Neousys Technology Inc.

RPM-450

User Manual

Revision 1.0

Table of Contents

Legal Information

All Neousys Technology Inc. products shall be subject to the latest Standard Warranty Policy.

Neousys Technology Inc. may modify, update or upgrade the software, firmware or any accompanying user documentation without prior notice. Neousys Technology Inc. will provide access to these new software, firmware or documentation releases from download sections of our website or through our service partners.

Before installing any software, applications or components provided by a third party, customer should ensure that they are compatible and interoperable with Neousys Technology Inc. product by checking in advance with Neousys Technology Inc.. Customer is solely responsible for ensuring the compatibility and interoperability of the third party's products. Customer is further solely responsible for ensuring its systems, software, and data are adequately backed up as a precaution against possible failures, alternation, or loss.

For questions in regards to hardware/ software compatibility, customers should contact Neousys Technology Inc. sales representative or technical support.

To the extent permitted by applicable laws, Neousys Technology Inc. shall NOT be responsible for any interoperability or compatibility issues that may arise when (1) products, software, or options not certified and supported; (2) configurations not certified and supported are used; (3) parts intended for one system is installed in another system of different make or model.

Contact Information

Neousys Technology Worldwide Offices

Notices

Copyright	All rights reserved. This publication may not be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual or otherwise, without the prior written consent of Neousys Technology, Inc.
Disclaimer	This manual is intended to be used as an informative guide only and is subject to change without prior notice. It does not represent commitment from Neousys Technology Inc. Neousys Technology Inc. shall not be liable for any direct, indirect, special, incidental, or consequential damages arising from the use of the product or documentation, nor for any infringement on third party rights.
Patents and Trademarks	Neousys, the Neousys logo, Expansion Cassette, MezIO™ are registered patents and trademarks of Neousys Technology, Inc.
FCC Conformity	This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
CE Conformity	The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

Safety Precautions

Read these instructions carefully before you install, operate, or transport the system.

- Install the system or DIN rail associated with, at a sturdy location
- Install the power socket outlet near the system where it is easily accessible
- Secure each system module(s) using its retaining screws
- Place power cords and other connection cables away from foot traffic.
- Do not place items over power cords and make sure they do not rest against data cables
- Shutdown, disconnect all cables from the system and ground yourself before touching internal modules
- Ensure that the correct power range is being used before powering the device
- Should a module fail, arrange for a replacement as soon as possible to minimize down-time
- If the system is not going to be used for a long time, disconnect it from mains (power socket) to avoid transient over-voltage

Service and Maintenance

- ONLY qualified personnel should service the system
- Shutdown the system, disconnect the power cord and all other connections before servicing the system
- When replacing/ installing additional components (expansion card, memory module, etc.), insert them as gently as possible while assuring proper connector engagement

ESD Precautions

- Handle add-on module, motherboard by their retention screws or the module's frame/ heat sink.
- Avoid touching the PCB circuit board or add-on module connector pins
- Use a grounded wrist strap and an anti-static work pad to discharge static electricity when installing or maintaining the system
- Avoid dust, debris, carpets, plastic, vinyl and styrofoam in your work area.
- Do not remove any module or component from its anti-static bag before installation

About This Manual

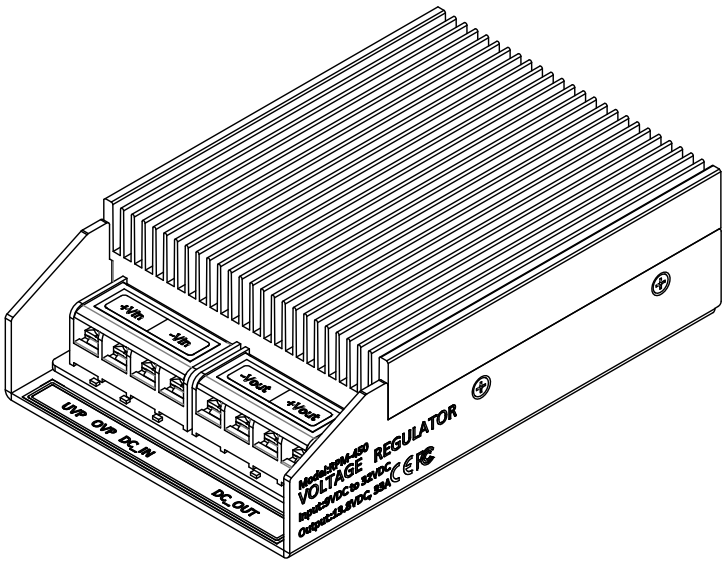
RPM-450 is a rugged buck-boost DC-DC converter designed for in-vehicle and industrial deployments. It delivers a stable 13.8 V / 450 W output across a wide 9–32 V input range, and serves as an ideal voltage stabilizer for vehicles, factories, and field installations.

Revision History

Version	Date	Description
1.0	Oct. 2025	Initial release

1 Introduction

The Neousys RPM-450 is a rugged buck-boost DC-DC converter that delivers a stable 13.8 V / 450 W output across a wide 9–32 V input range. Designed for 12 V / 24 V in-vehicle power systems and industrial applications, it smooths voltage fluctuations to ensure uninterrupted operation of high-power electronics. Even when input voltage drops to 9 V, the RPM-450 sustains a steady 13.8 V output, keeping back-end devices such as GPU computers running reliably without resets or power dropouts.



Built for harsh environments, the RPM-450 operates fanlessly from −25 °C to +70 °C. Its compact form factor fits tight spaces, shortens cable runs, and reduces integration costs, while 94–96% efficiency minimizes self-heating and simplifies thermal management.

The RPM-450 also features millisecond-level Undervoltage/Overvoltage Protection (UVP/OVP) with automatic recovery to safeguard back-end systems against unexpected voltage fluctuations. In addition, hardware Overcurrent/Short-Circuit Protection (OCP/SCP) prevents damage from overloads, and reverse-polarity protection guards against wiring errors. Front-panel LED indicators provide instant input/output status for quick diagnostics and reduced downtime.

Stable power is the foundation of edge AI applications. The Neousys RPM-450 provides a reliable 13.8 V backbone for GPU computer systems—delivering consistent performance under variable input, reducing unexpected reboots, and extending system uptime.

.

1.1 RPM-450 Specification

Input Specifications	
Input voltage	9V to 32V
Undervoltage shutdown	8.5V
Undervoltage recovery	8.9V, Automatic recovery
Overvoltage shutdown	34V
Overvoltage recovery	32.3V, Automatic recovery
Input current	Max. 50A, per pin 25A
No load current	156mA
Output Specifications	
Efficiency	94%
Output voltage	13.8V
Output current	0 ~ 33A
Rated Power	450W *
Over Current Protection	47A
Output ripple and noise	120mV
Output voltage rise time	3.38ms
Boot delay time	216ms
Voltage regulation	±1% **
Load regulation	±1% **
Protection	
UVP	OFF ≤ 8.5 V, ON ≥ 8.9 V; auto-recovery
OVP	OFF ≥ 34 V, ON ≤ 32.3 V; auto-recovery
OCP	Trips at 47 A; power-cycle to restore output
SCP	Survives 2 h short-circuit; power-cycle to restore output
RPP	Reverse-input protected up to 38 V without damage
Mechanical Specifications	
Dimension	95mm (W) x 144.1mm (D) × 41.2mm (H)
Weight	0.8 kg
Mounting	Wall-mount (standard) DIN-rail mount (optional)
Positive/Negative electrode cable (input/output)	Use O- or Y-type rings; outer Ø ≤ 8.2 mm inner Ø ≥ M3.5 screw
Environmental & Safety Specifications	
EMC	CE/FCC Class A, according to EN 55032 & EN 55035
Operating Temperature	-25°C to 70°C
Storage Temperature	-40°C to 85°C
Humidity	5%~90% , non-condensing
Switching Frequency	350KHz

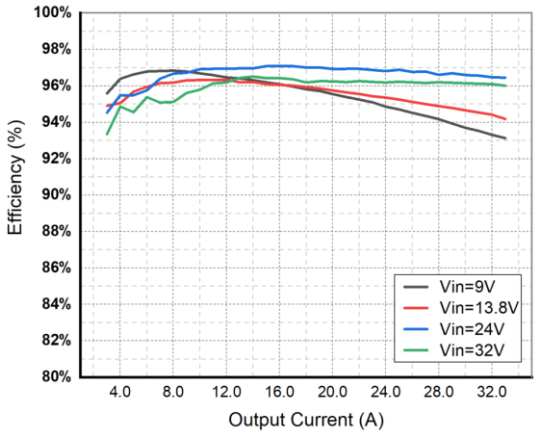
** Rated power could be sustained under low voltage 9V*

*** Tolerance: includes set up tolerance, voltage regulation and load regulation*

1.2 Critical Electrical Curve

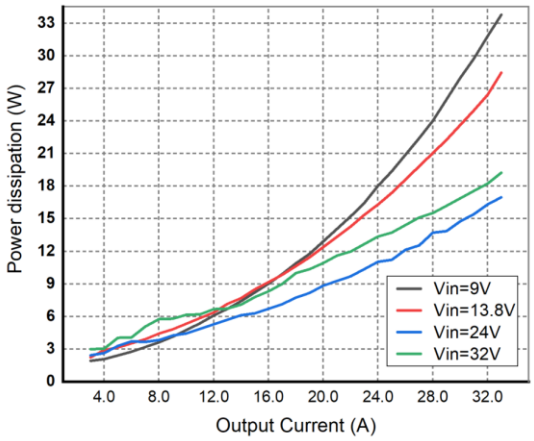
The following critical electrical curve plots how RPM-450 responds in efficiency, power dissipation, and voltage (V) and current (I).

1.2.1 Efficiency Curve



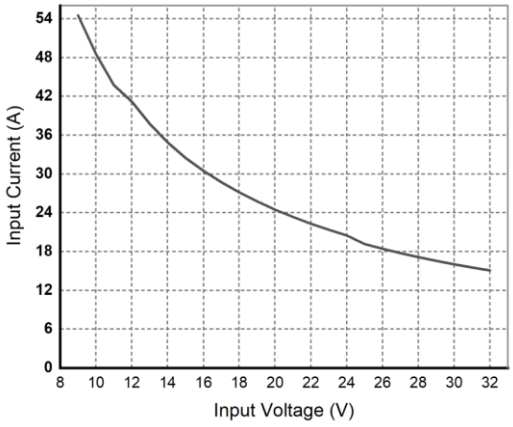
The graph shows input voltages at 9, 13.8, 24, 32 V, efficiency quickly climbs above ~95% and sustains 95–97% efficiency from light-to-mid load through most of the operating range. A gentle roll-off appears near max load, with slightly lower efficiency at the lowest Vin (9V) due to higher conversion ratio.

1.2.2 Power Dissipation



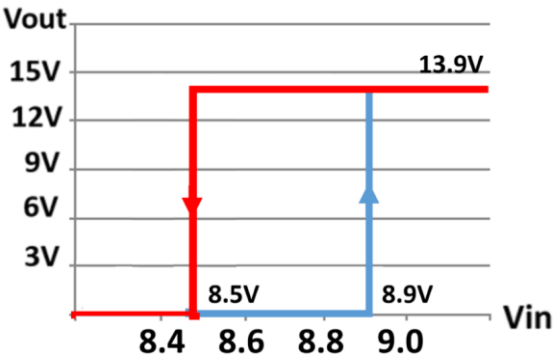
Power dissipation increases with output current and it also depends on the conversion ratio. At the same load, lower Vin exhibits higher power dissipation (9V), while 24–32V shows the lowest power dissipation. From light load to approximately 15–30W near full load, only a few watts were loss, depending on Vin. Because all loss manifests as heat, thermal design or the heat effect must be considered to the whole system.

1.2.3 Voltage (V) and Current (I) Curve

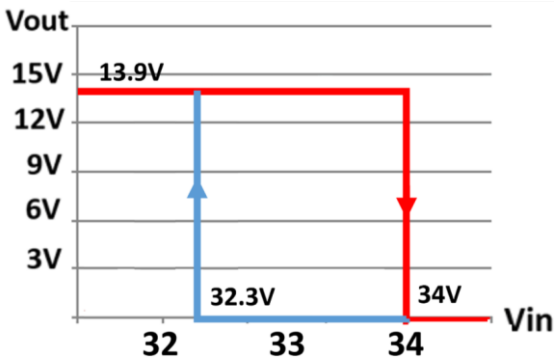


Input current scales inversely with Vin at about >50 A (approximately 9V), tapering to approximately 16–18A by 32V while the converter sustains an approximately 455 W output across the tested input range. This demonstrates stable high-power delivery without output collapse over wide input conditions, provided the source and cabling can supply the required input current.

1.3 Undervoltage/ Overvoltage Protection



Undervoltage protection



Overvoltage protection

To enhance system reliability, extend component lifespan, reduce maintenance interventions, and ensure safe operation in demanding in-vehicle and industrial power environments, the RPM-450 incorporates input voltage protection. The unit automatically shuts down when input voltage drops below 8.5 V or exceeds 34 V, thereby mitigating the risk of unstable startups and preventing electrical stress on internal components.

Automatic recovery is initiated when the input voltage increases to 8.9 V (UVP threshold) or decreases to 32.3 V (OVP threshold), eliminating the need for manual intervention and ensuring uninterrupted system operation.

1.4 Overcurrent/ Short-Circuit Protection (OCP/ SCP)

The RPM-450 is equipped with overcurrent protection (OCP), which actively limits output power when the load exceeds 125% of the rated capacity, utilizing a power foldback mechanism. Additionally, it features short-circuit protection (SCP): in the event of a hard short, the unit enters hiccup mode and can endure a continuous short for over two hours without sustaining damage. Output is automatically restored once the fault condition is cleared and input power is cycled.

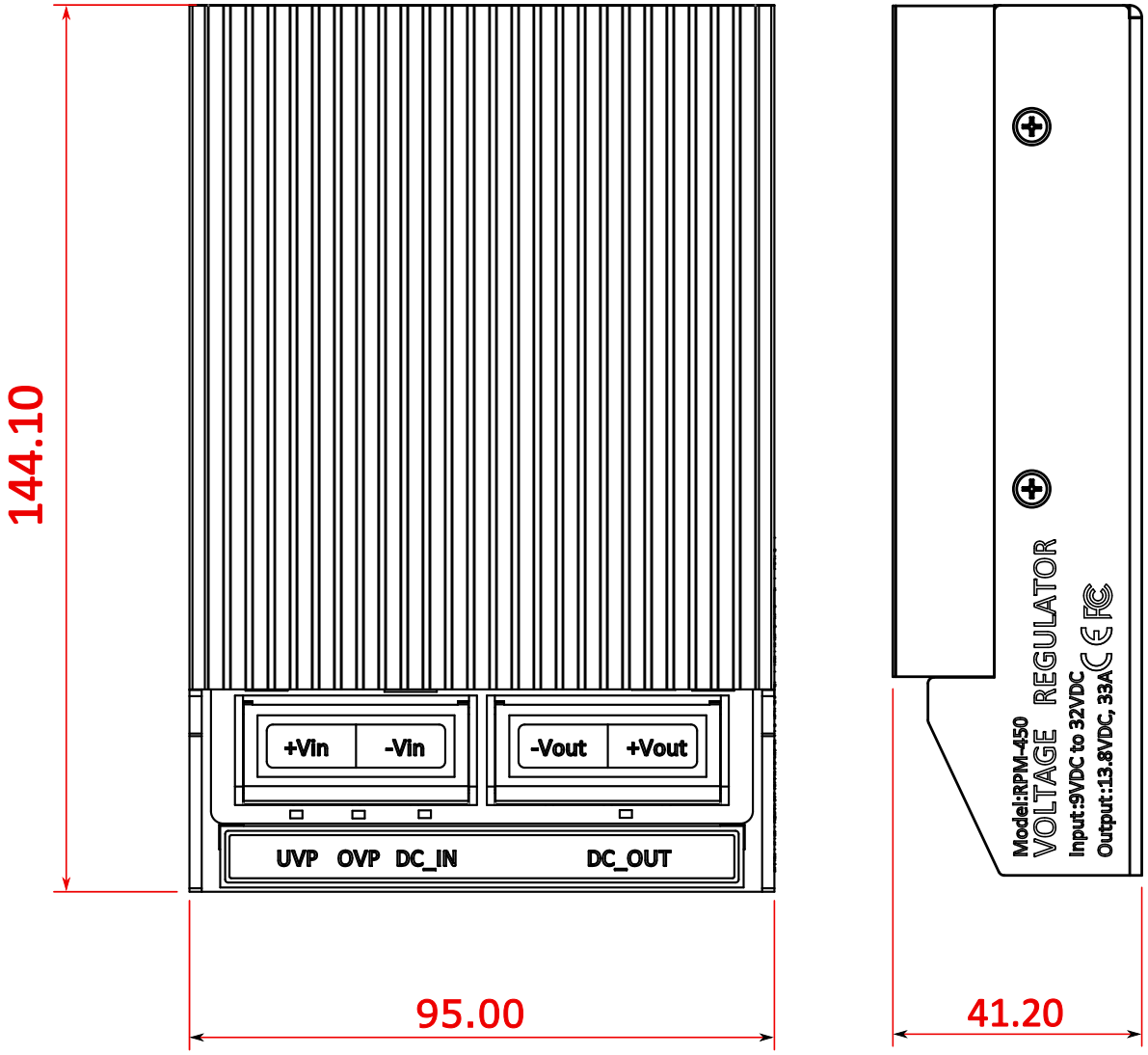
1.5 Reverse-Polarity Protection (RPP)

An integrated protection circuit shields the module from accidental reverse input connection, withstanding up to 38V, thereby preventing damage to both the converter and the system wiring harness.

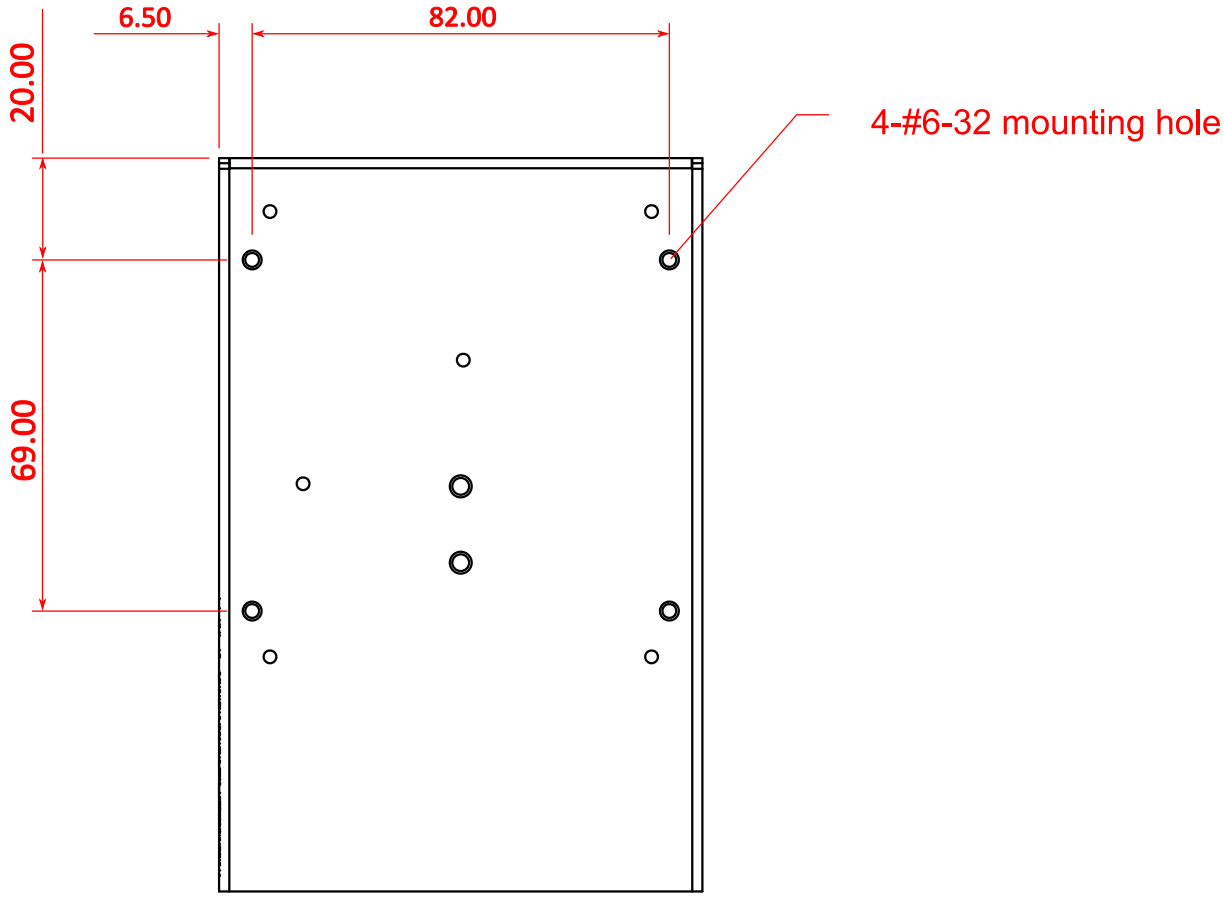
1.6 Dimension

NOTE

All measurements are in millimeters (mm).



1.7 Mounting Dimension



2 Setting Up Your RPM-450

2.1 Unpacking Your RPM-450

Upon receiving the RPM-450, please check immediately if the package contains all the items listed in the following table. If you purchased the optional DIN rail kit, please make sure it has been delivered. If not, please contact your local dealer or Neousys Technology.

Item	Description	Qty
1	RPM-450	1

2.2 Wiring and Installation Instructions

WARNING

Risk of irreparable damage. Do not reverse polarity, both input and output.

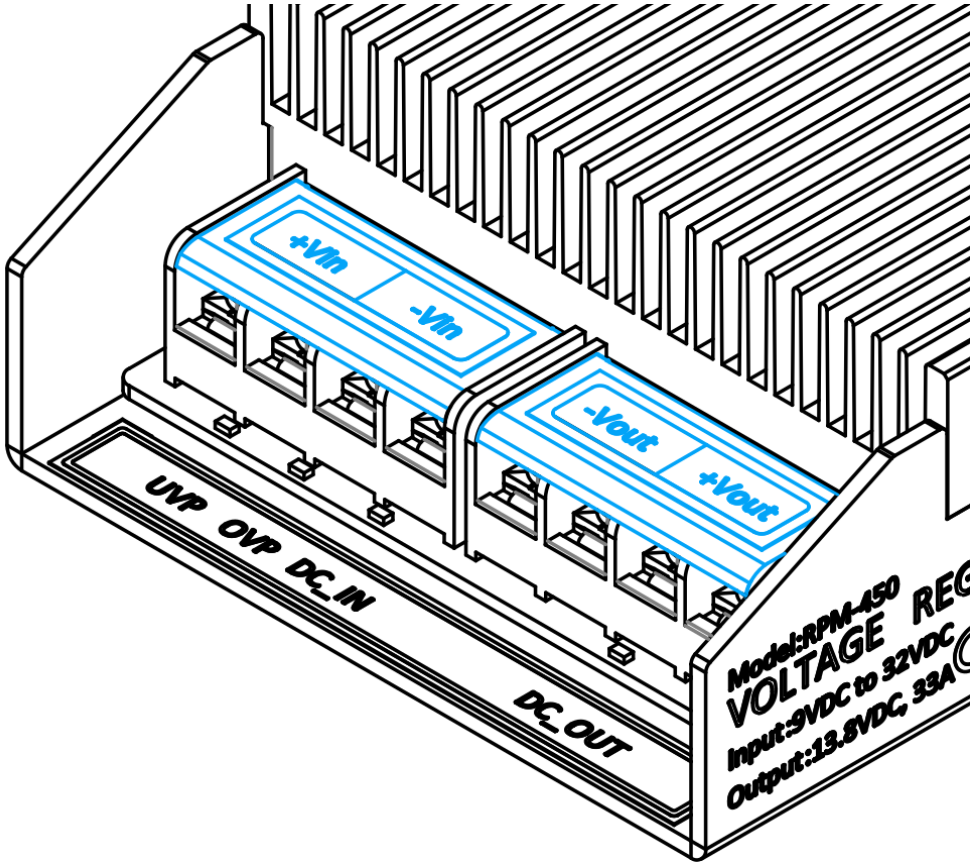
Please do not install converters in places with high moisture or near the water.

Please do not install converters in places with high ambient temperature or near fire source.

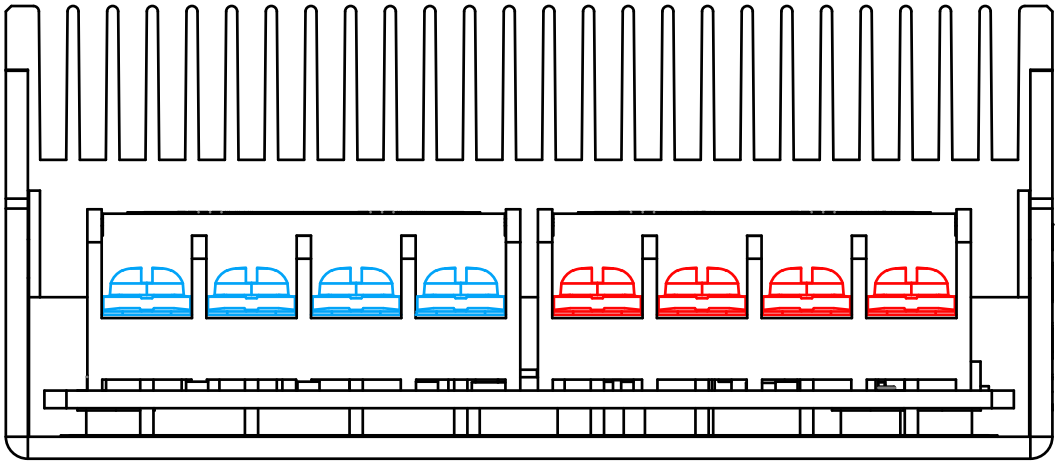
Please refer to the specifications about the maximum ambient temperature limitations.

Output current and output wattage must not exceed the rated values on specifications.

1. Remove the top cover indicated.



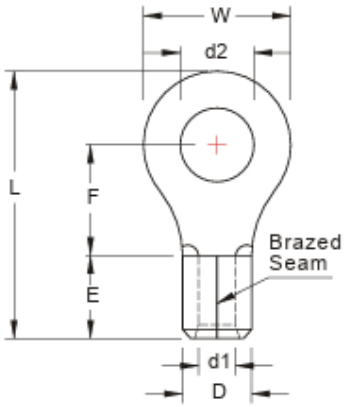
2. Loosen the terminal screws.



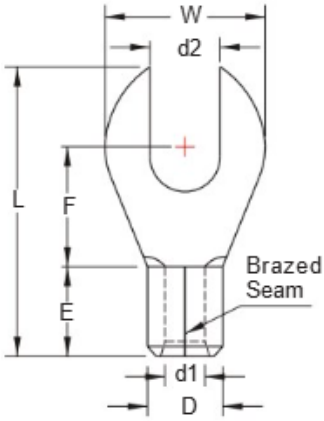
3. Insert O or Y type terminals matching the input/ output positive/ negative polarity. Connect the power source to the DC_IN screws (in **blue**) and the DC_OUT screws (in **red**) to the backend device/ computer. Please keep the cable as short as possible to minimize voltage drop.

Recommended Input/ Output Wire Specifications

AWG	18	16	14	12	10
Rated current of equipment (A)	6A	6-10A	10-16A	16-25A	25-32A
Corss-section of lead (mm^2)	0.75	1.00	1.5	2.5	4



O-type

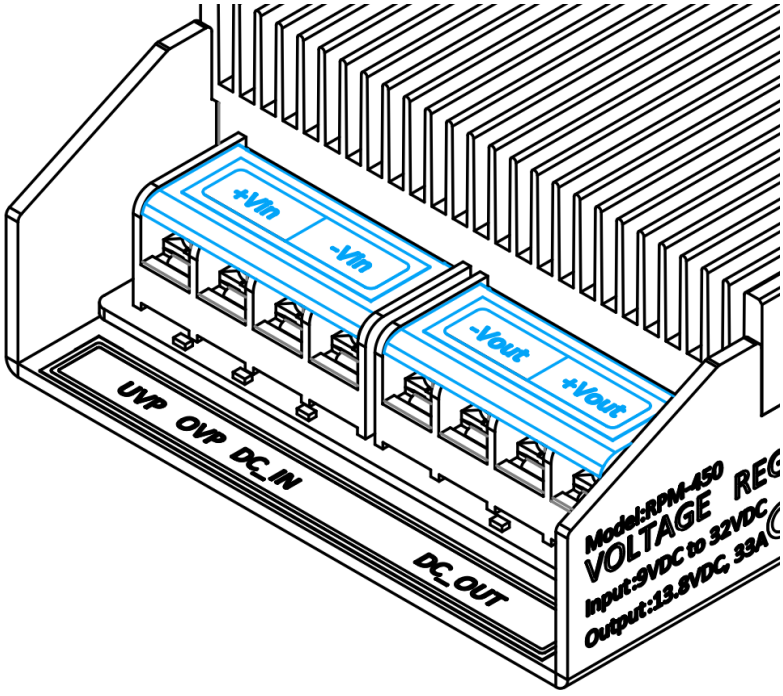


Y-type

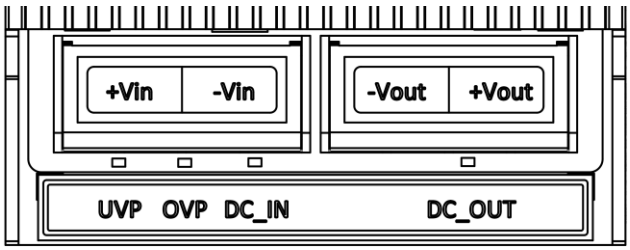
Outer Ø ≤ 8.2 mm (W)

Inner Ø ≥ M3.5 screw (d2)

4. Tighten and secure the screws, place the cover back onto RPM-450.



2.3 Under/ Over-Voltage LED Status Indicator



UVP: Undervoltage Protection Alert

OVP: Overvoltage Protection Alert

DC_IN: Input DC voltage

DC_OUT: Output DC voltage

Undervoltage Protection LED Status

Vin(V)	Vout(V)	UVP	OVP	DC_IN	DC_OUT
> 8.9V	~13.9V	Off	Off	**Green**	**Green**
> 8.6V - 8.8V	-	**Red (blinking)**	Off	**Green**	Off
< 8.5V	-	**Red (constant)**	Off	**Green**	Off

Overvoltage Protection LED Status

Vin(V)	Vout(V)	UVP	OVP	DC_IN	DC_OUT
< 32.3V	~13.9V	Off	Off	**Green**	**Green**
> 32.4V – 33.9V	-	Off	**Red (blinking)**	**Green**	Off
>34V	-	Off	**Red (constant)**	**Green**	Off

NOTE

All figures may be subject to a ±3% discrepancy.