



CO.10 CARCINOTRON

The CO.10 is a millimetric backward wave oscillator, focused by an integral permanent magnet, water cooled and delivering an output power over a frequency range of 285 to 305 GHz.

It can be amplitude modulated through its anode. Frequency modulation can be obtained by line voltage (1) variation, the frequency being independent of the load up to a VSWR of 3 : 1.

The high power obtained at such a high frequency makes it particularly suitable for physical measurements as plasma analysis, parametric resonance, study of the fine structure of the matter. It can be used also for transmission measurements, scaling, etc . . .



In short, the main features of the CO. 10 are :

- Minimum output power : 10 mW from 285 GHz to 305 GHz
60 mW in one point at least between 290 and 310 GHz.
- Frequency and amplitude modulation.

(1) *Line voltage or beam voltage.*

GENERAL CHARACTERISTICS

| Electrical | min. | max. | |
|--|-------|------|--------|
| Frequency | 285 | 305 | GHz |
| Heater voltage (d c) | - 8 | - 6 | V |
| Heater current (d c) | 1. 8 | 2. 4 | A |
| Wehnelt (2) voltage | - 250 | 0 | V |
| Wehnelt current | 0 | 2 | mA |
| Anode (3) voltage for 60 mA line current | 1600 | 2500 | V |
| Anode voltage for 40 mA line current | 1000 | 2000 | V |
| Anode current | 0 | 5 | mA |
| Line voltage (at lower frequencies) | 3000 | - | V |
| Line voltage (at higher frequencies) | - | 6000 | V |
| Line current | - | 60 | mA |
| Modulation sensitivity | 5 | 40 | MHz/V |
| Pushing | 50 | 100 | MHz/mA |

(2) *Wehnelt or Focusing electrode.*

(3) *Anode or Accelerator.*



MECHANICAL

| | | | |
|---------------------|------------------|------------------|-----------------------|
| Operating position | horizontal | RF output flange | UG 387/U |
| Focusing | permanent magnet | Input connector | HT plug (see drawing) |
| RF output waveguide | RG 138/U | Weight | 16 kg |

COOLING

| | | | |
|--------------------------------|---------------|---------------------------------|------------------------|
| Inlet water temperature . max. | 60 °C | Corresponding pressure drop . . | 0.3 to 0.5 bar |
| Inlet pressure max. | 1.5 bar | Ambient temperature . . max. | 60 °C |
| Flow-rate | 1 to 1.5 l/mn | Water interlock | supplied with the tube |

ABSOLUTE RATINGS (1)

| | | | |
|--------------------------------|------------|------------------------------|---------|
| Heater voltage | Vnom ± 3 % | Anode voltage max. | 3 000 V |
| Surge current max. | 2.5 A | Anode current max. | 10 mA |
| Warm-up time min. | 4 mn | Line voltage max. | 7 000 V |
| Wehnelt voltage max. | 0 V | Line current max. | 80 mA |
| Wehnelt current max. | 5 mA | Load VSWR max. | 5 : 1 |

TYPICAL OPERATION (1)

| | | | | | |
|----------------|---------|-----------------|------------|-------|-----|
| Heater voltage | - 7.5 V | Frequency | 301 | 305 | GHz |
| Heater current | 2.15 A | Line voltage | 4 600 | 4 950 | V |
| Warm-up time | 4 mn | Line current | 60 | 60 | mA |
| | | Anode voltage | 1 880 | 1 880 | V |
| | | Anode current | 0 | 0 | mA |
| | | Wehnelt voltage | - 50 | - 50 | V |
| | | RF output power | see curves | | |

(1) All voltages are referred to the cathode.

The tube can be operated beyond characteristic frequency range. Ask for information.

OPERATING INSTRUCTIONS

Supply (see diagram) :

The supply should meet following items :

- the following starting sequence : Heater, Wehnelt, Line, Anode.
- Current limitations :

| | | |
|---------|-----|----|
| Heater | 2.5 | A |
| Wehnelt | 5 | mA |
| Anode | 5 | mA |
| Line | 80 | mA |
- Protection against shorts or flashes which could occur in the tube.
- Warm-up timing.
- External water interlock for cooling circuit.
- Line overvoltage (Line voltage \geq Anode voltage + 1500 V) security device.

Application of voltages :

- Start the liquid flow through the cooling circuit.
- Apply voltages in the following order : heater (allow four minutes minimum cathode warm-up time), Wehnelt, line, anode.

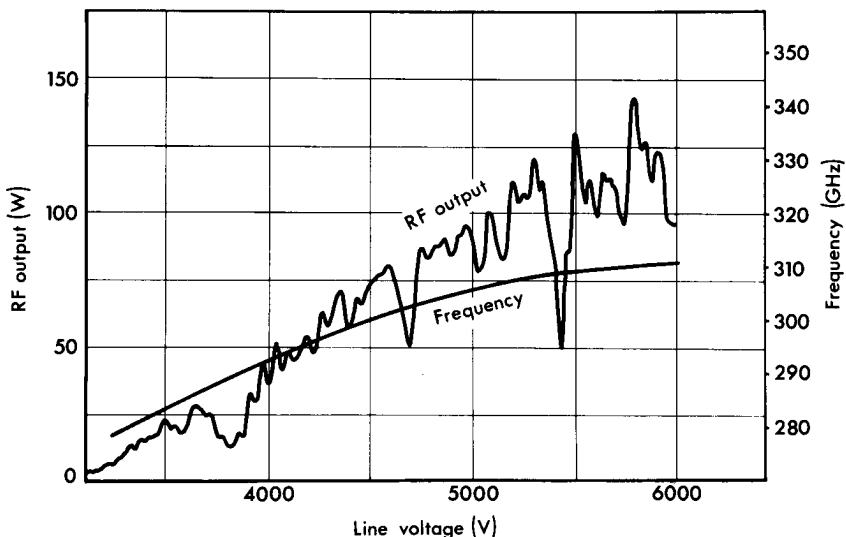
Protective measures :

- A minimum distance of 25 cm should be kept between the tube and any magnetic material.
- Do not try to obtain modulation through the Wehnelt voltage.
- Operating parameters are given with each tube particular test data sheets.

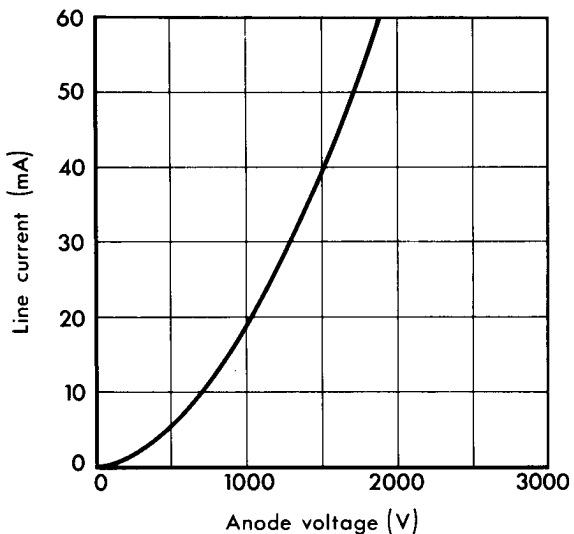


characteristic curves
(typical values)

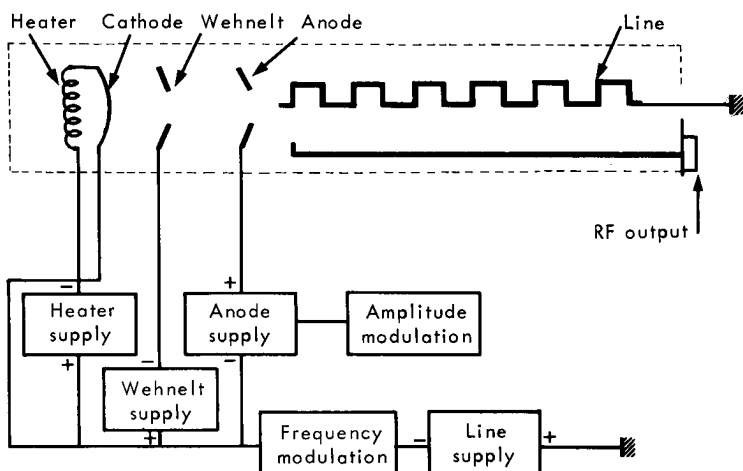
Heater voltage (dc) - 7.5 V
 Heater current (dc) 2.1 A
 Wehnelt voltage (dc) - 50 V
 Anode voltage (dc) 1880 V
 Line current (dc) 60 mA



Heater voltage (dc) - 7.5 V
 Heater current (dc) 2.1 A
 Wehnelt voltage (dc) - 50 V
 Line voltage (dc) 4 kV

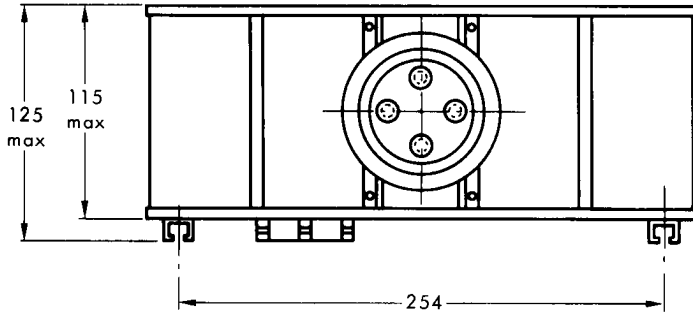


supply diagram

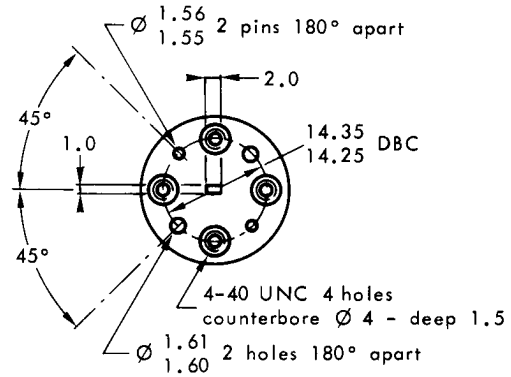
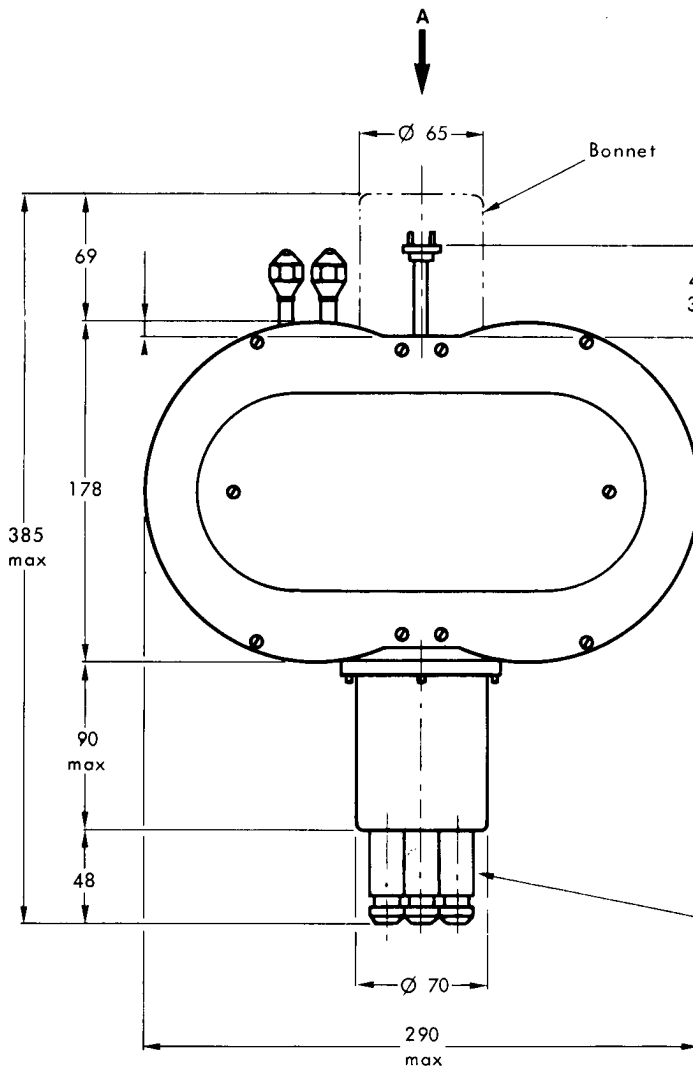
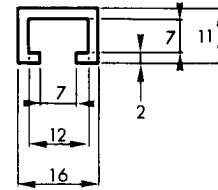




OUTLINE DRAWING



POSITIONING RAIL



RF OUTPUT
view A

High voltage connector
LEMO plug JUPITER type
ref III C 50 HT 10
CERN model

Dimensions in mm.

