

# **Mullard**

## **MAINTENANCE**

### **MANUAL**

PREPARED BY  
TECHNICAL SERVICE DEPARTMENT  
**MULLARD LIMITED**  
CENTURY HOUSE, SHAFTESBURY AVENUE, LONDON, W.C.2

**TP270**

# OUTPUT PENTODE (OBSOLETE)

# EL5

## HEATER

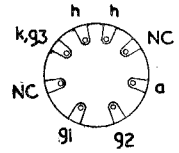
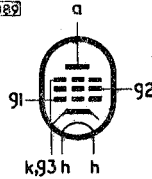
$V_h$	6.3	V
$I_h$	1.35	A

## LIMITING VALUES

$V_a$ max.	250	V
$P_a$ max.	18	W
$V_{g2}$ max.	275	V
$P_{g2}$ max.	3.0	W
$I_k$ max.	90	mA
$V_{h-k}$ max.	50	V

## CHARACTERISTICS

$V_a$	250	V
$V_{g2}$	275	V
$V_{g1}$	-14	V
$I_a$	72	mA
$I_{g2}$	7.0	mA
$g_m$	8.5	mA/V
$r_a$	22	k $\Omega$



Side Contact

## DIMENSIONS

Max. Overall Length	117	mm
Max. Diameter	51	mm

## OPERATING CONDITIONS

(As single valve class "A" amplifier)

$V_a$	250	V
$V_{g2}$	275	V
$I_a$	72	mA
$I_{g2}$	7.0	mA
$R_a$	3.5	k $\Omega$
$R_k$	175	$\Omega$
$P_{out}$	8.8	W
$D_{tot}$	10	%
$V_{in(r.m.s.)}$	9.1	V

**REPLACED BY:** EL37—Change base. May require some alteration in push-pull stages.

# OUTPUT PENTODE (OBSOLETE)

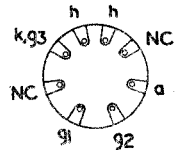
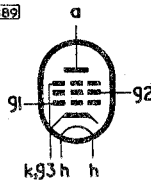
# EL6

## HEATER

$V_h$	6.3	V
$I_h$	1.2	A

## DIMENSIONS

Max. Overall Length	121	mm
Max. Diameter	52	mm



Side Contact

For characteristics, operating data and limiting values see type EL36. Except for base and dimensions, the EL6 and EL36 are identical.

**REPLACED BY:** EL37—Change base. May require some alteration in push-pull stages.



# OUTPUT PENTODE (OBSOLETE)

# EL35

## HEATER

$V_h$	6.3	V
$I_h$	1.35	A

## DIMENSIONS

Max. Overall Length	125	mm
Max. Diameter	47	mm

## LIMITING VALUES

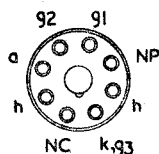
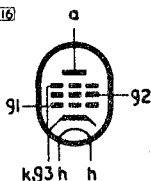
$V_a$ max.	375	V
$p_a$ max.	18	W
$V_{g2}$ max.	250	V
$p_{g2}$ max.	3.5	W
$I_k$ max.	90	mA
$V_{h-k}$ max.	50	V

## CHARACTERISTICS

$V_a$	250	V
$V_{g2}$	250	V
$V_{g1}$	-15.5	V
$I_a$	72	mA
$I_{g2}$	8.0	mA
$g_m$	5.0	mA/V
$r_a$	15.5	k $\Omega$
$\mu_{g1-g2}$	8.0	

## OPERATING CONDITIONS (As single valve class "A" amplifier)

$V_a$	250	V
$V_{g2}$	250	V
$R_k$	180	$\Omega$
$I_a$	72	mA
$I_{g2}$	8.0	mA
$R_a$	2.5	k $\Omega$
$P_{out}$	6.0	W
$V_{in(r.m.s.)}$	13	V
$D_{tot}$	10	%



Octal

## OPERATING CONDITIONS

### Two Valves in Class "AB" Push-pull (Self Bias)

$V_a$	270	360	V
$V_{g2}$	270	270	V
* $R_k$	135	250	$\Omega$
$I_{g2(0)}$	2 × 8	2 × 4.25	mA
$I_{g2}$ (max. sig.)	2 × 12.5	2 × 8.75	mA
$I_{g2(0)}$	16	8.5	mA
$I_{g2}$ (max. sig.)	25	17.5	mA
$R_{a-a}$	5.0	7.0	k $\Omega$
$P_{out}$	17	21	W
$V_{in(g1-g1)r.m.s.}$	31	46	V
$D_{tot}$	6.0	<3.0	%

\*Common cathode bias resistor.

### Two Valves in Class "AB" Push-pull (Fixed Bias)

$V_a$	360	V
$V_{g2}$	270	V
$V_{g1}$	-26	V
$I_{a(0)}$	2 × 44	mA
$I_a$ (max. sig.)	2 × 70	mA
$I_{g2(0)}$	2 × 4.25	mA
$I_{g2}$ (max. sig.)	2 × 9.75	mA
$R_{a-a}$	6.25	k $\Omega$
$P_{out}$	26	W
$V_{in(g1-g1)r.m.s.}$	36	V
$D_{tot}$	<3.0	%

**REPLACED BY:** EL37—No alteration necessary in single valve output stages, but may be necessary in push-pull stages.



# EL36

## OUTPUT PENTODE (OBSOLETE)

### HEATER

$V_h$	6.3	V
$I_h$	1.2	A

### DIMENSIONS

Max. Overall Length	143	mm
Max. Seated Height	129	mm
Max. Diameter	52	mm

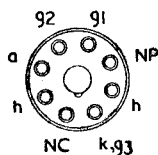
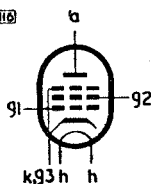
### LIMITING VALUES

$V_a$ max.	250	V
$p_a$ max.	18	W
$V_{g2}$ max.	275	V
$p_{g2}$ max.	3.0	W
$I_k$ max.	90	mA
$V_{h-k}$ max.	50	V

### CHARACTERISTICS

$V_a$	250	V
$V_{g2}$	250	V
$V_{g1}$	-7.0	V
$I_a$	72	mA
$I_{g2}$	8.0	mA
$g_m$	14.5	mA/V
$r_a$	20	k $\Omega$
$\mu_{g1-g2}$	20	

(8316)



Octal

### OPERATING CONDITIONS

(As single valve class "A" amplifier)

$V_a$	250	V
$V_{g2}$	250	V
$R_k$	90	$\Omega$
$I_a$	72	mA
$I_{g2}$	8.0	mA
$R_{a-a}$	3.5	k $\Omega$
$P_{out}$	8.0	W
$V_{in(r.m.s.)}$	4.8	V
$D_{tot}$	10	%

### OPERATING CONDITIONS FOR TWO VALVES IN PUSH-PULL

(Self Bias)

$V_a$	250	V
$V_{g2}$	250	V
* $R_k$	90	$\Omega$
$I_{a(o)}$	2 × 45	mA
$I_a$ (max. sig.)	2 × 53	mA
$I_{g2(o)}$	2 × 5.1	mA
$I_{g2}$ (max. sig.)	2 × 8.5	mA
$R_{a-a}$	5.0	k $\Omega$
$P_{out}$	14.5	W
$D_{tot}$	2.2	%
$V_{in(g1-g1)r.m.s.}$	14.5	V

\*Common cathode bias resistor.

**REPLACED BY:** EL37—Direct substitute in single valve output stages, but may require some alteration in push-pull stages.

Note by FP: This Mullard EL36 was the EL6 with Octal base.

Later the EL36 became the Line Output Pentode, the 6.3V version of the PL36.

