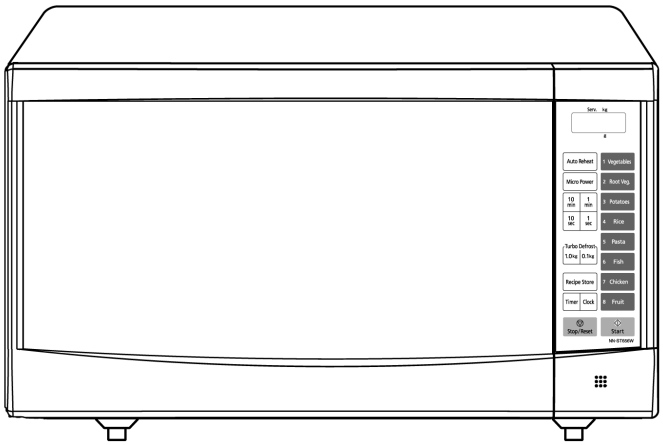
ORDER NO.PHAMOS0606035A3

Service Manual

Microwave Oven

Simplified

NN-ST686S
NN-ST656W



KTE(UAE)
PTE(Iran)
KPQ(Kuwait, Doha, Qatar, Oman, Bahrain, Pakistan)
STM(Saudi Arabia)

Please file and use this manual together with the service manual for Model NN-S560WF (ORDER NO. SIMMC0006012C3)

Specifications:

Specifications: \ Models:	ST686S (KTE, PTE, STM)	ST686S (KPQ)	ST656W (KTE, PTE, STM)	ST656W (KPQ)
Power Source:	240V AC Single Phase, 50Hz ---------- For KPQ Models 220V AC Single Phase, 50Hz ---------- For KTE, PTE Models 220V AC Single Phase, 50Hz/60Hz ---------- For STM Models			
Power Requirement:	1050W	1120W	1050W	1120W
Output:	1100W	1100W	1100W	1100W
Microwave Frequency:	2450MHz			
Timer:	99 min. 99 sec.			
Outside Dimensions:	518mm(W) X 404mm(D) X301mm(H)			
Oven Cavity Dimensions:	375mm(W) X 386mm(D) X 225mm(H)			
Weight:	12.0 kg			
PbF	This product with PbF			
Specifications subject to change without notice.				

Panasonic®

⚠ 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.

WARNING

1. This product should be serviced only by trained, qualified personnel.
2. Check for radiation leakage before and after every servicing according to the "procedure for measuring radiation leakage."
3. If the unit cannot be repaired on site, advise the customer not to use until unit is repaired.
4. There are special components used in the microwave oven which are important for safety. These parts are marked with a ⚠ on the replacement parts list. It is essential that these critical parts be replaced only with the manufacture's specified parts to prevent microwave leakage, shock, fire, or other hazards. Do not modify the orginal design.

This service manual covers products for following markets.
When troubleshooting or replacing parts, please refer to the country/area identifications shown below for your applicable product specification.

KTE	For UAE
PTE	For Iran
KPQ	For Kuwait, Doha, Qatar
	Oman, Bahrain, Pakistan
STM	For Saudi Arabia

CAUTION

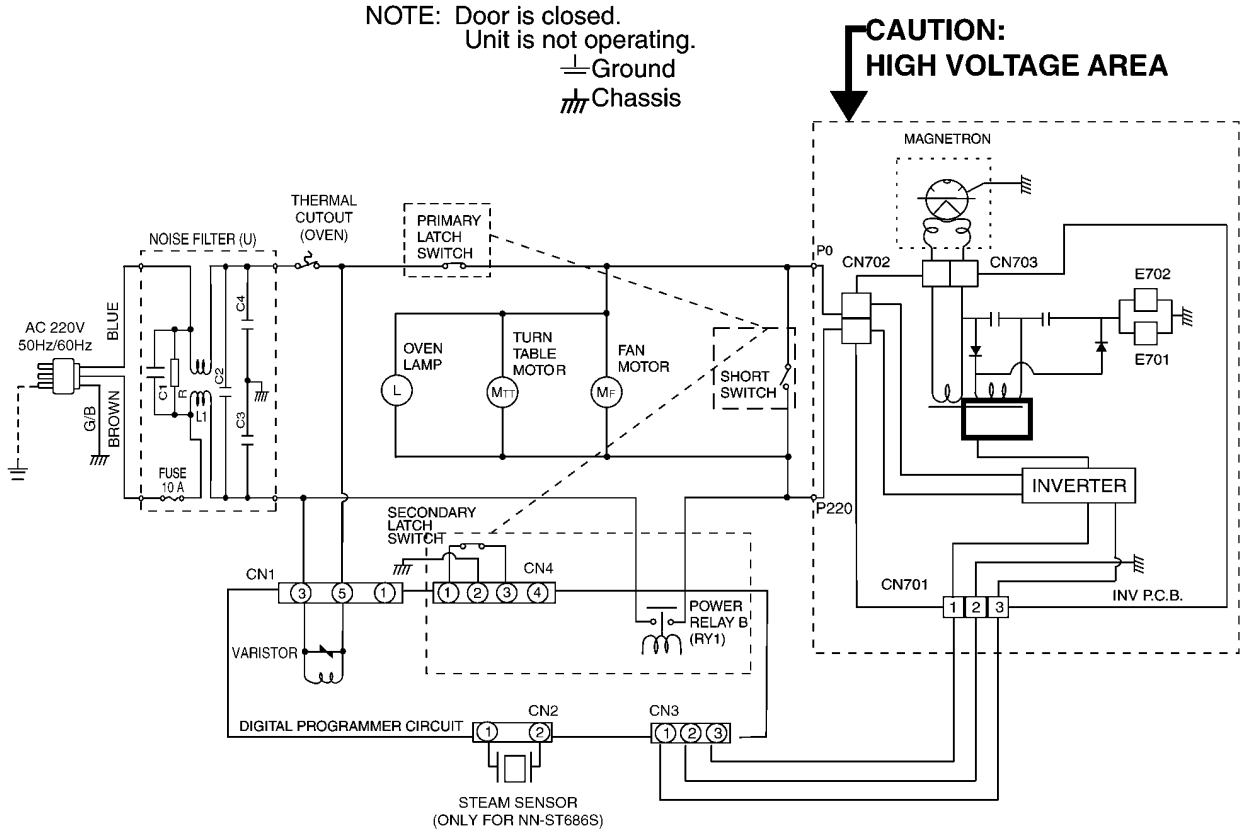
About lead free solder (PbF)

Distinction of PbF PCB: PCBs (manufactured) using lead free solder will have a PbF stamp on the PCB.

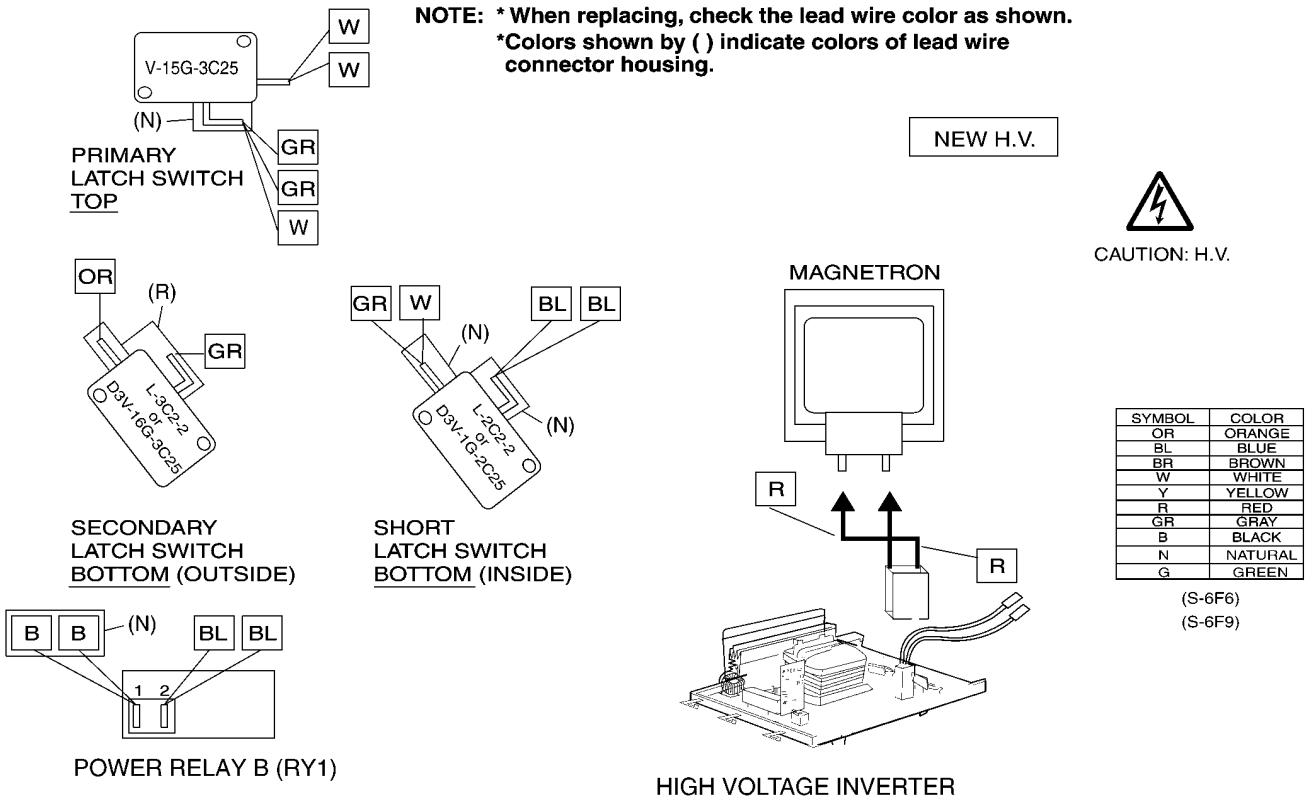
Caution:
- Pb free solder has a higher melting point than standard solder; Typically the melting point is 30 - 40˚C higher. Please use a high temperature soldering iron. In case of the soldering iron with temperature control, please set it to 370 ± 10˚C.
- Pb free solder will tend to splash when heated too high (about 600˚C).

CONTENTS

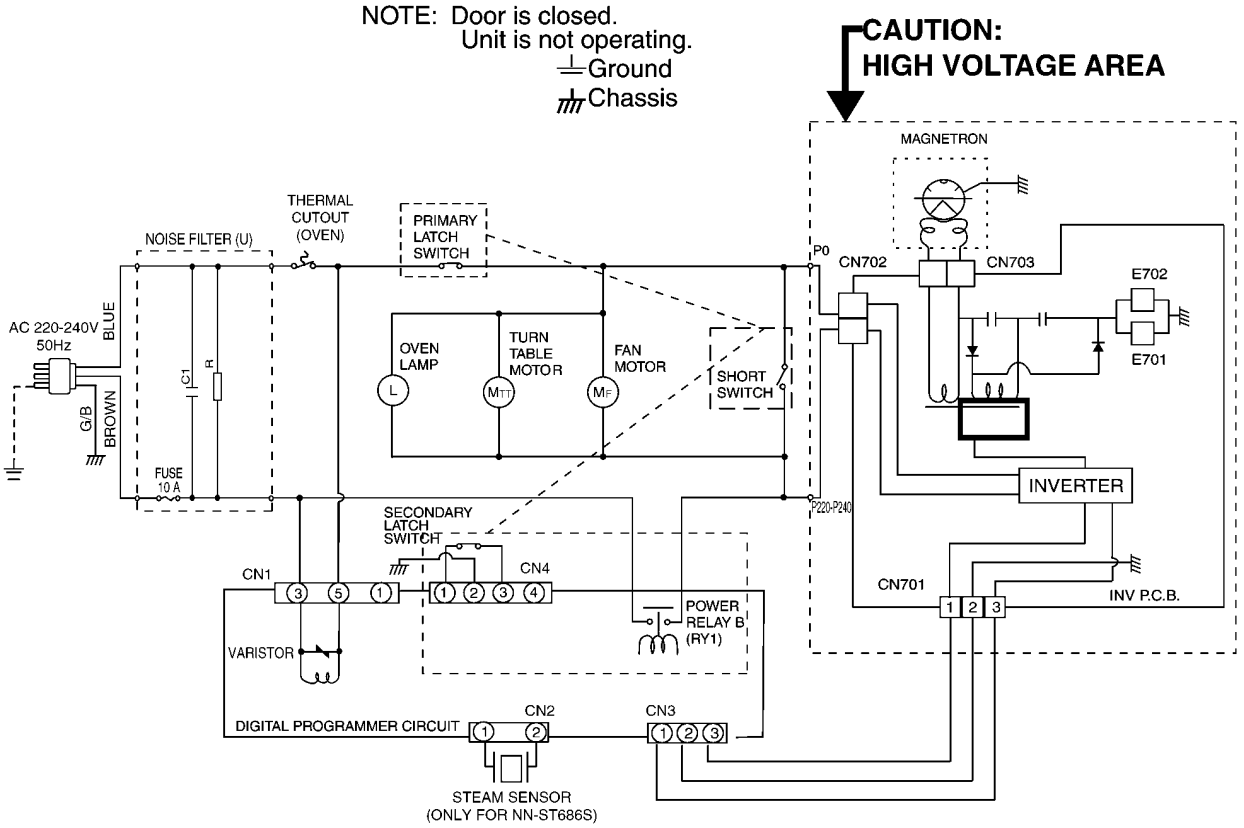
1 SCHEMATIC DIAGRAM (STM)



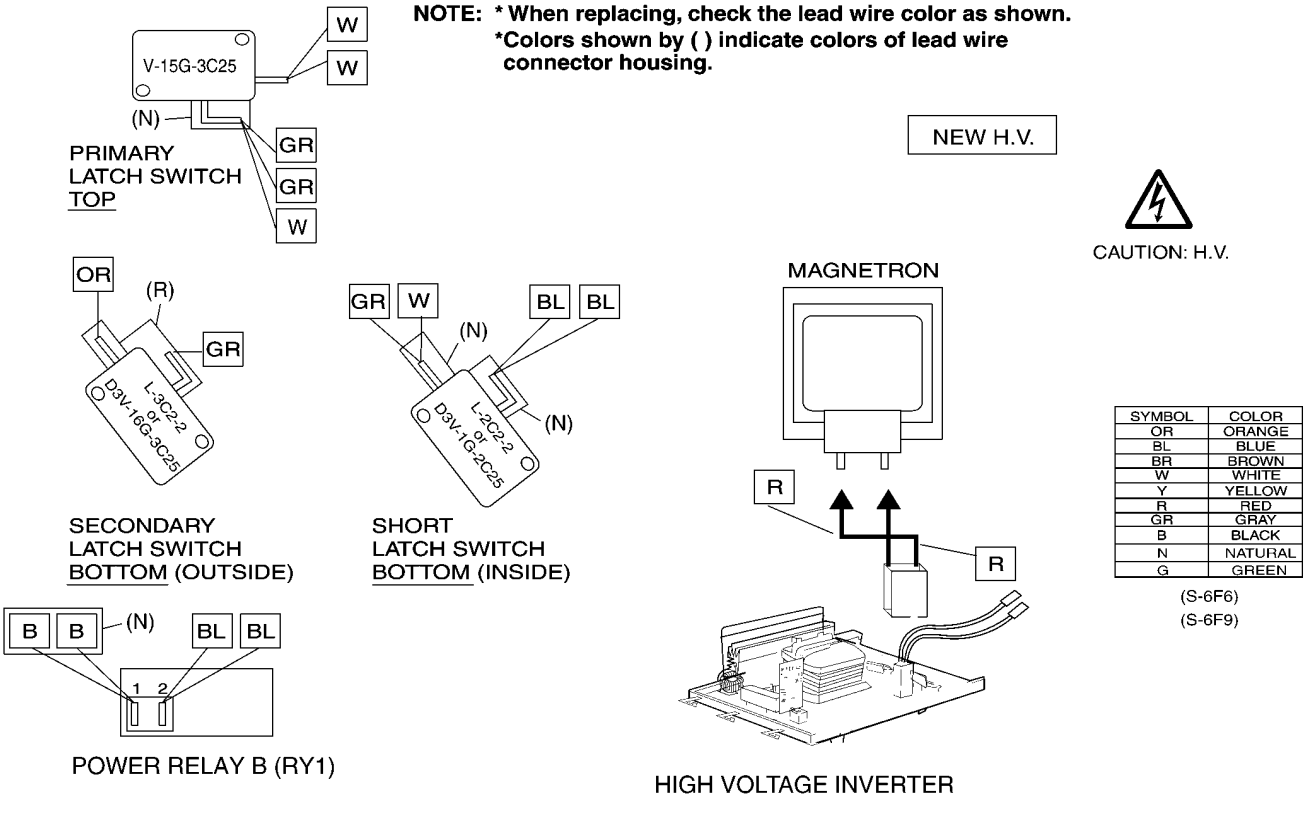
WIRING DIAGRAM



2 SCHEMATIC DIAGRAM (EXCEPT FOR STM)



WIRING DIAGRAM



3 CAUTIONS TO BE OBSERVED WHEN TROUBLESHOOTING

Unlike many other appliances, the microwave oven is a high voltage, high current device. It is free from danger in ordinary use, though extreme care should be taken during repair.

Caution

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

3.1. Check the grounding

Do not operate on a two wire extension cord. The microwave oven is designed to be grounded when used. It is imperative, therefore, to ensure the appliance is properly grounded before beginning repair work.

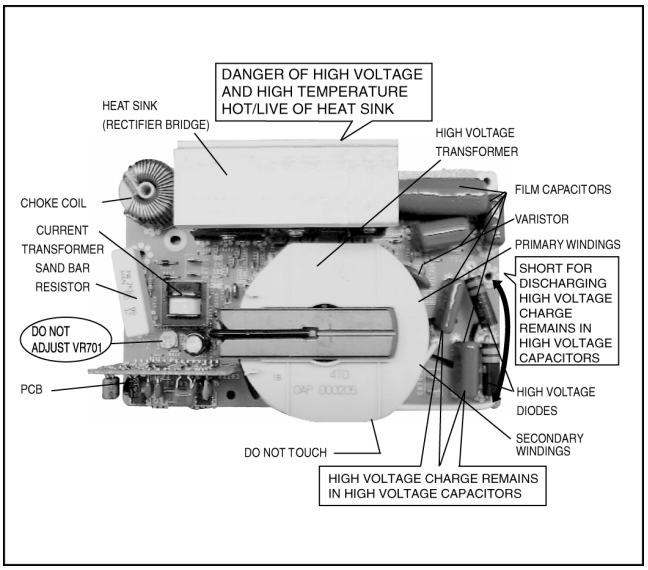
3.2. Inverter warnings

DANGER, HIGH VOLTAGE AND HIGH TEMPERATURE (HOT/LINE) OF THE INVERTER POWER SUPPLY (U)

The high voltage inverter power supply handles very high voltage and current for the magnetron tube. Though it is free from danger in ordinary use, extreme care should be taken during repair.

The aluminum heat sink is also energized with high voltage (HOT), do not touch when the AC input terminals are energized. The power device Collector is directly connected to the aluminum heat sink.

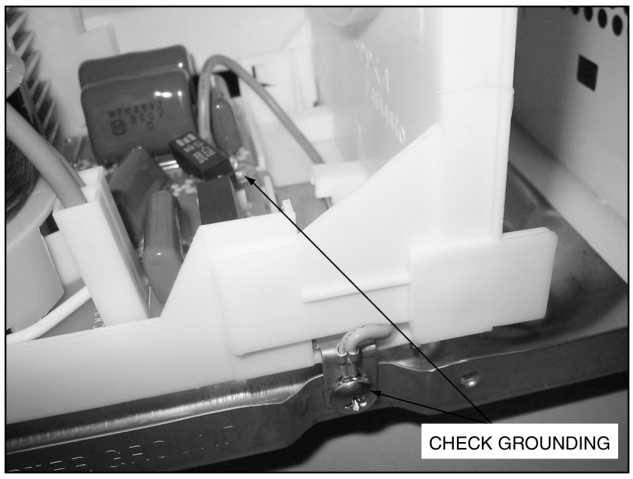
The aluminum heat sink may be HOT due to heat energy, therefore, extreme care should be taken during servicing.



H.V. Inverter warning

WARNING FOR INVERTER POWER SUPPLY (U) GROUNDING

Check the high voltage inverter power supply circuit grounding. The high voltage inverter power supply circuit board must have a proper chassis ground. The inverter grounding bracket must be connected to the chassis. If the inverter board is not grounded it will expose the user to very high voltages and cause extreme DANGER! Be sure that the inverter circuit is properly grounded via the inverter earth bracket.

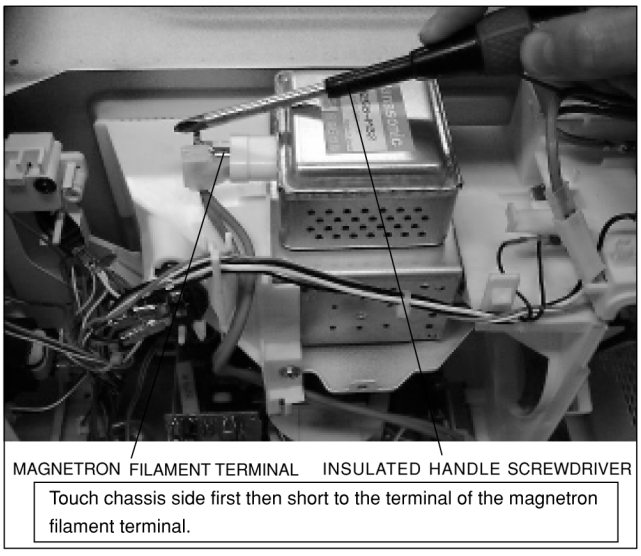


Grounding of the inverter circuit board

WARNING! DISCHARGE THE HIGH VOLATGE CAPACITORS

For about 30 seconds after the oven is turned off, an electric charge remains in the high voltage capacitors in the inverter power supply circuit board.

When replacing or checking parts, remove the power plug from the outlet and short the inverter output terminal of the magnetron filament terminals to the chassis ground with an insulated handle screwdriver to discharge. Please be sure to touch the chassis ground side first and then short to the output terminals.



Discharging the high voltage capacitors

WARNING

There is high voltage present with high current capabilities in the circuits of the primary and secondary windings, choke coil and heat sink of the inverter. It is extremely dangerous to work on or near these circuits with the oven energized. DO NOT measure the voltage in the high voltage circuit including the filament voltage of the magnetron.

WARNING

Never touch any circuit wiring with your hand or with an insulated tool during operation.

3.3. Part replacement.

When any part or component is to be replaced, always ensure that the power cord is removed from the wall outlet.

3.4. When the 10A fuse is blown due to the operation of the short switch:

WARNING

When the 10A 250V fuse is blown due to the operation of the interlock monitor switch, replace all of the components (primary latch switch, door switch, short switch and power relay B (RY1)).

1. This is mandatory. Refer to “adjustments and measurements” for the location of these switches.
2. When replacing the fuse, confirm that it has the appropriate rating for these models.
3. When replacing faulty switches, be sure the mounting tabs are not bent, broken or deficient in their ability to hold the switches.

3.5. Avoid inserting nails, wire etc. through any holes in the unit during operation.

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

3.6. Confirm after repair

1. After repair or replacement of parts, make sure that the screws of the oven, etc. are neither loose nor missing. Microwaves might leak if screws are not properly tightened.
2. Make sure that all electrical connections are tight before inserting the plug into the wall outlet.
3. Check for microwave energy leakage. (Refer to procedure for measuring microwave energy leakage).

CAUTION MICROWAVE RADIATION

USE CAUTION NOT TO BECOME EXPOSED TO RADIATION FROM THE MICROWAVE MAGNETRON OR OTHER PARTS CONDUCTING MICROWAVE ENERGY

IMPORTANT NOTICE

The following components have potentials above 2000V while the appliance is operated.

- Magnetron
- High voltage transformer (Located on inverter (U))
- High voltage diodes (Located on inverter (U))
- High voltage capacitors (Located on inverter (U))

Pay special attention to these areas.

When the appliance is operated with the door hinges or magnetron installed incorrectly, the microwave leakage can exceed more than 5mW/cm^2. After repair or exchange, it is very important to check if the magnetron and the door hinges are correctly installed.

3.7. Sharp edges

Caution

Please use caution when unpacking, installing or moving the unit, as some exposed edges may be sharp to the touch and cause injury if not handled with care.

4 MEASUREMENTS AND ADJUSTMENTS

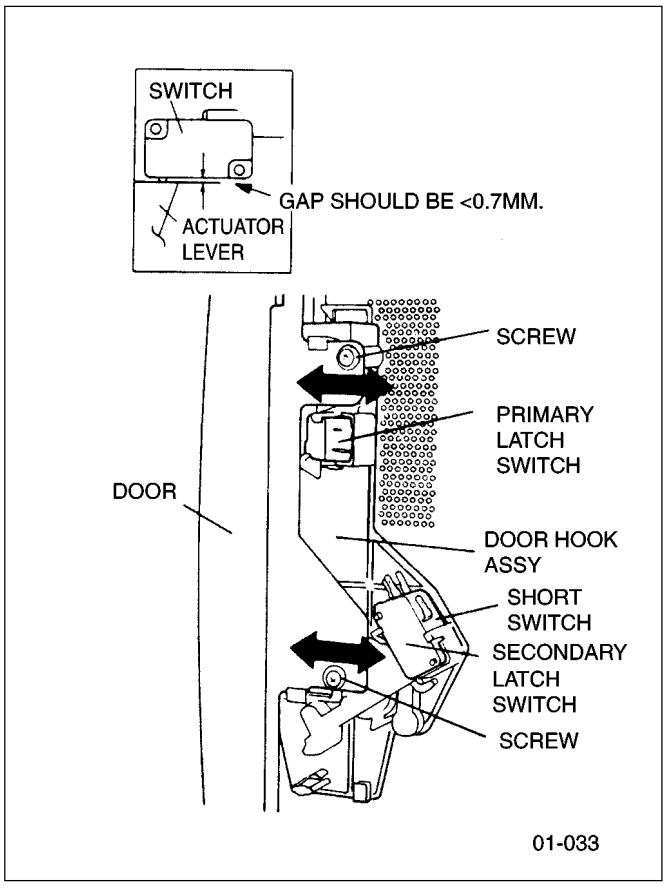
4.1. Adjustment of primary latch switch, secondary latch switch and short switch.

1. Mount the Primary latch switch, the secondary latch switch and the short switch to the door hook assembly as shown in ILL.

   NOTE:

   No specific individual adjustments during installation of the Primary latch switch, Secondary latch switch or Short switch to the door hook are required.

2. When mounting the door hook assembly to the oven assembly, adjust the door hook assembly by moving it in the direction of the arrows in the illustration, 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.
3. Reconnect the short switch and check the continuity of the monitor circuit and all latch switches again by following the component test procedures.



4.2. Measurement of microwave output

The output power of the 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 accurately as possible.

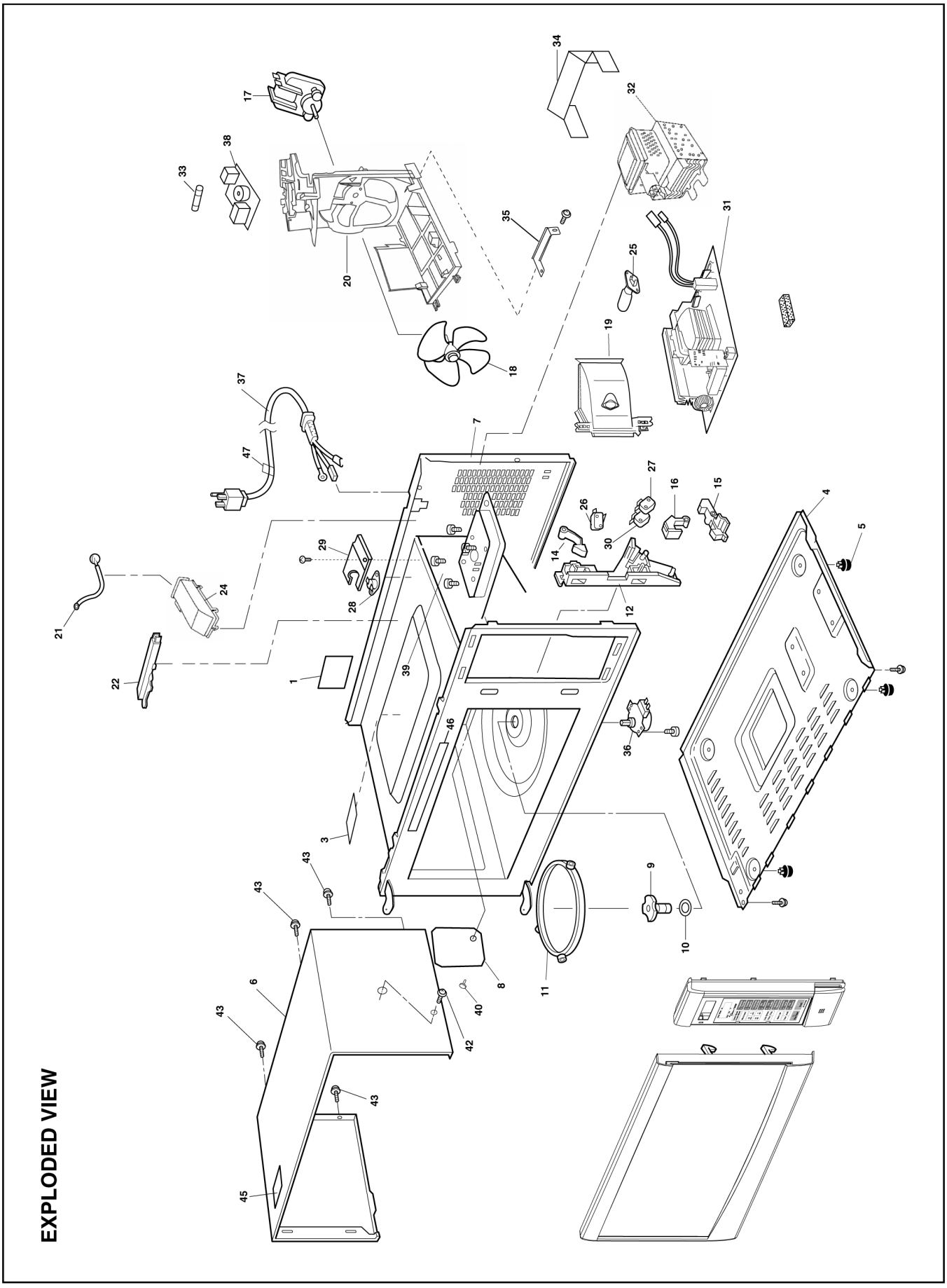
1. Fill the beaker with exactly one liter of tap water.Stir the water using the thermometer and record the water's temperature. (recorded as T1).
2. Place the beaker on the center of glass tray.
   Set the oven for High power and heat it for exactly one minute.
3. Stir the water again and read the temperature of the water. (recorded as T2).
4. The normal temperature rise at High power level for each model, is as shown in table.

TABLE (1L-1min.test)

RATED OUTPUT	TEMPERATURE RISE
1100W	Min. 9.4°C

5 EXPLODED VIEW AND PARTS LIST

5.1. EXPLODED VIEW



5.2. PARTS LIST

NOTE:

1. When ordering replacement part(s), please use part number(s) shown in this part list.
   Do not use description of the part.
2. Important safety notice:
   Components identified by mark have special characteristics important for safety.
   When replacing any of these components, use only manufacture's specified parts.

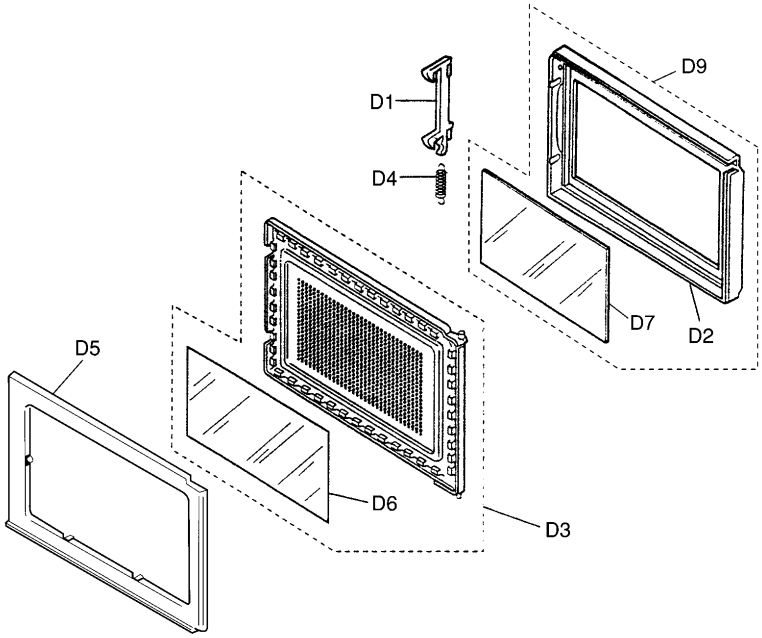
NOTE:

"A" parts are supplied by CSD (Japan)

"F" parts are supplied by PHAMOS (China)

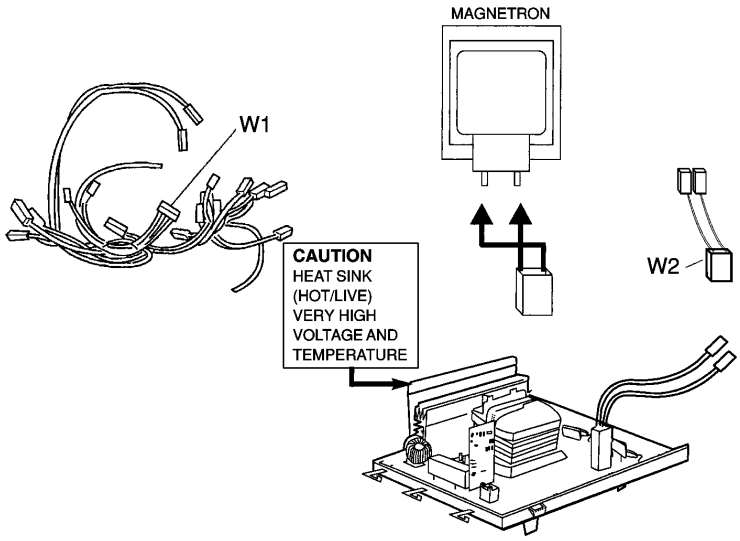
Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
1		F00066V00HP	CAUTION LABEL	1	
3		F21555500AP	OVEN STICKY PAPER	1	
4		F10014T00APG	BASE	1	
5		F10084T00AP	RUBBER FOOT	4	
6		F110D5Y00SAP	CABINET BODY(U)	1	ST686S
6		F110D5Y30HAP	CABINET BODY(U)	1	ST656W
7	⚠	F200A8F00AP	OVEN(U)	1	ST686S
7	⚠	F200A8F40AP	OVEN(U)	1	ST656W
8		F20555L00AP	COVER	1	
9		F21315Y00AP	PULLY SHAFT	1	
10		F2177-F80	WASHER	1	
11		F290D9330AP	ROLLER RING(U)	1	
12	⚠	F30206G30AP	DOOR HOOK	1	
14		F31366G30AP	HOOK LEVER A	1	
15		F31376G30AP	HOOK LEVER B	1	
16		F31386G30AP	HOOK LEVER C	1	
17		F400A6V00QP	FAN MOTOR	1	EXCEPT STM
17		F400A4T10SN	FAN MOTOR	1	STM
18		F40084T00AP	FAN BLADE	1	
19		F40257D00APG	AIR GUIDE A	1	
20		F41444T00AP	ORIFICE	1	
21		A707S4T00AP	STEAM SENSOR	1	ST686S
22		F64508660AP	SENSOR COVER B	1	ST686S
24		F65434T00AP	SENSOR COVER C	1	ST686S
25		F612E6W50XP	INCANDESCENT LAMP (U)	1	
26	⚠	F61425U30XN	MICRO SWITCH	1	(PRIMARY LATCH SWITCH) (V-15G-3C25)
27	⚠	J61414T00AP	MICRO SWITCH	1	(SECONDARY LATCH SWITCH) (D3V-16G-3C25)
28	⚠	F61455L00CP	THERMAL CUTOUT	1	105°C
29		F66264T00CP	THERMAL CUTOUT INSULATION BRACKET	1	
30	⚠	F61785U30XN	MICRO SWITCH	1	(SHORT SWITCH) (D3V-1G-2C25)
31	⚠	F606Y4V00XN	H.V.INVERTER (U)	1	
32	⚠	2M261-M32KLY	MAGNETRON	1	EXCEPT STM
32	⚠	2M261-M32J	MAGNETRON	1	STM
33	⚠	F62306V60BP	FUSE	1	10A/240V,50Hz
34		F40264T60APG	AIR GUIDE B	1	
35		F61844T00AP	GROUNDING PLATE	1	
36		F63265U30XN	TURNTABLE MOTOR	1	
37	⚠	F900C8F70YK	AC CORD W/PLUG	1	KTE,KPQ
37	⚠	F900C5E90SN	AC CORD W/PLUG	1	STM
37	⚠	F900C8F60PT	AC CORD W/PLUG	1	PTE
38		F692Y8A00YN	NOISE FILTER (U)	1	EXCEPT STM
38		F692Y8A00QP	NOISE FILTER (U)	1	STM
39		XTWFA4+12T	SCREW	4	FOR MAGNETRON
40		XTTFA4+6BN	SCREW	1	FOR COVER
42		XTCAFA4+12AFM	SCREW	1	FOR CABINET BODY SIDE (ST686S)
42		XTCAFA4+12AFW	SCREW	1	FOR CABINET BODY SIDE (ST656W)
43		XTWFA4+12D	SCREW	4	FOR CABINET BODY
45		F02445Y00AP	CAUTION LABEL	1	ST686S
46		F03348F60KT	MENU LABEL	1	ST686S
47		F02395E20KN	CORD CAUTION LABEL	1	

5.3. DOOR ASSEMBLY



Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
D1		F3018-1200	DOOR KEY A	1	
D2	⚠	F301A8F70HQP	DOOR A (U)	1	ST656W
D3	⚠	F302K5L00AP	DOOR E (U)	1	
D4		F30215G10XN	DOOR KEY SPRING	1	
D5	⚠	F30854T00AP	DOOR C	1	
D6	⚠	F31456V60XP	DOOR SCREEN A	1	
D7		F31468F70BQP	DOOR SCREEN B	1	ST656W
D9	⚠	F301A8F60SPT	DOOR A (U)	1	ST686S

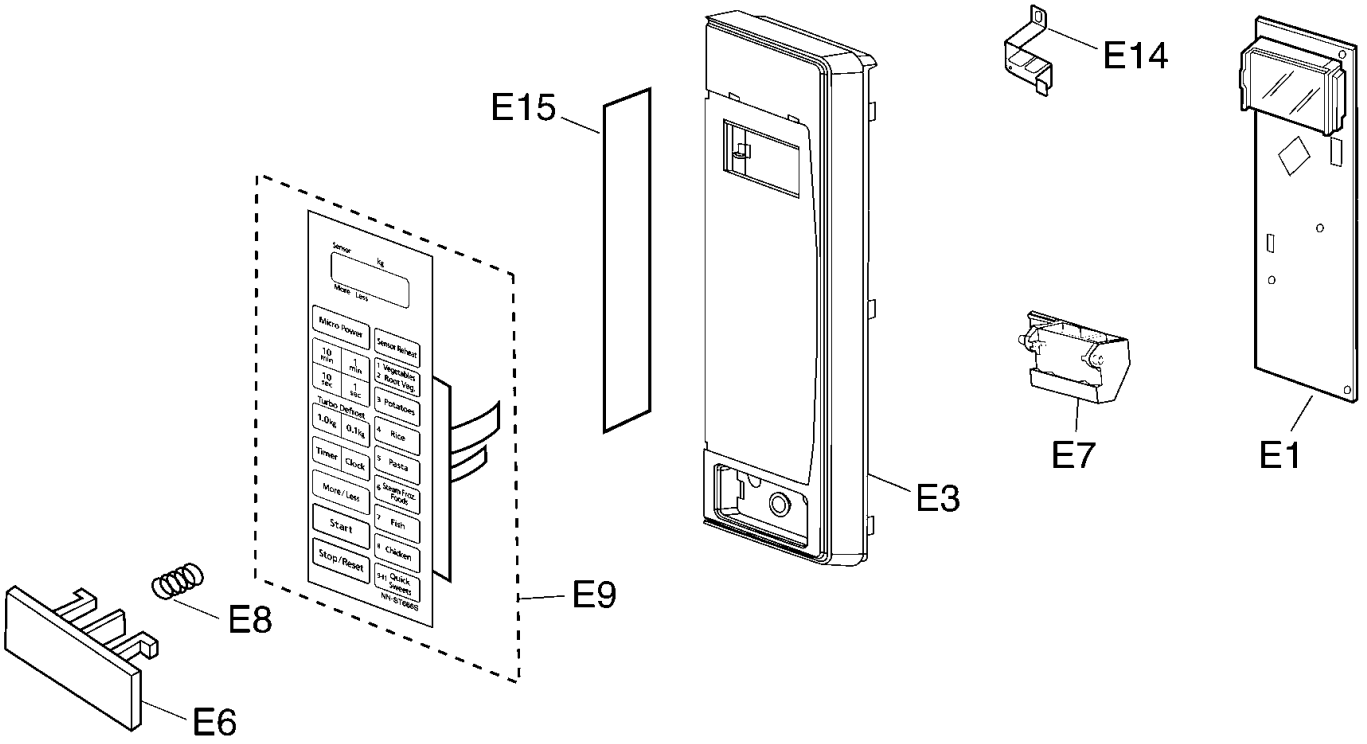
5.4. WIRING MATERIALS



Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
W1		F030A8F60PT	LEAD WIRE HARNESS	1	EXCEPT STM
W1		F030A8F60ST	LEAD WIRE HARNESS	1	STM
W2		F030E8F60PT	H.V.LEAD WIRE	1	EXCEPT STM
W2		F030E8A00QP	H.V.LEAD WIRE	1	STM

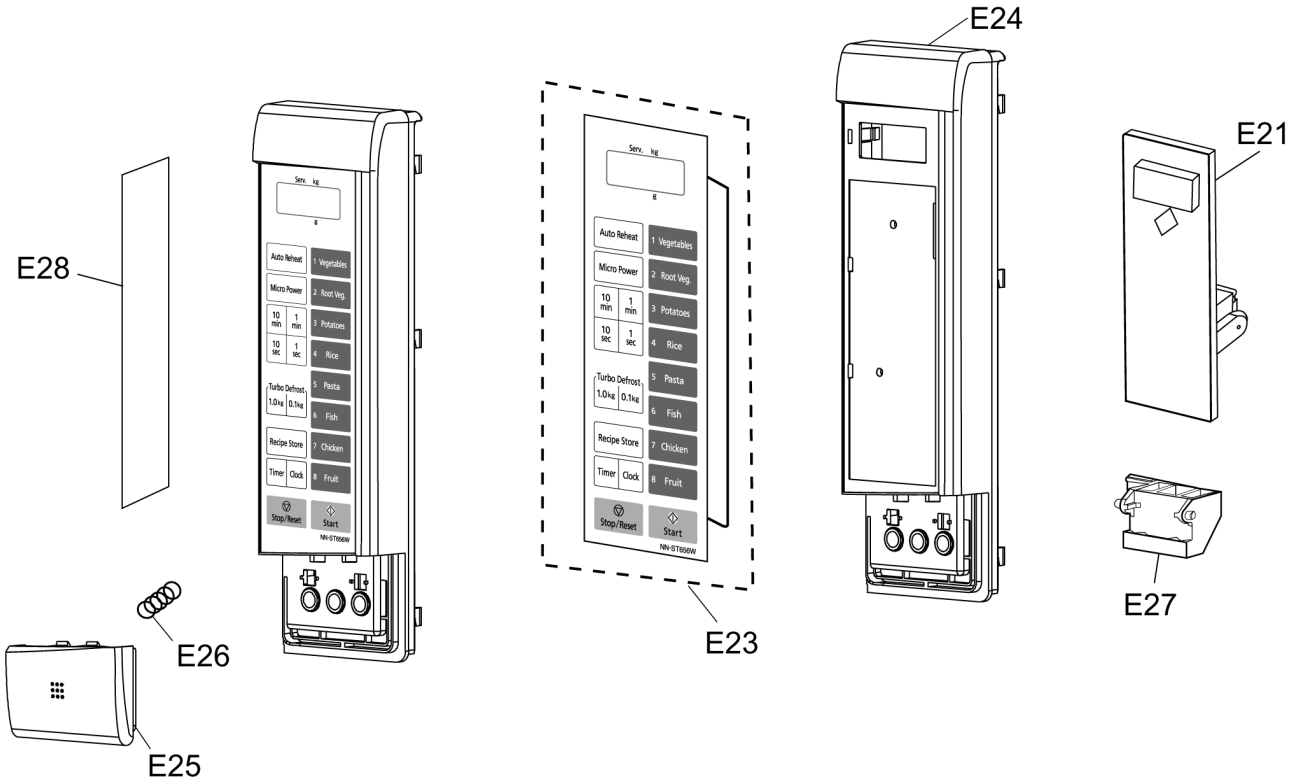
5.5. ESCUTCHEON BASE ASSEMBLY

5.5.1. NN-ST686S



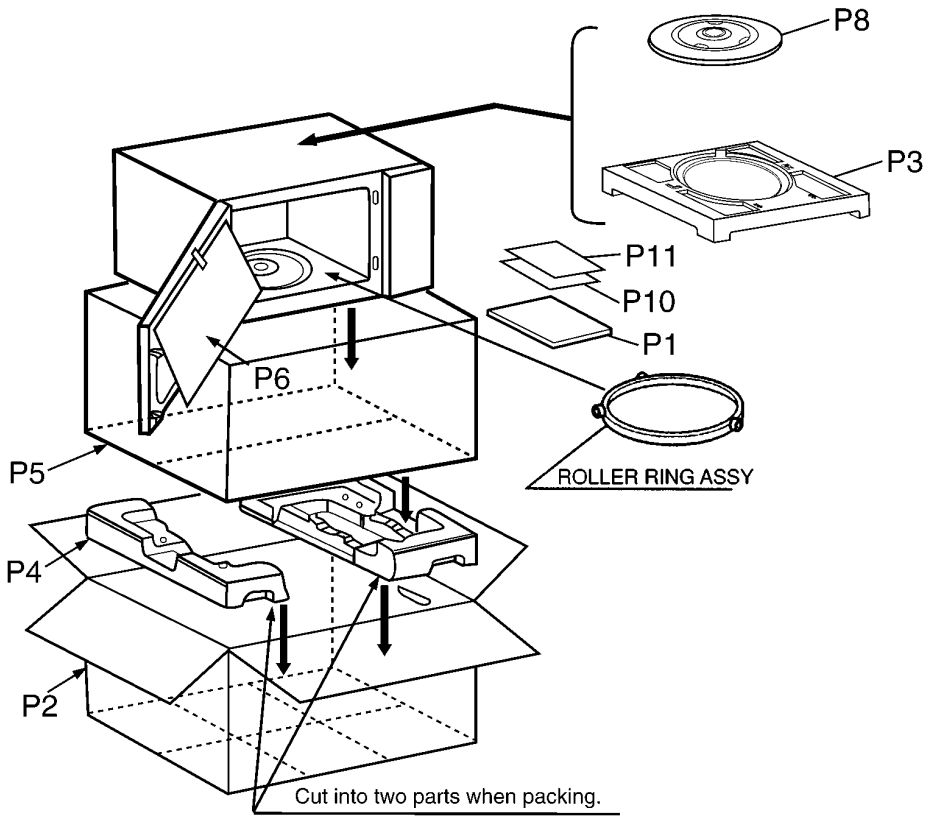
Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
E1		F603L8F60KT	D.P.CIRCUIT (AU)	1	ST686S KTE/PTE
E1		F603L8F60KP	D.P.CIRCUIT (AU)	1	ST686S KPQ
E1		F603L8F60ST	D.P.CIRCUIT (AU)	1	ST686S STM
E3		F800L5Y70SAP	ESCUTCHEON BASE (U)	1	ST686S
E6		F80725Y00SAP	DOOR OPENING BUTTON	1	ST686S
E7		F82565Y00AP	DOOR OPENING LEVER	1	ST686S
E8		F80375K00AP	COOK BUTTON SPRING	1	
E9		F630Y8F60SPT	MEMBRANE SWITCH (U)	1	ST686S
E14		F90095X00AP	GROUNDING PANEL	1	ST686S
E15		F00078F60SKT	NAME PLATE	1	ST686S KTE
E15		F00078F60SPT	NAME PLATE	1	ST686S PTE
E15		F00078F60SKP	NAME PLATE	1	ST686S KPQ
E15		F00078F60SST	NAME PLATE	1	ST686S STM

5.5.2. NN-ST656W



Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
E21		F603L8F90KT	D.P.CIRCUIT (AU)	1	ST656W KTE/PTE
E21		F603L8F90KP	D.P.CIRCUIT (AU)	1	ST656W KPQ
E21		F603L8F90ST	D.P.CIRCUIT (AU)	1	ST656W STM
E23		F630Y8F90BPT	MEMBRANE SWITCH (U)	1	ST656W
E24		F80348F70HQP	ESCUTCHEON BASE	1	ST656W
E25		F80728F70HQP	DOOR OPENING BUTTON	1	ST656W
E26		F80375K00AP	COOK BUTTON SPRING	1	
E27		F82566K10AP	DOOR OPENING LEVEL	1	ST656W
E28		F00078F90HKT	NAME PLATE	1	ST656W KTE
E28		F00078F90HPT	NAME PLATE	1	ST656W PTE
E28		F00078F90HKP	NAME PLATE	1	ST656W KPQ
E28		F00078F90HST	NAME PLATE	1	ST656W STM

5.6. PACKING AND ACCESSORIES



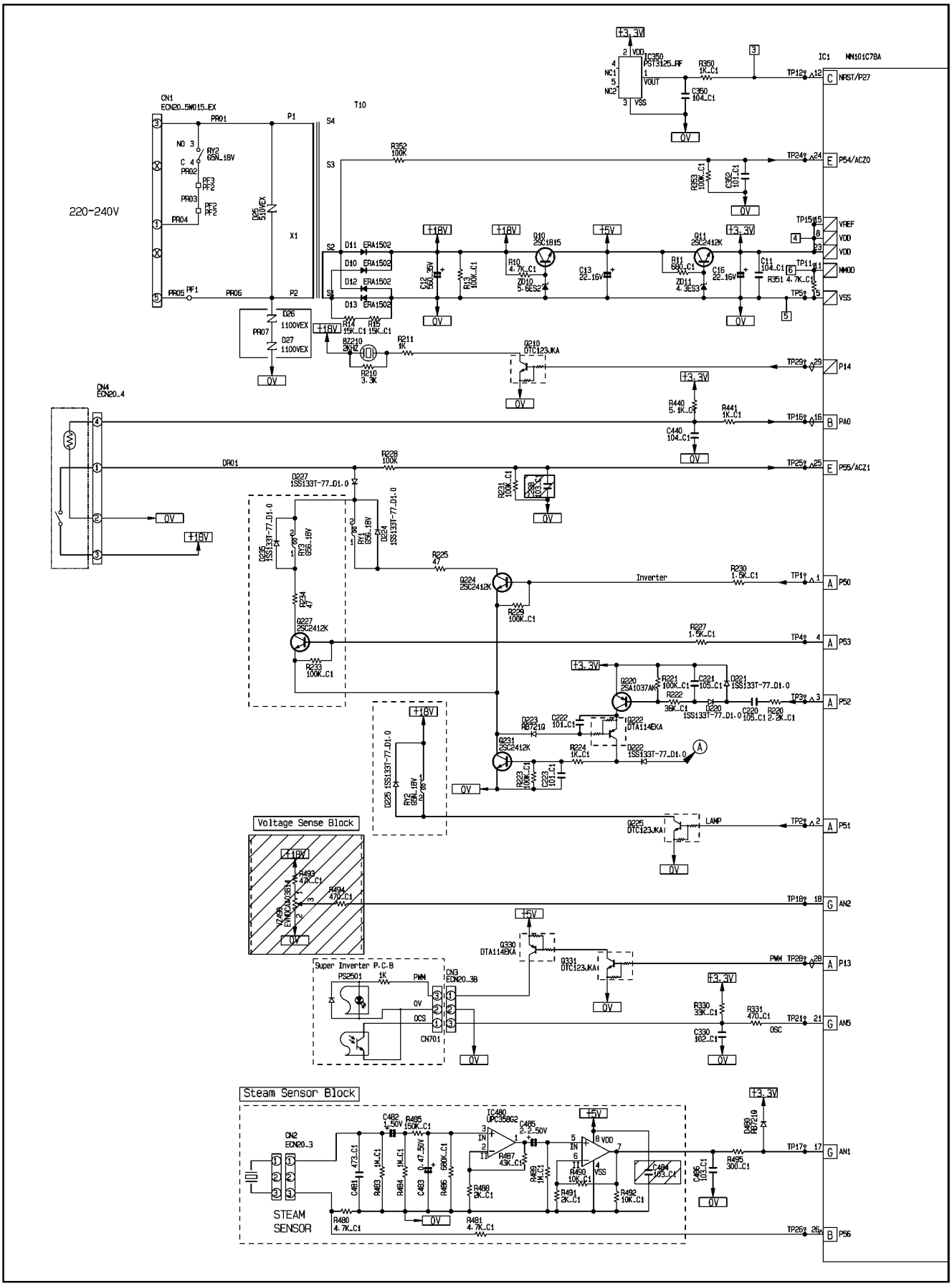
Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
P1		F00038F60KP	INSTRUCTION MANUAL	1	ST686S
P1		F00038F90KP	INSTRUCTION MANUAL	1	ST656W
P2		F01028F60SKT	PACKING CASE, PAPER	1	ST686S KTE/PTE
P2		F01028F60SKP	PACKING CASE, PAPER	1	ST686S KPQ/STM
P2		F01028F90HKT	PACKING CASE, PAPER	1	ST656W KTE/PTE
P2		F01028F90HKP	PACKING CASE, PAPER	1	ST656W KPQ/STM
P3		F01046K50AP	UPPER FILLER	1	
P4		F01055L00AP	LOWER FILLER	1	
P5		F01068100XN	P.E.BAG	1	
P6		F01078100XN	DOOR SHEET	1	
P8		F06014T00AP	COOKING TRAY	1	
P10		F000B7J70KP	COOKING GUIDE	1	
P11		F04458F60SKT	OVERLAY	1	ST686S
P11		F04458F90HKT	OVERLAY	1	ST656W

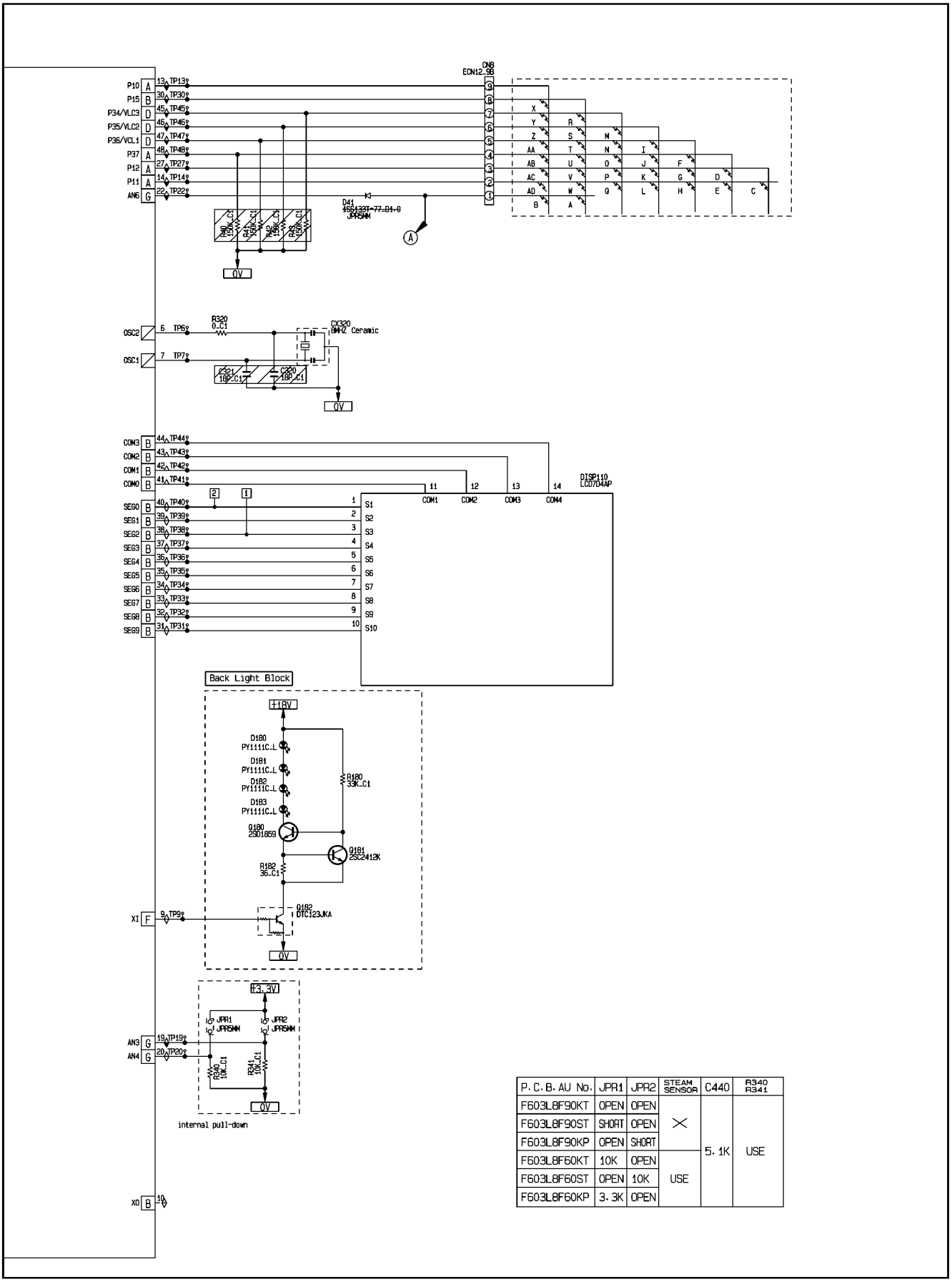
5.7. H.V. INVERTER BOARD MAIN PARTS LIST (F606Y4V00XN)

Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
Q701		A691E4V10GP	TRANSISTOR SI	1	
Q702			TRANSISTOR SI	1	
DB701		AESTRS2006M	DIODE SI	1	20A,600V
D701,D702		A62024V00GP	DIODE SI	2	0.3A
C704,C705		ECWH30822JUA	CAPACITOR	2	8200PF 3000VDC
T701		F609A4V00XN	H.V. TRANSFORMER	1	
		F607D4V00XN	D.P.CIRCUIT (KU)	1	
L701		F50204V00XN	CHOKE COIL	1	
CT701		F66904V00XN	CURRENT TRANSFORMER	1	

6 DIGITAL PROGRAMMER CIRCUIT

6.1. SCHEMATIC DIAGRAM





P.C.B. AU No.	JPR1	JPR2	STEAM SENSOR	C440	R340 R341
F603L8F90KT	OPEN	OPEN	×	5.1K	USE
F603L8F90ST	SHORT	OPEN			
F603L8F90KP	OPEN	SHORT			
F603L8F60KT	10K	OPEN	USE		
F603L8F60ST	OPEN	10K			
F603L8F60KP	3.3K	OPEN			

6.2. PARTS LIST

Ref. No.		Part No.	Part Name & Description	Pcs/Set	Remarks
BZ210		L0DDEA000014	BUZZER	1	2.0KHz
C222		F1H1H103A220	CHIP CAPACITOR	1	0.01µF/50V
C486		F1H1H103A220	CHIP CAPACITOR	1	0.01µF/50V (ST686S)
C481		F1H1H473A220	CHIP CAPACITOR	1	0.047µF/50V (ST686S)
C11,C223,C350		F1H1E104A030	CHIP CAPACITOR	3	0.1µF/25V
C220,C221		F1H1A105A019	CHIP CAPACITOR	2	1µF/10V
C330		F1H1H102A219	CHIP CAPACITOR	1	1000PF/50V
C352		F1H1H1010005	CHIP CAPACITOR	1	100PF/50V
C12		AECETK1V561B	AL CHEM CAPACITOR	1	560µF/35V
C13,C16		AECETS1C220B	AL CHEM CAPACITOR	2	22µF/16V
C482		AECETS1H010B	AL CHEM CAPACITOR	1	1µF/50V (ST686S)
C483		AECETS1HR47B	AL CHEM CAPACITOR	1	0.47µF/50V (ST686S)
C485		AECETS1H2R2B	AL CHEM CAPACITOR	1	2.2µF/50V (ST686S)
CN1		K1KA03AA0115	CONNECTOR	1	
CN2		K1KA03A00299	CONNECTOR	1	3 Pin (ST686S)
CN3		F03524U00AP	INV. HARNESS (U)	1	
CN4		F03535G40XN	CONNECTOR	1	
CN8		K1MN09AA0040	CONNECTOR	1	9 Pin
CX320		EF0EC8004A4	CERAMIC RESONATOR	1	8.00MHz
DISP110		L5AAAEC00057	LCD	1	
DISP1 HOLDER		F66174U20AP	LCD HOLDER	1	
D10-D13		B0EAKT000025	DIODE	4	
D220-D222,D224,D227		MA2C19600E	DIODE	5	
D480		MA2C700A0F	DIODE	1	(ST686S)
D25		D4EAY511A036	VARISTOR	1	510V
D26,D27		D4EAY112A036	VARISTOR	2	1100V
D180-D183		B3ACB0000065	CHIP-LED	4	
IC1		MN101C78ADL	L.S.I.	1	
IC350		C0EBE0000401	IC	1	
IC480		C0ABBA000230	IC	1	(ST686S)
Q222,Q330		UNR211100L	CHIP DIGI-TRANSISTOR	2	
Q182,Q210,Q331		UNR221M00L	CHIP DIGI-TRANSISTOR	3	
Q10,Q180		B1BAAJ000003	TRANSISTOR	2	
Q11,Q181,Q224,Q231		2SD0601A0L	CHIP TRANSISTOR	4	
Q220		2SB709A0L	CHIP TRANSISTOR	1	
R320		D0GBR00JA071	CHIP RESISTOR	1	0Ω,1/10W,5%
R13,R221,R223,R229,R231,R353		D0GB104JA068	CHIP RESISTOR	6	100K,1/10W,5%
R483,R484,R489		D0GB105JA071	CHIP RESISTOR	3	1MΩ,1/10W,5% (ST686S)
R182		D0GB360JA072	CHIP RESISTOR	1	36Ω,1/10W,5%
R11		D0GB681JA069	CHIP RESISTOR	1	680Ω,1/10W,5%
R224,R350,R441		D0GB102JA071	CHIP RESISTOR	3	1K,1/10W,5%
R230		D0GB152JA072	CHIP RESISTOR	1	1.5K,1/10W,5%
R220		D0GB222JA072	CHIP RESISTOR	1	2.2K,1/10W,5%
R210		D0GB332JA072	CHIP RESISTOR	1	3.3K,1/10W,5%
R340,R341		D0GB103JA072	CHIP RESISTOR	2	10K,1/10W,5%
R490,R492		D0GB103JA072	CHIP RESISTOR	2	10K,1/10W,5% (ST686S)
R485		D0GB154JA068	CHIP RESISTOR	1	150K,1/10W,5% (ST686S)
R488,R491		D0GB202JA071	CHIP RESISTOR	2	2KΩ,1/10W,5% (ST686S)
R180,R330		D0GB333JA070	CHIP RESISTOR	2	33K,1/10W,5%
R222		D0GB363JA072	CHIP RESISTOR	1	36K,1/10W,5%
R236,R331		D0GB471JA069	CHIP RESISTOR	2	470Ω,1/10W,5%
R495		D0GB471JA069	CHIP RESISTOR	1	470Ω,1/10W,5% (ST686S)
R10,R14,R15,R351		D0GB472JA072	CHIP RESISTOR	4	4.7K,1/10W,5%
R480,R481		D0GB472JA072	CHIP RESISTOR	2	4.7K,1/10W,5% (ST686S)
R487		D0GB433JA072	CHIP RESISTOR	1	43KΩ,1/10W,5% (ST686S)
R440,C440		D0GB512JA072	CHIP RESISTOR	2	5.1K,1/10W,5%
R486		D0GB684JA068	CHIP RESISTOR	1	680KΩ,1/10W,5% (ST686S)
R225		D0AE470JA155	CHIP RESISTOR	1	47Ω,1/4W,5%
R211		D0AE102JA155	CARBON RESISTOR	1	1K,1/4W,5%
R228,R352		D0AE104JA155	CARBON RESISTOR	2	100K,1/4W,5%
RY1		AEBGJQC25F18	POWER RELAY	1	
T10		G4C3AAH00008	LOW VOLTAGE TRANSFORMER	1	
ZD10		B0BA5R600016	ZENER DIODE	1	
ZD11		B0BA4R400002	ZENER DIODE	1	