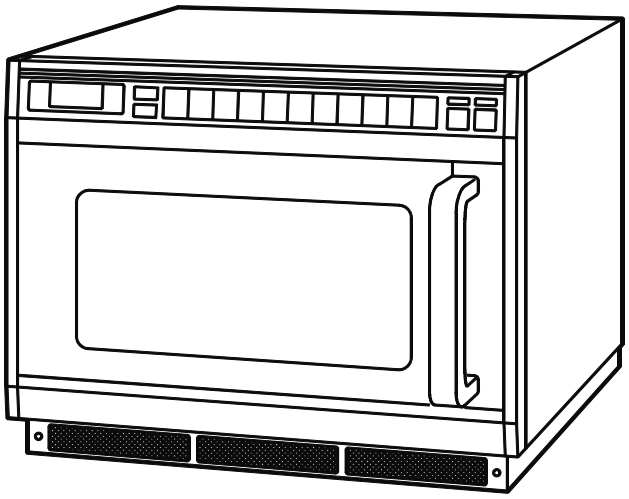
GARLAND®

SERVICE MANUAL SUPPLEMENT

for Model EM-C180

Microwave Oven



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

(e)(ii) 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. (For CANADA)

FORM # EM-C180 (02/05)

CAUTION

For microwave energy emission

On every service call. A check for microwave energy emission must be made according to the following manner.

Measurement of energy emission

Measurement must be made with the microwave oven operating at its maximum output and containing a load of 275±15 milliliters of tap water initially at 20°±5° celsius (68±9°F) placed within the cavity at the center.

NOTE: The water container must be a 600 milliliter beaker and made of an electrically none conductive material such as glass or plastic.

The cook tray must be in place when measuring emission.

A properly operating door and seal assembly will normally register emission no greater than 4 mW/cm^2 to allow for measurement uncertainty with the cooking shelf or tray in place.

All repairs must be performed in such a manner that microwave energy emission is minimal.

Follow the instructions supplied with the detector being used and perform an R.F. emission test around the door front, and all edges and vent of the outer case. The cabinet (wrapper) must be in place and the oven fully assembled.
When performing an emission survey, with the meter on FAST RESPONSE, the movement of the detector probe shall not exceed one (1) inch per second.

In the area emitting the highest reading, switch the meter to SLOW RESPONSE and take a reading for minimum of three (3) seconds. We recommended the pattern outline shown below when the door surface is surveyed.
NOTE: Periodically check to be sure that the probe tip is not worn or dirty.

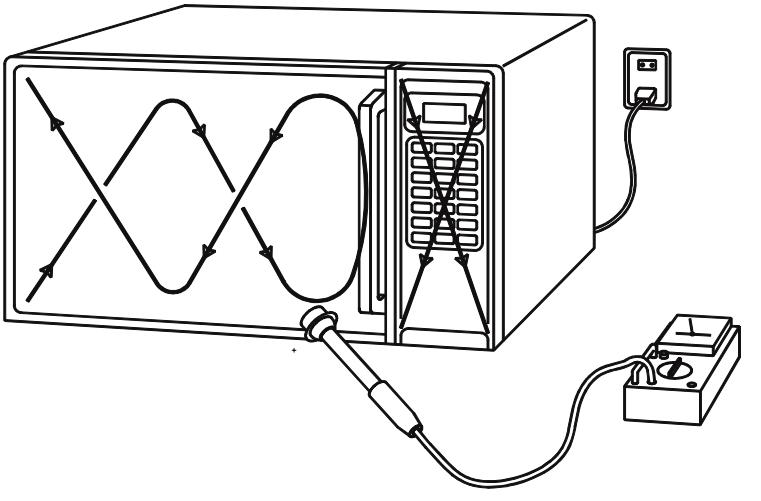
The following U.S. standard applies to microwave ovens:

21 CFR 1030.10, Performance Standard for Microwave Ovens.
It requires that the power density of the microwave radiation emitted by a microwave oven shall not exceed five (5) milliwatts per square centimeter at any point 5 centimeters (about 2 inches) or more from the external surface of the oven.

All microwave ovens exceeding the emission level of 4 mW/cm^2 must be reported to Dept. of Service for microwave ovens and the manufacturer immediately.
The owner should be told not to use the microwave oven until it has been repaired completely.

If a microwave oven is found to operate with the door open, report to Dept. of Service, the manufacturer and CDRH* immediately. Also tell the owner not to use the oven.
*CDRH: Center for Device and Radiological Health.

The interlock monitor switch acts as the final safety switch protecting the customer from microwave radiation. If the interlock monitor switch operates properly and the door interlock switch fails, the fuse will blow.
If this happens, all interlock switches must be replaced. The contacts of the interlock switches may be welded together.



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1. ADJUSTMENT PROCEDURES

TO AVOID POSSIBLE EXPOSURE TO MICROWAVE ENERGY LEAKAGE, THE FOLLOWING ADJUSTMENTS OF THE INTERLOCK SWITCHES SHOULD BE MADE ONLY BY AUTHORIZED SERVICE PERSONNEL.

The service center should have the designated detector to measure the microwave energy leakage after the repair or adjustment.

NOTE: Detector to be used at the service center is NARDA 8100, 8200 or the equivalent.

INTERLOCK SWITCH, INTERLOCK MONITOR SWITCH AND DOOR SENSING 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 pulled backwards until there is zero gap between the latch lever and the switch body on the interlock switch. At the same time there is zero gap between the latch lever and the switch body on the door sensing switch when the door latch is securely locked.
(3) Tighten the lever stopper screws securely.
(4) Make sure the interlock monitor switch closes after the interlock switch opens when the door is opened very slowly, according to "CHECKOUT PROCEDURE FOR SWITCHES" on page 6.
(5) Make sure the interlock monitor switch opens before the interlock switch closes when the door is closed very slowly, according to CHECKOUT PROCEDURE FOR SWITCHES" on page 6.
(6)(i) Make sure the microwave energy leakage should be no greater than 4 mW/cm^2 to allow to measurement uncertainty when measured with a detector. *(All service adjustments must be made for minimum microwave energy leakage readings.) (For US)*
(6)(ii) Make sure the microwave energy leakage is below the limit of 1 mW/cm^2 (at 275cc water load), 5 mW/cm^2 (at no load) and 5 mW/cm^2 (at 275 cc water load without cabinet) when measured with a detector.

(All service adjustments must be made for minimum microwave energy leakage readings.) (For Canada)

NOTE: If the interlock monitor circuit operates and at the same time the fuse blows with the door open, be sure to replace the relay circuit board , Interlock switch and monitor switch.

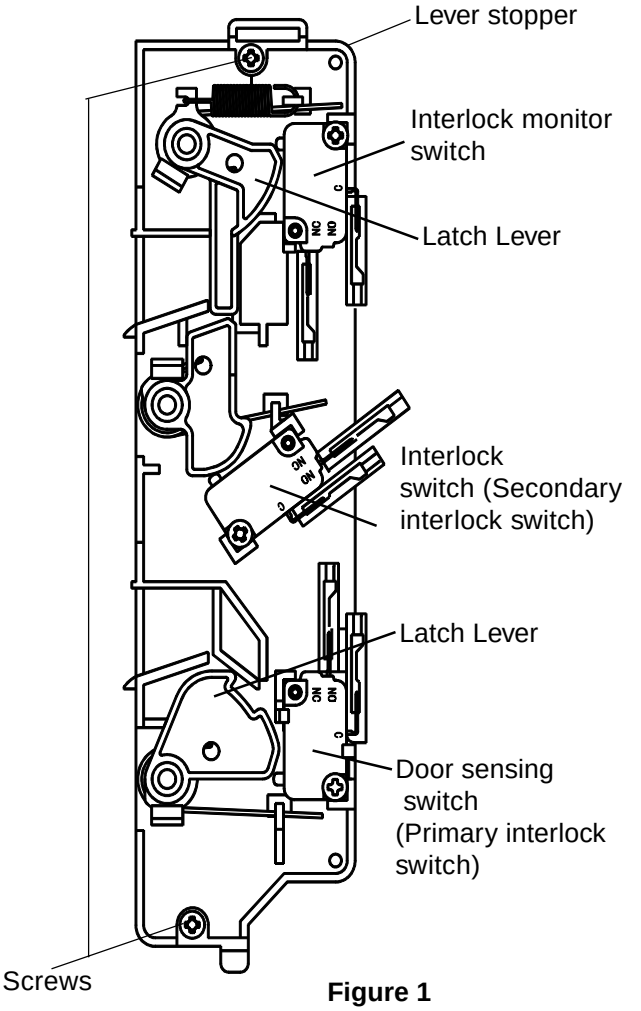


Figure 1

2.SPECIFICATIONS

Microwave output ..... 1,800W to 180W
Frequency 2,450MHz
Power supply 208V, 60Hz
Rated current ..... 13 Amp.
Safety Device .....
Thermal protector(Magnetron) 150°C(270°F)Open
(Thermostat) 80°C(144°F)Close
Thermistor (Magnetron) 200°C(360°F) Open
108°C(194°F)Close
Thermistor(Duct).....120°C(216°F) Open
Fuse (Cartridge Type) 250V 10A
Micro switch, Relay
Interlock Switch
Interlock monitor Switch
Door sensing Switch and
Relay RL-3 and 4
Max. input time ..... Electronic Digital, up to
Manual 10min./Memory 30min.
Overall Dimensions ..... 422(W)x540(D)x335(H) mm
Oven cavity size ..... 330(W)x330(D)x230(H) mm
Effective Capacity of Oven Cavity.....19.1liters
Net weight 32Kg

3. POWER OUTPUT MEASUREMENT

NOTE: The power output specification, 1800W on this model is measured with IEC measurement. The power output is measured with two(2) liters water is equivalent to 1800W in measurement with IEC, when measured with the following power output.

(1)1. Fill two beakers, one liter of tap water respectively
2. Use an accurate thermometer and measure each water temperature respectively.
(2) Place beakers side by side in center of the ceramic tray.
(3) Close the door,set the “TIME” for two minutes. Touch the “START” key and heat the water for exactly two minutes.
(4)Take the beakers out, immediately stir the water and measure the water temperatures respectively.
(5) Calculate the temperature rise of water in each beaker. Then calculate the average value of the two temperature rises.(ƒ¢t)
(6) The teperature rise shall be in the following range;

	Average Temp. Rise
Minimum	23.1°C
Maximum	28.3°C

Power output is affected by the line voltage under load.
(7) For correct Power output measurement, the line voltage under load must be 208±2Volts.

4.PRECATIONS AND REPAIR SERVICE TIPS

PRELIMINARY

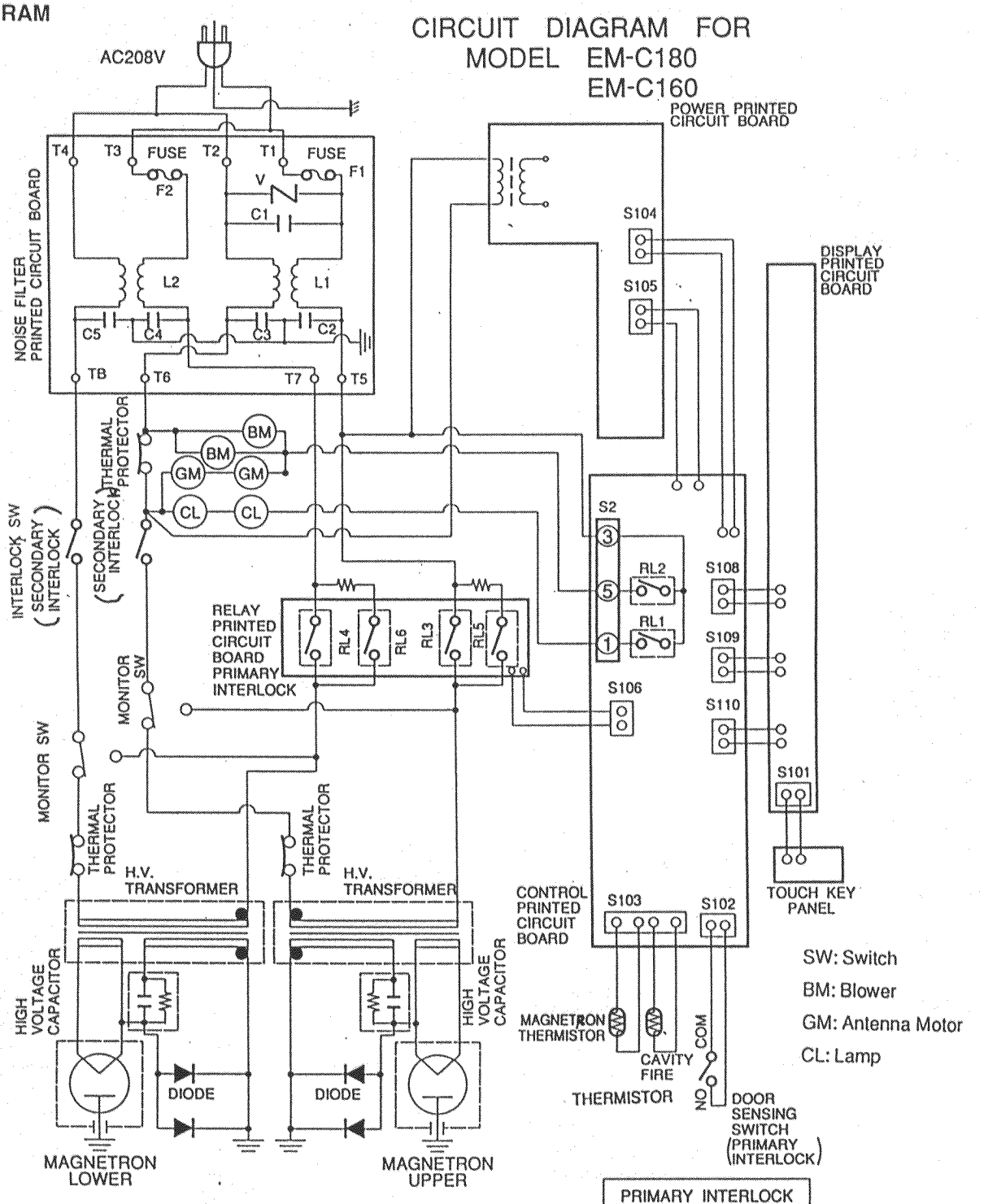
A. SINCE NEARLY 4,000 VOLTS EXISTS IN SOME CIRCUITS OF THIS MICROWAVE OVEN, REPAIRS SHOULD BE CARRIED OUT WITH GREAT CARE.

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

(1) Before the power is applied.
(a) Open and close door several times to make sure the interlock switch, door sensing switch and interlock monitor switch operate properly. (Listen for the clicking sound from switches.) Make sure the interlock monitor switch is closed after the interlock switch and door sensing are open when the door is opened. (See pages 1 and 6)
(b) Make sure the perforated screen and the choke dielectric 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 of any of the following conditions.
(a) Door is not closed 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 that there are no defective parts in the interlock mechanism.
(f) Make sure that there are no defective parts in the microwave generating and transmission assembly. (especially wave guide).
(4) The 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) Waveguide 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.CIRCUIT DIAGRAM



SWITCH MADE ●	INTERLOCK SWITCH	INTERLOCK MONITOR SWITCH		PRIMARY INTERLOCK DOOR SENSING SWITCH	PRIMARY INTERLOCK RELAY 3 RELAY 4
CONDITION	COM	COM	COM	COM	COM
	NO	NC	NO	NO	NO
DOOR OPEN		●			
DOOR CLOSED	●		●	●	●

Figure 2

* Caution: The voltage between filament leads of magnetron is about 3.3VA.C, but the filament carries 4KV/DC high voltage with respect to ground.Never touch these leads with bare hand during operation.

6. TEST PROCEDURES AND TROUBLESHOOTING

CAUTION

-DISCONNECT THE POWER SUPPLY CORD FROM THE WALL OUTLET WHENEVER REMOVING THE CABINET FROM THE UNIT. PROCEED WITH TESTS ONLY AFTER DISCHARGING THE HIGH VOLTAGE CAPACITORS AND REMOVING THE LEAD WIRES ON THE PRIMARY WINDING OF THE HIGH VOLTAGE TRANSFORMERS FOR LOWER AND UPPER MAGNETRONS.

(SEE FIGURE 3)

A. TEST PROCEDURES

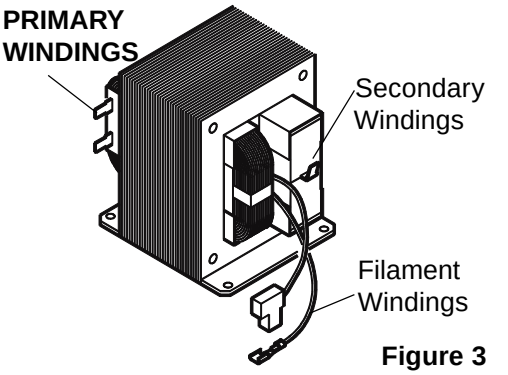
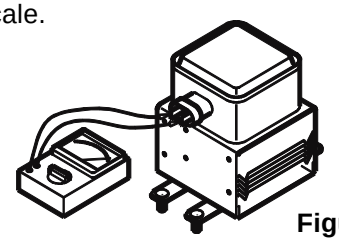
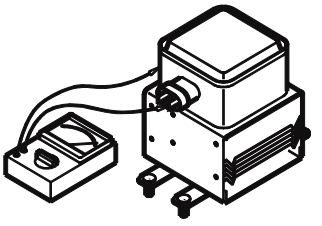
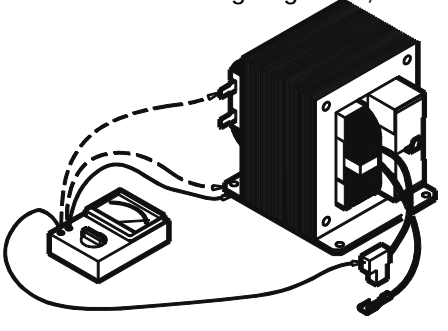
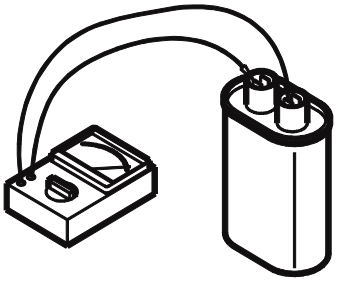
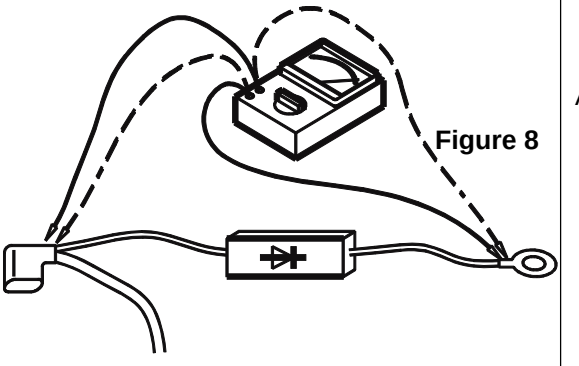


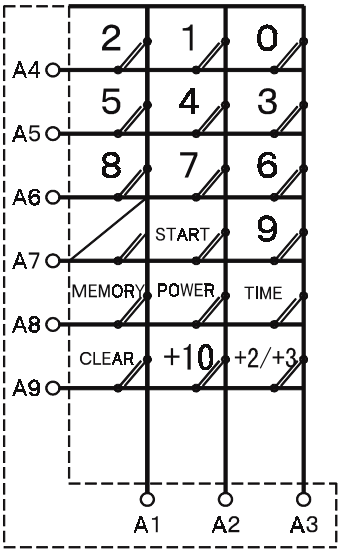
Figure 3

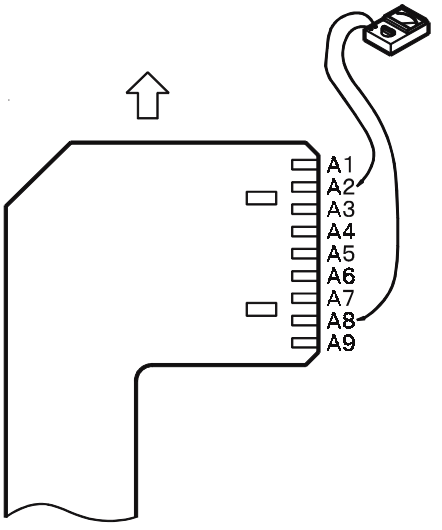
COMPONENT	CHECKOUT PROCEDURE	RESULT
MAGNETRON	1) Check for resistance: Across the filament terminal of the magnetron with an ohm - meter on Rx1 scale.  **Figure 4**	Normal reading: Less than 1 ohm.
	2) Check for resistance: Between each filament terminal of the magnetron and the chassis ground with an ohm-meter on highest scale.  **Figure 5**	Normal reading: Infinite ohms.
HIGH-VOLTAGE TRANSFORMER	1) Measure the resistance: With an ohm-meter on R x1 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 6**	Normal reading: Approximately 1.0 ohms Less than 1 ohm. Approximately 60 ohms Normal reading: Infinite ohms. Infinite ohms. Note: Remove varnish of measured point.

COMPONENT	CHECKOUT PROCEDURE	RESULT
HIGH-VOLTAGE CAPACITOR Including internal bleeder resistor	Measure the resistance: Across two terminals with an ohm-meter on highest scale.  **Figure 7**	Normal reading: Momentarily indicates several ohms, and gradually to 10 meg-ohms. Abnormal reading: Indicates continuity or 10 meg-ohms from the beginning.
HIGH-VOLTAGE DIODE	Measure the resistance: Across two terminals with an ohm-meter on highest scale.  **Figure 8**	Normal reading: Indicate about middle position in one direction (forward) and infinite ohms in the reverse direction, using ohm meter with a 9V battery. NOTE - Some digital meter may show more than 0 ohms or infinite ohms even in a forward direction because the low measuring voltage of the meter does not allow the meter to pass through the high voltage diode. Use an ohm meter with a 9V battery. Abnormal reading: Indicates continuity or infinite ohms in both directions.

COMPONENT	CHECKOUT PROCEDURE	RESULT
TOUCH KEY BOARD	Measure the resistance between terminals of FPC connector after removing it from S101.(Figure 10) NOTE - When reconnecting the FPC connector, make sure the holes on the connector are properly inserted in hook of the plastic fastener in S101. **MATRIX CIRCUIT FOR TOUCH KEY BOARD FPC CONNECTOR**	When checking the POWER key , connect the ohm-meter as illustrated below.

Resistance Value	When touched	When not touched
	Less than 1 K ohms	More than 1 meg ohms



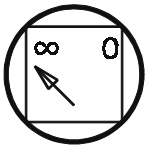
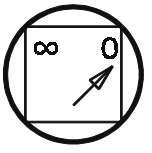
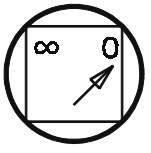
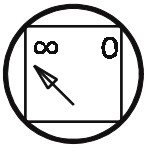


TERMINAL OF FPC CONNECTOR

FIGURE 10

CHECKOUT PROCEDURE FOR SWITCHES

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

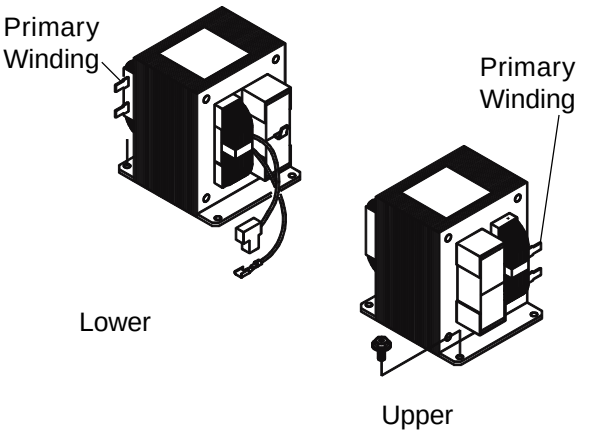
SWITCHES (SEE Figure 1 on page 1)	CHECKOUT PROCEDURES	DOOR OPEN	DOOR CLOSED
INTERLOCK SWITCH **DOOR SENSING SWITCH**	Terminals "COM" and "NO"		
INTERLOCK MONITOR SWITCH	Terminals "COM" and "NC"		

CAUTION: After checking the switches, make sure that the interlock monitor switch is properly connected according to the CIRCUIT DIAGRAM on page 3.

WARNING:

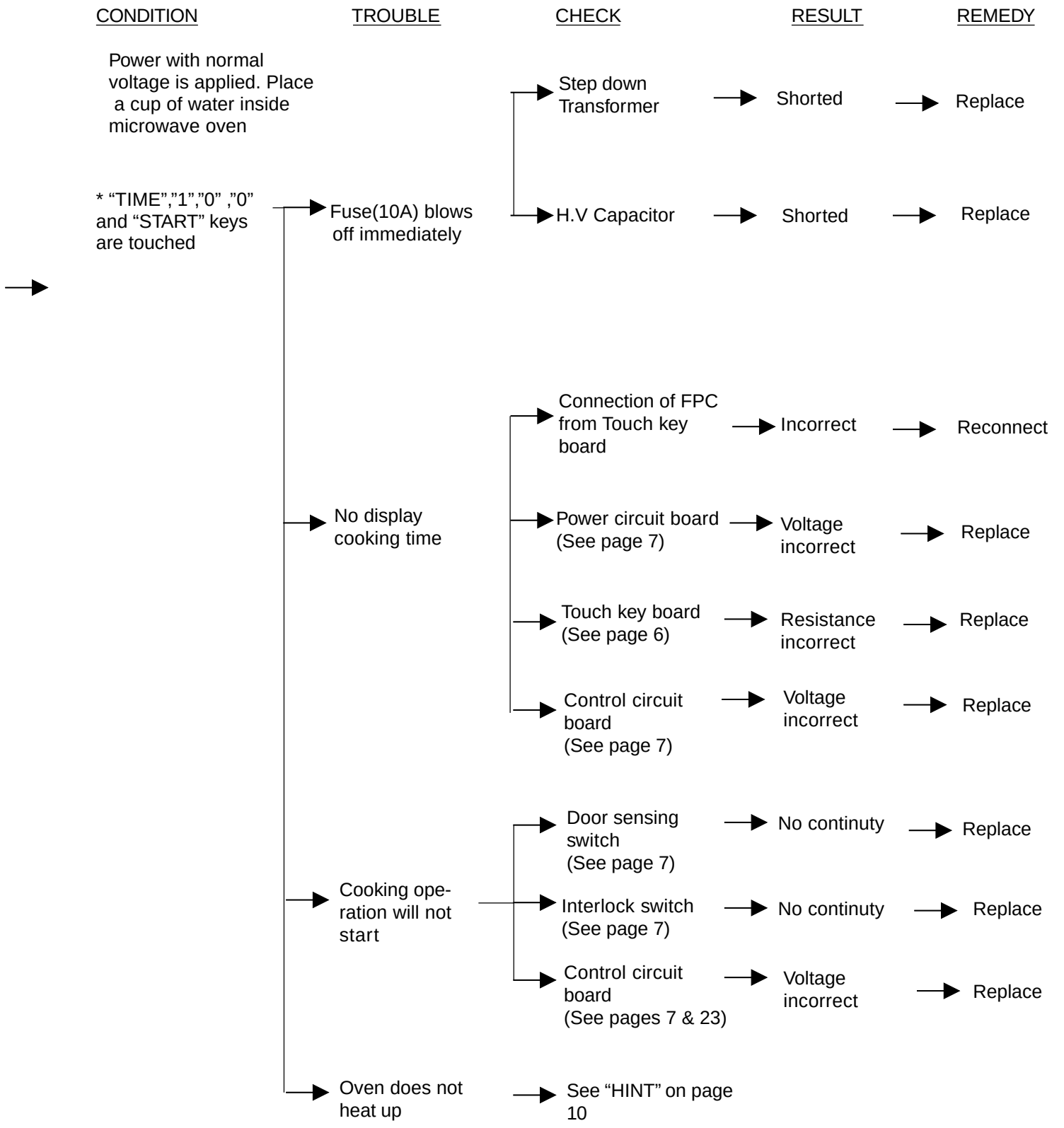
When removing the cabinet, you must disconnect the power supply cord from the wall oulet for your safety. Only the checkout procedure below needs the power supply on. TAKE GREAT CARE to avoid possible electrical shock.

For your safety, proceed with the test only after removing the wire leads from the primary winding of the high voltage transformer

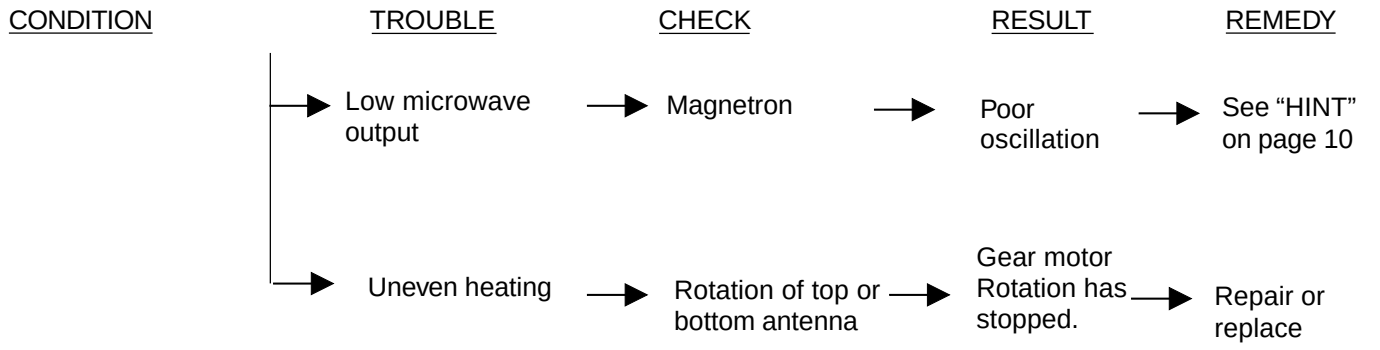


COMPONENT	CHECKOUT PROCEDURE	RESULT
POWER P.C.B	Check voltage at S104 and S105 after removing each connector (female) from power circuit board. Pin No.3 (Ground) and 4,5, 1,2 at S105. Pin No.1 and 2 at S104. CAUTION: For your safety, proceed with the test only after removing the wire leads from the primary winding of high voltage transformer. Test procedures: a) Make sure that the power supply cord is not plugged in. b) Remove the connector S104 and S105 from the power circuit board. c) Plug the power supply cord : back in. d) And then, measure each voltage.	Normal reading: Connection Pin No., Voltage(V) S105 #3 to #4 DC 12 #3 to #5 DC 16 #3 to #1 DC 30 #3 to #2 DC 35 S104 #1 to #2 AC 2.4
CONTROL P.C.B	Measure the voltage: Between test points TP-1, TP-2 ,TP-3 and ground (See figure 16 on page 23) Note - Proceed with the check of the control P.C.B to see if any one of the measured values is different from the specified values.	Test point TP, Voltage(V) TP-1 DC - 5 TP-2 DC - 12 TP-3 DC - 16 TP-4 DC - 35

B. TROUBLESHOOTING



* Note:Oven will not accept settings of 60 through to 99 seconds.
TIME must be entered as 1 minute and 39 seconds for 99 seconds.



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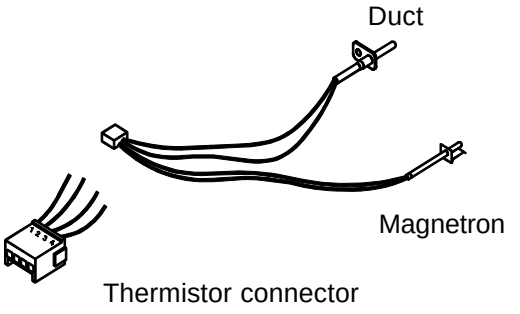
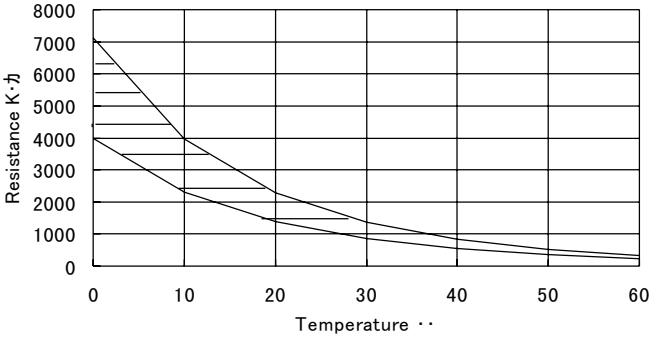
C. ERROR INDICATION

The Display will show an error indication for self-diagonosis as follows.
“E” means that a service technician is required .
“U” means that user can correct the operation.

Display	Trouble	Other Symptom	Solution
E-21	Thermistor (on duct) sensies a temperature of 120°C or higher.	Oven stops heating. Buzzer continuously beeps. Blower motor will stop immediately.	Check and remove the cause of the cavity fire or abnormal overheating. This error function will be cancelled when the power cord is unplugged.
E-31	Thermistor (on Magnetron) or thermistor (on Duct) is shorted.	Oven stops heating. Buzzer does not beep. Blower motor will stop immediately.	Check for short-circuit of thermistor itself or wire insulation of thermistor. This error function be cancelled when the power cord is unpluged.
E-32	Thermistor (on Magnetron) or thermistor (on Duct) is opened.	Oven stops heating. Buzzer does not beep. Blower motor is operated.	Check for open-circuit of thermistor itself or improper connection of wire socket of thermistor. This error function be cancelled when the CLEAR key is touched.
U-10	Thermistor (on Magnetron) senses a temperature of 200°C or higher.	Oven stops heating. Buzzer continuously beeps. Blower motor will stop immediately.	Check and remove cause of abnormal overheating (such as operation with no food). This error function will be cancelled when the CLEAR key is touched.
U-50	The key for “Start” is not touched within 1 minute after the door is opened or closed .	(Remark: The purpose of this function is to avoid accidental operation while the user is not attempting to operate the oven.)	This error function will be cancelled when the door is opened and closed.

THERMISTOR CHART





"HINT"

PROCEDURE FOR DETERMING WHETHER THE UPPER MAGNETRON CIRCUIT OR LOWER MAGNETRON CIRCUIT IS DEFECTIVE.

SYMPTOM:One magnetron does not work giving less than normal heat.

Caution:

Make sure that cabinet (outer wrap) and rear plate are not removed from the oven for your safety.

1.Operate oven as follows.
1)Place a cup of water in the oven
2)Close the door.
3)Touch "CLEAR", "TIME", "5", "0" and "START" keys to operate the oven for 50 seconds with full power level.

2. Determine if the Exhaust air is warm in the following positions..
1)Put your hand near the exhaust duct outside of the rear plate to feel the exhaust (Never remove the cabinet and rear plate from the oven for your safety when you put your hand near exhausting duct.)
2)If air from the upper position of the duct is not warm,the upper magnetron circuit is defective.
If air from the lower position of the duct is not warm,the lower magnetron circuit is defective.

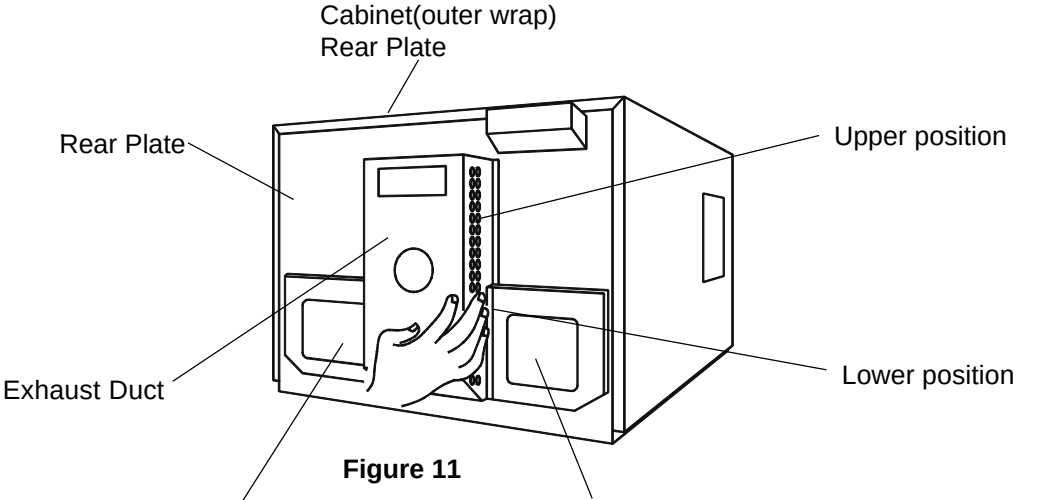


Figure 11

7. DISASSEMBLY INSTRUCTIONS

- THE OVEN MUST BE DISCONNECTED FROM THE ELECTRICAL OUTLET WHEN MAKING REPLACEMENTS, REPAIRS, ADJUSTMENT OR CONTINUITY CHECKS. BEFORE PROCEEDING WITH ANY REPAIR, WORK , WAIT AT LEAST 1 MINUTE, UNTIL THE CAPACITOR IN THE HIGH VOLTAGE AREA HAS FULLY DISCHARGED.

A. REMOVING INTERLOCK SWITCH

(See Figure 1 on page 1)

(1) Disconnect all lead wires from the interlock switches.
(2) Remove 2 screws securing the lever stopper.
(3) Remove 1 screw securing the switches. Then pull out the switches.
(4) Make the necessary adjustment, and perform a microwave energy leakage check according to "1. ADJUSTMENT PROCEDURE FOR SWITCHES" on page 1. Check proper operation according to "CHECKOUT PROCEDURE FOR SWITCHES" on page 6.

B.REMOVING INTERLOCK MONITOR AND DOOR SENSING SWITCH

(See Figure on page 1)

(1) Disconnect all lead wires from the interlock monitor switch and door sensing switch.
(2) Remove 1 screw securing the these switches. Then pull out the switches.
(3) Make the necessary adjustments or replacement of the switch by reversing step (2) and check microwave energy leakage according to "1. ADJUSTMENT PROCEDURE FOR SWITCHES" on page 1. Check proper operation according to "CHECKOUT PROCEDURE FOR SWITCHES" on page 6.

WHEN REPLACING ANY DOOR MICROSWITCH, REPLACE ONLY WITH THE SAME SWITCH SPECIFIED ON THE PARTS LIST.

C. REMOVING FUSE

Remove the 10A fuse with screwdriver.

NOTES

- When replacing the 10A fuse, be sure to use the exact repair part.
- If the 10A fuse blows immediately, check the primary and secondary interlock switch, the relays RL-3 and RL-4 (on the control circuit board) and the interlock monitor switch according to "CHECKOUT PROCEDURE FOR SWITCHES" on page 6. Make sure to check the microwave energy leakage according to "1. ADJUSTMENT PROCEDURE FOR SWITCHES" on page 1, when the primary and secondary interlock switches, the relay RL-3 and RL-4 or the interlock monitor switch is adjusted or replaced.
- If the interlock switch, the relay RL-3 and RL-4 or the interlock monitor switch operate properly, determine which of the following is defective : control circuit board, high voltage transformer, high voltage capacitor, high voltage diode or magnetron.

D. REMOVING DISPLAY CIRCUIT BOARD

(1) Disconnect all lead wires on the Control panel from the Control PCB and Power PCB.
(2) Remove 4 screws securing the Control panel Ass'y to the oven cavity.
(3) Push up and pull out the Control panel Ass'y.
(4) Remove 4 screws securing the Display PCB.
(5) Take out the Display PCB and push up the lever end of the plastic fastener and remove the FPC connector from the connector socket S101.

CAUTION:
When replacing new Display PCB please ensure that all 10 LED heads are positioned exacty into the square holes of the control frame at once. Never force any LED head into the PCB.

E. REMOVING MAGNETRONS

(1) Remove 1 screw securing the thermal protector .
(2) Disconnect 2 lead wires from the magnetron terminals .
(3) Remove thermistor (lower magnetron) by pulling horizontally.
(4) Remove 4 hex nuts (upper magnetron) or 2 hex nuts (lower magnetron)securing to the waveguide.
(5) Remove magnetrons.
(6) 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.
- When replacing the magnetron, be sure to install the magnetron gasket in the correct position and be sure that the gasket is in good condition.
- After replacing the magnetron, check the microwave energy leakage to ensure it is below the limit of 5mW/cm^2. (For US)

- After replacing the magnetron, be sure to check the microwave energy with a leakage detector and confirm it is below the limit of 1 mW/cm^2 (at 275cc water load),5 mW/cm^2 (at no load) and 5 mW/cm^2 (at 275 cc water load without cabinet) when measured with a detector. (For CANADA)

HINT FOR LAMP-CHANGE
Before removing the bulb access panel, pull out the main-plug. Change the faulty bulb and secure the bulb access panel. Plug the cord back in and check operation.

F. CHANGING POWER SUPPLY CORD

(See exploded view on page 15)

(1) Unfasten 1 screw for ground and pull out the 2 wires of the power cord from the terminal plate.

(2) Remove 1 screw for the bottom bracket of the cord bushing.

(3) Install the new power supply cord with the reverse procedure of above (1) to (2).

WARNING:

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

Key No.	Order No.	Parts Name
5	617 140 1318	Power cord Ass'y
6	617 140 1332	Cord bush
7	617 140 1349	Bottom bracket

G. REMOVING CERAMIC TRAY ASS'Y

(See Fig.12)

(1) Take off the cabinet.

(2) Put (insert) a screwdriver in the 9 mm diameter hole located at the lower hinge of left side of the oven cavity. Push the tray up with the screwdriver.

(3) Open the door and take out the tray very carefully.

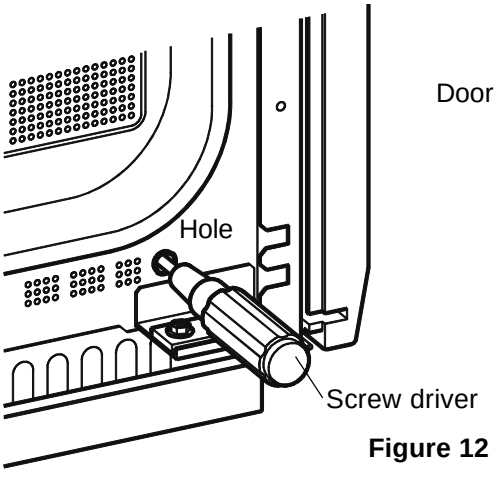


Figure 12

H.REMOVING DOOR

Remove 2 hex nuts securing the upper hinge, remove 3 hex nuts securing the lower hinge and remove 1 special screw securing the door arm (located at the bottom of the door sash).

NOTES

- After replacing the door, be sure to check that the interlock switch, the door sensing switch and the interlock monitor swich operate normally. (See pages 1 and 6)
- After replacing the door, check for microwave energy leakage with a leakage detector. Microwave energy leakage must be below the limit of 5mW/c ‡u.(For US)
- After instaling the door, check for microwave energy with a leakage detector and confirm that the leakage is the below the limit of 1 mW/cm^2 (at 275cc waterload),5 mW/cm^2 (at no load) and 5 mW/cm^2 (at 275cc water load without cabinet) . (For CANADA)

I.HOW TO RESET THE MEMORY OF ACCUMULATIVE COOKING TIME

1. Push the keys step by step as follows,
" CLEAR ", " TIME ", " 8 ", " 8 ", " 8 ", " 1 "
" START ", " START ".
The display will show accumulative cooking time in display window.

2. Then push the keys as follows.
" 0 ", " MEMORY ".
The Memory of Accumulative cooking time will be cleared.

J.RELEASING TYPE CONNECTOR

This oven is provided with locked type connectors. When you remove a connector, pull the connector while releasing the lock by pressing "A" point shown below. Do not pull the wire of the connector.
Connector:
S1, S2, S102, S104, S105 (Figure 13)

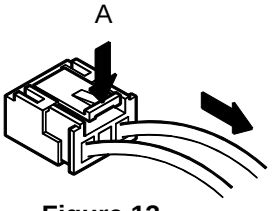


Figure 13

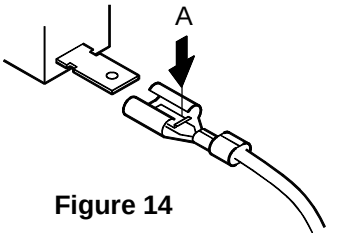


Figure 14

Pull connector case (Never pull the wire)

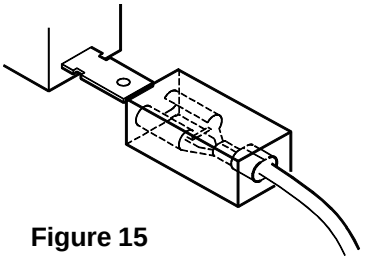
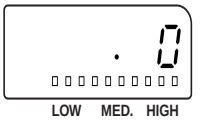
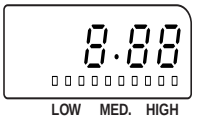
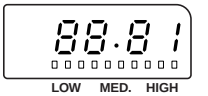
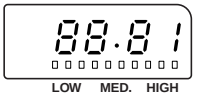
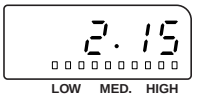
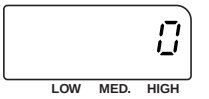
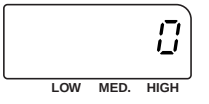


Figure 15

K. ADDITIONAL FUNCTIONS

The following functions can be completed by the key operation described below.
The Accumulative cooking time and the number of door opening /closings can be observed.
The Type and level of the buzzer sound can be selected. The “display of remaining cooking time when cooking is temporarily stopped due to door opening” can be selected. The “Accumulative cooking time period” will inform the service technician of the life expectation of the magnetron or other parts.

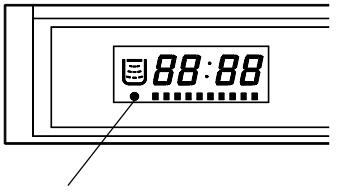
Key Operation Step

	KEY	OPERATION	DISPLAY WINDOW
1	CLEAR / STOP	• Press CLEAR / STOP key.	
2	TIME	• Press TIME key.	
3	8	• Press 8 three times.	
	Key operations at Step 1 thru Step 3 are common to all functions. Proceed with the key operation at Step 4 for your desired functions.		
4	1	• Select the function to press the number key 1 ... Accumulative cooking time. 2 ... The number of door operations. (See “HINT” at Step 6) 3 ... Indication of remaining cooking time (when cooking is interrupted by door opening). 4 ... To cancel remaining cooking time. 5 ... Tone of the buzzer on cooking completion. (Pip, Pip, Pip) 6 ... Tone of the buzzer on cooking completion. (Peep) 7 ... The buzzer off. 8 ... The buzzer on. e.g. Number 1 key is pressed for “Accumlative cooking time period”	
5	START	• Press START key. • All 4 digits will be flashing.	
6	START	• Press START key again. • The number “215”shows total cooking time in hours. • When number key other than 1 or 2 is pressed at step 4, “0” appears in display window and the setting has been completed. Note:When number “2” is depressd at Step 4 above the displayed figure shows the number of door operation ••100 e.g. “20” displayed=2000 door operations.	 
7	CLEAR / STOP	• Press CLEAR / STOP key to clear the display for the option 1 and 2. • The function is cleared and “0” will appear in the display window.	

Maintenance:

The microwave ovens are designed, manufactured, and tested for years of dependable operation. However, the oven may require service from time to time if the consumable components listed below are not replaced at the appropriate time. For protection from unexpected service calls and undue inconvenience, we recommend that the user has the listed parts replaced at the intervals below, (at customer cost).
This will avoid the trouble of repeated service calls after the expiration of the warranty period.

Consumable components:
When more than 1,250 hours of accumulative cooking time or more than 200,000 cycles of door opening/closing is observed by key operations (See page 13 for more information), the following consumable components should be replaced.
(Maintenance light in window display indicates when accumulative cooking time reaches 1,250 hours.)



Light

1. Magnetron Tube, Part No. 415 002 6408

2. Printed Circuit Board-Relay, Part No. 617 137 3844

3. Switch base Assembly, Part No. 617 205 1208

4. Door Latch, part No. 617 068 1087

When more than 2,000 hours of accumulative cooking time is observed, the following consumable components should be replaced.

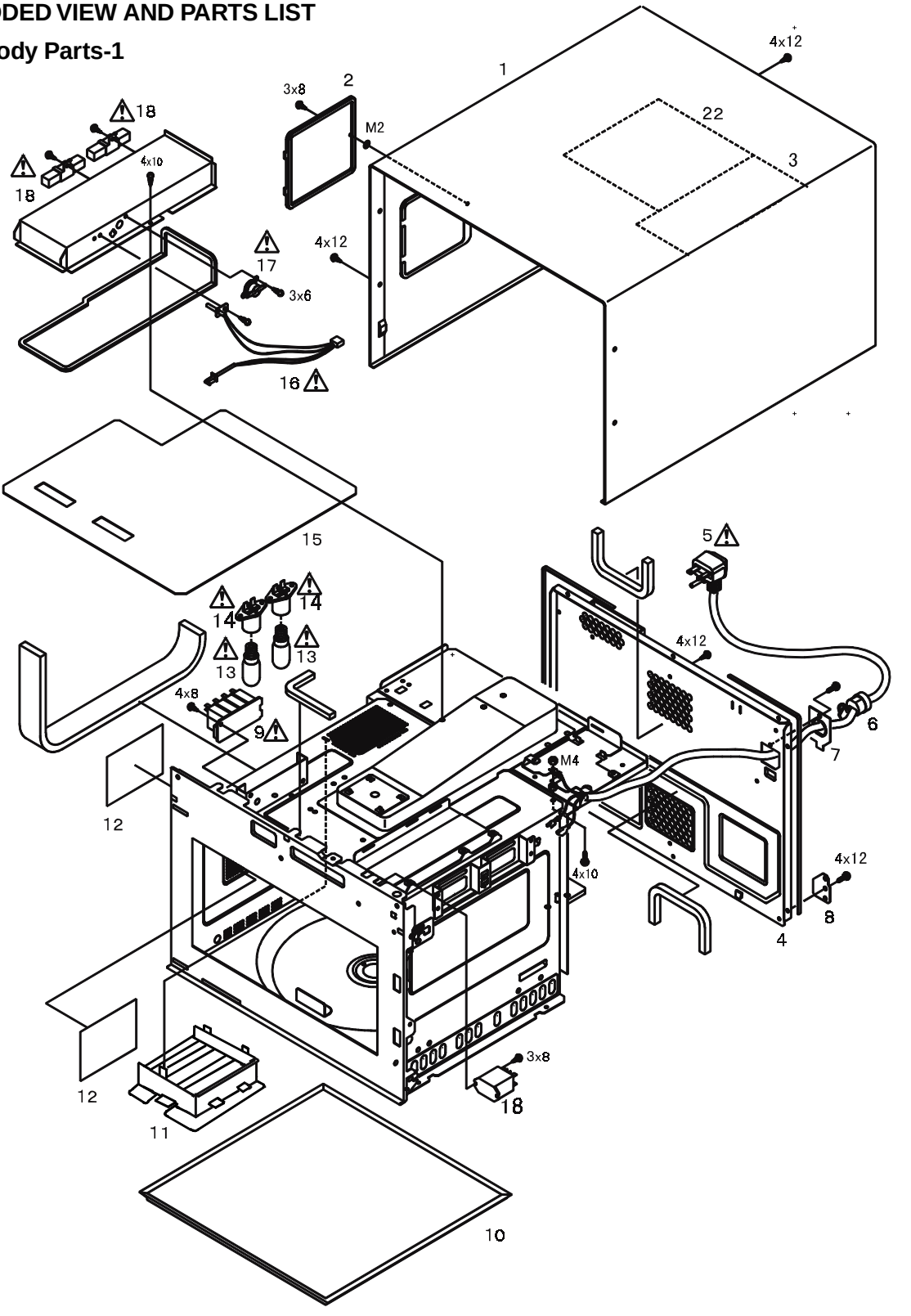
5. Blower motor, Part No. 617 140 1370
   When slow rotating of blower motor is observed after removing dust from blower motor, blower motor must be replaced.

6. Door hinge, Part No. 617 120 3028
   When a worn door hinge is observed and proper door adjustments can not be made, the door hinge must be replaced.

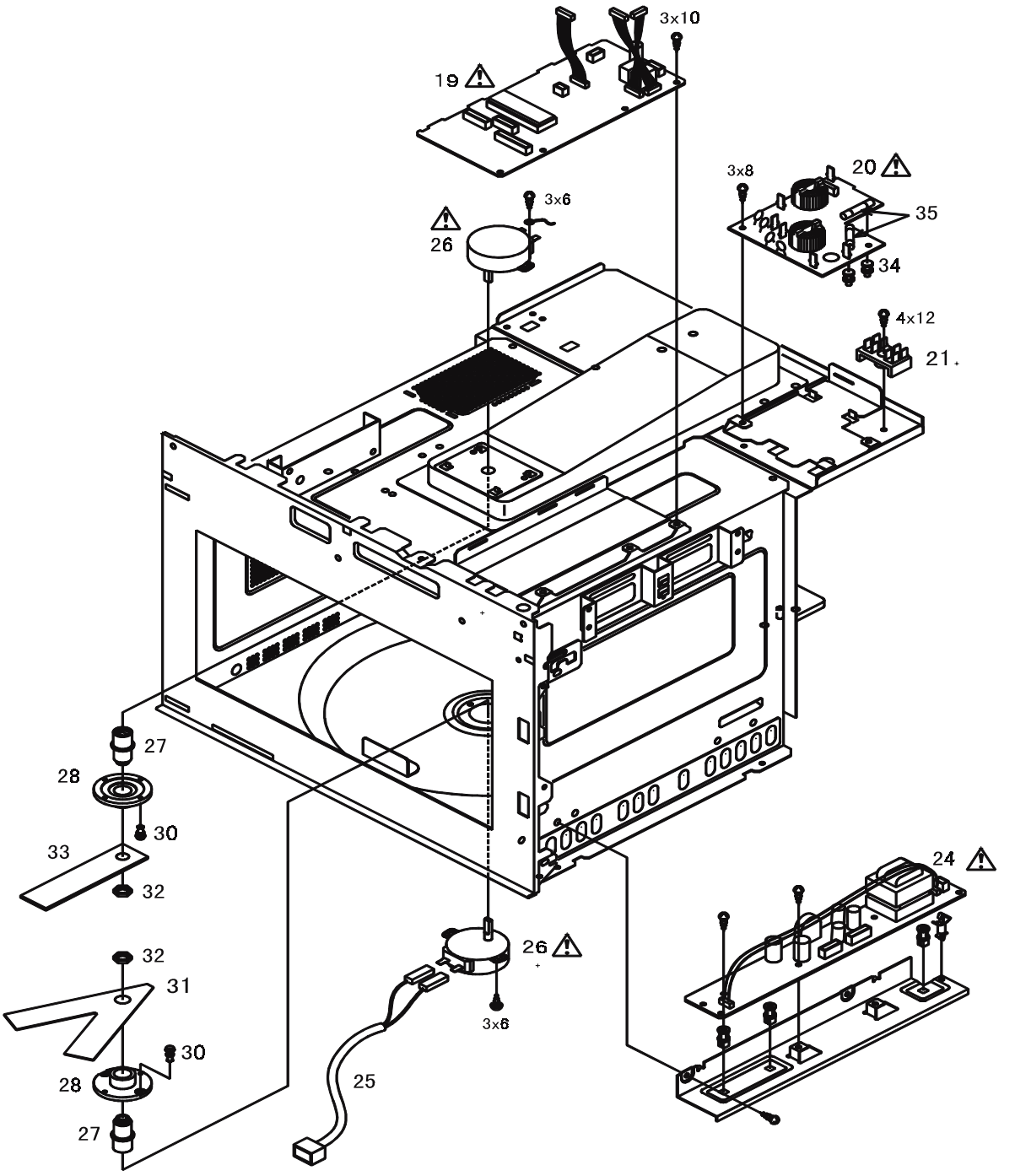
7. Door Assembly, Part No. 617 178 0734
   When a worn door pin is observed and proper door adjustments can not be made, the door assembly must be replaced.

8. EXPLODED VIEW AND PARTS LIST

Main body Parts-1



NOTE: All component have special characteristics for safety and must be replaced using parts listed in this manual. All service on M/W ovens should be performed by a qualified technician using approved testing equipment. Customers should not attempt replace component marked with a ⚠ symbol.

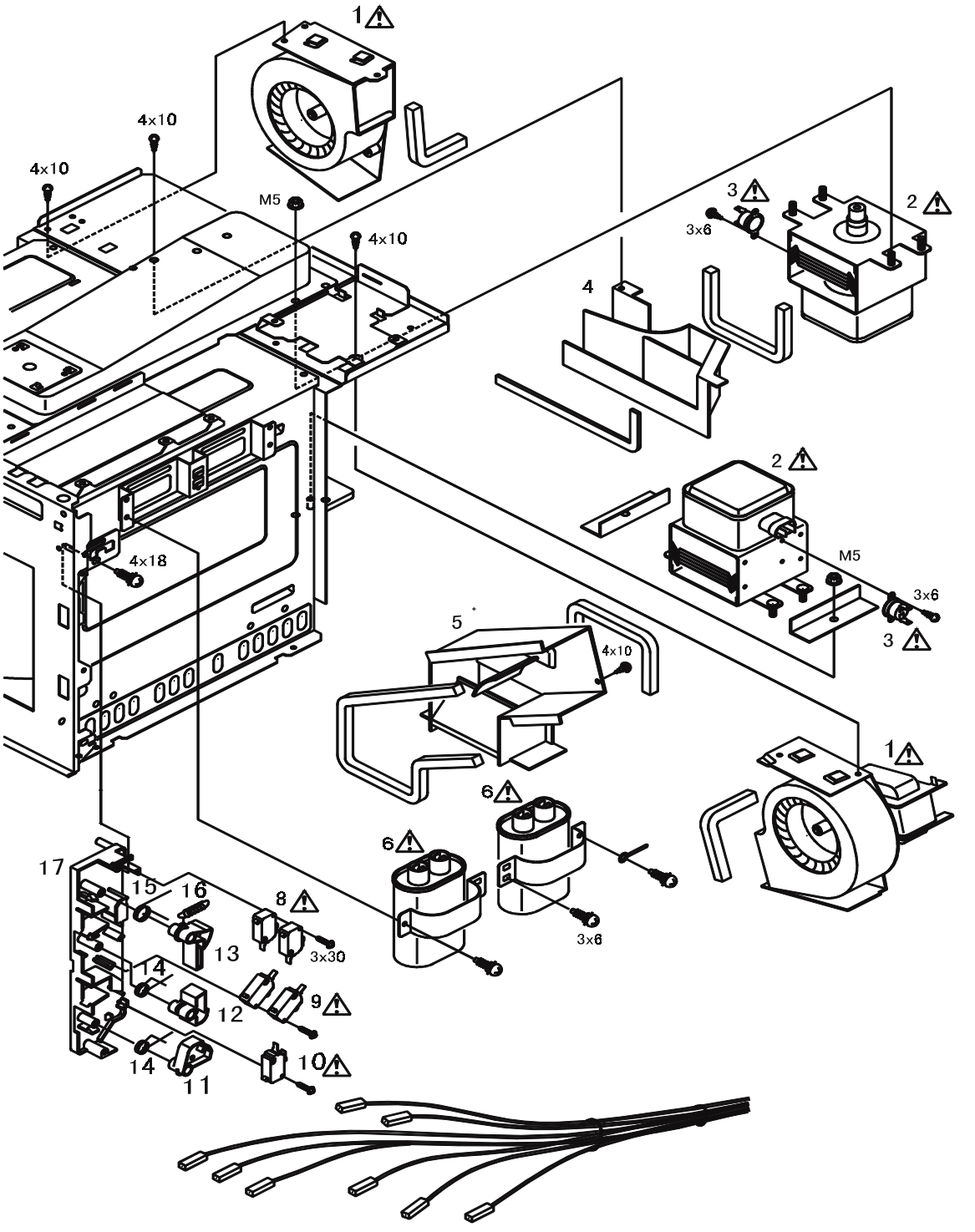


NOTE: All component have special characteristics for safety and must be replaced using parts listed in this manual. All service on M/W ovens should be performed by a qualified technician using approved testing equipment. Customers should not attempt replace component marked with a ⚠ symbol.

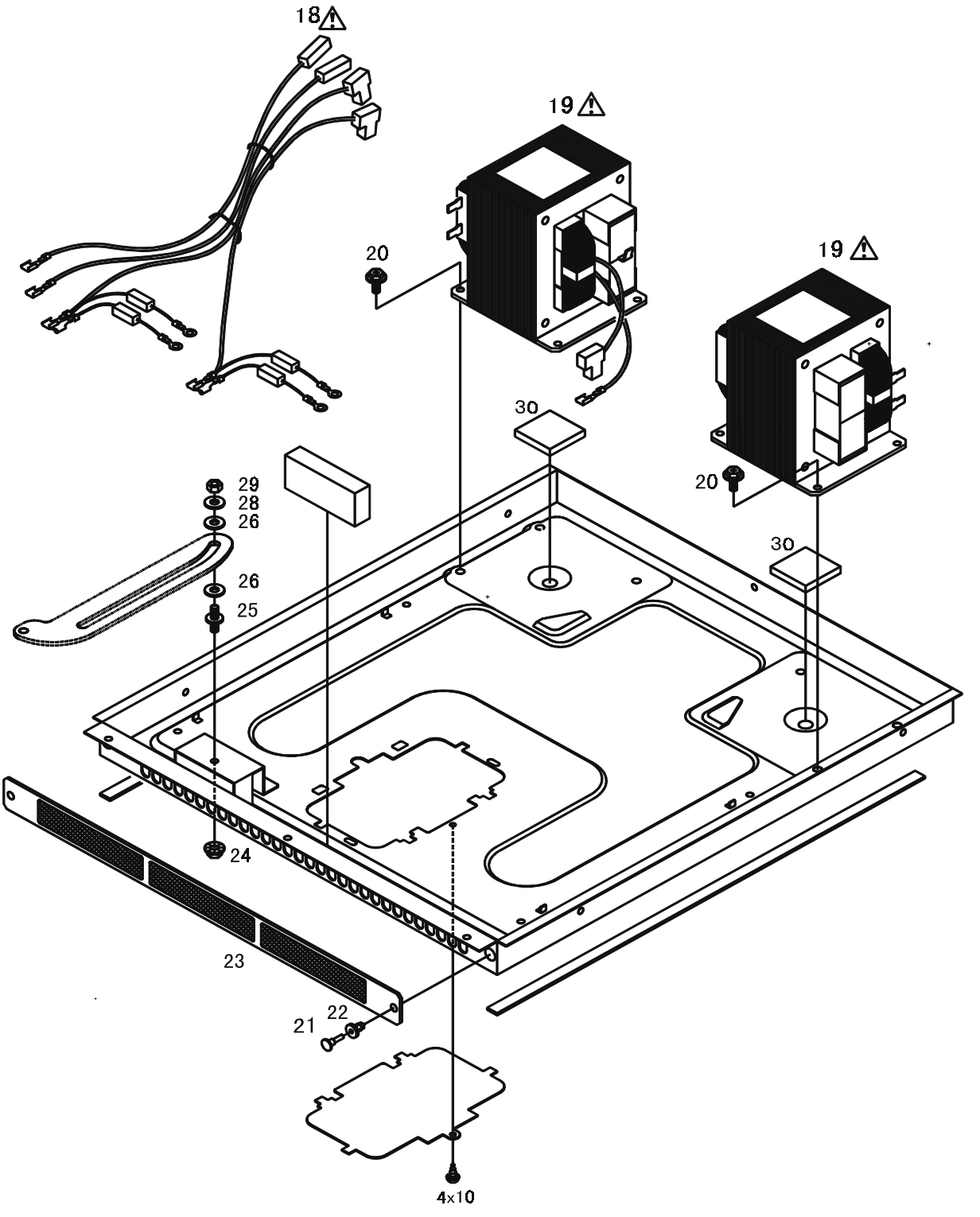
Main body Parts-1

KEY NO.	SERVICE PART NO.	DESCRIPTION	Q TY.
1	617 120 2854	CABINET	1
2	617 055 9584	FRAME PLATE ASS'Y	1
3	617 137 3639	INSU. SHEET	1
4	617 130 3520	FRAME REAR PLATE ASS'Y	1
5	617 140 1318	CORD ASS'Y	1
6	617 140 1332	CORD BUSH	1
7	617 140 1349	BOTTOM BRACKET	1
8	617 179 6087	FRAME BRACKET	1
9	617 137 3844	P.C.B COMP. RELAY	1
10	617 120 4230	SHELF ASS'Y	1
11	617 223 3963	DUCT	1
12	617 120 3387	LIGHT OPENING COVER	2
13	617 005 5147	LAMP 120V 20W	2
14	617 120 3592	LAMP SOCKET	2
15	617 120 3370	PROTECT COVER	1
16	617 130 3599	THERMISTOR ASS'Y	1
17	617 140 1264	THERMAL PROTECTOR 140°C	1
18	402 061 1505	CERAMIC RES 25 OHM 20W	2
19	617 208 6446	P.C.B COMP. CONTROL	1
20	617 209 9446	P.C.B COMP. NOIZE FILER	1
21	617 192 2110	TERMINAL PLATE	1
24	617 208 6453	P.C.B COMP. POWER	1
26	617 209 9422	GEAR MOTOR	2
27	617 120 3325	ANTENNA SHAFT	2
28	617 212 8535	ANTENNA BEARING	2
30	617 121 9265	CLIP	4
31	617 149 3054	ANTENNA LOWER	1
32	617 120 3349	SPECIAL NUT	2
33	617 120 3332	ANTENNA UPPER	1
34	617 207 6836	CLIP	2
35	423 020 2708	FUSE 250V 10A	2

Main body Parts-2



NOTE: All component have special characteristics for safety and must be replaced usnig parts listed in this manual.
All service on M/W ovens should be performed by a qualified technician using approved testing equipment. Customers should not attempt replace component marked with a ⚠ symbol.



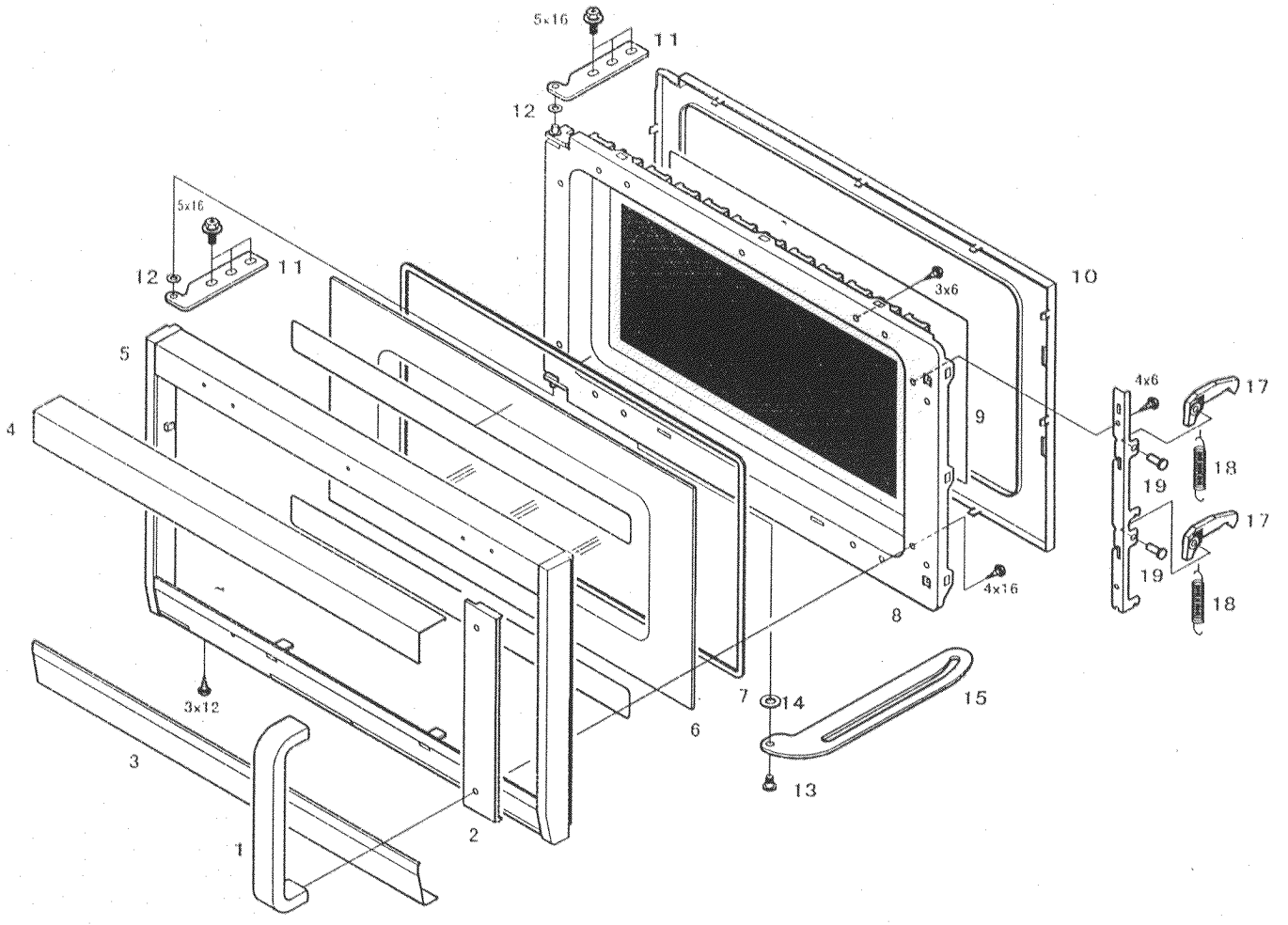
NOTE: All component have special characteristics for safety and must be replaced using parts listed in this manual.
All service on M/W ovens should be performed by a qualified technician using approved testing equipment. Customers should not attempt replace component marked with a ⚠ symbol.

Main body Parts-2

KEY NO.	SERVICE PART NO.	DESCRIPTION	Q TY
1	617 140 1370	BLOWER COMP.	2
2	415 002 6408	MAGNETRON 2M254(M)	2
3	617 140 1257	THERMAL PROTECTOR 150°C	2
4	617 120 3431	DUCT MAG. UPPER	1
5	617 120 3448	DUCT MAG. LOWER	1
6	617 197 5604	CAPACITOR 0.93MFD 2.4KWV	2
8	617 118 9247	MICRO SWITCH MONITOR	2
9	617 160 0438	MICRO SWITCH DOOR LATCH	2
10	617 004 3724	MICRO SWITCH DOOR SENSING	1
11	617 178 1182	LATCH LEVER	1
12	617 178 1175	LATCH LEVER	1
13	617 178 1168	LATCH LEVER	1
14	617 178 1205	SPRING	2
15	617 178 1212	SPRING	1
16	617 187 2217	SPRING	1
17	617 178 1151	LEVER STOPPER	1
18	617 209 9453	HARNESS WITH H.V DIODE	1
19	617 205 1246	TRANSFORMER	2
20	617 080 4196	SPECIAL SCREW	6
21	617 122 8908	CLIP	2
22	617 122 6379	GROMMET	2
23	617 120 3394	AIR FILTER ASS'Y	1
24	411 004 3506	NUT HEX+FLG W/SRT 5	1
25	617 080 3830	SPECIAL SCREW	1
26	617 080 5179	SPECIAL WASHER	2
28	617 080 5186	SPECIAL WASHER	1
29	411 055 0202	NUT HEX 5	1
30	617 078 3422	PROTECT PACKING	2

Note:SWITCH BASE ASSEMBLY (Part No. 617 205 1208) consists of parts listed on the above Key #8 thru #17.

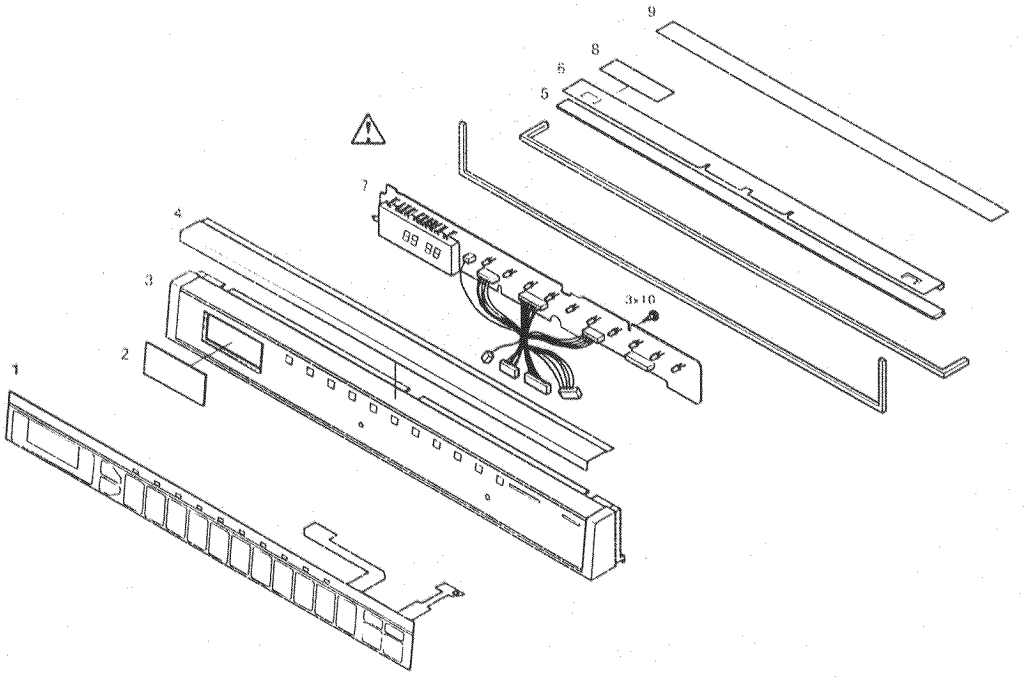
Door Parts



KEY NO.	SERVICE PART NO.	DESCRIPTION	Q TY
1	617 201 9697	DOOR HANDLE	1
2	617 201 9680	DOOR BASE	1
3	617 120 3127	ORNAMENT PLATE LOWER	1
4	617 120 3110	ORNAMENT PLATE UPPER	1
5	617 120 3073	DOOR COVER	1
6	617 209 9385	DOOR PANEL	1
7	617 121 5489	PACKING	2
8	617 178 0734	DOOR ASS'Y	1
9	617 178 1441	DOOR PANEL	1
10	617 178 0840	CHOKE DIELECTRIC	1
11	617 120 3028	HINGE	2
12	411 089 2500	WASHER F 5X10X0.8	2
13	617 080 3847	SPECIAL SCREW	1
15	617 068 3623	DOOR ARM	1
17	617 068 1087	DOOR LATCH	2
18	617 140 5392	SPRING	2
19	617 068 3579	ARM PIN	2

Note:DOOR ASSEMBLY (Parts No. 617 178 0734) consists of parts listed on the above Key #1 thru #19.

Control panel Parts



NOTE: All component have special characteristics for safety and must be replaced using parts listed in this manual. All service on M/W ovens should be performed by a qualified technician using approved testing equipment. Customers should not attempt replace component marked with a ⚠ symbol.

KEY NO.	SERVICE PART NO.	DESCRIPTION	Q TY
1	617 205 1161	KEY BOARD	1
2	617 120 3516	CONTROL PLATE	1
3	617 120 3493	CONTROL BASE	1
4	617 201 9895	ORNAMENT PLATE	1
5	617 073 7616	CAVITY GASKET	1
6	617 073 9672	PACKING COVER	1
7	617 211 7904	P.C.B COMP. DISPLAY	1
8	617 125 9872	INSU. SHEET	1
9	617 208 3377	CONTROL COVER	1

Items not illustrated

KEY NO.	SERVICE PART NO.	DESCRIPTION	Q TY
	617 130 3797	MENU LABEL	1
	617 205 1376	OPERATING INSTRUCTIONS	1

CONTROL CIRCUIT BOARD

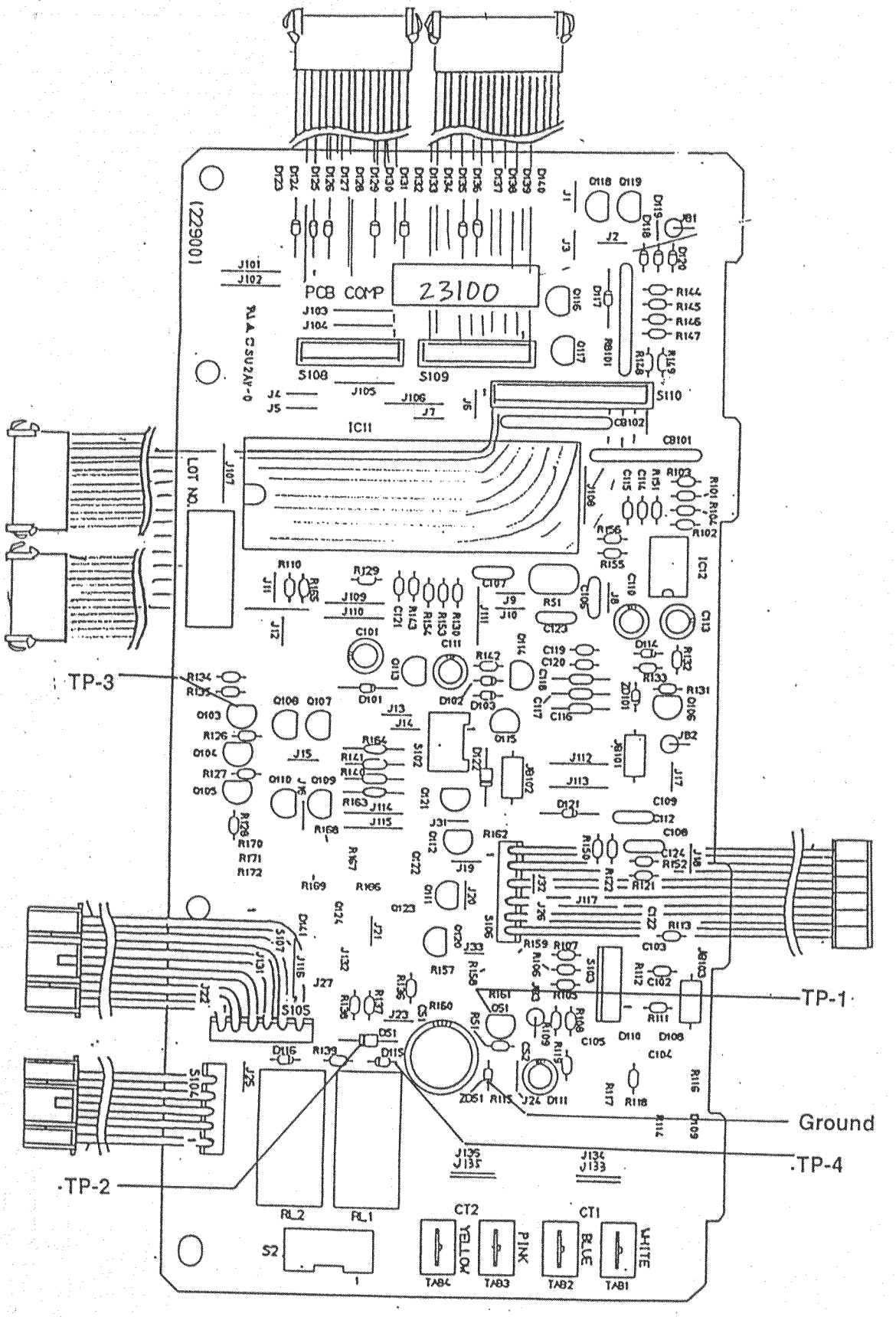
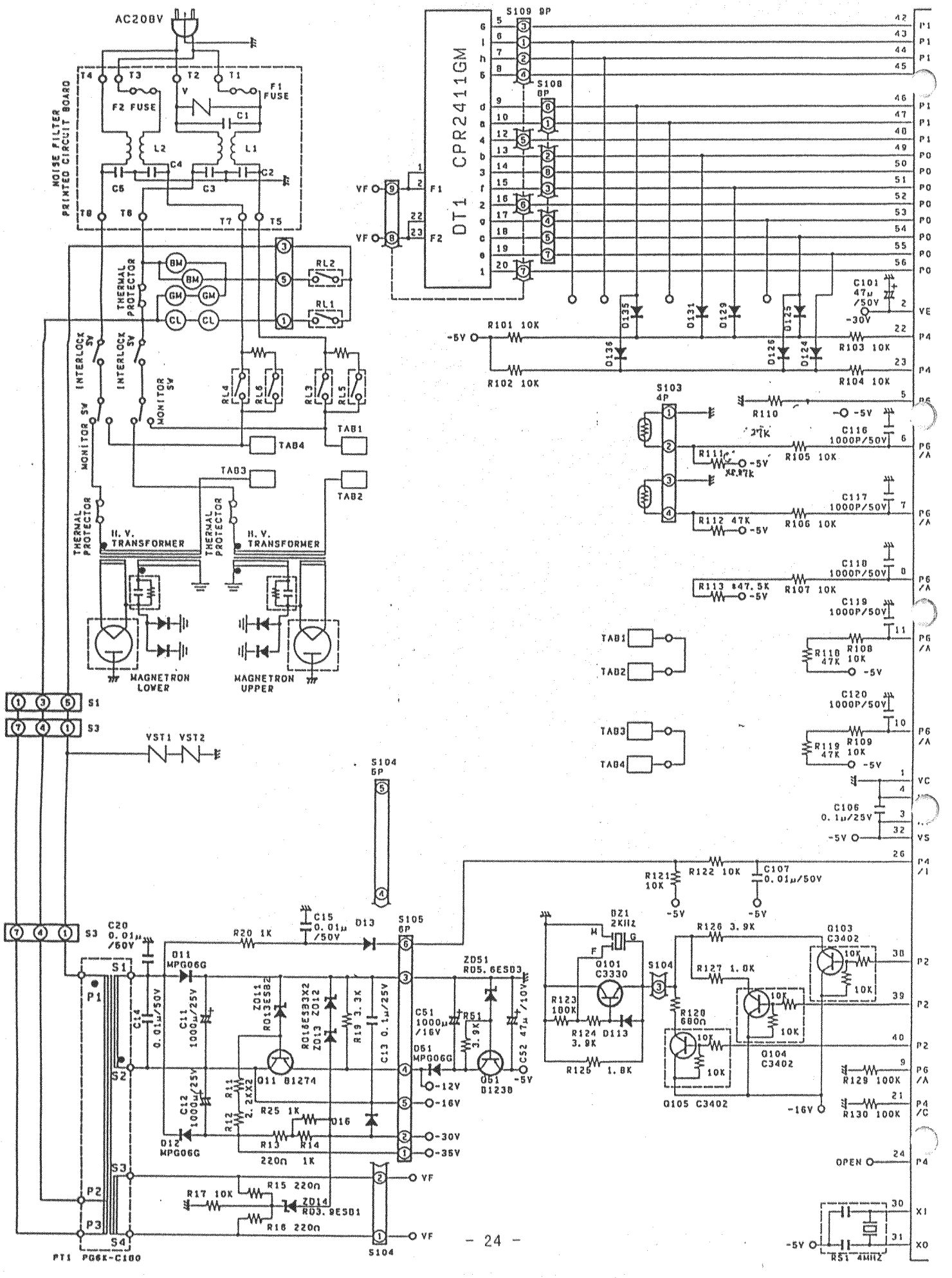
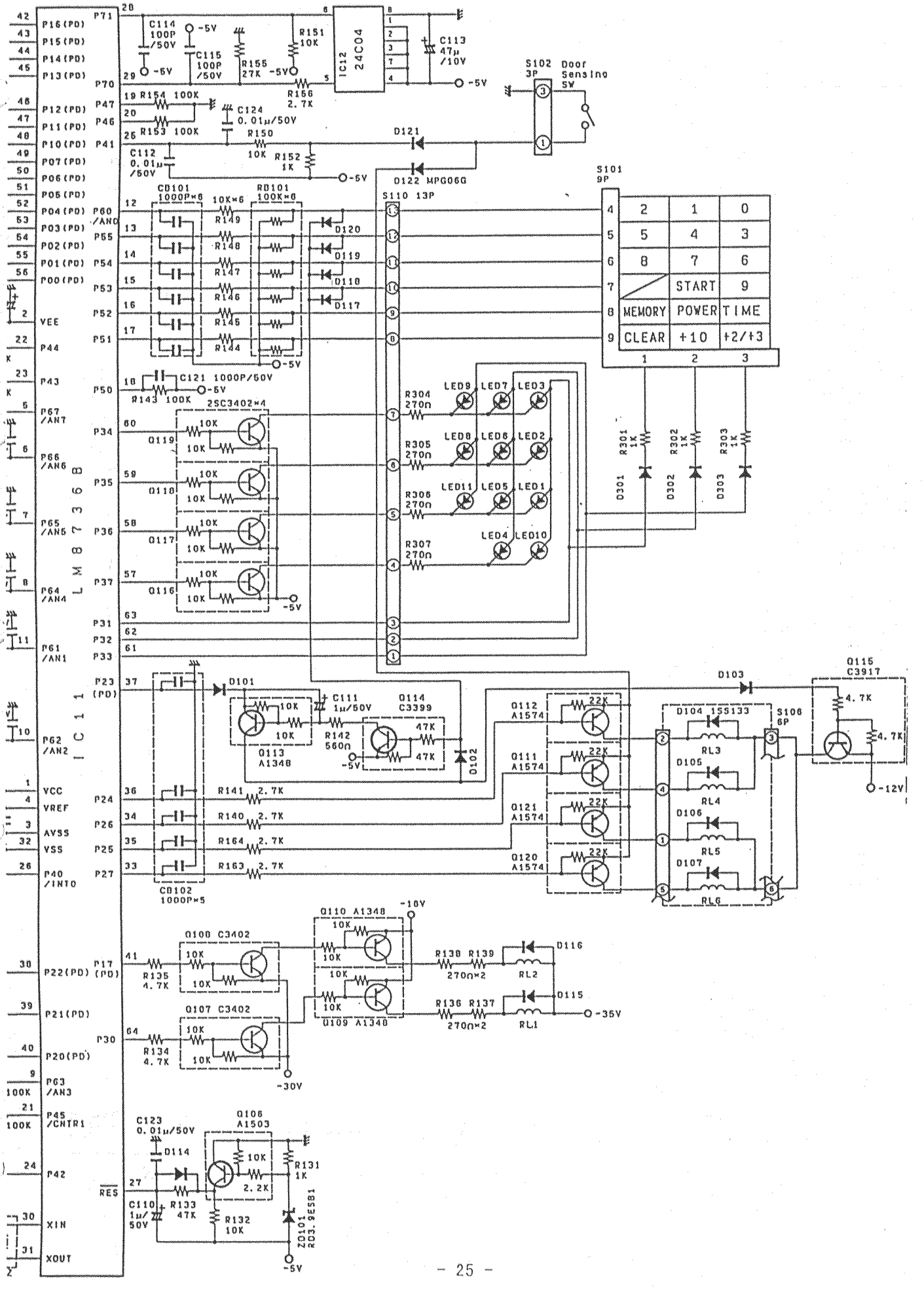


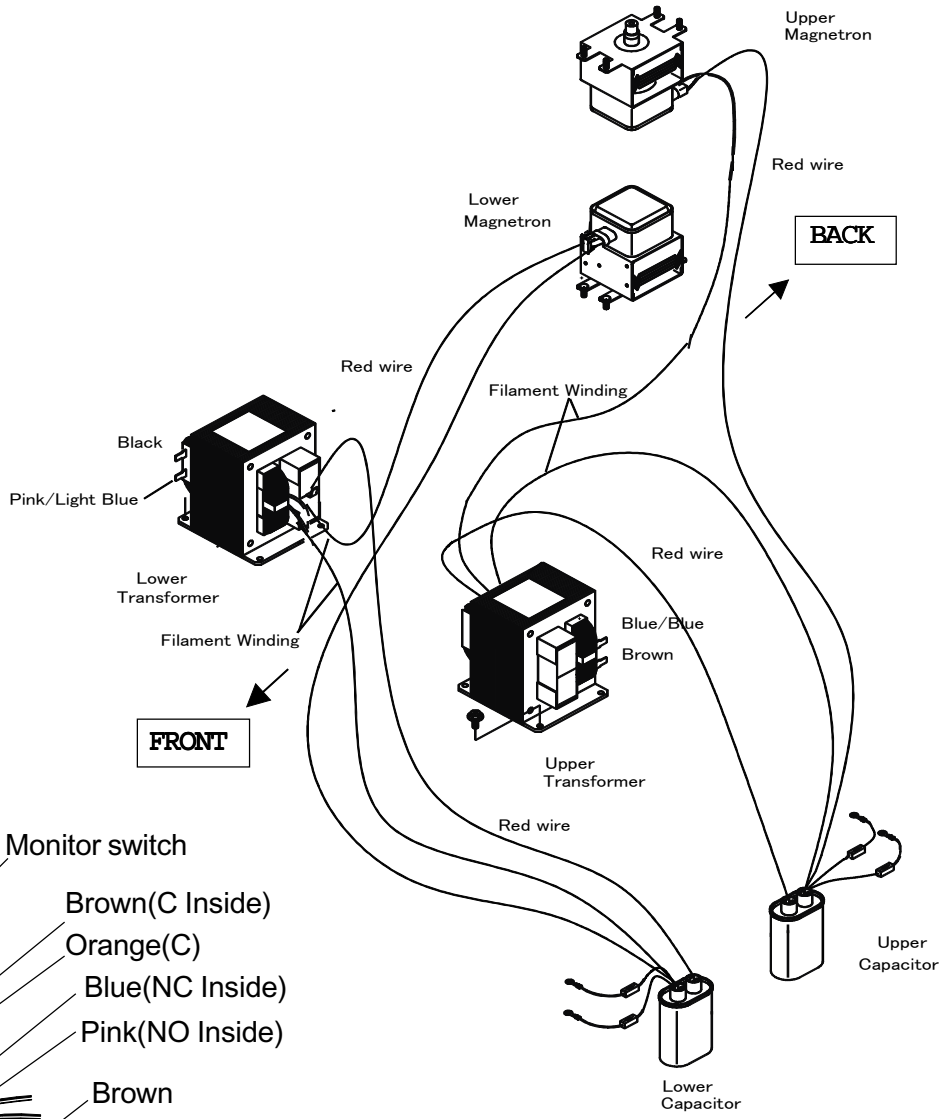
Figure 16

9. OVERALL CIRCUIT DIAGRAM

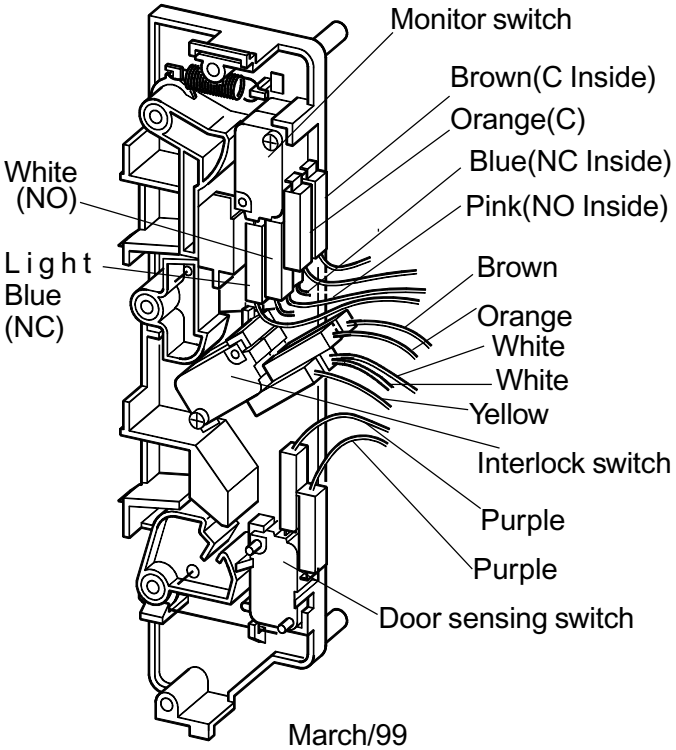



IC11 LM87368
P16(PD)
P15(PD)
P14(PD)
P13(PD)
P12(PD)
P11(PD)
P10(PD)
P07(PD)
P06(PD)
P05(PD)
P04(PD)
P03(PD)
P02(PD)
P01(PD)
P00(PD)
VEE
P44
P43
P67 /AN7
P66 /AN6
P65 /AN5
P64 /AN4
P61 /AN1
P62 /AN2
VCC
VREF
AVSS
VSS
P40 /INT0
P22(PD)
P21(PD)
P20(PD)
P63 /AN3
P45 /CNTR1
P42
XIN
XOUT
RES
IC12 24C04
C114 100P /50V
C115 100P /50V
R151 10K
R155 27K
R156 2.7K
C113 47μ /10V
S102 Door Sensing SW 3P
R154 100K
R153 100K
C124 0.01μ/50V
R150 10K
R152 1K
C112 0.01μ /50V
D121
D122 MPG06G
S101 9P
S110 13P
CD101 1000P×6
RD101 100K×6
R149
R148
R147
R146
R145
R144
D120
D119
D118
D117
C121 1000P/50V
R143 100K
2SC3402×4
Q119
Q118
Q117
Q116
R304 270Ω
R305 270Ω
R306 270Ω
R307 270Ω
LED9 LED7 LED3
LED8 LED6 LED2
LED11 LED5 LED1
LED4 LED10
R301 1K
R302 1K
R303 1K
D301
D302
D303
2 1 0
5 4 3
8 7 6
START 9
MEMORY POWER TIME
CLEAR +10 +2/+3
D101
C111 1μ/50V
Q113 A1348
R142 560Ω
Q114 C3399
D102
Q112 A1574
Q111 A1574
Q121 A1574
Q120 A1574
D103
Q115 C3917
D104 1SS133
RL3
D105
RL4
D106
RL5
D107
RL6
S106 8P
R141 2.7K
R140 2.7K
R164 2.7K
R163 2.7K
CD102 1000P×5
Q110 A1348
Q100 C3402
Q107 C3402
Q109 A1348
R135 4.7K
R134 4.7K
R138 R139 270Ω×2
R136 R137 270Ω×2
D116
D115
RL2
RL1
-10V
-30V
-35V
C123 0.01μ/50V
Q106 A1503
D114
R131 1K
R133 47K
R132 10K
C110 1μ/ 50V
ZD101 RD3.9ES1
-5V
-12V

Wiring of High voltage Circuit



Wiring of Switches



March/99