

Transmitting  
and generating tubes  
supplement

February 1964

contens

**Transmitting and generating tubes**

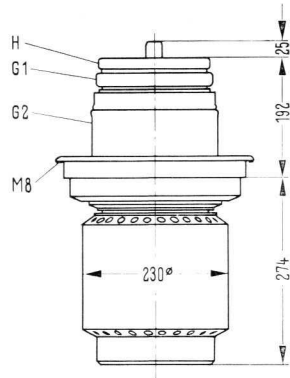
page	2	RS 2002
	4	RS 2031
	6	YL 1040
	8	YL 1050

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# RS 2002

The RS 2002 is a coaxially based transmitting tetrode. The grid sections are constructed in metal-ceramic technique. This tube is particularly suited for application in commercial SSB communication transmitters. Maximum plate dissipation is 120 kW or 150 kW respectively, according to the method of cooling.



## General Data

### FILAMENT

Filament voltage = 22 volts }  
 Filament current ≈ 350 amps } thoriated tungsten cathode

Emission current 280 A at DC plate voltage = DC screen voltage =  
 DC grid voltage = 700 volts

Grid-screen amplification factor 4 at DC plate voltage 3000 volts  
 DC screen voltage = 800 up to 1200 volts  
 DC plate current = 10 amps

Transconductance 130,000 μmhos at DC plate voltage =  
 3000 volts, DC screen voltage = 1000 volts  
 DC plate current = 10 amps

### INTERELECTRODE CAPACITANCES

Grid-filament	260 μμF	Grid-plate	8.5 μμF <sup>1)</sup>
Grid-screen	340 μμF	Plate-filament	1.7 μμF <sup>1)</sup>
Screen-filament	33 μμF	Screen-plate	115 μμF

<sup>1)</sup> measured with grounded flat metal shield with 50 cm diameter attached to the screen-grid terminal

## Maximum Ratings

Frequency	≦	30	Mc
DC Plate voltage	=	15	max. kilovolts
DC Screen voltage	=	1600	max. volts
DC Grid voltage	=	-800	max. volts
Peak cathode current	=	280	max. amps
Plate dissipation (RS 2002 W)	=	120	max. kilowatts
Plate dissipation (RS 2002 V)	=	150	max. kilowatts
Grid dissipation	=	1200	max. watts
Screen dissipation	=	2700	max. watts

## Typical Operation

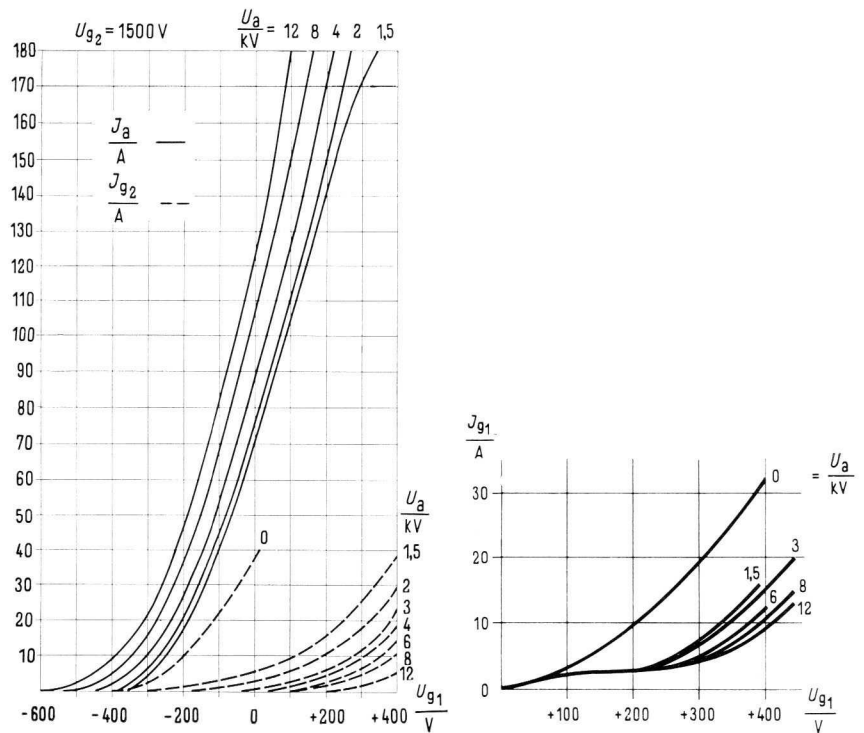
RF Linear Power Amplifier, SSB Modulation, Grid Current = 0

Modulation	:	without	one tone	two tone	
Power output	=	0	120	60	kilowatts
DC Plate voltage	=	9	9	9	kilovolts
DC Screen voltage	=	1500	1500	1500	volts
DC Grid voltage	ca.	-450	-450	-450	volts
Peak RF grid voltage	ca.	0	450	450	volts
DC Plate current	=	ca. 5	21	13.2	amps
DC Screen current	ca.	0	0.8	0.5	amps
Plate input	=	ca. 45	189	118.5	kilowatts
Plate dissipation	=	ca. 45	69	58.5	kilowatts
Screen dissipation	ca.	0	1200	750	watts
Efficiency	=	0	63.5	50.5	%

Other kind of operation.

Plate and Screen Modulation, Carrier Power Output = 220 kilowatts  
at DC Plate Voltage = 11 kilovolts

## Characteristics



## Cooling

RS 2002 W

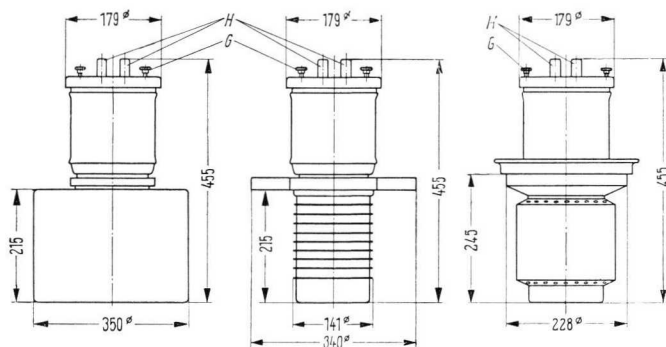
Required water flow on anode for inlet water temperature of 20 deg. C = 68 deg. F  
at max. plate dissipation . . . . 150 l/min  $\approx$  40 U. S. gallons per min.

RS 2002 V

Particulars on request.

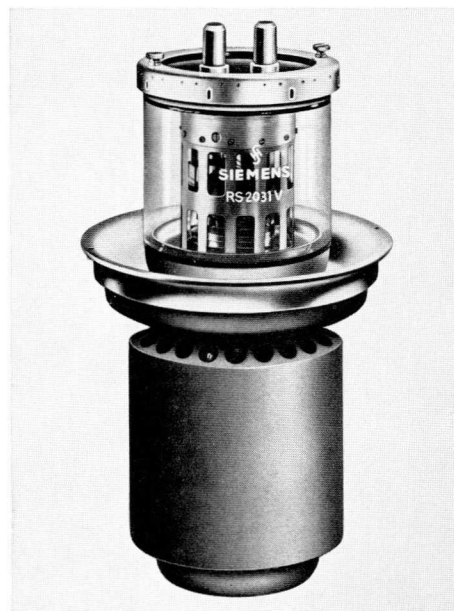
# RS 2031

Low-Mu Power Triode intended primarily for use as an audio amplifier or modulator and for application in industrial RF-Generators at frequencies up to 30 Mc.



RS 2031 W  
YD 1090  
Weight approx. 17 kg

RS 2031 W  
YD 1092  
Weight approx. 39 kg



## General Data

### FILAMENT

Filament Voltage = 18 volts }  
Filament Current approx. = 166 amps } Thoriated tungsten filament

Emission Current = 125 amps at DC Plate Voltage = DC Grid Voltage = 750 volts

Amplification Factor = 13,5 at DC Plate Voltage = 4 to 10 kilovolts, DC Plate Current = 5 amps

Transconductance = 78,000  $\mu$ mhos at DC Plate Voltage = 4 kilovolts, DC Plate Current = 5 amps

### INTERELECTRODE CAPACITANCES

Grid-Filament 160  $\mu$ f  
Plate-Filament 7,6  $\mu$ f\*)  
Grid-Plate 76  $\mu$ f

\*) measured with 40 x 40 cm grounded flat metal shield attached to the screen-grid terminal

## Maximum Ratings

Frequency	30 max.	Mc
DC Plate Voltage	12 max.	kilovolts
DC Grid Voltage	-1500 max.	volts
DC Cathode Current	25 max.	amps
Peak Cathode Current	100 max.	amps
Plate Dissipation (RS 2031 W)	60 max.	kilowatts
Plate Dissipation (RS 2031 V)	110 max.	kilowatts
Grid Dissipation	1100 max.	watts

## Typical Operation

### RF-Power Amplifier Class C, Grounded Cathode

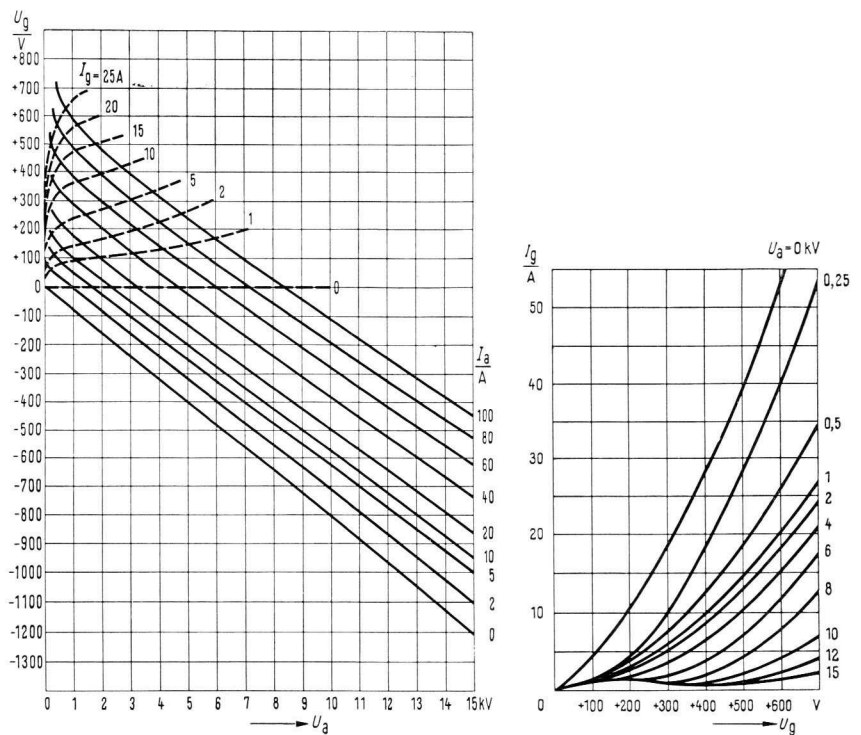
Frequency	30	30	Mc
Power Output	165	110	kilowatts <sup>1)</sup>
DC Plate Voltage	12	10	kilovolts
DC Grid Voltage	-1350	-1200	volts
Peak RF Grid Voltage	1830	1630	volts
DC Plate Current	17	13,8	amps
DC Grid Current	2	1,8	amps
Plate Input	204	138	kilowatts
Driving Power	3,3	2,7	kilowatts <sup>1)</sup>
Plate Dissipation	39	28	kilowatts
Grid Dissipation	600	500	watts
Efficiency	81	80	%
Plate Load Resistance	370	370	$\Omega$

<sup>1)</sup> Circuit losses are not included

Other kind of operation:

AF Power Amplifier and Modulator  
 Power Output = 240 kilowatts  
 DC Plate Voltage = 11 kilovolts

## Characteristics



## Cooling

### RS 2031 W

Required water flow on anode for inlet water temperature of 20 deg. C = 68 deg. F.  
 at max. plat dissipation... 60 l/min = 16 U. S. gallons.

### RS 2031 V

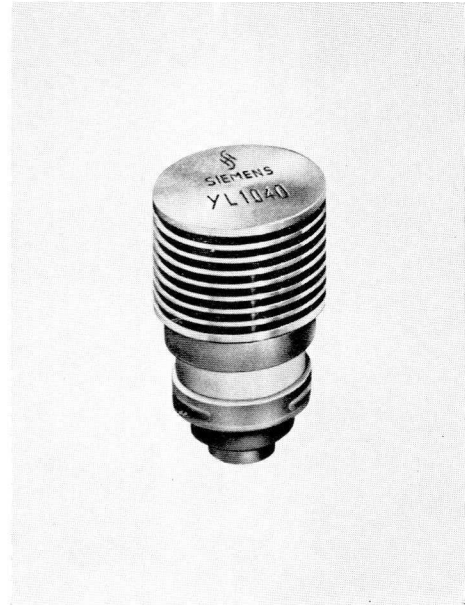
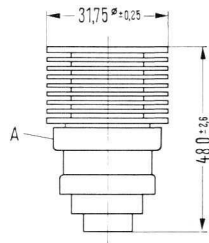
Particulars on request

## Accessories

Cathode Connectors (2 per tube)	Rö Kat 201
Water Jacket (RS 2031 W)	Rö Kü 201
Jacket for evaporative cooling (RS 2031 V)	Rö Kü V 201

# YL 1040

The YL 1040 is a very small forced-air-cooled metal-ceramic planax tetrode for frequencies up to 3 kMc, particularly suited for application in commercial radio communications SSB transmitters. Due to its stability under severe shock and vibration the tube is ideal for use in mobile equipment.



Weight approx. 60 g

## General Data

### HEATING

Heater Voltage 6.3 volts }  
 Heater Current 2.5 amps } MK-Dispenser-Cathode

Grid-Screen Amplification Factor 22 at DC Plate Voltage = 1000 volts  
 DC Screen Voltage = 200 volts  
 DC Plate Current = 100 ma

Transconductance 20,000  $\mu$ mhos at DC Plate current = 100 ma

### INTERELECTRODE CAPACITANCES

measured with special socket

Grid-Cathode	9 $\mu$ F	Grid-Plate	0.03 $\mu$ F
Grid-Screen	15 $\mu$ F	Screen-Cathode	0.2 $\mu$ F
Screen-Plate	3.5 $\mu$ F	Plate-Cathode	0.01 $\mu$ F

## Maximum Ratings

DC Plate Voltage ( $f \leq 1000$ Mc)	max.	1200 volts
DC Plate Voltage ( $f \leq 1600$ Mc)	max.	1000 volts
DC Screen Voltage	max.	300 volts
DC Grid Voltage	max.	-150 volts
DC Cathode Current	max.	400 ma
Plate Dissipation	max.	130 watts
Screen Input	max.	3 watts
Grid Dissipation	max.	1.5 watts
Grid Resistor	max.	30 kohms



## Typical Operation

### Linear RF Power Amplifier, SSB

	one tone	two tone	
Class	AB <sup>1)</sup>	AB <sup>2)</sup>	
Frequency	60	900	Mc
Power Output	55	30 <sup>3)</sup>	watts
DC Plate Voltage	1000	1000	volts
DC Screen Voltage	300	300	volts
DC Grid Voltage	-14	-8.5	volts
Peak RF Grid Voltage	14	7	volts
Zero Signal DC Plate Current	40	140	ma
DC Plate Current	120	150	ma
Power Input	120	150	watts
Plate Dissipation	65	117	watts
3rd order Intermodulation Products		35 <sup>4)</sup>	db
Gain		15	db

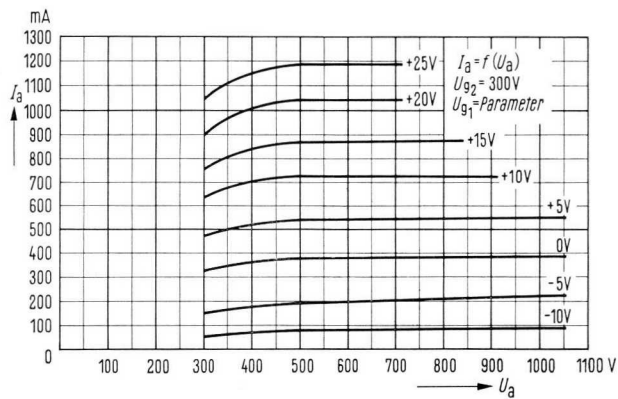
<sup>1)</sup> Grounded cathode

<sup>2)</sup> Grounded grid

<sup>3)</sup> Peak envelope power at 90 % circuit-efficiency

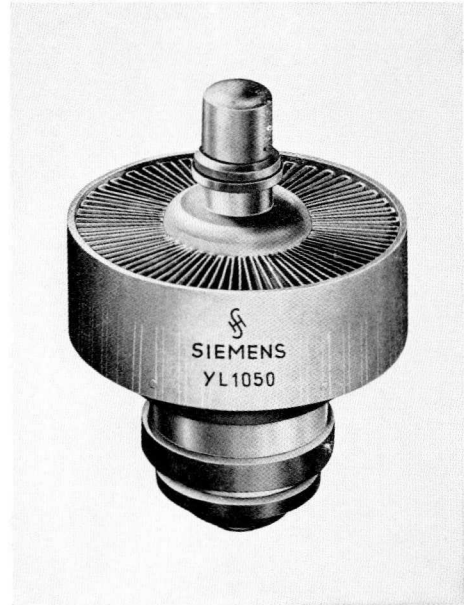
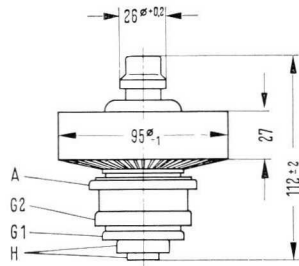
<sup>4)</sup> at plate Load resistance of 3000 ohms

## Characteristics



# YL 1050

The YL 1050 is a metal-ceramic forced-air-cooled power tetrode with concentric electrode contact surfaces for frequencies up to 1250 Mc. It is particularly suitable for class AB<sub>1</sub> linear amplifiers, class C power amplifiers and the power stages of TV transmitters.



## General Data

### HEATING

Heater voltage = 3.8 volts  $\pm$  5%

Heater current  $\approx$  23 amps

indirectly heated Matrix oxide cathode

pre-heating time: 180 sec.

pre-heating time at heater voltage = 5 V; 50 sec \*\*)

Grid-screen amplification factor 12 at DC plate voltage 2000 volts

DC screen voltage = 500 volts

DC plate current = 1 amp

Transconductance

55,000  $\mu$ mhos

DC plate current = 1 amp

### INTERELECTRODE CAPACITANCES

Grid-filament 40  $\mu$ f      Grid-plate 0.15  $\mu$ f\*)

Grid-screen 43  $\mu$ f      Plate-filament 0.012  $\mu$ f\*)

Screen-filament 1.4  $\mu$ f      Screen-plate 11  $\mu$ f

\*) measured with 40 x 40 mm grounded flat metal shield attached to the screen-grid terminal.

\*\*) As soon as the preheating time has elapsed, the heater voltage must immediately be switched back to its nominal value.

## Maximum Ratings

DC Plate voltage ( $f \leq 500$ Mc)	=	3000	max.	volts
DC Plate voltage ( $f \leq 1250$ Mc)	=	2500	max.	volts
DC Screen voltage	=	1000	max.	volts
DC Cathode current	=	1.3	max.	amps.
Plate dissipation	=	1600	max.	watts
Grid dissipation	=	10	max.	watts
Screen dissipation	=	30	max.	watts

## Typical Operation

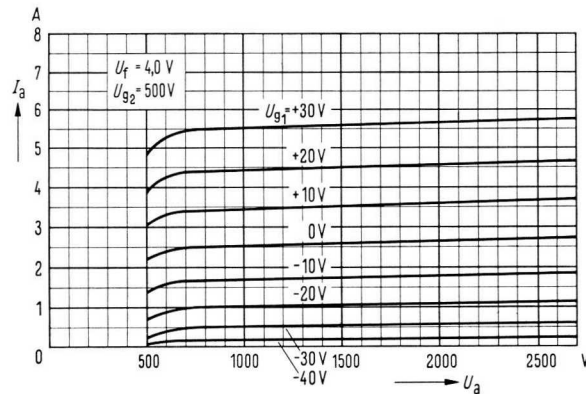
Linear RF Power Amplifier SSB, Suppressed Carrier, Class AB

Modulation		one tone	
Frequency	=	60	Mc
Power output	=	1000	watts
DC Plate voltage	=	2500	volts
DC Screen voltage	=	500	volts
DC Grid voltage	=	-45	volts
Peak RF grid voltage	=	45	volts
Zero-signal DC plate current	=	0.2	amp.
DC Plate current	=	0.78	amp.
Driving power	=	0	watt
Plate dissipation	=	950	watts
Grid dissipation	=	0	watts

Other kind of operation :

RF Power Amplifier	Frequency $\leq$ 600 Mc
Class B Grounded Grid	Power Output = 1400 watts at DC Plate Voltage = 1000 volts

## Characteristics



## Cooling

Required air flow on anode at max. plate dissipation 1.5 m<sup>3</sup>/min  $\approx$  53 cubic feet per min

Static Pressure Drop 12,5 mm WS = 0,49 inch of Water

Temperature of air at inlet 45 deg C

Temperature of air at outlet 105 deg C

