

# INSTRUCTION MANUAL



KEPCO POWER SUPPLIES

Size A - 180 Series



Model PRM 28-7(-50)

Serial No. ....

## GENERAL DESCRIPTION

The Kepco PRM Series 180 modules are a group of voltage stabilized d-c power supplies. The design of PRM power supplies is based on Kepco's patented "FLUX-O-TRAN"® ferroresonant transformer, which provides output voltage stabilization and output current limiting. Due to their rugged construction and low parts count, Kepco's PRM modules are highly reliable d-c power sources, featuring efficiencies of approximately 65 to 75%.

## SPECIFICATIONS, SOURCE INPUT:

- a) INPUT REQUIREMENTS (Models without suffix): 115V a-c,  $\pm 15V$ , 60 Hz  $\pm 5\%$ , single phase.
- b) INPUT REQUIREMENTS (Models with suffix "-50"): 104V a-c  $\pm 13.5V$  a-c or 115V a-c  $\pm 15V$  a-c or 208V a-c  $\pm 27V$  a-c or 230V a-c  $\pm 30V$  a-c, 50 Hz  $\pm 5\%$ , single phase.

Kepeco PRM Series 180 Power Supply Modules with suffix "-50" (50 Hz) are shipped for operation on 230V a-c, 50 Hz, single phase lines. The transformer primary connections on these models may be changed for other a-c input voltages, however, by altering the primary jumper connections as shown in FIG. 2.

*NOTE: A  $\pm 1\%$  change in source frequency produces approximately  $\pm 1.5\%$  of output voltage change.*

## SPECIFICATIONS, D-C OUTPUT

- a) OUTPUT RATINGS, LOAD EFFECT and RIPPLE:

MODEL	d-c OUTPUT		LOAD EFFECT VOLTS INCREASE		LOAD EFFECT CURVE (FIG. 4)	RIPPLE (max) RMS VOLTS (FIG. 3)
	VOLTS	AMPS	100%—50% LOAD	100%—25% LOAD		
PRM 5-25	5.2	0-25	0.5	0.8	1	0.4
PRM 5-25-50	5.2	0-20	0.5	0.8	1	0.4
PRM 6-25	6.3	0-25	0.5	0.8	1	0.4
PRM 6-25-50	6.3	0-20	0.5	0.8	1	0.4
PRM 12-15	12	0-15	0.6	1.0	1	0.4
PRM 12-15-50	12	0-12	0.6	1.0	1	0.4
PRM 18-10	18	0-10	0.6	1.0	2	0.3
PRM 18-10-50	18	0-8	0.6	1.0	2	0.3
PRM 24-8	24	0-8	0.7	1.2	2	0.3
PRM 24-8-50	24	0-6.4	0.7	1.2	2	0.3
PRM 28-7	28	0-7	0.7	1.2	2	0.4
PRM 28-7-50	28	0-5.6	0.7	1.2	2	0.4
PRM 36-5	36	0-5	0.8	1.3	3	0.4
PRM 36-5-50	36	0-4	0.8	1.3	3	0.4
PRM 48-4	48	0-4	1.0	1.8	4	0.3
PRM 48-4-50	48	0-3.2	1.0	1.8	4	0.3
PRM 60-3	60	0-3	1.1	1.9	5	0.3
PRM 60-3-50	60	0-2.4	1.1	1.9	5	0.3
PRM 120-1.5	120	0-1.5	2.2	3.6	7	0.3
PRM 120-1.5-50	120	0-1.2	2.2	3.6	7	0.3

TABLE 1 OUTPUT SPECIFICATIONS, PRM 180 SERIES.

*NOTE: Output voltage accuracy  $\pm 2\%$  or 0.25 volts, at nominal source input, full load and 30°C ambient temperature. Initial (cold) output voltage is 1% higher than the table values.*

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## SPECIFICATIONS, CONT'D.

- b) SOURCE EFFECT: Output varies less than  $\pm 1\%$  for the rated source voltage range at full load. At no load, the source effect is  $\pm 1.5\%$  maximum.
- c) TIME EFFECT (8-hour drift): Less than 1% or 0.1V, whichever is greater.
- d) TEMPERATURE EFFECT (coefficient): Less than 0.05% per °C.
- e) DYNAMICS:
  - 1) VOLTAGE RECOVERY: The time required for the stabilized output voltage to recover within the load effect band, following a 50% load step, is less than 400 milliseconds.
  - 2) OUTPUT IMPEDANCE: The output impedance from d-c to 10 KHz is a function of the load effect:
 
$$Z_o = \Delta E_o / \Delta I_o$$

where  $\Delta E_o$  is the change in output voltage for a given change in load current ( $\Delta I_o$ ). For frequencies **above** 10 KHz, the effect of 0.5  $\mu$ H series inductance must be added.

## SPECIFICATIONS, GENERAL

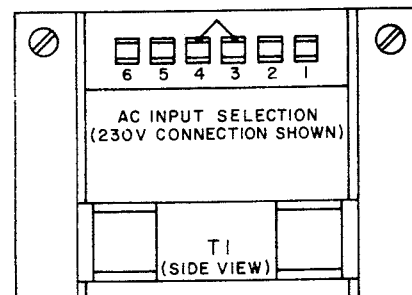
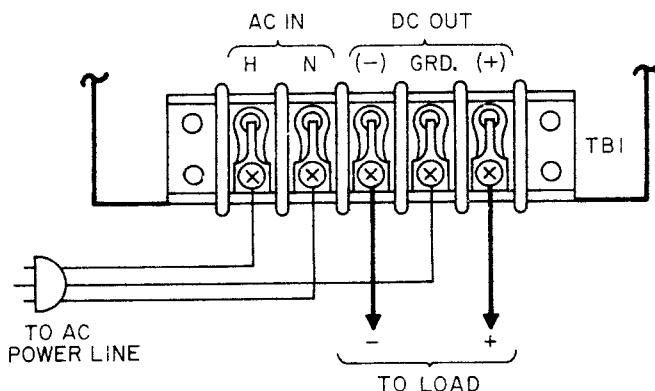
- a) OPERATING TEMPERATURE RANGE:  $-20^\circ\text{C}$  to  $55^\circ\text{C}$ . No derating of the specified output current and no external heat sink is required.
- b) STORAGE TEMPERATURE RANGE:  $-40^\circ\text{C}$  to  $85^\circ\text{C}$ .
- c) ISOLATION: The circuit of the PRM module is isolated from the chassis and from ground. It may be floated up to 600V d-c (or peak) off ground. The chassis should be grounded for safety. A common mode current of 50  $\mu$ A rms, 500  $\mu$ A p-p (at 60 Hz) flows to the ground return of the a-c power source.
- d) SERIES/PARALLEL: PRM modules can be connected in series up to the 600V isolation limit. Identical models can be paralleled for approximately double current (allow for 10% imbalance).
- e) STANDARDS: PRM modules are designed and tested in accord with NEMA standards for stabilized power supplies, d-c output, Publication No. PY-1-1972. 60 Hz PRM models (models without suffix) are recognized by Underwriters Laboratories under the UL Component Recognition Program: UL specifications 114 and 478.
- f) SHIPPING WEIGHT: Approximately 24 lbs. (10.9 Kg.).

## SPECIFICATIONS, MECHANICAL (See "Mechanical Outline Drawing", FIG. 7)

- a) MOUNTING: Three mounting methods are illustrated in the Mechanical Outline Drawing, FIG. 7. The PRM module may also be mounted into a standard (19-inch) instrument rack by means of the following Kepco Rack Adapters:
  - 1) Single-unit Rack Adapter, Kepco Model RA 10-1.
  - 2) Two-unit Rack Adapter, Kepco Model RA 8-2
  - 3) Three-unit Rack Adapter, Kepco Model RA 9-3.

## TERMINATIONS AND LOAD CONNECTIONS

A-C input and d-c output connections on the PRM Series 180 power supply are terminated at the barrier strip (TB1) as shown in FIG. 1. The barrier strip terminals are rated for 30 amperes and can accommodate wires to AWG #12. Load wires should be as heavy as practicable, as short as possible and should be tightly twisted to avoid noise pick-up problems. Recommended external fuse (if required): 3.5A @ 115V a-c, 1.75A @ 230V a-c, slow-acting type.



### NOTE:

- 104V a-c input: Connect (1)-(2) and (5)-(6).
- 115V a-c input: Connect (2)-(3) and (4)-(5).
- 208V a-c input: Connect (1)-(6).
- 230V a-c input: Connect (3)-(4).

FIG. 2 A-C INPUT VOLTAGE SELECTION. (MODELS WITH SUFFIX "-50").

FIG. 1 TERMINATIONS AND LOAD CONNECTIONS, PRM SERIES 180.

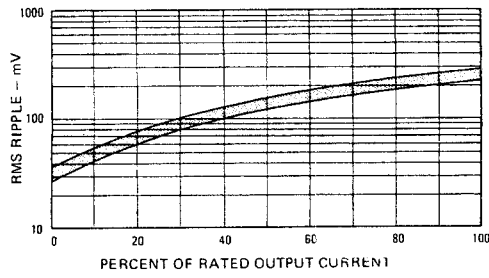


FIG. 3 TYPICAL OUTPUT RIPPLE, PRM SERIES 180.

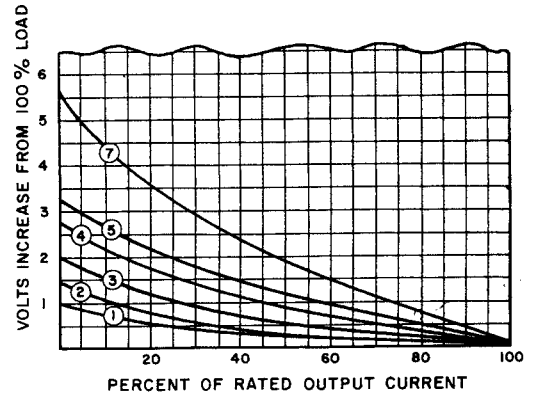


FIG. 4 TYPICAL LOAD EFFECT, PRM SERIES 180.

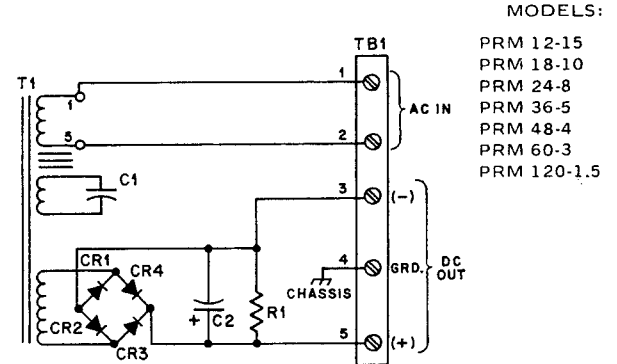
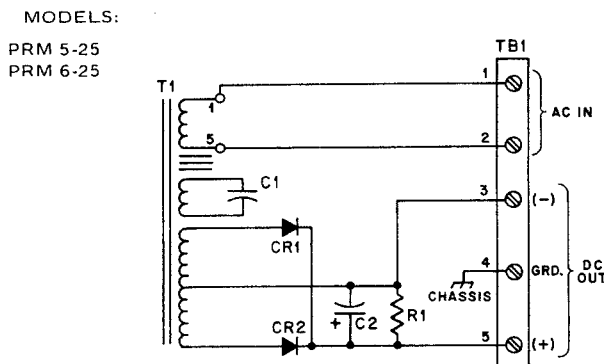
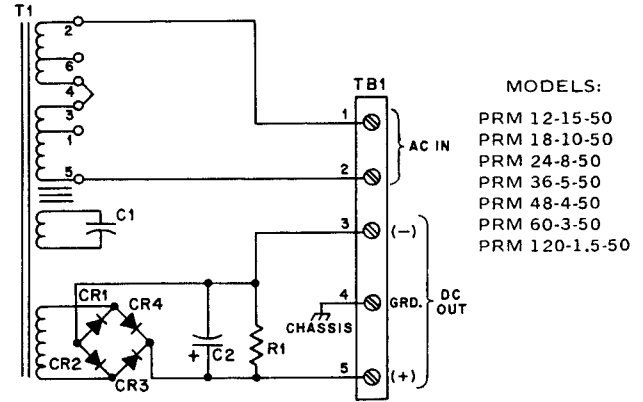
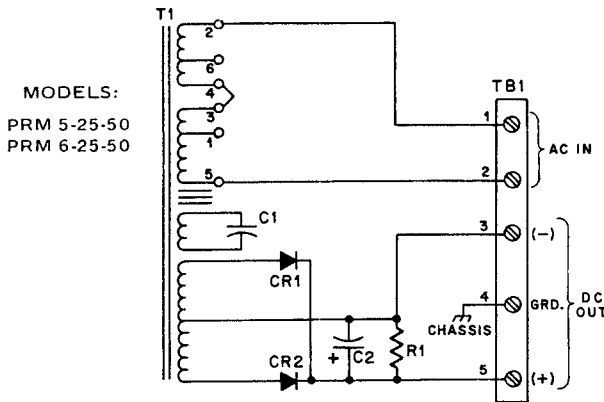
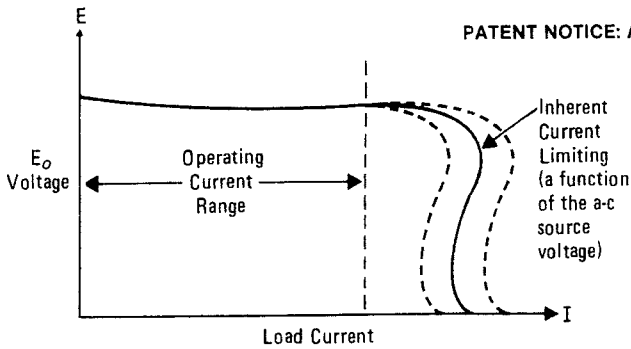
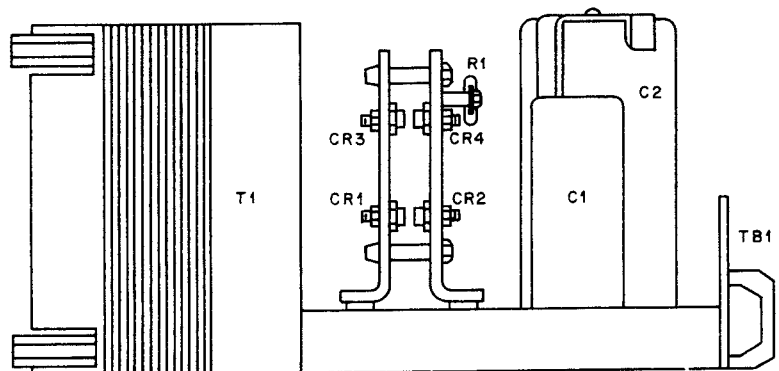


FIG. 5 SCHEMATIC DIAGRAM, PRM SERIES 180.

PATENT NOTICE: Applicable patent No's. will be supplied on request.



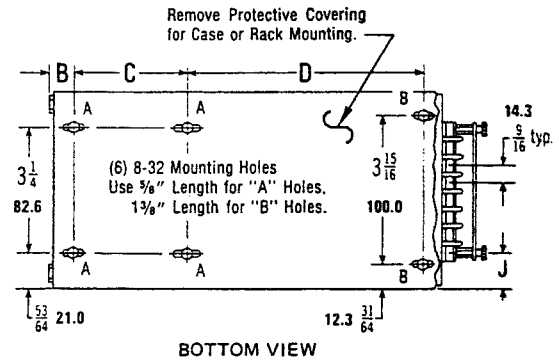
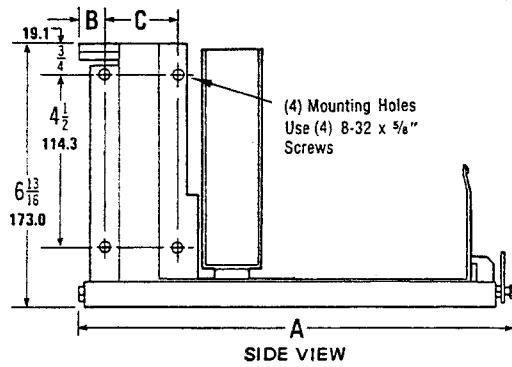
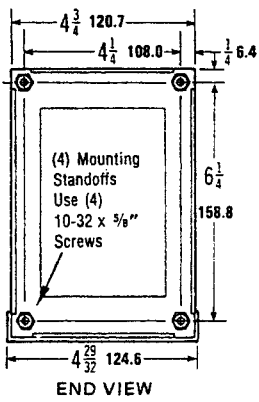
TYPICAL OUTPUT CHARACTERISTICS, PRM DESIGN GROUP



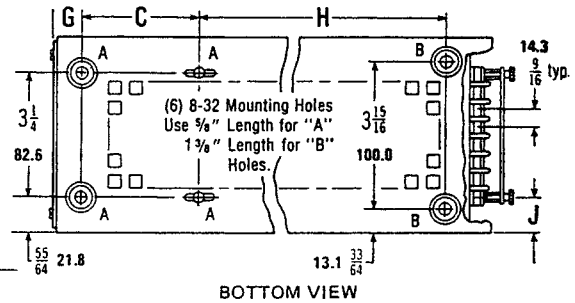
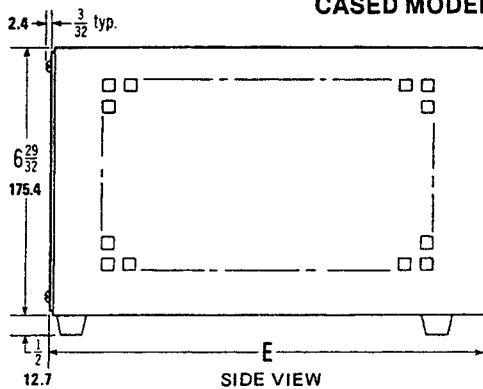
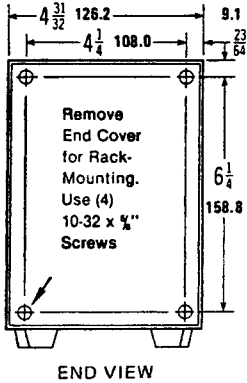
NOTE: CR3 AND CR4 NOT USED IN 5 AND 6 VOLT MODELS

FIG. 6 COMPONENT LOCATION, PRM 180 SERIES.

### UNCASED MODELS



### CASED MODELS



A	B	C	D	E	F	G	H	J (UNCASED)	J (CASED)
10 <sup>13</sup> / <sub>16</sub>	5/ <sub>8</sub>	2 <sup>1</sup> / <sub>32</sub>	6 <sup>1</sup> / <sub>2</sub>	10 <sup>7</sup> / <sub>16</sub>	1/ <sub>2</sub>	1 <sup>1</sup> / <sub>16</sub>	6 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>64</sub>
<b>274.6</b>	<b>15.9</b>	<b>59.5</b>	<b>165.1</b>	<b>265.1</b>	<b>12.7</b>	<b>17.5</b>	<b>165.1</b>	<b>17.5</b>	<b>20.2</b>

FIG. 7 MECHANICAL OUTLINE DRAWING, PRM 180 SERIES.

Notes:

- MATERIAL: Chassis, 16 GA-CRS; Case, 16GA - Aluminum.
- FINISH: Chassis: Cadmium plated with chromate wash; Case, royal blue epoxy paint.
- Fractional Dimensions (Light Face Type) are in inches. Decimal Dimensions (**Bold Face Type**) are in millimeters.
- TOLERANCES: ± 1/64 (0.4) between mounting holes. ± 1/32 (0.8) all other dimensions.

MODEL PRM 28-7 (-50)

### REPLACEMENT PARTS LIST

Code 05-1097

REFERENCE DESIGNATION	QTY	DESCRIPTION	MFRS. NAME & PARTS NO. SEE BOTTOM NOTE	KEPCO PART NO.	REC. SPARE PART QTY.
C1	1	Cap., Poly/Paper, Can-Type 3μF, ±6%, 660V a-c	General Electric Type 26F	117-0928	1
C2	1	Cap., Elect., Can-Type 100KμF, +75 -10%, 30V	Mepco 3186GE104V030BP	117-0959	1
CR1,2	2	Rect., Diode, Si., Stud-Type 200V (PIV), 40A	Motorola 1N1186A	124-0555	1
CR3,4	2	Rect., Diode, Si., Stud-Type 200V (PIV), 40A	Motorola 1N1186R	124-0210	1
R1	1	Res., Fxd., Power Strip 40 ohm, 5%, 40W	E-Systems Type ZR	115-1614	1
T1	1	Transformer, Power (Models without suffix only)	Kepco, Inc. 100-1481	100-1481	1
T1	1	Transformer, Power (Models with suffix "-50" only)	Kepco, Inc. 100-1578	100-1578	1

NOTE: REPLACEMENT PARTS MAY BE ORDERED FROM KEPCO, INC. ORDERS SHOULD INCLUDE KEPCO PART NUMBER AND DESCRIPTION.

PLEASE NOTE: THE MANUFACTURER'S NAME AND PART NUMBER LISTED FOR EACH ITEM ON REPLACEMENT PARTS LISTS REPRESENTS AT LEAST ONE SOURCE FOR THAT ITEM AND IS LISTED SOLELY FOR THE CONVENIENCE OF KEPCO EQUIPMENT OWNERS IN OBTAINING REPLACEMENT PARTS LOCALLY. WE RESERVE THE RIGHT TO USE EQUIVALENT ITEMS FROM ALTERNATE SOURCES. KEPCO, INC.