POWER KLYSTRON

YK1001
YK1002

QUICK REFERENCE DATA

The YK1001 is a forced-air cooled power klystron for vision and sound transmitters at bands IV and V. The YK1002 is electrically identical but has a water-cooled collector.

f	470 to 790 Mc/s
P_{out}	10 kW
Construction:	Permanent magnet focusing, unpackaged

This data should be read in conjunction with GENERAL OPERATIONAL RECOMMENDATIONS – MICROWAVE DEVICES which precede this section of the handbook.

Unless otherwise shown, data are applicable to both types.

TYPICAL OPERATION

Linear amplifier for television service (negative modulation)

	Normal collector voltage	*Depressed collector voltage*	
Collector voltage	18	13	kV
Collector current	1.85	1.85	A
Drift tube No. 5 voltage	18	18	kV
Drift tube current (total)	25	40	mA
Focusing electrode voltage	–300	–300	V
Drive power (sync)	10		W
Output power (sync)	11		kW
Gain	30		dB

Tuning of resonant cavities for C.C.I.R. system

Cavity 1	+2.0	Mc/s
Cavity 2	–0.5	Mc/s
Cavity 3	+4.5	Mc/s
Cavity 4	±0	Mc/s

Cavity damping at black level ($P_{out\ (sync)}$ = 11kW)

Cavity 1	2.0	W
Cavity 2	50	W
Cavity 3	80	W

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ABSOLUTE MAXIMUM RATINGS

Peak collector voltage (I_{beam} = 0A)	21	kV
Collector voltage max.	18.5	kV
Peak drift tube No. 5 voltage (I_{beam} = 0A)	21	kV
Drift tube No. 5 voltage max.	18.5	kV
Focusing electrode voltage max. (negative)	500	V
Collector current max.	2.0	A
Drift tube current max. (total)		
depressed collector operation ($V_{coll} < V_{cavity\ 5}$)	150	mA
normal collector operation ($V_{coll} = V_{cavity\ 5}$)	100	mA
Collector dissipation max.	35	kW
Cathode seal temperature max.	125	°C
First anode temperature max.	125	°C
Drift tubes Nos. 1, 2 and 3 temperature max.	80	°C
Drift tubes Nos. 4 and 5 temperature max.	150	°C
Output cavity temperature max.	125	°C
Collector temperature max.	260	°C
Ion pump voltage max.	4.0	kV
Ion pump current max.	10	mA

CATHODE

Indirectly heated, dispenser type

V_h	7.5±3%	V
I_h	32	A
$I_{h\ surge}$ max.	80	A
$r_{h\ cold}$	28	mΩ
t_{h-k} min.	3.0	min

GETTER

Ion pump

Ion pump voltage	3.0	kV
Ion pump current	See curve on page 11	

COOLING

A low velocity airflow should be directed at the cathode and accelerating anode. A flow of air of 1m³/min (35.3ft³/min) directed at cavities Nos. 1, 2 and 3 and 2m³/min (70.6ft³/min) at cavity No. 4 is sufficient to keep the temperature below the permitted maximum.
Cavity No. 5 and output cavity should be cooled by a flow of air of 2m³/min (70.6ft³/min) at a pressure of 90mm H_2O.
The collector of YK1001 is forced-air cooled, see curve on page 8
The collector of YK1002 is water cooled, see curve on page 9

MOUNTING POSITION

Vertical, cathode uppermost

OPERATING NOTE

For optimum performance, the electron beam should be focused for minimum cavity current.

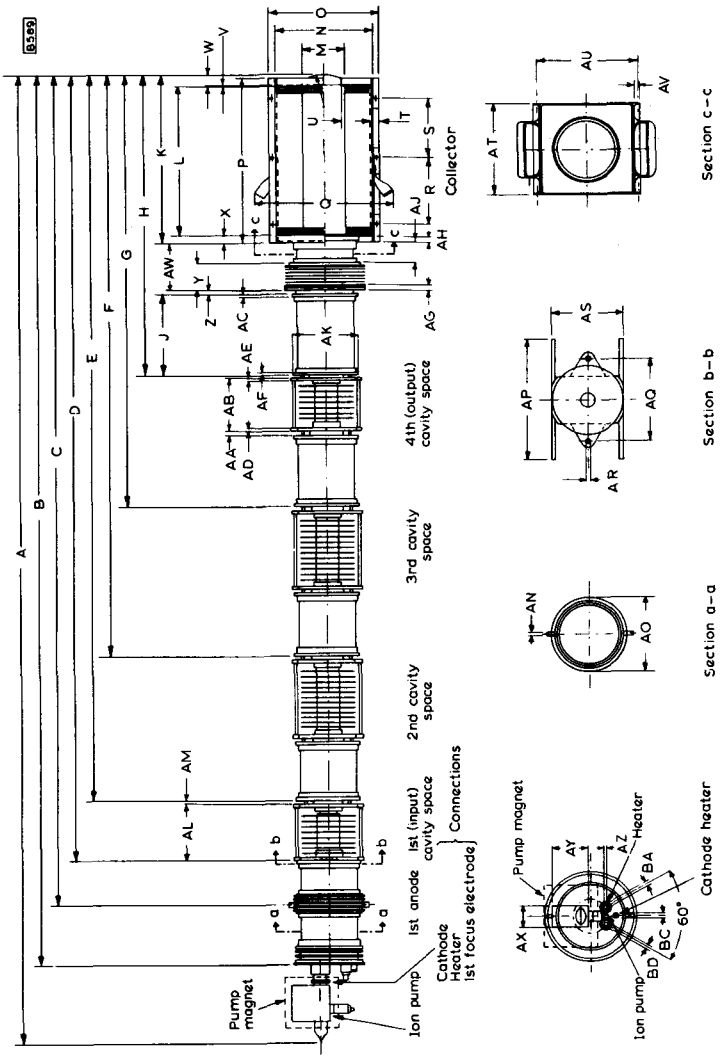
PHYSICAL DATA

Weight of klystron	YK1001	126	lb
		57	kg
	YK1002	126	lb
		57	kg
Weight of accessories		265	lb
		120	kg

ACCESSORIES

Heater connector	40649
Cathode connector	40649
Focusing electrode connector	40634
First anode connector	40634
Collector connector	40634
Ion pump connector	55351
Ion pump magnet	TE1053
5 focusing magnets	TE1065
4 resonant cavities	TE1066

OUTLINE DRAWING OF YK1001

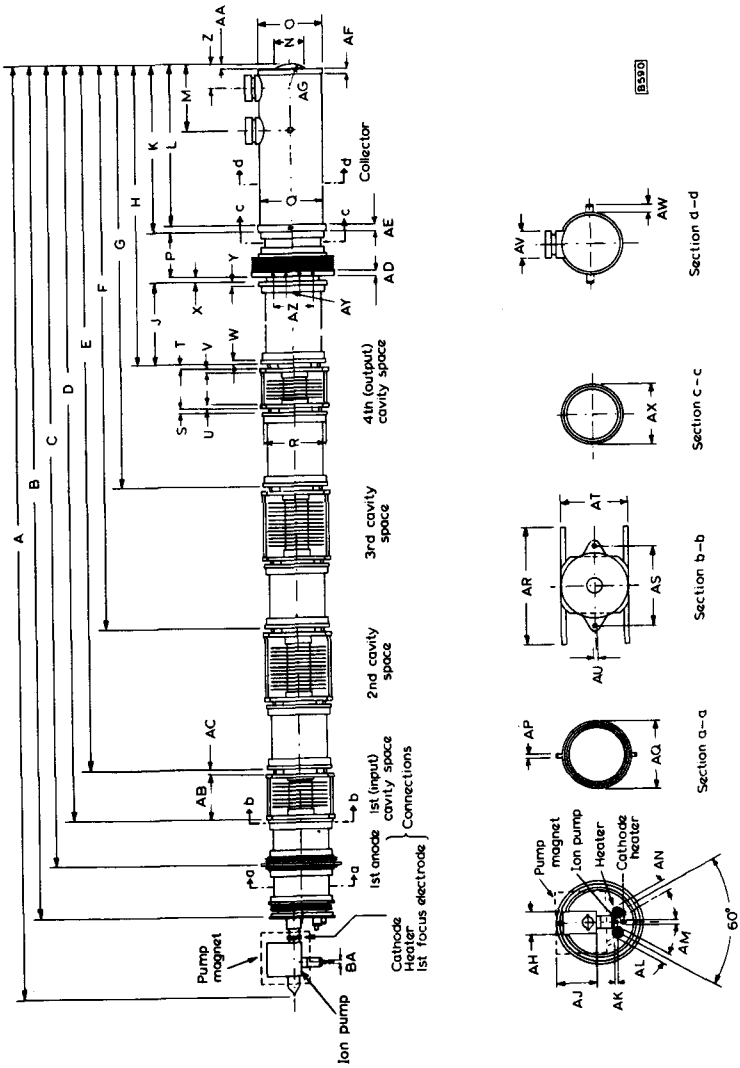


DIMENSIONS OF YK1001

The inch dimensions are derived from the original millimetre dimensions.

	Millimetres	*Inches*			*Millimetres*	*Inches*			*Millimetres*	*Inches*	
A	1642	64.6		T	12	0.47		AL	80	3.15	
B	1499	59		U	60	2.36	dia.	AM	7.0	0.28	
C	1393	54.8		V	1.5	0.06		AN	9.0	0.35	dia.
D	1306	51.4		W	17	0.67		AO	130	5.12	
E	1219	48		X	12	0.47		AP	200	7.9	
F	963	37.9		Y	40.5	1.6		AQ	150	5.9	
G	707	27.8		Z	7.0 ± 0.5	0.28 ± 0.02		AR	8.5	0.33	
H	496	19.53		AA	7.0	0.28		AS	120	4.7	
J	117 ± 0.5	4.60 ± 0.02		AB	80	3.15		AT	161	6.34	
K	295	11.6		AC	6.3 ± 0.2	0.248 ± 0.008		AU	174	6.85	
L	265	10.4		AD	8.0	0.315		AV	10	0.39	
M	69	2.72	dia.	AE	8.0	0.315		AW	77.5	3.05	
N	161	6.34		AF	6.3 ± 0.2	0.248 ± 0.008		AX	38	1.5	
O	184	7.2		AG	8.0	0.315		AY	75	2.95	
P	288	11.34		AH	10	0.39		AZ	6.0	0.24	
Q	250	9.84		AJ	39	1.54		BA	10.5	0.59	
R	114	4.5		AK	$117 +0.1 -0.2$	$4.606 +0.004 -0.008$	dia.	BC	10.5	0.59	
S	114	4.5						BD	9.0	0.35	

OUTLINE DRAWING OF YK1002



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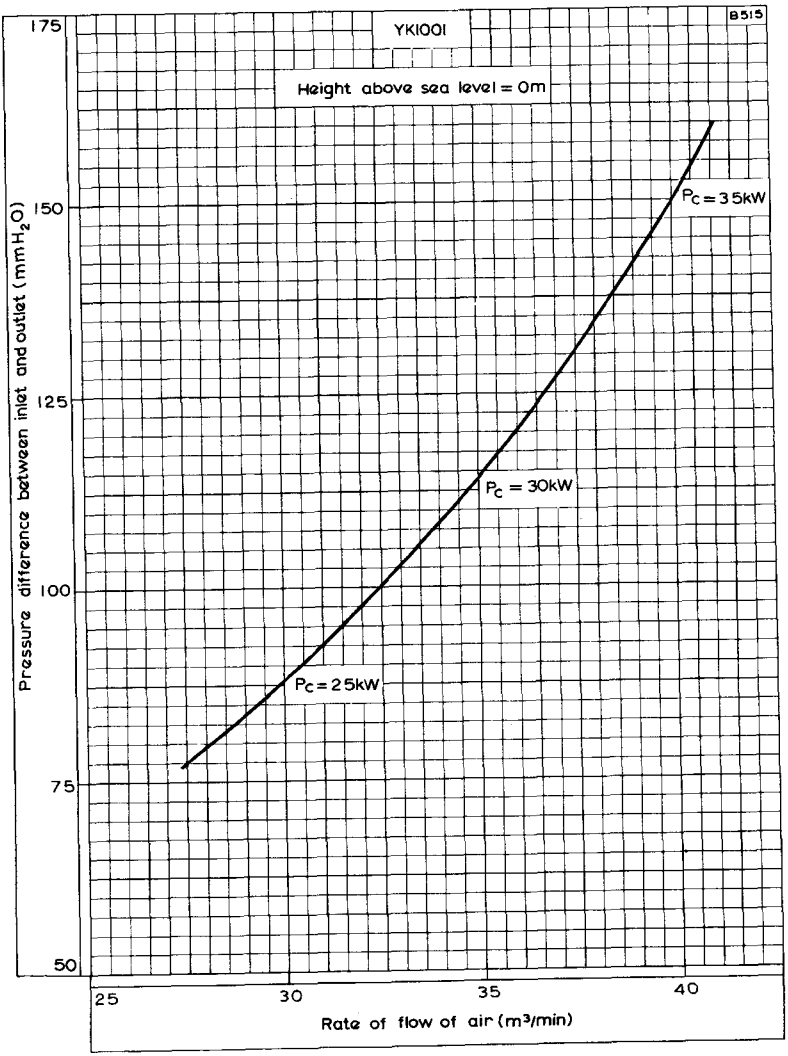
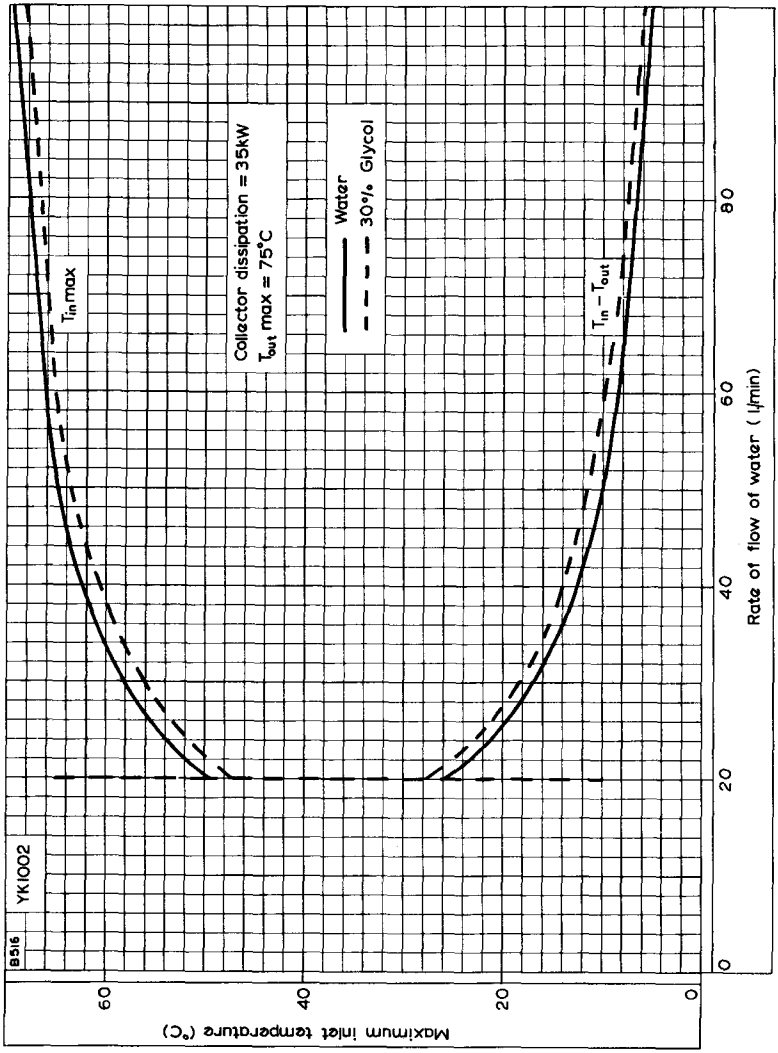
F	963	37.9	
G	707	27.8	
H	496	19.53	
J	117±0.5	4.60±0.02	
K	295	11.6	
L	285	11.2	
M	122	4.8	
N	60	2.36	dia.
O	117.5	4.6	dia.
P	77.5	3.05	
Q	115	4.53	dia.

	Millimetres	*Inches*	
R	117 +0.1 −0.2	4.606 +0.004 −0.008	dia.
S	7.0	0.28	
T	7.0±0.5	0.28±0.02	
U	8.0	0.315	
V	8.0	0.315	
W	6.3±0.2	0.248±0.008	
X	7.0±0.5	0.28±0.02	
Y	6.3±0.2	0.248±0.008	
Z	40	1.58	
AA	10	0.39	
AB	80	3.15	
AC	7.0	0.28	
AD	8.0	0.315	
AE	10	0.39	
AF	5.0	0.2	
AG	55	2.17	rad.

	Millimetres	*Inches*
AH	38	1.5
AJ	75	2.95
AK	6.0	0.24
AL	9.0	0.35
AM	10.5	0.59
AN	10.5	0.59
AP	9.0	0.35
AQ	130	5.12
AR	200	7.9
AS	150	5.9
AT	120	4.72
AU	8.5	0.33
AV	38.1	1.5
AW	15	0.6
AX	117	4.6
AY	20	0.79
AZ	60	2.36



COOLING CURVE FOR YK1001



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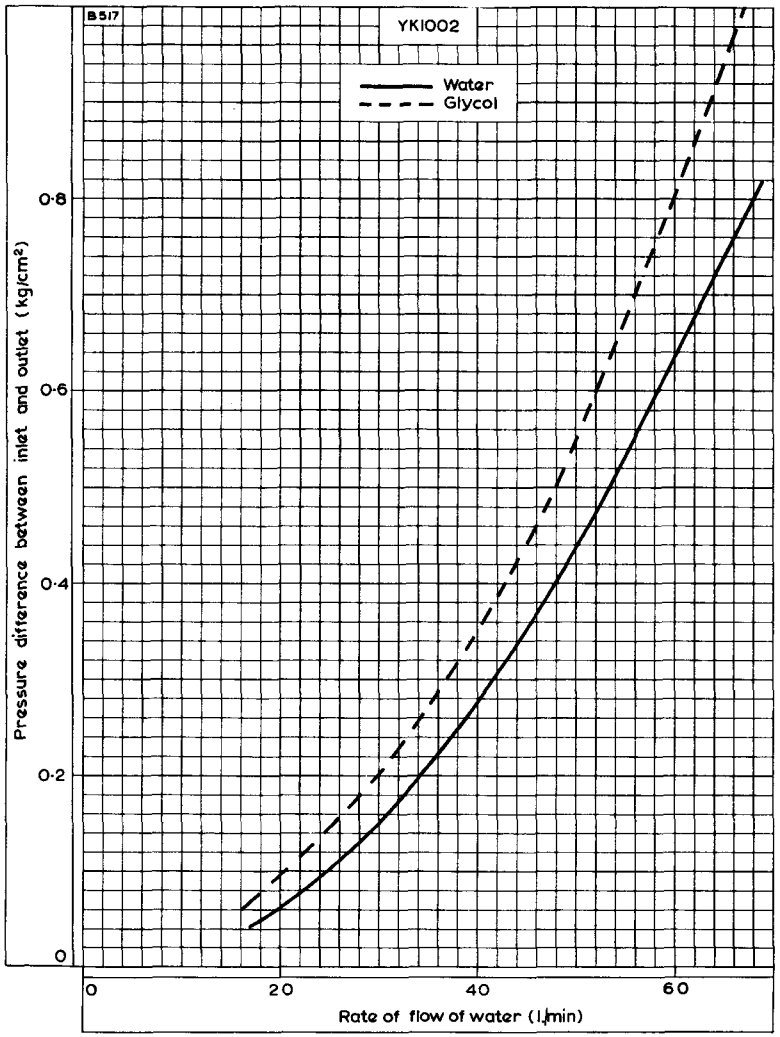

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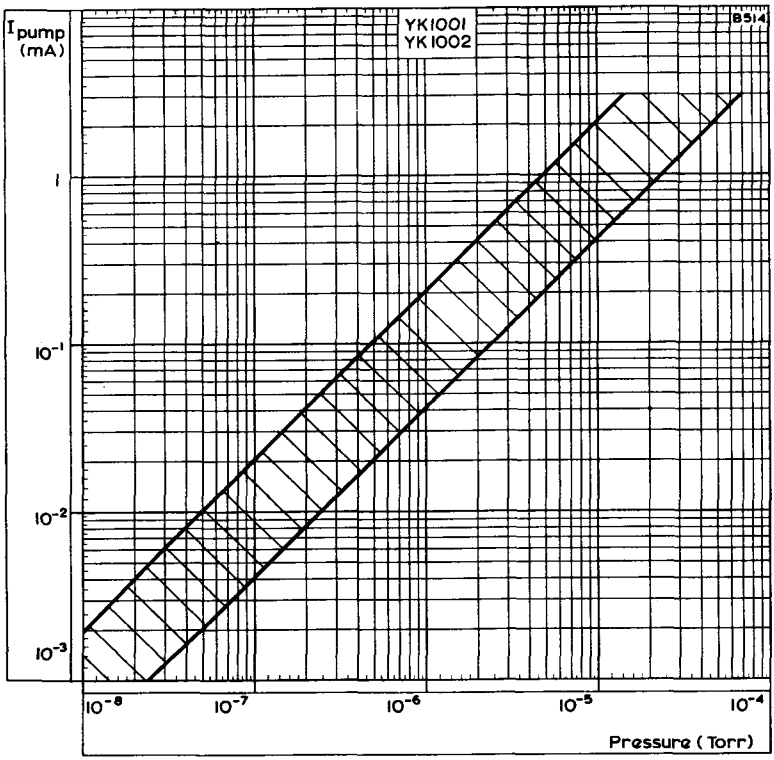

ION PUMP CHARACTERISTICS