

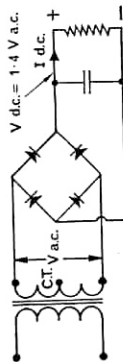
Power Supplies

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BASIC SINGLE PHASE RECTIFIER CIRCUIT RELATIONSHIPS

FULL-WAVE BRIDGE— CAPACITIVE INPUT FILTER

Circuit Factor: 0.62

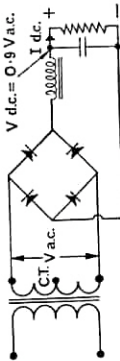


Rating per Rectifier

Peak Inverse Voltage = 1.4V a.c.
Average Current = 0.5 I d.c.
Peak Current: See Note 1

FULL-WAVE BRIDGE— CHOKE INPUT FILTER

Circuit Factor: 0.94

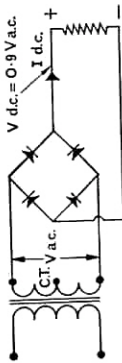


Rating per Rectifier

Peak Inverse Voltage = 1.4V a.c.
Average Current = 0.5 I d.c.
Peak Current = 1.0 I d.c.

FULL-WAVE BRIDGE— RESISTIVE LOAD

Circuit Factor: 0.9

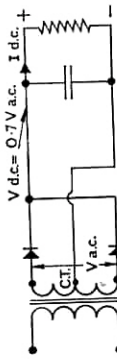


Rating per Rectifier

Peak Inverse Voltage = 1.4V a.c.
Average Current = 0.5 I d.c.
Peak Current = 1.57 I d.c.

FULL-WAVE— CAPACITIVE INPUT FILTER

Circuit Factor: 1.0

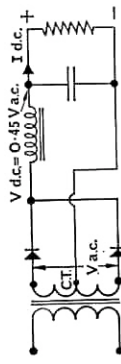


Rating per Rectifier

Peak Inverse Voltage = 1.4V a.c.
Average Current = 0.5 I d.c.
Peak Current: See Note 1.

FULL-WAVE— CHOKE INPUT FILTER

Circuit Factor: 1.54

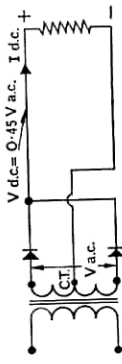


Rating per Rectifier

Peak Inverse Voltage = 1.4V a.c.
Average Current = 0.5 I d.c.
Peak Current = 1.0 I d.c.

FULL-WAVE— RESISTIVE LOAD

Circuit Factor: 1.39



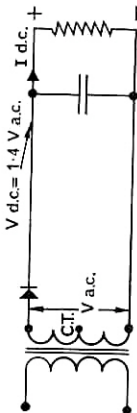
Rating per Rectifier

Peak Inverse Voltage = 1.4V a.c.
Average Current = 0.5 I d.c.
Peak Current = 1.57 I d.c.

HALF-WAVE— CAPACITIVE INPUT FILTER

Circuit Factor: 0.27 (0.43)

See Note 2

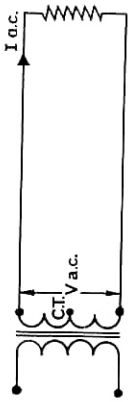


Rating per Rectifier

Peak Inverse Voltage = 2.8V a.c.
Average Current = 1.0 I d.c.
Peak Current: See Note 1.

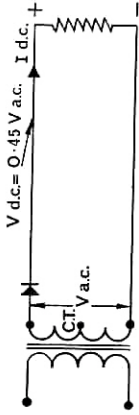
RESISTIVE—LOAD

Circuit Factor: 1.15



HALF-WAVE— RESISTIVE LOAD

Circuit Factor: 0.64



Rating per Rectifier

Peak Inverse Voltage = 1.4V a.c.
Average Current = 1.0 I d.c.
Peak Current = 3.14 I d.c.

Note 1

Peak current is only limited by the effective series resistance of the transformer and associated components.

Note 2

The 0.43 circuit factor should only be used when the transformer has been specially designed for half-wave capacitive input filter circuits.

To estimate ratings for conditions not included in a transformer specification :—

Load Current = **Load Current** × **Circuit Factor shown above for new circuit**
in new circuit = **in specified circuit** × **Circuit Factor shown above for specified circuit**

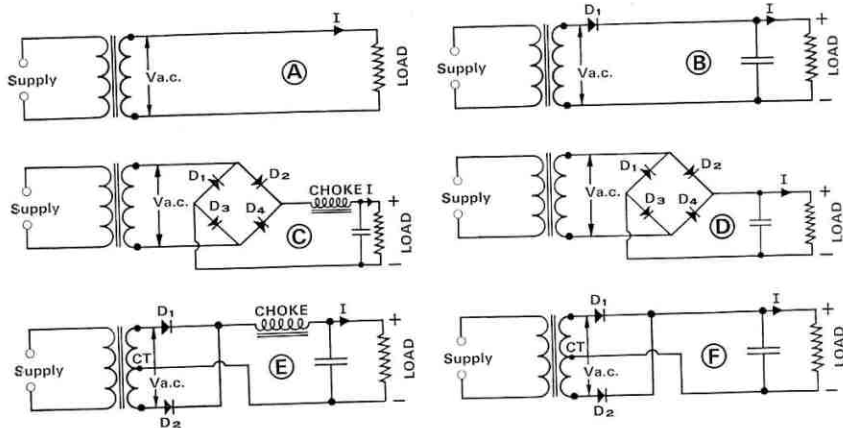
Reference to the diagram above for the new circuit will then show the relationship between transformer secondary volts and output volts and also rectifier ratings.

Relationships shown assume no circuit losses, and should only be used as a guide.

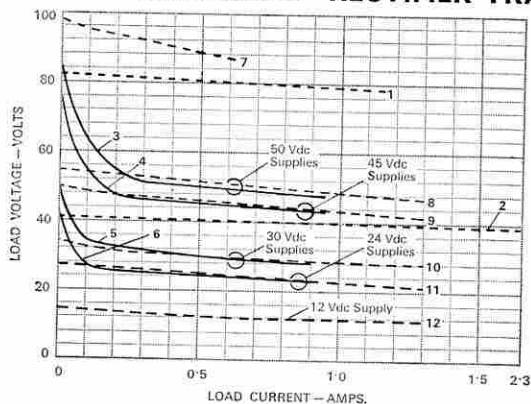
POWER SUPPLY REGULATION CURVES

To assist Designers, we show on the following pages typical regulation characteristics of our Rectifier Supply Transformers when they are used to supply resistive loads and when they are incorporated in a number of single phase rectifier circuits. Using this basic information, power supply components may be selected from our catalogue with predictable end results.

CIRCUITS—For reference



"UNIVERSAL" RECTIFIER TRANSFORMER



RIPPLE VOLTS

Peak to Peak at full load in Circuit:

C = 6V

E = 4V

D & F = 3V

CAPACITOR

In Circuit C & E—200 μ F; in D & F—3600 μ F.

Ripple Current Ratings: 1.4 x Full Load Current.

RECTIFIERS

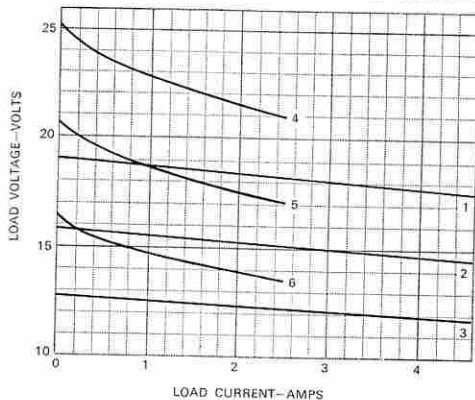
Our Type Rec. 50A.

CHOKE

Our "Tapped Choke."

Graph No.	1	2	3	4	5	6	7	8	9	10	11	12					
Circuit Diagram	A	A	C	C	E	E	D	D	F	D	F	D	F	D	F		
V a.c. (Transformer)	80	40	63	54	72	60	70	40	78	36	70	24	48	20	40	11	20
Max. Load Amps.	1.15	2.3	.94	.94	.9	.9	.62	1.3	1.0	1.3	1.0	1.3	1.0	1.3	1.0	1.3	1.0

18V RECTIFIER TRANSFORMER



RIPPLE VOLTS

Peak to Peak at full load for Graphs Nos.:

4 = 3V

5 = 2.2V

6 = 1.4V

CAPACITORS

For Graphs Nos.:

4 & 5 = 6,600 μ F

6 = 13,500 μ F

Ripple Current Ratings: 1.4 x Full Load Current

RECTIFIERS

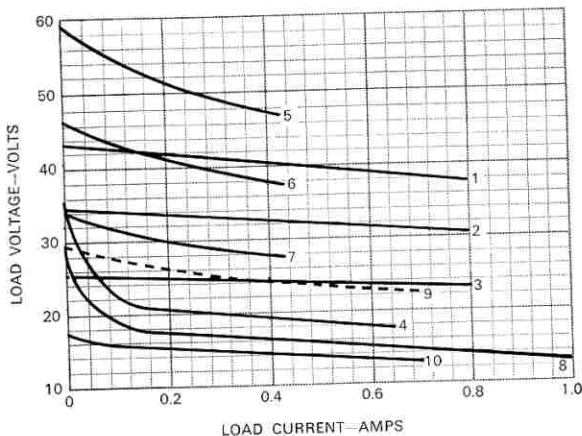
Our Type Rec. 40.

Graph No.	1	2	3	4	5	6
Circuit Diagram	A	A	A	D	D	D
V a.c. (Transformer)	18	15	12	18	15	12
Max. Load Amps	4.6	4.6	4.6	2.5	2.5	2.5

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20V RECTIFIER TRANSFORMER



RIPPLE VOLTS

Peak to Peak at full load for
Graphs Nos.:

- 4 & 8 = 1V
- 6, 7 & 10 = 2.5V
- 5 = 4.5V
- 9 = 6V

CAPACITORS

For Graphs Nos.:

- 8 = 250 μ F
- 4 & 5 = 500 μ F
- 6, 7 & 9 = 1000 μ F
- 10 = 2000 μ F

Ripple Current Ratings :
1.4 x Full Load Current.
Except for Graphs 4 and 8
when rating should be 100mA
minimum.

RECTIFIERS

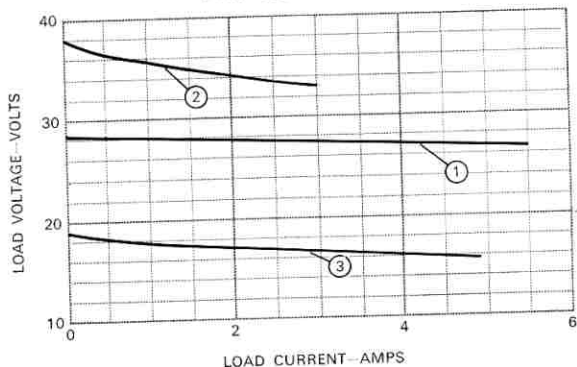
Our Type Rec. 50A.

CHOKE

Our "Tapped Choke".

Graph No.	1	2	3	4	5	6	7	8	9	10
Circuit Diagram	A	A	A	C	D	D	D	E	F	F
V a.c. (Transformer)	40	32	24	24	40	32	24	40	40	24
Max. Load, Amps.	0.8	0.8	0.8	0.65	0.43	0.43	0.43	1.0	0.7	0.7

27V RECTIFIER TRANSFORMER



RIPPLE VOLTS

Peak to Peak at full load for
Graph Nos.:

- 2 = 4V
- 3 = 2V

CAPACITORS

For Graph Nos.:

- 2 = 6,600 μ F
- 3 = 13,500 μ F

Ripple Current Ratings :
1.4 x Full Load Current.

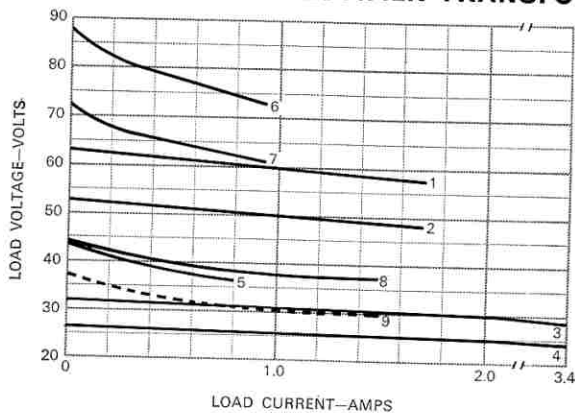
RECTIFIERS

For Graph Nos.:

- 2—Our Type Rec. 40.
- 3—Our Type Rec. 45.

Graph No.	1	2	3
Circuit Diagram	A	D	F
V a.c. (Transformer)	27	27	27
Max. Load, Amps.	5.5	3	4.8

30V RECTIFIER TRANSFORMER



RIPPLE VOLTS

Peak to Peak at full load for Graphs Nos.:

8 & 9 = 5V

6 & 7 = 6V

5 = 7V

CAPACITORS

For Graphs Nos.:

6 & 7 = 1000 μ F

5, 8 & 9 = 2000 μ F

Ripple Current Ratings :

1.4 x Full Load Current,

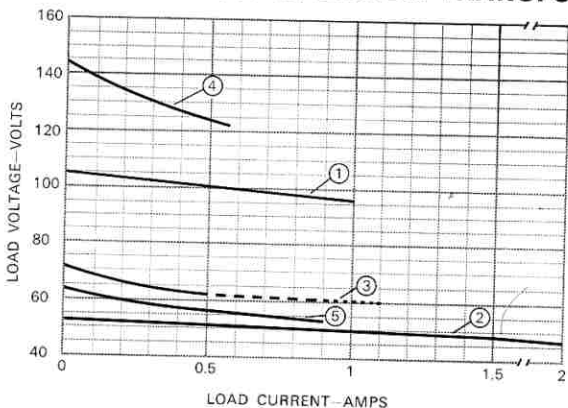
except Graph No. 5 which is 2.8 x Full Load Current.

RECTIFIERS

Our Type Rec. 50A.

Graph No.	1	2	3	4	5	6	7	8	9
Circuit Diagram	A	A	A	A	B	D	D	F	F
V a.c. (Transformer)	60	50	30	25	30	60	50	60	50
Max. Load, Amps.	1.7	1.7	3.4	3.4	0.8	0.93	0.93	1.5	1.5

50V RECTIFIER TRANSFORMER



RIPPLE VOLTS

Peak to Peak at full load for Graph Nos.:

3 & 5 = 2V

except D = 3V

4 = 18V

CAPACITORS

For Graph Nos.:

3 & 5 = 3,600 μ F

4 = 200 μ F

Ripple Current Ratings :

1.4 x Full Load Current

except Graph No. 3, Circuit

Diagram B = 2.8 x Full load Current.

RECTIFIERS

Our Type Rec. 50A.

Graph No.	1	2	3			4	5
Circuit Diagram	A	A	B	D	F	D	F
V a.c. (Transformer)	100	50	50	50	100	100	90
Max. Load, Amps.	1	2	0.5	1.1	0.9	0.56	0.9

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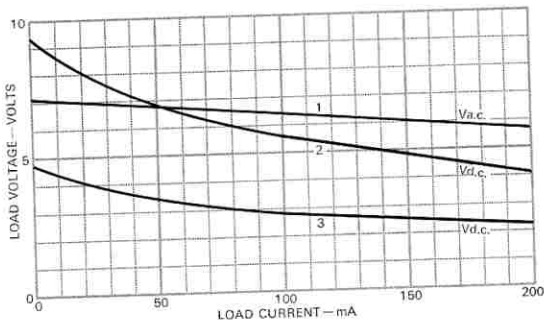
SUB. MIN. MAINS TRANSFORMERS

OCCUPY LESS THAN 1 CUB. INCH : RELATIVELY HIGH OUTPUT POWER.
INCREASED SAFETY MARGINS : FULLY VACUUM VARNISH IMPREGNATED.

Ambient operating temp. range $-40^{\circ}\text{C}.$ to $70^{\circ}\text{C}.$: Flash test voltage 2,000 V a.c.: Insulation res. 1,000 M Ω min.: Screen between primary and secondary windings: Generally to B.S. 2214.

For the regulation curves shown the transformers utilisation factor varies with the operating mode. Nevertheless, under the most adverse conditions the internal temperature rise will not exceed $40^{\circ}\text{C}.$ providing the maximum load current is not exceeded.

3V SUB. MIN. MAINS TRANSFORMER



CURVES 2 and 3

Ripple Volts, peak to peak at full load = 1 V.
Capacitor = 1,000 μF ; Ripple current rating 280 mA.
Rectifiers—Our type 1SJ50.



CURVE 1

Output V a.c. vs. load current.
With resistive load.

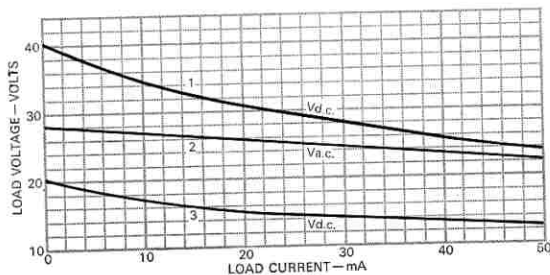
CURVE 2

Output V d.c. vs. load current.
Transformer connected into a full wave bridge circuit with capacitor input filter.

CURVE 3

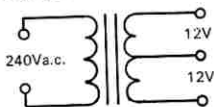
Output V d.c. vs. load current.
Transformer connected into a full wave bi-phase circuit with capacitor input filter.

12V SUB. MIN. MAINS TRANSFORMER



CURVES 1 and 3

Ripple Volts, peak to peak at full load = 2.5 V.
Capacitor = 100 μF ; Ripple current rating 70 mA.
Rectifiers—Our type 1SJ150.



CURVE 1

Output V d.c. vs. load current.
Transformer connected into a full wave bridge circuit with capacitor input filter.

CURVE 2

Output V a.c. vs. load current.
With resistive load.

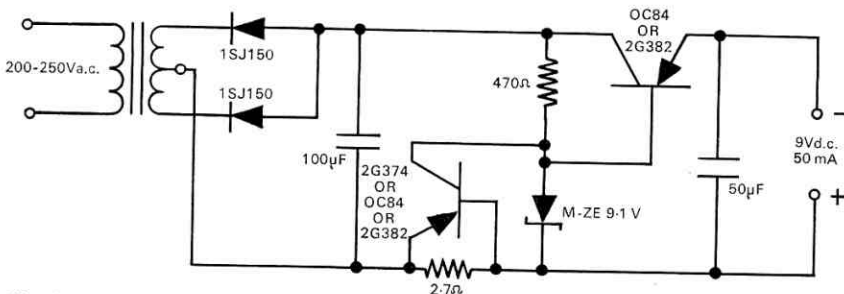
CURVE 3

Output V d.c. vs. load current.
Transformer connected into a full wave bi-phase circuit with capacitor input filter.

12V SUB. MIN. MAINS TRANSFORMER

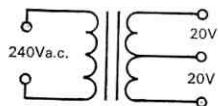
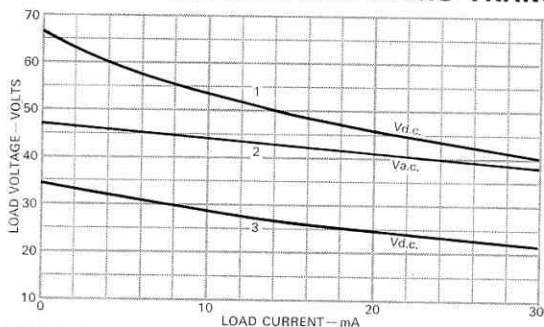
The stabilised supply shown incorporates an overload protection circuit, which limits the output current to 85 mA.

9 V STABILISED SUPPLY



Max. load current 50 mA; Peak to peak ripple voltage 2 mV at full load.

20V SUB. MIN. MAINS TRANSFORMER



CURVE 1

Output V d.c. vs. load current. Transformer connected into a full wave bridge circuit with capacitor input filter.

CURVE 2

Output V a.c. vs. load current. With resistive load.

CURVE 3

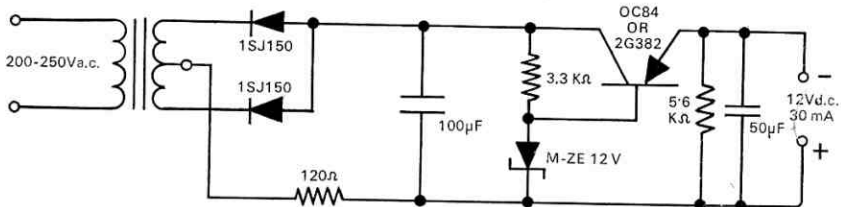
Output V d.c. vs. load current. Transformer connected into a full wave bi-phase circuit with capacitor input filter.

CURVES 1 and 3

Ripple volts, peak to peak at full load = 1.5 V.
Capacitor = 100µF; Ripple current rating 40 mA.
Rectifiers—Our type 1SJ150.

The stabilised supply shown below has a series resistor which provides overload protection. This limits the output current to 75 mA.

12 V STABILISED SUPPLY



Max. load current 30 mA; Peak to peak ripple voltage 4 mV.