



Product Specification

# **ML40 Multi Output Series**

**40W AC-DC**

**Medical Power Supplies**

Document No. 702603 Rev. 08-16-21

## Notices

*N2Power™* and the *N2Power* logo are registered trademarks of Qualstar Corporation.

Copyright© 2018 by Qualstar Corporation — All Rights Reserved

For warranty information refer to [www.n2power.com](http://www.n2power.com)

Information contained in this document is copyrighted by Qualstar Corporation and is intended for use by customers and prospective customers to evaluate and integrate our power supplies. Customers and prospective customers may reproduce this document as needed for these purposes. Reproduction in whole or in part for any other purpose or by any other party is prohibited without prior written permission from Qualstar Corporation.

Every effort has been made to keep the information contained in this document current and accurate as of the date of publication or revision. However, no guarantee is given or implied that the document is error-free or that it is accurate with regard to any specification. *Qualstar* reserves the right to modify the design or specification without notice.

This specification may not be construed as a contractual obligation except as specifically agreed to by *Qualstar* in writing at the time of order.

For information about this product specification, please write or call *Qualstar* at:

### **N2Power**

A subsidiary of Qualstar Corporation

1267 Flynn Road  
Camarillo, CA 93012

FAX: (805) 978-5212  
Phone: (805) 583-7744

E-Mail: [sales@n2power.com](mailto:sales@n2power.com)  
[www.n2power.com](http://www.n2power.com)

# Table of Contents

---

<b>1.</b>	<b>Introduction</b> .....	<b>1-1</b>
1.1	Introduction.....	1-1
1.2	Agency Compliance.....	1-2
<b>2.</b>	<b>AC Input</b> .....	<b>2-3</b>
2.1	Input Line Requirements.....	2-3
2.2	Input Over Current Protection.....	2-3
2.3	Inrush Current Limiting.....	2-3
2.4	Low Input Voltage.....	2-3
2.5	Leakage Current.....	2-3
<b>3.</b>	<b>DC Outputs</b> .....	<b>3-1</b>
3.1	Output Voltage Regulation.....	3-1
3.2	No Load Operation.....	3-1
3.3	Output Current/Power.....	3-2
3.4	Cooling.....	3-3
3.5	Output Ripple/Noise.....	3-4
3.6	Output Protection.....	3-5
3.7	Output Rise Time.....	3-6
3.8	Overshoot at Turn On/Turn Off.....	3-6
3.9	Voltage Trim.....	3-7
<b>4.</b>	<b>General Specifications</b> .....	<b>4-1</b>
4.1	Environmental.....	4-1
4.2	Mean Time between Failures.....	4-1
4.3	Labeling/Marking.....	4-1
4.4	Net Weight.....	4-2
4.5	Mounting and Physical Dimensions.....	4-2
4.6	Mating Connectors.....	4-7
4.7	Output Grounding.....	4-7
4.8	Pin Definitions.....	4-8
<b>5.</b>	<b>Efficiency</b> .....	<b>5-1</b>
<b>6.</b>	<b>Timing and Control</b> .....	<b>6-1</b>
6.1	Power Supply Timing.....	6-1
6.2	Voltage Hold-Up Time.....	6-1
<b>7.</b>	<b>Ordering Information</b> .....	<b>7-1</b>

# 1.

# Introduction

## 1.1 Introduction

This specification defines the ML40 Multi series of universal input, single output 40W switch mode power supplies. It includes information regarding the mechanical details, electrical and environmental ranges for storage and operation of the power supply. These power supplies achieve very high packaging densities. All of the ML40 Multi family models are listed in Table 3-1.

All models of the ML40 series can be used as standalone power supplies and have different chassis options – MLO40 for **O**pen frame, MLU40 for **U** Chassis, MLE40 for **E**nclosure and MLD40 for **D**in rail.



MLO40



MLU40



MLE40



MLD40

Figure 1-1 ML40 Multi Series

## 1.2 Agency Compliance

All of the ML40 models comply with the following international agency standards:

Safety	Complies with Standard	Remarks
United States	ANSI/AAMI ES60601-1	Leakage Current – see Table 2-2
	UL60950-1 UL62368-1	Hi-pot – Input to Output = 4000Vac
Canada	CAN/CSA-C22.2 No. 601.1 CAN/CSA-C22.2 No. 60601-1 CAN/CSA-C22.2 No. 60950-1 CAN/CSA C22.2 No.62368-1	
EU Council	EN 60601-1 EN60950-1 EN62368-1	Low Voltage Directive
International	IEC 60601-1 IEC60950-1 IEC62368-1	
EMC	Complies with Standard	Remarks
Emission	EN55032 FCC Part 15 Subpart B EN 55011	Class B Class B
	EN 60601-1-2 IEC 61000-3-2 IEC 61000-3-3	Harmonic Current Emissions Voltage Fluctuations & Flicker
	Immunity	
	EN 60601-1-2: EN 61000-4-2 EN 61000-4-3 EN 61000-4-4 EN 61000-4-5 EN 61000-4-6 EN 61000-4-8 EN 61000-4-11	Electrostatic Discharge Radiated Susceptibility Fast Transient/Burst Immunity Power Mains Surge Immunity Conducted Susceptibility Power Frequency Magnetic Field Voltage Dips, Short Interruptions
Reduction of Hazardous Substances (RoHS)	Complies with Standard	Remarks
EU Council	2002/95/EC 2011/65/EU 2015/863/EU	RoHS Directive RoHS 2 Directive Amending Annex II to Directive 2011/65/EU
Marks of Conformance		
United States & Canada		(Underwriters Laboratories File E469416)
		
EU Council		
RoHS		

Table 1-1 Agency Compliance

## 2.

# AC Input

---

### 2.1 Input Line Requirements

The following table defines the voltage and frequency requirements for the AC line inputs to the ML40 Multi models which are capable of supplying full rated power in continuous operation throughout the specified ranges of voltages and frequencies. The power supply will automatically recover from AC power loss and is capable of starting under maximum load at the minimum AC input voltage described below.

Parameter	Minimum	Nominal	Maximum
RMS Input Voltage	85VAC	100–240VAC	264VAC
RMS Input Current	-	-	1.05A / 100VAC 0.55A / 240VAC
Input Frequency	47Hz	50/60Hz	63Hz

Table 2-1 ML40 Multi Series Input Parameters

### 2.2 Input Over Current Protection

The ML40 Multi series incorporate a primary AC line fuse for input over current protection to prevent damage to the power supply and meet product safety requirements as outlined in Section 1.2.

### 2.3 Inrush Current Limiting

The cold-start (25°C) inrush current at 90° input phase angle (i.e. AC switch is closed at the peak of the AC sine wave input) is limited to less than 60 Amps peak for 230 VAC.

Repetitive ON-OFF cycling of the AC input voltage should not damage the power supply or cause the input fuse to open.

### 2.4 Low Input Voltage

The application of an input voltage below the minimums specified in Table 2-1 shall not cause damage to the power supply.

### 2.5 Leakage Current

There are 2 types of leakage current applicable to medical power suppliers:

Earth leakage current: current flowing from the mains part through or across the insulation into the protective earth conductor.

Touch Current (Enclosure Leakage Current): leakage current flowing from the enclosure or from parts thereof, excluding patient connections, accessible to any operator or patient in normal use, through an external path other than the protective earth conductor, to earth or to another part of the enclosure.

Note: The meaning of this term is the same as that of “enclosure leakage current” in the first and second editions of this standard. The term has been changed to align with IEC 60950-1 and to reflect the fact that the measurement now applies also to parts that are normally protectively earthed.

Table 2-2 Leakage Current

Model Name	Class I or Class II	Leakage Current Measurement
ML40-XX	Class I	Earth Leakage: < 0.5mA (N.C.)
		Earth Leakage: < 0.6mA (S.F.C.)
		Touch Leakage: < 100 $\mu$ A (N.C.)
		Touch Leakage: < 150 $\mu$ A (S.F.C.)

# 3.

# DC Outputs

## 3.1 Output Voltage Regulation

The DC output voltages shall remain within the Minimum and Maximum limits of Table 3-1 when measured at the power supply connector under all specified line, load and environmental conditions contained herein.

Model	Rated Voltage (VDC)	Load Regulation	Output voltage accuracy range		
			Minimum (VDC)	Nominal (VDC)	Maximum (VDC)
ML#40-05 N2 C, D	5V, V1	±0.5%	4.975	5	5.025
	3.3, V2	±1.5%	3.25	3.3	3.35
ML#40-12 N3 C,D	12V,V1	±0.5%	11.94	12	12.06
	5V,V2	±1.5%	4.925	5	5.075
ML#40-12 N2 C, D	12V, V1	±0.5%	11.94	12	12.06
	3.3, V2	±1.5%	3.25	3.3	3.35
ML#40-15 N3 C,D	15V,V1	±0.5%	14.93	15	15.08
	5V,V2	±1.5%	4.925	5	5.075
ML#40-24 N3 C,D	24V,V1	±0.5%	23.88	24	24.12
	5V,V2	±1.5%	4.925	5	5.075
ML#40-28 N3 C,D	28V,V1	±0.5%	27.86	28	28.14
	5V,V2	±1.5%	4.925	5	5.075
ML#40-05 N2MP3C,D	5V, V1	±0.5%	4.975	5	5.025
	3.3V, V2	±1.5%	3.25	3.3	3.35
	-5V,V3	±0.7%	-4.965	-5	-5.035
ML#40-05 N2P6C,D	5V, V1	±0.5%	4.975	5	5.025
	3.3V, V2	±1.5%	3.25	3.3	3.35
	12, V3	±0.7%	11.92	12	12.08
ML#40-05 N2MP6C,D	5V, V1	±0.5%	4.975	5	5.025
	3.3, V2	±1.5%	3.25	3.3	3.35
	-12, V3	±0.7%	-11.92	-12	-12.08
ML#40-12 N3MP3C,D	12V,V1	±0.5%	11.94	12	12.06
	5V,V2	±1.5%	4.925	5	5.075
	-5V,V3	±0.7%	-4.965	-5	-5.035
ML#40-12 N3MP6C,D	12V,V1	±0.5%	11.94	12	12.06
	5V,V2	±1.5%	4.925	5	5.075
	-12V,V3	±0.7%	-11.92	-12	-12.08
ML#40-12 N2P3C,D	12V,V1	±0.5%	11.94	12	12.06
	3.3V, V2	±1.5%	3.25	3.3	3.35
	5V,V3	±0.7%	4.965	5	5.035

ML#40-12 N2MP6C,D	12V,V1	±0.5%	11.94	12	12.06
	3.3V,V2	±1.5%	3.25	3.3	3.35
	-12V,V3	±0.7%	-11.92	-12	-12.08
ML#40-15 N3MP7C,D	15V,V1	±0.5%	14.93	15	15.08
	5V,V2	±1.5%	4.925	5	5.075
	-15V,V3	±0.7%	-14.93	-15	-15.08
ML#40-24 N3P6C,D	24V,V1	±0.5%	23.88	24	24.12
	5V,V2	±1.5%	4.925	5	5.075
	12V,V3	±0.7%	11.92	12	12.08
ML#40-24 N3MP6C	24V,V1	±0.5%	23.88	24	24.12
	5V,V2	±1.5%	4.925	5	5.075
	-12V,V3	±0.7%	-11.92	-12	-12.08

**Table 3-1 Output Voltage Specifications**

Note: “#” denotes the type of chassis, which can be  
O=Open frame, U=U Chassis, E=Enclosure, D=Din Rail

## 3.2 No Load Operation

The power supply will operate under no load condition and will not result in damage to the supply. The power supply will remain stable and operate normally after application of loads.

### 3.3 Output Current/Power

The maximum available output power is always a function of the input voltage and ambient temperature. The maximum output currents of all models of ML40 Multi are listed in Table 3-2. Refer to Section 3.3.1 and 3.4.1 for input voltage range and ambient temperature at which ML40 Multi can deliver these maximum output powers.

<b>Model</b>	<b>Voltage VDC</b>	<b>Current (Max) A</b>
ML#40-05 N2C,D	5	8
ML#40-12 N3C,D	12	3.34
ML#40-12 N2C,D	12	3.34
ML#40-15 N3C,D	15	2.67
ML#40-24 N3C,D	24	1.67
ML#40-28 N3C,D	28	1.43
ML#40-05	5	8
ML#40-05	5	8
ML#40-05	5	8
ML#40-12	12	3.34
ML#40-15	15	2.67
ML#40-24	24	1.67
ML#40-24	24	1.67

**Table 3-2 Max Load Currents**

### 3.3.1 Input Voltage Derating

The ML40 Multi series can be operated at the minimum input voltage of 85 VAC with the total maximum output power of 40 W.

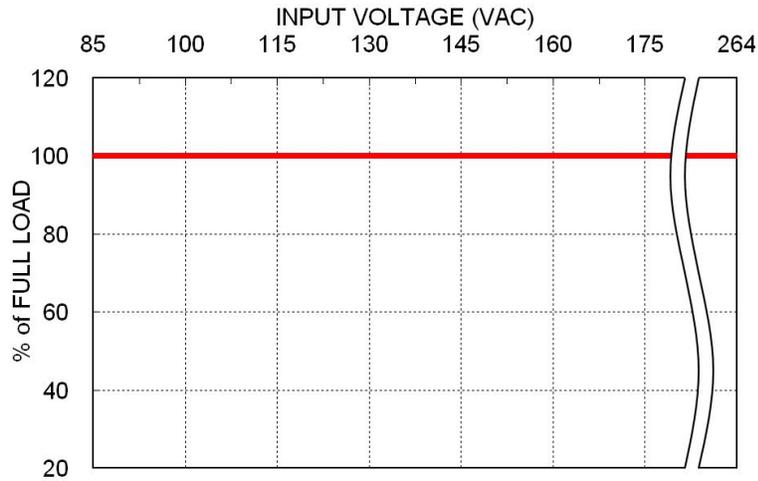


Figure 3-1 Load vs. Input Voltage

### 3.4 Cooling

ML40 Multi can deliver maximum output power with unrestricted convection cooling. “Unrestricted” means there are no nearby obstructions that would impede the convection cooling process.

#### 3.4.1 High Temperature Derating

The ML40 Multi series can be operated at elevated temperatures by derating the total maximum output power (or current). Refer to below graphs to get the maximum output power at a specific ambient temperature.

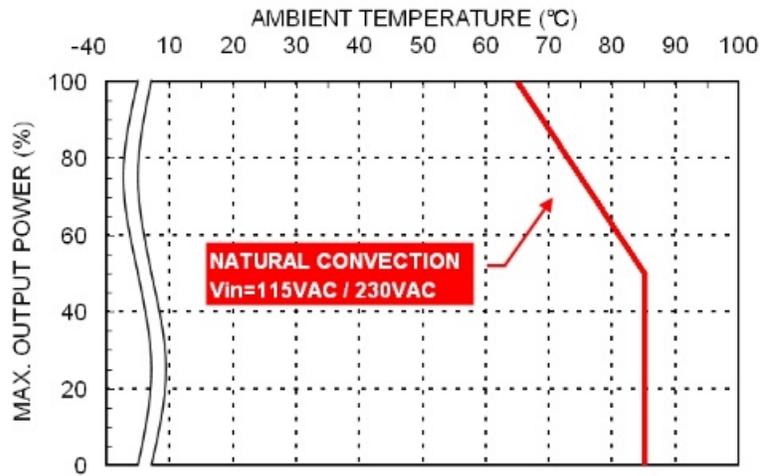


Figure 3-2 Temperature Derating Curve for ML#40 Multi Dual Output

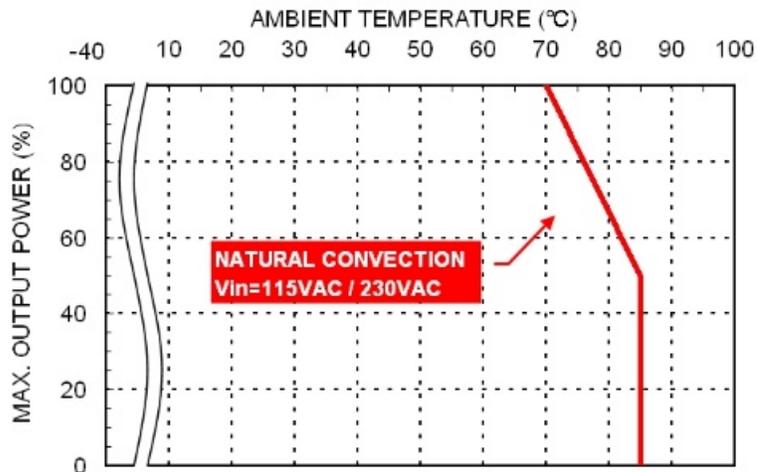


Figure 3-3 Temperature Derating Curve for ML#40 Multi Triple Output

### 3.5 Output Ripple/Noise

Output ripple voltage and noise are measured at 20MHz of bandwidth by using a 12” twisted pair-wire terminated with a ceramic capacitor (MLCC) in parallel. The capacitance values of this MLCC are 10µF for 5V VOUT1 output models, 1µF for 12V, 15V, 24V, 28V models VOUT1. All VOUT2 capacitance value of MLCCs are 10µF. VOUT3 are 10µF for 5V, 12V, 15V outputs. The ripple noise is measured from the output pin connectors.

#### 3.5.1 Ripple/Noise Limits

The ripple voltage of the outputs is measured at the pins of the mating connector. Ripple and noise shall not exceed the limits specified in Table 3-3 under any condition of line voltage and frequency specified in Section 2.1 and DC loading specified in Section 3-2.

Model	Output Voltage	Maximum Ripple+Noise (peak-to-peak)
ML#40-05 N2C,D	5	V1,100mV p-p
	3.3	V2 100mV p-p
ML#40-12 N3C,D	12	V1,120mV p-p
	5	V2 100mV p-p
ML#40-12 N2C,D	12	V1,120mV p-p
	3.3	V2 100mV p-p
ML#40-15 N3C,D	15	V1,150mV p-p
	5	V2 100mV p-p
ML#40-24 N3C,D	24	V1,240mV p-p
	5	V2 100mV p-p
ML#40-28 N3C,D	28	V1,280mV p-p
	5	V2 100mV p-p
ML#40-05 N2MP3C,D	5	V1,100mV p-p
	3.3	V2,100mV p-p
	-5	V3 100mV p-p
ML#40-05 N2P6C,D	5	V1,100mV p-p
	3.3	V2 100mV p-p
	12	V3,120mV p-p
ML#40-05 N2MP6C,D	5	V1,100mV p-p
	3.3	V2 100mV p-p
	-12	V3,120mV p-p
ML#40-12 N3MP3C,D	12	V1,120mV p-p
	5	V2 100mV p-p
	-5	V3 100mV p-p
ML#40-12 N3MP6C,D	12	V1,120mV p-p
	5	V2 100mV p-p
	-12	V3,120mV p-p

ML#40-12 N2P3C,D	12	V1,120mV p-p
	3.3	V2 100mV p-p
	5	V3 100mV p-p
ML#40-12 N2MP6C,D	12	V1,120mV p-p
	3.3	V2 100mV p-p
	-12	V3,120mV p-p
ML#40-15 N3MP7C,D	15	V1,150mV p-p
	5	V2 100mV p-p
	-15	V3,150mV p-p
ML#40-24 N3P6C,D	24	V1,240mV p-p
	5	V2 100mV p-p
	12	V3,120mV p-p
ML#40-24 N3MP6C,D	24	V1,240mV p-p
	5	V2 100mV p-p
	-12	V3,120mV p-p

**Table 3-3 Ripple Voltage of ML40 Multi Series**

### 3.5.2 Ripple/Noise Test Setup

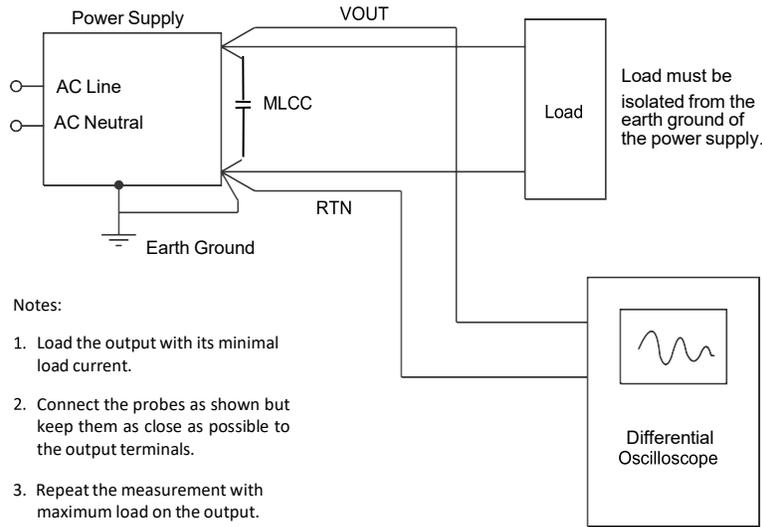


Figure 3-4 Ripple Noise Measurement Setup

## 3.6 Output Protection

There are output protection schemes designed to protect the load and the ML40 Multi series from component failures and extraordinary circumstances.

### 3.6.1 Over Voltage Protection (OVP)

No single fault is able to cause a sustained over voltage condition on the output. When an over-voltage condition occurs at output, the power supply will shut down. Following an OVP event, the ML40 Multi will not restart until AC power is turned off and back on.

Model	Output (VDC)	OVP Voltage		
		Minimum (VDC)	Nominal (VDC)	Maximum (VDC)
All	5 V	6.3	6.6	7.0
	12 V	15.0	15.9	16.8
	15 V	18.8	19.9	21.0
	24 V	30.0	31.8	33.6
	28 V	35.0	37.1	39.2

Table 3-1 Over Voltage Protection Limits

### **3.6.2 Over Current Protection (OCP)**

An excessive load will cause the output to shut down. The maximum output power before the power supply shuts down is about 145% (typical) of the rated output power. The power supply will periodically attempt to restart until the over-current condition is removed.

### **3.6.3 Short Circuit Protection**

A short circuit is defined as an impedance of less than 0.1 ohms placed between RTN and output. A short circuit will cause no damage to the power supply, but will cause it to shut down. The power supply will periodically attempt a restart until the short circuit condition is removed. After successfully restarting, the power supply will operate normally.

## **3.7 Output Rise Time**

Output voltage shall rise from 10% to 90% of nominal output voltage within 20ms. The output voltage waveform must be a monotonic ramp from 10% to 90% of final set point within the regulation band under any loading conditions specified in the respective load current tables in Table 3-2.

For the purposes of this specification, a monotonic ramp is defined as always having a positive slope from zero to  $10 \cdot V_{OUT}$  volts/millisecond. During any 5-millisecond portion of the ramp, its slope must be greater than 5% of its rated voltage per millisecond.

## **3.8 Overshoot at Turn On/Turn Off**

The output voltage overshoot upon the application or removal of the input mains voltage is less than 5% for all ML40 Multi models above the nominal voltage. No opposite polarity voltage will be present on any output during turn on or turn off.

### 3.9 Voltage Trim

A potentiometer (Figure 3-5) is provided to allow the user to adjust the output voltage up or down by up to 10%. The ability of the output to maintain its specified regulation accuracy under severe load or line conditions could be diminished by trimming the output to a higher than nominal voltage. The load current and power should not exceed the maximum limits described in Section 3.3.

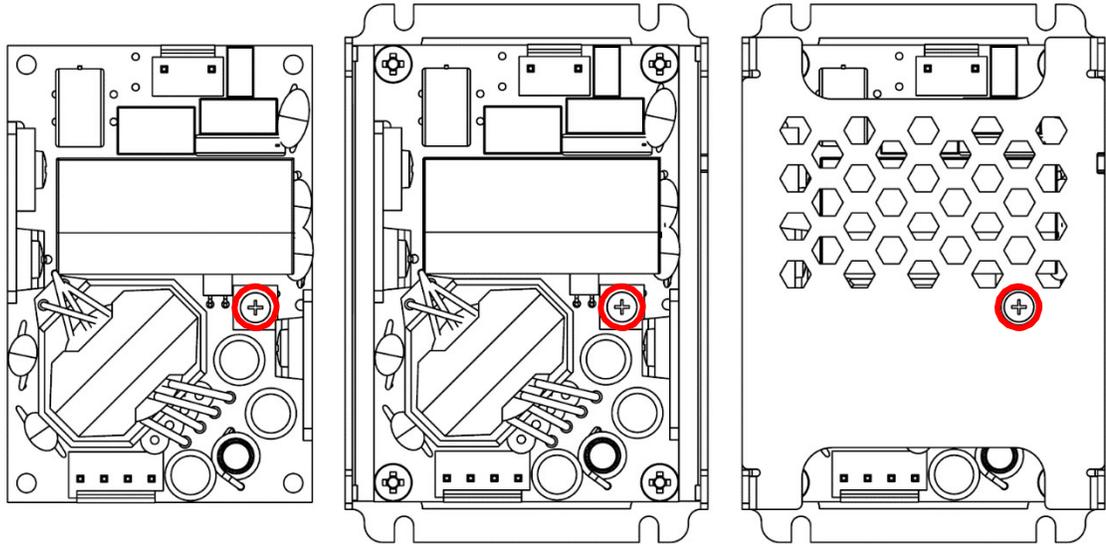


Figure 3-5 Potentiometer to adjust output voltage

# 4.

# General Specifications

## 4.1 Environmental

The ML40 Multi series meets or exceeds the following environmental specifications:

Parameter	Conditions	Specification	Remarks
Relative Humidity	Operating	-40°C to 85°C*	
	Non-Operating	-40°C to 85°C*	
	Operating	5-95% Maximum	Non-Condensing
	Non-Operating	95% Maximum	Non-Condensing
Altitude	Operating	16404 feet MSL Max.	5,000 meters
Vibration	No damage	2.0 G RMS Maximum	10-500Hz, 10-min/1cycle, 60 min each along x, y, z axis. Mounting: Compliance to IEC60068-2-6
		2.0 G RMS Maximum	

**Table 4-1 Environmental Specifications**

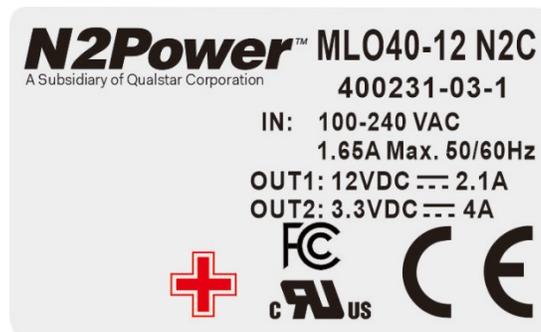
Note on (\*): Refer to **Figure 3-2** for derating at different temperatures.

## 4.2 Mean Time between Failures

The calculated MTBF of all models is equal to or greater than 3,010,000 hours of continuous operation at maximum output loading and worst-case input line voltage with convection cooling at 25°C. N2Power does not warrant the MTBF to be representative of any particular unit. The MTBF of the power supply is calculated in accordance with (MIL-HDBK-217F). Actual failure rates vary from unit to unit.

## 4.3 Labeling/Marking

The power supply is marked and labeled with the N2Power logo and part number, model number, input and output specifications, production code, appropriate safety agency logos and CE mark. A typical label is pictured below.



**Figure 4-1 Sample XL40 Multi series Label**

#### 4.4 Net Weight

<b>Model</b>	<b>Pound</b>	<b>Ounces</b>	<b>Kilograms</b>
MLO40 Multi	0.33	5.29	0.15
MLU40 Multi	0.43	6.98	0.19
MLE40 Multi	0.47	7.62	0.21
MLD40 Multi	0.52	8.40	0.23

**Table 4-2 Net Weights**

#### 4.5 Mounting and Physical Dimensions

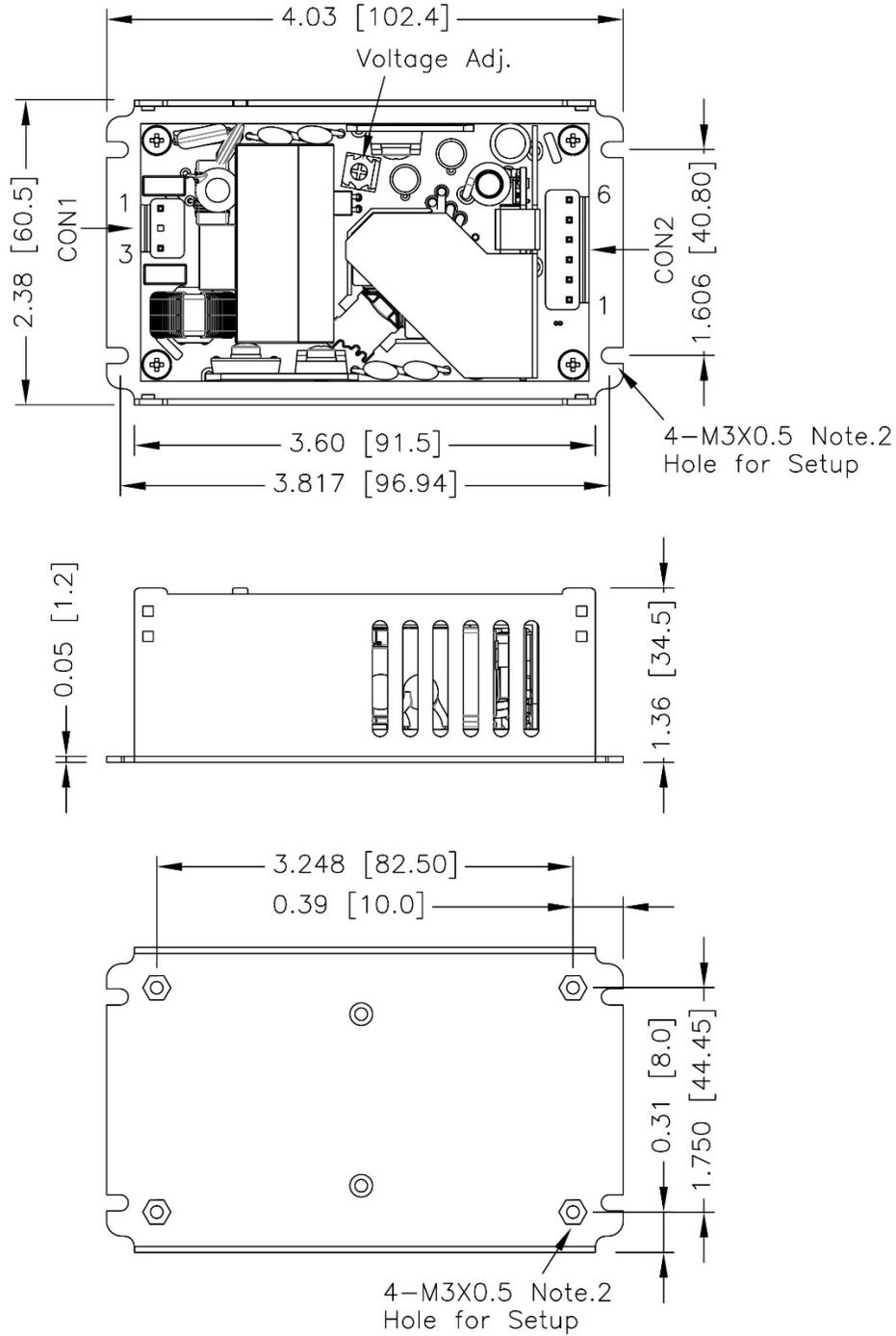
All ML40 Multi models are provided with four mounting holes of the following size.

<b>Model</b>	<b>Millimeter (mm)</b>	<b>Inch (in)</b>
ML#40 Multi	3.2	0.126

**Table 4-3 Mounting Screw Sizes**

See mechanical drawings for mounting hole locations and the dimensions of the power supplies. All the units are in “mm [in]” format with the tolerance of x.xx±0.5 [x.xxx±0.02].

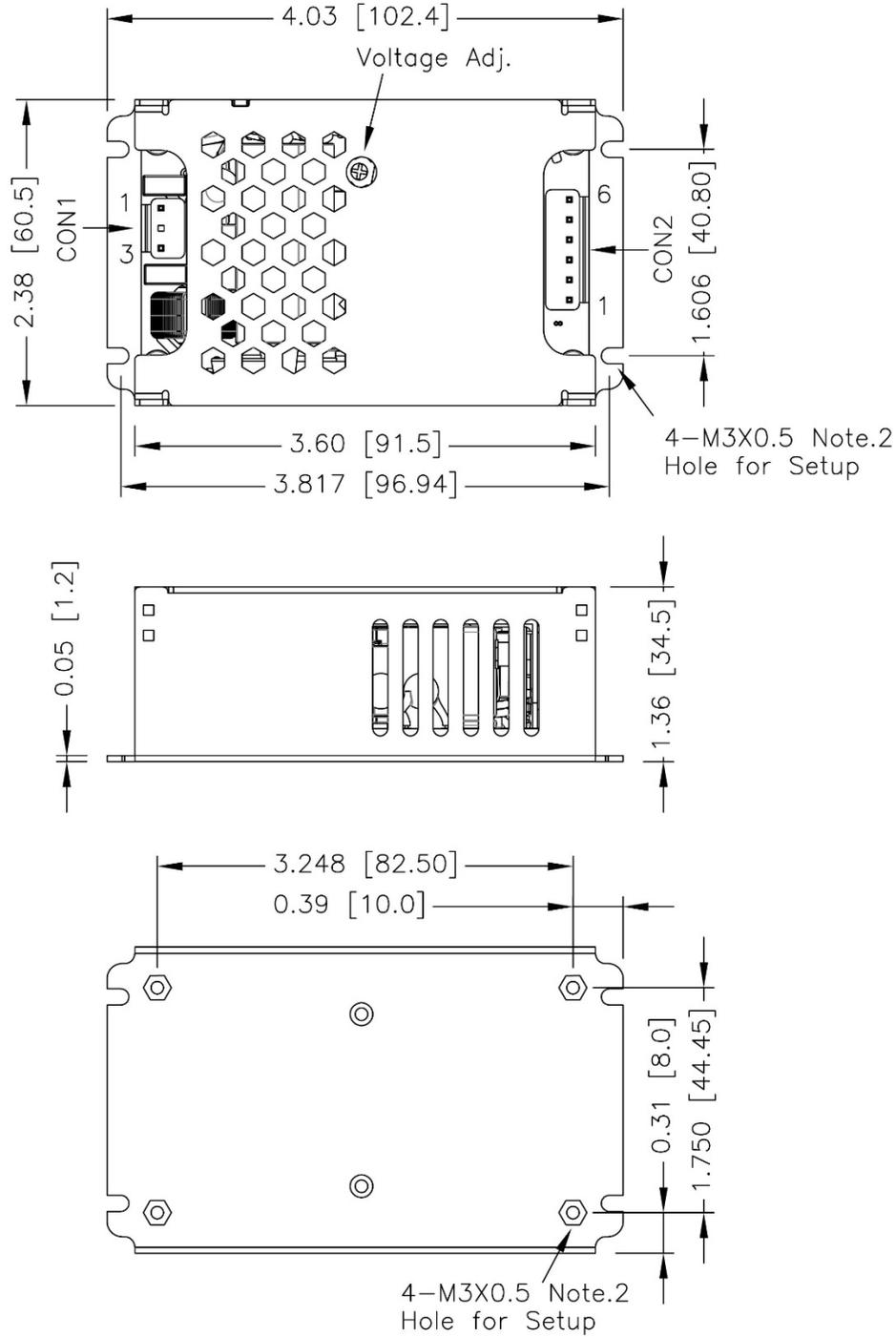




BOTTOM VIEW

1.All dimensions in inch[mm]  
Tolerance:x.xx±0.02[x.x±0.5] x.xxx±0.010[x.xx±0.25]

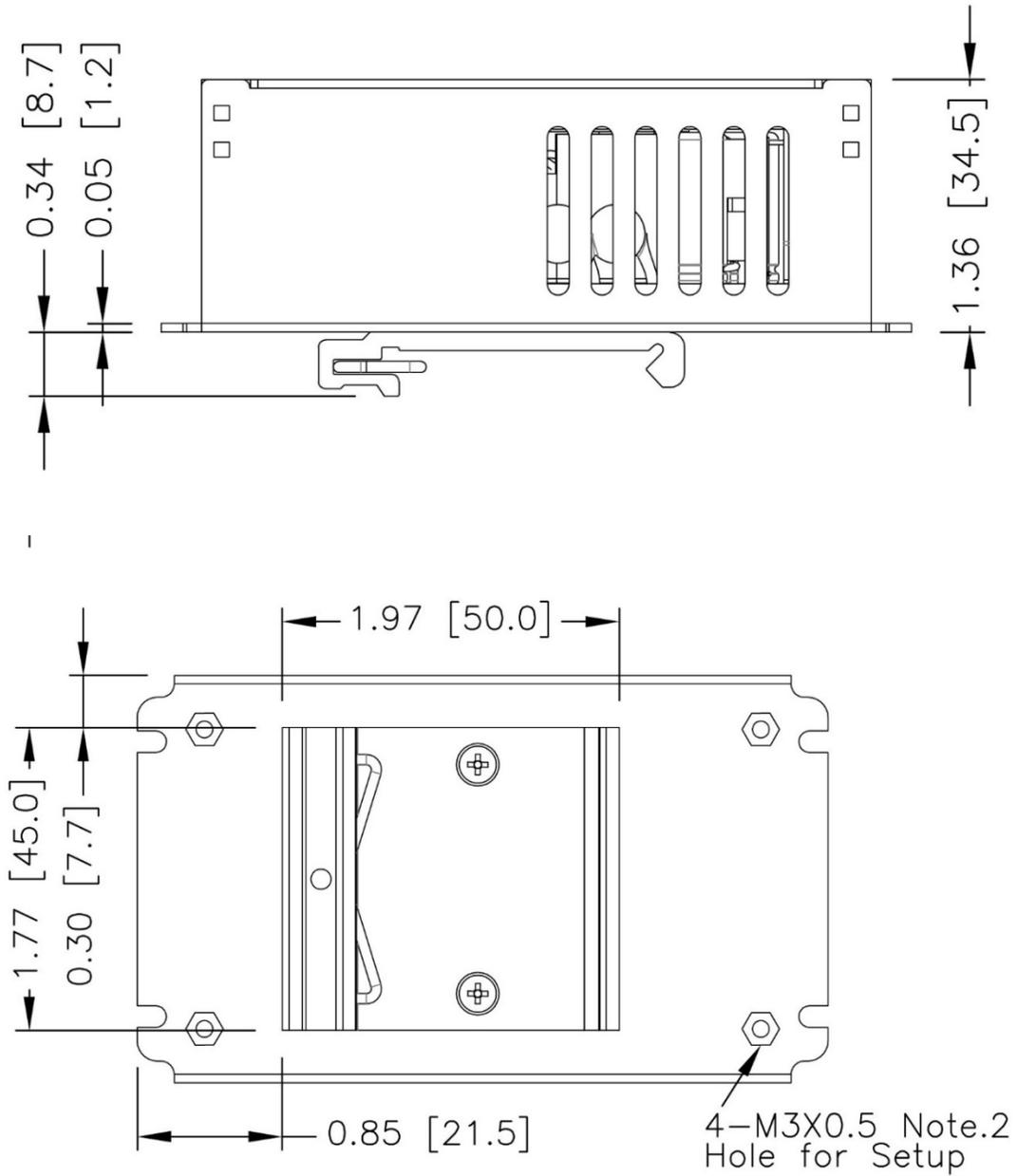
Figure 4-2 MLU40 Multi models: Mounting Hole Locations and Dimensions



BOTTOM VIEW

1. All dimensions in inch[mm]  
Tolerance: x.xx±0.02[x.x±0.5] x.xxx±0.010[x.xx±0.25]
2. The screw locked torque: MAX 5.0kgf-cm/0.49N-m

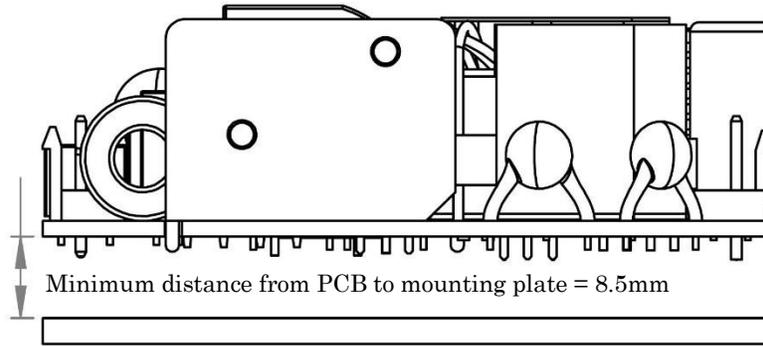
**Figure 4-3 MLE40 Multi models: Mounting Hole Locations and Dimensions**



BOTTOM VIEW

1.All dimensions in inch[mm]  
Tolerance:x.xx±0.02[x.x±0.5] x.xxx±0.010[x.xx±0.25]  
2.The screw locked torque: MAX 5.0kgf-cm/0.49N-m

Figure 4-4 MLD40 Multi models: Mounting Hole Locations and Dimensions.



**Figure 4-6 ML40 Multi minimum distance requirement from mounting plate**

When ML40 Multi models are mounted on the FG mounting plate, the distance from the mounting plate to the PCB must be at least 8.5mm.

A standoff less than 8.5mm high is acceptable when a thin insulator, 0.4mm thick (polyester, fish paper or equivalent UL rated 94V-2 minimum) is placed between the power supply and the mounting chassis (refer to applicable UL standard for clearance requirements).

## 4.6 Mating Connectors

The user must furnish all mating connectors. The mating connectors must meet the requirements of all applicable safety agencies (UL and/or TUV).

Model	Designator	Mating Housing	Terminal	
Mains input Options	JST Type	AC INPUT	SVH-21T-P1.1	
		+/-VOUT (DC Output)	SVH-21T-P1.1	
	Molex Type	AC INPUT	SD-2478	
		+/-VOUT (DC Output)	SD-2478	
	Terminal Block	AC INPUT	Screw locked torque- max 2Kgf.cm/0.2N.m	Wire dimension range 26 ~ 16AWG
		+/-VOUT (DC Output)		

**Table 4-4 Mating connectors**

## 4.7 Output Grounding

For CLASS I protection type power supplies (with suffix “C” at model names), the RTN signal may be connected to the power supply chassis ground (safety earth) screw terminals on the power supplies as shown in Figure 4-7.

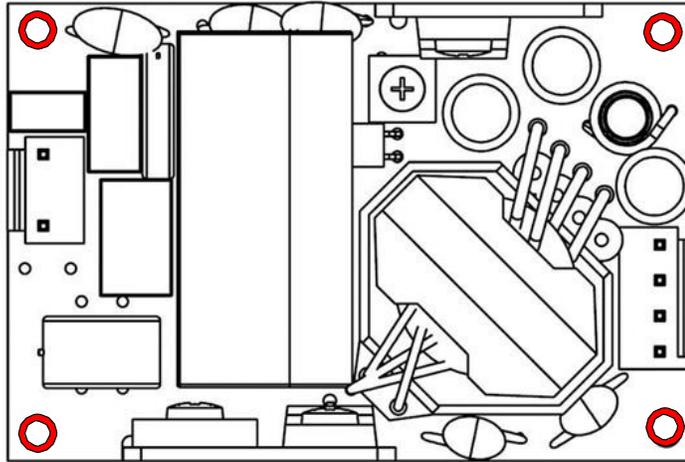


Figure 4-7 Safety ground connection points

#### 4.7 Pin Definitions

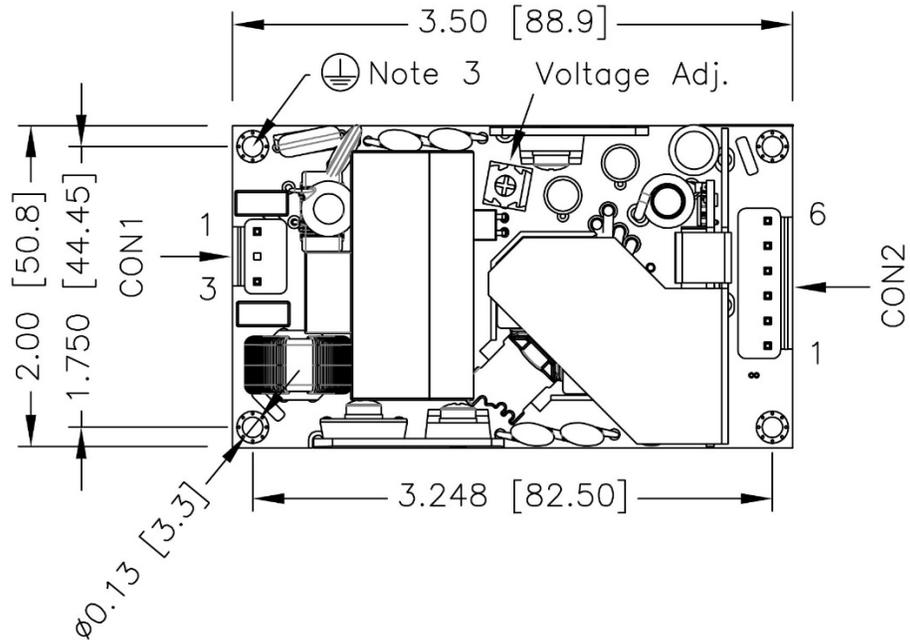


Figure 4-8 Pin Definitions

<b>Model</b>	<b>Connector</b>	<b>Pin No.</b>	<b>Assignment</b>
All	AC Input Terminal	1	AC NEUTRAL
		2	AC LINE
	Output Connector	1	VOUT 3
		2,3	RTN (VOUT Return)
		4,5	VOUT 2
		6	VOUT 1

**Table 4-5 Pin Definitions**

# 5.

# Efficiency

The efficiencies for the ML40 Multi power supply models are listed below. They were measured at full load, 25 °C at 230AC.

Model	Output Voltage	Total Load	Efficiency
ML#40-05 N2C,D	5, 3.3	40 W	89.50%
ML#40-12 N3C,D	12, 5	40 W	89%
ML#40-12 N2C,D	12, 3.3	40 W	90%
ML#40-15 N3C,D	15, 5	40 W	89%
ML#40-24 N3C,D	24, 5	40 W	86%
ML#40-28 N3C,D	28, 5	40 W	86%
ML#40-05 N2MP3C,D	5, 3.3, -5	40 W	86%
ML#40-05 N2P6C,D	5, 3.3, 12	40 W	89%
ML#40-05 N2MP6C,D	5, 3.3, -12	40 W	89%
ML#40-12 N3MP3C,D	12, 5, -5	40 W	89%
ML#40-12 N3MP6C,D	12, 5, -12	40 W	88%
ML#40-12 N2P3C,D	12, 3.3, 5	40 W	89%
ML#40-12 N2MP6C,D	12, 3.3, -12	40 W	88%
ML#40-15 N3MP7C,D	15, 5, -15	40 W	88%
ML#40-24 N3P6C,D	24, 5, 12	40 W	86%
ML#40-24 N3MP6C,D	24, 5, -12	40 W	86%

Table 5-1 Efficiency

# 6.

# Timing and Control

---

## 6.1 Power Supply Timing

The maximum duration for the output to rise up to regulated output voltage (99% of nominal voltage) from the start of AC input voltage is 1 second.

## 6.2 Voltage Hold-Up Time

The power supply will maintain output regulation per Table 3-1 despite a loss of input power at 115VAC/60Hz and 230VAC/50Hz at maximum rated continuous output for a minimum of 25ms.

# 7.

## Ordering Information

---

The following table provides the N2Power part numbers that should appear on your purchase order and will appear on any N2Power correspondence:

<b>Model</b>	<b>Output Voltage 1</b>	<b>Output Voltage 2</b>	<b>Output Voltage 3</b>	<b>N2Power Part Number</b>
MLO40-05 N2C	5 V	3.3 V		400231-01-5
MLU40-05 N2C	5 V	3.3 V		400233-01-1
MLE40-05 N2C	5 V	3.3 V		400234-01-9
MLD40-05 N2C	5 V	3.3 V		400232-01-3
MLO40-05 N2D	5 V	3.3 V		400231-21-3
MLU40-05 N2D	5 V	3.3 V		400233-21-9
MLE40-05 N2D	5 V	3.3 V		400234-21-7
MLD40-05 N2D	5 V	3.3 V		400232-21-1
MLO40-12 N3C	12 V	5 V		400231-02-3
MLU40-12 N3C	12 V	5 V		400233-02-9
MLE40-12 N3C	12 V	5 V		400234-02-7
MLD40-12 N3C	12 V	5 V		400232-02-1
MLO40-12 N3D	12 V	5 V		400231-22-1
MLU40-12 N3D	12 V	5 V		400233-22-7
MLE40-12 N3D	12 V	5 V		400234-22-5
MLD40-12 N3D	12 V	5 V		400232-22-9
MLO40-12 N2C	12 V	3.3 V		400231-03-1
MLU40-12 N2C	12 V	3.3 V		400233-03-7
MLE40-12 N2C	12 V	3.3 V		400234-03-5
MLD40-12 N2C	12 V	3.3 V		400232-03-9
MLO40-12 N2D	12 V	3.3 V		400231-23-9
MLU40-12 N2D	12 V	3.3 V		400233-23-5
MLE40-12 N2D	12 V	3.3 V		400234-23-3
MLD40-12 N2D	12 V	3.3 V		400232-23-7
MLO40-15 N3C	15 V	5 V		400231-04-9
MLU40-15 N3C	15 V	5 V		400233-04-5
MLE40-15 N3C	15 V	5 V		400234-04-3
MLD40-15 N3C	15 V	5 V		400232-04-7
MLO40-15 N3D	15 V	5 V		400231-24-7
MLU40-15 N3D	15 V	5 V		400233-24-3
MLE40-15 N3D	15 V	5 V		400234-24-1
MLD40-15 N3D	15 V	5 V		400232-24-5
MLO40-24 N3C	24 V	5 V		400231-05-6
MLU40-24 N3C	24 V	5 V		400233-05-2
MLE40-24 N3C	24 V	5 V		400234-05-0
MLD40-24 N3C	24 V	5 V		400232-05-4

<b>Model</b>	<b>Output Voltage 1</b>	<b>Output Voltage 2</b>	<b>Output Voltage 3</b>	<b>N2Power Part Number</b>
MLO40-24 N3D	24 V	5 V		400231-25-4
MLO40-24 N3D	24 V	5 V		400231-25-4
MLU40-24 N3D	24 V	5 V		400233-25-0
MLE40-24 N3D	24 V	5 V		400234-25-8
MLD40-24 N3D	24 V	5 V		400232-25-2
MLO40-28 N3C	28 V	5 V		400231-06-4
MLU40-28 N3C	28 V	5 V		400233-06-0
MLE40-28 N3C	28 V	5 V		400234-06-8
MLD40-28 N3C	28 V	5 V		400232-06-2
MLO40-28 N3D	28 V	5 V		400231-26-2
MLU40-28 N3D	28 V	5 V		400233-26-8
MLE40-28 N3D	28 V	5 V		400234-26-6
MLD40-28 N3D	28 V	5 V		400232-26-0
MLO40-05 N2MP3C	5 V	3.3 V	-5 V	400231-07-2
MLU40-05 N2MP3C	5 V	3.3 V	-5 V	400233-07-8
MLE40-05 N2MP3C	5 V	3.3 V	-5 V	400234-07-6
MLD40-05 N2MP3C	5 V	3.3 V	-5 V	400232-07-0
MLO40-05 N2MP3D	5 V	3.3 V	-5 V	400231-27-0
MLU40-05 N2MP3D	5 V	3.3 V	-5 V	400233-27-6
MLE40-05 N2MP3D	5 V	3.3 V	-5 V	400234-27-4
MLD40-05 N2MP3D	5 V	3.3 V	-5 V	400232-27-8
MLO40-05 N2P6C	5 V	3.3 V	12 V	400231-08-0
MLU40-05 N2P6C	5 V	3.3 V	12 V	400233-08-6
MLE40-05 N2P6C	5 V	3.3 V	12 V	400234-08-4
MLD40-05 N2P6C	5 V	3.3 V	12 V	400232-08-8
MLO40-05 N2P6D	5 V	3.3 V	12 V	400231-28-8
MLU40-05 N2P6D	5 V	3.3 V	12 V	400233-28-4
MLE40-05 N2P6D	5 V	3.3 V	12 V	400234-28-2
MLD40-05 N2P6D	5 V	3.3 V	12 V	400232-28-6
MLO40-05 N2MP6C	5 V	3.3 V	-12 V	400231-09-8
MLU40-05 N2MP6C	5 V	3.3 V	-12 V	400233-09-4
MLE40-05 N2MP6C	5 V	3.3 V	-12 V	400234-09-2
MLD40-05 N2MP6C	5 V	3.3 V	-12 V	400232-09-6
MLO40-05 N2MP6D	5 V	3.3 V	-12 V	400231-29-6
MLU40-05 N2MP6D	5 V	3.3 V	-12 V	400233-29-2
MLE40-05 N2MP6D	5 V	3.3 V	-12 V	400234-29-0
MLD40-05 N2MP6D	5 V	3.3 V	-12 V	400232-29-4
MLO40-12 N3MP3C	12 V	5 V	-5 V	400231-10-6
MLU40-12 N3MP3C	12 V	5 V	-5 V	400233-10-2
MLE40-12 N3MP3C	12 V	5 V	-5 V	400234-10-0
MLD40-12 N3MP3C	12 V	5 V	-5 V	400232-10-4
MLO40-12 N3MP3D	12 V	5 V	-5 V	400231-30-4

<b>Model</b>	<b>Output Voltage 1</b>	<b>Output Voltage 2</b>	<b>Output Voltage 3</b>	<b>N2Power Part Number</b>
MLU40-12 N3MP3D	12 V	5 V	-5 V	400233-30-0
MLE40-12 N3MP3D	12 V	5 V	-5 V	400234-30-8
MLD40-12 N3MP3D	12 V	5 V	-5 V	400232-30-2
MLO40-12 N3MP6C	12 V	5 V	-12 V	400231-11-4
MLU40-12 N3MP6C	12 V	5 V	-12 V	400233-11-0
MLE40-12 N3MP6C	12 V	5 V	-12 V	400234-11-8
MLD40-12 N3MP6C	12 V	5 V	-12 V	400232-11-2
MLO40-12 N3MP6D	12 V	5 V	-12 V	400231-31-2
MLU40-12 N3MP6D	12 V	5 V	-12 V	400233-31-8
MLE40-12 N3MP6D	12 V	5 V	-12 V	400234-31-6
MLD40-12 N3MP6D	12 V	5 V	-12 V	400232-31-0
MLO40-12 N2P3C	12 V	3.3 V	5 V	400231-12-2
MLU40-12 N2P3C	12 V	3.3 V	5 V	400233-12-8
MLE40-12 N2P3C	12 V	3.3 V	5 V	400234-12-6
MLD40-12 N2P3C	12 V	3.3 V	5 V	400232-12-0
MLO40-12 N2P3D	12 V	3.3 V	5 V	400231-32-0
MLU40-12 N2P3D	12 V	3.3 V	5 V	400233-32-6
MLE40-12 N2P3D	12 V	3.3 V	5 V	400234-32-4
MLD40-12 N2P3D	12 V	3.3 V	5 V	400232-32-8
MLO40-12 N2MP6C	12 V	3.3 V	-12 V	400231-13-0
MLU40-12 N2MP6C	12 V	3.3 V	-12 V	400233-13-6
MLE40-12 N2MP6C	12 V	3.3 V	-12 V	400234-13-4
MLD40-12 N2MP6C	12 V	3.3 V	-12 V	400232-13-8
MLO40-12 N2MP6D	12 V	3.3 V	-12 V	400231-33-8
MLU40-12 N2MP6D	12 V	3.3 V	-12 V	400233-33-4
MLE40-12 N2MP6D	12 V	3.3 V	-12 V	400234-33-2
MLD40-12 N2MP6D	12 V	3.3 V	-12 V	400232-33-6
MLO40-15 N3MP7C	15 V	5 V	-15 V	400231-14-8
MLU40-15 N3MP7C	15 V	5 V	-15 V	400233-14-4
MLE40-15 N3MP7C	15 V	5 V	-15 V	400234-14-2
MLD40-15 N3MP7C	15 V	5 V	-15 V	400232-14-6
MLO40-15 N3MP7D	15 V	5 V	-15 V	400231-34-6
MLU40-15 N3MP7D	15 V	5 V	-15 V	400233-34-2
MLE40-15 N3MP7D	15 V	5 V	-15 V	400234-34-0
MLD40-15 N3MP7D	15 V	5 V	-15 V	400232-34-4
MLO40-24 N3P6C	24 V	5 V	12 V	400231-15-5
MLU40-24 N3P6C	24 V	5 V	12 V	400233-15-1
MLE40-24 N3P6C	24 V	5 V	12 V	400234-15-9
MLD40-24 N3P6C	24 V	5 V	12 V	400232-15-3
MLO40-24 N3P6D	24 V	5 V	12 V	400231-35-3
MLU40-24 N3P6D	24 V	5 V	12 V	400233-35-9
MLE40-24 N3P6D	24 V	5 V	12 V	400234-35-7

<b>Model</b>	<b>Output Voltage 1</b>	<b>Output Voltage 2</b>	<b>Output Voltage 3</b>	<b>N2Power Part Number</b>
MLD40-24 N3P6D	24 V	5 V	12 V	400232-35-1
MLO40-24 N3MP6C	24 V	5 V	-12 V	400231-16-3
MLU40-24 N3MP6C	24 V	5 V	-12 V	400234-16-7
MLE40-24 N3MP6C	24 V	5 V	-12 V	400234-16-7
MLD40-24 N3MP6C	24 V	5 V	-12 V	400232-16-1
MLO40-24 N3MP6D	24 V	5 V	-12 V	400231-36-1
MLU40-24 N3MP6D	24 V	5 V	-12 V	400233-36-7
MLE40-24 N3MP6D	24 V	5 V	-12 V	400234-36-5
MLD40-24 N3MP6D	24 V	5 V	-12 V	400232-36-9

**Table 7-1 ML40 Multi Part Numbers**

The model names in the above table with suffix D are for CLASS II protection type. ML40s with suffix C are for CLASS I protection.

All ML40 Multi power supplies are RoHS compliant. For warranty information, refer to [www.n2power.com](http://www.n2power.com). Direct all questions, orders or requests for quotation as follows:

N2Power Order Desk:	<a href="mailto:orders@n2power.com">orders@n2power.com</a>	805-583-7744 x112
Fax (Attention N2Power):		805-978-5212
Sales:	<a href="mailto:sales@n2power.com">sales@n2power.com</a>	805-583-7744 x122
Technical Support:	<a href="mailto:techsupport@n2power.com">techsupport@n2power.com</a>	805-583-7744 x119
Address:	1267 Flynn Road Camarillo, CA 93012	