TECHNICAL DATASHEET

PMT Panel Mount Power Supply

24 V 50 W 1 Phase / PMT-24V50W1A☐☐



PMT

Highlights & Features

- Universal AC input voltage range
- Power will not de-rate from input voltage 90 Vac to 264 Vac
- High MTBF > 700,000 hrs per Telcordia SR-332
- Short Circuit / Overvoltage / Overload / Over Temperature Protections
- Versatile connector options (Terminal Block, Front Face, Harness)

Safety Standards

CB Certified for worldwide use

Model Number: PMT-24V50W1A☐☐
Unit Weight: 0.24 kg (0.53 lb)
Dimensions (L x W x H): 98 x 98 x 38 mm (3.86 x 3.86 x 1.50 inch)

General Description

The new PMT series of panel mount power supplies is the latest offering from one of the world's largest power supply manufacturers and solution providers - Delta. The first range of PMT products will offer a nominal output voltage of 24 V with a wide operating temperature range from -10°C to +70°C and can withstand shock and vibration requirements (in accordance to IEC 60068-2-27 and IEC 60068-2-6 respectively). In addition to features like overvoltage and overload protections, Delta's PMT series of panel mount power supplies is unlike many other brands in the same price level. The PMT series is designed for cost competitive markets without compromising the quality of the components and product specifications.

Model Information

PMT Panel Mount Power Supply

Model Number	Input Voltage Range	Rated Output Voltage	Rated Output Current
PMT-24V50W1A☐☐	85-264 Vac	24 Vdc	2.1 A

Model Numbering

							CC Code**
PM	**☐ –**	**24V**	**50W**	**1**	**A**	**☐**	**☐**
Panel Mount	Product Type T – Enclosed	Output Voltage	Output Power	Single Phase	No PFC	Connector Type A – Terminal Block G – Front Face* H – Harness*	Blank – Without connector cover A – With connector cover B – With conformal coating

*Options
**For Enclosed type with Terminal Block



A G H

All parameters are specified at 25°C ambient and AC input unless otherwise indicated.
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Specifications

Input Ratings / Characteristics

Nominal Input Voltage	100-240 Vac
Input Voltage Range	85-264 Vac
Nominal Input Frequency	50-60 Hz
Input Frequency Range	47-63 Hz
Input Current	< 1.10 A @ 115 Vac, < 0.65 A @ 230 Vac
Efficiency at 100% Load	> 86.0% @ 115 Vac & 230 Vac
Max Inrush Current (Cold Start)	< 30 A @ 115 Vac, < 60 A @ 230 Vac
Leakage Current	< 1 mA @ 240 Vac

Output Ratings / Characteristics*

Nominal Output Voltage	24 Vdc
Factory Set Point Tolerance	24 Vdc ± 2%
Output Voltage Adjustment Range	22-28V dc
Output Current	2.1 A (50 W max.)
Output Power	50 W
Line Regulation	< 0.5% typ. (@ 85-264 Vac input, 100% input)
Load Regulation	< 1% typ. (@ 85-264 Vac input, 0-100% input)
PARD** (20 MHz)	< 100 mVpp @ 0°C to 50°C, < 150 mVpp @ -10°C to 0°C
Rise Time	< 30 ms @ nominal input (100% load)
Start-up Time	< 2500 ms @ nominal input (100% load)
Hold-up Time	> 16.7 ms @ 115Vac (100% load)
Dynamic Response (Overshoot & Undershoot O/P Voltage)	± 5% @ 0-100% load (Slew Rate: 0.1 A/μS)
Start-up with Capacitive Loads	8,000 μF Max

*For power de-rating from 50°C to 70°C, see power de-rating on page 3.
**PARD is measured with an AC coupling mode, 5 cm wires, and in parallel with 0.1 μF ceramic capacitor & 47 μF electrolytic capacitor.

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Mechanical

Case Chassis / Cover		Aluminium / SGCC
Dimensions (L x W x H)		98 x 98 x 38 mm (3.86 x 3.86 x 1.50 inch)
Unit Weight		0.24 kg (0.53 lb)
Indicator		Green LED (DC OK)
Cooling System		Convection
Terminal	PM☐-24V50W1AA☐	M3.5 x 5 Pins (Rated 300 V/15 A)
	PM☐-24V50W1AG	M3.5 x 5 Pins (Rated 300 V/20 A)
	PM☐-24V50W1AH	I/P (JST): B3P5-VH(LF)(SN) O/P (JST): B2P3-VH(LF)(SN)
Wire	PM☐-24V50W1AA☐	AWG 22-12
	PM☐-24V50W1AG	AWG 22-12
	PM☐-24V50W1AH	AWG 22-18 (For the recommended Mating Connector and Terminal, please refer to the Table on Page 12)
Noise (1 Meter from power supply)		Sound Pressure Level (SPL) < 25 dBA

Environment

Surrounding Air Temperature	Operating	-10°C to +70°C
	Storage	-25°C to +85°C
Power De-rating		> 50°C de-rate power by 2.5% / °C
Operating Humidity		5 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: 50 G for a duration of 11 ms, 3 shocks for each 3 directions
Vibration	Non-Operating	IEC 60068-2-6, Random: 5 Hz to 500 Hz (2.09 Grms); 20 min per axis for all X, Y, Z direction
Over Voltage Category		II
Pollution Degree		2

Protections

Overvoltage	< 32 V, ±10%, SELV Output, Hiccup Mode, Non-Latching (Auto-Recovery)
Overload / Overcurrent	> 120% 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)
Internal Fuse at L pin	T3.15AH
Protection Against Shock	Class I with PE* connection

*PE: Primary Earth

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Reliability Data

MTBF	> 700,000 hrs as per Telcordia SR-332 I/P: 100 Vac, O/P: 100% Load, Ta: 35°C)
Expected Cap Life Time	10 years (115 Vac & 230 Vac, 50% load @ 40°C)

Safety Standards / Directives

Safety Entry Low Voltage		SELV
Electrical Safety	TUV Bauart	EN 60950-1, EN 62368-1
	UL/cUL recognized	UL 60950-1 and CSA C22.2 No. 60950-1 (File No. E131881) UL 62368-1 and CSA C22.2 No. 62368-1 (File No. E131881)
	CB Scheme	IEC 60950-1, IEC 62368-1
CE		In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU
UKCA		In conformance with Electromagnetic Compatibility Regulations 2016 and Electrical Equipment (Safety) Regulations 2016
Galvanic Isolation	Input to Output	3.0 KVac
	Input to Ground	1.5 KVac
	Output to Ground	0.5 KVac

EMC

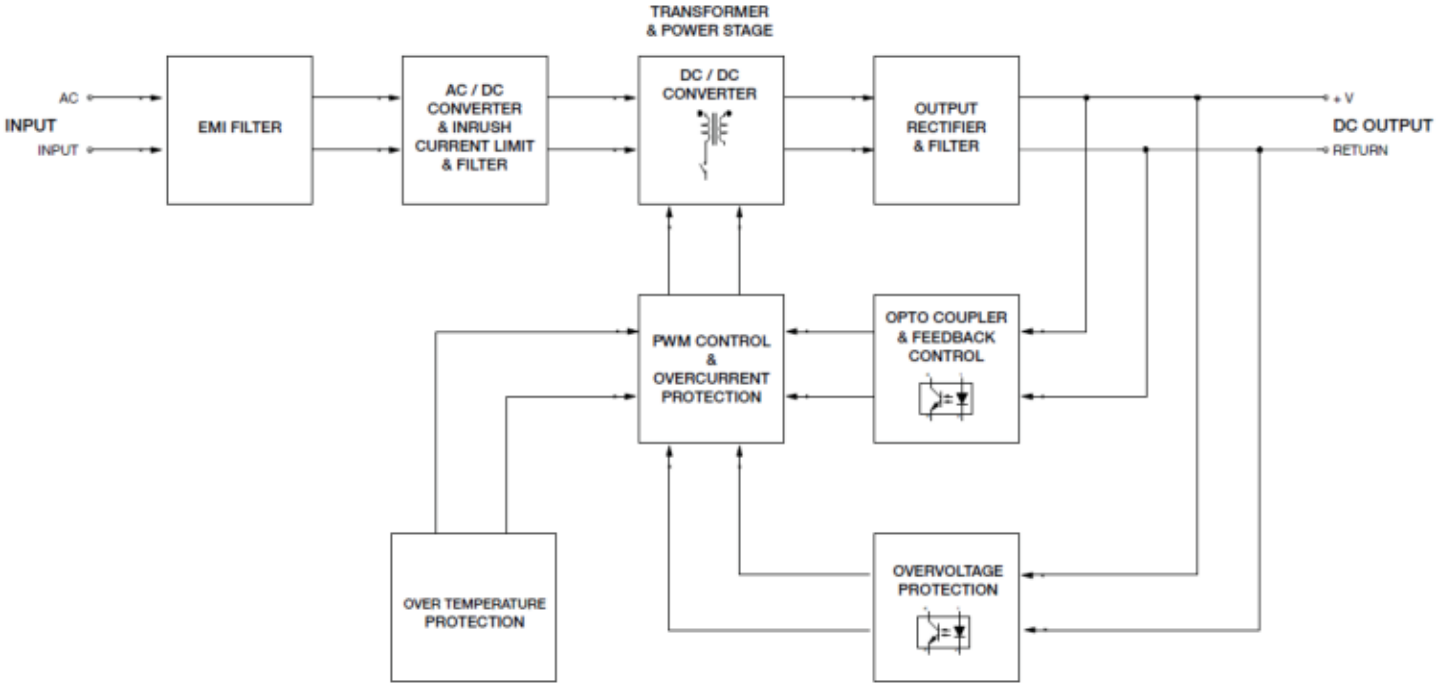
Emissions (CE & RE)		CISPR 32, EN/BS EN 55032, FCC Title 47: Class B
Immunity		EN/BS EN 55024
Electrostatic Discharge	IEC 61000-4-2	Level 4 Criteria A[1)] Air Discharge: 15 kV Contact Discharge: 8 kV
Radiated Field	IEC 61000-4-3	Level 3 Criteria A[1)] 80 MHz-1 GHz, 10 V/M with 1 kHz tone / 80% modulation
Electrical Fast Transient / Burst	IEC 61000-4-4	Level 3 Criteria A[1)] 2 kV
Surge	IEC 61000-4-5	Level 3 Criteria A[1)] Common Mode[2)]: 2 kV Differential Mode[3)]: 1 kV
Conducted	IEC 61000-4-6	Level 3 Criteria A[1)] 150 kHz-80 MHz, 10 Vrms
Power Frequency Magnetic Fields	IEC 61000-4-8	Criteria A[1)] 10 A/Meter
Voltage Dips and Interruptions	IEC 61000-4-11	100% dip; 1 cycle (20 ms); Self Recoverable
Low Energy Pulse Test (Ring Wave)	IEC 61000-4-12	Level 3 Criteria A[1)] Common Mode[2)]: 2 kV Differential Mode[3)]: 1 kV

1) Criteria A: Normal performance within the specification limits
2) Asymmetrical: Common mode (Line to earth)
3) Symmetrical: Differential mode (Line to line)

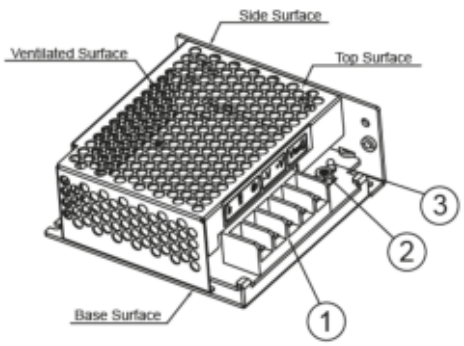
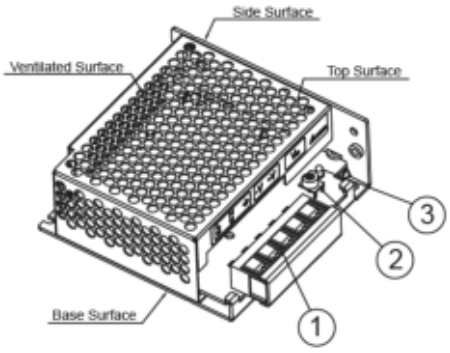
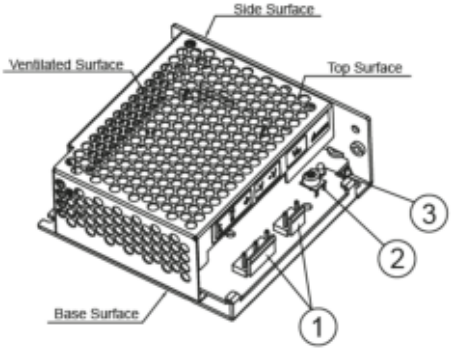
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Block Diagram



Device Descriptions

PMT-24V50W1AA☐: Terminal Block	**PMT-24V50W1AG:** Front Face	**PMT-24V50W1AH:** Harness
		

1) Input & Output terminal block connector
2) DC voltage adjustment potentiometer
3) DC OK control LED (Green)

All parameters are specified at 25°C ambient and AC input unless otherwise indicated.
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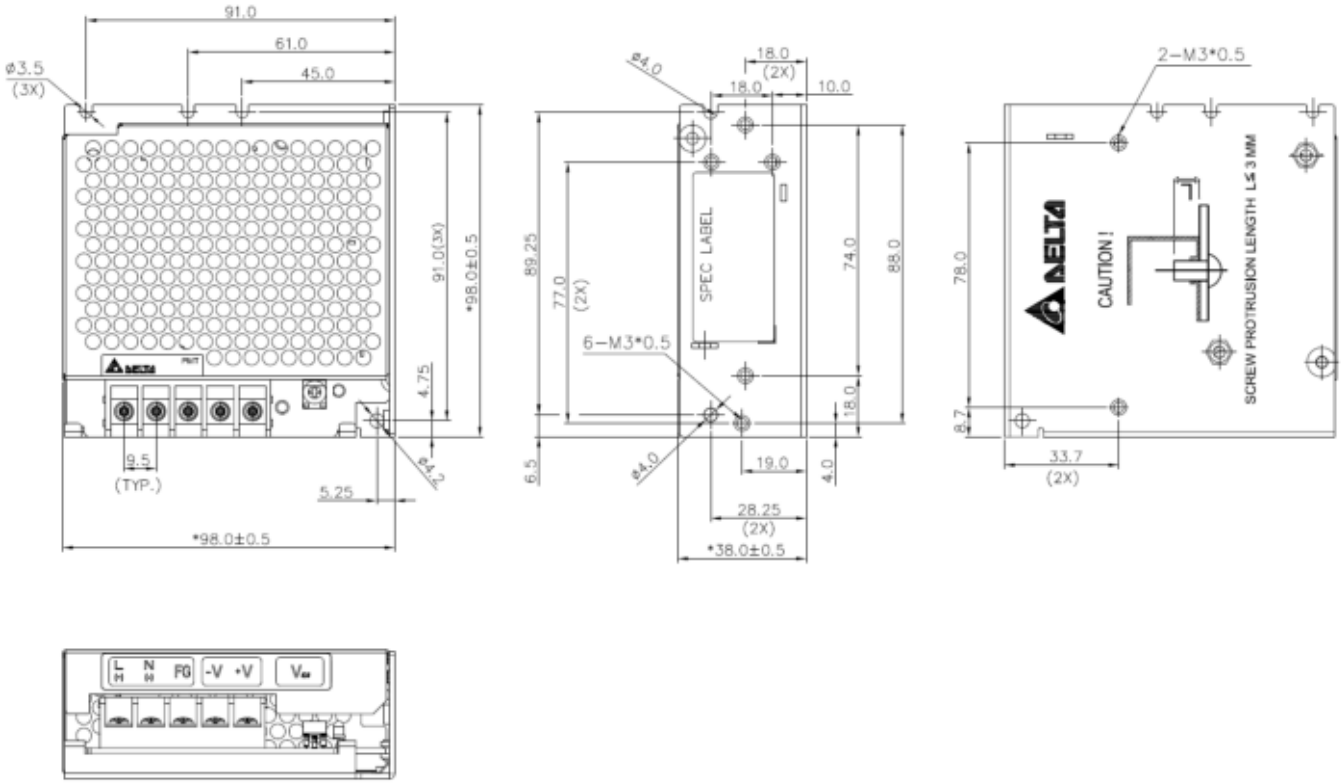
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Dimensions

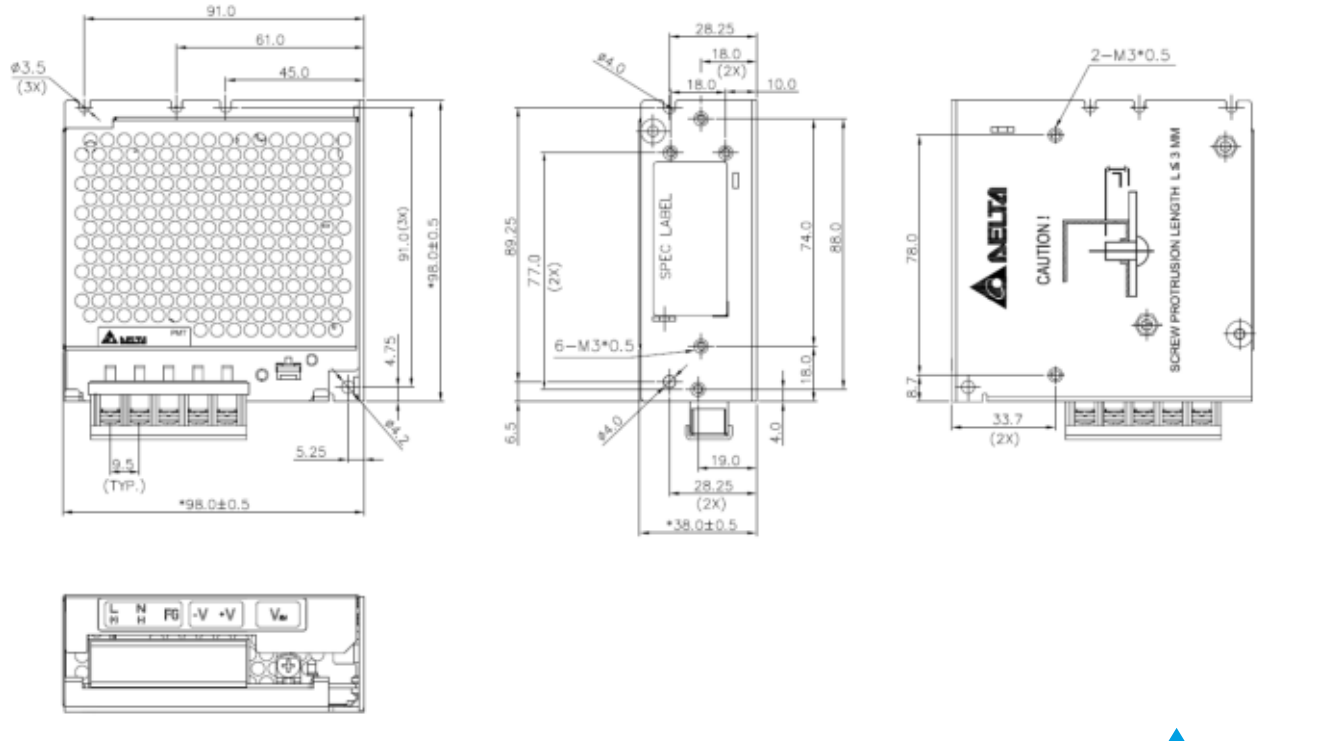
PMT-24V50W1AA☐: Terminal Block

L x W x H: 98 x 98 x 38 mm (3.86 x 3.86 x 1.50 inch)



PMT-24V50W1AG: Front Face

L x W x H: 98 x 98 x 38 mm (3.86 x 3.86 x 1.50 inch)



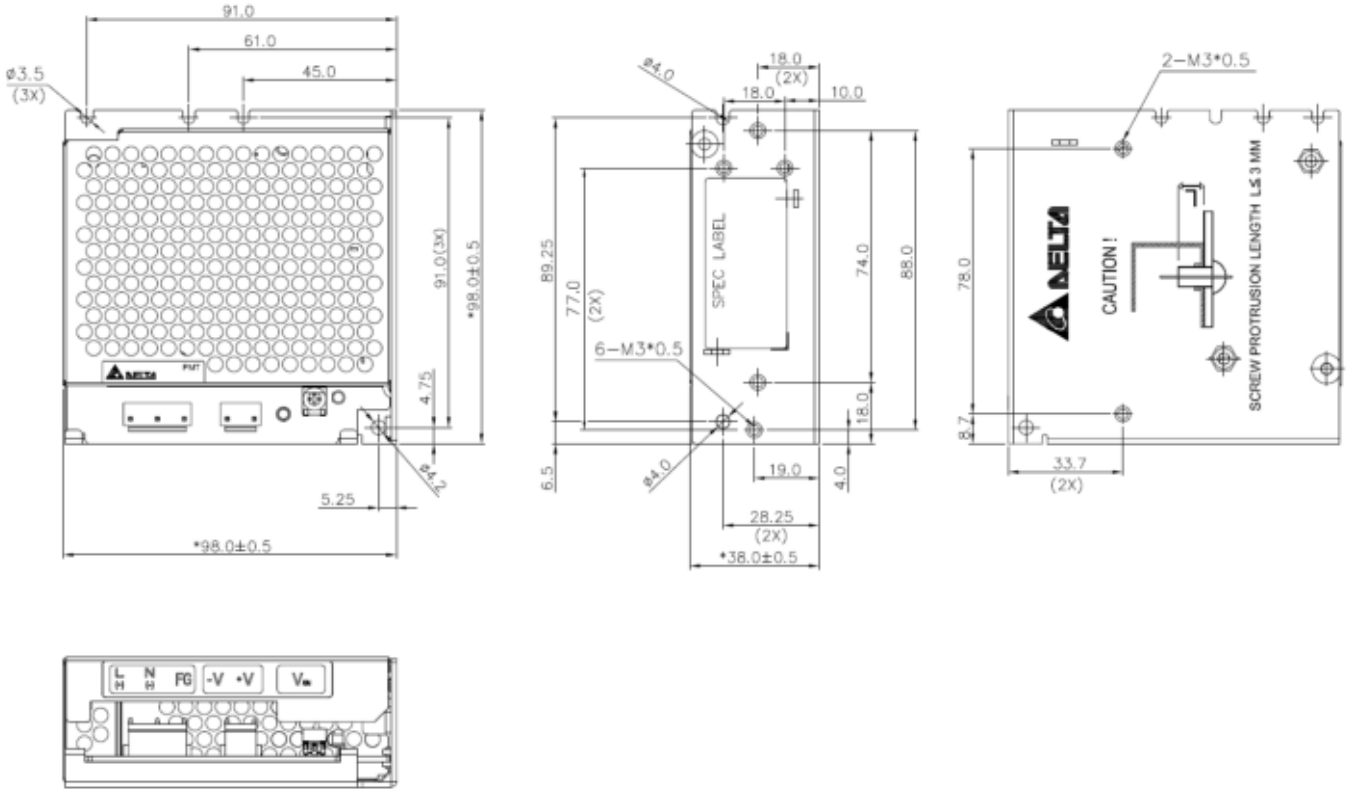
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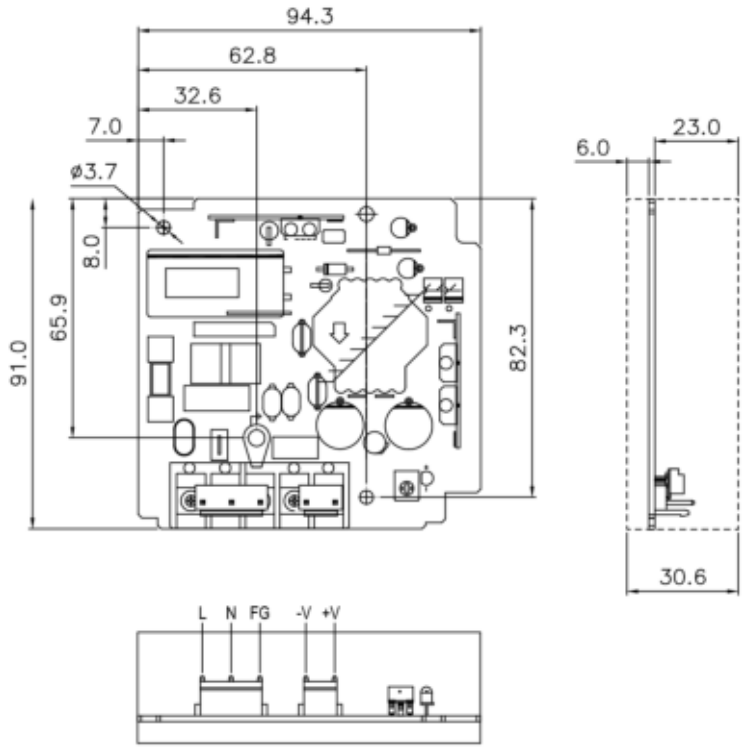
PMT Panel Mount Power Supply

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PMT-24V50W1AH: Harness

L x W x H: 98 x 98 x 38 mm (3.86 x 3.86 x 1.50 inch)





All parameters are specified at 25°C ambient and AC input unless otherwise indicated.

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Engineering Data

Output Load De-rating VS Surrounding Air Temperature

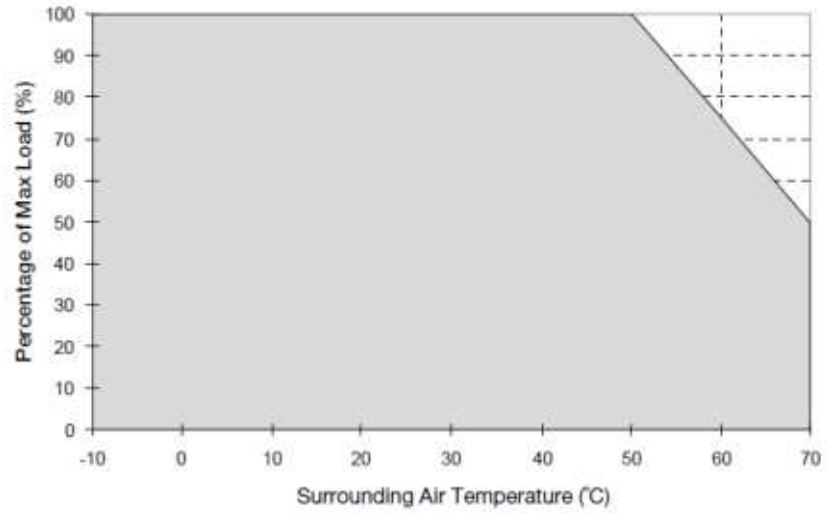
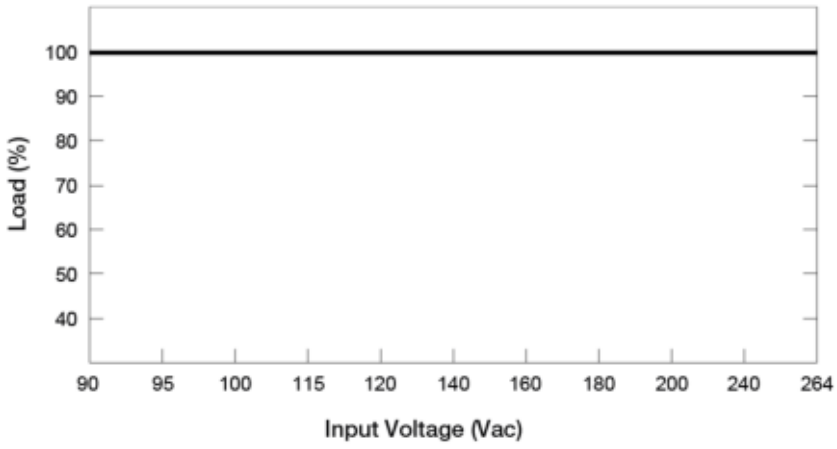


Fig. 1 De-rating for Vertical and Horizontal Mounting Orientation
> 50°C de-rate power by 2.5% / °C

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 exceeds its specification as defined on Page 3 under "Environment", 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. In order for the device to function in the manner intended, it is also necessary to keep a safety distance of 20 mm (0.79 inch) with adjacent units while the device is in operation.
4. Depending on the surrounding air temperature and output load delivered by the power supply, the device can be very hot!
5. If the device has to be mounted in any other orientation, please contact **info@deltapsu.com** for more details.

Output Load De-rating VS Input Voltage



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

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Assembly & Installation

Ⓐ Mounting holes for power supply (device). The power supply shall be mounted on minimum 2 mounting holes using M3 screw minimum 5 mm (0.20 inch) length.
Ⓑ This surface belongs to customer's end system or panel where the power supply is mounted.
Ⓒ Connector

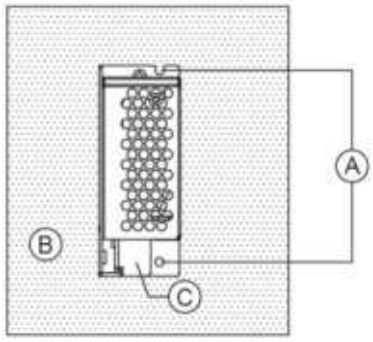
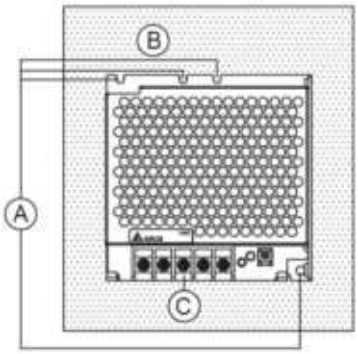
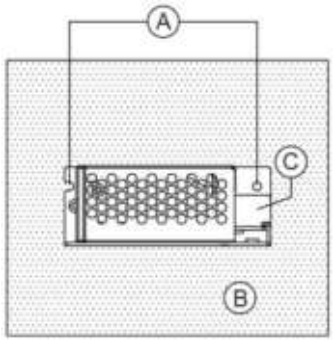
Side Mounting (Vertical)	Base Mounting (Vertical)	Side Mounting (Horizontal)
		

Fig. 2 Recommended Mounting Orientations

Ensure the mounted device is kept at ≥ 4 mm (0.16 inch) safety distance at all sides from other components and equipments. In addition, to ensure sufficient convection cooling, always maintain a distance of ≥ 20mm (0.79 inch) from ventilated surfaces while the device is in operation.

- **PM☐-24V50W1AA☐ / PM☐-24V50W1AG:** Use flexible cable (stranded or solid) of AWG No. 22-12. User should calculate and select the suitable wire specification (type/quantity/diameter) according to actual output current. The torque at the Connector shall not exceed 13 Kgf.cm (11.23 lbf.in). The insulation stripping length should not exceed 0.275" or 7 mm (Refer to Fig. 3).
- **PM☐-24V50W1AH:** Please refer the table below for the recommended mating connector, terminal and AWG wire size.

	Header (Board Mounting)	Mating Connector	Terminal	AWG
Input (JST)	B3P5-VH(LF)(SN)	VHR-5N	SVH-21T-P1.1	22-18
Output (JST)	B2P3-VH(LF)(SN)	VHR-3N		

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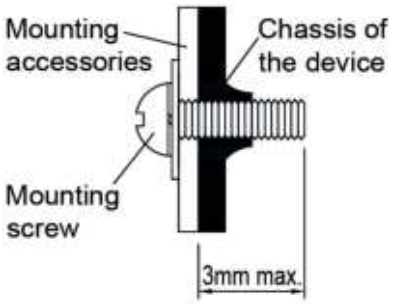


Fig. 4 Mounting Screw

- **For PMT Series (Refer to Fig. 4):** Only use M3 screw ≤ 3 mm (0.12 inch) through the base mounting holes. This is to keep a safe distance between the screw and internal components. Recommended mounting tightening torque: 4~7 Kgf.cm (3.47~6.08 lbf.in).

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.
- 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 surface.
- Warning (For Standard Terminal Block and Front Face Terminal Block products): When connecting the device, secure Earth connection before connecting L and N. When disconnecting the device, remove L and N connections before removing the Earth connection.

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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.

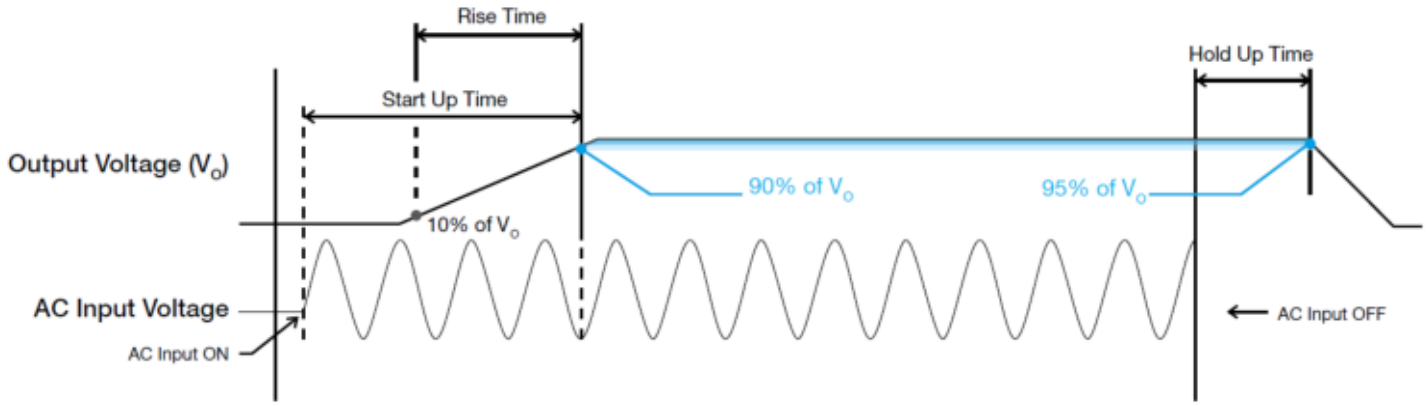
Rise Time

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

Hold-up Time

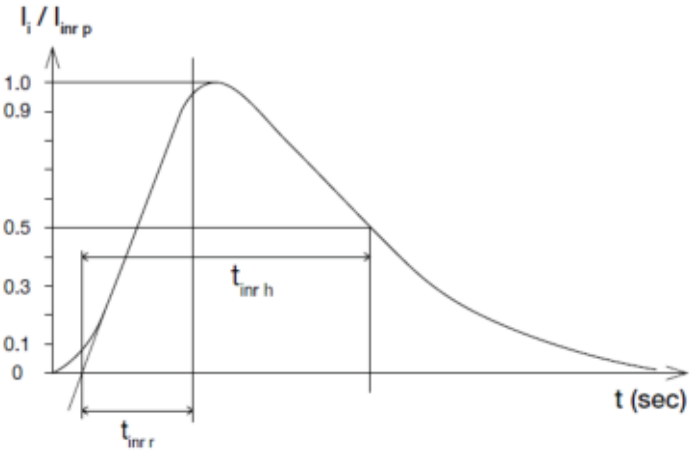
Time between the collapse of the AC input voltage, and the output falling to 95% of its steady state set value.

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



Inrush Current

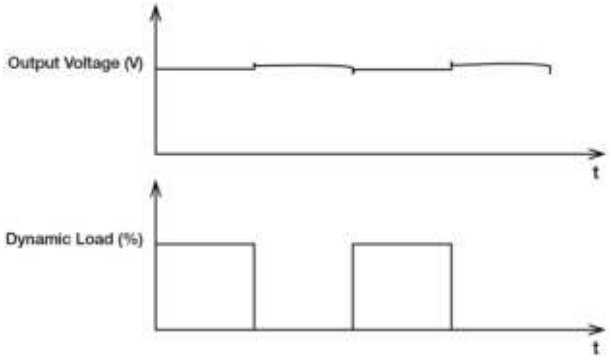
Inrush current is the peak, instantaneous, input current measured and, occurs when the input voltage is first applied. For AC input voltages, the maximum peak value of inrush current will occur during the first half cycle of the applied AC voltage. This peak value decreases exponentially during subsequent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



Dynamic Response

The power supply output voltage will remains within ±5% of its steady state value, when subjected to a dynamic load from 0 to 100% of its rated current.

50% duty cycle / 5 Hz to 100 Hz

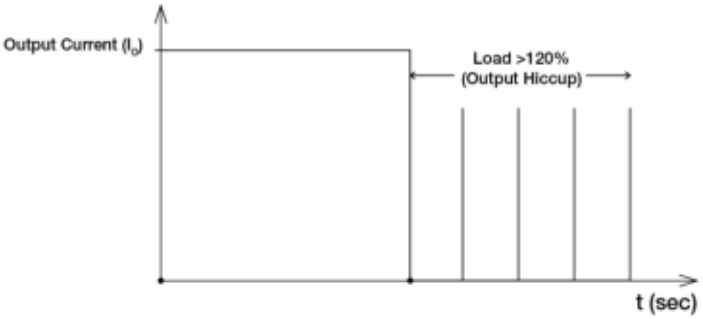


PMT Panel Mount Power Supply

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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 120% 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 <120% 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 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 (Auto-Recovery)

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".



Over Temperature Protection (Auto-Recovery)

As described in load de-rating section, 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.

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Operating Mode

■ Redundant Operation

In order to ensure proper redundancy operation for the power supply unit (PSU), ensure that the output voltage difference between the two units is kept at 0.45~0.50 V for 24 V supplies. Follow simple steps given below to set them up for the redundant operation:

Step 1.
Measure output voltage of PSU 1 and PSU 2. If PSU 1 is the master unit, then V_O of PSU 1 must be higher than PSU 2. In order to set the output voltage, individually connect the power supply to 50% of rated load, and set the PSU 1 and PSU 2 output voltage.

Step 2.
Connect the power supply units PSU 1 and PSU 2 to Vin 1 & Vin 2, respectively, of the DRR-20N (or 20A) module shown on the diagram on the right.

Step 3.
Connect the system load from V_{out}. Please note that output voltage V_{out} from DRR module will be = V_O (output voltage of power supply) – V_{drop}* (in DRR module).

*V_{drop} will vary from 0.60V to 0.90V (Typical 0.65V) depending on the load current and surrounding air temperature.

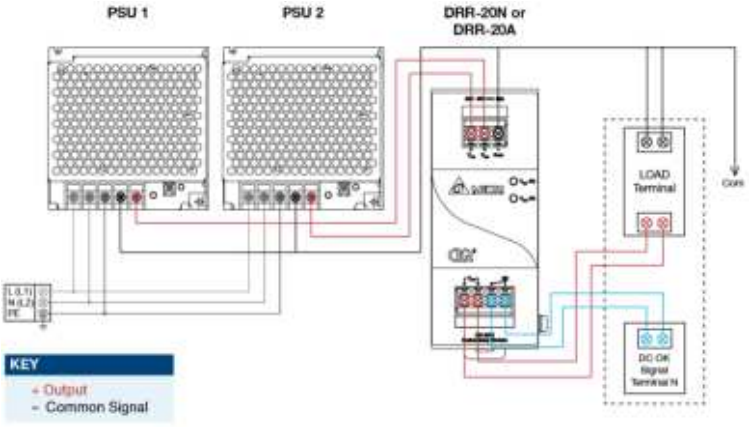


Fig. 5 Redundant Operation Connection Diagram

■ Parallel Operation

The power supply units (PSUs) can also be used for parallel operation in order to increase the output power. The difference in output voltage between the two units must be kept to within 25mV of each other. This difference must be verified with the same output load connected independently to each unit.

Parameters such as EMI, inrush current, leakage current, PARD, start up time will be different from those on the datasheet, when two units are connected in parallel. The user will need to verify that any differences will still allow the two power supplies connected in parallel will work properly in their product/application.

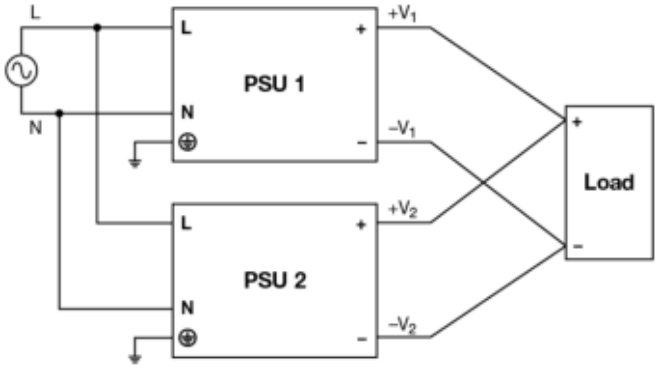


Fig. 6 Parallel Operation Connection Diagram

All parameters are specified at 25°C ambient and AC input unless otherwise indicated.

PMT Panel Mount Power Supply
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Others

Attention

Delta provides all information in the datasheets on an “AS IS” basis and does not offer any kind of warranty through the information for using the product. In the event of any discrepancy between the information in the catalog and datasheets, the datasheets shall prevail (please refer to www.DeltaPSU.com for the latest datasheets information). Delta shall have no liability of indemnification for any claim or action arising from any error for the provided information in the datasheets. Customer shall take its responsibility for evaluation of using the product before placing an order with Delta.

Delta reserves the right to make changes to the information described in the datasheets without notice.

Manufacturer and Authorized Representatives Information

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East Kilbride, Glasgow, G74 5PF, United Kingdom