

**Superior**  
*Electric*

**POWERSTAT®**  
**Variable Transformers**



*A POWERSTAT Variable Transformer  
is a continuously adjustable voltage autotransformer  
having a movable brush-tap riding on a commutator.  
Rotation of the brush-tap by either manual or motor-driven means  
delivers any output voltage  
in the range of zero to or above line voltage.*

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Recognized by Underwriters Laboratories  
File No. E15506, UL Standard UL508



Listed by the Canadian Standards Association  
File No. LR7674



Models prefixed "3PN" and "L" are  
Underwriters Laboratories Listed.

**PLEASE NOTE:** Screened 1 kVA and 2 kVA units rated 240 V or higher and 3 kVA and 4 kVA units rated 480 V or higher are not UL Recognized or CSA Certified. Types 3PN216C, 216CT, F216C, 3PN217C, 217CT, F217C, 226, 3PN226, 226T and F226 are standard screened units UL Recognized but not CSA Certified.

### POWERKOTE® COILS

Most POWERSTAT Variable Transformers feature POWERKOTE coils for longer life, increased ratings, greater overload capacities and better resistance to fungus, salt spray and other contaminating atmospheres. The commutator of the new POWERKOTE coil is embedded in a high temperature material which holds the windings in place, even under severe overloads. As a result, POWERSTAT Variable Transformers with POWERKOTE coils provide higher output ratings per pound and per dollar than ordinary variable transformers.

### CURRENT RATING TERMINOLOGY

To permit maximum utilization of POWERSTAT Variable Transformers, output ratings are given for both constant current and constant impedance loads.

**CONSTANT CURRENT LOAD:** Output current that can be carried regardless of output voltage setting.

**CONSTANT IMPEDANCE LOAD:** 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. These ratings apply only to units having maximum output voltage limited to line voltage.

### EXCELLENT REGULATION

POWERSTAT Variable Transformers deliver the desired voltage with only negligible variation in output voltage from no-load to full-load current. Individual regulation curves are shown for all types.

### HIGH EFFICIENCY

The watts loss of every POWERSTAT Variable Transformer is very low in contrast to the inefficient, wasteful control provided by rheostats and other resistive type controllers.

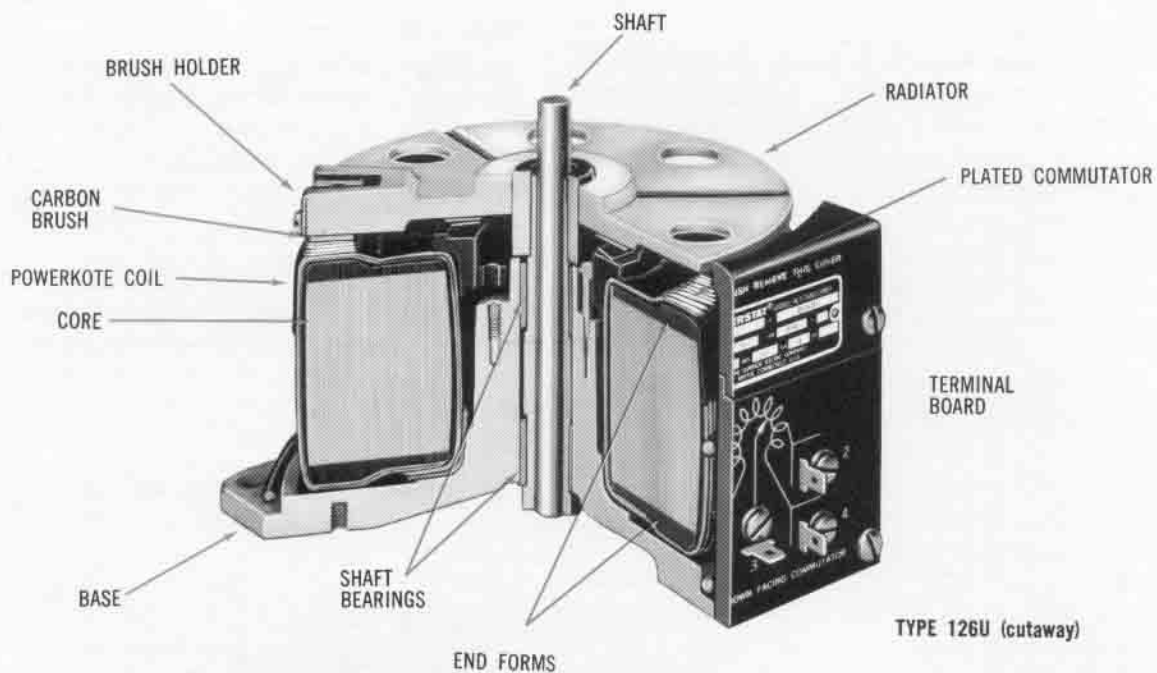
### NEGLIGIBLE WAVEFORM DISTORTION

A POWERSTAT Variable Transformer provides an output voltage which is a faithful and distortionless reproduction of the applied input waveform. This is a required feature of many electronic applications and is a result of superior core and coil design and the use of highest grade silicon steel.

### PRECIOUS METAL PLATED COMMUTATOR

A special precious metal plating process produces a commutator surface that withstands greater overloads and maintains a constant contact drop. The plated surface assures smooth performance, long life and increased resistance to corrosion.

# GENERAL FEATURES



## NEGLECTIBLE MAINTENANCE

With ordinary care and attention to the operating instructions, the only elements that may require periodic inspection and maintenance are the brushes. Their replacement is infrequently needed because they are made of a special carbon and are of a design that assures proper contact of the brush to the commutator at any setting.

## LOW OPERATING TORQUE

The glass-smooth commutator surface, the constant and correct contact pressure of the brush-tap to the commutator and the stable positioning of coil and internal components result in the low operating torque of all POWERSTAT Variable Transformers. The driving torque for the individual units is given in the section devoted to the particular type.

## LINEAR OUTPUT VOLTAGE

The angle of rotation from zero to maximum output voltage is given for each POWERSTAT Variable Transformer in the section devoted to the particular series. Output voltage is continuously adjustable from zero to maximum output voltage proportionately over the full range.

## SMOOTH CONTROL

The output voltage of a POWERSTAT Variable Transformer can be considered continuously adjustable. The voltage between turns is a fraction of a volt and the brush-tap is always in contact with one or more turns of the winding. Adjustment of output voltage can be made to a fraction of a volt.

## RUGGED MECHANICAL CONSTRUCTION

All POWERSTAT Variable Transformers are designed for heavy-duty, trouble-free operation. Rigid inspection at every stage of manufacture gives assurance of a quality-built product. The securely mounted core and coil, extra large aluminum brush heat radiator and durable brush assembly reduce the need for attention or replacement.

## LONG LIFE

POWERSTAT Variable Transformers give reliable performance over extended periods of time even under extreme operating conditions. Materials are constantly being improved to give increased life expectancy.

## MILITARY SPECIFICATIONS

All POWERSTAT Variable Transformer models are available on special order to meet applicable military specifications. The following are typical of the requirements which can be met:

ALTITUDE: Up to 10,000 feet operating; 50,000 feet nonoperating

HUMIDITY: 95 per cent relative humidity for 24 hours

VIBRATION: Per MIL-STD-810C, Method 514.2

SHOCK: Per MIL-STD-810C, Method 516.2

CORROSION: All metal parts except the commutator protected to withstand 100-hour salt spray per FED-STD-151A.

PHENOLIC PARTS: Laminated parts per MIL-P-15035C; molded parts per MIL-M-14F; rods and tubes per MIL-P-79C; and anti-fungus treatment per MIL-T-152B, Type 2.

CONNECTING WIRE: Per MIL-W-16878D

# GENERAL FEATURES

## OVERLOAD CAPACITY

Because of their conservative ratings and the use of POWERKOTE coils, POWERSTAT Variable Transformers can safely handle many overloads. The "on" curve in Figure A shows the maximum time the units can be subjected to various overloads. When used with repetitive overloads, the units must also be allowed sufficient "off" time as indicated by the "off" curve to prevent excessive temperature buildup. Where the "on" time desired for a repetition overload is less than the maximum shown, the "off" time can be reduced in accordance with the following equation:

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

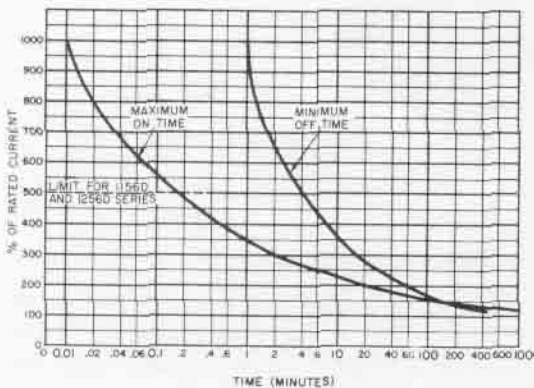


FIGURE A

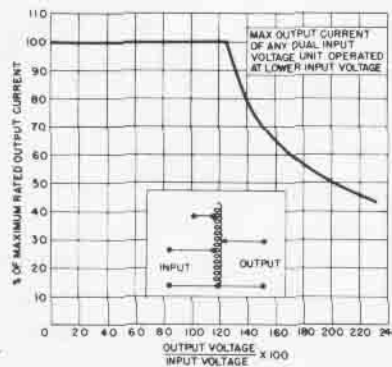


FIGURE B

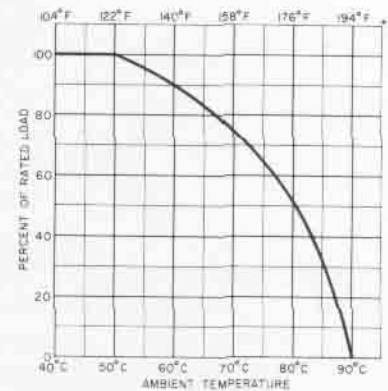


FIGURE C

## TYPE NUMBER DESIGNATIONS

EXAMPLE:

5M116CU-2

5-Second Motor-Driven Series Units in Ganged Assembly Open Construction

### SERIES UNIT RATINGS

SERIES	VOLTS*	MAX. AMPERES*	
		CONSTANT CURRENT	CONSTANT IMPEDANCE
10C	120	2.25	3
21	120	5	7
116C	120	10	13
117C	120	12	15
126	120	15	20
136B	120	22	28
146	120	30	35
1156D	120	50	55
12	240	0.7	0.9
22	240	2.25	3.25
216C	240	3.5	5
217C	240	5	7
226	240	7.5	10
236B	240	10	13
246	240	15	19
1256D	240	28	28

\*Nominal ratings. Vary with enclosure, mounting and special windings.

### PREFIXES

PREFIX	DESCRIPTION
3PN	3-Wire Cord Receptacle
5M	5-Second Motor Drive
15M	15-Second Motor Drive
30M	30-Second Motor Drive
60M	60-Second Motor Drive
DM	Adjustable/Digital Motor Drive
F	Fused with Terminal Box
LW	Isolated Secondary Series
L	Enclosed Series

### SUFFIXES

SUFFIX	DESCRIPTION
-2 to -27	Units in Ganged Assembly
X	220V, 50 Hertz Motor Drive
-40	40-Volt Series
T	Terminal Enclosure
U†	Open Construction
D	Open-Delta
P	Parallel
PS	Series-Parallel
S	Series
Y	Wye

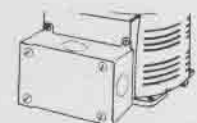
†110C-12 and 21-22 Series units are of open construction only but do not use a U prefix.



3PN 120-VOLT TYPES



3PN 240-VOLT TYPES



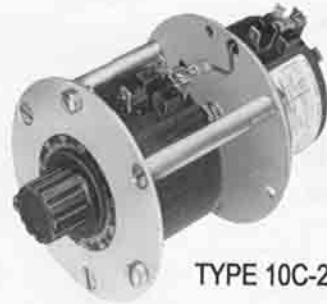
T (Terminal Enclosed) TYPES



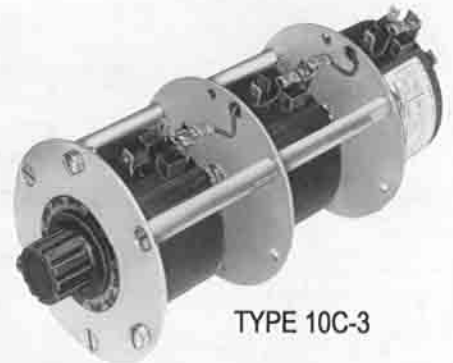
F (Fused) TYPES



TYPE 10C



TYPE 10C-2



TYPE 10C-3

POWERSTAT Variable Transformers of the 10C-12C Series are offered in single and three phase manually operated assemblies. The 10C Series units operate from 120 volt lines and the 12C Series units operate from 240 volt lines. 10C Series units are rated at 2.25 amperes for constant current loads and 3.0 amperes for constant impedance loads. When line voltage connected, 12C Series units are rated at 0.7 ampere for constant current loads and 0.9 ampere for constant impedance loads. For over voltage connection the output rating for constant current loads is 0.5 ampere in the output range above line voltage but 0.7 ampere in the range from zero to line voltage. All these ratings are for metal panel mounting.

The tapping arrangement permits an output voltage of zero to line voltage or 10 percent above line voltage. Compensation may be made for a 10 percent drop in line voltage or to provide a wider working range. For

additional flexibility, units of the 10C-12C Series can be connected to deliver an increasing output voltage of zero to line voltage with either clockwise or counterclockwise knob rotation. As shown in Figure A, all models can be operated at any frequency between 50 and 2000 hertz without reduction in allowable output current. Figure B shows the regulation curves for POWERSTAT Variable Transformers of the 10C-12C Series operating at full rated load. The curves show the voltage drop at any brush setting when full load is applied. For less than full load, voltage drop is proportional to the load. Driving torque, d-c resistance per coil and maximum core and brush loss when operating under no load are given in the chart. All types are of open construction designed for back-of-panel mounting. Type 10C and type 12C have 1/16 inch (1.6mm) high non-turn devices for keying the units to the panels. All units have a 2 inch (50.8mm) dial graduated 0-100 and an angle of knob rotation of 322°.

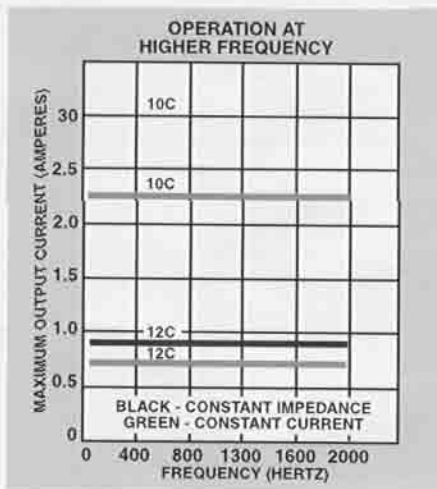


FIGURE A

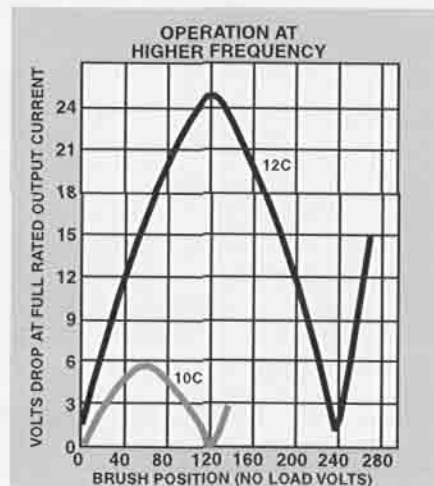
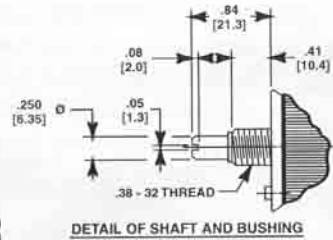
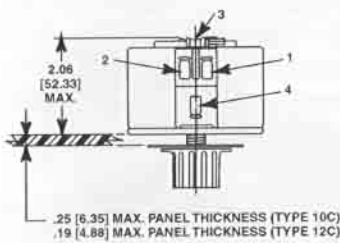
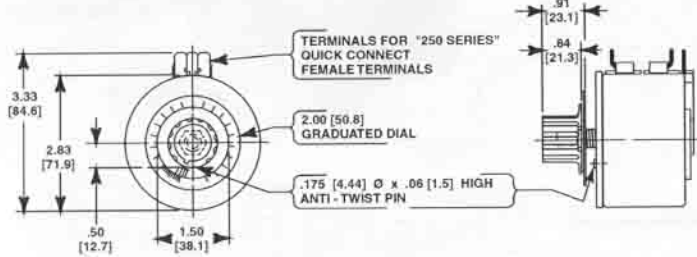
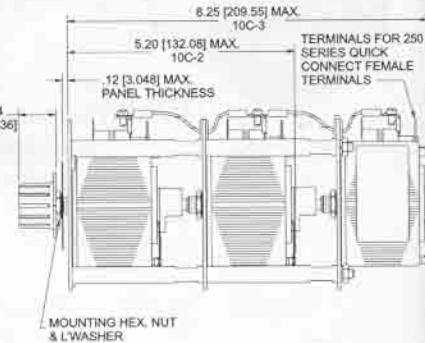


FIGURE B

# 10C - 12C series



3x .25-20TAP THRU EQUALLY SPACED ON A Ø 3.838 [98.552] B.C. (UNIT SUPPLIED WITH 3x FILLISTER HD SCREWS X .38 LG.)

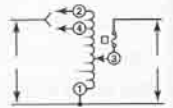


**TYPE 10C**

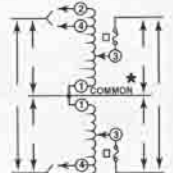
**TYPES 10C-2 AND 10C-3**

## CONNECTIONS AND RATINGS

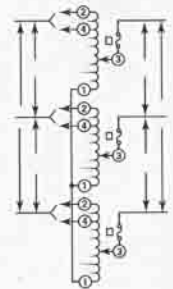
TYPE	CONNECTION	INPUT		OUTPUT				KNOB ROTATION	TERMINALS			
		VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		INPUT	JUMPER†	OUTPUT	
					MAX. AMPS	MAX. KVA	MAX. AMPS					MAX. KVA
10C	#1	120	50/60	0-120	2.25‡	0.27	3†	0.36	CW	1-2	—	1-3
			60	0-132	2.25‡	0.30	—	—	CW	1-4	—	1-3
12C	#1	240	50/60	0-240	0.7†	0.17	0.9†	0.22	CW	1-2	—	1-3
			60	0-264	0.5§	0.13	—	—	CW	1-4	—	1-3
10C-2	#2 1-Phase Series	240	50/60	0-240	2.25‡	0.54	3†	0.72	CW	2-2	1-1	3-3
			60	0-264	2.25‡	0.59	—	—	CCW	1-1	2-2	3-3
	#2 3-Phase Series	120	50/60	0-120	2.25‡	0.47	3†	0.62	CW	2-1-2	1-1	3-1-3
			60	0-132	2.25‡	0.51	—	—	CCW	1-2-1	2-2	3-2-3
12C-2	#2 1-Phase Series	480	50/60	0-480	0.7†	0.29	0.9†	0.37	CW	2-2	1-1	3-3
			60	0-528	0.5§	0.26	—	—	CCW	1-1	2-2	3-3
	#2 3-Phase Open Data	240	50/60	0-240	0.7†	0.29	0.9†	0.37	CW	4-4	1-1	3-3
			60	0-264	0.5§	0.23	—	—	CCW	2-1-2	1-1	3-1-3
10C-3	#3 3-Phase Wye	240	60	0-240	2.25‡	0.94	3†	1.2	CW	1-2-1	2-2	3-2-3
			60	0-264	0.5§	0.23	—	—	CCW	4-1-4	1-1	3-1-3
12C-3	#3 3-Phase Wye	480	50/60	0-480	0.7†	0.58	0.9†	0.75	CW	2-2-2	1-1-1	3-3-3
			60	0-528	0.5§	0.46	—	—	CCW	1-1-1	2-2-2	3-3-3
			60	0-528	0.5§	0.46	—	—	CCW	4-4-4	1-1-1	3-3-3



**CONNECTION 1**



**CONNECTION 2**



**CONNECTION 3**

CONNECTIONS SHOWN ARE FOR CW KNOB ROTATION

\* Common used as third leg in 3-phase open data or neutral in 3-wire single phase series and 4-wire 3-phase wye connections; not used in 2-wire series or 3-wire wye connections.

† Rating when mounted on a metal panel. When mounted on a bracket or a nonmetallic panel, derate to 2.5 amperes for 10C series, 0.75 amperes for 12C series.

‡ Rating when mounted on a metal panel. When mounted on a bracket or a nonmetallic panel, derate to 1.75 amperes for 10C series, 0.5 amperes for 12C series.

§ Maximum current when mounted on a metal panel is 0.76 amperes in output voltage range from 0 to line voltage

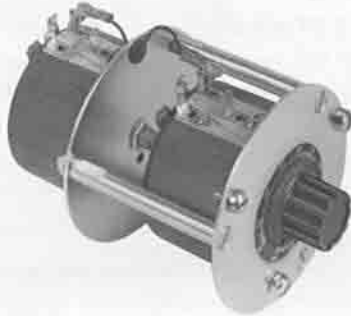
¶ Jumper provided in standard common position should be moved or removed as required.

□ Fuse recommended, not supplied.

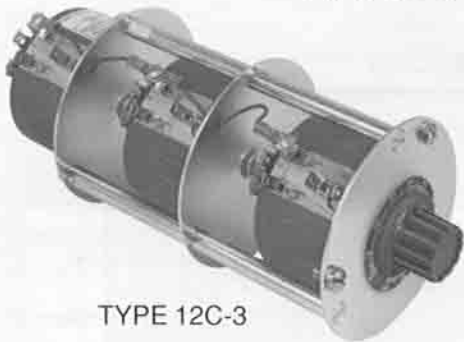
# 10C - 12C series



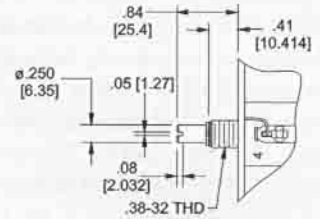
TYPE 12C



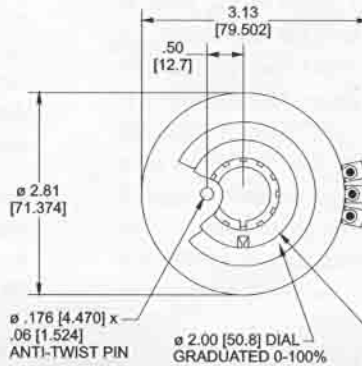
TYPE 12C-2



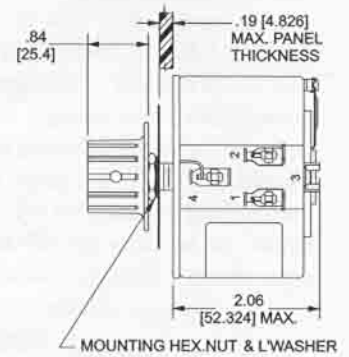
TYPE 12C-3



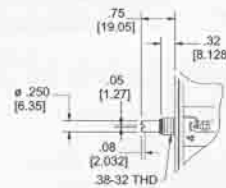
DETAIL OF SHAFT AND BUSHING



TYPE 12C

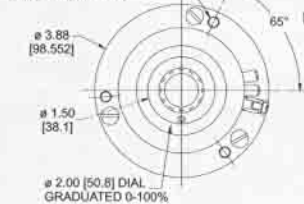


MOUNTING HEX.NUT & L.WASHER

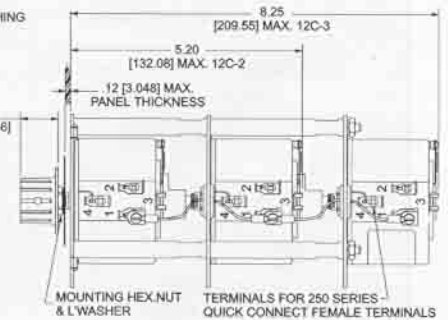


DETAIL OF SHAFT & BUSHING

3x .25-.20 TAP THRU EQUALLY SPACED ON A  $\phi$  3.88 [98.552] B.C. (UNIT SUPPLIED WITH 3x FILLISTER HD SCREWS X .38 LG.)



$\phi$  2.00 [50.8] DIAL GRADUATED 0-100%



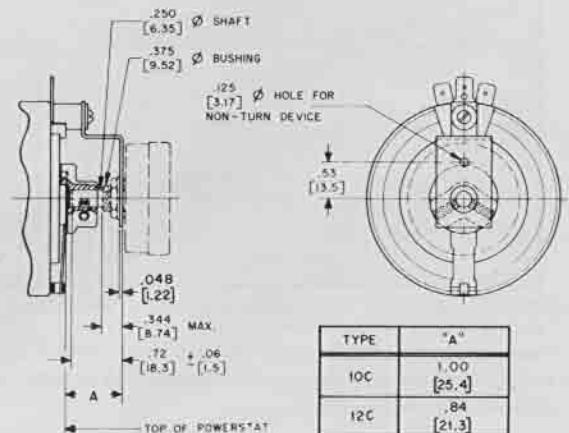
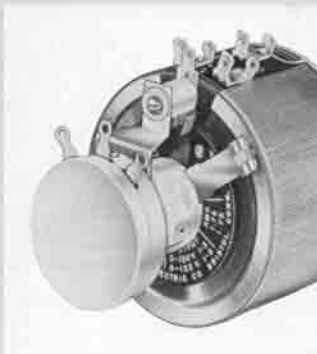
TYPES 12C-2, 12C-3

TYPE	Approximate Driving Torque		No-Load Loss at 60 Hertz (Watts)	D-C Resistance per Coil* (Ohms)
	Oz-In.	KpCm		
10C	5	.4	1.8	14.2
10C-2	15-20	1.1 - 1.4	3.6	14.2
10C-3	20-30	1.4 - 2.2	5.4	14.2
12C	5	.4	2.0	162
12C-2	15-20	1.1 - 1.4	4.0	162
12C-3	20-30	1.4 - 2.2	6.0	162

\*Measured from start to end of winding.

## POTENTIOMETER ADAPTER KITS

Adapter Kits are available to permit user mounting of potentiometers, rheostats, tap switches and other devices to operate in unison with a 10C-12C Series POWERSTAT Variable Transformer. Order Kit type B211060-1 for 10C Series units or Kit type 30111-000 for 12-C Series units. The kits will accommodate devices having a 3/8"-32 mounting bushing and a 1/4" (6.4mm) diameter shaft. If desired, POWERSTAT Variable Transformers having the device factory mounted are available on special order.





TYPE 21

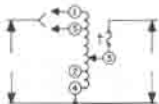
POWERSTAT Variable Transformers of the 21-22 Series are of open construction and are primarily designed for back-of-panel mounting. The rated output for the type 21 Series is 5 amperes for constant current loads and 7 amperes for constant impedance loads. For the 22 Series, the rated output is 2.25 amperes for constant current loads and 3.25 amperes for constant impedance loads. The 21 Series types operate from 120 volt lines and the 22 Series types from 240 volt lines. The tapping arrangement permits an output voltage range of zero to line voltage or zero to 17 percent above line voltage. As shown in Figure A, 21-22 Series POWERSTAT Variable Transformers can be operated at any frequency between 50 and 2000 hertz without reduction in allowable output current. Figure B shows the regulation curves for operating at full rated load. The curves show the voltage drop at any brush setting when full load is applied. Voltage drops for loads less than full load are proportional. Driving torque, d-c resistance per coil and maximum core and brush loss when operating under no load are given in the chart. All manually

operated units have a 3 3/4 inch (95.3mm) dial graduated 0-100 and an angle of rotation of 320° from the zero to maximum output voltage. Adjustable shafts can be extended from either end of the units, permitting general utility mounting if desired. In addition to the conventional screw-type method of connection, terminal adapters supplied with the units can be quickly mounted on the terminals for use with push-on connectors or soldered connections.

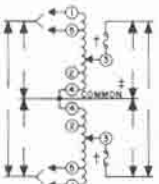
Motor-driven units in the 21-22 Series are designated by a letter M prefix in the type number. When ordering, prefix the motor-driven type number with the desired motor speed in seconds. Example: 5M21-2.

## CONNECTIONS AND RATINGS

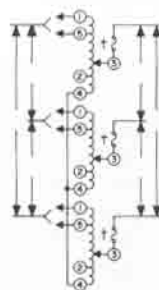
TYPE	CONNECTION	INPUT		OUTPUT				KNOB ROTATION	TERMINALS						
		VOLTS	HERTZ	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD			KNOB ON BASE END			KNOB ON RADIATOR END			
				MAX. AMPS.	MAX. KVA	MAX. AMPS.	MAX. KVA		INPUT	JUMPER*	OUTPUT	INPUT	JUMPER*	OUTPUT	
21 M21§	#1 Single Phase	120	50/60	0-120	5	0.60	7	0.84	CW	1-4	—	3-4	1-4	—	1-3
				0-140	5	0.70	—	—	CCW	1-4	—	1-3	1-4	—	3-4
									CW	4-5	—	3-4	1-2	—	1-3
									CCW	1-2	—	1-3	4-5	—	3-4
22 M22§	#1 Single Phase	240	50/60	0-240	2.25	0.54	3.25	0.78	CW	1-4	—	3-4	1-4	—	1-3
				0-280	2.25	0.63	—	—	CCW	1-4	—	1-3	1-4	—	3-4
									CW	4-5	—	3-4	1-2	—	1-3
									CCW	1-2	—	1-3	4-5	—	3-4
21-2 M21-2§	#2 1-Phase Series	240	50/60	0-240	5	1.2	7	1.7	CW	1-1	4-4	3-3	4-4	1-1	3-3
				0-280	5	1.4	—	—	CCW	4-4	1-1	3-3	1-1	4-4	3-3
									CW	5-5	4-4	3-3	2-2	1-1	3-3
	#2 3-Phase Open Delta	120	50/60	0-120	5	1	7	1.5	CW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3
				0-140	5	1.2	—	—	CCW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3
									CW	5-4-5	4-4	3-4-3	2-1-2	1-1	3-1-3
22-2 M22-2§	#2 1-Phase Series	480	50/60	0-480	2.25	1.1	3.25	1.6	CW	1-1	4-4	3-3	4-4	1-1	3-3
				0-560	2.25	1.3	—	—	CCW	4-4	1-1	3-3	1-1	4-4	3-3
									CW	5-5	4-4	3-3	2-2	1-1	3-3
	#2 3-Phase Open Delta	240	50/60	0-240	2.25	0.94	3.25	1.4	CW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3
				0-280	2.25	1.1	—	—	CCW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3
									CW	5-4-5	4-4	3-4-3	2-1-2	1-1	3-1-3
21-3 M21-3§	#3 3-Phase Wye	240	50/60	0-240	5	2.1	7	2.9	CW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3
				60	0-280	5	2.4	—	—	CCW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4
			60	0-280	5	2.4	—	—	CW	5-5-5	4-4-4	3-3-3	2-2-2	1-1-1	3-3-3
									CCW	2-2-2	1-1-1	3-3-3	5-5-5	4-4-4	3-3-3
									CW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3
									CCW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3
22-3 M22-3§	#3 3-Phase Wye	480	50/60	0-480	2.25	1.9	3.25	2.7	CW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3
				60	0-560	2.25	2.2	—	—	CCW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4
			60	0-560	2.25	2.2	—	—	CW	5-5-5	4-4-4	3-3-3	2-2-2	1-1-1	3-3-3
									CCW	2-2-2	1-1-1	3-3-3	5-5-5	4-4-4	3-3-3
									CW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3
									CCW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3



CONNECTION 1



CONNECTION 2



CONNECTION 3

‡Common used as third leg in 3-phase open delta or neutral in 3-wire single phase series and 4-wire 3-phase wye connections; not used in 2-wire series or 3-wire wye connections.

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

§Motor-driven types use connections for CW rotation, knob on radiator end.

†Fuse recommended, not supplied.

CONNECTIONS SHOWN ARE FOR CW KNOB ROTATION, KNOB ON BASE END (CCW ROTATION, KNOB ON RADIATOR END)





## MOTOR-DRIVEN TYPES

TYPE	Approximate Driving Torque		No-Load Loss at 60 Hertz† (Watts)	D-C Resistance per Coil*† (Ohms)
	Oz-In	KpCm		
21	15-25	1.1-1.8	3.0	4.4
21-2	35-45	2.5-3.2	6.0	4.4
21-3	70-80	5-5.8	9.0	4.4
22	20-30	1.4-2.2	3.0	10.8
22-2	45-60	3.2-4.3	6.0	10.8
22-3	70-90	5-6.5	9.0	10.8

†Data applies to M prefixed models also.  
\*Measured from start to end of winding.

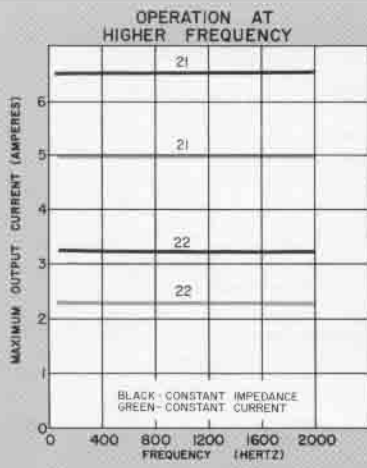
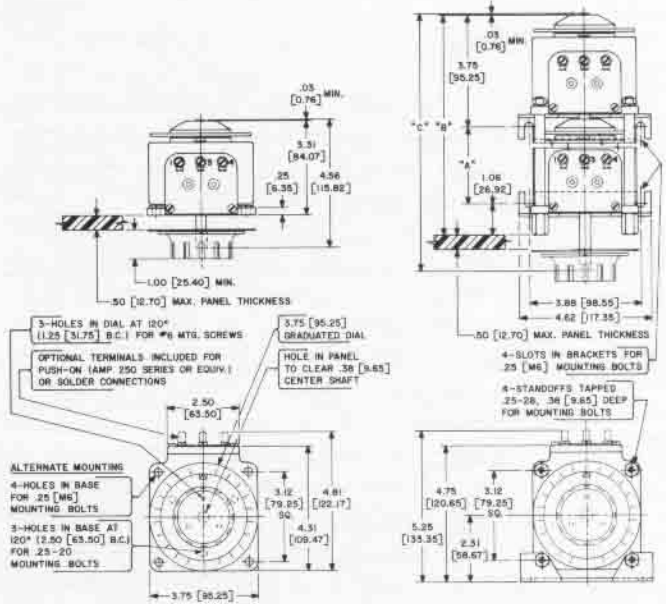


FIGURE A

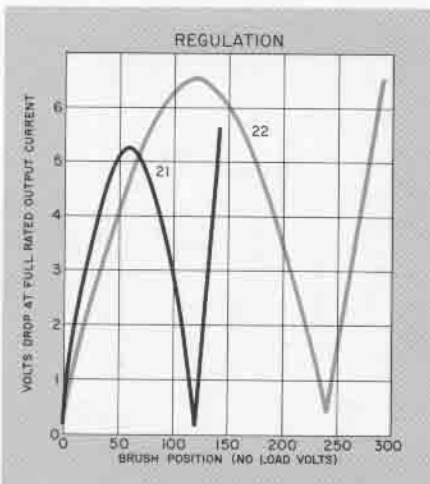
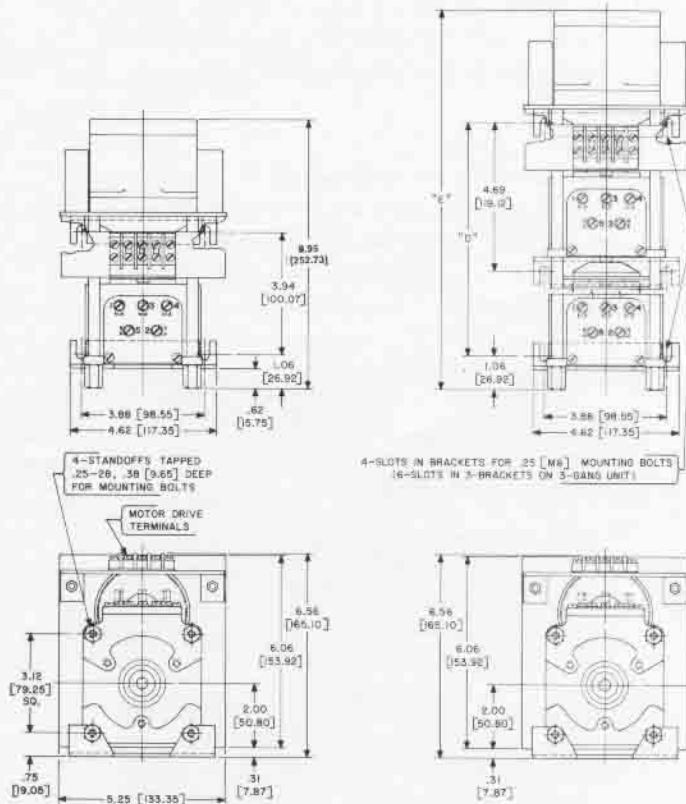


FIGURE B

## SINGLE MANUAL

## GANGED MANUAL

TYPE	"A"	"B"	"C"	"D"	"E"
2-GANG	2.69 [68.32]	7.50 [190.50]	8.75 [222.25]	7.38 [187.45]	13.39 [340.11]
3-GANG	6.12 [155.45]	10.94 [277.87]	12.19 [309.63]	10.81 [274.57]	16.83 [427.48]



SINGLE MOTOR DRIVEN

GANGED MOTOR DRIVEN

# 116C-216C and 117C-217C series

POWERSTAT Variable Transformers of the 116C and 117C Series operate from 120 volt lines and 216C and 217C Series operate from 240 volt lines. All models feature POWERKOTE coils. The rated output for constant current loads is 10 amperes for the 116C Series; 12 amperes for the 117C Series; 3.5 amperes for the 216C Series; and 5 amperes for the 217C Series. For a constant impedance load the maximum rated output current at line voltage is increased to 13 amperes for the 116C Series; 15 amperes for the 117C Series; 5 amperes for the 216C Series and 7 amperes for the 217C Series. Single, manually operated units have both 3-hole and 4-hole mounting arrangements; all others have the 4-hole mounting.

As shown in Figure A, assemblies of the 116C-216C Series can be operated at 50 to 1500 hertz and those of the 117C-217C Series can be operated at any frequency between 60 and 1500 hertz without reduction in allowable output current. Except for 216C types and the 217C types operating at the constant current rating, there is a slight reduction between 1500 and 2000 hertz. Figure B shows the regulation curves for types of the 116C-216C and 117C-217C Series operating at full load current. The curves show the voltage drop at any brush setting when full load is applied. For less than full load the voltage drop is proportional to the load.

Single units of the 117C-217C Series and cord-and-plug models of the 116C-216C Series have dials graduated in volts. Other single units of the 116C-216C Series and all ganged units have dials graduated 0-100. The angle of rotation from zero to maximum voltage is 317.5°.

Open construction models have a letter U suffix in the type number and have the shaft extending from the base end of the assembly for panel mounting. Knobs can also be placed at the radiator end of the assemblies for general utility mounting because the shafts are removable.



3PN TYPES

All plug-in models have input cord-plug sets, output receptacles, switches and fuses and are connected for clockwise knob rotation. Plug-receptacle constructions available are shown in the outline for plug-in types on page 13. Units of the 116C-216C Series are connected for overvoltage operation with provision for changing in the field to limit the output voltage to line voltage. Units in the 117C-217C Series have output voltage limited to line voltage. All models can be changed in the field to provide increasing output voltage with counterclockwise knob rotation.

Motor-driven POWERSTAT Variable Transformers have a letter M prefix in the type number. When ordering, the type number should be prefixed with the desired speed in seconds. For example: 5M116CT.

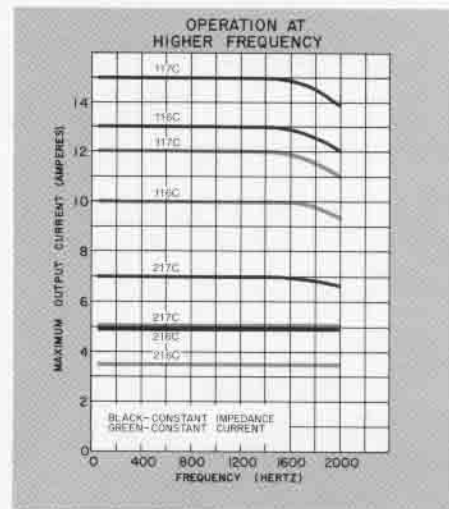


FIGURE A

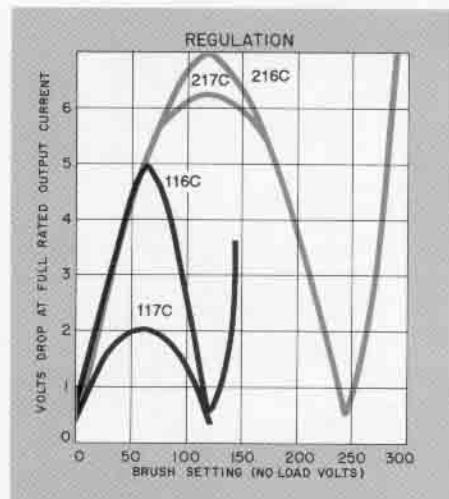


FIGURE B

TYPE†	Approximate Driving Torque		No-Load Loss at 60 Hertz (Watts)	D-C Resistance per Coil* (Ohms)
	Oz-In	KpCm		
116CU	20-30	1.4-2.2	6.5	1.1
116C-2	60-75	4.3-5.4	13	1.1
116C-3	100-125	7.2-9	19.5	1.1
117CU	20-30	1.4-2.2	8.5	0.49
117C-2	60-75	4.3-5.4	17	0.49
117C-3	100-125	7.2-9	25.5	0.49
216CU	20-30	1.4-2.2	6.5	10.8
216C-2	60-75	4.3-5.4	13	10.8
216C-3	100-125	7.2-9	19.5	10.8
217C	20-30	1.4-2.2	8.5	3.9
217C-2	60-75	4.3-5.4	17	3.9
217C-3	100-125	7.2-9	25.5	3.9

\*Measured from start to end of winding.

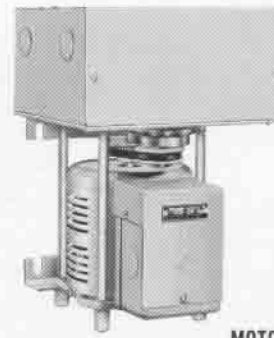
†Data also applies to units having applicable prefixes and suffixes.



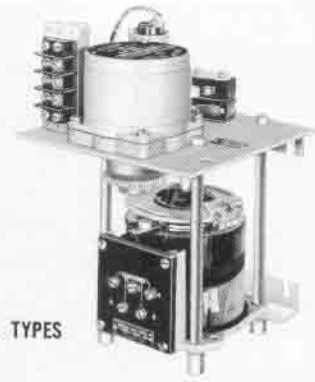
T TYPES



U TYPES

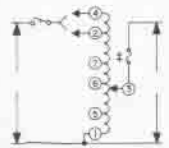


MOTOR-DRIVEN TYPES

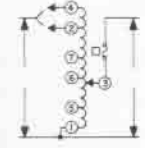


CONNECTIONS AND RATINGS

TYPE	CONNECTION	INPUT		OUTPUT				KNOB ROTATION	TERMINALS						
		VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		KNOB ON RADIATOR END		KNOB ON BASE END				
					MAX. AMP.	MAX. KVA	MAX. AMP.		MAX. KVA	INPUT	OUTPUT	INPUT	OUTPUT		
116C 3PN116C	#1	120	50/60	0-120	10	1.2	13	1.6	CW	1-4	1-3	1-4	3-4		
				0-140	10	1.4	—	—	CCW	1-4	3-4	1-4	1-3		
116CT M116CT § 116CU M116CU §	#2	120	50/60	0-120	10	1.2	13	1.6	CW	1-4	1-3	1-4	3-4		
				0-140	10	1.4	—	—	CCW	1-4	3-4	1-4	1-3		
3PN117C	#1	120	60	0-120	12	1.4	15	1.8	CW	1-4†	1-3	1-4	3-4		
									CCW	1-4	3-4	1-4	1-3		
117CT M117CT § 117CU M117CU §	#2	120	60	0-120	12	1.4	15	1.8	CW	1-4	1-3	1-4	3-4		
									CCW	1-4	3-4	1-4	1-3		
216C 3PN216C	#1	240	50/60	0-240	3.5	0.84	5	1.2	CW	1-4	1-3	1-4	3-4		
											CCW	1-4	3-4	1-4	1-3
				0-280	3.5	0.98	—	—	CW	1-2‡	1-3	4-5	3-4		
										CCW	4-5	3-4	1-2	1-3	
		120	50/60	0-280	3.5*	0.42†	—	—	CW	1-6	1-3	4-7	3-4		
										CCW	4-7	3-4	1-6	1-3	
216CT M216CT § 216CU M216CU §	#2	240	50/60	0-240	3.5	0.84	5	1.2	CW	1-4	1-3	1-4	3-4		
											CCW	1-4	3-4	1-4	1-3
				0-280	3.5	0.98	—	—	CW	1-2	1-3	4-5	3-4		
										CCW	4-5	3-4	1-2	1-3	
		120	50/60	0-280	3.5*	0.42†	—	—	CW	1-6	1-3	4-7	3-4		
										CCW	4-7	3-4	1-6	1-3	
3PN217C	#1	240	60	0-240	5	1.2	7	1.7	CW	1-4‡	1-3	1-4	3-4		
									CCW	1-4	3-4	1-4	1-3		
217CT M217CT § 217CU M217CU §	#2	240	60	0-240	5	1.2	7	1.7	CW	1-4	1-3	1-4	3-4		
									CCW	1-4	3-4	1-4	1-3		



CONNECTION 1



CONNECTION 2

116C TYPES DO NOT HAVE TERMINALS 6 OR 7

117C-217C TYPES DO NOT HAVE TERMINALS 2, 5, 6 OR 7

CONNECTIONS SHOWN ARE FOR CW KNOB ROTATION. KNOB ON RADIATOR END (CCW ROTATION KNOB ON BASE END)

\*Maximum output current in output voltage range up to 150 volts. At higher output voltages output current must be reduced according to rating curve Figure B on page 4.

†Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

‡Fuse supplied: 10 ampere on 116C types, 15 ampere on 117C types, 4 ampere on 216C types, 8 ampere on 217C types.

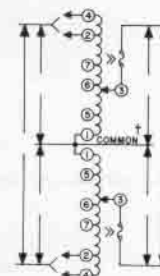
§Motor-driven types use connections for CW rotation, knob on radiator end.

¶Unit wired this way when shipped.

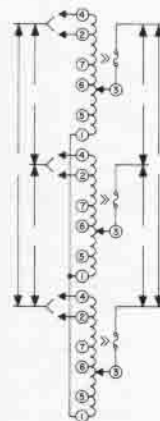
□Fuse recommended, not supplied.

# CONNECTIONS AND RATINGS

TYPE	CONNECTION	INPUT		OUTPUT				KNOB ROTATION	TERMINALS							
		VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		KNOB ON RADIATOR END			KNOB ON BASE END				
					MAX. AMP.	MAX. KVA	MAX. AMP.		MAX. KVA	INPUT	JUMPERS	OUTPUT	INPUT	JUMPERS	OUTPUT	
116CU-2 M116CU-2 ◻	#1 1-Phase Series	240	50/60	0-240	10	2.4	13	3.1	CW	4-4	1-1	3-3	1-1	4-4	3-3	
				0-280	10	2.8	—	—	CCW	1-1	4-4	3-3	4-4	1-1	3-3	
				0-280	10	2.8	—	—	CCW	5-5	4-4	3-3	2-2	1-1	3-3	
	#1 3-Phase Open Delta	120	50/60	0-120	10	2.1	13	2.7	CW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3	
				0-140	10	2.4	—	—	CCW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3	
				0-140	10	2.4	—	—	CCW	2-1-2	1-1	3-1-3	5-4-5	4-4	3-4-3	
117CU-2 M117CU-2 ◻	#1 1-Phase Series	240	60	0-240	12	2.9	15	3.6	CW	4-4	1-1	3-3	1-1	4-4	3-3	
				0-240	12	2.9	15	3.6	CCW	1-1	4-4	3-3	4-4	1-1	3-3	
	#1 3-Phase Open Delta	120	60	0-120	12	2.5	15	3.1	CW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3	
				0-120	12	2.5	15	3.1	CCW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3	
				0-120	12	2.5	15	3.1	CCW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3	
				0-120	12	2.5	15	3.1	CCW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3	
216CU-2 M216CU-2 ◻	#1 1-Phase Series	480	50/60	0-480	3.5	1.7	5	2.4	CW	4-4	1-1	3-3	1-1	4-4	3-3	
				0-560	3.5	2.0	—	—	CCW	1-1	4-4	3-3	4-4	1-1	3-3	
				0-560	3.5	2.0	—	—	CCW	5-5	4-4	3-3	2-2	1-1	3-3	
				0-560	3.5	2.0	—	—	CCW	2-2	1-1	3-3	5-5	4-4	3-3	
	#1 3-Phase Open Delta	240	50/60	0-240	3.5*	0.85†	—	—	CW	6-6	1-1	3-3	7-7	4-4	3-3	
				0-240	3.5	1.5	5	2.1	CCW	7-7	4-4	3-3	6-6	1-1	3-3	
				0-240	3.5	1.5	5	2.1	CCW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3	
				0-280	3.5	1.7	—	—	CCW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3	
#1 3-Phase Open Delta	240	50/60	0-240	3.5	1.5	5	2.1	CW	2-1-2	1-1	3-1-3	5-4-5	4-4	3-4-3		
			0-280	3.5	1.7	—	—	CCW	5-4-5	4-4	3-4-3	2-1-2	1-1	3-1-3		
			0-280	3.5	1.7	—	—	CCW	6-1-6	1-1	3-1-3	7-4-7	4-4	3-4-3		
			0-280	3.5	1.7	—	—	CCW	7-4-7	4-4	3-4-3	6-1-6	1-1	3-1-3		
217CU-2 M217CU-2 ◻	#1 1-Phase Series	480	60	0-480	5	2.4	7	3.4	CW	4-4	1-1	3-3	1-1	4-4	3-3	
				0-480	5	2.4	7	3.4	CCW	1-1	4-4	3-3	4-4	1-1	3-3	
	#1 3-Phase Open Delta	240	60	0-240	5	2.1	7	2.9	CW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3	
				0-240	5	2.1	7	2.9	CCW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3	
116CU-3 M116CU-3 ◻	#2 3-Phase Wye	240	50/60	0-240	10	4.2	13	5.4	CW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3	
				0-240	10	4.2	13	5.4	CCW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3	
			60	0-280	10	4.8	—	—	CW	2-2-2	1-1-1	3-3-3	5-5-5	4-4-4	3-3-3	
				0-280	10	4.8	—	—	CCW	5-5-5	4-4-4	3-3-3	2-2-2	1-1-1	3-3-3	
			60	0-240	12	5.0	15	6.2	CW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3	
				0-240	12	5.0	15	6.2	CCW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3	
216CU-3 M216CU-3 ◻	#2 3-Phase Wye	480	50/60	0-480	3.5	2.9	5	4.2	CW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3	
				0-480	3.5	2.9	5	4.2	CCW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3	
			60	0-560	3.5	3.4	—	—	CW	2-2-2	1-1-1	3-3-3	5-5-5	4-4-4	3-3-3	
				0-560	3.5	3.4	—	—	CCW	5-5-5	4-4-4	3-3-3	2-2-2	1-1-1	3-3-3	
			240	60	0-560	3.5*	1.5†	—	—	CW	6-6-6	1-1-1	3-3-3	7-7-7	4-4-4	3-3-3
					0-560	3.5*	1.5†	—	—	CCW	7-7-7	4-4-4	3-3-3	6-6-6	1-1-1	3-3-3
217CU-3 M217CU-3 ◻	#2 3-Phase Wye	480	60	0-480	5	4.2	7	5.8	CW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3	
				0-480	5	4.2	7	5.8	CCW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3	



CONNECTION 1



CONNECTION 2

116C TYPES  
DO NOT HAVE  
TERMINALS  
6 OR 7

117C-217C TYPES  
DO NOT HAVE  
TERMINALS  
2, 5, 6 OR 7

CONNECTIONS  
SHOWN ARE FOR  
CW KNOB  
ROTATION.  
KNOB ON RADIATOR  
END (CCW ROTATION  
KNOB ON BASE END)

\*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 on page 4.

†Common used as third leg in 3-phase open delta on neutral in 3-wire single phase series and 4-wire 3-phase wye connections; not used in 2-wire series or 3-wire wye connections.

‡Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

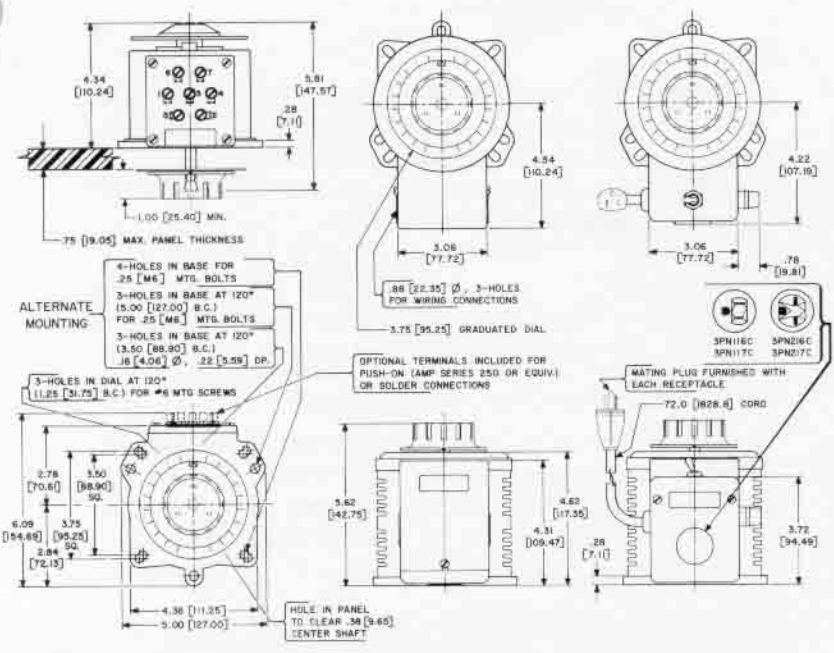
§Jumper provided in standard common position should be moved or removed as required.

¶Three-wire system only. There must be no neutral connection in input or output.

◻ Motor-driven types use connections for CW rotation, knob on radiator end.

» Fuse recommended, not supplied.

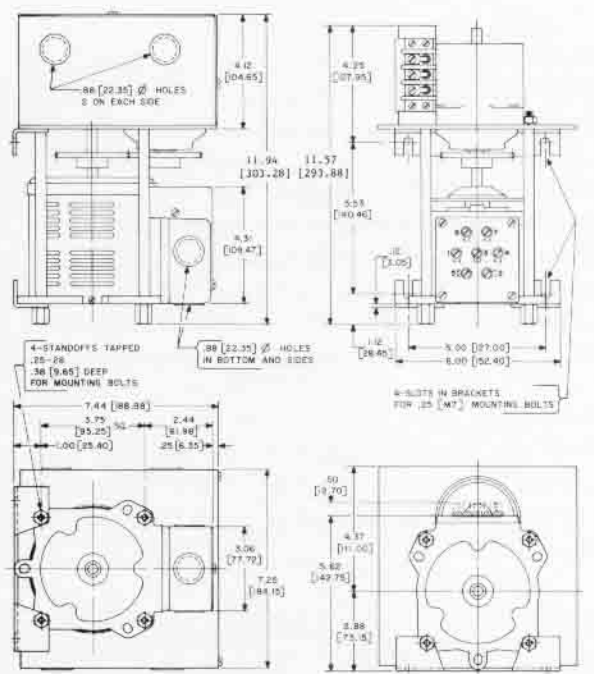
# 116C-216C and 117C-217C series



"U" TYPES

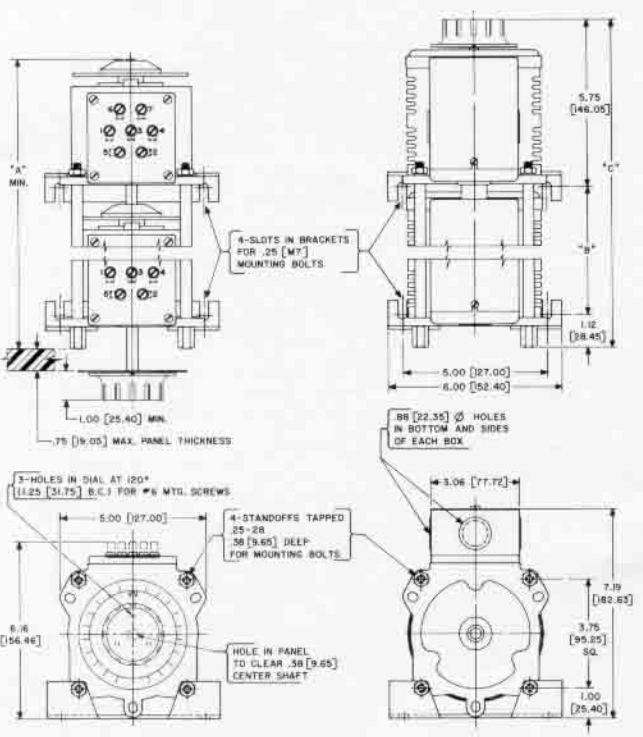
"T" TYPES

PLUG-IN TYPES

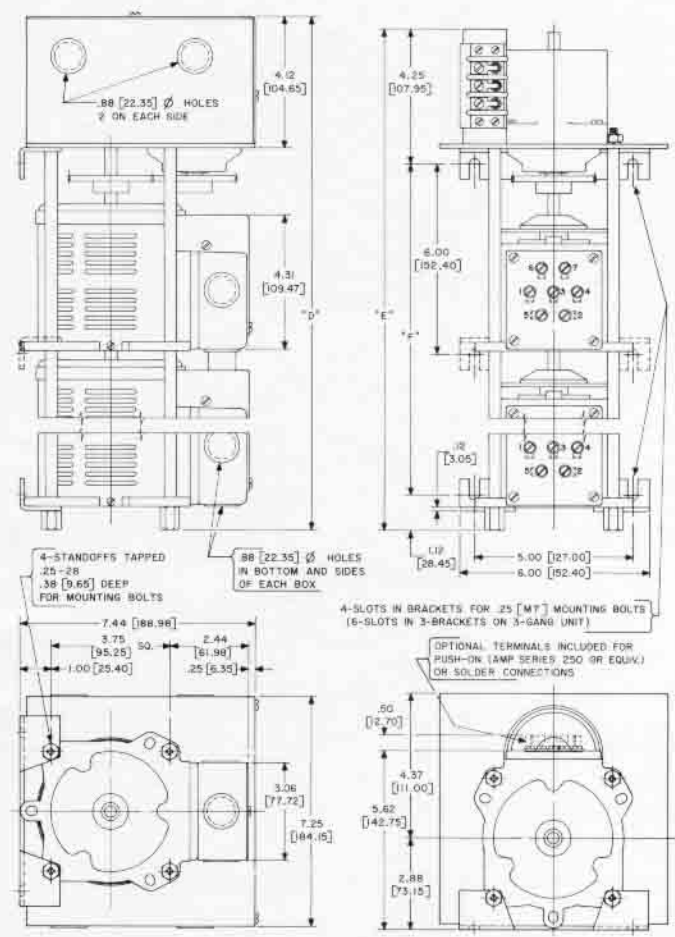


MOTOR DRIVEN

TYPE	"A"	"B"	"C"	"D"	"E"	"F"
2-GANG	10.00 [254.00]	4.44 [112.76]	11.31 [287.27]	16.75 [425.45]	16.47 [418.34]	10.44 [265.16]
3-GANG	14.88 [377.36]	9.34 [237.24]	16.22 [411.96]	21.65 [549.91]	21.38 [543.05]	15.34 [389.64]



MANUAL



MOTOR DRIVEN

# Q116U-Q216U and Q117U-Q217U series



TYPE Q116U

POWERSTAT Variable Transformers of the Q116U-Q216U and Q117U-Q217U Series are available in manually operated assemblies for single and three phase service. The Q116U and Q117U Series operate from 120 volt lines and the Q216U and Q217U Series operate from 240 volt lines. All models have POWERKOTE coils. The rated output for constant current loads is 9 amperes for the Q116U Series; 10 amperes for the Q117U Series; 3.5 amperes for the Q216U Series; and 5 amperes for the Q217U Series. For constant impedance loads, the maximum rated output current at line voltage is increased to 12 amperes for the Q116U Series; 13 amperes for the Q117U Series; 5 amperes for the Q216U Series; and 7 amperes for the Q217U Series. The units are of open construction and have no screening, fuses, line switches, terminal enclosures, input cords or output receptacles. They have removable shafts which can be extended from either end of the assemblies.

As shown in Figure A, Q116U-Q216U Series units can be operated at 50 to 1500 hertz and Q117U-Q217U units between 60 and 1500 hertz without reduction in allowable output current. Except for Q216U and Q217U types operating at the constant current rating, there is a slight reduction between 1500 and 2000 hertz. Figure B shows the regulation curves for units of the Q116U-Q216U and Q117U-Q217U Series operating at full load current. The curves show the voltage drop at any setting when full load is applied. For less than full load, the voltage drop is proportional to the load.

All models can be connected to provide an increasing output voltage with either clockwise or counterclockwise knob rotation. Dials on Types Q117U and Q217U are graduated in volts. All other dials are graduated 0-100. The angle of knob rotation from zero to maximum voltage is 317.5°.

TYPE	Approximate Driving Torque		No-Load Loss at 60 Hertz (Watts)	D-C Resistance per Coil* (Ohms)
	Oz-In	KpCm		
Q116U	20-30	1.4-2.2	6.5	1.1
Q116U-2	60-75	4.3-5.4	13.0	1.1
Q116U-3	100-125	7.2-9	19.5	1.1
Q117U	20-30	1.4-2.2	8.5	0.49
Q117U-2	60-75	4.3-5.4	17.0	0.49
Q117U-3	100-125	7.2-9	25.5	0.49
Q216U	20-30	1.4-2.2	6.5	10.8
Q216U-2	60-75	4.3-5.4	13.0	10.8
Q216U-3	100-125	7.2-9	19.5	10.8
Q217U	20-30	1.4-2.2	8.5	3.9
Q217U-2	60-75	4.3-5.4	17.0	3.9
Q217U-3	100-125	7.2-9	25.5	3.9

\*Measured from start to end of winding.

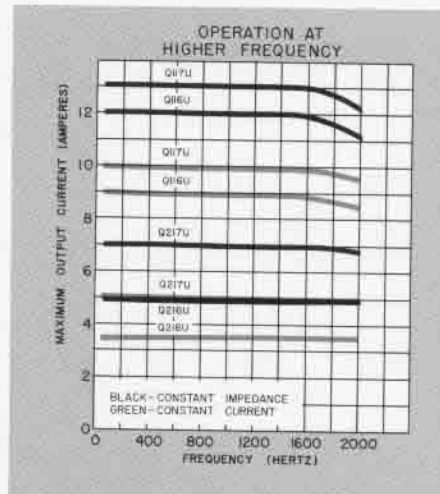


FIGURE A

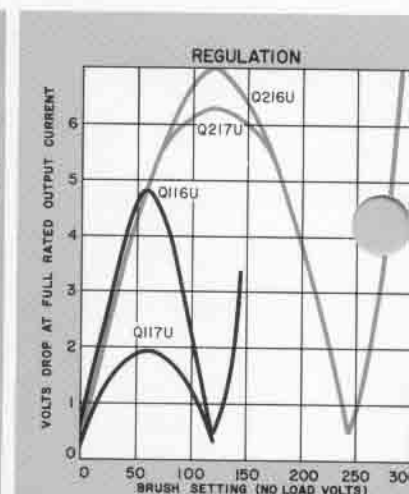
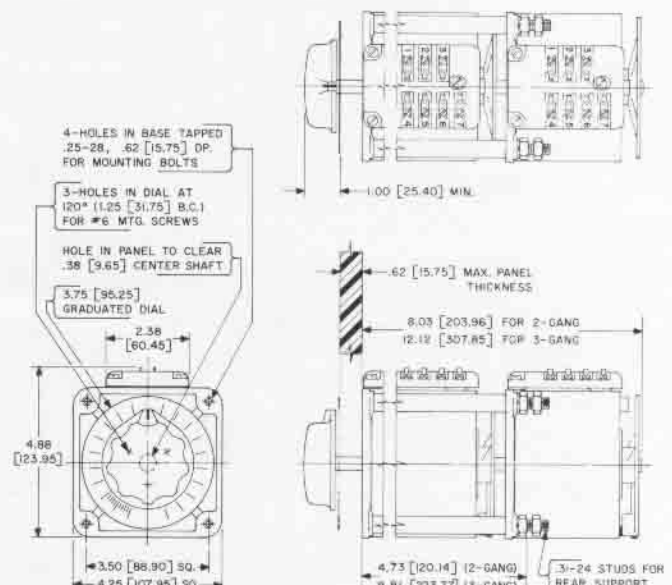
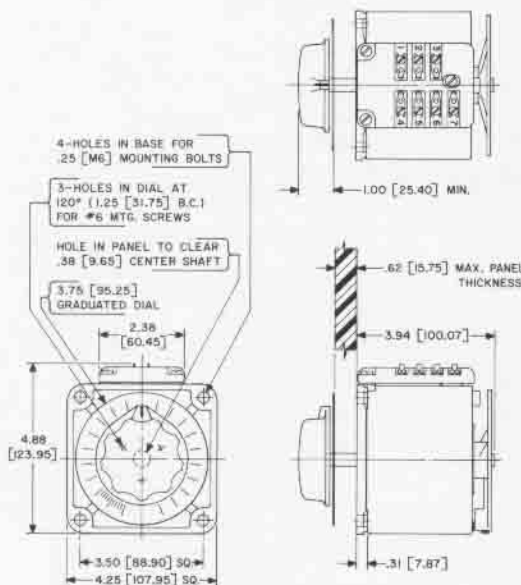
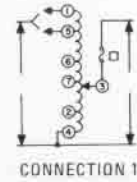


FIGURE B

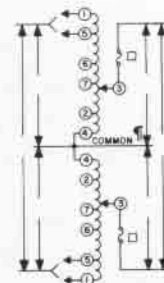


# CONNECTIONS AND RATINGS

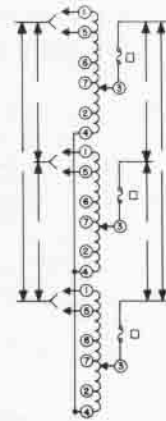
TYPE	CONNECTION	INPUT		OUTPUT				KNOB ROTATION	TERMINALS											
		VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		KNOB ON BASE END			KNOB ON RADIATOR END								
					MAX. AMP.	MAX. KVA	MAX. AMP.		MAX. KVA	INPUT	JUMPER†	OUTPUT	INPUT	JUMPER†	OUTPUT					
<b>SINGLE UNITS</b>																				
Q116U Q116UM	#1 Single Phase	120	50/60	0-120	9	1.1	12	1.4	CW	1-4	—	3-4	1-4	—	1-3					
					—	—	—	—	CCW	1-4	—	1-3	1-4	—	3-4					
				0-140	9	1.3	—	—	CW	4-5	—	3-4	1-2	—	1-3					
					—	—	—	—	CCW	1-2	—	1-3	4-5	—	3-4					
Q117U Q117UM	#1 Single Phase	120	60	0-120	10	1.2	13	1.6	CW	1-4	—	3-4	1-4	—	1-3					
					—	—	—	—	CCW	1-4	—	1-3	1-4	—	3-4					
Q216U Q216UM	#1 Single Phase	240	50/60	0-240	3.5	0.84	5	1.2	CW	1-4	—	3-4	1-4	—	1-3					
					—	—	—	—	CCW	1-4	—	1-3	1-4	—	3-4					
				0-280	3.5	0.98	—	—	CW	4-5	—	3-4	1-2	—	1-3					
					—	—	—	—	CCW	1-2	—	1-3	4-5	—	3-4					
		120	50/60	0-280	3.5*	0.42†	—	—	CW	4-7	—	3-4	1-6	—	1-3					
					—	—	—	—	CCW	1-6	—	1-3	4-7	—	3-4					
Q217U Q217UM	#1 Single Phase	240	60	0-240	5	1.2	7	1.7	CW	1-4	—	3-4	1-4	—	1-3					
					—	—	—	—	CCW	1-4	—	1-3	1-4	—	3-4					
<b>2-GANG ASSEMBLIES</b>																				
Q116U-2 Q116UM-2	#2 1-Phase Series	240	50/60	0-240	9	2.2	12	2.9	CW	1-1	4-4	3-3	4-4	1-1	3-3					
					—	—	—	—	CCW	4-4	1-1	3-3	1-1	4-4	3-3					
				0-280	9	2.5	—	—	CW	5-5	4-4	3-3	2-2	1-1	3-3					
					—	—	—	—	CCW	2-2	1-1	3-3	5-5	4-4	3-3					
	#2 3-Phase Open Delta	120	50/60	0-120	9	1.9	12	2.5	CW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3					
					—	—	—	—	CCW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3					
Q117U-2 Q117UM-2	#2 1-Phase Series	240	60	0-240	10	2.4	13	3.1	CW	1-1	4-4	3-3	4-4	1-1	3-3					
					—	—	—	—	CCW	4-4	1-1	3-3	1-1	4-4	3-3					
#2 3-Phase Open Delta	120	60	0-120	10	2.1	13	2.7	CW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3						
				—	—	—	—	CCW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3						
Q216U-2 Q216UM-2	#2 1-Phase Series	480	50/60	0-480	3.5	1.7	5	2.4	CW	1-1	4-4	3-3	4-4	1-1	3-3					
					—	—	—	—	CCW	4-4	1-1	3-3	1-1	4-4	3-3					
				0-560	3.5	2.0	—	—	CW	5-5	4-4	3-3	2-2	1-1	3-3					
					—	—	—	—	CCW	2-2	1-1	3-3	5-5	4-4	3-3					
	#2 3-Phase Open Delta	240	50/60	0-560	3.5*	0.85†	—	—	CW	7-7	4-4	3-3	6-6	1-1	3-3					
					—	—	—	—	CCW	6-6	1-1	3-3	7-7	4-4	3-3					
				0-240	3.5	1.5	5	2.1	CW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3					
					—	—	—	—	CCW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3					
#2 3-Phase Open Delta	120	50/60	0-280	3.5	1.7	—	—	CW	5-4-5	4-4	3-4-3	2-1-2	1-1	3-1-3						
				—	—	—	—	CCW	2-1-2	1-1	3-1-3	5-4-5	4-4	3-4-3						
			0-280	3.5*	0.74†	—	—	CW	7-4-7	4-4	3-4-3	6-1-6	1-1	3-1-3						
				—	—	—	—	CCW	6-1-6	1-1	3-1-3	7-4-7	4-4	3-4-3						
Q217U-2 Q217UM-2	#2 1-Phase Series	480	60	0-480	5	2.4	7	3.4	CW	1-1	4-4	3-3	4-4	1-1	3-3					
					—	—	—	—	CCW	4-4	1-1	3-3	1-1	4-4	3-3					
	#2 3-Phase Open Delta	240	60	0-240	5	2.1	7	2.9	CW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3					
					—	—	—	—	CCW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3					
<b>3-GANG ASSEMBLIES</b>																				
Q116U-3 Q116UM-3	#3 3-Phase Wye	240	50/60	0-240	9	3.8	12	5.0	CW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3					
					—	—	—	—	CCW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3					
			60	0-280	9	4.4	—	—	CW	5-5-5	4-4-4	3-3-3	2-2-2	1-1-1	3-3-3					
					—	—	—	—	CCW	2-2-2	1-1-1	3-3-3	5-5-5	4-4-4	3-3-3					
Q117U-3 Q117UM-3	#3 3-Phase Wye $\frac{5}{6}$	240	60	0-240	10	4.2	13	5.4	CW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3					
					—	—	—	—	CCW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3					
					Q216U-3 Q216UM-3	#3 3-Phase Wye	480	50/60	0-480	3.5	2.9	5	4.2	CW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3
										—	—	—	—	CCW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3
#3 3-Phase Wye	240	60	0-560	3.5	3.4	—	—	CW	5-5-5	4-4-4	3-3-3	2-2-2	1-1-1	3-3-3						
				—	—	—	—	CCW	2-2-2	1-1-1	3-3-3	5-5-5	4-4-4	3-3-3						
Q217U-3 Q217UM-3	#3 3-Phase Wye $\frac{5}{6}$	480	60	0-560	3.5*	1.5†	—	—	CW	7-7-7	4-4-4	3-3-3	6-6-6	1-1-1	3-3-3					
					—	—	—	—	CCW	6-6-6	1-1-1	3-3-3	7-7-7	4-4-4	3-3-3					
#3 3-Phase Wye $\frac{5}{6}$	480	60	0-480	5	4.2	7	5.8	CW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3						
				—	—	—	—	CCW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3						



CONNECTION 1



CONNECTION 2



CONNECTION 3

Q116U TYPES DO NOT HAVE TERMINALS 6 OR 7  
Q117U-Q217U TYPES DO NOT HAVE TERMINALS 2, 5, 6 OR 7

CONNECTIONS SHOWN ARE FOR CW KNOB ROTATION, KNOB ON BASE END (CCW ROTATION, KNOB ON RADIATOR END)

\*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 on page 4.  
 †Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Fig. B pg 4.  
 ‡Jumper provided in standard common position should be moved or removed as required.  
 §Three-wire system only. There must be no neutral connection in input or output.  
 ¶Common used as third leg in 3-phase open delta or neutral in 3-wire single phase series and 4-wire 3-phase wye connections; not used in 2-wire series or 3-wire wye connections.  
 ¶Fuse recommended, not supplied.

# 126-226 series

POWERSTAT Variable Transformers of the 126-226 Series are offered in single and three phase, manually-operated and motor-driven assemblies. The 126 Series types operate from 120 volt lines and the 226 Series types from 240 volt lines. The rated output for constant current loads is 15 amperes for the 126 Series and 7.5 amperes for the 226 Series. For a constant impedance load the maximum rated output current at line voltage is increased to 20 amperes for the 126 Series and 10 amperes for the 226 Series. All units in the 126-226 Series have POWERKOTE Coils.

POWERSTAT Variable Transformers of the 126-226 Series can be operated at any frequency between 50 and 2000 hertz. Figure A shows the allowable output current for operation at higher than rated frequency. Figure B shows the regulation curves for POWERSTAT Variable Transformers of the 126-226 Series operating at full load current. The curves show the voltage drop at any brush setting when full load is applied. For less than full load the voltage drop is proportional to the load. Driving torque, d-c resistance per coil and maximum core and brush loss when operating under no load are given in the chart ratings. The removable, solid-metal shaft can be adjusted for either general utility or back-of-panel mounting. All types have standard dials graduated 0-100. Terminal connections permit increasing output voltage with either clockwise or counterclockwise rotation of the knob. Rotation angle from zero to maximum output voltage is 320°.

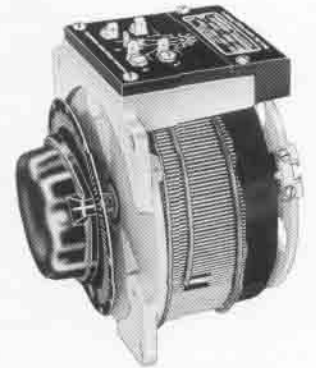
Plug-in units have the same ratings as types 126 and 226 but offer the convenience of input cord-plugs, fuses and output receptacles housed in cast aluminum terminal enclosures. They can be converted to limit the output voltage to line voltage. Plugs and receptacles are shown in the outline for cord and plug types on page 17. Fused models of the 126 Series have 15 ampere fuses and those of the 226 Series have 8 ampere fuses.

Open construction types have a letter (U) suffix in the type number and the same electrical ratings and coil to terminal wiring as their corresponding enclosed construction types. These POWERSTAT Variable Transformers have no protective screening and the shaft extends from the base end of the assembly for back-of-panel mounting. The shaft is removable permitting its extension from the radiator end of the assembly if desired without disturbing the brush or radiator.

POWERSTAT Variable Transformers of the 126-226 Series are available in two- and three-gang assemblies in either enclosed or open construction. Most are provided with jumpers in the standard common position that may be moved or removed as required.



TYPE 226



U TYPES



MOTOR-DRIVEN  
SCREENED TYPES

All except plug-in models in the 126-226 Series are available with motor drives in standard speeds of 5, 15, 30 or 60 seconds for full range travel. Motor-driven POWERSTAT Variable Transformers have an MC prefix in the type number and the identical electrical ratings of their corresponding manually-operated types. The motor is rated for an input of 120 volts, 50/60 hertz single phase with a current requirement of approximately 0.3 ampere. Standoffs are provided for bench mounting and slotted brackets for against-the-wall mounting. When ordering, motor-driven models should be prefixed with the desired speed in seconds. For example: 5MC126.

TYPE†	Approximate Driving Torque Oz-In	KpCm	No-Load Loss at 60 Hertz (Watts)	D-C Resistance per Coil* (Ohms)
126	25-35	1.8-2.5	9	0.45
126-2	65-90	4.7-6.5	18	0.45
126-3	100-135	7.2-9.7	27	0.45
226	25-35	1.8-2.5	9	2.8
226-2	65-90	4.7-6.5	18	2.8
226-3	100-135	7.2-9.7	27	2.8

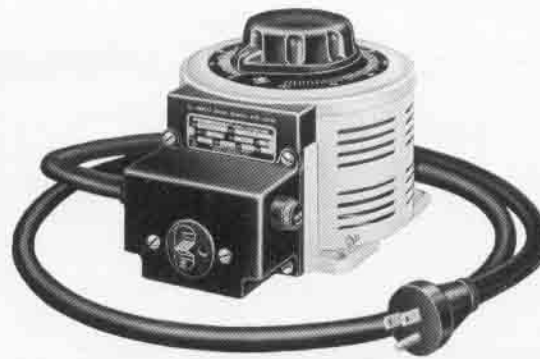
\*Measured from start to end of winding.

†Data also applies to units having applicable prefixes and suffixes.





F TYPES



CORD-PLUG TYPES



MOTOR-DRIVEN U TYPES

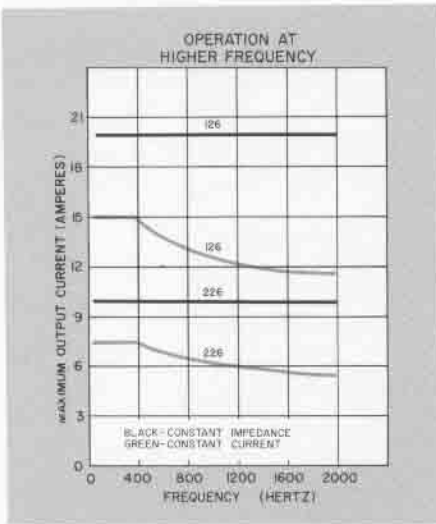


FIGURE A

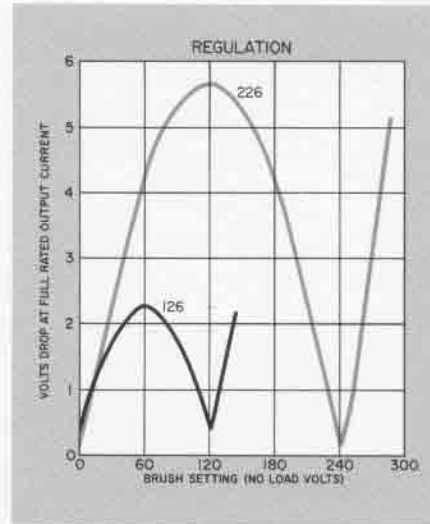
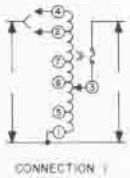


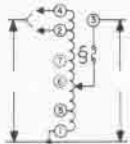
FIGURE B

## CONNECTIONS AND RATINGS

TYPE	CONNECTION	INPUT		OUTPUT				KNOB ROTATION	TERMINALS				
		VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		KNOB ON RADIATOR END		KNOB ON BASE END		
					MAX. AMP.	MAX. KVA	MAX. AMP.		MAX. KVA	INPUT	OUTPUT	INPUT	OUTPUT
126 MC 126T 126T MC 126T† 126U MC 126U‡	#1	120	50/60	0-120	15	1.8	20	2.4	CW	1-4	1-3	1-4	3-4
				0-140	15	2.1	—	—	CCW	1-4	3-4	1-4	1-3
									CW	1-2	1-3	4-5	3-4
									CCW	4-5	3-4	1-2	1-3
									CW	1-4	1-3	1-4	3-4
									CCW	1-4	3-4	1-4	1-3
									CW	1-2†	1-3	4-5	3-4
									CCW	4-5	3-4	1-2	1-3
									CW	1-4	1-3	1-4	3-4
									CCW	1-4	3-4	1-4	1-3
									CW	1-2	1-3	4-5	3-4
									CCW	4-5	3-4	1-2	1-3
		120	50/60	0-280	7.5*	0.91†	—	—	CW	1-6	1-3	4-7	3-4
									CCW	4-7	3-4	1-6	1-3
									CW	1-4	1-3	1-4	3-4
									CCW	1-4	3-4	1-4	1-3
									CW	1-2†	1-3	4-5	3-4
									CCW	4-5	3-4	1-2	1-3
									CW	1-6	1-3	4-7	3-4
									CCW	4-7	3-4	1-6	1-3



CONNECTION 1



CONNECTION 2

126 TYPES  
DO NOT HAVE  
TERMINALS  
6 OR 7

CONNECTIONS  
SHOWN ARE FOR  
CW KNOB  
ROTATION,  
KNOB ON  
RADIATOR END  
(CCW ROTATION,  
KNOB ON BASE END)

\*Maximum output current in output voltage range up to 150 volts. At higher output voltages output current must be reduced according to rating curve Figure B on page 4.

†Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

‡Motor-driven types use connections for CW rotation, knob on radiator end.

§Fuse supplied: 15 ampere on 126 types, 8 ampere on 226 types.

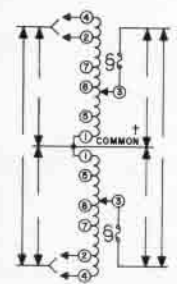
¶Cord-and-plug units wired this way when shipped.

□Not available on types F226 or MCF226.

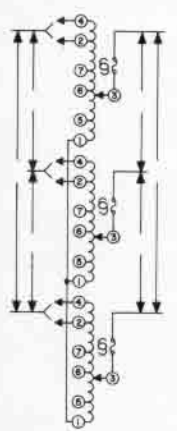
»Fuse recommended, not supplied.

# CONNECTIONS AND RATINGS

TYPE	CONNECTION	INPUT		OUTPUT				KNOB ROTATION	TERMINALS						
		VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		KNOB ON RADIATOR END			KNOB ON BASE END			
					MAX. AMP.	MAX. KVA	MAX. AMP.		MAX. KVA	INPUT	JUMPER†	OUTPUT	INPUT	JUMPER‡	OUTPUT
126U-2 MC126U-2□	#1 1-PHASE SERIES	240	50/60	0-240	15	3.6	20	4.8	CW	4-4	1-1	3-3	1-1	4-4	3-3
				CCW	1-1	4-4	3-3	4-4	1-1	3-3					
		0-280	15	4.2	—	—	CW	2-2	1-1	3-3	5-5	4-4	3-3		
		CCW	5-5	4-4	3-3	2-2	1-1	3-3							
	#1 3-PHASE OPEN DELTA	120	50/60	0-120	15	3.1	20	4.2	CW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3
				CCW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3					
		0-140	15	3.6	—	—	CW	2-1-2	1-1	3-1-3	5-4-5	4-4	3-4-3		
		CCW	5-4-5	4-4	3-4-3	2-1-2	1-1	3-1-3							
226U-2 MC226U-2□	#1 1-PHASE SERIES	480	50/60	0-480	7.5	3.6	10	4.8	CW	4-4	1-1	3-3	1-1	4-4	3-3
				CCW	1-1	4-4	3-3	4-4	1-1	3-3					
		0-560	7.5	4.2	—	—	CW	2-2	1-1	3-3	5-5	4-4	3-3		
		CCW	5-5	4-4	3-3	2-2	1-1	3-3							
		240	50/60	0-560	7.5*	1.8‡	—	—	CW	6-6	1-1	3-3	7-7	4-4	3-3
		CCW	7-7	4-4	3-3	6-6	1-1	3-3							
	#1 3-PHASE OPEN DELTA	240	50/60	0-240	7.5	3.1	10	4.2	CW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3
				CCW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3					
		0-280	7.5	3.6	—	—	CW	2-1-2	1-1	3-1-3	5-4-5	4-4	3-4-3		
		CCW	5-4-5	4-4	3-4-3	2-1-2	1-1	3-1-3							
		120	50/60	0-280	7.5*	1.6‡	—	—	CW	6-1-6	1-1	3-1-3	7-4-7	4-4	3-4-3
		CCW	7-4-7	4-4	3-4-3	6-1-6	1-1	3-1-3							
126U-3 MC126U-3□	#2 3-PHASE WYE	240	50/60	0-240	15	6.2	20	8.3	CW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3
			CCW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3						
	60	0-280	15	7.3	—	—	CW	2-2-2	1-1-1	3-3-3	5-5-5	4-4-4	3-3-3		
	CCW	5-5-5	4-4-4	3-3-3	2-2-2	1-1-1	3-3-3								
226U-3 MC226U-3□	#2 3-PHASE WYE	480	50/60	0-480	7.5	6.2	10	8.3	CW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3
			CCW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3						
	60	0-560	7.5	7.3	—	—	CW	2-2-2	1-1-1	3-3-3	5-5-5	4-4-4	3-3-3		
	CCW	5-5-5	4-4-4	3-3-3	2-2-2	1-1-1	3-3-3								
	240	60	0-560	7.5*	3.2‡	—	—	CW	6-6-6	1-1-1	3-3-3	7-7-7	4-4-4	3-3-3	
	CCW	7-7-7	4-4-4	3-3-3	6-6-6	1-1-1	3-3-3								



CONNECTION 1



CONNECTION 2

126 TYPES DO NOT HAVE TERMINALS 6 OR 7

CONNECTIONS SHOWN ARE FOR CW KNOB ROTATION, KNOB ON RADIATOR END (CCW ROTATION, KNOB ON BASE END)

\*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 on page 4

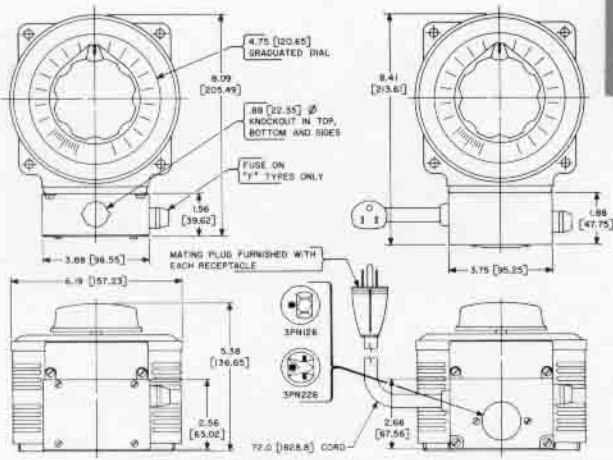
†Common used as third leg in 3-phase open delta or neutral in 3-wire single phase series and 4-wire 3-phase wye connections; not used in 2-wire series or 3-wire wye connections.

‡Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

§Fuses recommended on all units. 15 ampere fuses supplied internally on F126 types, 8 ampere on F226 types.

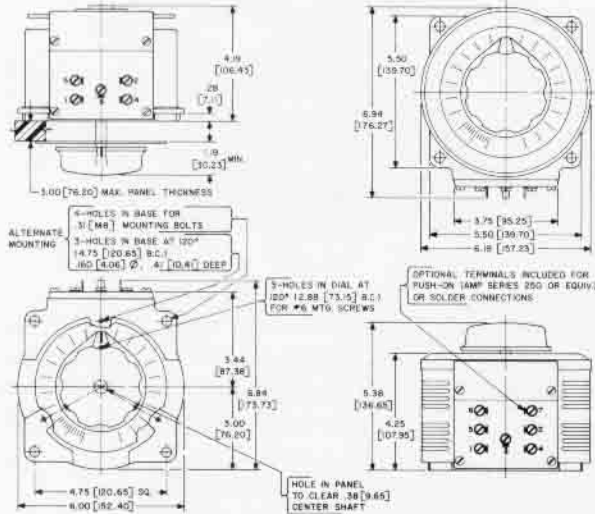
¶Jumper provided in standard common position should be moved or removed as required.

□Motor-driven types use connections for CW rotation, knob on radiator end.



"F" AND "T" TYPES

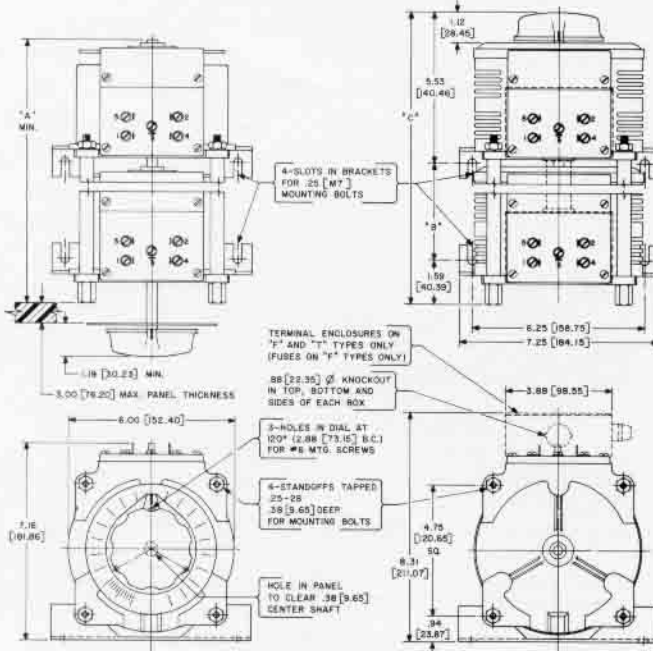
CORD AND PLUG TYPES



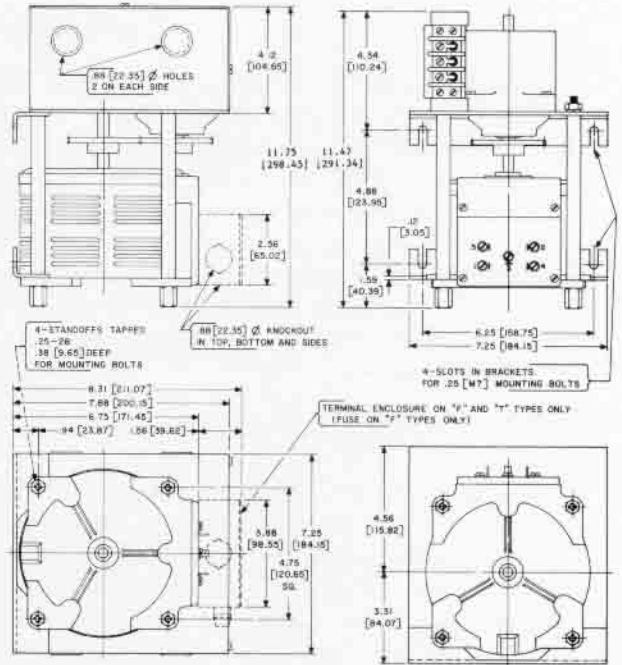
PANEL MOUNTED

BENCH OR WALL MOUNTED

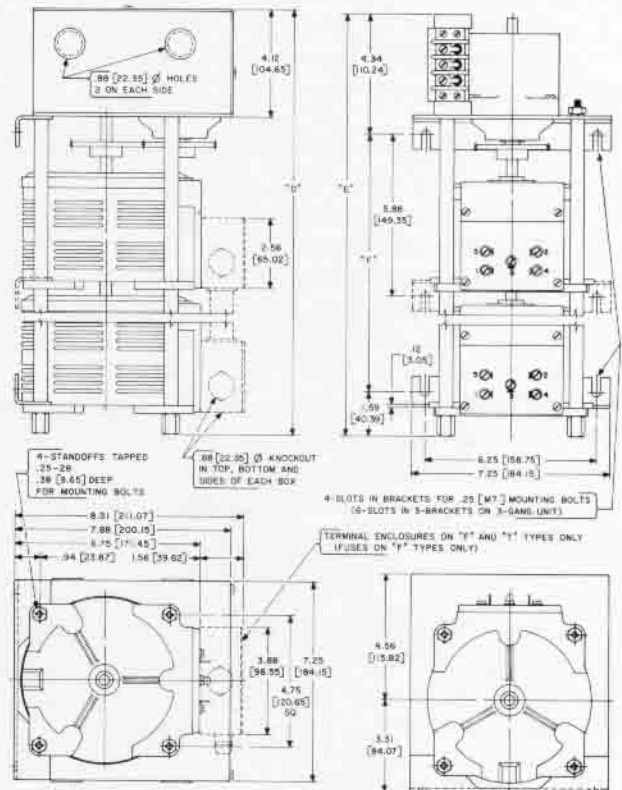
TYPE	"A"	"B"	"C"	"D"	"E"	"F"
2-GANG	3.44 [239.76]	3.50 [88.90]	10.82 [289.75]	16.25 [412.75]	15.97 [405.64]	9.38 [238.25]
3-GANG	3.84 [304.07]	6.00 [203.20]	15.12 [384.05]	20.75 [527.05]	20.47 [519.94]	13.88 [352.55]



MANUAL



MOTOR DRIVEN



MOTOR DRIVEN

# 136B-236B series

POWERSTAT Variable Transformers of the 136B-236B Series are available in single and three phase, manually operated and motor-driven assemblies. The 136B Series operates from 120 volt lines and the 236B Series from 240 volt lines. The rated output for constant current loads is 22 amperes for the 136B Series and 10 amperes for the 236B Series. For a constant impedance load the maximum rated output current at line voltage is 28 amperes for the 136B Series and 13 amperes for the 236B Series. POWERKOTE coils are featured on all units of the 136B-236B Series.

POWERSTAT Variable Transformers of the 136B-236B Series can be operated at any frequency between 50 and 2000 hertz. Figure A shows the reduction in allowable output current for operation higher than rated frequency. Figure B shows the regulation curves for types of the 136B-236B Series operating at full load current. Voltage drop is shown for any brush setting when full load is applied. For less than full load the voltage drop is proportional to the load. Driving torque, d-c resistance per coil and maximum core and brush loss when operating under no load are given in the chart. The shaft can be adjusted for general utility or back-of-panel mounting. Manually operated units have standard dials graduated 0-100. Terminal connections permit increasing output voltage with either clockwise or counter-clockwise rotation of the knob. The angle of rotation from zero to maximum output voltage is 316°.

Plug-in units have the same ratings as types 136B and 236B but offer the convenience of input cord-plugs, fuses and output receptacles housed in cast aluminum terminal enclosures. They can be converted to limit the output voltage to line voltage. Plugs and receptacles are shown in the outline for cord and plug types on page 21. Fused units of the 136B Series have 25 ampere fuses and those of the 236B Series have 10 ampere fuses.

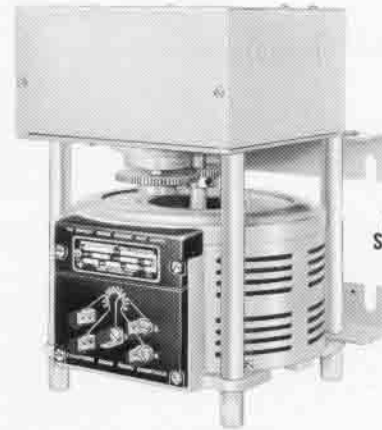
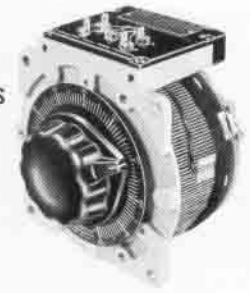
Open construction units have the letter U suffix in the type number and the same electrical ratings and coil to terminal wiring as their corresponding enclosed construction models. They have no protective screening. Knobs can be placed at the base end for back-of-panel mounting because the shaft is removable.

POWERSTAT Variable Transformers of the 136B-236B Series are available in two- and three-gang assemblies in either enclosed or open construction. Most ganged units are provided with jumpers in the standard common position that may be moved or removed as desired.



TYPE 136B

U TYPES



MOTOR-DRIVEN  
SCREENED TYPES

Two- and three-gang assemblies of the 136B-236B Series connected for parallel operation to increase their current carrying capacity require chokes to insure equal division of load. Order choke type T5000B for two-gang assemblies and type T5579B for three-gang assemblies.

All except plug-in units in the 136B-236B Series are available with motor drives in standard speeds of 5, 15, 30 or 60 seconds for full range travel. Motor-driven models have an MD prefix in the type number and the identical electrical ratings of their corresponding manually-operated types. The motor is rated for an input of 120 volts, 50/60 hertz single phase with a current requirement of approximately 0.3 ampere. Stand-offs are provided for bench mounting and slotted brackets for against-the-wall mounting. When ordering, motor-driven units should be prefixed with the desired speed in seconds. For example: 5MD136B.

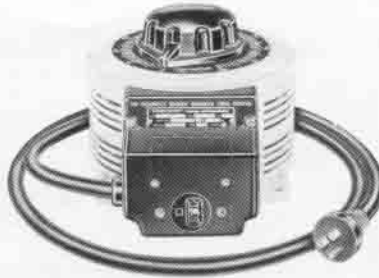
TYPE†	Approximate Driving Torque Oz-In	KpCm	No-Load Loss at 60 Hertz (Watts)	D-C Resistance per Coil* - (Ohms)
136B	30-50	2.2-3.6	15	0.27
136B-2	70-90	5-6.5	30	0.27
136B-3	110-140	7.9-10.1	45	0.27
236B	30-50	2.2-3.6	15	1.7
236B-2	70-90	5-6.5	30	1.7
236B-3	110-140	7.9-10.1	45	1.7

\*Measured from start to end of winding.

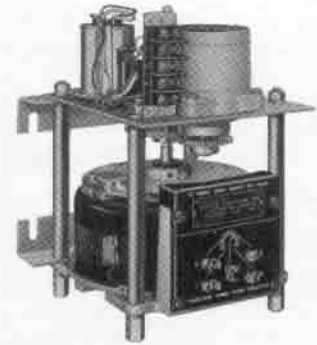
†Data also applies to units having applicable prefixes and suffixes.



T TYPES



CORD-PLUG TYPES



MOTOR-DRIVEN U TYPES

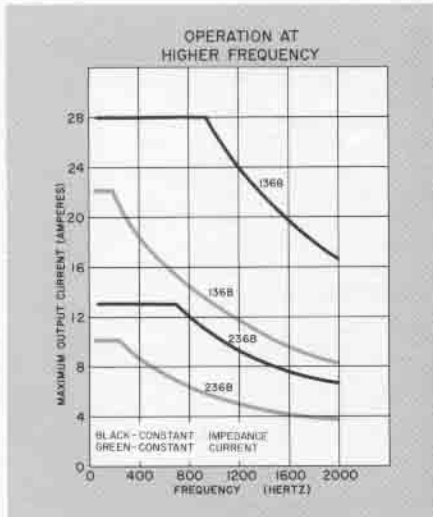


FIGURE A

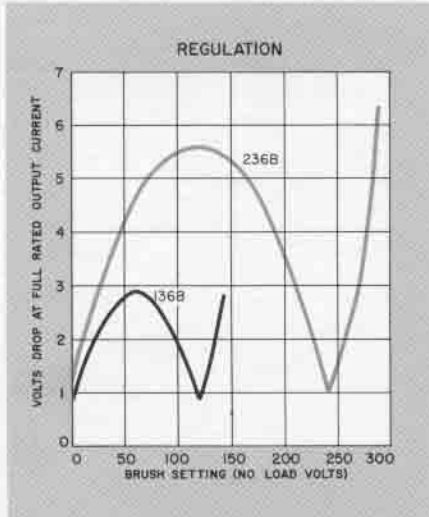


FIGURE B

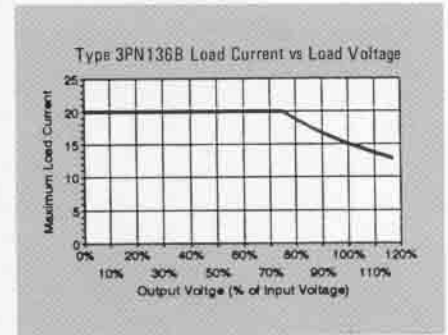
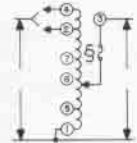
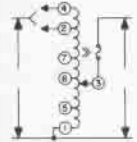


FIGURE C

TYPE	CONNECTION	INPUT		OUTPUT				KNOB ROTATION	TERMINALS				
		VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		KNOB ON RADIATOR END		KNOB ON BASE END		
					MAX. AMP	MAX. KVA	MAX. AMP		MAX. KVA	INPUT	OUTPUT	INPUT	OUTPUT
136B MD136B† 136BT MD136BT‡ 136BU MD136BU‡	#1	120	50/60	0-120	22	2.6	28	3.4	CW	1-4	1-3	1-4	3-4
				0-140	22	3.1	—	—	CCW	1-4	3-4	1-4	1-3
				0-120	22	2.6	28	3.4	CW	1-2	1-3	4-5	3-4
				0-140	22	3.1	—	—	CCW	4-5	3-4	1-2	1-3
F136B MDF136B‡	#2	120	50/60	0-120	22	2.6	28	3.4	CW	1-4	1-3	1-4	3-4
				0-140	22	3.1	—	—	CCW	1-4	3-4	1-4	1-3
				0-120	22	2.6	28	3.4	CW	1-2†	1-3	4-5	3-4
				0-140	22	3.1	—	—	CCW	4-5	3-4	1-2	1-3
3PN136B**	#2	120	50/60	0-120	20	1.8	—	—	CW	1-4	1-3	1-4	3-4
				0-140	20	1.8	—	—	CCW	1-4	3-4	1-4	1-3
				0-120	20	1.8	—	—	CW	1-2†	1-3	4-5	3-4
				0-140	20	1.8	—	—	CCW	4-5	3-4	1-2	1-3
236B MD236B† 236BT MD236BT‡ 236BU MD236BU‡	#1	240	50/60	0-240	10	2.4	13	3.1	CW	1-4	1-3	1-4	3-4
				0-280	10	2.8	—	—	CCW	1-4	3-4	1-4	1-3
		120	50/60	0-280	10*	1.2†	—	—	CW	1-6	1-3	4-7	3-4
				0-280	10*	1.2†	—	—	CCW	4-7	3-4	1-6	1-3
	#2	240	50/60	0-240	10	2.4	13	3.1	CW	1-4	1-3	1-4	3-4
				0-280	10	2.8	—	—	CCW	1-4	3-4	1-4	1-3
		120□	50/60	0-280	10*	1.2	—	—	CW	1-2‡	1-3	4-5	3-4
				0-280	10*	1.2	—	—	CCW	4-5	3-4	1-2	1-3



\*Maximum output current in output voltage range up to 150 volts. At higher output voltages, output current must be reduced according to rating curve Figure B on page 4.

†Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

‡Motor-driven types use connections for CW rotation, knob on radiator end.

§Fuse supplied: 25 ampere on 136B types, 10 ampere on 236B types.

¶Cord-and-plug units wired this way when shipped.

□Not available on types F236B or MDF236B.

»Fuse recommended, not supplied.

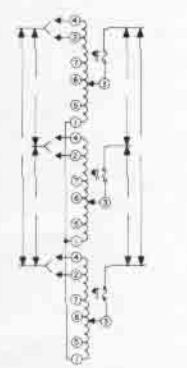
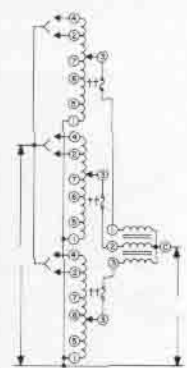
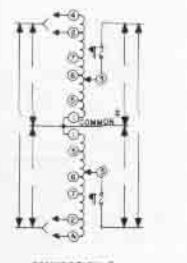
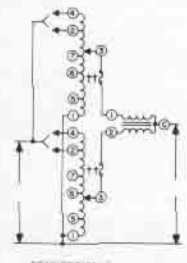
\*\*See Figure C.

136B TYPES  
DO NOT HAVE  
TERMINALS  
6 OR 7

CONNECTIONS  
SHOWN ARE FOR  
CW KNOB  
ROTATION,  
KNOB ON  
RADIATOR END  
(CCW ROTATION,  
KNOB ON BASE END)

# CONNECTIONS AND RATINGS

TYPE	CONNECTION	INPUT		OUTPUT				ROTA-TION	TERMINALS							
		VOLTS	HERTZ	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD			KNOB ON RADIATOR END			KNOB ON BASE END				
				MAX. AMP.	MAX. KVA	MAX. AMP.	MAX. KVA		INPUT	JUMPER □	OUTPUT	INPUT	JUMPER □	OUTPUT		
136BU-2 MD136BU-2+	#1 1-PHASE PARALLEL§	120	50/60	0-120	44	5.3	56	6.7	CW	1-4	1-1, 4-4§	1-C	1-4	1-1, 4-4§	4-C	
				0-140	44	6.2	—	—	CCW	1-4	1-1, 4-4§	4-C	1-4	1-1, 4-4§	1-C	
				0-140	44	6.2	—	—	CCW	1-2	1-1, 2-2§	1-C	4-5	4-4, 5-5§	4-C	
	#2 1-PHASE SERIES	240	50/60	0-240	22	5.3	28	6.7	CW	4-4	1-1	3-3	1-1	4-4	3-3	
				0-280	22	6.2	—	—	CCW	1-1	4-4	3-3	4-4	1-1	3-3	
				0-280	22	6.2	—	—	CCW	5-5	4-4	3-3	2-2	1-1	3-3	
	#2 3-PHASE OPEN DELTA	120	50/50	0-120	22	4.6	28	5.8	CW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3	
				0-140	22	5.3	—	—	CCW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3	
				0-140	22	5.3	—	—	CCW	2-1-2	1-1	3-1-3	5-4-5	4-4	3-4-3	
	236BU-2 MD236BU-2+	#1 1-PHASE PARALLEL§	240	50/60	0-240	20	4.8	26	6.2	CW	1-4	1-1, 4-4§	1-C	1-4	1-1, 4-4§	4-C
					0-280	20	5.6	—	—	CCW	1-4	1-1, 4-4§	4-C	1-4	1-1, 4-4§	1-C
					0-280	20	5.6	—	—	CCW	1-2	1-1, 2-2§	1-C	4-5	4-4, 5-5§	4-C
#2 1-PHASE SERIES		480	50/60	0-480	10	4.8	13	6.2	CW	4-4	1-1	3-3	1-1	4-4	3-3	
				0-560	10	5.6	—	—	CCW	1-1	4-4	3-3	4-4	1-1	3-3	
				0-560	10	5.6	—	—	CCW	2-2	1-1	3-3	5-5	4-4	3-3	
#2 3-PHASE OPEN DELTA		240	50/60	0-240	10	4.2	13	5.4	CW	4-4	1-1	3-3	1-1	4-4	3-3	
				0-280	10	4.8	—	—	CCW	1-1	4-4	3-3	4-4	1-1	3-3	
				0-280	10	4.8	—	—	CCW	5-5	4-4	3-3	2-2	1-1	3-3	
136BU-3 MD136BU-3+		#3 1-PHASE PARALLEL*	120	50/60	0-120	66	7.9	84	10.1	CW	1-4	1-1-1, 4-4-4*	1-C	1-4	1-1-1, 4-4-4*	4-C
					0-140	66	9.2	—	—	CCW	1-4	1-1-1, 4-4-4*	4-C	1-4	1-1-1, 4-4-4*	1-C
					0-140	66	9.2	—	—	CCW	1-2	1-1-1, 2-2-2*	1-C	4-5	4-4-4, 5-5-5*	4-C
	#4 3-PHASE WYE	240	50/60	0-240	22	9.1	28	11.6	CW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3	
				0-280	22	10.7	—	—	CCW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3	
				0-280	22	10.7	—	—	CCW	2-2-2	1-1-1	3-3-3	5-5-5	4-4-4	3-3-3	
	236BU-3 MD236BU-3+	#3 1-PHASE PARALLEL*	240	50/60	0-240	30	7.2	39	9.4	CW	1-4	1-1-1, 4-4-4*	1-C	1-4	1-1-1, 4-4-4*	4-C
					0-280	30	8.4	—	—	CCW	1-4	1-1-1, 4-4-4*	4-C	1-4	1-1-1, 4-4-4*	1-C
					0-280	30	8.4	—	—	CCW	1-2	1-1-1, 2-2-2*	1-C	4-5	4-4-4, 5-5-5*	4-C
		#4 3-PHASE WYE	480	50/60	0-480	10	8.3	13	10.8	CW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3
					0-560	10	9.7	—	—	CCW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3
					0-560	10	9.7	—	—	CCW	2-2-2	1-1-1	3-3-3	5-5-5	4-4-4	3-3-3



\*Jumpers also required connecting #3 on first unit to #1 on choke, #3 on second unit to #2 on choke and #3 on third unit to #3 on choke. T5579B choke required.

\*\*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 on page 4.

†Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

‡Units must be fused. 25 ampere fuses supplied internally on F136B types, 10 ampere on F236B types. On other types, fuses must be wired as shown.

§Common used as third leg in 3-phase open delta or neutral in 3-wire single phase series and 4-wire 3-phase wye connections; not used in 2-wire series or 3-wire wye connections.

§Jumpers also required connecting #3 on first unit to #1 on choke and connecting #3 on second unit to #2 on choke. T5000B choke required.

†Fuses recommended on all units. 25 ampere fuses supplied internally on F136B types, 10 ampere on F236B types.

□Jumper provided in standard common position should be moved or removed as required.

+Motor-driven types use connections for CW rotation, knob on radiator end.

**136B TYPES  
DO NOT HAVE  
TERMINALS  
6 OR 7**

**CONNECTIONS  
SHOWN ARE FOR  
CW KNOB  
ROTATION,  
KNOB ON BASE END  
(CCW ROTATION,  
KNOB ON  
RADIATOR END)**



POWERSTAT Variable Transformers of the 146-246 Series are available in single and three phase, manually operated and motor-driven assemblies. 146 Series units operate from 120 volt lines and 246 Series units from 240 volt lines. The rated output for constant current loads is 30 amperes for the 146 Series and 15 amperes for the 246 Series. For constant impedance loads, the maximum rated output current at line voltage is increased to 35 amperes for 146 types and 19 amperes for 246 types. Both Series incorporate POWERKOTE coils for longer life and increased resistance to damage.

POWERSTAT Variable Transformers of the 146-246 Series can be operated at any frequency between 50 and 550 hertz. Figure A shows the reduction in allowable output current when operated at higher than rated frequency. Figure B shows the regulation curves for types of the 146-246 Series operating at full load current. The curves show the voltage drop at any brush setting when full load is applied. For less than full load, the voltage drop is proportional to the load. Driving torque, d-c resistance per coil and maximum core and brush loss when operating under no load are given in the chart ratings. All models can be connected to deliver an increasing output voltage with either clockwise or counterclockwise knob rotation and have standard dials graduated 0-100. The angle of rotation from zero to maximum output voltage is 316°.

All are available with the terminal board enclosed in a metal terminal box. Knockouts in the terminal enclosure permit wiring with cable or conduit. Terminal enclosed models have the letter T in the type number following the series designation. For example: 5M246T. Fused units, prefixed with the letter F, in the 146 Series have 30 ampere fuses and those in the 246 Series have 15 ampere fuses.

Open construction units have the letter U suffix in the type number and the same electrical ratings and coil-to-terminal wiring as their corresponding enclosed construction models. They have no protective screening and the shaft extends from the radiator or brush end of the assembly. Knobs can be placed at the base end for back-of-panel mounting because the shaft is removable.

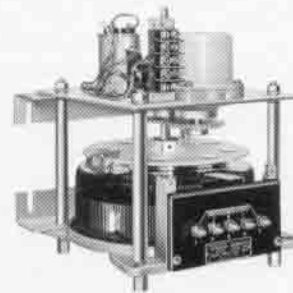
POWERSTAT Variable Transformers of the 146-246 Series are available in two- and three-gang assemblies in either enclosed or open construction. Most are provided with jumpers in the standard common position that may be moved or removed as desired.



TYPE 146



U TYPES



MOTOR-DRIVEN U TYPES

Two- and three-gang units connected for parallel operation to increase their current-carrying capacity require chokes to insure equal division of load. Order choke T6053 for type 146-2, choke T5000B for type 246-2, choke T6065 for type 146-3 or choke T5579B for type 246-3.

All types in the 146-246 Series are available with motor drives in standard speeds of 5, 15, 30 or 60 seconds for full range travel. Motor-driven units have an M prefix in the type number and the identical electrical ratings of their corresponding manually operated models. The motor is rated for an input of 120 volts, 50/60 hertz single phase with a current requirement of 0.3 ampere. Stand-offs are provided for bench mounting and slotted brackets for against-the-wall mounting. When ordering, motor-driven types should be prefixed with the desired speed in seconds. For example: 5M146.

TYPE†	Approximate Driving Torque		Typical No-Load Loss at 60 Hertz (Watts)	D-C Resistance per Coil* (Ohms)
	Oz-In	KpCm		
146	40-60	2.9-4.3	25	0.2
146-2	80-120	5.8-8.6	50	0.2
146-3	120-180	8.6-13	75	0.2
246	40-60	2.9-4.3	25	0.9
246-2	80-120	5.8-8.6	50	0.9
246-3	120-180	8.6-13	75	0.9

\*Measured from start to end of winding.

†Data also applies to types having applicable prefixes and suffixes.





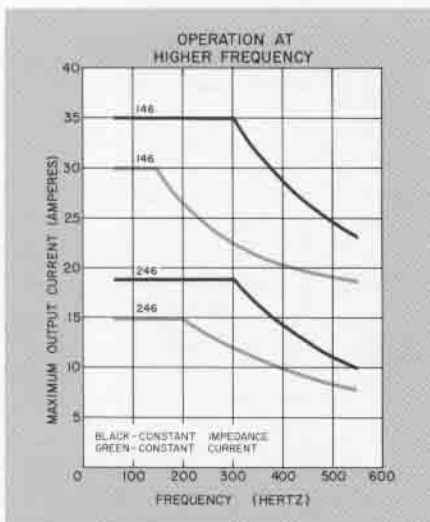
**GANGED U TYPES**



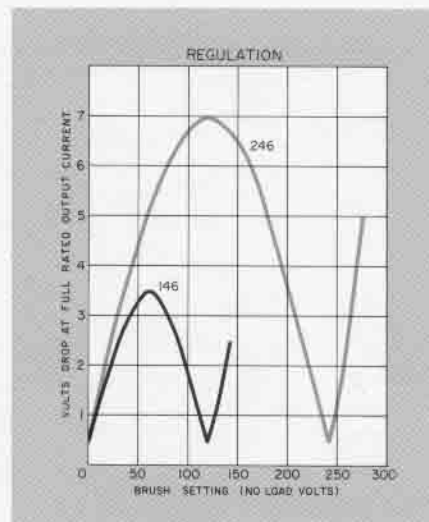
**T TYPES**



**MOTOR-DRIVEN SCREENED TYPES**



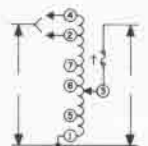
**FIGURE A**



**FIGURE B**

## CONNECTIONS AND RATINGS

TYPE	INPUT		OUTPUT				KNOB ROTATION	TERMINALS				
	VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		KNOB ON RADIATOR END		KNOB ON BASE END		
				MAX AMP	MAX KVA	MAX AMP		MAX KVA	INPUT	OUTPUT	INPUT	OUTPUT
146 M146; F146 MF146; 146T M146T; 146U M146U;	120	50/60	0-120	30	3.6	35	4.2	CW	1-4	1-3	1-4	3-4
0-140			30	4.2	—	—	CCW	1-4	3-4	1-4	1-3	
0-140			30	4.2	—	—	CW	1-2	1-3	4-5	3-4	
0-140			30	4.2	—	—	CCW	4-5	3-4	1-2	1-3	
246 M246; F246 MF246; 246T M246T; 246U M246U;	240	50/60	0-240	15	3.6	19	4.6	CW	1-4	1-3	1-4	3-4
0-240			15	3.6	19	4.6	CCW	1-4	3-4	1-4	1-3	
0-280			15	4.2	—	—	CW	1-2	1-3	4-5	3-4	
0-280			15	4.2	—	—	CCW	4-5	3-4	3-2	1-3	
	120	50/60	0-280	15*	1.8†	—	—	CW	1-6	1-3	4-2	3-4
CCW								4-7	3-4	1-6	1-3	



**146 TYPES DO NOT HAVE TERMINALS 6 OR 7**

**CONNECTIONS SHOWN ARE FOR CW KNOB ROTATION, KNOB ON RADIATOR END (CCW ROTATION, KNOB ON BASE END)**

\*Maximum output current in output voltage range up to 150 volts. At higher output voltages output current must be reduced according to rating curve Figure B on page 4.

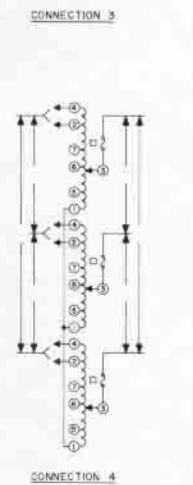
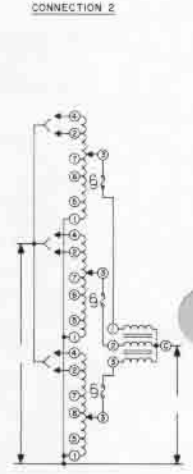
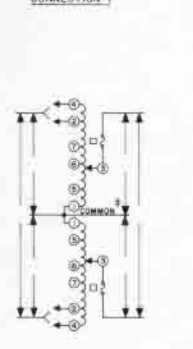
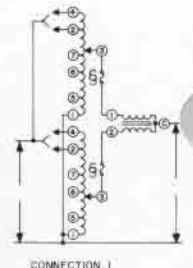
†Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

‡Fuses recommended on all units. 30 ampere fuses supplied internally on F146 types, 15 ampere on F246 types.

§Motor-driven types use connections for CW rotation, knob on radiator end.

# CONNECTIONS AND RATINGS

TYPE	CONNECTION	INPUT		OUTPUT				ROTA-TION	TERMINALS						
		VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		KNOB ON RADIATOR END			KNOB ON BASE END			
					MAX. AMP.	MAX. KVA	MAX. AMP.		MAX. KVA	INPUT	JUMPER»	OUTPUT	INPUT	JUMPER»	OUTPUT
146U-2 M146U-2☆	#1 1-PHASE PARALLEL †	120	50/60	0-120	60	7.2	70	8.4	CW	1-4	1-1, 4-4 †	1-C	1-4	1-1, 4-4 †	4-C
				0-140	60	8.4	—	—	CCW	1-4	1-1, 4-4 †	4-C	1-4	1-1, 4-4 †	1-C
				0-140	60	8.4	—	—	CCW	1-2	1-1, 2-2 †	1-C	4-5	4-4, 5-5 †	4-C
	#2 1-PHASE SERIES	240	50/60	0-240	30	7.2	35	8.4	CW	4-4	1-1	3-3	1-1	4-4	3-3
				0-280	30	8.4	—	—	CCW	1-1	4-4	3-3	4-4	1-1	3-3
				0-280	30	8.4	—	—	CCW	2-2	1-1	3-3	5-5	4-4	3-3
	#2 3-PHASE OPEN DELTA	120	50/60	0-120	30	6.2	35	7.3	CW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3
				0-140	30	7.3	—	—	CCW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3
				0-140	30	7.3	—	—	CCW	2-1-2	1-1	3-1-3	5-4-5	4-4	3-4-3
246U-2 M246U-2☆	#1 1-PHASE PARALLEL †	240	50/60	0-240	30	7.2	38	9.1	CW	1-4	1-1, 4-4 †	1-C	1-4	1-1, 4-4 †	4-C
				0-280	30	8.4	—	—	CCW	1-4	1-1, 4-4 †	4-C	1-4	1-1, 4-4 †	1-C
				0-280	30	8.4	—	—	CCW	1-2	1-1, 2-2 †	1-C	4-5	4-4, 5-5 †	4-C
		120	50/60	0-280	30**	3.6†	—	—	CW	1-6	1-1, 6-6 †	1-C	4-7	4-4, 7-7 †	4-C
				0-280	30**	3.6†	—	—	CCW	4-7	4-4, 7-7 †	4-C	1-6	1-1, 6-6 †	1-C
				0-480	15	7.2	19	9.1	CW	4-4	1-1	3-3	1-1	4-4	3-3
	#2 1-PHASE SERIES	480	50/60	0-480	15	8.4	—	—	CCW	1-1	4-4	3-3	4-4	1-1	3-3
				0-560	15	8.4	—	—	CCW	2-2	1-1	3-3	5-5	4-4	3-3
				0-560	15	8.4	—	—	CCW	5-5	4-4	3-3	2-2	1-1	3-3
		240	50/60	0-560	15**	3.6†	—	—	CW	6-6	1-1	3-3	7-7	4-4	3-3
				0-560	15**	3.6†	—	—	CCW	7-7	4-4	3-3	6-6	1-1	3-3
				0-240	15	6.2	19	7.9	CW	4-1-4	1-1	3-1-3	1-4-1	4-4	3-4-3
#2 3-PHASE OPEN DELTA	240	50/60	0-240	15	6.2	19	7.9	CCW	1-4-1	4-4	3-4-3	4-1-4	1-1	3-1-3	
			0-280	15	7.3	—	—	CW	2-1-2	1-1	3-1-3	5-4-5	4-4	3-4-3	
			0-280	15	7.3	—	—	CCW	5-4-5	4-4	3-4-3	2-1-2	1-1	3-1-3	
	120	50/60	0-280	15**	3.2†	—	—	CW	6-1-6	1-1	3-1-3	7-4-7	4-4	3-4-3	
			0-280	15**	3.2†	—	—	CCW	7-4-7	4-4	3-4-3	6-1-6	1-1	3-1-3	
			0-120	90	10.8	105	12.6	CW	1-4	1-1-1, 4-4-4*	1-C	1-4	1-1-1, 4-4-4*	4-C	
146U-3 M146U-3☆	#3 1-PHASE PARALLEL*	120	50/60	0-140	90	12.6	—	—	CCW	1-4	1-1-1, 4-4-4*	4-C	1-4	1-1-1, 4-4-4*	1-C
				0-140	90	12.6	—	—	CW	1-2	1-1-1, 2-2-2*	1-C	4-5	4-4-4, 5-5-5*	4-C
				0-140	90	12.6	—	—	CCW	4-5	4-4-4, 5-5-5*	4-C	1-2	1-1-1, 2-2-2*	1-C
	#4 3-PHASE WYE	240	50/60	0-240	30	12.5	35	14.5	CW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3
				0-280	30	14.5	—	—	CCW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3
				0-280	30	14.5	—	—	CW	2-2-2	1-1-1	3-3-3	5-5-5	4-4-4	3-3-3
246U-3 M246U-3☆	#3 1-PHASE PARALLEL*	240	50/60	0-240	45	10.8	57	13.7	CCW	5-5-5	4-4-4	3-3-3	2-2-2	1-1-1	3-3-3
				0-280	45	12.6	—	—	CW	1-4	1-1-1, 4-4-4*	1-C	1-4	1-1-1, 4-4-4*	4-C
				0-280	45	12.6	—	—	CCW	1-4	1-1-1, 4-4-4*	4-C	1-4	1-1-1, 4-4-4*	1-C
		120	50/60	0-280	45**	5.5†	—	—	CW	1-2	1-1-1, 2-2-2*	1-C	4-5	4-4-4, 5-5-5*	4-C
				0-280	45**	5.5†	—	—	CCW	4-5	4-4-4, 5-5-5*	4-C	1-2	1-1-1, 2-2-2*	1-C
				0-280	45**	5.5†	—	—	CW	1-6	1-1-1, 6-6-6*	1-C	4-7	4-4-4, 7-7-7*	4-C
	#4 3-PHASE WYE	480	50/60	0-480	15	12.5	19	15.8	CCW	4-7	4-4-4, 7-7-7*	4-C	1-6	1-1-1, 6-6-6*	1-C
				0-480	15	12.5	19	15.8	CW	4-4-4	1-1-1	3-3-3	1-1-1	4-4-4	3-3-3
				0-560	15	14.5	—	—	CCW	1-1-1	4-4-4	3-3-3	4-4-4	1-1-1	3-3-3
		240	60	0-560	15**	6.3†	—	—	CW	2-2-2	1-1-1	3-3-3	5-5-5	4-4-4	3-3-3
				0-560	15**	6.3†	—	—	CCW	5-5-5	4-4-4	3-3-3	2-2-2	1-1-1	3-3-3
				0-560	15**	6.3†	—	—	CW	6-6-6	1-1-1	3-3-3	7-7-7	4-4-4	3-3-3



146 TYPES  
DO NOT HAVE  
TERMINALS  
6 OR 7

CONNECTIONS  
SHOWN ARE FOR  
CW KNOB  
ROTATION,  
KNOB ON  
RADIATOR END  
(CCW ROTATION,  
KNOB ON BASE END)

\*Jumpers also required connecting #3 on first unit to #1 on choke, #3 on second unit to #2 on choke and #3 on third unit to #3 on choke. T6065 choke required for 146 types, T5579B choke for 246 types.

\*\*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 on page 4.

†Jumpers also required connecting #3 on first unit to #1 on choke and connecting #3 on second unit to #2 on choke. T6053 choke required for 146T types, T5000B choke for 246 types.

‡Common used as third leg in 3-phase open delta or neutral in 3-wire single phase series and 4-wire 3-phase wye connections; not used in 2-wire series or 3-wire wye connections.

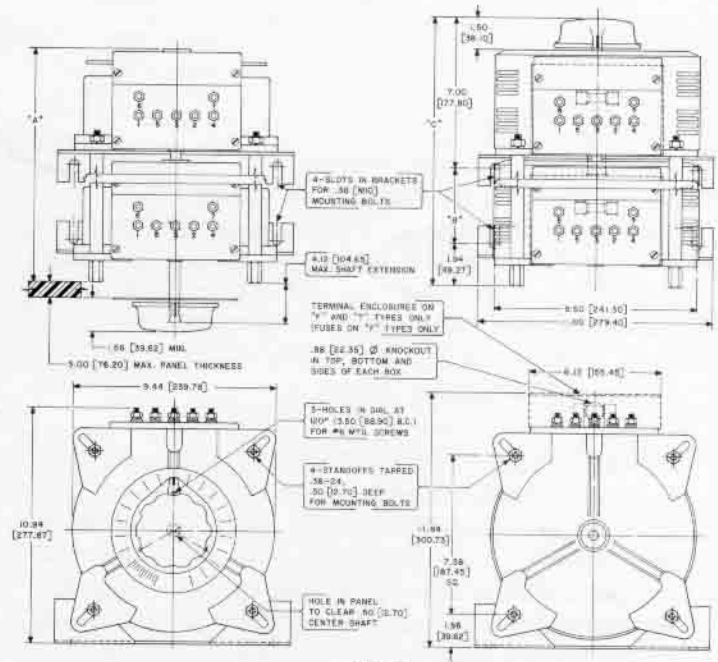
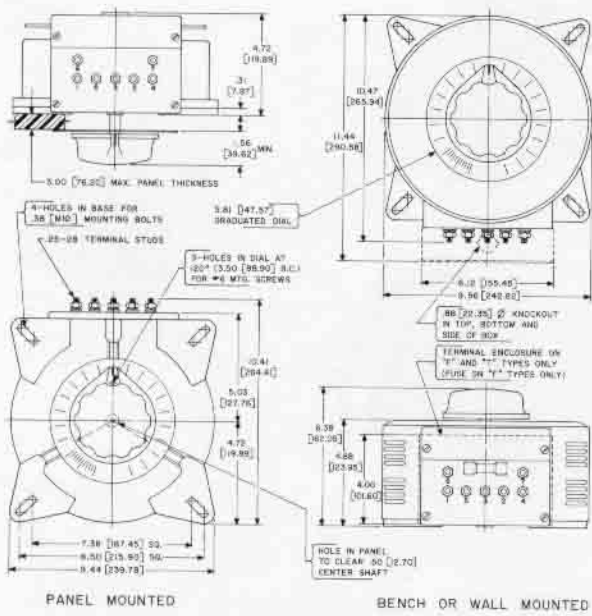
§Units must be fused. 30 ampere fuses supplied internally on F146 types, 15 ampere on F246 types. On other types, fuses, must be wired as shown.

†Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

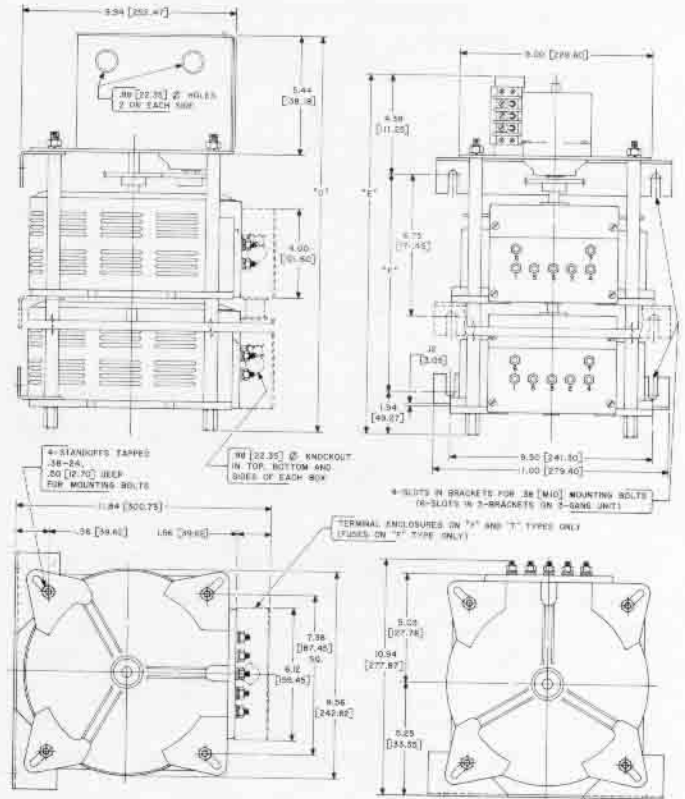
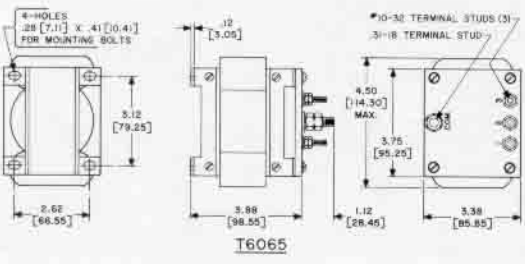
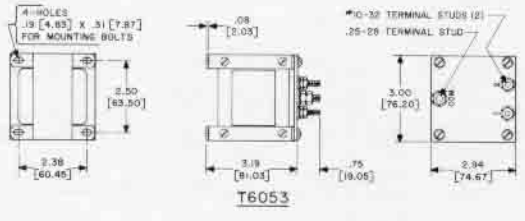
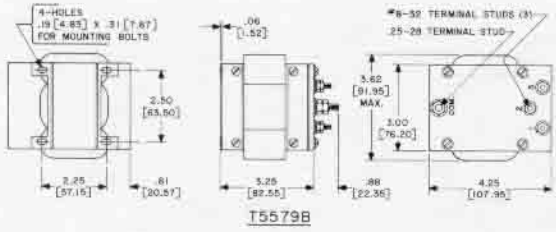
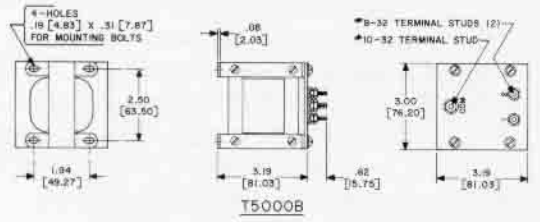
□Fuses recommended on all units. 30 ampere fuses supplied internally on F146 types, 15 ampere on F246 types.

»Jumper provided in standard common position should be moved or removed as required.

☆Motor-driven types use connections for CW rotation, knob on radiator end.



TYPE	"A"	"B"	"C"	"D"	"E"	"F"
SINGLE UNIT	—	—	—	13.19 [335.05]	12.16 [308.86]	5.19 [131.83]
2-GANG	10.64 [270.53]	3.56 [90.42]	12.50 [317.50]	18.31 [465.07]	12.28 [311.91]	10.31 [261.87]
3-GANG	15.97 [405.65]	8.69 [220.72]	17.62 [447.55]	23.44 [595.38]	22.41 [569.21]	15.44 [392.18]



# 1156D-1256D series



TYPE 1156D



MOTOR-DRIVEN  
SCREENED TYPES



U TYPES

POWERSTAT Variable Transformers of the 1156D-1256D Series are available in single and three phase, manually operated and motor-driven assemblies. The 1156D Series operates from 120 volt lines and the 1256D Series from 240 volt lines. The rated output for the 1156D Series is 50 amperes for constant current loads and 55 amperes for constant impedance loads. The 1256D Series is rated at 28 amperes for both constant current and constant impedance loads.

POWERSTAT Variable Transformers of the 1256D Series can be operated at any frequency between 50 and 500 hertz while 1156D Series units operate at 50/60 hertz only. Screens must be removed when operating at frequencies above 60 hertz. Figure A shows the reduction in allowable output current when operated at higher than rated frequency. The regulation curves for types of the 1156D-1256D Series operating at full load current are shown in Figure B. The curves show the voltage drop at any brush setting when full load is applied. For less than full load the voltage drop is proportional to the load. Driving torque, d-c resistance per coil and maximum core and brush loss when operating under no load are given in the chart. 1156D-1256D Series units may be bench or back-of-panel mounted. Manually operated types have standard dials graduated 0-100. The angle of rotation is 318° from zero to maximum output voltage. All units are provided with fuses in the output brush leads. POWERKOTE coils are featured in all 1156D-1256D Series models.

Except for models with chokes, all single units, 2- and 3-gang manually-operated and motor-driven assemblies are available with the terminal board enclosed in a metal terminal box. Knock-outs in the terminal enclosure permit wiring with cable or conduit. If a terminal enclosed unit is desired, include the letter T in the type number following the Series designation. For example: 1256DT-2S.

Open construction models have the letter U suffix in the type number and the same electrical ratings and coil-to-terminal wiring as their corresponding enclosed construction types but have no protective screening.

POWERSTAT Variable Transformers of the 1156D-1256D Series are available in 2-, 3-, 4-, 5-, 6-, 7-, 8- and 9-gang assemblies for manually-operated or motor-driven duty and in 10-, 12-, 14-, 15-, 16-, 18-, 21-, 24- and 27-gang assemblies in motor-driven types only. All can be bench or floor mounted. Single units, 2- and 3-gang manually-operated assemblies can be wall or back-of-panel mounted but additional support should be provided for ganged assemblies.

All POWERSTAT Variable Transformers of the 1156D-1256D Series are available as motor-driven assemblies. Motor-driven units have MB prefix in the type number and the identical electrical ratings of their corresponding manually-operated models. Standard speeds for full range travel are: 5, 15, 30 or 60 seconds for single units, 2- and 3-gang assemblies; 15, 30 or 60 seconds for 4-, 5- and 6-gang assemblies; 30 or 60 seconds for 7-, 8-, 9-, 10- and 12-gang assemblies; and 60 seconds for 14-gang and larger. The motor is rated for an input of 120 volts, 50/60 hertz, single phase with a current requirement of approximately 0.4 ampere. When ordering, motor-driven types should be prefixed with the desired speed in seconds. For example: 5MB1156D.

NUMBER OF GANGED UNITS	Approximate Driving Torque		No-Load Loss at 60 Hertz (Watts)	D-C Resistance Per Coil (Ohms)*	
	Oz-In	KpCm		1156D Series	1256D Series
Single	200-250	14.4-18	40	0.11	0.43
2	400-500	28.8-36	80	0.11	0.43
3	600-750	43.2-54	120	0.11	0.43
4	800-1000	57.6-72	160	0.11	0.43
5	1000-1250	72-90	200	0.11	0.43
6	1200-1500	86.4-108	240	0.11	0.43
7	1400-1750	100.8-126	280	0.11	0.43
8	1600-2000	115.2-144	320	0.11	0.43
9	1800-2250	129.6-162	360	0.11	0.43
10	Motor-driven		400	0.11	0.43
12	Motor-driven		480	0.11	0.43
14	Motor-driven		560	0.11	0.43
15	Motor-driven		600	0.11	0.43
16	Motor-driven		640	0.11	0.43
18	Motor-driven		720	0.11	0.43
21	Motor-driven		840	0.11	0.43
24	Motor-driven		960	0.11	0.43
27	Motor-driven		1080	0.11	0.43

\*Measured from start to end of winding.

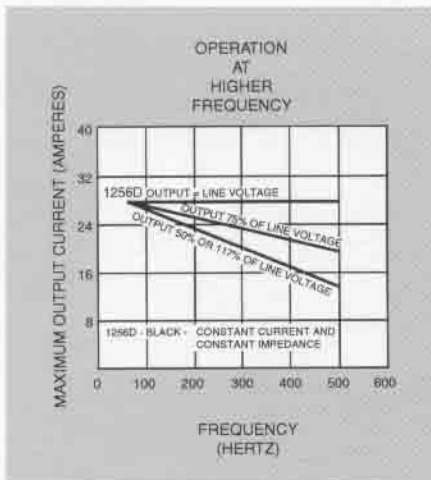
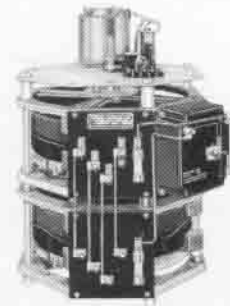


FIGURE A



TYPE  
1156D-2S



TYPE  
MB1256DU-2P

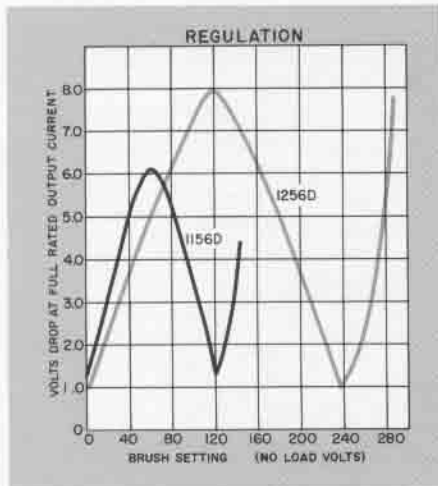
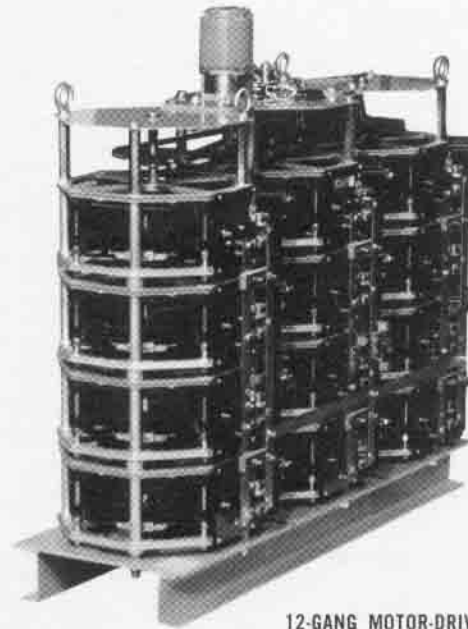


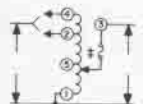
FIGURE B



12-GANG MOTOR-DRIVEN ASSEMBLY

## CONNECTIONS AND RATINGS

TYPE		INPUT		OUTPUT				TERMINALS		
		VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD			
MANUALLY OPERATED	MOTOR DRIVEN				MAX. AMP.	MAX. KVA	MAX. AMP.	MAX. KVA	INPUT	OUTPUT
1156D 1156DT 1156DU	MB1156D MB1156DT MB1156DU	120	50/60	0-120	50	6.0	55	6.6	1-4	1-3
				0-140	50	7.0	—	—	1-2	1-3
1256D 1256DT 1256DU	MB1256D MB1256DT MB1256DU	240	50/60	0-240	28	6.7	28	6.7	1-4	1-3
				0-280	28	7.8	—	—	1-2	1-3
		120	50/60	0-280	28*	3.4†	—	—	1-5	1-3



1156D TYPES  
DO NOT HAVE  
TERMINAL 5.

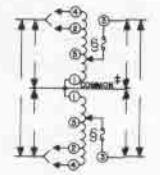
\*Maximum output current in output voltage range up to 150 volts. At higher output voltages, output current must be reduced according to rating curve Figure B on page 4.

†Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

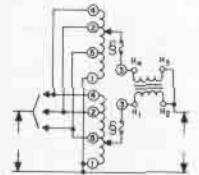
‡Fuse supplied: 50 ampere on 1156D types, 30 ampere on 1256D types.

## CONNECTIONS AND RATINGS

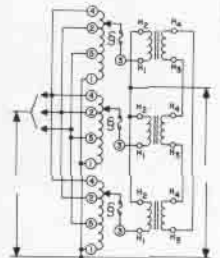
TYPE		CONNECTION	INPUT		OUTPUT				TERMINALS		
			VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD			
MANUALLY OPERATED	MOTOR DRIVEN						MAX. AMP.	MAX. KVA	MAX. AMP.	MAX. KVA	INPUT
1156D-2D 1156DT-2D 1156DU-2D	MB1156D-2D MB1156DT-2D MB1156DU-2D	#1 3-PHASE OPEN DELTA	120	50/60	0-120	50	10.4	55	11.4	4-1-4	3-1-3
					0-140	50	12.1	—	—	2-1-2	3-1-3
1156D-2P 1156DU-2P	MB1156D-2P MB1156DU-2P	#2 1-PHASE PARALLEL	120	50/60	0-120	100	12.0	110	13.2	1-4	1-H <sub>2</sub>
					0-140	100	14.0	—	—	1-2	1-H <sub>2</sub>
1156D-2S 1156DT-2S 1156DU-2S	MB1156D-2S MB1156DT-2S MB1156DU-2S	#1 1-PHASE SERIES	240	50/60	0-240	50	12.0	55	13.2	4-4	3-3
					0-280	50	14.0	—	—	2-2	3-3
1256D-2D 1256DT-2D 1256DU-2D	MB1256D-2D MB1256DT-2D MB1256DU-2D	#1 3-PHASE OPEN DELTA	240	50/60	0-240	28	11.6	28	11.6	4-1-4	3-1-3
					0-280	28	13.6	—	—	2-1-2	3-1-3
1256D-2P 1256DU-2P	MB1256D-2P MB1256DU-2P	#2 1-PHASE PARALLEL	240	50/60	0-240	56	13.4	56	13.4	1-4	1-H <sub>2</sub>
					0-280	56	15.7	—	—	1-2	1-H <sub>2</sub>
1256D-2S 1256DT-2S 1256DU-2S	MB1256D-2S MB1256DT-2S MB1256DU-2S	#1 1-PHASE SERIES	480	50/60	0-480	28	13.4	28	13.4	4-4	3-3
					0-560	28	15.7	—	—	2-2	3-3
1156D-3P 1156DU-3P	MB1156D-3P MB1156DU-3P	#3 1-PHASE PARALLEL	120	50/60	0-120	150	18.0	155	19.8	1-4	1-H <sub>2</sub>
					0-140	150	21.0	—	—	1-2	1-H <sub>2</sub>
1156D-3Y 1156DT-3Y 1156DU-3Y	MB1156D-3Y MB1156DT-3Y MB1156DU-3Y	#4 3-PHASE WYE	240	50/60	0-240	50	20.8	55	22.9	4-4-4	3-3-3
				60	0-280	50	24.2	—	—	2-2-2	3-3-3
1256D-3P 1256DU-3P	MB1256D-3P MB1256DU-3P	#3 1-PHASE PARALLEL	240	50/60	0-240	84	20.2	84	20.2	1-4	1-H <sub>2</sub>
					0-280	84	23.5	—	—	1-2	1-H <sub>2</sub>
1256D-3Y 1256DT-3Y 1256DU-3Y	MB1256D-3Y MB1256DT-3Y MB1256DU-3Y	#4 3-PHASE WYE	480	50/60	0-480	28	23.3	28	23.3	4-4-4	3-3-3
				60	0-560	28	27.2	—	—	2-2-2	3-3-3
1256D-3Y 1256DT-3Y 1256DU-3Y	MB1256D-3Y MB1256DT-3Y MB1256DU-3Y	#4 3-PHASE WYE	240	60	0-560	28*	11.8†	—	—	5-5-5	3-3-3



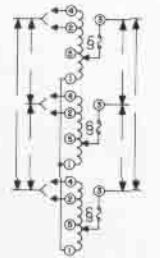
CONNECTION 1



CONNECTION 2



CONNECTION 3



CONNECTION 4

\*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 on page 4.

†Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

‡Common used as third leg in 3-phase open delta or neutral in 3-wire single phase series and 4-wire 3-phase wye connections; not used in 2-wire series or 3-wire wye connections.

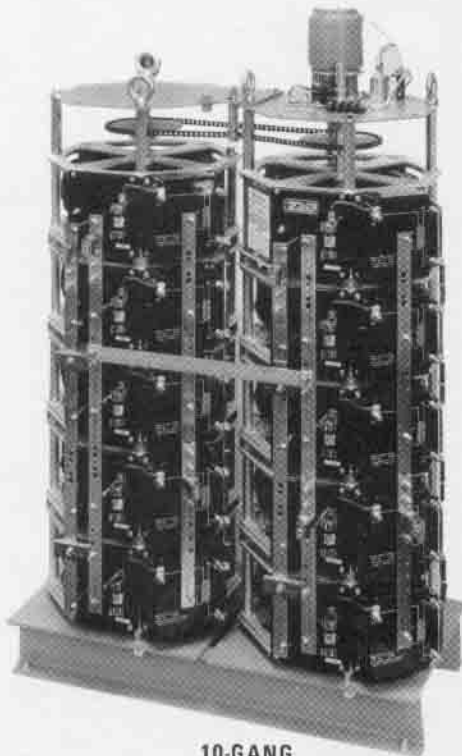
§Fuse supplied: 50 ampere on 1156D types, 30 ampere on 1256D types.

NOTE: Choke T5587 is supplied with all parallel connected units in the 1156D-1256D Series.

1156D TYPES  
DO NOT HAVE  
TERMINAL 5



## RATINGS OPEN DELTA AND SERIES-PARALLEL TYPES



**10-GANG  
MOTOR-DRIVEN  
ASSEMBLY**

TYPE	CONNECTION	INPUT		OUTPUT				
		VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD	
					MAX. AMP.	MAX. KVA	MAX. AMP.	MAX. KVA
MB1156DU-10D	3-PHASE OPEN DELTA	120	50/60	0-120	250	51.9	275	57.2
				0-140□	250	60.6	—	—
MB1156DU-10PS	1-PHASE SERIES-PARALLEL	240	50/60	0-240	250	60.0	275	66.0
				0-280□	250	70.0	—	—
MB1256DU-10D	3-PHASE OPEN DELTA	240	50/60	0-240	140	58.2	140	58.2
				0-280□	140	67.9	—	—
		120	50/60	0-280	140*	29.4†	—	—
MB1256DU-10PS	1-PHASE SERIES-PARALLEL	480	50/60	0-480	140	67.2	140	67.2
				0-560□	140	78.4	—	—
		240	50/60	0-560	140*	33.9†	—	—
MB1156DU-12D	3-PHASE OPEN DELTA	120	50/60	0-120	300	62.4	330	68.6
				0-140□	300	72.7	—	—
MB1156DU-12PS	1-PHASE SERIES-PARALLEL	240	50/60	0-240	300	72.0	330	79.2
				0-280□	300	84.0	—	—
MB1256DU-12D	3-PHASE OPEN DELTA	240	50/60	0-240	168	69.8	168	69.8
				0-280□	168	81.5	—	—
		120	50/60	0-280	168*	35.3†	—	—
MB1256DU-12PS	1-PHASE SERIES-PARALLEL	480	50/60	0-480	168	80.6	168	80.6
				0-560□	168	94.1	—	—
		240	50/60	0-560	168*	40.7†	—	—
MB1156DU-14D	3-PHASE OPEN DELTA	120	50/60	0-120	350	72.7	385	80.0
				0-140□	350	84.9	—	—
MB1156DU-14PS	1-PHASE SERIES-PARALLEL	240	50/60	0-240	350	84.0	385	92.4
				0-280□	350	98.0	—	—
MB1256DU-14D	3-PHASE OPEN DELTA	240	50/60	0-240	196	81.5	196	81.5
				0-280□	196	95.1	—	—
		120	50/60	0-280	196*	41.2†	—	—
MB1256DU-14PS	1-PHASE SERIES-PARALLEL	480	50/60	0-480	196	94.1	196	94.1
				0-560□	196	110	—	—
		240	50/60	0-560	196*	47.5†	—	—
MB1156DU-16D	3-PHASE OPEN DELTA	120	50/60	0-120	400	83.1	440	91.5
				0-140□	400	97.0	—	—
MB1156DU-16PS	1-PHASE SERIES-PARALLEL	240	50/60	0-240	400	96.0	440	106
				0-280□	400	112	—	—
MB1256DU-16D	3-PHASE OPEN DELTA	240	50/60	0-240	224	93.1	224	93.1
				0-280□	224	109	—	—
		120	50/60	0-280	224*	47.0†	—	—
MB1256DU-16PS	1-PHASE SERIES-PARALLEL	480	50/60	0-480	224	108	224	108
				0-560□	224	125	—	—
		240	50/60	0-560	224*	54.3†	—	—
MB1156DU-18D	3-PHASE OPEN DELTA	120	50/60	0-120	450	93.5	495	103
				0-140□	450	109	—	—
MB1156DU-18PS	1-PHASE SERIES-PARALLEL	240	50/60	0-240	450	108	495	119
				0-280□	450	126	—	—
MB1256DU-18D	3-PHASE OPEN DELTA	240	50/60	0-240	252	105	252	105
				0-280□	252	122	—	—
		120	50/60	0-280	252*	52.9†	—	—
MB1256DU-18PS	1-PHASE SERIES-PARALLEL	480	50/60	0-480	252	121	252	121
				0-560□	252	141	—	—
		240	50/60	0-560	252*	61.1†	—	—

\*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 on page 4.

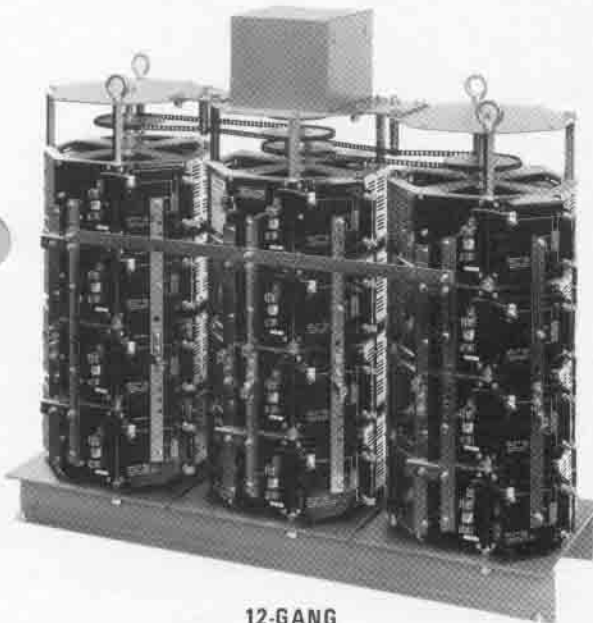
†Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

□ Unit wired this way when shipped.



## RATINGS WYE TYPES

TYPE	CONNECTION	INPUT			OUTPUT			
		VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD	
					MAX. AMP.	MAX. KVA	MAX. AMP.	MAX. KVA
MB1156DU-12Y	3-PHASE WYE	240	50/60	0-240	200	83.1	220	91.5
			60	0-280☆	200	97.0	—	—
MB1256DU-12Y	3-PHASE WYE	480	50/60	0-480	112	93.1	112	93.1
			60	0-560☆	112	109	—	—
		240	60	0-560	112*	47.0†	—	—
MB1156DU-15Y	3-PHASE WYE	240	50/60	0-240	250	104	275	114
			60	0-280☆	250	121	—	—
MB1256DU-15Y	3-PHASE WYE	480	50/60	0-480	140	116	140	116
			60	0-560☆	140	136	—	—
		240	60	0-560	140*	58.8†	—	—
MB1156DU-18Y	3-PHASE WYE	240	50/60	0-240	300	125	330	137
			60	0-280☆	300	145	—	—
MB1256DU-18Y	3-PHASE WYE	480	50/60	0-480	168	140	168	140
			60	0-560☆	168	163	—	—
		240	60	0-560	168*	70.5†	—	—
MB1156DU-21Y	3-PHASE WYE	240	50/60	0-240	350	145	385	160
			60	0-280☆	350	170	—	—
MB1256DU-21Y	3-PHASE WYE	480	50/60	0-480	196	163	196	163
			60	0-560☆	196	190	—	—
		240	60	0-560	196*	82.3†	—	—
MB1156DU-24Y	3-PHASE WYE	240	50/60	0-240	400	166	440	183
			60	0-280☆	400	194	—	—
MB1256DU-24Y	3-PHASE WYE	480	50/60	0-480	224	186	224	186
			60	0-560☆	224	217	—	—
		240	60	0-560	224*	94.1†	—	—
MB1156DU-27Y	3-PHASE WYE	240	50/60	0-240	450	187	495	206
			60	0-280☆	450	218	—	—
MB1256DU-27Y	3-PHASE WYE	480	50/60	0-480	252	210	252	210
			60	0-560☆	252	244	—	—
		240	60	0-560	252*	106†	—	—

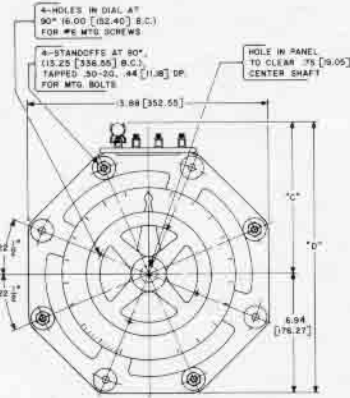
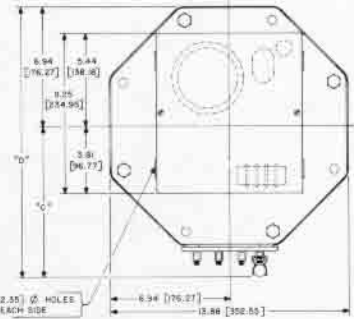
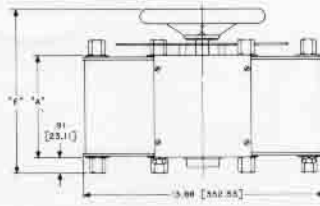
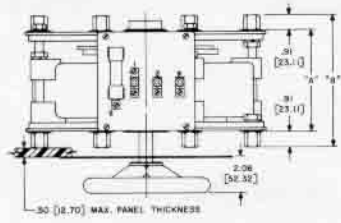


**12-GANG  
MOTOR-DRIVEN  
ASSEMBLY**

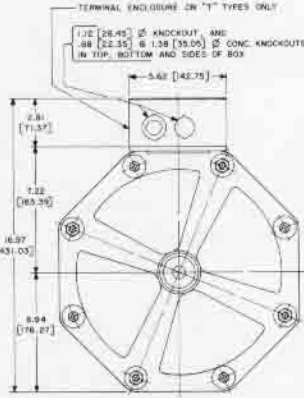
\*Maximum output current in output voltage range up to 300 volts. At higher output voltages, output current must be reduced according to rating curve Figure B on page 4.

†Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

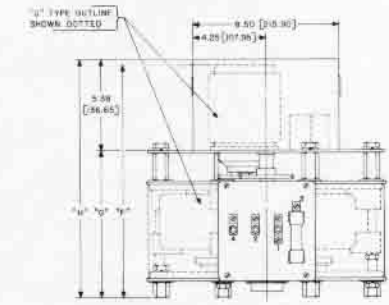
☆ Unit wired this way when shipped.



PANEL MOUNTED

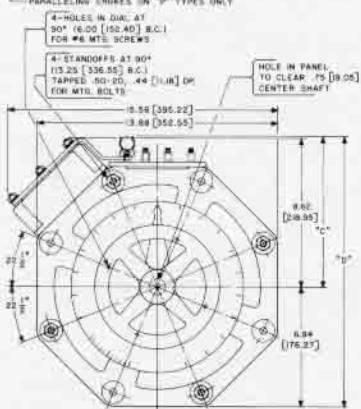
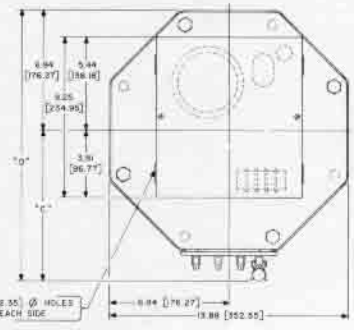
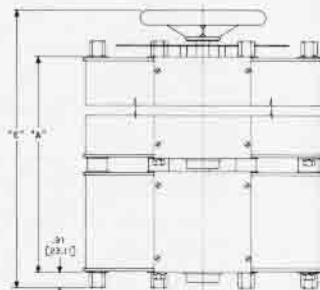
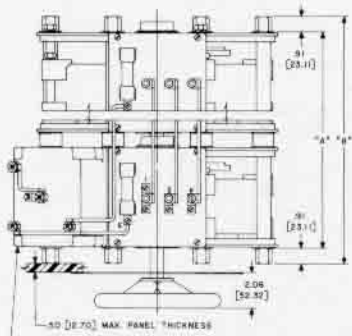


BENCH OR WALL MOUNTED

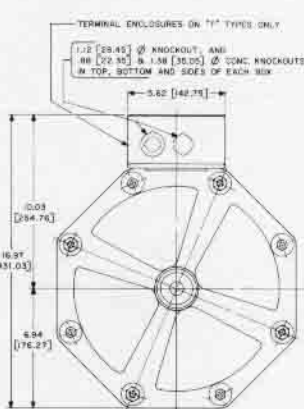


MOTOR DRIVEN

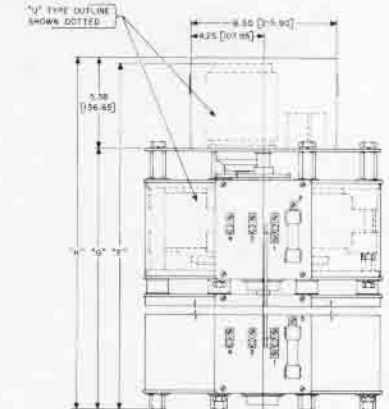
	TYPE	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"
1156D-1256D SERIES	SINGLE UNIT	5.88 [149.35]	7.69 [195.32]			9.47 [240.54]	15.44 [392.18]	8.50 [215.90]	15.76 [400.30]
	2-GANG	12.50 [317.50]	14.31 [363.47]	8.72 [221.49]	15.66 [397.76]	16.09 [408.69]	22.06 [560.32]	15.12 [384.05]	22.38 [568.45]
	3-GANG	19.12 [485.65]	20.94 [531.87]			22.72 [577.09]	28.69 [728.73]	21.75 [552.45]	29.00 [736.60]



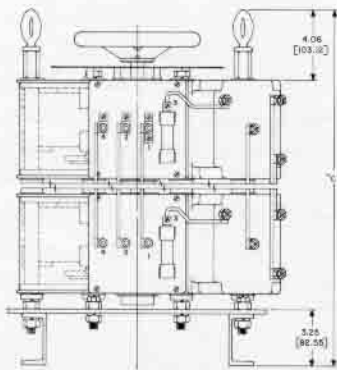
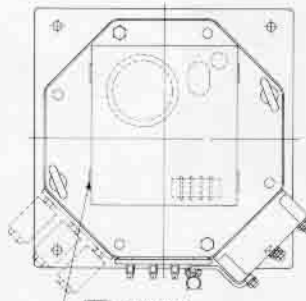
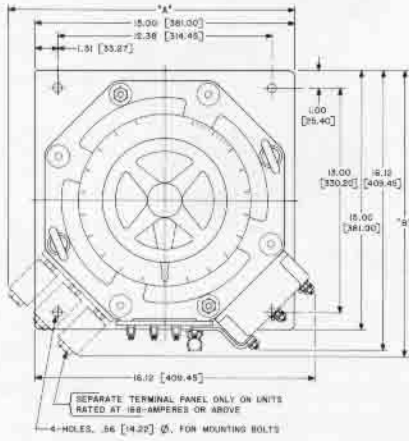
PANEL MOUNTED



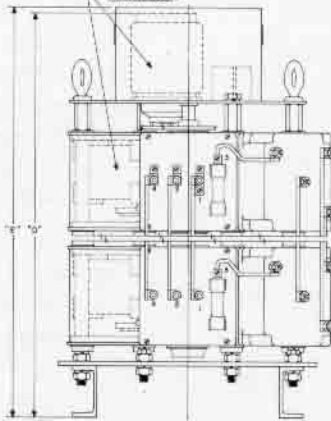
BENCH OR WALL MOUNTED



MOTOR DRIVEN



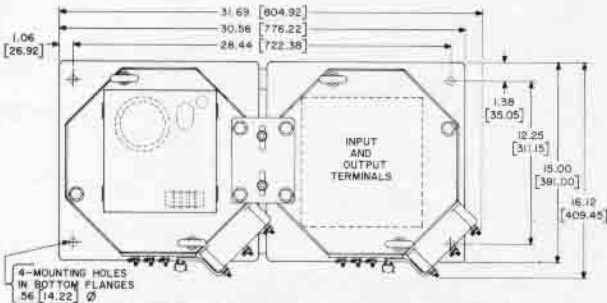
4-GANG TO 9-GANG MANUAL



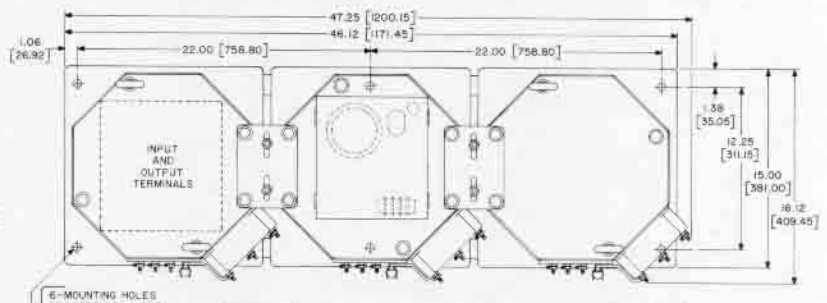
4-GANG TO 9-GANG MOTOR DRIVEN

TYPE	"A"		"B"		"C"	"D"	"E"
	1156D	1256D	1156D	1256D			
4D, 4PS	—	—	—	—	34.00 [863.60]	38.65 [981.71]	39.00 [990.60]
4P	16.75 [425.45]	—	15.62 [396.72]	—	34.00 [863.60]	38.65 [981.71]	39.00 [990.60]
5P	16.75 [425.45]	—	15.62 [396.72]	—	40.62 [1031.75]	45.31 [1150.87]	45.63 [1159.00]
6D, 6PS	—	—	—	—	47.25 [1200.15]	51.94 [1319.28]	52.26 [1327.40]
6Y	—	—	—	—	47.25 [1200.15]	51.94 [1319.28]	52.26 [1327.40]
6P	17.31 [439.69]	16.75 [425.45]	16.19 [411.23]	15.62 [396.72]	47.25 [1200.15]	51.94 [1319.28]	52.26 [1327.40]
7P	17.31 [439.69]	16.75 [425.45]	16.19 [411.23]	15.62 [396.72]	53.88 [1368.55]	58.56 [1487.42]	58.88 [1495.55]
8D, 8PS	18.75 [475.45]	—	15.62 [396.72]	—	60.50 [1536.70]	65.19 [1655.83]	65.50 [1663.70]
8P	17.75 [450.85]	16.75 [425.45]	16.62 [422.15]	15.62 [396.72]	60.50 [1536.70]	65.19 [1655.83]	65.50 [1663.70]
9P	17.75 [450.85]	17.31 [439.69]	16.62 [422.15]	16.19 [411.23]	67.12 [1704.85]	71.81 [1823.97]	72.13 [1832.10]
9Y	—	—	—	—	67.12 [1704.85]	71.81 [1823.97]	72.13 [1832.10]

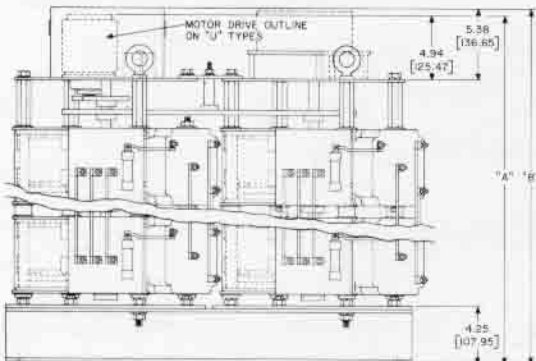
**NOTE:** Interconnections may be by bus bars instead of wire harnesses as illustrated.



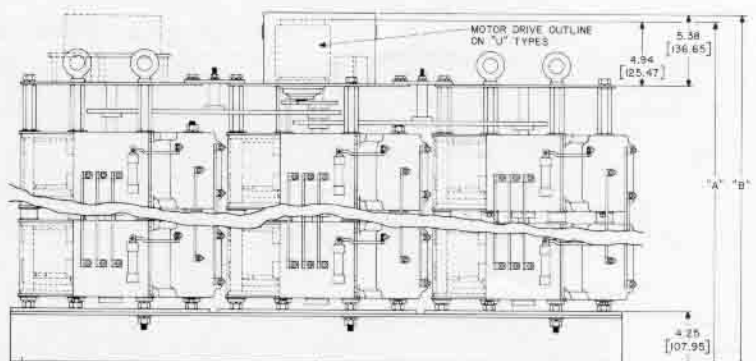
	10D, 10PS	12D, 12PS	14D, 14PS	16D, 16PS	18D, 18PS
"A"	49.44 [1255.78]	56.06 [1423.92]	62.69 [1592.33]	69.31 [1760.47]	75.94 [1928.88]
"B"	49.76 [1263.96]	56.38 [1432.05]	63.00 [1600.20]	69.63 [1768.60]	76.26 [1937.00]



	12Y	15Y	18Y	21Y	24Y	27Y
"A"	42.82 [1087.63]	49.44 [1255.78]	56.06 [1423.92]	62.69 [1592.33]	69.31 [1760.47]	75.94 [1928.88]
"B"	43.13 [1099.36]	49.76 [1263.96]	56.38 [1432.05]	63.00 [1600.20]	69.63 [1768.60]	76.26 [1937.00]



10- TO 18-GANG OPEN DELTA AND SERIES-PARALLEL TYPES



12- TO 27-GANG WYE TYPES

# 40 VOLT series



TYPE 10C-40



TYPE 21-40



TYPE M21-40

POWERSTAT Variable Transformers of the 40 Volt Series meet the high current, low voltage requirements of low voltage power supplies and a wide range of transistor circuit applications. All models operate from a 40 volt, 60 hertz single phase input with an output of 0-40 volts. POWERKOTE coils on all models assure long life and resistance to overloads.

Figure A shows the regulation curves for types of the 40 Volt Series operating at full output current. The curves show the voltage drop at any brush setting when full load is applied. For less than full load the voltage drop is proportional. Driving torque, d-c resistance per coil and maximum core and brush loss when operating under no load are given in the chart.

POWERSTAT Variable Transformers of the 40 Volt Series are of open construction and are intended for back-of-panel mounting.

Terminal connections permit increasing output voltage with either clockwise or counterclockwise knob rotation. Manually-operated units have standard dials graduated 0-100.

Single units and ganged assemblies in the 21-40 and 116CU-40 Series types are available with motor drives in speeds of 5, 15, 30 and 60 seconds for full range travel. Motor-driven units have a letter M prefix in the type number and the identical electrical ratings of their corresponding manually-operated models. The motor is rated for an input of 120 volts, 50/60 hertz single phase with a current requirement of approximately 0.3 ampere. When ordering, motor-driven types should be prefixed with the desired speed in seconds. For example: 5M116CU-40.

TYPE†	Approximate Driving Torque		No-Load Loss at 60 Hertz (Watts)	D-C Resistance per Coil (Ohms)
	Oz-In	KpCm		
10C-40	5-10	.4-.7	2	0.8
10C-40-2	15-20	1.1-1.4	4	0.8
10C-40-3	20-30	1.4-2.2	6	0.8
21-40	20-30	1.4-2.2	3	0.25
21-40-2	60-75	4.3-5.4	6	0.25
21-40-3	100-125	7.2-9	9	0.25
116CU-40	30-40	2.2-2.9	6	0.048
116CU-40-2	70-80	5-5.8	12	0.048
116CU-40-3	110-140	7.9-10.1	18	0.048

†Data applies to M prefixed models also.

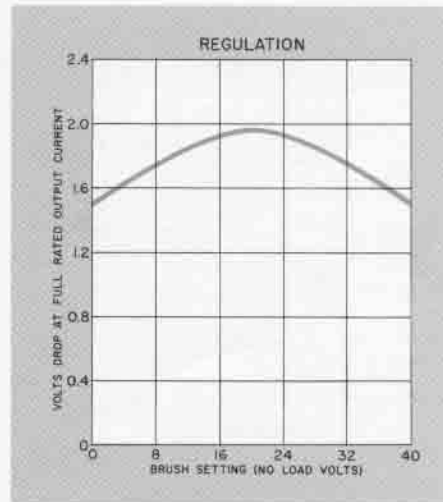
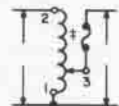


FIGURE A

## CONNECTIONS AND RATINGS

TYPE		CONNECTION	INPUT		OUTPUT				KNOB ROTATION	TERMINALS				
			VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD	CONSTANT IMPEDANCE LOAD	KNOB ON BASE END		KNOB ON RADIATOR END				
MANUALLY OPERATED	MOTOR DRIVEN*				MAX. AMP.	MAX. KVA	MAX. AMP.	MAX. KVA		INPUT	OUTPUT	INPUT	OUTPUT	
10C-40 10C-40-2† 10C-40-3†		#1	40	60	0-40	7	0.28	9	0.36	CW	1-2	1-3	—	—
										CCW	1-2	2-3	—	—
21-40 21-40-2† 21-40-3†	M21-40 M21-40-2† M21-40-3†	#2	40	60	0-40	18	0.72	22	0.88	CW	1-4	3-4	1-4	1-3
										CCW	1-4	1-3	1-4	3-4
116CU-40 116CU-40-2† 116CU-40-3†	M116CU-40 M116CU-40-2† M116CU-40-3†	#2	40	60	0-40	25	1.0	30	1.2	CW	1-4	3-4	1-4	1-3
										CCW	1-4	1-3	1-4	3-4



CONNECTION 1



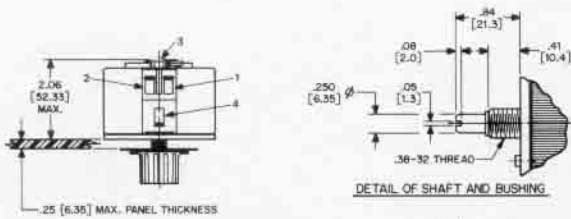
CONNECTION 2

CONNECTIONS SHOWN ARE FOR CW KNOB ROTATION, KNOB ON BASE END

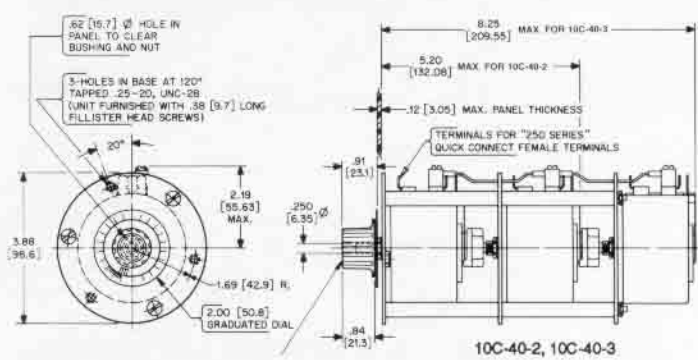
\*Motor-driven types use connections for CCW rotation, knob on radiator end.

†Ratings given apply separately to each unit in assembly.

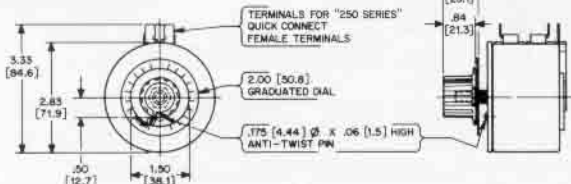
‡Fuse recommended, not supplied.



DETAIL OF SHAFT AND BUSHING

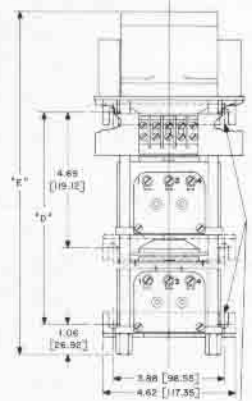


10C-40-2, 10C-40-3

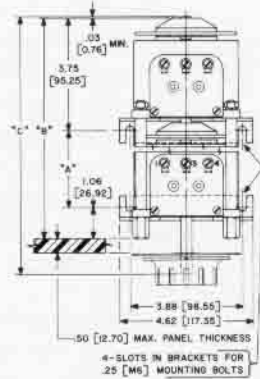


10C-40

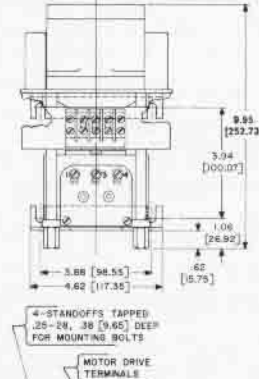
TYPE	*A*	*B*	*C*	*D*	*E*
2-GANG	2.69 [68.32]	7.50 [190.50]	8.75 [222.25]	7.38 [187.45]	13.30 [340.11]
3-GANG	6.12 [155.45]	10.54 [277.87]	12.19 [309.63]	10.81 [274.57]	16.83 [427.48]



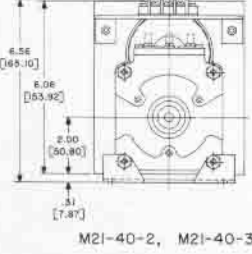
2I-40



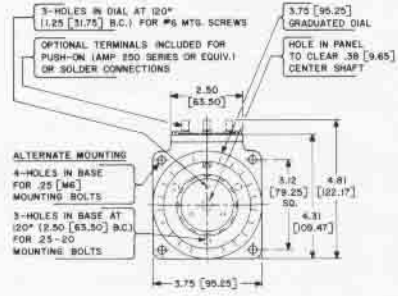
2I-40-2, 2I-40-3



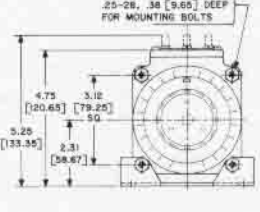
M2I-40



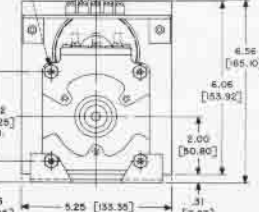
M2I-40-2, M2I-40-3



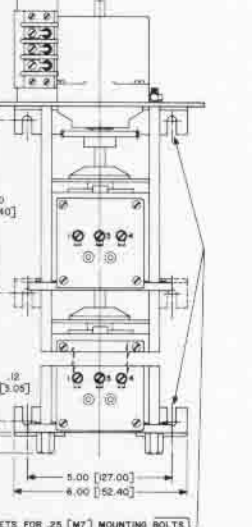
ALTERNATE MOUNTING



ALTERNATE MOUNTING

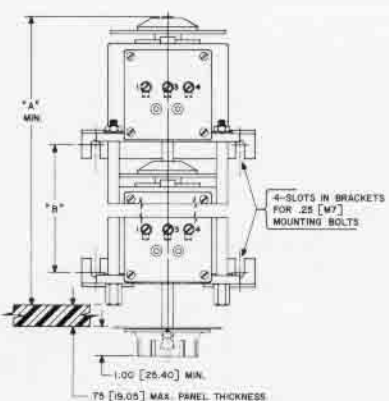


ALTERNATE MOUNTING

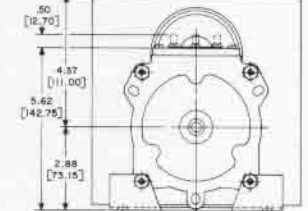


116CU-40-2, 116CU-40-3

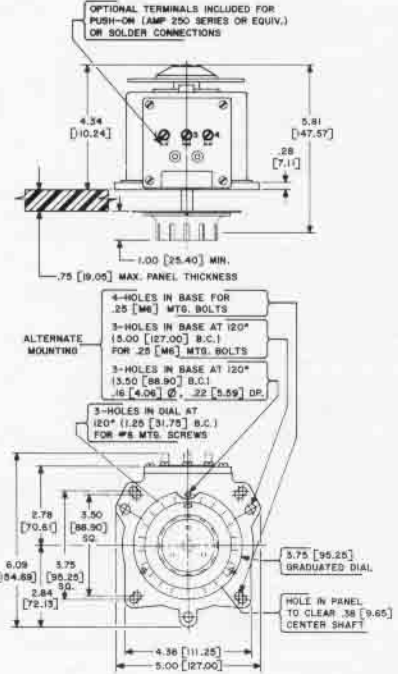
TYPE	*A*	*B*	*C*	*D*
SINGLE UNIT			12.24 [310.00]	5.53 [140.46]
2-GANG	10.00 [254.00]	4.44 [112.76]	17.14 [435.38]	10.44 [265.18]
3-GANG	14.88 [377.95]	9.34 [237.94]	22.35 [569.07]	15.34 [389.84]



116CU-40-2, 116CU-40-3



ALTERNATE MOUNTING

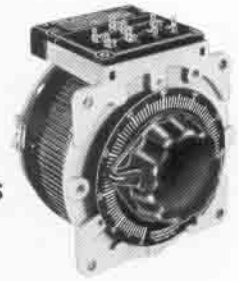


ALTERNATE MOUNTING

# LW136B series



TYPE LW136B



U TYPES

POWERSTAT Variable Transformers of the LW136B Series have three windings: two 120 volt primary windings which can be connected in either series or parallel so that the unit can operate from either a 240 volt or 120 volt line, and an isolated secondary winding rated 0-30 volts, 25 amperes. A center tap on the secondary winding allows 15-0-15 volt operation at a current rating of 35 amperes. Connections can be made for operation as a source of adjustable low output voltage, a line voltage corrector or a limited range variable transformer. Because there are actually more than 200 different ratings possible, those given in this catalog are the fundamental ratings used most frequently. For 50/60 hertz except as shown.

Single units with enclosed construction can be general utility or back-of-panel mounted. Changes from bench or wall to panel mounting can be easily made because the removable shaft can be quickly adjusted for either mounting. Self-lubricating nylon shaft bearings provide smooth turning, dependable service and long life. Driving torque, d-c resistance of each winding per coil and maximum core and brush loss when operating under no

load are given in the chart. Manually-operated models have standard dials graduated 0-100. The angle of rotation is 316° from zero to maximum output voltage. All units have POWER-KOTE coils.

All POWERSTAT Variable Transformers of the LW136B Series are available with motor-drives in standard speeds of 5, 15, 30 and 60 seconds for full range travel. Motor-driven types have an MD prefix in the type number and the identical ratings as their corresponding manually-operated types. The motor is rated for an input of 120 volts, 50/60 hertz single phase with a current requirement of 0.3 ampere. When ordering, motor-driven types should be prefixed with the desired speed in seconds. For example: 5MDLW136B-2.

Open construction models have the letter U suffix in the type number and the same electrical ratings and coil-to-terminal wiring as their corresponding enclosed construction units but have no protective screening.

If desired, all manually-operated and motor-driven models with enclosed construction are available with the terminal boards enclosed in metal terminal boxes. Knockouts in the terminal enclosures permit wiring with cable or conduit. If a terminal enclosed unit is desired, include the letter T in the type number following the Series designation. For example: LW136BT-3.

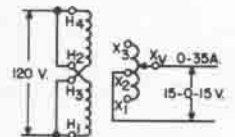
TYPE†	Approximate Driving Torque		No-Load Loss at 60 Hertz (Watts)	D-C Resistance Per Winding (Ohms)	
	Oz-In	KpCm		Each Primary	Secondary
LW136BU	30-50	2.2-3.6	9	0.6	0.04
LW136BU-2	70-90	5 -6.5	18	0.6	0.04
LW136BU-3	110-140	7.9-10.1	27	0.6	0.04

†Data also applies to units having applicable prefixes and suffixes.

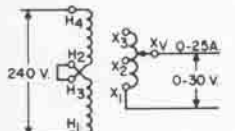
## CONNECTIONS AND RATINGS

TYPE	NOMINAL LINE VOLTAGE	USED AS LOW-VOLTAGE TRANSFORMER WITH ISOLATED SECONDARY			USED AS LIMITED-RANGE TRANSFORMER			USED AS LINE CORRECTOR		
		OUTPUT			OUTPUT			INPUT	OUTPUT	
		VOLTS	MAX. AMP.	MAX. KVA	VOLTS	MAX. AMP.	MAX. KVA	VOLTS	MAX. AMP.	MAX. KVA
LW136B MDLW136B LW136BT MDLW136BT LW136BU MDLW136BU	120	15-0-15	35	0.52	90-120	25	3.0	96-120	25	3.0
		0-30	25	0.75	105-135	35	4.7	107-137†	35	4.2
					120-150	25	3.8	120-150*†	25	3.0
	240	15-0-15	35	0.52	210-240	25	6.0	213-240	25	6.0
		0-30	25	0.75	225-255	35	8.9	226-256†	35	8.4
					240-270	25	6.8	240-274†	25	6.0

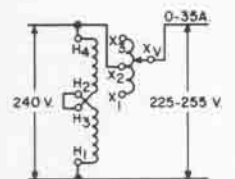
\*Maximum voltage limited by saturation characteristics of transformer core. 160 hertz only.



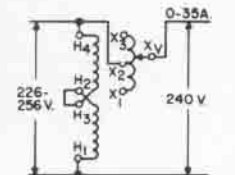
LOW VOLTAGE TRANSFORMER



LOW VOLTAGE TRANSFORMER



LIMITED RANGE TRANSFORMER

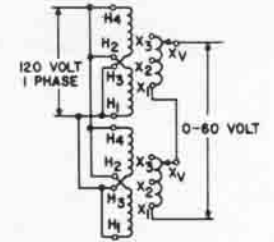


LINE CORRECTOR

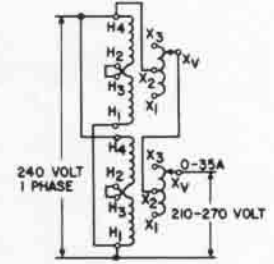
# CONNECTIONS AND RATINGS

## TYPICAL CONNECTIONS

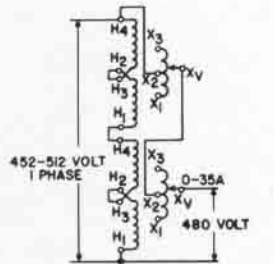
TYPE	CONNECTION	NOMINAL LINE VOLTAGE	USED AS LOW-VOLTAGE TRANSFORMER WITH ISOLATED SECONDARY			USED AS LIMITED-RANGE TRANSFORMER			USED AS LINE CORRECTOR					
			OUTPUT			OUTPUT			INPUT VOLTS	OUTPUT				
			VOLTS	MAX. AMP.	MAX. KVA	VOLTS	MAX. AMP.	MAX. KVA		MAX. AMP.	MAX. KVA			
LW136BU-2 MDLW136BU-2	SINGLE PHASE	120	30-0-30	35	1.0	60-120	25	3.0	80-120	25	3.0			
			0-60	25	1.5	90-150	35	5.2				96-150*†	35	4.2
						120-180	25	4.5						
		240	30-0-30	35	1.0	180-240	25	6.0	192-240	25	6.0			
			0-60	25	1.5	210-270	35	9.4	213-274†	35	8.4			
						240-300	25	7.5	240-300*†	25	6.0			
	480	30-0-30	35	1.0	420-480	25	12.0	427-480	25	12.0				
		0-60	25	1.5	450-510	35	17.8	452-512†	35	16.8				
					480-540	25	13.5	480-549†	25	12.0				
	THREE PHASE	120	0-30	25	1.3	90-120	25	5.2	96-120	25	5.2			
						105-135	35	8.2	107-137†	35	7.3			
						120-150	25	6.5	120-150*†	25	5.2			
240		0-30	25	1.3	210-240	25	10.4	213-240	25	10.4				
					225-255	35	15.5	226-256†	35	14.6				
					240-270	25	11.7	240-274†	25	10.4				
LW136BU-3 MDLW136BU-3	SINGLE PHASE	120	45-0-45	35	1.6	30-120	25	3.0	69-120	25	3.0			
			0-90	25	2.2	75-165	35	5.8				87-150*†	35	4.2
						120-210	25	5.2						
		240	45-0-45	35	1.6	150-240	25	6.0	175-240	25	6.0			
			0-90	25	2.2	195-285	35	10.0	202-295†	35	8.4			
						240-330	25	8.2						
	THREE PHASE	120	0-30	43.3	2.2	79-120	25	5.2	86-120	25	5.2			
						98-143	35	8.7				101-146†	35	7.3
						120-167	25	7.2						
			240	180-240†	25	10.4	192-240†	25	10.4					
				197-240	25	10.4				201-240	25	10.4		
				210-270†	35	16.4				214-260*†	35	14.5		
480		218-263	35	15.9	219-264†	35	14.5							
		240-286	25	12.4				240-293†	25	10.4				
		240-300†	25	13.0										
480		420-480†	25	20.8	427-480†	25	20.8							
		450-510†	35	30.9	452-512†	35	29.1							
		480-540†	25	23.4	480-520*†	25	20.8							



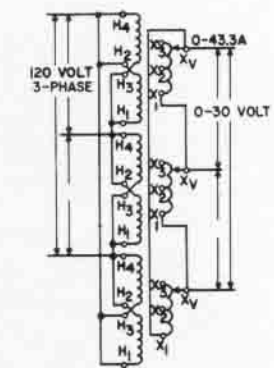
LOW VOLTAGE TRANSFORMER



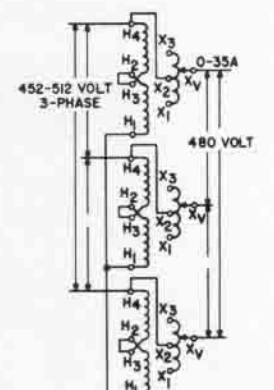
LIMITED RANGE TRANSFORMER



LINE CORRECTOR



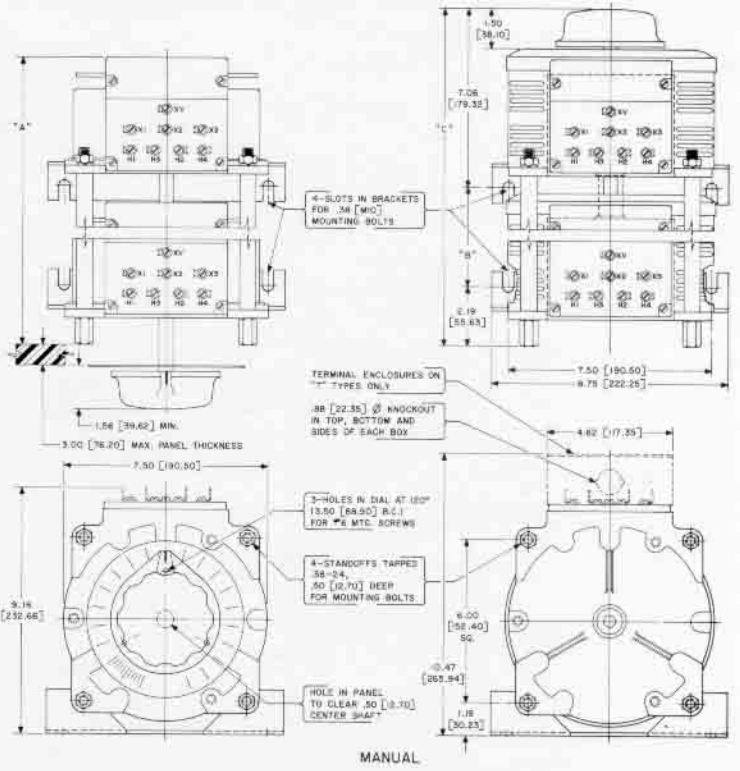
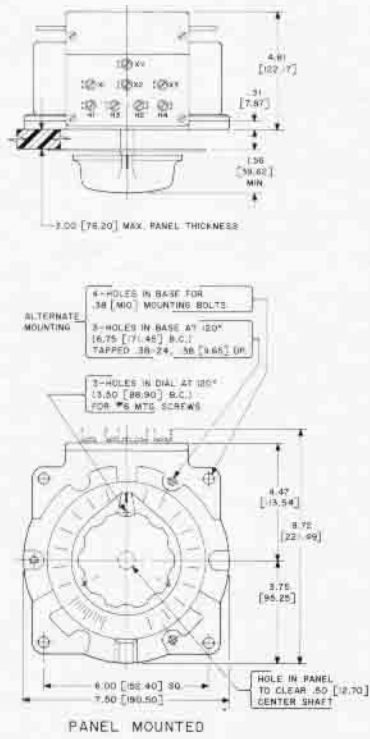
LOW VOLTAGE TRANSFORMER



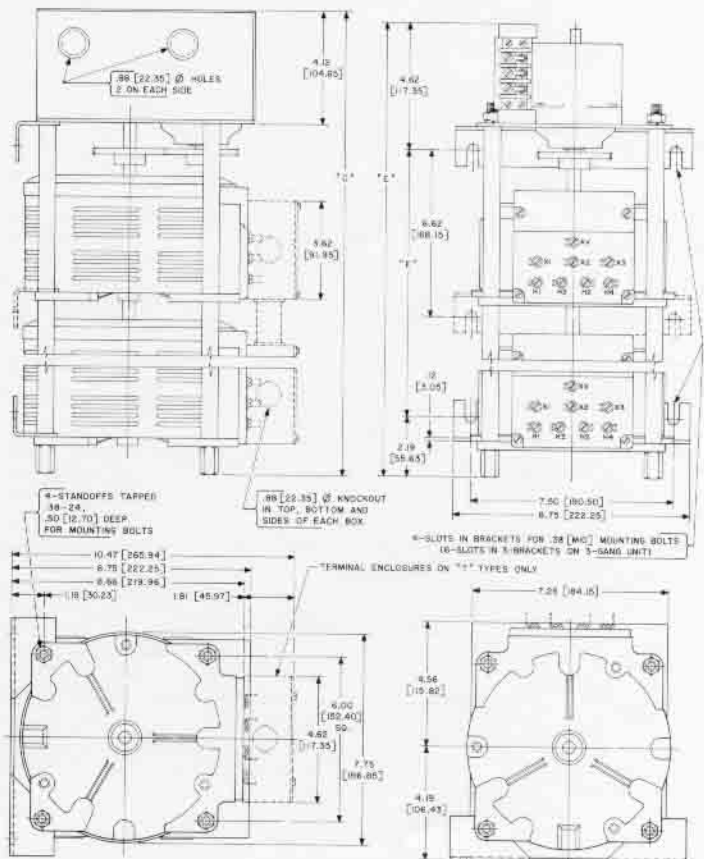
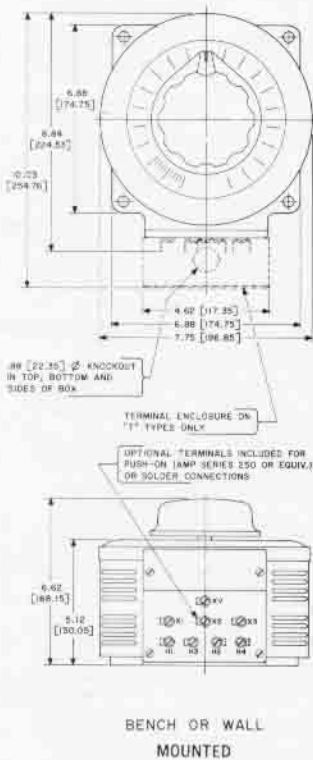
LINE CORRECTOR

\*Maximum voltage limited by saturation characteristics of transformer core, †60 hertz only.

# LW136B series



TYPE	"A"	"B"	"C"	"G"	"E"	"F"
SINGLE UNIT	—	—	—	12.75 [323.85]	12.47 [316.74]	5.00 [127.00]
2-GANG	11.62 [295.15]	4.18 [106.43]	13.44 [341.38]	N/A	18.38 [464.93]	10.81 [274.97]
3-GANG	17.44 [442.58]	10.00 [254.00]	19.25 [488.95]	N/A	24.10 [612.14]	16.62 [422.15]





# ENCLOSED L series

FOR MAXIMUM SAFETY



TYPE L116C



TYPE L21C



TYPE L10C

Enclosed L Series POWERSTAT Variable Transformers are ideally suited for use in applications requiring a portable source of variable a-c voltage up to 1.4 KVA capacity. They are specially designed to minimize the possibility of shock hazard.

For maximum protection and safety, all models are equipped with a grounded NEMA cord-plug assembly, on-off switch, pilot light, output receptacle and fuse. Type L116C has an integrally designed nonprojecting handle. Controls on the panel are re-

cessed for eye appeal and protection from accidental bumping. All models are designed for 120 volt single phase service.

### WALL MOUNTING

Enclosed L Series POWERSTAT Variable Transformers have slots at the rear that accept wall hanger brackets. They may be hung off the working surface yet can be easily removed for use in another location.

TYPE	INPUT		OUTPUT			DIMENSIONS INCHES (MILLIMETERS)		
	VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		HEIGHT	WIDTH	DEPTH
				MAX. AMP.	MAX. KVA			
L10C	120	60	0-132	1.75	0.23	6.28 (159.51)	5.0 (127.00)	4.25 (107.95)
L21C	120	50/60	0-140	4.5	0.63	7.78 (197.61)	5.38 (136.65)	5.63 (143.00)
L116C	120	50/60	0-140	10.0	1.4	9.50 (241.30)	6.44 (163.58)	6.5 (165.10)

# LINE CORRECTOR

series

A POWERSTAT Line Corrector is used to correct line voltage variations to maintain constant output voltage or to supply a limited range of variable voltage from a stable a-c source. It consists of an appropriately tapped POWERSTAT Variable Transformer and one or more fixed-ratio step-down transformers. This combination permits relatively small POWERSTAT Variable Transformers to control large amounts of current in applications requiring control only over a limited range. Manually operated and motor-driven types are available for nominal 115, 230 and 460 volt, 50/60 hertz, single and three phase service. All line corrector models have POWERKOTE coils.



TYPE LC2106D

## MOTOR-DRIVEN TYPES

With the exception of type MBLC3270DE which does not have the 5 second speed, all types of the Line Corrector Series are available with motor drives in standard speeds of 5, 15, 30 and 60 seconds for full range travel. Motor-driven models have an MB or MD prefix in the type number and the identical electrical ratings of their corresponding manually operated types. The motors are rated for 120 volt, 50/60 hertz single phase inputs with current requirements of 0.3 ampere for types prefixed MD, and 0.4 ampere for those prefixed MB. When ordering, motor-driven types should be prefixed with the desired speed in seconds. For example: 15MDLC2207D.



TYPE MBLC2115E

## CONNECTIONS AND RATINGS

TYPE		INPUT † VOLTS	OUTPUT †			VARIABLE TRANSFORMER SIMILAR TO:		FIXED RATIO TRANSFORMER				
MANUALLY OPERATED	MOTOR DRIVEN		VOLTS	MAX. AMP.	MAX. KVA	MANUALLY OPERATED	MOTOR DRIVEN	DIMENSIONS (INCHES)			NUMBER REQUIRED	WEIGHT EACH (POUNDS)
						TYPE	TYPE	LENGTH	WIDTH	HEIGHT		
LC2106D	MBLC2106D	95-135	115	57	6.6	136B	MD136B	7 $\frac{3}{4}$	7 $\frac{1}{8}$	6 $\frac{1}{8}$	1	44
LC2115E	MBLC2115E	95-135	115	144	16.6	1156D§	MB1156D§	9 $\frac{3}{8}$	7 $\frac{1}{8}$	9 $\frac{3}{8}$	1	107
LC2207D	MDLC2207D	195-255	230	36	8.3	236B	MD236B	7 $\frac{3}{8}$	7 $\frac{1}{8}$	6 $\frac{1}{8}$	1	46
LC2228E	MBLC2228E	205-250	230	130	29.9	1256D§	MB1256D§	8 $\frac{3}{8}$	7 $\frac{1}{8}$	9 $\frac{3}{8}$	1	100
LC2418E	MBLC2418E	400-520	460	45	20.7	1156D§	MB1156D§	9 $\frac{3}{8}$	7 $\frac{1}{8}$	9 $\frac{3}{8}$	1	107
LC3220YD	MDLC3220YD	195-255	230	63	25.1	136B-3	MD136B-3	7 $\frac{3}{8}$	7 $\frac{1}{8}$	6 $\frac{1}{8}$	3	44
LC3245YE	MBLC3245YE	195-255	230	145	57.8	1156D-3Y§	MB1156D-3Y§	9 $\frac{3}{8}$	7 $\frac{1}{8}$	9 $\frac{3}{8}$	3	112
LC3270DE	MBLC3270DE	195-255	230	188	74.9	1256D-4D§	MB1256D-4D§	8 $\frac{3}{8}$	11 $\frac{1}{8}$	10 $\frac{3}{8}$	2	120
LC3425YD	MDLC3425YD	400-520	460	35	27.9	236B-3	MD236B-3	7 $\frac{3}{8}$	7 $\frac{1}{8}$	6 $\frac{1}{8}$	3	46
LC3475YE	MBLC3475YE	400-520	460	100	79.7	1256D-3Y§	MB1256D-3Y§	9 $\frac{3}{8}$	7 $\frac{1}{8}$	9 $\frac{3}{8}$	3	107
LC34100YE	MBLC34100YE	420-500	460	148	118	1256D-3Y§	MB1256D-3Y§	9 $\frac{3}{8}$	7 $\frac{1}{8}$	9 $\frac{3}{8}$	3	107

†Line Correctors may also be used as limited range transformers. Input voltage is the output voltage shown in chart and output voltage is the input voltage shown in chart.  
§Without fuses.

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 screened models, the motor-drive assembly is enclosed and is provided with knockouts for cable or conduit connections. The permanent magnet SLO-SYN 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.



For full range travel from zero to maximum output voltage, standard motor-driven models are available in speeds of 5, 15, 30 and 60 seconds at 60 hertz or 6, 18, 36 and 72 seconds at 50 hertz. A smooth, quiet planetary gear unit is used for reduction from the motor to the POWERSTAT Variable Transformer shaft. Limit switch control at the lower and upper limits of travel prevents overtravel. The limit switches may be adjusted if desired. The motor circuit diagram is shown in Figure A.

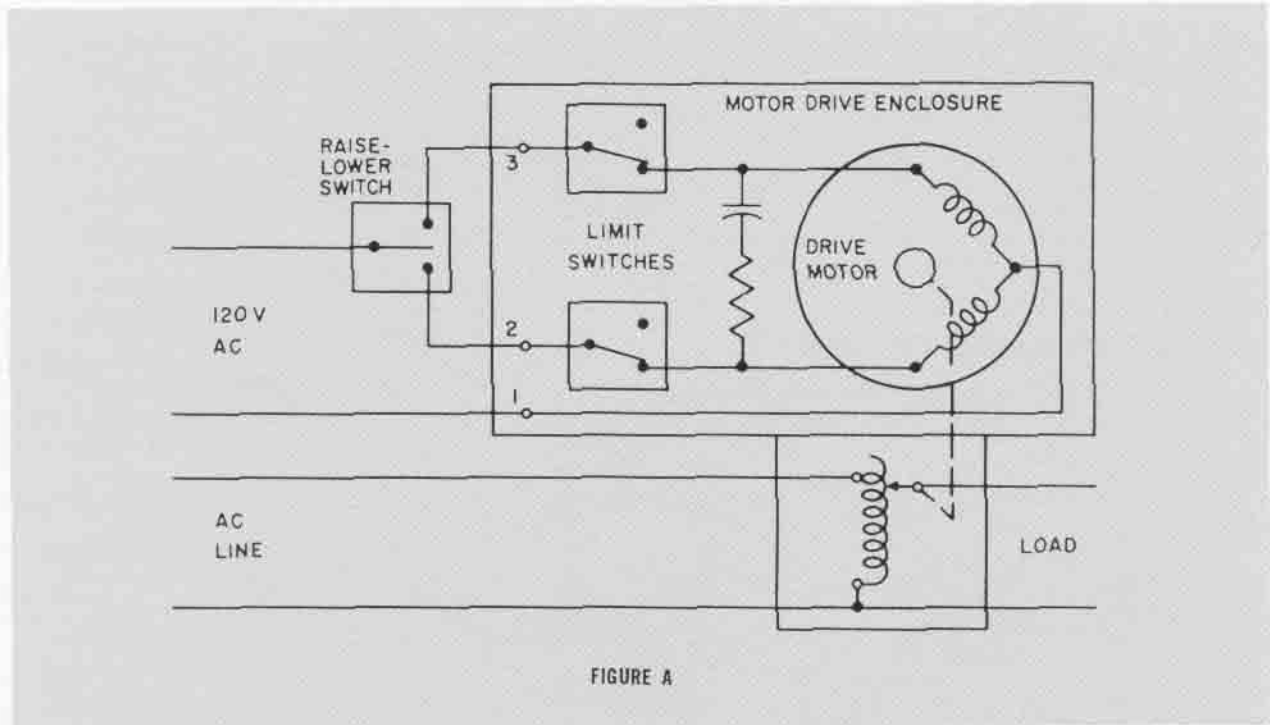


FIGURE A

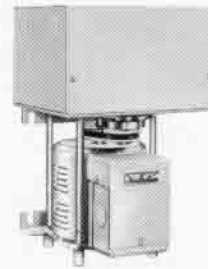
## RAISE-LOWER SWITCH

The standard method of controlling a motor-driven POWERSTAT Variable Transformer is with a momentary contact raise-lower switch of either the lever-action or the pushbutton type. A lever-action switch, catalog number 14096-000, is recommended for this use. The switch is supplied with an indicator plate and mounts in a stand-

ard 2 inch (50.8mm) deep switchbox. Any standard switchplate can be used.

Ordinarily, one switch is used to operate each POWERSTAT Variable Transformer as shown in Figure A. 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.

# ADJUSTABLE SPEED/ DIGITAL CONTROL



TYPE DM217CT

DM Series Adjustable Speed/Digitally Controlled Motor Drives are available on all POWERSTAT Variable Transformers in the 1kVA (116C-216C), 2kVA (126-226), 3kVA (136B-236B) and 4kVA (146-246) Series and on 5kVA (1156D-1256D) series units up to 6-deck. The drives operate from 120 volt, 50, 60 or 400 hertz lines and permit the output voltage of the variable transformers to be controlled over the full range of zero to maximum output voltage. Models for 240 volt service are also available and are identified with a letter X in the type number. For example, DM136BTX-2. Terminal blocks and knockouts are provided for making the external control and power connections. Motor drive enclosures on all 1kVA, 2kVA and 3kVA units are one inch higher than on equivalent standard motor-driven models while those on 5kVA units are two inches higher. Height of the motor drive enclosure on 4kVA models does not change.

Connections for the controls require low-voltage wiring only. Depending on the model ordered, the DM Series motor drive operates on either 120 volt or 240 volt, single-phase service at frequencies of 50, 60 or 400 hertz. Limit switches at the upper and lower limits of variable transformer travel prevent overtravel.

When ordering POWERSTAT Variable Transformers with Adjustable Speed/Digitally Controlled motor drives, prefix the manual type number with the letters "DM". For example: type DM136B-3. Types are available in cataloged 120, 208, 240, 480 and 575 volt, single and three-phase assemblies.

## ADJUSTABLE SPEED MOTOR DRIVE



When used as an adjustable speed motor drive, a DM Series drive allows the output voltage of the POWERSTAT Variable Transformer to be remotely controlled from a raise-lower switch. The speed of the motor drive can be controlled with a potentiometer to provide any speed from 5 to 200 seconds for full range travel. All control circuitry is solid-state.

Adjustable Speed Control type 65455-001, available as an accessory, provides a 500K ohm, reverse taper potentiometer for controlling the motor drive speed and a raise-lower, center-off switch for directional control. The control must be listed separately on the purchase order, if desired.

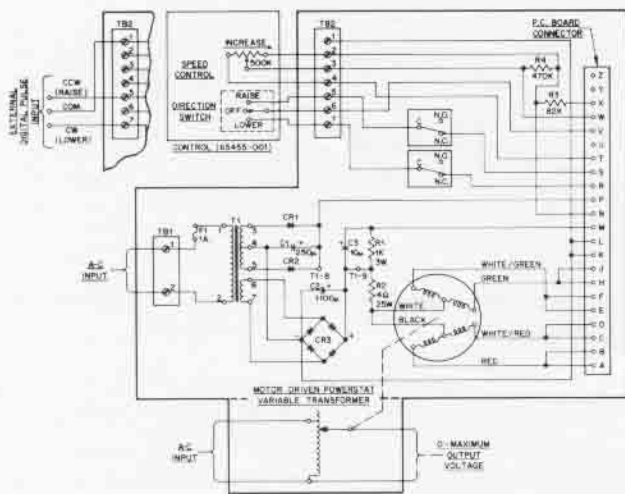
## DIGITALLY CONTROLLED MOTOR DRIVE

Digital control allows the variable transformer to be controlled over the full range with pulses or square waves. Pulses can

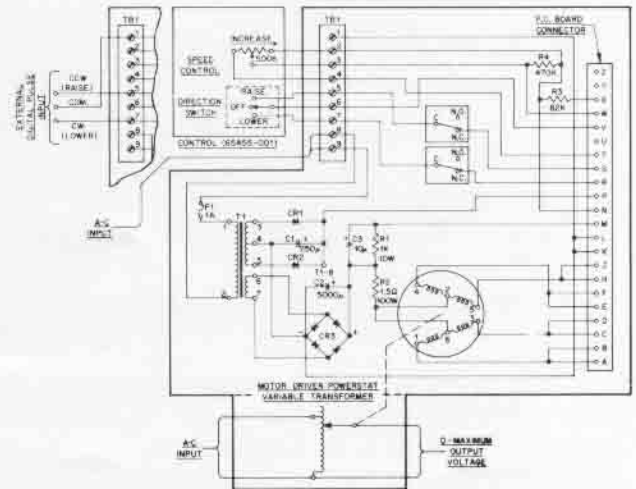
be programmed to increase or decrease the output voltage proportionally with a resolution ranging from approximately 0.5 volt to 2 volts, depending on model selected. Control over the full range from zero to maximum output voltage is accomplished in approximately 1200 pulses. Maximum speed is 250 pulses per second.

The motor drive will be triggered by a change in voltage from logic level 1 to logic level 0 applied to the proper pulse input terminal (CW or CCW). Complete specifications for the triggering pulse requirements are as follows.

Logic Level 1	2.4 VDC to 5.5 VDC
Logic Level 0	0 VDC to 0.4 VDC
Minimum Pulse Width	10 microseconds
Maximum Fall Time	1 microsecond
Maximum Rise Time	10 microseconds
Loading	5 milliamperes max. With an open collector TTL device, a 4.7K ohm $\pm$ 10% pull-up resistor to 5 volts is required.



CONNECTION DIAGRAM  
1 THRU 4 KVA POWERSTAT VARIABLE TRANSFORMERS  
WITH DM SERIES MOTOR DRIVE



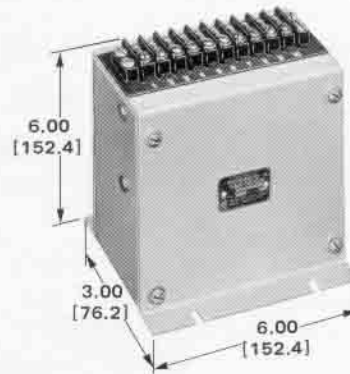
CONNECTION DIAGRAM  
5 KVA POWERSTAT VARIABLE TRANSFORMERS  
WITH DM SERIES MOTOR DRIVE

## POSITIONER SYSTEM

With Positioner Control PD120B, a synchronous motor driven POWERSTAT Variable Transformer is automatically driven to a setting proportional to the position of a control potentiometer. For example, if the control potentiometer is set at the mid position, the output voltage of the POWERSTAT unit will be driven to 50 percent of the full output voltage. The positioner controller does not regulate the output voltage. Changes in the input voltage will be reflected in the output voltage. Any number of motor-driven POWERSTAT units can be controlled from a compact control station.

A complete positioner system consists of a positioner controller type PD120B, a user supplied 1000 ohm, 3 W control potentiometer and asynchronous motor driven POWERSTAT Variable Transformer. The potentiometer can be mounted at the most suitable control location. Potentiometer kit 026602-008 consisting of a knob, a dial and a potentiometer is available for use with positioner systems.

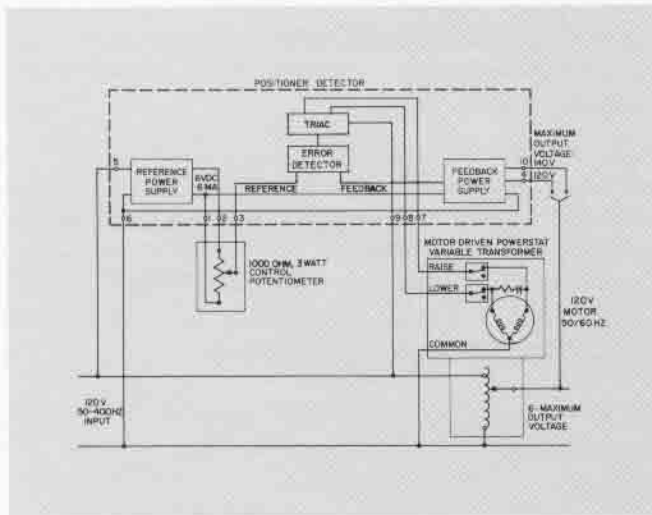
The wiring diagram for a complete positioner system is shown in Figure A. When used with a 240 or 480 V POWERSTAT Variable Transformer, a type T6068 step-down transformer is required in the output voltage sensing leads. Although two POWERSTAT units can be controlled from one potentiometer, one positioner controller is required for each POWERSTAT assembly. Figure B



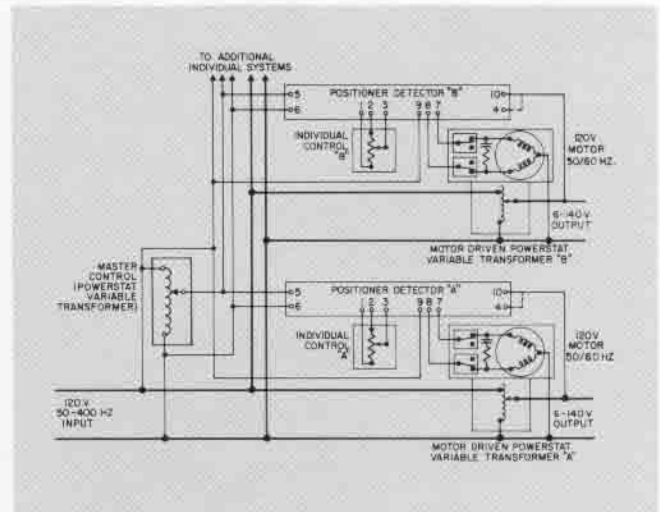
**POSITIONER CONTROL TYPE PD120B**

shows how two or more positioner controlled units can be mastered using a POWERSTAT Variable Transformer Type 10C to vary the input to the control potentiometers.

Consult the factory Application Support Group if the positioner system is to be used with other than an 120 V, 50/60 Hz synchronous motor drive or if the control is to be used on a 600 V system.



**FIGURE A**



**FIGURE B**

All dimensions are in inches (millimeters).

# STABILINE®

## FULL RANGE REGULATOR CONTROLLERS

*... for use with any synchronous motor driven  
POWERSTAT Variable Transformer to provide:*

- *Regulated AC voltage*
- *Regulated AC current*
- *Regulated DC voltage*

TYPES  
FR501B &  
FRX501B



TYPES  
FR501BMP &  
FRX501BMP

TYPES  
FR501BDC &  
FRX501BDC



A STABILINE Full Range Regulator Controller is a solid-state device which monitors the load voltage or current of a motor-driven POWERSTAT Variable Transformer and operates the motor drive to hold the output constant at the selected value. Any load voltage or current value within the full range of the POWERSTAT unit can be selected. These controllers are ideal for applications requiring a wide range of regulated current or voltage or where wide input voltage variations will be encountered.

Types prefixed FR are for use with 120 V POWERSTAT assembly motor drives; types prefixed FRX are for use with 240 V motor drives.

Types FR501B and FRX501B are AC controllers for use where the output is to be remotely selected from a separate user supplied output adjustment potentiometer (1 K ohm, 3W) or a 0 to 6 V, 6 mA reference source. Potentiometer Kit 026602-008 consisting of a knob, dial and potentiometer is offered for use with these units.

Types FR501BMP and FRX501BMP are AC controllers which have the output adjust potentiometer and an output voltmeter furnished as part of the unit.

Types FR501BDC and FRX501BDC are DC voltage controllers. A separate output adjustment potentiometer (1 K ohm, 3 W) or a 0 to 6 V, 6 mA reference source is required to set the desired output voltage. Potentiometer Kit 026602-008 consisting of a knob, dial and potentiometer is offered for this purpose.

### **Regulated AC Voltage**

All AC versions of the STABILINE Full Range Regulator Controllers can be used to provide regulated AC voltage when used with synchronous motor driven POWERSTAT Variable Transformers. This combination will maintain a constant output voltage accurate within  $\pm 0.8$  percent of the maximum output voltage. All AC controllers can be connected to provide a maximum output voltage of 120, 140, 240, 280, 480 or 600V at 50/60/400 Hz. For 480 or 600 V applications, a 4:1 step-down transformer (Superior Electric Type T6026) is required.

### **Regulated AC Current**

With the addition of a T6340 Transformer, the FR501B and FRX501B STABILINE Full Range Regulator Controllers can be

used with synchronous motor driven POWERSTAT Variable Transformers to automatically regulate current.

When used with these STABILINE Full Range Regulator Controllers, the T6340 sense transformer converts AC 0 to 5 A into voltage which is sensed by the controller to direct the POWERSTAT unit in regulating the load current.

To regulate load currents greater than 5 A, a separate current transformer is needed to convert the load current to the 0 to 5 A required by the T6340 sense transformer. Most current transformers deliver 0 to 5 A when the current through the transformer is varied between 0 and the rated current of the transformer. The current transformer must be rated to supply 0 to 5 A, 10 VA minimum to the T6340 sense transformer.

Superior Electric offers two current transformers which are suitable for load currents up to 500 A. The 300:5 A current transformer (Part No. 220282-001) is used for several current ranges depending on the number of times the load wire is passed through the current transformer:

Maximum Load Current	Number of times load wire passes through 300:5 current transformer.
50	6
75	4
150	2
300	1

The 500:5 A current transformer (Part No. 220282-002) is used for currents up to 500 A.

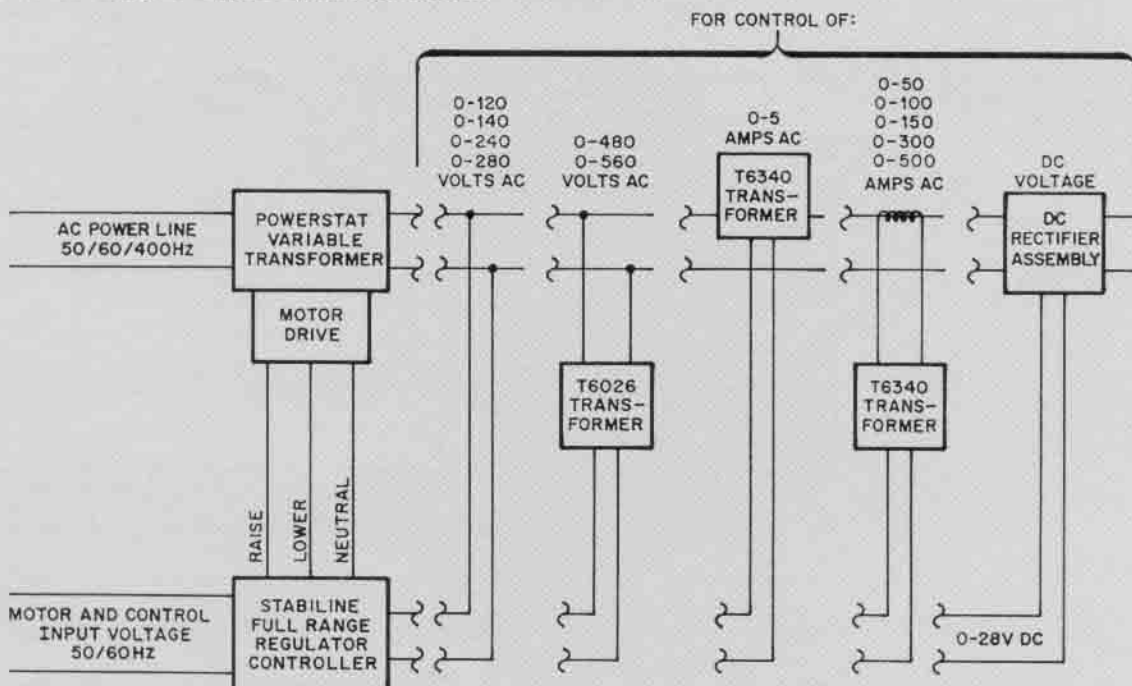
The combination will maintain constant output current accurate within  $\pm 1$  percent of the rated load current. Load current can be regulated from 0 to maximum.

### Regulated DC Voltage

STABILINE Full Range Regulator Controllers with DC suffixes provide regulated DC voltage when used with a synchronous motor driven POWERSTAT Variable Transformer that is powering a user supplied rectifier assembly. Types FR501BDC and FRX501BDC both require 0 to 28 VDC and 16 mA to the sensing terminals. This combination will maintain constant DC voltage accurate within  $\pm 0.8$  percent of the maximum DC voltage output.

A STABILINE Full Range Regulator Controller is a solid-state sensing device which detects any variation in load voltage or current and operates a POWERSTAT Variable Transformer drive motor to correct the variation. A potentiometer is used to adjust the level of a built-in reference voltage or a reference voltage is supplied by the user. The volt-

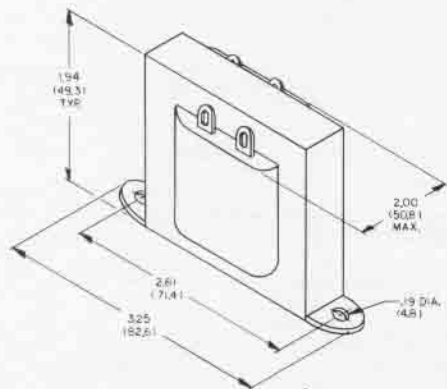
age or current to be regulated is rectified and compared with the reference voltage. An error signal created by the difference between the two actuates an integrated circuit switch which powers the variable transformer drive motor to correct the output.



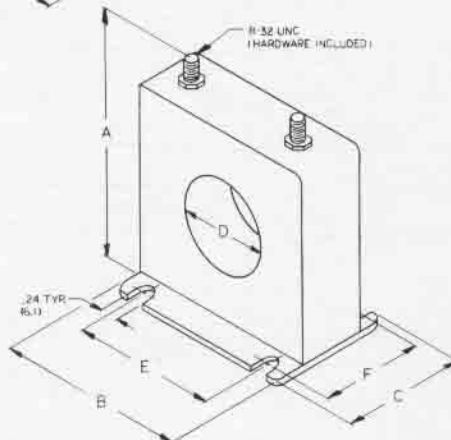
### SYSTEM REQUIREMENTS

Regulated Output	Motor & Control Voltage	Control Type	Load Volt/Amp Range	Required Sensing Components	
				Part No.	Description
AC VOLTAGE	120 Nom. (95 - 135)	FR501B* FR501BMP	0-120, 0-140 0-240, 0-280		None Required
	240 Nom. (216 - 264)	FRX501B* FRX501BMP	0-480, 0-600	T6026	Step-Down Transformer
AC CURRENT	120 Nom. (95 - 135)	FR501B* FR501BMP	0-5	T6340	5 A Sense Transformer
			0-50, 0-100 0-150, 0-300	T6340 And 220282-001	5 A Sense Transformer 300:5 Current Transformer
	240 Nom. (216 - 264)	FRX501B* FRX501BMP	0-500	T6340 220282-002	5 A Sense Transformer 500:5 Current Transformer
			0-Above 500	T6340 And Current Transformer	5 A Sense Transformer User Supplied
DC VOLTAGE	120 Nom. (95-135)	FR501BDC*	0-28	None Required	
	240 Nom. (216 - 264)	FRX501BDC*			

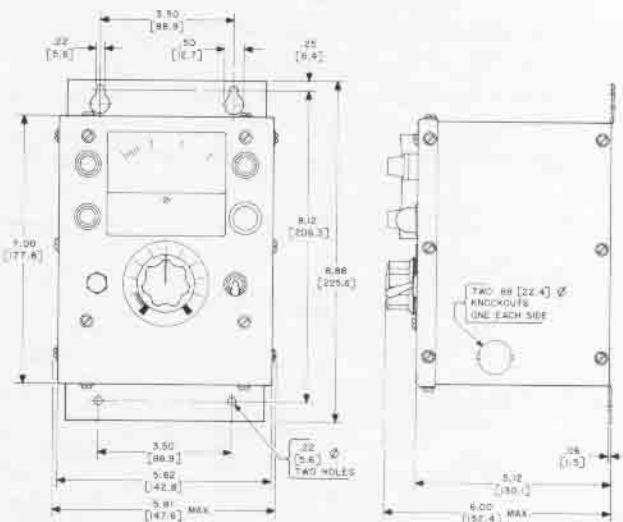
\*Potentiometer Kit 026602-008 or equivalent also required.



**T6026 & T6340  
Transformers**



**Current Transformers**



**Types FR501BMP & FRX501BMP**

Current Transformer	Dimensions					
	A	B	C	D	E	F
220282-001	3.11	2.33	1.88	1.13	1.70	1.60
300:5	(79.0)	(59.2)	(47.8)	(28.7)	(43.2)	(40.6)
220282-002	4.07	3.50	2.15	1.56	2.70	1.79
500:5	(103.4)	(88.9)	(54.6)	(39.6)	(68.6)	(45.5)

All dimensions are in inches (millimeters).



# RATING CHART single phase

INPUT		OUTPUT				MANUALLY OPERATED				MOTOR DRIVEN													
														CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		APPROXIMATE WEIGHT (POUNDS)		AVAILABLE SPEEDS (SECONDS) AT 60 HZ		APPROXIMATE WEIGHT (POUNDS)	
														MAX. AMP.	MAX. KVA	MAX. AMP.	MAX. KVA	NET	SHIPPING	NET	SHIPPING		
VOLTS	HERTZ	VOLTS	VOLTS	VOLTS	VOLTS	TYPE	TYPE	TYPE	TYPE	TYPE	TYPE	TYPE	TYPE										
<b>SINGLE PHASE RATINGS</b>																							
120	50/60	0-120	2.25*	0.27	31	0.36	10C	2	2-1/2	—	—	—	—										
120	60	0-132	2.25*	0.3C	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	5	0.54	7	0.78	21	5-1/2	6	M21	5, 15, 30, 60	13	15										
120	50/60	0-140	5	0.63	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	10	1.2	1.3	1.6	116C, 3PN116C, 116CT, 116CU	10	12	M116CT, M116CU	5, 15, 30, 60	19	22										
120	60	0-120	12	1.4	15	1.8	117CT, 117C, 3PN117C, 117CU	10	12	M117CT, M117CU	5, 15, 30, 60	19	22										
120	50/60	0-120	15	1.8	20	2.4	126, F126, 126T, 3PN126, 126U	16	18	MC126, MCF126, MC126T, MC126U	5, 15, 30, 60	27	31										
120	50/60	0-140	15	2.1	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	22	2.6	2.8	3.4	136BF136B, 136BT, 136BU	23	26	MO136B, MCF136B, MO136BT, MO136BU	5, 15, 30, 60	36	40										
120	50/60	0-140	22	3.1	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	20	1.8	—	—	3PN136B	23	26	—	—	—	—										
120	50/60	0-140	20	1.8	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	30	3.6	3.5	4.2	146, F146, 146T, 146U	35	38	M146, MF146, M146T, M146U	5, 15, 30, 60	50	57										
120	50/60	0-140	30	4.2	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	44	5.3	5.6	6.7	136BU-2§	48	53	MO136BU-2§	5, 15, 30, 60	68	85										
120	50/60	0-140	44	6.2	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	50	6.0	5.5	6.6	1156D, 1156DT, 1156DU	72	82	MB1156D, MB1156DT, MB1156DU	5, 15, 30, 60	95	102										
120	50/60	0-140	50	7.0	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	60	7.2	7.0	8.4	146U-2††	76	83	M146U-2††	5, 15, 30, 60	88	99										
120	50/60	0-140	60	8.4	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	66	7.9	8.4	10.1	136BU-3‡	74	80	MD136BU-3‡	5, 15, 30, 60	93	108										
120	50/60	0-140	66	9.2	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	90	10.8	10.5	12.6	146U-3§§	114	125	M146U-3§§	5, 15, 30, 60	126	140										
120	50/60	0-140	90	12.6	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	100	12.0	11.0	13.2	1156D-2P, MB1156D-U-2P	141	169	MB1156D-2P, MB1156DU-2‡	5, 15, 30, 60	162	200										
120	50/60	0-140	100	14.0	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	150	18.0	16.5	19.8	1156D-3P, MB1156D-U-3P	220	272	MB1156D-3P, MB1156DU-3-‡	5, 15, 30, 60	239	301										
120	50/60	0-140	150	21.0	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	200	24.0	22.0	26.4	1156D-U-4P	328	373	MB1156D-U-4P	15, 30, 60	348	393										
120	50/60	0-140	200	28.0	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	250	30.0	27.5	33.0	1156D-U-5P	400	445	MB1156D-U-5P	15, 30, 60	420	465										
120	50/60	0-140	250	35.0	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	300	36.0	33.0	39.6	1156D-U-6P	475	520	MB1156D-U-6P	15, 30, 60	495	540										
120	50/60	0-140	300	42.0	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	350	42.0	38.5	46.2	1156D-U-7P	555	605	MB1156D-U-7P	30, 60	575	625										
120	50/60	0-140	350	49.0	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	400	48.0	44.0	52.8	1156D-U-8P	635	690	MB1156D-U-8P	30, 60	655	710										
120	50/60	0-140	400	56.0	—	—	—	—	—	—	—	—	—										
120	50/60	0-120	450	54.0	49.5	59.4	1156D-U-9P	715	790	MB1145D-U-9P	30, 60	735	810										
120	50/60	0-140	450	63.0	—	—	—	—	—	—	—	—	—										

\* Rating when mounted on a metal panel. When mounted on a bracket or a nonmetallic panel, derate to 1.3 amperes for type 9, 1.75 amperes for 10C series, 0.5 ampere for 12C series.  
 \*\* 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 on page 4.  
 † Rating when mounted on a metal panel. When mounted on a bracket or a nonmetallic panel, derate to 1.8 amperes for type 9, 2.5 amperes for 10C series, 0.75 ampere for 12C series.  
 †† Maximum current when mounted on a metal panel is 0.7 ampere in output voltage range from 0 to line voltage.  
 ‡ Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.  
 § Requires also one paralleling choke type T6053.  
 §§ Requires also one paralleling choke type T5000B.  
 §§ Requires also one paralleling choke type T6065.  
 §§§ Requires also one paralleling choke type T4479B.  
 ¶ 120 volt input connection not available.  
 ¶¶ Speeds are 20 percent slower at 50 hertz.





# RATING CHART three phase

INPUT		OUTPUT				MANUALLY OPERATED				MOTOR DRIVEN			
VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		TYPE	APPROXIMATE WEIGHT (POUNDS)		TYPE	AVAILABLE SPEEDS (SECONDS) AT 60 HZ □ □ □	APPROXIMATE WEIGHT (POUNDS)	
			MAX. AMP.	MAX. KVA	MAX. AMP.	MAX. KVA		NET	SHIPPING			NET	SHIPPING
<b>THREE PHASE RATINGS continued</b>													
480	50/60	0-480	15	12.5	19	15.8	246U-3	114	125	M246U-3	5, 15, 30, 60	126	140
	60	0-560	15	14.5	—	—							
240	60	0-560	15**	6.3†	—	—							
480	50/60	0-480	28	23.3	28	23.3	1256D-3Y, 1256DT-3Y, 1256DU-3Y	220	235	MB1256D-3Y, MB1256DT-3Y, MB1256DU-3Y	5, 15, 30, 60	235	280
	60	0-560	28	27.2	—	—							
240	60	0-560	28**	11.8†	—	—							
480	50/60	0-480	56	46.6	56	46.6	1256DU-6Y	462	507	MB1256DU-6Y	15, 30, 60	482	527
	60	0-560	56	54.3	—	—							
240	60	0-560	56**	23.5†	—	—							
480	50/60	0-480	84	69.8	84	69.8	1256DU-9Y	715	790	MB1256DU-9Y	30, 60	735	810
	60	0-560	84	81.5	—	—							
240	60	0-560	84**	35.3†	—	—							
480	50/60	0-480	112	93.1	112	93.1	—	—	—	MB1256DU-12Y	30, 60	990	1115
	60	0-560	112	109	—	—							
240	60	0-560	112**	47.0†	—	—							
480	50/60	0-480	140	116	140	116	—	—	—	MB1256DU-15Y	60	1215	1350
	60	0-560	140	136	—	—							
240	60	0-560	140**	58.8†	—	—							
480	50/60	0-480	168	140	168	140	—	—	—	MB1256DU-18Y	60	1455	1600
	60	0-560	168	163	—	—							
240	60	0-560	168**	70.6†	—	—							
480	50/60	0-480	196	163	196	163	—	—	—	MB1256DU-21Y	60	1700	1850
	60	0-560	196	190	—	—							
240	60	0-560	196**	82.3†	—	—							
480	50/60	0-480	224	186	224	186	—	—	—	MB1256DU-24Y	60	1960	2120
	60	0-560	224	217	—	—							
240	60	0-560	224**	94.1†	—	—							
480	50/60	0-480	252	210	252	210	—	—	—	MB1256DU-27Y	60	2230	2400
	60	0-560	252	244	—	—							
240	60	0-560	252**	106.†	—	—							

† 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 on page 4.  
 § Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.  
 □ □ Speeds are 20 percent slower at 50 hertz.

## "Q" SERIES

120	50/60	0-120	9	1.1	12	1.4	Q116U	10	12	single phase
	60	0-140	9	1.3	—	—				
120	60	0-120	10	1.2	13	1.6	Q117U	10	12	
240	50/60	0-240	3.5	0.84	5	1.2				
	60	0-280	3.5	0.98	—	—	Q216U	10	12	
120	50/60	0-260	3.5†	0.42§	—	—				
240	60	0-240	5	1.2	7	1.7	Q217U	10	12	
240	50/60	0-240	9	2.2	12	2.9				
	60	0-280	9	2.5	—	—	Q117U-2	20	24	
240	60	0-240	10	2.4	13	3.1				
480	50/60	0-480	3.5	1.7	5	2.4	Q216U-2	20	24	
	60	0-560	3.5	2.0	—	—				
240	50/60	0-560	3.5†	0.85§	—	—	Q217U-2	20	24	
480	60	0-480	5	2.4	7	3.4				
120	50/60	0-120	9	1.9	12	2.5	Q116U-2	20	24	three phase
	60	0-140	9	2.2	—	—				
120	60	0-120	10	2.1	13	2.7	Q117U-2	20	24	
240	50/60	0-240	3.5	1.5	5	2.1				
	60	0-280	3.5	1.7	—	—	Q216U-2	20	24	
120	50/60	0-280	3.5†	0.74§	—	—				
240	60	0-240	5	2.1	7	2.9	Q217U-2	20	24	
240	50/60	0-240	9	3.8	12	5.0				
	60	0-280	9	4.4	—	—	Q116U-3	31	36	
240†	60	0-240	10	4.2	13	5.4				
480	50/60	0-480	3.5	2.9	5	4.2	Q117U-3	31	36	
	60	0-560	3.5	3.4	—	—				
240	60	0-560	3.5†	1.5§	—	—	Q216U-3	31	36	
480†	60	0-480	5	4.2	7	5.8				

\* Other types available on special order.  
 † 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 on page 4.  
 § Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.  
 † 120 volt input connection not available.  
 † There must be no neutral connection on in, out or output.

# RATING CHARTS

## 40-VOLT SERIES

INPUT		OUTPUT				MANUALLY OPERATED				MOTOR DRIVEN			
						CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		APPROXIMATE WEIGHT (POUNDS)		TYPES	AVAILABLE SPEEDS (SECONDS) AT 60 HZ □ □
		VOLTS	HERTZ	VOLTS	MAX. AMP.	MAX. KVA	MAX. AMP.	MAX. KVA	TYPE	NET	SHIPPING		
40	60	0-40	7	0.28	9	0.36	10C-40	2½	3	---	---	---	---
							10C-40-2†	6	6½	---	---	---	---
							10C-40-3†	9	9½	---	---	---	---
			18	0.72	22	0.88	21-40	5½	6	M21-40	5, 15, 30, 60	13	15½
							21-40-2†	11½	13½	M21-40-2†	5, 15, 30, 60	21	23
							21-40-3†	17	19	M21-40-3†	5, 15, 30, 60	26	31
							116CU-40	9	11	M116CU-40	5, 15, 30, 60	18	21
							116CU-40-2†	18	21	M116CU-40-2†	5, 15, 30, 60	30	34
							116CU-40-3†	25	30	M116CU-40-3†	5, 15, 30, 60	38	45

□ □ Speeds are 20 percent slower at 50 hertz.

## LW136B SERIES

NOMINAL LINE VOLTAGE	USED AS LOW-VOLTAGE TRANSFORMER WITH ISOLATED SECONDARY			USED AS LIMITED-RANGE TRANSFORMER			USED AS LINE CORRECTOR			MANUALLY OPERATED			MOTOR DRIVEN				
	OUTPUT			OUTPUT			OUTPUT			TYPE	APPROXIMATE WEIGHT (POUNDS)		TYPE	AVAILABLE SPEEDS (SECONDS) AT 60 HZ □ □	APPROXIMATE WEIGHT (POUNDS)		
	VOLTS	MAX. AMP.	MAX. KVA	VOLTS	MAX. AMP.	MAX. KVA	INPUT VOLTS	MAX. AMP.	MAX. KVA		NET	SHIPPING			NET	SHIPPING	
120	15-0-15	35	0.52	90-120	25	3.0	96-120	25	3.0	LW136B	---	---	MDLW136B	---	---	---	---
	0-30	25	0.75	105-135	35	4.7	107-137†	35	4.2	LW136BT	23	26	MDLW136BT	5, 15, 30, 60	36	40	
				120-150	25	3.8	120-150*†	25	3.0	LW136BU	---	---	MDLW136BU	---	---	---	---
	30-0-30	35	1.0	60-120	25	3.0	80-120	25	3.0	LW136BU-2	48	53	MDLW136BU-2	5, 15, 30, 60	68	85	
	0-60	25	1.5	90-150	35	5.2	96-150*†	35	4.2	LW136BU-3	74	80	MDLW136BU-3	5, 15, 30, 60	93	108	
				120-180	25	4.5	120-210	25	5.2								
240	15-0-15	35	0.52	210-240	25	6.0	213-240	25	6.0	LW136B	---	---	MDLW136B	---	---	---	---
	0-30	25	0.75	225-255	35	8.9	226-256†	35	8.4	LW136BT	23	26	MDLW136BT	5, 15, 30, 60	36	40	
				240-270	25	6.8	240-274†	25	6.0	LW136BU	---	---	MDLW136BU	---	---	---	---
	30-0-30	35	1.0	180-240	25	6.0	182-240	25	6.0	LW136BU-2	48	53	MDLW136BU-2	5, 15, 30, 60	68	85	
	0-60	25	1.5	210-270	35	9.4	213-274*†	35	8.4	LW136BU-3	74	80	MDLW136BU-3	5, 15, 30, 60	93	108	
				240-300	25	7.5	240-300*†	25	6.0								
480	15-0-15	35	0.52	150-240	25	6.0	175-240	25	6.0	LW136B	---	---	MDLW136B	---	---	---	---
	0-30	25	0.75	195-285	35	10.0	202-295†	35	8.4	LW136BT	23	26	MDLW136BT	5, 15, 30, 60	36	40	
				240-330	25	8.2	240-330†	25	6.0	LW136BU	---	---	MDLW136BU	---	---	---	---
	30-0-30	35	1.0	420-480	25	12.0	427-480	25	12.0	LW136BU-2	48	53	MDLW136BU-2	5, 15, 30, 60	68	85	
	0-60	25	1.5	450-510	35	17.8	452-512†	35	16.8	LW136BU-3	74	80	MDLW136BU-3	5, 15, 30, 60	93	108	
				480-540	25	13.5	480-549*†	25	12.0								
120	0-30	25	1.3	90-120	25	5.2	96-120	25	5.2	LW136BU-2	48	53	MDLW136BU-2	5, 15, 30, 60	68	85	
				105-135	35	8.2	107-137*	35	7.3	LW136BU-3	74	80	MDLW136BU-3	5, 15, 30, 60	93	108	
				120-150	25	6.5	120-150*†	25	5.2								
	0-30	43.3	2.2	75-120	25	5.2	86-120	25	5.2	LW136BU-2	48	53	MDLW136BU-2	5, 15, 30, 60	68	85	
	0-52	25	2.2	98-143	35	8.7	101-146*	35	7.3	LW136BU-3	74	80	MDLW136BU-3	5, 15, 30, 60	93	108	
				120-167	25	7.2	120-167†	25	5.2								
240	0-30	25	1.3	210-240	25	10.4	213-240	25	10.4	LW136BU-2	48	53	MDLW136BU-2	5, 15, 30, 60	68	85	
				225-255	35	15.5	226-256†	35	14.6	LW136BU-3	74	80	MDLW136BU-3	5, 15, 30, 60	93	108	
				240-270	25	11.7	240-274†	25	10.4								
	0-30	43.3	2.2	180-240†	25	10.4	182-240†	25	10.4	LW136BU-2	48	53	MDLW136BU-2	5, 15, 30, 60	68	85	
	0-35†	43.3	2.6	197-240	25	10.4	201-240	25	10.4	LW136BU-3	74	80	MDLW136BU-3	5, 15, 30, 60	93	108	
	0-52	25	2.2	218-263	35	15.9	214-260*†	35	14.5	LW136BU-3	74	80	MDLW136BU-3	5, 15, 30, 60	93	108	
480	0-30	43.3	2.6	218-263	35	15.9	218-263†	35	14.5	LW136BU-2	48	53	MDLW136BU-2	5, 15, 30, 60	68	85	
	0-60†	25	2.6	240-286	25	12.4	240-293†	25	10.4	LW136BU-3	74	80	MDLW136BU-3	5, 15, 30, 60	93	108	
				240-300†	25	13.0	240-300†	25	10.4								
	0-35†	43.3	2.6	420-480	25	20.8	427-480†	25	20.8	LW136BU-2	48	53	MDLW136BU-2	5, 15, 30, 60	68	85	
	0-60†	25	2.6	450-510†	35	30.9	452-512†	35	29.1	LW136BU-3	74	80	MDLW136BU-3	5, 15, 30, 60	93	108	
				480-540†	25	23.4	480-520*†	25	20.8								

Single Phase

Three Phase

\*Other types available on special order.

† 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 on page 4.

‡ Maximum KVA at maximum output voltage. Maximum KVA at lower output voltages may be calculated from rating curve Figure B on page 4.

§ 120 volt input connection not available.

¶ There must be no neutral connection on input or output.

□ □ Speeds are 20 percent slower at 50 hertz.

# RATING CHARTS

## ENCLOSED L SERIES

INPUT		OUTPUT				TYPE	APPROXIMATE WEIGHT (POUNDS)		
VOLTS	HERTZ	VOLTS	CONSTANT CURRENT LOAD		CONSTANT IMPEDANCE LOAD		NET	SHIPPING	
			MAX. AMP.	MAX. KVA.	MAX. AMP.				MAX. KVA.
120	60	0-132	1.75	.23	---	---	L10C	5 lb.	6 lb.
120	50/60	0-140	4.5	.63	---	---	L21C	10 lb.	11 lb.
120	50/60	0-140	10	1.4	---	---	L118C	14 lb.	15 lb.

## LINE CORRECTOR SERIES\*\*

INPUT		OUTPUT		MANUALLY OPERATED			MOTOR DRIVEN				
VOLTS	HERTZ	VOLTS	MAX. AMP.	MAX. KVA	TYPE	APPROXIMATE WEIGHT (POUNDS)		TYPE	AVAILABLE SPEEDS (SECONDS) AT 60 HZ □ □ □	APPROXIMATE WEIGHT (POUNDS)	
						NET	SHIPPING			NET	SHIPPING
95-135	50/60	115	57	6.6	LC2106D	66	81	MDLC2106D	5, 15, 30, 60	79	99
95-135	50/60	115	144	16.6	LC2115E	117	202	MBLC2115E	5, 15, 30, 60	197	227
195-255	50/60	230	36	8.3	LC2207D	68	83	MDLC2207D	5, 15, 30, 60	81	101
205-250	50/60	230	130	29.9	LC2228E	183	208	MBLC2228E	5, 15, 30, 60	213	243
400-520	50/60	460	45	20.7	LC2418E	177	202	MBLC2418E	5, 15, 30, 60	197	227
195-255	50/60	230	63	25.1	LC3220YD	204	229	MDLC3220YD	5, 15, 30, 60	222	252
195-255	50/60	230	145	57.8	LC3245YE	551	631	MBLC3245YE	5, 15, 30, 60	565	650
195-255	50/60	230	188	74.9	LC3270DE	560	670	MBLC3270DE	5, 15, 30, 60	580	695
400-520	50/60	460	35	27.9	LC3425YD	210	235	MDLC3425YD	5, 15, 30, 60	228	258
400-520	50/60	460	100	79.7	LC3475YE	536	616	MBLC3475YE	5, 15, 30, 60	550	635
420-500	50/60	460	148	118	LC34100YE	536	616	MBLC34100YE	5, 15, 30, 60	550	635

single phase

three phase

\*\*Line Correctors may also be used as limited range transformers. Input voltage is the output voltage shown in the chart and output voltage is the input voltage shown in the chart.

\*Maximum voltage limited by saturation characteristics of transformer core.  
160 hertz only.

□ Speeds are 20 percent slower at 50 hertz.

## AUXILIARY EQUIPMENT

TYPE	DESCRIPTION	TYPE	DESCRIPTION	TYPE	DESCRIPTION
14096-000	Raise-Lower Switch	26602-008	Control Potentiometer For FR501B	T5579B	3-Gang Paralleling Choke for 136B, 236B, 246 Series
PD120B	Position Detector	T6026	Transformer for Full Range Regulator Controllers	T5587	Paralleling Choke supplied with all 1156D-1256D Series
26602-008	Position Control Potentiometer	T6340	Transformer for Full Range Regulator Controllers	T6053	2-Gang Paralleling Choke for 146 Series
T6068	Transformer for Positioner Detector	R2110B-1	Potentiometer Adapter Kit for 10C Series	T6065	3-Gang Paralleling Choke for 146 Series
FR501B*	Full Range Regulator Controller For A-C Voltage Control	30111-000	Potentiometer Adapter Kit for 12 Series		
FR501BMP*	Full Range Regulator Controller with Meter and Control	T5000B	2-Gang Paralleling Choke 136B, 236B, 246 Series		
FR501BDC*	Full Range Regulator Controller For 0-C Voltage Control				

\*Add suffix X when ordering for use with X-suffixed motor-driven POWERSTAT Variable Transformers.

## REPLACEMENT BRUSHES

UNIT TYPE±	BRUSH TYPE	UNIT TYPE±	BRUSH TYPE	UNIT TYPE±	BRUSH TYPE	UNIT TYPE±	BRUSH TYPE	UNIT TYPE±	BRUSH TYPE	UNIT TYPE±	BRUSH TYPE
		116C	RB116B	226	RB226	146	RB146				
						246	RB246	Q116U	RBQ116	Q217U	RBQ217
10C	RB10B	117C	RB117B	136B, LC2106D LC3220YD	RB136	1156D, LC2115E LC2418E, LC3245YE	RB1156B	Q117U	RBQ117	LW136B	RBLW136
12	RB12	216C	RB216B			1256D, LC2228E LC3270DE				10C-40	RB10B-40
21	RB21	217C	RB217B	236B, LC2207D LC3425YD	RB236	LC3475YE, LC34100YE	RB1256B	Q216U	RBQ216	21-40	RB21-40
22	RB22	126	RB126							116C-40	RB116B-40

± Includes also ganged units and variations such as Enclosed, Oil-Cooled and Explosion-proof types.

# Other Voltage Control Products

## STABILINE® POWER CONDITIONERS –

PPC and WHC Series units maintain constant, clean voltage to electronic equipment by regulating voltage, providing isolation from common-mode noise and attenuating transverse-mode noise. Mounted in attractive cabinets. Ratings from 110 VA to 33 kVA single phase and 12 kVA to 125 kVA three phase. All 120 VAC, 60 Hz PPC Series units are UL 1012 listed and CSA certified; international 230 VAC, 50 Hz models are TUV certified.

## STABILINE® UNINTERRUPTIBLE POWER SUPPLIES –

UPSY Series units are true on-line systems that regulate voltage, protect equipment from noise and provide battery backup power in event of utility failure. Available in 500 VA desktop models with easy conversion to rack mounting. SP Series feature an Advanced Battery Management system to prolong battery life, speed recharge time and provide advance notification of impending battery service. Available in North American 120 VAC, 60 Hz and international 230 VAC, 50/60 Hz models with power ratings of 220, 300, 420, 500 and 650 VA.



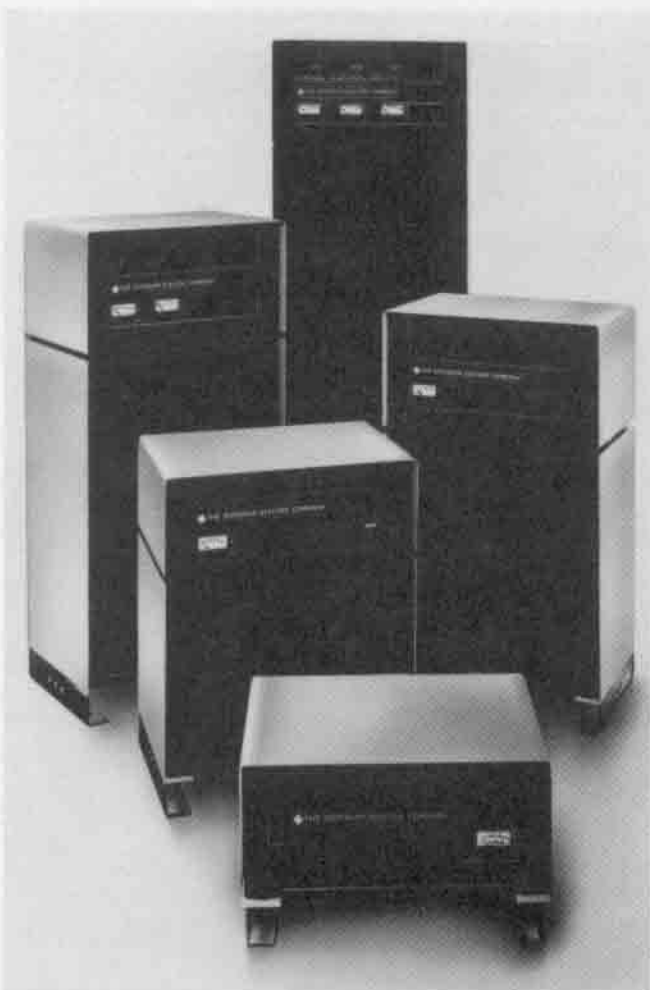
SL Series units are line-interactive devices that provide continuous sinewave output to every mission critical load. Use "boost/buck" tap system for tight output regulation and control over chronic low or high input voltage conditions. Available in North American versions with user selectable 110, 120 or 127 VAC, 60 Hz operation and international models for user selectable 220, 230 or 240 VAC, 50/60 Hz operation. Power ratings of 400, 600, 1000, 1500, 2000 and 2200 VA.

## STABILINE® POWER QUALITY INTERFACES –

PQI Series Transient Voltage Suppressors/RFI Filters provide bidirectional protection from source or load disturbances such as electromagnetic interference, spikes and transients. Offer input/output option choices and fax/modem telephone line protection. Ratings 120 VAC, 12 and 15 A and 240 VAC, 20 A. CSA approved and UL 1449 listed (clamping level 330 V). Wall and rack mount, desktop, industrial hardwired and NEMA 12 models available.

## STABILINE® VOLTAGE REGULATORS –

WHR Series units for AC power systems up to 660 V are high power voltage regulators that maintain constant voltage to sensitive equipment even when the input voltage and system load vary widely. Numerous standard options for tailoring unit to the application. Power ratings from 2 to 1680 kVA, 99% typical efficiency, no waveform distortion or power factor restrictions and availability of two input voltage ranges. Hold output voltage within  $\pm 1\%$ .



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POWERSTAT® Variable Transformers are obtainable worldwide through an extensive authorized distributor network. These distributors offer literature, technical assistance and a wide range of models off the shelf for fastest possible delivery and service.

In addition, Superior Electric sales engineers are available to provide prompt attention to customer needs. Call or fax for ordering and application information or for the address of the closest authorized distributor.

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### Colfax Automation Brand names:

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