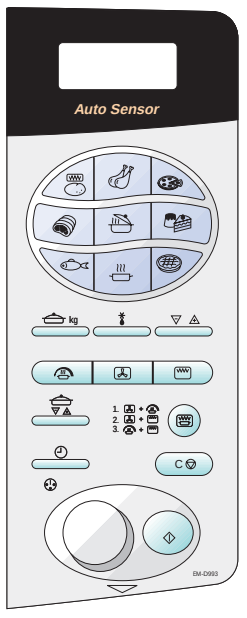
SANYO

FILE No.

SERVICE MANUAL

MICROWAVE OVEN WITH CONVECTION AND GRILL

EM-D993(Semo)



Product Code No.

EM-D993(Semo)	43739517

FOREWORD

Read this manual carefully, especially precaution on microwave energy, and follow the procedure strictly. Careless servicing and testing may expose yourself to the microwave energy leakage.

PRECAUTIONS

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 if 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.

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CAUTION
MICROWAVE ENERGY
PERSONNEL SHOULD NOT BE EXPOSED TO THE MICROWAVE ENERGY WHICH MAY RADIATE FROM THE MAGNETRON OR OTHER MICROWAVE GENERATING DEVICE IF IT IS IMPROPERLY USED OR CONNECTED. ALL INPUT AND OUTPUT MICROWAVE CONNECTIONS, WAVE GUIDES, FLANGES, AND GASKETS MUST BE SECURE. NEVER OPERATE THE DEVICE WITHOUT A MICROWAVE ENERGY ABSORBING LOAD ATTACHED. NEVER LOOK INTO AN OPEN WAVE GUIDE OR ANTENNA WHILE THE DEVICE IS ENERGISED.

1. ADJUSTMENT PROCEDURES

TO AVOID POSSIBLE EXPOSURE TO MICRO-WAVE ENERGY LEAKAGE, THE FOLLOWING ADJUSTMENT OF THE INTERLOCK SWITCHES SHOULD BE MADE ONLY BY AUTHORISED SERVICE PERSONNEL

PRIMARY INTERLOCK SWITCH, DOOR SENSING SWITCH AND INTERLOCK MONITOR SWITCH ADJUSTMENT
(Figure 1)

(1) Loosen 2 screws securing the lever stopper.
(2) Adjust the lever stopper position so that it is pushed up and pull forward until there is about zero gap.
  2-1. Between the lever and the switch body on the door sensing switch.
  2-2. Between the lever and the switch body on the interlock monitor switch.
  2-3. Between the latch lever and the switch body on the primary interlock switch.
  when the door latch is securely locked.
(3) Tighten the lever stopper screws securely.
(4) Make sure the interlock monitor is closed after the primary interlock switch opens when the door is opened very slowly, according to "CHECKOUT PROCEDURE FOR SWITCHES" on page 9.
(5) Make sure the interlock monitor is open before the primary interlock and secondary interlock switches close when the door is closed very slowly, according to "CHECKOUT PROCEDURE FOR SWITCHES" on page 9.
(6) Make sure the microwave energy leakage is below the limit of the regulation (5mW/cm^2) when measured with a detector. (All service adjustments must be made for minimum energy leakage readings.)

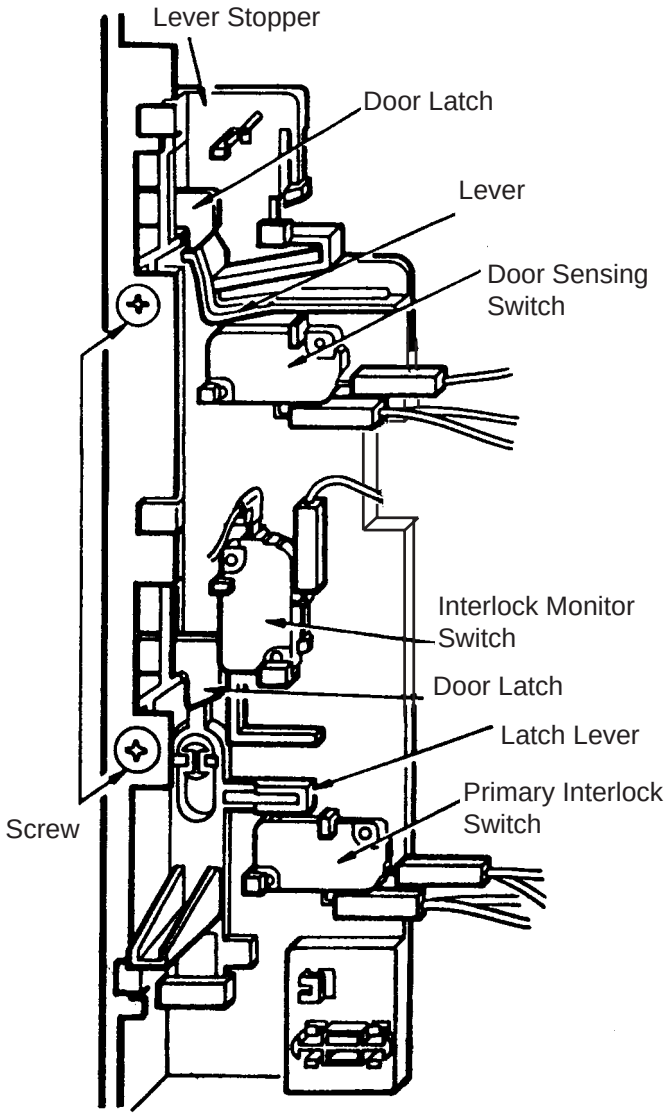


Figure 1

2. SPECIFICATIONS - EM-D993

Rated Power Consumption.....	Microwave 1650W Convection 1200W Grill 1300W
Microwave Output.....	900W
Frequency.....	2,450MHz ± 50MHz
Power Supply.....	230V,50Hz
Rated Current.....	6.7±10% Amps Micro (After 15mins.) 5.3A+5,-10% Conv. (After 15mins.) 5.5A+5,-10% Grill (After 15mins.)
Safety Devices.....	Thermal Protector for Magnetron, Open at 135˚C. Thermal Protector for Cavity, Open at 150˚C. Thermal Protector for Heater, Open at 122˚C. Thermal Protector for Convection, Open at 122˚C Fuse (Cartridge Type 8A) Primary Interlock Switch Door Sensing Switch Interlock Monitor Switch
Timer.....	Electronic Digital Micro, 90min.x 3 stages Convection, 90 mins Grill, 90 mins
Oven Temperature Control.....	Convection, 40˚C-250˚C Combination, 150˚C-250˚C
Overall Dimensions.....	570(W)x482(D)x378(H)mm
Oven Cavity Size.....	348(W)x344(D)x251(H)mm
Turntable Diameter.....	325mm(Glass),310mm(Metal)
Net Weight.....	Approx. 25Kg.

3. POWER OUTPUT MEASUREMENT

(1) Prepare 1000±5g tap water.
(2) Adjust water temperature to $10^{o}C \pm 2^{o}C$.
(3) Pour water into a container made of borosilicate glass, 190mm outer diameter cylinder, maximum 3mm thickness.
(4) Place the container in the centre of the oven cavity.
(5) Set the heating time for 47 seconds at full power and start the oven.
(6) Take the container out immediately when heating time is up.
(7) Stir water for making even water temperature in the container.
(8) Measure water temperature.

Water temperature rise should be between 8˚C to 12˚C for correct power output.

4.PRECAUTIONS AND REPAIR SERVICE TIPS PRELIMINARY

A.SINCE NEARLY 4,000 VOLTS EXIST IN SOME CIRCUITS OF THIS MICROWAVE OVEN, REPAIRS SHOULD BE CARRIED OUT WITH GREAT CARE

B.TO AVOID POSSIBLE EXPOSURE TO MICROWAVE ENERGY LEAKAGE, THE FOLLOWING PRECAUTIONS MUST BE TAKEN BEFORE SERVICING.

(1)Before the power is applied.
(a)Open and close door several times to make sure the primary interlock switch, the door sensing switch, and the interlock monitor switch operate properly. (Listen for the clicking sound from switches). Make sure the interlock monitor switch is closed after the primary interlock switch is opened, when the door is opened. (See pages 1 and 9).
(b)Make sure the perforated screen and the dielectric choke of the door are correctly mounted.

(2)After the power is applied.
(a)Open and close the door to see if the interlock mechanism operates properly.
(b)Check microwave energy leakage with a leakage detector and confirm the energy leakage is below $5mW/cm^2$.

(3)Do not operate the unit until it is completely repaired, if any of the following conditions exists.
(a)Door does not close firmly against the cavity front.
(b)The hinge is broken.
(c)The choke dielectric or the door seal is damaged.
(d)The door is bent or warped, or there is any other visible damage to the oven that may cause microwave energy leakage.
NOTE: Always keep the seal clean
(e)Make sure there are no defective parts in the microwave generating and transmission assembly. (especially waveguide).
(f)Make sure there are no defective parts in the inter lock mechanism.

(4)Following items should be checked after the unit is repaired.
(a)The interlock monitor switch is connected correctly and firmly.
(b)The magnetron gasket on the magnetron is properly positioned.
(c)Wave guide and oven cavity are intact (no leakage of microwave energy).
(d)The door can be properly closed and the safety switches work properly.
(e)The oven must be stopped when the door is opened or the time is up.

The oven must not be operated with any of the above components removed or bypassed.

5. OVEN CONTROL PANEL

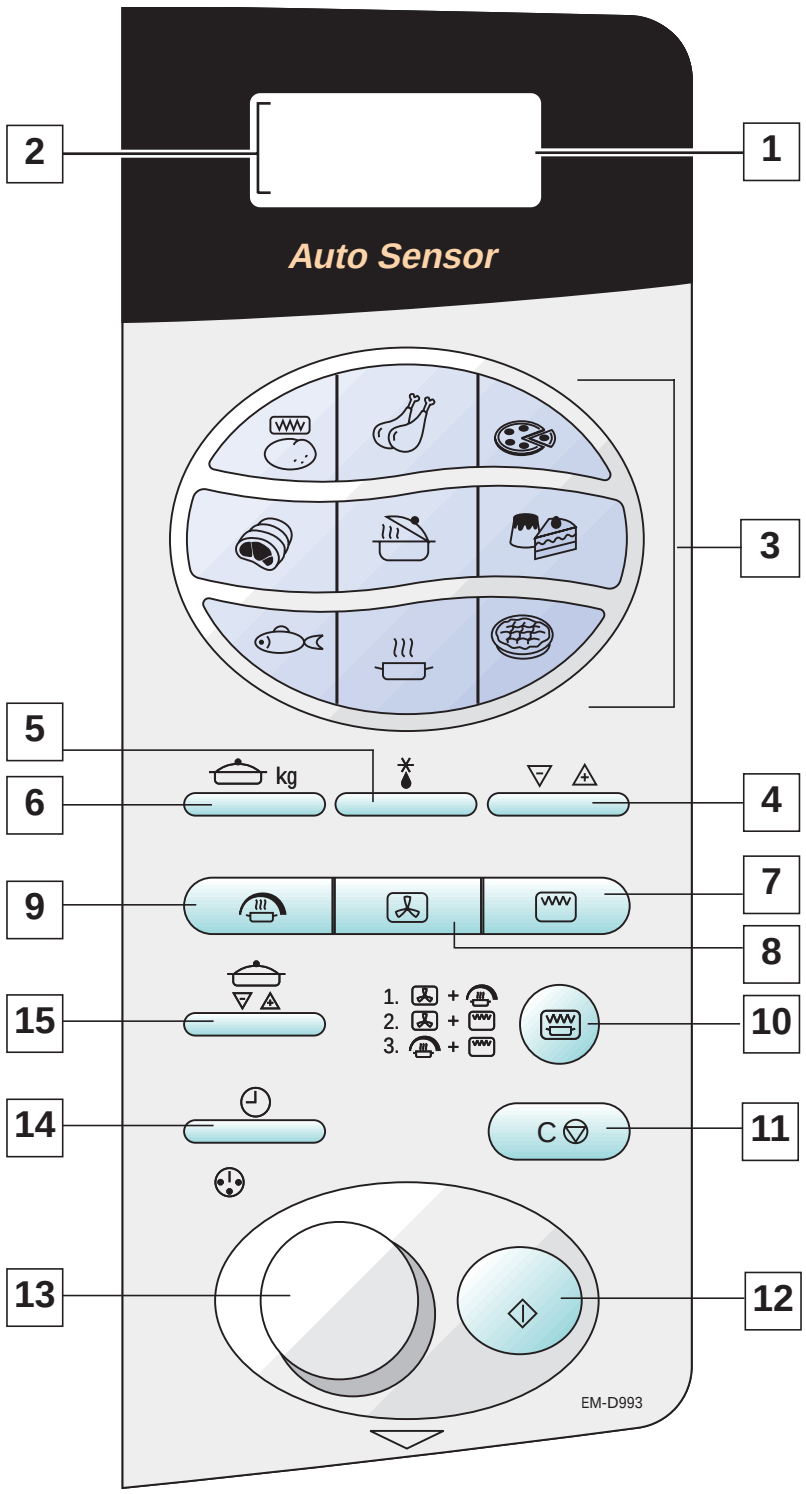


Figure 2

Notes :
A "beep tone" sounds when a "pad" on the control panel is touched, to indicate a setting has been entered.
When setting the controls you can keep your finger on a key until the desired setting is reached.

1. Display Window. Cooking mode and short messages are displayed.

2. Functional Indicator.

KEYS:

3. Auto Sensor Programs.

4. Time adjust for Auto Defrost and Direct Access

5. Auto Defrost

6. Weigh Dish.

7. Grill only.

8. Convection Temp. only.

9. Microwave Power.

10.Combination Cook:
1. Convection+Micro
2. Convection+Grill
3. Micro+Grill

11. Clear / Stop.

12.Start.

13. Time set.

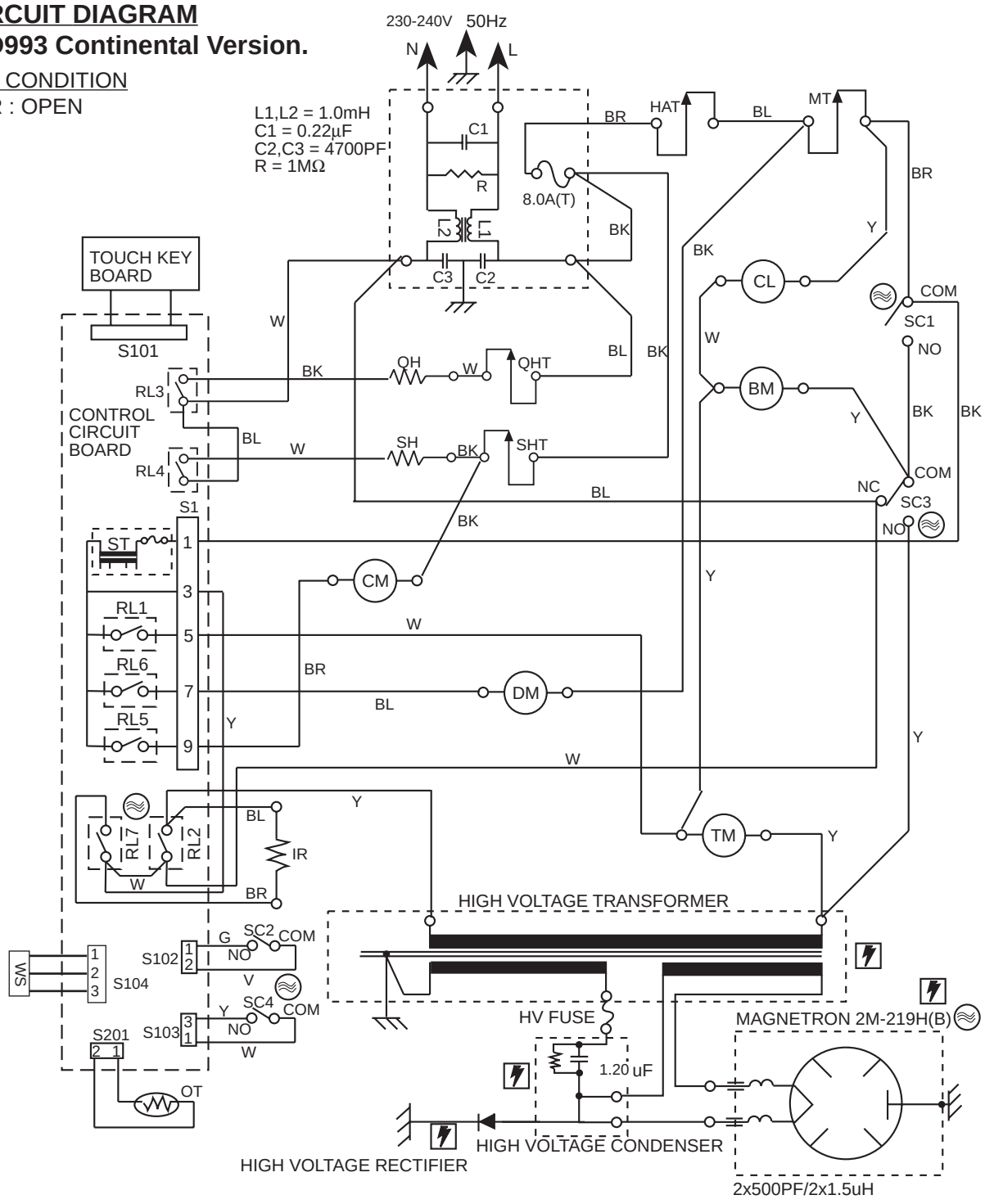
14. Time of Day.

15. Slow Cook.

6.CIRCUIT DIAGRAM

EM-D993 Continental Version.

OVEN CONDITION
DOOR : OPEN



SC1 : PRIMARY INTERLOCK SWITCH
SC2 : DOOR SENSING SWITCH
SC3 : INTERLOCK MONITOR SWITCH
SC4 : DUMPER SWITCH
QHT : THERMAL PROTECTOR FOR GRILL
MT : THERMAL PROTECTOR ON WAVEGUIDE
HAT : THERMAL PROTECTOR FOR CAVITY
SHT : THERMAL PROTECTOR FOR CONVEC.
RL1 : MAIN RELAY
RL2 : POWER CONTROL RELAY
RL3 : GRILL HEATER RELAY
RL4 : CONVEC. HEATER RELAY
RL5 : FAN MOTOR RELAY
RL6 : DUMPER MOTOR RELAY

BM : BLOWER MOTOR
CM : CONVEC. FAN MOTOR
TM : TURNTABLE MOTOR
DM : DUMPER MOTOR
CL : OVEN LAMP
QH : GRILL HEATER
SH : CONVEC. HEATER
OT : OVEN THERMISTOR
WS : WEIGHT SENSOR

WIRING COLOUR
W : WHITE
G : GREY
LB : LIGHT BLUE
BK : BLACK
V : VIOLET
BR : BROWN
Y : YELLOW
BL : BLUE

Figure 3

- The parts marked with ⚡ are supplied with a high voltage which exceeds 250V.

- The parts marked with ≈ have special characteristics important for microwave leakage. When replacing any of these parts use only manufacturer's specified parts.

7. TEST PROCEDURES AND TROUBLESHOOTING

CAUTION

- DISCONNECT THE POWER SUPPLY CORD FROM THE WALL OUTLET WHENEVER REMOVING THE CABINET FROM THE UNIT. PROCEED WITH THE TESTS ONLY AFTER DISCHARGING THE HIGH VOLTAGE CAPACITOR AND REMOVING THE LEAD WIRES FROM THE PRIMARY WINDING OF THE HIGH VOLTAGE TRANSFORMER. (See Figure 3)

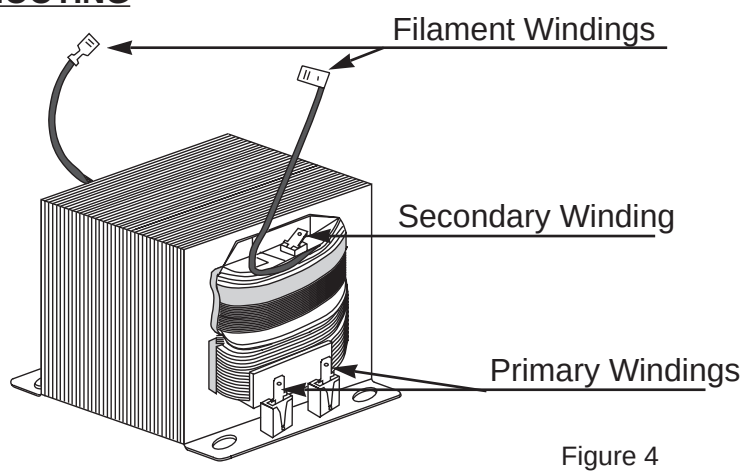
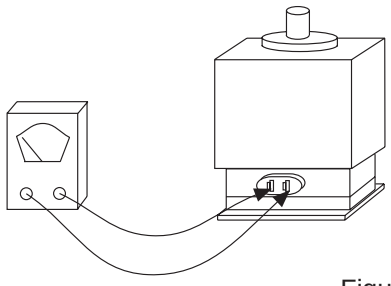
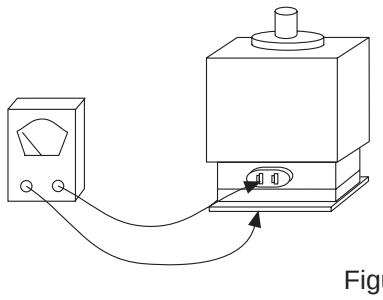
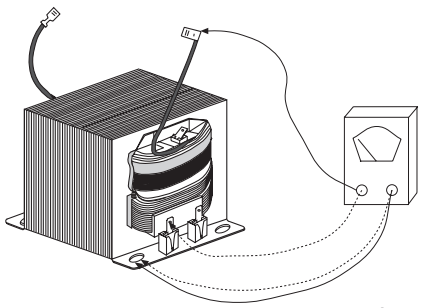
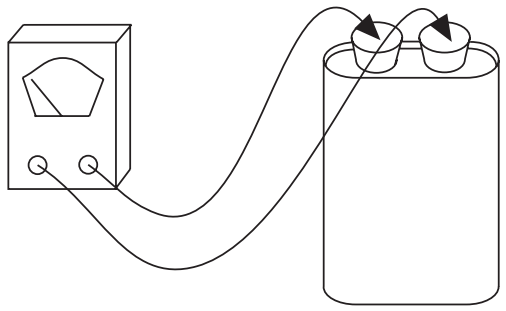
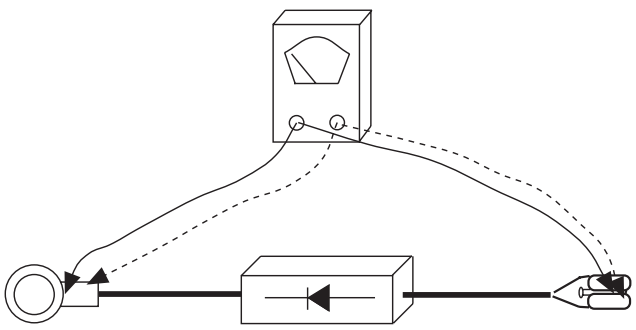


Figure 4

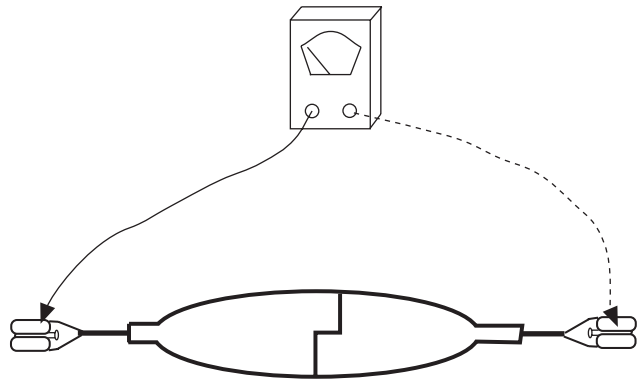
A. TEST PROCEDURE

COMPONENT	CHECKOUT PROCEDURE	RESULTS
MAGNETRON	1) Check for resistance : Across the filament terminals of the the magnetron with an ohmmeter on Rx1 scale.  Figure 5	Normal reading : Less than 1 ohm.
	2) Check for resistance : Across the filament terminals of the magnetron and the chassis ground with an ohm-meter on highest scale.  Figure 6	Normal reading : Infinite ohms
	The chart below shows the firing times of the variable power relay for the EM-D993 model. The table should be used as a means to check the magnetron is operating correctly and producing any other power setting apart from full power.	

Power Level	On Time/s (inc.'ramp up' time)	% On Time
High (900W)	30.0	100
M-High(750W)	28.0	93
Roast (450W)	18.0	60
Simmer(300W)	13.0	43
Warm (150W)	8.0	27
Low (80W)	6.0	20

COMPONENT	CHECKOUT PROCEDURE	RESULTS
HIGH VOLTAGE TRANSFORMER	1) Measure the resistance : With an ohmeter on Rx1 scale. a. Primary Winding ; b. Filament Winding ; c. Secondary Winding ; 2) Measure the resistance : With an ohm-meter on highest scale. a. Primary winding to ground ; b. Filament winding to ground ;  Figure 7	Normal readings : Approximately 1.7 ohms. Less than 1 ohm. Approximately 92 ohms. Normal readings : Infinite ohms Infinite ohms Note : Remove varnish of measured point.
HIGH VOLTAGE CAPACITOR including BLEEDER RESISTOR	1) Measure the resistance : Across two terminals with an ohm-meter on highest scale  Figure 8	Normal reading : Momentarily indicates several ohms, and gradually returns to 10 Meg-ohm. Abnormal reading : Indicates continuity or 10MΩ from the beginning.
HIGH VOLTAGE DIODE	Measure the resistance : Across two terminals with an ohm-meter on its highest scale.  Figure 9	Normal reading : Indicates over 10MΩ in one direction (forward direction) and infinite ohms in the reverse direction, using meter which is provided with a 9-volt battery. **NOTE** Some digital meters may show over even in a forward direction because low measuring voltage of meter does not allow the meter current to pass through the high voltage diode. Abnormal reading: Indicates continuity or infinite ohms in both directions.

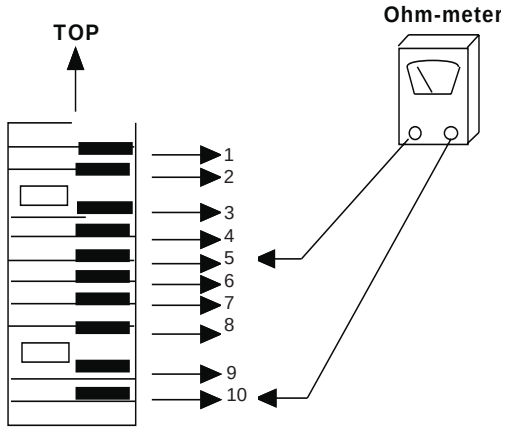
COMPONENT	CHECKOUT PROCEDURE	RESULT
THERMISTOR	Measure the resistance: Between the Pin 1 and Pin 3 of connector S103 after disconnecting it from the control circuit board with an ohm-meter on the highest scale.	Normal Reading: Approximately 300K ohms
CONVECTION HEATER (BACK HEATER)	Measure the resistance: After removing the lead wires from the convection heater with an ohm-meter on R x 1 scale.	Normal Reading: Approximately 46K ohms
GRILL HEATER (UPPER HEATER)	Measure the resistance: After removing the lead wires from the grill heater with an ohm-meter on R x 1 scale.	Normal Reading: Approximately 80K ohms
BLOWER MOTOR	Measure the resistance: After removing the lead wires from the blower motor with an ohm-meter on R x 100 scale.	Normal Reading: Approximately 389K ohms
CONVECTION FAN MOTOR	Measure the resistance: After removing the lead wires from the convection fan motor with an ohm-meter on R x 100 scale.	Normal Reading: Approximately 120K ohms
TURNTABLE MOTOR	Measure the resistance: After removing the lead wires from the turntable motor with an ohm-meter on highest scale.	Normal Reading: Approximately 22K ohms

<table>
<tr><th>COMPONENT</th><th>CHECKOUT PROCEDURE</th><th>RESULTS</th></tr>
<tr><td>HV FUSE</td><td>Measure the resistance : Across two terminals with an ohm-meter on its highest scale.
 
Figure 10</td><td>Normal reading :
Indicates continuity.

Abnormal reading :
Indicates infinite ohms.</td></tr>
<tr><td>CONTROL CIRCUIT BOARD COMPLETE</td><td>Measure the voltage : Between test points TP-1,TP-2,TP-3, TP-4, TP-5 and ground or between TP-6 and TP-7 (See control circuit board on page 26).
<u>NOTE</u>
Proceed with the check of the step down transformer, to see if any one of the measured values is different from the specified values</td><td><table><tr><td>Test point</td><td>TP-1</td><td>TP-2</td><td>TP-3</td><td>TP-4</td></tr><tr><td>Voltage</td><td>-5V DC</td><td>-15V DC</td><td>-30V DC</td><td>-35V AC</td></tr></table><table><tr><td>Test point</td><td>TP-5</td><td>TP-6/ TP-7</td></tr><tr><td>Voltage</td><td>-29V DC</td><td>2.0V DC</td></tr></table></td></tr>
<tr><td>TOUCH KEY BOARD</td><td>Measure the resistance between terminals of FPC connector after removing it from S101. (See Figure 11).
NOTE
- When reconnecting the FPC connector, make sure the holes on the connector are properly inserted in hooks of the plastic fastener in S101.

MATRIX CIRCUIT FOR TOUCH KEYBOARD FPC CONNECTOR
<table><tr><th></th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th></tr><tr><td>10</td><td>🕘</td><td>MICRO POWER</td><td>WEIGH DISH</td><td>BAKED POTATO</td><td>SNACKS</td></tr><tr><td>9</td><td></td><td>CONVEC. TEMP</td><td>AUTO DEFROST</td><td>ROAST CHICKEN</td><td>FISH</td></tr><tr><td>8</td><td></td><td>GRILL</td><td>MORE/ LESS</td><td>ROAST MEAT JOINT</td><td>REHEAT</td></tr><tr><td>7</td><td>START</td><td>DUAL</td><td></td><td>PIZZA</td><td>CAKE/ PUDDING</td></tr><tr><td>6</td><td>CLEAR/ STOP</td><td>SLOW COOK</td><td></td><td>CASSE-ROLE</td><td></td></tr></table></td><td><table><tr><td>Resistance Value</td><td>When touched

Less than 1K Ohms</td><td>When not touched

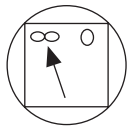
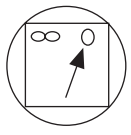
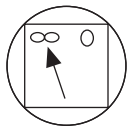
More than 1 MEG Ω</td></tr></table>
When checking the "START" key, connect Ohmmeter as illustration below.
 

TERMINALS OF FPC CONNECTOR

Figure 11</td></tr>
</table>

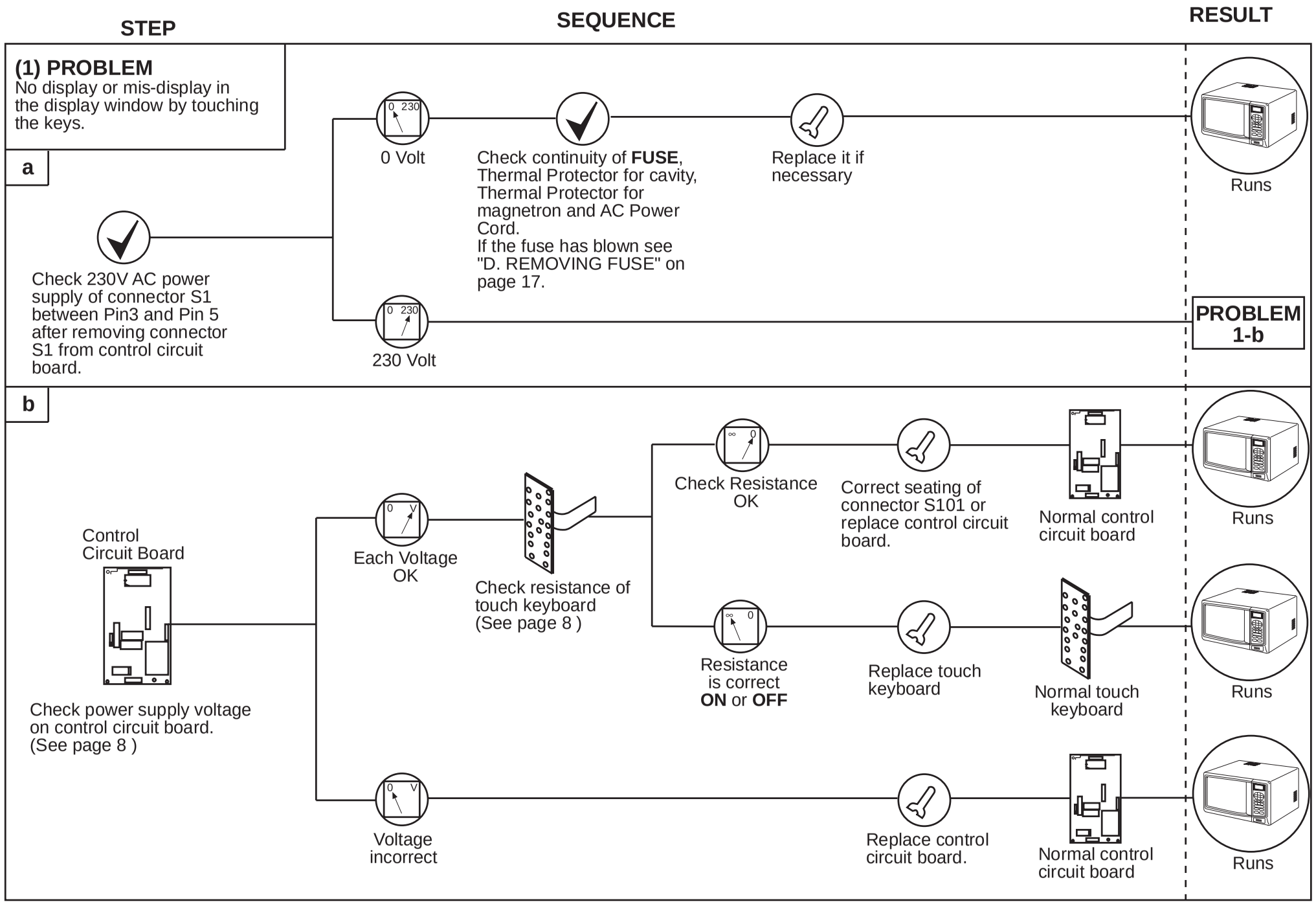
CHECKOUT PROCEDURE FOR SWITCHES

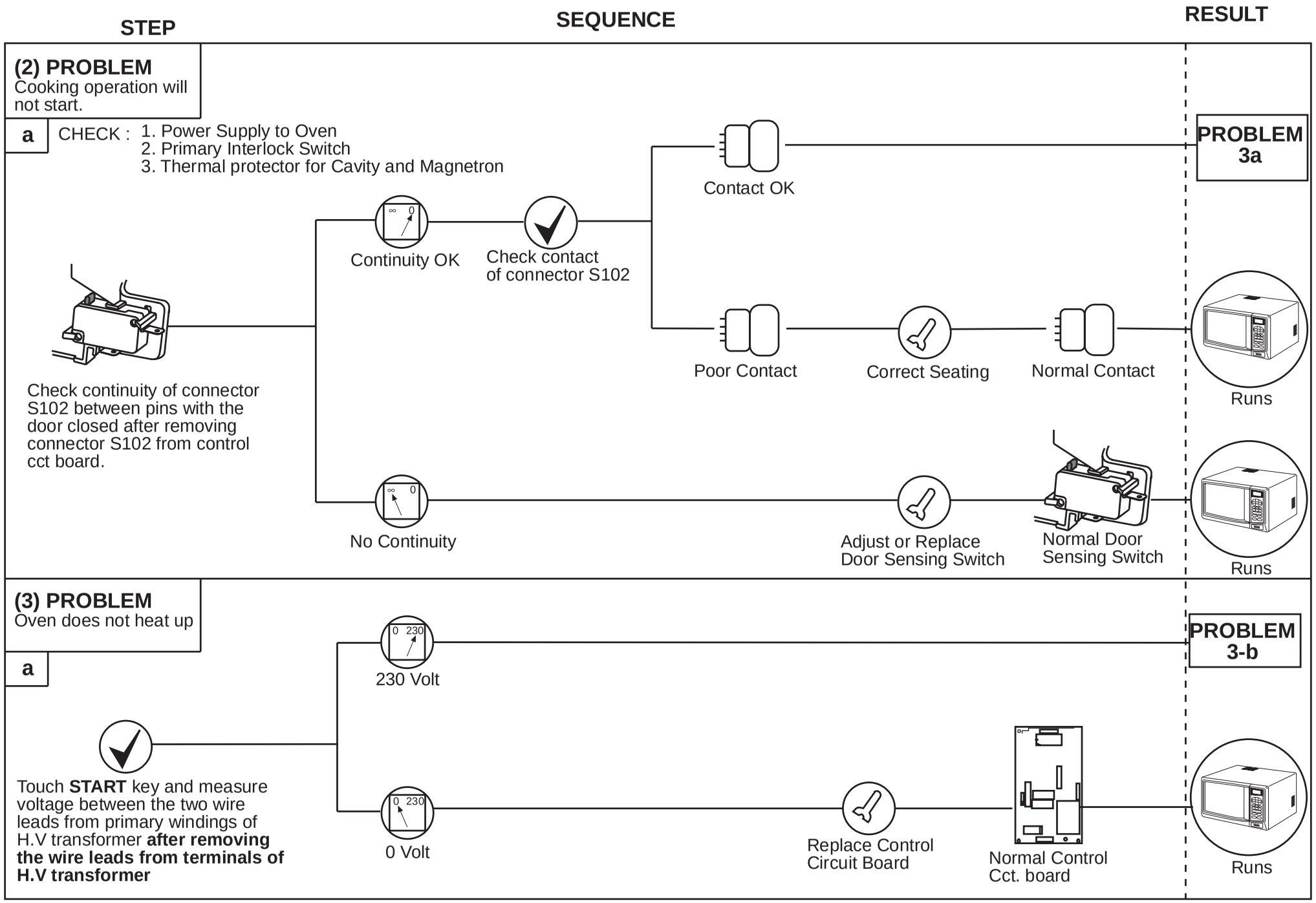
Disconnect the lead wires from the switches and check the continuity of the switches, connecting an ohm-meter to its terminals.

SWITCH	CHECKOUT PROCEDURES	DOOR OPEN	DOOR CLOSE
Primary Interlock	Connect an ohm-meters leads to terminals "COM" and "NO" of switch		
Door Sensing			
Interlock monitor	Connect an ohm-meters leads to terminals "COM" and "NC" of switch		

CAUTION : After checking the switches, make sure that the interlock monitor switch is properly connected according to the CIRCUIT DIAGRAM on page 4 (Continental version).

B. TROUBLESHOOTING




STEP
SEQUENCE
RESULT
(2) PROBLEM
Cooking operation will not start.
a
CHECK : 1. Power Supply to Oven
2. Primary Interlock Switch
3. Thermal protector for Cavity and Magnetron
Contact OK
PROBLEM 3a
Continuity OK
Check contact of connector S102
Check continuity of connector S102 between pins with the door closed after removing connector S102 from control cct board.
Poor Contact
Correct Seating
Normal Contact
Runs
No Continuity
Adjust or Replace Door Sensing Switch
Normal Door Sensing Switch
Runs
(3) PROBLEM
Oven does not heat up
a
230 Volt
PROBLEM 3-b
Touch START key and measure voltage between the two wire leads from primary windings of H.V transformer after removing the wire leads from terminals of H.V transformer
0 Volt
Replace Control Circuit Board
Normal Control Cct. board
Runs

STEP **SEQUENCE** **RESULT**

b

Check resistance of each winding after removing lead wires. (See page 6)

Resistance OK

Check H.V capacitor , H.V. diode or H.V fuse with an ohm-meter after removing the lead wires.(See page 8)

Normal H.V capacitor, H.V diode or H.V. fuse.

Replace HV Magnetron.

Normal Magnetron

Runs

Defective H.V capacitor, H.V diode or H.V. fuse.

Replace HV capacitor, H.V diode or H.V. fuse.

Normal H.V capacitor , diode or fuse.

Runs

Resistance Incorrect

Replace HV Transformer

Normal HV Transformer

Runs

(4) PROBLEM
Low microwave power output.

a

Check operation of blower motor when START key is touched.

Normal Operation

No Operation

Temporarily short across terminals of thermal protector for magnetron or thermal protector for cavity by using jumper lead.

Normal Operation

Replace thermal protector for magnetron or thermal protector for cavity.

Normal thermal protector for magnetron or thermal protector for cavity.

Runs

No Operation

Measure resistance of blower motor (Approx 274 ohms)

Resistance incorrect

Replace Blower motor

Normal Blower Motor

Runs

Normal Resistance

Replace control circuit board.

Normal control circuit board

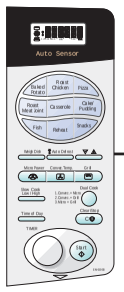
Runs

PROBLEM 3-b

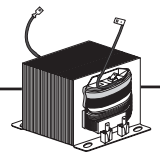
STEP	SEQUENCE	RESULT

(5) PROBLEM
The magnetron operates on high level when a lower cook power is selected.

a



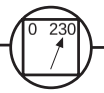
Set power level at low.



Touch **START** key and measure voltage between leads for primary winding of H.V transformer after removing the wire leads from terminals of H.V transformer.

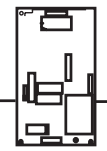
0 Volt

No problem
Measure water temperature rise exactly.

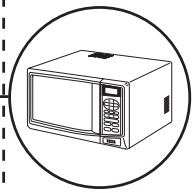


230 Volt

Replace control circuit board.



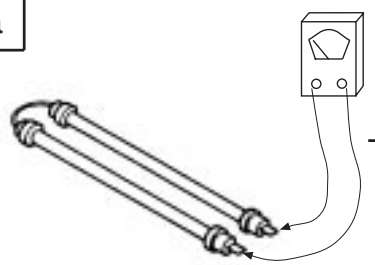
Normal control circuit board



Runs

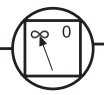
(6) PROBLEM
Unit does not heat up even if display counts down when key is touched for "Grill Cooking".

a



Check resistance of heater.
Approximately 51.6Ω measured over both tubes.

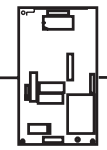
Normal Resistance.



Resistance Incorrect.

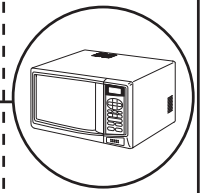
Replace control circuit board.

Replace Heater

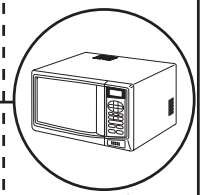


Normal control circuit board

Normal Heater



Runs



Runs

STEP | SEQUENCE | RESULT

(7) PROBLEM
Unit operation seems to be normal but little or no heating is produced for 'Convection Cooking'

a

Check operation of convec. motor when START key is touched.

Normal Operation

No Operation

Temporarily short across terminals of thermal protector for magnetron or thermal protector for cavity or thermal protector for convec. by using jumper lead.

Normal Operation

Replace thermal protector for magnetron or thermal protector for cavity or thermal protector for convec.

No Operation

Measure resistance of convec. motor (Approx 274 ohms)

Resistance incorrect

Replace convec. motor

Normal convec. Motor

Normal Resistance

Replace control circuit board.

Normal control circuit board

Normal thermal protector for magnetron or thermal protector for cavity or thermal protector for convec..

PROBLEM 3-b

Runs

Runs

Runs

(6) PROBLEM
Unit does not heat up even if display counts down when key is touched for "Convection Cooking"

a

Check resistance of heater. Approximately 51.6Ω measured over both tubes.

Normal Resistance.

Resistance Incorrect.

Replace control circuit board.

Replace Heater

Normal control circuit board

Normal Heater

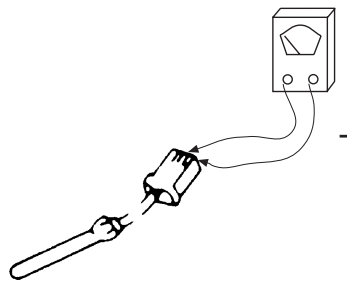
Runs

Runs

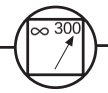
STEP | **SEQUENCE** | **RESULT**

(9) PROBLEM
Overheating even if the display window shows "160C" for preheating.

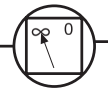
a



Check resistance of Oven Thermistor between Pin1 and Pin 3 of connector S201 after removing from control circuit board



Normal Resistance.

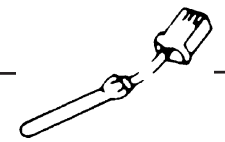


Resistance Incorrect.

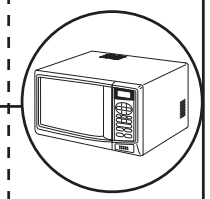
Replace control circuit board.

Replace Oven Thermistor

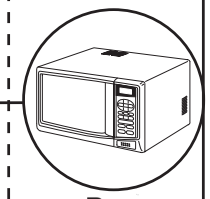
Normal control circuit board



Normal Oven Thermistor



Runs



Runs

NOTES:

- When the oven thermistor circuit is open, the display window will continuously show "160C" even if the unit becomes overheated by continuous ON of the heater.
- When it is short-circuited, the display window will show the set temperature immediately after the readout of "250C" even if the heater does not turn on.

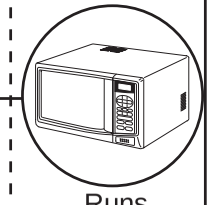
(10) PROBLEM
No buzzing by touching keys and at the end of cooking

a

Check normal operation of control circuit board and power circuit board.

Replace control circuit board.

Normal control circuit board



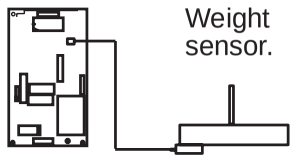
Runs

STEP | **SEQUENCE** | **RESULT**

(11) **PROBLEM**
E20 appears on the display.
(Problem with weight sensor).

a

Check the connection of the harness between the main PCB and the weight sensor.



OK → Change main PCB. → 'Zero adjust procedure' refer to page 18. → Problem still occurring → Change weight sensor. → 'Zero adjust procedure' refer to page 16. → Runs

Runs

Loose Connection or cut in the harness → Plug in harness properly or replace harness. → 'Zero adjust procedure', refer to page 16. → Runs

(12) PROBLEM
E22 appears on the display.
(Weight sensor memory problem).

a

Carry out 'Zero adjustment' for the weight sensor accurate to the procedure on page 18. → Runs

8.DISASSEMBLY INSTRUCTIONS

- OVEN MUST BE DISCONNECTED FROM ELECTRICAL OUTLET WHEN MAKING REPLACEMENTS, REPAIRS, ADJUSTMENTS, AND CONTINUITY CHECKS BEFORE PROCEEDING WITH ANY REPAIR WORK AFTER DISCONNECTING. WAIT AT LEAST 1 MINUTE, UNTIL THE CAPACITOR IN THE HIGH VOLTAGE AREA HAS FULLY DISCHARGED.
- WHEN REPLACING ANY DOOR MICRO SWITCH, REPLACE WITH THE SAME TYPE SWITCH SPECIFIED ON THE PARTS LIST.

A. REMOVING PRIMARY INTERLOCK SWITCH, DOOR SENSING SWITCH AND INTERLOCK MONITOR SWITCH

(See Figure 1 on page 1 and Figure 12 on this page)

(1) Remove 2 screws securing the lever stopper.
(2) Disconnect all lead wires from the primary interlock switch, door sensing switch and the interlock monitor switch
(3) Ease away the retaining clips holding the Primary interlock switch onto the lever stopper and remove.
(4) Remove the door sensing switch by reference to the step (3).
(5) Remove the interlock monitor switch by reference to step (3).
(6) Make the necessary adjustment, and make microwave energy leakage check according to “1. ADJUSTMENT PROCEDURES” on page 1. After the switch is replaced with a new one, check proper operation of it according to “CHECKOUT PROCEDURE FOR SWITCHES” on page 9.

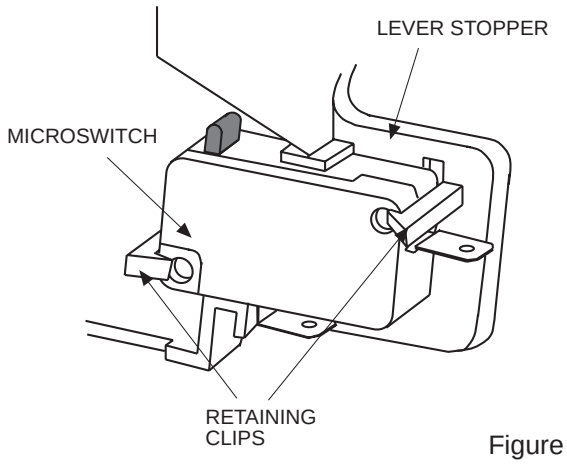


Figure 12

Interlock Switch Replacement - when replacing faulty switches, be sure switch retaining clips are not bent, broken or otherwise deficient in their ability to secure the switches in place.

B. REMOVING THE ANTENNA

(See exploded view on page 21)
(1). Remove the screw securing the cavity cover to the cavity.
(2). Remove the antenna complete by slightly bending it so the retension clips holding it slide out of the cavity wall.

C. REMOVING MAGNETRON

(See exploded view on page 22)
(1) Remove the antenna complete according to **B. REMOVING THE ANTENNA.**
(2) Disconnect the 2 lead wires from the magnetron.
(3) Remove 1 screw securing the duct to the magnetron, and take out the duct.
(4) Remove 2 screws securing the stay plate, and take out.
(5) Remove 4 screws securing the magnetron to the waveguide.
Take out the magnetron **VERY CAREFULLY.**

NOTES

- When removing the magnetron, make sure that its dome does not hit any adjacent parts, or it may be damaged.
- After replacing the magnetron, be sure to check the microwave energy leakage with a leakage detector and confirm the leakage is below 5 mW/cm^2 .

D. REMOVING FUSE

(A) Remove the 8A fuse with a screwdriver.
- When replacing the 8A fuse, be sure to use an exact repair part.
- If the 8A fuse blows immediately, check the primary interlock switch and the interlock monitor switch (terminals “C” and “NC”) according to “CHECKOUT PROCEDURE FOR SWITCHES” on page 9, and make sure to check the microwave energy leakage according to “1. ADJUSTMENT PROCEDURE” on page 1, when the primary interlock switch or the interlock monitor switch is replaced.
- If the primary interlock switch is defective, replace not only the primary interlock switch but also the interlock monitor switch.

Then install a new 8A fuse.
- If the primary interlock switch and the interlock monitor switch (terminals “C” and “NC”) operate properly, determine which of the following is defective: blower motor, turntable motor, high voltage transformer, high voltage capacitor, high voltage diode or magnetron.

- If the high voltage diode is defective , replace not only the high voltage diode but also the HV fuse.

E. REMOVING DOOR

(1) Remove the 2 screws securing the upper hinge.
(2) Tilt the top of the door toward you.
(3) Lift up the door to remove it.

When replacing the door body or door assembly the new door has to be set properly ensuring the correct door gap between door body and cavity front.

To set the new door;
1. Mount door loosely on cavity.
2. Before tigthening the top and bottom hinge screws place feeler gauges (the thickness varies for different models- see table below) between the door assembly and the cavity front plate between the top and bottom hinges. NB. Be careful not to scratch the door cover with the feeler gauges.
3. The door should then be aligned with the control base and held firmly in place leaving a gap within 1-2mm. between the door cover and control base.

4. The hinge screws should then be tightened to hold the door in place, and the feeler gauges removed.
5. The door gap should then be checked again using feeler gauges.

Below is a table giving the door setting for the:-

EM-D993

DOOR GAP	
Lower Limit	Upper Limit
0.1mm.	0.2mm.

NOTES

- After replacing the door, be sure to check that the primary interlock switch, door sensing switch and the interlock monitor switch operate normally. (See page 1).
- After replacing the door check for microwave energy leakage with a leakage detector.
  Microwave energy leakage must be below the limit of 5mW/cm^2.

F. DISASSEMBLYING DOOR

(See exploded view on page 24)

(1) Insert a thin flat blade screwdriver between the choke dielectric and the door mainframe and lift up the choke dielectric to release the hooks one by one.
(2) To remove door cover, remove the 3 screws securing the door cover to the door main frame
(3) Insert a thin flat blade screwdriver between the door cover and door mainframe and release the hooks one by one.
(4) To detach the glass door panel, insert a thin flat blade screwdriver between the door panel and door cover and release the clips one by one.

NOTES

- The choke dielectric, the glass door panel and the door cover may be damaged when they are removed. When re-installing them, replace them with new ones if they are damaged.
- After installing the door in place, check for microwave energy leakage with a leakage detector.
  Microwave energy leakage must be below the limit of 5mW/cm^2.

G. CHANGING POWER SUPPLY CORD

(See exploded view on page 22)

(1) Remove the earthing screw.
(2) Remove the power supply cord from the terminal of PCB complete.
(3) Remove power cord from cavity assembly by lifting cord bush, moving it to the left and pulling it away from cavity rear plate.
(4) Install the new power supply cord with the reverse procedure of above (1) to (3).

WARNING

For changing the power supply cord, never use parts other than the following :

Part Name : Power Supply Cord Assembly

Part No : **617 193 0177 (Euro)**

H. REMOVING TURNTABLE MOTOR COVER

(Refer to Figures 13 and 14 below)

(1) Turn the unit and cut the 6 joints of the bottom plate and the motor cover using diagonal pliers (nipper). (See Figure 13)
(2) Seperate the motor cover and the bottom plate.

NOTES

- Bend the cut joints inside slightly for safety and be careful of the sharp edges.

RE-INSTALL :

(1) Rotate the motor cover through 180˚.
(2) Insert the edge of the motor cover into the tab on the bottom plate.
(3) Secure the motor cover by screwing it to the bottom plate (See Figure 14)

Use screw 411 156 5502 (not supplied with oven)

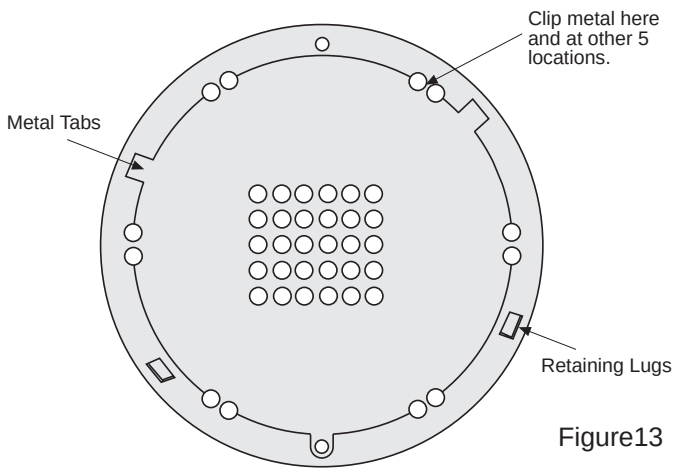


Figure13

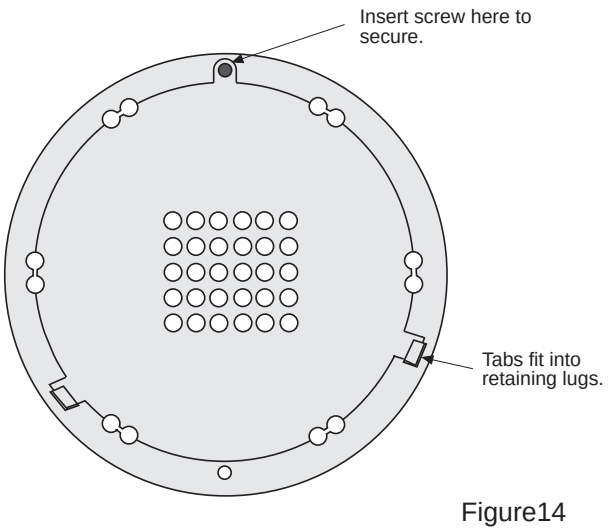


Figure14

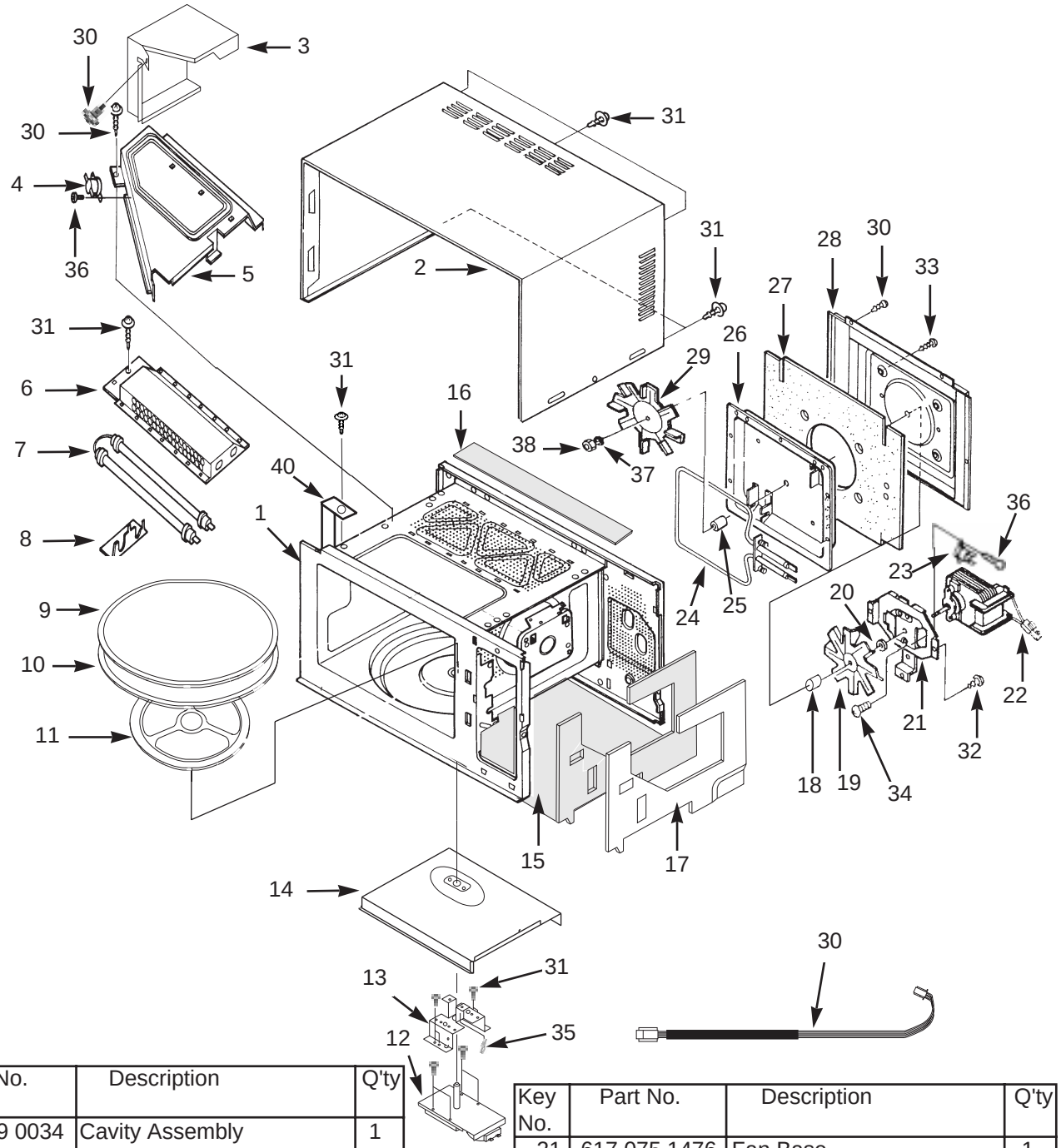
Adjustment Method for Weight Sensor

When the main PCB or weight sensor is changed, please carry the following ‘Zero’ adjustment out for the weight sensor.

Procedure		Display
1.	Plug in power cord (note: please do not touch the “Clear” key)	Demonstration words ‘WELCOME SHOWER WAVE....’
2.	Open the door	
3.	Place metal turntable	
4.	Close the door	
5.	Touch ‘More/Less’ key **two times** (No beep sound when key is touched)	Flashing ‘0:00’
6.	Touch ‘Weigh Dish’ key **two times**	
7.	Touch ‘START’ key	Flashing ‘0000’
8.	After 4 sec. display shows 1230	Flashing ‘1230’
9.	Open the door	
10.	Place the glass turntable	
11.	Close the door	
12.	Touch ‘START’	
13.	After 4 sec. display ‘1230’ stops the flashing	‘1230’

Note: When the display show the error mark “E-” during setting,please try again from the beginning. In this case, please check if the wiring between weight sensor and main PCB is correctly connected.

EXPLODED VIEW AND PARTS LIST
CAVITY PARTS-A



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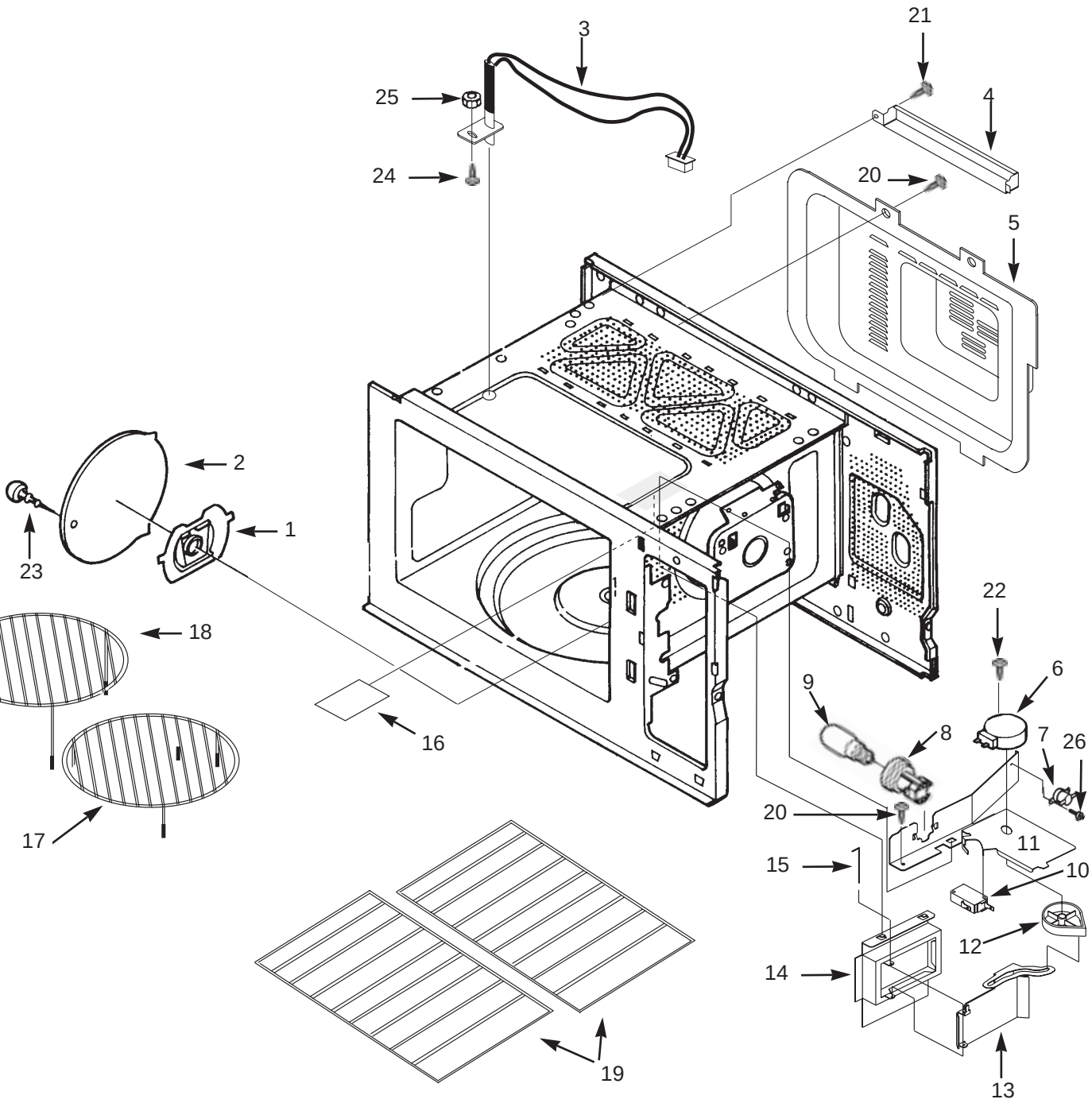
Key No.	Part No.	Description	Q'ty
1	617 199 0034	Cavity Assembly	1
2	617 187 1258	Cabinet	1
3	617 177 3330	Duct	1
4	617 153 3088	Thermostat, V150˚C	1
5	617 167 0349	Heat Ins. Plate	1
6	617 167 0356	Reflective Plate	1
7	617 169 8923	Heater Ass'y	1
8	617 167 0325	Heater Bct	1
9	617 186 0283	Shelf	1
10	617 189 5803	Shelf	1
11	617 186 6087	Shelf Ass'y	1
12	617 187 4679	Detector complete	1
13	617 153 8496	Parts Base	1
14	617 186 6063	Duct	1
15	617 187 4686	Heat Ins.	1
16	617 187 4693	Heat Ins.	1
17	617 177 3262	Heat Ins. Plate	1
18	617 179 0733	Coller	1
19	617 075 1162	Fan	1
20	617 186 0054	Special Washer	1

Key No.	Part No.	Description	Q'ty
21	617 075 1476	Fan Base	1
22	617 177 3231	Motor Complete	1
23	617 153 4917	Thermostat, v122˚C	1
24	617 177 3200	Heater Ass'y	1
25	617 117 6698	Collar	1
26	617 177 3217	Heater Case Ass'y	1
27	617 177 3255	Heat Ins.	1
28	617 177 3248	Heat Ins Plate	1
29	617 075 1186	Fan	1
30	617 187 4747	Harness	1
31	411 156 5601	SCR TPG PAN+F+S 4x10	17
32	411 065 2500	SCR TPG BIN 4x6	3
33	617 192 9348	SCR S-TPG PAN 4x25	4
34	411 001 5800	SCR S-TPG PAN 4x6	2
35	411 001 6005	SCR S-TPG PAN 4x8	2
36	411 010 5600	SCR EVR PAN 3x6	2
37	411 156 5502	SCR S-TPG PAN+F+S	2
38	411 016 3105	E Washer	1
39	411 054 8902	NUT HEX 4	1
40	617 195 8676	Clip	1

CAVITY PARTS-B

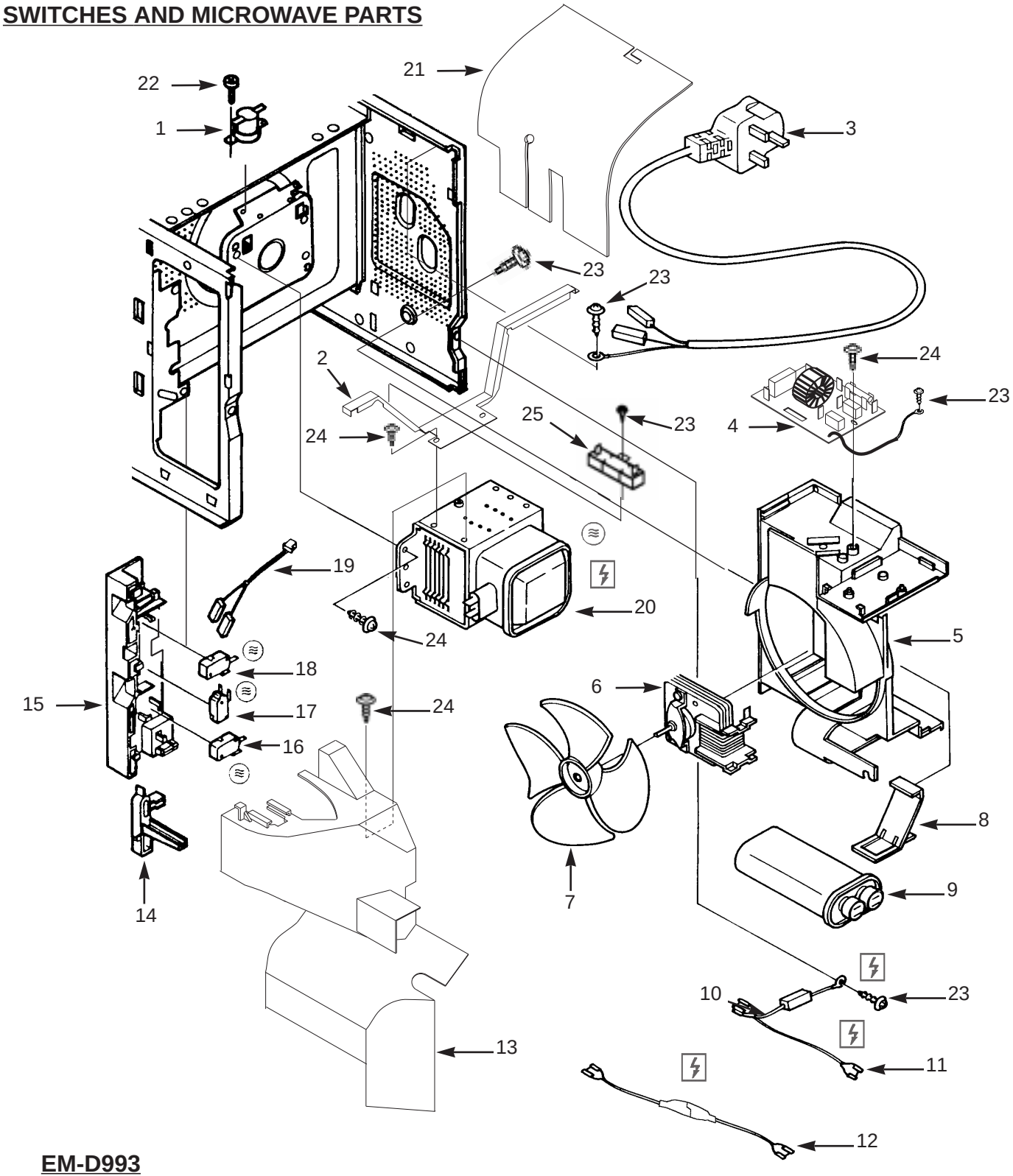


EM-D993

Key No.	Part No.	Description	Q'ty
1	617 186 6117	Antenna Complete	1
2	617 169 8930	Cavity Cover	1
3	617 128 9794	Thermistor Ass'y	1
4	617 177 3040	Duct	1
5	617 177 3033	Frame Rear Plate	1
6	617 123 9928	Gear Motor	1
7	617 153 3088	Thermal Limitor (v150°)	1
8	617 119 3480	Lamp Socket	1
9	617 149 3009	Lamp	1
10	617 160 5761	Response Switch	1
11	617 177 3408	Lamp BCT	1
12	617 177 3309	Cam	1
13	617 177 3293	Damper	1

Key No.	Part No.	Description	Q'ty
14	617 179 0771	Damper Bct.	1
15	617 179 0757	Shaft	1
16	617 177 3149	Lamp Plate	1
17	617 193 8487	Cook Net	1
18	617 183 1375	Cook Net	1
19	617 186 6070	Cook Net	2
20	411 156 5601	SCR TPG PAN+F+S 4x10	3
21	411 156 5502	SCR S-TPG PAN+F+S	1
22	411 001 6005	SCR S-TPG PAN 4x8	2
23	412 048 6508	SCR TPG TRS 4x10	1
24	411 165 0406	SCR TPG TRS 4x10 SUS	1
25	411 053 9306	NUT HEX +LFLC W/SRT 4	1
26	411 010 5600	SCR EVR PAN 3x6	1

SWITCHES AND MICROWAVE PARTS

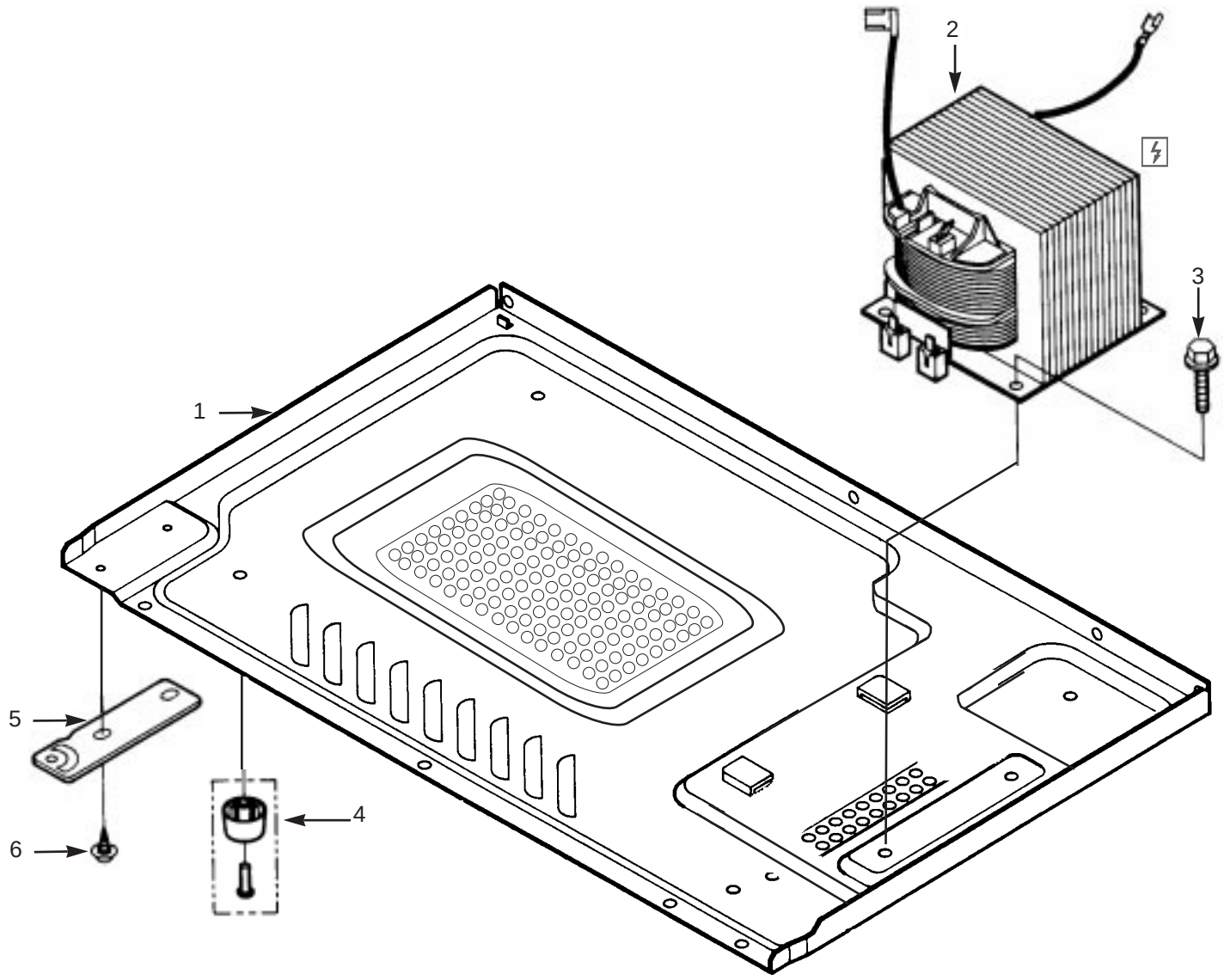


EM-D993

Key No.	Part No.	Description	Q'ty
1	617 153 6225	Thermal Limitor	1
2	617 177 3132	Stay Plate	1
3	617 193 0177	Power Cord Ass'y	1
4	617 179 0764	PCB Complete	1
5	617 167 0417	Space Partition	1
6	617 167 0592	Motor Complete	1
7	617 112 1025	Fan	1
8	617 162 2041	Capacitor Band	1
9	617 157 9819	Capacitor 1.20uF	1
10	617 182 6548	Diode Ass'y	1
11	617 167 0561	Lead Wire Ass'y	1
12	617 182 2915	Fuse Complete	1

Key No.	Part No.	Description	Q'ty
13	617 177 3330	Duct	1
14	617 101 0275	Latch Lever	1
15	617 144 0980	Lever Stopper	1
16	617 167 0523	Response Switch	1
17	617 167 0530	Response Switch	1
18	617 167 0523	Response Switch	1
19	617 134 1744	Harness	1
20	415 002 5005	Magnetron	1
21	617 182 7309	Insulation Plate	1
22	411 010 5600	SCR EVR PAN 3x6	1
23	411 156 5502	SCR S-TPG PAN +F+S 4x10	5
24	411 156 5601	SCR TPG PAN+F+S 4x10	7
25	402 071 0703	Ceramic Resistor	1

MICROWAVE PARTS



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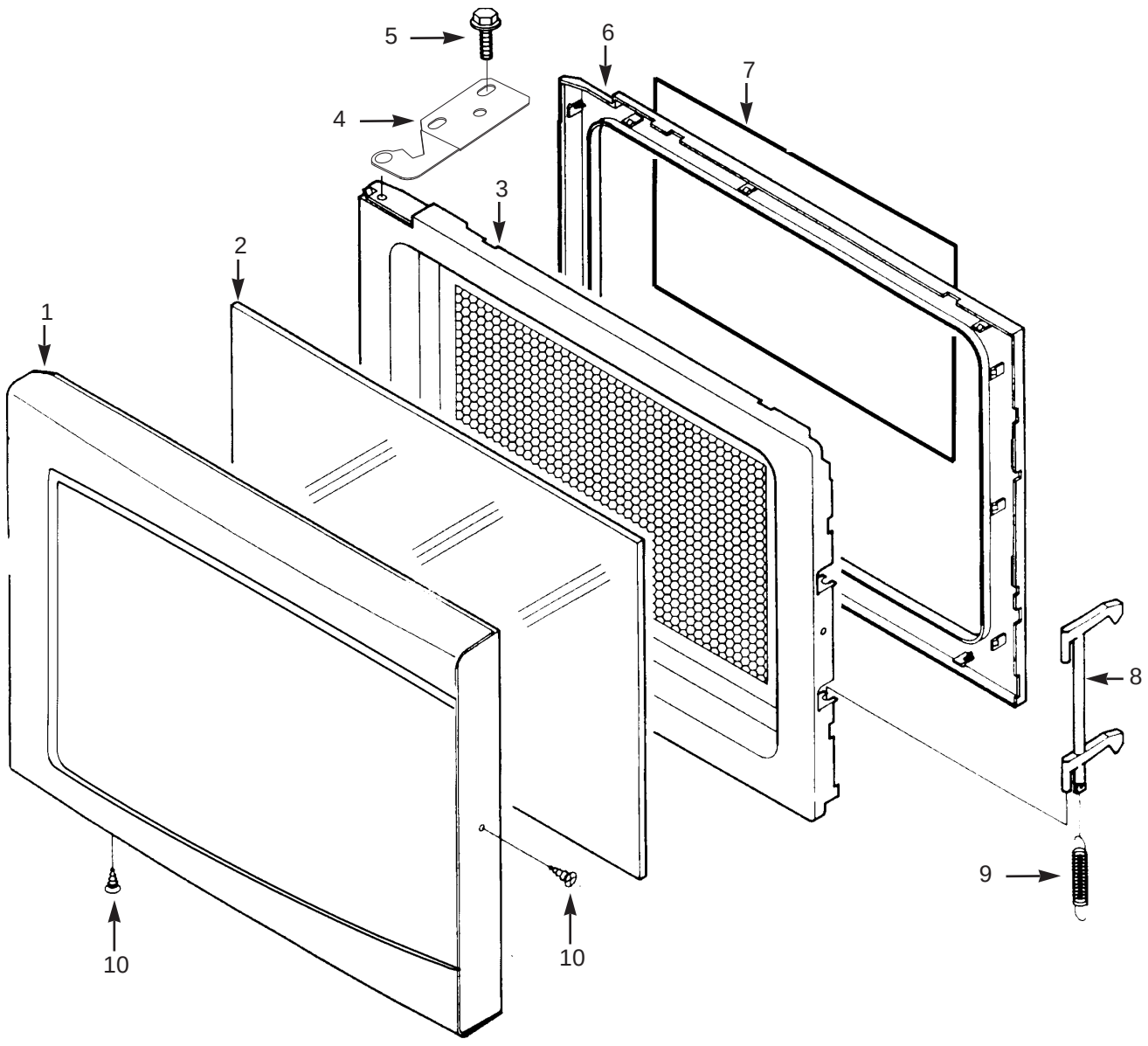
Key No.	Part No.	Description	Q'ty
1	617 186 6049	Bottom Plate	1
2	617 187 1241	Transformer	1
3	617 156 3658	Special Screw	2
4	617 188 9062	Foot Cushion Assembly	4
5	617 166 7493	Bottom Hinge	1
6	411 156 5502	SCR S-TPG PAN+F+S 4x10	2

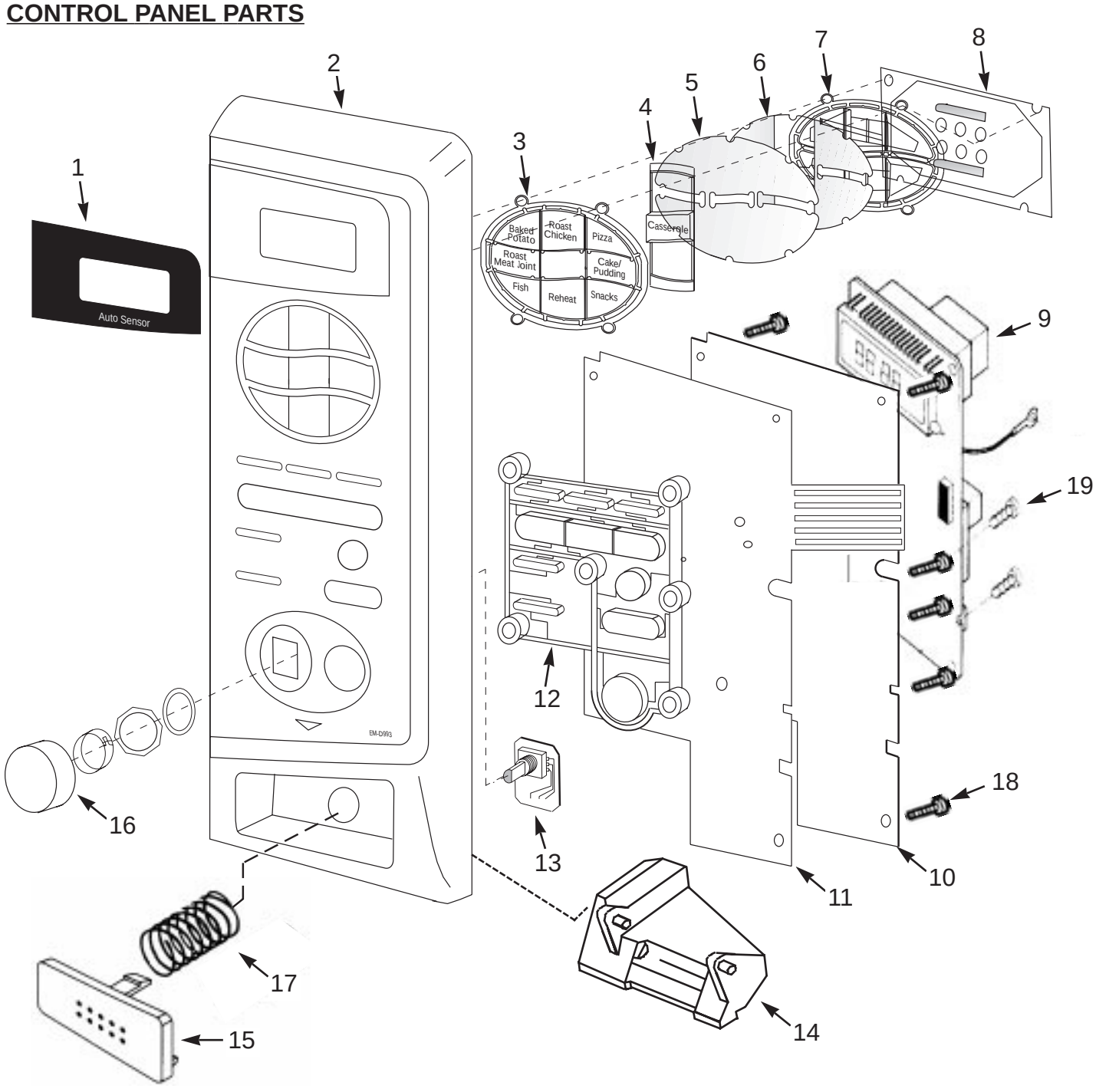
DOOR PARTS



EM-D993

Key No.	Part No.	Description	Q'ty
1	617 200 2774	Door Cover	1
2	617 177 1473	Door Panel	1
3	617 136 3890	Door Main Frame	1
4	617 103 8934	Hinge Ass'y	1
5	617 102 7495	Special Screw	2
6	617 135 6243	Choke Di-electric	1
7	617 136 3913	Door Panel	1
8	617 139 9530	Door Latch	1
9	617 135 8285	Spring	1
10	411 071 9104	Screw	3
*	617 200 2767	Door Ass'y	1

CONTROL PANEL PARTS



EM-D993

Key No.	Part No.	Description	Q'ty
1	617 197 8124	Control Plate	1
2	617 200 2811	Control Frame	1
3	617 200 2828	Switch Button	1
4	617 200 2835	Switch Button	1
5	617 197 8148	Control Plate	1
6	617 199 1369	Control Plate	1
7	617 197 8155	Switch Lever	1
8	617 196 5711	PCB Complete	1
9	617 196 5704	PCB Complete	1
10	617 197 8131	Control Plate	1
11	617 197 5475	Touch Keyboard	1
12	617 203 2580	Knob Body	1

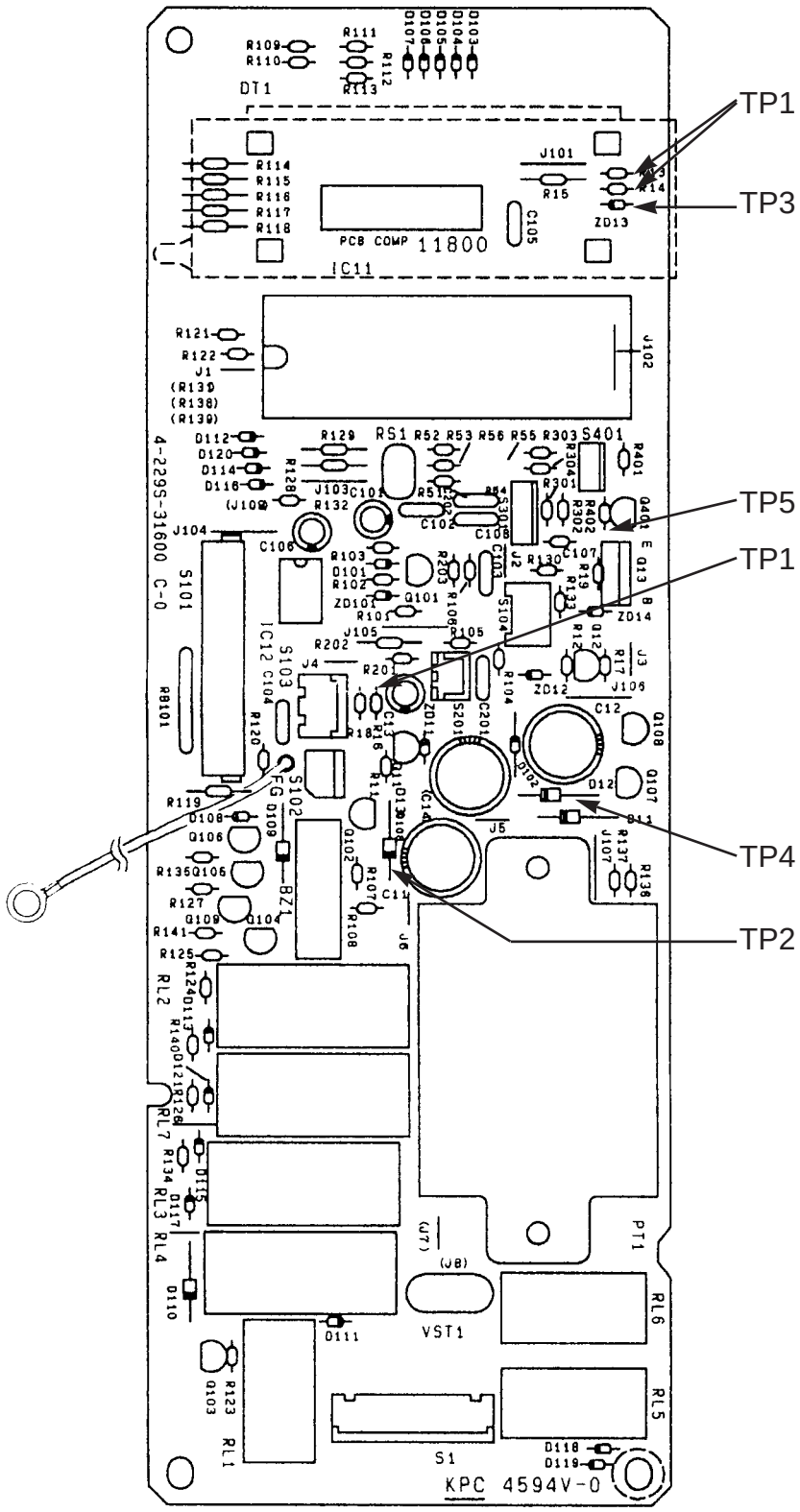
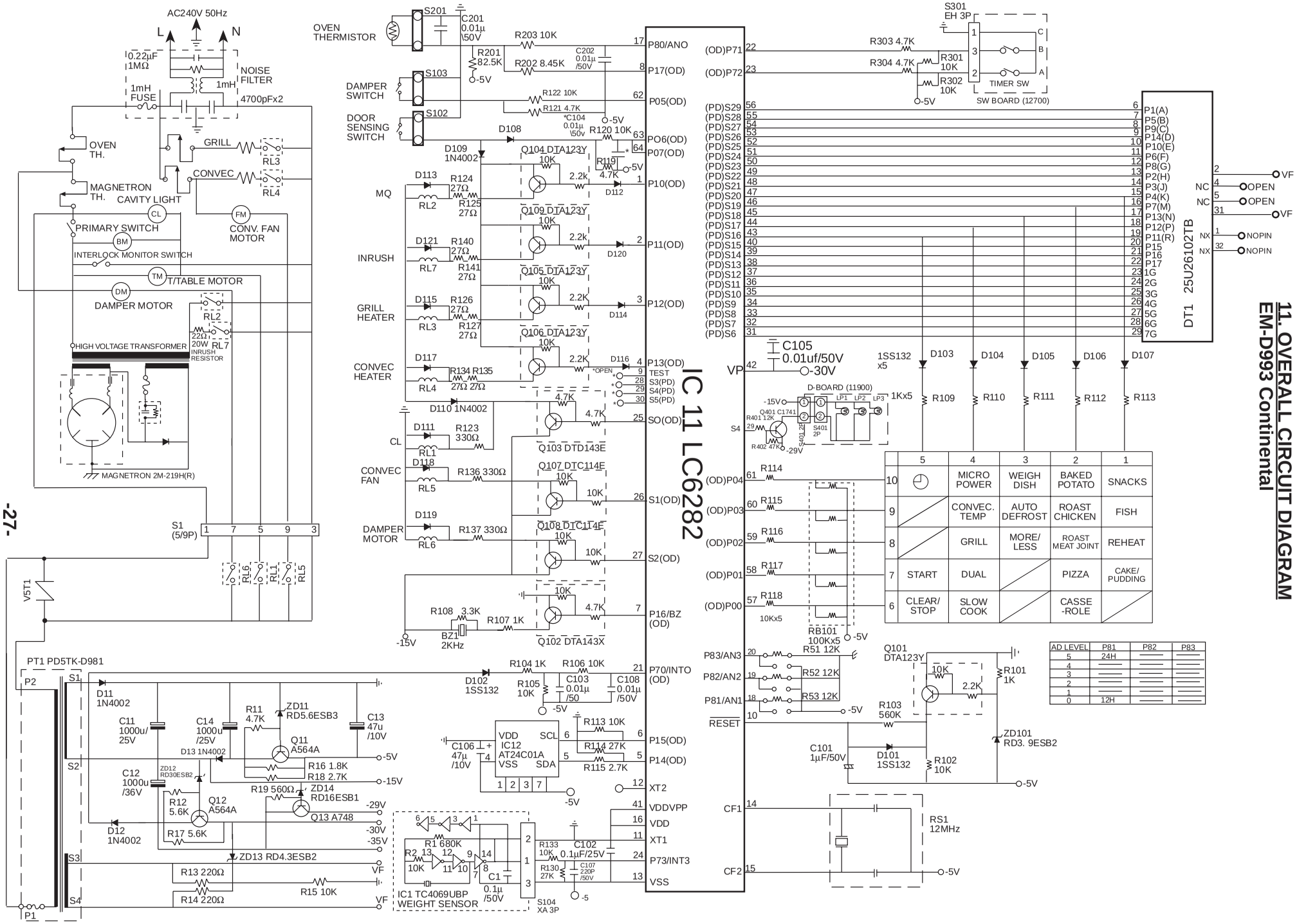
Key No.	Part No.	Description	Q'ty
13	617 197 4836	PCB Complete	1
14	617 135 8407	Latch Lever	1
15	617 177 1299	Handle Lever	1
16	617 198 5146	Knob Ass'y	1
17	617 080 9559	Spring	1
18	411 064 1306	SCR TPG BIN 3x10	11
19	411 064 2709	SCR TPG BIN 3x14	3
*	617 209 8579	Operating Instructions (UK)	1
*	617 209 8586	Operating Instr. (French)	1
*	617 209 8609	Operating Instr. (Dutch)	1
*	617 200 9940	Corrugate Box	1

* These items not illustrated

10.CONTROL CIRCUIT BOARD

EM-D993.

Model	Version	Spares No.	RL7	M.Processor
EM-D993	Semo	617 196 5704	Yes	IC11-LC 6282



11. OVERALL CIRCUIT DIAGRAM
EM-D993 Continental