PJT Open Frame Power Supply

PJT-100WBB Series / PJT-□□V100WBB□

PJT

Highlights & Features

- Universal AC input voltage
- Standard industrial foot print of 2” x 4”
- Low leakage current < 0.1mA
- High MTBF > 700,000 hrs as per Telcordia SR-332
- Multiple connector source options

Safety Standards

CB Certified for worldwide use

Model Number: PJT-□□V100WBB□
Unit Weight: 0.15 kg
Dimensions (L x W x D): 101.6 x 50.8 x 31.8 mm [2” x 4”]

General Description

The PJT open frame power supply series offers choices of 12V, 15V, 18V and 24V nominal output voltages. The single output products are designed with small standard industrial foot prints at 2” x 4”. The highly efficient convection cooling designs enable optimum thermal management for high power efficiency. The PJT series of products 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/EN/UL 60950-1 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-12V100WBB□	90-264Vac	12Vdc	6.67A (Convection) 8.33A (Forced Cooling)
PJT-15V100WBB□		15Vdc	5.33A (Convection) 6.67A (Forced Cooling)
PJT-18V100WBB□		18Vdc	4.44A (Convection) 5.55A (Forced Cooling)
PJT-24V100WBB□		24Vdc	3.33A (Convection) 4.17A (Forced Cooling)

Model Numbering

PJ	T –	XXV	100W	B	B	□
Open Frame	Product Type T – ITE Application Series	Output Voltage 12V 15V 18V 24V	Output Power	Package Type B – Open Frame	Family Code B	Harness Connector A – JST connector B – Molex connector* C – JWT connector*

*Options

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Specifications

Model Number		PJT-12V100WBB□	PJT-15V100WBB□	PJT-18V100WBB□	PJT-24V100WBB□
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		< 2.50A typ. @ 115Vac			
Efficiency at 100% Load	115Vac	86.0% typ.	87.0% typ.	87.0% typ.	88.0% typ.
	230Vac	88.0% typ.	89.0% typ.	89.0% typ.	89.0% typ.
Max Inrush Current		30A typ. @ 115Vac, 60A typ. @ 230Vac			
Leakage Current		0.1mA @ 240Vac			
Output Ratings / Characteristics					
Nominal Output Voltage		12Vdc	15Vdc	18Vdc	24Vdc
Output Voltage Range		No potentiometer (± 1%)			
Output Current*	Convection	6.67A	5.33A	4.44A	3.33A
	Forced Cooling	8.33A	6.67A	5.55A	4.17A
Output Power	Convection	80W			
	Forced Cooling	100W			
Line Regulation		± 0.5% @ 115Vac & 230Vac			
Load Regulation		± 1.0% @ 115Vac & 230Vac			
PARD (20MHz)		< 120mVpp	< 150mVpp	< 180mVpp	< 240mVpp
Start-up Time	115Vac	500ms typ. (100% load)			
	230Vac				
Hold-up Time	115Vac	10ms typ.			
	230Vac				
Dynamic Response (Overshoot & Undershoot O/P Voltage)		± 5% @ 50-100% load (Slew Rate: 0.1A/μS)			
Start-up with Capacitive Loads		4,000uF Max	3,500uF Max	3,000uF Max	2,000uF Max

*Convection: 80% load, Forced Cooling: 100% load

Mechanical

Dimensions		101.6 x 50.8 x 31.8 mm [2" x 4"]
Unit Weight		0.15 kg
Cooling System		Convection / Forced Cooling
Terminal	PJT-□□V100WBBA	Input: JST B2P3-VH(LF)(SN) Output: JST B4P-VH(LF)(SN)
	PJT-□□V100WBBB	Input: Molex 26-62-4030 Output: Molex 26-62-4040
	PJT-□□V100WBBC	Input: JWT A3963WV2-3P-D Output: JWT A3963WV2-4P
Wire		AWG 20-18

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Environment

Surrounding Air Temperature	Operating	-10°C to +70°C
	Storage	-40°C to +85°C
Power De-rating	Convection	> 50°C de-rate power by 2% / °C
	Forced Cooling	> 50°C de-rate power by 2.5% / °C
Operating Humidity		10 to 95% RH (Non-Condensing)
Operating Altitude		0 to 5,000 Meters
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/S² (2.5G); 10 min per cycle, 90 min per axis for all X, Y, Z direction

Protections

Overvoltage	< 18.0V, Latch Mode	< 22.5V, Latch Mode	< 27.0V, Latch Mode	< 36.0V, Latch Mode
Overload / Overcurrent	< 170% 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
Expected Cap Life Time	10 years (115Vac & 230Vac, 50% load @ 40°C)

Safety Standards / Directives

Electrical Safety		TUV Bauart to EN 60950-1, UL/cUL recognized to UL 60950-1 and CSA C22.2 No. 60950-1 (File No. E131881), CB scheme to IEC 60950-1
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	1.5KVac
	Output to Ground	0.5KVac

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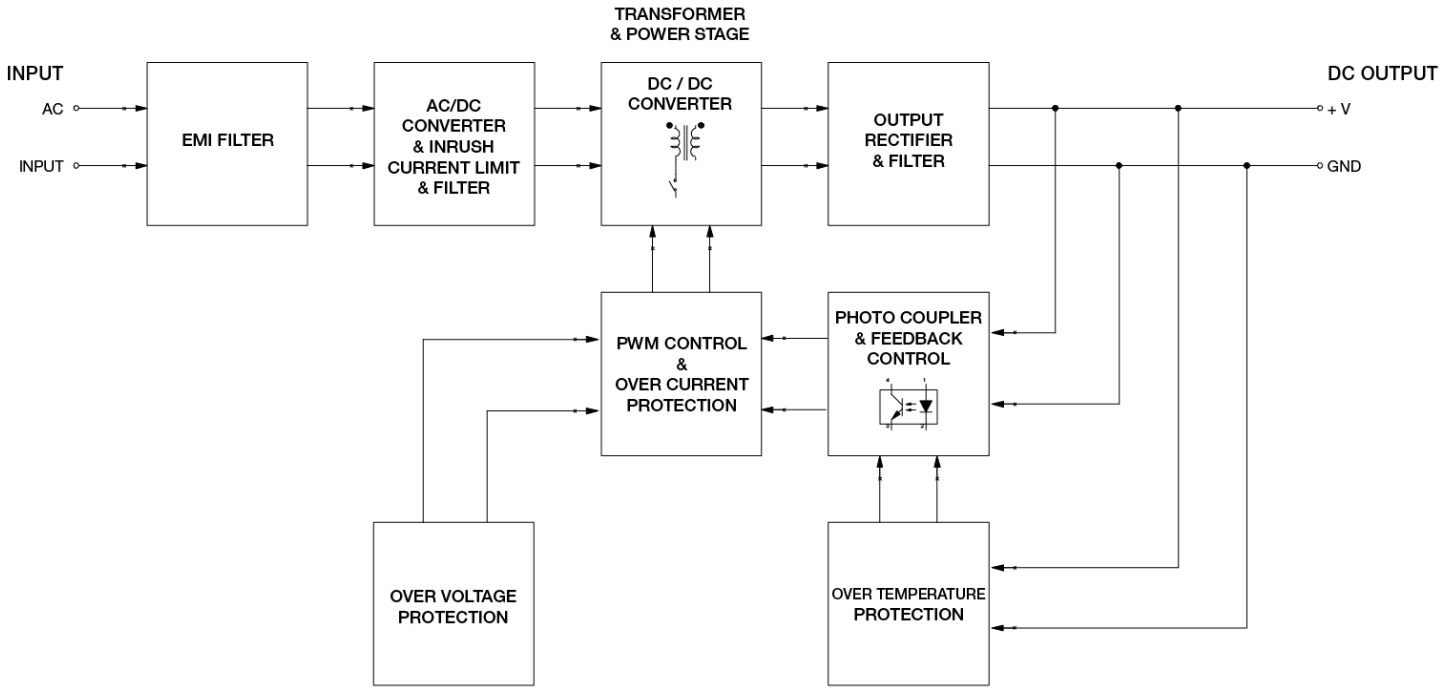
EMC

EMC / Emissions		CISPR 22, EN 55022, FCC Title 47: Class B
Immunity to		EN 55024
Electrostatic Discharge	IEC 61000-4-2	Criteria A[1)] Level 3 Air Discharge: 8kV Level 3 Contact Discharge: 6kV
Radiated Field	IEC 61000-4-3	Level 2 Criteria A[1)] 80MHz-1GHz, 3V/M with 1kHz tone / 80% modulation
Electrical Fast Transient / Burst	IEC 61000-4-4	Level 3 Criteria A[1)] 2kV
Surge	IEC 61000-4-5	Level 3 Criteria A[1)] Common Mode[2)]: 2kV Differential Mode[3)]: 1kV
Conducted	IEC 61000-4-6	Level 2 Criteria A[1)] 3V with 80% AM
Power Frequency Magnetic Fields	IEC 61000-4-8	Criteria A[1)] Magnetic field strength 3A/Meter
Voltage Dips	IEC 61000-4-11	30% dip; 10ms Criterion A (I/P: 115Vac) 30% dip; 10ms Criterion B (I/P: 100Vac) 60% dip; 100ms Criterion B 100% dip; 5000ms Criterion B
Low Energy Pulse Test (Ring Wave)	IEC 61000-4-12	Level 3 Criteria A[1)] Common Mode[2)]: 2kV Differential Mode[3)]: 1kV
Harmonic Current Emission		IEC/EN 61000-3-2, Class A
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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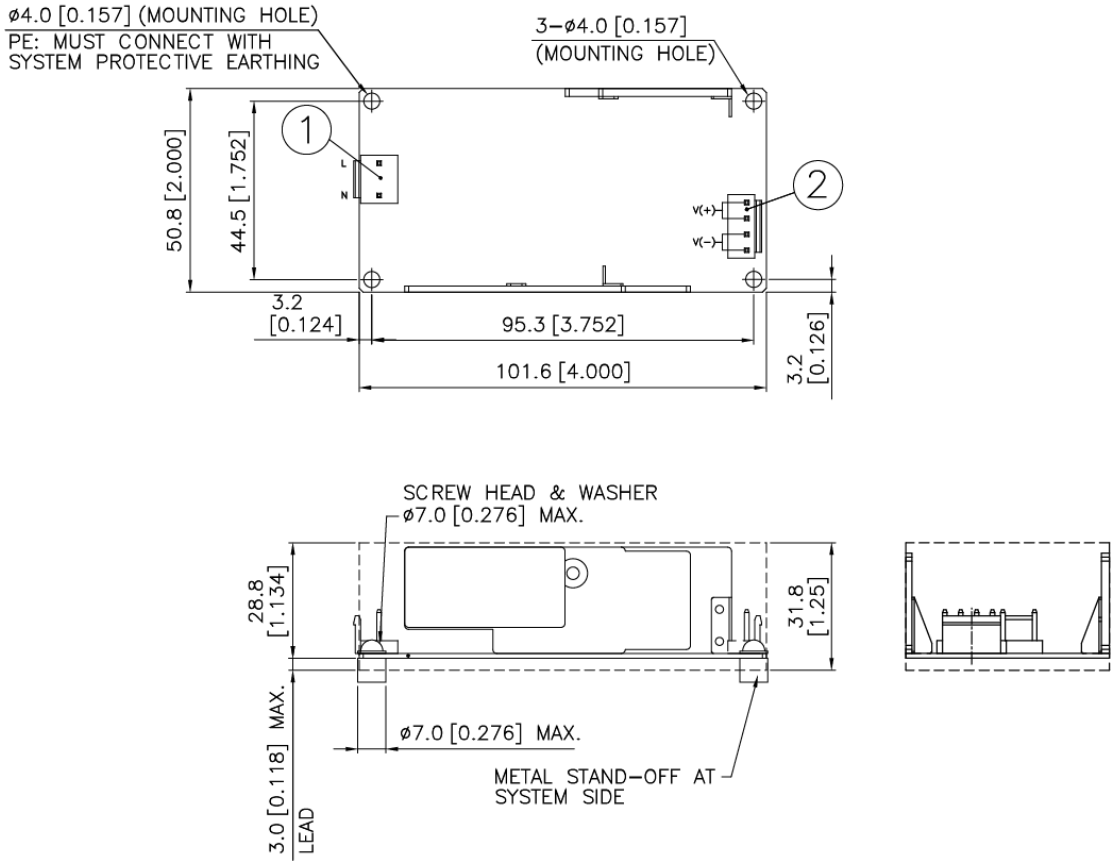
Dimensions

L x W x D: 101.6 x 50.8 x 31.8 mm [2" x 4"]



Item	Device Description
1	Input Connector
2	Output Connector

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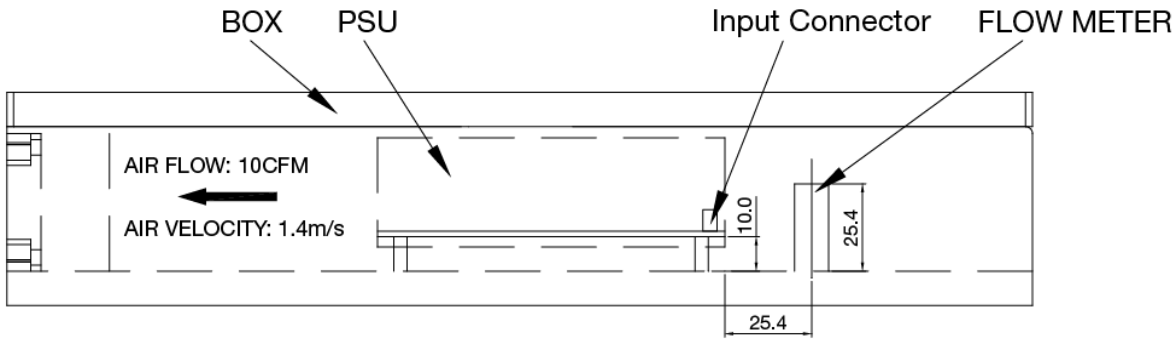
Engineering Data

Forced Cooling Air Flow Direction



De-rating

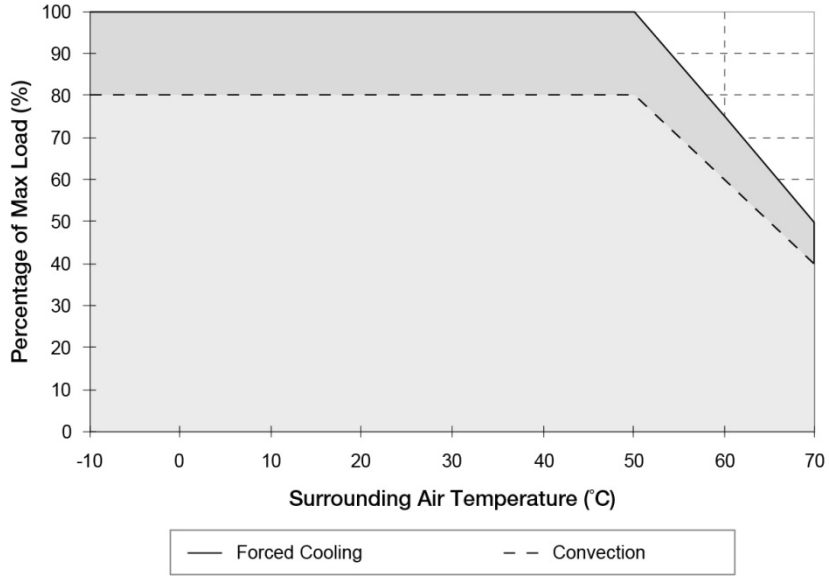


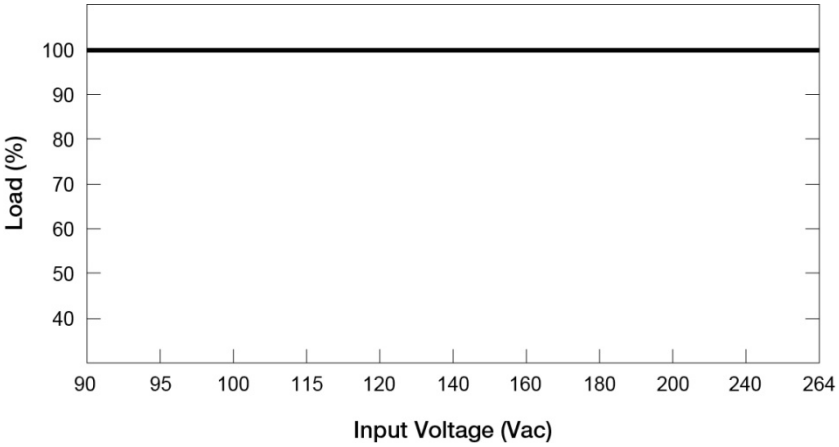
Fig. 1 De-rating for Horizontal Mounting Orientation

- **Convection:** > 50°C de-rate power by 2% / °C
- **Forced Cooling:** > 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** 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.

Base Mounting (Horizontal)

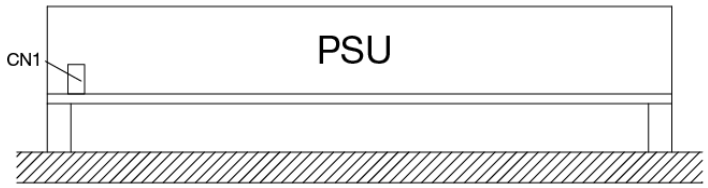
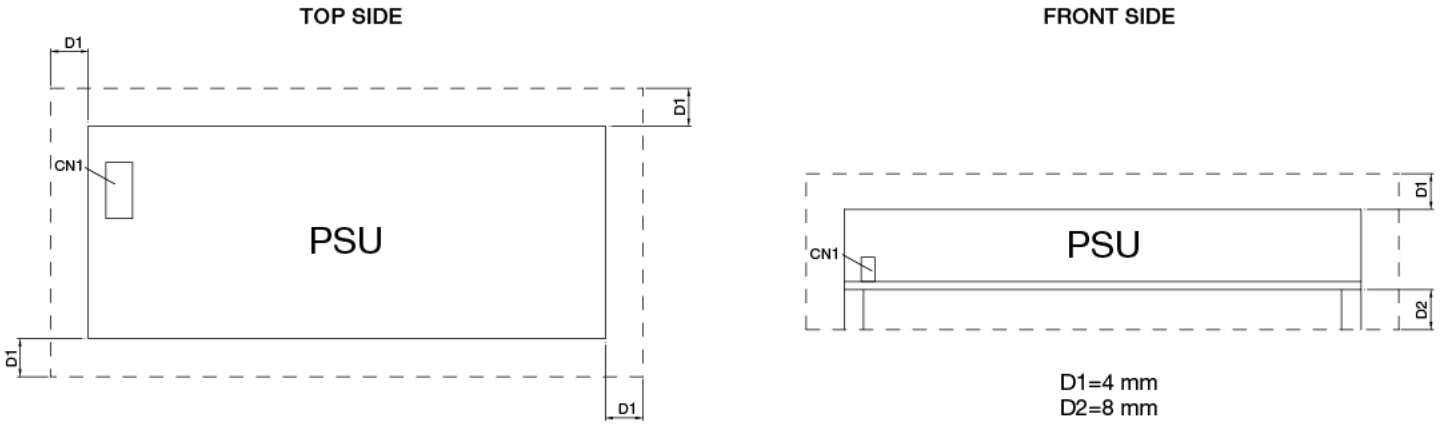


Fig. 2 Recommended Mounting Orientation



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 ≥ 4mm 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 ≥ 20mm 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 set value, after the input voltage is applied.

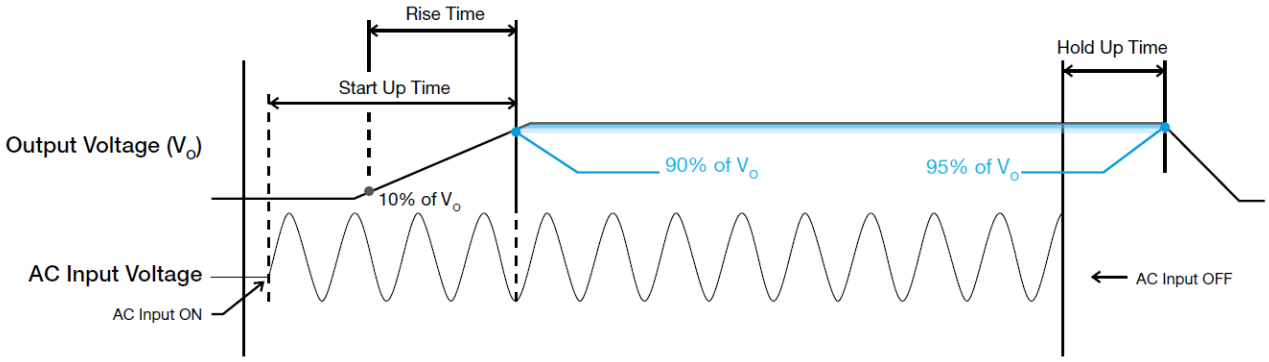
Rise Time

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

Hold-up Time

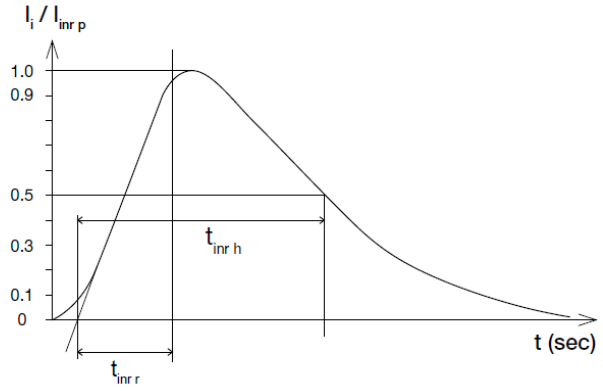
Hold up time is the time when the AC input collapses and output voltage retains regulation for a certain period of time. The time required for the output to reach 95% of its set value, after the input voltage is removed.

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



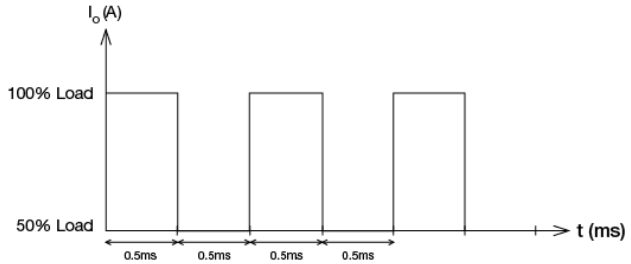
Inrush Current

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 ±5% of its steady state value, when subjected to a dynamic load from 50 to 100% of its rated current.



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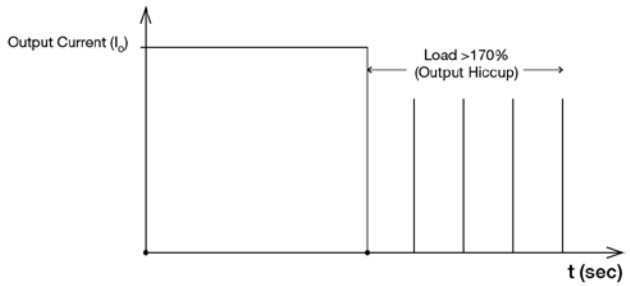
Overload & Overcurrent Protections

The power supply's Overload (OLP) and Overcurrent (OCP) Protections will be activated when output current exceeds 170% of I_O (Max load). In such occurrence, the V_O will start to droop and once the power supply has reached its maximum power limit, the protection is activated and the power supply will go into "Hiccup mode" (Auto-Recovery). The power supply will recover once the fault condition of the OLP and OCP is removed and I_O is back within the specifications.



It is not recommended to prolong the duration of I_O when it is <170% but >100%, since it may cause damage to the PSU.

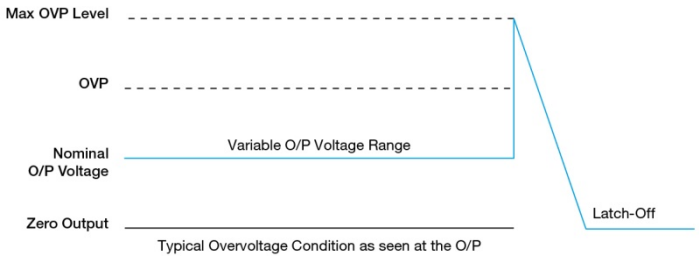
Short Circuit Protection

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.

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 3 under "Protections".

The power supply should be latch.



Over Temperature Protection

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.

PFC – Norm EN 61000-3-2

Line Current Harmonic content

Typically, the input current waveform is not sinusoidal due to the periodical peak charging of the input capacitor. In industrial environment, complying with EN 61000-3-2 is only necessary under special conditions. Complying to this standard can have some technical drawbacks, such as lower efficiency as well as some commercial aspects such as higher purchasing costs. Frequently, the user does not profit from fulfilling this standard, therefore, it is important to know whether it is mandatory to meet this standard for a specific application.