RCA TUBE HANDBOOK HB-3

THYRATRON & IGNITRON SECTION

In this section, data are given for RCA Thyratrons and Ignitrons. Thyratrons are used in relay applications, in grid-controlled rectifier service and in motor-control service. Ignitrons have applications in welder-control service, power rectification, and power conversion.

For further Technical Information, write to Commercial Engineering, Tube Department, Radio Corporation of America, Harrison, N. J.

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PRICES□
OF THYRATRON & IGNITRON TYPES
Schedule U▲

Type	*Price*
2D21	$ 2.00
3C23	12.50
3D22	15.00
105	49.50
172	74.00
502-A	1.85
627	22.00
629♣	13.00
672-A	35.00
676	55.00
677	55.00
884	1.85
885♣	2.00
2050	1.85
5550	50.00
5551	80.50
5552	121.00
5553	265.00
5554	190.00
5555	370.00
5557	8.50
5559	22.00
5560	28.00
5563	47.00
5696	1.90

□ This price list applies only in the United States of America and is subject to change without notice. All prices are exclusive of all Federal, State and local excise, sales, and similar taxes.

▲ Schedule U shows user prices for tube types priced for distribution through other than dealer and service channels.

♣ Not recommended for new equipment design.

INFORMATION ON PURCHASING ABOVE TYPES

Information as to where *RCA Thyratrons & Ignitrons* can be purchased may be obtained from our *regional office* nearest you or from *Tube Department, Radio Corporation of America, Harrison, N.J.*

2D21

THYRATRON

GAS TETRODE, MINIATURE TYPE

GENERAL DATA

Electrical:

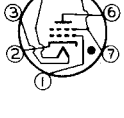
	Min.	Av.	Max.	
Heater, for Unipotential Cathode:				
Voltage (AC or DC)	5.7	6.3	6.9	volts
Current, with heater volts = 6.3	0.54	0.60	0.66	amp
Cathode:				
Heating Time, prior to tube conduction	10	–	–	sec
Direct Interelectrode Capacitances (Approx.):[o]				
Grid No.1 to Anode			0.026	μμf
Input			2.4	μμf
Output			1.6	μμf
Ionization Time (Approx.):				
For conditions: dc anode volts = 100; grid-No.1 square-pulse volts = 50; peak anode amp. during conduction = 0.5			0.5	μsec
Deionization Time (Approx.):				
For conditions: dc anode volts = 125; grid-No.1 volts = -100, grid-No.1 resistor (ohms) = 1000; dc anode amp. = 0.1			35	μsec
For conditions: dc anode volts = 125; grid-No.1 volts = -10; grid-No.1 resistor (ohms) = 1000; dc anode amp. = 0.1			75	μsec
Maximum Critical Grid Current, with ac anode-supply volts (rms) = 460, and average anode amp. = 0.1			0.5	μamp
Anode Voltage Drop (Approx.)			8	volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0; grid-No.2 volts = 0				250
Grid-No.2 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0; grid-No.2 resistor (megohms) = 0; grid-No.1 volts = 0				1000

[o] Without external shield.

Mechanical:

Mounting 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"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW	7BN

Pin 1 – Grid No.1
Pin 2 – Cathode
Pin 3 – Heater
Pin 4 – Heater



Pin 5 – Grid No.2
Pin 6 – Anode
Pin 7 – Grid No.2

← Indicates a change.

2D21
THYRATRON

RELAY and GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, ***Absolute Values*****:**

PEAK ANODE VOLTAGE:		
Forward	650 max.	volts
Inverse	1300 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:		
Peak, before anode conduction	-100 max.	volts
→ Average, during anode conduction■	-10 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Peak, before anode conduction	-100 max.	volts
→ Average, during anode conduction■	-10 max.	volts
CATHODE CURRENT:		
Peak	0.5 max.	amp
Average■	0.1 max.	amp
→ Surge, for duration of 0.1 sec. max.	10 max.	amp
GRID-No.2 CURRENT:		
→ Average■	+0.01 max.	amp
GRID-No.1 CURRENT:		
→ Average■	+0.01 max.	amp
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	25 max.	volts
→ AMBIENT TEMPERATURE RANGE	-75 to +90	°C

→ Typical Operating Conditions for Relay Service:

RMS Anode Voltage	117	400	. .	volts
Grid-No.2 Voltage	0	0	. .	volts
RMS Grid-No.1 Bias Voltage□	5	–	. .	volts
DC Grid-No.1 Bias Voltage	–	-6	. .	volts
Peak Grid-No.1 Signal Voltage	5	6	. .	volts
Grid-No.1-Circuit Resistance	1.0	1.0	. .	megohm
Anode-Circuit Resistance✱	1200	2000	. .	ohms

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	10 max.	megohms

■ Averaged over any interval of 30 sec. max.

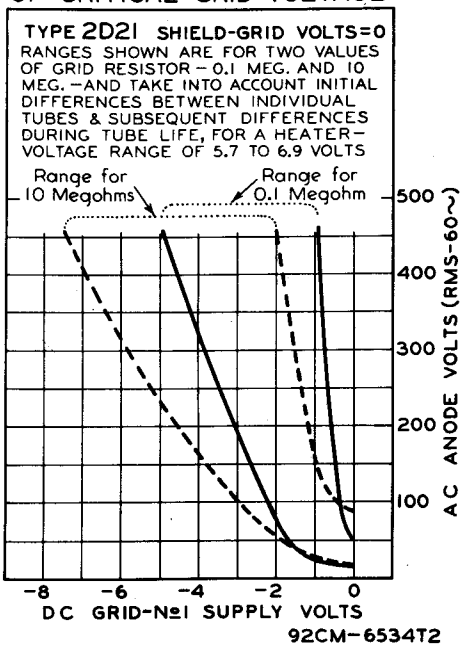
□ Approximately 180° out of phase with the anode voltage.

✱ Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.

→ Indicates a change.

2D21
THYRATHRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE



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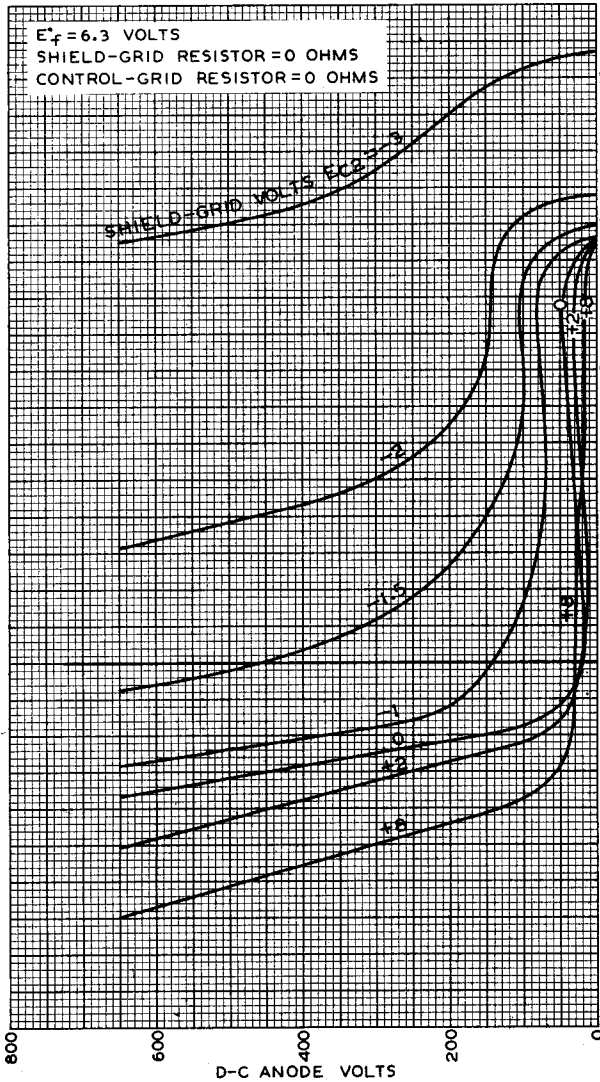
AVERAGE CONTROL CHARACTERISTICS



MAY 2, 1944

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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM—6531RI

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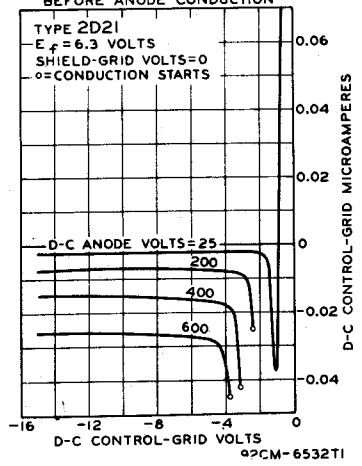
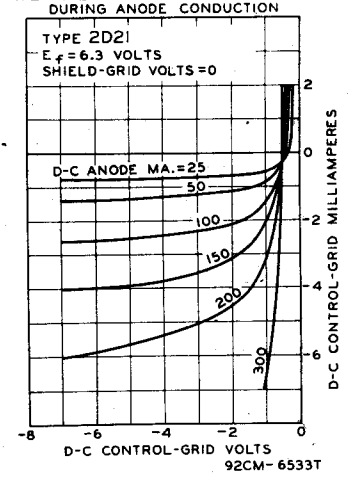
THYRATRON

AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION



AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION



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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

3C23

3C23

THYRATRON

GAS-AND-MERCURY-VAPOR TRIODE

DATA

Electrical:

Filament:				
Voltage*	2.5			volts
Current	7.0			amp
Direct Interelectrode Capacitance:				
Grid to Anode (Approx.)	1.8			µµf
Peak Voltage Drop	16			volts
Approximate Control Characteristics:				
Anode Voltage	25	100	500	volts
Grid Voltage	0	-2.5	-4.5	volts
Ionization Time (Approx.)	10			µseconds
Deionization Time (Approx.)	1000			µseconds

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	5-7/8" ± 1/4"
Seated Length	5-1/4" ± 1/4"
Maximum Diameter	2-1/16"
Bulb	ST-16
Cap	Medium Metal
Base	Medium 4-Pin, Bayonet

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE	1250 max.	volts
PEAK INVERSE ANODE VOLTAGE	1250 max.	volts
GRID VOLTAGE:		
Before Conduction	-500 max.	volts
During Conduction	-10 max.	volts
INSTANTANEOUS ANODE CURRENT:		
Below 25 Cycles	3.0 max.	amp
25 Cycles and Higher	6.0 max.	amp
AVERAGE ANODE CURRENT:**		
Below 210 Cycles	1.5 max.	amp
210 to 400 Cycles	1.0 max.	amp
SURGE ANODE CURRENT, for 0.1 sec., max.	120 max.	amp
INSTANTANEOUS GRID CURRENT	0.050 max.	amp
AVERAGE GRID CURRENT**	0.010 max.	amp
COND.-MERCURY TEMPERATURE RANGE▲	-40 to +80	°C

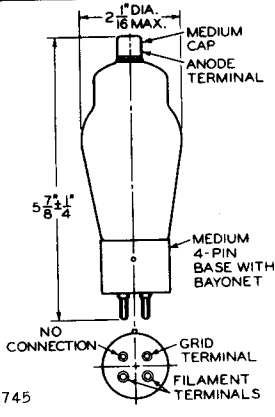
* Must be applied for at least 15 seconds before anode voltage is applied.

** Averaged over any interval of 5 seconds.

▲ Recommended condensed-mercury temperature = 40°C.

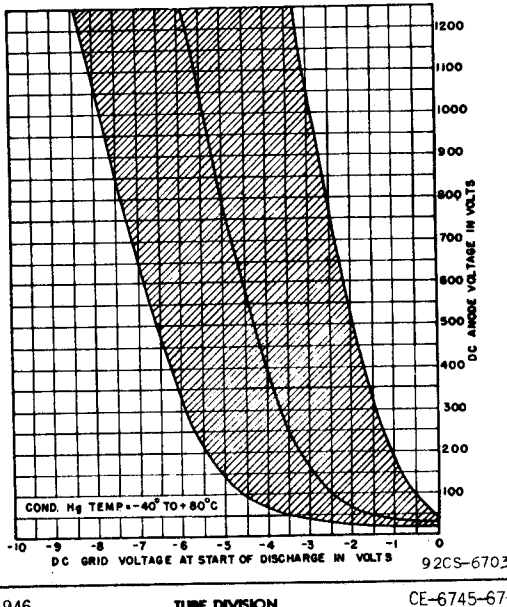
3C23

3C23
THYRATRON



92CS-6745

TYPICAL CONTROL CHARACTERISTICS
SHADED AREA SHOWS RANGE OF CHARACTERISTIC



92CS-6703

3C45

HYDROGEN THYRATRON

POSITIVE-CONTROL, TRIODE TYPE

GENERAL DATA

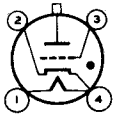
Electrical:

Heater, for Unipotential Cathode:		
Voltage	6.3 $^{+5\%}_{-10\%}$	ac or dc volts
Current at 6.3 volts:		
Minimum	2.0	amp
Average	2.3	amp
Maximum	2.5	amp
Minimum Heating Time	2	minutes
Direct Interelectrode Capacitances (Approx.):		
Grid to Anode	3.9	μμf
Grid to Cathode	8.6	μμf
Ionization Time (Approx.)□	0.6	μsec
Deionization Time (Approx.)	25	μsec
Anode-Cathode Voltage Drop (Approx.):		
At middle of pulse duration	150	volts
Maximum Variation in Firing Time (Jitter)	0.06	μsec

Mechanical:

Operating Position	Any
Overall Length	4-3/4" ± 1/4"
Seated Length	4-1/8" ± 1/4"
Maximum Diameter	1-9/16"
Bulb	T-12
Cap	Small (JETEC No.C1-1)
Base	Medium-Shell Small 4-Pin, Micanol (JETEC No.A4-9)

BOTTOM VIEW



Pin 1 - Heater
Pin 2 - Cathode
Pin 3 - Grid
Pin 4 - Heater, Cathode
Cap - Anode

Cooling . . . . . Natural

PULSE MODULATOR SERVICE

Maximum and Minimum CCS● Ratings, *Absolute Values*:

DC ANODE-SUPPLY VOLTAGE	800 min.	volts

□ Defined as the time interval between the point on the rising portion of the grid pulse which is 26% of the peak unloaded pulse amplitude and the point on the anode-current pulse which is 26% of its peak amplitude. The anode-current pulse has a time rise of 0.05 microsecond maximum. The grid pulse has a peak amplitude of 130 volts minimum, has a rise time of 0.5 microsecond maximum, and is supplied by a driver having 1500 ohms maximum internal impedance.

● Continuous Commercial Service.

3C45

3C45

HYDROGEN THYRATRON

PEAK ANODE VOLTAGE:		
Forward (E_{bmf})*	3000 max.	volts
Inverse	5% of E_{bmf} min.	volts
After anode-current pulse:▲		
During first 25 μsec	1500 max.	volts
After first 25 μsec	3000 max.	volts
GRID VOLTAGE:		
Negative (DC or Peak), before conduction	200 max.	volts
Peak Positive Pulse	175 min.	volts
ANODE CURRENT:		
Peak	35 max.	amp
Average°	0.045 max.	amp
Rate of Rise	750 max.	amp/μsec
OPERATION FACTOR†	3×10^8 max.	
PULSE DURATION●	6 max.	μsec
AMBIENT TEMPERATURE	-50 to +90	°C

Typical Operation● at 2000 pps in Circuit of Fig.1:

	Pulse Duration of 0.5 μsec	
DC Anode-Supply Voltage	1250	volts
Peak Anode Voltage:		
Forward	3000	volts
Inverse:		
Immediately after anode-current pulse	530	volts
Grid Voltage:		
Negative, before conduction	0	volts
Peak Positive Pulse (Unloaded)	175	volts
Effective Grid-Circuit Resistance	1000	ohms
Anode Current:		
Peak	35	amp
Average°	0.035	amp
Operation Factor†	2.1×10^8	
Peak Power Output to Pulse Transformer (T)	43000	watts

Maximum Circuit Values:

Effective Grid-Circuit Resistance	1500 max.	ohms

* In applications where the anode voltage is applied instantaneously, the power-supply filter should be designed so that the peak forward anode voltage is applied at a rate not to exceed 75000 volts per second.

▲ Exclusive of spike not having more than 0.05 microsecond duration.

● Operation with a bulb temperature within the approximate range of 60° to 90°C measured on the bulb directly opposite the anode is recommended for longest life. To attain this temperature under operating conditions involving low ambient temperature, the use of a heat-conserving enclosure for the tube may be necessary.

° Averaged over any cycle.

†,●: See next page.

RCA

3C45

HYDROGEN THYRATRON

† Defined as *Peak Forward Anode Volts x Pulse Repetition Rate (pps) x Peak Anode Amperes* (excluding spike).

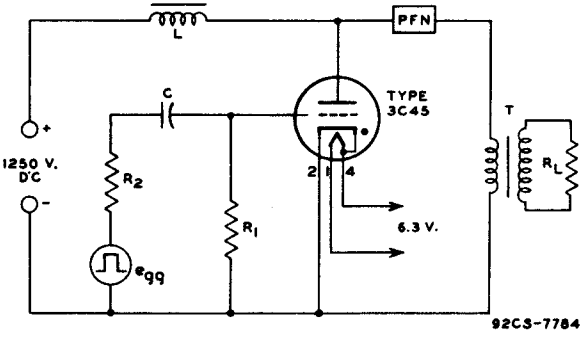
* Pulse duration is defined as the time interval between points on the pulse envelope at which instantaneous amplitudes are equal to 70.7% of the maximum amplitude excluding spike.

OPERATING CONSIDERATIONS

The *ambient-temperature operating range* for the 3C45 extends from −50° to +90°C (−58° to +194°F). Within this range, there is no appreciable effect on the electrical characteristics of the tube. However, for longest life, it is recommended that the tube be operated with a *bulb temperature* within the approximate range of 60° to 90°C (140° to 194°F). Under no circumstances should a stream of cooling air be applied to the glass envelope.

The *Connector* for the anode cap should be of the heat-radiating type and should have ample current-carrying capability for the operating requirements.

Fig. 1 – Typical Pulse-Modulator Circuit Operating at 2000 pps.



C: Blocking Capacitor, 0.001 μf

e_{gg}: Pulse Generator supplying peak positive pulse grid voltage of 175 volts (unloaded)

L: Charging Choke, 5 henries

PFN: Pulse-Forming Network with iterative impedance of 50 ohms, and a two-way transmission time of 0.5 microsecond

R_1: Grid Resistor, 30000 ohms

R_2: Effective Resistance of grid circuit, 1000 ohms

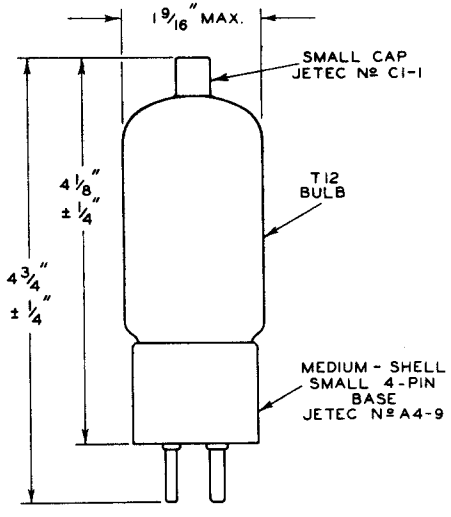
R_L: Load Resistance. Value reflected into primary of transformer (T) is 35 ohms.

T: Matching Pulse Transformer

RCA

3C45

HYDROGEN THYRATRON



92CS-7757

3D22
THYRATRON

GAS TETRODE

GENERAL DATA

Electrical:

	Min.	Av.	Max.	
Heater, for Unipotential Cathode:				
Voltage (AC or DC)	5.7	6.3	6.9	volts
Current, with heater volts = 6.3	2.35	2.60	2.85	amp
Cathode:				
Heating Time, prior to tube conduction	30	–	–	sec
Outage Time, without reheating	–	–	3	sec
Direct Interelectrode Capacitances (Approx.):●				
Grid No.1 to Anode			0.1	μμf
Input			7	μμf
Output			3.6	μμf

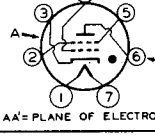
● Without external shield, and with base shell floating.

Ionization Time (Approx.):		
For conditions: dc anode volts = 100; grid-No.1 square-pulse volts = +100; and peak anode amp. during conduction = 8	0.5	μsec
Deionization Time (Approx.):		
For conditions: dc anode volts = 125; grid-No.1 volts = -200, grid-No.1 resistor (ohms) = 1000; and dc anode amp. = 0.8	150	μsec
For conditions: dc anode volts = 125, grid-No.1 volts = -14.8; grid-No.1 resistor (ohms) = 1000; and dc anode amp. = 0.8	400	μsec
Maximum Critical Grid Current, with ac anode-supply volts (rms) = 460, and average anode amp. = 0.8	0.8	μamp
Anode Voltage Drop (Approx.)	10	volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0 to 0.1; grid-No.2 resistor (megohms) = 0; and grid-No.2 volts = 0	150	
Grid-No.2 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0; grid-No.2 resistor (megohms) = 0 to 0.1; and grid-No.1 volts = -3	650	

Mechanical:

Mounting Position	Any
Maximum Overall Length	4-5/8"
Maximum Seated Length	4"
Maximum Diameter	2-3/8"
Bulb	T-16
Base	Medium-Metal-Shell Giant 7-Pin, Bayonet
Basing Designation for BOTTOM VIEW	7BV

Pin 1 – Heater
Pin 2 – Grid No.2
Pin 3 – Cathode
Pin 4 – Grid No.1
Pin 5 – Grid No.2
Pin 6 – Anode
Pin 7 – Heater



AA'= PLANE OF ELECTRODES

← Indicates a change.

3D22
THYRATRON

RELAY and GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, *Absolute Values*:

PEAK ANODE VOLTAGE:		
Forward	650 max.	volts
→ Inverse	1500 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:		
Peak, before anode conduction	-100 max.	volts
→ Average, during anode conduction■	-10 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Peak, before anode conduction	-200 max.	volts
→ Average, during anode conduction■	-10 max.	volts
→ CATHODE CURRENT:		
Peak	8 max.	amp
Average■	0.8 max.	amp
Surge, for duration of 0.1 sec. max.	30 max.	amp
GRID-No.2 CURRENT:		
→ Average■	+0.1 max.	amp
GRID-No.1 CURRENT:		
→ Average■	+0.05 max.	amp
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	25 max.	volts
AMBIENT TEMPERATURE RANGE	-75 to +90	°C

Maximum Circuit Values:

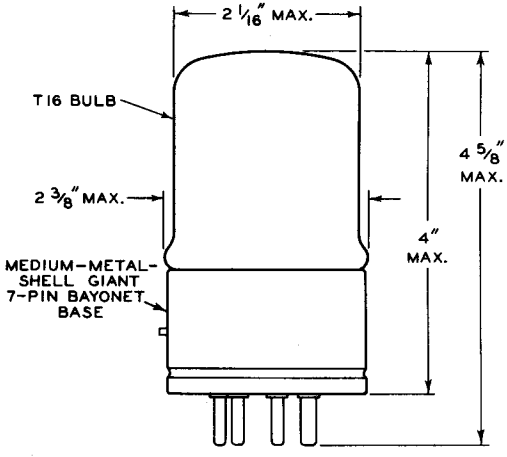
Grid-No.1-Circuit Resistance	2 max.	megohms

■ Averaged over any interval of 30 sec. max.

NOTE: Sufficient anode-circuit resistance, including tube load, must be used under all conditions of operation to prevent exceeding the current ratings of the tube.

→ Indicates a change.

3D22
THYRATRON

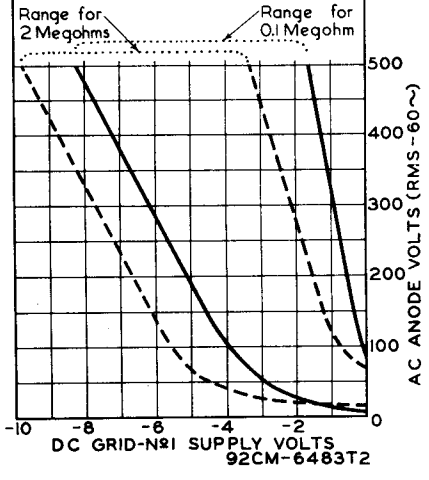


92CM-6569RI

3D22
THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

TYPE 3D22
GRID-№2 (SHIELD) VOLTS = 0
RANGES SHOWN ARE FOR TWO VALUES OF GRID RESISTOR—0.1 MEG. AND 2 MEG.—AND TAKE INTO ACCOUNT INITIAL DIFFERENCES BETWEEN INDIVIDUAL TUBES AND SUBSEQUENT DIFFERENCES DURING TUBE LIFE, FOR HEATER-VOLTAGE RANGE OF 5.7 TO 6.9 VOLTS, AND FOR AN AMBIENT TEMPERATURE RANGE OF −40 TO +90 °C.

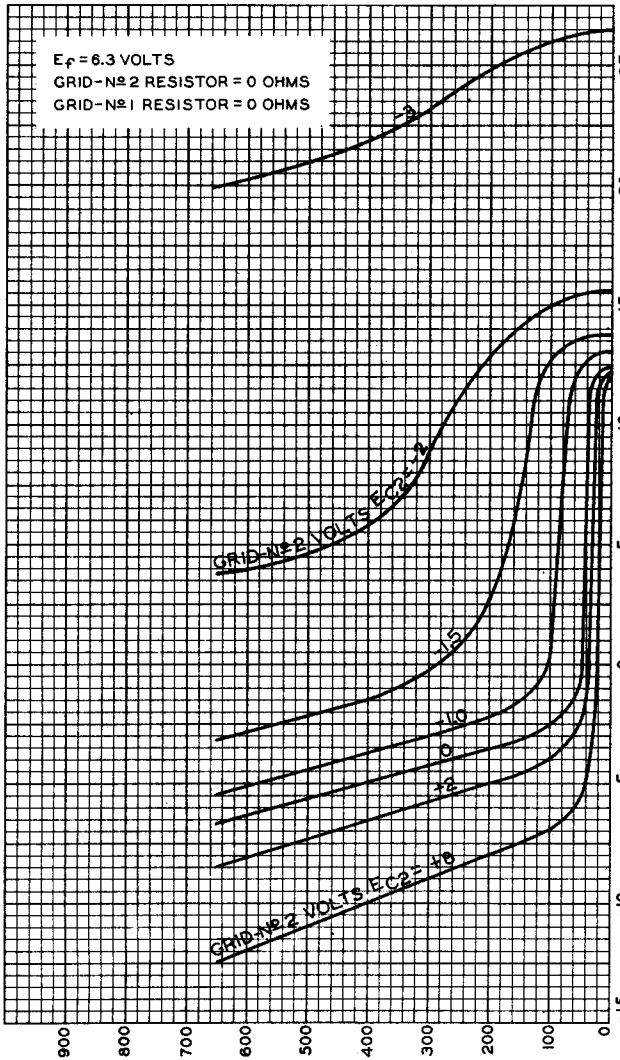


TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

RCA

3D22

AVERAGE CONTROL CHARACTERISTICS



JAN. 22, 1947

TUBE DEPARTMENT

RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6831

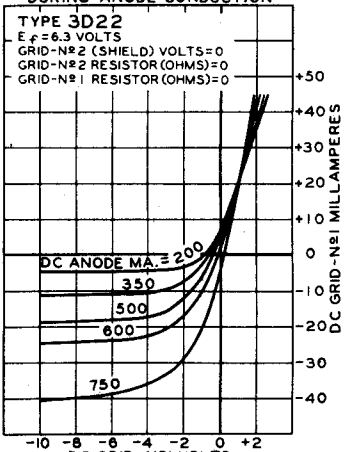
3D22

RCA

3D22

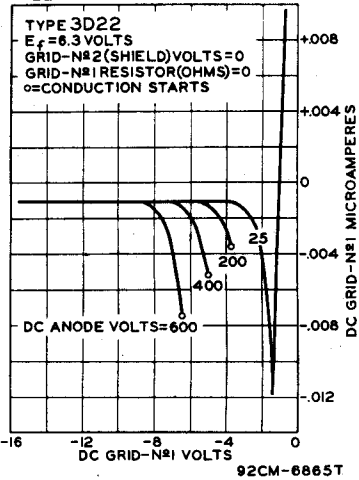
THYRATRON

AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION



92CM-6830T

AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION



92CM-6865T

105

THYRATRON

MERCURY-VAPOR TETRODE

DATA

Electrical:

	Continuous Service		Intermittent Service		
Heater, for Unipotential Cathode:					
Voltage*	5.0	5.0	5.5	5.0	volts
Current	10.0	10.0	11.0	10.0	amp
Direct Interelectrode Capacitance:					
Grid-No.1 to Anode (Approx.)	0.3	0.3	0.3	0.3	μμf
Peak Voltage Drop (Approx.)	16	16	16	16	volts
Approx. Control Characteristics:					
Anode Voltage	100	1000	100	1000	volts
Grid-No.2 Voltage	0	0	0	0	volts
Grid-No.1 Voltage	+1	-9	+1	-9	volts
Ionization Time (Approx.)	10	10	10	10	μsec.
Deionization Time (Approx.)	1000	1000	1000	1000	μsec.

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	11" ± 1/4"
Seated Length	10-1/4" ± 1/4"
Greatest Radius	2-13/16"
Bulb	ST-30
Caps	No. 3917
Base	Super-Jumbo 4-Pin, with Bayonet

Maximum Ratings, Absolute Values:

	Continuous Service	Intermittent Service		
PEAK FORWARD ANODE VOLT.	2500	750	10000	max.volts
PEAK INVERSE ANODE VOLT.	2500	750	10000	max.volts
GRID-No.1 (CONT.GRID) VOLT.:				
Before Conduction	-1000	-1000	-1000	max.volts
During Conduction	-10	-10	-10	max.volts
GRID-No.2 (SH'LD GRID) VOLT.:				
Before Conduction	-500	-500	-500	max.volts
During Conduction	-10	-10	-10	max.volts
INSTANTANEOUS ANODE CUR.:				
Below 25 Cycles	12.8	5.0	8.0	max.amp
25 Cycles and Higher	40	77	16	max.amp
AVERAGE ANODE CURRENT	6.4	2.5	4.0	max.amp
SURGE ANODE CUR., for 0.1 sec., max.	400	400	160	max.amp
INSTANTANEOUS GRID-No.1 CUR.	1.0	1.0	1.0	max.amp
AVERAGE GRID-No.1 CUR.	0.25	0.25	0.25	max.amp
INSTANTANEOUS GRID-No.2 CUR.	2.0	2.0	2.0	max.amp
AVERAGE GRID-No.2 CUR.	0.5	0.5	0.5	max.amp
TIME OF AVERAGING CURRENT	15	5	15	max.sec
COND.-MERCURY TEMP. RANGE▲	40-80	30-95	25-50	°C

* Must be applied 5 minutes before anode voltage is applied.
▲ Recommended condensed-mercury temperature = 40°C.

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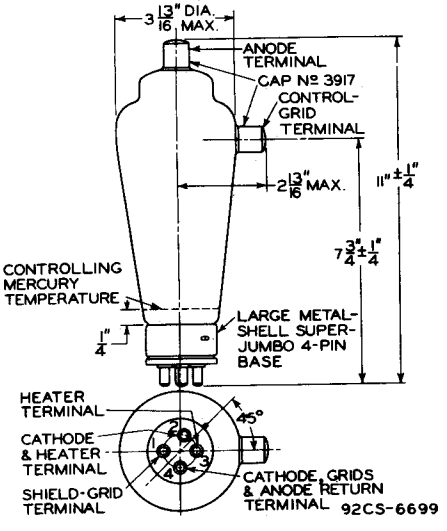
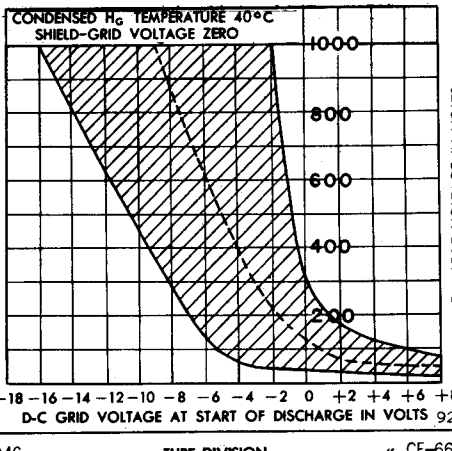
THYRATRON



OPERATIONAL REGION OF CRITICAL GRID VOLTAGE



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THYRATRON

METAL MERCURY-VAPOR TETRODE

Electrical:

DATA

	Continuous Service		Welder-Control Service		
Heater, for Unipotential Cathode:					
Voltage*.	5.0	5.0	5.0	5.5	volts
Current	10.0	10.0	10.0	11.0	amp
Direct Interelectrode Capacitance (Approx.):					
Grid No.1 to Anode	0.07	0.07	0.07	0.07	μμf
Peak Voltage Drop . .	16	16	16	16	volts
Approx. Control Characteristics:					
Anode Voltage . . .	100	2000	100	2000	volts
Grid-No.1 Voltage .	+1.0	-14	+1.0	-14	volts
Grid-No.2 Voltage .	0	0	0	0	volts
Ionization Time(Approx.)	10	10	10	10	μsec
Deionization Time (Approx.)	1000	1000	1000	1000	μsec

Mechanical:

Mounting Position	Vertical, Radiator Down
Overall Rigid Length.	10-11/16" ± 1/16"
Greatest Radius	2-5/8"
Terminals	See Outline Drawing

Maximum Ratings, Absolute Values:

	Continuous Service	Welder-Control Service	
PEAK FORWARD ANODE VOLT. .	2000 max.	750 max.	volts
PEAK INVERSE ANODE VOLT. .	2000 max.	750 max.	volts
GRID-No.1 (CONT. GRID) VOLT.:			
Before Conduction	-1000 max.	-1000 max.	volts
During Conduction	-10 max.	-10 max.	volts
GRID-No.2 (SHL'D GRID) VOLT.:			
Before Conduction	-300 max.	-300 max.	volts
During Conduction	-5.0 max.	-5.0 max.	volts
INSTANTANEOUS ANODE CUR.:			
Below 25 Cycles	13.0 max.	13.0 max.	amp
25 Cycles and Higher. . .	40 max.	77 max.	amp
AVERAGE ANODE CURRENT** . .	6.4 max.	2.5 max.	amp
SURGE ANODE CURRENT for 0.1 sec. max.	400 max.	400 max.	amp
INSTANTANEOUS GRID-No.1 CUR.	1.0 max.	1.0 max.	amp
AVERAGE GRID-No.1 Cur.** .	0.25 max.	0.25 max.	amp
INSTANTANEOUS GRID-No.2 CUR.	2.0 max.	2.0 max.	amp
AVERAGE GRID-No.2 CUR.**. .	0.5 max.	0.5 max.	amp
COND.-MERCURY TEMP. RANGE▲	40 - 80	30 - 95	°C

* Must be applied at least 5 minutes before anode voltage is applied.

** Averaged over any 15-second interval.

▲ Recommended condensed-mercury temperature 40°C.

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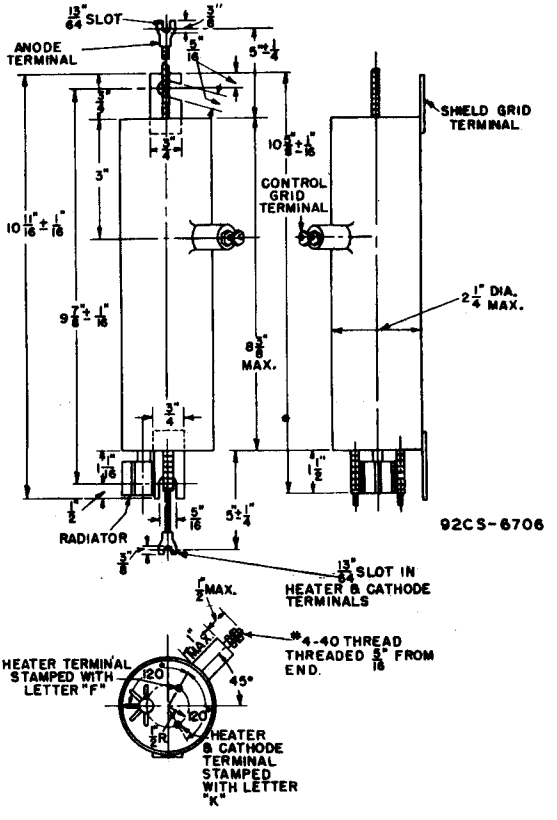
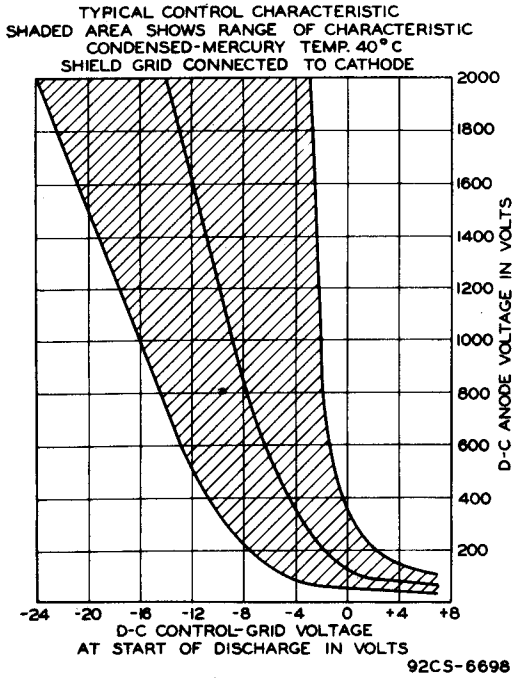
THYRATRON



172
THYRATRON



502-A
THYRATRON
GAS TETRODE TYPE

GENERAL DATA

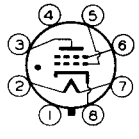
Electrical:

Heater, for Unipotential Cathode:				
Voltage	6.3			ac or dc volts
Current	0.6			amp
Cathode:				
Heating Time, prior to tube conduction	10			sec
Direct Interelectrode Capacitance (Approx.):				
Grid No.1 to Anode	0.2			μμf
Ionization Time (Approx.)	5			μsec
Deionization Time (Approx.)	1000			μsec
Maximum Critical Grid-No.1 Current	4			μamp
Anode Voltage Drop(Approx.)	11			volts
Approximate Control Characteristics (With 0.1-megohm grid-No.1 resistor):				
Peak Anode Voltage	30	100	650	volts
Grid-No.1 Voltage	0	-1.5	-3.75	volts
Grid-No.2 Voltage	0	0	0	volts

Mechanical:

Mounting Position	Any
Maximum Overall Length	2-5/8" ←
Seated Length	1-31/32" ± 3/32" ←
Maximum Diameter	1-5/16" ←
Bulb	Metal Shell MT-8 ←
Base	Small-Wafer Octal 8-Pin
Basing Designation for BOTTOM VIEW	6BS

Pin 1 - No Connection
Pin 2 - Heater
Pin 3 - Anode
Pin 4 - No Connection
Pin 5 - Grid No.1



Pin 6 - Grid No.2
Pin 7 - Heater
Pin 8 - Cathode, Shell

RELAY and GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, ***Absolute Values*****:**

PEAK ANODE VOLTAGE:		
Forward	650 max.	volts
Inverse	1300 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:		
Peak, before anode conduction	-100 max.	volts
Average, during anode conduction[D]	-5 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Peak, before anode conduction	-200 max.	volts
Average, during anode conduction[D]	-10 max.	volts

[D] See next page.

← Indicates a change.

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THYRATRON

CATHODE CURRENT:		
Peak	1.0 max.	amp
Average[□]	0.1 max.	amp
Surge, for duration of 0.1 sec. max.	10 max.	amp
GRID-No.2 CURRENT:		
Average[□]	10 max.	ma
GRID-No.1 CURRENT:		
Average[□]	10 max.	ma
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	25 max.	volts
AMBIENT TEMPERATURE RANGE	-55 to +90	°C

[□] Averaged over any interval of 30 sec. max.

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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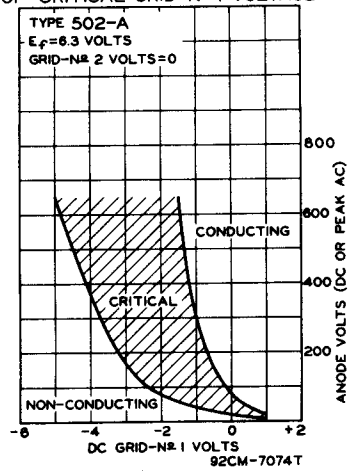
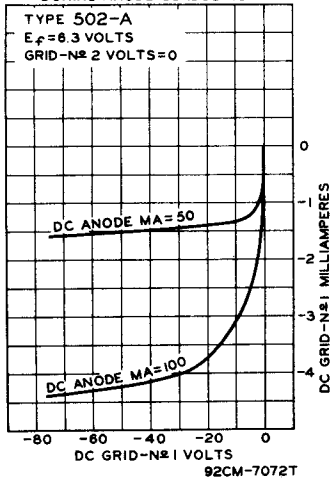
THYRATRON

OPERATIONAL RANGE
OF CRITICAL GRID-Nº 1 VOLTAGE



AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION



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THYRATRON

MERCURY-VAPOR TRIODE

DATA

Electrical:

Filament:		
Voltage*	2.5	volts
Current	6.0	amp
Direct Interelectrode Capacitance:		
Anode to Grid (Approx.)	2.5	μμf
Peak Voltage Drop	12	volts
Control Characteristic	Negative	
Ionization Time (Approx.)	10	μseconds
Deionization Time (Approx.)	1000	μseconds

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	6-3/8" ± 1/4"
Seated Length	6" ± 1/4"
Maximum Diameter	2-1/16"
Bulb	S-19
Cap	Medium Metal
Base	Small Shell Super-Jumbo 4-Pin

Maximum Ratings, Absolute Values:
For frequencies up to 150 cycles

PEAK FORWARD ANODE VOLTAGE	1250 max.	volts
PEAK INVERSE ANODE VOLTAGE	2500 max.	volts
PEAK GRID VOLT. (Before Conduction)	-500 max.	volts
PEAK ANODE CURRENT	2.5 max.	amp
AVERAGE ANODE CURRENT**	0.64 max.	amp
SURGE ANODE CURRENT for 0.1 sec. max.	25 max.	amp
GRID CURRENT, Before Conduction (Grid Neg.)	4 max.	μamp
PEAK GRID CURRENT	0.25 max.	amp
AVERAGE GRID CURRENT**	0.06 max.	amp
COND.-MERCURY TEMPERATURE RANGE ▲	25-70	°C

* Filament voltage must be applied at least 10 seconds before start of tube conduction.

** Averaged over any 30-second interval.

▲ Recommended Condensed-Mercury Temperature 40 to 45°C.

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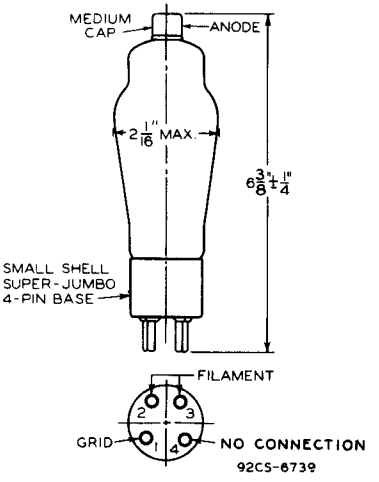
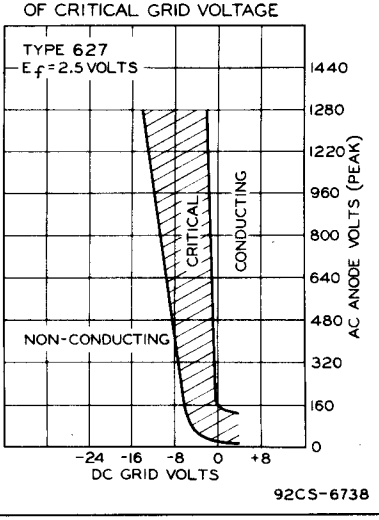
THYRATRON





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THYRATRON

GAS TRIODE

DATA

Electrical:

Heater, for Unipotential Cathode:			
Voltage*	2.5		volts
Current	2.6		amp
Direct Interelectrode Capacitances	(Approx.):		
Grid to Anode	3.3		μμf
Grid to Cathode	3.3		μμf
Anode to Cathode	1.8		μμf
Peak Voltage Drop	15		volts
Control Characteristic	Negative		
Ionization Time (Approx.)	10		μseconds
Deionization Time (Approx.)	1000		μseconds

Mechanical:

Mounting Position	Any
Maximum Overall Length	4-1/4"
Maximum Seated Length	3-5/8"
Maximum Diameter	1-9/16"
Bulb	ST-12
Base	Small 5-Pin

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE	350 max.	volts
PEAK INVERSE ANODE VOLTAGE	350 max.	volts
PEAK GRID VOLTAGE	-90 max.	volts
PEAK ANODE CURRENT	0.2 max.	amp
AVERAGE ANODE CURRENT**	0.04 max.	amp
SURGE ANODE CURRENT for 0.1 sec. max.	2.0 max.	amp
GRID CURRENT, Before Conduction	2.5 max.	μamp
PEAK GRID CURRENT	20 max.	ma.
AVERAGE GRID CURRENT**	0.4 max.	ma.
DC HEATER-CATHODE POTENTIAL RANGE	-45 to +5	volts
AMBIENT TEMPERATURE RANGE	-40 to +70	°C

* Heater voltage must be applied at least 30 seconds before start of tube conduction.

** Averaged over any 10-second interval.

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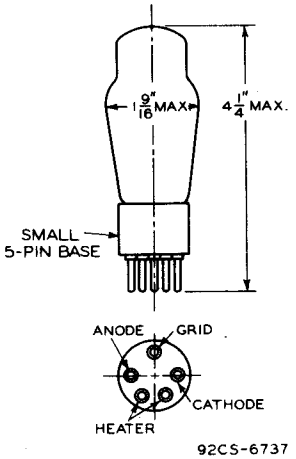
THYRATRON



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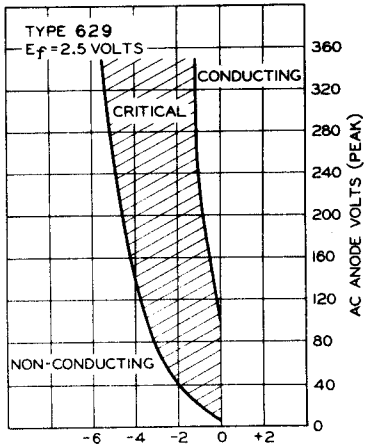
OPERATIONAL REGION
OF CRITICAL GRID VOLTAGE



92CS-6736

672-A
THYRATRON
MERCURY-VAPOR TETRODE

Supersedes Type 672

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:	
Voltage	5 ac or dc volts
Current	5 amp
Cathode:	
Min. Heating Time, prior to tube conduction	5 minutes
Direct Interelectrode Capacitances:	
Grid No.1 to Anode	0.04 μμf
Grid No.2 to Anode	3 μμf
Ionization Time (Approx.)	10 μsec
Deionization Time (Approx.)	1000 μsec
Maximum Critical Grid Current	2 μamp
Anode Voltage Drop (Approx.)	12 volts

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	7-7/8" ± 1/4"
Seated Length	7-1/8" ± 1/4"
Maximum Diameter	2-5/16"
Bulb	T-18
Cap	Skirted Medium
Base	Large-Shell Super-Jumbo 4-Pin, Bayonet
Basing Designation for BOTTOM VIEW	4CE

Pin 1 - Grid No.1
Pin 2 - Heater, Cathode

Pin 3 - Heater
Pin 4 - Grid No.2
Cap - Anode

GRID-CONTROLLED RECTIFIER SERVICE

For frequencies up to 150 cycles

Maximum Ratings, *Absolute Values*:

PEAK ANODE VOLTAGE:		
Forward	2500 max.	volts
Inverse	2500 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:		
Peak, before anode conduction	-300 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Peak, before anode conduction	-1000 max.	volts
CATHODE CURRENT:		
Peak	40 max.	amp
Average■	3.2 max.	amp
Surge, for duration of 0.1 sec. max.	150 max.	amp

■ See next page.

(continued on next page)

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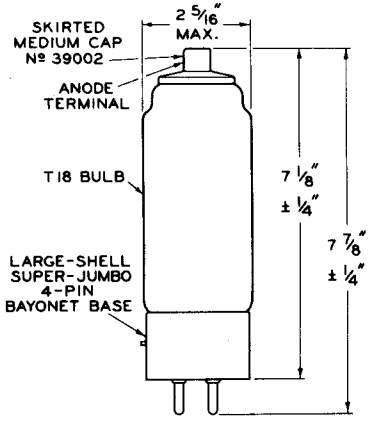
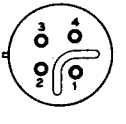
672-A
THYRATRON

GRID-No. 2 CURRENT:		
Peak	1 max.	amp
Average■	0.25 max.	amp
GRID-No. 1 CURRENT:		
Peak	1 max.	amp
Average■	0.25 max.	amp
COND.-MERCURY TEMPERATURE RANGE▲	40 to 80	°C

■ Averaged over any interval of 15 sec. max.

▲ Recommended condensed-mercury temperature is between 45° and 50°C.



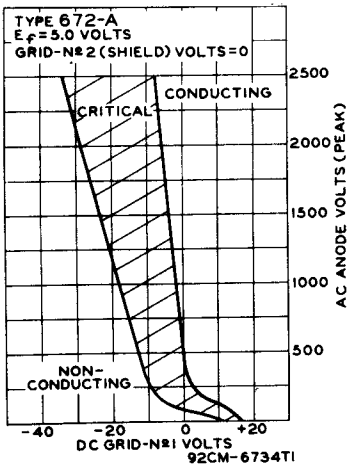


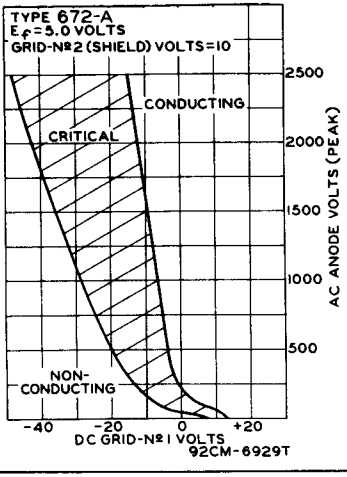
BOTTOM VIEW OF BASE

92CS-6735RI

672-A
THYRATRON

OPERATIONAL RANGES OF CRITICAL GRID-№1 VOLTAGE





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THYRATRON

MERCURY-VAPOR TRIODE

Electrical:

	DATA	
Heater, for Unipotential Cathode:		
Voltage*	5	volts
Current	10	amp
Direct Interelectrode Capacitance:		
Grid to Anode (Approx.)	5	μμf
Peak Voltage Drop	12	volts
Control Characteristic	Negative	
Ionization Time (Approx.)	10	μseconds
Deionization Time (Approx.)	1000	μseconds

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	11-1/4" ± 1/2"
Maximum Diameter	3-13/16"
Bulb	ST-30
Cap	No.3985
Base	Large Shell Super-Jumbo 4-Pin

Maximum Ratings, Absolute Values:

For frequencies up to 150 cycles

	Continuous Service	Welder-Control Service	
PEAK FORWARD ANODE VOLTAGE	2500 max.	750 max.	volts
PEAK INVERSE ANODE VOLTAGE	2500 max.	750 max.	volts
PEAK GRID VOLTAGE:			
Before Conduction	-500 max.	-500 max.	volts
PEAK ANODE CURRENT	40 max.	77 max.	amp
AVERAGE ANODE CURRENT	6.4 max.	2.5 max.	amp
SURGE ANODE CURRENT for 0.1 sec. max.	200 max.	200 max.	amp
GRID CURRENT: Before conduction (Grid Negative)	5 max.	5 max.	μamp
PEAK GRID CURRENT	1 max.	1 max.	amp
AVERAGE GRID CURRENT	0.25 max.	0.25 max.	amp
TIME OF AVERAGING CURRENTS	15 max.	5 max.	sec
COND.-MERCURY TEMP. RANGE▲	40 - 80	40 - 90	°C

* Heater voltage must be applied for at least 5 minutes before anode voltage is applied.

▲ Recommended condensed-mercury temperature range, 45 - 55°C.

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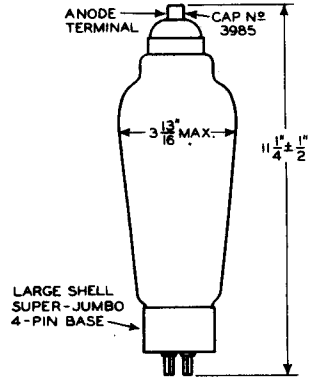
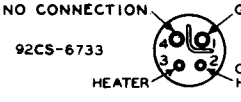
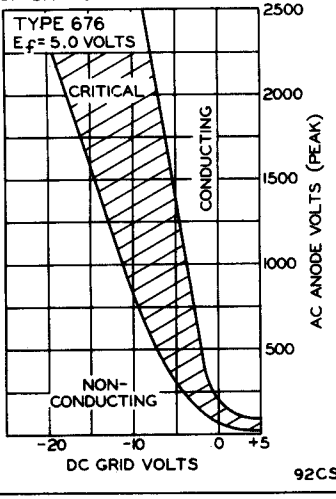
THYRATRON





OPERATIONAL REGION
OF CRITICAL GRID VOLTAGE



92CS-6732

TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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THYRATRON

MERCURY-VAPOR TRIODE

DATA

Electrical:

Heater, for Unipotential Cathode:		
Voltage*	5	volts
Current	10	amp
Direct Interelectrode Capacitance:		
Grid to Anode (Approx.)	5	μμf
Peak Voltage Drop	12	volts
Control Characteristic	Negative	
Ionization Time (Approx.)	10	μseconds
Deionization Time (Approx.)	1000	μseconds

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	11-1/4" ± 1/2"
Maximum Diameter	3-13/16"
Bulb	ST-30
Cap	No. 3985
Base	Large Shell Super-Jumbo 4-Pin

Maximum Ratings, Absolute Values:

For frequencies up to 150 cycles

PEAK FORWARD ANODE VOLTAGE	10000 max.	volts
PEAK INVERSE ANODE VOLTAGE	10000 max.	volts
PEAK GRID VOLTAGE:		
Before Conduction	-500 max.	volts
Anode Negative	10 max.	volts
PEAK ANODE CURRENT	15 max.	amp
AVERAGE ANODE CURRENT**	4 max.	amp
SURGE ANODE CURRENT for 0.1 sec., max.	16 max.	amp
GRID CURRENT: Before Conduction (Grid Neg.)	5 max.	μamp
PEAK GRID CURRENT	1 max.	amp
AVERAGE GRID CURRENT**	0.25 max.	amp
COND.-MERCURY TEMPERATURE RANGE▲	30 - 50	°C

* Heater voltage must be applied for at least 5 minutes before anode voltage is applied.

** Averaged over any 15-second interval.

▲ Recommended condensed-mercury temp. range, 35 - 45°C.

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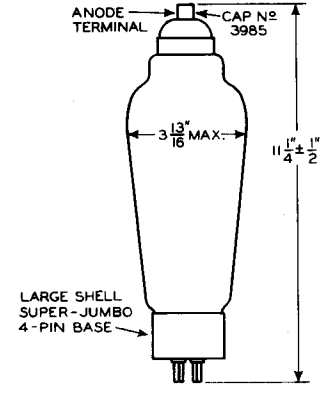
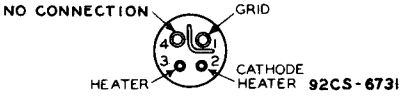
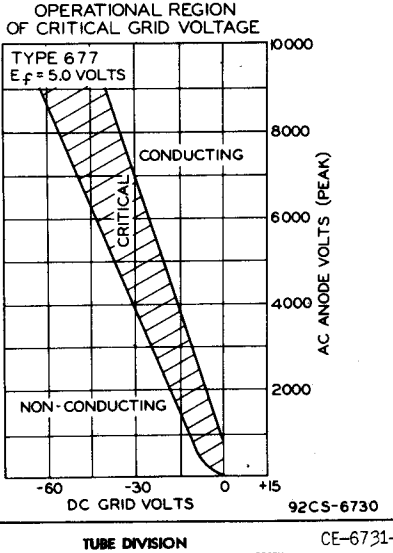
THYRATRON







TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

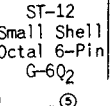
884, 885
THYRATRONS
TRIODE TYPES

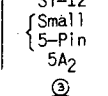
For new equipment design, RCA-884 is recommended.

GENERAL DATA

Electrical:	*Type 884*	*Type 885*	
Heater.	Coated Unipotential Cathode		
Voltage	6.3 ± 10%	2.5 ± 10%	a-c or d-c volts
Current	0.6	1.5	. . . . . amp. ←
Direct Interelectrode Capacitances:			←
Grid to Anode . . .	6	6	. . . . . μμf
Grid to Cathode . .	2	2	. . . . . μμf
Anode to Cathode. .	0.6	0.6	. . . . . μμf
Tube Voltage Drop . .	16	16	. . approx. volts
Physical:			
Mounting Position . .	Any	Any	
Maximum Overall Length	4-1/8	4-3/16	. . . . . inches
Maximum Seated Length	3-9/16	3-9/16	. . . . . inches
Maximum Diameter. . .	1-9/16	1-9/16	. . . . . inches
Bulb.	ST-12	ST-12	
Base.	Small Shell Octal 6-Pin	Small 5-Pin	
Basing Designation	$G\text{-}6O_2$	$5A_2$	

Pin 1 – No Connection
Pin 2 – Heater
Pin 3 – Anode
Pin 5 – Grid
Pin 7 – Heater
Pin 8 – Cathode





Pin 1 – Heater
Pin 2 – Anode
Pin 3 – Grid
Pin 4 – Cathode
Pin 5 – Heater

BOTTOM VIEWS

RELAXATION OSCILLATOR — Sweep-Circuit Service△

Maximum Ratings, ***Absolute Values:***

PEAK ANODE VOLTAGE.	300 *max.*	volts
PEAK CATHODE CURRENT ●	300 *max.*	ma.
PEAK GRID CURRENT ▲	1 *max.*	ma. ←
PEAK VOLTAGE BETWEEN ANY TWO ELECTRODES OR BETWEEN ANY ELECTRODE AND HEATER . .	350 *max.*	volts
D-C HEATER-CATHODE POTENTIAL.	-100 to +25	volts ←
AMBIENT TEMPERATURE RANGE	-75 to +90	°C ←

△ For best life results, it is desirable to delay tube conduction for about 10 seconds after applying heater voltage in order to allow the cathode to reach normal operating temperature.

● In sweep circuits designed so that the peak cathode current of 300 milliamperes will not be exceeded during condenser discharge, the resultant average cathode current is so small in comparison with the average-current capability of the cathode that a maximum rating for average cathode current is omitted because it has no practical significance.

▲ The resistance of the grid resistor should be not less than 1000 ohms per maximum instantaneous volt applied to the grid. Resistance values in excess of 500000 ohms may cause circuit instability.

←Indicates a change.

884
885

884, 885

THYRATRONS

(continued from preceding page)

RELAY & GRID-CONTROLLED RECTIFIER SERVICE □
At Frequencies Below 75 Cycles per Second

Maximum Ratings, *Absolute Values*:

PEAK ANODE VOLTAGE	350 *max.*	volts
PEAK CATHODE CURRENT	300 *max.*	ma.
AVERAGE CATHODE CURRENT #	75 *max.*	ma.
PEAK VOLTAGE BETWEEN ANY TWO ELECTRODES OR BETWEEN ANY ELECTRODE AND HEATER	350 *max.*	volts
→ D-C HEATER-CATHODE POTENTIAL	-100 to +25	volts
→ AMBIENT TEMPERATURE RANGE	-75 to +90	°C

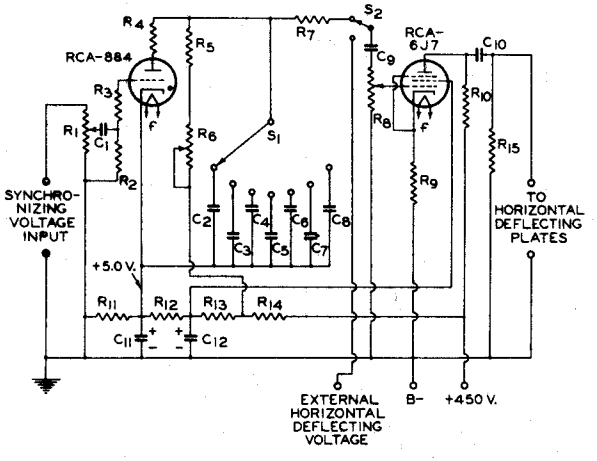
□ The heater voltage should be applied for 10 seconds before tube conduction occurs.

For an averaging period of 30 seconds.

→ Indicates a change.

884

LINEAR SWEEP-CIRCUIT OSCILLATOR AND AMPLIFIER



C_1 = 0.25 μf OR GREATER
C_2 = 0.25 μf, 500 V.
C_3 = 0.1 μf, 500 V.
C_4 = 0.04 μf, 500 V.
C_5 = 0.015 μf, 500 V.
C_6 = 0.005 μf, 500 V.
C_7 = 0.002 μf, 500 V.
C_8 = 0.0008 μf, 500 V.
C_9 = 0.5 μf, 250 V.
C_{10} = 0.5 μf, 500 V.
C_{11} = 25 μf, 15 V.
C_{12} = 8 μf, 200 V.
R_1 = 5000 OHM (MAX.) POTENTIOMETER
R_2 = NOT GREATER THAN 50000 OHMS
R_3 = 2000-3000 OHMS, 0.5 WATT

R_4 = 350-500 OHMS, 0.5 WATT
R_5 = 0.3-0.5 MEGOHM, 0.5 WATT
R_6 = 1 MEGOHM POTENTIOMETER
R_7 = 1 MEGOHM, 0.5 WATT
R_8 = 0.5 MEGOHM POTENTIOMETER
R_9 = 850 OHMS, 0.5 WATT
R_{10} = 0.1 MEGOHM, 0.5 WATT
R_{11} = 1500 OHMS, 0.5 WATT
R_{12} = 25000 OHMS, 1.0 WATT
R_{13} = 60000 OHMS, 1.0 WATT
R_{14} = 60000 OHMS, 1.0 WATT
R_{15} = 2.0 MEGOHMS, 1.0 WATT
S_1 = 7-CONTACT S.P. SWITCH
S_2 = S.P.D.T. SWITCH

92CM-4875R1

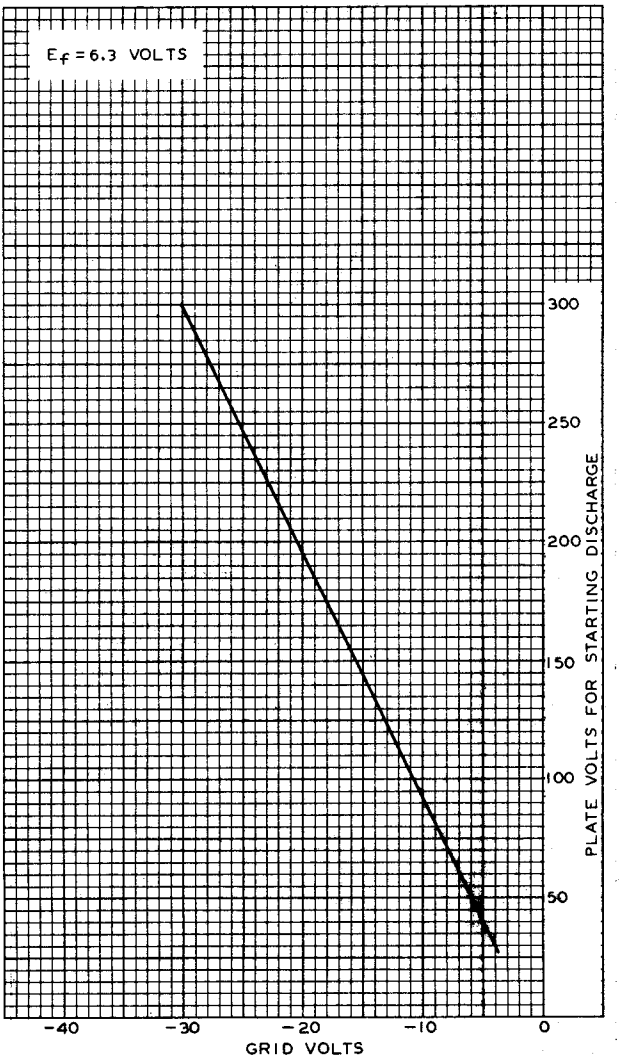
APPROXIMATE FREQUENCY RANGE (CYCLES/SEC.)

SWITCH (S_1) ON		C_2	C_3	C_4	C_5	C_6	C_7	C_8
R_6 AT	MAX.	20	40	110	280	670	1500	3600
	MIN.	60	130	340	880	2200	4900	11400

884

884

AVERAGE CONTROL CHARACTERISTIC



2050
THYRATRON
GAS TETRODE

GENERAL DATA

Electrical:

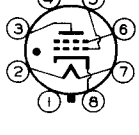
	Min.	Av.	Max.	
Heater, for Unipotential Cathode:				
Voltage (AC or DC)	5.7	6.3	6.9	volts
Current, with heater volts = 6.3	0.54	0.60	0.66	amp
Cathode:				
Heating Time, prior to tube conduction	10	–	–	sec
Direct Interelectrode Capacitances (Approx.):●				
Grid No.1 to Anode			0.26	μμf
Input			4.2	μμf
Output			3.6	μμf
Ionization Time (Approx.):				
For conditions: dc anode volts = 100; grid-No.1 square-pulse volts = 50; and peak anode amp. during conduction = 1.0			0.5	μsec
Deionization Time (Approx.):				
For conditions: dc anode volts = 125; grid-No.1 volts = −250; grid-No.1 resistor (ohms) = 1000; dc anode amp. = 0.1			50	μsec
For conditions: dc anode volts = 125; grid-No.1 volts = −10; grid-No.1 resistor (ohms) = 1000; dc anode amp. = 0.1			100	μsec
Maximum Critical Grid Current, with ac anode-supply volts (rms) = 460, and average anode amp. = 0.1			0.5	μamp
Tube Voltage Drop (Approx.)			8	volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0; grid-No.2 volts = 0			250	
Grid-No.2 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0; grid-No.2 resistor (megohms) = 0; grid-No.1 volts = 0			800	

● Without external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	4-1/8"
Maximum Seated Length	3-9/16"
Maximum Diameter	1-9/16"
Bulb	ST-12
Base	Small-Shell Octal 8-Pin
Basing Designation for BOTTOM VIEW	6BS

Pin 1 – No Connection
Pin 2 – Heater
Pin 3 – Anode
Pin 4 – No Connection



Pin 5 – Grid No.1
Pin 6 – Grid No.2
Pin 7 – Heater
Pin 8 – Cathode

← Indicates a change.

2050
THYRATRON

RELAY and GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, *Absolute Values*:

PEAK ANODE VOLTAGE:			
Forward	180 max.	650 max.	volts
Inverse	360 max.	1300 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:			
Peak, before anode conduction	-100 max.	-100 max.	volts
Average, during anode conduction■	-10 max.	-10 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Peak, before anode conduction	-250 max.	-250 max.	volts
Average, during anode conduction■	-10 max.	-10 max.	volts
CATHODE CURRENT:			
Peak	1.0 max.	1.0 max.	amp
Average■	0.2 max.	0.1 max.	amp
Surge, for duration of 0.1 sec. max.	10 max.	10 max.	amp
→ GRID-No.2 CURRENT:			
Average■	+0.01 max.	+0.01 max.	amp
→ GRID-No.1 CURRENT:			
Average■	+0.01 max.	+0.01 max.	amp
PEAK HEATER-CATHODE VOLTAGE:			
Heater negative with respect to cathode	100 max.	100 max.	volts
Heater positive with respect to cathode	25 max.	25 max.	volts
AMBIENT TEMPERATURE RANGE	-75 to +90	-75 to +90	°C

→ Typical Operating Conditions for Relay Service:

RMS Anode Voltage	117	400	volts
Grid-No.2 Voltage	0	0	volts
RMS Grid-No.1 Bias Voltage	5□	–	volts
DC Grid-No.1 Bias Voltage	–	-6	volts
Peak Grid-No.1 Signal Voltage	5	6	volts
Grid-No.1-Circuit Resistance	1.0	1.0	megohm
Anode-Circuit Resistance#	1200	2000	ohms

Maximum Circuit Values:

Grid-No.1-Circuit Resistance:		
For average anode current below 0.1 amp.	10 max.	megohms
For average anode current above 0.1 amp.	2 max.	megohms

■ Averaged over any interval of 30 sec. max.

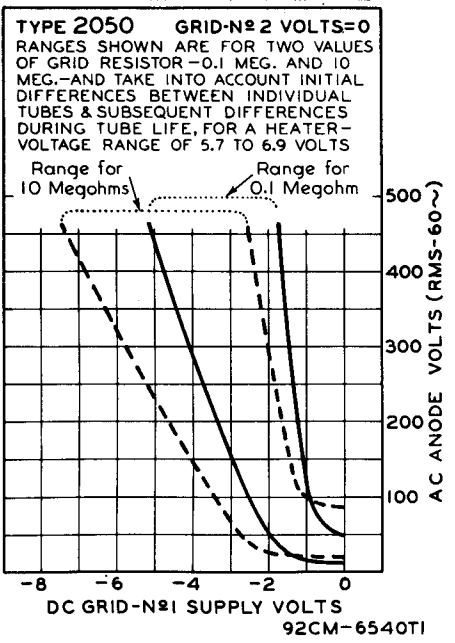
□ Approximately 180° out of phase with the anode voltage.

\# Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.

→ Indicates a change.

2050
THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE



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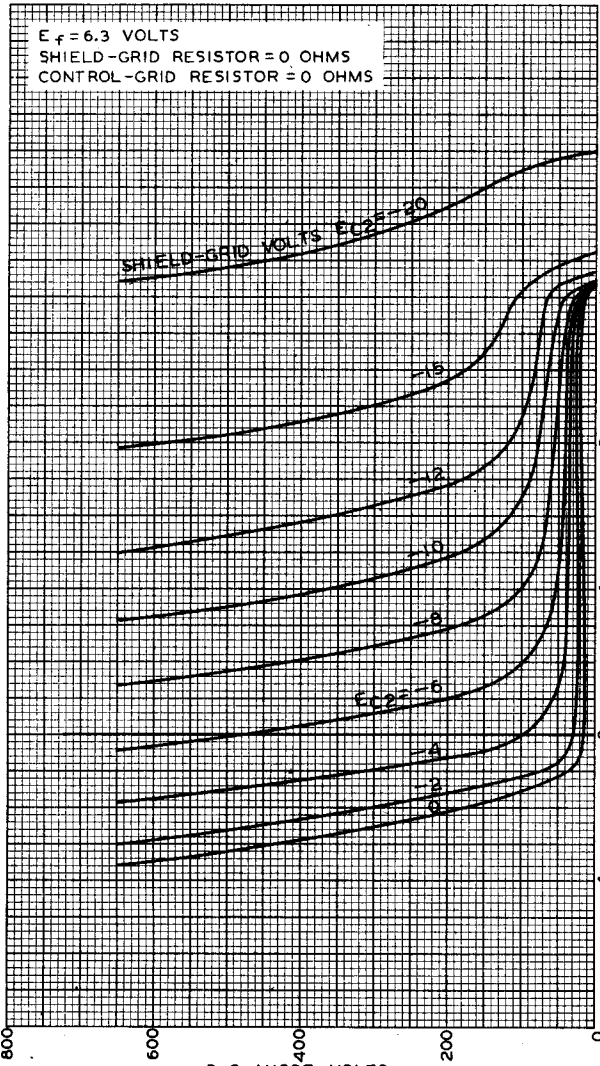
AVERAGE CONTROL CHARACTERISTICS



MAY 3, 1944

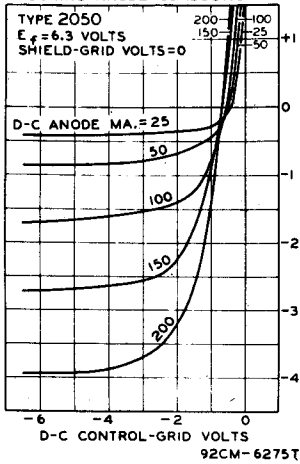
RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-6274RI

2050

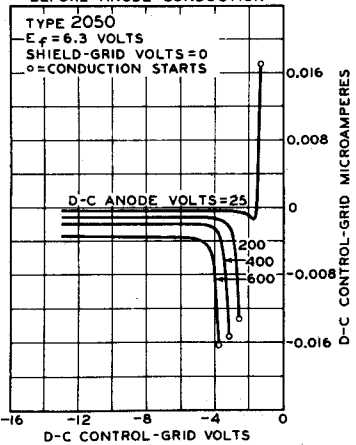
THYRATRON

AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION



92CM-6275T

AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION



92CM-6541T

RCA VICTOR DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5550
IGNITRON
SIZE A

5550

DATA

General:

Peak Voltage Drop (Approx.)	12 volts
Cooling:	
Type	Air, or Water-Cooled Clamp
Clamp Width (Approx.)	1-3/4"
Clamp Location	See Outline Drawing
Mounting Position	Vertical, Flexible Lead Up
Max. Rigid Length (Approx.)	10"
Maximum Diameter	2-3/4"

AC WELDER-CONTROL SERVICE ⊕

Ratings are for any voltage from 250 to 600 volts rms at frequencies from 25 to 60 cycles

Maximum Ratings, Absolute Values:

	Air Cooled*	Water Cooled	
DEMAND	105 max.	300 max.	kva
CORRESPONDING AVERAGE ANODE CUR.	3 max.	12.1 max.	amp
AVERAGE ANODE CURRENT	5.6 max.	22.4 max.	amp
CORRESPONDING DEMAND	35 max.	100 max.	kva
TIME OF AVERAGING ANODE CURRENT:			
AT 500 VOLTS RMS	15.5 max.	11 max.	sec
AT 250 VOLTS RMS	31 max.	22 max.	sec
SURGE ANODE CURRENT	■	■	peak amp
PEAK POSITIVE IGNITOR VOLTAGE§	900 max. 200 min.	900 max. 200 min.	volts volts
PEAK NEGATIVE IGNITOR VOLTAGE	5 max.	5 max.	volts
PEAK IGNITOR CURRENT §	100 max. 30 min.	100 max. 30 min.	amp amp
AVERAGE IGNITOR CURRENT**	1 max.	1 max.	amp
IGNITION TIME§	100 max.	100 max.	μsec
COOLING CLAMP TEMPERATURE	75 max.	50 max.	°C

* Mercury condensation in the anode-seal must be prevented by suitable heating devices.

⊕ RMS demand-voltage, -current, and -kva are on the basis of full-cycle conduction (no phase delay) regardless of whether or not phase control is used. Use the 250-volt rating for voltages below 250 volts.

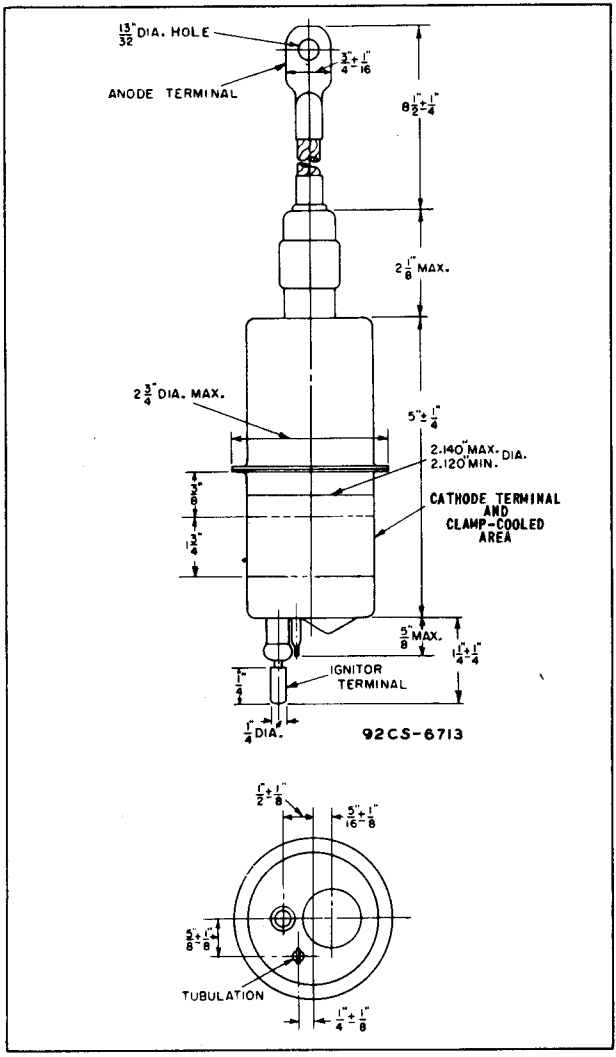
** Averaged over any 5-second interval.

■ Must be limited to 280% of maximum rms demand current.

§ Ignition will occur if either minimum peak positive potential is applied, or minimum peak ignitor current flows, for the rated maximum ignitor ignition time.

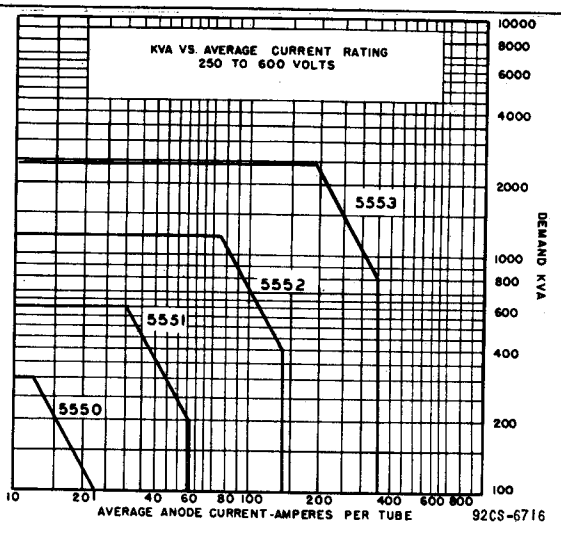
RCA

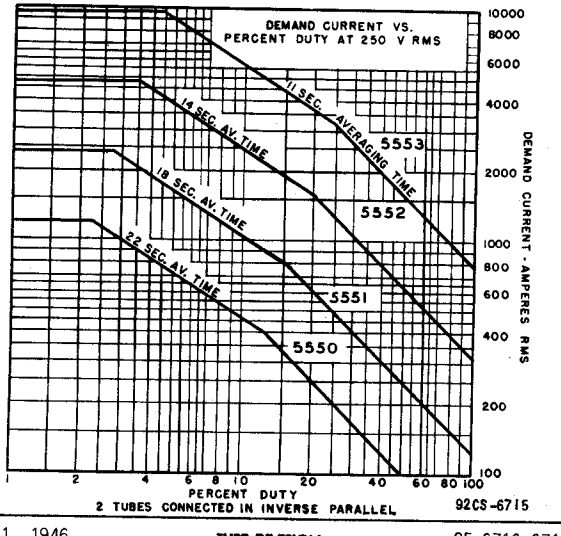
5550
IGNITRON



TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5550
IGNITRON

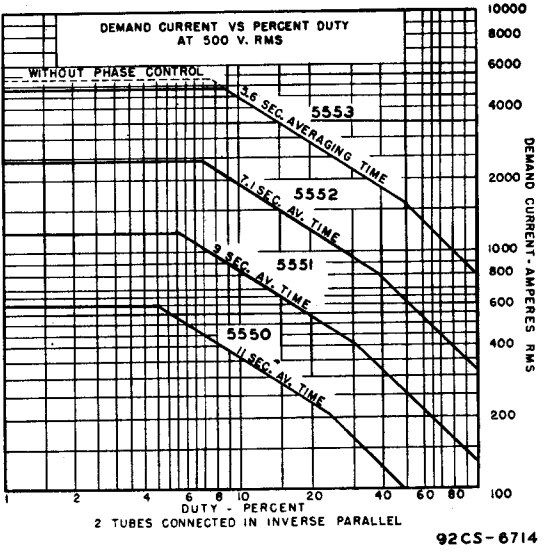




TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5550

IGNITRON



TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5551
IGNITRON
SIZE B

DATA

General:

Peak Voltage Drop	12 volts
Cooling:	
Type	Water
Minimum Flow	1 gallon/minute
Maximum Outlet Water Temperature	40°C
Minimum Inlet Water Temperature	10°C
Pressure Drop per tube, at Min. Flow	1.6 lb./sq.in.
Temp. Rise at Minimum Flow (Average current 40 amp/anode) Approx.	2°C
Mounting Position	Vertical, Flexible Lead Up
Max. Rigid Length (Approx.)	13-1/2"
Max. Diameter, including Cooling Connections	5-3/4"

AC WELDER-CONTROL SERVICE●

Ratings are for any voltage from 250 to 600 volts rms at frequencies from 25 to 60 cycles

Maximum Ratings, Absolute Values:

DEMAND	600 max.	kva
CORRESPONDING AVERAGE ANODE CURRENT	30.2 max.	amp
AVERAGE ANODE CURRENT	56 max.	amp
CORRESPONDING DEMAND	200 max.	kva
TIME OF AVERAGING ANODE CURRENT:		
At 500 volts rms	9 max.	sec
At 250 volts rms	18 max.	sec
SURGE ANODE CURRENT	■ peak	amp
PEAK POSITIVE IGNITOR VOLTAGE §	900 max. 200 min.	volts volts
PEAK NEGATIVE IGNITOR VOLTAGE	5 max.	volts
PEAK IGNITOR CURRENT §	100 max. 30 min.	amp amp
AVERAGE IGNITOR CURRENT*	1 max.	amp
IGNITION TIME §	100 max.	μsec

CURVES FOR THE 5551 IN THIS CLASS OF SERVICE ARE SHOWN UNDER TYPE 5550

INTERMITTENT RECTIFIER SERVICE

For frequencies from 25 to 60 cycles

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE	500 max.	volts
PEAK INVERSE ANODE VOLTAGE	500 max.	volts
PEAK ANODE CURRENT	700 max.	amp
AVERAGE ANODE CURRENT#	40 max.	amp
SURGE ANODE CURRENT for 0.15 sec. max.	8000 max.	amp

*, ■, §, ●, #: See next page.

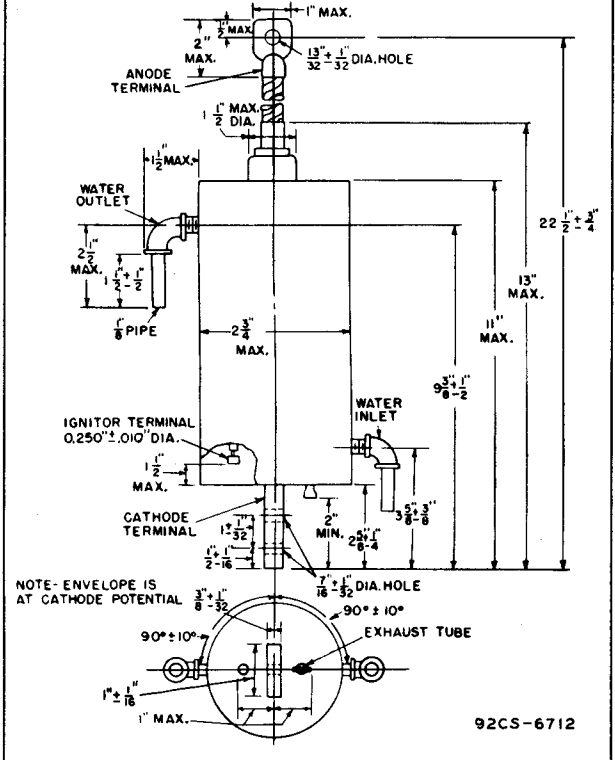
5551
IGNITRON

PEAK POSITIVE IGNITOR VOLTAGE §	900 max.	volts
	200 min.	volts
PEAK NEGATIVE IGNITOR VOLTAGE	5 max.	volts
PEAK IGNITOR CURRENT §	100 max.	volts
	30 min.	volts
AVERAGE IGNITOR CURRENT	1 max.	amp
IGNITION TIME §	100 max.	μsec

* Averaged over any 5-second interval.
\# Averaged over any 3-second interval.
■ Must be limited to 280% of maximum rms demand current.
● RMS demand-voltage, -current, and -kva are on the basis of full-cycle conduction (no phase delay) regardless of whether or not phase-control is used. Use the 250-volt rating for voltages below 250 volts.
§ Ignition will occur if either minimum peak positive ignitor potential is applied, or minimum peak ignitor current flows, for the rated maximum ignitor ignition time.

5551

IGNITRON



5552

IGNITRON

SIZE C

DATA

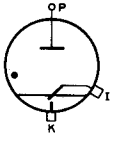
General:

Peak Voltage Drop	12	volts
Cooling:		
Type		Water
Minimum Flow	1.5	gal./min.
Pressure Drop per tube, at Minimum Flow	4.5	lb./sq.in. ←
Maximum Outlet Water Temperature	40	°C
Minimum Outlet Water Temperature	10	°C
Temp. Rise at Min. Flow (Average Current 100 amp/anode) Approx.	3	°C
Mounting Position	Vertical, Flexible Lead Up	
Maximum Rigid Length (Approx.)	14-1/2"	
Maximum Diameter, Including Cooling Connections	7-1/4"	

Terminal Connections:

I – Ignitor

K – Cathode



P – Anode

AC WELDER-CONTROL SERVICE®

Ratings are for any voltage from 250 to 600 volts rms at frequencies from 25 to 60 cycles per second

Maximum Ratings, *Absolute Values:*

Two Tubes in Inverse Parallel

DEMAND	1200	max.	kva
Average Anode Current at Maximum Demand	75.6	max.	amp
ANODE CURRENT:			
Average*	140	max.	amp
Demand at Max. Average Anode Current	400	max.	kva
Fault:			←
At 600 volts rms	5600	max.	amp
At 250 volts rms	13450	max.	amp
PEAK IGNITOR VOLTAGE:			
Positive§	900	max.	volts
	200	min.	volts
Negative	5	max.	volts
IGNITOR CURRENT:			
Peak§	100	max.	amp
	30	min.	amp
Average**	1	max.	amp
IGNITOR IGNITION TIME§	100	max.	μsec

® RMS demand-voltage, -current, and -kva are on the basis of full-cycle conduction (no phase delay) regardless of whether or not phase-control is used. Use the 250-volt rating for voltages below 250 volts.

* Averaged over any 5.8-second maximum interval for operation at 600 volts rms and over any 14-second maximum interval at 250 volts rms.

§,**: See next page. ← Indicates a change.

5552

IGNITRON

INTERMITTENT RECTIFIER SERVICE

For frequencies from 25 to 60 cycles per second

Maximum Ratings, *Absolute Values*:

PEAK ANODE VOLTAGE:		
Forward	500 max.	volts
Inverse	500 max.	volts
ANODE CURRENT:		
Peak	1600 max.	amp
Average□	100 max.	amp
Fault, for 0.15 second maximum	6000 max.	amp
PEAK IGNITOR VOLTAGE:		
Positive§	900 max. volts 200 min. volts	
Negative	5 max.	volts
IGNITOR CURRENT:		
Peak§	100 max. amp 30 min. amp	
Average**	1 max.	amp
IGNITOR IGNITION TIME§	100 max.	μsec

§ Ignition will occur if either minimum peak positive ignitor potential is applied, or minimum peak ignitor current flows, for the rated maximum ignition time.

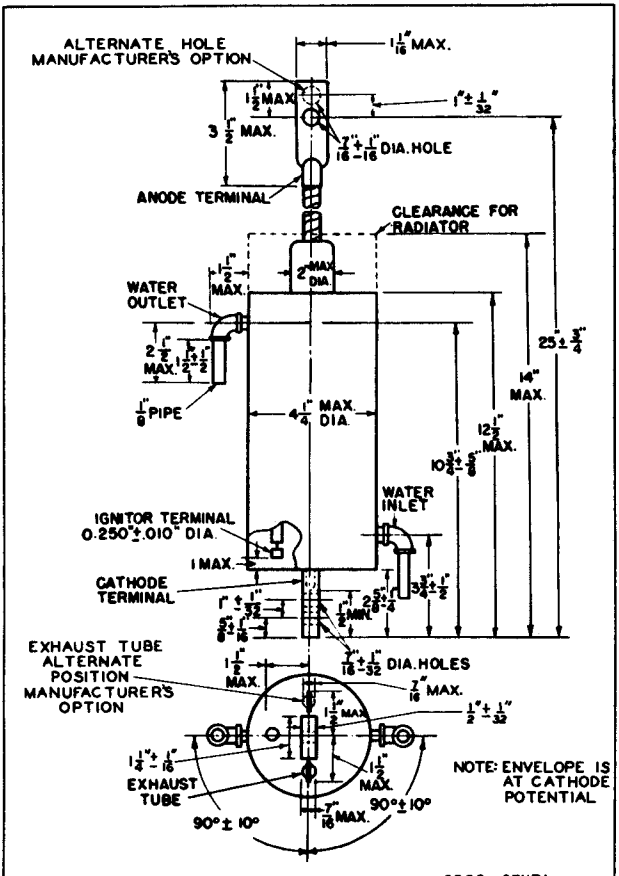
** Averaged over any 5-second maximum interval.

□ Averaged over any 6-second maximum interval.

Curves for the 5552 in AC Welder-Control Service are shown under Type 5550

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5552
IGNITRON



5553
IGNITRON
SIZE D

DATA

General:

Peak Voltage Drop	12 volts
Cooling:	
Type	Water
Minimum Flow	3 gal./min.
Pressure Drop per tube, at Minimum Flow	5.1 lb./sq. in.
Maximum Outlet Water Temperature	40 °C
Minimum Inlet Water Temperature	10 °C
Temp. Rise at Min. Flow (Average current 200 amp/anode), Approx.	5 °C
Mounting Position	Vertical, Flexible Lead Up
Maximum Rigid Length (Approx.)	20"
Maximum Diameter, including Cooling Connections	9-3/8"

AC WELDER-CONTROL SERVICE ®

Ratings are for any voltage from 250 to 600 volts rms at frequencies from 25 to 60 cycles

Maximum Ratings, Absolute Values:

DEMAND	2400 max.	kva
CORRESPONDING AVERAGE ANODE CUR.	192 max.	amp
AVERAGE ANODE CURRENT	355 max.	amp
CORRESPONDING DEMAND	800 max.	kva
TIME OF AVERAGING ANODE CURRENT:		
At 500 volts RMS	5.6 max.	sec
At 250 volts RMS	11 max.	sec
SURGE ANODE CURRENT	■ peak	amp
PEAK POSITIVE IGNITOR VOLTAGE §	900 max.	volts
	200 min.	volts
PEAK NEGATIVE IGNITOR VOLTAGE	5 max.	volts
PEAK IGNITOR CURRENT §	100 max.	amp
	30 min.	amp
AVERAGE IGNITOR CURRENT*	1 max.	amp
IGNITION TIME §	100 max.	μsec

CURVES FOR THE 5553 IN THIS CLASS OF SERVICE ARE SHOWN UNDER TYPE 5550

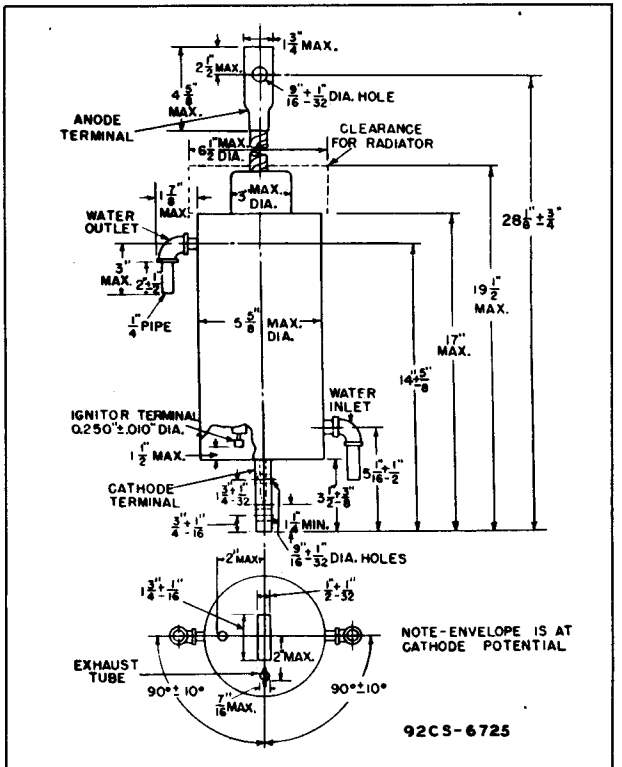
* Averaged over any 5-second interval.

■ Must be held to 280% of maximum demand rms current.

® RMS demand-voltage, -current, and -kva are on the basis of full-cycle conduction(no phase delay)regardless of whether or not phase-control is used. Use the 250-volt rating for voltages below 250 volts.

§ Ignition will occur if either minimum peak positive ignitor potential is applied, or minimum peak ignitor current flows, for the rated maximum ignitor ignition time.

5553
IGNITRON



5554
IGNITRON

DATA

General:

Cathode	Pool Type
Number of Ignitors*	2
Number of Main Anodes	1
Number of Auxiliary Anodes	1
Peak Voltage Drop:	
At 100 Amp. Peak-Anode Current	12.6 volts
At 300 Amp. Peak Anode Current	14.4 volts
At 600 Amp. Peak Anode Current	17.3 volts
Cooling:	
Type	Water
Typical Flow	1.5 to 3 gal./min.
Pressure Drop at Above Flow	2 to 5 lb./sq.in.
Temperature Rise at Lower Rate of Flow (150 Amp per Anode)	6°C
Mounting Position	Vertical, Flexible Lead Up
Maximum Rigid Length (Approx.)	17-1/2"
Diameter, Including Cooling Couplings	7-1/2" ± 1/8"

RECTIFIER SERVICE

For frequencies from 25 to 60 Cycles, Phase Retard = 0

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE	900 max.	2100 max.	volts
PEAK INVERSE ANODE VOLTAGE	900 max.	2100 max.	volts
PEAK ANODE CURRENT	900 max.	600 max.	amp
AVERAGE CONTINUOUS ANODE CUR.	100 max.	75 max.	amp
2-HOUR AVERAGE ANODE CURRENT*	150 max.	112.5 max.	amp
1-MINUTE AVERAGE ANODE CUR.**	200 max.	150 max.	amp
SURGE ANODE CURRENT for 0.15 sec. max.	6000 max.	4500 max.	amp
OUTLET WATER TEMPERATURE	60 max.	45 max.	°C
INLET WATER TEMPERATURE	6 min.	6 min.	°C
WATER FLOW, AT CONTINUOUS AVERAGE ANODE CUR. RATING	1.5 min.	1.5 min.	gpm
WATER FLOW, AT NO LOAD#	0.5 min.	0.5 min.	gpm
PEAK INVERSE AUXILIARY ANODE VOLTAGE:			
With Anode Conducting	25 max.	25 max.	volts
With Anode Not Conducting	150 max.	150 max.	volts
AVERAGE AUXILIARY ANODE CUR.	5 max.	5 max.	amp
PEAK POSITIVE IGNITOR VOLTAGE	900 max.	2100 max.	volts
PEAK NEGATIVE IGNITOR VOLTAGE	5 max.		volts
PEAK IGNITOR CURRENT	100 max.		volts
AVERAGE IGNITOR CURRENT##	2 max.		volts
IGNITION TIME	100 max.		volts

GENERAL REQUIREMENTS for SELF-EXCITATION and SEPARATE EXCITATION are given on the next page

•, *, **, #, ##: See next page.

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IGNITRON

AC WELDER-CONTROL SERVICE

Ratings for 2400 volts rms, 25 to 60 cycles

Maximum Ratings, Absolute Values:

DEMAND	1200 max.	kva
CORRESPONDING AVERAGE ANODE CURRENT	75 max.	amp
AVERAGE ANODE CURRENT	113 max.	amp
CORRESPONDING DEMAND	600 max.	kva
TIME OF AVERAGING ANODE CURRENT:		
At 2400 v RMS	1.5 max.	sec
SURGE ANODE CURRENT, for 0.15 sec. max.	3000 max.	amp
WATER FLOW	1.5 min.	gpm
OUTLET WATER TEMPERATURE	30 max.	°C
PEAK INVERSE AUXILIARY ANODE VOLTAGE:		
With Anode Conducting	25 max.	volts
With Anode Not Conducting	150 max.	volts
AVERAGE AUXILIARY ANODE CUR.	5 max.	amp
PEAK POSITIVE IGNITOR VOLTAGE	2400 max.	volts
PEAK NEGATIVE IGNITOR VOLTAGE	5 max.	volts
PEAK IGNITOR CURRENT	100 max.	amp
AVERAGE IGNITOR CURRENT##	2 max.	amp
IGNITION TIME	100 max.	μsec

GENERAL REQUIREMENTS for SELF-EXCITATION and SEPARATE-EXCITATION are given below

SELF-EXCITATION (ANODE FIRING)

See Circuit 92CS-6722

PEAK IGNITOR VOLTAGE	150 min.	volts
PEAK IGNITOR CURRENT	40 min.	amp
Ignitor series resistance for anode firing at anode voltages of:		
600 volts or less	4	ohms
601 to 1000 volts (Approx.)	10	ohms
1001 to 1500 volts (Approx.)	20	ohms
1501 to 2000 volts (Approx.)	35	ohms
2001 to 2400 volts (Approx.)	50	ohms

SEPARATE EXCITATION (CAPACITOR FIRING)

See Circuit 92CS-6722

Minimum volt-ampere requirements are shown on Curve 92CS-6725

• Use only one ignitor at a time.
* Averaged over any 2-minute interval.
** Averaged over any 1-minute interval.
# For systems in which the flow of water is controlled by the load.
Averaged over any 10-second interval.

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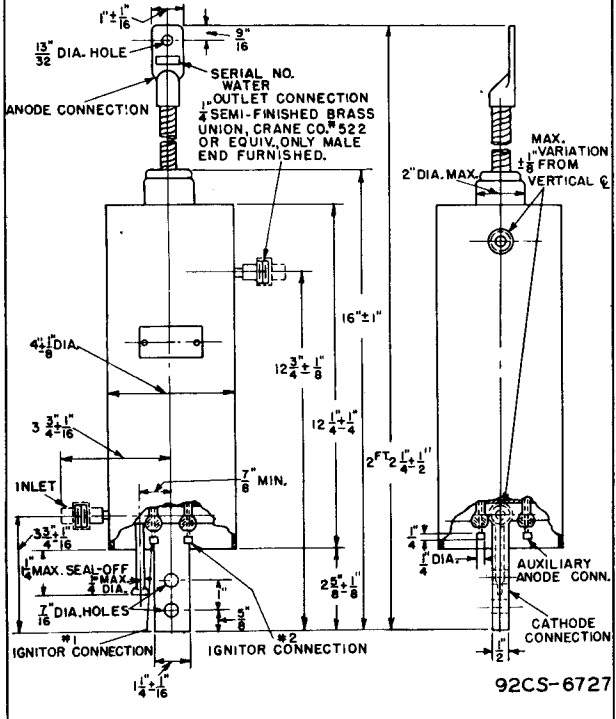
IGNITRON



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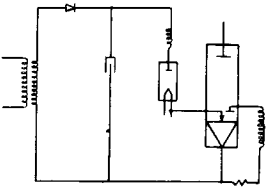
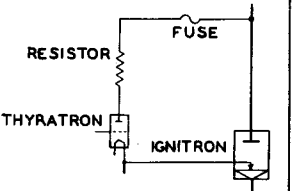
IGNITRON

ELEMENTARY CIRCUIT FOR CAPACITOR FIRING

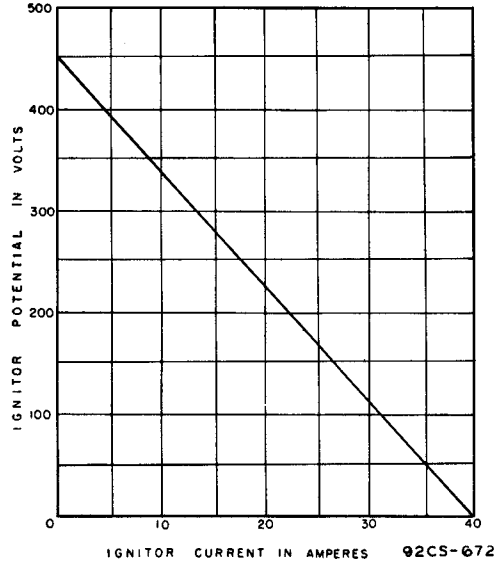


ELEMENTARY CIRCUIT FOR ANODE FIRING



92CS-6722

MINIMUM VOLT-AMPERE REQUIREMENTS FOR SEPARATE-EXCITATION FIRING SYSTEMS



92CS-6723

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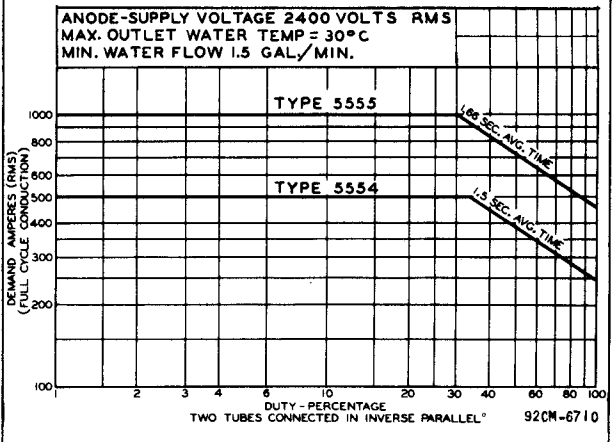
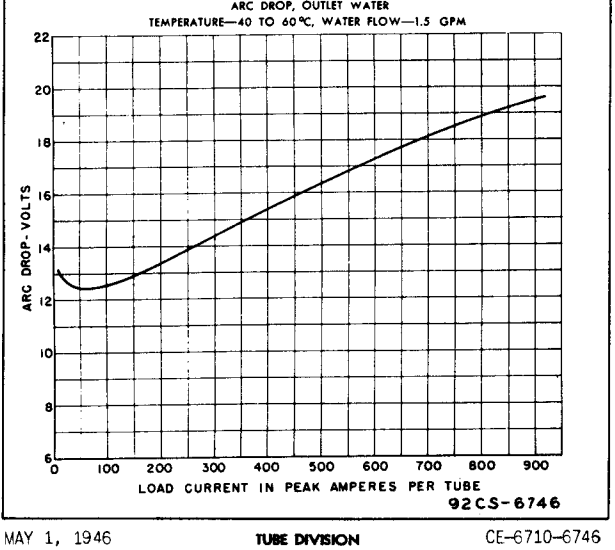
IGNITRON

WELDER-CONTROL SERVICE





5555
IGNITRON

DATA

General:

Cathode	Pool type
Number of Ignitors •	2
Number of Main Anodes	1
Number of Auxiliary Anodes	1
Peak Voltage Drop:	
At 100 Amp Peak Anode Current	12.6 volts
At 300 Amp Peak Anode Current	14.1 volts
At 600 Amp Peak Anode Current	16.2 volts
At 1200 Amp Peak Anode Current	19.1 volts
Cooling:	
Type	Water
Typical Flow	3 to 5 gal./min.
Pressure Drop at Above Flow	3 to 8 lb./sq.in.
Temp. Rise at Lower Rate of Flow (300 Amp per Anode)	7°C
Mounting Position	Vertical, Flexible Lead Up
Maximum Rigid Length (Approx.)	18-1/2"
Diameter, Including Cooling Couplings	9" ± 1/8"

RECTIFIER SERVICE

For Frequencies from 25 to 60 cycles, Phase Retard = 0

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE	900 max.	2100 max.	volts
PEAK INVERSE ANODE VOLTAGE	900 max.	2100 max.	volts
PEAK ANODE CURRENT	1800 max.	1200 max.	amp
AVERAGE CONTINUOUS ANODE CUR.	200 max.	150 max.	amp
2-HOUR AVERAGE ANODE CUR.*	300 max.	225 max.	amp
1-MINUTE AVERAGE ANODE CUR.**	400 max.	300 max.	amp
SURGE ANODE CURRENT for 0.15 sec. max.	12000 max.	9000 max.	amp
OUTLET WATER TEMPERATURE	60 max.	45 max.	°C
INLET WATER TEMPERATURE	6 min.	6 min.	°C
WATER FLOW, AT CONTINUOUS AVERAGE ANODE CUR. RATING	3 min.	3 min.	gpm
WATER FLOW, AT NO LOAD#	1 min.	1 min.	gpm
PEAK INVERSE AUXILIARY ANODE VOLTAGE:			
With anode conducting	25 max.	25 max.	volts
With anode not conducting	150 max.	150 max.	volts
AVERAGE AUXILIARY ANODE CUR.	5 max.	5 max.	amp
PEAK POSITIVE IGNITOR VOLTAGE	900 max.	2100 max.	volts
PEAK NEGATIVE IGNITOR VOLTAGE	5 max.	. .	volts
PEAK IGNITOR CURRENT	100 max.	. .	amp
AVERAGE IGNITOR CURRENT##	2 max.	. .	amp
IGNITION TIME	100 max.	. .	μsec

GENERAL REQUIREMENTS for SELF-EXCITATION and SEPARATE EXCITATION are given on the next page

•, *, **, #, ##: See next page.

5555

5555
IGNITRON

AC WELDER - CONTROL SERVICE

Ratings for 2400 volts rms, 25 to 60 cycles

Maximum Ratings, Absolute Values:

DEMAND	2400	max.	kva
CORRESPONDING AVERAGE ANODE CURRENT.	135	max.	amp
AVERAGE ANODE CURRENT.	207	max.	amp
CORRESPONGING DEMAND	1105	max.	kva
TIME OF AVERAGING ANODE CURRENT at 2400 volts rms	1.66	max.	sec
SURGE ANODE CURRENT, for 0.15 sec.max.	6000	max.	amp
WATER FLOW	3	min.	gal./min.
OUTLET WATER TEMPERATURE	30	max.	°C
PEAK INVERSE AUXILIARY ANODE VOLTAGE:			
With anode conducting	25	max.	volts
With anode not conducting.	150	max.	volts
AVERAGE AUXILIARY ANODE CURRENT.	5	max.	amp
PEAK POSITIVE IGNITOR VOLTAGE.	2400	max.	volts
PEAK NEGATIVE IGNITOR VOLTAGE.	5	max.	volts
PEAK IGNITOR CURRENT	100	max.	amp
AVERAGE IGNITOR CURRENT##	2	max.	amp
IGNITION TIME.	100	max.	μsec

Demand-ampere requirements are shown on curve 92CM-6710 under type 5554

SELF-EXCITATION (ANODE FIRING)

See Circuit 92CS-6722 under type 5554

PEAK IGNITOR VOLTAGE	150	min.	volts
PEAK IGNITOR CURRENT	40	min.	amp
Ignitor series resistance for anode firing at anode voltages of:			
600 volts or less (Approx.).	4	. .	ohms
601 to 1000 volts (Approx.).	10	. .	ohms
1001 to 1500 volts (Approx.)	20	. .	ohms
1501 to 2000 volts (Approx.)	35	. .	ohms
2001 to 2400 volts (Approx.)	50	. .	ohms

SEPARATE EXCITATION (CAPACITOR FIRING)

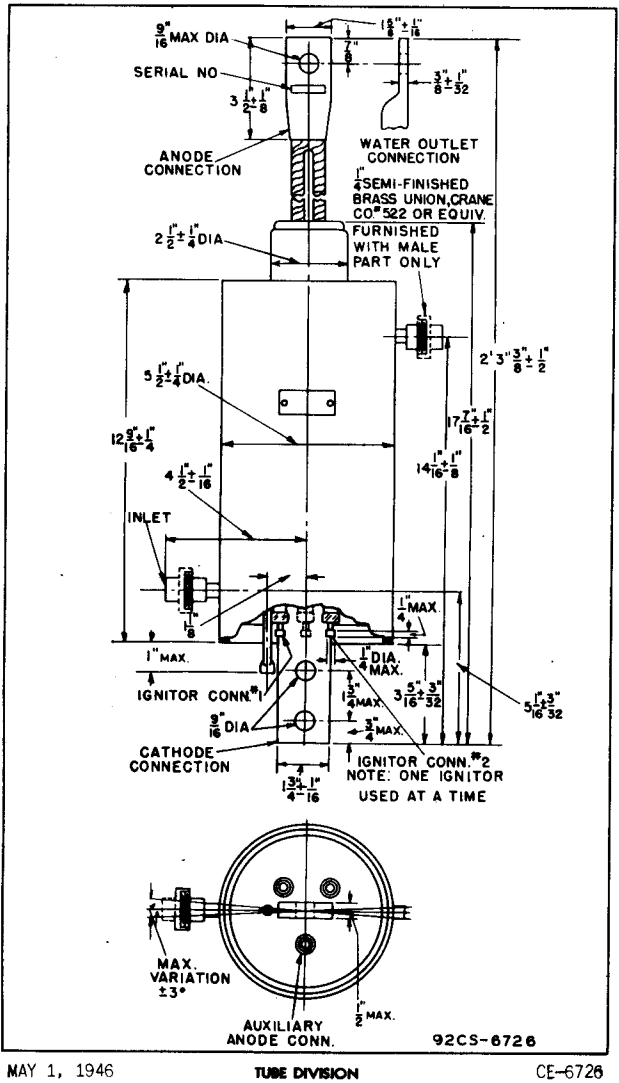
See Circuit 92CS-6722 under type 5554

Minimum volt-ampere requirements are shown on curve 92CS-6725 under type 5554

• Use only one ignitor at a time.
* Averaged over any 2-minute interval.
** Averaged over any 1-minute interval.
\# For systems in which the flow of water is controlled by the load.
\#\# Averaged over any 10-second interval.

RCA

5555
IGNITRON



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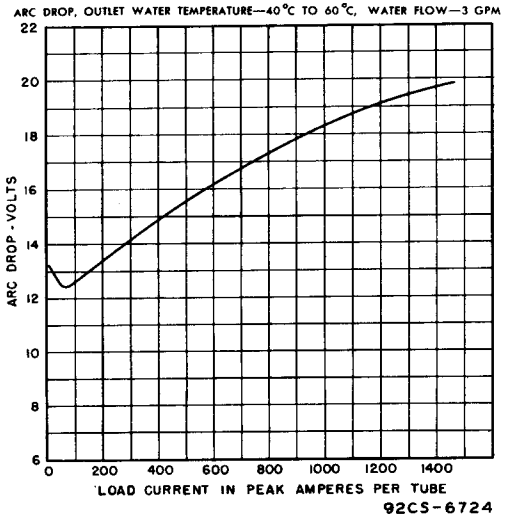
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5555
IGNITRON



TUBE DIVISION
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5557
THYRATRON
MERCURY-VAPOR TRIODE

DATA

Electrical:

Filament:				
Voltage*	2.5			volts
Current	5.0			amp
Direct Interelectrode Capacitance:				
Grid to Anode (Approx.)	4.4			μμf
Peak Voltage Drop (Approx.)	16			volts
Approximate Control Characteristics:				
Anode Voltage	40	100	1000	volts
Grid Voltage	0	-2.25	-6.5	volts
Ionization Time (Approx.)	10			microseconds
Deionization Time (Approx.)	1000			microseconds

Mechanical:

Mounting Position	Vertical, base down
Overall Length	6-3/8" ± 1/4"
Seated Length	5-3/4" ± 1/4"
Maximum Diameter	2-7/16"
Bulb	S-19
Cap	Medium
Base	Medium 4-Pin, Bayonet

Maximum Ratings, Absolute Values:

PEAK FORWARD ANODE VOLTAGE	2500 max.	volts
PEAK INVERSE ANODE VOLTAGE	5000 max.	volts
GRID VOLTAGE:		
Before Conduction	-500 max.	volts
During Conduction	-10 max.	volts
INSTANTANEOUS ANODE CURRENT:		
Below 25 Cycles	1.0 max.	amp
25 Cycles and Higher	2.0 max.	amp
AVERAGE ANODE CURRENT**	0.5 max.	amp
SURGE ANODE CURRENT for 0.1 sec. max.	40 max.	amp
INSTANTANEOUS GRID CURRENT	0.25 max.	amp
AVERAGE GRID CURRENT**	0.05 max.	amp
COND.-MERCURY TEMP. RANGE▲	40 to 80	°C

* Filament voltage must be applied at least 5 seconds before anode voltage is applied.

** Averaged over any 15-second interval.

▲ Recommended condensed-mercury temperature 40°C.

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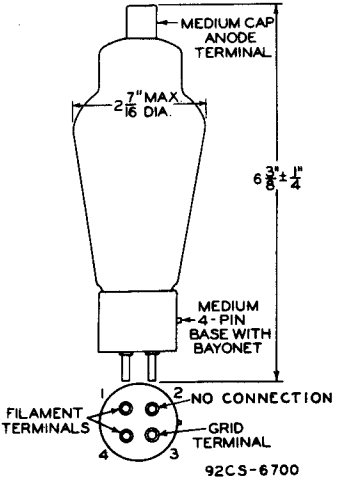
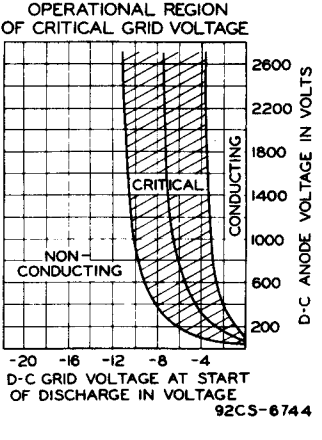
THYRATRON





5559

THYRATRON

MERCURY-VAPOR TRIODE

DATA

Electrical:

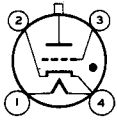
Heater, for Unipotential Cathode:		
Voltage	5.0	volts
Current	4.5	amp
Cathode:		
Minimum Heating Time, prior to tube conduction	5	minutes
Direct Interelectrode Capacitances (Approx.):		
Grid to Anode	2.5	μμf
Grid to Cathode	10	μμf
Ionization Time (Approx.)	10	μsec
Deionization Time (Approx.)	1000	μsec
Anode Voltage Drop (Approx.)	16	volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0		220

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	7" ± 1/4"
Seated Length	6-3/8" ± 1/4"
Maximum Diameter	3"
Bulb	ST-23
Cap	Medium
Base	Medium-Shell Small 4-Pin, Bayonet
Basing Designation for BOTTOM VIEW	4BL

Pin 1 – Heater

Pin 2 – Cathode; Circuit Returns



Pin 3 – Grid

Pin 4 – Heater, Cathode Cap – Anode

Maximum Ratings, *Absolute Values*:

PEAK ANODE VOLTAGE:		
Forward	1000 max.	volts
Inverse	1000 max.	volts
GRID VOLTAGE:		
Before Conduction	-500 max.	volts
During Conduction	-10 max.	volts
CATHODE CURRENT:		
Peak	15 max.	amp
Average**	2.5 max.	amp
Fault, for 0.1 sec. maximum	200 max.	amp
GRID CURRENT:		
Average**	+0.25 max.	amp
COND.-MERCURY TEMPERATURE RANGE▲	+40 to +80	°C
OPERATING FREQUENCY	150 max.	cps

** Averaged over any interval of 15 sec. max.

▲ Recommended operating temperature is 40°C.

← Indicates a change.

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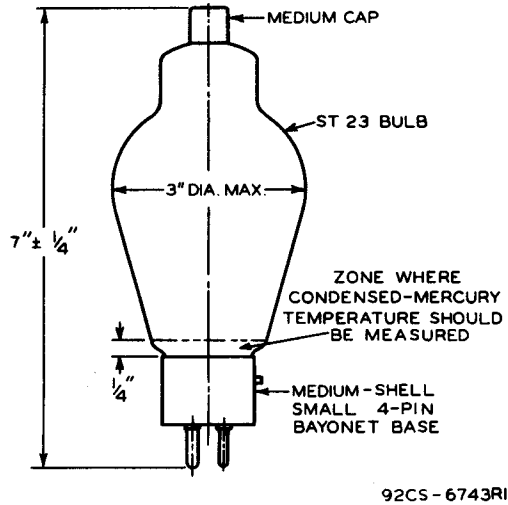
THYRATRON



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RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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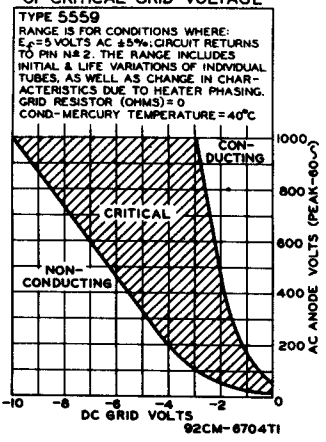
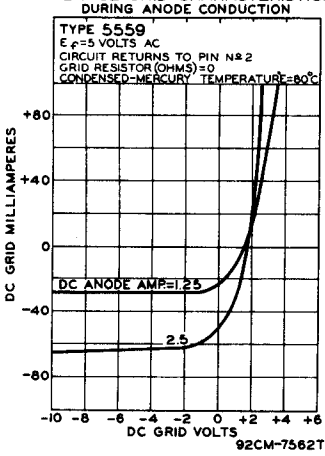
THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE



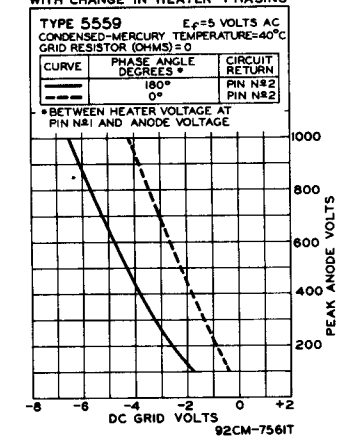
AVERAGE GRID CHARACTERISTICS DURING ANODE CONDUCTION



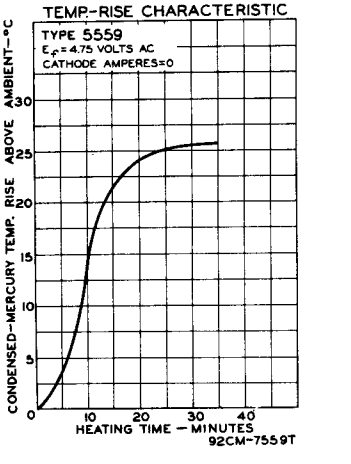
5559

THYRATRON

SHIFT OF AVERAGE CONTROL CHARACTERISTIC WITH CHANGE IN HEATER PHASING



TEMP.-RISE CHARACTERISTIC



5560

THYRATRON

MERCURY-VAPOR TETRODE

DATA

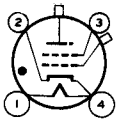
Electrical:

Heater, for Unipotential Cathode:			
Voltage	5.5□	5.0	volts
Current	5.0□	4.5	amp
Cathode:			
Minimum Heating Time, prior to tube conduction	5		minutes
Direct Interelectrode Capacitances (Approx.):			
Grid No.1 to Anode	0.2		μμf
Grid No.1 to Cathode	4.4		μμf
Ionization Time (Approx.)	10		μsec
Deionization Time (Approx.)	1000		μsec
Anode Voltage Drop (Approx.)	16		volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (ohms) = 0; grid-No.1 and grid-No.2 volts = 0		170	←
Grid-No.2 Control Ratio (Approx.) with grid No.1 resistor (ohms) = 0; grid-No.1 and grid-No.2 volts = 0		300	←

Mechanical:

Mounting Position	Vertical, Base Down
Overall Length	7-11/16" ± 1/4"
Seated Length	7-1/16" ± 1/4" ←
Greatest Radius	2-1/4"
Bulb	ST-23
Caps (Two)	Medium
Base	Medium-Shell Small 4-Pin, Bayonet
Basing Designation for BOTTOM VIEW	4CD

Pin 1 - Heater
Pin 2 - Cathode; Circuit Returns
Pin 3 - Grid No.2



Pin 4 - Heater, Cathode
Top Cap - Anode
Side Cap - Grid No.1

Maximum Ratings, *Absolute Values*:

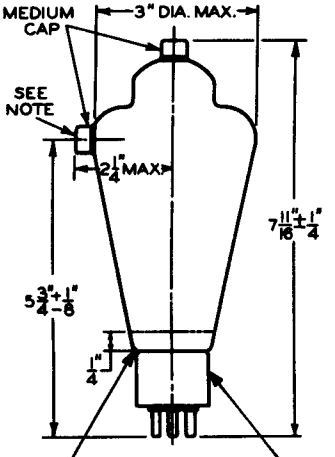
PEAK ANODE VOLTAGE:			
Forward		1000 max.	volts
Inverse		1000 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:			
Before Conduction		-300 max.	volts
During Conduction		-5 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:			
Before Conduction		-1000 max.	volts
During Conduction		-10 max.	volts
CATHODE CURRENT:			←
Peak	30 max.□	15 max.	amp
Average**	0.5 max.□	2.5 max.	amp
Fault, for 0.1 sec. maximum		200 max.	amp

□ **; See next page. ← Indicates a change.

5560
THYRATRON

GRID-No.2 CURRENT:		
Average**	0.25 max.	amp
GRID No.1 CURRENT:		
Average**	0.25 max.	amp
COND.-MERCURY TEMPERATURE RANGE▲	+40 to +80	°C
OPERATING FREQUENCY	150 max.	cps

□ Applies when this tube is used for ignitor firing.
** Averaged over any interval of 15 sec. max.
▲ Recommended operating temperature is 40°C.



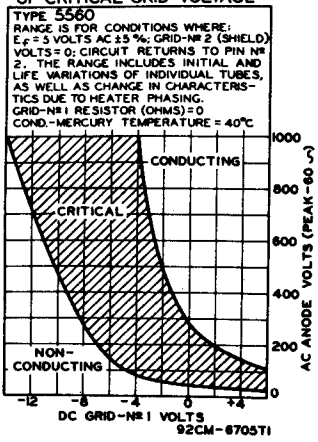
92CS-6742RI

NOTE: THE PLANE THROUGH TUBE AXIS AND CENTER OF GRID-№1 CAP IS 45°±5° FROM THE PLANE THROUGH THE TUBE AXIS AND CENTER OF BAYONET PIN. GRID-№1 CAP IS ON SAME SIDE AS PIN №3.

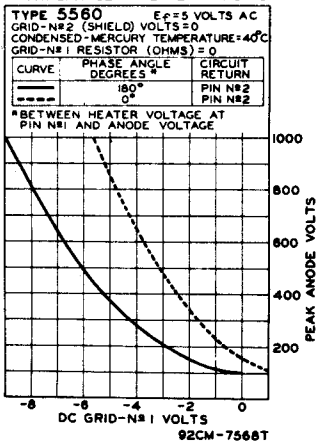
TEMPERATURE-RISE CHARACTERISTIC of the 5560 is the same as that shown for Type 5559

5560
THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

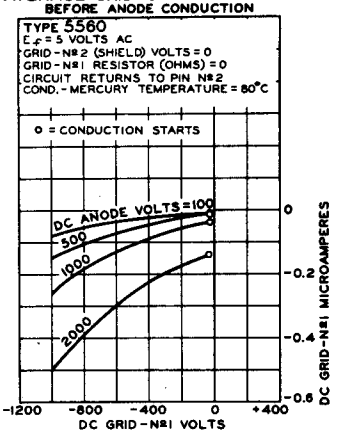


SHIFT OF AVERAGE CONTROL CHARACTERISTIC WITH CHANGE IN HEATER PHASING



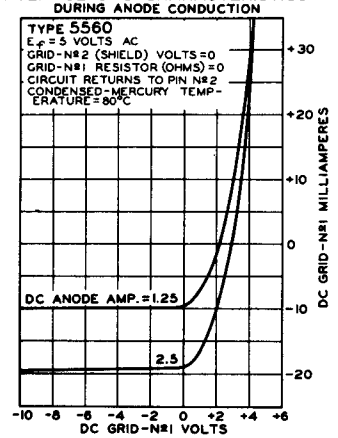
5560
THYRATRON

AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION



92CM-7556T

AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION



92CM-7570T

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

5563 ✓

5563
THYRATRON
MERCURY-VAPOR TRIODE

GENERAL DATA

Electrical:

Filament, Coated:		
Voltage	5	volts
Current	10	amp
Minimum Heating Time:		
At initial installation without anode voltage, for proper distribution of condensed mercury	15	minutes
During subsequent operation and prior to conduction, for bringing condensed-mercury temperature within operating range.	Not less than 60 seconds to provide adequate filament heating; longer, if required by low ambient temperatures.	
Direct Interelectrode Capacitances:[o]		
Grid to Anode	10 max.	μμf
Grid to Cathode	20 max.	μμf
Ionization Time	10 approx.	μseconds
Deionization Time	1000 approx.	μseconds
Anode Voltage Drop	15 approx.	volts
Grid Control Ratio[▲]	200 approx.	

[o] With no external shield.

Mechanical:

Mounting Position	Vertical, base down
Overall Length	10-1/8" to 11-1/16"
Maximum Diameter	3-7/8"
Cooling	Convection
Bulb	T-24
Cap	Skirted Medium No. 3985
Base	Medium-Metal-Shell Jumbo 4-Pin, Bayonet

BOTTOM VIEW

Pin 1 - Grid
Pin 2 - Filament, Internal Shield
Pin 3 - No Connection
Pin 4 - Filament
Cap - Anode

Maximum Ratings, *Absolute Values*:
For Anode-Supply Frequencies between 25 and 150 cps

COND. MERCURY TEMP. RANGE[□]	25 - 55	25 - 50	°C
PEAK ANODE VOLTAGE:			
Forward	10000 max.	15000 max.	volts
Inverse	10000 max.	15000 max.	volts
GRID VOLTAGE:			
Before Anode Conduction (Peak or DC)	-500 max.	-500 max.	volts
During Anode Conduction (Average)[●]	-10 max.	-10 max.	volts

▲, □, ●: See next page.

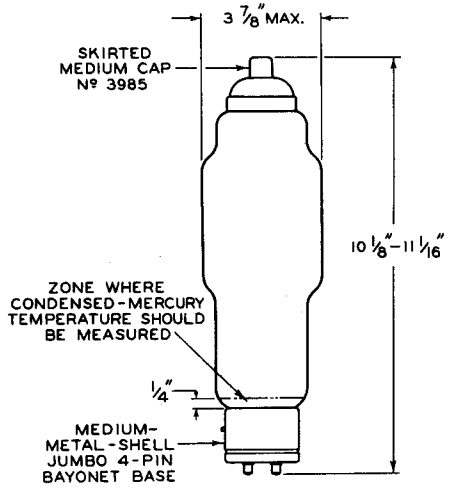
5563
THYRATRON

CATHODE CURRENT:			
Peak	10 max.	6.4 max.	amp
Average	1.8 max.	1.6 max.	amp
Surge, for max. duration of 0.1 second	200 max.	200 max.	amp
Averaging Time	1	1	cycle
GRID CURRENT:			
Peak	+1 max.	+1 max.	amp
Average	+0.1 max.	+0.1 max.	amp
Averaging Time	1	1	cycle
Maximum Circuit Values:			
Grid-Circuit Resistance	0.1 max.	0.1 max.	megohm

▲ For conditions with 0.1-megohm grid resistor, circuit returns to pin No. 2 as datum of potential, and filament voltage at pin No. 4 180° out of phase with the anode voltage.

□ Recommended operating value is 40° ± 5°C.

● Averaged over one conducting cycle.



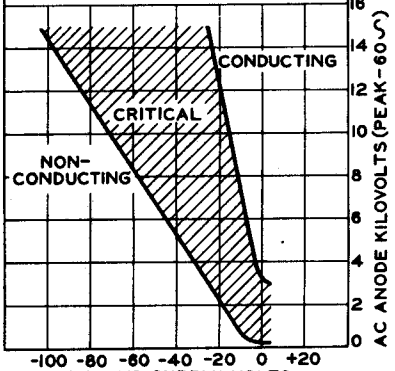
5563
THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

TYPE 5563

RANGE IS FOR CONDITIONS WHERE:

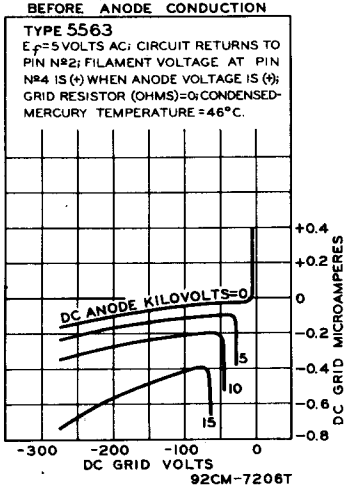
E_f = 5 VOLTS AC ± 5%; CIRCUIT RETURNS TO PIN №2; FIL. VOLTAGE AT PIN №4 IS (-) WHEN ANODE VOLTAGE IS (+). THE RANGE INCLUDES INITIAL & LIFE VARIATIONS OF INDIVIDUAL TUBES. GRID RESISTOR = 10000 TO 100000 OHMS. COND. MERCURY TEMPERATURE = 25° TO 50°C.



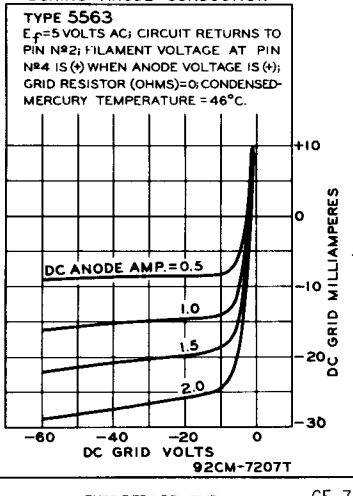
92CM-6842TI

5563
THYRATRON

AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION



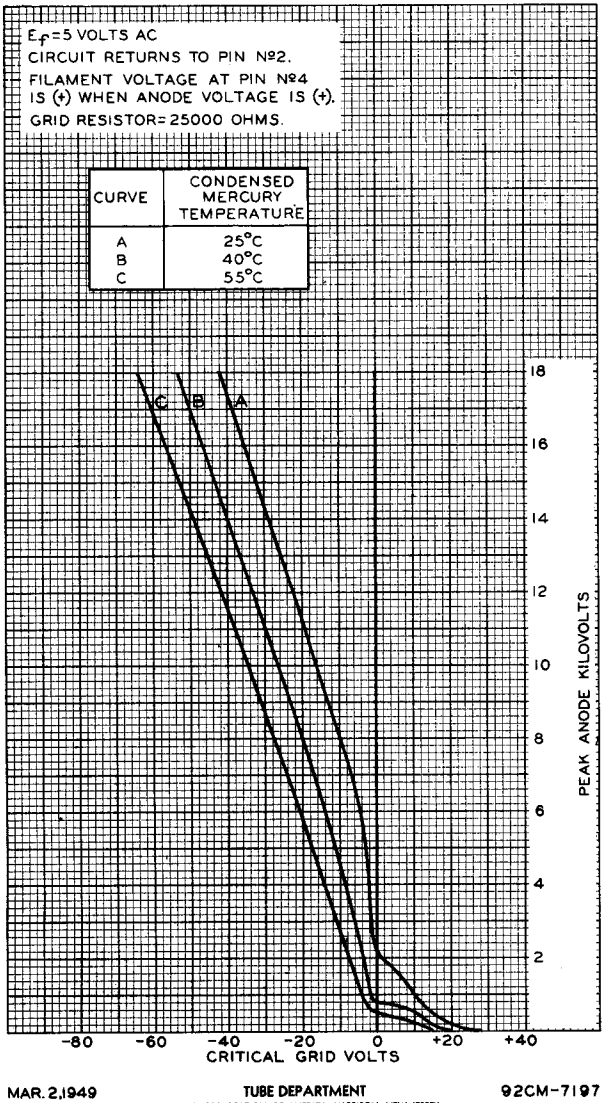
AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION



RCA

5563

AVERAGE CONTROL CHARACTERISTICS



5563

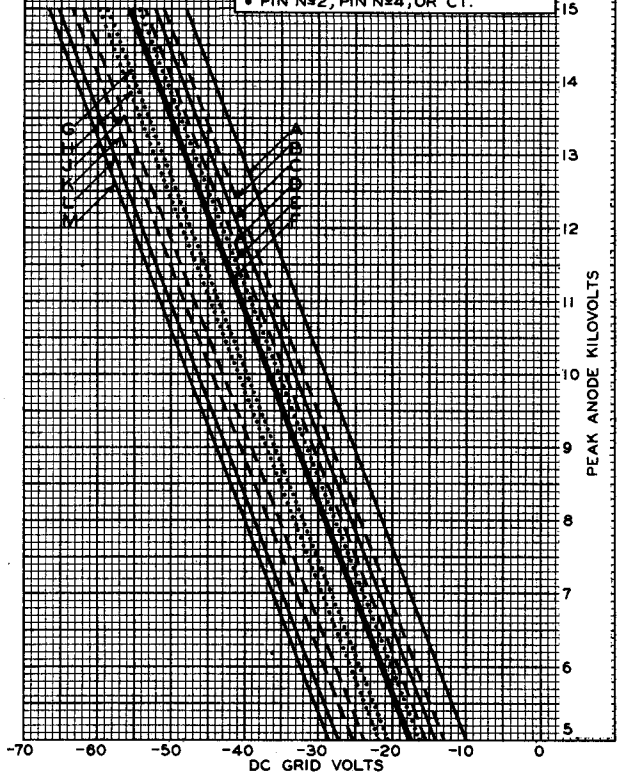
5563

SHIFT OF AVERAGE CONTROL CHARACTERISTICS WITH CHANGE IN FILAMENT PHASING AND CIRCUIT RETURN

E_f=5 VOLTS AC

CURVE	PHASE ANGLE DEGREES*	CIRCUIT RETURN	CURVE	PHASE ANGLE DEGREES*	CIRCUIT RETURN
A ——	0	PIN N°2	G •••••	135	PIN N°4
B – – –	0	CT°	H •••••	180	PIN N°4
C ——	45	PIN N°2	J – – –	135	CT°
D – – –	45	CT°	K – – –	180	CT°
E •••••	0	PIN N°4	L ——	135	PIN N°2,
F ——	90	ANY•	M ——	180	PIN N°2

* BETWEEN FILAMENT VOLTAGE AT PIN N°4 AND ANODE VOLTAGE
° CENTER TAP OF FILAMENT TRANSFORMER
• PIN N°2, PIN N°4, OR CT.



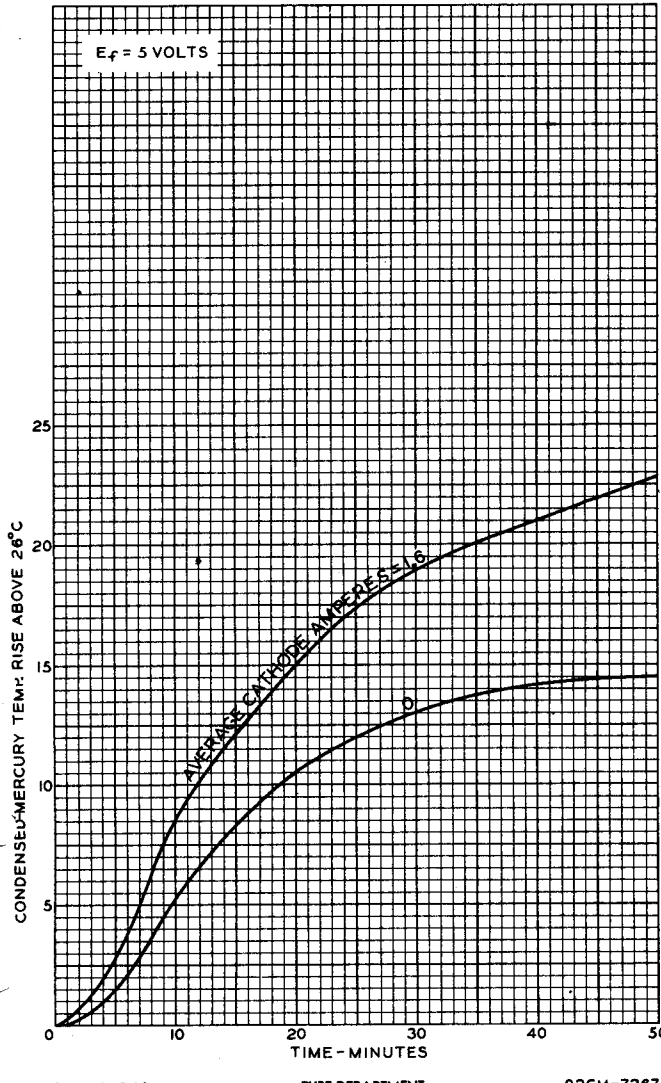
MAY 17, 1949

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7285

5563

OPERATION CHARACTERISTICS



5696
THYRATRON

GAS-TETRODE, MINIATURE TYPE

GENERAL DATA

Electrical:

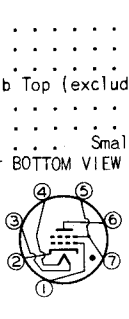
Heater, for Unipotential Cathode:		
Voltage	6.3	ac or dc volts
Current	0.150	amp
Cathode:		
Minimum Heating Time, prior to tube conduction	10	sec
Direct Interelectrode Capacitances (Approx.):°		
Grid No.1 to Anode	0.03	μμf
Input	1.8	μμf
Output	0.54	μμf
Ionization Time (Approx.):		
For conditions: dc anode volts = 100; grid-No.1 square-pulse volts = +50; peak cathode amperes during conduction = 0.150	0.5	μsec
Deionization Time (Approx.):		
For conditions: dc anode volts = 500; grid-No.1 volts = -100, grid-No.1 resistor (ohms) = 1000; dc cathode amperes = 0.025	25	μsec
For conditions: dc anode volts = 500; grid-No.1 volts = -13; grid-No.1 resistor (ohms) = 1000; dc cathode amperes = 0.025	40	μsec
Maximum Critical Grid-No.1 Current, with ac anode-supply volts (rms) = 350, and average cathode amperes = 0.025	0.5	μamp
Anode Voltage Drop (Approx.)	10	volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0; grid-No.2 volts = 0	250	
Grid-No.2 Control Ratio (Approx.) with grid-No.1 volts = 0, grid-No.2 resistor (ohms) = 0	15	

° Without external shield.

Mechanical:

Mounting Position	Any
Maximum Overall Length	1-3/4"
Maximum Seated Length	1-1/2"
Length, Base Seat to Bulb Top (excluding tip)	1-1/8" ± 3/32"
Maximum Diameter	3/4"
Bulb	T-5-1/2
Base	Small-Button Miniature 7-Pin
Basing Designation for BOTTOM VIEW	7BN

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



Pin 5 - Grid No.2
Pin 6 - Anode
Pin 7 - Grid No.2

5696

5696

THYRATRON

RELAY and GRID-CONTROLLED RECTIFIER SERVICE

Maximum Ratings, *Absolute Values*:

PEAK ANODE VOLTAGE:		
Forward	500 max.	volts
Inverse	500 max.	volts
GRID-No.2 (SHIELD-GRID) VOLTAGE:		
Peak, before anode conduction	−50 max.	volts
Average, during anode conduction■	−10 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Peak, before anode conduction	−100 max.	volts
Average, during anode conduction■	−10 max.	volts
CATHODE CURRENT:		
Peak	0.1 max.	amp
Average■	0.025 max.	amp
Surge, for duration of 0.1 sec. max.	2 max.	amp
GRID-No.2 CURRENT:		
Average■	+0.005 max.	amp
GRID-No.1 CURRENT:		
Average■	+0.005 max.	amp
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	25 max.	volts
AMBIENT TEMPERATURE RANGE	−55 to +90	°C

Typical Operating Conditions for Relay Service:

RMS Anode Voltage	117	volts
Grid No.2	Connected to cathode at socket	
RMS Grid-No.1 Bias Voltage□	5	volts
Peak Grid-No.1 Signal Voltage	5	volts
Grid-No.1-Circuit Resistance	0.1	megohm
Anode-Circuit Resistance#	5000	ohms

Maximum Circuit Values:

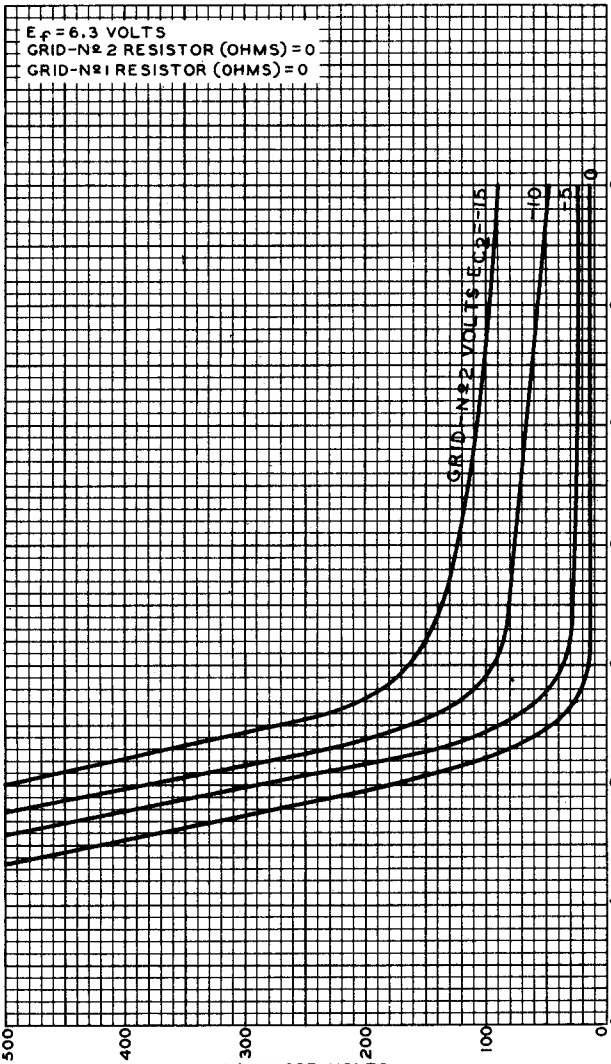
Grid-No.1-Circuit Resistance	10 max.	megohms

■ Averaged over any interval of 30 sec. max.

□ Approximately 180° out of phase with the anode voltage.

Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.

AVERAGE CONTROL CHARACTERISTICS



AUG. 6, 1948

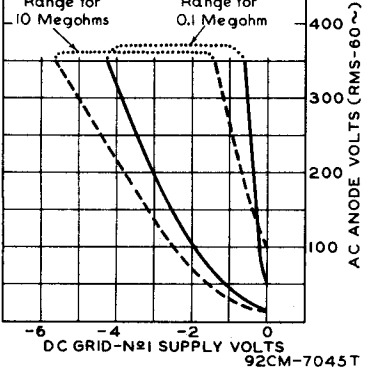
TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

92CM-7044

5696
THYRATRON

OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE

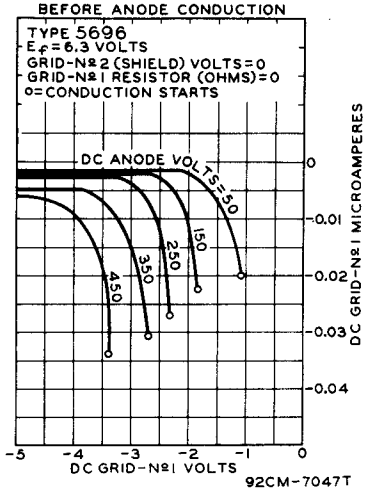
TYPE 5696
GRID-№2 (SHIELD) VOLTS=0
RANGES SHOWN ARE FOR TWO VALUES OF GRID RESISTOR-0.1 MEG. AND 10 MEG.-AND TAKE INTO ACCOUNT INITIAL DIFFERENCES BETWEEN INDIVIDUAL TUBES & SUBSEQUENT DIFFERENCES DURING TUBE LIFE, FOR A HEATER-VOLTAGE RANGE OF 5.7 TO 6.9 VOLTS AND FOR AN AMBIENT TEMPERATURE RANGE OF -55 TO +90°C



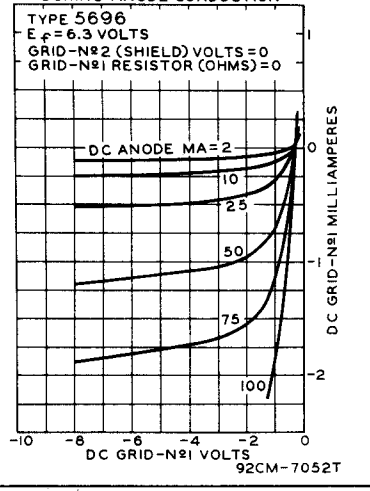
5696

THYRATRON

AVERAGE CHARACTERISTICS
BEFORE ANODE CONDUCTION



AVERAGE CHARACTERISTICS
DURING ANODE CONDUCTION



5728/FG-67

MERCURY-VAPOR THYRATRON

NEGATIVE/POSITIVE-CONTROL TRIODE TYPE

GENERAL DATA

Electrical:

Heater, for Unipotential Cathode:

	Min.	Av.	Max.	
Voltage (AC or DC)	4.75	5.0	5.25	volts
Current at 5.0 volts	-	4.5	4.9	amp

Cathode:

Minimum Heating Time, prior to tube conduction	5	minutes
Maximum Outage Time, without reheating	*See Curves*	

Direct Interelectrode Capacitances (Approx., without external shield):

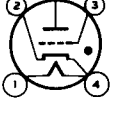
Grid to Anode	3.25	μμf
Grid to Cathode	8.9	μμf

Maximum Critical Grid Current with ac anode volts (rms) = 220	10	μamp
Anode Voltage Drop (Approx.)	16	volts
Ionization Time (Approx.): For conditions: dc anode-supply volts = 100, peak grid volts = +35, and peak anode amperes = 15	15	μsec
Deionization Time (Approx.): For conditions: dc anode volts = 120, dc grid-supply volts = -500, grid resistor (ohms) = 1000, and dc anode amperes = 2.5	5	μsec
For conditions: dc anode volts = 120, dc grid-supply volts = 0, grid resistor (ohms) = 1000, and dc anode amperes = 2.5	850	μsec

Mechanical:

Mounting Position	Vertical, base down
Maximum Overall Length	7"
Seated Length	6-1/8" ± 1/4"
Maximum Diameter	3"
Bulb	ST-23
Cap	Medium (JETEC No.C1-5)
Base	Medium-Shell Small 4-Pin, Bayonet (JETEC No.A4-10)

BOTTOM VIEW



Pin 1: Heater
Pin 2: Cathode (Grid & Anode Return)
Pin 3: Grid
Pin 4: Heater, Cathode

5728/FG-67

MERCURY-VAPOR THYRATRON

Temperature Control:

Heating—When the ambient temperature is so low that the normal rise of condensed-mercury temperature above the ambient temperature will not bring the condensed-mercury temperature up to the minimum value of the operating range specified under *Maximum Ratings*, some form of heat-conserving enclosure or auxiliary heater will be required.

Cooling—When the operating conditions are such that the maximum value of the operating condensed-mercury temperature is exceeded, provision should be made for forced-air cooling sufficient to prevent exceeding the maximum value.

Temperature Rise of Condensed Mercury to Equilibrium Above Ambient Temperature (Approx.):*		
No Load	25	°C
Full Load	31	°C

INVERTER SERVICE

Maximum Ratings, *Absolute Values:*

PEAK ANODE VOLTAGE:		
Forward	1000 max.	volts
Inverse	1000 max.	volts
GRID VOLTAGE:		
Peak, before anode conduction	−500 max.	volts
Average●, during anode conduction	−5 max.	volts
CATHODE CURRENT:		
Peak	15 max.	amp
Average●●	2.5 max.	amp
Fault, for duration of 0.1 sec. max.	200 max.	amp
GRID CURRENT:		
Average●	+0.3 max.	amp
CONDENSED-MERCURY TEMPERATURE RANGE	+40 to +80	°C

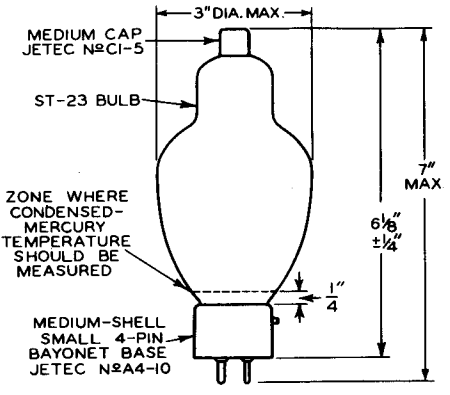
* With heater voltage = 4.75 volts and no heat-conserving enclosure.

● Averaged over one conducting cycle.

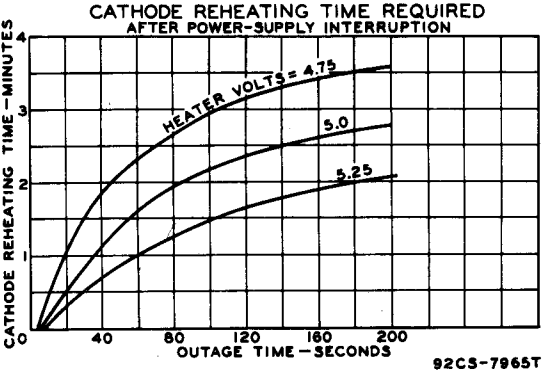
●● Averaged over any interval of 15 seconds maximum.

5728/FG-67

MERCURY-VAPOR THYRATRON



92CS-6701R3



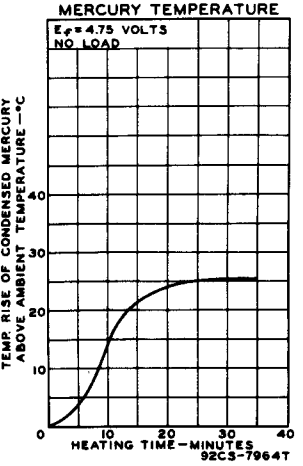
92CS-7965T

TUBE DEPARTMENT
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

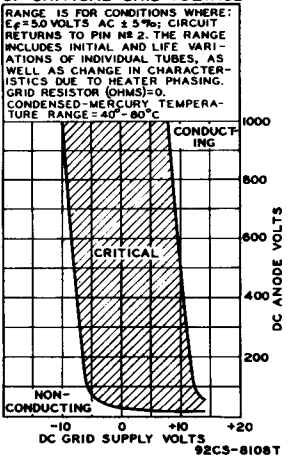
5728

5728/FG-67
CHARACTERISTIC CURVES

RATE OF RISE OF COND.-MERCURY TEMPERATURE

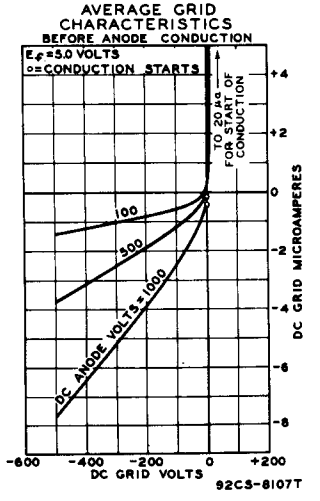


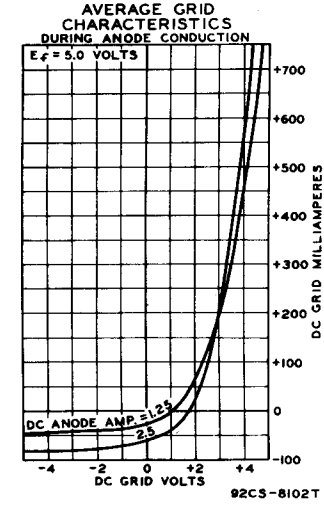
OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE



5728/FG-67

CHARACTERISTIC CURVES





5822
IGNITRON

DATA

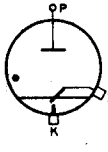
General:

Cathode, Ignitor Excited	Mercury-Pool Type	
Starting time at required ignitor voltage or current□	100	μsec
Anode Voltage Drop:		
At peak anode current of 1500 amperes	25	volts
Cooling:		
Type		water
Minimum Water Flow:		
At no load	0.5	gpm
At rated continuous average current	1.5	gpm
Maximum Pressure Drop:		
At 1.5 gpm	5	lb./sq.in.
Minimum Inlet-Water Temperature	10	°C
Maximum Outlet-Water Temperature	35	°C
Maximum Water-Temperature Rise	6	°C
Overall Rigid Length (Approx.)		14-1/2"
Maximum Diameter (Including water connections)		7-1/4"
Mounting Position	Vertical, flexible lead up	

Terminal Connections:

P – Anode Terminal (Flexible lead)

K – Cathode Terminal (Opposite the anode terminal)



I – Ignitor Terminal (Adjacent to the cathode terminal)

FREQUENCY-CHANGER RESISTANCE-WELDING SERVICE

For input-supply frequency from 50 to 60 cycles per second and minimum output frequency of 5 cycles per second

Maximum Ratings, *Absolute Values*:

	Rating I	*Rating II*	
PEAK ANODE VOLTAGE:			
Forward	1200 max.	1500 max.	volts
Inverse	1200 max.	1500 max.	volts
ANODE CURRENT:°			
Peak	1500 max.	1200 max.	amp
Corresponding Average*.	20 max.	16 max.	amp
Average*	70 max.	56 max.	amp
Corresponding Peak	420 max.	336 max.	amp
RATIO OF FAULT ANODE CURRENT TO PEAK ANODE CURRENT●.	12.5 max.	12.5 max.	

° Ratings are for zero phase-control angle. Straight-line interpolation on log-log paper is permissible between corresponding points.

* Averaged over any 6.25-second maximum interval.

● Duration of fault anode current should be limited to 0.15 second.

□: See next page.

5822

5822
IGNITRON

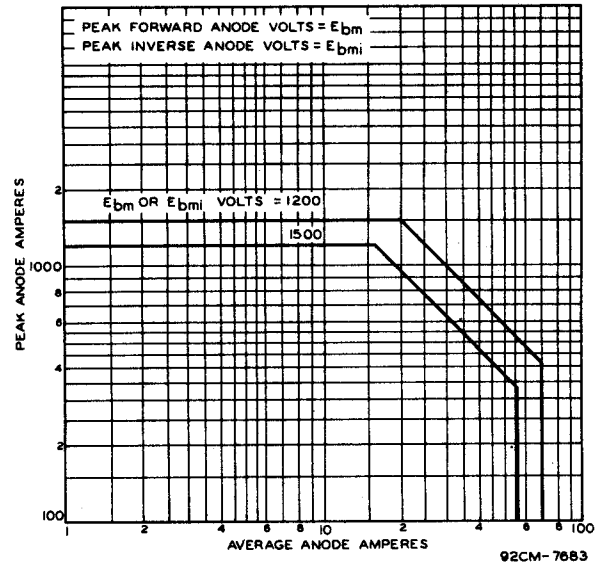
PEAK IGNITOR VOLTAGE:		
Positive[□]	Equal to anode	volts
	200 min.	volts
Negative	5 max.	volts
IGNITOR CURRENT:		
Peak[□]	100 max.	amp
	30 min.	amp
RMS	10 max.	amp
Average[■]	1 max.	amp

□ Ignition will occur if either minimum peak positive ignitor potential is applied, or minimum peak ignitor current flows, for the indicated starting time (see Cathode).

■ Averaged over any 5-second maximum interval.

Outline Drawing for the 5822 is the same as shown for Type 5552

RATING CHART



RCA

6012

THYRATRON

GAS TETRODE

GENERAL DATA

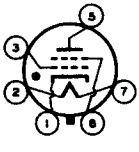
Electrical:

	Min.	Av.	Max.	
Heater, for Unipotential Cathode:				
Voltage (AC or DC)	5.7	6.3	6.9	volts
Current at 6.3 volts	2.35	2.6	2.85	amp
Cathode:				
Minimum Heating Time, prior to tube conduction			30	seconds
Maximum Outage Time, without reheating			5	seconds
Direct Interelectrode Capacitances (Approx., without external shield):				
Grid No.1 to Anode			0.23	μμf
Input			5.8	μμf
Output			3.9	μμf
Maximum Critical Grid-No.1 Current with ac anode-supply volts (rms) = 460, and average anode current = 0.5 amp			3	μamp
Anode Voltage Drop (Approx.)			10	volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0; grid-No.2 resistor (megohms) = 0; and dc grid-No.2 volts = 0			150	
Grid-No.2 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0; grid-No.2 resistor (megohms) = 0; and dc grid-No.1 volts = 0			650	

Mechanical:

Mounting Position	Any
Maximum Overall Length	4-1/4"
Maximum Seated Length	3-11/16"
Maximum Diameter	1-23/32"
Bulb	T-12
Base	Short Jumbo-Shell Octal 6-Pin (JETEC No.B6-73)

BOTTOM VIEW



Pin 1 – Cathode
Pin 2 – Heater
Pin 3 – Grid No.1
Pin 5 – Anode
Pin 7 – Heater
Pin 8 – Grid No.2

RELAY AND GRID-CONTROLLED RECTIFIER SERVICE

For Anode-Supply Frequency of 60 cps

Maximum Ratings, *Absolute Values*:

PEAK ANODE VOLTAGE:		
Forward	650 max.	volts
Inverse	1300 max.	volts

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GRID-No.2 (SHIELD-GRID) VOLTAGE:		
Peak, before anode conduction	-100 max.	volts
Average*, during anode conduction	-10 max.	volts
GRID-No.1 (CONTROL-GRID) VOLTAGE:		
Peak, before anode conduction	-200 max.	volts
Average*, during anode conduction	-10 max.	volts
CATHODE CURRENT:		
Peak	5 max.	amp
Average*	0.5 max.	amp
Fault, for duration of 0.1 sec. max.	20 max.	amp
GRID-No.2 CURRENT:		
Average*	0.05 max.	amp
GRID-No.1 CURRENT:		
Average*	0.05 max.	amp
PEAK HEATER-CATHODE VOLTAGE:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	25 max.	volts
AMBIENT TEMPERATURE RANGE	-75 to +90	°C

Maximum Circuit Values:

Grid-No.1-Circuit Resistance	2 max.	megohms

* Averaged over any interval of 30 seconds maximum.

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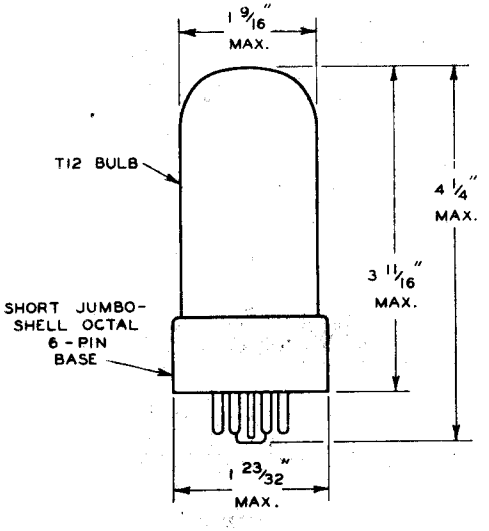

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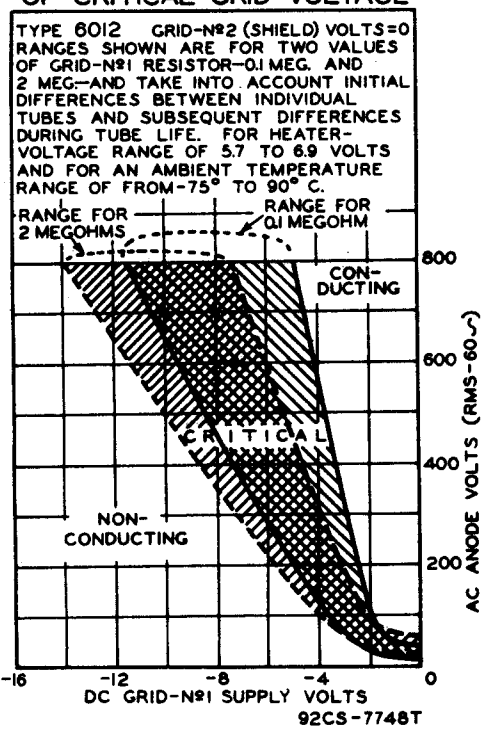
OPERATIONAL RANGE OF CRITICAL GRID VOLTAGE



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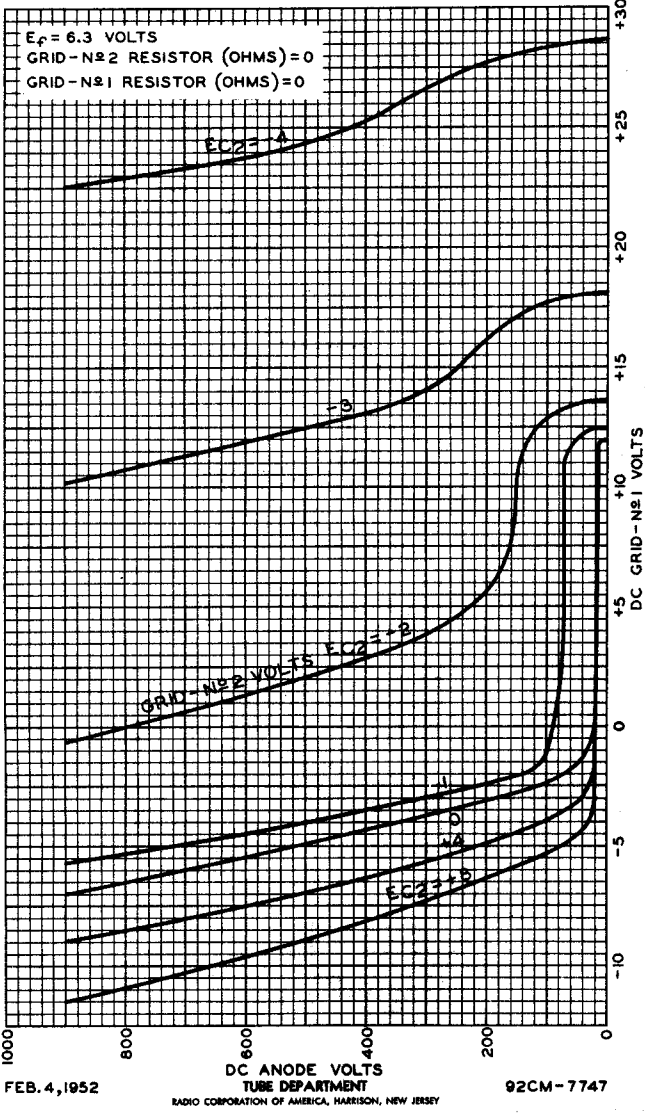
AVERAGE CONTROL CHARACTERISTICS



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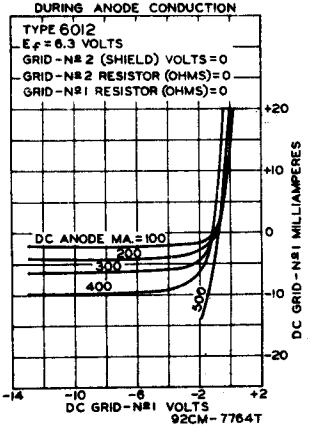
AVERAGE GRID CHARACTERISTICS
DURING ANODE CONDUCTION



AVERAGE GRID CHARACTERISTICS
BEFORE ANODE CONDUCTION