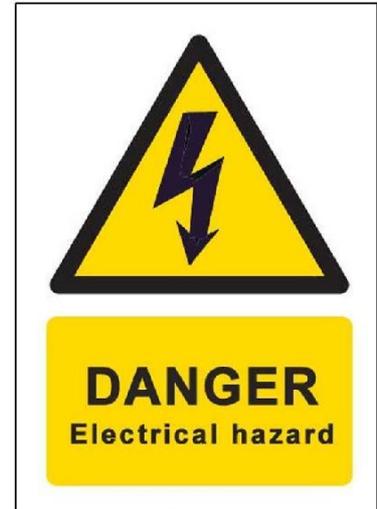


VARIAC - VARIABLE AUTO TRANSFORMERS Product Manual

A variac is a variable auto-transformer. They are used extensively to regulate the voltage for tool testing, laboratories and universities. Variac's usually have a toroidal auto transformer winding and a moving arm that gives the required voltage at different points along the surface of the toroid. The moving arm can either be manual or motorised. Variac's are usually air-cooled or oil cooled. Oil cooled variac's can operate close to their maximum current rating for prolonged periods of time without over-heating.



DANGER:

Risk of electrocution—Live output

Should be used by suitably qualified persons or similar

INSTALLATION PROCEDURE:

HARD WIRED UNITS:

- Unit must be installed in accordance with local wiring rules (like AS3000) by a qualified person.
- The unit should be connected with a ground properly.
- Allow min 100mm clearance on sides if installing into cabinets etc, do not block ventilation holes.
- Output must be fused with appropriate rating fuse (fuse should be the maximum or nominal current rating of the unit, fast or general type fuse). Do not use a delay type fuse. Warranty is voided if damaged by overload and not protected by the correct fuse.

USAGE:

- Units are designed to be used to a **maximum current**, not VA rating, so maximum current rating must not be exceeded at any point of operation.
- The adjustment dial should be varied (increased or decreased) gradually, not fast or in jerky movements, rapid or rough dial movement may damage or break the carbon brush, necessitating replacement.
- This will ensure long life of the variac, and reduce wear on the carbon control brush.
- The unit is designed for regular movement of the adjustment dial, if being used continuously in one output position (no dial movement) the output current rating must be reduced or de-rated approx. 10% as outlined in the specifications.
- The output dial includes a scale of voltage that provides general indication of voltage, it is not precise, for precise measurement, use an appropriate multimeter to measure the output voltage. Alternatively, some models are provided with output voltage and/or current meters for more accurate readings.
- Loads such as LED lights, switch mode power supplies may have a lot of harmonics in them therefore it is recommended to use a Variac that is double the load rating. (E.g. A 9 AMP load requires a 18 AMP Variac)

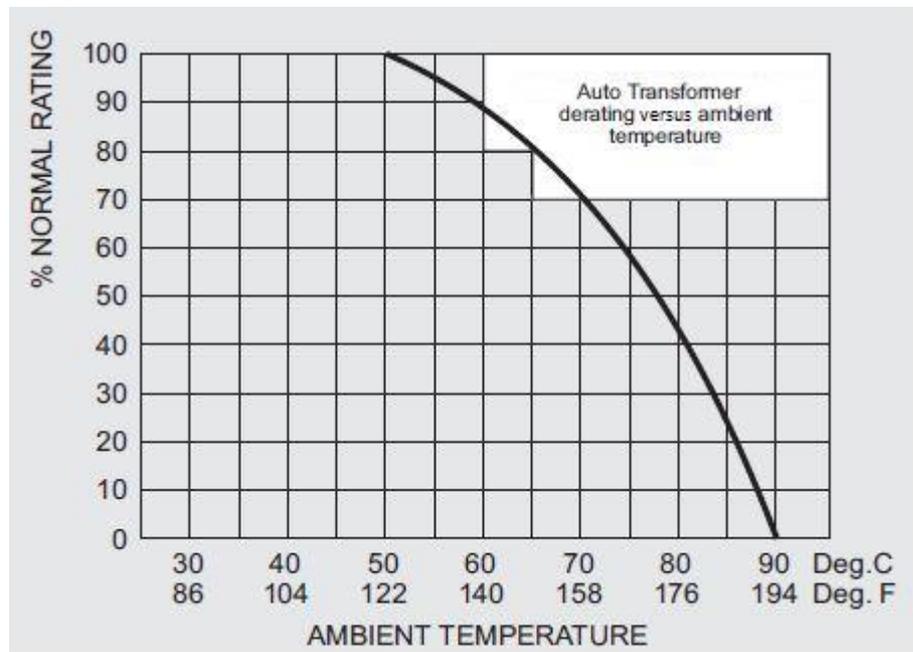
RATING:

Ratings quoted are for use in ambient temperature from -20°C to +50°C.

Current derating figures for temperatures above 50°C are as follows :

55°C	60°C	65°C	70°C
0.98	0.87	0.78	0.68

Generally, when the operation is required in ambient temperatures higher than 50°C output current must be reduced according to the curve shown below:



The current that may be drawn from a transformer through the brush is not constant as in fixed auto wound transformers, but varies according to brush position. At 50% and 110% of the line voltage, winding heat is the current limiting factor. Near zero and line voltage, winding heat is low and brush heat becomes the current limiting factor. Both factors operate at intermediate brush positions. This is common to all continuously variable Transformers. The ratings in terms of "Continuous Currents" "Nominal Currents" etc. should be fully understood for optimum results.

CURRENT RATINGS:

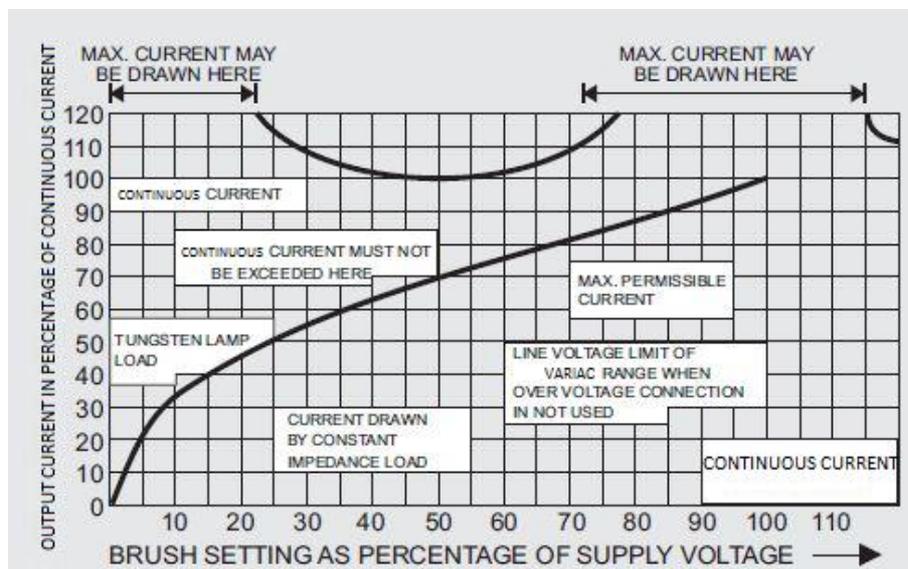
It is general practice to specify the current rating of Variable Transformer by two values, the continuous current and the nominal current. Variacs have two current ratings because in any adjustable auto transformer, heating of the winding varies with the brush setting. To limit these useful devices to the current that can be drawn at any setting (CONTINUOUS CURRENT) places an undue restriction on the capabilities. Most load (possible exceptions are some kind of motors and incandescent lamp loads) which draw NOMINAL CURRENT at line voltage may be safely regulated from zero to line voltage without danger of overload. This NOMINAL CURRENT is generally 20 to 30 percent above the CONTINUOUS CURRENT and this concept may be safely used to fill up the gap in the capacities of the CONTINUOUS CURRENT of the various models available.

CONTINUOUS CURRENT :

The continuous current can be drawn at any brush setting. When the over-voltage connection is used, the load should not be drawn more than continuous current.

NOMINAL CURRENT:

May only be drawn near zero or near maximum output voltage when the transformer is line connected, i.e. when connected for an output voltage range of zero to line voltage. See Current Rating Curves.



The Nominal Current can only be drawn in line-voltage connection with the listed (or lower) input voltage across the whole winding (e.g. 240 volts on a 240/270 volt unit), and can only be drawn near zero or at or near full output voltage. A load having linear voltage/current load, line (constant impedance load drawing nominal current at the line voltage can be controlled from zero to line voltage. The knowledge of the nominal current and the continuous current for the particular end application can be useful for filling in the capacity gap for the Variacs in that range and thus intermediate current requirements can at time be met from the particular rating valued Variacs.

OVER VOLTAGE CONNECTIONS:

A transformer connected for over voltage provides an output of 12 % above the supply voltage on load. Most models have terminations for line voltage or over voltage connection, at the option of the user. Rated' current only may be drawn when over voltage connected.

OVERLOAD PROTECTION:

Although our Variacs are designed for arduous industrial use, damage will occur if they are subjected to short circuit or continuous severe overload.

It is therefore recommended that protective devices be fitted such as a circuit breaker in the input circuit & and H.R.C. (High Rupture Capacity) fuse in the load circuit. It is normal practice to provide a protective device in the input circuit.

Improved core materials, permitting higher flux densities than was possible in the past, allow high inrush transient surges of up to 10 times the rated current to occur at switch on. This is not harmful except H.R.C. fuses or protective devices of instantaneous operation. It is therefore recommended that input protection Variacs is obtained by employing slow blow fuses or circuit breakers with slight operating delay. Input protective devices should be capable of handling 1000% overload for one cycle of the supply frequency.

It is not always appreciated that a variable transformer with an input voltage of 250 V and delivering say 10 amps to a load at 50 V (0.5 KVA), will draw a

current of only 2 amps from the supply mains. In this instance, a 10 amp. Fuse laced in the input circuit would not rupture until the load current reached 50 amps. It is obvious, therefore that input protective device afford little protection to the transformer against overloads at low output voltage. The solution is, of course, to fuse the load circuit with an H.R.C. fuse link.

MAINTENANCE:

- No regular user maintenance is required on internal parts.
- Keep unit clean by wiping with dry or damp cloth periodically.
- After many hours of use the carbon brush may wear, a spare replacement carbon brush is included inside the unit on the moving arm, or in front of the terminal plate.

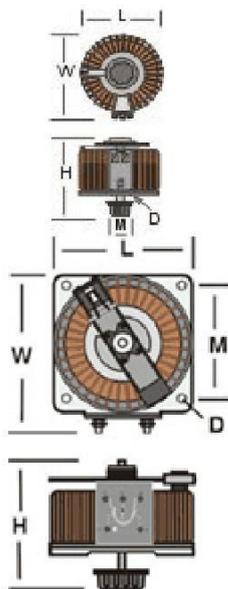
1 PHASE VARIAC

Open Back/Panel Mount

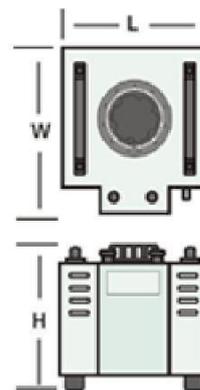
Input 230/240 Volts 50 Hz

Output 0 - 260/270 Volts

Nom. Amps	Cont. Amps	H	W	L	M	D	Wt
1	1	100	98	84	28	5	1.6
2	1.9	132	127	117	92	6.5	3.3
4	3.9	155	190	175	146	10.2	6.0
8	7	175	190	175	146	10.2	8.5
10	9	175	210	192	154	10.2	10
15	12	190	240	220	176	10.2	14
20	17	215	290	250	204	14	19
28	23	215	345	295	238	14	25



OPEN BACK/PANEL MOUNT VARIAC



PORTABLE VARIAC

Portable/Enclosed

Input 230/240 Volts 50 Hz

Output 0 - 260/270 Volts

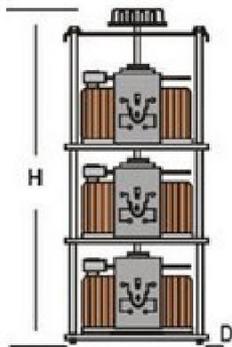
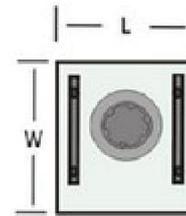
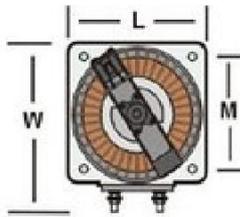
Nom. Amps	Cont. Amps	H	W	L	Wt
2	1.9	155	155	145	4.5
4	3.9	180	220	175	9
8	7	218	220	185	12
10	9	205	235	205	13
15	12	230	265	240	18
20	17	265	325	270	22
28	23	265	380	315	31
84	63	670	440	360	98

See separate oil cooled specs for larger capacity

All dimensions [mm] & weights [Kg] are approx. only

3 PHASE VARIAC

Open Back/Panel Mount							
Input 400/415 Volts 50 Hz							
Output 0 - 450/470 Volts							
Nom. Amps	Cont. Amps	H	W	L	M	D	Wt
2	1.9	400	127	117	92	6	11
4	3.9	480	190	175	146	10	20
8	7	520	190	175	146	10	27
10	9	520	210	192	154	10	32
15	12	535	240	220	176	10	44
20	17	675	290	250	204	12	58
28	23	675	345	295	238	12	80

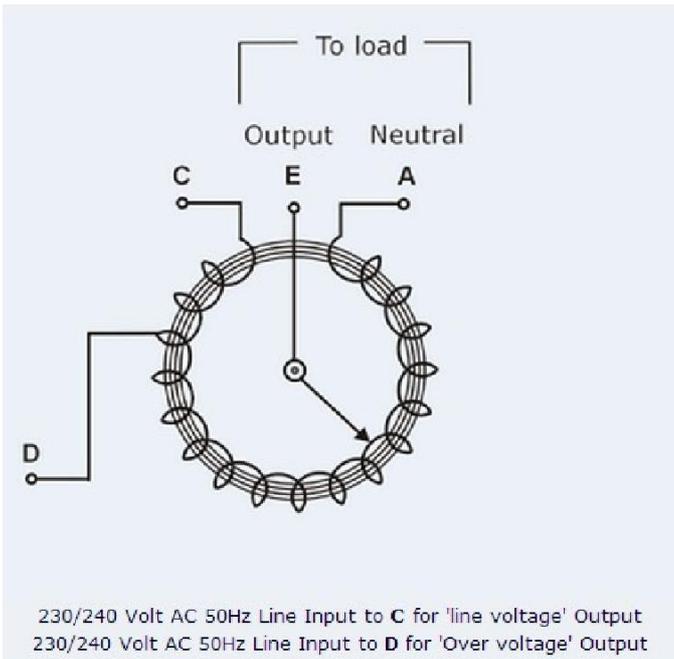


OPEN BACK/PANEL MOUNT 3 PHASE VARIAC

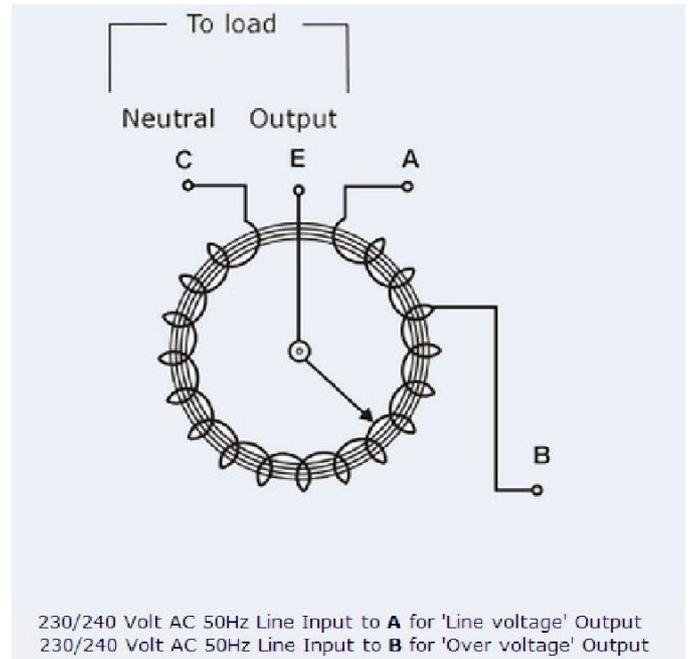
PORTABLE 3 PHASE VARIAC

Portable/Enclosed						
Input 400/415 Volts 50 Hz						
Output 0 - 450/470 Volts						
Nom. Amps	Cont. Amps	H	W	L	Wt	
2	1.9	410	165	145	14	
4	3.9	510	250	200	26	
8	7	550	250	200	33	
10	9	550	280	225	40	
15	12	555	310	245	53	
20	17	670	405	320	73	
28	23	670	440	360	95	
See separate oil cooled specs for larger capacity						
All dimensions [mm] & weights [Kg] are approx. only						

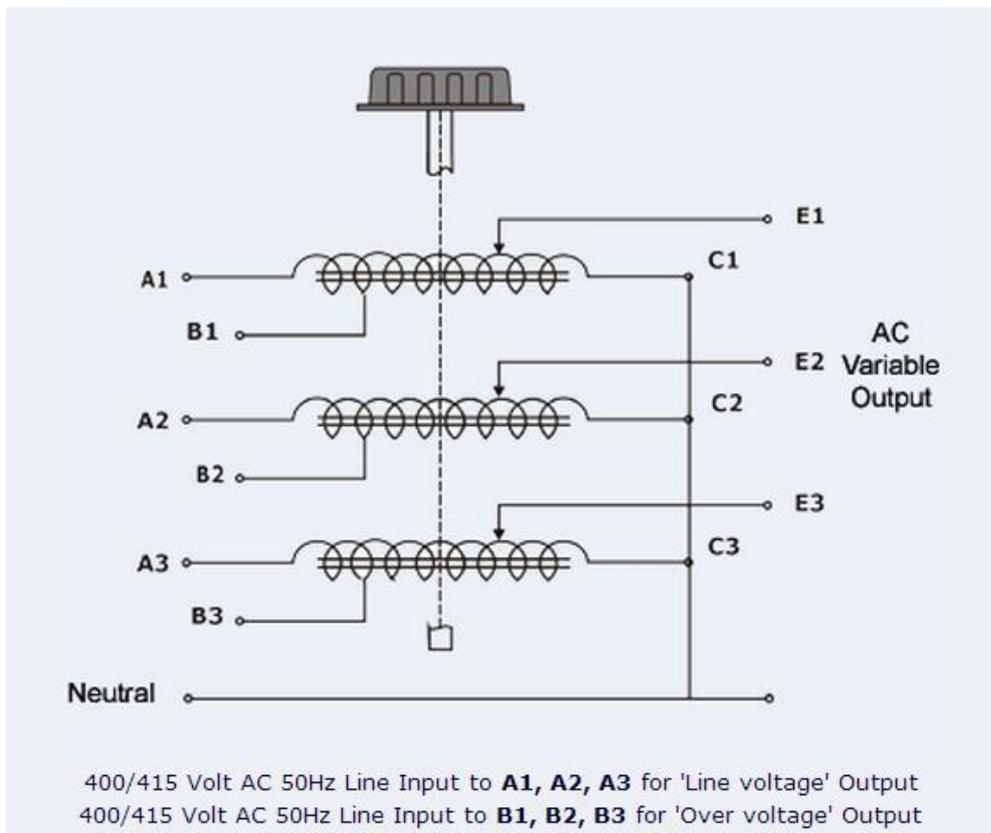
VARIAC—CIRCUIT DIAGRAM



1 PHASE OPEN BACK VARIAC



1 PHASE PORTABLE VARIAC



3 PHASE VARIAC