RACPRO1 Series Redundancy Module

Overview

The wide DC input range of 9 to 56 VDC allows connection of power supplies with 12/24/48 VDC output in 1+n redundancy operation up to 20 or 40A output in sharing parallel operation. The unique and innovative modern design with 25° push-in connectors allows easy tool-less installation or replacement.

Features

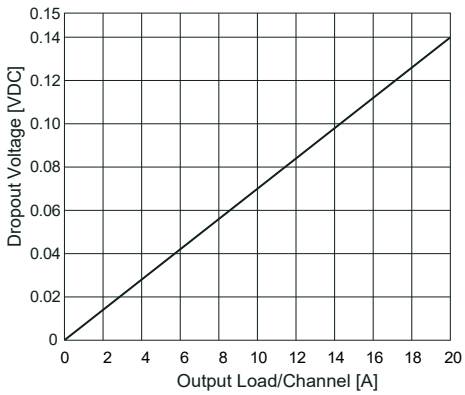
- Slim design
- Fast tool-less mounting and demounting
- Highest efficiency up to 99.5%
- Very low voltage drop 140mV
- Minimum power loss 5W typ.
- Full power -40 to +70 °C / Power Boost 150% 5s
- 3 year warranty

Redundancy Module								
Part Number	*Price*	*Number of Inputs*	*Input Voltage Range*	*Output Voltage Range*	*Amperage Rating*	*Connection*	*Requires*	*Drawing Link*
RACPRO1-RD40	$129.00	2	9–56 VDC	12/24/48 VDC	40A	Push terminals	(2) matched 12, 24 or 48 VDC power supplies	PDF

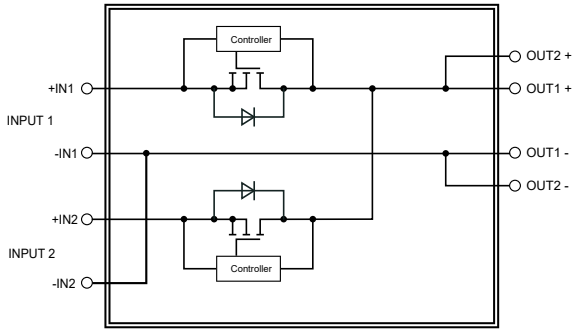
General Specifications	
Nominal Input Voltage	12/24/48 VDC
Input Voltage Range	9–56 VDC
Turn-on Voltage	9 VDC maximum
Turn-off Voltage	7 VDC maximum
Input Current	2 x 20A
No Load Power Consumption	V_{OUT} = 24 VDC 200 mW / V_{OUT} = 48 VDC 400 mW
Nominal Output Voltage	12/24/48 VDC
Output Current	40A (5s max - refer to Boost Power 60A) (1)
Voltage Drop I/P to O/P, (Refer to Input to Output Voltage Drop)	140 mV (Input 1 x 20A or 2 x 20A)
Minimum Load	0%
Ripple and Noise (20 MHz Bandwidth)	Input devices dependent
Output Capacitance	Input devices dependent
Housing Material	Polycarbonate (UL94 V-0) / aluminum
Mounting	35mm DIN rail
Agency Approval	cURs File E224736

Measured @ T_{AMB} = 25 °C, nom. V_{IN} and after warm-up unless otherwise stated.
(1) For use with all RACPRO1 power supplies. For other use, please contact RECOM tech support.

Input to Output Voltage Drop



Block Diagram

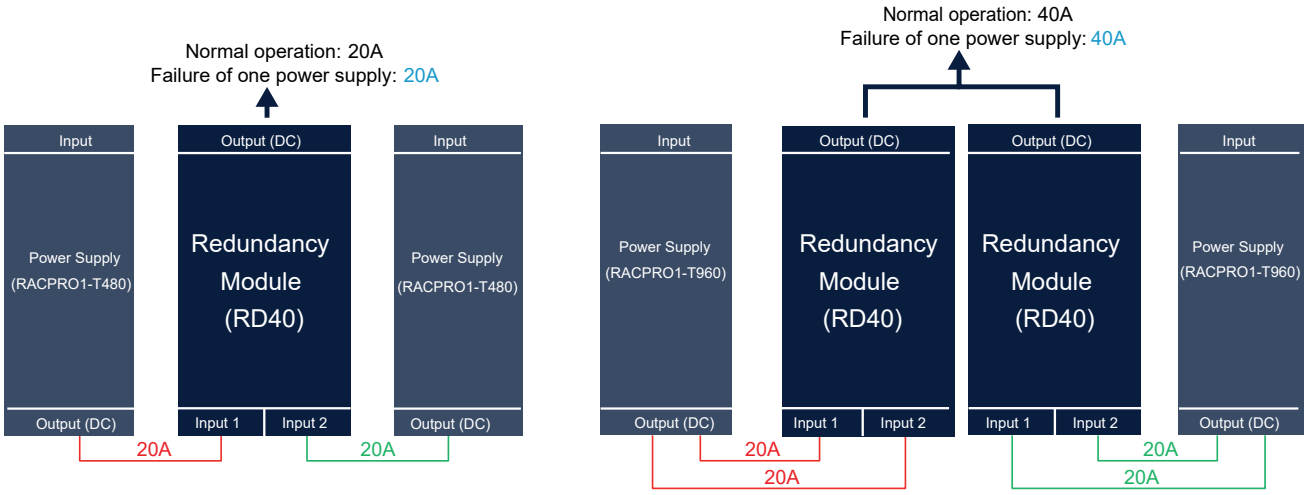


RACPRO1 Series Redundancy Module

Redundancy Configuration

Each input channel is supplied with half the nominal input current. In case one power supply fails, the other power supply supplies the missing input current so that the output remains unchanged (1+1 redundancy).

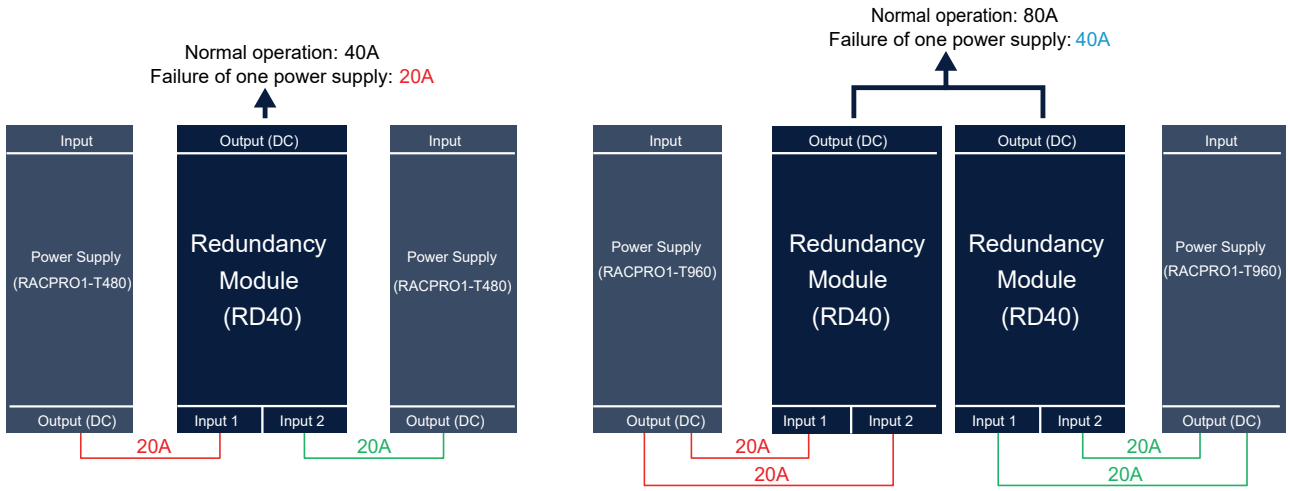
Each power supply needs to be able to supply the full output current at any give time.



Parallel Mode

Each input channel is supplied with its full nominal input current, resulting in the full nominal value of the output current. In case one power supply fails, the output current drops.

For parallel operation at 40A, two redundancy modules must be used, as each input is rated for a maximum of 20A.



RACPRO1 Series Redundancy Module

Protections		
Parameter	***Type***	***Value***
Internal Input Fuse	—	No
Short Circuit Protection (SCP)	—	Input device dependent
Return Voltage Immunity	Continuous	Maximum 63 VDC
	<5 min	Maximum 70 VDC
Reverse Current	—	Maximum 5 mA
Reverse Polarity Protection	—	Unit does not start when input voltage is reversed
Over Voltage Category (OVC)	—	OVC III (4000m)
Class of Equipment	—	Class 3

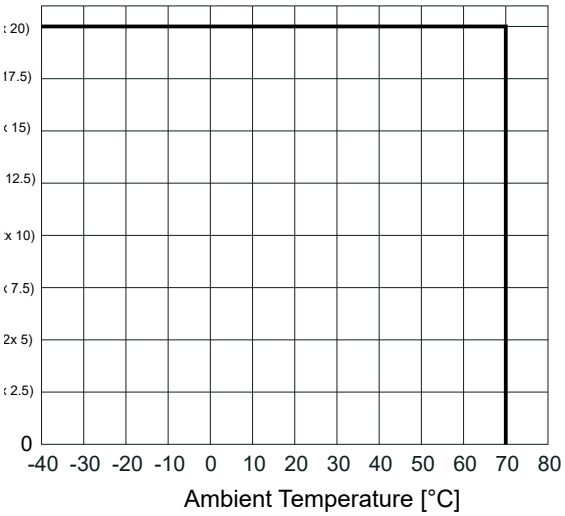
Measured @ T_{AMB}= 25 °C, nom. V_{IN} and after warm-up unless otherwise stated).

Environmental		
Parameter	***Condition***	***Value***
Operating Ambient Temperature Range	At natural convection (0.1m/s)	-40 to +70 °C [-40 to +158 °F]
Operating Altitude	Refer to Altitude Derating graph	4000m (OVC III) (Recognized by safety agency for safe operation up to 5000m. High altitude operation may impact the performance and lifetime.)
Operating Humidity	Non-condensing	Maximum 95% RH
Pollution Degree	—	PD2
IP Rating	—	IP20
Shock	According to IEC 60068-2-27 Fa (non-operating)	15G/11 ms, 3 times (positive/negative) in all axis
Vibration	According to IEC 60068-2-6 Fc (non-operating)	5–8.4 Hz @ 3.5mm deflection 8.4–150 Hz @ 2G, 10 cycles /axis(min-max-min); 1 octave/min
MTBF	According to EN/IEC 61709 (SN29500), T_{AMB} = 40 °C	2600 x 10^3 hours
Lifetime Expectancy (1)	T_{AMB} = 40 °C @ 100% Load	268 x 10^3 hours

Measured @ T_{AMB}= 25 °C, nom. V_{IN} and after warm-up unless otherwise stated).

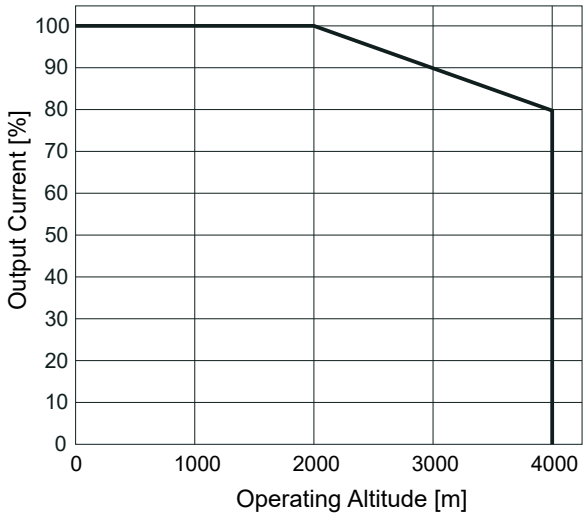
Derating Graph

(Standard and upside down mounting orientation)



Altitude Graph

(Standard and upside down mounting orientation, T_{AMB} = +60 °C)



NOTE: Above derating graph is valid for standard and upside-down mounting orientation only. For all other mounting orientations, the maximum output power must be reduced by 15% of the nominal power.

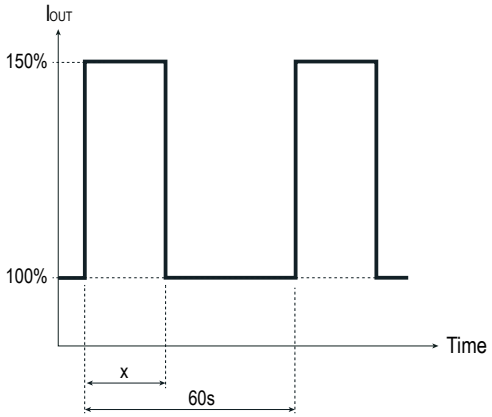
RACPRO1 Series Redundancy Module

Additional Features

The functions listed below only apply when operating with RACPRO1 power supplies. The duration of the boost power function "x" is defined by the respective power supply.

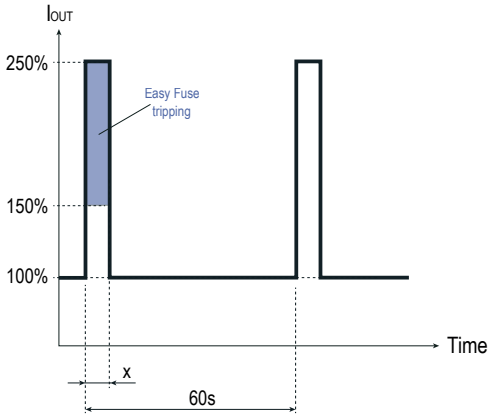
Boost Power

(Standard and upside down mounting orientation only
-40 °C to +60 °C max.)



Easy Fuse Tripping

(-40 °C to +60 °C max.)



Easy fuse tripping is designed to trip a fuse in the event of a short circuit. Once the fuse has tripped, the current returns to its normal operation value. The impulse that causes easy fusing tripping happens independently of the power boost.

Safety & Certifications Redundancy Module		
Certificate Type (Safety)	***Report Number***	***Standard***
Audio/Video, information and communication technology equipment - Part 1: Safety requirements (CB)	E224736-A6032-CB-1	IEC62368-1:2018 3rd Edition
Audio/Video, information and communication technology equipment - Part 1: Safety requirements		EN IEC 62368-1:2020+A11:2020
Audio/Video, information and communication technology equipment - Part 1: Safety requirements	E224736-A6032-UL	UL62368-1:2019 3rd Edition CAN/CSA-C22.2 No. 62368-1-19 3rd Edition
RoHS2	—	RoHS 2011/65/EU + AM2015/863

EMC Compliance - Redundancy Module		
EMC Compliance according to IEC/EN61000-6-4/6-2	***Condition***	***Standard / Criterion***
Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments	—	IEC/EN61000-6-2:2019
Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential area	—	IEC/EN 61000-6-3:2021
ESD Electrostatic discharge immunity test	Air: ±2, 4, 6, 8kV Contact: ±2, 4, 6, 8kV	IEC61000-4-2:2008, Criteria A EN61000-4-2:2009, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	10 V/m (80–1000 MHz)	IEC/EN61000-4-3:2006+A2:2010, Criteria A
Fast Transient and Burst Immunity	DC Power Port ±2 kV DC Output Port: ±2 kV	IEC/EN61000-4-4:2012 Criteria A
Surge Immunity	DC Power Port: Symmetric: 1kV Asymmetric: 2kV DC Output Port: Symmetric: 1kV Asymmetric (Input to DIN-rail (PE)): 1kV	IEC/EN61000-4-5:2014+A1:2017, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	10 Vrms (0.15–80 MHz)	IEC61000-4-6:2013, Criteria A EN61000-4-6:2014, Criteria A