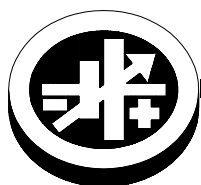
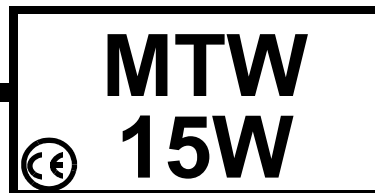


# INSTRUCTION MANUAL



**KEPCO** An ISO 9001 Company.



## 15 WATT TRIPLE OUTPUT SWITCHING POWER SUPPLY

### I — INTRODUCTION

**SCOPE OF MANUAL.** This instruction manual covers the installation and operation of the Kepco MTW 15W Switching Power Supply, Model MTW 15-51212K.

**DESCRIPTION.** The Kepco MTW 15W is a PC card style, triple-output switching power supply. Units may be operated with a nominal 100 to 120V a-c and 220 to 240V a-c (input voltage range 85 to 265 Va-c), 50-60 Hz (input frequency range 47-440Hz). They will also operate on 110V to 370V d-c input. The MTW 15W employs a light weight ferrite core with 30-250 KHz switching frequency. Regulation is provided by pulse width modulation. Integral regulator chips provide smooth isolated d-c outputs. A trimmer provides fine adjustment of the 5V output. The  $\pm 12V$  outputs have a common return. DC Output power is shared between +5V, +12V and -12V (15W max. total). A thermistor circuit prevents excessive turn-on current surge. Overvoltage protection is provided. Overcurrent protection with automatic recovery from short circuit is featured. A steel cover (Model CA 39) is available as an option.

Table 1 contains output specifications. Section II (following) contains specifications and operating limits.

### II — SPECIFICATIONS

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

**TABLE 1. MTW 15W OUTPUT SPECIFICATIONS**

SPECIFICATION		OUTPUT 1	OUTPUT 2	OUTPUT 3	CONDITON
OUTPUT VOLTS, d-c		5V	+12	-12V	+5V floating from $\pm 12V$
SETTING TOLERANCE (V)		4.9-5.1	11.4-12.6	11.4-12.6	
ADJUSTMENT RANGE		5.00-5.25 <sup>(5)</sup>	FIXED	FIXED	
OUTPUT CURRENT (A)	RATED	2.0	0.3	0.2	
	MINIMUM	0	0	0	
	PEAK <sup>(4)</sup>	3.0	0.6	0.3	Within 10 seconds.
SOURCE EFFECT		0.4% max.	0.4% max.	0.4% max.	85-132Va-c, 170-265Va-c
LOAD EFFECT		2% max.	1% max.	1% max.	10-100% load
TEMPERATURE EFFECT		1% max.	1% max.	1% max.	-10 to 50°C
COMBINED EFFECT		2% max.	2% max.	2% max.	Overshoot at startup: 4% typ.
TIME EFFECT (Drift)		2% max.	1% max.	1% max.	1/2 to 8 hr.
OVERCURRENT (AMPS) <sup>(2)</sup>		3.15 min.	0.63 min.	0.32 min.	
OVERVOLTAGE SETTING (VOLTS) <sup>(3)</sup>		5.7 min.	-	-	
EFFICIENCY (typ.)	100 Va-c	71%	71%	71%	
	240 Va-c	70%	70%	70%	
ACCEPTABLE OUTPUT CAP. ( $\mu F$ max.)		10000	5000	-	Fixed load resistance
RIPPLE AND NOISE <sup>(1)</sup> (mV p-p)	ripple (typ)	100	120	120	
	ripple (-10-0°C)	140 max.	160 max.	160 max.	
	spike noise (typ)	120	150	150	
	spike noise (-10-0°C)	160 max.	180 max.	180 max.	
(1) Switching component $\leq 20KHz$ , 0 to 100% load, 0 to 60 °C, tested with 100 $\mu F$ electrolytic and 0.1 $\mu F$ film capacitors across the load and connected to the power supply via 5.9 in (150mm) wires.		(3) Zener diode clamp method; protects load against faulty power supply; operation could require power supply service.			
(2) Fold back method; automatic recovery after cause of overcurrent is removed. Avoid overcurrent operation to prevent component degradation.		(4) Peak current acceptable as long as rms output current within 10 seconds is within rated value.			
		(5) Adjustable using 5V Output Voltage Adjustment trimpot.			

#### INPUT VOLTAGE:

Nominal 100-120V a-c, 200-240V a-c, range: 85-265V a-c (0 to 100% load, -10 to 60°C)  
d-c range: 110 -370V d-c (Safety agency approval applies only to a-c input operation.)

#### INPUT SOURCE FREQUENCY:

Nominal 50/60 Hz; Range 47-440 Hz. (0 to 100% load, -10 to 60°C).

**INPUT CURRENT:** (maximum load at 25°C with nominal output voltage):  
0.42A typ. (100 Va-c input, 100% load); 0.25A typ. (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:** First surge only, not including current flow into EMI filter.  
25A typ. (100 V a-c, 100% load, 25°C cold start); 50A typ. (240 Va-c, 100% load, 25°C cold start)

**LEAKAGE CURRENT:**  
0.75mA max, 0.2mA typ at 100V a-c (60Hz single pole switching) in conformance to DENAN .  
0.75mA max, 0.3mA typ at 240V d-c (60Hz single pole switching in conformance to UL 60950/IEC 60950-1)

**POWER FACTOR:** 0.55 typ. at 100 Va-c, 0.45 typ. at 240 Va-c

**TRANSIENT RECOVERY:** A step load change from 50% to 100% of rated load in 50 microseconds or more, produces no more than 4% output voltage excursion. Temperature range from -10 to 60°C.

**OUTPUT HOLDING TIME:** Upon input interruption the output is maintained for 150 milliseconds typical with 240 Va-c input voltage, and for 20 milliseconds typical with 100 Va-c input voltage. The condition for output load is 100%.

**START UP TIME:** 100mS max. (+5V, ±12V) at 100 Va-c, Output voltage may not rise with constant current load. .

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

**OVERCURRENT:** Hold back method, output voltage returns to rated level upon removal of cause (long term overcurrent could damage unit)

**OPERATING TEMPERATURE:** -10 to 60°C (start up -20 to -10°C). See the derating plot, 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:** Horizontal (see Figure 2).

**HUMIDITY:** 10% to 90% relative humidity, operating and storage, noncondensing, wet bulb temperature ≤35°C

**WITHSTANDING VOLTAGE:**  
(at 5 to 35°C ambient, 45 to 85% relative humidity, cutout current 10 ma):  
Between input and output terminals, 3.0 KV a-c for 1 minute.  
Between input and chassis, 2000V a-c for 1 minute.  
Between output terminals and chassis, 500V a-c for 1 minute.

**INSULATION RESISTANCE:** (500V d-c, 5 to 35°C ambient, 45 to 85% relative humidity) Between input and output, input and chassis, and output and chassis:100 megohms minimum.

**VIBRATION:** Three axes, one hour each, sweep time 10 min.: nonoperating  
5-10 Hz., 10 mm amplitude;10-200 Hz., 2G (19.6m/s<sup>2</sup>) acceleration

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

**SAFETY:** Meets UL 60950-1.c-UL and TÜV Rheinland EN60950-1 (ambient temp. 50°C max.). Meets creepage and clearance requirements of DENAN Appendix 8 (at 100V a-c only). MTW 15W units are CE marked per the Low Voltage Directive (LVD), EN60950. [The standards do not apply with DC input operation]

**EMC - EMISSIONS:**  
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.

**ELECTROLYTIC CAPACITOR:** Life expectancy: 10,000 hours min. (ambient temp. 50°C)

**WARRANTY:** One year.

### III — INSTALLATION

**MOUNTING THE POWER SUPPLY:** Refer to Figures 2, 3 and 4. The unit may be mounted on one mounting surface. The air surrounding the power supply must not exceed the ambient temperature values given in the graph in Figure 1.

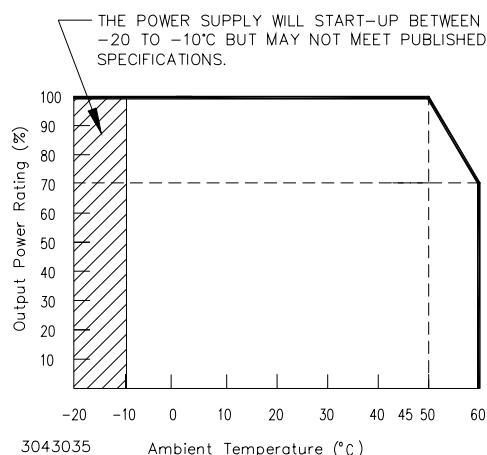
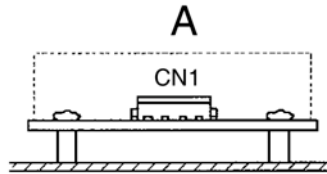


FIGURE 1. DERATING PLOT

**INSTALLATION (INSULATION):** Install unit 0.3 inches (8mm) away from base with the use of 0.24 inch (6mm) diameter spacers attached to the PC board. Keep at least 0.16 inches (4mm) spacing around and above the unit to comply with insulation and safety requirements. An insulator must be used if the spacing is less than 0.16 inches (4mm) (see Figure 3).

**VENTILATION:** It is recommended to keep at least 0.40 inches (10mm) clearance from adjacent equipment for proper ventilation

**CONNECTIONS:** Connect a load to the +5V output of the power supply by connecting pins 1, 2 of output connector CN2 (+5V) to the load (+) terminal, and pins 3, 4 (5V Return) to the load (-) terminal (see Figure 4 for input/output connector/pin locations). Connect a load to the +12V output of the power supply by connecting pin 5 (+12V) of connector CN2 to the load (+) terminal, and pin 6 ( $\pm 12V$  Return) to the load (-) terminal. Connect a load to the -12V output of the power supply by connecting pin 8 (-12V) of connector CN2 to the load (-) terminal, and pin 7 ( $\pm 12V$  Return) to the load (+) terminal. The AC input power is applied via input connector CN1. Make sure to connect the AC input Neutral and Line wires to pins 3 and 1, respectively, of CN1 (see Figure 2). See Table 2 for mating connector information. A Cable Kit (P/N 219-0485) is available as an option from Kepco. The kit includes an input cable, terminated on one end with an input mating connector; and an output cable, terminated on one end with an output mating connector.

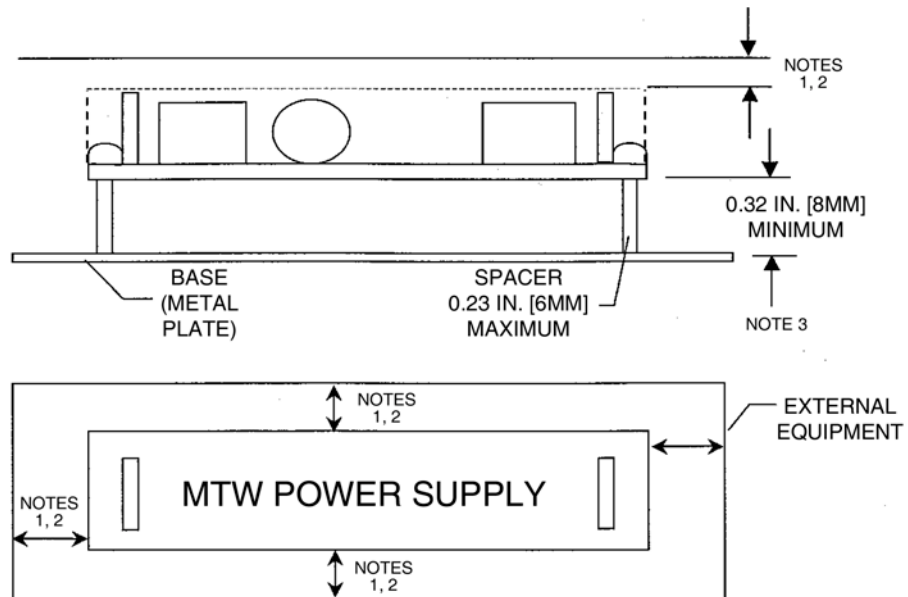


**NOTES:**

1. METHOD A (STANDARD) RECOMMENDED, APPLY DERATING CURVE PER FIGURE 1.
2. OTHER METHODS NOT ALLOWED (INADEQUATE COOLING).

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**FIGURE 2. MOUNTING DIRECTION**

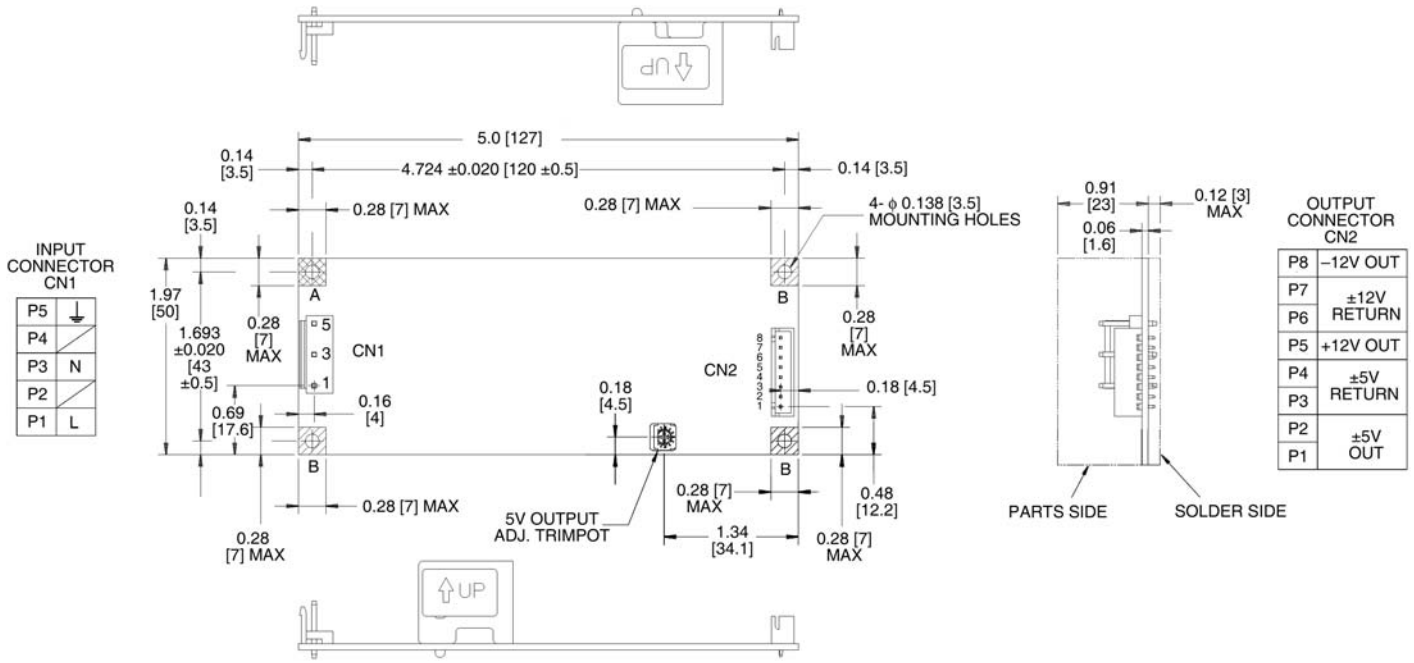


**NOTES:**

1. MAINTAIN MINIMUM 0.16 IN. [4 MM] CLEARANCE TO SATISFY INSULATION AND WITHSTAND VOLTAGE REQUIREMENTS; OTHERWISE USE ADEQUATE INSULATOR.
2. MINIMUM 0.39 IN. [10MM] CLEARANCE RECOMMENDED FOR ADEQUATE COOLING.
3. INSTALL POWER SUPPLY AT LEAST 0.32 IN. [8MM] ABOVE BASE USING SPACERS, (MAXIMUM DIA. 0.23 IN. [6MM]).

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**FIGURE 3. VENTILATION AND INSULATION REQUIREMENTS**



NOTES:  
 1. DIMENSIONS ARE IN INCHES. DIMENSIONS IN BRACKETS ARE IN MILLIMETERS.  
 2. TOLERANCES:  $\pm 0.04$  IN. [ $\pm 1.0$  MM] UNLESS OTHERWISE SPECIFIED.  
 3. WEIGHT: 5.29 OZ. (150 GR.) MAX.  
 4. AT AREAS A AND B: MOUNTING SCREWS INSTALLED FROM PARTS SIDE, SPACERS, 0.24 [6] DIA MAX, INSTALLED AT SOLDER SIDE.

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**FIGURE 4. MTW 15W MECHANICAL OUTLINE DIAGRAM**

**TABLE 2. INPUT/OUTPUT MATING CONNECTORS**

Connector	MTW 15W Connector	Mating Connector <sup>(2)</sup>	
		Socket Housing	Terminal Pin
Input	B3P5-VH-B <sup>(1)</sup>	VHR-5N <sup>(1)</sup>	SVH-21T-P1.1 <sup>(1)</sup>
Output	B8B-XH-A-2 <sup>(1)</sup>	XHP-8 <sup>(1)</sup>	SXH-001T-0.6 <sup>(1)</sup>

NOTES:  
 1. Manufacturer: Japan, Solderless Terminal Mfg. Co. Ltd, VH Series  
 2. Optional cable kit (KIT 219-0485) includes one input and one output cable (one meter long) with mating connectors for CN 1 (input) and CN2 (output), unterminated at other end.

**TABLE 3. ACCESSORIES**

Accessory	Part Number	Description
Cable Kit	KIT 219-0485	Includes one input and one output cable (one meter long) with mating connectors for CN1(input) and CN2 (output), unterminated at other end
Enclosure	CA 39	Galvanized Steel
	CA 39-R	Cold Rolled Steel with RoHS Compliant Zinc finish