

# Amperex

## YD1160/8731, YD1160FL YD1162/8733, YD1162FL RF Power Triodes

The YD1160/8731, YD1160FL, YD1162/8733 and YD1162FL are RF power triodes of metal-ceramic construction intended for use as industrial oscillators. The YD1160FL and YD1162FL have flying leads.

### GENERAL DATA

	YD1160/8731		YD1162/8733	
	YD1160FL		YD1162FL	
Electrical:				
Filament-Thoriated Tungsten				
Voltage <sup>Note 1</sup>	6.3		6.3	V
Current	66		66	A
Characteristics: measured at: V <sub>a</sub> = 2 kV, I <sub>a</sub> =1 A				
Amplification Factor	μ	20	20	
Transconductance	S	22	22	mA/V
Direct Interelectrode Capacities:				
Grid-Anode	C <sub>ag</sub>	14.5	14.5	pF
Grid-Filament	C <sub>gf</sub>	19	19	pF
Anode-Filament	C <sub>af</sub>	0.5	0.5	pF
Mechanical:				
	YD1160		YD1162	YD1162FL
	YD1160FL			
Overall Dimensions:				
Length	192		235	235 mm (max)
Diameter	122.8		131	100 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. A low velocity airflow may be required for cooling of the seals.

**YD1160/8731 & YD1160FL Table 1: Air cooling characteristics**

anode + grid dissipation $W_a + W_g$ kW	inlet temperature $T_i$ °C	rate of flow $q_{min}$ l/min	pressure drop delta P kPa*	outlet temperature $T_o$ °C
3	35	3.6	90	82
3	45	4.2	110	87

\* 1 Pa=0.1 mm H<sub>2</sub>O

**YD1162/8733 & YD1162FL 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 delta P kPa**	outlet temperature $T_o$ °C
3	20	2.2	18	42
	50	4.3	38	61
5	20	4.0	40	40
	50	8.0	140	60

Absolute max. water inlet temperature

$T_i$  max 50 °C

Absolute max water pressure

P max 600 kPa

\*\*100 kPa=1 at

**LIMITING VALUES** (Absolute maximum rating system)

Frequency	$f$	up to	85	150	MHz
Anode Voltage	$V_a$	max.	7.2	6.0	kV
Anode Current	$I_a$	max.	2.6	2.6	A
Anode input power	$W_{ia}$	max.	17	14.5	kW
Anode dissipation	$W_a$	max.	5	5	kW
Grid voltage	$-V_g$	max.	1	1	kV
Grid current, on load	$I_g$	max.	550	550	mA
Grid current, off load	$I_g$	max.	750	750	mA
Grid dissipation	$W_g$	max.	250	250	W
Grid circuit resistance	$R_g$	max.	20	20	k $\Omega$
Cathode current					
mean	$I_k$	max.	2.8	2.8	A
peak	$I_{kp}$	max.	15	15	A
Envelope Temperature	$T_{env}$	max.	240	240	$^{\circ}\text{C}$

**RF CLASS C OSCILLATOR FOR INDUSTRIAL USE  
OPERATING CONDITIONS**

Frequency	$f$	150	50	27.12	MHz
Filament voltage	$V_f$	5.8	6.3	6.3	V
Oscillator output power (Wo-Wfeedb)	$W_{osc}$	7.15	9.85	11.5	kW
Anode Voltage	$V_a$	5.5	6.5	6.5	kV
Anode Current	$I_a$	1.75	2.0	2.35	A
Anode input power	$W_{ia}$	9.6	13	15.3	kW
Anode dissipation	$W_a$	2.1	2.8	3.3	kW
Anode output power	$W_o$	7.5	10.2	12	kW
Anode efficiency	$n_a$	78	78	78	%
Oscillator efficiency	$n_{osc}$	75	75	75	%
Feedback ratio	$V_{gp}/V_{ap}$	14	15	16	%
Grid resistor	$R_g$	0.9	1.2	0.92	k $\Omega$
Grid current, on load	$I_g$	500	450	600	mA
Grid voltage, negative	$-V_g$	450	550	550	V
Grid dissipation	$W_g$	110	105	180	W
Grid resistor dissipation	$W_{rg}$	225	245	330	W

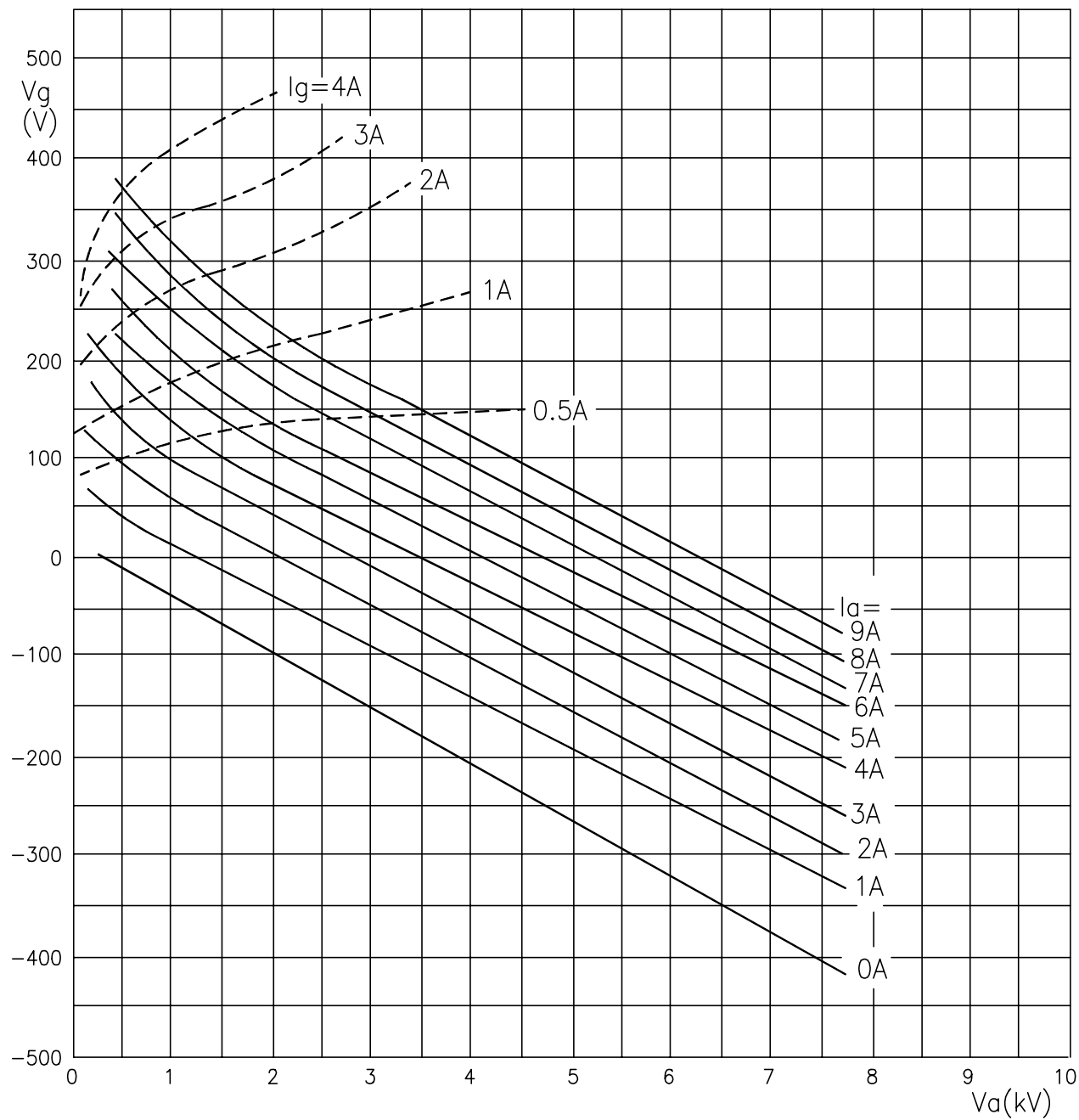
## Notes section:

- Heating Filament Voltage ( $f=150$  MHz)  $V_f$  5.8 V  
Filament Voltage ( $f<150$  MHz)  $V_f$  6.3 V

The filament is designed to accept temporary fluctuations of +5% and -10%

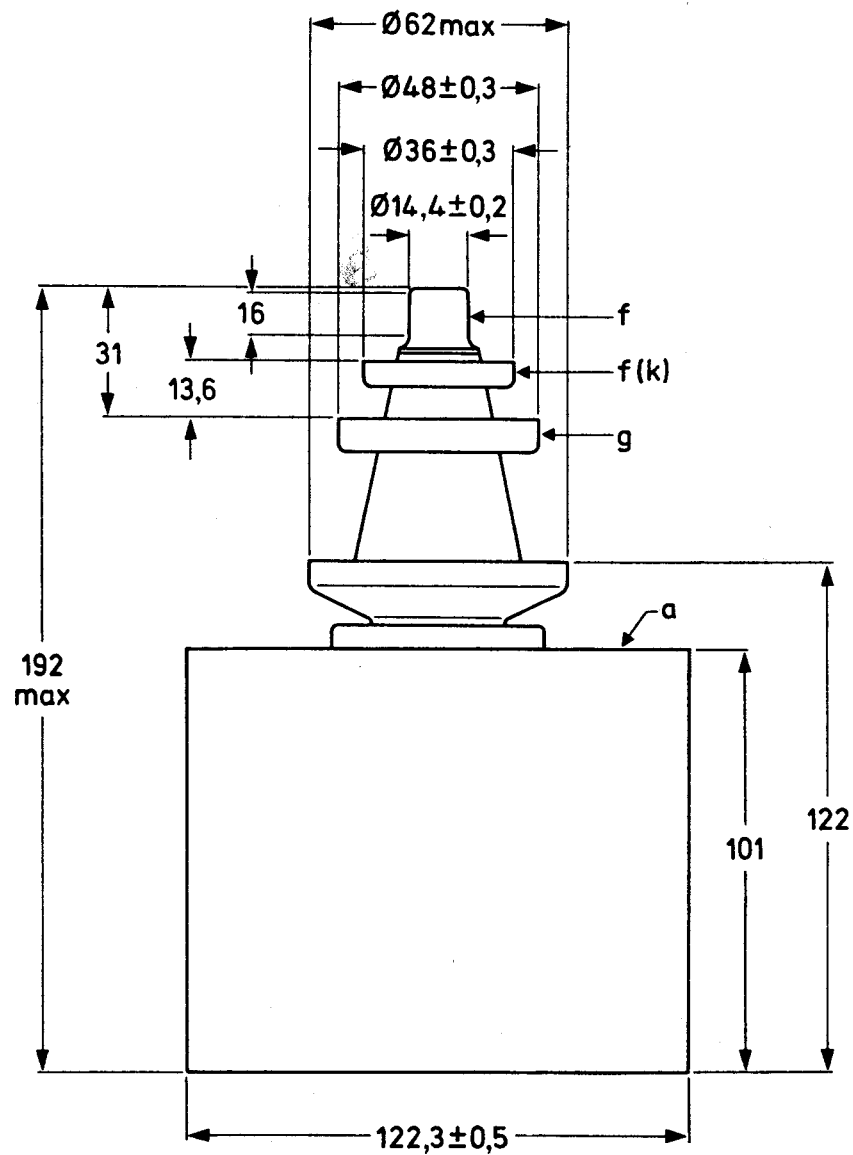
It is extremely important that the filament be properly decoupled. This should be done so that the resonance of the circuit formed by the filament and the decoupling elements remain below the fundamental oscillator frequency. In grounded-grid circuits this resonance should be below the grid-cathode resonance.

Figure 1 - Constant Current Characteristics



**Figure 2 - Mechanical Outline**

\*Dimensions in mm

**MECHANICAL DATA:**

Net Mass: 3.5 kg

Mounting Position: Vertical with anode up or down

**ACCESSORIES:**

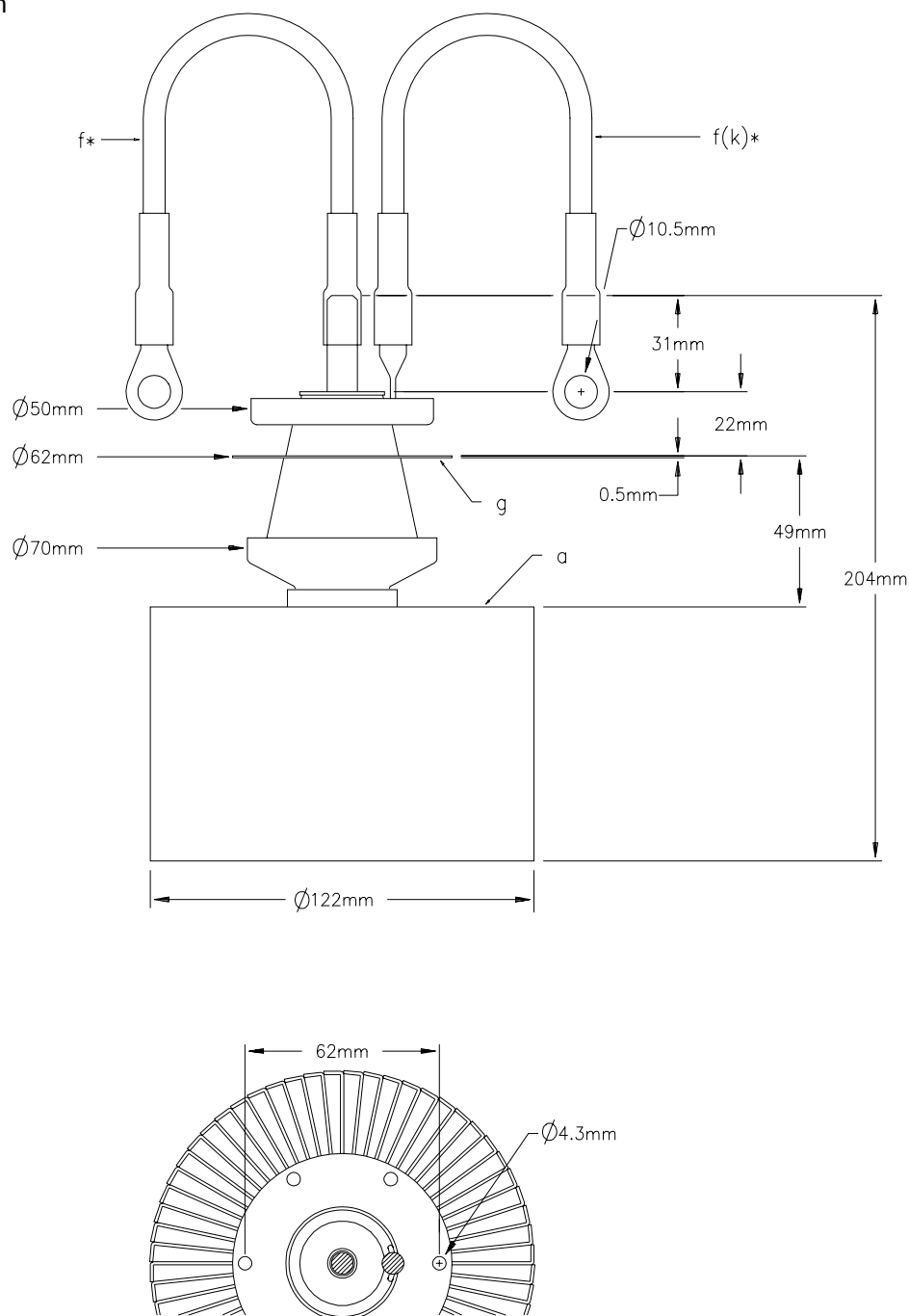
Filament Connector	Type 40688
Filament/Cathode Connector	Type 40689
Grid Connector	Type 40686
Insulating Pedestal	Type 40630

\*Note: All dimensions for reference only.

## YD1160FL

**Figure 3 - Mechanical Outline**

\*Dimensions in mm



### MECHANICAL DATA:

Net Mass: 3.6 kg

Mounting Position:

Vertical with anode up or down

Length of filament connections  $f$  and  $f(k)$ : 200 mm (approx.)

### ACCESSORIES:

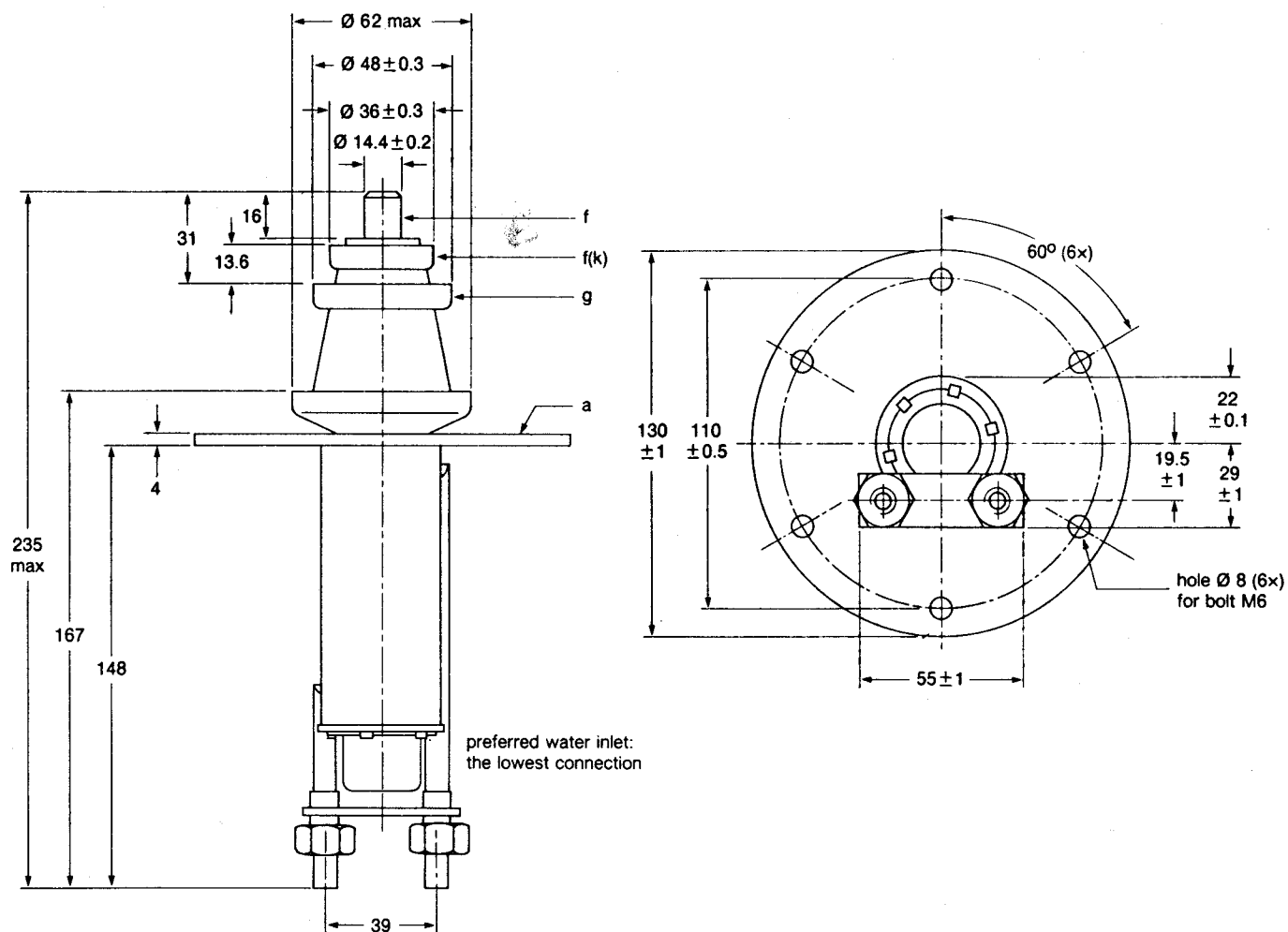
Insulating Pedestal

40630

\*Note: All dimensions for reference only.

**Figure 4 - Mechanical Outline**

\*Dimensions in mm

**MECHANICAL DATA:**

Net Mass: 1.6 kg

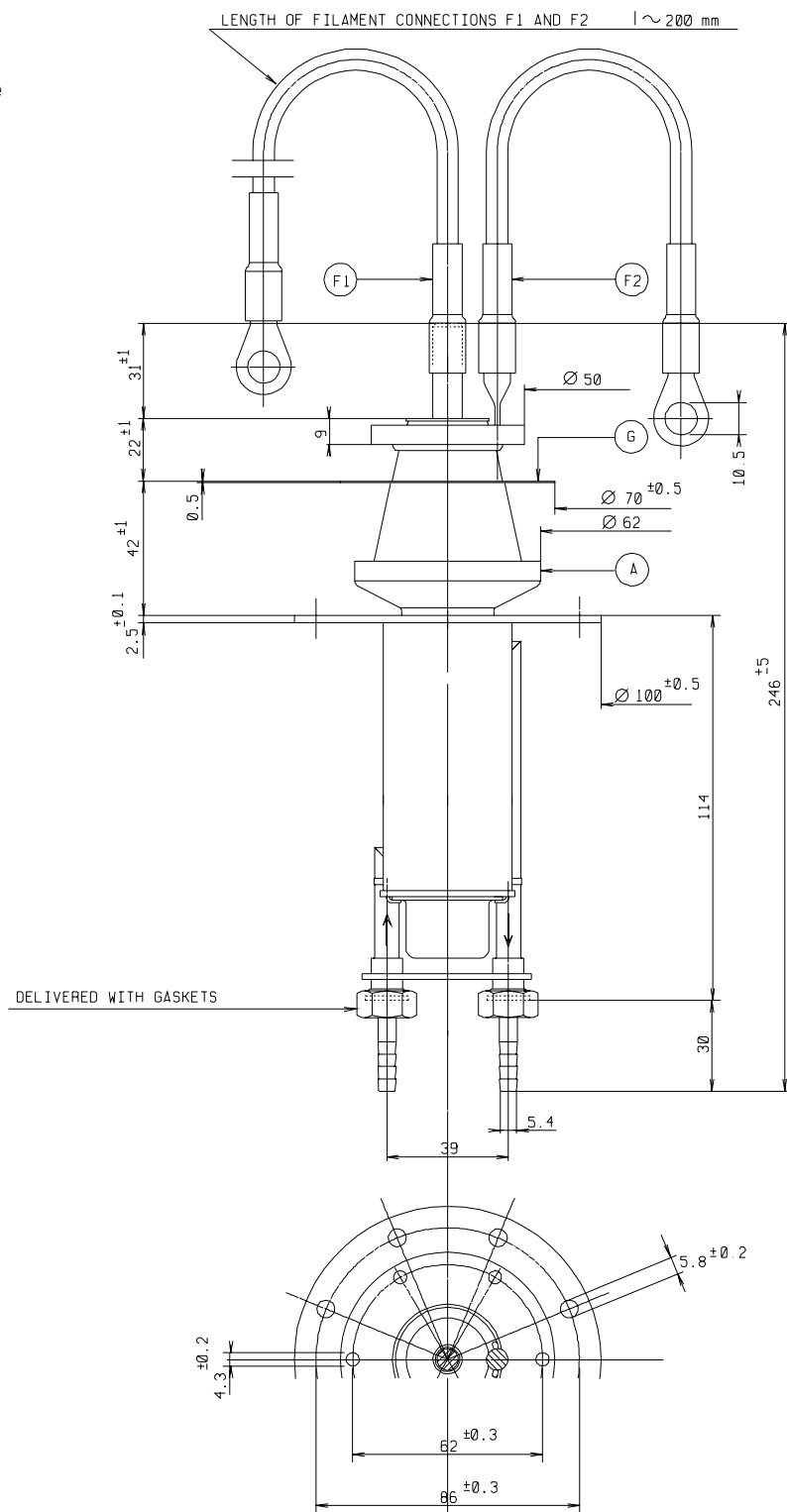
Mounting Position: Vertical with anode down

\*Note: All dimensions for reference only.

**YD1162FL**

### Figure 5 - Mechanical Outline

\*Dimensions in mm



**MECHANICAL DATA:**

Net Mass: 1.7 kg

Mounting Position:

Vertical with anode down

Length of filament connections  $f$  and  $f(k)$ : 200 mm (approx.)

\*Note: All dimensions for reference only.

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