MG5218

X-BAND MAGNETRON

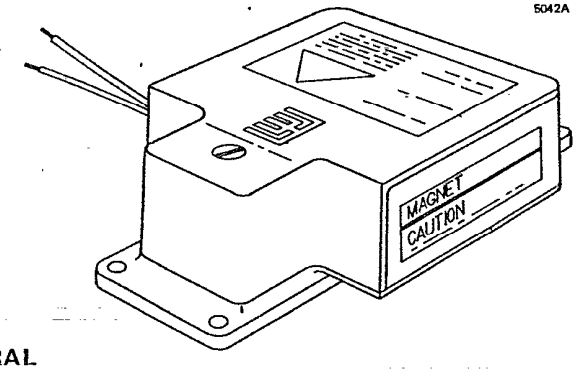
The data should be read in conjunction with the Magnetron Preamble.

ABRIDGED DATA

Compact, lightweight, rugged, fixed frequency pulse magnetron.

Frequency range	9380 to 9440	MHz
Typical peak output power	25	kW
Magnet		integral
Output		no. 16 waveguide (0.900 x 0.400 inch internal)
Coupler		IEC UBR100
Cooling		natural or conduction

5042A



GENERAL

Electrical

Cathode	indirectly heated	
Heater voltage (see note 1)	6.3	V
Heater current at 6.3 V	0.5	A
Cathode pre-heating time (minimum) (see note 2)	60	s
Input capacitance	8.0	pF max

July 1982

Mechanical

Overall dimensions	113.0 x 82.5 x 35.0 mm max
	4.450 x 3.250 x 1.378 inches max
Net weight	0.7 kg (1.54 pounds) approx
Mounting position	any

A minimum clearance of 1 inch (25 mm) must be maintained between the magnetron and any magnetic materials.

Cooling . . . . . natural or conduction

MAXIMUM AND MINIMUM RATINGS (Absolute values)

These ratings cannot necessarily be used simultaneously, and no individual rating should be exceeded.

	Min	Max	
Heater voltage (see note 1)	5.7	6.9	V
Anode voltage (peak)	—	8.6	kV
Anode current (peak)	5.0	10.0	A
Input power (mean) (see note 3)	—	100	W
Duty cycle	—	0.0025	
Pulse duration	—	2.5	μs
Rate of rise of voltage pulse (see note 4)	—	200	kV/μs
V.S.W.R. at the output coupler	—	1.5:1	
Anode temperature	—	120	°C

TYPICAL OPERATION

Operating Conditions

Heater voltage (for operation)	6.3	V
Anode current (peak)	8.0	A
Pulse duration	0.8	μs
Pulse repetition rate	900	p.p.s.
Rate of rise of voltage pulse	120	kV/μs

Typical Performance

Anode voltage (peak)	8.4	kV
Output power (peak)	25	kW
Output power (mean)	18	W

TEST CONDITIONS AND LIMITS

The magnetron is tested to comply with the following electrical specification

Test Conditions

	Oscillation 1	Oscillation 2	Oscillation 3	
Heater voltage (for test)	6.3	6.3	6.3	V
Anode current (mean)	8.0	0.8	8.0	mA
Duty cycle	0.001	0.0001	0.001	
Pulse duration (see note 5)	1.0	0.05	2.0	μs
Rate of rise of voltage pulse (see note 4)	200	200	200 kV/μs min	

Limits

	Min	Max	Min	Max	Min	Max	
Anode voltage (peak)	8.0	8.5	—	—	—	—	kV
Output power (mean)	20	—	2.0	—	—	—	W
Frequency (see note 6)	9380	9440	—	—	—	—	MHz
R.F. bandwidth at ¼ power	—	2.5	—	—	—	—	MHz
Frequency pulling (v.s.w.r not less than 1.5:1)	—	23	—	—	—	—	MHz
Stability (see note 7)	—	0.05	—	—	—	0.05	%
Cold impedance						see note 8	
Heater current						see note 9	
Temperature coefficient of frequency						see note 10	

LIFE TEST

The quality of all production is monitored by the random selection of tubes which are then life-tested under Test Conditions Oscillation 1. If the tube is to be operated under conditions other than those specified herein, English Electric Valve Company Ltd. should be consulted to verify that the life of the magnetron will not be impaired.

End of Life Criteria (under Test Conditions Oscillation 1)

Anode voltage (peak)	8.0 to 8.7	kV
Output power (mean)	18	W min
R.F. bandwidth at ¼ power	3.5	MHz max
Frequency	9380 to 9440	MHz

NOTES

1. For all values of mean input power, no reduction of heater voltage is required and for optimum performance a value within the specified ratings must be maintained.

   The magnetron heater must be protected against arcing by the use of a minimum capacitance of 4000 pF shunted across the heater directly at the input terminals; in some cases a capacitance as high as 2 μF may be necessary depending on the equipment design. For further details see the Magnetron Preamble.
2. For ambient temperatures above 0 °C. For ambient temperatures between 0 and −55 °C, cathode pre-heating time is 90 seconds minimum.
3. The various parameters are related by the following formula:

   $$P_i = i_{apk} \times v_{apk} \times Du$$

   where P_i = mean input power in watts

   i_{apk} = peak anode current in amperes

   v_{apk} = peak anode voltage in volts

   and Du = duty cycle.
4. Defined as the steepest tangent to the leading edge of the voltage pulse above 80% amplitude. Any capacitance in the viewing system must not exceed 6.0 pF.
5. Tolerance ± 10%.
6. Other frequency ranges can be supplied on request.
7. With the magnetron operating into a v.s.w.r. of 1.15:1 over a peak anode current range of 6.0 to 10.0 A. Pulses are defined as missing when the r.f. energy level is less than 70% of the normal energy level in a 0.5% frequency range. Missing pulses are expressed as a percentage of the number of input pulses applied during the period of observation after a period of 10 minutes operation.
8. The impedance of the magnetron measured over the operating frequency range when not oscillating will be such as to give a v.s.w.r. of at least 6:1 with a voltage minimum 16.5 to 22.5 mm from the output flange towards the anode.
9. Measured with heater voltage of 6.3 V and no anode input power, the heater current limits are 0.5 A minimum, 0.6 A maximum.
10. Design test only. The maximum frequency change with anode temperature change (after warming) is −0.25 MHz/°C.

HEALTH AND SAFETY HAZARDS

EEV magnetrons are safe to handle and operate, provided that the relevant precautions stated herein are observed. English Electric Valve Company does not accept responsibility for damage or injury resulting from the use of electronic devices it produces. Equipment manufacturers and users must ensure that adequate precautions are taken. Appropriate warning labels and notices must be provided on equipments incorporating EEV devices and in operating manuals.

High Voltage

Equipment must be designed so that personnel cannot come into contact with high voltage circuits. All high voltage circuits and terminals must be enclosed and fail-safe interlock switches must be fitted to disconnect the primary power supply and discharge all high voltage capacitors and other stored charges before allowing access. Interlock switches must not be by-passed to allow operation with access doors open.

R.F. Radiation

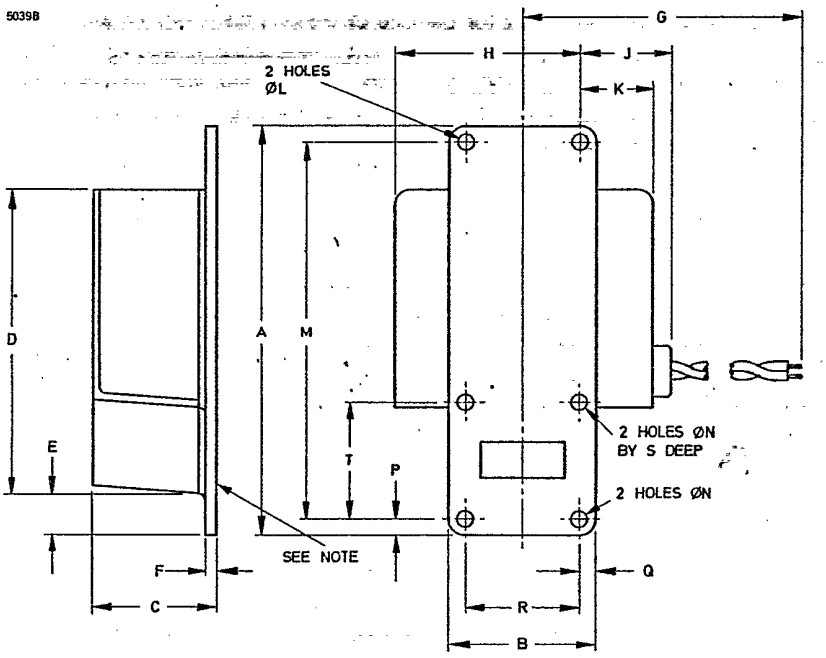
Personnel must not be exposed to excessive r.f. radiation.

All r.f. connectors must be correctly fitted before operation so that no leakage of r.f. energy can occur and the r.f. output must be coupled efficiently to the load. It is particularly dangerous to look into open waveguide or coaxial feeders while the device is energized. Screening of the cathode side arm of high power magnetrons may be necessary.

X-Ray Radiation

High voltage magnetrons emit a significant intensity of X-rays not only from the cathode sidearm but also from the output waveguide. These rays can constitute a health hazard unless adequate shielding for X-ray radiation is provided. This is a characteristic of all magnetrons and the X-rays emitted correspond to a voltage much higher than that of the anode.

OUTLINE



Lead Connections

Colour	Element
Green	Heater
Yellow	Heater, cathode

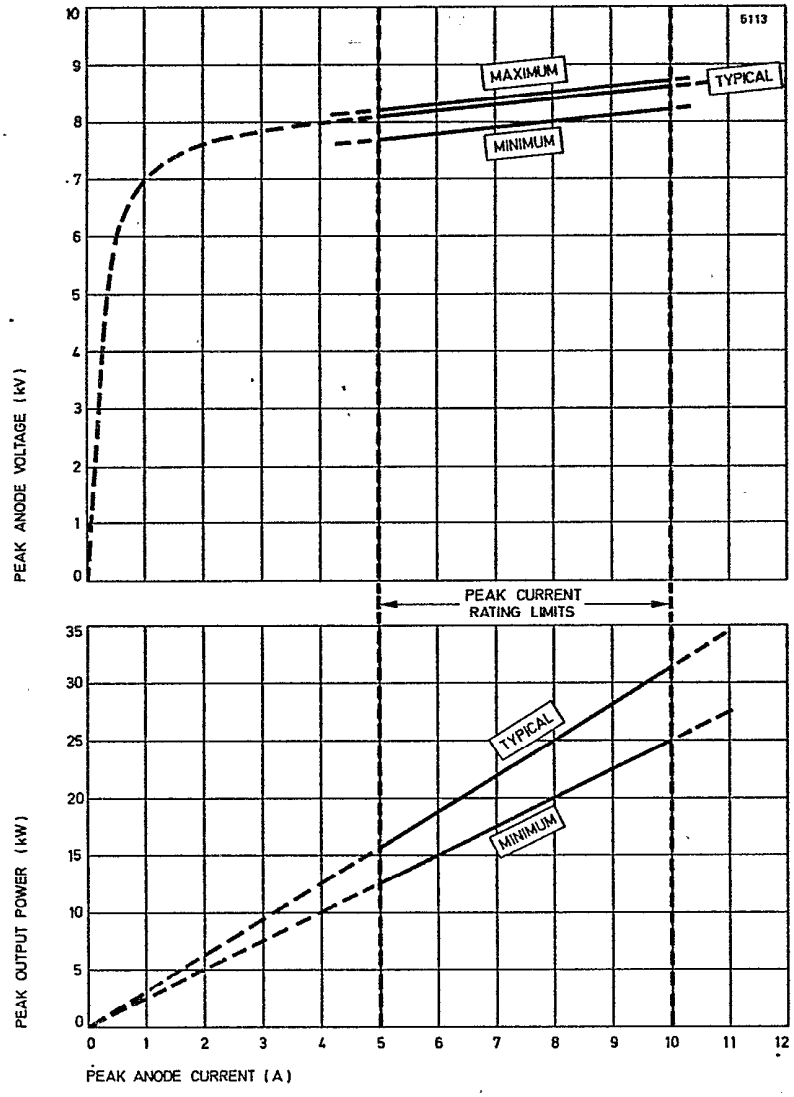
Outline Dimensions

Ref	Millimetres	Inches
A	113.0 max	4.449 max
B	41.40 ± 0.10	1.630 ± 0.004
C	35.00 max	1.378 max
D	86.00 max	3.386 max
E	10.00 min	0.394 min
F*	3.18 ± 0.10	0.125 ± 0.004
G	240 min	9.450 min
H	52.50 max	2.067 max
J	30.00 max	1.181 max
K	21.50 max	0.846 max
L	4.49 ± 0.20	0.177 ± 0.008
M	104.2 ± 0.1	4.102 ± 0.004
N	4.320 ± 0.075	0.170 ± 0.003
P	4.00 max	0.157 max
Q	5.15 ± 0.10	0.203 ± 0.004
R*	31.00 ± 0.10	1.220 ± 0.004
S	5.00 min	0.197 min
T*	32.52 ± 0.10	1.280 ± 0.004

Inch dimensions have been derived from millimetres except where inducated thus *.

Note The mating surface of the magnetron baseplate will be flat to within 0.20 mm (0.008 inch).

PERFORMANCE CHART



English Electric Valve Company Limited
Chelmsford, Essex, England
Printed in England

Author: anthony at lafox
Date: 5/14/99 11:58 AM
Priority: Normal
TO: janf at lafox
Subject: Data Spec

---------- Message Contents ----------

Jan, please see if this is in the spec file otherwise it will have to wait till Monday when JRD comes back.

---------- Forward Header ----------

Subject: Data Spec
Author: dianam at pacrim
Date: 5/14/99 3:28 PM

Hi all,

Pls kindly fax the data spec for MG5218 to us at fax:65-7442898. Customer need this spec to submit to end-user by Monday. Thks.

Regards,
Diana