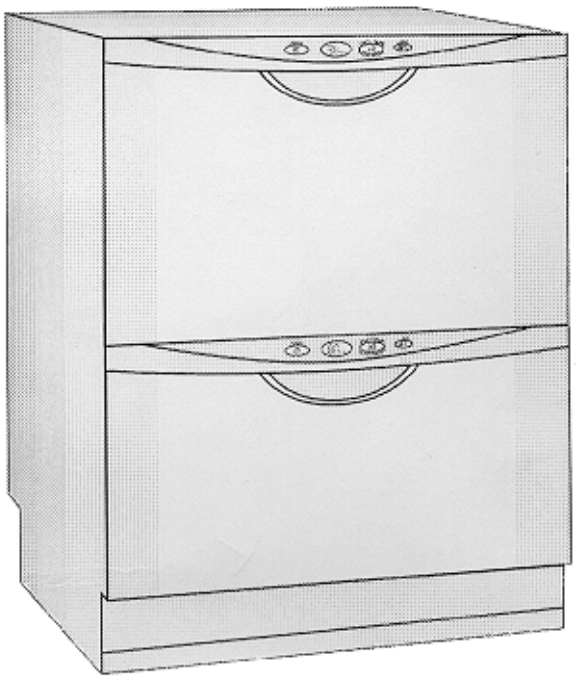
Fisher&Paykel
appliances
Service Diagnostics

DISHDRAWER®

MODELS

DD601 DS601 DD601V2 DS601V2



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Reprinted July 2003

DIMENSIONS & SPECIFICATIONS

PRODUCT SIZE (MM)

Height	817-877mm
Width	595mm
Depth	570mm
Drawer Open (incl cab)	1080mm

SPECIFICATIONS

Electrical	230-240V AC 50Hz 10amp max.
Lid Seal	30-40 Kpa
Exhaust Valve	12 Volt AC 70 ± 5 Ohms
Lid Seal Air Pump	5 Volt AC 16 ± 2 Ohms
Water Inlet Valves	24Volt DC 70 ± 5 Ohms 5 Lt/min
Flood Switch	24Volt DC Double Pole
EMI Filter	240Volt AC
Motor	40 Volt DC 3 Phase
Drain	4200 RPM
Wash	2300 – 2850 RPM
Stator	2.5 ± 0.2 Ohms per winding
Temperature Sensor (Part of Heater Plate)	962 Ohms @ 20°C 1000 Ohms@ 30°C 1202 Ohms @ 60°C

Inlet Hose	1.7m 960Kpa
Drain Hose	2.0m from rear of cabinet 2.5m bottom tub 2.9m top tub
Detergent Dispenser	24 volt DC 70 ± 5 Ohms
Rinse Aid Dispenser	24 Volt DC 70 ± 5 Ohms
Electronic P.C.B. Outputs: -	230-240 Volt Input 230 Volt DC 40 Volt DC 24 Volt DC
Heater Plate	240 Volt AC 55 ± 5 Ohms

DIAGNOSTICS

SETUP & DIAGNOSTICS

The DishDrawer comes with comprehensive fault codes and built in diagnostics to save the user & service person time and worry if the dishwasher ever exhibits a fault.

FAULT MODES

The faults are displayed in the LCD as one of 8 F (fatal) faults or one of 3 U (user) faults. A Fatal fault will usually require the assistance of a qualified service person, while many User a faults are simply blockages or installation errors easily fixed by the user. In the Integrated models, an LCD is not available and the fault number is indicated on the touch switch panel with Red LEDs. The indication below for the Touch Switch Panel is from left to right, with '_' meaning the LED is Off, and '#' meaning the LED is On. A fatal fault is accompanied by a continuous pulsating beep, while a user fault is accompanied by a more pleasant continuous pulsating tone pattern. The last two faults are logged into EE memory, with 8 bytes of information logged to aid location of the fault. These bytes are available for interrogation by a PC if required. The fault codes shown on Pages 8 and 9 have been implemented in the DishDrawer.

To clear any fault, press the **POWER** button. It the fault is still present then it cannot be cleared.

DIAGNOSTIC MODES

Temperature Display Mode

During a wash cycle, the current water temperature can be displayed on the LCD instead of the time remaining. To enter temperature display mode, start a wash cycle as normal. Initiate a keylock by pushing and holding the **KEYLOCK** button for 4 seconds.

Once in keylock mode, push and hold **START/PAUSE** for 8 seconds to enter temperature display mode. The temperature is now displayed and the MIN symbol is switched off. Keylock mode can now be exited.

To cancel temperature display mode, either repeat the above procedure or enter power off mode by pressing **POWER**. Temperature display mode is automatically cancelled at the end of a wash program (even in CC mode).

Rinse Aid / Tub-Open Beep/Water Pressure Setup Mode

To enter this setup mode, hold the **PROGRAMME** and **ECO** touch switches simultaneously for 5 seconds. Once the setup mode is entered, a beep is emitted and the LCD is red with "HP" displayed.

Push **POWER** at any time to exit this setup mode.

Rinse Aid Setup

The current rinse aid setting is shown using orange LEDs on the touch switch panel. The amount of rinse aid dispensed into a rinse cycle can be varied to suit the level of hardness of the local water supply. It is adjusted for 1 to 5 dispenser levels.
(1 = approx 1ml of rinse aid , 5 = approx. 5mls of rinse aid.)

Push **PROGRAMME** to advance the rinse aid setting. Once the desired setting is achieved, push **POWER** to exit. The rinse aid index is stored in EE memory, so even with the power removed, the rinse aid level is retained.

Tub-Open Beep Setup

The beep sequence that occurs when the tub is opened can be turned on or off using the **KEYLOCK** button. If the Smily Face on the LCD is on, then the beep sequence will occur when the tub is opened. If the Smiley face is off, then no beeps will occur when the tub is opened. Push **POWER** to exit when the desired setting has been selected.

The Integrated Model will sound a single beep when turning this option off, while the actual beep sequence is sounded when turning this option on. The DishDrawer will default to "beeps on" if the mains power is removed.

Water Pressure Set Up (DD601V2 Only)

The DishDrawer can be set to either High (Standard) or Low inlet water pressure. The LCD displays the current water pressure setting.
If "HP" is displayed, then the setting is High Pressure.

If “LP” is displayed, then the setting is Low Pressure. Low pressure is generally less than 50 kPa or equivalent to that supplied by a ceiling tank.

Push the **START/PAUSE** button to alternate between HP and LP.

On integrated models, a high beep is sounded when changing the HP, and a low beep is sounded when changing to LP. Push **POWER** to exit when the desired setting has been selected.

Dishwasher Diagnostics

Dishwasher Diagnostics can **only** be entered in Power Off mode, ie. when there is no display on the LCD or the badge LCDs are off. Diagnostics is entered by holding the **KEYLOCK** and **START/PAUSE** buttons simultaneously for 6 seconds. Ensure that **KEYLOCK** is pushed first to prevent the dishwasher from starting a wash, from a **START/PAUSE** keypress.

There are currently four levels of diagnostics. To move to next level push **POWER**. Once a mode has been entered, pushing **POWER** will exit diagnostics completely (except Display & Show Off modes). If no mode is entered, then the display will cycle through the four levels and exit after the last. On entering diagnostic mode, the first level is Download Mode.

Display / Download Mode

In this mode all LEDs (except Rinse program) and LCD segments (except keylock) are illuminated.

Optical LED Download / Fault Display

An optical data download is available here to download all EE data to a PC via the Rinse Program Red LED. Hold the reader pen over the Rinse Program LED and press **START/PAUSE** to initiate the download. A short beep indicates the start and finish of download.

The last two faults are displayed on the LCD during the optical download, with the Current Fault code displayed first followed by the Previous Fault Code.

Clearing Fault Logs

To clear the Current Fault, press the **KEYLOCK** button until a beep is sounded. This action moves the Current Fault into the Previous Fault while clearing the Current Fault. To Clear the Previous Fault, press **KEYLOCK** once more until the beep is sounded. **Warning:** Once a fault has been cleared, it is permanently removed from memory and cannot be recovered.

Press **POWER** to advance to the next mode.

Show Off Mode

This mode initiates a shop show off display and operation demonstration.
The LCD display is Red backlit and "Ad" is displayed. The touch switch LED's are - Grn Grn __ Grn Grn.

Press **POWER** to skip show off mode and move onto the next mode.
Press **START/PAUSE** to initiate show off mode:
A short series of tones indicates that Show Off mode has been entered. The Show Off display cycles through every LED, & LCD segment. If any front panel key is pressed the dishwasher will re-initiate a series of short tones. Once Show Off mode has been initiated, the mains power must be removed to exit out of Show Off mode.

Hardware Output Diagnostic Test Mode

This mode tests all the hardware outputs and inputs. The LCD display is Red backlit and "HO" is displayed.

Press **POWER** to skip hardware diagnostics and advance to the next mode.
Press **START/PAUSE** to enter hardware diagnostics.

Once hardware diagnostics has been entered, the current hardware output being tested is indicated in green on the touch switch panel using binary encoding, and also on the LCD as shown below.

Any combination of outputs can be switched on or off. Load sensing is enabled when the motor is running.

Press **START/PAUSE** to advance to next hardware output.
Press **KEYLOCK** to turn the currently displayed output on or off. If the currently displayed output has a green backlight, then that output has been switched on, and if the backlight is red, then that output is off.

Press **POWER** to exit at any time (All outputs will be switched off on exit).

The LCD display and touch switch panel green LED's are illuminated to correspond to a particular hardware device. The following table details the display order of the test.

	LED				
LCD	**Heavy**	**Norm**	**Fast**	**Deli**	**Hardware Output**
EU	Off	Off	Off	***On***	Exhaust Valve
FU	Off	Off	***On***	Off	Fill Water Valve
dd	Off	Off	***On***	***On***	Detergent Diverter Valve
LS	Off	***On***	Off	Off	Lid Seal Pump
rd	Off	***On***	Off	***On***	Rinse Aid Dispenser (dispenser's current setting)
P1	Off	***On***	***On***	Off	Motor Wash direction (2300-2850 rpm)
P2	Off	***On***	***On***	***On***	Motor Drain direction (4200 rpm)
dF	***On***	Off	Off	Off	DC drying fan (On 100% duty)
Er	***On***	Off	Off	***On***	Element Relay
'temp'	***On***	Off	***On***	Off	Displays current water temperature.

WARNING : As there is no protection in this mode it is possible to turn the element on with no water in the tub. It is advisable to avoid turning on the element without water in the tub.
NB : No Fault codes will come up while in diagnostics mode.

Tub Open Microswitch Test: At any time during HO test mode the Rinse red LED indicates the tub position. On = Open, Off = Closed.
Note : There maybe a short delay (up to 0.5sec) from when the tub has changed state to the position that is indicated on the LED. This is due the communication delays between the two micro-controllers.

Continuous Cycle Life Test Mode

In this mode the dishwasher can be run continuously in any wash cycle.
Once the cycle has finished, the dishwasher automatically restarts the same wash cycle.
The LCD is Red backlit and displays “CC”. The touchswitch panel is - Red Red __ Red Red.
To exit diagnostic mode push **POWER**.

To initiate a continuous cycle, press **START/PAUSE**. The dishwasher will enter standby mode. Choose the required cycle and operate the dishwasher as normal. Continuous cycling can be cancelled at any time by pushing the **POWER** button or removing the mains power. Continuous cycling is indicated by the backlight alternating between green and orange.

In continuous cycle, a delay occurs when a cycle has finished before the next cycle starts. This delay is currently 1 minute. During this time the LCD displays a finish cycle display, and the backlight alternates between RED and OFF.

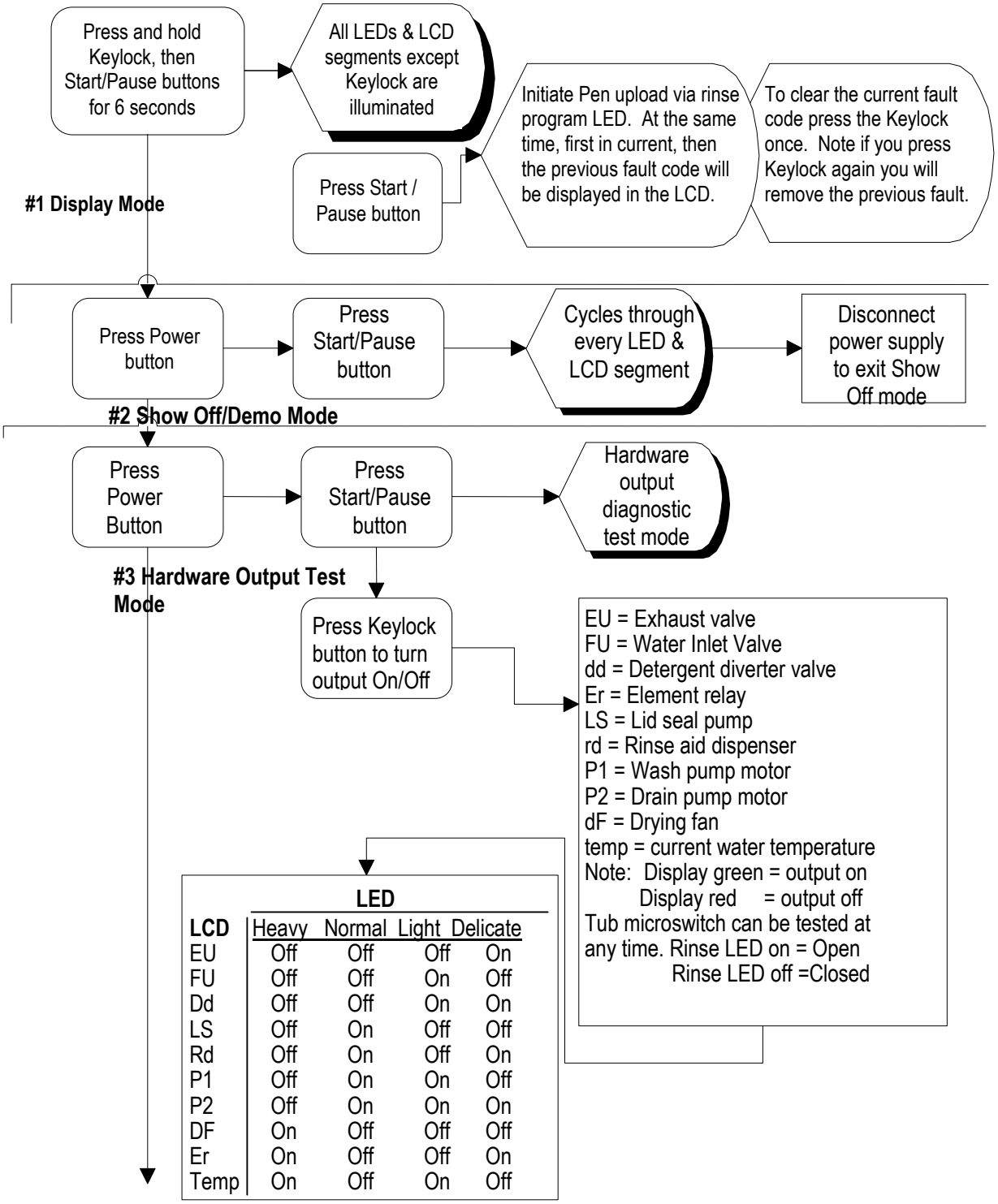
Cycle Count Retrieval

To display the cycle count of the controller on the LCD screen, pause the dishwasher while running a Continuous Cycle. The two bytes of the cycle count will be displayed alternately, in syncronisation with the changing backlight.
The Low byte is displayed when the backlight is Green.
The High byte is displayed when the backlight is Orange.
To calculate the total dishwasher controller cycle count, use the formula below.

Cycle_Count = ((200 x High_byte) + Low_byte).

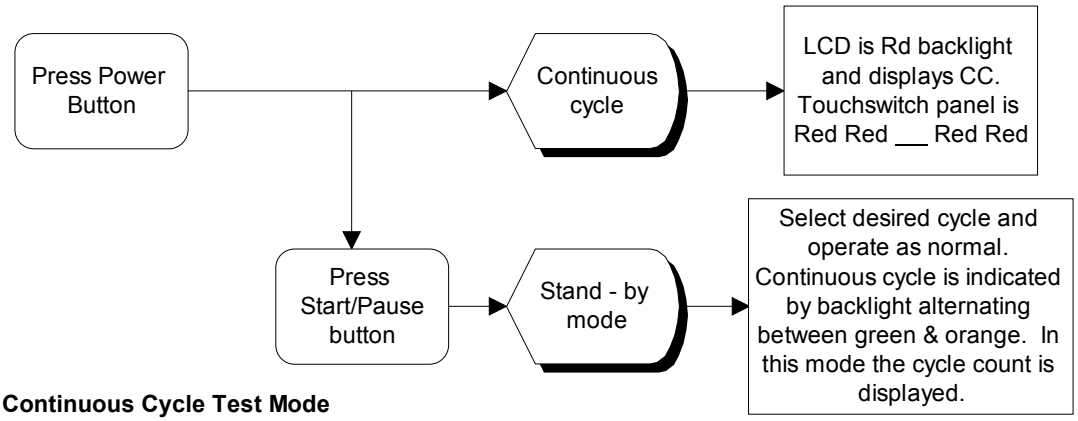
Eg. Low_byte = 156
High_byte = 21
Cycle_count = ((200 x 21) + 156) = 4,356.

DIAGNOSTICS QUICK REFERENCE FLOW CHART



	LED			
LCD	Heavy	Normal	Light	Delicate
EU	Off	Off	Off	On
FU	Off	Off	On	Off
Dd	Off	Off	On	On
LS	Off	On	Off	Off
Rd	Off	On	Off	On
P1	Off	On	On	Off
P2	Off	On	On	On
DF	On	Off	Off	Off
Er	On	Off	Off	On
Temp	On	Off	On	Off

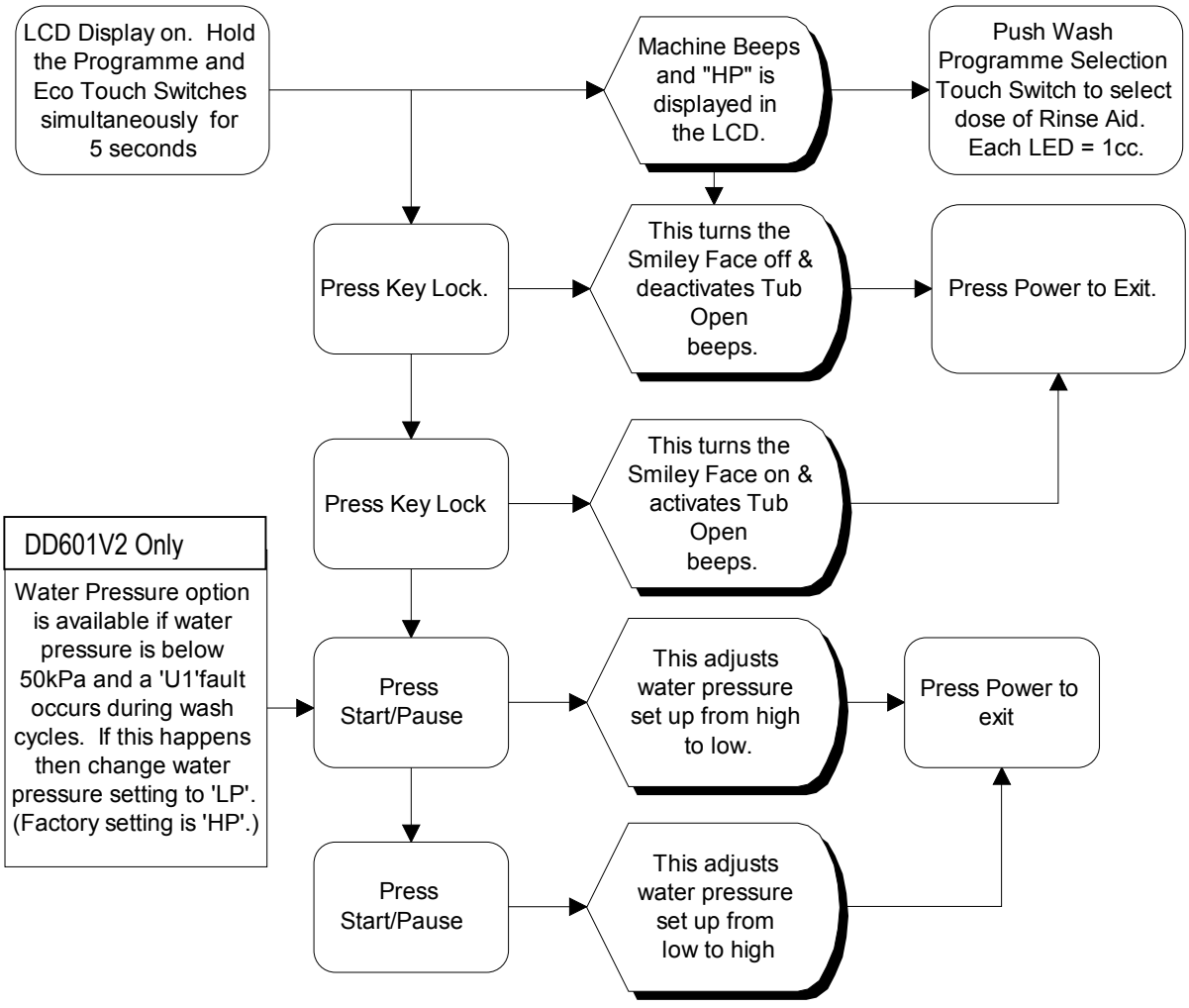
See Next Page



#4 Continuous Cycle Test Mode

Once a mode has been entered, press Power to exit diagnostics except Display and Show Off modes) which require the plug to be removed from the power socket.

Rinse Aid Adjustments/Tub Open Beep/Water Pressure Setup

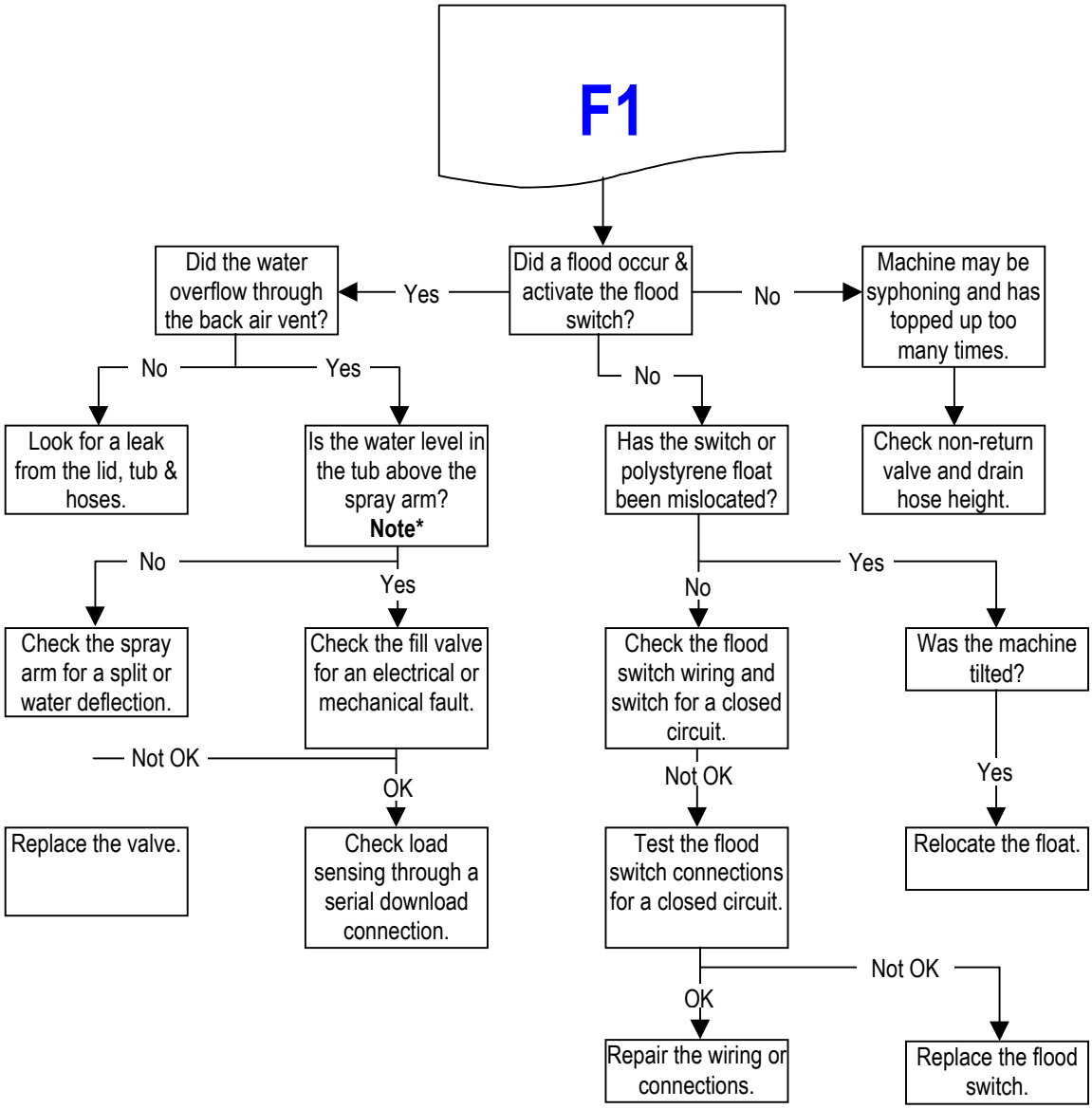


FAULT CODES

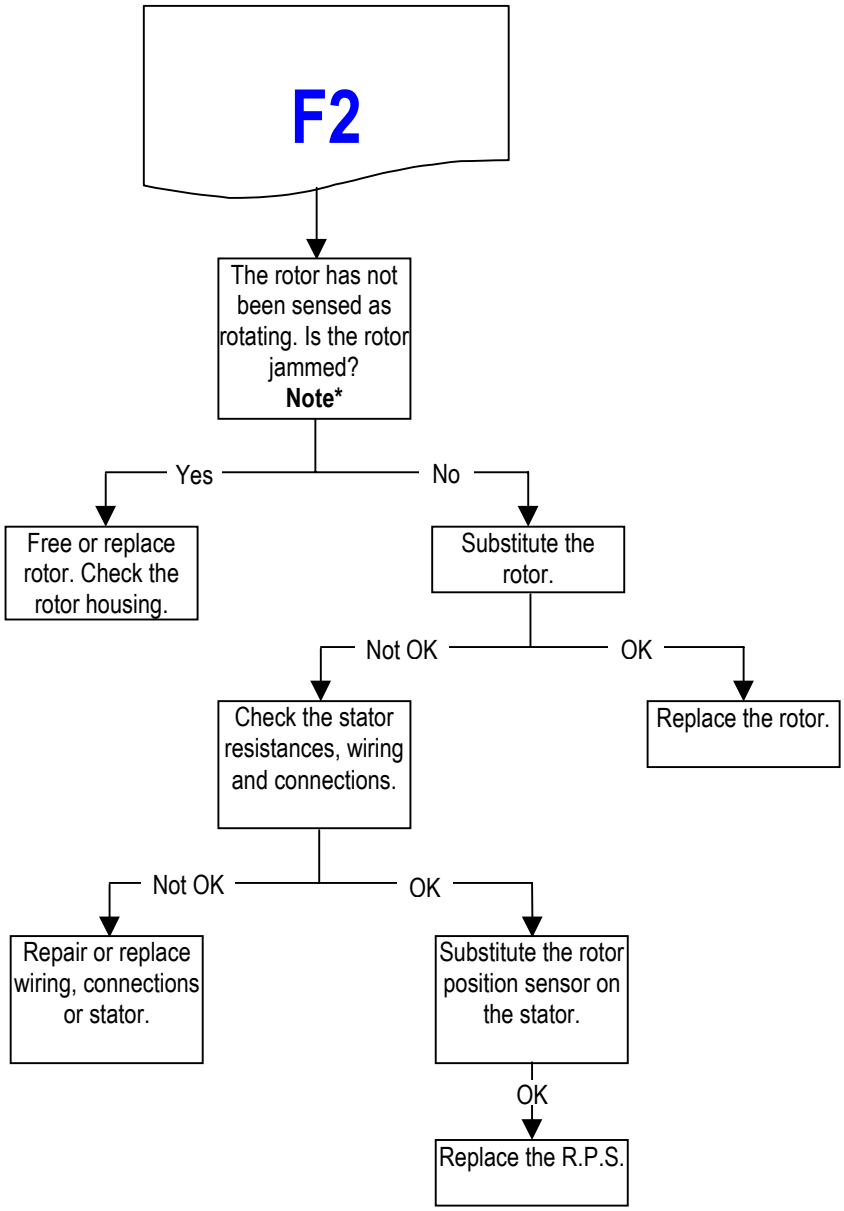
Fault Code	LED Display	Fault	Possible Causes
F1	----#	The flood switch has been activated.	• A leak has occurred in the base of the dishwasher. • The fill valve has failed open. • The flood switch is faulty. • Excessive water has been added to a wash sub cycle, indicating leaking seal or siphoning.
F2	---#-	The motor is not rotating.	• Foreign matter has jammed the motor. • The motor drive electronics or power supply have failed. • The rotor is faulty or missing. • The hall sensor is faulty or missing.
F3	---##	The water temperature is greater than 80°C.	• The element has failed on. • The temperature sensor has failed. • The electronics ADC has failed. • The incoming water temperature is greater than 80°C.
F4	--#--	No temperature increase has been recorded when the element is on.	• The element is not connected. • The element has gone open circuit. • Temperature sensor or electronics ADC has failed.

F6	--##-	Communications Baud rate error.	• The motor control micro has communications set at an incorrect baud rate. • Communication echo bytes are consistently incorrect (perhaps due to noise). • External master device has incorrect baud rate.
F7	--###	Communications Time-Out error.	• The motor control micro has crashed and is not responding to communications requests. • The hardware communications link from console to motor micro has broken. • An external device is holding the communications line low.
F8	-#---	RAM fault.	• The electronic controller has RAM fault.
U1	#---#	Fill fault. The motor has not primed after a given time.	• The water supply is not turned on. • The machine is siphoning. • The sprayarm is not in place. • Excessive foaming. • The fill valve has failed closed. • The machine is set to 'HP' on a low pressure water supply.
U2	#--#-	Tub open fault.	• The drawer has been forced open during a wash cycle. • The drawer microswitch has failed. • The exhaust valve has failed open circuit.

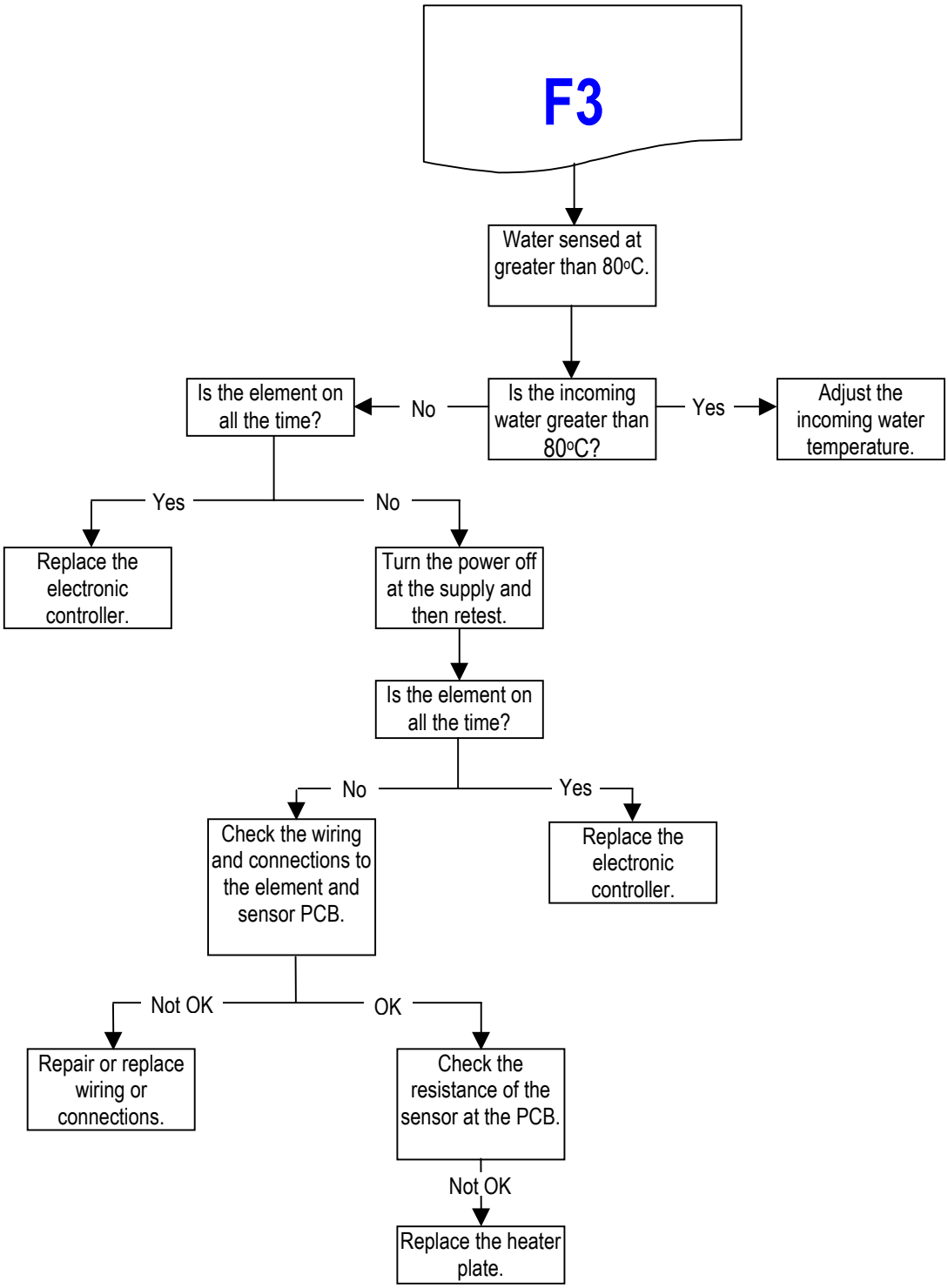
U3	#--##	Time to fill was too short, indicating water was still in the tub.	• Drain pump is blocked. • Drain hose is blocked. • Sprayarm or rotor not turning freely. • Motor electronics have failed. • Machine set to 'LP' on a high pressure water supply.

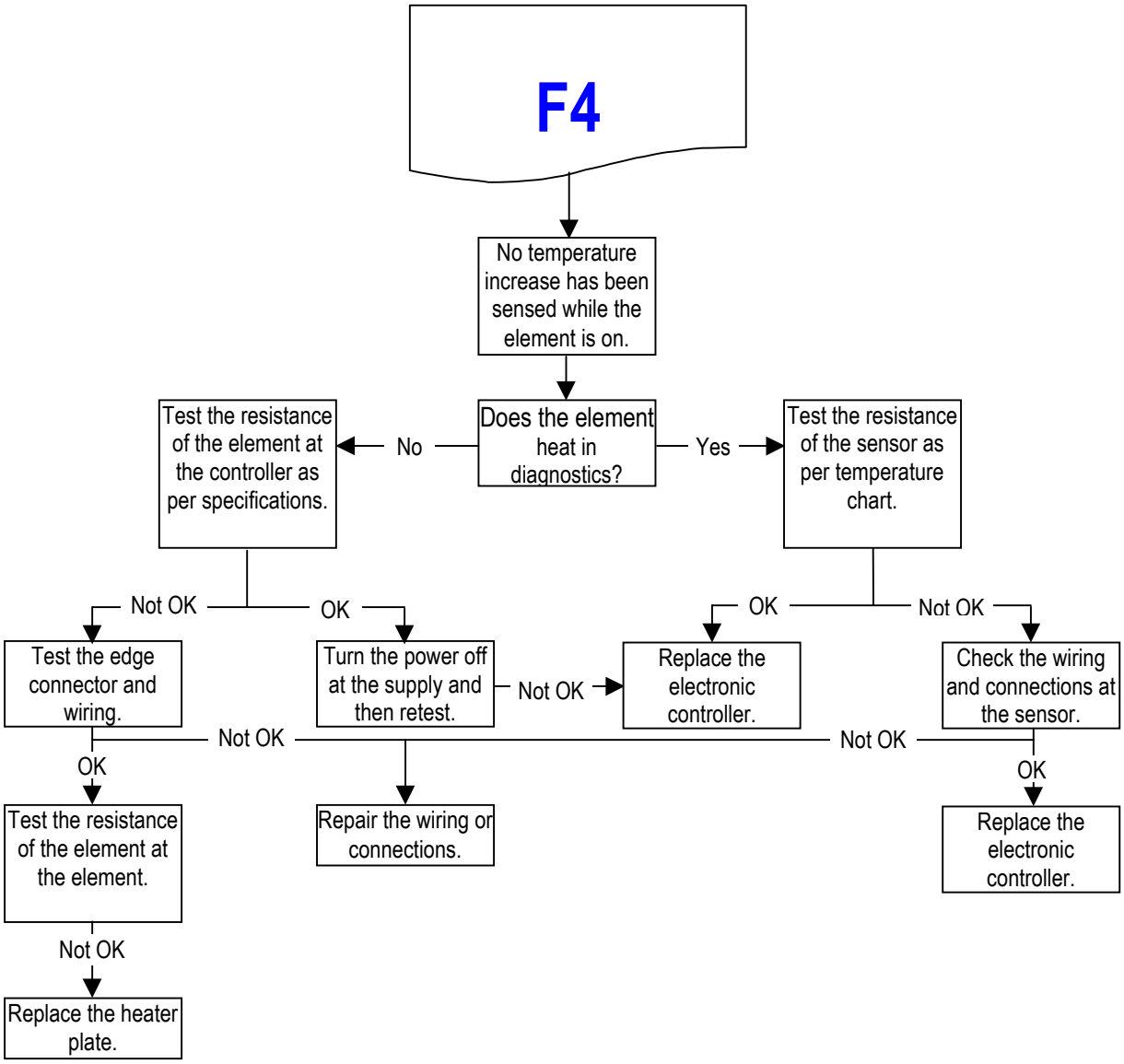


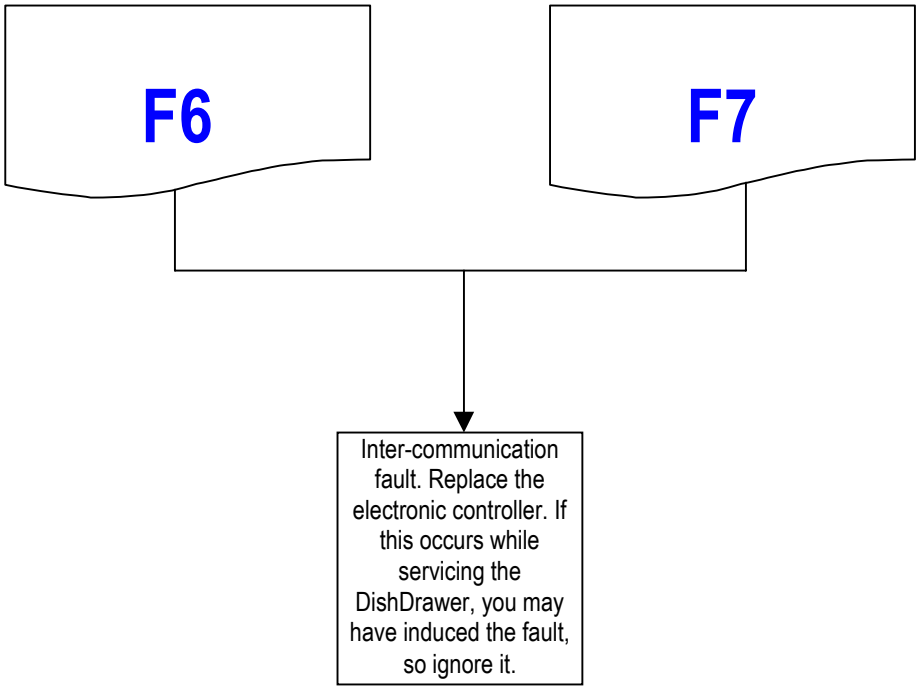
Note: Has the spray arm floated off, affecting load sensing, or is the product programmed for low pressure fill on a high pressure installation? Reprogram.

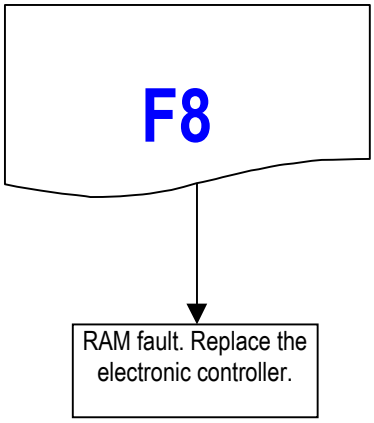


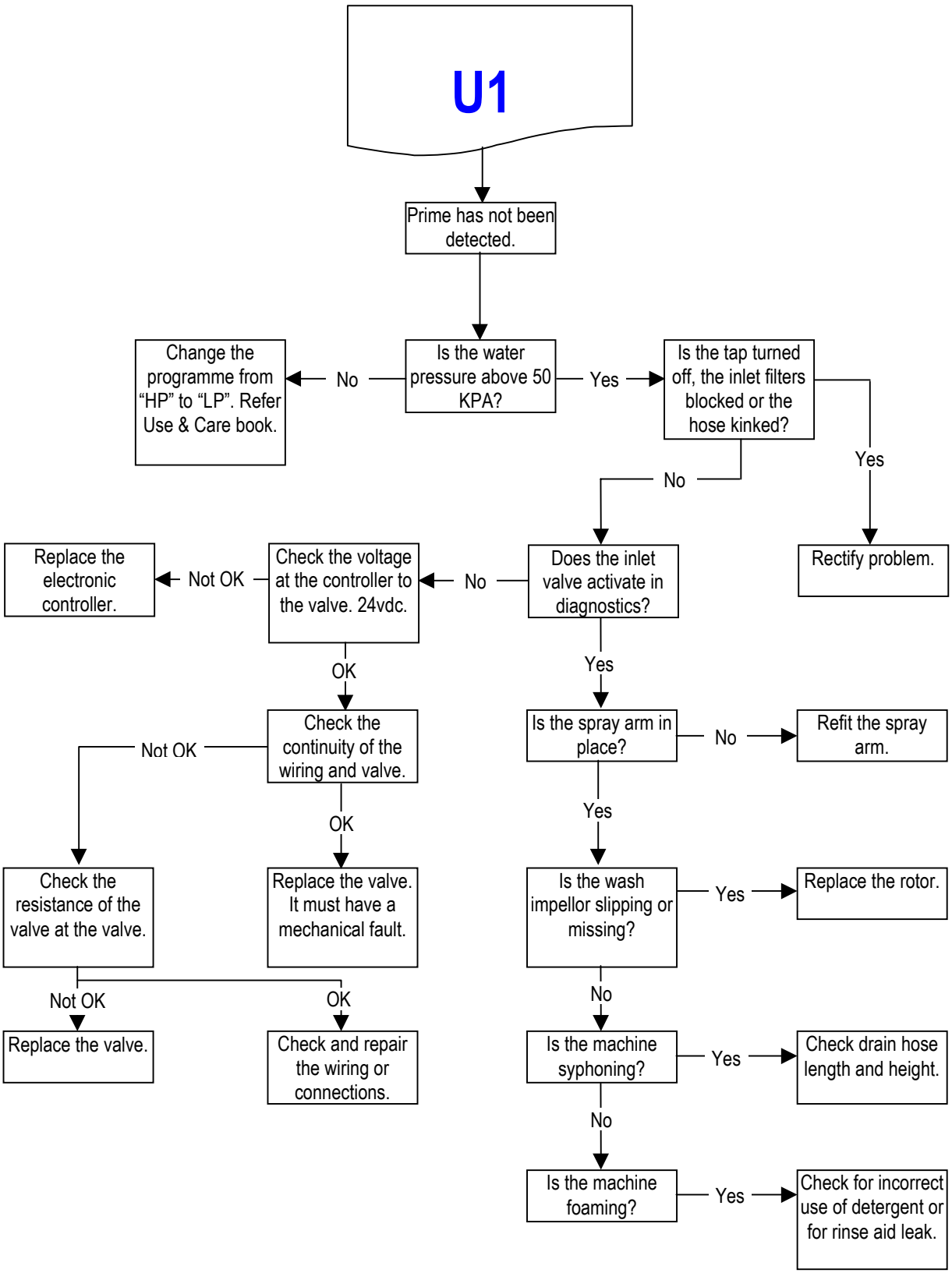
Note: Has the spray arm caused the rotor to jam by being interfered with by an object falling through the basket?

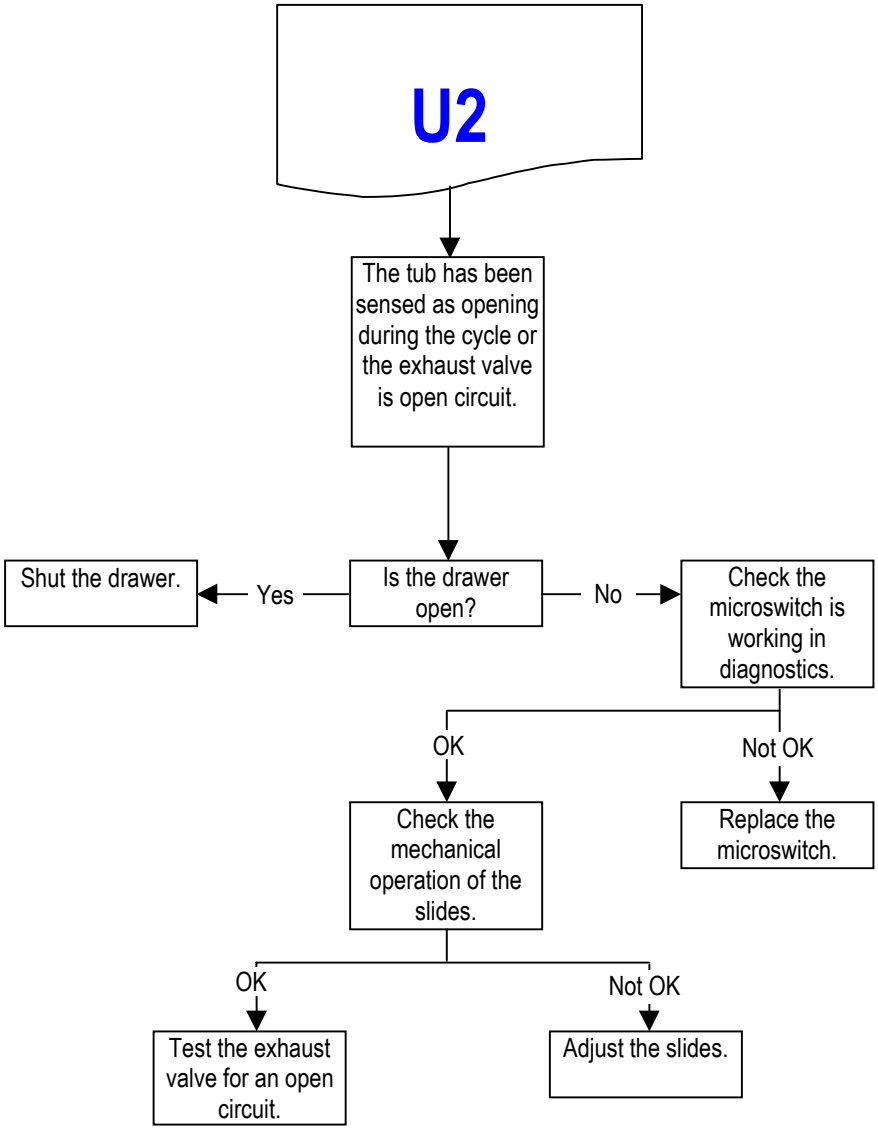

F3
Water sensed at greater than 80°C.
Is the incoming water greater than 80°C?
No
Is the element on all the time?
Yes
Replace the electronic controller.
No
Turn the power off at the supply and then retest.
Is the element on all the time?
No
Check the wiring and connections to the element and sensor PCB.
Yes
Replace the electronic controller.
Not OK
Repair or replace wiring or connections.
OK
Check the resistance of the sensor at the PCB.
Not OK
Replace the heater plate.
Yes
Adjust the incoming water temperature.


F4
No temperature increase has been sensed while the element is on.
Does the element heat in diagnostics?
No
Yes
Test the resistance of the element at the controller as per specifications.
Test the resistance of the sensor as per temperature chart.
Not OK
OK
OK
Not OK
Test the edge connector and wiring.
Turn the power off at the supply and then retest.
Not OK
Replace the electronic controller.
Check the wiring and connections at the sensor.
Not OK
Not OK
OK
OK
Test the resistance of the element at the element.
Repair the wiring or connections.
Replace the electronic controller.
Not OK
Replace the heater plate.

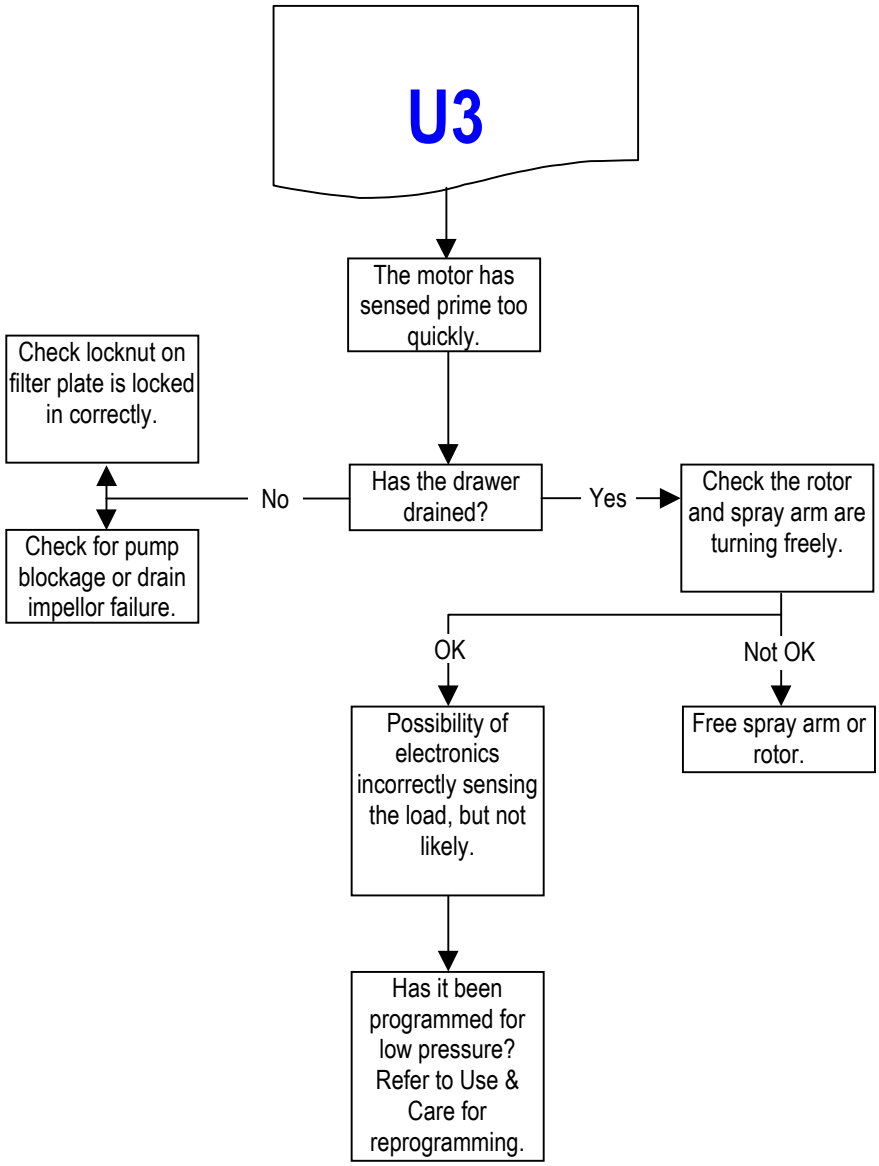

F6
F7
Inter-communication fault. Replace the electronic controller. If this occurs while servicing the DishDrawer, you may have induced the fault, so ignore it.

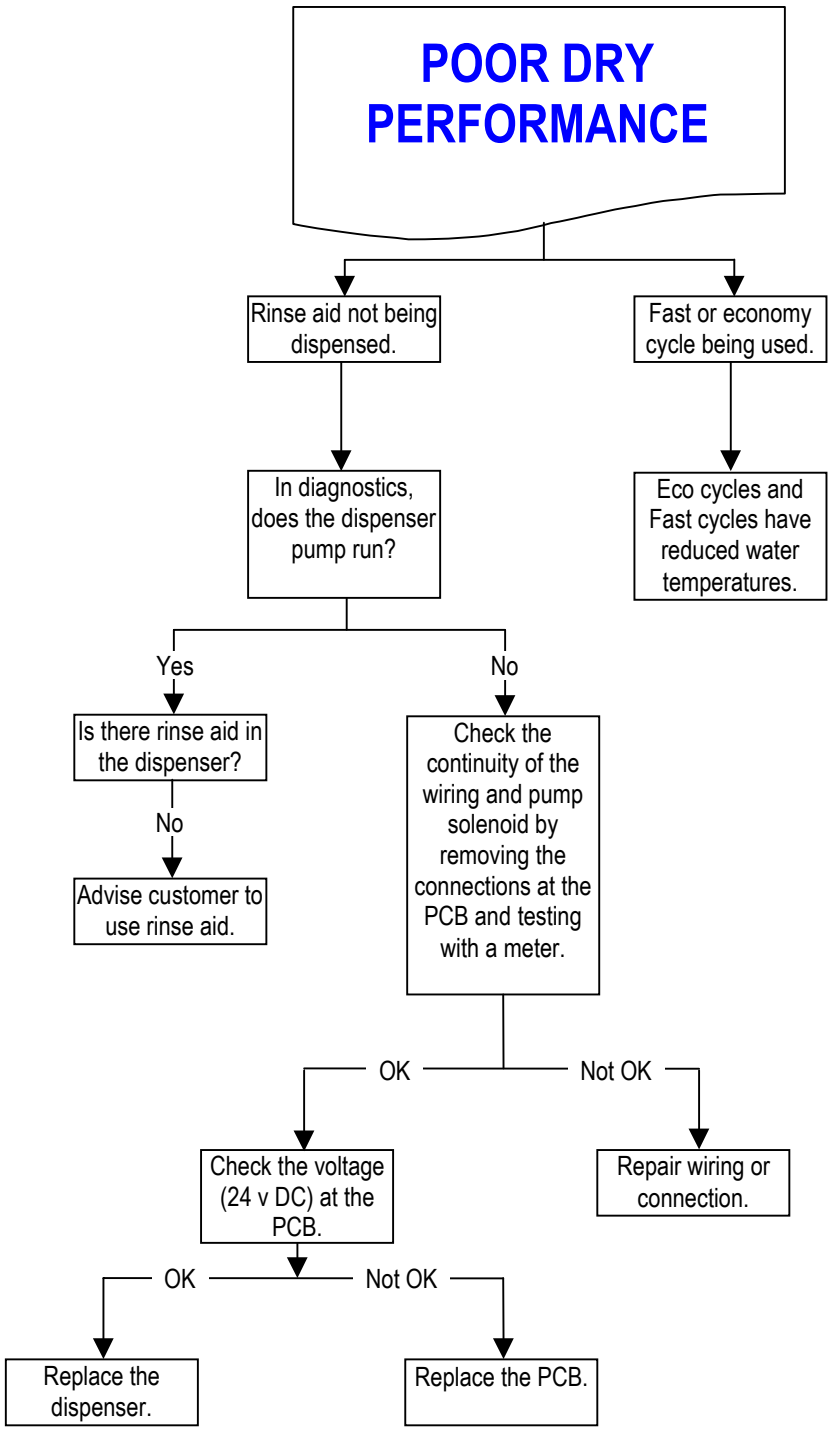

F8
RAM fault. Replace the electronic controller.

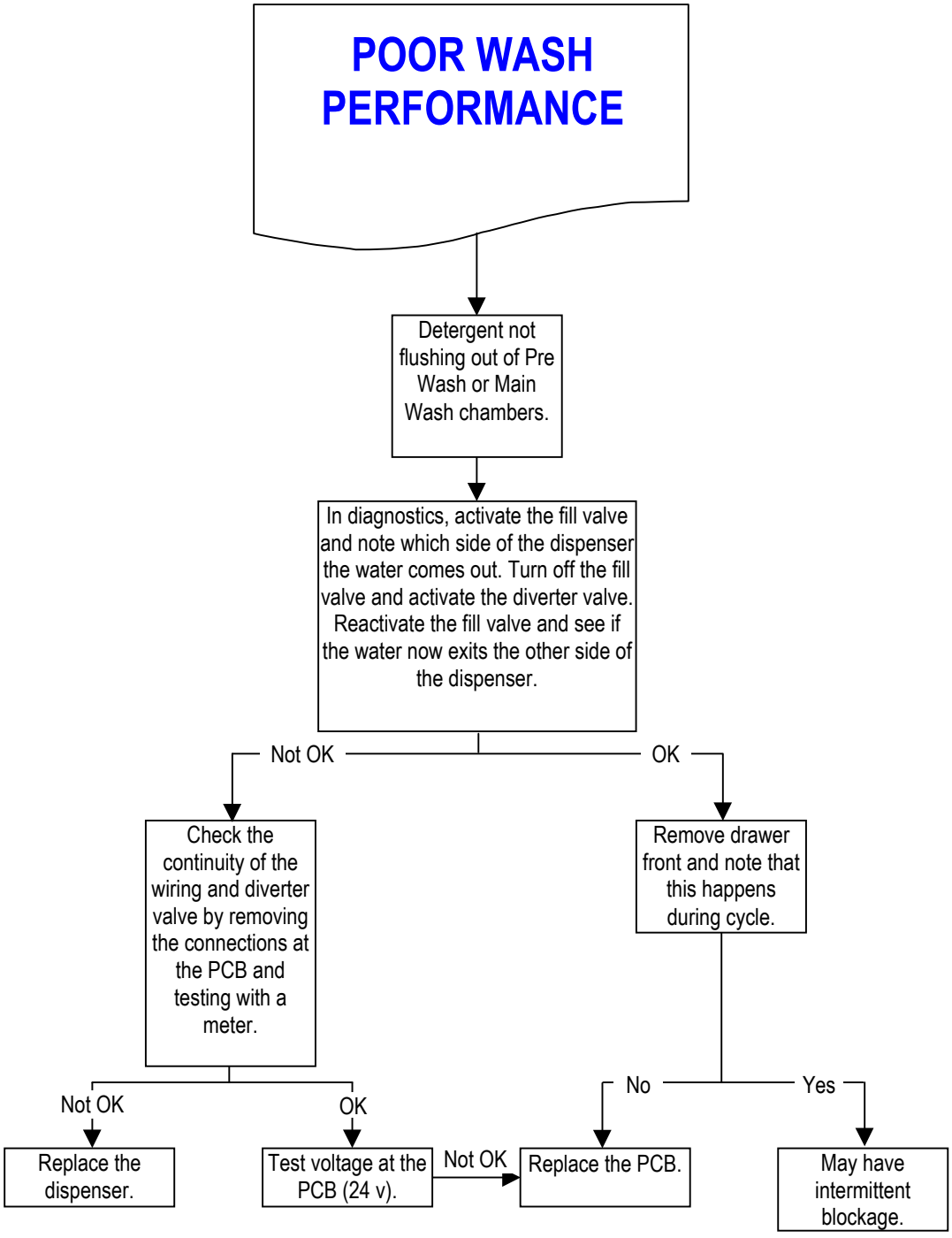

U1
Prime has not been detected.
Is the water pressure above 50 KPA?
No
Change the programme from "HP" to "LP". Refer Use & Care book.
Yes
Is the tap turned off, the inlet filters blocked or the hose kinked?
Yes
Rectify problem.
No
Does the inlet valve activate in diagnostics?
No
Check the voltage at the controller to the valve. 24vdc.
Not OK
Replace the electronic controller.
OK
Check the continuity of the wiring and valve.
Not OK
Check the resistance of the valve at the valve.
Not OK
Replace the valve.
OK
Check and repair the wiring or connections.
OK
Replace the valve. It must have a mechanical fault.
Yes
Is the spray arm in place?
No
Refit the spray arm.
Yes
Is the wash impellor slipping or missing?
Yes
Replace the rotor.
No
Is the machine syphoning?
Yes
Check drain hose length and height.
No
Is the machine foaming?
Yes
Check for incorrect use of detergent or for rinse aid leak.

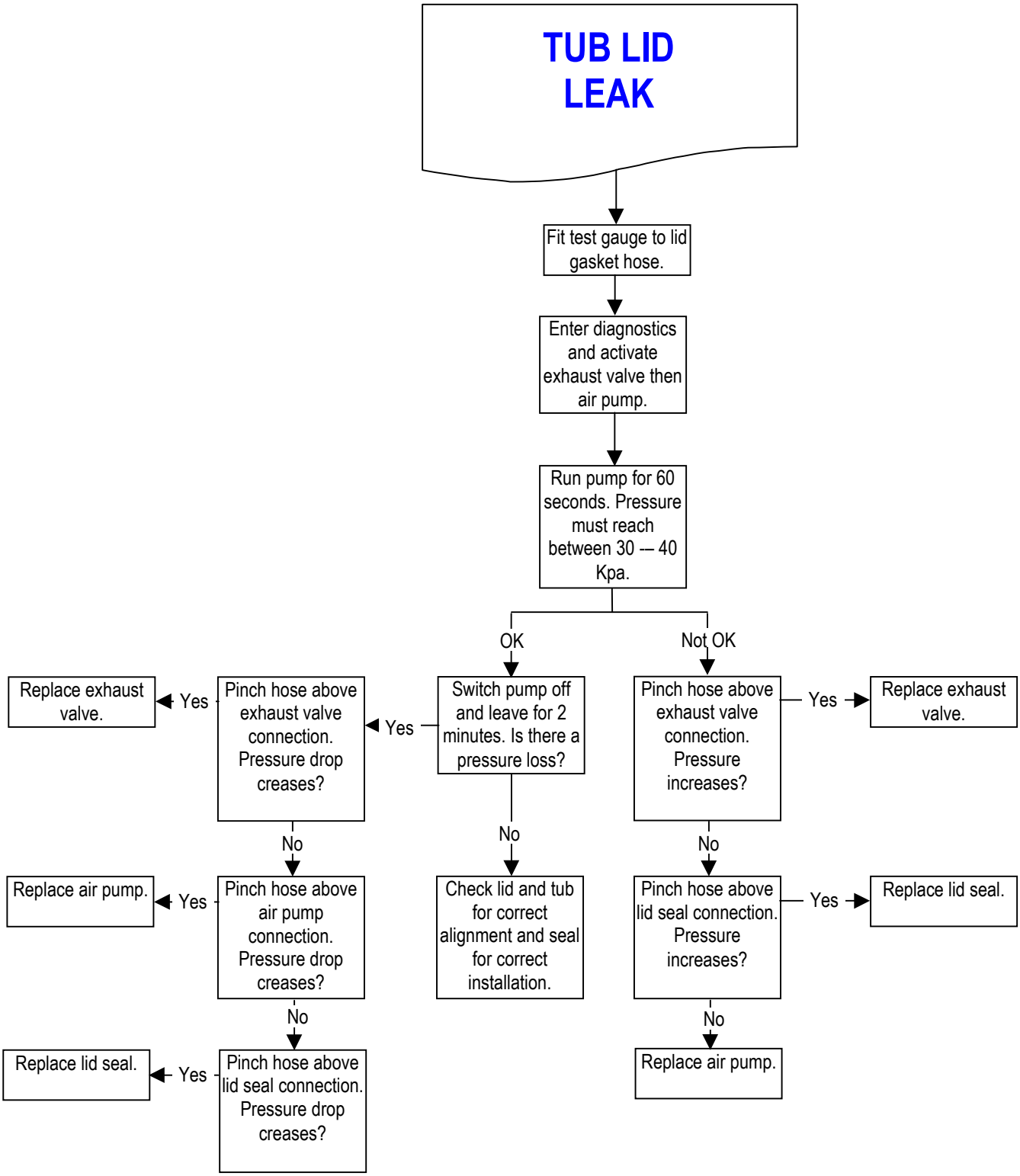


Note: The tub home microswitch is located on the rear of the left slide runner and is connected in series with the exhaust valve.


U3
The motor has sensed prime too quickly.
Check locknut on filter plate is locked in correctly.
Has the drawer drained?
No
Yes
Check for pump blockage or drain impellor failure.
Check the rotor and spray arm are turning freely.
OK
Not OK
Possibility of electronics incorrectly sensing the load, but not likely.
Free spray arm or rotor.
Has it been programmed for low pressure? Refer to Use & Care for reprogramming.


POOR DRY PERFORMANCE
Rinse aid not being dispensed.
Fast or economy cycle being used.
In diagnostics, does the dispenser pump run?
Eco cycles and Fast cycles have reduced water temperatures.
Yes
No
Is there rinse aid in the dispenser?
No
Advise customer to use rinse aid.
Check the continuity of the wiring and pump solenoid by removing the connections at the PCB and testing with a meter.
OK
Not OK
Check the voltage (24 v DC) at the PCB.
Repair wiring or connection.
OK
Not OK
Replace the dispenser.
Replace the PCB.


POOR WASH PERFORMANCE
Detergent not flushing out of Pre Wash or Main Wash chambers.
In diagnostics, activate the fill valve and note which side of the dispenser the water comes out. Turn off the fill valve and activate the diverter valve. Reactivate the fill valve and see if the water now exits the other side of the dispenser.
Not OK
OK
Check the continuity of the wiring and diverter valve by removing the connections at the PCB and testing with a meter.
Remove drawer front and note that this happens during cycle.
Not OK
OK
No
Yes
Replace the dispenser.
Test voltage at the PCB (24 v).
Not OK
Replace the PCB.
May have intermittent blockage.


TUB LID LEAK
Fit test gauge to lid gasket hose.
Enter diagnostics and activate exhaust valve then air pump.
Run pump for 60 seconds. Pressure must reach between 30 — 40 Kpa.
OK
Not OK
Switch pump off and leave for 2 minutes. Is there a pressure loss?
Yes
Pinch hose above exhaust valve connection. Pressure drop creases?
Yes
Replace exhaust valve.
No
Pinch hose above air pump connection. Pressure drop creases?
Yes
Replace air pump.
No
Pinch hose above lid seal connection. Pressure drop creases?
Yes
Replace lid seal.
No
Check lid and tub for correct alignment and seal for correct installation.
Pinch hose above exhaust valve connection. Pressure increases?
Yes
Replace exhaust valve.
No
Pinch hose above lid seal connection. Pressure increases?
Yes
Replace lid seal.
No
Replace air pump.

WIRING DIAGRAM