

TENTATIVE DATA

QUICK REFERENCE DATA

External anode triode, intended for use as Class 'C' industrial oscillator.

The YD1160 is forced-air cooled.

The YD1161 is water cooled by means of a separate jacket.

The YD1162 has an integral helical water cooler.

f	27.12	160	Mc/s
P _{out} (less P _{drive})	7.65	7.15	kW
f max. at full input	160		Mc/s
V _a max.	7.0		kV
p _a max.	5.0		kW

Unless otherwise shown, data is applicable to all types

To be read in conjunction with

GENERAL OPERATIONAL RECOMMENDATIONS - TRANSMITTING VALVES

INDUSTRIAL OSCILLATOR, CLASS 'C'

OPERATING CONDITIONS

f	27.12	27.12	160*	Mc/s
P _{out}	7.5	8.0	7.5	kW
P _{out} (less P _{drive})	7.15	7.65	7.15	kW
P _{load}	6.1	6.5	6.4	kW
Duty factor	1.0	1.0	1.0	
η_a	83	80	75	%
V _a	6.0	5.0	5.0	kV
I _a	1.5	2.0	2.0	A
-V _g	615	490	480	V
I _g on load	410	490	480	mA
I _g off load	540	720	700	mA
R _{g-f}	1.5	1.0	1.0	k Ω
Feedback ratio $v_{in(pk)}/v_{a(pk)}$	0.15	0.15	0.15	
P _{drive}	350	350	350	W
p _a	1.6	2.0	2.5	kW
p _g	100	110	100	W
V _f	6.3	6.3	5.8	V

*In typical cavity circuit.

RATINGS (ABSOLUTE MAXIMUM SYSTEM)

f max. at full input	160	Mc/s
V_a max.	7.0	kV
$-V_g$ max.	1.0	kV
I_g max.	750	mA
I_k max.	2.8	A
$i_{k(pk)}$ max.	15	A
p_a max.	5.0	kW
p_g max.	250	W
R_{g-f} max.	20	k Ω

CATHODE

Directly heated, thoriated tungsten

$*V_f$	6.3	V
I_f	66	A

*It is recommended that the filament voltage be reduced to 5.8V at 160Mc/s operating frequency.

CAPACITANCES

c_{a-g}	19	pF
c_{out}	0.5	pF
c_{in}	16	pF

CHARACTERISTICS (measured at $V_a = 2.0kV$, $I_a = 1.0A$)

g_m	20	mA/V
μ	20	

MOUNTING POSITION

Vertical, with base up or down

COOLING

Maximum temperatures

Anode seal	220	$^{\circ}C$
Grid seal	220	$^{\circ}C$
Filament seals	220	$^{\circ}C$
Radiator core	220	$^{\circ}C$

V.H.F. INDUSTRIAL TRIODE

YD1160
YD1161
YD1162

PHYSICAL DATA

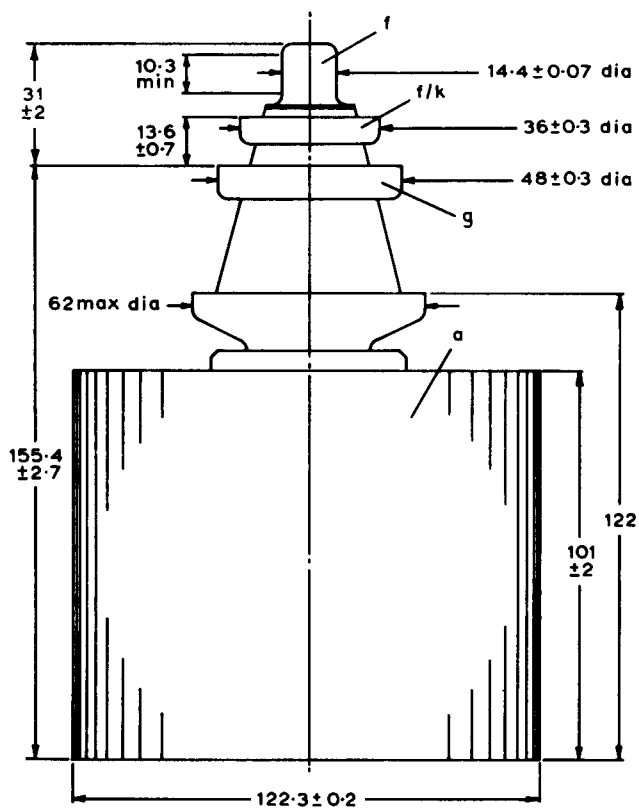
	YD1160	YD1161	YD1162	
Weight of valve	8.5	1.5	2.3	lb
	3.9	0.66	1.03	kg
Weight of insulating pedestal	4.6	-	-	lb
	2.1	-	-	kg
Weight of insulating pedestal plus carton	6.8	-	-	lb
	3.1	-	-	kg
Weight of water jacket	-	1.6	-	lb
	-	0.73	-	kg

ACCESSORIES

Filament connector	40688
Filament/cathode connector ($f < 30\text{Mc/s}$)	40689
Grid connector ($f < 30\text{Mc/s}$)	40686
Insulating pedestal x 1 (YD1160)	40630
Water jacket x 1 (YD1161)	K726

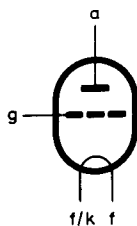


OUTLINE DRAWING OF YD1160

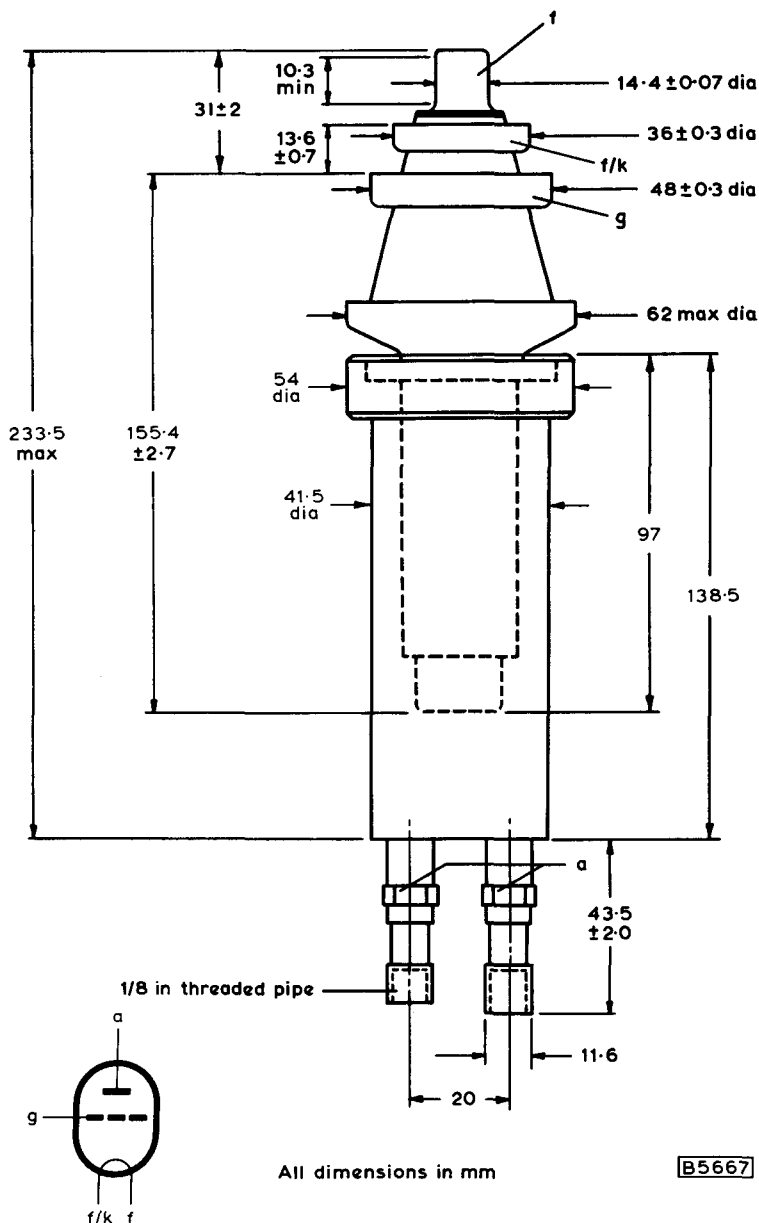


All dimensions in mm

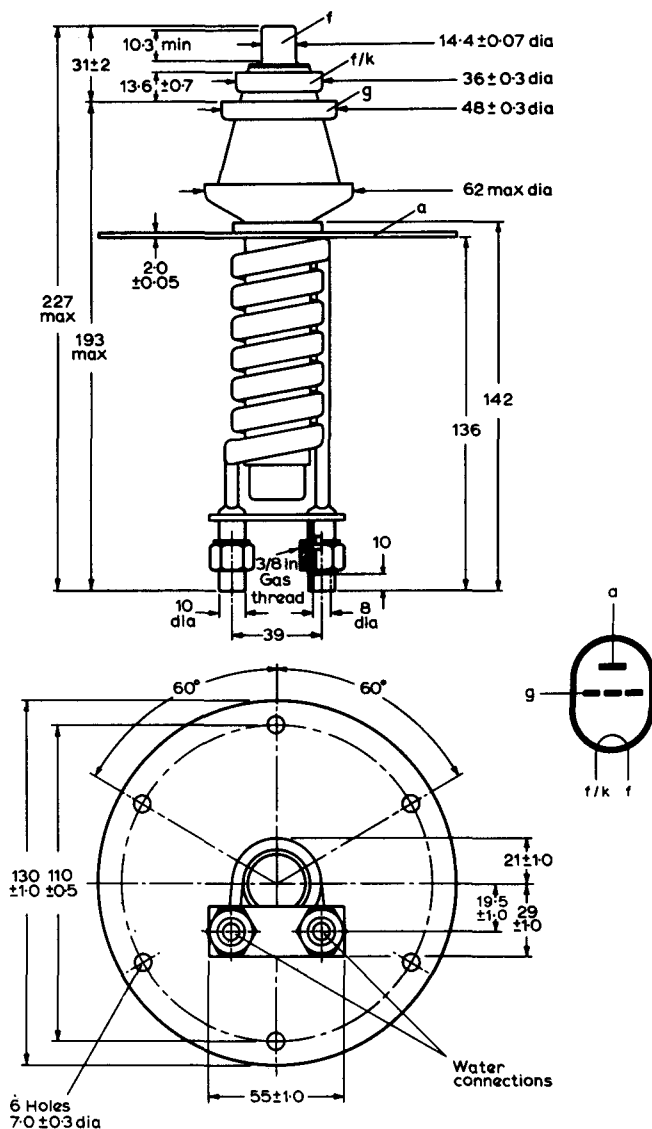
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OUTLINE DRAWING OF YD1161 MOUNTED IN WATER JACKET K726

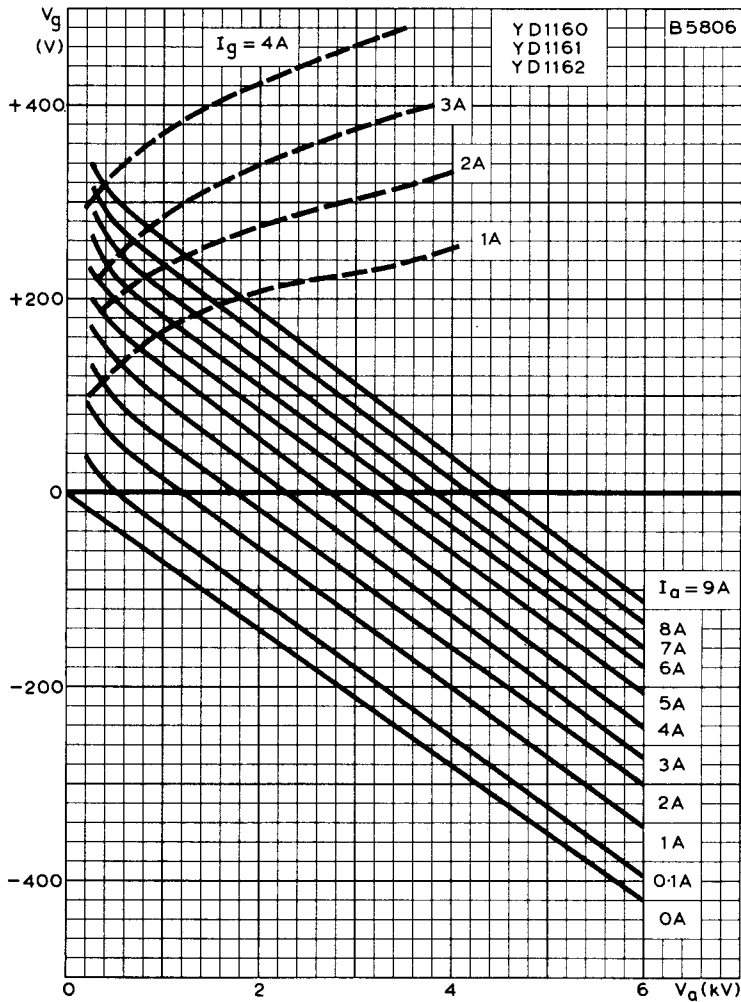


OUTLINE DRAWING OF YD1162

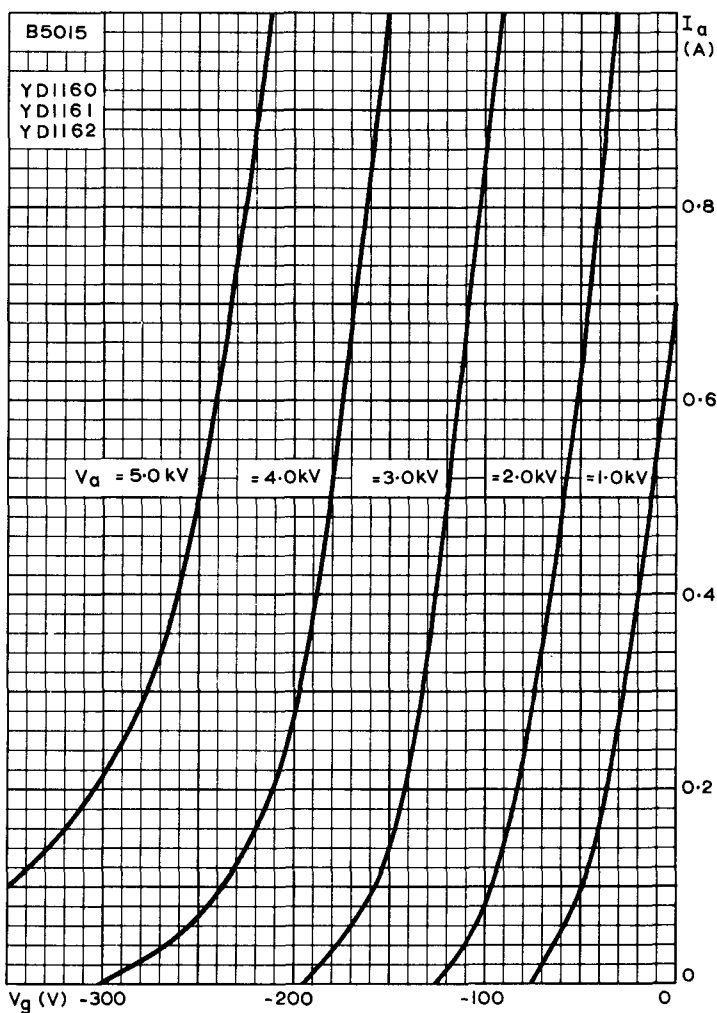


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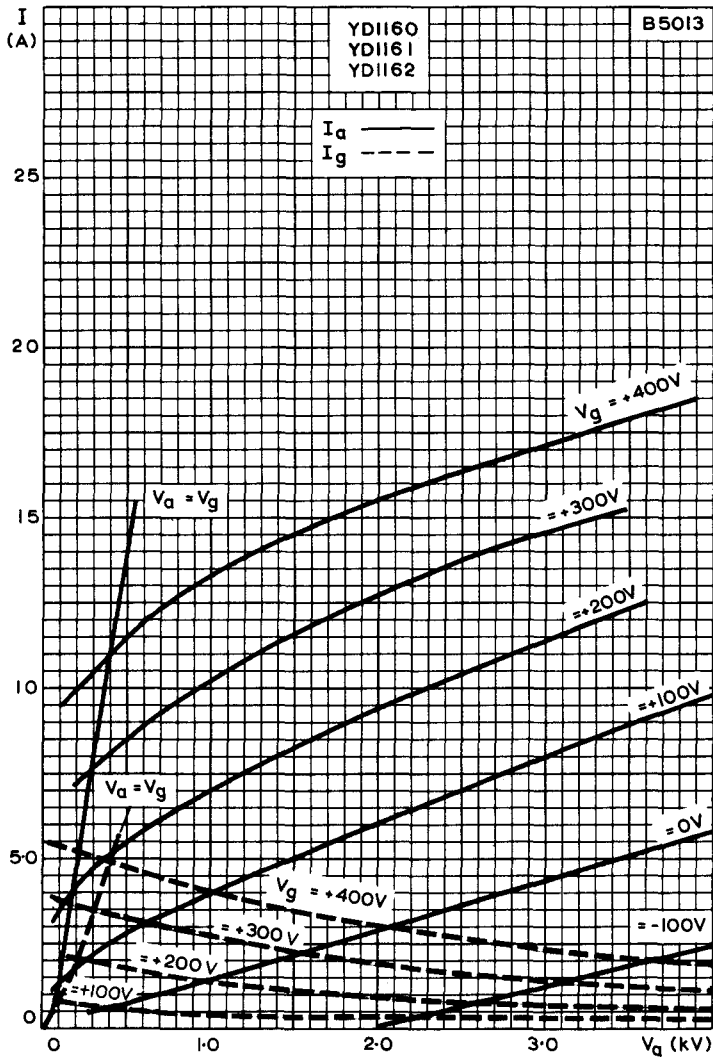
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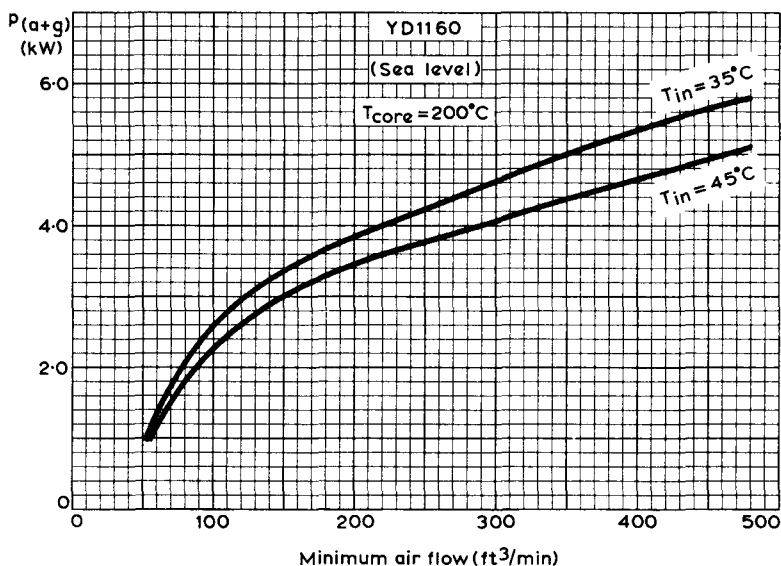
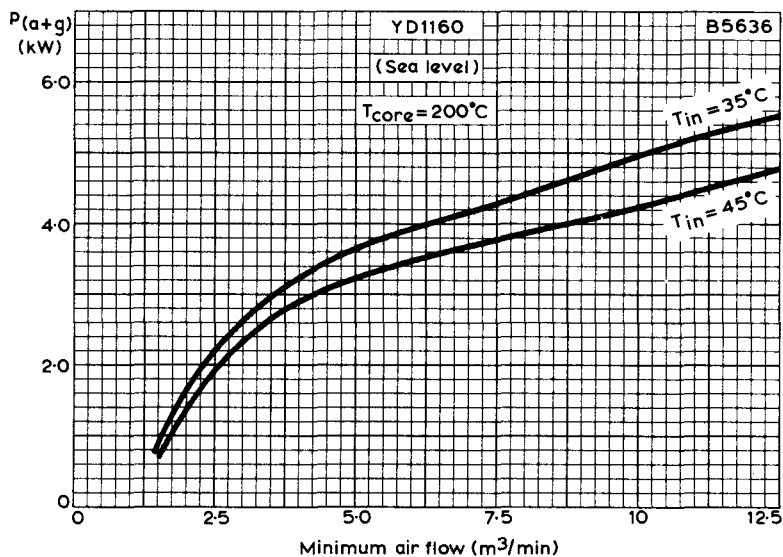
CONSTANT CURRENT CHARACTERISTICS



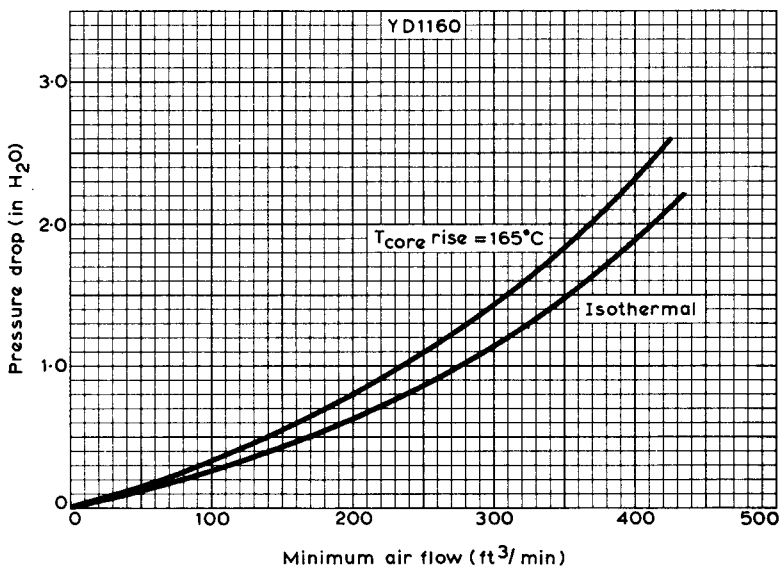
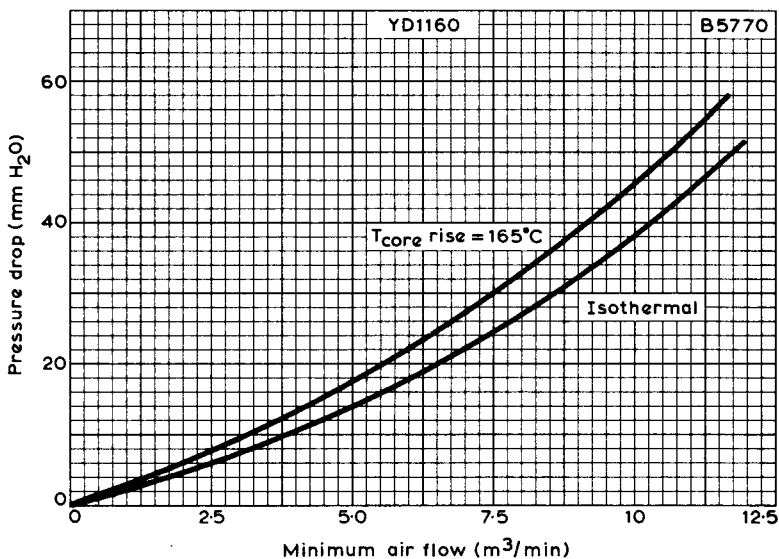
ANODE CURRENT PLOTTED AGAINST GRID VOLTAGE
WITH ANODE VOLTAGE AS PARAMETER



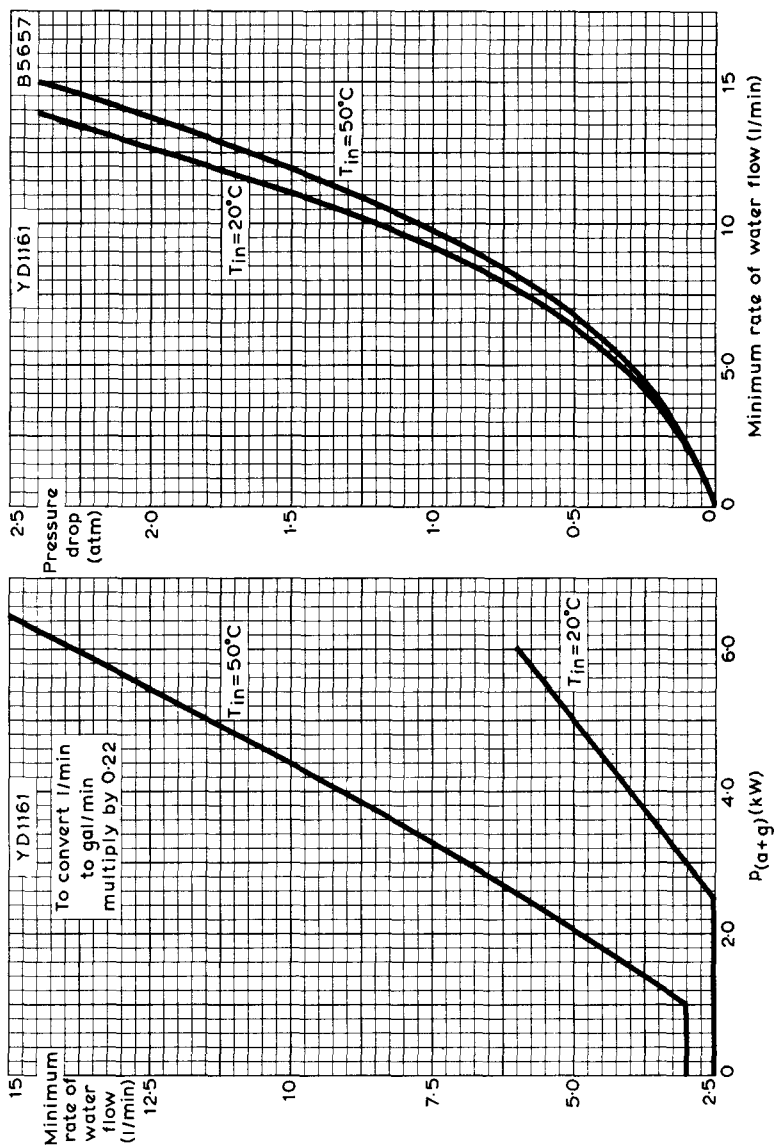
ANODE AND GRID CURRENTS PLOTTED AGAINST ANODE VOLTAGE
WITH GRID VOLTAGE AS PARAMETER



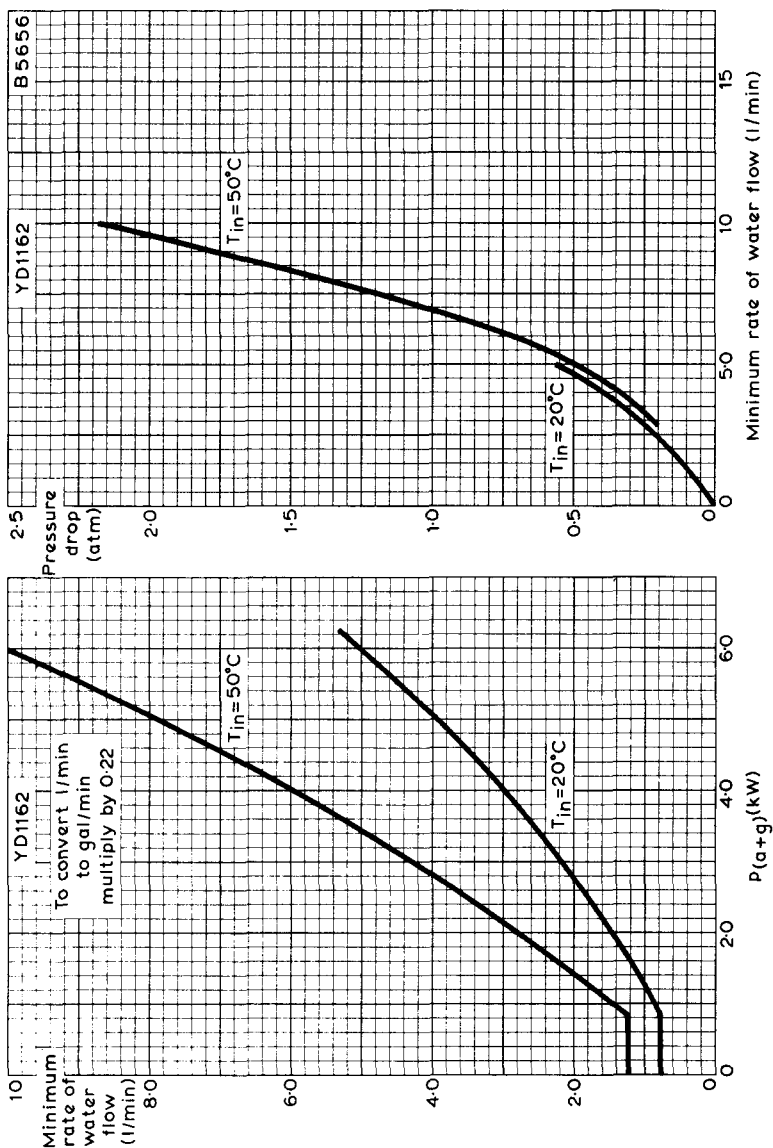
MINIMUM COOLING REQUIREMENTS WITH AIR INLET TEMPERATURES
OF 35 AND 45°C AT SEA LEVEL, RADIATOR CORE TEMPERATURE = 200°C



PRESSURE DROP PLOTTED AGAINST MINIMUM AIR FLOW FOR AN
ISOTHERMAL CONDITION AND FOR A RISE IN CORE TEMPERATURE
OVER INCOMING AIR OF 165°C



MINIMUM RATE OF WATER FLOW PLOTTED AGAINST ANODE AND
GRID DISSIPATION FOR $T_{in} = 20$ AND 50°C
PRESSURE DROP PLOTTED AGAINST MINIMUM RATE OF WATER
FLOW FOR $T_{in} = 20$ AND 50°C



MINIMUM RATE OF WATER FLOW PLOTTED AGAINST ANODE AND GRID DISSIPATION FOR $T_{in} = 20$ AND $50^{\circ}C$
PRESSURE DROP PLOTTED AGAINST MINIMUM RATE OF WATER FLOW FOR $T_{in} = 20$ AND $50^{\circ}C$

QUICK REFERENCE DATA

External anode triode, ceramic-metal construction, intended for use as class 'C' industrial oscillator.

The YD1160 is forced-air cooled.

The YD1161 is water cooled by means of a separate jacket.

The YD1162 has an integral helical water cooler.

f	27.12	150	MHz
P _{out} (less P _{drive})	8.8	7.15	kW
f max.	150		MHz
V _a max.	7.2		kV
p _a max.	5.0		kW

Unless otherwise shown, data is applicable to all types

To be read in conjunction with

GENERAL OPERATIONAL RECOMMENDATIONS - TRANSMITTING VALVES INDUSTRIAL OSCILLATOR, CLASS 'C'

f	27.12	27.12	150	MHz
P _{out}	7.9	9.2	7.5	kW
P _{out} (less P _{drive})	7.5	8.8	7.15	kW
P _{load}	6.4	7.5	6.4*	kW
Duty factor	1.0	1.0	1.0	
η_a	82.5	78.5	75.5	%
V _a	6.0	6.5	5.0	kV
I _a	1.6	1.8	2.0	A
-V _g	615	690	480	V
I _g on load	480	430	480	mA
I _g off load	600	580	650	mA
R _{g-f}	1.3	1.6	1.0	k Ω
Feedback ratio $v_{in(pk)}/v_{a(pk)}$	0.15	0.16	0.15	
P _{drive}	400	400	350	W
p _a	1.7	2.5	2.45	kW
p _g	120	110	100	W
V _f	6.3	6.3	5.8	V

*In typical cavity circuit.

RATINGS (ABSOLUTE MAXIMUM SYSTEM)

f	≤85	≤150	MHz
V _a max.	7.2	6.0	kV
P _{in} max.	12.5	11.0	kW
-V _g max.	1.0	1.0	kV
I _g max. on load	550	550	mA
off load	750	750	mA
I _k max.	2.8	2.8	A
i _{k(pk)} max.	15	15	A
p _a max.	5.0	5.0	kW
p _g max.	250	250	W
R _{g-f} max.	20	20	kΩ

CATHODE

Directly heated, thoriated tungsten

*V _f	6.3	V
I _f	66	A

*It is recommended that the filament voltage be reduced to 5.8V at 150MHz operating frequency.

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

CAPACITANCES

c _{a-g}	19	pF
c _{a-f}	0.5	pF
c _{g-f}	16	pF

CHARACTERISTICS (measured at V_a = 2.0kV, I_a = 1.0A)

g _m	22	mA/V
μ	20	

MOUNTING POSITION - YD1160, YD1162
- YD1161

Vertical, anode up or down
Vertical, anode down

COOLING

Maximum temperature of ceramic-metal seals 220 °C

YD1160 - Forced air cooled. See curves on pages C4 and C5

YD1161 - Anode - water cooled using jacket type K713

Seals - low velocity air flow may be required

See curves on page C6

YD1162 - Anode - water cooled with integral helical cooler

Seals - low velocity air flow may be required

See curves on page C7

V.H.F. INDUSTRIAL TRIODES

YD1160
YD1161
YD1162

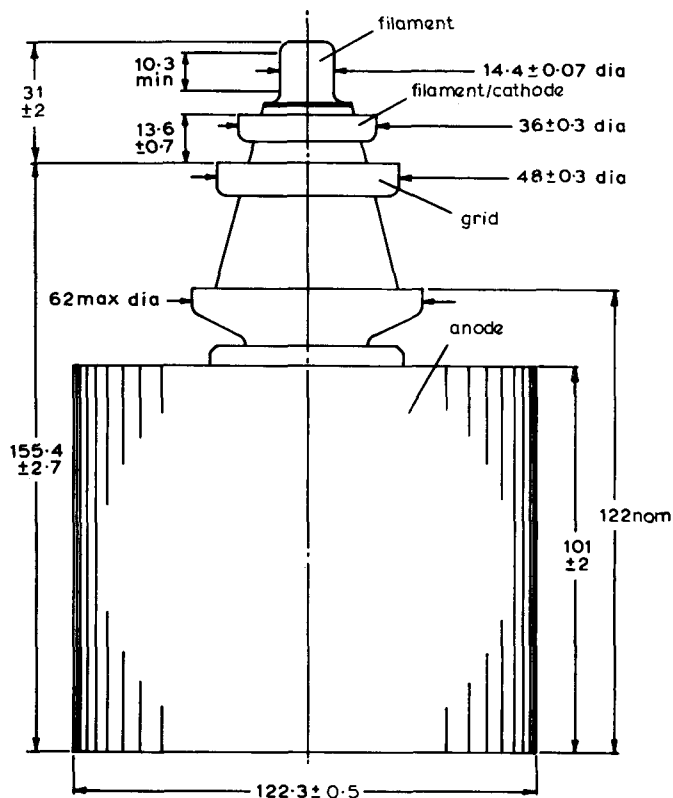
PHYSICAL DATA

	YD1160	YD1161	YD1162	
Weight of valve	8.5	1.5	2.3	lb
	3.9	0.66	1.03	kg
Weight of insulating pedestal	4.6	-	-	lb
	2.1	-	-	kg
Weight of insulating pedestal plus carton	6.8	-	-	lb
	3.1	-	-	kg
Weight of water jacket	-	1.6	-	lb
	-	0.73	-	kg

ACCESSORIES

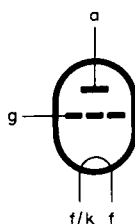
Filament connector	40688
Filament/cathode connector ($f < 30\text{MHz}$)	40689
Grid connector ($f \leq 30\text{MHz}$)	40686
($f > 30\text{MHz}$)	40687 ←
Insulating pedestal $\times 1$ (YD1160)	40630
Water jacket $\times 1$ (YD1161)	K726

OUTLINE DRAWING OF YD1160



All dimensions in mm

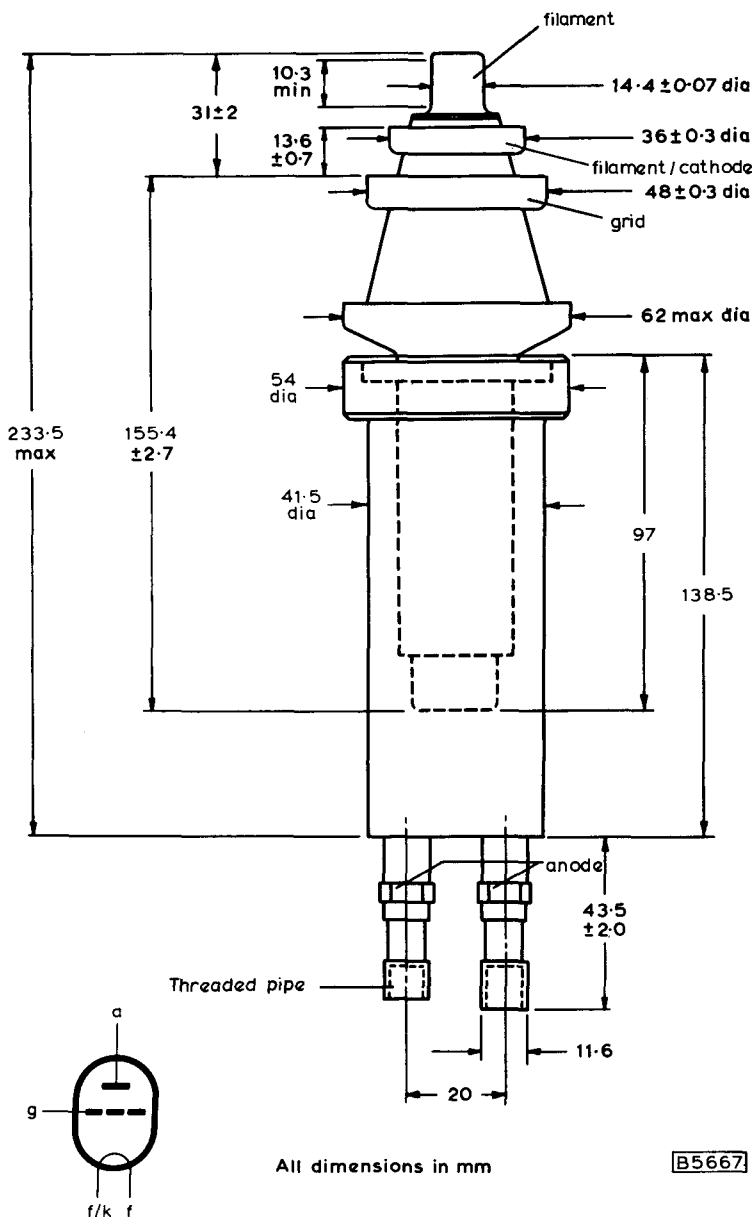
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V.H.F. INDUSTRIAL TRIODES

YD1160
YD1161
YD1162

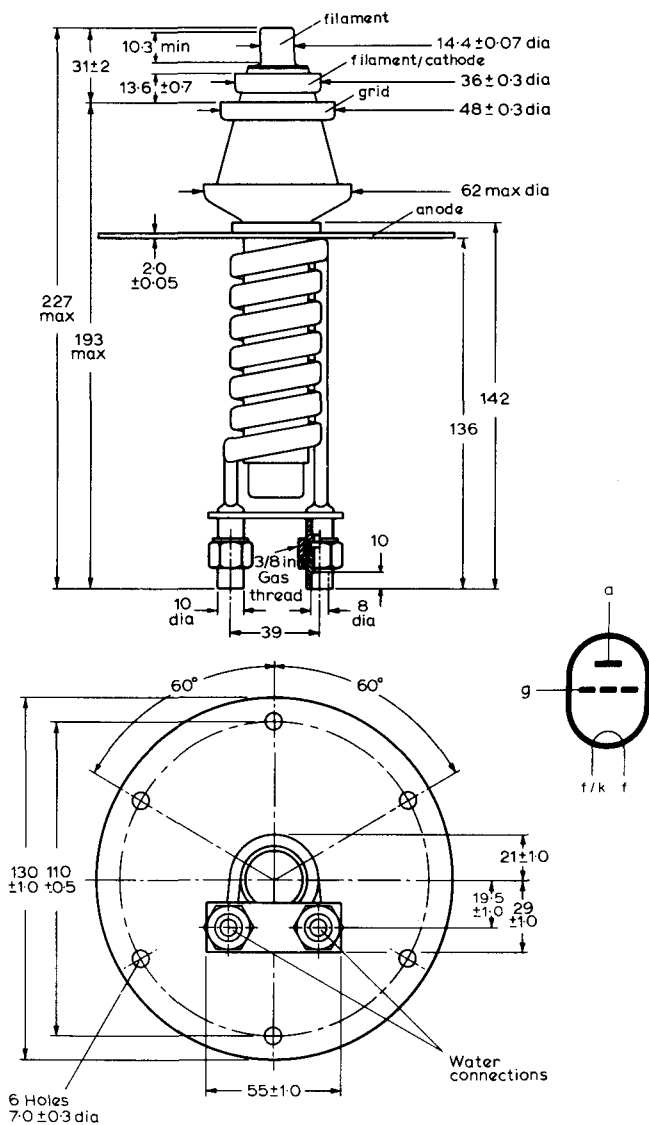
OUTLINE DRAWING OF YD1161 MOUNTED IN WATER JACKET K726



All dimensions in mm

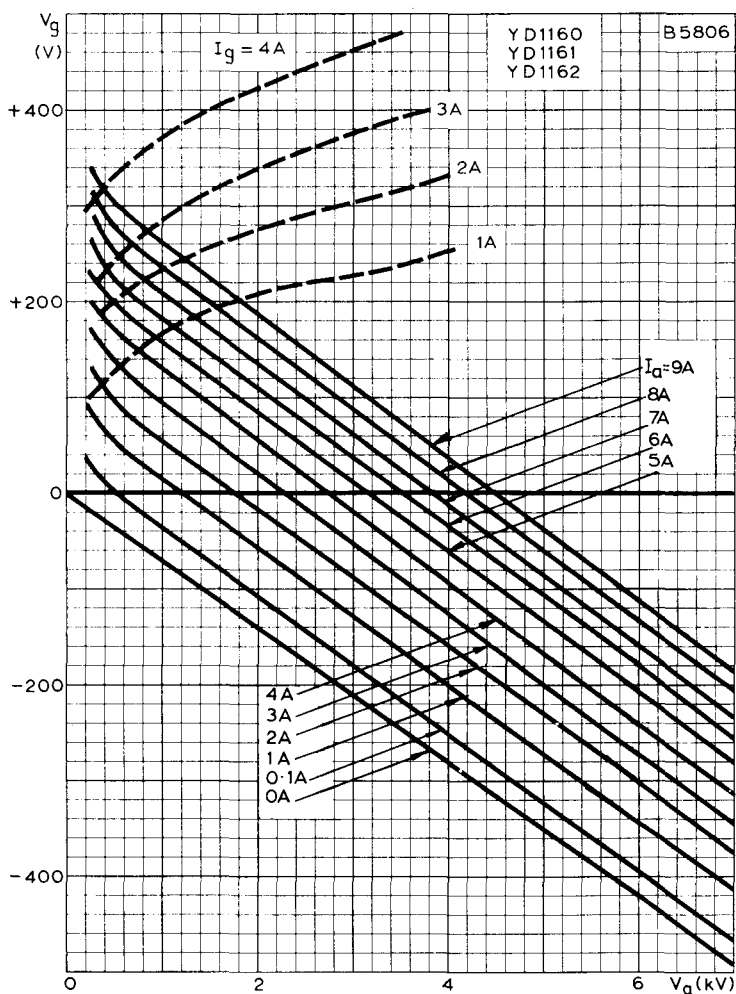
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OUTLINE DRAWING OF YD1162

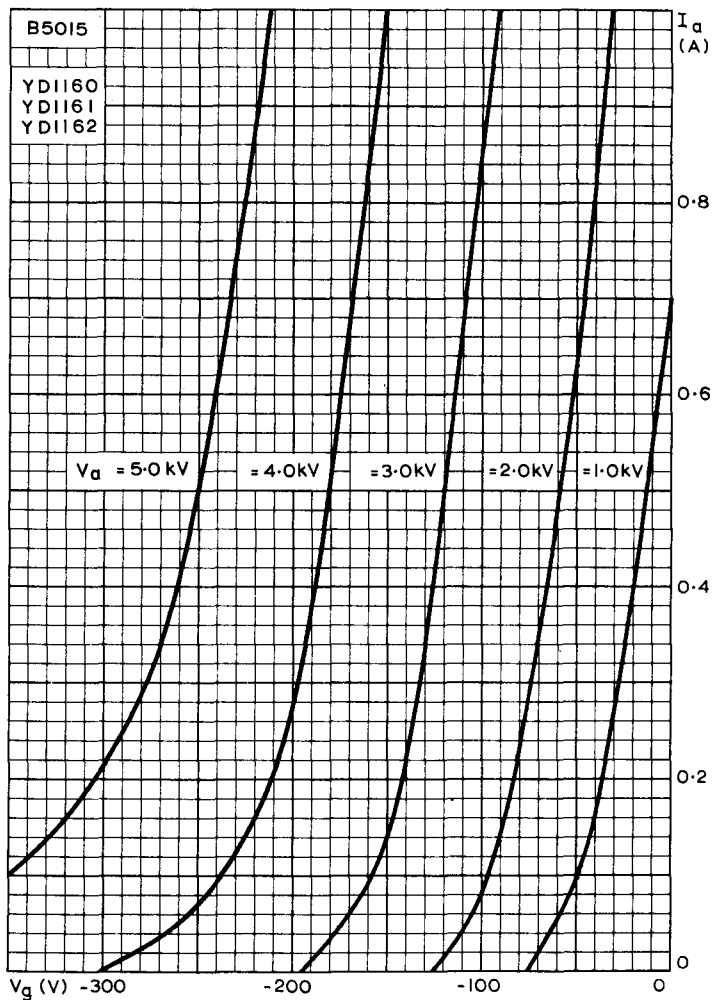


All dimensions in mm

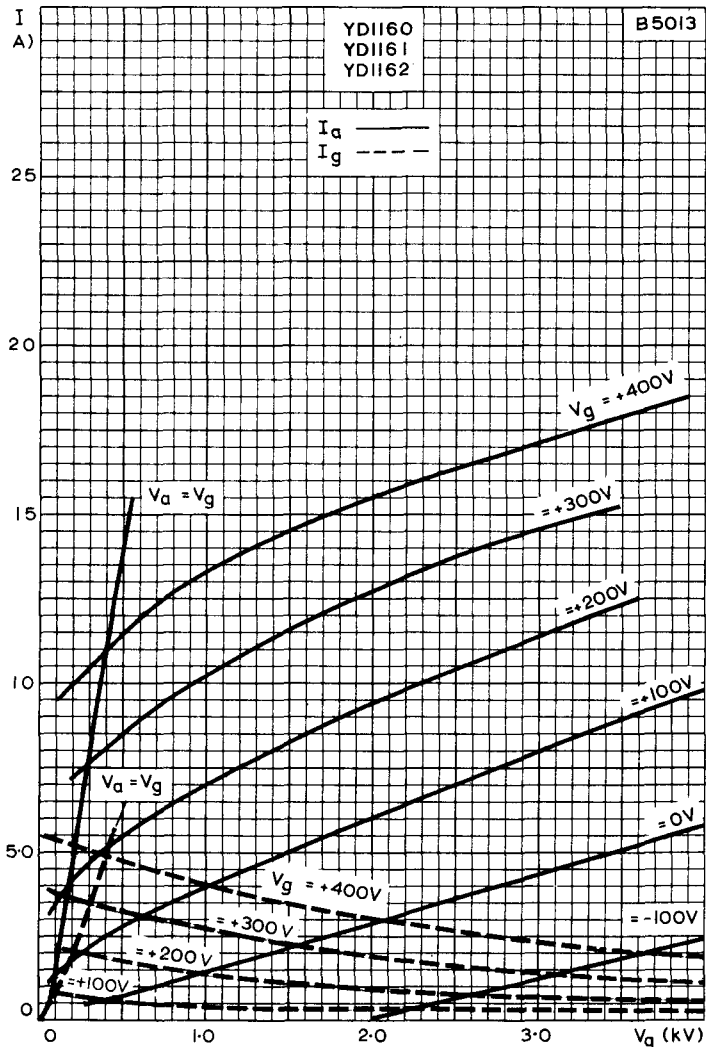
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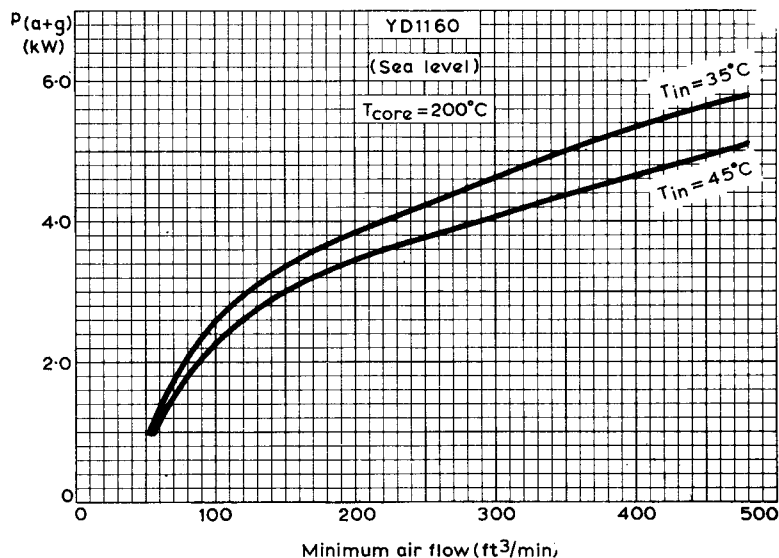
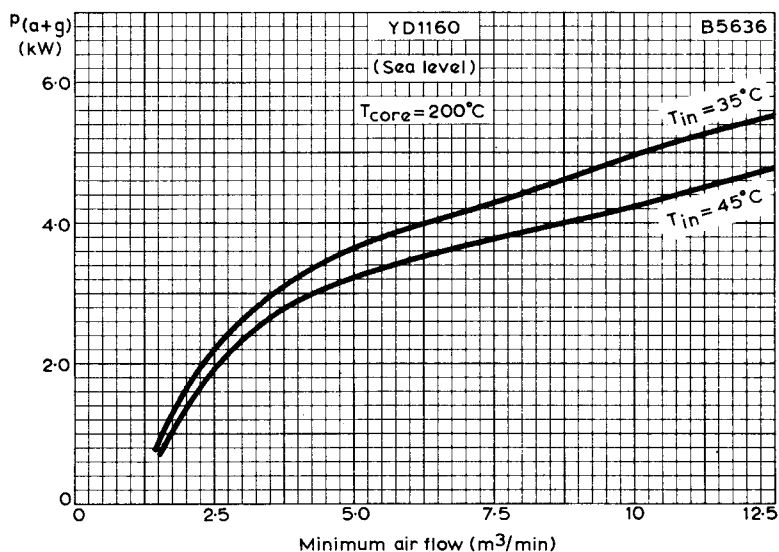
CONSTANT CURRENT CHARACTERISTICS



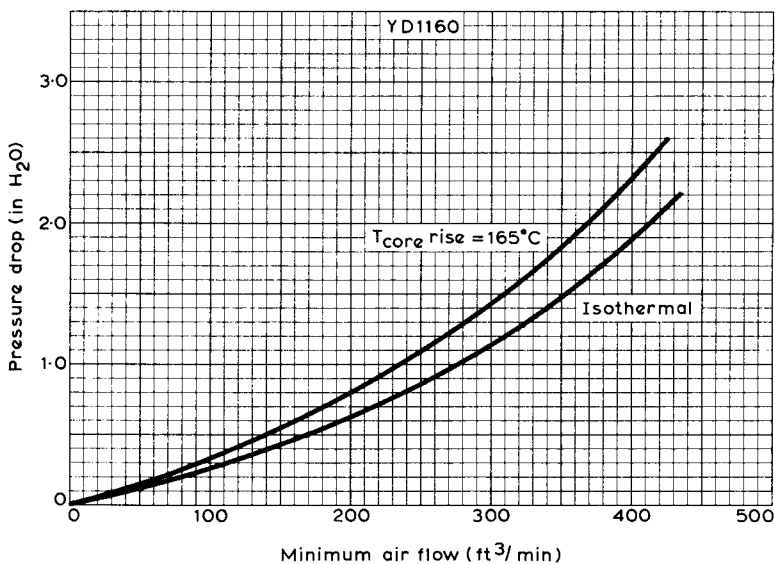
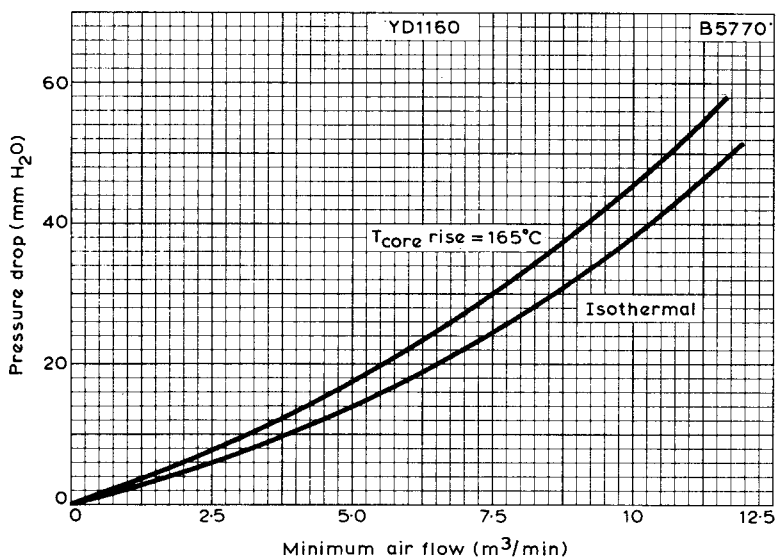
ANODE CURRENT PLOTTED AGAINST GRID VOLTAGE
WITH ANODE VOLTAGE AS PARAMETER



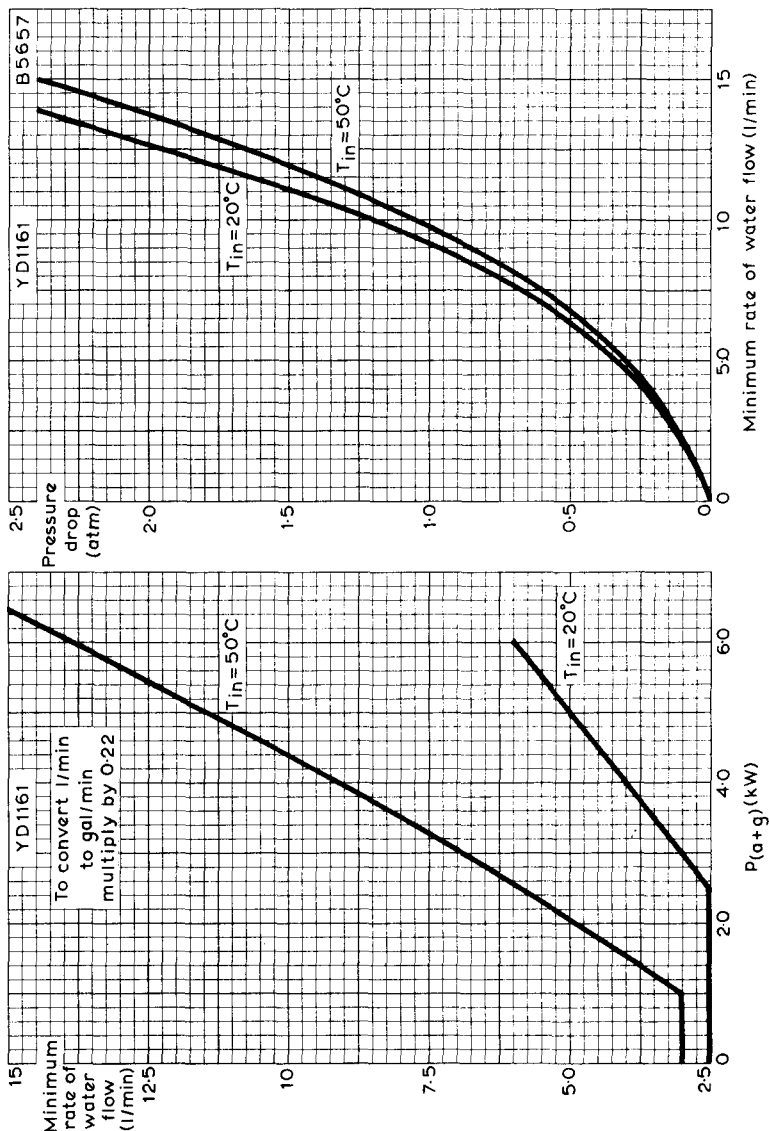
ANODE AND GRID CURRENTS PLOTTED AGAINST ANODE VOLTAGE
WITH GRID VOLTAGE AS PARAMETER



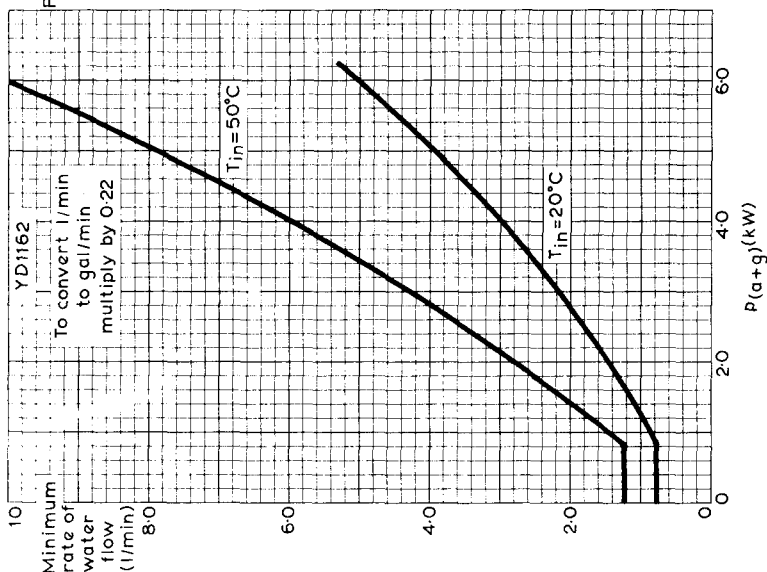
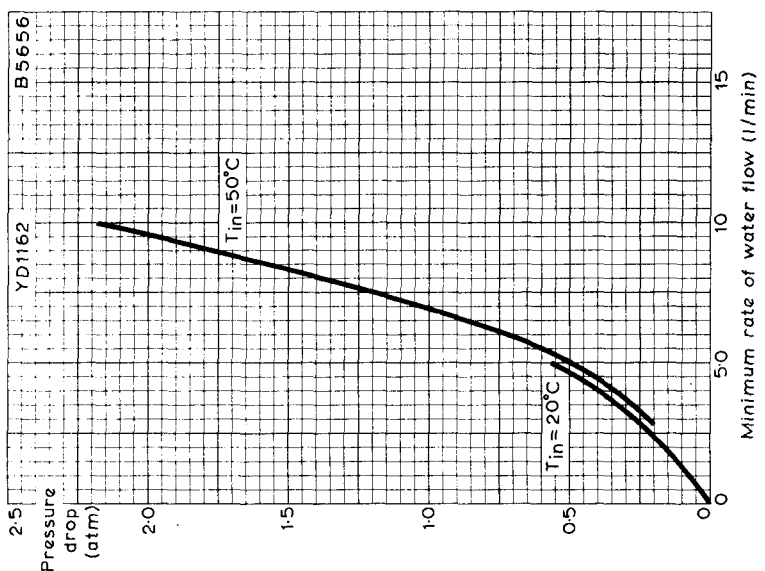
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 PRESSURE DROP PLOTTED AGAINST MINIMUM RATE OF WATER FLOW FOR $T_{in} = 20$ AND 50°C



MINIMUM RATE OF WATER FLOW PLOTTED AGAINST ANODE AND GRID DISSIPATION FOR $T_{in} = 20$ AND 50°C
PRESSURE DROP PLOTTED AGAINST MINIMUM RATE OF WATER FLOW FOR $T_{in} = 20$ AND 50°C