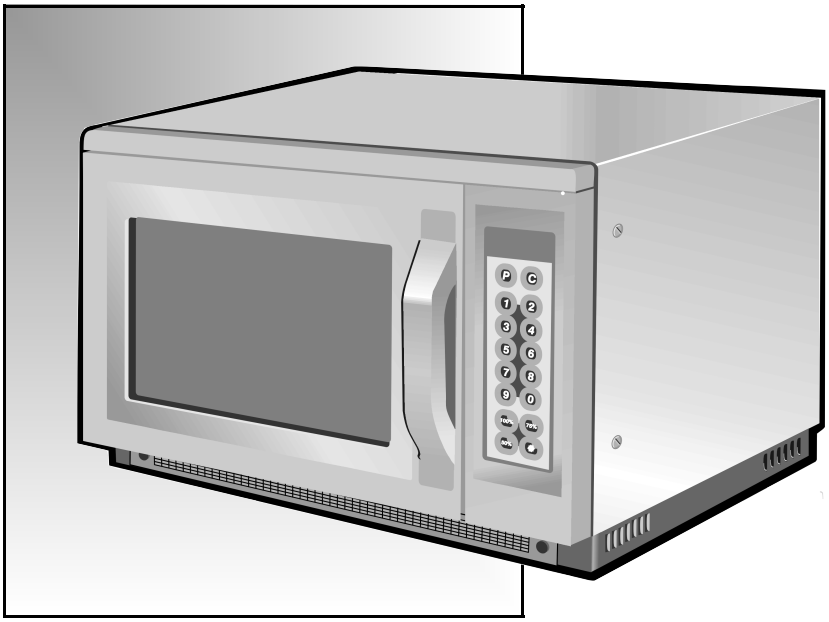


merrychef

MC-SERIES

SERVICE MANUAL

For all MC-Series models manufactured from January 2001

Part No. 32Z3329e Issue No. 5

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.co.uk
E-mail: sales@merrychef.co.uk **or** service@merrychef.co.uk

SAFETY CODE

This manual is designed to assist engineers who have been on a recognised product familiarisation and training course run by Merrychef Limited. It has been prepared to offer technical guidance for the Merrychef MC Series Commercial Microwave 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 leakage.

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

Before removing the rear cover 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 oven does NOT have an On/Off switch.

Upon completion of a service on an MC Series oven, or before reconnecting the appliance to the mains supply for testing, check all of the following points:

- All internal electrical connections are correct.
- All wiring insulation is correct and is not touching a sharp edge.
- All Earth connections are electrically and mechanically secure.
- All four door safety interlocks are secure and mechanically sound.
- The door operation is smooth.
- The door activates all four of the door interlock switches **in the correct order**.
- All fuse-holder safety covers are correctly fitted.

Before finishing the service call, recheck the following points:

- All of the electronics are functioning correctly, and all of the touch pads are working.
- The power output of the oven is correct (see pages 7 & 8).
- Microwave emission is below permissible limit - 5 mW/cm² (see BS EN 60335-2-90:1998).
- Oven has correct 50 mm air gap all round. Air flow should not be restricted.

PRODUCT SPECIFICATIONS

Model N^{o}. MC-Seies

Model Number Specification: Model N^{o}. + Voltage + Frequency + Country

Voltage	2 =	220-230V a.c.	4 =	230-240V a.c.
Frequency	5 =	50 Hz	6 =	60 Hz
Country	UK =	United Kingdom	EX =	Export

Power Requirements	MC1000C45UK MC1000C25EX MC1400C45UK MC1400C25EX MC1800C45UK MC1800C25EX	230-240V ac 50 Hz 13.0A Single Phase 2 Wire + Earth 220-230V ac 50 Hz 14.2A Single Phase 2 Wire + Earth 230-240V ac 50 Hz 13.0A Single Phase 2 Wire + Earth 220-230V ac 50 Hz 14.2A Single Phase 2 Wire + Earth 230-240V ac 50 Hz 13.0A Single Phase 2 Wire + Earth 220-230V ac 50 Hz 14.2A Single Phase 2 Wire + Earth
Power Output Microwave 100%	MC1000 MC1400 MC1800	1000W (IEC 705) 1400W (IEC 705) 1800W (IEC 705)
External Dimensions	Height Width Depth	335 mm (Plus 50 mm minimum clearance above) 510 mm (Plus 50 mm minimum clearance each side) 415 mm (Plus 50 mm clearance behind)
Internal Dimensions	Height Width Depth Capacity	210 mm 330 mm 330 mm 23 litres (0.81 ft^{3})
Weight	Nett Gross packed	30 kg 35 kg
Construction	Cavity & Case-	304 Stainless Steel
Settings	Microwave Timer	100%, 75%, 50%, progressive Defrost Up to 9 minutes 59 seconds Up to 3 cooking stages of up to 9 minutes 59 seconds each (Programmed)

Control System	Wipe-clean touch pad operating microprocessor based control system. Direct readout of time and power set. 10 Pre-programmed cooking sequences accessed by just two key presses.
Safety Features	Four door interlock switches. Cavity Overheat Sensor. Magnetron Overheat Sensor.
Additional Features	• Easy-to-use multistage programming. • Manual and Pre-programmed mode always available • Magnetron soft-start circuit for increased life and faster activation. • Multiple product facility.

INSTALLATION INSTRUCTIONS

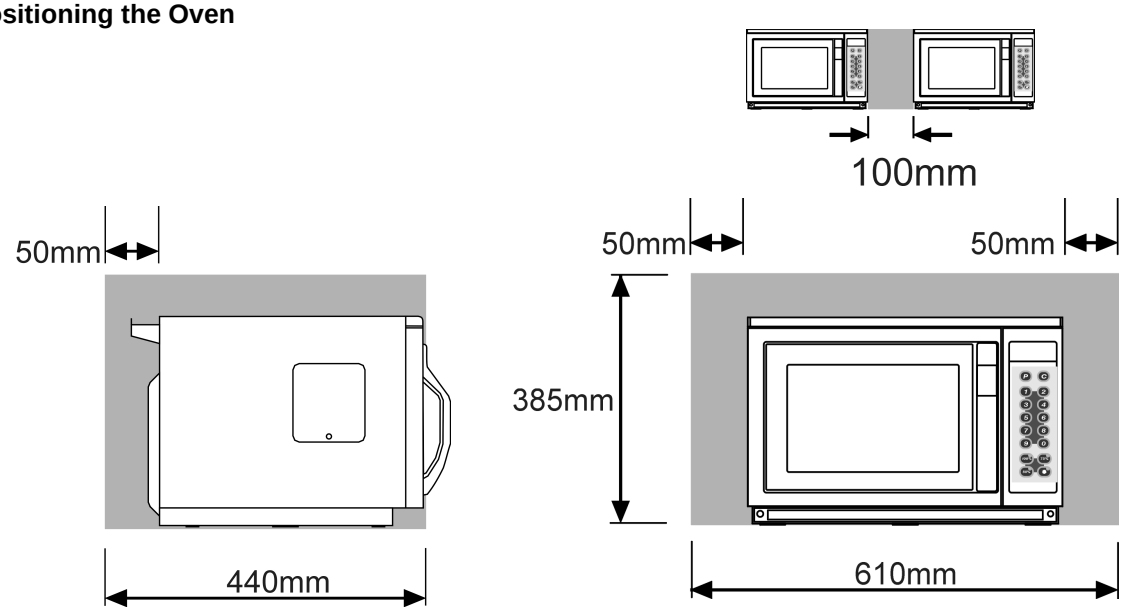
MC Series Ovens

Power Supply Requirements

The MC–Series oven should be connected to a suitable electricity supply, which can cope with the switching-on surge that occurs with certain types of catering equipment, such as 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"** circuit breaker, rated at 16A.

Positioning the Oven



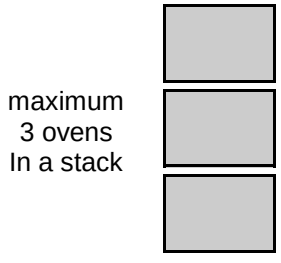
In order to maintain adequate ventilation for air intake and exhaust, and to allow access for cleaning filters, you must allow a minimum of 50 mm clearance all around the oven. Air intake temperature should not exceed 35°C - excessive temperature can lead to reduced operating duty cycle or premature ageing of internal components.

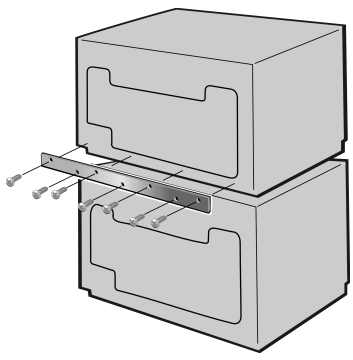
ALWAYS Place containers in the cavity carefully - impact damage may chip the oven shelf

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

NEVER Stack machines on top of each other without using the stacking adapter provided.

Stacking Adapter

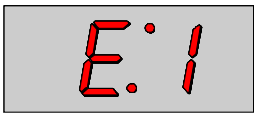
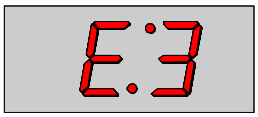




Error Codes and Diagnostics

The MC–Series oven will identify some of the most common problems by flashing an error message code in the time display window.

These are the error messages, and suggestions for repairing them.

	1 2	Door not fully shut. Possible electrical fault	Close door fully. Door switch inoperative.
	1 2 3	No time has been set. Invalid time has been set. Invalid program has been set.	Set a time. Set a valid time. Use call-back to check program.

Procedure A - Power Output Test in accordance with BS EN 60335-2-25:1996 Annex AA

This test is given in the BSI test standard for microwave ovens. It is reproduced below - not so that you can follow it, but to show you why it is impractical in normal conditions. A simplified procedure, which gives a good approximation to the BSI power output, is given in Procedure B which follows.

Note: This test can only be carried out on a **COLD** oven. If the oven has been operating, even for only a few seconds, the power given will be lower than the oven rating. This test must also be carried out at a stable voltage - the voltage in most kitchens varies considerably even within the period of the test. If the oven has been operating, go to **Procedure B.**

You will need:

A thermometer capable of reading to ±0.1°C.
A cylindrical borosilicate glass container, 190 mm diameter, with a wall thickness of 3 mm or less.
A calculator.
A set of scales capable of reading 1 kg to an accuracy of ± 1 g.
A glass or plastic stirrer.
A jug capable of holding over 1 litre of water.
Drinkable water which is at a temperature of 10°C ± 1°C.
A "Variac" or similar variable transformer capable of supplying the oven to ensure a stable voltage.

WARNING: *The Borosilicate Glass container has thin walls and is therefore fragile - take care not to break it during use.*

Method

A cylindrical container of borosilicate glass is used for the test. It has a maximum thickness of 3 mm, an external diameter of approximately 190 mm and a height of approximately 90 mm. The mass of the container is determined.

At the start of the test, the oven and the empty container are at ambient temperature. Potable water having an initial temperature of 10°C ± 1°C is used for the test. The temperature of the water is measured immediately before it is poured into the container.

A quantity of 1000 g ± 5g of water is added to the container and its actual mass obtained. The container is then immediately placed in the middle of the oven shelf which is in its lowest normal position. The appliance is supplied at rated voltage and operated at the maximum power setting. The time for the water temperature to attain 20°C ± 2°C is measured. The oven is then switched off and the final water temperature is measured within 60's.

NOTES:

1 The water is stirred before its temperature is measured.
2 Stirring and measuring devices are to have a low heat capacity.

The microwave power output is calculated from the formula:

$$P = \frac{4.187\, M_W\, (T_2-T_1) + 0.55\, M_C\, (T_2-T_0)}{t}$$

where

P is the microwave power output, in watts;
M_W is the mass of the water, in grams;
M_C is the mass of the container, in grams;
T_0 is the ambient temperature, in °C;
T_1 is the initial temperature of the water, in °C;
T_2 is the final temperature of the water, in °C;
t is the heating time in seconds, excluding the magnetron filament heat-up time.

Procedure B - Simplified Power Test

You will need:

A thermometer capable of reading to ±0.1°C.
A Polypropylene tray approximately 200 mm x 200 mm.
A measuring jug.
A calculator.
Water which is at a temperature of 10°C ± 2°C.

1 Measure 1 litre of cold water into the tray using the measuring jug.
2 Measure the water temperature, and record it as T[s].
3 Place the tray in the oven and close the door.
4 Turn the oven on.
5 Set the timer to 1:02.
6 Press the “100%” pad.
7 When the oven bleeps, open the door and remove the tray.
8 Stir the water thoroughly, and measure its temperature. Record this as T[e].

Calculation:

1 T[r] = T[s] - T[e].
2 Power = 78.5 x T[r]. Power is in Watts.

The power given by the above test should be within ±15% of the rated power.

Procedure C - Power Transformer Test

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

1 Isolate the oven from the mains supply.

WARNING:	*High voltages and large currents are present at the secondary winding and filament winding of the Power Transformer. 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 Power Transformer has High Voltages present because of the Soft Start circuit. Isolate the oven before testing.*

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 continuity of the windings. Results should be as follows:

Mains winding (between tags)	Approximately 1.3 Ω
High Voltage winding (between tag & chassis)	Approximately 82 Ω
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.

Procedure D - High Voltage Capacitor Test

You will need:

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

1 Isolate the oven from the mains supply.

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.

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

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

Procedure E - 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 Rectifier. 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 Rectifier has High Voltages present because of the Soft Start circuit. Isolate the oven before testing.*

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.

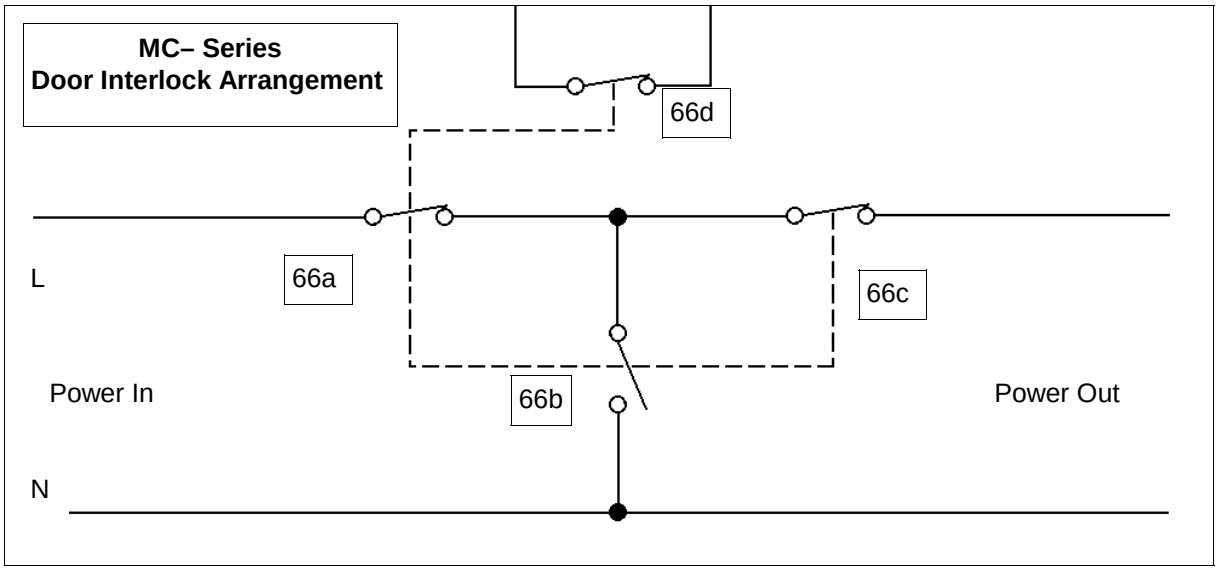
4

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

DOOR INTERLOCK OPERATION

Door Interlock Operation

The door on the oven is monitored by four microswitches. Three of these are used in the conventional "Primary, Secondary and Monitor" switch arrangement shown below, while the fourth is a low-voltage switch linked directly to the control circuitry.

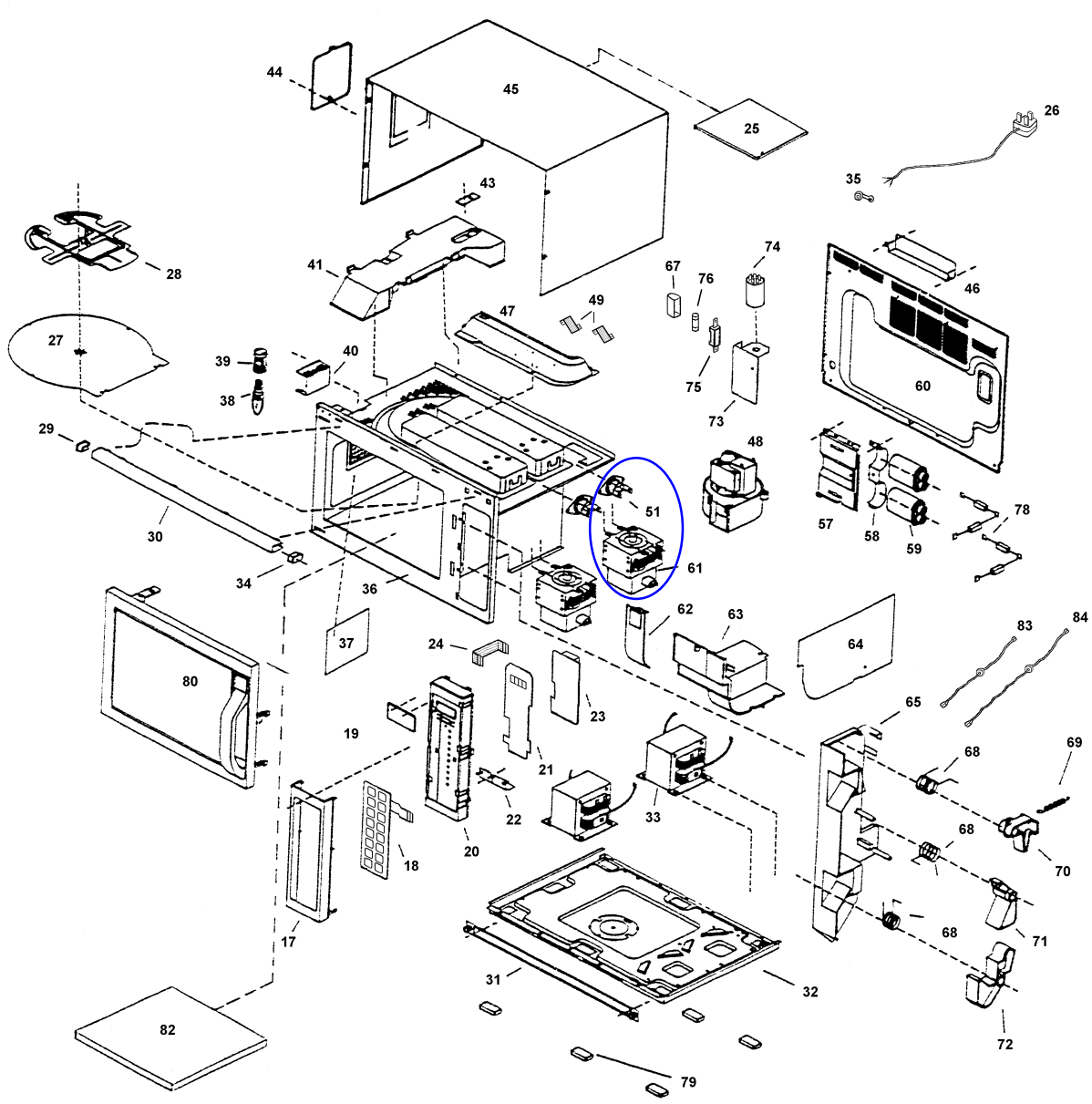


The switches operate as follows:

1. Monitor Switch [66b , Top]. As the door is closed, the monitor switch is opened.
2. Primary Interlock Switch [66a , Lower Middle]. The Primary switch is then closed.
3. Secondary Interlock Switch [66c , Upper Middle]. The Secondary Switch then closes.
4. Low voltage Switch [66d , Bottom]. The Low voltage switch operates concurrently with the Primary and Secondary switches.

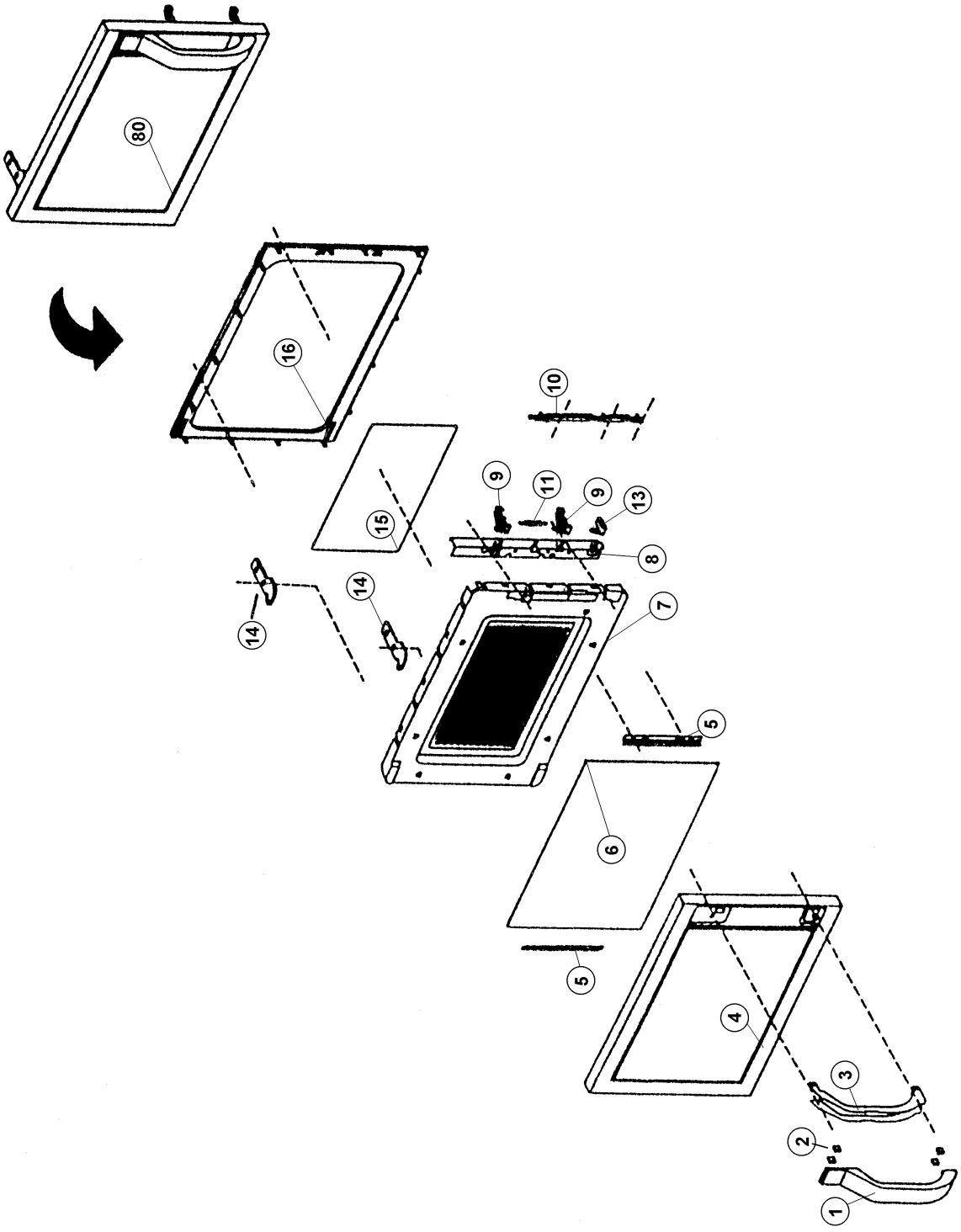
When the door is opened, the switches operate in the reverse order.

Exploded View – MC Series



Note: Model MC1000 has only one Magnetron assembly parts 51, 61

Door Assembly

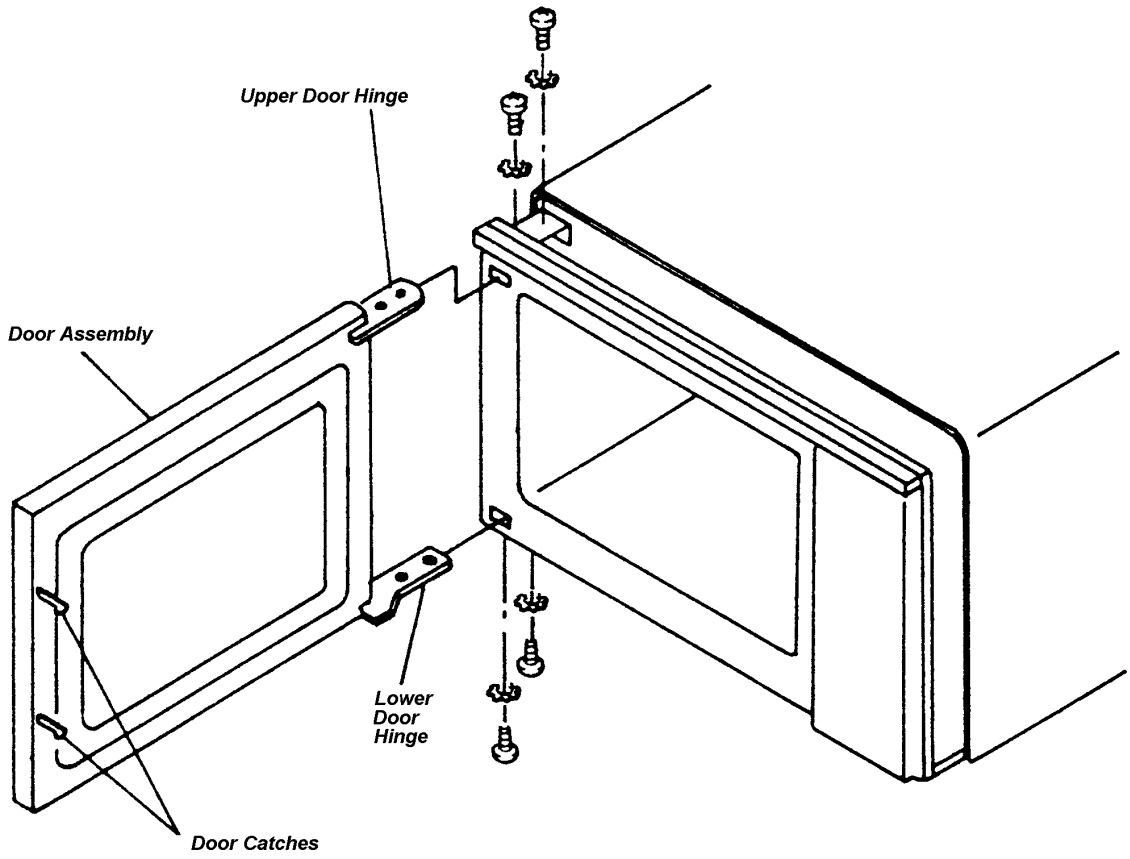


Door Replacement and Door Adjustment

DOOR REPLACEMENT

1. Remove four screws holding the Upper and Lower Hinge Plate [14] to the oven cavity.
2. Remove Door Assembly [80] by pulling it forward.
3. On re-installing new door assembly, secure the upper and lower oven hinges with the four mounting screws to the oven cavity. Make sure the door is parallel with the bottom line of the oven cavity face and the catches pass through the catch holes correctly.

Note: After any service to the door, the oven should be checked for leakage.

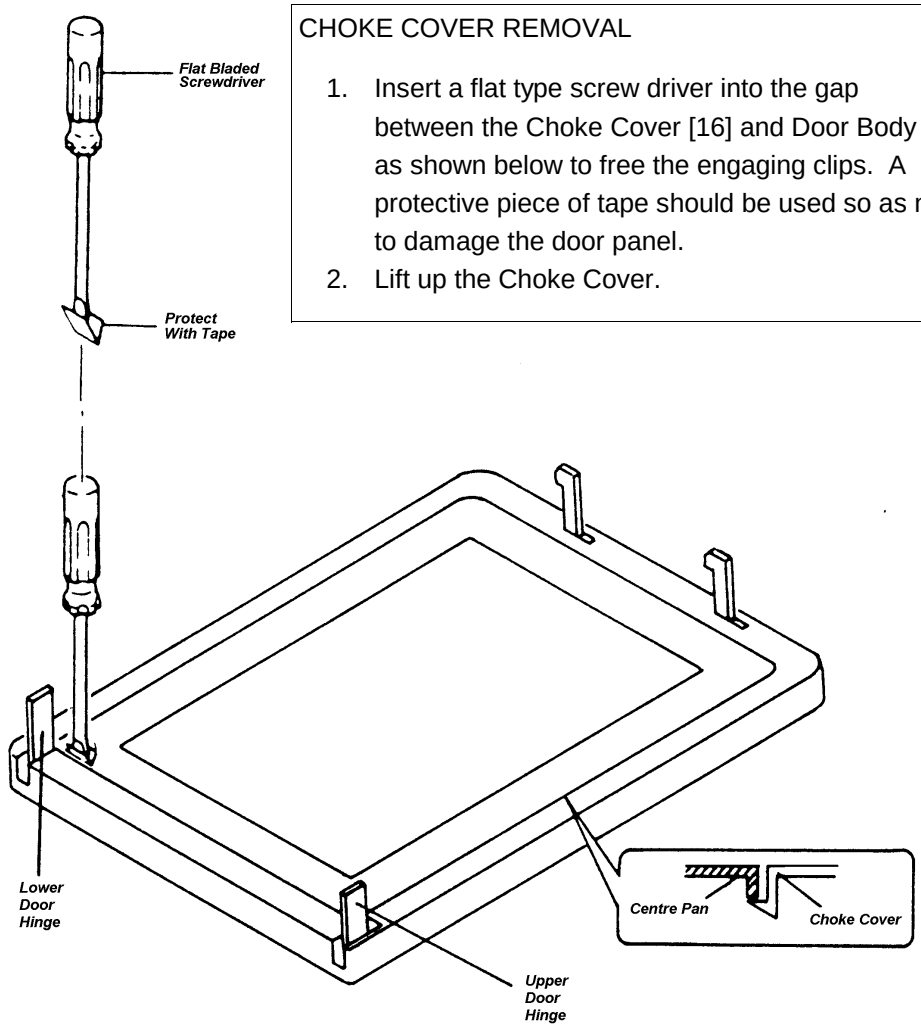


DOOR ADJUSTMENT

When removing and/or loosening hinges during door adjustment or replacement, the following adjustment criteria must be met. The door is adjusted to meet the following three conditions by keeping the hinge screws slack.

1. Adjust door interlock block to a position where it smoothly locates with the catches through the catch holes. Refer to Door Catch Adjustment.
2. Deviation of door alignment from horizontal line of cavity front is to be less than 1.0 mm.
3. The door is positioned so that it touches the cavity front.
4. Reinstall outer case and check for microwave leakage around the door with an approved microwave leakage meter

Door Servicing



CHOKE COVER REMOVAL

1. Insert a flat type screw driver into the gap between the Choke Cover [16] and Door Body [7] as shown below to free the engaging clips. A protective piece of tape should be used so as not to damage the door panel.
2. Lift up the Choke Cover.

DOOR COMPONENTS REMOVAL

Place the Door Assembly [80] on a soft cloth with the Choke Cover [16] facing up.

UPPER AND LOWER OVEN HINGE REMOVAL

1. Remove the Choke Cover, referring to "CHOKE COVER REMOVAL".
2. Release the Door Hinges [14] from the door panel.

DOOR HANDLE REMOVAL

1. Remove the two screws holding the Door Handle [1] to door.
2. Remove the Door Handle from the Door Body.

UPPER AND LOWER DOOR CATCH REMOVAL

1. Remove the Inner Handle [3] from the door assembly.
2. Remove the three screws holding the Door Catch Bracket [8] to the Door Body.
3. Release the Door Spring [11] from the tab of the Door Catch Link Rod [10] and Door Catch Bracket.
4. Release the Catches [9] from Door Catch Link Rod and Door Catch Bracket.

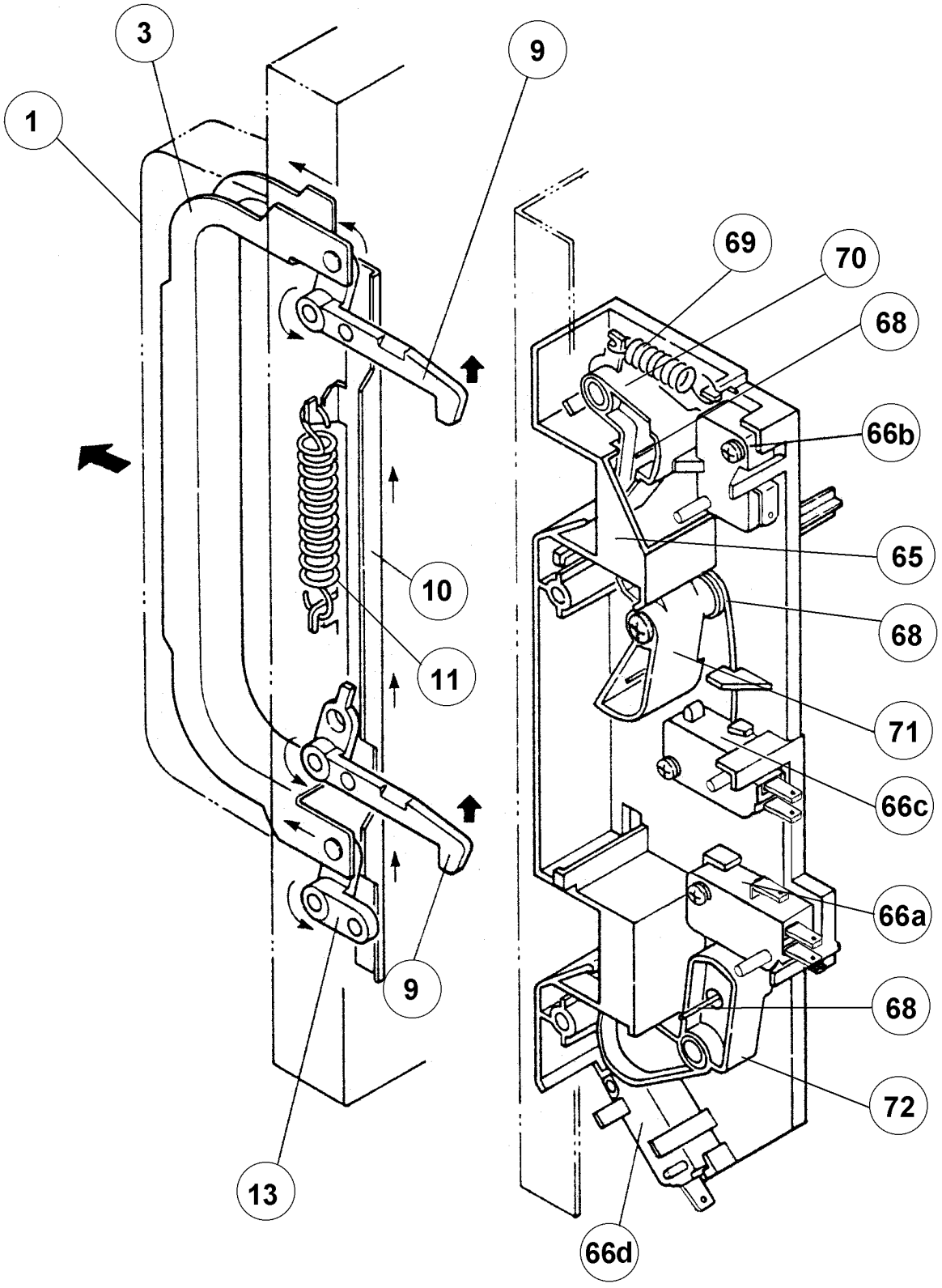
DOOR OUTER SKIN REMOVAL

1. Set the four tabs of the Door Outer Skin [4] upright.
2. Remove the Door Outer Skin from the Door Body [7].

DOOR GLASS REMOVAL

1. Remove the four screws holding the two Glass Locators [5] to the Door Body [7].

Door Interlock Details



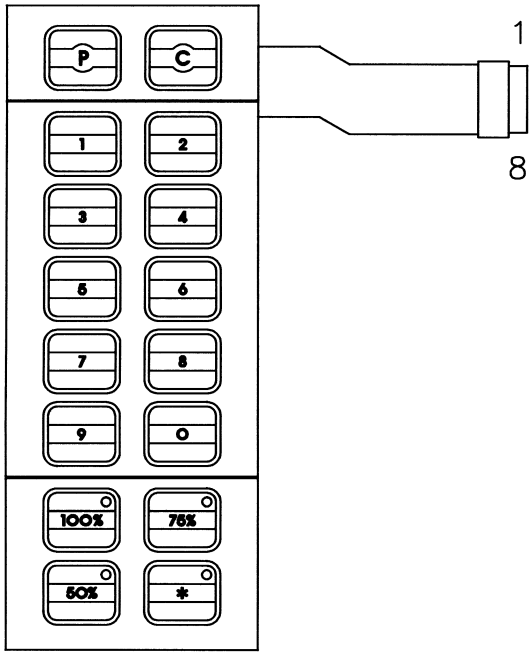
Membrane Panel Circuit

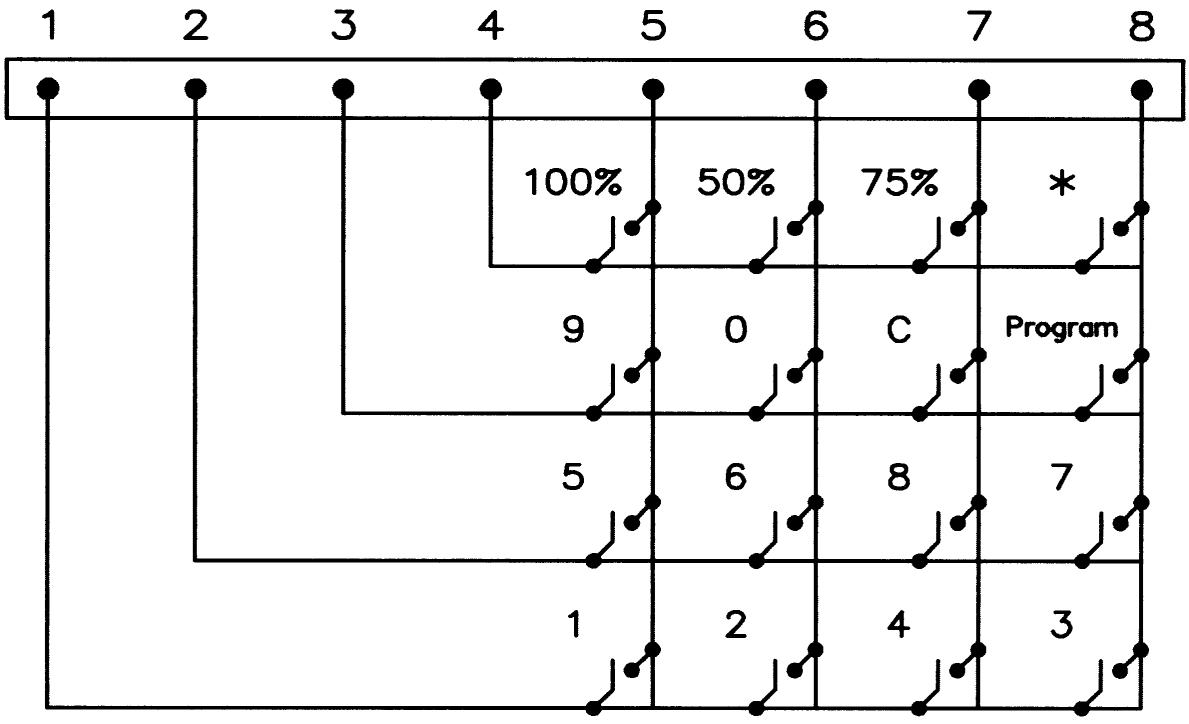
You will need:

A Digital Multi-meter (D.M.M.)

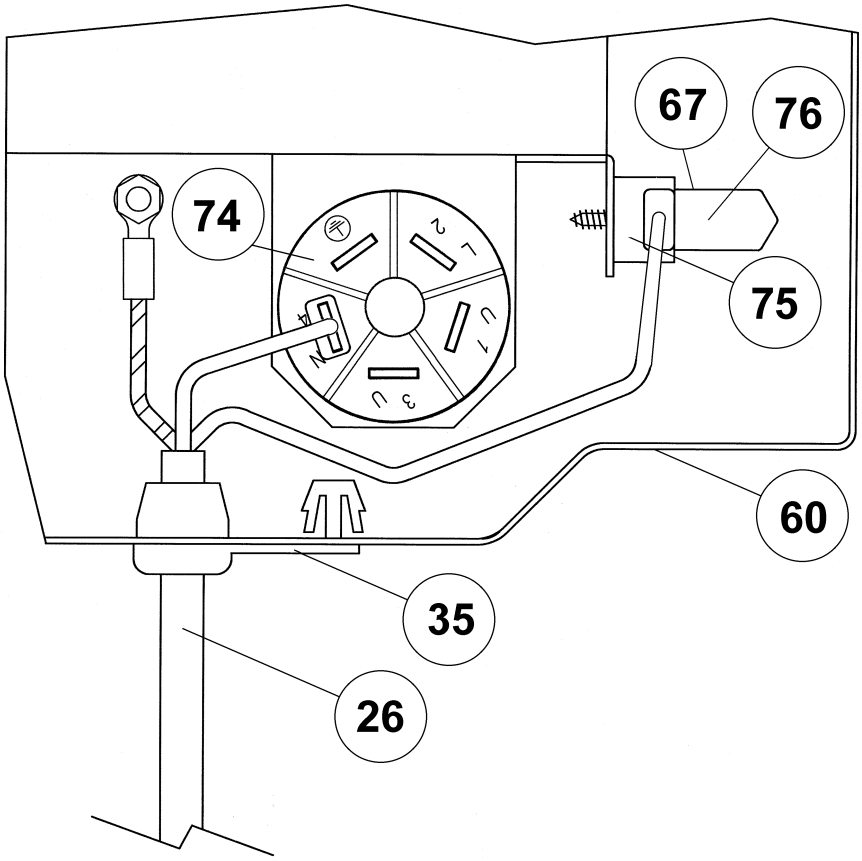
Procedure:

1. *Isolate the oven from the mains supply.*
2. *Remove the Logic Assembly from the Control Panel Housing.*
3. *Unplug the membrane "tail" from the Logic PCB Assembly.*
4. *Using a D.M.M., check for continuity between the correct terminals when the pads are pressed.*
5. *When the panel has been tested, re-assemble and re-test the control housing.*





INPUT WIRING DETAILS



Part Number Identification Chart: MC series ovens

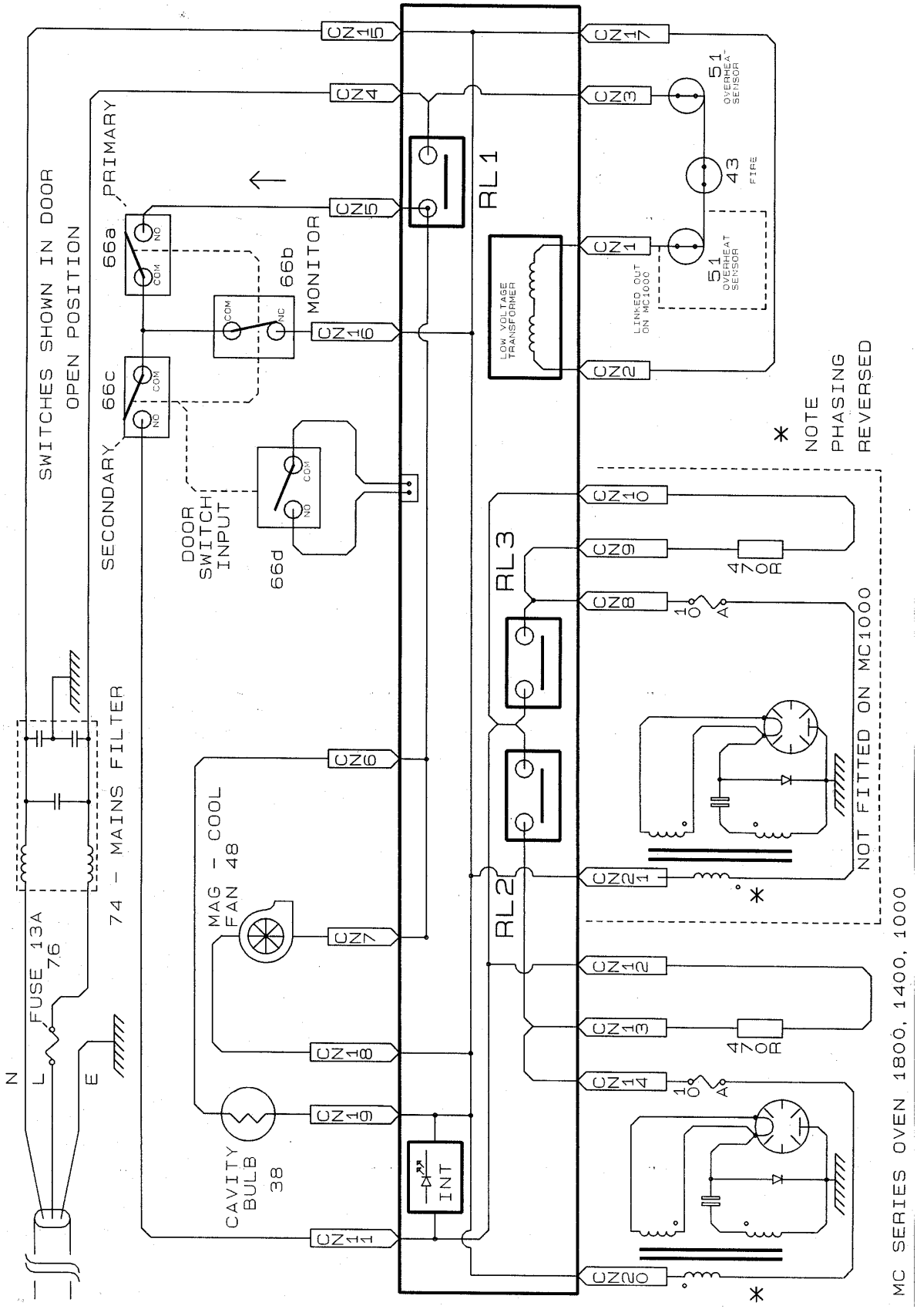
No	Description	MC1000	MC1400	MC1800
		Part No.	Part No.	Part No.
1	Outer Handle	30M0001	30M0001	30M0001
2	Handle Bearing (4)	30M0002	30M0002	30M0002
3	Inner Handle	30M0003	30M0003	30M0003
4	Door Outer Skin	30M0004	30M0004	30M0004
5	Glass Locator	30M0005	30M0005	30M0005
6	Outer Door Glass	30M0006	30M0006	30M0006
7	Door Body	30M0007	30M0007	30M0007
8	Door Catch Bracket	30M0008	30M0008	30M0008
9	Door Catch (2)	30M0009	30M0009	30M0009
10	Door Catch Link Rod	30M0010	30M0010	30M0010
11	Door Spring	30M0011	30M0011	30M0011
12	Oven Cavity MC-1000	30M0012	30M0036	30M0036
13	Door Catch Crank	30M0013	30M0013	30M0013
14	Upper / Lower Hinge Plate	30M0014	30M0014	30M0014
15	Inner Door Film	30M0015	30M0015	30M0015
16	Choke Cover	30M0016	30M0016	30M0016
17	Control Pnl Cover (see note 1.)	30M0017	30M0017	30M0017
18	MC-Series Membrane	40M0956	40M0956	40M0956
19	Display Screen	30M0019	30M0019	30M0019
20	Control Housing Moulding	30M0020	30M0020	30M0020
21	MC Series Logic PCB Assy	11M0326	11M0326	11M0326
22	Housing Support Bracket	30M0022	30M0022	30M0022
23	MC Series Relay PCB Assy	11M0327	11M0327	11M0327
24	10 Way Ribbon Cable Assy	11E0051	11E0051	11E0051
25	Insulating Sheet	30M0025	30M0025	30M0025
26	Mains Cable Assy	31Z0220	31Z0220	31Z0220
27	Mica Plate	30M0027	30M0027	30M0027
28	Stirrer	30M0028	30M0028	30M0028
29	Decorative Trim LH	30M0029	30M0029	30M0029
30	Decorative Trim Top	30M0030	30M0030	30M0030
31	Air Inlet Filter	30M0031	30M0031	30M0031
32	Chassis	30M0032	30M0032	30M0032
33	HV Transformer J1342	30M0035	———	———
	HV Transformer J1338	———	30M0033	30M0033
34	Decorative Trim RH	30M0034	30M0034	30M0034
35	Strain Relief Bush	31Z1036	31Z1036	31Z1036
36	Oven Cavity MC1400/1800	30M0036	30M0036	30M0036
37	Lamp Cover Film	30M0037	30M0037	30M0037
38	Lamp	30M0038	30M0038	30M0038
39	Lamp Holder	30M0039	30M0039	30M0039
40	Lamp Bracket	30M0040	30M0040	30M0040
41	Air Outlet Duct	30M0041	30M0041	30M0041
42	Temp Sensor	30M0042	30M0042	30M0042
43	Thermal Fuse	30M0043	30M0043	30M0043
44	Lamp Cover	30M0044	30M0044	30M0044
45	Back Case	30M0045	30M0045	30M0045

Note 1.
Part 17 supplied as MC 1800, remove label for MC1000 & MC1400

Part Number Identification Chart: MC series ovens

No	Description	MC1000	MC1400	MC1800
		Part No	Part No	Part No
46	Rear Air Guide	30M0046	30M0046	30M0046
47	Upper Air Duct	30M0047	30M0047	30M0047
48	Cooling Fan Assembly	30M0048	30M0048	30M0048
49	Gold Resistor	30Z0283	30Z0283	30Z0283
51	Magnetron Thermostat	30M0051	30M0051	30M0051
52	10A Fuse In-line Assembly	11M0330	11M0330	11M0330
56	Fan Scroll	30M0056	30M0056	30M0056
57	Main Capacitor Bracket	30M0057	30M0057	30M0057
58	Capacitor Clamp	30M0058	30M0058	30M0058
59	HV Capacitor 0.74uF	———	30Z0377	———
	HV Capacitor 0.88uF	———	30Z0987	———
	HV Capacitor 1.0uF	30M0059	———	30M0059
	HV Capacitor 1.1uF	———	———	30Z0989
60	Rear Panel	30M0060	30M0060	30M0060
61	Magnetron	30M0061	30M0061	30M0061
62	Magnetron Air Splitter	30M0062	30M0062	30M0062
63	Magnetron Cooling Duct	30M0063	30M0063	30M0063
64	Cooling Duct Cover	30M0064	30M0064	30M0064
65	Interlock Holder	30M0065	30M0065	30M0065
66 a-d	Microswitch V5A010CB (4)	30Z0233	30Z0233	30Z0233
67	Fuse Cover	30Z1080	30Z1080	30Z1080
68	Spring 1	30M0068	30M0068	30M0068
69	Spring 2	30M0069	30M0069	30M0069
70	Top Lever	30M0070	30M0070	30M0070
71	Middle Lever	30M0071	30M0071	30M0071
72	Bottom Lever	30M0072	30M0072	30M0072
73	Filter Bracket	40M0961	40M0961	40M0961
74	16A Mains Filter	30Z0997	30Z0997	30Z0997
75	Fuse Holder	30Z0231	30Z0231	30Z0231
76	Fuse 13A Anti surge	30Z0168	30Z0168	30Z0168
77	———	———		
78	HV Diode Assy	30M0078	30M0078	30M0078
79	Self-Adhesive Foot	30M0079	30M0079	30M0079
80	Door Assembly	11M0334	11M0334	11M0334
81	Power Relay	30M0081	30M0081	30M0081
82	Oven Shelf	30M0082	30M0082	30M0082
83	HT Lead 1	30M0083	30M0083	30M0083
84	HT Lead 2	———	30M0084	30M0084
91	Mains Filter Bracket	30M0091	30M0091	30M0091

CIRCUIT DIAGRAM: MC Series ovens



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 on which error occurs (if applicable) - **MC Series:**
Description of error
Suggestion for improvement to manual
Please return this form to: Engineering Department Merrychef Ltd Station Road West Ash Vale Aldershot Hampshire GU12 5XA Or Fax it on: +44 (0) 1252 371007