



OPERATING CONDITIONS

FREQUENCY MODULATION R.F. POWER AMPLIFIER AT 110 MHz

Maximum ratings

D.C. anode voltage	.....	4.5	kV
D.C. grid n° 2 voltage	.....	600	V
D.C. grid n° 1 voltage	.....	- 300	V
Peak cathode current	.....	7.5	A
Average anode current	.....	1.3	A
Anode dissipation	.....	3.0	kW
Grid n° 2 dissipation	.....	60	W
Grid n° 1 dissipation	.....	20	W
Frequency	.....	110	MHz

Typical operation

D.C. anode voltage	.....	3	4	kV
D.C. grid n° 2 voltage	.....	450	450	V
D.C. grid n° 1 voltage	.....	- 200	- 200	V
Grid n° 1 R.F. peak voltage	.....	220	220	V
D.C. anode current	.....	1.2	1.2	A
D.C. grid n° 2 current, approx.	.....	70	60	mA
D.C. grid n° 1 current, approx.	.....	20	20	mA
Input power	.....	3.6	4.8	kW
Anode dissipation	.....	1.1	1.3	kW
Output power, approx. (1)	.....	2.5	3.5	kW

(1) Without taking circuit losses into account.



Eimac Power Grid Tube Reference Data

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 Additional Catalogs: Klystrode® IOT

4CM500,000G

The 4CM500,000G is a ceramic/metal, multiphase cooled (water/vapor) power tetrode designed to be used as an exact replacement for the Thomson TH-558. This tube has a thoriated tungsten mesh filament and pyrolytic graphite grids which provide high dissipation combined with low secondary emission characteristics. Base coaxial contact rings are provided for the filament, grid, and screen terminals. These are forced air cooled. Maximum anode dissipation is 500 kW steady state with multiphase cooling.

Characteristics

Plate Dissipation (Max.)	500,000 Watts
Screen Dissipation (Max.)	8,000 Watts
Grid Dissipation (Max.)	3,000 Watts
Frequency for Max. rating (CW)	50 MHz
Amplification Factor	4.4
Filament/Cathode	Thoriated Tungsten
Voltage	23.0 Volts
Current	500 Amps
Capacitance	Grounded Cathode
Input	1,195 pf
Output	107.0 pf
Feedthrough	6.3 pf
Capacitance	---
Input	--- pf
Output	--- pf
Feedthrough	pf
Cooling	Water and Forced Air
Base	Special Coaxial
Air Socket	---
Air Chimney	---
Boiler	---
Length	25.7 in; 653 mm
Diameter	12.6 in; 321 mm
Weight	150 lb; 70 kg

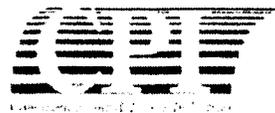


Class of Operation	Type of Service	Maximum Ratings		Typical Operation				
		Plate Voltage (Volts)	Plate current (Amps)	Plate Voltage (Volts)	Screen Voltage (Volts)	Plate Current (Amps)	Drive Power (Watts)	Output Power (kiloWatts)
C	RF Power Amplifier, Plate modulated	15,000	75.0	12,500	1,000	54	3,000	550
AB	AF Amplifier, Plate Modulated (2 tubes)	15,000	75.0	12,000	1,250	78	---	660

Characteristics and Operating values are based on performance tests. Figures may change without notice as the result of additional data or product refinement. CPI Eimac Division should be consulted before using this information for final equipment design.

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Additional Catalogs: Klystrode[®] IOT

4CV100,000C/8351

The 4CV100,000C/8351 is recommended for use as a Class C RF amplifier or oscillator, a Class AB, push-pull AF amplifier or modulator. The 4CV100,000/8351 is also useful as a plate and screen modulated Class C RF amplifier.

Characteristics

Plate Dissipation (Max.)	100,000 Watts
Screen Dissipation (Max.)	1,750 Watts
Grid Dissipation (Max.)	500 Watts
Frequency for Max. rating (CW)	30 MHz
Amplification Factor	4.5
Filament/Cathode	Thoriated Tungsten
Voltage	10 Volts
Current	300 Amps
Capacitance	Grounded Cathode
Input	440 pf
Output	55 pf
Feedthrough	2.3 pf
Capacitance	Grounded Grid
Input	175 pf
Output	57 pf
Feedthrough	0.4 pf
Cooling	Vapor & Forced Air
Base	Special, Graduated
Air Socket	SK-1500A
Air Chimney	---
Boiler	---
Length	17.24 in / 437.9 mm
Diameter	10.07 in / 255.8 mm
Weight	68 lb / 30.9 kg

Tube photo will soon
be done!

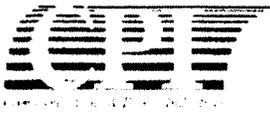


Class of Operation	Type of Service	Maximum Ratings		Typical Operation				
		Plate Voltage (Volts)	Plate current (Amps)	Plate Voltage (Volts)	Screen Voltage (Volts)	Plate Current (Amps)	Drive Power (Watts)	Output Power (kiloWatts)
C	RF Amplifier	20,000	15	17,500	1,500	11.8	125	168.0
C	RF Amplifier Plate Modulated	17,500	15	16,000	750	12	1,260	138.5
C	RF Amplifier Plate Modulated	17,500	15	17,500	900	11.6	8,100	141.0
AB1	RF Linear Amplifier	20,000	15	18,000	1,500	10	---	123.2
AB1	AF Amplifier or Modulator	20,000	15	18,000	1,500	20	---	246.4

Characteristics and Operating values are based on performance tests. Figures may change without notice as the result of additional data or product refinement. CPI Eimac Division should be consulted before using this information for final equipment design.

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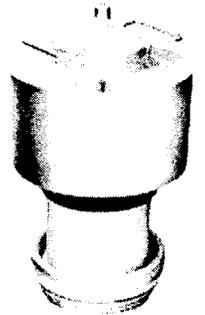
Additional Catalogs: Klystrode® IOT

4CX35,000C/8349

The 4CX35,000/8349 is intended for use at the 50 to 150 kW output power level. It is recommended for use as a Class C RF amplifier or oscillator, a Class AB RF linear amplifier, or a Class AB push-pull AM amplifier or modulator.

Characteristics

Plate Dissipation (Max.)	35,000 Watts
Screen Dissipation (Max.)	1,750 Watts
Grid Dissipation (Max.)	500 Watts
Frequency for Max. rating (CW)	30 MHz
Amplification Factor	4.5
Filament/Cathode	Thoriated Tungsten
Voltage	10.0 Volts
Current	295 Amps
Capacitance	Grounded Cathode
Input	440 pf
Output	55.0 pf
Feedthrough	2.3 pf
Capacitance	Grounded Grid
Input	175 pf
Output	57 pf
Feedthrough	0.4 pf
Cooling	Forced Air
Base	Special, graduated rings
Air Socket	SK-1500
Air Chimney	---
Boiler	----
Length	17.34 in; 440.00 mm
Diameter	9.75 in; 248.00 mm
Weight	50 lb; 22.70 kg

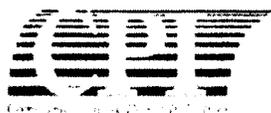


		Maximum Ratings		Typical Operation				
		Plate Voltage (Volts)	Plate current (Amps)	Plate Voltage (Volts)	Screen Voltage (Volts)	Plate Current (Amps)	Drive Power (Watts)	Output Power (kiloWatts)
Class of Operation	Type of Service							
C	RF Amplifier	20,000	15.0	19,000	750	7.0	258	110.0
C	RF Amplifier Plate Modulated	14,000	15.0	12,000	750	5.4	125	55.0
AB1	RF Linear Amplifier	20,000	15.0	15,000	1,500	5.7	---	55.0
Ab1	AF Amplifier or Modulator	20,000	15.0	12,000	1,500	9.2	---	70.0

Characteristics and Operating values are based on performance tests. Figures may change without notice as the result of additional data or product refinement. CPI Eimac Division should be consulted before using this information for final equipment design.

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Additional Catalogs: Klystrode® IOT

4CX5000A/8170

The 4CX5000A/8170 is useful as an oscillator, amplifier or modulator at frequencies up to 220 MHz, Class AB1 audio amplifier, or as a screen-modulated radio frequency amplifier. The rated plate dissipation is 5 kW for most classes of services and 6 kW for Class AB operation.

Characteristics

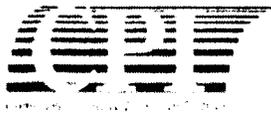
Plate Dissipation (Max.)	6,000 Watts
Screen Dissipation (Max.)	250 Watts
Grid Dissipation (Max.)	75 Watts
Frequency for Max. rating (CW)	220 MHz
Amplification Factor	4.5
Filament/Cathode	Thoriated Tungsten
Voltage	7.5 Volts
Current	75 Amps
Capacitance	Grounded Cathode
Input	120.0 pf
Output	20.5 pf
Feedthrough	0.7 pf
Capacitance	Grounded Grid
Input	56.0 pf
Output	21.5 pf
Feedthrough	0.1 pf
Cooling	Forced Air
Base	Special, Coaxial
Air Socket	SK-300A/SK-360
Air Chimney	SK-306/SK-356
Boiler	---
Length	9.13 in; 231.8 mm
Diameter	4.94 in; 125.4 mm
Weight	9.5 lb; 4.3 kg



		Maximum Ratings		Typical Operation				
		Plate Voltage (Volts)	Plate current (Amps)	Plate Voltage (Volts)	Screen Voltage (Volts)	Plate Current (Amps)	Drive Power (Watts)	Output Power (kiloWatts)
Class of Operation	Type of Service							
C	RF Amplifier	7,500	3.0	6,500	750	2.3	100	10.0
C	RF Amplifier Plate Modulated	5,500	2.5	5,000	500	1.4	25	5.8
C	RF Amplifier Screen Modulated	7,500	3.0	7,500	350	1.1	11	3.55
AB1	RF Linear Amplifier	7,500	4.0	7,500	1,250	1.9	---	10.0
AB1	AF Amplifier or modulator	7,500	4.0	7,000	1,250	3.7	---	17.5

Characteristics and Operating values are based on performance tests. Figures may change without notice as the result of additional data or product refinement. CPI Eimac Division should be consulted before using this information for final equipment design.

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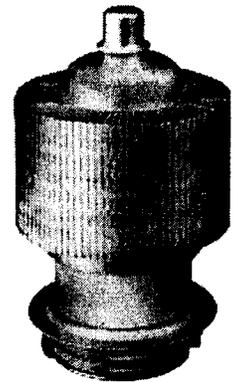
Additional Catalogs: Klystron[®] IOT

4CX3000A/8169

The 4CX3000A/8169 is designed to be used as a Class AB1 linear amplifier in audio or radio frequency applications. Its characteristic of low intermodulation distortion make it especially suitable for single sideband service. This tube is unique in that a production test is included to insure minimum distortion products. The 4CX3000A/8169 must produce a minimum of 5300 watts in Class AB1 service with 3rd order 1M distortion at least 32 dB down, from one tone of two-tone signal. The tube is also recommended for use as a Class C radio frequency power amplifier and plate-modulated, radio frequency power amplifier.

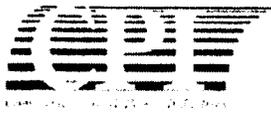
Characteristics

Plate Dissipation (Max.)	3,500 Watts
Screen Dissipation (Max.)	175 Watts
Grid Dissipation (Max.)	50 Watts
Frequency for Max. rating (CW)	150 MHz
Amplification Factor	5.5
Filament/Cathode	Thoriated Tungsten
Voltage	9.0 Volts
Current	41.5 Amps
Capacitance	Grounded Cathode
Input	-130 pf
Output	12.5 pf
Feedthrough	1.0 pf
Capacitance	Grounded Grid
Input	61.0 pf
Output	12.5 pf
Feedthrough	0.1 pf
Cooling	Forced Air
Base	Special, Breechblock
Air Socket	SK-1400
Air Chimney	SK-1406
Boiler	---
Length	7.90 in; 200.70 mm
Diameter	4.63 in; 117.60 mm
Weight	5.5 lb; 2.5 kg



Class of Operation	Type of Service	Maximum Ratings		Typical Operation				
		Plate Voltage (Volts)	Plate current (Amps)	Plate Voltage (Volts)	Screen Voltage (Volts)	Plate Current (Amps)	Drive Power (Watts)	Output Power (kiloWatts)
C	RF Amplifier at 30 MHz	7,000	2.0	7,000	500	1.9	41	11.0
C	RF Amplifier Plate Modulated at 30 MHz	5,000	1.4	5,000	500	1.4	31	5.75
AB	RF Linear Amplifier	7,000	2.0	5,000	850	1.7	---	5.3
AB	AF Amplifier or Modulator	6,000	2.0	6,000	850	3.1	---	12.4

Characteristics and Operating values are based on performance tests. Figures may change without notice as the result of additional data or product refinement. CPI Eimac Division should be consulted before using this information for final equipment design.



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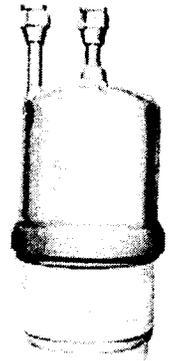
Additional Catalogs: Klystrode® IOT

3CW20,000A7

The 3CW20,000A7 is a high-mu power triode intended to be used as a zero bias Class B amplifier in audio or radio frequency applications. Operation with zero-grid bias offers circuit simplicity by eliminating the bias supply. In addition, grounded grid operation is attractive since a power gain as high as twenty times can be obtained. The 3CW20,000A7 is electrically identical to the air-cooled 3CX10,000A7 except for its 29kW plate dissipation rating.

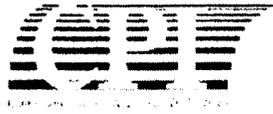
Characteristics

Plate Dissipation (Max.)	20,000 Watts
Screen Dissipation (Max.)	Watts
Grid Dissipation (Max.)	500 Watts
Frequency for Max. rating (CW)	110 MHz
Amplification Factor	200
Filament/Cathode	Thoriated Tungsten
Voltage	7.5 Volts
Current	99.0 Amps
Capacitance	Grounded Cathode
Input	59.0 pf
Output	0.2 pf
Feedthrough	36 pf
Capacitance	Grounded Grid
Input	59.0 pf
Output	36.0 pf
Feedthrough	0.2 pf
Cooling	Water and Forced Air
Base	Coaxial
Air Socket	SK-1300
Air Chimney	
Boiler	
Length	11.22 in; 285.00 mm
Diameter	4.65 in; 118.10 mm
Weight	11.5 lb; 5.2 kg



Class of Operation	Type of Service	Maximum Ratings		Typical Operation				
		Plate Voltage (Volts)	Plate current (Amps)	Plate Voltage (Volts)	Screen Voltage (Volts)	Plate Current (Amps)	Drive Power (Watts)	Output Power (kiloWatts)
C	Grid Driven RF Amplifier	7,000	4.0	7,000	---	4.0	530	21.3
C	Grid Driven RF Amplifier Plate Modulated	5,500	3.0	5,000	---	3.0	380	11.9
B	Cathode Driven RF Linear Amplifier	7,000	5.0	7,000	---	5.0	1,540	24.2
B	Cathode Driven RF Linear Amplifier (AM Service)	7,000	5.0	7,000	---	2.4	330	5.65

Characteristics and Operating values are based on performance tests. Figures may change without notice as the result of additional data or product refinement. CPI Eimac Division should be consulted before using this information for final equipment design.



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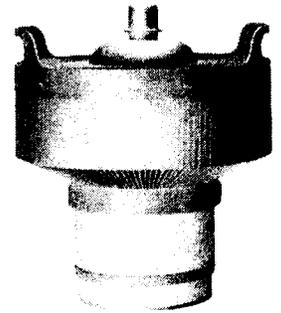
Additional Catalogs: Klystrode® IOT

3CX10,000A1/8158

The 3CX10,000A1/8158 is a low-mu triode intended for use as an audio amplifier and as a voltage regulator.

Characteristics

Plate Dissipation (Max.)	10,000 Watts
Screen Dissipation (Max.)	--- Watts
Grid Dissipation (Max.)	250 Watts
Frequency for Max. rating (CW)	160 MHz
Amplification Factor	5
Filament/Cathode	Thoriated Tungsten
Voltage	7.5 Volts
Current	100 Amps
Capacitance	Grounded Cathode
Input	53.0 pf
Output	1.4 pf
Feedthrough	34 pf
Capacitance	---
Input	--- pf
Output	--- pf
Feedthrough	--- pf
Cooling	Forced Air
Base	Coaxial
Air Socket	SK-1300
Air Chimney	SK-1306
Boiler	---
Length	8.75 in; 222.20 mm
Diameter	7.05 in; 179.10 mm
Weight	12.0 lb; 5.5 kg



Class of Operation	Type of Service	Maximum Ratings		Typical Operation				
		Plate Voltage (Volts)	Plate current (Amps)	Plate Voltage (Volts)	Screen Voltage (Volts)	Plate Current (Amps)	Drive Power (Watts)	Output Power (kiloWatts)
C	Cathode Driven RF Amplifier	7,000	4.0	7,000	---	4.0	4,100	24.5
C	Grid Driven RF Amplifier Plate Modulated	5,500	3.0	5,000	---	3.0	515	12.4
C	RF Industrial Oscillator or Amplifier	7,000	4.0	7,000	---	4.0	600	22.4
AB2	Cathode Driven RF Amplifier	7,000	5.0	7,000	---	4.0	2,050	20.0

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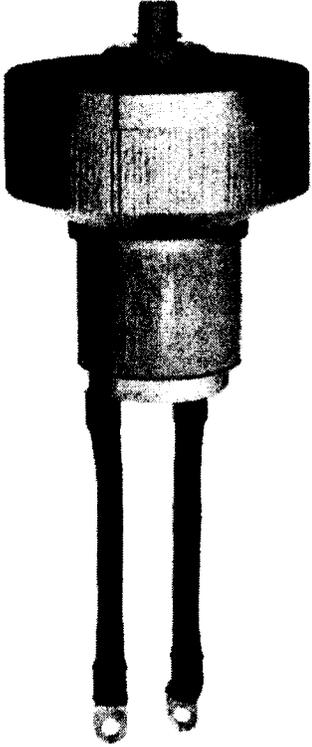
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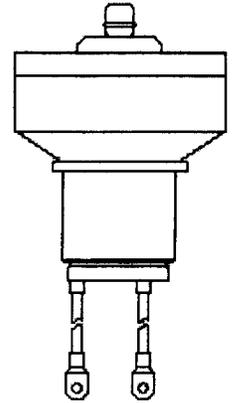
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TDP
TUBE 2CX10,000F

GENERAL DESCRIPTION



The 2CX10,000F is a ceramic/metal forced-air cooled high-vacuum diode designed for clipper or charging service. It employs a thoriated-tungsten filament to allow fast warmup. Flexible filament leads are used to simplify connection to the source of filament power so that no socket is required. The tube is normally mounted by clamping around the periphery of the anode cooler. Up to 12 kilowatts may be safely dissipated by the anode with the recommended forced-air cooling.



TECHNICAL SPECIFICATIONS

ELECTRICAL

Filament	Thoriated Tungsten Filament
Voltage	7.0 V
Current at 7.0 Volts nominal	110 A
Peak Inverse Plate Voltage	65 kV
Maximum Plate Dissipation	12 kW
DC Plate current	8.0 A
Peak Plate Current	25 A

MECHANICAL

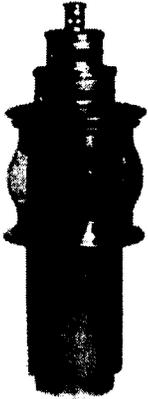
Maximum Overall Dimensions	
Length (including flexible filam. leads)	17.75 in; 45.1 cm
Diameter (anode cooler)	7.05 in; 17.8 cm
Net Weight (approximate)	11 lbs; 5 kg
Operating Position	Vertical, Base Down or Up
Maximum Operating Temperature	
Ceramic/Metal Seals	250°C
Anode Core	250°C
Base	Special, with Flexible Filament Leads
Cooling	Forced Air
Recommended Socket	None Required
Available Air Caster Chimney (use as dependant on tube mounting)	SK-1306

Specifications may change without notice



TDP
TUBE ML-5682

GENERAL DESCRIPTION



The ML-5682 is a general-purpose high-power triode suitable for use in AM, FM and TV broadcasting, dielectric and induction heating, pulse modulation and similar applications. This tube features rugged coaxial construction with high-dissipation, low-inductance rf terminals. The cathode consists of sturdy, stress-free, thoriated-tungsten filaments. This tube is suitable for cavity operation and its low plate impedance adapts it to broad-band service.

The ML-5682 is water-cooled and accepts a quick-change water-jacket coupling. The heavy-wall anode will dissipate up to 140 kW with a water flow of 60 gpm. The maximum CW plate-voltage rating of 16 kV applies at frequencies up to 30 Mc. The tube may be operated up to 88 Mc with a reduction in ratings. In pulse service the tube is capable of switching up to 8 Mw with plate voltages up to 35 kV.

The ML-5682 is also available with envelope construction utilizing ceramic instead of glass. This version, designated as the ML-5682K, is electrically identical to the ML-5682.

TECHNICAL SPECIFICATIONS

ELECTRICAL

Filament Voltage	16.5 Volts
Filament Current at 16.5 volts	325 Amps
Filament Starting Current, maximum	300 Amps
Filament Cold Resistance	0.0052 Ohms
Amplification Factor	30
Direct Interelectrode Capacitances	
Grid-Plate	35 uuf
Grid-Filament	110 uuf
Plate-Filament	2.6 uuf

MECHANICAL

Mounting Position	Vertical, anode down
Type of Cooling	Water and forced-air
Water Flow on Anode	See Water Cooling Characteristics
Maximum Water Pressure	75 psi
Maximum Outlet Water Temperature	70 °C
Air Flow on Envelope and Seals, approximate	250 cfm
Maximum Envelope Temperature	165 °C
Net Weight, approximate	50 lb.

Specifications may change without notice

THIS TUBE IS USED IN THE FOLLOWING SHORTWAVE BROADCAST TRANSMITTERS

Manufacturer	Transmitter specifications	Power in kW
Continental Electronics	420 A	400

THIS TUBE IS AVAILABLE FROM

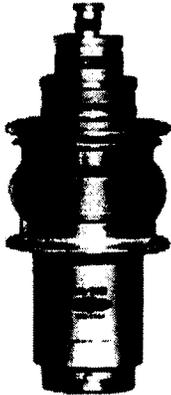
Manufacturer	Rebuilder	Distributor
Eimac Penta Laboratories	California Tube Laboratory Fountain	Richardson Electronics



**TDP
TUBE ML-5681**

GENERAL DESCRIPTION

The ML-5681 is a compact, general-purpose, high-power electron tube designed for operation at frequencies up to 110 Mc. It is a coaxial-terminal, water- and forced-air-cooled triode capable of approximately 50 kW output at 110 Mc in cathode-drive circuitry with 10 kW driving power. Maximum ratings of 9 kVdc plate voltage and 90 kW plate input apply at frequencies up to 110 Mc; increased ratings of 15 kVdc plate voltage and 150 kW plate input are permissible at frequencies up to 30 Mc.



The ML-5681 has basic design features which make it suitable for use over a wide range of power and frequency in high-power AM, FM, and TV broadcasting, particle accelerator, and dielectric and induction heating services. This tube is ideally suited to cavity operation, and its low plate impedance makes it advantageous for broad-band service. Other features include high-conductivity glass-to-metal seals, sturdy electrodes, integral anode water jacket, quick-change water coupling, and heavy-wall copper anode designed to dissipate 75 kW. All electrodes mount directly from heavy copper rings, resulting in a structure which is electrically and mechanically superior to the conventional types of water-cooled electron tubes. The large-diameter seals provide increased strength and freedom from excessive heating. The cathode is a multistrand, thoriated-tungsten filament, completely balanced and stress free throughout life. The grid is capable of unusually high heat dissipation, contributing to maximum stability of tube performance and circuit operation.

TECHNICAL SPECIFICATIONS

ELECTRICAL

Filament Voltage	12.0 Volts
Filament Current at 12.0 volts	220 Amps
Filament Starting Current, maximum	550 Amps
Filament Cold Resistance	0.0062 Ohms
Amplification Factor	25
Direct Interelectrode Capacitances	
Grid-Plate	61 uuf
Grid-Filament	76 uuf
Plate-Filament	2.0 uuf

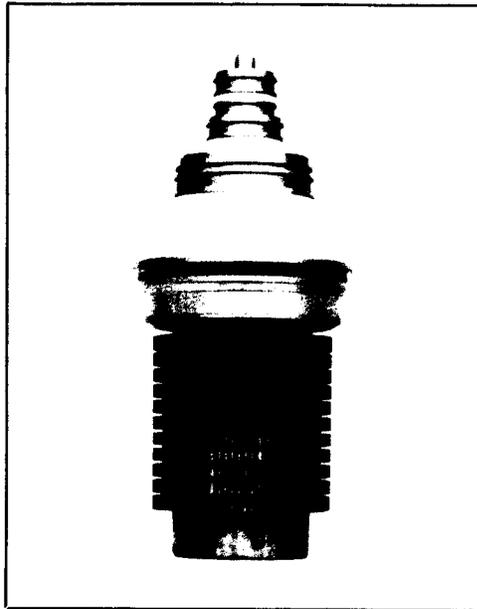
MECHANICAL

Mounting Position	Vertical, Anode Down
Type of Cooling	Water and Forced-Air
Water Flow on Anode	See Water Cooling Characteristics
Maximum Water Pressure	7 1/2 psi
Maximum Outlet Water Temperature	70 °C
Air Flow on Seals, approximate	250 cfm
Maximum Glass Temperature	165 °C
Net Weight, approximate	49 lbs.

Specifications may change without notice

THIS TUBE IS USED IN THE FOLLOWING SHORTWAVE BROADCAST TRANSMITTERS

Manufacturer	Transmitter specifications	Power in kW
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ML-7482

General Purpose Triode

440 kW CW



ELECTRON TUBE SPECIALIST

DESCRIPTION

The ML-7482 is a general-purpose vapor-cooled triode capable of 440 kilowatts continuous output as a Class C amplifier or oscillator at frequencies up to 30 Mc.

The anode is designed to dissipate 200 kilowatts, and substantially higher power during momentary overloads or intermittent operation. Efficient cooling is accomplished by vaporization of water in a boiler and transport of the vapor to a secondary cooling circuit at a temperature of about 100°C. Sturdy coaxial grid and cathode mounting structures

provide low-inductance, high-dissipation rf terminals. The cathode consists of sturdy, self-supporting, stress-free, thoriated-tungsten filaments. Envelope insulation members are strong, low-loss, ceramic cylinders.

The maximum rating of 20 kVdc plate voltage applies at frequencies up to 30 Mc. Useful power output can be obtained at frequencies up to 110 Mc at reduced plate voltage.

GENERAL CHARACTERISTICS

Electrical

Filament Voltage	14.5 V*
Filament Current	450 A
Filament Starting Current, maximum	1200 A
Filament Cold Resistance .....	.0035 ohms
Amplification Factor	45
Interelectrode Capacitances	
Grid-Plate	75 pf
Grid-Filament	200 pf
Plate-Filament	4 pf

Mechanical

Mounting Position	Vertical, Anode Down
Type of Cooling, Anode	Vaporization of water
Air Flow on Bulb and Seals, approximate	500 cfm**
Maximum Ceramic Temperature	165 °C
Net Weight, approximate	120 lb

*For older tubes with serial numbers lower than 476,000, the filament must be operated at 16.5 volts.

**At frequencies up to 15 Mc, air flow should be directed primarily on filament seals and the main ceramic bulb; at higher frequencies or high ambient temperatures, additional air flow may be required on the grid seals. Air flow should be distributed to maintain uniform temperature, not greater than 165°C, around the circumference of the seals.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

Continuous Commercial Service

Audio-Frequency Power Amplifier and Modulator Class B

Maximum Ratings, Absolute Values		
DC Plate Voltage	20000	V
Maximum-Signal DC Plate Current*	30	A
Plate Dissipation*	200	kW
Typical Operation (Values are for two tubes)		
DC Plate Voltage	12000	15000 V
DC Grid Voltage	-250	-320 V
Peak AF Grid-to-Grid Voltage	960	1740 v
Peak AF Plate-to-Plate Voltage	20400	25200 v
Zero-Signal DC Plate Current	2	2 A
Maximum-Signal DC Plate Current	20	56 A
Effective Load Resistance, Plate-to-Plate	1300	570 ohms
Max.-Signal Driving Power, approximate ..	.8	5 kW
Max.-Signal Power Output, approximate ..	160	550 kW

* Averaged over any audio-frequency cycle of sine-wave form.

Linear RF Power Amplifier - Class AB Single-Sideband Suppressed-Carrier Service

Maximum Ratings, Absolute Values		
DC Plate Voltage	20000	V
Grid Dissipation	2500	W
Plate Dissipation	200	kW
Typical Operation, Cathode-Drive		
	2-tone	16-tone†
DC Plate Voltage	20000	20000 V
DC Grid Voltage	-450	-450 V
Zero-Signal DC Plate Current	1	1 A
Maximum-Signal Peak Plate Current	54	135 a
Maximum-Signal Peak RF Grid Voltage	690	1100 v
Maximum-Signal Peak Driving Power	10	40 kw
Peak Envelope Power Output ‡	230	580 kw
Average Power Output, approximate	115	58 kW

†With peak-envelope to average power ratio of approximately 10.

‡Includes power transferred from driver stage.

Plate-Modulated RF Power Amplifier Class C Telephony

Carrier conditions per tube for use with a maximum modulation factor of 1.0

Maximum Ratings, Absolute Values		
DC Plate Voltage	15000	V
DC Grid Voltage	-1500	V
DC Plate Current	20	A
DC Grid Current	4	A
Plate Dissipation	130	kW
Typical Operation		
	Cathode Drive	
DC Plate Voltage	12000	14000 V
DC Grid Voltage	-800	-1000 V
Peak RF Grid Voltage	1350	1630 v
Peak RF Plate Voltage	10600	11800 v
DC Plate Current	13.5	20.5 A
DC Grid Current	3.5	3.5 A
RF Load Impedance	490	320 ohms
Driving Power, approximate	20	5.7 kW
Power Output, approximate	145§	220 kW

§Includes power transferred from driver stage.

WARNING: Operation of this tube may produce x-rays. Adequate rayproof shielding must therefore be provided in the equipment.

RF Power Amplifier and Oscillator Class C Telegraphy

Key-down conditions per tube without amplitude modulation⁴

Maximum Ratings, Absolute Values		
DC Plate Voltage	20000	V
DC Grid Voltage	-1500	V
DC Plate Current	35	A
DC Grid Current	4	A
Plate Dissipation	200	kW
Typical Operation		
DC Plate Voltage	14000	20000 V
DC Grid Voltage	-600	-1000 V
Peak RF Grid Voltage	1200	1600 v
Peak RF Plate Voltage	12000	17400 v
DC Plate Current	25	29 A
DC Grid Current	3.6	3.4 A
RF Load Impedance	250	330 ohms
Driving Power, approximate	4.5	6 kW
Power Output, approximate	260	440 kW

⁴Modulation essentially negative may be used if the positive peak of the envelope does not exceed 115% of the carrier conditions.

TUBE PROTECTION

The handling of very high power requires particular attention to the removal of power from tubes during fault conditions (initiated by tube or circuit instabilities) since the larger amount of energy involved can cause tube damage if not properly controlled. The tube must, therefore, be protected by limiting the time elapsed from inception of a fault condition to diverting the energy from the tube, as well as the amount of energy expended in the tube during this interval.

In addition to the normal circuit breakers and overload relays, it is necessary that a fast-acting electronic protective device (crowbar) or equivalent be used. This device will in most cases be a triggered gaseous device connected across the output of the plate supply filter, if used, to dissipate the filter-circuit energy as well as the rectifier output. The complete energy source must be shorted out as quickly as possible after the inception of a "fault", and in most cases the time interval should not be allowed to exceed approximately ten microseconds. For some basic electronic-crowbar fault-protection circuit considerations, as well as tests of the effectiveness of a protection device, refer to the references listed.

A nominal value of resistance must be placed in the plate lead of the tube being protected in order to be assured that the impedance of this tube under a flash arc condition is greater than that of the crowbar device when the latter is triggered. Critical damping is required for the crowbar discharge circuit. It is also recommended that a minimum of five to ten ohms resistance be connected in series with each rectifier tube in order to limit surge currents.

In circuits where high transient voltages may be developed due to a shorted load or other fault, special precautions are necessary to keep these excessive voltages from appearing at the tube electrodes.

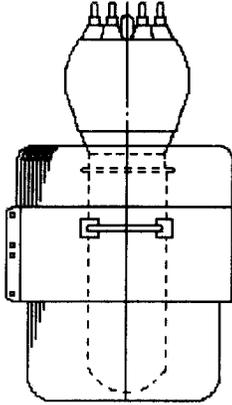
References:

1. W. N. Parker and M. V. Hoover, "Gas Tubes Protect High Power Transmitters", *Electronics*, 29, 144, January 1956.
2. H. D. Doolittle, "High Power Hydrogen Thyratrons", *Cathode Press*, 1, 6, 1954.



TDP
TUBE F-6804

GENERAL DESCRIPTION



The F-6804 is a three electrode tube designed for use as a radio frequency amplifier, oscillator, or Class B modulator. The anode is forced air cooled and is capable of dissipating 25 kilowatts during Continuous Commercial Service. The cathode is a thoriated tungsten filament of free hung design and filament excitation of 3-phase wye is required. Maximum ratings supply up to 22 megacycles.

TECHNICAL SPECIFICATIONS

ELECTRICAL

Filament Voltage, Line to Line	11.0 Volts
Filament Current, Per Phase	190 Amperes
Filament Starting Current	600 Amperes
Filament Heating Time	1.5 Seconds
Amplification Factor	40
$E_c = -100$ V. $I_b = 3.0$ Amperes	
Peak Cathode Current	100 Amperes
Direct Inter-electrode Capacitances	
Grid-Plate	37 puf
Grid-Filament	75 puf
Plate-Filament	2.2 puf

MECHANICAL

Mounting Position	Vertical, Anode Down
Air Flow Through Radiator	The tabulation listed below indicated the required flow of incoming air, through the radiator, for the various plate dissipation values. Cooling air to be applied before the application of filament power and to continue for 3 minutes after removal of filament power
Percentage of Maximum Rated Plate Dissipation for Each Class of Service	100% Rating 50% Rating 40% Rating
Air Flow	1,200 1,400 1,100 Min. 3fm
Static Pressure	2.0 1.5 0.65 " H ₂ O
Radiator Temperature	150°C, Maximum
Measured on the nose at end away from incoming air	
Maximum Incoming Air Temperature	40°C, Maximum
Glass Temperature	120°C, Maximum
At hottest part	
Net Weight (Approximate)	123 Grams

Specifications may change without notice

THIS TUBE IS USED IN THE FOLLOWING SHORTWAVE BROADCAST TRANSMITTERS



Eimac Power Grid Tube Reference Data 25



Back to Power Grid Tube Catalog Index

Additional Catalogs: Klystrode® IOT

4CV250,000B

The 4CV250,000B is recommended for use as a Class C RF amplifier or oscillator, a Class AB linear amplifier, or a Class AB push-pull AF amplifier or modulator. The 4CV250,000B is also useful as a plate and screen modulated Class C RF amplifier.

Characteristics

Plate Dissipation (Max.)	250,000 Watts
Screen Dissipation (Max.)	3,500 Watts
Grid Dissipation (Max.)	1,500 Watts
Frequency for Max. rating (CW)	30 MHz
Amplification Factor	4.5
Filament/Cathode	Thoriated Tungsten
Voltage	12.0 Volts
Current	660 Amps
Capacitance	Grounded Cathode
Input	745 pf
Output	124 pf
Feedthrough	6.0 pf
Capacitance	Grounded Grid
Input	324 pf
Output	128 pf
Feedthrough	1.2 pf
Cooling	Vapor and Water
Base	Special
Air Socket	
Air Chimney	
Boiler	BR-620
Length	28.02 in; 17.17 cm
Diameter	15.06 in; 38.26 cm
Weight	180 lb; 82 kg

Tube photo will soon
be done!



		Maximum Ratings		Typical Operation				
Class of Operation	Type of Service	Plate Voltage (Volts)	Plate current (Amps)	Plate Voltage (Volts)	Screen Voltage (Volts)	Plate Current (Amps)	Drive Power (Watts)	Output Power (kiloWatts)
C	RF Amplifier	20,000	40.0	19,000	800	32.5	3,000	460.0
C	RF Amplifier Plate Modulated	17,500	30.0	15,000	800	22.8	1,630	280.0
AB1	RF Linear Amplifier	20,000	40.0	20,000	1,800	23.0	---	330.0
AB1	AF Amplifier or Modulator (2 tubes)	20,000	40.0	20,000	1,800	46.0	---	660.0

Characteristics and Operating values are based on performance tests. Figures may change without notice as the result of additional data or product refinement. CPI Eimac Division should be consulted before using this information for final equipment design.

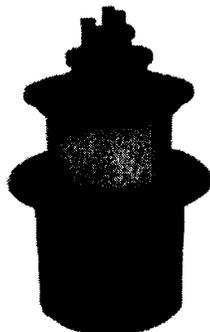
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TDP
TUBE 4CV250,000C

GENERAL DESCRIPTION



The 4CV250,000C is recommended for use as a Class C RF amplifier or oscillator, a Class AB RF linear amplifier or a Class AB push-pull AF amplifier or modulator.
The 4CV250,000C is also useful as a plate and screen modulated class C RF amplifier.

TECHNICAL SPECIFICATIONS

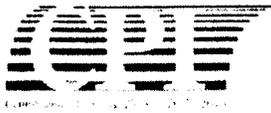
Plate Dissipation (Max.)	250,000 watts
Screen Dissipation (Max.)	3,500 watts
Grid Dissipation (Max.)	1,500 watts
Frequency for Max. Ratings (CW)	50 MHz
Cooling	Vapor and Water
Filament	Thoriated Tungsten
Voltage	12.0 volts
Current	660 amperes
Capacitances (Grounded Cath. Connection)	
Input	745 pF
Output	122 pF
Feed-through	0.5 pF
Capacitances (Grounded Grid Connection)	
Input	530 pF
Output	128 pF
Feed-through	1.4 pF
Amplification Factor (g_1-g_2)	4.5
Base	Special
Filament Connectors	SK-1711
Grid Connectors	SK-1710
Recommended Boiler	FR-630
Maximum Seal & Envelope Temperature	200°C
Maximum Length (less Boiler)	28.02 in; 71.17 cm
Maximum Diameter (less Boiler)	15.06 in; 38.20 cm
Weight (approximate) (less Boiler)	16.0 lb; 7.2 kg
Operating Position	Vertical, Anode Up (base down)

Specifications may change without notice

THIS TUBE IS USED IN THE FOLLOWING SHORTWAVE BROADCAST TRANSMITTERS:

Manufacturer	Transmitter specifications	Power in kW
<u>Continental Electronics</u>	419 B-1	250

THIS TUBE IS AVAILABLE FROM



Eimac Power Grid Tube Reference Data

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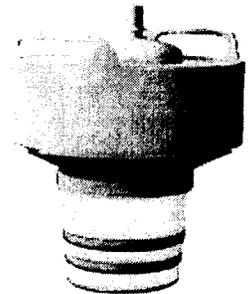
Additional Catalogs: Klystrode® IOT

4CX15,000A/8281

The 4CX15,000A/8281 is intended for use in audio or radio frequency applications. It features a new type of internal mechanical structure which results in high RF operating efficiency. Low RF losses in this mechanical structure permit operation of the 4CX15,000A/8281 at full ratings up to 110 MHz and at reduced ratings to 225 MHz.

Characteristics

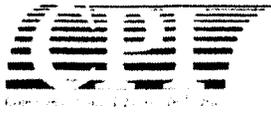
Plate Dissipation (Max.)	15,000 Watts
Screen Dissipation (Max.)	450 Watts
Grid Dissipation (Max.)	200 Watts
Frequency for Max. rating (CW)	110 MHz
Amplification Factor	4.5
Filament/Cathode	Thoriated Tungsten
Voltage	6.3 Volts
Current	160 Amps
Capacitance	Grounded Cathode
Input	160.5 pf
Output	24.5 pf
Feedthrough	1.5 pf
Capacitance	Grounded Grid
Input	67 pf
Output	25.5 pf
Feedthrough	0.2 pf
Cooling	Forced Air
Base	Special Coaxial
Air Socket	SK-300A
Air Chimney	SK-316
Boiler	--
Length	9.38 in / 238 mm
Diameter	7.58 in / 193 mm
Weight	12.8 lb / 5.8 kg



Class of Operation	Type of Service	Maximum Ratings		Typical Operation				
		Plate Voltage (Volts)	Plate current (Amps)	Plate Voltage (Volts)	Screen Voltage (Volts)	Plate Current (Amps)	Drive Power (Watts)	Output Power (kiloWatts)
C	RF Amplifier	10,000	6.0	10,000	750	4.6	220	36.5
C	RF Amplifier Plate Modulated	8,000	4.0	8,000	750	3.7	150	23.5
AB1	RF Linear Amplifier	10,000	6.0	10,000	1,500	4.3	--	28.5
AB1	AF Amplifier or Modulator (2 tubes)	10,000	6.0	10,000	1,500	8.5	--	57.7
--	Television Linear Amplifier	6,600	5.0	6,000	700	3.3	1,350	16.5

Characteristics and Operating values are based on performance tests. Figures may change without notice as the result of additional data or product refinement. CPI Eimac Division should be consulted before using this information for final equipment design.

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Eimac Power Grid Tube Reference Data

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Additional Catalogs: Klystrode® IOT

4CW25,000A

The 4CW25,000A is a tetrode intended for use in audio or radio frequency applications. It is recommended for RF linear power amplifier service for television linear amplifier service, and as a switch tube for pulsed regulator service.

Characteristics

Plate Dissipation (Max.)	25,000 Watts
Screen Dissipation (Max.)	450 Watts
Grid Dissipation (Max.)	20 Watts
Frequency for Max. rating (CW)	110 MHz
Amplification Factor	4.5
Filament/Cathode	Thoriated Tungsten
Voltage	6.3 Volts
Current	160 Amps
Capacitance	Grounded Cathode
Input	160 pf
Output	24.5 pf
Feedthrough	1.5 pf
Capacitance	Grounded Grid
Input	67 pf
Output	25.5 pf
Feedthrough	0.2 pf
Cooling	Water and Forced Air
Base	Special, Coaxial
Air Socket	SK-300A
Air Chimney	---
Boiler	---
Length	12.69 in; 322.00 mm
Diameter	4.75 in; 121.00 mm
Weight	13.5 lb; 6.1 kg



Class of Operation	Type of Service	Maximum Ratings		Typical Operation				
		Plate Voltage (Volts)	Plate current (Amps)	Plate Voltage (Volts)	Screen Voltage (Volts)	Plate Current (Amps)	Drive Power (Watts)	Output Power (kiloWatts)
C	RF Amplifier	10,000	5.0	10,000	750	4.5	220	36.5
C	RF Amplifier Plate Modulated	8,000	4.0	8,000	750	3.6	150	23.5
AB1	RF Linear Amplifier	10,000	6.0	10,000	1,500	4.2	---	28.5
AB1	AF Amplifier or Modulator	10,000	6.0	10,000	1,500	8.5	---	57.0

Characteristics and Operating values are based on performance tests. Figures may change without notice as the result of additional data or product refinement. CPI Eimac Division should be consulted before using this information for final equipment design.

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Hypervapotron[®] Tetrode with Pyrobloc[®] Grids



- Output power :
Radiobroadcasting
– 12 kW OC
Scientific applications
– 30 kW, pulse operation
VHF-TV, Band III
– 10.5 kW peak-of-sync in common amplification of the vision and sound carriers.
– 15 kW peak-of-sync in amplification of the vision carrier alone.
- Excellent linearity
- Great stability,
due to Pyrobloc[®] grids
- Anode dissipation up to 20 kW
- Hypervapotron[®] cooling

The TH 561 is a ceramic-metal tetrode of coaxial structure, employing Hypervapotron[®] anode cooling. It is designed for use in linear RF amplifiers of frequencies up to 300 MHz. Such amplifiers are intended for multiple uses, in VHF-TV transmitters (Band III), radiobroadcasting transmitters and scientific applications.

Supersedes DATA TEG 2455

This data sheet cannot be considered to be a contractual specification. The information given herein may be modified without notice due to product improvement or further development. Consult THOMSON TUBES ELECTRONIQUES before making use of this information for equipment design.

OPERATING CONDITIONS

I - RADIOBROADCASTING TRANSMITTERS

Maximum Ratings (2) (All potentials referenced to the cathode)

Frequency	120	MHz
Anode DC voltage	8	KV
Control grid DC voltage	-200	V
Screen grid DC voltage	800	V
Heating surge current	300	A
Peak cathode current	30	A
Anode DC current	6	A
Anode dissipation	20	kW
Control grid dissipation	100	W
Screen grid dissipation	250	W

Operating Example : RF power amplification without modulation - Grounded-cathode operation

Operating frequency	30	MHz
Operating heater voltage (3)	6.8	V
Anode voltage	7.5	kV
Screen grid voltage	600	V
Control grid voltage	-145	V
Anode DC current	2.3	A
Screen grid DC voltage	100	mA
Control grid DC voltage	10	mA
Average output power (4)	12	kW
Average input power	30	W

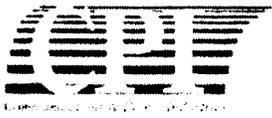
II - SCIENTIFIC APPLICATIONS

Maximum Ratings (2) (All potentials referenced to the cathode)

Frequency	300	MHz
Anode DC voltage	8	kV
Control grid DC voltage	-200	V
Screen grid DC voltage	800	V
Heater surge current	300	A
Peak cathode current	30	A
Anode DC current	6	A
Anode dissipation	20	kW
Control grid dissipation	100	W
Screen grid dissipation	250	W

Operating Example : Pulsed operation in circuit TH 18526 (5)

Operating frequency	210	MHz
Bandwidth (-1 dB)	8	MHz
Operating heater voltage (3)	6.6	V
Anode voltage	6.5	kV
Screen grid voltage	800	V
Control grid voltage	-160	V
Anode DC current during pulse	5.9	A
Screen grid DC current during pulse	160	mA
Control grid DC current during pulse	30	mA
Gain	15.5	dB
Output power during pulse (4)	30	kW
Pulse width	500	μs
Duty factor	1	%



Eimac Power Grid Tube Reference Data

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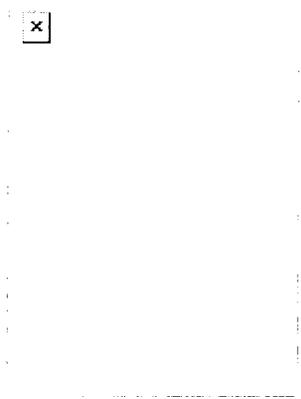
Additional Catalogs: Klystrode® IOT

4CM300,000GA

The 4CM300,000GA is a ceramic/metal, multiphase-cooled (water/vapor) power tetrode designed to be used as an exact replacement for the Thomson TH537. This tube has a thoriated tungsten mesh filament and pyrolytic graphite control and screen grids for applications requiring high dissipation combined with low secondary emission characteristics. Base coaxial contact rings are provided for the filament, grid, and screen terminals, and these terminals are cooled with forced air. The maximum anode dissipation rating is 500 kilowatts steady state, with multiphase cooling.

Characteristics

Plate Dissipation (Max.)	300,000 Watts
Screen Dissipation (Max.)	5,000 Watts
Grid Dissipation (Max.)	2,000 Watts
Frequency for Max. rating (CW)	50 MHz
Amplification Factor	4.3
Filament/Cathode	Thoriated Tungsten
Voltage	18.0 Volts
Current	430 Amps
Capacitance	Grounded Cathode
Input	820 pf
Output	80.0 pf
Feedthrough	4.5 pf
Capacitance	Grounded Grid
Input	340 pf
Output	81.0 pf
Feedthrough	0.8 pf
Cooling	Water and Forced Air
Base	Special Coaxial
Air Socket	SK-2453
Air Chimney	---
Boiler	---
Length	22.0 in; 56.0
Diameter	12.30 in; 31.1
Weight	125 lb; 57 kg



Class of Operation	Type of Service	Maximum Ratings		Typical Operation				
		Plate Voltage (Volts)	Plate current (Amps)	Plate Voltage (Volts)	Screen Voltage (Volts)	Plate Current (Amps)	Drive Power (Watts)	Output Power (kiloWatts)
C	RF Amplifier Plate Modulated	13,000	50.0	11,000	1,000	36.0	2,400	300.0

Characteristics and Operating values are based on performance tests. Figures may change without notice as the result of additional data or product refinement. CPI Eimac Division should be consulted before using this information for final equipment design.

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E2V Technologies

CW1603J2

RF Power Tetrode

The data should be read in conjunction with the Power Tetrode Preamble.

ABRIDGED DATA

Water cooled tetrode of metal-ceramic construction, with an integral water jacket, intended primarily for class C amplifiers and oscillators.

Anode dissipation	300	kW max
Anode voltage (class C unmodulated)	15	kV max
Maximum operating frequency	100	MHz

GENERAL

Electrical

Filament	thoriated tungsten
Filament voltage (see note 1)	18.0 ± 2% V
Filament current	430 A
Filament surge current (see note 2)	1100 A max
Filament cold resistance	4.8 mΩ
Peak cathode current ($V_{a1} = V_{g2} = V_{g1} = 600$ V)	400 A
Grid-screen amplification factor	4.3
Transconductance ($I_a = 25$ A, $V_{g2} = 1000$ V)	400 mA/V
Inter-electrode capacitances, approx:	
cathode to grid 1	310 pF
cathode to grid 2	28 pF
cathode to anode	0.6 pF
grid 1 to grid 2	515 pF
grid 1 to anode	4.5 pF
grid 2 to anode	75 pF

Mechanical

Overall length	547 mm max
Overall diameter	310 mm max
Net weight	55 kg approx
Mounting position	vertical, anode up

Cooling

Water cooling of anode:

water flow at maximum dissipation	150	l/min
inlet temperature	60	C max
outlet temperature	100	C max
inlet pressure	5 bar	max

Air cooling of electrode terminals:

airflow	1.5	m ³ /min
pressure	15	mbar
seal temperature	200	C max

ANODE, GRID AND SCREEN MODULATED RF POWER AMPLIFIER

(Class C Telephony, carrier conditions per tube)

MAXIMUM RATINGS (Absolute values)

Anode voltage	12	kV
Cathode current (peak)	400	A
Anode dissipation	300	kW
Screen voltage	1200	V
Screen dissipation	5.0	kW
Grid bias voltage	-800	V
Grid dissipation	2.0	kW

TYPICAL OPERATING CONDITIONS (below 30 MHz)

Anode voltage	11	kV
Screen voltage	1000	V
Grid voltage	-550	V
Peak RF drive voltage	700	V
Anode current	36	A
Screen current	1.3	A
Screen dissipation	4.0	kW
Grid current	2.0	A
Grid dissipation	600	W
Anode dissipation	90	kW
Nominal driving power	2.4	kW
Output power into circuit	305	kW

NOTES

- In some applications, operation at a lower filament voltage may give enhanced tube life. The equipment design should allow for operation in the range 16 to 20 V; E2V Technologies should be consulted regarding optimum filament voltage.
- The filament current must not exceed 1100 A, even momentarily, at any time.

E2V Technologies

CY1637

RF Power Tetrode

The data should be read in conjunction with the Power Tetrode Preamble.

ABRIDGED DATA

Vapour cooled tetrode, coaxial metal-ceramic envelope, for audio amplifiers, RF linear amplifiers or class C amplifiers or oscillators.

Anode dissipation	100	kW max
Anode voltage	20	kV max
Frequency for full ratings	30	MHz max
Output power (class C telegraphy)	82.5	kW

GENERAL

Electrical

Filament	thoriated tungsten
Filament voltage (see note 1)	10 V
Filament current	300 A
Peak usable cathode current	120 A
Grid-screen amplification factor	4.5
Inter-electrode capacitances, grounded filament:	
grid to anode	2.4 pF
input	465 pF
output	55 pF

Mechanical

Overall length	457.4 mm max
Overall diameter	256.5 mm max
Net weight	20 kg approx
Mounting position	vertical

Accessories

Socket (see page 7)	MA166B
Clamping device to secure tube in socket (optional)	MA233

COOLING

The CY1637 has a vapour cooled anode for use in a suitable boiler. The steam generated when the tube is operating is ejected from the top of the boiler and passed through an insulated tube to a separate condenser. The condensate is returned to an inlet on the side of the boiler.

Sufficient air must be passed over the base terminals to maintain the temperatures of the ceramic to metal seals below the maximum rated value of 250 °C. Using socket type MA166B, 1.70 to 2.83 m³/min of air will be required for base cooling, blown horizontally through the socket from two diametrically opposed nozzles. It is also necessary to direct 0.06 m³/min of air into the centre hole of the socket.

AUDIO FREQUENCY POWER AMPLIFIER AND MODULATOR (Class AB1) (See Note 2)

MAXIMUM RATINGS (Absolute values)

Anode voltage	20	kV
Anode current	15	A
Anode dissipation	100	kW
Screen voltage	2.5	kV
Screen dissipation	1750	W
Grid dissipation	500	W
Grid circuit resistance	0.1	MΩ

TYPICAL OPERATING CONDITIONS (Class AB1, two tubes)

Anode voltage	10	12	15	kV
Screen voltage	1.5	1.5	1.5	kV
Grid voltage	-290	-450	-340	V
Peak AF grid voltage	270	320	310	V
Anode current (zero signal)	4.0	1.0	2.0	A
Anode current (maximum signal)	17.4	8.6	15.1	A
Screen current (zero signal)	0	0	0	A
Screen current (maximum signal)	0.77	0.50	0.62	A
Anode dissipation per tube (maximum signal)	33.0	19.0	30.5	kW
Effective load (anode to anode)	1.15	2.86	2.56	kΩ
Nominal driving power (maximum signal)	0	0	0	W
Output power (maximum signal)	110	65	165	kW

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**RADIO FREQUENCY LINEAR AMPLIFIER
(Class AB1) (See Note 2)**

MAXIMUM RATINGS (Absolute values)

Anode voltage	20	kV
Anode current	15	A
Anode dissipation	100	kW
Screen voltage	2.5	kV
Screen dissipation	1750	W
Grid dissipation	500	W
Grid circuit resistance	0.1	MΩ

**TYPICAL OPERATING CONDITIONS
(Peak envelope or modulation crest
conditions, below 30 MHz)**

Anode voltage	10	15	kV
Screen voltage	1.5	1.5	kV
Grid voltage (see note 3)	-290	-340	V
Peak RF grid voltage	270	310	V
Anode current (zero signal)	2.0	1.0	A
Anode current (maximum signal)	8.7	7.55	A
Screen current (maximum signal)	0.385	0.310	A
Anode dissipation	33	30.5	kW
Nominal driving power	0	0	W
Output power (see note 4)	55.0	82.5	kW

**ANODE MODULATED RF POWER
AMPLIFIER**

**(Class C Telephony, carrier conditions per
tube for use with a maximum modulation
factor of 1.0)**

MAXIMUM RATINGS (Absolute values)

Anode voltage	17.5	kV
Anode current	15	A
Anode dissipation (see note 5)	67	kW
Screen voltage	2.0	kV
Screen dissipation	1750	W
Grid dissipation	500	W

**TYPICAL OPERATING CONDITIONS
(below 30 MHz)**

Anode voltage	7.5	10	kV
Screen voltage	750	750	V
Grid voltage	-460	-520	V
Peak AF screen voltage (for 100% modulation)	640	675	V
Peak RF grid voltage	630	680	V
Anode current	7.0	6.6	A
Screen current	1.200	0.985	A
Grid current	0.375	0.370	A
Anode dissipation	10.5	11.0	kW
Nominal driving power	235	250	W
Output power	42	55	kW

**ANODE AND SCREEN MODULATED RF
POWER AMPLIFIER**

**(Class D Tyler high efficiency circuit,
carrier conditions per tube for use with a
maximum modulation factor of 1.0)**

MAXIMUM RATINGS (Absolute values)

Anode voltage	17.5	kV
Anode current	15	A
Anode dissipation (see note 5)	67	kW
Screen voltage	2.0	kV
Screen dissipation	1750	W
Grid dissipation	500	W

**TYPICAL OPERATING CONDITIONS
(below 3 MHz)**

Anode voltage	12	kV
Screen voltage (see note 6)	750	V
Grid voltage (see note 7)	-600	V
Peak RF grid voltage	750	V
Anode current	10.3	A
Screen current	1.6	A
Grid current	0.7	A
Anode dissipation	19	kW
Nominal driving power	520	W
Output power	105	kW
Anode efficiency	85	%

**RF POWER AMPLIFIER OR OSCILLATOR
(Class C Telegraphy, key down conditions,
one tube)**

MAXIMUM RATINGS (Absolute values)

Anode voltage	20	kV
Anode current	15	A
Anode dissipation	100	kW
Screen voltage	2.5	kV
Screen dissipation	1750	W
Grid dissipation	500	W

**TYPICAL OPERATING CONDITIONS
(below 30 MHz)**

Anode voltage	10	15	kV
Screen voltage	750	750	V
Grid voltage	-425	-480	V
Peak RF grid voltage	575	640	V
Anode current	6.70	6.45	A
Screen current	0.925	0.810	A
Grid current	0.320	0.355	A
Anode dissipation	12	14	kW
Nominal driving power	185	225	W
Output power	55	82.5	kW