PET3CW20000H3

Water Cooled Triode
For Industrial RF Heating Machines

Drop in equivalent of 3CW20000H3

- Output Power: 28 kW in CW mode
- Anode voltage: 10 kV max
- Anode dissipation: 20 kW max
- Frequency: 90 MHz max

Manufactured in India, in a world-class facility equipped with high quality machinery, materials and components sourced from reputed suppliers in America, Europe and Japan.

Fifty-two weeks warranty against manufacturing defects irrespective of the number of hours of operation.

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PET3CW20000H3 is a water-cooled, ceramic-metal power triode with a robust mesh filament, for use in industrial radio-frequency heating

Electrical Characteristics

Filament	Thoriated tungsten	
Filament voltage (see note 1)	7.5	V
Filament current	100	A
Surge Filament current (peak) (see note 2)	500	A
Filament cold resistance.	9.7	mΩ
Peak usable cathode current	26	A
Amplification factor (V_a = 2.3 kV, I_a = 1.0 A)	20	
Mutual conductance (V_a = 2.5 kV, I_a = 1.3 A).	31	mA/V
Inter – electrode capacitances:		
Grid to anode	39	pF
Grid to filament	54	pF
Anode to filament	2.0	pF

Mechanical Characteristics

Connections	Filament leads and grid contact flange
Operating position	vertical, either way up
Maximum operating temperature	250 ^{O}C
Maximum dimensions	See outline drawings
Net weight	4 kg (8.8 pounds) approx

Accessories

Water coupling, supplied with PET3CW20000H3	CWPA323A
Thermal fuse available for PET3CW20000H3	PA85E
Cathode connector	CWPA830

For frequencies above 2MHz, CWPA830 should be used in conjunction with a strip connection to provide a low inductance cathode return.

Cooling

Anode is cooled by circulating water through the removable anode water jacket. The table below lists the minimum water flow requirement for adequate anode cooling at various anode dissipation levels. In all cases, the outlet water temperature must not exceed 70 ^{o}C nor should inlet water pressure exceed 60 psi. This table is based upon 20 ^{o}C temperature rise.

Additional forced-air cooling of the tube base is also required to maintain ceramic-to-metal seal temperature below the 250 ^{o}C maximum. Approximately 50 ft^3/min of cooling air directed into the base structure will generally satisfy requirements.

Minimum Water Cooling Requirements

Anode Dissipation (kW)	Water Flow l/min	Pressure Drop (psi)
10	12	2.5
15	13	3.0
20	15	3.5
25	18	4.0

The values given allow for maximum filament and grid dissipation in addition to anode dissipation shown.

Radio Frequency Oscillator For Industrial Service

(Class C Conditions, One Tube)

Maximum Ratings (Absolute Values)

Frequency	90	MHz max
Anode voltage d.c.	10	kV max
Anode current d.c. (see note 3)	4.0	A max
Anode input power	40	kW max
Anode dissipation	10	kW max
Grid voltage d.c.	–1000	V max
Grid current d.c..(See note 4)	0.6	A max
Grid dissipation	250	W max
Cathode current d.c.	5.0	A max

Typical Operating Conditions

Frequency	30	30	MHz
Anode voltage d.c.	7.0	9.0	kV
Anode current d.c.	4.0	4.0	A
Anode dissipation	9	7	kW
Grid voltage d.c.	–670	–930	V
Grid resistor	2450	2160	Ω
Grid current d.c..	275	430	mA
Grid dissipation	94	168	W
Drive power	260	570	W
Anode input power	28	36	kW
Anode output power	19	29	kW
Output power less drive	18.7	28.4	kW

NOTES

1. The filament voltage measured at the tube should be 7.5 V ± 5% for satisfactory performance, maximum life is obtained at -5%.
2. The filament current must not exceed 500 A, even momentarily, at any time.
3. The anode supply should include current-limiting resistors, and an over-current trip to remove anode voltage quickly in the event of an overload or arc (such load variations and faults are common in industrial service). Spark gaps should be connected between anode and ground, to protect the tube from voltage transients under fault conditions.
4. The grid current rating of 0.6 A d.c. should not be exceed, except for very short periods during tuning. The grid circuit should include over-current protection, and d.c. grid current should be monitored continuously during industrial operation with varying loads.

Health And Safety Hazards

PET electronic devices are safe to handle and operate, provided that the precautions stated are observed. PET does not accept responsibility for damage or injury resulting from the use of electronic devices it produces. Equipment manufacturers and users must ensure that adequate precautions are taken. Appropriate warning labels and notices must be provided on equipments incorporating PET devices and in operating manuals.

High voltage

Equipment must be designed so that personnel cannot come into contact with high voltage circuits. All high voltage circuits and terminals must be enclosed and fail-safe interlock switches must be fitted to disconnect the primary power supply and discharge all high voltage capacitors and other stored energy before allowing access. Interlock switches must not be bypassed to allow operation with access doors open.

R.F. Radiation

Personnel must not be exposed to excessive r.f. radiation. A properly designed equipment cabinet with good r.f. electrical connection between panels will normally provide sufficient protection.

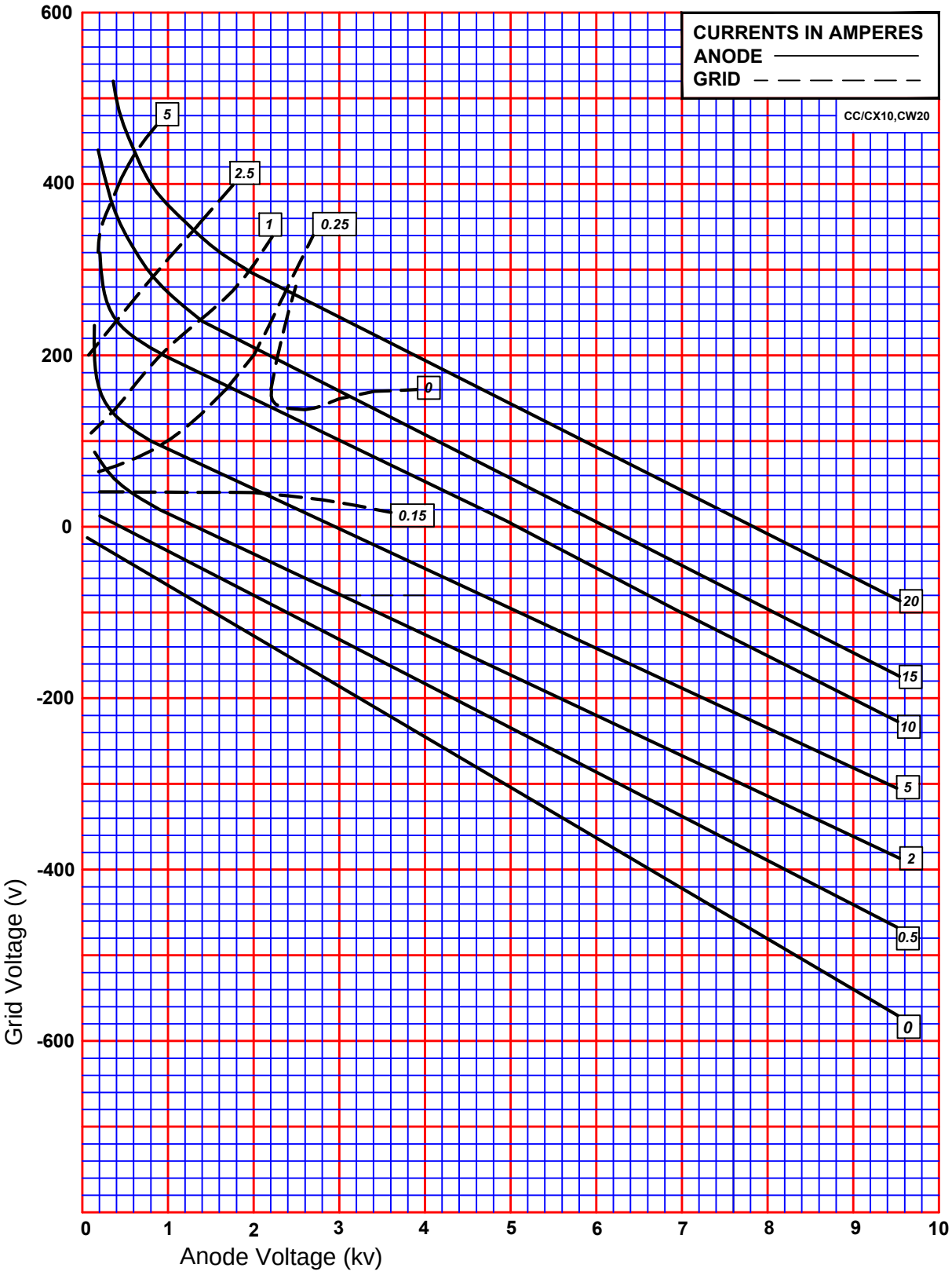
X-Ray Radiation

This device, when operating at voltages above 5 kV, produces progressively more dangerous X-rays as the voltage is increased, the radiation varies greatly during life. The device envelope provides only limited protection and further shielding may be required. A metal equipment cabinet with overlapping joints will usually provide sufficient shielding, but if there is any doubt an expert in this field should perform an X-ray survey of the equipment.

Implosion

This tube stores potential energy by virtue of its vacuum. The energy level is low, but there is some hazard from flying fragments if the tube is dropped or subjected to violent impact. The tube must be stored and transported in its approved pack. During installation or replacement the tube must not be scratched or damaged in any way likely to reduce the strength of the ceramic envelope.

TYPICAL CONSTANT CURRENT CHARACTERISTICS PET3CW20000H3



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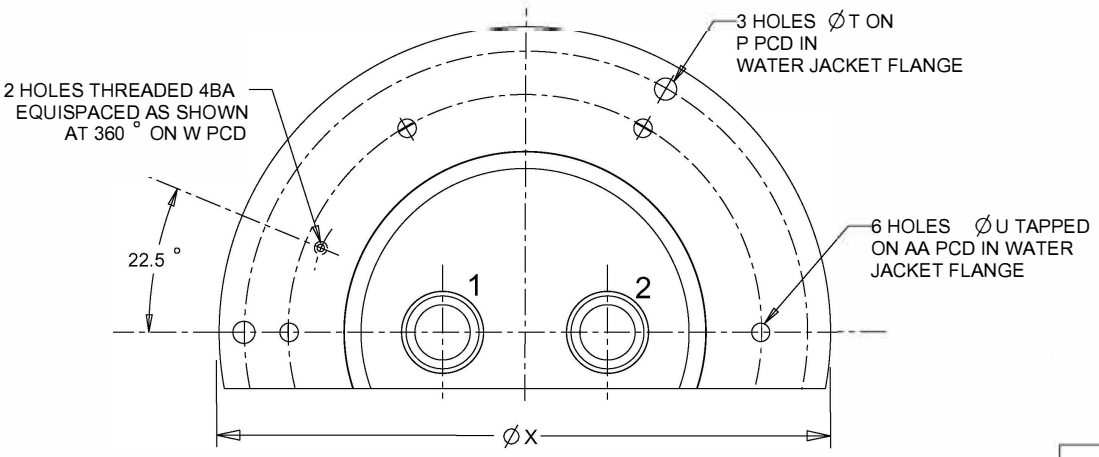
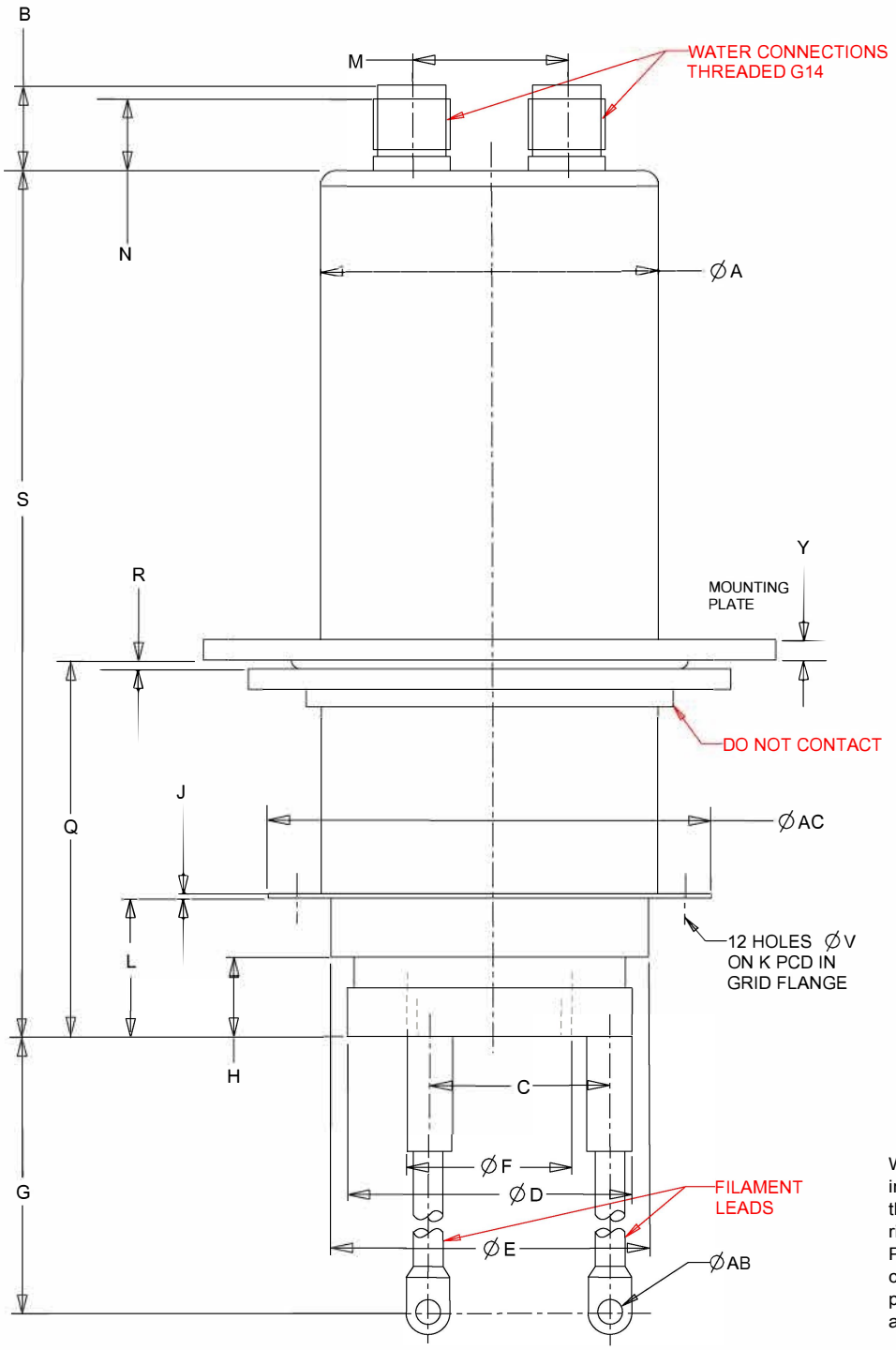
OUTLINE OF PET3CW20000H3





REF.	MILLIMETRES
A	98.00 ±1.0
B	24.55
C	52.04
D	82.60
E	92.00
F	47.63
G	209.55 ±6.35
H	23.00 ±1.0
J	01.50
K	112.65 ±0.25
L	40.00 ±1.0
M	44.73 ±2.5
N	20.50 ±2.5
P	152.56 ±0.5
Q	109.10 ±2.5
R	02.50
S	251.10 ±2.5
T	06.00
U	05.00
V	06.35
W	120.0
X	166.00
Y	06.00
AA	128.00
AB	9.91
AC	128.52 ±0.76

NOTE:

1. ALL DIMENSIONS ARE IN MM.
2. WATER CONNECTIONS

	ANODE DOWN	ANODE UP
INLET	2	1
OUTLET	1	2