

SPECIFICATION CONTROL DRAWING

REVISIONS

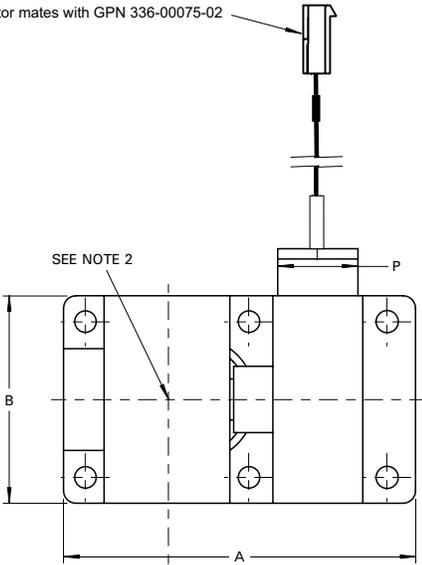
REV.	DATE	DESCRIPTION	ECO NO.
A	5/25/05	INITIAL RELEASE	-----

DWG. NO. 690-A0003-05

Connector mates with GPN 336-00075-02

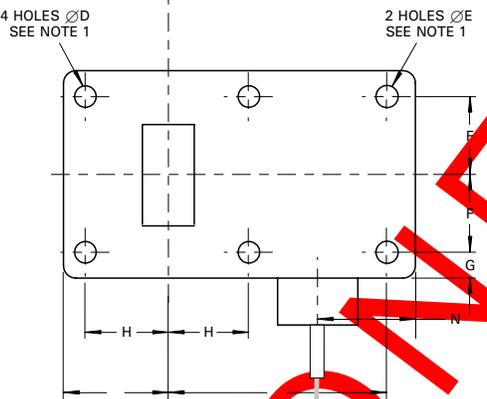
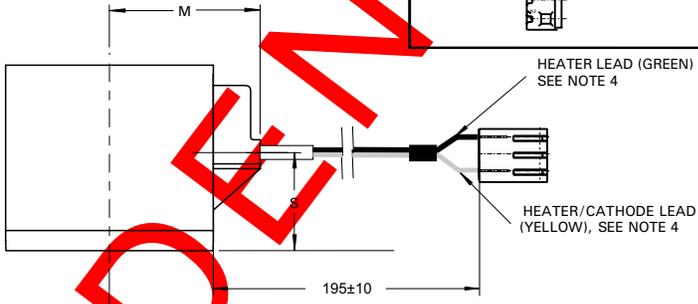
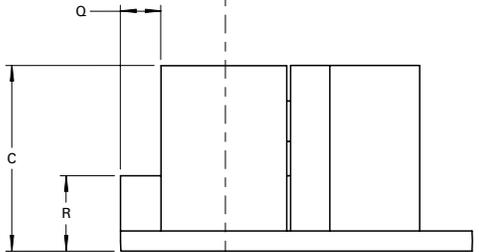
(All dimensions without limits are nominal)

Ref	Millimetres	Ref	Millimetres
A	73.0 max	H	16.26
B	42.0 max	J	20.2 max
C	40.0 max	K	43.74
D	4.39 max	M	30.0 max
E	4.24 min	N	19.0
F	4.52 max	P	16.0
G	4.37 min	Q	8.0 min
		R	15.5 max
		S	19.0 ± 1.0



Color	Element	Connector Pin #
Green	Heater	1
Yellow	Heater, Cathode	2

Pin #1



Warning!

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

A clearance of at least 50 mm is needed to prevent mutual attraction between magnetrons when removed from protective packaging.

- Outline Notes**
1. Positional tolerance 0.4 mm diameter.
 2. Anode temperature measured at this point.
 3. The mating surface of the magnetron baseplate will be flat to within 0.2 mm.
 4. Silicone rubber insulated leads, 2.05 mm diameter, contained within dimension P.
 5. Wires to be secured together with shrink tubing.

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Olathe, Kansas 66062 U.S.A.

TOLERANCE (UNLESS NOTED OTHERWISE)	DRWN	DATE
.XX ±.010", 0.25mm .XXX ±.005", 0.13mm HOLES ±.003", 0.08mm ANGLES ±0 DEG./30 MIN.	JRC	5/25/05
	CHKD.	
	PROJ. MGR.	
	APPR.	

TITLE	SIZE	DWG. NO.	REV.
MAGNETRON, 9410MHz, 4.0kW, E2V	A	690-A0003-05	A
SCALE	NONE	SHT. 1 OF 4	

ABRIDGED DATA

Compact, rugged, lightweight, fixed frequency pulse magnetron with very low levels of unwanted emissions.

Operating frequency	9410 ± 30	MHz
Typical peak output power	4.0	kW
Magnet	integral	
Cooling	conduction and natural	

GENERAL

Electrical

Cathode	indirectly heated	
Heater voltage (see note 1)	6.3	V
Heater current at 6.3 V (see note 2)	0.55	A
Cathode pre-heating time (minimum) (see note 3)	60	s
Input capacitance	8.0	pF max
Temperature coefficient of frequency	see note 4	

Mechanical

Overall dimensions	see outline
Net weight	250 g approx
Mounting position	any
Output	no. 16 waveguide
Coupler	IEC UBR100

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A clearance of at least 50 mm is needed to prevent mutual attraction between magnetrons when removed from protective packaging.

Cooling	conduction and natural
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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
Heater starting current (peak)	-	3.0	A
Anode voltage (peak)	3.4	3.9	kV
Anode current (peak)	2.0	4.0	A
Input power (mean) (see note 5)	-	25	W
Duty cycle	-	0.0025	
Pulse duration	-	2.5	μs
Rate of rise of voltage pulse (see notes 6 and 7)	-	100	kV/μs
VSWR at the output coupler	-	1.5:1	
Anode temperature	-55	120	°C

TYPICAL OPERATION

Operating Conditions

Heater voltage (for operation)	6.3	V
Anode current (peak)	3.0	A
Pulse duration	1.0	μs
Pulse repetition rate	1000	pps
Rate of rise of voltage pulse	40	kV/μs

Typical Performance

Anode voltage (peak)	3.7	kV
Output power (peak)	4.0	kW
Output power (mean)	4.0	W

TEST CONDITIONS AND LIMITS

The magnetron is tested to comply with the following electrical specification.

Test Conditions

Heater voltage (for test)	6.3	V
Anode current (mean)	3.0	mA
Duty cycle	0.001	
Pulse duration (see note 8)	1.0	μs
VSWR at the output coupler	1.15:1	max
Rate of rise of voltage pulse (see note 6):		
using hard tube pulser	100	kV/μs min
alternatively using line type pulser	50	kV/μs min

Limits

	Min	Max	
Anode voltage (peak) (see note 9)	3.5	3.8	kV
Output power (mean)	3.6	-	W
Frequency (see note 10)	9380	9440	MHz
RF bandwidth at 1/4 power (see note 11)	-	2.5	MHz
Frequency pulling (VSWR not less than 1.5:1) (see note 11)	-	30	MHz
Stability (see note 12)	-	0.1	%
Heater current	-	see note 2	

LIFE TEST

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

End of Life Criteria (Under the above Test Conditions)

Anode voltage (peak)	3.4 to 3.9	kV
Output power (mean)	3.4	W min
RF bandwidth at 1/4 power	3.5	MHz max
Frequency	9350 to 9440	MHz



GARMIN®

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SIZE

A

DWG. NO.

690-A0003-05

REV.

A

SCALE

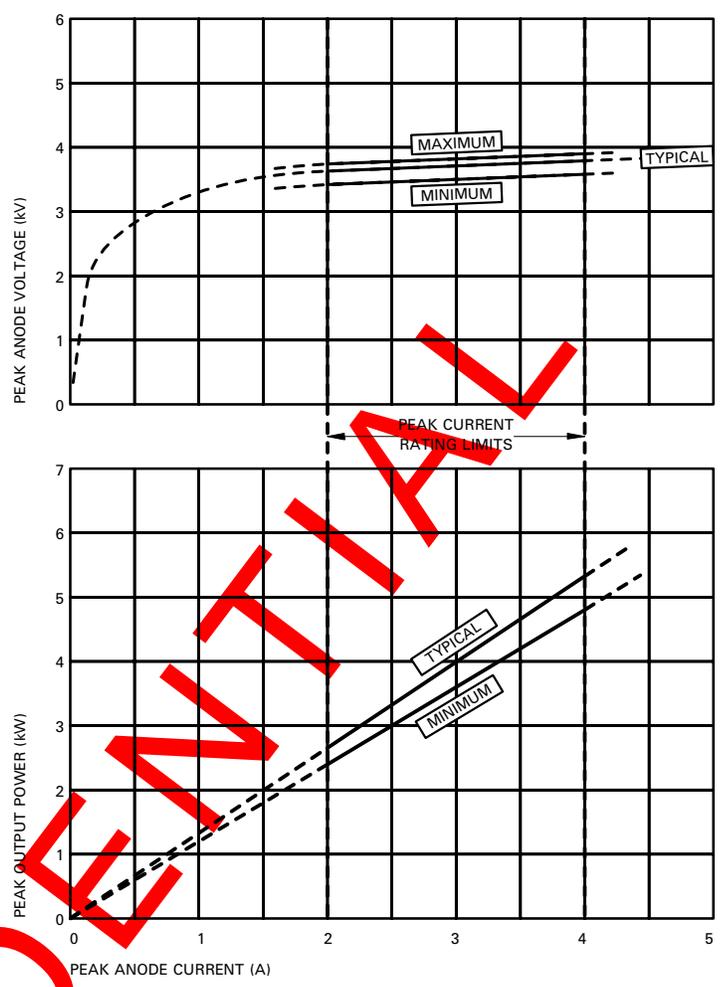
NONE

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NOTES

- No reduction of heater voltage is required at any value of mean input power. 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.
- 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.
- For ambient temperatures above 0 °C. For ambient temperatures between 0 and -55 °C, cathode pre-heating time is 75 seconds minimum.
- Design test only. The maximum frequency change with anode temperature change (after warming) is -0.25 MHz/°C.
- 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.
- 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.
- The maximum rate of rise of voltage for stable operation depends upon detailed characteristics of the applied pulse and the pulser design. The specified maximum rating applies to typical hard tube pulsers. For minimum starting jitter and optimum operation, the recommended rate of rise of voltage for most line type pulsers is from 30 to 50 kV/μs.
- Tolerance ± 10%.
- Measurements taken 'as read' using suitably calibrated equipment.
- Measured at factory ambient. Anode temperature 40 °C approx.
- Design test only.
- Design test only. With the magnetron operating into a VSWR of 1.15:1 over a peak anode current range of 2.0 to 4.0 A. Pulses are defined as missing when the RF 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 a two minute period of observation.

PERFORMANCE CHART



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<p>SCALE NONE</p>		<p>SHT. 3 OF 4</p>	