Remote voltage program board 0-10 Vd.c.

This option provides control voltage by an electronic board having an input signal from a PLC 0-10 Vdc and supplying an output signal (go-stop) to a gear motor of variac.

As input signal changes from zero up to 10V output voltage, i.e. voltage supplied by variac changes from zero to maximum rated voltage.
Output voltage is directly proportional to output signal, i.e. if signal is 5 V output voltage will be just half of maximum voltage. Output voltage can be controlled also by a potentiometer (remote control).

Rating and distinctives features

- Suitable for motor 24 Vdc
- Input control voltage 0-10 Vdc
- Supply voltage 220 Va.c.
- Regulation directly proportional
- Output voltage stability ±1% (Whether for load change 0-100% or supply mains change ±10%)

STANDARD KIT CODE NR. RVP 570

- *Electronic printed board with*
  Supply mains 220/24 Vdc Input/output terminal board
  All components secured to aluminium plate of variac.

Fig. 28 - *Single phase V70NA/M Motor Driven Autotransformer with voltage program board 0-10 Vdc*

Fig. 29 - *Three phase T20NA/M Motor Driven Autotransformer with voltage program board 0-10 Vdc*

Motor driven variable autotransformers (dimensions and weights)

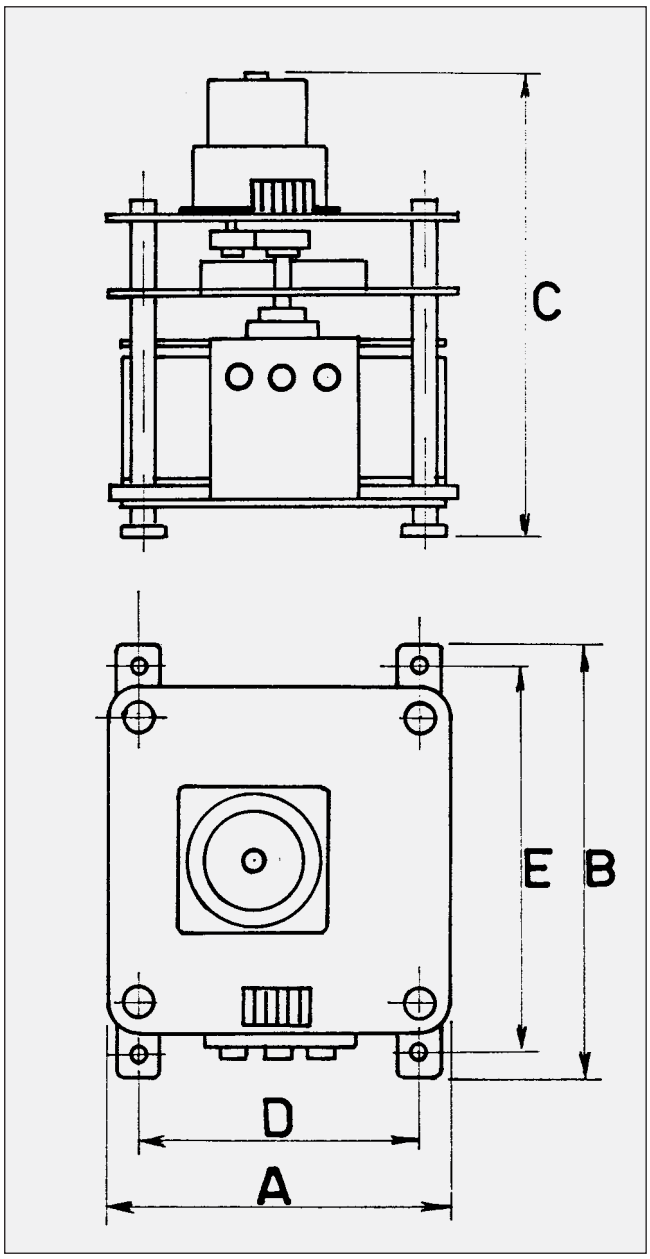

Fig. 30

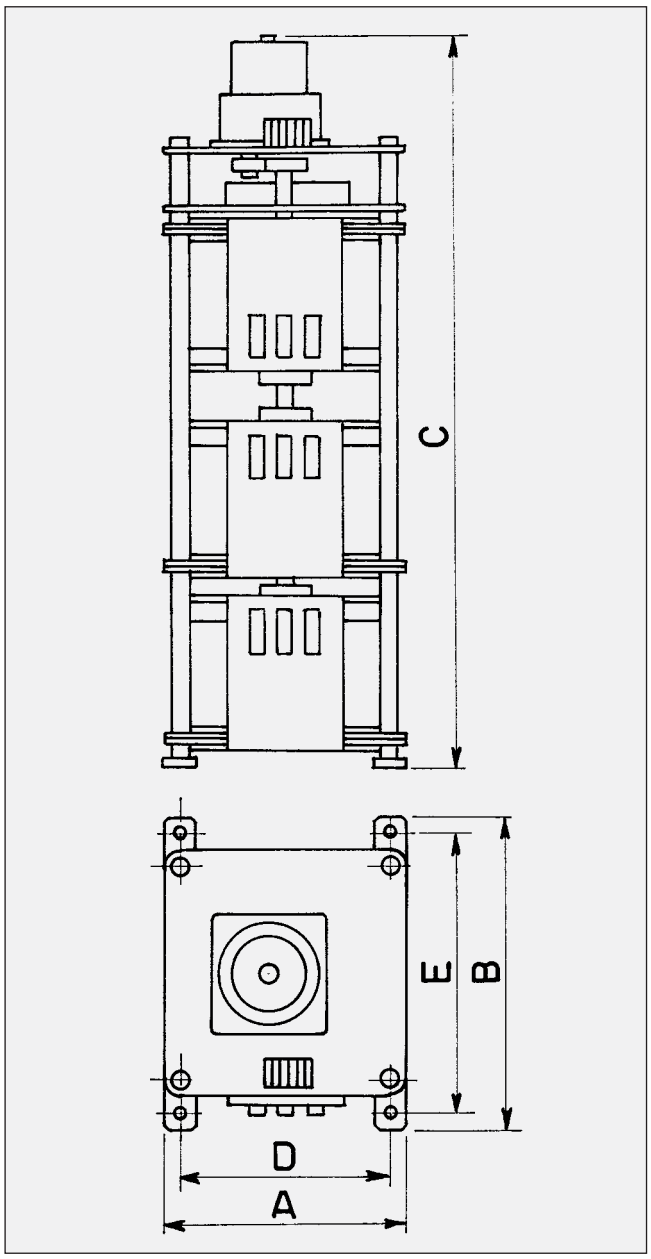

Fig. 31

Single phase

Type	Dimensions mm					Weight Kg
	A	B	C	D	E	
V 3 NA - M	160	180	260	85	160	5,8
V 5 NA - M	160	180	270	100	160	7
V 10 NA - M	160	210	300	133	186	11
V 20 NA - M	200	250	300	158	226	17
V 40 NA - M	230	280	300	188	256	23
V 70 NA - M	330	380	320	273	356	40

Three phase

Type	Dimensions mm					Weight Kg
	A	B	C	D	E	
T 3 NA/3 - M	160	180	500	85	160	12
T 5 NA/3 - M	160	180	530	100	160	16
T 10 NA/3 - M	160	210	570	133	186	27
T 20 NA/3 - M	200	250	605	158	226	44
T 40 NA/3 - M	230	280	620	188	256	56
T 70 NA/3 - M	330	380	730	273	356	114

Voltage Regulators for Higher Power ratings

SINGLE PHASE REGULATORS

Power ratings	Input voltage	Output voltage	Rated current	UNCOVERED MODELS			COVERED MODELS			UNCOVERED MOTOR DRIVEN MODELS (1)		
KVA	V	V	A	Type	Dimensions mm.	Weight Kg.	Type	Dimensions mm.	Weight Kg.	Type	Dimensions mm.	Weight Kg.
14	220	0-220	64	V 70 NA/2	330x550x320	75	V 70 NC/2	600x600x700	80	V 70 NA/2M	330x550x490	80
21	220	0-220	96	V 70 NA/3	330x550x490	110	V 70 NC/3	600x600x700	125	V 70 NA/3M	330x550x730	115
28	220	0-220	128	V 70 NA/4	330x550x650	145	V 70 NC/4	600x600x900	160	V 70 NA/4M	330x550x950	150
35	220	0-220	160	V 70 NA/5	330x550x820	180	V 70 NC/5	600x600x1200	250	V 70 NA/5M	330x550x1150	185
42	220	0-220	192	V 70 NA/6	330x550x980	215	V 70 NC/6	600x600x1200	285	V 70 NA/6M	330x550x1300	225
48	220	0-220	216	V70 NA/6 spec.	330x550x980	220	V70 NC/6 spec.	600x6000x1200	290	V70 NA/6M spec.	330x550x1300	230

THREE PHASE REGULATORS

Power ratings	Input voltage	Output voltage	Rated current	UNCOVERED MODELS			UNCOVERED MOTOR DRIVEN MODELS (2)			COVERED MOTOR DRIVEN MODELS		
KVA	V	V	A	Type	Dimensions mm.	Weight Kg.	Type	Dimensions mm.	Weight Kg.	Type	Dimensions mm.	Weight Kg.
42	380	0-380	64	T 70 NA/6	330x550x980	215	T 70 NA/6-M	330x550x1200	230	T 70 NC/6-M	600x600x1600	300
63	380	0-380	96	T 70 NA/9	330x550x1450	335	T 70 NA/9M	350x550x1600	350	T 70 NC/9M	600x600x1900	420
84	380	0-380	128	T 70 NA/12-3	1220x550x850	520	T 70 NA/12M-3	1220x550x1150	550	T 70 NC/12M-3	1560x640x1800	630
105	380	0-380	160	T 70 NA/15-3	1220x550x1000	630	T 70 NA/15M-3	1220x550x1300	660	T 70 NC/15M-3	1560x640x2000	780
126	380	0-380	192	T 70 NA/18-3	1220x550x1150	750	T 70 NA/18M-3	1220x550x1450	800	T 70 NC/18M-3	1560x640x2000	900

(1) On request covered model (type V 70 NC/2M ...)
(2) " " " " (type T 70 NC/6M....)

Special voltage and power ratings on request

Fig. 32 - *Three-phase variable autotransformer power 42 KVA enclosed construction T 70 NC/6*

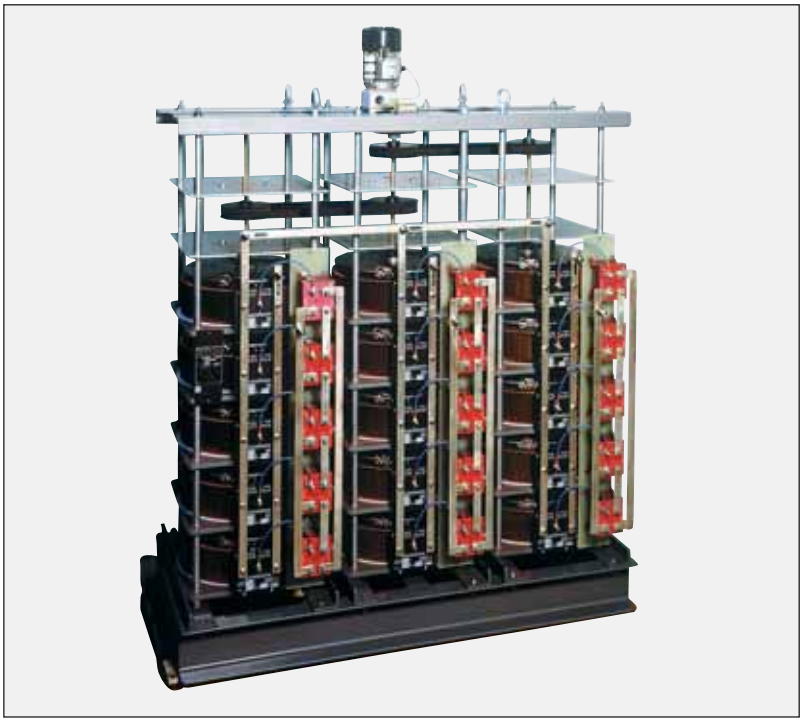

Fig. 33 - *Motor-driven three phase variable autotransformer power 105 KVA T 70 NA/15 M-3*

Fig. 34 - *Motor driven three phase variable autotransformer power 63 KVA T 70 NA/9M*

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, “Belotti 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.*

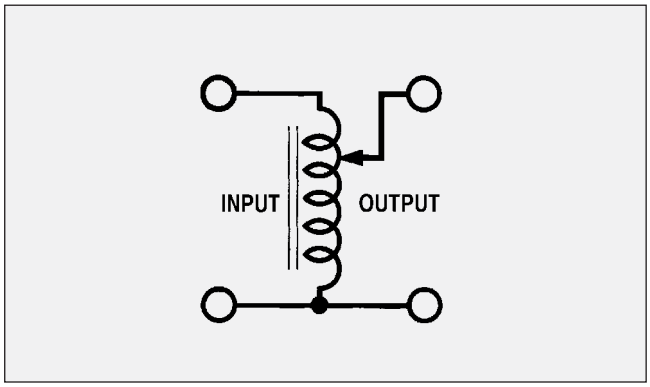

Fig. 38 - *Line-voltage connection*

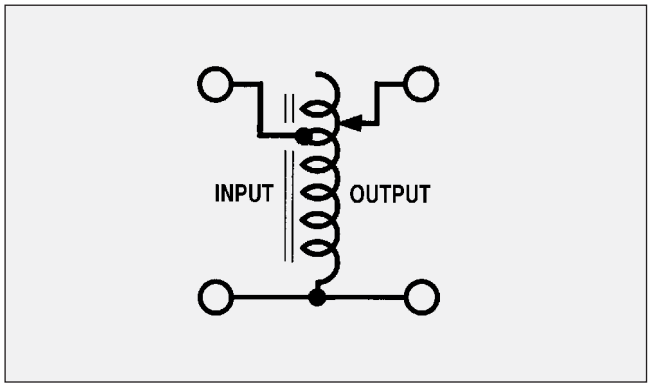

Fig. 39 - *Over-voltage connection*

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).

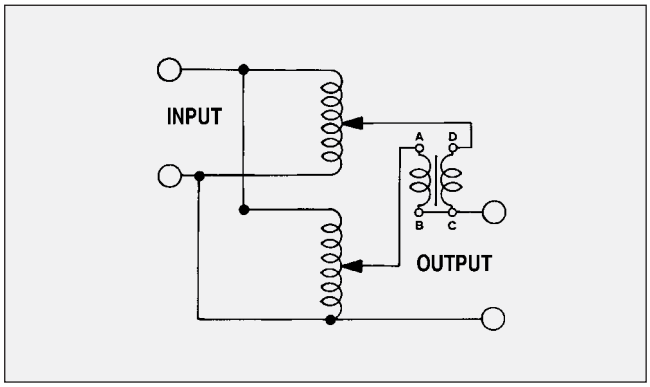

Fig. 40 - *Two-gang parallel-connected assembly*

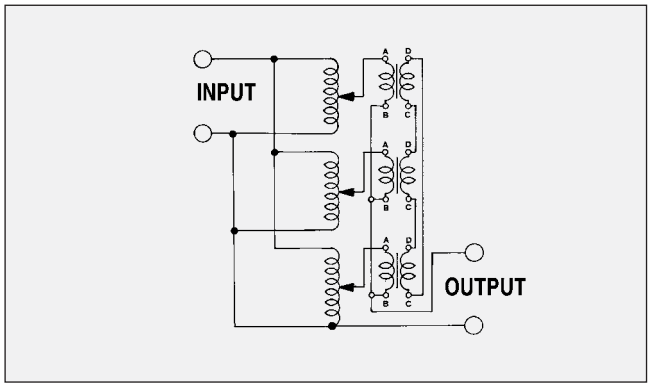

Fig. 41 - *Three-gang parallel-connected assembly*

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

Two, three or more identical 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.

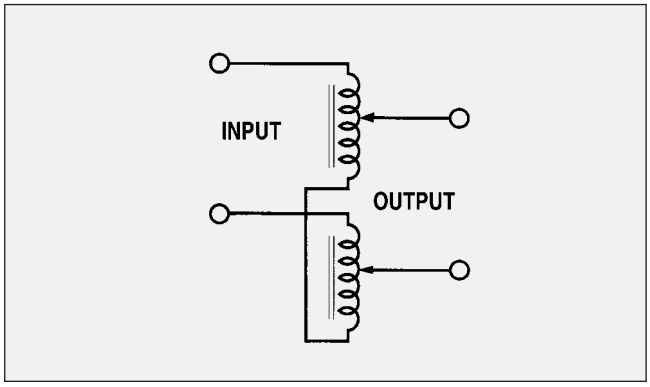

Fig. 42- *Two-ganged series-connected assembly*

Series connection *(Fig. 42)*

Two identical 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.

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.

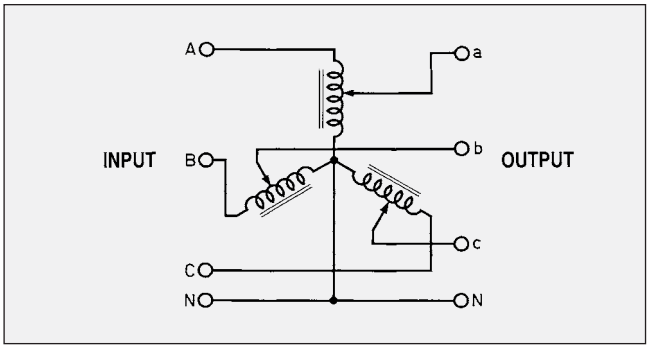

Fig. 43 - *Three-gang star connection*

Variable autotransformer with auxiliary transformers

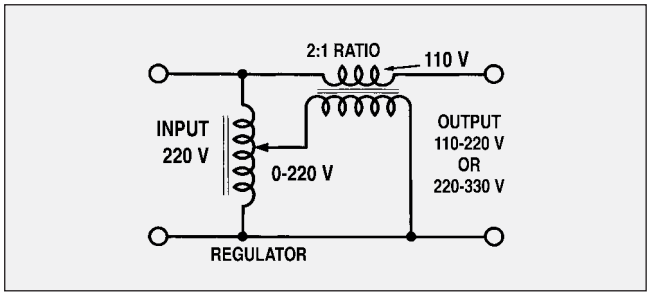

Fig. 44 - *Buck or boost circuit*

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.

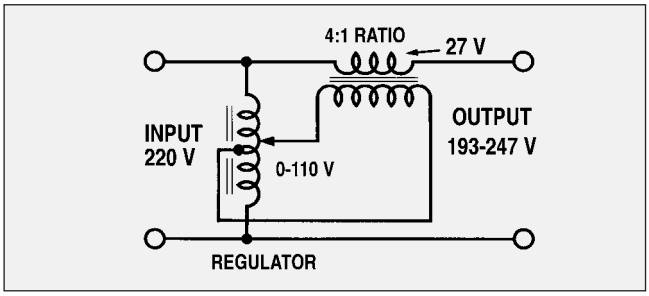

Fig. 45 - *Buck-and-boost circuit*

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.

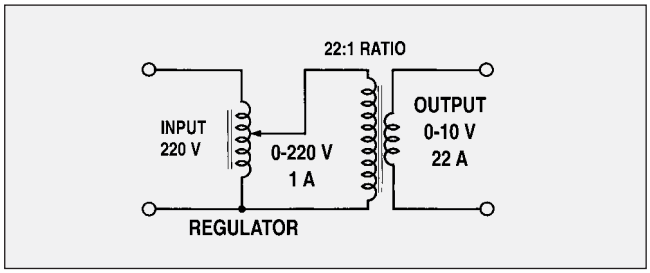

Fig. 46 - *Variable low-voltage output*

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).

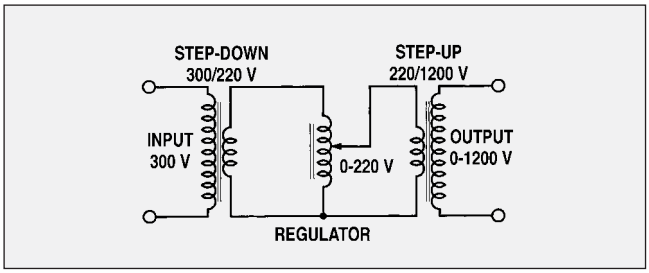

Fig. 47 - *Supply and load voltages beyond regulator range*

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.

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