

Chrome Class II DIN Rail Power Supply

24V 10W 1 Phase (NEC Class 2 & Household) / DRC-24V10W1HZ



CHROME

Highlights & Features

- Protection Class II, Double Isolation (No Earth connection is required)
- Household appliance approvals IEC/EN 60335-1
- Universal AC input voltage and full power up to 55°C
- Efficiency > 80.0% @ 115Vac & 230Vac
- NEC Class 2 / Limited Power Source (LPS) certified
- Overvoltage / Overcurrent / Over Temperature Protections

Safety Standards



CB Certified for worldwide use

Model Number:	DRC-24V10W1HZ
Unit Weight:	0.065 kg (0.14 lb)
Dimensions (L x W x D):	91 x 18 x 55.6 mm (3.58 x 0.71 x 2.19 inch)

General Description

The DRC-24V10W1HZ is part of the Chrome Class II DIN Rail Power Supply series, which is designed for use in compact cabinets for home automations and the food and beverage industry. Delta's Chrome Class II DIN Rail Power Supply series offers double isolated input. This means that no Earth connection is required thus resulting in low leakage current. This product provides a universal input voltage range of 90-264Vac, and a wide temperature range of -25°C to 71°C. The Chrome series is certified to safety standard according to IEC/EN/UL 60950-1 Information Technology Equipment (ITE), IEC/EN 60335-1 Household Electrical Appliance. In addition, the product meets the EMC approvals to EN 55014-1 / EN 55014-2 for household appliances and EN 61000-6-2 immunity for industrial environments without extra EMI filter required. The series is also fully compliant with RoHS Directive 2011/65/EU for environmental protection. NEC Class 2 and Limited Power Source (LPS) approvals are available for this product.

Model Information

Chrome Class II DIN Rail Power Supply

Model Number	Input Voltage Range	Rated Output Voltage	Rated Output Current
DRC-24V10W1HL	90-264Vac (125-375Vdc)	24Vdc	0.42A

Model Numbering

DR	C –	24V	10W	1	H	Z
DIN Rail	Product Series C – Isolation Class II Power Supply	Output Voltage	Output Power (10W series)	Single Phase	Household Approval	Z – Black Plastic Case

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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
Nominal DC Input Voltage*	125-375Vdc
Input Current	< 0.30A @ 115Vac, < 0.20A @ 230Vac
Efficiency at 100% Load	> 80.0% @ 115Vac & 230Vac
Max Inrush Current (Cold Start)	< 15A @ 115Vac, < 30A @ 230Vac
Leakage Current	< 0.25mA @ 240Vac

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

Output Ratings / Characteristics**

Nominal Output Voltage	24Vdc
Factory Set Point Tolerance	No potentiometer 24Vdc \pm 2%
Output Current	0-0.42A (10W max.)
Output Power	10W
Line Regulation	< 0.5% (@ 90-264Vac input, 100% load)
Load Regulation	< 1% (@ 90-264Vac input, 0-100% load)
PARD*** (20MHz)	< 100mVpp
Rise Time	< 70ms @ nominal input (100% load)
Start-up Time	< 2,000ms @ nominal input (100% load)
Hold-up Time	> 10ms @ 115Vac (100% load) > 60ms @ 230Vac (100% load)
Dynamic Response (Overshoot & Undershoot O/P Voltage)	\pm 5% @ 90-264Vac input, 10-100% load (Slew Rate: 0.1A/ μ S, 50% duty cycle @ 5Hz to 100Hz)
Start-up with Capacitive Loads	820 μ F Max

**For power de-rating from 55°C to 71°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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Mechanical

Case Cover / Chassis	Plastic	
Dimensions (L x W x D)	91 x 18 x 55.6 mm (3.58 x 0.71 x 2.19 inch)	
Unit Weight	0.065 kg (0.14 lb)	
Indicator	Green LED (DC OK)	
Cooling System	Convection	
Terminal	Input	M4 x 2 Pins (Rated 300V/16A)
	Output	M4 x 2 Pins (Rated 300V/16A)
Wire	Input / Output	AWG 26-12
Mounting Rail	Standard TS35 DIN Rail in accordance with EN 60715	
Noise (1 Meter from power supply)	Sound Pressure Level (SPL) < 25dBA	

Environment

Surrounding Air Temperature	Operating	-25°C to +71°C
	Storage	-25°C to +85°C
Power De-rating	> 55°C de-rate power by 2.5% / °C	
Operating Humidity	5 to 95% RH (Non-Condensing)	
Operating Altitude	0 to 2,000 Meters (6,560 ft.)	
Shock Test	Operating	IEC 60068-2-27, Half Sine Wave: 4G for a duration of 22ms, 3 shocks for each 3 directions, 9 times in total
Vibration	Operating	IEC 60068-2-6, Sine Wave: 10-500Hz @ 19.6m/S ² (2G peak); 10 min per cycle, 60 min for all X, Y, Z directions
Over Voltage Category	II	
Pollution Degree	2	

Protections

Overvoltage	Output power < 9W	< 34.8V, SELV Output, Latch Mode
	Output power ≥ 9W	< 34.8V, SELV Output, Hiccup Mode, Non-Latching (Auto-Recovery)
Overload / Overcurrent	< 15W, Hiccup Mode, Non-Latching (Auto-Recovery)	
Over Temperature	> 75°C Surrounding Air Temperature @ 100% load, Latch Mode	
Short Circuit	Hiccup Mode, Non-Latching (Auto-Recovery when the fault is removed)	
Internal Fuse	T1AH	
Degree of Protection	IP20	
Protection Against Shock	Class II (No PE* connection is required)	

*PE: Primary Earth

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Reliability Data

MTBF	> 500,000 hrs. as per Telcordia SR-332 I/P: 100Vac, O/P: 100% load, Ta: 35°C
Expected Cap Life Time	10 years (115Vac & 230Vac, 50% load @ 40°C)

Safety Standards / Directives

Safety Entry Low Voltage		SELV (EN 60950-1, EN 60335-1)
Electrical Safety	TUV Bauart	EN 60950-1, EN 60335-1
	UL/cUL recognized	UL 60950-1 and CSA C22.2 No. 60950-1 (File No. E131881)
	CB scheme	IEC 60950-1, IEC 60335-1 Limited Power Source (LPS)
Class 2 Power Supply	UL/cUL recognized	UL 60950-1 and CSA C22.2 No. 60950-1 (File No. E131881)
CE		In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EC
Material and Parts		RoHS Directive 2011/65/EU Compliant
Galvanic Isolation	Input to Output	3.0KVac

EMC

Emissions (CE & RE)		CISPR 32, EN 55032, FCC Title 47: Class B EN 55014-1
Immunity		EN 55024, EN 61000-6-2, EN 55014-2
Electrostatic Discharge	IEC 61000-4-2	Level 3 Criteria A ¹⁾ Air Discharge: 8kV Contact Discharge: 4kV
Radiated Field	IEC 61000-4-3	Level 3 Criteria A ¹⁾ 80MHz-1GHz, 10V/M, 80% modulation (1kHz) 1.4GHz-2GHz, 3V/M, 80% modulation (1KHz) 2GHz-2.7GHz, 1V/M, 80% modulation (1KHz)
Electrical Fast Transient / Burst	IEC 61000-4-4	Level 4 Criteria A ¹⁾ 4kV
Surge	IEC 61000-4-5	Level 2 Criteria A ¹⁾ Differential Mode ²⁾ : 1kV
Conducted	IEC 61000-4-6	Level 3 Criteria A ¹⁾ 150kHz-80MHz, 10Vrms
Power Frequency Magnetic Fields	IEC 61000-4-8	Criteria A ¹⁾ 30A/Meter
Voltage Dips and Interruptions	IEC 61000-4-11	> 95% dip; 0.5 cycle (10ms); Self Recoverable
Voltage Fluctuation and Flicker		IEC/EN 61000-3-3

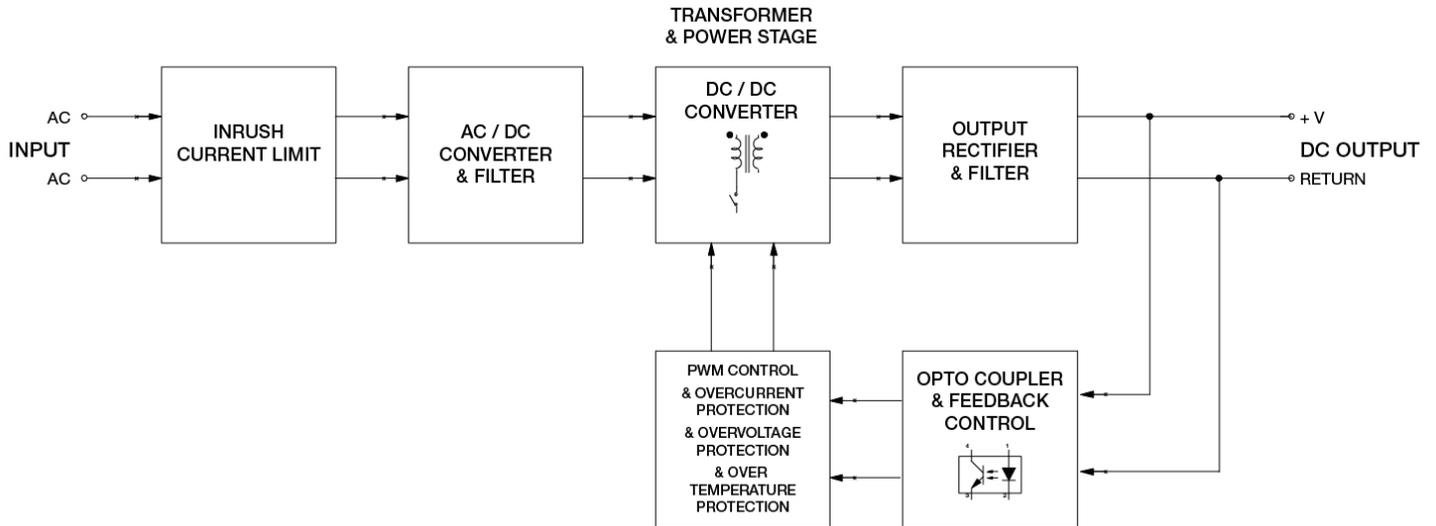
1) Criteria A: Normal performance within the specification limits

2) Symmetrical: Differential mode (Line to line)

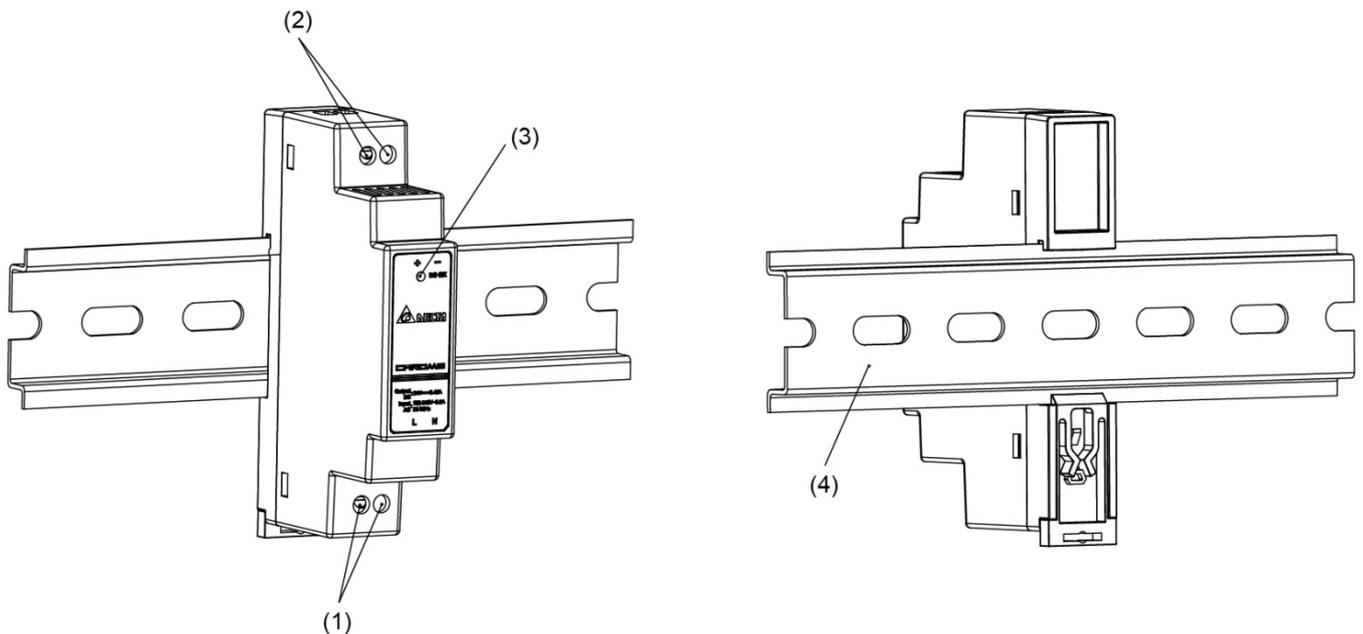
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Block Diagram



Device Description



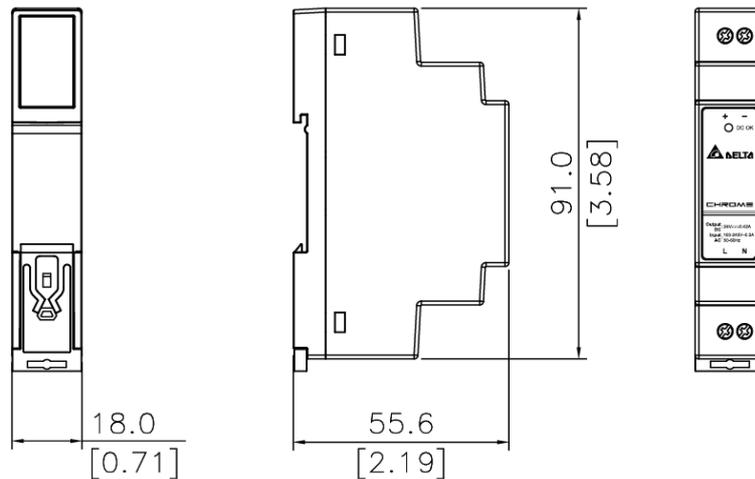
- 1) Input terminal block connector
- 2) Output terminal block connector
- 3) DC OK control LED (Green)
- 4) Universal mounting system

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Dimensions

L x W x D: 91 x 18 x 55.6 mm (3.58 x 0.71 x 2.19 inch)



Engineering Data

Output Load De-rating VS Surrounding Air Temperature

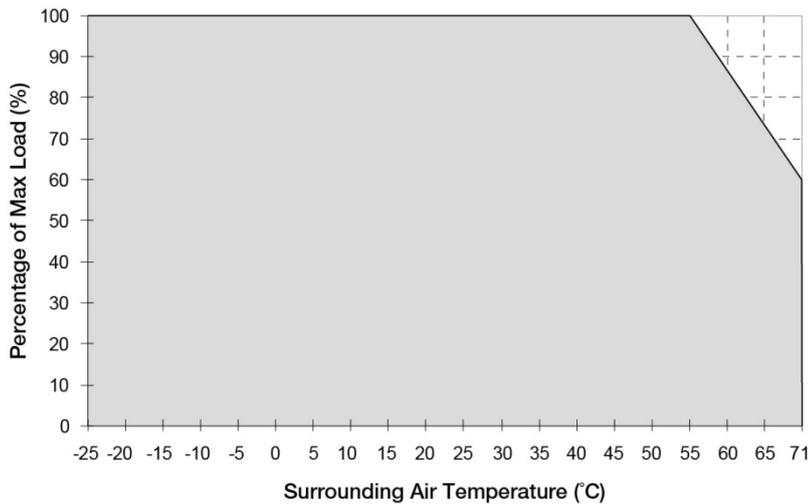


Fig. 1 De-rating for Vertical Mounting Orientation
 > 55°C de-rate power by 2.5% / °C

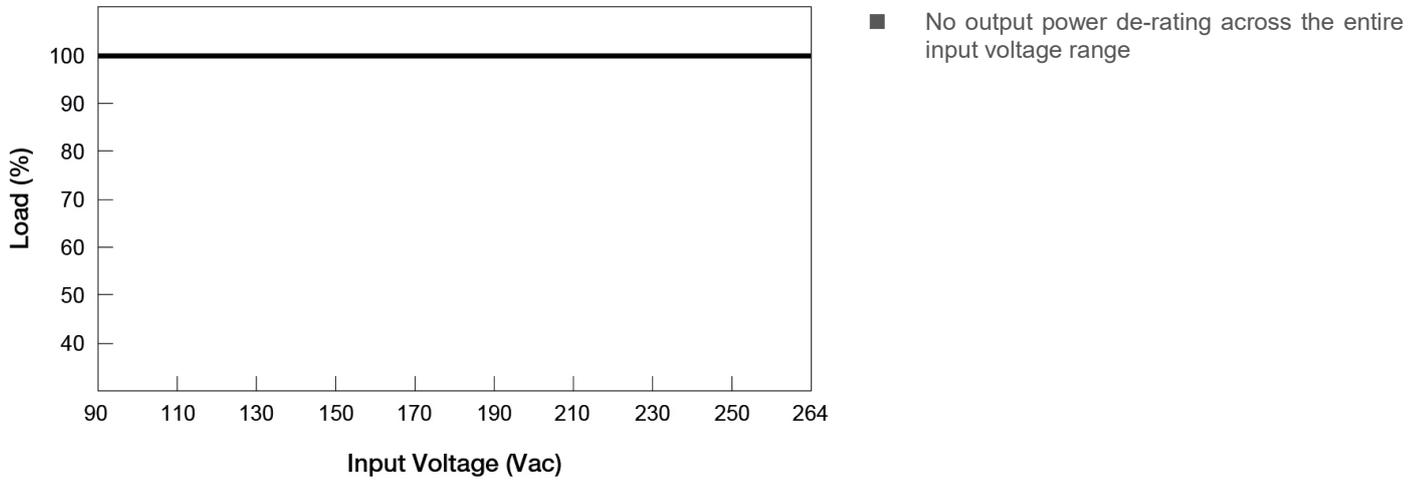
Note

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 latch mode and recover when AC power recycles.
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.

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Output Load De-rating VS Input Voltage



Assembly & Installation

The power supply unit (PSU) can be mounted on 35mm DIN rails in accordance with EN60715. The device should be installed with input terminal block at the bottom.

Each device is delivered ready to install.

Mounting

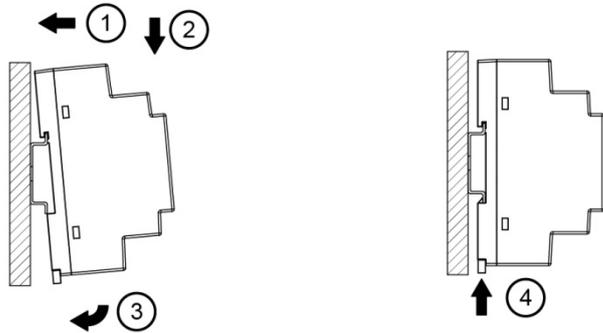


Fig. 2.1 Mounting

Snap on the DIN rail as shown in Fig. 2.1:

1. Tilt the unit upwards and insert it onto the DIN rail.
2. Push downwards until stopped.
3. Press against the bottom front side for locking.
4. Shake the unit slightly to ensure that it is secured.

Dismounting

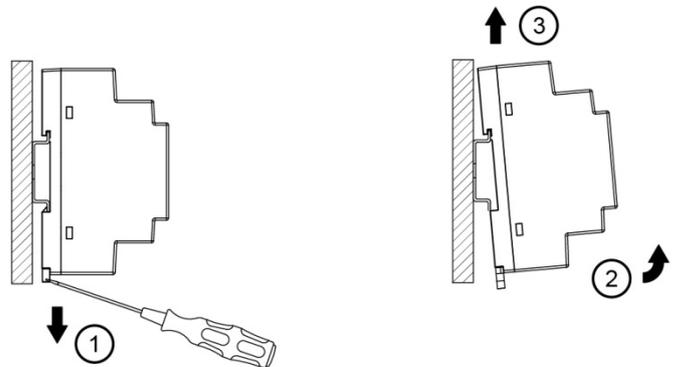


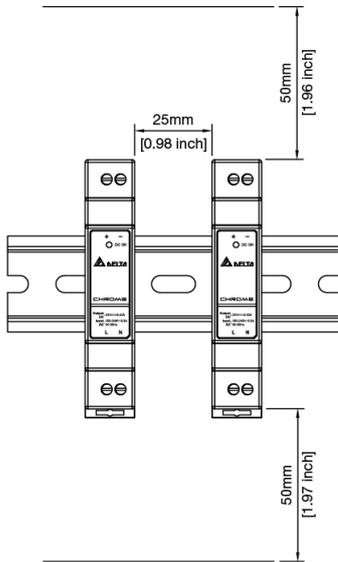
Fig. 2.2 Dismounting

To uninstall, pull or slide down the latch with screw driver as shown in Fig. 2.2. Then slide the power supply unit (PSU) in the opposite direction, release the latch and pull out the power supply unit (PSU) from the rail.

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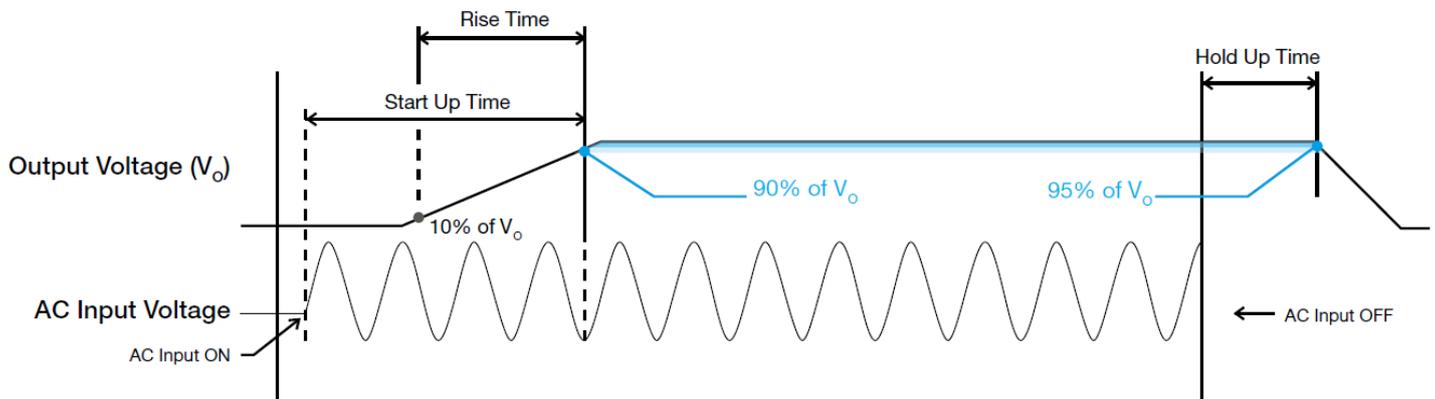
Safety Instructions



- ALWAYS switch mains of input power OFF before connecting and disconnecting the input voltage to the unit. If mains are not turned OFF, there is risk of explosion / severe damage.
- To guarantee sufficient convection cooling, keep a distance of 50mm (1.96 inch) above and below the device as well as a lateral distance of 25mm (0.98 inch) to other units.
- Note that the enclosure of the device can become very hot depending on the surrounding air temperature and load of the power supply. Risk of burns!
- DO NOT insert any objects into the unit.
- Hazardous voltages may be present for up to 5 minutes after the input mains voltage is disconnected. Do not touch the unit during this time.
- The power supplies are built in units and must be installed in a cabinet or room (condensation free environment and indoor location) that is relatively free of conductive contaminants.

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

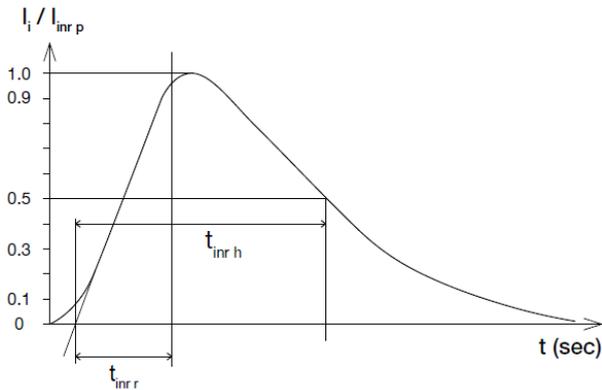
Time between the collapse of the AC input voltage, and the output falling to 95% of its steady state set value.

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Inrush Current

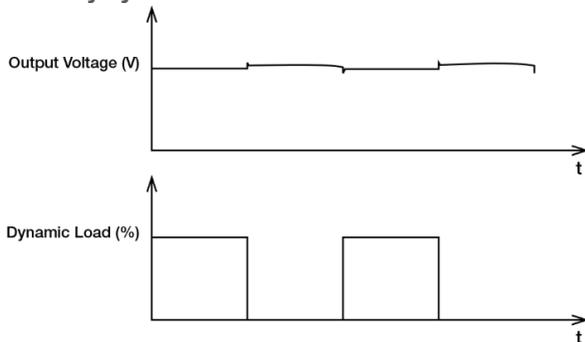
Inrush current is the peak, instantaneous, input current measured and, occurs when the input voltage is first applied. For AC input voltages, the maximum peak value of inrush current will occur during the first half cycle of the applied AC voltage. This peak value decreases exponentially during subsequent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



Dynamic Response

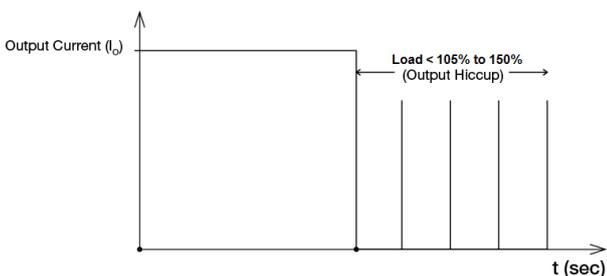
The power supply output voltage will remain within $\pm 5\%$ of its steady state value, when subjected to a dynamic load from 10% to 100% of its rated current.

■ 50% duty cycle / 5Hz to 100Hz



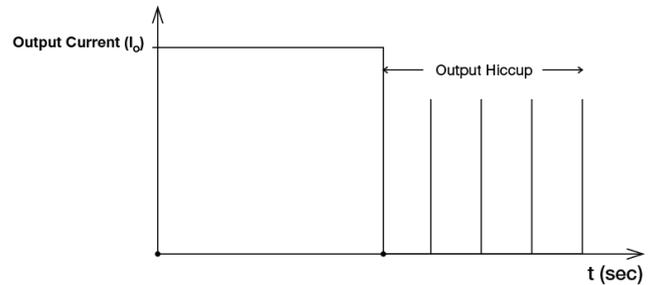
Overload & Overcurrent Protections (Auto-Recovery)

The power supply's Overload (OLP) and Overcurrent (OCP) Protections will be activated when output current $< 105\%$ to 150% 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.



Short Circuit Protection (Auto-Recovery)

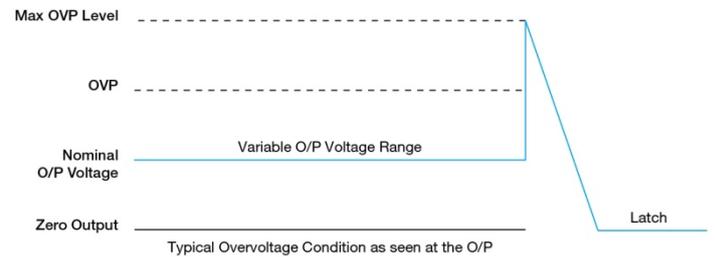
The power supply's output OLP/OCP function also provides protection against short circuits. When a short circuit is applied, the output current will operate in "Hiccup mode", as shown in the illustration in the OLP/OCP section on this page. The power supply will return to normal operation after the short circuit is removed.



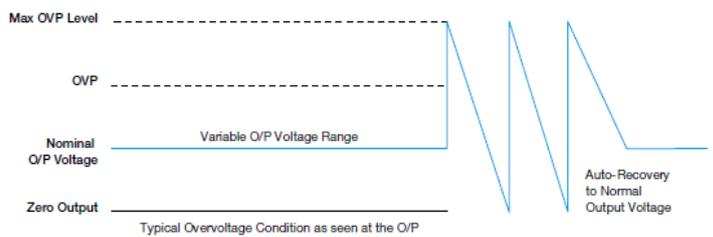
Overvoltage Protection (Latch Mode and Hiccup Mode)

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".

The power supply should be Latch when output power $< 9W$



The power supply should be Hiccup when output power $\geq 9W$



Over Temperature Protection (Latch Mode)

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; or, when the operating temperature is beyond what is recommended in the de-rating graph, the OTP circuit will be activated. When activated, power supply will latch, until the surrounding air temperature drops to its normal operating temperature or the load is reduced as recommended in the de-rating graph. Removal/re-application of input AC voltage will then be required in order to restart.

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External Input Protection Device

The unit is protected with internal fuse (not replaceable) at L pin and it has been tested and approved on 20A (UL) and 16A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above. Thus, if an external protective device is necessary, or, utilized, a minimum value of 8A B- or 4A C- characteristic breaker should be used.

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 0.45~0.50V for 24V supplies. Follow simple steps given below to verify:

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, connect the power supply to 50% of rated load at any line voltage from 90-264Vac, and set the PSU 1 and PSU 2 output voltage.

Step 2.

Connect the power supply units PSU 1 and PSU 2 to $V_{in 1}$ & $V_{in 2}$, respectively, of the DRR-20N (or 20A) module shown on the right of above diagram.

Step 3.

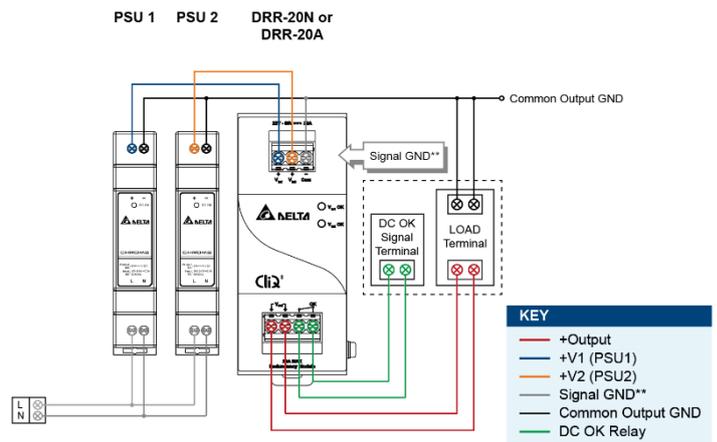
Connect the system load from V_{out} . Please note that output voltage V_{out} from DRR module will be $= V_O$ (output voltage of power supply) $- V_{drop}^*$ (in DRR module).

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

■ 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.



**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

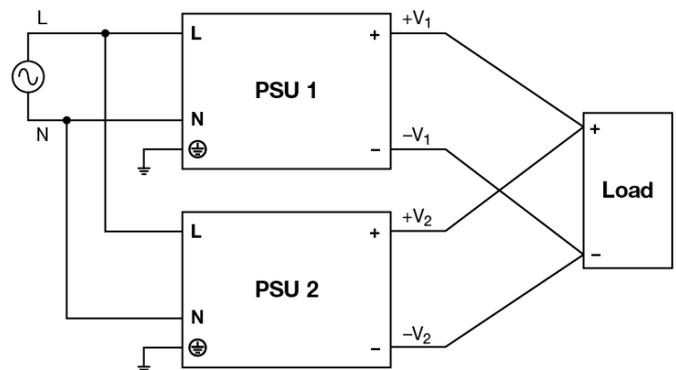


Fig. 4 Parallel Operation Connection Diagram

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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.

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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