



ELECTRONIC  
INNOVATIONS  
IN ACTION

TUBES

## —PRODUCT INFORMATION—

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# Compactron Dissimilar-Double-Triode Pentode

11BT11

The 11BT11 is a compactron containing a high-mu triode, a medium-mu triode, and a sharp-cutoff, frame-grid pentode. The pentode is intended for video amplifier service and the triodes for general-purpose applications.

## GENERAL

### ELECTRICAL

Cathode - Coated Unipotential

Heater Characteristics and Ratings

Heater Voltage, AC or DC\* . . . . 10.7 Volts  
Heater Current†. . . . . 0.6±0.04 Amperes  
Heater Warm-up Time, Average§ . . . 11 Seconds  
Direct Interelectrode Capacitances¶

#### Triode (Section 1)

Grid to Plate: (1Tg to 1Tp) . . . . 1.9 pf  
Input: 1Tg to (1Tk + Pg3 +  
h + i.s.) . . . . . 2.8 pf  
Output: 1Tp to (1Tk + Pg3 +  
h + i.s.) . . . . . 2.0 pf

#### Triode (Section 2)

Grid to Plate: (2Tg to 2Tp) . . . . 2.6 pf  
Input: 2Tg to (2Tk + 1Tk +  
Pg3 + h + i.s.) . . . . . 4.6 pf  
Output: 2Tp to (2Tk + 1Tk +  
Pg3 + h + i.s.) . . . . . 3.6 pf

#### Pentode Section

Grid-Number 1 to Plate:  
(Pg1 to Pp) . . . . . 0.13 pf  
Input: Pg1 to (Pk + 1Tk +  
Pg2 + Pg3 + h + i.s.) . . . . . 13 pf  
Output: Pp to (Pk + 1Tk +  
Pg2 + Pg3 + h + i.s.) . . . . . 4.6 pf

### Coupling

Pentode Plate to Triode Plate

(Section 2): (Pp to 2Tp),  
maximum . . . . . 0.08 pf

Triode Plate (Section 1) to  
Triode Plate (Section 2):  
(1Tp to 2Tp), maximum. . . . . 0.19 pf

### MECHANICAL

Operating Position - Any

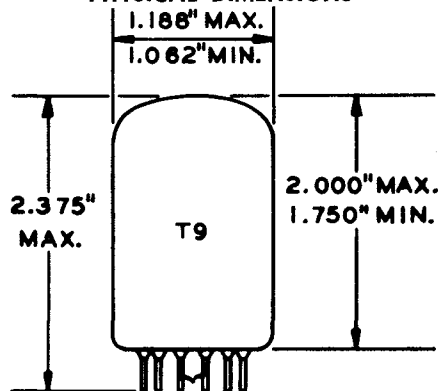
Envelope - T-9, Glass

Base - E12-70, Button 12-Pin

Outline Drawing - EIA 9-58

Maximum Diameter . . . . . 1.188 Inches  
Minimum Diameter . . . . . 1.062 Inches  
Maximum Over-all Length . . . . 2.375 Inches  
Maximum Seated Height. . . . . 2.000 Inches  
Minimum Seated Height. . . . . 1.750 Inches

### PHYSICAL DIMENSIONS

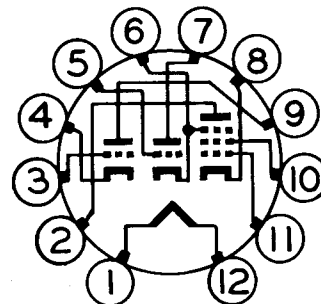


EIA 9-58

### TERMINAL CONNECTIONS

Pin 1 - Heater  
Pin 2 - Pentode Plate  
Pin 3 - Triode Grid (Section 2)  
Pin 4 - Triode Cathode (Section 2)  
Pin 5 - Triode Grid (Section 1)  
Pin 6 - Triode Cathode (Section 1),  
Pentode Grid Number 3, and  
Internal Shield  
Pin 7 - Triode Plate (Section 1)  
Pin 8 - Pentode Cathode  
Pin 9 - Triode Plate (Section 2)  
Pin 10 - Pentode Grid Number 2  
(Screen)  
Pin 11 - Pentode Grid Number 1  
Pin 12 - Heater

### BASING DIAGRAM



EIA 12GS

The tubes and arrangements disclosed herein may be covered by patents of General Electric Company or others. Neither the disclosure of any information herein nor the sale of tubes by General Electric Company conveys any license under patent claims covering combinations of tubes with other devices or elements. In the absence of an

express written agreement to the contrary, General Electric Company assumes no liability for patent infringement arising out of any use of the tubes with other devices or elements by any purchaser of tubes or others.

GENERAL ELECTRIC

**MAXIMUM RATINGS****DESIGN-MAXIMUM VALUES****Pentode Section**

|                                             |        |       |
|---------------------------------------------|--------|-------|
| Plate Voltage . . . . .                     | 165    | Volts |
| Screen Voltage . . . . .                    | 165    | Volts |
| Positive DC Grid-Number 1 Voltage . . . . . | 0      | Volts |
| Plate Dissipation . . . . .                 | 3.5    | Watts |
| Screen Dissipation . . . . .                | 1.5    | Watts |
| Heater-Cathode Voltage                      |        |       |
| Heater Positive with Respect to Cathode     |        |       |
| DC Component . . . . .                      | 100    | Volts |
| Total DC and Peak . . . . .                 | 200    | Volts |
| Heater Negative with Respect to Cathode     |        |       |
| Total DC and Peak . . . . .                 | 200    | Volts |
| Grid-Number 1 Circuit Resistance            |        |       |
| With Fixed Bias . . . . .                   | 50000  | Ohms  |
| With Cathode Bias . . . . .                 | 100000 | Ohms  |

**Triode (Section 1)**

|                                         |     |         |
|-----------------------------------------|-----|---------|
| Plate Voltage . . . . .                 | 330 | Volts   |
| Positive DC Grid Voltage . . . . .      | 0   | Volts   |
| Plate Dissipation . . . . .             | 1.5 | Watts   |
| Heater-Cathode Voltage                  |     |         |
| Heater Positive with Respect to Cathode |     |         |
| DC Component . . . . .                  | 100 | Volts   |
| Total DC and Peak . . . . .             | 200 | Volts   |
| Heater Negative with Respect to Cathode |     |         |
| Total DC and Peak . . . . .             | 200 | Volts   |
| Grid-Circuit Resistance                 |     |         |
| With Fixed Bias . . . . .               | 0.5 | Megohms |
| With Cathode Bias . . . . .             | 1.0 | Megohms |

**Triode (Section 2)**

|                                         |     |         |
|-----------------------------------------|-----|---------|
| Plate Voltage . . . . .                 | 330 | Volts   |
| Positive DC Grid Voltage . . . . .      | 0   | Volts   |
| Plate Dissipation . . . . .             | 2.0 | Watts   |
| Heater-Cathode Voltage                  |     |         |
| Heater Positive with Respect to Cathode |     |         |
| DC Component . . . . .                  | 100 | Volts   |
| Total DC and Peak . . . . .             | 200 | Volts   |
| Heater Negative with Respect to Cathode |     |         |
| Total DC and Peak . . . . .             | 200 | Volts   |
| Grid-Circuit Resistance                 |     |         |
| With Fixed Bias . . . . .               | 0.5 | Megohms |
| With Cathode Bias . . . . .             | 1.0 | Megohms |

Design-Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey electron tube of a specified type as defined by its published data and should not be exceeded under the worst probable conditions.

The tube manufacturer chooses these values to provide acceptable serviceability of the tube, making allowance for the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration.

The equipment manufacturer should design so that initially and throughout life no design-maximum value for the intended service is exceeded with a bogey tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all other electron devices in the equipment.

## CHARACTERISTICS AND TYPICAL OPERATION

## AVERAGE CHARACTERISTICS

## Pentode Section

|                                                                       |      |       |              |
|-----------------------------------------------------------------------|------|-------|--------------|
| Plate Voltage. . . . .                                                | 35   | 150   | Volts        |
| Screen Voltage . . . . .                                              | 100  | 100   | Volts        |
| Grid-Number 1 Voltage . . . . .                                       | 0    | ---   | Volts        |
| Cathode-Bias Resistor . . . . .                                       | ---  | 82    | Ohms         |
| Plate Resistance, approximate . . . . .                               | ---  | 51000 | Ohms         |
| Transconductance. . . . .                                             | ---  | 19000 | Micromhos    |
| Plate Current. . . . .                                                | 54   | 17.4  | Milliamperes |
| Screen Current . . . . .                                              | 13.5 | 3.2   | Milliamperes |
| Grid-Number 1 Voltage, approximate<br>Ib = 100 Microamperes . . . . . | ---  | -6.6  | Volts        |

## Triode (Section 1)

|                                                             |       |              |
|-------------------------------------------------------------|-------|--------------|
| Plate Voltage. . . . .                                      | 200   | Volts        |
| Cathode-Bias Resistor . . . . .                             | 270   | Ohms         |
| Amplification Factor . . . . .                              | 69    |              |
| Plate Resistance, approximate . . . . .                     | 12500 | Ohms         |
| Transconductance. . . . .                                   | 5500  | Micromhos    |
| Plate Current. . . . .                                      | 7.1   | Milliamperes |
| Grid Voltage, approximate<br>Ib = 50 Microamperes . . . . . | -5.5  | Volts        |

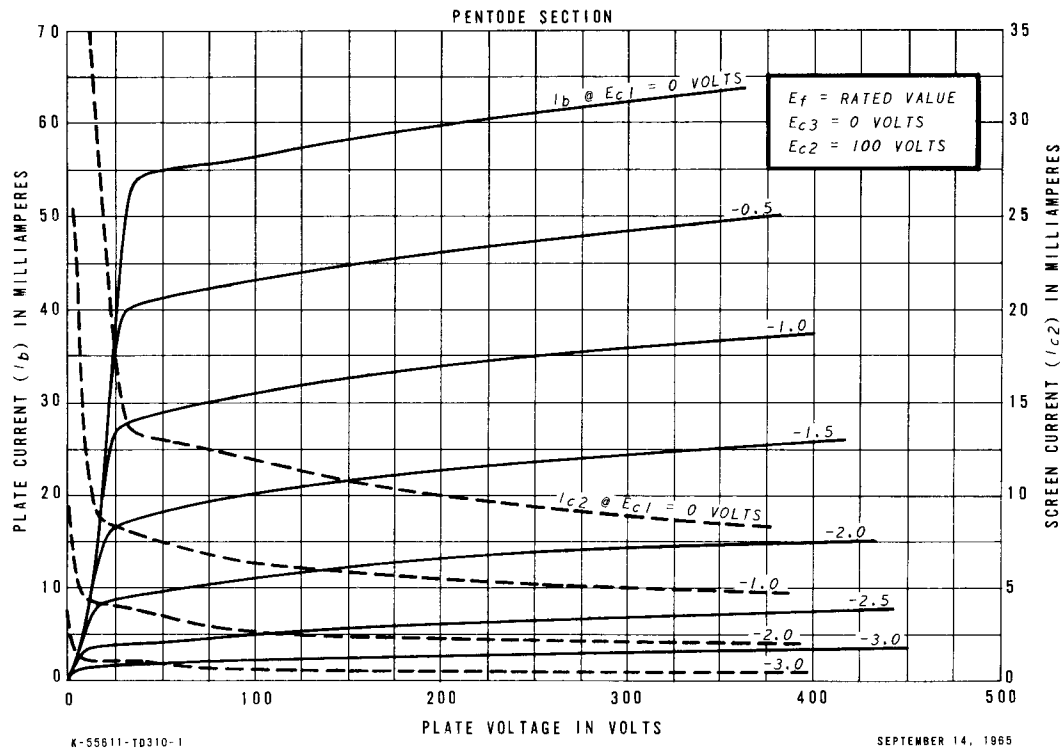
## Triode (Section 2)

|                                                              |      |              |
|--------------------------------------------------------------|------|--------------|
| Plate Voltage. . . . .                                       | 200  | Volts        |
| Cathode-Bias Resistor . . . . .                              | 470  | Ohms         |
| Amplification Factor . . . . .                               | 40   |              |
| Plate Resistance, approximate . . . . .                      | 7600 | Ohms         |
| Transconductance. . . . .                                    | 5300 | Micromhos    |
| Plate Current. . . . .                                       | 7.2  | Milliamperes |
| Grid Voltage, approximate<br>Ib = 100 Microamperes . . . . . | -8   | Volts        |

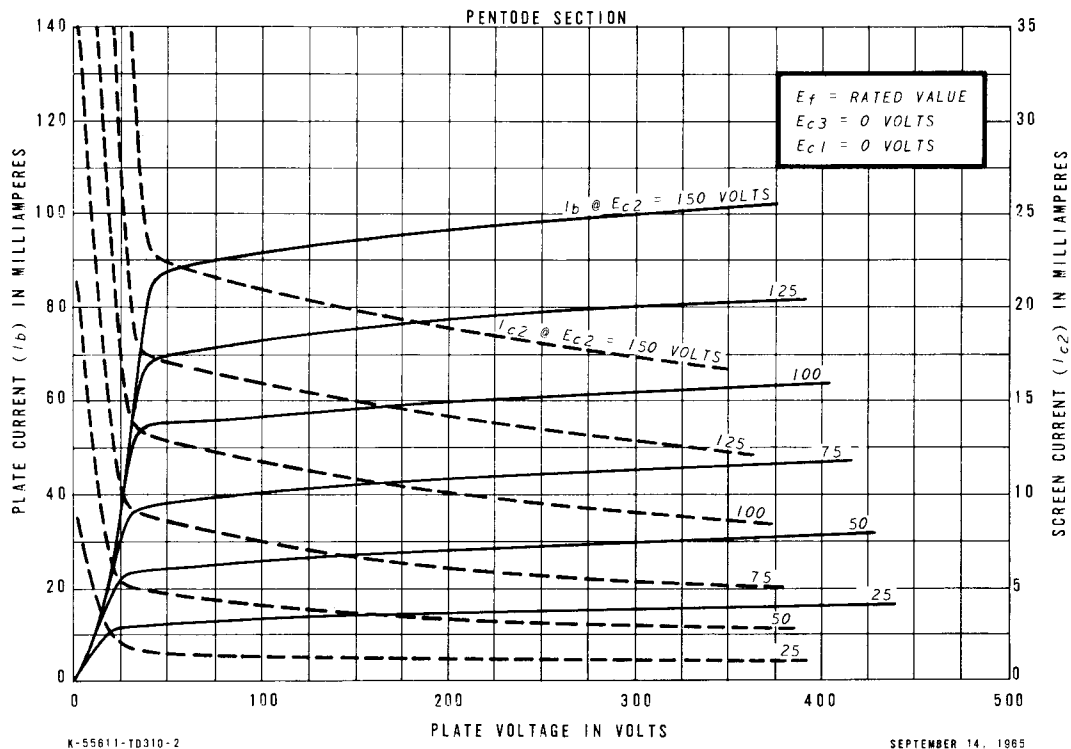
## NOTES

- \* Heater voltage for a bogey tube at  $I_f = 0.6$  amperes.
- ‡ The equipment designer should design the equipment so that heater current is centered at the specified bogey value, with heater supply variations restricted to maintain heater current within the specified tolerance.
- § The time required for the voltage across the heater to reach 80 percent of the bogey value after applying 4 times the bogey heater voltage to a circuit consisting of the tube heater in series with a resistance equal to 3 times the bogey heater voltage divided by the bogey heater current.
- ¶ Without external shield.

## AVERAGE PLATE CHARACTERISTICS

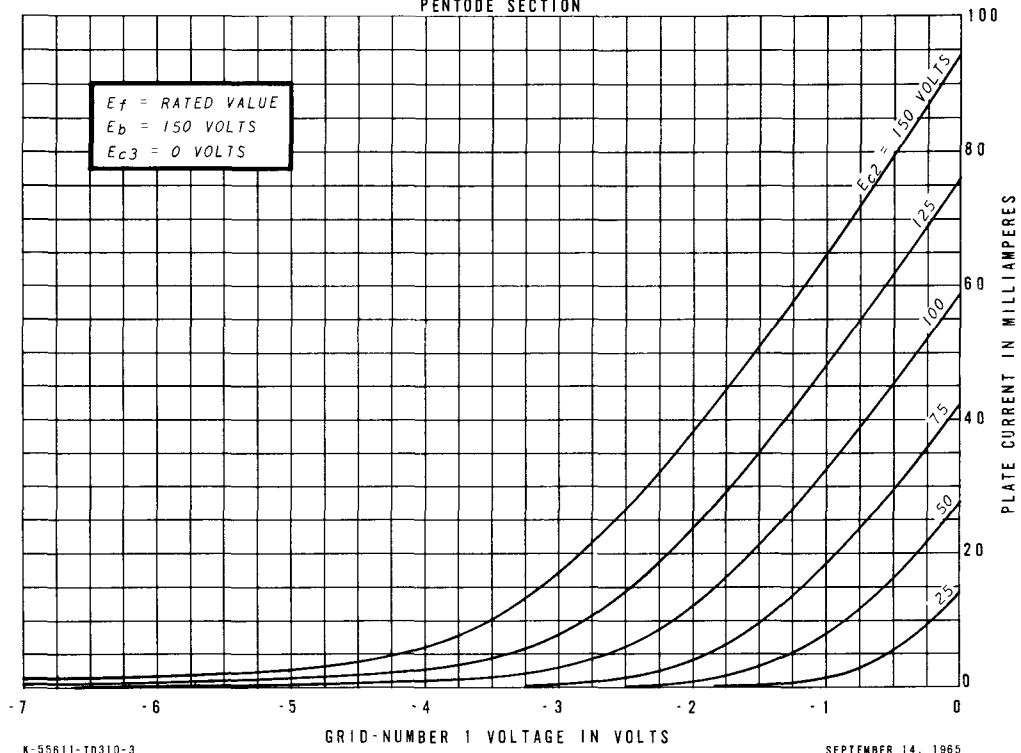


## AVERAGE PLATE CHARACTERISTICS



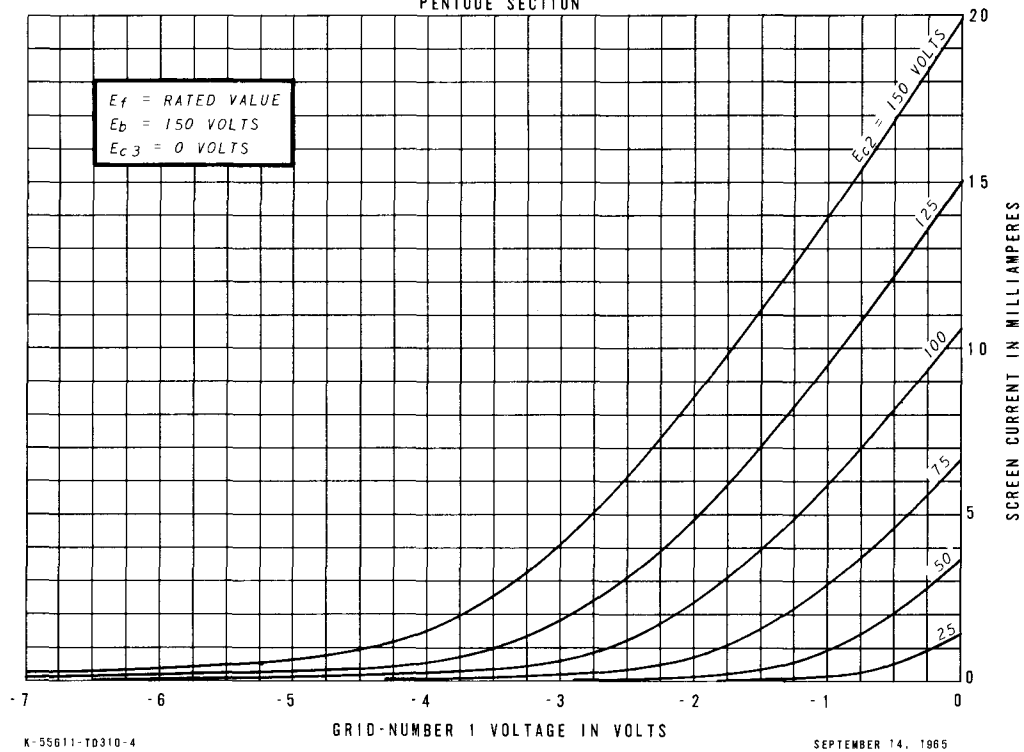
## AVERAGE TRANSFER CHARACTERISTICS

PENTODE SECTION



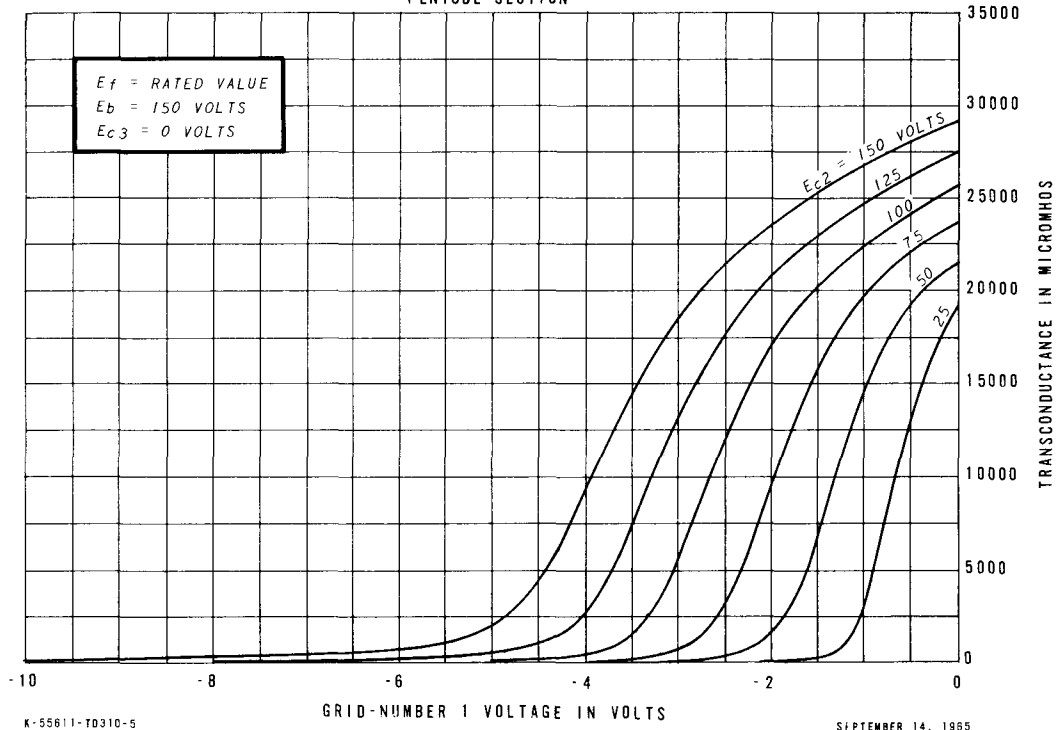
## AVERAGE TRANSFER CHARACTERISTICS

PENTODE SECTION



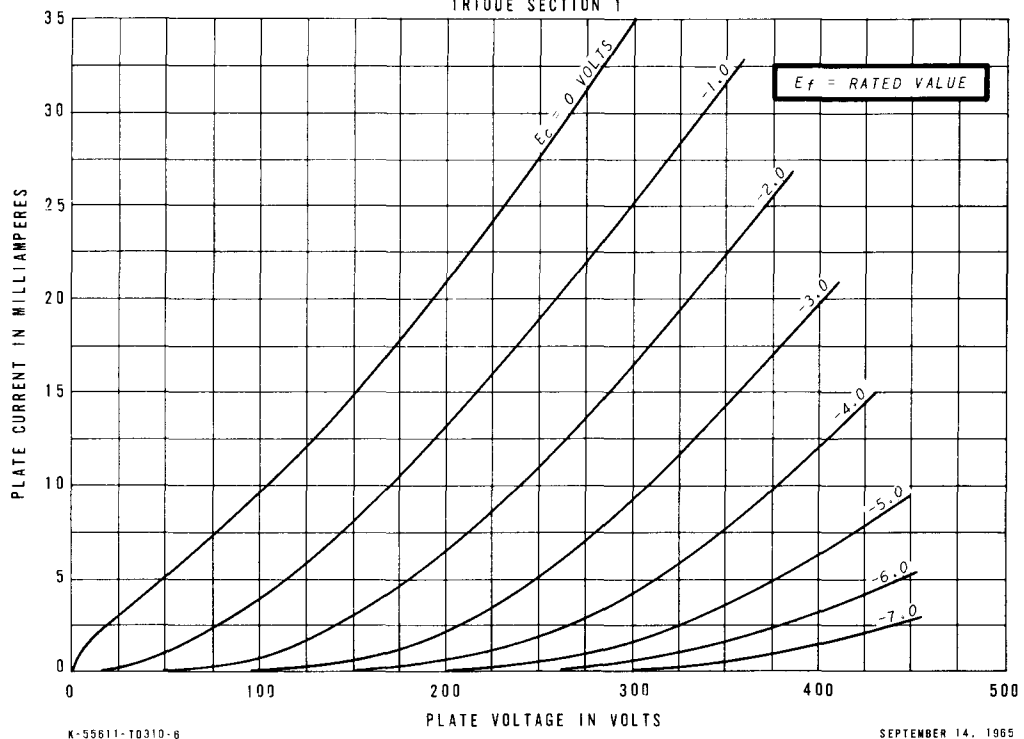
## AVERAGE TRANSFER CHARACTERISTICS

PENTODE SECTION

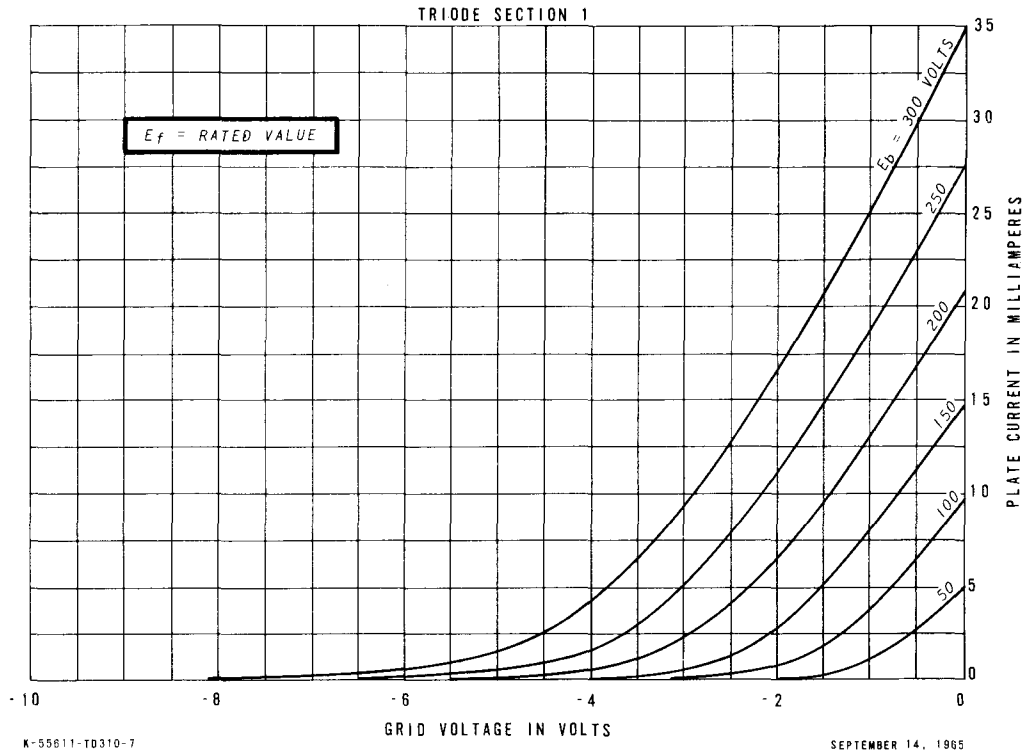


## AVERAGE PLATE CHARACTERISTICS

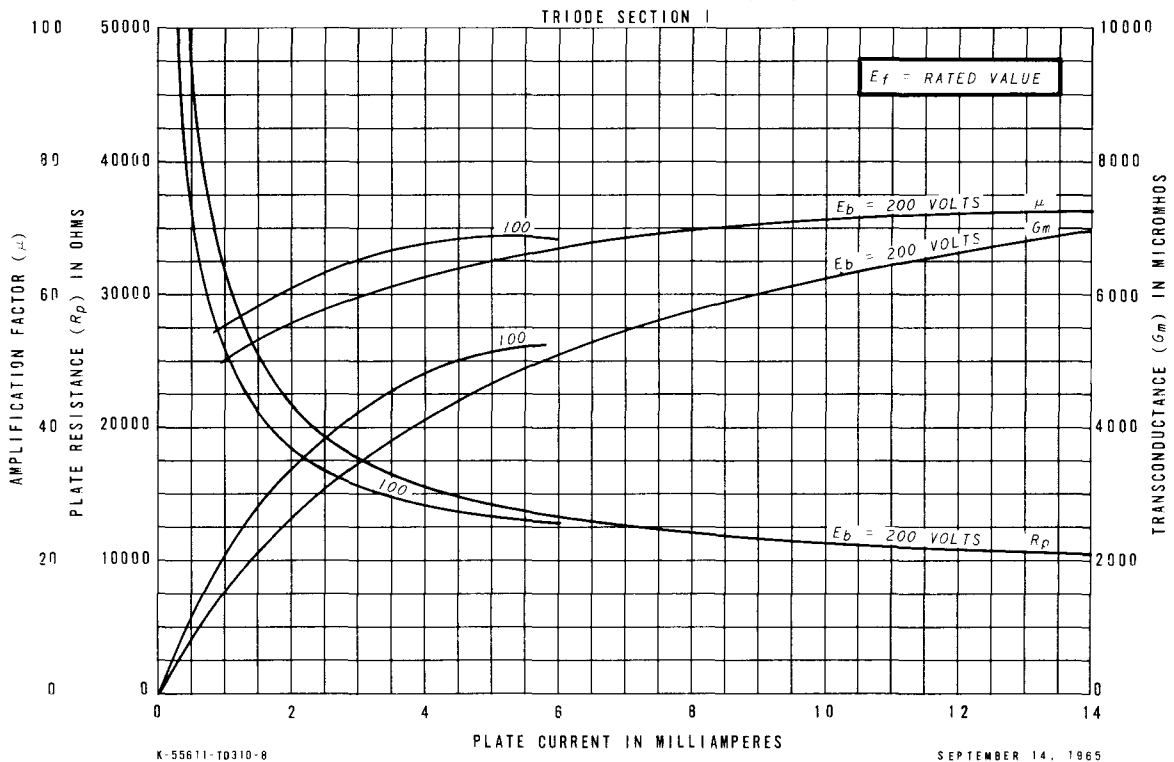
TRIODE SECTION 1



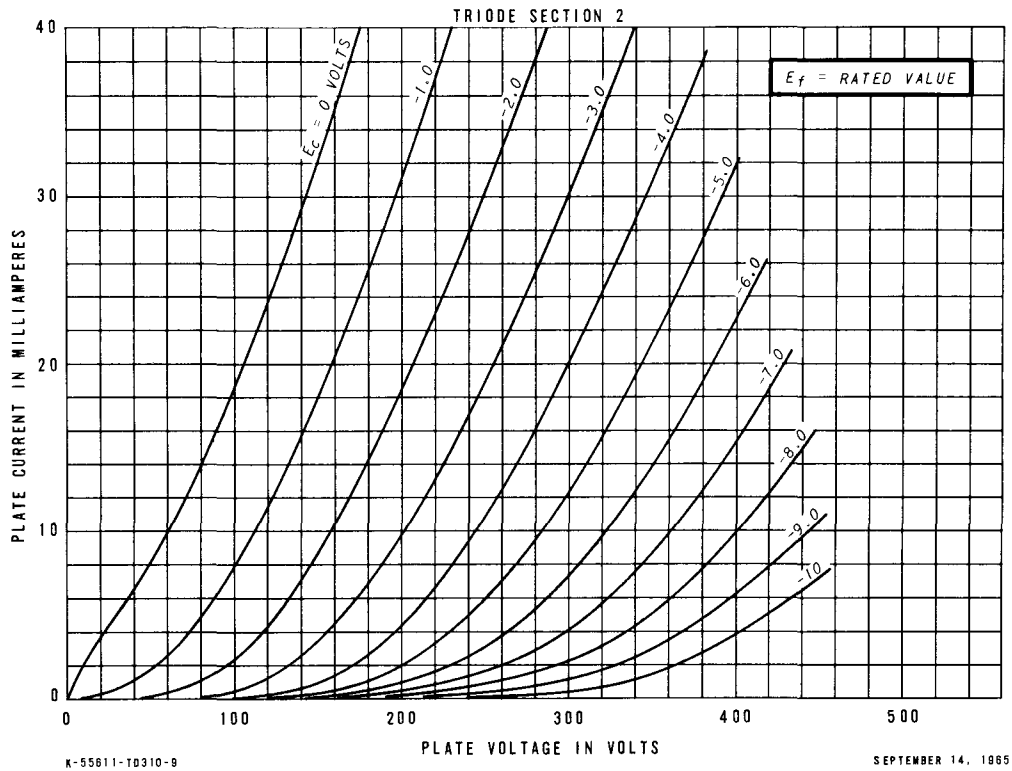
# AVERAGE TRANSFER CHARACTERISTICS



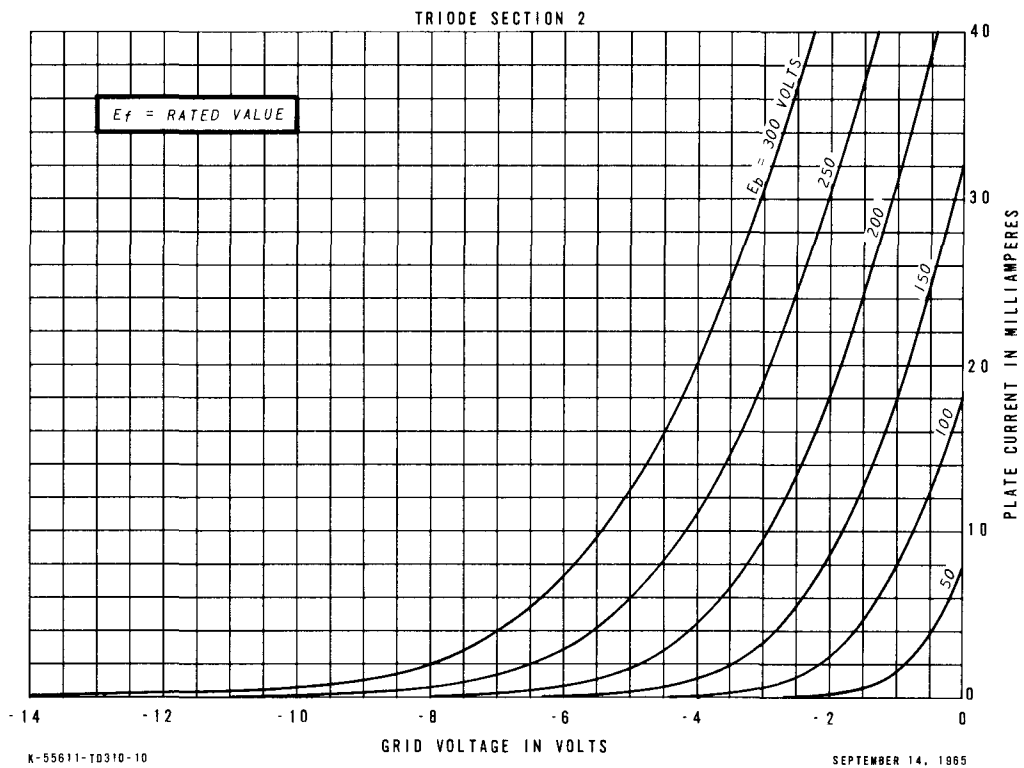
# AVERAGE CHARACTERISTICS



## AVERAGE PLATE CHARACTERISTICS

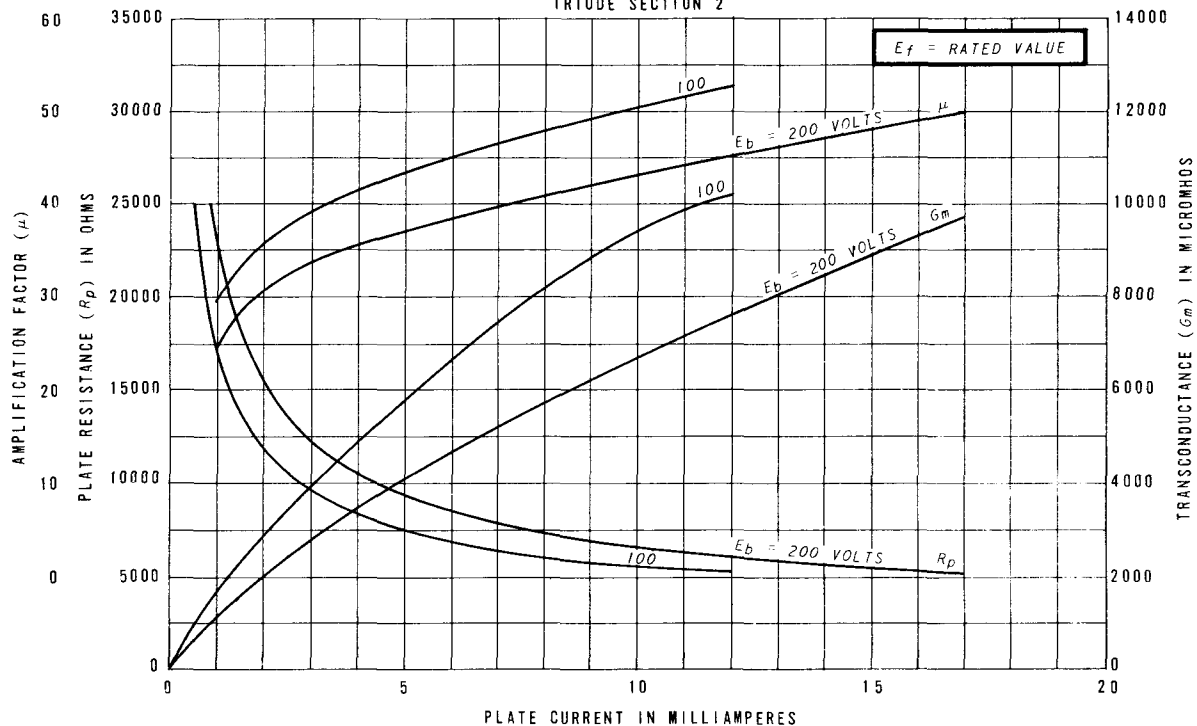


## AVERAGE TRANSFER CHARACTERISTICS



# AVERAGE CHARACTERISTICS

TRIODE SECTION 2



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**11BT11**

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**TUBE DEPARTMENT**

**GENERAL**  **ELECTRIC**

**Owensboro, Kentucky**