Metered variable autotransformers

All covered and portable models are available with voltmeter, ammeter and wattmeter.
The suffixes for meter identification are:
V = Voltmeter; A = Ammeter; W = Wattmeter

Isolated variable autotransformers

In addition to the complete line of standard products illustrated and described in this catalog, Variatori" manufactures a variety of special variable autotransformers.
Typical example is the apparatus showed in Fig. 37: the variable autotransformer have a separate transformer with primary winding which is electrically isolated from the secondary or output winding.
There is no common connection between the input and output of the transformer.

Fig. 35 - *Three phase variable autotransformer type T70NC/V*

Fig. 36 - *Three-phase variable autotransformer type T 40 NC/V - A 12 KVA. with voltmeter and three ammeters.*

Fig. 37 - *Single-phase variable autotransformer type V 20 NC/V - A - INS 2 KVA. including a isolated transformer.*

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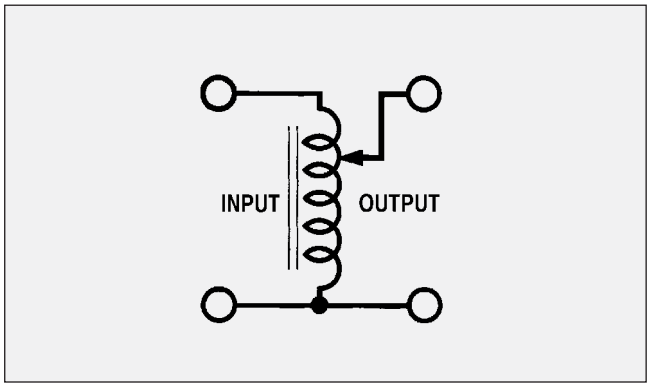

Fig. 38 - *Line-voltage connection*

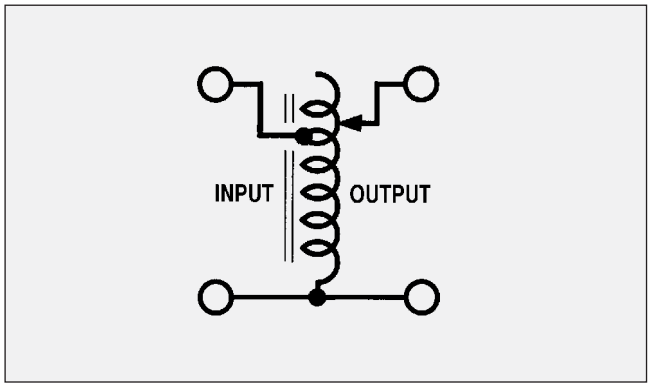

Fig. 39 - *Over-voltage connection*

Basic single-phase connection *(Fig. 38)*

The input is applied across the whole winding and the output voltage is variable from zero up to the input voltage (e.g. 0-220 V output from a 220 V supply).

Over voltage connection *(Fig. 39)*

The input is applied across less than the whole winding by means of the tapping provided, and the output voltage is variable from zero to above input voltage (e.g. 0-280 V output from 0-220 V supply).

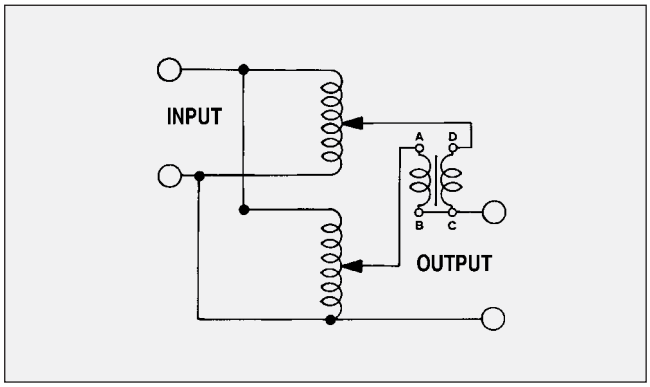

Fig. 40 - *Two-gang parallel-connected assembly*

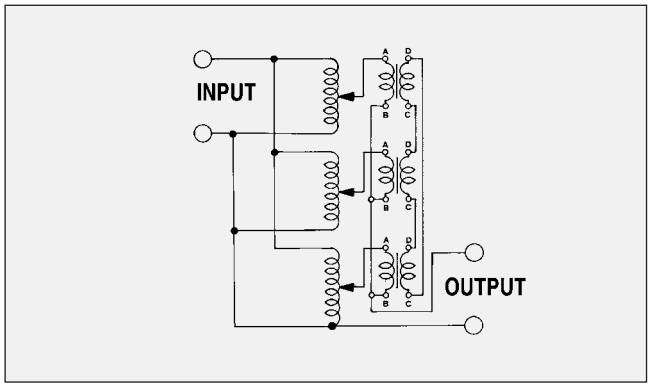

Fig. 41 - *Three-gang parallel-connected assembly*

Parallel connection *(Fig. 40 and Fig. 41)*

Two, three or more identical CEA variable autotransformers may be ganged in parallel to supply a single-phase load greater than a single unit can accomodate. Chokes are included to ensure the total current is divided equally between all parallel decks.

The output current from two units in parallel is twice that of a single unit; for three units in parallel is three times that of a single unit, etc. The voltage rating remains that of a single unit.

Parallel operation is only suitable for the larger models since, in the case of smaller models, it is more economical to use the next larger single unit.

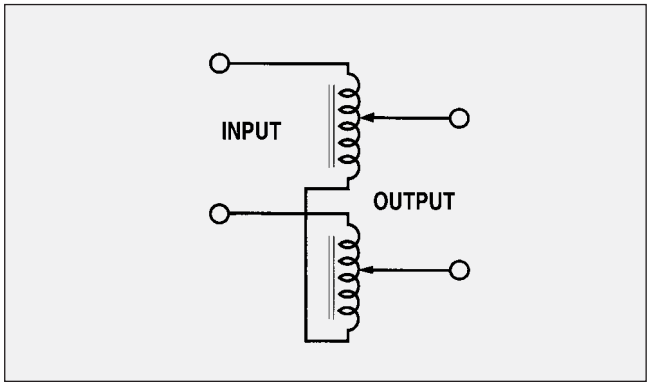

Fig. 42- *Two-ganged series-connected assembly*

Series connection *(Fig. 42)*

Two identical CEA variable autotransformers may be ganged in series for operation at up to twice the input voltage of a single unit. The current rating remains that of a single unit. It is important to note that the load cannot be earthed, or commoned to the input neutral, in the circuit of Fig. 42. When it is necessary to earth the load, an isolating transformer must be included.

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Three-phase — star connection *(Fig. 43)*

The most commonly used three-phase circuit is the star connection of a three-gang assembly, in which the line-to-neutral voltage (phase voltage) is applied across each variable autotransformer unit. 240 volt models are used on 415/240 volt supplies, and 120 volt models on 208/210 volt supplies, in either line-voltage or over-voltage connection. Note that the star point must always be connected as shown; otherwise an excessive voltage could be applied to one variable autotransformer.

For increased power rating in the largest models (series T 70 NA/6) a six-gang star-parallel assembly can be used, having a parallel-connected pair of autotransformers on each of the three phases.

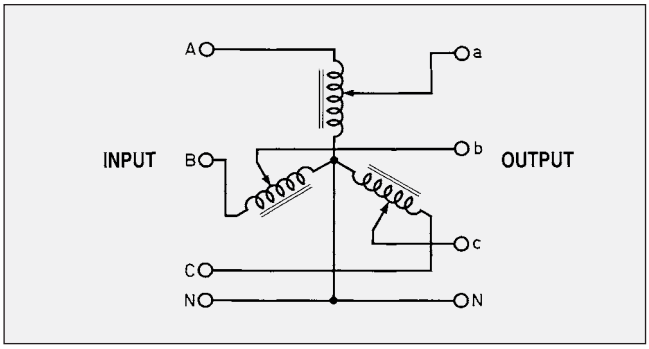

Fig. 43 - *Three-gang star connection*

Variable autotransformer with auxiliary transformers

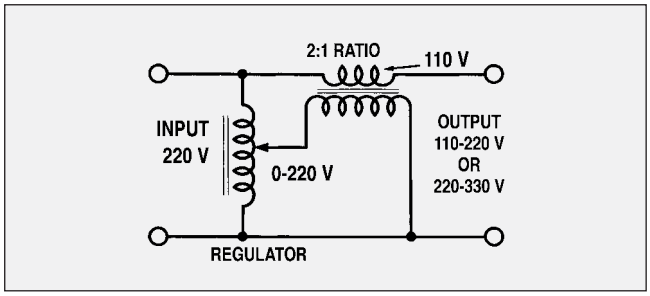

Fig. 44 - *Buck or boost circuit*

Buck or boost circuit *(Fig. 44)*

For limited-range variation in one direction from supply voltage, boosting of low mains, etc.

The output of the voltage regulator feeds the primary of the step-down transformer, the secondary of which is connected in series with the supply. According to the way the fixed transformer is connected, this gives limited-range variation from supply voltage upwards (boost) or downwards (buck). The range of voltage variation is the regulator's output range divided by the ratio of the fixed transformer, and the output current available is the regulator's current rating multiplied by that ratio.

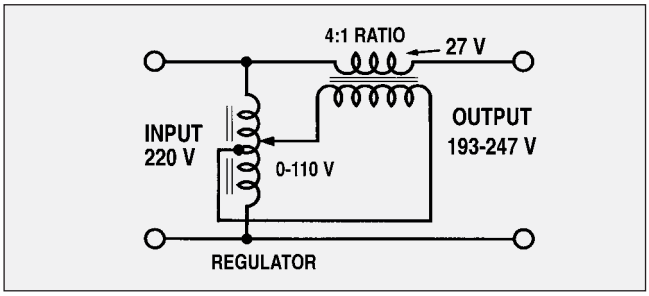

Fig. 45 - *Buck-and-boost circuit*

Buck-and-boost circuit *(Fig. 45)*

For limited-range voltage adjustment both above and below supply voltage, i.e., for under-and over-voltage testing, stabilisation of varying mains voltages, etc.

The primary of the fixed transformer is connected between the brush and a tapping on the regulator winding. The tap position is determined by the relative amounts of buck and boost required. In the example shown, a centre-tapped regulator and 4 : 1 fixed transformer provide a total variation of 25% of supply voltage, with equal swings above and below. The output current available is four times the regulator rating.

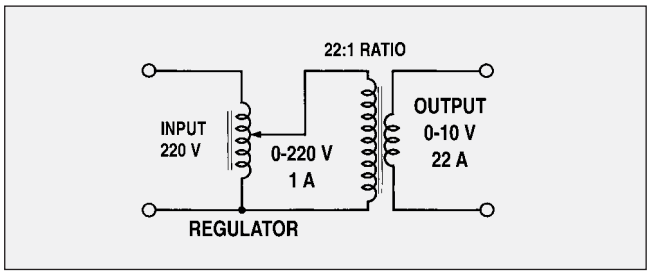

Fig. 46 - *Variable low-voltage output*

Variable low-voltage output *(Fig. 46)*

In the example shown, 1 ampere, 220 V regulator is used with a 22 : 1 step-down transformer to provide a variable output of 0-10 volts at 22 ampere rated current. The larger units or ganged assemblies can be used in this way to provide low-voltage output at very high current. In both the circuits of Figs. 46 and 47 fixed autotransformers may often be used instead of the double-wound transformers shown where isolation is unnecessary. This is more economical where the transformation ratio is not high. (Up to 2 : 1 typically).

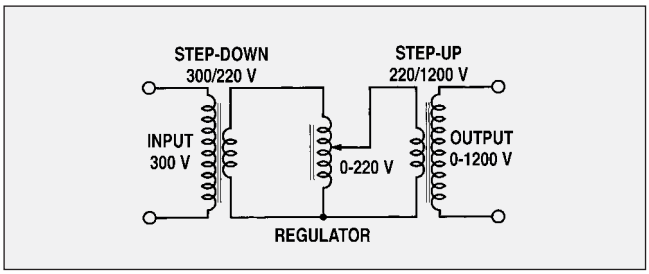

Fig. 47 - *Supply and load voltages beyond regulator range*

Supply and load voltages beyond regulator range *(Fig. 47)*

In the example shown, the regulator is preceded by a step-down transformer and followed by a step-up transformer to obtain a variable output of 0-1200 volts from a 300 volt supply.

This arrangement can be used for voltages either above or substantially below the rated input voltage. Of course, if either the supply voltage or the required output voltage is within the ratings of the variable autotransformer, only one auxiliary transformer is required.