

# PJT Open Frame Power Supply

## 12V 40W 1 Phase / PJT-12V40WBAG

# PJT

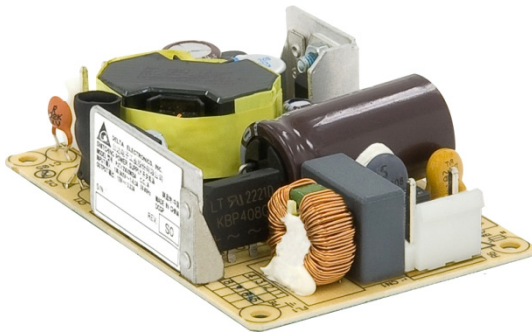
### Highlights & Features

- Universal AC input voltage
- Standard industrial foot print of 2" x 3"
- Low leakage current < 0.1mA
- Convection cooled operating temperature range from -10°C to +70°C
- High MTBF > 700,000 hrs as per Telcordia SR-332

### Safety Standards



CB Certified for worldwide use



**Model Number:** PJT-12V40WBAG  
**Unit Weight:** 0.08 kg (0.17 lb)  
**Dimensions (L x W x D):** 76.2 x 50.8 x 22.9 mm (2 x 3 inch)

### General Description

The PJT-12V40WBAG open frame power supply series offers 12V nominal output voltages. The single output products are designed with small standard industrial foot prints at 2" x 3". The highly efficient convection cooling designs enable optimum thermal management for high power efficiency. The product can operate from -10°C to +70°C across the entire input voltage range of 90 to 264Vac and are certified for safety standard according to IEC/UL 60065 and for EMI standard according to EN 55022, Class B.

### Model Information

#### PJT Open Frame Power Supply

Model Number	Input Voltage Range	Output Voltage	Output Current
PJT-12V40WBAG	90-264Vac	12Vdc	3.33A

### Model Numbering

PJ	T –	12V	40W	B	A	G
Open Frame	Product Type T – ITE Application Series	Output Voltage	Output Power	Package Type B – Open Frame	Family Code A	IEC/UL 60065 approval

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### Specifications

#### Input Ratings / Characteristics

Nominal Input Voltage		100-240Vac
Input Voltage Range		90-264Vac
Nominal Input Frequency		50-60Hz
Input Frequency Range		47-63Hz
Input Current		< 0.85A typ. @ 115Vac
Efficiency at 100% Load	115Vac	85.0% typ.
	230Vac	86.0% typ.
Max Inrush Current (Cold Start)		30A typ. @ 115Vac, 60A typ. @ 230Vac
Leakage Current		0.1mA @ 240Vac

#### Output Ratings / Characteristics

Nominal Output Voltage		12Vdc
Output Voltage Range		No potentiometer (± 5%)
Output Current		3.33A
Output Power		40W
Line Regulation		± 0.5% @ 115Vac & 230Vac
Load Regulation		± 1.0% @ 115Vac & 230Vac
PARD* (20MHz)		< 120mVpp
Start-up Time	115Vac	2800ms typ. (100% load)
	230Vac	1100ms typ. (100% load)
Hold-up Time	115Vac	18ms typ. (100% load)
	230Vac	90ms typ. (100% load)
Dynamic Response (Overshoot & Undershoot O/P Voltage)		± 5% @ 50-100% load (Slew Rate: 0.1A/μS)
Start-up with Capacitive Loads		4,000uF Max

\* PARD is measured with an AC coupling mode, and in parallel with 0.1 $\mu$ F ceramic capacitor & 47 $\mu$ F electrolytic capacitor.

### Mechanical

Dimensions	76.2 x 50.8 x 22.9 mm (2 x 3 inch)
Unit Weight	0.08 kg (0.17 lb)
Cooling System	Convection
Terminal	Input: JST B2P3-VH (LF)(SN) Output: JST B4P-VH (LF)(SN)
Wire	AWG 22-18

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### Environment

Surrounding Air Temperature	Operating	-10°C to +70°C
	Storage	-40°C to +85°C
Power De-rating	> 50°C de-rate power by 2.5% / °C	
Operating Humidity	10 to 95% RH (Non-Condensing)	
Operating Altitude	0 to 5,000 Meters (16,400 ft.)	
Shock Test (Non-Operating)	IEC 60068-2-27, Half Sine Wave: 50G for a duration of 11ms, 3 shocks for each 3 directions	
Vibration (Operating)	IEC 60068-2-6, Sine Wave: 10Hz to 150Hz @ 25m/S <sup>2</sup> (2.5G); 10 min per cycle, 90 min per axis for all X, Y, Z direction	

### Protections

Overvoltage	13.2-18.0V, Latch Mode
Overload / Overcurrent	> 140% of rated load current, Hiccup Mode, Non-Latching (Auto-Recovery)
Over Temperature	Non-Latching (Auto-Recovery)
Short Circuit	Hiccup Mode, Non-Latching (Auto-Recovery when the fault is removed)
Protection Against Shock	Class I with PE* connection

\*PE: Primary Earth

### Reliability Data

MTBF	> 700,000 hrs. as per Telcordia SR-332 at Input: 115Vac, Output: 100% load, Ta: 25°C
Expected Cap Life Time	10 years (115Vac & 230Vac, 50% load @ 40°C)

### Safety Standards / Directives

Electrical Safety	UL/cUL recognized to UL 60065 and CSA C22.2 No. 60065-03 (File No. E162016), CB scheme to IEC 60065	
CE	In conformance with EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC	
Material and Parts	RoHS Directive 2011/65/EU Compliant	
Galvanic Isolation	Input to Output	3.0KVac
	Input to Ground	2.0KVac
	Output to Ground	0.5KVac

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### EMC

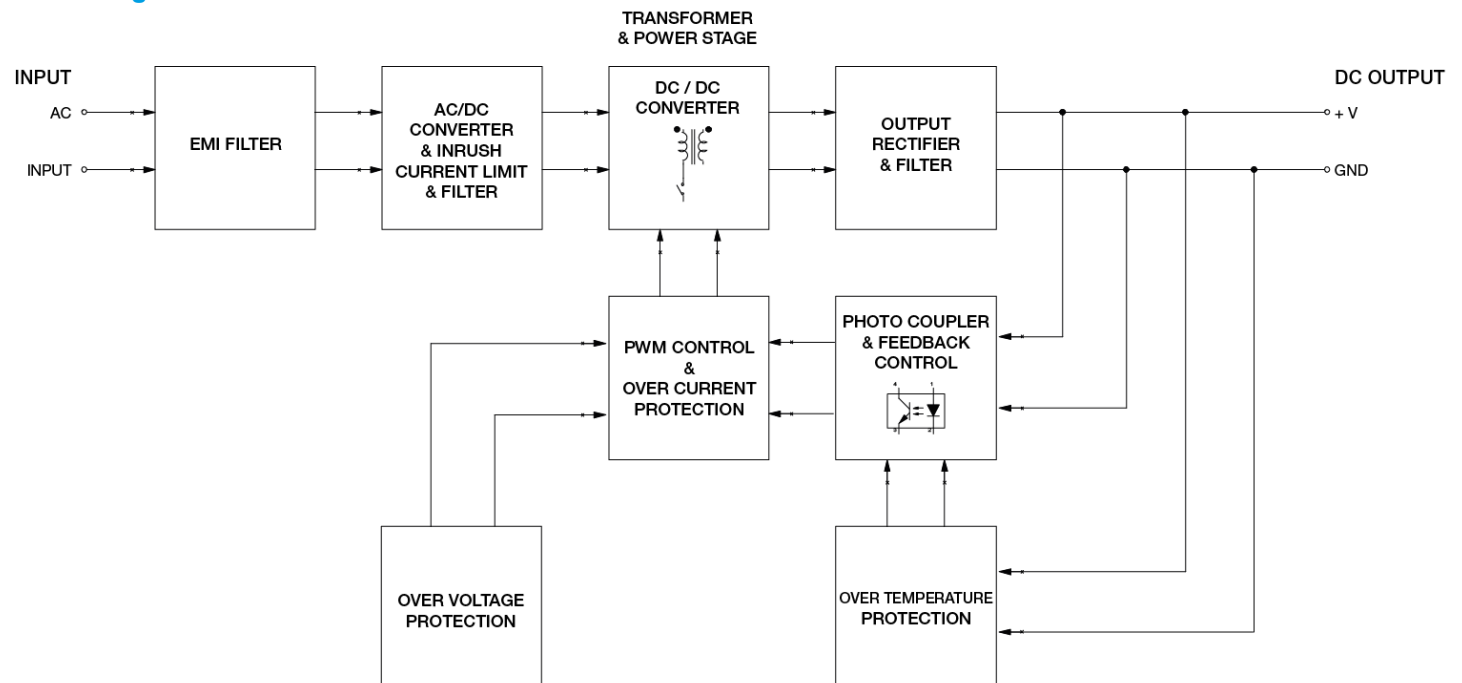
EMC / Emissions			CISPR 22, EN 55022, FCC Part 15 Subpart B: Class B ICES-003 Issue 5: Class B
Immunity to			EN 55024
Electrostatic Discharge	IEC 61000-4-2		Criteria A <sup>1)</sup> Level 3 Air Discharge: 8kV Level 3 Contact Discharge: 6kV
Radiated Field	IEC 61000-4-3		Level 2 Criteria A <sup>1)</sup> 80MHz-1GHz, 3V/M with 1kHz tone / 80% modulation
Electrical Fast Transient / Burst	IEC 61000-4-4		Level 3 Criteria A <sup>1)</sup> 2kV
Surge	IEC 61000-4-5		Level 3 Criteria A <sup>1)</sup> Common Mode <sup>2)</sup> : 2kV Differential Mode <sup>3)</sup> : 1kV
Conducted	IEC 61000-4-6		Level 2 Criteria A <sup>1)</sup> 3V with 80% AM
Power Frequency Magnetic Fields	IEC 61000-4-8		Criteria A <sup>1)</sup> Magnetic field strength 3A/Meter
Voltage Dips	IEC 61000-4-11		30% dip; 10ms Criterion A 60% dip; 100ms Criterion B 95% dip; 5000ms Criterion B
Voltage Fluctuation and Flicker			IEC/EN 61000-3-3

1) Criteria A: Normal performance within the specification limits

2) Asymmetrical: Common mode (Line to earth)

3) Symmetrical: Differential mode (Line to line)

### Block Diagram

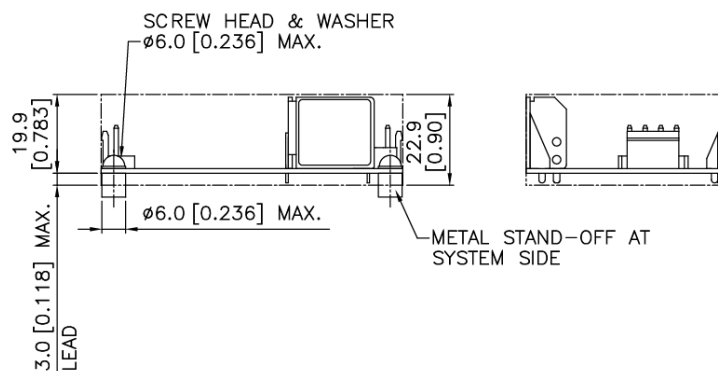
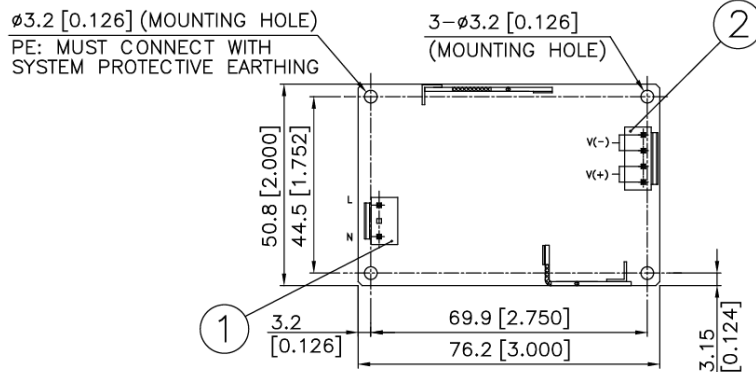


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### Dimensions

L x W x D: 76.2 x 50.8 x 22.9 mm [2 x 3 inch]



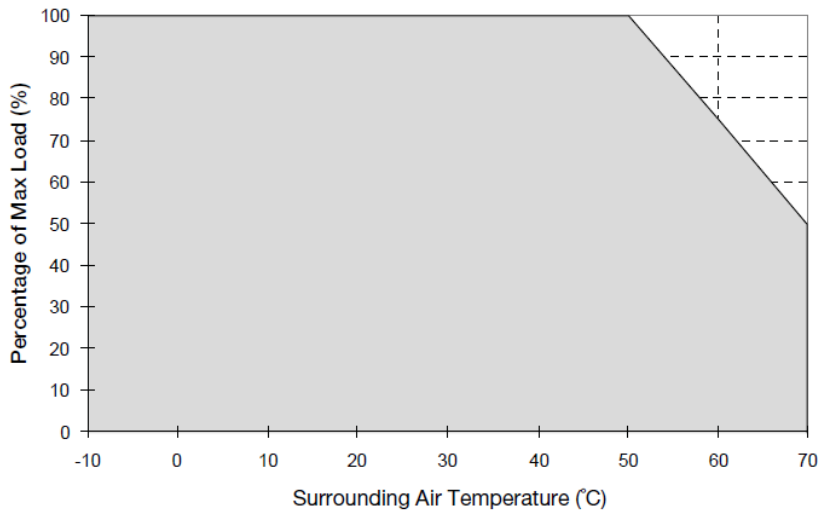
Item	Device Description
1	Input Connector
2	Output Connector

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### Engineering Data

#### De-rating

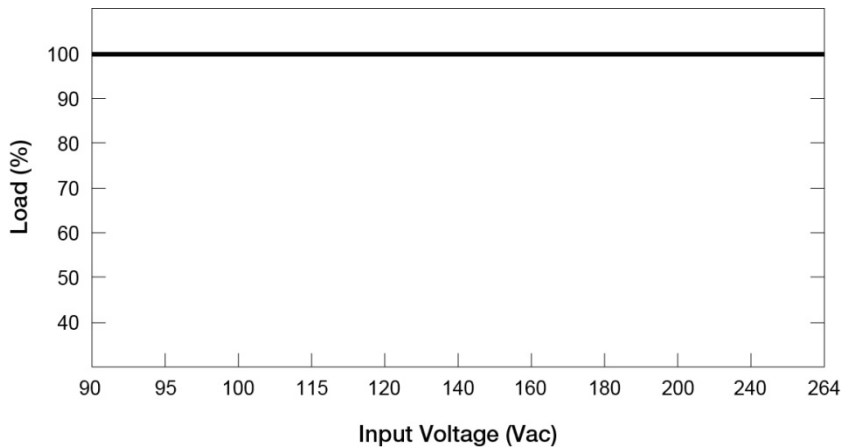


**Fig. 1 De-rating for Horizontal Mounting Orientation**  
 > 50°C de-rate power by 2.5% / °C

#### Note

1. Power supply components may degrade, or be damaged, when the power supply is continuously used outside the shaded region, refer to the graph shown in Fig. 1.
2. If the output capacity is not reduced when the surrounding air temperature >50°C, the device will run into Over Temperature Protection. When activated, the output voltage will go into bouncing mode and will recover when the surrounding air temperature is lowered or the load is reduced as far as necessary to keep the device in working condition.
3. Depending on the surrounding air temperature and output load delivered by the power supply, the device can be very hot!
4. If the device has to be mounted in any other orientation, please do not hesitate to contact [info@deltapsu.com](mailto:info@deltapsu.com) for more details.

#### Output De-rating VS. Input Voltage



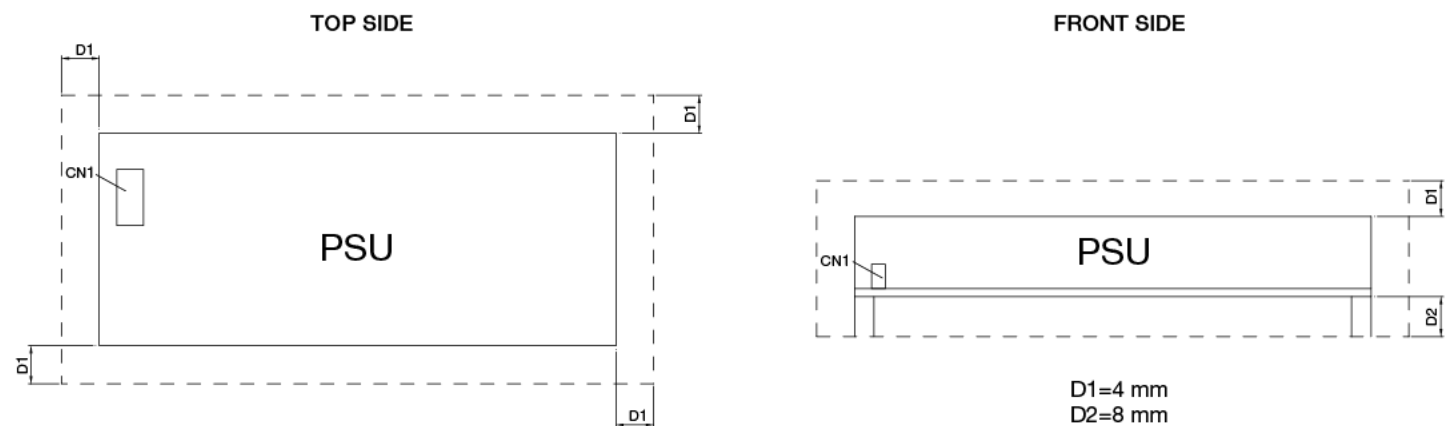
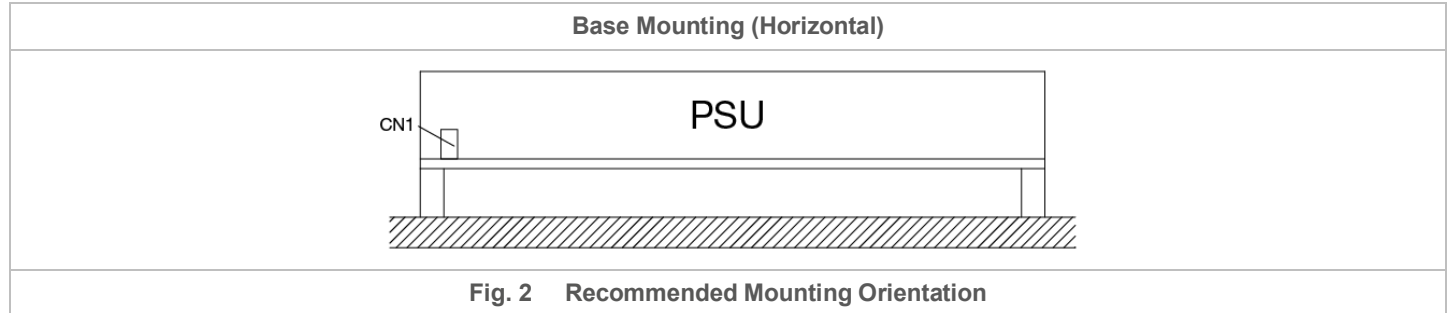
- No output power de-rating for the input voltage from 90Vac to 264Vac

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### Assembly & Installation

Any excessive twisting or bending may damage the device's PCB. Please handle the device with care.



### Safety Instructions

- If user's mounting orientation is not according to the recommended mounting orientations, please consult Delta for further information.
- The device is not recommended to be placed on low thermal conductive surface. For example, plastics.
- For safety reasons, please ensure the mounted device is kept at  $\geq 4\text{mm}$  safety distance at all sides from other components and equipments. Please insert an insulation sheet between the system and product, if the safety distance is less than 4mm. In addition, to ensure sufficient convection cooling, always maintain a distance of  $\geq 20\text{mm}$  from ventilated surfaces while the device is in operation.
- Note that the enclosure of the device can become very hot depending on the ambient temperature and load of the power supply. Do not touch the device while it is in operation or immediately after power is turned OFF. Risk of burning!
- Do not touch the terminals while power is being supplied. Risk of electric shock.
- Prevent any foreign metal, particles or conductors from entering the device through the openings during installation. It may cause electric shock, safety hazard, fire, and/or product failure.
- The power supply must be mounted by metal screws onto a grounded metal surface. It is highly recommended that the Earth terminal on the connector be connected to the grounded metal surface.

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### Functions

#### Start-up Time

The time required for the output voltage to reach 90% of its final steady state set value, after the input voltage is applied.

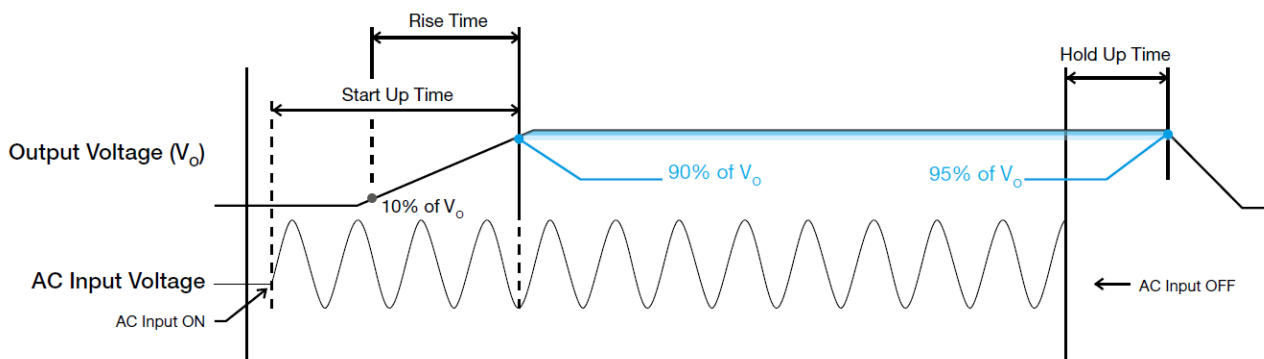
#### Rise Time

The time required for the output voltage to change from 10% to 90% of its final steady state set value.

#### Hold-up Time

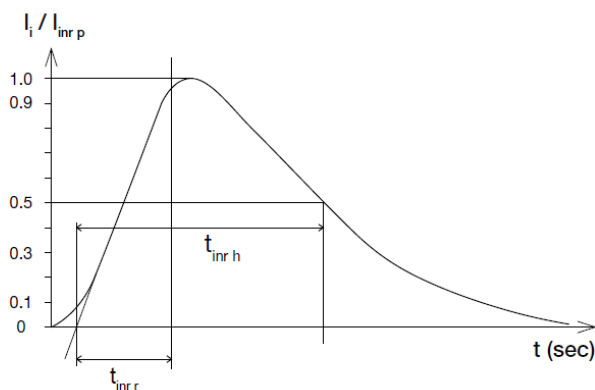
Time between the collapse of the AC input voltage, and the output falling to 95% of its steady state set value.

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



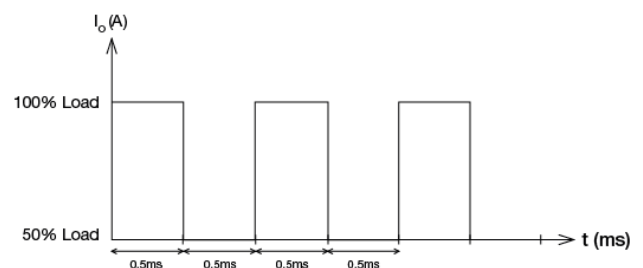
#### Inrush Current

Inrush current is the peak, instantaneous, input current measured and, 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.



#### Dynamic Response

The power supply output voltage will remain within  $\pm 5\%$  of its steady state value, when subjected to a dynamic load from 50 to 100% of its rated current.



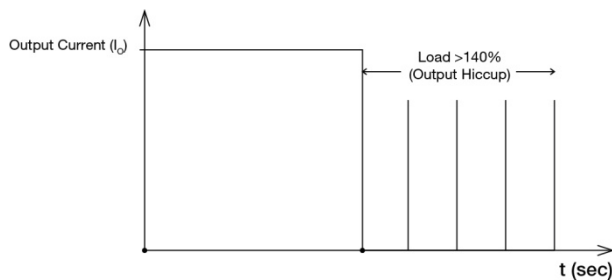


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### Overload & Overcurrent Protections (Auto-Recovery)

The power supply's Overload (OLP) and Overcurrent (OCP) Protections will be activated when output current exceeds 140% of  $I_O$  (Max load). In such an occurrence, the  $V_O$  (output voltage) will start to droop. 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 cause of OLP or OCP is removed, and  $I_O$  is back within the specified range



It is not recommended to prolong the duration of  $I_O$  when it is <140% but >100%, since it may cause damage to the PSU.

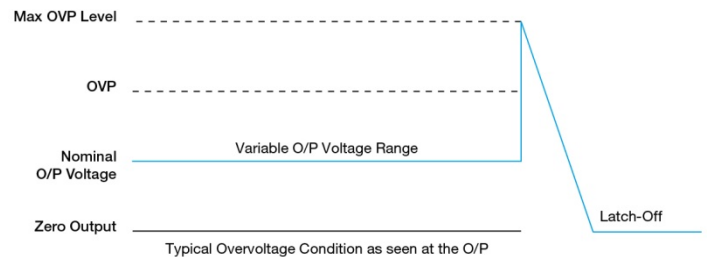
### Short Circuit Protection (Auto-Recovery)

The power supply's output OLP/OCP function also provides protection against short circuits. When a short circuit is applied, the power supply will operate in "CC 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.

### Overvoltage Protection (Latch Mode)

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 3 under "Protections". Power supply will latch off, and require removal/re-application of input AC voltage in order to restart.

**The power supply should be latch.**



### Over Temperature Protection (Auto-Recovery)

As mentioned above, the power supply also has Over Temperature Protection (OTP). In the event of a higher operating temperature at 100% load, the power supply will run into OTP when the operating temperature is beyond what is recommended in the de-rating graph. When activated, the output voltage will go into bouncing mode until the temperature drops to its normal operating temperature as recommended in the de-rating graph

### Others

#### Delta RoHS Compliant



#### Restriction of the usage of hazardous substances

The European directive 2011/65/EU limits the maximum impurity level of homogeneous materials such as lead, mercury, cadmium, chrome, polybrominated flame retardants PBB and PBDE for the use in electrical and electronic equipment. RoHS is the abbreviation for "Restriction of the use of certain hazardous substances in electrical and electronic equipment".

This product conforms to this standard.