

**1. Report of Measurement conducted by TOSHIBA
(With DAEWOO Magnetron of 2M218)**

▶ FCC ID : C5F7NF10MO1000 ◀

TOSHIBA

TOSHIBA HOKUTO ELECTRONICS CORPORATION

MAGNETRON ENGINEERING DEPARTMENT

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Mr. Byeong-Jun Kim
Research Manager
Microwave Oven
R & D Center
DAEWOO ELECTRONICS Co., LTD.
#412-2, Chongchon 2-Dong,
Pupyong-Ku, Incheon,
KOREA

April 29, 1998
(Ref. No. : 98-050)

RE : Electromagnetic radiation from microwave oven KOR-108Q
with Daewoo magnetron 2M218

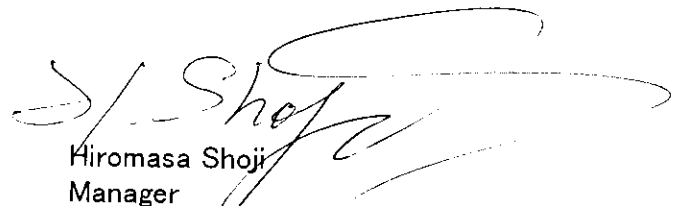
Dear Mr. Kim

We are enclosing herewith the above mentioned test results based on FCC measuring method in our measuring facility of FCC file number 430A.

We confirmed test results are satisfied with FCC limit.

Please feel free to contact us, if you have any question or request.

Sincerely yours,



Hiromasa Shoji
Manager
Magnetron Application Engineering
Magnetron Engineering Department

SY/IS/n2

cc : Mr. Miyauchi TOSHIBA TOKYO
Mr. Ikegami TOSHIBA HOKUTO TOKYO

ELECTROMAGNETIC RADIATION TEST OF MICROWAVE OVEN

The following measurements were conducted in Toshiba Hokuto Electronics Corporation measurement facility of FCC file number 430A.

Date : 1998-4-28
Oven : KOR-108Q
Tube : 2M218
Line : 120V/60Hz

1. Output power (Load : 1000ml water (center))

Input power : 1550W
Output power : 985W
* Permissible FIS = $35.1 \mu\text{V/m}$ at 300m
(FIS : Field Intensity Strength)

2. Power Leak (Load : 275ml water (center))

Po leak : 0.15 mW/cm^2

3. FIS measurements

Measurement equipment (Refer Page-4)

Interference analyzer : EMC-60 MK-IV (Bandwidth : 5MHz)
Antenna : CA-S, CA-M and CA-X

3-1 Side band radiation (Load : 700ml water (center))

Frequency (MHz)	FIS ($\mu\text{V/m}$) at 300m
2,393	1.6
2,503	1.6

3-2 Harmonics radiation

Harmonics	Load	FIS ($\mu\text{V/m}$) at 300m	Frequency (MHz)
2nd	700ml side	16.8	4,891
3rd	700ml center	26.8	7,340
4th	700ml center	26.5	9,815

Note : 2nd and 3rd Harmonics : The maximum value with the load condition such as 300ml or 700ml water in the center or side position

4. Frequency measurements

Measurement equipment (Refer Page-4)

Interference analyzer : EMC-60 MK-IV (Bandwidth : 5MHz)
Antenna : CA-S, CA-M and CA-X

4-1 The variation of frequency for load variation (Load : 1000ml water center)

Volume of water (ml)	Frequency (MHz)
1000	2,438
800	2,436
600	2,440
400	2,432
200	2,423

4-2 The variation of frequency for line voltage variation (Load : 1000ml water center)

Line voltage (V)	Frequency (MHz)
96	2,440
108	2,440
120	2,441
132	2,441
150	2,442

5. Frequency sweeping

Measurement equipment (Refer Page-4)

Spectrum analyzer : HP8562A
Antenna : CA-S, CA-M and CA-X

None of higher FIS value than those shown in the above table existed in the following frequency band.

Frequency (MHz)	Load condition
2000 - 2400	700ml center
2500 - 4000	
4000 - 8000	300ml or 700ml water in the center or side position
8000 - 10000	700ml center

No.	Equipment Name	Model Name & Manufacturer	Specification	Last Calibration Date	Calibration Frequency
1	Interference Analyzer	EMC-60 MK-IV SER. : 44116 ELECTRO-METRICS	0.5 to 18 GHz	March 1998	
2	Antenna	(1) CA-S SER : 22-1 POLARAD	2.1 to 4.34 GHz		
		(2) CA-M SER : 20-15 POLARAD	4.19 to 7.74 GHz		
		(3) CA-X SER : 20-10 POLARAD	7.36 to 10 GHz		
3	Signal Generator	8671B SER : 2545A00106 HEWLETT PACKARD	2.0 to 18 GHz	March 1998	
4	Frequency Counter	85340A SER : 134A01280 HEWLETT PACKARD		March 1998	Annually
5	Power Meter	435A SER : 1312J00144 HEWLETT PACKARD	0 to 1 mW	March 1998	Annually
6	Power Sensor	8481A SER : 1234A871 HEWLETT PACKARD		March 1998	
7	Spectrum Analyzer	8562A SER : 2923A03932 HEWLETT PACKARD	1 kHz to 22 GHz	March 1998	

4. Specification of DAEWOO Magnetron of 2M218

► FCC ID : C5F7NF10MO1000 ◀



DAEWOO
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MAGNETRON DIVISION

TO :

APPROVAL SIGNATURE

S P E C I F I C A T I O N

FOR
DAEWOO MAGNETRON

2 M 2 1 8


NO. 1011 MYONG
MANAGER, MAGNETRON DEPT.

SPECIFICATION NO. :
ISSUED :

SFC

This specification is based upon EIAJ ET-145A Testing Methods for Continuous Wave Magnetrons

DAEWOO CONTINUOUS WAVE MAGNETRON 2M218

DESCRIPTION	Magnetron (Fixed Frequency, Integral Magnet)									
FUNCTION	For Microwave Oven (2450MHz Band continuous wave oscillation)									
OUTER DIMENSIONS	See Outline drawing									
ABSOLUTE MAXIMUM RATINGS									NOTE(4)(5)	NOTE(4)
	TERM	Ef	tk	e _{bm}	I _b	I _{bm}	P _i	σ_L	T _p	T _{case}
	UNIT	V	s	kV	mAdc	A	kW	-	°C	°C
	MAX.	3.75	-	4.5	350	1.2	1.4	4	250	100
	MIN.	2.80	0	-	-	-	-	-	-	-
STANDARD TEST CONDITION	NOTE (1)(2)(3)	3.30	-	-	300	-	-	1.1MAX	-	-

TEST SPECIFICATION

TEST TERM NOTE (3)	TEST METHOD EIAJ ET-145A	TEST CONDITION	SYMBOL	BOGIE	LIMIT		UNIT
					MIN.	MAX.	
*** VIBRATION	5.4.1		-	-	-	-	-
** BREAK DOWN VOLTAGE	4.2	NOTE (6)	-	-	-	-	-
** INSULATION	4.2	Eb=1kVdc R.H. MAX. 60%	-	-	100	-	Ω
** FILAMENT CURRENT	4.1.1	U _k =120s	I _f	10	8	12	A
PEAK ANODE VOLTAGE	4.3.1	NOTE (7)	e _{bm}	4.10	3.95	4.25	kV
AVERAGE POWER OUTPUT (1)	4.3.3.1	NOTE (7)	P _o (1)	935	835	965	W
FREQUENCY	4.3.4		f	2452	2442	2462	MHz
*** PULLING FIGURE	4.3.5	1.5 ~ 1.5	f _{pd}	-	-	15	Hz
*** SINK PHASE	4.3.7		$\lambda_{\text{sub}}, \lambda_{\text{g}}$	0.1°	-	-	°
** STABILITY MODING (1)	4.3.11.2	$\sigma_L = 2, 3, 4, 100s$	-	-	2	-	-
** FUNDAMENTAL FREQUENCY RADIATION	4.3.15	$\sigma_L = 1$	S _L	-	-	100	dBm
*** LIFE TEST	4.5.1		t	-	500	-	h
*** LIFETIME END POINT	AVERAGE POWER OUTPUT (1)	4.3.3.1	P _o (1)	-	710	-	W

SPEC. NO. :

DATE:

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NOTE (1) Prescribed R.F. Coupler (Refer to the attached chart) or the similar type must be used.

(2) Forced air cooling (1000 l/min).

(3) Single phase full wave rectifier without filter shall be used for power supply.

(4) See outline drawing for measuring point.

(5) Maximum saturated anode temperature for normal condition (with load in the cavity) should be 200°C.

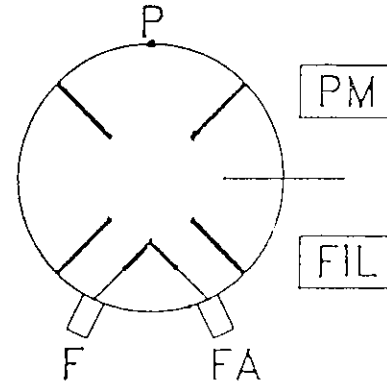
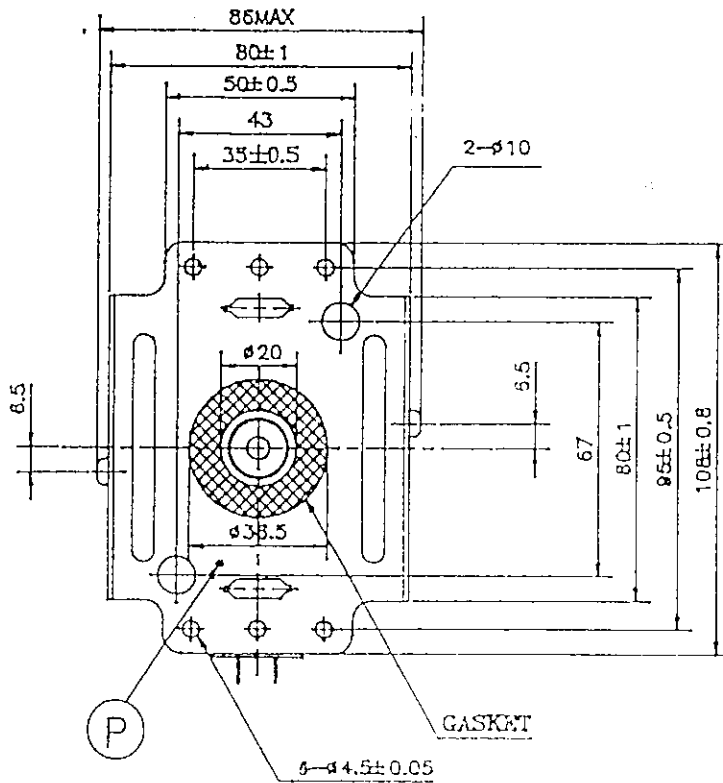
(6) $E_b = 10\text{KVdc}$ or 7KVac : $t = 50\text{s}$

(7) The surrounding temperature will be settled at the value of 25°C and it's exchange rate should be $\pm 1^\circ\text{C/min}$.

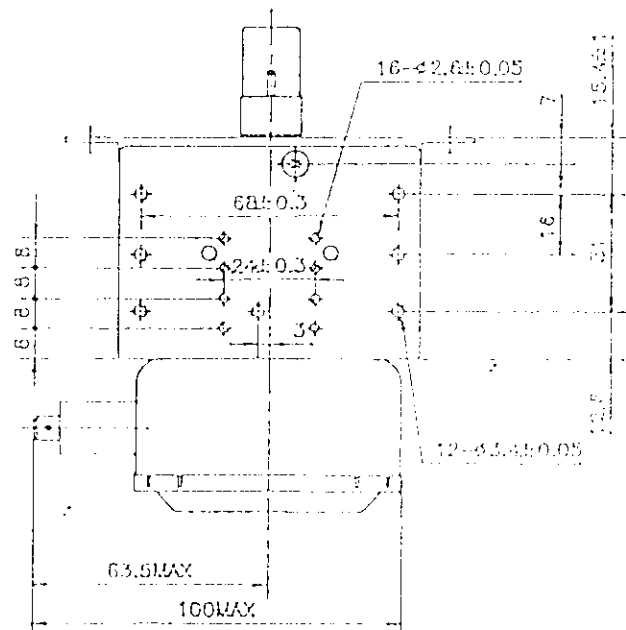
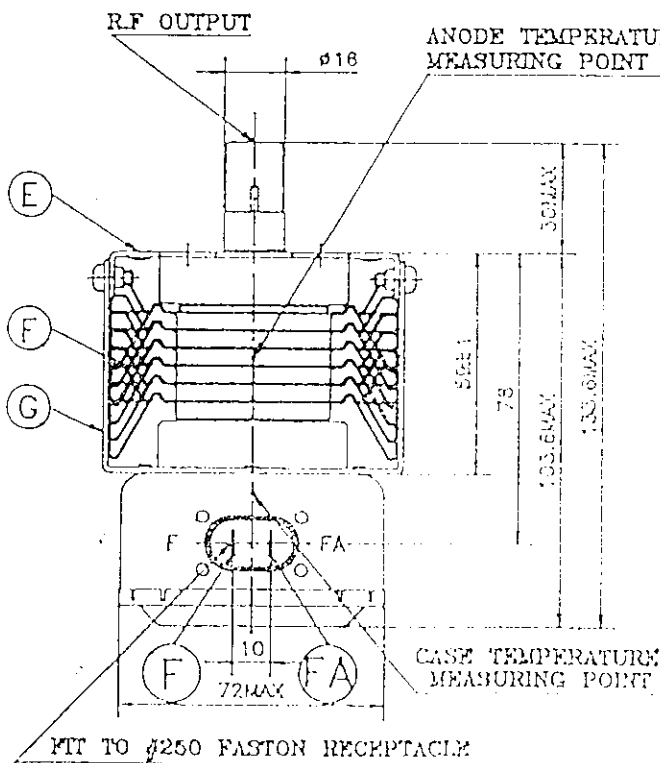
(8) Tests shall be classified as follows.

Tests	Unit	Remarks
Production test	100%	This test is intended to ensure if the production line is being processed in compliance with the standard, and shall be conducted on some typical characteristics which are considered to be affected by changes in the process.
Design test	50%	This test is intended to ensure the standard design shall be conducted on each characteristic which are not affected by changes in the production line as long as the design is maintained.
Type test or test	100%	This test is intended to ensure that the standard design of the product is maintained and may be conducted on any characteristic change in the design of the product.

UNIT: mm

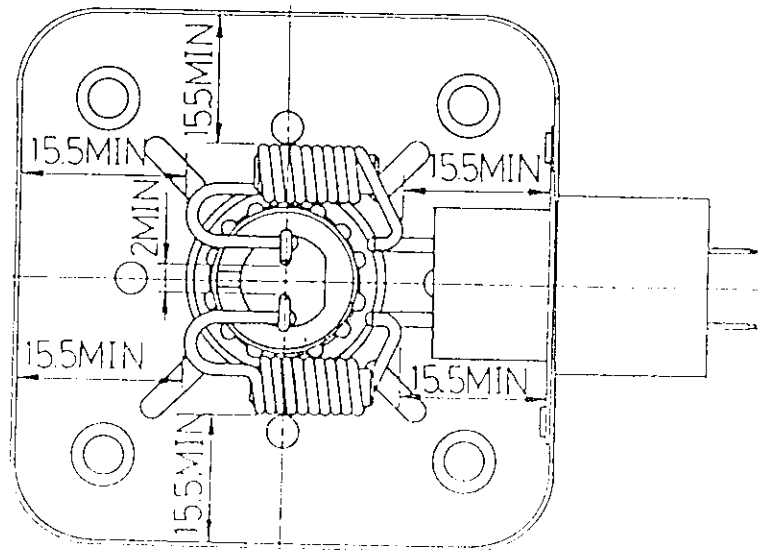
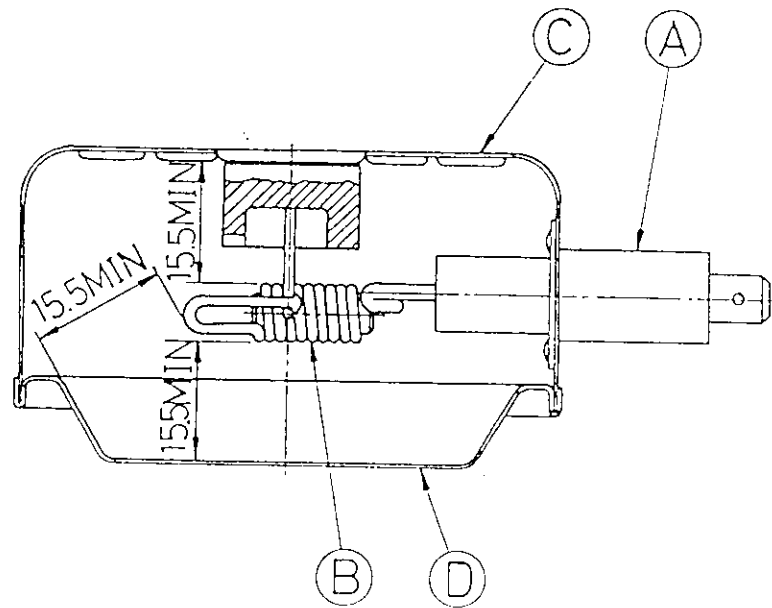


NOTE<1> TEMPERATURE TO BE MEASURED AT THE OUTLET SIDE OF AIRFLOW.



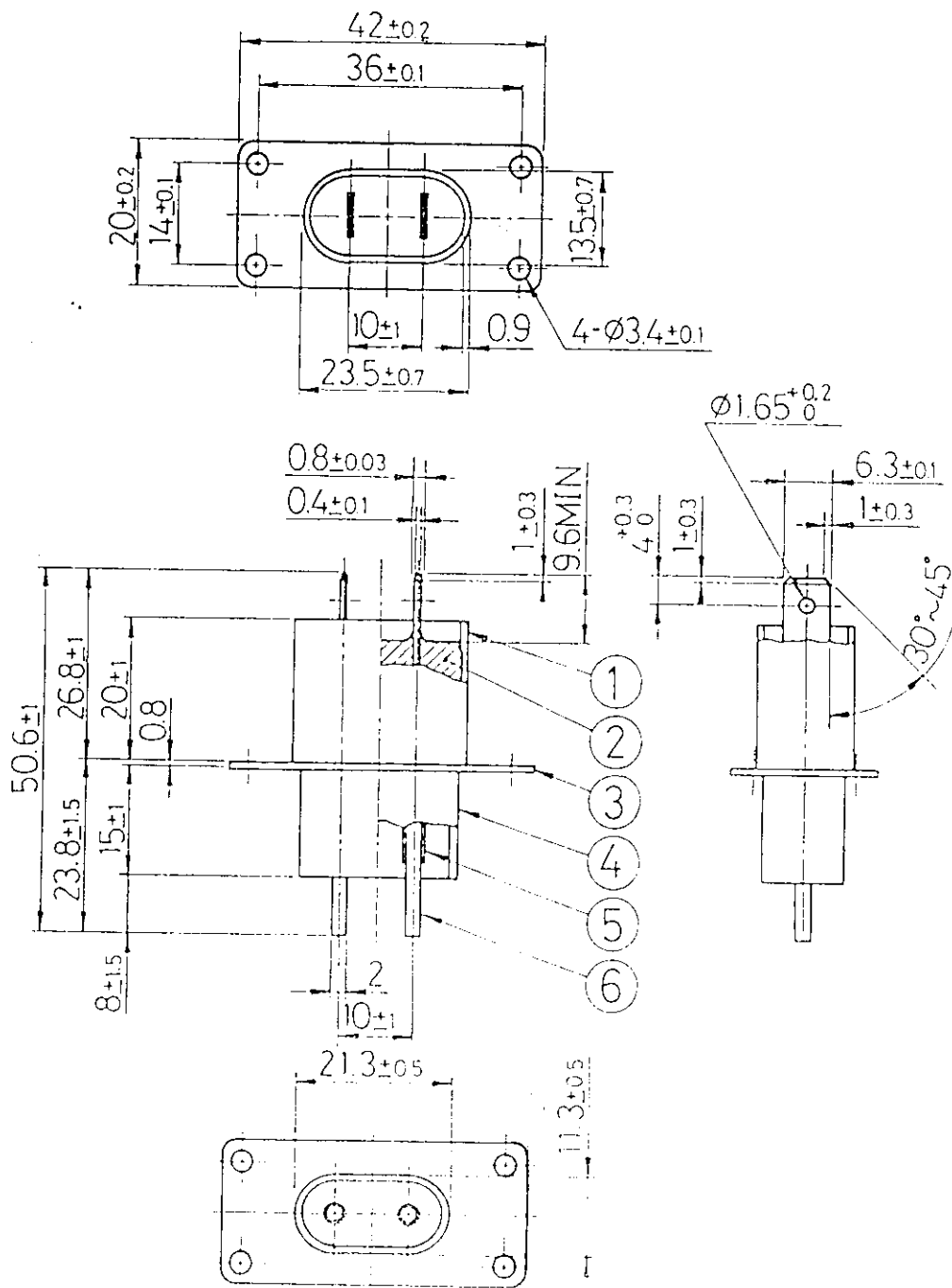
SPACING IN THE SHIELDING CASE

UNIT : mm



DETAILS OF FILTER CAPACITOR

UNIT : mm



NOTE(1) THE FASTON TAB MEETS TO BS 5057 : 1973 AND DIN 46244 : APRIL 1980.

SPEC. NO. :

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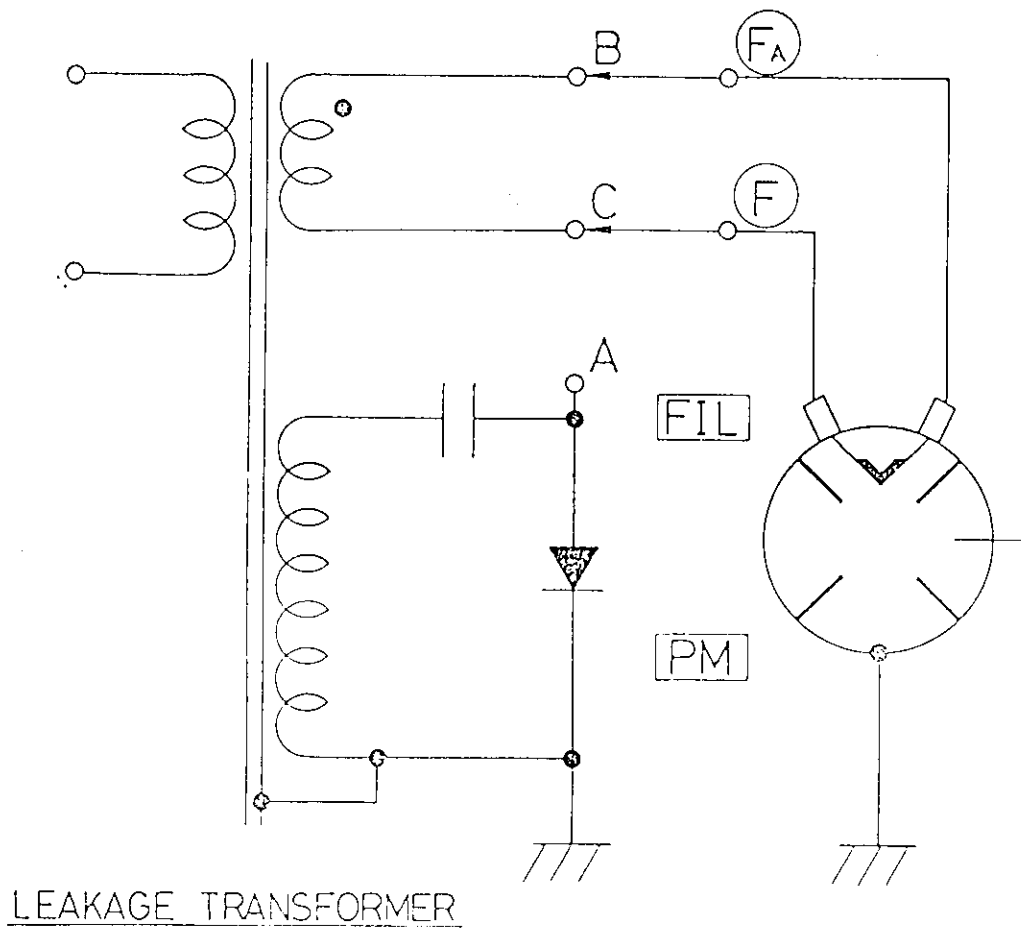
PLATE 10

MATERIAL LIST

Part name	Manufacturer	Material	Manufacturer of Materials	U L - No.			Note
				Guide No.	File No.	Grade No.	
A Capacitor (HFC-2S-1)	T D K Corporation	1 Polybutylene terephthalate	Mitsubishi Rayon Co., LTD.	QMFZ2	E54695(M)	G2930	500pF ± 1% WV10WV50
		2 Epoxy Resin	TDK Corporation	-	-	R-2, R-3	
		3 Steel	TDK Corporation	-	-	-	
		4 Polybutylene terephthalate	Polyplastic Co., LTD.	QMFZ2	E45034(B)	3310	
		5 Silicone Rubber Tube	Shin-etsu Chemical Co., LTD. Toshiba Silicone Co., LTD.	-	-	7009 E-53	
		6 Steel	TDK Corporation	-	-	-	

Part name	Manufacturer	Material	Thickness Diameter (mm)	Size (mm)	Note
B Choke coil	Dong An Corporation	Ferrite	-	15 x 16	1.5 turns 1.5 μH ± 1%
		Enameled copper wire	1.4	-	
C Shielding case	Daewoo Electronics Co., LTD.	Zinc steel	T 0.4	70 x 70	0.1%
D Shielding case cover	do	do	T 0.4	71 x 71	
E Heat sink enclosure (1)	do	do	T 0.4	-	
F Heat sink	do	Aluminium	T 0.7	30 x 30	
G Heat sink enclosure (2)	do	Zinc steel	1.4	-	

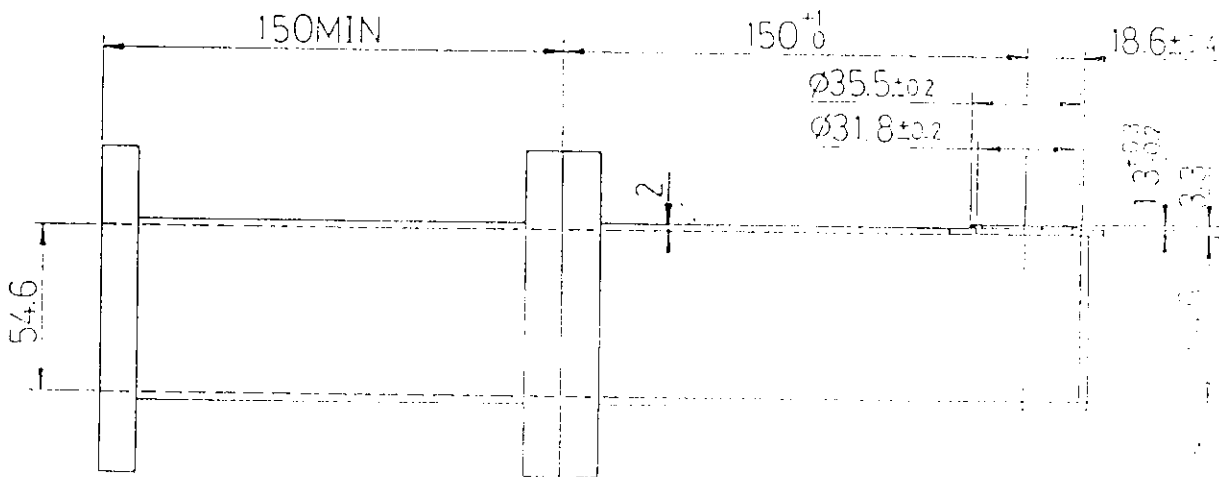
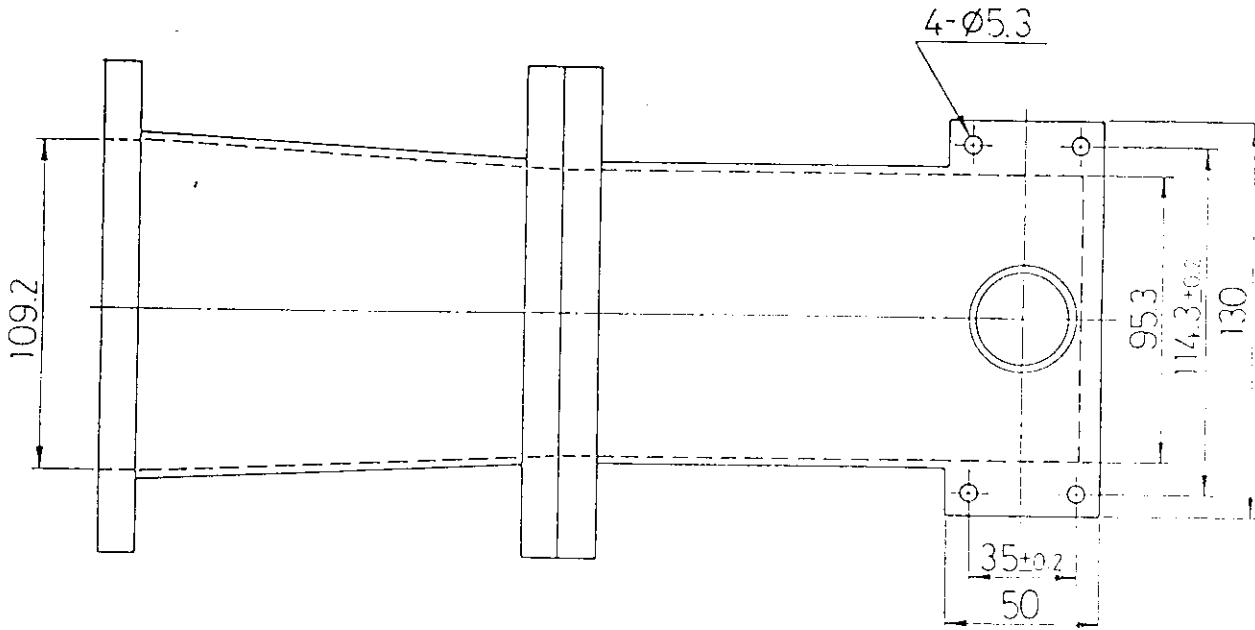
FILAMENT CONECTION



A WILL BE CONNECTED TO B OR C

R.F. COUPLER

UNIT : mm



STANDARD R.F. COUPLER DEFINED BY U.S.A. 1.

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DATE:

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LABEL

LABEL

The Label as shown below shall be put on each tube.

