

## DESCRIPTION

The Sylvania Omegatron Type SY1301 is a mass spectrometer analyzer tube capable of resolving peaks of interest of simple hydrocarbons and fixed gases in the 2 to 50 mass to charge ratio range. By increasing magnetic field strength resolution is extended through mass 80. Useable in a pressure range from  $10^{-5}$  to  $10^{-10}$  torr, it can be incorporated into nearly any high vacuum system where a glass to glass or metal to glass seal can be made. The bulb is Nonex glass and is supplied with graded seals according to customer specifications. It operates at an ionizing current of only one microamp which minimizes gauge pumping and gas reactions. (See Note 5 for additional technical references.) Type SY1301A is a calibrated unit, being otherwise identical with its counterpart Type SY1301.

## MECHANICAL DATA

|                                            |                                          |
|--------------------------------------------|------------------------------------------|
| Physical Dimensions                        | See Outline                              |
| Filament Emitter                           | Tungsten                                 |
| Envelope                                   | 7720 Nonex Glass                         |
| Maximum Envelope Bake-Out Temperature      | 450°C                                    |
| Base                                       | 8-Pin, T-9 with Center Lead <sup>3</sup> |
| Basing                                     |                                          |
| Pin No. 1—Electron Beam Focusing Electrode |                                          |
| Pin No. 2—Filament Emitter                 |                                          |
| Pin No. 3—Trapping Voltage Cage            |                                          |
| Pin No. 4—RF Electrode                     |                                          |
| Pin No. 5—Electron Collector Electrode     |                                          |
| Pin No. 6—Ion Collector Shield (RF Ground) |                                          |
| Pin No. 7—Trapping Voltage Cage            |                                          |
| Pin No. 8—Filament Emitter                 |                                          |
| Center Pin—Ion Collector Electrode         |                                          |

## ELECTRICAL DATA

### TYPICAL OPERATION<sup>2</sup> (M/e 44-2; Pressure Range $10^{-5}$ to $10^{-10}$ Torr)

|                                              |                            |
|----------------------------------------------|----------------------------|
| Frequency of Applied RF                      | 169 to 3720 Kc             |
| Amplitude                                    | 1.7 to 3.0 v               |
| Focus Electrode Voltage                      | -70 Vdc                    |
| Trapping Voltage <sup>1</sup>                | -0.5 to -2.0 Vdc           |
| Electron Collector Voltage                   | 22.5 Vdc                   |
| Magnetic Flux Density                        | 5000 Gauss                 |
| Electron Beam Current                        | 1.0 $\mu$ A                |
| Emitter Voltage Range (Approx.) <sup>4</sup> | 1.05 to 1.25 Vac           |
| Ion Collector Current                        | $10^{-10}$ to $10^{-15}$ A |

## NOTES:

1. With the Omegatron in a properly aligned magnetic field, the trapping voltage is normally -1.0 volt but may be varied in increments of 0.1 volt within the range to obtain maximum sensitivity. For mass 2 trapping voltage is set at 1.9 volts.
2. Resolution can be extended through mass 80 by increasing magnetic field strength. The approximate relationship is

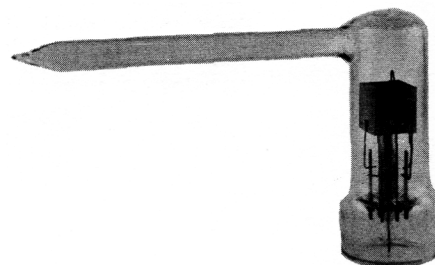
$$\frac{M}{\Delta M} = \frac{edH^2}{2EM}$$

where:

- $e$  = charge of the ion in esu.
- $d$  = distance from ion collector to electron beam in cm.
- $H$  = magnetic flux density in gauss.
- $E$  = high frequency field strength (distance between high frequency electrodes in cm).
- $M$  = mass of the ion in grams.

## QUICK REFERENCE DATA

Omegatron  
Mass Spectrometer  
Small Size  
High Sensitivity  
Nonex Glass  
Gold Plated Pins  
Complete Systems  
Available



## SYLVANIA ELECTRIC PRODUCTS INC.

Electronic Components Group  
ELECTRONIC TUBE DIVISION  
EMPORIUM, PA.

A Technical Publication

JUNE, 1964

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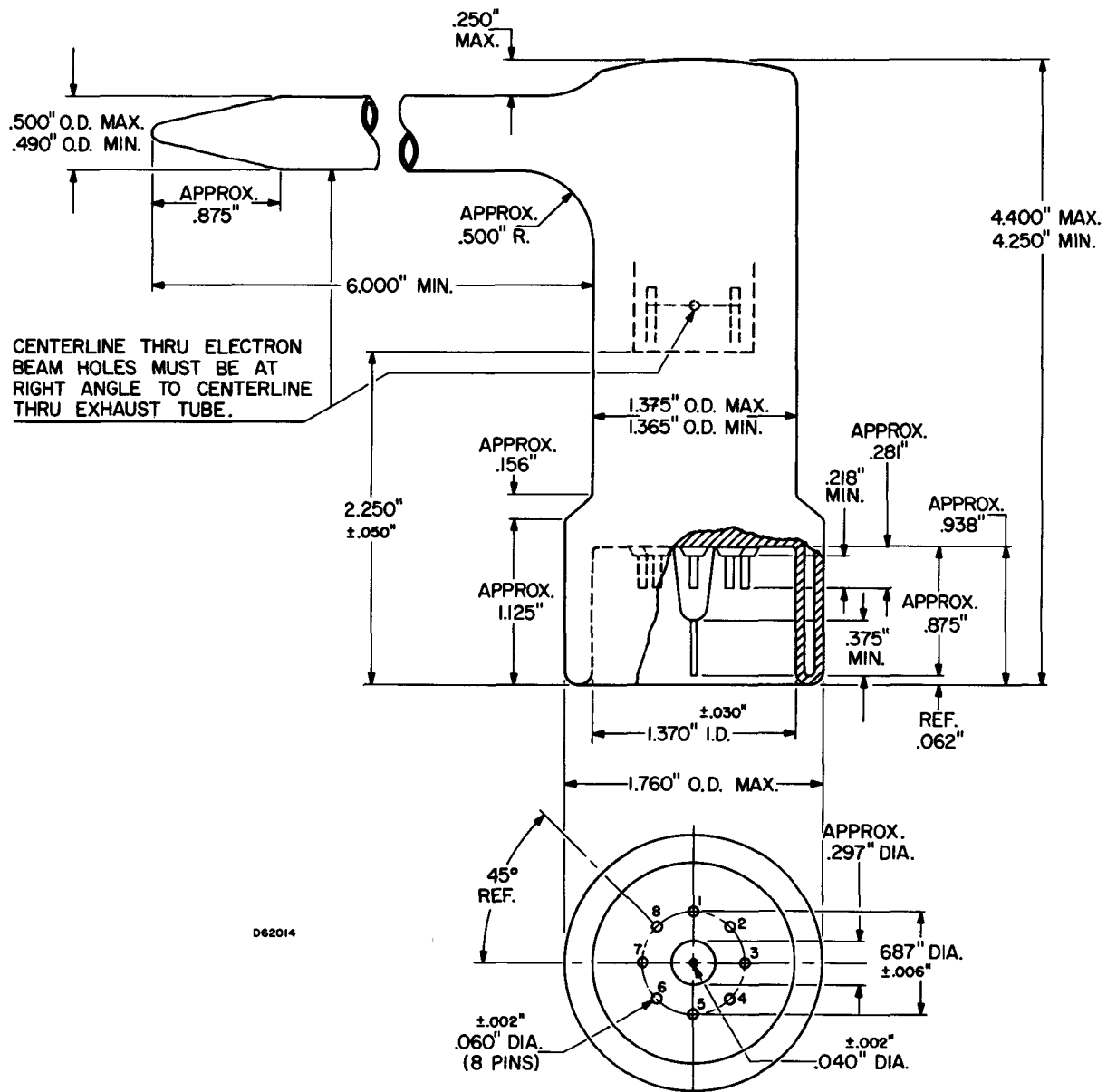
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SPECIAL PURPOSE  
ELECTRONIC TUBES

NOTES: (Continued)

3. Base pins are coated with gold to assure low resistance connection with pin clips.
4. Following alignment of the Omegatron in the magnetic field, the emitter voltage is adjusted within the specified range to produce a beam current of  $1.0 \mu A$ .
5. The following technical reference booklets are available from Sylvania upon request: (1) Omegatron Mass Spectrometer and (2) Operational Data—Sylvania Omegatron Type SY1301.

OUTLINE



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