Version 3.0

Version 2.0

merrychef

EC402s

SERVICE& PARTS MANUAL

This manual covers UK/EC models manufactured from:
Version 2.0 Serial No. 000745 –001199
Version 3.0 Serial No. 001200 onwards

ISSUE 2
31.05.2007

SERVICE MANUAL

CAUTION MICROWAVE EMISSIONS

DO NOT BECOME EXPOSED TO EMISSIONS FROM THE MICROWAVE GENERATOR OR PARTS CONDUCTING MICROWAVE ENERGY

TABLE OF CONTENTS

Merrychef Limited,
Station Road West,
Ash Vale, Aldershot
Hampshire GU12 5XA
United Kingdom
Tel: +44 (0)1252 371000 Fax: +44 (0)1252 371007
Internet address: http://www.merrychef.com
E-mail: sales@merrychef.com **or** service@merrychef.com

SAFETY CODE

This manual is designed to assist engineers who have been on a recognised product familiarisation and training course run by Merrychef. It has been prepared to offer technical guidance for the EC402S range of Ovens.

Please remember that it is wiser **not** to attempt a service task if you are unsure of being able to complete it competently, quickly, and above all **safely**.

To avoid injury to yourself, and to protect the appliance from possible damage, please follow this Safety Code when servicing these ovens.

Before attempting to repair the oven, check it for microwave emission using a calibrated emission detector.

Check that the oven is not emitting microwaves, even when supposedly not in operation.

Check that the oven is not operating continuously, whether the display indicates cooking or not.

Always discharge the HT capacitors before working on the oven using a suitably insulated 10 MΩ Resistor.

When testing the oven with covers off run for short periods of time only or magnetrons will overheat and the display will show Error condition.

Before removing any covers from the oven, do all of the following.

- Switch off the mains supply and remove the plug from the wall socket.
  or
- If the oven is hard wired, ensure that the power is turned off at the isolator switch.

Note:
The On/Off switch on the oven is **not** adequate protection against electric shock, as it does not isolate all of the internal wiring from the mains.

Upon completion of a service the oven, or before reconnecting the appliance to the electrical supply for testing, check all of the following points:

- All internal electrical connections are correct (see wiring diagram).
- All wiring insulation is correct and is not touching a sharp edge.
- All grounding connections are electrically and mechanically secure.
- All door safety interlocks are secure and mechanically sound.
- The door operation is smooth, and the arms run freely in the slots.
- The door activates all four of the door interlock switches and **in the correct order**
- The temperature sensor is correctly connected to the Power PCB.

Before finishing a service call, recheck the following points:

- All of the electronics are functioning correctly and all of the touch pads are working.
- Microwave emissions are below permissible limit of 5 mW/cm².
- The power output of the oven is checked in accordance with the procedure page.
- Oven has correct 50mm (2 inches) air gap all round and 50mm (2 inches) above. Air flow should not be restricted.

PRODUCT SPECIFICATIONS

Model Number: 402S VVV F P C R TT ZZ

Example 402S2205BK2GMEU
Model No. EC402s
220V, 50Hz, L1 +L2 +N +Earth supply, MenuKey Revision 1, General Market, EU

Supply Voltage	Freq. Hz	Phase/Supply	Control Type	Version	Type	Country /Region
VVV	F	P	C	R	TT	ZZ
Voltage (ac) **208** = 208V **220** = 220-230V **240** = 230-240V	**5** = 50Hz **6** = 60Hz	Phase Arrangement **A** = L + N + E (30 Amp) **B** = L1 + L2 + N + E **C** = 2 P + Gnd (20 Amps) **D** = 2 P + Gnd (30 Amps)	**K** = Electronic MenuKey	**1** **2** **3**	**GM** = General Market	**UK** = United Kingdom **US** = USA **EU** = Europe

Power Requirement		See Rating Label
Power Output	Microwave 100% Convection	1500watts 3250watts
External Dimensions	Height Width Depth	595mm (23.0 inches) 585mm (23.0 inches) 700mm (27.5 inches)
Weight	Nett	90kg (198lb.s)
Construction	Cavity Casework	304 Stainless Steel

INSTALLATION INSTRUCTIONS

Installation Instructions for Mealstream 402s Ovens

Power Supply Requirements
The Mealstream 402s should be connected to a suitable electricity supply, which can cope with the switching-on surge that occurs with certain types of catering equipment, including microwaves. Because of this requirement, we strongly recommend that a separate, suitably rated supply is installed for the oven.

The supply for the oven should be fitted with a **Type "C"** or **Time Delay circuit breaker**.

If the oven is hard-wired to the supply, a double-pole isolator switch with a contact gap of at least 1/8 inch (3 mm) should be fitted.

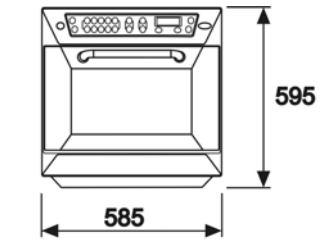
Earth Bond terminal
An Earth Bond Terminal is provided on the rear panel of the oven for independent Earth (GND) connection.

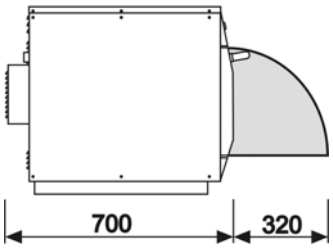
Grounding requirement
This appliance must be connected to a grounded, metallic, permanent wiring system, or an equipment grounding conductor should be run with the circuit conductors and connected to the equipment grounding terminal or lead on the appliance.

Positioning the Oven

In order to maintain adequate ventilation for air intake and exhaust, and to allow access for cleaning filters, you must allow a minimum of 50 mm (2 inches) clearance at the sides and rear of the oven.

Air intake temperature should not exceed 45°C (110°F) excessive temperature will lead to reduced operating duty cycle, or premature ageing of internal components. Failure to comply with these conditions will invalidate the warranty.



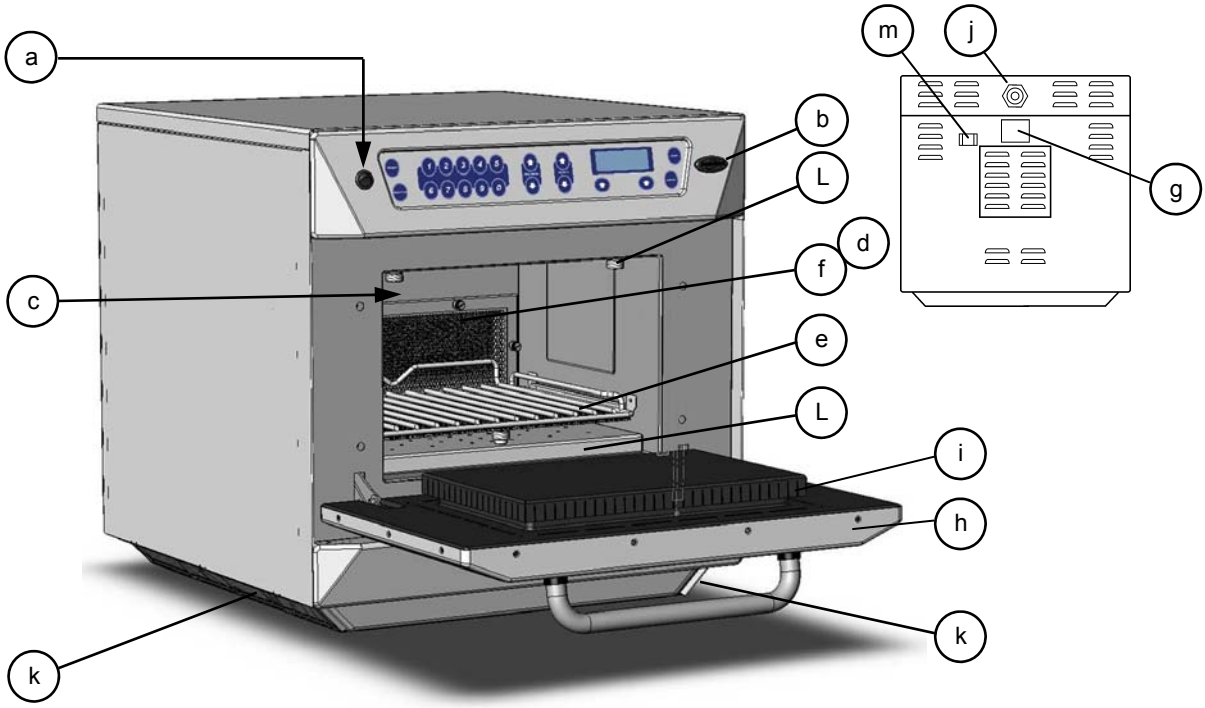


NEVER Install an oven above fryers, grills, griddles or any other major heat source.

ALWAYS Place containers in the cavity carefully - impact damage may chip the vitreous enamel coating on the runners and baffle plate.

Note:
The minimum recommended clearance required for air flow

MAIN FEATURES



a On/Off SWITCH

This is used to turn the oven On or Off.

IT DOES NOT ISOLATE INTERNAL WIRING FROM THE MAINS SUPPLY.

b MenuKey

The MenuKey System automatically changes all the cooking programs with an electronic key and allows program names to be identified.

c OVEN CAVITY

The oven cavity is mainly constructed from stainless steel panels. It must be kept clean.

d GREASE FILTER

The grease filter must be cleaned on a regular basis, and kept free of debris.

e RACK

The cooking rack should be removed daily and cleaned

f HOT AIR FAN

Situated behind the grease filter and circulates the hot air through the cavity.

g RATING PLATE

The rating plate is situated on the rear of the oven, and states the Model, Serial Number, Electrical Ratings and Manufacturers telephone number.

h DOOR

The door consists of a thermally insulated inner section, and an additional air gap provided by a twin skinned door front to lower the surface temperature.

i DOOR SEAL

These ensure a tight seal around the door. They should be kept clean and checked regularly for signs of damage. Replace if worn or damaged.

j ELECTRICAL SUPPLY CORD

Electrical supply cord is situated on the rear of the oven,

k AIR FILTERS

Main intake for cooling air for internal components. Must be clear of obstructions.

L IMPINGER PLATES (Upper & Lower)

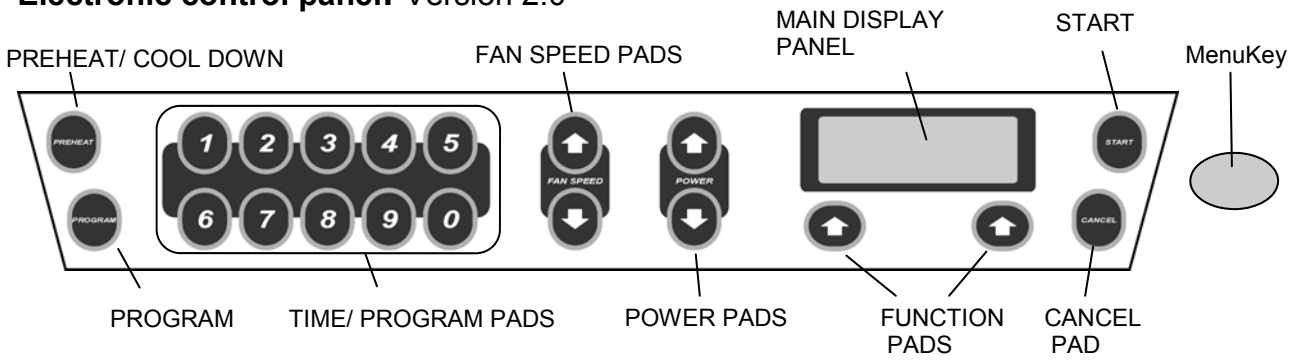
Direct the air in the cavity. They must be cleaned on a regular basis, and kept free of debris

m STEAM VENT PIPE

Vents steam from the oven cavity

MAIN FEATURES

Electronic control panel: Version 2.0



CANCEL PAD
Cancels all timed cooking cycles, pre-programmed operations and stops the microwave energy. It does not alter the oven temperature. If the oven is hot, food will continue to cook and should be removed from the oven immediately. This pad will also cancel any incorrect operations. It will not erase programs.

FAN SPEED PADS
The Fan speed can be increased and decreased in 5% steps (10% to 100%)

FUNCTION PADS
Move through control functions in the Main Display

MAIN DISPLAY PANEL
Shows the principal functions of the oven.
When cooking, the time remaining counts down.
Also displays error messages and oven temperature. (See TROUBLESHOOTING)
When storing and recalling a program the display indicates the program number and details

MenuKey
The MenuKey System automatically changes all the cooking programs with an electronic key and allows program names to be identified.

POWER PADS
The microwave power can be increased or decreased adjusted in 10% steps. (0% to 100%)
The default setting is 50% microwave power.

PREHEAT/ COOL DOWN
Commences main oven heating cycle to a preset temperature. Press and hold for 5 seconds to commence cool down procedure (See CLEANING)

PROGRAM
Activates program mode for storing programs in memory START PAD Commences a program

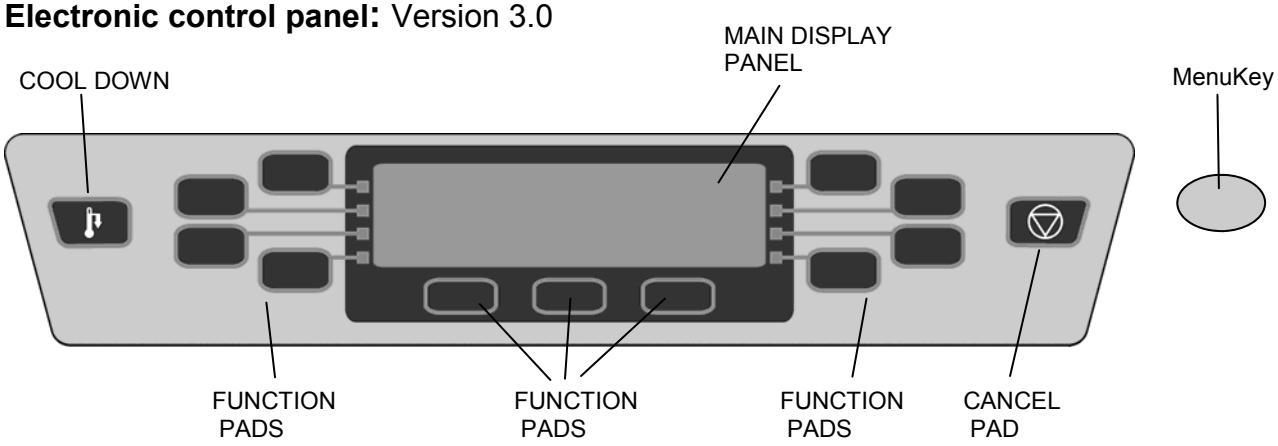
TIME/ PROGRAM PADS
These pads are used for setting the cooking time in 1 second steps to a maximum of 10 minutes.
They are also used for storing and recalling programs from 0-499

Display Panel error messages

Message	Condition	Possible cause
ERROR MAGNETRON 1	Magnetron 1 has overheated	Blocked Air filter(s) Oven located near hot air sources Oven being used empty Cooling fan failure Magnetron failure
ERROR MAGNETRON 2	Magnetron 2 has overheated	
ERROR MAGNETRON 1 & 2	Magnetron 1 and 2 have overheated	
CAVITY SENSOR ERROR	Cavity temperature exceeds more than 50°C above PREHEAT temperature setting during cook cycle	Indicates combustion (fire) in oven cavity Note: In service operations when PREHEAT is set to 0°C this message can appear when the oven is operated

MAIN FEATURES

Electronic control panel: Version 3.0



MenuKey 2
The MenuKey System automatically changes all the cooking programs with an electronic key and allows program names to be identified

CANCEL PAD
Cancels all timed cooking cycles, pre-programmed operations and stops the microwave energy. It does not alter the oven temperature. If the oven is hot, food will continue to cook and should be removed from the oven immediately. This pad will also cancel any incorrect operations. It will not erase programs.

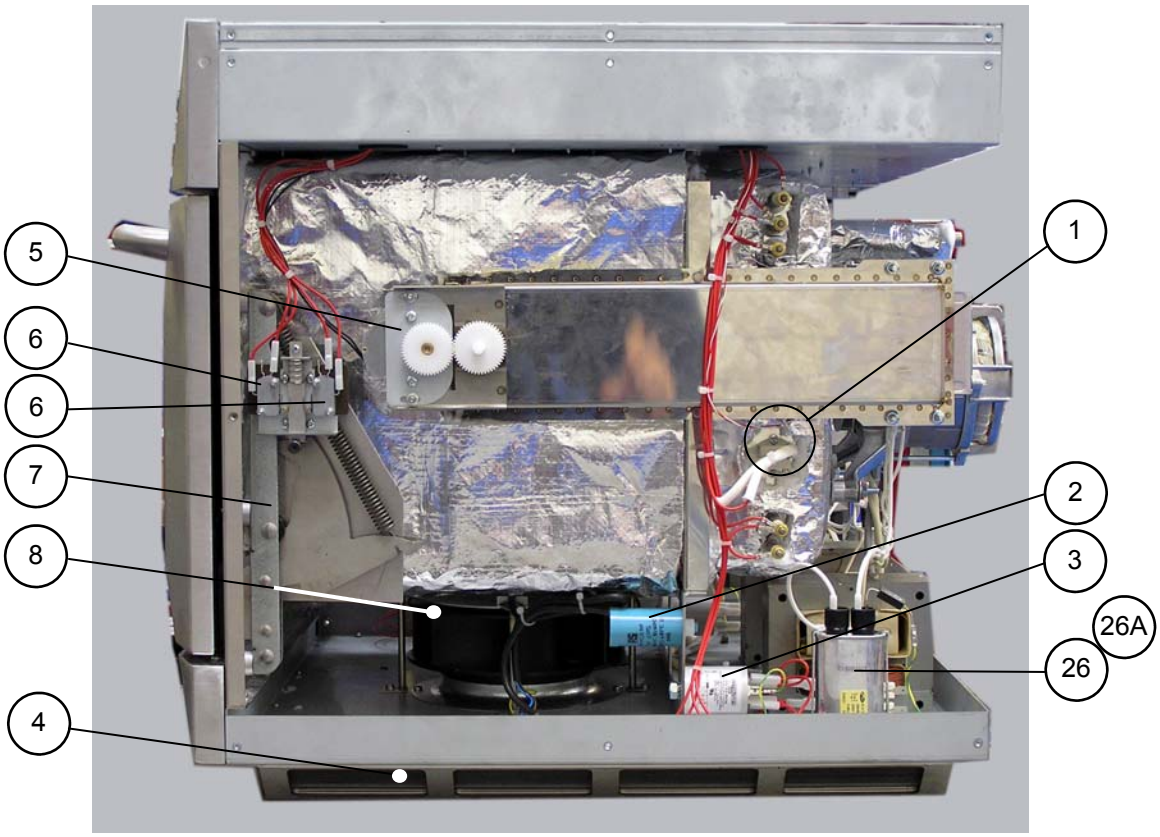
DISPLAY PANEL
Shows the principal functions of the oven. When cooking, the time remaining counts down. Also displays error messages and oven temperature. When storing and recalling a program the display indicates the program number and details.

FUNCTION PADS
The function pads select options shown in the DISPLAY PANEL.

COOL DOWN PAD
Puts the oven into Cool Down Mode prior to cleaning

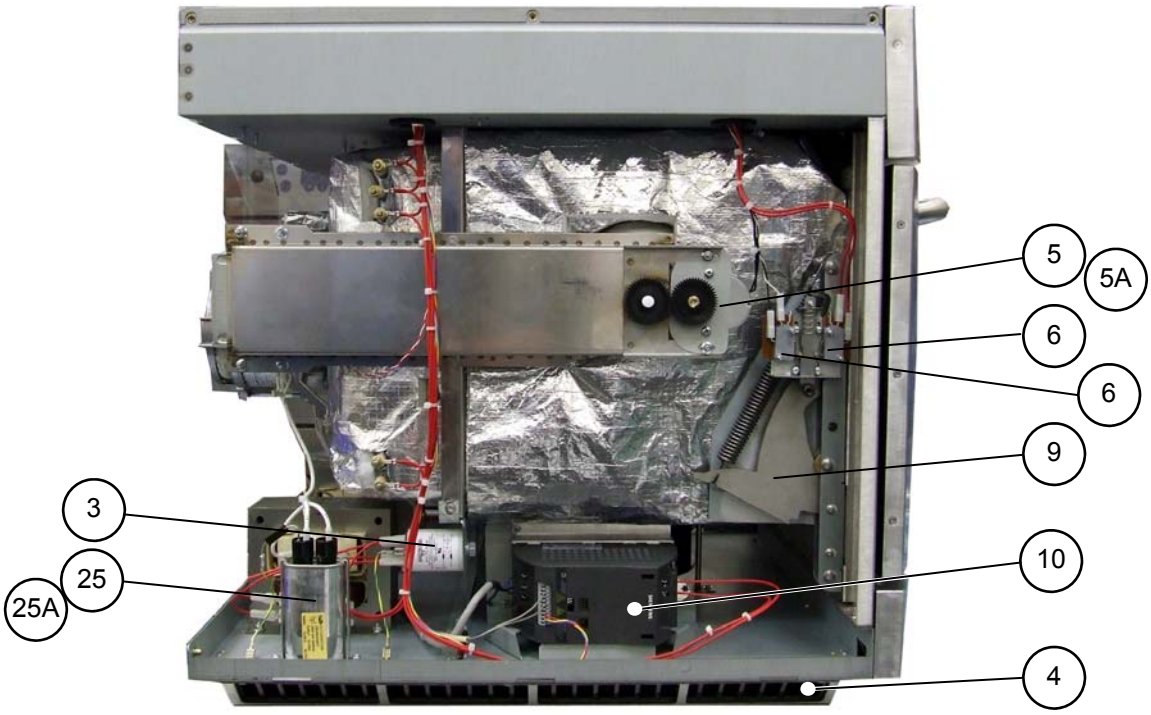
Error Message	Condition	Possible Cause
Magnetron 1 Overheat Ensure air filters are clean Allow oven to cool	Magnetron 1 has overheated	Blocked air filters Oven located near hot air source Oven being used empty Cooling fan failure Magnetron failure
Magnetron 2 Overheat Ensure air filters are clean Allow oven to cool	Magnetron 2 has overheated	
Magnetron 1 & 2 Overheat Ensure air filters are clean Allow oven to cool	Magnetron 1 & 2 have overheated	
Ambient Overheat Ensure air filters are clean Allow oven to cool	Temperature inside casing has exceeded limit	Blocked air filters Restricted airflow to air filters Oven located near hot air source Circulation fan failure Combustion (fire) in cavity
Cavity Overheat Please contact service	Cavity temperature has exceeded more than 295°C	Blocked air filters Restricted airflow to air filters Combustion (fire) in cavity
Heater Failure	Cavity has not reached a temperature of 100°C 10 minutes	One or more heater elements have failed and need to be replaced

PRINCIPAL COMPONENTS: Right Side



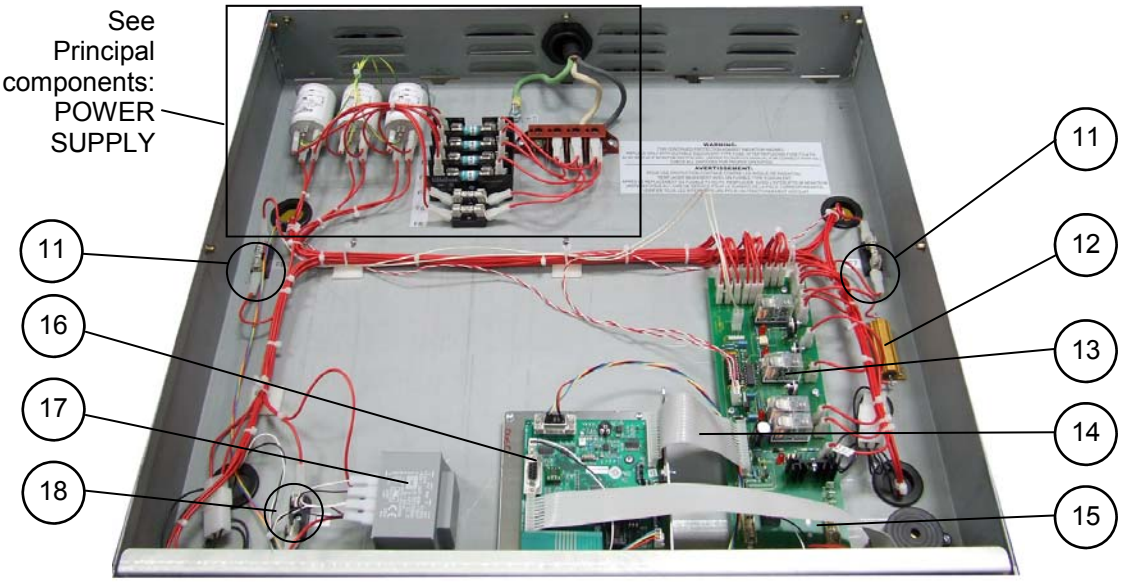
No.	Description	Part No.
1	Cavity High limit Stat	30Z1024
2	Motor Start Capacitor 2µF (Blue)	30Z1298
3	Filter 16A	30Z1339
4	Air filter	SA276
5	Stirrer motor Assembly	SA238
5A	Stirrer (inside cavity)	SA213
6	Microswitch SW1 Microswitch SW2	30Z1294
7	Door Hinge Assembly RH	SA202
8	Magnetron Cooling Fan	30Z1295
26	HV Capacitor 2500V 1.1µF (50HZ models)	30Z1242
26	HV Capacitor 2500V 0.88µF (60HZ models)	30Z1251
26A	HV Capacitor clip (1.1µF) 103mm	31Z1239
26A	HV Capacitor clip (0.88µF) 88mm	31Z0521

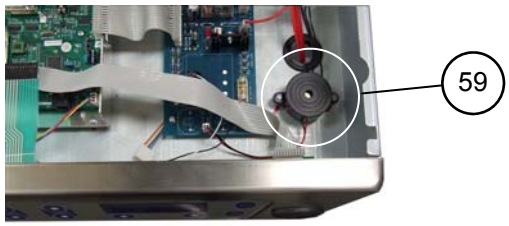
PRINCIPAL COMPONENTS: Left Side



No.	Description	Part No.
3	Filter 16A	30Z1339
4	Air filter	SA276
5	Stirrer motor Assembly	SA238
5A	Stirrer (inside cavity)	SA213
6	Microswitch SW3 Microswitch SW4	30Z1294
9	Door Hinge Assembly LH	SA203
10	Motor Controller	30Z1319
25	HV Capacitor 2500V 1.0µF (50Hz models)	30Z1241
25	HV Capacitor 2500V 0.88µF (60Hz models)	30Z1251
25A	HV Capacitor clip (1.0µF) 95mm	31Z1261
25A	HV Capacitor clip (0.88µF) 88mm	31Z1261

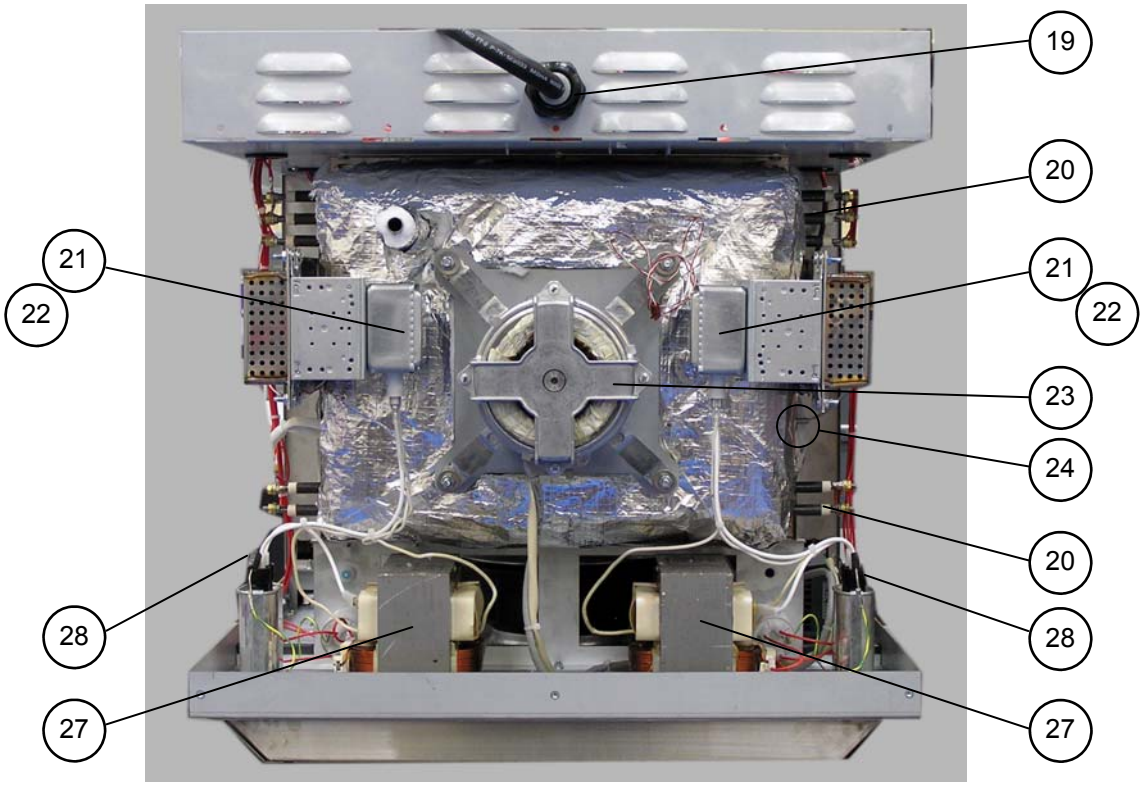
PRINCIPAL COMPONENTS: Control Box





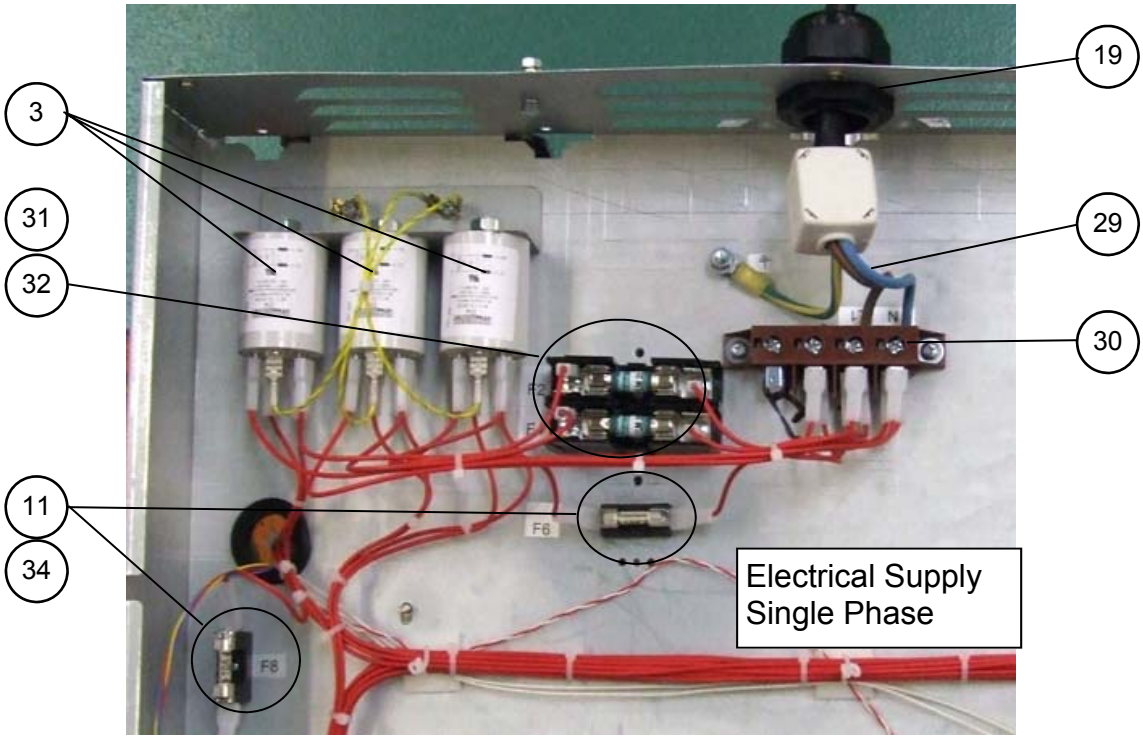
No.	Description	Part No.
11	Fuse 10A HRC	30Z0217
12	Gold resistor (220R)	30Z0235
13	Relay PCB Assembly	11K0004
14	Ribbon Cable 15way	11Z0298
15	Ribbon Cable 10way MenuKey	11M0117
16	Logic PCB Assembly Version 2.0	SA231
16	Logic PCB Assembly Version 3.0	SA260
17	Transformer LT (Low voltage)	30Z1155
18	Fuse 1A	30Z0957
59	Sounder	SA257

PRINCIPAL COMPONENTS: Back view

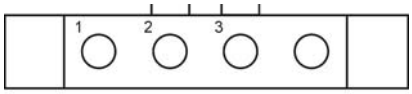


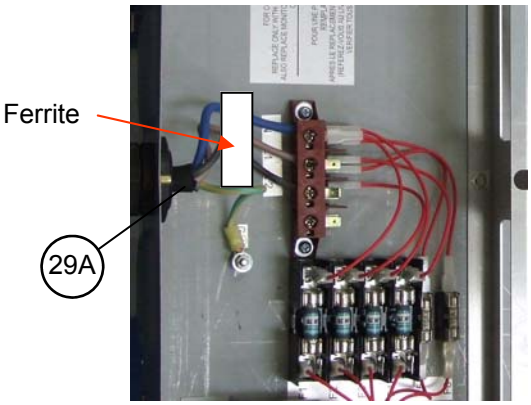
No.	Description	Part No.
19	Cable Gland	31Z0500
	Cable Gland Nut	31Z0499
20	Heater Element **220V** 650W	DV0606
20	Heater Element **240V** 650W	DV0607
21	Magnetron	30Z1171
22	Magnetron Thermistor Assembly	SA234
23	Convection (Hot Air) Motor Assembly	SA208
24	Thermistor Cavity	30Z1315
27	Transformer 208/220/240V **50Hz**	30Z1233
27	Transformer 208/220/240V **60Hz**	30Z1230
28	HT Rectifier	11H0010

PRINCIPAL COMPONENTS: Power Supply



Electrical Supply
Twin Phase:
2P+N+Earth

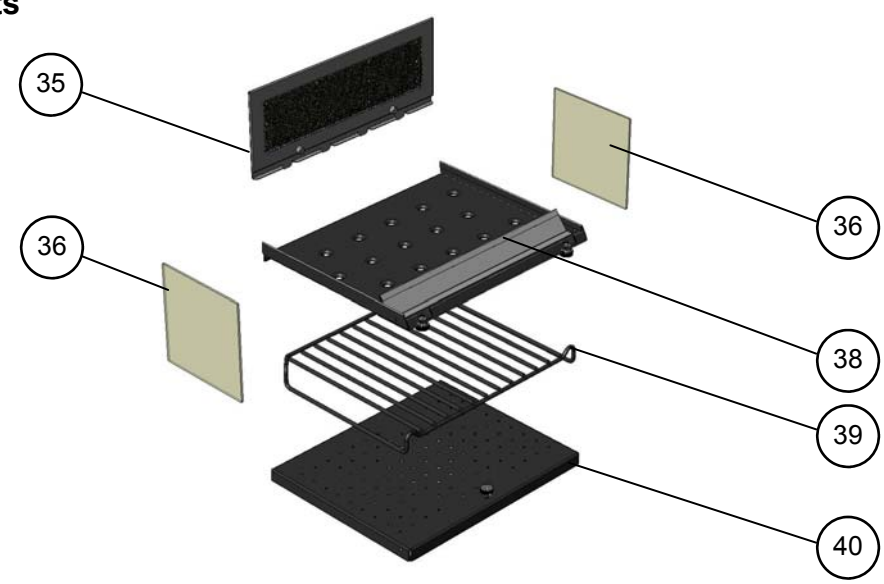




No.	Description	Part No.
3	Filter 16A	30Z1339
11	Fuse 10A HRC	30Z0217
19	Cable Gland	31Z0500
	Cable Gland Nut	31Z0499
29	Electrical Supply Lead Assembly Single Phase	SA226
29A	Electrical Supply Lead Assembly Twin Phase	SA225
30	Terminal Block	31Z0447
31	Fuse 20A FLM	30Z1177
32	Fuse Holder 30A	30Z1178
34	Fuse Holder 10A	30Z0231

PRINCIPAL COMPONENTS

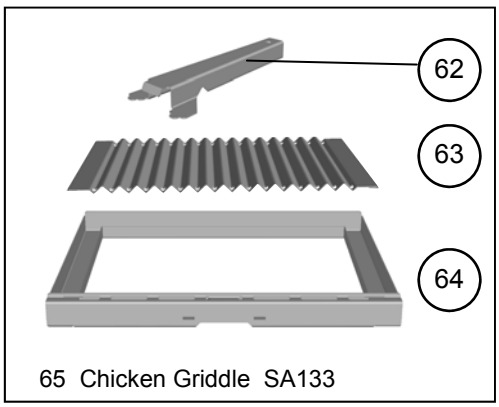
Cavity parts



No.	Description	Part No.
35*	Grease Filter (2 parts)	SA340 SA339
36	Stirrer Glass	DV0492
37*	Rack Support (Not shown)	DV0114
38	Upper Impinger plate	SA211
39	Rack	DV0275
40	Lower Impinger plate	SA266

* Parts 35 & 37 Contact Service Department

KFC Accessories

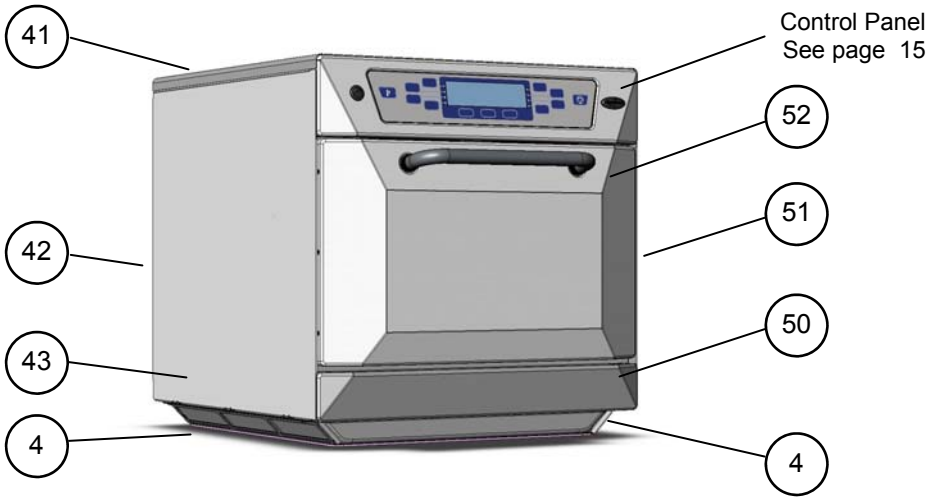


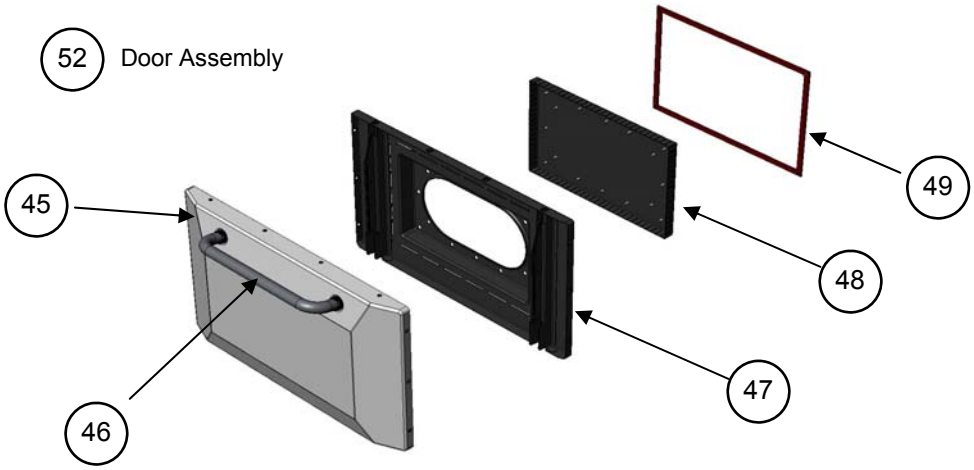
65 Chicken Griddle SA133

No.	Description	Part No.
60	Cool-down pan	32Z4028
61	Oven tray	MC3175
62	Handle Assembly	SA267
63	Griddle	DV0221
64	Griddle carrier	SA350
65	Chicken Griddle (SA350 + DV0221 + DV0267)	SA133

PRINCIPAL COMPONENTS

External Parts



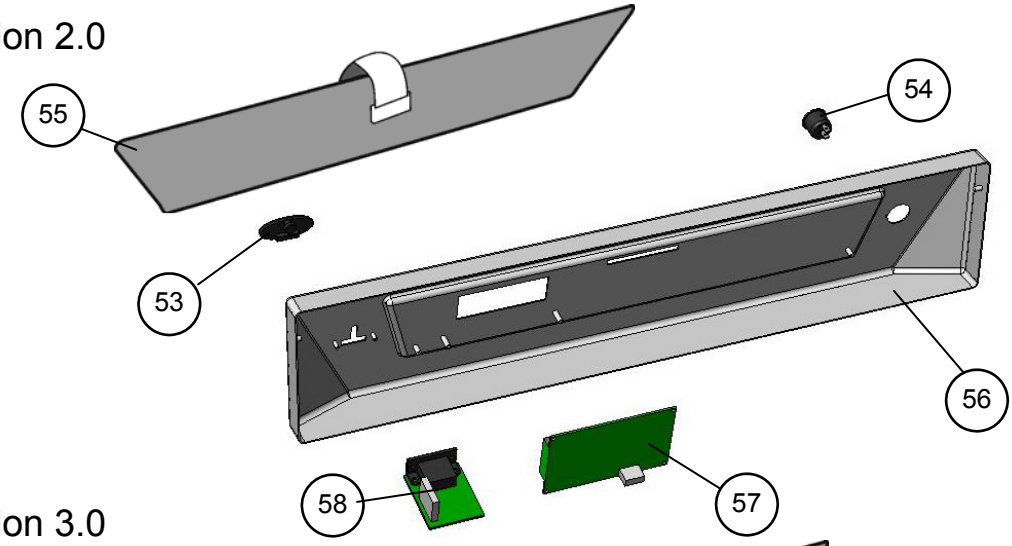


No.	Description	Part No.
4	Air Filter	SA276
41	Top Panel	DV0187
42	Rear Panel	SA329
43	Side Panel LH	DV0091
45	Door Skin	DV0501
46	Door Handle	32Z1066
47	Door Inner	SA331
48	Door Choke	DV0168
49	Door Seal	DV0305
	Door seal sealant (tube)	31Z0186
50	Bottom Trim	DV0037
51	Side Panel RH	DV0092
52	Door Assembly	SA111

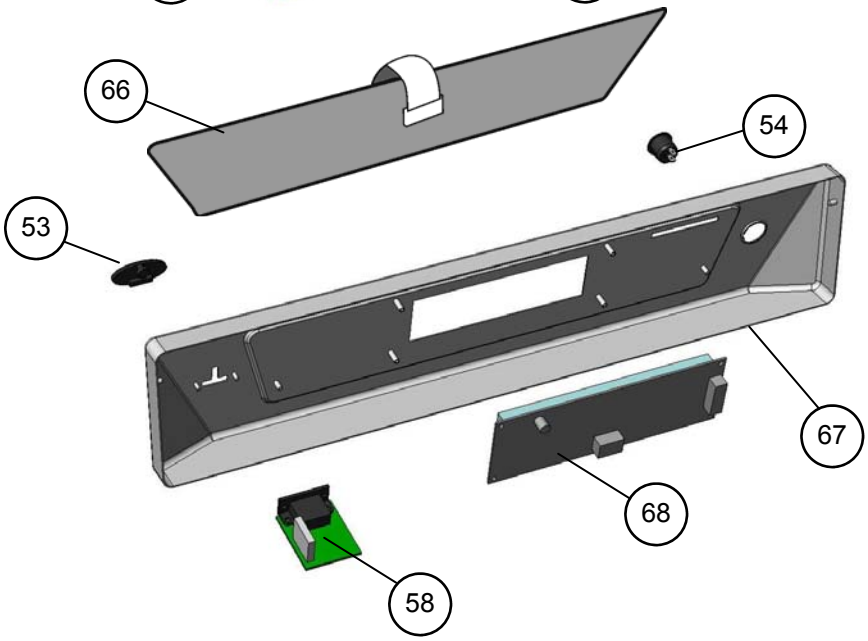
PRINCIPAL COMPONENTS

Electronic Control Panel Assembly

Version 2.0



Version 3.0



No.	Description	Part No.
53	MenuKey Dust Cover	DV0052
54	Power switch (On/Off)	30Z1318
55	GM Membrane Version 2.0	DV0055
56	Front Panel Version 2.0	DV0036
57	Display Assembly & Header Version 2.0	30Z1299
58	MenuKey Socket	11K0005
66	GM Membrane Version 3.0	DV0254
67	Front Panel Version 3.0	DV0249
68	Display Assembly & Header Version 3.0	30Z1324

Part number identification chart 1

Ref. No.	Description	Part No.
1	Cavity High limit Stat	30Z1024
2	Motor Start Capacitor 2µF (Blue)	30Z1298
3	Filter 16A	30Z1339
4	Air filter	SA276
5	Stirrer motor Assembly	SA238
5A	Stirrer (inside cavity)	SA213
6	Microswitch SW1, SW2, SW3, SW4	30Z1294
7	Door Hinge Assembly RH	SA202
8	Magnetron Cooling Fan	30Z1295
9	Door Hinge Assembly LH	SA203
10	Motor Controller	30Z1319
11	Fuse 10A HRC	30Z0217
12	Gold resistor (220R)	30Z0235
13	Relay PCB Assembly	11K0004
14	Ribbon Cable 15way	11Z0298
15	Ribbon Cable 10way MenuKey	11M0117
16	Logic PCB Assembly Version 2.0	SA231
16	Logic PCB Assembly Version 3.0	SA260
17	Transformer LT (Low voltage)	30Z1155
18	Fuse 1A	30Z0957
19	Cable Gland	31Z0500
	Cable Gland Nut	31Z0499
20	Heater Element **220V** 650W	DV0606
	Heater Element **240V** 650W	DV0607
21	Magnetron	30Z1171
22	Magnetron Thermistor Assembly	SA234
23	Convection (Hot Air) Motor Assembly	SA208
24	Thermistor Cavity	30Z1315
25	HV Capacitor 2500V 1.0µF (**50Hz** Models)	30Z1241
25	HV Capacitor 2500V 0.88µF (**60Hz** Models)	30Z1251
25A	HV Capacitor clip (1.0µF) 95mm	31Z1233
25A	HV Capacitor clip (0.88µF) 88mm	31Z1261
26	HV Capacitor 2500V 1.1µF (**50Hz** Models)	30Z1242
26A	HV Capacitor clip (1.1µF) 103mm	31Z1239
27	Transformer 208/220/240V **50Hz**	30Z1233
27	Transformer 208/220/240V **60Hz**	30Z1230
28	HT Rectifier	11H0010
29	Electrical Supply Lead Assembly	SA226
29A	Electrical Supply Lead Assembly Twin Phase	SA225
30	Terminal Block	31Z0447
31	Fuse 20A FLM	30Z1177

Part number identification chart 2

Ref. No.	Description	Part No.
32	Fuse Holder 30A	30Z1178
34	Fuse Holder 10A	30Z0231
35	Grease Filter (2 parts)	SA339 SA340
36	Stirrer Glass	DV0492
37	Rack Support	DV0114
38	Upper Impinger plate	SA211
39	Rack	DV0275
40	Lower Impinger plate	SA266
41	Top Trim	DV0187
42	Rear Panel	SA329
43	Side Panel LH	DV0091
44	Air Filter	SA302
45	Door Skin	DV0501
46	Door Handle	32Z1066
47	Door Inner	SA331
48	Door Choke	DV0168
49	Door Seal	DV0305
50	Bottom Trim	DV0037
51	Side Panel RH	DV0092
52	Door Assembly	SA111
53	MenuKey Dust Cover	DV0052
54	Power switch (On/Off)	30Z1318
55	Membrane GM Version Version 2.0	DV0055
56	Front Panel Version Version 2.0	DV0036
57	Display Assembly & Header Version 2.0	30Z1299
58	MenuKey Socket	11K0005
59	Sounder	SA257
60	Cool-down pan	32Z4028
61	Oven tray	MC3175
62	Handle Assembly	SA267
63	Griddle	DV0221
64	Griddle carrier	SA350
65	Chicken Griddle (SA350+DV0221+ DV0267)	SA133
66	GM Membrane Version 3.0	DV0254
67	Front Panel Version 3.0	DV0249
68	Display Assembly & Header Version 3.0	30Z1324
—	Door seal sealant (tube)	31Z0186
—	Stirrer cover sealant (tube)	31Z0527
—	Grease Filter Cartridge	SA340
—	Microswitch interlock Spring	31Z1247

PROCEDURE FOR POWER OUTPUT MEASUREMENT

The power output specification 1500W on this model is established under IEC 705 standard method. This method is only workable in Laboratory controlled conditions.

An approximate method is as follows:

Ensure the oven is cold before commencing the test

Before this test is carried out the oven PREHEAT temperature must be set to 0ºC as this enables the oven to be used in Microwave ONLY mode. On completing the test the Oven PREHEAT temperature should be restored to its previous setting.

EC402s Version 2.0 To set the PREHEAT temperature to 0ºC

1. Switch the oven on and immediately press the **Edit Preheat** function key, the ENTER PREHEAT TEMP screen will display (Note this screen is available for 5 seconds)
2. The oven display shows the current PREHEAT setting, make a note of this temperature
3. Enter **0**,**0**,**0** for 0ºC and press **Save**.
4. The display will now show the initial Edit Preheat/Profile screen for 10 seconds then the cold standby screen.
   Press the **PREHEAT** pad, the oven will not preheat but the READY TO COOK screen will appear in the display.

EC402s Version 3.0 To set the PREHEAT temperature to 0ºC

1. Switch the oven on and immediately press the **Edit Preheat Temp** function key, the OVEN TEMPERATURE screen will display (Note this screen is available for 5 seconds)
2. The oven display shows the current PREHEAT setting, make a note of this temperature
3. Hold down the **<< —** for **0ºC** and press **Save**.
4. The Categories screen will appear in the display.

Test procedure:

1. Fill one beaker (glass or plastic) with one litre (1.78 pints) of tap water at about 20ºC(68ºF) and measure the water temperature.
   (Use a thermometer with a $^{1}/_{10}$, 0.1 degree gauge).

2. Place the beaker in the centre of the cold cavity.

3. Version 2.0 Press the Manual Function Pad to enter **Manual Mode**
   Version 3.0 Press the lower RH function pad below the display to enter **Manual Mode**
   Set **Time** to 1 minute 3 seconds, Power to 100% and Fan to 0%.
   Press the **Start** pad and wait until the counter reaches zero.

4. Take the beaker out immediately stir the water with a plastic implement and measure the water temperature.

Calculate the temperature rise of water in the beaker.
The temperature rise of the water should be within the following range:

Temperature **Rise**
15ºC (27ºF) Minimum
20ºC (36ºF) Maximum

Manual Mode:
If this screen does not appear MANUAL MODE is set to OFF and must be changed to ON in the oven PROFILE.
Version 3.0
Switch Oven OFF then ON and immediately press the lower of the 4 pads on the RHS of the display. In OVEN PROFILE change **Manual Mode** to ON
Version 2.0
Switch Oven OFF then ON and immediately press the **Profile** pad. Press change to set OVEN MODE to PROGRAM/MANUAL

Note:
Power Output is affected by the line voltage under load.
For correct Power Output measurement the line voltage under load must be correct.

PROCEDURES FOR PRINCIPAL COMPONENTS TEST (1)

1. Power Transformer Test

You will need:

A Digital Multi-meter (D.M.M.)
A Megger or similar resistance meter using 500V d.c.

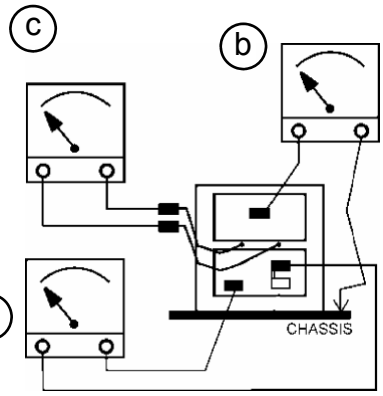
WARNING: High voltages and large currents are present at the High Voltage Capacitor. It is very dangerous to work near this part when the oven is on. **NEVER** make any voltage measurements at the High Voltage circuits, including the magnetron filament.

WARNING: Even when the oven is not cooking, the High Voltage Capacitor has High Voltages present because of the Soft Start circuit. Isolate the oven before testing.

See Safety Code (Page 3)

1 Isolate the oven from the mains supply.
2 Ensure that the High Voltage Capacitor is discharged before commencing work.
3 Remove all connections from the Power Transformer.
4 Using a D.M.M., check the resistance of the windings. Results should be as follows:

a	Mains winding between tags	Approx. 1.1 Ω
b	High Voltage winding	Approx. 60 Ω
c	Filament winding between terminals	Less than 1 Ω



5 Using a Megger, test the insulation resistance between:

Primary winding and chassis	Pass if over 10 MΩ
Filament winding and chassis	Pass if over 10 MΩ

One end of the High Voltage winding is connected to the chassis, so this is not tested.

2. High Voltage Capacitor Test

You will need:

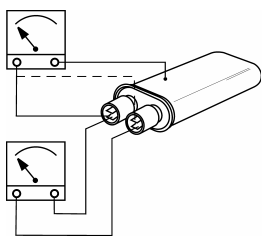
A Digital Multi-meter (D.M.M.)
A Megger or similar resistance meter using 500V d.c.

WARNING: High voltages and large currents are present at the High Voltage Capacitor. It is very dangerous to work near this part when the oven is on. **NEVER** make any voltage measurements at the High Voltage circuits, including the magnetron filament.

WARNING: Even when the oven is not cooking, the High Voltage Capacitor has High Voltages present because of the Soft Start circuit. Isolate the oven before testing.

See Safety Code (Page 3)

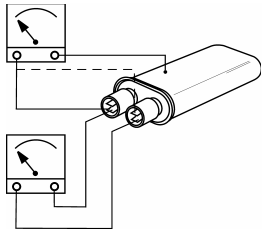
1. Isolate the oven from the mains supply.
2. Ensure that the High Voltage Capacitor is discharged before commencing work.
3. Remove all connections from the High Voltage Capacitor.
4. Using a D.M.M., check for continuity between the terminals & compare results with table on next page.



PROCEDURES FOR PRINCIPAL COMPONENTS TEST (2)

(High Voltage Capacitor Test continued, ensure steps 1-4 on previous page have been completed)

Between Terminals	Pass if approximately 10 MΩ
Between Terminals and Case	Pass if open circuit



5. Using a Megger, test the insulation resistance between the terminals and the case.

Between Terminals and Case	Pass if over 100 MΩ

3. High Voltage Rectifier Test

You will need:

A Megger or similar resistance meter using 500V d.c.

WARNING: High voltages and large currents are present at the High Voltage Capacitor. It is very dangerous to work near this part when the oven is on. **NEVER** make any voltage measurements at the High Voltage circuits, including the magnetron filament.

WARNING: Even when the oven is not cooking, the High Voltage Capacitor has High Voltages present because of the Soft Start circuit. Isolate the oven before testing.

See Safety Code (Page 3)

1. Isolate the oven from the mains supply.
2. Ensure that the High Voltage Capacitor is discharged before commencing work.
3. Remove all connections from the High Voltage Rectifier.
4. Using the Megger, test for continuity in both directions. Compare results with the table.

Open Circuit both ways	**FAIL**
Conducts one way only	**PASS**
Short Circuit both ways	**FAIL**
Conducts one way, leaks the other	**FAIL**

4. Magnetron Test

You will need:

A Megger or similar resistance meter using 500V d.c.

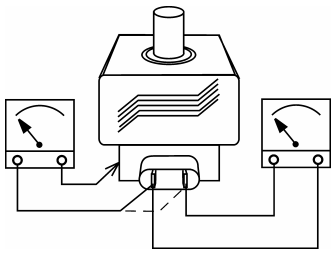
A Magnetron can be tested for an open filament or a short circuit by carrying out a continuity check.

WARNING: High voltages and large currents are present at the High Voltage Capacitor. It is very dangerous to work near this part when the oven is on. **NEVER** make any voltage measurements at the High Voltage circuits, including the magnetron filament.

WARNING: Even when the oven is not cooking, the High Voltage Capacitor has High Voltages present because of the Soft Start circuit. Isolate the oven before testing.

See Safety Code (Page 3)

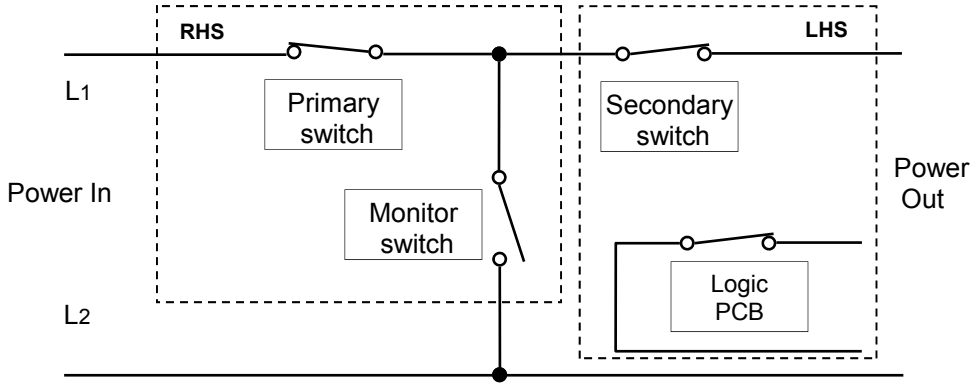
1. Isolate the oven from the mains supply.
2. Ensure that the High Voltage Capacitor is discharged before commencing work.
3. Remove all connections from the Magnetron.
4. A continuity check across the Filament terminals should be 1ohm or less
5. A continuity check between each filament terminal and the metal outer should read open.



PROCEDURE FOR DOOR INTERLOCK ADJUSTMENT AND TEST 1

The door on the 402s oven is monitored by four microswitches. Three are used in the conventional "Primary, Secondary and Monitor" switch arrangement shown below and the fourth sends a signal to the Logic PCB. The switches operate as follows:

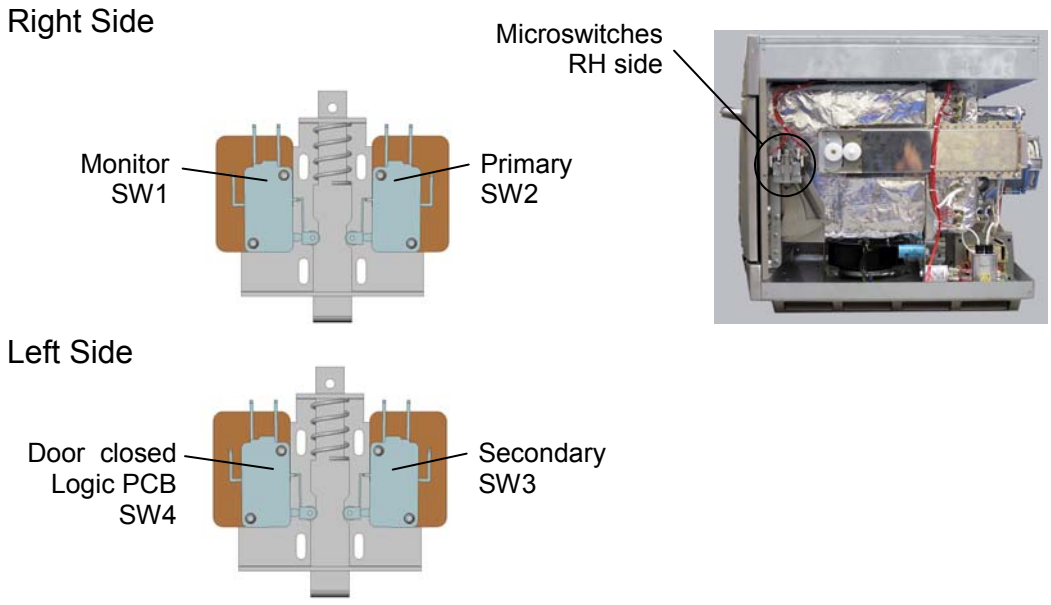
Door Interlock Arrangement: Switches shown in Door Closed position



1. **Monitor switch**
   The Monitor switch will produce a short circuit across the mains supply when the door is opened if the Primary interlock switch is faulty, thus blowing the microwave fuse and rendering the oven inoperative.

2. **Primary Interlock and Secondary Interlock**
   The Primary switch will cut off the microwave emissions from the oven when the door is opened by breaking the electrical supply circuit to the transformers. The Secondary interlock switch will cut off the microwave emission if the Primary switch has failed.

Note:
If operation of the Monitor switch has caused the Microwave Fuse to blow, the Primary and Monitor microswitches must be changed as they may have been damaged by the high short-circuit currents involved.



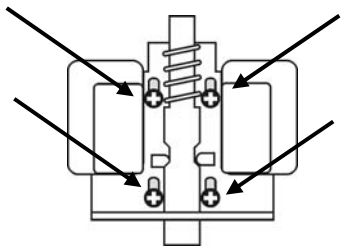
PROCEDURE FOR DOOR INTERLOCK ADJUSTMENT AND TEST 2

It is vital that the microswitches are adjusted to the correct position. There are two sets switch assemblies located either side of the oven.

The interlocks ensure that the oven will not operate microwave with the door open.

WARNING

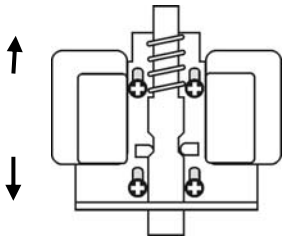
Before adjusting the microswitch assemblies ensure that the oven has been isolated from the electrical supply.
Please note the terminals on the microswitches remain live when the oven is switched off, so complete isolation is essential.



Objective

With a 1mm spacer located as shown, both switches on both sides should be activated/ closed position.

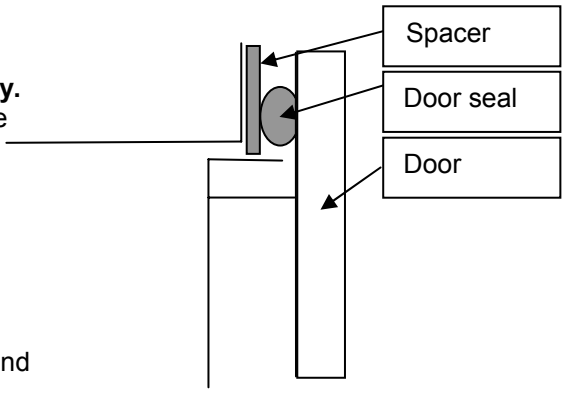
With a 5mm spacer located as shown SW2 and SW3 should be open.



Method of adjustment.

By loosening the four screws on each mounting bracket the microswitch assembly can be raised or lowered and thereby the switches can be made to operate at different door positions.

Procedure.



1. **Isolate the oven from the Electrical supply.**
2. Place a 1mm spacer between the cavity face and the door seal as shown.
3. Working on the right hand side, adjust the bracket so the SW2 'just' operates.
4. Working on the left hand side, adjust the bracket so that SW3 'just' operates.
5. Remove the 1mm spacer and then place a 5mm spacer in the same position.
   Check that SW2 and SW3 are open circuit and not operated.
6. Repeat the steps above to ensure the setup is correct.
7. Ensure that all the screws are tightened.
8. Reconnect the electrical supply.

PRINCIPAL COMPONENTS: Hot Air Motor & Controller 1

Convection and Fan Speed Control

The convection heat is provided by 5 elements located in the hot box at the rear of the oven cavity. The hot air from the hot box passes over catalytic converters and is circulated into the bottom and top of the cavity through the impinger plates. It returns through the removable grease filter at the back of the cavity and into the fan.

Convection motor

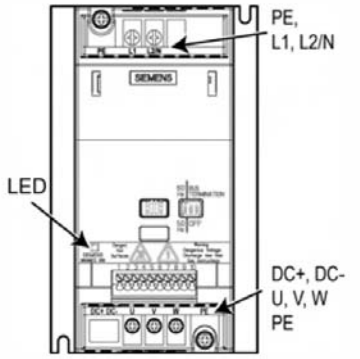
The convection motor Is a 3-phase AC motor having a maximum speed of 7200 rpm controlled by a motor speed controller.
The windings are thermally protected and in the event of a thermal fault a trip will operate and shut down the motor speed controller.

Step	Motor/ controller fault finding
1	Electrical supply into motor controller
2	Three phase connections to motor
3	Speed Controller connections to logic board
4	Motor thermal cut-out (short circuit)
5	Motor rotates freely/ not seized
6	Motor winding resistances: Blue-Black 3 Ohms—4 Ohms Black-Brown 3 Ohms—4 Ohms Brown-Blue 3 Ohms—4 Ohms Black or Brown or Blue to Earth (Open circuit)

PRINCIPAL COMPONENTS: Hot Air Motor & Controller 2

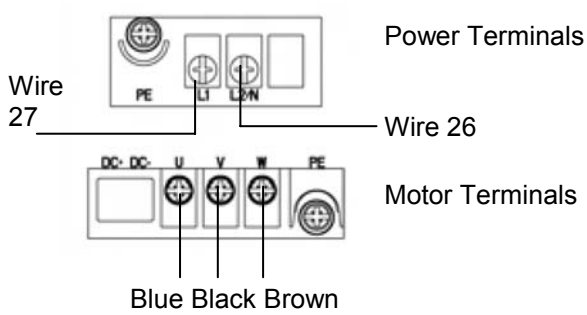
Motor Controller
Provides an AC, 3-phase switched mode drive to the convection motor and is controlled by a 0 - 10 Volt signal from the logic board. This allows the motor to be adjusted from approximately 1500 rpm to 7000 rpm in steps of 5%.

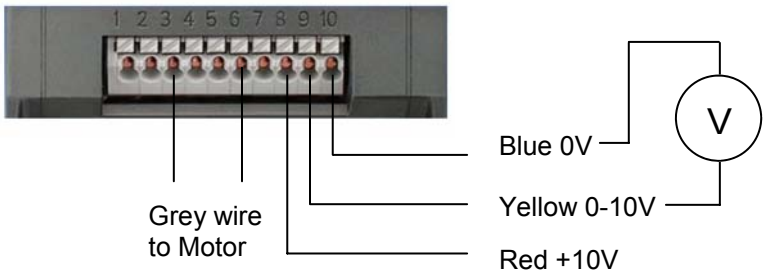
Door Open = 1500 RPM
Door Closed (not cooking) = 3500 RPM
Door Closed (cooking) = as specified by program or setting



Motor Speed and Logic board voltage table

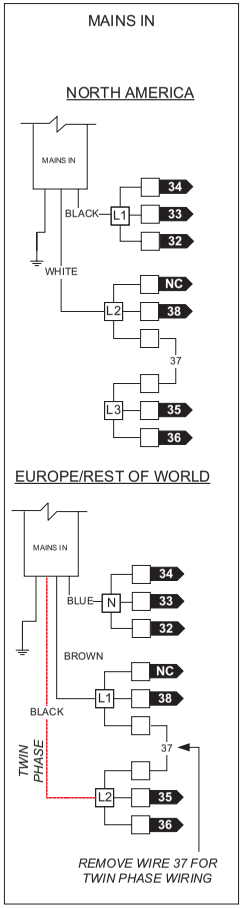
Fan speed %	Voltage dc	RPM	Condition
100%	10V	7000	Full Speed
50%	5V	3000	Door Closed
20%	2V	1500	Door Open

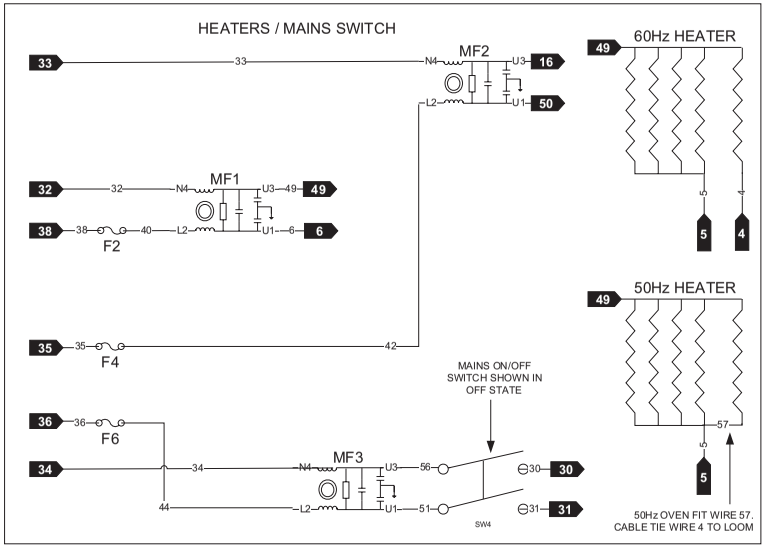


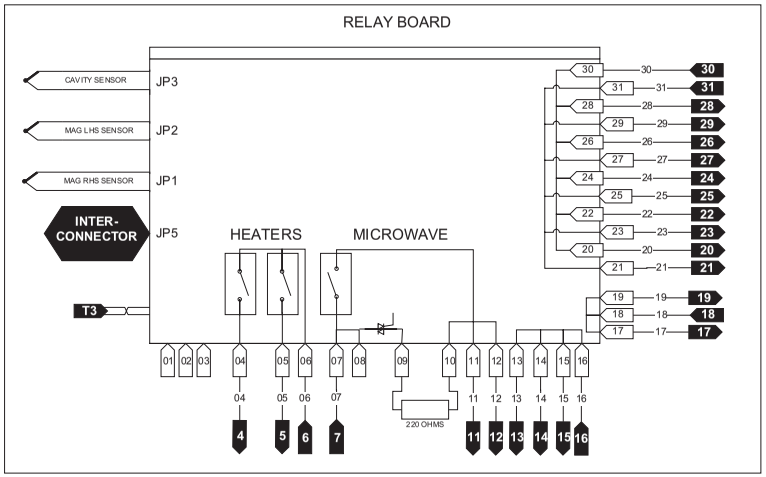


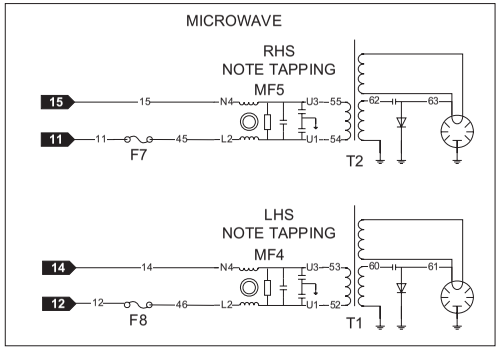
Displays and messages: LED status display

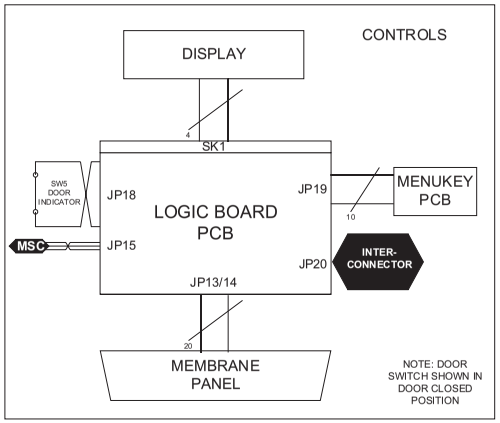
LED	Meaning	Position
LED Off	Inverter Off / No supply	LED 
1000 ms On/1000 ms Off	Power On / Ready	
LED On steadily	Inverter Running	
500 ms On / 200 ms Off	General Warning	
100 ms On / 100 ms Off	Fault Condition	

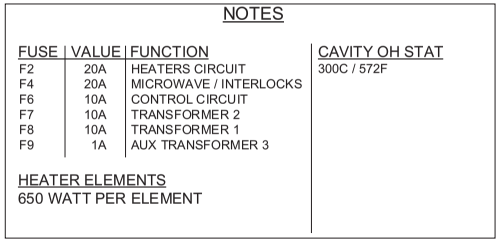


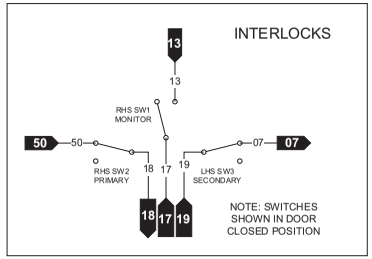


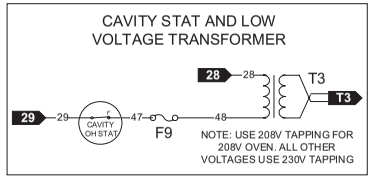


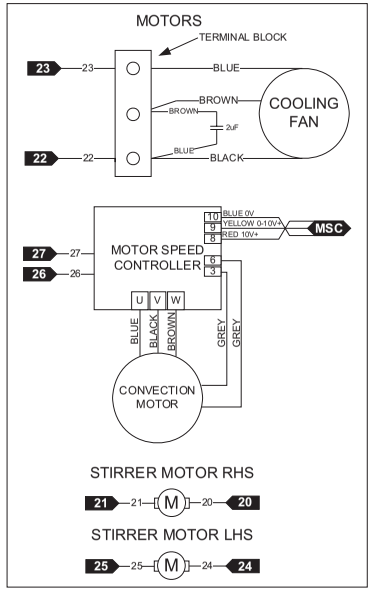












CIRCUIT DIAGRAM: Issue 9

Trouble-Shooting Guide

Is the problem Food Quality or Fundamental Operational Issue?

Food Quality

Standard Food Quality Checks

- Check that the PREHEAT temperature is set correctly.
  See User Manual.
- Check that the food being cooked has been stored at the correct temperature.
- Check that the correct program is being used.

Still Have a problem:
Select a Category.

- **Cold Food Page 29**
- **Core TemperaturesLow Page 29**

Fundamental

Standard Electrical Checks

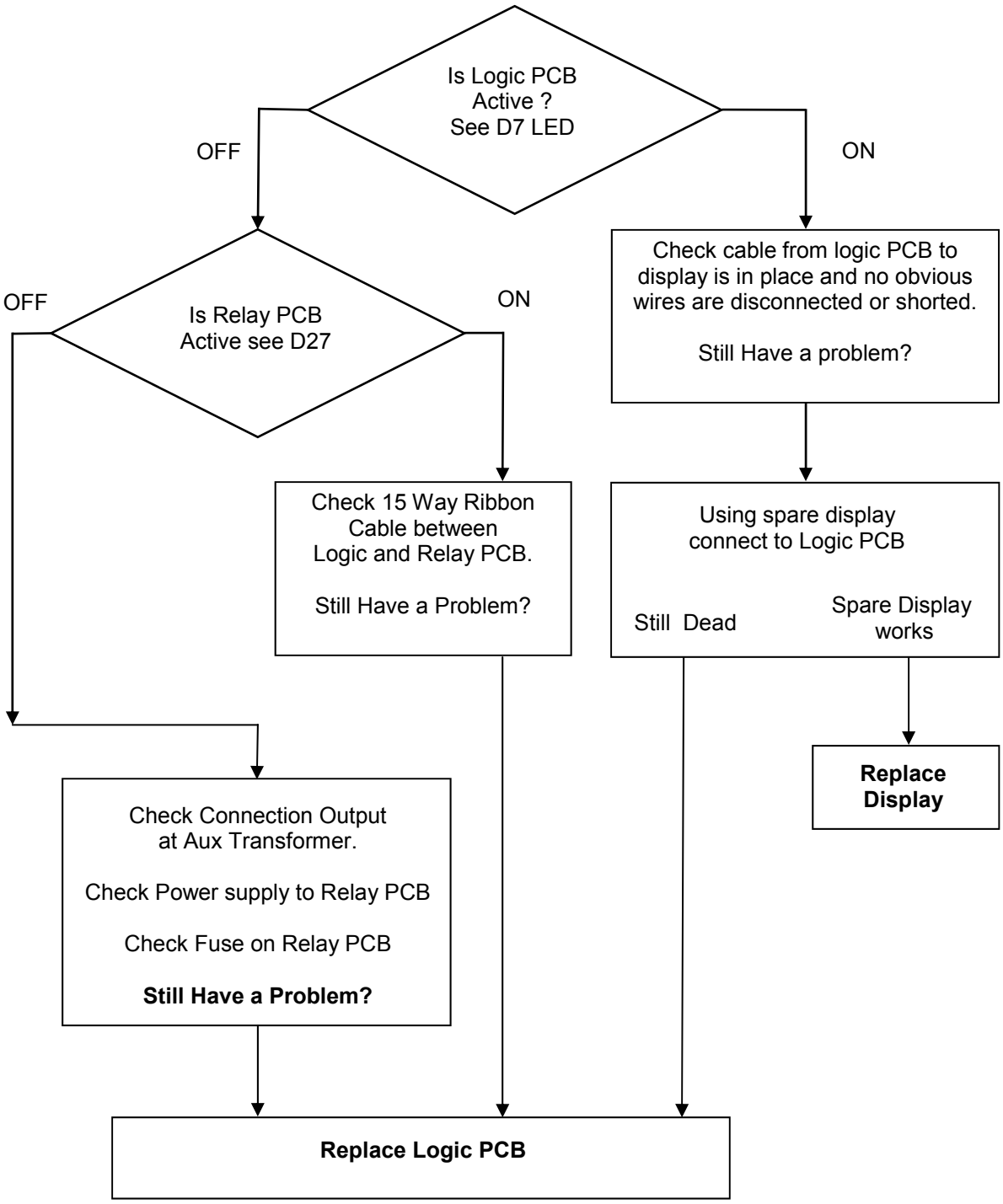
- Check that oven is connected to an Electricl Power supply and that any trip that supplies the unit is not switched off.
- Check that the oven is switched on.
- Check the Electricl Power supply voltage at the input terminal block.
- Check that all fuses are intact.
- Check that the overheat stat has not tripped this can be checked by measuring the voltage across the Auxiliary transformer.

Still Have a problem:
Select a Category.

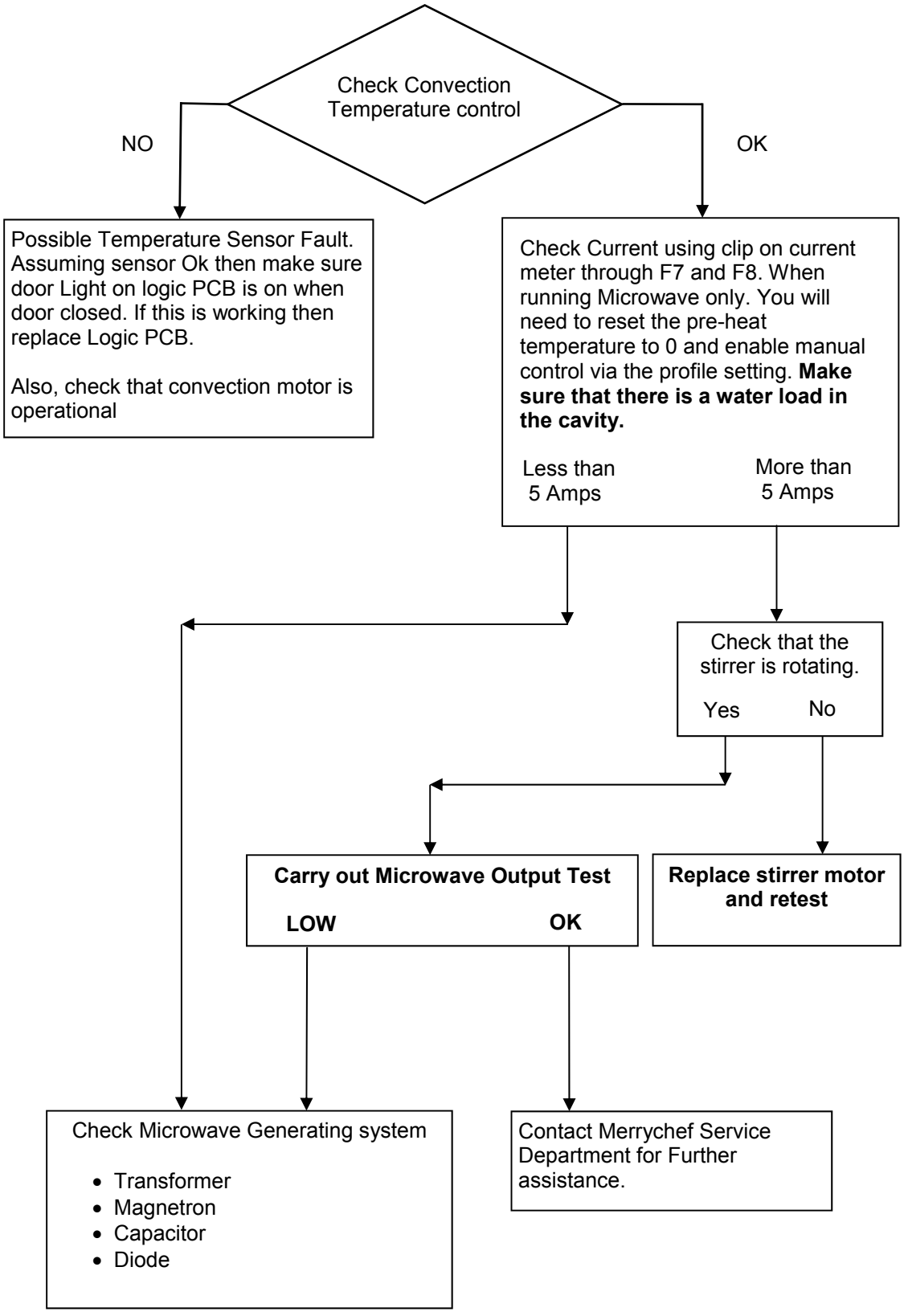
- **No Display Page 28**
- **Cavity Sensor Error Page 30**
- **Magnetron / Over heat errors Page 31**

Note : The following Diagnosis procedures may not expose all possible errors but have been included for general guidance.

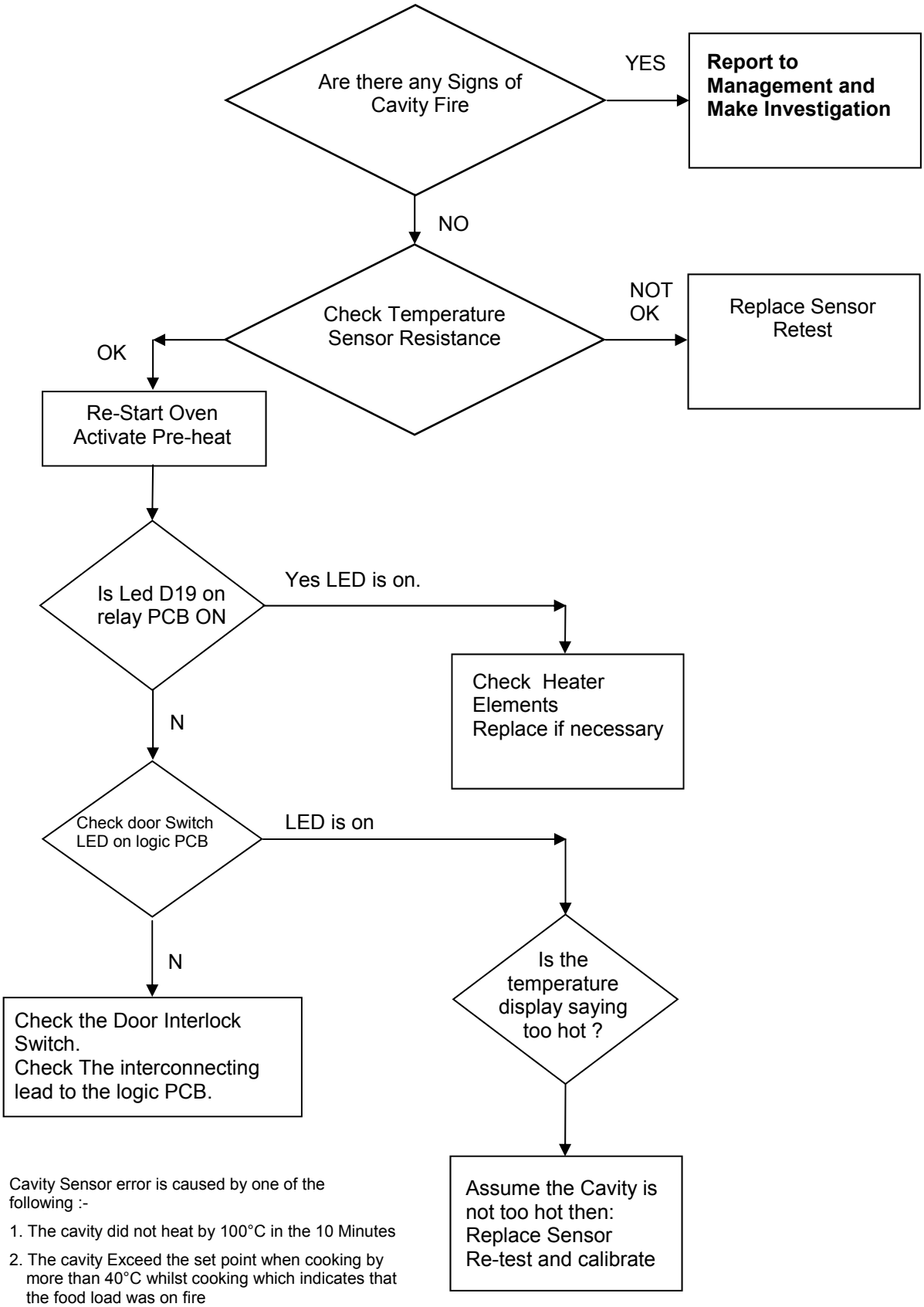
No Display


Is Logic PCB
Active ?
See D7 LED
OFF
ON
Is Relay PCB
Active see D27
OFF
ON
Check cable from logic PCB to display is in place and no obvious wires are disconnected or shorted.
Still Have a problem?
Check 15 Way Ribbon Cable between Logic and Relay PCB.
Still Have a Problem?
Using spare display connect to Logic PCB
Still Dead
Spare Display works
Replace Display
Check Connection Output at Aux Transformer.
Check Power supply to Relay PCB
Check Fuse on Relay PCB
Still Have a Problem?
Replace Logic PCB

Cold Food


Check Convection Temperature control
NO
OK
Possible Temperature Sensor Fault. Assuming sensor Ok then make sure door Light on logic PCB is on when door closed. If this is working then replace Logic PCB.
Also, check that convection motor is operational
Check Current using clip on current meter through F7 and F8. When running Microwave only. You will need to reset the pre-heat temperature to 0 and enable manual control via the profile setting. Make sure that there is a water load in the cavity.
Less than 5 Amps
More than 5 Amps
Check that the stirrer is rotating.
Yes
No
Carry out Microwave Output Test
LOW
OK
Replace stirrer motor and retest
Check Microwave Generating system
Transformer
Magnetron
Capacitor
Diode
Contact Merrychef Service Department for Further assistance.

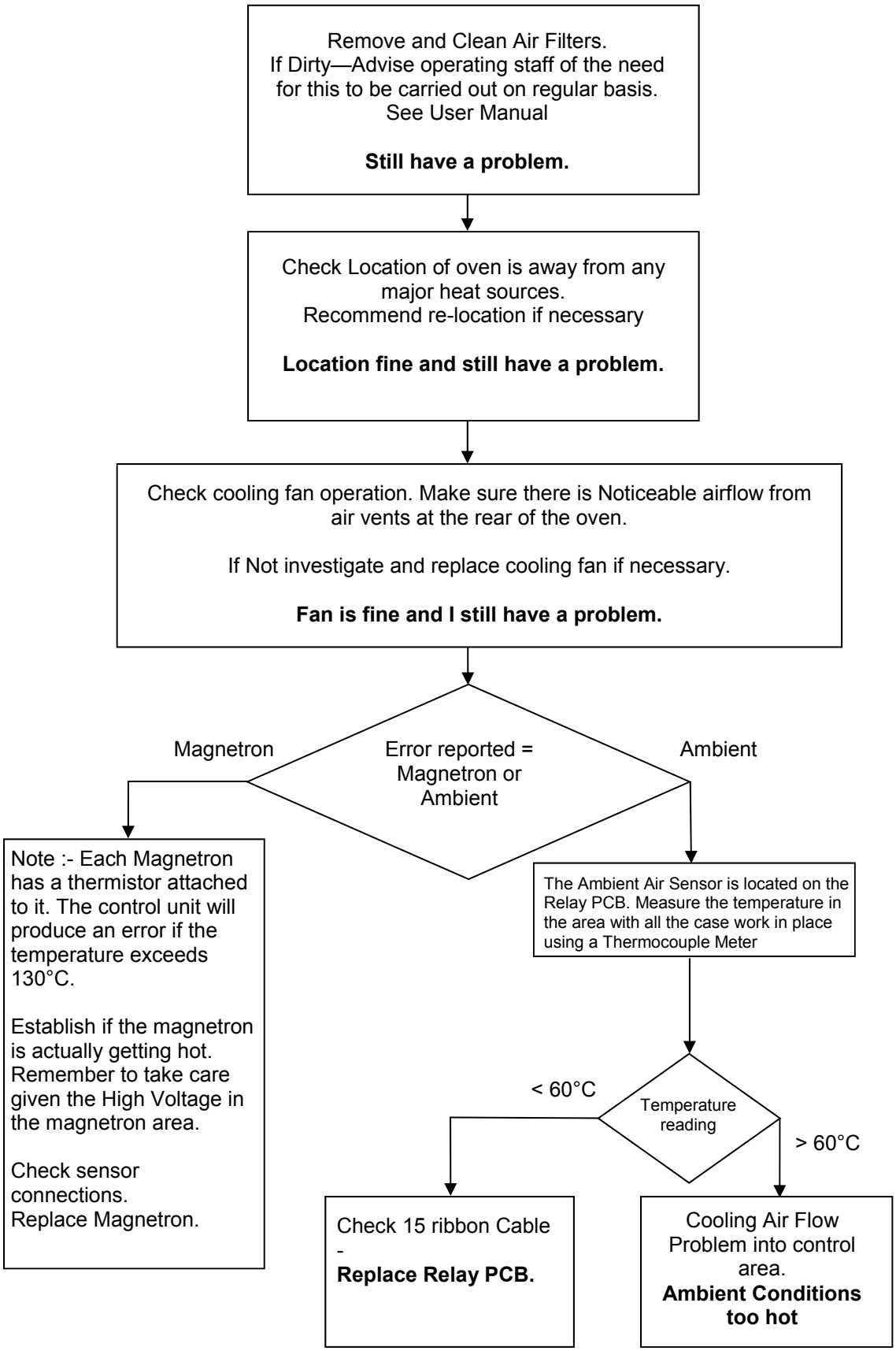
Cavity Sensor Error



Cavity Sensor error is caused by one of the following :-

1. The cavity did not heat by 100°C in the 10 Minutes
2. The cavity Exceed the set point when cooking by more than 40°C whilst cooking which indicates that the food load was on fire

Magnetron / Overheat issues



APPENDIX 1: TEMPERATURE SENSOR RESISTANCE DATA

Temperature Sensor Resistance

Temp °F	Temp °C	Min. Rate kΩ	Standard Rate kΩ	Max. Rate kΩ
212	100	11.490	13.060	14.810
302	150	2.803	3.161	3.434
392	200	0.950	1.000	1.050
482	250	0.3572	0.3865	0.4171

R(200)°C = 1 kΩ ± 5%

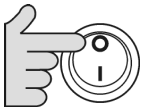
Note:
These resistances will only be apparent in a stable cavity temperature as the sensor has a slow response time.

APPENDIX 2: MenuKey Version 2.0 models

The MenuKey System automatically changes all the cooking programs on the oven from a pre-programmed electronic key.

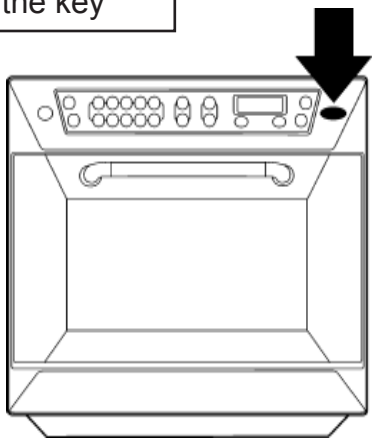
To change the menus on the oven:

1 Ensure the power switch is **OFF**.



2 Lift the **MenuKey** cover in the top front panel of the oven and put the key in the slot.

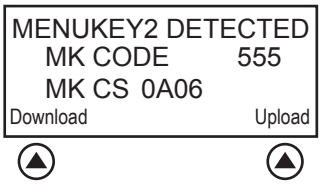
Do not remove the key during download sequence as this could corrupt the data on the key



3 With the key still in place switch the power switch **ON**.
The oven will now go through the program download sequence by displaying the following:

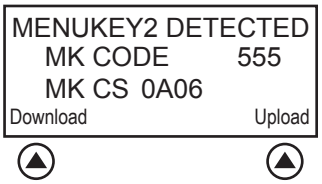
The MenuKey Code. e.g. 555

The MenuKey CS e.g. 0A06
MenuKey CS (checksum) confirms the menus on this key are valid for the MenuKey Code.

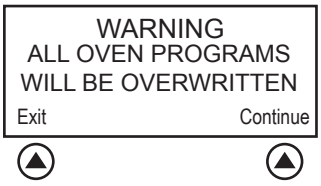


4 Confirm that the MenuKey Code and MenuKey CS are correct and press **Download** Function key to load the programs into the Oven memory.

Download

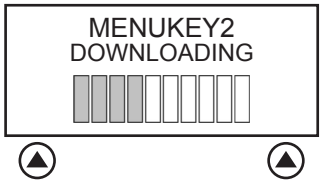


Note: Downloading from a MenuKey will clear all the existing programs



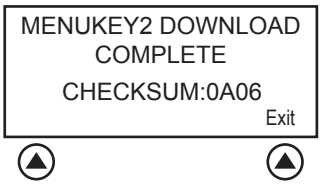
Check that the key is correct then press the **Continue** function key to proceed with the Download.

Continue

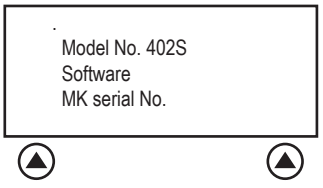


On completion of the download press the **Exit** function key to return the oven to standby mode. The display briefly will show the following:

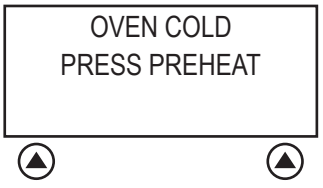
Exit



Oven Model No. Software & MenuKey serial No.



The standby screen will then display



Remove the MenuKey and keep in a safe place.

APPENDIX 2: MenuKey Version 3.0 models

The MenuKey System automatically changes all the cooking programs on the oven from a pre-programmed electronic key.

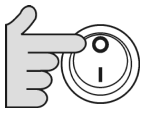
To change the menus on the oven:

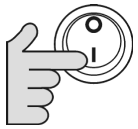
WARNING
Downloading from a MenuKey will clear all the existing programs

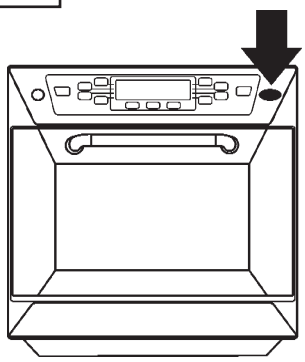
Do not remove the key during download sequence as this could corrupt the data on the key

MENUKEY2

Check that the key has the correct number/code for the programs you want to load into the oven memory







1 Ensure the power switch is **OFF**.

2 Lift the **MenuKey** cover in the top front panel of the oven and put the key in the slot.

3 With the key still in place switch the power switch **ON**. The oven will now go through the program download sequence by displaying the following:

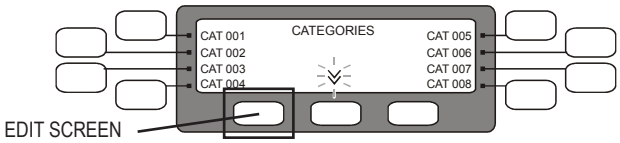
MenuKey Detected Please Wait	Copying Programs from MenuKey to Oven	Verifying Programs Copied Correctly	MenuKey Copied Successfully

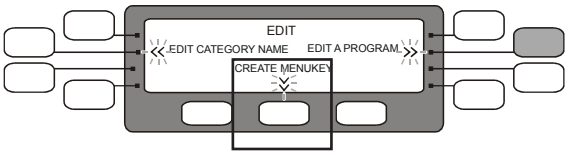
The display briefly will show the following : Oven Model No., Software & MenuKey serial No. The Oven will then commence heating up to the PREHEAT temperature ready to cook.

4 Remove the MenuKey and keep in a safe place.

Saving Programs to a MenuKey

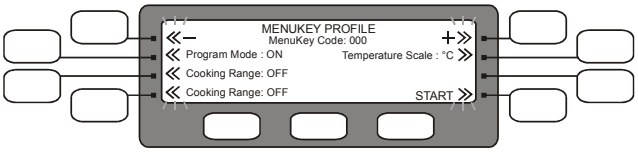
In the **CATEGORIES** screen select **EDIT SCREEN** (Pad name hidden) then select **CREATE MENUKEY**





1 Enter a number for the MenuKey Code to identify the new MenuKey, use the +/- Function Pads.

For an explanation of the following features see Setting the Oven Profile Page 11



2 Set the Program Mode to **ON** or **OFF**,
3 Set Manual Mode to **ON** or **OFF**:
4 Enter the Lower Band temperature setting **15-75°C**
5 Set the oven Temperature Scale **°C**

Insert a MenuKey and press START to copy the programs. The display shows the following:

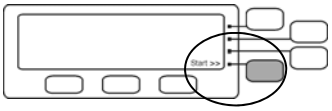
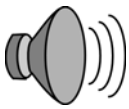
WARNING
Any programs already on the key will be deleted

Copying Programs from Oven to MenuKey	Verifying Programs Copied Correctly	MenuKey Copied Successfully

The Display returns to the CATEGORIES screen and the Oven will heat up to the PREHEAT temperature ready to cook.

APPENDIX 3: Cool Down Procedure

To cool down and clean a hot oven

Action	EC402s V2.0	EC 402s V3.0
To commence **Cool Down** procedure Press		
Place Ice in cavity 	COOL DOWN MODE PLACE ICE IN CAVITY	COOL DOWN MODE PLACE LOAD IN CAVITYAND PRESS START
Press	Continue 	 Start
The oven cools down for approximately 30 minutes	COOL DOWN MODE OVEN HOT PLEASE WAIT (Also in Spanish)	COOL DOWN MODE OVEN HOT PLEASE WAIT
Cycle ends 	COOL DOWN COMPLETE READY FOR CLEANING	Turn oven off and ensure Air Filters are clean
Switch oven off ready for cleaning		

APPENDIX 3: CLEANING: 1

For the oven to operate at peak efficiency, the cavity, door and air filters and grease filter must be kept clean.

A daily cleaning routine will ensure that you comply with the required hygiene standards and will help to maintain and prolong the efficiency of your oven.

Follow the SAFETY INSTRUCTIONS at the beginning of this manual.

WARNING: DO NOT use caustic cleaners on any part of the oven or oven cavity as it will cause permanent damage to the Catalytic Convertors

- **ALWAYS switch off at the electrical supply before cleaning**
- **Complete COOL DOWN procedure and allow the oven and accessories to cool before commencing cleaning**
- **As required wipe out spillages with disposable paper wipes**
- **NEVER use steel wool, knives or harsh abrasives on any part of the oven**

Hot surface Hazard

Faults arising from neglect or misuse including use without clean filters in place are not covered by the guarantee. Service visits as a result of such faults will be chargeable.

As with all electrical appliances, it is wise to have the electrical connections inspected periodically.

DO NOT use the oven without clean air filters and cavity grease filter in place

START UP: OVEN COATING PROCEDURE (clean, cold oven)

1.
With the oven clean and cold, spray Merrychef Oven Protector onto the sponge

2.
Spread Oven Protector lightly onto all internal surfaces of the oven

3.
Spread Oven Protector lightly onto the internal surface of the oven door

4.
Switch the oven ON when the oven has reached operating temperature it will take 30 minutes to cure the Oven Protector.

Note: oven protector turns light brown when cured

APPENDIX 3: CLEANING: 1

- **ALWAYS switch off at the electrical supply and allow oven to cool before cleaning**
- **CAUTION: Allow the oven and accessories to cool before commencing cleaning**

WARNING: DO NOT use caustic cleaners on any part of the oven or oven cavity as it will cause permanent damage to the Catalytic Convertors

Equipment: Merrychef oven cleaner, Merrychef Oven Protector, heat proof gloves, protective rubber gloves, non–abrasive nylon scrub pad, cleaning towel and cloths, eye protection and dust mask (optional)

COLD OVEN: CLEANING INSTRUCTIONS (following cool down)

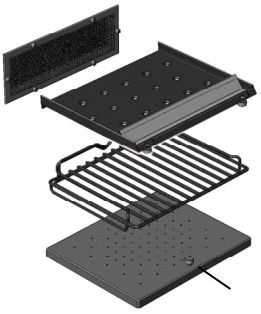
CAUTION: Wear protective rubber gloves when cleaning the oven

Oven Parts and filters & Oven Cavity

Wash all parts in warm soapy water. Wash off using a clean cloth and plenty of clean, warm water. Dry using a fresh, clean cloth.

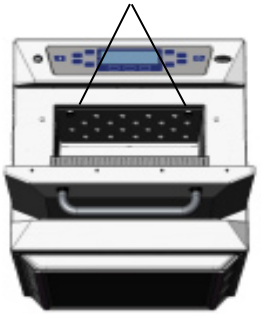
Remove air filters both sides

Remove the rack and lift out bottom impinger plate



Remove top impinger plate

Undo fasteners



To remove grease filter push down and lift out

If the door seals are damaged, the oven must be repaired by an approved Servicer.

DO NOT spray directly into the fan opening at the rear of the oven

1.
Wear protective rubber gloves and protective glasses carefully spray Merrychef Oven Cleaner onto the internal surfaces of the oven except door seals.
DO NOT spray directly into the fan opening at the rear of the oven

2.
For difficult areas leave to soak for 10 minutes. Leave the oven door open during cleaning. Use a non–abrasive nylon scrub pad/sponge to clean all internal surfaces and the inside of the door.

3.
Wash off using a clean cloth and plenty of clean warm water to rinse top, sides and back of oven. Dry using a fresh clean cloth or paper towel. Wipe the outside of the oven with a damp cloth.

4.
Replace clean oven parts

Grease Filter*
Top plate*
Bottom plate*
Air filters x2

DO NOT USE TOOLS

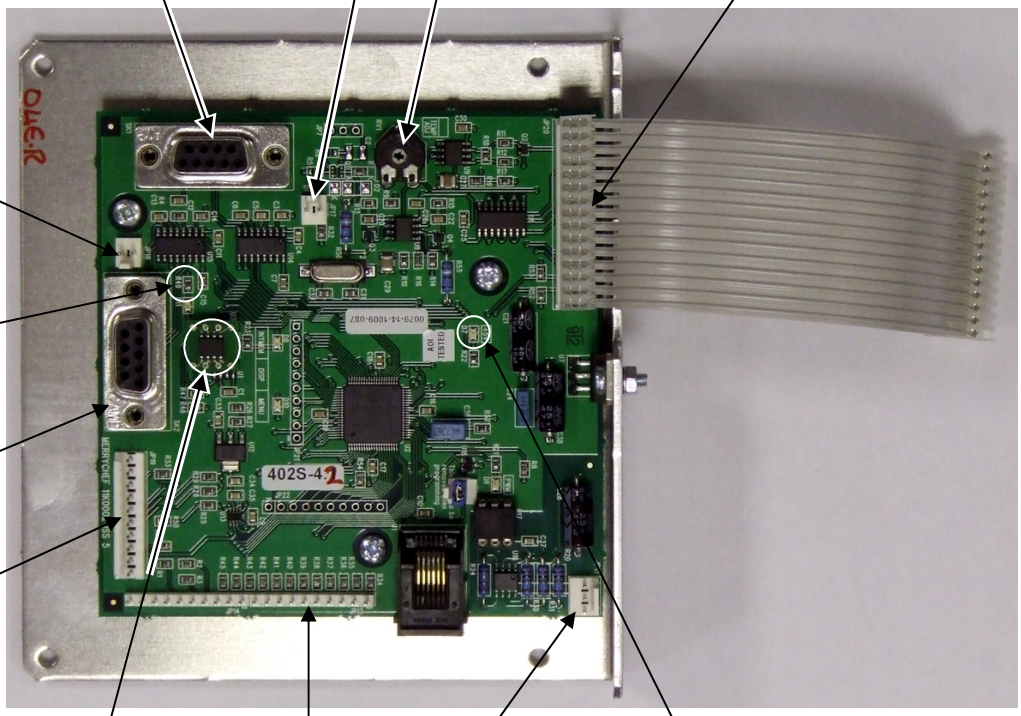
DO NOT use the oven without clean air filters and cavity grease filter in place

*When replacing impinger plates and the cavity grease filter use firm finger pressure to tighten fasteners
DO NOT USE TOOLS

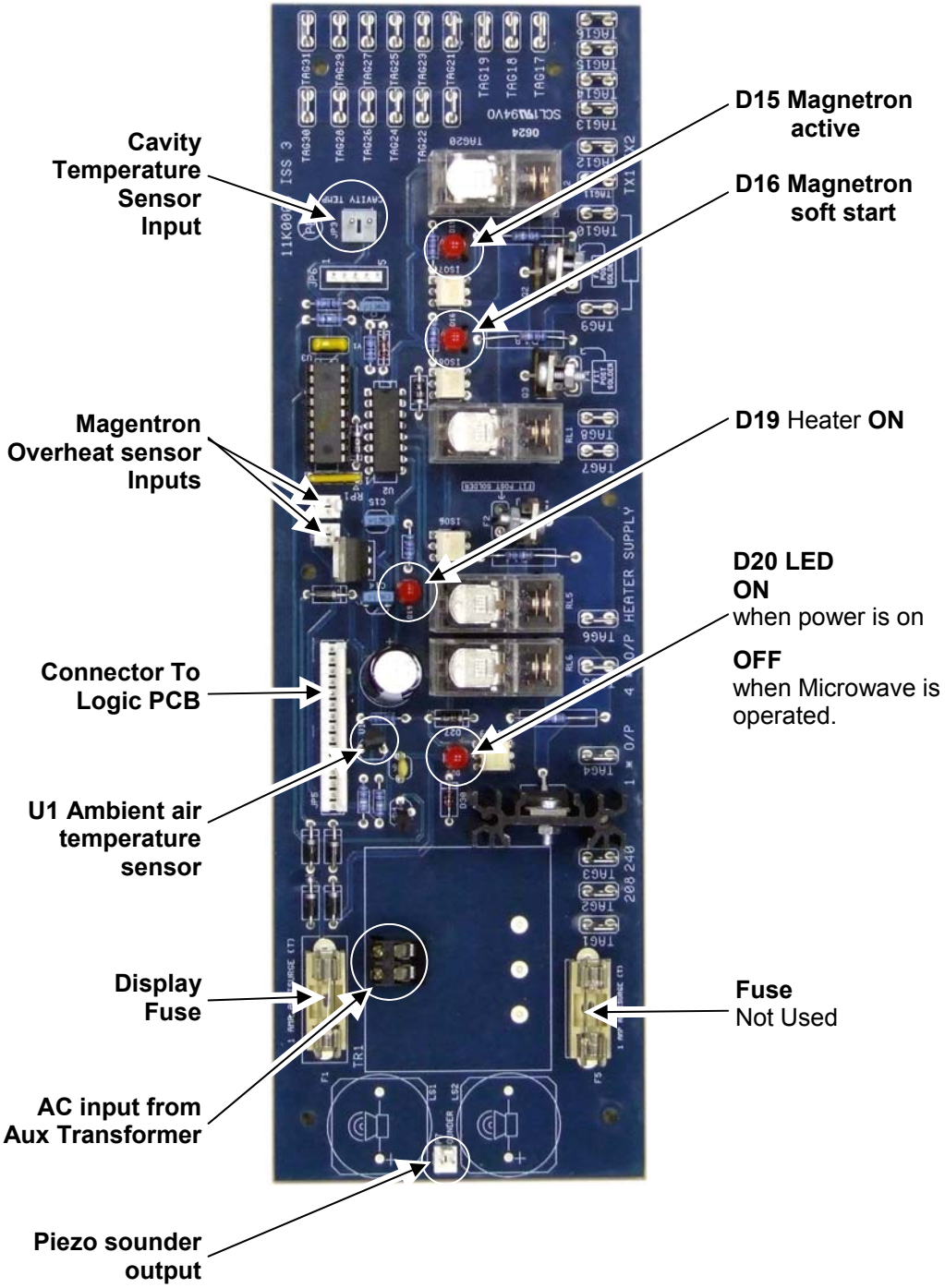
APPENDIX 4: Recommended spares lists UK/EC

Part No.	Description	Qty	Unit	First Aid Kit	Service Kit	1-5 Ovens	5-50 Ovens	50-100 Ovens	Piece Qty for 600 Ovens
11H0010	HT DIODE ASSY	2	EA	2	2	2	6	12	72
11K0004	RELAY PCB	1	EA		1	1	3	6	36
11M0117	DC VOLTAGE CONNECTOR 10 WAY	1	EA	1	1	1	3	6	36
11Z0298	15 WAY 0.1 RIBBON CABLE ASSY	1	EA	1	1	1	3	6	36
30Z0217	FUSE 1in 10A HRC	5	EA	5	5	5	15	30	180
30Z0231	FUSE HOLDER 1IN (13A)	3	EA	3	3	3	9	18	108
30Z0957	FUSE 1x1/4in 1A HBC (MAINS)	1	EA	1	1	1	3	6	36
30Z1339	FILTER 16A	2	EA	2	2	2	6	12	72
30Z1155	BLOCK TRANSFORMER B0012024	1	EA		1	1	3	6	36
30Z1171	MAGNETRON PANASONIC 2M244	2	EA	1	2	2	6	12	72
30Z1177	20 AMP LITTELFUSE FLM020	4	EA	4	4	4	12	24	144
30Z1178	30A FUSE HOLDER	4	EA	2	4	4	12	24	144
30Z1230	60HZ TRANS MULTI 208 220 240	2	EA	1	2	2	6	12	72
30Z1233	50HZ TRANS MULTI 208 220 240	2	EA	1	2	2	6	12	72
30Z1241	1.0uF 2500V (50HZ Model)	1	EA	1	2	2	6	12	72
30Z1242	1.1uF 2500V (50HZ Model)	1	EA	1	2	2	6	12	72
30Z1251	0.88uF 2500V (60Hz Model)	2	EA	2	4	2	6	12	72
30Z1294	MICROSWITCH WITH ROLLER	4	EA	2	2	2	6	12	72
30Z1295	MAGNETRON COOLING FAN	1	EA		1	1	3	6	36
30Z1298	CAPACITOR - MOTOR START - 2uF	1	EA		1	1	3	6	36
30Z1299	DISPLAY ASSY + HEADER	1	EA		1	1	3	6	36
30Z1300	THERMISTOR SENSOR 50K NTC	2	EA	2	2	2	6	12	72
30Z1315	THERMISTOR 150MM + LEAD 900MM	1	EA	1	1	1	3	6	36
30Z1318	2 POLE ROUND ROCKER SWITCH	1	EA	1	1	1	3	6	36
30Z1319	MOTOR SPEED CONTROLLER	1	EA		1	1	3	6	36
31Z0186	DOOR SEAL SEALANT - 1 TUBE	1	TUBE	1	1	2	6	12	72
31Z0527	STIRRER COVER - SEALANT 1 TUBE	1	TUBE	1	1	2	6	12	72
31Z1247	MICROSWITCH INTERLOCK SPRING	1	EA	1	1	1	3	6	36
32Z4028	COOL DOWN TRAY	1	EA			2	6	12	72
DV0037	BOTTOM TRIM	1	EA			1	1	2	12
DV0055	MEMBRANE PANEL V2.0 - 2.5	1	EA		1	1	3	6	36
DV0091	SIDE PANEL L/H	1	EA			1	1	2	12
DV0092	SIDE PANEL RH	1	EA			1	1	2	12
DV0187	TOP TRIM	1	EA			1	1	2	12
DV0305	DOOR SEAL 402s	1	EA	1	1	2	6	12	72
DV0203	SEAL - CERAMIC COVER	2	EA	2	2	2	6	12	72
DV0254	MEMBRANE PANEL V3.0	1	EA		1	1	3	6	36
DV0275	RACK V3.0	1	EA			1	3	6	36
DV0492	STIRRER COVER - CERAMIC	2	EA	2	2	2	6	12	72
DV0606	HEATER ELEMENT 220V	5	EA	3	5	5	15	30	180
DV0607	HEATER ELEMENT 240V	5	EA	3	5	5	15	30	180
SA111	DOOR ASSEMBLY V2.0 V3.0	1	EA			1	1	2	12
SA208	HOT AIR MOTOR ASSY	1	EA		1	1	3	6	36
SA225	MAINS LEAD ASSY (EU) 4-CORE	1	EA		1	1	2	4	24
SA226	MAINS LEAD ASSY (UK) 3-CORE	1	EA		1	1	2	4	24
SA231	LOGIC BOARD MAIN ASSY 2.0 & 2.5	1	EA		1	1	3	6	36
SA238	STIRRER MOTOR	1	EA		1	1	3	6	36
SA260	LOGIC BOARD MAIN ASSY V3.0	1	EA		1	1	3	6	36
SA276	AIR FILTER	2	EA	2	2	2	6	12	72
SA314	CATALYST ASSY UPPER	1	EA			1	1	1	6
SA315	CATALYST ASSY LOWER	1	EA			1	1	1	6
SA329	REAR PANEL	1	EA			1	1	2	12
SA339	GREASE FILTER HOUSING	1	EA			1	1	2	12
SA340	GREASE FILTER CARTRIDGE	1	EA		1	1	2	3	18

APPENDIX 5: LOGIC PCB Connection Points and key features.



APPENDIX 5: Relay PCB Connection Points and key features.



MANUAL CORRECTIONS AND MODIFICATIONS

Whilst every effort has been made to ensure that the information contained in this manual is accurate and complete, if you believe that an error has been made, or if you have any suggestions for how the manual could be improved, please fill in and return this form. A review of any forms returned will be made on a regular basis, and the manual will be updated if required.

Name
Address
Page number on which error occurs (if applicable) -
Description of error
Suggestion for improvement to manual
Please return this form to: Service Dept. Merrychef Limited, Station Road West, Ash Vale, Aldershot Hampshire GU12 5XA United Kingdom Tel: +44 (0)1252 371000 Fax: +44 (0)1252 371007 Internet address: http://www.merrychef.com E-mail: technical.support@merrychef.com