RF POWER TRIODE

Triodes in metal-ceramic construction intended for use as industrial oscillators.

The YD1180 is forced-air cooled
The YD1182 is water cooled by an integral cooler.

QUICK REFERENCE DATA				
Oscillator output power (W_o-W_{feedb}), typical	W_{osc}		31,6	kW
Frequency for full ratings	f	max.	100	MHz

To be read in conjunction with "General Operational Recommendations".

RF CLASS C OSCILLATOR FOR INDUATRIAL USE
OPERATING CONDITIONS

Frequency	f	90	MHz
Oscillator output power (W_o-W_{feedb})	W_{osc}	31,6	kW
Anode voltage	V_a	7,5	kV
Anode current	I_a	5,4	A
Anode input power	W_{ia}	40,5	kW
Anode dissipation	W_a	7,5	kW
Anode output power	W_o	33	kW
Anode efficiency	η_a	81,5	%
Oscillator efficiency	η_{osc}	78	%
Feedback ratio	V_{gp}/V_{ap}	14,8	%
Grid resistor	R_g	450	Ω
Grid current, on load	I_g	1,45	A
Grid voltage, negative	$-V_g$	652	V
Grid dissipation	W_g	450	W
Grid resistor dissipation	W_{Rg}	946	W

LIMITING VALUES (Absolute max. rating system)

Frequency		f	up to	100	MHz
Anode voltage		V_a	max.	9	kV
Anode current		I_a	max.	6	A
Anode input power		W_{ia}	max.	45	kW
Anode dissipation: continuous service	(YD1180)*	W_a	max.	15	kW
	(YD1182)		max.	20	kW
Grid voltage		$-V_g$	max.	1,5	kV
Grid current, on load		I_g	max.	1,6	A
of load		I_g	max.	2,4	A
Grid dissipation		W_g	max.	500	W
Grid circuit resistance		R_g	max.	10	kΩ
Cathode current, mean		I_k	max.	7,5	A
peak		I_{kp}	max.	40	A
Envelope temperature		t_{env}	max.	240	°C

HEATING : direct; thoriated tungsten filament, mesh construction

Filament voltage	V_f		7	V
Filament current	I_f		175	A
Peak filament starting current	I_{fp}	max.	1000	A
Cold filament resistance	R_{fo}		4,2	mΩ

The filament is designed to accept temporary fluctuations of +5% and −10%. To ensure that the cathode temperature remains constant irrespective of the operating frequency, it may be necessary to reduce the filament voltage at higher frequencies. When doing so it must be borne in mind that the filament voltage-to-current ratio measured with only the filament voltage applied should remain constant under all operating conditions.

It is extremely important that the filament be properly decoupled. This should be done so that the resonance of the circuit formed by the filament and the decoupling elements remain below the fundamental oscillator frequency. In grounded-grid circuits this resonance should be below the grid-cathode resonance. For further information please see Application Book "Tubes for RF heating" or contact the manufacturer.

CAPACITANCES

Anode to filament	C_{af}	1	pF
Grid to filament	C_{gf}	66	pF
Anode to grid	C_{ag}	32	pF

* See Fig. 4.

CHARACTERISTICS measured at V_a = 7 kV, I_a = 2,4 A

Transconductance	S	40	mA/V
Amplification factor	μ	33	

COOLING

To obtain optimum life, the temperature of the seals and of the envelope should, under normal operating conditions, be kept below 200 °C.

To maintain these temperatures additional cooling may be necessary.
At frequencies higher than about 4 MHz cooling of the seals becomes mandatory.

YD1180
Direction of airflow: see outline drawing.

See also cooling curves

With insulating pedestal type 40648

Table 1 Air cooling characteristics

Anode+grid dissipation W_a+W_g (kW)	Altitude h (m)	Inlet temperature T_i (°C)	Rate of flow qmin (m^3/min)	Pressure drop ΔP (Pa*)	Outlet temperature T_o (°C)
15	0	35	15	850	92
10	0	35	9,3	320	99
8	0	35	7	200	104
15	0	45	17,3	1060	98
10	0	45	10,7	400	104
8	0	45	8,1	250	108
15	1500	35	18	970	93
10	1500	35	11,2	460	100
8	1500	35	8,4	230	104
15	3000	25	19	950	90
10	3000	25	11,8	450	95
8	3000	25	8,9	230	99

* 1 Pa ≈ 0,1 mm H_2O

YD1182

Table 2 Water cooling characteristics

Anode + grid dissipation Wa + Wg (kW)	Inlet temperature t_i (°C)	Rate of flow q_{min} (ℓ/min)	Pressure drop Pi (kPa *)	Outlet temperature t_o (°C)
20	20	10	40	51
	50	15	80	71
15	20	7,5	22	54
	50	10,5	43	73
10	20	4,5	10	58
	50	6,7	20	75

Absolute max. water inlet temperature	T_i	max.	50	°C
Absolute max. water pressure	P	max.	600	kPa(abs)

ACCESSORIES

Filament connector with cable	type 40708A	net mass	600	g
Filament /cathode connector with cable	type 40709A	net mass	640	g
Grid connector f ≤ 4 MHz	type 40710	net mass	60	g
f > 4 MHz	type 40711	net mass	310	g
Insulating pedestal (YD1180 only)	type 40648	net mass	7, 15	kg

* 100 kPa ≈ 1 at.

Dimensions in mm

MECHANICAL DATA

YD1180

Mounting position : vertical with anode up or down

Net mass : approx. 12 kg

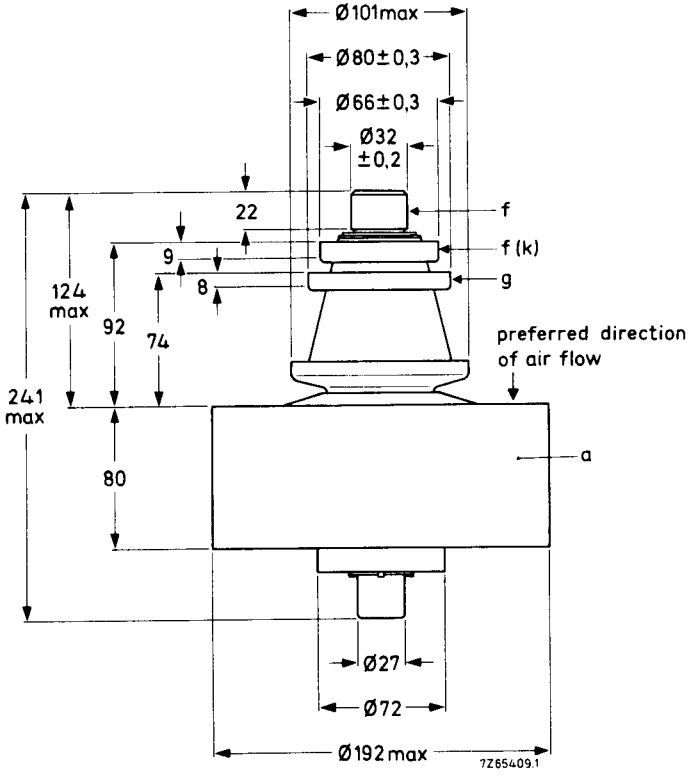


Fig. 1 Mechanical outline.

YD1182

Mounting position : vertical with anode up or down

Net mass : approx. 3,5 kg

Dimensions in mm

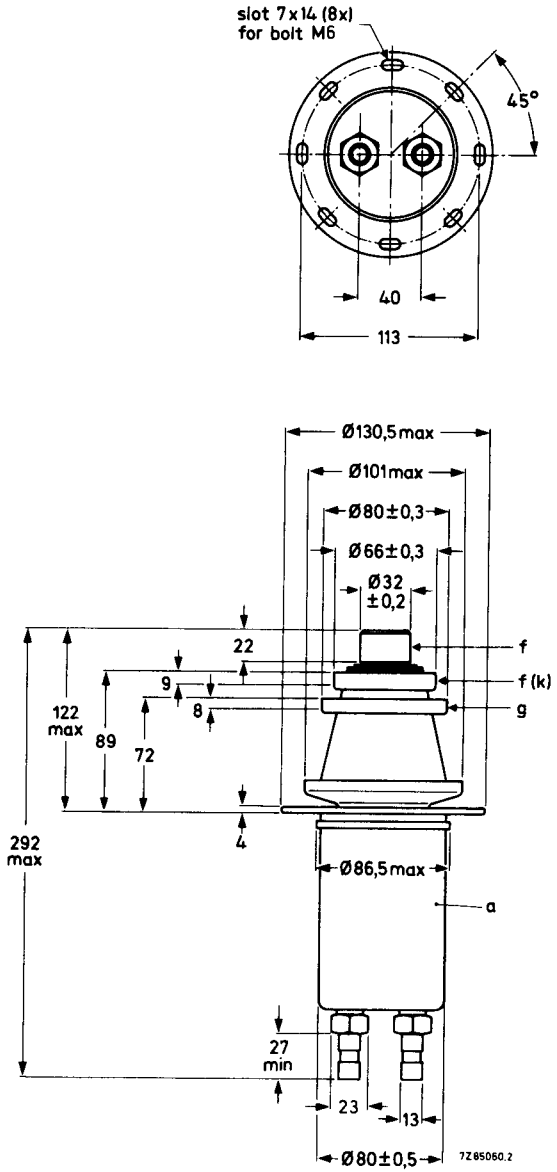


Fig. 2 Mechanical outline – YD1182.

Thread of water connections BSP 1/2 in

With anode up the inlet and outlet connections should be interchanged.

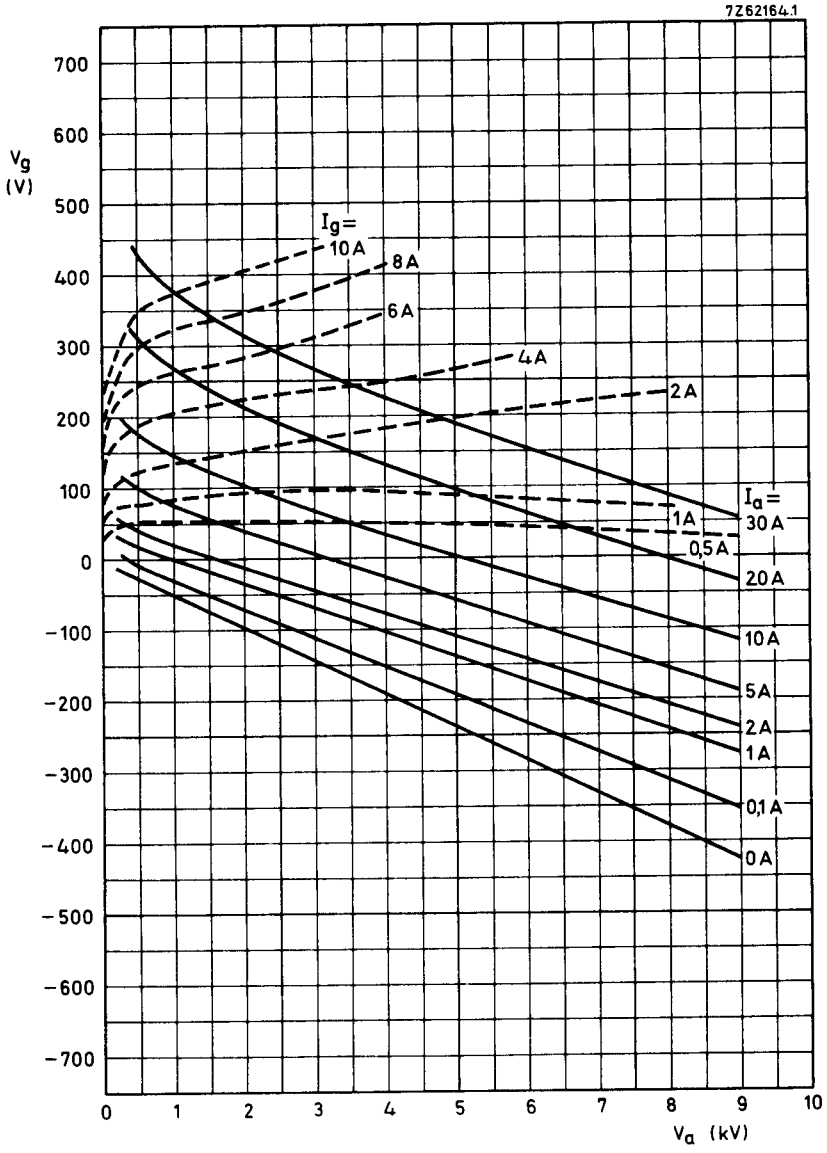
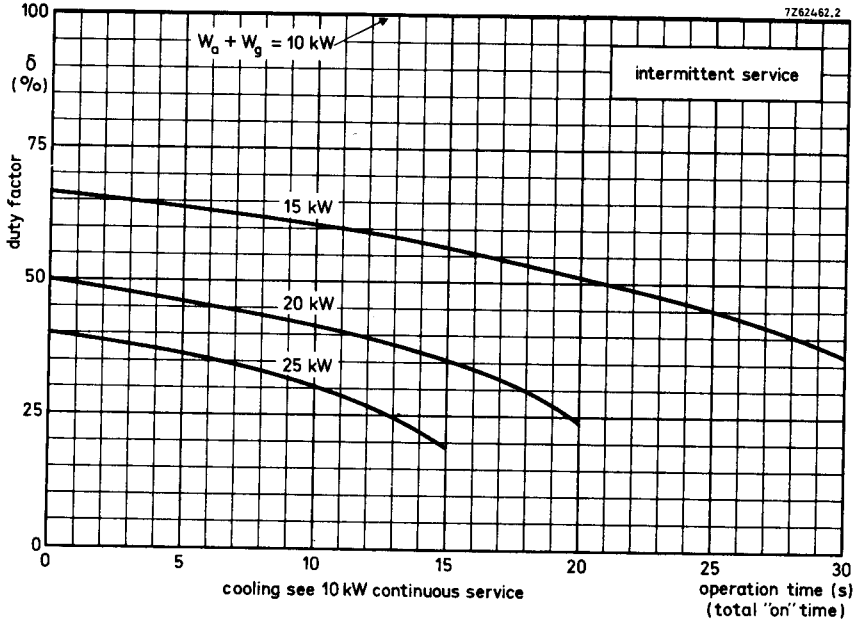
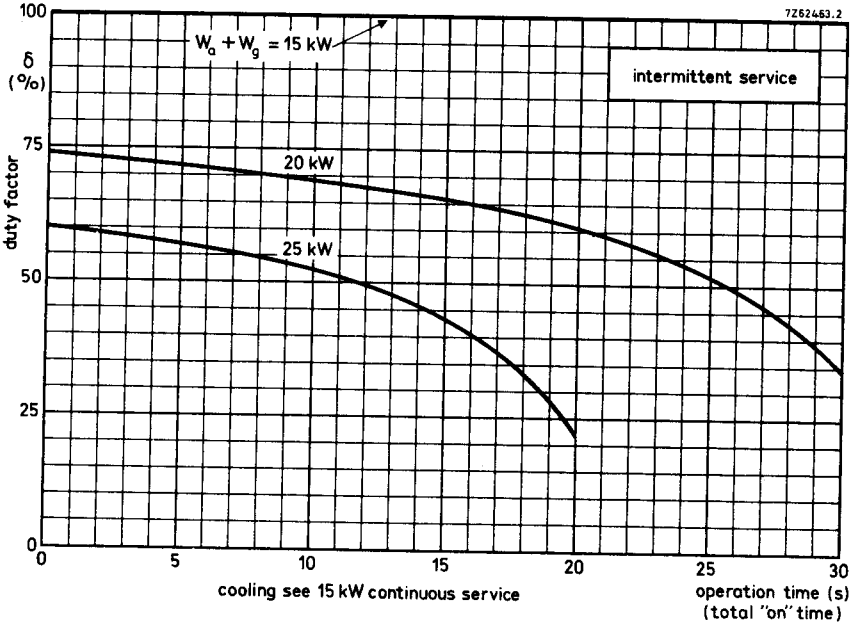


Fig. 3 Constant current characteristics.

Fig. 4 (YD1180 only). Intermittent service. Limits of anode dissipation and cooling.

YD1180





PHILIPS

Data handbook

Electronic components and materials

YD 1180 YD1182

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1	231	1988.02
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8	238	1988.02
9	FP	2000.09.09