

DORHEA DAD12748-1

DORHEA DC-DC Buck Boost Converter Module (DAD12748-1) User Manual

Adjustable Step-Up/Down Voltage Regulator with LCD Display

1. INTRODUCTION

This manual provides instructions for the DORHEA DC-DC Buck Boost Converter Module, model DAD12748-1. This versatile module functions as an adjustable step-up/down voltage regulator, capable of both boosting and bucking input voltage to achieve a desired output. It features an integrated LCD digital voltmeter and ammeter for real-time monitoring of input/output voltage, current, and power. Designed for various applications requiring precise voltage and current control, this module offers stable and reliable performance.

2. SAFETY INFORMATION

WARNING: Electrical Shock Hazard. Improper use can result in serious injury or death.

- Always ensure power is disconnected before making any connections or adjustments to the module.
- Do not exceed the specified input voltage, output voltage, or current limits.
- Ensure proper heat dissipation, especially when operating at higher currents or power levels.
- Avoid short circuits. Although the module has short-circuit protection, repeated or prolonged short circuits can damage the device.
- Keep the module away from moisture, dust, and extreme temperatures.
- This module is intended for use by individuals with adequate knowledge of electronics and electrical safety.

3. PRODUCT OVERVIEW

The DORHEA DC-DC Buck Boost Converter Module is built with a boost and buck chip as the main controller, external 60V 75A MOS tube, and double 60V 5A SS56 Schottky rectifiers for enhanced stability. It features an LCD display for clear readings and user-friendly buttons for control.

Key Features:

- Adjustable input voltage range: DC 5.5-30V
- Adjustable output voltage range: DC 0.5-30V
- Adjustable output current: 0-4A (with enhanced heat dissipation)
- Maximum output power: 35W (50W with enhanced heat dissipation)
- Integrated LCD display for voltage, current, and power monitoring
- Button controls for display switching and output ON/OFF
- Voltage display resolution: 0.05V
- Current display resolution: 0.005A
- Safety protections: Soft Start, Input Reverse Protection, Output Anti-Backflow, Short Circuit Protection, Low-Voltage Protection

Component Identification:

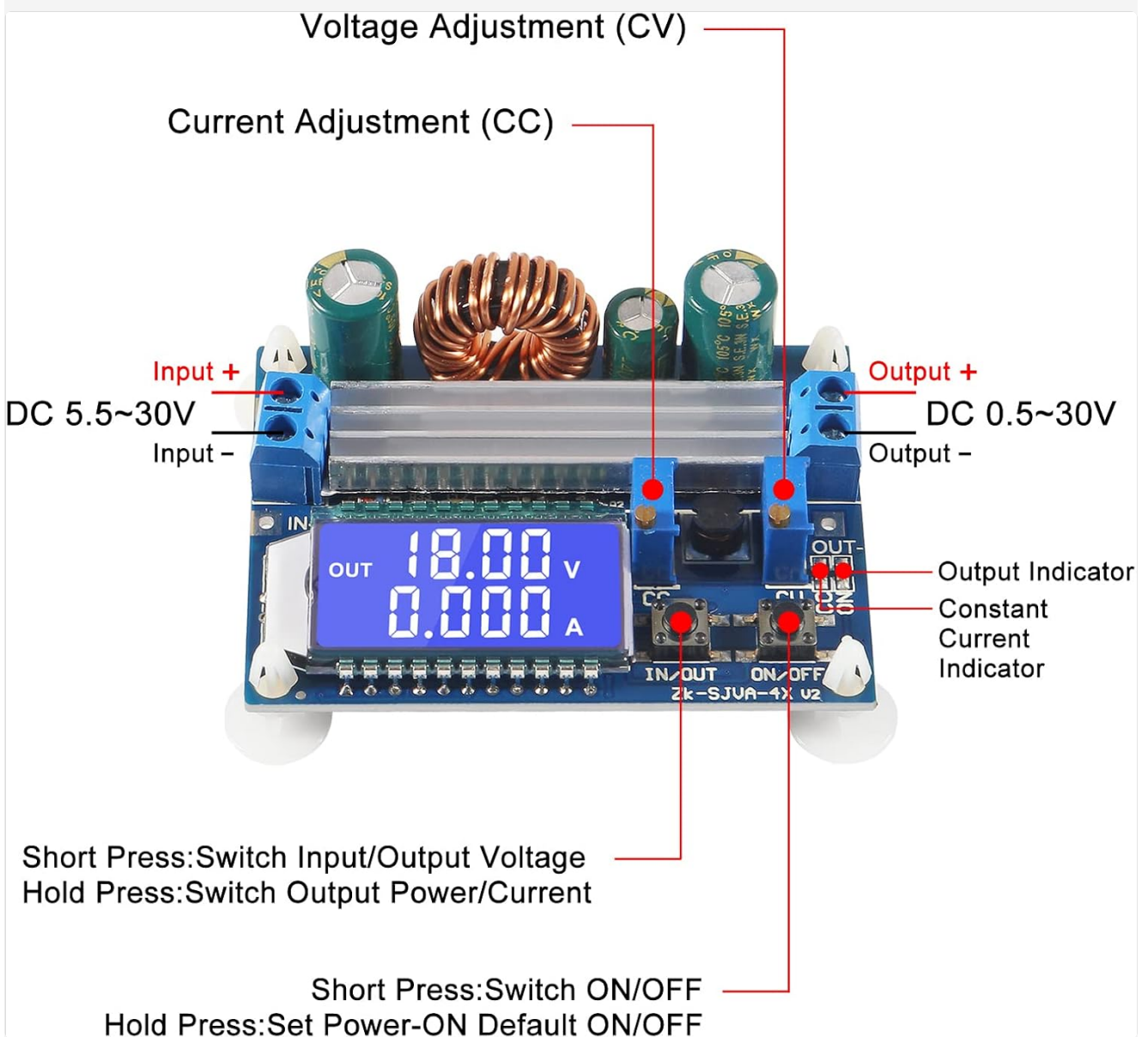


Figure 3.1: Labeled diagram of the module's main components.

This image illustrates the key connection points and controls on the module. Observe the "Input +" and "Input -" terminals for power input, and "Output +" and "Output -" for power output. The "CV" (Constant Voltage) and "CC" (Constant Current) potentiometers are used for adjustment. The "IN/OUT" and "ON/OFF" buttons control display and output respectively. The LCD screen displays operational parameters.

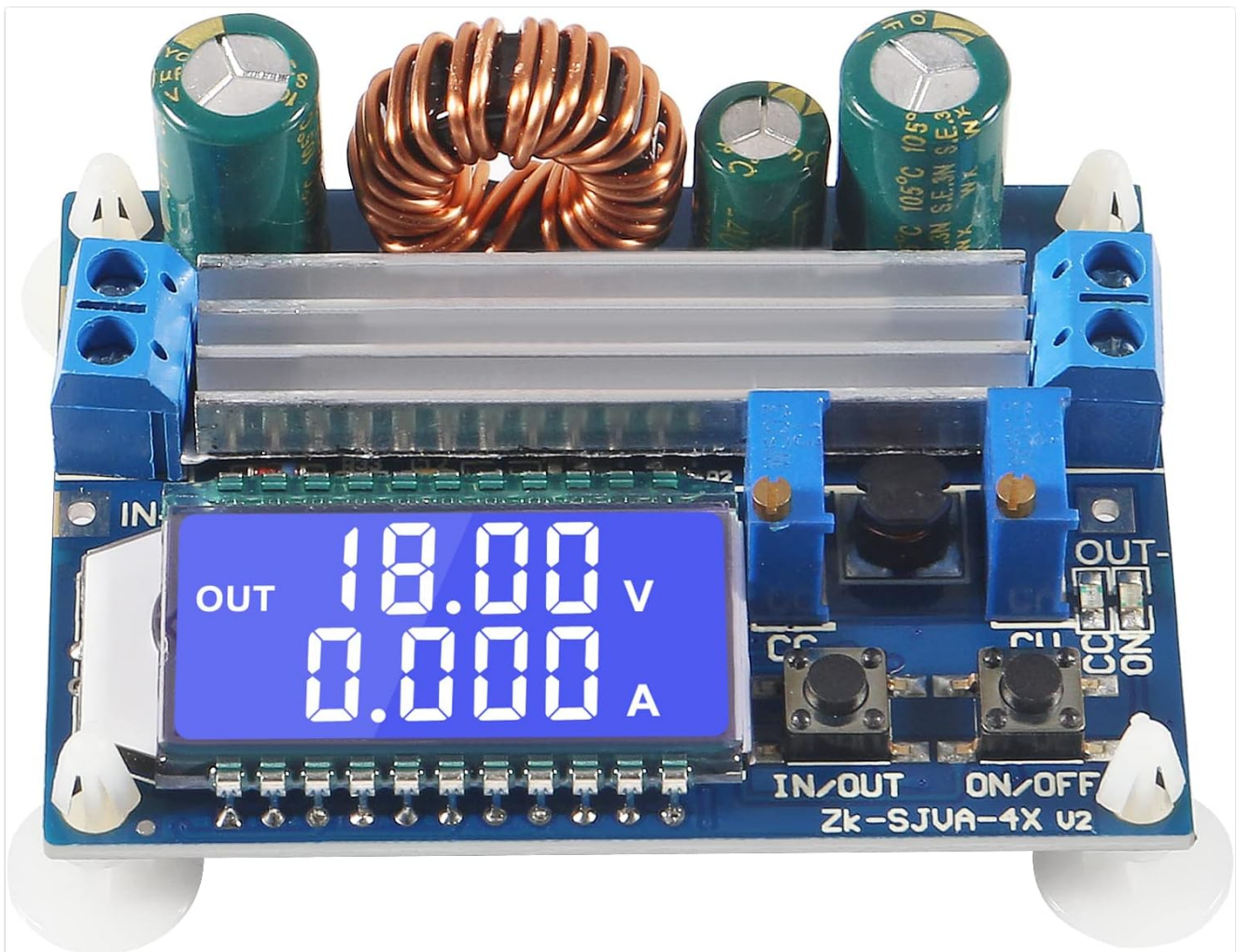


Figure 3.2: Front view of the module with LCD display.

This view provides a clear look at the module's front, highlighting the LCD display which shows the output voltage and current. The input and output terminals are visible on the left and right sides, respectively. The two control buttons are located below the LCD screen.

4. SPECIFICATIONS

Parameter	Value
Input Voltage Range	DC 5.5V - 30V (Note: Input voltage below 4.7V triggers low-voltage protection)
Output Voltage Range	DC 0.5V - 30V (Adjustable)
Output Current	3A (stable long-term), up to 4A (with enhanced heat dissipation)
Output Power	35W (natural heat dissipation), up to 50W (with enhanced heat dissipation)
Voltage Display Resolution	0.05V
Current Display Resolution	0.005A
Transfer Efficiency	Approx. 88%
Operating Frequency	180KHz
Dimensions (LxWxH)	66mm x 48mm x 21mm

Parameter	Value
Mounting Hole Diameter	4mm
Soft Start	Yes (Note: High power load module may fail when started without soft start)
Input Reverse Protection	Yes
Output Anti-Backflow	Yes (No additional anti-backflow diode required for battery charging)
Short Circuit Protection	Yes (Module automatically shuts down output, restored after re-energizing)
Low-Voltage Protection	Default approx. 4.7V (Output disconnected if input is less than 4.7V)

5. SETUP

Follow these steps to set up your DC-DC Buck Boost Converter Module:

- 1. Prepare Connections:** Ensure all power sources are disconnected before making any wiring.
- 2. Input Connection:** Connect your DC power source to the "Input +" and "Input -" terminals. Observe polarity: positive to "Input +" and negative to "Input -". The module has input reverse protection, but correct connection is always recommended.
- 3. Output Connection:** Connect your load or device to the "Output +" and "Output -" terminals. Observe polarity: positive to "Output +" and negative to "Output -".
- 4. Initial Power-Up:** Once all connections are secure, apply power to the input terminals. The LCD display should illuminate, showing the current input or output voltage.
- 5. Heat Dissipation:** For continuous operation at higher currents (above 3A) or power (above 35W), ensure adequate heat dissipation. This may involve attaching the included heatsink or providing active cooling.

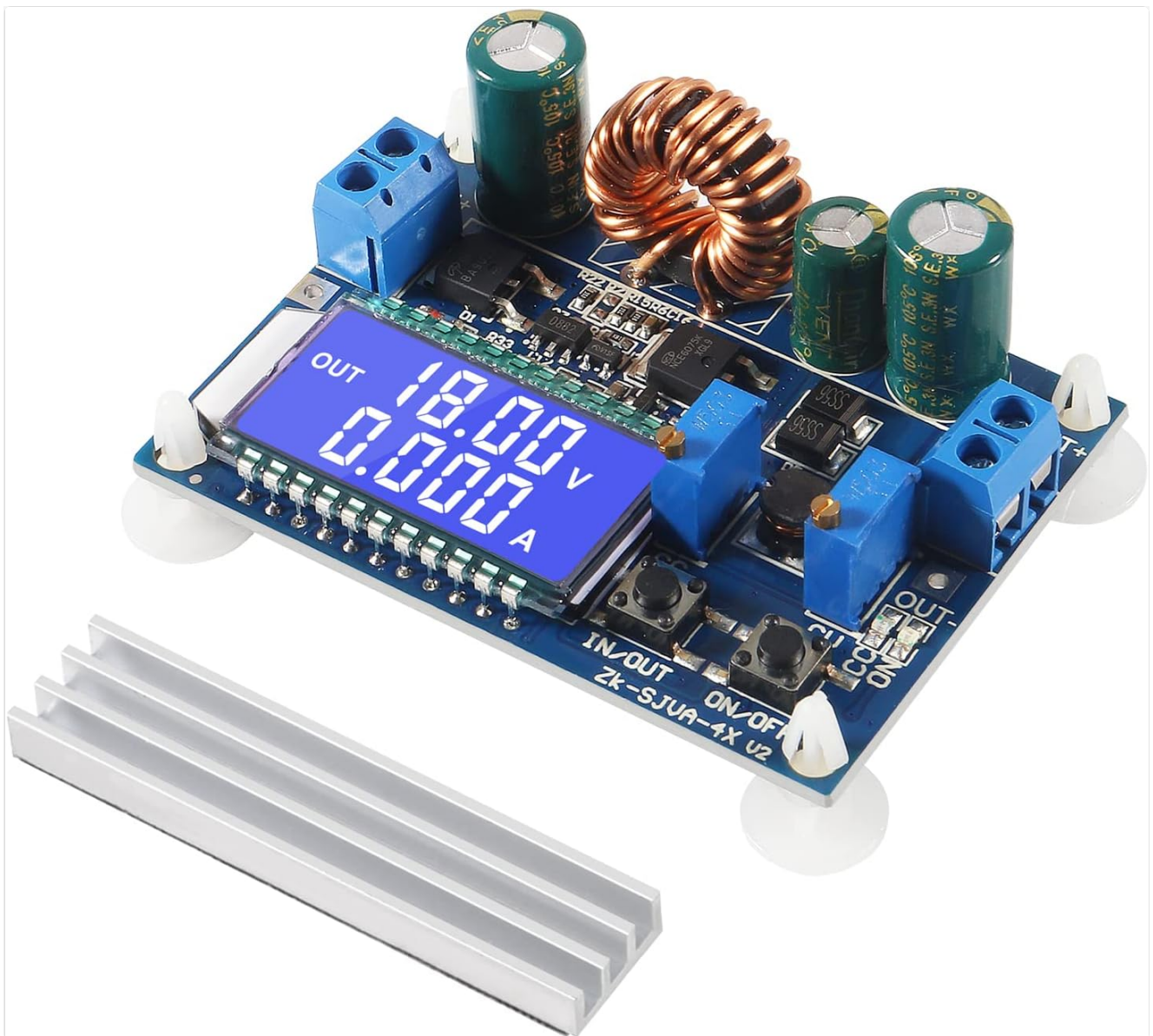


Figure 5.1: Module with heatsink for enhanced heat dissipation.

This image shows the module alongside an aluminum heatsink. For operations requiring higher current or power, attaching this heatsink to the main power components on the module is recommended to prevent overheating and ensure stable performance.

6. OPERATING INSTRUCTIONS

The module features two buttons and two potentiometers for control and adjustment.

Button Functions:

- **IN/OUT Button:**
 - **Short Press:** Switches the LCD display between input voltage and output voltage.
 - **Long Press:** Switches the LCD display between output current and output power.
- **ON/OFF Button:**
 - **Short Press:** Toggles the output ON or OFF.
 - **Long Press:** Sets the default output state (ON or OFF) for the next power-up. The setting is saved.

Potentiometer Adjustments:

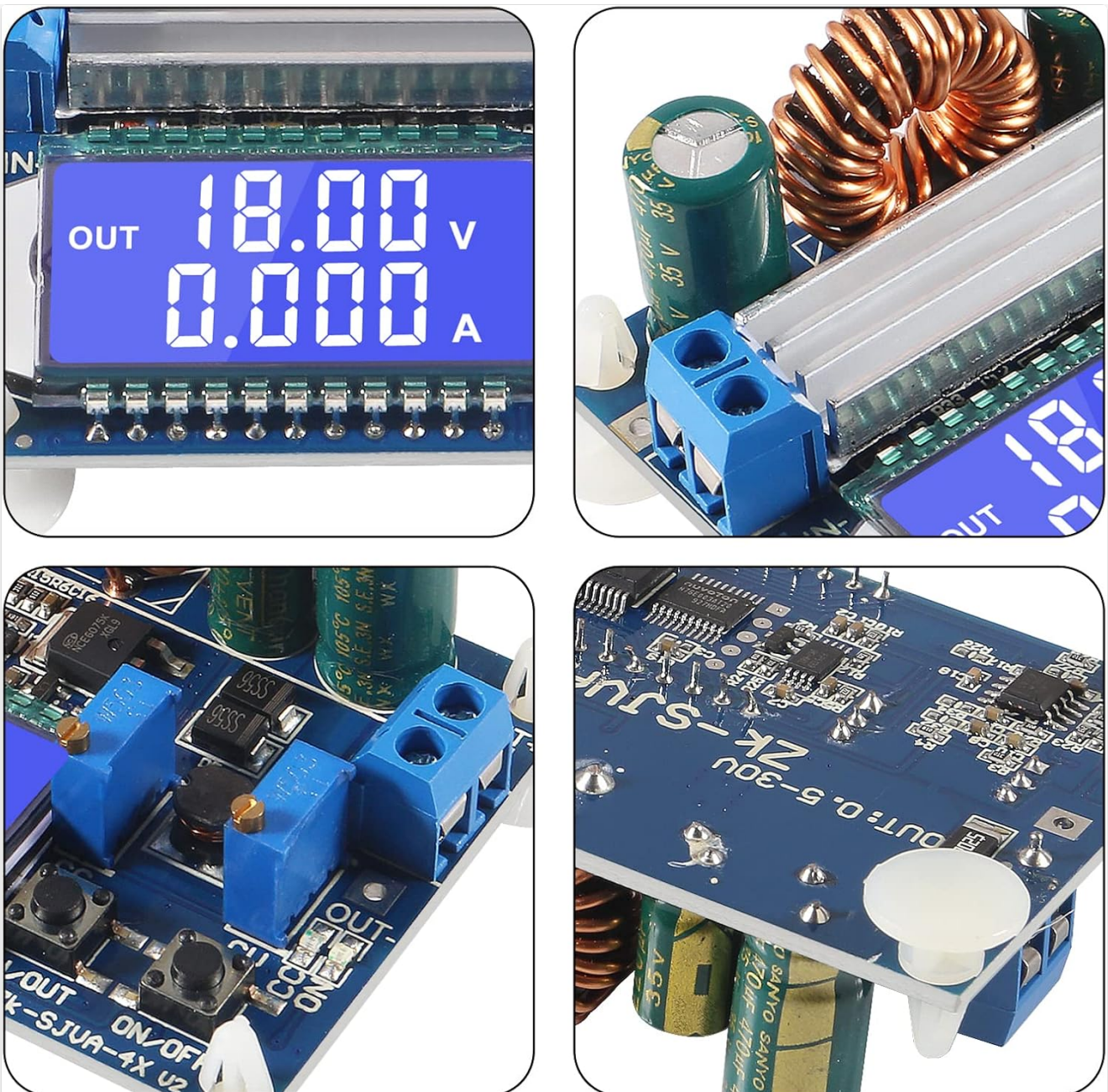


Figure 6.1: Close-up of adjustment potentiometers and LCD.

This image provides a detailed view of the two potentiometers, labeled "CV" and "CC", located near the output terminals. These are used for fine-tuning the output voltage and current limits.

- **CV (Constant Voltage) Potentiometer:**

- Rotate clockwise to increase the output voltage.
- Rotate counter-clockwise to decrease the output voltage.
- Adjust this to set your desired output voltage.

- **CC (Constant Current) Potentiometer:**

- Rotate clockwise to increase the current limit.
- Rotate counter-clockwise to decrease the current limit.
- When the load current reaches the set current, the module enters constant current (CC) mode, and the red "CC" indicator light will illuminate. This protects the load and the module from overcurrent.

Important: Always adjust the CV potentiometer first to set the desired voltage, then adjust the CC potentiometer to set the maximum current limit for your application. If charging a battery, set the voltage slightly higher than the battery's full charge voltage and the current to the desired charging current. The module will automatically switch to

constant voltage mode when the battery is nearly full.

7. MAINTENANCE

- **Cleaning:** Keep the module clean and free from dust. Use a soft, dry cloth to wipe the surface. Do not use liquids or abrasive cleaners.
- **Heat Dissipation:** Regularly check that the heatsink (if installed) is free from dust and debris to ensure efficient cooling. Ensure adequate airflow around the module, especially during high-power operation.
- **Connections:** Periodically inspect all wiring connections to ensure they are secure and free from corrosion.
- **Storage:** When not in use, store the module in a dry, cool environment, away from direct sunlight and extreme temperatures.

8. TROUBLESHOOTING

Problem	Possible Cause	Solution
No display/No output	No input power, incorrect wiring, input voltage too low.	Check input power supply. Verify input wiring polarity. Ensure input voltage is within 5.5V-30V range. Check if low-voltage protection is active (input below 4.7V).
Output shuts down unexpectedly	Short circuit, overcurrent, low-voltage protection triggered.	Check for short circuits in the output. Reduce load to stay within current limits. Re-energize the module after clearing a short circuit. Ensure input voltage is stable and above 4.7V.
Output voltage/current cannot be adjusted	Potentiometers at limit, faulty potentiometer.	Rotate potentiometers fully in both directions to check range. Ensure the module is powered on and not in a protection state.
Inaccurate voltage/current readings	Input voltage too low (for input measurement), calibration issue.	Ensure input voltage is above 5V for accurate input measurement. If persistent, compare with an external multimeter.
Module gets hot during operation	Operating at high current/power without sufficient heat dissipation.	Install the provided heatsink. Ensure adequate airflow. Reduce load if necessary.
High power load module may fail when started	Sudden high current draw during startup.	The module has a soft start feature. If issues persist with very high inductive or capacitive loads, consider adding an external soft-start circuit or gradually increasing the load.

9. WARRANTY AND SUPPORT

For warranty information and technical support, please refer to the product's purchase documentation or contact the seller/manufacturer directly. Keep your purchase receipt as proof of purchase.

Manufacturer: DORHEA

Model Number: DAD12748-1



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