

PMC Panel Mount Power Supply

24V 300W 1 Phase / PMC-24V300W1BA

PMC

Highlights & Features

- Universal AC input voltage range
- Full corrosion resistant aluminium casing
- High PF > 0.99 @ 115Vac
- Built-in Remote On/Off and 12V SB (STANDBY) / 0.5A
- High MTBF > 700,000 hrs per Telcordia SR-332
- Safety approval according to IEC/EN/UL 60950-1, IEC/EN/UL 62368-1 and EMI to EN 55032, Class B
- Overvoltage / Overcurrent / Over Temperature Protections
- IP20 certified

Safety Standards



CB Certified for worldwide use

Model Number: PMC-24V300W1BA
Unit Weight: 0.82 kg (1.81 lb)
Dimensions (L x W x H): 199 x 105 x 41 mm
 (7.83 x 4.13 x 1.61 inch)

General Description

The Hi-End Panel Mount Power Supply with Remote sense function & 12V STANDBY / 0.5A is the latest offering from one of the world's largest power supply manufacturers and solution providers - Delta. The product range offers a nominal output voltage of 24V, a wide temperature range from -10°C to +70°C and a highly dependable minimum holdup time. The state-of-the-art design is made to withstand harsh industrial environments. What makes the product stands out from the crowd is its lightweight full aluminum body design which can withstand shock and vibration according to IEC60068-2. The PMC series also offers overvoltage and overload protection. Using a wide input voltage range design, it is compatible worldwide. The input also includes DC operating voltage from 125-375Vdc. Best of all, this excellent design and quality does not come with a big price tag.

Model Information

PMC Panel Mount Power Supply

Model Number	Input Voltage Range	Rated Output Voltage	Rated Output Current
PMC-24V300W1BA	85-264Vac (125-375Vdc)	24Vdc	V1: 12.5A, V2 SB: 0.50A

Model Numbering

PMC	24V	300W	1	B	A
PMC Series	Output Voltage	Output Power	Single Phase	With PFC	IP20 Connector

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Specifications

Input Ratings / Characteristics

Nominal Input Voltage	100-240Vac
Input Voltage Range	85-264Vac
Nominal Input Frequency	50-60Hz
Input Frequency Range	47-63Hz
Nominal DC Input Voltage	125-250Vdc
DC Input Voltage Range*	125-375Vdc
Input Current	< 4.0A @ 115Vac, < 2.0A @ 230Vac
Efficiency at 100% Load	> 86% @ 115Vac, > 88% @ 230Vac
Max Power Dissipation	0% load < 4.4W @ 115Vac & < 4.0W @ 230Vac
	100% load < 49W @ 115Vac & < 38W @ 230Vac
Max Inrush Current (Cold Start)	< 35A @ 115Vac, < 70A @ 230Vac
Power Factor at 100% Load	>0.99 @ 115Vac , > 0.97 @ 230Vac
Leakage Current	< 1mA @ 240Vac

*Fulfills test conditions for DC input. Safety approval for DC input can be obtained upon request.

Output Ratings / Characteristics**

Nominal Output Voltage	V1: 24Vdc, V2 SB: 12Vdc
Factory Set Point Tolerance	V1: 24Vdc \pm 2%
Output Voltage Adjustment Range	V1: 22-28Vdc
Output Current	V1: 0-12.5A, V2 SB: 0-0.50A (306W max.)
Output Power	306W
Line Regulation	< 0.5% (@ 85 to 264Vac input, 100% load)
Load Regulation	< 1% (@ 85 to 264Vac input, 0-100% load)
PARD*** (20MHz)	V1: <100mVpp , V2 SB: <200mVpp
Rise Time	< 30ms @ nominal input (100% load)
Start-up Time	< 1,000ms @ nominal input (100% load)
Hold-up Time	> 15ms @ nominal input, 100% load
Dynamic Response (Overshoot & Undershoot O/P Voltage)	\pm 5% @ 85-264Vac input, 0-100% load (Slew Rate: 0.1A/ μ S, 50% duty cycle @ 5Hz)
Start-up with Capacitive Loads	8,000 μ F 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, 5cm wires, and in parallel with 0.1 μ F ceramic capacitor & 47 μ F electrolytic capacitor.

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24V 300W 1 Phase / PMC-24V300W1BA

Mechanical

Case Cover			Aluminium
Dimensions (L x W x H)			199 x 105 x 41 mm (7.83 x 4.13 x 1.61 inch)
Unit Weight			0.82 kg (1.81 lb)
LED Indicator	Green LED		DC OK
Cooling System			Forced Cooling (Built-in Fan)
Terminal	CN1	Input and Output	M3.5 x 7 Pins (Rated 300Vac/20A)
	CN2	Power Supply Header	JST: S8B-PHDSS(LF)(SN)
		Mating Connector	JST: PHDR-08VS or equivalent
		Terminal	JST: SPHD-001T-P0.5 (x8) or equivalent
Wire	CN1	Input and Output	AWG 18-16
	CN2	Mating Connector	AWG 24
Noise (1 Meter from power supply)			Sound Pressure Level (SPL) < 40dBA

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 3,000 Meters (9,840 ft.)	
Shock Test	Non-Operating	IEC60068-2-27, 30G (300m/S ²) for a duration of 18ms 3 times per direction, 18 times in total
Vibration	Non-Operating	IEC60068-2-6, 10Hz to 150Hz @ 50m/S ² (5G peak); 20 min per axis for all X, Y, Z direction
Bump	Operating	IEC 60068-2-29, 10G (100m/S ²) for a duration of 11ms, 1000 times per direction, 6000 times in total
Over Voltage Category	II	
Pollution Degree	2	

Protections

Overvoltage	V1: < 32V ±10%, V2 SB: < 16V ±15%, SELV output, Hiccup Mode, Non-Latching (Auto-Recovery).
Overload / Overcurrent	> 120% of rated load current, Hiccup Mode, Non-Latching (Auto-Recovery).
Over Temperature	< 75°C Ambient Temp@ 100% load, Non-Latching (Auto-Recovery).
Short Circuit	Hiccup Mode, Non-Latching (Auto-recovery when the fault is removed).
Internal Fuse at L pin	T6.3AH
Degree of Protection	IP20
Protection Against Shock	Class I with PE* connection

*PE: Primary Earth

PMC Panel Mount Power Supply

24V 300W 1 Phase / PMC-24V300W1BA

Reliability Data

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

Safety Standards / Directives

Safety Entry Low Voltage		SELV (EN 60950-1)
Electrical Safety	SIQ Bauart	EN 60950-1, EN 62368-1
	UL/cUL recognized	UL 60950-1 and CSA C22.2 No. 60950-1 (File No. E191395) UL 62368-1 and CSA C22.2 No. 62368-1 (File No. E191395)
	CCC	GB4943
	CB scheme	IEC 60950-1, IEC 62368-1
CE		In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU
Galvanic Isolation	Input to Output	3.0 KVac
	Input to Ground	1.5 KVac
	Output to Ground	0.5 KVac

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24V 300W 1 Phase / PMC-24V300W1BA

EMC

Emissions (CE & RE)		Generic Standards: CISPR32, EN55032, FCC Title 47: Class B, GB9254	
Immunity		Generic Standards: EN 55024	
Electrostatic Discharge	IEC61000-4-2	Level 4 Criteria A ¹⁾ Air Discharge: 15kV Contact Discharge: 8kV	
Radiated Field	IEC61000-4-3	Level 3 Criteria A ¹⁾ 80MHz-1GHz, 10V/M with 1kHz tone / 80% modulation	
Electrical Fast Transient / Burst	IEC61000-4-4	Level 3 Criteria A ¹⁾ 2kV	
Surge	IEC61000-4-5	Level 3 Criteria A ¹⁾ Common Mode ²⁾ : 2kV Differential Mode ³⁾ : 1kV	
Conducted	IEC61000-4-6	Level 3 Criteria A ¹⁾ 150kHz-80MHz, 10Vrms	
Power Frequency Magnetic Fields	IEC61000-4-8	Criteria A ¹⁾ 10A/Meter	
Voltage Dips and Interruptions	IEC61000-4-11	0% of 100Vac, 20ms 40% of 100Vac, 200ms 70% of 100Vac, 500ms 0% of 100Vac, 5000ms 0% of 240Vac, 20ms 40% of 240Vac, 200ms 70% of 240Vac, 500ms 0% of 240Vac, 5000ms	Criteria A ¹⁾ Criteria B ²⁾ Criteria A ¹⁾ Criteria B ²⁾ Criteria A ¹⁾ Criteria B ²⁾ Criteria A ¹⁾ Criteria B ²⁾
Low Energy Pulse Test (Ring Wave)	IEC61000-4-12	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) Criteria B: Temporary degradation or loss of function which is self-recoverable

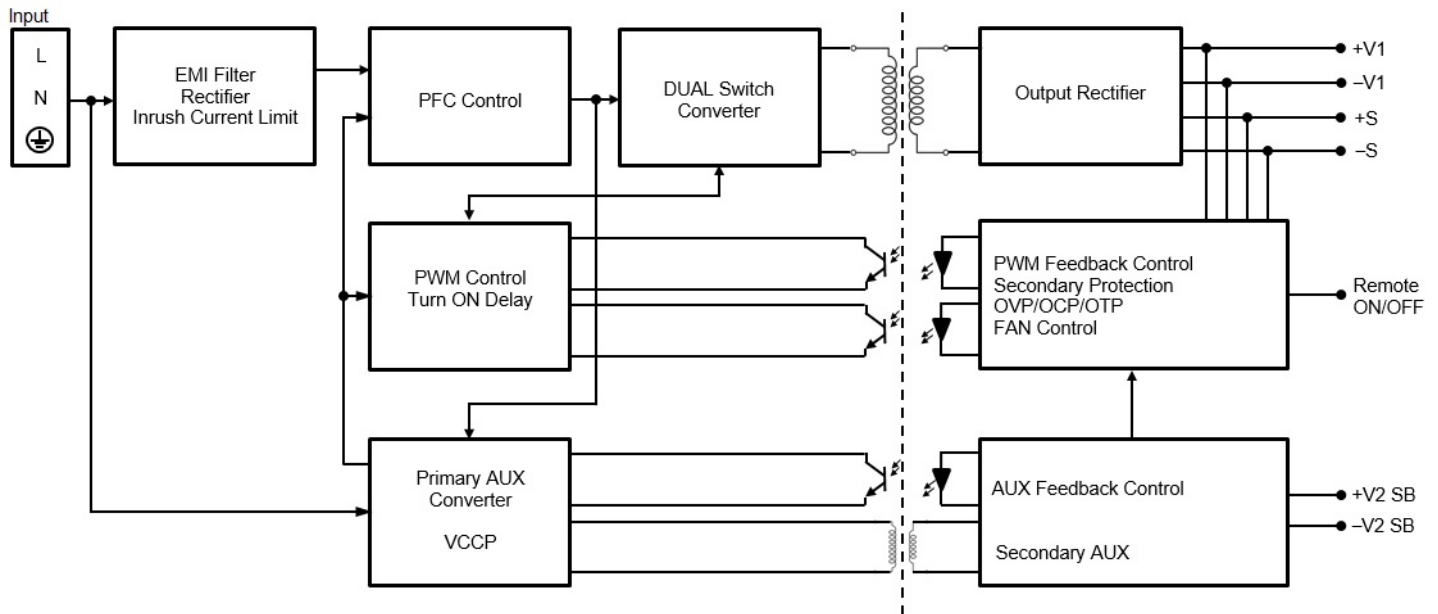
3) Asymmetrical: Common mode (Line to earth)

4) Symmetrical: Differential mode (Line to line)

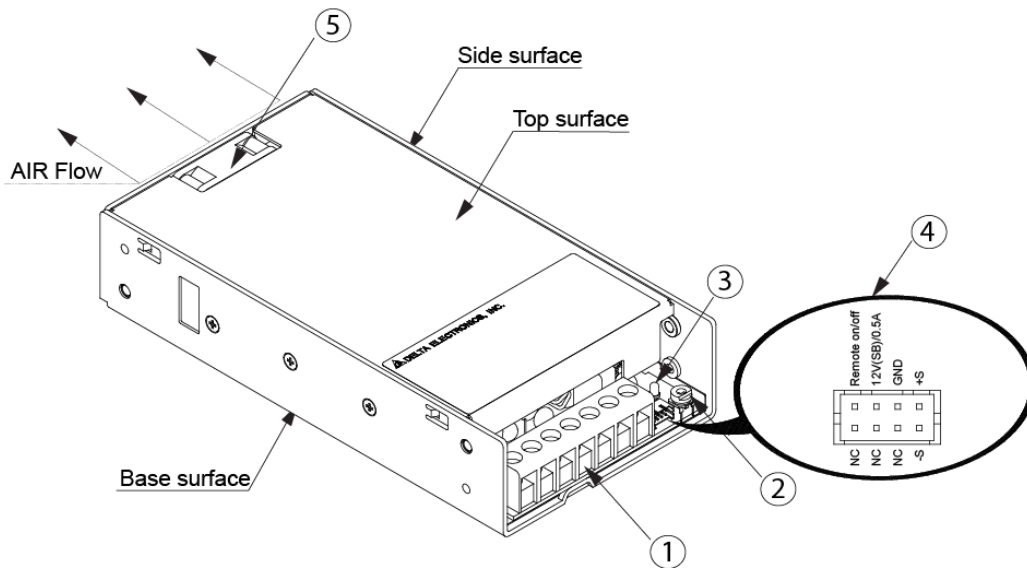
PMC Panel Mount Power Supply

24V 300W 1 Phase / PMC-24V300W1BA

Block Diagram



Device Description



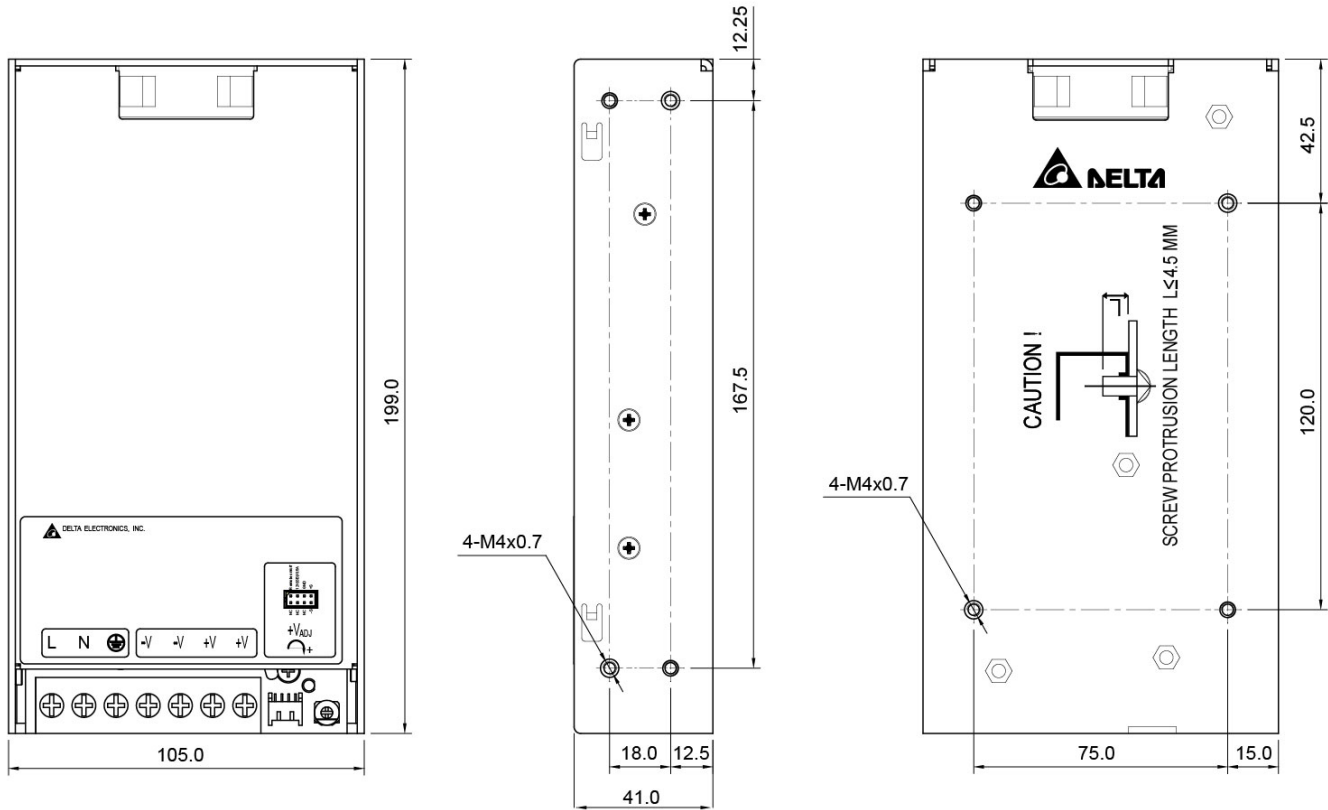
- 1) Input & Output IP20 connector
- 2) DC Voltage adjustment potentiometer
- 3) DC OK control LED (Green)
- 4) CN2: Remote Sense Function & 12V STANDBY / 0.5A
- 5) DC Fan and Air flow direction

PMC Panel Mount Power Supply

24V 300W 1 Phase / PMC-24V300W1BA

Dimensions

L x W x H: 199 x 105 x 41 mm (7.83 x 4.13 x 1.61 inch)



Engineering Data

Output Load De-rating VS Surrounding Air Temperature

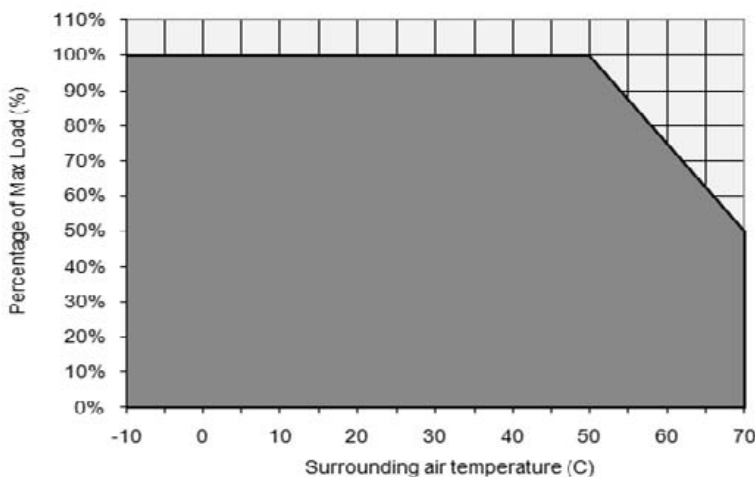


Fig. 1 De-rating for Vertical and Horizontal Mounting Orientation
 > 50°C de-rate power by 2.5% / °C

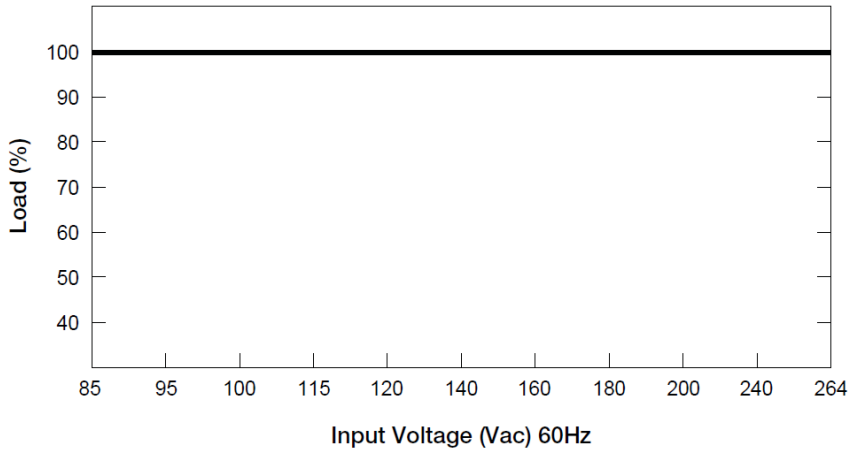
Note

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 may 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 as recommended in the safety instructions 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.

PMC Panel Mount Power Supply

24V 300W 1 Phase / PMC-24V300W1BA

Output Load De-rating VS Input Voltage



■ No output power de-rating across the entire input voltage range

Assembly & Installation

Mounting

- Ⓐ Mounting holes
- Ⓑ Input / Output connector
- Ⓒ Mounting surface (customer system)
- Ⓓ DC FAN

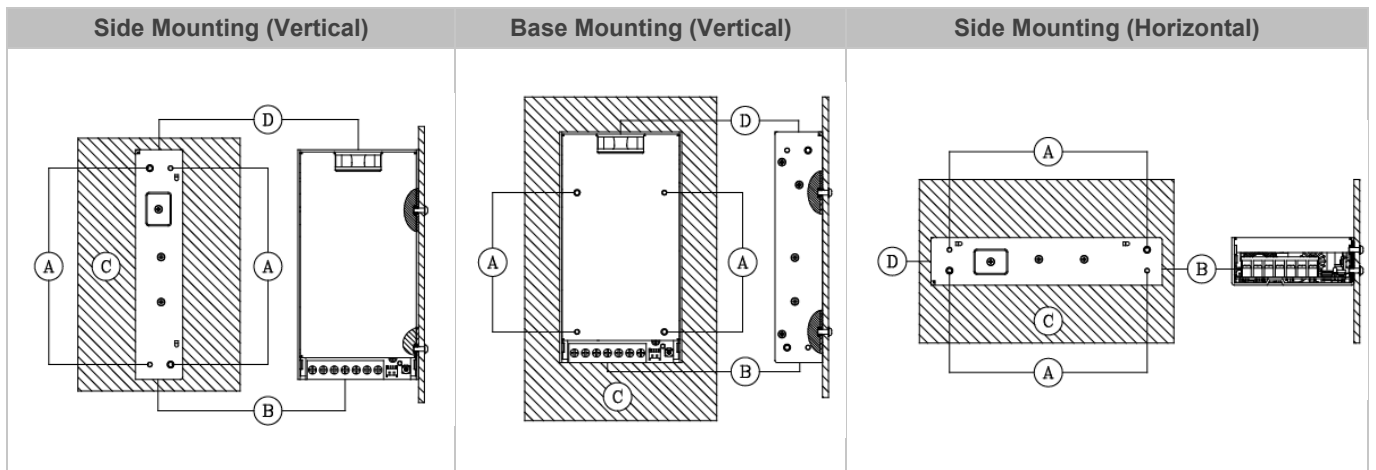


Fig. 2 Mounting Orientation

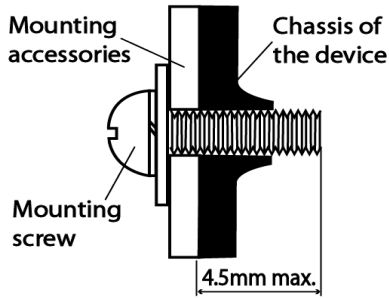
- Use flexible cable (stranded or solid) of AWG No. 20-16.
- The torque at the Connector shall not exceed 13Kgf.cm (11.23 lbf.in). The insulation stripping length should not exceed 0.275" or 7mm.
- Please refer Table 1 for the recommended Mating Connector, Terminal and AWG wire size.

Table 1		Power Supply Header	Mating Connector	Terminal	AWG
CN2	JST	S8B-PHDSS(LF)(SN)	PHDR-08VS or equivalent	SPHD-001T-P0.5 (x8) or equivalent	24

PMC Panel Mount Power Supply

24V 300W 1 Phase / PMC-24V300W1BA

Installation



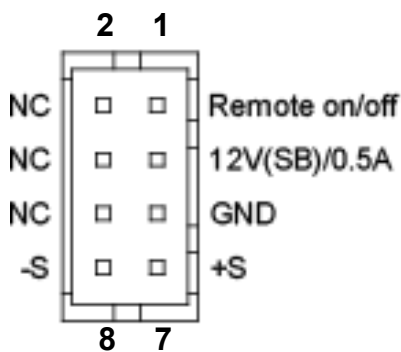
- Only use M4 screw ≤ 4.5 mm through the base mounting holes. This is to keep a safe distance between the screw and internal components.
- Recommended mounting tightening torque: 4~8 Kgf.cm

Safety Instructions

- To ensure sufficient convection cooling, always maintain a safety distance of > 20 mm (0.78 inch) from all ventilated surfaces while the device is in operation.
- The device is not recommended to be placed on low thermal conductive surface, for example, plastics.
- 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 to enter the device through the openings during installation. It can cause: -
- Electric shock; Safety Hazard; Fire; Product failure
- Warning: 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.

Functional Manual

Pin Assignment of CN2



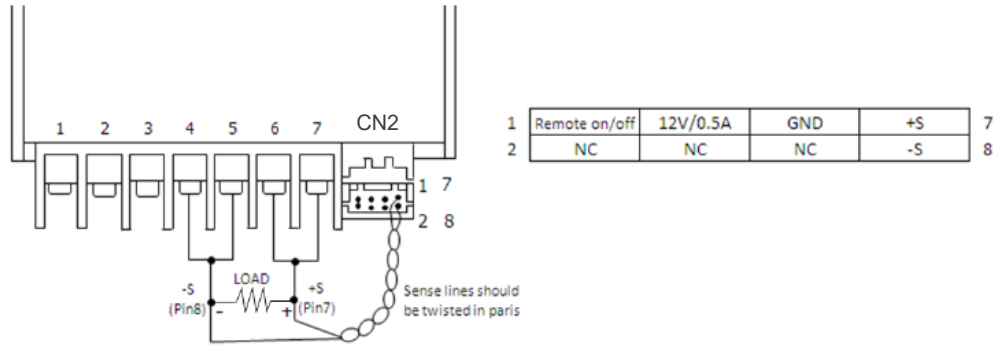
Pin	Functions	Descriptions
1	Remote on/off	Turn the output on and off by electrical SW or dry contact between Pin 5(GND); Short: Power OFF, Open: Power ON
2, 4, 6	NC	No Application
3	12V (SB)/ 0.5A	Auxiliary Voltage output 11.4 -12.6V, Reference to Pin 5 (GND). The maximum load current is 0.5A
5	GND	Ground reference for Remote on/off and 12V (SB)
7	+S	Positive sensing. The +S Signal should be connected to the positive terminal of the load
8	-S	Negative sensing. The -S signal should be connected to the negative terminal of the load

PMC Panel Mount Power Supply

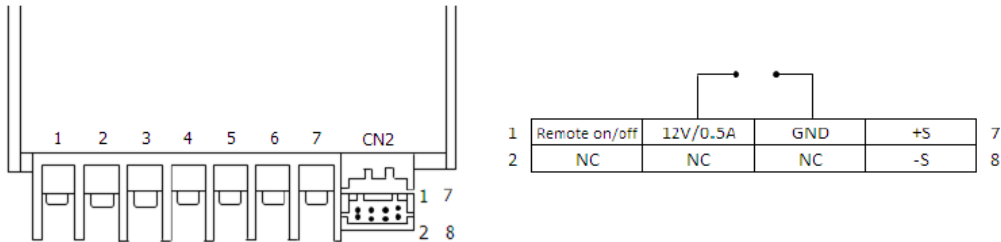
24V 300W 1 Phase / PMC-24V300W1BA

Configuration of CN2

1. Remote sense

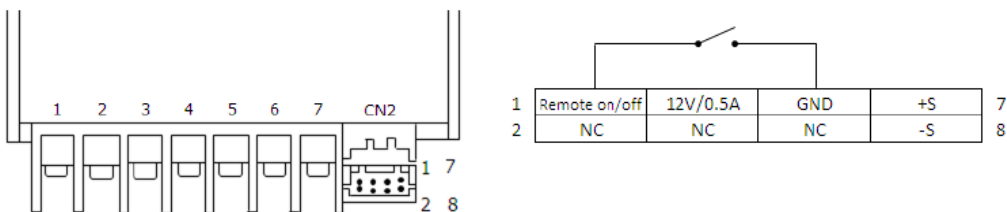


2. Auxiliary Voltage: 12V (SB)/ 0.5A



3. Remote on/off

Between pin1 and GND (pin5)	Output Status
SW ON (Short)	OFF
SW OFF (Open)	ON

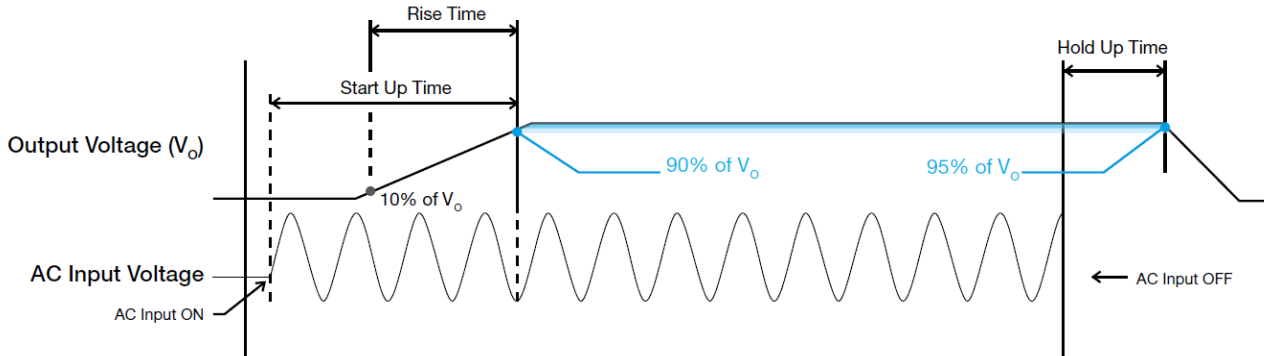


PMC Panel Mount Power Supply

24V 300W 1 Phase / PMC-24V300W1BA

Functions

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



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

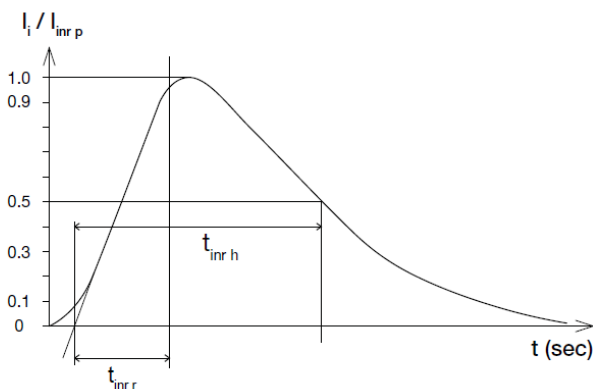
The time required for the output voltage to change from 10% to 90% of its final steady state set value.

Hold-up Time

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

Inrush Current

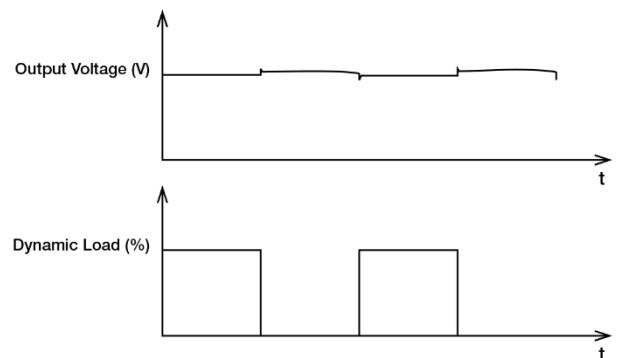
Inrush Current is the first surge current seen on the input side when AC input is applied to the power supply. It is the first pulse captured; see a typical picture for the inrush current as seen in the power supply.



Dynamic Response

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

- 50% duty cycle / 5Hz

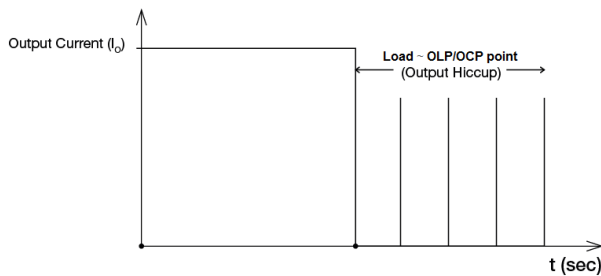


PMC Panel Mount Power Supply

24V 300W 1 Phase / PMC-24V300W1BA

Overload & Overcurrent Protections (Auto-Recovery)

The power supply's Overload (OLP) and Over current (OCP) Protections will be activated when output current (I_o) exceeds its specification as defined on Page 3 under "Protections. In such occurrence, the output voltage (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.



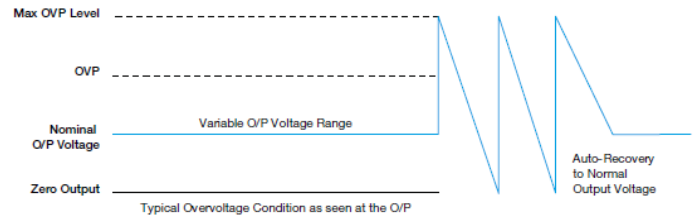
It is not recommended to prolong the duration of I_o when it is less than OLP/OCP point, but greater than 100%, since it may cause damage to the PSU.

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.

PMC Panel Mount Power Supply

24V 300W 1 Phase / PMC-24V300W1BA

Operating Mode

■ Redundant Operation

In order to ensure proper redundant operation for the power supply unit (PSU), the output voltage difference between the two units must be kept at 0.45~0.50V for 24V 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 at any line voltage from 85-264Vac, and set the PSU 1 and PSU 2 output voltage.

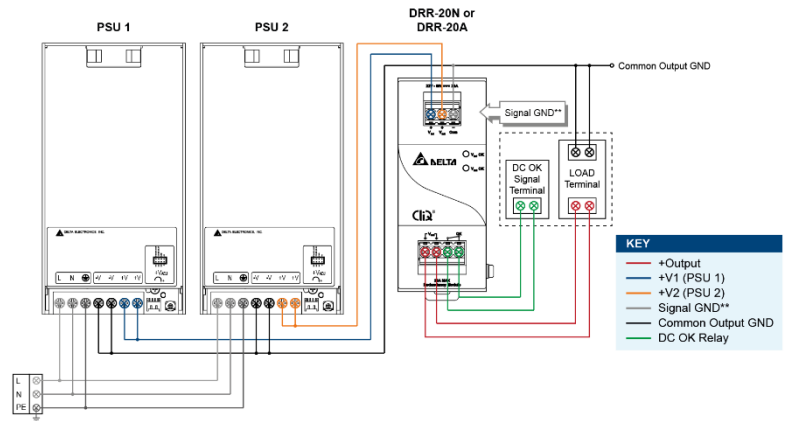
Step 2.

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.



**The Signal GND in the DRR module is for the built-in LED and DC OK signals. The Output GND terminals from the two PSU's do not need to be connected to the Signal GND terminal.

Fig. 3 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.

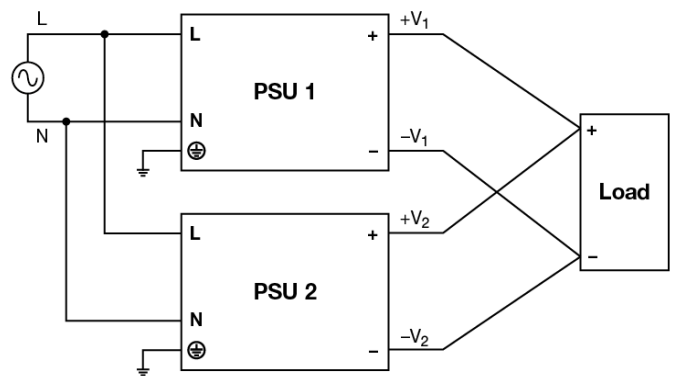


Fig. 4 Parallel Operation Connection Diagram

PMC Panel Mount Power Supply

24V 300W 1 Phase / PMC-24V300W1BA

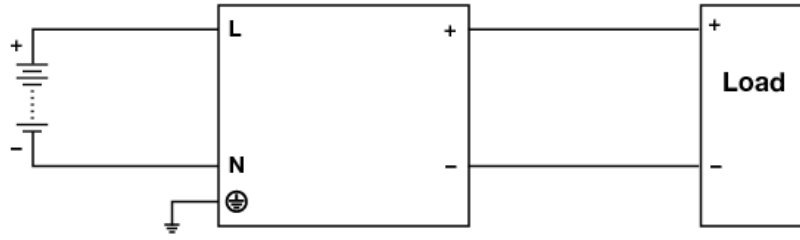


Fig. 5 DC Input Operation Connection Diagram

■ DC Input Operation

Step 1.
Use a battery or similar DC source.

Step 2.
Connect +pole to L and -pole to N.

Step 3.
Connect the PE terminal to an earth wire or to the machine ground.

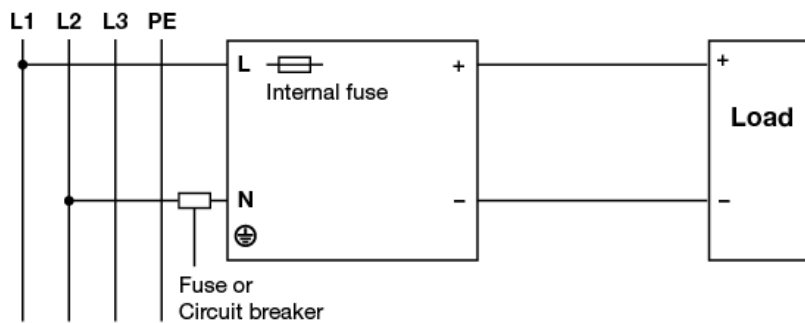


Fig. 6 2 of 3 Phase System Input Operation Connection Diagram

■ 2 of 3 Phase System Input Operation

Delta's PMC can use on 2 of 3 phase system. Please refer to the following step.

Step 1.
The input voltage applied from Line to Neutral is below the maximum rated input. The input voltage shall be below 240Vac +10%.

Step 2.
The external protector is needed on N (Neutral) input line to secure a safety. N line does not have internal fuse protection. An appropriate fuse or circuit breaker should be connected in series with N input line connection like the following.

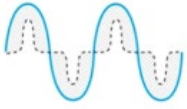
PMC Panel Mount Power Supply

24V 300W 1 Phase / PMC-24V300W1BA

Others

PFC – Norm EN 61000-3-2

Line Current harmonic



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.

This product conforms to this standard.

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.

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