TECHNICAL DATASHEET

DIN Pro Series Redundancy Module

80 A / DRR-80AF



DIN Pro

Highlights & Features

- Wide input and output range of 10.8-60 Vdc
- Wide operating temperature range from -40°C to +80°C
- Supports front-end power with 200% Power Boost operation
- Built-in 2 channel DC OK LED and alarm relay contact
- Built-in Oring MOSFET for fault decoupling
- Supports 1+1 & N+1 Redundancy connection
- Conformal coating on PCBAs to protect against common dust and chemical pollutants
- Certified to IEC/EN/UL 62368 and IEC/UL 61010 standards
- Hazardous Locations approval to ATEX II 3 G (Zone 2)

Safety Standards

CB Certified for worldwide use

Model Number: DRR-80AF
Unit Weight: 0.46 kg (1.01 lb)
Dimensions (H x W x D): 124.2 x 44 x 126.9 mm (4.88 x 1.73 x 4.99 inch)

General Description

Delta's DIN Pro redundancy module offers a variable input and output voltage from 10.8 Vdc to 60 Vdc. Moreover, the DRR-80AF 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 aluminum case is shock and vibration resistant according to IEC 60068-2 standard. Moreover, the redundancy modules are able to support power supply in parallel operation with an Oring MOSFET to decoupling power failure issue. These modules also have an alarm relay contact as a system monitoring function.

Model Information

DIN Pro Redundancy Module

Model Number	Input Voltage Range	Rated Output Voltage	Rated Output Current
DRR-80AF	10.8-60 Vdc	V_{in} -0.15 V (typ.)	80.0 A Max.

Model Numbering

DR	R –	☐AF	☐
DIN Rail	Redundancy Module	Output Current 80 – 80 A	Option Code

All parameters are specified at 25°C ambient and AC input unless otherwise indicated.

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Specifications

Input Ratings / Characteristics

Nominal Input Voltage		12-56 Vdc
Input Voltage Range		10.8-60 Vdc
Input Current	DRR-80AF	12-30 V 80 A Max. / 30-60 V 40 A - 80 A Max. (1+1 Redundancy) = Nom. 12 V / 24 V 2×40 A / 48 V 2×25 A (N+1 Redundancy) = Nom. 12 V / 24 V 2×40 A / 48 V 2×25 A (Single unit use) = Nom. 12 V / 24 V 80 A / 48 V 50 A Max.
Efficiency		> 99.0% typ.
Max Power Dissipation	Standby Mode	< 1 W
	Operating Mode	< 15 W
Input Voltage Alarm / Relay Contacts*1		V_{in1} & V_{in2} > 10.8V ± 5% (Relay closed)
DC OK Relay Contact		30 V / 1 A
Power Boost Function (This power boost function depends on front-end power supply which has Power Boost for start-up)		200% for 5 Seconds 12 V Power Boost to 1920 W (12V×80A×200%) 24 V Power Boost to 3840 W (24V×80A×200%) 48 V Power Boost to 4800 W (48V×50A×200%)

*1.The LED will turn on when the V_{in1} or V_{in2} > 10.8 V ± 5%, the relay contacts will be closed.

Output Ratings / Characteristics

Nominal Output Voltage Range		V_{in}-0.15 V (typ.)
Output Current	12-30 V	80 A Max.
	30-60 V	40 A - 80 A Max.
Voltage Drop (V_{in}-V_{out})		0.15 V typ.

Mechanical

Case Cover Chassis		Galvanized steel with organic coating (SGCC) Aluminum alloy with organic coating
Dimensions (H x W x D)		124.2 x 44 x 126.9 mm (4.88 x 1.73 x 4.99 inch)
Unit Weight		0.46 kg (1.01 lb)
LED Indicators	Green LED	DC OK: V_{in1} and V_{in2}
Cooling System		Convection
Terminal		Input: 4 Pins (Rated 600 V / 65 A) Output: 2 Pins (Rated 600 V / 125 A) DC OK: 4 Pins (Rated 300 V / 7A)
Wire	Input	AWG 8
	Output	AWG 4
	DC OK	AWG 22
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	> 70°C de-rate power by 3% / °C
	Horizontal Mounting	> 70°C de-rate power by 3% / °C
Operating Humidity		5 to 95% RH (Non-Condensing)
Operating Altitude		0 to 5000 Meters (16,666 ft.)
Shock Test	Non-Operating	IEC 60068-2-27, Half Sine Wave: 50 G for duration of 11 ms; 3 times per direction, 9 times in total
Vibration	Non-Operating	IEC 60068-2-64, Random: 5 Hz to 500 Hz (2.09 G); 20 min per axis for all X, Y, Z direction
	Operating	IEC 60068-2-6, Sine Wave: 10 Hz to 500 Hz (2G peak); 10 min per cycle, 60 min for X, Y, Z direction
Class of Equipment		Class III / According to IEC/EN 62368-1
Pollution Degree		2

Protections

Overload / Overcurrent*2	12 V / 24 V: 80 A	< 160 A, No Damage
	48 V: 50 A	< 100 A, No Damage
Short Circuit	12 V / 24 V: 80 A	< 160 A, No Damage
	48 V: 50 A	< 100 A, No Damage
Degree of Protection		IP20
Protection Against Shock		Class III with PE*3 connection

*2.The overload condition must be controlled by the PSUs in parallel. The limit of input current should not be more than 80 A (12 V / 24 V) or not more than 50 A (48 V) per channel.
*3 PE: Case 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
Warranty	3 Years

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Safety Standards / Directives

Electrical Safety	CB Scheme	IEC/EN 62368-1, AS/NZS 62368.1 RCM; IEC 61010-1/2-201
	UL/cUL Recognized	UL 62368-1 and CAN/CSA C22.2 No. 62368-1 (File No. E131881)
	TUV	EN/IEC 62368-1
	UKCA	BS EN 62368-1
	EAC	TP TC 020/2011
Industrial Control Equipment	UL/cUL Listed	UL 61010-1/2-201 and CAN/CSA C22.2 No. 61010-1/2-201 (File No. E338991)
CE		In conformance with EMC Directive 2014/30/EU and Low Voltage Directive 2014/35/EU
UKCA		In conformance with Electrical Equipment (Safety) Regulations 2016 No. 1011 and The Electromagnetic Compatibility Regulations 2016 No. 1091
ATEX (Zone 2)		Ex II 3 G Ex ec nC IIC Gc EN IEC 60079-0:2018 EN IEC 60079-7:2015/A1:2018 EN IEC 60079-15:2019
Galvanic Isolation	Input to PE	1.5 KVac
	Output to PE	1.5 KVac
	Input/Output to DC OK	0.5 KVac

EMC

Emissions (CE & RE)		CISPR 32, EN/BS EN 55032 Class B AS/NZS CISPR 32 Class B / KS C 9832
Immunity		EN/BS EN 55035 KS C 9835
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, 3 V/M, 80% modulation (1 kHz)
Electrical Fast Transient / Burst	IEC 61000-4-4	Level 3 Criteria A[1)] 1 kV /5K HZ
Surge	IEC 61000-4-5	Level 3 Criteria B[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, 3 Vrms
Power Frequency Magnetic Fields	IEC 61000-4-8	Criteria A[1)] 30 A/Meter

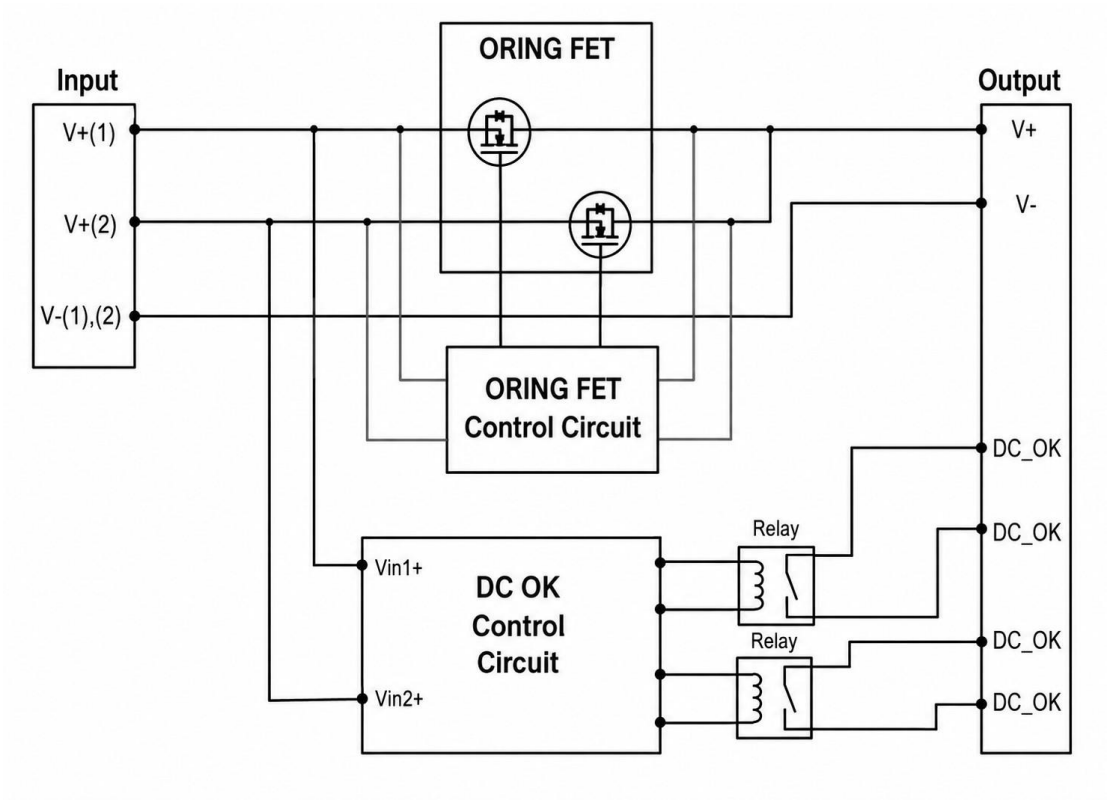
Note: Product intended to be used as Apparatus with AC-DC Power Supply, EMC compliance to be verified in correspondence to the connected units.

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

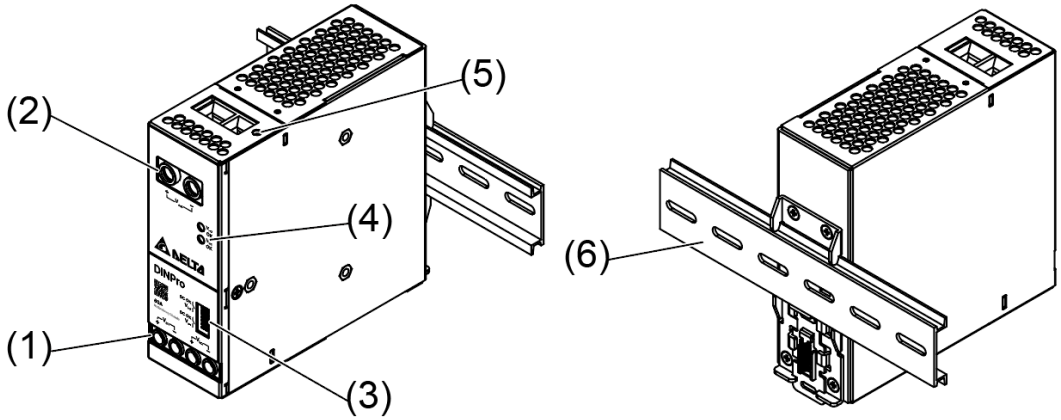
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Block Diagram



Device Description



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

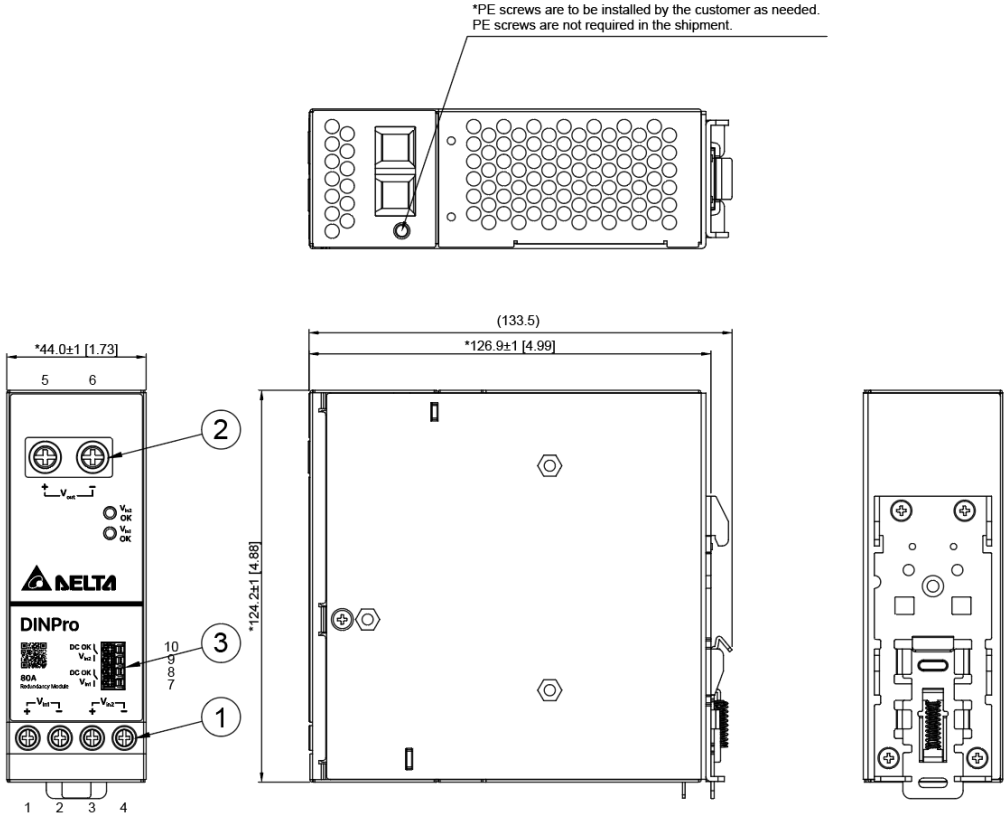
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Dimensions

H x W x D: 124.2 x 44 x 126.9 mm (4.88 x 1.73 x 4.99 inch)



*Unless otherwise specified tolerance of dimension are ±1 mm

Item	Device Description
1	Input terminal block connector Pin 1: V+ (V1) Pin 2: V- (V1) Pin 3: V+ (V2) Pin 4: V- (V2)
2	Output terminal block connector Pin 5: V+ Pin 6: V-
3	DC OK relay contact Pin 7: DC OK + (V1) Pin 8: DC OK - (V1) Pin 9: DC OK + (V2) Pin 10: DC OK - (V2)

Wiring Size:

	Stranded / Solid		Torque		Stripping Length
	(mm²)	(AWG)	(Kgf.cm)	(lbf.in)	(mm)
(1) Input	8.37	8	14.0	12.2	11
(2) Output	21.15	4	42.0	36.5	18
(3) DC OK relay contact	0.32	22	-	-	12

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Engineering Data

Output Load De-rating VS Surrounding Air Temperature

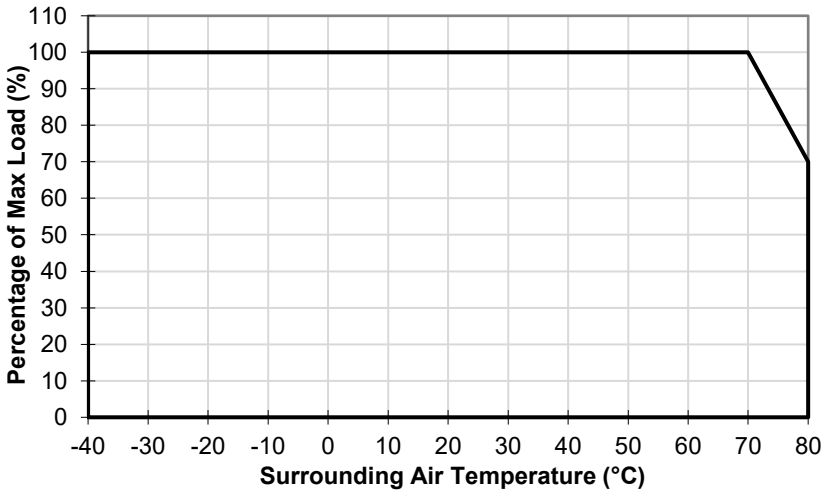


Fig. 1 De-rating for Vertical and Horizontal Mounting Orientation
> 70°C de-rate power by 3% / °C

Output Load De-rating VS Input Voltage

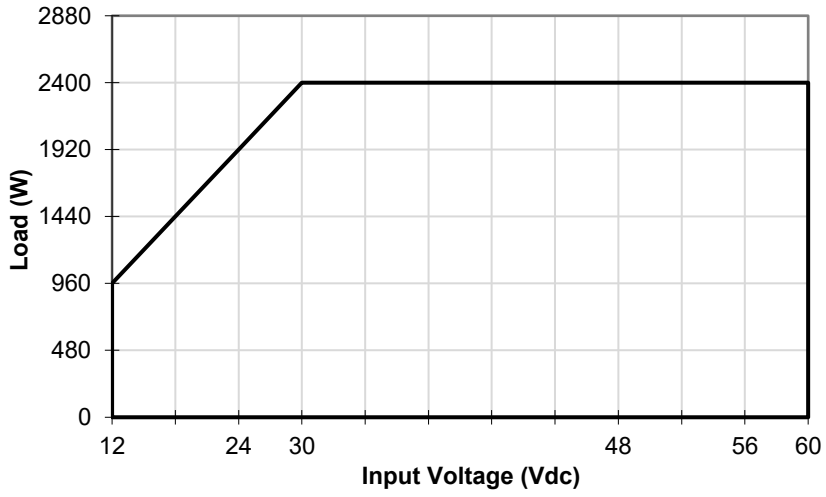


Fig. 2 De-rating for 31V-60V DC input with 40A-80A

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 MOSFET 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 leave a message via the Contact Us form.

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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

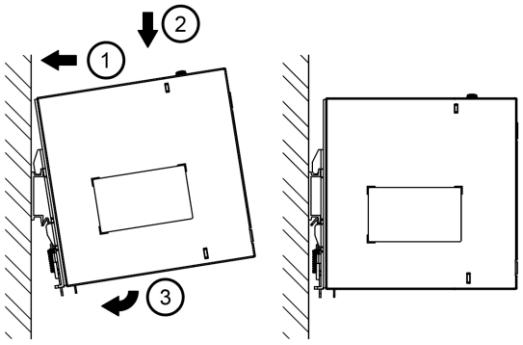


Fig. 3.1 Mounting

Snap on the DIN rail as shown in Fig. 3.1:
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

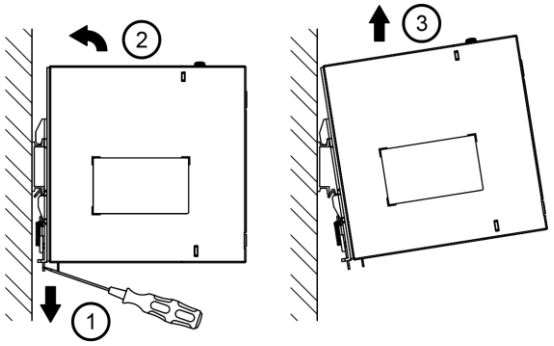


Fig. 3.2 Dismounting

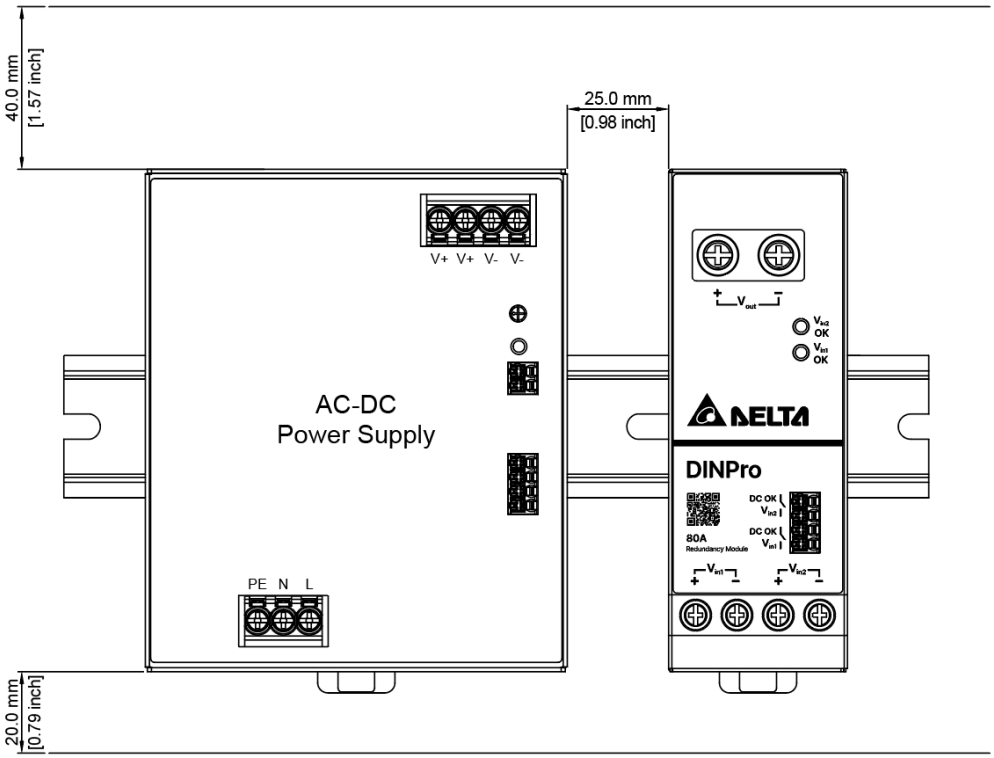
To uninstall, pull or slide down the latch with screw driver as shown in Fig. 3.2. Then slide the unit in the opposite direction, release the latch and pull out the unit from the rail.

In accordance to IEC/EN/UL 62368-1 and IEC/UL 61010-2-201, flexible cables require ferrules. Use appropriate copper cables that are designed to sustain operating temperature of 105°C or more to fulfill UL requirements.

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Safety Instructions



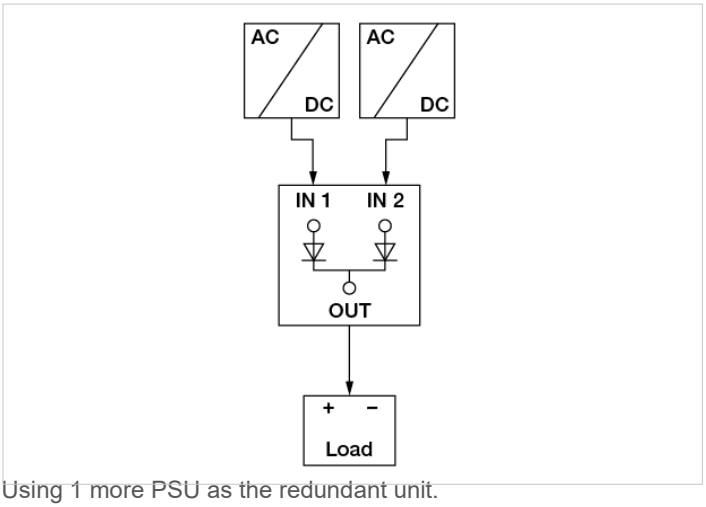
- ALWAYS switch mains of input power OFF before connecting and disconnecting the input voltage to the unit. If mains are not turned OFF, there is risk of explosion / severe damage.
- To guarantee sufficient convection cooling, keep a distance of 40 mm (1.57 inch) above and 20 mm (0.79 inch) below. If load is less than 50%, lateral distance can be 0 mm (0 in). In case the adjacent device is a heat source, the lateral distance will be 15 mm (0.59 inch) for 80% load or > 25 mm (0.98 inch) lateral distance condition for 100% load @ 50°C ambient temperature.
- 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 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.
- For detailed product installation and notice, please refer the user manual.

DIN Pro Series Redundancy Module
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Functions

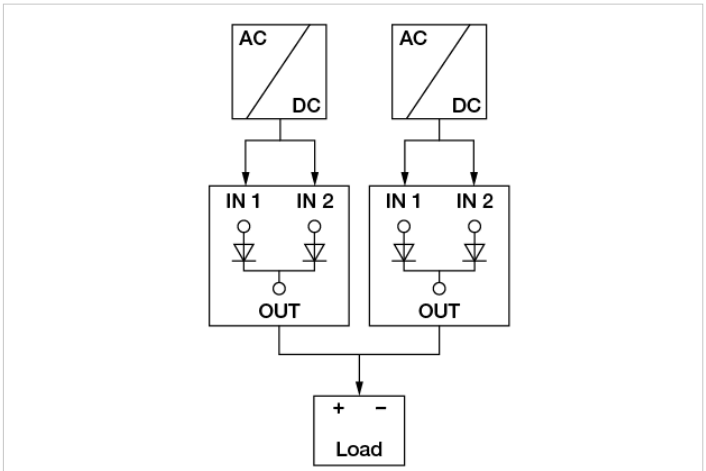
Typical Application Notes

Fig. 4.1 1+1 Redundancy



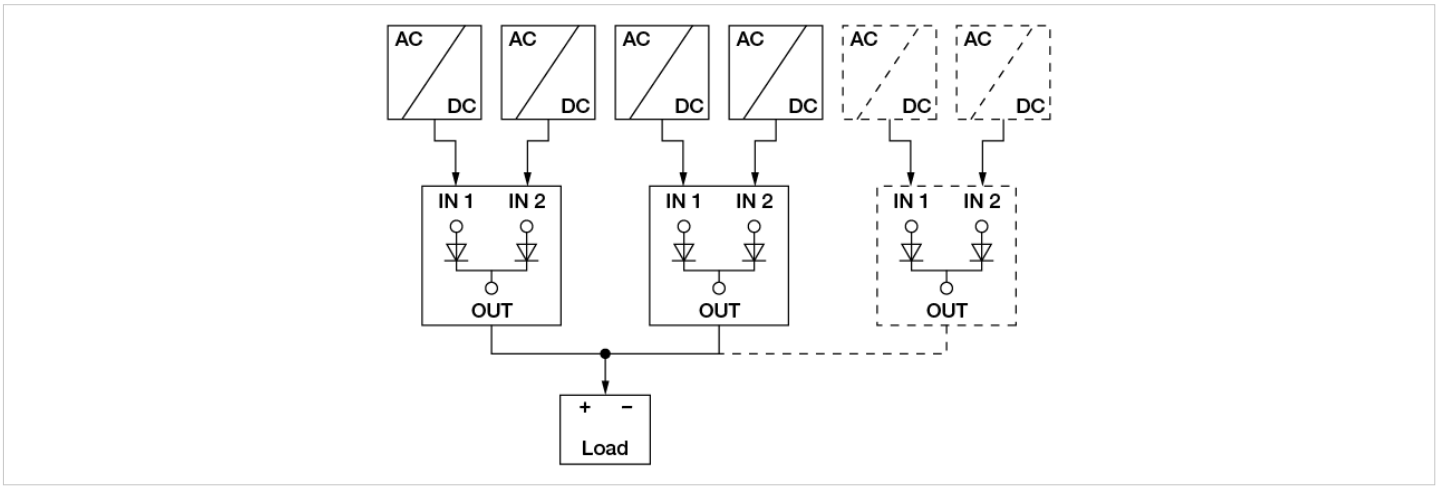
Using 1 more PSU as the redundant unit.

Fig. 4.2 Single Use



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

Fig. 4.3 N+1 Redundancy



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

DIN Pro Series Redundancy Module
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Operating Mode

■ **Redundant Operation Connection**

In order to ensure proper redundant operation for the power supply unit (PSU), the output voltage difference between the two units must be kept within ±25 m v of output. Follow simple steps given below to set them up for the redundant operation:

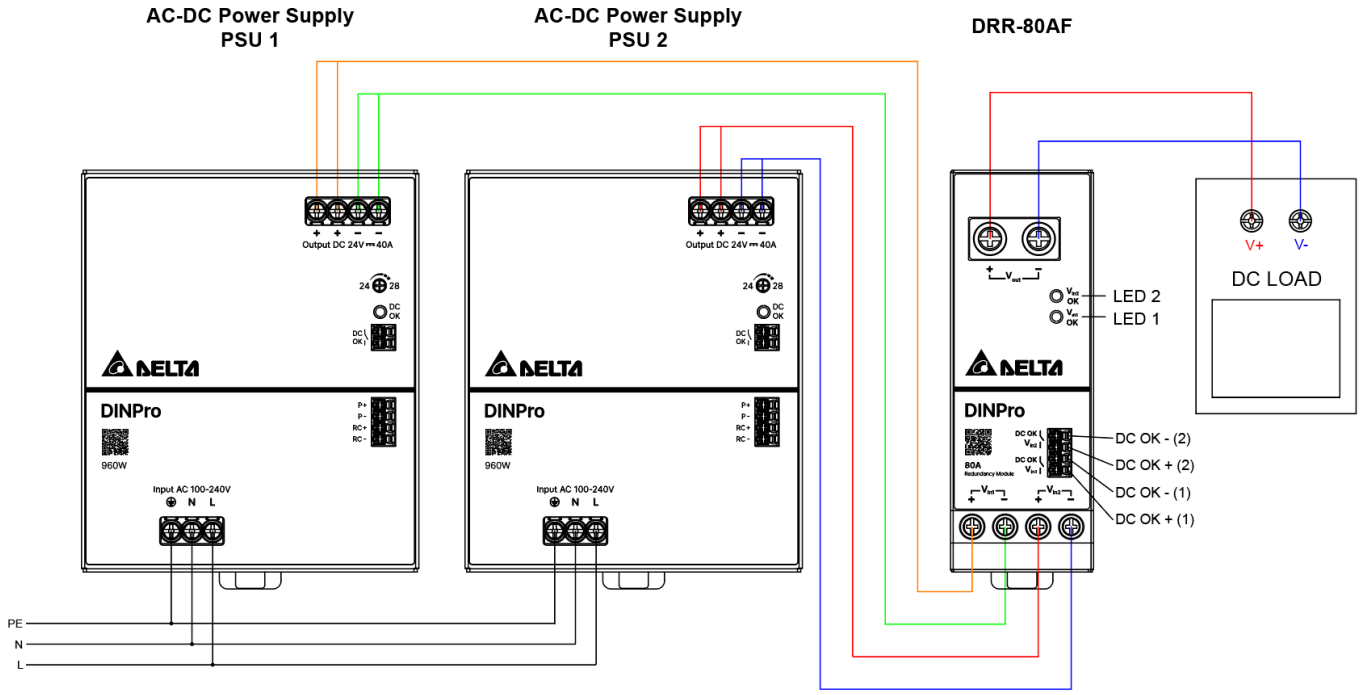


Fig. 5 Redundant / Parallel Operation Connection Diagram

Step 1.
Measure output voltage of PSU 1 and PSU 2. If PSU 1 will be 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. If it operate for 50% / 50% redundant condition then output must be kept within ±25 m v of output.

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 0.15 V to 0.2 V (Typical 0.15 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. 40 A + 40 A + 40 A + 40 A = 160 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. 5 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.

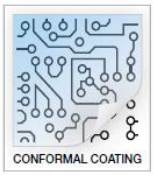
Step 3.
Connect PSU 1 and PSU 2 with the DRR module and measure at V_{in} 1 & V_{in} 2 to verify the voltage difference. Ensure the voltages are within ±25 mV.

Step 4.
Output voltage from DRR module V_{out} will be = V_O (output voltage of power supply) – V_{drop}* (in DRR module).

DIN Pro Redundancy Modules
DRR-80AF / 80A

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 PCBAs 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.

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 **PSU.deltaww.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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