October 15, 1958

PENTAGRID CONVERTER TYPES 3BE6, 6BE6 AND 12BE6

The 3BE6, 6BE6 and 12BE6 are 7-pin pentagrid converter types designed for combined oscillator and mixer service in ac/dc and auto receivers.

The 3BE6 has been designed for use in receivers which employ series-connected heaters, especially in television receivers where the picture-tube heater is in series with other heaters. When it is employed in this type of circuit with other tubes having a heater current rating of 600 ma., heater voltage surges across individual tubes are minimized inasmuch as the heater warm-up characteristic is controlled.

ELECTRICAL:

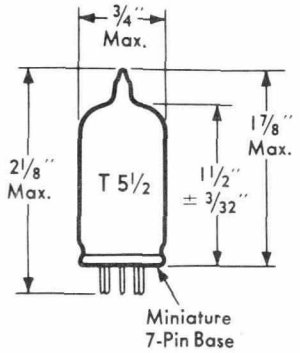
Cathode	Coated Unipotential			
Heater:	3BE6	6BE6	12BE6	
Voltage (ac or dc)	3.15	6.3	12.6	Volts
Current	0.60	0.30	0.15	Ampere
Warm-up Time (approx.) ▲	11	..	..	Seconds

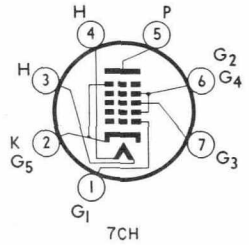
Direct Interelectrode Capacitances:

	Unshielded	Shielded †	
Grid 3 to all other Electrodes (RF Input)	7	7	max. uuf
Plate to all other Electrodes (Mixer Output)	8	13	uuf
Grid 1 to all other Electrodes (Osc. Input)	5.5	5.5	max. uuf
Grid 3 to Plate	0.30	0.25	max. uuf
Grid 3 to Grid 1	0.15	0.15	max. uuf
Grid 1 to Plate	0.1	0.05	max. uuf
Grid 1 to Cathode & Grid 5	3	3	uuf
Cathode and Grid 5 to all other Electrodes except Grid 1	15	20	uuf

MECHANICAL:

Bulb	T-5-1/2
Base	Miniature 7-Pin (JETEC E7-1)
Outline	5-2
Basing	7CH
Mounting Position	Any





Supersedes 3BE6 Data Sheet Dated January 5, 1955
Supersedes 6BE6 Data Sheet Dated July 20, 1954
Supersedes 12BE6 Data Sheet Dated June 15, 1954

Receiving Tube Section

CONVERTER SERVICE

MAXIMUM RATINGS:
Design Center Values

Plate Voltage	300 max.		Volts
Grids 2 and 4 Voltage	100 max.		Volts
Grid 2 and 4 Supply Voltage	300 max.		Volts
Plate Dissipation	1.0 max.		Watts
Grids 2 and 4 Dissipation	1.0 max.		Watts
Total Cathode Current	14 max.		Ma.
Grid 3 Voltage:			
Negative Bias Value	50 max.		Volts
Positive Bias Value	0 max.		Volts

Heater-Cathode Voltage:	3BE6	6BE6 3BE6 12BE6		
Heater Negative with Respect to Cathode:				
Total DC + Peak	200	90	max.	Volts
Heater Positive with Respect to Cathode:				
DC Component	100	..	max.	Volts
Total DC + Peak	200	90	max.	Volts

TYPICAL OPERATING CHARACTERISTICS:
with Separate Excitation*

Plate Voltage	100	250	Volts
Grids 2 and 4 Voltage	100	100	Volts
Grid 3 Voltage	-1.5	-1.5	Volts
Grid 1 Voltage (rms)	10	10	Volts
Grid 1 Resistor	20000	20000	Ohms
Plate Resistance (approx.)	0.4	1	Megohm
Conversion Transconductance	455	475	umhos
Grid 3 Voltage (approx.) for Conversion Transconductance of:			
10 umhos	-30	-30	Volts
100 umhos	-6	-6	Volts
Plate Current	2.6	2.9	Ma.
Grids 2 and 4 Current	7	6.8	Ma.
Grid 1 Current	0.5	0.5	Ma.
Total Cathode Current	10.1	10.2	Ma.

OSCILLATOR CHARACTERISTICS:
Not Oscillating

Plate Voltage	100	Volts
Grids 2 and 4	Connected to Plate	
Grid 3 Voltage	0	Volts
Grid 1 Voltage	0	Volts
Transconductance	7250	umhos
Cathode Current	25	Ma.
Amplification Factor	20	
Grid 1 Cutoff Voltage♦	-11	Volts

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

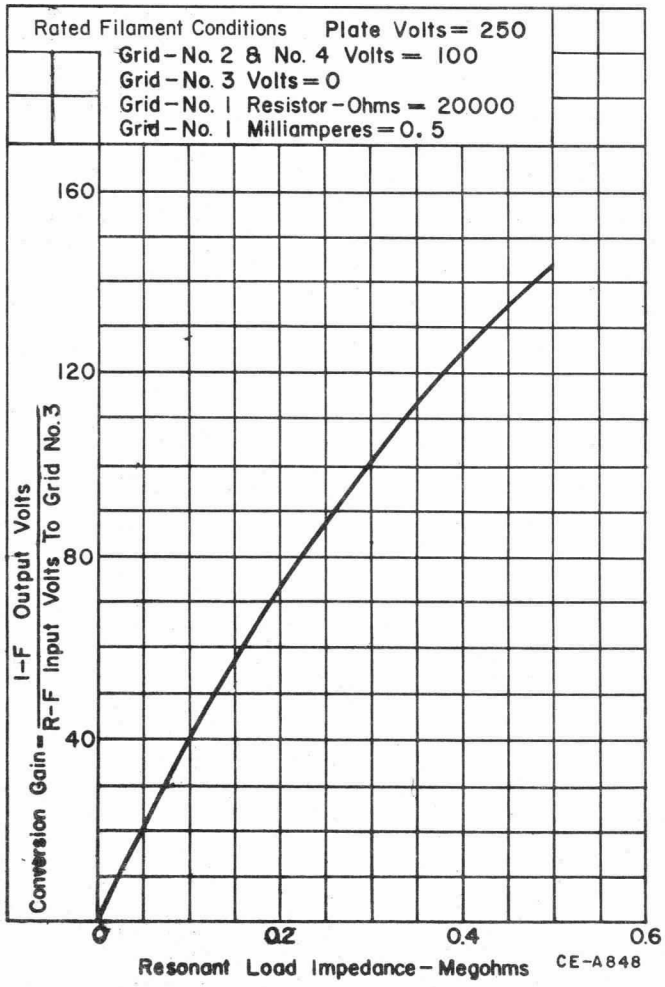
† External shield No. 316 connected to pin 2.

♦ For plate current of 10 microamperes.

▲ Heater warm-up time is defined as the time required for the voltage across the heater to reach 80% of its rated value after applying four times rated heater voltage to a circuit consisting of the tube heater in series with a resistance equal to three times rated heater voltage divided by rated heater current.

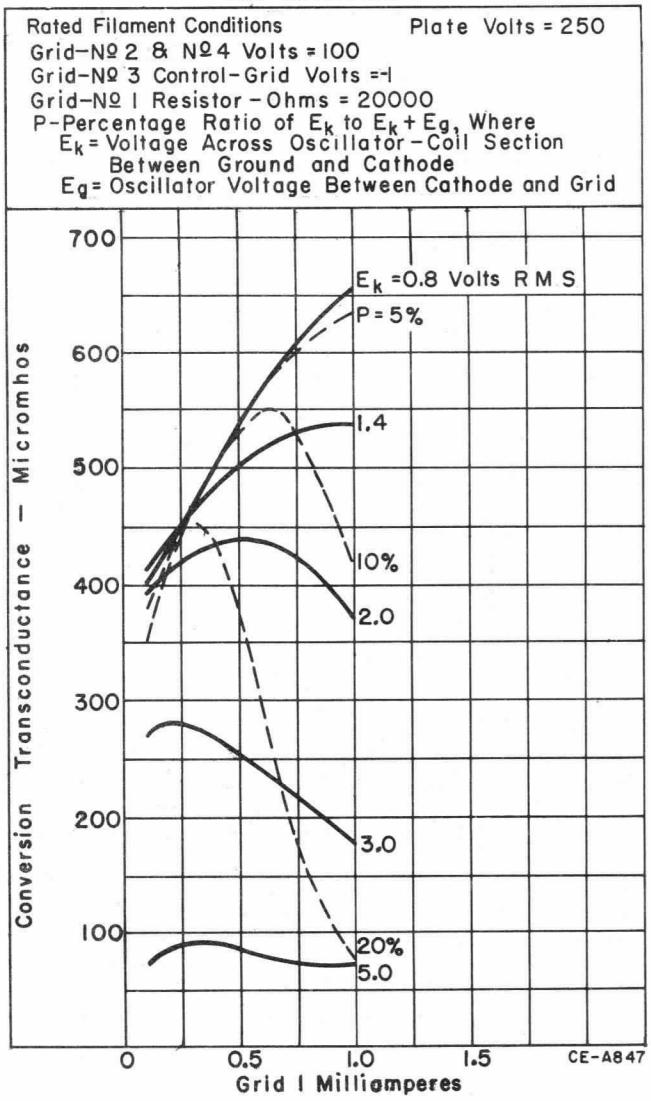
OPERATION CHARACTERISTIC

Self-Excitation



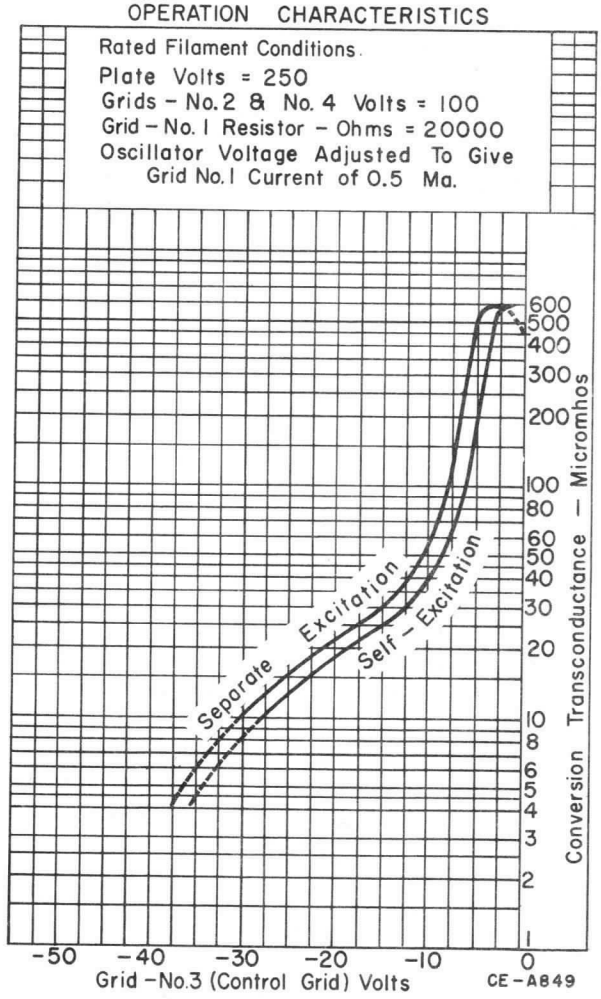
OPERATION CHARACTERISTICS

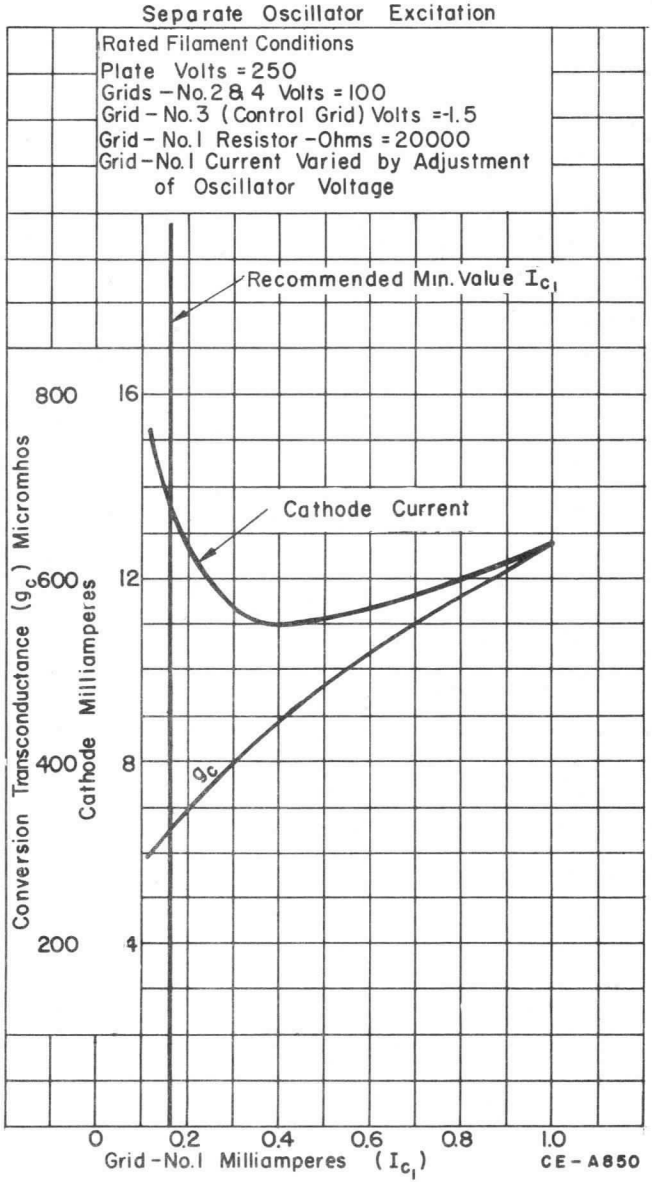
Self-Excitation



OPERATION CHARACTERISTICS

Rated Filament Conditions.
Plate Volts = 250
Grids – No. 2 & No. 4 Volts = 100
Grid – No. 1 Resistor – Ohms = 20000
Oscillator Voltage Adjusted To Give
Grid No. 1 Current of 0.5 Ma.



OPERATION CHARACTERISTICS
Separate Oscillator Excitation

Rated Filament Conditions
Plate Volts = 250
Grids – No. 2 & 4 Volts = 100
Grid – No. 3 (Control Grid) Volts = -1.5
Grid – No. 1 Resistor – Ohms = 20000
Grid – No. 1 Current Varied by Adjustment
of Oscillator Voltage