

INSTRUCTIONS

for INSTALLATION OPERATION and MAINTENANCE

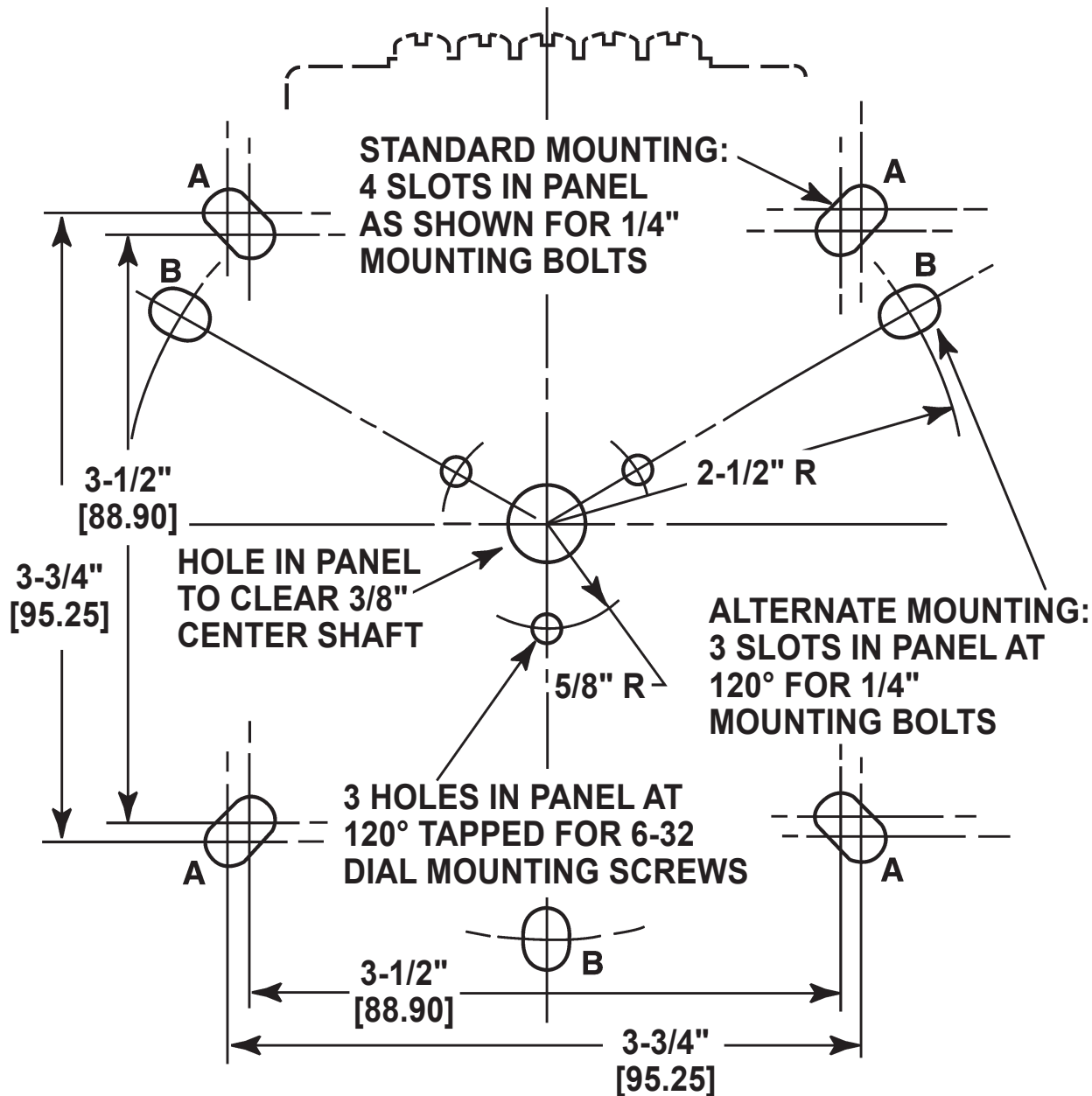
POWERSTAT®

VARIABLE TRANSFORMERS
WITH POWERKOTE® COILS
116CU-40 / 116C / 117C / 216C and 217C Series

The right to make engineering refinements on all products is reserved. Dimensions and other details are subject to change.

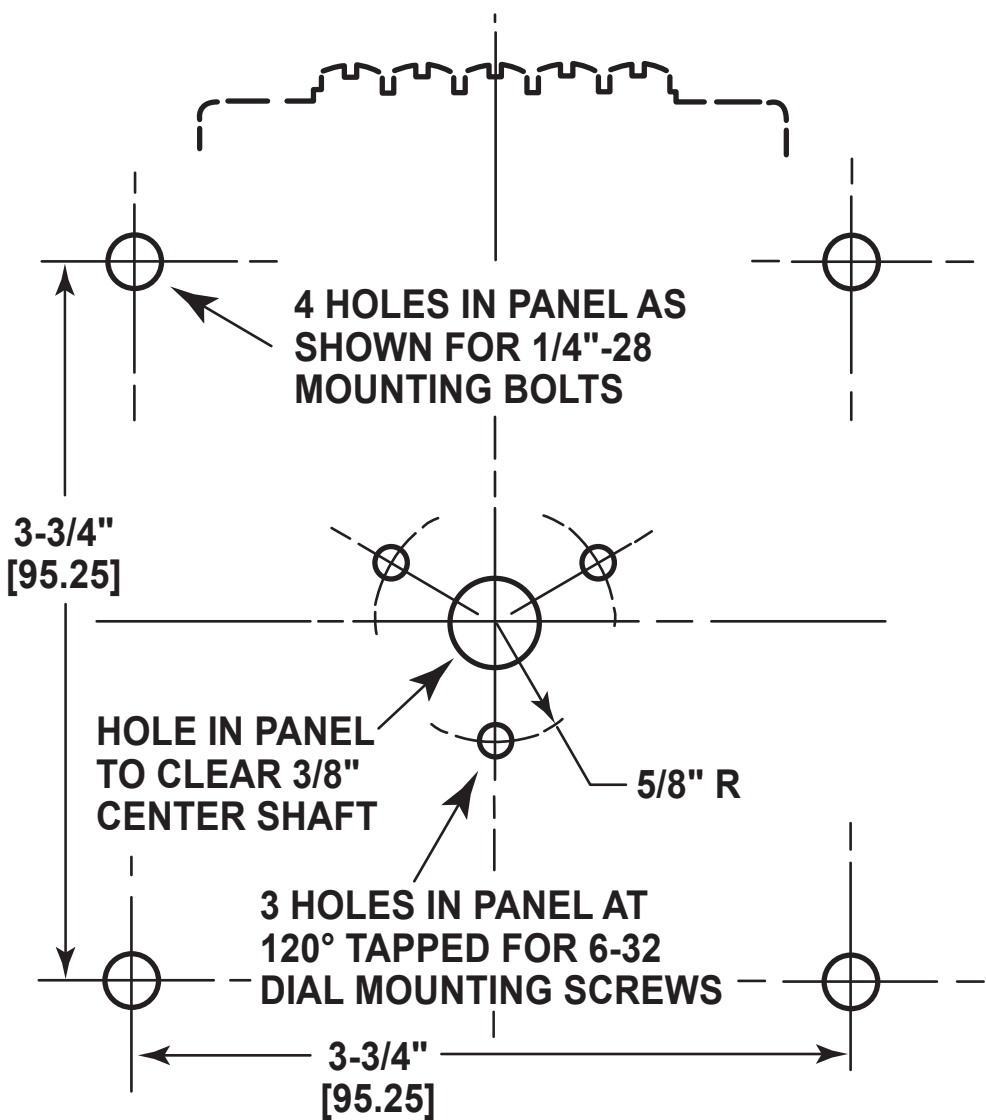
MOUNTING TEMPLATE NO. 1

NOTE: All dimensions are in inches [millimeters]



MOUNTING TEMPLATE NO. 2

NOTE: All dimensions are in inches [millimeters]



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INSPECTION

A POWERSTAT Variable Transformer is a precision product packed with care. When unpacking, examine carefully for any shipping damage. Inspect the brush contact with particular care. The "Damage and Shortage" Instructions packed with the unit outline the proper procedure to follow if any parts are damaged or missing.

INSTALLATION

NOTE- The unit should be protected from any dust or debris that may be encountered while drilling holes, installing wiring, etc., during installation.

MANUALLY OPERATED ASSEMBLIES

POWERSTAT Variable Transformer types within this Series have two sets of mounting holes to facilitate installation in new or existing layouts. Use the set that is most convenient for the application. All models are designed so that the same unit can be either bench or back-of-panel mounted as desired. The units as shipped are arranged for bench mounting. To change to back-of-panel mounting, proceed as outlined.

SINGLE UNITS

Models 3PN116C, 3PN117C, 3PN216C and 3PN217C have a cord and plug input and a receptacle output, and are usually used as a portable source of variable a-c voltage. If desired they may be mounted in the same manner as other manually operated single units.

BENCH OR WALL MOUNTING

- Using Drilling Template No. 1, locate and drill the desired set of mounting holes (four holes marked "A" or three holes marked "B").
- On open construction models ("U" types), loosen the shaft setscrews in the insulator of the radiator and slide the shaft through so it projects from the other end of the assembly. Tighten the setscrews.
- Place the unit in position and insert and fasten 1/4" mounting screws.
- For "U" types, provide a support for the dial. Mount the dial to the support. Attach the knob with its pointer set correctly with respect to the brush location and the dial indications.
- On enclosed terminal ("T") types, remove the terminal cover and required conduit hole caps. Attach conduit or cable and dress the leads. Make the necessary connections to the terminal cover.

BACK-OF-PANEL MOUNTING

- Using Drilling Template No.1, locate and drill the desired set of mounting holes (four holes marked "A" or three holes marked "B"), the three dial mounting screw holes, and the center shaft hole. Three dial screw holes must be tapped to accommodate the 6-32 screws supplied. Maximum panel thickness is 5/8" for open ("U" type) models.
- On enclosed models, remove the knob, loosen the shaft setscrews in the insulator of the radiator and slide the shaft through so it projects from the other end of the assembly. Tighten the setscrews. Maximum panel thickness for enclosed models is 5/16".

MAINTENANCE

With ordinary care, a POWERSTAT Variable Transformer should require no servicing except possible replacement of the brush assembly. The brush should be inspected periodically and replaced if arcing takes place or if it is badly worn. Because the brush must be of a special material, replace only with a Superior Electric brush assembly. The assembly is designed to assure perfect contact of the brush to the commutator regardless of brush position and length of time in use. Take care to avoid scraping, scratching or marring the commutator surface. Follow these steps to install a new brush assembly:

- Unfasten the two brush anchor screws, remove and discard the old brush assembly.
- Insert the new brush assembly. Be sure that the tang on the back of the brush assembly goes under the overhang at the rear of the radiator slot. Replace and tighten the brush anchor screws.
- Raise the brush and place a piece of sandpaper (grit #400 or finer) between the brush and the commutator with the abrasive side against the brush.
- While holding the sandpaper in place (flat), rotate the brush through a short arc about four times. Remove the sandpaper and blow out any remaining carbon particles.
- Rotate the brush over the full range several times to check for smooth travel and to be sure the brush fits flat to the commutator over the full range.

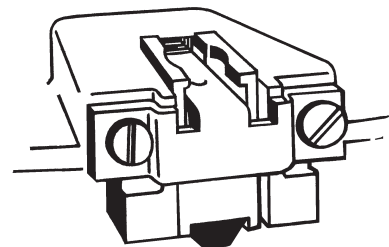


FIGURE A
BRUSH ASSEMBLY

REPLACEMENT BRUSH ASSEMBLIES

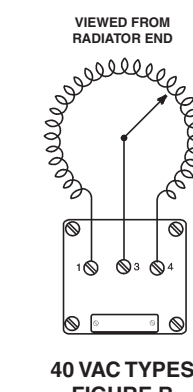
TYPE	PART NO.	DESCRIPTION
116CU-40	065431-004	RB116C-40
116C / 117C	065431-001	RB116C/RB117C
216C / 217C	065431-002	RB216C/RB217C

Whenever unusual mechanical or electrical difficulties are encountered in the operation or installation of your POWERSTAT Variable Transformer, consult Superior Electric.

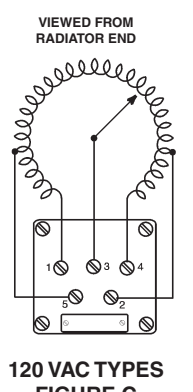
CONNECTIONS AND RATINGS

Important connection notes. Please read carefully.

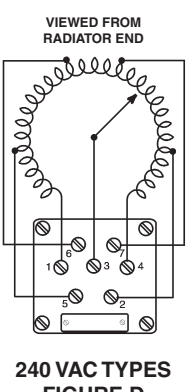
- CONNECTIONS AND RATINGS given in these instructions are those most commonly used. In addition, all ganged units may be connected so that the units operate electrically independent on a common shaft. When this is desired, connections and ratings for the individual models may be obtained from the RATINGS CHART and CONNECTION DIAGRAMS of the single unit.
- Coil to terminal connections for all POWERSTAT Variable Transformers included in these instructions are given in Figures B, C, and D.
- For ambient temperatures between -20°C and +50°C use current ratings given in the charts. Figure E shows the output current de-rating required above 50°C.
- The connection diagrams are labeled "L" for Line Connections, "B" for Boost Connections and "S" for Step-Up Connections.
- Clockwise (CW) and counterclockwise (CCW) rotation connections shown in the tables and diagrams are for motor driven units and units with the knob on the radiator end. For connections with the knob on the base end, use the shown CCW connection for CW operation, and shown CW connection for CCW operation.



40 VAC TYPES
FIGURE B



120 VAC TYPES
FIGURE C



240 VAC TYPES
FIGURE D

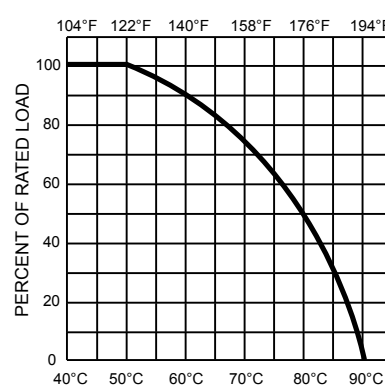
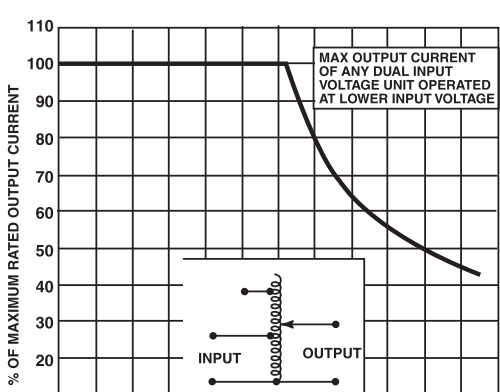
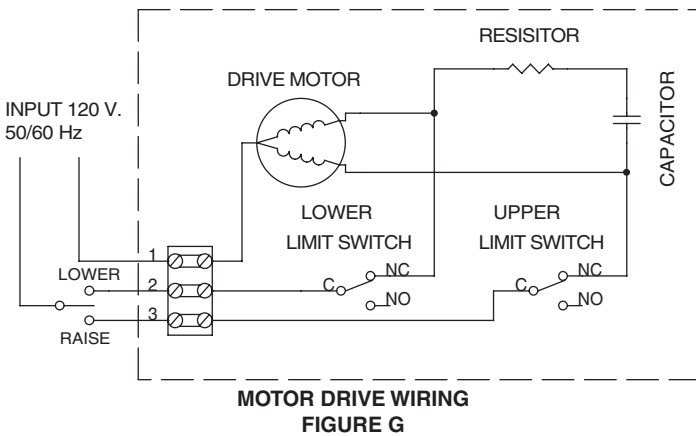


FIGURE E



OPERATION IN "STEP-UP" CONNECTION
FIGURE F



MOTOR DRIVE WIRING
FIGURE G

BASIC UNIT TYPE	RECOMMENDED FUSE (AMPERES)	
	CONSTANT CURRENT LOAD	CONSTANT IMPEDANCE LOAD
116CU-40	25	30
116C	10†	15
117C	15	15†
216C	4†	5
217C	5	8†

† Cord-and-Plug units supplied with these fuses

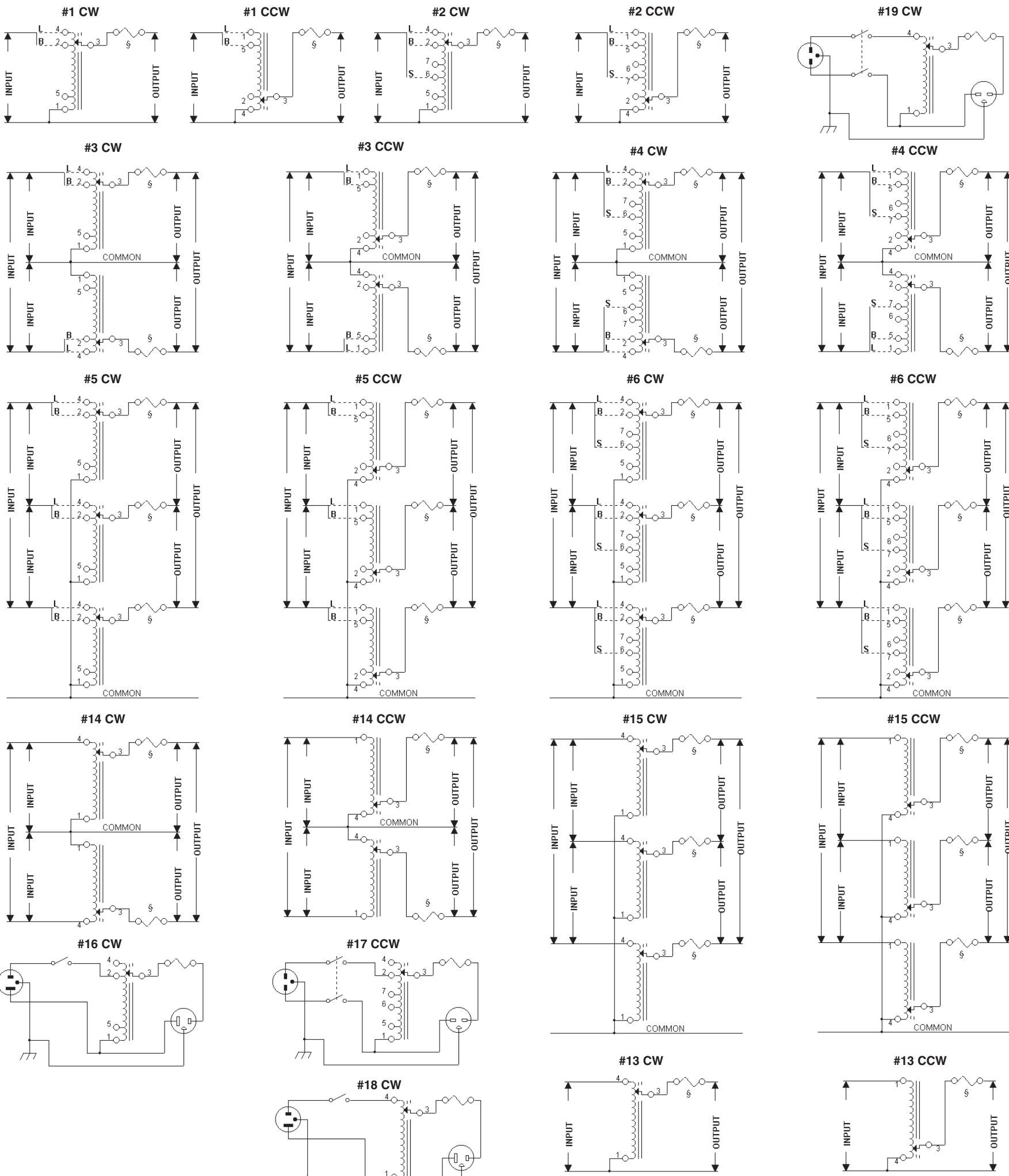
FIGURE H

Motor Driven Prefix shown below:

Model Number Prefix	Operating Time for Full Travel (seconds)
7ME	7
15ME	15
30ME	30
60ME	60

FIGURE I

CONNECTION DIAGRAMS



RATINGS CHART

40 VOLT, SINGLE PHASE																	
"LINE" CONNECTION						"BOOST" CONNECTION					"STEP-UP" CONNECTION						
Input Voltage: 40																	
Output Voltage: 0-40																	
Constant Current Load			Constant Impedance Load			Terminals & Rotation			Constant Current Load			Terminals & Rotation			Model Numbers		
Max. Amps	Max. KVA	Max. KVA	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Manually Operated	Motor Driven (See Fig. I)	Conn. Diag.
Freq. (Hz)									Freq. (Hz)								
60	25	1.0	30	1.2	1-4 1-4	1-3 1-3	1-4 1-4								116CU-40	ME116CU-40	13
120 VOLT, SINGLE PHASE																	
"LINE" CONNECTION						"BOOST" CONNECTION					"STEP-UP" CONNECTION						
Input Voltage: 120						120					N/A						
Output Voltage: 0-120						0-140											
Constant Current Load			Constant Impedance Load			Terminals & Rotation			Constant Current Load			Terminals & Rotation			Model Numbers		
Max. Amps	Max. KVA	Max. KVA	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Manually Operated	Motor Driven (See Fig. I)	Conn. Diag.
Freq. (Hz)									Freq. (Hz)								
50/60	10	1.2	13	1.6	1-4 1-4	1-3 1-3	1-4 1-4		50/60	10	1.4	1.2 4.8	1-3 1-3	1-4 1-4			
60	12	1.4	15	1.8	1-4 1-4	1-3 1-3	1-4 1-4								116CU 116CT	ME116CU ME116CT	13
240 VOLT, SINGLE PHASE																	
"LINE" CONNECTION						"BOOST" CONNECTION					"STEP-UP" CONNECTION						
Input Voltage: 240 208						240 208					120						
Output Voltage: 0-240 0-208						0-280 0-242					0-280						
Constant Current Load			Constant Impedance Load			Terminals & Rotation			Constant Current Load			Terminals & Rotation			Model Numbers		
Max. Amps	Max. KVA	Max. KVA	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Manually Operated	Motor Driven (See Fig. I)	Conn. Diag.
Freq. (Hz)									Freq. (Hz)								
50/60	3.5	0.84	5	1.2	1-4 1-4	1-3 1-3	1-4 1-4		50/60	3.5	0.98	1.2 4.8	1-3 1-3	1-4 1-4			
60	5	1.2	7	1.7	1-4 1-4	1-3 1-3	1-4 1-4								3PN116C 116CU 116CT	ME116CU ME116CT	13
50/60	10	2.4	13	3.1	4-4 1-1	3-3 3-3	4-4 1-1		50/60	10	2.8	2-2 5-5	3-3 3-3	1-1 4-4			
60	12	2.9	15	3.6	4-4 1-1	3-3 3-3	4-4 1-1								117CU 117CT	ME117CU ME117CT	13
480 VOLT, SINGLE PHASE																	
"LINE" CONNECTION						"BOOST" CONNECTION					"STEP-UP" CONNECTION						
Input Voltage: 480 380						480 380					240 208						
Output Voltage: 0-480 0-380						0-560 0-443					0-580 0-483						
Constant Current Load			Constant Impedance Load			Terminals & Rotation			Constant Current Load			Terminals & Rotation			Model Numbers		
Max. Amps	Max. KVA	Max. KVA	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Manually Operated	Motor Driven (See Fig. I)	Conn. Diag.
Freq. (Hz)									Freq. (Hz)								
50/60	3.5	1.7	5	2.4	4-4 1-1	3-3 3-3	4-4 1-1		50/60	3.5	2.0	2-2 5-5	3-3 3-3	1-1 4-4			
60	5	2.4	7	3.4	4-4 1-1	3-3 3-3	4-4 1-1								216CU 217CT	ME216CU ME217CT	14
600 VOLT, SINGLE PHASE																	
"LINE" CONNECTION						"BOOST" CONNECTION					"STEP-UP" CONNECTION						
Input Voltage: 600						Below models will operate at 600 volts, but nameplate ratings are at 480 volts and are UL Listed to 575 volt operation. If 600 volt nameplate ratings are required, add a -C suffix to the model number at time of ordering (Ex: 216CU-2-C). All -C suffix types are CSA approved for 600 volt operation.											
Output Voltage: 0-600																	
Constant Current Load			Constant Impedance Load			Terminals & Rotation			Constant Current Load			Terminals & Rotation			Model Numbers		
Max. Amps	Max. KVA	Max. KVA	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Manually Operated	Motor Driven (See Fig. I)	Conn. Diag.
Freq. (Hz)									Freq. (Hz)								
60	3.5	2.1	5	3.0	4-4 1-1	3-3 3-3	4-4 1-1								216CU-2	ME216CU-2	4
120 VOLT, THREE PHASE OPEN DELTA																	
"LINE" CONNECTION						"BOOST" CONNECTION					"STEP-UP" CONNECTION						
Input Voltage: 120						120											
Output Voltage: 0-120						0-140											
Constant Current Load			Constant Impedance Load			Terminals & Rotation			Constant Current Load			Terminals & Rotation			Model Numbers		
Max. Amps	Max. KVA	Max. KVA	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Manually Operated	Motor Driven (See Fig. I)	Conn. Diag.
Freq. (Hz)									Freq. (Hz)								
50/60	10	2.1	13	2.7	4-1-4 1-4-1	3-1-3 3-4-3	1-1 4-4		50/60	10	2.4	2-1-2 5-4-5	3-1-3 3-4-3	1-1 4-4			
60	12	2.5	15	3.1	4-1-4 1-4-1	3-1-3 3-4-3	1-1 4-4								116CU-2 117CU-2	ME116CU-2 ME117CU-2	14
240 VOLT, THREE PHASE OPEN DELTA																	
"LINE" CONNECTION						"BOOST" CONNECTION					"STEP-UP" CONNECTION						
Input Voltage: 240 208						240 208					120						
Output Voltage: 0-240 0-208						0-280 0-242					0-280						
Constant Current Load			Constant Impedance Load			Terminals & Rotation			Constant Current Load			Terminals & Rotation			Model Numbers		
Max. Amps	Max. KVA	Max. KVA	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Manually Operated	Motor Driven (See Fig. I)	Conn. Diag.
Freq. (Hz)									Freq. (Hz)								
50/60	3.5	1.5	5	2.1	4-1-4 1-4-1	3-1-3 3-4-3	1-1 4-4		50/60	3.5	1.7	2-1-2 5-4-5	3-1-3 3-4-3	1-1 4-4			
60	5	2.1	7	2.9	4-1-4 1-4-1	3-1-3 3-4-3	1-1 4-4								216CU-2	ME216CU-2	4
240Y/138 VOLT, THREE PHASE WYE																	
"LINE" CONNECTION						"BOOST" CONNECTION					"STEP-UP" CONNECTION						
Input Voltage: 240 208						240 208					120						
Output Voltage: 0-240 0-208						0-280 0-242					0-280						
Constant Current Load			Constant Impedance Load			Terminals & Rotation			Constant Current Load			Terminals & Rotation			Model Numbers		
Max. Amps	Max. KVA	Max. KVA	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Manually Operated	Motor Driven (See Fig. I)	Conn. Diag.
Freq. (Hz)									Freq. (Hz)								
50/60	10	4.2	13	5.4	4-4 1-1	3-3 3-3	1-1 1-1		60	10	4.8	2-2 5-5	3-3 3-3	1-1 1-1			
60	12	5.0	15	6.2	4-4 1-1	3-3 3-3	1-1 1-1								116CU-3 117CU-3	ME116CU-3 ME117CU-3	15
480Y/277 VOLT, THREE PHASE WYE																	
"LINE" CONNECTION						"BOOST" CONNECTION					"STEP-UP" CONNECTION						
Input Voltage: 480 380						480 380					240 208						
Output Voltage: 0-480 0-380						0-560 0-443					0-560 0-483						
Constant Current Load			Constant Impedance Load			Terminals & Rotation			Constant Current Load			Terminals & Rotation			Model Numbers		
Max. Amps	Max. KVA	Max. KVA	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Manually Operated	Motor Driven (See Fig. I)	Conn. Diag.
Freq. (Hz)									Freq. (Hz)								
50/60	3.5	2.9	5	4.2	4-4 1-1	3-3 3-3	1-1 1-1		60	3.5	3.4	2-2 5-5	3-3 3-3	1-1 1-1			
60	5	4.2	7	5.8	4-4 1-1	3-3 3-3	1-1 1-1								216CU-3	ME216CU-3	15
600Y/346 VOLT, THREE PHASE WYE																	
"LINE" CONNECTION						"BOOST" CONNECTION					"STEP-UP" CONNECTION						
Input Voltage: 600						Below models will operate at 600 volts, but nameplate ratings are at 480 volts and are UL Listed to 575 volt operation. If 600 volt nameplate ratings are required, add a -C suffix to the model number at time of ordering (Ex: 216CU-3-C). All -C suffix types are CSA approved for 600 volt operation.											
Output Voltage: 0-600																	
Constant Current Load			Constant Impedance Load			Terminals & Rotation			Constant Current Load			Terminals & Rotation			Model Numbers		
Max. Amps	Max. KVA	Max. KVA	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Max. Amps	Max. KVA	Max. KVA	Input CW CCW	Output CW CCW	Jumper CW CCW	Manually Operated	Motor Driven (See Fig. I)	Conn. Diag.
Freq. (Hz)									Freq. (Hz)								
60	3.5	3.6	5	5.2	4-4 1-1	3-3 3-3	1-1 1-1								216CU-3	ME216CU-3	6