

F9 Diagnostic Manual

DishDrawer[™] Ph5 & 6



Brand: Fisher & Paykel
DCS

| MODELS | MARKETS |
|---------------|---------------------------|
| DD605/DS605 | NZ, AU, UK, EU, DK, US,CA |
| DD60 | NZ, AU, UK,EU, DK, |
| DD90 | NZ, AU, UK,EU,DK |
| DD24 | US, CA |
| DD36 | US, CA |
| | |

CONTENTS

| | | |
|----------|--|-----------|
| 1 | FAULT FINDING PROCEDURE | 4 |
| 2 | F9 FAULT CODE..... | 5 |
| 3 | CONTROLLER TYPES | 5 |
| 4 | CHECKING SPECIFIC COMPONENTS | 6 |
| | 4.1 Component Checking Procedure..... | 8 |
| 5 | DIAGNOSTICS | 16 |
| | 5.1 DishDrawer Diagnostics..... | 16 |
| | 5.1.1 Display Mode – Level One | 16 |
| | 5.1.2 Hardware Output Test Mode – Level Two | 17 |
| | 5.1.3 Fast Test Cycle – Level Three | 18 |
| | 5.1.4 Continuous Cycle Test Mode – Level Four..... | 19 |
| 6 | WIRING DIAGRAM | 20 |

1 FAULT FINDING PROCEDURE

Before beginning, determine if the controller fitted is a PH5 or PH5.1 controller, as the fault finding procedure is slightly different for each (See Section 3 - Controller Types).

1. If it is a double product, one tub will be displaying an F9 and the other will most likely be displaying U4. The U4 indicates that the F9 fault on the other tub means that the U4 tub cannot operate. **DO NOT** replace the controller with the U4 fault.
2. Disconnect then reconnect the power to the product at the wall socket. Wait 20 seconds after power up, if a tub faults F9 in this time then go to Step 3, otherwise skip to Step 5.
3. On the tub with the F9, check the following:
 - a. Check that the harnesses are completely connected and there is no contamination in the connector - Especially the 'POWER' and 'DISPENSER' connections.
 - b. Measure the resistance of the power resistor (See Section 4.1)
 - c. Measure the resistance of the detergent diverter (See Section 4.4)

If any components are faulty, replace and go back to Step 2. If all of these components appear OK, go to Step 4.

4. Before replacing the controller, **ALL** components need to be measured to determine if they are faulty.
 - a. Measure the resistance of all other components (coils, windings etc) – Section 4.2 to 4.7. Replace any faulty components before installing a new controller.
 - b. If on power up the product still produces an F9, check all connections between the chassis board and controller, check the chassis board for signs of corrosion (See Section 4.9) and if required replace the chassis board and/or harness.

Replace any faulty components, repeat Step 2 and if no F9 fault appears, go to Step 6.

5. **ALL** components need to be checked to determine if they are faulty.

5.1 Controllers:

- a. Check each component individually in 'HO' mode (see Section 5 and 5.1.3).
- b. Only run **ONE** component at a time, if after approximately 5 seconds a long, low tone is played then that component is faulty or not connected. Reconnect or replace the component. In this case the controller does **NOT** need to be replaced.
Note: To adequately test the motor there must be water in the tub.
- c. If all components appear OK, and the product is a pre finished LCD model go to (e) if the product is a flat door or integrated product, then replace the badge isolator.

5.0 Controllers:

- a. Measure the resistance of all other components (coils, windings etc) – Section 4.2 to 4.7. If any components are faulty, then replace the component.
- b. Run the fan in 'HO' mode. If the fan exhibits poor performance (low air flow), replace the fan.
- c. If (a) and (b) find faulty components, replace the controller and go to step 6. Otherwise go to (d).

Both 5.0 & 5.1 Controllers

- d. Check the controller for signs of corrosion or burning. If any found, replace controller and harness (if required) – See Section 4.8.
- e. If turning off the bottom tub (power button) causes the top tub to fault F9, check the 'CHASSIS' harness connections are tight (at controller and chassis board) and for chassis board dry joints before replacing the chassis board – See Section 4.9.

6. As per Step 5, check all components individually in 'HO' mode (see Section 5 and 5.1.3) and then run a Fast Cycle (**see 5.1.3**) before leaving the site.

2 F9 FAULT CODE

| | |
|---|--|
| <p>Display</p>  <p>Secondary Panel</p>  | <p>Power Supply / Controller Fault</p> <p>The product will disable power supply, log the fault, lock out the user and report to the user via a fault code.</p> <p>Note: The isolation relay will be disabled. Power to the product will need to be disconnected then reconnected for it to become fully functional again.</p> <p>Once powered up, wait 20 seconds before trying to enter diagnostics, as product will be doing a self check.</p> |
|---|--|

3 CONTROLLER TYPES

There are 2 versions of controller:

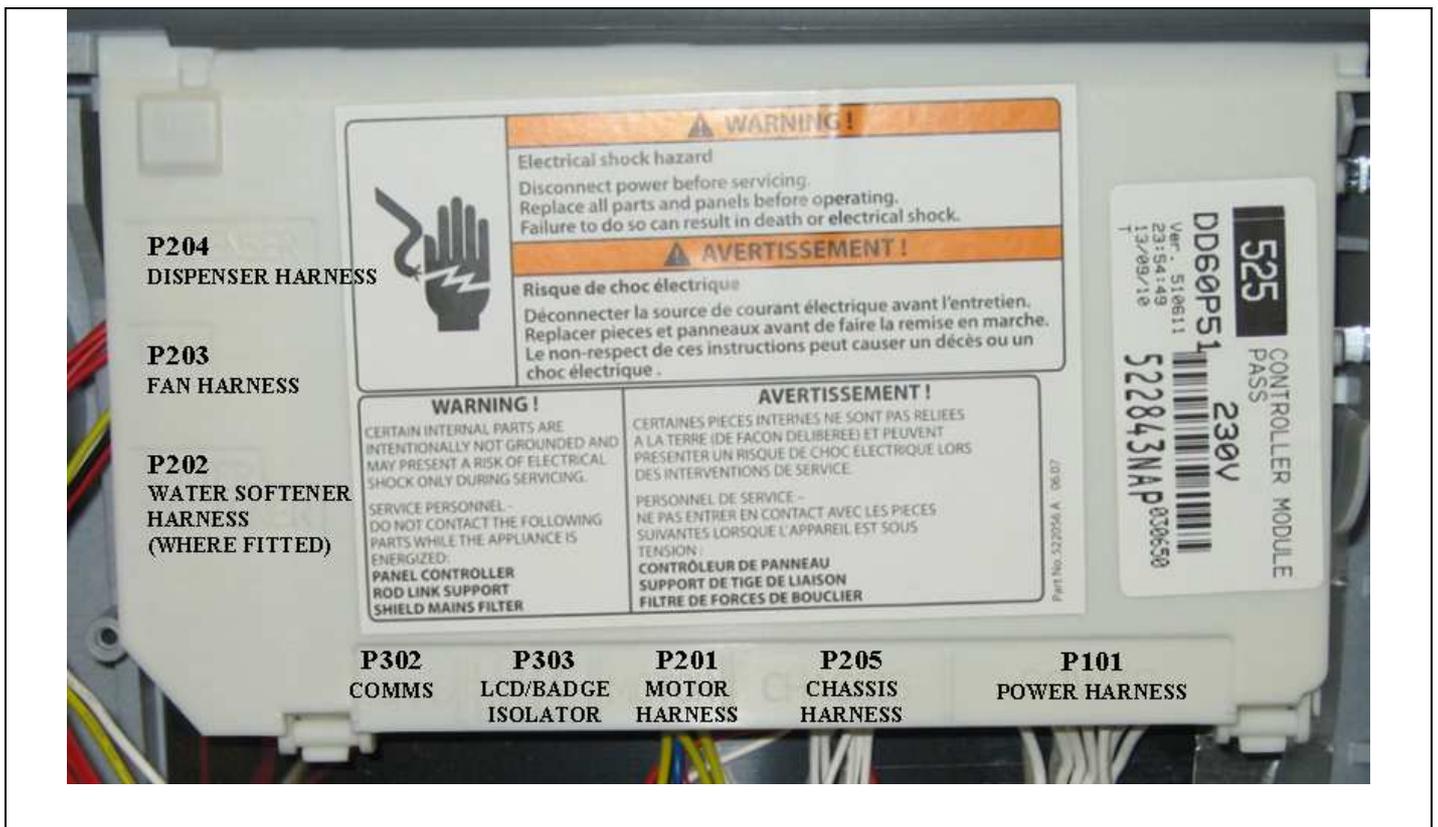
Phase 5 series controllers

| Part Number | Market |
|-------------|------------|
| 527715NAP | NZ, AU |
| 528793EUP | GB, IE, EU |
| 528356USP | USA, CA |
| 522946USP | USA, CA |

Phase 5.1 series controller

| Part Number | Market |
|-------------|------------|
| 522843NAP | NZ, AU |
| 522844EUP | GB, IE, EU |
| 522841USP | USA, CA |

4 CHECKING SPECIFIC COMPONENTS



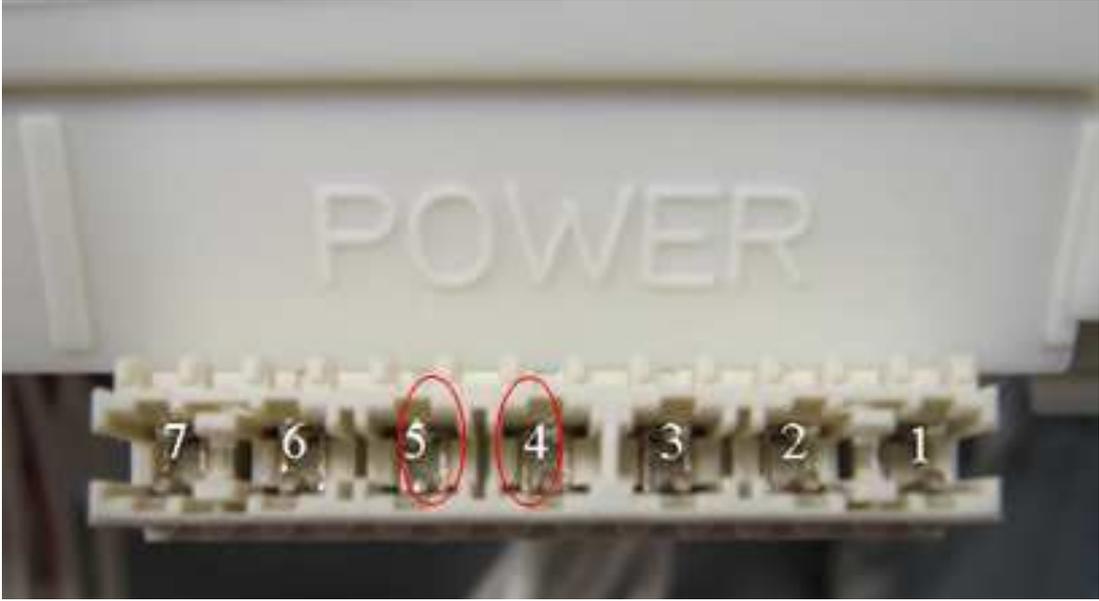
| Device | Connector | Pin Pair | Description |
|-----------------------------|-----------|----------|---|
| Fill valve | P205 | 10 & 11 | 65 +/- 10 ohm |
| Lid motor | P205 | 6 & 7 | Check if open or short circuit |
| Lid motor | P205 | 8 & 9 | Check if open or short circuit |
| Rinse aid pump | P204 | 1 & 2 | 65 +/- 10 ohm |
| Detergent diverter | P204 | 3 & 4 | 65 +/- 10 ohm |
| Fan | P203 | 1 & 2 | Check if open or short circuit Note: run in diagnostics and check fan torque |
| Water softener bypass valve | P202 | 1 & 2 | 65+/- 10 ohm |
| Water softener brine pump | P202 | 3 & 4 | 65+/- 10 ohm |
| Temperature sensor | P101 | 1 & 2 | 12000 Ohms @ 20 ^o C (68 ^o F) 8300 Ohms @ 30 ^o C (86 ^o F) 3000 Ohms @ 60 ^o C (140 ^o F) |

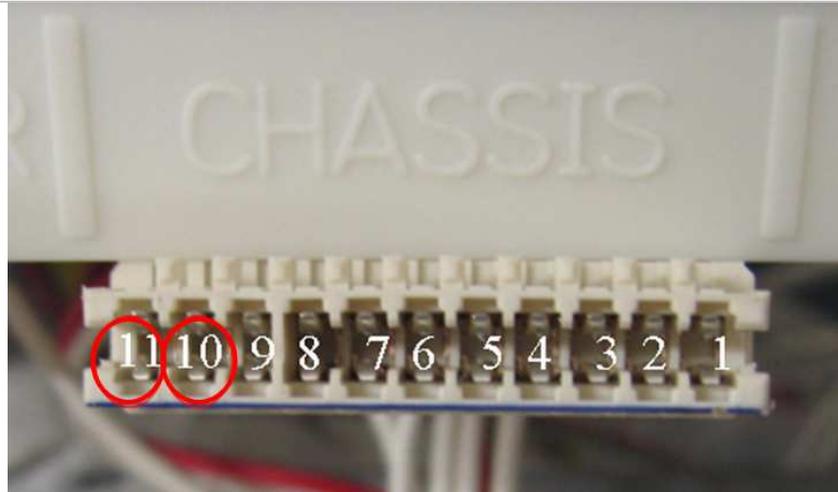
| | | | |
|--|---------------------------|---------------------------|--|
| Motor phases | P201 | 1 & 2 | 8.0 +/- 5 Ohms (per winding), 16 ohms phase to phase from the controller connector |
| Dropper resistor | P101 | 4 & 5 | NZ/AU/EU/UK 98 Ohms +/- 7 Ohms US/CA 24 Ohms +/- 3 Ohms |
| Element | P101 and Power Plug | 6 to Neutral Pin | NZ/AU/EU/UK DD605/DD60 - 50 ohm +/- 4 Ohms DD90 - 38 ohm +/- 3 Ohms US/CA DD605/DD24 - 24 ohm +/- 3 Ohms DD36 - 19 ohm +/- 2 Ohms |
| Note: DD90 & DD36 Heater track are in parallel, if one heater track fails, resistance will double. (230V - 76 ohm : 120V - 38 ohm) | | | |

NOTE: Pins are counted right to left on connectors P101, P205, P201, P303, P302.

Connectors P202, 203, 204 – pin 1 is at the bottom of the connector.

4.1 Component Checking Procedure

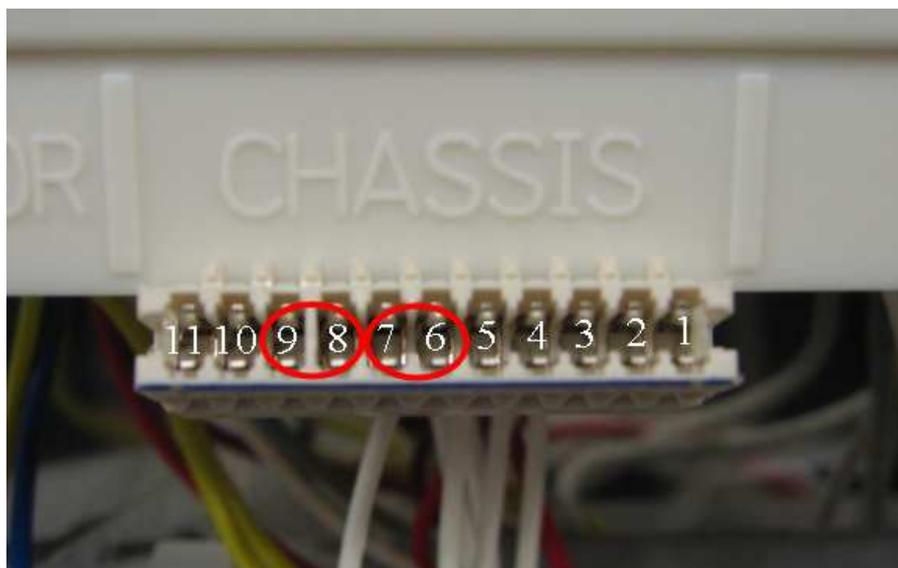
| Number | Procedure |
|--------|--|
| 1 | <p>Check Dropper Resistor:</p> <p>This is checked at the power connector harness at the controller (P101) Remove the harness from the controller, and using a multimeter check the resistance between pins 4 & 5 – be careful not to spread the pins with the meter probes. The following resistances should apply:</p> <p>NZ / AU / EU / UK 98 Ohms +/- 7 Ohms</p> <p>US / CA 24 Ohms +/- 3 Ohms</p> <p>If the dropper resistor is open circuit, then the heater plate will need to be replaced.</p>  |
| 2 | <p>Check Fill Valve:</p> <p>This is checked on the chassis harness (P205), between pins 10 & 11. Remove the chassis harness from the controller, and using a multimeter check the resistance between pins 10 & 11 – be careful not to spread the pins with the meter probes. The following resistance should apply: 65 Ohms (+/- 10 Ohms)</p> <p>If resistance is OK, continue checking other components.</p> <p>If shorted replace the fill valve, but continue to check the other components.</p> |



3

Check the lid actuators:

These are checked at the chassis harness (P205) between pins 6 & 7, 8 & 9.
Normal resistance range may vary, so only replace if open or short circuit.



4

Check the Detergent Dispenser and Rinse Aid Coils:

These can be checked on harness P204

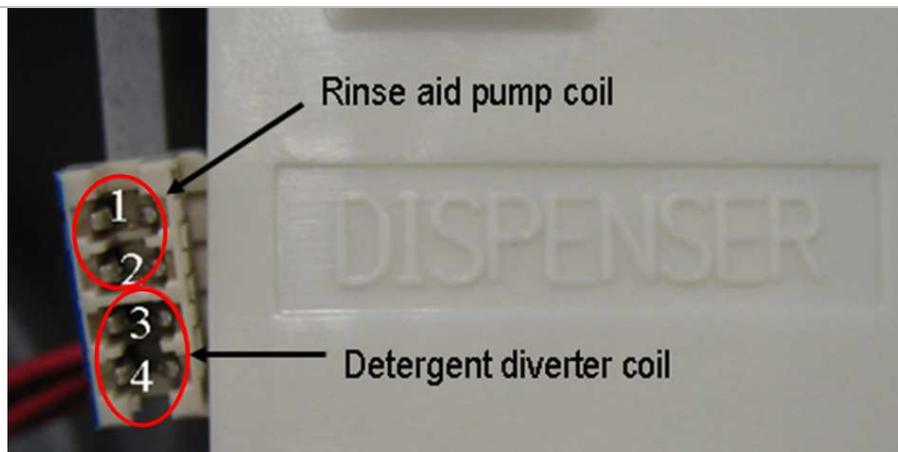
Remove the dispenser harness from the controller, and using a multimeter check the resistance between pins 1 & 2 for the rinse aid pump coil - take care not to spread the pins with the meter probes.

The following resistances should apply:
65 Ohms (+/- 10 Ohms)

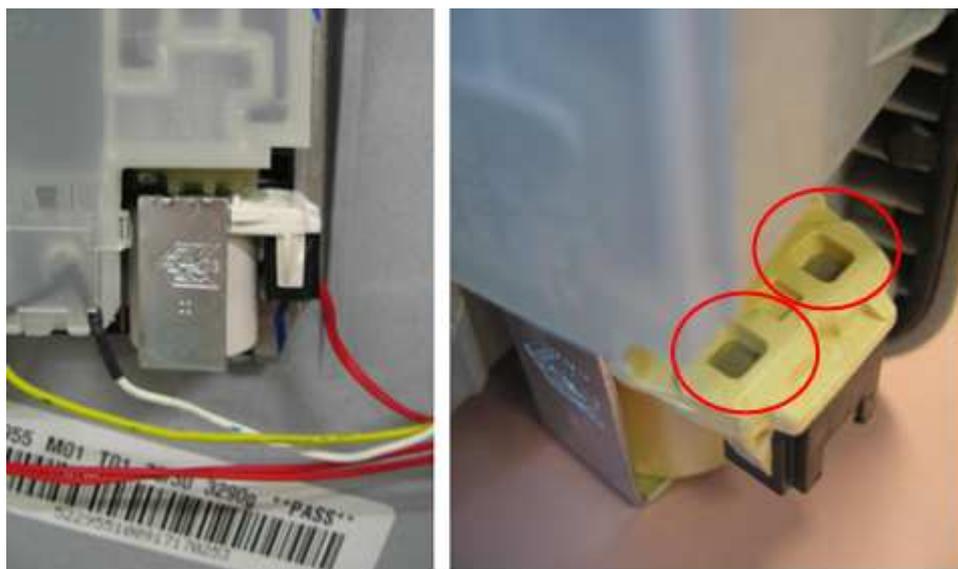
Check the resistance between pin 3 & 4 for the detergent diverter coil,
The following resistances should apply:

65 Ohms (+/- 10 Ohms)

If shorted replace the coil, but continue to check the other components.



Or, check the coils at the detergent dispenser, remove the connector and using a multimeter check the resistance between the coil pins.

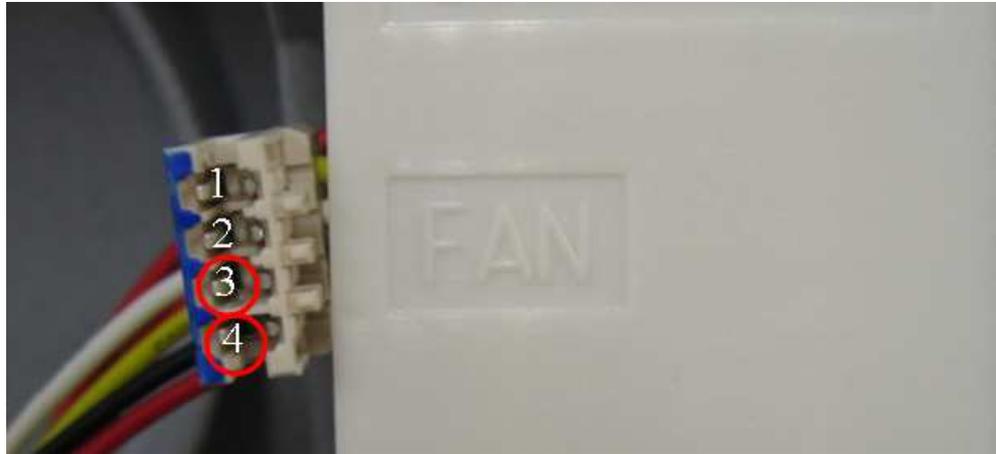


5

Check the drying fan:

This can be checked on harness P203 on pins 3 & 4, it is not possible to check the resistance so you should only replace if it is open or short circuit.

Or, run the fan in "HO" mode in diagnostics and check for air flow, if the fan exhibits poor performance (low air flow) replace it.



6

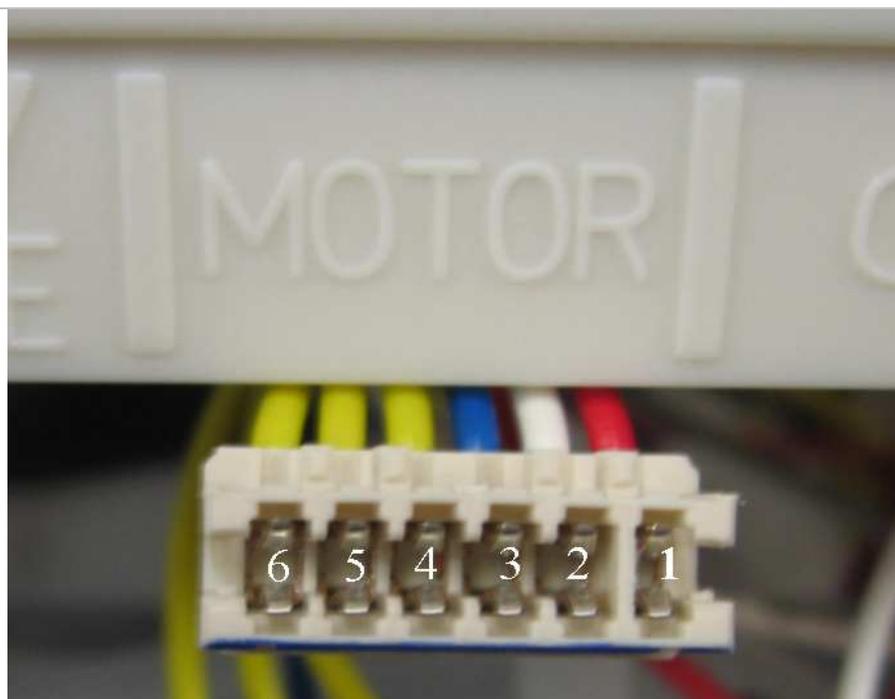
Check the motor winding:

These can be checked on harness P201 at the controller.

To check remove the harness and measure resistance between pins 1&2, 2&3, 1&3 the following resistances should apply:

8.0 +/- 5 Ohms (per winding),

16 ohms phase to phase from the controller connector.



7

Check the Water Softener:

If fitted, check the water softener coils, these can be checked at harness P202

Remove the water softener harness from the controller, and using a multimeter check the resistance between pins 1 & 2 for the softener bypass coil - take care not to spread the pins with the meter probes.

The following resistances should apply:

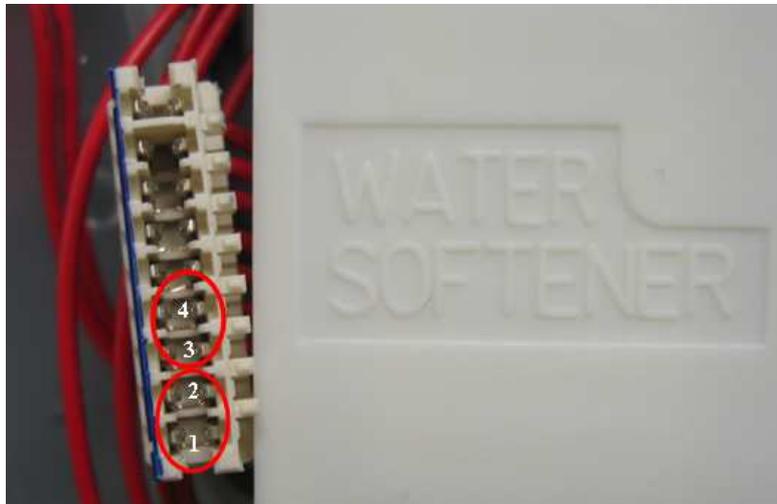
65 Ohms (+/- 10 Ohms)

Check the resistance between pin 3 & 4 for the brine pump,

The following resistances should apply:

65 Ohms (+/- 10 Ohms)

If shorted replace the coil, but continue to check the other components.



Or, the coils can be checked with a multimeter at the water softener itself.

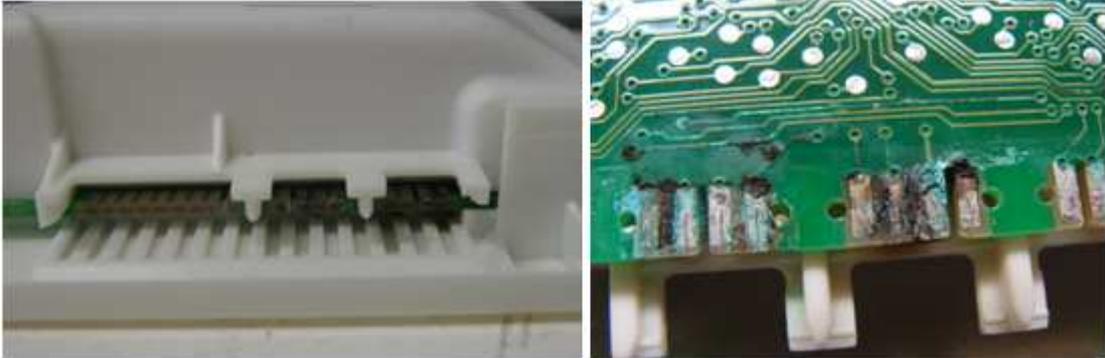


8

Check for Corrosion or Burning at the Controller Connections:

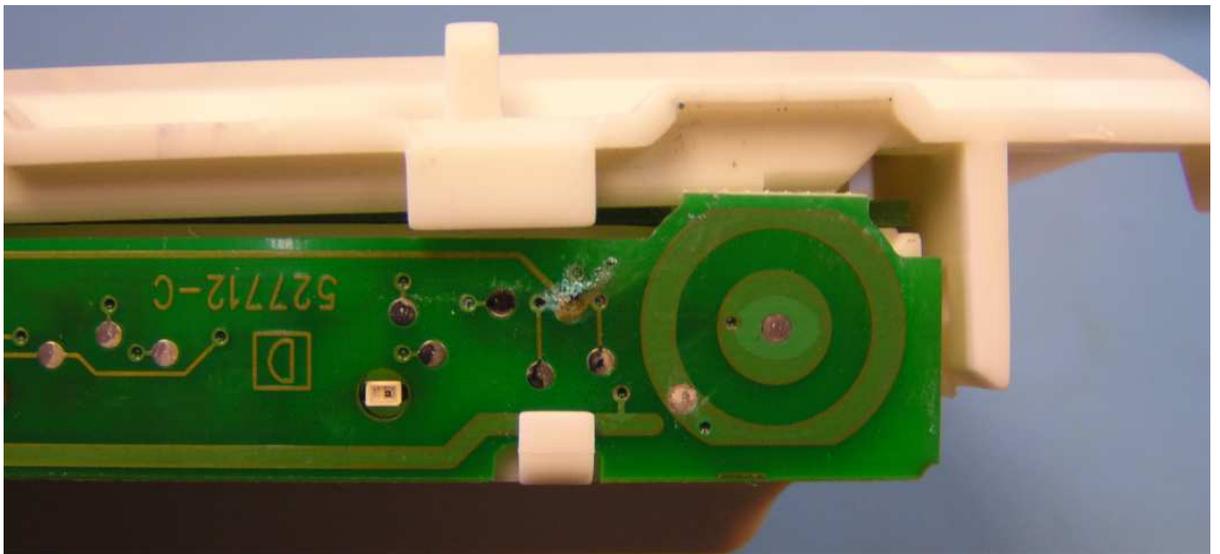
Check connections and check the secondary touch panel switches, to do this you will need to remove the controller from the tub.

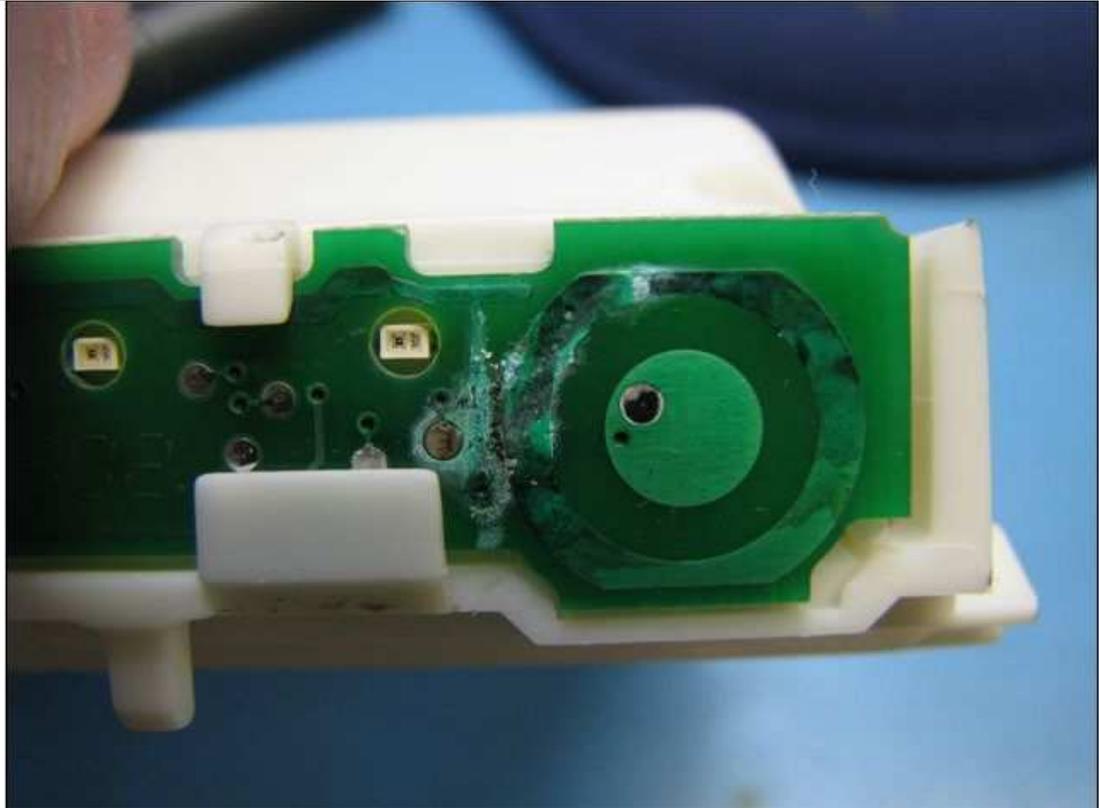
If the connections are burnt or corroded then the controller and harness will need replaced.



If there is signs of corrosion on the secondary touch panel, check for leaks on the tub flange, ensure this is not leaking when getting hot.

Also check drying fan operation, and that the product vent is not blocked off causing a build up of condensation.



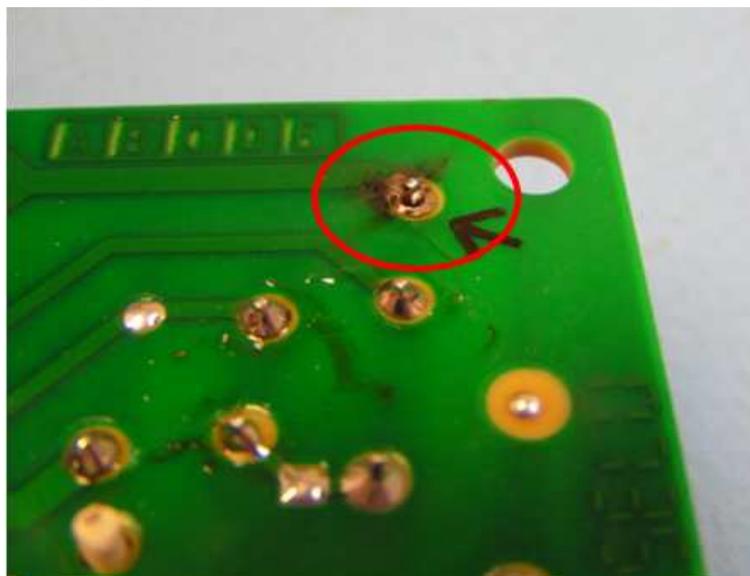
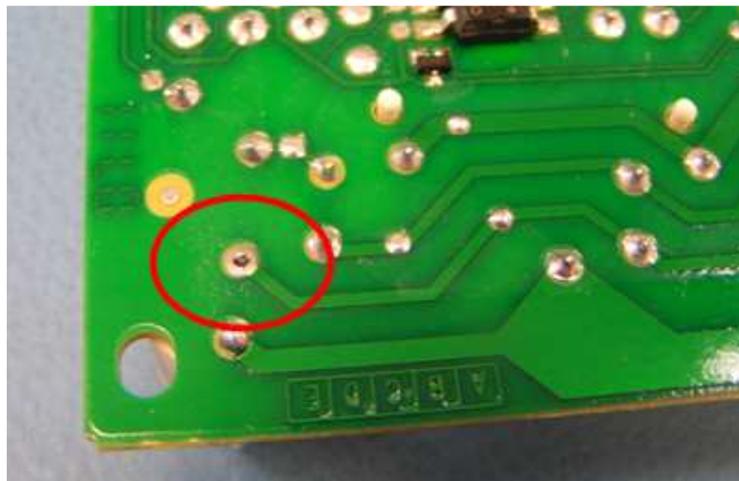


For integrated models check the length of the door panel, that this has not been extended and is covering the fan duct, which will cause a build up of moisture behind the door panel.

9

Check the Chassis board:

Check the chassis board (mains filter board) for any corroded/ burnt contacts or dry joints, to do this remove the mains filter board from the housing.



5 DIAGNOSTICS

5.1 DishDrawer Diagnostics

DishDrawer™ diagnostics can only be entered in Power Off mode, i.e. when there is no display on the LCD, or the badge LEDs are off.

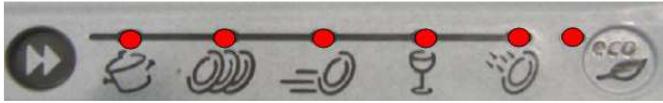
Note: If the product has been powered off at the wall due to a fault code error, once power is turned back on, wait 20 seconds before trying to enter diagnostics, as the product will be doing a self check in this time, and will not allow diagnostics to be entered.

Diagnostics is entered by holding the **KEYLOCK** and **START/PAUSE** buttons simultaneously for 5 seconds. Ensure that **KEYLOCK** is pushed first

There are currently four levels of diagnostics. To move to the next level press **POWER**. To enter a level, press **START/PAUSE**. Once a level has been entered, pressing **POWER** will exit diagnostics completely. If no level is entered, then the display will cycle through the four levels and exit after the last. On entering diagnostics mode, the first level is the display mode.

5.1.1 Display Mode – Level One

In this mode all LEDs and LCD segments (except keylock) are illuminated in the display.

| Pre Finished | Integrated and Flat Door Models The following LED's will show on the secondary display panel |
|---|---|
|  |  |

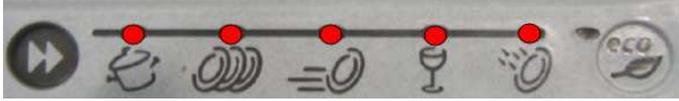
The last two faults are displayed on the LCD for pre finished models. For integrated or flat door models the secondary control panel LED will show a sequence of lights to show the fault code.

The current fault code is displayed first followed by the previous fault code. E.g.

| Pre Finished | Integrated and Flat Door Models |
|---|---|
|  | <p>F9 fault code</p>  <p>HEAVY NORMAL FAST DELICATE RINSE</p> |

5.1.2 Hardware Output Test Mode – Level Two

This level tests all the hardware outputs and inputs. The LCD display shows 'HO'

| Pre Finished | Integrated and Flat Door Models Will show the following LED's on secondary display panel |
|---|---|
|  |  |

Press **POWER** to skip hardware diagnostics and advance to the next level.

Press **START/PAUSE** to enter hardware diagnostics.

Once hardware diagnostics has been entered, letters in the LCD display indicate the current hardware output being tested. For integrated models, the LEDs on the touch switch panel indicate the hardware output being tested, using binary encoding, as shown in the table below.

Different combinations of outputs can be switched on or off together, but the controller will prevent components such as the wash pump and the lid motors being turned on together.

Press **START/PAUSE** to advance to the next hardware output.

Press **KEYLOCK** to turn the currently displayed output on or off. If the bubbles symbol (green LED above start/pause button on integrated models) is displayed, then that output has been switched on, and if it is not displayed then that output is off.

For Phase 5.1 - the controller now monitors the power supply current when any (and only) one fill valve, detergent diverter, water softener bypass valve, fan, rinse aid pump, water softener brine pump, wash or drain motor is turned on.

- If the current is too high or too low on the component then after approx 5 seconds, the controller starts a long, low tone repeated every second to advise the component is faulty, or disconnected. (except the water softener)
- This test **will not** work if more than one hardware output has been turned on at the same time.
- This test does not check lid motor current, as this varies too much to make useful measurements.

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

LCD Norm Fast Deli Rinse Hardware Output

| | LCD | Norm | Fast | Deli | Rinse | Hardware Output |
|----|-----------|-----------|-----------|-----------|-----------|--|
| bL | Off | Off | Off | Off | <u>On</u> | Backlight |
| Er | Off | Off | Off | <u>On</u> | Off | Element Relay (turns off after 5 seconds) |
| Ld | Off | Off | Off | <u>On</u> | <u>On</u> | Lid Motors (will run for 10 seconds) |
| dd | Off | <u>On</u> | Off | Off | Off | Detergent Diverter Valve |
| FU | Off | <u>On</u> | Off | Off | <u>On</u> | Fill Water Valve |
| P1 | Off | <u>On</u> | <u>On</u> | Off | Off | Motor Wash direction 2300-2850 rpm (will not run if the tub is open) |
| P2 | Off | <u>On</u> | <u>On</u> | <u>On</u> | <u>On</u> | Motor Drain direction 4200 rpm (times out after 255 seconds.) |
| rd | <u>On</u> | Off | Off | Off | Off | Rinse Aid Dispenser (dispenses according to current user setting) |
| dF | <u>On</u> | Off | Off | Off | <u>On</u> | Drying fan |
| LE | <u>On</u> | Off | Off | <u>On</u> | Off | Rinse Aid and Salt Tank LEDs |
| C1 | <u>On</u> | Off | Off | <u>On</u> | <u>On</u> | Water Softener Diverter Valve |
| C2 | <u>On</u> | <u>On</u> | Off | Off | Off | Water Softener Brine Pump |
| C3 | <u>On</u> | <u>On</u> | Off | Off | <u>On</u> | Water Softener Brine Valve |
| °C | <u>On</u> | <u>On</u> | <u>On</u> | Off | Off | Displays current water temperature. |
| °E | <u>On</u> | <u>On</u> | <u>On</u> | <u>On</u> | <u>On</u> | Displays controller rail voltage |

(C3 is used in the factory to empty the water softener before the product is packed.)

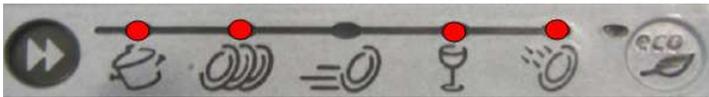
Tub Home Sensor Test: At any time during HO test mode the Keylock symbol on the LCD display (Keylock LED on integrated badge) indicates the tub position. On = closed, off = open.

Press **POWER** to skip hardware diagnostics and exit mode.

5.1.3 Fast Test Cycle – Level Three

WARNING : Only run this cycle if connected to the water supply. This level runs an 8-minute fast test cycle.

Flat door and Integrated will show the following LED's on secondary display panel.

| Pre Finished | Integrated and Flat Door Models Will show the following LED's on secondary display panel |
|---|--|
|  |  |

Press **POWER** to skip Fast Test Cycle and advance to the next level. Press **START/PAUSE** to enter Fast Test cycle.

Once the fast test cycle is selected, the DishDrawer™ goes into standby mode and 8 minutes will be showing on the display. The test cycle is started by pressing **START/PAUSE**, and the following components are run during the 8 minute cycle that follows: - Lid motors, fill valve, wash motor, element, drain motor, drying fan.

Press **POWER** to exit at any time.

The test sequence in fast cycle mode performs 33 tests. The number of any failed test is displayed on the touch switch panel LEDs. The test sequence continues even if a test fails. If there are multiple failures the LEDs will change during the test.

5.1.4 Continuous Cycle Test Mode – Level Four

Not required for testing of F9 related faults.

