

OPERATOR'S MANUAL

FPD 5-48W POWER SUPPLY SERIES

Flat Pack Single Output DC to DC Converter

KEPCO INC.
An ISO 9001 Company.

MODEL FPD 5-48W POWER SUPPLY

ORDER NO.

REV. NO.

IMPORTANT NOTES:

- 1) This manual is valid for the following Model and associated serial numbers:

MODEL	SERIAL NO.	REV. NO.
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- 2) A Change Page may be included at the end of the manual. All applicable changes and revision number changes are documented with reference to the equipment serial numbers. Before using this Operator's Manual, check your equipment serial number to identify your model. If in doubt, contact your nearest Kepco Representative, or the Kepco Documentation Office in New York, (718) 461-7000, requesting the correct revision for your particular model and serial number.
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**FLAT PACK
Single Output
DC to DC Converters**

I INTRODUCTION:

SCOPE OF MANUAL: This instruction brief contains information for the installation and operation of the Kepco FPD 5-48W DC to DC Converter Series of switching power supplies. For further operating and service information for the FPD 5-48W DC to DC Converter Series contact your Kepco Representative directly, or write to Kepco, Inc., 131-38 Sanford Avenue, Flushing, New York 11352 U.S.A.

DESCRIPTION: The Kepco FPD 5-48W DC to DC Converter Series consists of four switching power supplies, having a nominal 24-48 Vdc input and different DC output voltages, rated as listed in Section II. FPD 5-48W Converter switching power supplies have similar electrical specifications, except for the output ratings. They are low-dissipative stabilizers, using pulse-width modulation to control the output. The units feature input/output isolation. All models are guaranteed for one year when operated within the specifications given herein.

II MODELS:

The following specifications apply to the power supply models listed below:

NOTE: Normal conditions are nominal input, nominal output, and 25 degrees C.

MODEL	INPUT	OUTPUT
FPD 5-1-48W	24-48 Vdc	5 Vdc 1A
FPD 12-0.4-48W	24-48 Vdc	12 Vdc 0.4A
FPD 15-0.35-48W	24-48 Vdc	15 Vdc 0.35A
FPD 24-0.2-48W	24-48 Vdc	24 Vdc 0.2A

III SPECIFICATIONS:

Nominal Input Voltage:	24-48 Vdc
Input Voltage Range:	20-56 Vdc
Input Current:	0.3A Typical 0.4A maximum at 24 Vdc Input 0.15A Typical 0.2A Maximum at 48 Vdc Input
Efficiency:	75 percent Typical 24 Vdc Input 71 percent Typical 48 Vdc Input
Switching Frequency:	500-900 kHz Typical
Circuit Type:	Forward Converter

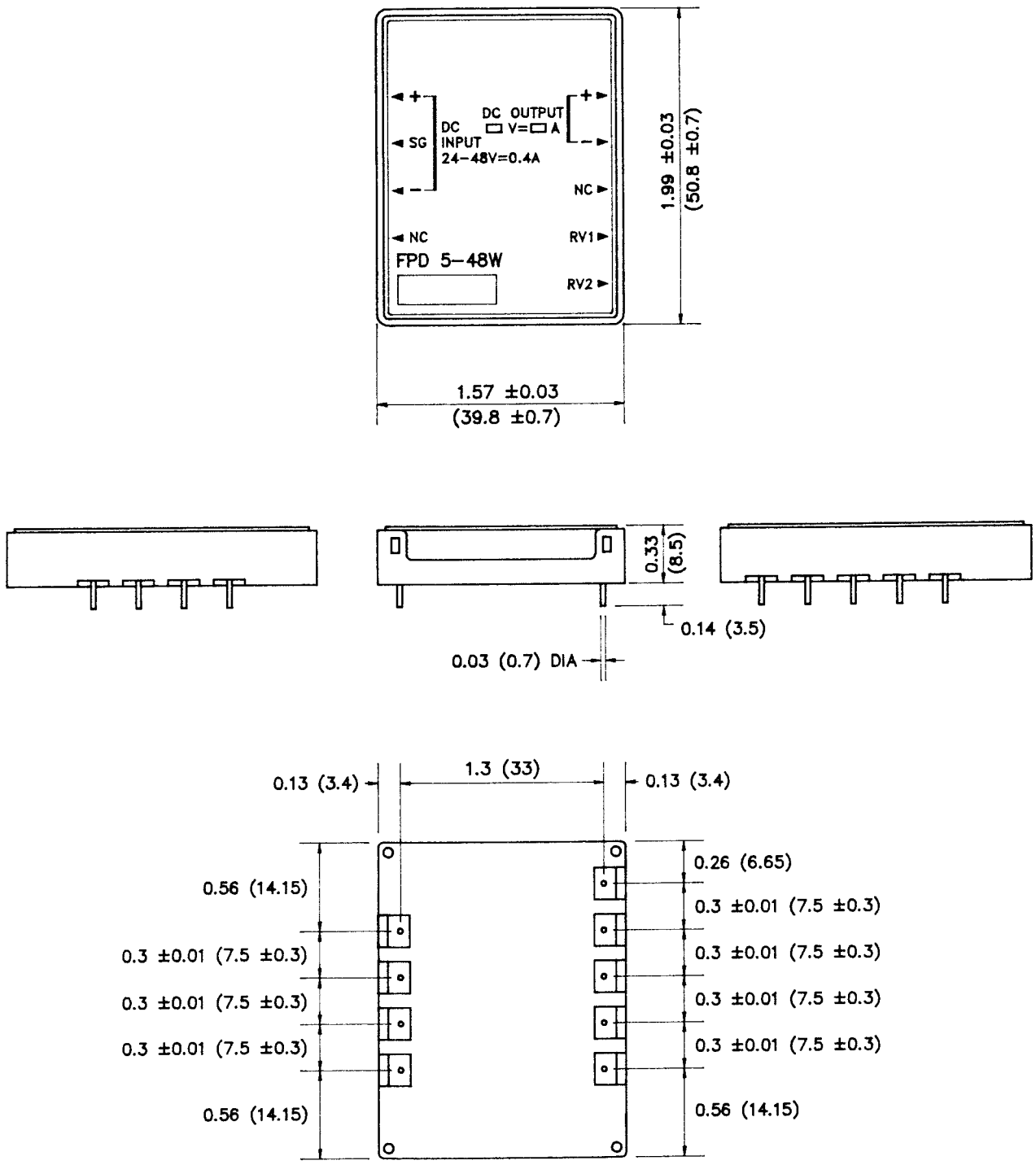
IV OUTPUT SPECIFICATIONS:

MODEL	FPD 5-1K	FPD 12-0.4K	FPD 15-0.35K	FPD 24-0.2K
Output Voltage Nominal	5V	12V	15V	24V
Output Current Nominal	1A	0.4A	0.35A	0.2A
Output Power Maximum (Fig. 9)	5.0W	4.8W	5.25W	4.8W
Voltage Adjustment Range	± 10 percent with external trimmer and resistor (see Figures 4A and 4B)			
Output Voltage Accuracy	± 5 percent Maximum			
Ripple, Maximum 0-50 Degrees C 10-100 % Load	100mV p-p	200mV p-p	200mV p-p	300mV p-p
Noise, DC to 50 MHz, Maximum 0-50 Degrees C 10-100% Load	200mV p-p	300mV p-p	300mV p-p	400mV p-p
Overcurrent Setting – Foldback Winker Operation Characteristic	1.2~2.0A	0.48~0.8A	0.42~0.7A	0.24~0.4A
Overvoltage Setting Shut Down Characteristic	5.5~6.9V	13.2~15.7V	16.5~19.0V	26.4~31.5

Source Effect	1% Typical — 2% Maximum (20-30 Vdc, 40-56 Vdc Input)
Load Effect	1% Typical — 2% Maximum (10-100% Load)
Temperature Effect	1% Typical — 2% Maximum (0-50 Degrees C)
Combined Effect	2.5% Typical — 5% Maximum (Source, Load, Temperature)
Time Effect	0.1% Typical — 0.5% Maximum (0.5-8 Hours at 25 Degrees C)
Recovery Characteristics 50 to 100% Load Change	Less Than ± 4 Percent Excursion . Recovery to within 1 percent in less than 1ms (tr, tf of load change ≥ 50 μs (See Figure 3)

V GENERAL SPECIFICATIONS

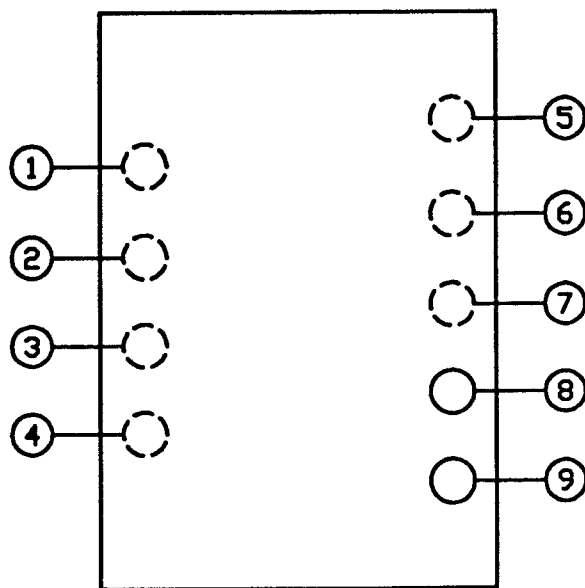
SPECIFICATIONS	CONDITIONS
Temperature	Operating 0~71 Degrees C Storage – 45 ~ 75 Degrees C
Humidity	Operating and Storage: 5 ~ 95 percent RH Wet bulb temperature < 35 Degrees C Non-Condensing
Vibration	5 ~10Hz — 10mm Amplitude 10 ~55Hz — 2G Acceleration Non-Operating 1 Hour on each 3 axis
Shock	20 G 11± 5 ms Pulse Duration Non-Operating, 1/2 Sine Pulse - 3 Shocks each axis
Withstand Voltage	Input-Output: 500 Vdc 1 minute at 25 degrees C 65 percent RH
Isolation Resistance	Input-Output >100M ohm, 500 Vdc Output-Signal Ground:
Dimensions	2.0 (50.8) x 1.56 (39.8) x 0.33 (8.5) See Outline Drawing, Figure 1
Weight	0.71 oz. (20 grams) Typical, 1.06 oz. (30 grams) Maximum
Cover Material	Plastic (UL94V-O) With Aluminum Base



- NOTES:
1. DIMENSIONS IN PARENTHESIS ARE IN MILLIMETERS, ALL OTHERS ARE IN INCHES.
 2. ± 0.02 in. (± 0.5 mm) TOLERANCE UNLESS OTHERWISE SPECIFIED.

FIGURE 1 MECHANICAL OUTLINE DRAWING OF THE FPD 5-48W DC TO DC CONVERTER

TERMINAL LOCATION



TOP VIEW

- ① DC INPUT (+)
- ② SIGNAL GROUND (SG)
- ③ DC INPUT (-)
- ④ NC
- ⑤ DC OUTPUT (+)
- ⑥ DC OUTPUT (-)
- ⑦ NC
- ⑧ REMOTE VOLTAGE CONTROL (RV1)
- ⑨ REMOTE VOLTAGE CONTROL (RV2)

NOTE: ② SG TERMINAL MUST BE CONNECTED TO TERMINAL ① (+) OR ③ (-)
② SG TERMINAL IS CONNECTED TO ALUMINUM BASE.

FIGURE 2 TERMINAL LOCATIONS OF THE FPD 5-48W DC TO DC CONVERTER

RECOVERY CHARACTERISTIC

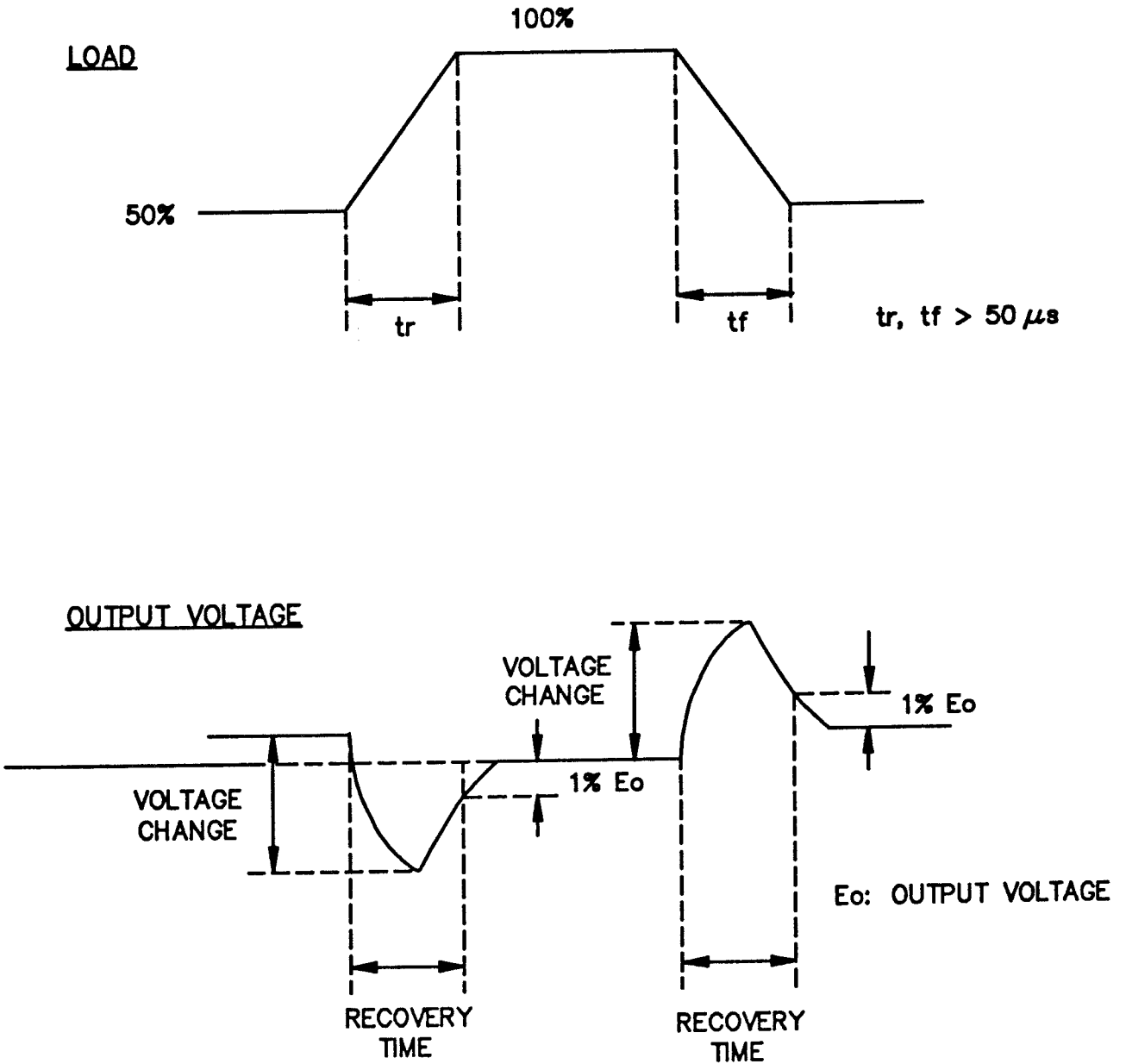
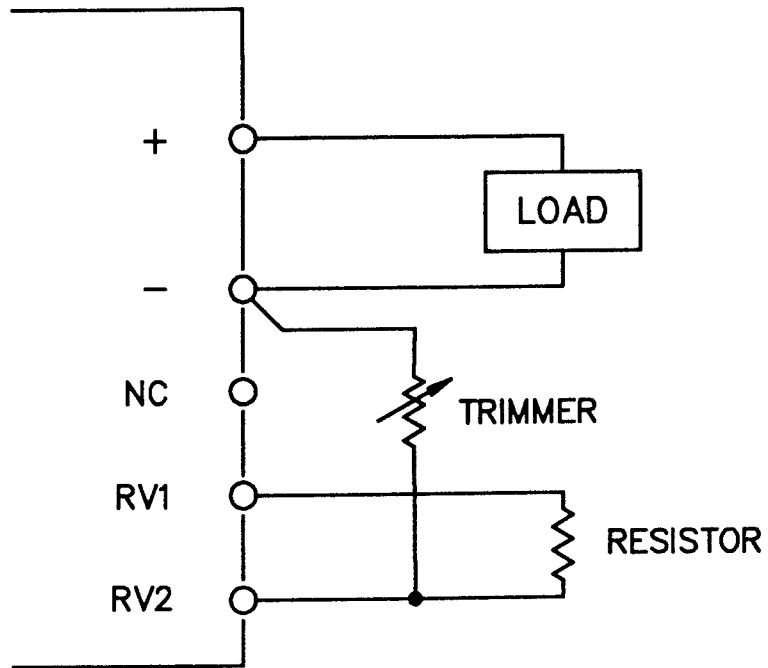


FIGURE 3 RECOVERY CHARACTERISTICS OF THE FPD 5-48W DC TO DC CONVERTER

EXTERNAL OUTPUT VOLTAGE TRIMMING



EXTERNAL OUTPUT VOLTAGE TRIMMING (WHEN CONNECTING LINES TO THE UNIT ARE LONG)

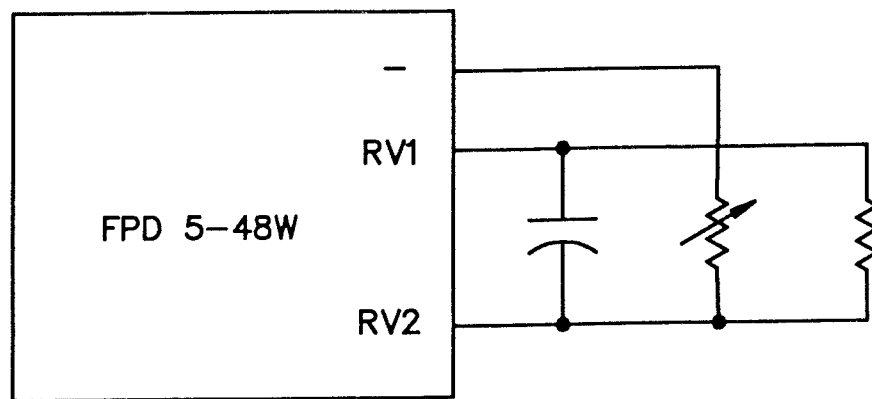


FIGURE 4A (TOP) EXTERNAL OUTPUT VOLTAGE TRIMMING FOR THE FPD 5-48W DC TO DC CONVERTER
 FIGURE 4B (BOTTOM) FPD 5-48W APPLICATION WHERE THE CONNECTING LINES TO THE DC TO DC CONVERTER
 ARE LONG

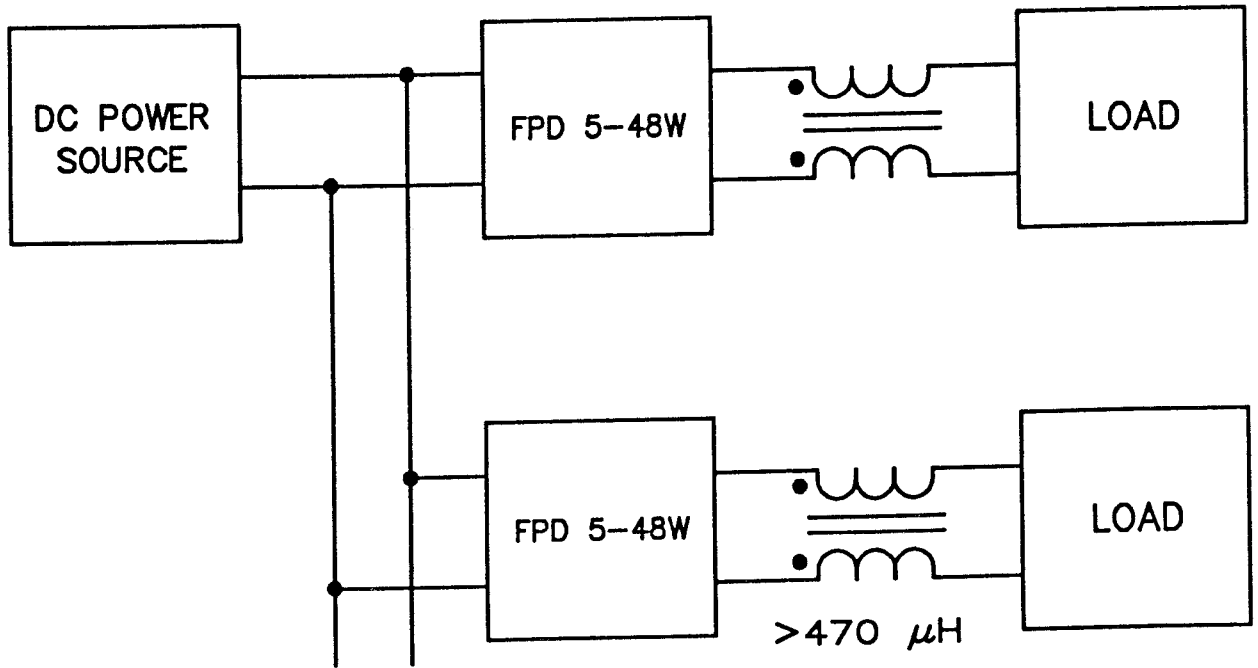
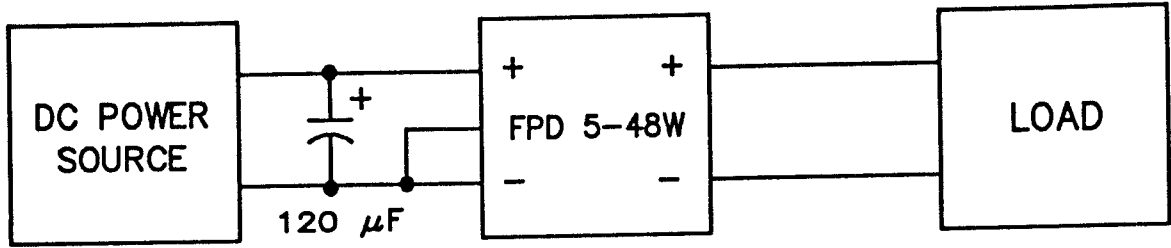
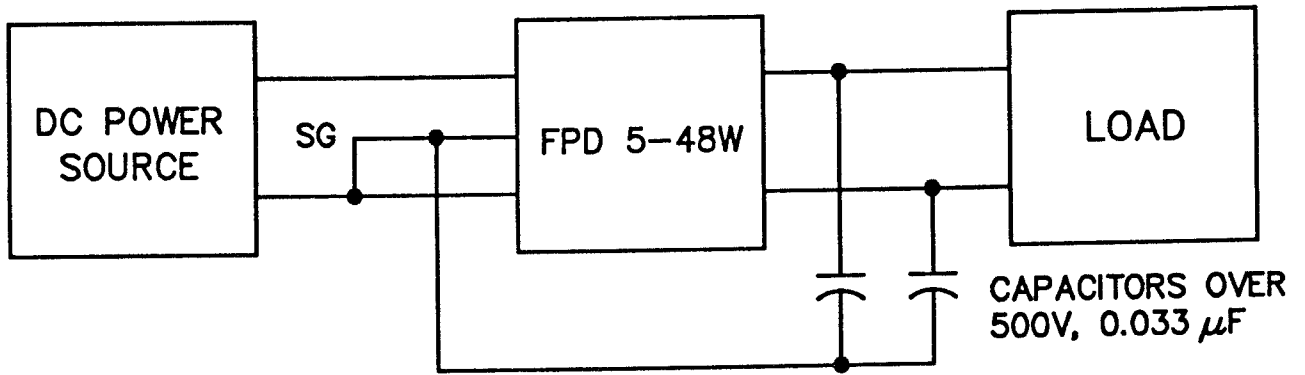


FIGURE 5 (TOP) FPD 5-48W APPLICATION WHERE THE INPUT LINES TO THE DC TO DC CONVERTER ARE LONG

FIGURE 6 (BOTTOM) A COMMON MODE NOISE SUPPRESSION CIRCUIT TO REDUCE MUTUAL INTERFERENCE AND GROUND LOOP NOISE IN THE DC TO DC CONVERTER

CONNECTION WITH ISOLATION



CONNECTION WITHOUT ISOLATION

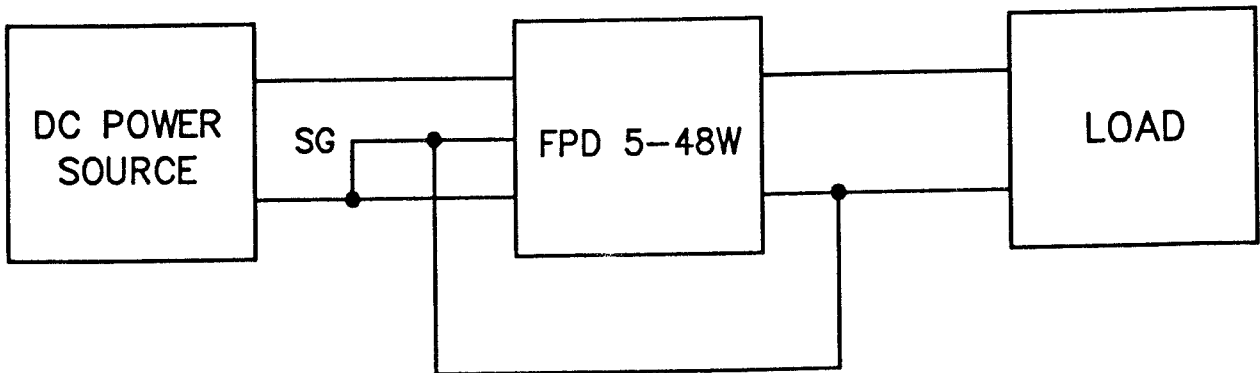


FIGURE 7A (TOP) FPD 5-48W APPLICATION WHERE VOLTAGE SURGES ARE PRESENT AT THE INPUT TERMINALS TO THE DC TO DC CONVERTER - A NOISE SUPPRESSION CIRCUIT WITH ISOLATION

FIGURE 7B (BOTTOM) FPD 5-48W APPLICATION WHERE VOLTAGE SURGES ARE PRESENT AT THE INPUT TERMINALS TO THE DC TO DC CONVERTER - A NOISE SUPPRESSION CIRCUIT WITHOUT ISOLATION

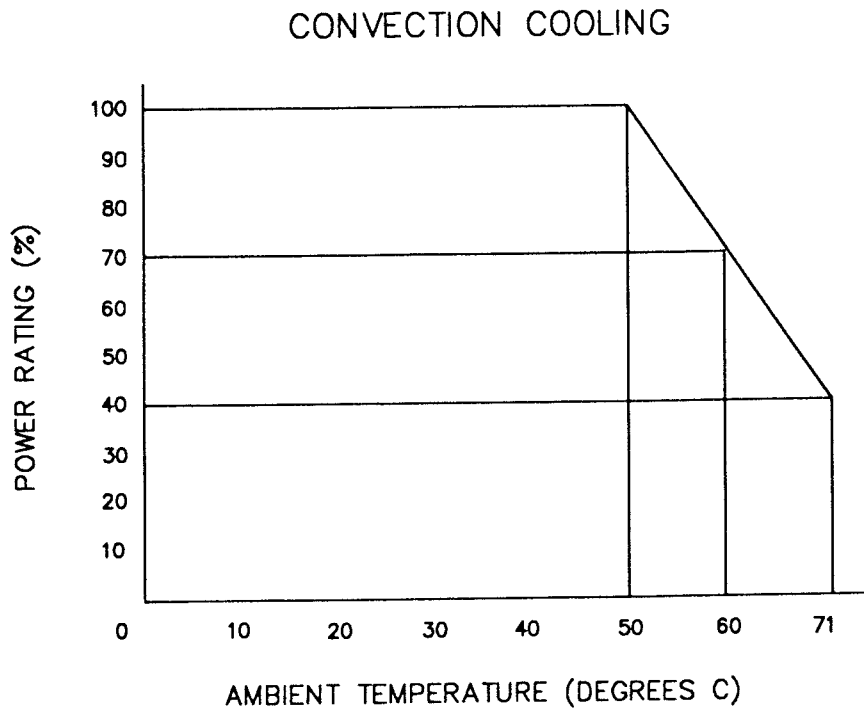
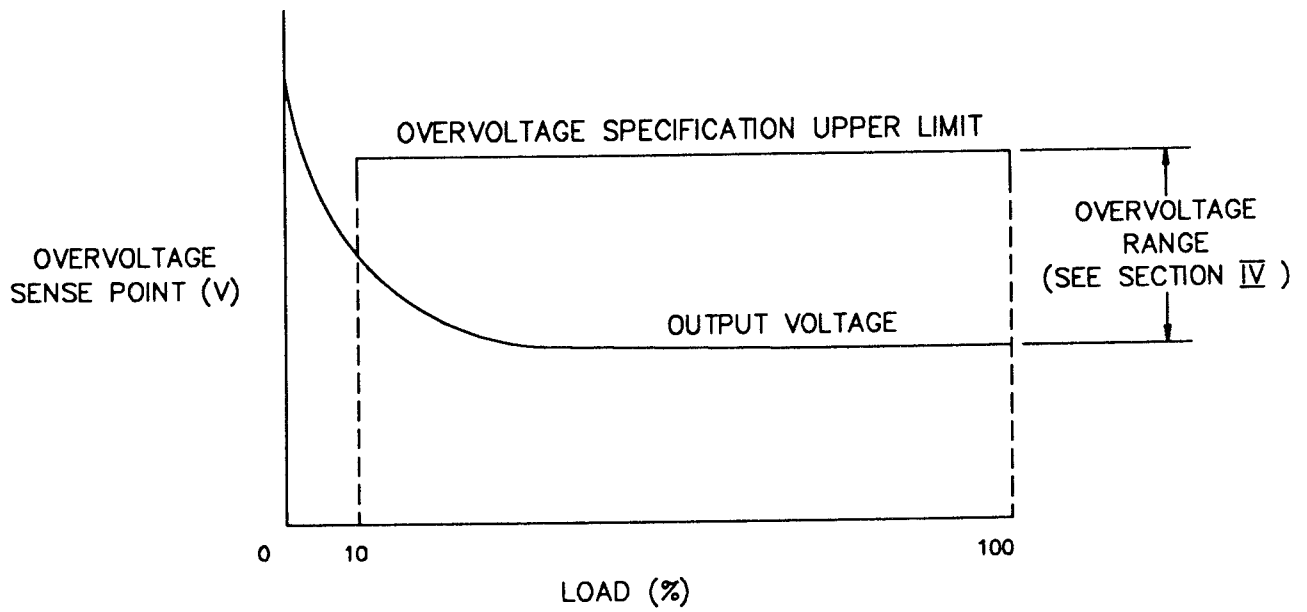


FIGURE 8 (TOP) OVERVOLTAGE PROTECTION CHARACTERISTIC FOR THE FPD 5-48W DC TO DC CONVERTER

FIGURE 9 (BOTTOM) A PLOT OF PERCENT OUTPUT RATING VERSUS AMBIENT TEMPERATURE (WITH CONVECTION COOLING) FOR THE FPD 5-48W DC TO DC CONVERTER