MICRO INSTRUMENTS

Innovative electronics for a changing world

DC CUSTOM RM 2 OUT

19” Rack mount DC STEP UP/STEP DOWN Converter

Total Power output up to **800W** depending on step up / Down ratios selected

High-Efficiency Non-Isolated DC-DC STEP UP Converters

19” Rack mount | 32-Bit Microcontroller Controlled | Fanless Design

The **DC-DC RM STEP UP / DOWN Series** is a family of high-power density, non-isolated, Digitally controlled synchronous DC-DC converters (no diodes for increased efficiancy) designed for demanding Telecom applications. Managed by an advanced 32-bit microcontroller core, these units offer precise voltage regulation, intelligent thermal management, and robust electronic protection mechanisms. Featuring a multi-layer PCB layout optimized for low Electromagnetic Interference (EMI) and long-life industrial rated capacitors, the series guarantees true continuous output power without the need for active fan cooling.

1. ## Key Features

- **Advanced Control:** Integrated 32-bit microcontroller handles real-time telemetry, control, LED diagnostics, and ultra-fast fault response.
- **Thermal Management:** Purely fanless, convection-cooled design utilizing high-thermal-efficiency multi-layer PCB design to curb EMI and optimize heat dissipation.
- **Robust Reliability:** Built exclusively with premium, long-life industrial-grade capacitors for extended MTBF (Mean Time Between Failures**)** in harsh environments.
- **Status LED:** Output-side RGB status LED provides instant visual feedback on load conditions, input health, and fault diagnostics per output channel.
- **Protection:** Electronic Input **Polarity** protection, Input and output hardware current protection by ATO Blade fuse with easy replaceable fuse holders on board.
- **Advanced Protection:** Electronic Input under voltage / over voltage, output over voltage, over-current, short-circuit, and over-temperature safety micro processor cut-outs with automatic retry.

2. # Model specifics

Please email us with your custom requirement

What can be selected:

Each output can be chosen as a step up or a step down converter (Output wattage can range from 200W to 400W per output depending on input and output parameters.

STEP DOWN CONVERTER:

Any voltage (same or different) **lower** than the battery input (12V to 48V) to a minimum of 5VDC output

STEP UP CONVERTER:

Any voltage **higher** than the battery input (12V or 24V battery input) to a maximum of 56VDC output

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All models with 12V input - Undervoltage lockout @ 10.5VDC - Recover @ 11.5VDC

All models with 24V input - Undervoltage lockout @ 21.0VDC - Recover @ 23.0VDC

All models with 48V input - Undervoltage lockout @ 42.0VDC - Recover @ 45.0VDC

Input over voltage protection - 16VDC for models with 12V inputs

Input over voltage protection - 32VDC for models with 24V inputs

Input over voltage protection - 62VDC for models with 48V inputs

3. ## Technical Specifications

Electrical Specifications

- **Topology:** Non-isolated Synchronous Boost Converter
- **Output Power:** True continuous rated output across full operational thermal range without fans
- **Line/Load Regulation:** ≤±1%

Environmental & Thermal Specifications

- **Cooling:** Natural convection / Fanless design
- **Maximum Internal Board Temperature:** 75°C (Shutdown threshold)
- **Storage Temperature:** -40°C to +85°C
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4. ## System Protection & LED Diagnostics

The converter features a front-facing RGB LED on the output side for each channel that communicates real-time operational status, current load profiles, and critical fault states.

Normal Operational States (Load Telemetry) - Both output channels

The LED monitors real-time output current draw and shifts color dynamically based on the percentage of the rated continuous current:

- **Solid Green:** Normal operation; load is between **0% and 60%** of rated capacity.
- **Solid Amber:** Moderate to high load; load is between **60% and 90%** of rated capacity.
- **Solid Red:** Heavy load condition; load is between **90% and 100%** of rated capacity.

Fault & Diagnostic States

If a fault condition triggers a protective shutdown, the microcontroller isolates the output and flags the issue via specific flashing sequences:

LED Behavior	System State	Description / Recovery Action
Solid Blue	Pre-Start Sequence	Microcontroller initialization and power-on self-test (POST).
Flashing Blue	Input VDC Problem	Input voltage is outside acceptable operating limits (Under-voltage / Over-voltage lockout).
Flashing Yellow	Over-Temperature	Internal board temperature has reached **75°C**. Output is disabled until the board cools to a safe margin of **50°C**.
Flashing Red	Over-Current / Short Circuit	Output exceeded **100%** of rated current. Output trips instantly, flashes for **8 seconds**, and then initiates an automatic re-start sequence.

5. ## Mechanical Specifications

- **Enclosure Type:** 1U 19” Rack mount
- **PCB Construction:** Multi-layer impedance-controlled FR4 with enhanced copper weight for optimal thermal performance and EMI mitigation.
- **Dimensions (L×W×H): 480mm x 160mm x 45mm**
- **Weight: 1.4Kg (1400g)**
- **Terminals:** Heavy-duty Barrier block screw terminals

6. ## Safety specifications

- Designed to meet electromagnetic compatibility standards (low-EMI multi-layer design).
- Input and Output hardware ATO (Blade fuse) protected
- Input and output electronic voltage and current protection with auto shutdown and auto retry