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# PENTAGRID CONVERTER

MINIATURE TYPE

## GENERAL DATA

### Electrical:

Heater, for Unipotential Cathode:

Voltage . . . . .	6.3	. . . . .	ac or dc volts
Current . . . . .	0.3	. . . . .	amp

Direct Interelectrode

Capacitances:

Without  
Shield

With  
Shield<sup>o</sup>

Grid No.3 to All Other Electrodes (RF Input) . . . . .	7 max.	7 max.	$\mu\mu\text{f}$
Plate to All Other Elec- trodes (Mixer Input) . . . . .	8	13	$\mu\mu\text{f}$
Grid No.1 to All Other Electrodes (Osc. Input) . . . . .	5.5 max.	5.5 max.	$\mu\mu\text{f}$
Grid No.3 to Plate . . . . .	0.30 max.	0.25 max.	$\mu\mu\text{f}$
Grid No.3 to Grid No.1 . . . . .	0.15 max.	0.15 max.	$\mu\mu\text{f}$
Grid No.1 to Plate . . . . .	0.1 max.	0.05 max.	$\mu\mu\text{f}$
Grid No.1 to Cathode and Grid No.5 . . . . .	3	3	$\mu\mu\text{f}$
Cathode and Grid No.5 to All Other Electrodes Except Grid No.1 . . . . .	15	20	$\mu\mu\text{f}$

<sup>o</sup> JETEC No.316 connected to pin No.2.

### Mechanical:

Mounting Position . . . . . Any

Maximum Overall Length . . . . . 2-1/8"

Maximum Seated Length . . . . . 1-7/8"

Length from Base Seat to  
Bulb Top (Excluding tip) . . . . . 1-1/2"  $\pm$  3/32"

Maximum Diameter . . . . . 3/4"

Bulb . . . . . T-5-1/2

Base . . . . . Small-Button Miniature 7-Pin (JETEC No.E7-1)

Basing Designation for BOTTOM VIEW . . . . . 7CH

Pin 1 - Grid No.1  
Pin 2 - Cathode,  
Grid No.5  
Pin 3 - Heater  
Pin 4 - Heater



Pin 5 - Plate  
Pin 6 - Grid No.2,  
Grid No.4  
Pin 7 - Grid No.3

## CONVERTER

### Maximum Ratings, Design-Center Values:

PLATE VOLTAGE . . . . .	300 max.	volts
GRID-No.3 (CONTROL-GRID) VOLTAGE:		
Negative Bias Value . . . . .	50 max.	volts
Positive Bias Value . . . . .	0 max.	volts
GRIDS-No.2 & No.4 (SCREEN) VOLTAGE . . . . .	100 max.	volts
GRIDS-No.2 & No.4 SUPPLY VOLTAGE . . . . .	300 max.	volts

←Indicates a change

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## PENTAGRID CONVERTER

TOTAL CATHODE CURRENT . . . . .	14 max.	ma
PLATE DISSIPATION . . . . .	1 max.	watt
GRIDS-No.2 & No.4 INPUT . . . . .	1 max.	watt
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode . .	90 max.	volts
Heater positive with respect to cathode . .	90 max.	volts

→ **Characteristics - Separate Excitation:\***

Plate Voltage . . . . .	100	250	volts
Grids-No.2 & No.4 Voltage . . . . .	100	100	volts
Grid-No.3 Voltage . . . . .	-1.5	-1.5	volts
Grid-No.1 (Oscillator Grid)			
Voltage (rms) . . . . .	10	10	volts
Grid-No.1 Resistor . . . . .	20000	20000	ohms
Plate Resistance (Approx.) . . . . .	0.4	1	megohm
Conversion Transconductance . . . . .	455	475	$\mu$ mhos
Grid-No.3 Voltage (Approx.) for conversion transconductance of:			
10 $\mu$ mhos . . . . .	-30	-30	volts
100 $\mu$ mhos . . . . .	-6	-6	volts
Plate Current . . . . .	2.6	2.9	ma
Grids-No.2 & No.4 Current . . . . .	7	6.8	ma
Grid-No.1 Current . . . . .	0.5	0.5	ma
Total Cathode Current . . . . .	10.1	10.2	ma

NOTE: With grids-No.2 & No.4 and plate at 100 volts, grids-No.1 & No.3 at zero volts, and signal applied to grid No.1, the oscillator trans-conductance (not oscillating) is 7250 micromhos; the cathode current is 25 milliamperes; and the amplification factor is 20. Grid-No.1 voltage (approx.) for plate current of 10 microamperes is -11 volts.

\* The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.

→ Indicates a change

MAY 3, 1954

TUBE DIVISION

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

DATA

# Pentagrid Converter

## 7-PIN MINIATURE TYPE

### GENERAL DATA

#### Electrical:

Heater, for Unipotential Cathode:

Voltage (AC or DC) . . . . . 6.3 ± 10% volts  
Current at 6.3 volts. . . . . 0.3 amp

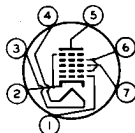
Direct Interelectrode Capacitances:

	Without External Shield	With External Shield <sup>a</sup>	
Grid No.3 to all other elec- trodes (RF input) . . . . .	7	7	μf
Plate to all other electrodes (Mixer input) . . . . .	8	13	μf
Grid No.1 to all other elec- trodes (Oscillator input) . . .	5.5	5.5	μf
Grid No.3 to plate. . . . .	0.3 max.	0.25 max.	μf
Grid No.3 to grid No.1. . . . .	0.15 max.	0.15 max.	μf
Grid No.1 to plate. . . . .	0.1 max.	0.05 max.	μf
Grid No.1 to cathode & grid No.5 .	3	3	μf
Cathode & grid No.5 to all other electrodes except grid No.1. . .	15	20	μf

#### Mechanical:

Operating Position. . . . . Any  
Maximum Overall Length. . . . . 2-1/8"  
Maximum Seated Length . . . . . 1-7/8"  
Length, Base Seat to Bulb Top (Excluding tip) . . . 1-1/2" ± 3/32"  
Diameter. . . . . 0.650" to 0.750"  
Dimensional Outline . . . . . See *General Section*  
Bulb. . . . . T5-1/2  
Base. . . . . Small-Button Miniature 7-Pin (JEDEC No. E7-1)  
Basing Designation for BOTTOM VIEW. . . . . 7CH

Pin 1 - Grid No.1  
Pin 2 - Cathode,  
Grid No.5  
Pin 3 - Heater  
Pin 4 - Heater



Pin 5 - Plate  
Pin 6 - Grid No.2,  
Grid No.4  
Pin 7 - Grid No.3

### CONVERTER

#### Maximum Ratings, Design-Maximum Values:

PLATE VOLTAGE . . . . . 330 max. volts  
GRID-No.3 (CONTROL-GRID) VOLTAGE:  
Negative-bias value . . . . . 55 max. volts  
Positive-bias value . . . . . 0 max. volts  
GRIDS-No.2 & No.4 (SCREEN-GRID)  
SUPPLY VOLTAGE. . . . . 330 max. volts  
GRIDS-No.2 & No.4 VOLTAGE . . . . . 110 max. volts

← Indicates a change.



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CATHODE CURRENT . . . . .	15.5	max.	ma
GRIDS-No.2 & No.4 INPUT . . . . .	1.1	max.	watts
PLATE DISSIPATION . . . . .	1.1	max.	watts
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode . . . . .	200	max.	volts
Heater positive with respect to cathode . . . . .	200 <sup>b</sup>	max.	volts

## Characteristics:

*With separate excitation<sup>c</sup>*

Plate Voltage . . . . .	100	250	volts
Grid-No.3 Voltage . . . . .	-1.5	-1.5	volts
Grids-No.2 & No.4 Voltage . . . . .	100	100	volts
RMS Grid-No.1 (Oscillator Grid) Voltage. . . . .	10	10	volts
Grid-No.1 Resistor. . . . .	20000	20000	ohms
Plate Resistance (Approx.). . . . .	0.4	1	megohm
Conversion Transconductance . . . . .	455	475	$\mu$ mhos
Grid-No.3 Voltage (Approx.) for conversion transconductance ( $\mu$ mhos) =			
10. . . . .	-30	-30	volts
100 . . . . .	-6	-6	volts
Plate Current . . . . .	2.6	2.9	ma
Grids No.2 & No.4 Current . . . . .	7	6.8	ma
Grid-No.1 Current . . . . .	0.5	0.5	ma
Cathode Current . . . . .	10.1	10.2	ma

## Oscillator Characteristics (Not Oscillating):

*With grids No.2 & No.4 connected to plate*

Plate and Grids-No.2 & No.4 Voltage . . . . .	100	volts
Grid-No.3 Voltage . . . . .	0	volts
Grid-No.1 Voltage . . . . .	0	volts
Amplification Factor between grid No.1 and grids No.2 & No.4 connected to plate. . . . .	20	
Transconductance between grid No.1 and grids No.2 & No.4 connected to plate. . . . .	7250	$\mu$ mhos
Cathode Current . . . . .	25	ma
Grid-No.1 Voltage (Approx.) for plate $\mu$ a = 10. . . . .	-11	volts

<sup>a</sup> With external shield JEDEC No.316 connected to cathode.

<sup>b</sup> The dc component must not exceed 100 volts.

<sup>c</sup> The characteristics shown with separate excitation correspond very closely with those obtained in a self-excited oscillator circuit operating with zero bias.

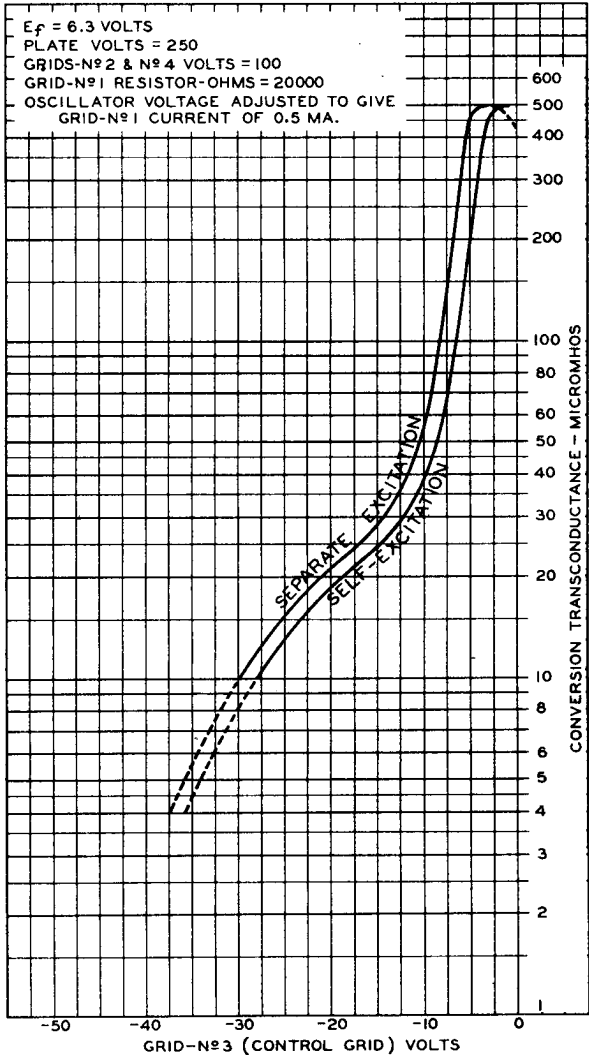




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### OPERATION CHARACTERISTICS



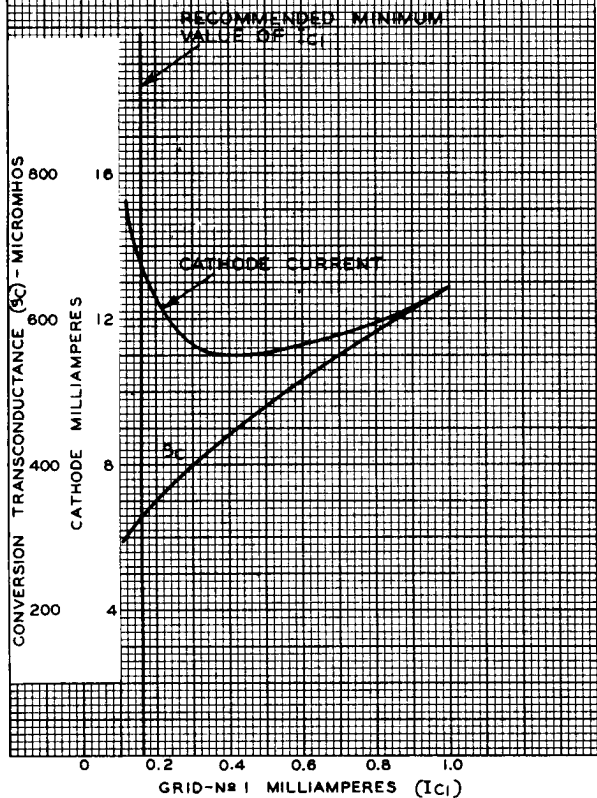
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### OPERATION CHARACTERISTICS WITH SEPARATE OSCILLATOR EXCITATION

$E_f = 6.3$  VOLTS  
PLATE VOLTS = 250  
GRIDS-№ 2 & № 4 VOLTS = 100  
GRID-№ 3 (CONTROL GRID) VOLTS = -1.5  
GRID-№ 1 RESISTOR-OHMS = 20000  
GRID-№ 1 CURRENT VARIED BY ADJUSTMENT  
OF OSCILLATOR VOLTAGE

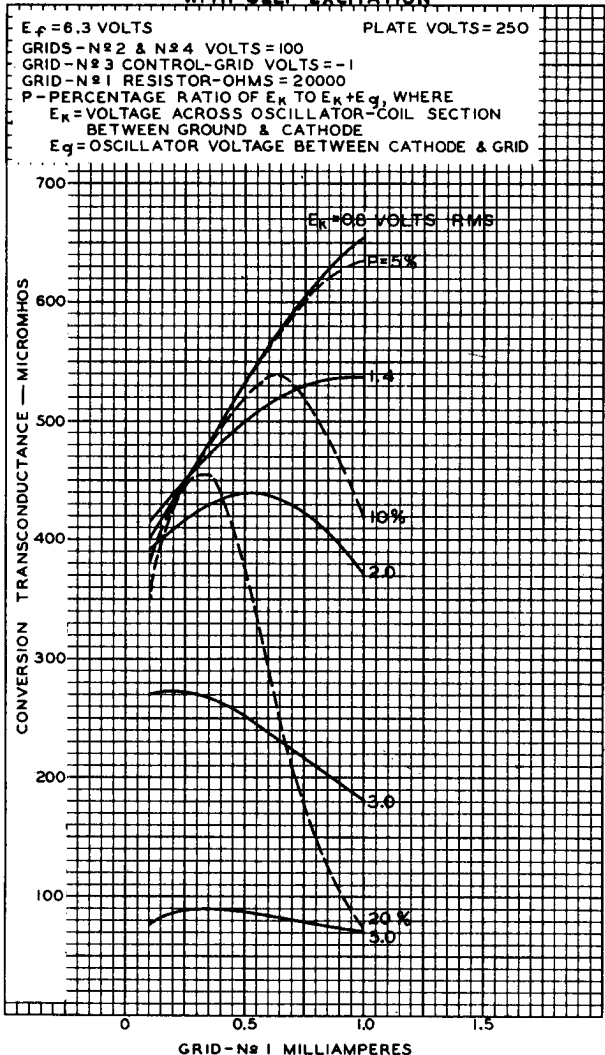




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### OPERATION CHARACTERISTICS WITH SELF-EXCITATION



NOV. 12, 1945

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### OPERATION CHARACTERISTIC WITH SELF-EXCITATION

$E_f = 6.3$  VOLTS  
PLATE VOLTS = 250  
GRIDS-N<sup>o</sup> 2 & N<sup>o</sup> 4 VOLTS = 100  
GRID-N<sup>o</sup> 3 VOLTS = 0  
GRID-N<sup>o</sup> 1 RESISTOR-OHMS = 20000  
GRID-N<sup>o</sup> 1 MILLIAMPERES = 0.5

