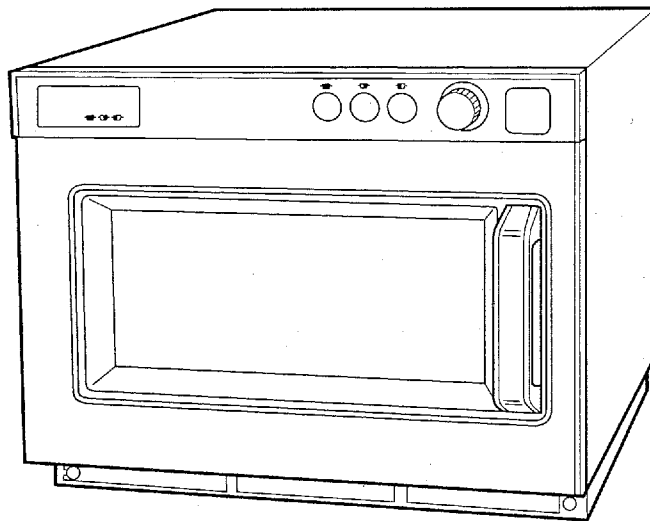





Service Manual

Microwave Oven

NE-1446**NE-1456****NE-1846****NE-1856**

Specifications

		NE-1446	NE-1456	NE-1846	NE-1856
Power Source :		230-240 V AC Single Phase, 50Hz			
Power Requirement :		2270 W		2830 W	
High frequency Output :	 HIGH	1400 W (IEC-705)		1800 W (IEC-705)	
	 MED	700 W		900 W	
	 DEF	340 W		340 W	
Frequency :		2450 MHz			
Timer :		NE-1446/1846: 25 Min. HIGH 30 Min. MED, DEF NE-1856/NE-1456: 15 Min. HIGH, MED 30 Min. DEF			
Outside Dimensions :		422 mm (W) X 508 mm (D) X 335 mm (H)			
Oven Cavity Dimensions :		330 mm (W) X 310 mm (D) X 175 mm (H)			
Weight :		30 kg			
Specification subject to change without notice.					

Panasonic®

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WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

This service manual covers products for following markets.

When troubleshooting or replacing parts, please refer to the country identifications shown below for your applicable product specification.

BPQ.....For United Kingdom

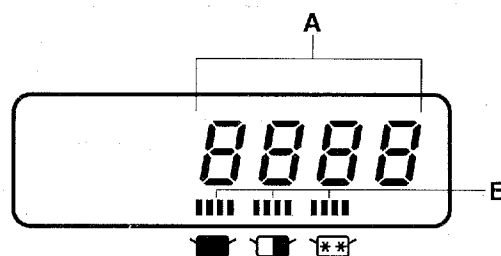
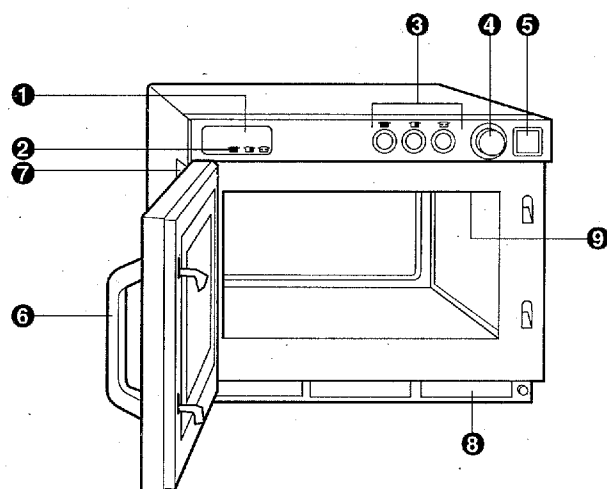
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
This products should be serviced only by trained, qualified personnel.




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NE-1846/NE-1446



- | | |
|---|--|
| ① Digital Display Window(see below) | ⑥ Door Handle |
| ② Power Level Indicator Display | ⑦ Oven Lamp Cover |
| ③ Power Level Selector Buttons | ⑧ Air Filter |
| ④ Time Dial | ⑨ Splatter Shield(top of inner cavity) |
| ⑤ Start Button() | |

- A—Heating Time Display(min.,sec.)
B—Power Level Indicator
 HIGH
 MEDIUM
 DEFROST

⚠ WARNING

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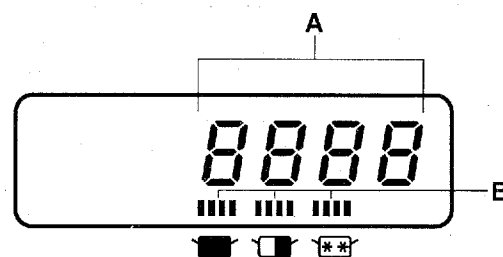
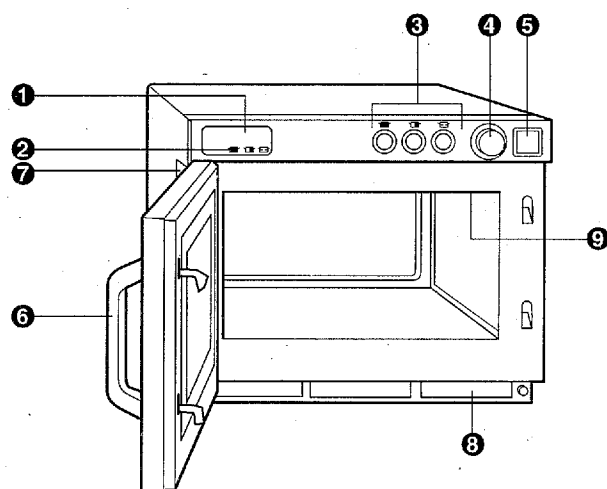
WARNING

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NE-1846/NE-1446

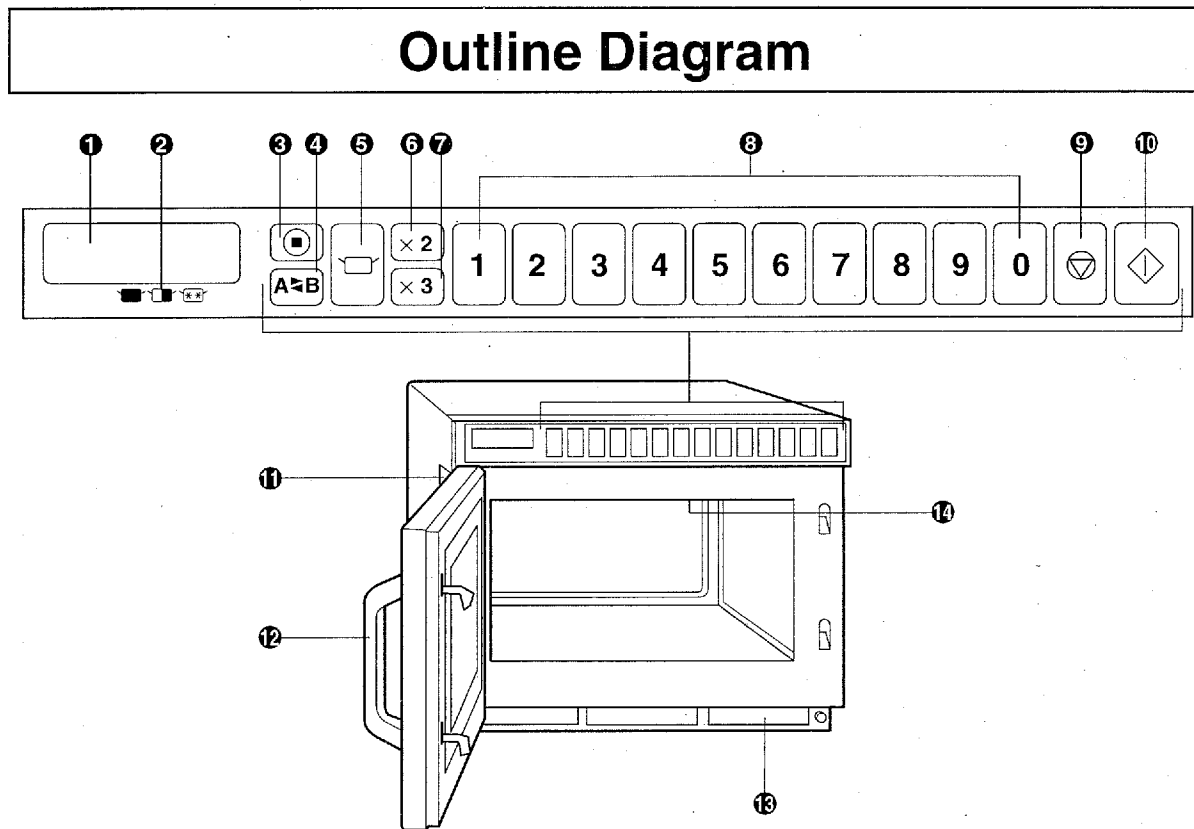


- | | |
|-------------------------------------|--|
| ① Digital Display Window(see below) | ⑥ Door Handle |
| ② Power Level Indicator Display | ⑦ Oven Lamp Cover |
| ③ Power Level Selector Buttons | ⑧ Air Filter |
| ④ Time Dial | ⑨ Splatter Shield(top of inner cavity) |
| ⑤ Start Button() | |

- A—Heating Time Display(min.,sec.)
 B—Power Level Indicator
 HIGH
 MEDIUM
 DEFROST

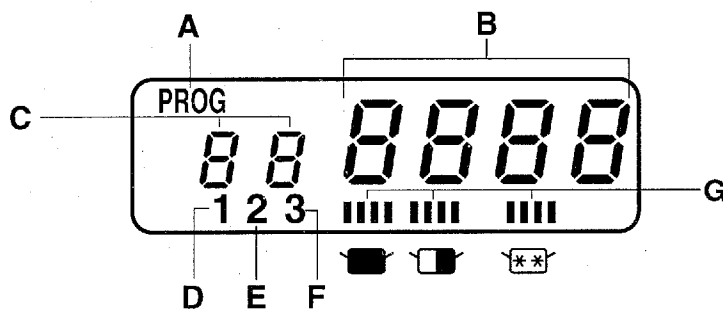
OUTLINE DIAGRAM

NE-1856/NE-1456



- ① Digital Display Window (see below)
- ② Power Level Indicator Display
- ③ Program Pad (■)
- ④ Shift Pad
- ⑤ Power Level Selector Pad (□)
- ⑥ Double Quantity Pad
- ⑦ Treble Quantity Pad

- ⑧ Number/Memory Pads
- ⑨ Stop/Reset Pad (⊙)
- ⑩ Start Pad (◇)
- ⑪ Oven Lamp Cover
- ⑫ Door Handle
- ⑬ Air Filter
- ⑭ Splatter Shield (top of inner cavity)













- A—Program Display
- B—Heating Time Display (min. sec.)
- C—Memory Pad Number Display
- D—1st Stage Heating Indicator















- E—2nd Stage Heating Indicator
- F—3rd Stage Heating Indicator
- G—Power Level Indicator
- HIGH
- ◻ MEDIUM
- ** DEFROST

OPERATION PROCEDURE (NE-1856/NE-1456)

1. Manual heating for single stage











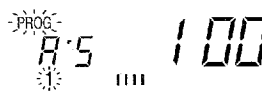


OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle.	
2. Open the door. Place a water load in the oven and close the door.	0
3. Tap POWER LEVEL pad () once. (Set to High power)	 
4. Set the desired heating time by tapping number pads 2, 0, 0 . (Set to 2 minutes)	  2 00
5. Tap START pad ().	  1 59
6. When the time is up, you hear 3 beeps sound.	
7. Open the door and take out the water load. The display goes back to previously setting time.	1  2 00
8. Close the door. 1 minute later, display will return blank.	


2. Manual heating for 2nd or 3rd stage

OPERATION	DISPLAY
1. Follow step 1 to 4 for single stage.	  2 00
2. Tap POWER LEVEL pad () twice. (Set to MED power)	1  
3. Set the desired heating time by tapping number pads 1, 0, 0 . (Set to 1 minute)	1  1 00
4. Tap START pad (). (1st stage)	 2  2 59
5. When the 1st stage time is up, you hear 1 beep sound. (2nd stage)	  59
6. When the time is up, you hear 3 beeps sound.	
7. Open the door and take out the water load. The display goes back to previously setting time.	1 2   3 00
8. Close the door. 1 minute later, display will return blank.	

NOTE: For a 3rd stage heating cycle, select a further power level and time between steps 3 and 4 above.

3. Memory setting for single stage




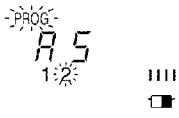



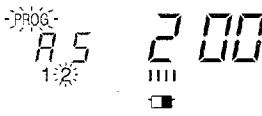
OPERATION	DISPLAY
1. Display must be blank before programming can begin. Touch  pad.	
2. Tap  pad. (Set to memory pad 5) NOE: Previously selected power and time will appear.	
3. Tap  pad () once. (Set to High power)	
4. Set the desired heating time by tapping number pads  ,  ,  . (Set to 1 minute)	
5. Touch  pad again.	
6. 3 seconds after, the display window will go blank.	


TO PROGRAM MEMORY AREA B: Follow steps 1 above. Touch the Memory Shift pad  and a small "B" will appear beneath the flashing "PROG".

Touch the memory pad you wish to program, and the previously selected time and power level will appear in the display window.

NOTE: Once the Memory area B has been selected it cannot be changed back to Memory area A. If you do not require Memory area B, cancel it by touching the cancel pad and begin again.



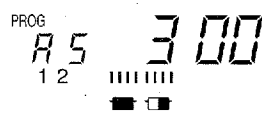






4. Memory setting for 2nd or 3rd stage

OPERATION	DISPLAY
1. Follow steps 1 to 4 for memory setting for single stage.	
2. Tap  pad () twice. (Set to MED power)	
3. Set the desired heating time by tapping number pads  ,  ,  . (Set to 2 minutes)	

OPERATION	DISPLAY
4. Touch Program pad again. Heating time is displayed by adding single and 2nd stage heating time.	
5. 3 seconds after, the display window will become blank.	













NOTE: For a 3rd stage heating cycle, select a further power level and dial in a time, between steps 3 and 4 above.

5. Memory pad heating







OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle.	
2. Open the door. Place a water load in the oven and close the door.	
3. Tap  pad.	
4. Tap  pad (). (1st stage)	
5. (2nd stage)	
6. When the time is up, you hear 3 beeps sounds.	
7. Open the door and take out the water load.	
8. Close the door. Display will return blank after 1 minute.	

NOTE: When program is locked, heating can be started automatically by tapping memory pad.










6. Programming Double or Treble Quantity Pad

OPERATION	DISPLAY
1. The display window must be blank before programming can begin.	
2. Press the  pad.	
3. Press  pad. The pad number and previously selected time and power will appear.	 A 0 2 00 
4. Press  pad. The previously programmed magnification number appear. ex. 15 means 1.6 times. ※NOTE: When you want program for treble quantity heating, press  pad.	 A 0 2 16
5. Set the desired magnification by pressing the appropriate number pad. ex. 1.5 times: press  and 	 A 0 2 15
6. Press the  pad again.	PROG A 0 2 15
7. After 3 seconds the display will goes blank.	

7. Memory Pad Heating for Double or Treble Quantity Heating


OPERATION	DISPLAY
1. Open the door place a water load in the oven and close the door.	0
2. Press the  pad. NOTE: When you want treble quantity heating, press  pad.	PROG 2
3. Press the desired memory pad. ex. memory 0 (programme No. A-0)	PROG A 0 3 00 1 
4. Press  pad.	PROG A 0 2 59 
5. When the time is up, you will hear 3 beeps sound.	
6. Open the door and remove the water load.	0
7. Close the door 1 minute later, display will return blank.	

8. Procedure to Program the Air Filter

OPERATION	DISPLAY
1. Open the door and leave it open.	0
2. While pressing  pad, close and open the door.	0
3. Quickly press  pad. The display will show the length of time originally PRESET. ex: 100 hours	 H 100
4. Set the desired clean time by pressing appropriate pads. ex: 1230 hours, press  ,  ,  , 	 H 12 30
5. Press  pad.	PROG H 12 30
6. After 3 seconds, "0" will appear.	0
7. After the programmed time past, at the end of cooking, "FILT" will appear.	FILT

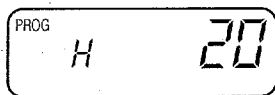
Note: To check the total number of hours used.

1. Open the door and leave it open.

2. Whilst pressing the  press the "3" pad.





3. The display will show the number of hours used. "PROG" and "H" will appear in the display.

[Example]: If the oven has been used for 20 hours.





After 3 seconds "0" will appear in the display window.

9. To Read the Cycle Counter



OPERATION	DISPLAY
1. Open the door and leave it open.	0
2. While pressing  pad, press each memory pad. The display shows the number of times each memory pad has been used. Within 3 seconds, pressing the  pad to show the number of times the oven has been used in the manual mode. ex: 6666→6,666 times NOTE: To read the number of times the oven has been used in the B side programmes. Press A-B shift pad. Then while pressing the  pad press each memory pad.	66 66
3. Remove your finger from  pad and quickly close door while the display is still showing a pad's cycle count. Display will now show the total cumulative number of times the oven has been used. ex: 99999→99,999 times.	9 99 99
4. 3 seconds later, the display will go blank.	

NOTE: Total cumulative number includes programming memory heating and manual heating number of times has been used. Cooking times over 99,999 times will be back 0.








10. To Activate Program Lock

OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle. Do not open the door.	
2. Press and hold  pad until the display show "PROG", "P" and "L". (for more than 5 seconds)	
3. Programme lock feature now activated.	PROG P L

11. To Release Program Lock

OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle.	
2. Open the door. Leave it open. While pressing  pad, press and hold  pad until the display will show "PROG" and "P". (for more than 5 seconds)	0
3. Program lock feature is now deactivated.	PROG P

12. To Select Beep Tone Options






OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle.	
2. Open the door and leave it open.	0
3. Press  pad and then within 1 minute press  pad.	 3 bE EP 1
4. Select the desired sound loudness level by pressing  pad. Repeated pressing of  pad will lower the loudness and all the way to silent.	 2 bE EP 1
5. Press  pad again.	PROG 2 bE EP 1
6. Close the door. 1 minute later display window will go blank.	

To select length of tone at end of heating cycle there are 2 options.













A. 3 beeps (factory setting)

B. 60 seconds of short beeps.

To set for 60 seconds of short beeps.

OPERATION	DISPLAY
1. Complete steps 1-4 above. Do not close the door.	 3 bE EP 1
2. Touch  pad and quickly select the desired tone length by touching  pad. "1" illuminated 3 beeps. "2" illuminated 60 seconds of beeps.	 3 bE EP 2
3. Press  pad again. 3 seconds later, the display will "0".	PROG 3 bE EP 2
4. Close the door 1 minute later display will go blank.	

OPERATION PROCEDURE (NE-1446/1846)

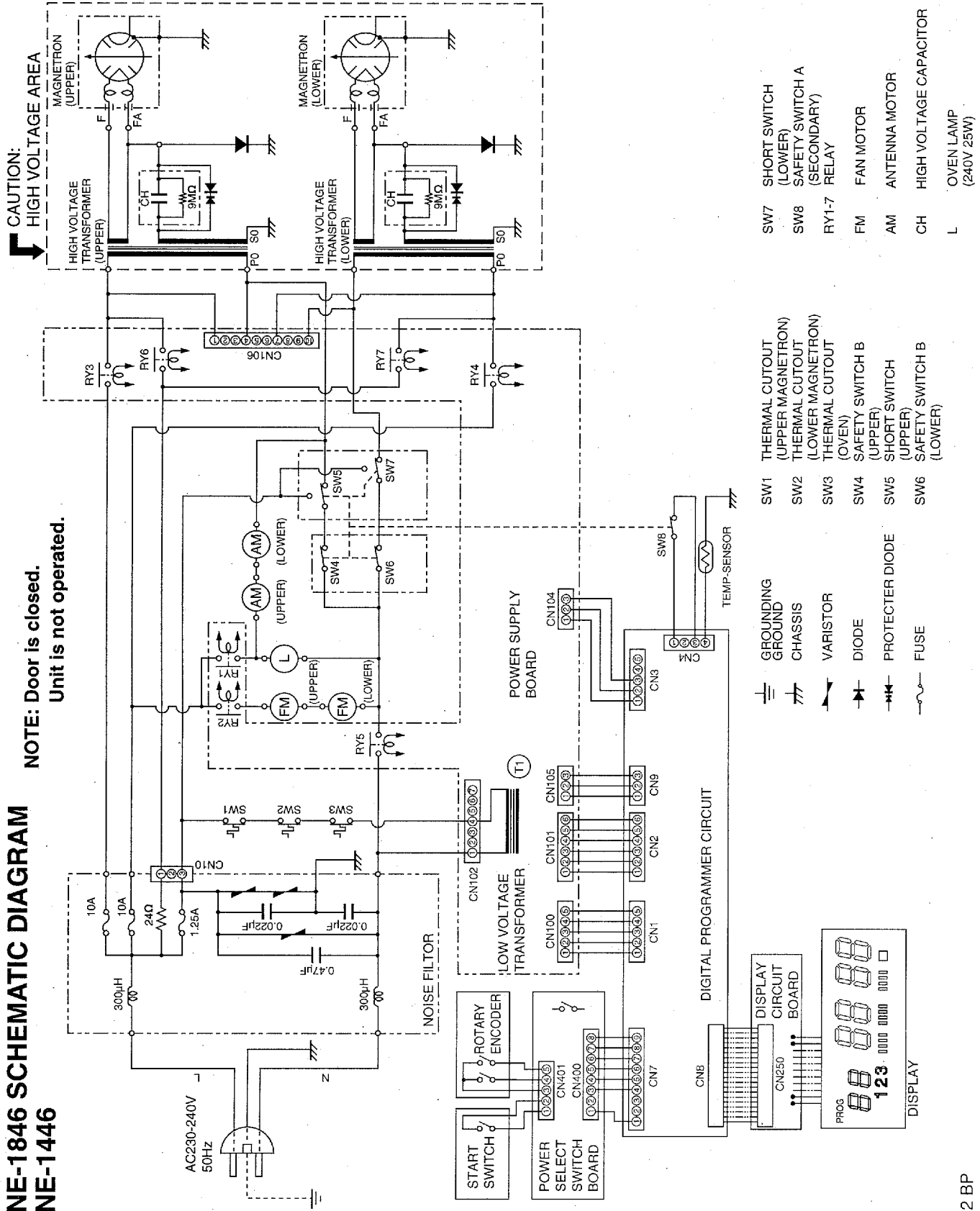
OPERATION	DISPLAY
1. Plug the power supply cord into wall receptacle.	
2. Open the door. Place a water load and close door.	 
3. Select desired power level if other than  (HIGH) power.	 
4. Set the desired heating time by turning the timer dial. NOTE: (HIGH.....MAX 25 MIN) (MED, DEF...MAX 30 MIN)	 
5. Press the start button.	 
6. When the time is up, display will blink "0" until door is opened.	
7. Open the door and remove water load.	 
8. Close the door. 1 minute later, display will go blank.	

Notes:

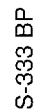
1. When you press the Start Button with door open, "0" will appear in the display in all cases.
2. Even after setting the heating time you can still change the power level.
3. If you wish to change the heating time during heating, simply adjust the timer to desired minutes and seconds.

NE-1846 SCHEMATIC DIAGRAM NE-1446

NOTE: Door is closed.
Unit is not operated.

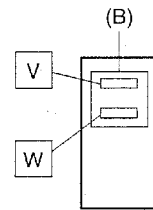
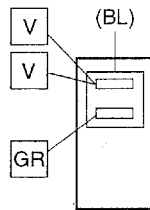
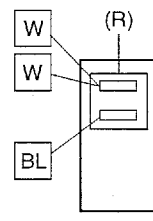
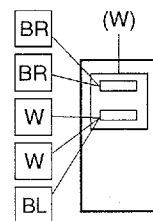
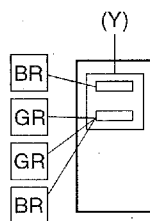
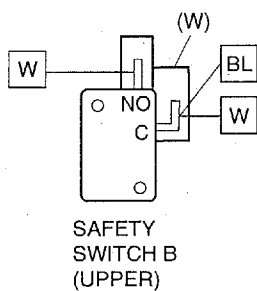
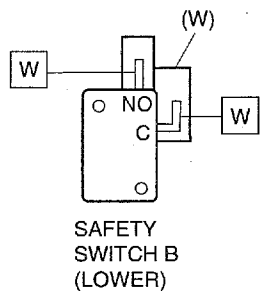
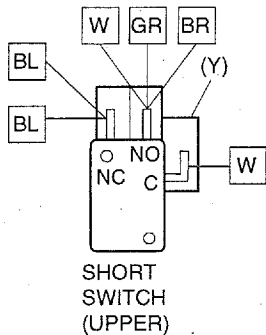
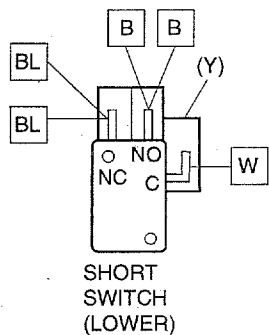
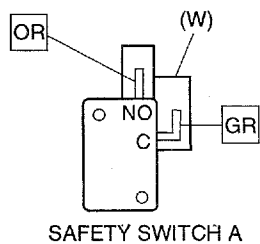
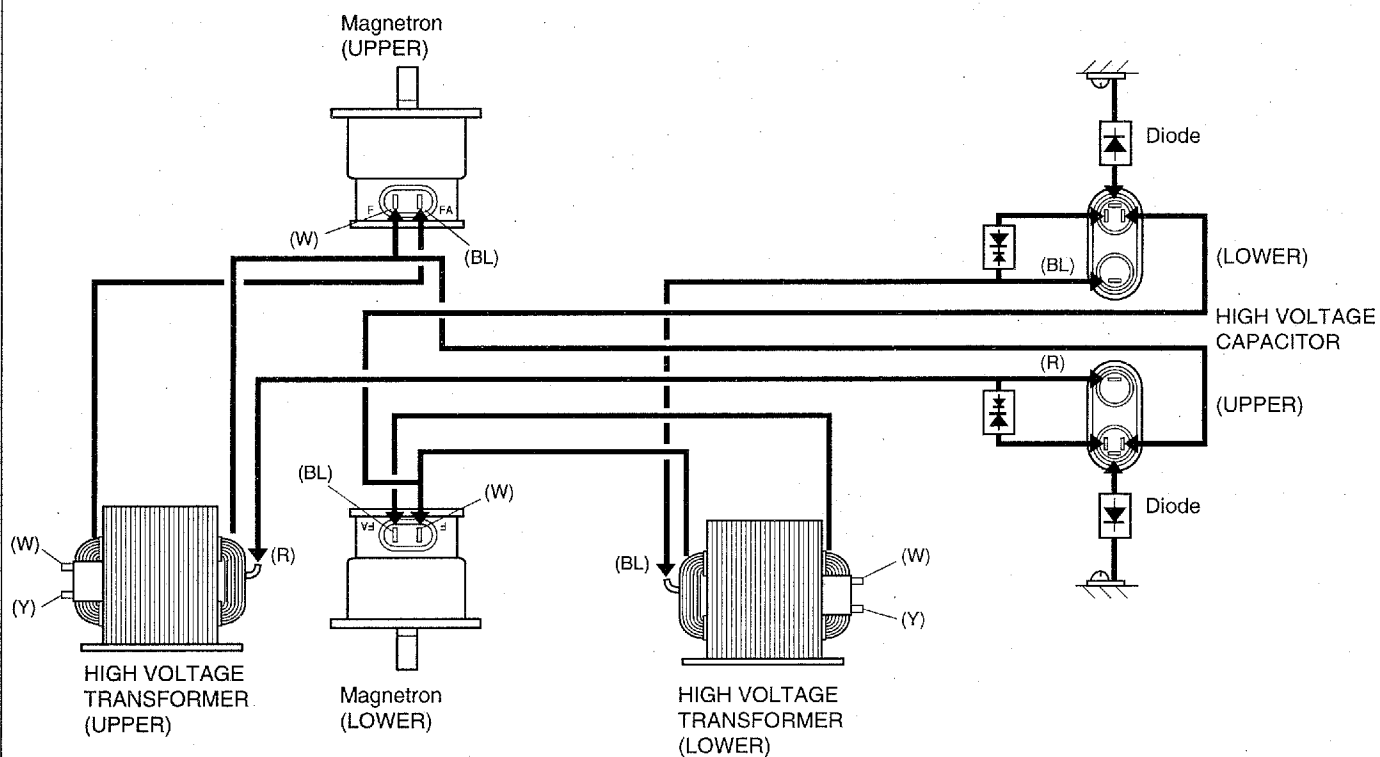


**NOTE: Door is closed.
Unit is not operated.**



WIRING DIAGRAM

NOTE: When replacing, check the lead wire colour as shown.



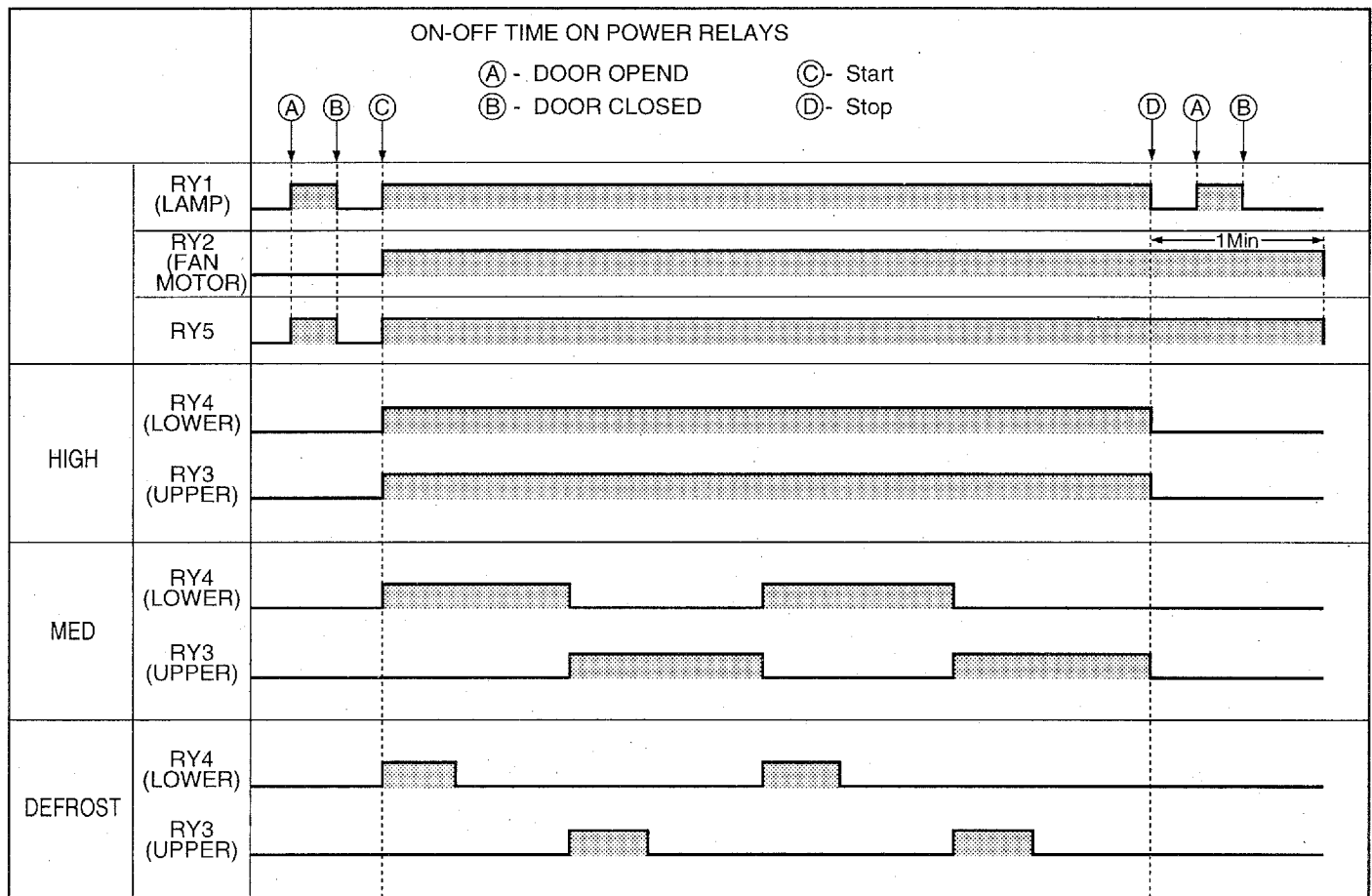
SYMBOL	COLOUR
B	BLACK
R	RED
OR	ORANGE
GR	GRAY
BR	BROWN
Y	YELLOW
BL	BLUE
W	WHITE

M021

DESCRIPTION OF OPERATING SEQUENCE

Variable power cooking control

The coil of power relay A and B are energized intermittently by the digital programmer circuit, when the oven is set to MEDIUM or DEFROST power position. The digital programmer circuit controls the ON-OFF time of the power relay A and B contacts in order to vary the output power of the microwave oven. One complete ON and OFF cycle of the power relay is 44 seconds. The relation between indications on the control panel and the output power of the microwave oven is as shown in **Figure**.



96-002M

CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

Unlike many other appliances, the microwave oven is high voltage, high current equipment. Though it is free from danger in ordinary use, extreme care should be taken during repair.

CAUTION

Servicemen should remove their watches whenever working close to or replacing the magnetron.

1. Check the earthing

Do not operate on a 2 wire extension cord. The microwave oven is designed to be used in a completely earthed condition. It is imperative, therefore, to make sure it is properly earthed before beginning repair work.

2. If the door lock, the door switch, the door seal or the door develops a malfunction, be sure not to operate the oven until complete repairs are made.

If the oven is operated with any of these parts in imperfect condition, hazardous microwave leakage might occur.

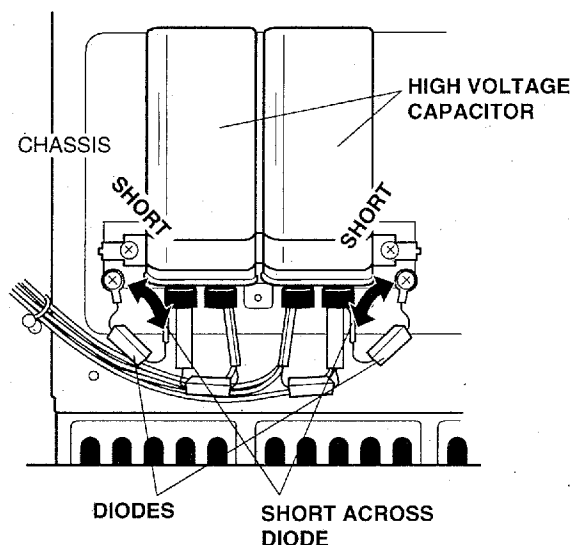
WARNING

Never operate the oven until the following are confirmed:

- (A) The door is tightly closed.
- (B) There is no broken hinge or door arm.
- (C) The door seal is not damaged.
- (D) The door is not bent or warped.
- (E) There is no other visible damage.

3. Warning about the electric charge in the high voltage capacitor.

For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitor. When replacing or checking parts, remove the power plug from the outlet, wait 30 seconds and short the terminal of the high voltage capacitor (terminal of lead wire from diode) to chassis ground with an insulated jumper lead wire or an insulated handle screwdriver to discharge.



08-037M

Discharge the 2 High Voltage Capacitors.
Touch chassis side first then short to the high voltage capacitor terminal.

Important Note

1. High voltage above 250 volts are existing on following parts during operation.

- *Magnetron
- *High Voltage Transformer
- *High Voltage Diode
- *High Voltage Capacitor

Unusual attention should be paid during repair or troubleshooting of product.

2. If the microwave oven is operated with incorrect installed door hinge or magnetron, it can cause microwave leakage of over 5mW/cm². Hence it is absolutely necessary to check if magnetron and door hinge are correctly and safely installed after repairs or replacement.

WARNING

Never touch any circuit wiring with your hand nor with an insulated tool during operation.

4. When parts must be replaced, always remove the power plug from the outlet, and discharge the high voltage capacitor.

5. Confirm after repair

- (A) After repair or replacement of parts, make sure that the screws of the oven, etc. are neither loose nor missing. Microwave might leak if screws are not properly tightened.
- (B) Make sure that all electrical connections are tight before inserting the plug into the wall outlet.

6. Avoid inserting nails, wire, etc. through holes in unit during operation.

Never insert a wire, nail or any other metal object through the lamp holes on the cavity or any other holes or gaps, because such objects may work as an antenna and cause microwave leakage.

7.

CAUTION MICROWAVE RADIATION

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 waveguides, flanges, and gasket must be secure. Never operate the device without a microwave energy absorbing load attached. Never look into an open waveguide or antenna while the device is energized.

8.

CAUTION

High voltage parts may become uncovered when outer cabinet is removed.

DISASSEMBLY AND PARTS REPLACEMENT PROCEDURE

CAUTION

Servicemen should remove their watches whenever working close to or replacing the magnetron.

1. Replacement of magnetrons (Upper and Lower)

Upper magnetron

- Discharge electric charge remaining on the high voltage capacitors.
- Remove the entire rear panel by removing screws as shown.
- Disconnect all lead wires from magnetron and thermal cutout.
- Remove the 4 screws holding magnetron.
- Remove 2 screws holding thermal cutout.
- Remove the mounting bracket from magnetron and install it on the new magnetron.

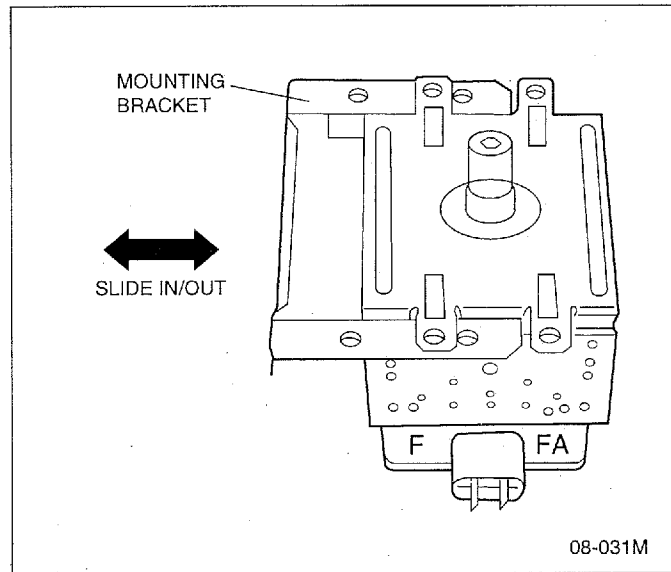
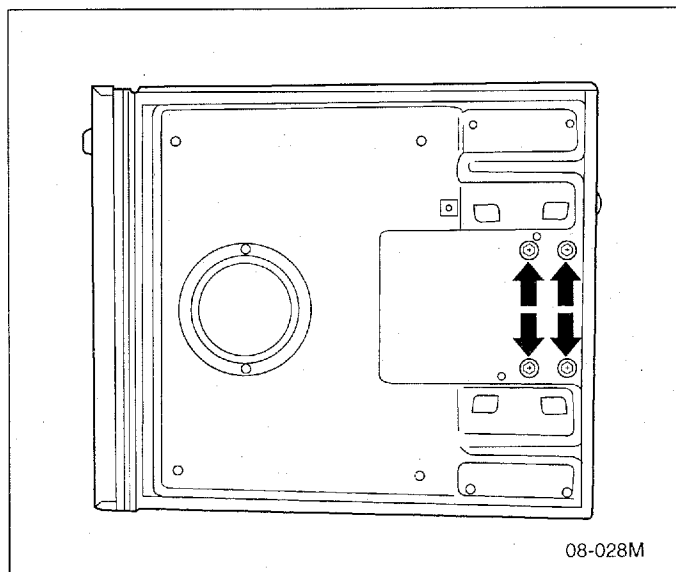
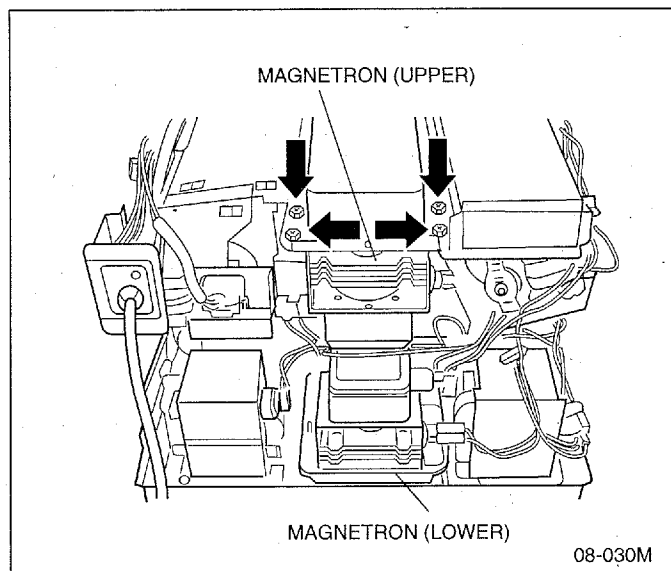
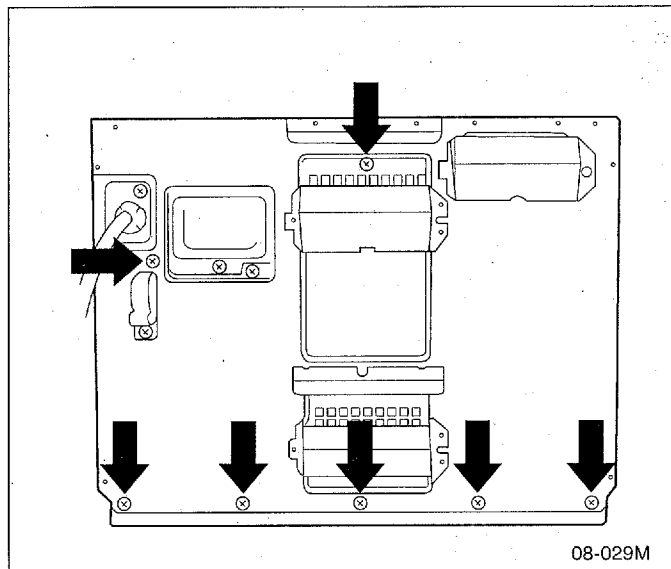
Lower magnetron

- Discharge electric charge remaining on the high voltage capacitors.
- Remove the entire rear panel by removing screws as shown.
- Carefully place the unit on its left side (H.V.Capacitor side).
- Remove the cover by removing 2 screws.
- Remove the 4 screws holding magnetron by inserting screwdriver through the 4 openings on bottom plate.
- Remove 2 screws holding thermal cutout.
- Remove the mounting bracket from magnetron and install it on the new magnetron.

NOTE: To prevent microwave leakage, tighten mounting screws properly making sure there is no gap between the waveguide and the magnetron.

CAUTION

When connecting 2 filament lead wires to the magnetron terminals, be sure to connect the lead wires in the correct position. The lead wire with blue connector should be connected to "FA terminal" and white or pink one should be connected to "F terminal".



Removal of Positive Lock connector

The positive lock connector is a specially designed loose free connector and you will find this connector in many lead wire connections. To remove this connector, pull the lead wire by pressing an extruded lever in the center of receptacle terminal as shown.

2. Replacement of power supply circuit board

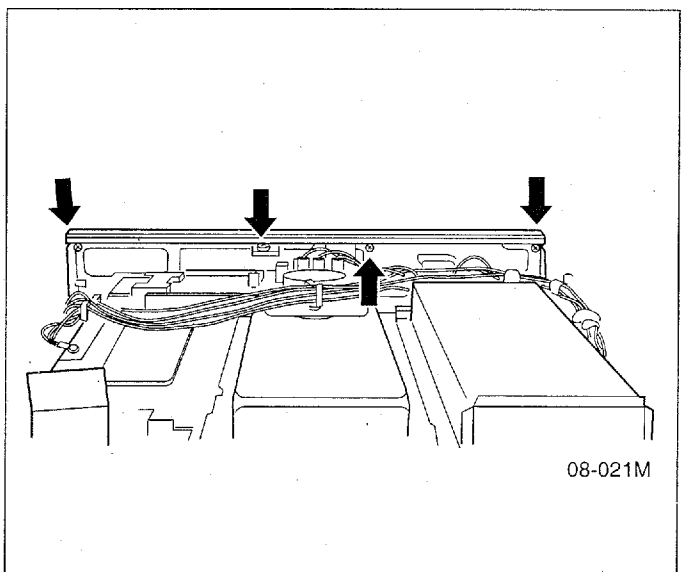
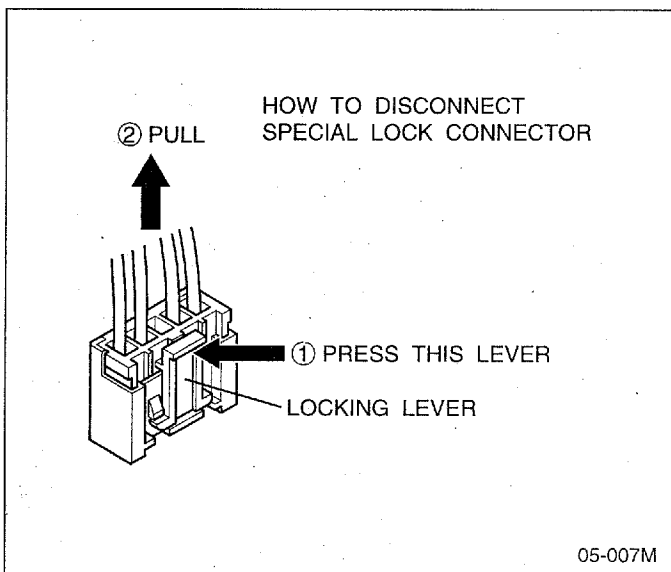
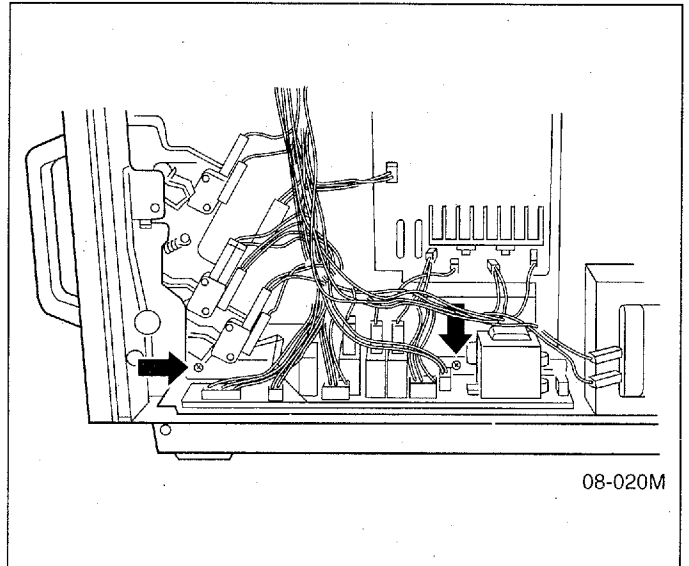
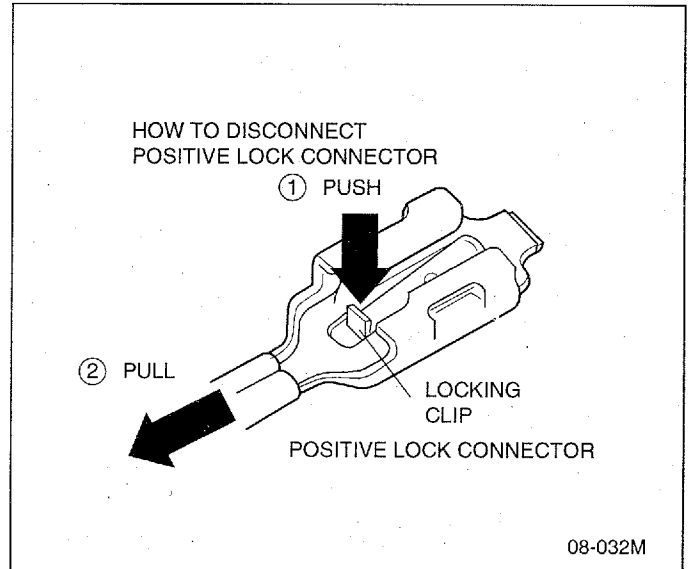
NOTE: Be sure to ground any static electric charge built up on your body, before handling the power supply P.C.B. and D.P.C..

- (A) Disconnect all lead wires from power supply circuit board.
- (B) Remove the power supply P.C.B. together with its mounting bracket by first removing the 2 bracket holding screws.
- (C) The power supply P.C.B. can be separated from mounting bracket by removing the 2 L.V.T. holding screws and unfastening the plastic clips.

3. Replacement of digital programmer circuit board

- (A) Remove grounding screw for membrane switch and D.P.C. ground.
- (B) Remove 3 screws holding control panel assembly to detach it from main unit then remove connectors.
- (C) Remove 2 screws holding the D.P.C. board and while pushing back on 2 plastic holding clips, remove the board.

NOTE: Please use care in handling the power supply P.C.B. and D.P.C. board to avoid damage.



4. Replacement of upper antenna

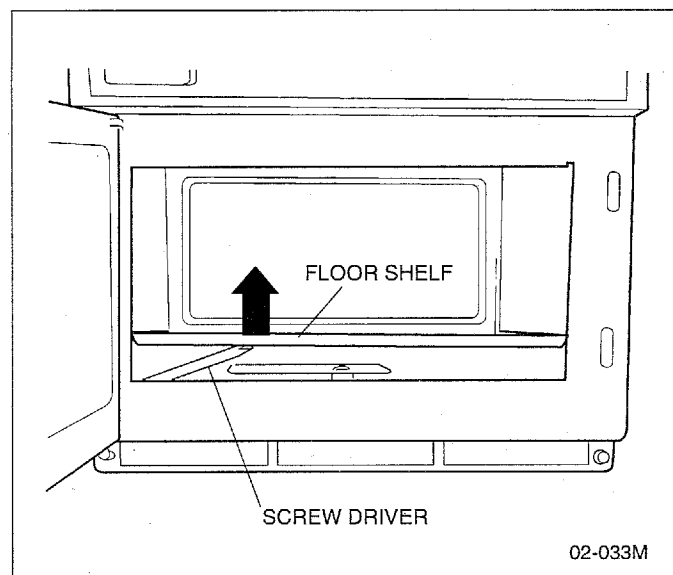
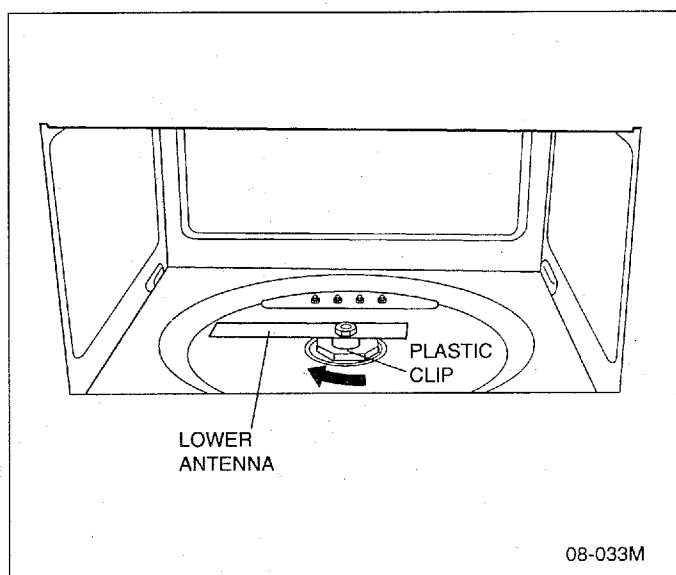
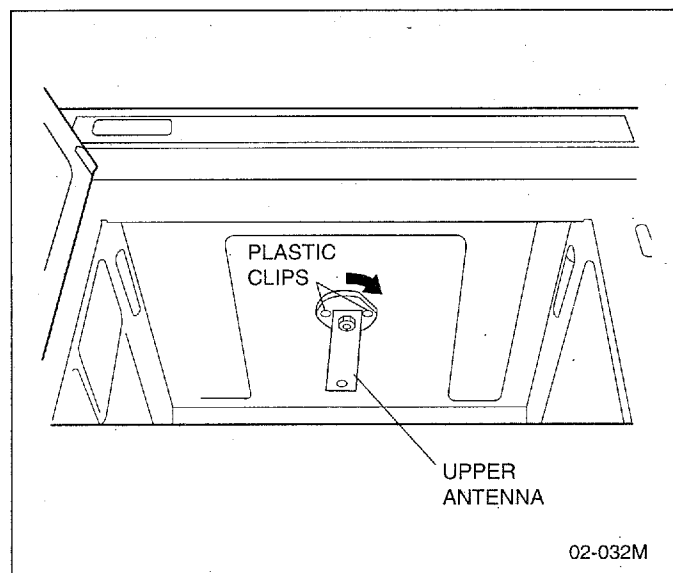
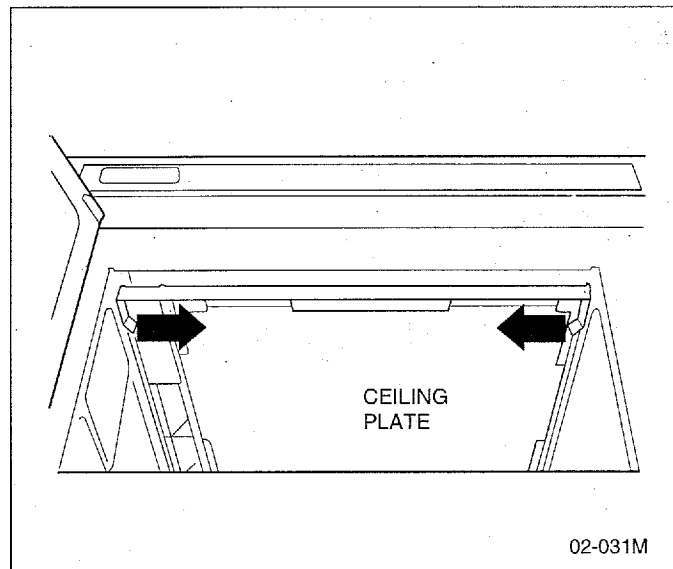
CAUTION

The upper and lower rotating antennas are different type and are not interchangeable each other. Care should be taken not to reverse the top and bottom antennas.

- (A) Remove ceiling plate by gently moving the left and right tabs inward while pulling the plate down and outward.
- (B) Using a small flat screwdriver or the like, remove two plastic clips located on the antenna ring. Next turn the antenna ring approx. 1/8 turn clockwise to unhook the tabs and pull off.

5. Replacement of floor shelf and lower antenna

- (A) To remove the floor shelf, insert a screwdriver through the small opening on the left side of the oven cavity and carefully lift the floor shelf.
- (B) For removal of lower antenna, use the same procedure as upper antenna.



6. Replacement of temperature sensor (Thermal protector)

- (A) Cut 2 lead wires at the top of sensor terminals.
- (B) Remove 2 screws holding temp sensor and replace with new one.
- (C) Solder the lead wires securely to the sensor terminals.

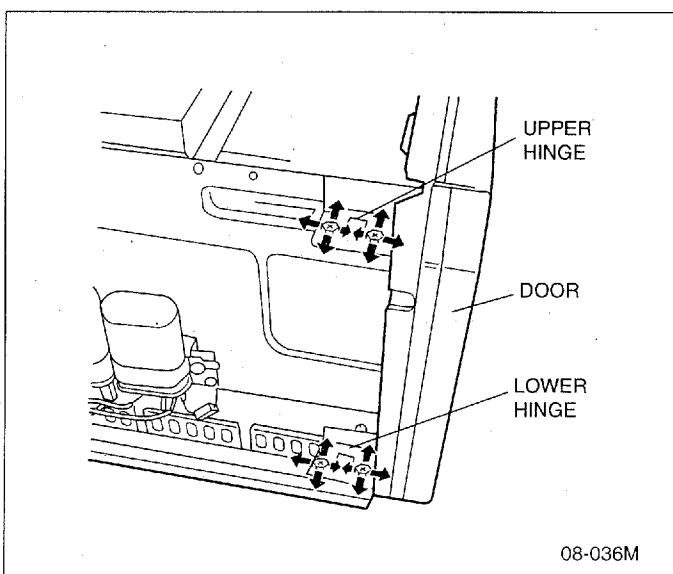
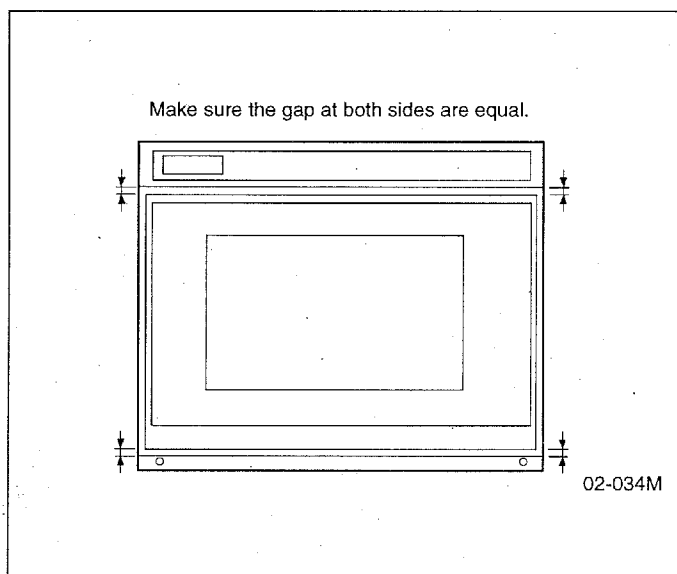
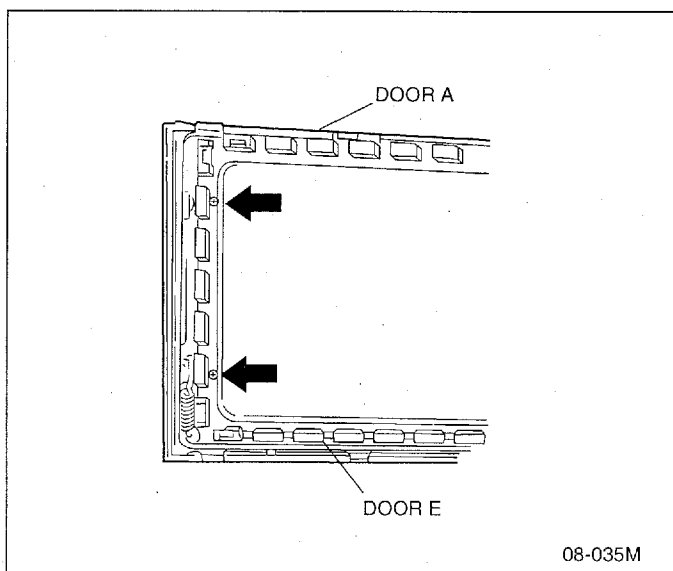
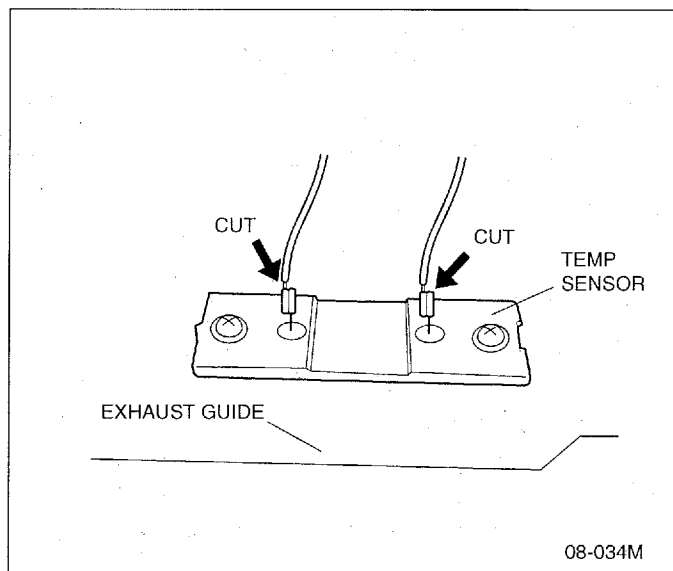
7. Disassembly of door assembly

- (A) Remove each 2 bolts holding upper and lower hinges.
- (B) Open the door and while pulling the door outward, work upper and lower hinges out through the holes of the front surface of oven.
- (C) Remove door C (choke cover) from door E by carefully pulling outward starting from the upper right hand corner.
- (D) Remove 2 screws holding door handle and separate door A from door E by carefully freeing catch hooks.
- (E) Remove door key, door key lever, door key spring and handle pins from door E.
- (F) Assemble the door by taking the above steps in a reverse order.

Replacement

- (A) When mounting the door to the oven be sure to adjust the door parallel to the bottom line of the oven face plate by moving the upper hinge and lower hinge in the direction necessary for proper alignment.
- (B) Adjust so that the door has no play between the inner door surface and oven front surface. If the door assembly is not mounted properly, microwave may leak from the clearance between the door and the oven.

NOTE: Please refer to MEASUREMENT AND ADJUSTMENT.



COMPONENT TEST PROCEDURE

CAUTION

1. High voltage is present at the high voltage terminal of the high voltage transformer during any cook cycle.
2. It is neither necessary nor advisable to attempt measurement of the high voltage.
3. Before touching any oven components, or wiring, always unplug the oven from its power source and discharge the high voltage capacitor.

1. High voltage transformer

- (A) Remove connections from the transformer terminals and check continuity.
- (B) Normal (cold) resistance readings should be as follows:

Secondary windi	Approx. 80 Ω ~ 120 Ω
Filament winding	Approx. 0 Ω
Primary winding	Approx. 0 Ω ~ 3 Ω

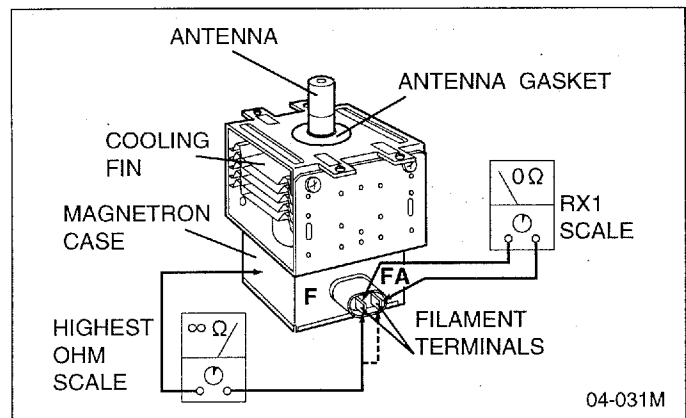
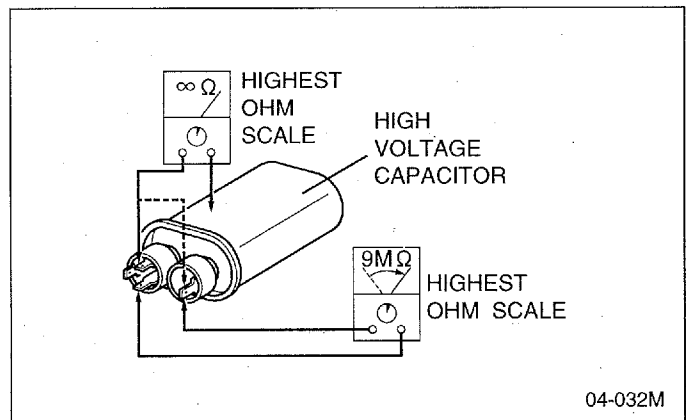
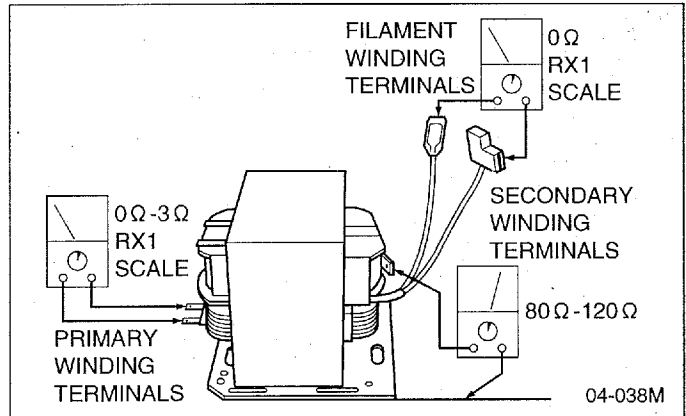
2. High voltage capacitor

- (A) Check continuity of capacitor with meter on highest OHM scale.
- (B) A normal capacitor will show continuity for a short time, and then indicate 9M Ω once the capacitor is charged.
- (C) A shorted capacitor will show continuous continuity.
- (D) An open capacitor will show constant 9M Ω .
- (E) Resistance between each terminal and chassis should be infinite.

3. Magnetron

Continuity checks can only indicate an open filament or a shorted magnetron. To diagnose for an open filament or shorted magnetron.

- (A) Isolate magnetron from the circuit by disconnecting the leads.
- (B) A continuity check across magnetron filament terminals should indicate one ohm or less.
- (C) A continuity check between each filament terminal and magnetron case should read open.



4. Diode

- (A) Isolate the diode from the circuit by disconnecting the leads.
- (B) With the ohmmeter set on the highest resistance scale, measure the resistance across the diode terminals. Reverse the meter leads and again observe the resistance reading. Meter with 6V, 9V or higher voltage batteries should be used to check the front-to-back resistance of the diode, otherwise an infinite resistance may be read in both directions.
- A normal diode's resistance will be infinite in one direction and several hundred k Ω in the other direction.

5. Membrane key board (Membrane switch assembly)

Check continuity between switch terminals, by tapping an appropriate pad on the key board. The contacts assignment of the respective pads on the key board is as shown in digital programmer circuit.

6. Protector diode

- (A) Isolate the protector diode assembly from the circuit by disconnecting its leads.
- (B) With the ohmmeter set on the highest resistance scale, measure the resistance across the protector diode terminals. Reverse the meter leads and again observe the resistance reading. A normal protector diode's resistance will be infinite in both directions.
- It is faulty if it shows continuity in one or both directions.

7. Temp sensor (Thermal protector)

A temp sensor is mounted on exhaust guide. Its purpose is to automatically shut off the oven in case the cavity overheats for any reason.

The thermal protector will operate at 257°F (125°C).

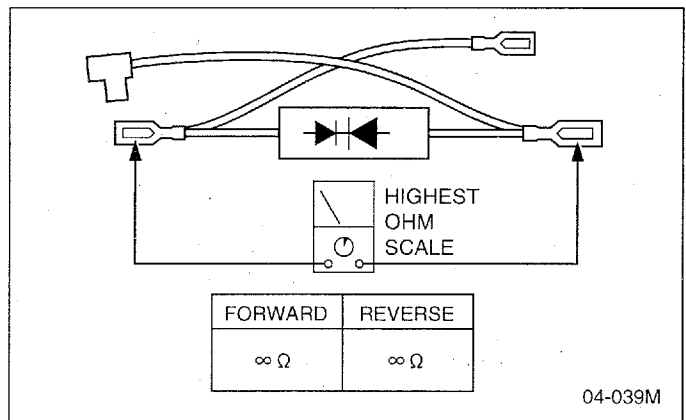
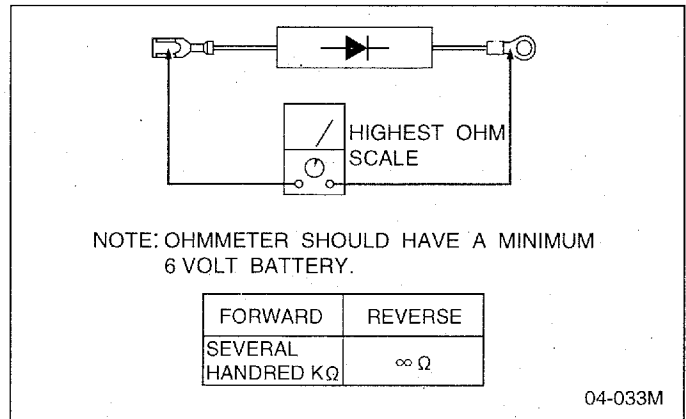
The device is connected to the DPC on touch control models.

When the thermal protector exceeds its temperature it will turn off the power to oven cavity and display will go to reset mode.

The cooking program can be reset after cool-down.

THERMISTOR RESISTANCE VALUE

30K-120K at 10°C-30°C (50°F-86°F)



MEASUREMENTS AND ADJUSTMENTS

1. Adjustment of Safety switch A, Safety switch B and short switch

(A) When mounting Safety switch A, Safety switch B and short switch to door hook assembly, mount the Safety switch A, Safety switch B and the short switch to the door hook assembly as shown in table.

NOTE: No specific adjustment during installation of Safety switch A, Safety switch B and short switch to the door hook is necessary.

(B) When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of arrow in table so that the oven door will not have any play in it. Check for play in the door by pulling the door assembly. Make sure that the latch keys move smoothly after adjustment is completed. Completely tighten the screws holding the door hook assembly to the oven assembly.

(C) Reconnect the short switch and check the continuity of the monitor circuit and all latch switches again by following the components test procedures.

2. Measurement of microwave output

The output power of magnetron can be determined by performing IEC standard test procedures. However, due to the complexity of IEC test procedures, it is recommended to test the magnetron using the simple method outlined below.

Necessary Equipment:

- * 1 liter beaker
- * Glass thermometer
- * Wrist watch or stopwatch

NOTE: Check the line voltage under load. Low voltage will lower the magnetron output. Take the temperature readings and heating time as accurate as possible.

- (A) Fill the beaker with exactly one liter of tap water. Stir the water using the thermometer and record the beaker's temperature (recorded as T1).
- (B) Place the beaker on the center of glass cook plate. Set the oven for High power and heat it for exactly one minute.
- (C) Stir the water again and read the temperature of the beaker (recorded as T2).
- (D) The normal temperature rise (T2-T1) at High power position for each model is as shown in table.

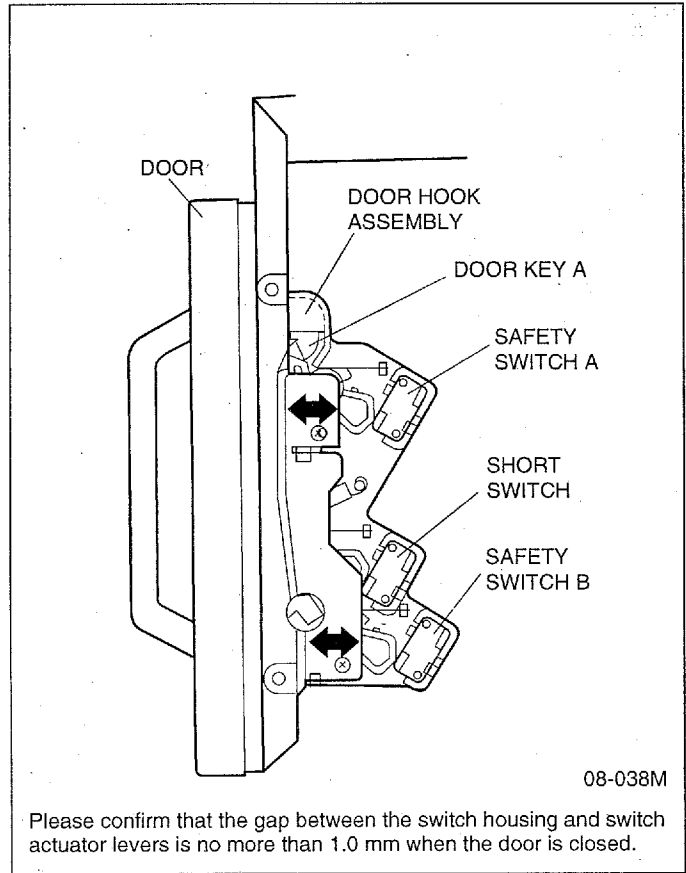



TABLE (1 l -1min. test)

RATED OUTPUT	TEMPERATURE RISE
1400W (IEC-705)	Min. 12.5°C
1600W (IEC-705)	Min. 14.5°C
1800W (IEC-705)	Min. 16.0°C

TROUBLESHOOTING GUIDE

CAUTION

1. Check grounding before checking for trouble.
2. Be careful of the high voltage circuit.
3. Discharge high voltage capacitor.
4. When checking the continuity of the switches or the high voltage transformer, disconnect one lead wire from these parts and then check continuity with the AC plug removed. To do otherwise may result in a false reading or damage to your meter.
When disconnecting a plastic connector from a terminal, you must hold the plastic connector instead of the lead wire and then disconnect it, otherwise lead wire may be open or the connector cannot be removed.
5. Be sure to ground any static electric charge built up in your body, before handling the D.P.C.
6. A 230-240V AC is present at the shaded area  of the power supply circuit board (Terminals of power relays and primary circuit of low voltage transformer). When troubleshooting, be cautious of possible electrical shock hazard.

First of all operate the microwave oven following the correct operating procedures described on pages 3 of this service manual in order to find the exact cause of any trouble.

NOTE: If the unit shows faulty symptom as shown below, check the parts listed in possible cause column depending on failure indication e.g. F81, F82 in the display.

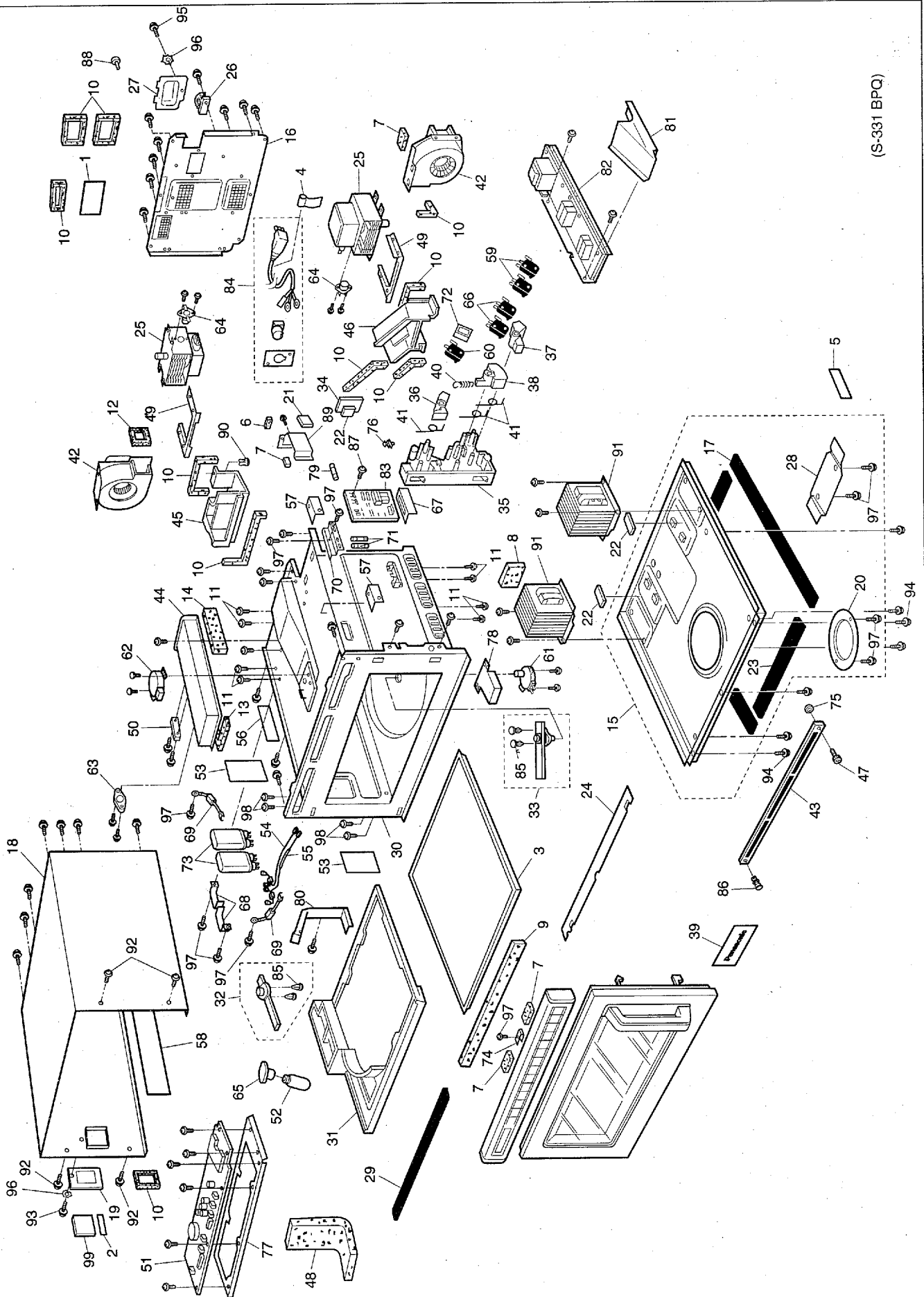
[TROUBLE 1] Oven does not operate at all or oven does not start cooking.

DISPLAY	CONDITIONS	POSSIBLE CAUSE	TIMING OF FAILURE INDICATION
F33	Open temperature sensor (exhaust)	1.Temperature sensor failure 2.Digital programmer circuit failure 3.Loose connector CN4	It is appeared when failure occurred.
F34	Short temperature sensor (exhaust)	1.Temperature sensor failure 2.Digital programmer circuit failure	It is appeared when failure occurred.
F44		1.Shorted power select switch 2.Shorted membrane switch	It is appeared 2 minuted after failure occurred.
F01 (With continuous beep sounds)	Exhaust temperature exceeds 120°C	1.Burning food in the oven due to over cook	It is appeared when exhaust temperature exceeds above 120°C
F05	Memory failure	1.Digital programmer circuit failure	
No display	1.25A fuse blown	1.Switch failure SW4, SW5, SW6, SW7 2.Low-Voltage transformer failure	
No display	1.25A fuse is OK	1.Switch failure SW1, SW2, SW3 2.Low voltage transformer failure 3.Digital programmer circuit failure	
F81	No voltage supply to high voltage transformer (upper)	1.Relay failure RY-3 2.10A fuse open 3.Digital programmer circuit failure	It is appeared when cooking is completed.
F82	No voltage supply to high voltage transformer (lower)	1.Relay failure RY-4 2.10A fuse open 3.Digital programmer circuit failure	It is appeared when cooking is completed.
F86	Shorted contacts of RY-3	1.Relay failure RY-3 2.Digital programmer circuit failure	It is appeared when failure occurred.
F87	Shorted contacts of RY-4	1.Relay failure RY-4 2.Digital programmer circuit failure	It is appeared when failure occurred.

EXPLODED VIEW AND PARTS LIST

(S-331 BPQ)

EXPLODED VIEW



PARTS LIST

NOTE : When ordering replacement part(s), please use part number(s) shown in this parts list.

Do not use description of the part.

: Important safety notice:

Components identified by ⚠ mark have special characteristics important for safety.

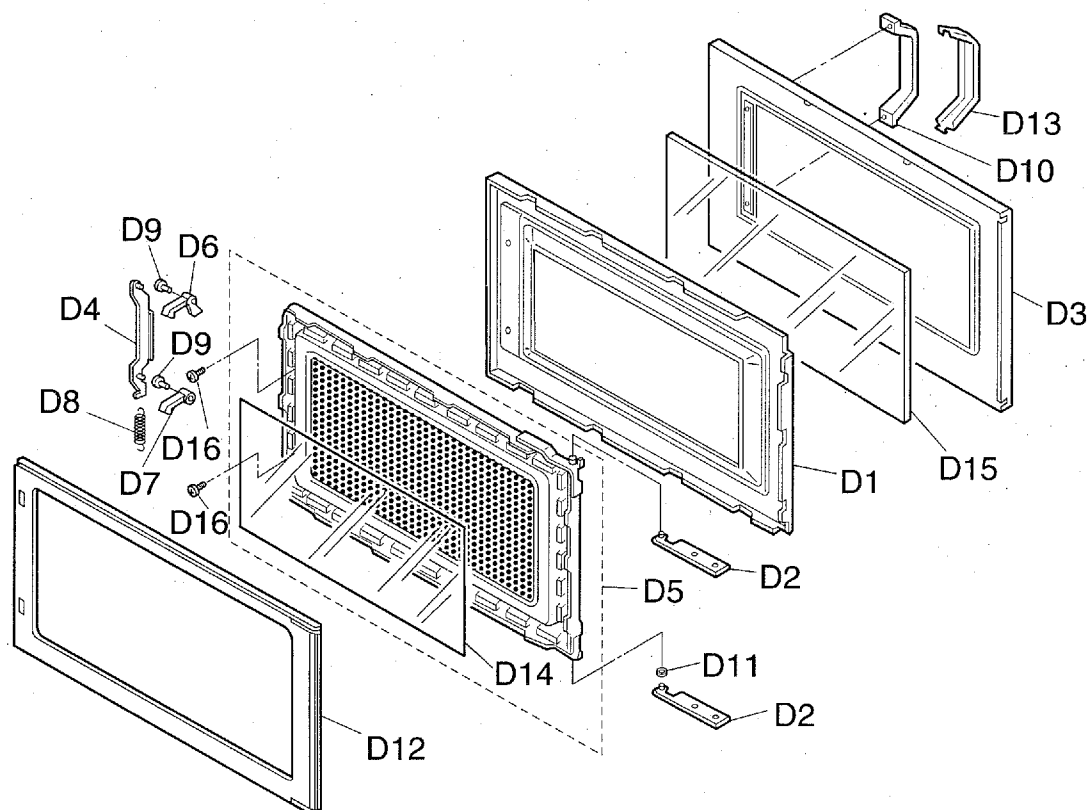
When replacing any of these components, use only manufacturer's specified parts.

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
1	A00064080BP	CAUTION LABEL	1	
2	ANE0072Z70GP	CAUTION LABEL	1	
3	ANE010T8U0AP	SHELF	1	
4	A02396000BP	CORD LABEL	1	
5	A05243320BP	NAME PLATE	1	NE-1446
5	A05243310BP	NAME PLATE	1	NE-1456
5	A05243340BP	NAME PLATE	1	NE-1846
5	A05243330BP	NAME PLATE	1	NE-1856
6	ANE0901000CD	CUSHION RUBBER A	1	
7	ANE000Z000AD	CUSHION RUBBER A	4	NE-1456,NE-1856
7	ANE000Z000AD	CUSHION RUBBER A	3	NE-1446,NE-1846
8	ANE0911000MG	CUSHION RUBBER B	1	
9	A8251-3180	SPACER	1	
10	ANE000Z000AA	CUSHION RUBBER C	10	
11	XYEANE5+C16T	SCREW	8	5X16 (FOR MAGNETRON)
12	ANE000Z000AB	CUSHION RUBBER C	1	
13	ANE0962000AP	CUSHION RUBBER D	1	
14	ANE0962000AV	CUSHION RUBBER D	1	
15	A100A3310BP	BASE	1	(NOTE 1)
16	A100Q-3280	BACK PANEL	1	
17	ANE10088U0AP	RUBBER FOOT	3	
18	ANE10098U0AP	CABINET BODY	1	
19	ANE10268U0AP	LAMP COVER	1	
20	ANE10288U0AP	ANTENNA MOTOR COVER	1	
21	ANE10498U0AP	CUSHION RUBBER	1	
22	ANE1062-8U0	CUSHION RUBBER B	3	
23	ANE10948U0AP	RUBBER FOOT B	1	
24	ANE11268U0AP	BASE BRACKET	1	
25	⚠ 2M210-M1ECOM	MAGNETRON	2	
26	ANE11408A0AG	STOPPER	1	
27	ANE11548U0AP	BACK PANEL COVER	1	
28	ANE11668U0AP	BASE METAL	1	
29	ANE11748U0AP	SPACER	1	
30	A200A-3280	OVEN	1	
31	A2011-3470	CEILING PLATE	1	
32	A202K-3280	ANTENNA (U)	1	UPPER
33	A202R3320GP	ANTENNA B (U)	1	LOWER
34	ANE21208U0AP	SPACER	1	
35	A3020-3470	DOOR HOOK	1	
36	A3136-3470	HOOK SPACER A	1	
37	A3137-3470	HOOK SPACER B	1	
38	A3138-3470	HOOK SPACER C	1	
39	A31863320GP	DOOR PANEL	1	NE-1446
39	A31863310BP	DOOR PANEL	1	NE-1456
39	A31863340GP	DOOR PANEL	1	NE-1846
39	A31863330GP	DOOR PANEL	1	NE-1856
40	ANE32398U0AP	SPRING	1	
41	ANE32628U0AP	SPRING	3	
42	⚠ A400A3310GP	FAN MOTOR	2	(55W)
43	A400B-3280	AIR FILTER FLAME	1	
44	A400K-3180	EXHAUST GUIDE	1	
45	ANE40258U0AP	AIR GUIDE A	1	UPPER
46	ANE40268U0AP	AIR GUIDE B	1	LOWER
47	A4091-3280	SCREW	1	(FOR AIR FILTER FRAME)

Ref. No.		Part No.	Part Name & Description	Pcs/ Set	Remarks
48		ANE41038U0AP	AIR GUIDE CUSHION B	1	
49		ANE50328U0AP	MAGNETRON BRACKET	2	
50	⚠	A601L5150AP	TEMP SENSOR	1	
51	⚠	A603L3320GP	D.P.CIRCUIT (U)	1	NE-1446,NE-1846RTL (W/COMPONENT)
51	⚠	A603L3310GP	D.P.CIRCUIT (U)	1	NE-1456,NE-1856 RTL (W/COMPONENT)
52		ANE6030Q50GN	INCANDESCENT LAMP	1	(240V,25W)
53		ANE60408U0AP	OVEN LAMP SHEET	2	
54		A606V-3280	PROTECTOR DIODE	1	(CONNECTOR COLOR:RED)
55		A606W-3280	PROTECTOR DIODE B	1	(CONNECTOR COLOR:BLUE)
56		ANE60708U0BP	INSULATION SHEET A	1	
57		A6070-3280	INSULATION SHEET A	2	
58		A6071-3280	INSULATION SHEET B	1	
59	⚠	ANE6142-F60	MICROSWITCH	2	(V-15G-3C26) SECONDARY LATCH SWITCH
60	⚠	ANE61424L0AG	MICROSWITCH	1	(V-16G-3C26) PRIMARY LATCH SWITCH
61	⚠	A6144-3280	ANTENNA MOTOR	1	LOWER (2.5W)
62	⚠	A61446030AP	ANTENNA MOTOR	1	UPPER (2.5W)
63	⚠	A61454000AP	THERMAL CUTOUT	1	(FOR OVEN)
64	⚠	A61454210AP	THERMAL CUTOUT	2	(FOR MAGNETRON)
65	⚠	ANE61522Q0BP	SOCKET	1	
66		ANE6161-3X0	MICRO SWITCH	2	(V-16G-1C25) SHORT SWITCH
67		A6170-3280	INSULATION SHEET C	1	
68		ANE61888U0AP	CAPACITOR BRACKET	2	
69		A62024000AP	DIODE,SI	2	
70		ANE62298U0AP	MOUNTING BRACKET	1	
71	⚠	A62304210BP	FUSE	2	(10A)
72		ANE6238X20AP	SPACER	1	
73	⚠	A63903310GP	H.V.CAPACITOR	2	NE-1446,NE-1456 (AC2300V,0.82MF)
73	⚠	A63903330GP	H.V.CAPACITOR	2	NE-1846,NE-1856 (AC2300V,1MF)
74		ANE64086Q0AP	WASHER	1	NE-1456,NE-1856
75		A6408-3280	WASHER	1	(FOR AIR FILTER FRAME)
76		ANE65448U0AP	SPACER A	1	
77		A6585-3280	P.C.B.HOLDER	1	
78		A65943030GP	MOTOR COVER	1	
79	⚠	A65953170GP	FUSE	1	(1.25A)
80		ANE66038U0BP	OVEN LAMP BRACKET	1	
81		A6688-3180	COVER	1	
82	⚠	A692M3310GP	L.V.TRANSFORMER (U)	1	
83	⚠	A692Y3310GP	NOISE FILTER (U)	1	
84	⚠	A910A3310BP	AC CORD W/PLUG (U)	1	(240V)
85		ANE900T8V0AP	CLIP	2	(FOR ANTENNA (U), ANTENNA B (U))
86		ANE90828U0AP	CLIP (BLACK)	1	(FOR AIR FILTER FRAME)
87		XYN40F10BN	SCREW	1	4X10 (FOR NOISE FILTER (U))
88		ANE91438U0AP	CLIP (GRAY)	1	(FOR BACK PANEL)
89		ANE91448U0AP	BRACKET	1	
90		ANE91628U0AP	CLIP B	1	(FOR AIR GUIDE A)
91		J600B3310GP	H.V.TRANSFORMER	2	(1.5KVA)
92		XTC4+10BC	SCREW	4	4X10 (FOR CABINET BODY)
93		XTC4+10FC	SCREW	1	4X10 (FOR LAMP COVER)
94		XTC4+12BK	SCREW (BLACK)	2	4X12 (FOR BASE)
95		XTT4+8E	SCREW	1	4X8 (FOR BACK PANEL COVER)
96		XWC4BPN	WASHER	2	(FOR BACK PANEL COVER, LAMP COVER)
97		XYD4+EE12F	SCREW	10	NE-1446, NE-1846 (4X12) FOR MOUNTING BRACKET, DIODE, CAPACITOR BRACKET, AC CORD W/PLUG, ANTENNA MOTOR COVER, BASE METAL
97		XYD4+EE12F	SCREW	11	NE-1456, NE-1856 (4X12) FOR MOUNTING BRACKET, DIODE, CAPACITOR BRACKET, AC CORD W/PLUG, ANTENNA MOTOR COVER, BASE METAL, WASHER
98		XSWANE5+10U	SCREW	4	5X10 (FOR HINGE)
99		A10923310GP	INTERRUPTION COVER B	1	

NOTE 1 : Please order name plate together.

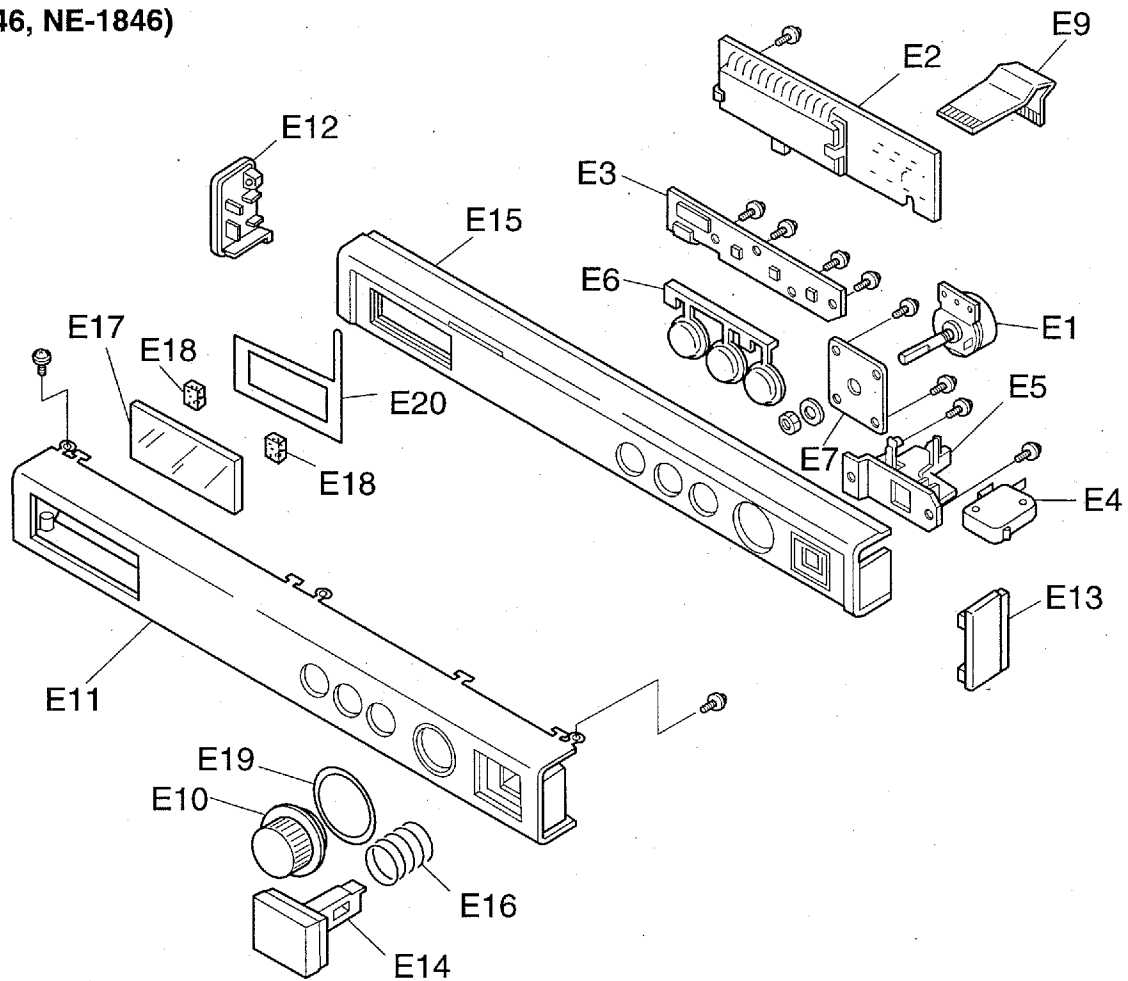
DOOR ASSEMBLY



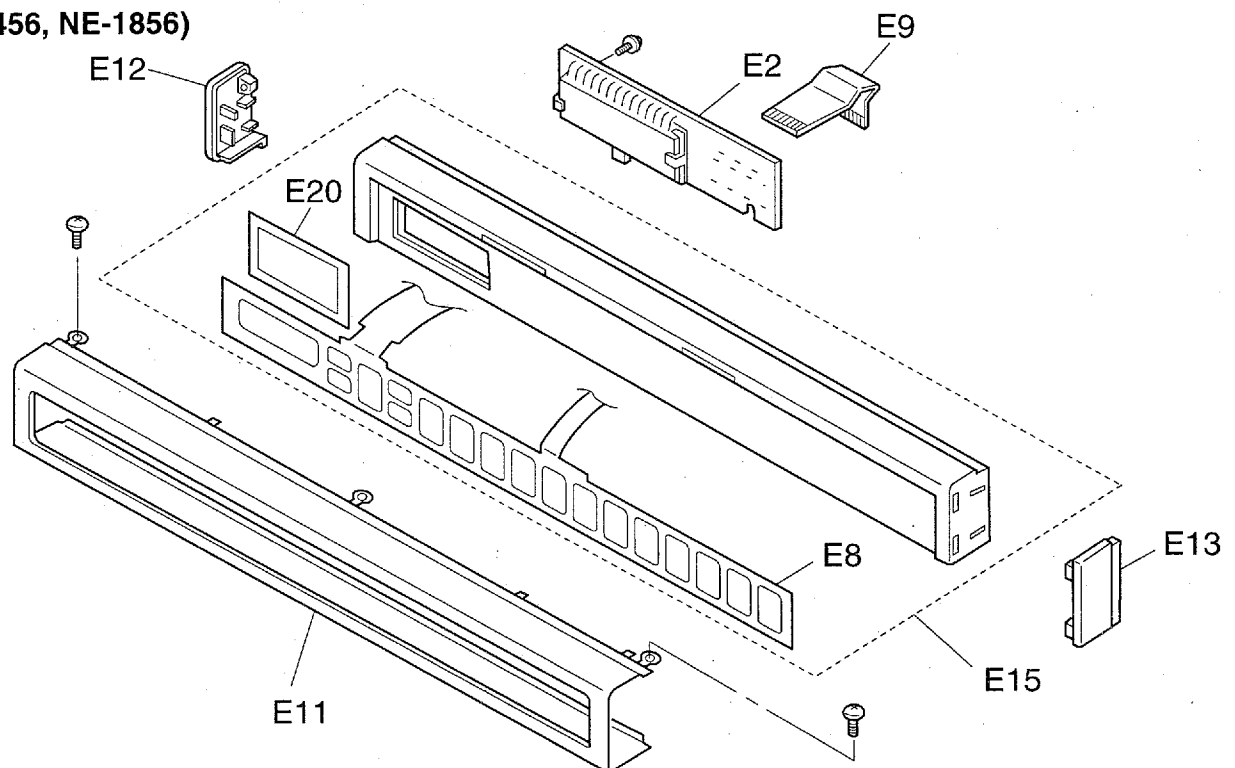
(S-331 BPQ)

Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
D1	ANE30038U0AP	DOOR FRAME (U)	1	
D2	ANE30078U0AP	HINGE	2	
D3	ANE301A8U0AP	DOOR A	1	
D4	ANE301H8U0AP	DOOR KEY LEVER B	1	
D5	ANE301Q8U0AP	DOOR E (U)	1	
D6	ANE30188U0AP	DOOR KEY	1	
D7	ANE30198U0AP	DOOR KEY B	1	
D8	ANE30218U0AP	DOOR KEY SPRING	1	
D9	ANE30562Q0AP	HANDLE PIN	2	
D10	A30703170GP	HANDLE PEICE A	1	
D11	ANE3081P60AP	DOOR HINGE SPACER	1	
D12	ANE30858U0AP	DOOR C	1	
D13	ANE31348U0AP	HANDLE PEICE B	1	
D14	ANE31458U0AP	DOOR SCREEN A	1	
D15	ANE31468U0AP	DOOR SCREEN B	1	
D16	XYEANE4+C16T	SCREW	2	4X16 (FOR DOOR E)

ESCUTCHEON BASE ASSEMBLY
(NE-1446, NE-1846)

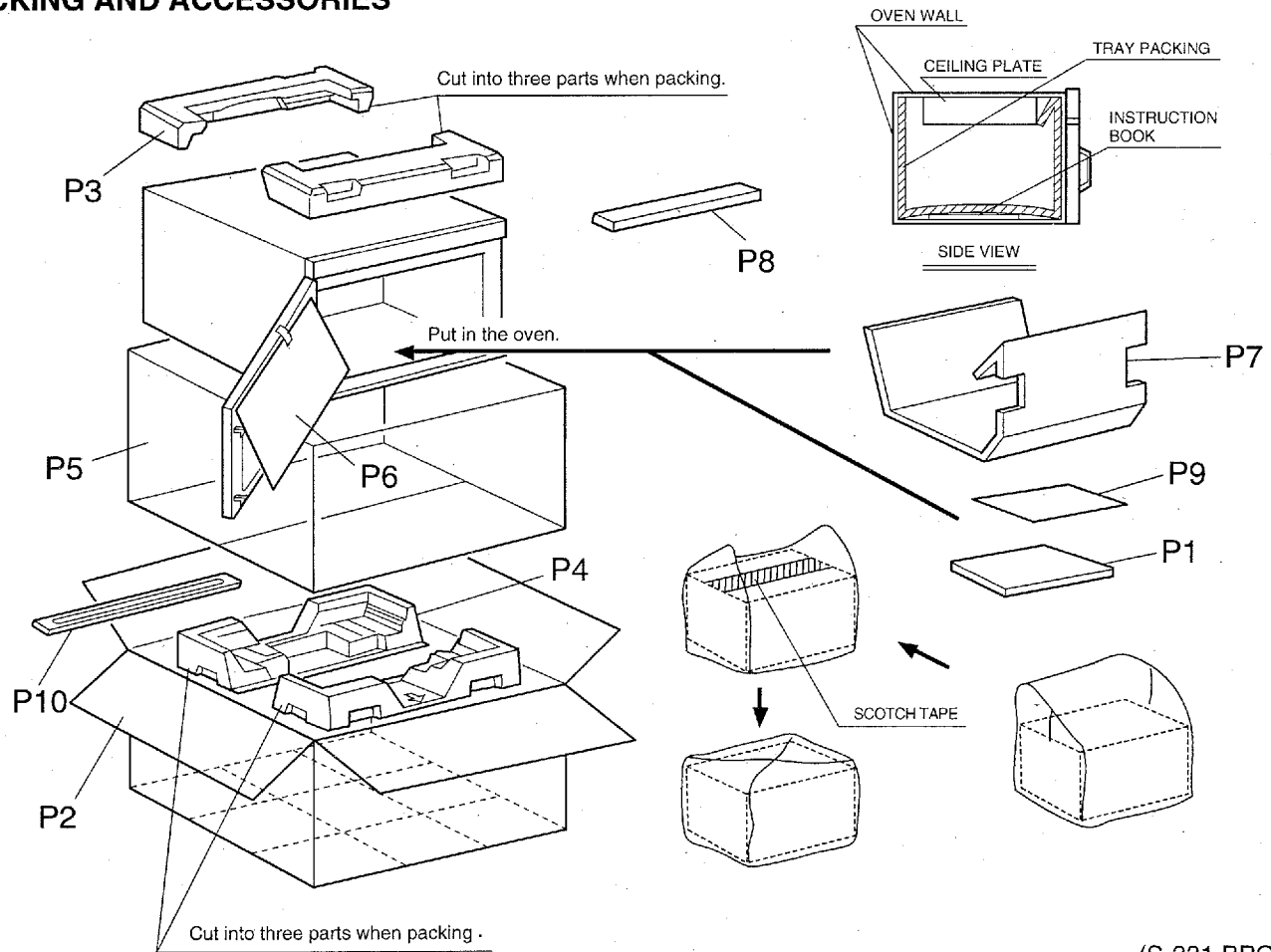


(NE-1456, NE-1856)



Ref. No.		Part No.	Part Name & Description	Pcs/ Set	Remarks
E1		A03553320GP	TIMER	1	NE-1446,NE-1846
E2		A603M3310GP	PC BOARD B (U)	1	
E3		ANE605Q8Y0BP	PC BOARD F (U)	1	NE-1446,NE-1846
E4	⚠	ANE61424L0AG	MICROSWITCH	1	NE-1446,NE-1846 (V-16G-3C26)
E5		ANE61628Y0BP	START SWITCH BRACKET	1	NE-1446,NE-1846
E6		ANE62648Y0BP	SELECT SWITCH BUTTON	1	NE-1446,NE-1846
E7		ANE63438Y0BP	TIMER BRACKET	1	NE-1446,NE-1846
E8	⚠	A64793310GP	MEMBRANE SWITCH	1	NE-1456,NE-1856
E9		A6590-3280	FLAT CABLE	1	
E10		ANE800D8Y0BP	TIMER KNOB	1	NE-1446,NE-1846
E11		ANE801N8Y0BP	ESCUTCHEON A (U)	1	NE-1446,NE-1846
E11		ANE801N8U0AP	ESCUTCHEON A (U)	1	NE-1456,NE-1856
E12		ANE80028U0AP	ESCUTCHEON B	1	
E13		ANE80068U0AP	ESCUTCHEON D	1	
E14		ANE803X8Y0BP	START BUTTON	1	NE-1446,NE-1846
E15		ANE80348Y0BP	ESCUTCHEON BASE	1	NE-1446,NE-1846
E15		A800D3310GP	ESCUTCHEON BASE (U)	1	NE-1456,NE-1856
E16		ANE80378Y0BP	COOK BUTTON SPRING	1	NE-1446,NE-1846
E17		A81263320GP	SMOKE PANEL	1	NE-1446,NE-1846
E18		ANE0921000BA	CUSHION RUBBER C	1	NE-1446,NE-1846
E19		ANE82878Y0BP	SPACER A	1	NE-1446,NE-1846
E20		A83373320GP	ESCUTCHEON SHEET	1	NE-1446,NE-1846
E20		A8337-3280	ESCUTCHEON SHEET	1	NE-1456,NE-1856

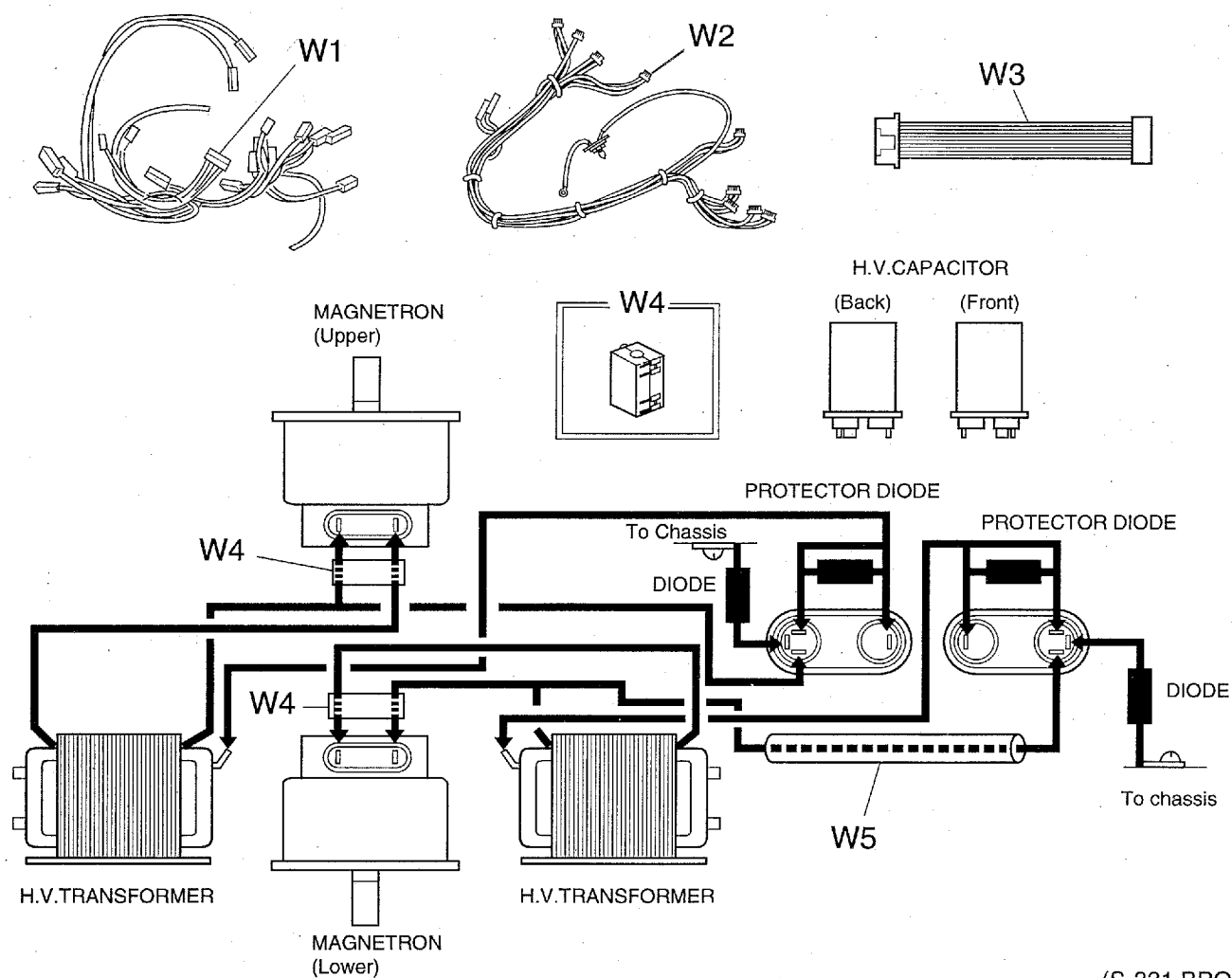
PACKING AND ACCESSORIES



(S-331 BPQ)

Ref. No.	Part No.	Part Name & Description	Pcs/Set	Remarks
P1	A00033320BP	INSTRUCTION BOOK	1	NE-1446,NE-1846
P1	A00033310BP	INSTRUCTION BOOK	1	NE-1456,NE-1856
P2	A01023320BP	PACKING CASE,PAPER	1	NE-1446
P2	A01023310BP	PACKING CASE,PAPER	1	NE-1456
P2	A01023340BP	PACKING CASE,PAPER	1	NE-1846
P2	A01023330BP	PACKING CASE,PAPER	1	NE-1856
P3	ANE01048U0AP	UPPER FILLER	1	
P4	ANE01058U0AP	LOWER FILLER	1	
P5	A01065200AP	VINYL COVER	1	
P6	ANE01072Q0AP	DOOR SHEET	1	
P7	A01083310GP	TRAY PACKING	1	
P8	A01453230BP	DOOR SHEET B	1	
P9	A04203310BP	OPERATING GUIDE	1	NE-1456,NE-1856
P10	A1134-3280	FOOT BRACKET	1	

WIRING MATERIAL



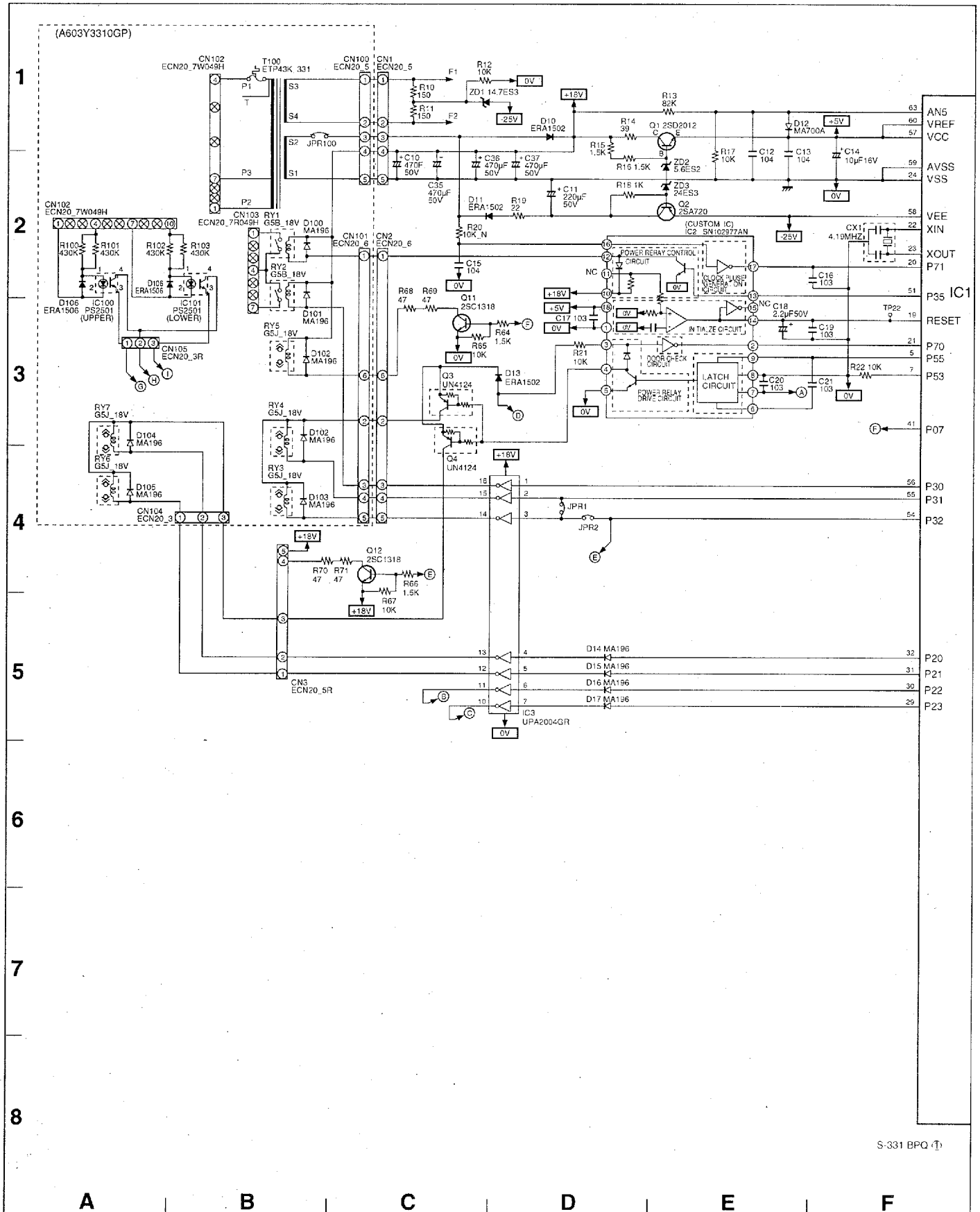
(S-331 BPQ)

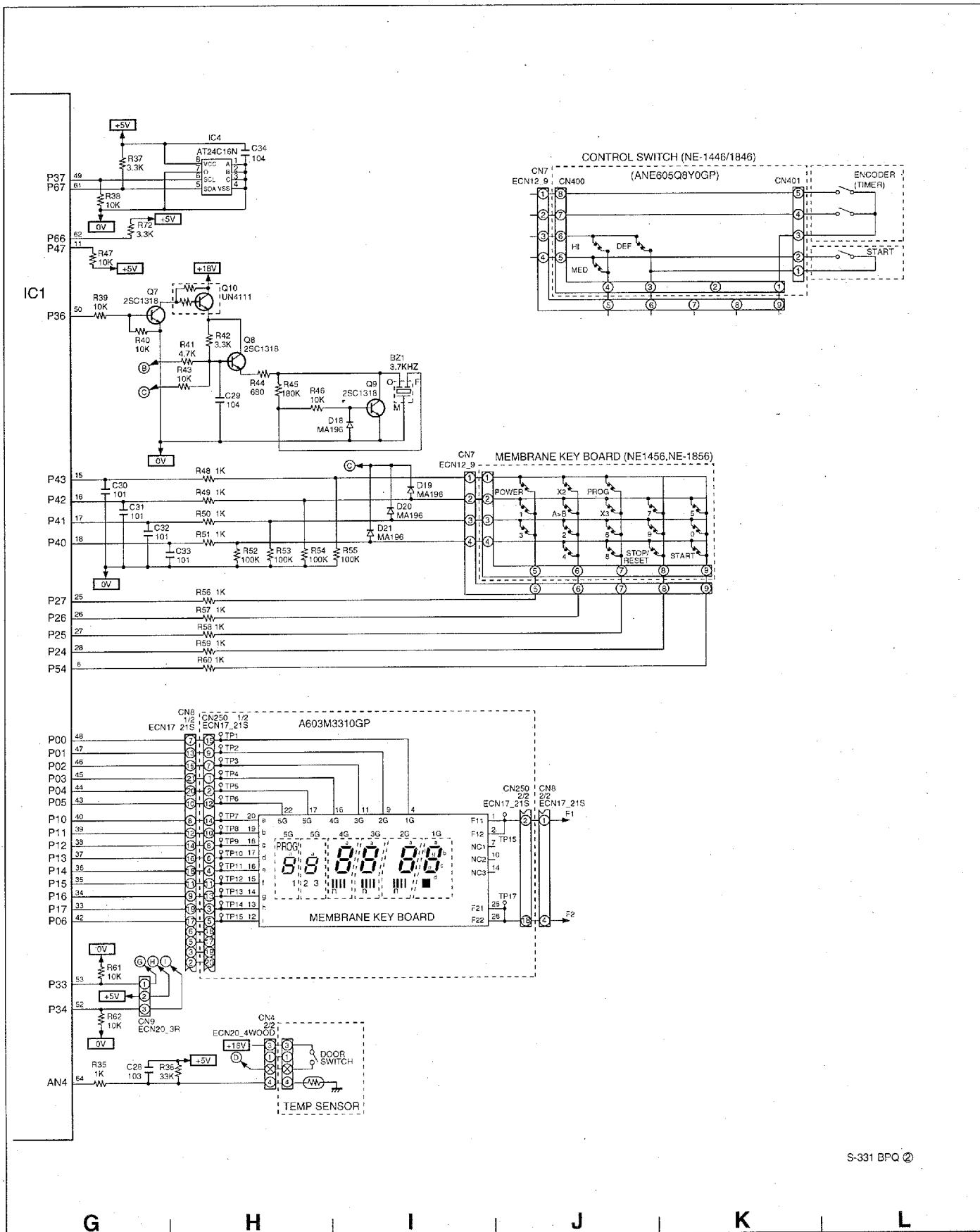
Ref. No.	Part No.	Part Name & Description	Pcs/ Set	Remarks
W1	A030A3310GP	LEAD WIRE HARNESS	1	
W2	A030H3310GP	LEAD WIRE HARNESS	1	
W3	A03543320GP	LEAD WIRE	1	NE-1446, NE-1846
W4	A50966520UP	FERRITE CORE	2	
W5	A61393230BP	INSULATION TUBE	1	

Ref. No.		Part No.	Part Name & Description	Pcs/ Set	Remarks
REF NO. 83 NOISE FILTER (U)					
C1		ECQE2A474MWA	POLYESTER CAPACITOR	1	(0.47MF,250V,±20%)
C2,3		ANE6169A20GN	CAPACITOR	2	(0.022MF,250V,±20%)
CN10		AEEMMD00703W	CONNECTOR	1	3PIN
D1		ERZC10DK621F	VARISTOR	1	
D2,3		ERZC10DK112R	VARISTOR	2	
F1,2		A62316010BP	FUSE HOLDER	4	
F3		A62316000GP	FUSE HOLDER	2	
L1		A621A3310GP	FILTER COIL	1	
R1		ERF15ZXJ240	RESISTOR	1	(24Ω,15W,±5%)
REF NO. 82 L. V. TRANSFORMER (U)					
		ANE61158U0AP	POWER RELAY BRACKET	1	
		ANE65448U0AP	SPACER A	6	
		ANE65458U0AP	SPACER B	2	
		A6338-3280	INSULATION SHEET B	1	
		XYN3+F25S	SCREW	2	3X25
CN100		AEEMMF01F05W	CONNECTOR	1	5PIN
CN101		AEEMMF03F06W	CONNECTOR	1	6PIN
CN102		AEEMMD04907W	CONNECTOR	1	7PIN
CN103		AEEMMD04907R	CONNECTOR	1	7PIN
CN104		AEEMMF00703W	CONNECTOR	1	3PIN
CN105		AEEMMF00703R	CONNECTOR	1	3PIN
CN106		AEEMMD24910W	CONNECTOR	1	10PIN
D100, 101,102 103,104 105,108		MA196-(TA5)	DIODE,SI	7	
D106, 107		AEDNERA1506	DIODE,SI	2	
IC100, 101		AEICP25011HL	L.S.I	2	
R100, 101,102 103		ERDS1TJ434T	CARBON FILM RESISTOR	4	(430KΩ,1/2W,±5%)
RY1	⚠	AEBG5B18P-1	POWER RELAY	1	(18V)
RY2	⚠	AEBG5B1E18	POWER RELAY	1	(18V)
RY3,4,5	⚠	AEG5J1EM18B	POWER RELAY	5	(18V)
T100	⚠	ETP43KZN61CN	L.V.TRANSFORMER	1	
REF NO. E2 P. C. BOARD B (U)					
		ANE82848U0AP	SPACER CUSHION	1	
CN250		AEEMHLEM21S	CONNECTOR	1	21PIN
DISP250		A64563080AP	FLUORESCENT TUBE	1	
REF NO. E3 P. C. BOARD F (U)					
CN400		AEEMS08BEH	CONNECTOR	1	8PIN
CN401		AEEMS05BEH	CONNECTOR	1	5PIN
SW400, 401,402		EVQQTG05G	SWITCH	3	

DIGITAL PROGRAMMER CIRCUIT

SCHEMATIC DIAGRAM





S-331 BPQ ②

DIGITAL PROGRAMMER CIRCUIT

PARTS LIST

Ref. No.	Part No.	Description	Pcs/ Set	Remarks	Ref. No.	Part No.	Description	Pcs/ Set	Remarks
BZ1	EFBRL37C20	BUZZER	1	3.7KHZ	ZD2	AEDZ5R6ES2T1	ZENER DIODE,SI	1	
C10,35,36,37	ECA1HM471B	ELECTROLYTIC CAPACITOR,AL	4	470MF/50V	ZD3	AEDZ24ES3T1	ZENER DIODE,SI	1	
C11	ECA1HM221B	ELECTROLYTIC CAPACITOR,AL	1	220MF/50V					
C12,13,15, 22,25,27,28, 29,34 C14	AECF50F104Z	CERAMIC CAPACITOR	9	0.1MF/50V					
	ECEA1CKA100B	ELECTROLYTIC CAPACITOR,AL	1	10MF/16V					
C16,17,19, 20,21	ECBT1E103ZF5	CERAMIC CAPACITOR	5	0.01MF/25V					
C18	ECEA1HKA2R2B	ELECTROLYTIC CAPACITOR,AL	1	2.2MF/50V					
C23,24,26, 30,31,32,33	ECBT1H101KB5	CERAMIC CAPACITOR	7	0.0001MF/50V					
CN1	AEEMMF01F05W	CONNECTOR	1	5PIN					
CN2	AEEMMF03F06W	CONNECTOR	1	6PIN					
CN3	AEEMMF01F05R	CONNECTOR	1	5PIN-RED					
CN4	AEEMMF00D04W	CONNECTOR	1	4PIN					
CN7	AEEMMD1FF09W	CONNECTOR	1	NE-1446,NE-1846 9PIN					
CN7	AEEM09FDZBTM	CONNECTOR	1	NE-1456,NE-1856					
CN8	AEEMHLEM21S	CONNECTOR	1						
CN9	AEEMMF00703R	CONNECTOR	1	3PIN-RED					
CX1	EFOGC4194T4	RESONATOR	1	4.19MHZ					
D10,11,13	AEDNERA1502	DIODE,SI	3	1.0A					
D12	MA700A-(TA)	DIODE,SI	1	0.06A					
D14,15,16, 17,18,19,20, 21	MA196-(TA5)	DIODE,SI	8	0.1A					
IC1	AEIC38122256	LSI	1						
IC2	AEIC102977AN	IC	1	AN6752					
IC3	AEICU2004GR	IC	1						
IC4	AEICAT24C16N	IC	1						
Q1	AEQHHP0124BS	POWER RELAY	1						
Q1	2SD2012	TRANSISTOR,SI,2W	1	3MHZ					
Q2,5	2SA720PRTA	TRANSISTOR,SI,400mW	2	200MHZ					
Q3,4	UN4124-(TA)	TRANSISTOR,SI,300mW	2						
Q6,7,8,9,11, 12	2SC1318QSTA	TRANSISTOR,SI,400mW	6	200MHZ					
Q10	UN4111-(TA)	TRANSISTOR,SI,300mW	1						
R10,11	ERDS2TJ151T	CARBON FILM RESISTOR	2	150Ω,1/4W,5%					
R12,17,21, 22,23,25,27, 34,38,39,40, 46,47,61,62, 63,65,67	ERDS2TJ103T	CARBON FILM RESISTOR	18	10KΩ,1/4W,5%					
R13	ERDS2TJ823T	CARBON FILM RESISTOR	1	82KΩ,1/4W,5%					
R14	ERDS2TJ390T	CARBON FILM RESISTOR	1	39Ω,1/4W,5%					
R15,16,32, 64,66	ERDS2TJ152T	CARBON FILM RESISTOR	5	1.5KΩ,1/4W,5%					
R18,24,26, 28,29,30,31, 35,43,48,49, 50,51,56,57, 58,59,60	ERDS2TJ102T	CARBON FILM RESISTOR	18	1.0KΩ,1/4W,5%					
R19	ERDS2TJ220T	CARBON FILM RESISTOR	1	22Ω,1/4W,5%					
R20	ERDS2FJ103T	CARBON FILM RESISTOR	1	10KΩ,1/4W,5%					
R33,44	ERDS2TJ681T	CARBON FILM RESISTOR	2	680Ω,1/4W,5%					
R36	ERDS2TJ333T	CARBON FILM RESISTOR	1	33KΩ,1/4W,5%					
R37,42,72	ERDS2TJ332T	CARBON FILM RESISTOR	3	3.3KΩ,1/4W,5%					
R41	ERDS2TJ472T	CARBON FILM RESISTOR	1	4.7KΩ,1/4W,5%					
R45	ERDS2TJ184T	CARBON FILM RESISTOR	1	180KΩ,1/4W,5%					
R52,53,54,55	ERDS2TJ104T	CARBON FILM RESISTOR	4	100KΩ,1/4W,5%					
R68,69,70,71	ERDS2TJ470T	CARBON FILM RESISTOR	4	47Ω,1/4W,5%					
ZD1	AEDZ4R7ES3T1	ZENER DIODE,SI	1						