

# Medical AC-DC Adapter

## MEA-65W Series / MEA-065A□C □-A



# MEA-065A



### Highlights & Features

- Extreme compact size
- Meet Efficiency Level VI
- Safety Approvals to IEC 60601-1 Ed. 3.1 & IEC 62368-1
- Compliant with IEC 60601-1-2 Ed. 4 Requirements
- Low touch current ( <0.1 mA Normal & 0.3 mA signal fault )
- 2 × MOPP isolation

### Safety Standards



CB Certified for worldwide use

**Model Number:** MEA-065A□C □-A  
**Unit Weight:** 250 grams (0.55 lb)  
**Dimensions (W × L × H):** 50.0 × 115.0 × 29.0 mm  
 1.97 × 4.52 × 1.14 inch

### General Description

The MEA-065A 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-065A is certified according to EN 55011 for industrial, scientific and medical (ISM) radio-frequency equipment and meet EN 55032 for Information Technology Equipment (ITE) radio-frequency equipment. MEA-065A 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-065A12C	90-264 Vac	12 Vdc	5.0 A
MEA-065A15C	90-264 Vac	15 Vdc	4.33 A
MEA-065A19C	90-264 Vac	19 Vdc	3.42 A
MEA-065A24C	90-264 Vac	24 Vdc	2.71 A

### Model Numbering

					CC Code	
MEA –	065	A	□	C	□ -	A
Delta Medical Desktop Adapter	Max wattage in the product series ( 60 W for 12 V output 65 W for other output)	Family Code	Output Voltage (Single Output) 12 – 12 V 15 – 15 V 19 – 19 V 24 – 24 V	Input Connector Type C – C14	Plug, Molding type and others A : Barrel Type: 5.5 x 2.5 x 10 mm, 180°, 1.2 m 6* : 4 PIN DIN	Delta Standard

\* : 12 V & 24V model



# Medical AC-DC Adapter

## MEA-65W Series / MEA-065A□C □-A

### Specifications

Model Number	MEA-065A12C	MEA-065A15C	MEA-065A19C	MEA-065A24C
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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	88%	89%		
Efficiency @ 10%	79%			
Standby Power (max.)	0.15 W @ 115 Vac & 230 Vac		0.21 W @ 115 Vac & 230 Vac	
Inrush Current (typ.)	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> , 0.3 mA @ 264 Vac SFC <sup>2)</sup>			

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

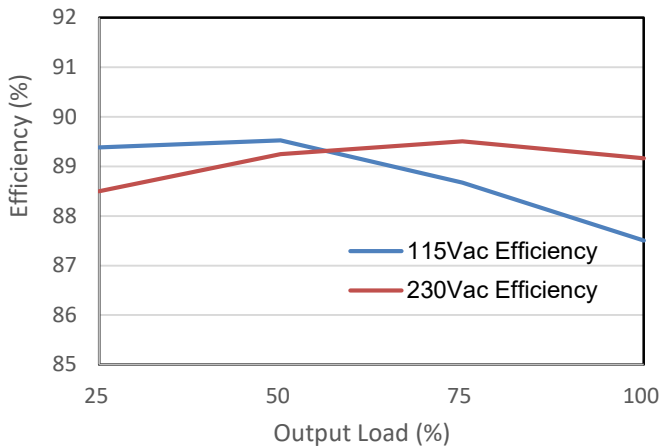


Figure 1-1 MEA-065A12C Efficiency versus Output Load

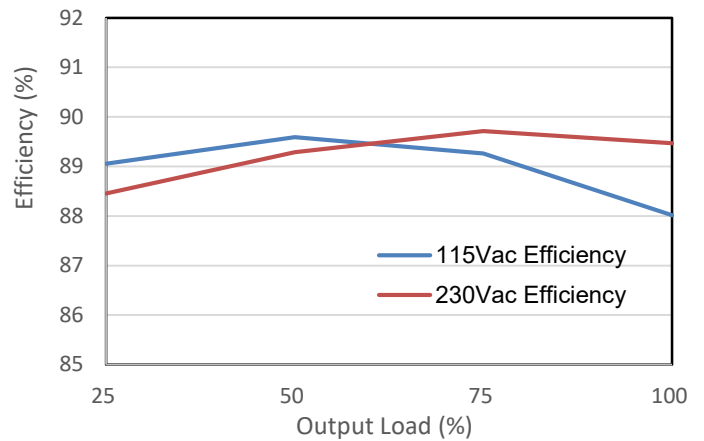


Figure 1-2 MEA-065A15C Efficiency versus Output Load

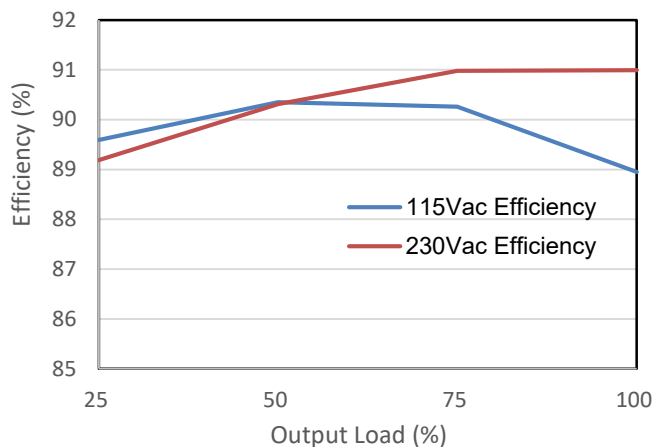


Figure 1-3 MEA-065A19C Efficiency versus Output Load

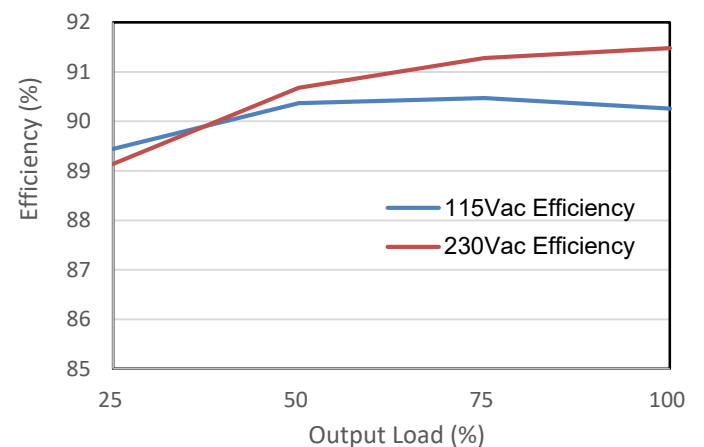


Figure 1-4 MEA-065A24C Efficiency versus Output Load

# Medical AC-DC Adapter

## MEA-65W Series / MEA-065A□C □-A

Model Number	MEA-065A12C	MEA-065A15C	MEA-065A19C	MEA-065A24C
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### Output Ratings / Characteristics\*

Nominal Output Voltage	12 Vdc	15 Vdc	19 Vdc	24 Vdc
Nominal Output Current	5.0 A	4.33 A	3.42 A	2.71 A
Output Power	60 W	65 W	65 W	65 W
Line Regulation	± 0.5%			
Load Regulation	± 4.5%			
PARD*** (20 MHz)	1%			
Rise Time	< 50 ms @ 115 Vac & 230 Vac			
Start-up Time	< 3000 ms @ 115 Vac & 230 Vac			
Hold-up Time	10 ms typ. @ 115 Vac			
Dynamic Response (Overshoot & Undershoot O/P Voltage)	± 10% @ 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)	50.0 × 115.0 × 29.0 mm (1.97 × 4.52 × 1.14 inch)	
Unit Weight	250 grams (0.55 lb)	
Cable Length	1200 mm	
Indicator	Green LED	
Terminal	Input	IEC 60320 C14 socket
	Output	Barrel type: 5.5 x 2.5 x 10 mm, 180° (for MEA-065A□C A-A)
		4 Pin Din ( for MEA-065A12C 6-A and MEA-065A24C 6-A )

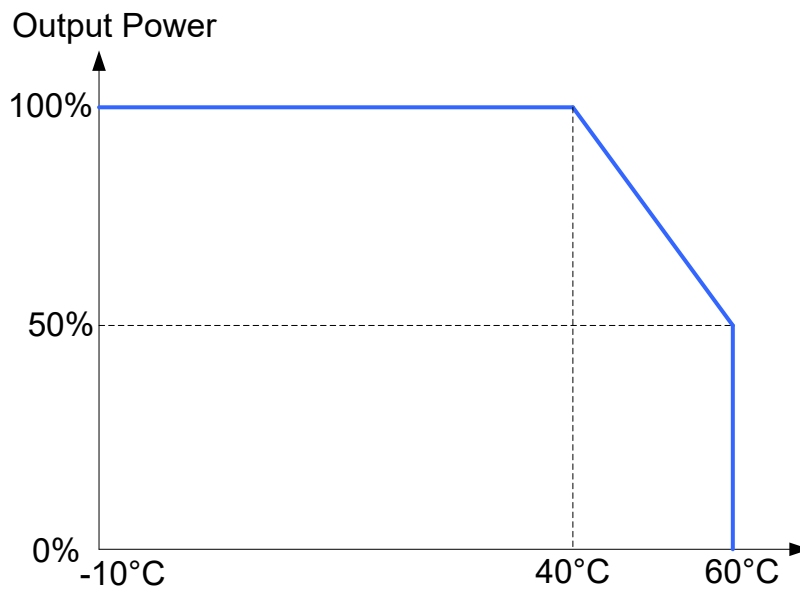
# Medical AC-DC Adapter

MEA-65W Series / MEA-065A□C □-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 106-54 kPa)
Shock Test	Non-Operating	50 G, 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

## 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	1.5 years (100 Vac, 100% load @ 25°C)

# Medical AC-DC Adapter

## MEA-65W Series / MEA-065A□C □-A

### Safety Standards / Directives

Medical Safety		IEC 60601-1 3.1 edition CB report EN 60601-1 CAN/CSA-C22.2 NO. 60601-1:14, ANSI/AAMI ES60601-1 UL60601-1 (File No. E356265)
ITE Safety		IEC 62368-1 IEC 60950-1 GB4943.1-2011, GB9254-2008, GB17625.1-2012
CE		MDD Directive 93/42/EEC
Galvanic Isolation	Input to Output	4000 Vac
	Input to PE	1500 Vac
	Output to PE	500 Vac

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

EMC / Emissions		EN55011 Class B Compliance to EN55032, FCC Title 47: Class B
Harmonic Current Emissions	IEC61000-3-2	Meet Class A
Immunity to		
Voltage Flicker	IEC61000-3-3	
Electrostatic Discharge	IEC61000-4-2	Level 4 Criteria A <sup>5)</sup> Air Discharge: 15 kV Contact Discharge: 8 kV
Radiated Field	IEC61000-4-3	Criteria A <sup>5)</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	IEC61000-4-4	Level 3 Criteria A <sup>5)</sup> : 2 kV
Surge	IEC61000-4-5	Level 3 Criteria A <sup>5)</sup> Common Mode <sup>7)</sup> : 2 kV Differential Mode <sup>8)</sup> : 1 kV
Conducted	IEC61000-4-6	Level 2 Criteria A <sup>5)</sup> 150 kHz-80 MHz, 3 Vrms, 6 Vrms at ISM bands and Amateur radio bands
Power Frequency Magnetic Fields	IEC61000-4-8	Criteria A <sup>5)</sup> Magnetic field strength 30 A/m
Voltage Dips	IEC61000-4-11	Criteria A <sup>5)</sup> 0% U <sub>T</sub> , 0.5 cycle (10 ms) @ 56 W output 0°/45°/90°/135°/180°/225°/270°/315°/360°  Criteria B <sup>6)</sup> 0% U <sub>T</sub> , 1 cycle (20 ms), 0°  Criteria A <sup>5)</sup> 70% U <sub>T</sub> , 25 cycle (500 ms), 0° @ 56 W (for MEA-065A24C) 70% U <sub>T</sub> , 25 cycle (500 ms), 0° @ full load (for other models)  Criteria B <sup>6)</sup> 0% U <sub>T</sub> , 250 cycle (5000 ms), 0°

3) Criteria A: Normal performance within the specification limits

4) Criteria B: Output out of regulation, or shuts down during test. Automatically restore to normal operation after test.

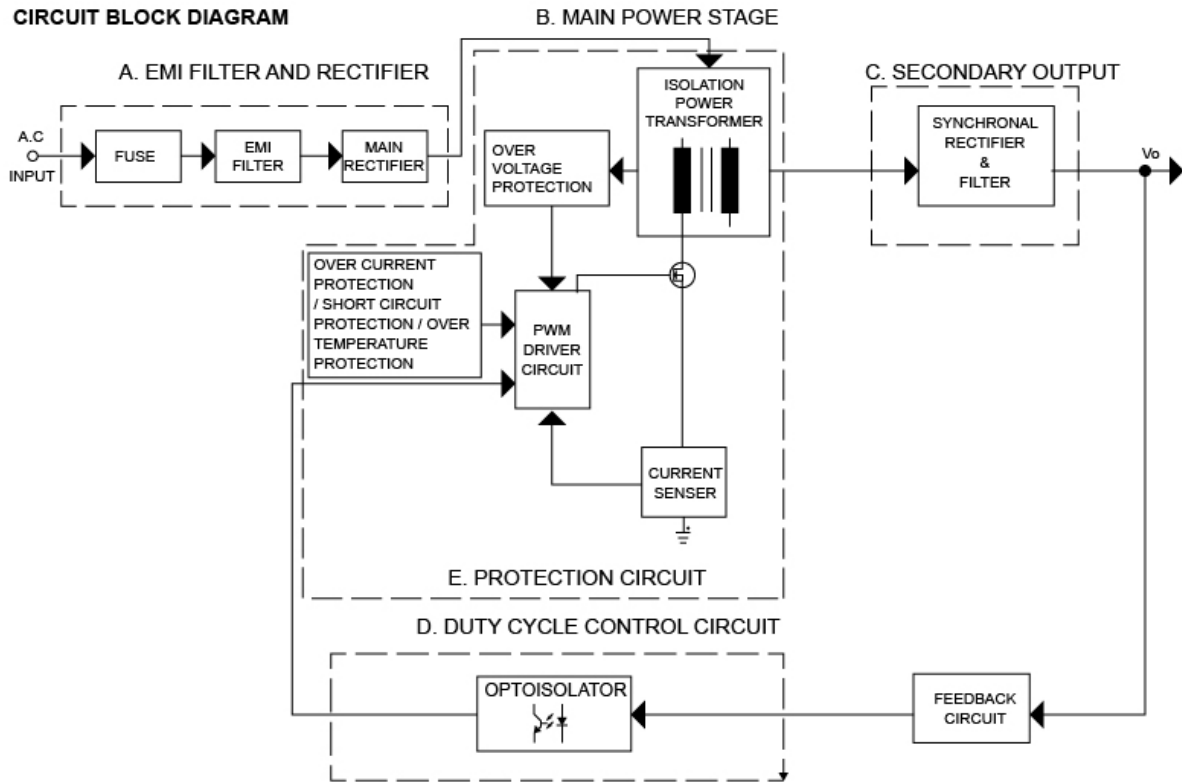
5) Asymmetrical: Common mode (Line to earth)

6) Symmetrical: Differential mode (Line to line)

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MEA-65W Series / MEA-065A □ C □ -A

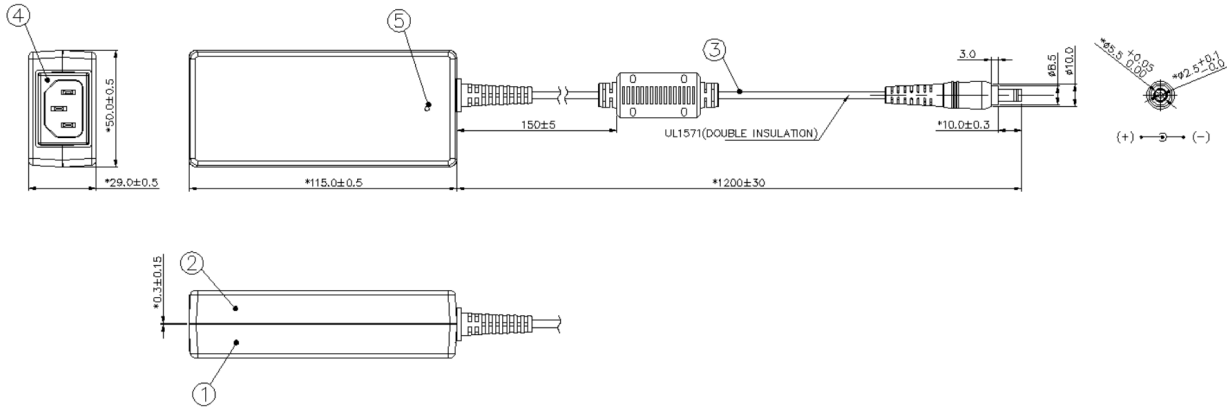
## Block Diagram:



# Medical AC-DC Adapter

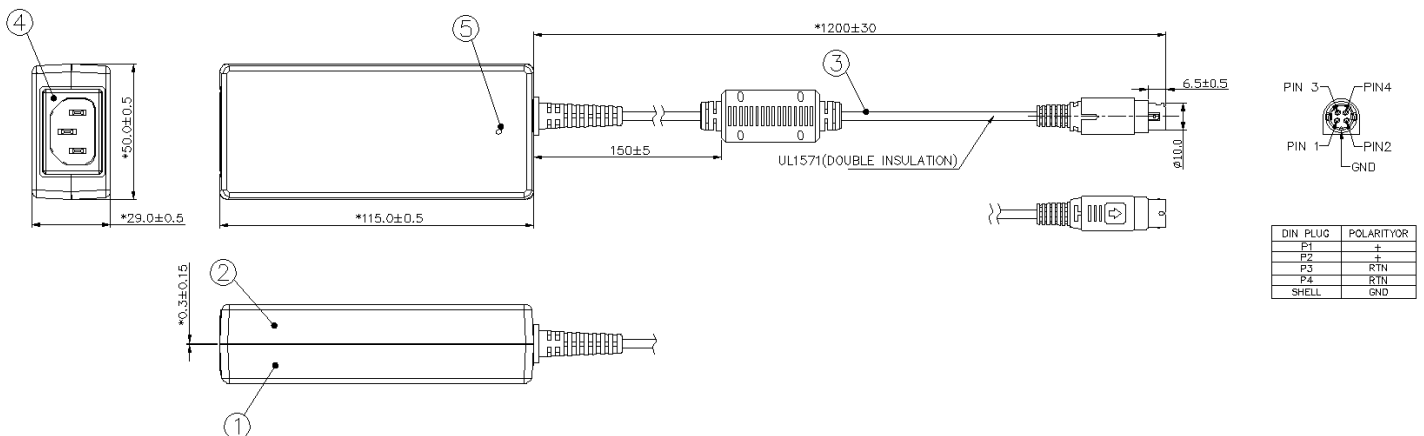
## MEA-65W Series / MEA-065A□C □-A

**Dimension (MEA-065A□C A-A) :** L x W x D : 115.0 x 50.0 x 29.0 mm (4.52 x 1.97 x 1.14 inch)



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

**Dimension (MEA-065A12C 6-A and MEA-065A24C 6-A) :** L x W x D : 115.0 x 50.0 x 29.0 mm (4.52 x 1.97 x 1.14 inch)



DIN PLUG	POLARITY/OR
P1	+
P2	+
P3	R/N
P4	R/N
SHELL	GND

Item	Device Description
1	Cover
2	Chassis
3	Power Cord UL 1571, #16 AWG
4	Socket (IEC60320, C14)
5	Lens

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### 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.

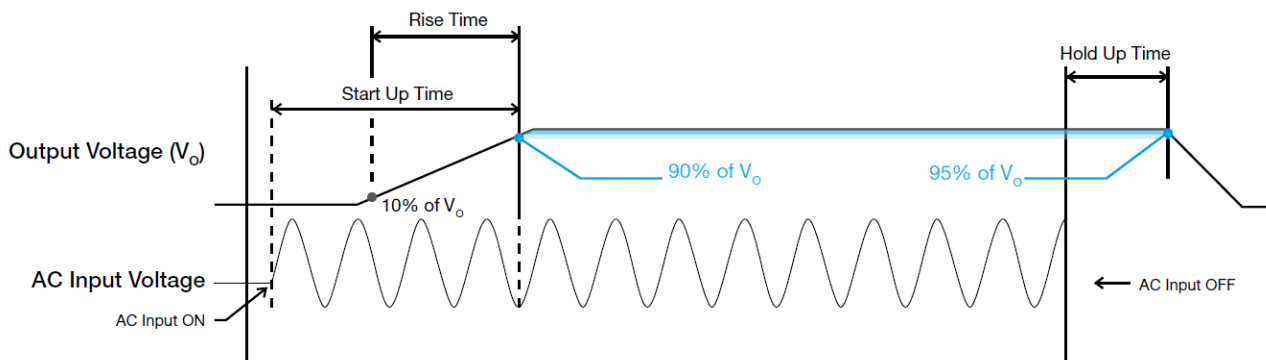
#### Rise Time

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



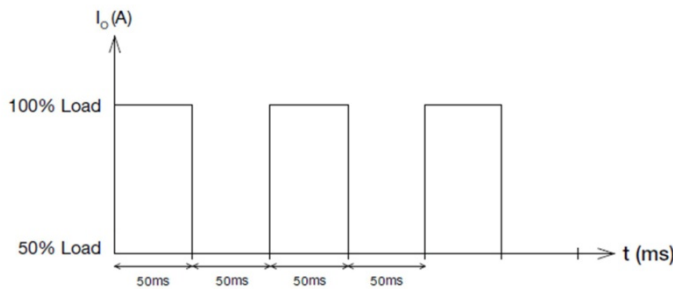


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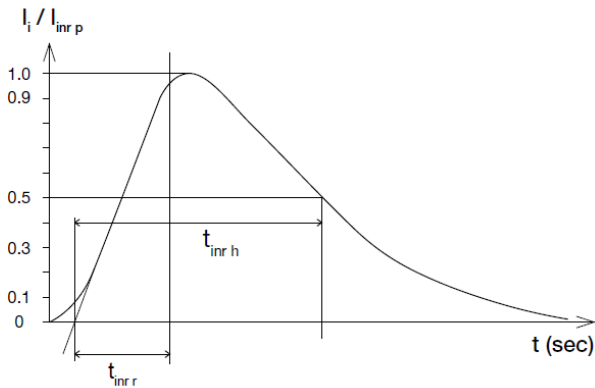
### Dynamic Response

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

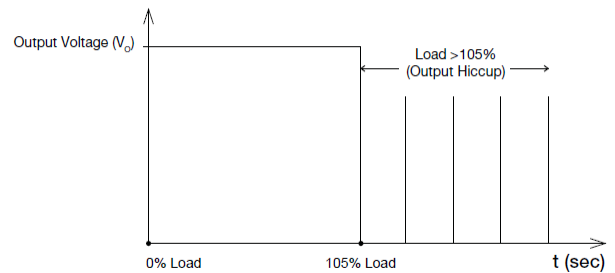
The power supply's overvoltage circuit will be activated when its internal feedback circuit fails. The output voltage shall not exceed its specifications defined on Page 4 under "Protections". Power supply will latch off, and require removal/re-application of input AC voltage in order to restart.

### 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.

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## 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.