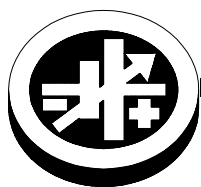


INSTRUCTION MANUAL



KEPCO An ISO 9001 Company.



30 WATT SINGLE OUTPUT OPEN FRAME POWER SUPPLIES

I — INTRODUCTION

SCOPE OF MANUAL. This instruction manual covers the installation and operation of the Kepco RKW 30W Series of Open Frame Switching Power Supplies.

DESCRIPTION. The Kepco RKW 30W Series consists of six models of switching power supplies, with a single output as shown in Table 1. Units may be operated with a nominal 100V a-c to 240V a-c (input voltage range 85 to 265 Va-c), 50-60 Hz (input frequency range 47-66Hz.). They will also operate on 110V to 370V d-c input. The RKW 30W Series employs a MOSFET switch flyback converter with a fixed switching frequency of approximately 60KHz. Regulation is provided by pulse width modulation. A thermistor prevents excessive turn-on current surge. Overvoltage and overcurrent protection is provided. Current limiting with automatic recovery from short circuit is featured. Units are convection cooled L-chassis construction. A steel cover (Model CA 33) is available as an option.

Section II contains specifications and operating limits of individual RKW 30W Series models (Table 1) as well as specifications and operating limits common to all RKW 30W Series Models. Section III describes installation and Section IV describes operation

II — SPECIFICATIONS

The following specifications are at nominal input voltages at 25°C unless otherwise specified.

TABLE 1. OUTPUT RATINGS AND SPECIFICATIONS, RKW 30W SERIES

MODEL	RKW 3.3-7K	RKW 5-6K	RKW 12-2.5K	RKW 15-2K	RKW 24-1.3K	RKW 48-0.65K	
OUTPUT VOLTS, d-c	3.3V	5V	12V	15V	24V	48V	
ADJUSTMENT RANGE, Vd-c	2.85-4.0	4.0-5.8	9.6-13.2	12-16.5	19.2-26.4	38.4-52.8	
OUTPUT CURRENT (AMPS) -10 to +50 °C	7.0	6.0	2.5	2.0	1.3	0.65	
CURRENT LIMIT ⁽²⁾ (AMPS)	7.9 min	6.3 min	2.6 min	2.1 min	2.1 min	0.68 min	
OVP SETTING ⁽¹⁾ (VOLTS)	4.2-5.2	6.0-6.9	13.7-15.7	17.0-19.0	27.0-30.5	55.0-60.0	
EFFICIENCY	100 Va-c	75%	77%	81%	81%	84%	84%
	200 Va-c	76%	78%	82%	83%	85%	85%
RIPPLE AND NOISE ⁽³⁾ (mV p-p)	Switching ripple (typ)	80	80	100	100	100	130
	spike noise (typ) ⁽²⁾	120	120	150	150	150	200

(1) An overvoltage shuts down the output. Recover by recycling a-c input (60 second delay required before resetting).

(2) After the cause of the overload is removed, output is automatically restored.

(3) Bandwidth 100 MHz. Ripple and noise will be approximately 1.5 times these values in the operating temperature range -10 ~ 0°C. The ripple and noise values tabulated are valid when the output is derated as shown in figure 2 from 50 ~ 65°C

INPUT VOLTAGE:

Nominal 100-240V a-c, range: 85-265V a-c (0 to 100% load, -10 to 71°C).
d-c range: 110 -370V d-c

INPUT SOURCE FREQUENCY:

Nominal 50/60 Hz; Range 47-66 Hz (0 to 100% load, -10 to 71°C).

INPUT CURRENT:

5V-48V models: 0.85A rms max., 0.65A rms typ. (100-120 Va-c input, 100% load);
0.45A rms max., 0.38A rms typ. (200-240 Va-c input, 100% load).
3.3V model: 0.7A rms max., 0.55A rms typ. (100-120 Va-c input, 100% load);
0.4A rms max., 0.33A rms typ. (200-240 Va-c input, 100% load).

INPUT PROTECTION AND SOFT START: A thermistor circuit reduces start-up surge. Units are protected against shorts by an input fuse. Fuse value 2A, 250V.

INPUT SURGE: cold start 25 °C (First surge only, not including the current flow into the EMI filter)
12.5A typ. (100 V a-c, 100% load); 25A typ. (200 Va-c, 100% load).

LEAKAGE CURRENT:

0.55mA max, 0.32mA typ at 120V a-c and 60 Hz; 0.75mA max, 0.50mA typ at 240V d-c and 60 Hz (operating in conformance with UL 1950/IEC 950)

STABILIZATION:

Source Effect: (85 to 132Va-c, 170-265 Va-c) 0.1% typ., 0.2% max. (3.3V Model: 5mV typ., 10mV max.)
Load Effect: (0%-100% of rated output current) 0.3% typ., 0.6% max. (3.3V Model: 15mV typ., 30mV max.)
Temperature effect: (-10 to 71°C) 0.5% typ., 1.0% max.
Combined effect: 0.9% typ., 1.8% max.
Drift: (1/2 to 8 hr. at 25°C) 0.2% typ., 0.5% max.

TRANSIENT RECOVERY: A step load change from 50% to 100% of rated output current in 50 microseconds or more, produces no more than 4% output voltage excursion (3.3V model: ±200mV max.). Recovery time is 1ms maximum.

OUTPUT HOLDING TIME: With 100 Va-c input voltage: upon input interruption the output is maintained for 35 milliseconds typical (20 ms min.); with 240 Va-c input voltage: 230 milliseconds typical (130 ms min.).

START UP TIME: 900ms max., 600ms typ. at 100 Va-c; 400ms max., 200ms typ. at 240 Va-c).

OVERVOLTAGE PROTECTION: Fixed, factory set. See Table 1. The overvoltage circuit is set by Zener diode clamp, latching will occur.

OVERCURRENT: Output voltage returns to rated level upon removal of cause of malfunction.

OPERATING TEMPERATURE: -10 to 71°C (start up -20 to -10°C). See the derating, Figure 1. Do not allow the power supply to become dust covered because that will decrease the cooling efficiency of the unit and cause insulation to deteriorate.

STORAGE TEMPERATURE: -30°C to + 75°C.

COOLING: Natural convection.

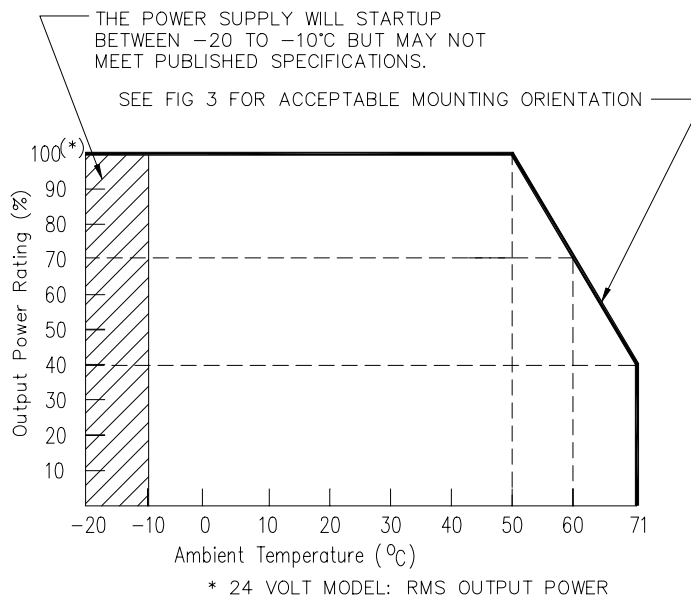
ORIENTATION: Vertical or horizontal.

HUMIDITY: 10% to 95% relative humidity, operating and storage, noncondensing, wet bulb temperature < or = 35°C.

WITHSTANDING VOLTAGE

(at 15 to 35°C ambient, 10 to 85% relative humidity, cutout current 20 ma):
Between input and output terminals, 3.0 KV a-c for 1 minute.
Between input terminals and ground, 2000V a-c for 1 minute.
Between output terminals and ground, 500V a-c for 1 minute.

INSULATION RESISTANCE: Between input and output, input and ground, output and ground: 100 megohms minimum (500V d-c, 15 to 35°C ambient, 10 to 85% relative humidity)



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FIGURE 1. OUTPUT POWER VS. TEMPERATURE

VIBRATION: Three axes, one hour each, sweep time 10 min., nonoperating
5-10 Hz., 10 mm amplitude
10-200 Hz., 2G (19.6m/s²)

SHOCK: Three axes, 60G (588m/s²), 11ms ±5 msec pulse duration, three shocks each axis, nonoperating, 1/2 sine pulse

EMC - EMISSIONS:

Radiated Noise 30MHz to 1GHz: FCC Class B, VCCI-B, EN55011-B, EN55022-B
Conducted Noise 0.15MHz to 30MHz: FCC Class B, VCCI-B, EN55011-B, EN55022-B

EMC - IMMUNITY:

ESD: EN 61000-4-2 Level 4, Normal operation.
Radiated Field Noise: EN 61000-4-3 Level 3, Normal operation.
Electrical Fast Transient/Burst (EFT): EN 61000-4-4 Level 3, Normal operation.
Surge: EN 61000-4-5 Level 4, no damage.
Conducted Noise: EN 61000-4-6 Level 3, Normal operation.
Power Frequency Magnetic Field: EN 61000-4-8 Level 4, Normal operation.
Voltage Dips, Short Interruptions, Voltage Variation: EN 61000-4-11, Normal operation.

SAFETY: All units designed to meet EN 60950 (U.S. UL 60950 3rd Ed.; Canada: CAN/CSA-22.2 No. 60950-00 3rd Ed. (ambient temp. 50°C)). RKW 30W units are CE marked per the Low Voltage Directive (LVD), EN60950. [The standards do not apply with DC input operation]

WEIGHT: 10.5 oz. (300 grams) max

WARRANTY: One year.

III — INSTALLATION

MOUNTING THE POWER SUPPLY: Refer to Figures 3 and 4. The unit may be mounted on one mounting surface. Note the restrictions for maximum penetration of mounting screws. The air surrounding the power supply must not exceed the ambient values given in the graph in Figure 1.

CONNECTIONS: Connect the load to the power supply Output + and Output – terminals shown in Figure 2. The AC input power is applied via the terminal block. Make sure to connect the AC input Neutral, Line and Ground wires to the respective terminals of the terminal block (see Figure 2).

IV — OPERATION

When output voltage is available, the green LED is on. The Output Voltage Adjust trimmer (see Figure 2) allows adjustment of the output voltage within the range specified in Table 1.

SERIES OPERATION: When a number of power supplies are operating in series, the current rating is to be limited to the rating of the power supply with the lowest rating. A diode ($V_r > 2 \Sigma V_o$, $I_f > 2 I_o$, $V_f \ll \text{low}$) must be connected to the power supply output terminals to protect the unit from reverse voltage.

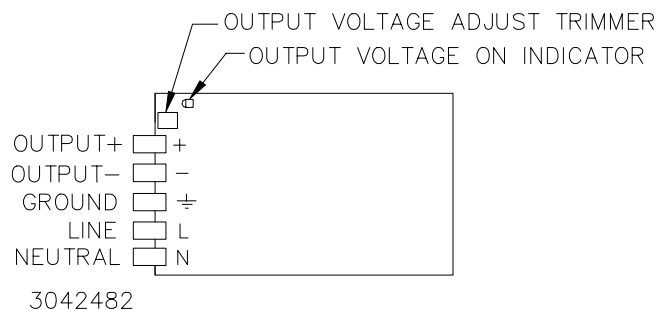
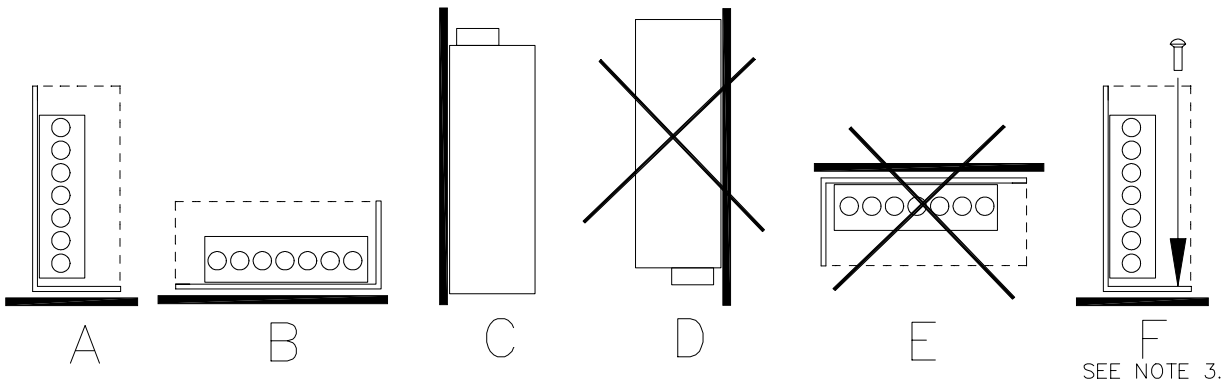


FIGURE 2. COMPONENT LOCATIONS



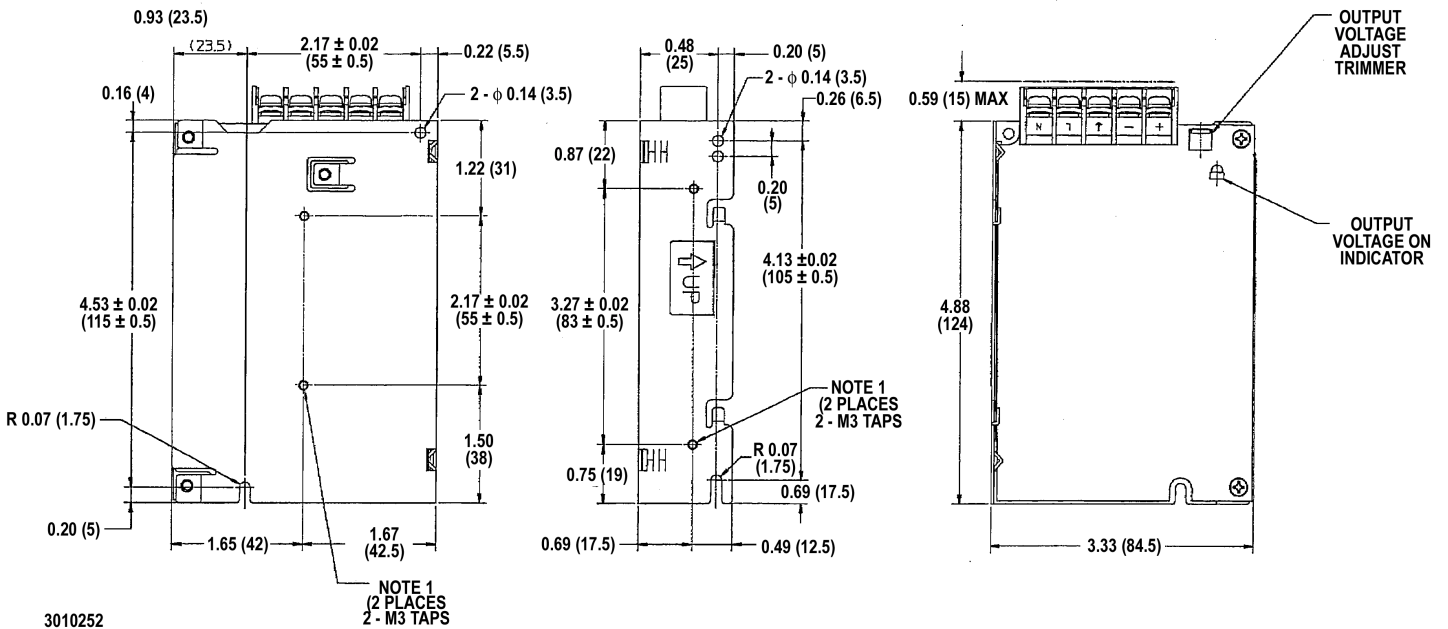
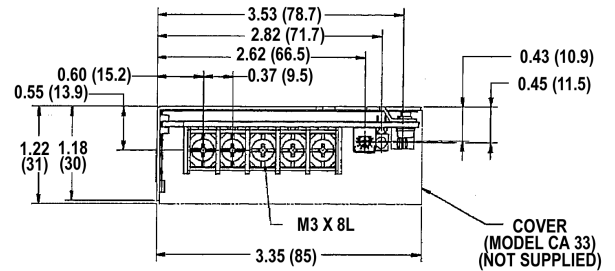
- NOTES:
1. METHODS D AND E ARE NOT RECOMMENDED DUE TO INSUFFICIENT VENTILATION.
 2. REFER TO FIGURE 1 FOR OUTPUT POWER VS. TEMPERATURE FOR MOUNTING METHOD SELECTED.
 3. MOUNTING BY TOP SCREWS ONLY IS NOT RECOMMENDED; VIBRATION/SHOCK SPECIFICATIONS ARE REDUCED AS FOLLOWS: VIBRATION: 9.8M/S²; SHOCK: 98M/S².

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FIGURE 3. POWER SUPPLY MOUNTING

NOTES:

1. MAX PENETRATION OF M3 MOUNTING SCREWS IS 0.24 (6) FROM CASE SURFACE/
2. ± 0.04 (± 1) TOLERANCE UNLESS OTHERWISE SPECIFIED.
3. DIMENSIONS ARE IN INCHES, DIMENSIONS IN BRACKETS () ARE IN MILLIMETERS.
4. REFER TO FIGURE 4 FOR MOUNTING ORIENTATION.



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FIGURE 4. RKW 30W MECHANICAL OUTLINE DIAGRAM