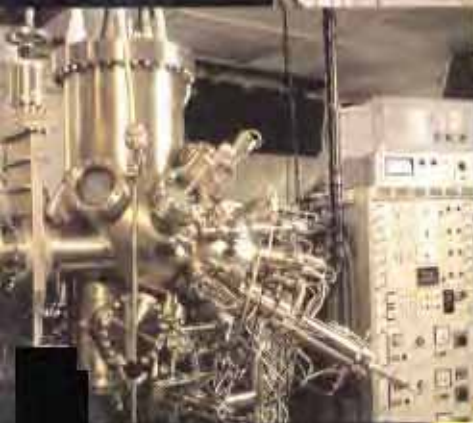


**STACO  
ENERGY<sup>®</sup>**  
**PRODUCTS CO.**

*Your Tailored Power Solutions Provider™*

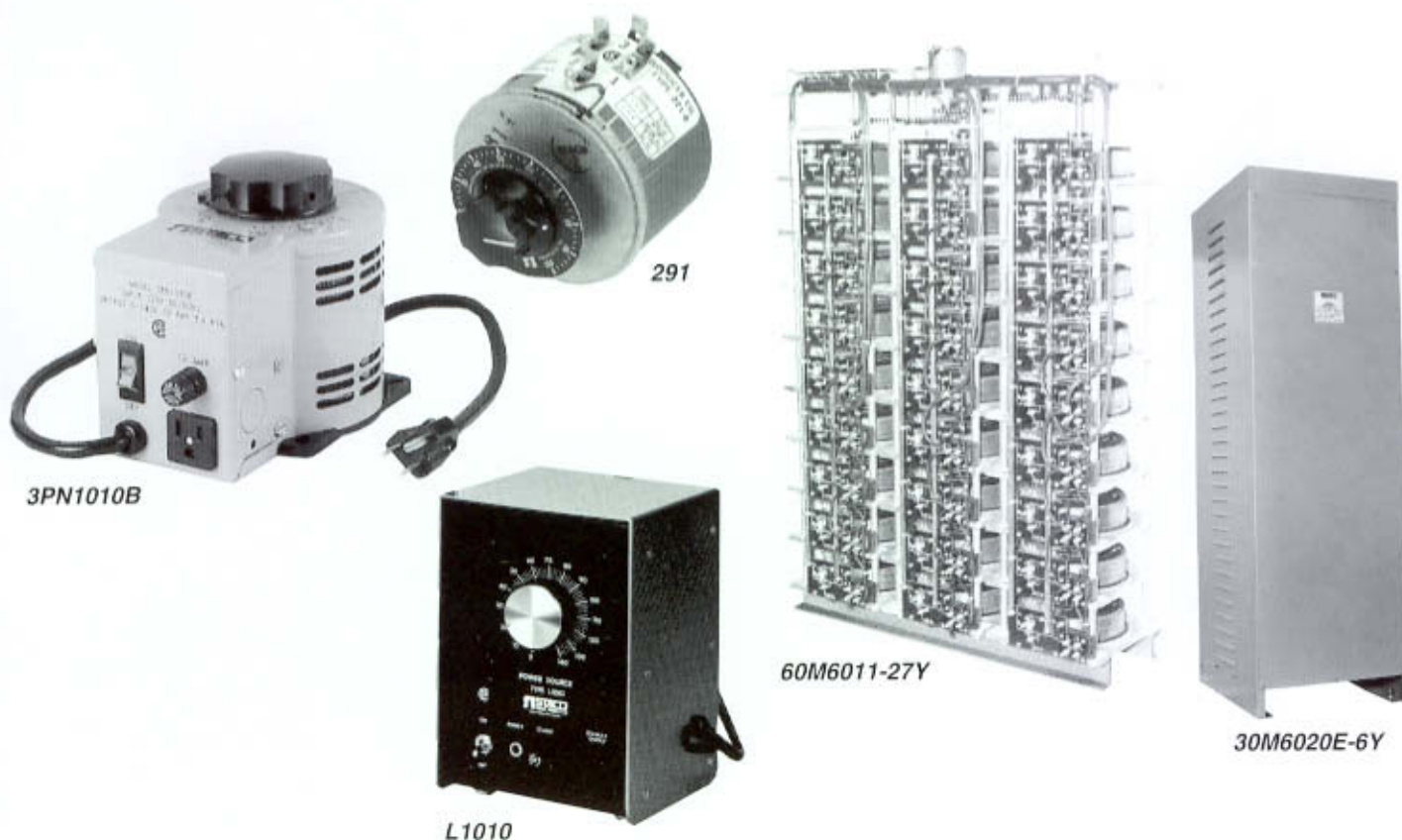
# Variable Transformer Voltage Controls

0.24 to 1500 kVA



# Table of Contents

|                                                    |    |
|----------------------------------------------------|----|
| Introduction and How to Specify and Order .....    | 1  |
| Product Design and Engineering Data .....          | 2  |
| Schematics and Wiring Diagrams .....               | 8  |
| Product Sections by Series .....                   |    |
| 100/200 Series .....                               | 10 |
| 500 Series .....                                   | 12 |
| 1000/1200 Series .....                             | 14 |
| 1500 Series .....                                  | 18 |
| 2500 Series .....                                  | 20 |
| 5000 Series .....                                  | 22 |
| 6000 Series .....                                  | 30 |
| Isolated Series .....                              | 35 |
| Enclosed Cord and Plug .....                       |    |
| 3PN Series .....                                   | 36 |
| L Series .....                                     | 37 |
| Variable Transformer Controllers .....             |    |
| FRC-20 Full Range Controller .....                 | 38 |
| Type MP Microprocessor Controller .....            | 39 |
| "Quick Step" Motorized Variable Transformers ..... | 40 |
| Paralleling Chokes .....                           | 40 |
| <b>Product Quick Selector</b> .....                | 41 |



# Introduction

STACO Energy Products Co. has been a leading manufacturer of Variable Transformers for over 60 years, building standard as well as custom-designed products for industrial, commercial, and military applications.

STACO's complete line of variable transformers and AC voltage controls are available from a nationwide network of industrial and scientific distributors. Local STACO distributors and representatives have factory trained personnel capable of assisting you in selecting the transformer best suited for your application. Contact our customer service department for the name of the distributor or representative near you.

If our standard products do not meet your specific requirements, contact us at STACO. Our engineering staff is available to solve your special application requirements. Often, it

just requires minor revisions to standard components, enabling STACO to keep your costs to a minimum.

## How to Order and Specify

Selecting the STACO Variable Transformer best suited for your specific requirements is easy once you make the following basic determinations:

**Input** — Line voltage? Single or three phase? Frequency?

**Output** — Voltage? Amperage? KVA?

To assist you in making the proper selection, an explanation of STACO's standard numbering system is described below. The Product Quick Selector, a tabular listing by rating for each product, starts on page 41.

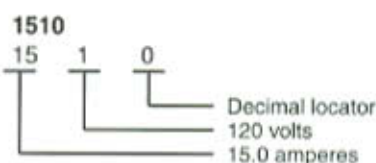
## STACO Numbering System

The basic single units (open construction) are identified by 3 or 4 digits, i.e., 501-B, 1010B, 5021, etc. The first two digits designate current; the third, voltage; the fourth is simply a decimal locator.

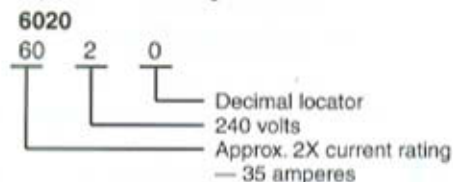
1. In a 3 digit number, the first digit indicates amperes; the second indicates the additional fraction of amperes, the third indicates voltage.



2. In a 4 digit number where the third digit is 1, the first two digits indicate amperes, the third designates 120 volts.



3. In a 4 digit number where the third digit is 2, the first two digits are twice (approximately) the amperes, the third designates 240 volts.

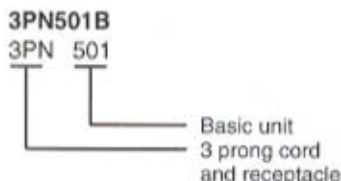


## Prefixes & Suffixes

STACO Variable Transformers are available in many different configurations. These other models can be identified by adding the following prefixes or suffixes to the basic 3 or 4 digit numbers.

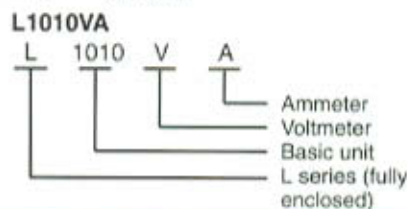
### Prefixes

|     |                                          |                             |
|-----|------------------------------------------|-----------------------------|
| 5M  | } "5," etc. — speed in seconds of travel |                             |
| 15M |                                          |                             |
| 30M |                                          | M — motorized               |
| 60M |                                          |                             |
| 3PN |                                          | 3 prong cord and receptacle |
| J   |                                          | Isolated unit               |
| L   |                                          | L series (fully enclosed)   |



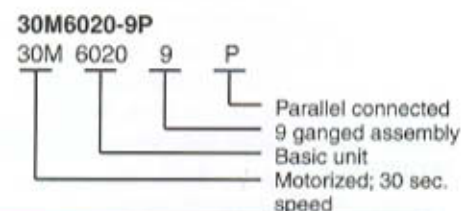
### Suffixes

|          |                                |
|----------|--------------------------------|
| — 2 thru | Ganged units "2," 2 gang, etc. |
| — 27     |                                |
| — A      | Ammeter                        |
| — C      | Cased                          |
| — D      | Delta connected                |
| — E      | Nema 1 drip-proof enclosure    |
| — G      | Military                       |
| — H      | 400 Hertz                      |
| — K      | Less knob                      |



### Suffixes continued

|      |                            |
|------|----------------------------|
| — N  | Less dial                  |
| — P  | Parallel connected         |
| — PS | Parallel series, connected |
| — S  | Series connected           |
| — T  | Terminal box               |
| — V  | Voltmeter                  |
| — W  | Wattmeter                  |
| — Y  | Wye connected              |



## 120 Volt Series Unit Ratings

| SERIES | MAX. CONSTANT CURRENT | AMPERES* CONSTANT IMPEDANCE |
|--------|-----------------------|-----------------------------|
| 171    | 1.75                  | 2.2                         |
| 201    | 2.0                   | 2.5                         |
| 221-B  | 2.5                   | 3.2                         |
| 291    | 3.0                   | 3.5                         |
| 501-B  | 5.0                   | 7.0                         |
| 1010B  | 10.0                  | 13.0                        |
| 1210B  | 12.0                  | 15.0                        |
| 1510   | 15.0                  | 20.0                        |
| 2510   | 25.0                  | 30.0                        |
| 5011   | 50.0                  | —                           |
| 6011   | 60.0                  | —                           |

## 240 Volt Series Unit Ratings

| SERIES | MAX. CONSTANT CURRENT | AMPERES* CONSTANT IMPEDANCE |
|--------|-----------------------|-----------------------------|
| 252    | 0.8                   | 1.0                         |
| 1020B  | 3.5                   | 5.0                         |
| 1220B  | 5.0                   | 7.0                         |
| 1520   | 9.5                   | 12.0                        |
| 2520   | 10.0                  | 13.0                        |
| 5021   | 28.0                  | —                           |
| 6020   | 35.0                  | —                           |

\* Nominal ratings. Consult each catalog Series for detailed specifications.

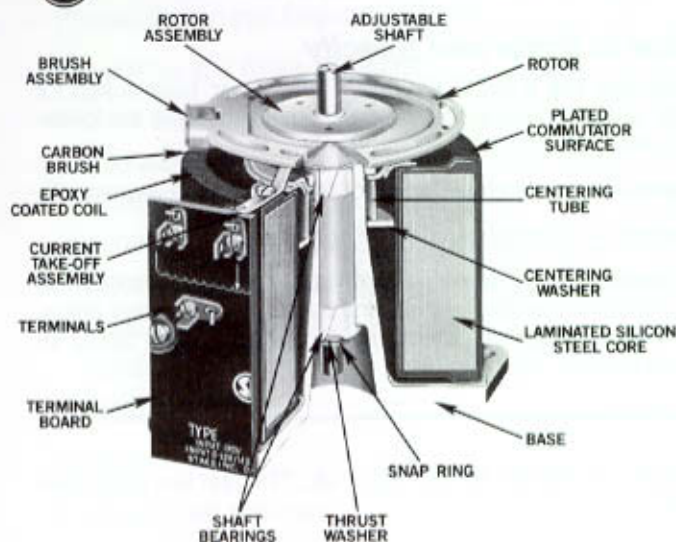
## Dimensions

Dimensions are provided throughout this catalog in inches [millimeters].

\* Nominal ratings. Consult each catalog Series for detailed specifications.



Listed by the Canadian Standards Association  
File No. LR18948



*Type 1010B Cutaway*

## General Information

STACO ENERGY PRODUCTS CO. is a leading manufacturer of variable transformers, the most versatile and reliable voltage controls available. Variable transformers have many industrial and laboratory applications as basic components to control voltage, current, power, heat, speed, light, and electromechanical force.

A basic STACO Variable Transformer consists of a single layer, magnet wire, winding on a toroidal core of laminated silicon steel. A carbon brush, connected to an output lead, is rotated over a precision ground, plated commutator track to tap off voltage at any turn from zero to the maximum output voltage of the winding.

STACO research has developed design features and proprietary processes providing longer lasting, more reliable products. Particularly important is the high-temperature foundation material bonding the coil securely to the core assembly. This material, which has a high thermal transfer characteristic, dissipates heat from the brush contact area, increases the heat-distribution of the core itself and provides the transformer with greater tolerance to transients and short-term overloads.

### VOLTAGE RATINGS

Basic single STACO Variable Transformers are rated either 120 volts or 240 volts. Higher voltage requirements are met by combining or ganging 120-volt or 240-volt units. A 480-volt, single-phase application can be met with two 240-volt variable transformers ganged in a series connection. In three-phase applications, three 120-volt units are ganged in a wye connection to result in a 240-volt line-to-line three-phase assembly. Similarly, three 240-volt units are ganged in a wye connection to result in a 380-volt or a 480-volt line-to-line three-phase assembly. In each of these instances, the individual transformers, or coils, are identified with the basic voltage rating, either 120 volts or 240 volts. When variable transformers are connected in open delta for three-phase applica-

tions, two 120-volt units are ganged for 120-volt line-to-line usage. For 240-volt open delta applications, two 240-volt units are ganged with the open delta assembly. In any of the above voltage applications, higher current requirements are met by paralleling two or more units in the ganged assembly.

### EFFICIENCY & REGULATION

In contrast to inefficient, wattage-burning resistive-type controllers such as rheostats, STACO Variable Transformers have an extremely low power loss and efficiencies as high as 98%.

STACO Variable Transformers deliver any desired voltage (within the transformer rating) with negligible variation in output voltage from no-load to full-load current. Voltage drop tables and a sample regulation curve are provided in this section.

### DISTORTIONLESS VOLTAGE CONTROL

STACO Variable Transformers produce an accurate transfer of input wave to output circuit, providing distortionless voltage control (a requisite of many sophisticated electronic applications).

### PLATED COMMUTATOR SURFACE

The commutator surface of each coil is specially plated with precious metal, giving STACO commutators longer life, increased resistance to corrosion and the capacity to withstand greater overloads (while maintaining a constant contact voltage drop).

### SIMPLE INSTALLATION AND CONNECTION

Mounting and hook-up of STACO units is convenient and easy. Most series units are designed with an adjustable shaft to accommodate either bench or panel mount (adjustable to accommodate varying panel thickness). Terminals are easily accessible: screw, lug, quick-connect or solder design. Connections deliver increasing output voltage with either clockwise or counter-clockwise knob rotation. Manually operated units have standard dials graduated 0-100 (percentage of output voltage).

### LONGER LIFE WITH NEGLIGIBLE MAINTENANCE

Precise design assembly of the brush (at a constant pressure to a smoothly finished and securely bonded commutator surface) provides excellent mechanical performance, long life, and low-driving torque. Brush replacement is seldom needed, but it is easily performed. High safety margins of voltage, current-carrying capacity and dielectric strength are why you can expect longer life from STACO Variable Transformers.

### SMOOTH AND LINEAR VOLTAGE CONTROL

STACO Variable Transformers are designed with a fraction of a volt per turn. Close adjustment of output voltage is easy because the brush always contacts one or more turns. Coil turns are evenly spaced, and output voltage is proportional to angular rotation. Full angular travel is approximately 320 degrees on all Series.

### VOLTAGE DOUBLER (DUAL INPUT)

Most 240-volt models have an additional input voltage tap permitting normal overvoltage output, with half normal input voltage. The output current must be reduced when the output voltage exceeds 125% of the input voltage as shown in Fig. B on page 6.

## TEMPERATURE & RATING

The low loss of STACO Variable Transformers allows operation at full current rating @ ambient temperatures up to 50 degrees C (122 degrees F). In locations above this temperature, the output current must be reduced according to Fig. A on page 6. On single-transient loads and on-off cycled loads, output currents up to 10 times normal may be carried for brief intervals, as shown in Fig. C on page 6.

## MILITARY SPECIFICATIONS

All STACO Variable Transformer models are available on special order to meet certain military specifications. Typical of the requirements which can be met are:

|                 |                |
|-----------------|----------------|
| ALTITUDE        | PHENOLIC PARTS |
| CONNECTING WIRE | SHOCK          |
| CORROSION       | VIBRATION      |
| HUMIDITY        |                |

## RUGGED MECHANICAL CONSTRUCTION

STACO Variable Transformers are precision built to exacting mechanical tolerances using the finest materials available. Quality assurance inspections are performed to insure that the high designed-in quality is maintained throughout the manufacturing cycle. A STACO Variable Transformer provides accurate, reliable and lasting voltage control for a broad variety of applications.

## General Definitions

The following words or phrases are commonly used to describe characteristics of STACO Variable Transformers.

**INPUT VOLTAGE:** The supply voltage to which a STACO Variable Transformer is connected.

**FREQUENCY:** All units in this catalog operate in the range of 50 to 60 HERTZ unless otherwise noted. These units may be used on higher frequencies within the limits shown in the tabulations in the section "Operation at Higher Frequency," page 5.

**OUTPUT VOLTAGE:** The range of voltage available at the output terminals.

**CURRENT RATING TERMINOLOGY:** To permit maximum utilization of STACO Variable Transformers, output ratings are given for both constant current and constant impedance loads.

**CONSTANT CURRENT RATING:** Output current that can be carried regardless of output voltage setting. (Reduce, for output above 125% of input voltage, on voltage doubler connection.)

**CONSTANT IMPEDANCE RATING:** Output current that can be carried with loads such as incandescent lamps or resistance heaters in which the current drawn is approximately proportional to the applied voltage, increasing to maximum current at line voltage. This rating applies only to applications where maximum output voltage is limited to line voltage.

**KVA RATING:** The maximum output current at maximum output line voltage multiplied by that maximum voltage and

divided by 1000 for single phase. Divide by 577 for three phase ( $1000/\sqrt{3}$ ).

**OVERVOLTAGE CONNECTION:** Output voltage from zero to 17% above line voltage (10% for 171 through 291 Series).

**LINE VOLTAGE CONNECTION:** Output voltage from zero to line voltage.

**VOLTAGE DOUBLER CONNECTION:** Unit gives full over-voltage output with half normal input voltage. Available on most 240- and 480-volt units. Reduce output current when output voltage exceeds 125% of input voltage.

**REGULATION:**

|                                                      |
|------------------------------------------------------|
| $\frac{VNL - VFL}{VNL} \times 100 \text{ (percent)}$ |
| VNL = Output Volts No Load                           |
| VFL = Output Volts Full Load                         |

**DRIVING TORQUE:** Torque required to turn the STACO Variable Transformer shaft.

**ROTATION:** Rotation of STACO Variable Transformer shaft gives increase in output voltage (as viewed from referenced end).

**SINGLE UNIT TAP AND TERMINAL DIAGRAM:** Input connection is shown for normal overvoltage output. Optional line voltage and voltage doubler input are indicated. Winding section voltages are for a normal overvoltage (or voltage doubler) connection at input voltage shown. Line voltage connections give 85% of these voltages (90% on 171 through 291 Series). Cased units with line cord may omit several coil taps.

**CONNECTION — SINGLE PHASE UNIT:** Terminals are provided on most models for zero to 117% of input voltage (over-voltage connection) and zero to 100% of input voltage (line voltage connection).

**CONNECTION — SINGLE PHASE PARALLEL:** Up to nine units on the same shaft may be paralleled by using suitable chokes and circuits to multiply the current and KVA rating. Parallel operation of smaller ganged units is not recommended because it is usually more economical to handle rated loads with the capacity of larger single units. (See specification charts in each transformer series section.)

**CONNECTION — SINGLE PHASE SERIES:** By jumpering the common connections, two equal single units (or two equal groups of paralleled units) driven by the same shaft may be used at double voltage (line-to-line) in single phase series with external connection only to the input and output terminals. The load must be grounded. If an input neutral is connected to the common, an output neutral may be used. Transformer or loads need not be balanced to neutral.

**CONNECTION — THREE PHASE OPEN DELTA:** By jumpering the common connections, two equal single units (or two equal groups of paralleled units) driven by the same shaft may be used at normal voltages (line-to-line) in three phase open delta. One power line, identical on input and output, connects to the common. The other input lines connect to the two input terminals, and the two output terminals feed the other output lines. (This connection is the same as single phase series with neutral, except that here voltages on all input line pairs are equal and out of phase.)

**CONNECTION — THREE PHASE WYE:** By jumpering the common connections, three equal single units (or three equal groups of paralleled units) driven by the same shaft may be used at double voltages (line-to-line) in three phase wye. The load must be ungrounded. Input lines connect to the three input terminals, and the three output terminals feed the output lines. If ganged units are used in a system that ordinarily has a common neutral or ground between source and load, then the neutral or ground must also be connected to the common point of the ganged variable transformer assembly. If the system has no neutral, then the loads must be balanced. Because of the 115.5% voltage on the individual single units, there are 50 HERTZ restrictions. See specifications for each Series.

**BENCH MOUNTING:** Mounting of STACO Variable Transformers on floor, bench, or wall where the knob and brush rotors of single units (and most multiple units) are at the same end of the coils.



**CASED MODELS:** All 1010B to 6020 Series models are available in cased designs (identified by the suffix "C," "CT" or "E" in the type number). "C" styles enclose only the coil, while "CT" models provide protective housing for both coil and terminal board. Knockouts are provided in the terminal board housing to accommodate conduit or cable connections. "E" styles include our NEMA 1, drip-proof, fully front accessible enclosures for our 5000/6000 Series.



**BACK OF PANEL MOUNTING:** Mounting of STACO Variable Transformers with shaft passing through a panel. The knob and brush rotors of single units (and most multiple units) are at opposite ends of the coils.

**ISOLATED VARIABLE TRANSFORMERS:** An Isolated Variable Transformer consists of two (primary and secondary) magnet wire windings on a toroidal core. The primary winding is electrically isolated from the secondary winding. The input winding has 82% of the turns of the output winding so the output voltage can be varied from 0-122% of the input voltage.

**UNCASED (OPEN CONSTRUCTION) MODELS:** The basic models of all series are uncased designs. The type number contains no prefix or suffix letter. These models do not have a protective housing for coil or terminal board. Adjustable shaft design on most manually operated models permits back-of-panel or bench mounting.



**PORTABLE CORD & PLUG MODELS:** Cased plug-in models have a ventilated steel case, line cord, receptacle, illuminated on/off switch and fuse. A three-conductor (3PN prefix) line cord and matching receptacle are available on these units. Plug-in models are connected for output voltage in a clockwise rotation and are available in each Series through the 2510/2520 units.



**L SERIES:** A selected grouping of variable transformers packaged in a deluxe aluminum enclosure, three-conductor line cord, plug, matching receptacle, pilot light, switch and fuse. An ammeter and voltmeter are available on the 10 amp model.



## General Design Specifications

The table below lists general design values for each standard unit on a per coil basis. The DC resistance is as measured from start to finish of coil winding, no load losses are actual core losses, and the torque values are the driving torque required to move the rotor and brush assembly. Using per coil values listed, total DC resistance and core losses can be calculated for parallel or series connected ganged units, and total torque requirements can be determined.

| Type  | Coil DC Res. (Ohms) | Per Coil Value No Load 60 Hz Losses (Watts) | Driving Torque (oz-in) |
|-------|---------------------|---------------------------------------------|------------------------|
| 171   | 23.6                | 1.5                                         | 6 max                  |
| 201   | 23.8                | 1.5                                         | 6 max                  |
| 221-B | 14.5                | 1.8                                         | 6 max                  |
| 252   | 115                 | 2.0                                         | 6 max                  |
| 291   | 8.0                 | 2.2                                         | 6 max                  |
| 501-B | 4.4                 | 3.0                                         | 10-30                  |
| 511   | 4.4                 | 3.0                                         | 10-30                  |
| 1010B | 1.2                 | 5.4                                         | 15-35                  |
| 1020B | 11.4                | 5.2                                         | 15-35                  |
| 1210B | 0.6                 | 6.4                                         | 15-35                  |
| 1220B | 4.4                 | 6.4                                         | 15-35                  |
| 1510  | 0.3                 | 13.2                                        | 15-35                  |
| 1520  | 1.4                 | 18.0                                        | 15-35                  |
| 2510  | 0.21                | 14.7                                        | 60 max                 |
| 2520  | 1.7                 | 14.5                                        | 60 max                 |
| 5011  | 0.090               | 28.0                                        | 105-160                |
| 5021  | 0.353               | 28.0                                        | 105-160                |
| 6011  | 0.144               | 7.5                                         | 105-160                |
| 6020  | 0.478               | 7.5                                         | 105-160                |

## OPERATION AT HIGHER FREQUENCY

All STACO standard Variable Transformers are designed to operate within a frequency range of 50 to 60 Hertz unless otherwise noted. While designed to operate at 50/60 Hz, Staco Variables can be operated at frequencies up to 2000 Hz. The table below lists unit maximum output current rating at 50/60, 400, 1500, and 2000 HZ.

| Type  | Maximum Output Current (Amperes) |       |          |      |          |      |          |      |
|-------|----------------------------------|-------|----------|------|----------|------|----------|------|
|       | 50/60 Hz                         |       | 400 Hz   |      | 1500 Hz  |      | 2000 Hz  |      |
|       | Constant                         |       | Constant |      | Constant |      | Constant |      |
|       | I                                | Z     | I        | Z    | I        | Z    | I        | Z    |
| 171   | 1.75                             | 2.2   | 1.75     | 2.2  | 1.75     | 2.2  | 1.75     | 2.2  |
| 201   | 2.0                              | 2.5   | 2.0      | 2.5  | 2.0      | 2.5  | 2.0      | 2.5  |
| 221-B | 2.5                              | 3.2   | 2.5      | 3.2  | 2.5      | 3.2  | 2.5      | 3.2  |
| 252   | 0.8                              | 1.0   | 0.8      | 1.0  | 0.8      | 1.0  | 0.8      | 1.0  |
| 291   | 3.0                              | 3.5   | 3.0      | 3.5  | 3.0      | 3.5  | 3.0      | 3.5  |
| 501-B | 5.0                              | 7.0   | 5.0      | 7.0  | 5.0      | 7.0  | 5.0      | 7.0  |
| 511   | 5.0                              | 7.0   | 5.0      | 7.0  | 5.0      | 7.0  | 5.0      | 7.0  |
| 1010B | 10.0                             | 13.0  | 10.0     | 13.0 | 9.0      | 11.7 | 9.0      | 11.7 |
| 1020B | 3.5                              | 5.0   | 3.5      | 5.0  | 3.5      | 5.0  | 3.5      | 5.0  |
| 1210B | 12.0*                            | 15.0* | 12.0     | 15.0 | 3.2      | 4.5  | 3.2      | 4.5  |
| 1220B | 5.0*                             | 7.0*  | 5.0      | 7.0  | 4.5      | 6.3  | 4.5      | 6.3  |
| 1510  | 15.0                             | 20.0  | 12.5     | 17.0 | 5.0      | 7.0  | 5.0      | 7.0  |
| 1520  | 7.5                              | 10.0  | 7.5      | 10.0 | 3.5      | 4.3  | 3.5      | 4.3  |
| 2510  | 25.0                             | 30.0  | 18.6     | 30.0 | 9.0      | 11.5 | 9.0      | 11.5 |
| 2520  | 10.0                             | 13.0  | 9.3      | 13.0 | 3.3      | 5.0  | 3.3      | 5.0  |
| 5011  | 50.0                             | —     | 22.5     | 22.5 | —        | —    | —        | —    |
| 5021  | 28.0                             | —     | 14.0     | 14.0 | —        | —    | —        | —    |
| 6011  | 60.0                             | —     | 25.0     | 25.0 | —        | —    | —        | —    |
| 6020  | 35.0                             | —     | 17.0     | 17.0 | —        | —    | —        | —    |

\* 60 Hz only

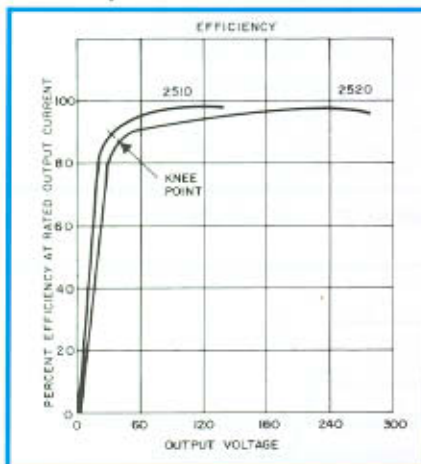
## EFFICIENCY

Efficiency curves are available from STACO or can be drawn similar to the efficiency curve shown below for any units by starting at zero, passing through the knee point, and reaching 98% efficiency at rated voltage.

## Knee Point Data

| Model Number | % Efficiency | Volts |
|--------------|--------------|-------|
| 171          | 62           | 23    |
| 201          | 67           | 24    |
| 221-B        | 73           | 23    |
| 252          | 65           | 50    |
| 291          | 67           | 24    |
| 501-B        | 77           | 18    |
| 1010B/1210B  | 80           | 30    |
| 1020B/1220B  | 80           | 17    |
| 1510         | 86           | 10    |
| 1520         | 83           | 20    |
| 2510         | 90           | 30    |
| 2520         | 87           | 40    |
| 5011         | 82           | 27    |
| 5021         | 75           | 40    |
| 6011         | 87           | 30    |
| 6020         | 82           | 38    |

## Efficiency



## OUTPUT CURRENT LIMITS

Continuous brush output current of STACO Variable Transformers, at normal ambient temperatures, must be limited to the rated amperes. The constant current rating may be drawn at any brush position except in voltage doubler circuits.

For satisfactory life, the brush output current of STACO Variable transformers operated in hot enclosures, or other locations of high ambient temperature, must be limited as shown in Fig. A. Close exposure to radiant heat should be avoided or loading should be reduced accordingly.

For voltage doubler connections (at output voltages above 125 percent of the input voltage) the continuous brush output current must be progressively limited (as shown in Fig. B) down to 44 percent of rated amperes at maximum output voltage. Protection of this type of usage may be approximated with a dual-element lag fuse in the lead to the input terminal and with either a quick or slow blow fuse in the brush output lead.

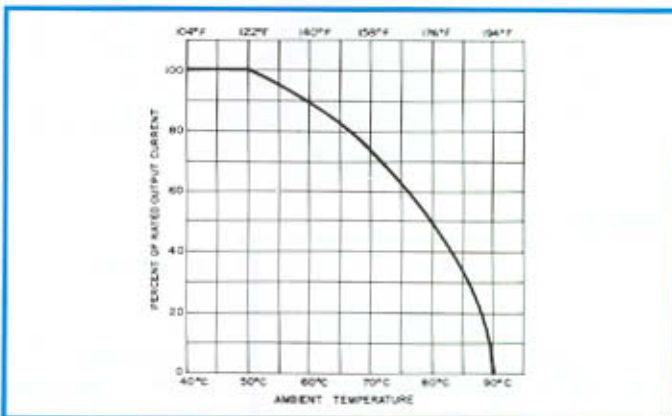


Figure A. Max output current for high temperature

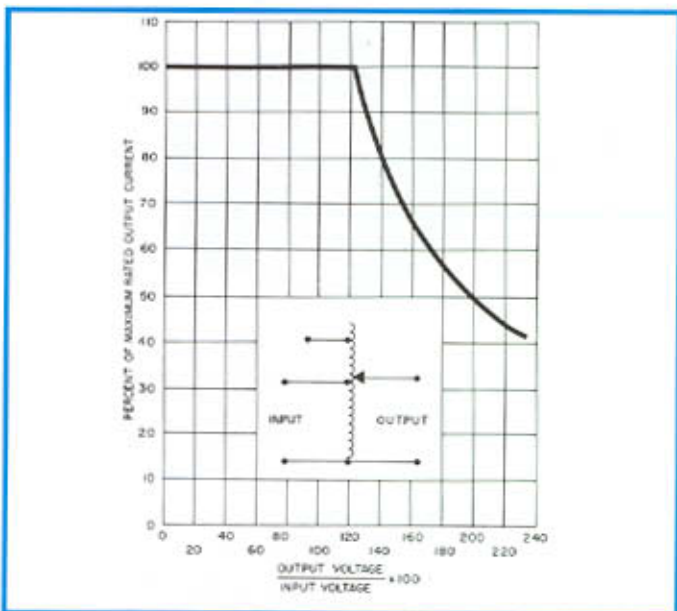


Figure B. Max Output Current — Dual Voltage

## SHORT-TIME CURRENT OVERLOAD

Although STACO Variable Transformers are small and light weight for the large power ratings which they handle, brush currents up to 10 times normal may be drawn for a brief time. The maximum on time curve of Fig. C shows the duration of surge on transient currents which may be absorbed by a cold unit on motor starting or similar service. Protection for this level of service may be approximated by hydraulic-magnetic circuit breakers with trip coil in the brush output lead. If the unit is hot from previous loading, such as repetitive overloads, it must also be allowed sufficient off time as indicated on the minimum off time curve of Fig. C to prevent excessive temperatures. If the time on is less than allowed by the "on" curve, the minimum time off may be reduced in accordance with the following equation:

$$\frac{\text{OFF TIME}}{\text{ON TIME}} = \left( \frac{\text{OVERLOAD CURRENT}}{\text{RATED CURRENT}} \right)^2 - 1$$

Protection for this level of service may be approximated by a dual-element lag fuse in the brush output lead.

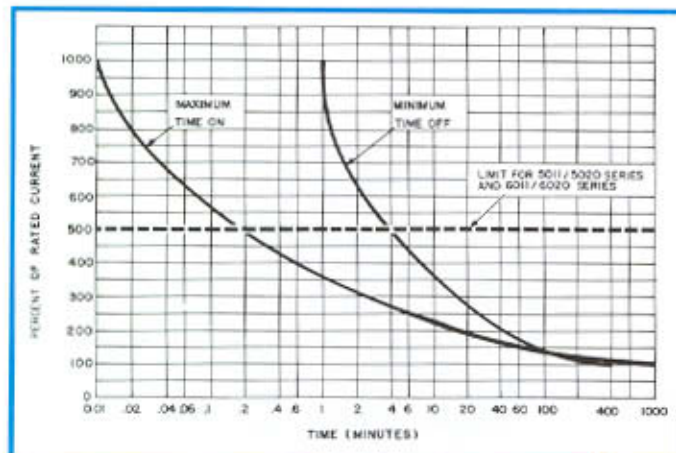


Figure C. Max On Time and Min Off Time for Various Overload Current Conditions

## MOTOR-DRIVEN VARIABLE TRANSFORMERS

Motor-driven models permit remote control of large amounts of power. A STACO motor-driven Variable Transformer can be installed in any out-of-the-way space and the control station placed where desired. Extreme flexibility in system design is possible because the control location does not have to accommodate the variable transformer assembly. Motor-driven units have the same electrical ratings as their corresponding manually-operated types.

The motor drive is a compact integral unit mounted on top of the assembly. On cased models, the motor-drive assembly is enclosed and is provided with knock-outs for cable or conduit connections. The permanent magnet synchronous motor operates on 120 volt, 50/60 Hertz single phase lines. Because synchronous motors are frequency sensitive, they operate slightly slower at 50 Hertz.



Standard motor-driven models are available in speeds of 5, 15, 30 and 60 seconds at 60 Hertz for full range travel from zero to maximum output voltage. A smooth, quiet planetary gear unit is used for proper speed reduction from the motor to

the STACO Variable Transformer shaft. Limit switch control at the lower and upper limits of travel prevents overtravel. The limit switches may be adjusted if desired. Additional limit switches may be added for operation and control of auxiliary circuits as required, STACO Auxiliary Switch Kit P/N 964-0057 (available separately).

To specify, prefix the desired time of travel in seconds, and the letter "M" for motor-drive to the Type number. For example: 5 seconds speed travel = 5M1010B.

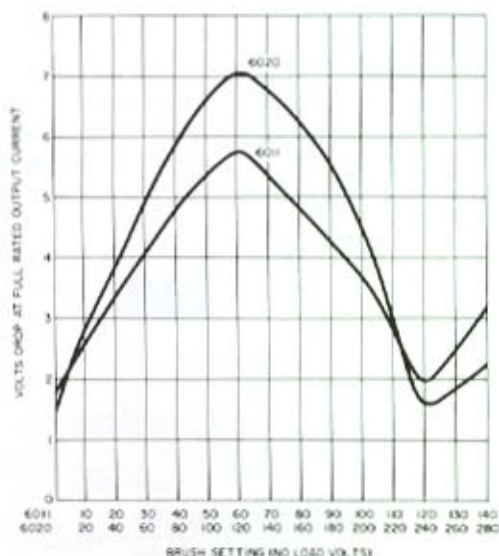
Normally, one switch is used to operate each Motor-Driven STACO Variable Transformer. Any momentary contact switch, whether lever action or push button, may be used. If desired, additional switches can be provided to permit control from any of several locations. Master control of two or more motor-driven units is also possible using relays or multiple-pole switches.

## TYPE FRC-20 AND MP CONTROLLERS

For our Motor Operated Variable Transformers, we offer the FRC-20 and MP Controllers, which both position and regulate the variable transformer. For complete information refer to section on controller types, pages 38 and 39.

## Regulation

These tables provide the voltage drop at selected points at the corresponding model's regulation curve. This is the variation in the output voltage from no-load to full-load current. A sample regulation curve for the 6000 Series is illustrated below.



## 120 Volts - Voltage Drop At Full Rated Output Current

| Type  | Brush Setting (No Load Volts) |     |     |     |     |     |     |
|-------|-------------------------------|-----|-----|-----|-----|-----|-----|
|       | 0                             | 20  | 40  | 60  | 80  | 100 | 120 |
| 171   | 0.2                           | 4.2 | 7.1 | 8.5 | 7.0 | 4.0 | 0.2 |
| 201   | 0.2                           | 4.9 | 7.8 | 9.0 | 7.5 | 4.2 | 0.3 |
| 221-B | 0.3                           | 3.0 | 5.1 | 6.0 | 5.0 | 2.9 | 0.3 |
| 291   | 0.4                           | 2.5 | 4.1 | 5.2 | 4.2 | 2.3 | 0.4 |
| 501-B | 0.3                           | 3.9 | 5.2 | 5.8 | 5.2 | 4.0 | 0.3 |
| 511   | 0.3                           | 3.9 | 5.2 | 5.8 | 5.2 | 4.0 | 0.3 |
| 1010B | 0.2                           | 2.8 | 4.2 | 4.5 | 4.2 | 3.0 | 0.8 |
| 1210B | 0.2                           | 1.3 | 1.8 | 2.0 | 1.8 | 1.4 | 0.4 |
| 1510  | 0.1                           | 0.8 | 1.4 | 1.7 | 1.5 | 0.9 | 0.2 |
| 2510  | 0.5                           | 1.8 | 2.2 | 2.5 | 2.2 | 1.9 | 0.1 |
| 5011  | 3.0                           | 4.2 | 4.8 | 5.4 | 5.2 | 4.1 | 3.0 |
| 6011  | 1.9                           | 2.5 | 3.3 | 5.7 | 4.8 | 3.7 | 2.0 |

## 240 Volts - Voltage Drop At Full Rated Output Current

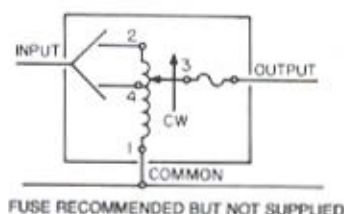
| Type  | Brush Setting (No Load Volts) |      |      |      |      |      |     |
|-------|-------------------------------|------|------|------|------|------|-----|
|       | 0                             | 40   | 80   | 120  | 160  | 200  | 240 |
| 252   | 1.0                           | 13.0 | 17.5 | 20.6 | 17.0 | 12.5 | 1.4 |
| 1020B | 0.2                           | 5.4  | 6.7  | 7.0  | 6.5  | 5.0  | 0.4 |
| 1220B | 0.2                           | 4.5  | 5.8  | 6.1  | 5.6  | 4.3  | 0.4 |
| 1520  | 0.2                           | 2.2  | 3.6  | 4.0  | 3.3  | 2.1  | 0.3 |
| 2520  | 0.5                           | 4.2  | 5.2  | 5.5  | 5.2  | 4.2  | 0.4 |
| 5021  | 2.5                           | 4.2  | 5.8  | 7.0  | 6.6  | 4.6  | 2.6 |
| 6020  | 1.4                           | 3.9  | 5.9  | 7.0  | 6.2  | 4.5  | 1.6 |

# Schematics and Wiring Diagrams

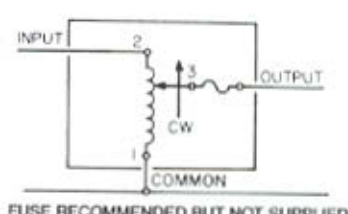
## General Wiring Information

Common is used as the third leg in a three phase open delta or as neutral in a three wire single phase series and four wire, three phase wye connection. It is not used in two wire series or three wire wye connection.

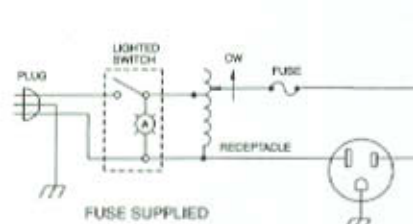
If ganged units are used in a system that ordinarily has a common neutral or ground between source and load, the neutral or ground must be connected to the common terminals of the variable transformer assembly. If the system has no neutral, the load must be balanced or the transformers will be damaged.



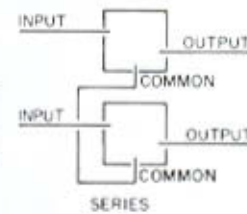
1



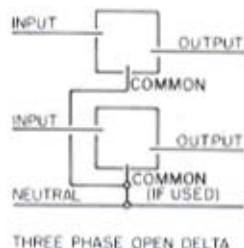
2



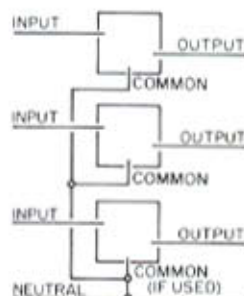
3



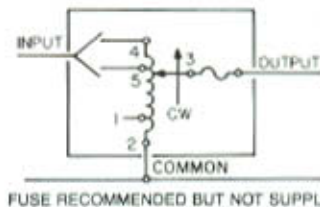
4



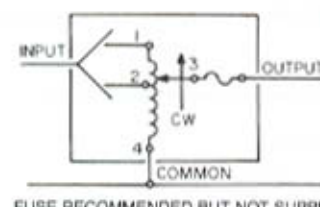
5



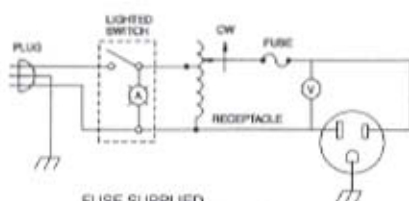
6



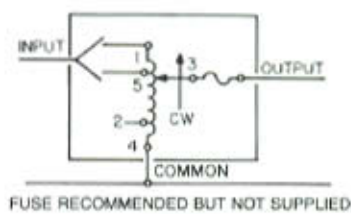
7



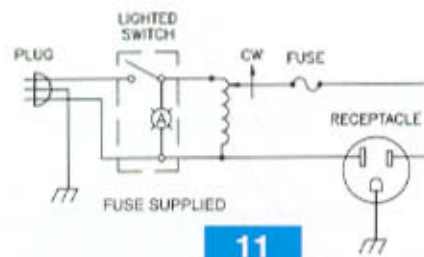
8



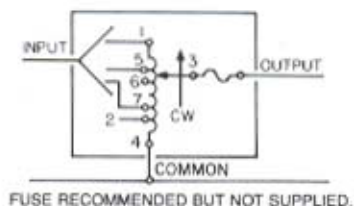
9



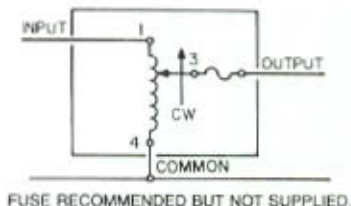
10



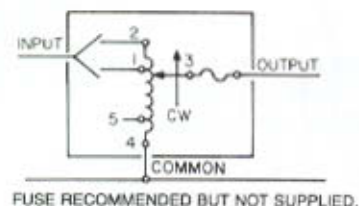
11



12

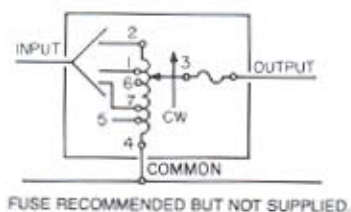


13

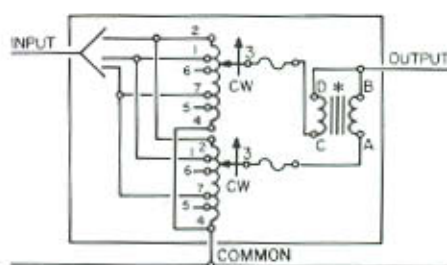


14

# Schematics and Wiring Diagrams

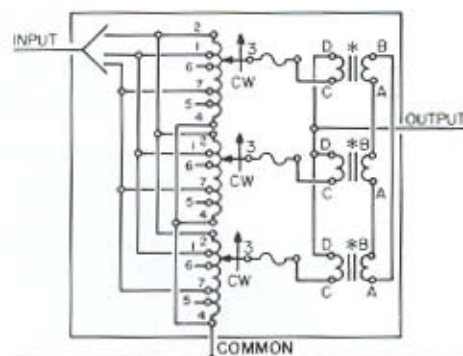


15



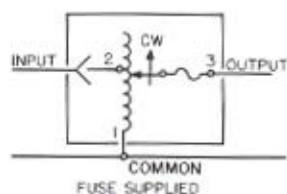
\* PARALLELING CHOKE FOR 2510-51LAC  
\* PARALLELING CHOKE FOR 2520-52LAC  
TERMINALS #6 AND #7 OMITTED ON 2510  
FUSE RECOMMENDED BUT NOT SUPPLIED.

16

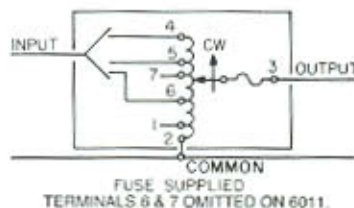


\* PARALLELING CHOKE FOR 2510-51LAC  
\* PARALLELING CHOKE FOR 2520-52LAC  
TERMINALS #6 AND #7 OMITTED ON 2510  
FUSE RECOMMENDED BUT NOT SUPPLIED.

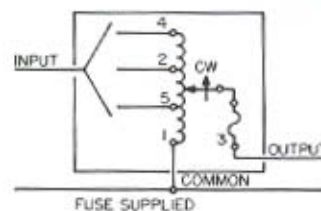
17



18

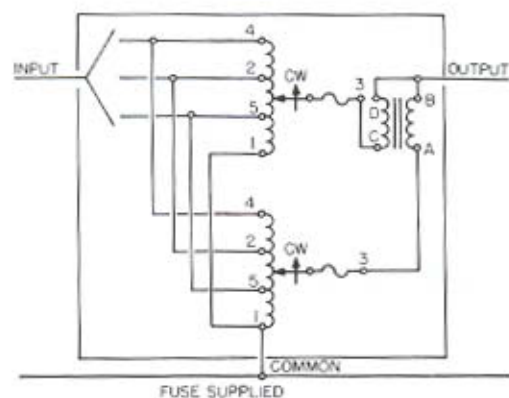


19



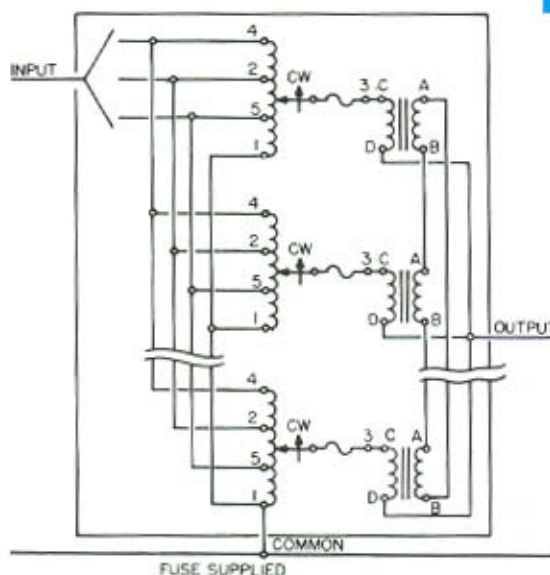
Terminals 4 and 5 omitted on 5011 Series  
Terminal 5 omitted on 6011 Series

20



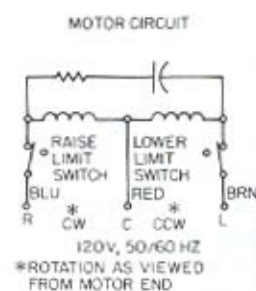
Terminals 4 and 5 omitted on 5011 Series  
Terminal 5 omitted on 6011 Series

21



Terminals 4 and 5 omitted on 5011 Series  
Terminal 5 omitted on 6011 Series

22



23

# 100/200 Series

These manually operated panel mounted units are available in single and three phase models from 0.8 to 3.0 amperes. The 171, 201, 221-B and 291 units operate from 120 volt input, while the 252 unit operates from a 240 volt input. STACO's coil tapping arrangement permits an output voltage from 0 to line

voltage in either the clockwise or counterclockwise direction and from 0 to 10% above line voltage in the clockwise direction. Two and three ganged, manually operated units are available for increased single phase voltage ratings and for three phase applications.

| PART NO. | WIRING                                | INPUT |       | OUTPUT |                             |            |                               | SHAFT ROTATION FOR VOLTAGE INCREASE | TERMINAL CONNECTIONS<br>(For increasing Voltage)<br>As Viewed from Base End |                        |        | SCHE-<br>MATIC<br>(Pg 8 & 9) | NET<br>WT.<br>LBS. |            |
|----------|---------------------------------------|-------|-------|--------|-----------------------------|------------|-------------------------------|-------------------------------------|-----------------------------------------------------------------------------|------------------------|--------|------------------------------|--------------------|------------|
|          |                                       | VOLTS | HERTZ | VOLTS  | CONSTANT<br>CURRENT<br>LOAD |            | CONSTANT<br>IMPEDANCE<br>LOAD |                                     | Input                                                                       | Jumper*                | Output |                              |                    |            |
|          |                                       |       |       |        | MAX<br>AMPS                 | MAX<br>KVA | MAX<br>AMPS                   |                                     |                                                                             |                        |        |                              |                    | MAX<br>KVA |
| 171      | Single<br>Phase                       | 120   | 50/60 | 0-120  | 1.75                        | 0.21       | 2.2                           | 0.26                                | CW                                                                          | 1-2                    | —      | 1-3                          | 1                  | 2          |
|          |                                       |       | 60    | 0-132  | 1.75                        | 0.23       | —                             | —                                   | CCW                                                                         | 1-2                    | —      | 2-3                          |                    |            |
|          |                                       |       | 60    | 0-132  | 1.75                        | 0.23       | —                             | —                                   | CW                                                                          | 1-4                    | —      | 1-3                          |                    |            |
| 171-2    | Single<br>Phase<br>Series             | 240   | 50/60 | 0-240  | 1.75                        | 0.42       | 2.2                           | 0.53                                | CW                                                                          | 2-2                    | 1-1    | 3-3                          | 1&4                | 4 1/4      |
|          |                                       |       | 60    | 0-264  | 1.75                        | 0.46       | —                             | —                                   | CCW                                                                         | 1-1                    | 2-2    | 3-3                          |                    |            |
|          |                                       |       | 60    | 0-264  | 1.75                        | 0.46       | —                             | —                                   | CW                                                                          | 4-4                    | 1-1    | 3-3                          |                    |            |
|          | Three<br>Phase<br>Open<br>Delta $\pi$ | 120++ | 50/60 | 0-120  | 1.75                        | 0.36       | 2.2                           | 0.46                                | CW                                                                          | 2-1-2                  | 1-1    | 3-1-3                        | 1 & 5              | 4 1/4      |
|          |                                       |       | 60    | 0-132  | 1.75                        | 0.40       | —                             | —                                   | CCW                                                                         | 1-2-1                  | 2-2    | 3-2-3                        |                    |            |
|          |                                       |       | 60    | 0-132  | 1.75                        | 0.40       | —                             | —                                   | CW                                                                          | 4-1-4                  | 1-1    | 3-1-3                        |                    |            |
| 171-3    | Three<br>Phase<br>Wye $\pi$           | 240++ | 60    | 0-240  | 1.75                        | 0.73       | 2.2                           | 0.92                                | CW                                                                          | 2-2-2                  | 1-1-1  | 3-3-3                        | 1 & 6              | 6 1/2      |
|          |                                       |       |       |        |                             |            |                               |                                     | CCW                                                                         | 1-1-1                  | 2-2-2  | 3-3-3                        |                    |            |
| 201      | Single<br>Phase                       | 120   | 50/60 | 0-120  | 2.0                         | 0.24       | 2.5                           | 0.30                                | CW                                                                          | 1-2                    | —      | 1-3                          | 1                  | 2          |
|          |                                       |       | 60    | 0-132  | 2.0                         | 0.26       | —                             | —                                   | CCW                                                                         | 1-2                    | —      | 2-3                          |                    |            |
|          |                                       |       | 60    | 0-132  | 2.0                         | 0.26       | —                             | —                                   | CW                                                                          | 1-4                    | —      | 1-3                          |                    |            |
| 201-2    | Single<br>Phase<br>Series             | 240   | 50/60 | 0-240  | 2.0                         | 0.48       | 2.5                           | 0.60                                | CW                                                                          | 2-2                    | 1-1    | 3-3                          | 1 & 4              | 4 1/4      |
|          |                                       |       | 60    | 0-264  | 2.0                         | 0.53       | —                             | —                                   | CCW                                                                         | 1-1                    | 2-2    | 3-3                          |                    |            |
|          |                                       |       | 60    | 0-264  | 2.0                         | 0.53       | —                             | —                                   | CW                                                                          | 4-4                    | 1-1    | 3-3                          |                    |            |
|          | Three<br>Phase<br>Open<br>Delta $\pi$ | 120++ | 50/60 | 0-120  | 2.0                         | 0.42       | 2.5                           | 0.52                                | CW                                                                          | 2-1-2                  | 1-1    | 3-1-3                        | 1 & 5              | 4 1/4      |
|          |                                       |       | 60    | 0-132  | 2.0                         | 0.46       | —                             | —                                   | CCW                                                                         | 1-2-1                  | 2-2    | 3-2-3                        |                    |            |
|          |                                       |       | 60    | 0-132  | 2.0                         | 0.46       | —                             | —                                   | CW                                                                          | 4-1-4                  | 1-1    | 3-1-3                        |                    |            |
| 201-3    | Three<br>Phase<br>Wye $\pi$           | 240++ | 60    | 0-240  | 2.0                         | 0.83       | 2.5                           | 1.04                                | CW                                                                          | 2-2-2                  | 1-1-1  | 3-3-3                        | 1 & 6              | 6 1/2      |
|          |                                       |       |       |        |                             |            |                               |                                     | CCW                                                                         | 1-1-1                  | 2-2-2  | 3-3-3                        |                    |            |
| 221-B    | Single<br>Phase                       | 120   | 50/60 | 0-120  | 2.5                         | 0.30       | 3.2                           | 0.38                                | CW                                                                          | 1-2                    | —      | 1-3                          | 1                  | 2 1/2      |
|          |                                       |       | 60    | 0-132  | 2.5                         | 0.33       | —                             | —                                   | CCW                                                                         | 1-2                    | —      | 2-3                          |                    |            |
|          |                                       |       | 60    | 0-132  | 2.5                         | 0.33       | —                             | —                                   | CW                                                                          | 1-4                    | —      | 1-3                          |                    |            |
| 221-B-2  | Single<br>Phase<br>Series             | 240   | 50/60 | 0-240  | 2.5                         | 0.60       | 3.2                           | 0.77                                | CW                                                                          | 2-2                    | 1-1    | 3-3                          | 1 & 4              | 5 1/2      |
|          |                                       |       | 60    | 0-264  | 2.5                         | 0.66       | —                             | —                                   | CCW                                                                         | 1-1                    | 2-2    | 3-3                          |                    |            |
|          |                                       |       | 60    | 0-264  | 2.5                         | 0.66       | —                             | —                                   | CW                                                                          | 4-4                    | 1-1    | 3-3                          |                    |            |
|          | Three<br>Phase<br>Open<br>Delta $\pi$ | 120++ | 50/60 | 0-120  | 2.5                         | 0.52       | 3.2                           | 0.67                                | CW                                                                          | 2-1-2                  | 1-1    | 3-1-3                        | 1 & 5              | 5 1/2      |
|          |                                       |       | 60    | 0-132  | 2.5                         | 0.57       | —                             | —                                   | CCW                                                                         | 1-2-1                  | 2-2    | 3-2-3                        |                    |            |
|          |                                       |       | 60    | 0-132  | 2.5                         | 0.57       | —                             | —                                   | CW                                                                          | 4-1-4                  | 1-1    | 3-1-3                        |                    |            |
| 221-B-3  | Three<br>Phase<br>Wye $\pi$           | 240++ | 60    | 0-240  | 2.5                         | 1.04       | 3.2                           | 1.33                                | CW                                                                          | 2-2-2                  | 1-1-1  | 3-3-3                        | 1 & 6              | 8 1/4      |
|          |                                       |       |       |        |                             |            |                               |                                     | CCW                                                                         | 1-1-1                  | 2-2-2  | 3-3-3                        |                    |            |
| 3PN221B  | Single<br>Phase                       | 120   | 60    | 0-132  | 2.50                        | 0.33       | —                             | —                                   | CW                                                                          | LINE CORD & RECEPTACLE |        |                              | 3                  | 3          |
| 252      | Single<br>Phase                       | 240   | 50/60 | 0-240  | 0.8                         | 0.19       | 1.0                           | 0.24                                | CW                                                                          | 1-2                    | —      | 1-3                          | 1                  | 2 1/2      |
|          |                                       |       | 60    | 0-264  | 0.8                         | 0.21       | —                             | —                                   | CCW                                                                         | 1-2                    | —      | 2-3                          |                    |            |
|          |                                       |       | 60    | 0-264  | 0.8                         | 0.21       | —                             | —                                   | CW                                                                          | 1-4                    | —      | 1-3                          |                    |            |
| 252-2    | Single<br>Phase<br>Series             | 480   | 50/60 | 0-480  | 0.8                         | 0.38       | 1.0                           | 0.48                                | CW                                                                          | 2-2                    | 1-1    | 3-3                          | 1 & 4              | 5 1/2      |
|          |                                       |       | 60    | 0-528  | 0.8                         | 0.42       | —                             | —                                   | CCW                                                                         | 1-1                    | 2-2    | 3-3                          |                    |            |
|          |                                       |       | 60    | 0-528  | 0.8                         | 0.42       | —                             | —                                   | CW                                                                          | 4-4                    | 1-1    | 3-3                          |                    |            |
|          | Three<br>Phase<br>Open<br>Delta $\pi$ | 240++ | 50/60 | 0-240  | 0.8                         | 0.33       | 1.0                           | 0.42                                | CW                                                                          | 2-1-2                  | 1-1    | 3-1-3                        | 1 & 5              | 5 1/2      |
|          |                                       |       | 60    | 0-264  | 0.8                         | 0.37       | —                             | —                                   | CCW                                                                         | 1-2-1                  | 2-2    | 3-2-3                        |                    |            |
|          |                                       |       | 60    | 0-264  | 0.8                         | 0.37       | —                             | —                                   | CW                                                                          | 4-1-4                  | 1-1    | 3-1-3                        |                    |            |
| 252-3    | Three<br>Phase<br>Wye $\pi$           | 480++ | 50/60 | 0-480  | 0.8                         | 0.67       | 1.0                           | 0.83                                | CW                                                                          | 2-2-2                  | 1-1-1  | 3-3-3                        | 1 & 6              | 8 1/4      |
|          |                                       |       | 60    | 0-528  | 0.8                         | 0.73       | —                             | —                                   | CCW                                                                         | 1-1-1                  | 2-2-2  | 3-3-3                        |                    |            |
|          |                                       |       | 60    | 0-528  | 0.8                         | 0.73       | —                             | —                                   | CW                                                                          | 4-4-4                  | 1-1-1  | 3-3-3                        |                    |            |

# 100/200 Series

| PART NO. | WIRING                                | INPUT |       | OUTPUT |                             |            |                               | SHAFT<br>ROTATION<br>FOR<br>VOLTAGE<br>INCREASE | TERMINAL CONNECTIONS<br>(For increasing Voltage)<br>As Viewed from Base End |         |        | SCHE-<br>MATIC<br>(Pg 8 & 9) | NET<br>WT.<br>LBS. |            |
|----------|---------------------------------------|-------|-------|--------|-----------------------------|------------|-------------------------------|-------------------------------------------------|-----------------------------------------------------------------------------|---------|--------|------------------------------|--------------------|------------|
|          |                                       | VOLTS | HERTZ | VOLTS  | CONSTANT<br>CURRENT<br>LOAD |            | CONSTANT<br>IMPEDANCE<br>LOAD |                                                 | Input                                                                       | Jumper* | Output |                              |                    |            |
|          |                                       |       |       |        | MAX<br>AMPS                 | MAX<br>KVA | MAX<br>AMPS                   |                                                 |                                                                             |         |        |                              |                    | MAX<br>KVA |
| 291      | Single<br>Phase                       | 120   | 50/60 | 0-120  | 3.0                         | 0.36       | 3.5                           | 0.42                                            | CW                                                                          | 1-2     | —      | 1-3                          | 1                  | 2 1/2      |
|          |                                       |       | 60    | 0-132  | 3.0                         | 0.40       | —                             | —                                               | CCW                                                                         | 1-2     | —      | 2-3                          |                    |            |
|          |                                       |       |       |        |                             |            |                               |                                                 | CW                                                                          | 1-4     | —      | 1-3                          |                    |            |
| 291-2    | Single<br>Phase<br>Series             | 240   | 50/60 | 0-240  | 3.0                         | 0.72       | 3.5                           | 0.84                                            | CW                                                                          | 2-2     | 1-1    | 3-3                          | 1 & 4              | 5 1/2      |
|          |                                       |       |       |        |                             |            |                               |                                                 | CCW                                                                         | 1-1     | 2-2    | 3-3                          |                    |            |
|          |                                       |       | 60    | 0-264  | 3.0                         | 0.79       | —                             | —                                               | CW                                                                          | 4-4     | 1-1    | 3-3                          |                    |            |
|          | Three<br>Phase<br>Open<br>Delta $\pi$ | 120++ | 50/60 | 0-120  | 3.0                         | 0.62       | 3.5                           | 0.73                                            | CW                                                                          | 2-1-2   | 1-1    | 3-1-3                        | 1 & 5              | 5 1/2      |
|          |                                       |       |       |        |                             |            |                               |                                                 | CCW                                                                         | 1-2-1   | 2-2    | 3-2-3                        |                    |            |
|          |                                       |       | 60    | 0-132  | 3.0                         | 0.69       | —                             | —                                               | CW                                                                          | 4-1-4   | 1-1    | 3-1-3                        |                    |            |
| 291-3    | Three<br>Phase<br>Wye $\pi$           | 240++ | 60    | 0-240  | 3.0                         | 1.25       | 3.5                           | 1.45                                            | CW                                                                          | 2-2-2   | 1-1-1  | 3-3-3                        | 1 & 6              | 8 1/4      |
|          |                                       |       |       |        |                             |            |                               |                                                 | CCW                                                                         | 1-1-1   | 2-2-2  | 3-3-3                        |                    |            |

\* Jumper provided in the standard common position and should be moved or removed as required.

++ Line to line voltage

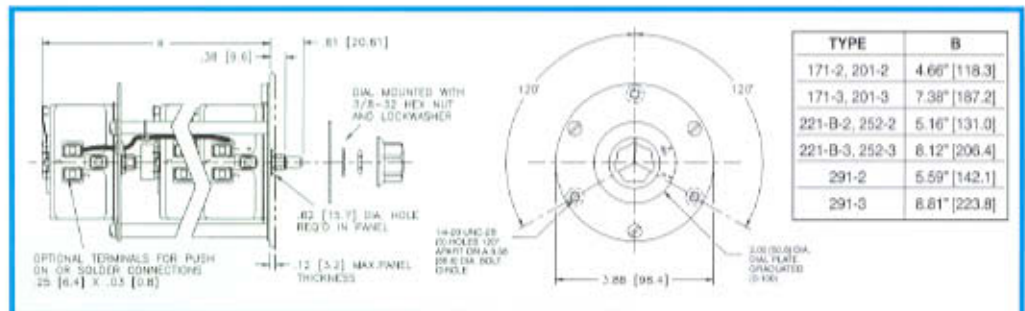
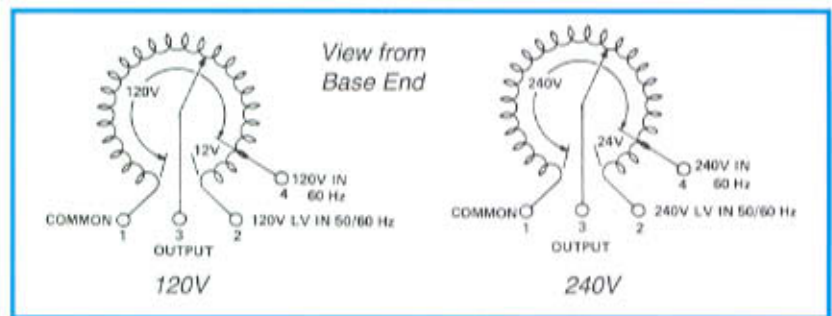
$\pi$  If ganged units are used in a system that ordinarily has a common neutral or ground between source and load, the neutral or ground must be connected to the common terminals of the variable transformer assembly. If the system has no neutral, the load must be balanced or the transformers will be damaged.



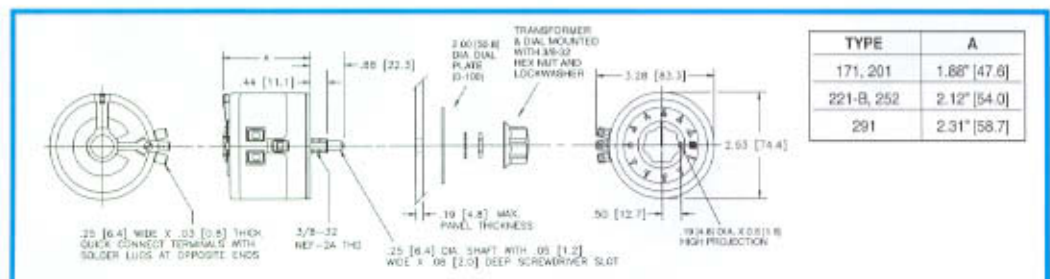
221-B



201-3



Two and Three Gang Units



Single Unit

# 500 Series

Versatility, compactness and durability are included in the many designed-in features of the STACO 501-B Series Variable Transformers. These transformers operate from 120 volt input lines and are rated at 5 amperes for constant current loads and 7 amperes for constant impedance loads at line voltage. The coil tapping arrangement permits output voltage of 0 to line voltage or 17% above line voltage on constant current line conditions. This unit's Faston® terminals are easily converted to screw connections with the terminal adapter kits supplied with each unit.

The STACO 511 is ideal for OEM applications with its panel mount, fixed shaft design and even smaller envelope than the

501-B. it can be single point or four point mounted. The four point mounting is the same as the 501-B.

Either unit can be operated from 50-2000 hertz without derating.

Motor driven units are available and identified by the prefix "M" in the type number. The synchronous motor is designed for operation on 120 volt, 50/60 Hertz single phase lines and draws approximately 0.3 amperes. If a motor driven model is ordered, be sure to prefix the part number with the desired travel time from 0 to maximum of 5, 15, 30, or 60 seconds.

| PART NO.             | WIRING                          | INPUT     |       | OUTPUT |                             |            |                               |            | SHAFT<br>ROTATION<br>FOR<br>VOLTAGE<br>INCREASE | TERMINAL CONNECTIONS<br>(For increasing Voltage)<br>As Viewed from Base End |         |        | SCHE-<br>MATIC<br>(Pg 8 & 9) | NET<br>WT.<br>LBS. | (Max)<br>MOTOR<br>DRIVEN |
|----------------------|---------------------------------|-----------|-------|--------|-----------------------------|------------|-------------------------------|------------|-------------------------------------------------|-----------------------------------------------------------------------------|---------|--------|------------------------------|--------------------|--------------------------|
|                      |                                 | VOLTS     | HERTZ | VOLTS  | CONSTANT<br>CURRENT<br>LOAD |            | CONSTANT<br>IMPEDANCE<br>LOAD |            |                                                 | Input                                                                       | Jumper* | Output |                              |                    |                          |
|                      |                                 |           |       |        | MAX<br>AMPS                 | MAX<br>KVA | MAX<br>AMPS                   | MAX<br>KVA |                                                 |                                                                             |         |        |                              |                    |                          |
| 501-B<br>M501-B+     | Single<br>Phase                 | 120       | 50/60 | 0-120  | 5.0                         | 0.60       | 7.0                           | 0.84       | CW                                              | 1-4                                                                         | —       | 4-3    | 10                           | 5 1/4              | 12                       |
|                      |                                 |           |       | 0-140  | 5.0                         | 0.70       | —                             | —          | CCW                                             | 1-4                                                                         | —       | 1-3    |                              |                    |                          |
|                      |                                 |           |       |        |                             |            |                               |            | CW                                              | 4-5                                                                         | —       | 4-3    |                              |                    |                          |
|                      |                                 |           |       |        |                             |            |                               |            | CCW                                             | 1-2                                                                         | —       | 1-3    |                              |                    |                          |
| 501-B-2<br>M501-B-2+ | Single<br>Phase<br>Series       | 240       | 50/60 | 0-240  | 5.0                         | 1.2        | 7.0                           | 1.68       | CW                                              | 1-1                                                                         | 4-4     | 3-3    | 10 & 4                       | 11 1/2             | 20                       |
|                      |                                 |           |       | 0-280  | 5.0                         | 1.4        | —                             | —          | CCW                                             | 4-4                                                                         | 1-1     | 3-3    |                              |                    |                          |
|                      |                                 |           |       |        |                             |            |                               |            | CW                                              | 5-5                                                                         | 4-4     | 3-3    |                              |                    |                          |
|                      |                                 |           |       |        |                             |            |                               |            | CCW                                             | 2-2                                                                         | 1-1     | 3-3    |                              |                    |                          |
|                      | Three<br>Phase<br>Open<br>Delta | 120<br>++ | 50/60 | 0-120  | 5.0                         | 1.04       | 7.0                           | 1.46       | CW                                              | 1-4-1                                                                       | 4-4     | 3-4-3  | 10 & 5                       |                    |                          |
|                      |                                 |           |       | 0-140  | 5.0                         | 1-21       | —                             | —          | CCW                                             | 4-1-4                                                                       | 1-1     | 3-1-3  |                              |                    |                          |
|                      |                                 |           |       |        |                             |            |                               |            | CW                                              | 5-4-5                                                                       | 4-4     | 3-4-3  |                              |                    |                          |
|                      |                                 |           |       |        |                             |            |                               |            | CCW                                             | 2-1-2                                                                       | 1-1     | 3-1-3  |                              |                    |                          |
| 501-B-3<br>M501-B-3+ | Three<br>Phase<br>Wye           | 240<br>++ | 50/60 | 0-240  | 5.0                         | 2.08       | 7.0                           | 2.91       | CW                                              | 1-1-1                                                                       | 4-4-4   | 3-3-3  | 10 & 6                       | 15 1/2             | 26                       |
|                      |                                 |           | 60    | 0-280  | 5.0                         | 2.43       | —                             | —          | CCW                                             | 4-4-4                                                                       | 1-1-1   | 3-3-3  |                              |                    |                          |
|                      |                                 |           |       |        |                             |            |                               |            | CW                                              | 5-5-5                                                                       | 4-4-4   | 3-3-3  |                              |                    |                          |
|                      |                                 |           |       |        |                             |            |                               |            | CCW                                             | 2-2-2                                                                       | 1-1-1   | 3-3-3  |                              |                    |                          |
| 3PN501B              | Single<br>Phase                 | 120       | 50/60 | 0-140  | 5.0 ‡                       | 0.70       | —                             | —          | CW                                              | LINE CORD & RECEPTACLE                                                      |         |        | 3                            | 7 3/4              |                          |
| 511                  | Single<br>Phase                 | 120       | 50/60 | 0-120  | 5.0                         | 0.60       | 7.0                           | 0.84       | CW                                              | 1-4                                                                         | —       | 4-3    | 8                            | 4 1/2              |                          |
|                      |                                 |           |       | 0-140  | 5.0                         | 0.70       | 7.0                           | 0.84       | CCW                                             | 4-2                                                                         | —       | 4-4    |                              |                    |                          |

‡ Unit is fused for the constant current rating at the factory.

\* Jumper provided in the standard common position and should be moved or removed as required.

++ Line to line voltage

π If ganged units are used in a system that ordinarily has a common neutral or ground between source and load, the neutral or ground must be connected to the common terminals of the variable transformer assembly. If the system has no neutral, the load must be balanced or the transformers will be damaged.

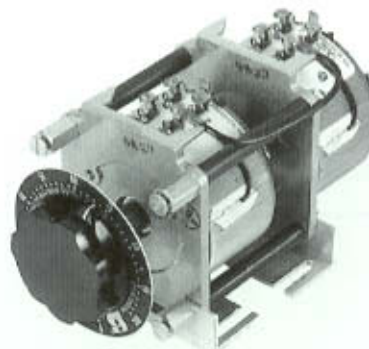
+ Motor driven units use terminal connections for CCW increasing voltage as viewed from the base end. See figure 23 on page 9 for motor wiring.



501-B



511

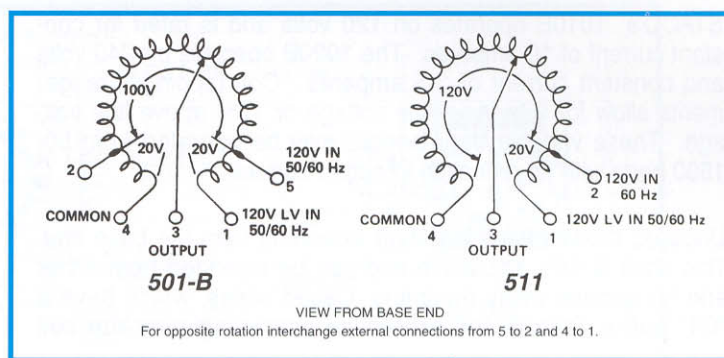
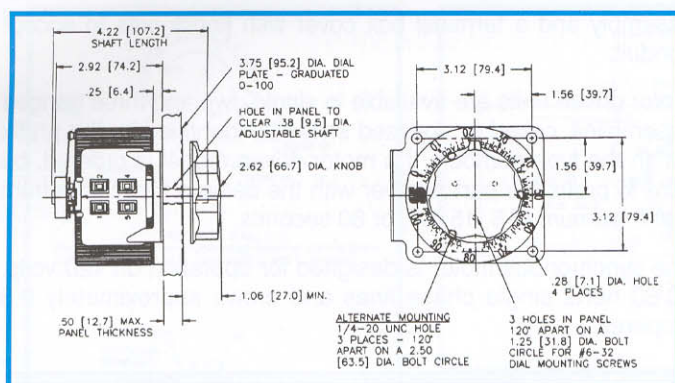


501-B-2

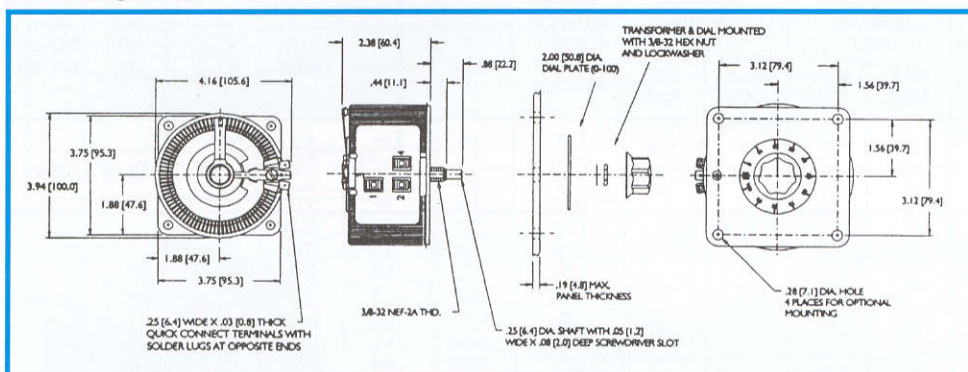


5M501-B

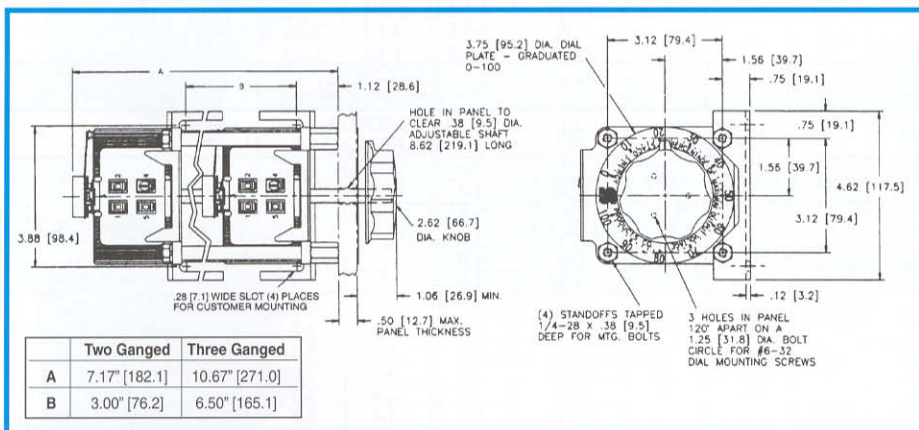
# 500 Series



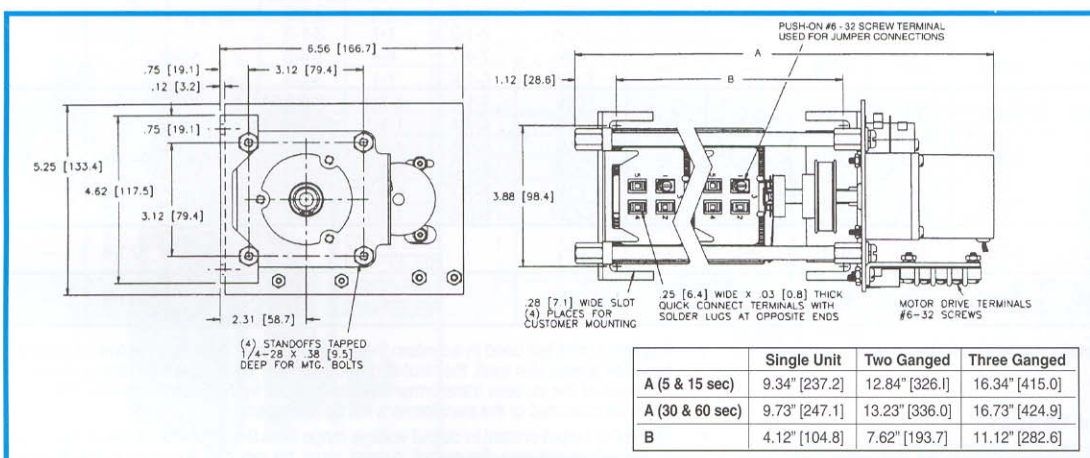
**501-B Single Unit**



**511 Single Unit**



**Two and Three Ganged, Manual**



**Motorized Single, Two and Three Ganged**

# 1000 Series

STACO's 1010B operates on 120 volts and is rated for constant current of 10 amperes. The 1020B operates on 240 volts and constant current of 3.5 amperes. Coil tapping arrangements allow for 0 to input line voltage or 17% above line voltage. These variable transformers may be operated from 50-1500 hertz with no reduction in output current.

Uncased models have the shaft extending from the base end. This shaft is fully adjustable and can be extended from either end for general utility mounting. Cased styles, which have a "CT" suffix, feature the protective screening over the coil

assembly and a terminal box cover with knock-outs to accept conduit.

Motor driven units are available in single, two and three ganged assemblies; cased or uncased styles as identified by the prefix "M" in the type number. If a motor driven model is ordered, be sure to prefix the part number with the desired travel time from 0 to maximum of 5, 15, 30, or 60 seconds.

The synchronous motor is designed for operation on 120 volts, 50/60 hertz single phase lines and draws approximately 0.3 amperes.

| PART NO.                                         | WIRING                            | INPUT |                         | OUTPUT                           |                             |            |                               |            | SHAFT<br>ROTATION<br>FOR<br>VOLTAGE<br>INCREASE | TERMINAL CONNECTIONS<br>(For increasing Voltage)<br>As Viewed from Base End |                           |                                  | SCHE-<br>MATIC<br>(Pg 8 & 9)     | NET<br>WT.<br>LBS.               | (Max)<br>MOTOR<br>DRIVEN |                                  |                                  |                                  |        |        |        |                |
|--------------------------------------------------|-----------------------------------|-------|-------------------------|----------------------------------|-----------------------------|------------|-------------------------------|------------|-------------------------------------------------|-----------------------------------------------------------------------------|---------------------------|----------------------------------|----------------------------------|----------------------------------|--------------------------|----------------------------------|----------------------------------|----------------------------------|--------|--------|--------|----------------|
|                                                  |                                   | VOLTS | HERTZ                   | VOLTS                            | CONSTANT<br>CURRENT<br>LOAD |            | CONSTANT<br>IMPEDANCE<br>LOAD |            |                                                 | Input                                                                       | Jumper*                   | Output                           |                                  |                                  |                          |                                  |                                  |                                  |        |        |        |                |
|                                                  |                                   |       |                         |                                  | MAX<br>AMPS                 | MAX<br>KVA | MAX<br>AMPS                   | MAX<br>KVA |                                                 |                                                                             |                           |                                  |                                  |                                  |                          |                                  |                                  |                                  |        |        |        |                |
| 1010B<br>1010BCT<br>M1010B†<br>M1010BCT†         | Single<br>Phase                   | 120   | 50/60                   | 0-120                            | 10                          | 1.2        | 13                            | 1.56       | CW<br>CCW<br>CW<br>CCW                          | 1-4<br>1-4<br>4-5<br>1-2                                                    | —<br>—<br>—<br>—          | 4-3<br>1-3<br>4-3<br>1-3         | 10                               | 10 1/4                           | 16 3/4                   |                                  |                                  |                                  |        |        |        |                |
| 1010B-2<br>1010BCT-2<br>M1010B-2†<br>M1010BCT-2† | Single<br>Phase<br>Series         | 240   | 50/60                   | 0-240                            | 10                          | 2.4        | 13                            | 3.12       | CW<br>CCW<br>CW<br>CCW                          | 1-1<br>4-4<br>5-5<br>2-2                                                    | 4-4<br>1-1<br>4-4<br>1-1  | 3-3<br>3-3<br>3-3<br>3-3         | 10 & 4                           | 22 1/2                           | 30 7/8                   |                                  |                                  |                                  |        |        |        |                |
|                                                  |                                   |       |                         | 0-280                            | 10                          | 2.8        | —                             | —          | CW<br>CCW                                       | 5-5<br>2-2                                                                  | 4-4<br>1-1                | 3-3<br>3-3                       |                                  |                                  |                          |                                  |                                  |                                  |        |        |        |                |
|                                                  |                                   |       |                         | Three<br>Phase<br>Open<br>Deltas | 120++                       | 50/60      | 0-120                         | 10         | 2.08                                            | 13                                                                          | 2.70                      | CW<br>CCW<br>CW<br>CCW           |                                  |                                  |                          | 1-4-1<br>4-1-4<br>5-4-5<br>2-1-2 | 4-4<br>1-1<br>4-4<br>1-1         | 3-4-3<br>3-1-3<br>3-4-3<br>3-1-3 | 10 & 5 |        |        |                |
|                                                  |                                   |       |                         |                                  |                             |            | 0-140                         | 10         | 2.42                                            | —                                                                           | —                         | CW<br>CCW                        |                                  |                                  |                          | 5-4-5<br>2-1-2                   | 4-4<br>1-1                       | 3-4-3<br>3-1-3                   |        |        |        |                |
|                                                  | Three<br>Phase<br>Wye             | 240++ | 50/60                   |                                  |                             |            | 0-240                         | 10         | 4.16                                            | 13                                                                          | 5.4                       | CW<br>CCW<br>CW<br>CCW           | 1-1-1<br>4-4-4<br>5-5-5<br>2-2-2 |                                  |                          | 4-4-4<br>1-1-1<br>4-4-4<br>1-1-1 | 3-3-3<br>3-3-3<br>3-3-3<br>3-3-3 | 10 & 6                           |        | 34 1/2 | 42 1/2 |                |
|                                                  |                                   |       |                         |                                  |                             |            | 60                            | 0-280      | 10                                              | 4.85                                                                        | —                         | —                                | CW<br>CCW                        |                                  |                          | 5-5-5<br>2-2-2                   | 4-4-4<br>1-1-1                   |                                  |        |        |        | 3-3-3<br>3-3-3 |
|                                                  |                                   |       | Single<br>Phase         | 120                              | 50/60                       | 0-140      |                               | 10‡        | 1.4                                             | —                                                                           | —                         | CW                               | LINE CORD &<br>RECEPTACLE        |                                  |                          | 3                                | 10 1/4                           |                                  | —      |        |        |                |
|                                                  |                                   |       | 3PN1010BA<br>3PN1010BV  | Single<br>Phase                  | 120                         | 50/60      | 0-140                         | 10‡        | 1.4                                             | w/Ammeter<br>w/Voltmeter                                                    |                           | CW                               | LINE CORD &<br>RECEPTACLE        |                                  |                          | 9                                | 10 1/4                           |                                  | —      |        |        |                |
| 1020B<br>1020BCT<br>M1020B†<br>M1020BCT†         | Single<br>Phase                   | 240   | 50/60                   | 0-240                            | 3.5                         | 0.84       | 5.0                           | 1.20       | CW<br>CCW<br>CW<br>CCW                          | 1-4<br>1-4<br>4-5<br>1-2                                                    | —<br>—<br>—<br>—          | 4-3<br>1-3<br>4-3<br>1-3         | 12                               | 10 1/4                           | 16 3/4                   |                                  |                                  |                                  |        |        |        |                |
|                                                  |                                   |       |                         | 0-280                            | 3.5                         | 0.98       | —                             | —          | CW<br>CCW                                       | 1-2<br>1-2                                                                  | —<br>—                    | 4-3<br>1-3                       |                                  |                                  |                          |                                  |                                  |                                  |        |        |        |                |
|                                                  |                                   | 120   | 50/60                   | 0-280                            | 3.5#                        | 0.42§      | —                             | —          | CW<br>CCW                                       | 4-7<br>1-6                                                                  | —<br>—                    | 4-3<br>1-3                       |                                  |                                  |                          |                                  |                                  |                                  |        |        |        |                |
|                                                  |                                   |       |                         | 0-480                            | 3.5                         | 1.68       | 5.0                           | 2.4        | CW<br>CCW<br>CW<br>CCW                          | 1-1<br>4-4<br>5-5<br>2-2                                                    | 4-4<br>1-1<br>4-4<br>1-1  | 3-2<br>3-3<br>3-3<br>3-3         |                                  |                                  |                          | 12 & 4                           | 22 1/2                           | 30 3/4                           |        |        |        |                |
| Single<br>Phase<br>Series                        | 480                               | 50/60 | 0-560                   | 3.5                              | 1.96                        | —          | —                             | CW<br>CCW  | 5-5<br>2-2                                      | 4-4<br>1-1                                                                  | 3-3<br>3-3                |                                  |                                  |                                  |                          |                                  |                                  |                                  |        |        |        |                |
|                                                  |                                   |       | 240                     | 50/60                            | 0-560                       | 3.5#       | 0.84§                         | —          | —                                               | CW<br>CCW                                                                   | 7-7<br>6-6                | 4-4<br>1-1                       | 3-3<br>3-3                       |                                  |                          |                                  |                                  |                                  |        |        |        |                |
|                                                  | Three<br>Phase<br>Open<br>Delta π | 240++ | 50/60                   | 0-240                            | 3.5                         | 1.45       | 5.0                           | 2.08       | CW<br>CCW<br>CW<br>CCW                          | 1-4-1<br>4-1-4<br>5-4-5<br>2-1-2                                            | 4-4<br>1-1<br>4-4<br>1-1  | 3-4-3<br>3-1-3<br>3-4-3<br>3-1-3 | 12 & 5                           |                                  |                          |                                  |                                  |                                  |        |        |        |                |
|                                                  |                                   |       |                         | 0-280                            | 3.5                         | 1.70       | —                             | —          | CW<br>CCW                                       | 7-4-7<br>6-1-6                                                              | 4-4<br>1-1                | 3-4-3<br>3-1-3                   |                                  |                                  |                          |                                  |                                  |                                  |        |        |        |                |
| 120++                                            |                                   | 50/60 | 0-280                   | 3.5#                             | 0.73§                       | —          | —                             | CW<br>CCW  | 7-4-7<br>6-1-6                                  | 4-4<br>1-1                                                                  | 3-4-3<br>3-1-3            |                                  |                                  |                                  |                          |                                  |                                  |                                  |        |        |        |                |
|                                                  |                                   |       | Three<br>Phase<br>Wye π | 480++                            | 50/60                       | 0-480      | 3.5                           | 2.91       | 5.0                                             | 4.16                                                                        | CW<br>CCW<br>CW<br>CCW    | 1-1-1<br>4-4-4<br>5-5-5<br>2-2-2 | 4-4-4<br>1-1-1<br>4-4-4<br>1-1-1 | 3-3-3<br>3-3-3<br>3-3-3<br>3-3-3 | 12 & 6                   | 34 1/2                           |                                  |                                  | 42 1/4 |        |        |                |
|                                                  | 60                                |       |                         |                                  |                             | 0-560      | 3.5                           | 3.40       | —                                               | —                                                                           | CW<br>CCW                 | 7-7-7<br>6-6-6                   | 4-4-4<br>1-1-1                   | 3-3-3<br>3-3-3                   |                          |                                  |                                  |                                  |        |        |        |                |
|                                                  |                                   |       |                         | 240++                            | 60                          | 0-560      | 3.5#                          | 1.46§      | —                                               | —                                                                           | CW<br>CCW                 | 7-7-7<br>6-6-6                   | 4-4-4<br>1-1-1                   | 3-3-3<br>3-3-3                   |                          |                                  |                                  |                                  |        |        |        |                |
| 3PN1020B                                         | Single<br>Phase                   | 240   |                         | 50/60                            | 0-280                       | 3.5‡       | 0.98                          | —          | —                                               | CW                                                                          | LINE CORD &<br>RECEPTACLE |                                  |                                  | 3                                |                          |                                  | 10 1/4                           | —                                |        |        |        |                |
| 3PN1020BA<br>3PN1020BV                           | Single<br>Phase                   | 240   | 50/60                   | 0-280                            | 3.5‡                        | 0.98       | w/Ammeter<br>w/Voltmeter      |            | CW                                              | LINE CORD &<br>RECEPTACLE                                                   |                           |                                  | 9                                | 10 1/4                           | —                        |                                  |                                  |                                  |        |        |        |                |

\* Jumper provided in the standard common position and should be moved or removed as required.

++ Line to line voltage

‡ Unit is fused for the constant current rating at the factory.

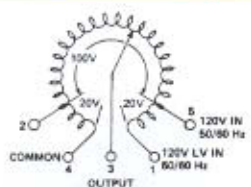
† Motor driven units use terminal connections for CCW increasing voltage, as viewed from the base end. See Fig 23 on page 9 for motor wiring.

§ Maximum KVA at maximum output voltage and corresponding derated output current. Maximum KVA for lower voltages may be calculated from derating curve Figure B, page 6.

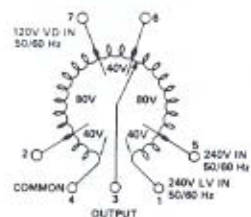
π If ganged units are used in a system that ordinarily has a common neutral or ground between source and load, the neutral or ground must be connected to the common terminals of the variable transformer assembly. If the system has no neutral, the load must be balanced or the transformers will be damaged.

# Maximum output current in output voltage range from 0 to 25% above line voltage. At higher output voltages, the output current must be reduced according to the derating curve. Figure B, page 6.

# 1000/1200 Series



VIEW FROM BASE END  
For opposite rotation interchange external connections from 5 to 2 and 4 to 1. Terminals 2 and 5 omitted on 1210.



VIEW FROM BASE END  
For opposite rotation interchange external connections from 5 to 2, 4 to 1 and 7 to 6. Terminals 2, 5, 6 and 7 omitted on 1220.



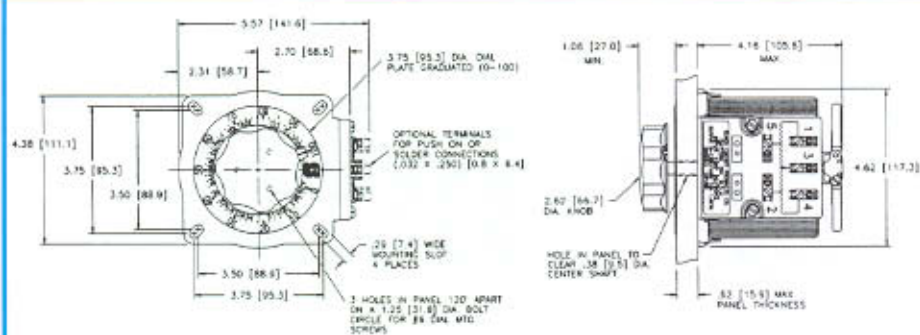
1010B



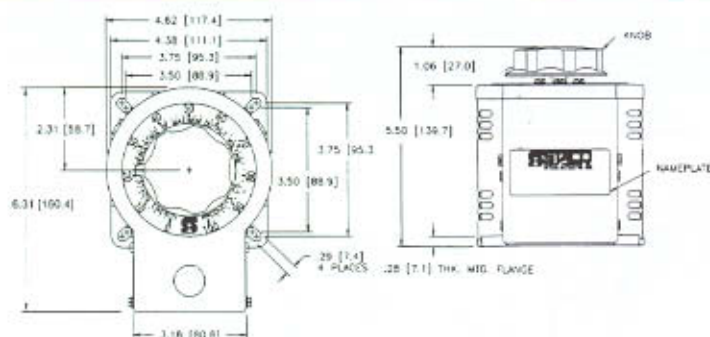
1210BCT



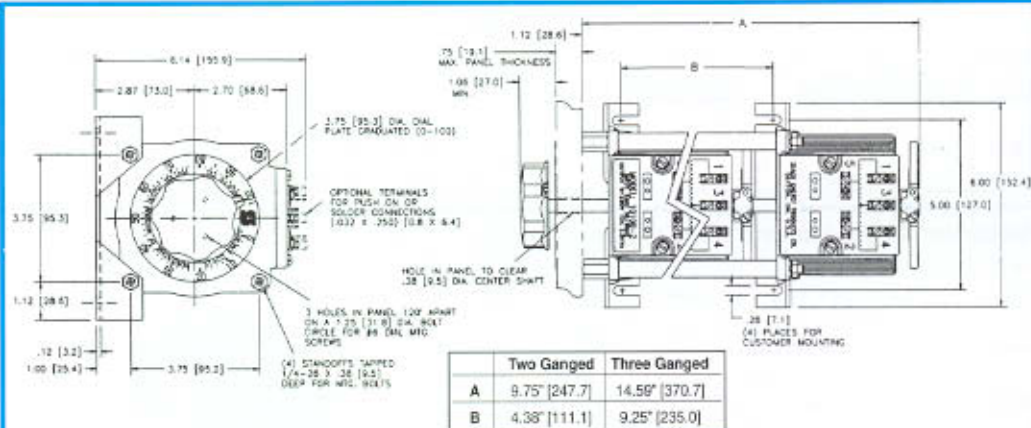
30M1010B



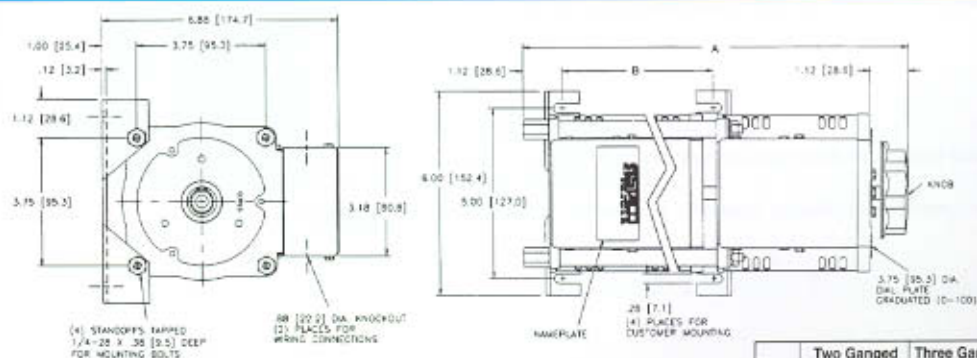
Single Unit, Uncased



Single Unit, Cased

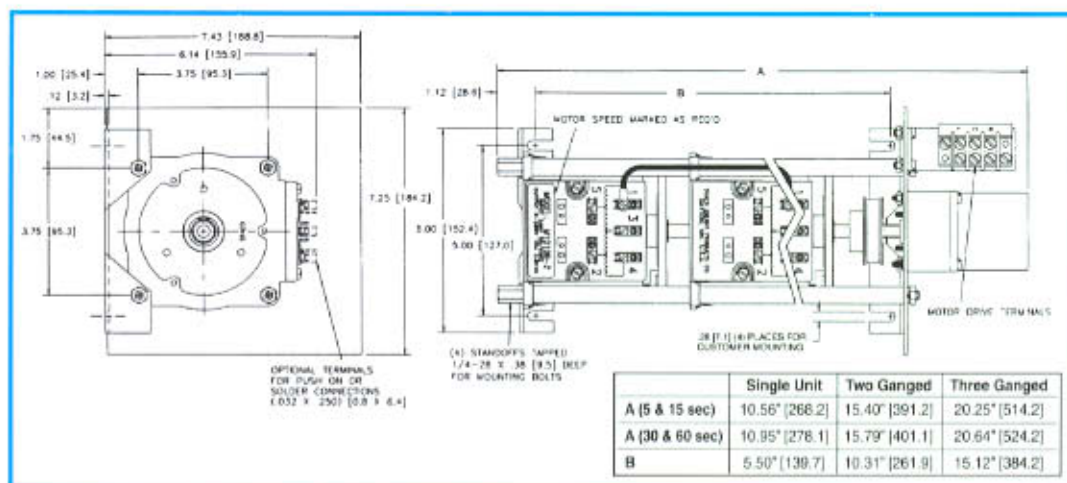


Two and Three Ganged, Uncased



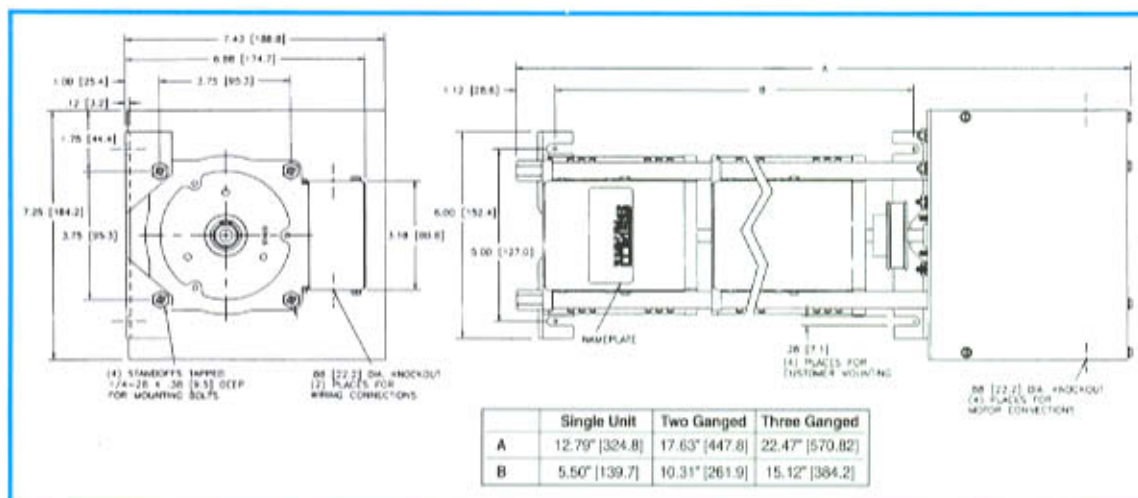
Two and Three Ganged, Cased

# 1000/1200 Series



**1210B**  
**Front View**

**Motorized Single, Two and Three Ganged, Uncased**



**1210B**  
**Rear View**

**Motorized Single, Two and Three Ganged, Cased**



**1220BCT-2**



**15M1010B-2**

# 1200 Series

The 1210B operates on 120 volts and is rated for constant current of 12 amperes. The 1220B operates on 240 volts and constant current of 5 amperes. The 1210B and 1220B operate from 0 to line voltage only. There is no reduction in allowable output current up to 1500 hertz.

Uncased models have the shaft extending from the base end. This shaft is fully adjustable and can be extended from either end for general utility mounting. Cased styles, which have a "CT" suffix, feature the protective screening over the coil assembly and a terminal box cover with knock-outs to

accept conduit.

Motor driven units are available in single, two and three ganged assemblies; cased or uncased styles as identified by the prefix "M" in the type number. If a motor driven model is ordered, be sure to prefix the part number with the desired travel time from 0 to maximum of 5, 15, 30, or 60 seconds.

The synchronous motor is designed for operation on 120 volts, 50/60 hertz single phase lines and draws approximately 0.3 amperes.

| PART NO.                                         | WIRING                   | INPUT |       | OUTPUT |                       |         |                         |         | SHAFT ROTATION FOR VOLTAGE INCREASE | TERMINAL CONNECTIONS<br>(For increasing Voltage)<br>As Viewed from Base End |                |                | SCHE-MATIC<br>(Pg 8 & 9) | NET WT. LBS. | (Max) MOTOR DRIVEN |
|--------------------------------------------------|--------------------------|-------|-------|--------|-----------------------|---------|-------------------------|---------|-------------------------------------|-----------------------------------------------------------------------------|----------------|----------------|--------------------------|--------------|--------------------|
|                                                  |                          | VOLTS | HERTZ | VOLTS  | CONSTANT CURRENT LOAD |         | CONSTANT IMPEDANCE LOAD |         |                                     | Input                                                                       | Jumper*        | Output         |                          |              |                    |
|                                                  |                          |       |       |        | MAX AMPS              | MAX KVA | MAX AMPS                | MAX KVA |                                     |                                                                             |                |                |                          |              |                    |
| 1210B<br>1210BCT<br>M1210B†<br>M1210BCT†         | Single Phase             | 120   | 60    | 0-120  | 12                    | 1.44    | 15                      | 1.80    | CW<br>CCW                           | 1-4<br>1-4                                                                  | —<br>—         | 4-3<br>1-3     | 13                       | 10 1/4       | 16 3/4             |
| 1210B-2<br>1210BCT-2<br>M1210B-2†<br>M1210BCT-2† | Single Phase Series      | 240   | 60    | 0-240  | 12                    | 2.88    | 15                      | 3.60    | CW<br>CCW                           | 1-1<br>4-4                                                                  | 4-4<br>1-1     | 3-3<br>3-3     | 13 & 4                   | 22 1/2       | 30 3/4             |
|                                                  | Three Phase Open Delta π | 120++ | 60    | 0-120  | 12                    | 2.49    | 15                      | 3.12    | CW                                  | 1-4-1                                                                       | 4-4            | 3-4-3          | 13 & 5                   |              |                    |
|                                                  |                          |       |       |        |                       |         |                         |         | CCW                                 | 4-1-4                                                                       | 1-1            | 3-1-3          |                          |              |                    |
|                                                  |                          |       |       |        |                       |         |                         |         |                                     |                                                                             |                |                |                          |              |                    |
| 1210B-3<br>1210BCT-3<br>M1210B-3†<br>M1210BCT-3† | Three Phase Wye π        | 240++ | 60    | 0-240  | 12                    | 4.96    | 15                      | 6.24    | CW<br>CCW                           | 1-1-1<br>4-4-4                                                              | 4-4-4<br>1-1-1 | 3-3-3<br>3-3-3 | 13 & 6                   | 34 1/2       | 42 1/4             |
| 3PN1210B                                         | Single Phase             | 120   | 60    | 0-120  | 12‡                   | 1.44    | 15                      | 1.80    | CW                                  | LINE CORD & RECEPTACLE                                                      |                |                | 11                       | 10 1/4       | —                  |
| 1220B<br>1220BCT<br>M1220B†<br>M1220BCT†         | Single Phase             | 240   | 60    | 0-240  | 5.0                   | 1.20    | 7.0                     | 1.68    | CW<br>CCW                           | 1-4<br>1-4                                                                  | —<br>—         | 4-3<br>1-3     | 13                       | 10 1/4       | 16 3/4             |
| 1220B-2<br>1220BCT-2<br>M1220B-2†<br>M1220BCT-2† | Single Phase Series      | 480   | 60    | 0-480  | 5.0                   | 2.40    | 7.0                     | 3.36    | CW<br>CCW                           | 1-1<br>4-4                                                                  | 4-4<br>1-1     | 3-3<br>3-3     | 13 & 4                   | 22 1/2       | 30 3/4             |
|                                                  | Three Phase Open Delta π | 240++ | 60    | 0-240  | 5.0                   | 2.08    | 7.0                     | 2.91    | CW                                  | 1-4-1                                                                       | 4-4            | 3-4-3          | 13 & 5                   |              |                    |
|                                                  |                          |       |       |        |                       |         |                         |         | CCW                                 | 4-1-4                                                                       | 1-1            | 3-1-3          |                          |              |                    |
|                                                  |                          |       |       |        |                       |         |                         |         |                                     |                                                                             |                |                |                          |              |                    |
| 1220B-3<br>1220BCT-3<br>M1220B-3†<br>M1220BCT-3† | Three Phase Wye π        | 480++ | 60    | 0-480  | 5.0                   | 4.16    | 7.0                     | 5.82    | CW<br>CCW                           | 1-1-1<br>4-4-4                                                              | 4-4-4<br>1-1-1 | 3-3-3<br>3-3-3 | 13 & 6                   | 34 1/2       | 42 1/4             |
| 3PN1220B                                         | Single Phase             | 240   | 60    | 0-240  | 5.0‡                  | 1.20    | 7.0                     | 1.68    | CW                                  | LINE CORD & RECEPTACLE                                                      |                |                | 11                       | 10 1/4       | —                  |

\* Jumper provided in the standard common position and should be moved or removed as required.

++ Line to line voltage

‡ Unit is fused for the constant current rating at the factory.

† Motor driven units use terminal connections for CCW increasing voltage, as viewed from the base end. See Figure 23 on page 9 for motor wiring.

π If ganged units are used in a system that ordinarily has a common neutral or ground between source and load, the neutral or ground must be connected to the common terminals of the variable transformer assembly. If the system has no neutral, the load must be balanced or the transformers will be damaged.

# Maximum output current in output voltage range from 0 to 25% above line voltage. At higher output voltages, the output current must be reduced according to the derating curve, Figure B, page 6.

# 1500 Series

The 1510/1520 Series Variable Transformers are highly reliable, dependable and accurate AC control devices. The 1510, 120 volt unit is rated at 15 amperes for constant current loads; while the 1520, 240 volt unit is rated at 9.5 amperes for constant current loads. Constant impedance ratings are listed in the specifications. They can be operated at frequencies between 50 and 2000 hertz with derating at higher than rated frequency.

Uncased models have the shaft extending from the base end. This shaft is fully adjustable and can be extended from either end for general utility mounting. Cased styles are available in either "C" style (featuring protective screening over the coil assembly

only) or the "CT" style (which also includes a terminal box cover with knock-outs to accept conduit).

Motor driven units are available in single, two and three ganged assemblies; cased or uncased styles as identified by the prefix "M" in the type number. If a motor driven model is ordered, be sure to prefix the part number with the desired travel time from 0 to maximum of 5, 15, 30, or 60 seconds.

The synchronous motor is designed for operation on 120 volts, 50/60 hertz single phase lines and draws approximately 0.3 amperes.

| PART NUMBER                   |                                     | WIRING                        | INPUT                               |                                     | OUTPUT                 |                       |         |                         | SHAFT ROTATION FOR VOLTAGE INCREASE | TERMINAL CONNECTIONS (FOR INCREASING VOLTAGE) AS VIEWED FROM BASE END |                                  |                                  | SCHE-MATIC (Pg 8 & 9)            | NET WEIGHT LBS. MAX.             |              |         |                                  |                                  |                          |        |        |        |
|-------------------------------|-------------------------------------|-------------------------------|-------------------------------------|-------------------------------------|------------------------|-----------------------|---------|-------------------------|-------------------------------------|-----------------------------------------------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|--------------|---------|----------------------------------|----------------------------------|--------------------------|--------|--------|--------|
| MANUALLY OPERATED             | MOTOR DRIVEN                        |                               | VOLTS                               | HERTZ                               | VOLTS                  | CONSTANT CURRENT LOAD |         | CONSTANT IMPEDANCE LOAD |                                     | INPUT                                                                 | JUMPER*                          | OUTPUT                           |                                  | MAN-UAL                          | MOTOR DRIVEN |         |                                  |                                  |                          |        |        |        |
|                               |                                     |                               |                                     |                                     |                        | MAX AMPS              | MAX KVA | MAX AMPS                |                                     |                                                                       |                                  |                                  |                                  |                                  |              | MAX KVA |                                  |                                  |                          |        |        |        |
| 1510<br>1510C<br>1510CT       | M1510+<br>M1510C+<br>M1510CT+       | Single Phase                  | 120                                 | 50/60                               | 0-120                  | 15                    | 1.80    | 20                      | 2.40                                | CW<br>CCW<br>CW<br>CCW                                                | 2-4<br>2-4<br>1-4<br>5-2         | —<br>—<br>—<br>—                 | 4-3<br>2-3<br>4-3<br>2-3         | 14                               | 15 3/4       | 26      |                                  |                                  |                          |        |        |        |
| 1510-2<br>1510C-2<br>1510CT-2 | M1510-2+<br>M1510C-2+<br>M1510CT-2+ | Single Phase Series           | 240                                 | 50/60                               | 0-240                  | 15                    | 3.60    | 20                      | 4.80                                | CW<br>CCW<br>CW<br>CCW                                                | 2-2<br>4-4<br>1-1<br>5-5         | 4-4<br>2-2<br>4-4<br>2-2         | 3-3<br>3-3<br>3-3<br>3-3         | 14 & 4                           | 35 1/4       | 45 1/2  |                                  |                                  |                          |        |        |        |
|                               |                                     |                               |                                     |                                     | 0-280                  | 15                    | 4.20    | —                       | —                                   | CW<br>CCW                                                             | 1-1<br>5-5                       | 4-4<br>2-2                       | 3-3<br>3-3                       | 14 & 5                           |              |         |                                  |                                  |                          |        |        |        |
|                               |                                     |                               |                                     |                                     | Three Phase Open Delta | 120++                 | 50/60   | 0-120                   | 15                                  | 3.12                                                                  | 20                               | 4.15                             | CW<br>CCW<br>CW<br>CCW           | 2-4-2<br>4-2-4<br>1-4-1<br>5-2-5 |              |         | 4-4<br>2-2<br>4-4<br>2-2         | 3-4-3<br>3-2-3<br>3-4-3<br>3-2-3 | 14 & 5                   |        |        |        |
|                               |                                     |                               |                                     |                                     |                        |                       |         | 0-140                   | 15                                  | 3.64                                                                  | —                                | —                                |                                  |                                  |              |         |                                  |                                  |                          |        |        |        |
|                               |                                     | 1510-3<br>1510C-3<br>1510CT-3 | M1510-3+<br>M1510C-3+<br>M1510CT-3+ | Three Phase Wye                     | 240++                  | 50/60                 | 0-240   | 15                      | 6.22                                | 20                                                                    | 8.30                             | CW<br>CCW<br>CW<br>CCW           | 2-2-2<br>4-4-4<br>1-1-1<br>5-5-5 | 4-4-4<br>2-2-2<br>4-4-4<br>2-2-2 |              |         | 3-3-3<br>3-3-3<br>3-3-3<br>3-3-3 | 14 & 6                           | 55 1/2                   | 65 3/4 |        |        |
|                               |                                     |                               |                                     |                                     |                        | 60                    | 0-280   | 15                      | 7.26                                | —                                                                     | —                                |                                  |                                  |                                  |              |         |                                  |                                  |                          |        |        |        |
| 3PN1510B                      | —                                   | Single Phase                  | 120                                 | 50/60                               | 0-140                  | 15‡                   | 2.10    | —                       | —                                   | CW                                                                    | LINE CORD & RECEPTACLE           |                                  |                                  | 3                                | 18           | —       |                                  |                                  |                          |        |        |        |
| 3PN1510BA<br>3PN1510BV        | —                                   | Single Phase                  | 120                                 | 50/60                               | 0-140                  | 15‡                   | 2.10    | —                       | —                                   | CW                                                                    | LINE CORD & RECEPTACLE           |                                  |                                  | 9                                | 18           | —       |                                  |                                  |                          |        |        |        |
| 1520<br>1520C<br>1520CT       | M1520+<br>M1520C+<br>M1520CT+       | Single Phase                  | 240                                 | 50/60                               | 0-240                  | 9.5                   | 2.28    | 12                      | 2.88                                | CW<br>CCW<br>CW<br>CCW                                                | 2-4<br>2-4<br>1-4<br>5-2         | —<br>—<br>—<br>—                 | 4-3<br>2-3<br>4-3<br>2-3         | 15                               | 19 1/4       | 29 1/2  |                                  |                                  |                          |        |        |        |
|                               |                                     |                               |                                     |                                     | 0-280                  | 9.5                   | 2.66    | —                       | —                                   | CW<br>CCW                                                             | 7-4<br>6-2                       | —<br>—                           | 4-3<br>2-3                       |                                  |              |         |                                  |                                  |                          |        |        |        |
|                               |                                     |                               |                                     |                                     | 120                    | 50/60                 | 0-280   | 9.5#                    | 1.14§                               | —                                                                     | —                                | CW<br>CCW                        | 7-4<br>6-2                       |                                  |              |         | —<br>—                           | 4-3<br>2-3                       |                          |        |        |        |
|                               |                                     |                               |                                     |                                     |                        |                       |         |                         |                                     |                                                                       |                                  |                                  |                                  |                                  |              |         |                                  |                                  |                          |        |        |        |
|                               |                                     |                               | 1520-2<br>1520C-2<br>1520CT-2       | M1520-2+<br>M1520C-2+<br>M1520CT-2+ | Single Phase Series    | 480                   | 50/60   | 0-480                   | 9.5                                 | 4.56                                                                  | 12                               | 5.76                             | CW<br>CCW<br>CW<br>CCW           |                                  |              |         | 2-2<br>4-4<br>1-1<br>5-5         | 4-4<br>2-2<br>4-4<br>2-2         | 3-3<br>3-3<br>3-3<br>3-3 | 15 & 4 | 42 1/4 | 52 1/2 |
|                               |                                     |                               |                                     |                                     |                        |                       |         | 0-560                   | 9.5                                 | 5.32                                                                  | —                                | —                                | CW<br>CCW                        |                                  |              |         | 7-7<br>6-6                       | 4-4<br>2-2                       | 3-3<br>3-3               |        |        |        |
| 240                           | 50/60                               | 0-560                         |                                     |                                     |                        | 9.5#                  | 2.28§   | —                       | —                                   | CW<br>CCW                                                             | 2-4-2<br>4-2-4                   | 4-4<br>2-2                       | 3-4-3<br>3-2-3                   | 15 & 5                           |              |         |                                  |                                  |                          |        |        |        |
|                               |                                     | 0-240                         |                                     |                                     |                        | 9.5                   | 3.95    | 12                      | 5.0                                 | CW<br>CCW<br>CW<br>CCW                                                | 2-4-2<br>4-2-4<br>1-4-1<br>5-2-5 | 4-4<br>2-2<br>4-4<br>2-2         | 3-4-3<br>3-2-3<br>3-4-3<br>3-2-3 |                                  |              |         |                                  |                                  |                          |        |        |        |
| Three Phase Open Delta        | 240++                               | 50/60                         |                                     |                                     | 0-240                  | 9.5                   | 3.95    | 12                      | 5.0                                 | CW<br>CCW<br>CW<br>CCW                                                | 2-4-2<br>4-2-4<br>1-4-1<br>5-2-5 | 4-4<br>2-2<br>4-4<br>2-2         | 3-4-3<br>3-2-3<br>3-4-3<br>3-2-3 | 15 & 5                           |              |         |                                  |                                  |                          |        |        |        |
|                               |                                     |                               |                                     |                                     | 0-280                  | 9.5                   | 4.61    | —                       | —                                   | CW<br>CCW                                                             | 7-4-7<br>6-2-6                   | 4-4<br>2-2                       | 3-4-3<br>3-2-3                   |                                  |              |         |                                  |                                  |                          |        |        |        |
|                               | 120++                               | 50/60                         |                                     |                                     | 0-280                  | 9.5#                  | 1.98§   | —                       | —                                   | CW<br>CCW                                                             | 7-4-7<br>6-2-6                   | 4-4<br>2-2                       | 3-4-3<br>3-2-3                   |                                  |              |         |                                  |                                  |                          |        |        |        |
|                               |                                     |                               |                                     |                                     |                        |                       |         |                         |                                     |                                                                       |                                  |                                  |                                  |                                  |              |         |                                  |                                  |                          |        |        |        |
| 1520-3<br>1520C-3<br>1520CT-3 | M1520-3+<br>M1520C-3+<br>M1520CT-3+ | Three Phase Wye               | 480++                               | 50/60                               | 0-480                  | 9.5                   | 7.90    | 12                      | 10                                  | CW<br>CCW<br>CW<br>CCW                                                | 2-2-2<br>4-4-4<br>1-1-1<br>5-5-5 | 4-4-4<br>2-2-2<br>4-4-4<br>2-2-2 | 3-3-3<br>3-3-3<br>3-3-3<br>3-3-3 | 15 & 6                           | 66           | 76 1/4  |                                  |                                  |                          |        |        |        |
|                               |                                     |                               |                                     | 60                                  | 0-560                  | 9.5                   | 9.21    | —                       | —                                   | CW<br>CCW                                                             | 7-7-7<br>6-6-6                   | 4-4-4<br>2-2-2                   | 3-3-3<br>3-3-3                   |                                  |              |         |                                  |                                  |                          |        |        |        |
|                               |                                     |                               | 240++                               | 60                                  | 0-560                  | 9.5#                  | 3.96§   | —                       | —                                   | CW<br>CCW                                                             | 7-7-7<br>6-6-6                   | 4-4-4<br>2-2-2                   | 3-3-3<br>3-3-3                   |                                  |              |         |                                  |                                  |                          |        |        |        |
|                               |                                     |                               |                                     |                                     |                        |                       |         |                         |                                     |                                                                       |                                  |                                  |                                  |                                  |              |         |                                  |                                  |                          |        |        |        |
|                               |                                     |                               | 3PN1520B                            | —                                   | Single Phase           | 240                   | 50/60   | 0-280                   | 9.5‡                                | 2.66                                                                  | —                                | —                                | CW                               | LINE CORD & RECEPTACLE           |              |         | 3                                | 22                               | —                        |        |        |        |
|                               |                                     |                               |                                     |                                     |                        |                       |         |                         |                                     |                                                                       |                                  |                                  |                                  |                                  |              |         |                                  |                                  |                          |        |        |        |

\*A" suffix includes Ammeter, "V" suffix includes Voltmeter

+ Motor driven units use terminal connections for CCW increasing voltage, as viewed from the base end. See Fig 23 on page 9 for motor wiring.

• Jumper provided in the standard common position and should be moved or removed as required.

++ Line to line voltage

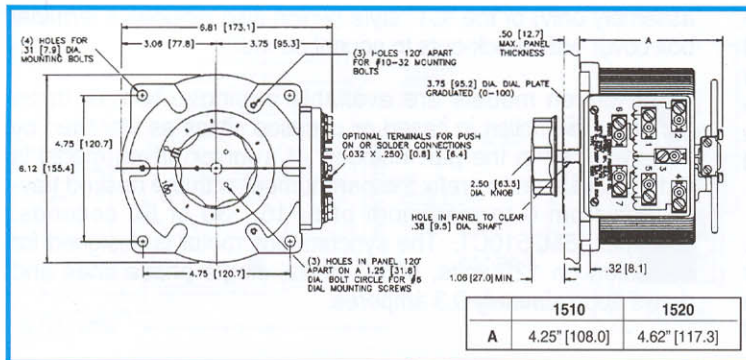
† Unit is fused for the constant current rating at the factory.

§ Maximum KVA at maximum output voltage and corresponding derated output current. Maximum KVA for lower voltages may be calculated from derating curve Figure B, page 6.

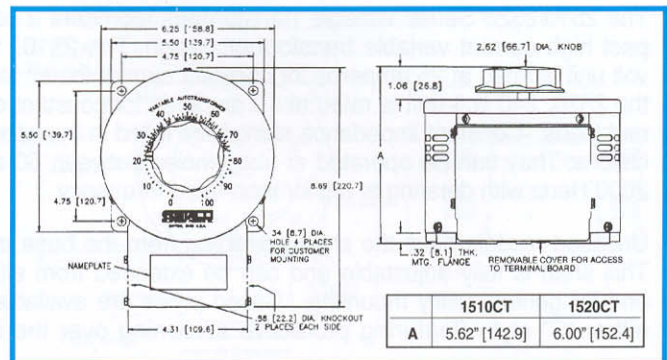
z If ganged units are used in a system that ordinarily has a common neutral or ground between source and load, the neutral or ground must be connected to the common terminals of the variable transformer assembly. If the system has no neutral, the load must be balanced or the transformers will be damaged.

# Maximum output current in output voltage range from 0 to 25% above line voltage. At higher output voltages, the output current must be reduced according to the derating curve, Figure B, page 6.

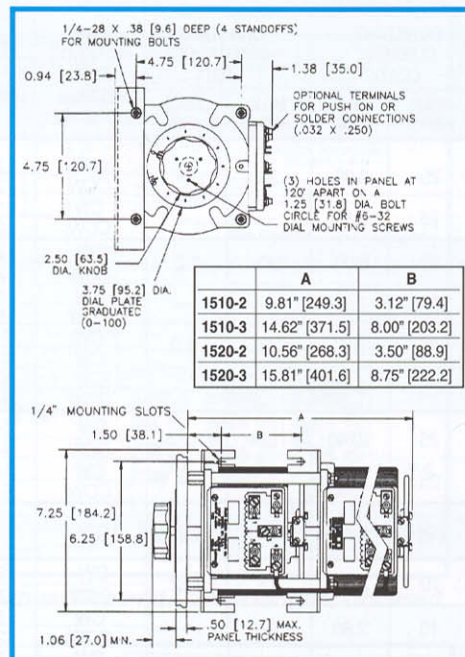
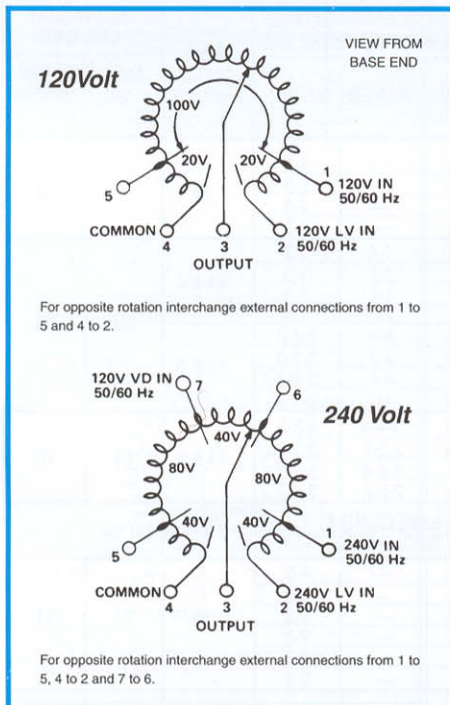
# 1500 Series



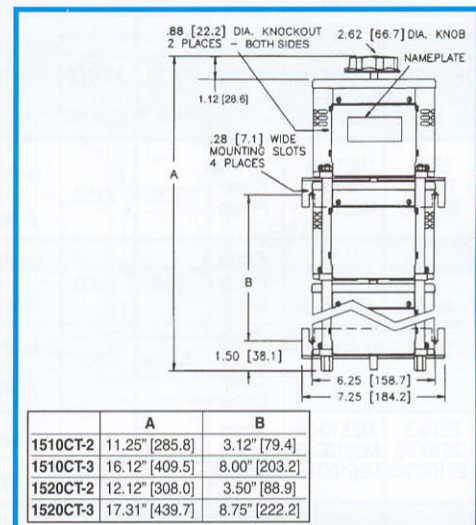
Manual Single, Uncased



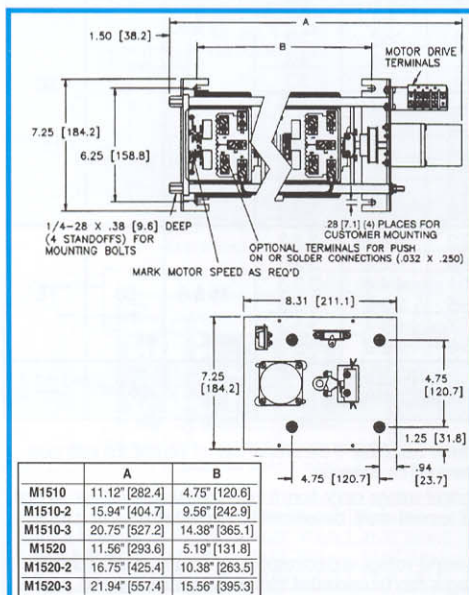
Manual Single, Cased



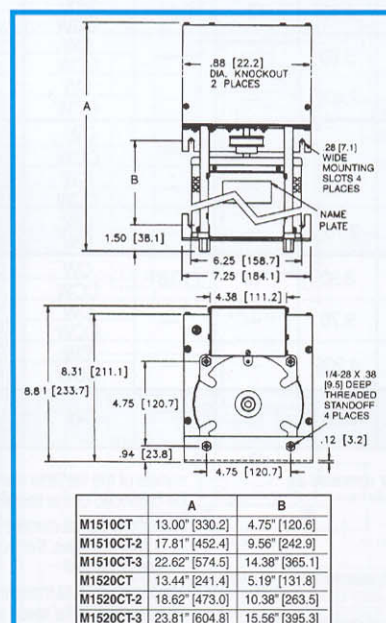
Manual Two- and Three-Ganged, Uncased



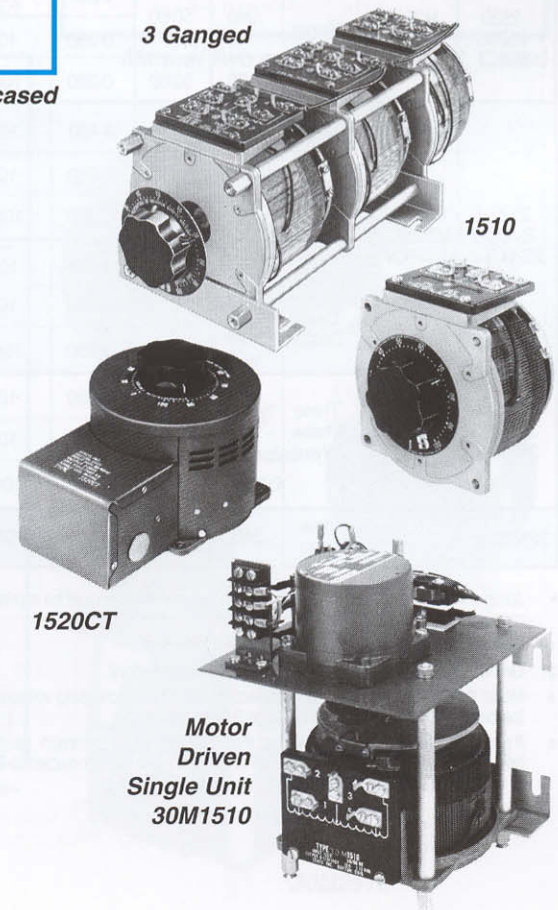
Manual Two- and Three-Ganged, Cased



Motor-Driven Single, Two and Three-Ganged, Uncased



Motor-Driven Single, Two and Three-Ganged, Cased



## 2500 Series

The 2510/2520 Series Variable Transformers represent a compact high current variable transformer design. The 2510, 120 volt unit is rated at 25 amperes for constant current loads; while the 2520, 240 volt unit is rated at 10 amperes for constant current loads. Constant impedance ratings are listed in the specifications. They can be operated at frequencies between 50 and 2000 Hertz with derating at higher than rated frequency.

Uncased models have the shaft extending from the base end. This shaft is fully adjustable and can be extended from either end for general utility mounting. Cased styles are available in either "C" style (featuring protective screening over the coil

assembly only) or the "CT" style (which also includes a terminal box cover with knock-outs to accept conduit).

Motor-driven models are available in single, two, or three ganged assemblies in cased or uncased styles as identified by the prefix "M" in the part number. If a motor driven model is ordered, be sure to prefix the part number with the desired travel time from 0 to maximum of 5, 15, 30 or 60 seconds. Example: 5M2510CT. The synchronous motor is designed for operation on 120 volts, 50/60 Hertz, single phase lines and draws approximately 0.3 amperes.

| PART NUMBER                   |                                     | WIRING                 | INPUT |       | OUTPUT |                       |         |                         | SHAFT ROTATION FOR VOLTAGE INCREASE | TERMINAL CONNECTIONS (FOR INCREASING VOLTAGE) AS VIEWED FROM BASE END |                                  |                          | SCHE-MATIC (Pg 8 & 9)            | NET WEIGHT LBS. MAX.             |              |         |                                  |                                  |        |    |    |
|-------------------------------|-------------------------------------|------------------------|-------|-------|--------|-----------------------|---------|-------------------------|-------------------------------------|-----------------------------------------------------------------------|----------------------------------|--------------------------|----------------------------------|----------------------------------|--------------|---------|----------------------------------|----------------------------------|--------|----|----|
| MANUALLY OPERATED             | MOTOR DRIVEN                        |                        | VOLTS | HERTZ | VOLTS  | CONSTANT CURRENT LOAD |         | CONSTANT IMPEDANCE LOAD |                                     | INPUT                                                                 | JUMPER*                          | OUTPUT                   |                                  | MAN-UAL                          | MOTOR DRIVEN |         |                                  |                                  |        |    |    |
|                               |                                     |                        |       |       |        | MAX AMPS              | MAX KVA | MAX AMPS                |                                     |                                                                       |                                  |                          |                                  |                                  |              | MAX KVA |                                  |                                  |        |    |    |
| 2510<br>2510C<br>2510CT       | M2510+<br>M2510+<br>M2510CT+        | Single Phase           | 120   | 50/60 | 0-120  | 25                    | 3.00    | 30                      | 3.6                                 | CW<br>CCW<br>CW<br>CCW                                                | 2-4<br>2-4<br>1-4<br>2-5         | —<br>—<br>—<br>—         | 4-3<br>2-3<br>4-3<br>2-3         | 14                               | 21           | 31      |                                  |                                  |        |    |    |
| 2510-2<br>2510C-2<br>2510CT-2 | M2510-2+<br>M2510C-2+<br>M2510CT-2+ | Single Phase Series    | 240   | 50/60 | 0-240  | 25                    | 6.00    | 30                      | 7.2                                 | CW<br>CCW<br>CW<br>CCW                                                | 2-2<br>4-4<br>1-1<br>5-5         | 4-4<br>2-2<br>4-4<br>2-2 | 3-3<br>3-3<br>3-3<br>3-3         | 14 & 4                           | 50           | 60      |                                  |                                  |        |    |    |
|                               |                                     |                        |       |       | 0-280  | 25                    | 7.00    | —                       | —                                   | CW<br>CCW                                                             | 1-1<br>5-5                       | 4-4<br>2-2               | 3-3<br>3-3                       |                                  |              |         |                                  |                                  |        |    |    |
|                               |                                     | Three Phase Open Delta | 120++ | 50/60 | 0-120  | 25                    | 5.20    | 30                      | 6.2                                 | CW<br>CW<br>CW<br>CCW                                                 | 2-4-2<br>4-2-4<br>1-4-1<br>5-2-5 | 4-4<br>2-2<br>4-4<br>2-2 | 3-4-3<br>3-2-3<br>3-4-3<br>3-2-3 | 14 & 5                           |              |         |                                  |                                  |        |    |    |
|                               |                                     |                        |       |       | 0-140  | 25                    | 6.06    | —                       | —                                   |                                                                       |                                  |                          |                                  |                                  |              |         |                                  |                                  |        |    |    |
|                               |                                     |                        |       |       | 240++  | 50/60                 | 0-240   | 25                      | 10.40                               | 30                                                                    | 12.5                             | CW<br>CCW<br>CW<br>CCW   | 2-2-2<br>4-4-4<br>1-1-1<br>5-5-5 |                                  |              |         | 4-4-4<br>2-2-2<br>4-4-4<br>2-2-2 | 3-3-3<br>3-3-3<br>3-3-3<br>3-3-3 | 14 & 6 | 68 | 78 |
|                               |                                     |                        |       |       |        |                       | 60      | 0-280                   | 25                                  | 12.10                                                                 | —                                | —                        |                                  |                                  |              |         |                                  |                                  |        |    |    |
| 3PN2210B                      |                                     | Single Phase           | 120   | 50/60 | 0-140  | 22‡                   | 3.08    | —                       | —                                   | CW                                                                    | LINE CORD & RECEPTACLE           |                          |                                  | 3                                | 24 1/4       | —       |                                  |                                  |        |    |    |
| 2520<br>2520C<br>520CT        | M2520+<br>M2520C+<br>M2520CT+       | Single Phase           | 240   | 50/60 | 0-240  | 10                    | 2.40    | 13                      | 3.12                                | CW<br>CCW<br>CW<br>CCW                                                | 2-4<br>2-4<br>1-4<br>2-5         | —<br>—<br>—<br>—         | 4-3<br>2-3<br>4-3<br>2-3         | 15                               | 21           | 31      |                                  |                                  |        |    |    |
|                               |                                     |                        |       |       | 0-280  | 10                    | 2.80    | —                       | —                                   | CW<br>CCW                                                             | 7-4<br>6-2                       | —<br>—                   | 4-3<br>2-3                       |                                  |              |         |                                  |                                  |        |    |    |
|                               |                                     |                        | 120   | 50/60 | 0-280  | 10#                   | 1.20§   | —                       | —                                   | —                                                                     | —                                |                          |                                  |                                  |              |         |                                  |                                  |        |    |    |
|                               |                                     |                        |       |       |        |                       |         |                         |                                     |                                                                       |                                  |                          |                                  |                                  |              |         |                                  |                                  |        |    |    |
| 2520-2<br>2520C-2<br>2520CT-2 | M2520-2+<br>M2520C-2+<br>M2520CT-2+ | Single Phase Series    | 480   | 50/60 | 0-480  | 10                    | 4.80    | 13                      | 6.24                                | CW<br>CCW<br>CW<br>CCW                                                | 2-2<br>4-4<br>1-1<br>5-5         | 4-4<br>2-2<br>4-4<br>2-2 | 3-3<br>3-3<br>3-3<br>3-3         | 15 & 4                           | 50           | 60      |                                  |                                  |        |    |    |
|                               |                                     |                        |       |       | 0-560  | 10                    | 5.60    | —                       | —                                   | CW<br>CCW                                                             | 7-7<br>6-6                       | 4-4<br>2-2               | 3-3<br>3-3                       |                                  |              |         |                                  |                                  |        |    |    |
|                               |                                     |                        | 240   | 50/60 | 0-560  | 10#                   | 2.40§   | —                       | —                                   | —                                                                     | —                                |                          |                                  |                                  |              |         |                                  |                                  |        |    |    |
|                               |                                     |                        |       |       |        |                       |         |                         |                                     |                                                                       |                                  |                          |                                  |                                  |              |         |                                  |                                  |        |    |    |
|                               |                                     | Three Phase Open Delta | 240++ | 50/60 | 0-240  | 10                    | 4.20    | 13                      | 5.40                                | CW<br>CCW<br>CW<br>CCW                                                | 2-4-2<br>4-2-4<br>1-4-1<br>5-2-5 | 4-4<br>2-2<br>4-4<br>2-2 | 3-4-3<br>3-2-3<br>3-4-3<br>3-2-3 | 15 & 5                           |              |         |                                  |                                  |        |    |    |
|                               |                                     |                        |       |       | 0-280  | 10                    | 4.85    | —                       | —                                   | CW<br>CCW                                                             | 7-4-7<br>6-2-6                   | 4-4<br>2-2               | 3-4-3<br>3-2-3                   |                                  |              |         |                                  |                                  |        |    |    |
|                               |                                     |                        | 120++ | 50/60 | 0-280  | 10#                   | 2.10§   | —                       | —                                   | —                                                                     | —                                |                          |                                  |                                  |              |         |                                  |                                  |        |    |    |
|                               |                                     |                        |       |       |        |                       |         |                         |                                     |                                                                       |                                  |                          |                                  |                                  |              |         |                                  |                                  |        |    |    |
|                               |                                     |                        |       |       | 480++  | 50/60                 | 0-480   | 10                      | 8.30                                | 13                                                                    | 10.81                            | CW<br>CCW<br>CW<br>CCW   | 2-2-2<br>4-4-4<br>1-1-1<br>5-5-5 | 4-4-4<br>2-2-2<br>4-4-4<br>2-2-2 |              |         | 3-3-3<br>3-3-3<br>3-3-3<br>3-3-3 | 15 & 6                           | 68     | 78 |    |
|                               |                                     |                        |       |       |        |                       | 0-560   | 10                      | 9.70                                | —                                                                     | —                                | CW<br>CCW                | 7-7-7<br>6-6-6                   | 4-4-4<br>2-2-2                   |              |         | 3-3-3<br>3-3-3                   |                                  |        |    |    |
| 240++                         | 60                                  | 0-560                  | 10#   | 4.20§ |        | —                     | —       | —                       | —                                   |                                                                       |                                  |                          |                                  |                                  |              |         |                                  |                                  |        |    |    |
|                               |                                     |                        |       |       |        |                       |         |                         |                                     |                                                                       |                                  |                          |                                  |                                  |              |         |                                  |                                  |        |    |    |
| 3PN2520B                      |                                     | Single Phase           | 240   | 50/60 | 0-280  | 10‡                   | 2.80    | —                       | —                                   | CW                                                                    | LINE CORD & RECEPTACLE           |                          |                                  | 3                                | 24 1/4       | —       |                                  |                                  |        |    |    |

\* Jumper provided in the standard common position and should be moved or removed as required.

++ Line to line voltage

‡ Unit is fused for the constant current rating at the factory.

+ Motor driven units use terminal connections for CCW increasing voltage, as viewed from the base end. See Figure 23 on page 9 for motor wiring.

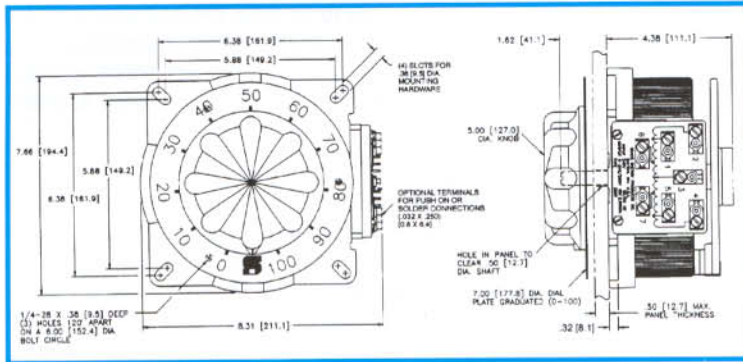
± If ganged units are used in a system that ordinarily has a common neutral or ground between source and load, the neutral or ground must be connected to the common ter-

minals of the variable transformer assembly. If the system has no neutral, the load must be balanced or the transformers will be damaged.

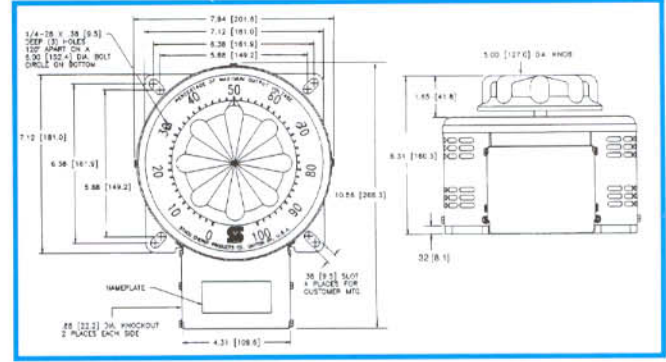
# Maximum output current in output voltage range from 0 to 25% above line voltage. At higher output voltages, the output current must be reduced according to the derating curve, Figure B, page 6.

§ Maximum KVA at maximum output voltage and corresponding derated output current. Maximum KVA for lower voltages may be calculated from derating curve Figure B, page 6.

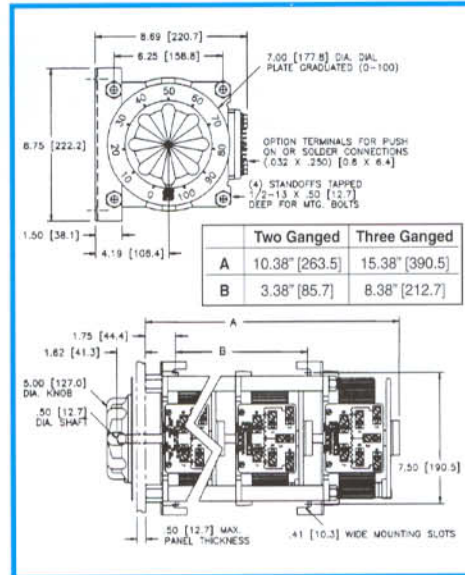
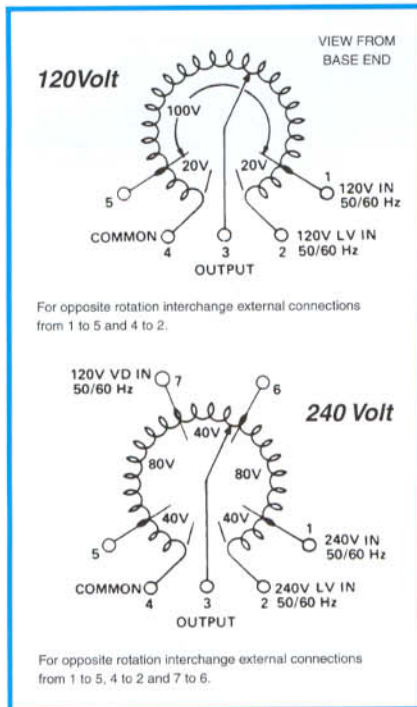
# 2500 Series



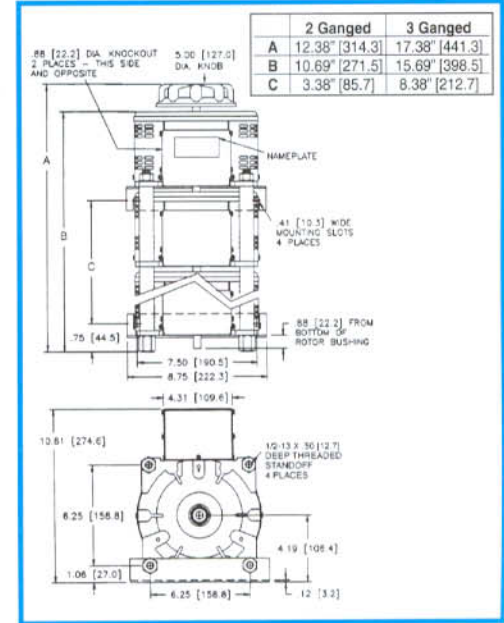
Manual Single, Uncased



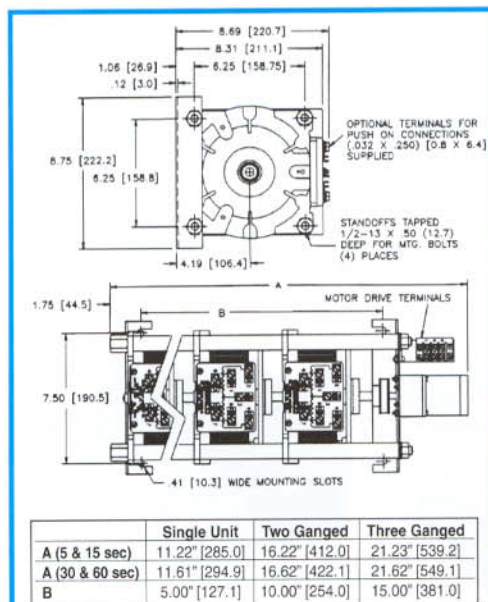
Manual Single, Cased



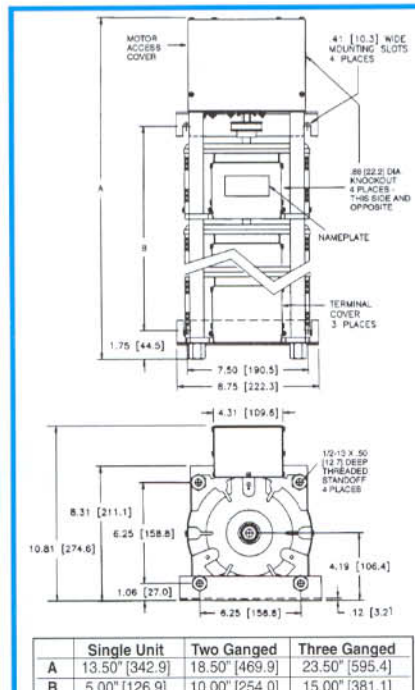
Manual Two and Three-Ganged, Uncased



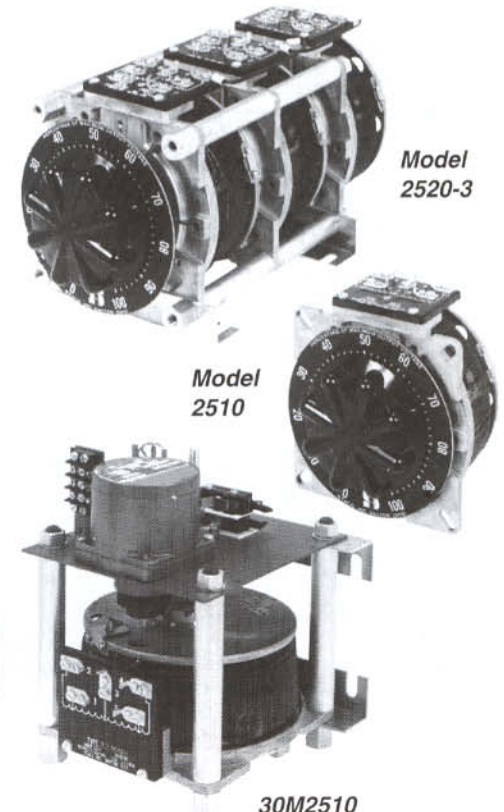
Manual Two and Three-Ganged, Cased



Motor-Driven Single, Two and Three-Ganged, Uncased



Motor-Driven Single, Two and Three-Ganged, Cased



## 5000 Series

The 5011/5021 Series Variable transformers are designed to control large KVA requirements. The 5011 operates on 120 volts and is rated for constant current of 50 amperes. The 5021 operates on 240 volts and constant current of 28 amperes. The 5011 Series units have coil tapping arrangements allowing output voltage from 0-117% of line voltage, while the 5021 Series allows output voltage from 0 to line voltage or 17% above line voltage. They can be operated at frequencies between 50 and 400 Hertz with a rating at higher than rated frequency.

Adjustable shaft design on manually operated models permits back-of-panel or bench mounting. Terminals are 1/4" screw type. For single and two ganged units, case styles are available in either "C" style, which encloses only the coil, or the "CT" style,

which provides protective housing for both the coil and terminal board. Knockouts are provided in the terminal board housing to accommodate conduit or cable connections. For three ganged and above, we offer our Nema 1, dripproof, fully front accessible "E" enclosure.

Motor-driven models are available from single thru 27 ganged assemblies; cased or uncased (identified with the prefix "M" in the part number). The synchronous motor is designed for operation on 120 volt, 50/60 Hertz, single phase lines and draws approximately 0.3 amperes. To meet a wide range of application requirements, standard motor speeds of 5, 15, 30 and 60 seconds are available depending upon the size of the variable transformer.

| PART NUMBER                      |                                     | WIRING                    | INPUT |       | OUTPUT |             |         | SHAFT ROTATION FOR VOLTAGE INCREASE | TERMINAL CONNECTIONS<br>For Increasing Voltage<br>As Viewed from Rotor End |        | SCHE-MATIC<br>(Pg 8 & 9) | NET WEIGHT<br>IN LBS.<br>(MAX) |              |
|----------------------------------|-------------------------------------|---------------------------|-------|-------|--------|-------------|---------|-------------------------------------|----------------------------------------------------------------------------|--------|--------------------------|--------------------------------|--------------|
| MANUALLY OPERATED                | MOTOR DRIVEN                        |                           | VOLTS | HERTZ | VOLTS  | MAX AMPS    | MAX KVA |                                     | INPUT                                                                      | OUTPUT |                          | MAN-UAL                        | MOTOR DRIVEN |
| 5011<br>5011C<br>5011CT          | M5011<br>M5011C<br>M5011CT          | Single Phase              | 120   | 50/60 | 0-140  | 50          | 7.0     | CW                                  | 1-2                                                                        | 1-3    | 18                       | 57                             | 78           |
| 5021<br>5021C<br>5021CT          | M5021<br>M5021C<br>M5021CT          | Single Phase              | 240   | 50/60 | 0-240  | 28          | 6.7     | CW                                  | 2-4                                                                        | 2-3    | 19                       | 57                             | 78           |
|                                  |                                     |                           |       |       | 0-280  | 28          | 7.8     | CCW                                 | 4-2                                                                        | 4-3    |                          |                                |              |
|                                  |                                     |                           | 120   | 50/60 | 0-280  | 28*12<br>VD | 3.4†    | CW                                  | 2-5                                                                        | 2-3    |                          |                                |              |
|                                  |                                     |                           |       |       |        |             |         | CCW                                 | 4-1                                                                        | 4-3    |                          |                                |              |
| 5011-2D<br>5011C-2D<br>5011CT-2D | M5011-2D<br>M5011C-2D<br>M5011CT-2D | Three Phase<br>Open Delta | 120   | 50/60 | 0-140  | 50          | 12.1    | CW                                  | 2-1-2                                                                      | 3-1-3  | 20 & 5                   | 134                            | 155          |
|                                  |                                     |                           |       |       |        |             |         |                                     |                                                                            |        |                          |                                |              |
| 5011-2P<br>5011C-2P<br>5011CT-2P | M5011-2P<br>M5011C-2P<br>M5011CT-2P | Single Phase<br>Parallel  | 120   | 50/60 | 0-140  | 100         | 14.0    | CW                                  | 1-2                                                                        | 1-B    | 21                       | 136                            | 157          |
| 5011-2S<br>5011C-2S<br>5011CT-2S | M5011-2S<br>M5011C-2S<br>M5011CT-2S | Single Phase<br>Series    | 240   | 50/60 | 0-280  | 50          | 14.0    | CW                                  | 2-2                                                                        | 3-3    | 20 & 4                   | 134                            | 155          |
| 5021-2D<br>5021C-2D<br>5021CT-2D | M5021-2D<br>M5021C-2D<br>M5021CT-2D | Three Phase<br>Open Delta | 240   | 50/60 | 0-240  | 28          | 11.6    | CW                                  | 4-1-4                                                                      | 3-1-3  | 20 & 5                   | 134                            | 155          |
|                                  |                                     |                           |       |       | 0-280  | 28          | 13.6    | CW                                  | 2-1-2                                                                      | 3-1-3  |                          |                                |              |
| 5021-2P<br>5021C-2P<br>5021CT-2P | M5021-2P<br>M5021C-2P<br>M5021CT-2P | Single Phase<br>Parallel  | 240   | 50/60 | 0-240  | 56          | 13.4    | CW                                  | 1-4                                                                        | 1-B    | 21                       | 136                            | 157          |
|                                  |                                     |                           |       |       | 0-280  | 56          | 15.7    | CW                                  | 1-2                                                                        | 1-B    |                          |                                |              |
| 5021-2S<br>5021C-2S<br>5021CT-2S | M5021-2S<br>M5021C-2S<br>M5021CT-2S | Single Phase<br>Series    | 480   | 50/60 | 0-480  | 28          | 13.5    | CW                                  | 4-4                                                                        | 3-3    | 20 & 4                   | 134                            | 155          |
|                                  |                                     |                           |       |       | 0-560  | 28          | 15.7    | CW                                  | 2-2                                                                        | 3-3    |                          |                                |              |
| 5011-3P<br>5011E-3P              | M5011-3P<br>M5011E-3P               | Single Phase<br>Parallel  | 120   | 50/60 | 0-140  | 150         | 21.0    | CW                                  | 1-2                                                                        | 1-D    | 22                       | 216                            | 237          |
|                                  |                                     |                           |       |       |        |             |         |                                     |                                                                            |        |                          |                                |              |
| 5011-3Y<br>5011E-3Y              | M5011-3Y<br>M5011E-3Y               | Three Phase<br>Wye        | 240   | 60    | 0-280  | 50          | 24.2    | CW                                  | 2-2-2                                                                      | 3-3-3  | 20 & 6                   | 212                            | 233          |



5011



5021



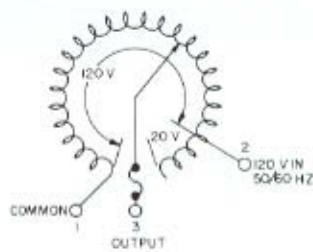
5021CT-2



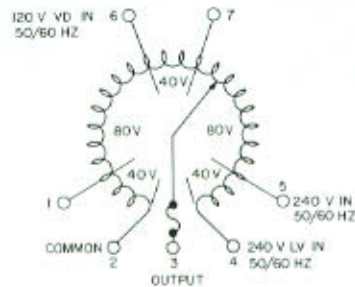
5011C

# 5000 Series

VIEW FROM ROTOR END

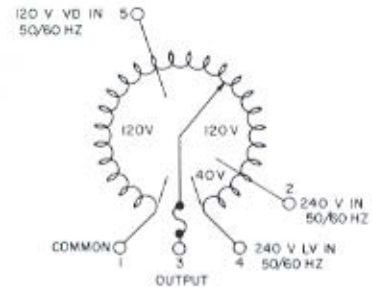


5011



For opposite rotation interchange external connections from 5 to 1, 2 to 4 and 6 to 7.

5021 Single Unit



5021 Ganged Unit

| PART NUMBER           |                         | WIRING                       | INPUT |       | OUTPUT         |                |              | SHAFT ROTATION FOR VOLTAGE INCREASE | TERMINAL CONNECTIONS For Increasing Voltage As Viewed from Rotor End |                | SCHEMATIC (Pg 8 & 9) | NET WEIGHT IN LBS. (MAX) |              |
|-----------------------|-------------------------|------------------------------|-------|-------|----------------|----------------|--------------|-------------------------------------|----------------------------------------------------------------------|----------------|----------------------|--------------------------|--------------|
| MANUALLY OPERATED     | MOTOR DRIVEN            |                              | VOLTS | HERTZ | VOLTS          | MAX AMPS       | MAX KVA      |                                     | INPUT                                                                | OUTPUT         |                      | MANUAL                   | MOTOR DRIVEN |
| 5021-3P<br>5021E-3P   | M5021-3P<br>M5021E-3P   | Single Phase Parallel        | 240   | 50/60 | 0-240<br>0-280 | 84<br>84       | 20.2<br>23.5 | CW<br>CW                            | 1-4<br>1-2                                                           | 1-D<br>1-D     | 22                   | 216                      | 237          |
|                       |                         |                              | 120   | 50/60 | 0-280          | 84*36<br>V.D.  | 10.2‡        | CW                                  | 1-5                                                                  | 1-D            |                      |                          |              |
| 5021-3Y<br>5021E-3Y   | M5021-3Y<br>M5021E-3Y   | Three Phase Wye              | 480   | 50/60 | 0-480<br>0-560 | 28<br>28       | 23.3<br>27.2 | CW<br>CW                            | 4-4-4<br>2-2-2                                                       | 3-3-3<br>3-3-3 | 20 & 6               | 212                      | 233          |
|                       |                         |                              | 240   | 60    | 0-560          | 28*12<br>V.D.  | 11.8‡        | CW                                  | 5-5-5                                                                | 3-3-3          |                      |                          |              |
| 5011-4D<br>5011E-4D   | M5011-4D<br>M5011E-4D   | Three Phase Open Delta       | 120   | 50/60 | 0-140          | 100            | 24.2         | CW                                  | 2-1-2                                                                | B-1-B          | 21 & 5               | 314                      | 335          |
| 5011-4P<br>5011E-4P   | M5011-4P<br>M5011E-4P   | Single Phase Parallel        | 120   | 50/60 | 0-140          | 200            | 28.0         | CW                                  | 1-2                                                                  | 1-D            | 22                   | 316                      | 337          |
| 5011-4PS<br>5011E-4PS | M5011-4PS<br>M5011E-4PS | Single Phase Series Parallel | 240   | 50/60 | 0-280          | 100            | 28.0         | CW                                  | 2-2                                                                  | B-B            | 21 & 4               | 314                      | 335          |
| 5021-4D<br>5021E-4D   | M5021-4D<br>M5021E-4D   | Three Phase Open Delta       | 240   | 50/60 | 0-240<br>0-280 | 56<br>56       | 23.3<br>27.2 | CW<br>CW                            | 4-1-4<br>2-1-2                                                       | B-1-B<br>B-1-B | 21 & 5               | 314                      | 335          |
|                       |                         |                              | 120   | 50/60 | 0-280          | 56*24<br>V.D.  | 11.8‡        | CW                                  | 5-1-5                                                                | B-1-B          |                      |                          |              |
| 5021-4P<br>5021E-4P   | M5021-4P<br>M5021E-4P   | Single Phase Parallel        | 240   | 50/60 | 0-240<br>0-280 | 112<br>112     | 26.9<br>31.4 | CW<br>CW                            | 1-4<br>1-2                                                           | 1-D<br>1-D     | 22                   | 316                      | 337          |
|                       |                         |                              | 120   | 50/60 | 0-280          | 112*48<br>V.D. | 13.5‡        | CW                                  | 1-5                                                                  | 1-D            |                      |                          |              |
| 5021-4PS<br>5021E-4PS | M5021-4PS<br>M5021E-4PS | Single Phase Series          | 480   | 50/60 | 0-480<br>0-560 | 56<br>56       | 26.9<br>31.4 | CW<br>CW                            | 4-4<br>2-2                                                           | B-B<br>B-B     | 21 & 4               | 314                      | 335          |
|                       |                         |                              | 240   | 50/60 | 0-560          | 56*24<br>V.D.  | 13.5‡        | CW                                  | 5-5                                                                  | B-B            |                      |                          |              |
| 5011-5P<br>5011E-5P   | M5011-5P<br>M5011E-5P   | Single Phase Parallel        | 120   | 50/60 | 0-140          | 250            | 35.0         | CW                                  | 1-2                                                                  | 1-D            | 22                   | 400                      | 420          |
| 5011-6D<br>5011E-6D   | M5011-6D<br>M5011E-6D   | Three Phase Open Delta       | 120   | 50/60 | 0-140          | 150            | 36.4         | CW                                  | 2-1-2                                                                | D-1-D          | 22 & 5               | 481                      | 502          |
| 5011-6P<br>5011E-6P   | M5011-6P<br>M5011E-6P   | Single Phase Parallel        | 120   | 50/60 | 0-140          | 300            | 42.0         | CW                                  | 1-2                                                                  | 1-D            | 22                   | 483                      | 504          |
| 5011-6PS<br>5011E-6PS | M5011-6PS<br>M5011E-6PS | Single Phase Series Parallel | 240   | 50/60 | 0-280          | 150            | 42.0         | CW                                  | 2-2                                                                  | D-D            | 22 & 4               | 481                      | 502          |
| 5011-6Y<br>5011E-6Y   | M5011-6Y<br>M5011E-6Y   | Three Phase Wye              | 240   | 60    | 0-280          | 100            | 48.5         | CW                                  | 2-2-2                                                                | B-B-B          | 21 & 6               | 479                      | 500          |

# 5000 Series

| PART NUMBER           |                           | WIRING                                | INPUT |             | OUTPUT         |                 |              | SHAFT ROTATION FOR VOLTAGE INCREASE | TERMINAL CONNECTIONS<br>For Increasing Voltage<br>As Viewed from Rotor End |                | SCHE-<br>MATIC<br>(Pg 8 & 9) | NET WEIGHT<br>IN LBS.<br>(MAX) |                 |
|-----------------------|---------------------------|---------------------------------------|-------|-------------|----------------|-----------------|--------------|-------------------------------------|----------------------------------------------------------------------------|----------------|------------------------------|--------------------------------|-----------------|
| MANUALLY<br>OPERATED  | MOTOR<br>DRIVEN           |                                       | VOLTS | HERTZ       | VOLTS          | MAX<br>AMPS     | MAX<br>KVA   |                                     | INPUT                                                                      | OUTPUT         |                              | MAN-<br>UAL                    | MOTOR<br>DRIVEN |
| 5021-6D<br>5021E-6D   | M5021-6D<br>M5021E-6D     | Three<br>Phase<br>Open Delta          | 240   | 50/60       | 0-240<br>0-280 | 84<br>84        | 34.9<br>40.7 | CW<br>CW                            | 4-1-4<br>2-1-2                                                             | D-1-D<br>D-1-D | 22 & 5                       | 481                            | 502             |
|                       |                           |                                       | 120   | 50/60       | 0-280          | 84*36<br>V.D.   | 17.6†        | CW                                  | 5-1-5                                                                      | D-1-D          |                              |                                |                 |
| 5021-6P<br>5021E-6P   | M5021-6P<br>M5021E-6P     | Single<br>Phase<br>Parallel           | 240   | 50/60       | 0-240<br>0-280 | 168<br>168      | 40.3<br>47.0 | CW<br>CW                            | 1-4<br>1-2                                                                 | 1-D<br>1-D     | 22                           | 483                            | 504             |
|                       |                           |                                       | 120   | 50/60       | 0-280          | 168*72<br>V.D.  | 20.4†        | CW                                  | 1-5                                                                        | 1-D            |                              |                                |                 |
| 5021-6PS<br>5021E-6PS | M5021-6PS<br>M5021E-6PS   | Single<br>Phase<br>Series<br>Parallel | 480   | 50/60       | 0-480<br>0-560 | 84<br>84        | 40.3<br>47.0 | CW<br>CW                            | 4-4<br>2-2                                                                 | D-D<br>D-D     | 22 & 4                       | 481                            | 502             |
|                       |                           |                                       | 240   | 50/60       | 0-560          | 84*36<br>V.D.   | 20.4†        | CW                                  | 5-5                                                                        | D-D            |                              |                                |                 |
| 5021-6Y<br>5021E-6Y   | M5021-6Y<br>M5021E-6Y     | Three<br>Phase<br>Wye                 | 480   | 50/60<br>60 | 0-480<br>0-560 | 56<br>56        | 46.6<br>54.3 | CW<br>CW                            | 4-4-4<br>2-2-2                                                             | B-B-B<br>B-B-B | 21 & 6                       | 479                            | 500             |
|                       |                           |                                       | 240   | 60          | 0-560          | 56*24<br>V.D.   | 23.5†        | CW                                  | 5-5-5                                                                      | B-B-B          |                              |                                |                 |
| 5011-7P<br>5011E-7P   | M5011-7P<br>M5011E-7P     | Single<br>Phase<br>Parallel           | 120   | 50/60       | 0-140          | 350             | 49.0         | CW                                  | 1-2                                                                        | 1-D            | 22                           | 563                            | 584             |
| 5021-7P<br>5021E-7P   | M5021-7P<br>M5021E-7P     | Single<br>Phase<br>Parallel           | 240   | 50/60       | 0-240<br>0-280 | 196<br>196      | 47.0<br>54.9 | CW<br>CW                            | 1-4<br>1-2                                                                 | 1-D<br>1-D     | 22                           | 563                            | 584             |
|                       |                           |                                       | 120   | 50/60       | 0-280          | 196*84<br>V.D.  | 23.5†        | CW                                  | 1-5                                                                        | 1-D            |                              |                                |                 |
| 5011-8D<br>5011E-8D   | M5011-8D<br>M5011E-8D     | Three<br>Phase<br>Open Delta          | 120   | 50/60       | 0-140          | 200             | 48.4         | CW                                  | 2-1-2                                                                      | D-1-D          | 22 & 5                       | 640                            | 661             |
| 5011-8P<br>5011E-8P   | M5011-8P<br>M5011E-8P     | Single<br>Phase<br>Parallel           | 120   | 50/60       | 0-140          | 400             | 56.0         | CW                                  | 1-2                                                                        | 1-D            | 22                           | 642                            | 663             |
| 5011-8PS<br>5011E-8PS | M5011-8PS<br>M5011E-8PS   | Single<br>Phase<br>Series<br>Parallel | 240   | 50/60       | 0-280          | 200             | 56.0         | CW                                  | 2-2                                                                        | D-D            | 22 & 4                       | 640                            | 661             |
| 5021-8D<br>5021E-8D   | M5021-8D<br>M5021E-8D     | Three<br>Phase<br>Open Delta          | 240   | 50/60       | 0-240<br>0-280 | 112<br>112      | 46.6<br>54.3 | CW<br>CW                            | 4-1-4<br>2-1-2                                                             | D-1-D<br>D-1-D | 22 & 5                       | 640                            | 661             |
|                       |                           |                                       | 120   | 50/60       | 0-280          | 112*48<br>V.D.  | 23.3†        | CW                                  | 5-1-5                                                                      | D-1-D          |                              |                                |                 |
| 5021-8P<br>5021E-8P   | M5021-8P<br>M5021E-8P     | Single<br>Phase<br>Parallel           | 240   | 50/60       | 0-240<br>0-280 | 224<br>224      | 53.8<br>62.7 | CW<br>CW                            | 1-4<br>1-2                                                                 | 1-D<br>1-D     | 22                           | 642                            | 663             |
|                       |                           |                                       | 120   | 50/60       | 0-280          | 224*96<br>V.D.  | 26.9†        | CW                                  | 1-5                                                                        | 1-D            |                              |                                |                 |
| 5021-8PS<br>5021E-8PS | M5021-8PS<br>M5021E-8PS   | Single<br>Phase<br>Series<br>Parallel | 480   | 50/60       | 0-480<br>0-560 | 112<br>112      | 53.8<br>62.7 | CW<br>CW                            | 4-4<br>2-2                                                                 | D-D<br>D-D     | 22 & 4                       | 640                            | 742             |
|                       |                           |                                       | 240   | 50/60       | 0-560          | 112*48<br>V.D.  | 26.9†        | CW                                  | 5-5                                                                        | D-D            |                              |                                |                 |
| 5011-9P<br>5011E-9P   | M5011-9P<br>M5011E-9P     | Single<br>Phase<br>Parallel           | 120   | 50/60       | 0-140          | 450             | 63.0         | CW                                  | 1-2                                                                        | 1-D            | 22                           | 721                            | 742             |
| 5011-9Y<br>5011E-9Y   | M5011-9Y<br>M5011E-9Y     | Three<br>Phase<br>Wye                 | 240   | 60          | 0-280          | 150             | 72.5         | CW                                  | 2-2-2                                                                      | D-D-D          | 22 & 6                       | 717                            | 738             |
| 5021-9P<br>5021E-9P   | M5021-9P<br>M5021E-9P     | Single<br>Phase<br>Parallel           | 240   | 50/60       | 0-240<br>0-280 | 252<br>252      | 60.5<br>70.6 | CW<br>CW                            | 1-4<br>1-2                                                                 | 1-D<br>1-D     | 22                           | 721                            | 742             |
|                       |                           |                                       | 120   | 50/60       | 0-280          | 252*108<br>V.D. | 30.2†        | CW                                  | 1-5                                                                        | 1-D            |                              |                                |                 |
| 5021-9Y<br>5021E-9Y   | M5021-9Y<br>M5021E-9Y     | Three<br>Phase<br>Wye                 | 480   | 50/60<br>60 | 0-480<br>0-560 | 84<br>84        | 69.8<br>81.5 | CW<br>CW                            | 4-4-4<br>2-2-2                                                             | D-D-D<br>D-D-D | 22 & 6                       | 717                            | 738             |
|                       |                           |                                       | 240   | 60          | 0-560          | 84*36<br>V.D.   | 35.0†        | CW                                  | 5-5-5                                                                      | D-D-D          |                              |                                |                 |
| —                     | M5011-10D<br>M5011E-10D   | Three<br>Phase<br>Open Delta          | 120   | 50/60       | 0-140          | 250             | 60.6         | CW                                  | 2-1-2                                                                      | D-1-D          | 22 & 5                       |                                | 812             |
| —                     | M5011-10PS<br>M5011E-10PS | Single<br>Phase<br>Series<br>Parallel | 240   | 50/60       | 0-280          | 250             | 70.0         | CW                                  | 2-2                                                                        | D-D            | 22 & 4                       |                                | 812             |
| —                     | M5021-10D<br>M5021E-10D   | Three<br>Phase<br>Open Delta          | 240   | 50/60       | 0-240<br>0-280 | 140<br>140      | 58.2<br>67.9 | CW<br>CW                            | 4-1-4<br>2-1-2                                                             | D-1-D<br>D-1-D | 22 & 5                       |                                | 812             |
|                       |                           |                                       | 120   | 50/60       | 0-280          | 140*60<br>V.D.  | 29.1†        | CW                                  | 5-1-5                                                                      | D-1-D          |                              |                                |                 |

# 5000 Series

| PART NUMBER          |                           | WIRING                                | INPUT |       | OUTPUT |                 |            | SHAFT ROTATION FOR VOLTAGE INCREASE | TERMINAL CONNECTIONS<br>For Increasing Voltage<br>As Viewed from Rotor End |        | SCHE-<br>MATIC<br>(Pg 8 & 9) | NET WEIGHT<br>IN LBS.<br>(MAX) |                 |
|----------------------|---------------------------|---------------------------------------|-------|-------|--------|-----------------|------------|-------------------------------------|----------------------------------------------------------------------------|--------|------------------------------|--------------------------------|-----------------|
| MANUALLY<br>OPERATED | MOTOR<br>DRIVEN           |                                       | VOLTS | HERTZ | VOLTS  | MAX<br>AMPS     | MAX<br>KVA |                                     | INPUT                                                                      | OUTPUT |                              | MAN-<br>UAL                    | MOTOR<br>DRIVEN |
| —                    | M5021-10PS<br>M5021E-10PS | Single<br>Phase<br>Series<br>Parallel | 480   | 50/60 | 0-480  | 140             | 67.2       | CW                                  | 4-4                                                                        | D-D    | 22 & 4                       | —                              | 812             |
|                      |                           |                                       |       |       | 0-560  | 140             | 78.4       | CW                                  | 2-2                                                                        | D-D    |                              |                                |                 |
|                      |                           |                                       | 240   | 50/60 | 0-560  | 140*60<br>V.D.  | 33.6†      | CW                                  | 5-5                                                                        | D-D    |                              |                                |                 |
| —                    | M5011-12D<br>M5011E-12D   | Three<br>Phase<br>Open Delta          | 120   | 50/60 | 0-140  | 300             | 72.7       | CW                                  | 2-1-2                                                                      | D-1-D  | 22 & 5                       | —                              | 940             |
| —                    | M5011-12PS<br>M5011E-12PS | Single<br>Phase<br>Series<br>Parallel | 240   | 50/60 | 0-280  | 300             | 84.0       | CW                                  | 2-2                                                                        | D-D    | 22 & 4                       | —                              | 940             |
| —                    | M5021-12D<br>M5021E-12D   | Three<br>Phase<br>Open Delta          | 240   | 50/60 | 0-240  | 168             | 69.8       | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                       | —                              | 940             |
|                      |                           |                                       |       |       | 0-280  | 168             | 81.5       | CW                                  | 2-1-2                                                                      | D-1-D  |                              |                                |                 |
|                      |                           |                                       | 120   | 50/60 | 0-280  | 168*72<br>V.D.  | 34.9†      | CW                                  | 5-1-5                                                                      | D-1-D  |                              |                                |                 |
| —                    | M5021-12PS<br>M5021E-12PS | Single<br>Phase<br>Series<br>Parallel | 480   | 50/60 | 0-480  | 168             | 80.6       | CW                                  | 4-4                                                                        | D-D    | 22 & 4                       | —                              | 940             |
|                      |                           |                                       |       |       | 0-560  | 168             | 94.1       | CW                                  | 2-2                                                                        | D-D    |                              |                                |                 |
|                      |                           |                                       | 240   | 50/60 | 0-560  | 168*72<br>V.D.  | 40.3†      | CW                                  | 5-5                                                                        | D-D    |                              |                                |                 |
| —                    | M5011-14D<br>M5011E-14D   | Three<br>Phase<br>Open Delta          | 120   | 50/60 | 0-140  | 350             | 84.9       | CW                                  | 2-1-2                                                                      | D-1-D  | 22 & 5                       | —                              | 1097            |
| —                    | M5011-14PS<br>M5011E-14PS | Single<br>Phase<br>Series<br>Parallel | 240   | 50/60 | 0-280  | 350             | 98.0       | CW                                  | 2-2                                                                        | D-D    | 22 & 4                       | —                              | 1097            |
| —                    | M5021-14D<br>M5021E-14D   | Three<br>Phase<br>Open Delta          | 240   | 50/60 | 0-240  | 196             | 81.5       | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                       | —                              | 1097            |
|                      |                           |                                       |       |       | 0-280  | 196             | 95.1       | CW                                  | 2-1-2                                                                      | D-1-D  |                              |                                |                 |
|                      |                           |                                       | 120   | 50/60 | 0-280  | 196*84<br>V.D.  | 40.8†      | CW                                  | 5-1-5                                                                      | D-1-D  |                              |                                |                 |
| —                    | M5021-14PS<br>M5021E-14PS | Single<br>Phase<br>Series<br>Parallel | 480   | 50/60 | 0-480  | 196             | 94.1       | CW                                  | 4-4                                                                        | D-D    | 22 & 4                       | —                              | 1097            |
|                      |                           |                                       |       |       | 0-560  | 196             | 109.8      | CW                                  | 2-2                                                                        | D-D    |                              |                                |                 |
|                      |                           |                                       | 240   | 50/60 | 0-560  | 196*84<br>V.D.  | 47.1†      | CW                                  | 5-5                                                                        | D-D    |                              |                                |                 |
| —                    | M5011-16D<br>M5011E-16D   | Three<br>Phase<br>Open Delta          | 120   | 50/60 | 0-140  | 400             | 96.7       | CW                                  | 2-1-2                                                                      | D-1-D  | 22 & 5                       | —                              | 1254            |
| —                    | M5011-16PS<br>M5011E-16PS | Single<br>Phase<br>Series<br>Parallel | 240   | 50/60 | 0-280  | 400             | 112.0      | CW                                  | 2-2                                                                        | D-D    | 22 & 4                       | —                              | 1254            |
| —                    | M5021-16D<br>M5021E-16D   | Three<br>Phase<br>Open Delta          | 240   | 50/60 | 0-240  | 224             | 93.1       | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                       | —                              | 1254            |
|                      |                           |                                       |       |       | 0-280  | 224             | 108.6      | CW                                  | 2-1-2                                                                      | D-1-D  |                              |                                |                 |
|                      |                           |                                       | 120   | 50/60 | 0-280  | 224*96<br>V.D.  | 46.6†      | CW                                  | 5-1-5                                                                      | D-1-D  |                              |                                |                 |
| —                    | M5021-16PS<br>M5021E-16PS | Single<br>Phase<br>Series<br>Parallel | 480   | 50/60 | 0-480  | 224             | 107.5      | CW                                  | 4-4                                                                        | D-D    | 22 & 4                       | —                              | 1254            |
|                      |                           |                                       |       |       | 0-560  | 224             | 125.5      | CW                                  | 2-2                                                                        | D-D    |                              |                                |                 |
|                      |                           |                                       | 240   | 50/60 | 0-560  | 224*96<br>V.D.  | 53.8†      | CW                                  | 5-5                                                                        | D-D    |                              |                                |                 |
| —                    | M5011-18D<br>M5011E-18D   | Three<br>Phase<br>Open Delta          | 120   | 50/60 | 0-140  | 450             | 109.0      | CW                                  | 2-1-2                                                                      | D-1-D  | 22 & 5                       | —                              | 1417            |
| —                    | M5011-18PS<br>M5011E-18PS | Single<br>Phase<br>Series<br>Parallel | 240   | 50/60 | 0-280  | 450             | 126.0      | CW                                  | 2-2                                                                        | D-D    | 22 & 4                       | —                              | 1417            |
| —                    | M5021-18D<br>M5021E-18D   | Three<br>Phase<br>Open Delta          | 240   | 50/60 | 0-240  | 252             | 104.5      | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                       | —                              | 1417            |
|                      |                           |                                       |       |       | 0-280  | 252             | 122.2      | CW                                  | 2-1-2                                                                      | D-1-D  |                              |                                |                 |
|                      |                           |                                       | 120   | 50/60 | 0-280  | 252*108<br>V.D. | 52.5†      | CW                                  | 5-1-5                                                                      | D-1-D  |                              |                                |                 |
| —                    | M5021-18PS<br>M5021E-18PS | Single<br>Phase<br>Series<br>Parallel | 480   | 50/60 | 0-480  | 252             | 121.0      | CW                                  | 4-4                                                                        | D-D    | 22 & 4                       | —                              | 1417            |
|                      |                           |                                       |       |       | 0-560  | 252             | 141.0      | CW                                  | 2-2                                                                        | D-D    |                              |                                |                 |
|                      |                           |                                       | 240   | 50/60 | 0-560  | 252*108<br>V.D. | 60.5†      | CW                                  | 5-5                                                                        | D-D    |                              |                                |                 |
| —                    | M5011-12Y<br>M5011E-12Y   | Three<br>Phase<br>Wye                 | 240   | 60    | 0-280  | 200             | 96.7       | CW                                  | 2-2-2                                                                      | D-D-D  | 22 & 6                       | —                              | 942             |
| —                    | M5021-12Y<br>M5021E-12Y   | Three<br>Phase<br>Wye                 | 480   | 50/60 | 0-480  | 112             | 93.1       | CW                                  | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 942             |
|                      |                           |                                       |       | 60    | 0-560  | 112             | 108.6      | CW                                  | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                           |                                       | 240   | 60    | 0-560  | 112*48<br>V.D.  | 46.6†      | CW                                  | 5-5-5                                                                      | D-D-D  |                              |                                |                 |

# 5000 Series

| PART NUMBER          |                         | WIRING                | INPUT |       | OUTPUT |                  |            | SHAFT<br>ROTATION<br>FOR<br>VOLTAGE<br>INCREASE | TERMINAL CONNECTIONS<br>For Increasing Voltage<br>As Viewed from Rotor End |        | SCHE-<br>MATIC<br>(Pg 8 & 9) | NET WEIGHT<br>IN LBS.<br>(MAX) |                 |
|----------------------|-------------------------|-----------------------|-------|-------|--------|------------------|------------|-------------------------------------------------|----------------------------------------------------------------------------|--------|------------------------------|--------------------------------|-----------------|
| MANUALLY<br>OPERATED | MOTOR<br>DRIVEN         |                       | VOLTS | HERTZ | VOLTS  | MAX<br>AMPS      | MAX<br>KVA |                                                 | INPUT                                                                      | OUTPUT |                              | MAN-<br>UAL                    | MOTOR<br>DRIVEN |
| —                    | M5011-15Y<br>M5011E-15Y | Three<br>Phase<br>Wye | 240   | 60    | 0-280  | 250              | 121.0      | CW                                              | 2-2-2                                                                      | D-D-D  | 22 & 6                       | —                              | 1179            |
| —                    | M5021-15Y<br>M5021E-15Y | Three<br>Phase<br>Wye | 480   | 50/60 | 0-480  | 140              | 116.5      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 1179            |
|                      |                         |                       | 60    | 60    | 0-560  | 140              | 136.0      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       | 240   | 60    | 0-560  | 140*60<br>V. D.  | 58.2†      | CW                                              | 5-5-5                                                                      | D-D-D  |                              |                                |                 |
| —                    | M5011-18Y<br>M5011E-18Y | Three<br>Phase<br>Wye | 240   | 60    | 0-280  | 300              | 145.5      | CW                                              | 2-2-2                                                                      | D-D-D  | 22 & 6                       | —                              | 1415            |
| —                    | M5021-18Y<br>M5021E-18Y | Three<br>Phase<br>Wye | 480   | 50/60 | 0-480  | 168              | 139.5      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 1415            |
|                      |                         |                       | 60    | 60    | 0-560  | 168              | 163.3      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       | 240   | 60    | 0-560  | 168*72<br>V. D.  | 70.0†      | CW                                              | 5-5-5                                                                      | D-D-D  |                              |                                |                 |
| —                    | M5011-21Y<br>M5011E-21Y | Three<br>Phase<br>Wye | 240   | 60    | 0-280  | 350              | 169.5      | CW                                              | 2-2-2                                                                      | D-D-D  | 22 & 6                       | —                              | 1654            |
| —                    | M5021-21Y<br>M5021E-21Y | Three<br>Phase<br>Wye | 480   | 50/60 | 0-480  | 196              | 163.0      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 1654            |
|                      |                         |                       | 60    | 60    | 0-560  | 196              | 189.5      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       | 240   | 60    | 0-560  | 196*84<br>V. D.  | 82.0†      | CW                                              | 5-5-5                                                                      | D-D-D  |                              |                                |                 |
| —                    | M5011-24Y<br>M5011E-24Y | Three<br>Phase<br>Wye | 240   | 60    | 0-280  | 400              | 193.7      | CW                                              | 2-2-2                                                                      | D-D-D  | 22 & 5                       | —                              | 1892            |
| —                    | M5021-24Y<br>M5021E-24Y | Three<br>Phase<br>Wye | 480   | 50/60 | 0-480  | 224              | 186.5      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 1892            |
|                      |                         |                       | 60    | 60    | 0-560  | 224              | 217.8      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       | 240   | 60    | 0-560  | 224*96<br>V. D.  | 93.0†      | CW                                              | 5-5-5                                                                      | D-D-D  |                              |                                |                 |
| —                    | M5011-27Y<br>M5011E-27Y | Three<br>Phase<br>Wye | 240   | 60    | 0-280  | 450              | 218.4      | CW                                              | 2-2-2                                                                      | D-D-D  | 22 & 6                       | —                              | 2131            |
| —                    | M5021-27Y<br>M5021E-27Y | Three<br>Phase<br>Wye | 480   | 50/60 | 0-480  | 252              | 209.5      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 2131            |
|                      |                         |                       | 60    | 60    | 0-560  | 252              | 244.0      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       | 240   | 60    | 0-560  | 252*108<br>V. D. | 105.0†     | CW                                              | 5-5-5                                                                      | D-D-D  |                              |                                |                 |

\* Maximum output current in output voltage range from 0 to 25 percent above line voltage. At higher output voltages, output current must be reduced according to rating curve, Figure B, page 6.

† Maximum KVA at maximum output and corresponding de-rated current. Maximum KVA at lower output voltages may be calculated from derating curve, Figure B, page 6.

V. D. Voltage Doubler



5000/6000 Series  
Enclosed Unit



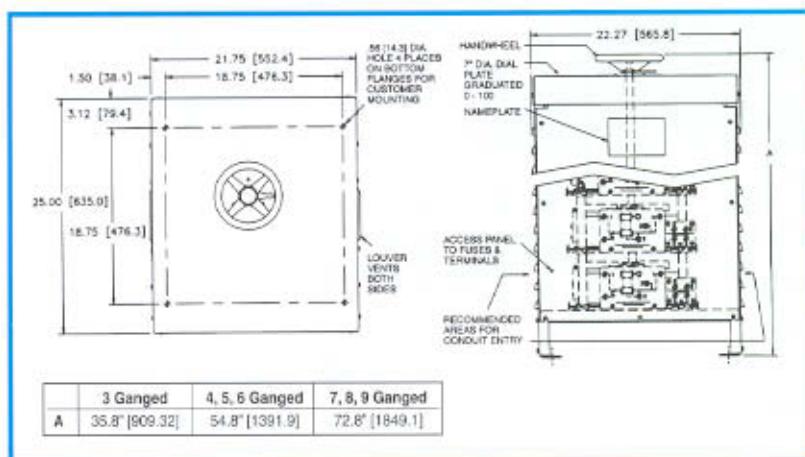
30M6020-9Y



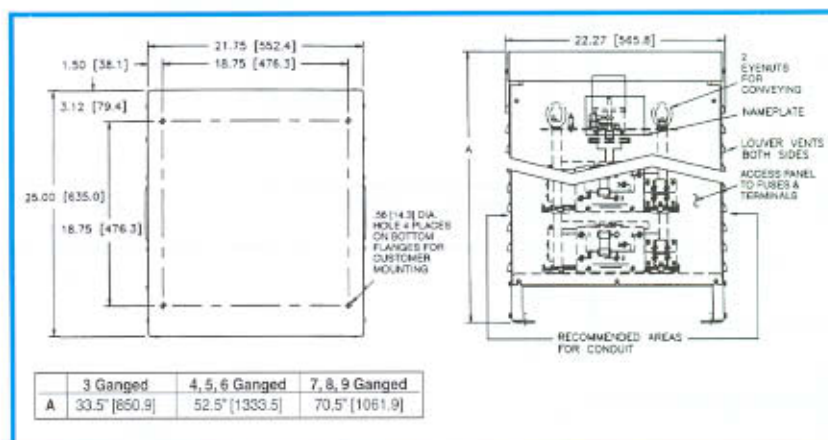
30M5011-3Y



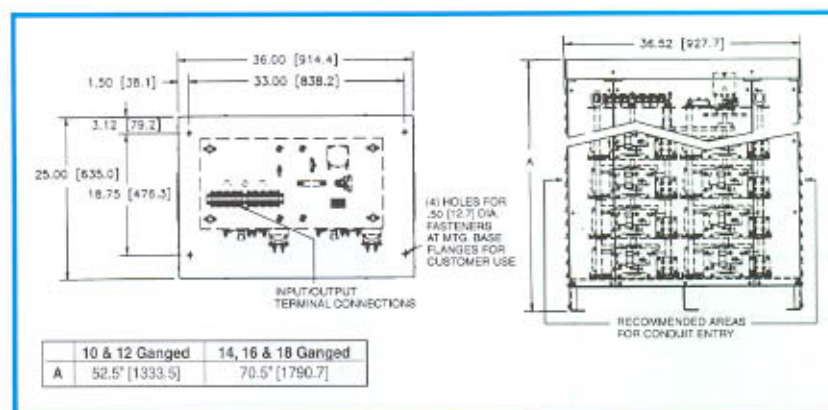
# 5000/6000 Series



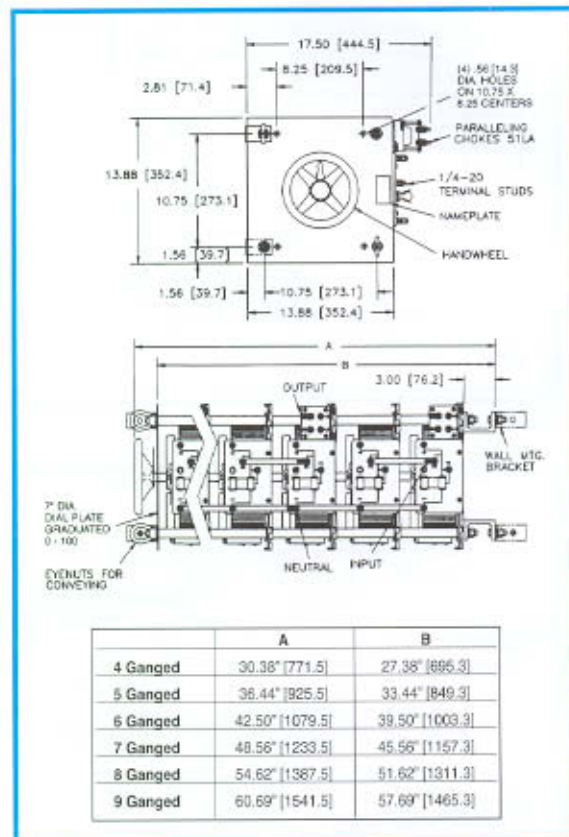
Manual Three to Nine-Ganged, Cased



Motor-Driven Three to Nine-Ganged, Cased



Motor-Driven 10, 12, 14, 16 & 18-Ganged Open Delta and Parallel, Cased

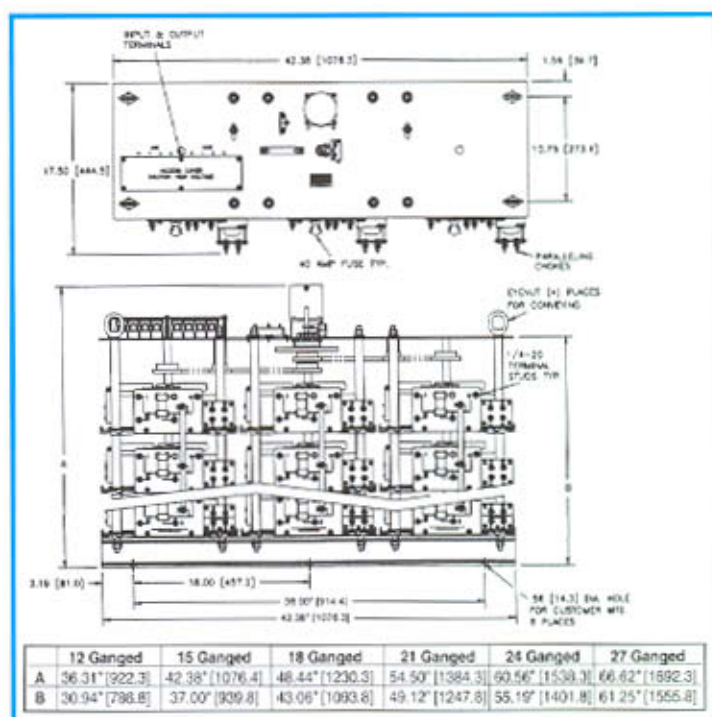


Manual Four to Nine-Ganged, Uncased

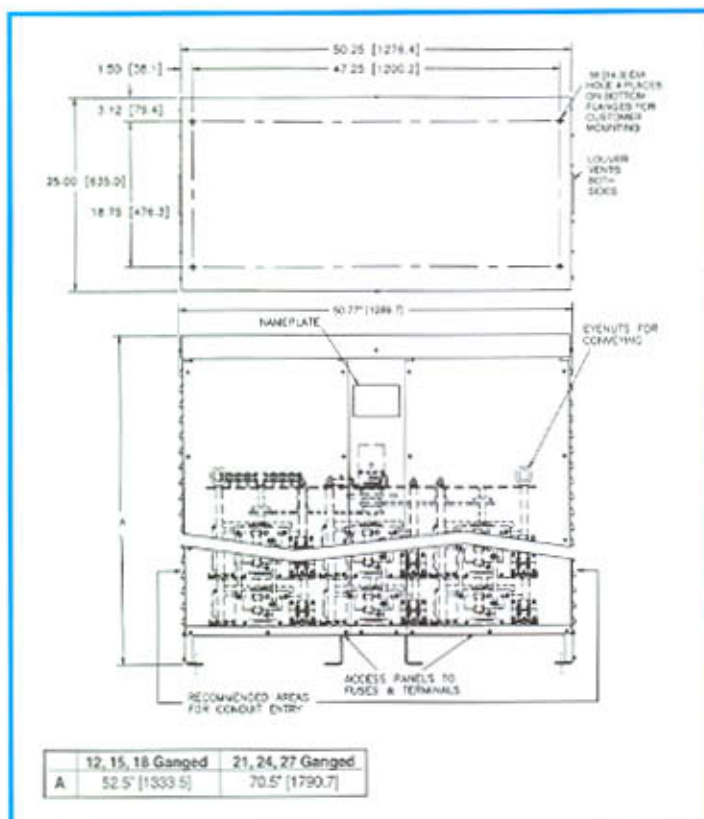


5021-3Y

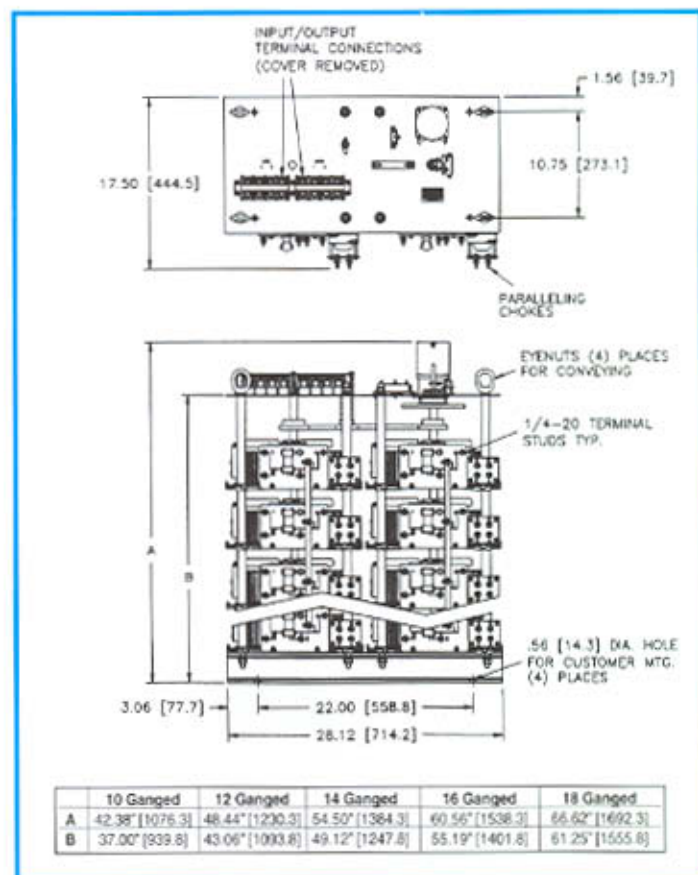
# 5000/6000 Series



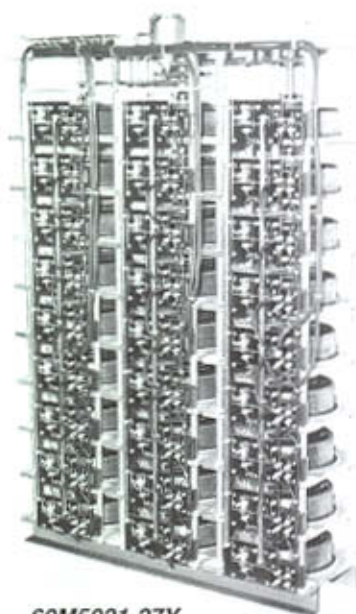
Motor-Driven 12, 15, 18, 21, 24 & 27-Ganged, Uncased



Motor-Driven 12, 15, 18, 21, 24 & 27-Ganged, Cased



Motor-Driven 10, 12, 14, 16 & 18-Ganged Open Delta & Parallel, Uncased



60M5021-27Y

## 6000 Series

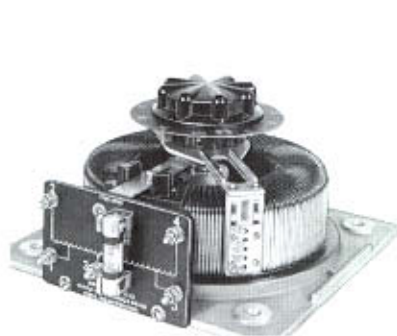
Variable transformers of the 6011/6020 Series are designed for larger KVA requirements. The 6011, 120 volt unit is rated for constant current of 60 amperes. The 6020, 240 volt unit is rated at 35 amperes for constant current loads. All single units have coil tapping arrangements allowing output voltage from 0 to line voltage or 17% above line voltage.

Adjustable shaft design on manually operated models permits back-of-panel or bench mounting. Terminals are 1/4" screw type. For single and two ganged units, case styles are available in either "C" style, which encloses only the coil, or the "CT" style, which provides protective housing for both the coil and terminal board. Knockouts are provided in the terminal board

housing to accommodate conduit or cable connections. For three ganged and above, we offer our Nema 1, dripproof, fully front accessible "E" enclosure.

Motor-driven models are available from single thru 27 ganged assemblies; cased or uncased (identified with the prefix "M" in the part number. The synchronous motor is designed for operation on 120 volt, 50/60 Hertz lines and draws approximately 0.3 amperes. To meet a wide range of application requirements, standard motor speeds of 5, 15, 30 and 60 seconds are available depending upon the size of the variable transformer.

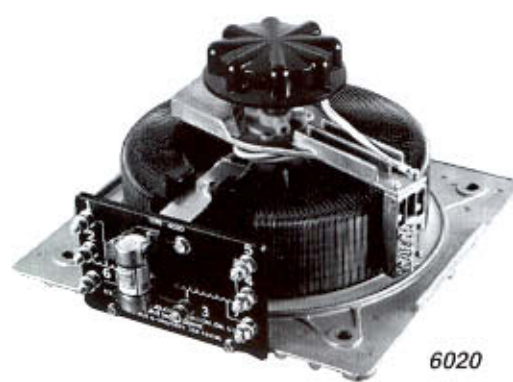
| PART NUMBER                      |                                     | WIRING                          | INPUT |       | OUTPUT |                |            | SHAFT ROTATION FOR VOLTAGE INCREASE | TERMINAL CONNECTIONS<br>For Increasing Voltage<br>As Viewed from Rotor End |        | SCHE-<br>MATIC<br>(Pg 8 & 9) | NET WEIGHT<br>IN LBS.<br>(MAX) |                 |
|----------------------------------|-------------------------------------|---------------------------------|-------|-------|--------|----------------|------------|-------------------------------------|----------------------------------------------------------------------------|--------|------------------------------|--------------------------------|-----------------|
| MANUALLY<br>OPERATED             | MOTOR<br>DRIVEN                     |                                 | VOLTS | HERTZ | VOLTS  | MAX<br>AMPS    | MAX<br>KVA |                                     | INPUT                                                                      | OUTPUT |                              | MAN-<br>UAL                    | MOTOR<br>DRIVEN |
| 6011<br>6011C<br>6011CT          | M6011<br>M6011C<br>M6011CT          | Single<br>Phase                 | 120   | 50/60 | 0-120  | 60             | 7.2        | CW                                  | 2-4                                                                        | 2-3    | 19                           | 67                             | 88              |
|                                  |                                     |                                 |       |       |        |                |            | CCW                                 | 4-2                                                                        | 4-3    |                              |                                |                 |
|                                  |                                     |                                 |       |       | 0-140  | 60             | 8.4        | CW                                  | 2-5                                                                        | 2-3    |                              |                                |                 |
|                                  |                                     |                                 |       |       |        |                |            | CCW                                 | 4-1                                                                        | 4-3    |                              |                                |                 |
| 6020<br>6020C<br>6020CT          | M6020<br>M6020C<br>M6020CT          | Single<br>Phase                 | 240   | 50/60 | 0-240  | 35             | 8.4        | CW                                  | 2-4                                                                        | 2-3    | 19                           | 63                             | 84              |
|                                  |                                     |                                 |       |       |        |                |            | CCW                                 | 4-2                                                                        | 4-3    |                              |                                |                 |
|                                  |                                     |                                 |       |       | 0-280  | 35             | 9.8        | CW                                  | 2-5                                                                        | 2-3    |                              |                                |                 |
|                                  |                                     |                                 |       |       |        |                |            | CCW                                 | 4-1                                                                        | 4-3    |                              |                                |                 |
|                                  |                                     |                                 | 120   | 50/60 | 0-280  | 35*-15<br>V.D. | 4.2†       | CW                                  | 2-6                                                                        | 2-3    |                              |                                |                 |
|                                  |                                     |                                 |       |       |        |                |            | CCW                                 | 4-7                                                                        | 4-3    |                              |                                |                 |
|                                  |                                     |                                 |       |       |        |                |            |                                     |                                                                            |        |                              |                                |                 |
|                                  |                                     |                                 |       |       |        |                |            |                                     |                                                                            |        |                              |                                |                 |
| 6011-2D<br>6011C-2D<br>6011CT-2D | M6011-2D<br>M6011C-2D<br>M6011CT-2D | Three<br>Phase<br>Open<br>Delta | 120   | 50/60 | 0-120  | 60             | 12.5       | CW                                  | 4-1-4                                                                      | 3-1-3  | 20 & 5                       | 154                            | 175             |
|                                  |                                     |                                 |       |       | 0-140  | 60             | 14.5       | CW                                  | 2-1-2                                                                      | 3-1-3  |                              |                                |                 |
| 6011-2P<br>6011C-2P<br>6011CT-2P | M6011-2P<br>M6011C-2P<br>M6011CT-2P | Single<br>Phase<br>Parallel     | 120   | 50/60 | 0-120  | 120            | 14.4       | CW                                  | 1-4                                                                        | 1-B    | 21                           | 156                            | 177             |
|                                  |                                     |                                 |       |       | 0-140  | 120            | 16.8       | CW                                  | 1-2                                                                        | 1-B    |                              |                                |                 |
| 6011-2S<br>6011C-2S<br>6011CT-2S | M6011-2S<br>M6011C-2S<br>M6011CT-2S | Single<br>Phase<br>Series       | 240   | 50/60 | 0-240  | 60             | 14.4       | CW                                  | 4-4                                                                        | 3-3    | 20 & 4                       | 154                            | 175             |
|                                  |                                     |                                 |       |       | 0-280  | 60             | 16.8       | CW                                  | 2-2                                                                        | 3-3    |                              |                                |                 |
| 6020-2D<br>6020C-2D<br>6020CT-2D | M6020-2D<br>M6020C-2D<br>M6020CT-2D | Three<br>Phase<br>Open<br>Delta | 240   | 50/60 | 0-240  | 35             | 14.5       | CW                                  | 4-1-4                                                                      | 3-1-3  | 20 & 5                       | 146                            | 167             |
|                                  |                                     |                                 |       |       | 0-280  | 35             | 16.9       | CW                                  | 2-1-2                                                                      | 3-1-3  |                              |                                |                 |
|                                  |                                     |                                 | 120   | 50/60 | 0-280  | 35*-15<br>V.D. | 7.3†       | CW                                  | 5-1-5                                                                      | 3-1-3  |                              |                                |                 |
| 6020-2P<br>6020C-2P<br>6020CT-2P | M6020-2P<br>M6020C-2P<br>M6020CT-2P | Single<br>Phase<br>Parallel     | 240   | 50/60 | 0-240  | 70             | 16.8       | CW                                  | 1-4                                                                        | 1-B    | 21                           | 148                            | 169             |
|                                  |                                     |                                 |       |       | 0-280  | 70             | 19.6       | CW                                  | 1-2                                                                        | 1-B    |                              |                                |                 |
|                                  |                                     |                                 | 120   | 50/60 | 0-280  | 70*-30<br>V.D. | 8.4†       | CW                                  | 1-5                                                                        | 1-B    |                              |                                |                 |
| 6020-2S<br>6020C-2S<br>6020CT-2S | M6020-2S<br>M6020C-2S<br>M6020CT-2S | Single<br>Phase<br>Series       | 480   | 50/60 | 0-480  | 35             | 16.8       | CW                                  | 4-4                                                                        | 3-3    | 20 & 4                       | 146                            | 167             |
|                                  |                                     |                                 |       |       | 0-560  | 35             | 19.6       | CW                                  | 2-2                                                                        | 3-3    |                              |                                |                 |
|                                  |                                     |                                 | 240   | 50/60 | 0-560  | 35*-15<br>V.D. | 8.4†       | CW                                  | 5-5                                                                        | 3-3    |                              |                                |                 |
| 6011-3P<br>6011E-3P              | M6011-3P<br>M6011E-3P               | Single<br>Phase<br>Parallel     | 120   | 50/60 | 0-120  | 180            | 21.6       | CW                                  | 1-4                                                                        | 1-D    | 22                           | 246                            | 267             |
|                                  |                                     |                                 |       |       | 0-140  | 180            | 25.2       | CW                                  | 1-2                                                                        | 1-D    |                              |                                |                 |
| 6011-3Y<br>6011E-3Y              | M6011-3Y<br>M6011E-3Y               | Three<br>Phase<br>Wye           | 240   | 60    | 0-240  | 60             | 24.9       | CW                                  | 4-4-4                                                                      | 3-3-3  | 20 & 6                       | 242                            | 263             |
|                                  |                                     |                                 |       |       | 0-280  | 60             | 29.1       | CW                                  | 2-2-2                                                                      | 3-3-3  |                              |                                |                 |



6011



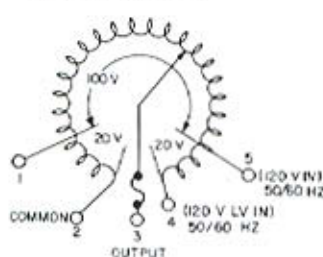
6011



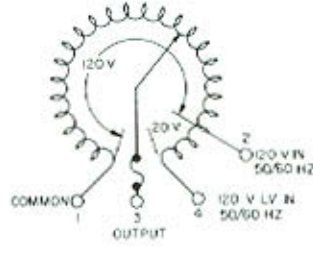
6020

# 6000 Series

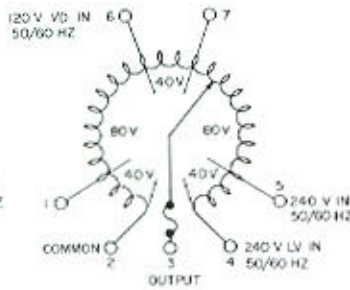
VIEW FROM ROTOR END



6011 Single Unit

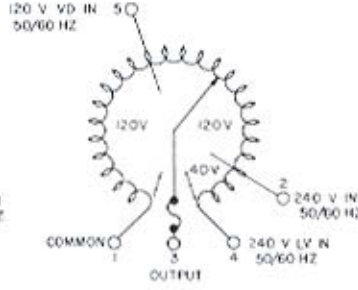


6011 Ganged Unit



For opposite rotation interchange external connections from 5 to 1, 2 to 4 and 6 to 7.

6020 Single Unit



6020 Ganged Unit

| PART NUMBER           |                         | WIRING                       | INPUT |       | OUTPUT |          |         | SHAFT ROTATION FOR VOLTAGE INCREASE | TERMINAL CONNECTIONS For Increasing Voltage As Viewed from Rotor End |        | SCHE-MATIC (Pg 8 & 9) | NET WEIGHT IN LBS. (MAX) |              |
|-----------------------|-------------------------|------------------------------|-------|-------|--------|----------|---------|-------------------------------------|----------------------------------------------------------------------|--------|-----------------------|--------------------------|--------------|
| MANUALLY OPERATED     | MOTOR DRIVEN            |                              | VOLTS | HERTZ | VOLTS  | MAX AMPS | MAX KVA |                                     | INPUT                                                                | OUTPUT |                       | MAN-UAL                  | MOTOR DRIVEN |
| 6020-3P<br>6020E-3P   | M6020-3P<br>M6020E-3P   | Single Phase Parallel        | 240   | 50/60 | 0-240  | 105      | 25.2    | CW                                  | 1-4                                                                  | 1-D    | 22                    | 246                      | 267          |
|                       |                         |                              | 120   | 50/60 | 0-280  | 105      | 29.4    | CW                                  | 1-2                                                                  | 1-D    |                       |                          |              |
| 6020-3Y<br>6020E-3Y   | M6020-3Y<br>M6020E-3Y   | Three Phase Wye              | 480   | 50/60 | 0-480  | 35       | 29.1    | CW                                  | 4-4-4                                                                | 3-3-3  | 20 & 6                | 240                      | 261          |
|                       |                         |                              | 240   | 60    | 0-560  | 35       | 33.9    | CW                                  | 2-2-2                                                                | 3-3-3  |                       |                          |              |
| 6011-4D<br>6011E-4D   | M6011-4D<br>M6011E-4D   | Three Phase Open Delta       | 120   | 50/60 | 0-120  | 120      | 24.9    | CW                                  | 4-1-4                                                                | B-1-B  | 21 & 5                | 354                      | 375          |
|                       |                         |                              |       |       | 0-140  | 120      | 29.1    | CW                                  | 2-1-2                                                                | B-1-B  |                       |                          |              |
| 6011-4P<br>6011E-4P   | M6011-4P<br>M6011E-4P   | Single Phase Parallel        | 120   | 50/60 | 0-120  | 240      | 28.8    | CW                                  | 1-4                                                                  | 1-D    | 22                    | 356                      | 377          |
|                       |                         |                              |       |       | 0-140  | 240      | 33.6    | CW                                  | 1-2                                                                  | 1-D    |                       |                          |              |
| 6011-4PS<br>6011E-4PS | M6011-4PS<br>M6011E-4PS | Single Phase Series Parallel | 240   | 50/60 | 0-240  | 120      | 28.8    | CW                                  | 4-4                                                                  | B-B    | 21 & 4                | 354                      | 375          |
|                       |                         |                              |       |       | 0-280  | 120      | 33.6    | CW                                  | 2-2                                                                  | B-B    |                       |                          |              |
| 6020-4D<br>6020E-4D   | M6020-4D<br>M6020E-4D   | Three Phase Open Delta       | 240   | 50/60 | 0-240  | 70       | 29.1    | CW                                  | 4-1-4                                                                | B-1-B  | 21 & 5                | 338                      | 359          |
|                       |                         |                              | 120   | 50/60 | 0-280  | 70       | 33.9    | CW                                  | 2-1-2                                                                | B-1-B  |                       |                          |              |
| 6020-4P<br>6020E-4P   | M6020-4P<br>M6020E-4P   | Single Phase Parallel        | 240   | 50/60 | 0-240  | 140      | 33.6    | CW                                  | 1-4                                                                  | 1-D    | 22                    | 340                      | 361          |
|                       |                         |                              | 120   | 50/60 | 0-280  | 140      | 39.2    | CW                                  | 1-2                                                                  | 1-D    |                       |                          |              |
| 6020-4PS<br>6020E-4PS | M6020-4PS<br>M6020E-4PS | Single Phase Series Parallel | 480   | 50/60 | 0-480  | 70       | 33.6    | CW                                  | 4-4                                                                  | B-B    | 21 & 4                | 338                      | 359          |
|                       |                         |                              | 240   | 50/60 | 0-560  | 70       | 39.2    | CW                                  | 2-2                                                                  | B-B    |                       |                          |              |
| 6011-5P<br>6011E-5P   | M6011-5P<br>M6011E-5P   | Single Phase Parallel        | 120   | 50/60 | 0-120  | 300      | 36.0    | CW                                  | 1-4                                                                  | 1-D    | 22                    | 450                      | 471          |
|                       |                         |                              |       |       | 0-140  | 300      | 42.0    | CW                                  | 1-2                                                                  | 1-D    |                       |                          |              |
| 6020-5P<br>6020E-5P   | M6020-5P<br>M6020E-5P   | Single Phase Parallel        | 240   | 50/60 | 0-240  | 175      | 42.0    | CW                                  | 1-4                                                                  | 1-D    | 22                    | 430                      | 451          |
|                       |                         |                              | 120   | 50/60 | 0-280  | 175      | 49.0    | CW                                  | 1-2                                                                  | 1-D    |                       |                          |              |
| 6011-6D<br>6011E-6D   | M6011-6D<br>M6011E-6D   | Three Phase Open Delta       | 120   | 50/60 | 0-120  | 180      | 37.4    | CW                                  | 4-1-4                                                                | D-1-D  | 22 & 5                | 541                      | 562          |
|                       |                         |                              |       |       | 0-140  | 180      | 43.6    | CW                                  | 2-1-2                                                                | D-1-D  |                       |                          |              |
| 6011-6P<br>6011E-6P   | M6011-6P<br>M6011E-6P   | Single Phase Parallel        | 120   | 50/60 | 0-120  | 360      | 43.2    | CW                                  | 1-4                                                                  | 1-D    | 22                    | 543                      | 564          |
|                       |                         |                              |       |       | 0-140  | 360      | 50.4    | CW                                  | 1-2                                                                  | 1-D    |                       |                          |              |
| 6011-6PS<br>6011E-6PS | M6011-6PS<br>M6011E-6PS | Single Phase Series Parallel | 240   | 50/60 | 0-240  | 180      | 43.2    | CW                                  | 4-4                                                                  | D-D    | 22 & 4                | 541                      | 562          |
|                       |                         |                              |       |       | 0-280  | 180      | 50.4    | CW                                  | 2-2                                                                  | D-D    |                       |                          |              |
| 6011-6Y<br>6011E-6Y   | M6011-6Y<br>M6011E-6Y   | Three Phase Wye              | 240   | 60    | 0-240  | 120      | 49.8    | CW                                  | 4-4-4                                                                | B-B-B  | 21 & 6                | 539                      | 560          |
|                       |                         |                              |       |       | 0-280  | 120      | 58.1    | CW                                  | 2-2-2                                                                | B-B-B  |                       |                          |              |

# 6000 Series

| PART NUMBER           |                           | WIRING                             | INPUT |       | OUTPUT |                         |         | SHAFT ROTATION FOR VOLTAGE INCREASE | TERMINAL CONNECTIONS<br>For Increasing Voltage<br>As Viewed from Rotor End |        | SCHE-MATIC<br>(Pg 8 & 9) | NET WEIGHT<br>IN LBS.<br>(MAX) |              |
|-----------------------|---------------------------|------------------------------------|-------|-------|--------|-------------------------|---------|-------------------------------------|----------------------------------------------------------------------------|--------|--------------------------|--------------------------------|--------------|
| MANUALLY OPERATED     | MOTOR DRIVEN              |                                    | VOLTS | HERTZ | VOLTS  | MAX AMPS                | MAX KVA |                                     | INPUT                                                                      | OUTPUT |                          | MAN-UAL                        | MOTOR DRIVEN |
| 6020-6D<br>6020E-6D   | M6020-6D<br>M6020E-6D     | Three Phase<br>Open<br>Delta       | 240   | 50/60 | 0-240  | 105                     | 43.6    | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | 517                            | 538          |
|                       |                           |                                    | 120   | 50/60 | 0-280  | 105*45<br>V.D.          | 50.9    | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |
| 6020-6P<br>6020E-6P   | M6020-6P<br>M6020E-6P     | Single Phase<br>Parallel           | 240   | 50/60 | 0-240  | 210                     | 50.4    | CW                                  | 1-4                                                                        | 1-D    | 22                       | 489                            | 510          |
|                       |                           |                                    | 120   | 50/60 | 0-280  | 210<br>210*-90<br>V.D.  | 58.8    | CW                                  | 1-2                                                                        | 1-D    |                          |                                |              |
| 6020-6PS<br>6020E-6PS | M6020-6PS<br>M6020E-6PS   | Single Phase<br>Series<br>Parallel | 480   | 50/60 | 0-480  | 105                     | 50.4    | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | 487                            | 508          |
|                       |                           |                                    | 240   | 50/60 | 0-560  | 105                     | 58.8    | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
| 6020-6Y<br>6020E-6Y   | M6020-6Y<br>M6020E-6Y     | Three Phase<br>Wye                 | 480   | 50/60 | 0-480  | 105*45<br>V.D.          | 58.8    | CW                                  | 4-4-4                                                                      | B-B-B  | 21 & 6                   | 485                            | 506          |
|                       |                           |                                    | 240   | 60    | 0-560  | 70<br>70*-30<br>V.D.    | 29.1    | CW                                  | 2-2-2                                                                      | B-B-B  |                          |                                |              |
| 6011-7P<br>6011E-7P   | M6011-7P<br>M6011E-7P     | Single Phase<br>Parallel           | 120   | 50/60 | 0-120  | 420                     | 50.4    | CW                                  | 1-4                                                                        | 1-D    | 22                       | 633                            | 654          |
|                       |                           |                                    |       |       | 0-140  | 420                     | 58.8    | CW                                  | 1-2                                                                        | 1-D    |                          |                                |              |
| 6020-7P<br>6020E-7P   | M6020-7P<br>M6020E-7P     | Single Phase<br>Parallel           | 240   | 50/60 | 0-240  | 245                     | 58.8    | CW                                  | 1-4                                                                        | 1-D    | 22                       | 598                            | 619          |
|                       |                           |                                    | 120   | 50/60 | 0-280  | 245<br>245*-105<br>V.D. | 68.6    | CW                                  | 1-2                                                                        | 1-D    |                          |                                |              |
| 6011-8D<br>6011E-8D   | M6011-8D<br>M6011E-8D     | Three Phase<br>Open<br>Delta       | 120   | 50/60 | 0-120  | 240                     | 49.8    | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | 720                            | 741          |
|                       |                           |                                    |       |       | 0-140  | 240                     | 58.1    | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |
| 6011-8P<br>6011E-8P   | M6011-8P<br>M6011E-8P     | Single Phase<br>Parallel           | 120   | 50/60 | 0-120  | 480                     | 57.6    | CW                                  | 1-4                                                                        | 1-D    | 22                       | 722                            | 743          |
|                       |                           |                                    |       |       | 0-140  | 480                     | 67.2    | CW                                  | 1-2                                                                        | 1-D    |                          |                                |              |
| 6011-8PS<br>6011E-8PS | M6011-8PS<br>M6011E-8PS   | Single Phase<br>Series<br>Parallel | 240   | 50/60 | 0-240  | 240                     | 57.6    | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | 720                            | 741          |
|                       |                           |                                    |       |       | 0-280  | 240                     | 67.2    | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
| 6020-8D<br>6020E-8D   | M6020-8D<br>M6020E-8D     | Three Phase<br>Open<br>Delta       | 240   | 50/60 | 0-240  | 140                     | 58.1    | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | 688                            | 709          |
|                       |                           |                                    | 120   | 50/60 | 0-280  | 140<br>140*-60<br>V.D.  | 67.8    | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |
| 6020-8P<br>6020E-8P   | M6020-8P<br>M6020E-8P     | Single Phase<br>Parallel           | 240   | 50/60 | 0-240  | 280                     | 67.2    | CW                                  | 1-4                                                                        | 1-D    | 22                       | 690                            | 711          |
|                       |                           |                                    | 120   | 50/60 | 0-280  | 280<br>280*-120<br>V.D. | 78.4    | CW                                  | 1-2                                                                        | 1-D    |                          |                                |              |
| 6020-8PS<br>6020E-8PS | M6020-8PS<br>M6020E-8PS   | Single Phase<br>Series<br>Parallel | 480   | 50/60 | 0-480  | 140                     | 67.2    | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | 688                            | 709          |
|                       |                           |                                    | 240   | 50/60 | 0-560  | 140<br>140*-60<br>V.D.  | 78.4    | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
| 6011-9P<br>6011E-9P   | M6011-9P<br>M6011E-9P     | Single Phase<br>Parallel           | 120   | 50/60 | 0-120  | 540                     | 64.8    | CW                                  | 1-4                                                                        | 1-D    | 22                       | 811                            | 832          |
|                       |                           |                                    |       |       | 0-140  | 540                     | 75.6    | CW                                  | 1-2                                                                        | 1-D    |                          |                                |              |
| 6011-9Y<br>6011E-9Y   | M6011-9Y<br>M6011E-9Y     | Three Phase<br>Wye                 | 240   | 60    | 0-240  | 180                     | 74.7    | CW                                  | 4-4-4                                                                      | D-D-D  | 22 & 6                   | 807                            | 828          |
|                       |                           |                                    |       |       | 0-280  | 180                     | 87.2    | CW                                  | 2-2-2                                                                      | D-D-D  |                          |                                |              |
| 6020-9P<br>6020E-9P   | M6020-9P<br>M6020E-9P     | Single Phase<br>Parallel           | 240   | 50/60 | 0-240  | 315                     | 75.6    | CW                                  | 1-4                                                                        | 1-D    | 22                       | 775                            | 796          |
|                       |                           |                                    | 120   | 50/60 | 0-280  | 315<br>315*-135<br>V.D. | 88.2    | CW                                  | 1-2                                                                        | 1-D    |                          |                                |              |
| 6020-9Y<br>6020E-9Y   | M6020-9Y<br>M6020E-9Y     | Three Phase<br>Wye                 | 480   | 50/60 | 0-480  | 105                     | 87.2    | CW                                  | 4-4-4                                                                      | D-D-D  | 22 & 6                   | 771                            | 792          |
|                       |                           |                                    | 240   | 60    | 0-560  | 105<br>105*-45<br>V.D.  | 101.7   | CW                                  | 2-2-2                                                                      | D-D-D  |                          |                                |              |
| —                     | M6011-10D<br>M6011E-10D   | Three Phase<br>Open<br>Delta       | 120   | 50/60 | 0-120  | 300                     | 62.3    | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | —                              | 912          |
|                       |                           |                                    |       |       | 0-140  | 300                     | 72.7    | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |
| —                     | M6011-10PS<br>M6011E-10PS | Single Phase<br>Series<br>Parallel | 240   | 50/60 | 0-240  | 300                     | 72.0    | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | —                              | 912          |
|                       |                           |                                    |       |       | 0-280  | 300                     | 84.0    | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
| —                     | M6020-10D<br>M6020E-10D   | Three Phase<br>Open<br>Delta       | 240   | 50/60 | 0-240  | 175                     | 72.7    | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | —                              | 912          |
|                       |                           |                                    | 120   | 50/60 | 0-280  | 175<br>175*-75<br>V.D.  | 84.8    | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |

# 6000 Series

| PART NUMBER       |                           | WIRING                       | INPUT |       | OUTPUT |                  |         | SHAFT ROTATION FOR VOLTAGE INCREASE | TERMINAL CONNECTIONS<br>For Increasing Voltage<br>As Viewed from Rotor End |        | SCHE-MATIC<br>(Pg 8 & 9) | NET WEIGHT<br>IN LBS.<br>(MAX) |              |
|-------------------|---------------------------|------------------------------|-------|-------|--------|------------------|---------|-------------------------------------|----------------------------------------------------------------------------|--------|--------------------------|--------------------------------|--------------|
| MANUALLY OPERATED | MOTOR DRIVEN              |                              | VOLTS | HERTZ | VOLTS  | MAX AMPS         | MAX KVA |                                     | INPUT                                                                      | OUTPUT |                          | MAN-UAL                        | MOTOR DRIVEN |
| —                 | M6020-10PS<br>M6020E-10PS | Single Phase Series Parallel | 480   | 50/60 | 0-480  | 175              | 84.0    | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | —                              | 872          |
|                   |                           |                              |       |       | 0-560  | 175              | 98.0    | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
|                   |                           |                              | 240   | 50/60 | 0-560  | 175*-75<br>V.D.  | 42.0†   | CW                                  | 5-5                                                                        | D-D    |                          |                                |              |
| —                 | M6011-12D<br>M6011E-12D   | Three Phase Open Delta       | 120   | 50/60 | 0-120  | 360              | 74.7    | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | —                              | 1060         |
|                   |                           |                              |       |       | 0-140  | 360              | 87.2    | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |
| —                 | M6011-12PS<br>M6011E-12PS | Single Phase Series Parallel | 240   | 50/60 | 0-240  | 360              | 86.4    | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | —                              | 1060         |
|                   |                           |                              |       |       | 0-280  | 360              | 100.8   | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
| —                 | M6020-12D<br>M6020E-12D   | Three Phase Open Delta       | 240   | 50/60 | 0-240  | 210              | 87.2    | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | —                              | 1012         |
|                   |                           |                              |       |       | 0-280  | 210              | 101.7   | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |
|                   |                           |                              | 120   | 50/60 | 0-280  | 210*-90<br>V.D.  | 43.6†   | CW                                  | 5-1-5                                                                      | D-1-D  |                          |                                |              |
| —                 | M6020-12PS<br>M6020E-12PS | Single Phase Series Parallel | 480   | 50/60 | 0-480  | 210              | 100.8   | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | —                              | 1012         |
|                   |                           |                              |       |       | 0-560  | 210              | 117.6   | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
|                   |                           |                              | 240   | 50/60 | 0-560  | 210*-90<br>V.D.  | 50.4†   | CW                                  | 5-5                                                                        | D-D    |                          |                                |              |
| —                 | M6011-14D<br>M6011E-14D   | Three Phase Open Delta       | 120   | 50/60 | 0-120  | 420              | 87.2    | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | —                              | 1237         |
|                   |                           |                              |       |       | 0-140  | 420              | 101.7   | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |
| —                 | M6011-14PS<br>M6011E-14PS | Single Phase Series Parallel | 240   | 50/60 | 0-240  | 420              | 100.8   | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | —                              | 1237         |
|                   |                           |                              |       |       | 0-280  | 420              | 117.6   | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
| —                 | M6020-14D<br>M6020E-14D   | Three Phase Open Delta       | 240   | 50/60 | 0-240  | 245              | 101.7   | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | —                              | 1181         |
|                   |                           |                              |       |       | 0-280  | 245              | 118.7   | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |
|                   |                           |                              | 120   | 50/60 | 0-280  | 245*-105<br>V.D. | 50.9†   | CW                                  | 5-1-5                                                                      | D-1-D  |                          |                                |              |
| —                 | M6020-14PS<br>M6020E-14PS | Single Phase Series Parallel | 480   | 50/60 | 0-480  | 245              | 117.6   | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | —                              | 1181         |
|                   |                           |                              |       |       | 0-560  | 245              | 137.2   | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
|                   |                           |                              | 240   | 50/60 | 0-560  | 245*-105<br>V.D. | 58.8†   | CW                                  | 5-5                                                                        | D-D    |                          |                                |              |
| —                 | M6011-16D<br>M6011E-16D   | Three Phase Open Delta       | 120   | 50/60 | 0-120  | 480              | 99.6    | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | —                              | 1414         |
|                   |                           |                              |       |       | 0-140  | 480              | 116.3   | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |
| —                 | M6011-16PS<br>M6011E-16PS | Single Phase Series Parallel | 240   | 50/60 | 0-240  | 480              | 115.2   | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | —                              | 1414         |
|                   |                           |                              |       |       | 0-280  | 480              | 134.4   | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
| —                 | M6020-16D<br>M6020E-16D   | Three Phase Open Delta       | 240   | 50/60 | 0-240  | 280              | 116.3   | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | —                              | 1350         |
|                   |                           |                              |       |       | 0-280  | 280              | 135.6   | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |
|                   |                           |                              | 120   | 50/60 | 0-280  | 280*-120<br>V.D. | 58.1†   | CW                                  | 5-1-5                                                                      | D-1-D  |                          |                                |              |
| —                 | M6020-16PS<br>M6020E-16PS | Single Phase Series Parallel | 480   | 50/60 | 0-480  | 280              | 134.4   | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | —                              | 1350         |
|                   |                           |                              |       |       | 0-560  | 280              | 156.8   | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
|                   |                           |                              | 240   | 50/60 | 0-560  | 280*-120<br>V.D. | 67.2†   | CW                                  | 5-5                                                                        | D-D    |                          |                                |              |
| —                 | M6011-18D<br>M6011E-18D   | Three Phase Open Delta       | 120   | 50/60 | 0-120  | 540              | 112.1   | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | —                              | 1597         |
|                   |                           |                              |       |       | 0-140  | 540              | 130.8   | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |
| —                 | M6011-18PS<br>M6011E-18PS | Single Phase Series Parallel | 240   | 50/60 | 0-240  | 540              | 129.6   | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | —                              | 1597         |
|                   |                           |                              |       |       | 0-280  | 540              | 151.2   | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
| —                 | M6020-18D<br>M6020E-18D   | Three Phase Open Delta       | 240   | 50/60 | 0-240  | 315              | 130.8   | CW                                  | 4-1-4                                                                      | D-1-D  | 22 & 5                   | —                              | 1525         |
|                   |                           |                              |       |       | 0-280  | 315              | 152.6   | CW                                  | 2-1-2                                                                      | D-1-D  |                          |                                |              |
|                   |                           |                              | 120   | 50/60 | 0-280  | 315*-135<br>V.D. | 94.5†   | CW                                  | 5-1-5                                                                      | D-1-D  |                          |                                |              |
| —                 | M6020-18PS<br>M6020E-18PS | Single Phase Series Parallel | 480   | 50/60 | 0-480  | 315              | 151.2   | CW                                  | 4-4                                                                        | D-D    | 22 & 4                   | —                              | 1525         |
|                   |                           |                              |       |       | 0-560  | 315              | 176.4   | CW                                  | 2-2                                                                        | D-D    |                          |                                |              |
|                   |                           |                              | 240   | 50/60 | 0-560  | 315*-135<br>V.D. | 75.6†   | CW                                  | 5-5                                                                        | D-D    |                          |                                |              |
| —                 | M6011-12Y<br>M6011E-12Y   | Three Phase Wye              | 240   | 60    | 0-240  | 240              | 99.6    | CW                                  | 4-4-4                                                                      | D-D-D  | 22 & 6                   | —                              | 1062         |
|                   |                           |                              |       |       | 0-280  | 240              | 116.3   | CW                                  | 2-2-2                                                                      | D-D-D  |                          |                                |              |

# 6000 Series

| PART NUMBER          |                         | WIRING                | INPUT |       | OUTPUT |                         |            | SHAFT<br>ROTATION<br>FOR<br>VOLTAGE<br>INCREASE | TERMINAL CONNECTIONS<br>For Increasing Voltage<br>As Viewed from Rotor End |        | SCHE-<br>MATIC<br>(Pg 8 & 9) | NET WEIGHT<br>IN LBS.<br>(MAX) |                 |
|----------------------|-------------------------|-----------------------|-------|-------|--------|-------------------------|------------|-------------------------------------------------|----------------------------------------------------------------------------|--------|------------------------------|--------------------------------|-----------------|
| MANUALLY<br>OPERATED | MOTOR<br>DRIVEN         |                       | VOLTS | HERTZ | VOLTS  | MAX<br>AMPS             | MAX<br>KVA |                                                 | INPUT                                                                      | OUTPUT |                              | MAN-<br>UAL                    | MOTOR<br>DRIVEN |
| —                    | M6020-12Y<br>M6020E-12Y | Three<br>Phase<br>Wye | 480   | 50/60 | 0-480  | 140                     | 116.3      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 1014            |
|                      |                         |                       |       | 60    | 0-560  | 140                     | 135.6      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       |       | 240   | 0-560  | 140*<br>140*60<br>V.D.  | 58.1‡      | CW                                              | 5-5-5                                                                      | D-D-D  |                              |                                |                 |
| —                    | M6011-15Y<br>M6011E-15Y | Three<br>Phase<br>Wye | 240   | 60    | 0-240  | 300                     | 124.6      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 1329            |
|                      |                         |                       |       |       | 0-280  | 300                     | 145.3      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       |       |       |        |                         |            |                                                 |                                                                            |        |                              |                                |                 |
| —                    | M6020-15Y<br>M6020E-15Y | Three<br>Phase<br>Wye | 480   | 50/60 | 0-480  | 175                     | 145.3      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 1269            |
|                      |                         |                       |       | 60    | 0-560  | 175                     | 169.5      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       |       | 240   | 0-560  | 175*<br>175*75<br>V.D.  | 72.7‡      | CW                                              | 5-5-5                                                                      | D-D-D  |                              |                                |                 |
| —                    | M6011-18Y<br>M6011E-18Y | Three<br>Phase<br>Wye | 240   | 60    | 0-240  | 360                     | 149.5      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 1595            |
|                      |                         |                       |       |       | 0-280  | 360                     | 174.4      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       |       |       |        |                         |            |                                                 |                                                                            |        |                              |                                |                 |
| —                    | M6020-18Y<br>M6020E-18Y | Three<br>Phase<br>Wye | 480   | 50/60 | 0-480  | 210                     | 174.6      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 1523            |
|                      |                         |                       |       | 60    | 0-560  | 210                     | 203.4      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       |       | 240   | 0-560  | 210*<br>210*90<br>V.D.  | 87.2‡      | CW                                              | 5-5-5                                                                      | D-D-D  |                              |                                |                 |
| —                    | M6011-21Y<br>M6011E-21Y | Three<br>Phase<br>Wye | 240   | 60    | 0-240  | 420                     | 174.4      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 1864            |
|                      |                         |                       |       |       | 0-280  | 420                     | 203.4      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       |       |       |        |                         |            |                                                 |                                                                            |        |                              |                                |                 |
| —                    | M6020-21Y<br>M6020E-21Y | Three<br>Phase<br>Wye | 480   | 50/60 | 0-480  | 245                     | 203.4      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 1780            |
|                      |                         |                       |       | 60    | 0-560  | 245                     | 237.4      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       |       | 240   | 0-560  | 245*<br>245*105<br>V.D. | 101.7‡     | CW                                              | 5-5-5                                                                      | D-D-D  |                              |                                |                 |
| —                    | M6011-24Y<br>M6011E-24Y | Three<br>Phase<br>Wye | 240   | 60    | 0-240  | 480                     | 199.3      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 2132            |
|                      |                         |                       |       |       | 0-280  | 480                     | 232.5      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       |       |       |        |                         |            |                                                 |                                                                            |        |                              |                                |                 |
| —                    | M6020-24Y<br>M6020E-24Y | Three<br>Phase<br>Wye | 480   | 50/60 | 0-480  | 280                     | 232.5      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 2036            |
|                      |                         |                       |       | 60    | 0-560  | 280                     | 271.3      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       |       | 240   | 0-560  | 280*<br>280*120<br>V.D. | 116.3‡     | CW                                              | 5-5-5                                                                      | D-D-D  |                              |                                |                 |
| —                    | M6011-27Y<br>M6011E-27Y | Three<br>Phase<br>Wye | 240   | 60    | 0-240  | 540                     | 224.2      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 2401            |
|                      |                         |                       |       |       | 0-280  | 540                     | 261.6      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       |       |       |        |                         |            |                                                 |                                                                            |        |                              |                                |                 |
| —                    | M6020-27Y<br>M6020E-27Y | Three<br>Phase<br>Wye | 480   | 50/60 | 0-480  | 315                     | 261.6      | CW                                              | 4-4-4                                                                      | D-D-D  | 22 & 6                       | —                              | 2293            |
|                      |                         |                       |       | 60    | 0-560  | 315                     | 305.2      | CW                                              | 2-2-2                                                                      | D-D-D  |                              |                                |                 |
|                      |                         |                       |       | 240   | 0-560  | 315*<br>315*135<br>V.D. | 130.8‡     | CW                                              | 5-5-5                                                                      | D-D-D  |                              |                                |                 |

\* Maximum output current in output voltage range from 0 to 25 percent above line voltage. At higher output voltages, output current must be reduced according to rating curve Figure B, page 6.

‡ Maximum KVA at maximum output and corresponding de-rated current. Maximum KVA at lower output voltages may be calculated from rating curve Figure B, page 6.

V.D. Voltage Doubler

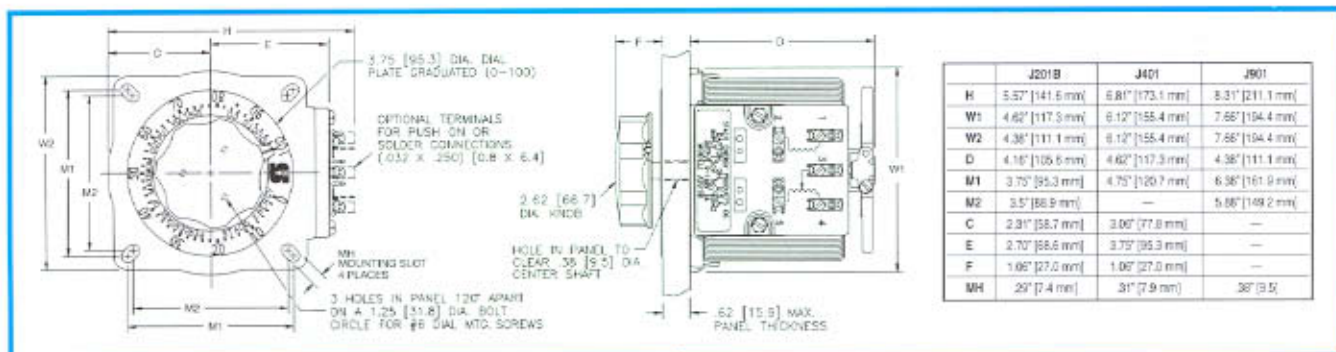
# Isolated Series

The isolated variable transformer has a separate primary winding which is electrically isolated from the secondary or output winding. Either side of the output can be grounded independently of the supply line, making them safe for all industrial, classroom, and laboratory applications where an isolated output without a common ground connection is required.

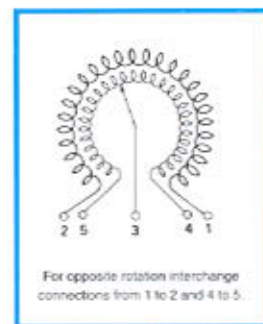
The isolated units are designed for 120V, 50/60Hz input, and

the output voltages will vary from 0 - 122% of the input for a 0-140 volt output. Three sizes are available — J201B rated at 2 amps, J401 rated at 4 amps, and J901 rated at 9 amps. These units are each available in the uncased design for bench or back-of-panel mounting, and the shaft is adjustable to accommodate various panel thicknesses. Dial plates supplied are 0-100%. The J201B and J401 are also provided in the 3PN plug and cord series with and without voltmeter or ammeter.

| MODEL | WIRING             | INPUT |       | OUTPUT  |                             |            |                               |            | SHAFT<br>ROTATION<br>For<br>Voltage<br>Increase | TERMINAL CONNECTIONS                                   |            |            | NET<br>WT.<br>LBS. |
|-------|--------------------|-------|-------|---------|-----------------------------|------------|-------------------------------|------------|-------------------------------------------------|--------------------------------------------------------|------------|------------|--------------------|
|       |                    | VOLTS | HERTZ | VOLTS   | CONSTANT<br>CURRENT<br>LOAD |            | CONSTANT<br>IMPEDANCE<br>LOAD |            |                                                 | (For increasing voltage)<br>As viewed from<br>Base End |            |            |                    |
|       |                    |       |       |         | MAX<br>AMPS                 | MAX<br>KVA | MAX<br>AMPS                   | MAX<br>KVA |                                                 | INPUT                                                  | JUMPER     | OUTPUT     |                    |
| J201B | Isolated           | 120   | 50/60 | 0-140   | 2                           | 0.28       | —                             | —          | CW<br>CCW                                       | 1-2<br>1-2                                             | —<br>—     | 3-5<br>3-4 | 8 1/2              |
|       | Non-Isolated       |       |       | 0-120   | 5                           | 0.60       | —                             | —          | CW<br>CCW                                       | 4-5<br>4-5                                             | —<br>—     | 3-5<br>3-4 |                    |
|       | Voltage<br>Doubler |       |       | 120-260 | 4.5                         | 0.52       | —                             | —          | CW<br>CCW                                       | 1-2<br>1-2                                             | 1-5<br>2-4 | 3-2<br>3-1 |                    |
|       | Series             | 240   |       | 110-240 | 4.5                         | 1.08       | —                             | —          | CW<br>CCW                                       | 1-5<br>1-5                                             | 2-4<br>2-4 | 3-2<br>3-1 |                    |
| J401  | Isolated           | 120   | 50/60 | 0-140   | 4                           | 0.56       | —                             | —          | CW<br>CCW                                       | 1-2<br>1-2                                             | —<br>—     | 3-5<br>3-4 | 14 3/4             |
|       | Non-Isolated       |       |       | 0-120   | 10                          | 1.20       | —                             | —          | CW<br>CCW                                       | 4-5<br>4-5                                             | —<br>—     | 3-5<br>3-4 |                    |
|       | Voltage<br>Doubler |       |       | 120-260 | 9                           | 1.04       | —                             | —          | CW<br>CCW                                       | 1-2<br>1-2                                             | 1-5<br>2-4 | 3-2<br>3-1 |                    |
|       | Series             | 240   |       | 110-240 | 9                           | 2.16       | —                             | —          | CW<br>CCW                                       | 1-5<br>1-5                                             | 2-4<br>2-4 | 3-2<br>3-1 |                    |
| J901  | Isolated           | 120   | 50/60 | 0-140   | 9                           | 1.26       | —                             | —          | CW<br>CCW                                       | 1-2<br>1-2                                             | —<br>—     | 3-5<br>3-4 | 26 3/4             |
|       | Non-Isolated       |       |       | 0-120   | 25                          | 3.00       | —                             | —          | CW<br>CCW                                       | 4-5<br>4-5                                             | —<br>—     | 3-5<br>3-4 |                    |
|       | Voltage<br>Doubler |       |       | 120-260 | 20                          | 2.34       | —                             | —          | CW<br>CCW                                       | 1-2<br>1-2                                             | 1-5<br>2-4 | 3-2<br>3-1 |                    |
|       | Series             | 240   |       | 110-240 | 20                          | 4.80       | —                             | —          | CW<br>CCW                                       | 1-5<br>1-5                                             | 2-4<br>2-4 | 3-2<br>3-1 |                    |



J201B



# Enclosed Cord and Plug Series

## 3PN Series

The cased plug-in models feature a ventilated steel case, input line cord and plug, fused NEMA rated output receptacle, and an illuminated on/off switch. They are connected for output voltage increase with a clockwise rotation, and the dials are graduated from 0-100% of the voltage setting.

For application flexibility, two field modification kits have been added. The 3PN-MK kit allows either the 3PN221B or

3PN501B to be wall, bench top, or machine mounted. The 3PN-SK kit provides an adjustable voltage stop for either the 3PN1000, 3PN1200, or 3PN1500 series.

Cased plug-in models are also available with a pivot and jewel AC voltmeter or ammeter (with  $\pm 5\%$  full scale accuracy) conveniently located atop the enclosure for easy readout.

| VOLTS | PART NO.               | INPUT |       | OUTPUT                      |            |                               |            | SCHE-MATIC<br>(Pg. 8 & 9) | NET<br>WT<br>LBS |
|-------|------------------------|-------|-------|-----------------------------|------------|-------------------------------|------------|---------------------------|------------------|
|       |                        | HERTZ | VOLTS | CONSTANT<br>CURRENT<br>LOAD |            | CONSTANT<br>IMPEDANCE<br>LOAD |            |                           |                  |
|       |                        |       |       | MAX<br>AMPS                 | MAX<br>KVA | MAX<br>AMPS                   | MAX<br>KVA |                           |                  |
| 120   | 3PN221B                | 60    | 0-132 | 2.50                        | 0.33       | —                             | —          | 3                         | 3                |
|       | 3PN501B                | 50/60 | 0-140 | 5.0 ±                       | 0.70       | —                             | —          | 3                         | 7 3/4            |
|       | 3PN1010B               | 50/60 | 0-140 | 10±                         | 1.4        | —                             | —          | 3                         | 10 1/4           |
|       | 3PN1010BA<br>3PN1010BV | 50/60 | 0-140 | 10±                         | 1.4        | w/Ammeter<br>w/Voltmeter      |            | 9                         | 10 1/4           |
|       | 3PN1210B               | 60    | 0-120 | 12±                         | 1.44       | 15                            | 1.80       | 11                        | 10 1/4           |
|       | 3PN1510B               | 50/60 | 0-140 | 15±                         | 2.10       | —                             | —          | 3                         | 18               |
|       | 3PN1510BA<br>3PN1510BV | 50/60 | 0-140 | 15±                         | 2.10       | w/Ammeter<br>w/Voltmeter      |            | 9                         | 18               |
|       | 3PN2210B               | 50/60 | 0-140 | 22±                         | 3.08       | —                             | —          | 3                         | 24 1/4           |
| 240   | 3PN1020B               | 50/60 | 0-280 | 3.5±                        | 0.98       | —                             | —          | 3                         | 10 1/4           |
|       | 3PN1020BA<br>3PN1020BV | 50/60 | 0-280 | 3.5±                        | 0.98       | w/Ammeter<br>w/Voltmeter      |            | 9                         | 10 1/4           |
|       | 3PN1220B               | 60    | 0-240 | 5.0±                        | 1.20       | 7.0                           | 1.68       | 11                        | 10 1/4           |
|       | 3PN1520B               | 50/60 | 0-280 | 9.5±                        | 2.66       | —                             | —          | 3                         | 22               |
|       | 3PN2520B               | 50/60 | 0-280 | 10±                         | 2.80       | —                             | —          | 3                         | 24 1/4           |

‡ Unit is fused for the constant current rating at the factory.



3PN221B,  
3PN501B



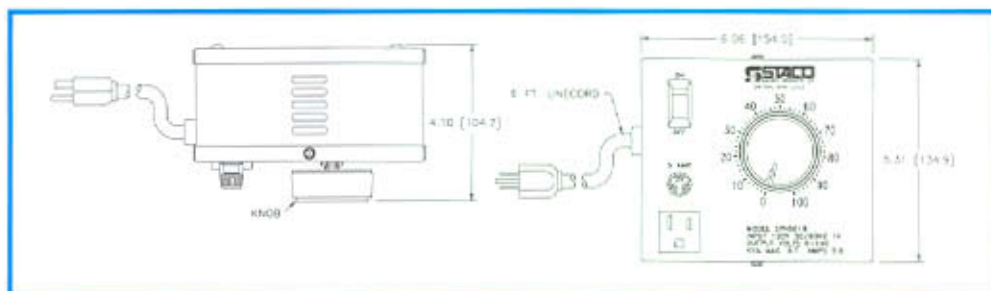
3PN-MK-Kit



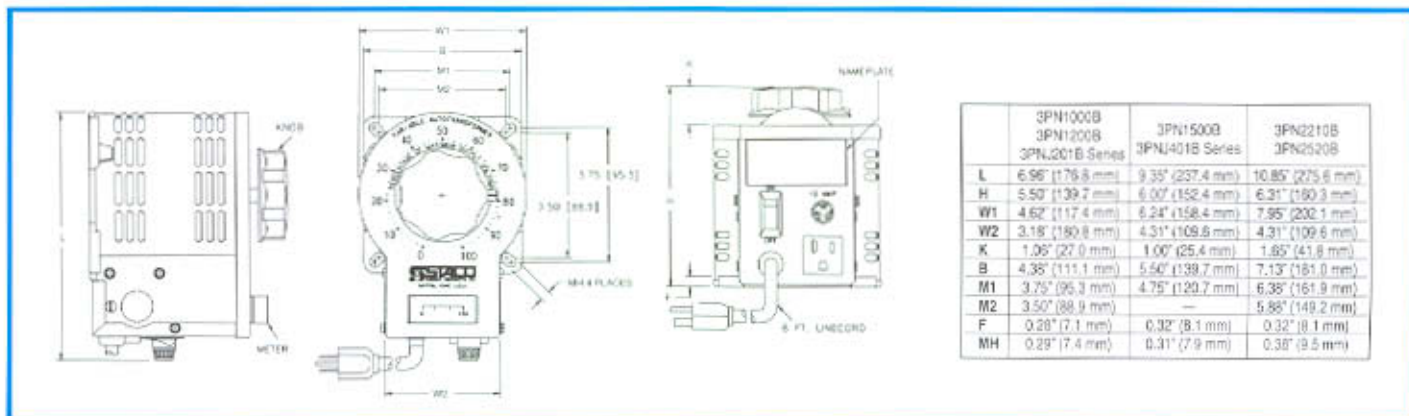
3PN1010B



3PN-SK-Kit



3PN221B, 3PN501B



3PN1010BV & 3PNJ201BV, A Cord and Plug

|    | 3PN1000B<br>3PN1200B<br>3PNJ201B Series | 3PN1500B<br>3PNJ401B Series | 3PN2210B<br>3PN2520B |
|----|-----------------------------------------|-----------------------------|----------------------|
| L  | 6.96" (176.8 mm)                        | 9.35" (237.4 mm)            | 10.85" (275.6 mm)    |
| H  | 5.50" (139.7 mm)                        | 6.00" (152.4 mm)            | 6.31" (160.3 mm)     |
| W1 | 4.62" (117.4 mm)                        | 6.24" (158.4 mm)            | 7.95" (202.1 mm)     |
| W2 | 3.18" (80.8 mm)                         | 4.31" (109.6 mm)            | 4.31" (109.6 mm)     |
| K  | 1.06" (27.0 mm)                         | 1.00" (25.4 mm)             | 1.85" (46.8 mm)      |
| B  | 4.38" (111.1 mm)                        | 5.50" (139.7 mm)            | 7.13" (181.0 mm)     |
| M1 | 3.75" (95.3 mm)                         | 4.75" (120.7 mm)            | 6.38" (161.9 mm)     |
| M2 | 3.50" (88.9 mm)                         | —                           | 5.88" (149.2 mm)     |
| F  | 0.28" (7.1 mm)                          | 0.32" (8.1 mm)              | 0.32" (8.1 mm)       |
| MH | 0.29" (7.4 mm)                          | 0.31" (7.9 mm)              | 0.36" (9.5 mm)       |

## Enclosed Cord and Plug Series



3PN1510B



3PN2210B



3PN1010BV

### L Series

These fully enclosed variable voltage controls provide protection from physical abuse, chemical spills, and other hazards. They are ideal for about every laboratory application including control of electric heating elements, lighting, electric motor speed or power, and electrical testing. Output voltage is controlled with a large slip resistant knob which increases the voltage linearly as it is turned clockwise.

In addition to portable use, the rugged, flat-topped enclosure has a slot at top rear for wall mounting. All models include line cord and plug, receptacle, switch, pilot lamp and fuse (the metered unit includes a circuit breaker). A voltmeter and ammeter are included in the L1010VA. The meter accuracy is  $\pm 3\%$ , and a meter range selector is used to increase reading resolution.

| MODEL NUMBER* | LINE VOLTAGE | OUTPUT  |         | DIMENSIONS     |                |               | WEIGHT (LBS.) |
|---------------|--------------|---------|---------|----------------|----------------|---------------|---------------|
|               |              | VOLTAGE | CURRENT | HEIGHT         | WIDTH          | DEPTH         |               |
| L221          | 120          | 0-132   | 1.75    | 6.31" [160.4]  | 5.00" [127.0]  | 4.25" [108.0] | 3.5           |
| L501          |              | 0-140   | 4.5     | 7.75" [197.0]  | 5.38" [136.5]  | 5.62" [142.9] | 7.25          |
| L1010         |              |         | 10.0    | 9.41" [238.9]  | 6.50" [165.1]  | 6.25" [158.8] | 12.25         |
| L1010VA       |              |         | 10.0    | 12.38" [314.3] | 10.75" [273.0] | 6.25" [158.8] | 17.75         |

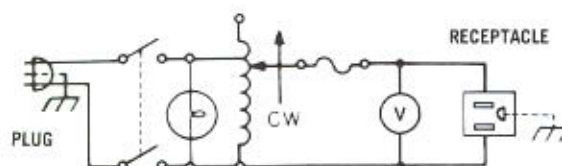
\* All models 50/60 Hz operation except L221, which is 60 Hz only.



3PN 120-VOLT TYPES  
3PN (120)



3PN 240-VOLT TYPES  
3PN (240)



# Variable Transformer Controllers

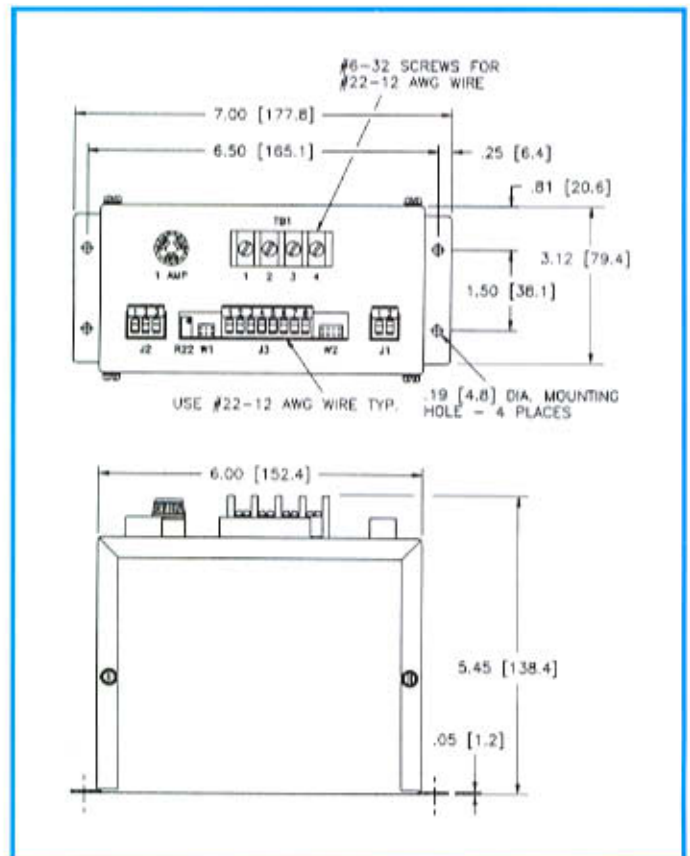
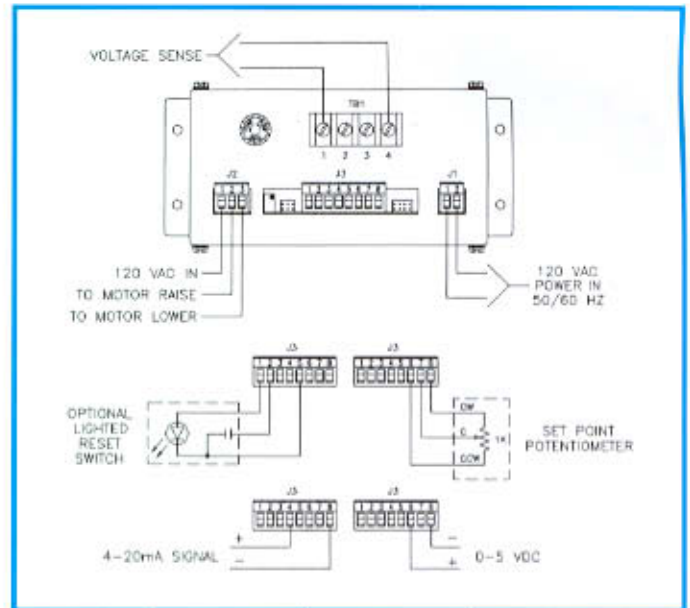
## FRC-20 Controller

The STACO FRC-20 Controller is designed to position and regulate any STACO motor driven variable transformer; and, can be controlled with a

0-5 VDC or 4-20 Ma set point, a 1 k ohm potentiometer, or a fixed resistor network.

It maintains a full range regulation of 0.5% , and a limited range regulation of 0.25%. This unit is field configurable for feedback voltages up to 600 Vac, full range/limited range, and type of control. Each FRC-20 includes a 1 amp motor supply fuse and a set point supply trim potentiometer. It is a compact package and can be easily mounted on the motor plate or inside an enclosure. Contact factory for current and other feedback alternates.

- 0.5% full range regulation
- 0.25% limited range regulation
- 0-5 VDC or 4-20 Ma set point control
- 1 k ohm potentiometer or fixed resistor network control
- Full or limited range control
- Small size
- Ease in mounting
- Up to 600 Vac feedback voltage operation
- Current regulation



# Variable Transformer Controllers

## MP Series

The MP Series microprocessor based controller controls, regulates, and provides ease in interfacing a computer or process controller with a STACO motor-driven variable transformer.

It can be controlled with the microterminal, process control set point, or a bi-directional communications port such as RS-232 or RS-422. The variable transformer regulation is maintained at  $\pm 0.5$  volts. The MP controller is available with one, two or three channels for control of up to three motorized variable transformers or individual phase control of a three phase unit.

The microcontroller is capable of operating in several different operational modes with selectable control ranges - tunable for various motor speeds, output voltage ramping, serial/analog set point selection, and feed back voltage range.

## Controller Advantages

- Intelligent microprocessor based
- Controls variable voltage transformer regulation to within  $\pm 0.5$  volts
- Multi-channeled unit enables control of one, two, or three individual motorized variable transformers or each phase of a three phase unit
- LCD display of feedback signals and set points
- Available with standard analog control signals ( 0-1 mA, 4-20 mA, 0-50 mVDC, 0-10 VDC) for set point and control functions
- Available with standard bi-directional RS-232, RS-422, IEEE-488 communication ports for set point and control functions
- Multiple set points, ramping, and dwell times available
- Heavy duty wall mountable NEMA 12 style enclosure
- Control of the unit can be local, at a remote location, or both



**Controller with  
Enclosure  
Mounted  
Microterminal  
Option**



**Rack Mounted Microprocessor Controller**

- Battery back-up RAM retains data if power is lost
- Microterminal available for remote or stand-alone monitoring and control
- User programmable to accept peak-to-peak, rms, or average AC feedback signals
- Phase loss detection, logic level signal

## Available Options

- Bi-directional RS-232, RS-422, IEEE-488 communication ports
- Single, double, or triple channel feedback
- Process control set point (0-50mVDC, 0-10VDC, 0-1mA & 4-20mA)
- Optical isolation of control and feedback inputs for reduced noise interference
- Panel mounted microterminal for local control and monitoring
- Phase loss detection

## Available Options

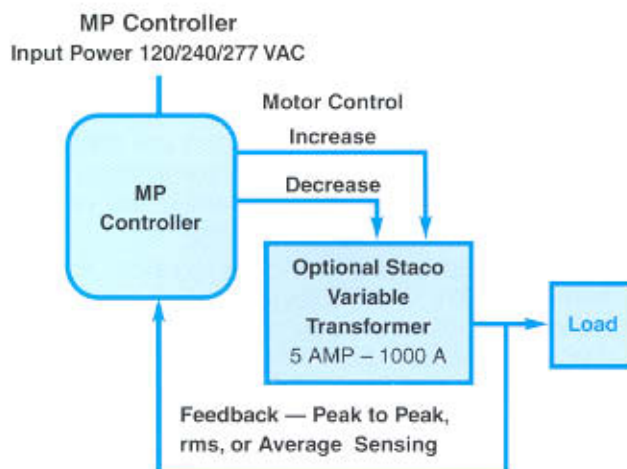
| Options                                                                | Suffix |
|------------------------------------------------------------------------|--------|
| Process Control Set point                                              | S      |
| Enclosure mounted MICRO TERMINAL                                       | T      |
| Microterminal only, for remote mounting                                | MT     |
| Phase loss detection                                                   | L      |
| Optical Isolated Inputs (optical isolation reduces noise interference) | I      |
| RS-232 Communications Port                                             | 2      |
| RS-422 Communications Port                                             | 4      |
| IEEE-488 Communications Port                                           | 8      |

## Typical Examples

A Single channel controller with an enclosure mounted terminal and process control set point — *Specify MPAST*

A Single channel controller with an enclosure mounted terminal and an RS-232 port — *Specify MPA2T*

A three channel controller for control of 3Ø bank of variable transformers, with three motors for individual phase control plus RS-422 port — *Specify MPC4*



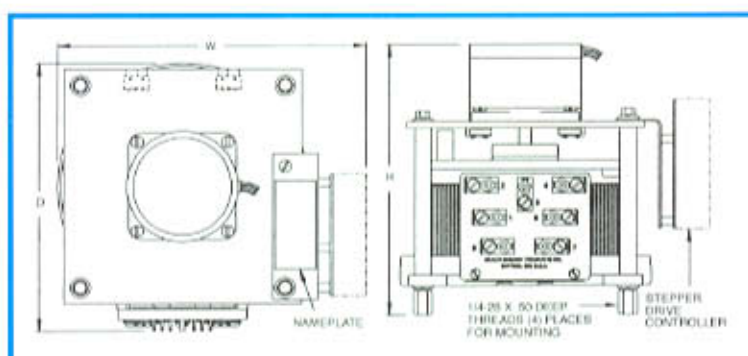
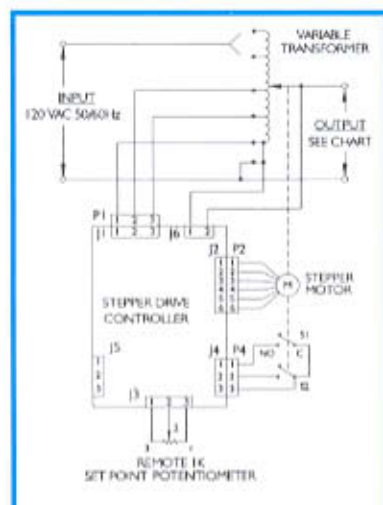
# “Quick Step” Motorized Variable Transformers

The Quick-Step is a positioner and a regulator. It is self-contained and consists of a stepper motor driven, microprocessor controlled, full range variable transformer with a 0 to 100%

adjustable output voltage range. The “Quick-Step” is shipped fully assembled, factory wired and tested, ready to be installed. The full range correction rate is less than one second.

| TYPE   | STYLE      | INPUT VOLTAGE | OUTPUT    |      |      | DIMENSIONS (INCHES) |      |      | WEIGHT (LBS) |
|--------|------------|---------------|-----------|------|------|---------------------|------|------|--------------|
|        |            |               | VOLTAGE   | AMPS | kVA  | H                   | W    | D    |              |
| SD291  | Open Frame | 120V 50/60 Hz | 0-120/132 | 3.0  | 0.40 | 4.94                | 5.00 | 3.75 | 13           |
| SD511  |            |               | 0-120/140 | 5.0  | 0.70 | 5.00                | 5.84 | 4.16 | 15           |
| SD1010 |            |               |           | 10.0 | 1.40 | 8.06                | 6.62 | 5.34 | 20           |
| SD1510 |            |               |           | 15.0 | 2.10 | 8.41                | 7.88 | 6.80 | 22           |
| SD2510 |            |               |           | 25.0 | 3.50 | 8.40                | 9.39 | 8.29 | 26           |

Note: Limited output range and 240 volt input models are available in designs to meet special application needs. Contact factory for specifications and application information.



## Paralleling Chokes

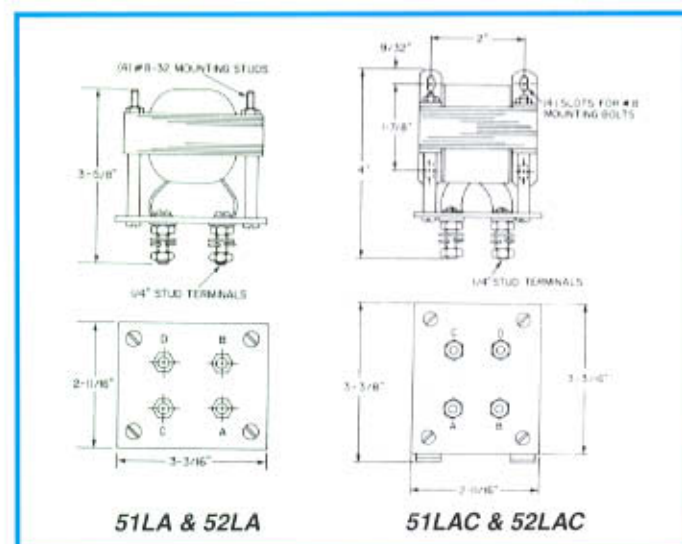
Paralleling chokes, or reactors are used to force equal distribution or current where two or more variable transformers are ganged in parallel circuits. When variable transformers are connected in parallel without the use of paralleling chokes, slight differences in brush contact conditions will result in unequal loading of the individual units causing a possible overload condition.

Parallel operation of ganged units (smaller than the 2510/2520 series) is not recommended because it is usually more economical to handle rated loads with the capacity of larger single units.

Schematics figures 16 and 17 on page 9 illustrate the use of the four terminal style chokes available from Staco. Four designs of chokes are offered. Type 51LA and 51LAC are for 120 volt operation. Type 51LAC is used in 5011 “CT” and 6011 “CT” style units and is recommended for use with models of the 2510 Series when hooked in parallel.

Type 52LA and 52LAC are for 240 volt operation. Type 52LAC is used in the 5021 “CT” and 6020 “CT” style units and is recommended for use with models of the 2520 when hooked in parallel. Types 51LA and 52LA are used on all uncased models of the 5011/5021 and 6011/6020 Series when parallel wired at the factory. Complete details are shown.

Chokes need not be ordered separately on ganged assemblies of the 5011/5021 and 6011/6020 Series because each unit is wired complete with all necessary chokes and connecting wiring.



---

## Product Selector Guide

# Product Quick Selector

The STACO Variable Transformer Product Quick Selector is a guide to all standard single-phase and three-phase variable transformers in the Staco product line including portable, ganged and motorized models. Units are listed by voltage rating and by increasing values of current and KVA.

With known values of voltage, current and frequency, the STACO Variable Transformer Selector can be used to locate the particular transformer that best fits your requirements. If a

motor driven model is ordered, be sure to prefix the part number with the desired travel time, typically 5, 15, 30 or 60 seconds.

For non-standard operating conditions, refer to the Product Design and Engineering Section of this catalog.

Ratings and configurations not included in the Variable Transformer Selector may be obtained by consulting our STACO representative or by contacting the factory.

|              | INPUT          |             | OUTPUT           |                        |                |                          |            | MANUALLY OPERATED     | MOTOR DRIVEN |                 | DETAILED TECHNICAL INFO PAGE |                                   |
|--------------|----------------|-------------|------------------|------------------------|----------------|--------------------------|------------|-----------------------|--------------|-----------------|------------------------------|-----------------------------------|
|              | VOLTS          | HERTZ       | VOLTS            | CONSTANT CURRENT LOAD† |                | CONSTANT IMPEDANCE LOAD‡ |            |                       | PART NUMBER  | PART NUMBER     |                              | AVAILABLE SPEEDS (sec. at 60 Hz*) |
|              |                |             |                  | MAX AMPS               | MAX KVA        | MAX AMPS                 | MAX KVA    |                       |              |                 |                              |                                   |
| SINGLE PHASE | 120            | 50/60<br>60 | 0-120<br>0-132   | 1.75<br>1.75           | 0.21<br>0.23   | 2.2<br>—                 | 0.26<br>—  | 171                   | —            | —               | 10                           |                                   |
|              |                | 50/60<br>60 | 0-120<br>0-132   | 2.00<br>2.00           | 0.24<br>0.26   | 2.5<br>—                 | 0.30<br>—  | 201                   | —            | —               | 10                           |                                   |
|              |                | 50/60<br>60 | 0-120<br>0-132 ■ | 2.50<br>2.50           | 0.30<br>0.33   | 3.2<br>—                 | 0.38<br>—  | 221-B<br>3PN221B      | —            | —               | 10                           |                                   |
|              |                | 50/60<br>60 | 0-120<br>0-132   | 3.00<br>3.00           | 0.36<br>0.40   | 3.5<br>—                 | 0.42<br>—  | 291                   | —            | —               | 11                           |                                   |
|              |                | 50/60       | 0-120<br>0-140 ■ | 5.0<br>5.0             | 0.60<br>0.70   | 7.0<br>—                 | 0.84<br>—  | 501-B, 511<br>3PN501B | M501-B<br>—  | 5,15,30,60<br>— | 12                           |                                   |
|              |                | 50/60       | 0-120<br>0-140 ■ | 10<br>10               | 1.20<br>1.40   | 13<br>—                  | 1.56<br>—  | 1010B<br>3PN1010B     | M1010B<br>—  | 5,15,30,60<br>— | 14                           |                                   |
|              |                | 60          | 0-120            | 12                     | 1.44           | 15                       | 1.80       | 1210B<br>3PN1210B     | M1210B<br>—  | 5,15,30,60<br>— | 17                           |                                   |
|              |                | 50/60       | 0-120<br>0-140 ■ | 15<br>15               | 1.80<br>2.10   | 20<br>—                  | 2.40<br>—  | 1510<br>3PN1510B      | M1510B<br>—  | 5,15,30,60<br>— | 18                           |                                   |
|              |                |             | 0-140 ■          | 22                     | 3.08           | —                        | —          | 3PN2210B              | —            | —               | 20                           |                                   |
|              |                |             | 0-120<br>0-140   | 25<br>25               | 3.00<br>3.50   | 30<br>—                  | 3.60<br>—  | 2510                  | M2510        | 5,15,30,60<br>— | 20                           |                                   |
|              |                |             | 0-120<br>0-140   | 50<br>50               | 6.00<br>7.00   | 60<br>—                  | 7.20<br>—  | 2510-2•               | M2510-2•     | 5,15,30,60      | 20                           |                                   |
|              |                |             | 0-140            | 50                     | 7.00           | —                        | —          | 5011                  | M5011        | 5,15,30,60      | 22                           |                                   |
|              |                |             | 0-120<br>0-140   | 60<br>60               | 7.20<br>8.40   | —<br>—                   | —<br>—     | 6011                  | M6011        | 5,15,30,60      | 30                           |                                   |
|              |                |             | 0-120<br>0-140   | 75<br>75               | 9.00<br>10.50  | 90<br>—                  | 10.80<br>— | 2510-3••              | M2511-3••    | 5,15,30,60      | 20                           |                                   |
|              |                |             | 0-140            | 100                    | 14.00          | —                        | —          | 5011-2P               | M5011-2P     | 5,15,30,60      | 22                           |                                   |
|              |                |             | 0-120<br>0-140   | 120<br>120             | 14.40<br>16.80 | —<br>—                   | —<br>—     | 6011-2P               | M6011-2P     | 5,15,30,60      | 30                           |                                   |
|              | 0-140          |             | 150              | 21.00                  | —              | —                        | 5011-3P    | M5011-3P              | 5,15,30,60   | 22              |                              |                                   |
|              | 0-120<br>0-140 |             | 180<br>180       | 21.60<br>25.20         | —<br>—         | —<br>—                   | 6011-3P    | M6011-3P              | 5,15,30,60   | 30              |                              |                                   |
|              | 0-140          |             | 200              | 28.00                  | —              | —                        | 5011-4P    | M5011-4P              | 15,30,60     | 23              |                              |                                   |
|              | 0-120<br>0-140 |             | 240<br>240       | 28.80<br>33.60         | —<br>—         | —<br>—                   | 6011-4P    | M6011-4P              | 15,30,60     | 31              |                              |                                   |
|              | 0-140          |             | 250              | 35.00                  | —              | —                        | 5011-5P    | M5011-5P              | 15,30,60     | 23              |                              |                                   |
|              | 0-120<br>0-140 |             | 300<br>300       | 36.00<br>42.00         | —<br>—         | —<br>—                   | 6011-5P    | M6011-5P              | 15,30,60     | 31              |                              |                                   |
|              | 0-140          |             | 300              | 42.00                  | —              | —                        | 5011-6P    | M5011-6P              | 15,30,60     | 23              |                              |                                   |
|              | 0-140          | 350         | 49.00            | —                      | —              | 5011-7P                  | M5011-7P   | 30, 60                | 24           |                 |                              |                                   |
|              | 0-120<br>0-140 | 360<br>360  | 43.20<br>50.40   | —<br>—                 | —<br>—         | 6011-6P                  | M6011-6P   | 15,30,60              | 31           |                 |                              |                                   |
|              | 0-140          | 400         | 56.00            | —                      | —              | 5011-8P                  | M5011-8P   | 30, 60                | 24           |                 |                              |                                   |
|              | 0-120<br>0-140 | 420<br>420  | 50.40<br>58.80   | —<br>—                 | —<br>—         | 6011-7P                  | M6011-7P   | 30, 60                | 32           |                 |                              |                                   |

# Product Quick Selector

|                           | INPUT |             | OUTPUT           |                        |                |                          |           | MANUALLY OPERATED | MOTOR DRIVEN |                 | DETAILED TECHNICAL INFO PAGE |                                   |
|---------------------------|-------|-------------|------------------|------------------------|----------------|--------------------------|-----------|-------------------|--------------|-----------------|------------------------------|-----------------------------------|
|                           | VOLTS | HERTZ       | VOLTS            | CONSTANT CURRENT LOAD† |                | CONSTANT IMPEDANCE LOAD‡ |           |                   | PART NUMBER  | PART NUMBER     |                              | AVAILABLE SPEEDS (sec. at 60 Hz*) |
|                           |       |             |                  | MAX AMPS               | MAX KVA        | MAX AMPS                 | MAX KVA   |                   |              |                 |                              |                                   |
| SINGLE PHASE              | 120   | 50/60       | 0-140            | 450                    | 63.00          | —                        | —         | 5011-9P           | M5011-9P     | 30, 60          | 24                           |                                   |
|                           |       |             | 0-120            | 480                    | 57.60          | —                        | —         | 6011-8P           | M6011-8P     | 30, 60          | 32                           |                                   |
|                           |       |             | 0-140            | 480                    | 67.20          | —                        | —         |                   |              |                 |                              |                                   |
|                           |       |             | 0-120<br>0-140   | 540<br>540             | 64.80<br>75.60 | —<br>—                   | —<br>—    | 6011-9P           | M6011-9P     | 30, 60          | 32                           |                                   |
| SINGLE Ø VOLTAGE DOUBLERS | 120   | 50/60       | 0-280            | 3.50▲                  | 0.42           | —                        | —         | 1020B             | M1020B       | 5,15,30,60      | 14                           |                                   |
|                           |       |             |                  | 9.50▲                  | 1.14           | —                        | —         | 1520              | M1520        | 5,15,30,60      | 18                           |                                   |
|                           |       |             |                  | 10▲                    | 1.20           | —                        | —         | 2520              | M2520        | 5,15,30,60      | 20                           |                                   |
|                           |       |             |                  | 20▲                    | 2.40           | —                        | —         | 2520-2•           | M2520-2•     | 5,15,30,60      | 20                           |                                   |
|                           |       |             |                  | 28▲                    | 3.40           | —                        | —         | 5021              | M5021        | 5,15,30,60      | 22                           |                                   |
|                           |       |             |                  | 30▲                    | 3.60           | —                        | —         | 2520-3            | M2520-3      | 5,15,30,60      | 20                           |                                   |
|                           |       |             |                  | 35▲                    | 4.20           | —                        | —         | 6020              | M6020        | 5,15,30,60      | 30                           |                                   |
|                           |       |             |                  | 56▲                    | 6.80           | —                        | —         | 5021-2P           | M5021-2P     | 5,15,30,60      | 22                           |                                   |
|                           |       |             |                  | 70▲                    | 8.40           | —                        | —         | 6020-2P           | M6020-2P     | 5,15,30,60      | 30                           |                                   |
|                           |       |             |                  | 84▲                    | 10.20          | —                        | —         | 5021-3P           | M5021-3P     | 5,15,30,60      | 23                           |                                   |
|                           |       |             |                  | 105▲                   | 12.60          | —                        | —         | 6020-3P           | M6020-3P     | 5,15,30,60      | 31                           |                                   |
|                           |       |             |                  | 112▲                   | 13.50          | —                        | —         | 5021-4P           | M5021-4P     | 15, 30, 60      | 23                           |                                   |
|                           |       |             |                  | 140▲                   | 16.80          | —                        | —         | 6020-4P           | M6020-4P     | 15, 30, 60      | 31                           |                                   |
|                           |       |             |                  | 168▲                   | 20.40          | —                        | —         | 5021-6P           | M5021-6P     | 15, 30, 60      | 24                           |                                   |
|                           |       |             |                  | 175▲                   | 21.00          | —                        | —         | 6020-5P           | M6020-5P     | 15, 30, 60      | 31                           |                                   |
|                           |       |             |                  | 196▲                   | 23.50          | —                        | —         | 5021-7P           | M5021-7P     | 30, 60          | 24                           |                                   |
|                           |       |             |                  | 210▲                   | 25.20          | —                        | —         | 6020-6P           | M6020-6P     | 15, 30, 60      | 32                           |                                   |
|                           |       |             |                  | 224▲                   | 26.90          | —                        | —         | 5021-8P           | M5021-8P     | 30, 60          | 24                           |                                   |
|                           |       |             |                  | 245▲                   | 29.40          | —                        | —         | 6020-7P           | M6020-7P     | 30, 60          | 32                           |                                   |
|                           |       |             |                  | 252▲                   | 30.20          | —                        | —         | 5021-9P           | M5021-9P     | 30, 60          | 24                           |                                   |
|                           |       |             |                  | 280▲                   | 33.60          | —                        | —         | 6020-8P           | M6020-8P     | 30, 60          | 32                           |                                   |
|                           |       |             |                  | 315▲                   | 37.80          | —                        | —         | 6020-9P           | M6020-9P     | 30, 60          | 32                           |                                   |
| SINGLE PHASE              | 240   | 50/60       | 0-240<br>0-264   | 0.80<br>0.80           | 0.19<br>0.21   | 1.00<br>—                | 0.24<br>— | 252               | —            | —               | 10                           |                                   |
|                           |       | 50/60<br>60 | 0-240<br>0-264   | 1.75<br>1.75           | 0.42<br>0.46   | 2.20<br>—                | 0.53<br>— | 171-2             | —            | —               | 10                           |                                   |
|                           |       | 50/60<br>60 | 0-240<br>0-264   | 2.00<br>2.00           | 0.48<br>0.53   | 2.50<br>—                | 0.60<br>— | 201-2             | —            | —               | 10                           |                                   |
|                           |       | 50/60<br>60 | 0-240<br>0-264   | 2.50<br>2.50           | 0.60<br>0.66   | 3.20<br>—                | 0.77<br>— | 221-B-2           | —            | —               | 10                           |                                   |
|                           |       | 50/60<br>60 | 0-240<br>0-264   | 3.00<br>3.00           | 0.72<br>0.79   | 3.50<br>—                | 0.84<br>— | 291-2             | —            | —               | 11                           |                                   |
|                           |       | 50/60       | 0-240<br>0-280 ■ | 3.50<br>3.50           | 0.84<br>0.98   | 5.0<br>—                 | 1.20<br>— | 1020B<br>3PN1020B | M1020B<br>—  | 5,15,30,60<br>— | 14                           |                                   |
|                           |       | 50/60       | 0-240<br>0-280   | 5.00<br>5.00           | 1.20<br>1.40   | 7.00<br>—                | 1.68<br>— | 501-B-2           | M501-B-2     | 5,15,30,60      | 12                           |                                   |
|                           |       | 60          | 0-240            | 5.00                   | 1.20           | 7.00                     | 1.68      | 1220B<br>3PN1220B | M1220B<br>—  | 5,15,30,60<br>— | 17                           |                                   |
|                           |       | 50/60       | 0-240<br>0-280 ■ | 9.50<br>9.50           | 2.28<br>2.66   | 12.00<br>—               | 2.88<br>— | 1520<br>3PN1520B  | M1520<br>—   | 5,15,30,60<br>— | 18                           |                                   |
|                           |       | 50/60       | 0-240<br>0-280   | 10<br>10               | 2.40<br>2.80   | 13<br>—                  | 3.12<br>— | 1010B-2           | M1010B-2     | 5,15,30,60      | 14                           |                                   |
|                           |       | 50/60       | 0-240<br>0-280 ■ | 10<br>10               | 2.40<br>2.80   | 13<br>—                  | 3.12<br>— | 2520<br>3PN2520B  | M2520<br>—   | 5,15,30,60<br>— | 20                           |                                   |
|                           |       | 60          | 0-240            | 12                     | 2.88           | 15                       | 3.60      | 1210B-2           | M1210B-2     | 5,15,30,60      | 17                           |                                   |
|                           |       | 50/60       | 0-240<br>0-280   | 15<br>15               | 3.60<br>4.20   | 20<br>—                  | 4.80<br>— | 1510-2            | M1510-2      | 5,15,30,60      | 18                           |                                   |
|                           |       | 50/60       | 0-240<br>0-280   | 20<br>20               | 4.80<br>5.60   | 26<br>—                  | 6.20<br>— | 2520-2•           | M2520-2•     | 5,15,30,60      | 20                           |                                   |
|                           |       | 50/60       | 0-240<br>0-280   | 25<br>25               | 6.00<br>7.00   | 30<br>—                  | 7.20<br>— | 2510-2            | M2510-2      | 5,15,30,60      | 20                           |                                   |
|                           |       | 50/60       | 0-240<br>0-280   | 28<br>28               | 6.70<br>7.80   | —<br>—                   | —<br>—    | 5021              | M5021        | 5,15,30,60      | 22                           |                                   |

# Product Quick Selector

|              | INPUT |                     | OUTPUT         |                        |                  |                          |           | MANUALLY OPERATED | MOTOR DRIVEN |             | DETAILED TECHNICAL INFO PAGE |                                   |    |
|--------------|-------|---------------------|----------------|------------------------|------------------|--------------------------|-----------|-------------------|--------------|-------------|------------------------------|-----------------------------------|----|
|              | VOLTS | HERTZ               | VOLTS          | CONSTANT CURRENT LOAD† |                  | CONSTANT IMPEDANCE LOAD‡ |           |                   | PART NUMBER  | PART NUMBER |                              | AVAILABLE SPEEDS (sec. at 60 Hz*) |    |
|              |       |                     |                | MAX AMPS               | MAX kVA          | MAX AMPS                 | MAX kVA   |                   |              |             |                              |                                   |    |
| SINGLE PHASE | 240   | 50/60               | 0-240<br>0-280 | 30<br>30               | 7.20<br>8.40     | 39<br>—                  | 9.40<br>— | 2520-3**          | M2520-3**    | 5,15,30,60  | 20                           |                                   |    |
|              |       | 50/60               | 0-240<br>0-280 | 35<br>35               | 8.40<br>9.80     | —<br>—                   | —<br>—    | 6020              | M6020        | 5,15,30,60  | 30                           |                                   |    |
|              |       | 50/60               | 0-280          | 50                     | 14.00            | —                        | —         | 5011-2S           | M5011-2S     | 5,15,30,60  | 22                           |                                   |    |
|              |       | 50/60               | 0-240<br>0-280 | 56<br>56               | 13.40<br>15.70   | —<br>—                   | —<br>—    | 5021-2P           | M5021-2P     | 5,15,30,60  | 22                           |                                   |    |
|              |       | 50/60               | 0-240<br>0-280 | 60<br>60               | 14.40<br>16.80   | —<br>—                   | —<br>—    | 6011-2S           | M6011-2S     | 5,15,30,60  | 30                           |                                   |    |
|              |       | 50/60               | 0-240<br>0-280 | 70<br>70               | 16.80<br>19.60   | —<br>—                   | —<br>—    | 6020-2P           | M6020-2P     | 5,15,30,60  | 30                           |                                   |    |
|              |       | 50/60               | 0-240<br>0-280 | 84<br>84               | 20.20<br>23.50   | —<br>—                   | —<br>—    | 5021-3P           | M5021-3P     | 5,15,30,60  | 23                           |                                   |    |
|              |       | 50/60               | 0-240<br>0-280 | 105<br>105             | 25.20<br>29.40   | —<br>—                   | —<br>—    | 6020-3P           | M6020-3P     | 5,15,30,60  | 31                           |                                   |    |
|              |       | 50/60               | 0-240<br>0-280 | 112<br>112             | 26.90<br>31.40   | —<br>—                   | —<br>—    | 5021-4P           | M5021-4P     | 15, 30, 60  | 23                           |                                   |    |
|              |       | 50/60               | 0-240<br>0-280 | 120<br>120             | 28.80<br>33.60   | —<br>—                   | —<br>—    | 6011-4PS          | M6011-4PS    | 15, 30, 60  | 31                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 140<br>140             | 33.60<br>39.20   | —<br>—                   | —<br>—    | 6020-4P           | M6020-4P     | 15, 30, 60  | 31                           |                                   |    |
|              |       |                     | 0-280          | 150                    | 42.00            | —                        | —         | 5011-6PS          | M5011-6PS    | 15, 30, 60  | 23                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 168<br>168             | 40.30<br>47.00   | —<br>—                   | —<br>—    | 5021-6P           | M5021-6P     | 15, 30, 60  | 24                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 175<br>175             | 42.00<br>49.00   | —<br>—                   | —<br>—    | 6020-5P           | M6020-5P     | 15, 30, 60  | 31                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 180<br>180             | 43.20<br>50.40   | —<br>—                   | —<br>—    | 6011-6PS          | M6011-6PS    | 15, 30, 60  | 31                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 196<br>196             | 47.00<br>54.90   | —<br>—                   | —<br>—    | 5021-7P           | M5021-7P     | 30, 60      | 24                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 210<br>210             | 50.40<br>58.80   | —<br>—                   | —<br>—    | 6020-6P           | M6020-6P     | 15, 30, 60  | 32                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 224<br>224             | 53.80<br>62.70   | —<br>—                   | —<br>—    | 5021-8P           | M5021-8P     | 30, 60      | 24                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 240<br>240             | 57.60<br>67.20   | —<br>—                   | —<br>—    | 6011-8PS          | M6011-8PS    | 30, 60      | 32                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 245<br>245             | 58.80<br>68.60   | —<br>—                   | —<br>—    | 6020-7P           | M6020-7P     | 30, 60      | 32                           |                                   |    |
|              |       |                     | 0-280          | 250                    | 70.00            | —                        | —         | —                 | M5011-10PS   | 30, 60      | 24                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 252<br>252             | 60.50<br>70.60   | —<br>—                   | —<br>—    | 5021-9P           | M5021-9P     | 30, 60      | 24                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 280<br>280             | 67.20<br>78.40   | —<br>—                   | —<br>—    | 6020-8P           | M6020-8P     | 30, 60      | 32                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 300<br>300             | 72.00<br>84.00   | —<br>—                   | —<br>—    | —                 | M6011-10PS   | 30, 60      | 32                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 315<br>315             | 75.60<br>88.20   | —<br>—                   | —<br>—    | 6020-9P           | M6020-9P     | 30, 60      | 32                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 360<br>360             | 86.40<br>100.80  | —<br>—                   | —<br>—    | —                 | M6011-12PS   | 30, 60      | 33                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 420<br>420             | 100.80<br>117.60 | —<br>—                   | —<br>—    | —                 | M6011-14PS   | 60          | 33                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 480<br>480             | 115.20<br>134.40 | —<br>—                   | —<br>—    | —                 | M6011-16PS   | 60          | 33                           |                                   |    |
|              |       |                     | 0-240<br>0-280 | 540<br>540             | 129.60<br>151.20 | —<br>—                   | —<br>—    | —                 | M6011-18PS   | 60          | 33                           |                                   |    |
|              |       | 1 PHASE V. DOUBLERS | 240            | 50/60                  | 0-560            | 3.50 ▲                   | 0.84      | —                 | —            | 1020B-2     | M1020B-2                     | 5,15,30,60                        | 14 |
|              |       |                     |                |                        |                  | 9.50 ▲                   | 2.28      | —                 | —            | 1520-2      | M1520-2                      | 5,15,30,60                        | 18 |
|              |       |                     |                |                        |                  | 10 ▲                     | 2.40      | —                 | —            | 2520-2      | M2520-2                      | 5,15,30,60                        | 20 |
|              |       |                     |                |                        |                  | 28 ▲                     | 6.80      | —                 | —            | 5021-2S     | M5021-2S                     | 5,15,30,60                        | 22 |
| 35 ▲         | 8.40  |                     |                |                        |                  | —                        | —         | 6020-2S           | M6020-2S     | 5,15,30,60  | 30                           |                                   |    |

# Product Quick Selector

|                               | INPUT |       | OUTPUT         |                        |                  |                          |           | MANUALLY OPERATED | MOTOR DRIVEN |             | DETAILED TECHNICAL INFO PAGE |
|-------------------------------|-------|-------|----------------|------------------------|------------------|--------------------------|-----------|-------------------|--------------|-------------|------------------------------|
|                               | VOLTS | HERTZ | VOLTS          | CONSTANT CURRENT LOAD† |                  | CONSTANT IMPEDANCE LOAD‡ |           |                   | PART NUMBER  | PART NUMBER |                              |
|                               |       |       |                | MAX AMPS               | MAX KVA          | MAX AMPS                 | MAX KVA   |                   |              |             |                              |
| SINGLE PHASE VOLTAGE DOUBLERS | 240   | 50/60 | 0-560          | 56 ▲                   | 13.50            | —                        | —         | 5021-4PS          | M5021-4PS    | 15, 30, 60  | 23                           |
|                               |       |       |                | 70 ▲                   | 16.80            | —                        | —         | 6020-4PS          | M6020-4PS    | 15, 30, 60  | 31                           |
|                               |       |       |                | 84 ▲                   | 20.40            | —                        | —         | 5021-6PS          | M5021-6PS    | 15, 30, 60  | 24                           |
|                               |       |       |                | 105▲                   | 25.20            | —                        | —         | 6020-6PS          | M6020-6PS    | 15, 30, 60  | 32                           |
|                               |       |       |                | 112 ▲                  | 26.90            | —                        | —         | 5021-8PS          | M5021-8PS    | 30, 60      | 24                           |
|                               |       |       |                | 140 ▲                  | 33.60            | —                        | —         | 6020-8PS          | M6020-8PS    | 30, 60      | 32                           |
|                               |       |       |                | 168 ▲                  | 40.30            | —                        | —         | —                 | M5021-12PS   | 30, 60      | 25                           |
|                               |       |       |                | 175 ▲                  | 42.00            | —                        | —         | —                 | M6020-10PS   | 30, 60      | 33                           |
|                               |       |       |                | 196 ▲                  | 47.10            | —                        | —         | —                 | M5021-14PS   | 60          | 25                           |
|                               |       |       |                | 210 ▲                  | 50.40            | —                        | —         | —                 | M6020-12PS   | 30, 60      | 33                           |
|                               |       |       |                | 224 ▲                  | 53.80            | —                        | —         | —                 | M5021-16PS   | 60          | 25                           |
|                               |       |       |                | 245 ▲                  | 58.80            | —                        | —         | —                 | M6020-14PS   | 60          | 33                           |
|                               |       |       |                | 252 ▲                  | 60.50            | —                        | —         | —                 | M5021-18PS   | 60          | 25                           |
|                               |       |       |                | 280 ▲                  | 67.20            | —                        | —         | —                 | M6020-16PS   | 60          | 33                           |
| 315 ▲                         | 75.60 | —     | —              | —                      | M6020-18PS       | 60                       | 33        |                   |              |             |                              |
| SINGLE PHASE                  | 480   | 50/60 | 0-480<br>0-528 | 0.80<br>0.80           | 0.38<br>0.42     | 1.00<br>—                | 0.48<br>— | 252-2             | —            | —           | 10                           |
|                               |       | 50/60 | 0-480<br>0-560 | 3.50<br>3.50           | 1.68<br>1.96     | 5.00<br>—                | 2.40<br>— | 1020B-2           | M1020B-2     | 5,15,30,60  | 14                           |
|                               |       | 60    | 0-480          | 5.00                   | 2.40             | 7.00                     | 3.36      | 1220B-2           | M1220B-2     | 5,15,30,60  | 17                           |
|                               |       | 50/60 | 0-480<br>0-560 | 9.50<br>9.50           | 4.56<br>5.32     | 12<br>—                  | 5.76<br>— | 1520-2            | M1520-2      | 5,15,30,60  | 18                           |
|                               |       |       | 0-480<br>0-560 | 10<br>10               | 4.80<br>5.60     | 13<br>—                  | 6.24<br>— | 2520-2            | M2520-2      | 5,15,30,60  | 20                           |
|                               |       |       | 0-480<br>0-560 | 28<br>28               | 13.50<br>15.70   | —<br>—                   | —<br>—    | 5021-2S           | M5021-2S     | 5,15,30,60  | 22                           |
|                               |       |       | 0-480<br>0-560 | 35<br>35               | 16.80<br>19.60   | —<br>—                   | —<br>—    | 6020-2S           | M6020-2S     | 5,15,30,60  | 30                           |
|                               |       |       | 0-480<br>0-560 | 56<br>56               | 26.90<br>31.40   | —<br>—                   | —<br>—    | 5021-4PS          | M5021-4PS    | 15, 30, 60  | 23                           |
|                               |       |       | 0-480<br>0-560 | 70<br>70               | 33.60<br>39.20   | —<br>—                   | —<br>—    | 6020-4PS          | M6020-4PS    | 15, 30, 60  | 31                           |
|                               |       |       | 0-480<br>0-560 | 84<br>84               | 40.30<br>47.00   | —<br>—                   | —<br>—    | 5021-6PS          | M5021-6PS    | 15, 30, 60  | 24                           |
|                               |       |       | 0-480<br>0-560 | 105<br>105             | 50.40<br>58.80   | —<br>—                   | —<br>—    | 6020-6PS          | M6020-6PS    | 15, 30, 60  | 32                           |
|                               |       |       | 0-480<br>0-560 | 112<br>112             | 53.80<br>62.70   | —<br>—                   | —<br>—    | 5021-8PS          | M5021-8PS    | 30, 60      | 24                           |
|                               |       |       | 0-480<br>0-560 | 140<br>140             | 67.20<br>78.40   | —<br>—                   | —<br>—    | 6020-8PS          | M6020-8PS    | 30, 60      | 32                           |
|                               |       |       | 0-480<br>0-560 | 168<br>168             | 80.60<br>94.10   | —<br>—                   | —<br>—    | —                 | M5021-12PS   | 30, 60      | 25                           |
|                               |       |       | 0-480<br>0-560 | 175<br>175             | 84.00<br>98.00   | —<br>—                   | —<br>—    | —                 | M6020-10PS   | 30, 60      | 33                           |
|                               |       |       | 0-480<br>0-560 | 196<br>196             | 94.10<br>109.80  | —<br>—                   | —<br>—    | —                 | M5021-14PS   | 60          | 25                           |
|                               |       |       | 0-480<br>0-560 | 210<br>210             | 100.80<br>117.60 | —<br>—                   | —<br>—    | —                 | M6020-12PS   | 30, 60      | 33                           |
|                               |       |       | 0-480<br>0-560 | 224<br>224             | 107.50<br>125.50 | —<br>—                   | —<br>—    | —                 | M5021-16PS   | 60          | 25                           |
|                               |       |       | 0-480<br>0-560 | 245<br>245             | 117.60<br>137.20 | —<br>—                   | —<br>—    | —                 | M6020-14PS   | 60          | 33                           |
|                               |       |       | 0-480<br>0-560 | 252<br>252             | 121.00<br>141.00 | —<br>—                   | —<br>—    | —                 | M5021-18PS   | 60          | 25                           |
|                               |       |       | 0-480<br>0-560 | 280<br>280             | 134.40<br>156.80 | —<br>—                   | —<br>—    | —                 | M6020-16PS   | 60          | 33                           |
|                               |       |       | 0-480<br>0-560 | 315<br>315             | 151.20<br>176.40 | —<br>—                   | —<br>—    | —                 | M6020-18PS   | 60          | 33                           |

# Product Quick Selector

|                                         | INPUT |        | OUTPUT |                        |         |                          |         | MANUALLY OPERATED | MOTOR DRIVEN |             | DETAILED TECHNICAL INFO PAGE |                                   |
|-----------------------------------------|-------|--------|--------|------------------------|---------|--------------------------|---------|-------------------|--------------|-------------|------------------------------|-----------------------------------|
|                                         | VOLTS | HERTZ  | VOLTS  | CONSTANT CURRENT LOAD† |         | CONSTANT IMPEDANCE LOAD‡ |         |                   | PART NUMBER  | PART NUMBER |                              | AVAILABLE SPEEDS (sec. at 60 Hz*) |
|                                         |       |        |        | MAX AMPS               | MAX KVA | MAX AMPS                 | MAX KVA |                   |              |             |                              |                                   |
| THREE PHASE OPEN DELTA VOLTAGE DOUBLERS | 120   | 50/60  | 0-280  | 3.50▲                  | 0.73    | —                        | —       | 1020B-2           | M1020B-2     | 5,15,30,60  | 14                           |                                   |
|                                         |       |        |        | 9.50▲                  | 1.98    | —                        | —       | 1520-2            | M1520-2      | 5,15,30,60  | 18                           |                                   |
|                                         |       |        |        | 10▲                    | 2.10    | —                        | —       | 2520-2            | M2520-2      | 5,15,30,60  | 20                           |                                   |
|                                         |       |        |        | 28▲                    | 5.80    | —                        | —       | 5021-2D           | M5021-2D     | 5,15,30,60  | 22                           |                                   |
|                                         |       |        |        | 35▲                    | 7.30    | —                        | —       | 6020-2D           | M6020-2D     | 5,15,30,60  | 30                           |                                   |
|                                         |       |        |        | 56▲                    | 11.80   | —                        | —       | 5021-4D           | M5021-4D     | 15, 30, 60  | 23                           |                                   |
|                                         |       |        |        | 70▲                    | 14.50   | —                        | —       | 6020-4D           | M6020-4D     | 15, 30, 60  | 31                           |                                   |
|                                         |       |        |        | 84▲                    | 17.60   | —                        | —       | 5021-6D           | M5021-6D     | 15, 30, 60  | 24                           |                                   |
|                                         |       |        |        | 105▲                   | 21.80   | —                        | —       | 6020-6D           | M6020-6D     | 15, 30, 60  | 32                           |                                   |
|                                         |       |        |        | 112▲                   | 23.30   | —                        | —       | 5021-8D           | M5021-8D     | 30, 60      | 24                           |                                   |
|                                         |       |        |        | 140▲                   | 29.10   | —                        | —       | 6020-8D           | M6020-8D     | 30, 60      | 32                           |                                   |
|                                         |       |        |        | 175▲                   | 36.30   | —                        | —       | —                 | M6020-10D    | 30, 60      | 32                           |                                   |
|                                         |       |        |        | 196▲                   | 40.80   | —                        | —       | —                 | M5021-14D    | 60          | 25                           |                                   |
|                                         |       |        |        | 210▲                   | 43.60   | —                        | —       | —                 | M6020-12D    | 30, 60      | 33                           |                                   |
|                                         |       |        |        | 224▲                   | 46.60   | —                        | —       | —                 | M5021-16D    | 60          | 25                           |                                   |
|                                         |       |        |        | 245▲                   | 50.90   | —                        | —       | —                 | M6020-14D    | 60          | 33                           |                                   |
|                                         |       |        |        | 252▲                   | 52.50   | —                        | —       | —                 | M5021-18D    | 60          | 25                           |                                   |
|                                         |       |        |        | 280▲                   | 58.10   | —                        | —       | —                 | M6020-16D    | 60          | 33                           |                                   |
|                                         |       |        |        | 315▲                   | 94.50   | —                        | —       | —                 | M6020-18D    | 60          | 33                           |                                   |
| THREE PHASE OPEN DELTA                  | 240   | 50/60  | 0-240  | 0.80                   | 0.33    | 1.00                     | 0.42    | 252-2             | —            | —           | 10                           |                                   |
|                                         |       |        | 0-264  | 0.80                   | 0.37    | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       |        | 0-240  | 3.50                   | 1.45    | 5.00                     | 2.08    | 1020B-2           | M1020B-2     | 5,15,30,60  | 14                           |                                   |
|                                         |       | 60     | 0-280  | 3.50                   | 1.70    | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       |        | 0-240  | 5.00                   | 2.08    | 7.00                     | 2.91    | 1220B-2           | M1220B-2     | 5,15,30,60  | 17                           |                                   |
|                                         |       |        | 50/60  | 0-240                  | 9.50    | 3.95                     | 12      | 5.00              | 1520-2       | M1520-2     | 5,15,30,60                   | 18                                |
|                                         |       | 0-280  |        | 9.50                   | 4.61    | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 10                     | 4.20    | 13                       | 5.40    | 2520-2            | M2520-2      | 5,15,30,60  | 20                           |                                   |
|                                         |       | 0-280  |        | 10                     | 4.85    | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 28                     | 11.60   | —                        | —       | 5021-2D           | M5021-2D     | 5,15,30,60  | 22                           |                                   |
|                                         |       | 0-280  |        | 28                     | 13.60   | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 35                     | 14.50   | —                        | —       | 6020-2D           | M6020-2D     | 5,15,30,60  | 30                           |                                   |
|                                         |       | 0-280  |        | 35                     | 16.90   | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 56                     | 23.30   | —                        | —       | 5021-4D           | M5021-4D     | 15, 30, 60  | 23                           |                                   |
|                                         |       | 0-280  |        | 56                     | 27.20   | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 70                     | 29.10   | —                        | —       | 6020-4D           | M6020-4D     | 15, 30, 60  | 31                           |                                   |
|                                         |       | 0-280  |        | 70                     | 33.90   | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 84                     | 34.90   | —                        | —       | 5021-6D           | M5021-6D     | 15, 30, 60  | 24                           |                                   |
|                                         |       | 0-280  |        | 84                     | 40.70   | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 105                    | 43.60   | —                        | —       | 6020-6D           | M6020-6D     | 15, 30, 60  | 32                           |                                   |
|                                         |       | 0-280  |        | 105                    | 50.90   | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 112                    | 46.60   | —                        | —       | 5021-8D           | M5021-8D     | 30, 60      | 24                           |                                   |
|                                         |       | 0-280  |        | 112                    | 54.30   | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 140                    | 58.10   | —                        | —       | 6020-8D           | M6020-8D     | 30, 60      | 32                           |                                   |
|                                         |       | 0-280  |        | 140                    | 67.80   | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 175                    | 72.70   | —                        | —       | —                 | M6020-10D    | 30, 60      | 32                           |                                   |
|                                         |       | 0-280  |        | 175                    | 84.80   | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 196                    | 81.50   | —                        | —       | —                 | M5021-14D    | 60          | 25                           |                                   |
|                                         |       | 0-280  |        | 196                    | 95.10   | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 210                    | 87.20   | —                        | —       | —                 | M6020-12D    | 30, 60      | 33                           |                                   |
|                                         |       | 0-280  |        | 210                    | 101.70  | —                        | —       | —                 | —            | —           | —                            |                                   |
|                                         |       | 0-240  |        | 224                    | 93.10   | —                        | —       | —                 | M5021-16D    | —           | 25                           |                                   |
|                                         |       | 0-280  | 224    | 108.60                 | —       | —                        | —       | —                 | —            | —           |                              |                                   |
| 0-240                                   | 245   | 101.70 | —      | —                      | —       | M6020-14D                | 60      | 33                |              |             |                              |                                   |
| 0-280                                   | 245   | 118.70 | —      | —                      | —       | —                        | —       | —                 |              |             |                              |                                   |
| 0-240                                   | 252   | 104.50 | —      | —                      | —       | M5021-18D                | 60      | 25                |              |             |                              |                                   |
| 0-280                                   | 252   | 122.20 | —      | —                      | —       | —                        | —       | —                 |              |             |                              |                                   |
| 0-240                                   | 280   | 116.30 | —      | —                      | —       | M6020-16D                | 60      | 33                |              |             |                              |                                   |
| 0-280                                   | 280   | 135.60 | —      | —                      | —       | —                        | —       | —                 |              |             |                              |                                   |
| 0-240                                   | 315   | 130.80 | —      | —                      | —       | M6020-18D                | 60      | 33                |              |             |                              |                                   |
| 0-280                                   | 315   | 152.60 | —      | —                      | —       | —                        | —       | —                 |              |             |                              |                                   |

# Product Quick Selector

|                                  | INPUT |       | OUTPUT |                        |         |                          |         | MANUALLY OPERATED | MOTOR DRIVEN |             | DETAILED TECHNICAL INFO PAGE |                                   |
|----------------------------------|-------|-------|--------|------------------------|---------|--------------------------|---------|-------------------|--------------|-------------|------------------------------|-----------------------------------|
|                                  | VOLTS | HERTZ | VOLTS  | CONSTANT CURRENT LOAD† |         | CONSTANT IMPEDANCE LOAD‡ |         |                   | PART NUMBER  | PART NUMBER |                              | AVAILABLE SPEEDS (sec. at 60 Hz*) |
|                                  |       |       |        | MAX AMPS               | MAX KVA | MAX AMPS                 | MAX KVA |                   |              |             |                              |                                   |
| THREE PHASE WYE                  | 240   | 60    | 60     | 0-240                  | 1.75    | 0.73                     | 2.20    | 0.92              | 171-3        | —           | —                            | 10                                |
|                                  |       |       | 60     | 0-240                  | 2.00    | 0.83                     | 2.50    | 1.04              | 201-3        | —           | —                            | 10                                |
|                                  |       |       | 60     | 0-240                  | 2.50    | 1.04                     | 3.20    | 1.33              | 221-B-3      | —           | —                            | 10                                |
|                                  |       |       | 60     | 0-240                  | 3.00    | 1.25                     | 3.50    | 1.45              | 291-3        | —           | —                            | 11                                |
|                                  |       |       | 50/60  | 0-240                  | 5.00    | 2.08                     | 7.00    | 2.91              | 501-B-3      | M501-B-3    | 5,15,30,60                   | 12                                |
|                                  |       |       | 60     | 0-280                  | 5.00    | 2.43                     | —       | —                 | —            | —           | —                            | —                                 |
|                                  |       |       | 50/60  | 0-240                  | 10      | 4.16                     | 13      | 5.40              | 1010B-3      | M1010B-3    | 5,15,30,60                   | 14                                |
|                                  |       |       | 60     | 0-280                  | 10      | 4.85                     | —       | —                 | —            | —           | —                            | —                                 |
|                                  |       |       | 60     | 0-240                  | 12      | 4.96                     | 15      | 6.24              | 1210B-3      | M1210B-3    | 5,15,30,60                   | 17                                |
|                                  |       |       | 50/60  | 0-240                  | 15      | 6.22                     | 20      | 8.30              | 1510-3       | M1510-3     | 5,15,30,60                   | 18                                |
|                                  |       |       | 60     | 0-280                  | 15      | 7.26                     | —       | —                 | —            | —           | —                            | —                                 |
|                                  |       |       | 50/60  | 0-240                  | 25      | 10.40                    | 30      | 12.50             | 2510-3       | M2510-3     | 5,15,30,60                   | 20                                |
|                                  |       |       | 60     | 0-280                  | 25      | 12.10                    | —       | —                 | —            | —           | —                            | —                                 |
|                                  |       |       | 60     | 0-280                  | 50      | 24.20                    | —       | —                 | 5011-3Y      | M5011-3Y    | 5,15,30,60                   | 22                                |
|                                  |       |       |        | 0-240                  | 60      | 24.90                    | —       | —                 | 6011-3Y      | M6011-3Y    | 5,15,30,60                   | 30                                |
|                                  |       |       |        | 0-280                  | 60      | 29.10                    | —       | —                 | —            | —           | —                            | —                                 |
|                                  |       |       |        | 0-280                  | 100     | 48.50                    | —       | —                 | 5011-6Y      | M5011-6Y    | 15, 30, 60                   | 23                                |
|                                  |       |       |        | 0-240                  | 120     | 49.80                    | —       | —                 | 6011-6Y      | M6011-6Y    | 15, 30, 60                   | 31                                |
|                                  |       |       |        | 0-280                  | 120     | 58.10                    | —       | —                 | —            | —           | —                            | —                                 |
|                                  |       |       |        | 0-280                  | 150     | 72.50                    | —       | —                 | 5011-9Y      | M5011-9Y    | 30, 60                       | 24                                |
|                                  |       |       |        | 0-240                  | 180     | 74.70                    | —       | —                 | 6011-9Y      | M6011-9Y    | 30, 60                       | 32                                |
|                                  |       |       |        | 0-280                  | 180     | 87.20                    | —       | —                 | —            | —           | —                            | —                                 |
|                                  |       |       |        | 0-280                  | 200     | 96.70                    | —       | —                 | —            | M5011-12Y   | 30, 60                       | 25                                |
|                                  |       |       |        | 0-240                  | 240     | 99.60                    | —       | —                 | —            | M6011-12Y   | 30, 60                       | 33                                |
|                                  |       |       |        | 0-280                  | 240     | 116.30                   | —       | —                 | —            | —           | —                            | —                                 |
|                                  |       |       |        | 0-280                  | 250     | 121.00                   | —       | —                 | —            | M5011-15Y   | 60                           | 26                                |
|                                  |       |       |        | 0-240                  | 300     | 124.60                   | —       | —                 | —            | M6011-15Y   | 60                           | 34                                |
|                                  |       |       |        | 0-280                  | 300     | 145.30                   | —       | —                 | —            | —           | —                            | —                                 |
|                                  |       |       |        | 0-240                  | 360     | 149.50                   | —       | —                 | —            | M6011-18Y   | 60                           | 34                                |
|                                  |       |       |        | 0-280                  | 360     | 174.40                   | —       | —                 | —            | —           | —                            | —                                 |
|                                  |       |       |        | 0-280                  | 400     | 193.70                   | —       | —                 | —            | M5011-24Y   | 60                           | 26                                |
|                                  |       |       |        | 0-240                  | 420     | 174.40                   | —       | —                 | —            | M6011-21Y   | 60                           | 34                                |
|                                  |       |       |        | 0-280                  | 420     | 203.40                   | —       | —                 | —            | —           | —                            | —                                 |
|                                  |       |       |        | 0-280                  | 450     | 218.40                   | —       | —                 | —            | M5011-27Y   | 60                           | 26                                |
|                                  |       |       |        | 0-240                  | 480     | 199.30                   | —       | —                 | —            | M6011-24Y   | 60                           | 34                                |
|                                  |       |       |        | 0-280                  | 480     | 232.50                   | —       | —                 | —            | —           | —                            | —                                 |
|                                  |       |       |        | 0-240                  | 540     | 224.20                   | —       | —                 | —            | M6011-27Y   | 60                           | 34                                |
|                                  |       |       |        | 0-280                  | 540     | 261.60                   | —       | —                 | —            | —           | —                            | —                                 |
| THREE PHASE WYE VOLTAGE DOUBLERS | 240   | 60    | 0-560  | 3.50▲                  | 1.46    | —                        | —       | 1020B-3           | M1020B-3     | 5,15,30,60  | 14                           |                                   |
|                                  |       |       |        | 9.50▲                  | 3.96    | —                        | —       | 1520-3            | M1520-3      | 5,15,30,60  | 18                           |                                   |
|                                  |       |       |        | 10▲                    | 4.20    | —                        | —       | 2520-3            | M2520-3      | 5,15,30,60  | 20                           |                                   |
|                                  |       |       |        | 28▲                    | 11.80   | —                        | —       | 5021-3Y           | M5021-3Y     | 5,15,30,60  | 23                           |                                   |
|                                  |       |       |        | 35▲                    | 14.50   | —                        | —       | 6020-3Y           | M6020-3Y     | 5,15,30,60  | 31                           |                                   |
|                                  |       |       |        | 56▲                    | 23.50   | —                        | —       | 5021-6Y           | M5021-6Y     | 15, 30, 60  | 24                           |                                   |
|                                  |       |       |        | 70▲                    | 29.10   | —                        | —       | 6020-6Y           | M6020-6Y     | 15, 30, 60  | 32                           |                                   |
|                                  |       |       |        | 84▲                    | 35.00   | —                        | —       | 5021-9Y           | M5021-9Y     | 30, 60      | 24                           |                                   |
|                                  |       |       |        | 105▲                   | 43.60   | —                        | —       | 6020-9Y           | M6020-9Y     | 30, 60      | 32                           |                                   |
|                                  |       |       |        | 112▲                   | 46.60   | —                        | —       | —                 | M5021-12Y    | 30, 60      | 25                           |                                   |
|                                  |       |       |        | 140▲                   | 58.10   | —                        | —       | —                 | M6020-12Y    | 30, 60      | 34                           |                                   |
|                                  |       |       |        | 168▲                   | 70.00   | —                        | —       | —                 | M5021-18Y    | 60          | 26                           |                                   |
|                                  |       |       |        | 175▲                   | 72.70   | —                        | —       | —                 | M6020-15Y    | 60          | 34                           |                                   |
|                                  |       |       |        | 196▲                   | 82.00   | —                        | —       | —                 | M5021-21Y    | 60          | 26                           |                                   |
|                                  |       |       |        | 210▲                   | 87.20   | —                        | —       | —                 | M6020-18Y    | 60          | 34                           |                                   |
|                                  |       |       |        | 224▲                   | 93.00   | —                        | —       | —                 | M5021-24Y    | 60          | 26                           |                                   |
|                                  |       |       |        | 245▲                   | 101.70  | —                        | —       | —                 | M6020-21Y    | 60          | 34                           |                                   |
|                                  |       |       |        | 252▲                   | 105.00  | —                        | —       | —                 | M5021-27Y    | 60          | 26                           |                                   |
|                                  |       |       |        | 280▲                   | 116.30  | —                        | —       | —                 | M6020-24Y    | 60          | 34                           |                                   |
|                                  |       |       |        | 315▲                   | 130.80  | —                        | —       | —                 | M6020-27Y    | 60          | 34                           |                                   |

# Product Quick Selector

|                 | INPUT |             | OUTPUT         |                        |                  |                          |            | MANUALLY OPERATED | MOTOR DRIVEN |             | DETAILED TECHNICAL INFO PAGE |
|-----------------|-------|-------------|----------------|------------------------|------------------|--------------------------|------------|-------------------|--------------|-------------|------------------------------|
|                 | VOLTS | HERTZ       | VOLTS          | CONSTANT CURRENT LOAD† |                  | CONSTANT IMPEDANCE LOAD‡ |            |                   | PART NUMBER  | PART NUMBER |                              |
|                 |       |             |                | MAX AMPS               | MAX kVA          | MAX AMPS                 | MAX kVA    |                   |              |             |                              |
| THREE PHASE WYE | 480   | 50/60<br>60 | 0-480<br>0-528 | 0.80<br>0.80           | 0.67<br>0.73     | 1.00<br>—                | 0.83<br>—  | 252-3             | —            | —           | 10                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 3.50<br>3.50           | 2.91<br>3.40     | 5.00<br>—                | 4.16<br>—  | 1020B-3           | M1020B-3     | 5,15,30,60  | 14                           |
|                 |       | 60          | 0-480          | 5.00                   | 4.16             | 7.00                     | 5.82       | 1220B-3           | M1220B-3     | 5,15,30,60  | 17                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 9.50<br>9.50           | 7.90<br>9.21     | 12<br>—                  | 10<br>—    | 1520-3            | M1520-3      | 5,15,30,60  | 18                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 10<br>10               | 8.30<br>9.70     | 13<br>—                  | 10.81<br>— | 2520-3            | M2520-3      | 5,15,30,60  | 20                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 28<br>28               | 23.30<br>27.20   | —<br>—                   | —<br>—     | 5021-3Y           | M5021-3Y     | 5,15,30,60  | 23                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 35<br>35               | 29.10<br>33.90   | —<br>—                   | —<br>—     | 6020-3Y           | M6020-3Y     | 5,15,30,60  | 31                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 56<br>56               | 46.60<br>54.30   | —<br>—                   | —<br>—     | 5021-6Y           | M5021-6Y     | 15, 30, 60  | 24                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 70<br>70               | 58.10<br>67.80   | —<br>—                   | —<br>—     | 6020-6Y           | M6020-6Y     | 15, 30, 60  | 32                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 84<br>84               | 69.80<br>81.50   | —<br>—                   | —<br>—     | 5021-9Y           | M5021-9Y     | 30, 60      | 24                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 105<br>105             | 87.20<br>101.70  | —<br>—                   | —<br>—     | 6020-9Y           | M6020-9Y     | 30, 60      | 32                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 112<br>112             | 93.10<br>108.60  | —<br>—                   | —<br>—     | —                 | M5021-12Y    | 30, 60      | 25                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 140<br>140             | 116.30<br>135.60 | —<br>—                   | —<br>—     | —                 | M6020-12Y    | 30, 60      | 34                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 168<br>168             | 139.50<br>163.30 | —<br>—                   | —<br>—     | —                 | M5021-18Y    | 60          | 26                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 175<br>175             | 145.30<br>169.50 | —<br>—                   | —<br>—     | —                 | M6020-15Y    | 60          | 34                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 196<br>196             | 163.0<br>189.5   | —<br>—                   | —<br>—     | —                 | M5021-21Y    | 60          | 26                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 210<br>210             | 174.60<br>203.40 | —<br>—                   | —<br>—     | —                 | M6020-18Y    | 60          | 34                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 224<br>224             | 186.50<br>217.80 | —<br>—                   | —<br>—     | —                 | M5021-24Y    | 60          | 26                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 245<br>245             | 203.40<br>237.40 | —<br>—                   | —<br>—     | —                 | M6020-21Y    | 60          | 34                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 252<br>252             | 209.50<br>244.00 | —<br>—                   | —<br>—     | —                 | M5021-27Y    | 60          | 26                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 280<br>280             | 232.50<br>271.30 | —<br>—                   | —<br>—     | —                 | M6020-24Y    | 60          | 34                           |
|                 |       | 50/60<br>60 | 0-480<br>0-560 | 315<br>315             | 261.60<br>305.20 | —<br>—                   | —<br>—     | —                 | M6020-27Y    | 60          | 34                           |

Models with 575V input and 0-575V output are available with Series 6020 variable transformers with a Y, S, or PS suffix. See pages 30, 31, 32, 33 & 34.

† **Constant Current Load** — the normal rated output amperes may be drawn at any position of the brush except in voltage doubler connections.

‡ **Constant Impedance Load** — an increased current may be drawn at the maximum voltage output (Limited to line voltage) provided the current reduces proportionally as output voltage is lowered.

▲ Voltage Doubler (half rated voltage input). Normal rated amperes may be drawn from 0 to 125% of the input voltage. At outputs above this, the load current must be reduced according to the derating guide. Figure B, page 6.

■ Cord and plug models wired this way at the factory

• One 52LAC paralleling choke is required

■ Three 52LAC paralleling chokes are required.

\* Speeds are approximately 20% slower at 50Hz.

***Your Tailored Power Solutions Provider™***

*Variable Transformers*

---

*Voltage Regulators*

---

*Power Conditioners*

---

*UPS Products*

---

US Toll Free: 866-261-1191  
Phone: 937-253-1191  
E-mail: [sales@stacoenergy.com](mailto:sales@stacoenergy.com)

[www.stacoenergy.com](http://www.stacoenergy.com)



**STACO**  
**ENERGY®**  
**PRODUCTS CO.**

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## Staco:

[5021](#) [5011](#) [6020-3Y](#) [3PN-SK](#) [3PN-MK](#) [6020](#) [5011CT](#) [2520C](#) [6020CT](#) [5021CT](#) [5021-3Y](#) [1510C](#) [1510C-2](#)  
[1510C-3](#) [2510C-2](#) [2510C-3](#) [2520C-2](#) [2520C-3](#) [3PN1520BA](#) [3PN1520BV](#) [5011-2D](#) [5011-2P](#) [5011-2S](#) [5011-3P](#)  
[5011-3Y](#) [5011-4D](#) [5011-4P](#) [5011-4PS](#) [5011-5P](#) [5011-6D](#) [5011-6P](#) [5011-6PS](#) [5011-6Y](#) [5011C](#) [5011C-2D](#) [5011C-](#)  
[2P](#) [5011C-2S](#) [5011CT-2D](#) [5011CT-2P](#) [5011CT-2S](#) [5011E-3P](#) [5011E-3Y](#) [5011E-4D](#) [5011E-4P](#) [5011E-4PS](#) [5011E-](#)  
[5P](#) [5011E-6D](#) [5011E-6P](#) [5011E-6PS](#) [5011E-6Y](#) [5021-2D](#) [5021-2P](#) [5021-2S](#) [5021-3P](#) [5021-4D](#) [5021-4P](#) [5021-](#)  
[4PS](#) [5021-6D](#) [5021-6P](#) [5021-6PS](#) [5021-6Y](#) [5021C](#) [5021C-2D](#) [5021C-2P](#) [5021C-2S](#) [5021CT-2D](#) [5021CT-2P](#)  
[5021CT-2S](#) [5021E-3P](#) [5021E-3Y](#) [5021E-4D](#) [5021E-4P](#) [5021E-4PS](#) [5021E-6D](#) [5021E-6P](#) [5021E-6PS](#) [5021E-6Y](#)  
[6011-2D](#) [6011-2P](#) [6011-2S](#) [6011-3P](#) [6011-4D](#) [6011-4P](#) [6011-4PS](#) [6011-5P](#) [6011-6D](#) [6011-6P](#) [6011-6PS](#) [6011C](#)  
[6011C-2D](#) [6011C-2P](#) [6011C-2S](#) [6011CT](#) [6011CT-2D](#) [6011CT-2P](#) [6011CT-2S](#) [6011E-3P](#) [6011E-4D](#) [6011E-4P](#)  
[6011E-4PS](#)