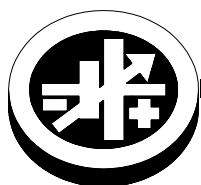


# INSTRUCTION MANUAL



**KEPCO** An ISO 9001 Company.

**RMW**  
**300W SERIES**



## 300 WATT, PFC, OPEN FRAME POWER SUPPLIES

### I – INTRODUCTION

**SCOPE OF MANUAL.** This instruction manual covers the installation and operation of the Kepco RMW 300W Series of RoHS-compliant Open Frame PFC (Power Factor Corrected) Switching Power Supplies.

**DESCRIPTION.** Kepco RMW Series are 300W RoHS-compliant switching power supplies with seven models providing 5V, 12V, 15V, 24V, 28V, 48V and a triple output model (RMW 51212K-300) which provides a primary output of +5V and secondary outputs of  $\pm 12V$ . All models include 1) a separate +12V output that can be used to power an external cooling fan (not supplied), 2) a separate output that can be used to drive a “Power OK” LED (not supplied).

Remote sensing capability (compensation 0.5V per lead) and Power Factor Correction (PFC) is included in all models.

Units may be operated with nominal 115V a-c or 230V a-c (input voltage range 85 to 264 Va-c), 50-60 Hz (input frequency range 47-63Hz). Units operate up to 400Hz although leakage current, power factor and efficiency specifications may not be met. They will also operate on 120V to 370V d-c input. Units are convection cooled U-chassis construction.

Specifications and operating limits for individual RMW 300W models are listed in Table 1. Section II contains specifications and operating limits common to all RMW 300W Series Models. Section III describes RMW 300W features. Section IV describes installation and Section V describes operation.

**TABLE 1. OUTPUT RATINGS AND SPECIFICATIONS, RMW 300W SERIES**

MODEL	Nominal Output Voltage	Setting Accuracy	Adjustment Range (V d-c)	OVP Range <sup>(2)</sup> (V d-c)	Output Current			Efficiency @115V a-c (%)
					Min. (A d-c)	Rated <sup>(3)</sup> (A d-c)	Max. <sup>(4)</sup> (A d-c)	
RMW 5-60K	+5V	$\pm 50mV$	4.5-5.5	5.8-7.3	0	60	72	83
RMW 51212K-300	+5V	$\pm 50mV$ <sup>(1)</sup>	4.5-5.5	5.7-7.3	0	32	45	85 <sup>(5)</sup>
	+12V	$\pm 600mV$ <sup>(1)</sup>	Fixed	NA	0	11	14	
	-12V	$\pm 600mV$ <sup>(1)</sup>	Fixed	NA	0	1	2	
RMW 12-25K	+12V	$\pm 100mV$	10.8-13.2	14.3-18.3	0	25	30	88
RMW 15-20K	+15V	$\pm 100mV$	13.5-16.5	19.1-21.6	0	20	23	86
RMW 24-12K	+24V	$\pm 100mV$	21.6-26.4	28.4-33.4	0	12	14.6	88
RMW 28-11K	+28V	$\pm 100mV$	25.2-30.8	33-42	0	11	12.6	88
RMW 48-6.5K	+48V	$\pm 100mV$	43.2-52.8	60-67	0	6.25	7.3	90

(1) The +5V output is preset to between 4.95V and 5.05V for 60% of rated load and nominal input line while the other outputs are verified to be within the specified accuracy range.  
 (2) An overvoltage shuts down the output. Recover by recycling a-c input.  
 (3) Overcurrent protection point: 120% - 150% of rated load current, auto-recovery (except for 5V models which latch off).  
 (4) Requires 18 CFM (22 CFM for 24V, 28V and 48V models) forced air cooling.  
 (5) 85% efficiency for all three outputs combined.

## II — SPECIFICATIONS

The following specifications are at nominal input voltages at 25°C, nominal output voltage  $\pm 1\%$  unless otherwise specified.

### INPUT:

Voltage: 100-230V a-c nominal; Range 85-264V a-c (0 to 100% load, 0 to 50°C); 110-370V d-c. (polarity insensitive; consult factory) Safety agency approval applies only to a-c input operation.

Frequency: Nominal 50-60 Hz; Range 47-400Hz (0 to 100% load, 0 to 50°C) (at 400Hz leakage current exceeds UL/VDE safety specification limit).

Current (nominal output at 100% load):

@115V a-c rms: 4A a-c rms max.

5A a-c max for RMW 51212K-300

@230V a-c rms: 2A a-c rms max.

2.5A a-c max for RMW 51212K-300

Inrush Current (cold start 25 °C ambient, EMI capacitors removed):

@115V a-c rms: 30A pk max.,

@230V a-c rms: 60A pk max.

Switching Frequency: 120KHz

### POWER FACTOR:

@115V a-c: 0.99 typ. (0.96 for 12V and 15V model)

@230V a-c: 0.95 typ.

### STABILIZATION:

Source Effect Range ( $\pm 10\%$  change in line voltage):  
1% max.

Load Effect ( $\pm 40\%$  load change from 60% load):

Primary:  $\pm 1\%$

12V Aux:  $\pm 3\%$

+12V:  $\pm 5\%$

-12V:  $\pm 5\%$  (RMW 51212K-300)

Ripple/Noise (all outputs, nominal line, rated load):  
<1% Vp-p (measured with 15MHz BW scope terminated with 0.047 $\mu$ F and electrolytic capacitors.

**CAPACITIVE LOADING:**  $\leq 30,000\mu$ F.

### TRANSIENT RECOVERY:

Load change from 20% to 100% of rated output current in 50 microseconds or more: >700mV  $\pm 4\%$  max.

**OUTPUT HOLDING TIME:** Upon input interruption the output is maintained for: 20 mS typ. (@115V a-c, rated load).

### START UP TIME:

@115V a-c: 2S max.

@230V a-c: 2S max.

**OVERVOLTAGE PROTECTION:** Fixed, factory set. See Table 2. Latching will occur. Reset by cycling input power off, then on again.

**OVERCURRENT:** Hiccup type, autorecovery (output voltage returns to rated level upon removal of cause of

overcurrent). Models RMW 5-60K and RMW 51212K-300 latch off for overcurrent or short circuit; reset by cycling input power off, then on again.

**OPERATING TEMPERATURE:** 0 to +50°C (start up - 0°C min.). 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:** -20°C to +85°C.

**HUMIDITY:** 10% to 95% RH, operating and storage, noncondensing.

**COOLING:** Natural convection.

**ALTITUDE:** 3000 meters.

**MOUNTING ORIENTATION:** Vertical or horizontal.

### EMC - EMISSIONS:

Radiated Noise 30MHz to 1GHz: FCC Class B, CISPR 22 'B'

Conducted Noise 15KHz to 30MHz: FCC Class B, CISPR 22 'B'

Input Harmonics (on AC Mains)  
EN 61000-3-2, Class D.

### EMC - IMMUNITY:

ESD: EN 61000-4-2 Criteria B (4KV contact, 8KV air discharge)

Radiated Field Noise:  
EN 61000-4-3 Criteria A (10V/M, 80% amplitude modulation).

Electrical Fast Transient/Burst (EFT):  
EN 61000-4-4 Criteria B (2KV).

Surge: EN 61000-4-5 Criteria B (1KV line to line 2KV line to ground).

Conducted Noise:  
EN 61000-4-6 Criteria A (10V/M, 80% amplitude modulation).

Power Frequency Magnetic Field:  
EN 61000-4-8 Criteria A (30A/meter).

Voltage Dips, Short Interruptions, Voltage Variation:  
EN 61000-4-11

30% dips 10mS: Criteria B

60% dips 100mS: Criteria C

>95% dips 5000mS: Criteria C

**SAFETY:** Designed to meet UL 60950-1, CSA-22.2 No. 234, RMW 300W units are CE marked per the Low Voltage Directive (LVD), EN60950.

**WEIGHT:** 2.2 lbs. (1 Kg).

**WARRANTY:** One year.

### III — FEATURES

- Primary Output Adjustable  $\pm 10\%$
- 12 Volt Auxiliary Fan Output
- Power OK Output (suitable for external LED)
- Remote Error Sensing
- Overvoltage/Overcurrent protection
- Power Factor Corrected, Universal a-c input
- Full 300 Watt Operation up to 50°C Ambient
- Convection cooling
- RoHS-Compliant
- 120% Power Capability with forced air cooling (Operation of Model RMW 51212K-300 at peak (maximum) power of 360W without cooling fan must be limited to less than 60 seconds.)

### IV — INSTALLATION

**MOUNTING THE POWER SUPPLY.** Refer to Figure 2. The unit may be mounted using 6-32 mounting screws (not supplied). Eight mounting holes are provided: four on the base, and two on each side. Note the restrictions for maximum penetration of mounting screws (see Figure 2).

**CONNECTIONS:** All connections are made via TB1 through TB5 (see Figure 2 for locations).

NOTE: Parallel connection of RMW 300W units is not supported.

AC input power is applied via terminal block TB1. Connect the AC input Neutral, Line and Earth Ground wires to the respective terminals of the terminal block (see Figure 2).

TB2 provides the DC outputs; see Table 2 for pin allocation.

TB3, TB4 and TB5 are each 2-pin connectors that require a Molex 5045-02A (or equivalent) mating connector.

- TB3 provides a floating +12V output for use with an auxiliary fan (not supplied).
- TB4 provides  $\pm$  connections used for remote sensing.
- TB5 provides connections used to drive an external LED (not supplied).

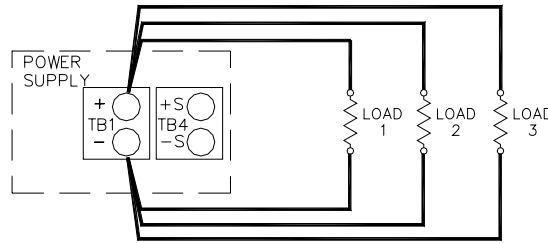
**REMOTE SENSING:** TB4 provides +S and -S connections to be used for remote sensing. Figure 1 shows proper connection of multiple loads using remote sensing. Remote sensing compensation is up to 0.5V per load wire. Use shielded (recommended) or twisted wire for remote sense connections. Install one electrolytic capacitor (470 $\mu$ F) between +S and + and one between - and -S terminals.

**TABLE 2. TB2 DC OUTPUT PIN ALLOCATION**

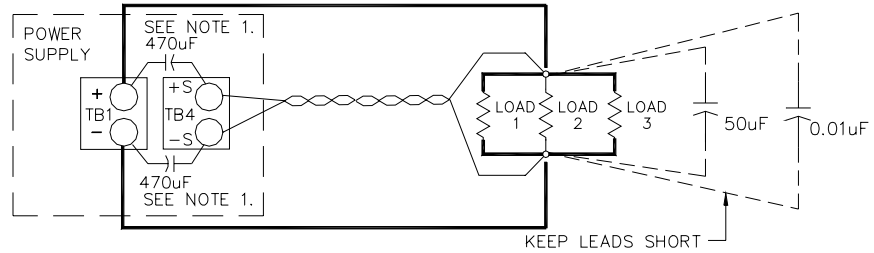
MODEL	OUTPUT TERMINAL												
	1	2	3	4	5	6	7	8	9	10	11	12	
RMW 5-60K	+5V <sup>(1)</sup>		GND						+5V		RTN (+12V)		+12V
RMW 51212K-300	+5V		GND						+12V	-12V	---		---
RMW 12-25K	+12V		GND				RTN (+12V)		+12V	---	---	---	
RMW 15-20K	+15V		GND				RTN (+12V)		+12V	---	---	---	
RMW 24-12K	+24V	GND	RTN (+12V)		+12V		---	---	---	---	---		
RMW 28-11K	+28V	GND	RTN (+12V)		+12V		---	---	---	---	---		
RMW 48-6.2K	+48V	GND	RTN (+12V)		+12V		---	---	---	---	---		

(1) CAUTION: Limit RMW 5-60K to 15A maximum per output terminal to avoid overheating

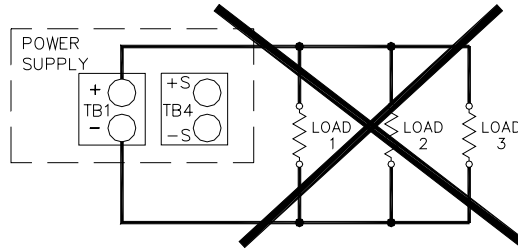
**A**  
CORRECT METHOD  
WITH NO REMOTE SENSING



**B**  
CORRECT METHOD  
WITH SENSING AT LOAD  
(REMOTE SENSING)



**C**  
NOT RECOMMENDED



NOTES:

1. CAPACITORS AT +, +S AND -, -S, PREVENT OSCILLATION AND PREMATURE TRIPPING OF OVERVOLTAGE PROTECTION.
2. CAPACITORS AT LOAD TERMINALS REDUCE RIPPLE.

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**FIGURE 1. LOAD CONNECTIONS**

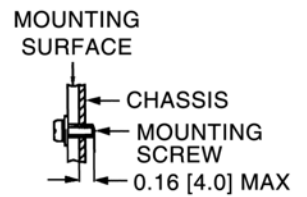
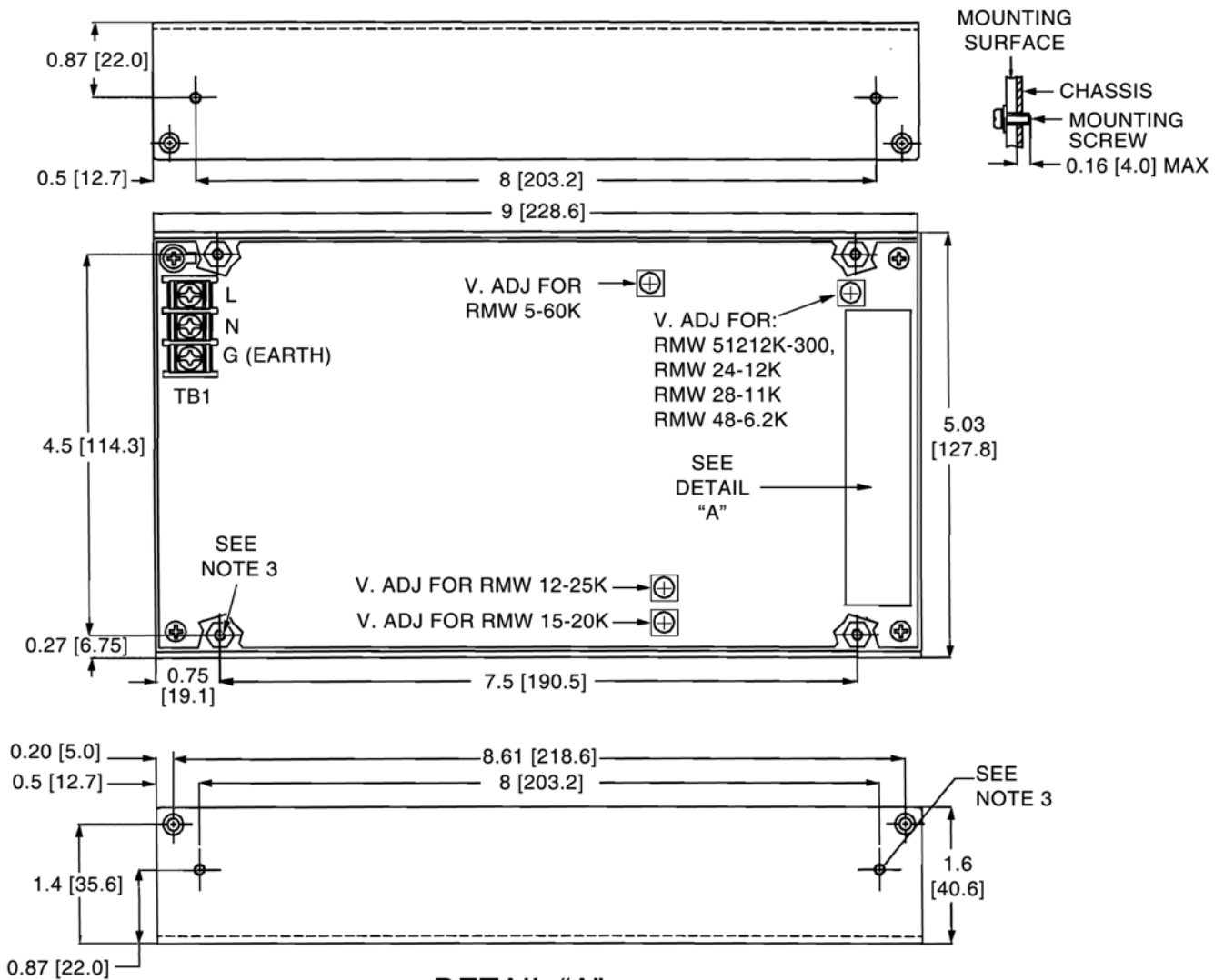
## V — OPERATION

**POWER OK:** When output voltage is available, the output at TB5 is available to directly drive an external LED to indicate power is on.

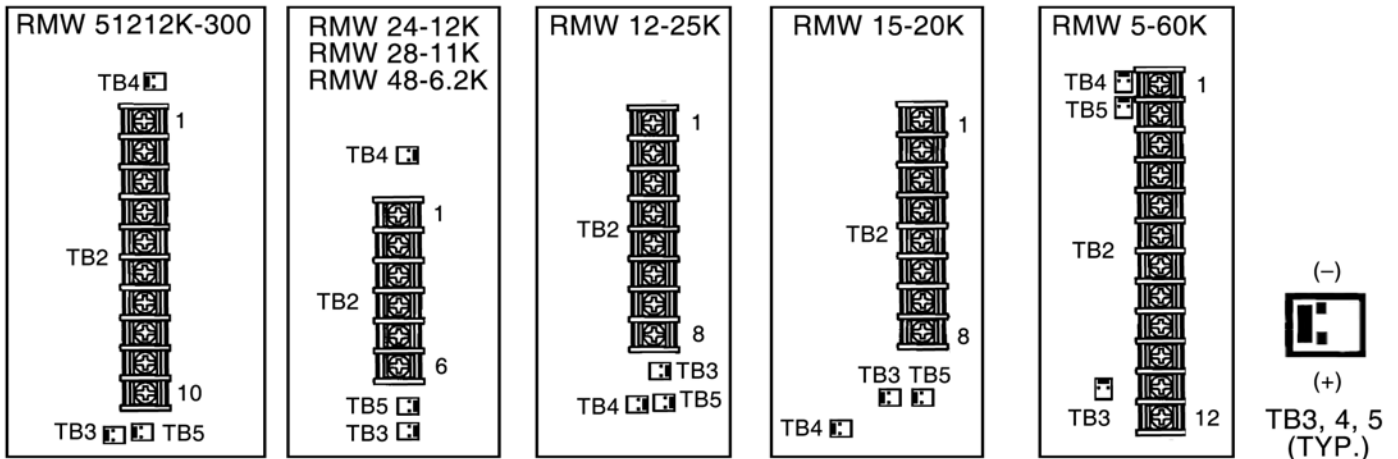
**AUXILIARY FAN:** When output voltage is available, the +12V output at TB3 is available to drive an external cooling fan.

**VOLTAGE ADJUST:** The Output Voltage Adjust trimmer (see Figure 2) allows adjustment of the primary output voltage within the range specified in Table 1.

**PARALLEL OPERATION:** Parallel connection of RMW 300W units is not supported.



**DETAIL "A"**



**NOTES:**

1. DIMENSIONS IN INCHES, DIMENSIONS IN BRACKETS ARE IN MILLIMETERS.
2. TOLERANCES: 0.031 IN.[0.8MM], EXCEPT 0.016 IN.[0.4MM] BETWEEN MOUNTING HOLES.
3. MOUNTING HOLES FOR #6-32 SCREW (8 PL).
4. TB3, TB4, TB5 REQUIRE MOLEX 5045-02A (OR EQUIVALENT) MATING CONNECTOR.

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**FIGURE 2. RMW 300W MECHANICAL OUTLINE DIAGRAM**