

# V.H.F. INDUSTRIAL TRIODES

YD1170  
YD1171  
YD1172

## TENTATIVE DATA

### QUICK REFERENCE DATA

External anode triode, of ceramic to metal construction, intended for use as an industrial oscillator at frequencies up to 120 MHz.

The YD1170 is forced-air cooled.

The YD1171 is water cooled by means of a separate water jacket.

The YD1172 has an integral helical water cooler.

f	120	MHz
P <sub>out</sub> (less P <sub>drive</sub> )	15.4	kW
f max.	120	MHz
V <sub>a</sub> max.	7.2	kV
p <sub>a</sub> max.	10	kW

Unless otherwise stated, data is applicable to all types

To be read in conjunction with

GENERAL OPERATIONAL RECOMMENDATIONS - TRANSMITTING VALVES

INDUSTRIAL OSCILLATOR, CLASS 'C'

### OPERATING CONDITIONS

f	120	MHz
P <sub>out</sub>	16.2	kW
P <sub>out</sub> (less P <sub>drive</sub> )	15.4	kW
P <sub>load</sub>	13.5*	kW
Duty factor	1.0	
$\eta_a$	79.4	%
V <sub>a</sub>	6.0	kV
I <sub>a</sub>	3.4	A
-V <sub>g</sub>	460	V
I <sub>g</sub> on load	920	mA
I <sub>g</sub> off load	1.35	A
R <sub>g-f</sub>	500	$\Omega$
Feedback ratio $v_{in(pk)}/v_{a(pk)}$	0.13	
p <sub>a</sub>	4.2	kW
p <sub>g</sub>	275	W

\*Cavity circuit, 90% transfer.

**RATINGS (ABSOLUTE MAXIMUM SYSTEM)**

f max.	120	MHz
P <sub>in</sub> max.	24	kW
V <sub>a</sub> max.	7.2	kV
-V <sub>g</sub> max.	1.5	kV
I <sub>a</sub> max.	4.0	A
I <sub>g</sub> max. on load	1.0	A
off load	1.5	A
I <sub>k</sub> max.	4.8	A
i <sub>k(pk)</sub> max.	25	A
p <sub>a</sub> max.	10	kW
R <sub>g-f</sub> max.	10	kΩ

**CATHODE**

Directly heated, thoriated tungsten

V <sub>f</sub> <100MHz	5.8	V
100-120MHz	5.5	V
I <sub>f</sub>	130	A
i <sub>f(pk)</sub> max. (starting)	800	A
r <sub>f</sub> (cold)	0.0056	Ω

The filament has been designed to accept temporary fluctuations of supply voltage of +5 to -10%.

**CAPACITANCES**

c <sub>a-g</sub>	24	pF
c <sub>g-f</sub>	47	pF
c <sub>a-f</sub>	0.6	pF

**CHARACTERISTICS (at V<sub>a</sub> = 6.0kV, I<sub>a</sub> = 2.0A)**

g <sub>m</sub>	33	mA/V
μ	29	

**MOUNTING POSITION** - YD1170, YD1172  
                          YD1171

Vertical, anode up or down  
Vertical, anode down



**V.H.F. INDUSTRIAL  
TRIODES**

**YD1170  
YD1171  
YD1172**

**COOLING**

YD1170

Anode - Forced-air cooled

Seals - At the higher values of anode dissipation and at the highest operating frequencies additional cooling is required.

Temperatures

All seals max.	200	°C
Envelope max.	200	°C
Air inlet max.	45	°C

Anode dissipation	Height above sea level	Inlet temperature	Outlet temperature	Rate of air flow per minute	Pressure difference between inlet and outlet
(kW)	(km)	(°C)	(°C)	(m <sup>3</sup> ) (ft <sup>3</sup> )	(mm H <sub>2</sub> O)
10	0	35	94	9.5 335	55
8.0	0	35	105	6.5 229	28
6.0	0	35	113	4.5 159	15
4.0	0	35	117	3.0 106	8.0
10	0	45	98	11.0 388	69
8.0	0	45	108	7.6 265	35
6.0	0	45	115	5.2 184	19
4.0	0	45	119	3.5 123	10
10	1.5	35	94	11.4 405	63
8.0	1.5	35	105	7.8 273	32
6.0	1.5	35	113	5.4 194	17
4.0	1.5	35	117	3.6 131	9.0
10	3.0	25	90	12 424	62
8.0	3.0	25	102	8.2 291	32
6.0	3.0	25	111	5.7 203	17
4.0	3.0	25	116	3.8 138	9.0



YD1171

Anode - Water cooled (separate water jacket)

Seals - For frequencies >4 MHz air cooling is required.

Temperatures

All seals max.	200	°C
Envelope max.	200	°C
Water inlet max.	50	°C

Anode dissipation	Inlet temperature	Outlet temperature	Rate of water flow per minute		Pressure difference between inlet and outlet (atm)
(kW)	(°C)	(°C)	(litres)	(gal)	
10	20	36	10	2.2	0.6
8.0	20	37	7.8	1.72	0.38
6.0	20	38	5.7	1.25	0.22
10	50	61	15	3.3	1.25
8.0	50	62	11.3	2.49	0.75
6.0	50	62	8.2	1.80	0.42

For inlet temperatures between 20 and 50°C the required water flow can be found by linear interpolation.

YD1172

Anode - Water cooled (integral cooler)

Seals - For frequencies >4 MHz air cooling is required.

Temperatures

All seals max.	200	°C
Envelope max.	200	°C
Water inlet max.	50	°C

Anode dissipation	Inlet temperature	Outlet temperature	Rate of water flow per minute		Pressure difference between inlet and outlet (atm)
(kW)	(°C)	(°C)	(litres)	(gal)	
10	20	46	6.0	1.32	0.25
8.0	20	49	4.5	0.99	0.15
6.0	20	53	3.0	0.66	0.07
10	50	67	9.0	1.98	0.52
8.0	50	69	6.7	1.47	0.31
6.0	50	72	4.5	0.99	0.15

For inlet temperatures between 20 and 50°C the required water flow can be found by linear interpolation.

## V.H.F. INDUSTRIAL TRIODES

**YD1170  
YD1171  
YD1172**

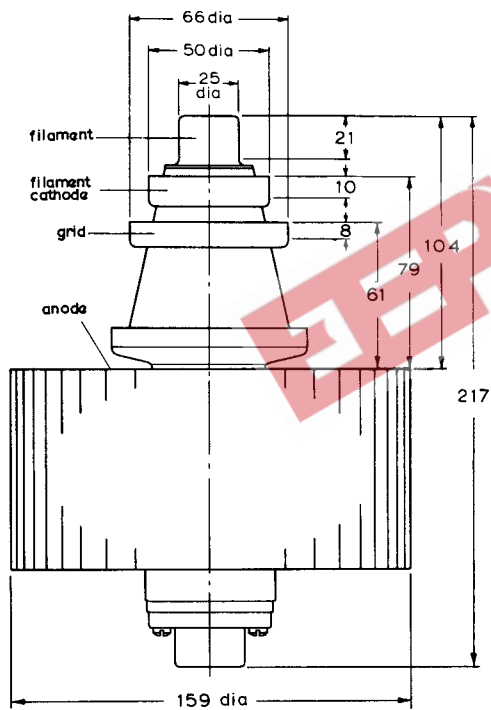
### PHYSICAL DATA

	YD1170	YD1171	YD1172	
Weight of valve	7.5	1.5	2.0	kg
	16.5	3.3	4.4	lb
Weight of insulating pedestal	4.25	-	-	kg
	9.4	-	-	lb
Weight of water jacket	-	2.0	-	kg
	-	4.4	-	lb

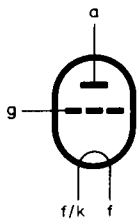
### ACCESSORIES

Filament connector	40692
Filament/cathode connector	40693
Grid connector ( $f \leq 4.0$ MHz)	40690
Grid connector ( $f > 4.0$ MHz)	40691
Filament cables $\times 2$	40715
Insulating pedestal (YD1170)	40654
Water jacket (YD1171)	K727

OUTLINE DRAWING OF YD1170



All dimensions in mm

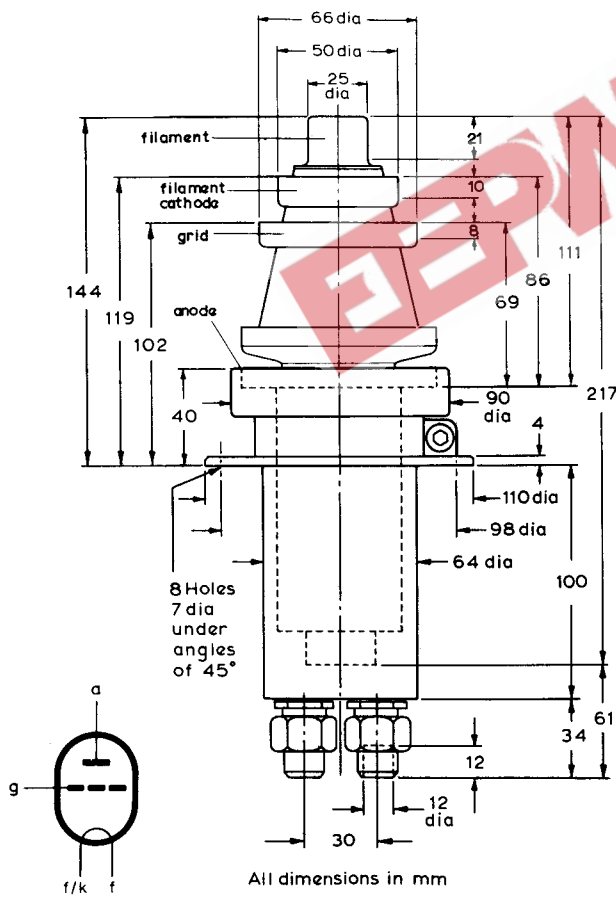


85767

**V.H.F. INDUSTRIAL  
TRIODES**

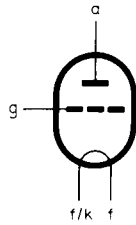
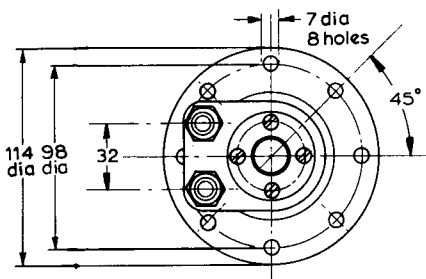
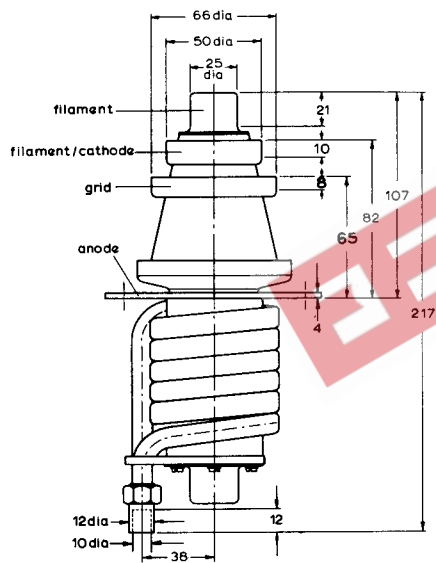
**YD1170  
YD1171  
YD1172**

OUTLINE DRAWING OF YD1171 MOUNTED IN WATER JACKET K727



85731

OUTLINE DRAWING OF YD1172



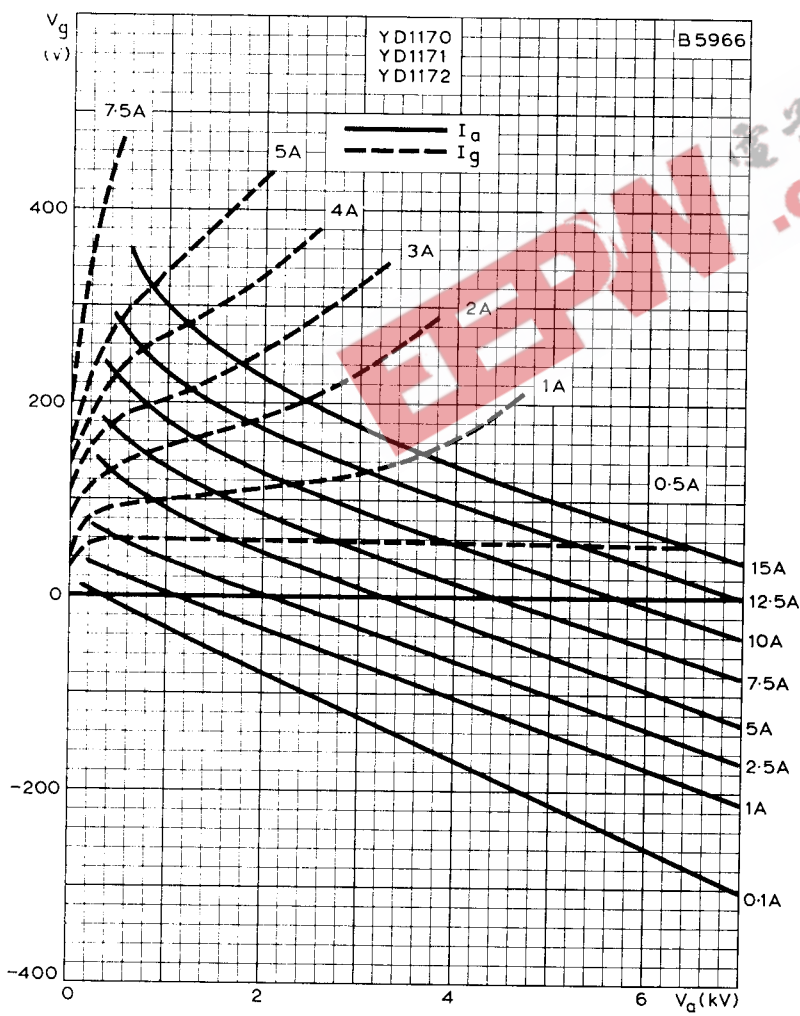
All dimensions in mm

B6734



**V.H.F. INDUSTRIAL  
TRIODES**

**YD1170  
YD1171  
YD1172**



CONSTANT CURRENT CHARACTERISTICS