

CliQ II Redundancy Modules

20 A / DRR-20□, 40 A / DRR-40□



Highlights & Features

- Wide input and output range of 22-60 Vdc
- Very wide operating temperature from -40°C to +80°C
- Built-in 2 channel DC OK signal and alarm relay contact
- Support N+1 Redundancy connection
- Conformal coating on PCBAs to protect against common dust and chemical pollutants
- Hazardous Locations approval to ATEX and Class I, Div 2 (DRR-20A and DRR-40A)
- IP20 Certified
- Certified according to IEC/EN/UL 62368-1

Safety Standards



CB Certified for worldwide use

Model Number:	DRR-20□, DRR-40□
Unit Weight:	0.38 kg (0.84 lb), 0.52 kg (1.15 lb)
Dimensions (H x W x D):	121 x 50 x 122.1 mm (4.76 x 1.97 x 4.81 inch)

General Description

Delta's CliQ II redundancy modules offer a variable input and output voltage from 22 Vdc to 60 Vdc. The DRR-20□ and DRR-40□ can operate over a wide temperature range of -40°C to +80°C. The state-of-the-art design is made to withstand harsh industrial environments. The rugged, compact aluminium case is shock and vibration resistant according to IEC 60068-2 standard. Due to the wide input and output voltage range from 22 Vdc to 60 Vdc, the redundancy modules are able to support power supply in parallel operation. These modules also have an alarm relay contact as an indicator.

Model Information

CliQ II Redundancy Module

Model Number	Input Voltage Range	Rated Output Voltage	Rated Output Current
DRR-20□	22-60 Vdc	$V_{in}-0.65$ V (typ.)	20.0 A
DRR-40□	22-60 Vdc	$V_{in}-0.65$ V (typ.)	40.0 A

Model Numbering

DR	R -	XXA	□
DIN Rail	Redundancy Module	Output Current 20 - 20 A 40 - 40 A	A - Metal Case, with Class I, Div N - Metal Case, without Class I, Div 2

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Specifications

Input Ratings / Characteristics

Nominal Input Voltage	24 Vdc and 48 Vdc		
Input Voltage Range	22-60 Vdc		
Input Current	DRR-20□	20 A Max (1+1 Redundancy) = Nominal 2 x 12.5 A (N+1 Redundancy) = Nominal 2 x 10 A (Single Use) = Nominal 20 A	
	DRR-40□	40 A Max (1+1 Redundancy) = Nominal 2 x 25 A (N+1 Redundancy) = Nominal 2 x 20 A (Single Use) = Nominal 40 A	
Efficiency	> 97.0% typ.		
Max Power Dissipation	Standby Mode		
	Operating Mode	DRR-20□	< 15 W
		DRR-40□	< 40 W
Input Voltage Alarm / Relay Contacts*	24 V System: Both V_{in1} & V_{in2} > 18 V \pm 5% or < 30 V Max 48 V System: Both V_{in1} & V_{in2} > 36 V \pm 5% or < 60 V Max		

*The LED will turn on when the V_{in1} & V_{in2} > 18 V \pm 5% (for 24 V system) or > 36 V \pm 5% (for 48 V system) and not more than 30 V (for 24 V system) or not more than 60 V (for 48 V system). The relay contacts will be closed. If V_{in1} & V_{in2} are under or over this range, the LED will turn off.

Output Ratings / Characteristics

Nominal Output Voltage Range	$V_{in}-0.65$ V (typ.)	
Output Current	DRR-20□	20 A Max
	DRR-40□	40 A Max
Voltage Drop ($V_{in}-V_{out}$)	0.65 V typ.	

Mechanical

Case Cover / Chassis	Aluminium	
Dimensions (H x W x D)	121 x 50 x 122.1 mm (4.76 x 1.97 x 4.81 inch)	
Unit Weight	DRR-20□	0.38 kg (0.84 lb)
	DRR-40□	0.52 kg (1.15 lb)
LED Indicators	Green LED	DC OK: V_{in1} and V_{in2}
Cooling System	Convection	
Terminal	DRR-20□	Input: 3 Pins (Rated 300 V / 30 A) Output: 4 Pins (Rated 300 V / 30 A)
	DRR-40□	Input: 5 Pins (Rated 300 V / 30 A) Output: 5 Pins (Rated 300 V / 30 A)
Wire	Input / Output	AWG 12-10
Mounting Rail	Standard TS35 DIN Rail in accordance with EN 60715	
Noise (1 Meter from power supply)	Sound Pressure Level (SPL) < 40 dBA	

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Environment

Surrounding Air Temperature	Operating	-40°C to +80°C
	Storage	-40°C to +85°C
Power De-rating	Vertical Mounting	> 50°C de-rate power by 2.5% / °C
	Horizontal Mounting	> 50°C de-rate power by 2.5% / °C
Operating Humidity	5 to 95% RH (Non-Condensing)	
Operating Altitude	0 to 2,500 Meters (8,200 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 @ 30 m/s ² (3 G peak); 60 min per axis for all X, Y, Z direction
Over Voltage Category	III	According to IEC/EN 62477-1 / EN 60204-1 (clearance and creepage distances) and IEC 62103 (safety part)
Pollution Degree	2	

Protections

Overload / Overcurrent*	DRR-20□	< 25 A, No Damage
	DRR-40□	< 50 A, No Damage
Short Circuit	DRR-20□	< 25 A, No Damage
	DRR-40□	< 50 A, No Damage
Degree of Protection	IP20	
Protection Against Shock	Class III with PE** connection	

*The overload condition must be controlled by the PSUs in parallel. The limit of input current should not be more than 25 A (for 20 A module) or not more than 50 A (for 40 A module).

**PE: Primary Earth

Reliability Data

MTBF	> 800,000 hrs. as per Telcordia SR-332 I/P: 24 Vdc and 48 Vdc, O/P: 100% load, Ta: 25°C
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Safety Standards / Directives

Electrical Equipment of Machines		EN/BS EN 60204-1 (over voltage category III)
Electrical Equipment for Use in Electrical Power Installations		IEC/EN/BS EN 62477-1 / IEC 62103
Electrical Safety	SIQ 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 recognized	UL 508 and CSA C22.2 No. 107.1-01 (File No. E315355)
Hazardous Location / ATEX (For DRR-20A and DRR-40A)	cCSAus	CSA C22.2 No. 213-M1987 and ANSI / ISA 12.12.01:2007 [Class I, Division 2, Group A, B, C, D T4, Ta= -40°C to +80°C (> +50°C derating)]
	ATEX	EN 60079-0:2009, EN 60079-15:2010 [Ex] II 3G Ex nA nC IIC T4 Gc, Ta= -40°C to +80°C (> +50°C derating)] Certificate No. EPS 12 ATEX 1 491 X
KC		K 60950-1 (DRR-40N only)
CE		In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU For DRR-20A and DRR-40A: 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 & Output / PE	1.5 KVac

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EMC

Emissions (CE & RE)		Generic Standards: CISPR 32, EN/BS EN 55032, KN 32 (DRR-20N and DRR-40N only), EN/BS EN 55011, FCC Title 47: Class B
Immunity		Generic Standards: EN/BS EN 55024, EN/BS EN 61000-6-2 KN 35 (DRR-20N and DRR-40N only)
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)
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	Level 3 Criteria A ¹⁾ Additional 100% dip; 1 cycle (20 ms); No Damage
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

Note: Product intended to be used as Apparatus with AC-DC Power Supply, EMC compliance to be verified in correspondence to the connected units.

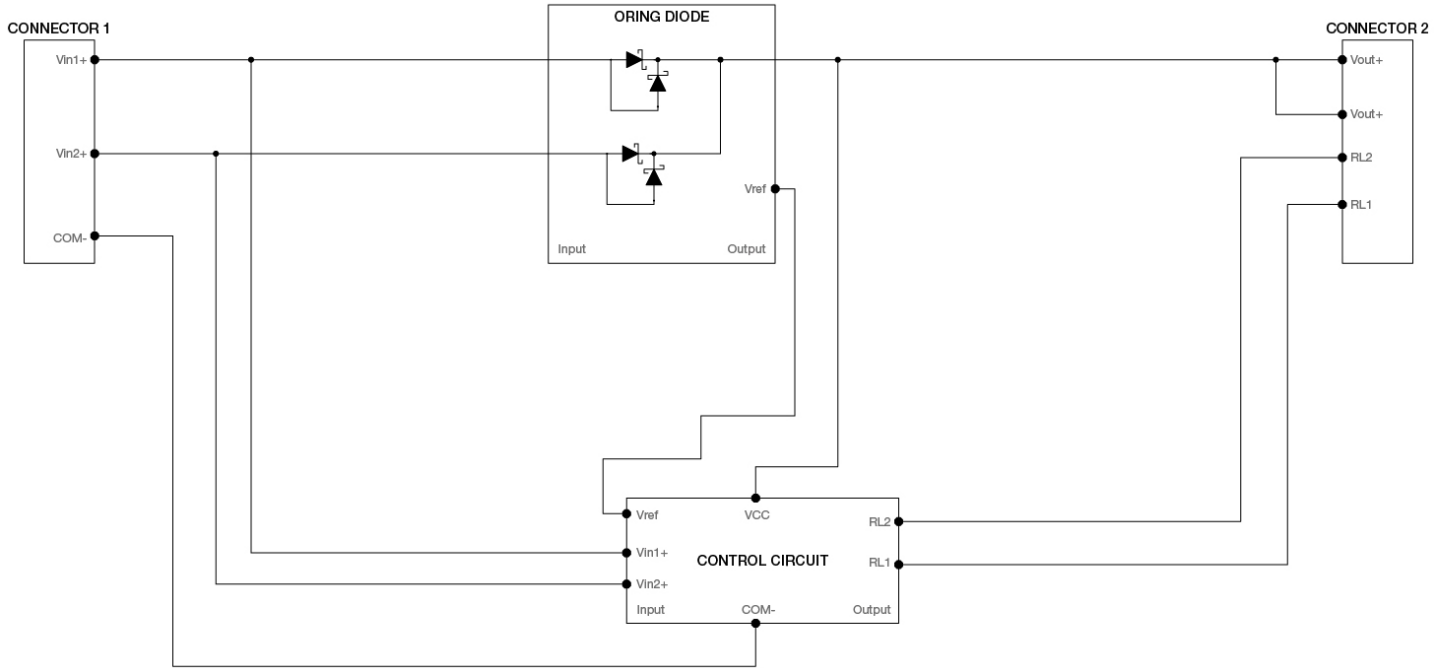
- 1) Criteria A: Normal performance within the specification limits
 2) Asymmetrical: Common (Line to earth)
 3) Symmetrical: Differential mode (Line to line)

CliQ II Redundancy Modules

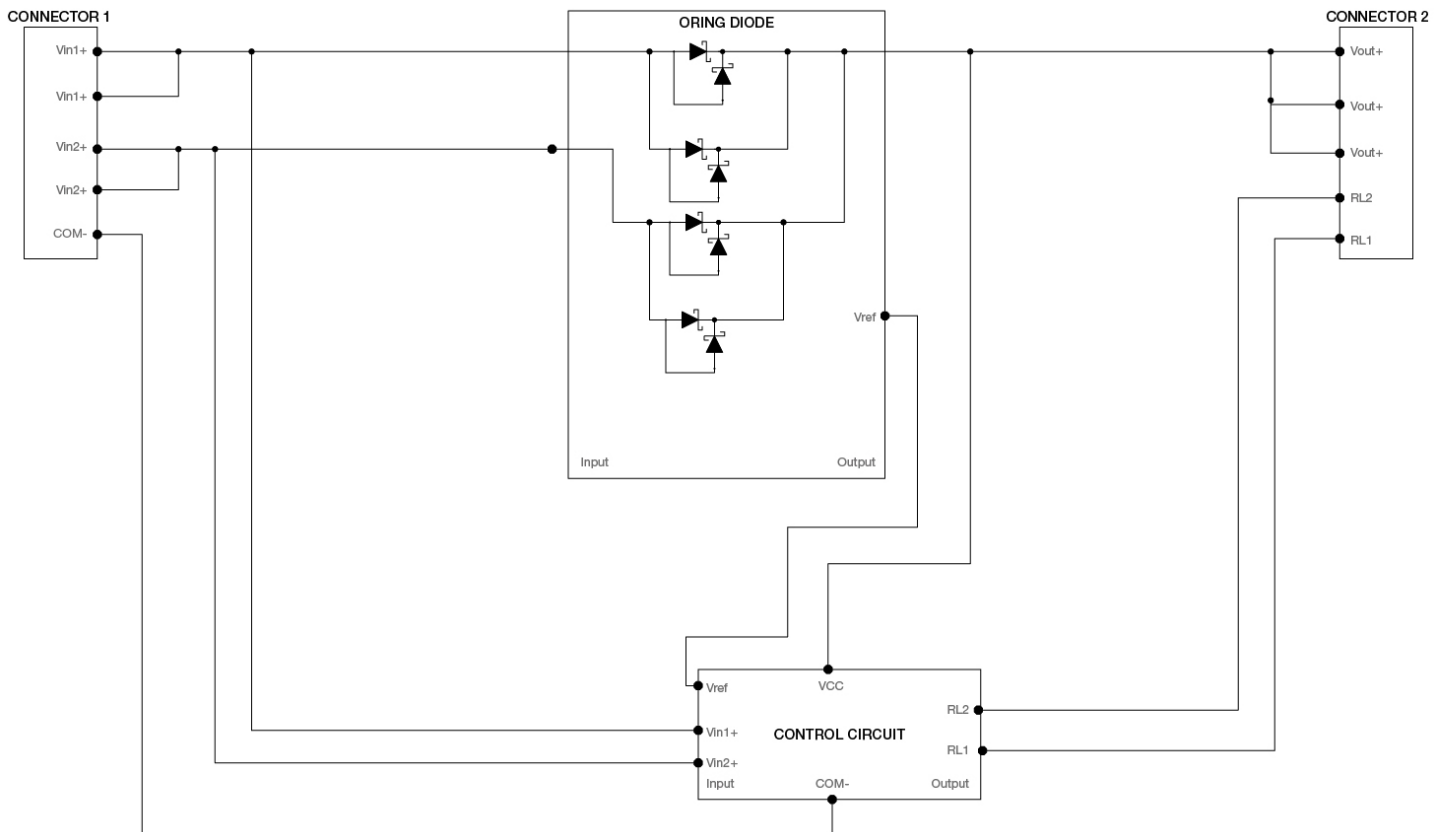
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Block Diagram

DRR-20□



DRR-40□

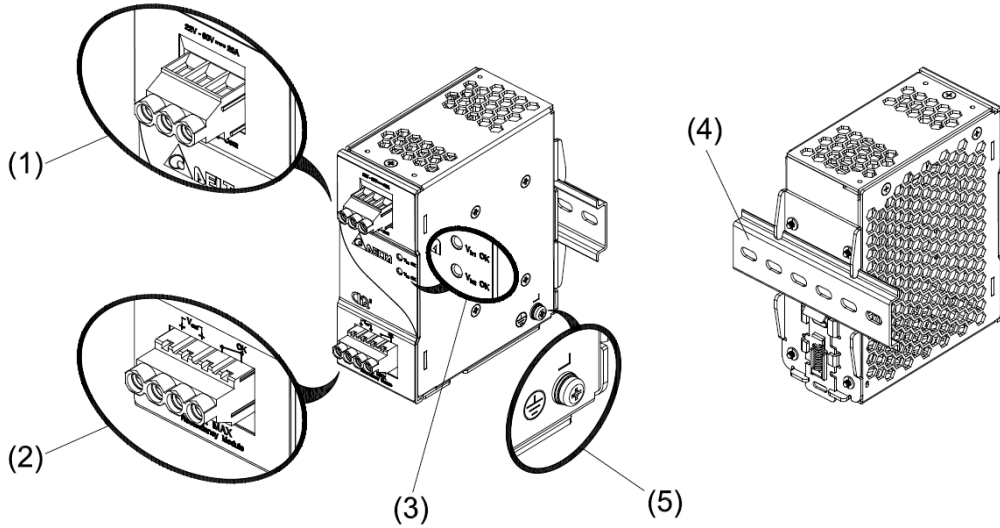


CliQ II Redundancy Modules

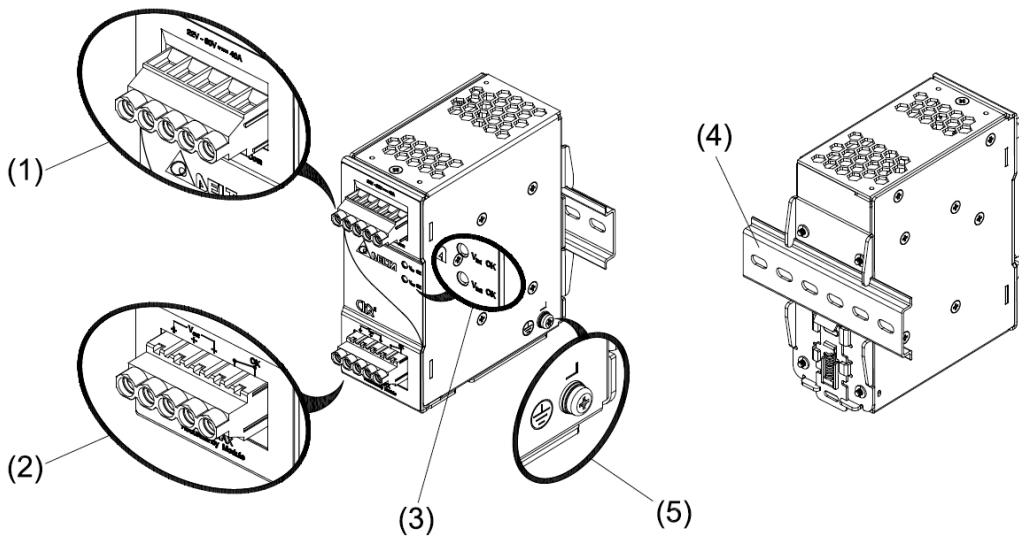
20 A / DRR-20□, 40 A / DRR-40□

Device Description

DRR-20□



DRR-40□



- 1) Input terminal block connector
- 2) Output terminal block connector
- 3) LED indicator of V_{in1} & V_{in2}
- 4) Universal mounting rail system
- 5) Earth connection

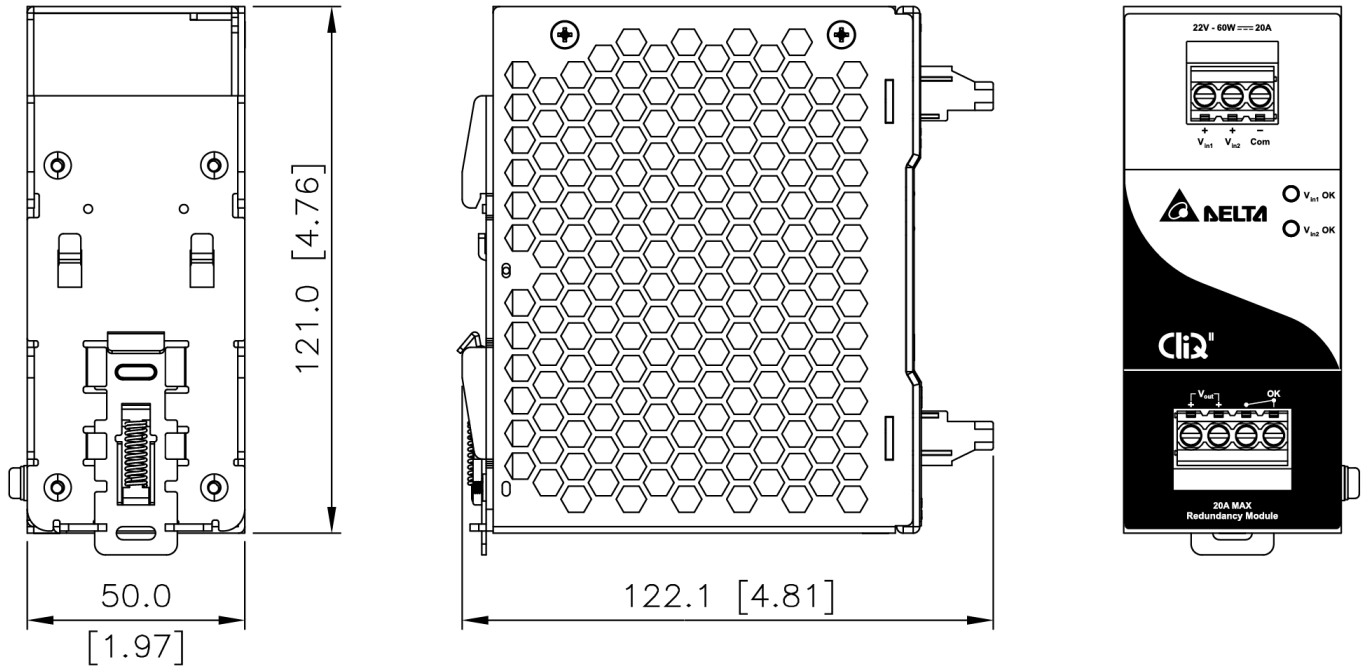
CliQ II Redundancy Modules

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Dimensions

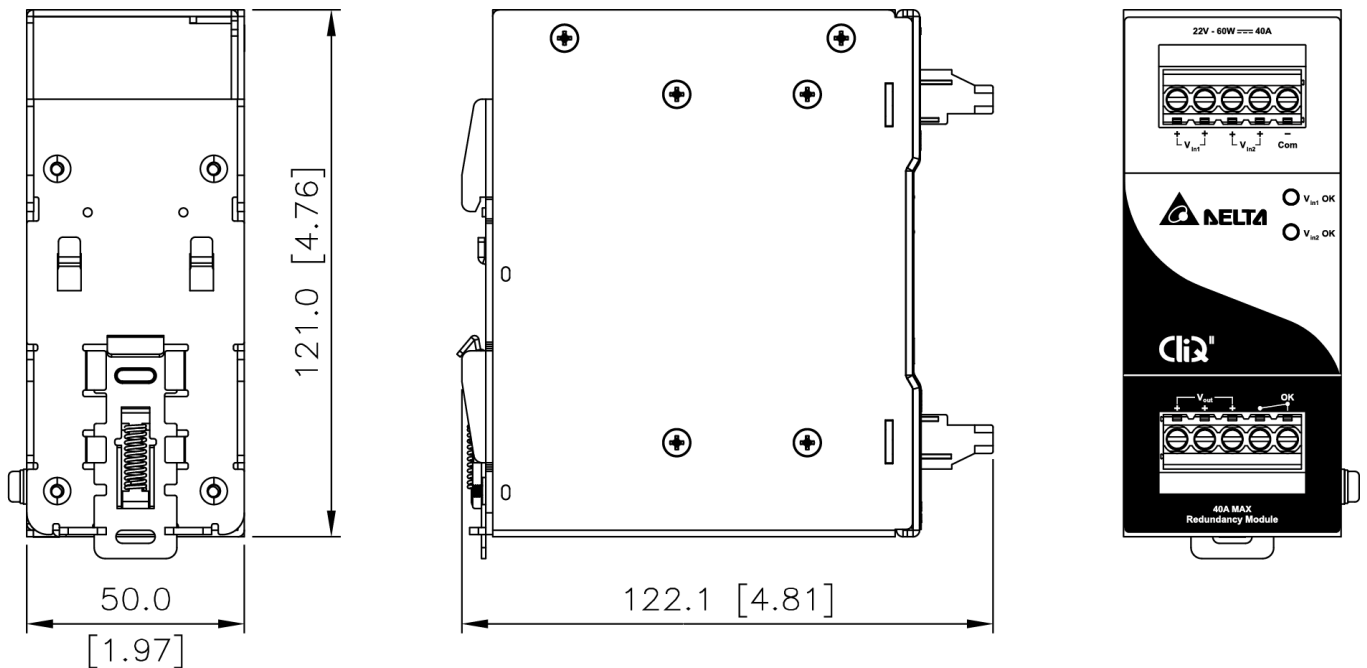
DRR-20□

H x W x D: 121 x 50 x 122.1 mm (4.76 x 1.97 x 4.81 inch)



DRR-40□

H x W x D: 121 x 50 x 122.1 mm (4.76 x 1.97 x 4.81 inch)



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Engineering Data

Output Load De-rating VS Surrounding Air Temperature

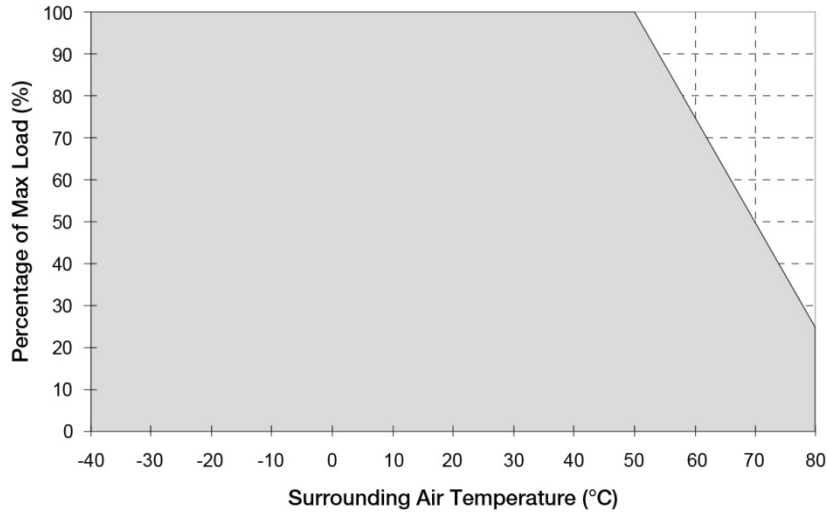


Fig. 1 De-rating for Vertical and Horizontal Mounting Orientation
 > 50°C de-rate power by 2.5% / °C

Note

1. The unit may degrade, or be damaged, when it 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 have some thermal stress problem and the ORing Diodes may become too hot.
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.

Assembly & Installation

The unit can be mounted on 35 mm (1.38 inch) DIN rails in accordance with EN 60715. The device should be installed with input terminal block at the top.

Each device is delivered ready to install.

Mounting

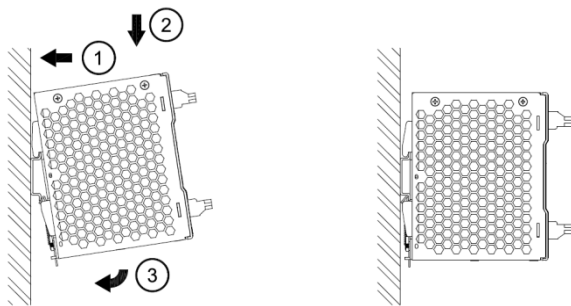


Fig. 2.1 Mounting

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

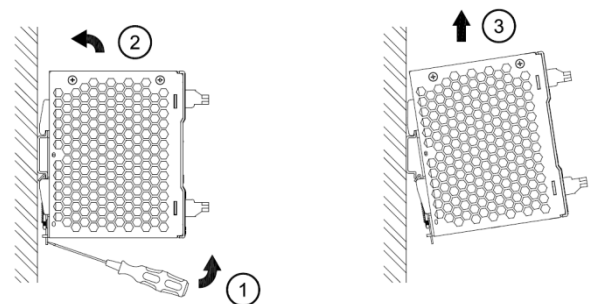


Fig. 2.2 Dismounting

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

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

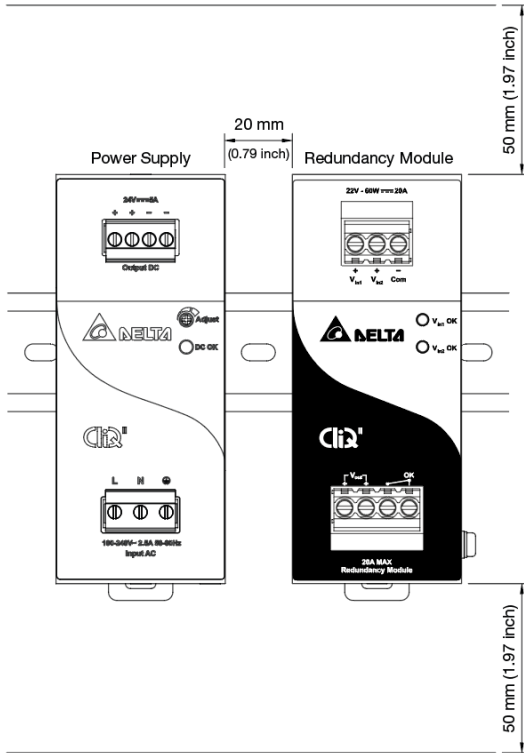
Use appropriate copper cables designed to sustain operating temperature of 60°C / 75°C or more to fulfill UL requirements.

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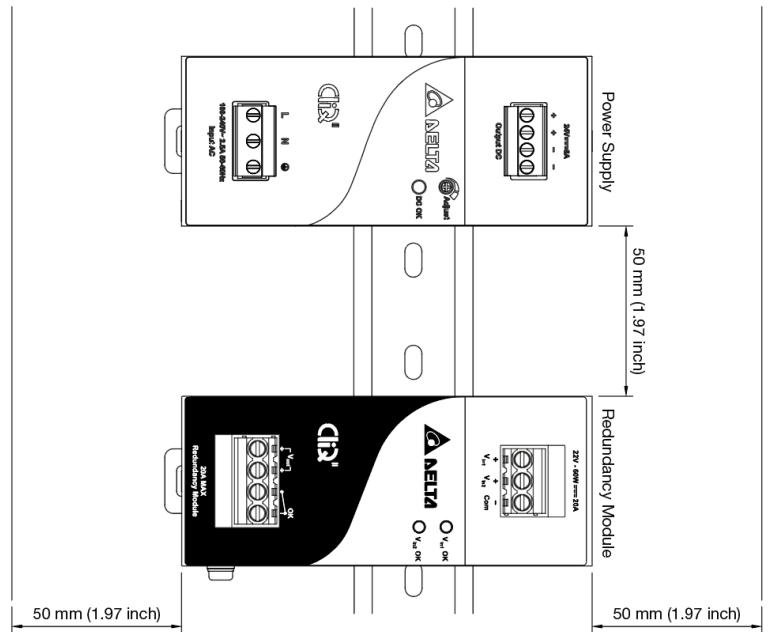
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Safety Instructions

■ 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!
- The main power must be turned off before connecting or disconnecting wires to the terminals!
- 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 supply of the unit shall comply with any isolated secondary circuit according to UL 508, Clause 32.

For DRR-20A and DRR-40A:

- The 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 unless the power has been switched off or the area is known to be non-hazardous.

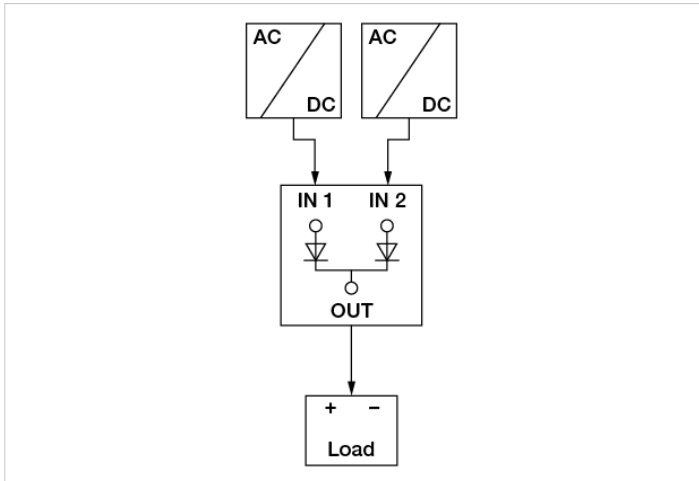
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Functions

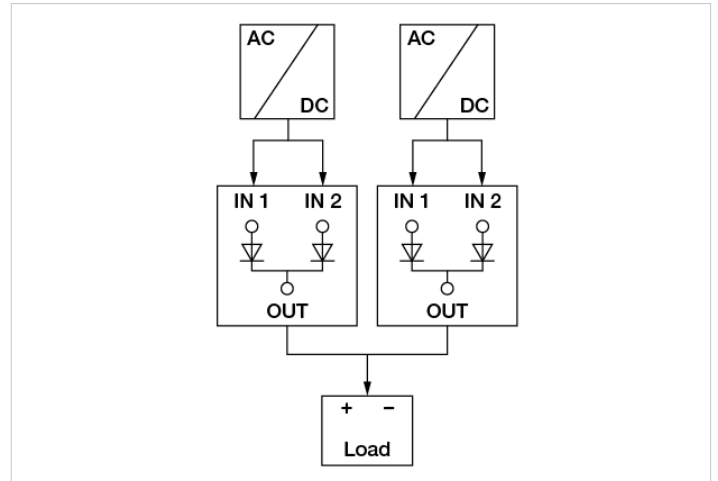
Typical Application Notes

Fig. 3.1 1+1 Redundancy



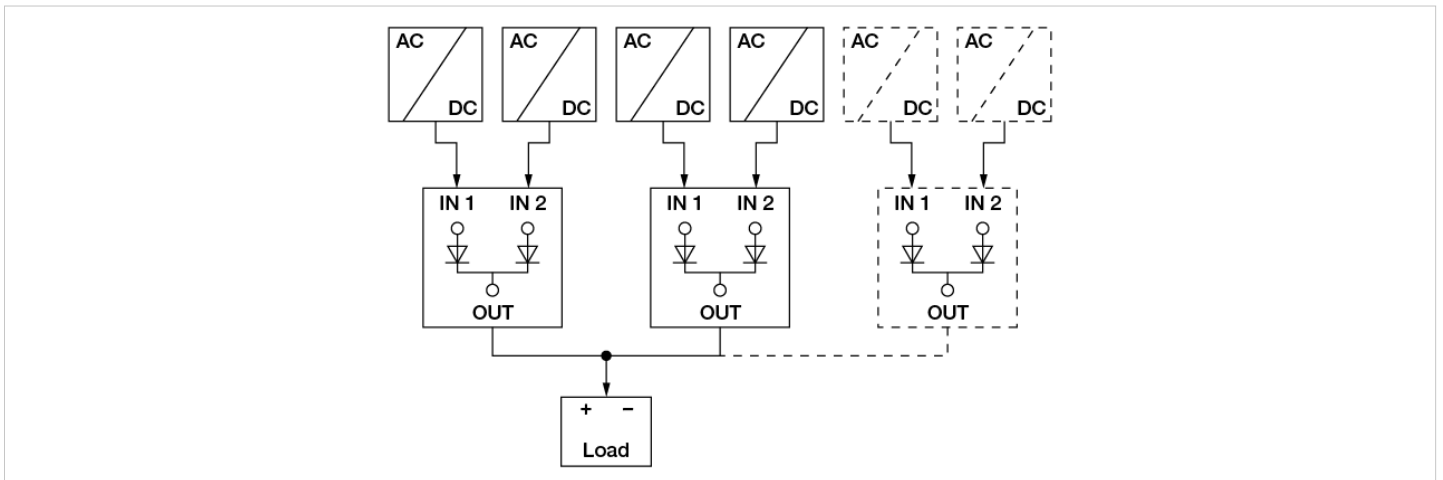
Using 1 more PSU as the redundant unit.

Fig. 3.2 Single Use



Using more PSUs as the redundant units to increase the reliability.

Fig. 3.3 N+1 Redundancy



Connecting only one PSU to one DRR module to reduce the stress of the diodes and hence increase the reliability.

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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 0.45~0.50 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 at any line voltage, and set the PSU 1 and PSU 2 output voltage.

Step 2.

Connect the right DRR module as per the system requirement to the power supply units PSU 1 and PSU 2 at $V_{in 1}$ & $V_{in 2}$ respectively

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 0.60 V to 0.90 V (Typical 0.65 V) depending on the load current and surrounding air temperature.

■ Parallel Operation

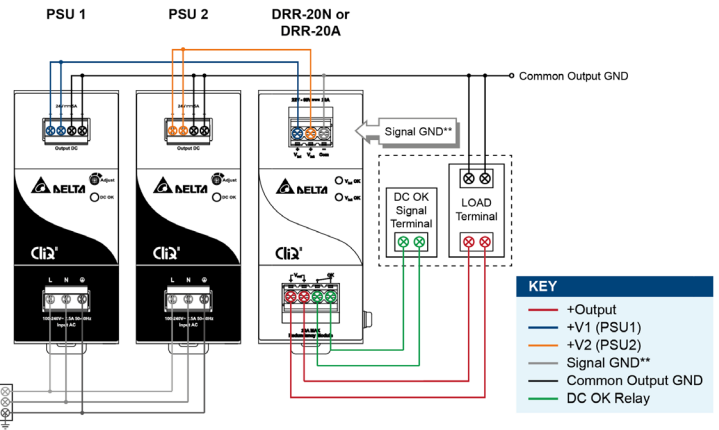
These DRR modules can also be used for Parallel function in order to increase the output power by N+1 (e.g. 2.5 A + 2.5 A = 5 A or 2.5 A + 2.5 A + 2.5 A = 7.5 A) or current sharing, and thus increasing the power supply and system reliability. A good current sharing between two power supplies can be achieved by following simple steps as below (Refer to Fig. 4 for the Connection Diagram).

Step 1.

Set output load condition for both supplies at 50% and measure the output voltages.

Step 2.

Adjust output voltages to the same level or within ± 25 mV difference.



**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. 4 Redundant / Parallel Operation Connection Diagram

Step 3.

Connect PSU 1 and PSU 2 with the DRR module and measure at $V_{in 1}$ & $V_{in 2}$ to verify the voltage difference. Ensure the voltages are within ± 25 mV.

Step 4.

Output voltage from DRR module V_{out} will be $= V_O$ (output voltage of power supply) $- V_{drop}^*$ (in DRR module).