INSTRUCTION MANUAL

KEPCO

ERX

SINGLE OUTPUT
SWITCHING POWER SUPPLIES

I-INTRODUCTION

SCOPE OF MANUAL. This instruction manual contains information for the installation and operation of the Kepco ERX-240W Series of Switching Power Supplies. For service information, please refer to the Service Manual[1] for the ERX Series, which can be purchased, either from your Kepco Representative, or by writing directly to: Kepco Inc., 131-38 Sanford Avenue, Flushing, New York, 11352, U.S.A. When ordering a Service Manual, please state **Model Designation and Serial Number of your ERX power supply.** This information can be found on the NAME PLATE of your ERX power supply, as indicated in FIG. 4.

DESCRIPTION. The Kepco ERX-240W Series consists of several models of switching power supplies, having a single output, rated as listed in Table 1.

ERX switching power supplies are of open frame construction and have similar electrical specifications, except for the output ratings as listed in Table 1.

OPTIONAL ENCLOSURE. An optional enclosure, Kepco Model CA-18, is available if the power supply is used in a non-metallic cabinet.

[1] Service Manual will be available in the Spring of 1986.

MODEL		ERX 5-48	ERX 12-20	ERX 15-16	ERX 24-10
Output Volts [1]		5V	12V	15V	24V
OUTPUT	40°C, amb.	48.0 (240W)	20.0 (240W)	16.0 (240W)	10.0 (240W)
CURRENT,	50°C, amb.	38.4 (192W)	16.0 (192W)	12.8 (192W)	8.0 (192W)
AMPERES,	60°C, amb.	28.8 (144W)	12.0 (144W)	9.6 (144W)	6.0 (144W)
(WATTS)	70°C, amb.	19.2 (96W)	8.0 (96W)	6.4 (96W)	4.0 (96W)
CURRENT LIMIT (Amps)		50.4 ~ 52.8	21.0 ~ 22.0	16.8 ~ 17.6	11.2 ~ 12.0
OVP SETTING (Volts)[2]		5.8 ~ 6.9	13.7 ~ 15.7	17.0 ~ 19.0	27.9 ~ 30.5
RIPPLE & NOISE[3] (mV, p-p)					
	source (typ)	< 5	< 20	< 20	< 30
	source (max)	< 10	< 50	< 50	< 60
	switching (typ)	< 50	< 50	< 50	< 50
	switching (max)	< 90	< 100	< 100	< 120
	spike noise[4]	< 150	< 300	< 300	< 400

[1] The Output Voltage may be adjusted around the listed nominal values as follows: Model ERX 5-48: +10 – 20%, all other models +10 – 30%.
[2] Reset by removing input power for approximately 60 seconds.
[3] Source component, 2x source frequency, and switching component approximately 30-100 KHz.
[4] Measured with a 50 MHz bandwidth, p-p.

TABLE 1 OUTPUT RATINGS, ERX-240W SERIES

II-SPECIFICATIONS

INPUT VOLTAGE: 85 to 132V a-c or 170 to 264V a-c, (Selectable, see Section III), 47 to 66 Hz, single phase.

BROWNOUT VOLTAGE: 80V a-c/160V a-c. The ERX power supply will function at the brown-out level with minor degradation in the specifications for ripple, stabilization and holding time.

INPUT CURRENT: (Maximum, at full load as specified at the 40°C level in Table 1 and at the minimum input voltage). ERX-240W SERIES: 5.8/2.9A; at 85V a-c/170V a-c input voltage respectively.

INPUT PROTECTION AND SOFT START: All ERX power supplies are protected by a fuse against short circuits in the input circuit. A soft start circuit (thyristor) prevents excessive input surge current at turn on.

INPUT SURGE CURRENT: Turn-on from cold condition at 25°C, <17A at 115V a-c; <34A at 230V a-c.

EFFICIENCY: Typical 80%.

OUTPUT RATINGS: See Table 1.

OUTPUT ADJUSTMENT RANGE: ERX 5-48: +10 – 20%, all other models: +10 – 30% around the nominal output voltage. The location of the output adjustment rheostat is shown in Fig. 2.

OUTPUT STABILIZATION: Refer to Table 2.

INFLUENCE QUANTITY	OUTPUT VARIATIONS Typ.	Max.
SOURCE EFFECT (Min-Max)	<0.6%	1.0%
LOAD EFFECT (10-100%)(1)	<0.6%	1.0%
TEMPERATURE EFFECT (0-70°C)	<1.0%	2.0%
COMBINED EFFECT (Envelope)	<2.2%	4.0%
TIME EFFECT (drift, 8 hr @ 25°C)	<0.1%	0.5%

(1) Measured at the (±) sensing terminals.

TABLE 2 OUTPUT STABILIZATION

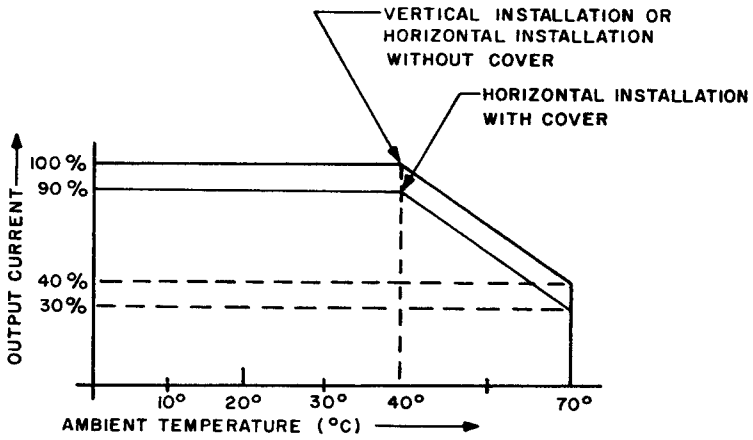

FIG. 1 DERATING GRAPH: USE FOR OPERATION FROM 50-71°C AMBIENT TEMPERATURE.

OUTPUT RECOVERY FROM LOAD CHANGES (ALL OUTPUTS): A step load change from 50 to 100% of the rated load current produces less than 4% output voltage excursion (or 0.5 volt, whichever is greater). Recovery occurs to within 1.0% (or 0.05 volt whichever is greater) of the original output voltage setting in less than 1 millisecond. Step-load rise or fall time must be greater than 50 microseconds.

OUTPUT HOLDING TIME: On a-c input interruption or failure, the d-c output will be maintained for a minimum of 20 milliseconds (30 ms typical) at full load and nominal input source.

OVERVOLTAGE PROTECTION: Overvoltage protection is provided by means of a circuit which disconnects the drive for the main switch. The threshold levels are as follows: ERX 5-48: 5.8 to 6.9V; ERX 12-20: 13.7 to 15.7V; ERX 15-16: 17.0 to 19.0V; ERX 24-20: 27.0 to 30.5V.
NOTE: *The overvoltage circuit is reset by interrupting the a-c input for approximately 60 seconds.*

AMBIENT OPERATING TEMPERATURE RANGE: 0°C to 70°C. Power supplies must be derated depending on installation and ambient temperature, see DERATING GRAPH, FIG. 1.

STORAGE TEMPERATURE RANGE: −20°C to +75°C.

ISOLATION (at 20°C ambient temperature, 85% relative humidity):

Between input and output terminals: 3750V a-c for 1 minute (without Y capacitor)

Between input and chassis: 1250V a-c for 1 minute

Between output terminal and chassis: 500V d-c, 100 megohms.

VIBRATION: 5-10 Hz, 10 mm amplitude, 3 axes.
10-55 Hz, 2 g, 3 axes.

SHOCK: 20 g, 3 axes (11 ±5 msec. pulse duration).

EMI-CONDUCTED: FCC 20780, Class B, VDE 0871

EMI-RADIATED: VDE 0875/7.71 (Level N), with optional enclosure.

SAFETY: VDE 0806/IEC 380 approved. UL 478 recognized, CSA 22.2-154 certified

III-OPERATION

INPUT SOURCE VOLTAGE SELECTION (See Fig. 2): The ERX power supply is delivered for operation on 85—132V a-c power lines (wire jumper in the "115V" position). For operation on 170—264V a-c power lines, change the wire jumper to the "230V" position.

FUSE CHANGE (Main Fuse) Since a dual fuse is provided, either the large (¼" x 1¼") size or the smaller (5 x 20 mm) size fuse can be used for replacement. The replacement fuse must conform to the applicable SAFETY specifications listed in SECTION 2. Fuse value: 6.3A-250V, Time-Lag type.

¼" x 1¼" Replacement Fuse: Kepco P/N 541-0084 **or** SAN-O ST4-6.3A.

5 x 20 mm Replacement Fuse: Kepco P/N 541-0085 **or** BUSS Type GDC.

The internal thermal fuse (F2, see FIG. 2) protects the turn-on resistor (R1) from overheating. For replacement use, UCHIHASHI P/N U21 or KEPCO P/N 541-0086.

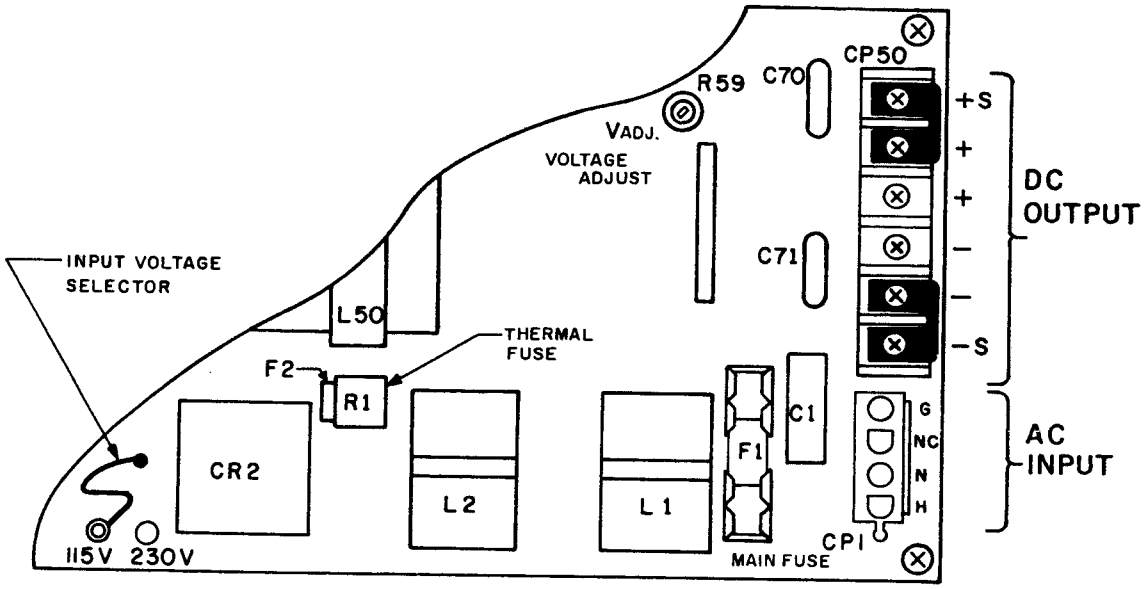

FIG. 2 ERX-240W POWER SUPPLY, SIMPLIFIED TOP-VIEW

LOAD CONNECTION: The load should be connected to the output of the ERX-240W power supply as illustrated in FIG. 3. The barrier strip terminals are rated for 30 Amps. Two terminals are provided for each output side for load current sharing on those ERX models with output currents exceeding the 30A limit. Error sensing at the load requires the removal of the jumper links as illustrated in FIG. 3. Error sensing will compensate for load wire voltage drops of up to 0.35V per lead. Long load wires may require decoupling at the load to prevent current spikes and preserve the transient response characteristics of the ERX. Capacitor values of 50μF (Electrolytic type) and 0.1μ (Film type) have been found to work satisfactorly.

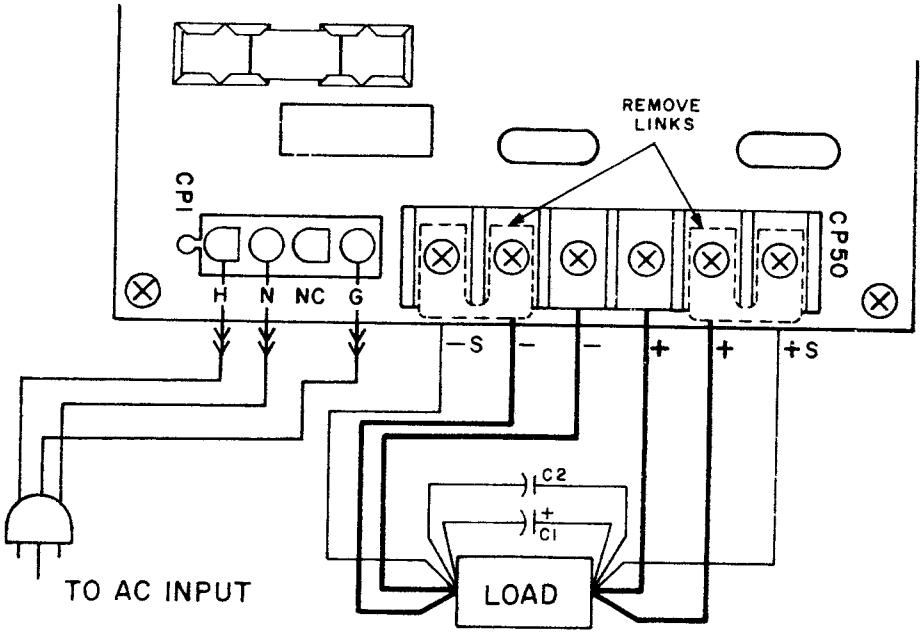

FIG. 3 LOAD CONNECTIONS WITH ERROR SENSING, ERX-240W SERIES.

INSTALLATION: The ERX power supply may be mounted in any position. Mounting holes are provided on the bottom surface, as well as on one side of the chassis, as indicated in Fig. 4. Care should be taken that the air immediately surrounding the power supply does not exceed the specified ambient temperature value. Cooler power supply operation can often be achieved by careful selection of the mounting surface.

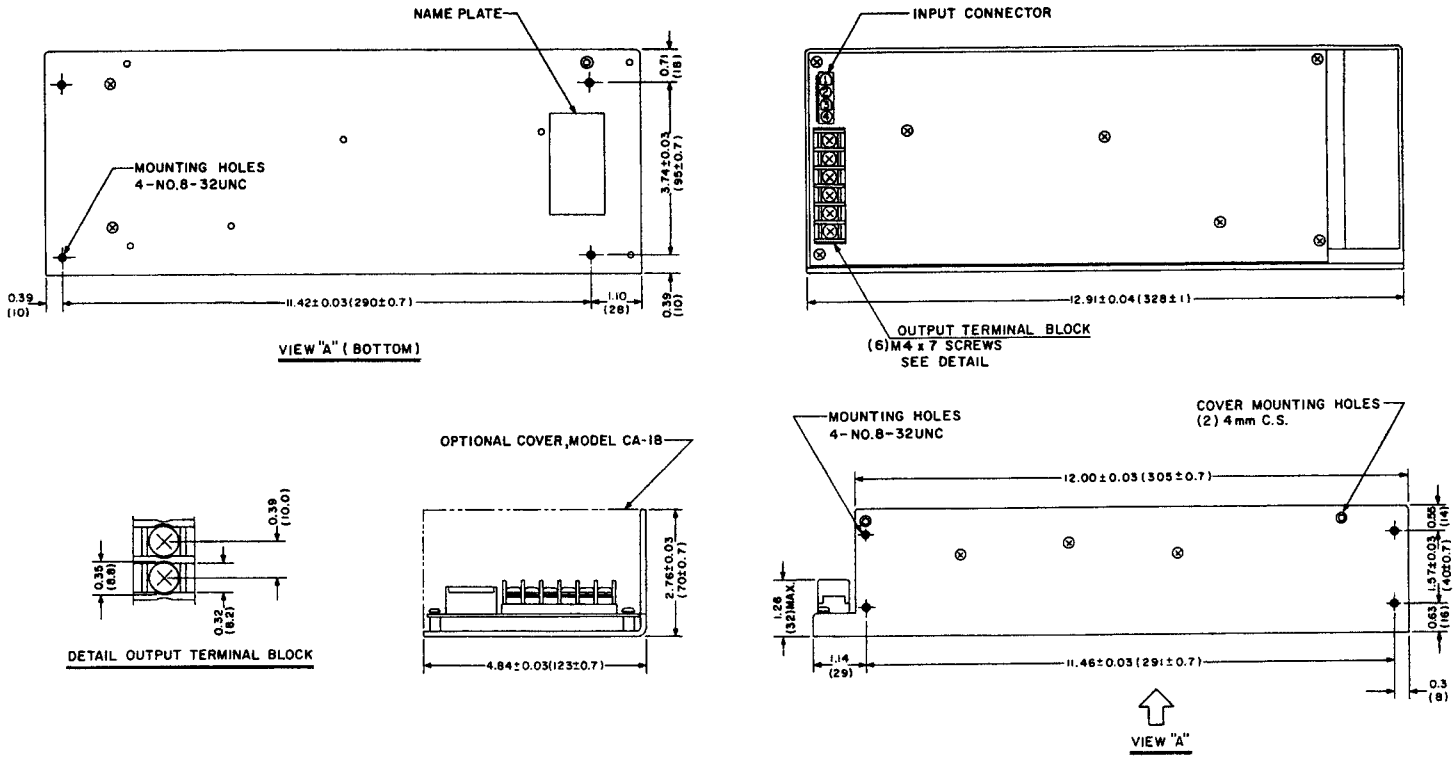

FIG. 4 MECHANICAL OUTLINE DRAWING, ERX-240W SERIES, WITH (OPTIONAL) COVER.

Notes:
1) Dimensions in parentheses are in millimeters, others are in inches.
2) TOLERANCES: 0.05" **(1.2 mm)** unless noted otherwise.
3) AC INPUT CONNECTOR: Molex 5219-04A. MATING CONNECTOR: Molex 3191 Series or equivalent. A cable kit, Kepco P/N 219-0169 is available from Kepco Inc. This kit is a single cable, 1 meter long, providing the a-c input terminations for the ERX power supplies on one end and free wire ends on the other.
4) DC OUTPUT TERMINAL BLOCK: TDK ULP-804(A)-6P, KEPCO P/N 567-0015.
5) TERMINAL SCREWS: M4 x 7 BN, KEPCO P/N 501-0058.
6) MATERIAL AND FINISH: A) CHASSIS, aluminum, phosphate treated; B) COVER, CRS cadmium plated.
7) WEIGHT: 4.7 lbs (2.24 kg.) max.

KEPCO, INC. •131-38 SANFORD AVENUE • FLUSHING, N.Y. 11352 U.S.A. • (718) 461-7000 • FAX: (718) 767-1102
email: hq@kepcopower.com • World Wide Web: http://www.kepcopower.com