

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW. Primarily intended for use in V.H.F. television transmitters.

## PRELIMINARY DATA

This data should be read in conjunction with "Operating Notes Part 1—Power Valves" included in this volume of the Handbook.

## FILAMENT

Thoriated tungsten.

$V_f$	6.3	V
$I_f$	32.5	A

## CAPACITANCES

$C_{1n}$	23.5	$\mu\mu\text{F}$
$C_{out}$	8.4	$\mu\mu\text{F}$
$C_{a-g1}$	< 0.35	$\mu\mu\text{F}$

CHARACTERISTICS (measured at  $V_a=4.0$  kV,  $I_a=2.0$  A)

$g_m$	19	mA/V
$\mu_{g1-g2}$	8.5	

## COOLING

Max. temperature of seals	180	$^{\circ}\text{C}$
Max. bulb temperature	250	$^{\circ}\text{C}$

In order to keep within the temperature limits it may be necessary to direct a flow of air on to the seals.

The amount of forced-air cooling required for this valve depends upon the anode dissipation and the height above sea-level.

Typical values of input temperature, rate of flow of air and pressure difference between the inlet and outlet of the housing are given in the following table.

Anode Dissipation	Height above sea-level	Input Temperature	Rate of flow of air	Pressure difference between inlet and outlet
$P_a$ (kW)	$h$ (m)	$T_{in}$ ( $^{\circ}\text{C}$ )	( $\text{m}^3/\text{min}$ )	(mm of $\text{H}_2\text{O}$ )
1.0	0	35	1.8	10
1.0	0	45	2.2	15
1.0	1,500	35	2.2	13
1.0	3,000	25	2.3	13
2.5	0	35	4.5	60
2.5	0	45	5.4	85
2.5	1,500	35	5.4	73
2.5	3,000	25	5.8	75
3.0	0	35	5.7	95

# QY5-3000A

## R.F. POWER TETRODE

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW. Primarily intended for use in V.H.F. television transmitters.

### OPERATION AS SINGLE VALVE R.F. POWER OSCILLATOR OR AMPLIFIER (CLASS "C" TELEGRAPHY)

#### Limiting Values

$V_a$ max. ( $f < 110$ Mc/s)	5.0	kV
$V_a$ max. ( $f < 220$ Mc/s)	4.0	kV
$V_{g2}$ max.	800	V
$-V_{g1}$ max.	500	V
$I_a$ max.	1.1	A
$p_a$ max.	3.0	kW
$p_{g2}$ max.	100	W
$p_{g1}$ max.	30	W

#### Typical Operating Conditions

$f$	75	110	75	110	Mc/s
$V_a$	5	5	4	4.0	kV
$V_{g2}$	800	800	800	800	V
$V_{g1}$	-250	-250	-250	-250	V
$I_a$	1.1	1.1	1.1	1.1	A
$I_{g2}$	100	100	120	120	mA
$I_{g1}$	70	70	80	80	mA
$V_{in(pk)}$	480	480	500	500	V
$P_{drive}$	30	30	36	36	W
$P_{out}$	4.1	3.9	3.15	2.9	kW
$\eta$	74.5	71.5	72	69	%

### OPERATION AS R.F. POWER AMPLIFIER (CLASS "C" ANODE AND SCREEN-GRID MODULATION). Screen-grid modulated through a choke of 60 H.

#### Limiting Values

$V_a$ max. ( $f < 110$ Mc/s)	4.0	kV
$V_a$ max. ( $f < 220$ Mc/s)	3.2	kV
$V_{g2}$ max.	800	V
$-V_{g1}$ max.	500	V
$I_a$ max.	900	mA
$p_a$ max.	2.0	kW
* $p_{g2}$ max.	100	W
$p_{g1}$ max.	30	W

\*For other methods of modulation,  $p_{g2}$  max. = 65 W.

#### Typical Operating Conditions

$V_a$	4.0	kV
$V_{g2}$	800	V
$V_{g1}$	-375	V
$I_a$	900	mA
$I_{g2}$	120	mA
$I_{g1}$	85	mA
$V_{in(pk)}$	625	V
$P_{drive}$	48	W
$P_{out}$	2.7	kW
$\eta$	75	%
For 100% modulation		
$P_{mod.}$	1.8	kW

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW. Primarily intended for use in V.H.F. television transmitters.

**OPERATION AS R.F. AMPLIFIER CLASS "C" GRID-MODULATION FOR TELEVISION SERVICE** (with positive modulation and negative synchronisation).

**Limiting Values**

f max.	220	←
V <sub>a</sub> max.	4.0	kV
V <sub>g2</sub> max.	800	V
-V <sub>g1</sub> max.	500	V
I <sub>a</sub> (peak white) max.	1.1	A
I <sub>g1</sub> (peak white) max.	80	mA
P <sub>in</sub> (peak white) max.	4.4	kW
p <sub>a</sub> (peak white) max.	3.0	kW
p <sub>g2</sub> (peak white) max.	100	W

**Typical Operating Conditions for 2 Valves in Push-Pull**

f	170-220	170-220	←
*Bandwidth (-1.5 db)	—	6.5	Mc/s
*Bandwidth (-3.0 db)	7.5	12	Mc/s
V <sub>a</sub>	4.0	4.0	kV
V <sub>g2</sub>	800	800	V
V <sub>g1</sub> (peak white)	-230	-230	A
V <sub>g1</sub> (black)	-380	-380	V
V <sub>in (g1-g1) pk</sub>	850	850	V
I <sub>a</sub> (peak white)	1.7	2.1	A
I <sub>a</sub> (black)	0.5	0.6	A
I <sub>g2</sub> (peak white)	80	50	mA
I <sub>g2</sub> (black)	10	10	mA
I <sub>g1</sub> (peak white)	25	50	mA
I <sub>g1</sub> (black) (approx.)	0	0	mA
†P <sub>drive</sub> (peak white)	200-300	300-400	W
P <sub>out</sub> (peak white)	4.0	2.8	kW
P <sub>out</sub> (black)	360	250	W
‡P <sub>load</sub> (peak white)	2.8	1.96	kW

\*Bandwidth based on a single LC circuit.

†Includes power dissipated in circuit and loading resistors.

‡With a circuit transfer efficiency of 70%.

**OPERATION AS R.F. POWER AMPLIFIER CLASS "B" FOR TELEVISION SERVICE** (with positive modulation and negative synchronisation).

**Limiting Values**

f max.	220	←
V <sub>a</sub> max.	4.0	kV
V <sub>g2</sub> max.	800	V
I <sub>a</sub> (peak white) max.	1.1	A
I <sub>g1</sub> (peak white) max.	80	mA
P <sub>in</sub> (peak white) max.	4.4	kW
p <sub>a</sub> (peak white) max.	3.0	kW
p <sub>g2</sub> (peak white) max.	100	W

# QY5-3000A

## R.F. POWER TETRODE

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW  
Primarily intended for use in V.H.F. television transmitters.

### Typical Operating Conditions for 2 Valves in Push-Pull

f	170-220	Mc/s
*Bandwidth (-1.5 db)	6.5	Mc/s
*Bandwidth (-3.0 db)	12	Mc/s
$V_a$	4.0	kV
$V_{g2}$	800	V
$V_{g1}$	-150	V
$V_{in (g1-g1)(Pk)}$ (peak white)	700	V
$V_{in (g1-g1)(Pk)}$ (black)	350	V
$I_a$ (peak white)	2.1	A
$I_a$ (black)	0.6	A
$I_{g2}$ (peak white)	50	mA
$I_{g2}$ (black)	10	mA
$I_{g1}$ (peak white)	50	mA
$I_{g1}$ (black) (approx.)	0	mA
† $P_{drive}$ (peak white)	200 to 300	W
$P_{out}$ (peak white)	2.8	kW
$P_{out}$ (black)	250	W
‡ $P_{load}$ (peak white)	1.96	kW

\*Bandwidth based on a single LC circuit.

†Includes power dissipated in circuit and loading resistors.

‡With a circuit transfer efficiency of 70%.

### OPERATION AS R.F. AMPLIFIER CLASS "C" GRID-MODULATION FOR TELEVISION SERVICE (with negative modulation and positive synchronisation).

#### Limiting Values

f max.	220	Mc/s
$V_a$ max.	4.0	kV
$V_{g2}$ max.	800	V
$-V_{g1}$ max.	500	V
$I_a$ (sync.) max.	1.5	A
$P_{in}$ (sync.) max.	6.0	kW
$p_a$ (sync.) max.	3.0	kW
$p_{g2}$ (sync.) max.	100	W
$p_{g1}$ (sync.) max.	30	W

### Typical Operating Conditions for 2 Valves in Push-Pull

	170-220	170-220	Mc/s
f	170-220	170-220	Mc/s
*Bandwidth (-1.5 db)	6.5	—	Mc/s
*Bandwidth (-3 db)	12	7.5	Mc/s
$V_a$	4.0	4.0	kV
$V_{g2}$	800	800	V
$V_{g1}$ (sync.)	-150	-150	V
$V_{g1}$ (black)	-230	-230	V
$V_{g1}$ (white)	-450	-450	V
$V_{in(g1-g1)Pk}$	850	850	V
$I_a$ (sync.)	2.75	2.75	A
$I_a$ (black)	2.1	1.7	A
$I_{g2}$ (sync.)	110	250	mA

(continued)



High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW.

Primarily intended for use in V.H.F. television transmitters.

### Typical Operating Conditions for 2 Valves in Push-Pull (contd.)

$I_{g2}$ (black)	50	80	mA
$I_{g1}$ (sync.)	100	80	mA
$I_{g1}$ (black)	50	25	mA
† $P_{drive}$ (sync.)	300–400	200–300	W
$P_{out}$ (sync.)	5.0	5.9	kW
$P_{out}$ (black)	2.8	4.0	kW
‡ $P_{load}$ (sync.)	3.5	4.13	kW

\*Bandwidth based on a single LC circuit.

†Includes power dissipated in circuit and loading resistors.

‡With a circuit transfer efficiency of 70%.

### OPERATION AS R.F. AMPLIFIER CLASS "B" FOR TELEVISION SERVICE (with negative modulation and positive synchronisation).

#### Limiting Values

$f$ max.	220	Mc/s
$V_a$ max.	4.0	kV
$V_{g2}$ max.	800	V
$I_a$ (sync.) max.	1.5	A
$P_{in}$ (sync.) max.	6.0	kW
$p_a$ (sync.) max.	3.0	kW
$P_{g2}$ (sync.) max.	100	W
$P_{g1}$ (sync.) max.	30	W

#### Typical Operating Conditions for 2 Valves in Push-Pull

$f$	170–220	Mc/s
*Bandwidth (–1.5 db)	6.5	Mc/s
*Bandwidth (–3 db)	12	Mc/s
$V_a$	4.0	kV
$V_{g2}$	800	V
$V_{g1}$	–150	V
$V_{in(g1-g1)pk}$ (sync.)	850	V
$V_{in(g1-g1)pk}$ (black)	700	V
$I_a$ (sync.)	2.75	A
$I_a$ (black)	2.1	A
$I_{g2}$ (sync.)	110	mA
$I_{g2}$ (black)	50	mA
$I_{g1}$ (sync.)	100	mA
$I_{g1}$ (black)	50	mA
† $P_{drive}$ (sync.)	300–400	W
$P_{out}$ (sync.)	5.0	kW
$P_{out}$ (black)	2.8	kW
‡ $P_{load}$ (sync.)	3.5	kW

\*Bandwidth based on a single LC circuit.

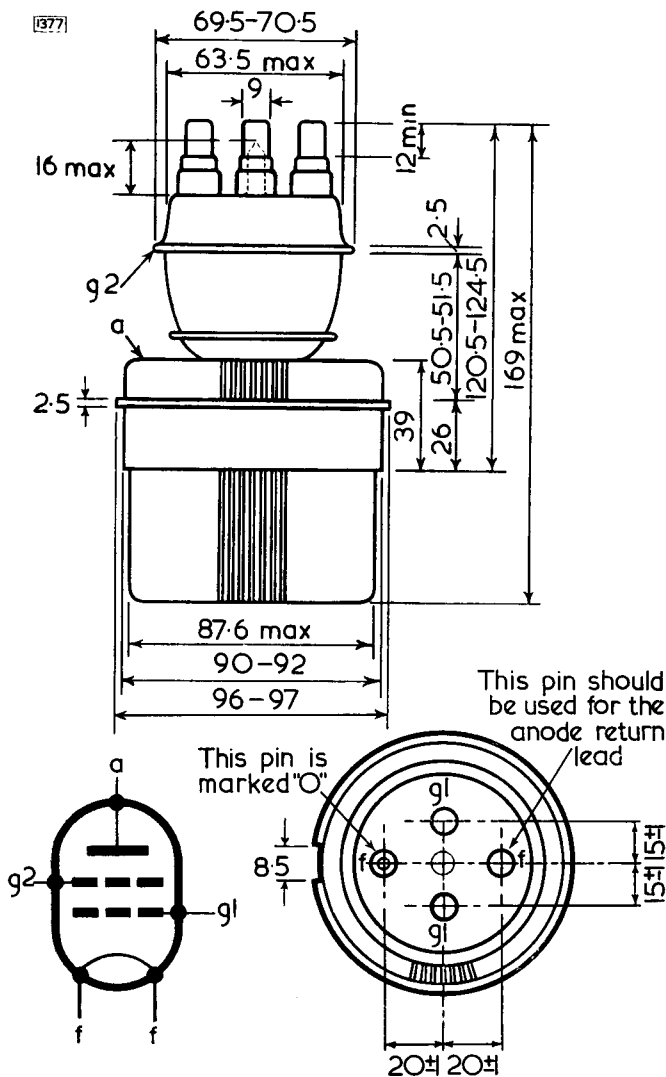
†Includes power dissipated in circuit and loading resistors.

‡With a circuit transfer efficiency of 70%.

# QY5-3000A

## R.F. POWER TETRODE

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW. Primarily intended for use in V.H.F. television transmitters.

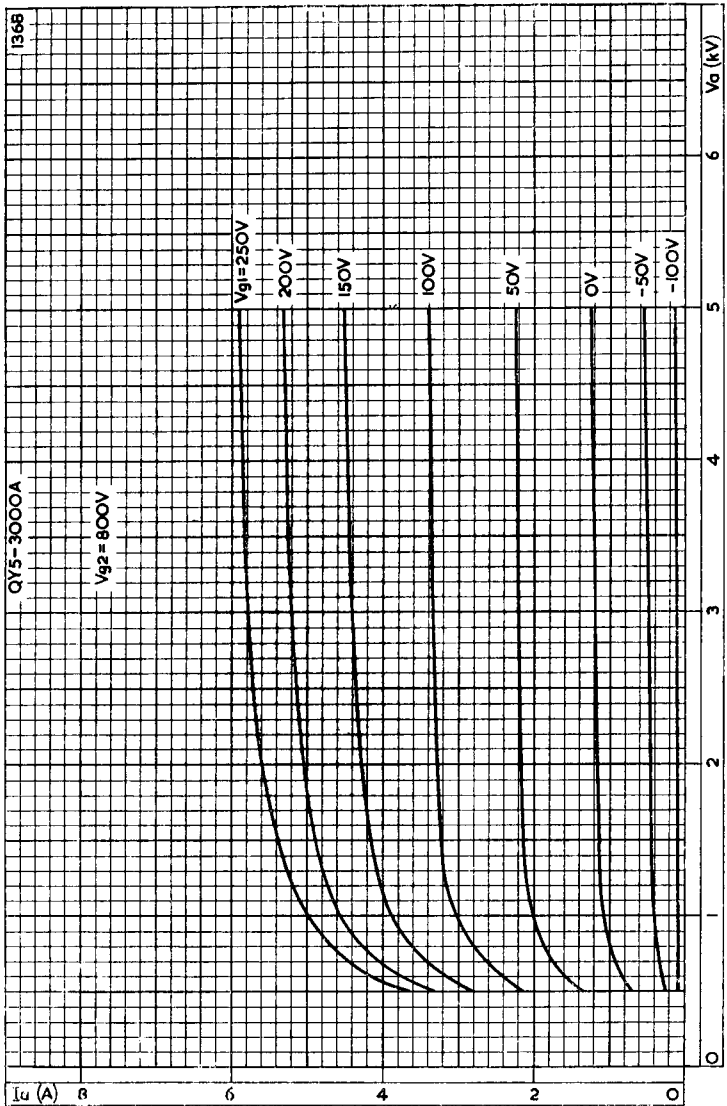


All dimensions in mm.

# R.F. POWER TETRODE

# QY5-3000A

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW. Primarily intended for use in V.H.F. television transmitters.

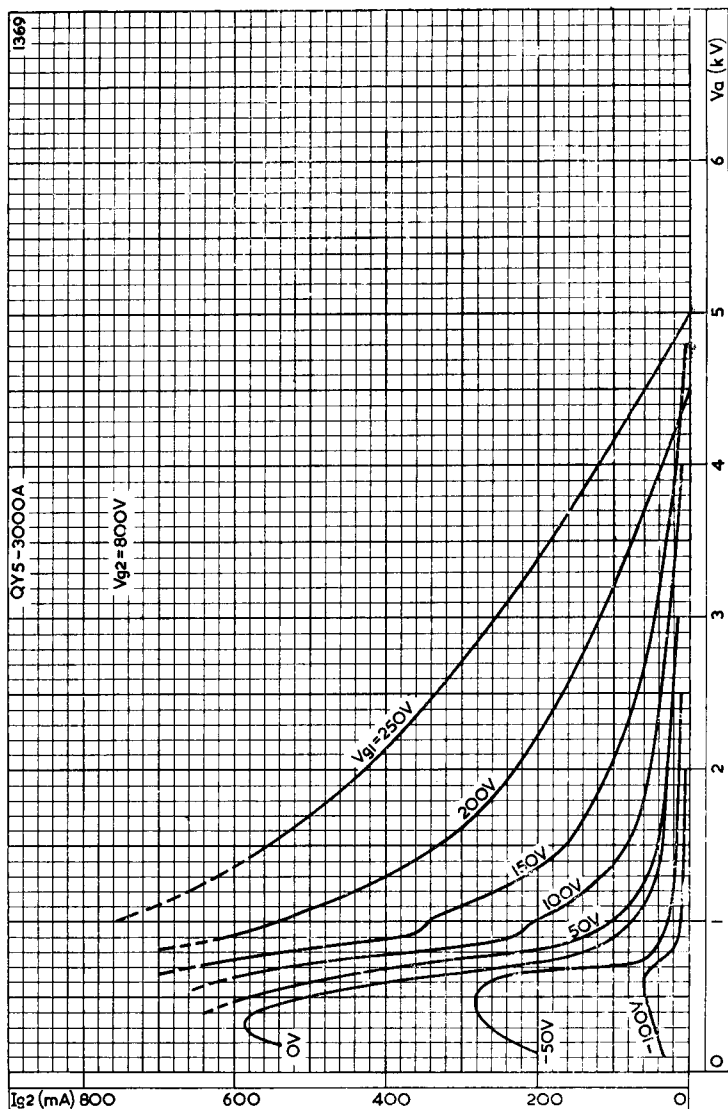


ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER

# QY5-3000A

## R.F. POWER TETRODE

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW. Primarily intended for use in V.H.F. television transmitters.



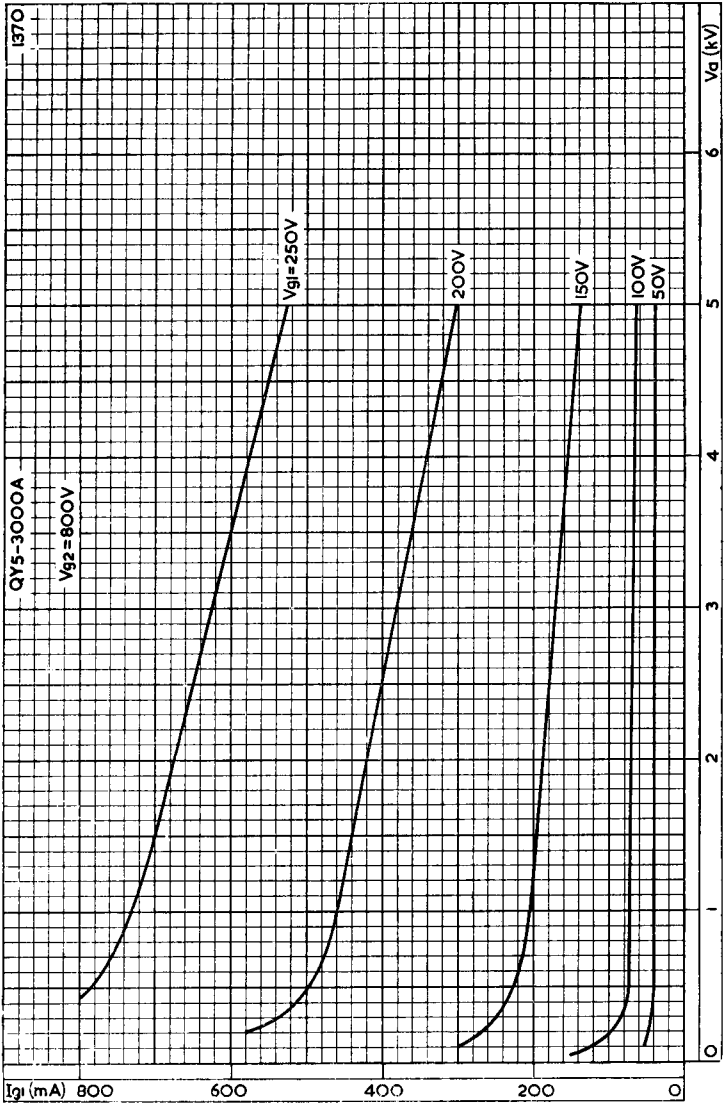
SCREEN-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER



# R.F. POWER TETRODE

# QY5-3000A

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW. Primarily intended for use in V.H.F. television transmitters.

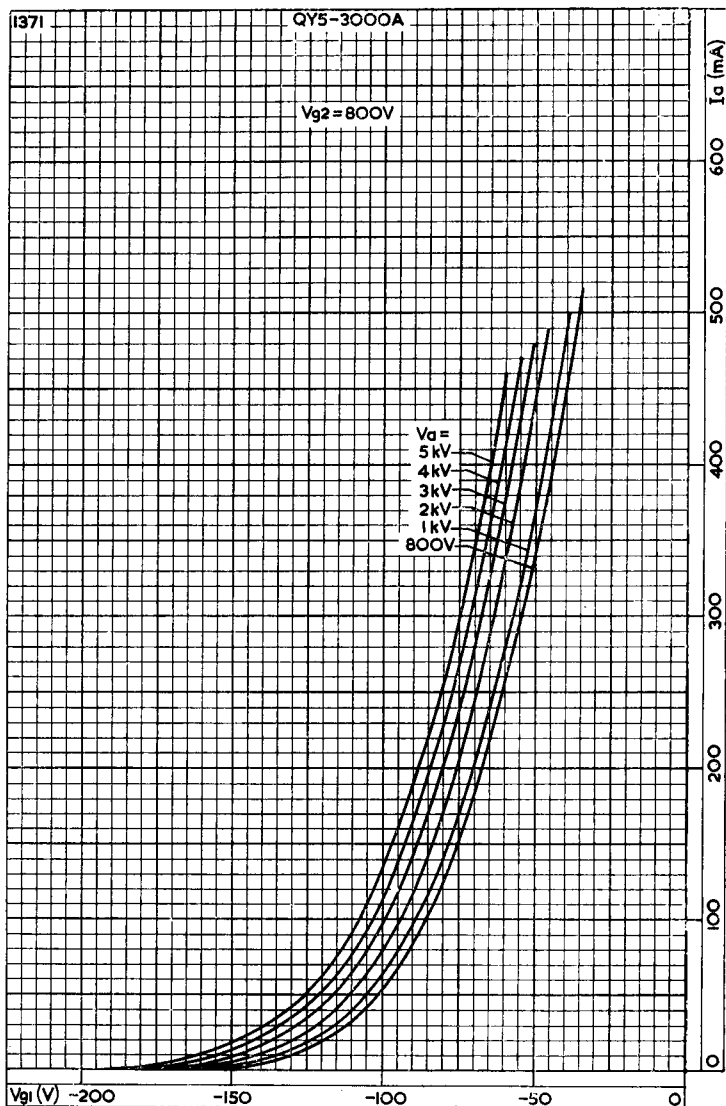


CONTROL-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER

# QY5-3000A

## R.F. POWER TETRODE

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW. Primarily intended for use in V.H.F. television transmitters.

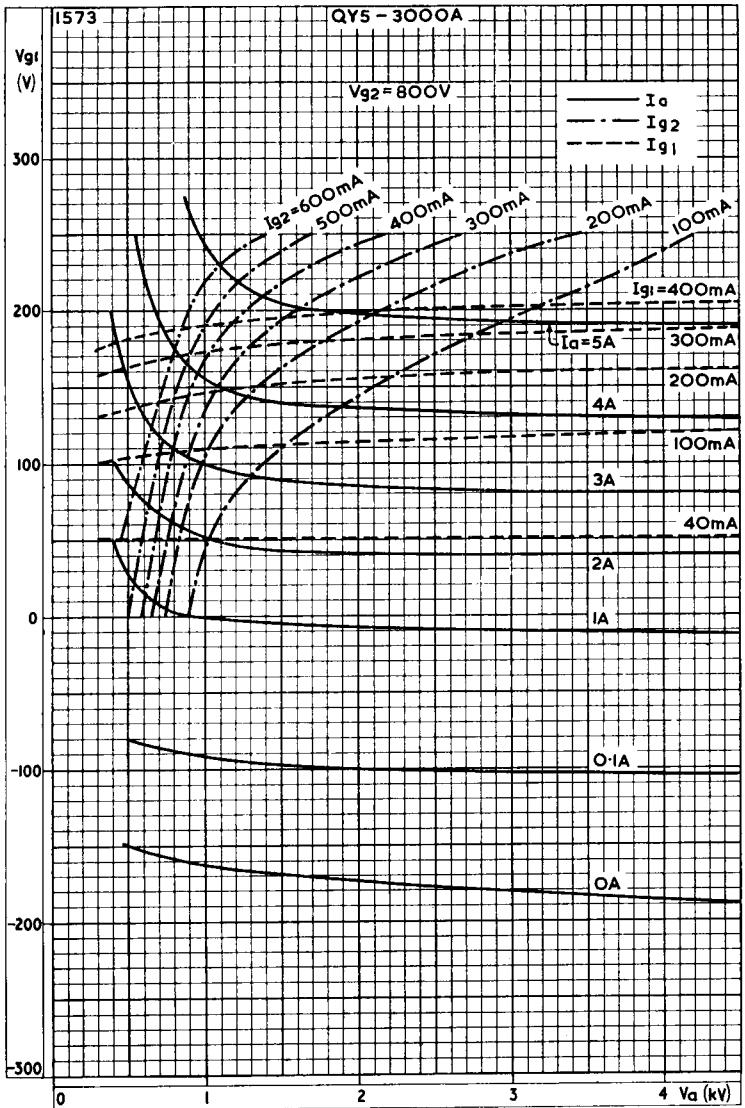


ANODE CURRENT PLOTTED AGAINST CONTROL-GRID VOLTAGE WITH ANODE VOLTAGE AS PARAMETER

# R.F. POWER TETRODE

# QY5-3000A

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW. Primarily intended for use in V.H.F. television transmitters.

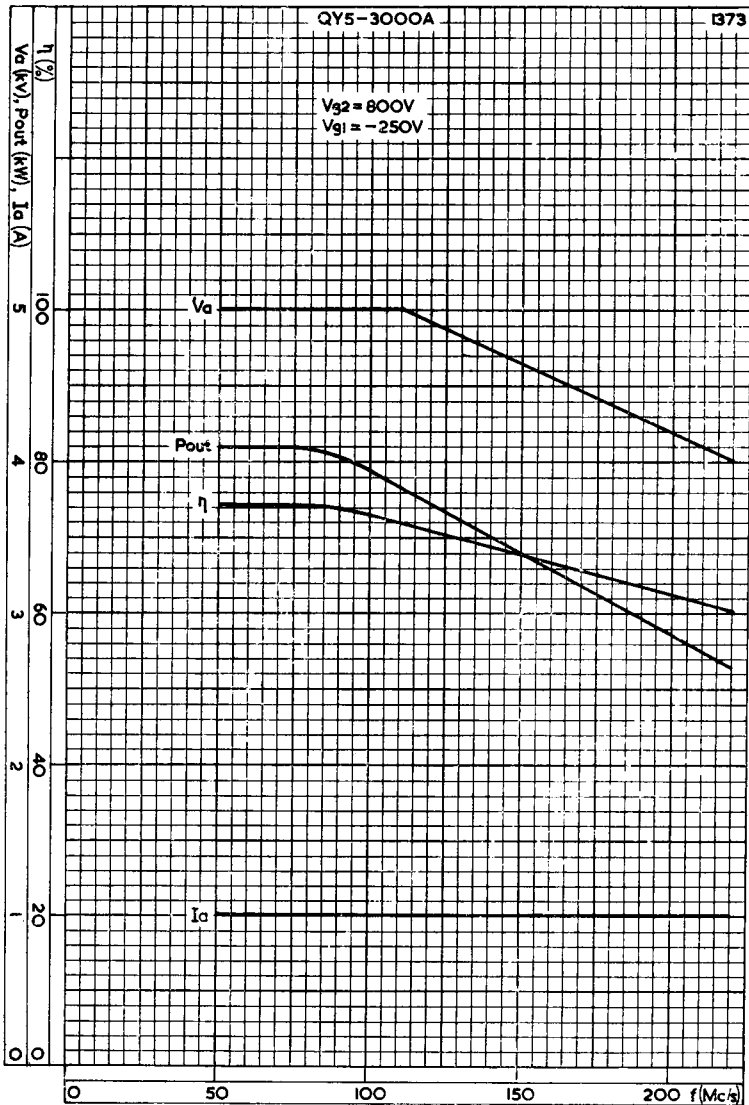


CONSTANT CURRENT CURVES

# QY5-3000A

## R.F. POWER TETRODE

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW. Primarily intended for use in V.H.F. television transmitters.

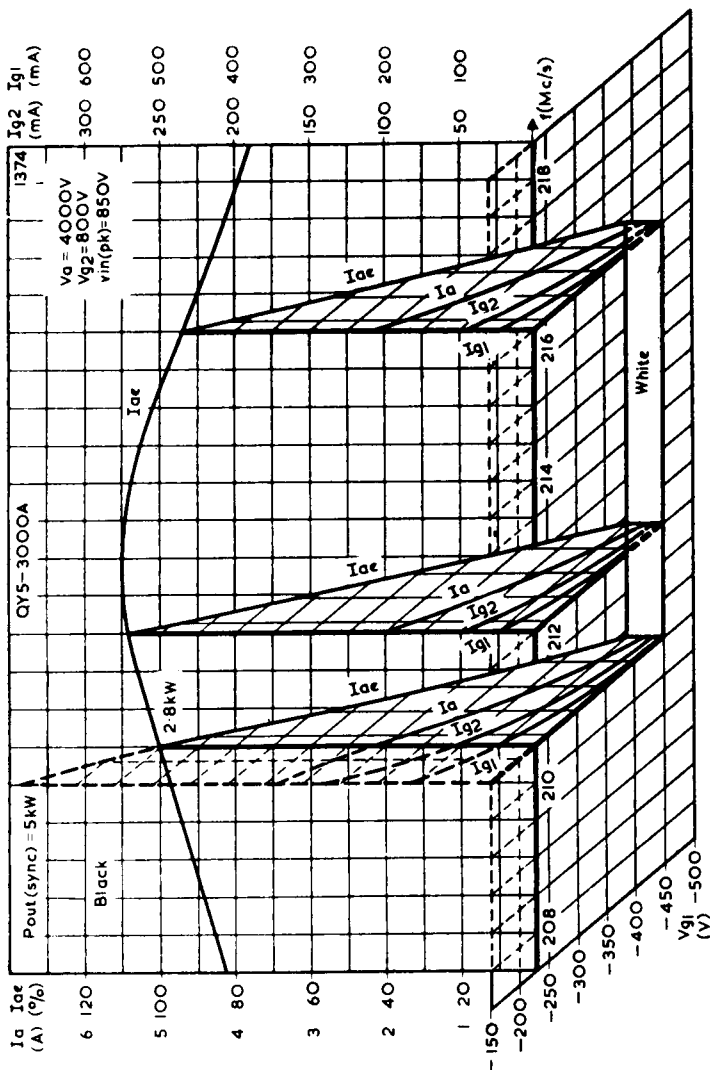


FREQUENCY CHARACTERISTICS.  
SINGLE VALVE CLASS "C" TELEGRAPHY

# R.F. POWER TETRODE

# QY5-3000A

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW. Primarily intended for use in V.H.F. television transmitters.



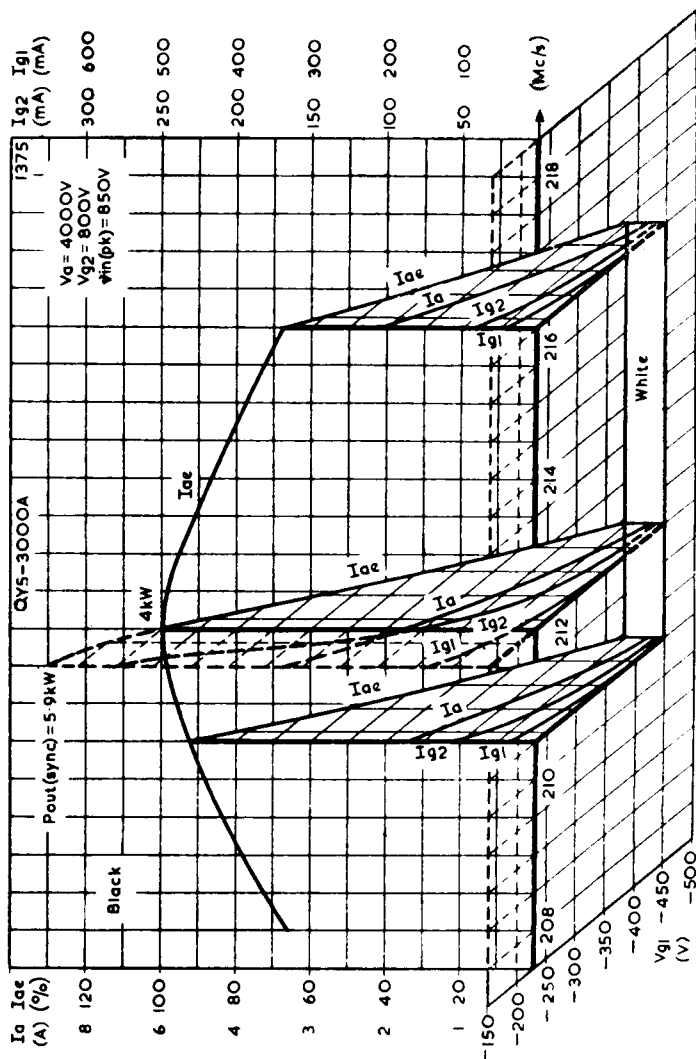
OPERATION OF TWO VALVES AS R.F. AMPLIFIER CLASS "C" GRID MODULATION FOR TELEVISION SERVICE, WITH NEGATIVE MODULATION AND POSITIVE SYNCHRONISATION

$$P_{out} (\text{sync.}) = 5.0 \text{ kW}$$

# QY5-3000A

## R.F. POWER TETRODE

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW. Primarily intended for use in V.H.F. television transmitters.



OPERATION OF TWO VALVES AS R.F. AMPLIFIER CLASS "C" GRID MODULATION FOR TELEVISION SERVICE, WITH NEGATIVE MODULATION AND POSITIVE SYNCHRONISATION

$$P_{out(sync.)} = 5.9kW$$

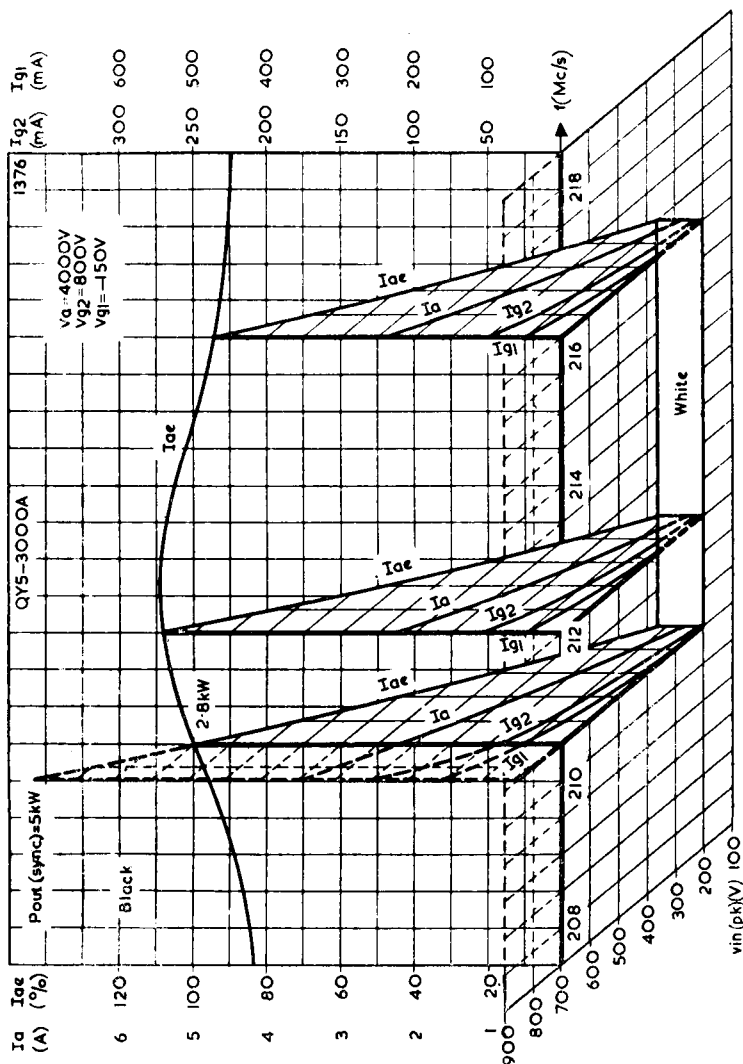


# R.F. POWER TETRODE

# QY5-3000A

High-power forced air-cooled tetrode, rated for a maximum anode dissipation of 3 kW.

Primarily intended for use in V.H.F. television transmitters.



OPERATION OF TWO VALVES AS R.F. AMPLIFIER CLASS "B" FOR TELEVISION SERVICE, WITH NEGATIVE MODULATION AND POSITIVE SYNCHRONISATION

## R.F. POWER TETRODE

# QY5-3000W

High-power water-cooled tetrode, rated for a maximum anode dissipation of 3kW. Primarily intended for use in V.H.F. television transmitters.

### PRELIMINARY DATA

This data should be read in conjunction with "Operating Notes Part 1—Power Valves" included in this volume of the Handbook.

#### FILAMENT Thoriated tungsten.

$V_f$	6.3	V
$I_f$	32.5	A

#### CAPACITANCES

$C_{in}$	23.5	$\mu\mu\text{F}$
$C_{out}$	8.4	$\mu\mu\text{F}$
$C_{a-g_1}$	0.35	$\mu\mu\text{F}$

#### CHARACTERISTICS (Measured at $V_{it} = 4.0$ kV, $I_a = 2.0$ A.)

$g_m$	19	$\text{mA/V}$
$\mu_{k_1, k_2}$	8.5	

#### COOLING

Max. temperature of seals	180	$^{\circ}\text{C}$
Max. bulb temperature	250	$^{\circ}\text{C}$

Typical values of input temperature, rate of flow of water and pressure difference between the inlet and outlet housing at various anode dissipations are given in the following table:—

Anode Dissipation $P_a$ (kW)	Input Temperature $T_{in}$ ( $^{\circ}\text{C}$ )	Rate of flow of water (litres/min)	Pressure difference between inlet and outlet (atm)
1.0	20	2.5	0.073
1.0	50	3.0	0.1
2.0	20	2.5	0.073
2.0	50	4.8	0.25
3.0	20	3.0	0.105
3.0	50	6.9	0.55

In order to keep within the temperature limits it may be necessary to direct a flow of air on to the seals. Air cooling will in general not be necessary at frequencies  $\leq 75$  Mc/s and  $V_a \leq 4.0$  kV ( $V_a < 3.2$  kV for class "C" anode and screen-grid modulation). At  $V_a \leq 5.0$  kV ( $V_a \leq 4.0$  kV for class "C" anode and screen-grid modulation) air cooling will in general be necessary at all frequencies.

**The characteristics, operating conditions and limiting values are identical with those given for QY5-3000A.**





## QUICK REFERENCE DATA

Power tetrodes intended for use in V.H.F. television transmitters. The QY5-3000A is forced-air cooled, and the QY5-3000W water cooled.

	Class 'C' telegraphy	Class 'C' television	Class 'AB' S.S.B.	Class 'B' A.F.	
f max.	220	220	220	—	Mc/s
V <sub>a</sub> max.	5.0	4.0	5.0	5.0	kV
p <sub>a</sub> max.	3.0	3.0	3.0	3.0	kW
<b>Performance</b>					
f	75	220	30	—	Mc/s
P <sub>out</sub>	4.1	4.0	1.57	9.5	kW

This data should be read in conjunction with GENERAL OPERATIONAL RECOMMENDATIONS—TRANSMITTING VALVES which precede this section of the handbook.

## FILAMENT

Thoriated tungsten

V <sub>f</sub>	6.3	V
I <sub>f</sub>	32.5	A

## CAPACITANCES

C <sub>in</sub>	23.5	pF
C <sub>out</sub>	8.4	pF
C <sub>a-g1</sub>	< 350	mpF

## CHARACTERISTICS (measured at V<sub>a</sub> = 4.0kV, I<sub>a</sub> = 2.0A)

g <sub>m</sub>	19	mA/V
I <sub>g1-g2</sub>	8.5	

# QY5-3000A

# QY5-3000W

## R.F. POWER TETRODE

### COOLING

$T_{\text{seals max.}}$	180	°C
$T_{\text{bulb max.}}$	250	°C

#### QY5-3000A

In order to keep within the temperature limits it may be necessary to direct a flow of air on to the seals.

The amount of forced-air cooling required for this valve depends upon the anode dissipation and the height above sea-level.

Typical values of inlet temperature, rate of flow of air and pressure difference between the inlet and outlet of the housing are given in the following table.

Anode Dissipation	Height above sea-level		Inlet Temperature	Rate of flow of air per minute		Pressure difference between inlet and outlet	
	$P_a$ (kW)	$h$ (m) (ft)		$T_{\text{in}}$ (°C)	( $m^3$ ) ( $ft^3$ )	(mm H <sub>2</sub> O) (in H <sub>2</sub> O)	
1.0	0	0	35	1.8	63.6	10	0.39
1.0	0	0	45	2.2	74.2	15	0.59
1.0	1,500	4,921	35	2.2	74.2	13	0.51
1.0	3,000	9,842	25	2.3	81.2	13	0.51
2.5	0	0	35	4.5	158.9	60	2.36
2.5	0	0	45	5.4	190.7	85	3.35
2.5	1,500	4,921	35	5.4	190.7	73	2.87
2.5	3,000	9,842	25	5.8	204.8	75	2.95
3.0	0	0	35	5.7	201.3	95	3.74

#### QY5-3000W

Typical values of inlet temperature, rate of flow of water and pressure difference between the inlet and outlet housing at various anode dissipations are given in the following table:—

Anode Dissipation	Inlet Temperature	Rate of flow of water per minute		Pressure difference between inlet and outlet
		(litres)	(gal)	
$P_a$ (kW)	$T_{\text{in}}$ (°C)	(litres)	(gal)	(atm)
1.0	20	2.5	0.55	0.073
1.0	50	3.0	0.66	0.1
2.0	20	2.5	0.55	0.073
2.0	50	4.8	1.06	0.25
3.0	20	3.0	0.66	0.105
3.0	50	6.9	1.52	0.55

In order to keep within the temperature limits it may be necessary to direct a flow of air on to the seals. Air cooling will in general not be necessary at frequencies  $\leq 75$  Mc/s and  $V_a \leq 4.0$  kV ( $V_a \leq 3.2$  kV for class "C" anode and screen-grid modulation). At  $V_a \leq 5.0$  kV ( $V_a \leq 4.0$  kV for class "C" anode and screen-grid modulation) air cooling will in general be necessary at all frequencies.



## CLASS "C" TELEGRAPHY OR F.M. TELEPHONY

### Absolute maximum ratings

$V_a$ max. ( $f < 110\text{Mc/s}$ )	5.0	kV
$V_a$ max. ( $f < 220\text{Mc/s}$ )	4.0	kV
$V_{g2}$ max.	800	V
$-V_{g1}$ max.	500	V
$I_a$ max.	1.1	A
$P_a$ max.	3.0	kW
$P_{g2}$ max.	100	W
$P_{g1}$ max.	30	W

### Typical operating conditions

$f$	75	110	75	110	Mc/s
$V_a$	5.0	5.0	4.0	4.0	kV
$V_{g2}$	800	800	800	800	V
$V_{g1}$	-250	-250	-250	-250	V
$I_a$	1.1	1.1	1.1	1.1	A
$I_{g2}$	100	100	120	120	mA
$I_{g1}$	70	70	80	80	mA
$V_{in(pk)}$	480	480	500	500	V
$P_{drive}$	30	30	36	36	W
$P_{out}$	4.1	3.9	3.15	2.9	kW
$\eta_a$	74.5	71.5	72	69	%

## CLASS "C" ANODE AND SCREEN-GRID MODULATION

Screen-grid modulated through a choke of 60H

### Absolute maximum ratings Carrier condition for a modulation factor of 1.

$V_a$ max. ( $f < 110\text{Mc/s}$ )	4.0	kV
$V_a$ max. ( $f < 220\text{Mc/s}$ )	3.2	kV
$V_{g2}$ max.	800	V
$-V_{g1}$ max.	500	V
$I_a$ max.	900	mA
$P_a$ max.	2.0	kW
* $P_{g2}$ max.	100	W
$P_{g1}$ max.	30	W

\*For other methods of modulation,  $P_{g2}$  max. = 65W.

### Typical operating conditions

$V_a$	4.0	kV
$V_{g2}$	800	V
$V_{g1}$	-375	V
$I_a$	900	mA
$I_{g2}$	120	mA
$I_{g1}$	85	mA
$V_{in(pk)}$	625	V
$P_{drive}$	48	W
$P_{out}$	2.7	kW
$\eta_a$	75	%
For 100% modulation		
$P_{mod.}$	1.8	kW

# QY5-3000A

# QY5-3000W

R.F. POWER TETRODE

## CLASS "C" GRID-MODULATION FOR TELEVISION SERVICE

(with positive modulation and negative synchronisation)

### Absolute maximum ratings

f max.	220	Mc/s
$V_a$ max.	4.0	kV
$V_{g2}$ max.	800	V
$-V_{g1}$ max.	500	V
$I_a$ (peak white) max.	1.1	A
$I_{g1}$ (peak white) max.	80	mA
$P_{in}$ (peak white) max.	4.4	kW
$p_a$ (peak white) max.	3.0	kW
$p_{g2}$ (peak white) max.	100	W

### Typical operating conditions for 2 valves in push-pull

f	170-220	170-220	Mc/s
*Bandwidth (-1.5db)	—	6.5	Mc/s
*Bandwidth (-3.0db)	7.5	12	Mc/s
$V_a$	4.0	4.0	kV
$V_{g2}$	800	800	V
$V_{g1}$ (peak white)	-230	-230	V
$V_{g1}$ (black)	-380	-380	V
$V_{in(g1-g1)pk}$	850	850	V
$I_a$ (peak white)	1.7	2.1	A
$I_a$ (black)	0.5	0.6	A
$I_{g2}$ (peak white)	80	50	mA
$I_{g2}$ (black)	10	10	mA
$I_{g1}$ (peak white)	25	50	mA
$I_{g1}$ (black) approx.	0	0	mA
† $P_{drive}$ (peak white)	200-300	300-400	W
$P_{out}$ (peak white)	4.0	2.8	kW
$P_{out}$ (black)	360	250	W
‡ $P_{load}$ (peak white)	2.8	1.96	kW

\*Bandwidth based on a single LC circuit.

†Includes power dissipated in circuit and loading resistors.

‡With a circuit transfer efficiency of 70%.

## CLASS "B" FOR TELEVISION SERVICE

(with positive modulation and negative synchronisation)

### Absolute maximum ratings

f max.	220	Mc/s
V <sub>a</sub> max.	4.0	kV
V <sub>g2</sub> max.	800	V
I <sub>a</sub> (peak white) max.	1.1	A
I <sub>g1</sub> (peak white) max.	80	mA
P <sub>in</sub> (peak white) max.	4.4	kW
p <sub>a</sub> (peak white) max.	3.0	kW
p <sub>g2</sub> (peak white) max.	100	W

### Typical operating conditions for 2 valves in push-pull

f	170-220	Mc/s
*Bandwidth (-1.5 db)	6.5	Mc/s
*Bandwidth (-3.0 db)	12	Mc/s
V <sub>a</sub>	4.0	kV
V <sub>g2</sub>	800	V
V <sub>g1</sub>	-150	V
V <sub>in(g1-g1)(pk)</sub> (peak white)	700	V
v <sub>in(g1-g1)(pk)</sub> (black)	350	V
I <sub>a</sub> (peak white)	2.1	A
I <sub>a</sub> (black)	0.6	A
I <sub>g2</sub> (peak white)	50	mA
I <sub>g2</sub> (black)	10	mA
I <sub>g1</sub> (peak white)	50	mA
I <sub>g1</sub> (black) (approx.)	0	mA
‡P <sub>drive</sub> (peak white)	200 to 300	W
P <sub>out</sub> (peak white)	2.8	kW
P <sub>out</sub> (black)	250	W
‡P <sub>load</sub> (peak white)	1.96	kW

\*Bandwidth based on a single LC circuit.

†Includes power dissipated in circuit and loading resistors.

‡With a circuit transfer efficiency of 70%.

# QY5-3000A

# QY5-3000W

R.F. POWER TETRODE

## CLASS "C" GRID-MODULATION FOR TELEVISION SERVICE

(with negative modulation and positive synchronisation)

### Absolute maximum ratings

f max.	220	Mc/s
$V_a$ max.	4.0	kV
$V_{g2}$ max.	800	V
$-V_{g1}$ max.	500	V
$I_a$ (sync.) max.	1.5	A
$P_{in}$ (sync.) max.	6.0	kW
$p_a$ (sync.) max.	3.0	kW
$p_{g2}$ (sync.) max.	100	W
$p_{g1}$ (sync.) max.	30	W

### Typical operating conditions for 2 valves in push-pull

f	170-220	170-220	Mc/s
*Bandwidth (-1.5 db)	6.5	—	Mc/s
*Bandwidth (-3 db)	12	7.5	Mc/s
$V_a$	4.0	4.0	kV
$V_{g2}$	800	800	V
$V_{g1}$ (sync.)	-150	-150	V
$V_{g1}$ (black)	-230	-230	V
$V_{g1}$ (white)	-450	-450	V
$V_{in(g1-g1)pk}$	850	850	V
$I_a$ (sync.)	2.75	2.75	A
$I_a$ (black)	2.1	1.7	A
$I_{g2}$ (sync.)	110	250	mA
$I_{g2}$ (black)	50	80	mA
$I_{g1}$ (sync.)	100	80	mA
$I_{g1}$ (black)	50	25	mA
† $P_{drive}$ (sync.)	300-400	200-300	W
$P_{out}$ (sync.)	5.0	5.9	kW
$P_{out}$ (black)	2.8	4.0	kW
‡ $P_{load}$ (sync.)	3.5	4.13	kW

\*Bandwidth based on a single LC circuit.

†Includes power dissipated in circuit and loading resistors.

‡With a circuit transfer efficiency of 70%.

## CLASS "B" FOR TELEVISION SERVICE

(with negative modulation and positive synchronisation)

### Absolute maximum ratings

f max.	220	Mc/s
$V_a$ max.	4.0	kV
$V_{g2}$ max.	800	V
$I_a$ (sync.) max.	1.5	A
$P_{in}$ (sync.) max.	6.0	kW
$p_a$ (sync.) max.	3.0	kW
$p_{g2}$ (sync.) max.	100	W
$p_{g1}$ (sync.) max.	30	W

### Typical operating conditions for 2 valves in push-pull

f	170-220	Mc/s
*Bandwidth (-1.5 db)	6.5	Mc/s
*Bandwidth (-3 db)	12	Mc/s
$V_a$	4.0	kV
$V_{g2}$	800	V
$V_{g1}$	-150	V
$V_{in(g1-g1)pk}$ (sync.)	850	V
$V_{in(g1-g1)pk}$ (black)	700	V
$I_a$ (sync.)	2.75	A
$I_a$ (black)	2.1	A
$I_{g2}$ (sync.)	110	mA
$I_{g2}$ (black)	50	mA
$I_{g1}$ (sync.)	100	mA
$I_{g1}$ (black)	50	mA
† $P_{drive}$ (sync.)	300-400	W
$P_{out}$ (sync.)	5.0	kW
$P_{out}$ (black)	2.8	kW
‡ $P_{load}$ (sync.)	3.5	kW

\*Bandwidth based on a single LC circuit.

†Includes power dissipated in circuit and loading resistors.

‡With a circuit transfer efficiency of 70%.



# QY5-3000A

# QY5-3000W

R.F. POWER TETRODE

## CLASS "AB" SINGLE SIDEBAND SUPPRESSED CARRIER

### Absolute maximum ratings

f max.	200	Mc/s
V <sub>a</sub> max.	5.0	kV
V <sub>g2</sub> max.	1.0	kV
P <sub>a</sub> max.	3.0	kW
P <sub>g2</sub> max.	100	W
I <sub>k</sub> max.	1.2	A
i <sub>k(pk)</sub> max.	3.8	A
-V <sub>g1</sub> max.	500	V

### Typical operating conditions

Envelope peak to average  $\geq 1$  and  $< 2$

f	30	30	30	Mc/s
V <sub>a</sub>	5.0	5.0	5.0	kV
V <sub>g2</sub>	1.0	1.0	1.0	kV
*V <sub>g1</sub>	-120	-117	-85	V
I <sub>a(o)</sub>	200	200	500	mA

### "Single tone" modulation, maximum signal conditions

I <sub>a</sub>	474	505	640	mA
I <sub>g2</sub>	20	70	15	mA
I <sub>g1</sub>	0	20	0	mA
V <sub>in(pk)</sub>	120	134	85	V
P <sub>load(driver)</sub>	3.0	5.0	3.0	W
P <sub>a</sub>	1.02	0.96	1.82	kW
P <sub>g2</sub>	20	70	15	W
P <sub>out</sub>	1.35	1.57	1.38	kW
$\eta_a$	57	63	43	%
P <sub>load</sub>	1.15	1.34	1.17	kW

### "Two tone" modulation, maximum signal conditions

I <sub>a</sub>	351	380	576	mA
I <sub>g2</sub>	8.5	25	7.0	mA
I <sub>g1</sub>	0	1.5	0	mA
V <sub>in(pk)</sub>	120	134	85	V
P <sub>load(driver)</sub>	1.5	2.5	1.5	W
P <sub>a</sub>	1.08	1.12	2.19	kW
P <sub>g2</sub>	8.5	25	7.0	W
P.E.P <sub>out</sub>	1.35	1.57	1.38	kW
P <sub>out</sub> (mean)	675	785	690	W
$\eta_a$	38	41	24	%
P.E.P <sub>(load)</sub>	1.15	1.34	1.17	kW
†D <sub>i.m.</sub>	33	30	42	dB

\*V<sub>g1</sub> is set to give the I<sub>a(o)</sub> and will vary slightly from valve to valve.

†The voltage amplitude of all intermodulation products are below this level, which is referred to the amplitude of either of the two tone frequencies. Relative to the peak envelope power these figures will be increased by 6dB. The figures are measured at full drive.



## CLASS "B" A.F.

## Absolute maximum ratings

$V_a$ max.	5.0	kV
$V_{g2}$ max.	800	V
$I_k$ max.	1.7	A
$I_{k(pk)}$ max.	5.3	A
$P_a$ max.	3.0	kW
$P_{g2}$ max.	100	W
$P_{g1}$ max.	30	W

## Typical operating conditions for 2 valves in push-pull

$V_a$	5.0	5.0	4.0	4.0	kV
$V_{g2}$	800	800	800	800	V
$V_{g1}$	-107	-107	-103	-93	V
$I_{a(o)}$	$2 \times 100$	$2 \times 100$	$2 \times 100$	$2 \times 150$	mA
$I_a$ (max. sig.)	$2 \times 1.1$	$2 \times 1.46$	$2 \times 0.6$	$2 \times 1.37$	A
$I_{g2}$ (max. sig.)	$2 \times 50$	$2 \times 120$	$2 \times 60$	$2 \times 75$	mA
$I_{g1}$	$2 \times 40$	$2 \times 150$	$2 \times 11$	$2 \times 84$	mA
$V_{in(g1-g1)r.m.s.}$	420	505	259	414	V
$P_{drive}$	$2 \times 11$	$2 \times 50$	$2 \times 2.0$	$2 \times 40$	W
$P_a$	$2 \times 1.9$	$2 \times 2.55$	$2 \times 0.9$	$2 \times 2.36$	kW
$\eta_a$	65	65	62	57	%
$R_{a-a}$	5.0	3.7	7.0	3.43	k $\Omega$
$P_{out}$	7.2	9.5	3.0	6.25	kW

## ACCESSORIES

Filament and control grid clips	40634
Screen grid connector	40622
Insulating pedestal (QY5-3000A)	40635
Water jacket (QY5-3000W)	K713

## PHYSICAL DATA

	QY5-3000A	QY5-3000W
Weight of valve	{ 4.96 2.25	0.77 0.35 kg
Weight of valve plus carton	{ 12.6 5.7	2.4 1.1 lb kg



**CLASS "B" A.F.****Absolute maximum ratings**

$V_a$ max.	5.0	kV
$V_{g2}$ max.	800	V
$I_k$ max.	1.7	A
$I_{k(pk)}$ max.	5.3	A
$P_a$ max.	3.0	kW
$P_{g2}$ max.	100	W
$P_{g1}$ max.	30	W

**Typical operating conditions for 2 valves in push-pull**

$V_a$	5.0	5.0	4.0	4.0	kV
$V_{g2}$	800	800	800	800	V
$V_{g1}$	-107	-107	-103	-93	V
$I_{a(o)}$	2 × 100	2 × 100	2 × 100	2 × 150	mA
$I_a$ (max. sig.)	2 × 1.1	2 × 1.46	2 × 0.6	2 × 1.37	A
$I_{g2}$ (max. sig.)	2 × 50	2 × 120	2 × 60	2 × 75	mA
$I_{g1}$	2 × 40	2 × 150	2 × 11	2 × 84	mA
$V_{in(g1-g1)r.m.s.}$	420	505	259	414	V
$P_{drive}$	2 × 11	2 × 50	2 × 2.0	2 × 40	W
$P_a$	2 × 1.9	2 × 2.55	2 × 0.9	2 × 2.36	kW
$\eta_a$	65	65	62	57	%
$R_{a-a}$	5.0	3.7	7.0	3.43	k $\Omega$
$P_{out}$	7.2	9.5	3.0	6.25	kW

**ACCESSORIES**

Filament and control grid clips	40634
Screen grid connector	40622
Insulating pedestal (QY5-3000A)	40635
Water jacket (QY5-3000W)	K713

**PHYSICAL DATA**

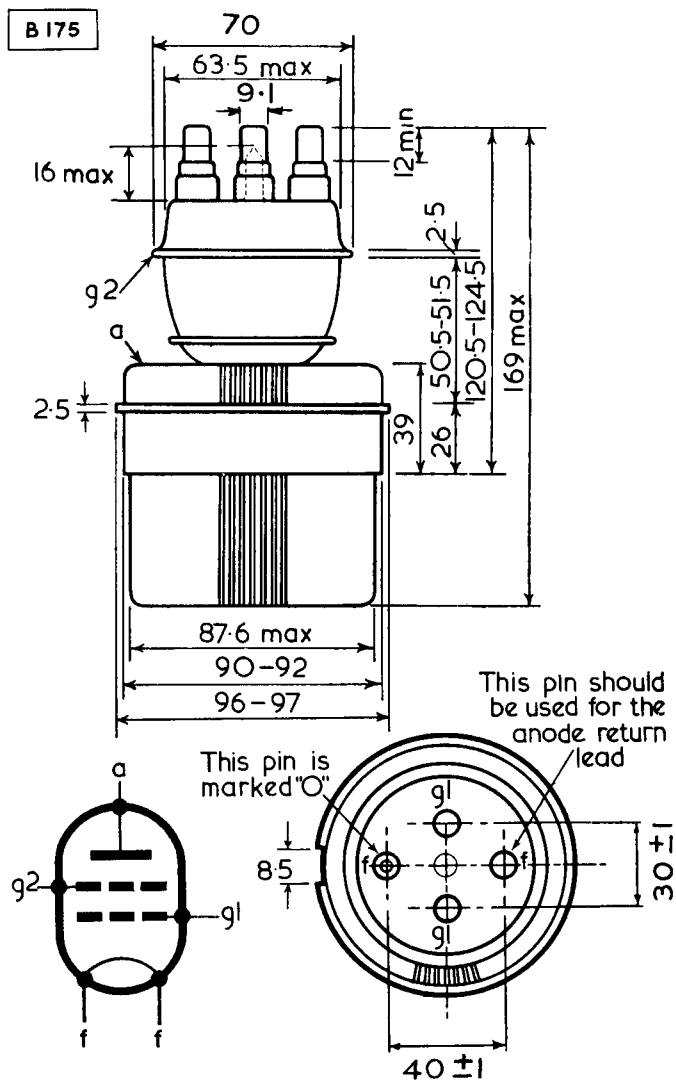
	QY5-3000A	QY5-3000W	
Weight of valve	{ 4.96 2.25	0.77 0.35	lb kg
Weight of valve plus carton	{ 12.6 5.7	2.4 1.1	lb kg



# QY5-3000A QY5-3000W

R.F. POWER TETRODE

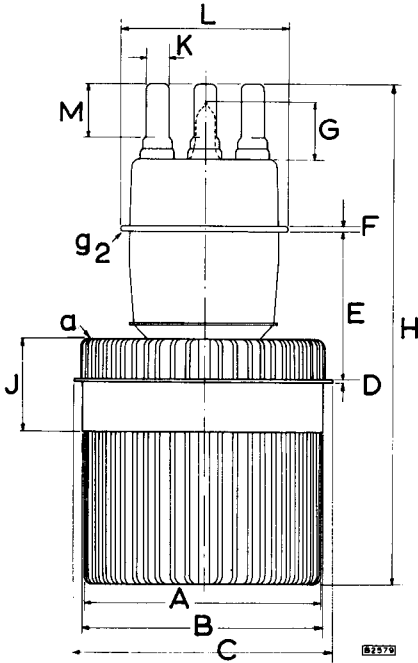
OUTLINE DRAWING OF QY5-3000A



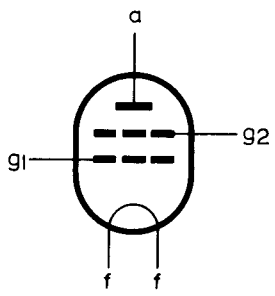
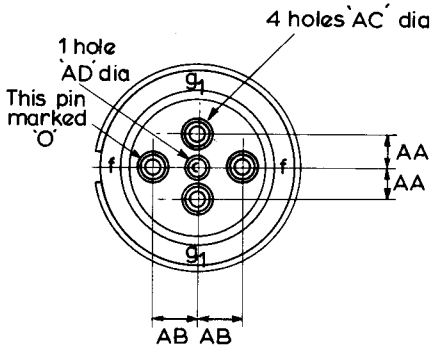
# QY5-3000A QY5-3000W

R.F. POWER TETRODE

OUTLINE DRAWING OF QY5-3000A

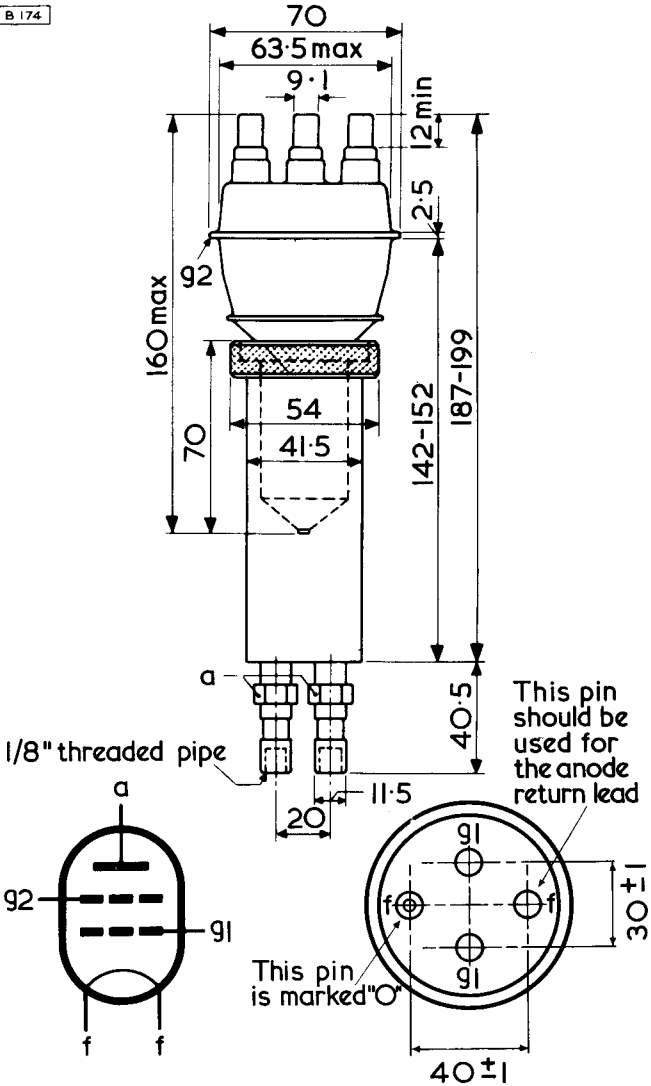


→



OUTLINE DRAWING OF QY5-3000W

B 174



All dimensions in mm.

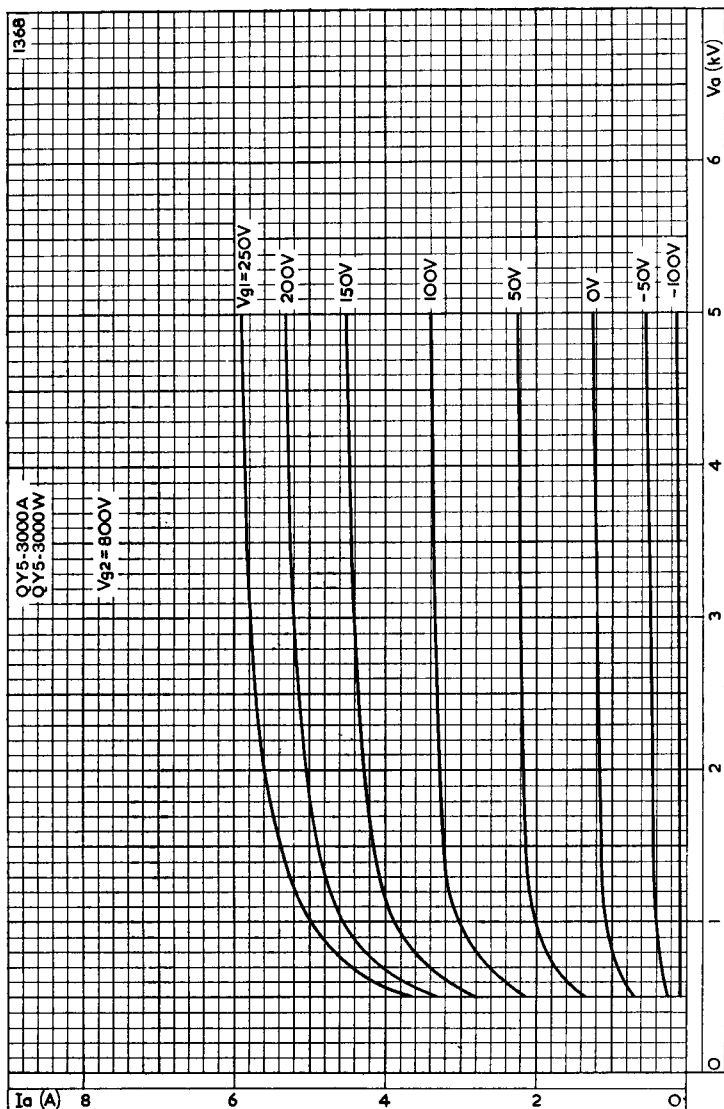
## DIMENSIONS

	<i>Inches</i>	<i>Millimetres</i>	
A	3.445	87.5	max
B	$3.583 \pm 0.031$	$91 \pm 0.8$	
C	$3.799 \pm 0.015$	$96.5 \pm 0.4$	
D	$0.098 \pm 0.020$	$2.5 \pm 0.5$	
E	$2.008 \pm 0.015$	$51 \pm 0.4$	
F	$0.098 \pm 0.020$	$2.5 \pm 0.5$	
G	0.630	16	max
H	6.614	168	max
J	$1.535 \pm 0.039$	$39 \pm 1.0$	
K	$0.354 \pm 0.004$	$9.0 \pm 0.1$	
L	$2.756 \pm 0.015$	$70 \pm 0.4$	
M	0.394	10	min
AA	$0.591 \pm 0.002$	$15 \pm 0.05$	
AB	$0.787 \pm 0.002$	$20 \pm 0.05$	
AC	$0.394 \pm 0.002$	$10 \pm 0.05$	
AD	$0.295 \pm 0.002$	$7.5 \pm 0.5$	

Inch dimensions derived from original millimetre dimensions.





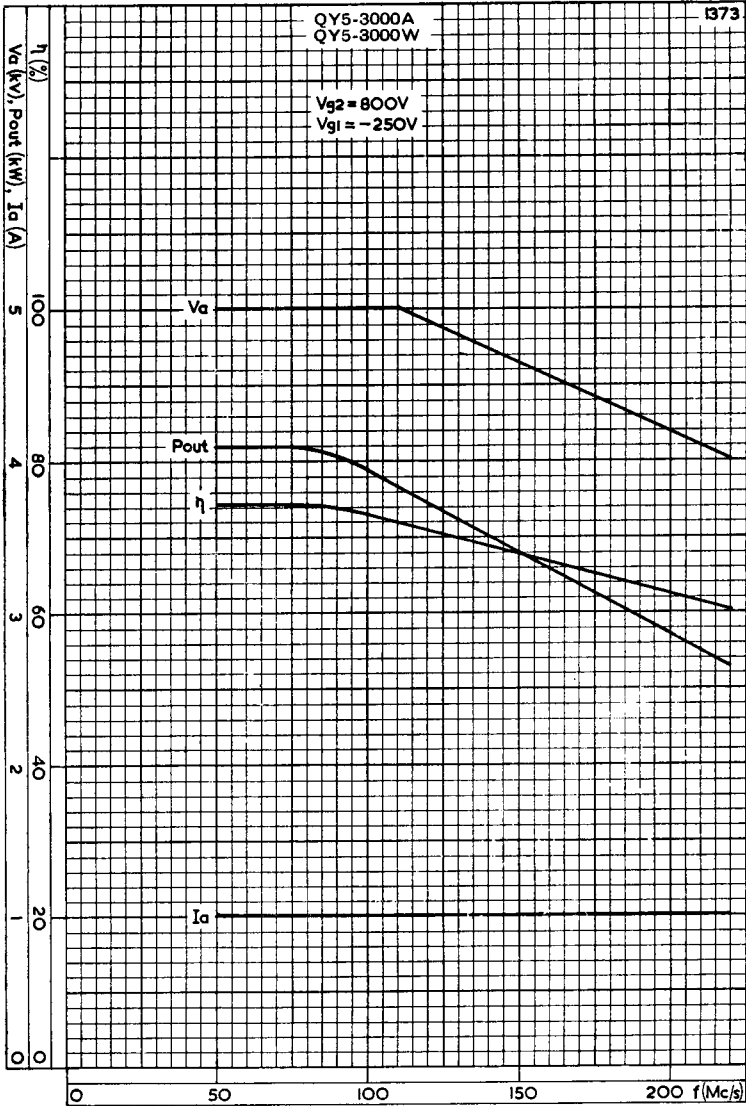


ANODE CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER

# QY5-3000A

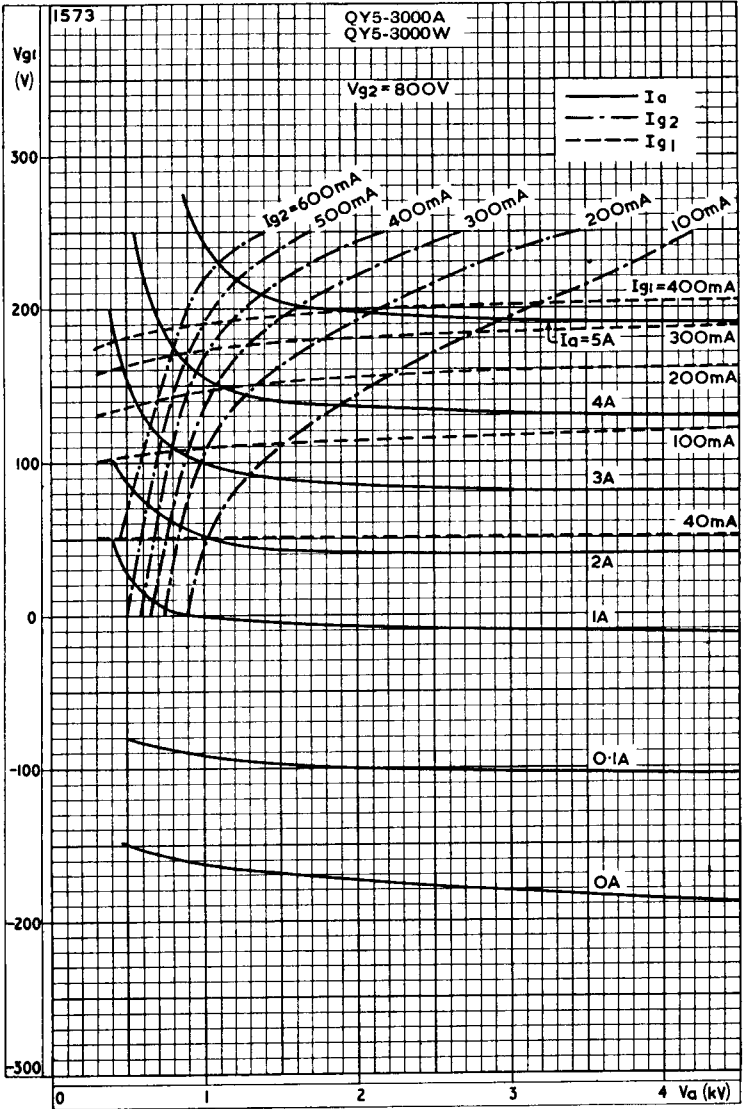
# QY5-3000W

R.F. POWER TETRODE



FREQUENCY CHARACTERISTICS.  
SINGLE VALVE CLASS "C" TELEGRAPHY

# QY5-3000A QY5-3000W

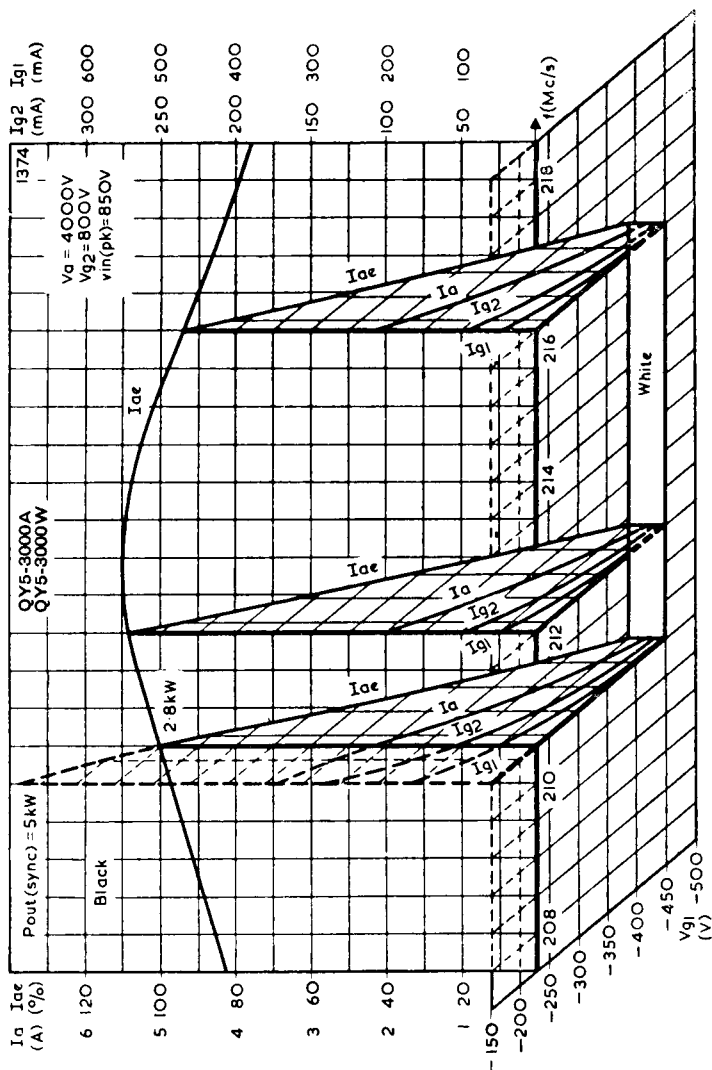


CONSTANT CURRENT CURVES

# QY5-3000A

# QY5-3000W

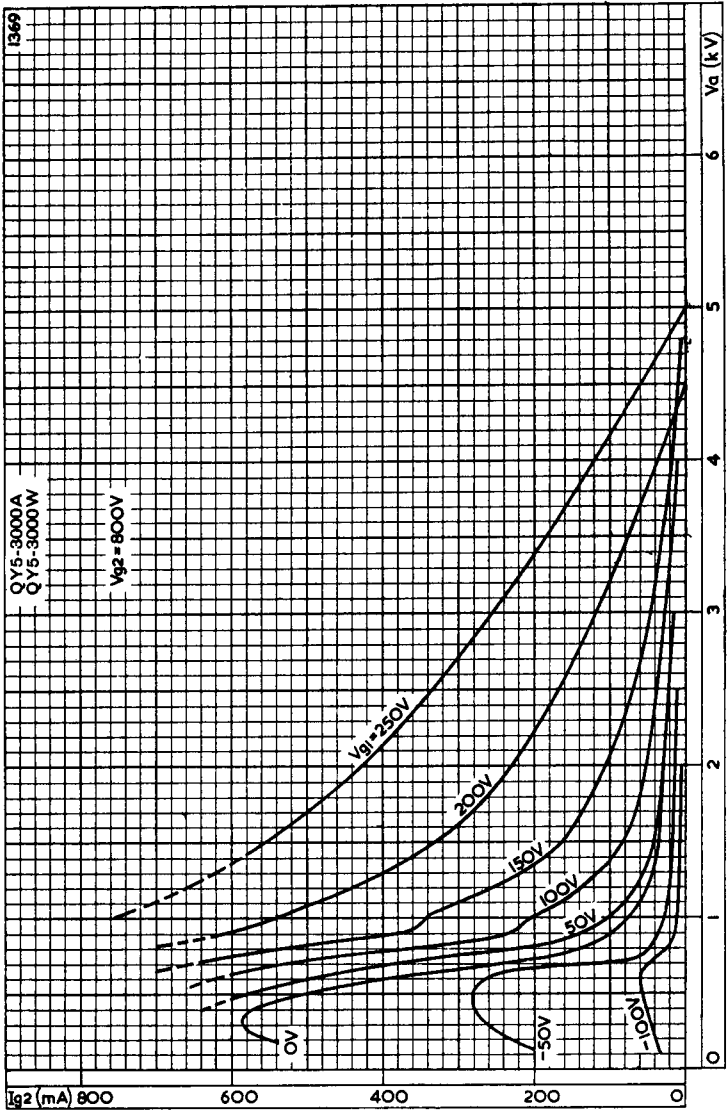
R.F. POWER TETRODE



OPERATION OF TWO VALVES AS R.F. AMPLIFIER CLASS "C" GRID MODULATION FOR TELEVISION SERVICE, WITH NEGATIVE MODULATION AND POSITIVE SYNCHRONISATION

$P_{out(sync)} = 5.0kW$

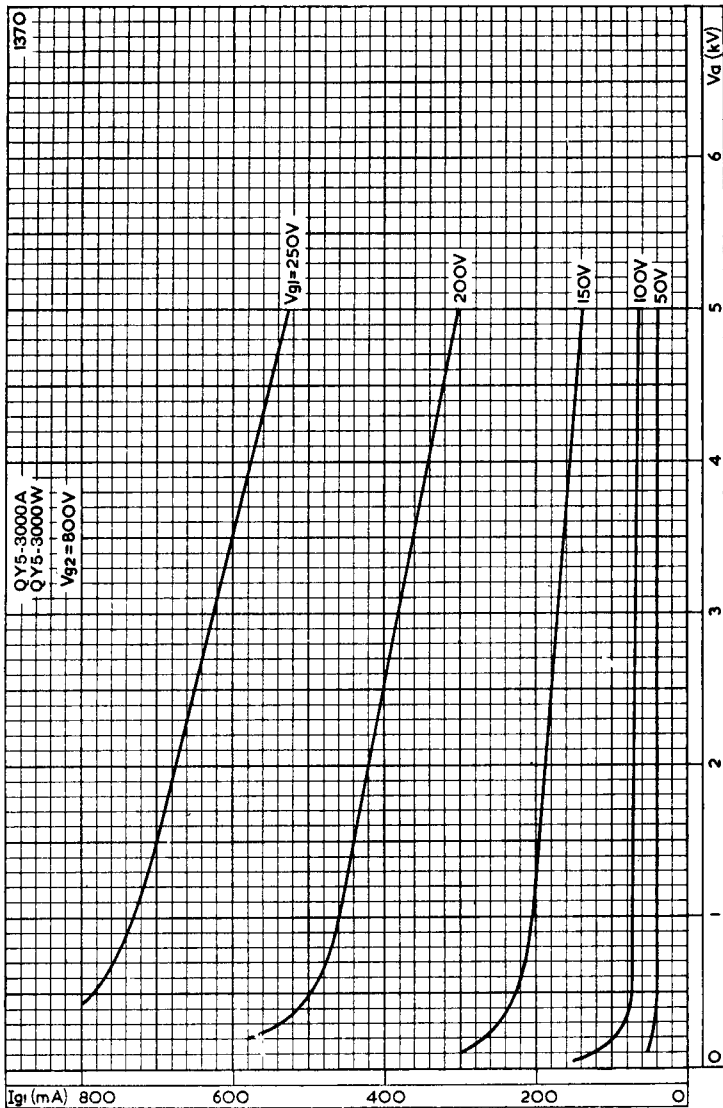
# QY5-3000A QY5-3000W



SCREEN-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE WITH CONTROL-GRID VOLTAGE AS PARAMETER

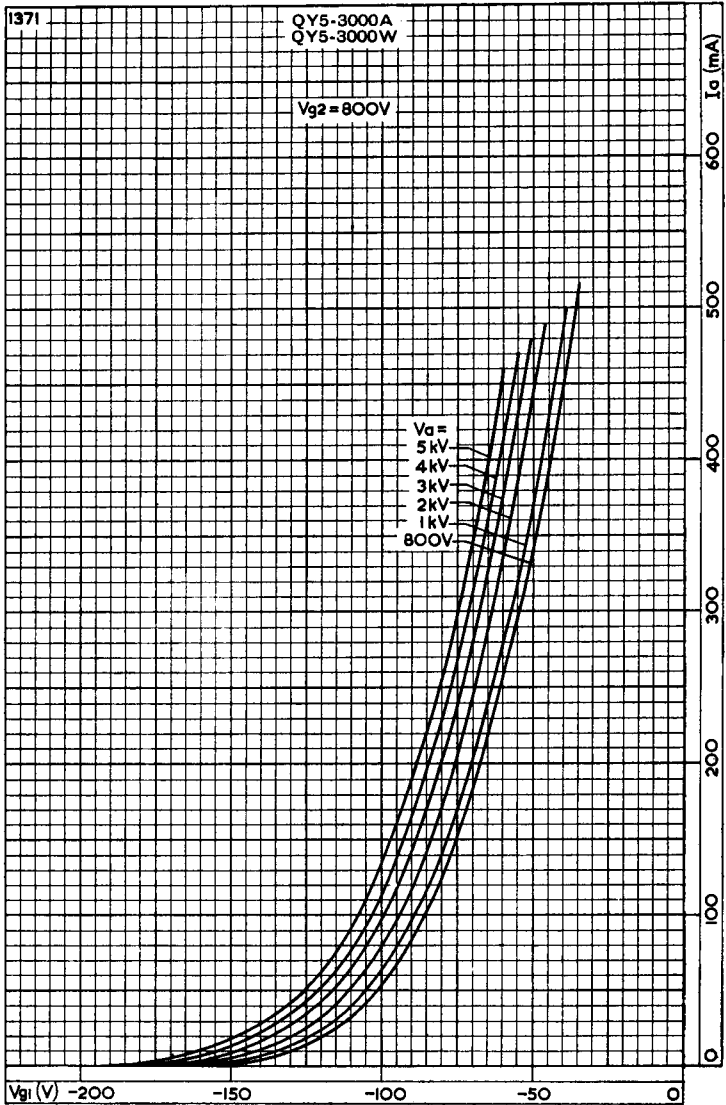
# QY5-3000A QY5-3000W

R.F. POWER TETRODE



CONTROL-GRID CURRENT PLOTTED AGAINST ANODE VOLTAGE  
WITH CONTROL-GRID VOLTAGE AS PARAMETER

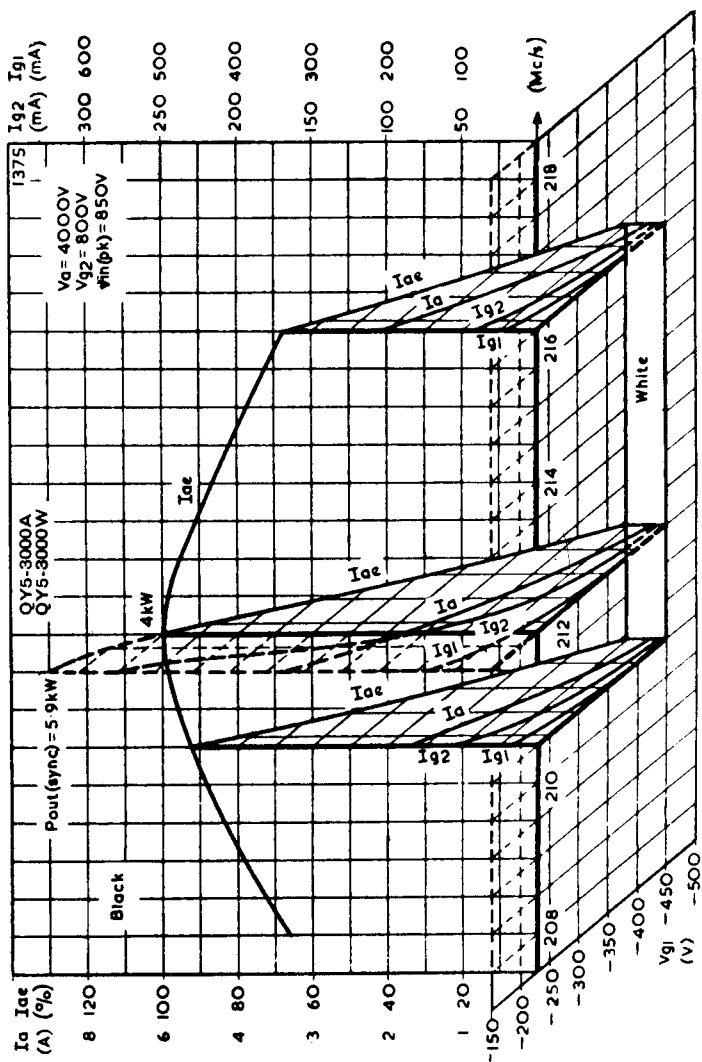
# QY5-3000A QY5-3000W



ANODE CURRENT PLOTTED AGAINST CONTROL-GRID VOLTAGE  
WITH ANODE VOLTAGE AS PARAMETER

# QY5-3000A QY5-3000W

R.F. POWER TETRODE



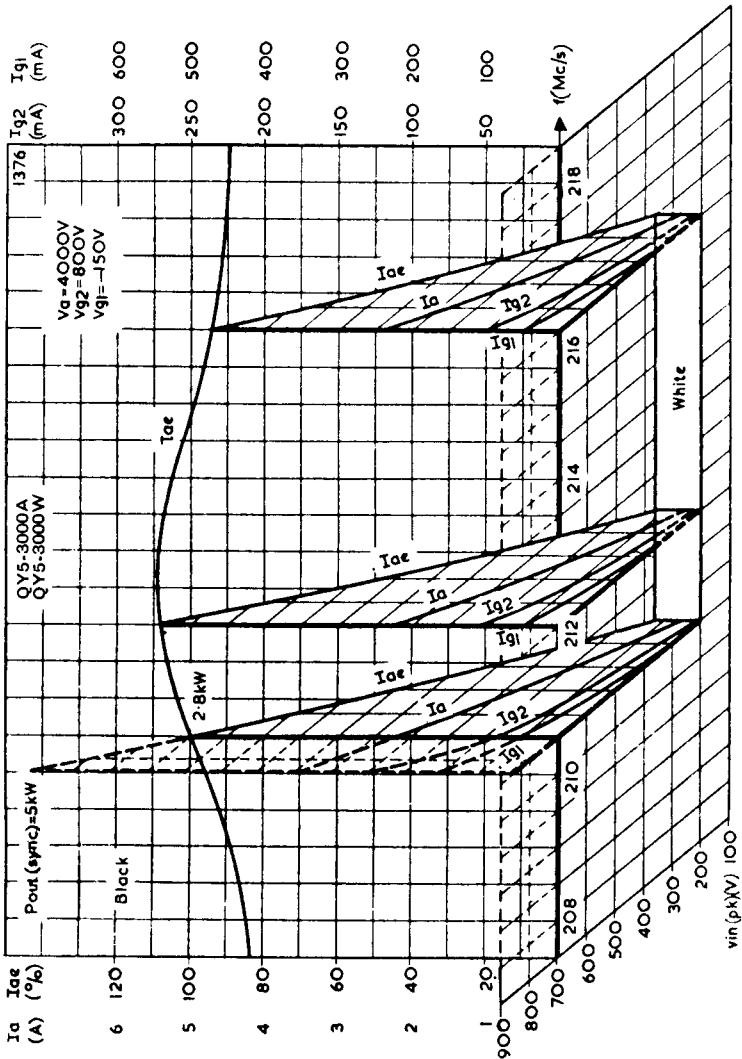
OPERATION OF TWO VALVES AS R.F. AMPLIFIER CLASS "C" GRID MODULATION FOR TELEVISION SERVICE, WITH NEGATIVE MODULATION AND POSITIVE SYNCHRONISATION

$$P_{out(sync.)} = 5.9kW$$





# QY5-3000A QY5-3000W



OPERATION OF TWO VALVES AS R.F. AMPLIFIER CLASS "B" FOR TELEVISION SERVICE, WITH NEGATIVE MODULATION AND POSITIVE SYNCHRONISATION