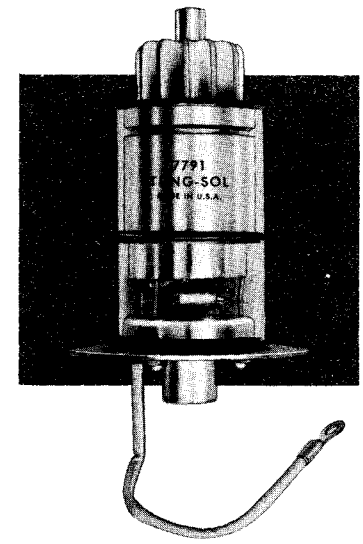
# TUNG-SOL

# PRODUCT BULLETIN

# INDUSTRIAL ELECTRON TUBE TYPE 7791

DECEMBER, 1962

## HYDROGEN DIODE



**DESCRIPTION**—The 7791 is an indirectly heated, hydrogen filled, half-wave diode designed for use in high-voltage rectifier circuits. The 7791 is a rugged diode that can handle higher voltage than comparable xenon-filled tubes, and is more efficient than vacuum rectifiers. An internally-connected hydrogen generator prevents gas clean-up.

Contrasted with a solid state rectifier, the 7791 can withstand high current and inverse voltage surges. This diode also has the advantage of being temperature free and has a wide range of mounting positions as compared with mercury-vapor tubes. The 7791 is capable of delivering 2.0 amperes average and withstanding 25 kilovolts peak inverse voltage as shown on rating graph.

The 7791 employs flange mounting for minimum overall height consistent with good electrical connections and ease of installation.

### ELECTRICAL DATA

| | Min | Bogey | Max | |
|---|---|---|---|---|
| Heater Voltage | 4.75 | 5.0 | 5.25 | Volts |
| Heater Current — $E_f$ = 5.0 Volts | 13 | 15 | 17 | Amperes |
| Cathode Heating Time | 3 | — | — | Minutes |
| Anode Voltage Drop | 30 | — | 60 | Volts |
| Initial Firing Voltage | — | — | 100 | Volts |
| Recurrent Firing Voltage | 30 | — | 75 | Volts |

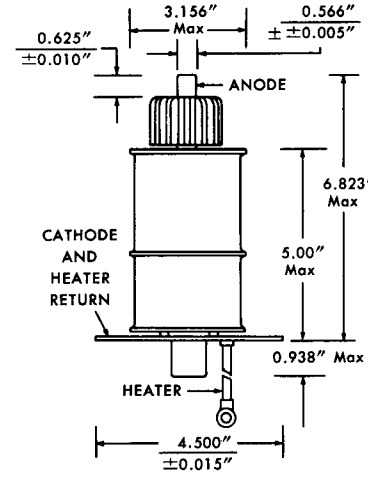
### MECHANICAL DATA

| | |
|---|---|
| Type of Cooling | See Rating Graph. Convection or Forced Air — 50 cfm directed at top of radiator |
| Mounting Position | Horizontal or Vertical (Base Down) |
| Average Net Weight | 1 Pound 13 Ounces |
| Dimensions | See Outline Drawing |
| Mounting Data | See Mounting Data Drawing |
| Anode Connection | See Outline Drawing |
| Heater Connection | 7 ± ½-inch long lead with lug for ¼-inch diameter screw |

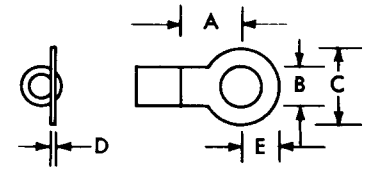
### RATINGS, ABSOLUTE VALUES

| | SHUNT DIODE SERVICE | | RECTIFIER SERVICE | | |
|---|---|---|---|---|---|
| | Minimum | Maximum | Minimum | Maximum | |
| Peak Inverse Anode Voltage | — | 30,000 | — | 25,000 | Volts |
| Cathode Current | | | | | |
| Peak | — | 750 | — | 8 | Amperes |
| Average | — | 0.5 | — | 2 | Amperes |
| RMS | — | 20 | — | — | Amperes |
| Fault — 0.1 Second Maximum Duration | — | 1,000 | — | 60 | Amperes |
| Averaging Time | — | — | — | 15 | Seconds |
| Ambient Temperature | −55 | +75 | −55 | +75 | Degrees Centigrade |
| Altitude | — | 10,000 | — | 10,000 | Feet |

**CAUTION** — In order to avoid damage to tube, the cathode connection must be made to the base flange only.




(SEE CAUTION NOTE)




| Symbol | Dimension |
|---|---|
| A | 0.380" MIN |
| B | 0.260" – 0.313" |
| C | 0.605" MAX |
| D | 0.04" MIN |
| E | 0.305" MAX |

**OUTLINE DRAWING**

# TYPE 7791

## MAXIMUM RATING CHART FOR INFINITE INDUCTANCE CHOKE INPUT FILTER

| FIG. | CIRCUIT | TRANSFORMER | NO. OF TUBES | * | A-C SECONDARY VOLTAGE $E_{RMS}$ Kilovolts | D-C OUTPUT — APPROX $E_{DC}$ Kilovolts | D-C OUTPUT — APPROX $I_{DC}$ AMPS | RIPPLE KILOVOLTS RMS | RIPPLE FREQ |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Half-wave 1-phase | 1-phase | 1 | A | 7.10 | 3.20 | 1.75 | 3.50 | f |
| | | | | B | 14.20 | 4.80 | 1.00 | 5.25 | |
| | | | | C | 14.20 | 4.80 | 2.00 | 5.25 | |
| | | | | D | 17.50 | 8.00 | 1.00 | 8.75 | |
| 2 | Full-wave 1-phase | 1-phase C-T | 2 | A | 3.55 | 3.20 | 3.50 | 1.50 | 2f |
| | | | | B | 7.10 | 4.80 | 2.00 | 2.25 | |
| | | | | C | 7.10 | 4.80 | 4.00 | 2.25 | |
| | | | | D | 8.80 | 8.00 | 2.00 | 3.75 | |
| 3 | Bridge circuit 1-phase | 1-phase | 4 | A | 7.10 | 6.40 | 3.50 | 3.00 | 2f |
| | | | | B | 14.20 | 9.60 | 2.00 | 4.50 | |
| | | | | C | 14.20 | 9.60 | 4.00 | 4.50 | |
| | | | | D | 17.50 | 16.00 | 2.00 | 7.50 | |
| 4 | Half-wave 3-phase | Delta-Wye | 3 | A | 4.10 | 4.80 | 5.25 | 0.85 | 3f |
| | | | | B | 8.20 | 7.20 | 3.00 | 1.30 | |
| | | | | C | 8.20 | 7.20 | 6.00 | 1.30 | |
| | | | | D | 10.00 | 12.00 | 3.00 | 2.30 | |
| 5 | Full-wave 3-phase | Delta-Wye | 6 | A | 4.10 | 9.50 | 5.25 | 0.40 | 6f |
| | | | | B | 8.20 | 14.25 | 3.00 | 0.60 | |
| | | | | C | 8.20 | 14.25 | 6.00 | 0.60 | |
| | | | | D | 10.00 | 23.75 | 3.00 | 1.15 | |
| 6 | Full-wave 3-phase | Delta-Delta | 6 | A | 7.10 | 9.50 | 5.25 | 0.40 | 6f |
| | | | | B | 14.20 | 14.25 | 3.00 | 0.60 | |
| | | | | C | 14.20 | 14.25 | 6.00 | 0.60 | |
| | | | | D | 17.50 | 23.75 | 3.00 | 1.15 | |

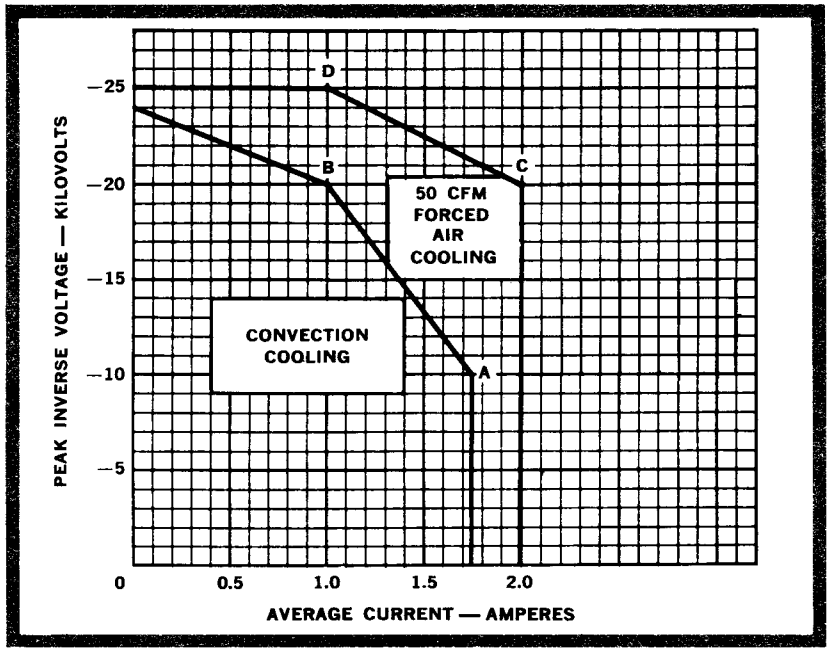
*See RATING GRAPH

A: Convection cooled at maximum current rating.
B: Convection cooled at maximum voltage rating.
C: Forced air cooled at maximum current rating.
D: Forced air cooled at maximum voltage rating.

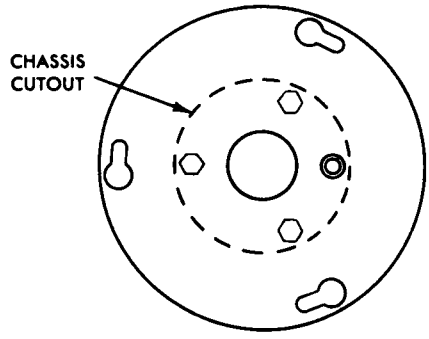
For figure references see STANDARD RECTIFIER CIRCUITS AND RATINGS sheet.

The 7791 should be protected from transient voltages in excess of the maximum rating by spark gaps installed either directly across the tube or across each plate transformer secondary leg.

## RATING GRAPH




## MOUNTING DATA




NOTES

1. 2.625 inch minimum diameter mounting hole required.
2. Three mounting slots for 0.50 inch maximum head ¼-inch screws spaced 120 degrees on 3.750 ± 0.010 inch diameter circle.