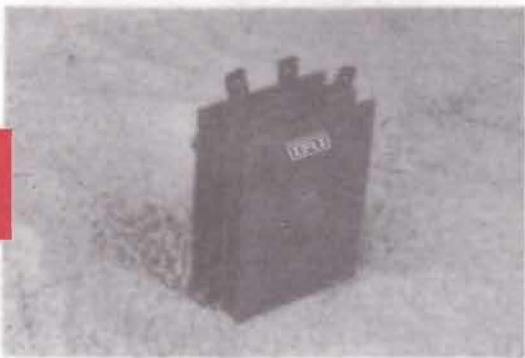
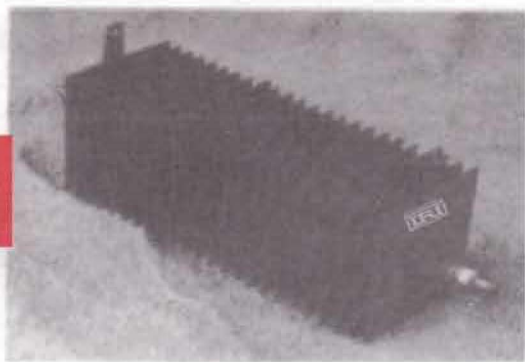


SELENIUM RECTIFIERS

ELEMENTS & STACKS, W & H SERIES

The H and W series are the result of continuous research and development programme aimed at reliable, lowcost, compact selenium rectifier elements and stacks. High standard of quality are further insured by Westing house plant & machinery and the expert technical know how available at Insel Rectifiers.

The aluminium based selenium rectifier elements are manufactured by an improved, closely controlled vacuum deposition process. This new process ensure stable, non-ageing, low loss characteristics permitting higher current density operation while maintaining a reliability standard which has been a by word in the selenium rectifier field for over thirty years.

IRI selenium rectifier elements are available in two catagories, series 'H' & 'W'. Both series are available in Voltage grades upto 36 volts.

RECTIFIER STACK CODING.						
H	O	G	LA	06	B	01
Rectifier Series	Max. RMS input voltage per series element	Element Code	Mechanical Structure/ Spacing	Number of series elements per arm	Circuit Arrangements	Number of Parallel Paths per arm
H--Normal current density	0-22 1-30 2-36 3-25	(see below for dimensions) C D E F G K M Q R Y S N T P	L LA	2 Digits	Single Phase A--Half wave B--Bridge-ve Outer C--Centre tap +ve common N--Centre tap-ve common D--Voltage doubler	2 Digits
W--Higher current density	4-33				Three Phase G-- Bridge E--Half wave +ve common Y--Half wave-ve common Q--Half Bridge +ve Outer R--Half Bridge -ve Outer S--Hexaphase	

CURRENT RATINGS OF IRI ELEMENTS IN STACKS

SERIES	GRADE	ELEMENT		Active Area in Sq. cm	Mech. Structure	Maximum recommended elements in stack	single Phase		3 Phase Bridge & Half Wave	Hexa Phase
			Dim. in m.m				Half Wave	Bridge		
'H' SERIES	IN O, 1, 2, 3, & 4 Voltage grades	C	17X17	1.9	L	40	0.08	0.16	0.24	0.34
		D	23X23	4.0	L	40	0.23	0.46	0.51	1.02
					LA	40	0.30	0.60	0.75	1.50
		E	36X23	6.75	L	40	0.52	1.04	1.38	2.76
		F	36X36	11	L	40	0.65	1.35	1.75	3.50
		G	50X50	23	L	40	1.10	2.20	2.85	5.70
					LA	32	1.35	2.50	3.15	6.30
					L	40	1.65	3.30	4.27	8.55
					LA	32	2.02	3.75	4.82	9.45
		K	76X50	35	L	40	2.75	5.50	7.15	14.30
					LA	32	3.00	6.00	8.50	17.10
		M	76X76	50	L	40	3.00	6.00	8.00	16.00
					LA	32	3.30	6.60	8.80	18.00
					L	42	3.50	7.00	10.70	21.45
		Q	100X62	62	LA	32	4.00	8.00	12.00	24.00
					L	42	3.75	7.50	11.25	22.50
		R	102X76	80	LA	32	4.50	9.00	13.50	27.00
					L	42	4.00	8.00	12.00	24.00
		Y	100X83	74	L	42	4.00	8.00	12.00	24.00
		S	100X100	90	LA	32	5.00	10.00	15.00	30.00
					L	42	5.50	11.00	14.30	28.60
		N	152X76	107	LA	32	6.00	12.00	18.00	34.00
					L	42	6.00	12.00	18.00	36.00
		T	152X100	152	LA	32	7.50	15.00	22.00	44.00
					L	42	10.25	20.50	26.65	53.20
		P	305X76	221	LA	32	12.30	24.60	35.00	63.85

AC/DC Calculation for Resistive / Inductive Loads

Circuit	Formula	AC/DC Current Ratio (1)	Ripple Per cent (2)	n (Approx)
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SINGLE PHASE

Half Wave	$VL=2.22(E+nVf)$	1.57	1.21	$\frac{2.22E}{Ve}$
Centre-tap	$VL=2.22(E+2nVf)$	0.80	48	$\frac{2.22}{Ve}$
Bridge	$VL=1.11(E+4nVf)$	1.125	48	$\frac{1.11E}{Ve}$

THREE PHASE

Half Wave	$VL=1.48(E+3nVf)$	0.60	18.3	$\frac{1.48E}{Ve}$
Bridge	$VL=0.742(E+6nVf)$	0.80	4.2	$\frac{0.742E}{Ve}$

VL = on-Load a.c. input voltage (total secondary voltage for single phase centre-tap, line-to line for three phase half wave and bridge)

E = mean d.c. output voltage.

vf = mean element forward voltage drop.

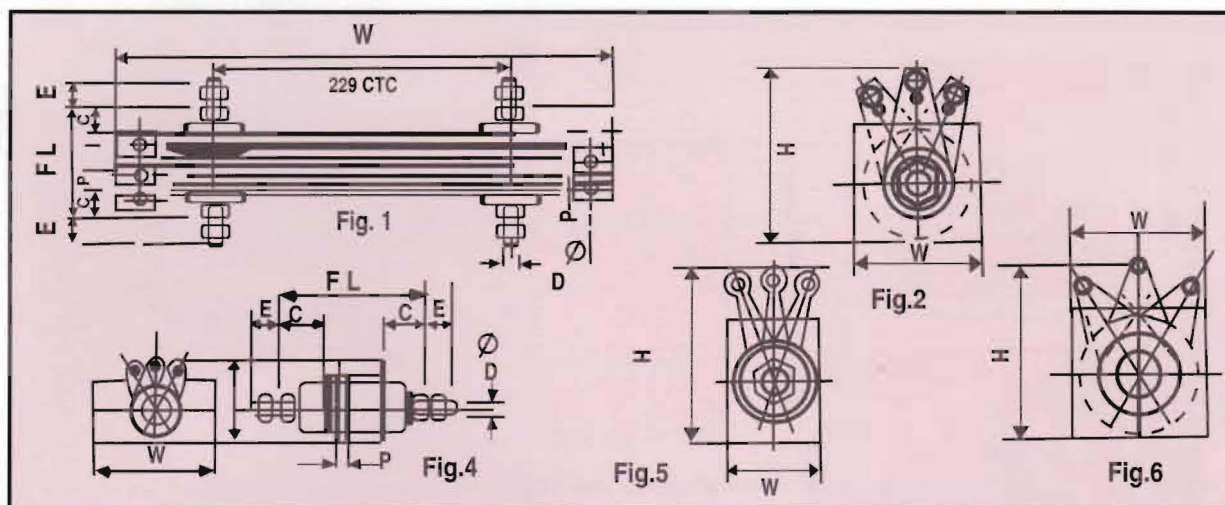
n = number of series elements.

Ve = Voltage of Plate

NOTE: 1. FOR 'W' Series add 40% to the current rating given above for 'H' Series.
2. The rating above are at an ambient temperature of 45C

- (1) = $\frac{\text{a.c. input current}}{\text{d.c. output current}}$
(2) = $\frac{\text{a.c. ripple voltage...r.m.s.} \times 100}{\text{mean d.c. output voltage}}$

IRI knows all about current trends.



STACK DIMENSIONS OF VARIOUS PLATE ASSEMBLIES

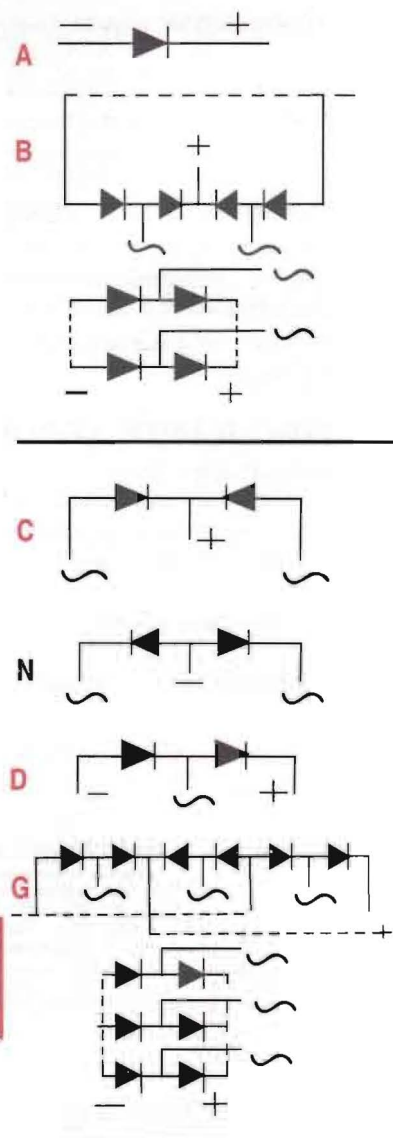
Plate Type	Mech. Structure	Fig. Ref.	Width (w) MM	Height (w) mm	F.L. (cx2) + PxN	Pitch (p) mm	Spindle dia(D)	E Projection on both side
C	L	6	17	32	32 + PxN	2.5	3/16	10
D	L	6	23	35	32 + PxN	3.35	3/16	10
	LA	6	23	35	32 + PxN	5.8	3/16	10
E	L	4	36	35	32 + PxN	5.8	3/16	10
F	L	6	36	48	32 + PxN	7.1	3/16	10
G	L	2	50	68	20 + PxN	7.0	1/4	15
	LA	2	50	68	20 + PxN	8.5	1/4	15
K	L	4	50	100	20 + PxN	7.0	1/4	15
	LA	4	50	100	20 + PxN	8.5	1/4	15
M	L	2	76	100	45 + PxN	9.9	3/8	20
	LA	2	76	100	45 + PxN	12.2	3/8	20
Q	L	5	62	122	45 + PxN	12.2	3/8	20
	LA	5	62	122	45 + PxN	17.3	3/8	20
R	L	5	76	122	45 + PxN	9.9	3/8	20
	LA	5	76	122	45 + PxN	12.2	3/8	20
Y	L	5	83	122	45 + PxN	9.9	3/8	20
	LA	5	83	122	45 + PxN	12.2	3/8	20
S	L	2	100	122	45 + PxN	12.2	3/8	20
	LA	2	100	122	45 + PxN	17.3	3/8	20
N	L	4	152	100	45 + PxN	12.2	3/8	20
	LA	4	152	100	45 + PxN	17.3	3/8	20
T	L	5	100	185	45 + PxN	12.2	3/8	20
	LA	5	100	185	45 + PxN	17.3	3/8	20
P	L	1	381	100	51 + PxN	9.9	3/8	20
	LA	1	381	100	51 + PxN	12.2	3/8	20

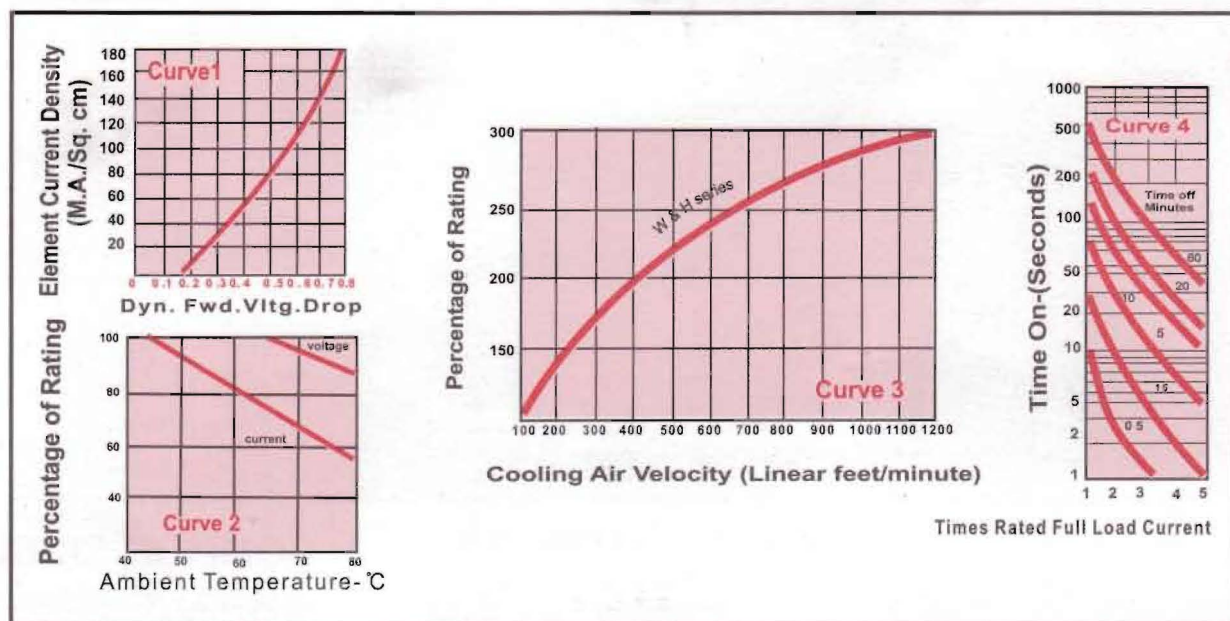
N. = Number of plates in stack
 F.L. = Fixing Length
 C = End assembly length
 P = Plate Distance

RECTIFIERS WITH 4 OR LESS THAN 4 PLATES SHALL BE SCREW / BOLT MOUNTED.

The company's policy is one of continuous development and improvement of its product and therefore the right is reserved to supply Product which may differ slightly from those illustrated here.

COMMON CIRCUIT ARRANGEMENTS





FORWARD VOLTAGE DROP: IRI rectifiers have very low forward drop which gives higher DC output, Temperature rise of the rectifier plate is less, the ageing is minimized. Please refer Curve 1 for Forward Voltage Drop characteristics.

CURRENT CHARACTERISTIC: Current ratings on page 2 are at ambient temperature of 45 degree centigrade. Ambient Temp. for Rectifier is the temperature below it. For operation at higher ambient temperatures derate the currents as per Curve 2.

FORCED AIR/OIL COOLING: It is possible to draw higher currents from the stacks if extra arrangement of cooling is made either by forced air or by dipping the rectifier in oil. Please refer Curve 3 for re-rating the stack at different air velocities. The rated current can be increased to 3 times when the rectifier is dipped in oil.

CAPACITIVE LOADING: For Capacitive Battery, Motor loading in single phase half wave, centre tap and bridge derate the current by 40%, 20% and 20% respectively. However the current

ratings in three phase circuits remain the same for resistive, inductive, capacitive and motor load.

INTERMITTENT DUTY: IRI Selenium Rectifiers can withstand higher currents if duty cycle is intermittent. Please refer Curve 4 for the purpose.

RECOMMENDATIONS:

1. The stack should be stored in dry and warm place.
2. If the rectifiers are stored for more than 6 months it is recommended that the rated voltage is applied for about one hour before the load is switched on.
3. For application of natural cooling the rectifier stacks must be mounted so that the spindle is in horizontal plane. This will allow the free flow of air through the elements.
4. Stacks should not be mounted one above the other. Where ever it is unavoidable the current rating should be derated to 70%.
5. The stacks with rectangular elements should be mounted so that longer side is horizontal.



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