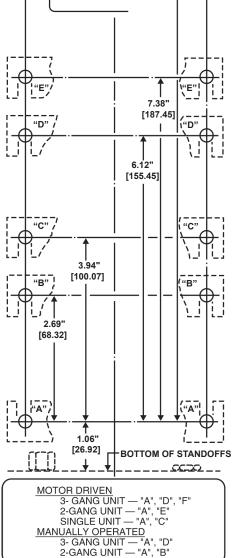


MOUNTING TEMPLATE NO. 2 NOTE: All dimensions are in inches [millimeters]





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VARIABLE TRANSFORMERS





1-800-787-3532 1-800-821-1369 1-800-787-3532, Ext. 70782 1-800-787-3532, Ext. 72058

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 and the proper procedure to follow if any parts are procedure to follow if any part of the parts are procedure to follow if any part of the 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

Manually operated single units are designed for back-of-panel mount If they are to be bench or wall mounted, some cover should be provide to support the dial and prevent contact with the electrically "hot" radii and commutation.

HARDWARE

Drilling Template No. 1 shows standard 4-hole mounting and an alternate 3-hole mounting. For standard 4-hole mounting use 1/4" bolt of appropriate type and length. The alternate mounting scheme allows the mounting screws to be hidden by the dial but requires 1/4 - 20 flat head type screws whose length can only be 1/8" to 3/16" longer than the thickness of the mounting panel. To accommodate longer length screws, use 1/4" flat washers as spacers between unit and the back of the panel. Three 6-32 x 3/16" binding head screws are provided for dial mounting.

ACCESSORY TERMINAL PACK

An accessory terminal pack, ordered separately, contains seven terminal adapters for quick-connect terminations or for easy soldering (only three adapters are required for any one connection).

SINGLE UNITS

BENCH OR WALL MOUNTING

L

USA

CT 06032

SUITE 3 - FARMINGTON, www.superiorelectric.com

LANE

28 SPRING

- ENCH OK WALL MOUNTING 1. Using Drilling Template No. 1, locate and drill the desired set of mounting bolt holes (holes "A" or three holes "B"). 2. Insert the shart and adjust its to i will prortude about %" through the dial after installation. Tighten the setscrews. 3. Place the unit in position. Insert and tighten the mounting screws. 4. Mount the dial and its support(§). Place the knob on the shaft and position interpointer oracity in relation to the bush position and the dial indications.
- Tighten the knob setscrews.

BACK-OF-PANEL MOUNTING

- Using Drilling Template No. 1 locate and drill the desired set of mounting both holes (four holes "A" or three holes "B"), the three dial screw holes "C" and the center shaft hole. The dial screw holes must be tapped to accommodate the 6-32 screws supplied. Maximum panel thickness is
- Inzert the shaft and adjust it so it will project about %4" through the panel after installation. Tighten the setscrews.
 Place the unit in position behind the panel. Insert and tighten the mounting screws.
 Mount the dial on the panel. Place the knob on the shaft and position the pointer correctly in relation to the brush position and the dial indications. Tighten the knob setscrews.

GANGED ASSEMBLIES

Manually operated ganged assemblies are designed for back-of-panel mounting. If they are to be mounted in an exposed position, some cover should be provided to prevent contact with the electrically "holf" radiator and commutator. Due to the weight of ganged assemblies, the four holes "X" of Drilling Template No. 1 are recommended for mounting.

MAINTENANCE

With ordinary care, a POWERSTAT Variable Transformer should require no With ordinary care, a POWEHSTAT 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 the Superior Electric brush assembly listed below. The assembly seembly the superior Electric brush assembly listed below. The assembly see 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.

- 1. Unfasten the brush assembly anchor screws and discard the old brush
- Unfasten the brush assembly anchor screws and discard the old brush assembly.
 Insent the new brush assembly in the radiator slot, replace the anchor screws and lighten to the radiator. Be sure the back and of the brush strap is under the projection at the rear of the radiator brush slot.
 Raise the brush and place a piece of crocus cloth or very fine sandpaper between the brush and the commutator so the smooth side is against the commutator and the abrasive side is toward the brush.
 While holding the cloth or sandpaper in place, rotate the radiator through a short arc. Blow out the excess carbon particles.

CONNECTIONS AND RATINGS

FIGURE A

- 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 units may be obtained from the RATINGS CHART and CONNECTION DIAGRAMS of the single unit.
- For **ambient temperatures** between -20° C and $+50^{\circ}$ C use current ratings given in the charts. Figure C shows the output

- For ambient temperatures between -20°C and +50°C use current ratings given in the charts. Figure C shows the output current de-rating required above 50°C.
 Coll to terminal connections for all 21, 22 and 21-40 Series units are shown in Figures A.
 The CONNECTION DIAGRAMS are labeled "L" for Line Connections and "6" for Boost Connections.
 Clickwise (CW) and counterclockwise (CCW) rotation connections shown in the Ratings Chart and Connection Diagrams are for motor driven units and manual units with the knob on the traditor end. For connections with the knob on the base end, use the shown CCW connection for the CCW operation, and shown CW connection for the CW operation.
 Fuses are recommended on all units as shown (§). Recommended fuses are 18 ampero on 21-40, 5 ampere for the 21, and 3 ampere on the 22. If used for constant impedance load connection the 11 was a 3-white year on the 21.
 COMMON shown in the connection diagrams is used as third leg in 3-phase open delta, or neutral in single-phase 3-wire we configurations. COMMON is not used in single-phase 4-wire wer configurations. COMMON is not used in single-phase 3-wire were configurations. Lower 6.

Three 6-32 x 3/16° binding head screws are provided for dial mounting. Four 1/a²-28 x 1/2° flat head screws are provided for mounting in panels 1/4 to 3/6° thick. For thinner panels use 1/4° flat wathers as spacers between the unit and the panel. For thicker panels use 1/4²-28 screws 1/8° to 1/4° longer than the panel thickness.

HARDWARE

ACCESSORY TERMINAL PACK

An accessory terminal pack, ordered separately, contains seven terminal adapters for quick-connect terminations or for easy soldering (only three adapters are required for any one connection).

BACK-OF-PANEL MOUNTING

- Using Drilling Template No. 1, locate and drill the four mounting bolt holes "A, the 3 dial screw holes "C" and the center shaft hole. The dial acrew holes must be tapped to accommodate the 6-52 acrews 2. Locene the knob astractives and remove the knob. Remove the dial.
 Locene the shaft setscrews in the hub of each radiator and adjust the shaft so it will project about 3" through the panel after installation. Tiphten the estscrews on the first unit. Turn all radiators to the extreme iminit of travel (care position) and tighten the shaft setscrews on the remaining unit(s).
 Place the unit in obaliton, lowert and tighten the for wave-table
- remaining unit(s). A Place the unit in position. Insert and tighten the four ¼"-28 mounting screws. A 3-gang assembly, because of its added length and weight, requires extra support in the form of a bracket or shell. 5. Mount the dial on the panel. Place the knob on the shaft and position the pointer correctly in relation to the brush position and the dial
- indications. Tighten the knob setscrews

MOUNTING ON SIDE BRAKETS

- OUNTING ON SIDE BRAKETS

 Jusing Diffilling Template No. 2. Jocate and drill the proper set of numbing holes. BE SURE TO USE THE PROPERSET OF HOLES.
 boomt he softed setserves in the hub of each relation rond adjust the shaft so it will project about %' through the dial after installation. Tophten the setscrews on the first unit. Turnal Initiations to the extreme limit of travel (zero position) and tighten the shaft setscrews on the remaining unit(5).
 Insert the two top mounting bolts and screw them in part way.
 Place the unit in position and insert the two bottom bolts. Tighten all the bolts. Mount the dial and its supports. Place the knob on the shaft and position the pointer correctly in relation to the brush position and the dial indications. Tighten the knob setscrews.

MOUNTING ON STANDOFFS

- 1. Using Drilling Template No. 1 locate and drill the four mounting bolt
- holes "A". 2. Loosen the knob setscrews and remove the knob. Remove the dial. 3. Loosen the shaft setscrews in the hub of each radiator and adjust the shaft so it will project about %" through the dial after installation. Tighten the setscrews on the first unit. Turn all the radiators to the extreme limit of travel (zero position) and tighten the shaft setscrews on the emergine unit(0.
- extreme minit of a area (zero position) and upitien the shart setschews on the remaining unit(§). Place the unit in position. Insert and tighten the mounting bolts. A 3-gang assembly, if mounted on a vertical panel, requires extra support in the form of a bracket or shelf.
- Mount the dial and its supports. Place the knob on the shaft and position the pointer correctly in relation to the brush position and the dial indications. Tighten the knob setscrews.

MOTOR-DRIVEN ASSEMBLIES

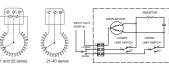
Motor-driven POWERSTAT Variable Transformers of the 21, 21-40 and 22 Series, both single units and ganged assemblies, may be mounted on side brackets or on standoffs in the same manner as manually operated ganged assemblies. 3-gang assemblies, however, have 3 side brackets, requiring 6 mounting botts as shown in Template No. 2.

5. Remove the cloth or sandpaper and rotate the radiator over the full range several times to check for smooth travel of the brush over the commutator surface. The brush should fit flat over the entire commutator range. No space should be visible between the brush and the surface.

BRUSH ASSEMBLY



or electrical difficulties are encounte of your POWERSTAT Variable Transfe





RATED LOAD ۲ 50°C 60°C 70°C 80°C AMBIENT TEMPERATURE

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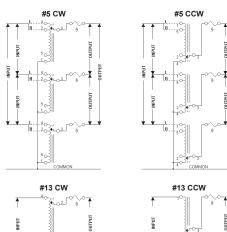
CONNECTION DIAGRAMS (Viewed from the Radiator End)

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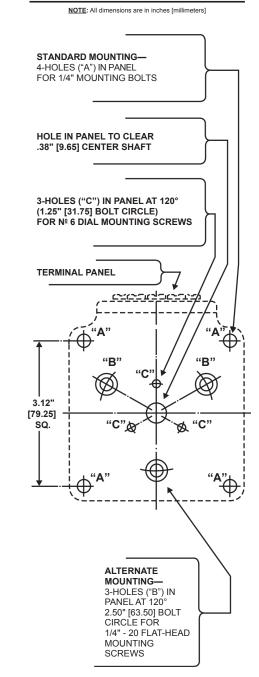
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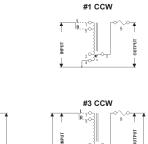
www.sup

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MOUNTING TEMPLATE NO. 1

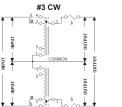




COMM

UTPUT

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RATINGS CHART

NPUT

INPUT

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Freq	Max	Max.	Max.	Max.	Input	Output	Jumper	Freq	Max	Max	Input	Output	Jumper		Mator	Conn
Freq. (Hz)	Amps	KVA	Amps	KVA	ĊW CCW	CŴ CCW	CŴ CCW	(Hz)	Amps	KVA	ĊW CCW	CW CCW	CW CCW	Manually Operated	Driven	Diag.
60	18	0.72	22	0.88	1-4 1-4	1-3 3-4								21-40	ME21-40	13
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Freq.	Max	Max.	Max.	Max.	Input CW	Output CW	Jumper CW	Freq. (Hz)	Max.	Max.	Input CW	Output CW	Jumper CW	Manually Operated	Motor	Conn
(Hzj	Amps	KVA	Amps	KVA	CCW	CCW	ccw		Amps	KVA	CCW	CCW	ccw	Operated	Driven	Diag.
50/60	5	0.6	7	0.84	1-4 1-4	1-3 3-4		50/60	5	0.7	1-2 4-5	1-3 3-4		21	ME21	1
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les	put Voltag		"LINE" C	ONNECTI	ON 208			240	-	BOOST* 208	CONNECT	TION				
	tput Volta	ge:	0-240		0-208			0-280		0-242						
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Freq. (Hz)	Max.	Max. KVA	Max.	Max.	Input CW	Output CW	Jumper CW CCW	Freq. (Hz)	Max.	Max.	Input CW CCW	Output CW	Jumper CW	Manually Operated	Motor Driven	Conn. Diag.
	Amps	-	Amps	KVA	CW CCW	CW CCW	CCW	1 <u>· ·</u>	Amps	KVA	CCW 1-2	CW CCW	CŴ CCW	· · ·		
50/60	2.25	0.54	3.25	0.78	1-4 1-4	1-3 3-4		50/60	2.25	0.63	4-5	1-3 3-4		22	ME22	1
50/60	5	1.2	7	1.7	4-4 1-1	3-3 3-3	1-1 4-4	50/60	5	1.4	2-2 5-5	3-3 3-3	1-1 4-4	21-2	ME21-2	3
						48	0 VOI	.T, SI	NGL	E P	HAS	E				
			"LINE" C	ONNECTI	ON	_				BOOST"	CONNECT	TION				
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	Con Currer	stant		stant scel ord		ninals & F	Rotation	1	Con	stant nt Load	Term	ninals & F	totation	Model M	lumbers	
Freq.	Max.	Max.	Max.	Max.	Input	Output	Jumper	Eren	Max	Max.	Input	Output	Jumper		Motor	Conn
(Hz)	Amps	KVA	Amps	KVA	CW	CŴ CCW	CŴ CCW	Freq. (Hz)	Amps	KVA	CW	CŴ CCW	CŴ CCW	Manually Operated	Driven	Diag.
50/60	2.25	1.1	3.25	1.6	4-4 1-1	3-3 3-3	1-1 4-4	50/60	2.25	1.3	2-2 5-5	3-3 3-3	1-1 4-4	22-2	ME22-2	3
						60	ο νοι	.T, SI	NGL	E P	HAS	E				
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Ing	put Voltag tput Volta	je:	600 0-600													
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Freq.	Max.	nt Load Max.	Impedar Max.	nce Load	Input CW	Output	Jumper		Max.	Max.	Input CW	Output	Jumper	Manually	Motor	Conn.
(Hz)	Amps	KVA	Amps	KVA	CW	Output CW CCW	Jumper CW CCW	Freq. (Hz)	Amps	KVA	CW	Output CW CCW	Jumper CW CCW	Operated	Driven	Diag.
60	2.25	1.35	3.25	1.95	4-4 1-1	3-3 3-3	1-1 4-4							22-2	ME22-2	3
				-							_					
				1	20 \	VOL.	T, THI	REE F	HA	SE O	IPEN	I DE	LTA			
			"LINE" C			VOL	T, THI	REE F			CONNECT		LTA			
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lnj Ou	tput Volta Con	ge: stant	120 0-120 Con	ONNECTI	ON	VOL ninals & F			1	BOOST*	CONNECT			Model P	lumbers	
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Out Freq. (Hz) 50/60	tput Volta Con Currer Max. Amps 5	ge: stant tt Load Max. KVA 1	120 0-120 Con Impedat Max. Amps 7	stant nce Load Max. KVA 1.5	ON Terri CW CCW 4-1-4 1-4-1 4-0 N	ninals & F Output CW CCW 3-1-3 3-4-3	Rotation Jumper CW CCW 1-1 4-4	120 0-140 Freq. (Hz) 50/60	Con Curren Max. Amps 5 PHAS	stant It Load Max. KVA 1.2 SE O BOOST	Tem Input CCW 2-1-2 5-4-5	ninals & F Output CW CCW 3-1-3 3-4-3	Jumper CW CCW 1-1 4-4	Manually Operated	Motor Driven	Diag.
Out Freq. (Hz) 50/60	tput Volta Con Currer Max. Amps 5	ge: stant ht Load Max. KVA 1	120 0-120 Con Impedat Max. Amps 7 *LINE* C	stant nce Load Max. KVA 1.5	ON Terri CW CCW 4-1-4 1-4-1 1-4-1 4.0 N 208	ninals & F Output CW CCW 3-1-3 3-4-3	Rotation Jumper CW CCW 1-1 4-4	120 0-140 Freq. (Hz) 50/60	Con Curren Max. Amps 5 PHAS	stant tt Load Max. KVA 1.2 SE 0 800ST* 208	Tem Input CW CCW 2-1-2 5-4-5	ninals & F Output CW CCW 3-1-3 3-4-3	Jumper CW CCW 1-1 4-4	Manually Operated	Motor Driven	Diag.
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Out Freq. (Hz) 50/60	tput Volta Con Curren Max. Amps 5 5 5 5 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ge: stant nt Load Max. KVA 1 1 ge: ge:	120 0-120 Con Impedat Max. Amps 7 7 "LINE" C 240 0-240 Con Impedat	Stant Ince Load Max. KVA 1.5 2 DNNECTI	ON Terri CCW CCW 4-1-4 1-4-1 1-4-1 1-4-1 1-4-1 0 0N 208 0-208 Terri	ninals & F Output CW CCW 3-1-3 3-4-3 VOL	Rotation Jumper CW CCW 1-1 4-4 T, THI	120 0-140 Freq. (Hz) 50/60 240 0-280	Con Curren Max. Amps 5 PHAS Con Curren	stant tt Load Max. KVA 1.2 SEC BOOST ^{**} 208 0-242 stant tt Load	Term Input CW CCW 2-1-2 5-4-5 PEEN CONNEC	ninals & F Output CW CCW CCW CCW CCW TON DE TION	totation Jumper CW 1-1 4-4 LTA	Manually Operated 21-2 Model M	Motor Driven ME21-2 (umbers	2 Diag. 3
Out Freq. (Hz) 50/60	tput Volta Con Currer Max. Amps 5 5 5 put Voltag tput Voltag	ge: stant tt Load Max. KVA 1 1 ge: ge: stant tt Load	120 0-120 Impeda Max. Amps 7 7 "LINE" C 240 0-240 Con	Max. KVA 1.5 200NECTI stant nce Load	ON Term CCW 4-1-4 1-4-1 4-0 0N 208 0-208	output CW CCW 3-1-3 3-4-3 VOL	Rotation Jumper CW CCW 1-1 4-4 T, THI	120 0-140 Freq. (Hz) 50/60	Con Currer Max. Amps 5 PHAS	stant tt Load Max. KVA 1.2 SEC BOOST* 208 0-242 stant	Tem Input CW CCW 2-1-2 5-4-5 PEN CONNEC	ninals & F Output CW CCW 3-1-3 3-4-3 DE	Lotation Jumper CW CCW 1-1 4-4 LTA	Manually Operated 21-2	Motor Driven ME21-2	3 3
Out Freq. (Hz) 50/60	tput Volta Con Curret Max. Amps 5 5 5 5 5 5 0 0 0 0 0 0 0 0 0 0 0 0 0	ge: stant tt Load Max. KVA 1 1 ge: ge: stant tt Load Max.	120 0-120 Con Impedat Max. Amps 7 7 240 0-240 Con Impedat Max.	stant tce Load Max. KVA 1.5 2 DNNECTI ce Load Max.	ON Terri CCW CCW 4-1-4 1-4-1 1-4-1 1-4-1 1-4-1 0N 208 0-208 Terri Linput CW	ninals & F Output CW CCW 3-1-3 3-4-3 VOL	Rotation Jumper CW 1-1 4-4 T, THI Rotation Jumper CW	120 0-140 Freq. (Hz) 50/60 240 0-280	Con Curren Max. Amps 5 5 Con Curren Max.	stant tt Load Max. KVA 1.2 SEC BOOST ^{**} 208 0-242 stant tt Load	Term CONNEC Input CW CCW 2-1-2 5-4-5 PEN CONNEC	ninals & F Output CW CCW 3-1-3 3-4-3 DE TION	totation Jumper CW C-CW 1-1 4-4 LTA LTA totation Jumper CW	Manually Operated 21-2 Model M	Motor Driven ME21-2 (umbers	2 Diag. 3
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