Fisher&Paykel appliances

customercare™

Service Manual

AQUASMART™
Hi-Efficiency washer

Model:
WL70T60CW
WL80T65CW

479615

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.

GUIDE TO USING THIS MANUAL
The model covered by this manual is listed on the front cover.

The front cover picture shows the type of product and may not necessarily be an exact image of the model covered by the manual.

479615

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479615

FISHER & PAYKEL

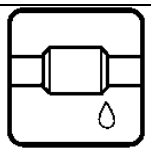
ELECTRONIC WASHING MACHINE

Covering the following models		
Market	**Model Number**	**Product code**
Australia	WL70T60CW2	93171
	WL80T56CW2	93191
New Zealand	WL70T60CW2	92171
	WL80T56CW2	92191
Rest of World	WL70T60CW2	95xxx
	WL80T56CW2	95xxx

CONTENTS

1 HEALTH & SAFETY

When servicing the AquaSmart Washer, health & safety issues must be considered at all times. Specific safety issues are listed below with the appropriate icon.

	**Electrical Safety** Ensure the mains power has been disconnected before servicing the washer. If the mains supply is required to be on to service the washer, make sure it is turned off when removing any electrical component or connection to avoid electric shock.
	**Electrostatic Discharge** An anti-static strap is to be used as electrical static discharge (ESD) protection when servicing electronic components.
	**Good Working practices** Ensure the work area is in a tidy and orderly condition at all times so as not to cause a hazard while service work is being completed. Always clean and tidy the washer and work area after service is completed.
	**Isolate Water Supply** Turn off the water connection tap before servicing
	**Water Leak Check** Check for water leaks as part of the testing after the service has been completed.
	**Insulation test** Megger test to check insulation Warning: short together the phase and neutral pins on the plug so not to damage any electronic circuitry.
	**Sharp Metal Edges** When working around cut sheet metal edges, use appropriate gloves or protection to eliminate the change of receiving a laceration.

2 SPECIFICATIONS

2.1 Dimensions

Height to lid	
Open	1410mm – 1440mm
Closed	950mm – 980mm
Height to console	1010mm – 1050mm
Width	650mm (WL80) 600mm (WL70)
Depth	650mm (WL80) 600mm (WL70)
Inlet hose length	1200mm
Packed weight	60.5kg (WL80) 52.0kg (WL70)
Unpacked weight	52.0kg (WL80) 45.0kg (WL70)

Note: The exact height of AquaSmart™ is dependent on how far the feet are inserted into the base of the machine.

2.2 Maximum Capacity (AS/NZS 2040.1:2005)

Dry Weight: WL80 8 kg and WL70 7kg

2.3 Water Consumption

Load Size	*Regular High Efficiency**
8kg	82 litres
5kg	69 litres
3kg	60 litres
1kg	55 litres

Regular High Efficiency is the default wash cycle for AquaSmart™

2.4 Water Fill Temperature (Approximate Factory Settings)

Supply	Water Fill Temp*
Hot	60°c
Hot / Warm	46°C
Warm	39°C
Warm / Cold	33°C
Cold Plus	20°C
Cold	Supply temperature

Recommended hot water inlet temperature 70 °C (Maximum)

Dependent on hot and cold supply temperatures and water pressures

2.5 Wash Motor

Electronically commutated 36 pole direct drive 3 phase brushless DC motor.
Motor Resistance @68°F (20°C): 19.5Ω +/- 10% (39Ω +/- 1.95Ω across any two phases)

2.6 Pump Motor

The motor is a fully electronically controlled 325V, 3 phase, 6 pole, brushless DC motor.
The speed of the motor will vary depending on whether it is draining or re-circulating the water.

Motor Resistance @68°F (20°C): 8.1Ω +/- 10% per phase (16.2Ω +/- 10% across any two phases)
Maximum Wattage: 200W
Nominal Wattage: 60W
Drain Speed: 2500rpm
Recirculation Speed: 2000 rpm

Head Height	Drain Speed	Flow Rate
4ft (Nominal)	2500rpm	23.6 litres per minute
8ft (Maximum)	2500rpm	15 litres per minute

Recirculation Speed: 2000 rpm

2.7 Water Valves

Supply	Operation Mode	Voltage	Resistance	Flow Rate
Cold	Digitally Operated	24VDC	64Ω @ 68°F (20°C)	10 litres per min. max
Hot	Digitally Operated	24VDC	64Ω @ 68°F (20°C)	10 litres per min. max
Detergent	Digitally Operated	24VDC	64Ω @ 68°F (20°C)	8 litres per min. max
Fabric	Digitally Operated	24VDC	64Ω @ 68°F (20°C)	2 litres per min. max

Note: The flow rate will vary slightly depending on pressure.

Water Supply

- For the best operating conditions the hot water temperature should be approximately 65°C.
- The hot water temperature should not exceed 75°C or cold-water temperature 35°C. Temperatures above these may cause the machine to fault or cause damage to the machine.
- If there is an uncontrolled water-heating source (e.g. a wet back or solar heating) a tempering device should be fitted. This will ensure the hot water temperature remains within safe limits. For the most suitable type of tempering device we recommend contacting a local plumber or plumbing supply merchant.
- Inlet Water Static Pressure 3psi (20kPa) to 150psi (1MPa).

Note: If using a header tank, then the outlet of the header tank must be at least 2 metres above the top of the clothes washer.

- The water supply flow rate should be greater than 6 litre per minute (assumes ½ inch diameter pipes).
- The minimum height of the taps to clear the top of the machine is 1150mm.

2.8 Thermistor

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

2.9 Cabinet

Pre-painted steel

2.10 Lid

ABS plastic

2.11 Top Deck

Polypropylene

2.12 Inner Bowl

Stainless steel: Grade 430T

2.13 Bowl base and balance ring

Polypropylene

Inner Bowl Weight
8.27kg – 8.47kg (WL70)
10.85kg –11.08kg (WL80)

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

2.14 Outer Bowl

Aluminium insert over-moulded with polypropylene

2.15 Console

ABS plastic

2.16 Facia

IMD (In-mould decorative) Polycarbonate/PET

2.17 Neck Ring / Straps

Neck Ring: Polypropylene
Straps: Dynaflex TPE (Thermoplastic Elastomer)

2.18 Low Profile Agitator

Low profile agitator: Polypropylene
Low profile agitator Cap: Polypropylene
Low profile agitator Bolt: Acetyl

2.19 Energy / Water Rating

Energy Rating
3.5 Stars
For more information contact www.energyrating.gov.au

Water Rating
4 Stars
(WELS Water Efficiency Labelling and Standards)
For more information contact http://www.waterrating.gov.au

2.20 Fabric Softener Dispenser

Dosage 70mls (To the Max indicator level)
Note: Any amount above the Max level may cause the fabric softener to self-siphon into the machine.

2.21 Electric Supply

Operating Voltage: 230V AC 50Hz
Maximum Current: 2.8 amps

2.22 User Guide

User Guide: P/No 421168

2.23 Lid Lock

Resistance: 63Ω +/- 10% @ 20°C

Note: Normally low voltage, potentially 230V if harness is grounded to the cabinet!

2.24 Control Panel LCD Model

2.25 Important Screw / Bolt Torque Settings

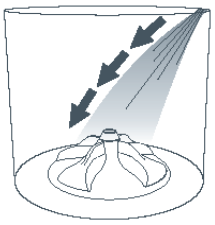
Below are the important screw torque settings on the AquaSmart™ washer. These settings must be adhered to. For all other screws and bolts that are not listed, we recommended that they are tightened sufficiently without being over-tightened.

Screw / Bolt	Torque (Nm)
Pump hood to cap to outer bowl	3Nm
Rotor bolt to shaft	8Nm
Pump housing to outer bowl	2Nm
Stator to Outer bowl	5Nm
Low Profile Agitator Bolt	4Nm
Nut Bearing to Shaft	18Nm
Spline Driven to Inner Bowl Base	1.5Nm
Nozzle Inlet to Top Deck	0.4Nm

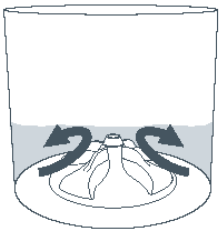
3 THE UNIQUE AQUASMART™ WASH

The AquaSmart™ is based on the SmartDrive™ washing machine and has two modes of washing, **High Efficiency** & **Conventional**. It is essentially a front loader (high efficiency mode) and a top loader (conventional mode) washer in one.

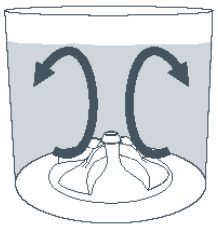
Both washing modes start the same way, with a detergent activating wash.



Detergent Activating Wash
AquaSmart™ fills at the selected water temperature, with just enough water so that the clothes are saturated. This concentrated detergent solution is then re-circulated through the wash. This thoroughly dissolves and activates the detergent.



High Efficiency Mode (front loader type wash)
In the High Efficiency mode, the *AquaSmart*™ fills with just enough water to lift the clothes off the low profile agitator, so that when it rotates, the clothes gently roll over each other. This wash uses similar quantities of water to most Front Loaders and so, not only are there the benefits of water savings, but also the higher detergent concentrations give optimum soil removal.



Conventional Mode (top loader type wash)
The Conventional mode is the immersion wash all Top Loader users are familiar with. After the Detergent Activating Wash, the AquaSmart™ fills with water until the clothes are underwater, whilst gently turning the clothes over. We recommend this mode when the dilution effect of water can solve or prevent common wash problems. For example when dye or colour run can be a problem or when washing sandy towels. Sheets are better washed in this mode. Some cycles can be used in both modes, whilst others work in only one.

Cycle	Modes Available
Regular	High Efficiency and Conventional
Sheets	Conventional
Whites	High Efficiency and Conventional
Colors	Conventional
Heavy Duty	High Efficiency and Conventional
Delicate	High Efficiency and Conventional
Easy Iron	Conventional
Bulky	Conventional

4 CONTROL PANEL

LCD Model

1. Power On/Off button.
2. High-Efficiency mode On/Off. When off, the machine uses the conventional wash mode
3. High-Efficiency LED used also for data download (refer to Section 7.3).
4. Start/Pause button
5. LCD Screen.
6. Left arrow (used when scrolling through options on the LCD screen).
7. Right arrow (used when scrolling through options on the LCD screen).
8. Select button – Use to confirm setting.
9. Back button - Use to cancel setting.

5 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 AquaSmart™ washing machines.

5.1 Electronics

5.1.1 Motor Control Module

The Motor Control Module used on the AquaSmart™ washer is similar to the other washers in its physical size and shape; however the electronics have different software to control the unique aspects of this machine.

Therefore the Motor Control Module is specific to this machine and is not interchangeable with any other machines.

The identifier label (AQS P92UD) stands for AQS AquaSmart P9 Phase 9, 2UD 2Unit Dispensing.

5.2 Stand By Mode

If the 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 mode, the machine must be removed from 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.

5.3 Out of Balance Detection – ‘Bump Detect’

On this machine the Out of Balance detection, is undertaken with electronic sensing, known as ‘Bump Detect’. ‘Bump Detect’ is software written into the Motor Control Module, which looks at specific feedback from the Motor.

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 need 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. Ensure that the feet have the rubber inserts fitted and the cabinet corners are clear of the floor.
4. Check that the straps on the neck ring are not broken and that they are fitted correctly.
5. Check the weight of the inner bowl. Bowl weight is as follows.
   - 8.27kg – 8.47kg (WL70).
   - 10.85kg –11.08kg (WL80)
6. If all the above are correct them turn on the Out Of Balance recovery. Refer to adjusting the machine options in the U&C book. Before turning on this function on you will need to judge the availability of water as it can / will increase the water usage.

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.

Water temperature Sensing

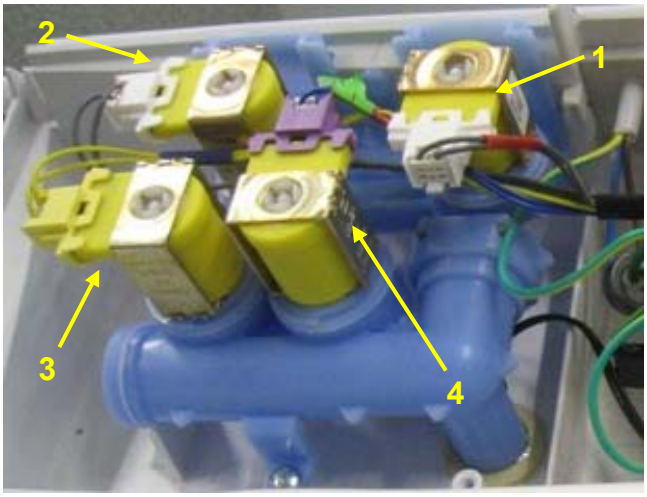
The thermistor for sensing the water temperature is located in the back of the outlet elbow on the valve assembly, and is connected directly to the Motor Control Module.

Details for adjusting the wash temperature, Refer to the Use & Care Book.

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

5.4 Water Valves

The water valve assembly incorporates four valves that are joined by a common valve body.
The two main inlet coils control the flow of water into the valve body assembly that then in turn supplies water into the machine through the inlet nozzle.
Two additional coils are used that control the valves for the fabric and detergent dispensing. They control the flow of water to the fabric and detergent dispensing system via hoses that run underneath the top deck.



1. Hot coil (White Clip)
2. Cold coil (White Clip)
3. Fabric coil (Yellow Clip)
4. Detergent coil (Purple Clip)

5.5 Dispensing System

Two hoses of different lengths run underneath the top deck and connect to the detergent and the fabric softener dispensers. The detergent dispenser hose has cream elbows and the fabric softener dispenser hose has grey elbows.

Moulded into the top deck at the valve end are identification letters (‘D’ for Detergent & ‘S’ for softener). At the dispenser end are moulded the words ‘Detergent’ and ‘Softener’.

It is important that the hoses are retained in the clips around the perimeter of the opening of the top deck correctly.

5.5.1 Detergent Dispensing

During fill, the detergent valve is also energised. This allows a proportion of the inlet water to flow into the detergent dispenser.

The flow rate through the detergent valve is dependent on the inlet water pressure, but it is less than the flow rate of water entering the machine. The valve will remain energised until the water level reaches 25mm, at which point the bowl starts stirring until the desired water level has been achieved.

The detergent valve can be tested in diagnostics (refer to Section 7.1.2 for LCD models).

5.5.2 Fabric Softener Dispensing

The design of the softener dispenser is such that it creates a self-siphoning effect. When the motor control module calls for softener at the beginning of the deep rinse cycle, the softener valve will energise. This allows water to flow into and through the dispenser mechanism. The valve is pulsed on and off for a total of 95 seconds (see table below) to ensure that all of the softener has dispensed.

Siphon Pulse	On	Off
1st	10 s	15 s
2nd	10 s	10 s
3rd	10 s	10 s
4th	10 s	10 s
5th	10 s	remains off

Note: The 1st off time of 15 seconds is to 'kick start' the siphoning process.

If the softener valve was to run continuously, the water would cut a path through the softener and the bulk of the softener would remain in the dispenser. The maximum level for the softener is 70mls at the 'Max' mark. If the softener dispenser was to be filled higher than this mark, the softener will self-siphon into the machine.

The Softener valve can be tested in diagnostics (refer to Section 7.1.2 for LCD models).

5.5.3 Inlet Nozzle

In addition to its design, which ensures excellent rinse water distribution, the nozzle shares an important relationship with the inlet valve assembly and the dispensing system as described above.

An internal piston within the nozzle moves with the amount of water pressure against it. When the water pressure is high, more holes in the nozzle are exposed, and the backpressure on the dispensing valves is less.

When the pressure is low, fewer holes in the nozzle are exposed and more backpressure is created, which ensures that either during detergent dispensing or softener dispensing the dispensing system takes priority.

If the water pressure was very low during dispensing, it is conceivable that no water would enter the machine via the inlet nozzle until the dispensing has been completed.

Conversely, if the piston was jammed and the water pressure was high, a high flow rate of water would go through the dispensing system and result in water on the floor.

5.6 Water Level Measurement

The AquaSmart™ uses the same pressure sensing system used in the SmartDrive™ and Intuitive machines to determine the water level. The difference with AquaSmart™ is that on both the Conventional and High Efficiency modes, AquaSmart™ will automatically choose the water level, as the precise water level for the clothes load is critical to the performance of the wash. ***The amount of water used in either mode is unable to be selected or adjusted by the user.***

So now there are an infinite number of water levels that AquaSmart™ can choose depending on the weight and type of the clothes being washed.

5.7 Motor

5.7.1 Stator

The stator used is **not interchangeable** with any previous phase or series of machine. The stator has 36 poles with the windings being Aluminium and is Identified by the printed marking **AL 60 190T** it looks the same as a copper Stator but is 19.5Ω per winding.

Aluminium Stator (36 Poles)

Curved pole tips

Testing the Stator

If the stator needs to be tested first test the resistance of the windings from the harness end that is connected to the Motor Control Module. (Refer to Section 6.2).

Note: Ensure that the Rotor and bowl are stationary when measurements are made.

Testing the stator from the console

The resistance of each individual winding is approximately 19Ω, however when testing the stator from the console we are testing across two windings therefore the resistance should be approx. 39Ω +/- 10%.

To test all windings you will need to measure across:

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

If the meter shows an incorrect reading then it is recommend testing the stator from underneath the machine, as there may be a fault in the wiring harness. To test the stator, both rotor and stator need to be removed. (Refer to Sections 10.24and 10.25).

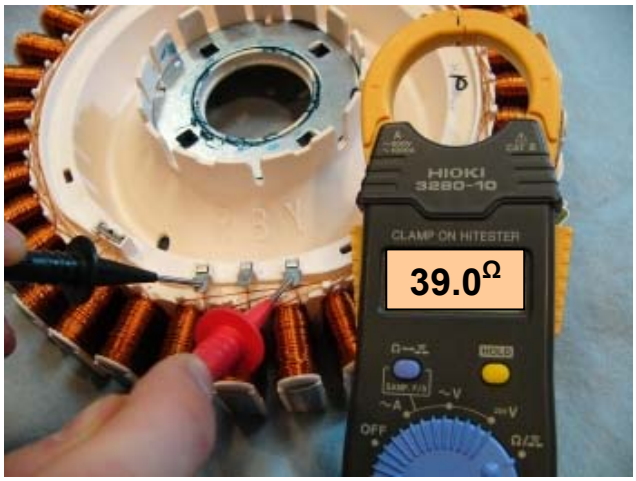
Note: Two clamp plates are used to secure the Stator, one on each side. The four bolts are tightened to a torque of 5Nm. The plastic bolt for securing the Rotor requires a 5/8" (16mm) socket and should be tightened to 8Nm.

Testing the Stator

After removing the Stator, it can now be tested.

Test points are:
R / B
B / Y
Y / R

The value should be approximately 39Ω +/- 10% across any of the two windings.



5.7.2 Rotor

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The rotor has 48 blocks of individual magnets moulded into a black housing, as opposed to earlier machines having 16 blocks, containing 3 magnets in a white moulding.
The rotor is not interchangeable with any previous phase or series of machine.

The rotors can physically be interchanged, however electrically they are **incompatible**.

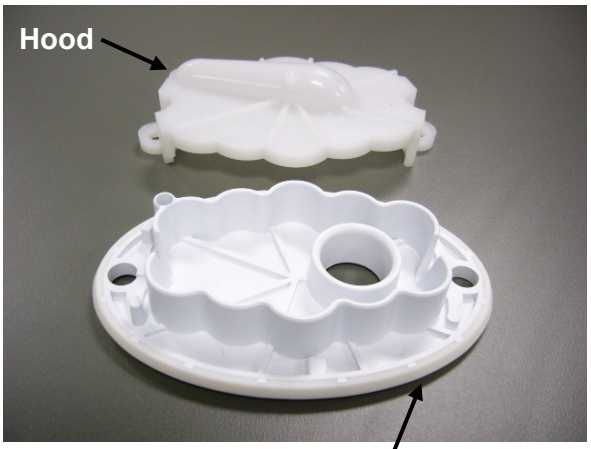
If the black rotor is fitted to earlier machines, fault code 240 will occur. Conversely a motor stall fault will occur if a white rotor is fitted to this AquaSmart machine.

5.8 Smart Pump

Smart Pump™ provides a more flexible and efficient pumping system than a conventional pump/diverter valve combination. SmartPump™ can be diverted quickly; it reacts faster and is better controlled. In addition, SmartPump™ has the capability of pumping to a much higher head whilst maintaining a constant volume flow rate regardless of pump efficiency degradations due to age.

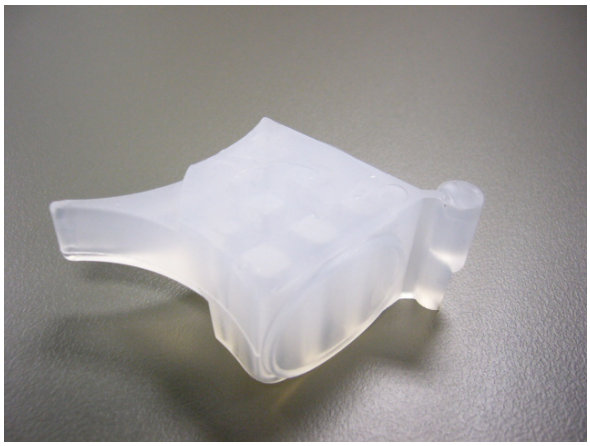
5.8.1 Hood and Cap

The hood and cap form the top of the pump housing, which must seal to the outer bowl. The hood and cap filters out objects that cannot pass through the pump system.



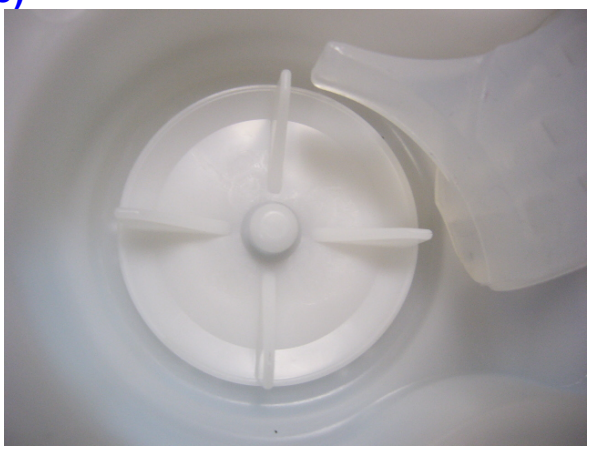
5.8.2 Flapper Valve

A diverter valve has been integrated into the pump cavity and operates automatically with a change in pump direction. This change of direction moves a flapper valve, which diverts the water to the drain hose or to the re-circulation hose. The valve is sealed off against the port face with water pressure.



5.8.3 Impeller (non-field serviceable)

The impellor imparts rotational energy into the water and keeps sand away from the shaft seal.



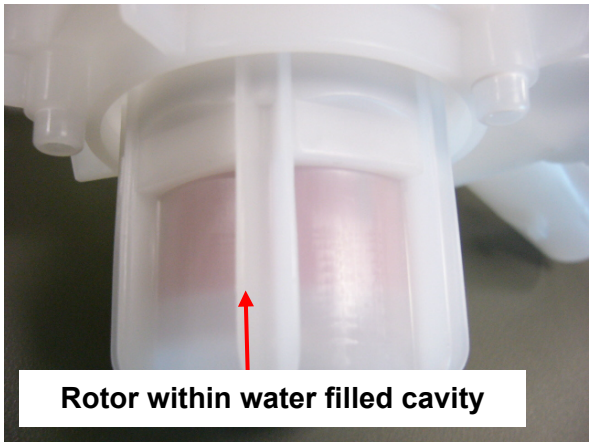
5.8.4 Rotor and Stator

The rotor and stator magnetically interact with each other in order to convert electrical energy into rotational movement of the rotor

Rotor

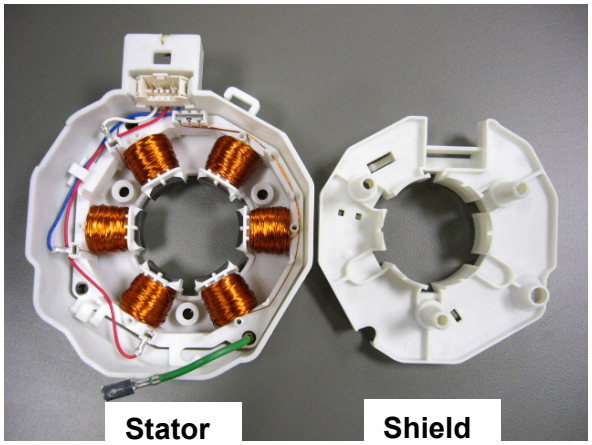
The rotor assembly is a complete unit that is permanently fixed into the pump housing. The resulting cavity is charged with water, which acts as a lubricant. In the event of a failure of the rotor, the whole assembly must be replaced.

Note: Contained within the rotor cavity are seals and bearings that are non field serviceable. The bearings provide a low friction wear surface for the rotor shaft to run on, and the seals eliminate grit from the rotor and bearing cavity



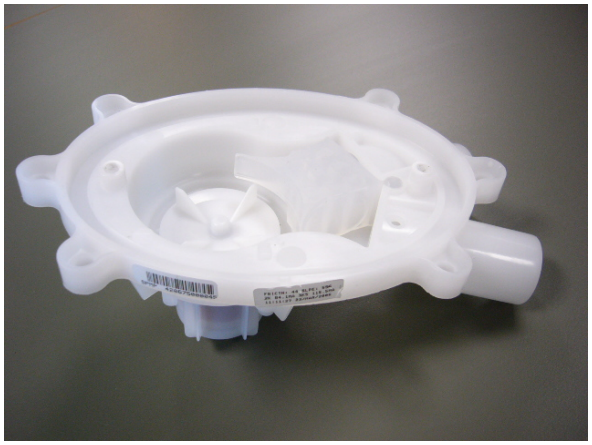
Stator & Shield

The Stator is mounted to the base of the pump housing together with the shield & cap. The harness connector inserts into the underside of the motor. Care must be taken to isolate the machine from the mains power before servicing the pump, and it is important that the harness connector cover has been refitted after reassembly.



5.8.5 Pump Housing

The pump housing is bolted directly to the outer bowl. It contains the volute shape and flapper sealing faces and also provides a structure to attach the stator and rotor assemblies.

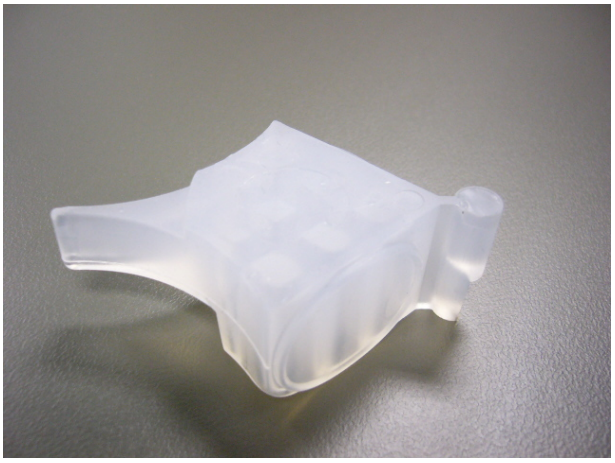


5.8.6 SmartPump™ Spare Parts

The following spare part service kits are available for SmartPump™.

Hood And Cap (SmartPump™) Kit
P/N 479418

Flapper (SmartPump™)
P/N 420403



Seal (SmartPump™) Housing
P/N 479420

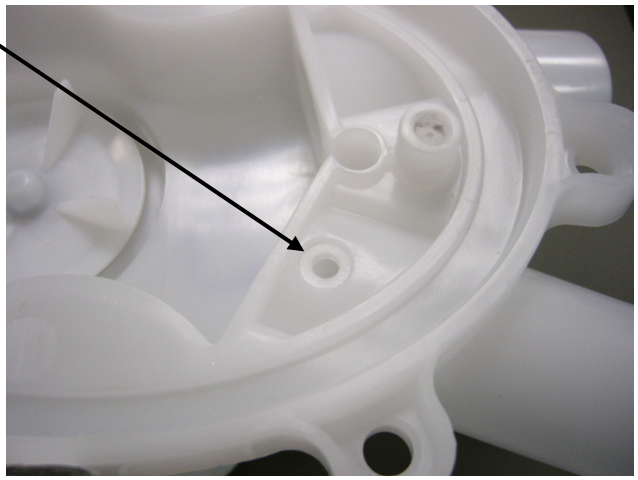
Pump Assembly (SmartPump™) Kit
P/N 479417

Note: The pump assembly is supplied with the connector removed from the stator shield. The cover must be fitted in place after the wiring harness has been attached.

5.8.7 SLR Feature

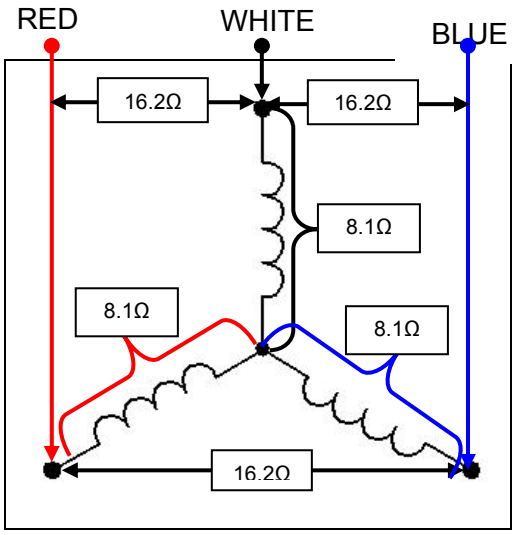
SLR stands for Simplified Leak Recirculation. This feature has been added so that should the flapper not completely seal against the housing of the pump when draining, water can bypass through this hole and back into the pump, avoiding re-circulating back into the bowl and on to the washing load.

It is important that this hole remains clear, and it should be checked whenever the pump is serviced.



5.8.8 Testing the Pump Stator

SmartPump™ Wiring Diagram



The stator resistance can either be tested from the harness at the motor controller or at the connections to the stator itself.

5.8.9 Testing SmartPump™ Stator from the Console

The resistance of each individual winding is approximately 8.1Ω +/- 10%, however when testing the stator from the console we are testing across two windings, therefore the resistance should be approximately 16.2Ω +/- 10%.

To test all windings you will need to measure across:
- Red and White
- White and Blue
- Blue and Red

If the meter shows an incorrect reading, we would recommend testing the stator from underneath the machine, as there could be a fault in the wiring harness. To test the stator it will need to be removed from the machine (refer to Section 10.20).

5.8.10 SmartPump™ Test Routine

Use the following procedure to test the SmartPump™. It is equally important to test both the drain and recirculation modes. In diagnostic mode the lid lock is disabled, which allows the technician to visually inspect both aspects of the pump.

1. Enter diagnostic mode. (Refer to Section 7.)
2. If the inner bowl is empty of water, activate either or both of the water valves until the inner bowl is approximately 1/4 full with water. (Refer to Section 7.1.2.)
3. While in diagnostic mode, set the pump to Recirculation Mode (refer to Section 7.1.2), run for at least 1 minute and observe the following:
   - Ensure that a good flow rate is being delivered through the portal of the hose.
   - Ensure that a good pattern of flow is being delivered. If a poor flow rate is apparent, firstly check that the neck ring is fitted correctly and is not obstructing the flow of water. Secondly, remove the neck ring and check the shape and location of the recirculation nozzle is as expected. If no faults are found, the pump must be inspected. To access the pump cavity, (refer to Section 10.19).
   - Ensure that no leaks are occurring from either the recirculation hose where it attaches to the outer bowl (to do this the top deck will need to be lifted, refer to Section 10.15), or no leaks where it attaches to the SmartPump™.
   - Ensure that no water is exiting from the drain hose. If it is, this indicates that water is bypassing. For the description of bypassing, refer to Section 5.8.11.
4. Again, whilst in diagnostic mode, set the machine to drain (refer to Section 7.1.2), run for at least 1 minute or until all water has been drained, and observe the following:
   - Ensure that a good pattern of flow is being delivered. If a poor flow rate is apparent the pump must be inspected. To access the pump cavity, refer to Section 10.19.
   - Ensure there are no leaks from where the drain hose exits from the cabinet or at the pump housing.
   - Ensure no water is exiting from the recirculation hose. Again, this would indicate that bypassing is occurring.

5.8.11 Bypassing

Bypassing is the term given to water that either flows from the recirculation hose when the pump is draining, or from the drain hose when the pump is re-circulating. No water at all should exit from the opposing hose. The flapper valve not sealing against the face of the pump cavity, or a poor fit of the hood and cap can generally cause bypassing.

If bypassing occurs, the pump (including the SLR Feature (refer to Section 5.8.7) must be inspected. To access the pump cavity (refer to Section 10.19).

5.9 Lid Lock

AquaSmart™ uses the same lid lock that is used on previous machines, and is locked during the complete cycle.

The Lid Lock symbol (padlock) appears in the top right hand corner of the screen on the LCD model, letting you know at a glance if you can open the lid or not.

To unlock the lid at any time, press **START/PAUSE**.

If the lid is left open on the AquaSmart™, the machine will be unable to lock the lid, and the cycle will be halted. The machine will beep and display a message to alert the user.
If this occurs, ensure that the lid is closed, and press the **START/PAUSE** button.

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 lid lock 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 seconds). Only then will it release the lid from the lock. The motor acts like a generator and allows the lock to stay energised under the bowls inertia.

In a brown out situation (where power is lost only momentary), the machine will restart at the start of whichever section of the cycle it was on and continue the wash.

The lid is locked throughout the complete cycle.

Eco-Active	**Locked**
Agitate	**Locked**
Spray Rinse	**Locked**
Deep Rinse	**Locked**
Spin	**Locked**

5.10 Neck Ring

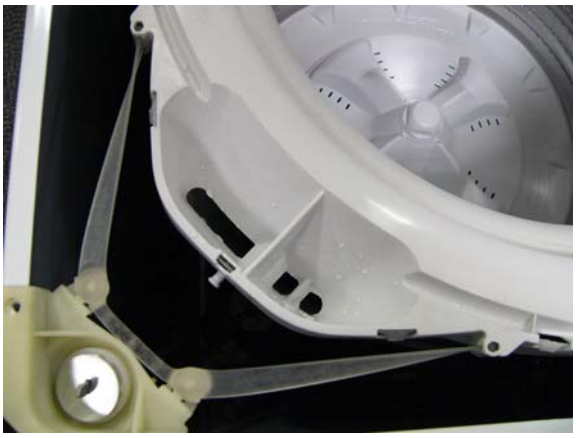
The neck ring incorporates wells used for the fabric and detergent dispensing and has four bump pads fitted to protect the cabinet from denting.

The neck ring is clipped in place to the outer bowl. It also restrains the re-circulating nozzle.

It is important that the neck ring is secured correctly to the outer bowl and has the four pads fitted, as it affects bump detect (out of balance detection). The bowl assembly may experience more movement, which could lead to cabinet damage.

Buffer pads are mounted at four points on the neck ring to cushion any neck ring to wrapper collusions.

Dynaflex straps are located at four points on the neck ring and connect to lugs on each of the suspension rods.



The straps serve two purposes:
1. To limit radial bowl motion during agitation.
2. Stabilises the bowl, which also improves wash performance.

If one or more straps break, this can cause an increase in out of balance activity, which again may lead to cabinet damage and noise from loose straps.
If the straps become disconnected from there mountings Do not refit the straps but replace the 4 piece set as failure to do so will result in increased out of balance issues.

For a detailed explanation of Bump Detect, (refer to Section 5.3).

5.11 Inner and Outer Bowl

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

The inner bowl is free to move in a vertical direction. The position of the inner bowl is determined by the water level. At the base of the inner bowl 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 bowl floats upwards and disengages the driven spline from the drive spline. This action frees the agitator from the inner bowl 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 bowl to settle back down onto the drive spline and re-engage the driven spline, thus allowing the agitator and inner bowl to turn as one unit. The floating bowl is also used to detect the correct water level for the size of the clothes load.

The point at which the bowl 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 bowl will float. By detecting the point at which the bowl floats, the machine can determine whether the correct water level for the particular clothes load has been reached

5.11.1 Detection of Inner Bowl Float off Point – Bowl Check

During fill the inner bowl 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 bowl float checks (bowl check). The inner bowl will stop and commence a number of small agitate type actions. During this action the machine determines if the inner bowl has floated if it has, the machine determines the correct water level has been reached. If the inner bowl has not floated, the machine will continue filling and check again later. The water level at which the inner bowl floats is not necessarily the same as the final water level.

5.11.2 Detection of Inner Bowl Re-Engagement – Bowl Check

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

5.11.3 Inner Bowl

SmartDrive™

AquaSmart™

5.11.4 Balance Ring

The inner bowl for AquaSmart™ has a top balance ring, which has 2 internal chambers instead of just one as on SmartDrive™ bowls. Both chambers are ½ filled with water.
The physical appearance of the balance ring changes from a square profile to a curved profile.

5.11.5 Inner Bowl Base

The bowl used on the AquaSmart™ has all 3 chambers partially filled with water where as the bowl base used on SmartDrive™ has only the inner and middle chambers filled with water.

IMPORTANT
It is important that the inner bowl for AquaSmart™ is only used on AquaSmart™ models. If the inner bowl is fitted to a SmartDrive™, it will cause the bump detect software not to function correctly, leading to increased cases whereby the inner bowl could hit against the top deck and cabinet.

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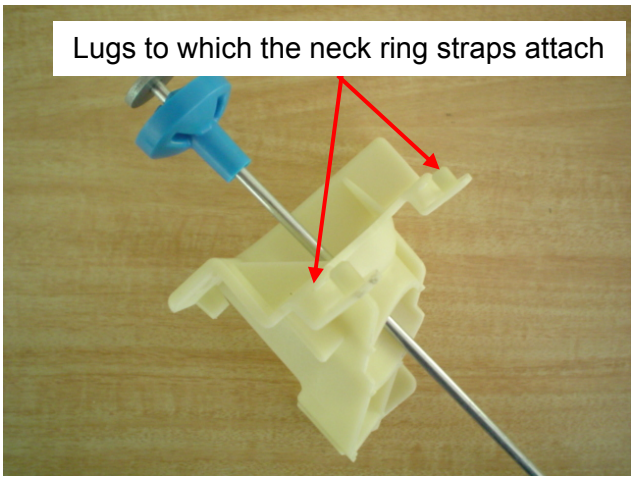
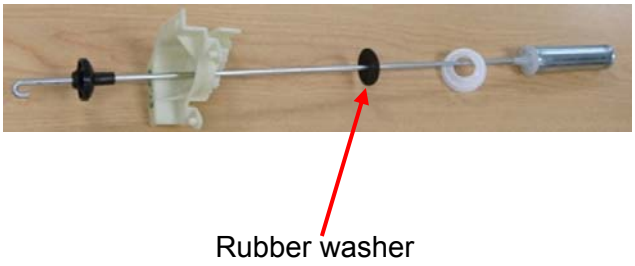
Conversely, a SmartDrive™ inner bowl should not be fitted to AquaSmart™.

5.12 Suspension Rods

The suspension rods on AquaSmart™ need to be more robust than the suspension rods used on SmartDrive™ machines. The top bracket has lugs to which the straps from the neck ring attach.

A rubber washer sits midway down the rod, this helps detergent residue from running down the rod and into the grease filled damper.





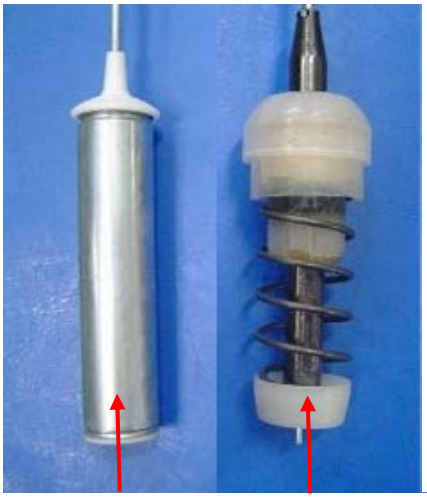
IMPORTANT
It is important that these suspension rods are used only on AquaSmart™ machines.
These rods haven't been tested on SmartDrive™ machines, however if they were to be fitted it is likely that there will be an increased level of noise and vibration on spin.

Conversely, rods from a SmartDrive™ washer should not be fitted to AquaSmart™.

There is also an increased chance that the inner bowl may strike against the cabinet and top deck on spin up.

The current machines use the suspension rod on the left.

This new rod provides even greater dampening, and assists in preventing out of balance loads.



Service Version (current) Service Version "B" (early)

5.13 Agitator Low Profile

The unique low profile agitator works well in both the High Efficiency and Conventional modes. In the High Efficiency mode, the clothes have greater contact with the agitator due to the low water level, and the agitator ensures a high level of clothes turnover.

In Conventional mode, the clothes are completely submerged in the water and the curving steep side walls and raised shoulders of the wash plate vanes create enough inward and upward movement to keep the clothes turning over even when there is reduced contact with the agitator.

Top View

Underside View

5.14 Control Panel

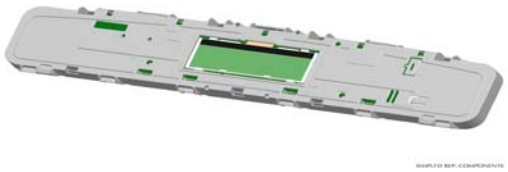
The three core components of the control panel on the LCD model are the console, the IMD facia, and the PCB and housing. A new look that differs from existing machines has been created, so now capacitive touch buttons drive a high-resolution dot matrix display. The fascia provides a sleek look and no protruding buttons makes it easier to clean.

Console:
The console, which is made from ABS, is the housing to which the facia and PCB housing attaches. Lugs at the base of the console locate into the top deck. The console is secured to the rear of the top deck by two screws.

IMD Facia – LCD Model
IMD stands for In Mould Decorative display.
Clear plastic is molded over the decorative polycarbonate silver film. The last process is to mould the seal on to the fascia. The IMD process means a reduction of parts and any subsequent printing process.

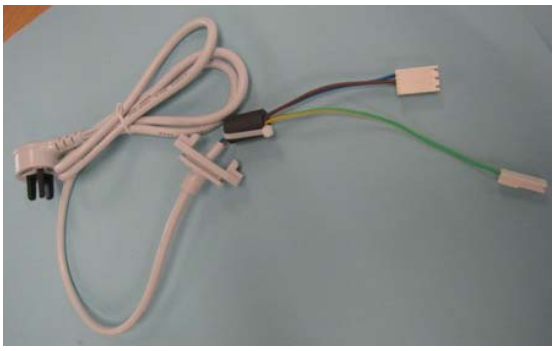
- No lens.
- No light pipes.
- No separate buttons.
- No separate seal.

PCB and Housing – LCD Model
The PCB, which contains the capacitive touch buttons and LCD, is mounted within a plastic housing. The PCB housing is clipped into the console at the bottom, and secured with four screws along the top.



5.15 Mains Cord

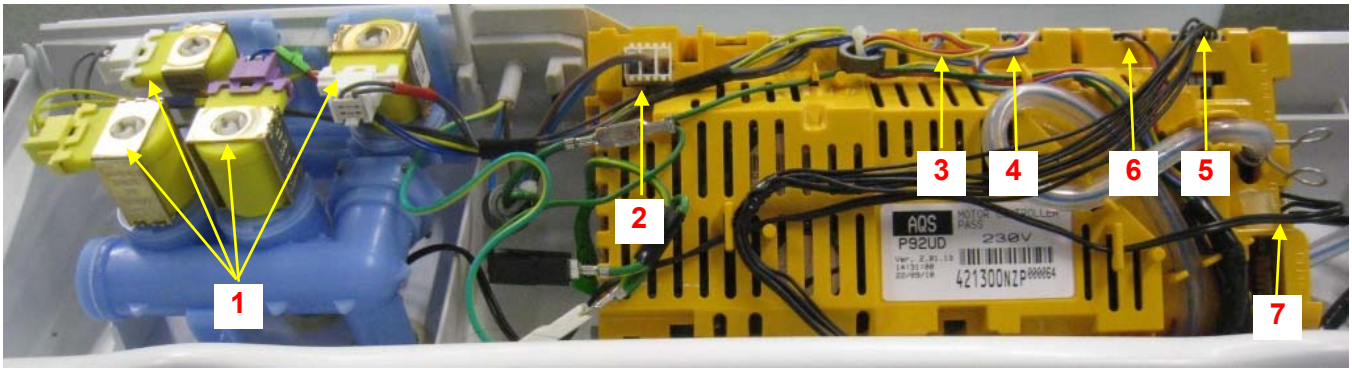
This product requires a mains cord which has a ferrite toroid fitted.



P/No 424225

6 VOLTAGE AND RESISTANCE READINGS FROM THE CONTROLLER

6.1 Voltage Readings



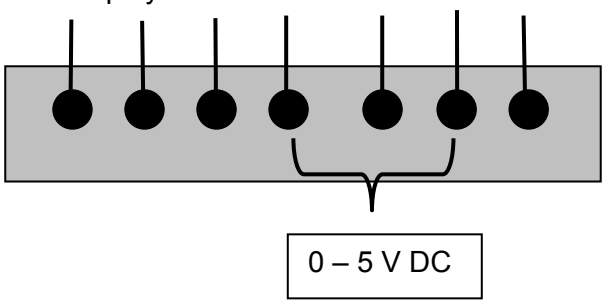
1. Water Valves
Varies between 13 – 22V DC
Note: Accurate voltages can only be obtained by using a True RMS multimeter.

2. Supply voltage
230V AC

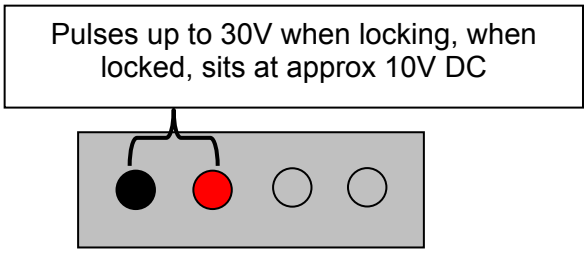
3. Wash Motor
No accurate readings are possible.

4. Pump Motor
No accurate readings are possible.

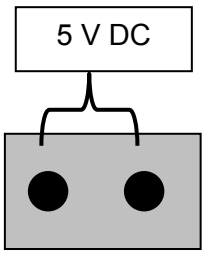
5. Display Module



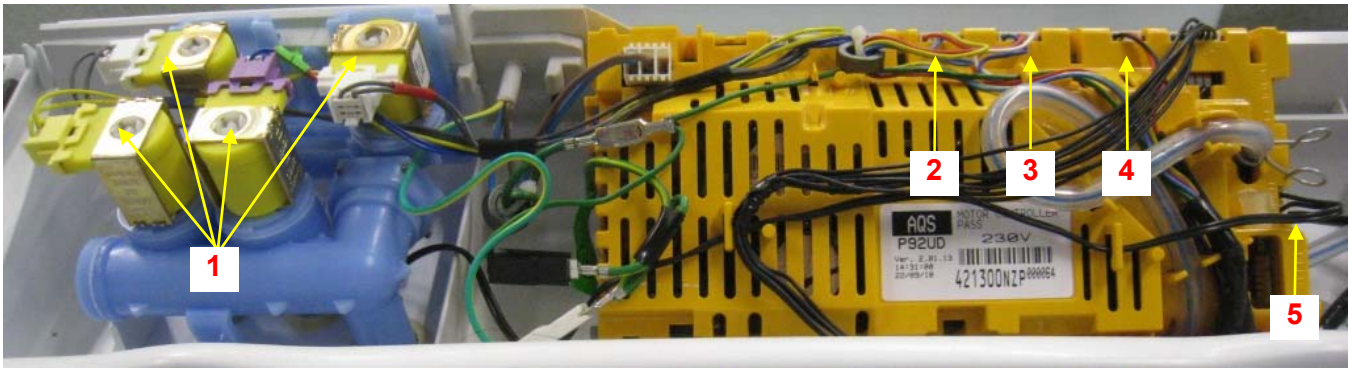
6. LID LOCK



7. Thermistor

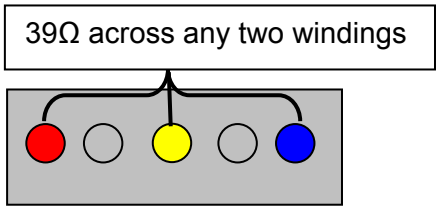


6.2 Resistance Readings

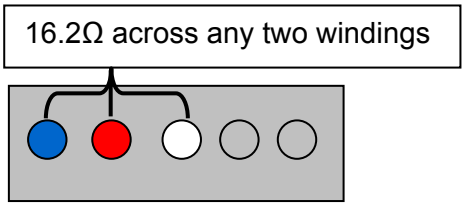


1. Water Valves
   64 Ω +/- 10%

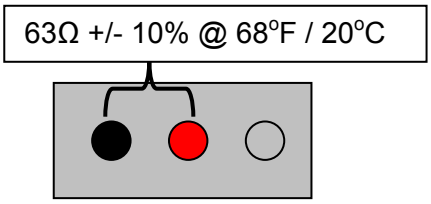
2. Wash Motor



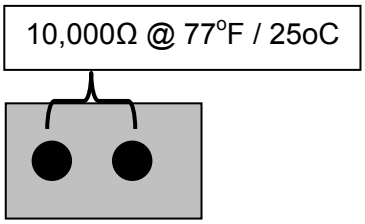
3. Pump Motor



4. Lid lock



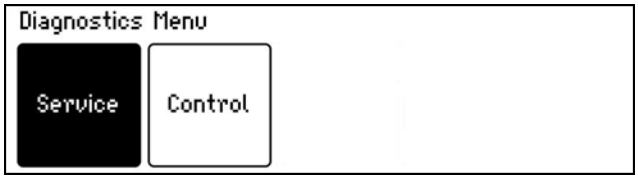
5. Thermistor



7 DIAGNOSTIC MODE – LCD MODEL

To enter the **DIAGNOSTIC MODE**, turn the power on at the power point and off at the console.

Press and hold the **HI-EFFICIENCY** and **SELECT** ✓ buttons. Keep the buttons pressed for at least 2 seconds, after which time two beeps will sound and the screen below will appear.



Use either **Scroll** arrows ◀ or ▶ to highlight the screen you wish to view, then touch the **Select** ✓ button to enter the appropriate screen.

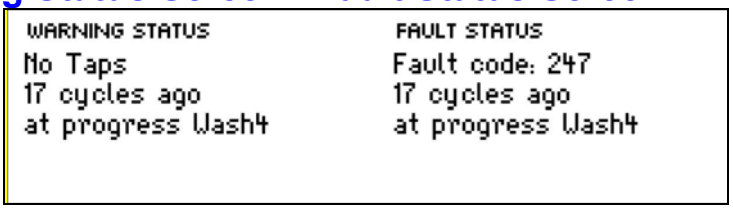
7.1 Service Screen

Upon entering the service screen, one of the following will appear in the LCD display.

- Warning Status / Fault Status
- Machine Status

To scroll between these use either **Scroll** arrow ◀ or ▶.

7.1.1 Warning Status Screen / Fault Status Screen



Warning Status

In this screen will be displayed the last USER WARNING FAULT that occurred and will show how many cycles ago and in what part of the cycle it occurred.

The User Warning Faults are as follows:

- No Taps
- Overloaded
- Out Of Balance
- Over Suds or water still in the machine during spin
- No Hot Water
- No Cold Water
- Agitate Overloaded

Fault Status

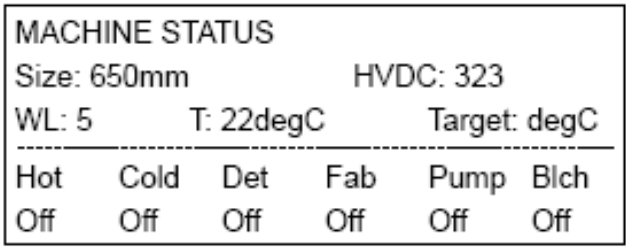
In this screen will be displayed a fault code for the last fault that has occurred and will show how many cycles ago and in what part of the cycle it occurred.

The fault code number can now be checked in the detailed fault codes, to ascertain what repairs may be necessary.

For fault code details refer to section 8.

7.1.2 Machine Status Screen

In the top half of the screen it displays the following information.



Size is the size of machine, (650mm = Large)
HVDC is for on line testing in the factory.
WL displays the water level in mm.
T is the actual temp of the inlet chamber water.
Target temp is the temperature selected.

In the lower half of the screen it displays the status of the following components.

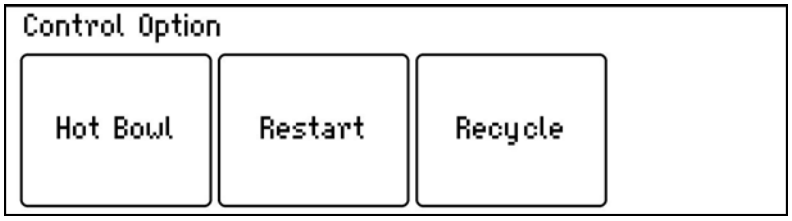
- Hot Valve (HOT)
- Cold Valve (COLD)
- Detergent Valve (DET)
- Softener Valve (FAB)
- SmartPump™ (PUMP)
- Bleach Valve (Blch) Not fitted

Component Testing
This screen enables the components that are displayed to be tested.

- To test a component, firstly highlight the component by using either **Scroll** arrow ◀ or ▶.
- Activate the component by touching the **Select** ✓ button.
- Deactivate the component, by touching the **Select** ✓ button again.

Note: SmartPump™ can be tested in both the drain and recirculation modes. After highlighting Pump, the first press of the Select button activates the pump in the drain direction, the second press activates the pump in the recirculation direction; a final press turns the pump off.

7.2 Control Screen



7.2.1 Hot Bowl Flag

If the machine has been filled utilising the hot water valve (i.e. warm or hot fill) and has not had a cold rinse, the electronics will not allow the machine to spin up to its full speed of 1000 RPM. It will only allow the spin speed to reach 700 RPM.

To remove this flag, enter the Control Screen mode, ensure the **HOT BOWL** option is highlighted, and then touch the **HI-EFFICIENCY** button. Alternatively this flag can also be removed by putting the machine through a complete final rinse.

7.2.2 Restart Feature

The AquaSmart™ leaves the factory with the **RESTART** set to ON, this is indicated in the screen by the word **RESTART** highlighted. To turn the **RESTART** feature OFF, touch the **Left Scroll** arrow ◀. This will remove the highlight from the word **RESTART**.
When servicing the machine, it is more convenient to turn the RESTART feature OFF. This will allow any fault in the system to show up immediately it occurs.

With the RESTART feature on: (Factory Default setting)

1. 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.
2. If the fault was only of temporary nature, the machine will restart and finish the cycle.
3. 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.

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.

To identify that the RESTART feature has been activated, refer to the Restart / Recycle table. (Refer to Section 7.2.4)

7.2.3 Recycle Feature

At the end of servicing, the machine may require an extended test where the machine can be left to complete a number of wash cycles. By turning on the **RECYCLE** feature, the machine will continuously repeat the wash cycle until the **RECYCLE** feature is turned off. To toggle this feature on or off, touch the right scroll arrow ▶. When the recycle feature is on, the word **RECYCLE** will be highlighted.

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.

To identify that the RECYCLE feature has been activated, refer to the Restart / Recycle table. (Refer to Section 7.2.4)

7.2.4 Restart / Recycle Table LCD

As the LCD AquaSmart™ has only one LED (located above the High Efficiency button) the state of the LED will signify which feature has been selected or not selected. The table below explains the state of the LED when the machine is on at the wall and off at the machine.

LED: Off (Factory Default)	Restart on
	Recycle off
LED: Solid	Restart off
	Recycle on
LED: Slow Flashing	Restart off
	Recycle off
LED: Quick Flashing	Restart on
	Recycle on

7.2.5 Restart / Recycle Features Permanently Programmed

It is possible for the Restart Feature to be disabled, or the Recycle Feature to be enabled, or a combination of both to be permanently programmed into the memory of the electronics so that in the event of a power cut the electronics will remember the setting.

The factory settings are:

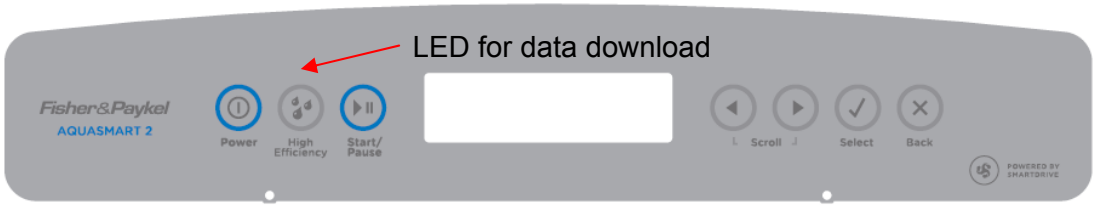
- Restart is enabled
- Recycle is disabled

If a machine is encountered with the Restart/Recycle features not set to the factory defaults, the machine must be re-programmed using following steps;

1. Enter diagnostic mode by pressing and holding the **HI-EFFICIENCY** button and then pressing the **SELECT** ✓ button. Keep the buttons pressed for at least 2 seconds, after which time two beeps will be heard and a screen showing 'Service' & 'Control' will appear.
2. Using either scroll arrows ◀ or ▶, highlight the 'Control' screen and then touch the **SELECT** ✓.
3. To enable/disable the Restart feature permanently, press and hold the **LEFT SCROLL ARROW** ◀ for three seconds until a beep is heard.
4. To enable/disable the Recycle feature permanently, press and hold the **RIGHT SCROLL ARROW** ▶ for three seconds until a beep is heard.

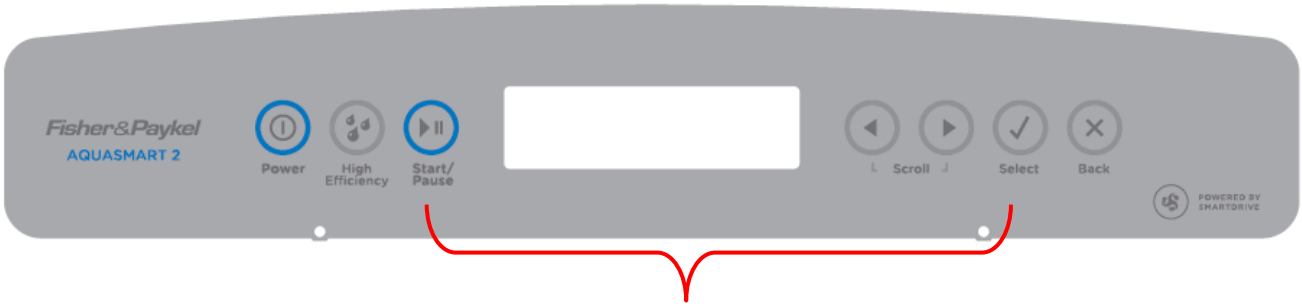
7.3 Data Download

To activate the data download, enter the diagnostic mode with the power on at the power point and off at the console, press and hold the **HI-EFFICIENCY** and **SELECT** ✓ buttons. Keep the buttons pressed for at least 2 seconds, after which time two beeps will sound. Then press the **START/PAUSE** ▶II button. The LED above the High Efficiency button will be on and flickering.



Place the download pen over this LED and follow the instructions supplied with the data download program.

7.4 Showroom Mode



Press and Hold **START/PAUSE** ▶II, then touch the **SELECT** ✓ button

Showroom mode will play the introduction and repeat it continuously, until the machine has been isolated from the power supply.

To access the showroom mode follow the steps below.

1. Turn the power supply to the washing machine on.

2. During the introduction sequence on the LCD display (which lasts for approximately 1 minute) press and hold the **START/PAUSE** ▶II button and the **SELECT** ✓ button, and hold these buttons for at least two seconds.

To exit, turn off the power supply to the washing machine at the wall.

8 FAULT CODES

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 Error

The Motor Control Module has found a fault with the size setting.

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

10. (00001010) Temperature Sensor (Thermistor) Error

The temperature sensor may be open circuit.

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 @ 25°C or 12.5kΩ @ 20°C. Replace if faulty.
3. Replace Motor Control Module.

12. (00001100) Flood Protection Error

The Motor Control Module has detected the water level to be above the flood level and tried to pump the excess water out. After pumping for 30 seconds, the pump has been unable to lower the water level below the flood level. The water valves may have stuck on and are letting water in at a flow rate that is higher than the pump can handle, or the pump may be blocked and cannot drain the excess water. Note: Under extremely high flow rate conditions the machine may overfill during the “top-up” routine in agitate.

Primary Source: Water Valves.
Action: If the water valves are on continuously, check that the water valves turn off mechanically, by removing power to the 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.

21 (00010101) Water Valve Over Current

The Motor Control Module has detected that the water valve circuit is drawing to high a current.

Primary Source: Water valves.
Action: Check that the resistance of the water valves are 64Ω @ 20°C.
Secondary Source: Motor Control Module
Action: Replace the Motor Control module.

24. (00011000) Dispensing Type Not Set

The Motor Control Module has found that the dispensing type needs to be set.
Reselect the dispensing type for the machine by using the DISPENSING TYPE SETTING.

Action, LED Machines: To set the dispensing type, turn the power on at the power point and off at the console. Ensure no LED's are lit before proceeding to the next step; if so press the power button to turn them off.
Press and hold **Wash Temperature button** then press **Power**.
Press the **Temperature button** to scroll through the dispensing type options, stopping at the desired dispensing type setting.
Cold LED = No dispensing
Warm LED = Double dispensing
Hot LED = Triple dispensing
Press Power button to confirm the setting and to exit this mode.

Action, LCD Machines: To set the dispensing type, turn the power on at the power point and off at the console. Ensure the LCD is not lit before proceeding to the next step; if so press the power button to turn it off.
Press the **Start/Pause** and Left Scroll (left arrow) buttons at the same time
Use the Left and Right Scroll (arrow) buttons to select the appropriate dispensing type
Press Power button to confirm the setting and to exit this mode.

26. (00011010) Detergent Valve Fault

The Motor Controller module has detected that the detergent valve (purple clip) is faulty. It determines this by measuring voltages from the valve diagnostic circuit. The most likely cause is that the valve harness has not been connected correctly or the valve is open circuit.

Primary Source: Wiring.
Action: Check the valve harness is correctly fastened to the valve or the pins are not bent backwards.
Secondary Source: Detergent Valve.
Action: Check the valve coil is not faulty (i.e. not open circuit – See 1.8).
Tertiary Source: Motor Controller module.
Action: Replace the Motor Controller module.

27. (00011011) Fabric Softener Valve Fault

The Motor Controller module has detected that the fabric softener valve (yellow clip) is faulty. It determines this by measuring voltages from the valve diagnostic circuit. The most likely cause is that the valve harnesses has not been connected correctly or the valve is open circuit.

Primary Source: Wiring.
Action: Check the valve harness is correctly fastened to the valve or the pins are not bent backwards.
Secondary Source: Fabric Softener Valve.
Action: Check the valve coil is not faulty (i.e. not open circuit – See 1.8).
Tertiary Source: Motor Controller module.
Action: Replace the Motor Controller 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 850mm, maximum 1200mm.
2) Check that the hose guide is fitted and check that the hose does not protrude more than 20mm beyond the guide.

Secondary Source: Mechanical.

Action:
1) Check the pressure tube connections on the outer bowl 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) No change in the water level (Pump Blocked Error)

While draining, the water level reading from the pressure sensor has not changed for over 3 minutes. There are four likely reasons for this fault.

1) The drain hose or the pressure switch hose has been squashed or kinked and the pump out rate has been dramatically reduced.
2) The pump is partially or fully blocked.
3) 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.
4) 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 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 bowl 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 bowl contains water, then service the pump from the top of the machine by removing the top deck and inner bowl. 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.

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 detected and recorded an empty water level while agitating. The water level must have been greater than empty for the machine to start agitating initially.

Primary Source: Mechanical.
Action: Check the pressure tube is attached 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 Motor Control Module has detected a fault with the pressure tube.

Primary Source: Mechanical.
Action: Check that the pressure tube is not blocked with water or dirt, is not kinked and it attached securely.
Secondary Source: Motor Control Module pressure sensor.
Action: Replace the Motor Control Module.

40. (00101000) Bowl Dis-engage Fault

While carrying out a bowl check, the Motor Control Module has found that the bowl is not engaged even though the pressure sensor indicates that the bowl 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 bowl 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 110°C. This fault is most likely due to a short circuit in the sensor line.

Primary Source: Temperature Sensor (Thermistor).
Action:
1) Check the connection from the thermistor the Motor Control Module, especially check for a short circuit.
2) Check the resistance of the thermistor. Resistance should be 10kΩ @ 25°C or 12.5kΩ @ 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.

49. (00110001) Cold Valve or Cold Valve & Hot Valve Faulty

The Motor Control Module has measured a voltage from the valve diagnostic circuit (or both the valve and pump diagnostic circuit in AquaSmart models) that indicates that the cold valve or both the hot and cold valves are open circuit. The most likely cause is that the valve harness has not been connected correctly or the valve(s) is open circuit.

In AquaSmart models it could indicate that there is a problem with the pump or pump system. It also can be caused by a failure of the Motor Control Module pump drive while the pump is running. This will manifest as fault code 249 which can change to fault code 49 when power to the machine is removed then reapplied.
Primary Source: Wiring.
Action: Check the valve harnesses are correctly fastened to the valves and the Motor Control Module, or the pins are not bent backwards. If possible, test the harness for continuity between the valve end of the harness and the Motor Control Module end of the harness.

Secondary Source: Water Valves.
Action: Measure the resistance of the Hot and Cold valve coils.

Tertiary Source (except AquaSmart models): Motor Control Module.
Action: Replace the Motor Control Module.

Tertiary Source AquaSmart Models: Pump System.
Action: Measure the resistances of the pump stator windings from the controller end of the pump harness. The resistance between each pair of terminals should measure approximately 16.2Ω. If an open circuit is detected, the reading should then be taken directly from the pump stator, as the fault may be in the harness. Carry out any corrective action as and if required.

If the reading is correct or otherwise, follow procedures for Fault Code 249, as a problem in the pump or pump system such as a blockage or restriction may have contributed to the failure.
Note: If a fault has been found in the pump system, after correcting the fault, it is also likely that the Motor Control Module will need to be replaced.

Quaternary Source AquaSmart Models: Motor Control Module.
Action: Replace the Motor Control Module.

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 49 for service procedure.

56. (00111000) Bowl Check No Valid Fault

While carrying out a bowl check, the machine has not been able to determine a valid bowl status and so the Display flags this fault. This fault differs from fault code 40 in that a valid bowl 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 bowl, or select a higher water level. If the load was to one side of the bowl or too heavy, it can be possible for the agitator to bind in one direction when trying to sense bowl 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: 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.
Action: Replace Motor Control Module.

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

69 (01000101) Pressure Transducer Error – Zero Too Low

70 (01000110) Pressure Transducer Error – Zero Too High

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

The pressure transducer sensor is faulty or damaged.

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. Can also occur when the display is changed with the power still on.

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

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.

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

110. (01101110) Motor Bridge Thermistor Open Circuit

111. (01101111) Motor Bridge Thermistor Short Circuit

The motor bridge thermistor is faulty or damaged

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

112. (01110000) Motor Current Sense Too High

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 is faulty or damaged.

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

114 (01110010) Smart Pump Current Sense Fault

The pump current sense circuit within the motor control module is faulty.

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

136. (10001000) Motor Stall

The Motor Control Module has been unable to start the motor.

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 bowl by rotating by hand. Bearings and seals may be seized.

Tertiary Source: Motor Control Module.

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

137 (10001001) Motor loss of a Phase

The Motor Control Module has detected the loss of one of the phases of the motor. Possible causes of this fault are: Faulty motor harness, an open circuit winding of motor or faulty motor controller.

Primary Source: Wiring

Action: Measure/check the motor harness, connectors and motor for continuity. 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 39Ω.

Secondary Source: Motor.

Action: Remove Stator and measure/check the resistance of each winding which is approximately 19.5Ω.

Tertiary Source: Motor Control Module.

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

160. (10100000) Bowl Engaged In Agitate

The bowl has re-engaged itself during agitate.

Primary Source: Mechanical.

Action:
1) Check that the rotating bowl 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 bowl is not overloaded with too many clothes.
4) If none of the above appears to be at fault, then check the air bell at the bottom of the inner bowl for leaks.

Secondary Source: Installation (drain) set up

Action: Check that the drain hose is fitted into the drain caddy and extends no more than 20 mm from the end. Check if fitted to a stand pipe that the drain hose is not pushed down to far.

Tertiary 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 bowl to re-engage during agitate and the Motor Control Module to display this fault. Replace Motor Control Module.

220. (11011100) EEPROM Model Map Not Programmed

On power up, the Motor Control Module has detected a fault in its memory.

Primary Fault: Motor Control Module.

Action: Change Motor Control Module.

221 (11011101) Motor Control Module Fault

The motor control has encountered a RAM check error

Primary Fault: Motor Control Module.
Action: Change Motor Control Module.

222 (11011110) Motor Control Module Fault

The motor control has encountered a Stack error

Primary Fault: Motor Control Module.
Action: Change Motor Control Module.

223 (11011111) Motor Control Module Fault

The motor control has encountered a program counter error

Primary Fault: Motor Control Module.
Action: Change Motor Control Module.

224 (11100000) Motor Control Module Fault

The motor control has encountered a peripheral error

Primary Fault: Motor Control Module.
Action: Change Motor Control Module.

225 (11100001) Motor Control Module Fault

The motor control has encountered a clock error

Primary Fault: Motor Control Module.
Action: Change 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 in 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, the connections at the Motor Control Module and lid lock ends.

Primary Fault: Connectors on the harness at either end could be at fault.
Action: Replace Harness.
Secondary Source: Lid lock has failed to be activated.
Action: Replace Lid Lock Assembly.
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 Controller must be faulty and needs replacing.

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, this should be 63 ohms +/- 10% @ 20 °C. If faulty, replace the Lid Lock assembly.

236. (11101100) Incompatible EEPROM Version

Failed to start with fault being immediately displayed

Primary Fault: Motor Control Module is wrong one.
Action: Fit correct Motor Control Module.

237. (11101111) Temperature Sensor Error

The electronics have picked up a continuity problem, the same as fault code 10.

Primary Fault: The sensor has failed either in the harness or the 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 the connections look fine and the fault still occurs.

238. (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.

241. (11110001) Function Time Out

A fault has occurred with the Display Module.

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

The Motor Control Module has attempted a motor step test and found the motor has not stepped to the correct position.

Primary Source: Wiring.
Action: Check the continuity of the Motor Harness and that the connectors are correctly applied to the Motor and Motor Control Module.
Secondary Source: Motor.
Action: Check continuity of motor phases. Check the bridge terminal on the stator is not open circuit or burnt. Replace Stator.
Tertiary Source: Motor Control module.
Action: Replace the Motor Control Module.

245. (11110101) Smart Pump Stall

This fault is normally as a result of the pump stalling during its normal operation.

Primary Source: Pump stator winding open circuit.
Action: Check the resistance of the pump stator. Resistance per Phase: 8.1Ω +/- 10% (16.2Ω +/- 10% across any two phases).
Secondary Source: Pump System.
Action:
1. Check that the drain hose has not been kinked.
2. Check the length of the drain hose. A 1 metre extension hose of the same diameter fitted to the existing drain hose is the maximum allowable length.
3. Check that the machine is not pumping to a head that exceeds the pump's limits (2.4 meters is maximum head height).
4. Remove the inner bowl and check that the pump hood hasn't been fitted around the wrong way.
5. Check for lint streaming from the pump hood that may be blocking the cap inlet.
6. Remove the pump hood and cap. Check for lint, grit and debris.
7. Check for free movement of the flapper and that the impeller hasn't come off the rotor.
8. Check for free movement of the flapper (replace if broken).
9. Check for lint and foreign objects in the ports of the pump housing.

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

246. (11110110) Bleach Valve Fault

The Motor Controller module has detected that the Bleach valve (red clip) is faulty. It determines this by measuring voltages from the valve diagnostic circuit. The most likely cause is that the valve harness has not been connected correctly or the valve is open circuit.

Primary Source: Wiring.
Action: Check the valve harness is correctly fastened to the valve or the pins are not bent backwards.
Secondary Source: Bleach Valve.
Action: Check the valve coil is not faulty (i.e. not open circuit – See 1.8).
Tertiary Source: Motor Controller module.
Action: Replace the Motor Controller module.

247. (11110111) Smart pump Flapper Fault

The Motor Control Module has registered a drop in the water level during the recirculation phase of the wash cycle. Water is being drained instead of recycling. The most likely cause is that the flapper is stuck in the drain position.

Primary Source: Flapper valve.
Action: Check for free movement of the flapper valve (replace if broken or damaged).

248 (11111000) SmartPump Top Up Fault

More than 6 attempts have been made to top-up the water level in the bowl during recirculation.

Primary Source: Poor Flapper Seal.
Action:
1. Clean any foreign objects out of the pump, concentrating especially on the flapper and drain/re-circulating port areas.
2. Remove the flapper to ensure no foreign objects exist below and around the flapper.
3. Check the flapper damage, especially the lip seals. If damaged, replace.

Secondary Source: Cap not tight, warped, damaged (worn).
Action:
1. Check that the hood/cap is tight. If loose and screws are difficult to tighten, foreign objects could be in the screw boss. Remove pump fully and inspect/ replace if in doubt.
2. Check the cap is not warped or it is not excessively worn in the area where it contacts the flapper. Replace the cap if warped or worn.

Tertiary Source: Damaged Pump Housing Port.
Action: Check that there is no excessive wear to the pump housing port caused by foreign objects. Replace pump if necessary.

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

249. (11111001) SmartPump Timeout Fault (No change in water level)

While draining, the water level reading from the pressure sensor has not changed for 3 minutes. This fault will generally be caused by a problem with the pump system, from either a blockage or restriction in the pump system. This will also flag if the machine is By-Passing (refer to section 5.8.11).

Primary Source: Pump System.
Action:
1. Check that the drain hose has not been kinked.
2. Check the length of the drain hose. A 1-metre extension hose of the same diameter fitted to the existing drain hose is the maximum allowable length.
3. Check that the machine is not pumping to a head that exceeds the pump's limits (2.4 meters is maximum head height).
4. Remove the inner bowl and check that the pump hood hasn't been fitted around the wrong way.
5. Check for lint streaming from the pump hood that may be blocking the cap inlet.
6. Remove the pump hood and cap. Check for lint, grit and debris.
7. Check for free movement of the flapper and that the impeller hasn't come off the rotor.
8. Check for free movement of the flapper (replace if broken).
9. Check for lint and foreign objects in the ports of the pump housing.

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

250. (11111010) SmartPump Loss of Sync

This fault is normally as a result of the pump not starting and is usually caused by an object that has got into the pump, and is either under or on top of the impeller, which is causing the motor to stall when trying to start.

Primary Source: Pump stator winding open circuit.
Action: Check the resistance of the pump stator. Resistance per Phase: 8.1Ω +/- 10% (16.2Ω +/- 10% across any two phases.
Secondary Source: Pump System.
Action:
1. Check that the drain hose has not been kinked.
2. Check the length of the drain hose. A 1 metre extension hose of the same diameter fitted to the existing drain hose is the maximum allowable length.
3. Check that the machine is not pumping to a head that exceeds the pump's limits (2.4 meters is maximum head height).
4. Remove the inner bowl and check that the pump hood hasn't been fitted around the wrong way.
5. Check for lint streaming from the pump hood that may be blocking the cap inlet.
6. Remove the pump hood and cap. Check for lint, grit and debris.
7. Check for free movement of the flapper and that the impeller hasn't come off the rotor.
8. Check for free movement of the flapper (replace if broken).
9. Check for lint and foreign objects in the ports of the pump housing.

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

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

253 (11111101) Smart Pump Over Current

The motor control Module has detected that the smart pump is drawing high current.

Primary Fault: Pump stator winding short circuited
Action: Check the resistance of the pump stator at the motor controller end of the harness, resistance per Phase: 8.1Ω +/- 10% (16.2Ω +/- 10% across any two phases).
If faulty recheck the pump stator resistance at the Smart Pump. If resistance is correct replace harness assembly but if still faulty replace pump.

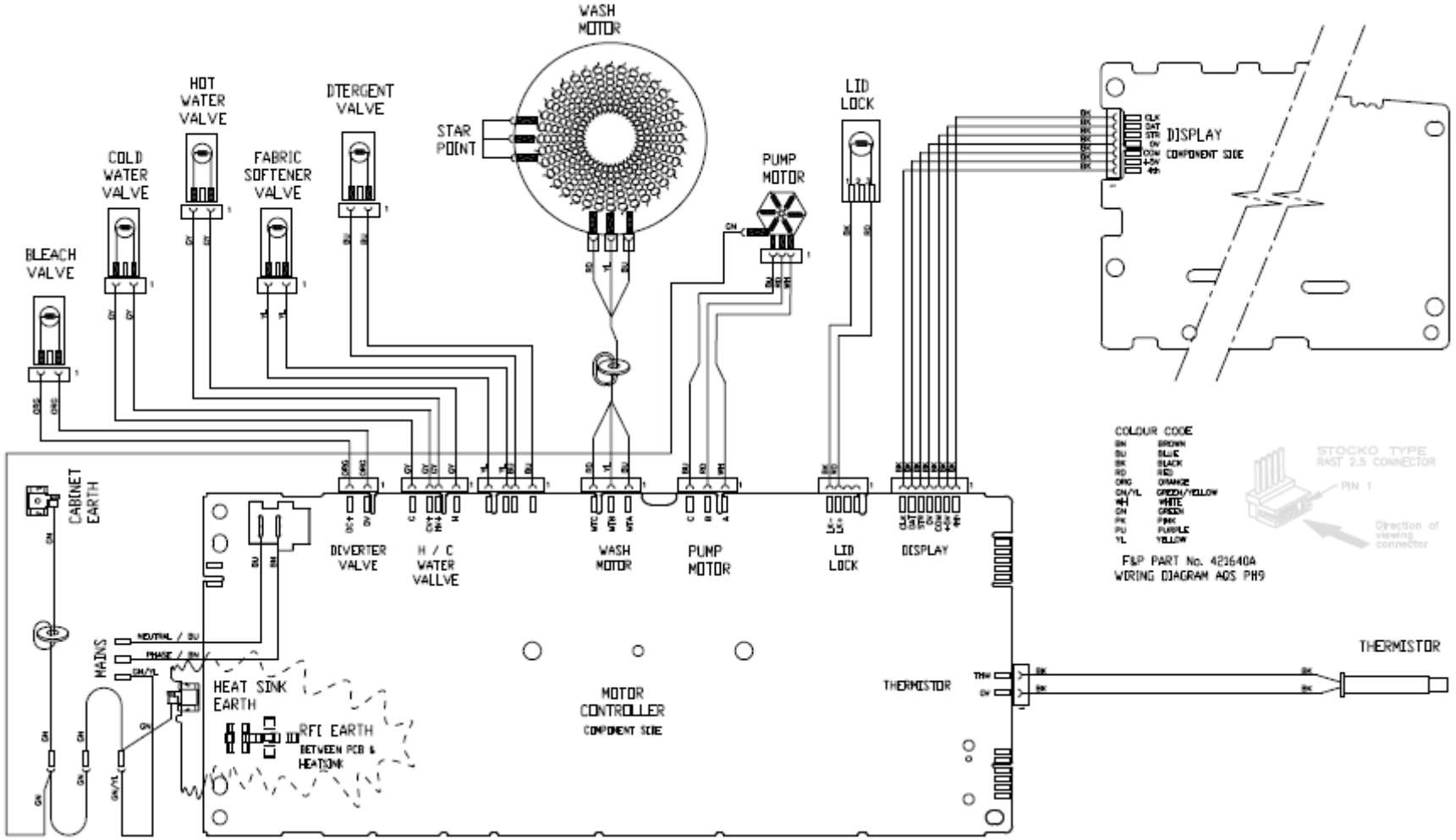
254 (11111110) Motor Control Version to Old

The Motor Control Module software version is too old for the display to support.

Primary Fault: Motor Control Module
Action: Replace Motor Control Module

9 WIRING DIAGRAM

Resistance Table	
Valves	64Ω @ 68 °F / 20°C
Pump	16.2Ω
Lid Lock	63Ω +/- 10% @ 68 °F / 20°C
Thermistor	10KΩ @ 77 °F / 25°C
Stator	39Ω +/- 10%



10 SERVICE PROCEDURES

Note: Prior to carrying out any service procedures, ensure that the machine has been isolated from the power supply.

10.1 Removal of Lid

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

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

10.2 Accessing Components in Console Area

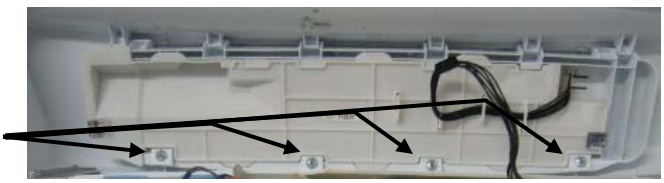
(a) Remove the lid.

(b) Remove the two screws at the rear of the console securing the console to the top deck.

(c) Tilt the console forward.

10.3 Removal of Display Module

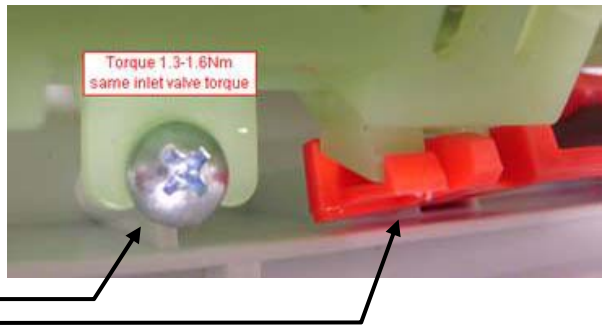
(a) Follow procedures for accessing components in console area (refer to Section 10.1 & 10.2).
(b) Disconnect the wiring harness from the motor control module.
(c) Remove the 4 screws securing the display module to the console
(d) Remove the display module from the housing by pivoting the display away from the console.



Reassembly:
Refit in the reverse manner.

10.4 Removal of motor Control Module

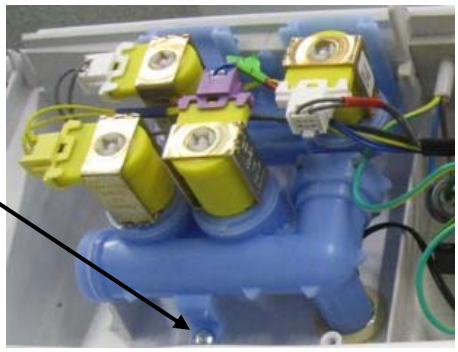
(a) Follow procedures for removal of Display Module. (Refer to Section 10.3).
(b) Disconnect all wiring harnesses to the Motor Control Module.
(c) Remove the pressure tube by squeezing on the legs of the spring clip. Pull gently on the tube to slide it off the spigot. ***Note: If too much force is used on removal or reinsertion, damage to the pressure transducer may occur.***
(d) Remove module retaining screw.
(e) Pull the tab on the top deck harness clamp towards the front to release the Motor Control Module.
(f) Lift the Motor Control Module upwards at the front and out.



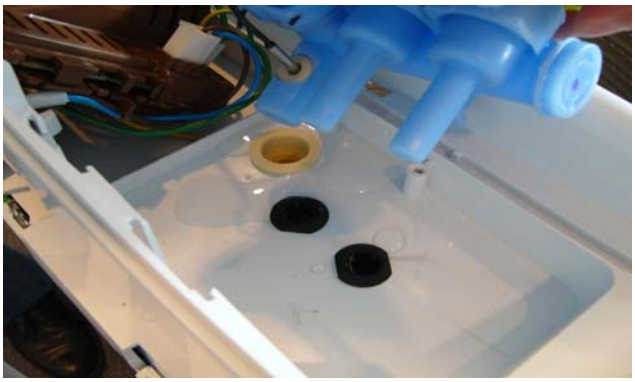
Reassembly:
Refit in reverse manner. **Important**: When refitting pressure tube to pressure transducer ensure that the pressure tube is clear of any water droplets before operating the machine on a fill cycle. If the bowl is full of water, drain the water then blow down the tube before reconnecting.

10.5 Removal of Inlet Valve Assembly

(a) Follow procedures for accessing components in console area (refer to Section 10.1).
(b) Remove screw securing the valve body to the top deck.
(c) Disconnect wiring harness from each coil.
(d) Disconnect Thermistor harness from motor control module.
(d) Depress tab from the rear of the console and slide valve assembly upwards from the top deck.



Refitting Valve Block:
(a) Ensure the area beneath the valve assembly is dry.
(b) The spigots of the valve assembly must be lubricated with a small amount of either Petroleum Jelly or silicon paste before insertion.

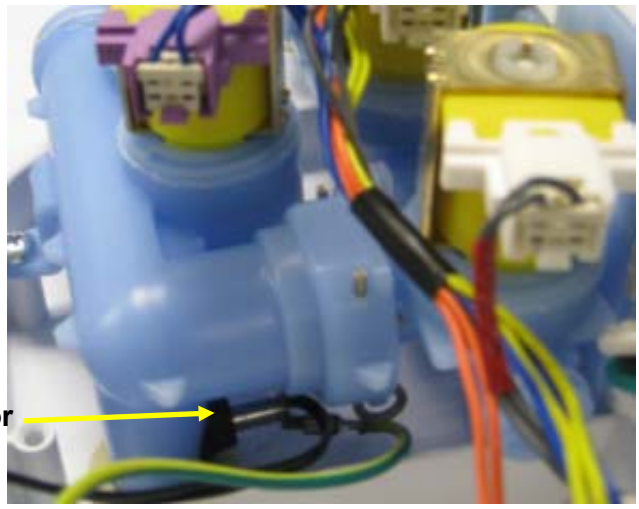


Note: The wires that are connected from the valve assembly to the motor control module must be placed between the coils, and must not sit on top. If the wires sit in close proximity to the display module they will cause interference.

10.6 Removal of Thermistor

(a) Follow procedures for removal of Display Module. (Refer to Section 10.3).
(b) Disconnect thermistor-wiring harness to the Motor Control Module.
(c) Slide body of thermistor out from the valve.

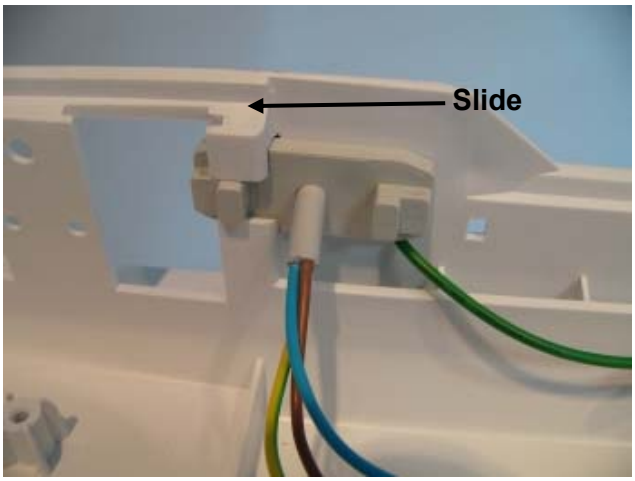
Reassembly:
Refit in reverse manner, ensuring when refitting the thermistor that the thermistor is pushed until it comes to a stop against the back wall of the elbow.



10.7 Removal of the Cord Set

(a) Follow procedures for removal of Inlet Valves Assembly. (Refer to Section 10.5).
(b) Disconnect the mains plug to the Motor Control Module.
(c) Slide the strain relief to the left and slide out.

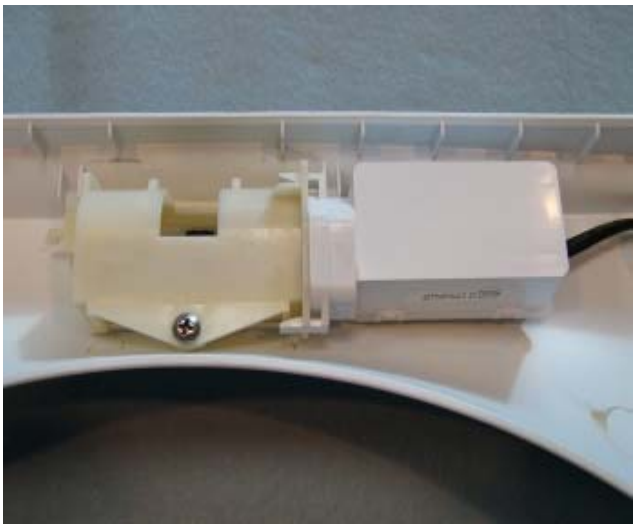
Reassembly:
Refit in reverse manner. When refitting the thermistor, ensure that the thermistor is pushed until it comes to a stop against the back wall of the elbow.



10.8 Raising the Top Deck

(a) Remove the lid.
(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) Prior to raising the top deck ensure that there is no water, softener or bleach in the dispensers.
(e) Raise the top deck.

10.9 Removal of Lid Lock



(a) Follow procedures for accessing components in console area. (Refer to Section 10.1).
(b) Disconnect lid lock wiring harness to the Motor Control Module.
(c) Remove Motor Control Module from the top deck (Refer to Section 10.4) leaving all remaining harnesses and press tube 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 upward, taking care not to damage the top deck.
(f) Remove the two screws under the buffers securing the top deck to the cabinet.
(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.

10.10 Removal of Top Deck

(a) Disconnect the mains cord from the power socket.

(b) Ensure the water taps are turned off

(c) Disconnect the water inlet hoses from the rear of the machine.

(d) Remove the lid.

(e) Follow procedures for removal of display module. (Refer to section 10.3)

(f) Follow procedures for removal of Inlet Valve Assembly. (Refer to Section 10.5)

(g) Follow procedures for removal of Motor Control Module. (Refer to section 10.4).

(h) Follow procedures for removal of Cord Set. (Refer to section 10.7)

(i) Carefully remove the two lid buffers from the front left & right side of the top deck by levering upwards, taking care not to damage the top deck.

(j) Remove the two screws under the buffers securing the top deck to the cabinet.

(k) Lift the top deck upwards and release the two rear tabs.

(l) Lift the top deck clear.

10.11 Removal of Softener Funnel

(a) Lift the lid.
(b) To remove the cap, lift it upwards.

Reassembly:
Refit in the reverse manner ensuring that the funnel is clipped fully home to ensure that the bleach dispenser functions correctly.

10.12 Removal of Detergent Cover

Note: Only remove the cover if it is essential to do so. If removed, the cover and the gasket P/No 421047 MUST be replaced.

Photo 1 Photo 2

(a) Lift the lid.
(b) To remove the cap, lift upwards (Photo1).

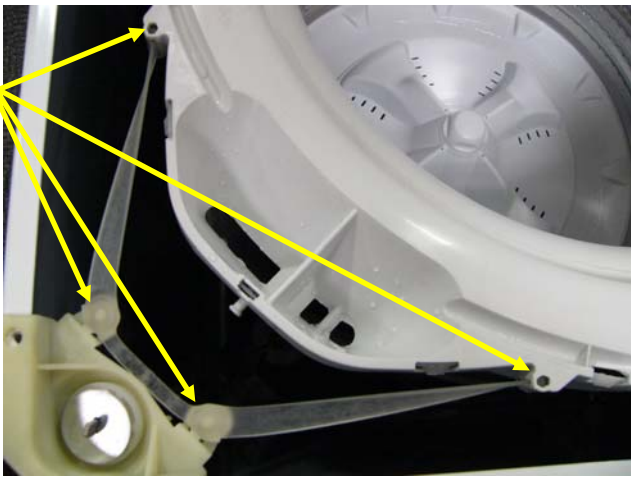
Reassembly:
Refit in reverse manner.
Note: On removal of the cover the retaining clips will be damaged. If the cover is refitted rather than being replaced, the cover will not provide an adequate seal, which may cause the water to fountain from the dispenser during fill. The gasket must also be replaced for the same reason.

10.13 Removal of Dispensing Hoses

(a) Follow procedures for removal of inlet valve assembly. (Refer to Section 10.4).
(b) Follow procedures to raise the top deck (refer to Section **Error! Reference source not found.**).
(c) Disconnect the hoses from the dispensers and remove them from the top deck retaining clips.
(d) Remove the hose(s).

Reassembly:
Refit in the reverse manner, ensuring each hose is fitted to the correct position and that they are properly clipped in place.

10.14 Removal of Straps



(a) Follow procedures for raising the top deck (refer to Section **Error! Reference source not found.**).
(b) Unclip each end of the straps from the neck ring.
(c) Unclip the strap from the suspension rod.

Reassembly:
Refit in the reverse manner, ensuring that there are no twists in the straps.

10.15 Removal of Neck Ring

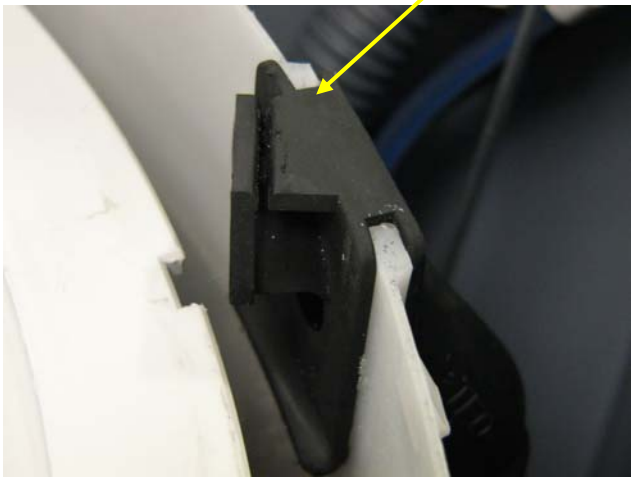
(a) Follow procedures for raising the top deck (refer to Section **Error! Reference source not found.**).
(b) Unclip the strap from the suspension rod.
(c) Unclip the neck ring from the outer bowl assembly.

Reassembly:

(a) Prior to fitting the neck ring, ensure the recirc nozzle is fitted to the outer bowl correctly.
(b) Fit the straps to the neck ring.
(c) Fit the neck ring to the outer bowl, ensuring that all the clips are engaged.
(d) Fit the straps to the suspension rods ensuring and that there are no twists in the straps.

Note: The top of the recirc nozzle must be dry before fitting the neck ring. If any water is present, a capillary action may take place which will cause water to run down the outside of the bowl and onto the floor.

The top of the nozzle must be dry before refitting the neck ring



10.16 Removal of Low Profile Agitator

Note: Removal of low profile agitator is not intended to be done by the user, as regular maintenance in this area should not be required.

(a) Lift the lid and remove the low profile agitator cap by using an appropriate flat bladed screwdriver in one side of the slots. Lever the cap upwards until it disengages. The cap can then be removed by hand.
(b) Remove the bolt by turning anti-clockwise using a 13mm open-ended spanner or an adjustable spanner.
(c) Remove the low profile agitator.

Note: If the low profile agitator does not lift off easily, hold the top balance ring of the inner bowl, and then jerk the bowl upwards. This action will push the agitator upwards.

Reassembly:

(a) Refit the agitator, ensuring that it is pushed as far down as it can go.

(b) Insert the bolt into the shaft and hand tighten until the first click has been felt, then using an open-ended or adjustable spanner, tighten a further 4 more clicks. Over tightening will cause excessive damage to the castellation on the agitator, and may cause the head of the bolt to shear off. **Failure to tighten the bolt correctly will cause the agitator to lift off the spline on the shaft during wash**.

(c) Fit the cap to the top of the bolt. Using your hand, hit firmly on top of the cap until the clips on the cap engage to the bolt.

10.17 Removal of Inner Bowl

(a) Follow procedures for removal of Straps. (Refer to Section 10.14).
(b) Follow procedures for removal of Neck Ring (Refer to Section 10.15)
(c) Follow procedures for removal of Agitator. (Refer to Section 10.16).
(d) Lift inner bowl upwards and clear of machine.

Note: If the inner bowl 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 bowl upwards.

Reassembly:
Refit in the reverse manner.

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

(a) Follow procedures for removal of Inner bowl. (Refer to Section 10.17).
(b) Remove the 3 screws securing the spline driven to the inner bowl.

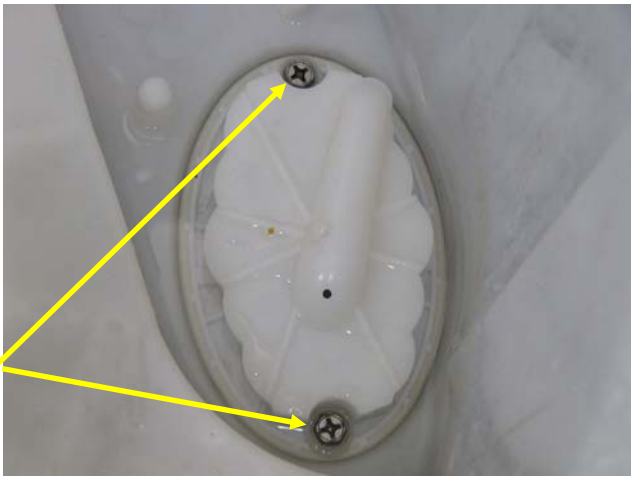
Reassembly:
Refit in the reverse manner. Ensure that the screws are tightened sufficiently with out over tightening.

10.19 Removal of Pump Hood & Cap (Impeller & Flapper Inspection)

(a) Follow procedures for removal of neck ring (refer to Section 10.15).
(b) Follow procedures for removal of low profile agitator (refer to Section 10.16).
(c) Remove the inner bowl by lifting the inner bowl upwards and clear of machine.

Note: If the inner bowl 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 bowl upwards.

(d) Remove the two bolts securing pump cap to the outer bowl.



Note: It is important that the screw bosses are kept free of grit. If the bosses have any grit, this can reduce the travel of the screw, which will lead to a poor fit of the cap, which in turn will cause bypassing (refer to Section 5.8.11). Bypassing can cause water on the floor, especially if the water dribbles from the recycle nozzle on to a spinning bowl.

Grit in the bosses introduces stress in the plastic when the screw is fitted, which can lead to the cracking of the boss, which may in turn cause leaking.

(d) The impeller and flapper area of the pump can now be inspected.

Reassembly:
Refit in reverse manner.
Note: There are features on the hood and cap that make it difficult to fit in the incorrect position. Ensure the orientation of these parts is correct before fitting.

10.20 Removal of Stator (SmartPump™) – Testing / Inspection Purposes Only

Note: The stator is not available as a separate spare part; use this procedure for inspecting and testing the stator only.

(a) Tilt the rear of the machine carefully against the wall ensuring that the machine is stable and locked in position; take necessary precautions not to damage the wall or the machine.
(b) Disconnect earth by sliding connector apart.
(c) Remove the three screws holding the Stator assembly to the Housing Pump.
(d) Lower the stator assembly.
(d) Unclip the wiring harness cover by releasing the two tabs from the topside of the stator shield and unplug the harness from the stator.

(e) The stator can now be electrically tested. If a fault is shown and the stator needs to be visually inspected, the shield cap can be removed.

Reassembly:
Refit in reverse manner.
Note: Alignment arrows are moulded into the stator shield and the rotor housing to aid in the refitting process.

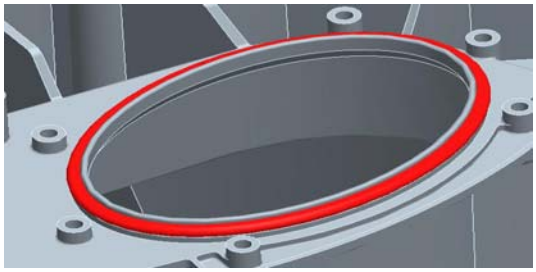
10.21 Removal of Pump Housing

(a) If the bowl is full of water, drain or bail as much of the water as possible from the machine prior to continuing. To assist with bailing the water, the inner bowl can be removed.
(b) Tilt the rear of the machine carefully against the wall ensuring that the machine is stable and locked in position; take necessary precautions not to damage the wall or the machine.
(c) Remove the hose clamps from the Drain & Recirculation Hoses. Carefully remove the two hoses while holding a container under the hose to catch the remaining water trapped in the hoses and pump.
(d) Undo the two screws holding the pump to the outer bowl. The pump can now be removed from the bowl by pulling down on the two port tubes.

Reassembly:

(a) Fit the Housing Pump O-ring to the Outer Bowl. When replacing or refitting the pump housing, a new O-ring must be fitted.

(c) Refit the Pump Housing.

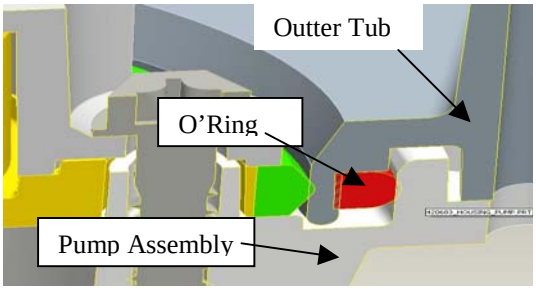


Note: This should be done with the Pump Cap & Hood in place, but it is not essential.

(c) Press the pump to its home position as much as possible by hand, and then use the bolts to evenly torque the pump down.

(d) Tighten the pump bolts to a torque of 2Nm.

Note: If the bolts happen to strip when refitting the pump housing, refer to the Pump Housing – Stripped Pump Housing Procedure (refer to Section 11.1).



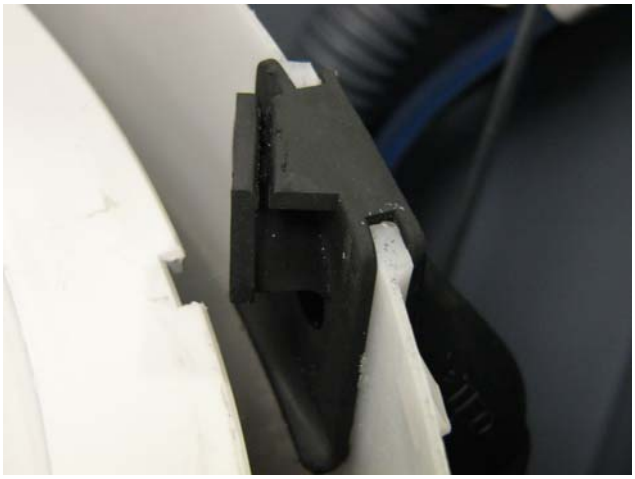
10.22 Removal of Recirculation Hose

(a) If the bowl is full of water drain or bail as much of the water as possible from the machine prior to continuing. To assist with bailing the water, the inner bowl can be removed.

(b) Follow procedures for removal of neck ring (refer to Section 10.15).

(c) Lift the recirculation hose upwards and out of its position on the outer bowl.

(d) 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.

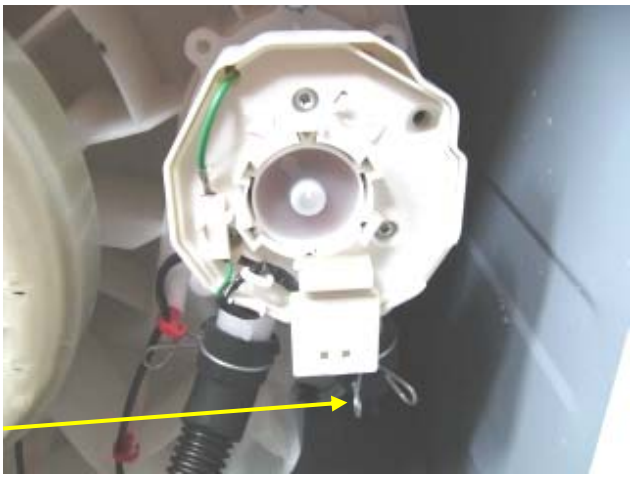


(e) Depress the two ends of the clip and slide the clip away from the pump housing.

(f) The hose can now be removed.

Reassembly:

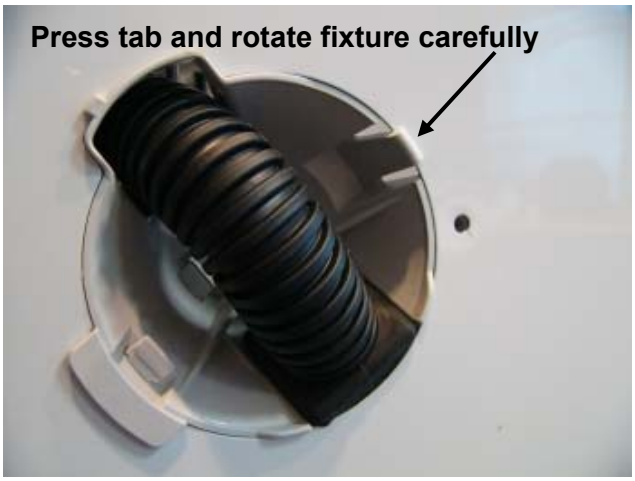
Refit in the reverse manner, ensuring the recirc hose clip faces away from the cabinet.



Clip must face away from cabinet

10.23 Removal of outer bowl from the Cabinet

(a) Follow procedures for removal of the Top Deck. (Refer to Section.10.10).
(b) Follow procedures for removal of Inner bowl. (Refer to Section 10.17).
(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 harness assembly, and 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 bowl 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.

10.24 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 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.

10.25 Removal of Stator

(a) Follow procedures for removal of Rotor. (Refer to Section 10.24).
(b) Unscrew the four bolts securing the Stator to the outer bowl.
(c) Lift Stator off the base of the outer bowl 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 bowl. Ensure that the correct colour wire is fitted to the correct terminal. The Stator is marked RBY (Red, Blue and Yellow).
(b) Ensure that that the stator clamp plates are flat and that there is a small amount of grease on the Stator side of the 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.

11 SPECIALISED SERVICE PROCEDURES

11.1 Pump Housing - Stripped Bolt Procedure

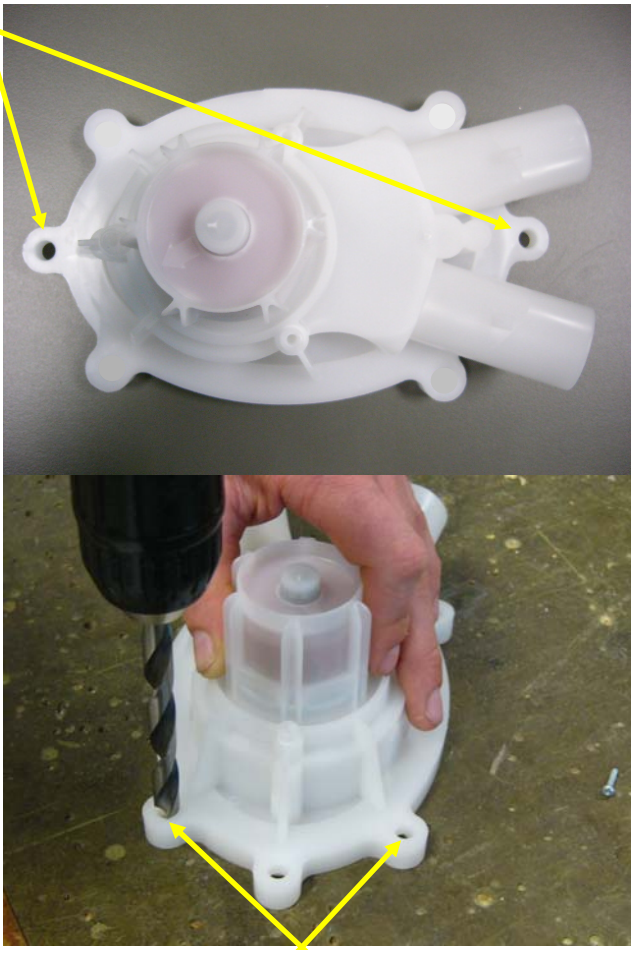
On the pump housing there are two bolt holes positions. These positions are used when the housing is assembled to the base of the outer bowl in the factory.

On servicing, should either or both bolts strip in the outer bowl, the other 'blanked off' holes can be used.

It is important to drill the two holes either side of the centre holes, otherwise the pump housing will not completely seal to the outer bowl.

(a) Follow procedures for removal of pump housing (refer to Section 10.21).
(b) Place the pump housing upside down on a block of timber or other such suitable surface. Using a sharp 7mm drill bit, drill both of the blanked off holes either side of the centre hole.
(c) Place the pump housing on the outer bowl. Using the two new positions, screw the pump housing to the outer bowl. Ensure the bolts are tightened to 2Nm.

Note: It is essential that if using the alternate screw hole positions, that two bolts are used, otherwise the pump housing will not seat correctly and a leak will develop.



Drill hole in the two outer positions

11.2 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, e.g. from hepatitis etc, then bail the water from the machine first. To assist in removing water from the machine, remove the inner bowl.

After removing the low profile agitator, the inner bowl, the pump hood and the cap, the impeller and flapper can easily be accessed for servicing. Use this procedure to clear any foreign objects from the machine.
Note: The impeller is not a field replaceable item, and if it is damaged, the entire pump assembly must be replaced.

(a) Follow procedures for removal of pump hood & cap (refer to Section 10.19).
(b) Spin the impeller by hand (it should be free to turn in both directions). If there is any resistance, try and locate the object. If the object can be located, remove and recheck for free movement of the impeller. Also ensure that the ports, flapper, chamber and SLR feature (refer to Section 5.8.7) are clean and free of lint or other obstructions

Note: If there appears to be a foreign object trapped under the impeller and it cannot be freed by using the above procedure, it may be possible to clean out under the impeller area by holding it under running water while spinning the impeller. To do this the pump housing must be removed from the machine. If this fails to clear the obstruction, then the pump will have to be replaced. To remove the pump housing, (refer to Section 10.21.)

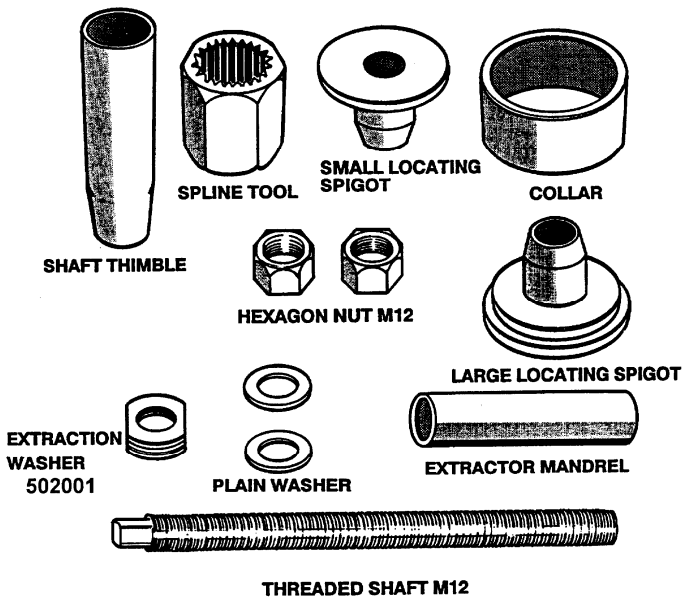
(c) Refit the pump hood and cap ensuring the correct orientation.
(d) If water is in the machine, enter diagnostic mode and run the pump (refer to Section 7.1.2) to drain the remaining water from the machine.
(e) After the water has drained, check for any other objects in the bowl.

On completion of service we recommend carrying out the SmartPump™ test routine (refer to Section 5.8.10).

11.3 Shaft & Bearing Replacement

Procedures described in this section as well as section 11.4 can only be carried out by using the Bearing Removal Tool Kit, part number 502009.

The contents of the kit are as follows:



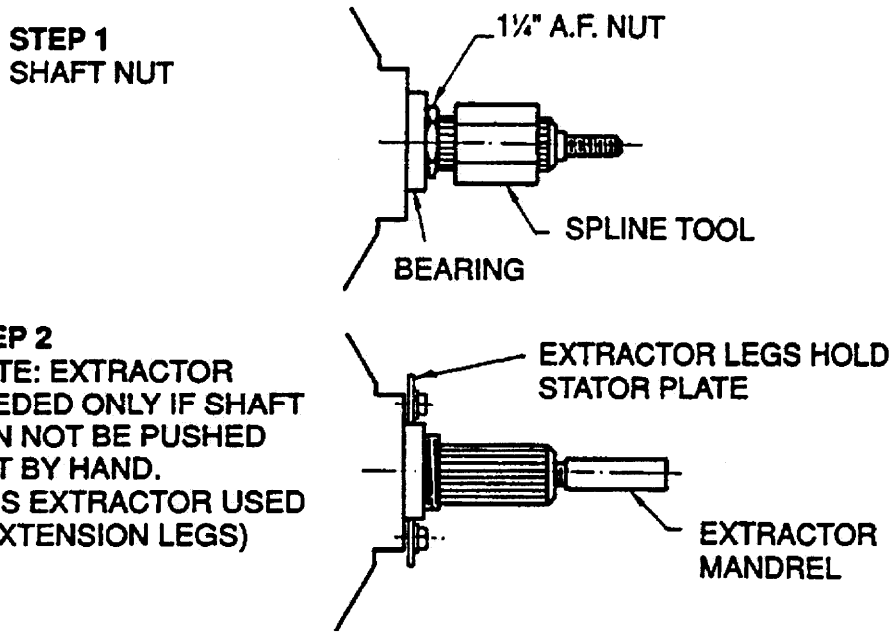
Bearing Removal Tool Kit
502009

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 Bowl from Cabinet. (Refer to Section 10.23).
(b) Lay the outer bowl 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 bowl. 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 bowl 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



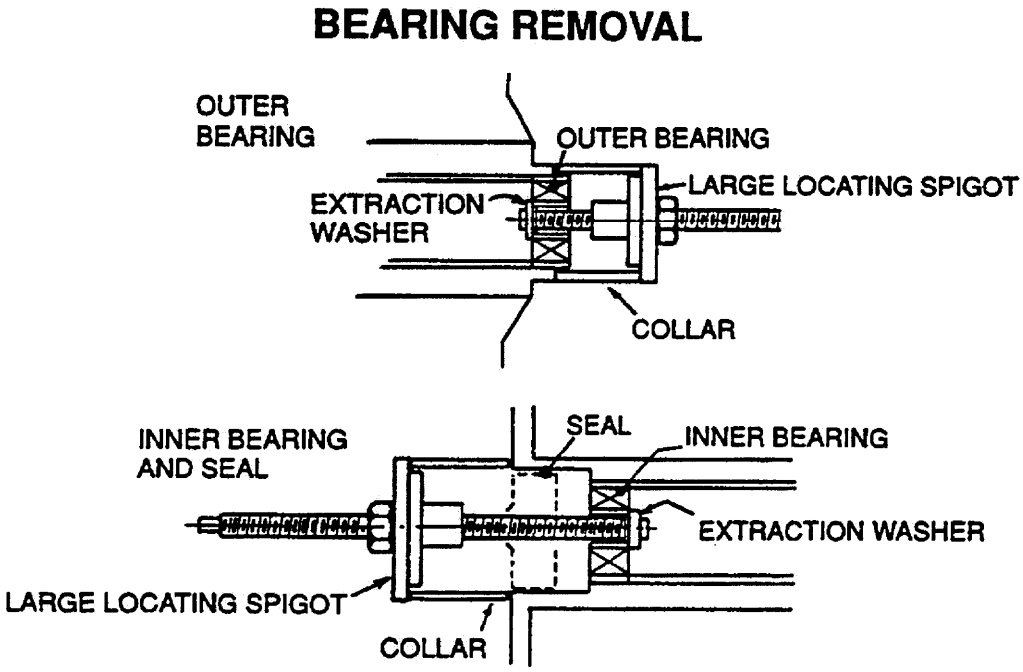
WARNING: Make sure the Stator clamp plate is flat before reusing. If in doubt, replace.

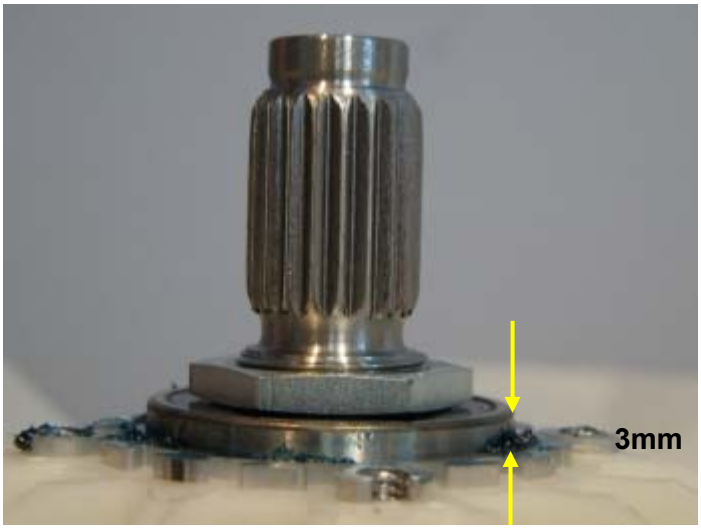
(c) Remove the outer bearing using the bearing removal tool.

WARNING: Do not remove the bearings with a hammer and drift as serious damage to the bearing housing or outer bowl 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 bowl. 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 3mm.

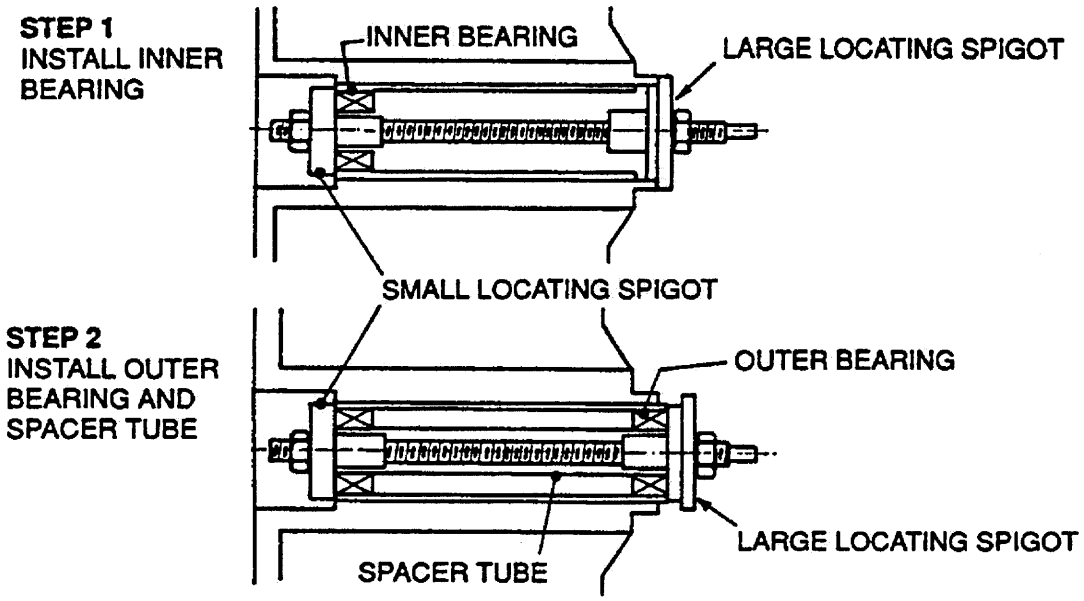
11.4 Shaft & Bearing Assembly

(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 aluminium 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 Bowl. 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 bowl. 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 bowl.

12 SOLVING WASH PROBLEMS

Listed below are possible causes and solutions to some common wash problems.

Creasing:
- Was the washer or dryer overloaded?
- Selecting the Easy Iron cycle will minimise creasing.
- Try not to leave wet clothes in washing machine or laundry bowl.

Linting:
- Was the washer overloaded?
- Wash lint-givers (e.g. towels, flannel sheets) separately from lint collectors (e.g. synthetics).
- Have you used enough detergent to hold lint in suspension?
- Over-drying in dryer can cause a build-up of static electricity causing items to collect lint.
- Try using a Conventional cycle.

Poor soil removal:
- Did you use enough detergent for load size or amount of soil? (Note: Hard water requires more detergent than normal or soft water situations).
- Are you using a good quality detergent?
- Is the washing machine overloaded?
- Separate heavily and lightly soiled garments.
- Use a wash temperature appropriate to soil type e.g. blood and mud are better washed in cold water, while oily soils are better in warmer water.

Residue detergent
- Is the washing machine overloaded?
- Using too much detergent for the size of the load.
- Is your cold water less than 20°C? – Select CONTROLLED COLD temperature option (rather than cold directly from the faucet).

Dye transfer:
- Remember to separate colors and whites.
- Wash non-colorfast items separately and select Colors cycle.
- Remember to remove items from washer as soon as the wash is finished.

Tangling:
- Separate larger items from smaller items.
- Use the Easy Iron cycle to wash shirts.
- Wash sheets using the Sheets cycle.
- Try washing smaller load sizes.

Black or grey marks on clothes:
- A build-up caused by detergent can flake off and mark clothes. Remove clothes and put through a “Clean Me” cycle.
- Are you using enough detergent for the amount of dirt?

13 NOTES