Version 3.0

Version 2.0

merrychef

EC402s

US Models including WAWA

SERVICE& PARTS MANUAL

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

ISSUE 5
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SERVICE MANUAL

CAUTION MICROWAVE EMISSIONS

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

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MICROWAVE SAFETY PRECAUTIONS

CAUTION
WARNING TO SERVICE TECHNICIANS
PRECAUTIONS TO BE OBSERVED BEFORE AND DURING SERVICING TO AVOID POSSIBLE EXPOSURE TO EXCESSIVE MICROWAVE ENERGY

(a) Do not operate or allow the oven to be operated with the door open.

(b) Make the following safety checks on all ovens to be serviced before activating the magnetron or other microwave source, and make repairs as necessary:

1) interlock operation.
2) proper door closing.
3) seal and sealing surfaces (arcing, wear, and other damage).
4) damage to or loosening of hinges and latches.
5) evidence of dropping or abuse.

(c) Before turning on microwave power for any service test or inspection within the microwave generating compartments, check the magnetron, wave guide or transmission line, and cavity for proper alignment, integrity and connections.

(d) Any defective or misadjusted components in the interlock, monitor, door seal, and microwave generation and transmission systems shall be repaired, replaced, or adjusted by procedures described in this manual before the oven is released to the owner.

(e)(i) For U.S.A.
A microwave leakage check to verify compliance with the Federal Performance Standard should be performed on each oven prior to release to the owner.

(e)(ii) For CANADA.
A microwave leakage check to verify compliance with the Canadian Regulation, HEALTH AND WELFARE, SOR/79 920 should be performed on each oven prior to release to the owner.

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 402s 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 diagrams).
- 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 4 mW/cm².
- The power output of the oven is checked in accordance with the procedure page.
- Oven has correct 2 inch (50mm) air gap all round and 2 inches (50mm) above. Air flow should not be restricted.

PRODUCT SPECIFICATIONS

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

Example 402S2086DK3GMUS
Model No. EC402s
208V, 60Hz, 2P + GND supply, MenuKey Revision 3, General Market, USA

Supply Voltage	Freq. Hz	Phase/Supply	Control Type	Rev	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	**US** = USA

Power Requirements	208Volts 240Volts	208V ac 60Hz 30Amp 2P & G 240V ac 60Hz 40Amp 2P & G
Power Output	Microwave 100% Convection	1500watts 3250watts
External Dimensions	Height Width Depth	23.0 inches 23.0 inches 27.5 inches
Weight	Nett	198lb.s (90kg)
Construction	Cavity Casework	304 Stainless Steel

INSTALLATION INSTRUCTIONS

Installation Instructions for Mealstream Combination Ovens

Power Supply Requirements
The Mealstream Series 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**.

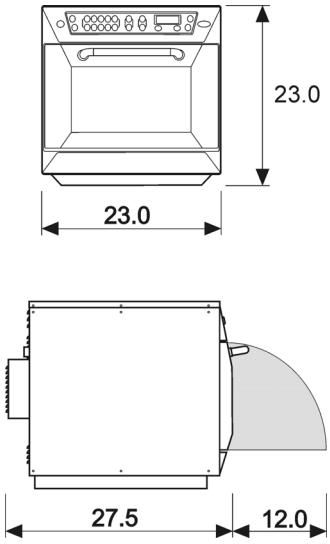
If the oven is hard-wired to the supply, a double-pole isolator switch with a contact gap of at least 1/8 inch (3 mm) should be fitted.

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 2 inches (50 mm) clearance at the sides and rear of the oven.

Air intake temperature should not exceed 110°F/45°C 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.

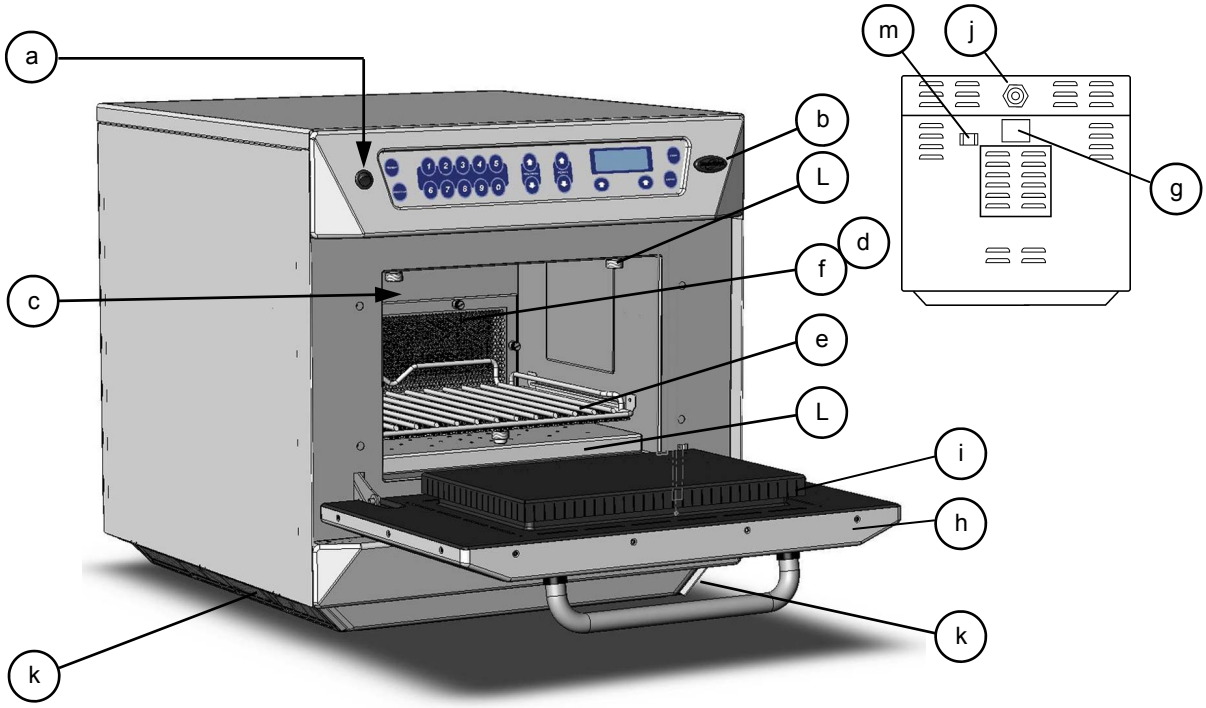


NEVER Install an oven above fryers, grills, griddles or any other major heat source.

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)

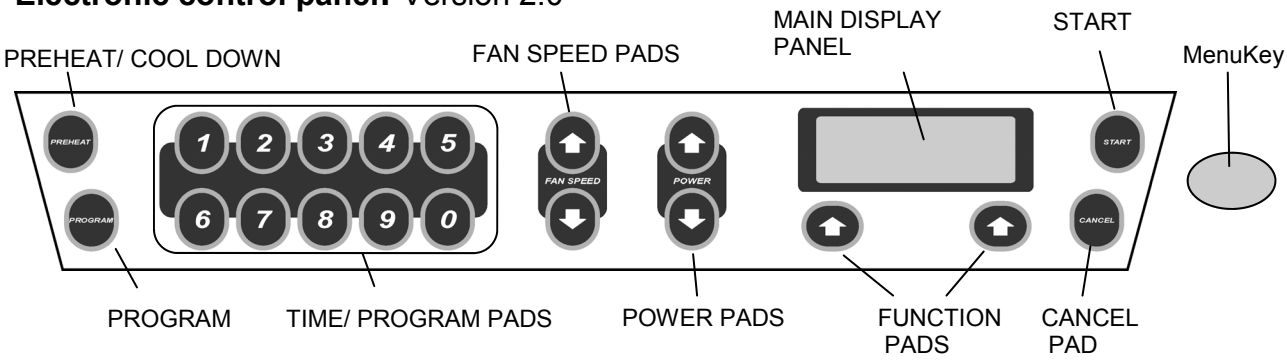
Direct the air in the cavity. They must be cleaned on a regular basis, and kept free of debris

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

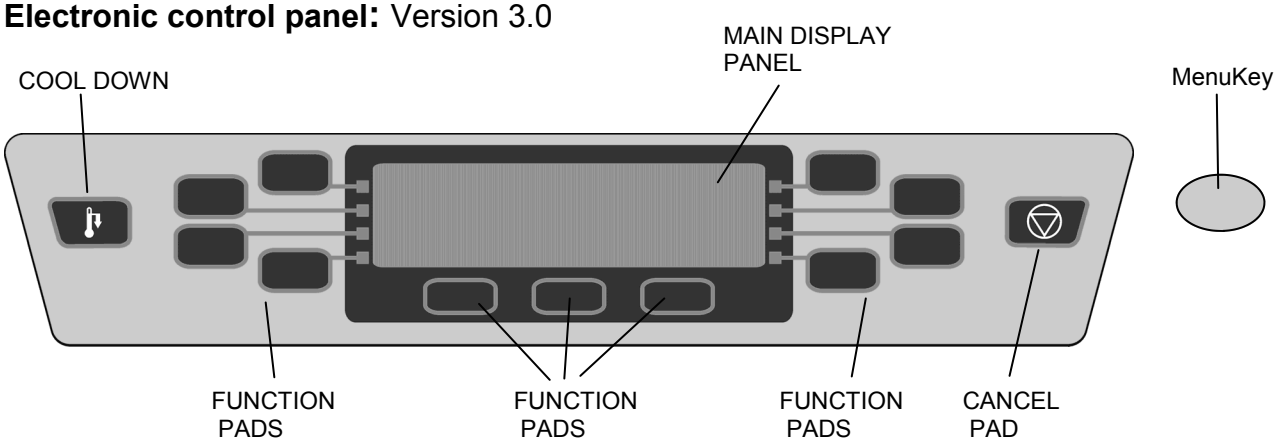
TIME/ PROGRAM PADS
These pads are used for setting the cooking time in 1 second steps to a maximum of 10 minutes.
They are also used for storing and recalling programs from 0-499

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 90°F above PREHEAT temperature setting during cook cycle	Indicates combustion (fire) in oven cavity Note: In service operations when PREHEAT is set to 0°F 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.

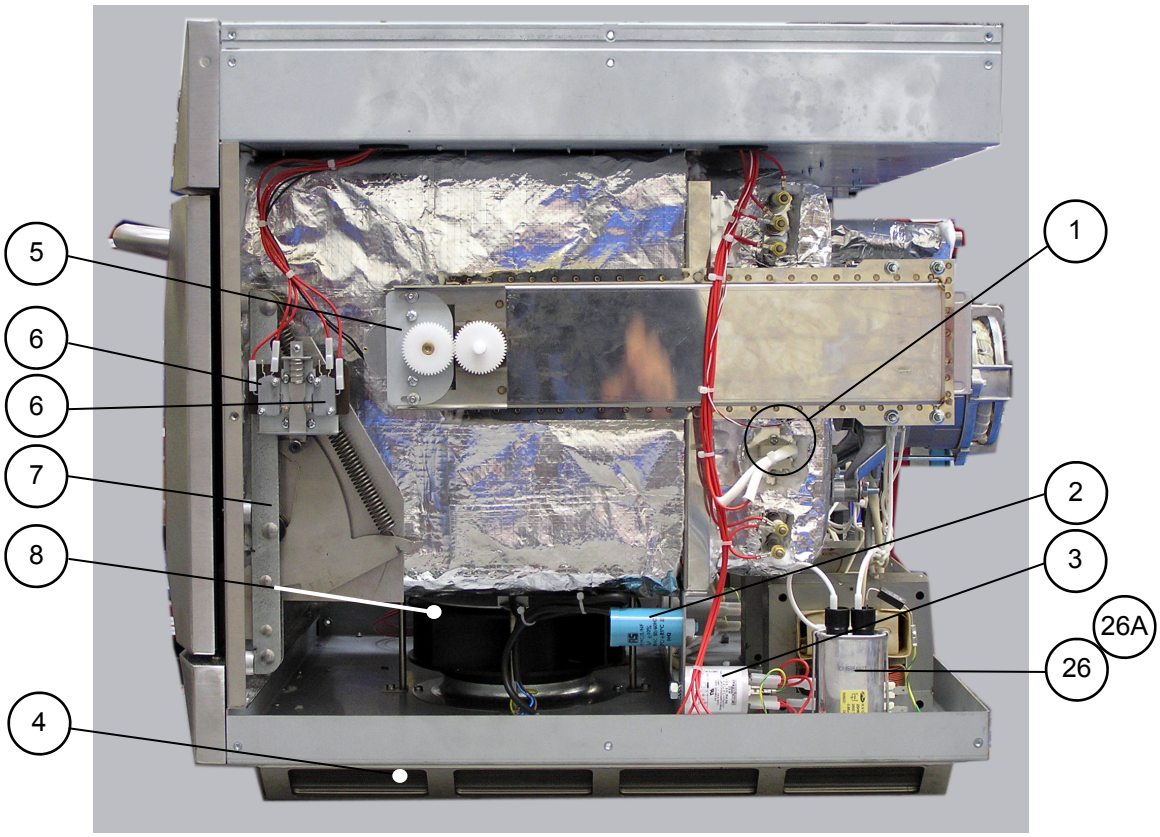
DISPLAY PANEL
Shows the principal functions of the oven. When cooking, the time remaining counts down. Also displays error messages and oven temperature. When storing and recalling a program the display indicates the program number and details.

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

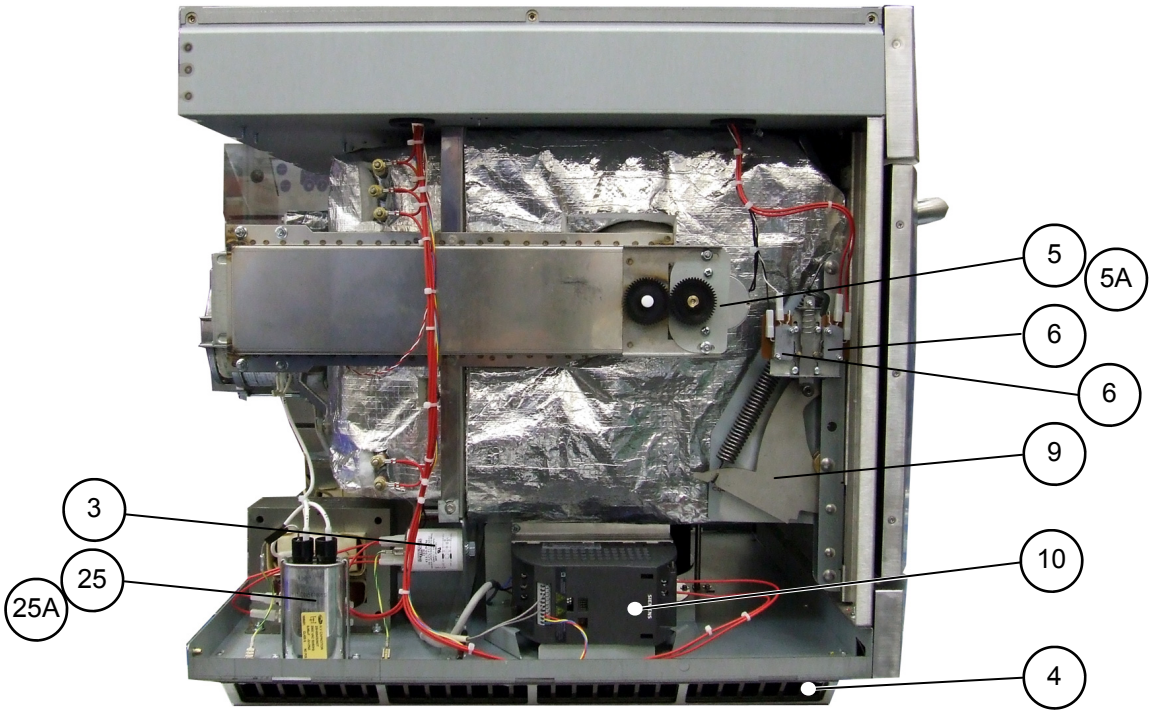
Error Message	Condition	Possible Cause
Magnetron 1 Overheat Ensure air filters are clean Allow oven to cool	Magnetron 1 has overheated	Blocked air filters Oven located near hot air source Oven being used empty Cooling fan failure Magnetron failure
Magnetron 2 Overheat Ensure air filters are clean Allow 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 565°F	Blocked air filters Restricted airflow to air filters Combustion (fire) in cavity
Heater Failure	Cavity has not reached a temperature of 100°F in 10 minutes	One or more heater elements have failed and need to be replaced

PRINCIPAL COMPONENTS: Right Side



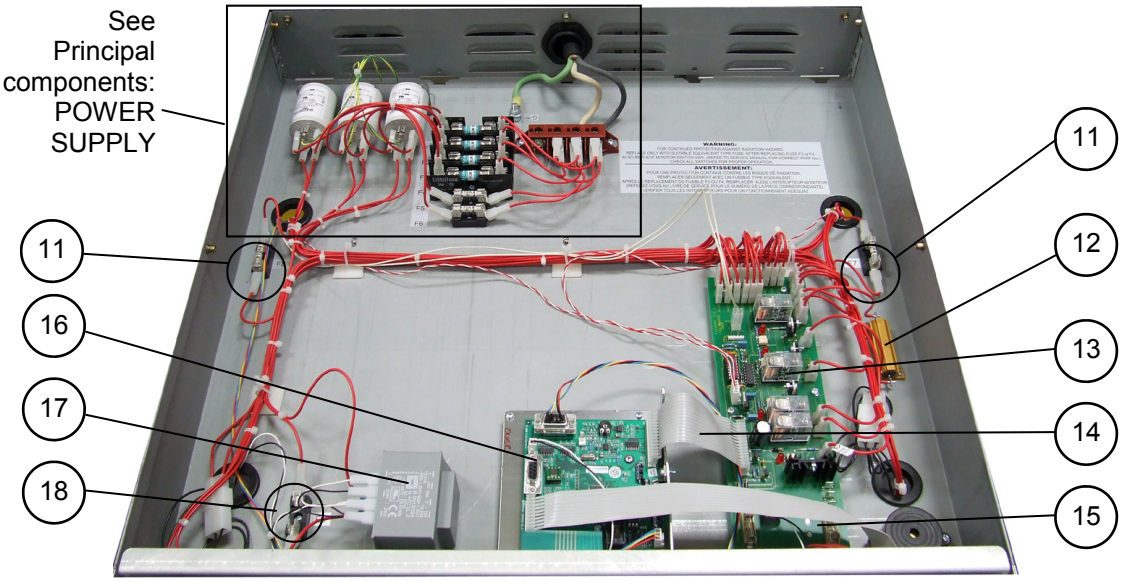
No.	Description	Part No.
1	Cavity High limit Stat	30Z1024
2	Motor Start Capacitor 2µF (Blue)	30Z1298
3	Filter 16A	30Z1339
4	Air filter	SA276
5	Stirrer motor Assembly	SA238
5A	Stirrer (inside cavity)	SA213
6	Microswitch SW1 Microswitch SW2	30Z1294
7	Door Hinge Assembly RH	SA202
8	Magnetron Cooling Fan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

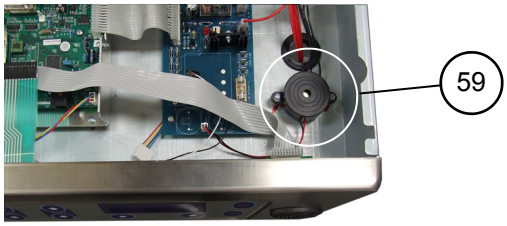
PRINCIPAL COMPONENTS: Left Side



No.	Description	Part No.
3	Filter 16A	30Z1339
4	Air filter	SA302
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	30Z1293
25	HV Capacitor 2500V 0.88µF (60Hz models)	30Z1251
25A	HV Capacitor clip (0.88µF) 88mm	31Z0521

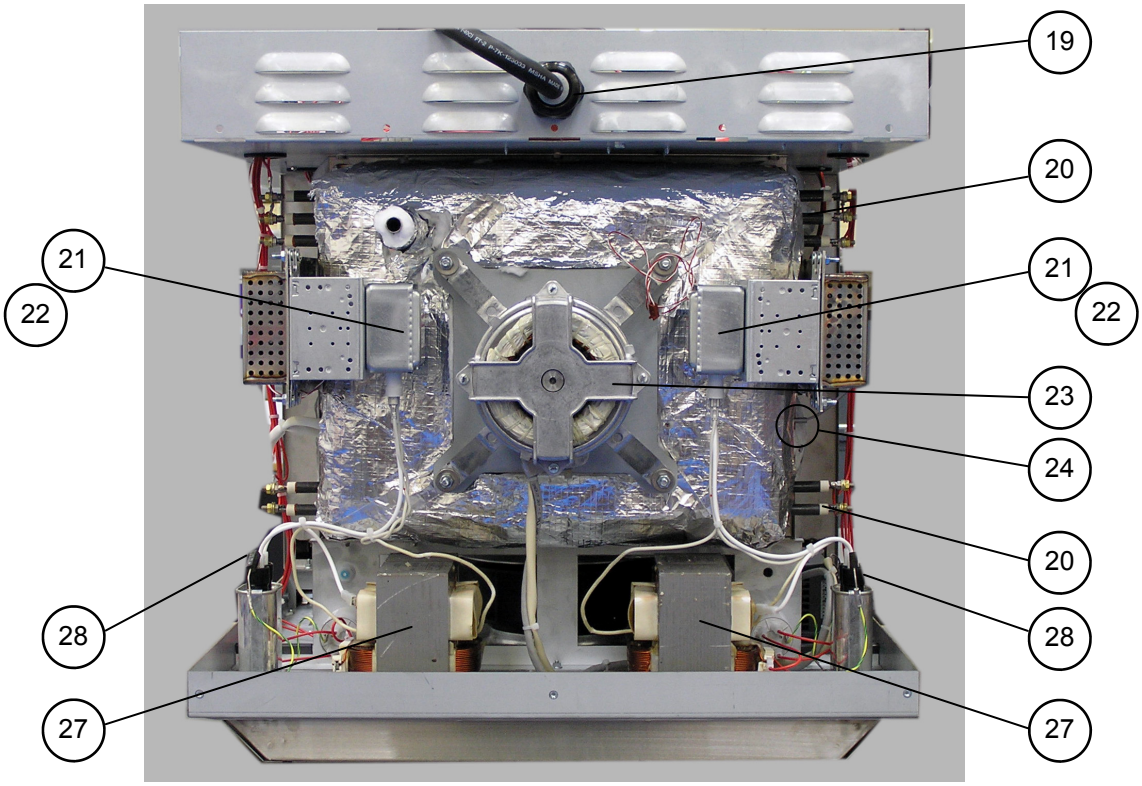
PRINCIPAL COMPONENTS: Control Box





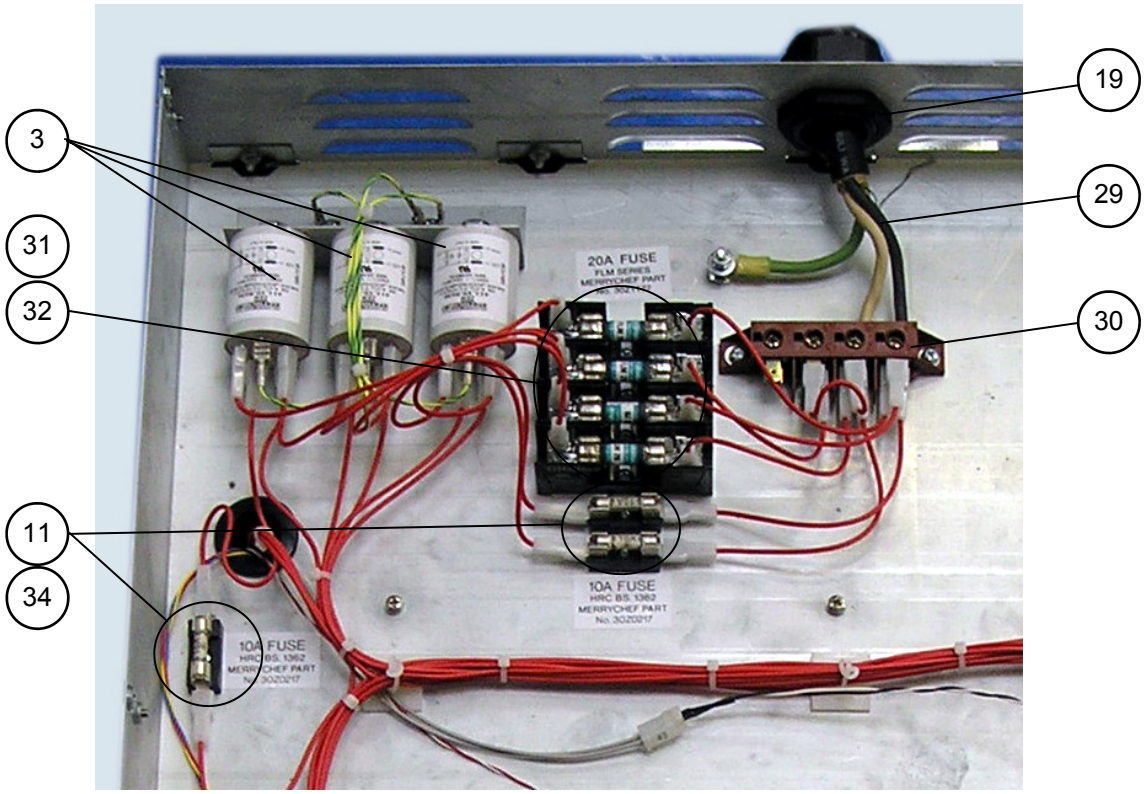
No.	Description	Part No.
11	Fuse 10A HRC	30Z0217
12	Gold resistor (220R)	30Z0235
13	Relay PCB Assembly	11K0004
14	Ribbon Cable 15way	11Z0298
15	Ribbon Cable 10way MenuKey	11M0117
16	Logic PCB Assembly Version 2.0	SA231
16	Logic PCB Assembly Version 3.0	SA260
17	Transformer LT (Low voltage)	30Z1155
18	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 **208V** 650W	DV0576
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 60Hz	30Z1230
28	HT Rectifier	11H0010

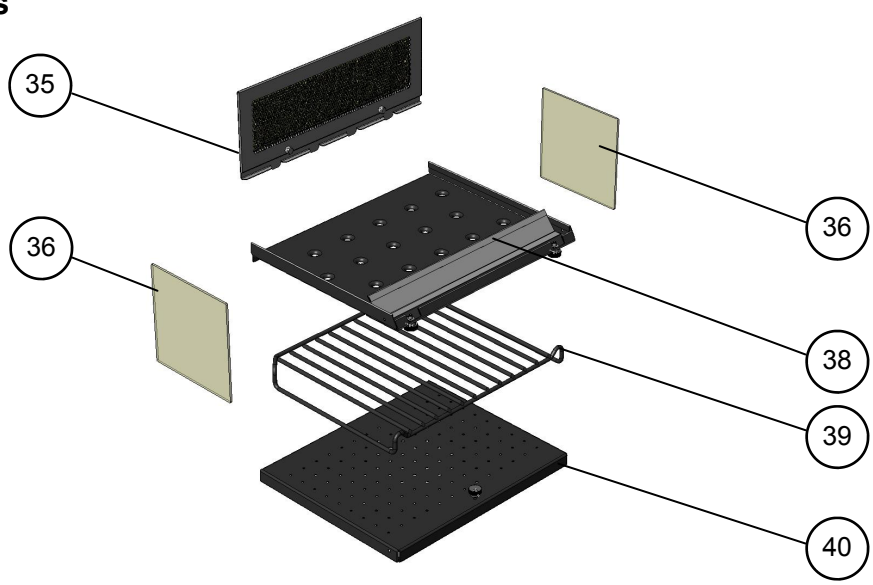
PRINCIPAL COMPONENTS: Power Supply



No.	Description	Part No.
3	Filter 16A	30Z1339
11	Fuse 10A HRC	30Z0217
19	Cable Gland	31Z0500
19	Cable Gland Nut	31Z0499
29	Electrical Supply Lead Assembly	SA217
30	Terminal Block	31Z0447
31	Fuse 20A FLM	30Z1177
32	Fuse Holder 30A	30Z1178
34	Fuse Holder 10A	30Z0231

PRINCIPAL COMPONENTS

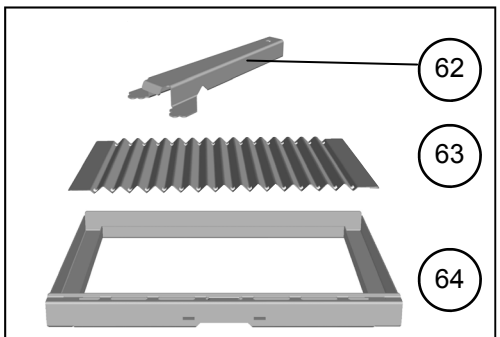
Cavity parts



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

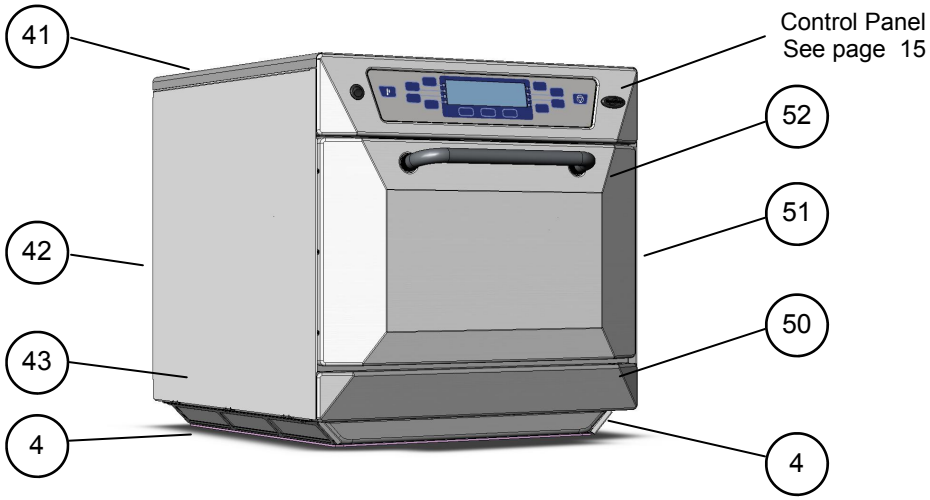


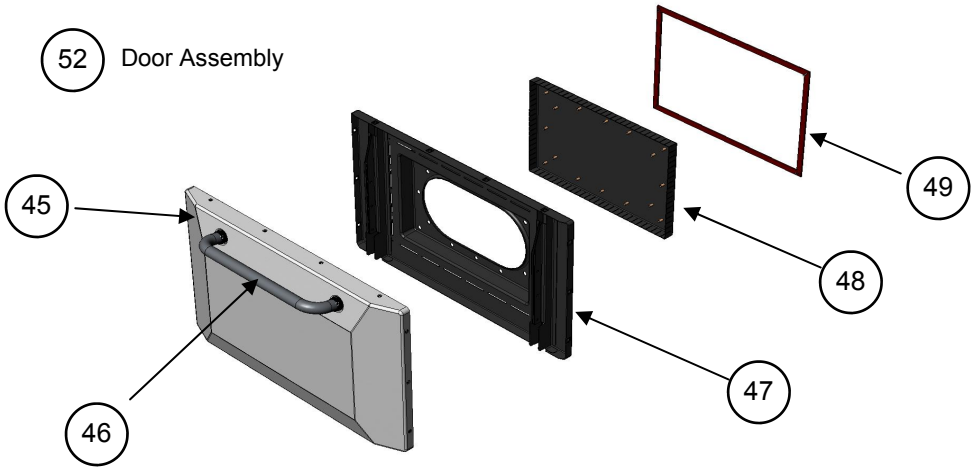
65 Chicken Griddle SA133

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

PRINCIPAL COMPONENTS

External Parts





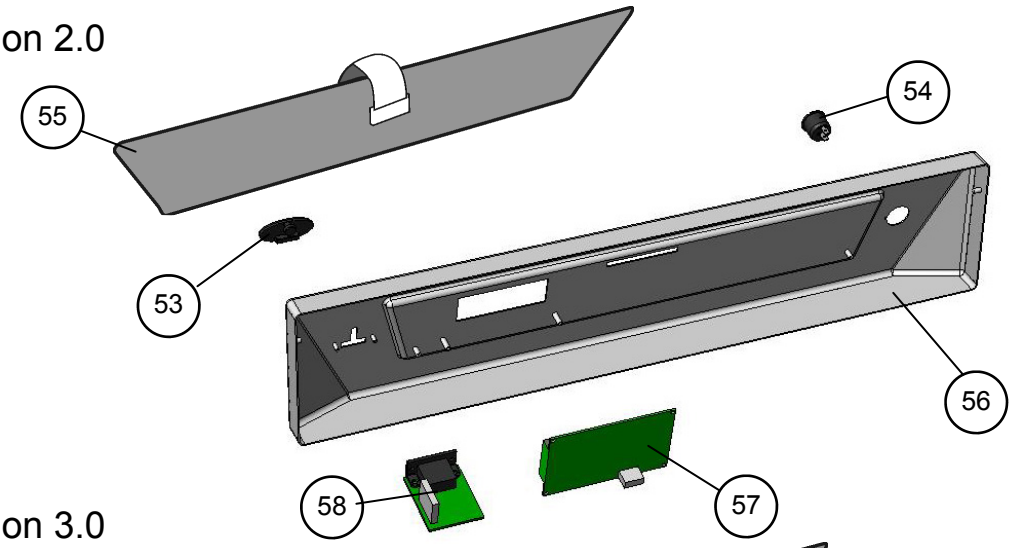
No.	Description	Part No.
4	Air Filter	SA276
41*	Top Trim	DV0187
42*	Rear Panel	SA329
43*	Side Panel LH	DV0091
45	Door Skin	DV0501
46	Door Handle	32Z1066
47*	Door Inner	SA331
48*	Door Choke	DV0168
49	Door Seal	DV0305
50*	Bottom Trim	DV0037
51*	Side Panel RH	DV0092
52*	Door Assembly	SA111

*Note:
On Ovens with Serial No.s before 000745 (WAWA Models)
External Panels Items 41,42, 43, 45, 47,48, 50, 51, 52 are only available to special order.

PRINCIPAL COMPONENTS

Electronic Control Panel Assembly

Version 2.0



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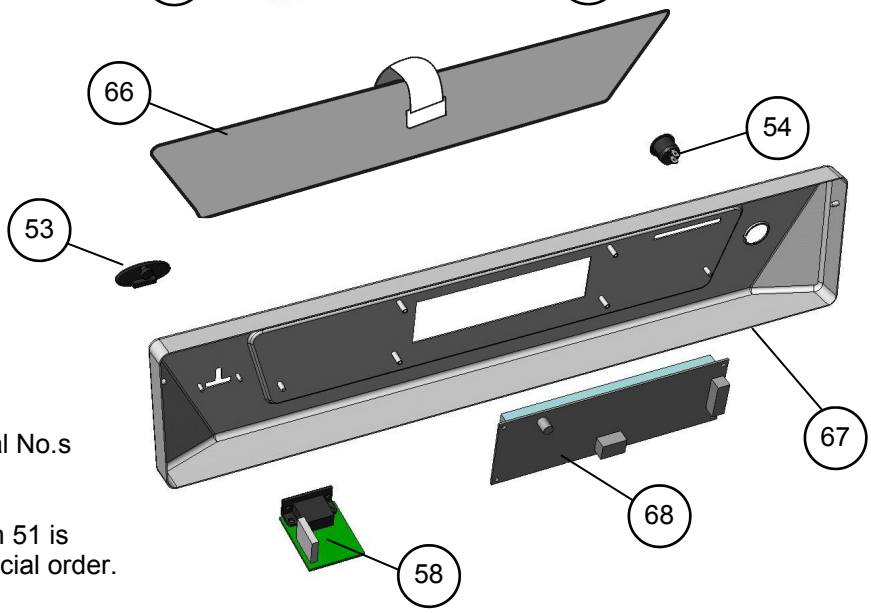


*Note:
On Ovens with Serial No.s before 000745
(WAWA Models)
External Panels Item 51 is only available to special order.

No.	Description	Part No.
53	MenuKey Dust Cover	DV0052
54	Power switch (On/Off)	30Z1318
55	GM Membrane Version 2.0	DV0055
55	Membrane WAWA version	DV0192
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	30Z1293
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 **208V** 650W	DV0576
	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 0.88µF (**60Hz** Models)	30Z1251
25A	HV Capacitor clip (0.88µF) 88mm	31Z0521
27	Transformer 208/220/240V **60Hz**	30Z1230
28	HT Rectifier	11H0010
29	Electrical Supply Lead Assembly	SA217
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
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 WAWA version	DV0192
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	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

*Note:
On Ovens with
Serial No.s before 000745
(WAWA Models)
Grease Filter 35, Rack 39
External Panel Parts
41,42, 43, 45, 47, 48,
50, 51, 52
are only available
to special order.

PROCEDURE FOR MICROWAVE EMISSION TEST (1)

Warning

Check for radiation emission after servicing. Should the emission be more than 4mW/cm² Inform Merrychef service centre immediately. After repairing or replacing any radiation safety device, keep a written record for future reference, as required by D.H.H.S. and Health and Welfare Canada regulation.
This requirement must be strictly observed. In addition, the emission reading must be recorded on the service repair documentation while in the customer's premises.

Please Note

DO NOT attempt to carry out the following procedure unless you have the following tools.

Tools required for microwave leakage test

1.0 Pint (600ml) glass beaker
Supply of cold water
Microwave leakage meter

Changing the Oven Profile

In order to carry out the test the oven **PREHEAT** must be set to **OFF**[V3.0] or **0ºF**[V2.0] to switch off the convection heaters and the **Manual** controls must be set to **ON** [V3.0] or **PROGRAM/ MANUAL**[V2.0].
When the test is completed the oven must be returned to its original settings or the appropriate MenuKey can be used to reset the oven automatically.
See Appendix 6 for changing the Oven Profile

Read and understand all of these notes and procedure before carrying out this operation.

Note before measuring.

- Make sure that the survey meter you are using has been calibrated and is suitable for measuring frequencies of 2,450 MHz.
- Do not exceed meter full scale deflection, leakage meter should initially be set to the highest scale, then adjusted down as necessary to ensure that low readings are measured on the most sensitive range.
- To prevent false readings, hold the probe on the grip provided and move along the areas indicated on the following page.
  The probe should be moved at 1 inch/second (2.5cm/second)).
- With any casework removed the leakage should not exceed 4mW/cm².
- When measuring the leakage, always hold the probe at 2inches (50mm) from the test area using the probe supplied with the instrument.
- Always hold the probe at right angles to the oven and point of measurement

Procedure:

1. Place 0.5 pint (275ml) of cold water in the 1.0 Pint (600ml) glass beaker.
2. Place the 1.0 Pint (600ml) glass beaker in the centre of oven.
3. Set the leakage meter to the appropriate scale/range.
4. Set a time of 30 seconds with Fan speed at 10% and Power at 100%.
5. Press Start and move the survey meter probe along the areas indicated on page 21. Open the door at 30 seconds and taking care change the water. If the water boils the meter readings will be inaccurate.

On completing the test remember to return the Oven Profile and PREHEAT temperature to the original settings.

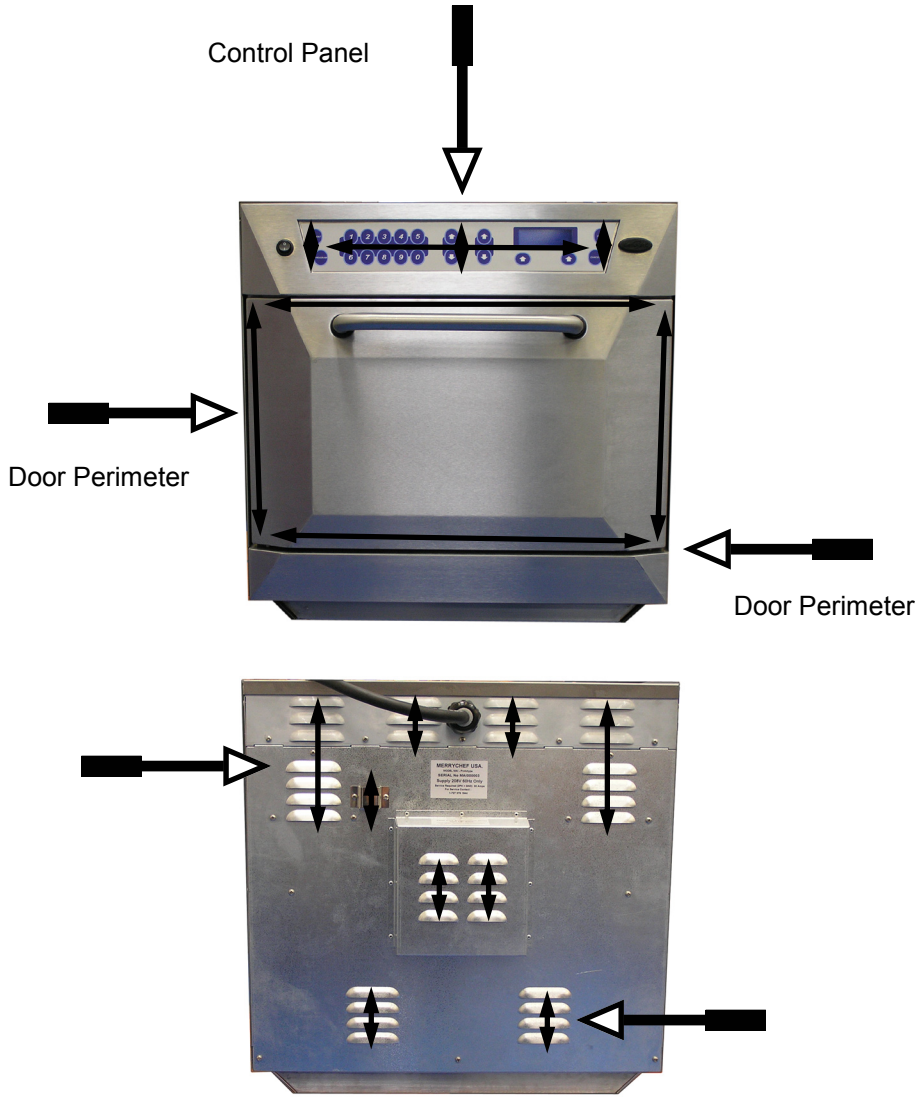
Manual Mode

If the manual mode screen does not appear it must be changed in the OVEN PROFILE see Appendix 6

PROCEDURE FOR MICROWAVE EMISSION TEST (2)

- Readings must be **below** 4mW/cm². If a level greater that 4mW/cm² is observed, this should be reported to Merrychef Service Division immediately.
- In any case, notes should be kept of the leakage that is observed. In terms of level and position on the oven. This should be kept with the service documentation.

Test for microwave leakage at all points marked with a ↔



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

Changing the Oven Profile

In order to carry out the test the oven **PREHEAT** must be set to **OFF**[V3.0] or **0ºF**[V2.0] to switch off the convection heaters and the **Manual** controls must be set to **ON** [V3.0] or **PROGRAM/ MANUAL**[V2.0]

When the test is completed the oven must be returned to its original settings or the appropriate MenuKey can be used to reset the oven automatically.

See Appendix 6 for changing the Oven Profile

Test procedure:

1. Fill one beaker (glass or plastic) with 2.11 pints (one litre) of tap water at about 68ºF (20ºC) 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.

Manual Mode

If the manual mode screen does not appear it must be changed in the OVEN PROFILE see Appendix 6

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

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

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.

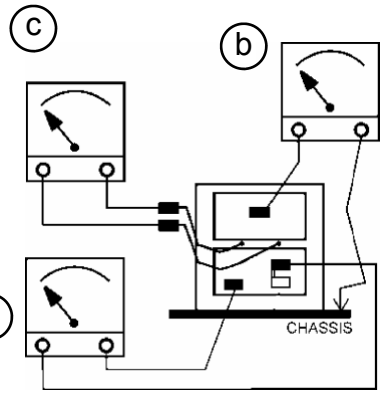
WARNING: High voltages and large currents are present at the High Voltage Capacitor. It is very dangerous to work near this part when the oven is on. **NEVER** make any voltage measurements at the High Voltage circuits, including the magnetron filament.

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 4)

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:

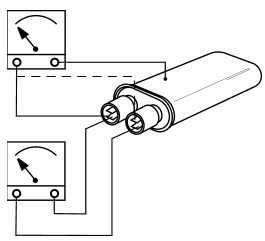
A Digital Multi-meter (D.M.M.)
A Megger or similar resistance meter using 500V d.c.

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 4)

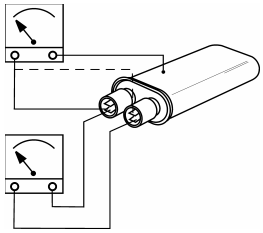
1. Isolate the oven from the mains supply.
2. Ensure that the High Voltage Capacitor is discharged before commencing work.
3. Remove all connections from the High Voltage Capacitor.
4. Using a D.M.M., check for continuity between the terminals & compare results with table on next page.



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 4)

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.

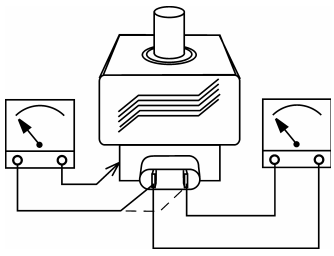
A Magnetron can be tested for an open filament or a short circuit by carrying out a continuity check.

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 4)

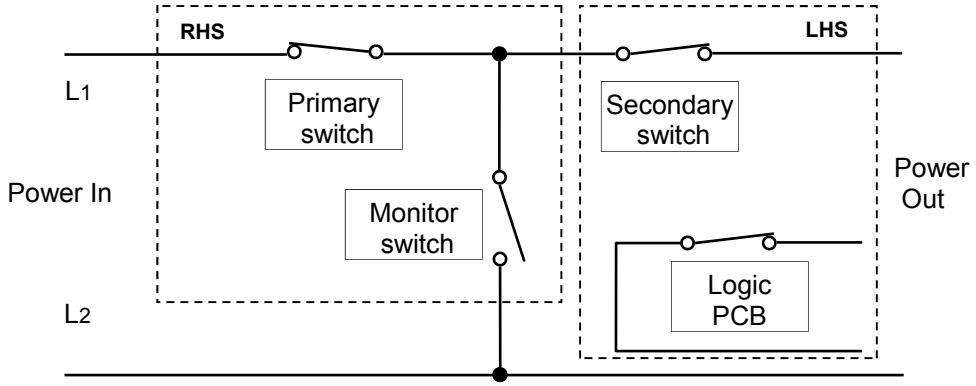
1. Isolate the oven from the mains supply.
2. Ensure that the High Voltage Capacitor is discharged before commencing work.
3. Remove all connections from the Magnetron.
4. A continuity check across the Filament terminals should be 1ohm or less
5. A continuity check between each filament terminal and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

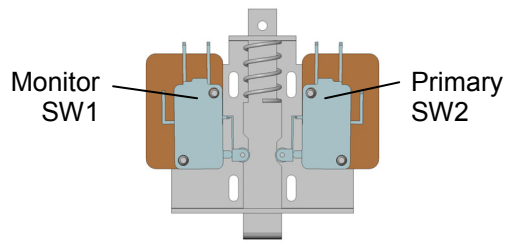


1. **Monitor switch**
   The Monitor switch will produce a short circuit across the mains supply when the door is opened if the Primary interlock switch is faulty, thus blowing the microwave fuse and rendering the oven inoperative.

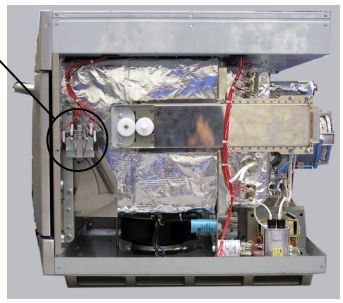
2. **Primary Interlock and Secondary Interlock**
   The Primary switch will cut off the microwave emissions from the oven when the door is opened by breaking the electrical supply circuit to the transformers. The Secondary interlock switch will cut off the microwave emission if the Primary switch has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

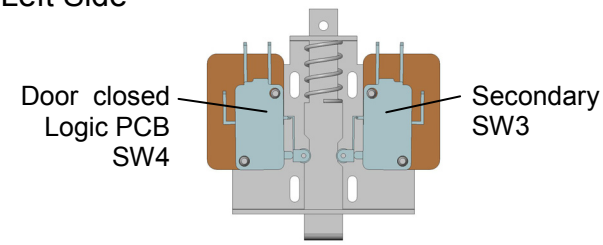
Right Side



Microswitches RH side



Left Side



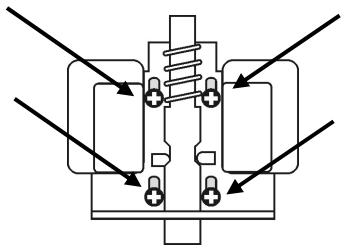
PROCEDURE FOR DOOR INTERLOCK ADJUSTMENT AND TEST 2

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

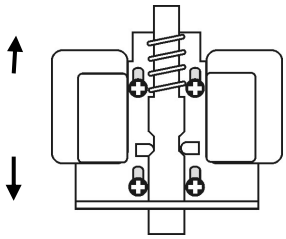
Before adjusting the microswitch assemblies ensure that the oven has been isolated from the electrical supply.
Please note the terminals on the microswitches remain live when the oven is switched off, so complete isolation is essential.



Objective

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

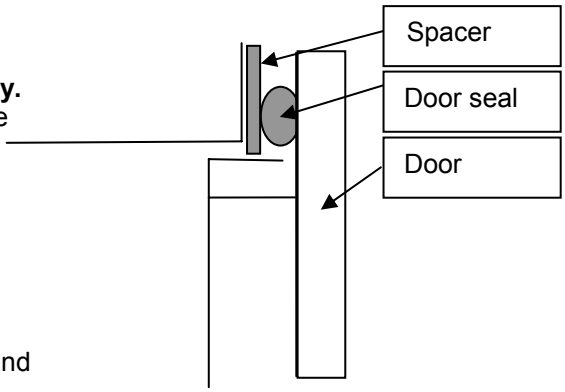
With a 5mm spacer located as shown SW2 and SW3 should be open.



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

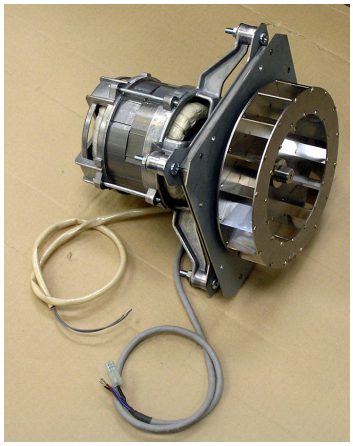
Convection and Fan Speed Control

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	208V/240V, 60Hz 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)

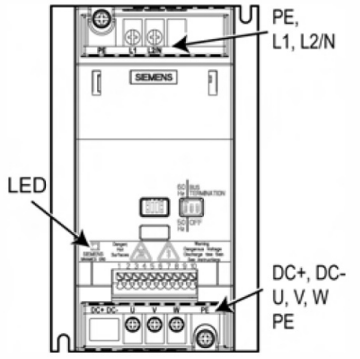


PRINCIPAL COMPONENTS: Hot Air Motor & Controller 2

Motor Controller

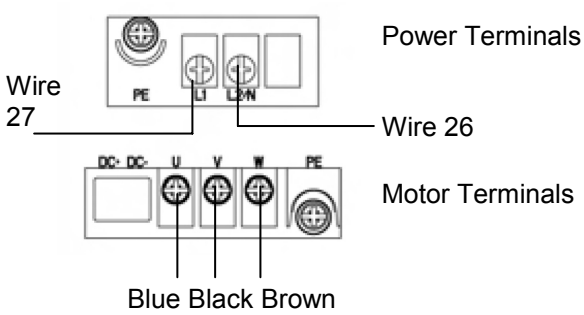
Provides an AC, 3-phase switched mode drive to the convection motor and is controlled by a 0 - 10 Volt signal from the logic board. This allows the motor to be adjusted from approximately 1500 rpm to 7000 rpm in steps of 5%.

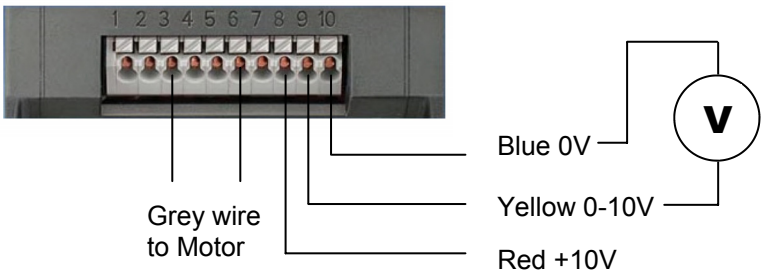
Door Open = 1500 RPM
Door Closed (not cooking) = 3500 RPM
Door Closed (cooking) = as specified by program or setting



Motor Speed and Logic board voltage table

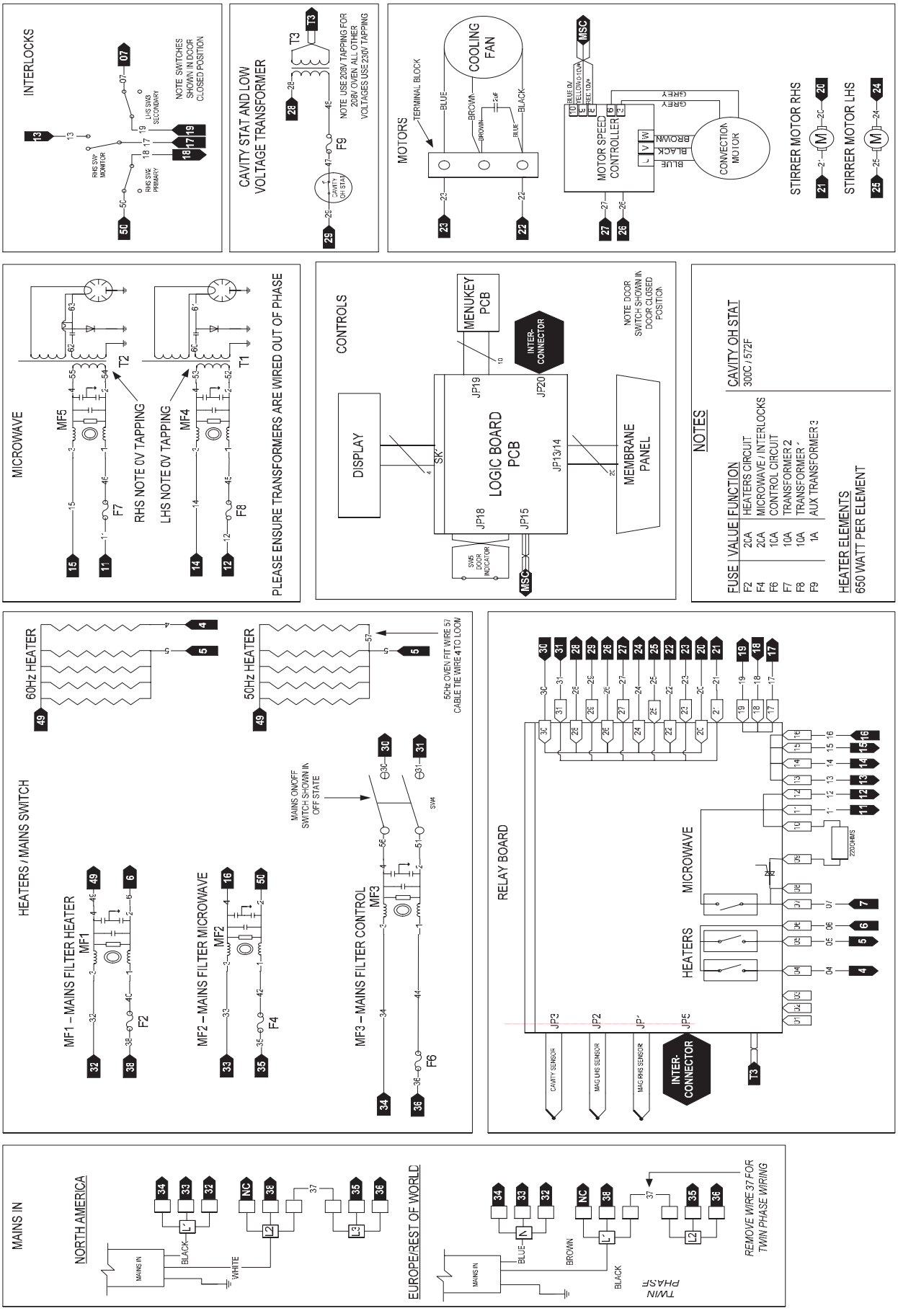
Fan speed %	Voltage dc	RPM	Condition
100%	10V	7000	Full Speed
50%	5V	3000	Door Closed
20%	2V	1500	Door Open





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 11

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 32**
- **Core TemperaturesLow Page 32**

Fundamental

Standard Electrical Checks

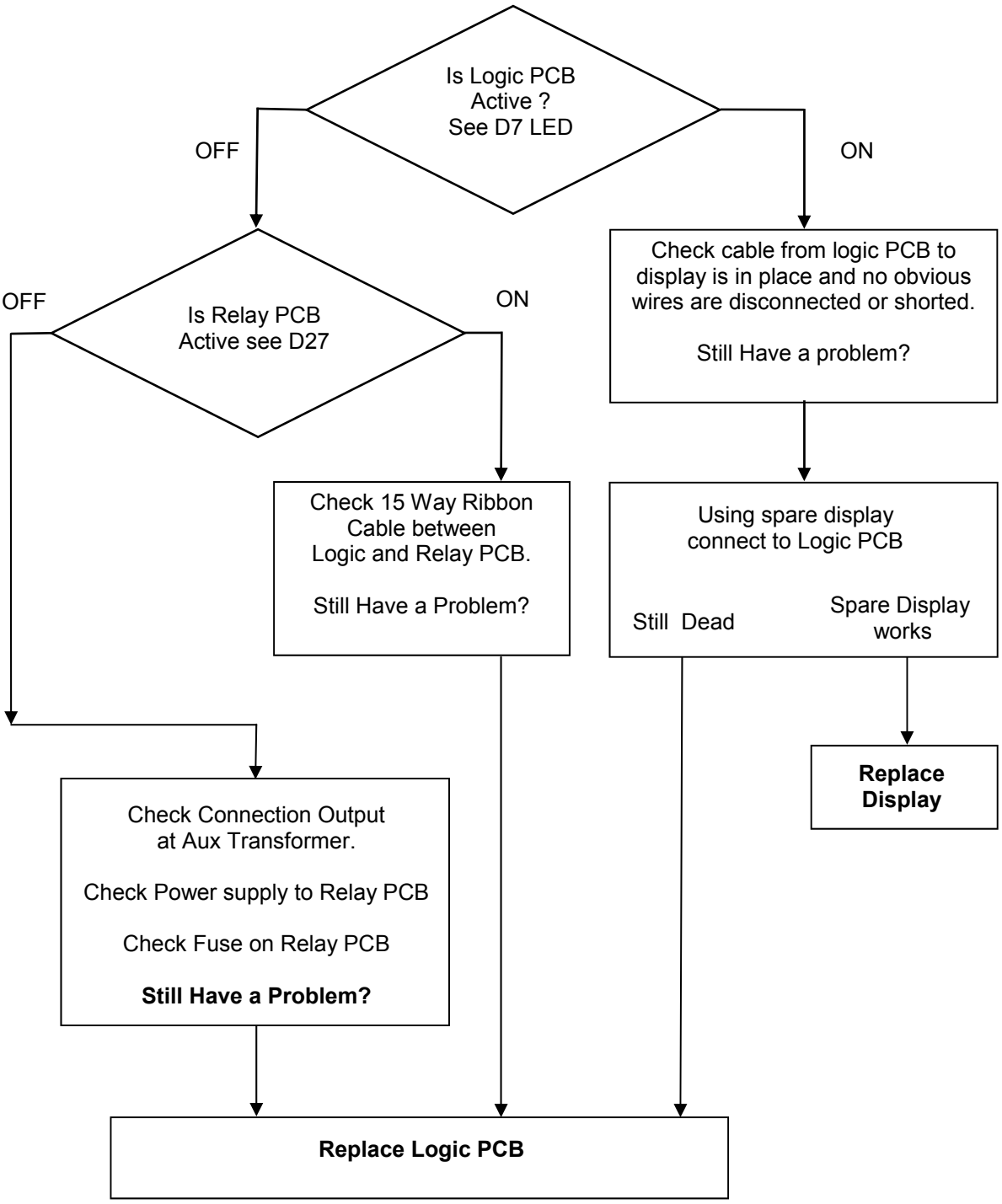
- Check that oven is connected to an Electricl Power supply and that any trip that supplies the unit is not switched off.
- Check that the oven is switched on.
- Check the Electricl Power supply voltage at the input terminal block.
- Check that all fuses are intact.
- Check that the overheat stat has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

Still Have a problem:
Select a Category.

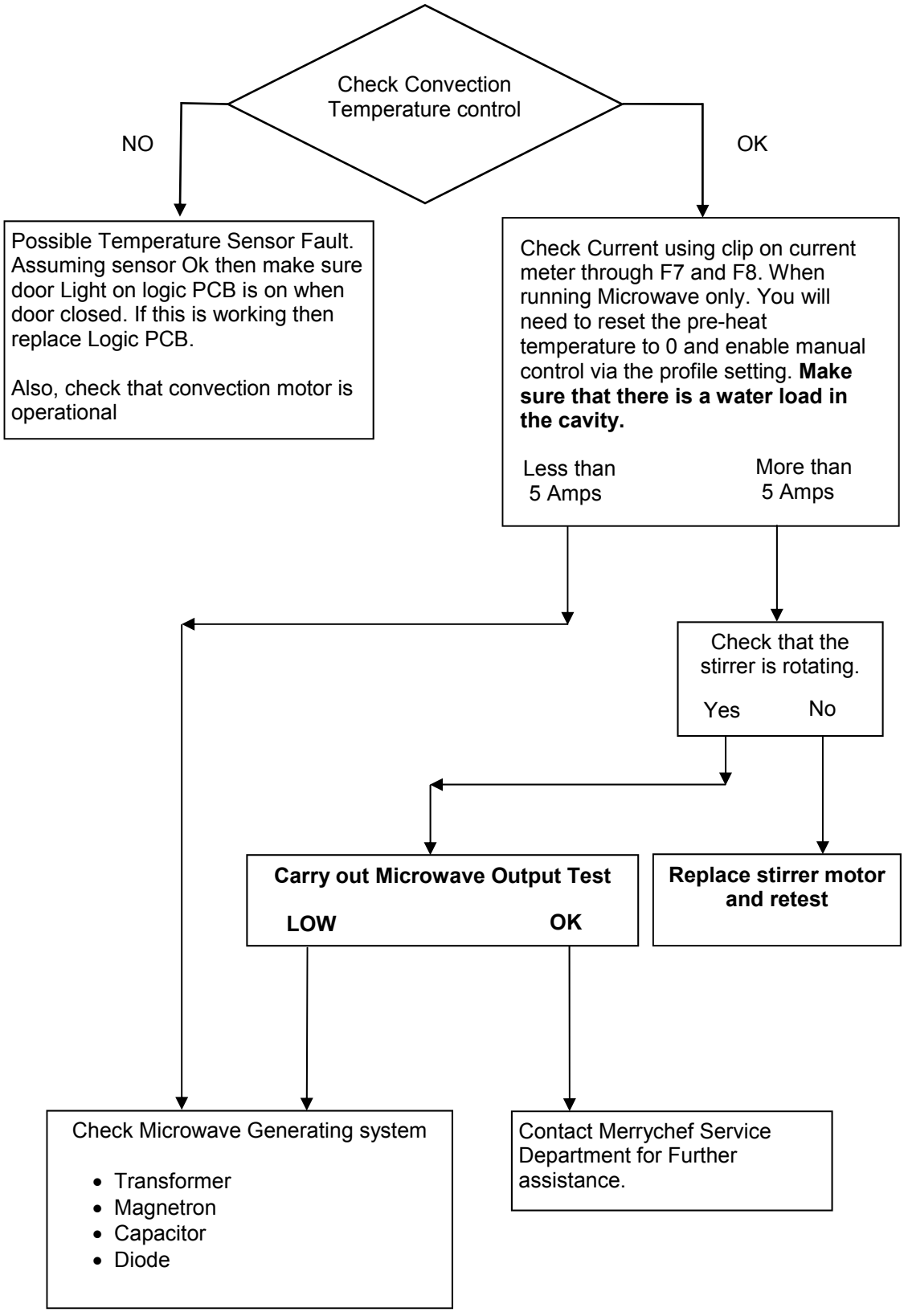
- **No Display Page 31**
- **Cavity Sensor Error Page 33**
- **Magnetron / Over heat errors Page 34**

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

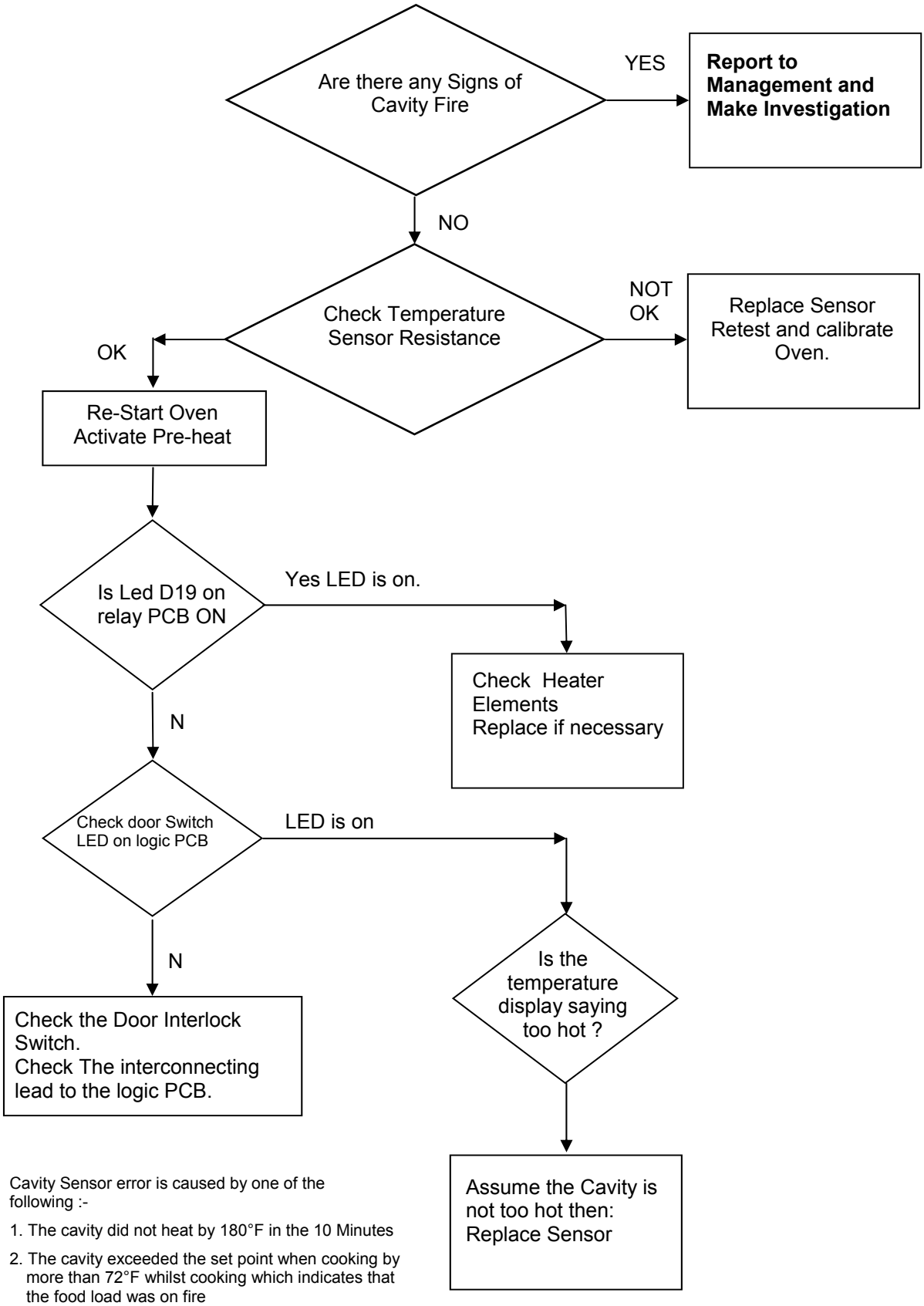
No Display


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.

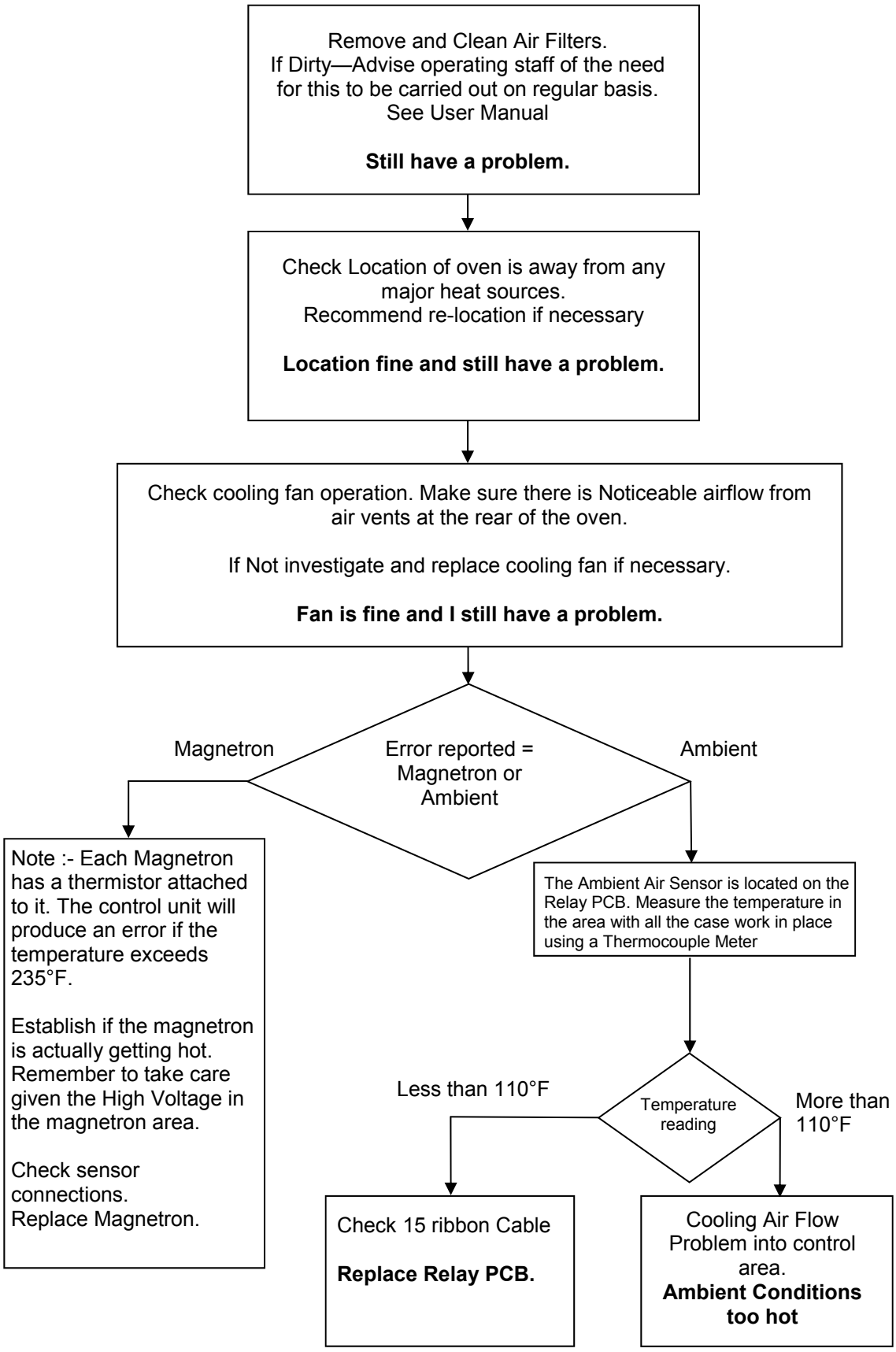
Cavity Sensor Error



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

1. The cavity did not heat by 180°F in the 10 Minutes
2. The cavity exceeded the set point when cooking by more than 72°F whilst cooking which indicates that the food load was on fire

Magnetron / Overheat issues



APPENDIX 1: TEMPERATURE SENSOR RESISTANCE DATA

Temperature Sensor Resistance

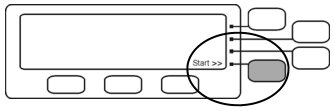
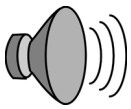
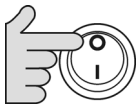
Temp °F	Temp °C	Min. Rate kΩ	Standard Rate kΩ	Max. Rate kΩ
212	100	11.490	13.060	14.810
302	150	2.803	3.161	3.434
392	200	0.950	1.000	1.050
482	250	0.3572	0.3865	0.4171

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 3: Cool Down Procedure

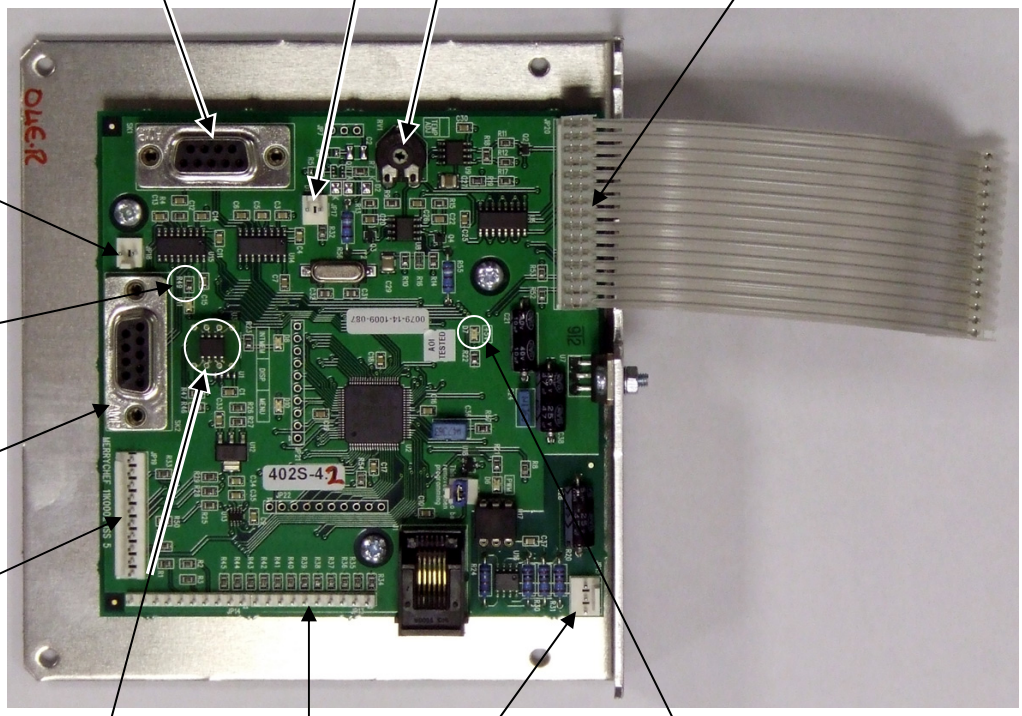
To cool down and clean a hot oven

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		

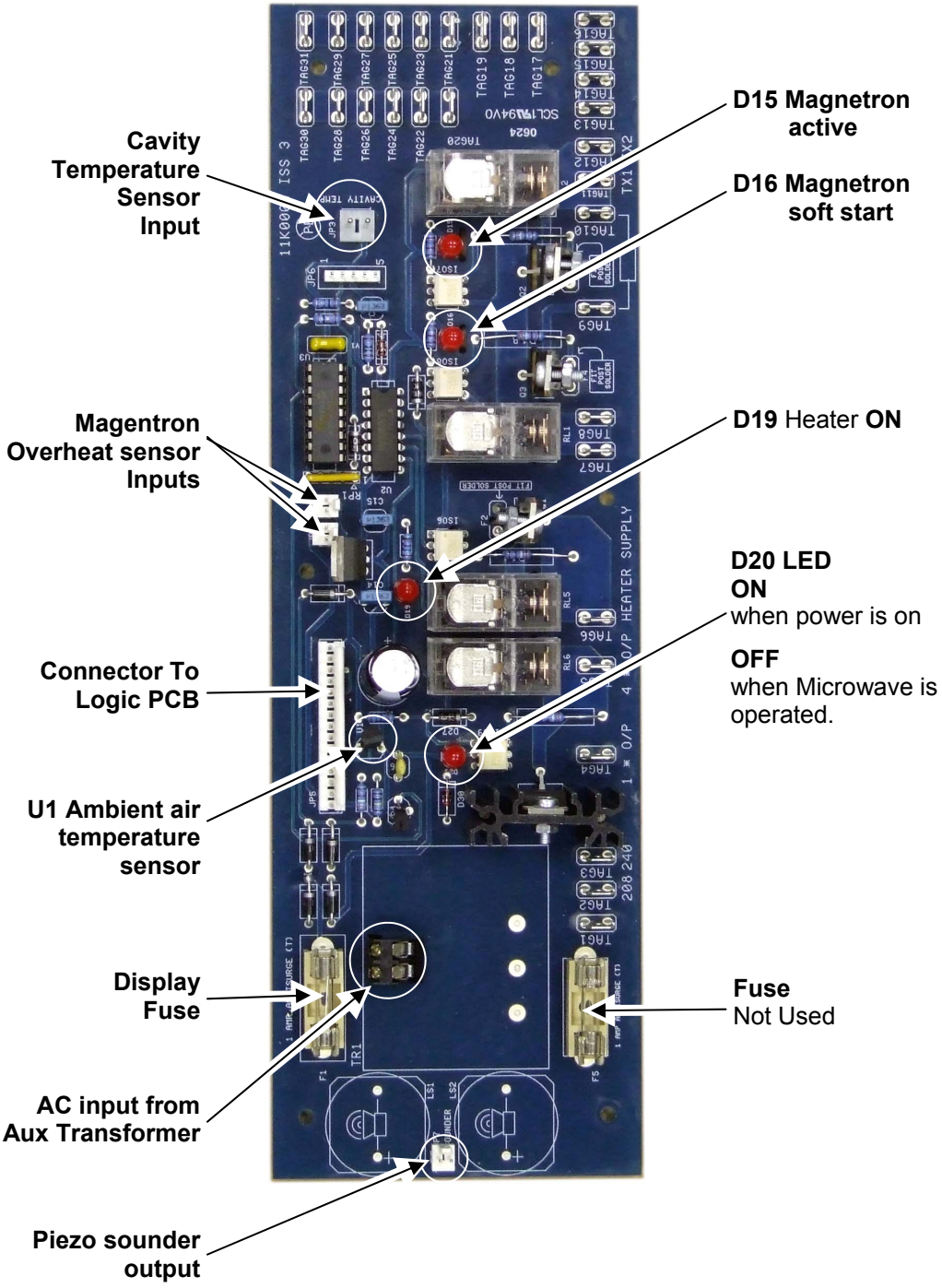
APPENDIX 4: Recommended spares lists USA

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	TRANS MULTI 208 220 240 **60HZ**	2	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
SA234	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
30Z1293	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 SPRING INTERLOCK	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
DV0576	HEATER ELEMENT **208V**	5	EA	3	5	5	15	30	180
DV0606	HEATER ELEMENT **220V**								
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
SA217	ELECTRICAL SUPPLY LEAD ASSY	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.



APPENDIX 6: Engineering Test Settings

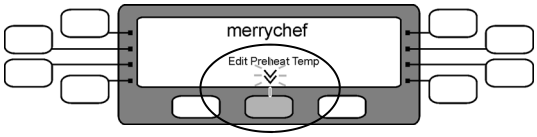
Engineering Test Settings - Changing the Oven Profile

In order to carry out an oven test procedure the oven PREHEAT must be set to 0ºF/OFF to switch off the convection heaters and the Manual controls must be enabled.
When the test is completed the oven must be returned to its original settings or the appropriate MenuKey can be used to reset the oven automatically.

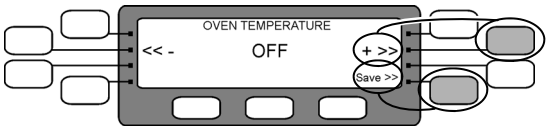
To set the PREHEAT temperature to 0ºF/OFF

402s Version 3.0 models

1. Switch the oven **OFF**
2. Switch **ON** and immediately press **Edit Preheat Temp**.



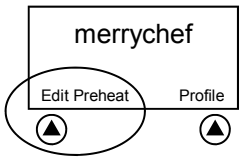
3. Make a note of the Preheat temperature in the display.



Press **+>>** for **OFF**
(note pressing either +>> or << - will cycle through all the available temperatures)
Then Press **Save** to store this setting

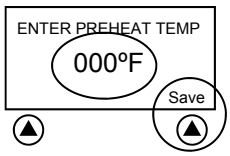
402s Version 2.0/ 2.5

1. Switch the oven **OFF**
2. Switch **ON** and immediately press **Edit Preheat** to show the ENTER PREHEAT TEMP screen.



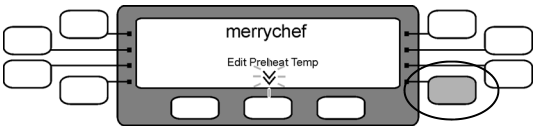
3. Make a note of the Preheat temperature in the display.
4. Press **0**, **0**, **0** to overwrite the current temperature setting.

Then press **Save** to store this setting

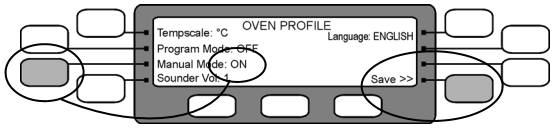


To set the Oven controls to allow Manual operation

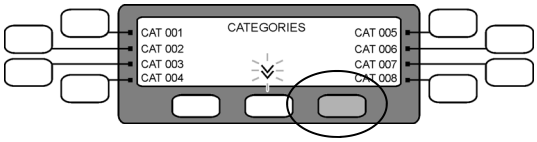
1. Switch the oven **OFF then**
2. Switch **ON** and immediately press the lower right pad to display the OVEN PROFILE screen.



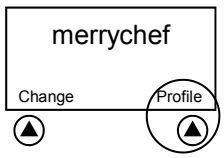
3. Press to set Manual Mode to **ON** Then Press **Save**



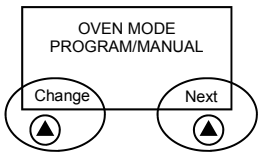
To use Manual Mode: from the CATEGORIES standby screen press the lower centre right pad To display the Manual mode screen.



1. Switch the oven **OFF**
2. Switch **ON** and immediately press **Profile** to edit the oven operating profile



3. Press **Change** to set OVEN MODE to **PROGRAM/MANUAL**



Then press **Next** five times to return to the OVEN COLD standby screen.

To use MANUAL MODE:
from the OVEN COLD/PRESS PREHEAT standby screen press the **PREHEAT/ COOL DOWN** pad on the control panel and then press Manual.