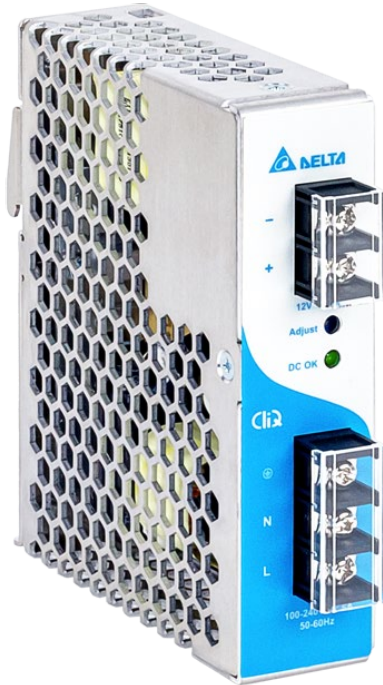


CliQ DIN Rail Power Supply

12 V 60 W 1 Phase / DRP012V060W1AA



Highlights & Features

- Universal AC input voltage range
- Power will not de-rate for the entire input voltage range
- Power Boost of 150% for 3 seconds
- Full corrosion resistant aluminium casing
- Conforms to harmonic current IEC/EN 61000-3-2, Class A
- Multiple wire connections to terminal allowed
- Conformal coating on PCBAs to protect against common dust and chemical pollutants
- Hazardous Locations approval to ATEX and Class I, Div 2
- Certified according to IEC/EN/UL 62368-1

Safety Standards



CB Certified for worldwide use

Model Number: DRP012V060W1AA
Unit Weight: 0.33 kg (0.73 lb)
Dimensions (L x W x D): 121 x 32 x 120 mm
 (4.76 x 1.26 x 4.72 inch)

General Description

The DRP012V060W1AA is part of the CliQ DIN rail power supply series from one of the world's leading power supply companies, Delta Electronics Group. The rugged metal case has a compact body at only 32 mm, which is both shock and vibration resistant according to IEC 60068-2 standard. The product operates within a wide temperature range from -20°C to +80°C. The DRP012V060W1AA features universal AC input voltage range from 85 Vac to 264 Vac and the power will not de-rate for the entire input voltage range. The single phase power supply unit includes overvoltage, overcurrent, over temperature and short circuit protections. The product features built-in Power Boost of 150% for 3 seconds. Such feature enables reserve power to be always available for reliable startup of loads with high inrush current, thus eliminating the need of a more expensive power supply unit at higher power rating. Another great feature is the conformal coating on the PCBA which allows DRP012V060W1AA to be certified to ATEX and Class I, Div 2 for use in hazardous locations.

Model Information

CliQ DIN Rail Power Supply

| Model Number | Input Voltage Range | Rated Output Voltage | Rated Output Current |
|----------------|--------------------------|----------------------|----------------------|
| DRP012V060W1AA | 85-264 Vac (120-375 Vdc) | 12 Vdc | 5.00 A |

Model Numbering

| DR | P | 012V | 060W | 1 | A | A |
|----------|--------------|----------------|--------------|--------------|-------------|------------|
| DIN Rail | Power Supply | Output Voltage | Output Power | Single Phase | CliQ Series | Metal Case |

CliQ DIN Rail Power Supply

12 V 60 W 1 Phase / DRP012V060W1AA

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 |
| DC Input Voltage Range* | 120-375 Vdc |
| Input Current | < 1.35 A @ 115 Vac, < 0.80 A @ 230 Vac |
| Efficiency at 100% Load | > 86.0% @ 115 Vac & 230 Vac |
| Max Power Dissipation | 0% load < 0.45 W @ 115 Vac, < 1.0 W @ 230 Vac |
| | 100% load < 9.7 W @ 115 Vac & 230 Vac |
| Max Inrush Current (Cold Start) | < 50 A @ 115 Vac, < 100 A @ 230 Vac |
| Leakage Current | < 1 mA @ 240 Vac |

*Safety approval according to IEC/EN/UL 60950-1 and IEC/EN/UL 62368-1.

Output Ratings / Characteristics**

| | |
|--|--|
| Nominal Output Voltage | 12 Vdc |
| Factory Set Point Tolerance | 12 Vdc \pm 2% |
| Output Voltage Adjustment Range | 11-14 Vdc |
| Output Current | 5.00 A (continuously operating at 12 V) 7.50 A (Power Boost for 3 seconds at 12 V, refer to the details in the Functions section) |
| Output Power | 60 W (continuously operating at 12 V) 90 W (Power Boost for 3 seconds at 12 V, refer to the details in the Functions section) |
| Line Regulation | < 0.5% (@ 85-264 Vac input, 100% load) |
| Load Regulation | < 1% (@ 85-264 Vac input, 0-100% load) |
| PARD*** (20MHz) | < 100 mVpp |
| Rise Time | < 20 ms @ nominal input (100% load) |
| Start-up Time | < 2,500 ms @ nominal input (100% load) |
| Hold-up Time | > 22 ms @ 115 Vac, > 110 ms @ 230 Vac (100% load) |
| Dynamic Response (Overshoot & Undershoot O/P Voltage) | \pm 5% @ 85-264 Vac input, 0-100% load (Slew Rate: 0.1 A/ μ s, 50% duty cycle @ 5 Hz to 1 KHz) |
| Start-up with Capacitive Loads | 8,000 μ F Max |

**For power de-rating from 50°C to 80°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 μ F ceramic capacitor & 47 μ F electrolytic capacitor.

CliQ DIN Rail Power Supply

12 V 60 W 1 Phase / DRP012V060W1AA

Mechanical

| | |
|-----------------------------------|--|
| Case Cover / Chassis | Aluminium |
| Dimensions (L x W x D) | 121 x 32 x 120 mm (4.76 x 1.26 x 4.72 inch) |
| Unit Weight | 0.33 kg (0.73 lb) |
| Indicator | Green LED |
| Cooling System | Convection |
| Terminal | Input |
| | Output |
| Wire | Input / Output |
| Mounting Rail | Standard TS35 DIN Rail in accordance with EN 60715 |
| Noise (1 Meter from power supply) | Sound Pressure Level (SPL) < 40 dBA |

Environment

| | | |
|-----------------------------|---------------------|--|
| Surrounding Air Temperature | Operating | -20°C to +80°C |
| | Storage | -25°C to +85°C |
| Power De-rating | Vertical Mounting | > 50°C de-rate power by 2.5% / °C, |
| | Horizontal Mounting | > 70°C de-rate power by 4% / °C |
| Operating Humidity | | 5 to 95% RH (Non-Condensing) |
| Operating Altitude | | 0 to 2,000 Meters (6,560 ft) |
| Shock Test | Non-Operating | IEC 60068-2-27, 30 G (300 m/S ²) for a duration of 18 ms, 1 time per direction, 2 times in total |
| Vibration | Non-Operating | IEC 60068-2-6, 10 Hz to 500 Hz @ 50 m/S ² (5 G peak); 90 min per axis for all X, Y, Z direction |
| Over Voltage Category | III | According to IEC/EN 62477-1 (clearance and creepage distances) |
| Pollution Degree | | 2 |

Protections

| | |
|--------------------------|--|
| Overvoltage | 16 V, +10% / -5%, SELV Output, Hiccup Mode, Non-Latching (Auto-Recovery) |
| Overload / Overcurrent | > 150% of rated load current, Hiccup Mode, Non-Latching (Auto-Recovery) |
| Over Temperature | < 80°C Surrounding Air Temperature @ 100% load, Non-Latching (Auto-Recovery) |
| Short Circuit | Hiccup Mode, Non-Latching (Auto-Recovery when the fault is removed) |
| Internal Fuse at L pin | T3.15 AH |
| Protection Against Shock | Class I with PE* connection |

*PE: Primary Earth

Reliability Data

| | |
|------------------------|--|
| MTBF | > 500,000 hrs. as per Telcordia SR-332 I/P: 115 Vac, O/P: 100% load, Ta: 25°C |
| Expected Cap Life Time | 10 years (115 Vac & 230 Vac, 50% load @ 40°C) |

CliQ DIN Rail Power Supply

12 V 60 W 1 Phase / DRP012V060W1AA

Safety Standards / Directives

| | | |
|--|-------------------|--|
| Electrical Equipment for Use in Electrical Power Installations | | IEC/EN/BS EN 62477-1 |
| Safety Entry Low Voltage | | SELV (IEC 60950-1) |
| Electrical Safety | TUV Bauart | 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) |
| | CB Scheme | IEC 60950-1, IEC 62368-1 |
| | UKCA | BS EN 62368-1 |
| Industrial Control Equipment | UL/cUL listed | UL 508 and CSA C22.2 No. 107.1-01 (File No. E315355) |
| | CSA | CSA C22.2 No. 107.1-01 (File No. 181564) |
| Hazardous Location / ATEX | cCSAus | CSA C22.2 No. 213-M1987, ANSI / ISA 12.12.01:2011 [Class I, Division 2, Group A, B, C, D T4, Ta= -20°C to +80°C (> +50°C derating)] |
| | ATEX | EN 60079-0:2012, EN 60079-15:2010 [Ex II 3G Ex nA IIC T4 Gc, Ta= -20°C to +80°C (> +50°C derating)] Certificate No. EPS 12 ATEX 1 491 X |
| CE | | In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU In conformance with Equipment for explosive atmospheres (ATEX) directive 2014/34/EU |
| UKCA | | In conformance with Electrical Equipment (Safety) Regulations 2016 No. 1011 and The Electromagnetic Compatibility Regulations 2016 No. 1091 |
| Galvanic Isolation | Input to Output | 4.0 KVac |
| | Input to Ground | 1.5 KVac |
| | Output to Ground | 1.5 KVac |

CliQ DIN Rail Power Supply

12 V 60 W 1 Phase / DRP012V060W1AA

EMC

| | | |
|-----------------------------------|----------------|--|
| Emissions (CE & RE) | | Generic Standards: CISPR 32, EN/BS EN 55032, KN 32, CISPR 11, EN/BS EN 55011, FCC Title 47: Class B |
| Immunity | | Generic Standards: EN/BS EN 55024, KN 35, EN/BS EN 61000-6-1, EN/BS EN 61000-6-2 |
| 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, 80% modulation (1 kHz) 1.4 GHz-2 GHz, 3 V/M, 80% modulation (1 kHz) 2 GHz-2.7 GHz, 1 V/M, 80% modulation (1 kHz) |
| 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⁾ 30 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 |
| Harmonic Current Emission | | IEC/EN/BS EN 61000-3-2, Class A |
| Voltage Fluctuation and Flicker | | IEC/EN/BS EN 61000-3-3 |

1) Criteria A: Normal performance within the specification limits

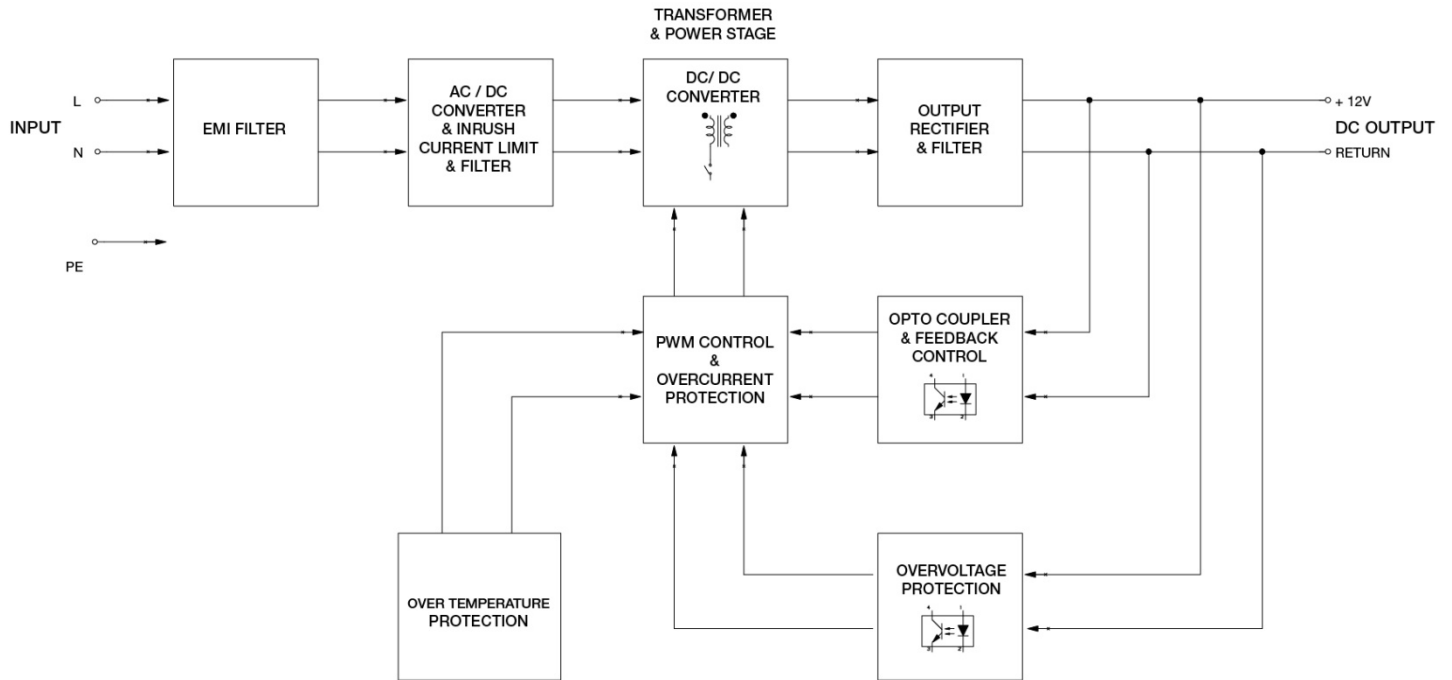
2) Asymmetrical: Common mode (Line to earth)

3) Symmetrical: Differential mode (Line to line)

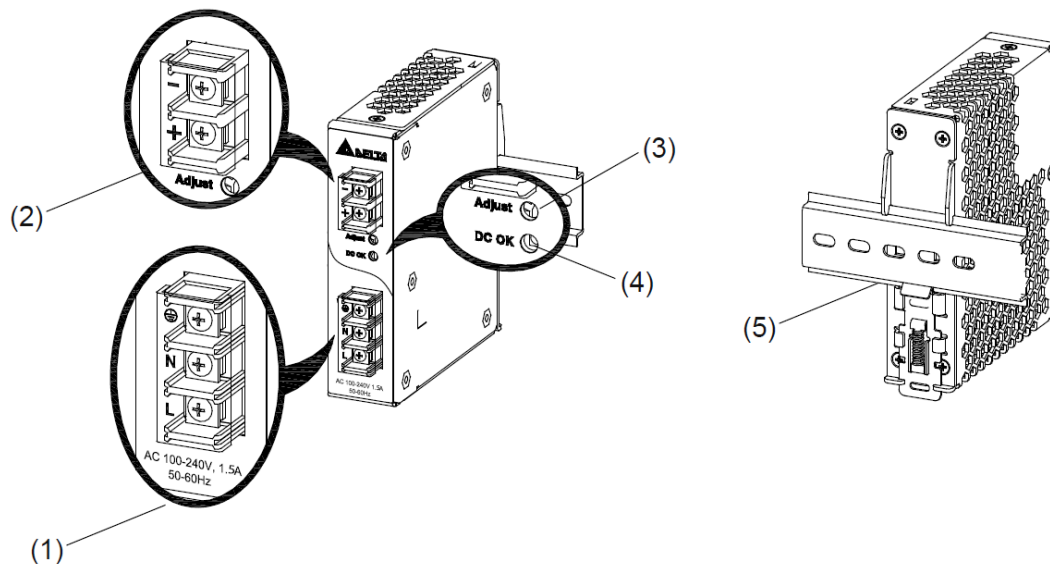
CliQ DIN Rail Power Supply

12 V 60 W 1 Phase / DRP012V060W1AA

Block Diagram



Device Description



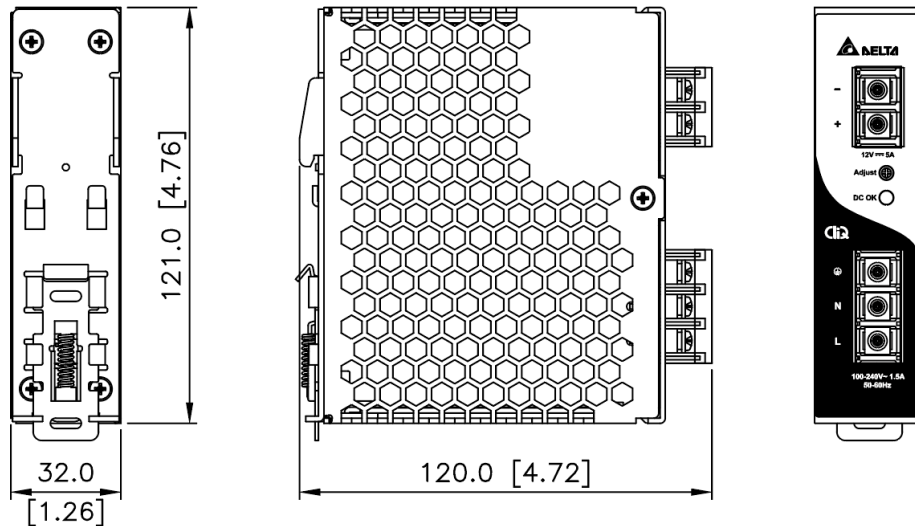
- 1) Input terminal block connector
- 2) Output terminal block connector
- 3) DC Voltage adjustment potentiometer
- 4) DC OK control LED (Green)
- 5) Universal mounting rail system

CliQ DIN Rail Power Supply

12 V 60 W 1 Phase / DRP012V060W1AA

Dimensions

L x W x D: 121 x 32 x 120 mm (4.76 x 1.26 x 4.72 inch)



Engineering Data

Output Load De-rating VS Surrounding Air Temperature

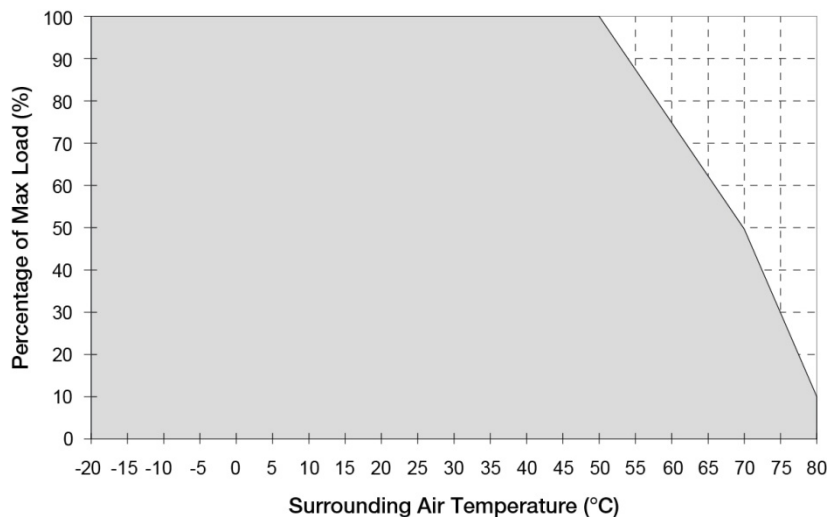


Fig. 1 De-rating for Vertical and Horizontal Mounting Orientation
 > 50°C de-rate power by 2.5% / °C,
 > 70°C de-rate power by 4% / °C

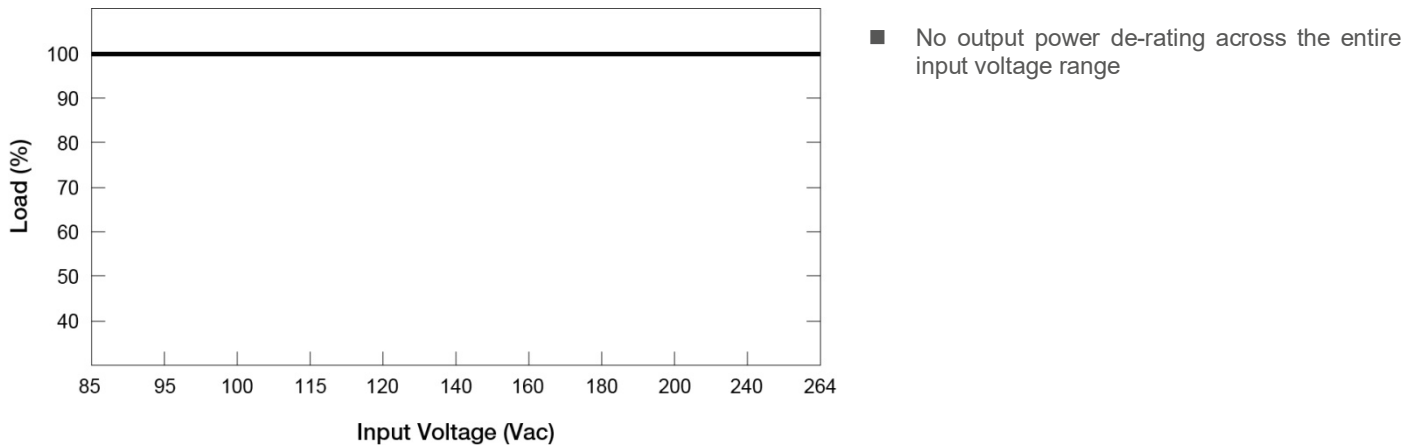
Note

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.

CliQ DIN Rail Power Supply

12 V 60 W 1 Phase / DRP012V060W1AA

Output Load De-rating VS Input Voltage



Assembly & Installation

The power supply unit (PSU) can be mounted on 35 mm DIN rails in accordance with EN 60715. The device should be installed with input terminal block at the bottom.

Each device is delivered ready to install.

Mounting

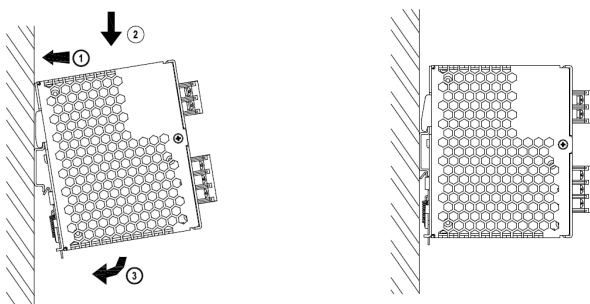


Fig. 2.1 Mounting

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

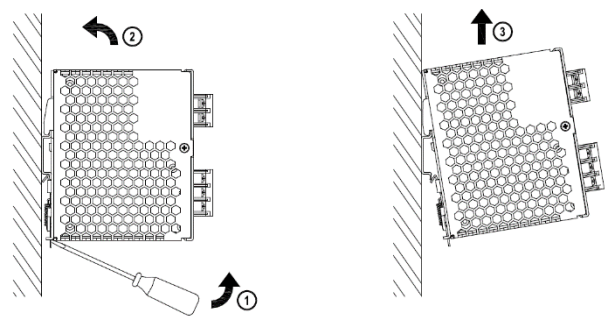


Fig. 2.2 Dismounting

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.

In accordance with EN 60950 / UL 60950 and EN 62368 / UL 62368, flexible cables require ferrules.

Use appropriate copper cables designed to sustain operating temperature of at least 75°C or more to fulfill UL requirements.

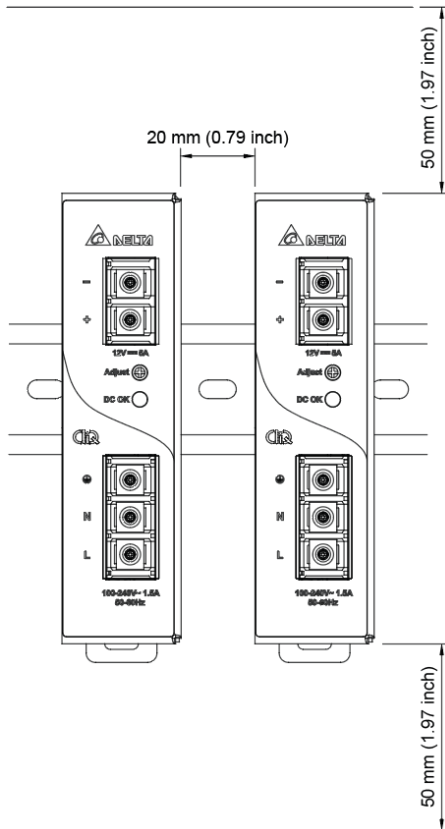
For stranded wires it is recommended to use suitable lug to crimp wires.

CliQ DIN Rail Power Supply

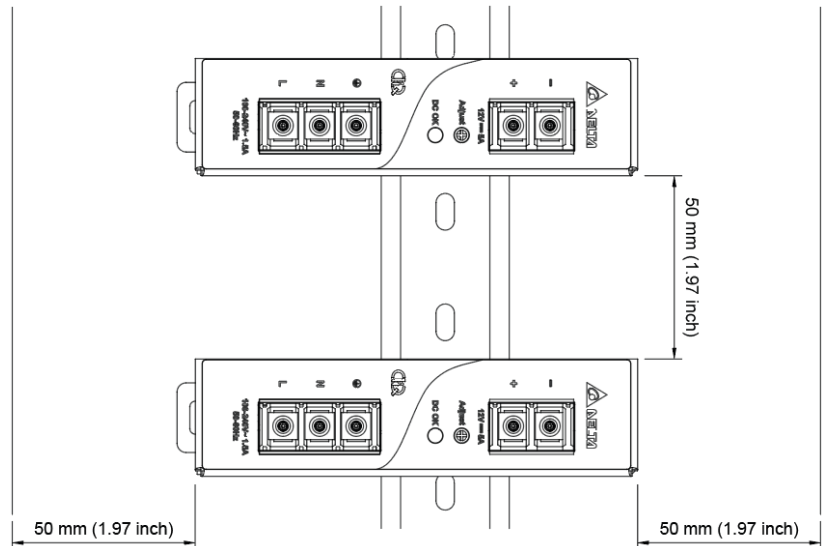
12 V 60 W 1 Phase / DRP012V060W1AA

Safety Instructions

■ Vertical Mounting



■ Horizontal Mounting



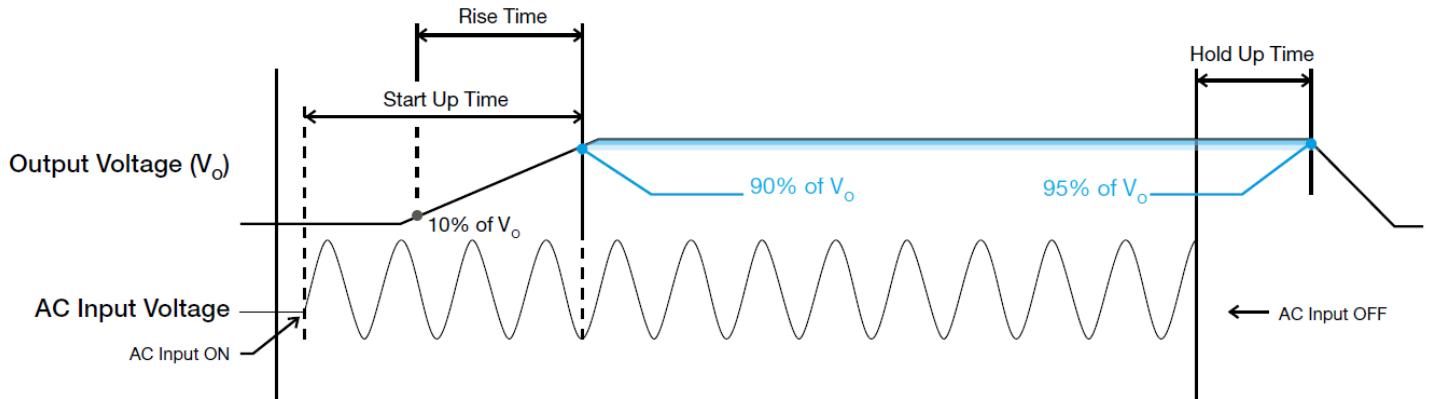
- ALWAYS switch mains of input power OFF before connecting and disconnecting the input voltage to the unit. If mains are not turned OFF, there is risk of explosion / severe damage.
- To guarantee sufficient convection cooling, please refer to the following instructions to ensure sufficient clearance around the device.
Vertical Mounting: 50 mm (1.97 inch) above and below the device as well as a lateral distance of 20 mm (0.79 inch) to other units.
Horizontal Mounting: 50 mm (1.97 inch) above and below the device as well as a lateral distance of 50 mm (1.97 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!
- Only plug in and unplug connectors when power is turned off!
- 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.
- CAUTION: "For use in a controlled environment".
- The power supplies unit must be installed in an IP54 enclosure or cabinet in the final installation. The enclosure or cabinet must comply with EN 60079-0 or EN 60079-15.
- Warning: Explosion Hazard - Substitution of components may impair suitability for Class I, Division 2.
- Warning: Explosion Hazard - Do not disconnect equipment or adjust potentiometer unless the power has been switched off or the area is known to be non-hazardous.

CliQ DIN Rail Power Supply

12 V 60 W 1 Phase / DRP012V060W1AA

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

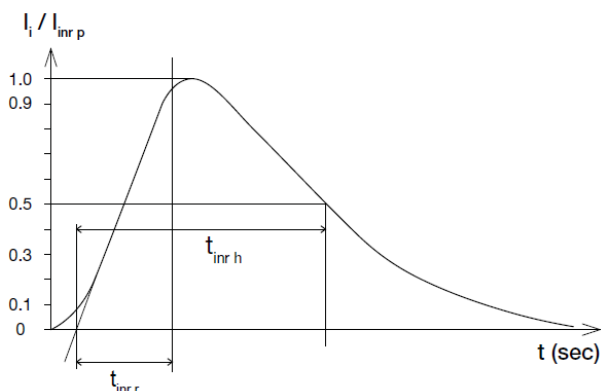
The time required for the output voltage to change from 10% to 90% of its final steady state set value.

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

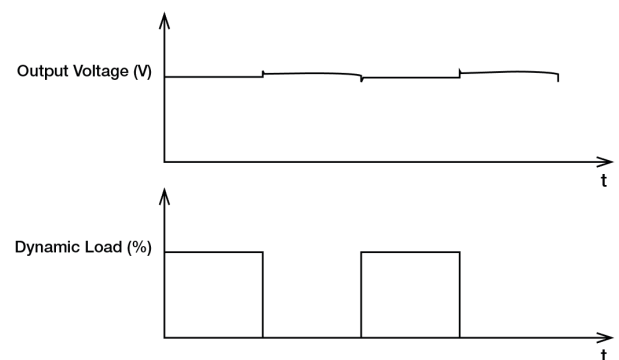
Inrush current is the peak, instantaneous, input current measured and, occurs when the input voltage is first applied. For AC input voltages, the maximum peak value of inrush current will occur during the first half cycle of the applied AC voltage. This peak value decreases exponentially during subsequent 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 0 to 100% of its rated current.

- 50% duty cycle / 5 Hz to 1 KHz



CliQ DIN Rail Power Supply

12 V 60 W 1 Phase / DRP012V060W1AA

Power Boost

Power Boost is the reserve power available constantly that allows reliable startup to support sudden and short spike of loads with high inrush current typically during turn on to remove the need of more expensive higher rated power supply unit. After the output has reached its steady state set value, the power supply can support surge loads with a higher short-term power demand up to 150% of maximum rated load (I_O Max), for a maximum duration of 3 seconds. The Power Boost is also available to repeatedly basis with according to the condition of an average (R.M.S) output power shall not exceed continuous operating condition or refer to duty cycle calculation below.

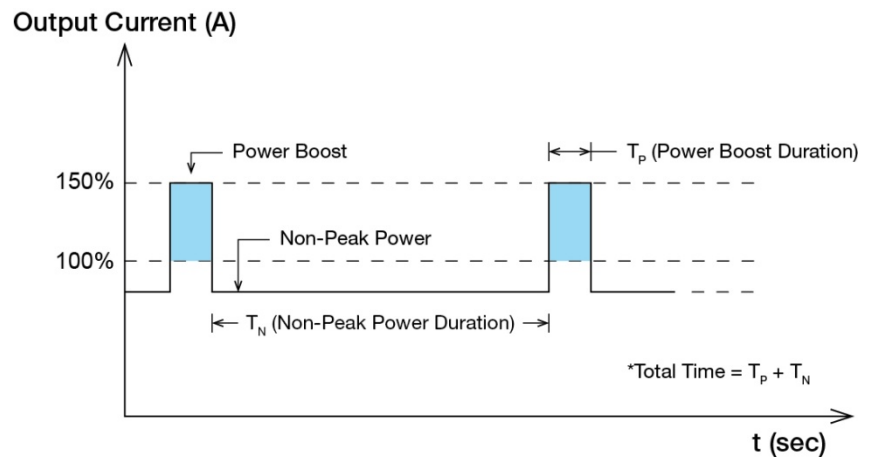


Fig. 2 Duty Cycle Calculation

$$\text{Duty cycle (\%)} = \frac{T_p}{\text{Total Time}}$$

$$\text{Average Output Power (P}_{Avg}\text{)} = \frac{(\text{Power Boost} \times T_p) + (\text{Non-Peak Power} \times T_N)}{\text{Total Time}}$$

OR

$$\text{Non-Peak Power} = \frac{(P_{Avg} \times \text{Total Time}) - (\text{Power Boost} \times T_p)}{T_N}$$

■ An example of Power Boost and Average Output Power

| Power Boost | Peak Power (W _P) | Power Boost Duration (T _P) | Duty Cycle | Non-Peak Power (W _N) | Non-Peak Power Duration (T _N) | Total Time (T) |
|-------------|------------------------------|--|------------|----------------------------------|---|----------------|
| 150% | 90 | 3 sec | 10% | 57 W | 27 sec | 30 sec |
| 150% | 90 | 3 sec | 35% | 44 W | 5.5 sec | 8.5 sec |
| 120% | 72 | 6 sec | 20% | 57 W | 24 sec | 30 sec |
| 120% | 72 | 6 sec | 35% | 53 W | 11 sec | 17 sec |

It is not recommended to prolong the duration of Power Boost to be longer than the specified duty cycle calculation, this may cause damage to the PSU.

External Input Protection Device

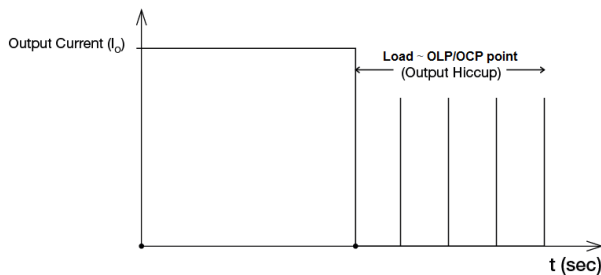
The unit is protected at the L pin, with an internal fuse that cannot be replaced. The power supply has been tested and approved on 20 A (UL) and 16 A (IEC) branch circuits without additional protection device. An external protection device is only required if the supplying branch has an ampacity greater than above. Thus, if an external protective device is necessary, or, utilized, please refer a minimum value of 20 A B- or 10 A C- characteristic breaker.

CliQ DIN Rail Power Supply

12 V 60 W 1 Phase / DRP012V060W1AA

Overload & Overcurrent Protections (Auto-Recovery)

The power supply's Overload (OLP) and Overcurrent (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.



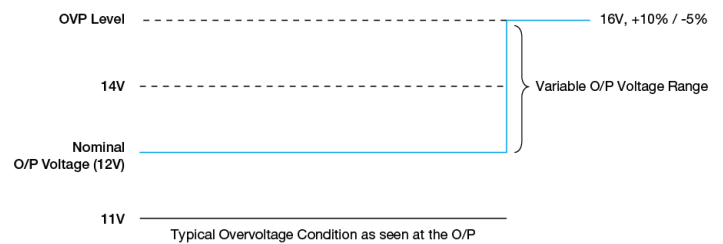
It is not recommended to prolong the duration of I_O when it is less than OLP/OCP point, but greater than 100%, since it may cause damage to the PSU.

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". The power supply doesn't shut down but goes in 2nd level regulation at 15-16 Vdc and continue to deliver the power. According to high output voltage which will be operating > 100% of rated load (16 V × rated output current), if this condition persists, the power supply will sense OTP (Over Temperature Protection) and will go under hiccup mode. The power will return to normal operation once the fault condition is removed.



Over Temperature Protection (Auto-Recovery)

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.

CliQ DIN Rail Power Supply

12 V 60 W 1 Phase / DRP012V060W1AA

Others

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 PCBA's or circuit board. The coating preserves the performance of precision electronic primarily by preventing ionizable contaminants such as salt from reaching circuit nodes, where the material slumps around sharp edges. This can be a problem especially in highly conversing atmosphere.

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

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.

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Mouser Electronics

Authorized Distributor

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