Electrolux

SERVICE BULLETIN

COOKING

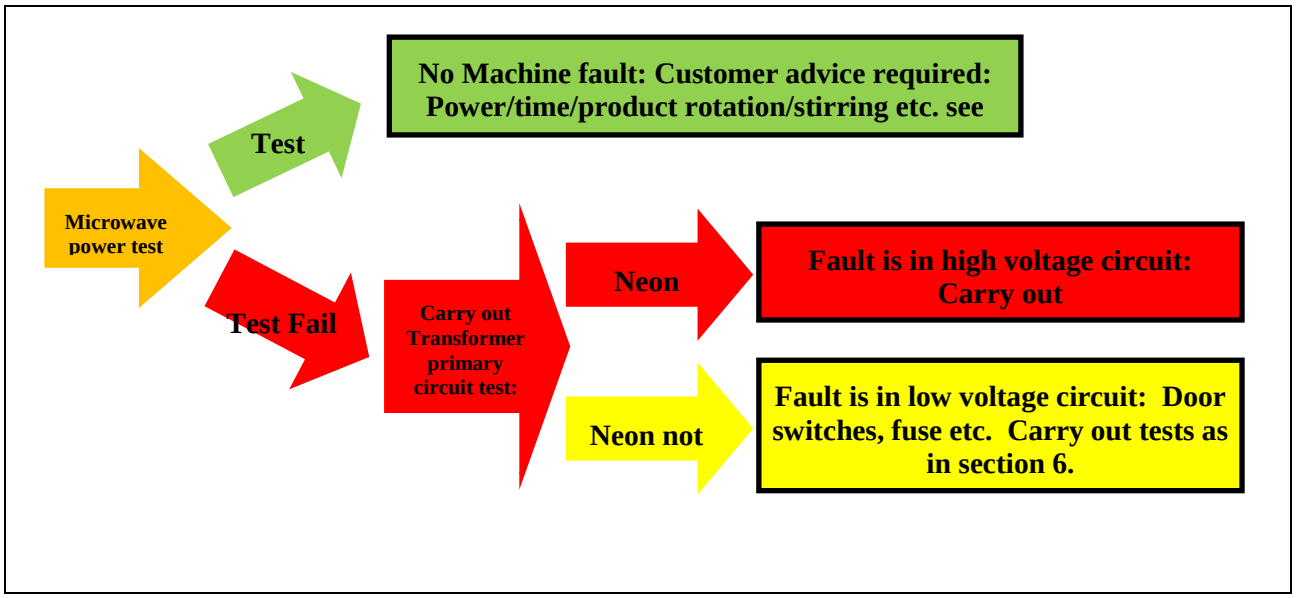
Troubleshooting for Microwave combination oven.

(This outline guide is intended as a guide only to ensure basic logical fault finding steps are followed. More comprehensive information in regard to specific faults and broader information can be found in the relevant sections of the Electrolux TDS)

Warning:

Only suitably trained and/or experienced personnel should perform microwave oven repair work.

Work flow



Step 1: Microwave Power test

The first step is to establish whether the customer issue is a fault with the low voltage/high voltage components of the unit, or a cooking performance issue which may be a user issue and only require advice and/or information to overcome. To do this the operational status of the machine must be ascertained through a power/performance test. This test must be the first step for an engineer visiting a microwave service call and forms the basis for all subsequent action:

Step 1: Initial power/performance test: This step should be carried out on all microwave service calls and definitely prior to any dismantling of the machine: Test equipment: 500ml plastic beaker (use standard type:), thermometer:

Fill plastic beaker with 500 ml of tap water. Stir, measure and record the temperature of the water. Place the beaker into the centre bottom of the microwave cavity (On combination machine: ensure slide in trays/wire shelf removed. Side racks should remain in place). Microwave on full power for 60 seconds. During the test; observe the oven, display and

cavity for any unexpected behaviour. On completion of the test, the water should be thoroughly stirred again and the temperature re- measured: The water temperature should have increased by at least 13°C.

Test result outcome:

A: Machine heats water to or above specification above: Go to Section 1 below:
B: No heat from microwave: Go to Section 2 below:
C: Machine heats water but not to specification: Go to Section 3 below:
D: Machine is noisy but may heat/not heat: Go to Section 4 below:

Section 1: Machine heats water to specification: Specified temperature rise indicates both the high and low voltage circuits and all components are working correctly. Also confirms the power output of the microwave fully meets specification: No parts or physical repair work necessary:

- Is the customer comparing the performance to a previous compact microwave with turntable? If so; information should be passed on that the appliance is working fully to specification but as the oven is primarily designed as a speed oven with microwave support, it may require a different approach to that of an ordinary unit: The oven can be used to simply microwave product, but it has far more capability than a standard compact device. Methods may need to be adapted but with familiarity and experience; exceptional performance and results will be obtained. Metal trays and wire racks must not be used for microwave only cooking: These will cause arcing and deflect the microwaves. Food should be covered and placed in the bottom of the oven for microwave cooking. Cooking time should be divided and the food rotated at intervals.
- Uneven cooking or spot overcooking: The oven is a very powerful unit, also the microwaves are "stirred" rather than the product rotated: For performance issues such as uneven cooking, methods might need to be adjusted from those previously used. Food may need to be rotated during cooking, it may need to be stirred too. Large moist foodstuffs and/or frozen meals will require a lower power setting and turning during cooking. Food should always be covered too, in order to avoid excessive steam release and condensation build up.

- *Warning*: All subsequent sections are for suitably qualified staff. DO NOT proceed unless suitably trained and/or experienced in microwave oven repair work:

Dangerous voltages may be present if covers are removed: DO NOT attempt to test live. Even when appliance is unplugged; charge may remain in the high voltage capacitor and in all circumstances: This must be discharged prior to beginning any work.
High-voltage circuits in a microwave oven generate 4000 volts DC! Never attempt to measure high voltage at the magnetron or transformer terminals.

NEVER, under any circumstances, run a cooking operation with the covers removed or touch any oven components or wiring whilst the appliance is running.

Remember the 3D's:

- Disconnect from supply
- Door held open
- Discharge the high voltage capacitor:

Discharge high voltage capacitor immediately upon removing appliance cover !

Use appropriate instrument and in the following order

Short one terminal to case

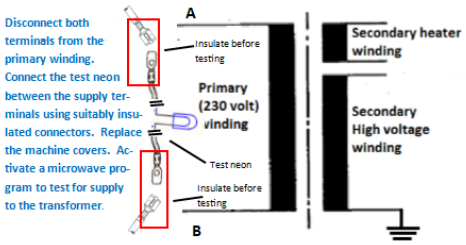
Short other terminal to case

Short both terminals togethe

Repeat if power is reinstated for functional test then panels removed again !

NB: Low voltage side – This is still 230v AC so in fact not strictly "low" voltage and still potentially very dangerous. However compared to the 4000 volts "high side", it is regarded as "the low voltage side" in regard to the microwave power circuit.

Section 2: No heat on Microwave setting: Apparent by the temperature of the water test in step 1 above not increasing. Possible low voltage **or** high voltage fault: To determine which; Now carry out a low voltage circuit test:



(NB: Only suitably trained and/or experienced personnel should proceed any further with fault finding: Prior to beginning any work inside the appliance: Remove the mains plug and the appliance case/cover: DISCHARGE THE HIGH VOLTAGE CAPACITOR! using the procedure outlined above: Remember the 3D's above!)

Test type: Check of supply to primary winding of transformer; Proves integrity of complete "low side" circuit: Test equipment: 230v Test neon
Disconnect the appliance from the power supply, remove the appliance case or top panel and carry out the procedure to discharge the high voltage capacitor:

Disconnect the 230v supply (A-B) to the primary winding of the transformer and connect a 230v test neon between the supply wires: Ensure the neon is placed in a position so it can be observed when the cover is replaced. Replace the cover on the appliance safely but temporarily. Select a microwave programme (full power), start the programme and observe the neon. This will light up if the "low side" circuit is fully functional; this then indicates an issue with the high voltage side, if the neon fails to light, the fault is in the low voltage circuit.
Test result:

Neon lights up = Fault with the high voltage circuit: Proceed to Section 5.
Neon doesn't light up= Fault in low voltage circuit: Proceed to Section 6.

Section 3: Machine heats water but does not meet above specification: Low power output: (NB: Only suitably trained and/or experienced personnel should proceed any further with fault finding: Prior to beginning any work inside the appliance: Remove the mains plug and the appliance case/cover: DISCHARGE THE HIGH VOLTAGE CAPACITOR! using the procedure outlined above: (Remember the 3D's above!).

Inspect all high voltage terminals for loose connections and/or any signs of arcing. Please ensure all connections are clean and as tight as possible. Any high resistance connection will lead to significant power loss.

Check operation of the stirrer fan: From the underside of the oven cavity remove the waveguide cover, place a bowl or cup of water inside, close the door, start a microwave cycle and observe the rotation of the stirrer fan.

Check security/tightness of oven components inside cavity. In particular the lamp fitting, Temperature sensor and oven/grill element.

Section 4: Machine is noisy but may heat/not heat: Microwave devices are very susceptible to vibration and therefore noise. Panels and components do resonate and care should be taken to tighten and adjust any vibrating items. Any arcing or sparking will lead to extra noise: The racks and trays must be removed for microwave cooking and there must always be a load. Is there sufficient load for the power level selected? Are microwaves being deflected by metal cookware? Does the load have sufficient water content for the power level selected? The high voltage side of the microwave does create a certain level of noise and if any item is intermittently touching the case, this may cause additional vibration and/or arcing. Excessive noise seeming to come from the magnetron should be investigated by checking any possible sources of arcing; the high voltage cabling should be routed so as not to touch the side or top casing of the oven, the tightness of all connectors to the transformer and capacitor should be checked (Remember the 3D's above!). Is the waveguide cover intact? Has this been burnt or damaged by food residue not being cleaned off and led to hot spotting? If all other checks have been conducted and excessive noise is still suspected to be the magnetron, this should be removed and inspected for damage and or cracking of the magnets. Please note any magnetrons replaced during the warranty period must be returned for investigation.

Section 5: High voltage component testing: Test equipment required: Insulation tester, multi meter. The test carried out in section 2 above confirms the circuit in front of the high voltage transformer is good. Therefore the high voltage components should be tested as follows: Please note: Only suitably trained and/or experienced personnel should proceed any further: Prior to beginning any work inside the appliance: Remove the mains plug and the appliance case/cover: DISCHARGE THE HIGH VOLTAGE CAPACITOR! Using the procedure outlined above: (Remember the 3D's above!)

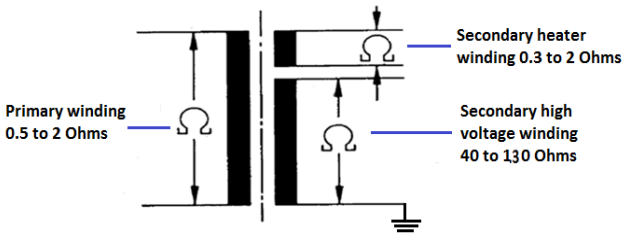
Test type: Check of high voltage components. Individual component testing to ensure only specific faulty item is replaced. Test equipment: Multi meter and insulation test meter.

Components to test:
Diode: Disconnect the diode from the unit: Using an insulation tester set on 500 volts, connect suitably insulated leads and clips of the insulation tester to either end of the diode leads. Taking care not to touch any bare lead or probes, test the diode one way, then reverse the connections and test again: The diode should be very high resistance in one direction and very low resistance in the other direction. If this test passes, carry on testing further components:
Capacitor: Checks/Charge /discharge: Ensure the capacitor is discharged as above:

Disconnect all wires and the diode: Using an insulation tester set on 500 volts, connect suitably insulated leads and clips of the insulation tester between the exposed capacitor terminals. Capacitor should start low and move to very high resistance: 10MΩ Magnetron: Unlikely/ rarely a problem: Visual outline checks should be carried out first, for signs of arcing or burning. Magnets should be inspected for any signs of cracks. Carry out a continuity test between the 2 terminals of the heater/filament (should be very low resistance 0.2-0.3 0hm). Also carry out an insulation test between the terminals and the case. Pay attention to the terminal connections; any burn marks indicating a poor connection should be cleaned and the terminals tightened. .

High voltage transformer: Resistance checks of windings: No live testing! Discharge capacitor!

**Test type: Resistance testing of windings: Multi meter low Ohms setting:



Primary winding across the 240V supply – 0.5 to 2 Ohms

Low voltage secondary winding steps down to approx. 3V for heater – 0.3 to 2 Ohms

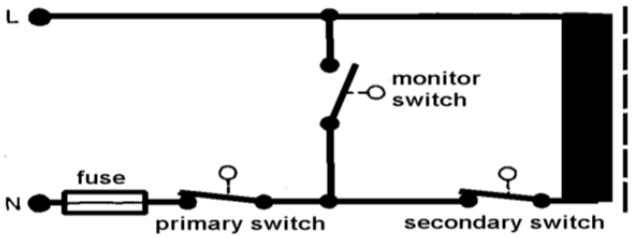
High voltage secondary winding steps up to approx. 2000Volts – 40 to 130 Ohms

Insulation - high voltage winding connected to earth so insulation failure undetectable

Section 6: Low Voltage component testing:

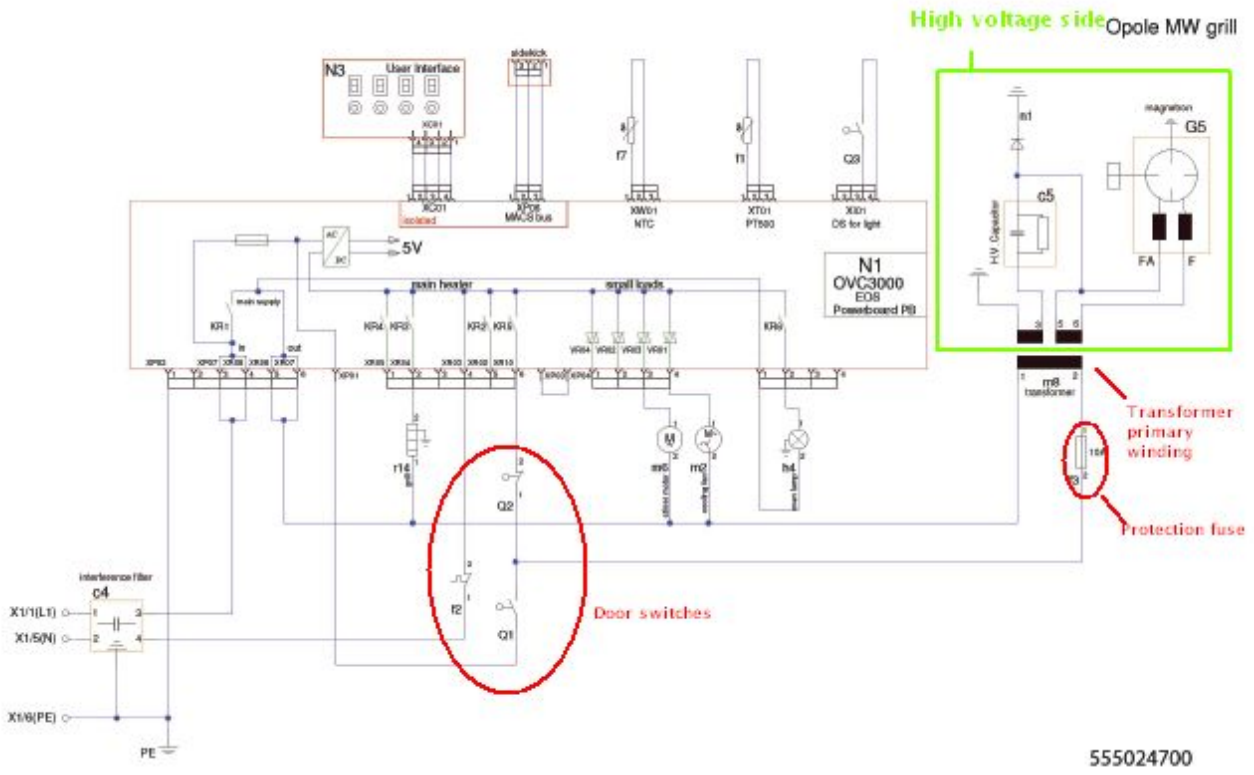
Test equipment required: multi meter/continuity tester. The test carried out in section 2 above confirms the fault is in the low voltage side of the circuit. The most likely cause of no power to the primary winding of the transformer is from the door switch circuit. Ensure the machine is safely isolated. Remove the top cover and check the protection fuse is intact by checking for continuity. If the fuse has ruptured, the cause of this must be located. The fuse is a failsafe protection for the door mechanism, so it is likely the primary switch has stuck or the switches are operating in the wrong order; perhaps the switch mechanisms are faulty or distorted? If the fuse is ok then all the switches should be checked for correct operation as below. Remember: 2 switches are "normally open" and one "normally closed".

With the door closed the primary and secondary switches close to allow current to flow to the primary winding of the transformer.



When the door is open the same two switches open to ensure no neutral can be supplied to the primary winding of the transformer and therefore cannot operate in microwave mode with the door open. A failsafe switch exists (monitor), so if the primary switch sticks closed the monitor will connect live to neutral and the excessive current drawn will rupture the fuse in circuit.

Ariane microwave combination oven circuit diagram



Revision	Date	Description	Approved by
0.0	06/2017	Document creation	Andrew Lott