Mercury Vapour Rectifiers

June 1965

ENGLISH ELECTRIC VALVE CO. LTD.

CHELMSFORD
ENGLAND

Telephone:
Chelmsford 3491

Printed in England

MERCURY VAPOUR RECTIFIER

869B

American Designation 869B

INTRODUCTION

The 869B is a hot cathode Mercury Vapour Rectifier with maximum ratings of 20kV peak inverse voltage and 10A peak current. It will provide a d.c. output of 19kV 7·5A in a three phase full wave circuit.

GENERAL DATA

(See also Preamble to Rectifier Section of this Catalogue)

Electrical

Filament	Oxide Coated
Filament Voltage	5·0 V
Filament Current	19 A
Filament Heating Time	1 Minute
Condensed Mercury Temperature	(*See page* 2)
Maximum Peak Inverse Voltage	(*See page* 2)
Maximum Anode Current:	
Peak	(*See page* 2)
Mean (30 secs Max averaging time)	(*See page* 2)
Under fault conditions (0·1 second Max duration)	100 A

Mechanical

Overall Length	14·44 inches (366·7 mm)	Max
Overall Diameter	5·125 inches (130·2 mm)	Max
Net Weight	1¾ pounds (800 gm)	Approx
Mounting Position		Vertical, base down
Cap		JEDEC No. C1-9
Base	3-Pin Jumbo (JEDEC No. A3-20)	

CONTROL OF CONDENSED MERCURY TEMPERATURE

On the following pages two curves are given showing:

1. Total heating time for any value of ambient temperature. This is for use when the valve is being switched on from cold.
2. Rise of condensed mercury temperature above ambient plotted against heating and cooling time. This can be used as indicated by the example in the preamble to this section of the catalogue.

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MAXIMUM OPERATING CONDITIONS
(Absolute Values—see Preamble)

Circuit	* Diagram	Condensed Mercury Temp. °C	Peak Inverse Voltage (50-60 c/s) kV	Anode Current in Amperes		Transformer Secondary Voltage (R.M.S.) kV	Max D.C. Output	
				Peak	Mean‡		kV	Amps
Single Phase Full Wave	A	30–40	20	10	2·5	7·0	6·3	5·0
		30–50	15	10	2·5	5·3	4·7	5·0
		30–60	10	10	2·5	3·5	3·1	5·0
Single Phase Full Wave Bridge	B	30–40	20	10	2·5	14·0	12·6	5·0
		30–50	15	10	2·5	10·6	9·5	5·0
		30–60	10	10	2·5	7·0	6·3	5·0
Three Phase Half Wave	C	30–40	20	10	2·5	8·1†	9·5†	7·5
		30–50	15	10	2·5	6·1†	7·1†	7·5
		30–60	10	10	2·5	4·1†	4·7†	7·5
Three Phase Full Wave	D§	30–40	20	10	2·5	8·1	19·0	7·5
		30–50	15	20	5	6·1	14·2	15·0
		30–60	10	20	5	4·1	9·5	15·0

*For diagrams see Typical Rectifier Circuits for Choke Input Filters in the preamble to this section of the catalogue.

†For operation with constant full load. If the load resistance is increased the secondary voltage should be decreased (to avoid excessive peak inverse voltage) until at no load the reduction is 14%. The d.c. output voltage will be correspondingly decreased.

‡Mean anode currents are averaged over any period of 30 seconds maximum.

§With filament and anode supplies out of phase (60°–120°).

X-RAY WARNING

X-rays are produced when the 869B is operated with a peak inverse anode voltage above 16kV (absolute value). These rays can constitute a health hazard unless the valve is adequately shielded for X-ray radiation. This is entirely a function of high voltage devices and does not reflect upon the design of the valve.

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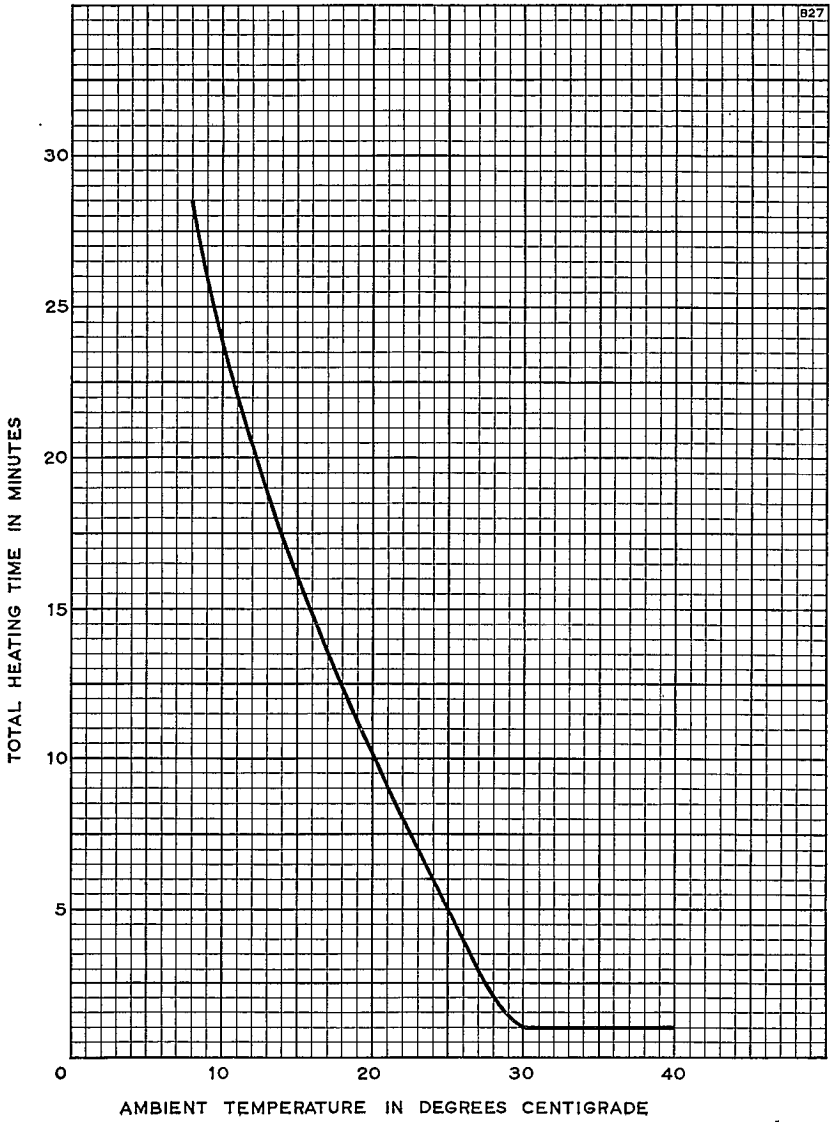
TOTAL HEATING TIME CHARACTERISTIC



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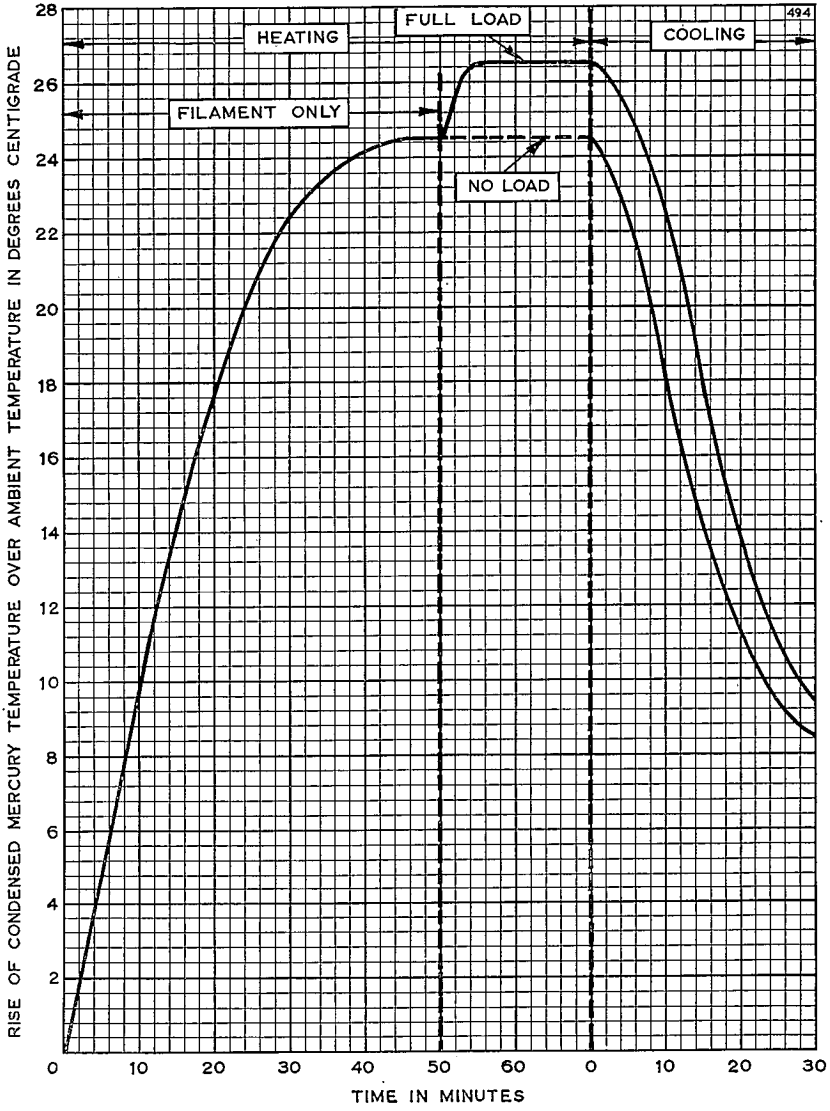
ENGLISH ELECTRIC

HEATING AND COOLING CHARACTERISTIC



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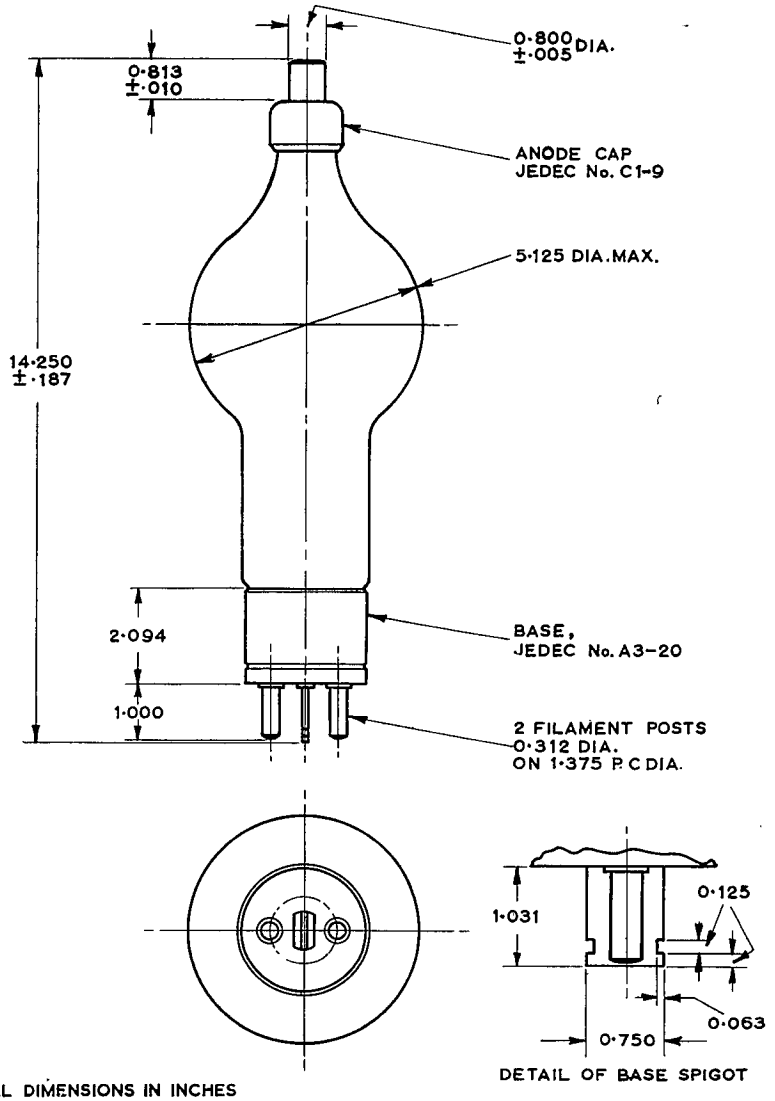
OUTLINE

495A



DETAIL OF BASE SPIGOT

ALL DIMENSIONS IN INCHES

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MERCURY VAPOUR RECTIFIER

AH205/857B ←

Service Type CV2673 **American Equivalent 857B**

INTRODUCTION

The AH205/857B is a hot cathode Mercury Vapour Rectifier with maximum ratings of 22kV peak inverse voltage and 40A peak current. It will provide a D.C. output of 21kV 30A in a three phase full wave circuit or 7kV 20A in a single phase full wave circuit. ←

GENERAL DATA
(See also Preamble to Rectifier Section of this Catalogue)

Electrical

Filament	Oxide Coated	
Filament Voltage	5·0	V
Filament Current	30	A
Filament Heating Time	1	Minute
Condensed Mercury Temperature	*(See page 2)*	
Max Peak Inverse Voltage	*(See page 2)*	
Max Anode Current:		
Peak	40	A
Mean (30 seconds Max averaging time)	10	A ←
Under fault conditions (0·2 seconds Max duration)	400	A

Mechanical

Overall Length	19·88 inches	(505 mm)	Max
Overall Diameter	7·63 inches	(194 mm)	Max
Net Weight	4·0 pounds	(1·8 kg)	Approx
Mounting Position	Vertical, base down		
Base	*(See outline drawing)*		

CONTROL OF CONDENSED MERCURY TEMPERATURE

On the following pages two curves are given showing:

1. Total heating time for any value of ambient temperature. This is for use when the valve is being switched on from cold.
2. Rise of condensed mercury temperature above ambient plotted against heating and cooling time. This can be used as indicated by the example in the preamble to this section of the catalogue.

← Indicates a change

MAXIMUM OPERATING CONDITIONS
(Absolute Values—see Preamble)

Circuit	* Diagram	Condensed Mercury Temp. °C	Peak Inverse Voltage (50-60 c/s) kV	Anode current in Amperes		Transformer Secondary Voltage (R.M.S.) kV	Max. D.C. Output	
				Peak	Mean‡		kV	Amps
Single Phase Full Wave	A	30–40	22	40	10	7·7	7·0	20
		25–60	10	40	10	3·5	3·1	20
Single Phase Full Wave Bridge	B	30–40	22	40	10	15·5	14·0	20
		25–60	10	40	10	7·0	6·3	20
Three Phase Half Wave	C	30–40	22	40	10	9·0†	10·5†	30
		25–60	10	40	10	4·1†	4·7†	30
Three Phase Full Wave	D	30–40	22	40	10	9·0	21·0	30
		25–60	10	40	10	4·1	9·5	30

*For diagrams see Typical Rectifier Circuits for Choke Input Filters in the preamble to this section of the catalogue.

†For operation with constant full load. If the load resistance is increased the secondary voltage should be decreased (to avoid excessive peak inverse voltage) until at no load the reduction is 14%. The D.C. output voltage will be correspondingly decreased.

‡Mean anode currents are averaged over any period of 30 seconds maximum.

→ ## X-RAY WARNING

X-Rays are produced when the AH205/857B is operated with a peak inverse anode voltage above 16 kV (absolute value). These rays can constitute a health hazard unless the valve is adequately shielded for X-ray radiation. This is entirely a function of high voltage devices and does not reflect upon the design of the valve.

→ Indicates a change

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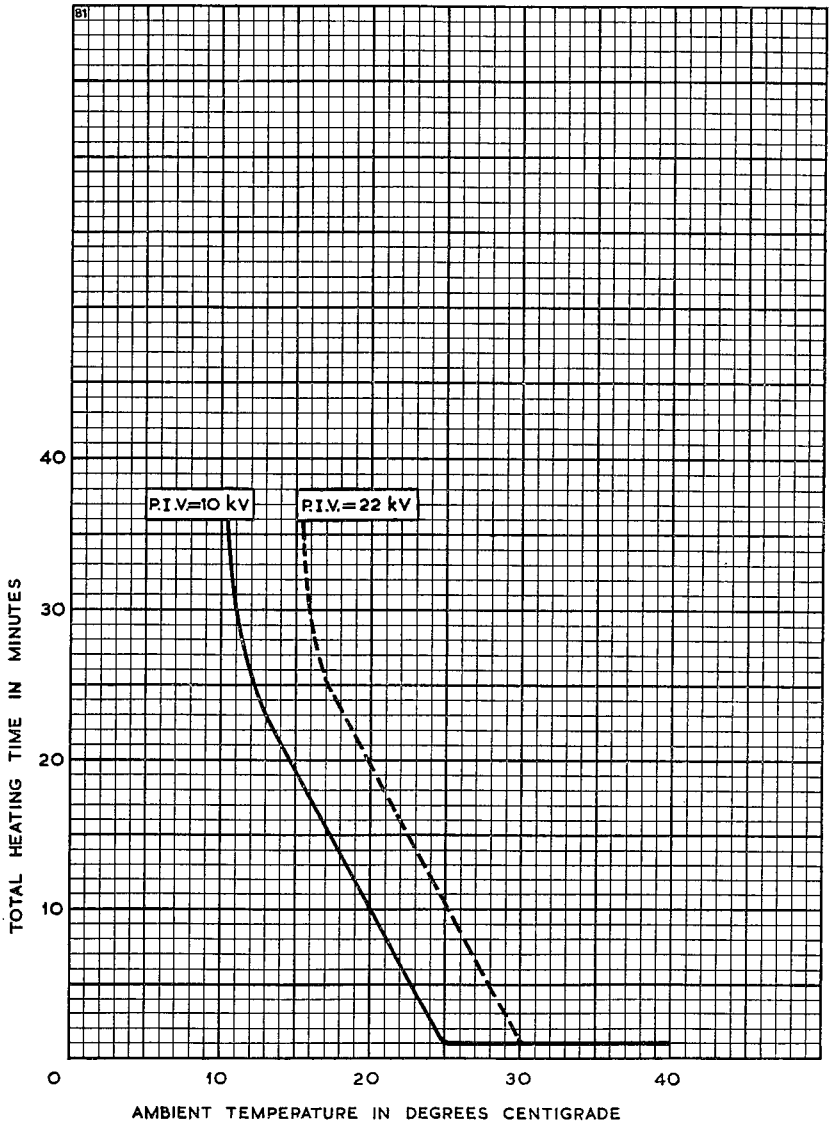
TOTAL HEATING TIME CHARACTERISTIC



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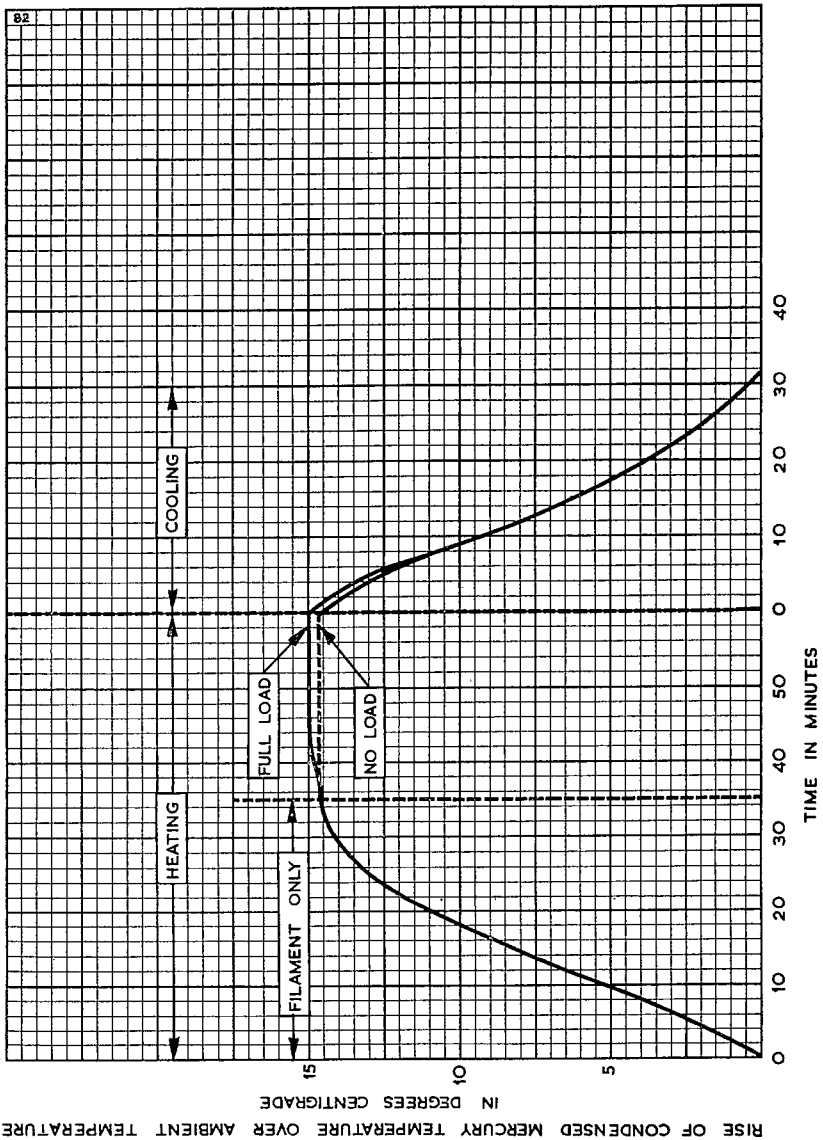
HEATING AND COOLING CHARACTERISTIC



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OUTLINE

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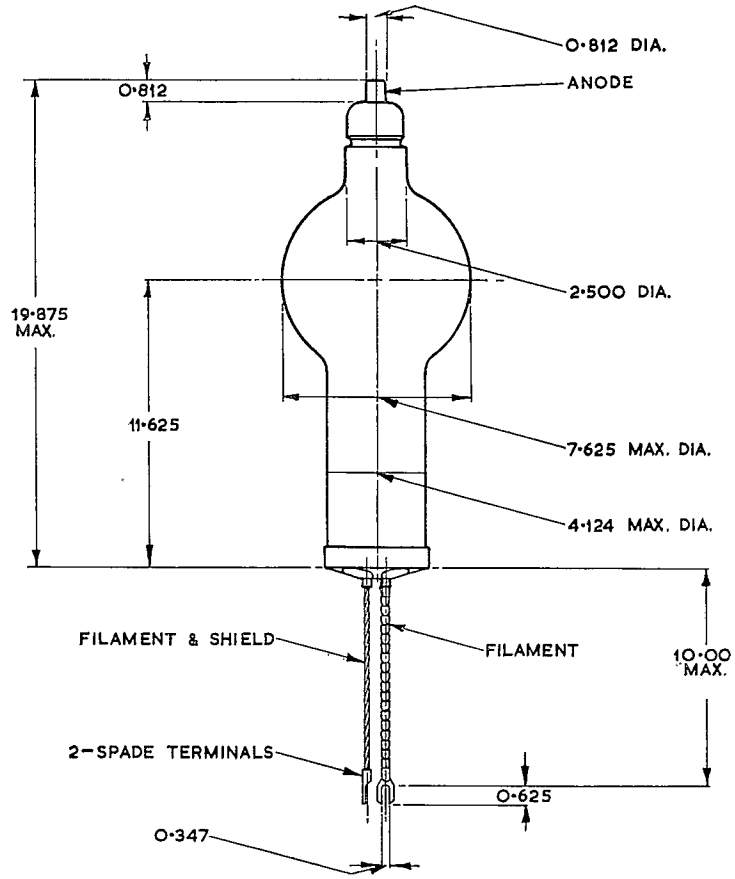

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MERCURY VAPOUR RECTIFIER

AH200

INTRODUCTION

The AH200 is a hot cathode Mercury Vapour Rectifier with maximum ratings of 20kV peak inverse voltage and 10A peak current. It is similar to the AH213, differing only in filament rating and in terminal sizes.

GENERAL DATA

(See also Preamble to Rectifier Section of this Catalogue)

Electrical

Filament	Oxide Coated	
Filament Voltage	2·5	V
Filament Current	40	A
Filament Heating Time	1	Minute
Condensed Mercury Temperature	*(See page 2)*	
Max Peak Inverse Voltage	*(See page 2)*	
Max Anode Current:		
Peak	*(See page 2)*	
Mean‡	*(See page 2)*	
Under fault conditions (0·1 seconds Max duration)	100	A

Mechanical

Overall Length	18·0 inches	(457 mm)	Max
Overall Diameter	5·25 inches	(133 mm)	Max
Net Weight	1·75 pounds	(800 gm)	Approx
Mounting Position	Vertical, base down		
Base	*(See outline drawing)*		

CONTROL OF CONDENSED MERCURY TEMPERATURE

On the following pages two curves are given showing:

1. Total heating time for any value of ambient temperature. This is for use when the valve is being switched on from cold.
2. Rise of condensed mercury temperature above ambient plotted against heating and cooling time. This can be used as indicated by the example in the preamble to this section of the catalogue.

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MAXIMUM OPERATING CONDITIONS
(absolute values—see Preamble)

Circuit	* Diagram	Condensed Mercury Temp. °C	Peak Inverse Voltage (50-60 c/s) kV	Anode current in Amperes		Transformer Secondary Voltage (R.M.S.) kV	Max D.C. Output	
				Peak	Mean‡		kV	Amps
Single Phase Full Wave	A	30–40	20	10	2·5	7·0	6·3	5·0
		30–50	15	10	2·5	5·3	4·7	5·0
		30–60	10	10	2·5	3·5	3·1	5·0
Single Phase Full Wave Bridge	B	30–40	20	10	2·5	14·0	12·6	5·0
		30–50	15	10	2·5	10·6	9·5	5·0
		30–60	10	10	2·5	7·0	6·3	5·0
Three Phase Half Wave	C	30–40	20	10	2·5	8·1†	9·5†	7·5
		30–50	15	10	2·5	6·1†	7·1†	7·5
		30–60	10	10	2·5	4·1†	4·7†	7·5
Three Phase Full Wave	D§	30–40	20	10	2·5	8·1	19·1	7·5
		30–50	15	20	5	6·1	14·2	15·0
		30–60	10	20	5	4·1	9·5	15·0

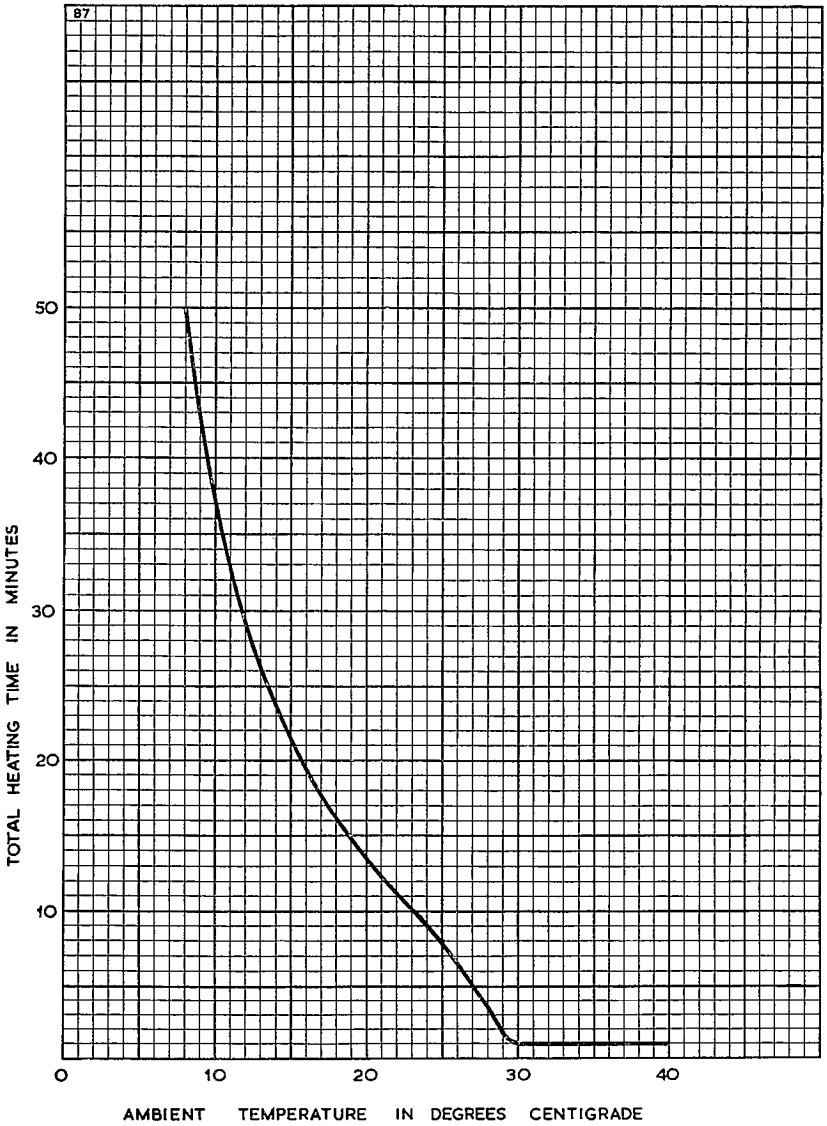
*For diagrams see Typical Rectifier Circuits for Choke Input Filters in the preamble to this section of the catalogue.

†For operation with constant full load. If the load resistance is increased the secondary voltage should be decreased (to avoid excessive peak inverse voltage) until at no load the reduction is 14%. The D.C. output voltage will be correspondingly decreased.

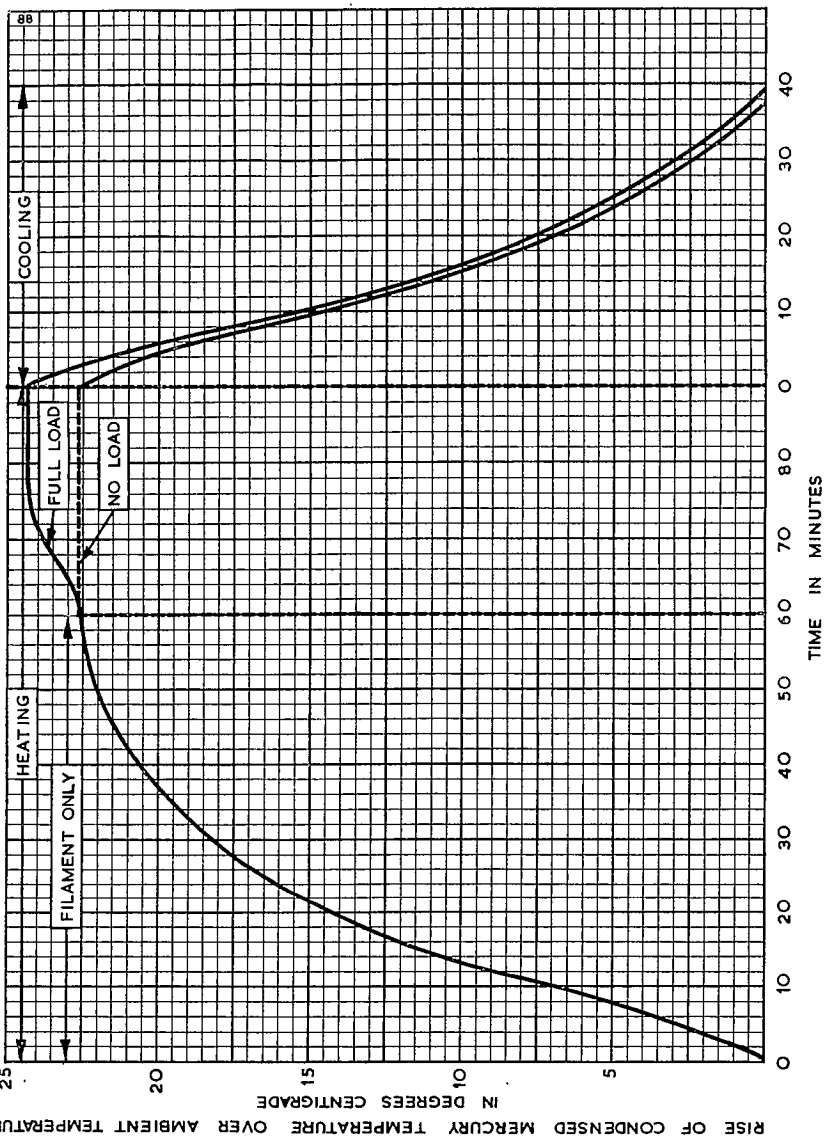
‡Mean anode currents are averaged over any period of 30 seconds maximum.

§With filament and anode supplies out of phase (60°–120°).

TOTAL HEATING TIME CHARACTERISTIC



HEATING AND COOLING CHARACTERISTIC



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OUTLINE

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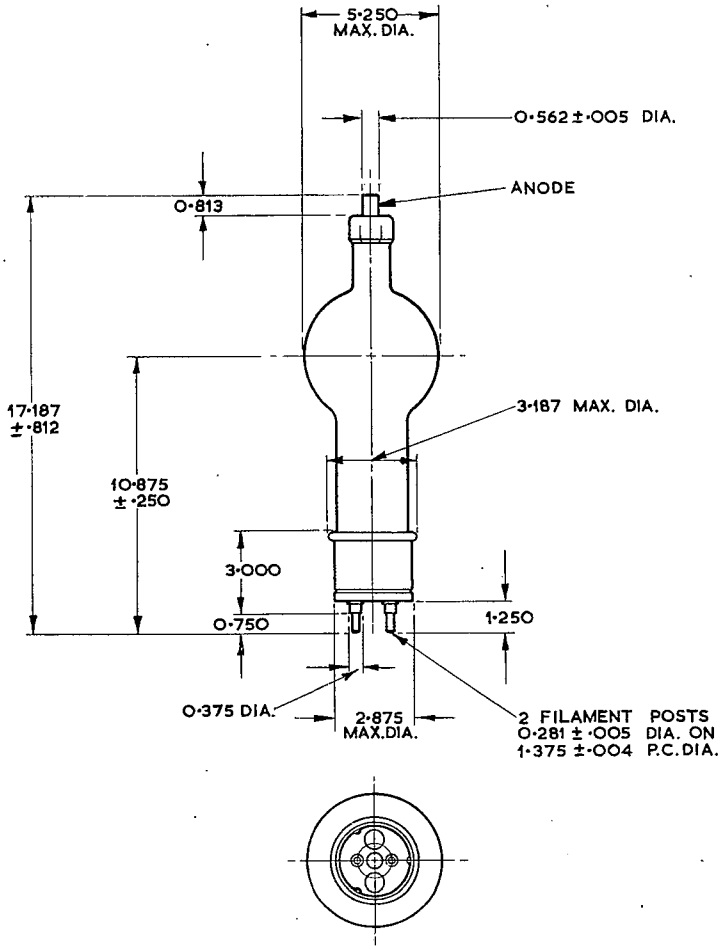

ALL DIMENSIONS IN INCHES

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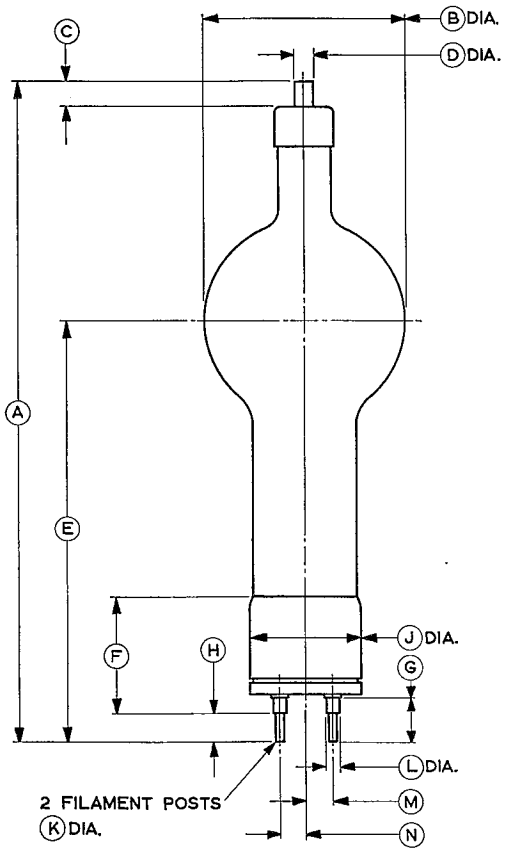
OUTLINE

89A



Ref.	Inches	Millimetres	Ref.	Inches	Millimetres
A	17·187±0·812	436·5±20·62	H	0·750	19·05
B	5·250 Max	133·4 Max	J	2·875	73·03
C	0·812	20·62	K	0·281±0·005	7·14±0·13
D	0·562±0·005	14·27±0·13	L	0·375	9·53
E	10·875±0·250	276·2±6·35	M	0·687	17·45
F	3·000	76·20	N	0·687	17·45
G	1·125	28·58			

Millimetre dimensions have been derived from inches.

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MERCURY VAPOUR RECTIFIER

AH211

Service Type CV532

INTRODUCTION

The AH211 is a maintenance type only. For new designs the AH211A is recommended.

GENERAL DATA

(See also Preamble to Rectifier Section of this catalogue)

Electrical

Filament	Oxide Coated	
Filament Voltage	2·5	V
Filament Current	30	A
Filament Heating Time	1	Minute
Condensed Mercury Temperature	25 to 50	°C
Max Peak Inverse Voltage	16	kV
Max Anode Current:		
Peak	8	A
Mean‡	2	A
Under fault conditions (0·1 seconds Max duration)	100	A

Mechanical

Overall Length	12·38 inches	(314 mm)	Max
Overall Diameter	3·19 inches	(81 mm)	Max
Net Weight	1 pound	(460 gm)	Approx
Mounting Position		Vertical, base down	
Base		*(See outline drawing)*	

CONTROL OF CONDENSED MERCURY TEMPERATURE

On the following pages two curves are given showing:

1. Total heating time for any value of ambient temperature. This is for use when the valve is being switched on from cold.
2. Rise of condensed mercury temperature above ambient plotted against heating and cooling time. This can be used as indicated by the example in the preamble to this section of the catalogue.

MAXIMUM OPERATING CONDITIONS
(Absolute Values—see Preamble)

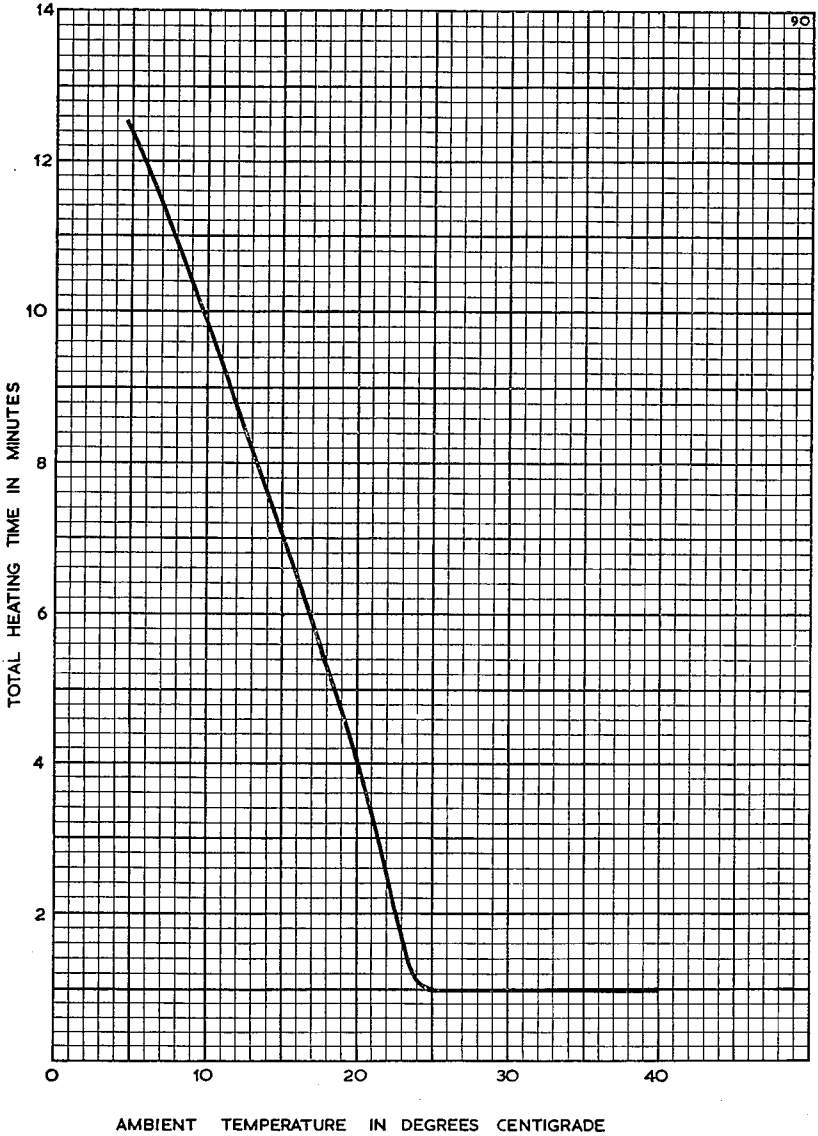
Circuit	* Diagram	Condensed Mercury Temp. °C	Peak Inverse Voltage (50-60 c/s) kV	Anode current in Amperes		Transformer Secondary Voltage (R.M.S.) kV	Max D.C. Output	
				Peak	Mean‡		kV	Amps
Single Phase Full Wave	A	25–50	16	8	2·0	5·6	5·0	4
Single Phase Full Wave Bridge	B	25–50	16	8	2·0	11·2	10·1	4
Three Phase Half Wave	C	25–50	16	8	2·0	6·5†	7·6†	6
Three Phase Full Wave	D	25–50	16	8	2·0	6·5	15·2	6

*For diagrams see Typical Rectifier Circuits for Choke Input Filters in the preamble to this section of the catalogue.

†For operation with constant full load. If the load resistance is increased the secondary voltage should be decreased (to avoid excessive peak inverse voltage) until at no load the reduction is 14%. The D.C. output voltage will be correspondingly decreased.

‡Mean anode currents are averaged over any period of 30 seconds maximum.

TOTAL HEATING TIME CHARACTERISTIC



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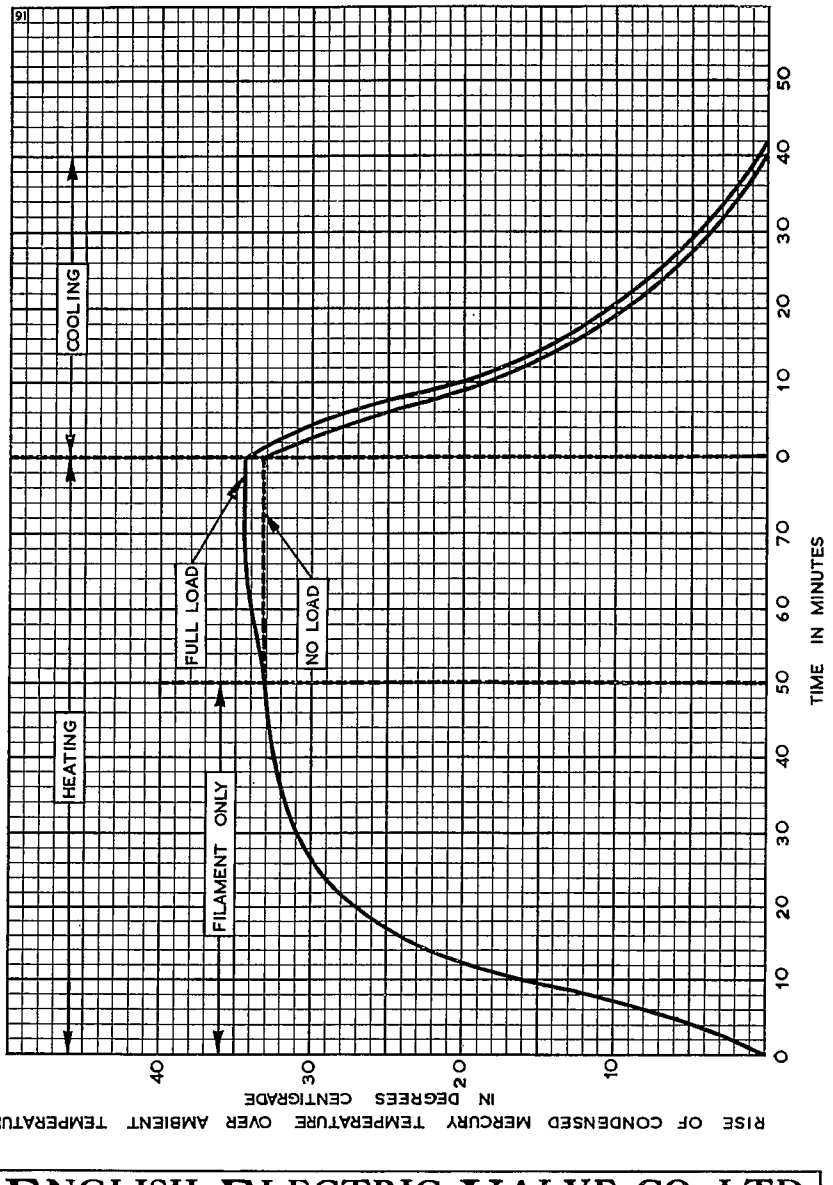
HEATING AND COOLING CHARACTERISTIC



MERCURY VAPOUR RECTIFIER

AH211

OUTLINE

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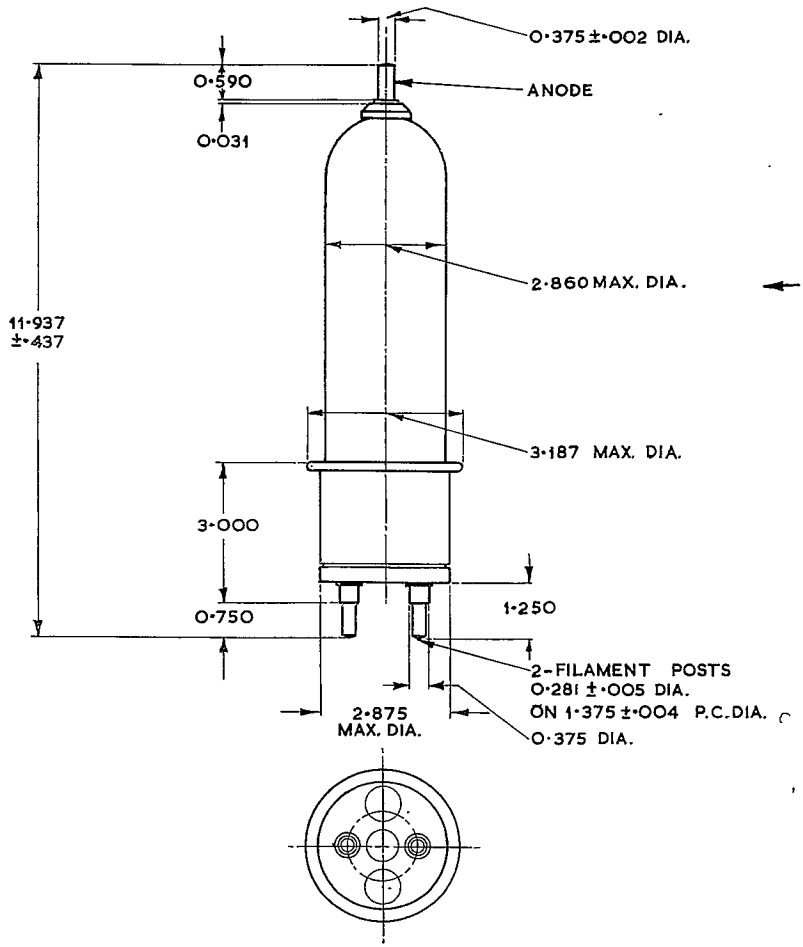

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INDICATES A CHANGE ←

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MERCURY VAPOUR RECTIFIER

AH211A

Service Type CV532 ←

INTRODUCTION

The AH211A is a hot cathode Mercury Vapour Rectifier with maximum ratings of 16kV peak inverse voltage and 8A peak current. It will provide a D.C. output of 15kV 6A in a three phase full wave circuit.

GENERAL DATA

(See also Preamble to Rectifier Section of this catalogue)

Electrical

Filament	Oxide Coated	
Filament Voltage	2·5	V
Filament Current	30	A
Filament Heating Time	1	Minute
Condensed Mercury Temperature	25 to 50	°C
Max Peak Inverse Voltage	16	kV
Max Anode Current:		
Peak	8	A
Mean (30 seconds Max averaging time)	2	A ←
Under fault conditions (0·1 seconds Max duration)	100	A

Mechanical

Overall Length	13·38 inches	(340 mm)	Max
Overall Diameter	3·19 inches	(81 mm)	Max
Net Weight	1¼ pounds	(0·5 kg)	Approx
Mounting Position		Vertical, base down	
Base		*(See outline drawing)*	

CONTROL OF CONDENSED MERCURY TEMPERATURE

On the following pages two curves are given showing:

1. Total heating time for any value of ambient temperature. This is for use when the valve is being switched on from cold.
2. Rise of condensed mercury temperature above ambient plotted against heating time and cooling time. This can be used as indicated by the example in the preamble to this section of the catalogue.

← Indicates a change.

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MAXIMUM OPERATING CONDITIONS
(Absolute Values—see Preamble)

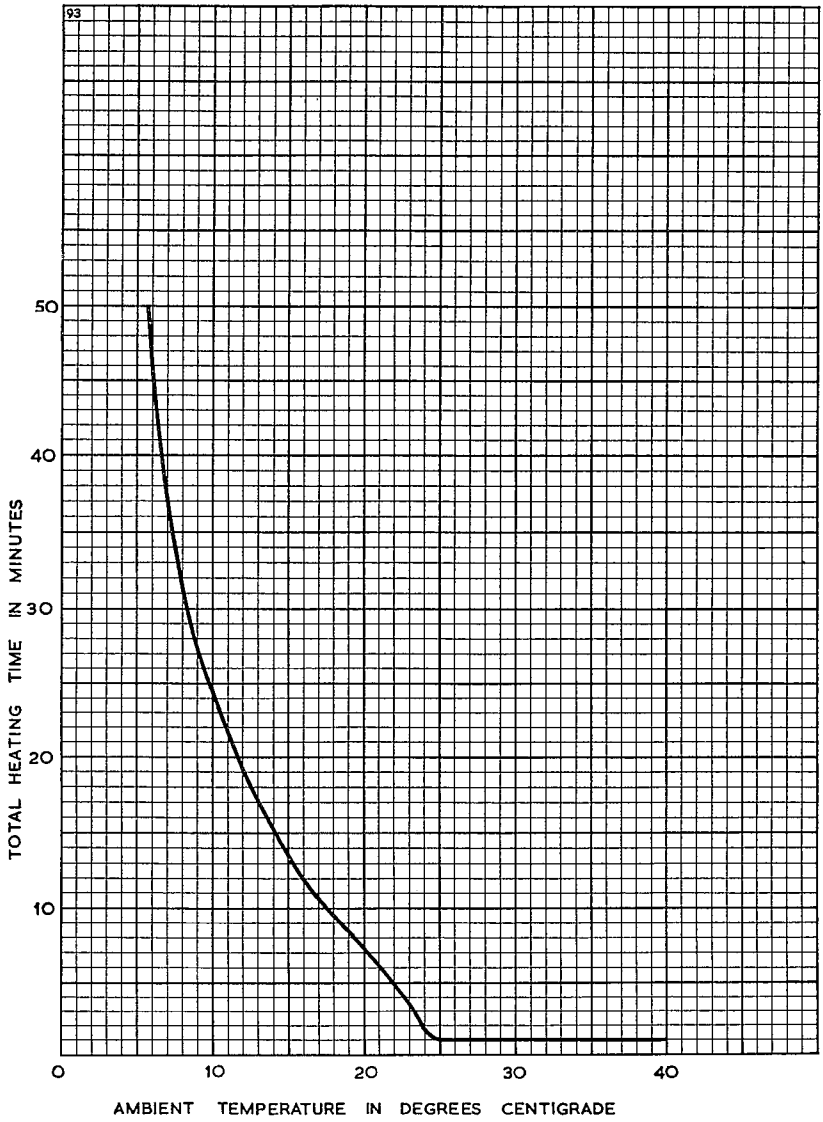
Circuit	* Diagram	Condensed Mercury Temp. °C	Peak Inverse Voltage (50-60 c/s) kV	Anode current in Amperes		Transformer Secondary Voltage (R.M.S.) kV	Max D.C. Output	
				Peak	Mean‡		kV	Amps
Single Phase Full Wave	A	25–50	16	8	2·0	5·6	5·0	4
Single Phase Full Wave Bridge	B	25–50	16	8	2·0	11·2	10·1	4
Three Phase Half Wave	C	25–50	16	8	2·0	6·5†	7·6†	6
Three Phase Full Wave	D	25–50	16	8	2·0	6·5	15·2	6

*For diagrams see Typical Rectifier Circuits for Choke Input Filters in the preamble to this section of the catalogue.

†For operation with constant full load. If the load resistance is increased, the secondary voltage should be decreased (to avoid excessive peak inverse voltage) until at no load the reduction is 14%. The D.C. output voltage will be correspondingly decreased.

‡Mean anode currents are averaged over any period of 30 seconds maximum.

TOTAL HEATING TIME CHARACTERISTIC



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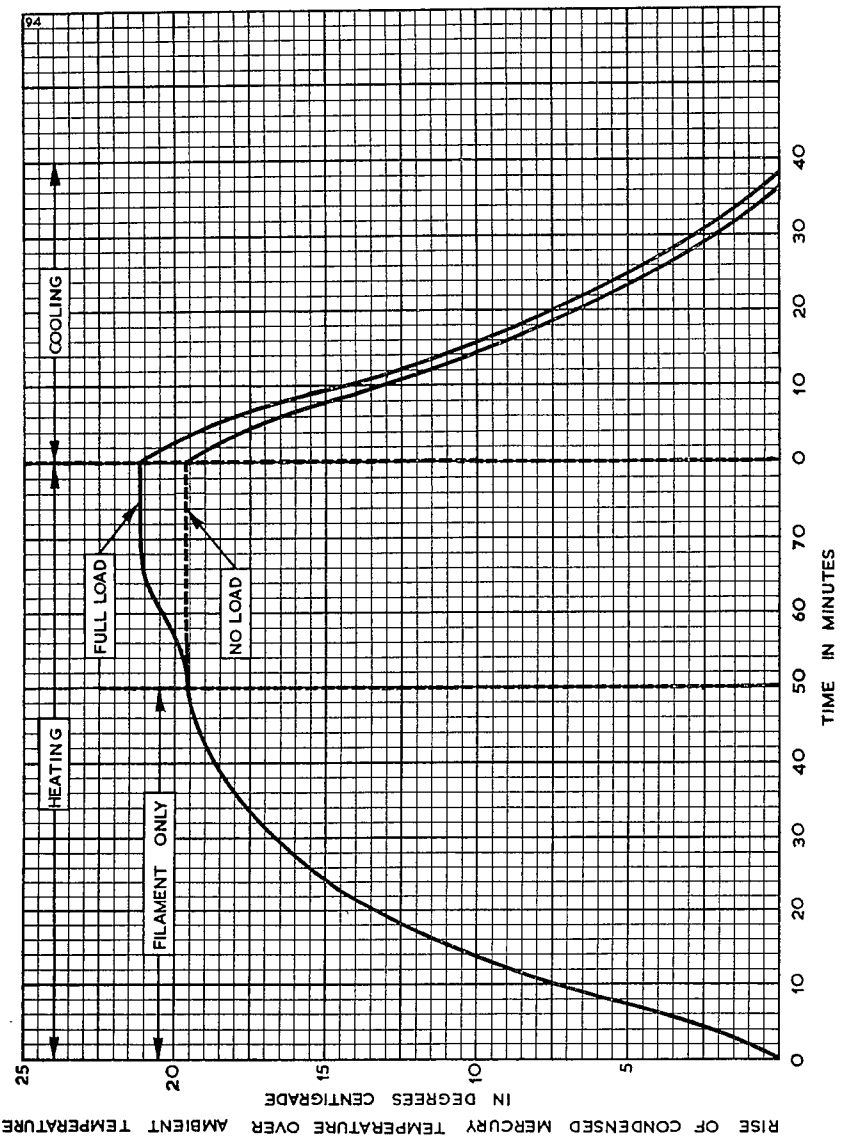
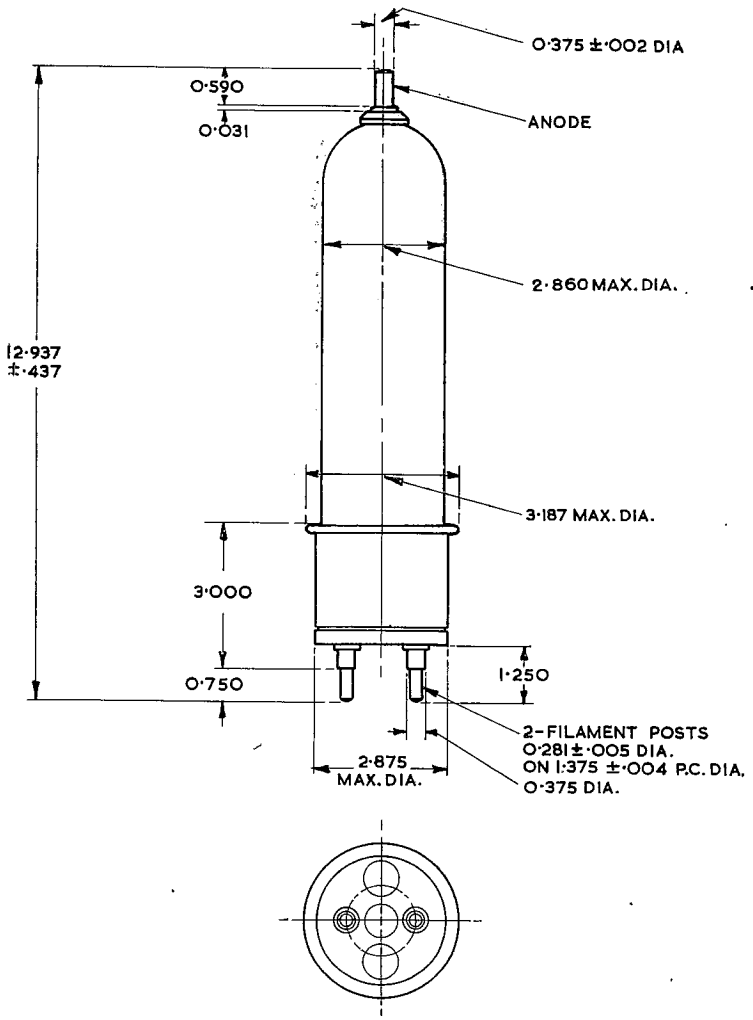
HEATING AND COOLING CHARACTERISTIC



OUTLINE

529

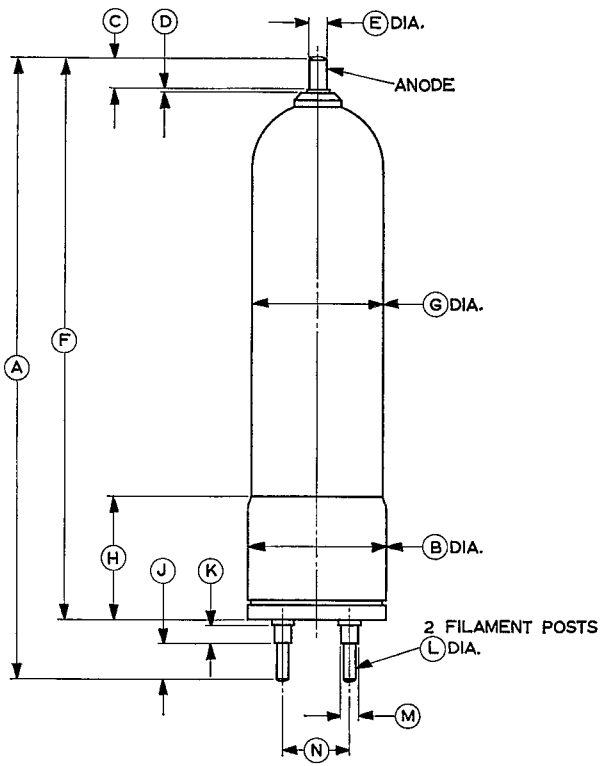


ALL DIMENSIONS IN INCHES

INDICATES A CHANGE ←

OUTLINE

529A



Ref.	Inches	Millimetres	Ref.	Inches	Millimetres
A	12·937±0·437	328·6±11·10	H	2·563	65·10
B	2·875	73·03	J	0·750	19·05
C	0·590	14·99	K	0·375	9·53
D	0·031	0·79	L	0·281±0·005	7·14±0·13
E	0·375±0·002	9·525±0·051	M	0·375	9·53
F	11·687±0·437	296·8±11·10	N	1·375	34·93
G	2·860 Max	72·64 Max			

Millimetre dimensions have been derived from inches.

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MERCURY VAPOUR RECTIFIER

AH213

Service Type CV2723 **Electrically Equivalent to American 869B**

INTRODUCTION

The AH213 is a hot cathode Mercury Vapour Rectifier with maximum ratings of 20kV peak inverse voltage and 10A peak current. It is similar to the AH200, differing only in filament rating and in terminal sizes.

GENERAL DATA

(See also Preamble to Rectifier Section of this catalogue)

Electrical

Filament	Oxide Coated	
Filament Voltage	5	V
Filament Current	19	A
Filament Heating Time	1	Minute
Condensed Mercury Temperature	*(See page 2)*	
Max Peak Inverse Voltage	*(See page 2)*	
Max Anode Current:		
Peak	*(See page 2)*	
Mean‡	*(See page 2)*	
Under fault conditions (0·1 seconds Max duration)	100	A

Mechanical

Overall Length	18·0 inches	(457 mm)	Max
Overall Diameter	5·25 inches	(133 mm)	Max
Net Weight	1·75 pounds	(800 gm)	Approx
Mounting Position	Vertical, base down		
Base	*(See outline drawing)*		

CONTROL OF CONDENSED MERCURY TEMPERATURE

On the following pages two curves are given showing:

1. Total heating time for any value of ambient temperature. This is for use when the valve is being switched on from cold.
2. Rise of condensed mercury temperature above ambient plotted against heating and cooling time. This can be used as indicated by the example in the preamble to this section of the catalogue.

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MAXIMUM OPERATING CONDITIONS
(Absolute Values—see Preamble)

Circuit	* Diagram	Condensed Mercury Temp. °C	Peak Inverse Voltage (50-60 c/s) kV	Anode Current in Amperes		Transformer Secondary Voltage (R.M.S.) kV	Max D.C. Output	
				Peak	Mean‡		kV	Amps
Single Phase Full Wave	A	30–40	20	10	2·5	7·0	6·3	5·0
		30–50	15	10	2·5	5·3	4·7	5·0
		30–60	10	10	2·5	3·5	3·1	5·0
Single Phase Full Wave Bridge	B	30–40	20	10	2·5	14·0	12·6	5·0
		30–50	15	10	2·5	10·6	9·5	5·0
		30–60	10	10	2·5	7·0	6·3	5·0
Three Phase Half Wave	C	30–40	20	10	2·5	8·1†	9·5†	7·5
		30–50	15	10	2·5	6·1†	7·1†	7·5
		30–60	10	10	2·5	4·1†	4·7†	7·5
Three Phase Full Wave	D§	30–40	20	10	2·5	8·1	19·0	7·5
		30–50	15	20	5	6·1	14·2	15·0
		30–60	10	20	5	4·1	9·5	15·0

*For diagrams see Typical Rectifier Circuits for Choke Input Filters in the preamble to this section of the catalogue.

†For operation with constant full load. If the load resistance is increased the secondary voltage should be decreased (to avoid excessive peak inverse voltage) until at no load the reduction is 14%. The D.C. output voltage will be correspondingly decreased.

‡Mean anode currents are averaged over any period of 30 seconds maximum.

§With filament and anode supplies out of phase (60°–120°).

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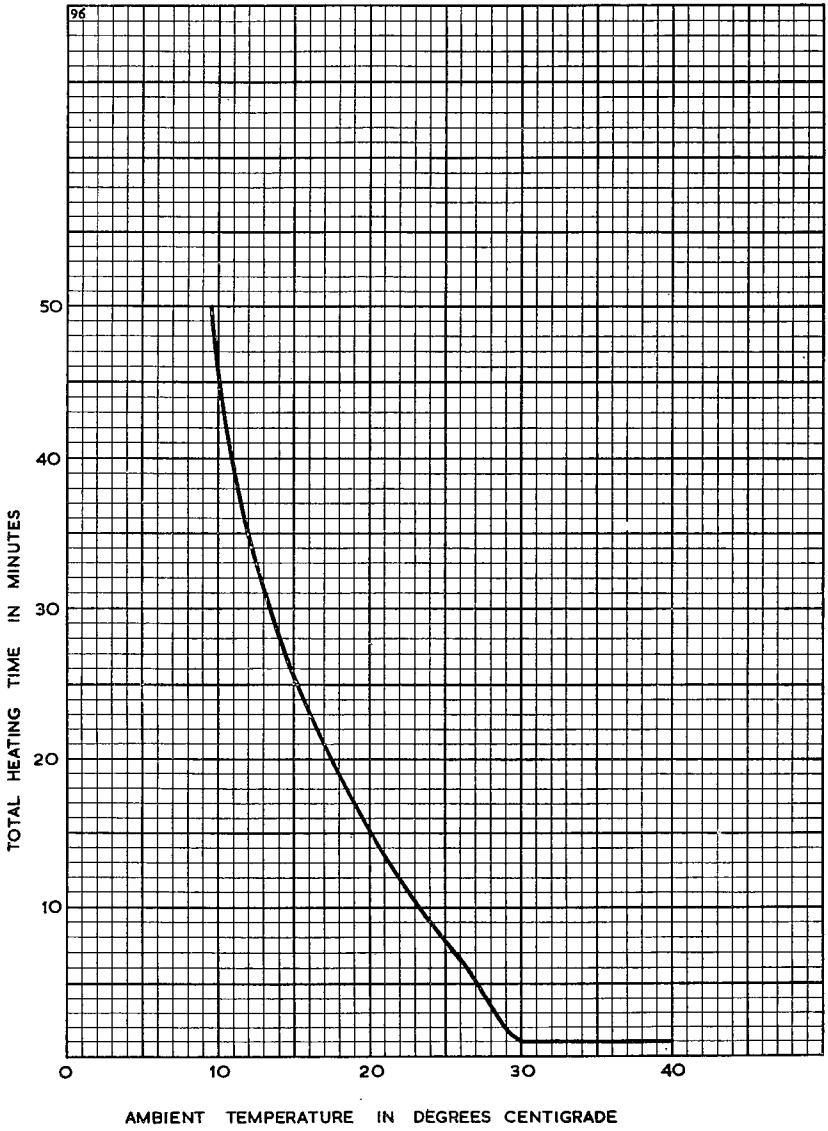
TOTAL HEATING TIME CHARACTERISTIC



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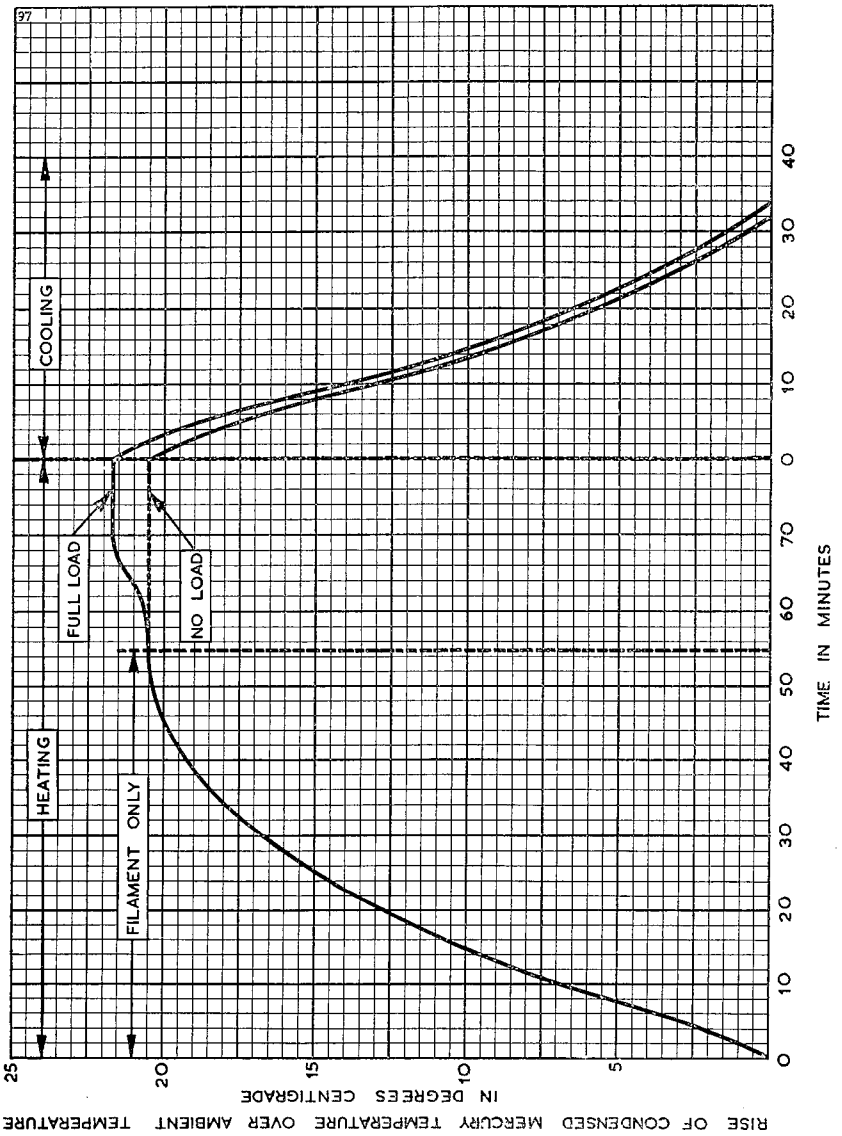
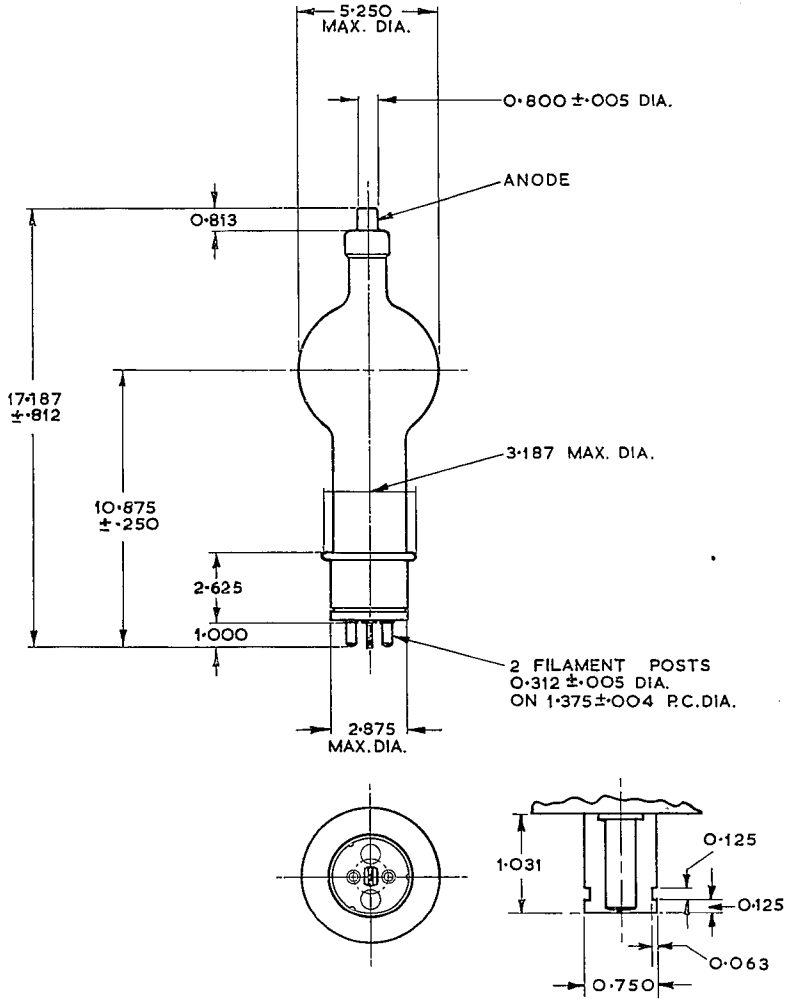
HEATING AND COOLING CHARACTERISTIC



OUTLINE

98



ALL DIMENSIONS IN INCHES

DETAIL OF BASE SPIGOT

MERCURY VAPOUR RECTIFIER

AH221

Service Types CV5 and CV1435 ←

INTRODUCTION

The AH221 is a hot cathode Mercury Vapour Rectifier with maximum ratings of 20kV peak inverse voltage and 5A peak current. It will provide a D.C. output of 19·0kV 3·75A in a three phase full wave circuit. ←

GENERAL DATA

(See also Preamble to Rectifier Section of this catalogue)

Electrical

Filament	Oxide Coated	
Filament Voltage	4·0	V
Filament Current	11	A
Filament Heating Time	1	Minute
Condensed Mercury Temperature	(*See Page* 2) ←	
Max Peak Inverse Voltage	(*See Page* 2) ←	
Max Anode Current:		
Peak	5·0	A
Mean‡	1·25	A
Under fault conditions (0·2 second Max duration)	50	A

Mechanical

Overall Length	10·63 inches	(270 mm)	Max
Overall Diameter	2·32 inches	(59 mm)	Max
Net Weight	8 ounces	(230 gm)	Approx
Mounting Position	Vertical, base down		
Base	Goliath Edison Screw		

CONTROL OF CONDENSED MERCURY TEMPERATURE

On the following pages two curves are given showing:

1. Total heating time for any value of ambient temperature. This is for use when the valve is being switched on from cold.

2. Rise of condensed mercury temperature above ambient plotted against heating and cooling time. This can be used as indicated by the example in the preamble to this section of the catalogue.

← Indicates a change.

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MAXIMUM OPERATING CONDITIONS
(Absolute Values—see Preamble)

Circuit	* Diagram	Condensed Mercury Temp. °C	Peak Inverse Voltage (50-60 c/s) kV	Anode Current in Amperes		Transformer Secondary Voltage (R.M.S.) kV	Max D.C. Output	
				Peak	Mean‡		kV	Amps
Single Phase Full Wave	A	20–40 20–50	20 11	5·0 5·0	1·25 1·25	7·0 3·9	6·3 3·5	2·5 2·5
Single Phase Full Wave Bridge	B	20–40 20–50	20 11	5·0 5·0	1·25 1·25	14·0 7·75	12·6 7·0	2·5 2·5
Three Phase Half Wave	C	20–40 20–50	20 11	5·0 5·0	1·25 1·25	8·1† 4·4†	9·5† 5·2†	3·75 3·75
Three Phase Full Wave	D	20–40 20–50	20 11	5·0 5·0	1·25 1·25	8·1 4·4	19·0 10·4	3·75 3·75

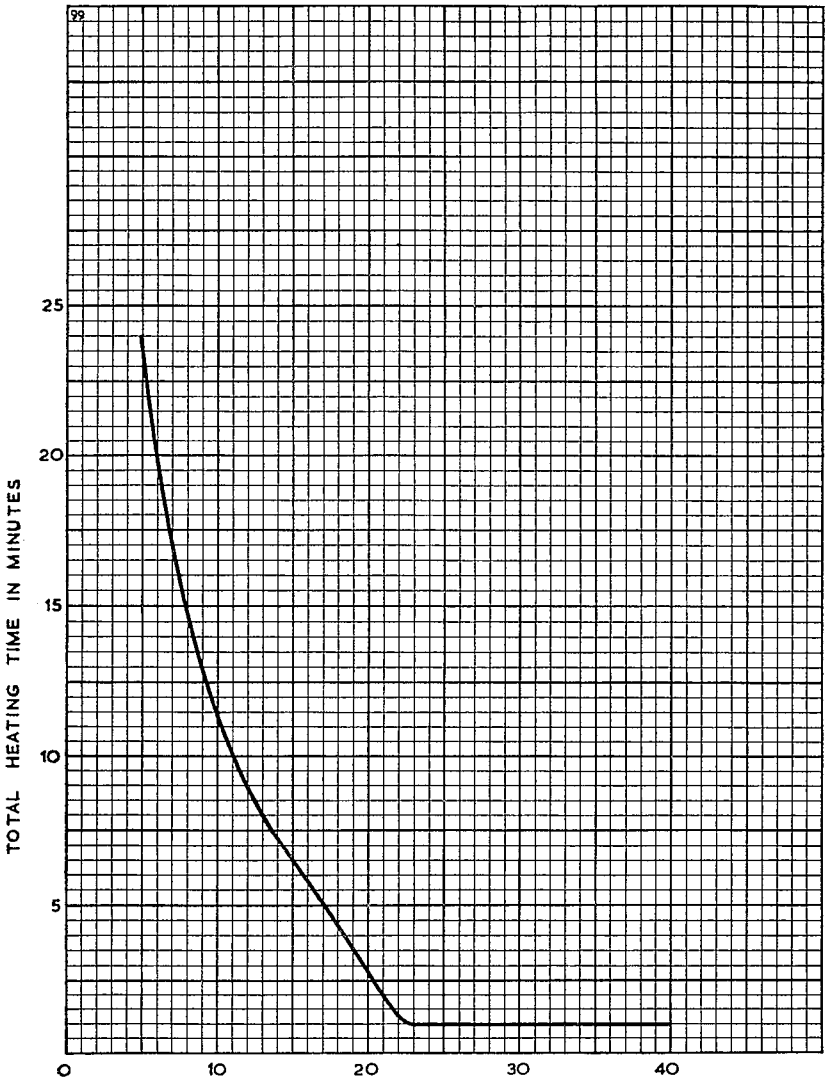
*For diagram see Typical Rectifier Circuits for Choke Input Filters in the preamble to this section of the catalogue.

†For operation with constant full load. If the load resistance is increased the secondary voltage should be decreased (to avoid excessive peak inverse voltage) until at no load the reduction is 14%. The D.C. output voltage will be correspondingly decreased.

‡Mean anode currents are averaged over any period of 15 seconds maximum.

→ Indicates a change.

TOTAL HEATING TIME CHARACTERISTIC



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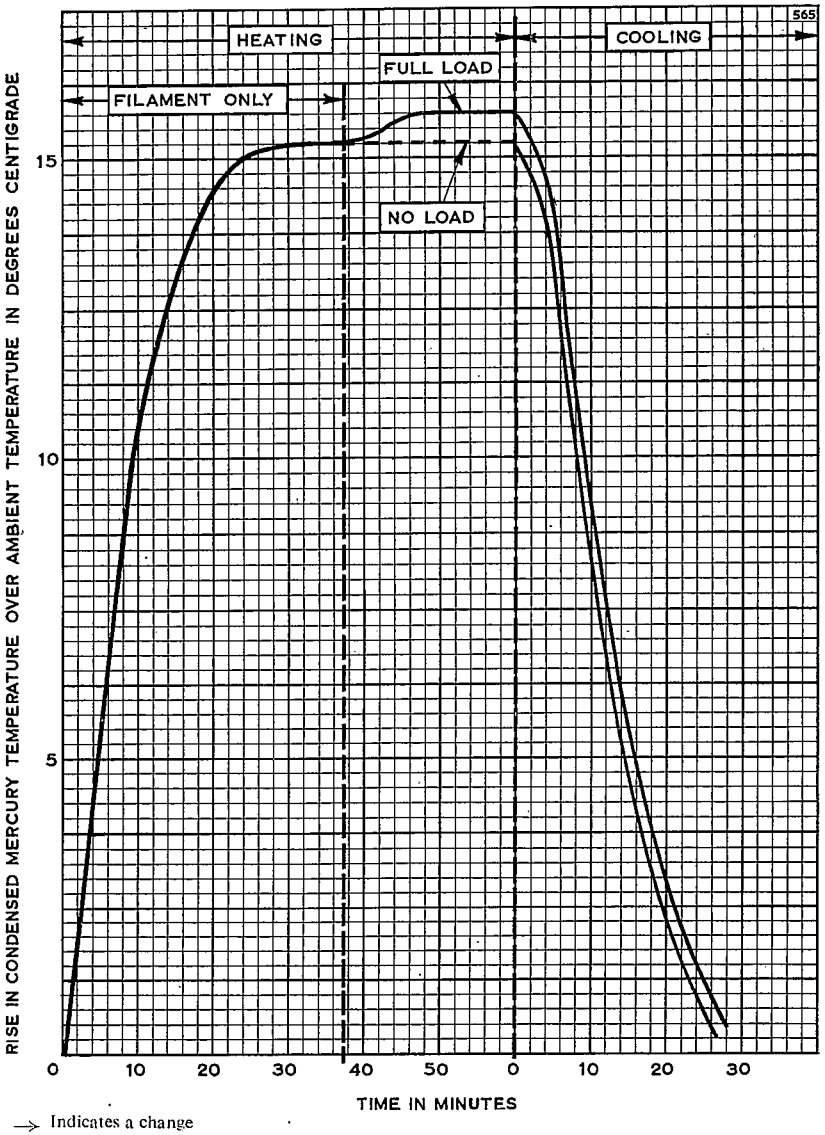
← HEATING AND COOLING CHARACTERISTIC



→ Indicates a change

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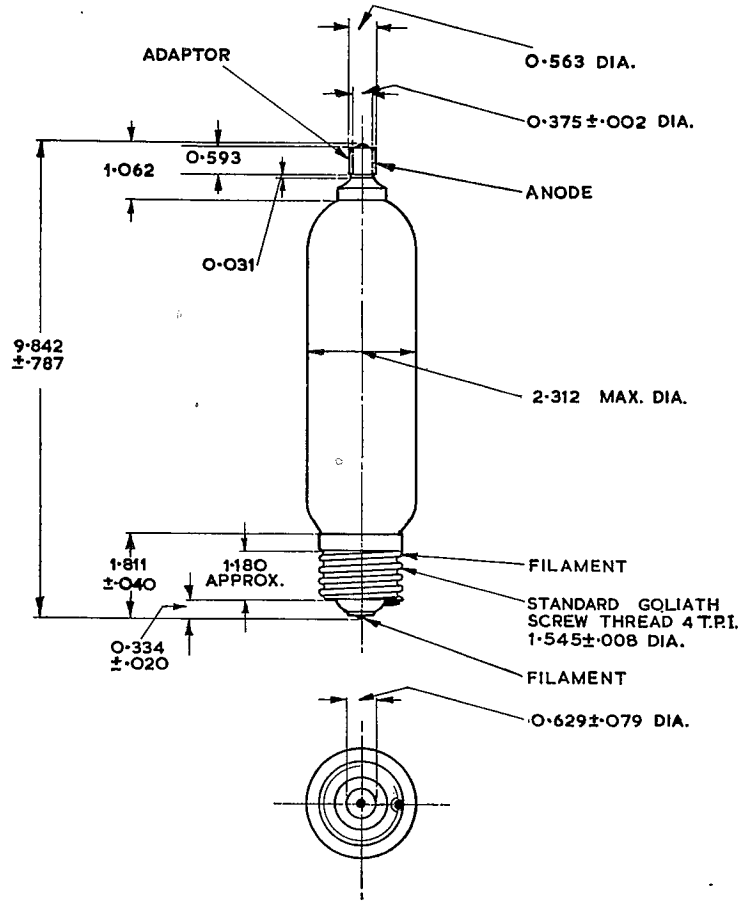
OUTLINE

101A



ALL DIMENSIONS IN INCHES

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MERCURY VAPOUR RECTIFIER

AH238

ENGLISH ELECTRIC

Service Type CV1629

INTRODUCTION

The AH238 is a hot cathode Mercury Vapour Rectifier with maximum ratings of 13kV peak inverse voltage and 5·0A peak current. It will provide a d.c. output of 12kV 3·7A in a three phase full wave circuit.

GENERAL DATA

(See also Preamble to Rectifier Section of this catalogue)

Electrical

Filament	Oxide Coated	
Filament Voltage	4·0	V
Filament Current	7·0	A
Filament Heating Time	1	Minute
Condensed Mercury Temperature	*(See page 2)*	
Max Peak Inverse Voltage	*(See page 2)*	
Max Anode Current:		
Peak	5·0	A
Mean‡	1·25	A
Under fault conditions (0·1 second Max duration)	100	A

Mechanical

Overall Length	9·488 inches	(241mm)	Max←
Overall Diameter	2·312 inches	(58·7mm)	Max←
Net Weight	7 ounces	(200gm)	Approx
Mounting Position	Vertical, base down		
Base	Goliath Edison Screw		
Top Cap	B.S.448/CT9 fitted with screw terminal adaptor		←

CONTROL OF CONDENSED MERCURY TEMPERATURE

On the following pages two curves are given showing:

1. Total heating time for any value of ambient temperature. This is for use when the valve is being switched on from cold.
2. Rise of condensed mercury temperature above ambient plotted against heating and cooling time. This can be used as indicated by the example in the preamble to this section of the catalogue.

← Indicates a change

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ENGLISH ELECTRIC

MAXIMUM OPERATING CONDITIONS

(Absolute Values—see Preamble)

Circuit	* Diagram	Condensed Mercury Temp. °C	Peak Inverse Voltage (50-60 c/s) kV	Anode Current in Amperes		Transformer Secondary Voltage (R.M.S.) kV	Max D.C. Output	
				Peak	Mean‡		kV	A
Single Phase Full Wave	A	25–55	13	5	1·25	4·5	4·1	2·5
		25–60	10	5	1·25	3·5	3·1	2·5
		25–65	8	5	1·25	2·8	2·5	2·5
Single Phase Full Wave Bridge	B	25–55	13	5	1·25	9·1	8·2	2·5
		25–60	10	5	1·25	7·0	6·3	2·5
		25–65	8	5	1·25	5·6	5·0	2·5
Three Phase Half Wave	C	25–55	13	5	1·25	5·3†	6·2†	3·75
		25–60	10	5	1·25	4·1†	4·7†	3·75
		25–65	8	5	1·25	3·2†	3·7†	3·75
Three Phase Full Wave	D	25–55	13	5	1·25	5·3	12·4	3·75
		25–60	10	5	1·25	4·1	9·5	3·75
		25–65	8	5	1·25	3·2	7·5	3·75

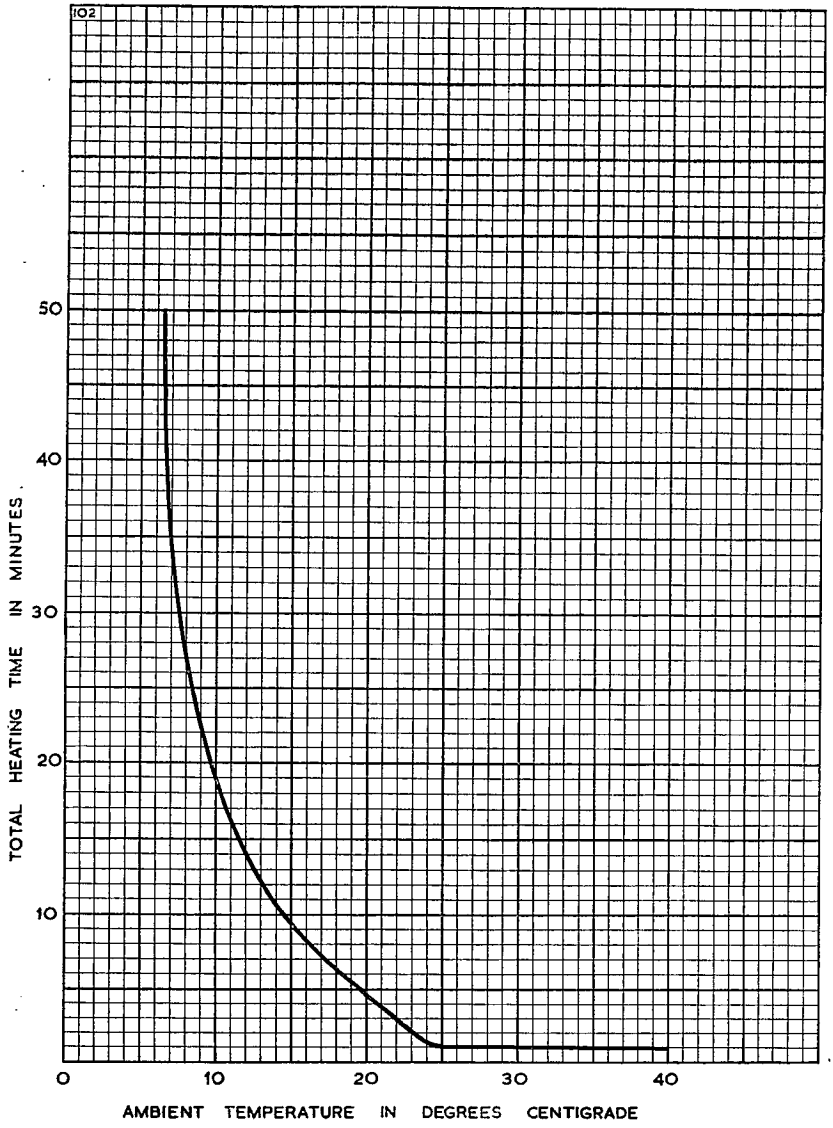
*For diagrams see Typical Rectifier Circuits for Choke Input Filters in the preamble to this section of the catalogue.

†For operation with constant full load. If the load resistance is increased the secondary voltage should be decreased (to avoid excessive peak inverse voltage) until at no load the reduction is 14%. The d.c. output voltage will be correspondingly decreased.

‡Mean anode currents are averaged over any period of 15 seconds maximum.

ENGLISH ELECTRIC

TOTAL HEATING TIME CHARACTERISTIC



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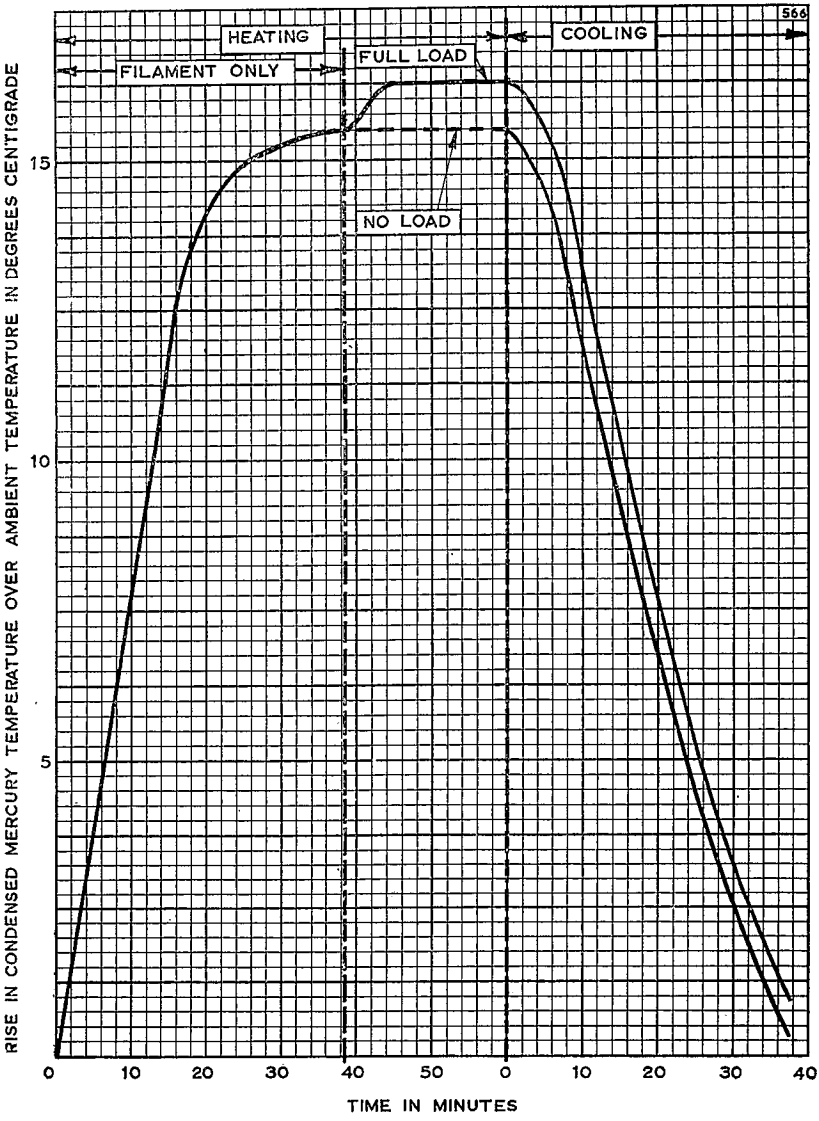
ENGLISH ELECTRIC

HEATING AND COOLING CHARACTERISTIC



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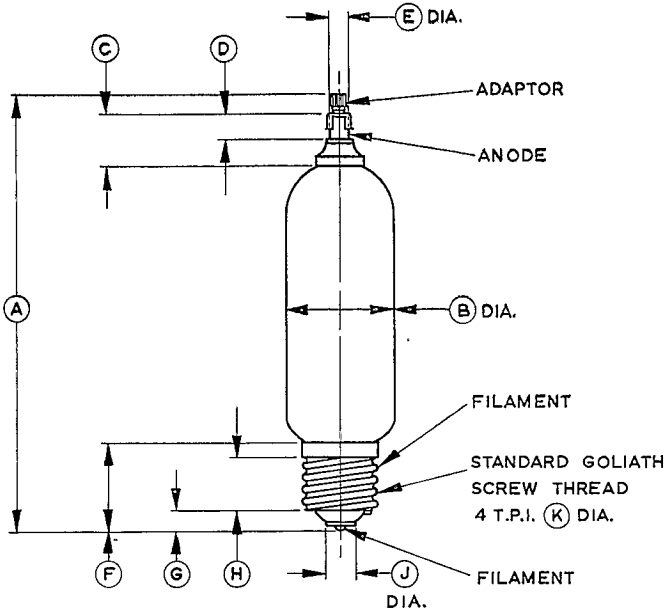
OUTLINE

104C



Ref.	Inches	Millimetres
A	9·488 Max	241 Max
B	2·312 Max	58·72 Max
C	1·062	26·97
D	0·593	15·06
E	0·375±0·002	9·525±0·051
F	1·811±0·040	46·00±1·02
G	0·355±0·040	9·02±1·02
H	1·180	29·97
J	0·630±0·079	16·00±2·01
K	1·546±0·009	39·27±0·23

Millimetre dimensions have been derived from inches.

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AH2511

MERCURY VAPOUR RECTIFIER

JEDEC Type 6693

ABRIDGED DATA

Hot cathode mercury vapour rectifier		
Peak inverse anode voltage	15	kV max
Peak anode current (at 15kV p.i.v.)	12	A max
Mean anode current (at 15kV p.i.v.)	3.0	A max
Fault anode current (0.1s max)	120	A max
Frequency	150	Hz max

GENERAL

Electrical

Filament		oxide coated
Filament voltage	5.0	V
Filament current	11.5	A
Filament heating time (minimum)	1.0	min
Voltage drop (approx)	12	V
Condensed mercury temperature rise above ambient (approx):		
at no load	13	°C
at 2.5A load	23	°C

Mechanical

Overall length	308mm (12.126 inches) max
Overall diameter	72mm (2.835 inches) max
Net weight	450g (1 pound) approx
Mounting position	vertical, base down
Base	B4D with bayonet
Top cap	B.S.448/CT9 fitted with screw terminal adaptor

March 1969

MAXIMUM OPERATING CONDITIONS (Absolute values)

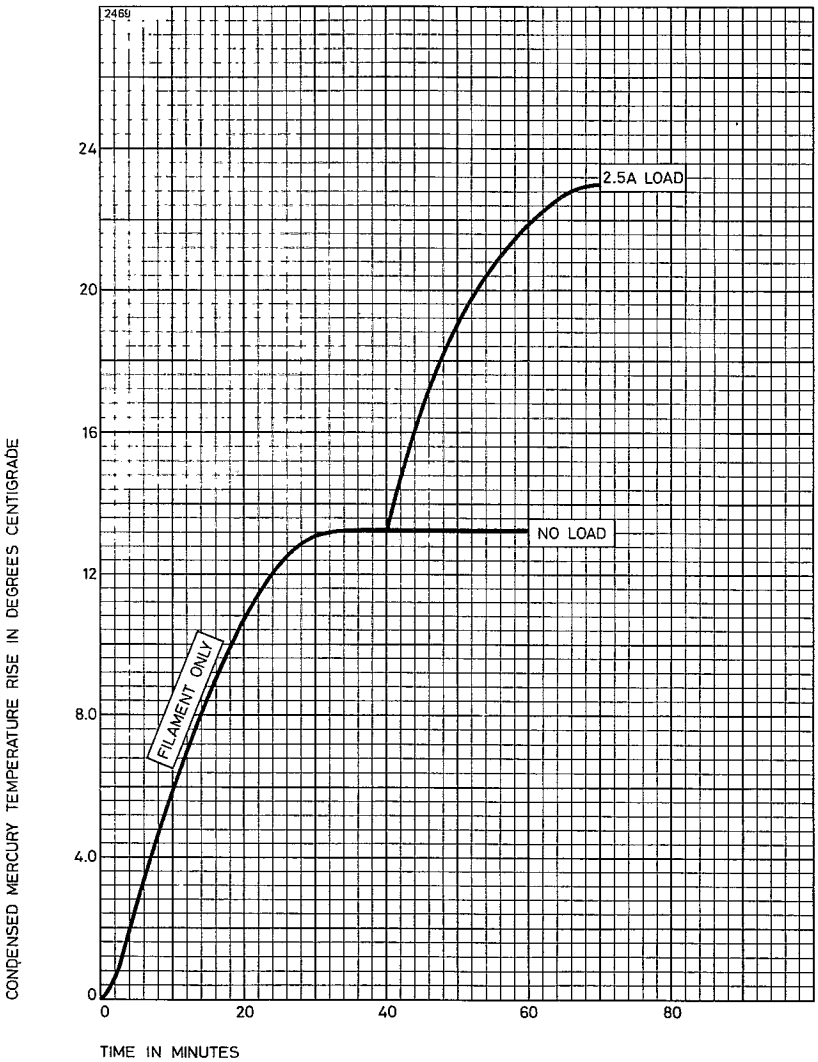
Circuit*	Condensed mercury temp. (°C)	Peak inverse voltage (50–60Hz) (kV)	Anode current in amperes peak	mean♦	Transformer secondary voltage (r.m.s.) (kV)	Maximum d.c. output (kV)	(A)
A	25–55	15	12	3.0	5.3	4.8	6.0
Single phase	25–60	10	12	3.0	3.5	3.2	6.0
full wave	25–75	2.5	20	5.0	0.88	0.8	10
B	25–55	15	12	3.0	10.6	9.6	6.0
Single phase	25–60	10	12	3.0	7.1	6.4	6.0
bridge	25–75	2.5	20	5.0	1.77	1.6	10
C	25–55	15	12	3.0	6.1†	7.2†	9.0
Three phase	25–60	10	12	3.0	4.1†	4.8†	9.0
half wave	25–75	2.5	20	5.0	1.02†	1.2†	15
D	25–55	15	12	3.0	6.1	14.3	9.0
Three phase	25–60	10	12	3.0	4.1	9.5	9.0
full wave	25–75	2.5	20	5.0	1.02	2.4	15

* See Typical Rectifier Circuits for Choke input filters in the preamble to the Rectifier section of the Valve Data Book.

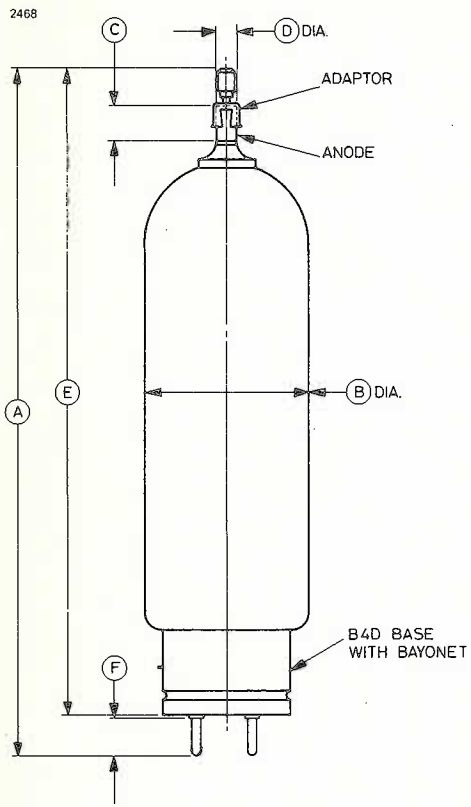
† For operation at constant full load. If the load is reduced, the peak inverse voltage on the valves will exceed the ratings unless the transformer secondary voltage is reduced. The total reduction required is 14% at no load and the d.c. output voltage will be correspondingly reduced.

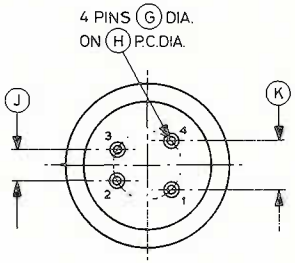
♦ Averaging time 15 seconds maximum.

HEATING CHARACTERISTIC



OUTLINE





VIEW ON BASE

Pin	Element
1	No connection
2	Filament
3	Filament
4	No connection

Ref	Inches	Millimetres	Ref	Inches	Millimetres
A*	11.811 ± 0.315	300.0 ± 8.0	F	0.625	15.88
B*	2.835 max	72.0 max	G	0.187 ± 0.003	4.750 ± 0.076
C	0.593	15.06	H	1.000	25.40
D	0.375 ± 0.002	9.525 ± 0.051	J	0.562	14.27
E*	11.122 ± 0.236	282.5 ± 6.0	K	0.750	19.05

Millimetre dimensions have been derived from inches except where marked *.

MERCURY VAPOUR RECTIFIER

BD12

ENGLISH ELECTRIC

ABRIDGED DATA

Hot Cathode Full Wave Mercury Vapour Rectifier

Peak Inverse Anode Voltage	1·0	kV Max
Peak Anode Current (per anode)	50	A Max
Mean Anode Current (per anode)	16·5	A Max

GENERAL

(See also Preamble to Rectifier Section of this Catalogue)

Electrical

Cathode	Indirectly Heated	
Heater Voltage	5·0	V
Heater Current	35	A
Cathode Heating Time (Minimum)	5·0	min
Voltage Drop (Approx)	12	V
Condensed Mercury Temperature Rise above Ambient (Approx):		
At no load	52	°C
At full load	60	°C

Mechanical

Overall Length (excluding leads)	16·437 inches	(417·5 mm)	Max
Overall Diameter	6·437 inches	(163·5 mm)	Max
Net Weight	3½ pounds	(1·6 kg)	Approx
Mounting Position		Vertical, base down	
Connections		Flexible leads	

MAXIMUM AND MINIMUM RATINGS

(Absolute Values)

Peak Inverse Anode Voltage	1·0	kV Max
R.M.S. Voltage between Anodes	250	V Max
Peak Anode Current (per anode)	50	A Max
Mean Anode Current (per anode) (averaging time 30sec max)	16·5	A Max
Surge Anode Current (per anode) (0·1sec maximum duration)	500	A Max
Condensed Mercury Temperature (on load)	40	°C Min
	100	°C Max

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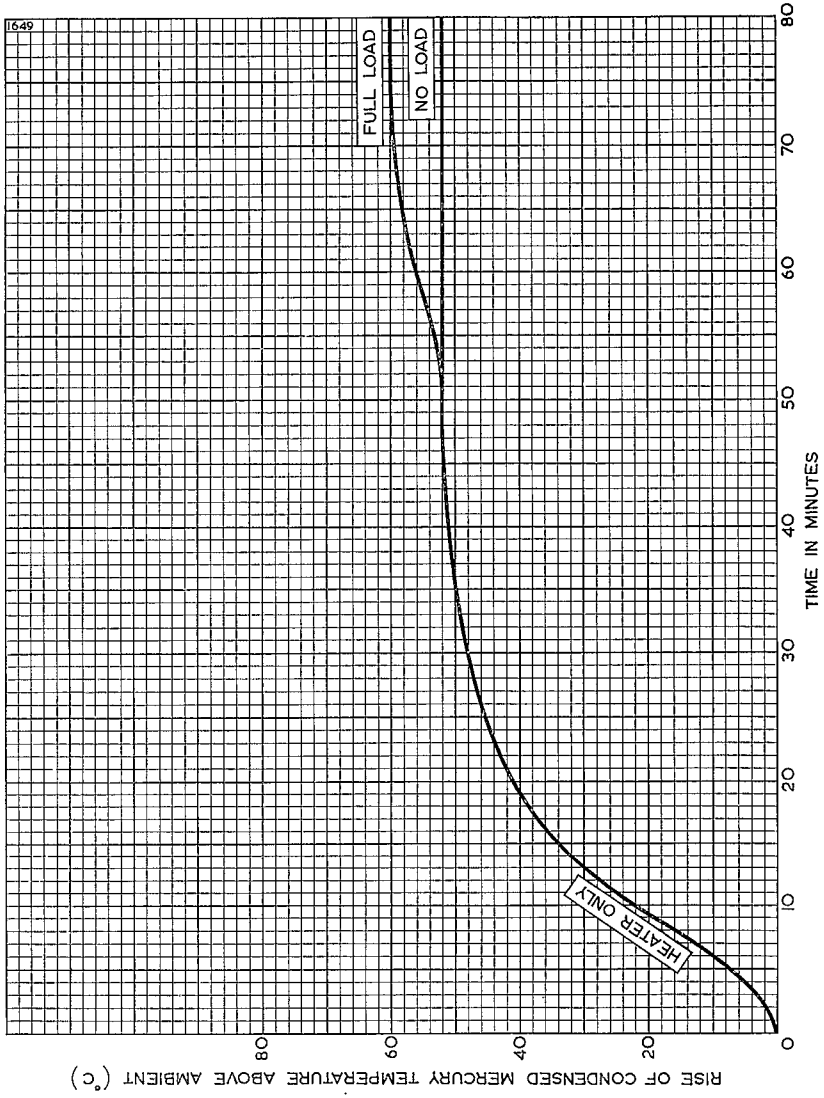
ENGLISH ELECTRIC

HEATING CHARACTERISTIC



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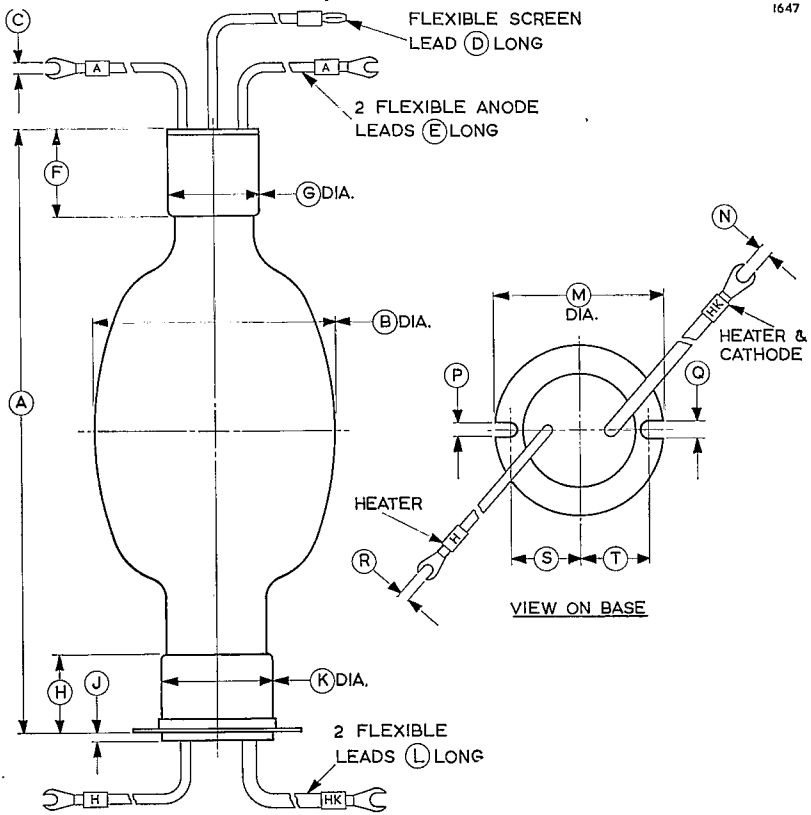
OUTLINE

1647



Ref.	Inches	Millimetres	Ref.	Inches	Millimetres
A	15·625±0·500	396·9±12·70	K	2·875 Max	73·03 Max
B	6·437 Max	163·5 Max	L	7·750±0·250	196·9±6·35
C	0·265	6·73	M	4·375 Max	111·1 Max
D	6·250±0·250	158·8±6·35	N	0·328	8·33
E	7·750±0·250	196·9±6·35	P	0·344	8·74
F	2·250	57·15	Q	0·437	11·10
G	2·875 Max	73·03 Max	R	0·265	6·73
H	2·000	50·80	S	1·813	46·05
J	0·250±0·062	6·35±1·57	T	1·813	46·05

Millimetre dimensions have been derived from inches.

Xenon Filled Rectifiers

June 1965

ENGLISH ELECTRIC VALVE CO. LTD.

CHELMSFORD
ENGLAND

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3B22

XENON FILLED RECTIFIER

Service Type CV3815 **American Designation 3B22**

INTRODUCTION

The 3B22 is a hot cathode, full wave, Xenon filled Rectifier with maximum ratings of 725V peak inverse voltage and 4·0A peak current.

GENERAL DATA

(See also Preamble to Rectifier Section of this Catalogue)

Electrical

Filament	Oxide Coated	
Filament Voltage	2·5	V
Filament Current	6·25 A	Approx
Min Filament Heating Time	20	secs
Ambient Temperature Range	−55 to +75	°C
Max Peak Inverse Voltage	725	V
Max Anode Current (per anode):		
Peak	4·0	A
Mean (4·5 secs averaging time)	0·5	A
Under Fault Conditions (0·1 second Max duration)	60	A
Max Power Supply Frequency	250	c/s

Mechanical

Overall Length	6·00 inches (153 mm)	Max
Overall Diameter	1·66 inches (42·1 mm)	Max
Net Weight	3 ounces (90 gm)	Approx
Mounting Position		Any
Base	Medium UX4 with bayonet	
Cooling		Natural

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XENON FILLED RECTIFIER

MAXIMUM OPERATING CONDITIONS

(Absolute Values—see Preamble)

D.C. Output with choke input filter and delayed H.T. switching

Circuit	* Diagram	Peak Inverse Voltage (up to 250c/s) V	Anode Current in Amperes		Transformer Secondary Voltage (R.M.S.) V	Max D.C. Output	
			Peak	Mean‡		V	Amps
Single Phase Full Wave	A	725	4	0·5	255	230	1·0
Single Phase Full Wave Bridge	B	725	4	0·5	510	460	1·0
Three Phase Full Wave	D	725	4	0·5	295	690	1·5

* For diagrams see Typical Rectifier Circuits for Choke Input Filters in the preamble to this section of the catalogue.

‡Mean anode currents are averaged over any period of 4·5 seconds.

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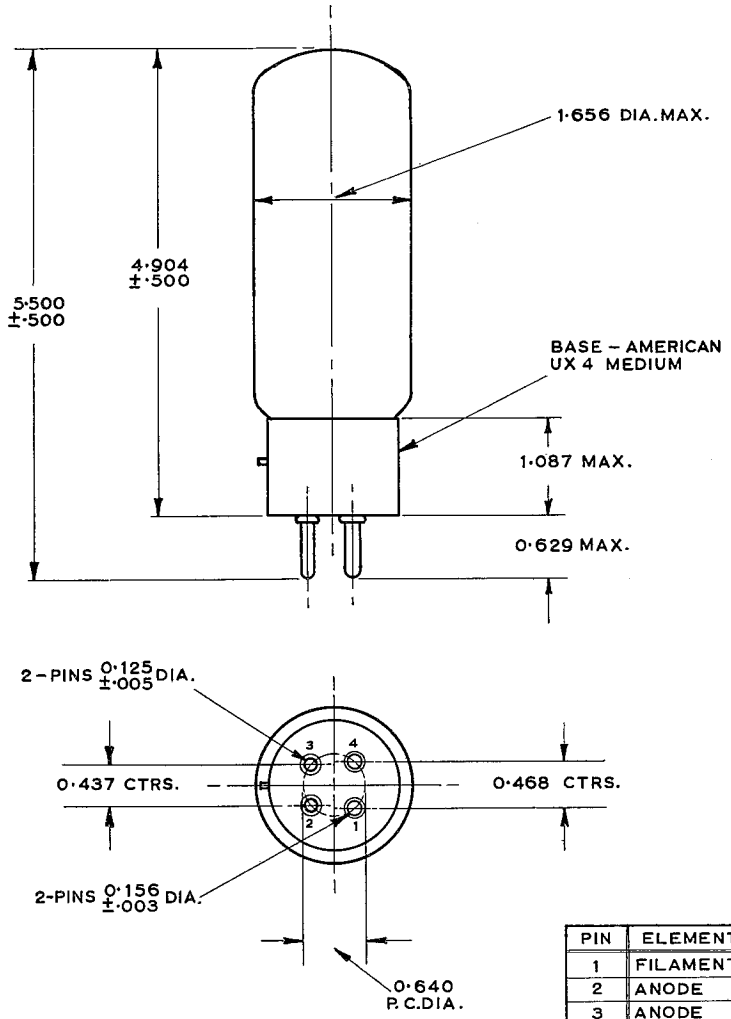
XENON FILLED RECTIFIER

OUTLINE

496



PIN	ELEMENT
1	FILAMENT
2	ANODE
3	ANODE
4	FILAMENT

ALL DIMENSIONS IN INCHES

XENON FILLED RECTIFIER

3B28
(AX224)

Service Type CV1835 **American Designation 3B28**

INTRODUCTION

The 3B28 is a hot cathode, Xenon filled Rectifier with maximum ratings of 1A peak current at 10kV peak inverse voltage and 2A peak current at 5kV peak inverse voltage.

GENERAL DATA

(See also Preamble to Rectifier Section of this Catalogue)

Electrical

Filament	Oxide Coated		
Filament Voltage	2·5		V
Filament Current	5·0		A
Min Filament Heating Time	10		secs
Ambient Temperature Range	−55 to +75		°C
Max Peak Inverse Voltage	5·0	10·0	kV
Max Anode Current:			
Peak	2·0	1·0	A
Mean‡	0·5	0·25	A
Under fault conditions (0·1 second Max duration)	20	20	A
Max Power Supply Frequency	500	150	c/s

Mechanical

Overall Length	6·16 inches	(156 mm)	Max
Overall Diameter	2·07 inches	(53 mm)	Max
Net Weight	2 ounces	(57 gm)	Approx
Mounting Position	Any		
Base	Medium UX4 with bayonet		
Cooling	Natural		

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MAXIMUM OPERATING CONDITIONS
(Absolute Values—see Preamble)

D.C. Output with choke input filter and delayed H.T. switching

Circuit	* Diagram	Peak Inverse Voltage kV	Anode Current in Amperes		Transformer Secondary Voltage (R.M.S.) kV	Max D.C. Output	
			Peak	Mean‡		kV	Amps
Single Phase Full Wave	A	● 10	1	0·25	3·5	3·1	0·5
		△ 5	2	0·5	1·7	1·5	1·0
Single Phase Full Wave Bridge	B	● 10	1	0·25	7·0	6·3	0·5
		△ 5	2	0·5	3·5	3·1	1·0
Three Phase Half Wave	C	● 10	1	0·25	4·1†	4·7†	0·75
		△ 5	2	0·5	2·0†	2·3†	1·5
Three Phase Full Wave	D	● 10	1	0·25	4·1	9·5	0·75
		△ 5	2	0·5	2·0	4·7	1·5

*For diagrams see Typical Rectifier Circuits for Choke Input Filters in the preamble to this section of the catalogue.

†For operation with constant full load. If the load resistance is increased the secondary voltage should be decreased (to avoid excessive peak inverse voltage) until at no load the reduction is 14%. The D.C. output voltage will be correspondingly decreased.

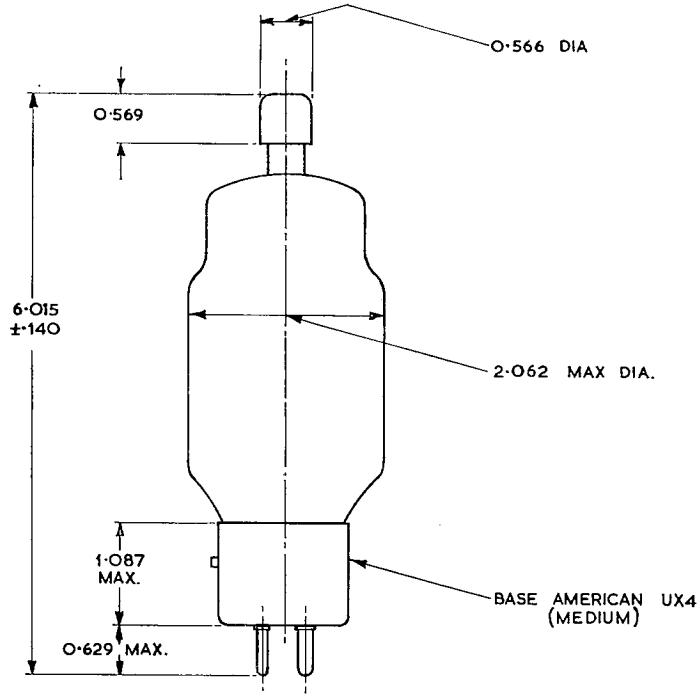
‡Mean anode currents are averaged over any period of 15 seconds maximum.

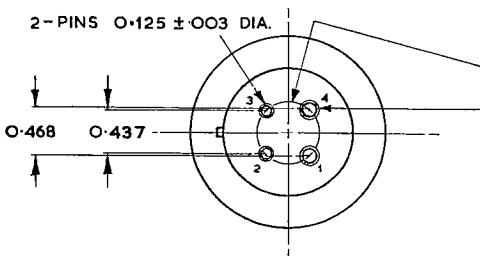
●For operation up to 150c/s.

△For operation up to 500c/s.

OUTLINE

105





PIN	ELEMENT
1	FILAMENT
2	NO CONNECTION
3	NO CONNECTION
4	FILAMENT & SHIELD
CAP	ANODE

ALL DIMENSIONS IN INCHES

Printed in England

XENON FILLED RECTIFIER

4B32
(AX230)

Service Type CV2518 **American Designation 4B32**

INTRODUCTION

The 4B32 is a hot cathode, Xenon filled Rectifier with maximum ratings of 10kV peak inverse voltage and 5A peak current.

GENERAL DATA

(See also Preamble to Rectifier Section of this catalogue)

Electrical

Filament	Oxide Coated	
Filament Voltage	5·0	V
Filament Current	7·1	A
Min Filament Heating Time	30	secs
Ambient Temperature Range	−55 to +70	°C
Max Peak Inverse Voltage	10·0	kV
Max Anode Current:		
Peak	5·0	A
Mean‡	1·25	A
Under fault conditions (0·1 second Max duration)	50	A
Max Power Supply Frequency	150	c/s

Mechanical

Overall Length	8·5 inches	(216 mm)	Max
Overall Diameter	2·32 inches	(59 mm)	Max
Net Weight	8 ounces	(230 gm)	Approx
Mounting Position			Any
Base			B4F
Cooling			Natural

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MAXIMUM OPERATING CONDITIONS
(Absolute Values—see Preamble)

D.C. Output with choke input filter and delayed H.T. switching

Circuit	* Diagram	Peak Inverse Voltage (up to 150c/s) kV	Anode Current in Amperes		Transformer Secondary Voltage (R.M.S.) kV	Max D.C. Output	
			Peak	Mean‡		kV	Amps
Single Phase Full Wave	A	10	5	1·25	3·5	3·1	2·5
Single Phase Full Wave Bridge	B	10	5	1·25	7·0	6·3	2·5
Three Phase Half Wave	C	10	5	1·25	4·1†	4·7†	3·75
Three Phase Full Wave	D	10	5	1·25	4·1	9·5	3·75

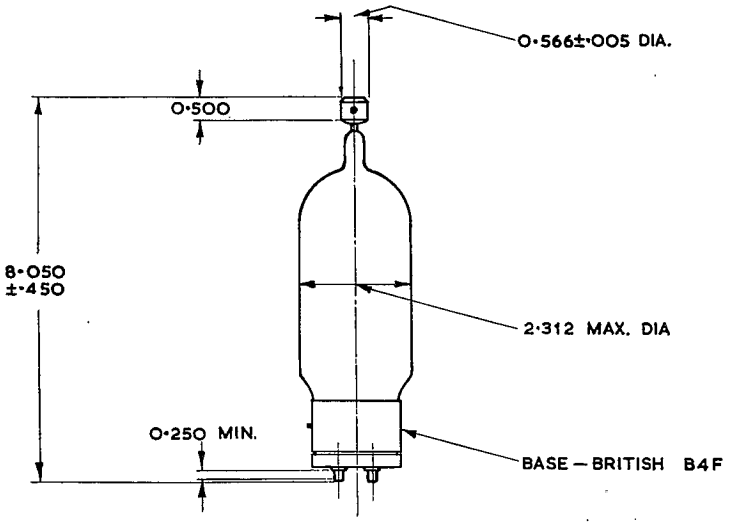
*For diagrams see Typical Rectifier Circuits for Choke Input Filters in the preamble to this section of the catalogue.

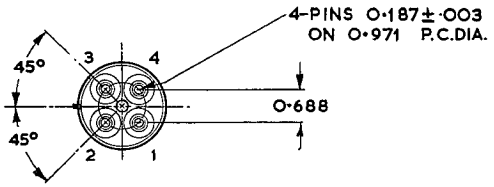
†For operation with constant full load. If the load resistance is increased the secondary voltage should be decreased (to avoid excessive peak inverse voltage) until at no load the reduction is 14%. The D.C. output voltage will be correspondingly decreased.

‡Mean anode currents are averaged over any period of 15 seconds maximum.

OUTLINE

106





PIN	ELEMENT
1	NO CONNECTION
2	FILAMENT
3	NO CONNECTION
4	FILAMENT
CAP	ANODE

ALL DIMENSIONS IN INCHES

TUNGAR RECTIFIER

68504

ENGLISH ELECTRIC

INTRODUCTION

The 68504 is a hot cathode, full-wave, gas-filled Rectifier designed for use in low voltage battery charging equipment.

GENERAL DATA

(See also Preamble to Rectifier Section of this Catalogue)

Electrical

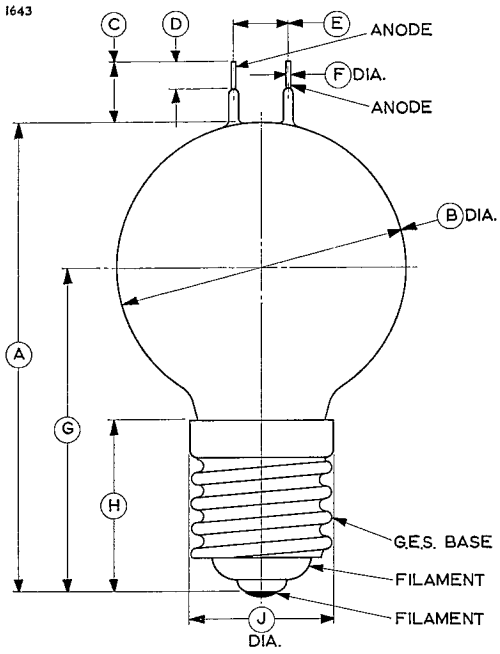
Cathode	Oxide Coated Filament	
Filament Voltage	2·3	V
Filament Current	18±2	A
Cathode Heating Time (Minimum)	30	s
Voltage Drop (Approx)	10	V
Ambient Temperature Range	−55 to +70	°C
D.C. Output as Full-Wave Rectifier:		
Voltage	30	V Max
Current	5·0	A Max

Mechanical

Overall Length	5·71 inches	(145 mm)	Max
Overall Diameter	3·03 inches	(77 mm)	Max
Net Weight	4 ounces	(112 gm)	Approx
Mounting Position			Any
Base			Goliath Edison Screw
Cooling			Convection

ENGLISH ELECTRIC

OUTLINE



Ref.	Inches	Millimetres
A	4·528±0·394	115·0±10·0
B	3·032 Max	77·0 Max
C	0·472±0·197	12·0±5·0
D	0·276 Min	7·0 Min
E	0·492±0·098	12·5±2·5
F	0·059	1·5
G	3·465±0·394	88·0±10·0
H	1·811 Max	46·0 Max
J	1·543 Max	39·2 Max

Inch dimensions have been derived from millimetres.

TUNGAR RECTIFIER

68506

ENGLISH ELECTRIC

INTRODUCTION

The 68506 is a hot cathode, half-wave, gas-filled Rectifier designed for use in low voltage battery charging equipment.

GENERAL DATA

(See also Preamble to Rectifier Section of this Catalogue)

Electrical

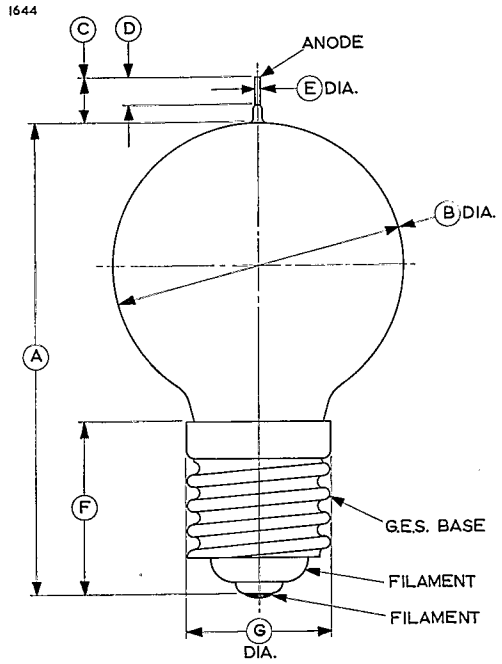
Cathode	Oxide Coated Filament	
Filament Voltage	2·3	V
Filament Current	18±2	A
Cathode Heating Time (Minimum)	30	s
Voltage Drop (Approx)	10	V
Ambient Temperature Range	−55 to +70	°C
D.C. Output as Half-Wave Rectifier:		
Voltage	75	V Max
Current	6·0	A Max

Mechanical

Overall Length	5·71 inches	(145 mm)	Max
Overall Diameter	3·03 inches	(77 mm)	Max
Net Weight	4 ounces	(112 gm)	Approx
Mounting Position			Any
Base			Goliath Edison Screw
Cooling			Convection

ENGLISH ELECTRIC

OUTLINE



Ref.	Inches	Millimetres
A	4·528±0·394	115·0±10·0
B	3·032 Max	77·0 Max
C	0·472±0·197	12·0±5·0
D	0·276 Min	7·0 Min
E	0·059	1·5
F	1·811 Max	46·0 Max
G	1·543 Max	39·2 Max

Inch dimensions have been derived from millimetres.

TUNGAR RECTIFIER

68530

ENGLISH ELECTRIC

INTRODUCTION

The 68530 is a hot cathode, full-wave, gas-filled Rectifier designed for use in low voltage battery charging equipment.

GENERAL DATA

(See also Preamble to Rectifier Section of this Catalogue)

Electrical

Cathode	Oxide Coated Filament	
Filament Voltage	2·0	V
Filament Current	8±1	A
Cathode Heating Time (Minimum)	30	s
Voltage Drop (Approx)	10	V
Ambient Temperature Range	−55 to +70	°C
D.C. Output as Full-Wave Rectifier:		
Voltage	30	V
Current	6·0	A

Mechanical

Overall Length	5·94 inches	(151 mm)	Max
Overall Diameter	3·19 inches	(81 mm)	Max
Net Weight	4 ounces	(112 gm)	Approx
Mounting Position			Any
Base			Special 4-pin
Cooling			Convection

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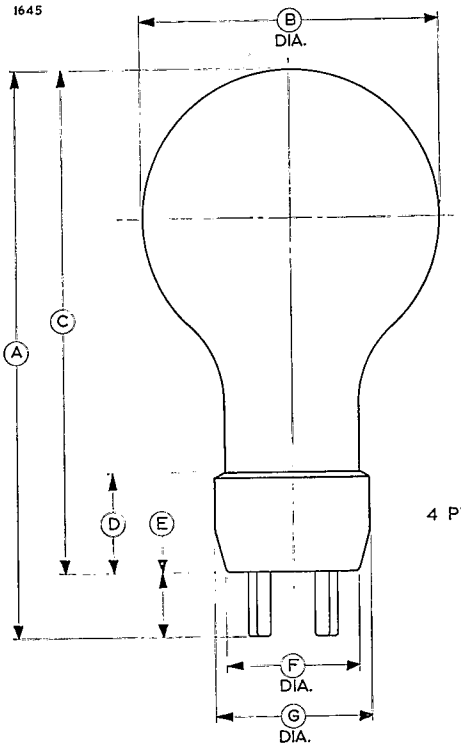
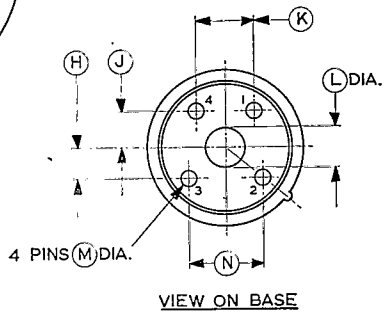
TUNGAR RECTIFIER

68530

ENGLISH ELECTRIC

OUTLINE





VIEW ON BASE

BASE CONNECTIONS

Pin	Element
1	Filament
2	Anode
3	Anode
4	Filament

Ref.	Inches	Millimetres	Ref.	Inches	Millimetres
A	5·688±0·25	144·5±6·35	H	0·312	7·94
B	3·125±0·063	79·38±1·60	J	0·375	9·53
C	5·125±0·125	130·2±3·18	K	0·594	15·09
D	1·062	27·00	L	0·375	9·53
E	0·625	15·88	M	0·156	3·96
F	1·375	34·93	N	0·781	19·84
G	1·625	41·28			

Millimetre dimensions have been derived from inches.

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AX228

XENON FILLED RECTIFIER

Service Type CV2399

INTRODUCTION

The AX228 is a hot cathode, Xenon filled Rectifier with maximum ratings of 13kV peak inverse voltage and 6A peak current. The AX228 may be used as a replacement for the AH221 in applications where its peak inverse voltage rating is adequate, with the advantage that close control of ambient temperature is not required. →

GENERAL DATA

(See also Preamble to Rectifier Section of this catalogue)

Electrical

Filament		Oxide Coated	
Filament Voltage		4·0	V
Filament Current		11·0	A
Min Filament Heating Time		30	sec
Ambient Temperature Range		−55 to +70	°C
Max Peak Inverse Voltage	10	13	kV
Max Anode Current:			
Peak	6·0	6·0	A
Mean‡	1·5	1·25	A
Under fault conditions (0·1 second maximum duration)		50	A
Max Power Supply Frequency		150	c/s

Mechanical

Overall Length	10·16 inches	(258 mm)	Max
Overall Diameter	2·32 inches	(59 mm)	Max
Net Weight	8 ounces	(230 gm)	Approx
Mounting Position			Any
Base			Goliath Edison Screw
Cooling			Natural

→ Indicates a change.

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XENON FILLED RECTIFIER

MAXIMUM OPERATING CONDITIONS
(Absolute Values—see Preamble)

D.C. Output with choke input filter and delayed h.t. switching

Circuit	* Diagram	Peak Inverse Voltage (up to 150c/s) kV	Anode Current in Amperes		Transformer Secondary Voltage (R.M.S.) kV	Max D.C. Output	
			Peak	Mean‡		kV	Amps
Single Phase Full Wave	A	10	6·0	1·5	3·5	3·2	3·0
		13	6·0	1·25	4·6	4·1	2·5
Single Phase Full Wave Bridge	B	10	6·0	1·5	7·0	6·4	3·0
		13	6·0	1·25	9·2	8·2	2·5
Three Phase Half Wave	C	10	6·0	1·5	4·1†	4·7†	4·5
		13	6·0	1·25	5·3†	6·2†	3·75
Three Phase Full Wave	D	10	6·0	1·5	4·1	9·5	4·5
		13	6·0	1·25	5·3	12·3	3·75

*For diagrams see Typical Rectifier Circuits for Choke Input Filters in the preamble to this section of the catalogue.

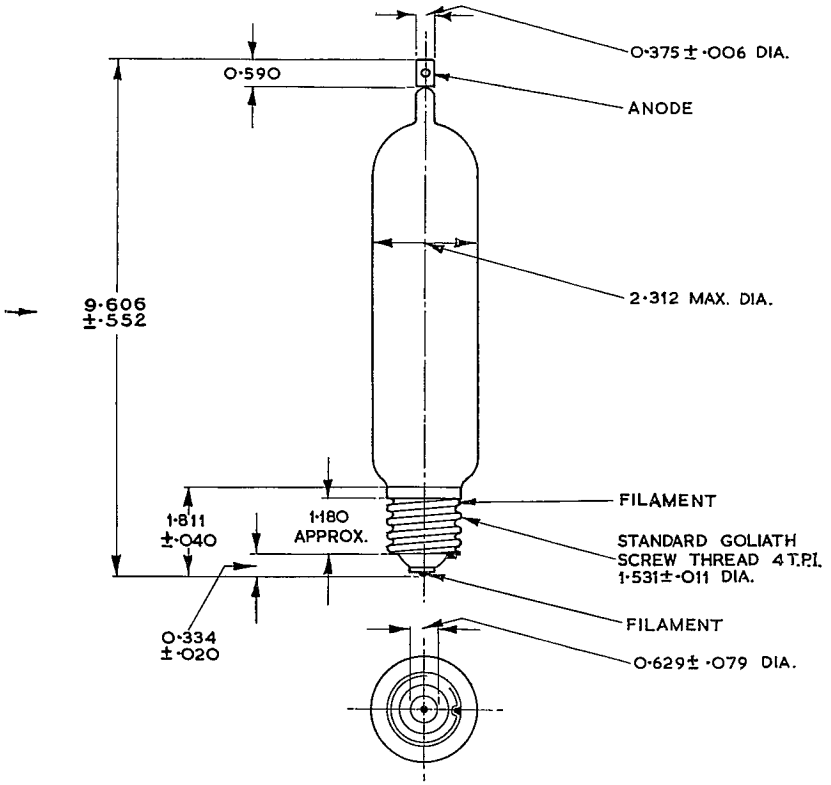
†For operation with constant full load. If the load resistance is increased the secondary voltage should be decreased (to avoid excessive peak inverse voltage) until at no load the reduction is 14%. The d.c. output voltage will be correspondingly decreased.

‡Mean anode currents are averaged over any period of 15 seconds maximum

XENON FILLED RECTIFIER

OUTLINE

497



ALL DIMENSIONS IN INCHES

INDICATES A CHANGE ←

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