

# MEA-090A

## Highlights & Features

- Meet Efficiency Level DOE VI & ErP Lot 7
- Safety Approvals to IEC 60601-1- & IEC 60950-1 / IEC 62368-1
- Compliant with IEC 60601-1-2 4<sup>th</sup> Ed. Requirements
- Low touch current ( <0.1mA Normal & 0.3mA signal fault )
- 2 × MOPP isolation

## Safety Standards



CB Certified for worldwide use



<b>Model Number:</b>	MEA-090A□C □-A
<b>Unit Weight:</b>	0.31 kg (0.68 lb)
<b>Dimensions (W × L × H):</b>	62.0 × 135.0 × 32.0 mm 2.44 × 5.31 × 1.26 inch

## General Description

The MEA-090A series of external power supply come with universal AC input at 90 Vac to 264 Vac. Key features include 0.1 mA low earth leakage and electric shock protection complying with 2 x MOPP. The MEA-090A is certified according to EN/BS EN 55011 for industrial, scientific and medical (ISM) radio-frequency equipment and meet EN/BS EN 55032 for Information Technology Equipment (ITE) radio-frequency equipment. MEA-090A has both medical and ITE safety approvals such as IEC 62368, CB certification and CCC approval. Designs are fully compliant with RoHS for environmental protection.

## Model Information

### Medical AC-DC Adapter

Model Number	Input Voltage Range	Rated Output Voltage	Rated Output Current
MEA-090A12□	90-264 Vac	12 Vdc	6.75 A
MEA-090A15□	90-264 Vac	15 Vdc	6 A
MEA-090A19□	90-264 Vac	19 Vdc	4.74 A
MEA-090A24□	90-264 Vac	24 Vdc	3.75 A

## Model Numbering

						CC Code		
MEA –	090	A	□	□	□	□	-	A
Delta Medical Desktop Adapter	Max wattage in the Product series	Family Code	Output Voltage (Single Output) 12 – 12V 15 – 15V 19 – 19V 24 – 24V	Input Connector Type C – C14	Blank	Plug, Molding type and others <b>V:</b> Tuning Fork Type: 5.5x2.5x11mm, 90°, 1.2m <b>6:</b> 4 PIN DIN, 180°, 1.2m <b>W:</b> Tuning Fork Type: 5.5x2.5x11mm, 180°, 1.2m	Delta Standard	Turning Fork / Din / Other

**Specifications**

Model Number	MEA-090A12C	MEA-090A15C	MEA-090A19C	MEA-090A24C
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**Input Ratings / Characteristics**

Nominal Input Voltage	100-240 Vac			
Input Voltage Range	90-264 Vac			
Nominal Input Frequency	50-60 Hz			
Input Frequency Range	47-63 Hz			
Input Current (max.)	1.5 A @ 115 Vac, 0.75 A @ 230 Vac			
Average Efficiency (min.)	88% @ 115 Vac 89% @ 230 Vac	89% @ 115 Vac 89% @ 230 Vac	89% @ 115 Vac 89% @ 230 Vac	89% @ 115Vac 89% @ 230Vac
Efficiency @ 10%	79%			
Standby Power (max.)	0.15 W @ 115 Vac & 230 Vac			
Inrush Current (typ.) <sup>1)</sup>	50 A @ 115 Vac and 100 A @ 230 Vac			
Touch Current (max.)	0.1 mA @ 264 Vac NC <sup>1)</sup> , 0.3 mA @ 264 Vac SFC <sup>2)</sup>			
Earth Leakage Current (max.)	0.1 mA @ 264 Vac NC <sup>1)</sup> , 0.5 mA @ 264 Vac SFC <sup>2)</sup>			

- 1) NC: Normal condition
- 2) SFC: Single fault condition

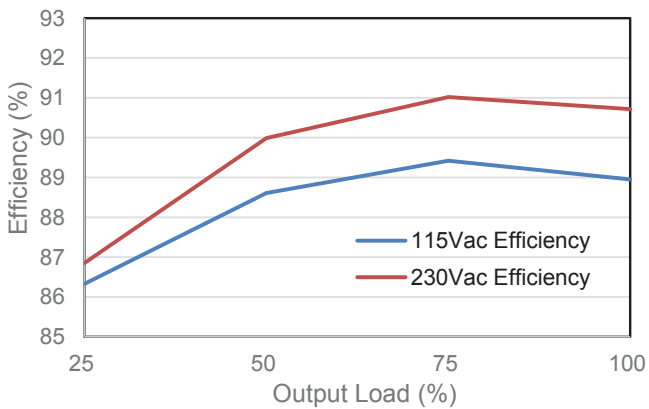


Figure 1-1 MEA-090A12C Efficiency versus Output Load

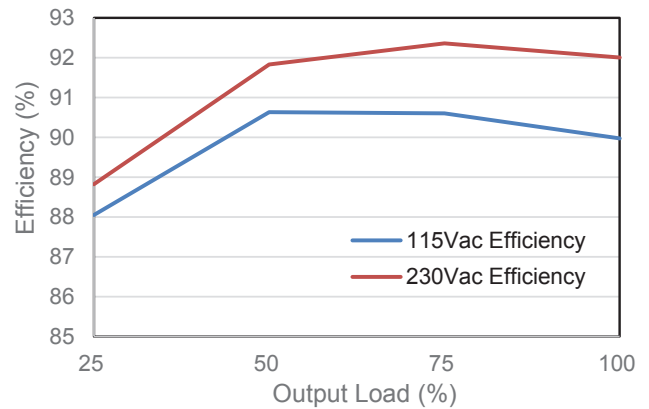


Figure 1-2 MEA-090A15C Efficiency versus Output Load

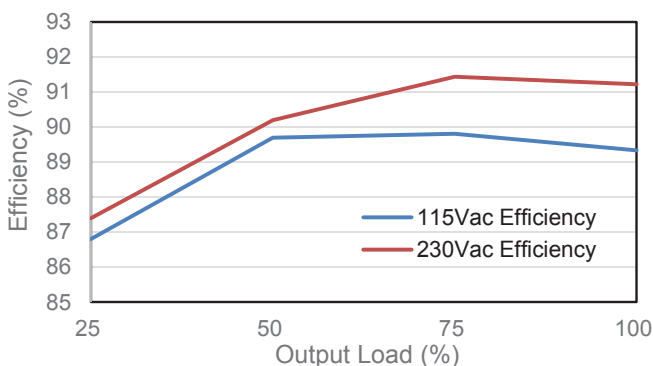


Figure 1-3 MEA-090A19C Efficiency versus Output Load

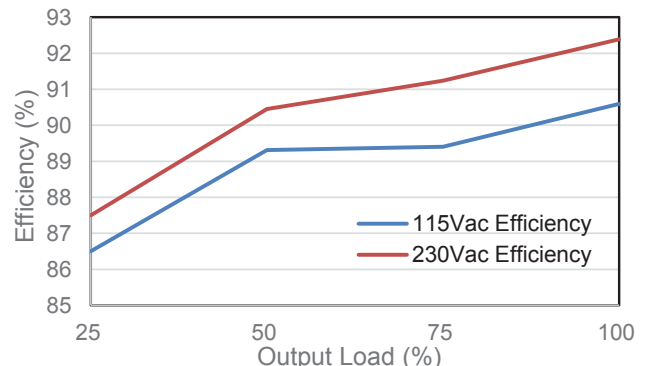


Figure 1-4 MEA-090A24C Efficiency versus Output Load

Model Number	MEA-090A12C	MEA-090A15C	MEA-090A19C	MEA-090A24C
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**Output Ratings / Characteristics\***

Nominal Output Voltage	12 Vdc	15 Vdc	19 Vdc	24 Vdc
Nominal Output Current	6.75 A	6.0 A	4.74 A	3.75 A
Output Power	81 W	90 W	90 W	90 W
Line Regulation (max)	± 0.5%			
Load Regulation (max)	± 4.5%			
Ripple & Noise (min)	1%			
Rise Time	< 50 ms @ 115 Vac & 230 Vac			
Start-up Time	< 3000 ms @ 115 Vac & 230 Vac			
Hold-up Time (typ.)	20 ms @ 115 Vac & 230 Vac			
Dynamic Response (Overshoot & Undershoot O/P Voltage)	± 5% @ 0-50% & 50-100% load; Slew rate 0.25 A/μs (@ 100 Hz, 50% Duty Cycle)			

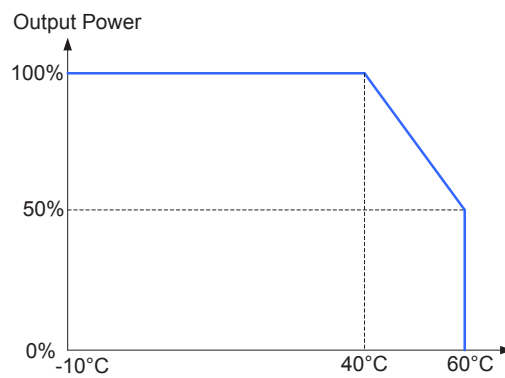
**Mechanical**

Case Chassis / Cover	PC	
Dimensions (W × L × H)	62.0 × 135.0 × 32.0 mm (2.44 × 5.31 × 1.26 inch)	
Unit Weight	0.31 kg (0.68 lb)	
Cable Length	1200 mm	
Indicator	Green LED	
Terminal	Input	IEC 60320 C14 socket
	Output	Tuning Fork type: 5.5 x 2.5 x 11 mm, 90° (for MEA-090A□C V-A)
		4 Pin Din type, 180° (for MEA-090A□C 6-A)
		Tuning Fork type: 5.5 x 2.5 x 11 mm, 180° (for MEA-090A□C W-A)

### Environment

Surrounding Air Temperature	Operating	-10°C to +60°C
	Storage	-40°C to +85°C
Power De-rating	> 40°C de-rate power by 2.5% / °C	
Operating Humidity	5-95% RH (Non-Condensing)	
Operating Altitude	Up to 5,000 meters (up to 16,400 feet or 106-54kPa)	
Shock Test	Non-Operating	50G, 11 ms, 3 shocks for each direction
Vibration	Non-Operating	5-500 Hz, 2.09 Grms, 20 minute for each three axis

### Power De-rating Curve



### Protections

Overvoltage (max.)	150% max, Latch Mode
Overload / Overcurrent (max.)	180% max of rated load current, Hiccup Mode, (Non-Latching, Auto-Recovery)
Over Temperature	Latch Mode
Short Circuit	Hiccup Mode, (Non-Latching, Auto-Recovery)
Degree of Protection	IP22
Protection Against Shock	Class I with C14 socket

### Reliability Data

MTBF (typ.)	> 1 million Hours based on Telecordia SR-332 (at 115 Vac, Max. load and 25°C Ambient)
Expected Cap Life Time	5 years (50% load @ 115 Vac, 25°C)

**Safety Standards / Directives**

Medical Safety	IEC 60601-1 CB report, EN 60601-1 CAN/CSA-C22.2 No. 60601-1, ANSI/AAMI ES60601-1	
ITE Safety	IEC 62368-1 IEC 60950-1 GB4943.1, GB9254, GB17625.1 PSE J60950-1(H29)	
CE	In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU EN 60601-1: 2006 + A11: 2011 + A1: 2013 + A12: 2014 & EN 60601-1-2: 2015	
UKCA	In conformance with Electrical Equipment (Safety) Regulations 2016 and Electromagnetic Compatibility Regulations 2016, Medical Devices Regulations 2002 (UK MDR 2002)	
Material and Parts	RoHS Directive 2011/65/EU & EU 2015/863 Compliant	
Galvanic Isolation	Input to Output	4000 Vac
	Input to PE <sup>3)</sup>	1500 Vac
	Output to PE <sup>3)</sup>	500 Vac

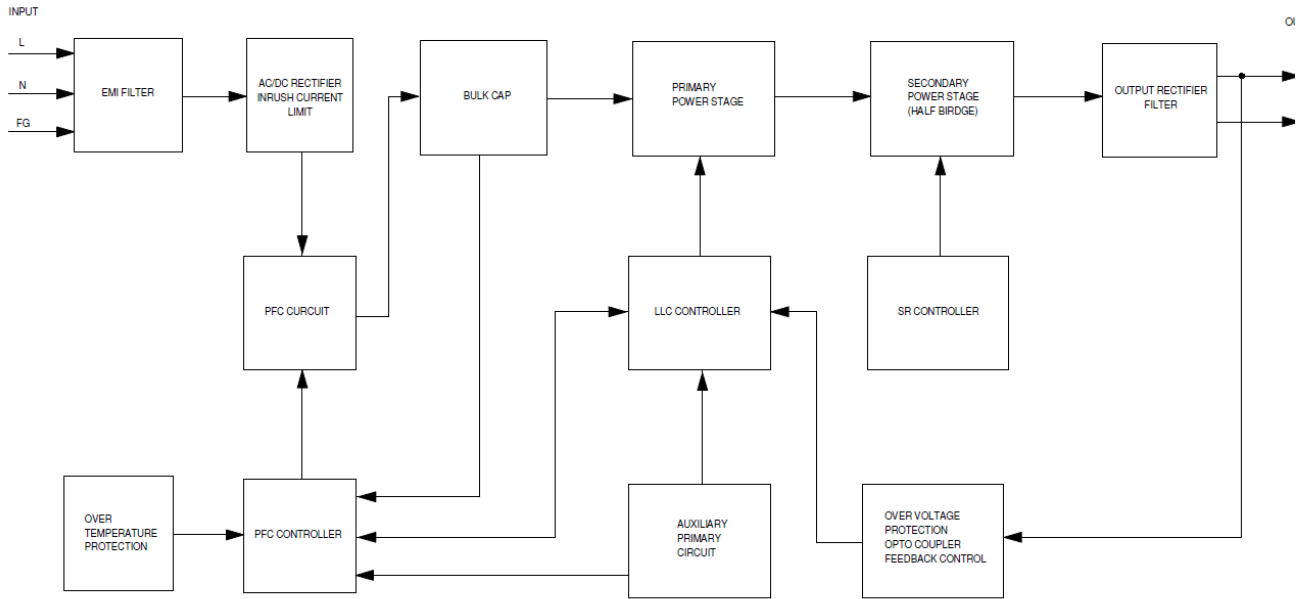
3) : C14 socket model, PE: Protection Earth

**EMC (Compliant with IEC 60601-1-2 4<sup>th</sup> Ed. Requirements)**

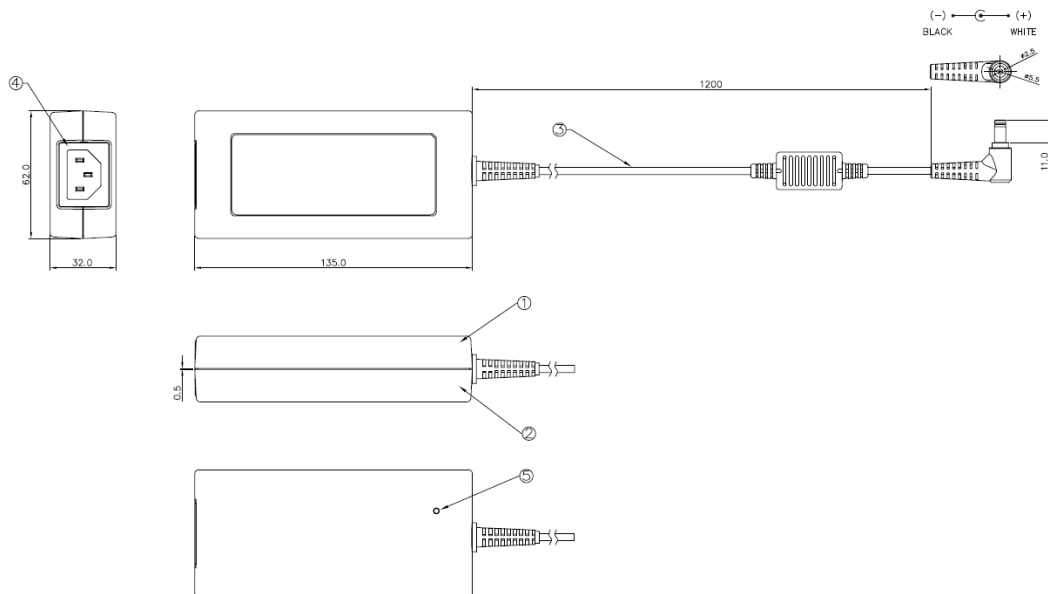
EMC / Emissions	EN/BS EN 55011, EN/BS EN 55032 Class B Compliance to FCC Title 47: Class B	
Harmonic Current Emissions	IEC 61000-3-2	Meet Class A
Voltage Flicker	IEC 61000-3-3	
Immunity to		
Electrostatic Discharge	IEC 61000-4-2	Level 4 Criteria A <sup>4)</sup> Air Discharge: 15 kV Contact Discharge: 8 kV
Radiated Field	IEC 61000-4-3	Criteria A <sup>4)</sup> 80 MHz-2700 MHz, 10 V/m AM modulation 385 MHz-5785 MHz, 28 V/m Pulse mode and other modulation
Electrical Fast Transient / Burst	IEC 61000-4-4	Level 3 Criteria A <sup>4)</sup> : 2 kV
Surge	IEC 61000-4-5	Level 3 Criteria A <sup>4)</sup> Common Mode <sup>6)</sup> : 2 kV Differential Mode <sup>7)</sup> : 1 kV
Conducted	IEC 61000-4-6	Level 2 Criteria A <sup>4)</sup> 150 kHz-80 MHz, 3 Vrms, 6 Vrms at ISM bands and Amateur radio bands
Power Frequency Magnetic Fields	IEC 61000-4-8	Criteria A <sup>4)</sup> Magnetic field strength 30 A/m
Voltage Dips	IEC 61000-4-11	Criteria A <sup>4)</sup> 0% U <sub>T</sub> , 0.5 cycle (10 ms), 0°/45°/90°/135°/180°/225°/270°/315°/360° Criteria B <sup>5)</sup> 0% U <sub>T</sub> , 1 cycle (20 ms), 0° Criteria A <sup>4)</sup> 70% U <sub>T</sub> , 25 cycle (500 ms), 0° Criteria B <sup>5)</sup> 0% U <sub>T</sub> , 250 cycle (5000 ms), 0°

4) Criteria A: Normal performance within the specification limits  
5) Criteria B: Output out of regulation, or shuts down during test. Automatically restore to normal operation after test.  
6) Asymmetrical: Common mode (Line to earth)  
7) Symmetrical: Differential mode (Line to line)

### Block Diagram

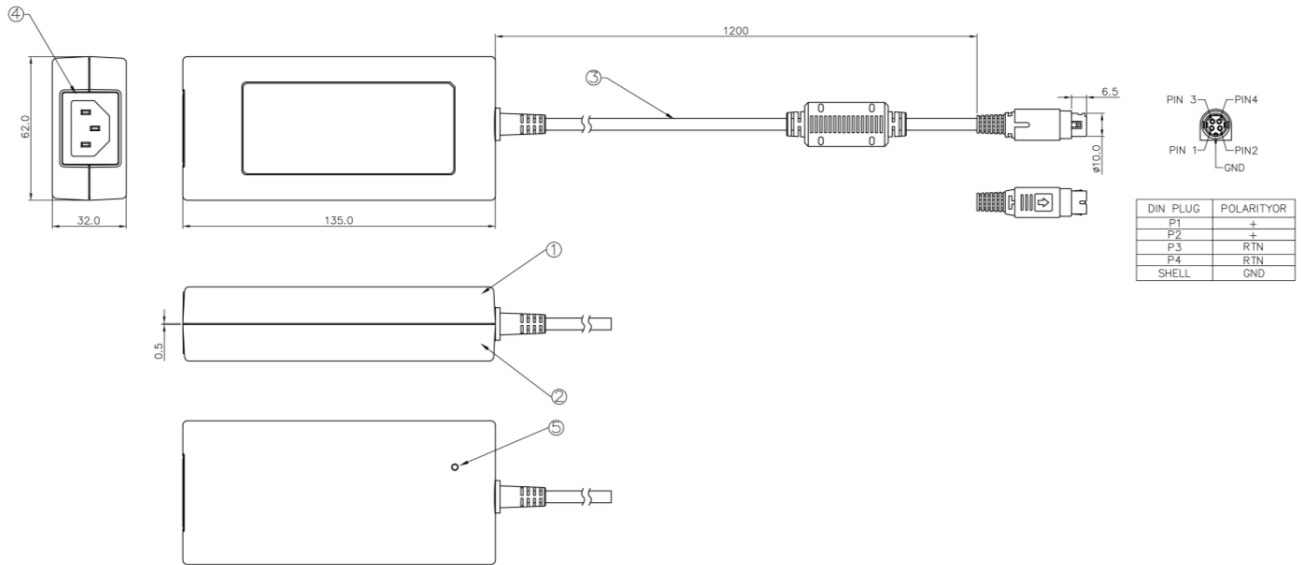


**Dimension (MEA-090A□C V-A):** L x W x H: 135.0 × 62.0 × 32.0 mm (5.31 × 2.44 × 1.26 inch)



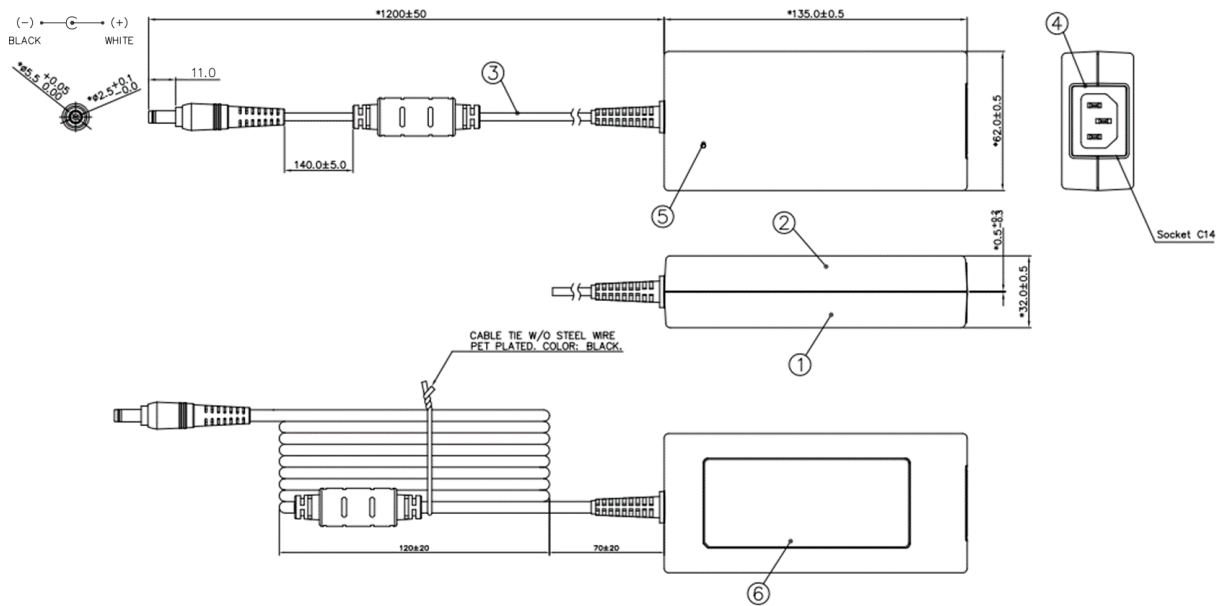
Item	Device Description
1	Chassis
2	Cover
3	Power Cord UL 1571, 18 AWG for 19 V, 24 V model 16 AWG for 12 V, 15 V model
4	Socket (IEC60320, C14)
5	Lens

**Dimension (MEA-090A□C 6-A):** L x W x H: 135.0 × 62.0 × 32.0 mm (5.31 × 2.44 × 1.26 inch)



Item	Device Description
1	Chassis
2	Cover
3	Power Cord UL 1571, 18 AWG for 19 V, 24 V model 16 AWG for 12 V, 15 V model
4	Socket (IEC60320, C14)
5	Lens

**Dimension (MEA-090A□C W-A):** L x W x H: 135.0 × 62.0 × 32.0 mm (5.31 × 2.44 × 1.26 inch)



Item	Device Description
1	Chassis
2	Cover
3	Power Cord UL 11352, 16 AWG for 15 V model
4	Socket (IEC60320, C14)
5	Lens



## Functions

### Start-up Time

The time required for the output voltage ( $V_o$ ) to reach 90% of its set value, after the input AC voltage is applied.

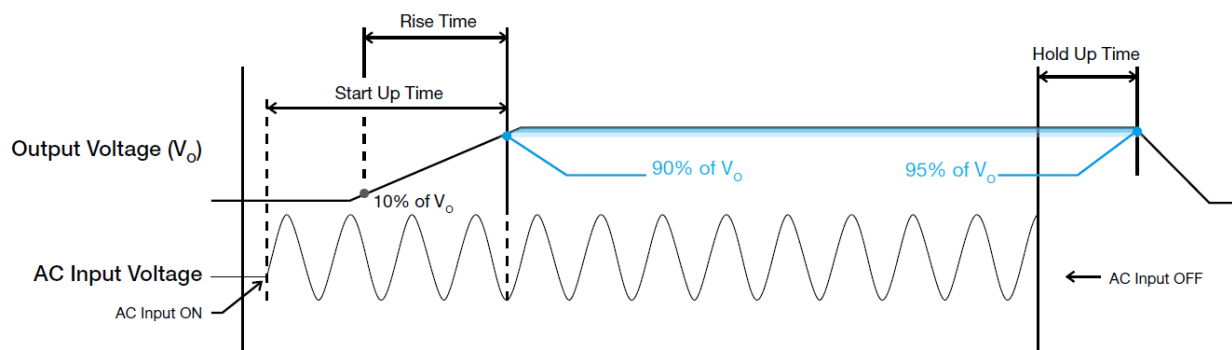
### Rise Time

The time required for the output voltage ( $V_o$ ) to change from 10% to 90% of its steady state value.

### Hold-up Time

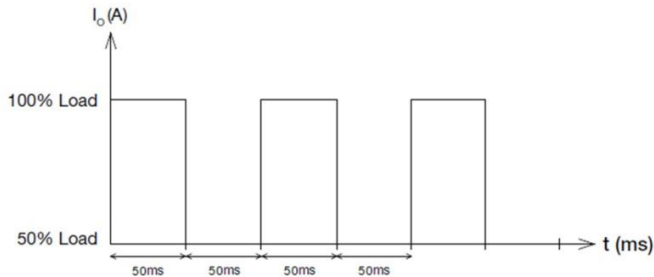
Hold up time is the time when the AC input collapses and output voltage retains regulation for a certain period of time. The time required for the output to reach 95% of its set value, after the input voltage is removed.

#### ■ Graph illustrating the Start-up Time, Rise Time, and Hold-up Time



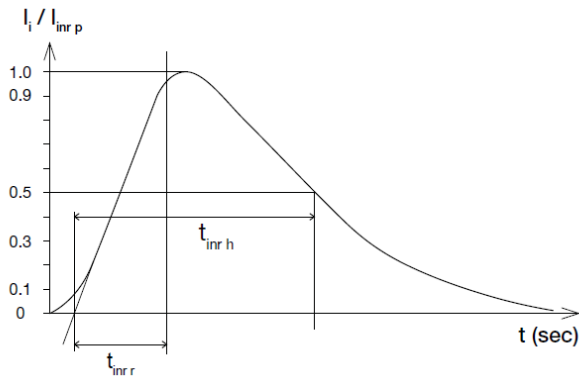
### Dynamic Response

The power supply output voltage will remain within  $\pm 10\%$  of its steady state value, when subjected to a dynamic load change from 0 to 50% & 50 to 100% of its rated current.



### Inrush Current

Inrush current is the input current that occurs when the input voltage is first applied. For AC input voltages, the maximum peak value of inrush current will occur during the first half cycle of the applied AC voltage. This peak value decreases exponentially during subsequent cycles of AC voltage.



### Overvoltage Protection

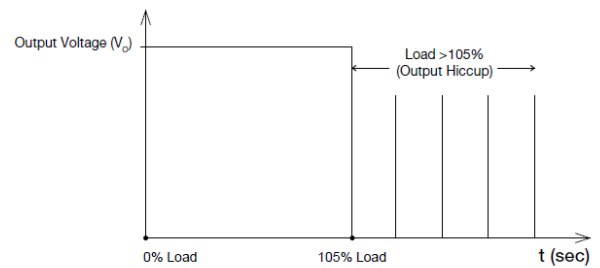
The power supply's overvoltage circuit will be activated when its internal feedback circuit fails. The output voltage shall not exceed its specifications defined on Page 4 under "Protections". Power supply will latch off, and require removal/re-application of input AC voltage in order to restart.

### Short Circuit Protection

The power supply's output OLP/OCP function also provides protection against short circuits. When a short circuit is applied, the output current will operate in "Hiccup mode", as shown in the illustration in the OLP/OCP section on this page. The power supply will return to normal operation after the short circuit is removed.

### Overload & Over current Protections

The power supply's Overload (OLP) and Over current (OCP) Protections will be activated when output current is between 105% and 180% of  $I_o$  (Max load). Upon such an occurrence,  $V_o$  will start to drop. Once the power supply has reached its maximum power limit, the protection will be activated, and the power supply will go into "Hiccup mode" (Auto-Recovery). The power supply will recover once the fault condition causing the OLP and OCP is removed and  $I_o$  is back within the specified limit.



### Over Temperature Protection

As mentioned above, the power supply also has Over Temperature Protection (OTP). This is activated when the overload condition persists for an extended duration and the output current is below the overload trigger point but  $>100\%$  load. In the event of a higher operating condition at 100% load, the power supply will run into OTP when the surrounding air temperature is higher than the operating temperature. When activated, the output voltage will latch off and require removal/re-application of input AC voltage in order to restart.

### Certificate



Delta has been certified as meeting the requirement of ISO 13485: 2003 and EN ISO 13485:2012 for the design and manufacture of switching power supply and adaptor for medical device.



Delta is approved for the UL Total Certification Program (TCP) approved client laboratory for IEC 62368-1. Delta also has participated UL Client Test Data Program (CTDP) for IEC 60601.



Meet DOE Level VI Efficiency Requirement.

(November 2023, Rev. 02)