



Product Specification

ML65 Multi Output Series

65W AC-DC

Power Supplies

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1.

Introduction

1.1 Introduction

This specification defines the ML65 Multi series of universal input, single output 65 W 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 ML65 Multi family models are listed in Table 3-1.

All models of the ML65 Multi series can be used as standalone power supplies and have different chassis options – MLO65 for **O**pen frame, MLU65 for **U** Chassis, MLE65 for **E**nclosure and MLD65 for **D**in rail.



MLO65 Multi



MLU65 Multi



MLE65 Multi



MLD65 Multi

Figure 1-1 ML65 Multi Series

1.2 Agency Compliance

All of the ML65 Multi 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
	UL 60601-1 IEC/EM/UL60950-1, 62368-1	Hi-pot – Input to Output = 4000V
Canada	CAN/CSA-C22.2 No. 601.1 CAN/CSA-C22.2 No. 60601-1 CAN/CSA-C22.2 No. 60950-1/62368-1	
EU Council International	EN 60601-1 EN 60950-1/62368-1 IEC 60601-1 IEC 60950-1/62368-1	Low Voltage Directive
EMC	Complies with Standard	Remarks
Emission	EN55032, CISPR32, FCC Part15	Conducted Class B, Radiation Class B
	EN 55011: 2009/A1: 2010	Conducted Emission Class B
	CISPR 11: 2009/A1: 2010	Radiated Emission Class B
	EN 60601-1-2: 2007	
	IEC 61000-3-2: 2006+A2: 2009 IEC 61000-3-3:2008	Harmonic Current Emissions Voltage Fluctuations & Flicker
Immunity	EN 60601-1-2: 2007	
	EN 61000-4-2	Electrostatic Discharge
	EN 61000-4-3	Radiated Susceptibility
	EN 61000-4-4	Fast Transient/Burst Immunity
	EN 61000-4-5	Power Mains Surge Immunity
	EN 61000-4-6	Conducted Susceptibility
	EN 61000-4-8	Power Frequency Magnetic Field
	EN 61000-4-11	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)

TUV



EU Council



RoHS



2. AC Input

2.1 Input Line Requirements

The following table defines the voltage and frequency requirements for the AC line inputs to the ML65 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	-	-	1.65A / 100VAC 0.95A / 240VAC
Input Frequency	47Hz	50/60Hz	63Hz

Table 2-1 ML65 Multi Series Input Parameters

2.2 Input Over Current Protection

The ML65 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.

Model Name	Class I or Class II	Leakage Current Measurement
ML65-XX	Class I	Earth Leakage < 0.5 mA (N.C)
ML40-XX	Class I	Earth Leakage: < 0.6 mA (S.F.C.)
		Touch Leakage: < 100 μ A (N.C)
		Touch Leakage: < 150 μ A (S.F.C.)

Table 2-2 Leakage Current

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#65-05 N2 C, D	5V, V1	±0.5%	4.975	5	5.05
	3.3, V2	±1.5%	3.285	3.3	3.315
ML#65-12 N3 C,D	12V, V1	±0.5%	11.94	12	12.06
	5V, V2	±1.5%	4.925	5	5.075
ML#65-12 N2 C, D	12V, V1	±0.5%	11.94	12	12.06
	3.3, V2	±1.5%	3.285	3.3	3.315
ML#65-15 N3 C,D	15V,V1	±0.5%	14.93	15	15.08
	5V,V2	±1.5%	4.925	5	5.075
ML#65-24 N3 C,D	24V,V1	±0.5%	23.88	24	24.12
	5V,V2	±1.5%	4.925	5	5.075
ML#65-28 N3 C,D	28V,V1	±0.5%	27.86	28	28.14
	5V,V2	±1.5%	4.925	5	5.075
ML#65-05 N2MP3C,D	5V, V1	±0.5%	4.975	5	5.025
	3.3V, V2	±1.5%	3.285	3.3	3.315
	-5V,V3	±0.7%	-4.965	-5	-5.035
ML#65-05 N2P6C,D	5V, V1	±0.5%	4.975	5	5.025
	3.3V, V2	±1.5%	3.285	3.3	3.315
	12, V3	±0.7%	11.92	12	12.08
ML#65-05 N2MP6C,D	5V, V1	±0.5%	4.975	5	5.025
	3.3, V2	±1.5%	3.285	3.3	3.315
	-12, V3	±0.7%	-11.92	-12	-12.08
ML#65-12 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#65-12 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#65-12 N2P3C,D	12V,V1	±0.5%	11.94	12	12.06
	3.3V, V2	±1.5%	3.285	3.3	3.315
	5V,V3	±0.7%	4.965	5	5.035
ML#65-12 N2MP6C,D	12V,V1	±0.5%	11.94	12	12.06
	3.3V,V2	±1.5%	3.285	3.3	3.315
	-12V,V3	±0.7%	-11.92	-12	-12.08

ML#65-15 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#65-24 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#65-24 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 ML65 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 ML65 Multi can deliver these maximum output powers.

Model	Voltage VDC	Current (Max) A
MLO65-05 N2C,D	5	10
MLO65-12 N3C,D	12	5.42
MLO65-12 N2C,D	12	5.42
MLO65-15 N3C,D	15	4.34
MLO65-24 N3C,D	24	2.71
MLO65-28 N3C,D	28	2.33
MLO65-05 N2MP3C,D	5	10
MLO65-05 N2P6C,D	5	10
MLO65-05 N2MP6C,D	5	10
MLO65-12 N3MP3C,D	12	5.42
MLO65-12 N3MP6C,D	12	5.42
MLO65-12 N2P3C,D	12	5.42
MLO65-12 N2MP6C,D	12	5.42
MLO65-15 N3MP7C,D	15	4.34
MLO65-24 N3P6C,D	24	2.71

Table 3-2 Max Load Currents

*Maximum output power of all ML#65-05N2 C,D models is 50 W and the rest of the models can deliver total output power of up to 65 W.

3.3.1 Input Voltage Derating

The ML65 Multi series can be operated at the minimum input voltage of 85 VAC with the maximum load of 80% of the total maximum output power. From 85 VAC to 90 VAC, the output load can be increased by 4% /VAC and from 90 VAC onwards, the output load can be 100%.

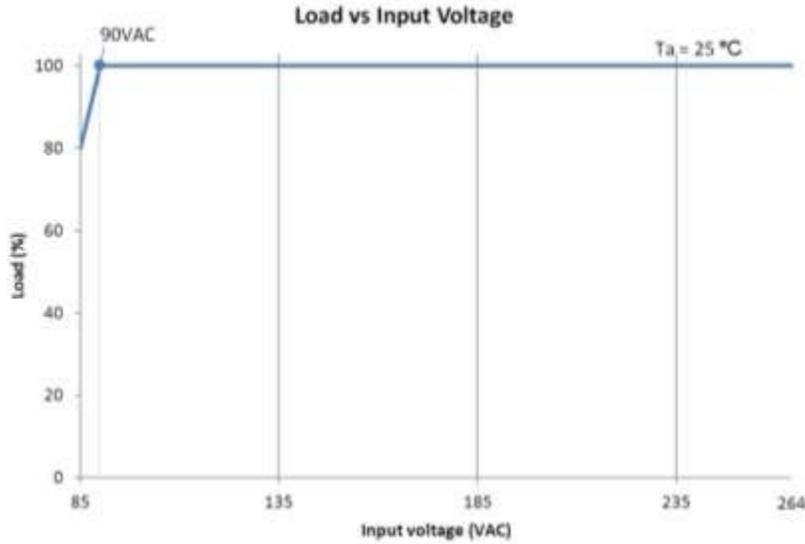


Figure 3-1 Load vs. Input Voltage

3.4 Cooling

ML65 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 ML65 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.

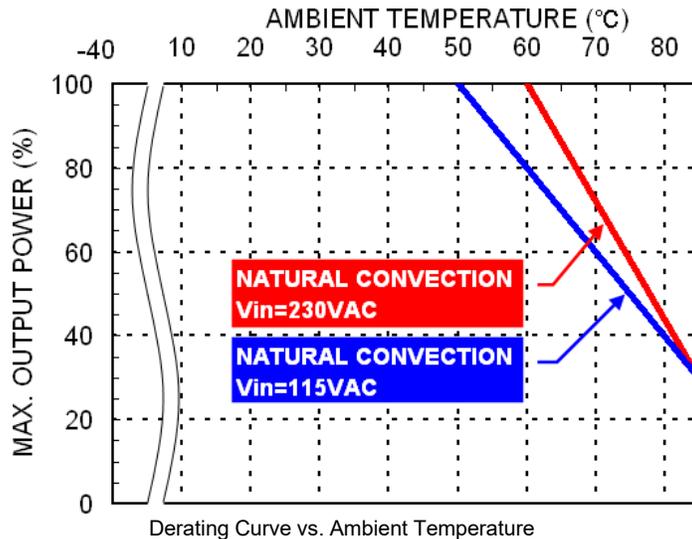
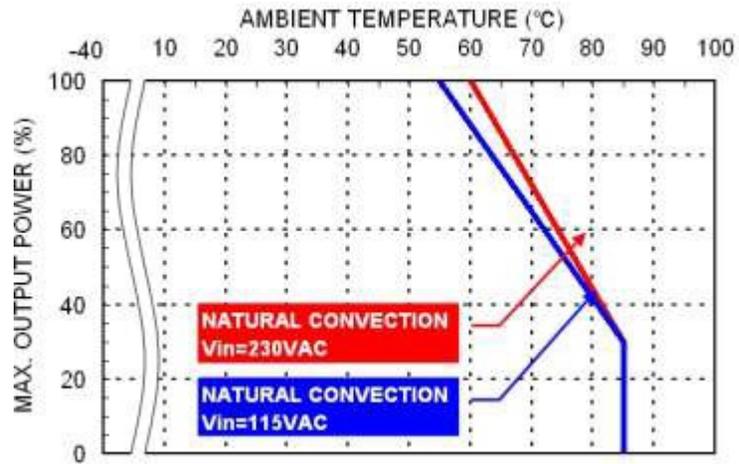


Figure 3-2 Temperature Derating Curve for ML#65-XX-XXX dual output models.



Derating Curve vs. Ambient Temperature

Figure 3-3 Temperature Derating Curve for ML#65-XX XXXXXX Triple Output Models.

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 value of this MLCCs are 10µF for 5V VOUT1 output models, 1µF for 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 3-3.

Model	Output Voltage	Maximum Ripple+Noise (peak-to-peak)
ML#65-05 N2C,D	5	V1,100mV p-p
	3.3	V2 100mV p-p
ML#65-12 N3C,D	12	V1,120mV p-p
	5	V2 100mV p-p
ML#65-12 N2C,D	12	V1,120mV p-p
	3.3	V2 100mV p-p
ML#65-15 N3C,D	15	V1,150mV p-p
	5	V2 100mV p-p
ML#65-24 N3C,D	24	V1,240mV p-p
	5	V2 100mV p-p
ML#65-28 N3C,D	28	V1,280mV p-p
	5	V2 100mV p-p
ML#65-05 N2MP3C,D	5	V1,100mV p-p
	3.3	V2,100mV p-p
	-5	V3 100mV p-p
ML#65-05 N2P6C,D	5	V1,100mV p-p
	3.3	V2 100mV p-p
	12	V3,120mV p-p
ML#65-05 N2MP6C,D	5	V1,100mV p-p
	3.3	V2 100mV p-p
	-12	V3,120mV p-p
ML#65-12 N3MP3C,D	12	V1,120mV p-p
	5	V2 100mV p-p
	-5	V3 100mV p-p
ML#65-12 N3MP6C,D	12	V1,120mV p-p
	5	V2 100mV p-p
	-12	V3,120mV p-p

ML#65-12 N2P3C,D	12	V1,120mV p-p
	3.3	V2 100mV p-p
	5	V3 100mV p-p
ML#65-12 N2MP6C,D	12	V1,120mV p-p
	3.3	V2 100mV p-p
	-12	V3,120mV p-p
ML#65-15 N3MP7C,D	15	V1,150mV p-p
	5	V2 100mV p-p
	-15	V3,150mV p-p
ML#65-24 N3P6C,D	24	V1,240mV p-p
	5	V2 100mV p-p
	12	V3,120mV p-p
ML#65-24 N3MP6C,D	24	V1,240mV p-p
	5	V2 100mV p-p
	-12	V3,120mV p-p

Table 3-3 Ripple Voltage of ML65

3.5.2 Ripple/Noise Test Setup

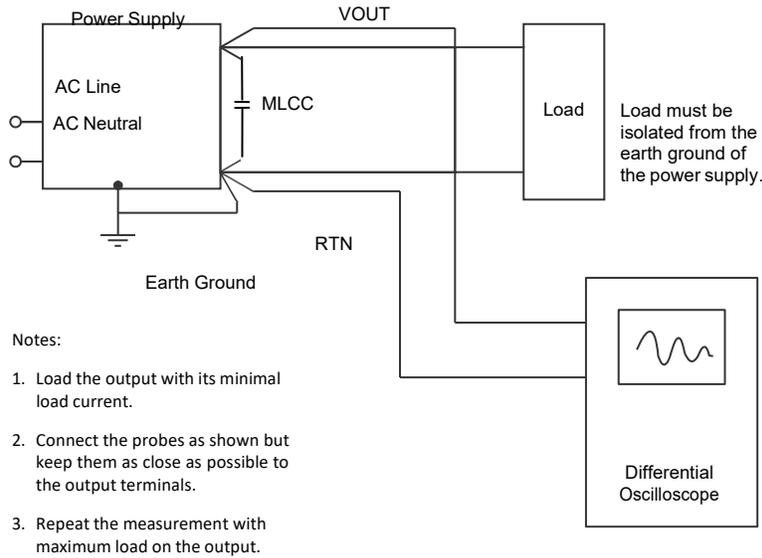


Figure 3-4 Ripple Noise Measurement Setup

3.6 Output Protection

There are output protection schemes designed to protect the load and the ML65 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 ML65 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 3-4 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 $10 \times V_{OUT}$ 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 ML65 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 (see picture below) is provided to allow the user to adjust the output 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.

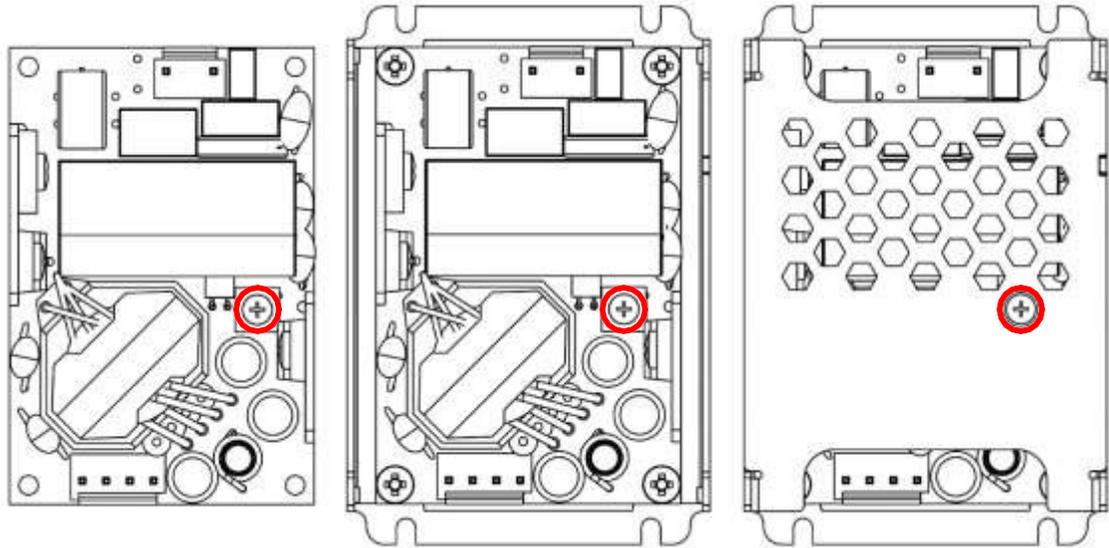


Figure 3-5 Potentiometer to adjust output

1.

General Specifications

1.1 Environmental

The ML65 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 2.0 G RMS Maximum	10-500Hz, 10-min/1cycle, 60 min each along x, y, z axis. Mounting: Compliance to IEC60068-2-6

Table 4-1 Environmental Specifications

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

1.2 Mean Time between Failures

The calculated MTBF of all models is equal to or greater than 1,494,000 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.

1.3 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 ML65 Multi series Label

1.4 Net Weight

Model	Pound	Ounces	Kilograms
MLO65 Multi	0.34	5.47	0.17
MLU65 Multi	0.45	7.16	0.22
MLE65 Multi	0.49	7.80	0.24
MLD65 Multi	0.53	8.57	0.27

Table 4-2 Net Weights

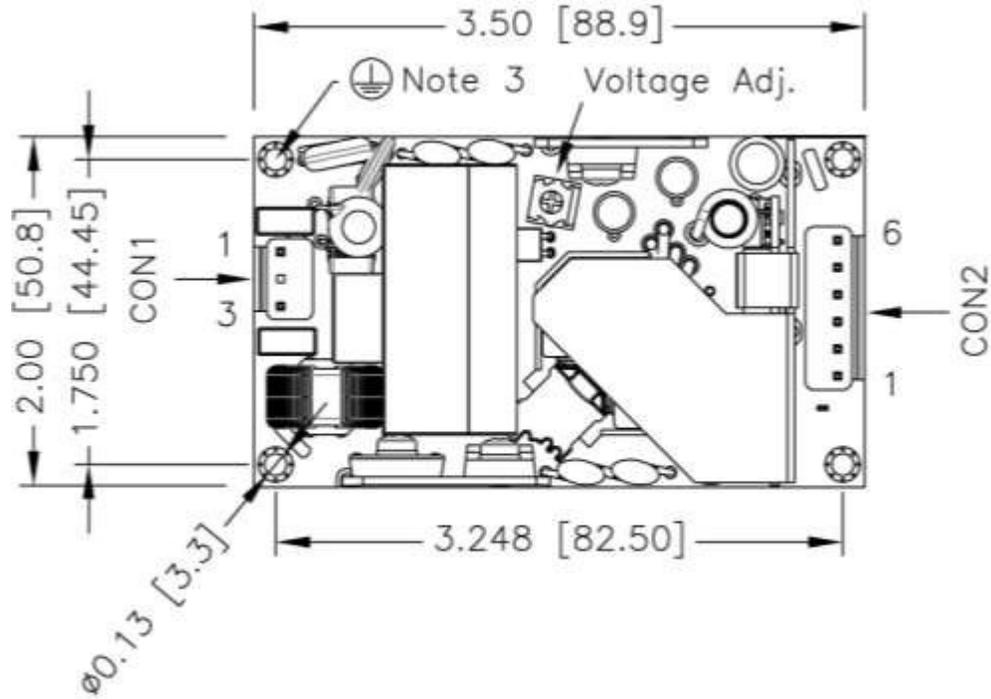
1.5 Mounting and Physical Dimensions

All ML65 Multi models are provided with four mounting holes of the following size.

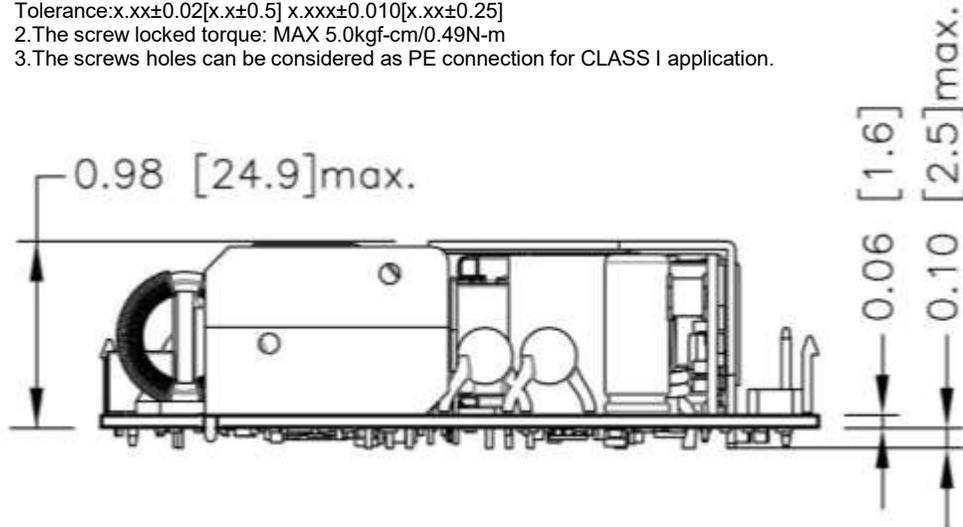
Model	Millimeter (mm)	Inch (in)
ML#65 Multi	3.2	0.126

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].

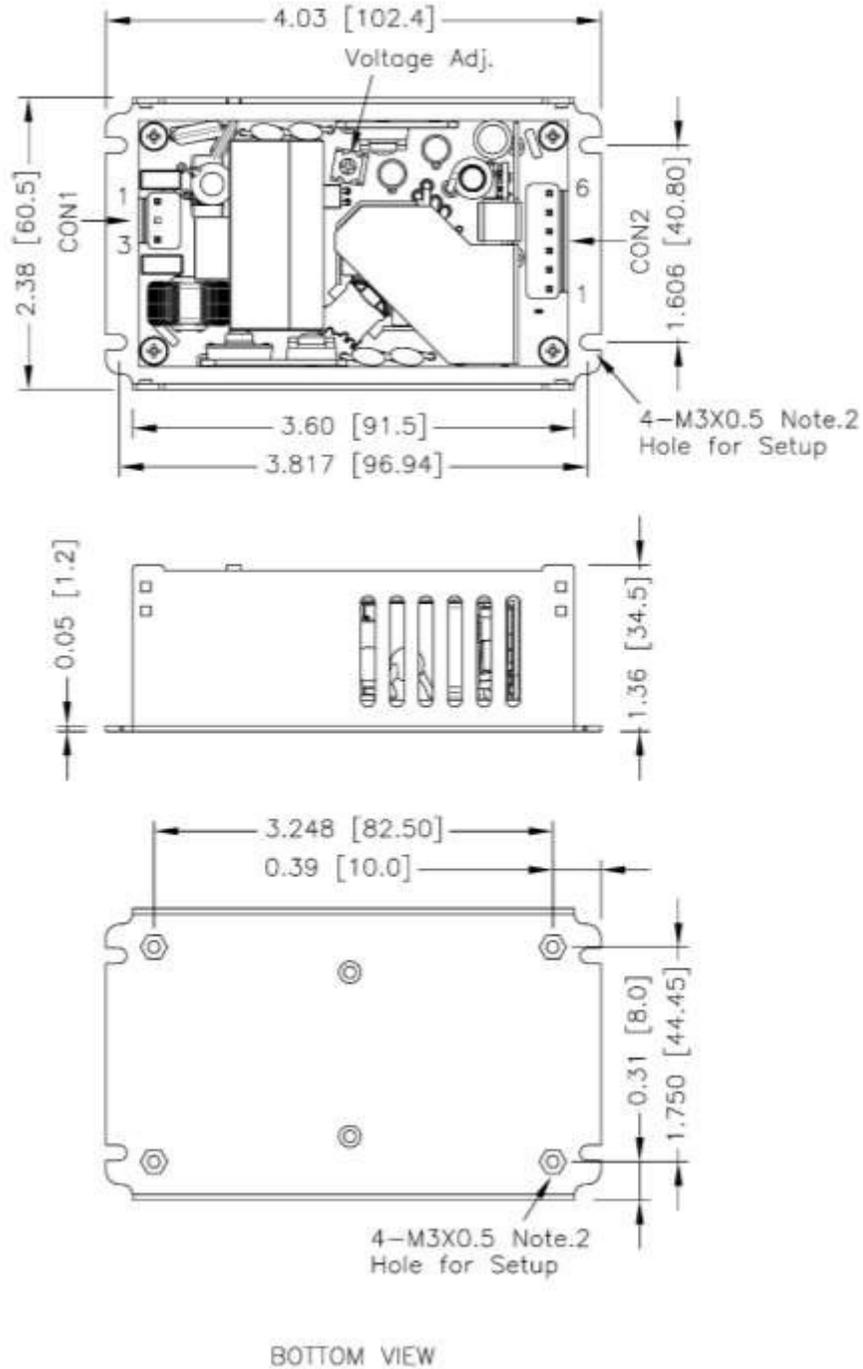


1. All dimensions in inch[mm]
Tolerance: $x.xx \pm 0.02 [x.x \pm 0.5]$ $x.xxx \pm 0.010 [x.xx \pm 0.25]$
2. The screw locked torque: MAX 5.0kgf-cm/0.49N-m
3. The screws holes can be considered as PE connection for CLASS I application.



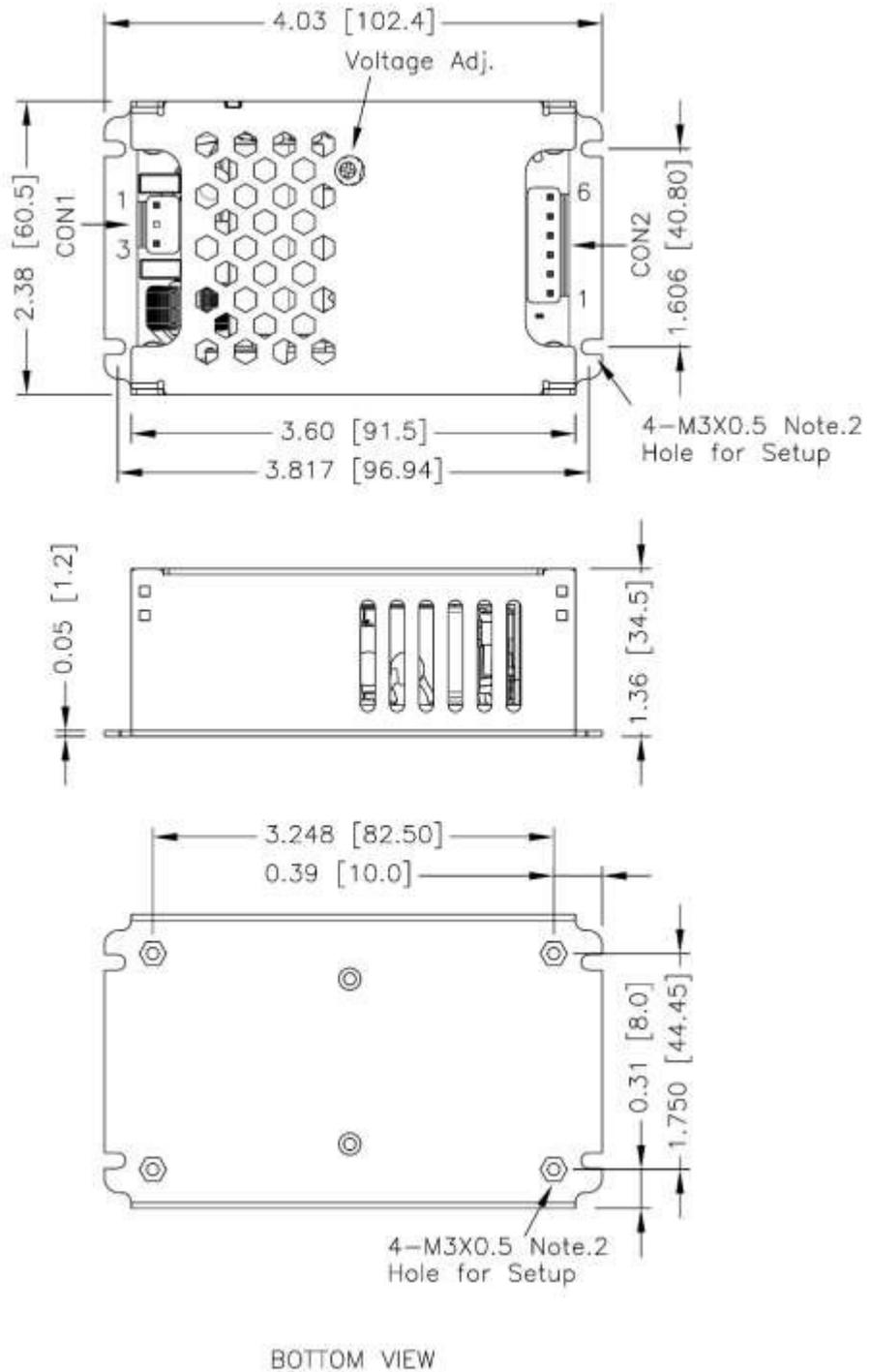
FRONT VIEW

Figure 4-2 MLO65 Multi models: Mounting Hole Locations and Dimensions



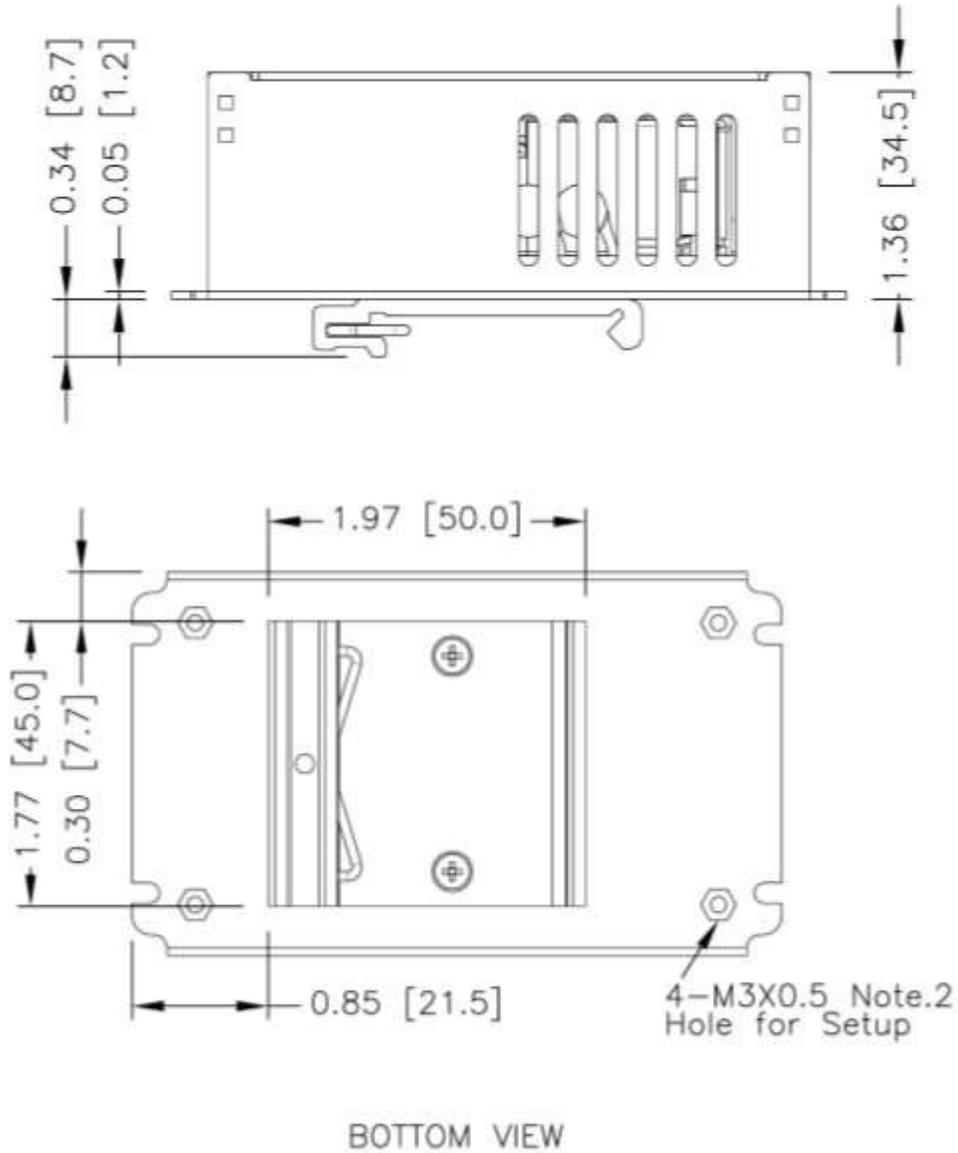
1. All dimensions in inch[mm]
Tolerance: x.xx±0.02[x.x±0.5] x.xxx±0.010[x.xx±0.25]
2. The screw locked torque: MAX 5.0kgf-cm/0.49N-m

Figure 4-3 MLU65 Multi models: Mounting Hole Locations and Dimensions



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 MLE65 Multi models: Mounting Hole Locations and Dimensions



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 MLD65 Multi models: Mounting Hole Locations and Dimensions

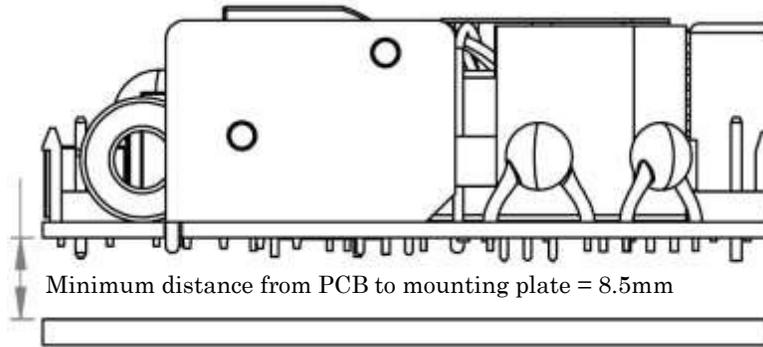


Figure 4-4 ML65 Multi minimum distance requirement from mounting plate

When ML65 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).

1.6 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 +/-VOUT (DC Output)	VHR-3N	SVH-21T-P1.1
		VHR-6N	SVH-21T-P1.1
	 Molex Type AC INPUT +/-VOUT (DC Output)	09-50-8031	SD-2478
		09-50-8061	SD-2478
	 Terminal Block AC INPUT +/-VOUT (DC Output)	Screw locked torque- max 2Kgf.cm/0.2N.m	Wire dimension range 26 ~ 16AWG

Table 4-4 Mating connectors

1.7 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 4-5.

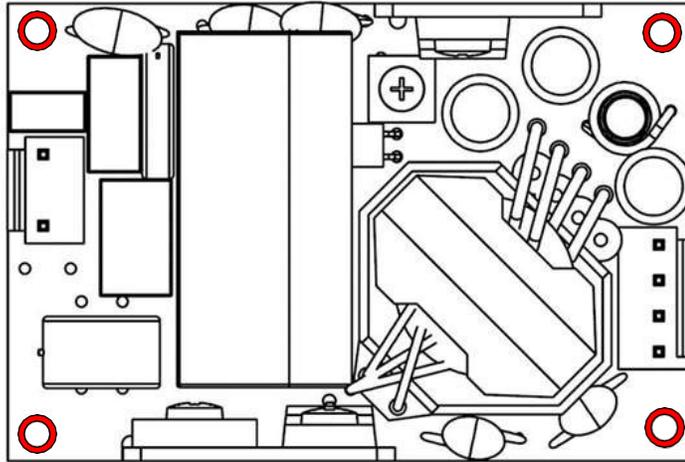


Figure 4-5 Safety ground connection points

1.8 Pin Definitions

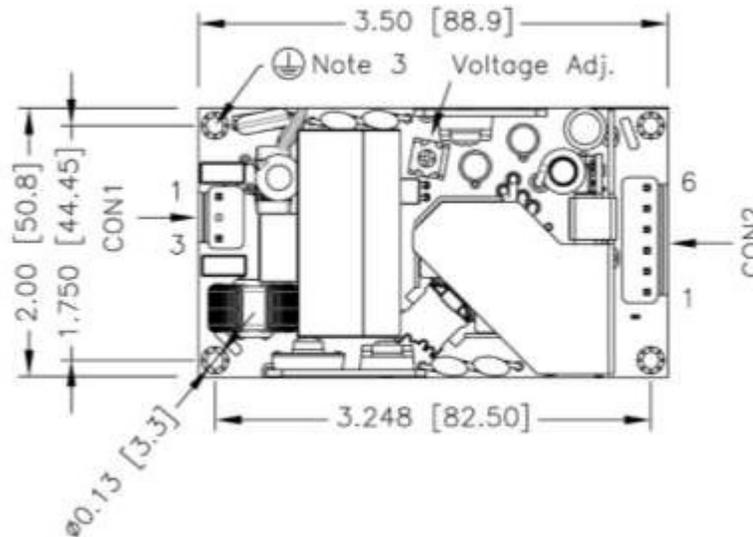


Figure 4-6 Pin Definitions

Model	Connector	Pin No.	Assignment
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

2.

Efficiency

The efficiencies for the ML65 Multi power supply models are listed below. They were measured at full load, 25 °C at 230AC.

Model	Output	Total	
	Voltage	Load	Efficiency
ML#65-05 N2C,D	5,3.3	65 W	88.50%
ML#65-12 N3C,D	12,5	65 W	90%
ML#65-12 N2C,D	12,3.3	65 W	89.50%
ML#65-15 N3C,D	15,5	65 W	90.50%
ML#65-24 N3C,D	24,5	65 W	89%
ML#65-28 N3C,D	28,5	65 W	88%
ML#65-05 N2MP3C,D	5,3.3,-5	65 W	88%
ML#65-05 N2P6C,D	5,3.3,12	65 W	88%
ML#65-05 N2MP6C,D	5,3.3,-12	65 W	88%
ML#65-12 N3MP3C,D	12,5,-5	65 W	89.50%
ML#65-12 N3MP6C,D	12,5,-12	65 W	89%
ML#65-12 N2P3C,D	12,3.3,5	65 W	89%
ML#65-12 N2MP6C,D	12,3.3,-12	65 W	88.50%
ML#65-15 N3MP7C,D	15,5,-15	65 W	89.5
ML#65-24 N3P6C,D	24,5,12	65 W	88.5
ML#65-24 N3MP6C,D	24,5,-12	65 W	88.5

Table 5-1 Efficiency

3.

Timing and Control

3.1 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.

3.2 Voltage Hold-Up Time

The power supply will maintain output regulation per Table 3-1 despite a loss of input power at 115 VAC/ 60 Hz and 230 VAC/ 50 Hz at maximum rated continuous output for a minimum of 16 ms.

4.

Ordering Information

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

Model	Output Voltage 1	Output Voltage 2	Output Voltage 3	N2Power Part Number
MLO65-05 N2C	5 V	3.3 V		400227-01-3
MLU65-05 N2C	5 V	3.3 V		400229-01-9
MLE65-05 N2C	5 V	3.3 V		400230-01-7
MLD65-05 N2C	5 V	3.3 V		400228-01-1
MLO65-05 N2D	5 V	3.3 V		400227-21-1
MLU65-05 N2D	5 V	3.3 V		400229-21-7
MLE65-05 N2D	5 V	3.3 V		400230-21-5
MLD65-05 N2D	5 V	3.3 V		400228-21-9
MLO65-12 N3C	12 V	5 V		400227-02-1
MLU65-12 N3C	12 V	5 V		400229-02-7
MLE65-12 N3C	12 V	5 V		400230-02-5
MLD65-12 N3C	12 V	5 V		400228-02-9
MLO65-12 N3D	12 V	5 V		400227-22-9
MLU65-12 N3D	12 V	5 V		400229-22-5
MLE65-12 N3D	12 V	5 V		400230-22-3
MLD65-12 N3D	12 V	5 V		400228-22-7
MLO65-12 N2C	12 V	3.3 V		400227-03-9
MLU65-12 N2C	12 V	3.3 V		400229-03-5
MLE65-12 N2C	12 V	3.3 V		400230-03-3
MLD65-12 N2C	12 V	3.3 V		400228-03-7
MLO65-12 N2D	12 V	3.3 V		400227-23-7
MLU65-12 N2D	12 V	3.3 V		400229-23-3
MLE65-12 N2D	12 V	3.3 V		400230-23-1
MLD65-12 N2D	12 V	3.3 V		400228-23-5
MLO65-15 N3C	15 V	5 V		400227-04-7
MLU65-15 N3C	15 V	5 V		400229-04-3
MLE65-15 N3C	15 V	5 V		400230-04-1
MLD65-15 N3C	15 V	5 V		400228-04-5
MLO65-15 N3D	15 V	5 V		400227-24-5
MLU65-15 N3D	15 V	5 V		400229-24-1
MLE65-15 N3D	15 V	5 V		400230-24-9
MLD65-15 N3D	15 V	5 V		400228-24-3
MLO65-24 N3C	24 V	5 V		400227-05-4
MLU65-24 N3C	24 V	5 V		400229-05-0

Model	Output Voltage 1	Output Voltage 2	Output Voltage 3	N2Power Part Number
MLE65-24 N3C	24 V	5 V		400230-05-8
MLD65-24 N3C	24 V	5 V		400228-05-2
MLO65-24 N3D	24 V	5 V		400227-25-2
MLU65-24 N3D	24 V	5 V		400229-25-8
MLE65-24 N3D	24 V	5 V		400230-25-6
MLD65-24 N3D	24 V	5 V		400228-25-0
MLO65-28 N3C	28 V	5 V		400227-06-2
MLU65-28 N3C	28 V	5 V		400229-06-8
MLE65-28 N3C	28 V	5 V		400230-06-6
MLD65-28 N3C	28 V	5 V		400228-06-0
MLO65-28 N3D	28 V	5 V		400227-26-0
MLU65-28 N3D	28 V	5 V		400229-26-6
MLE65-28 N3D	28 V	5 V		400230-26-4
MLD65-28 N3D	28 V	5 V		400228-26-8
MLO65-05 N2MP3C	5 V	3.3 V	-5 V	400227-07-0
MLU65-05 N2MP3C	5 V	3.3 V	-5 V	400229-07-6
MLE65-05 N2MP3C	5 V	3.3 V	-5 V	400230-07-4
MLD65-05 N2MP3C	5 V	3.3 V	-5 V	400228-07-8
MLO65-05 N2MP3D	5 V	3.3 V	-5 V	400227-27-8
MLU65-05 N2MP3D	5 V	3.3 V	-5 V	400229-27-4
MLE65-05 N2MP3D	5 V	3.3 V	-5 V	400230-27-2
MLD65-05 N2MP3D	5 V	3.3 V	-5 V	400228-27-6
MLO65-05 N2P6C	5 V	3.3 V	12 V	400227-08-8
MLU65-05 N2P6C	5 V	3.3 V	12 V	400229-08-4
MLE65-05 N2P6C	5 V	3.3 V	12 V	400230-08-2
MLD65-05 N2P6C	5 V	3.3 V	12 V	400228-08-6
MLO65-05 N2P6D	5 V	3.3 V	12 V	400227-28-6
MLU65-05 N2P6D	5 V	3.3 V	12 V	400229-28-2
MLE65-05 N2P6D	5 V	3.3 V	12 V	400230-28-0
MLD65-05 N2P6D	5 V	3.3 V	12 V	400228-28-4
MLO65-05 N2MP6C	5 V	3.3 V	-12 V	400227-09-6
MLU65-05 N2MP6C	5 V	3.3 V	-12 V	400229-09-2
MLE65-05 N2MP6C	5 V	3.3 V	-12 V	400230-09-0
MLD65-05 N2MP6C	5 V	3.3 V	-12 V	400228-09-4
MLO65-05 N2MP6D	5 V	3.3 V	-12 V	400227-29-4
MLU65-05 N2MP6D	5 V	3.3 V	-12 V	400229-29-0
MLE65-05 N2MP6D	5 V	3.3 V	-12 V	400230-29-8
MLD65-05 N2MP6D	5 V	3.3 V	-12 V	400228-29-2
MLO65-12 N3MP3C	12 V	5 V	-5 V	400227-10-4
MLU65-12 N3MP3C	12 V	5 V	-5 V	400229-10-0
MLE65-12 N3MP3C	12 V	5 V	-5 V	400230-10-8

Model	Output Voltage 1	Output Voltage 2	Output Voltage 3	N2Power Part Number
MLD65-12 N3MP3C	12 V	5 V	-5 V	400228-10-2
MLO65-12 N3MP3D	12 V	5 V	-5 V	400227-30-2
MLU65-12 N3MP3D	12 V	5 V	-5 V	400229-30-8
MLE65-12 N3MP3D	12 V	5 V	-5 V	400230-30-6
MLD65-12 N3MP3D	12 V	5 V	-5 V	400228-30-0
MLO65-12 N3MP6C	12 V	5 V	-12 V	400227-11-2
MLU65-12 N3MP6C	12 V	5 V	-12 V	400229-11-8
MLE65-12 N3MP6C	12 V	5 V	-12 V	400230-11-6
MLD65-12 N3MP6C	12 V	5 V	-12 V	400228-11-0
MLO65-12 N3MP6D	12 V	5 V	-12 V	400227-31-0
MLU65-12 N3MP6D	12 V	5 V	-12 V	400229-31-6
MLE65-12 N3MP6D	12 V	5 V	-12 V	400230-31-4
MLD65-12 N3MP6D	12 V	5 V	-12 V	400228-31-8
MLO65-12 N2P3C	12 V	3.3 V	5 V	400227-12-0
MLU65-12 N2P3C	12 V	3.3 V	5 V	400229-12-6
MLE65-12 N2P3C	12 V	3.3 V	5 V	400230-12-4
MLD65-12 N2P3C	12 V	3.3 V	5 V	400228-12-8
MLO65-12 N2P3D	12 V	3.3 V	5 V	400227-32-8
MLU65-12 N2P3D	12 V	3.3 V	5 V	400229-32-4
MLE65-12 N2P3D	12 V	3.3 V	5 V	400230-32-2
MLD65-12 N2P3D	12 V	3.3 V	5 V	400228-32-6
MLO65-12 N2MP6C	12 V	3.3 V	-12 V	400227-13-8
MLU65-12 N2MP6C	12 V	3.3 V	-12 V	400229-13-4
MLE65-12 N2MP6C	12 V	3.3 V	-12 V	400230-13-2
MLD65-12 N2MP6C	12 V	3.3 V	-12 V	400228-13-6
MLO65-12 N2MP6D	12 V	3.3 V	-12 V	400227-33-6
MLU65-12 N2MP6D	12 V	3.3 V	-12 V	400229-33-2
MLE65-12 N2MP6D	12 V	3.3 V	-12 V	400230-33-0
MLD65-12 N2MP6D	12 V	3.3 V	-12 V	400228-33-4
MLO65-15 N3MP7C	15 V	5 V	-15 V	400227-14-6
MLU65-15 N3MP7C	15 V	5 V	-15 V	400229-14-2
MLE65-15 N3MP7C	15 V	5 V	-15 V	400230-14-0
MLD65-15 N3MP7C	15 V	5 V	-15 V	400228-14-4
MLO65-15 N3MP7D	15 V	5 V	-15 V	400227-34-4
MLU65-15 N3MP7D	15 V	5 V	-15 V	400229-34-0
MLE65-15 N3MP7D	15 V	5 V	-15 V	400230-34-8
MLD65-15 N3MP7D	15 V	5 V	-15 V	400228-34-2
MLO65-24 N3P6C	24 V	5 V	12 V	400227-15-3
MLU65-24 N3P6C	24 V	5 V	12 V	400229-15-9
MLE65-24 N3P6C	24 V	5 V	12 V	400230-15-7
MLD65-24 N3P6C	24 V	5 V	12 V	400228-15-1

Model	Output Voltage 1	Output Voltage 2	Output Voltage 3	N2Power Part Number
MLO65-24 N3P6D	24 V	5 V	12 V	400227-35-1
MLU65-24 N3P6D	24 V	5 V	12 V	400229-35-7
MLE65-24 N3P6D	24 V	5 V	12 V	400230-35-5
MLD65-24 N3P6D	24 V	5 V	12 V	400228-35-9
MLO65-24 N3MP6C	24 V	5 V	-12 V	400227-16-1
MLU65-24 N3MP6C	24 V	5 V	-12 V	400229-16-7
MLE65-24 N3MP6C	24 V	5 V	-12 V	400230-16-5
MLD65-24 N3MP6C	24 V	5 V	-12 V	400228-16-9
MLO65-24 N3MP6D	24 V	5 V	-12 V	400227-36-9
MLU65-24 N3MP6D	24 V	5 V	-12 V	400229-36-5
MLE65-24 N3MP6D	24 V	5 V	-12 V	400230-36-3
MLD65-24 N3MP6D	24 V	5 V	-12 V	400228-36-7

Table 7-1 ML65 Multi Part Numbers

The model names in the above table are for CLASS II D protection type. ML65s with “C” are for CLASS I protection type.

All ML65 Multi power supplies are RoHS compliant. For warranty information, refer to www.n2power.com. Direct all questions, orders or requests for quotation as follows:

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