

# F4008C CARCINOTRON

The F4008C "O" type carcinotron is a backward wave oscillator delivering an output power of 30 mW (minimum) to 300 mW over the range 7 to 11 GHz.

Amplitude modulation can be achieved by anode voltage variation. Frequency modulation is obtained by varying the line voltage. The frequency is independent of the load up to a VSWR of 3 : 1.

An integral permanent magnet insures focusing, forced air cooling insures operation in a wide temperature range.

This "O" type carcinotron, which features excellent signal to noise ratio is particularly suitable for wide frequency sweep wobbled generator, wide dispersion spectrum analyser, radar panoramic receiver, frequency agile radar (master and local oscillator).



## GENERAL CHARACTERISTICS

## Electrical (1)

|                                             | min. | 6.3 | max. |       |
|---------------------------------------------|------|-----|------|-------|
| Heater voltage                              |      |     |      | V     |
| Heater current                              | 0.75 |     | 1.80 | A     |
| Grid voltage                                | -100 |     | 0    | V     |
| Anode voltage (2)                           | -    |     | 150  | V     |
| Anode current                               | -1   |     | +2   | mA    |
| Line voltage at 7 GHz                       | 300  |     | -    | V     |
| at 11 GHz                                   | -    |     | 1500 | V     |
| Line current                                | -    |     | 25   | mA    |
| — Line frequency modulation                 |      |     |      |       |
| Modulation coefficient at 7 GHz             | -    |     | 9.5  | MHz/V |
| Modulation coefficient at 11 GHz            | 1.3  |     | -    | MHz/V |
| — Anode frequency modulation                |      |     |      |       |
| Modulation coefficient at 7 GHz             | -    |     | 2.5  | MHz/V |
| Modulation coefficient at 11 GHz            | 0.5  |     | -    | MHz/V |
| — Anode amplitude modulation                |      |     |      |       |
| Anode voltage variation for an output power |      |     |      |       |
| variation of 6 dB - at 7 GHz                | -    |     | 70   | V     |
| - at 11 GHz                                 | 15   |     | -    | V     |
| — Power variation                           |      |     |      |       |
| in the range 7 to 11 GHz                    | -    |     | 8    | dB    |
| in any 0.2 GHz bandwidth                    | -    |     | 1.5  | dB    |
| Grid voltage for cut-off                    | -100 |     | -    | V     |
| — Interelectrode capacitances               |      |     |      |       |
| Anode to all other electrodes               | -    |     | 30   | pF    |
| Line to all other electrodes                | -    |     | 30   | pF    |
| Signal to noise ratio between 1 and 10 MHz  | 40   |     | -    | dB    |

**(1) All voltages are referred to the cathode.**

(2) Anode or accelerator. Line or cathode may be connected to ground, both are isolated from the focusing device.



## Mechanical

|                          |                            |
|--------------------------|----------------------------|
| Operating position       | any                        |
| RF connections           | 50 $\Omega$ N type UG 21/U |
| Weight                   | 3.5 kg                     |
| Focusing                 | permanent magnet           |
| Power supply connections | see drawing                |

## ABSOLUTE RATINGS (non simultaneous values)

|                      | min. | max. |    |               | min. | max. |    |
|----------------------|------|------|----|---------------|------|------|----|
| Heater voltage       | 6.1  | 6.5  | V  | Anode voltage | -    | 200  | V  |
| Heater surge current | -    | 3.5  | A  | Anode current | -1   | +3   | mA |
| Warm-up time         | 2    | -    | mn | Line voltage  | -    | 1600 | V  |
| Grid voltage         | -125 | -    | V  | Line current  | -    | 30   | mA |

## Cooling

|                                      | min. | max.   |                        |
|--------------------------------------|------|--------|------------------------|
| Temperature at the measurement point | -    | 100    | $^{\circ}\text{C}$     |
| Air flow                             | -    | 10     | $\text{dm}^3/\text{s}$ |
| Air pressure                         | -    | 0.0025 | bars                   |
| Flow direction                       | (1)  |        |                        |

## Environmental conditions

|                             | min. | max. |                    |
|-----------------------------|------|------|--------------------|
| Vibrations from 10 to 50 Hz | -    | 1    | mm                 |
| Acceleration at 50 Hz       | -    | 1    | g                  |
| Shocks - acceleration       | -    | 15   | g                  |
| - duration                  | -    | 11   | ms                 |
| Ambient temperature         |      |      |                    |
| - during operation          | -40  | +100 | $^{\circ}\text{C}$ |
| - during storage            | -50  | +110 | $^{\circ}\text{C}$ |

## TYPICAL OPERATION

|                |      |     |               |      |    |
|----------------|------|-----|---------------|------|----|
| Heater voltage | 6.3  | V   | Anode voltage | 70   | V  |
| Heater current | 1.3  | A   | Anode current | 0.05 | mA |
| Frequency      | 11   | GHz | Grid voltage  | 0    | V  |
| Line voltage   | 1455 | V   | Output power  | 190  | mW |
| Line current   | 17.6 | mA  |               |      |    |

## OPERATING INSTRUCTIONS

### Application of voltages

Voltages should be applied in the following order : Heater, Grid, Line, Anode.  
They should be removed in the reverse order from start up.

### Supply

The supply should feature the following security devices :

Warm-up timing,

Power supply protection against arcing or short circuit which may occur in the tube,

Protection against applying voltages before starting air flow.

A safety device should prevent anode voltage from exceeding line voltage, even in case of modulation. If grid and anode power supplies present high internal resistance, a 50 k $\Omega$  resistance should be connected in parallel.

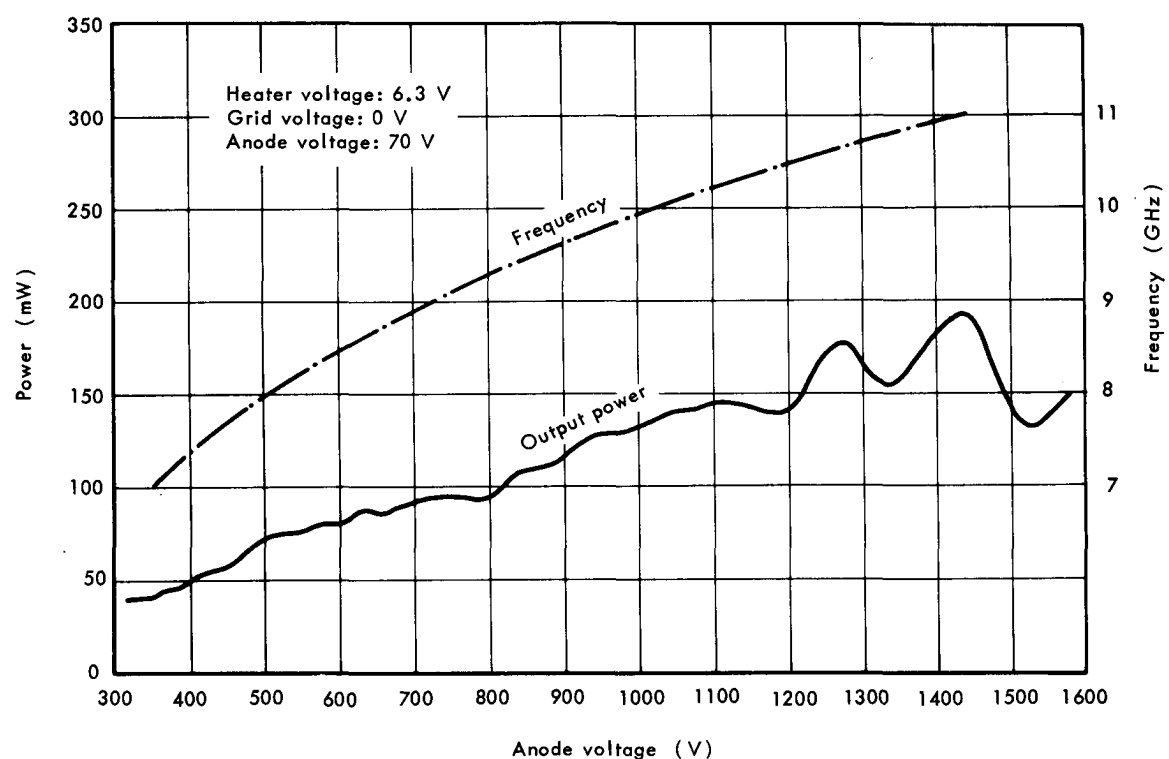
### Permanent magnet

The tube should be kept away from all magnetic materials, at least 10 cm, and 15 cm away from field generating devices.

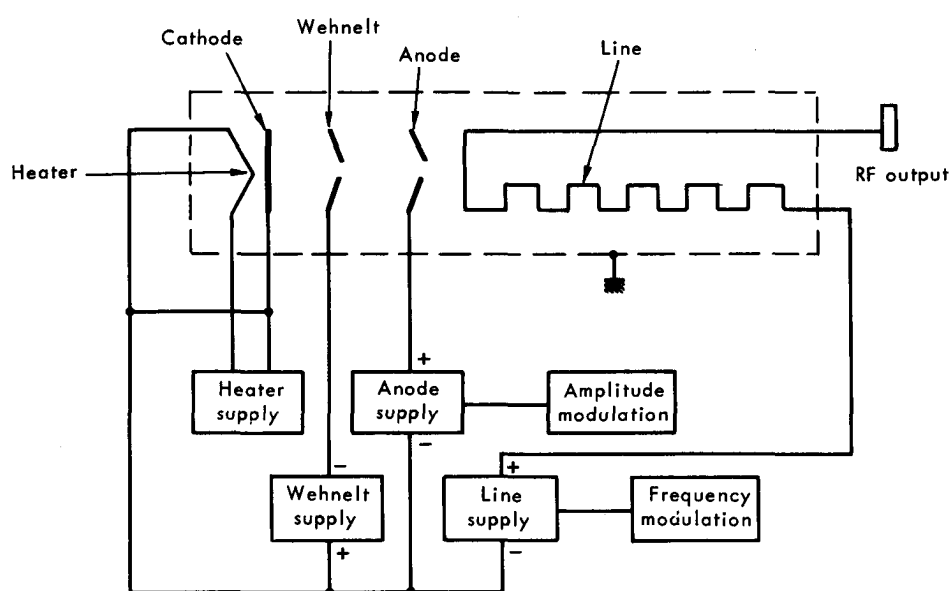
(1) T point indicated on drawing



### Characteristic curves

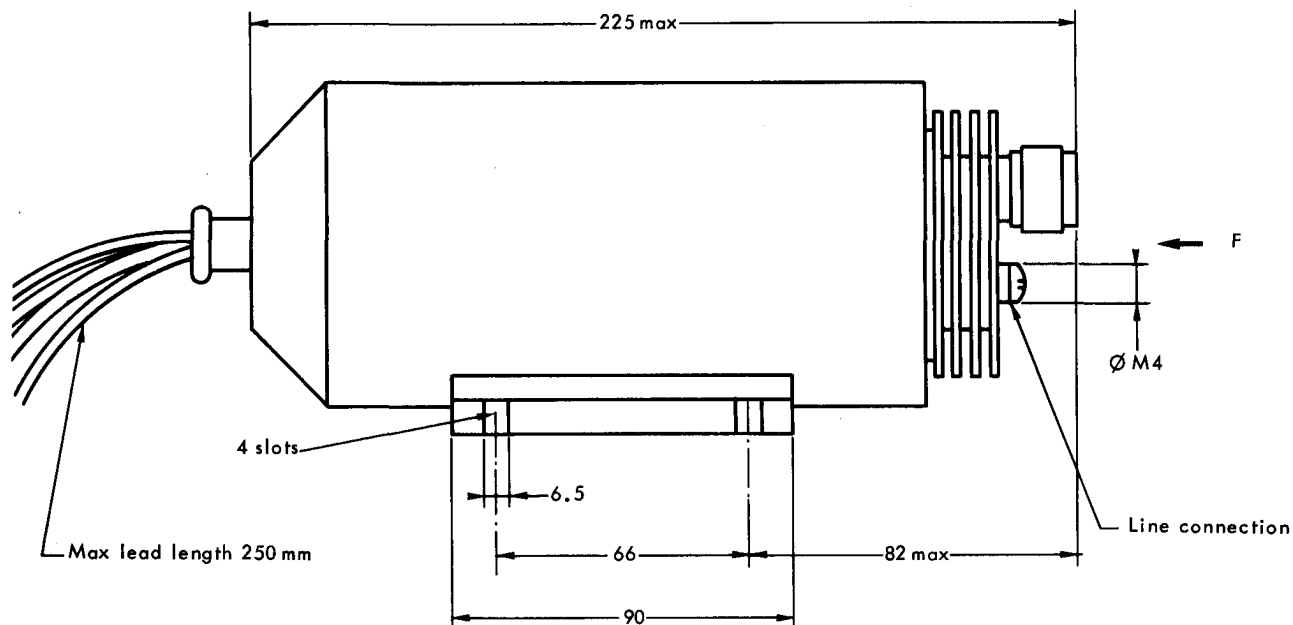


### Supply diagram



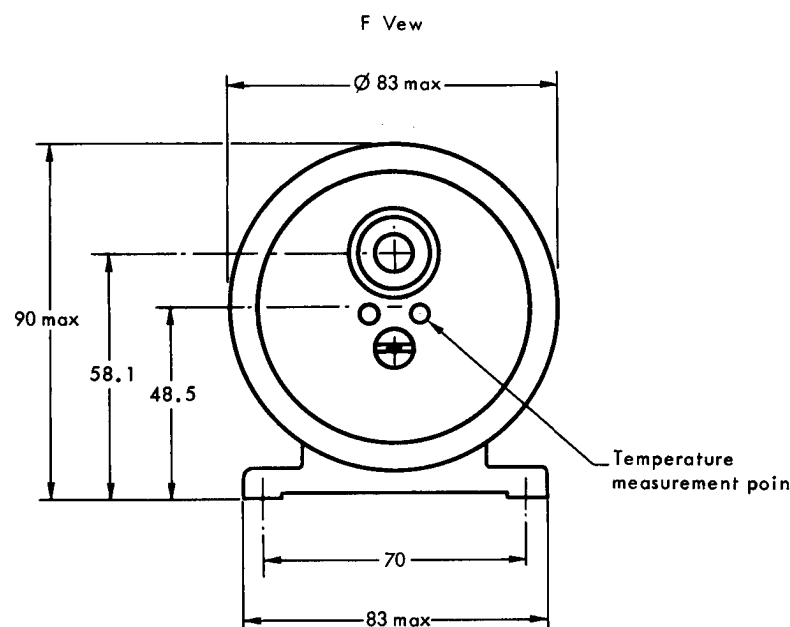


# OUTLINE DRAWING



| CONNECTIONS |                       |
|-------------|-----------------------|
| Heater      | Brown                 |
| Cathode     | Yellow                |
| Anode       | Blue                  |
| Wehnelt     | Green                 |
| Line        | Red<br>(on heat sink) |

The line is isolated from the magnet.



Dimensions in mm.

