



CliQ II DIN Rail Power Supply 24V 60W 1Phase



Model No. DRP 024V 060W 1BA
Weight: 0.37Kg.
Size: 121 mm X 32 mm X 125 mm (H x W x D)

Features

- RoHS Compliant
- Efficiency > 89% Typ.
- Over load protection
- Over voltage protection
- Meet Energy Star Level V
- Over temperature protection
- Expected life time : 10 Years
- Power boost 150% for 5 seconds
- Compact design for easy handling
- Output terminals for fast wiring and easy installation
- With Conformal Coating (Class1 Div 2 Hazard Loc Ready)
- Redundancy : DRR-20A & DRR-40A External ORing Diode

Description

The new CliQ II DRP024V060W1BA is the latest offering from one of the World's No.1 Power Supply Company. The product offers a nominal output voltage of 24V, a wide temperature range from -20°C to 80°C and a minimum holdup time of >20ms@115Vac. The state-of-the-art design is made to withstand harsh industrial environments. The rugged, compact design aluminium case is shock and vibration resistant according to IEC60068-2-6. The 60 watts CliQ II DIN Rail power supply provides over voltage, overload and thermal protection. Due to the wide input voltage range from 85 to 264Vac, the Delta's CliQ power supply is worldwide usable.

INPUT SPECIFICATION

| | |
|-----------------------------|------------------------------------|
| Input Voltage (Nominal) | 100 - 240Vac |
| Input Voltage range | 85 - 264Vac |
| Input Frequency (Nominal) | 50 - 60Hz |
| Input Frequency range | 47 - 63Hz |
| DC Input Voltage (Nominal) | 125 - 250Vdc |
| DC Input Voltage Range | 120 - 375Vdc |
| Input Current | < 1.40A @ 115Vac, < 0.80A @ 230Vac |
| Efficiency | > 89.0% @ 115Vac & 230Vac |
| Inrush current (Cold Start) | < 20A @ 115Vac, < 35A @ 230Vac |
| Leakage Current | < 1mA @ 240Vac |
| Energy Star | Meet Level V |

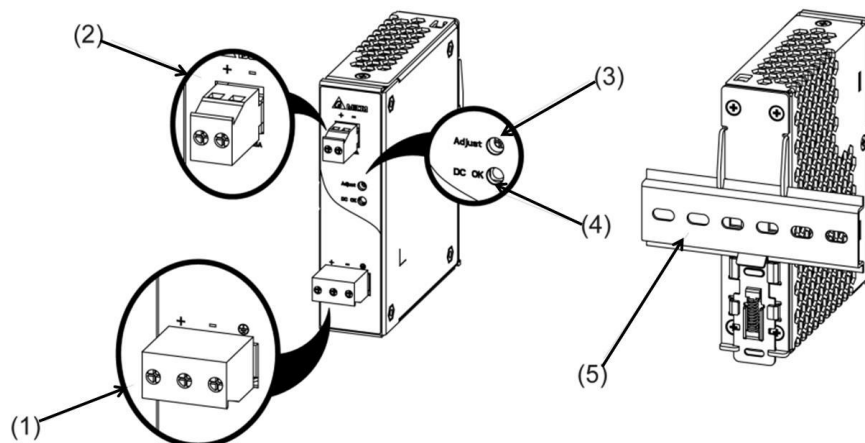
OUTPUT SPECIFICATION

| | |
|---|--|
| Output Voltage (Nominal) | 24 Vdc |
| Output Voltage Tolerance | +/- 2% (Initial set point tolerance) |
| Output Voltage Adjust Range | 24 – 28 Vdc |
| Line Regulation | < 0.5% Typical @ 85 to 264Vac input, 100% load |
| Load Regulation | < 1% Typical @ 85 to 264Vac input, 0 to 100% load |
| Ripple & Noise (PARD), 20MHz BW | < 50mVpp (25°C) / PARD (150mVpp) |
| Output Current (Nominal) | 2.5 A |
| Power Derating above 50°C | Derated Linearly 2.5% / °C |
| Rise Time | < 100 ms @ nominal input, 100% load (25°C) |
| Start-Up Time | < 2000ms @ nominal input, 100% load (25°C) |
| Hold-Up Time | > 20ms @ 115Vac, > 125ms @ 230Vac (100% load, 25°C) |
| Dynamic Response (Overshoot & Undershoot O/P Voltage) | +/-5% @ 0% - 100% load |
| Startup with capacitive loads | 8,000µF @ nominal input & nominal O/P voltage 24V (25°C) |



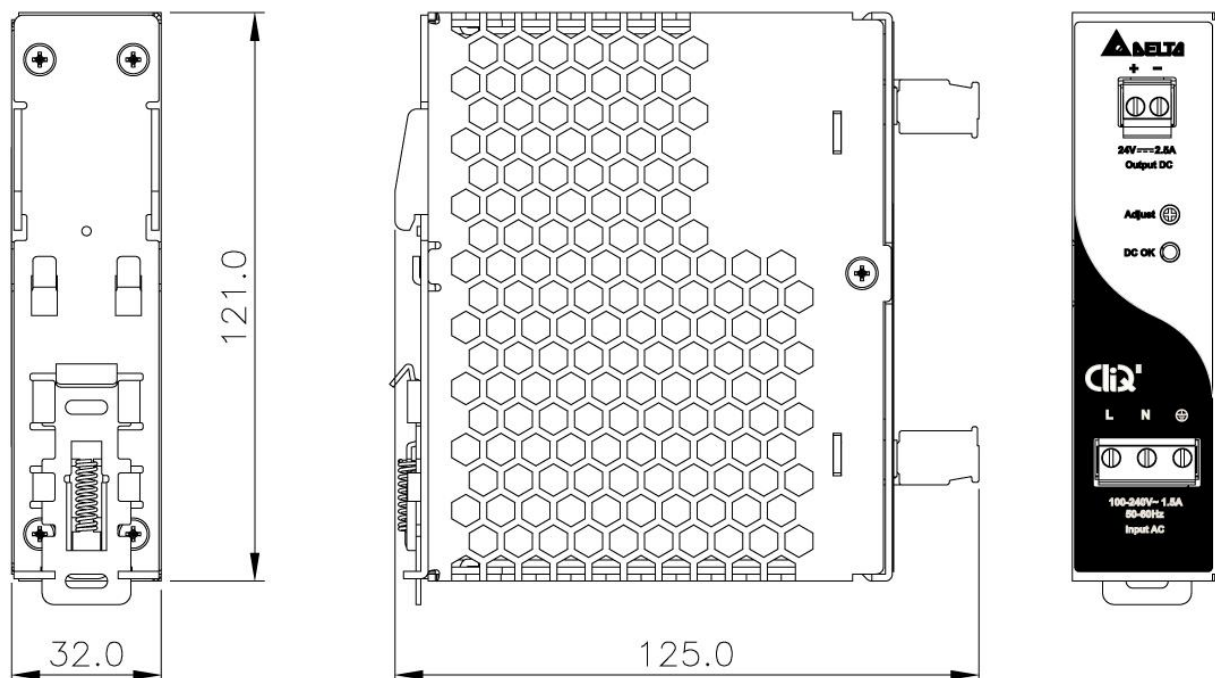
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Device Description:



- 1) Input terminal block connector
- 2) Output terminal block connector
- 3) DC voltage adjustment potentiometer
- 4) DC OK control LED (green)
- 5) Universal mounting rail system

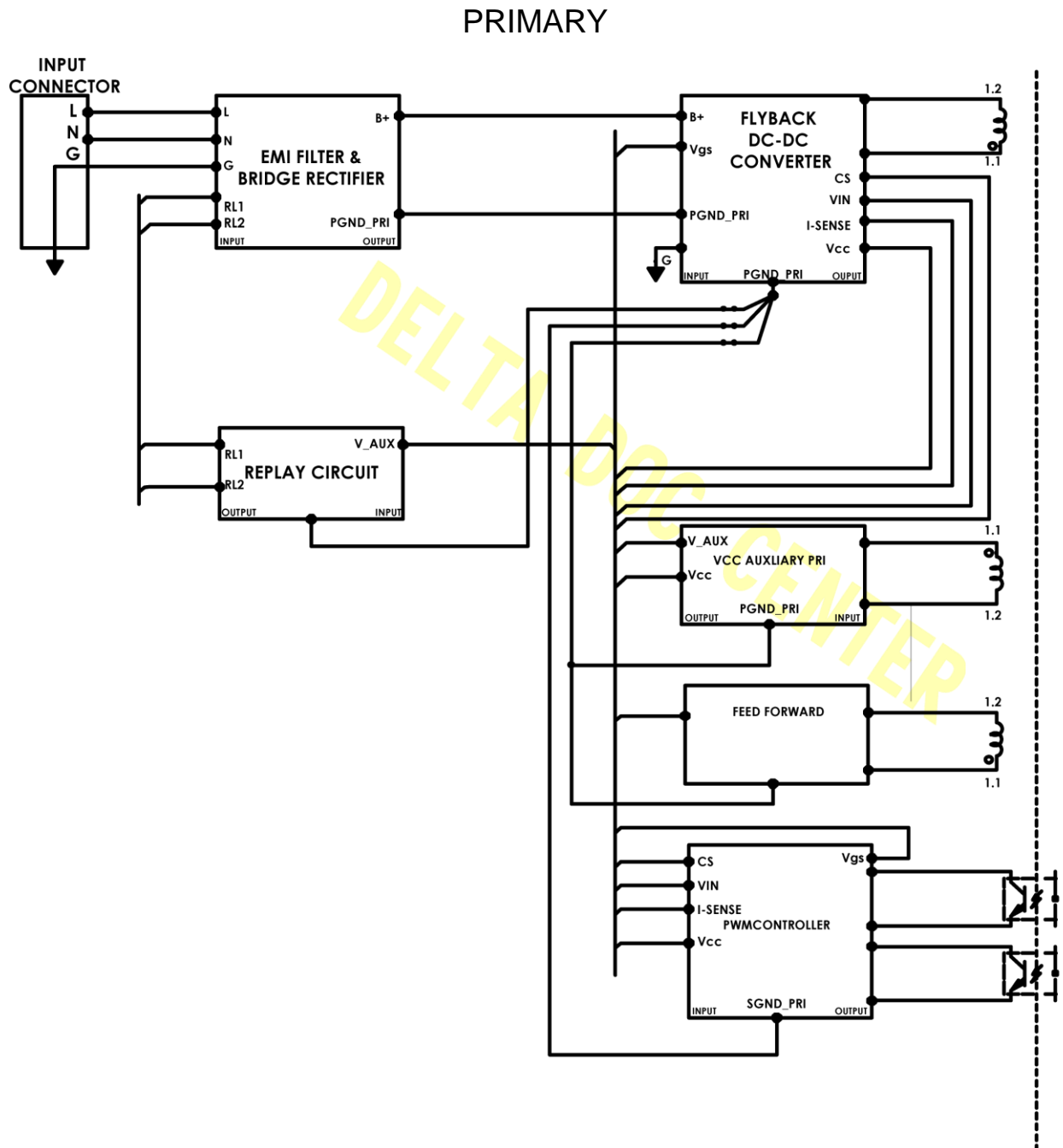
Mechanical Drawing:



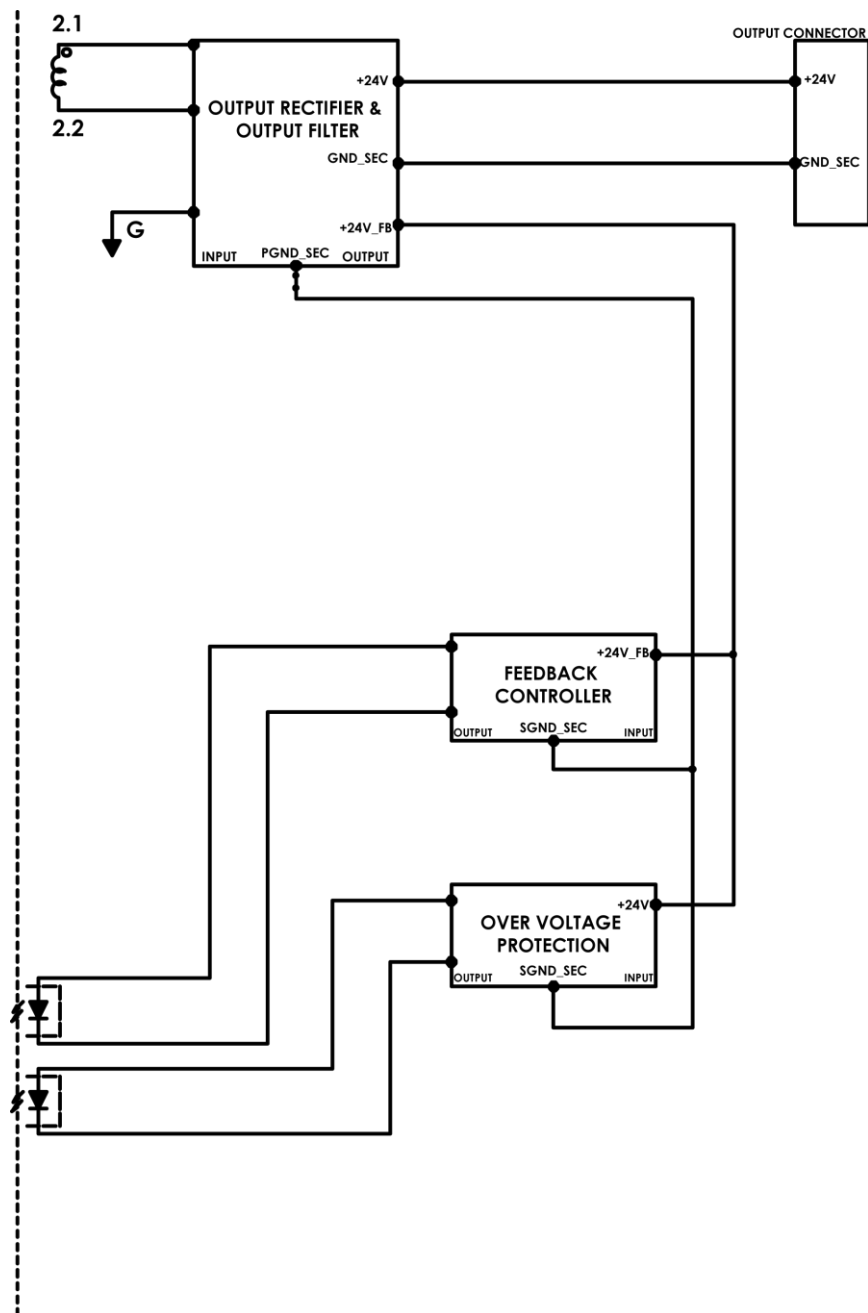
MECHANICAL SPECIFICATION

| | |
|-----------------|--|
| Dimension | 121 mm X 32 mm X 125 mm (H x W x D) |
| Weight | 0.37kg |
| Cooling System | Convection |
| Input Terminal | Pluggable connector 3 pin (Rated 300V/15A) |
| Output Terminal | Pluggable connector 2 pin (Rated 300V/15A) |
| Indicator | Green LED (DC OK) |
| Casing | Aluminum |

Block Diagram:



SECONDARY





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PROTECTION

| | |
|---|---|
| Over Voltage Protection | 32V +10%/-10%, SELV output, Hicc-up Mode, Non-Latching (Auto recovery). |
| Over Load, Over Current Protection | > 150% of rated load current, Hicc-up Mode, Non-Latching (Auto recovery). |
| Over Temperature Protection | < 80°C Ambient Temp@ 100% load. Non-Latching (Auto-recovery). |
| Short Circuit Protection | Hicc-up Mode, Non-Latching, (Auto-recovery when the fault is removed). |

Over Load Protection

The Power Supply is provided with an overload protection (OLP/OCP) function which protects the power supply from possible damage caused by excess current. The Power Supply also has an over temperature protection (OTP) in case overload condition persists for an extended duration and is below the overload trigger point but > 100% load. Typically the overload current (I_{OL}) is > I_{SURGE} (150%) output voltage will start dropping when the power supply reaches max power limit. It will go into bouncing mode when the output reaches UVLO (under voltage point). The output voltage will recover automatically when the overload condition is removed.

Over Temperature Protection

The Power Supply has an over temperature protection (OTP). This is activated when the overload condition persists for an extended duration and the output current is below the overload trigger point but >100% load. In the event of a higher ambient operating condition at 100% load, the Power Supply will run into OTP when the ambient temperature is > 80°C. When activated, the output voltage will go into bouncing mode until the operating ambient temperature drops to 50°C or output capacity is reduced as recommended in the graph.

Over Voltage Protection

The Power Supply has an overvoltage protection (OVP) and is activated when the power supply feedback circuit fails. The output voltage will not be > 32V +10%/-10%, under any Line/Load and operating ambient temperature. The Power Supply does not shut down but goes into Hiccup mode (Auto-Recovery). The output voltage will recover back to 24VDC once the fault is removed.

Short Circuit Protection

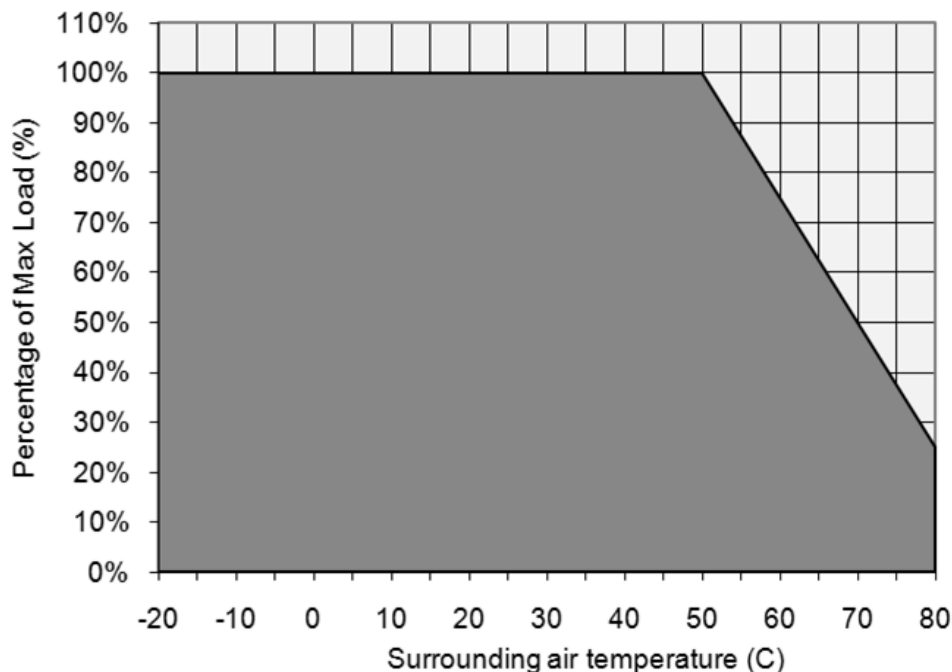
The Power Supply has a short circuit protection which is in line with the overload protection and activates whenever there is a short across the output voltage. It will go into bouncing mode and recovers automatically when the fault is removed.



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Derating Curve

(For both Horizontal and Vertical)



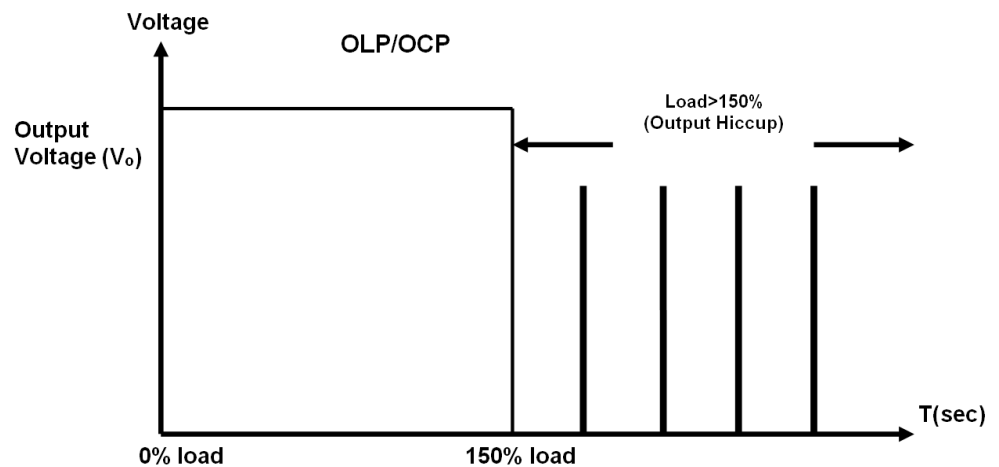
Note

1. Do not use the device in areas outside of the shaded portion shown in the above graph. Internal parts may gradually deteriorate and become damaged.
2. For the power derating refer above graph ambient temperature $> 50^{\circ}\text{C}$, the output capacity has to be reduced by 2.5% per Celsius increase in temperature. If the output capacity is not reduced when $\text{Amb} > 50^{\circ}\text{C}$ device will run into thermal protection by switching off i.e. device will go in bouncing mode and will recover when Amb is lowered or load is reduced as far as necessary to keep device in working condition.
3. If the device has to be mounted in any other direction, please contact your service provider for more details.
4. In order for the device to function in the manner intended, it is also necessary to observe a lateral spacing of 20mm. from other equipments.
5. Depending on the ambient temperature and output capacity of the device, the device housing can be very hot!



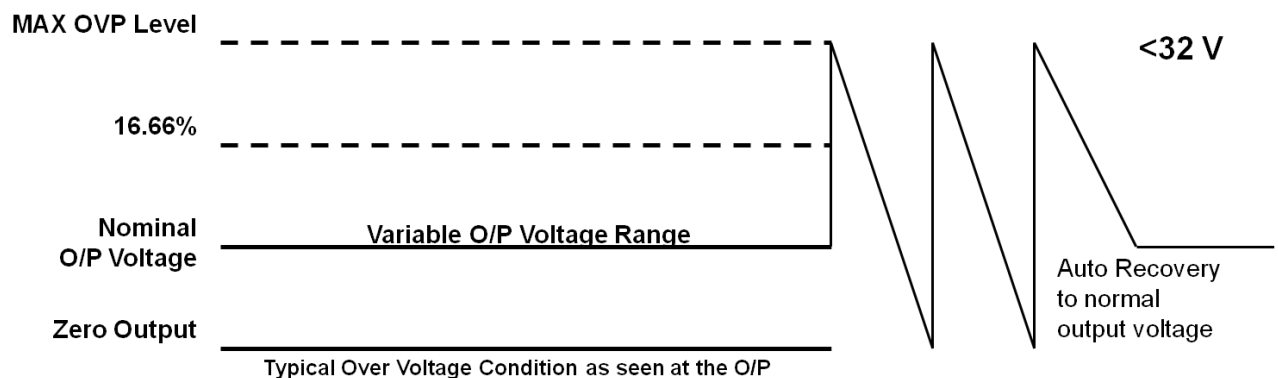
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Over Load Protection



*Typically the over load current (I_{OL}) is $> I_{SURGE}$ (150%) output voltage will start dropping when the power supply reaches max power limit.

Over Voltage Protection



* The Power Supply does not shut down but goes into Hiccup mode (Auto-Recovery). The output voltage will recover back to 24VDC once the fault is removed.



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ENVIRONMENT

| | |
|--|---|
| Ambient temperature (Operating) | -20°C to +50°C, with operation to 80°C possible with a linear derating to half power from 50°C to 80°C. |
| Operating humidity | < 95%RH |
| Ambient temperature (Storage) | -25°C to 85°C |
| Altitude (Operating) | 2,500 Meters |
| Shock Test | IEC60068-2-27, 30G (300m/s ²) |
| Vibration (Non-Operating) | IEC60068-2-6, 10Hz to 500Hz @ 30m/s ² (3G peak) for all X, Y, Z direction |
| Bump | IEC60068-2-29, 11ms/ 10gn |
| MTBF | > 1,000,000 hrs, as per BELL CORE STD or IEC61709 Tested at 115Vac & 230Vac input, 100% load, 25°C ambient |
| Expected Cap Life Time | 10 years (115Vac & 230Vac, 50% load and 40°C ambient). |
| Material and Parts | RoHS directive, WEEE directive |
| Degree of protection | IP20 |
| Class of protection | Class I with PE connection |
| Pollution degree | 2 |

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 below for the Inrush current in a typical Power Supply

Start Up Time

Start-up time is measured from the point AC input is applied to the point output voltage reaches within 90% of its set value. See below for a typical start-up time characteristic.

Rise Time

Rise time is measured from the point output voltage rises from 10% to 90% of its set value. See below for a typical rise time measurement.

Hold Up Time

Hold time is the time when the AC input collapses and o/p voltage retains regulation for a certain period of time is called as hold up time. See in the picture below a typical hold up time characteristic of a power supply. The hold time is measured until the output voltage remains in regulation hence it measured until the output voltage reaches minimum regulation -2% of its set value.

Output Voltage

The 24VDC connection is made using the "+" and "-" screw connections. At the time of delivery, the output voltage is 24VDC. The output voltage can be set from 24 To 28VDC on the potentiometer seen as Adjust on the front panel of each power supply

Surge Load

Typical surge load capability of the power supply, the PSU is capable of delivering 5 Sec. of Surge load about 150% of I_o max the output voltage can be out of regulation limits of $\pm 5\%$.

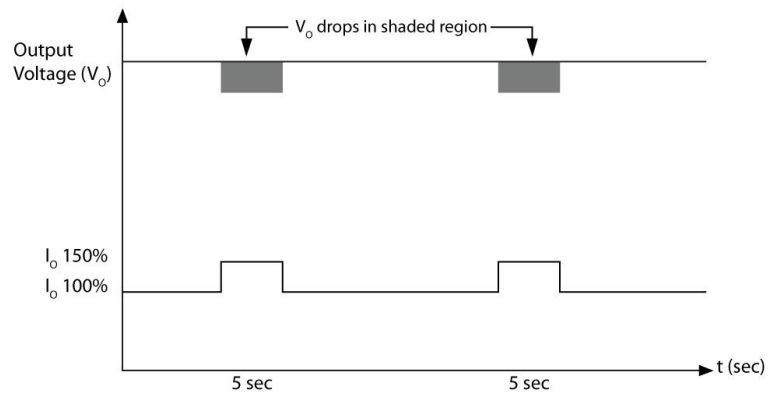
Dynamic Load

Additionally power supply is capable of dynamic change of load from 0% to 100% with output voltage within $\pm 5\%$ of regulation limits. See below the dynamic behavior of the PSU.



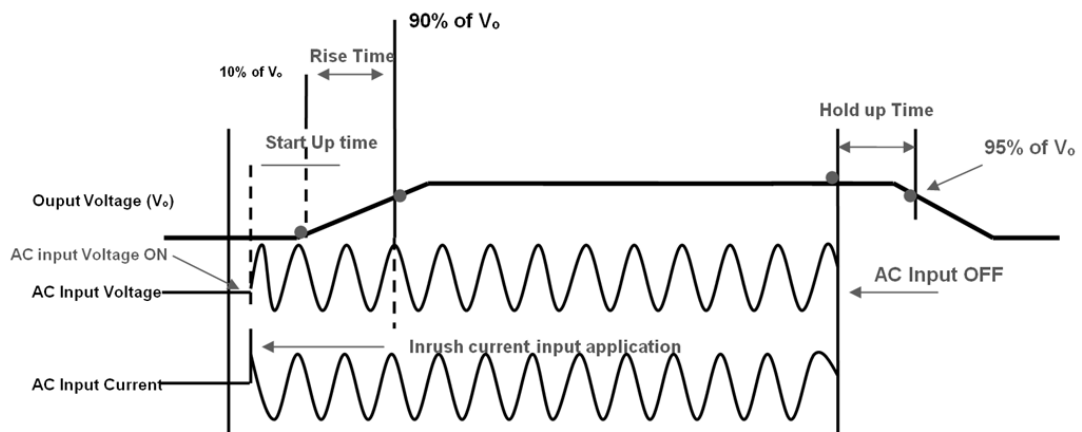
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Power Boost 150% for 5 Sec.



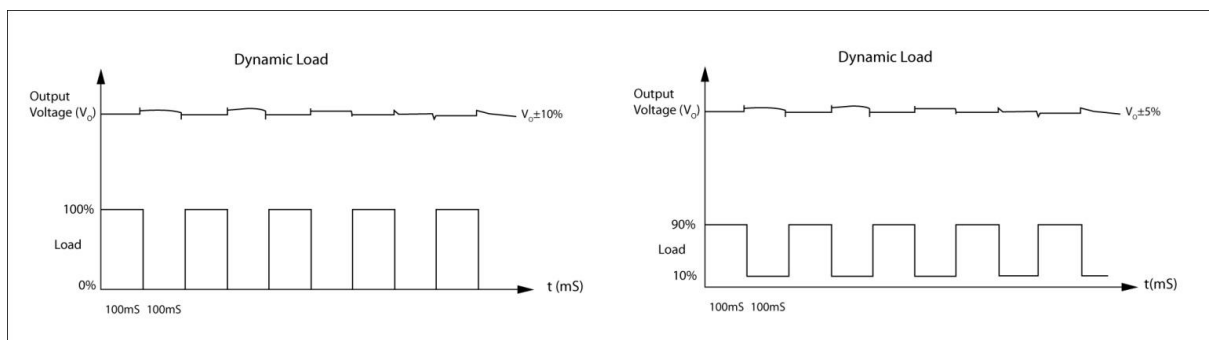
* Surge Load; typical surge load capability of the power supply, the PSU is capable of delivering 5 Sec

Hold Up Time



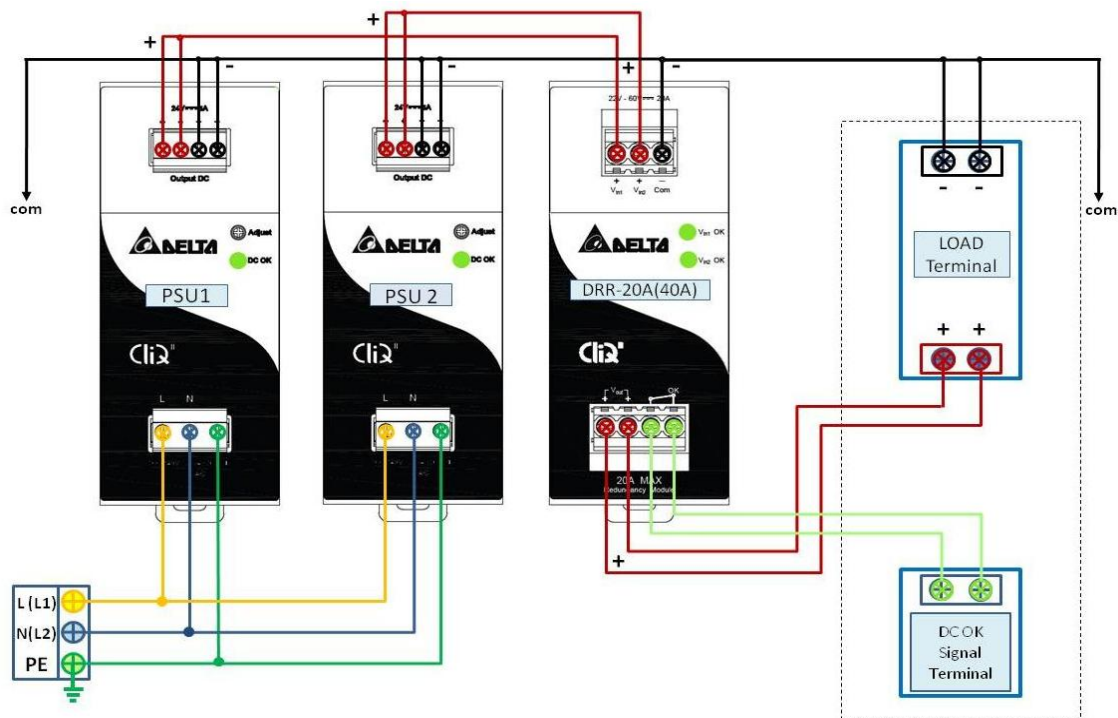
* The hold time is measured until the output voltage remains in regulation hence it measured until the output voltage reaches minimum regulation -2% of its set value.

Dynamic Load



* The power supply is capable of dynamic change of load from 0% to 100% with o/p voltage within $\pm 5\%$ of regulation limits.

Redundancy operation with DRP 20A- (40A)



Parallel Operation

When 2 Power Supplies are connected in parallel, they can share the load if the following steps are taken.

Step1. Measure the output voltages at no load from Anode1 to Ground i.e. Voltage Anode1 to Ground of PSU1 and Voltage Anode2 to Ground of PSU2. If the voltages are not the same, follow Step 2. If they are the same, skip to Step 3.

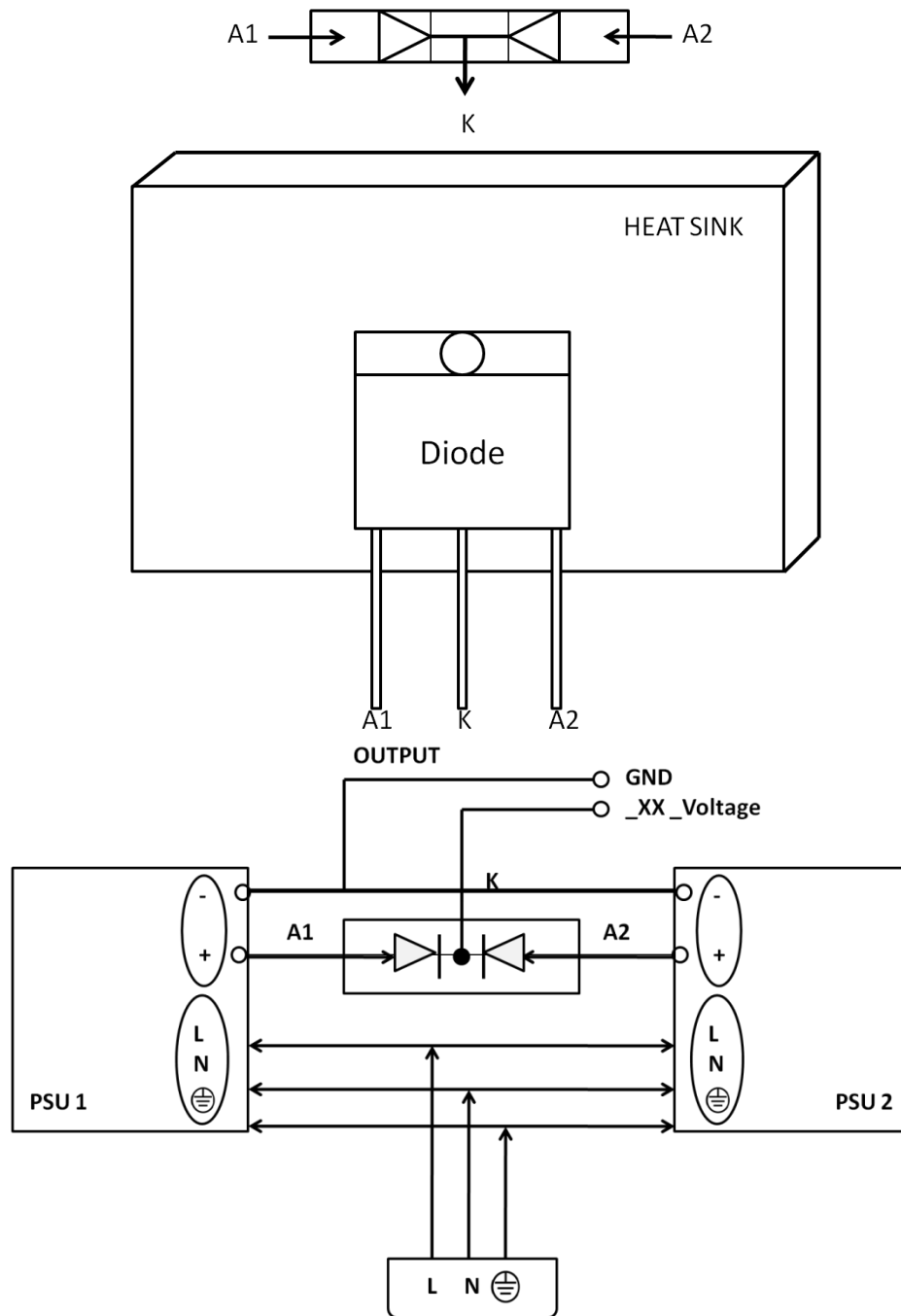
Step2. . Adjust the output voltages, with the help of VR on the Power Supply front panel marked as ADJUST, to the same level. For e.g. if PSU1 is measuring 24.15Vdc and PSU2 is measuring 24.25Vdc, adjust the output voltage of one to be the same as the other

Step3. Connect the Power Supply to the end system load and measure the output voltages from A1 to Ground i.e. Voltage Anode 1 to Ground of PSU1 and Voltage Anode 2 to Ground of PSU2. Ensure that the output voltages are the same even after the 2 Power Supplies are connected to load. If not, adjust them with the VR available on the front panel. A tolerance of +/-25mV would be acceptable.

Note

- 1) If the output voltage of any Power Supply is higher, it will take the initial load and share the maximum load.
- 2) If the output voltages are the same, then an equal load current sharing between the 2 Power Supplies can be achieved.
- 3) The ORing diode must be of an appropriate rating. The rating must be at least 4 times of the output load current and at least reverse voltage rating of 20Vrr.
- 4) The use of a heat sink is advised to ensure the ORing Diode does not overheat.
- 5) Recommended Redundancy Module: DRR-20A

Redundancy Operation with ORing Diode



*See the figure for a typical Redundant/Parallel operation of PSU using CliQ series power supplies. The 2 power supplies PSU1 & PSU 2 are connected thru a twin diode where Anode1 A1 is connected to the +Ve i. e. 24V of PSU1 and Anode2 A2 is connected to the +Ve i.e. 24V of PSU2 and the output ground GND are shorted together. The output of these 2 power supplies PSU1 & PSU2 is drawn from the Cathode K of the twin diode thus making the power supply work in Redundant/Parallel operation.



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SAFETY STANDARDS /EMC

SAFETY STANDARD

TUV Bauart to EN 60950-1
 Class 1 Div 2 T4 Hazardous Location (Pending)
 UL 508 Industrial control equipment
 CE EMC and Low Voltage directive
 CB Test certification and report to IEC60950-1
 IEC 62103:2003/EN 50178 Electronic Equipment in power installations
 IEC/EN/UL 60950-1 Safety of information technology Equipment
 CSA C22.2 No.107.1-01 Canadian Standard : CSA C22.2 No.107.1-01
 Rectifying equipment, commercial & industrial

EMI

CISPR22, EN55022, EN55011, FCC Title 47 : Class B

EMS

- EN 61000-4-2 ¹⁾
Electrostatic Discharge Standard (ESD)
LEVEL 4 Criteria A
Air Discharge : 15 KV
Contact discharge : 8 KV
- EN 61000-4-3 ¹⁾
Radiate Field Immunity
LEVEL 3 Criteria A
80MHz - 1GHz / 10V/M with 1kHz tone / 80% modulation.
- EN 61000-4-4 ¹⁾
Fast transients (Burst Immunity)
LEVEL 3 Criteria A
2 KV⁴⁾
- IEC 61000-4-5 ¹⁾
Surge voltage Immunity
LEVEL 3 Criteria A
Common Mode : 2 KV³⁾
Differential Mode : 1 KV⁴⁾
- EN 61000-4-6 ¹⁾
Conducted Immunity
LEVEL 3 Criteria A
150KHz - 80MHz / 10Vrms.
- EN 61000-4-8 ¹⁾
Power frequency magnetic field
LEVEL 3 Criteria A
10A/Meter
- EN 61000-4-11 ²⁾
Voltage dips
Input 100% dip 1 cycle, Main Buffering > 20ms, Self Recoverable
- IEC 61000-4-12 ¹⁾
Low Energy Pulse Test (Ring Wave)
LEVEL 3 Criteria A
Common Mode : 2 KV³⁾
Differential Mode : 1 KV⁴⁾

Galvanic Isolation :

Input / output
 type test/routine test : 4.0 KVac/
 Input / PE
 type test/routine test : 1.5 KVac/
 output / PE
 type test/routine test : 1.5 KVac/

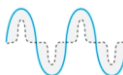
- 1) Criterion A: Normal operating behavior within the defined limits.
 2) Criterion B: Temporary impairment to operational behavior that is corrected by the device itself.
 3) Symmetrical: Conductor to conductor.
 4) Asymmetrical: Conductor to ground.



Delta RoHS Compliant

Restriction of the usage of hazardous substances

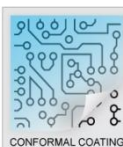
The European directive 2002/95/EC limits the maximum impurity level of homogeneous materials such as lead, mercury, cadmium, chrome+, polybrominated flame retardants PBB and PBDE for the use in electrical and electronic equipment. RoHS is the abbreviation for "Restriction of the use of certain hazardous substances in electrical and electronic equipment". All items in the catalog conform 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.



Conformal Coating

The Protective Coating Technology

Delta Electronics Group has designed the perfect dipping technique which penetrates everywhere including under device, and prevents leakage. The conformal coating dipping can be applied to PCBs or circuit board. The coating preserve the performance of precision electronic primarily by preventing ionizable contaminants such as salt from reaching circuit nodes where the material slumps around sharp edges can be a problem especially in the highly conversing atmosphere.