



# Triode Type BR 191B

VHF AMPLIFIER AND OSCILLATOR

**General.** The BR 191B is a forced-air-cooled transmitting triode fitted with a thoriated tungsten filament designed for television, FM broadcast and industrial service.

It has a maximum anode dissipation of 3 kW and can be operated at 6.2 kV up to 30 Mc/s, 5.2 kV up to 110 Mc/s and 3.2 kV up to 220 Mc/s. Under grounded-grid Class C telegraphy conditions an output power of 5.5 kW is obtainable up to 110 Mc/s.

The flanged header grid terminal is a design feature of the BR 191B which is of particular value when used in grounded grid circuits. This terminal, when used with a large circular connector, effectively isolates the filament from the anode circuit and provides a direct low inductance path to the grid. As a result, neutralisation is generally unnecessary in grounded grid service.

**Cooling.** The anode requires forced-air-cooling. The curves given show the air inlet temperature °C/anode + grid loss; and air flow/air pressure characteristics. The header and filament seals also require air cooling. The volume of air necessary is approximately 10 cu. ft. per minute and should be directed on to the header from above through a 1-in. nozzle.

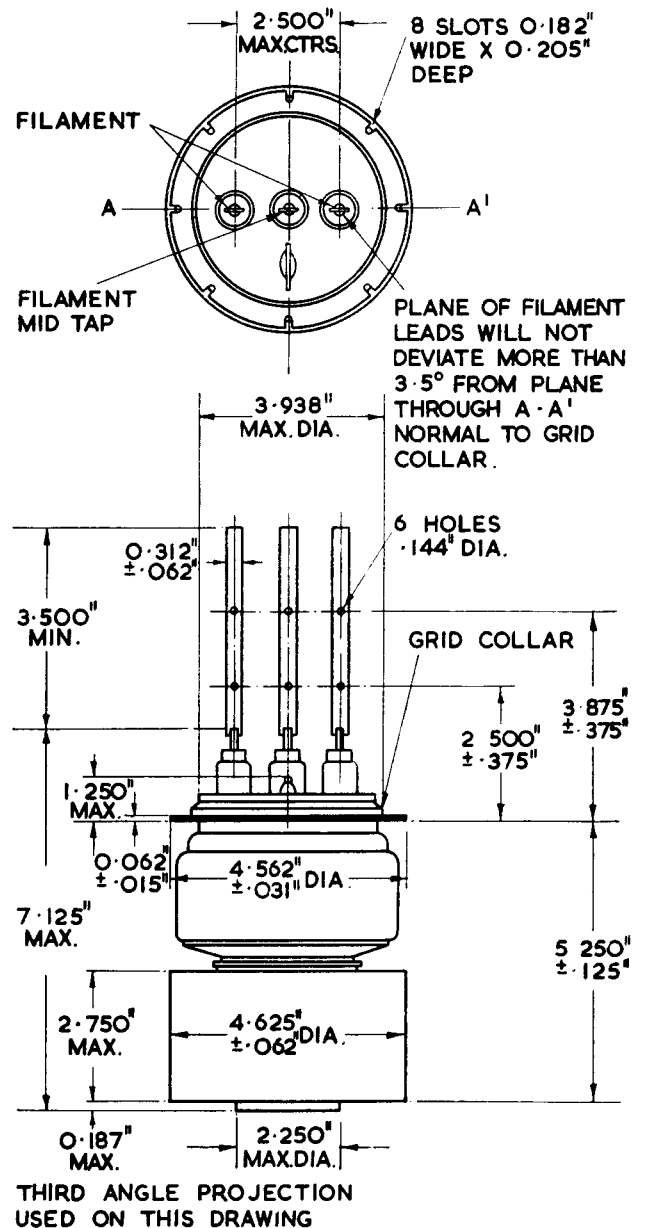
All air supplies must be started before the application of any supply voltage in order to limit the temperatures of the radiator and the grid and filament seals.

Filament power, anode power and air supplies may be removed simultaneously.

The incoming air temperature must not exceed 45°C. The radiator temperature (measured on the core at end away from incoming air) must not exceed 180°C. At the hottest part of the bulb the temperature must not be greater than 180°C. The temperature of the filament, grid and anode seals must not exceed 180°C.

**Filament Starting.** The cold filament resistance is approximately 0.052 Ω. The filament current must not exceed 175 A, even momentarily, at any time.

**Mounting.** The valve is to be mounted in a vertical position with the filament end to the top.



MARCONI'S WIRELESS TELEGRAPH COMPANY LIMITED

Chelmsford, Essex, England. Telephone: Chelmsford 3221. Telex: 1953. Telegrams: Expanse Chelmsford Telex

### APPROXIMATE DATA

$V_f$	12.6	V
$I_f$	29	A
$\mu$	29	
$I_k$ (pk)	10	A
$f$ (max)	220	Mc/s
$C_{a-gl}$	18.5	pF
$C_{a-k}$	0.5	pF
$C_{gl-k}$	19	pF

### (1) RF POWER AMPLIFIER AND OSCILLATOR CLASS C TELEGRAPHY AND CLASS C FM TELEPHONY

(Unmodulated, one valve, key down conditions)

Maximum permissible ratings (a)

$f$	<30	<110	<120	Mc/s
$V_a$	6.2	5.2	3.2	kV
$V_{gl}$	-1,000	-1,000	-600	V
$I_a$	1.4	1.4	1.4	A
$I_{gl}$	0.3	0.3	0.25	A
$P_{in}$	8.7	7.3	4.5	kW
$P_a$	3	3	3	kW

#### Typical Operation

Grounded-filament circuit

$f$	<30	<110	Mc/s
$V_a$	6	5	kV
$V_{gl}$	(i) from fixed supply of -550	-525	V
	(ii) via $R_{gl-k}$	1,900	1,725 $\Omega$
	(iii) via $R_k$	360	340 $\Omega$
$V_{gl}$ (pk)	875	850	V
$I_a$	1.25	1.25	A
$I_{gl}$ (b)	0.29	0.29	A
$P_{dr}$ (b)	225	225	W
$P_{out}$	6	4.8	kW

Grounded-grid circuit

$f$	<30	<110	<220	Mc/s
$V_a$	6	5	3	kV
$V_{gl}$	(i) from fixed supply	-550	-1,000	-160 V
	(ii) via $R_{gl-k}$	1,900	4,100	670 $\Omega$
	(iii) via $R_k$	360	740	110 $\Omega$
$V_{gl}$ (pk)	875	1,350	410	V
$I_a$	1.25	1.1	1.25	A
$I_{gl}$ (b)	0.29	0.245	0.24	A
$P_{dr}$ (b)	1,225	1,680	510	W
$P_{out}$	7	5.5	2.65	kW

### (2) RF POWER AMPLIFIER

#### CLASS C

(Anode modulated, one valve, carrier conditions, permissible modulation 100%)

Maximum permissible ratings

$f$	<30	<110	Mc/s
$V_a$	5	4.2	kV
$V_{gl}$	-1,000	-1,000	V
$I_a$	1	1	A
$I_{gl}$	0.3	0.3	A
$P_{in}$	5	4.2	kW
$P_a$	2	2	kW

#### Typical Operation

Grounded-filament circuit

$f$	<30	<110	Mc/s
$V_a$	4.7	4	kV
$V_{gl}$	(i) from fixed supply of -400	-350	V
	(ii) via $R_{gl-k}$	1,425	1,460 $\Omega$
$V_{gl}$ (pk) (c)	675	600	V
$I_a$	0.96	0.93	A
$I_{gl}$ (b)	0.28	0.24	A
$P_{dr}$ (b)	170	130	W
$P_{out}$	3.7	2.8	kW

### (3) RF POWER AMPLIFIER

#### CLASS C TELEVISION SERVICE (RMA System)

(Grid modulated, one valve, synchronising level conditions unless otherwise stated)

Maximum permissible ratings

$f$	54-216	Mc/s
$V_a$	3.7	kV
$V_{gl}$ (white level)	-800	V
$I_a$	1.9	A
$I_{gl}$ (pedestal level)	0.225	A
$P_{in}$	6.3	kW
$P_a$	3	kW

#### Typical Operation

Grounded-grid circuit

(Key-down conditions without amplitude modulation)

$\Delta f$ (d)	8.5	Mc/s
$V_a$	3.2	kV
$V_{gl}$	(i) Synchronising level	-110 V
	(ii) Pedestal level	-220 V
	(iii) White level	-520 V

$V_{g1}$ (pk)	435	V
$I_a$ (i) Synchronising level	1.8	A
(ii) Pedestal level	1.25	A
$I_{g1}$ (b) (i) Synchronising level	0.4	A
(ii) Pedestal level	0.13	A
$P_{dr}$ (Synchronising level) (c) (f)	770	W
$P_{out}$ (b) (i) Synchronising level	4	kW
(ii) Pedestal level	2.3	kW

**(4) RF POWER AMPLIFIER**  
**CLASS B TELEVISION SERVICE (RMA System)**

*(One valve, synchronising level unless otherwise stated)*

*Maximum permissible ratings*

$f$	54-216	Mc/s
$V_a$	3.7	kV
$I_a$	1.9	A
$I_{g1}$ (pedestal level)	0.225	A

$P_{in}$	6.5	kW
$p_a$	3	kW

**Typical Operation**  
*Grounded-grid circuit*

$\Delta f$ (d)	10	8.5	Mc/s
$V_a$	3	3.2	kV
$V_{g1}$	-105	-110	V
$V_{g1}$ (pk)			
(i) Synchronising level	380	435	V
(ii) Pedestal level	290	310	V
$I_a$ (i) Synchronising level	1.8	1.8	A
(ii) Pedestal level	1.36	1.35	A
$I_{g1}$ (i) Synchronising level	0.265	0.4	A
(ii) Pedestal level	0.115	0.13	A
$P_{dr}$ (Synchronising level) (d) (e)	625	770	W
$P_{out}$ (i) Synchronising level (d)	3.15	4	kW
(ii) Pedestal level (d)	1.8	2.3	kW

**NOTES**

- (a) Modulation essentially negative may be used if the positive peak of the audio frequency envelope does not exceed 115% of carrier condition.
- (b) Subject to wide variation. The figures given are approximate only.
- (c) Drive modulated approximately 30%.
- (d) Computed between half power points and based on valve output capacitance only.
- (e) Computed value to supply grid losses and feed-through power. Additional power will be required to supply circuit losses.

