

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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Research Manager
Microwave Oven
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#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

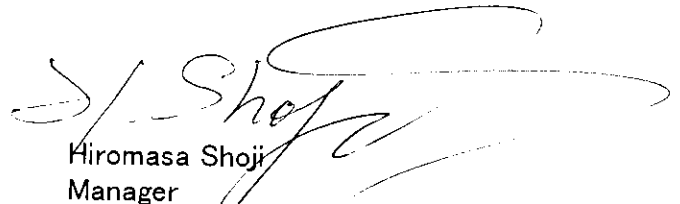
Dear Mr. Kim

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 ◀



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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. 1001 MYUNG
MANAGER, MAGNETRON DEPT.

SPECIFICATION NO. :
ISSUED :

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 | mA _{dc} | 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 (8) | 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 | E _b =1kVdc R.H. MAX. 60% | - | - | 100 | - | Ω |
| ** FILAMENT CURRENT | 4.1.1 | U _k =120c | 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) | 915 | 835 | 965 | W |
| FREQUENCY | 4.3.4 | | f | 2452 | 2442 | 2462 | MHz |
| *** PULLING FIGURE | 4.3.5 | f ₁ - f ₂ | f _p | - | - | 15 | Hz |
| *** SINK PHASE | 4.3.7 | | λ _s - I _{bm} λ _e | 0.15 | - | - | - |
| ** STABILITY MODING (1) | 4.3.11.2 | σ _L = 2, 3, 4, 100c | - | - | - | - | - |
| ** FUNDAMENTAL FREQUENCY RADIATION | 4.3.15 | σ _L = 1 | S _L | - | - | 100 | dB |
| *** LIFE TEST | 4.5.1 | | t | - | - | - | h |
| *** LIFETIME END POINT | AVERAGE POWER OUTPUT (1) | 4.3.3.1 | NOTE (7) | P _o (1) | 710 | - | W |

SPEC. NO. :

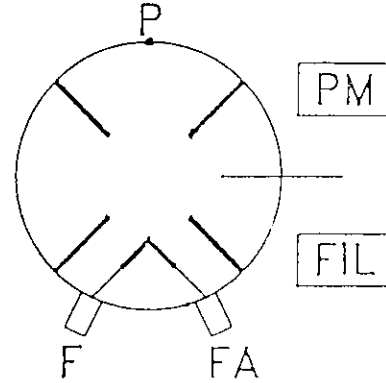
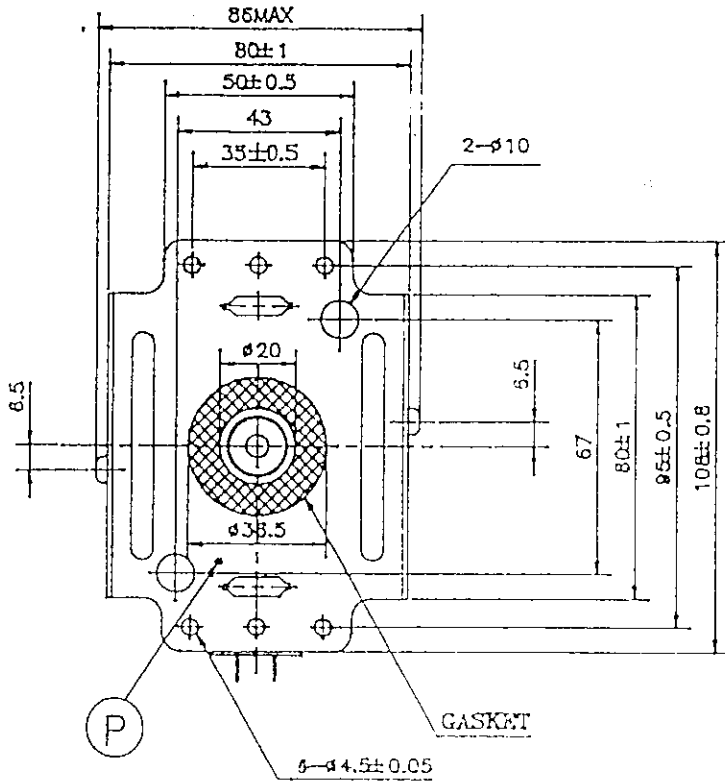
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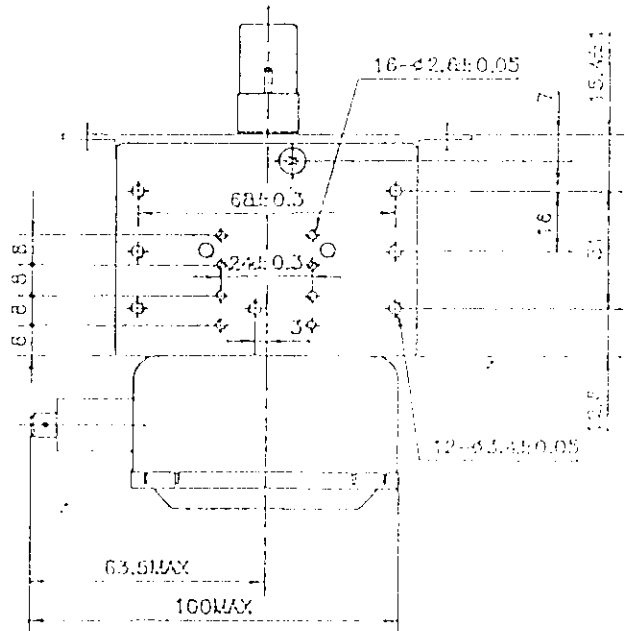
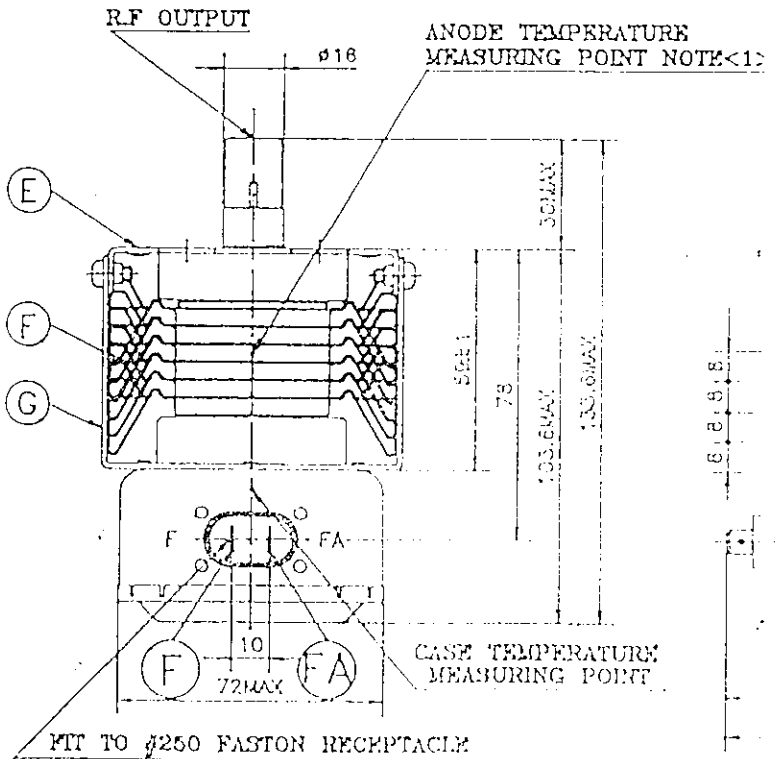
- NOTE (1) Prescribed R.F. Coupler (Refer to the attached chart) or the similar type must be used.
- (2) Forced air cooling (1000 l/min).
- (3) Single phase full wave rectifier without filter shall be used for power supply.
- (4) See outline drawing for measuring point.
- (5) Maximum saturated anode temperature for normal condition (with load in the cavity) should be 200°C.
- (6) $E_b = 10R_{Vdc}$ or $7R_{Vac}$; $t = 50s$
- (7) The surrounding temperature will be settled at the value of 25°C and it's exchange rate should be $> 1 \text{ m/s}$.
- (8) Tests shall be classified as follows.

| Class | Code | 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 | 200 | This test is intended to ensure the design compliance shall be conducted on each characteristic which are not affected by changes in the production line as long as the design is maintained. |
| Development test | 300 | This test is intended to ensure compliance of the standard design on the development stage and may be omitted if no substantial change in the design is made. |

UNIT: mm

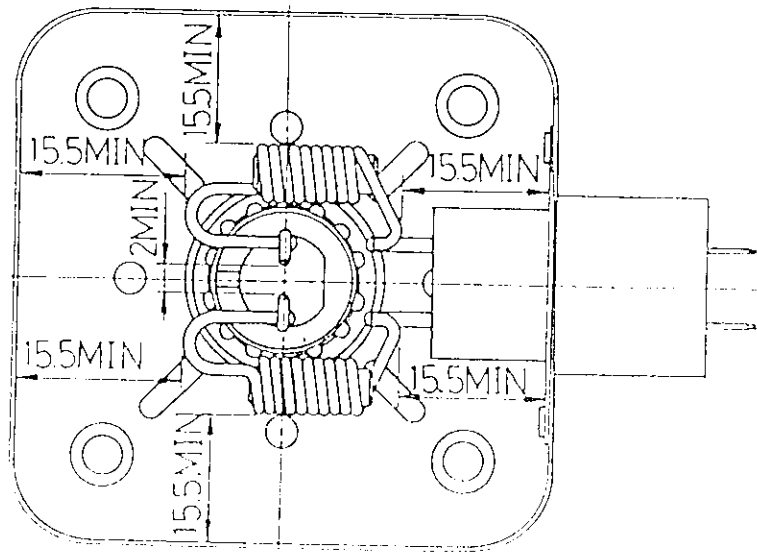
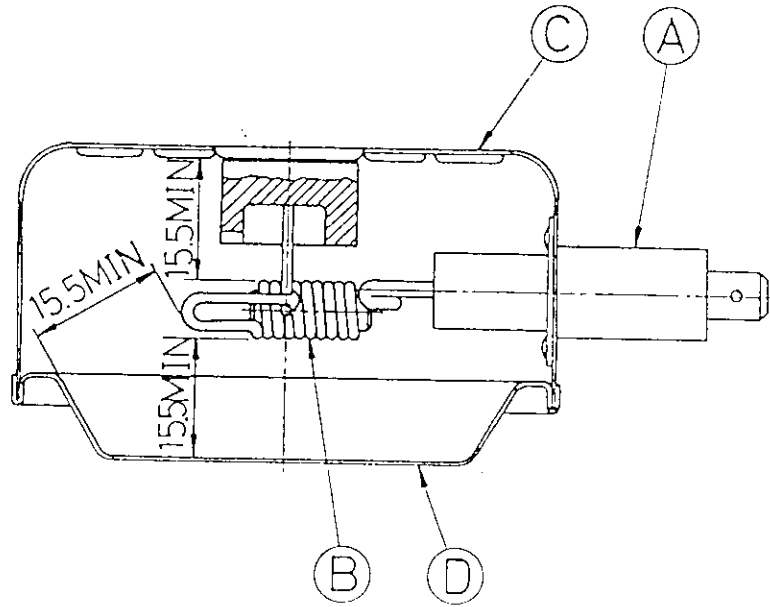


NOTE<1> TEMPERATURE TO BE MEASURED AT THE OUTLET SIDE OF AIRFLOW.



SPACING IN THE SHIELDING CASE

UNIT : mm



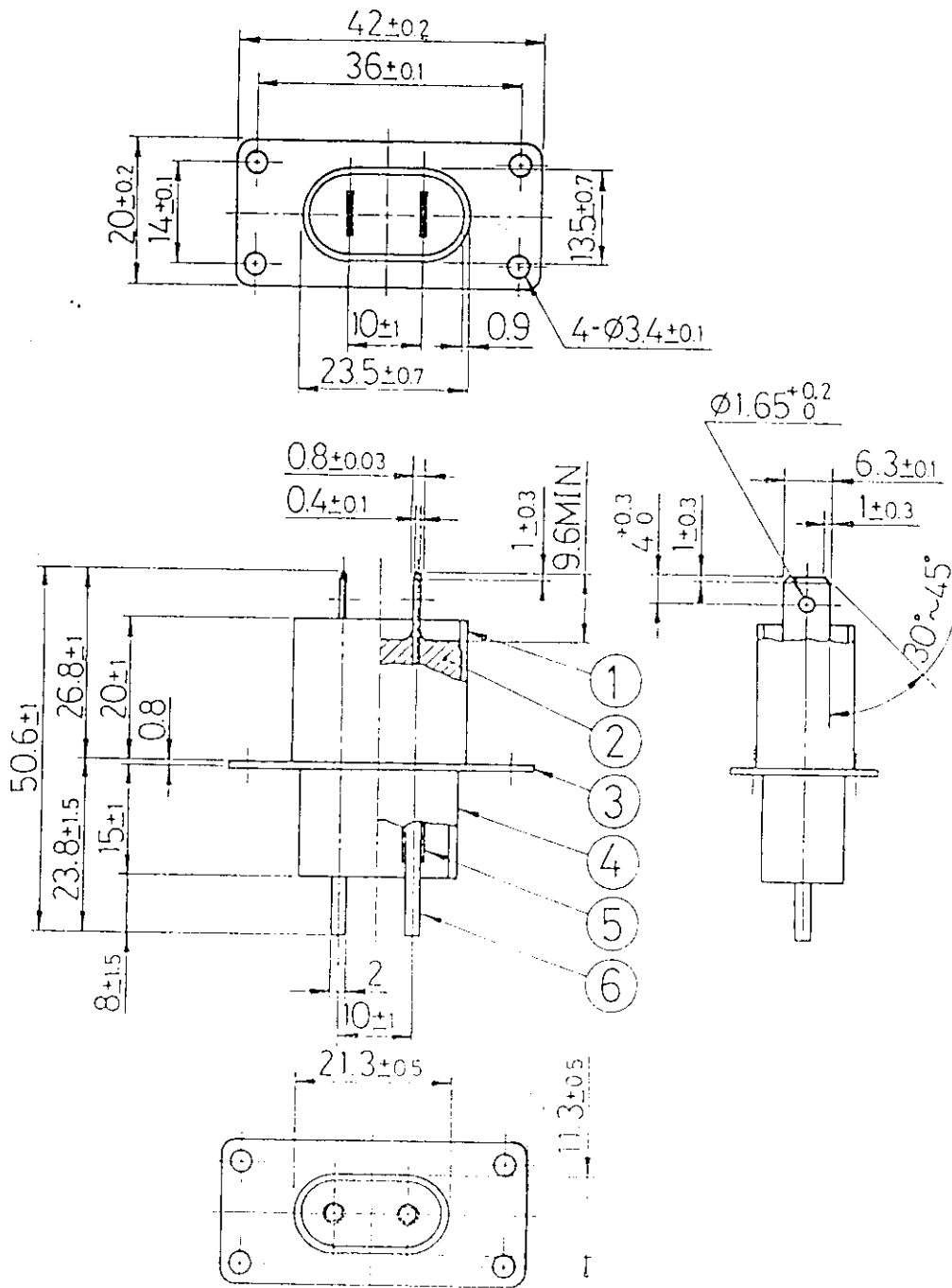
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DETAILS OF FILTER CAPACITOR

UNIT : mm



NOTE<1> THE FASTENING TAB MEETS TO BS 5057 : 1973 AND DIN 46244 : APRIL, 1980.

SPEC. NO. :

DATE:

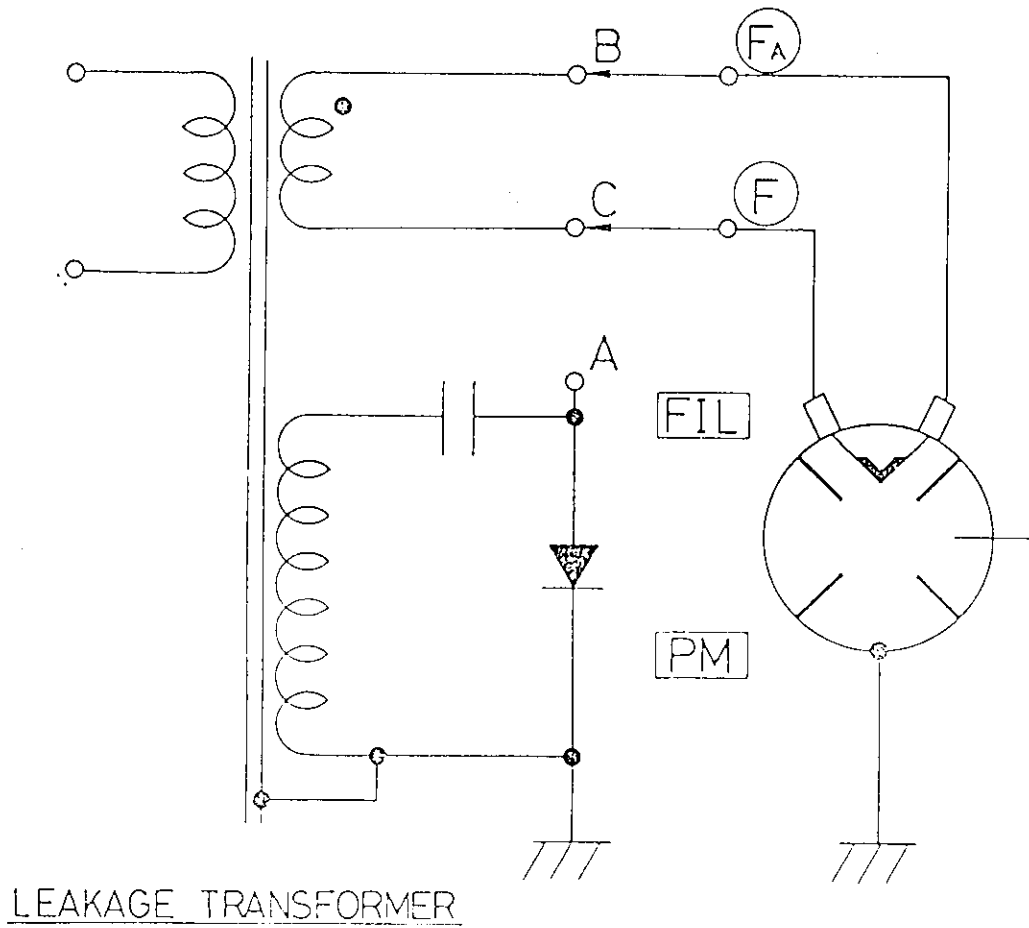
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MATERIAL LIST

| 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 | 500PMS WY10400 |
| | | 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. | - | - | 3009 | |
| | | | Toshiba Silicone Co., LTD. | - | - | 5-53 | |
| 6 Steel | TDK Corporation | - | - | - | | | |

| Part name | Manufacturer | Material | Thickness Diameter (mm) | Size (mm) | Note |
|---------------------------|------------------------------|----------------------|-------------------------|-----------|--------------------------|
| B Core coil | Dong An Corporation | Ferrite | - | 15 x 16 | 1.5 turn 1.5 / 10 x 1 |
| | | Enameled copper wire | 1.4 | | |
| C Shielding case | Daewoo Electronics Co., LTD. | Zinc steel | T 0.4 | 70 x 70 | |
| 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 | 80 x 80 | 0.1 |
| G Heat sink enclosure (2) | do | Pine steel | 1.4 | | |

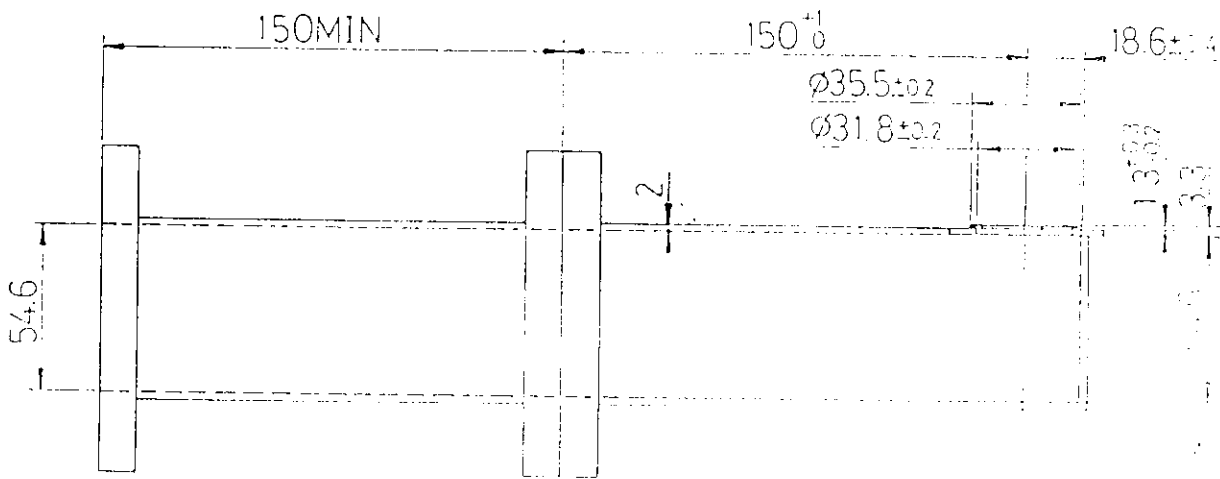
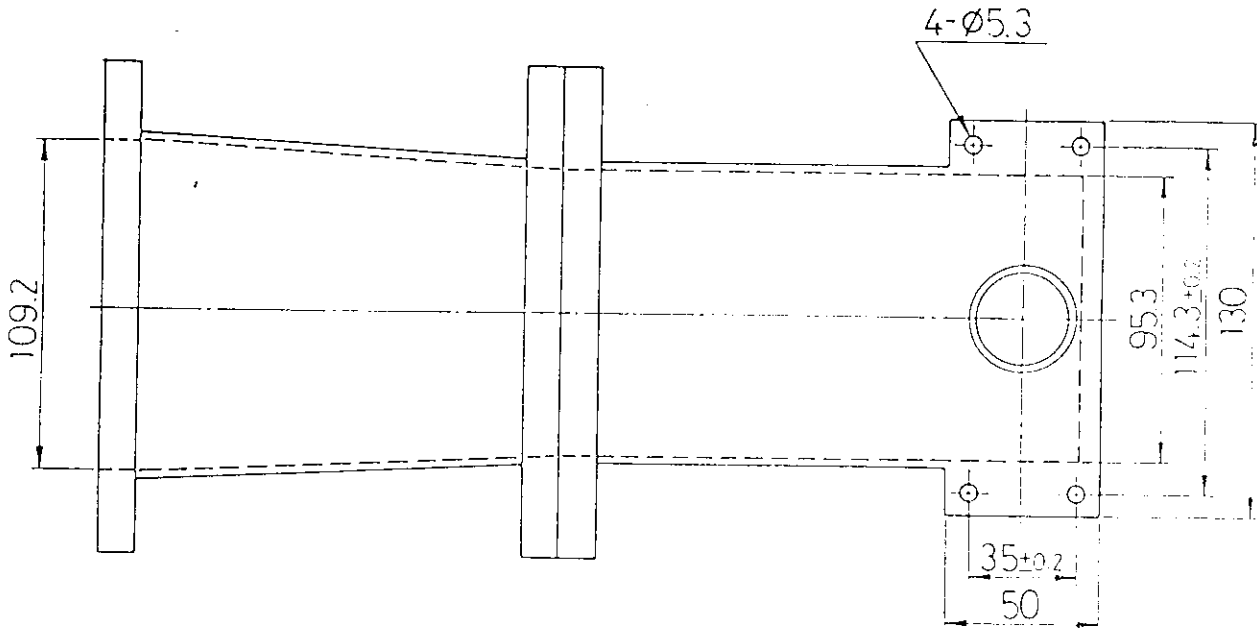
FILAMENT CONNECTION



A WILL BE CONNECTED TO B OR C

R. F. COUPLER

UNIT : mm



STANDARD R.F. COUPLER DEFINED BY U. I. A. I.

SPEC. NO. :

DATE :

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LABEL

LABEL

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

