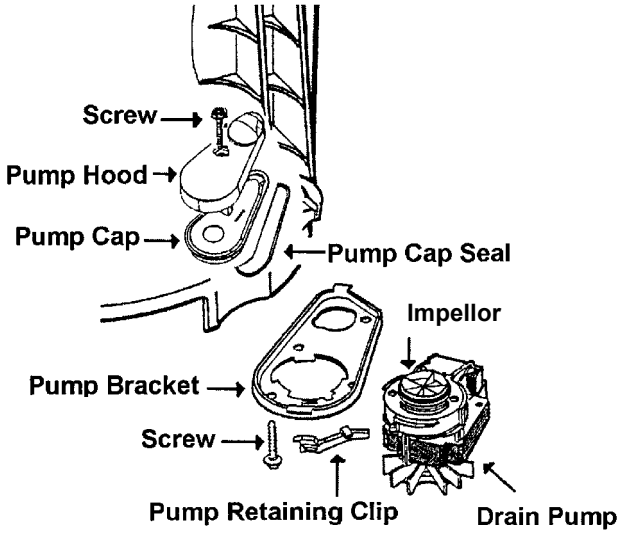
10 SPECIALISED SERVICE PROCEDURES

10.1 Blocked Pump Procedure

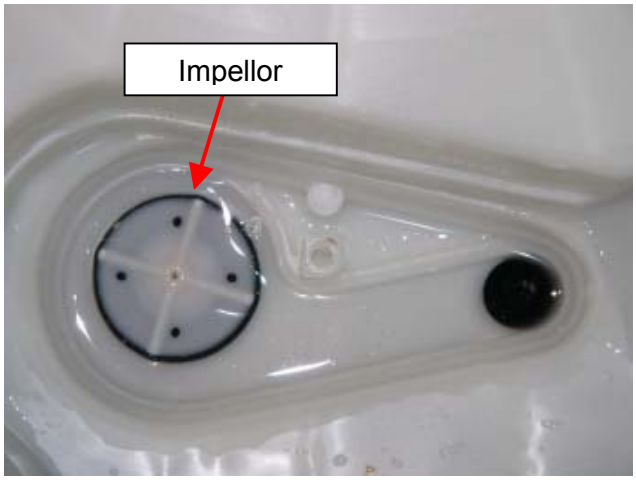
It is possible to clear a blockage/obstruction from the pump without having to drain the water from the machine or disturbing the pump. If however there are concerns over the condition of the water and there may be a risk of infection, ie from hepatitis etc, then bail the water from the machine first.

While it is possible in some cases to be able to flick the pump from underneath the machine to remove the obstruction, our recommendation is to carry out the procedure below which leaves the pump undisturbed.

This way the object causing the obstruction can be identified, as well as the integrity of the pump remains in tact.



(a) Follow procedure for removal of pump hood. (Refer to Section 9.14).
(b) Remove pump cap.
(c) Locate object and check for free movement in both directions of the impellor.
(d) Refit pump cap and pump hood, ensuring that the seal is not pinched.
(e) If water is in the machine, enter diagnostic mode and run the pump (Refer to Section 4.2) to drain the remaining water out of the machine.
(f) Check for and remove any other foreign objects that may be present in the bottom of the outer basket.

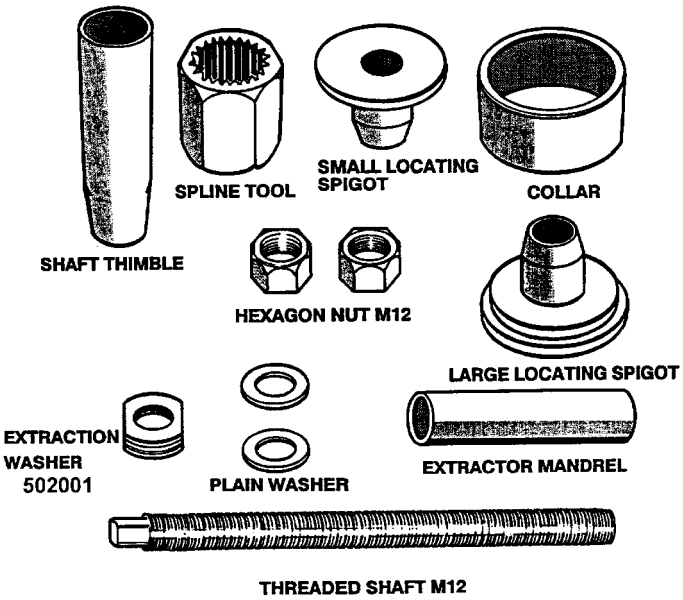


Reassembly:
Refit in reverse manner.

10.2 Shaft & Bearing Replacement

Procedures described in this section as well as section 10.3 can only be carried out by using the Bearing Removal Tool Kit, part number 502009.

The contents of the kit are as follows:



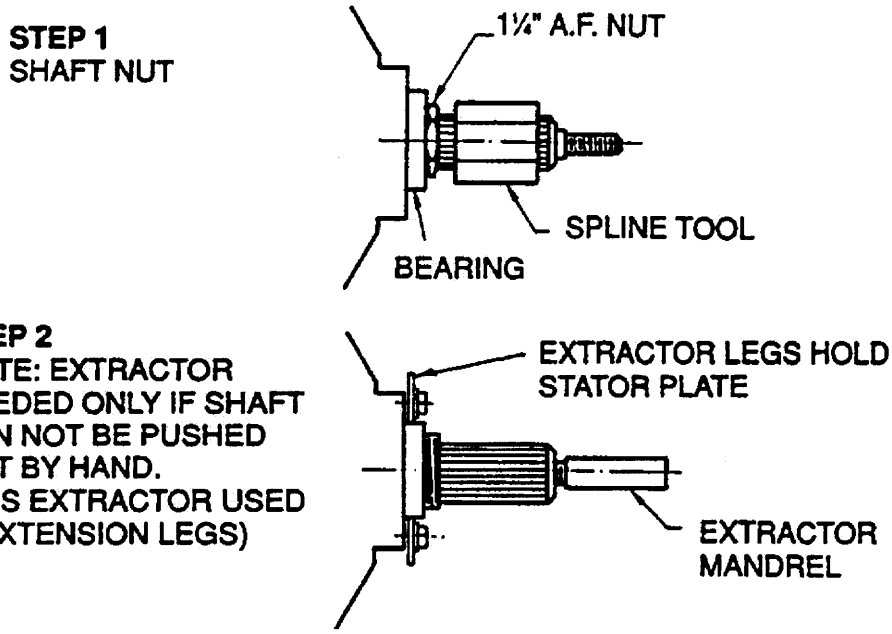
Bearing Removal Tool Kit
502009

Note: The extractor mandrel was designed for the older shaft with the external thread, however will work with the shaft on this machine with the internal thread.

(a) Follow procedures for Removal of Outer Basket From Cabinet. (Refer to Section 9.15).
(b) Lay the outer basket on its side before removal of the shaft. This ensures that the shaft does not fall directly onto the floor.

Note: The shaft can only be removed towards the inside of the outer basket. Remove the shaft. If the shaft is difficult to remove, use a puller and a mandrel. Refit the thick Stator motor clamp plate onto the outer basket and secure with the four Stator mounting bolts. The Stator clamp plate may be used to hold the legs of the puller in place.

SHAFT REMOVAL



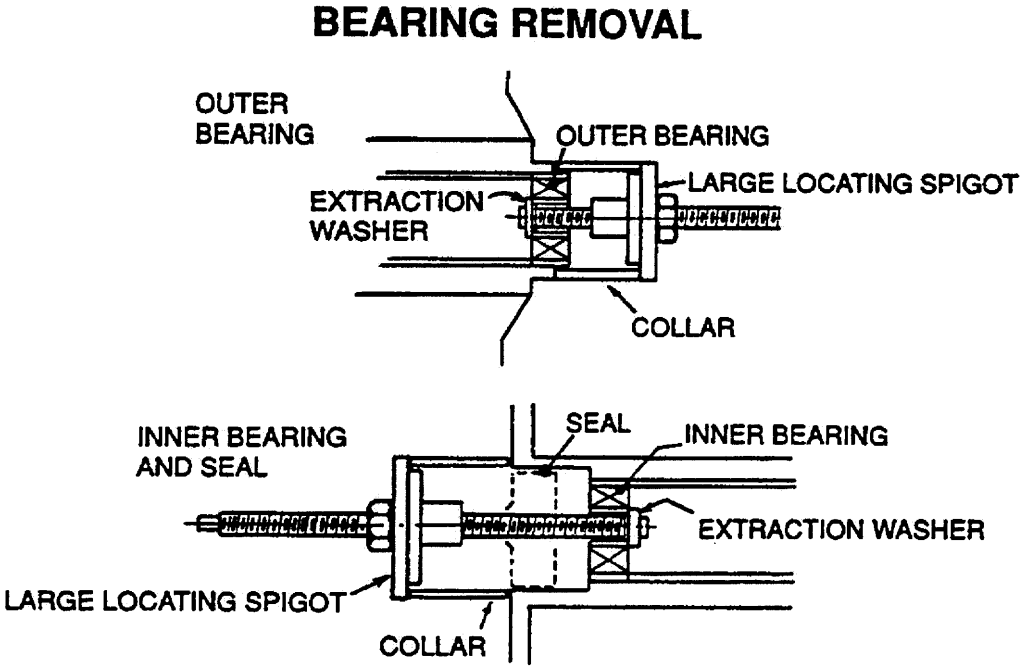
WARNING: Make sure the Stator clamp plate is flat before reusing. If in doubt, replace.

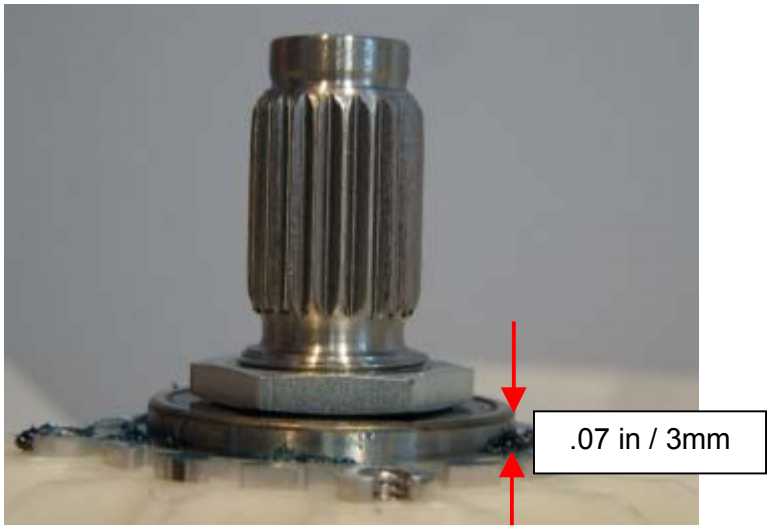
(c) Remove the outer bearing using the bearing removal tool.

WARNING: Do not remove the bearings with a hammer and drift as serious damage to the bearing housing or outer basket may result. Use the bearing removal tool as illustrated.

(d) Remove the seal with the aid of a screwdriver handle levering from side to side.

(e) Remove inner bearing using the bearing removal tool. Insert the threaded rod and extractor washer up from the bottom of the outer basket. Place the collar and large locating spigot on the threaded rod and extract the bearing.





Note: The outer bearing will be proud of the housing by approximately .07in /3mm.

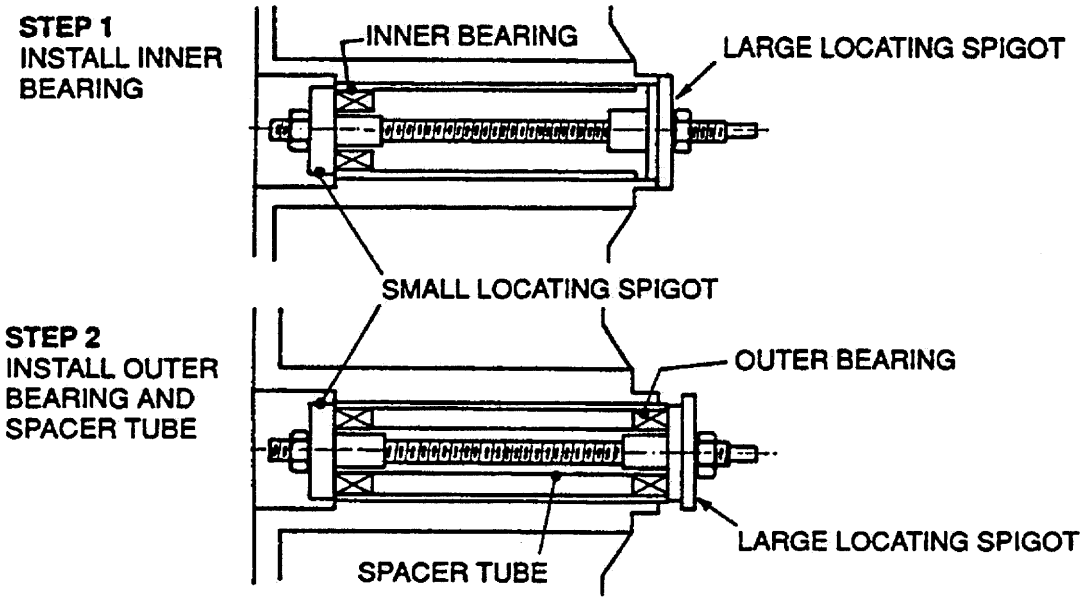
10.3 Shaft & Bearing Assembly

(a) The bearings must be inserted separately with the **inner bearing fitted first** and pulled down with the bearing tool onto the shoulder in the bearing housing.

IMPORTANT: There must be no gap between the bearing outer race and the shoulder of the aluminum extrusion. Remove the insertion tool at this point and check that the inner bearing is fully home.

(b) Fit the bearing spacer and press in the outer bearing using the bearing tool. Check the spacer has no end float but has slight sideways movement to allow for shaft insertion.

BEARING INSTALLATION



(c) Ease the shaft through the bearings from inside the outer basket. Take care the shaft is fitted with the threaded retaining nut section facing downwards in the direction of the base.

(d) Fit the shaft retention nut. Use the spline tool and spanner to tighten the shaft retention nut.
(e) Invert the outer basket. Take care not to damage the shaft or flooring. **Fit the assembly thimble sleeve onto the shaft before fitting the seal.** Lubricate the seal outside diameter with liquid detergent and then slide into position by pressing down on both sides of the seal.

Note: The seal should be flush with the lip on the base of the outer basket.

11 WASH PERFORMANCE INFORMATION

11.1 Creasing

Creasing can be caused by over loading the washer or the dryer. Permanent Press or Delicate cycles have been designed to minimise creasing as they use a lower spin speed. Do not leave wet clothes to sit in the washer or laundry basket.

11.2 Soiling

Soiling is the result of insufficient detergent for the load. White clothes are better washed separately. Separate lightly and heavily soiled items, as clothes can pick up soil from dirty wash water. Cold water below 68°F / 20 °C does not wash effectively. Select the wash temperature according to soil type. For example, blood and mud are better washed in cold water, while sweat and oil based soil wash better in warmer water. Loads made up of articles of varying sizes will wash better (e.g. full loads of sheets may not wash that well). Hard water requires more detergent than soft water.

11.3 Linting

Wash lint givers (eg. towels, flannelette sheets) separately from lint collectors (eg. synthetic fabrics). Over loading the washer can increase the likelihood of linting. Insufficient detergent for the load can increase linting as there will not be enough detergent to hold the lint in suspension. Over drying synthetic fabrics in a dryer can cause a build-up of static electricity and result in the fabrics attracting lint.

11.4 Detergent Residue

Over loading the washer can result in detergent residue being caught in the creases of the fabrics. If this occurs, decrease the load size. Some detergents need to be pre-dissolved. Check the instructions for the detergent. Cold ambient temperatures, cold washes or short agitation times may not let the detergent dissolve properly. In these cases pre-dissolve the detergent. Overdosing of detergent can also cause residue when foam breaks down and will show as white specs on the clothing. Poor quality detergents can result in residue.

11.5 Black Marks on Clothes

A build up caused by the interaction of fabric softener and detergent (scrud) can flake off and mark clothes. Do not use too much fabric softener, maximum 75cc. If this is a problem, it is recommended that the machine is periodically filled with hot water, plus 1-2 cups of dishwasher powder and left to soak.

11.6 Grey Marks on Clothes

Not enough detergent for the amount of soil on the clothes can result in grey marks on clothes. If this is a problem it is recommended that the machine be periodically filled with hot water, plus detergent and left to soak.

11.7 Dye Transfer

Wash and dry non-colorfast clothes separately. Non colorfast clothes left sitting in a washer or laundry basket can transfer dye to other clothes.

11.8 Tangling

Washing with too much water (i.e. under loading) can cause the clothes to tangle around each other. Do not load the machine by wrapping clothes around the agitator.

12 OPERATING PROBLEMS

12.1 No Power

If the machine appears dead, and there is no response from pressing the power button, then check the following.

- Check the supply voltage and that the machine is plugged in and switched on.
- Remove the lid and the console.
- With the power supply isolated, physically check all the plug connections to the Motor Control Module.
- With the power supply switched, on check all voltage readings as described in section 6.
- Prior to replacing a Motor Control Module, check all resistances of the components as described in section 7. We also recommended that a visual inspection of the motor and pump area be carried out. Check for corrosion and signs of water leaking as well as damage that may have occurred to any of the wiring harnesses.

12.2 Flooding / Leaking

- Check for obvious signs of leaks from taps, inlet hoses, inlet washers, water valves and mixing chamber. There should be no signs of water within the top-deck area.
- Check for obvious signs of leaks in the standpipe, drain hose, pump, and air bell. The pump can leak if the pump bracket is not secured properly.
- Check that the drain hose is inserted correctly, and that the drain is not blocked, or pushed too far into the standpipe.
- Check that the water valves are not jammed on, or dripping when off.
- Has the pressure tube been connected when the basket contained water? The pressure tube must be connected when the basket is empty, otherwise flooding may occur on the next cycle.
- Has the machine oversudsed, caused by too much, incorrect use of or poor quality detergents.
- Has the correct water level been selected for the clothes load? Too much water for the clothes load will cause water to splash.
- Check that the size setting is correct.
- Check that the high water level is acceptable. Acceptable limits are 10-110mm from the top of the agitator to the water. If it is less than 10mm, then splashing may be a problem. Empty the basket, remove then refit the pressure tube to the Motor Control Module, and then retest. If water levels are outside these limits, replace the Motor Control Module.
- Otherwise it could be that the machine was overloaded or in a humid environment. Too much detergent could have been used.

12.3 Noisy

If the user is complaining about noise, it may be in a number of different areas. Is the noise during spin? Is it a banging sound? This would typically be the drain hose, inlet hoses, mains lead or harness. If it is an out of balance noise, check that the machine is level and stable. Check the bias spring and balance rings. Remove the inner basket and check that its weight is within specification (Refer Section 1.12).

If it is a ‘clunk’ that occurs up to 3 times per cycle, this would be a basket check and is completely normal. It occurs when the machine is draining and ¾ empty. This is a ‘feature’ and a noise that cannot be reduced.

Other things to check are:

- Is the machine level and on all four feet equally.
- Check the mains lead, inlet hoses and drain hose outside the wrapper, behind the machine.
- Check the harness and drain hose inside is not banging on the wrapper during spin.
- Check the bias spring is fitted correctly.
- Check the 2 balance rings in the inner basket contain water. Check the basket weight.

- Check for noisy suspension rods.
- If the inner basket or agitator are noisy, check for obstructions. Check the spline drive is clean. If there is a grating sound, check the single stainless steel washer beneath the spline drive.
- If the motor is abnormally noisy, chipped or cracked Rotor magnets are unlikely to affect the noise.
- If the pump is noisy, check for obstructions. Change parts as necessary.

12.4 Continuous or Slow Spinning

The most likely cause of slow or continuous spinning is 'Out of Balance'. To correct this, refer to section 4.8.5.

Too much detergent can cause final spin to stop and respin 4 times. This is due to suds build up between the baskets, and normally will sound a User Warning.

A more likely cause of slow spinning is the **Hot Basket Flag** (Refer to Section 4.6).

12.5 Siphoning

Typically this occurs when the Standpipe height is too low. The minimum is 33.46in / 850mm from the floor. This is 3.54 in / 90mm ABOVE the drain hose outlet on the machine. With a very low standpipe and a very high water level, this could result in water pouring down the standpipe prior to the machine completing fill and resulting in no water in the basket during agitate.

If the drain hose is pushed too far into the standpipe or drain, the machine will siphon during rinse, which could result in a 'No Taps' user warning.

Siphoning can result from a restricted drain hose or partial pump block.

Notes