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For Messrs. APC TECHNOLOGIES, INC. Date Sep. 8, 2011

CUSTOMER'S ACCEPTANCE SPECIFICATIONS

MAGNETRON 2M121A-80

CONTENTS

Accepted by ; _____

Date ; _____

Proposed by ; Yuichi Ito

Y. Ito

RECORD OF REVISION

Date	Sheet No.	Summary

TEST SPECIFICATIONS

Type : 2M121A

Description : Continuous Wave Magnetron for Microwave Ovens,
2450MHz, Fixed Frequency.

Absolute Maximum Ratings :

Item	Symbol	Min.	Max.	Unit	Note
Filament Voltage	Ef	4.2	5.0	V	8, 9
Pre-heating Time	tk	0	—	sec	8
Peak Anode Voltage	ebm	—	4.7	kVp	
Average Anode Current	Ib	—	525	mAdc	
Peak Anode Current	ibm	—	1.8	Ap	
Average Anode Input	Pi	—	2.1	kW	
Load VSWR		—	4		10
Anode Core Temperature	Tp	—	180	℃	6, 7

Test conditions :

Filament Voltage	Ef = 4.60 V
Average Anode Current	Ib = 450 mAdc
Load VSWR	less than 1.1

see notes 1, 2 and 3.

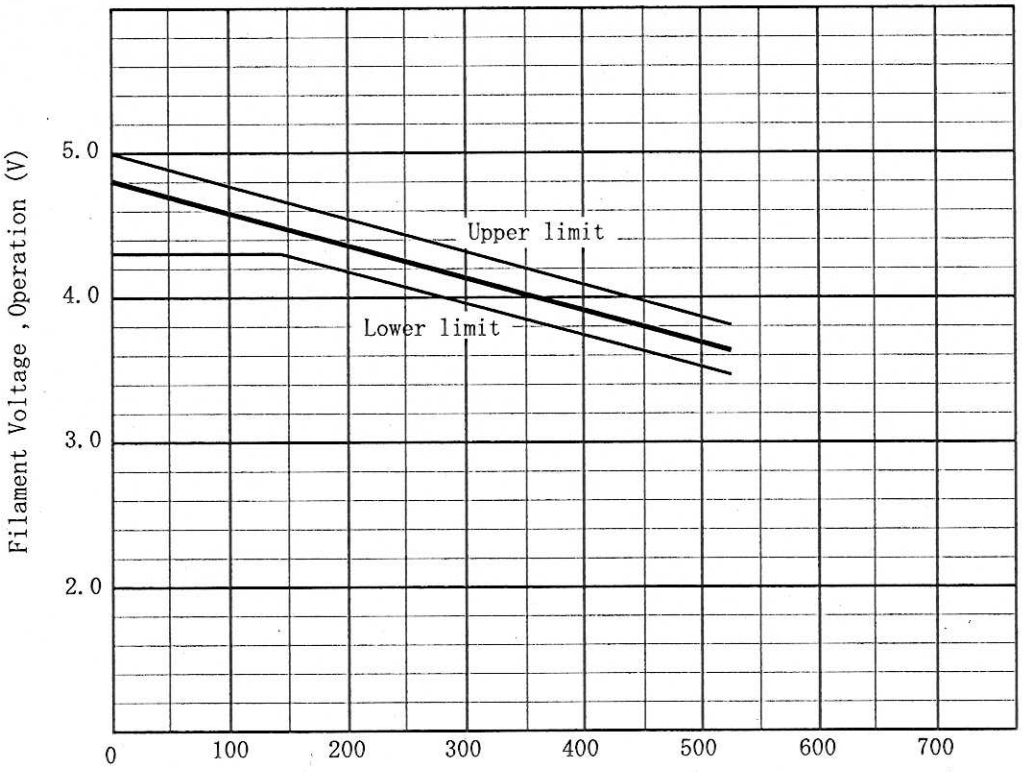
Tests :

Item	Symbol	Bogie	Min.	Max.	Unit	Note
Filament Current, Stand-by	If	14	13	15	A	4
Peak Anode Voltage	ebm	4.5	4.2	4.7	kVp	11
Average Power Output	Po	1450	1300	—	W	11
Frequency	fo	2455	2440	2470	MHz	
Stability	ST	—	550	—	mAdc	5
Breakdown Voltage	Et	—	10	—	kVdc	

Notes :

1. Single-phase, full-wave rectifier without filter should be used for power supply.
2. Block diagram of test equipment, launching section and tapered waveguide are shown in sheets 1609-0002-4 and 0003-4.
3. Air flow of 1.5 m^3/min. (53 CFM) should be provided.
4. After tk = 30 sec.
5. Any instability such as mode jump, run away etc. should not be observed at any load phase for each specified load VSWR = 2, 3 and 4
6. Point for anode core temperature measurement is shown in sheet 1604-2M121A-01
7. Storage temperature should be between -30℃ and +60℃.
8. Power supply should be a half-wave doubler.
9. Recomended value of filament voltage when running for 2M121A in Hot-start operation system is shown in Fig. 1
10. Tube should not be operated in the restricted region, arcing region and over heating region shown in Fig. 2
11. Figures are specified at 20±1℃ of the magnet's temperature.
    If the magnet's temperature is T℃, ebm(T), Po(T) and fo shall be :
    $ebm(T)=\{1-0.002(T-20)\}ebm$
    $Po(T)=\{1-0.002(T-20)\}Po$
    $fo(T)=fo$
    Measurement shall be done within 15sec after ebm is supplied.
12. Performance chart is shown in Fig. 3.
13. Cooling characteristics are shown in Fig. 4.

Condition : Hot start operation.
(Pre-heat system)



(Recomended value of filament voltage when running for 2M121A as a function of Ib)

Fig. 1 Reduction Chart of Filament Voltage

Conditions :
Anode Power Supply : Single-phase full-wave
rectifier without filter
Average Anode Current = 450 mA

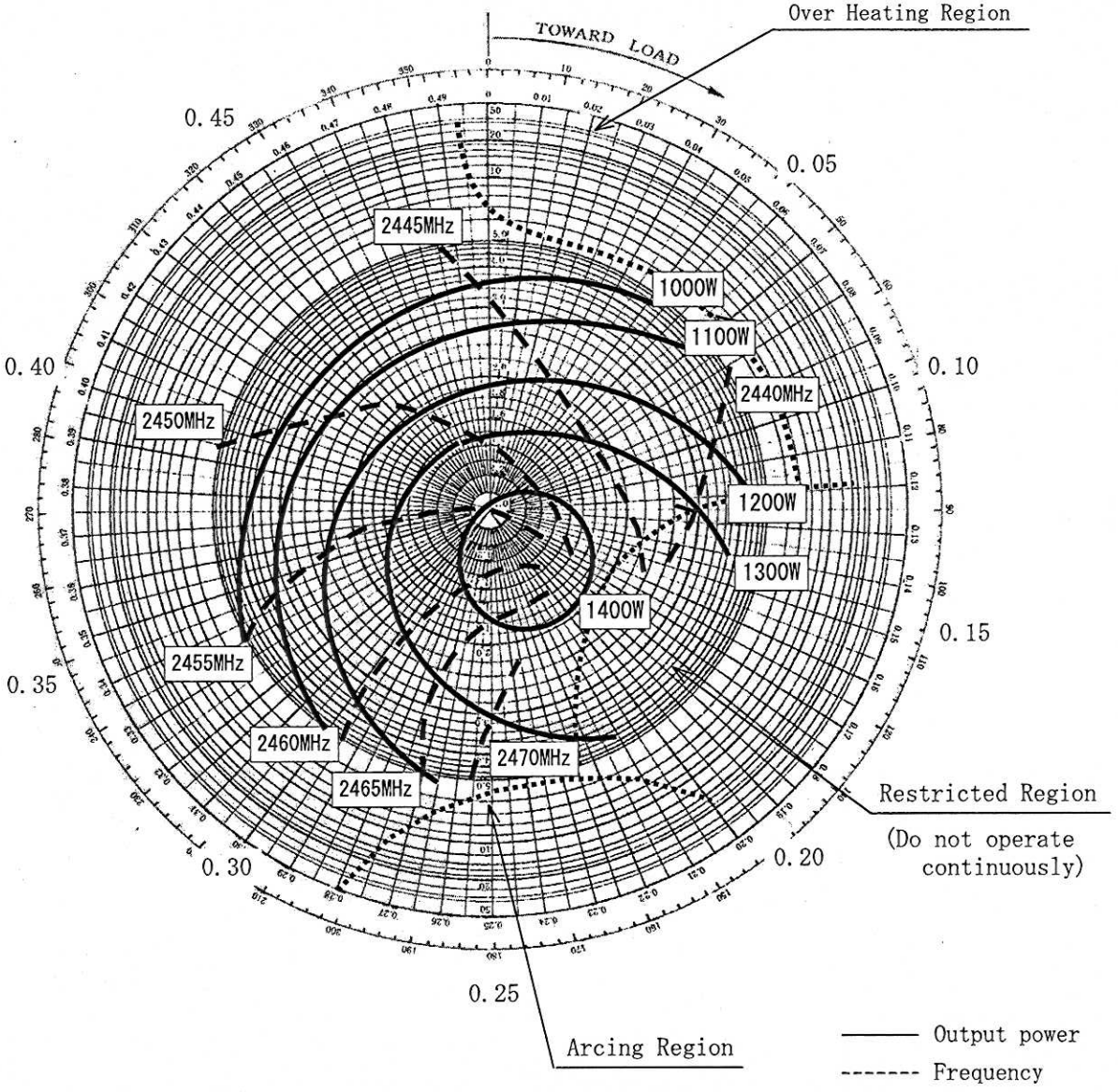


Fig. 2 Rieke Diagram of the 2M121A

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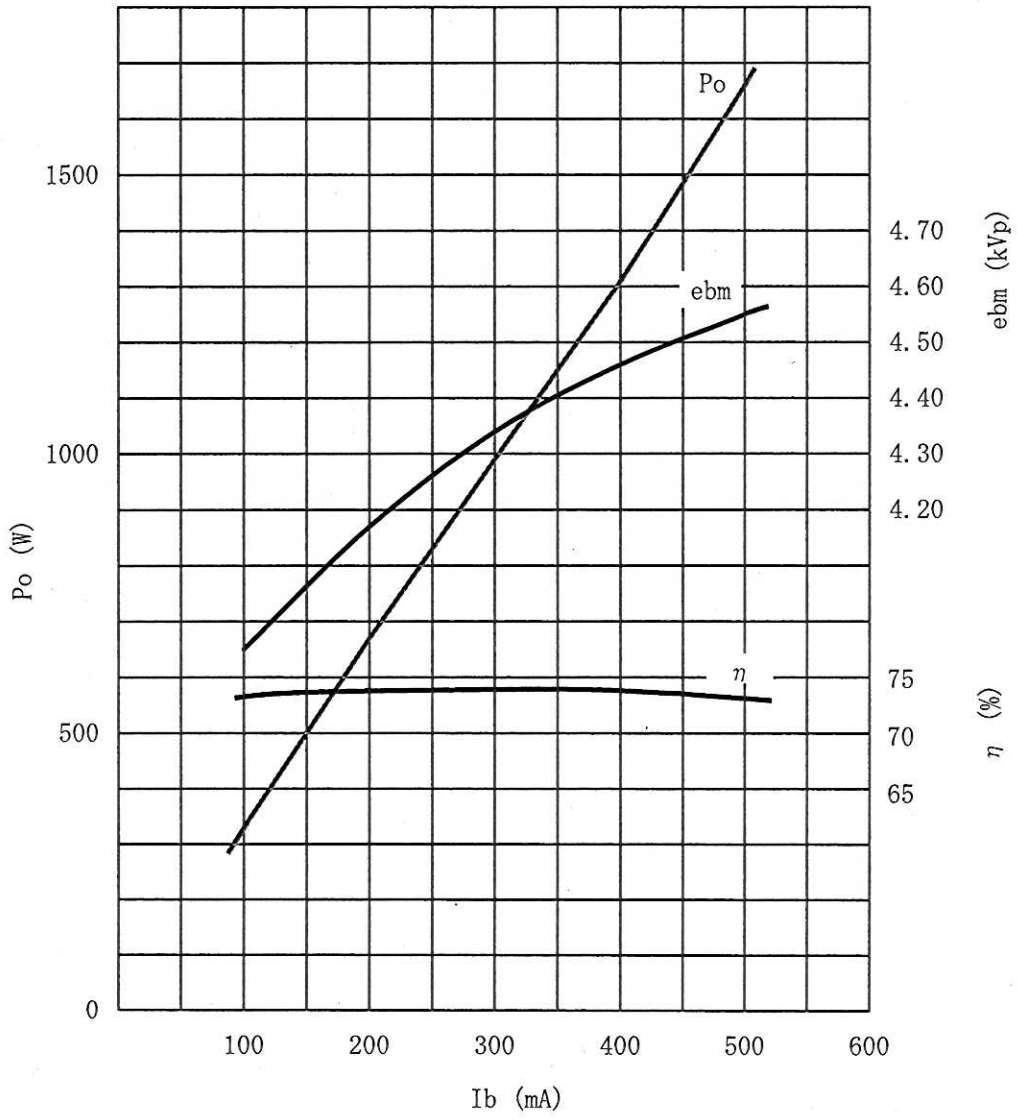

Fig.3 Performance Chart of the 2M121A

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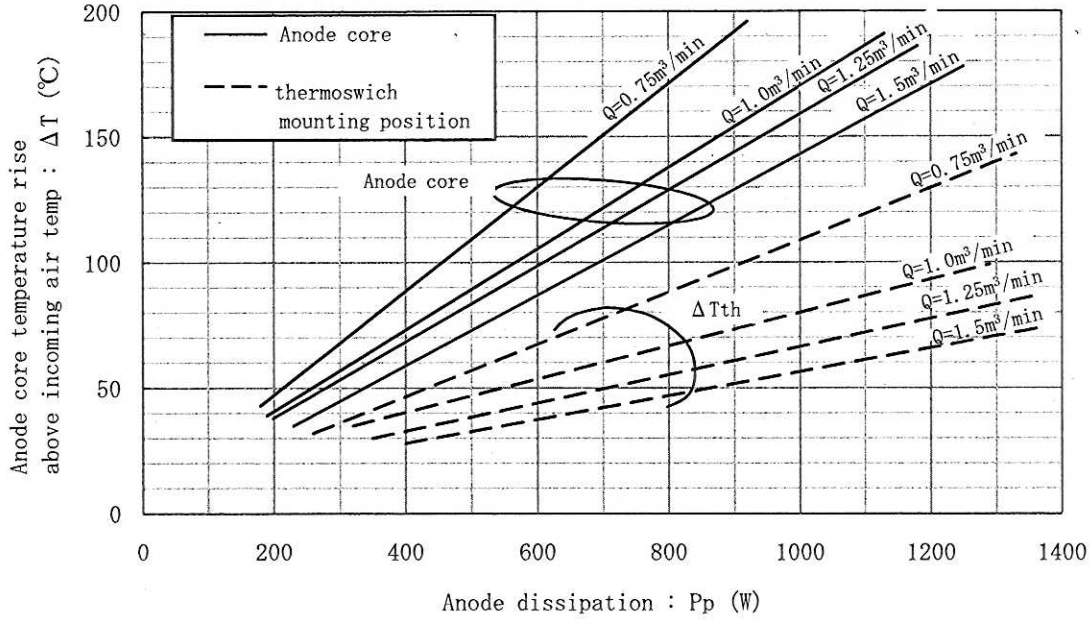
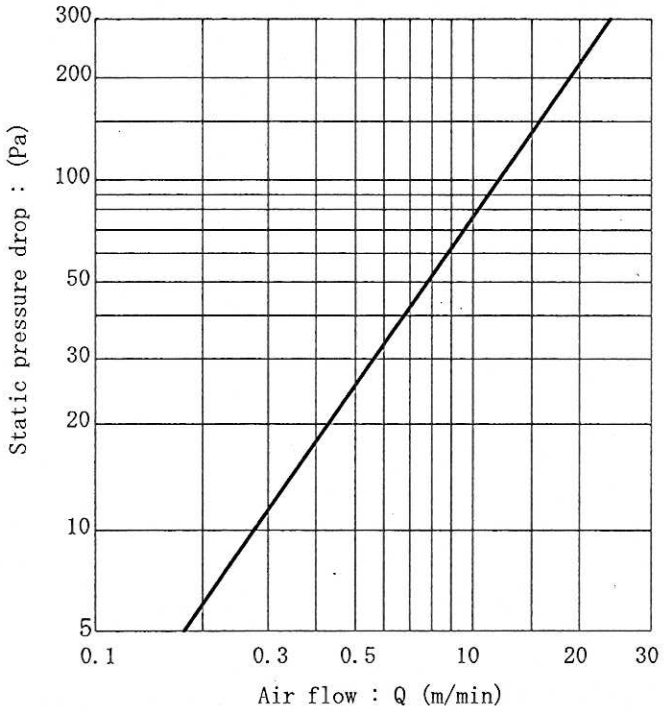


Anode Dissipation VS. Anode Core Temperature Rise.



Air Flow VS. Static Pressure

Fig. 4 Cooling Requirements of The 2M121A

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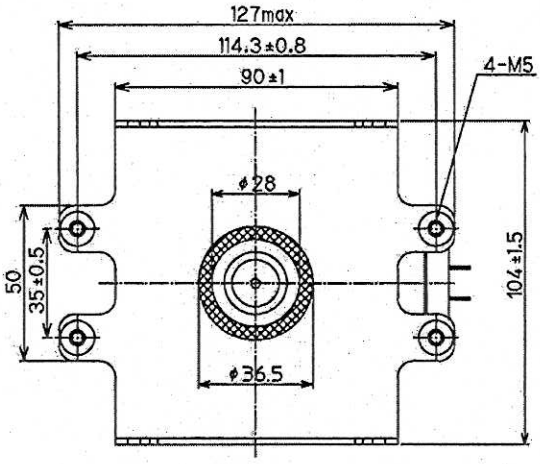
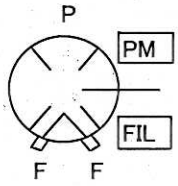
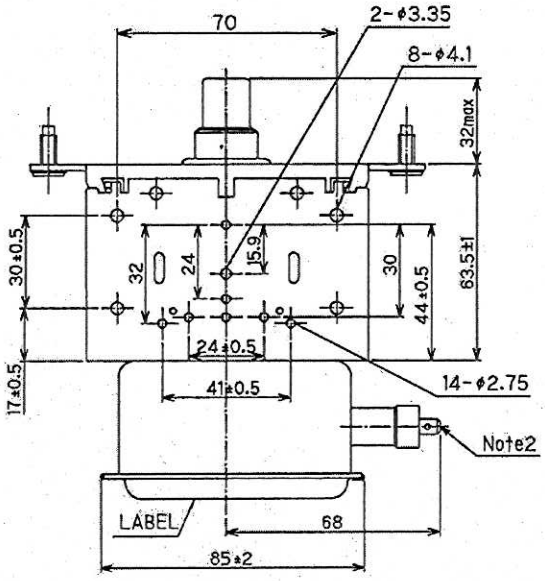
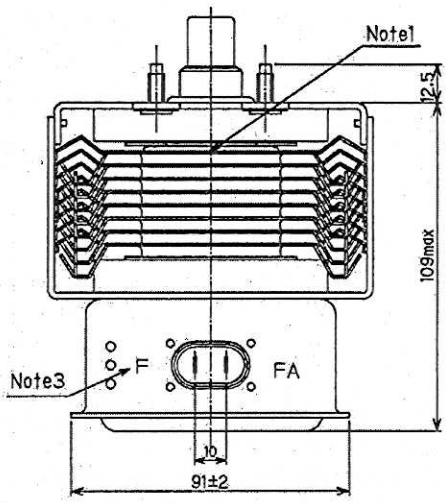
DIMENSIONAL OUTLINE OF 2M121

Dimensions in millimeters









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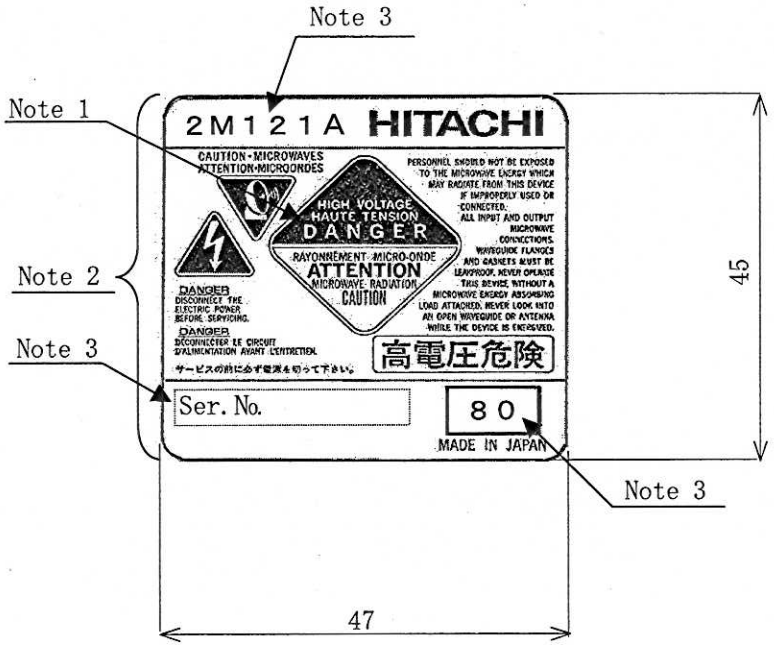
Note :

1. Anode temperature measuring point. (down stream air).
2. Adaptable to AMP Faston 250 series receptacle.
3. Filament terminal near this mark ("F" mark) shall be connected with filament transformer so as to be positive polarity when anode current flows.
4. Change of numbers and dimensions of holes on the yoke which are not specified in the drawing should accepted.
5. Change of fixing method of following portion should accepted :
   (1) upper yoke to lower yoke : fix by calking.
   (2) lower yoke to filter box : fix by welding.
   (3) filter box to capacitor : fix by calking.

LABEL

Dimensions in millimeters



Note :

1. Area indicated to be red with white letters.
2. Area indicated to be white with red letters.
3. Type name "2M121A" suffix number "80" and "Ser No." to be stamped with black letters.

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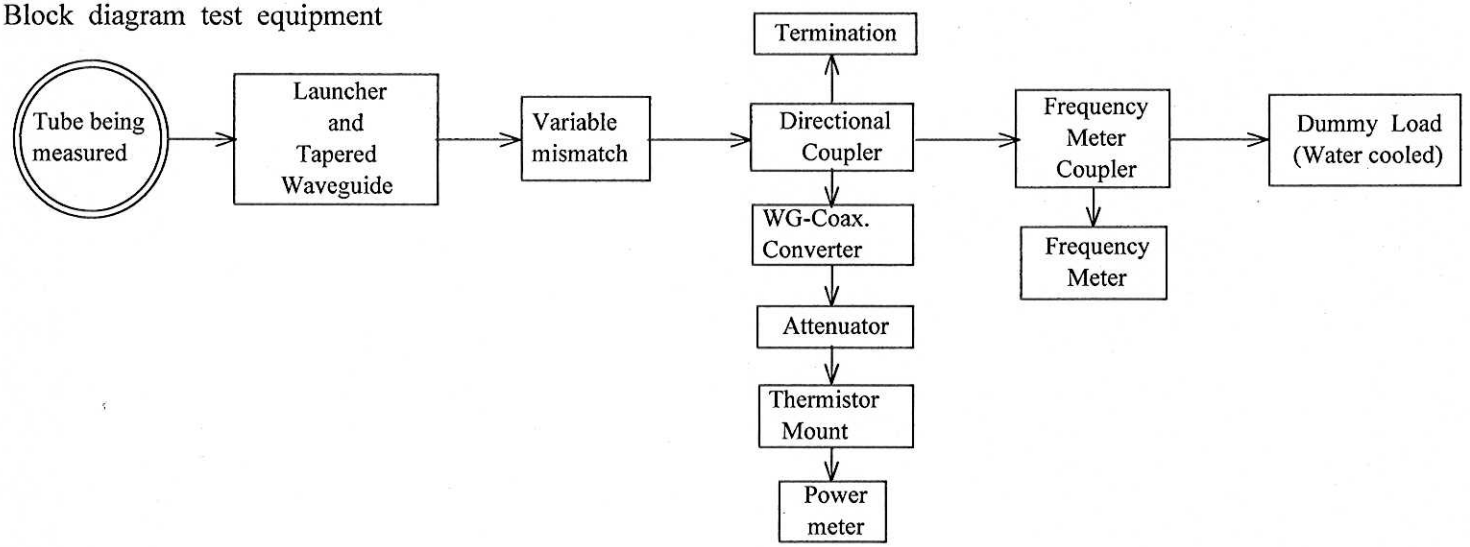
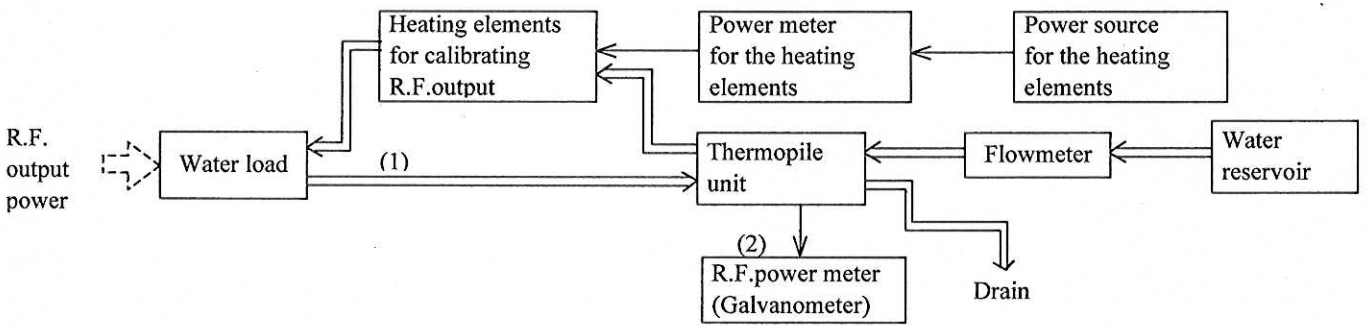
1. Block diagram test equipment



2. Calibration circuit for microwave power

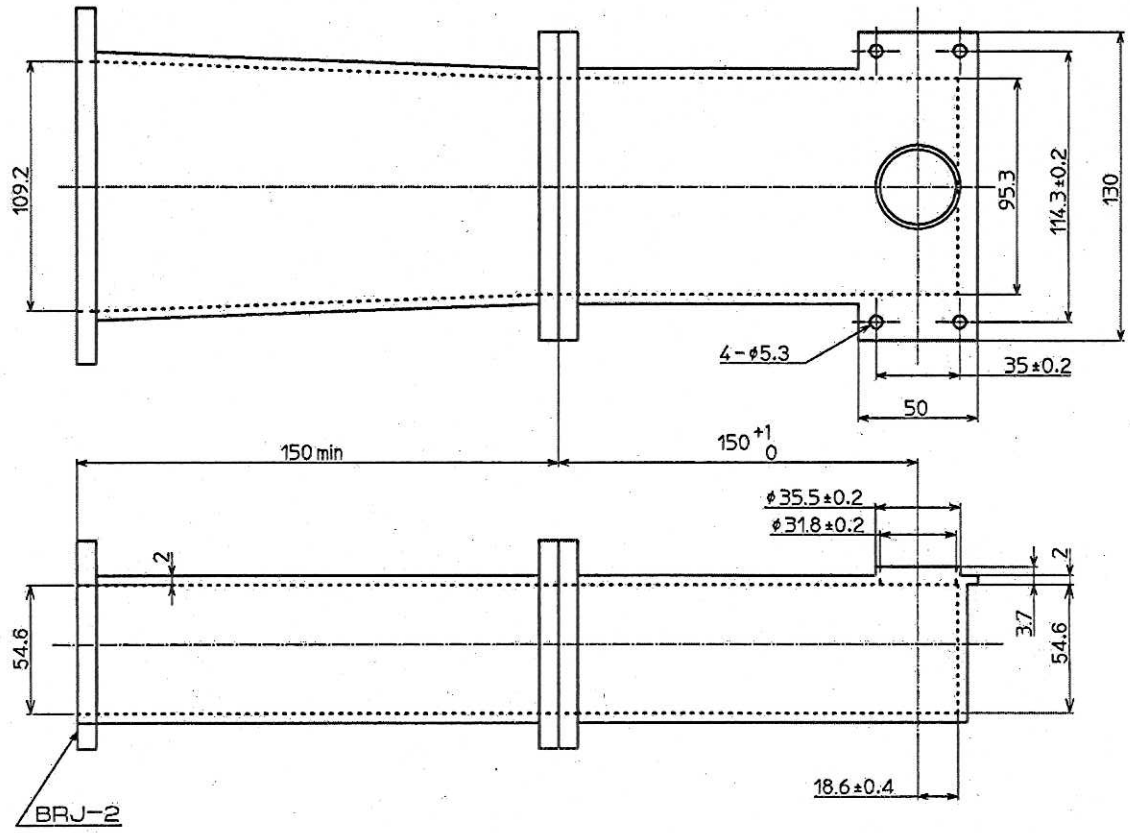


note(1) The mark ⇒ indicates the current of water.

(2) The reading of the R.F.power meter(Galvanometer)should be checked against the power meter for the heating elements.

LAUNCHER AND TAPERED WAVEGUIDE FOR TESTING

Dimensions in millimeters



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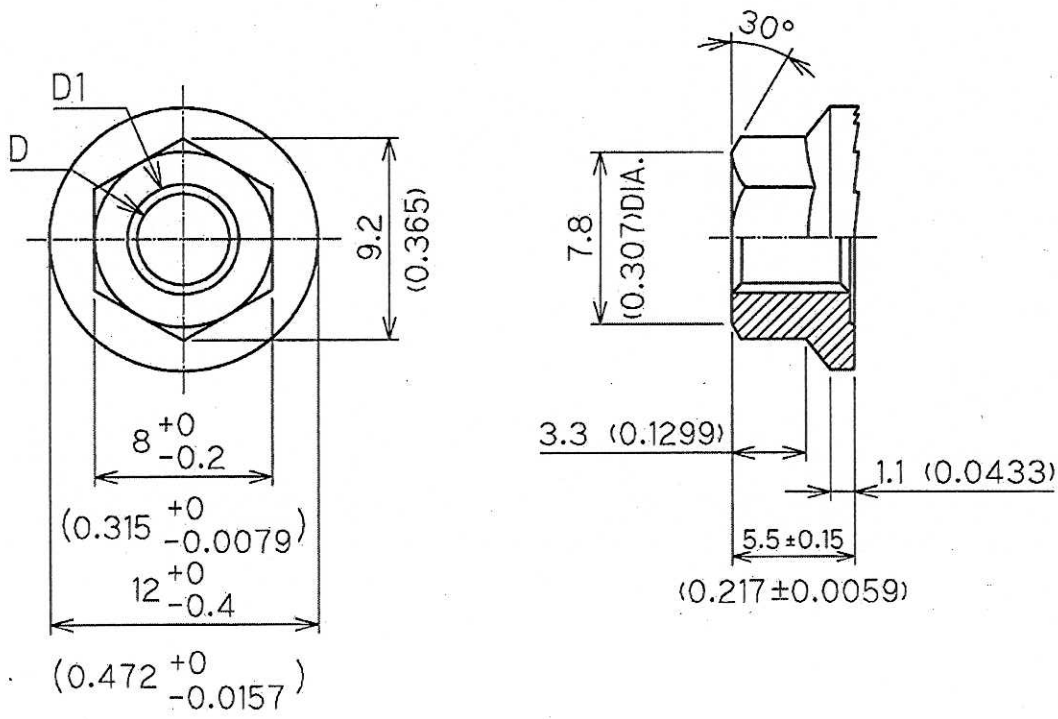
ACCESSORY

Dimensions in millimeters
(in inches)

HEXAGONAL NUT WITH FLANGE



D	:	4.134 (0.1628)DIA.
D1	:	5.0 (0.1969)DIA.
PITCH	:	0.8 (0.0315)
MATERIAL	:	steel
QUANTITY	:	4 pieces per tube.
USAGE	:	Mouting of tube.

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PRECAUTIONS FOR SAFETY

Carefully take the following precautions for safety in using the magnetrons for microwave ovens or for other applications.

Magnetrons must be handled by individuals possessing adequate backgrounds of electrical, electronic, microwave and mechanical experience.

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1.Radiation Leakage

Care should be taken for radiation leaked from the magnetron, although the leakage from the input part of magnetron is restricted to a level which human body is not adversely affected.

1-1 Properly install and tightly fasten the magnetron in the oven or in the waveguide launcher.

1-2 Do not deform the gasket or do not operate the magnetron with the gasket removed, to avoid hazardous conditions such as radiation leakage and arcing.

1-3 Never operate the magnetron without installing it in the oven or with the output antenna exposed.

1-4 Do not remove the lid of filter box nor deform the filter box.

1-5 Always keep your eyes apart from the operating magnetron in consideration of the unexpected hazardous conditions.

1-6 Do not use a dropped magnetron because the microwave sealing might be damaged.

2.Temperature

Although the magnetron is subjected to forced air or water cooling during operation, high temperature is observed the enclosure of magnetron, care should be taken as follows:

2-1 Do not touch the magnetron immediately after turning power off.
Allow the magnetron to cool before handling.

2-2 Putting on cotton gloves or the equivalents is recommended for safe handling.

2-3 Install a thermo-protector on the enclosure of magnetron to avoid abnormal temperature rise.

3.High Voltage Shock

Since the magnetron is operated with negative high potential at the filament terminals, a special care must be taken as follows :

3-1 Do not touch nor come close to the filament terminals or their surroundings during operation.

3-2 To avoid shock hazards, never insert metallic wire or line into the filter box, and never operate the magnetron with the lid of filter box open.

3-3 Before removing the magnetron from the oven, carefully check that power is turned off, and discharge the filament terminal or the capacitor in the power supply circuit by using the discharging rod adequately designed safety.

4.High Voltage Break Down

4-1 Contact resistance at connecting point for filament terminals :

Care should be taken for loose connection between filament terminal and receptacle. Because higher contact resistance as connecting point causes both larger ohmic loss and higher temperature, magnetron cannot adequately be operated due to low filament voltage, insulating materials by terminal leads (in a feed through capacitor) can easily be burned, and insulation may be broken down due to burned insulator.

Special care must be taken as follows :

4-1-1 To avoid loose contact, do not use economy type receptacle.
Premier line receptacle is recommended for tight connection.

4-1-2 Properly install receptacle to terminals.

4-1-3 Properly and tightly connect the flying lead to receptacle.

4-2 Surface of insulator of feed through capacitor :

Since the surface of insulator of the feed through capacitor is eventually contaminated by dirty materials which mainly comes from cooked food-stuff and dust in the room, proper care should be taken for the insulator from dirty smudge.

The dirty smudge on the insulator at high humidity conditions may cause the insulator burn due to high voltage.

Special care must be taken as follows :

4-2-1 Do not touch surface of insulator with bare hand or with dirty gloves when you install magnetron in the oven.

4-2-2 Protect the surface of insulator from the polluted air with soot, dust, vaporous oil, moisture, and so on. Do not blow the insulator with polluted cooling air.

4-2-3 Protect the surface of insulator from the contamination by insects, such as cockroach.

4-2-4 Do not place a combustible material near the surface of insulator.
One of solutions is to add an incombustible insulator to cover terminals and capacitor.