Amperex

YD1185/8935
YD1187/8956
RF Power Triodes

The YD1185/8935 and YD1187/8936 are RF power triodes in metal-ceramic construction intended for use as industrial oscillators. The YD1185 is forced-air cooled. The YD1187 has an integral water cooler.

GENERAL DATA

Electrical:

Filament-Thoriated Tungsten	Mesh Construction		
Voltage[Note 1]		7.0	V
Current		175	A

Characteristics: measured at: V_a = 11 kV, I_a =1.5 A

Amplification Factor	μ		50	
Transconductance	S		40	mA/V
Direct Interelectrode Capacities:				
Grid-Anode	C_{ag}		22	pF
Grid-Filament	C_{gf}		66	pF
Anode-Filament	C_{af}		0.8	pF
Peak filament starting current	I_{fp}	max.	1000	A
Cold filament resistance	R_{fo}	max.	4.2	mΩ

Mechanical:

	YD1185/8935	YD1187/8936	
Overall Dimensions:			
Length	241	292	mm (max)
Diameter	192	130.5	mm (max)
Mounting Position	See outline drawings		
Cooling Type:	air	water	

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Cooling:
To obtain optimum life, the temperature of the seals/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.

YD1185/8935 Table 1: Air cooling characteristics

anode + grid dissipation W_a+W_g (kW)	Altitude h (m)	inlet temperature T_i (°C)	rate of flow q_{min} (m^3/min)	pressure drop ΔP (Pa*)	outlet temperature T_O (°C)
15 10 8	0 0 0	35 35 35	15 9.3 7	850 350 220	92 99 104
15 10 8	0 0 0	45 45 45	17.3 10.7 8.1	1060 440 270	98 104 108
15 10 8	1500 1500 1500	35 35 35	18 11.2 8.4	970 400 250	93 100 104
15 10 8	3000 3000 3000	25 25 25	19 11.8 8.9	950 390 250	90 95 99

*1 Pa=0.1 mm H_20

YD1187/8936 Table 2: Water cooling characteristics

anode + grid dissipation W_a+W_g (kW)	inlet temperature T_i (°C)	rate of flow q_{min} (ℓ/min)	pressure drop ΔP (kPa**)	outlet temperature T_O (°C)
20	20 50	10 15	40 80	51 71
15	20 50	7 10.5	22 43	54 73
10	20 50	4.5 6.7	10 20	58 75

Absolute max. water inlet temperature T_i max 50 °C
Absolute max water pressure P max 600 kPa** (abs)
**100 kPa=1 at

LIMITING VALUES (Absolute maximum rating system)

Frequency	f	up to		100	MHz
Anode Voltage	V_a	max.		14.4	kV
Anode Current	I_a	max.		6	A
Anode input power	W_{Ia}	max.		72	kW
Anode dissipation (Continuous service)	W_a	max.	YD1185*	15	kW
Anode dissipation (Continuous service)	W_a	max.	YD1187	20	kW
Grid voltage	$-V_g$	max.		1.5	kV
Grid current, on load	I_g	max.		1.6	A
Grid current, off 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

RF CLASS C OSCILLATOR FOR INDUSTRIAL USE
OPERATING CONDITIONS

Frequency	f	90	90	90	MHz
Oscillator output power (Wo-Wfeedb)	W_{osc}	33.4	40	50	kW
Anode Voltage	V_a	8.5	10	12	kV
Anode Current	I_a	5.4	5.33	5.33	A
Anode input power	W_{ia}	45.9	53.3	64	kW
Anode dissipation	W_a	11.4	12.1	12.8	kW
Anode output power	W_o	34.5	41.2	51.2	kW
Anode efficiency	n_a	75.1	77.3	80.0	%
Oscillator efficiency	n_{osc}	72.7	75.0	78.1	%
Feedback ratio	V_{gp}/V_{ap}	11	10.2	9	%
Grid resistor	R_g	330	400	430	Ω
Grid current, on load	I_g	1.5	1.45	1.4	A
Grid voltage, negative	$-V_g$	495	580	600	V
Grid dissipation	W_g	400	380	360	W
Grid resistor dissipation	W_{Rg}	740	840	840	W

Notes section:

1. 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, you must remember that the filament voltage-to-current ratio, as 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.

*See Figure 2

Figure 1 - Constant Current Characteristics

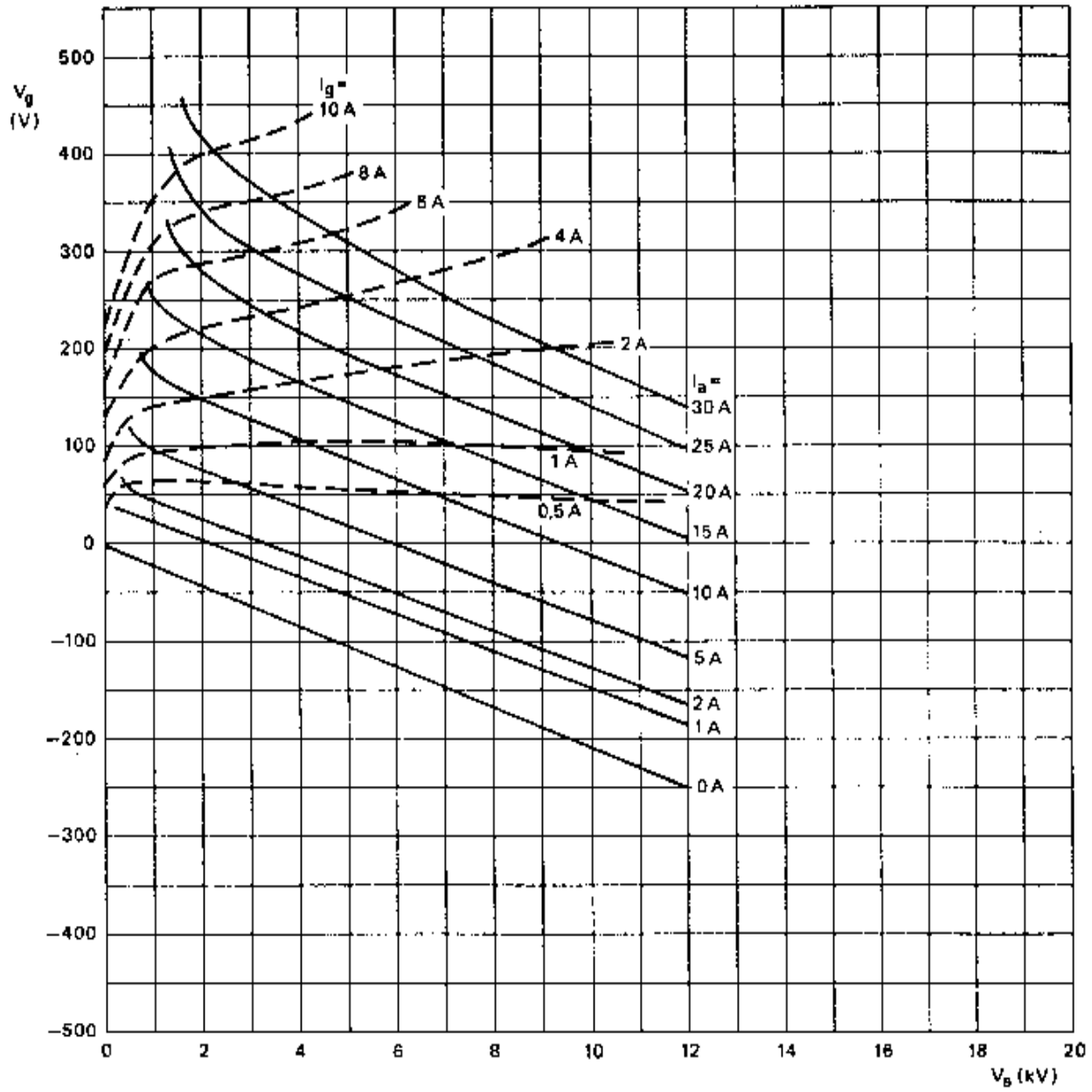


Figure 2 - Intermittent service. Limits of anode dissipation & cooling. (YD1185 only)

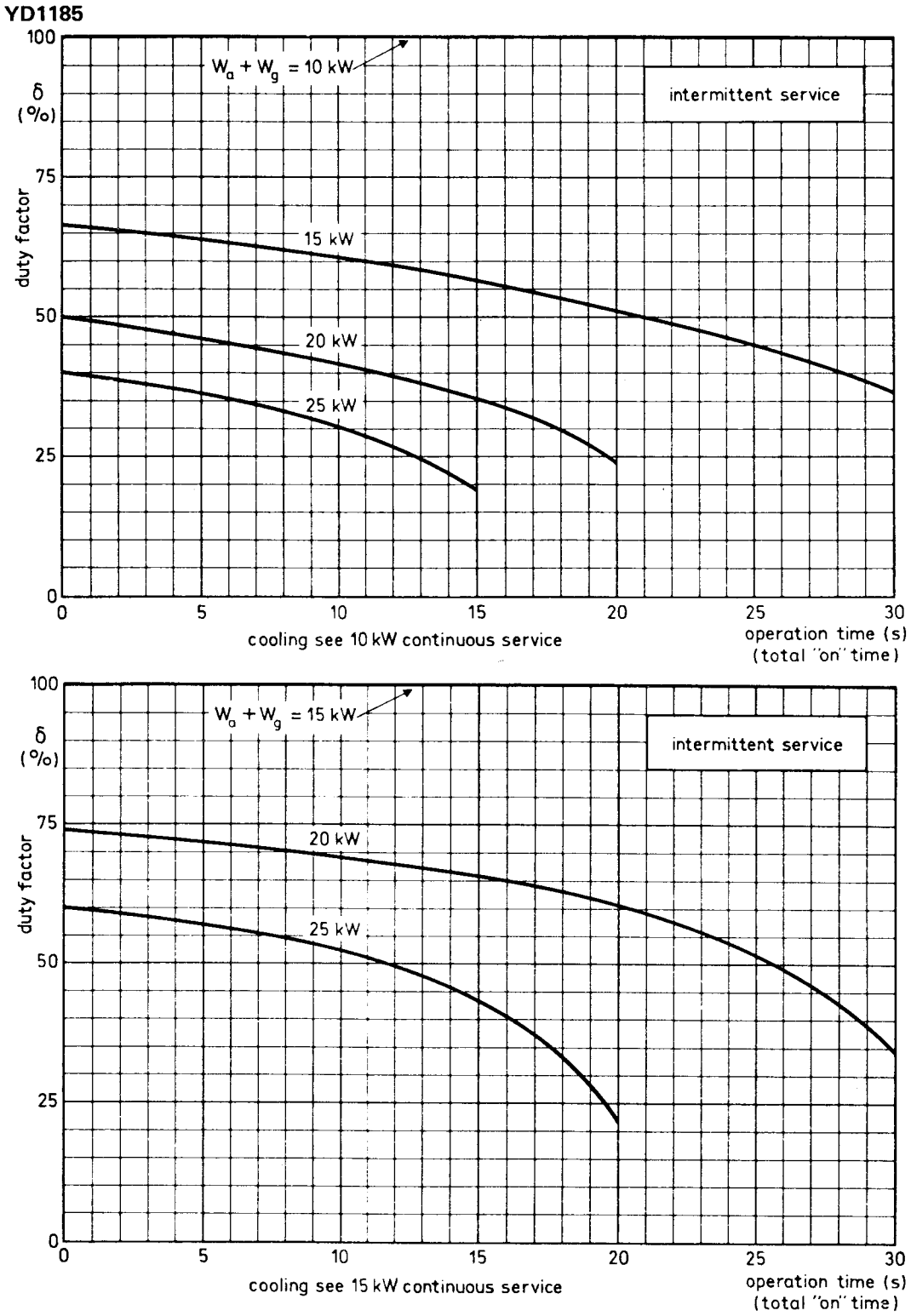
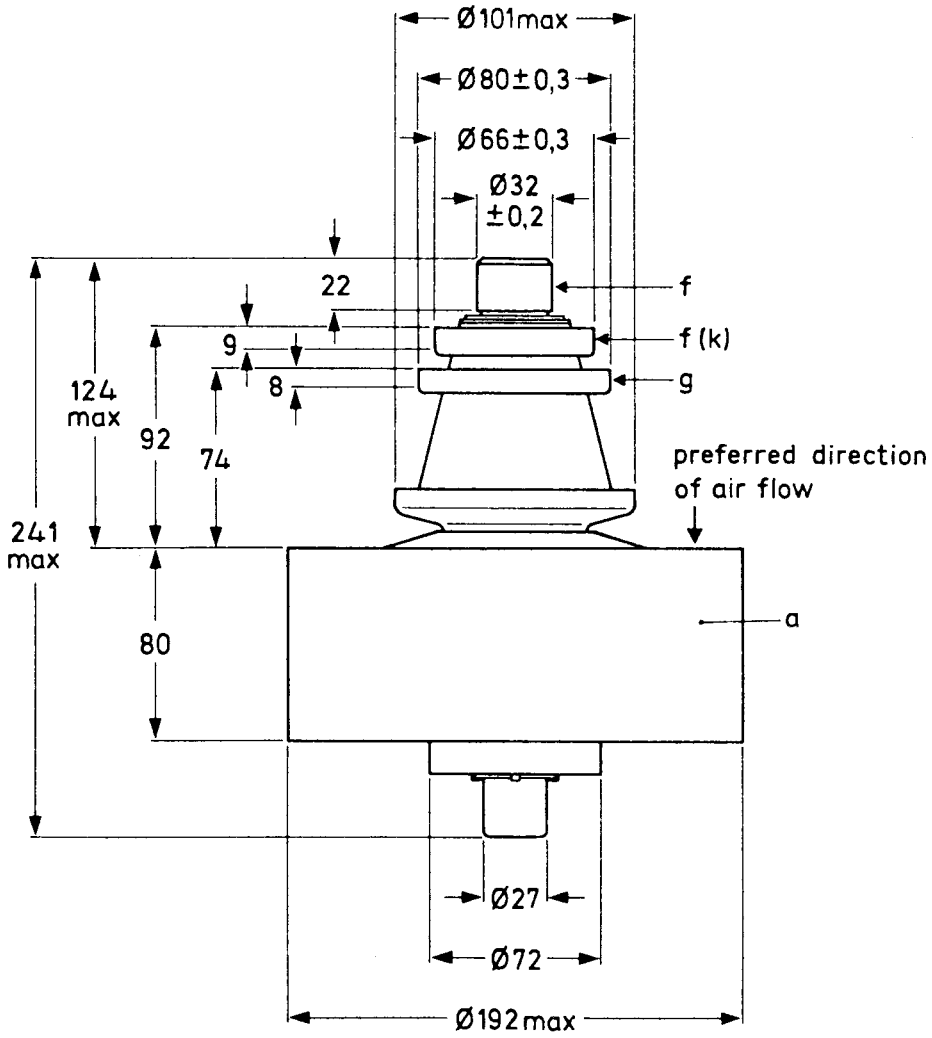


Figure 3 - Mechanical Outline
*Dimensions in mm



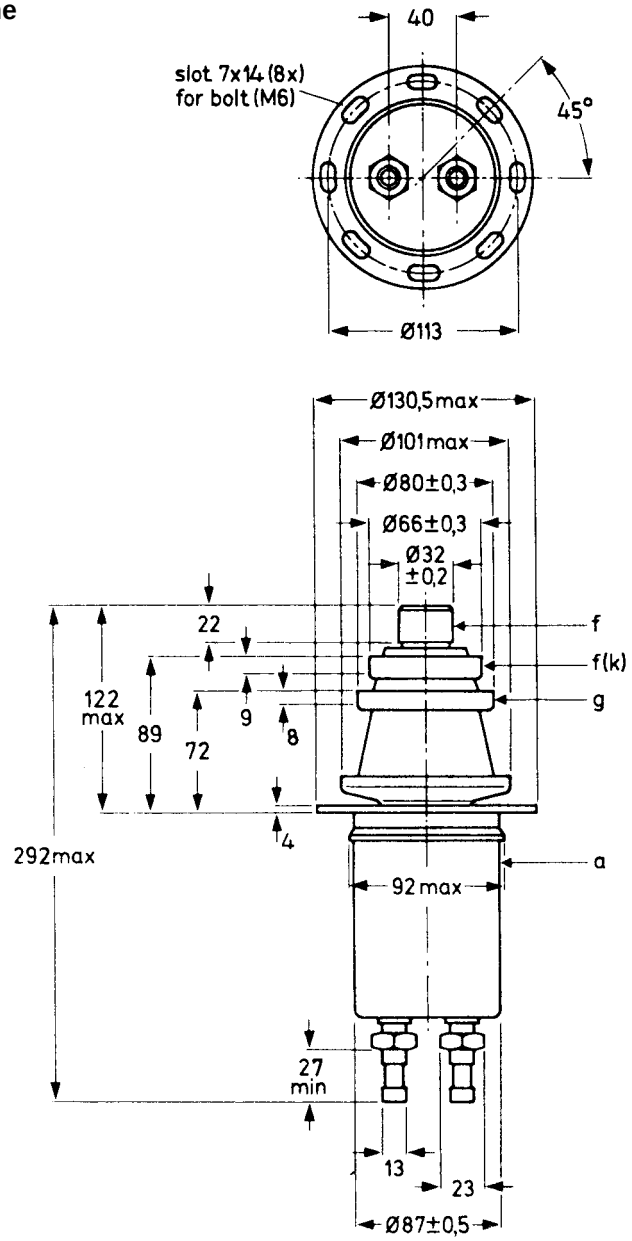
MECHANICAL DATA:
Net Mass: 12 kg
Mounting Position: Vertical, with anode up or down

ACCESSORIES:

Filament connector with cable		type	40708A
Filament/cathode connector with cable		type	40709A
Grid connector	f ≤ 4 MHz	type	40710
	f > 4 MHz	type	40711
Insulating Pedestal (YD1185 only)		type	40648

* Note: All dimensions for reference only.

Figure 4 - Mechanical Outline
*Dimensions in mm



MECHANICAL DATA:
Net Mass: 3.4 kg
Mounting Position: Vertical, with anode up or down.
Thread of water connections BSP 1/2 inch.
With the anode up, the inlet and outlet connections should be interchanged.

ACCESSORIES:

Filament connector with cable		type	40708A
Filament/cathode connector with cable		type	40709A
Grid connector	f ≤ 4 MHz	type	40710
	f > 4 MHz	type	40711

*Note: All dimensions for reference only.