# Amperex

# 7804/TBL6/14

**RF Power Triode**

Air Cooled

## QUICK REFERENCE DATA

Industrial RF oscillator, class-C

| freq. | three-phase | |
|---|---|---|
| | $V_a$ | $W_o$ |
| MHz | kV | kW |
| 30 | 7 | 17.7 |
| | 6 | 14.3 |

**HEATING:** direct; thoriated tungsten filament

| | | | | |
|---|---|---|---|---|
| Filament voltage | $V_f$ | = | 6.3 | V |
| Filament current | $I_f$ | = | 136 | A |
| Cold filament resistance | $R_{fo}$ | = | 0.005 | $\Omega$ |

The filament is designed to accept temporary fluctuations of +5% and -10%

The filament current must never exceed a peak value of 280 at any time during the initial energizing schedule.

## CAPACITANCES

| | | | | |
|---|---|---|---|---|
| Output | $C_a$ | = | 1.2 | pF |
| Input | $C_g$ | = | 44.5 | pF |
| Anode to Grid | $C_{ag}$ | = | 33.5 | pF |

## TYPICAL CHARACTERISTICS

| | | | | |
|---|---|---|---|---|
| Anode Voltage | $V_a$ | = | 6 | kV |
| Anode current | $I_a$ | = | 2.5 | A |
| Mutual conductance | S | = | 23 | mA/V |
| Amplification factor | u | = | 17.5 | |

**Richardson Electronics, Ltd.**

40W267 Keslinger Road
LaFox, IL  60147 USA
(630) 208-2200

**TEMPERATURE LIMIT** (Absolute limit)

Seal temperature                                          max.          220      °C

**Table 1:** Cooling

| anode dissipation $W_a$ (kW) | altitude (m) | inlet temperature $T_i$ (°C) | rate of flow $q_{min}$ (m³/min.) | pressure drop P (Pa)* | outlet temperature $T_o$ max (°C) |
|---|---|---|---|---|---|
| 10 | 0 | 35 | 11 | 500 | 90 |
| 7.5 | 0 | 35 | 8.0 | 270 | 90 |
| 5 | 0 | 35 | 5.2 | 120 | 95 |
| 10 | 0 | 45 | 12.3 | 630 | 95 |
| 7.5 | 0 | 45 | 9.0 | 340 | 95 |
| 5 | 0 | 45 | 5.9 | 150 | 100 |
| 10 | 1500 | 35 | 13 | 590 | 90 |
| 7.5 | 1500 | 35 | 9.5 | 320 | 90 |
| 5 | 1500 | 35 | 6.2 | 140 | 95 |
| 10 | 3000 | 25 | 14 | 640 | 85 |
| 7.5 | 3000 | 25 | 10.2 | 340 | 85 |
| 5 | 3000 | 25 | 6.6 | 150 | 90 |

* $1P_a = 0.1$mm $H_2O$

**ACCESSORIES**

Filament connectors with cable               40662
Grid connector                                        40664
Insulating pedestal                                  K508
or air distributor                                      K509

The rounded side of the grid connector should face the anode.  To ensure a uniform RF current distribution in the grid seal at frequencies higher than 4 MHz, the grid lead should be connected as shown below.
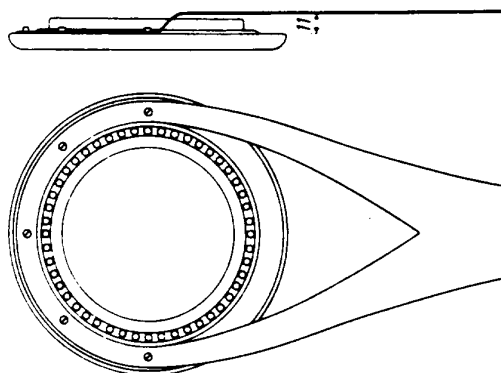


Fig. 1 Grid Lead Detail

**RF CLASS C OSCILLATOR FOR INDUSTRIAL USE** with anode voltage from three-phase half-wave rectifier without filter.

**LIMITING VALUES** (Absolute limits)

| | | | | | |
|---|---|---|---|---|---|
| Frequency | $f$ | | up to | 30 | MHz |
| Anode voltage | $V_a$ | = | max. | 8 | kV |
| Anode current | $I_a$ | = | max. | 4.0 | A |
| Anode dissipation | $W_a$ | = | max. | 10 | kW |
| Anode input power | $W_{ia}$ | = | max. | 30 | kW |
| Negative grid voltage | $-V_g$ | = | max. | 1600 | V |
| Grid current, loaded | $I_g$ | = | max. | 1.5 | A |
| Grid current, unloaded | $I_g$ | = | max. | 2.0 | A |
| Grid circuit resistance | $R_g$ | = | max. | 10 | k$\Omega$ |

**OPERATING CONDITIONS**

| | | | | | |
|---|---|---|---|---|---|
| Frequency | $f$ | = | 30 | 30 | MHz |
| Anode voltage | $V_a$ | = | 7 | 6 | kV |
| Anode current, loaded | $I_a$ | = | 3.5 | 3.3 | A |
| Anode current, unloaded | $I_a$ | = | 0.7 | 0.51 | A |
| Grid current, loaded | $I_g$ | = | 0.95 | 0.8 | A |
| Grid current, unloaded | $I_g$ | = | 1.35 | 1.1 | A |
| Grid resistor | $R_g$ | = | 950 | 1000 | $\Omega$ |
| Load resistance | $R_{a\sim}$ | = | 1000 | 870 | $\Omega$ |
| Feedback ratio under loaded conditions | $V_{g\sim}/V_{a\sim}$ | = | 25 | 26 | % |
| Anode input power | $W_{ia}$ | = | 24.5 | 19.8 | kW |
| Anode dissipation | $W_a$ | = | 6.8 | 5.5 | kW |
| Output power | $W_o$ | = | 17.7 | 14.3 | kW |
| Efficiency | $N$ | = | 72 | 72 | % |
| Output power in the load * | $W_l$ | = | 14 | 11 | kW |

*Useful power in the load, measured in a circuit having an efficiency of approx. 85%.

**Figure S**
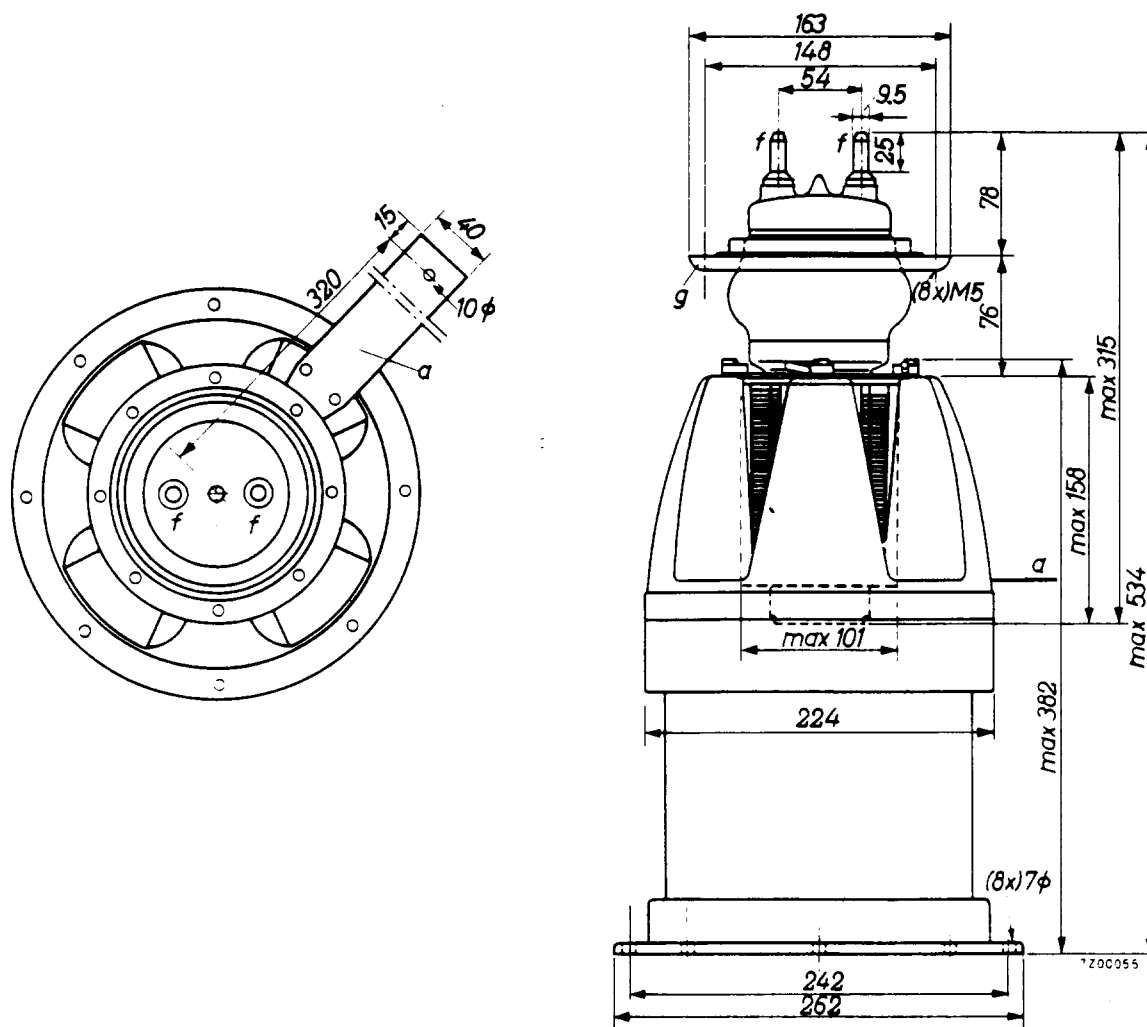
Tube with grid connector
and insulating pedestal

All dimensions in mm.

**Mechanical Data**

Mounting position:      vertical with anode down
Net mass of tube:       3.8 kg
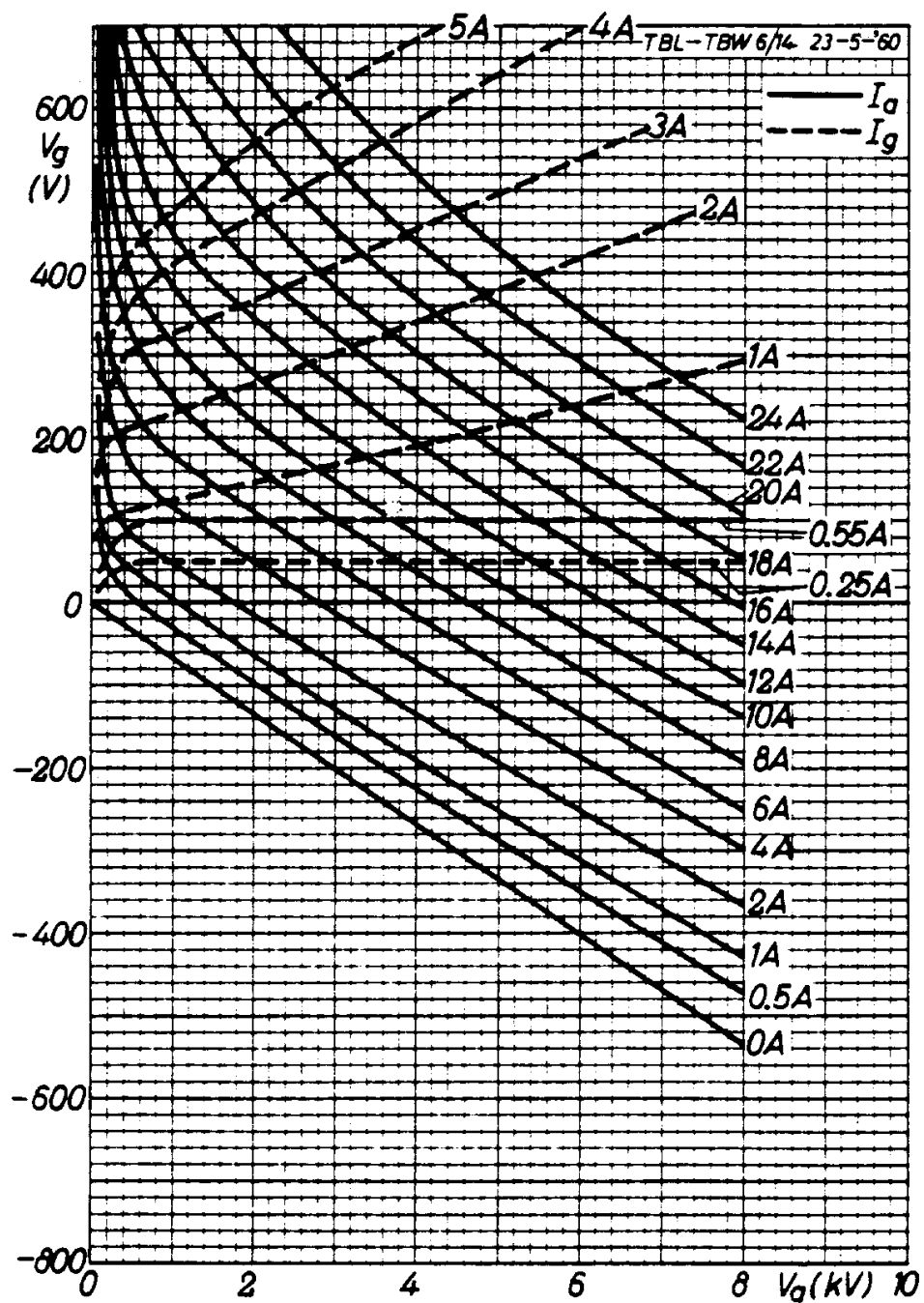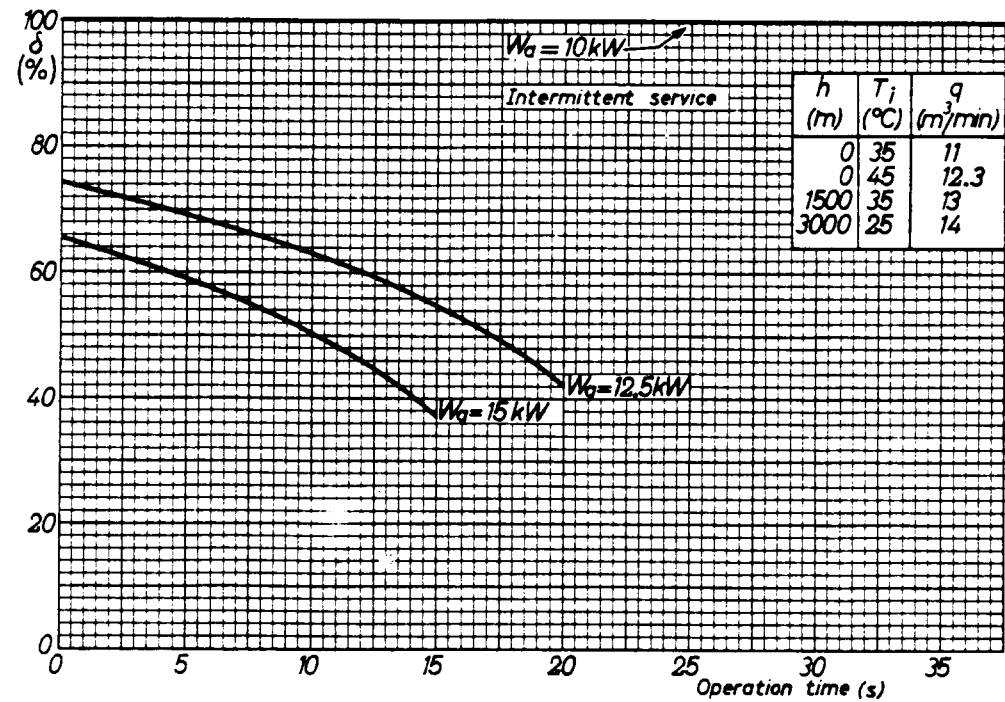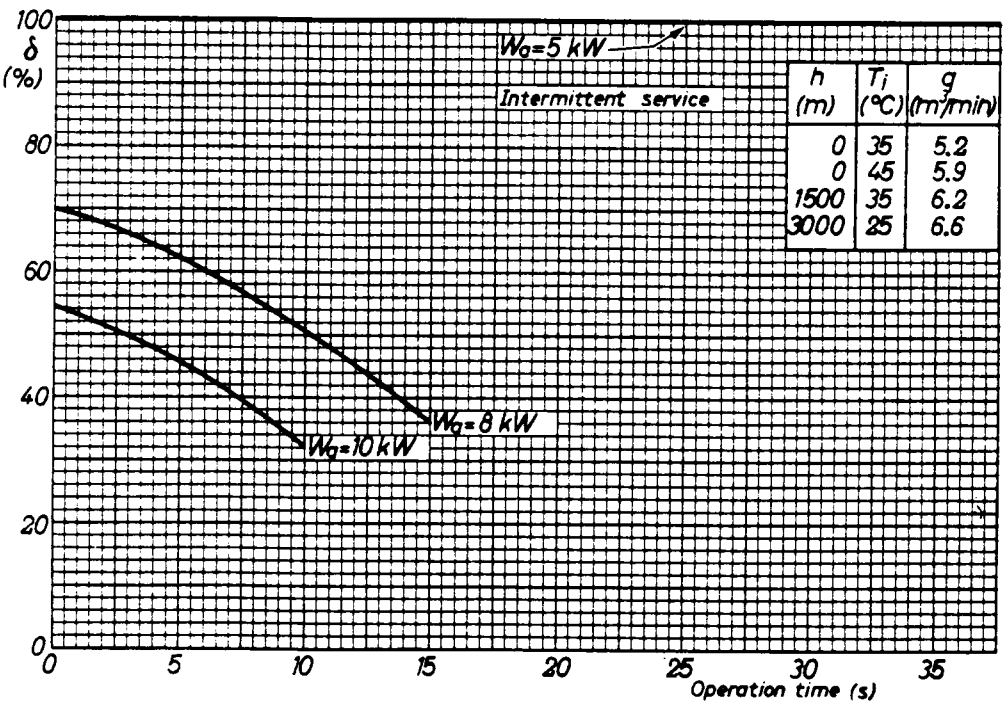Net mass of pedestal:   7.4 kg

**Fig. 3 Constant current characteristics**

Fig. 4 Intermittent service. Limits of anode dissipation and cooling.



| h (m) | $T_j$ (°C) | q (m³/min) |
|---|---|---|
| 0 | 35 | 11 |
| 0 | 45 | 12.3 |
| 1500 | 35 | 13 |
| 3000 | 25 | 14 |

(a) For cooling see 10 kW continuous service.



| h (m) | $T_j$ (°C) | q (m³/min) |
|---|---|---|
| 0 | 35 | 5.2 |
| 0 | 45 | 5.9 |
| 1500 | 35 | 6.2 |
| 3000 | 25 | 6.6 |

(b) For cooling see 5 kW continuous service.