UNI-T®

Instruments.uni-trend.com

UDP5000 Series Programmable DC Power Supplies

User Manual

REV 2

January 2025

Foreword

Thank you for choosing this UNI-T instrument. For safe and proper use this instrument, please read this manual carefully, especially the safety instructions section.

After reading this manual, it is recommended to keep the manual in a convenient location, preferably near the device, for future reference.

Safety Instructions

This chapter contains information and warnings that must be observed. Ensure that the instrument is operated under the safe conditions. In addition to the safety precautions indicated in this chapter, you must also follow accepted safety procedures.

Safety Precautions		
Warning	Please follow these guidelines to avoid possible electric shock and risk to personal safety.	
	Users must adhere to standard safety precautions during the operation, servicing, and maintenance of this device. UNI-T will not be liable for any personal safety and property loss caused by the user's failure following the safety precautions. This device is designed for professional users and responsible organizations for measurement purposes. Do not use this device in any manner not specified by the manufacturer. This device is intended for indoor use only, unless otherwise stated in the product manual.	
Safety Statements		
Warning	"Warning" indicates the presence of a hazard. It warns users to pay attention to a certain operation process, operation method or similar. Personal injury or death may occur if the rules in the "Warning" statement are not properly executed or observed. Do not proceed to the next step until you fully understand and meet the conditions stated in the "Warning" statement.	
Caution	"Caution" indicates the presence of a hazard. It warns users to pay attention to a certain operation process, operation method or similar. Product damage or loss of important data may occur if the rules in the "Caution" statement are not properly executed or observed. Do not proceed to the next step until you fully understand and meet the conditions stated in the "Caution" statement.	
Note	"Note" indicates important information. It reminds users to pay attention to procedures, methods, and conditions, etc. The contents of "Note" should be highlighted if necessary.	
Safety Signs		
	Danger	It indicates danger of electric shock, which may cause personal injury or death.
	Warning	It indicates that there are factors you should be cautious of to prevent personal injury or product damage.
	Caution	It indicates danger, which may cause damage to this device or other equipment if you fail to follow a certain procedure or condition. If the "Caution" sign is present, all conditions must be met before you proceed to operation.

	Note	It indicates potential problems, which may cause failure of this device if you fail to follow a certain procedure or condition. If the "Note" sign is present, all conditions must be met before this device will function properly.
	AC	Alternating current of device. Please check the region's voltage range.
	DC	Direct current device. Please check the region's voltage range.
	Grounding	Frame and chassis grounding terminal
	Grounding	Protective grounding terminal
	Grounding	Measurement grounding terminal
	OFF	Main power off
	ON	Main power on
	Power	Standby power supply: When the power switch is turned off, this device is not completely disconnected from the AC power supply.
CAT I		Secondary electrical circuit connected to wall sockets through transformers or similar equipment, such as electronic instruments and electronic equipment; electronic equipment with protective measures, and any high-voltage and low-voltage circuits, such as the copier in the office.
CAT II		Primary electrical circuit of the electrical equipment connected to the indoor socket via the power cord, such as mobile tools, home appliances, etc. Household appliances, portable tools (e.g., electric drill), household sockets, sockets more than 10 meters away from CAT III circuit or sockets more than 20 meters away from CAT IV circuit.
CAT III		Primary circuit of large equipment directly connected to the distribution board and circuit between the distribution board and the socket (three-phase distributor circuit includes a single commercial lighting circuit). Fixed equipment, such as multi-phase motor and multi-phase fuse box; lighting equipment and lines inside large buildings; machine tools and power distribution boards at industrial sites (workshops).
CAT IV		Three-phase public power unit and outdoor power supply line equipment. Equipment designed to "initial connection," such as power distribution system of power station, power instrument, front-end overload protection, and any outdoor transmission line.
	Certification	CE indicates a registered trademark of EU.
	Certification	UKCA indicates a registered trademark of United Kingdom.
	Certification	Conforms to UL STD 61010-1 and 61010-2-030. Certified to CSA STD C22.2 No.61010-1 and 61010-2-030.
	Waste	Do not place equipment and accessories in the trash. Items must be properly disposed of in accordance with local regulations.

	EEUP	This environment-friendly use period (EFUP) mark indicates that dangerous or toxic substances will not leak or cause damage within this indicated time period. The environmentally friendly use period of this product is 40 years, during which it can be used safely. Upon expiration of this period, it should enter the recycling system.
Safety Requirements		
Warning		
Preparation before use		Please connect this device to AC power supply with the power cable provided. The AC input voltage of the line reaches the rated value of this device. See the product manual for specific rated value. The line voltage switch of this device matches the line voltage. The line voltage of the line fuse of this device is correct. This device is not intended for measuring the main circuit.
Check all terminal rated values		Please check all rated values and marking instructions on the product to avoid fire and the impact of excessive current. Please consult the product manual for detailed rated values before connection.
Use the power cord properly		You can only use the special power cord for the instrument approved by the local and state standards. Please check whether the insulation layer of the cord is damaged, or the cord is exposed, and test whether the cord is conductive. If the cord is damaged, please replace it before using the instrument.
Instrument Grounding		To avoid electric shock, the grounding conductor must be connected to the ground. This product is grounded through the grounding conductor of the power supply. Please be sure to ground this product before it is powered on.
AC power supply		Please use the AC power supply specified for this device. Please use the power cord approved by your country and confirm that the insulation layer is not damaged.
Electrostatic prevention		This device may be damaged by static electricity, so it should be tested in the anti-static area if possible. Before the power cable is connected to this device, the internal and external conductors should be grounded briefly to release static electricity. The protection grade of this device is 4 kV for contact discharge and 8 kV for air discharge.
Measurement accessories		Measurement accessories designated as lower-grade, which are not applicable to main power supply measurement, CAT II, CAT III, or CAT IV circuit measurement. Probe subassemblies and accessories within the range of IEC 61010-031 and current sensors within the range of IEC 61010-2-032 can meet its requirements.
Use the input / output port of this device properly		Please use the input / output ports provided by this device in a proper manner. Do not load any input signal at the output port of this device. Do not load any signal that does not reach the rated value at the input port of this device. The probe or other connection accessories should be effectively grounded to avoid product damage or abnormal function. Please refer to the product manual for the rated value of the input / output port of this device.
Power fuse		Please use a power fuse of exact specification. If the fuse needs to be replaced, it must be replaced with another one that meets the specified specifications by the maintenance personnel authorized by UNI-T.
Disassembly and cleaning		There are no components available for operators inside. Do not remove the protective cover. Qualified personnel must conduct maintenance.
Service environment		This device should be used indoors in a clean and dry environment with ambient temperature from 0 ℃ to +40 ℃. Do not use this device in explosive, dusty, or high humidity conditions.

Do not operate in humid environment	Do not use this device in a humid environment to avoid the risk of internal short circuit or electric shock.
Do not operate in flammable and explosive environment	Do not use this device in a flammable and explosive environment to avoid product damage or personal injury.
Caution	
Abnormality	If this device may be faulty, please contact the authorized maintenance personnel of UNI-T for testing. Any maintenance, adjustment or parts replacement must be done by the relevant personnel of UNI-T.
Cooling	Do not block the ventilation holes at the side and back of this device. Do not allow any external objects to enter this device via ventilation holes. Please ensure adequate ventilation and leave a gap of at least 15 cm on both sides, front and back of this device.
Safe transportation	Please transport this device safely to prevent it from sliding, which may damage the buttons, knobs, or interfaces on the instrument panel.
Proper ventilation	Insufficient ventilation will cause the device temperature to rise, thus causing damage to this device. Please keep proper ventilation during use, and regularly check the vents and fans.
Keep clean and dry	Please take precautions to prevent dust or moisture in the air affecting the performance of this device. Please keep the product surface clean and dry.
Note	
Calibration	The recommended calibration period is one year. Calibration should only be conducted by qualified personnel.

Cleaning

To prevent electric shock, unplug the power cord before cleaning. Use a clean cloth slightly dampened with water to wipe the outer shell and panel, and ensure they remain dry. Avoid allowing water to enter the instrument. Do not attempt to clean the inside of the instrument.

Note: Do not use solvents (such as alcohol or gasoline) to clean the instrument.

1. Product Overview

Product Introduction

UDP5000 series is a single-output programmable switched DC power supply, available in 16 models, featuring four rated voltage models 40 V, 80 V, 160 V, and 250 V; four power model 400 W, 800 W, 1200 W, and 2000 W. This series allows flexible voltage and current output combinations under fixed power conditions. A single unit can accommodate both high-voltage, low-current and high-current, low-voltage outputs, optimizing costs and space. For example, UDP5040-40 (40 V/40 A/400 W) supports multiple output configurations, such as 10 V/40 A/400 W, 20 V/20 A/400 W, 40 V/10 A/400 W.

UDP5000 series is equipped with USB and LAN interfaces, supports the SCPI protocol, and enables remote control, industrial PLC integration, and intelligent test platform setups. It is widely used in DC-DC power module testing, battery charging, and sensor applications.

Main Features

1. **TFT-LCD Display**: Simultaneously shows set voltage, current, output voltage, and output current.
2. **Series and Parallel Connections**: Supports series and parallel connections of the same model, with up to 3 units in parallel and 2 units in series.
3. **LAN Port**: Enables remote control via Web and VXI bus using a browser.
4. **Global Voltage Compatibility**: Supports automatic voltage switching, eliminating the need to manually adjust the input voltage range.
5. **Extension Ports**: Built-in USB, LAN, and analog control ports for future expansion.
6. **SCPI**: Compatible with the SCPI protocol, facilitating remote control, industrial PLC integration, and intelligent test platform setups.
7. **High Power Quality**: Features high power factor, low THD, low ripple, and low noise, ensuring minimal harmonic interference, ideal for applications requiring superior power quality.
8. **Multiple CC/CV Slope Modes**: Provides enhanced load protection.
9. **External Analog Control**: Supports external analog voltage/resistance control, as well as voltage and current monitoring output.
10. **High Power Outputs**: Enables high-power output from both the front and rear panels.
11. **Remote Sense Compensation Function**: Compensates for voltage drops in wiring, ensuring accurate testing results.
12. **Protection Modes**: OVP (Over Voltage Protection), OCP (Over Current Protection), OTP (Over Temperature Protection), and OPP (Over Power Protection) functions.
13. **Discharge Load Control**: After shutdown, the output capacitor's current is discharged to a safe voltage level.

14. **Wide Operating Temperature Range**: Designed for reliable operation in environments up to 50°C.

UDP5000 Series

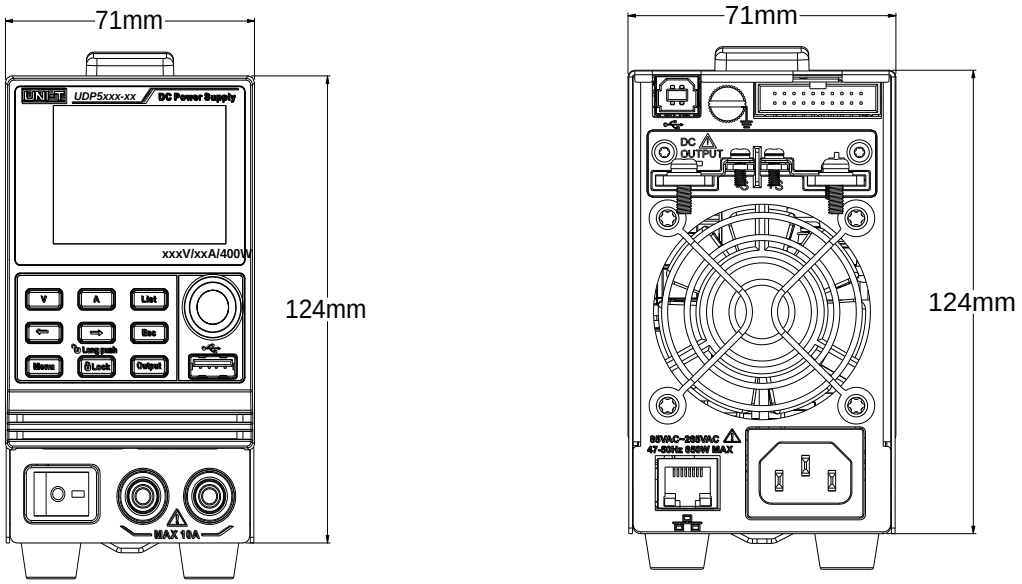
400 W Model

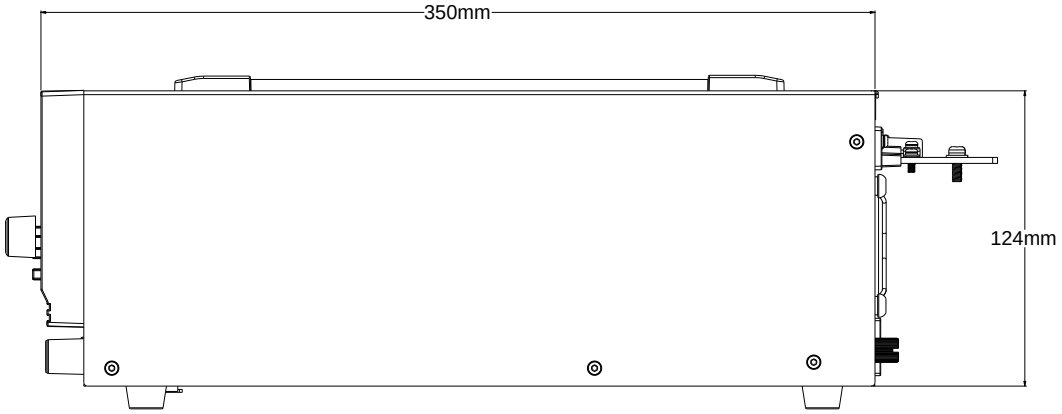
Model	Rated Voltage	Rated Current
UDP 5040-40	40 V	40 A
UDP 5080-20	80 V	20 A
UDP 5160-8	160 V	8 A
UDP 5250-6	250 V	6A

Accessory

1. USB 2.0 Double-Ended Printing Cable: Black, 1.5m, "neutral" (RoHS)
2. Output Protection Cover: One set, includes one M3 × 8 cross-head screw
3. Power Cord and Outlet: VDE H05 VV-F 3 × 0.75mm^2, 1.8m, 250V / 10A, 3C certified, black, IEC 60320-C13, C14

Model Dimensions: 350mm × 71mm × 124mm





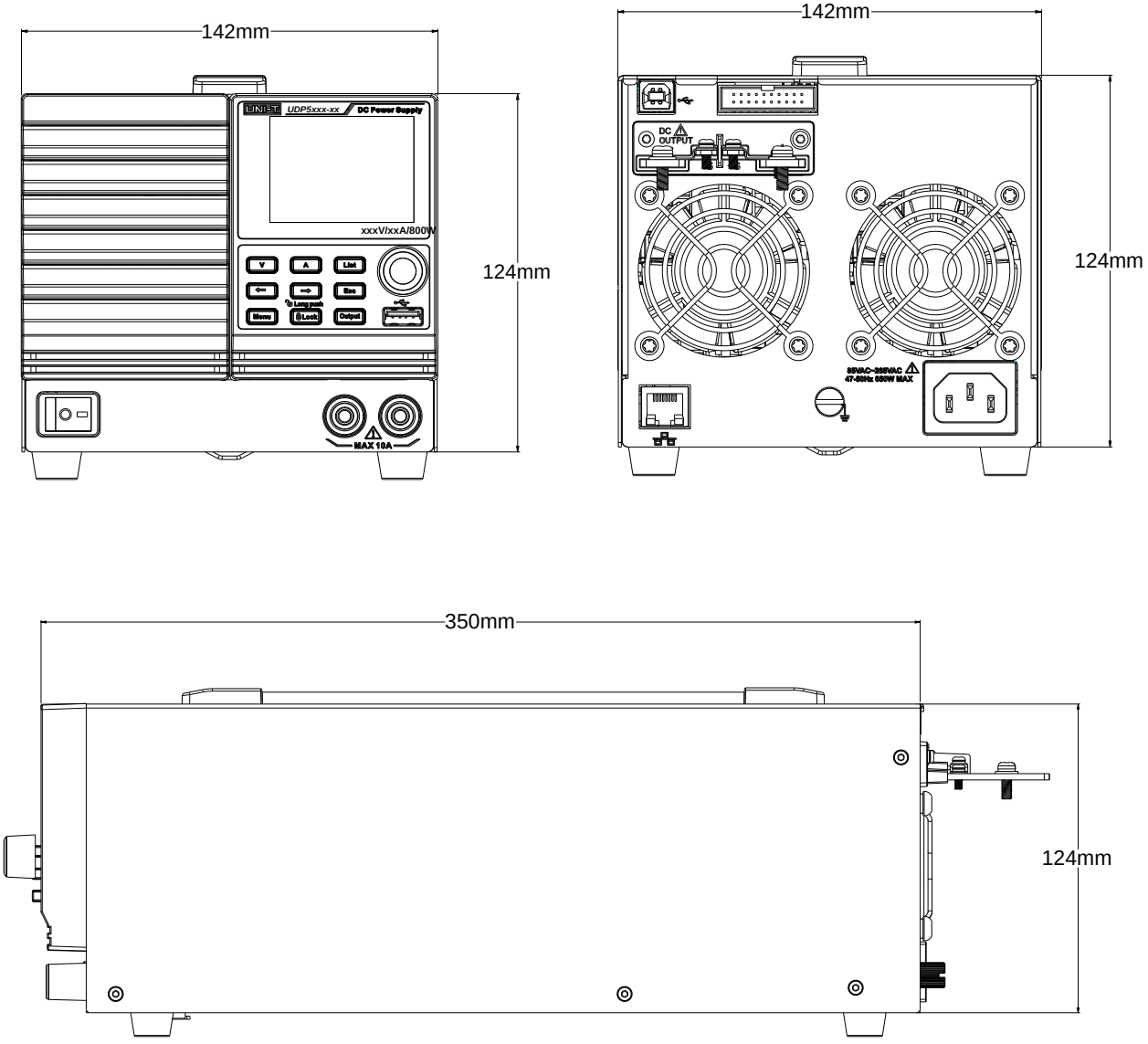
800 W Model

Model	Rated Voltage	Rated Current
UDP 5040-80	40 V	80 A
UDP 5080-40	80 V	40 A
UDP 5160-16	160 V	16 A
UDP 5250-12	250 V	12 A

Accessory

1. USB 2.0 Double-Ended Printing Cable: Black, 1.5m, "neutral" (RoHS)
2. Output Protection Cover: One set, includes one M3 × 8 cross-head screw
3. Power Cord and Outlet: VDE H05 VV-F 3 × 0.75mm^2, 1.8m, 250V / 10A, 3C certified, black, IEC 60320-C13, C14

Model Dimensions:350mm x 142mm x 124mm



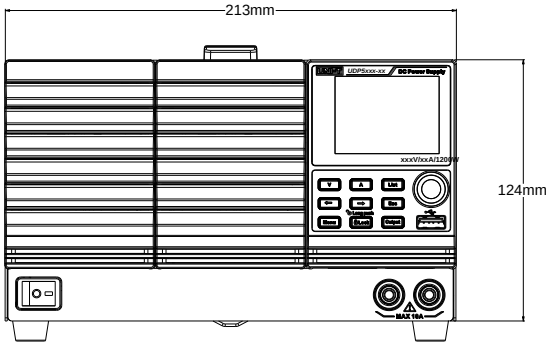
1200 W Model

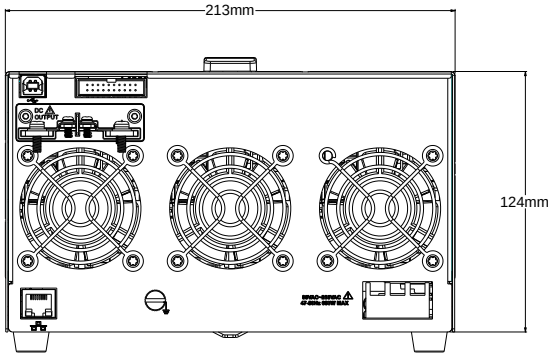
Model	Rated Voltage	Rated Current
UDP 5040-120	40 V	120 A
UDP 5080-60	80 V	60 A
UDP 5160-24	160 V	24 A
UDP 5250-18	250 V	18 A

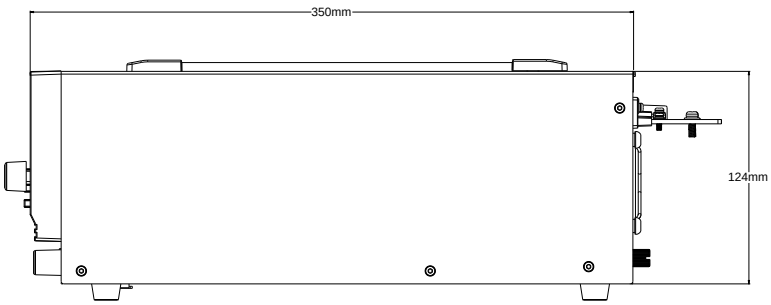
Accessory

1. USB 2.0 Double-Ended Printing Cable: Black, 1.5m, "neutral" (RoHS)
2. Output Protection Cover: One set, includes one M3 × 8 cross-head screw
3. AC Protection Cover: Two M3 × 8 cross-head screws
4. Power Cord and Outlet: (H05 VV-F)3G*2.5mm^2(Brown, blue, yellow, green), black PVC jacket, 3m, 250 V, 20 A, 60227 IEC 53 (RVV), black
5.

Model Dimensions: 350mm x 213mm x 124mm







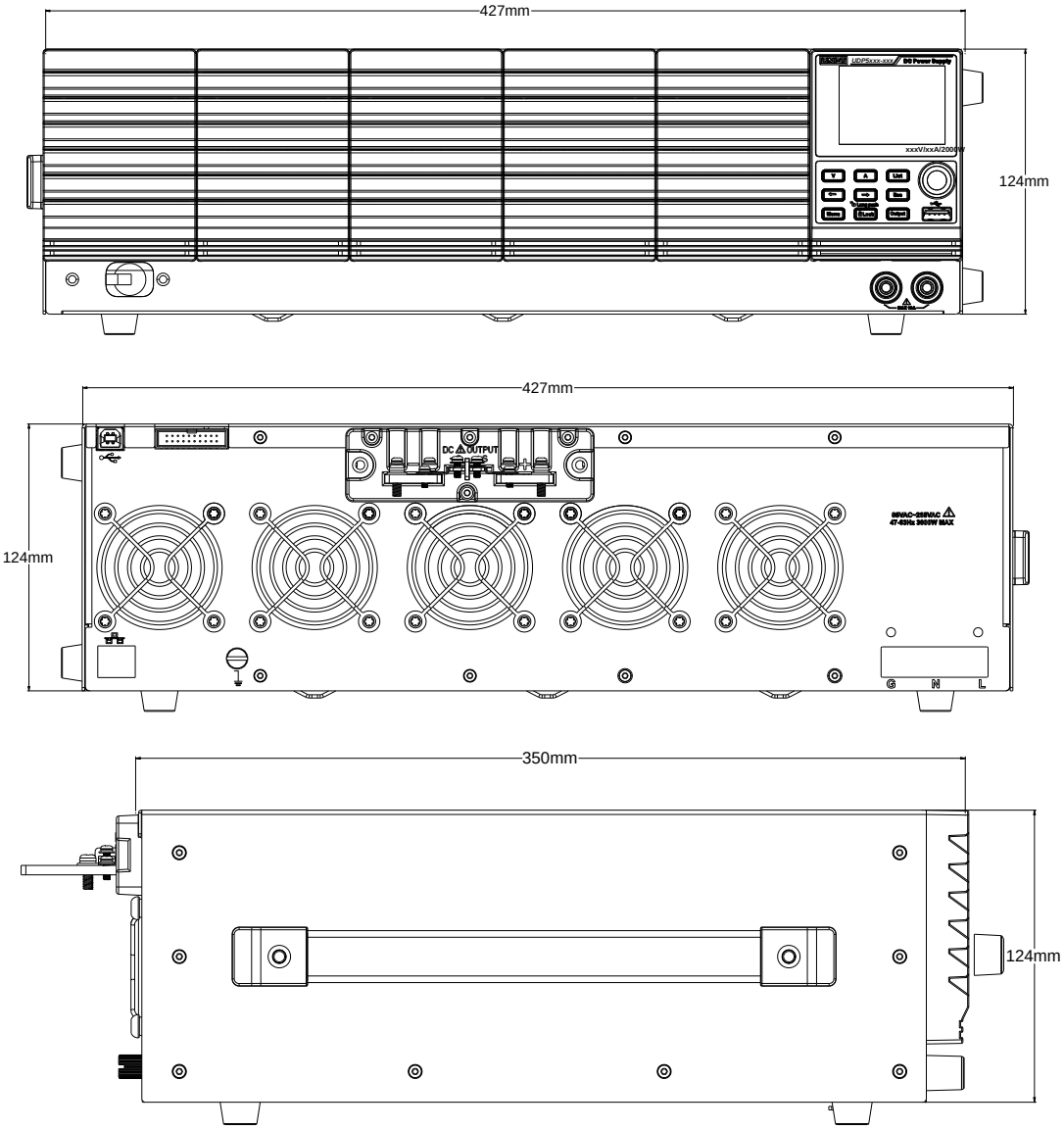
2000 W Model

Model	Rated Voltage	Rated Current
UDP 5040-200	40 V	200 A
UDP 5080-100	80 V	100 A
UDP 5160-40	160 V	40 A
UDP 5250-30	250 V	30 A

Accessory

1. USB 2.0 Double-Ended Printing Cable: Black, 1.5m, "neutral" (RoHS)
2. Output Protection Cover: One set, includes one M3 × 8 cross-head screw
3. AC Protection Cover: Two M3 × 8 cross-head screws
4. Power Cord and Outlet: (H05 VV-F)3G*2.5mm^2(Brown, blue, yellow, green), black PVC jacket, 3m, 250 V, 20 A, 60227 IEC 53 (RVV), black

Model Dimensions: 350mm x 427mm x 124mm



2. Inspection and Installation

2.1 Packing List

Before Using the Instrument:

1. Inspect the product for any physical damage, scratches, or defects.
2. Check that all accessories are included as per the packing list.

If the product is damaged or any accessories are missing, contact the UNI-T Sales Department or your distributor immediately.

Item	Quantity	Remarks
UDP5000 Series Programmable DC Power Supply	1	Subject to the actual order
Power Cord	1	Based on the specified model
Quick Start Guide	1	Paper document
User Manual/Upper Computer Software	1	Electronic files can download from official Uni-Trend website
USB cable	1	
Output Protection Cover	1	

Note

After confirming that there are no issues with the package, please keep the packing box and related items properly. If the instrument needs to be returned for service, it must meet the original packing requirements.

2.1.1 Connecting Power Cord

Danger: Risk of electric shock.

This product complies with IEC Safety Class I standards (featuring a protective conductor terminal). To prevent electric shock, always use a properly grounded AC power source.

Connecting Power Cord for 400 W / 800 W Models

Note

- Connect AC power using the provided power cord.
- Ensure the power cord is plugged into a socket within easy reach for quick disconnection in emergencies.

- Do not use the dedicated power cable for other devices.

Power Cord Connection Steps

1. Ensure the AC input power is within the rated range.
   - Nominal input voltage: 100 Vac - 240 Vac, 50Hz - 60Hz, single-phase
2. Turn off the power switch before connecting the power cord.
3. Firmly insert the IEC 60320-C13 connector into the IEC 60320-C14 inlet on the rear panel until securely connected.
4. Ensure the connection is tight and stable, with no looseness, to maintain a proper electrical circuit.

Connecting Power Cord for 1200 W / 2000 W Models

Danger: Risk of electric shock.

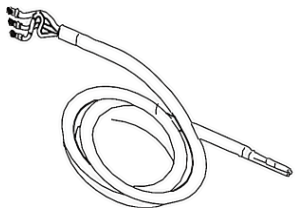
- Disconnect the circuit breaker on the distribution board to ensure the power supply is completely cut off.
- Always install the output protection cover during operation to prevent potential hazards such as fire.
- Only qualified professionals should handle distribution board connections to ensure safety.
- When using the distribution board circuit breaker, ensure it meets the necessary conditions, including circuit load and current capacity.

Note

This product features an internal protection circuit directly linked to the input terminal polarity. When connecting the distribution board to the power input terminal, ensure the **neutral wire (N)**, **live wire (L)**, and **ground wire (GND)** are correctly connected.

- For AC power connections: Use the dedicated power cord provided. If unavailable, a qualified technician must select a power cord no longer than 3 meters.
- Emergency power cutoff: If the AC power supply needs to be disconnected, always turn off the circuit breaker on the distribution board first.

Provided Power Cord for 1200 W / 2000 W Models



Power Cord for 1200 W Model

If the dedicated cord is unavailable, please use a cord with the following specifications:

1200 W Model 2000 W Model	Cable length: Below 12.1 mm Rated voltage: Above 250 V Vinyl Chloride Insulated Flexible Cable (VCTF) Nominal sectional area: 2.5 mm^2 3-core Input terminal side: U-type terminal (OD:6.3*4.3*25.5 mm)

Fixed Torque of Connecting Screw for Input Terminal

	Fixed Torque [N·m]
M4	1.33

Circuit Breaker Requirements for Distribution board

- Rated Current:

  1200 W Model: 30 A (100 V series), 15 A (200 V series)

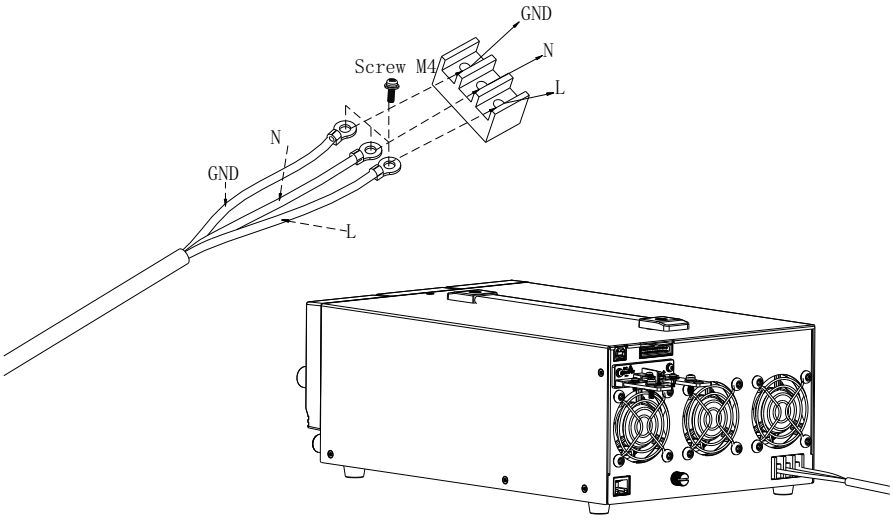
  2000 W Model: 50 A (100 V series), 30 A (200 V series)

- Do not exceed the rated current.
- Use a circuit breaker specifically dedicated to this product.
- Ensure it can be easily operated under all circumstances.
- If used exclusively for this product, clearly indicate that it is designated for cutting off the AC power supply.

	400 W Model	800 W Model	1200 W Model	2000 W Model
Protective conductor current (265 Vac, 60 Hz)	1.5 mA	2.5 mA	4.0 mA	4.7 mA
Surge Current	25 A max.	50 A max.	75 A max.	125 A max.

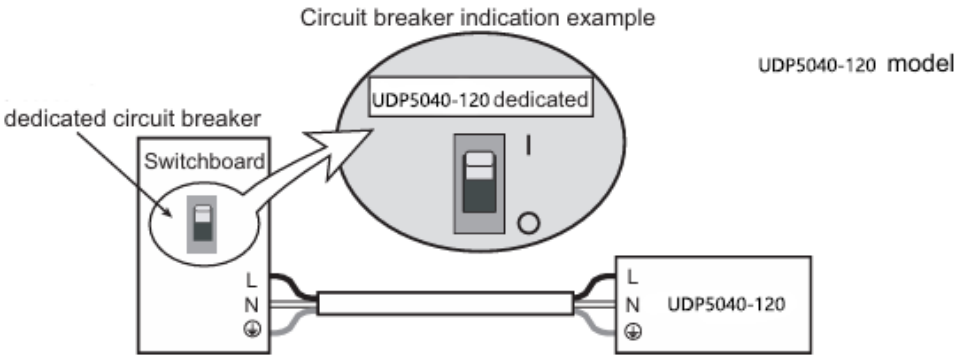
Power Cord Connection Steps

1. Ensure the AC input power is within the rated range.
   - Nominal input voltage: 100 Vac - 240 Vac, 50Hz - 60Hz, single-phase
2. Turn off the power switch before connecting the power cord.
3. Connect the power cord to the AC input terminal on the rear panel.
   - Attach the power cord to the input protection cover.
   - Correctly connect the Neutral (N), Live (L), and Ground (GND) wires.
   - Secure the connection using screws.



Input Wire Assembly Drawing (1200 W Model)

4. Connect the power cord to the distribution board. Ensure the circuit breaker on the distribution board is in the OFF state before making the connection.



5. Install crimping terminals on the distribution board side of the power cable.
6. When connecting the distribution board to the power input terminal, ensure that the neutral wire (N), live wire (L), and ground wire (GND) are correctly connected.

2.1.2 Load

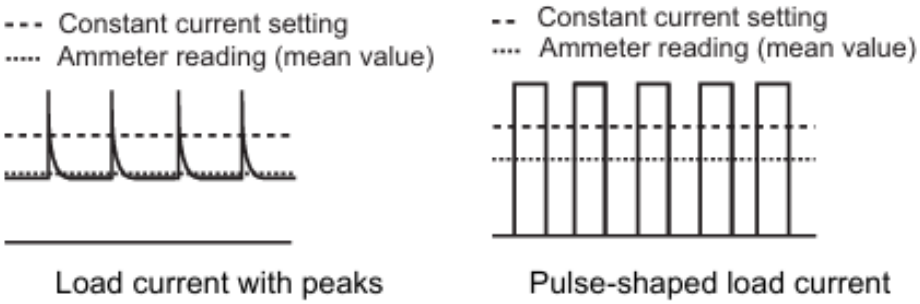
Please note that unstable output may occur when connecting the following types of loads.

- **Loads that generate peak pulse currents or fluctuating pulses.**

  This product displays the average current value. However, if the actual peak current exceeds the set value while the displayed current remains below the set value, the product may enter instantaneous constant current operation, leading to a drop in output voltage.

  To stabilize the output for such loads:

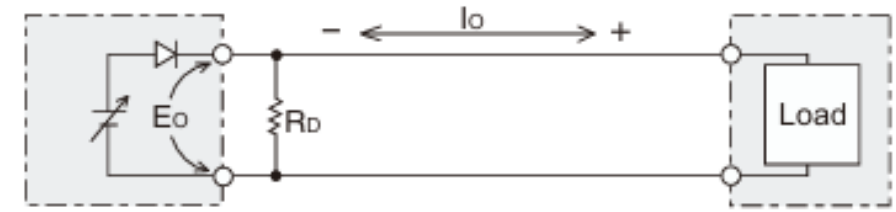
  - Increase the constant current set value.
  - Increase the capacitance of the capacitor.

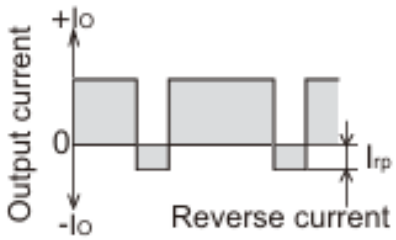


- Loads that generate inverse current to the power supply.

  This product cannot absorb reverse current from the load. When connecting loads that generate regenerative power, such as inverters, converters, or transformers, the output voltage may rise, leading to instability and potential malfunctions.

  To prevent this issue, connect a resistor (RD) to divert the reverse current, as shown in the figure below. However, note that the current flowing to the load will decrease by Irp accordingly.





$$R_D\ (\text{in}\ \Omega) \le \frac{EO\ (\text{in V})}{Irp\ (\text{in A})}$$

RD: Reverse current bypass dummy load
Eo: Output voltage
Irp: Maximum reverse current

Warning

Select a resistor RD with a sufficiently high power rating. If a resistor with an inadequate power rating is used, RD may overheat and burn out.

2.2.3 Wire Selection for Load

Danger: Risk of fire.

- Risk of electric shock.
- Use an output wire with a sufficient current capacity that meets the rated output current.

- High temperatures may occur near the output terminal. Ensure that all wire components can withstand temperatures over 85°C.
- Select an output wire with a rated voltage higher than the insulation voltage of this product.

Note

For the load wire, use a cable with a sufficient wire diameter to safely handle high current and ensure it has a durable, flame-retardant outer layer.

Current Capacity of Output Wire

The temperature of the wire is influenced by power loss due to its resistance and the surrounding ambient temperature. When the ambient temperature is 30°C, the current-carrying capacity of heat-resistant plastic wires is as follows:

For a heat-resistant plastic wire installed alone in open air with a maximum allowable temperature of 60°C, its current-carrying capacity aligns with to standard values.

If using plastic wires with lower heat resistance, operating in environments above 30°C, or bundling wires into a harness with poor heat dissipation, the current capacity must be reduced accordingly.

Nominal Sectional Area [mm²]	AWG (Reference Sectional Area [mm²])		Allowable Current [A] (Ta=30℃)	Recommended Current [A]
2	14	(2.08)	27	10
3.5	12	(3.31)	37	-
5.5	10	(5.26)	49	20
8	8	(8.37)	61	30
14	6	(13.3)	88	50
22	4	(21.15)	115	80
30	2	(33.62)	139	-
38	1	(42.41)	162	100
50	1/0	(53.49)	190	-
60	2/0	(67.43)	217	-
80	3/0	(85.01)	257	200
100	4/0	(107.2)	298	-

- Addressing Noise

For wires with the same heat resistance rating, maximize spacing to improve heat dissipation and current flow. However, placing the output + (positive) and output – (negative) wires close together or bundling them in a harness helps reduce noise.

The recommended current values provided in the table above are adjusted to account for the use of output wire harnesses. These values serve as a reference for wiring.

- **Remote Sensing Limit**

  Wires have inherent resistance due to their material properties. As wire length increases or current flow rises, the voltage drop across the wire becomes more significant, reducing the voltage applied to the load.

  This product includes a remote sense compensation function to compensate for such voltage drops within specified limits. If the voltage drop exceeds these limits, use wires with a larger cross-sectional area to minimize losses and improve output efficiency.

	5040 Model	5080 Model	5160 Model	5250 Model
Compensating Voltage	1.5 V	4 V	5 V	5 V

2.2.4 Insulated Output Terminal

Danger: Risk of electric shock.

- Even if the output terminal is grounded, ensure that the insulation of the output terminals (including the voltage sampling terminals) exceeds the insulation voltage rating of this product for safety.
- If suitable wires that meet the rated voltage requirements are unavailable, use a high-voltage-resistant insulating sleeve with a voltage resistance higher than the product's insulation voltage to ensure proper insulation and safety.

Note

- There is a risk of damaging the internal circuit.
- When using an external voltage (Vext) to control this product, do not ground Vext. Instead, use a floating ground.

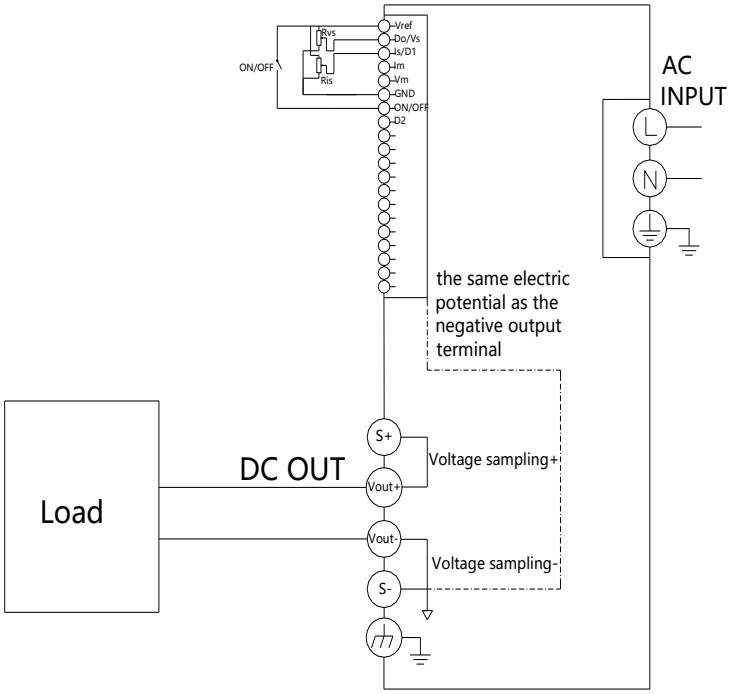
Insulation voltage refers to the maximum allowable voltage between the output terminals of the power supply equipment and the protective conductor terminal (chassis terminal).

For wires connected to the output terminals (including voltage sampling terminals) and the load, ensure that their voltage relative to the chassis exceeds the insulation voltage rating of this product.

Output Terminal (Ungrounded)

When the output terminal of this product is not grounded (floating), it remains insulated from the protective terminal. If the GND wire of the power cord is connected to the grounding terminal of the distribution board, the chassis potential of this product will match the ground potential.

Ensure that all wires and devices connected to the grounding point have insulation ratings exceeding the insulation voltage of this product to maintain safety and proper operation.

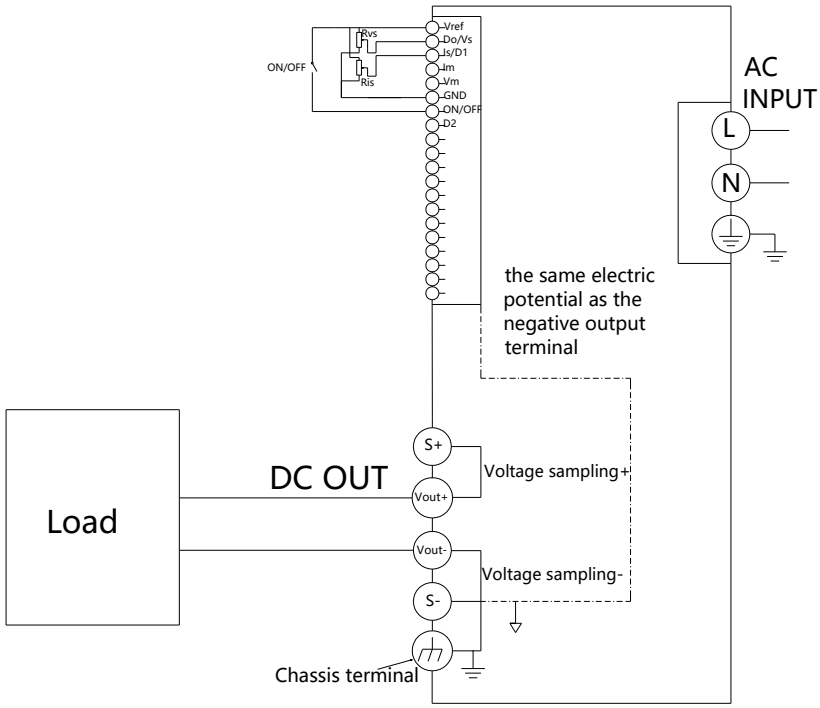


Output Terminal (Grounded)

When the **+ (positive)** output terminal is connected to the chassis terminal, its potential equals the ground potential. The insulation of the wires and loads connected to the output terminals (including voltage sampling terminals) must exceed the product's maximum voltage relative to the chassis.

Similarly, when the **- (negative)** output terminal is connected to the chassis terminal, the insulation resistance of the wires and loads must meet the product's maximum insulation voltage.

For safety reasons, if floating operation is not required, it is recommended to connect either the + or - output terminal to the chassis terminal.



2.2.5 Connecting Output Terminal

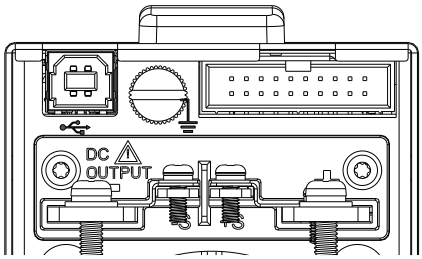
Danger: Risk of electric shock.

- Turn off the power switch before touching the rear output terminals.
- Even when the output is off or the power switch is turned off, if the bleeder load setting is OFF, residual voltage may remain at the output terminals upon reactivation. Set the discharge load to Auto or ON before touching the terminals to prevent residual voltage.
- When the power switch is turned on, always install the output protective cover, regardless of whether the output wires are connected.

Fixed Torque of Connecting Screw for Output Terminal

	Fixed Torque [N · m]
M3	0.58
M4	1.33

Connecting Rear Output Terminal



1. Disconnect the power switch

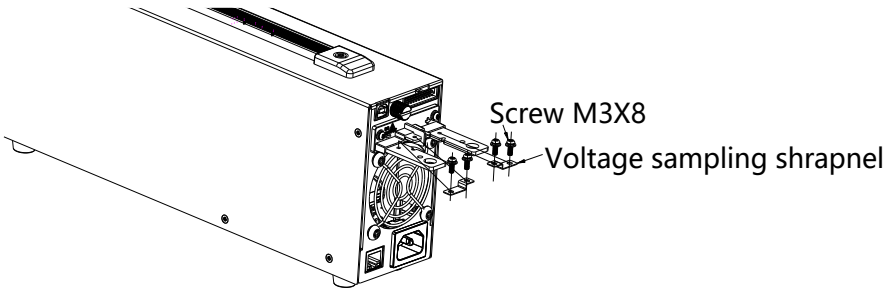
   Ensure the power switch is off and confirm that no residual voltage is present at the rear output terminals.

2. Connecting the remote sense compensation function

   The product is shipped with a voltage sampling spring piece installed between the sampling and output terminals.

   If using the remote sense compensation function, remove this piece and connect it to both ends of the required load.

   Skip this step if not using remote sense compensation function.

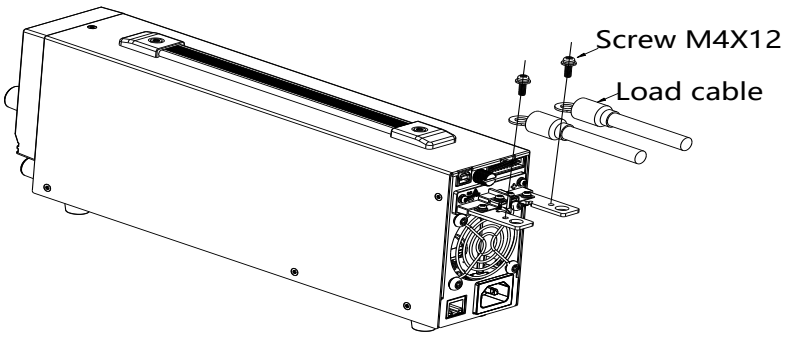


3. Connecting Output Wires

The product includes factory-installed screws. Remove them before connecting the output wires to the terminals.

Use only the original screw set for connection.

Wire Diameter: Maximum φ7 (including the outer layer) Applicable Models	Wire Diameter: Maximum φ10 (including the outer layer) Applicable Models
400 W	2000 W
800 W	
1200 W	



Note: If the output wires are incorrectly positioned, the output protective cover cannot be installed.

2.2 Installing Output Protection Cover

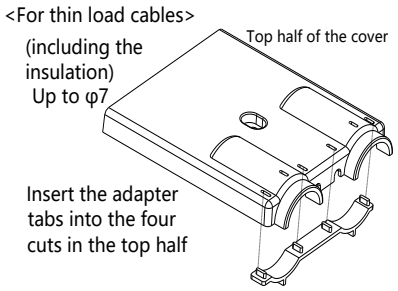
According to the position where the adapter overlaps with the output protection cover, the aperture for inserting the output wires can be adjusted in two ways. Install it based on the wire diameter (including the outer layer) of the connected output wires. Take the 400 W model as an example.

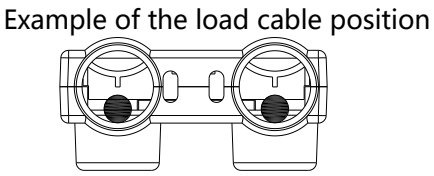
2.2.1 Wire Diameter

- Below φ7: Set the aperture as small as possible, aligning it with the adapter of the output protection cover.
- φ8 to φ17: Set the aperture as large as possible, aligning it with the adapter of the output protection cover.

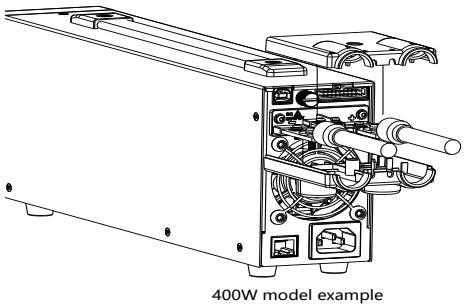
2.2.2 Connection Procedure

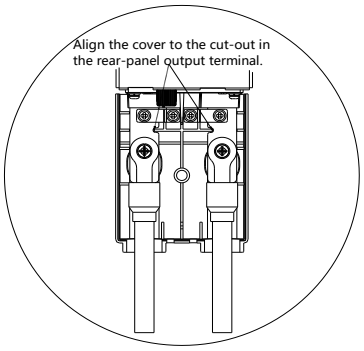
1. Install the adapter on the upper side of the output protection cover.
   Insert the notch of the output protection cover into the protrusion of the adapter.



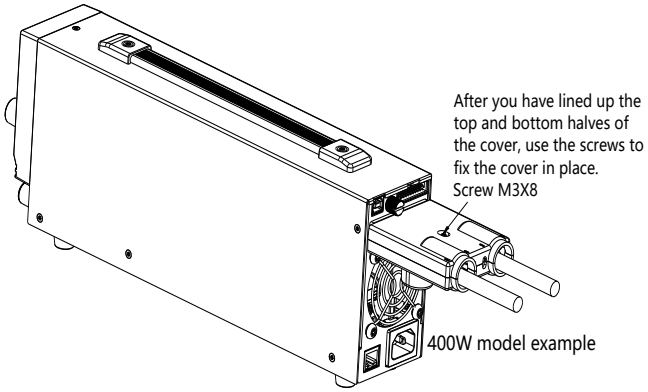


2. Align the lower side of the output protection cover with the rear output terminals.





3. Align the top and bottom sides of the output protection cover, then secure it using the screws.
   Ensure that all screws are properly tightened.



2.3 Connecting Front Output Terminal

1. The front panel display shows the electrical specifications corresponding to the power supply model.
2. The front output terminals do not have a dedicated grounding terminal. If grounding is required, connect the chassis grounding terminal on the rear panel to either the - (negative) or + (positive) output terminal.
3. If the output terminals are not grounded (floating), ensure their insulation is sufficient before use.
4. When the front output current exceeds 10 A (Typ.), an overcurrent warning will appear on the display's status bar, and the output will automatically shut off.
5. Some models, such as UDP5040-40 and UDP5080-20, do not support outputting the full rated current through the front terminals.

Danger: Risk of electric shock.

- A special safety plug is required for the front output terminals. Wires with exposed conductive parts (such as banana plugs) are not allowed.
- Risk of overheating or fire.
- Do not apply a current exceeding 10 A to the front output terminals.

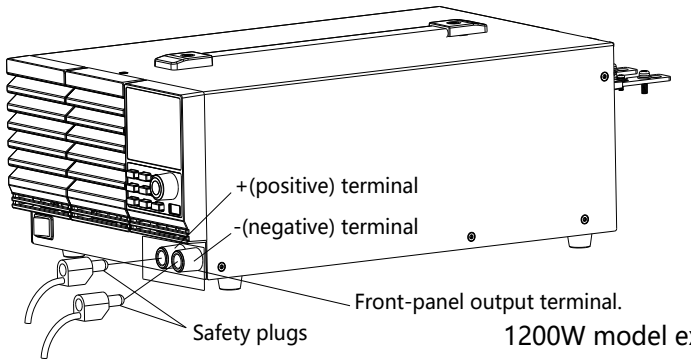
Wire and Plug Specification (Recommended)

PVC insulated cable: Nominal sectional area 0.33 mm^2 (AWG22) to 0.82 mm^2 (AWG18)

Rated voltage: Above 1000 V

Length: Below 3 meters

Output terminal plug: Safety plug



1200W model example

Connect the output wire with a safety plug to the front output terminal

To minimize noise interference, keep the connection as short as possible.

Twist the + (positive) and - (negative) load wires together in a spiral shape before use.

3. Basic Configuration

3.1 Interface and Keys

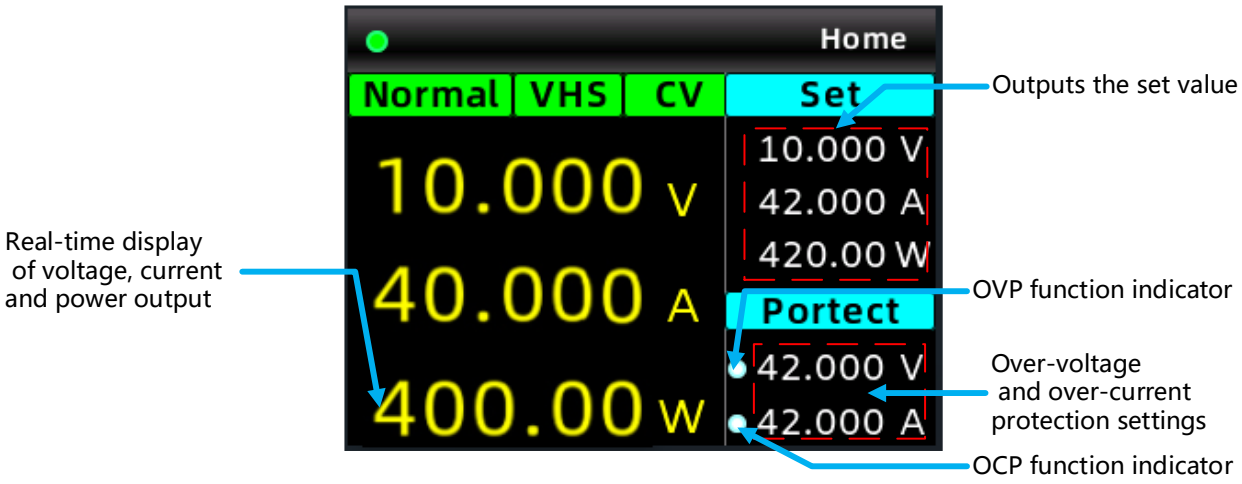
This section introduces the front panel, rear panel, key function, and LCD display of UDP5000 series. It helps users quickly familiarize themselves with the instrument's appearance, structure, and button functions.

3.1.1 Front Panel

3.1.2 Rear Panel

Taking the 400 W model (UDP5040-40) as an example, the rear panel may vary for different models.

3.1.3 Icon and Character



Icon and Character	Functional Description	Remarks
	If this icon is blinking, it indicates that the sampling is in progress.	
	Network connection: Displays network status.	
	USB port: Identifies the inserted USB device.	
Normal	Current power operation mode	The operation mode can be changed.
VHS	Current slope mode	VHS, IHS, VSR, ISR
CV	CV (Constant voltage) output is enabled	The corresponding status is displayed according to the actual output.
CC	CV (Constant current) output is enabled.	
关闭	OFF: Output is disabled	
	Highlight: OVP/OCP is ON Pale: OCP/OVP is OFF	
	Keylock	
[Delayer]	Delayer mode is enabled.	
[List] [List]	List mode status	Yellow: The list mode is paused. Light blue: The list mode is in progress.
OTP	Over temperature protection, the output is disabled.	

3.1.3.1 Key Functions

Button	Functional Description
V	Voltage setting button: Long press to enter the OVP (Over Voltage Protection) setting.
A	Current setting button: Long press to enter the OCP (Over Current Protection) setting.
List	List mode and delay function switching button. When a USB flash drive is connected, long press to save a screenshot to the USB.
← →	Arrow keys: Used to switch the step value.
Esc	Return to the previous level or exit data editing.
Menu	Enter the menu page to view and set the power supply information, including output settings, system settings, network settings, and viewing local machine information. Long press to enter the preset value page.
Lock	Short press to lock, long press to unlock.
Output	Turn the power supply on or off.
Rotary Knob	Used for numerical editing and selection. Scroll to set the data. Short press to confirm the setting, equivalent to the Enter key.
USB 2.0	Connect to a USB flash drive for saving screenshots, accessing and storing information, reading/saving files, and upgrading the firmware.

3.1.3.2 Screenshot

When a USB flash drive is connected, long press the List button to save the current page to the USB.

Remove the USB after the screenshot process is complete.

Note: The USB flash drive must be formatted in FAT32.

3.2 Menu Setting

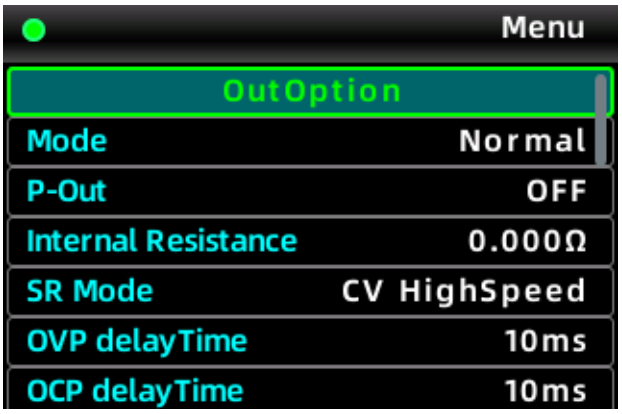
Press the Menu button to access the menu settings, including output settings, system settings, network settings, and machine information.

Key Operation

Use the arrow keys ←, → to navigate between these settings. Rotate the rotary knob to adjust each setting.

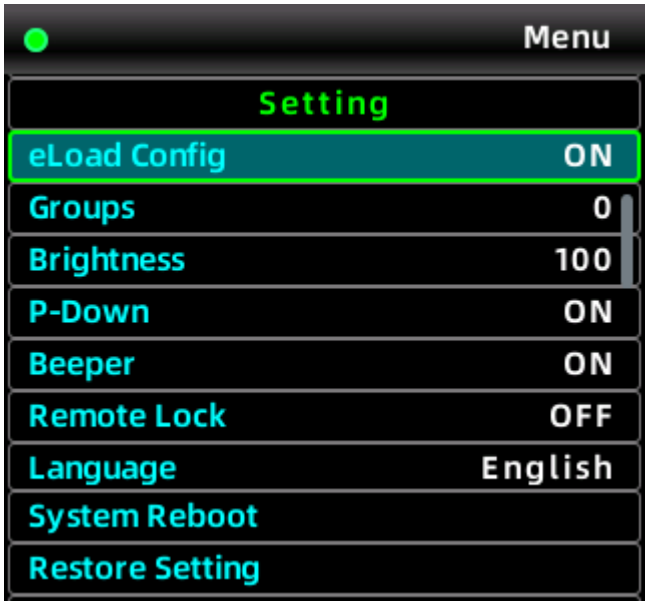
Short press the rotary knob to set or confirm a selection. If selected, rotating the knob will change the setting.

Output Settings



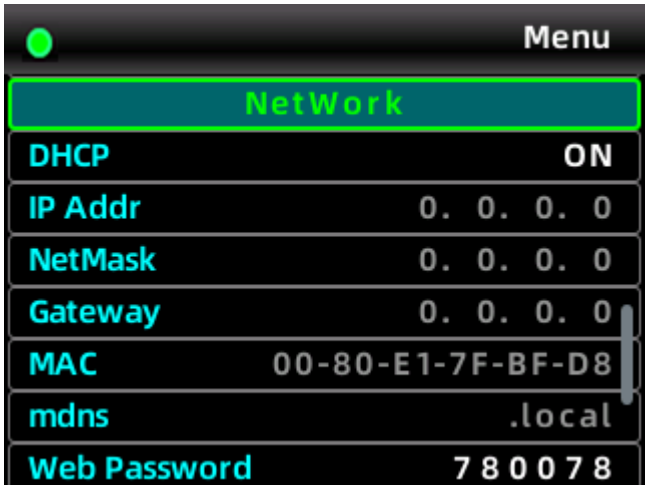
Operation Mode: Switch between the following operation modes: Normal, parallel master, parallel slave, series master, series slave, and external voltage control.
Power-on Output:
Hold: After the power supply is powered on, the previous output state is maintained.
OFF: After the power supply is powered on, the output state is turned off by default.
Internal Resistance: Set the internal resistance for the power supply.
Slope Mode: CV High-Speed Priority (VHS), CC High-Speed Priority (IHS), CV Slope Priority (VSR), CC Slope Priority (ISR). Select the appropriate slope mode based on the output requirements.
OVP Delay Time: Set the delay time for over voltage protection.
OCP Delay Time: Set the delay time for over voltage protection.

System Settings



Discharge Load:
ON: Turn on the discharge load.
OFF: Turn off the discharge load.
Backlight Brightness: Adjust the brightness of the display screen.
Power Failure Detection:
ON: When mains power fails, an alarm will be triggered, the output will be turned off, and rapid discharge will occur.
OFF: When mains power fails, there will be no alarm, the output will be turned off, and rapid discharge will occur.
Beeper:
ON: Turn on the beeper.
OFF: Mute the beeper.
Remote Lock:
ON: When controlled by remote commands, it will automatically lock and return to the home page.
Language: Switch the display language among multiple languages.
System Reboot: Immediately reboot the power supply.
Restore Setting: Reset all settings to the factory defaults.

Network Settings



DHCP:

ON: Automatically assigns an IP address based on the external LAN interface (requires DHCP).

OFF: Manually set the IP address.

Network Address, Subnet Mask, Gateway:

ON: When DHCP is on, the currently assigned IP address is displayed.

OFF: When DHCP is off, manually set the IP address.

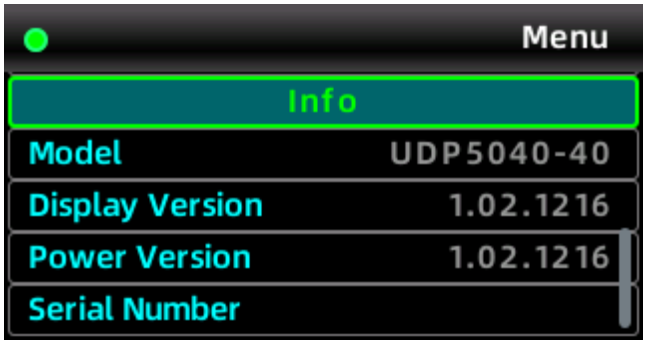
Apply Network Settings:

When DHCP is off, save the manually set IP address and apply the new network settings.

Mdns: Mdns hostname

Web Password: The password used for logging into Mdns.

Machine Information



Model: Specific model of the machine.

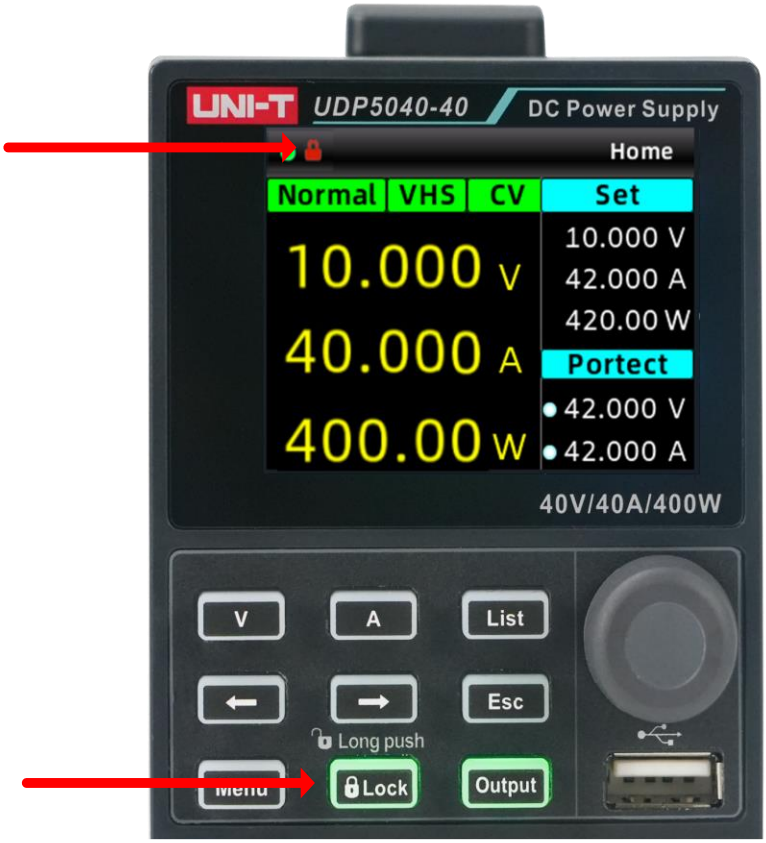
Display Board Version, Power Board Version:

Displays the software versions of the current display and power boards, respectively.

Serial Number:

Device serial number

3.3 Key/Panel Lock



Key Lock Function

This function prevents accidental changes to the set voltage/current due to unintentional operations.

Panel Lock Function

- Short press the Lock button. The lock icon changes to , and a red lock icon appears in the status bar of the power supply display.
- All operations are disabled when the panel is locked .
- Modifying the output voltage/current setting requires unlocking the panel.

Panel Unlock Function

- Long press the lock button to unlock the panel, the lock icon changes to , and the red lock icon disappears from the status bar of the power supply display, indicating that the panel is unlocked.
- All operations are enabled when the panel is unlocked.

3.3.1 Power Supply ON/OFF

Power ON

Danger: Risk of electric shock.

Always install the output protection cover during operation to prevent potential hazards such as fire.

Note

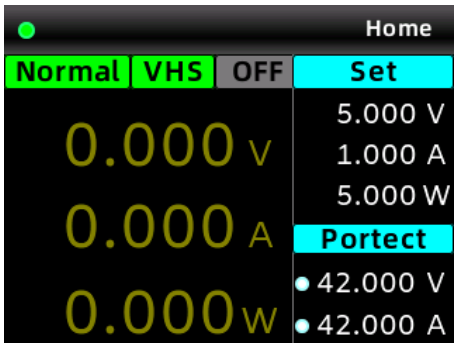
Risk of load damage.

When configuring the power supply to enable output on the setting menu, set appropriate OVP (Overvoltage Protection) and OCP (Overcurrent Protection) values before connecting different loads.

When the power supply is first turned on after purchase, it will start with factory default settings. During operation, the power supply automatically saves system configurations. After shutdown, it will resume using the saved settings (excluding the output on/off state) during the next startup.
The output state at power-on can be configured in the system settings menu.

Power ON Steps

1. Ensure that the power cord is properly connected.
2. Ensure that the output protection cover is installed.
   Factory default: The output protection cover is not installed.
3. Turn on the power supply.
4. After the power supply loads the startup logo and completes the self-test, it will display the voltage and current settings, as shown below.



Power OFF

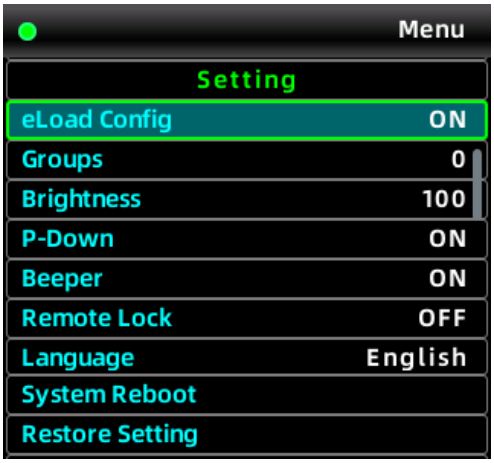
When turning off the power switch:
Since the AC input is disconnected, different shutdown states will be displayed based on the power supply's **Power Failure Detection** settings.

UDP5000 series saves panel settings (excluding the output on/off state) before turning off the power switch. The output state at power-on can be configured in the system settings.
Note: Immediately turning off the power switch after changing system settings may result in the final settings not being saved.

Note

After turning off the power switch, wait at least 10 seconds for the panel display to fully turn off before turning it back on. Repeatedly switching the power on and off in rapid succession may cause inrush currents, leading to circuit malfunctions and shortening the lifespan of the power switch and internal fuses.

3.4 Factory Default Reset



- Press the Menu Menu button to access the menu settings.
- Rotate the rotary knob to Restore Setting.
- Short press the rotary knob to confirm.
- After confirmation, the power supply will restart. Once restarted, all settings will reset to factory defaults.

4. Function Setting

4.1 Power-on Self-Test

A successful self-inspection process indicates that the power supply meets the factory standards and can be used normally. Before operating the power supply, please make sure you have read and understood the safety instructions.

Warning

- Ensure that the grid voltage of the power supply is within the voltage range specified for the product before turning on the power. Otherwise, the power supply may be damaged.
- Connect the main power plug into a power socket with protective grounding. Do not use a power strip without protective grounding. Before operating the power supply, ensure that the power supply is properly grounded.

- Pay attention to the positive and negative pole markings before wiring the power supply. Otherwise, the power supply may be damaged.

Self-Inspection Process

1. Properly connect the power cord, then press the power switch to turn on the power supply. The power supply will automatically perform a self-inspection.
2. Upon completion of the self-inspection, the LCD display will show current and voltage information on the home page.

4.2 Output Function

4.2.1 Output Voltage/Current/OVP/OCP Settings

This section introduces the procedures for setting the output voltage, current, OVP (Over-Voltage Protection), OCP (Over-Current Protection), and output operations.

Output Value Settings: Set the power supply to output voltage and current in real time.

These values represent the actual voltage and current delivered to external devices.

Protection Value Settings: Set the upper limit for the output voltage and current.

These limits ensure that the output does not exceed the OVP or OCP threshold, preventing accidental overvoltage or overcurrent conditions.

Output Voltage/Current Setting Steps

During adjustment, use the arrow keys ← , → to toggle between digit positions for quick setting.

- Press the Voltage V or Current A button.
- Rotate the rotary knob to adjust the voltage or current values.
- Press the rotary knob to confirm the setting
- Press the Output Output button to enable the output function.

Protection Value Setting Steps

- Press the Voltage V or Current A button to access OVP/OCP settings.
- Rotate the rotary knob to adjust the voltage or current values.
- Press the rotary knob to confirm the setting, when the icon changes to , it indicates that OVP/OCP is enabled.
- Press the Esc button to exit OVP/OCP settings.

OCP/OVP Delay Time Setting Steps

- Short press the Menu Menu button to access the menu settings.
- Rotate the rotary knob to select OVP/OCP delay time.
- Rotate the rotary knob to adjust the value, then press the rotary knob to confirm the setting.
- Press the Esc button to exit the menu setting.

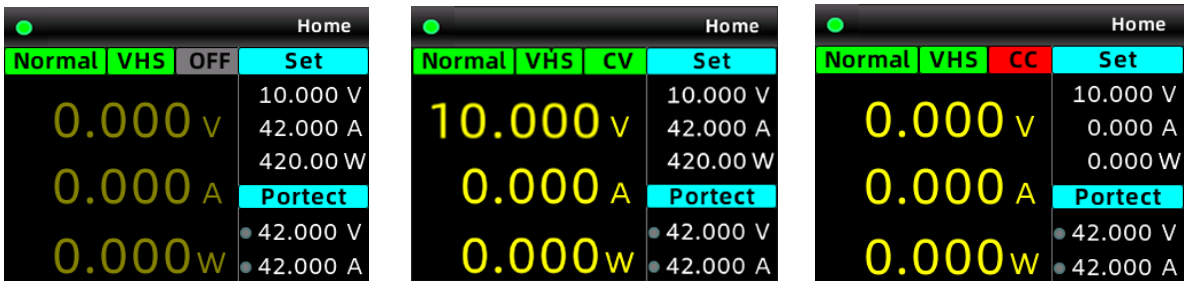
Output Settings

Press the Output button to toggle the power supply's output to Off or On.

When the output is enabled, the OFF icon changes to CC/CV. When the output is disabled, the OFF icon remains OFF.

When the constant voltage (CV) output is active, CV is displayed in green. When the constant current (CC) output is active, CC is displayed in red.

The current output setting values can be obtained when the output function is enabled.

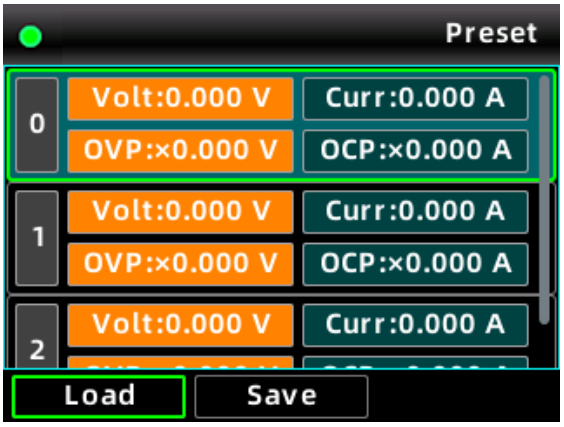


If the output is enabled, and the voltage/current settings change, the actual output will adjust accordingly.

If the output is disabled, after setting the voltage/current values, press the Output button to enable the output function.

4.2.2 Preset Value

UDP5000 series is equipped with preset value settings for quickly saving and loading voltage or current preset values.



Long press the Menu button in any page to load the user-defined group preset values.
Use the arrow keys , and the rotary knob to load and save the preset values.
One user-defined group can save and load three data sets.

Short press the Menu Menu button to access the menu and navigate to the user-defined group settings.
User-defined groups: 0-31 groups

4.2.3 Voltage/Current Setting Range

The rated voltage/current setting range is from 0% to 105%.

400 W Model

Model	Voltage Setting	Current Setting
UDP5040-40	0 V to 40 V	0 V to 40 A
UDP5080-20	0 V to 80 V	0 V to 20 A
UDP5160-8	0 V to 160 V	0 V to 8 A
UDP5250-6	0 V to 250 V	0 V to 6 A

800 W Model

Model	Voltage Setting	Current Setting
UDP5040-80	0 V to 40 V	0 V to 80 A
UDP5080-40	0 V to 80 V	0 V to 40 A
UDP5160-16	0 V to 160 V	0 V to 16 A
UDP5250-12	0 V to 250 V	0 V to 12 A

1200 W Model

Model	Voltage Setting	Current Setting
UDP5040-120	0 V to 40 V	0 V to 120 A
UDP5080-60	0 V to 80 V	0 V to 60 A
UDP5160-24	0 V to 160 V	0 V to 24 A
UDP5250-18	0 V to 250 V	0 V to 18 A

2000 W Model

Model	Voltage Setting	Current Setting
UDP5040-200	0 V to 40 V	0 V to 200 A
UDP5080-100	0 V to 80 V	0 V to 100 A
UDP5160-40	0 V to 160 V	0 V to 40 A
UDP5250-30	0 V to 250 V	0 V to 30 A

Power Supply Power-on Output State

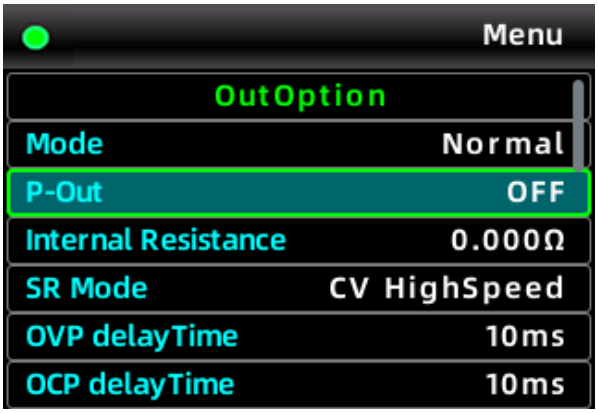
In the factory default settings, the power supply's power-on state is OFF.

Press the Menu button to access the menu and navigate to the output settings, the power supply can configure the output state to Hold upon power-up.

Hold state: Maintains the output state from before the power supply was turned off.

After configuring the power-on output to Hold:

- If the power supply's output was ON before the power switch was turned off, the output will remain ON when the power supply is turned on again.
- If the power supply's output was OFF before the power switch was turned off, the output will remain OFF when the power supply is turned on again.



Note

If the OVP/OCP is not set correctly and the power-on state is Hold, it may cause damage to the load.

4.3 Slope Mode

When the output is enabled, the power supply can start as either a constant voltage (CV) power supply or a constant current (CC) power supply. It is necessary to select an appropriate slope mode based on actual conditions.

CV Slope Priority (VSR): Fixes the constant current value and gradually changes the constant voltage value.

CC Slope Priority (ISR): Fixes the constant voltage value and gradually changes the constant current value.

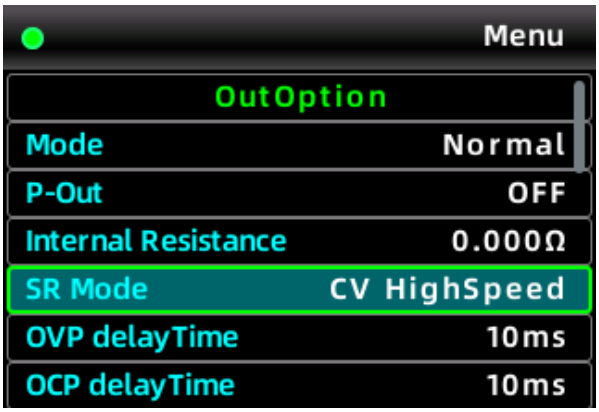
For example, consider the 400 W Models of the UDP5000 series.

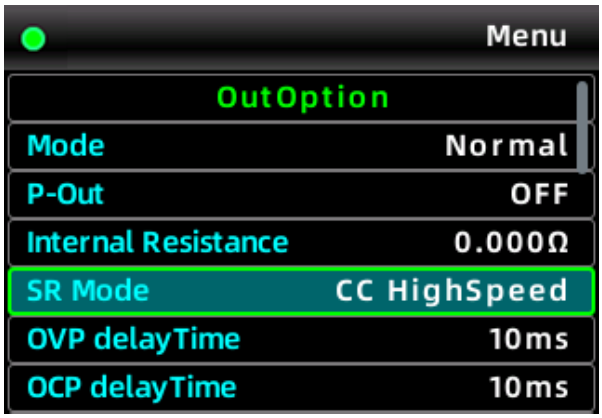
Press the Menu button to access the menu and navigate to the slop mode when the output is enabled.

This series provides four slop modes: CV high-speed priority (VHS), CC high-speed priority (HIS), CV slop priority (VSR), CC slop priority (ISR).

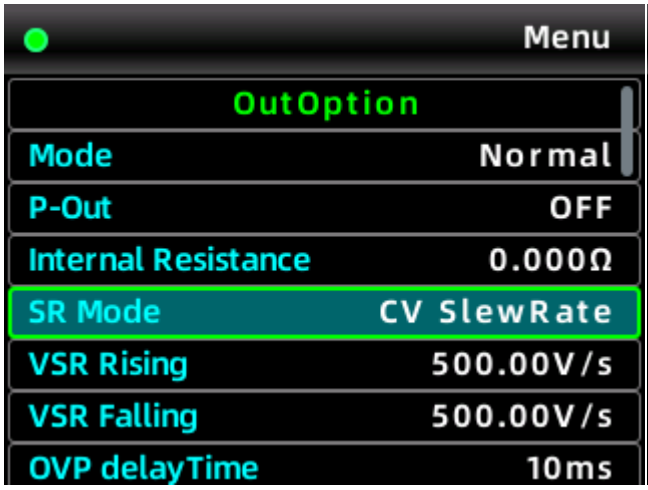
CV high-speed priority (VHS) and CC high-speed priority (HIS) default to high-speed rise and fall rates.

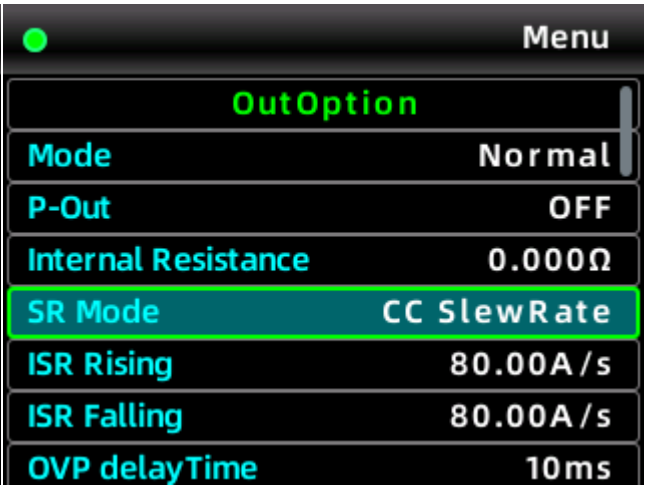
For CV slop priority (VSR) and CC slop priority (ISR), the rise and fall rates can be set as needed.





Press the Menu button to access the menu and navigate to the slop mode, rotate the rotary knob to select the slop mode, then press it again to confirm the setting.





When CV slop priority (VSR) or CC slop priority (ISR) is selected, use the rotary knob to set the rise and fall rates for the voltage and current.

4.4 Operating Voltage/Current Range

UDP5000 series power supplies are constant voltage (CV) / constant current (CC) switching power supply instruments. Within the rated output power, the power supply provides a wide range of operating voltages and currents.

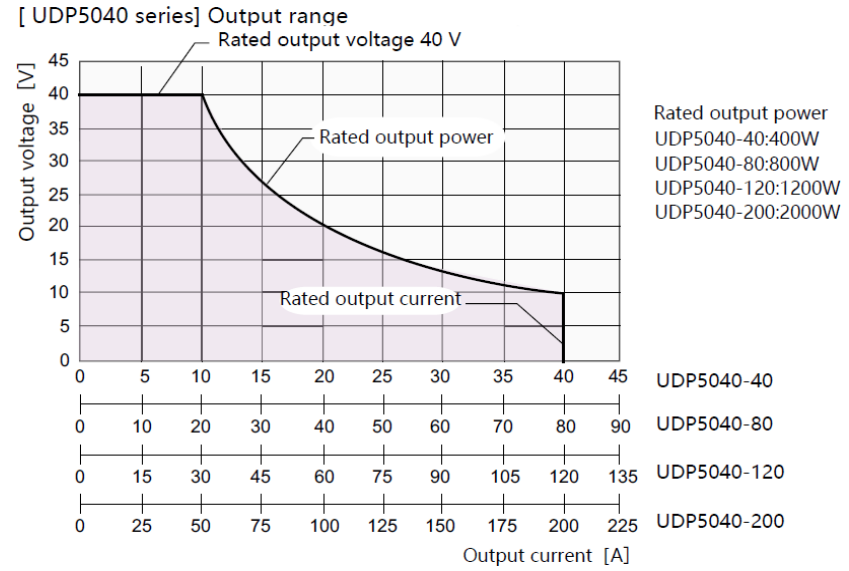
Multiple voltage and current combinations can be output at a fixed power. A single power supply can accommodate different output configurations, such as high voltage with low current or high current with low voltage. Meanwhile, since the power supply's output voltage and current are controlled by the power limit, it features automatic range switching for voltage and current, known as the Auto Range function.

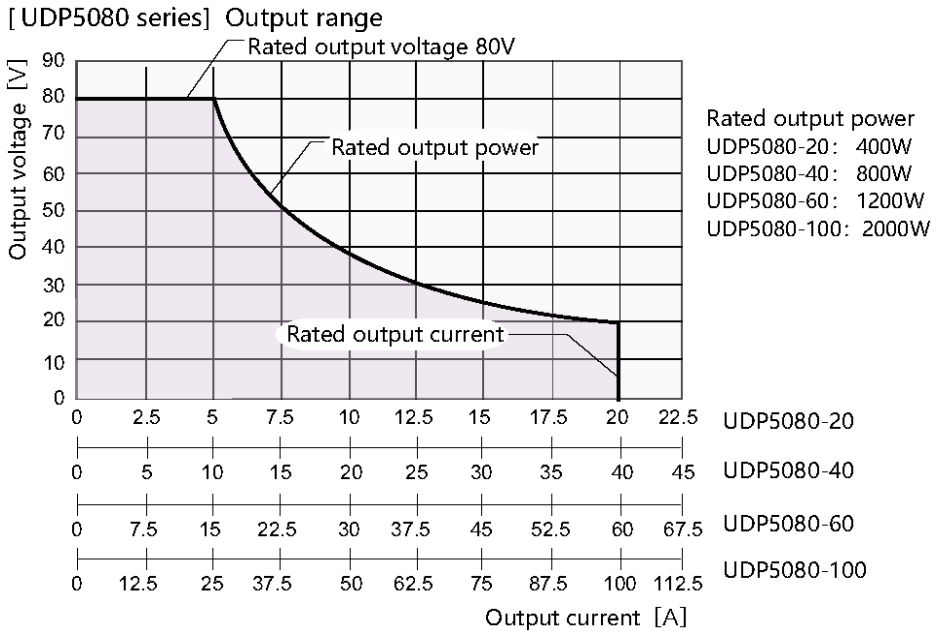
With the Auto Range function, within the rated output power, the power supply automatically adjusts the set values of output voltage and current based on the power.

When Vout*Iout≤P (rated), the instrument generally operates as a constant voltage (CV) / constant current (CC) power supply.

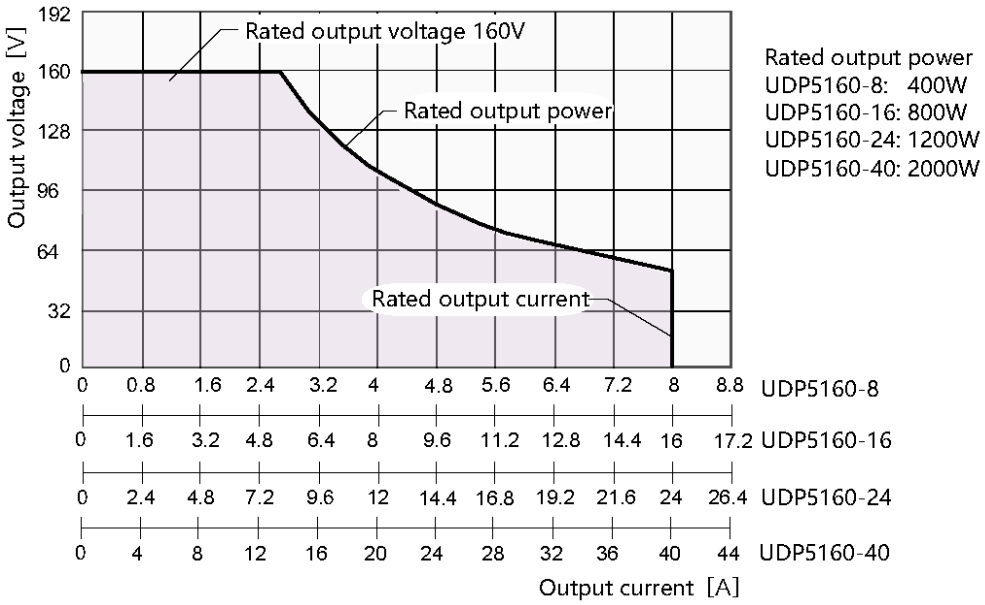
When Vout*Iout > P(rated), the actual output is limited by the power limit (POWER LIMIT: approximately 105% of the rated output power), and the output voltage or current will adjust based on the actual load value.

For example, consider the UDP5040 model, as shown in the following figure.

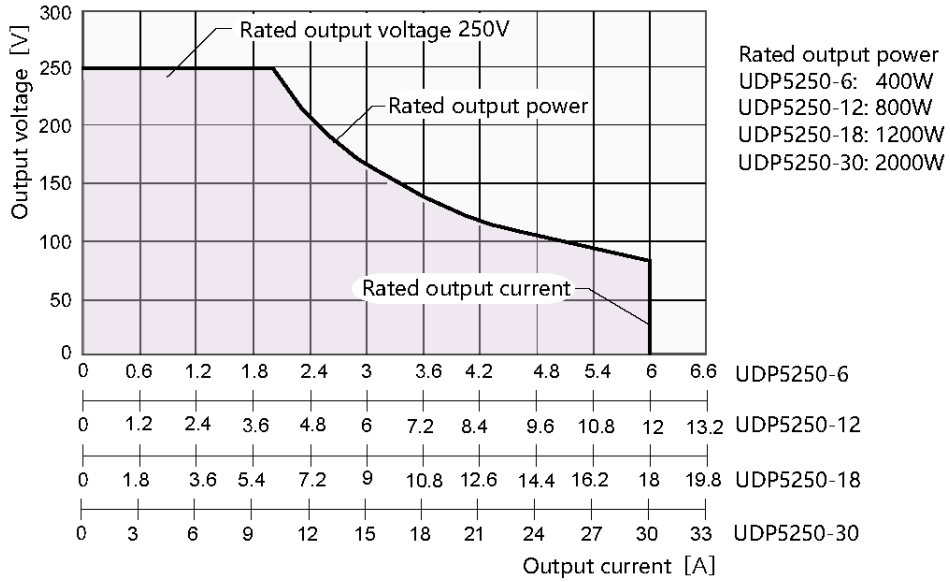




[UDP5160 series] Output range



[UDP5250 series] Output range



4.4.1 CV/CC Power Supply

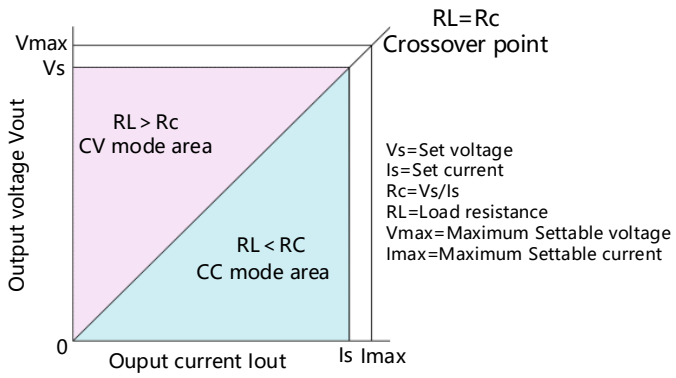
This product can function as both a constant voltage (CV) power supply and a constant current (CC) power supply. Even when the load changes, the output voltage and output current remain stable.

In constant voltage mode (CV mode), the output voltage remains constant.

In constant current mode (CC mode), the output current remains constant

The operating mode is determined by the three parameters: output voltage setting (Vs), load resistance (RL), and output current setting (Is).

The following explanation provides details on the working principle mentioned above.



When the external load resistance RL > Rc and Vs/RL < Is, the power supply operates CV mode.

In this state, the output voltage of the power supply remains constant, and the set current value **Is** is not directly output. Instead, **Is** functions as the current limit. The actual output current: I=Vs/RL.

When the external load resistance RL < Rc and Vs/RL > Is， the power supply operates CC mode.

In this state, the output current of the power supply remains constant, and the set voltage value **Vs** is not directly output. Instead, **Vs** functions as the voltage limit. The actual output voltage: **V** =RL*Is.

When the external load resistance RL=Rc, the power supply operates at the switching crossover point between constant current (CC) and constant voltage (CV) modes.

In this state, the power supply's operation mode will automatically adjust based on the load.

As the external load resistance RL decreases, the output current of the power supply will increase, reaching the current limit Is. To protect the load, the power supply will automatically switch to CC mode.

As the external load resistance RL increases, the output voltage of the power supply will increase, reaching the current voltage Vs. To protect the load, the power supply will automatically switch to CV mode.

For example:

Consider a power supply with an output power of 100 W, a rated output voltage of 10 V, and a rated output current of 10 A.

Set the power supply output to 10 V and 1 A (Vs = 10 V, Is = 1 A). At this point, Rc=10 V/1 A=10 Ω.

CV Mode Operation:

- When the external load resistance RL=5 Ω < Rc, the power supply operates in constant current (CC) mode (10 V/5 Ω=2 A > Is).
- The output current of the power supply will remain constant at Is=1 A, and Vs=10 V serves as the upper voltage limit. The actual output voltage will be V=5 Ω*1 A=5 V.
- In this mode, when the output current Is of the power supply increases to 2 A, the load resistance RL becomes equal to Rc, reaching the crossover point (Vs/Rc=2A).
- When Is > 2 A, the power supply switches to constant voltage (CV) mode.

CC Mode Operation:

- When the external load resistance RL=15 Ω > Rc, the power supply operates in constant voltage (CV) mode (10 V/15 Ω=0.6 A < Is).
- The output voltage of the power supply will remain constant at Vs=10 V, and Is=1 A serves as the upper current limit. The actual output current will be I=10 V/15 Ω=0.6 A.
- In this mode, when the output voltage Vs of the power supply increases to 15 V, the load resistance RL becomes equal to Rc, reaching the crossover point (Rc*Is=15 V).
- When Vs > 15 V and continuously increased, the power supply switches to constant current (CC) mode.

4.5 Protection Function

When the output is turned on, the internal capacitors of the power supply are charged. Due to the set current value, there may be instances where the power supply instantly switches to constant current (CC) mode.

This product includes several protection functions:

Output Cut-Off Protection (Alarm Occurs)

- Over-Voltage Protection (OVP)
- Over-Current Protection (OCP)
- Over-Power Protection (OPP)
- Over-Temperature Protection (OTP)
- Front Output Terminal Over-Current Protection (FOCP)
- Communication Monitoring (Watchdog)
- Single-Control Series/Parallel Operation Protection (PRL ALM)
- Shutdown (SD)

Limit Settings

- Voltage limit (Limited to approximately 95% of the OVP)
- Current limit (Limited to approximately 95% of the OCP)
- Power limit

4.5.1 Alarm ON/OFF

Alarm Function

The alarm will occur when a protection function is triggered. The alarm will be activated in the following cases.

Disable Power Supply Output

For OVP/OCP/FOCP/SD/PRL ALM operations, breaker tripping can be enabled in configuration settings (2000 W models only).

When an alarm occurs, the cause of the abnormality will be displayed in the status bar and the output will be turned off.

W If the output is active when a protection function is triggered, the output status icon Output will change to the inactive state Output.

Alarm causes will not be displayed when viewing system configuration items.

When breaker tripping is enabled for OVP/OCP/FOCP/SD/PRL ALM, the display will alternate between showing the alarm cause and AC input low protection (AC-FAIL) (2000 W models only).

Alarm OFF

- Turn off the power switch, resolve the cause of the alarm, and then turn the power switch back on.

- If the alarm persists even after all causes have been resolved, a malfunction may have occurred. Immediately stop using the product and contact UNI-T distributor for assistance.

4.5.2 Output Cut-Off Protection (Alarm Occurs)

Over-Voltage Protection (OVP)

To ensure the safe operation of both the power supply and the load, an appropriate OVP value should be set based on the actual load.

- OVP: When the voltage at the output terminals exceeds the preset over-voltage protection value, the power supply automatically turns off the output.
- OVP delay: The OVP delay time can be configured.
- Breaker Tripping (2000 W Models Only): When configuring the OVP, breaker tripping can be enabled or disabled in the configuration settings.

Over-Current Protection (OCP)

To ensure the safe operation of both the power supply and the load, an appropriate OCP value should be set based on the actual circuit. This will limit the maximum operating current.

- OCP: When the output current exceeds the preset over-current protection value, the power supply automatically turns off the output.
- OCP delay: The OCP delay time can be configured.
- Breaker Tripping (2000 W Models Only): When configuring the OCP, breaker tripping can be enabled or disabled in the configuration settings.

Front Output Terminal Over-Current Protection (FOCP)

The FOCP function automatically shuts off the power supply's output when the current at the front output terminal exceeds 10 A.

- If the OCP value is set lower than the FOCP value, OCP takes precedence.
- Breaker Tripping (2000 W Models Only): When configuring the FOCP, breaker tripping can be enabled or disabled in the configuration settings.

Over-Temperature Protection (OTP)

The OTP function automatically turns off the power supply's output when the internal temperature reaches the over-temperature protection value.

Note: If the power supply is restarted immediately after shutting down due to OTP, the protection may activate again. Allow the internal temperature to cool before restarting.

AC Input Low Protection (AC-FAIL)

When the power supply detects that the AC input voltage is below the startup voltage, it will automatically shut down.

Single-Control Series/Parallel Operation Protection (PRL ALM)

When multiple power supplies are operated in series or parallel, if a slave unit stops functioning abnormally, the master unit detects the slave's alarm and automatically shuts down the entire system's output. This ensures that the master unit and other slave units do not continue outputting (parallel alarm protection).

Power Limit

The output power is limited to approximately 105% of the rated output power. As the load resistance changes, either the output voltage or current will adjust accordingly.

	400 W Model	800 W Model	1200 W Model	2000 W Model
Power Limit	420W	840W	1260W	2100W

4.6 Remote Sensing

The remote sense compensation function improves the output accuracy and stability of the power supply by compensating for voltage drops caused by the resistance of cables or connectors, ensuring the load receives the correct voltage.

It uses two pairs of wires: one pair transmits the power supply current, while the other pair (S+ and S-) measures the actual voltage at the load terminal. By using this measurement pair, the power supply detects the voltage at the load and automatically adjusts the output voltage to compensate for any voltage drop caused by the resistance of the transmission wires.

The remote sense compensation function can compensate up to a specific value. It is important to select load wires with sufficient current-carrying capacity to prevent the voltage drop on the load wires from exceeding the compensation voltage.

Notes for using the remote sense compensation function in switching power supplies:

Sampling Point Voltage Limit: Ensure the voltage at the sampling point (load terminal) does not exceed the rated output voltage of the power supply. This prevents potential overvoltage damage to the load equipment.

Maximum Output Voltage Limit: When operating near the power supply's maximum output voltage, the remote sense compensation will limit the output to ≤105% of the rated voltage. This ensures the system remains within safe operational limits.

Electrolytic Capacitor Installation at the Sampling Point: Install an electrolytic capacitor at the load-end sampling point (S+ and S-) to filter voltage spikes and noise, provide a stable voltage reference for the remote sense circuit, and enhance system stability and protect the load from transient disturbances.

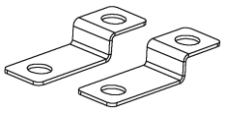
To decrease the noise effect, it is recommended to use twisted pair cables or a 2-core shield cable. The shield of the cable should be connected to one of the ground terminals of either the instrument or the load.

	400 W Model	800 W Model	1200 W Model	2000 W Model
Compensating Voltage	1.5 V	4 V	5 V	5 V

Note

The product is shipped with a voltage sampling spring piece installed between the sampling and output terminals.

If the voltage sampling spring piece is damaged or lost, please contact UNI-T distributor for assistance.



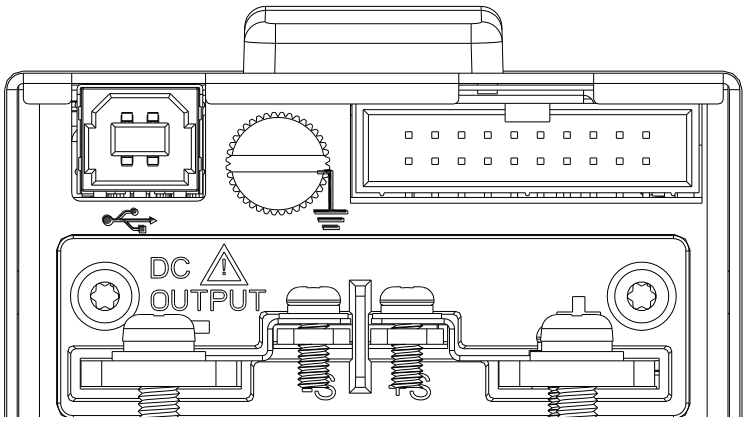
Warning: Risk of electric shock and internal circuit damage.

- Never perform wiring on the voltage sampling terminals while the power supply is powered on.
- Use wires with a rated voltage higher than the power supply's insulation voltage for sampling lines. For exposed shielded parts, use a voltage-resistant insulation sleeve with a rating higher than the insulation voltage of this product for protection.
- When the discharge load is disabled, residual voltage may remain on the output terminals for a short period after the output is turned off. Always enable the discharge load before touching the voltage sampling terminals.
- Always install the output protection cover when the power supply is switched on.

4.6.1 Remote Sensing Operation Procedure

Warning: May damage the power supply and load.

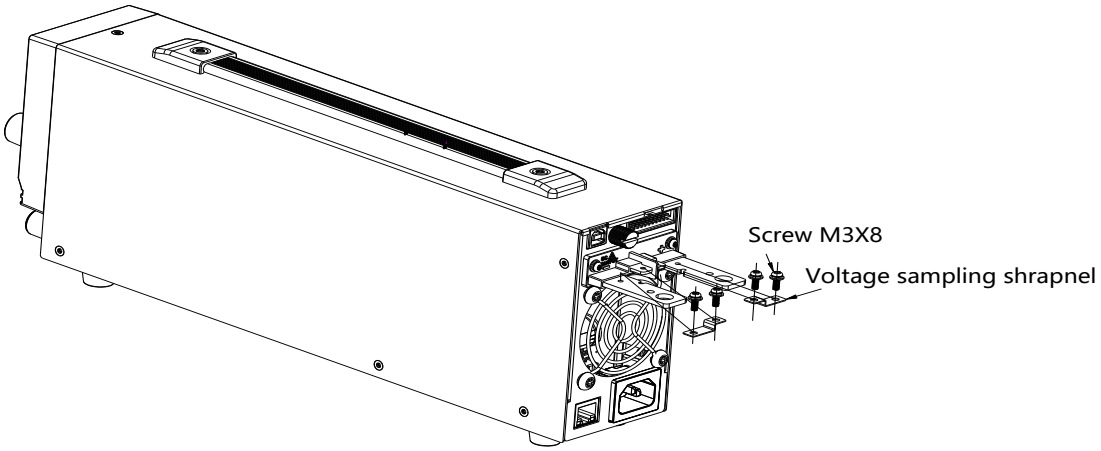
- Correctly connect the positive and negative terminals of the power supply and load.
- Use output wires with sufficient current capacity and a flame-resistant, durable outer sheath.
- Ensure that the voltage at the sampling point does not exceed the rated output voltage to prevent damage to the load device.



Rear Panel Structure

Operation Steps

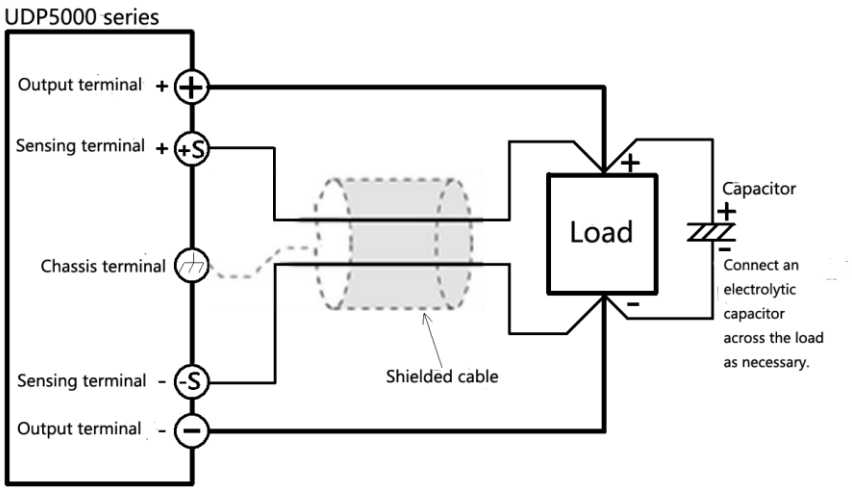
1. Turn off the power supply.
2. Use M3 head screwdriver to remove the voltage sampling spring piece that connects the voltage sampling terminal and the output terminal.



3. Connect the wires to the power supply and the load.
   - Select a pair of wires to measure the actual voltage at the load terminal. Based on the current magnitude, select an appropriate pair of output wires to transmit the power supply current.
   - Use the output wires to connect the positive output terminal of the power supply to the positive input terminal of the load device, and the negative output terminal of the power supply to the negative input terminal of the load device. Install crimp terminals compatible with M4×12 screws to secure the wires.
   - Connect the S+ measuring terminal of the power supply to the positive input terminal of the load device. Connect the S- measuring terminal of the power supply to the negative input terminal of the load device. Install crimp terminals compatible with M3×6 screws to secure the wires.

   Note: If shield wires cannot be used, coil the measuring wires together in a spiral shape.

   If the sampling wires become disconnected, the output voltage may increase by several volts. To prevent the output voltage from exceeding the set voltage, set an appropriate overvoltage protection (OVP) value.



4. Install an electrolytic capacitor at the input terminal of the load device.
   - Connect the positive terminal of the electrolytic capacitor to the positive terminal of the measuring wire of the load device.
   - Connect the negative terminal of the electrolytic capacitor to the negative terminal of the measuring wire of the load device.
5. Check the connections.
   - Ensure that all connections are secure and that there are no loose wires or short circuits.
   - Confirm that the current-carrying wires and measuring wires are connected correctly.
6. Configure power output
   - Set the output voltage and current values of the power supply according to the load requirements.
   - Start the power supply and observe the output voltage and current to ensure they are within the expected range.

4.6.2 Connect Electrolytic Capacitor to Load

If the wire is too long the following condition may occur.

1. **Increased Voltage Drop**

   The resistance of the wire increases with length will increase transmission losses. Even when the remote sense compensation function is enabled, the power supply must adjust the output voltage more significantly to compensate for the voltage drop caused by wire resistance. If the wire is excessively long, the required compensation may exceed the power supply's capacity, preventing the voltage at the load terminal from stabilizing at the expected value.

2. **Enhanced Inductive Effect**

   A longer wire has higher inductance, which becomes particularly problematic in high-frequency applications. This increased inductance can distort voltage and current waveforms, introducing additional noise and interference. High-frequency signal transmission may also be degraded, leading to reduced system performance.

3. **Signal Delay**

   The longer the wire, the greater the signal transmission delay. This is especially critical in systems that require rapid response, such as real-time control systems. Delayed signal transmission can slow down the system's control response, negatively impacting overall performance and stability

4. **Increased Electromagnetic Interference (EMI)**

   Long wires are more susceptible to receiving and radiating electromagnetic interference (EMI), which can compromise the system's electromagnetic compatibility. Additionally, electromagnetic noise from the surrounding environment is more likely to couple into long wires, disrupting normal system operation.

5. **Reduced Effectiveness of Remote Sense Compensation**

   While the remote sense compensation function can offset voltage drops caused by wire resistance, excessively long wires add complexity and make compensation more difficult. This can reduce the effectiveness of remote sense compensation, leading to unstable voltage at the load terminal.

Measures for Long Wires

Use thick wires: Selecting thicker wires with lower resistance helps reduce voltage drop and power loss.

Minimize wire length: During design and installation, keep wire lengths as short as possible to reduce resistance, inductive effects, and the risk of electromagnetic interference.

Use twisted-pair or shielded wires: Twisted-pair or shielded wires effectively reduce electromagnetic interference and improve signal transmission quality.

Add capacitive filtering: Installing electrolytic capacitors at the load terminal enhances filtering, reduces voltage fluctuations and noise, and improves system stability

Optimize power supply placement: Place the power supply as close to the load as possible to shorten wire length, reducing voltage drop and signal delay.

Why install an electrolytic capacitor at the sampling point of the load?

- **Instantaneous Current Compensation**: When the load suddenly increases, the output current changes abruptly. The electrolytic capacitor can quickly release stored electrical energy to meet the instantaneous current demand, helping to stabilize the voltage and improve the power supply's response to load changes.
- **Noise Reduction and Voltage Stabilization**: Longer connecting wires introduce noise, which may cause oscillations in the output voltage and current. The electrolytic capacitor helps filter out noise, ensuring a cleaner and more stable power supply environment, thereby reducing voltage fluctuations and prolonging equipment lifespan.
- **Protection for Precision Devices**: Many precision electronic devices require highly stable power supply voltages. The electrolytic capacitor minimizes voltage fluctuations and noise, protecting sensitive equipment and enhancing long-term reliability.

Electrolytic Capacitor Specification

Capacitance: 0.1 μF to 100 μF

Voltage withstand: This product can withstand voltages exceeding 150% of its rated output voltage.

	5040 Model	5080 Model	5160 Model	5250 Model
Voltage Withstand	Above 60 V	Above 120 V	Above 240 V	Above 375

4.6.3 Connect a Mechanical Switch Between UDP5000 Series and Load

Warning

Always turn off the power supply before using the switch to prevent the risk of electric shock.

Note

- Select a high-quality mechanical switch with low resistance.
- Ensure the mechanical switch's rated voltage and current meet the system requirements.

When a mechanical switch is used between the power supply and the load, switching it off may cause voltage spikes and transient voltages, leading to electromagnetic interference (EMI) that affects system stability.

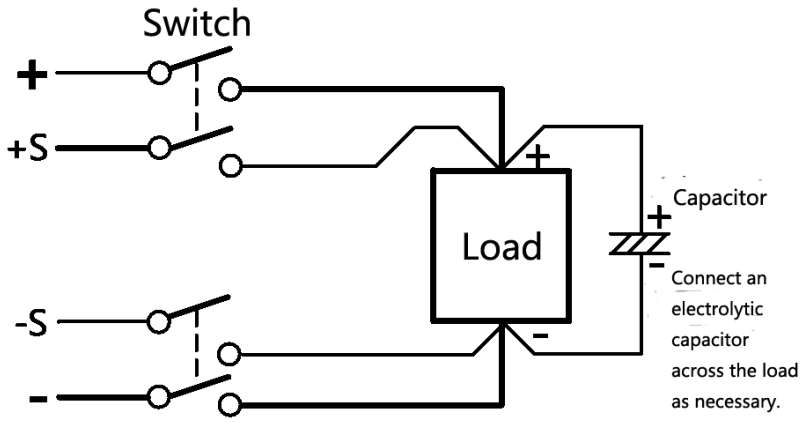
Measures to reduce EMI and voltage spikes

Electrolytic Capacitor: Connect an electrolytic capacitor at the load terminal to smooth voltage changes and reduce the impact of voltage spikes

EMI Filter: Install an EMI filter near the switch to minimize electromagnetic interference affecting the system.

Synchronize Sampling and Output Wires: As shown in the figure below, a switch should also be connected to the sampling wire to synchronously enable/disable both the output wires and sampling wires.

Power Off Before Switching: Always turn off the power supply output before operating the mechanical switch.



4.7 Troubleshooting

When abnormalities occur in the power supply, some issues can be resolved using the simple methods described in the following table. If the problem persists, please contact UNI-T distributor for assistance.

Power Switch Fault

Case	Check Item	Solution
The power supply does not respond when the power switch is turned on.	Is the power cord damaged?	Replace the power cord if it is damaged.
	Is the power cord connected correctly?	Reconnect the power cord properly.

Power on but display fault

Case	Check Item	Solution
After turning on the power switch, the display panel does not respond, but the fan rotates at high speed.	Did you press and hold the rotary knob while turning on the power switch?	Turn off the power switch and restart the unit without pressing the rotary knob.

Output Voltage/Current/OCP/OCP Setting Fault

Case	Check Item	Solution
Output voltage cannot be set.	Is the voltage limit function enabled?	• The output voltage setting must not exceed approximately 95% of the OVP setting. • The OVP setting must not be than lower than approximately 105% of the output voltage setting. • Ensure the limit function is disabled and confirm the OVP setting.
Output current cannot be set.	Is the current limit function enabled.	• The output current setting must not exceed approximately 95% of the OCP setting. • The OCP setting must not be than lower than approximately 105% of the output current setting. • Ensure the limit function is disabled and confirm the OCP setting.
Buttons unresponsive during voltage/current setting	Is this instrument operating as a series/parallel slave?	Output settings cannot be adjusted if the instrument is in slave mode.
	Is the keypad lock enabled?	Unlock the keypad to allow adjustments.
	Is the list mode active?	Turn off the list mode.
	Is external voltage control enabled?	Output voltage/current settings are unavailable during external voltage control.
OVP/OCP cannot be set.	Is the keypad lock enabled?	Unlock the keypad to allow adjustments.
	Is this instrument operating as a series/parallel slave?	Output settings cannot be adjusted if the instrument is in slave mode.
	Is the list mode active?	Turn off the list mode.

Output Fault

Case	Check Item	Solution
No output after pressing the output button	Is the output voltage set to 0V or the output current set to 0A?	Rotate the rotary knob to set the output voltage and current to the desired value
	Is external voltage control enabled?	Turn off the external voltage control.
Output automatically turns off immediately after turning.	Is OVP enabled?	Set the OVP value higher than the voltage setting.
	Is OTP enabled?	An abnormal temperature rise may trigger OTP. Check the operating environment, address any overheating causes, and restart the

		output.
	Is external voltage control enabled?	If the external voltage control is enabled, pressing the output button will only exit external voltage control mode and will not activate output.

Great Output Fluctuation

Case	Check Item	Solution
Output fluctuations occasionally increase.	Is the input voltage outside the specified range?	Ensure the input voltage remains within the rated range.
Relocating the installation site causes greater fluctuations.	Is there a strong magnetic or electric field source nearby?	Move the instrument away from interference sources or mitigate noise by twisting output wires
Significant fluctuations occur during external control	Is the external voltage noise excessive?	Use appropriate filtering or shielding techniques to reduce voltage noise.
Fluctuations worsen after replacing output wires.	Is the sampling wire connected?	If remote sense compensation is disabled, reconnect the voltage sampling spring piece.

Output Unstable

Case	Check Item	Solution
When enabling output, changing the voltage/current value may cause instability.	Is the operation mode switching between CV → CC or CC → CV?	• Set the output voltage or current limit higher than the current setting. • If the current setting is already at the maximum, consider a power supply with a higher output voltage or current capacity.
The output voltage or current fluctuates during operation.	Is the instrument operating in single-controlled parallel mode?	Performance may be lower in parallel operation than when the instrument is used alone.
	Have the sense wires or voltage sampling spring pieces become disconnected?	If remote sense compensation is disabled, reconnect the voltage sampling spring piece.
	Is the operation mode repeatedly switching between CC/CV?	If remote sensing compensation causes oscillations, install a capacitor at the load terminal.
		If circuit damage is suspected, immediately stop using the instrument and arrange for repairs.
	Are there loose connections or breaks in the sampling wires or output wires?	Turn off the power switch and check all wiring connections.
	Are there load current peaks or fluctuations?	If peak currents exceed the set value, increase the current setting or switch to a higher-capacity power supply.
Output voltage deviates when power is applied.	Has the instrument been powered on for at least 30 minutes?	The instrument should warm up for at least 30 minutes before use.
Output voltage does not drop even after turning off the output.	Is the discharge load setting disabled?	If the discharge load is disabled, residual voltage may remain after turning off the output. Set the discharge load to On/Auto to ensure proper voltage dissipation.
Output voltage deviates from the set value.	Has the internal resistance value been configured?	Set the internal resistance value to zero.
	Are the screws securing the voltage sampling spring piece loose?	Secure the voltage sampling spring piece by tightening the screws at the voltage sampling terminals and rear output terminals.

5. Application Function

5.1 Discharge Load

Danger: Risk of electric shock.

Note

When handling the output terminals after powering off the device, ensure the discharge load is enabled during operation.

After turning off the output or power switch, residual voltage from the previous operation may remain on the output terminals for a short period.

The discharge load is ON by default and can be set to either ON or OFF.

Setting Steps

Press the Menu button to access the menu, rotate the rotary knob to configure the discharge load status.

ON: Turn on the discharge load

OFF: Turn off the discharge load

The discharge load can effectively control the absorption of external current, protect batteries and devices, and ensure the safe and stable operation of the system.

To prevent the discharge load from unnecessarily absorbing external current, the discharge load function should be set to OFF. For example, when connecting a battery, disabling the discharge load can help prevent excessive discharge.

Requirements for Series/Parallel Modes

When performing single-control parallel mode or series mode, ensure that all connected instruments use the same parameters. Even if an instrument operates as a slave, it should still be set to the same parameters to ensure system coordination and stability.

Application Case: Battery Protection

When connecting a battery, set the discharge load to OFF to prevent rapid discharge and extend battery life.

Note:

- The setting should be consistent.

- Ensure that the discharge load setting for all connected instruments is the same, especially in the complex power systems, to avoid unnecessary current absorption and discharge.

Regular Checks

Regularly check the discharge load setting to ensure that it meets the operational requirements.

Reference Current

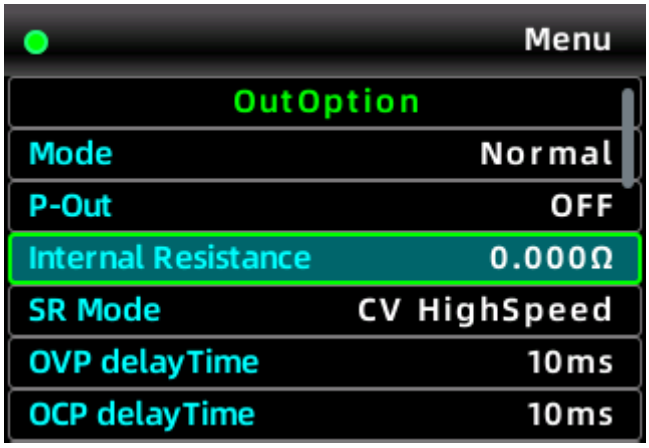
The absorbed current depends on different conditions and can be set accordingly.

5.2 Internal Variable Resistance

The internal variable resistance function can adjust the power supply's internal resistance, simulating real power sources such as secondary batteries, solar cells, and fuel cells. This feature enables precise control of output voltage, current, and other parameters while the power supply operates in constant voltage (CV) mode.

Note: The internal variable resistance function can only be configured when the power supply is in constant voltage (CV) mode.

Setting Steps



Press the Menu button to access the menu, rotate the rotary knob to configure the internal resistance of the power supply.

When the internal resistance of the power supply is set, the actual output voltage may deviate from the configured value due to the voltage drop across the internal resistance.

For example, if the power supply is configured as follows:

Output voltage: 15 V

Current limit: 5 A

Internal resistance: 1.000 Ω

External load: 5 Ω

The actual output voltage is calculated as: V=15 V-15 V*1 Ω÷(1 Ω+5 Ω)=12.5 V

This results in a 2.5 V voltage drop across the power supply's internal resistance.

The actual output current is: I=15 V÷(1 Ω+5 Ω)=2.5 A

If the internal resistance were 0 Ω, the output current would be: I=15 V÷5 Ω=3 A

Power	Model	Vrtg[V]	Irtg[A]	Rint[Ω]	Resolution Setting
400 W	UDP5040-40	40	40	0.000 to 1.00	0.001
	UDP5080-20	80	20	0.000 to 4.00	0.001
	UDP5160-8	160	8	0.000 to 15.00	0.001
	UDP5250-6	250	6	0.000 to 31.25	0.001
800 W	UDP5040-80	40	80	0.000 to 0.50	0.001
	UDP5080-40	80	40	0.000 to 2.00	0.001
	UDP5160-16	160	16	0.000 to 7.50	0.001
	UDP5250-12	250	12	0.000 to 15.625	0.001
1200 W	UDP5040-120	40	120	0.000 to 0.33	0.001
	UDP5080-60	80	60	0.000 to 1.33	0.001
	UDP5160-24	160	24	0.000 to 5.00	0.001
	UDP5250-18	250	18	0.000 to 10.416	0.001
2000 W	UDP5040-200	40	200	0.000 to 0.20	0.001
	UDP5080-100	80	100	0.000 to 0.80	0.001
	UDP5160-40	160	40	0.000 to 3.00	0.001
	UDP5250-30	250	30	0.000 to 6.25	0.001

Note: Internal variable resistance for the 5040 model and 5080 model is calculated as Rint[Ω] Max=Rated voltage ÷ Rated current.

Internal variable resistance for the 5160 model and 5250 model is calculated as Rint [Ω] Max=Rated voltage ÷ Rated current × 0.75.

5.3 Sequence Function

The sequence function allows the power supply to automatically execute a predefined program step by step.

Sequence programs cannot be configured via the front panel; they must be created using remote commands. Once a sequence program is executed via remote control, it is stored in the instrument's memory. After that, it can be executed directly from the front panel. The stored program can run without requiring a PC connection.

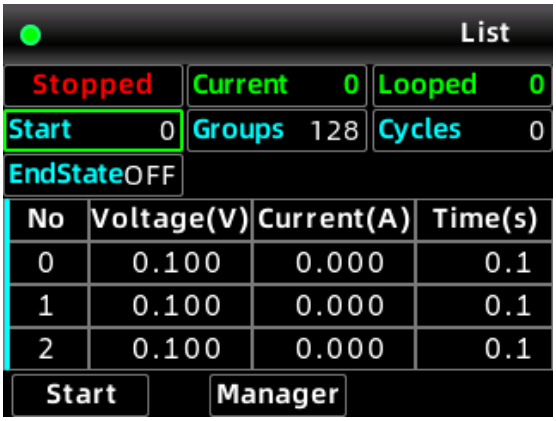
For detailed instructions on using the sequence function, please refer to the *UDP5000 Series Programmable DC Power Supplies-Programming Manual*.

5.4 List Mode and Delayer

When configuring settings, use the rotary knob to navigate or the arrow keys , for quick selection.

5.4.1 List Mode

1. Short press the list button to enter the list mode settings.



Rotate the rotary knob to configure the start group, total groups, cycle count, and stop state. During setting, the arrow keys , can also be used to select individual digits for quicker adjustments.

Stop states: ON, OFF, LAST.

Note:

- The sum of start group and total groups must not exceed 128. For example, if the start group is set to 10, the maximum total groups allowed is 118.
- The cycle count supports values from 1 to 9,999. Set to 0 for an infinite loop.

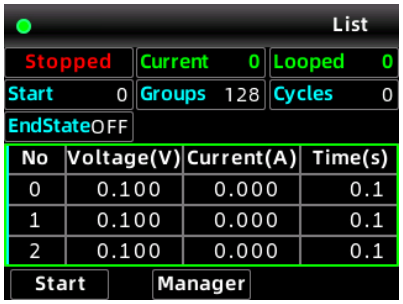


Figure 1

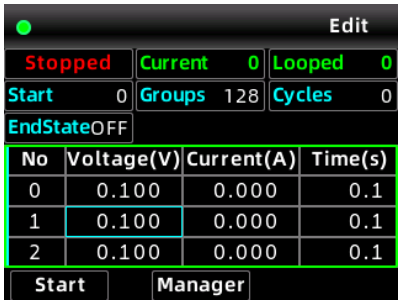


Figure 2

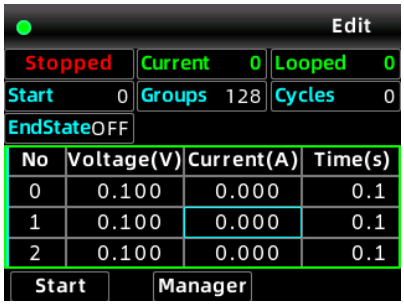


Figure3

2. Rotate the rotary knob to the list output setting, as shown in Figure 1.

   Then short press the rotary knob to enter voltage, current and time settings. Rotate the rotary knob to switch between these settings, as shown in Figure 2.

   The arrow keys ← , → supports horizontal choice.

   Press the Esc button to exit the settings.

3. After setting the list output, rotate the rotary knob to Start.

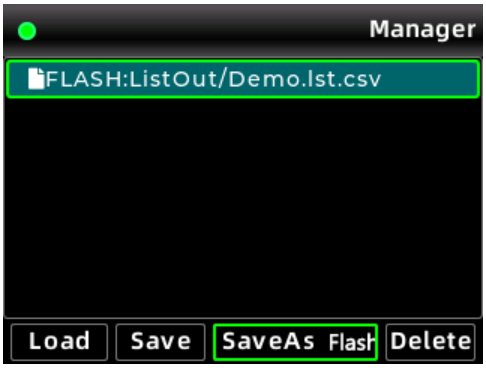
   Then short press the output Output to enable the list output.

   The list output mode will stop based on the user-defined stop state, when conditions are met, or if stopped manually.

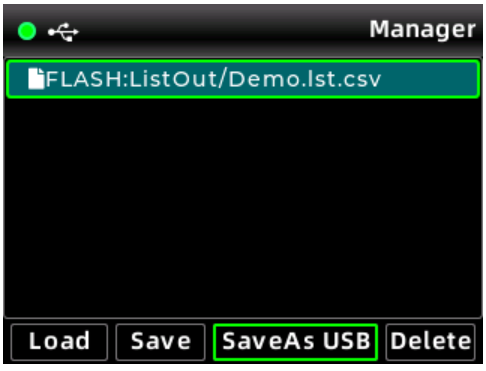
   Note: During operation, pressing the output Output button will pause the list output mode and disable the output. Press it again to resume operation.

4. Rotate the rotary knob to the manager settings. Short press the rotary knob to access the manager settings menu.

Internal Memory



External Memory



After entering the manager settings menu, select a file to save or enter a filename to save it to the specified memory.

Use the arrow keys ←, ← to load, save, save as, or delete

Short press the rotary knob to confirm.

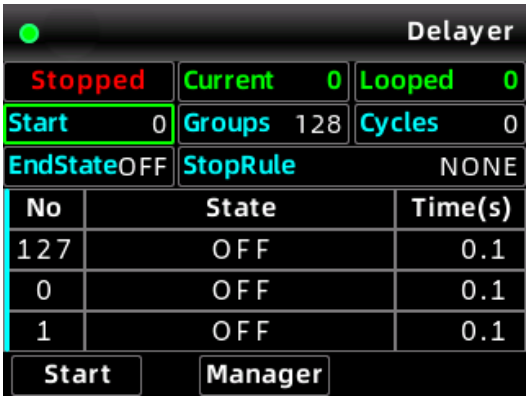
Rotate the rotary knob to navigate between saved data, then short press to select it.

Note:

- Output sequence data will not be saved automatically; it must be saved manually.
- The list data can be saved to external memory only when a USB flash drive is connected; otherwise, it can only be saved to internal memory.

5.4.2 Dealyer

1. Short press the list button twice to access the delay setting menu.



Rotate the rotary knob to configure the start group, total groups, cycle count, stop state, and stop rule. During setting, the arrow keys ←, → can also be used to select individual digits for quicker adjustments.

Stop states: ON, OFF, LAST.

Stop rule: Vo > 0.000V, Vo < 0.000V, Io > 0.000A, Io < 0.000A, Po > 0.000W, Po < 0.000W, where 0.000 is variable.

Note:

- The sum of start group and total groups must not exceed 128. For example, if the start group is set to 10, the maximum total groups allowed is 118.
- The cycle count supports values from 1 to 9,999. Set to 0 for an infinite loop.

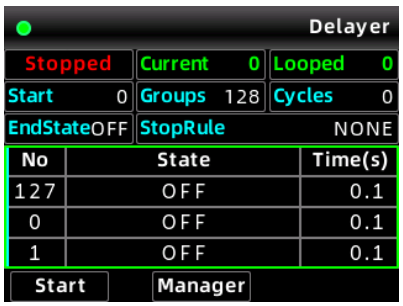


Figure 4

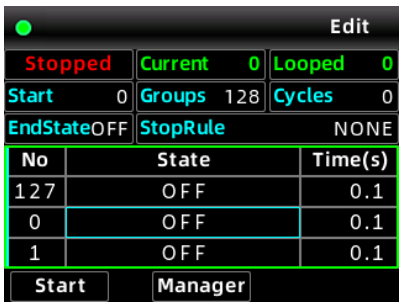


Figure 5

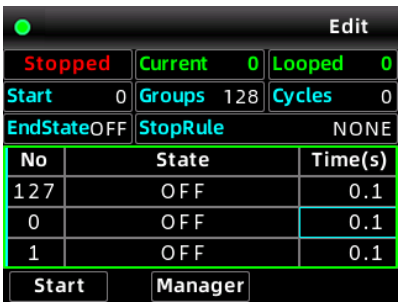


Figure 6

2. Rotate the rotary knob to delay settings menu, as shown in Figure 4.

   Then short press the rotary knob to enter stop state, time settings, rotate the rotary knob to switch between settings, as shown in Figure 5.

   The arrow keys , supports horizontal choice, as shown in Figure 6.

   Press the Esc button to exit the settings.

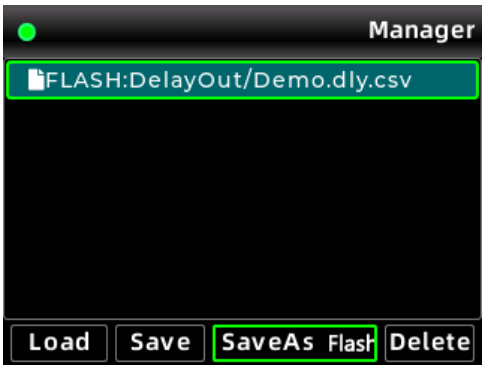
3. After setting the delayer, rotate the rotary knob to Start.

   Then short press to enable the list output.

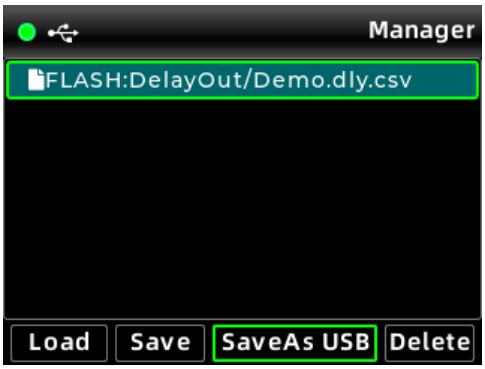
   The delayer will stop based on the user-defined stop state, when conditions are met, or if stopped manually.

4. Rotate the rotary knob to the manager settings. Short press the rotary knob to access the manager settings menu.

Internal Memory



External Memory



After entering the manager settings menu, select a file to save or enter a filename to save it to the specified memory.

Use the arrow keys , to load, save, save as, or delete

Short press the rotary knob to confirm.

Rotate the rotary knob to navigate between saved data, then short press to select it.

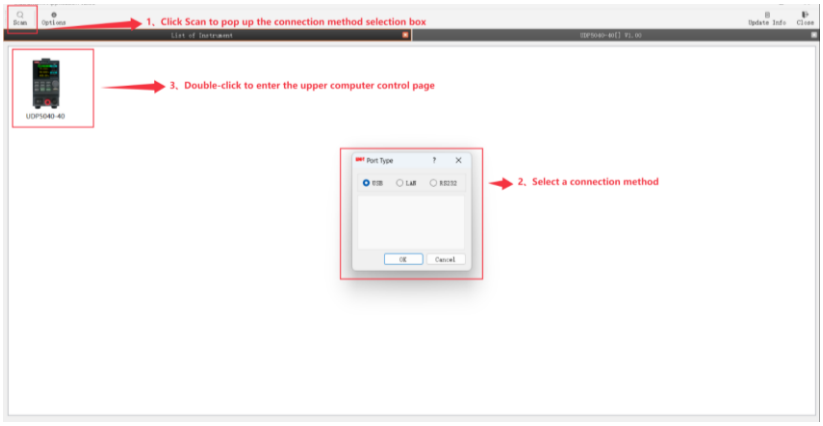
Note:

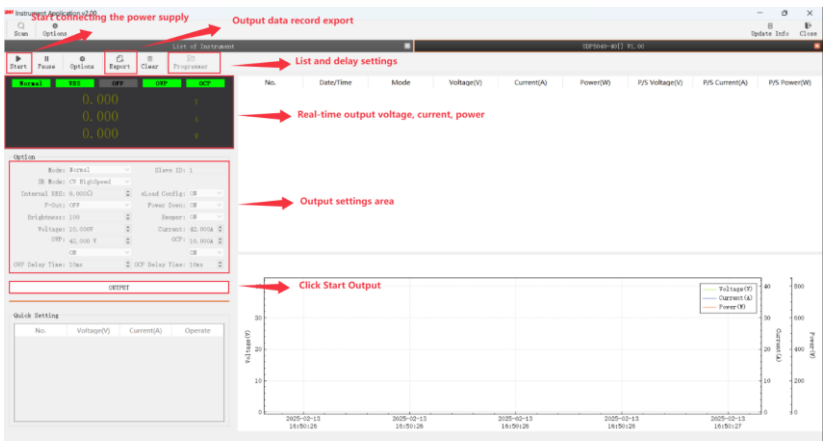
- Output delayer data will not be saved automatically; it must be saved manually.
- The delayer data can be saved to external memory only when a USB flash drive is connected; otherwise, it can only be saved to internal memory.

6. Remote Control

6.1 Upper Computer Control

1. Download the Instrument Application installation file from the UNI-T official website www.uni-trend.com.
2. Power on the power supply.
3. Connect the PC to the UDP5000 series via a USB or LAN control cable.
4. Launch the remote control application.
5. Example: UD5040-40
   - Click Instrument Application to select the connection method
   - Double-click UDP5040-40 icon to enter the remote communication interface, as shown in the following figure.



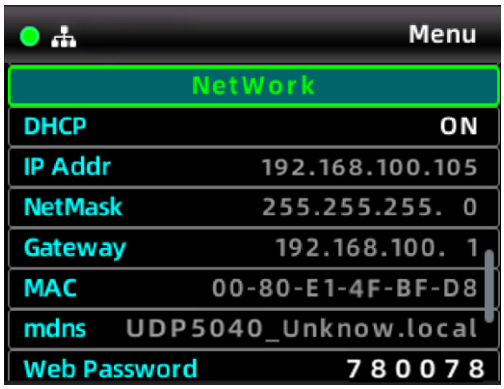


6.2 Web Remote Control

UDP5000 series also supports Web remote control.

1. Connect the PC and UDP5000 series power supply's LAN port to the same router and network. The power supply's status bar will display to confirm a successful LAN connection.
2. Press the menu Menu button on UDP5000 series power supply to access network settings. Manually configure the IP address and other parameters. Enable DHCP service for automatic IP address assignment.

   Note: DHCP requires router support. After enabling DHCP, the power supply will automatically fetch and update IP parameters, as shown in the following figure.



3. Open a browser on the PC and enter the power supply's IP address 192.168.100.105, as shown in the figure above.

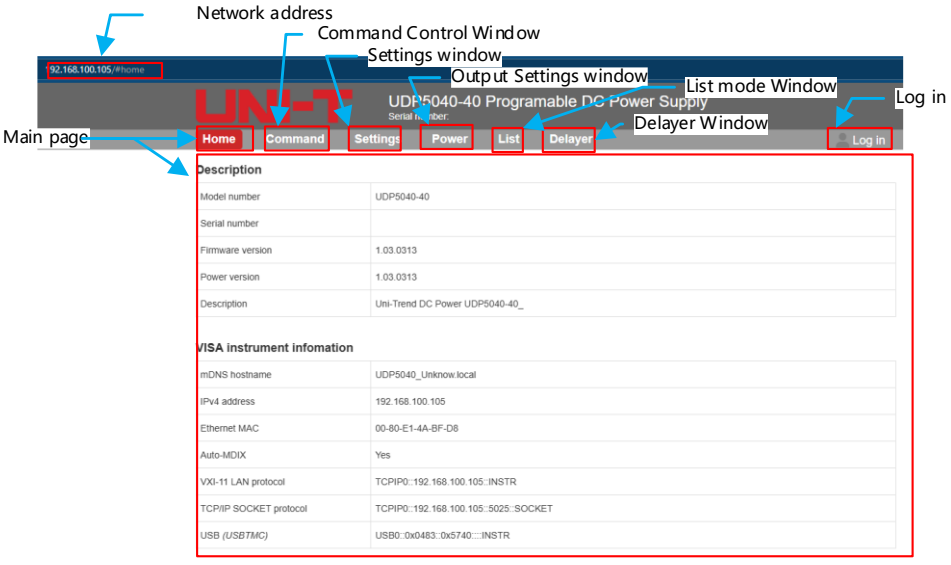
   Note: Communication can only be established when the PC and the power supply are on the same network.

4. Enter the control interface.

   IP address: Enter the power supply's IP address 192.168.100.105

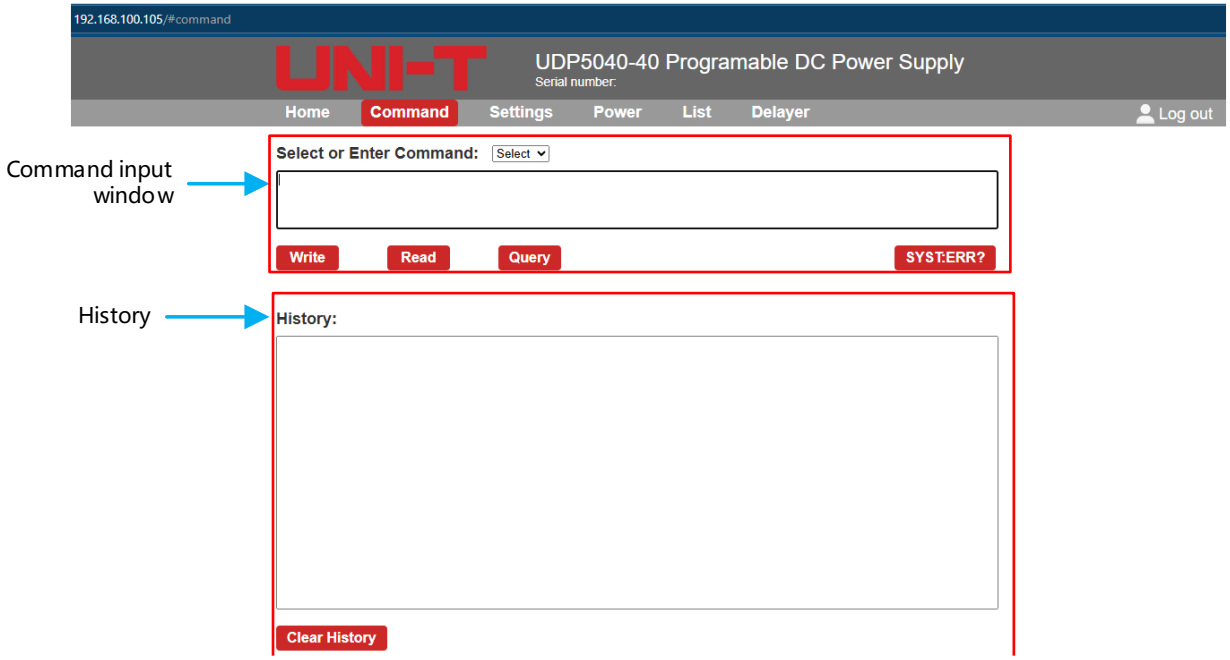
   Login: Enter the Web password of the power supply

   Main page

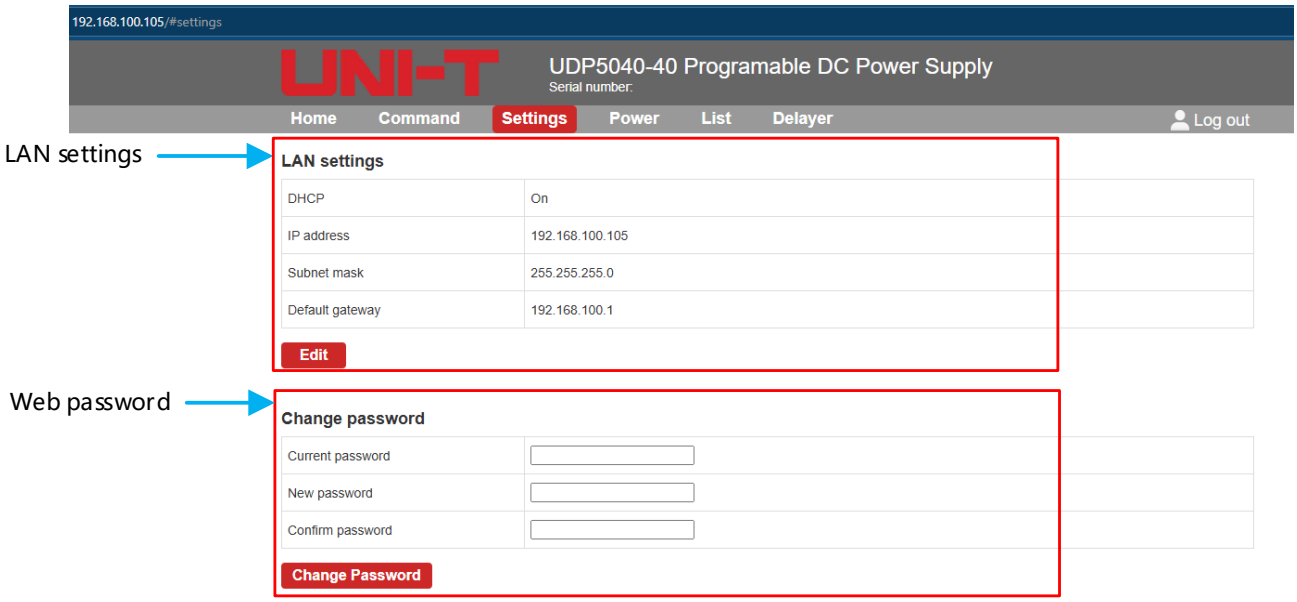


Command control window

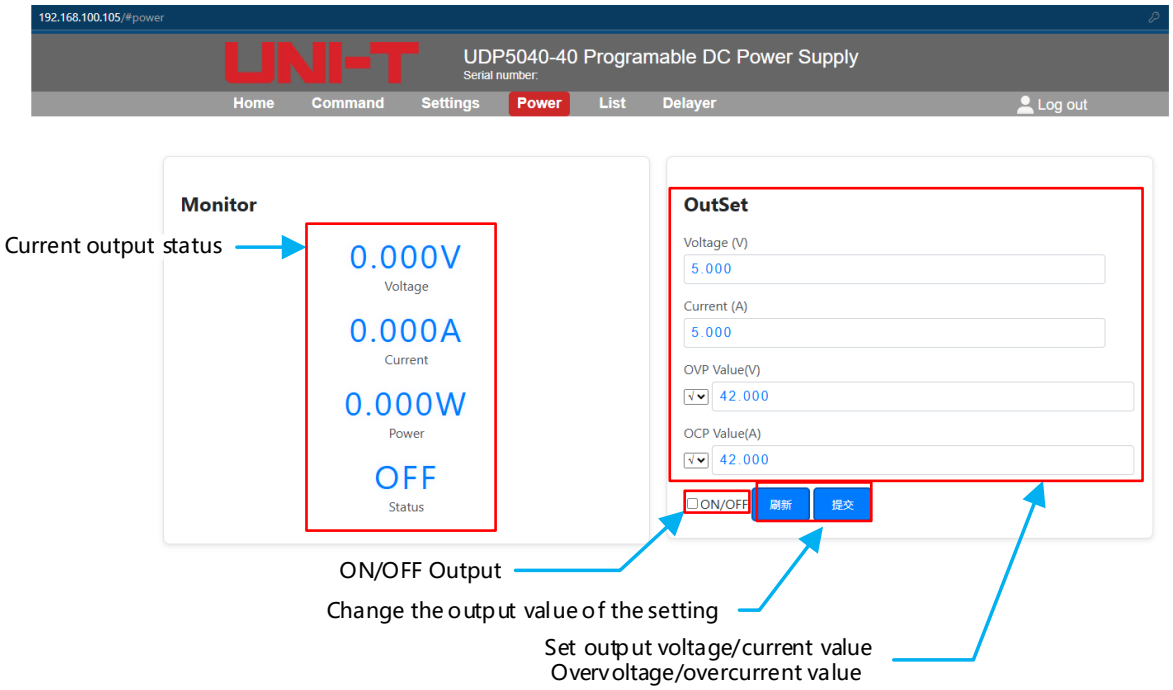
For control commands, refer to the *UDP5000 Series Programmable DC Power Supplies-Programming Manual*.



Setting window

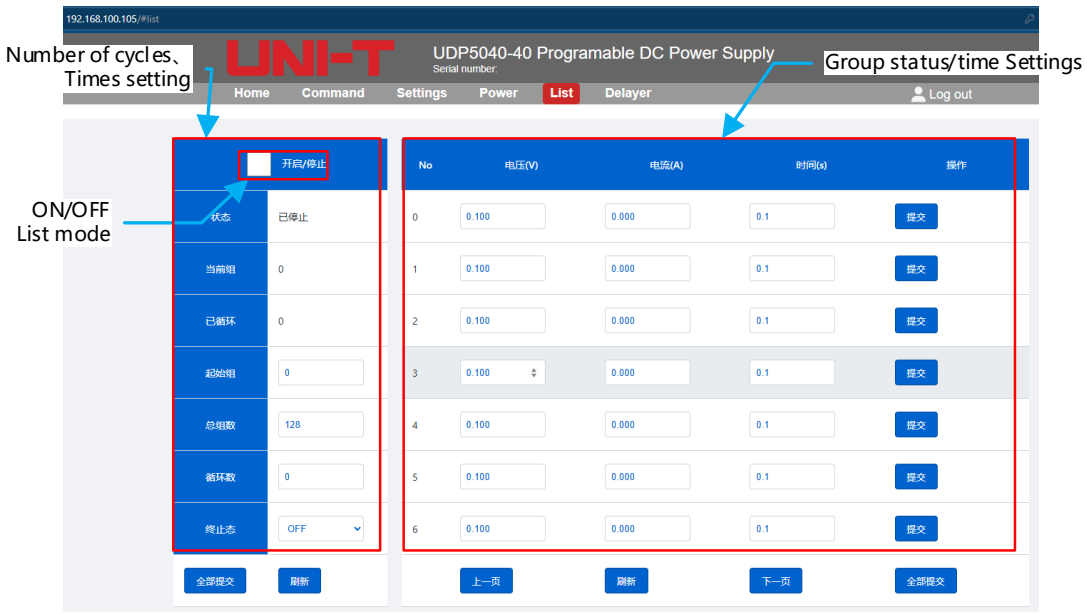


Output setting window



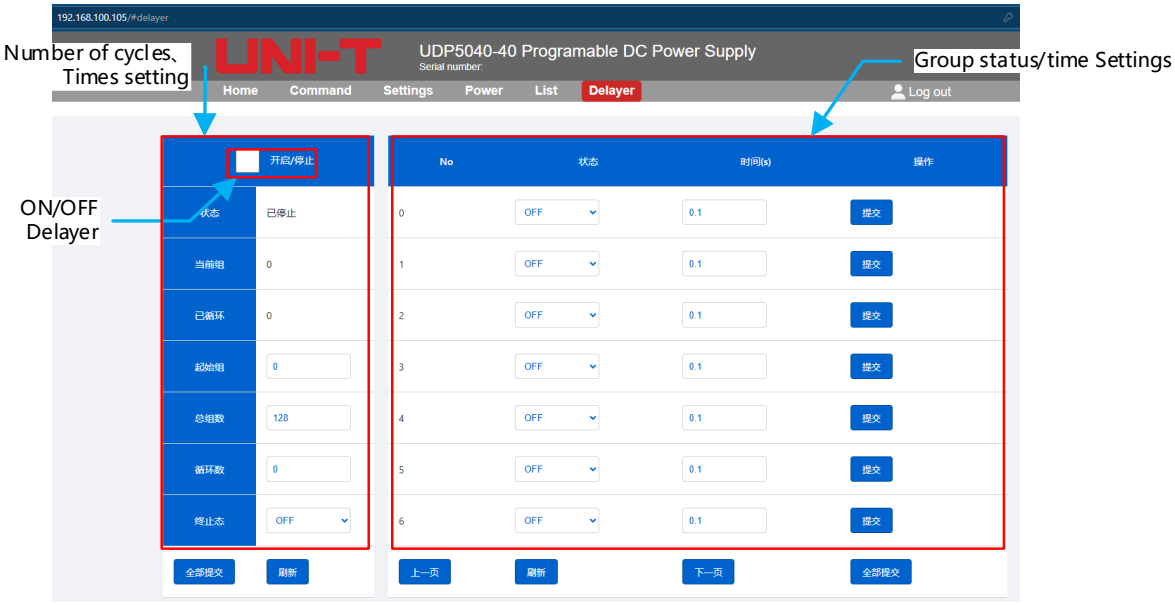
Note: After changing the voltage/current value in the Outset area, you need to click "提交", and the power supply will output according to the current setting value.

List mode window



Note: After setting the group voltage/current/time area, you need to click "全部提交" to import the current Settings into the power supply.

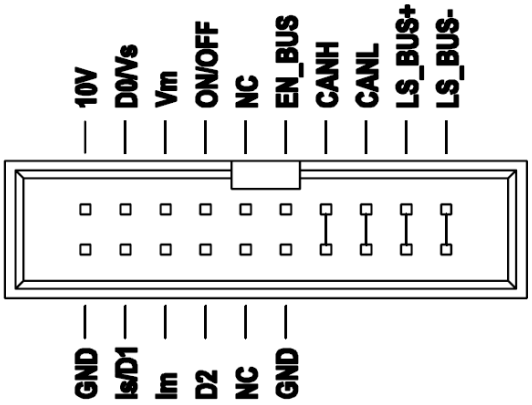
Delayer mode window



Note: After setting the group status/time area, you need to click "全部提交" to import the current Settings into the power supply.

7. External Control

7.1 Analog Interface



Analog Interface on Rear Panel

	Interface Definition
GND	Ground terminal
VREF_V	Provides a stable 10 V reference voltage for external voltage control.
Vs/D0	External analog control: An analog voltage input of 0-10 V corresponds to 0-VoutMax.
Is/D1	External analog control: An analog current input of 0-10 V corresponds to 0-IoutMax.

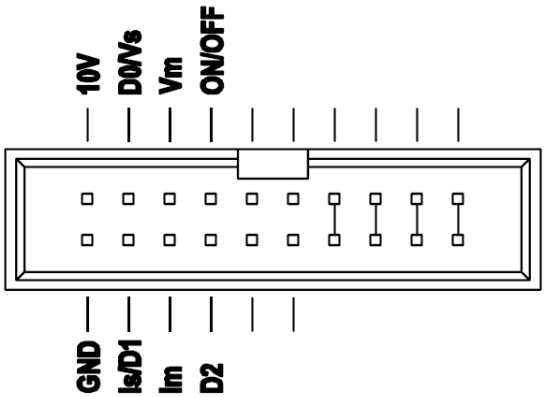
D2	External digital control
ON/OFF	External digital/analog control for power output: High level turns the output ON; Low level turns it OFF.
Vm	Voltage output analog channel: 0-10 V corresponds to 0-VoutMax.
Im	Current output analog channel: 0-10 V corresponds to 0-IoutMax.
NC	Not connected (not in use)
EN_BUS	Used for the master to send an enable signal to the slave in multi-unit series/parallel connections. Connects to RS485-B (-).
CANH	Transmits inter-device communication data for multi-unit series/parallel operations.
CANL	
LS_BUS+	Transmits differential signals to balance the output current between master and slave units in multi-unit series/parallel connections.
LS_BUS-	

7.2 External Voltage Control

All UDP5000 series models are equipped with an external analog control function. An external analog interface is located on the rear panel of the power supply.

Users can connect an external switch and potentiometer to:

- Control the power output (turn it on or off).
- Adjust the output voltage and output current values.



	Normal Mode	Ext-V (External Voltage Control)
VREF	The power supply internally provides a 10 V reference voltage for external voltage control output.	
GND	Ground terminal	
D0/Vs	/	Voltage analog control (0-10 V)

Is/D1	/	Current analog control (0-10 V)
Vm	/	Analog output for voltage monitoring (0-10 V)
Im	/	Analog output for current monitoring (0-10 V)
ON/OFF	/	Turn on/off power output
D2	/	/

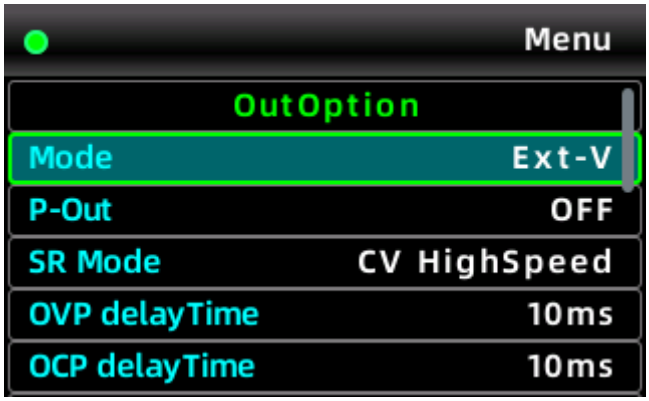
When using external voltage control, the power supply's operation mode should be set to External Voltage Control.

Note

After enabling External Voltage Control mode:

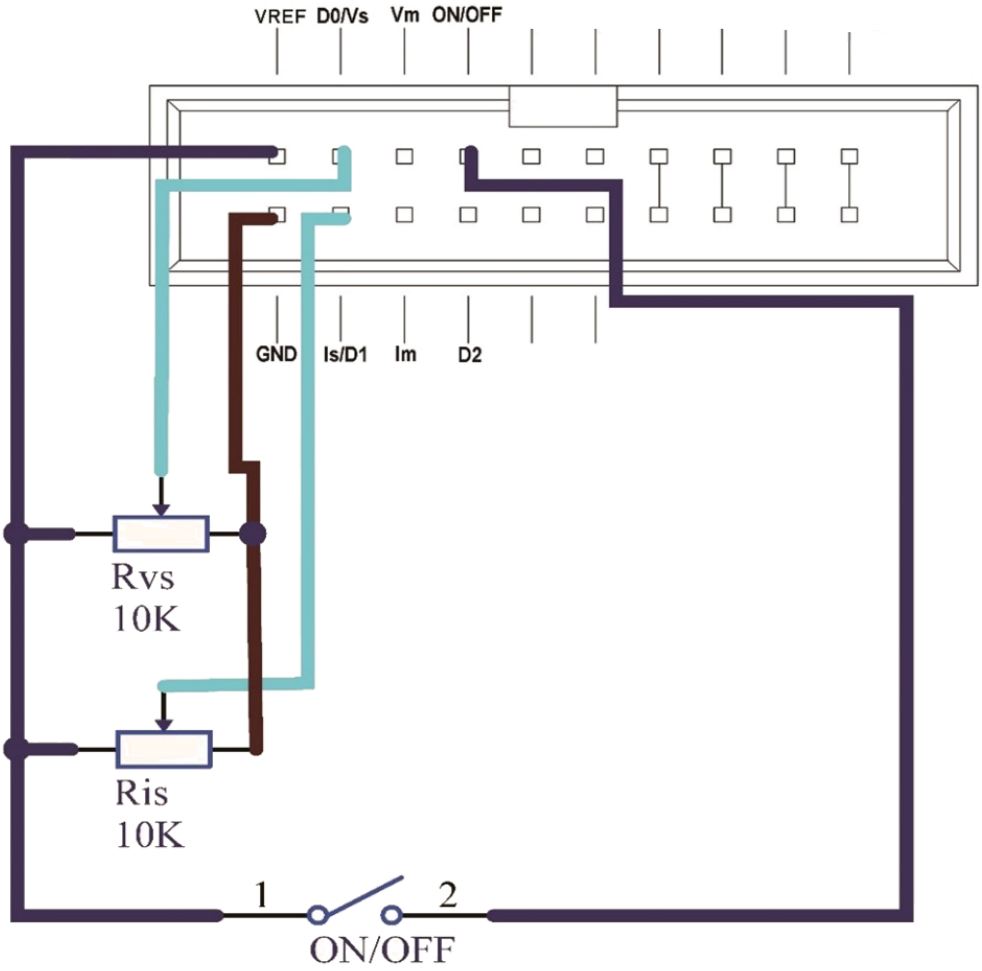
- The rotary knobs cannot be used to set output voltage/current values or voltage/current protection limits.
- The function lock button remains available.
- Press the menu Menu button to access the menu bar and configure system settings.
- Manually pressing the output Output button will immediately exit external voltage control mode.

Setting Steps



Press the men Menu button to access the menu settings, rotate the rotary knob to set the operation mode to external voltage control.

Hardware Connection Diagram for External Voltage Control



External Voltage Control Operation Steps:

1. Connect the wires as shown in the diagram above, and set the power supply mode to external voltage control.
2. Adjust the Rvs or the Ris potentiometer to set the output voltage or current value.
3. Close the external switch to enable power output; disconnect it to turn off the power output.

Operating Principle

VREF provides a stable 10 V reference voltage.

Adjusting the external potentiometer modifies the Vs and Is voltages (1 V to 10 V), thereby regulating the power supply's output voltage and current.

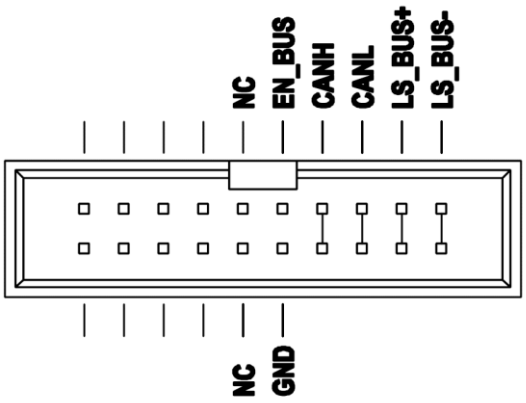
A mechanical switch is externally connected between VREF and ON/OFF:

- When the switch closes, a high-level signal is sent to ON/OFF, enabling power output.
- When the switch opens, a low-level signal is sent to ON/OFF, disabling power output.

Output monitoring is achieved via Vm and Im, which output 0-10 V signals corresponding to the actual output voltage and current. When multiple power supplies are connected to a single voltage/current control device, their outputs can be adjusted simultaneously. This setup allows users to control and monitor the power supply's output using external analog signals.

7.3 CAN Interface

The CAN interface supports external multi-unit series/parallel operation, allowing up to three units in parallel and a maximum of two units in series.



CAN Interface

	Interface Definition
NC	Not connected (not in use)
GND	Ground terminal
EN_BUS	Coordinates and synchronizes start/stop, protection, and operation modes in multi-unit series/parallel operation, ensuring stable and reliable collaboration between units. Connects to RS485-B (-).
CANH	Enables CAN communication between power supplies, providing a stable and reliable communication foundation for multi-unit operation.
CANL	
LS_BUS+	Facilitates synchronized control of multiple units during series/parallel operation, allowing centralized adjustment and output balancing across all power supplies.
LS_BUS-	

Note: This section introduces the interfaces only. For detailed usage in series/parallel configurations, refer to the *Series/Parallel Operation* chapter.

8. Series/Parallel Operation

This chapter explains the function connections, settings, and operations for multi-power supply series/parallel configurations.

8.1 Single-Control Parallel Operation

Single-control operation enables centralized control of a parallel-connected power supply system via a master unit, while other identical UDP5000-series models function as slaves. This setup increases the total output current capacity, calculated as: Maximum Output Current = Single-unit Rated Current × Number of Parallel-Connected Unit

	400 W Model	800 W Model	1200 W Model	2000 W Model
Maximum Parallel-Connected Units	4	4	4	2

The difference in output voltage and output current between the master unit and the slave unit must be within 1% of the rated value.

Danger: Risk of electric shock.

- Before touching the output terminals, turn off the power switch.
- After assembling the output cables, install the output protection cover.

Note

If parallel operation is not in use, disconnect all parallel connections.

8.1.1 Parallel Operation Steps

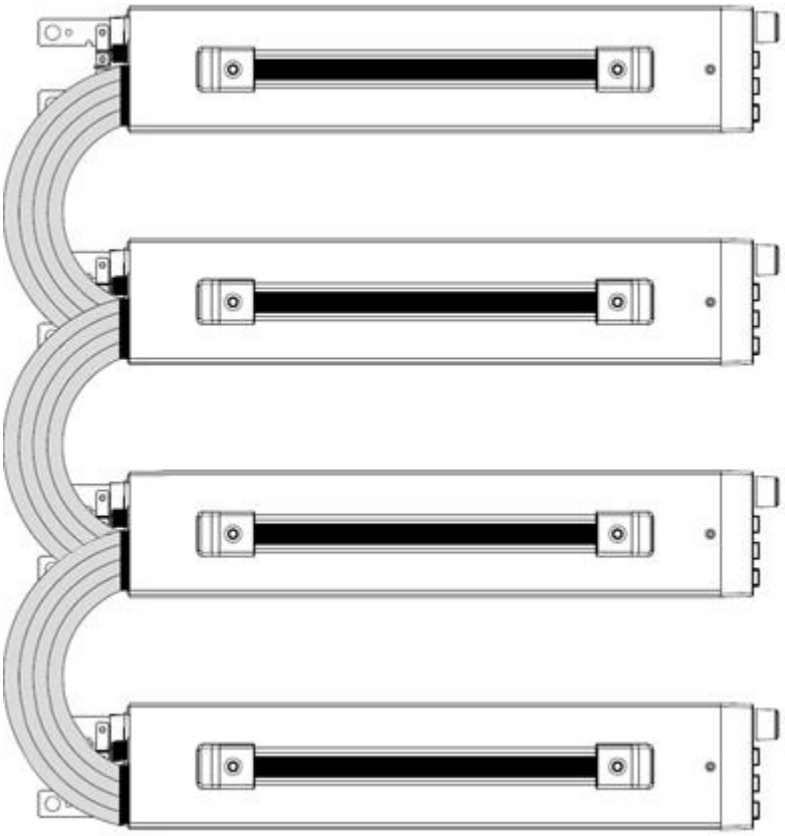
Note

- When grounding the output terminals, connect the same-polarity output terminals (+ or -) of the master and slave units to the chassis terminal. Improper connection may damage the power supply and load.
- For long wires, phase shifts due to wiring inductance and capacitance may cause oscillations. To prevent this, connect an electrolytic capacitor (ranging from hundreds of μF to tens of thousands of μF) at the load end as needed. The capacitor's voltage rating must be at least 120% of the UDP5000 series rated output voltage.
- Twist the + and - wires together and keep them as short as possible when connecting.

Example: Setting parallel operation on UDP5040-40

1. Turn off all power switches.
2. Remove the output protection cover.
3. Connect the analog interface.

   Use a double-ended female header cable (dual-row female header 2×10 pins, 2.54mm pitch) to connect the analog interface of the parallel power supplies.



4. Parallel-connect the output terminals of all units to a wire connector using appropriate wires, then connect to the load.

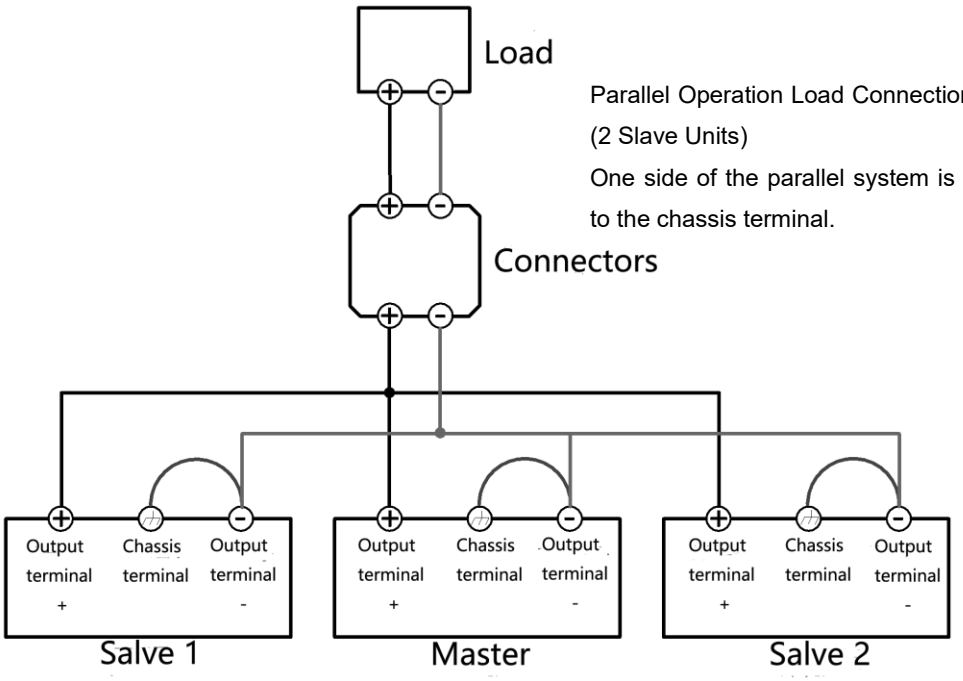
   Ground the same-polarity output terminals (+ or -) of the master and slave units.

   Use wires with sufficient current capacity for the output connection.

   Ensure equal length and cross-sectional area for all wires connecting each UDP5000 series unit to the intermediate terminal block.

   Keep wire lengths ≤50 cm to minimize resistance and inductance.

   Separate the analog interface wiring from the output wiring as much as possible to reduce interference.



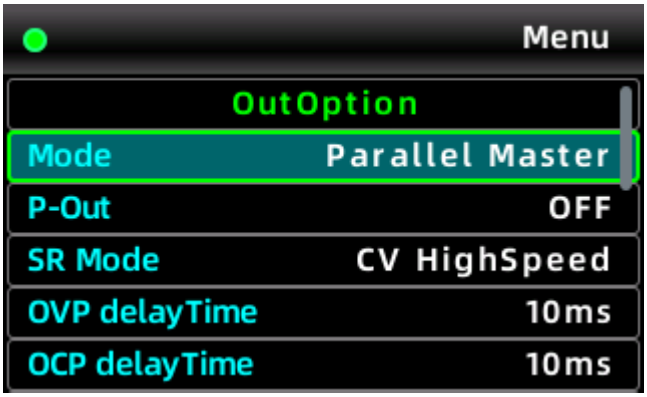
Parallel Operation Load Connection Example (2 Slave Units)

One side of the parallel system is connected to the chassis terminal.

5. Install the output protection cover.

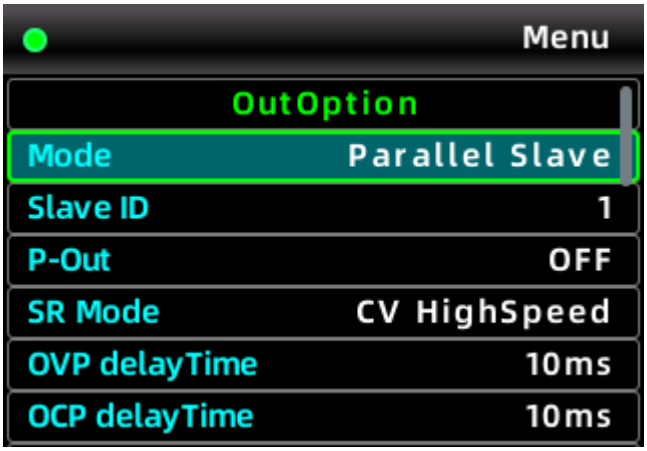
8.1.2 Master/Slave Settings

Select one power supply as the master, and other power supply as slaves.



Parallel-connect master setting:

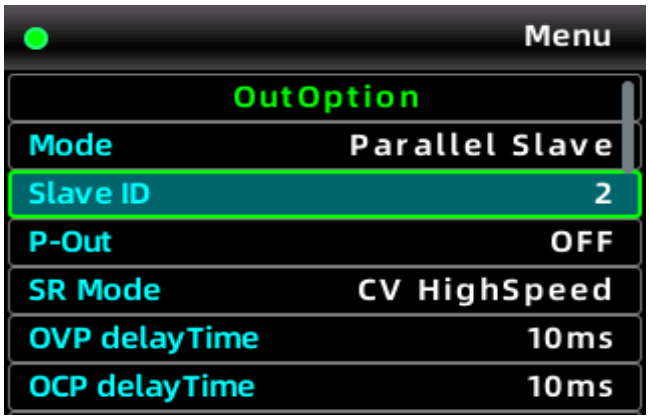
Press the menu Menu button to access the menu settings, rotate the rotary knob to select the mode to Parallel Master.



Parallel-connect slave setting:

Press the menu Menu button to access the menu settings, rotate the rotary knob to select the mode to Parallel Slave.

Set the slave ID for the slave number: 1, 2.



Output Setting and Other Functions

- Once the master and slave units are successfully interconnected, the output voltage/current, OVP/OCP, and output on/off can only be set on the master unit.
- Slave units will automatically synchronize with the master's settings and cannot perform output settings.
- The accuracy of voltage/current settings follows the master unit's specifications.
- List mode and delayer functions are not available during parallel operation.
- Function key lock/unlock and system information configuration remain accessible on each unit.

Remote Compensation for Parallel Operation

This function is available only on the master unit. Refer to *Remote Sensing* for details.

External Monitoring

- Analog output for voltage monitoring (Vm): Available on the master unit.
- Analog output for current monitoring (Im): Monitors the individual output currents of both the master and slave units.
- Total output current monitoring: Available on the master unit.
- Various monitoring states: Constant Voltage Status (CV STATUS), Constant Current Status (CC STATUS), Output ON/OFF, and alarm states can be monitored on both the master and slave units.

8.1.3 Parallel Operation Display

Voltage/Current Display

Example: Display panel for a 3-unit power supply in parallel operation (Output current: 60 A)

8.1.5 Starting Single-Control Parallel Operation

⚠ Note

- After turning the power switch on/off, wait at least 10 seconds after the panel logo disappears before performing another operation.

In a parallel operation with a master unit and two slave units (slave 1 and slave 2):

Output voltage:
20.000 indicates the output current of the master unit.

60.000 indicates the total output voltage across all connected units in parallel operation.

Output power:
200.00 indicates the output power of the master unit.

600.00 indicates the total output power across all connected units in parallel operation.

Total output current: The sum of the output currents from the master, slave 1, and slave 2.

Total output power: The sum of the output powers from master, slave 1, and slave 2

- Rapidly toggling the power switch within a short period may cause the inrush current limiting circuit to malfunction.
- This may shorten the lifespan of the power switch and the internal input fuse.

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1. Turn on the power switch of all parallel-connected power supplies.
2. Configure the settings on the master unit.
3. Press the output Output button to enable the master unit's output.

8.2 Single-Control Series Operation

Single-control operation enables centralized control of a series-connected power supply system via a master unit, while other identical UDP5000-series models function as slaves. This setup increases the output voltage capacity, calculated as: Maximum Output Voltage = Single-unit Rated Voltage × Number of Series-Connected Unit

Maximum Series-Connected Units: 2

	400 W Model	800 W Model	1200 W Model	2000 W Model

Maximum Series-Connected Units	2	2	2	2

Danger: Risk of electric shock.

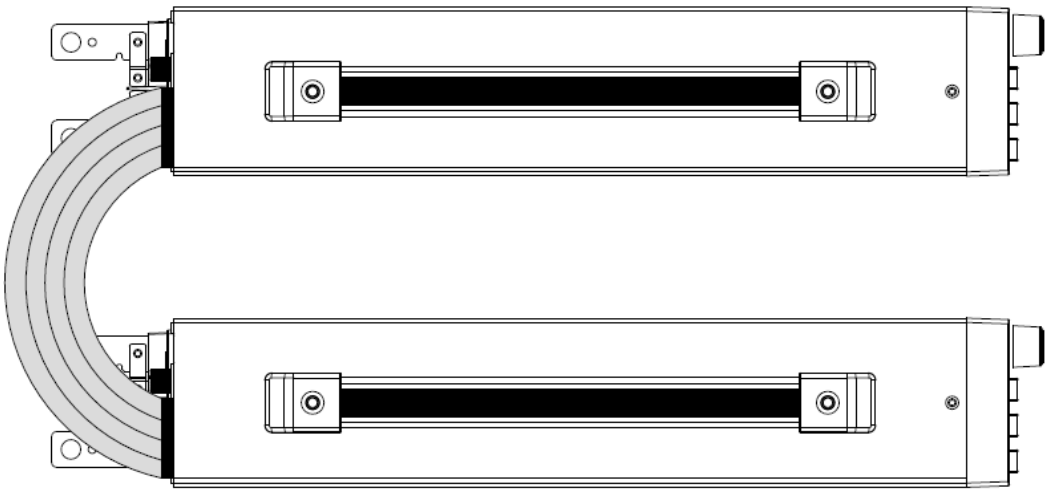
- Before touching the output terminals, turn off the power switch.
- After assembling the output cables, install the output protection cover.

8.2.1 Series Operation Steps

Example: Setting series operation on UDP5040-40

1. Turn off all power switches.
2. Remove the output protection cover.
3. Remove the output protection cover.

   Use a double-ended female header cable (dual-row female header 2×10 pins, 2.54mm pitch) to connect the analog interface of the series power supplies.



4. Connect the power supplies in series with the load.

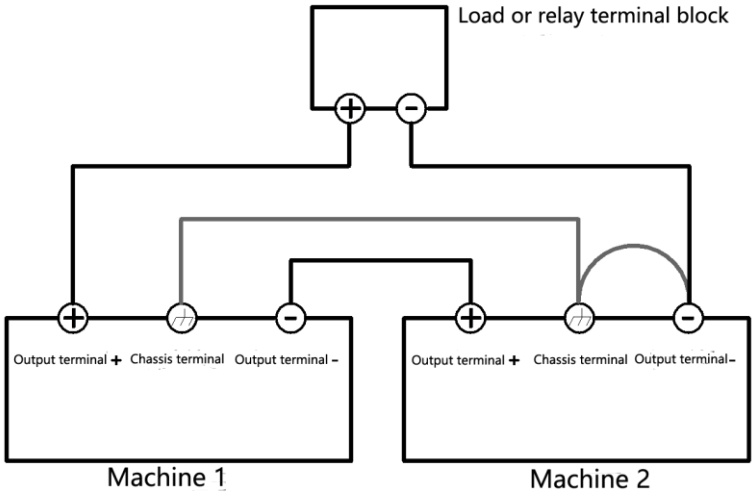
   Use wires with sufficient current capacity for the output connection.

   Keep output wires as short as possible to minimize voltage drop.

   Excessive wire length can increase voltage drop, causing potential differences between power supplies and leading to greater load fluctuations.

Series Operation Load Connection Example

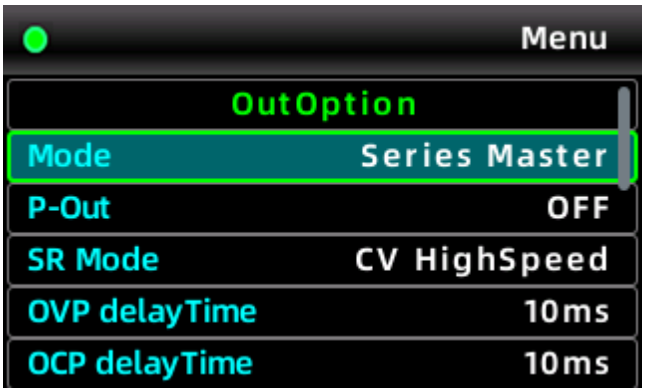
One side of Machine 2 is connected to the chassis terminal.



5. Install the output protection cover.

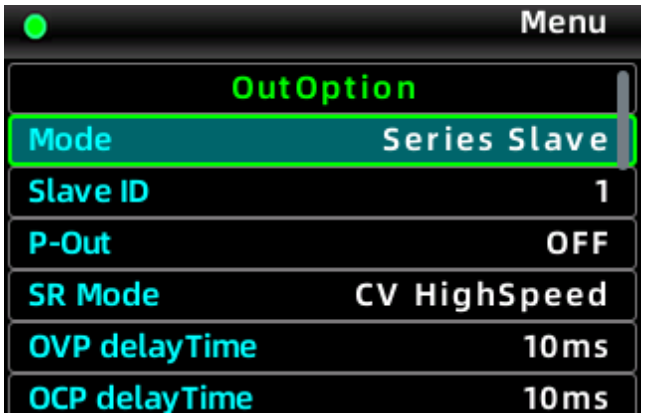
8.2.2 Master/Slave Settings

Select one power supply as the master, and other power supply as slaves.



Series-connect master setting:

Press the menu Menu key to access the menu settings, rotate the rotary knob to select the mode to Series Master.



Series-connect slave setting:

Press the menu Menu key to access the menu settings, rotate the rotary knob to select the mode to Series Slave.
Set the slave ID for the slave number: 1, 2.

Output Setting and Other Functions

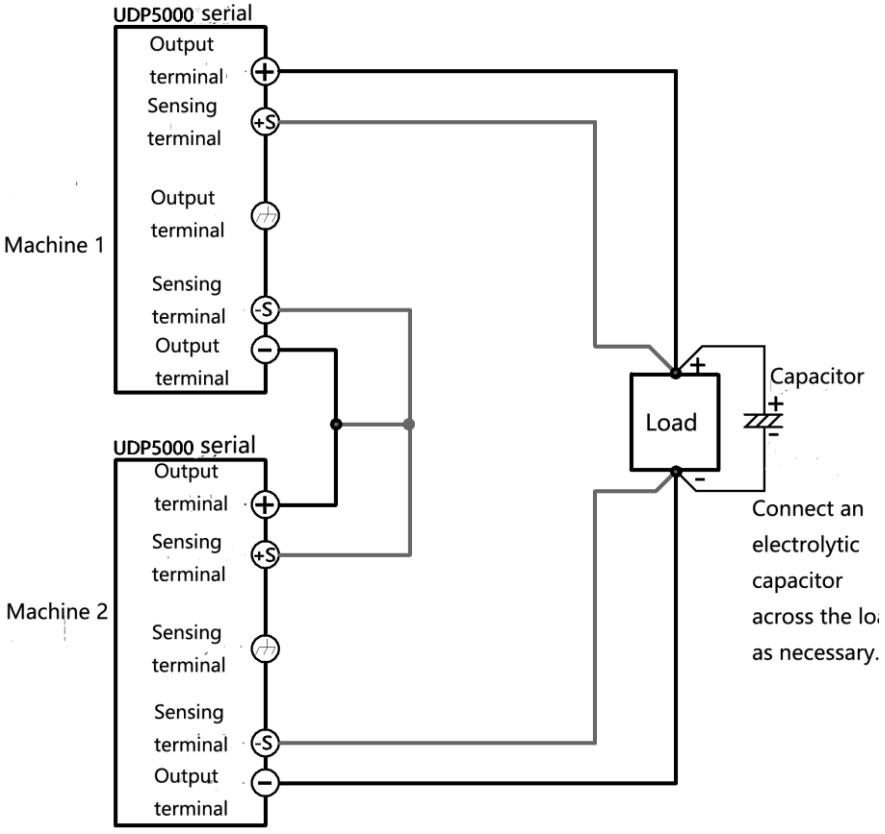
- Once the master and slave units are successfully interconnected, the output voltage/current, OVP/OCP, and output on/off can only be set on the master unit.
- Slave units will automatically synchronize with the master's settings and cannot perform output settings.
- The accuracy of voltage/current settings follows the master unit's specifications.
- List mode and delayer functions are not available during series operation.
- Function key lock/unlock and system information configuration remain accessible on each unit.

Remote Compensation for Series Operation

Note

- If the remote compensation wire is not connected properly, excessive voltage may be applied to the load, leading to a fault.
- For long wires, phase shifts due to wiring inductance and capacitance may cause oscillations. To prevent this, connect an electrolytic capacitor (ranging from hundreds of μF to tens of thousands of μF) at the load end as needed. The capacitor's voltage rating must be at least 120% of the UDP5000 series rated output voltage.

When using the remote compensation function, connect the wires as follows.



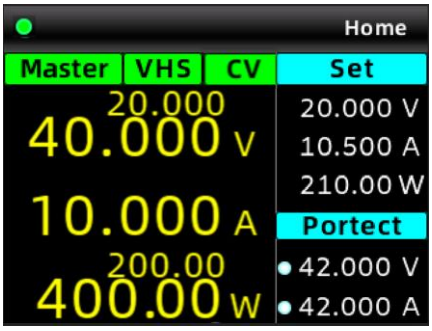
External Monitoring

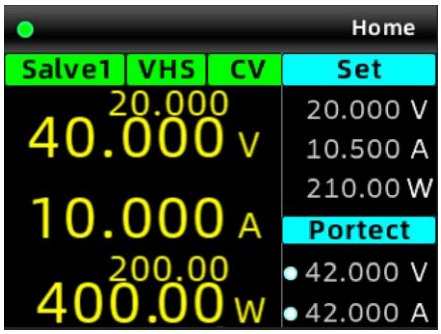
- Analog output for voltage monitoring (Vm): Available on each unit.
- Total output voltage: The sum of monitoring value of machine 1 and machine 2.
- Analog output for current monitoring (Im): Available on each unit.
- Various monitoring states: Constant Voltage Status (CV STATUS), Constant Current Status (CC STATUS), Output ON/OFF, Output ON/OFF, and alarm states can be monitored on both the master and slave units.

8.2.3 Series Operation Display

Voltage/Current Display

Example: Display panel for a 2-unit power supply in series operation (Output current: 10 A)





In a series operation with a master unit and a slave unit:

Output Voltage
20.000 indicates the output voltage of the master unit.

40.000 indicates the total output voltage across all connected units in series operation.

Output Power
200.00 indicates the output power of the master unit.

40.000 indicates the total output power across all connected units in series operation.

Total output voltage: The sum of output voltages from the master and slave 1.
Total output power: The sum of output powers from the master and slave 1.

8.2.4 Starting Single-Control Series Operation

Note

- When turning on the power switch, wait at least 10 seconds after the exhaust fan has stopped before proceeding. This delay ensures that internal components have fully reset, preventing potential damage or malfunctions.
- Rapidly toggling the power switch within a short period may cause the inrush current limiting circuit to malfunction.
- This may shorten the lifespan of the power switch and the internal input fuse.

1. Turn on the power switch of all series-connected power supplies.

2. Configure the output voltage and current settings.
3. Press the output Output button to enable the master unit's output.

9. Technical Specifications

Specification Conditions

This section outlines the technical specifications for the 400 W, 800 W, 1200 W, and 2000 W models of the UDP5000 series. It includes detailed information on input/output specifications, voltage and current specifications, output characteristics, noise and ripple, and display characteristics.

Unless otherwise specified, technical specifications are based on the following settings and conditions (applicable to all models):

- Load Type: Purely resistive load
- Preheating Time: 30 minutes
- Post-Preheating Calibration: The product must be properly calibrated in an environment of 23°C ±5°C following the appropriate calibration procedures.

Technical Terminology

- Typical value (Typ.): These represent typical values when the product operates at an ambient temperature of 23°C (73.4°F). These values do not guarantee the product's performance.
- Rated value: The specified nominal value.
- Reading: The measured value displayed.
- Rated load and no-load:
  Constant voltage mode (when the output current is set to ≥ the maximum output current at the rated output voltage):
  Rated load: Using a purely resistive load, the output current reaches 95% to 100% of the maximum output current when the rated output voltage is applied.
  No-load: No output current flows through the load (i.e., an open-circuit state).
  Constant current mode (when the output voltage is set to ≥ the maximum output voltage at the rated output current)
  Rated load: Using a purely resistive load, the output voltage drops to 95% to 100% of the maximum output voltage when the rated output current is applied. Including the voltage drop in the load cable, the UDP5000 series power supply output voltage must not exceed the maximum output voltage at the rated output current.
  No-load: Using a purely resistive load, the output voltage drops to 10% of the maximum output voltage or 1 V (whichever is higher) when the rated output current is applied.
- Rise time: The time taken for the output voltage or current to increase from 10% to 90% of the rated value when the power supply output is turned on.
- Fall time: The time taken for the output voltage or current to decrease from 90% to 10% of the rated value when the power supply output is turned off.

UDP5000 series power supply operates within the rated output power range for both voltage and current. However, the available current at the rated output voltage and the available voltage at the specified rated output current are limited by the rated output power:

- Maximum output current at the rated output voltage = Rated output power ÷ Rated output voltage
- Maximum output voltage at the rated output current = Rated output power ÷ Rated output current

9.1 400 W Model

AC Input Characteristics

Specification/Model		UDP5040-40	UDP5080-20	UDP5160-8	UDP5250-6
AC Input					
Nominal input rating		100 Vac - 240 Vac, 50Hz - 60Hz, single-phase			
Input Voltage Range		85 Vac to 265 Vac			
Input Voltage Frequency Range		47 Hz to 63 Hz			
Current (Typ.)*1	100 Vac	5.6 A			
	200 Vac	2.8 A			
Surge Current (MAX) *2		Below 25 Apeak			
Power (MAX)*3		560 W			
Power Factor (Typ.)*1		0.99 (Input voltage: 100 V), 0.97 (Input voltage: 200 V)			
Efficiency (MIN)*1		75% (Typ.)			
Output Hold Time (MIN)*3		Above 20 ms			

*1. Rated output current at output rated power.

*2. After the power switch is turned on (within approximately 1 ms), the charge current component that flows through the internal EMC filter circuit capacitor is not included.

*3. At output rated power.

Output Characteristics

Specification/Model			UDP5040-40	UDP5080-20	UDP5160-8	UDP5250-6
Output						
Rated Value	Output Voltage*1		40 V	80 V	160 V	250 V
	Output Current*1		40 A	20 A	8 A	6 A
	Output Power		400 W			
Voltage	Maximum Adjustable Voltage*2		42 V	84 V	168 V	262.5 V
	Output Accuracy*3		±(0.05% of the set value + 0.05% of the rated value)			
	Setting Resolution		1 mV	1 mV	10 mV	10 mV
	Display Resolution		1 mV	1 mV	1 mV (<100 V) 10 mV (≥100 V)	1 mV (<100 V) 10 mV (≥100 V)
	Power Regulation*4		±6 mV	±10 mV	±12.2 mV	±26 mV
	Load Regulation*5		±6 mV	±10 mV	±12.2 mV	±26 mV
	Ripple and Noise*6	p-p*7	50 mV		100 mV	100 mV
		rms*7	5 mV		12 mV	20 mV
	Rise Time	Rated Load	Below 50 ms		Below 100 ms	
		No Load	Below 50 ms		Below 100 ms	
	Fall Time	Rated Load	Below 50 ms		150 ms	250 ms
		No Load	Below 500 ms		1200 ms	2000 ms
	Maximum Remote Sense Compensation Voltage (MAX)		1.5 V	4 V	5 V	5 V
	Temperature Coefficient*8		100 ppm/°C			
Current	Maximum Adjustable Current*2		42 A	21 A	8.4 A	6.3 A
	Output Accuracy*9		±(0.5% of the set value + 0.1% of the rated value)			
	Setting Resolution		1 mA	1 mA	1 mA	1 mA
	Display Resolution		1 mA	1 mA	1 mA	1 mA
	Power Regulation*4		±6 mA	±4 mA	±3 mA	±2.5 mA
	Load Regulation		±13 mA	±9 mA	±7 mA	±6 mA
	Ripple and Noise*6	rms*7	80 mA	40 mA	30 mA	12 mA
	Rise Time (Typ.)	Rated Load	50 ms		100 ms	
	Fall Time (Typ.)	Rated Load	50 ms		100 ms	
	Temperature Coefficient*8		100 ppm/°C			
Maximum Adjustable Internal Resistance			1.000 Ω	4.000 Ω	15 Ω	31.25 Ω

*1. The maximum output voltage and maximum output current are constrained by the maximum output power.

*2. OVP and OCP limits are set at approximately 95%.

*3. Applies to a 1% to 100% range of the rated voltage.

*4. For input voltages of 90 VAC to 121 VAC or 198 VAC to 242 VAC under constant load.

*5. When the power supply outputs the rated voltage and operates from no-load to rated load (i.e., outputs the rated current), voltage regulation is calculated as: Output Voltage Regulation= (Load Voltage at No-Load Current - Load Voltage at Rated Load Current) ÷ Load Voltage at Full Load Current ×100%

*6. In constant voltage mode, with the power supply delivering the rated current at rated power, measure the ripple and noise at the output using an oscilloscope

*7. Measurement bandwidth: 20 MHz.

*8. Ambient temperature range: 0°C to 50°C.

*9. Applies to a 1% to 100% range of the rated current. For 0% to 1%, values are typical (Typ.)

Display Characteristics

Specification/Model		UDP5040-40	UDP5080-20	UDP5160-8	UDP5250-6
Voltage Display	Maximum Display	99.999	99.999	999.99	999.99
	Minimum Display*1	0.100	0.100	0.50	0.50
	Display Accuracy	1 mV	1 mV	1 mV (<100 V) 10 mV (≥100 V)	1 mV (<100 V) 10 mV (≥100 V)
Current Display	Maximum Display	99.999	99.999	9.999	9.999
	Display Accuracy	1 mA	1 mA	1 mA	1 mA
Power Display	Maximum Display	999.99			
	Display Accuracy	1 mW (<100 W), 10 mW (≥100 W)			

*1. For the 5040 and 5080 models, the output voltage is 0.1 V, while for the 5160 and 5250 models, the output voltage is 0.5 V.

9.2 800 W Model

AC Input Characteristics

Specification/Model		UDP5040-80	UDP5080-40	UDP5160-16	UDP5250-12
AC Input					
Nominal input rating		100 Vac - 240 Vac, 50Hz - 60Hz, single-phase			
Input Voltage		85 Vac to 265 Vac			
Input Voltage Frequency Range		47 Hz to 63 Hz			
Current (Typ.)*1	100 Vac	11.2 A			
	200 Vac	5.6 A			
Surge Current (MAX)*2		Below 50 Apeak			
Power (MAX)*3		1120 W			
Power Factor (Typ.)*1		0.99 (Input voltage: 100 V), 0.97 (Input voltage: 200 V)			
Efficiency (MIN)*1		75% (Typ.)			
Output Hold Time (MIN)*3		Above 20 ms			

*1. Rated output current at output rated power.

*2. After the power switch is turned on (within approximately 1 ms), the charge current component that flows through the internal EMC filter circuit capacitor is not included.

*3. At output rated power.

Output Characteristics

Specification/Model			UDP5040-80	UDP5080-40	UDP5160-16	UDP5250-12
Output						
Rated Value	Output Voltage*1		40 V	80 V	160 V	250 V
	Output Current*1		80A	40 A	16 A	12 A
	Output Power		800 W			
Voltage	Maximum Adjustable Voltage*2		42 V	84 V	168 V	262.5 V
	Output Accuracy*3		±(0.05% of the set value + 0.05% of the rated value)			
	Setting Resolution		1 mV	1 mV	10 mV	10 mV
	Display Resolution		1 mV	1 mV	1 mV (<100 V) 10 mV (≥100 V)	1 mV (<100 V) 10 mV (≥100 V)
	Power Regulation*4		±6 mV	±10 mV	±20 mV	±26 mV
	Load Regulation*5		±6 mV	±10 mV	±20 mV	±26 mV
	Ripple and Noise*6	p-p*7	50 mV		100 mV	100 mV
		rms*7	5 mV		12 mV	20 mV
	Rise Time	Rated Load	Below 50 ms		Below 100 ms	
		No Load	Below 50 ms		Below 100 ms	
	Fall Time	Rated Load	Below 50 ms		150 ms	250 ms
		No Load	Below 500 ms		1200 ms	2000 ms
	Maximum Remote Sense Compensation Voltage (MAX)		1.5 V	4 V	5 V	5 V
	Temperature Coefficient*8		100 ppm/°C			
Current	Maximum Adjustable Current*2		84A	42 A	16.8 A	12.6 A
	Output Accuracy*9		±(0.5% of the set value + 0.1% of the rated value)			
	Setting Resolution		1 mA	1 mA	1 mA	1 mA
	Display Resolution		1 mA	1 mA	1 mA	1 mA
	Power Regulation*4		±10 mA	±6 mA	±5 mA	±3 mA
	Load Regulation		±21 mA	±13 mA	±10 mA	±7 mA
	Ripple and Noise*6	rms*7	160 mA	80 mA	40 mA	24 mA
	Rise Time (Typ.)	Rated Load	50 ms		100 ms	
	Fall Time (Typ.)	Rated Load	50 ms		100 ms	
	Temperature Coefficient*8		100 ppm/°C			
Maximum Adjustable Internal Resistance			0.500 Ω	2.000 Ω	7.5 Ω	15.625 Ω

*1. The maximum output voltage and maximum output current are constrained by the maximum output power.

*2. OVP and OCP limits are set at approximately 95%.

*3. Applies to a 1% to 100% range of the rated voltage.

*4. For input voltages of 90 VAC to 121 VAC or 198 VAC to 242 VAC under constant load.

*5. When the power supply outputs the rated voltage and operates from no-load to rated load (i.e., outputs the rated current), voltage regulation is calculated as: Output Voltage Regulation= (Load Voltage at No-Load Current - Load Voltage at Rated Load Current) ÷ Load Voltage at Full Load Current ×100%

*6. In constant voltage mode, with the power supply delivering the rated current at rated power, measure the ripple and noise at the output using an oscilloscope

*7. Measurement bandwidth: 20 MHz.

*8. Ambient temperature range: 0°C to 50°C.

*9. Applies to a 1% to 100% range of the rated current. For 0% to 1%, values are typical (Typ.)

Display Characteristics

Specification/Model		UDP5040-80	UDP5080-40	UDP5160-16	UDP5250-12
Voltage Display	Maximum Display	99.999	99.999	999.99	999.99
	Minimum Display*1	0.100	0.100	0.50	0.50
	Display Accuracy	1 mV	1 mV	1 mV (<100 V) 10 mV (≥100 V)	1 mV (<100 V) 10 mV (≥100 V)
Current Display	Maximum Display	99.999	99.999	99.999	99.999
	Display Accuracy	1 mA	1 mA	1 mA	1 mA
Power Display	Maximum Display	999.99			
	Display Accuracy	1 mW (<100 W), 10 mW (≥100 W)			

*1. For the 5040 and 5080 models, the output voltage is 0.1 V, while for the 5160 and 5250 models, the output voltage is 0.5 V.

9.3 1200 W Model

AC Input Characteristics

Specification/Model		UDP5040-120	UDP5080-60	UDP5160-24	UDP5250-18
AC Input					
Nominal input rating		100 Vac - 240 Vac, 50Hz - 60Hz, single-phase			
Input Voltage		85 Vac to 265 Vac			
Input Voltage Frequency Range		47 Hz to 63 Hz			
Current (Typ.)*1	100 Vac	16.8 A			
	200 Vac	8.4 A			
Surge Current (MAX)*2		Below 75 Apeak			
Power (MAX)*3		1680 W			
Power Factor (Typ.)*1		0.99 (Input voltage: 100 V), 0.97 (Input voltage: 200 V)			
Efficiency (MIN)*1		75% (Typ.)			
Output Hold Time (MIN)*3		Above 20 ms			

*1. Rated output current at output rated power.

*2. After the power switch is turned on (within approximately 1 ms), the charge current component that flows through the internal EMC filter circuit capacitor is not included.

*3. At output rated power.

Output Characteristics

Specification/Model			UDP5040-120	UDP5080-60	UDP5160-24	UDP5250-18
Output						
Rated Value	Output Voltage*1		40 V	80 V	160 V	250 V
	Output Current*1		120 A	60 A	24 A	18 A
	Output Power		1200 W			
Voltage	Maximum Adjustable Voltage*2		42 V	84 V	168 V	262.5 V
	Output Accuracy*3		±(0.05% of the set value + 0.05% of the rated value)			
	Setting Resolution		1 mV	1 mV	10 mV	10 mV
	Display Resolution		1 mV	1 mV	1 mV (<100 V) 10 mV (≥100 V)	1 mV (<100 V) 10 mV (≥100 V)
	Power Regulation*4		±6 mV	±10 mV	±20 mV	±26 mV
	Load Regulation*5		±6 mV	±10 mV	±20 mV	±26 mV
	Ripple and Noise*6	p-p*7	50 mV		100 mV	100 mV
		rms*7	5 mV		12 mV	20 mV
	Rise Time	Rated Load	Below 50 ms		Below 100 ms	
		No Load	Below 50 ms		Below 100 ms	
	Fall Time	Rated Load	Below 50 ms		150 ms	250 ms
		No Load	Below 500 ms		1200 ms	2000 ms
	Maximum Remote Sense Compensation Voltage (MAX)		1.5 V	4 V	5 V	5 V
	Temperature Coefficient*8		100 ppm/°C			
Current	Maximum Adjustable Current*2		126 A	63 A	25.2 A	18.9 A
	Output Accuracy*9		±(0.5% of the set value + 0.1% of the rated value)			
	Setting Resolution		10 mA	1 mA	1 mA	1 mA
	Display Resolution		1 mA (<100 A) 10 mA (≥100 A)	1 mA	1 mA	1 mA
	Power Regulation*4		±14 mA	±8 mA	±6 mA	±3.5 mA
	Load Regulation		±29 mA	±17 mA	±12 mA	±8.0 mA
	Ripple and Noise*6	rms*7	240 mA	120 mA	60 mA	36 mA
	Rise Time (Typ.)	Rated Load	50 ms		100 ms	
	Fall Time (Typ.)	Rated Load	50 ms		100 ms	
	Temperature Coefficient*8		100 ppm/°C			
Maximum Adjustable Internal Resistance			0.333 Ω	1.333 Ω	5.00 Ω	10.416 Ω

*1. The maximum output voltage and maximum output current are constrained by the maximum output power.

*2. OVP and OCP limits are set at approximately 95%.

*3. Applies to a 1% to 100% range of the rated voltage.

*4. For input voltages of 90 VAC to 121 VAC or 198 VAC to 242 VAC under constant load.

*5. When the power supply outputs the rated voltage and operates from no-load to rated load (i.e., outputs the rated current), voltage regulation is calculated as: Output Voltage Regulation= (Load Voltage at No-Load Current - Load Voltage at Rated Load Current) ÷ Load Voltage at Full Load Current ×100%

*6. In constant voltage mode, with the power supply delivering the rated current at rated power, measure the ripple and noise at the output using an oscilloscope

*7. Measurement bandwidth: 20 MHz.

*8. Ambient temperature range: 0°C to 50°C.

*9. Applies to a 1% to 100% range of the rated current. For 0% to 1%, values are typical (Typ.)

Display Characteristics

Specification/Model		UDP5040-120	UDP5080-60	UDP5160-24	UDP5250-18
Voltage Display	Maximum Display	99.999	99.999	999.99	999.99
	Minimum Display*1	0.100	0.100	0.50	0.50
	Display Accuracy	1 mV	1 mV	1 mV (<100 V) 10 mV (≥100 V)	1 mV (<100 V) 10 mV (≥100 V)
Current Display	Maximum Display	999.99	99.999	99.999	99.999
	Display Accuracy	1 mA (<100 A) 10 mA (≥100 A)	1 mA	1 mA	1 mA
Power Display	Maximum Display	999.99			
	Display Accuracy	1 mW (<100 W), 10 mW (≥100 W)			

*1. For the 5040 and 5080 models, the output voltage is 0.1 V, while for the 5160 and 5250 models, the output voltage is 0.5 V.

9.4 2000 W Model

AC Input Characteristics

Specification/Model		UDP5040-200	UDP5080-100	UDP5160-40	UDP5250-30
AC Input					
Nominal input rating		100 Vac - 240 Vac, 50Hz - 60Hz, single-phase			
Input Voltage		85 Vac to 265 Vac			
Input Voltage Frequency Range		47 Hz to 63 Hz			
Current (Typ.)*1	100 Vac	28 A			
	200 Vac	14 A			
Surge Current (MAX)*2		Below 125 Apeak			
Power (MAX)*3		2800 W			
Power Factor (Typ.)*1		0.99 (Input voltage: 100 V), 0.97 (Input voltage: 200 V)			
Efficiency (MIN)*1		75% (Typ.)			
Output Hold Time (MIN)*3		Above 20 ms			

*1. Rated output current at output rated power.

*2. After the power switch is turned on (within approximately 1 ms), the charge current component that flows through the internal EMC filter circuit capacitor is not included.

*3. At output rated power.

Output Characteristics

Specification/Model			UDP5040-200	UDP5080-100	UDP5160-40	UDP5250-30
Output						
Rated Value	Output Voltage*1		40 V	80 V	160 V	250 V
	Output Current*1		200 A	100 A	40 A	30 A
	Output Power		2000 W			
Voltage	Maximum Adjustable Voltage*2		42 V	84 V	168 V	262.5 V
	Output Accuracy*3		±(0.05% of the set value + 0.05% of the rated value)			
	Setting Resolution		1 mV	1 mV	10 mV	10 mV
	Display Resolution		1 mV	1 mV	1 mV (<100 V) 10 mV (≥100 V)	1 mV (<100 V) 10 mV (≥100 V)
	Power Regulation*4		±6 mV	±10 mV	±20 mV	±26 mV
	Load Regulation*5		±6 mV	±10 mV	±20 mV	±26 mV
	Ripple and Noise*6	p-p*7	50 mV		100 mV	100 mV
		rms*7	5 mV		12 mV	20 mV
	Rise Time	Rated Load	Below 50 ms		Below 100 ms	
		No Load	Below 50 ms		Below 100 ms	
	Fall Time	Rated Load	Below 50 ms		150 ms	250 ms
		No Load	Below 500 ms		1200 ms	2000 ms
	Maximum Remote Sense Compensation Voltage (MAX)		1.5 V	4 V	5 V	5 V
	Temperature Coefficient*8		100 ppm/°C			
Current	Maximum Adjustable Current*2		210 A	105 A	42 A	31.5 A
	Output Accuracy*9		±(0.5% of the set value + 0.1% of the rated value)			
	Setting Resolution		10 mA	10 mA	1 mA	1 mA
	Display Resolution		1 mA (<100 A) 10 mA (≥100 A)	1 mA (<100 A) 10 mA (≥100 A)	1 mA	1 mA
	Power Regulation*4		±22 mA	±12 mA	±8 mA	±4.5 mA
	Load Regulation		±45 mA	±25 mA	±18 mA	±10.0 mA
	Ripple and Noise*6	rms*7	400 mA	200 mA	100 mA	60 mA
	Rise Time (Typ.)	Rated Load	50 ms		100 ms	
	Fall Time (Typ.)	Rated Load	50 ms		100 ms	
	Temperature Coefficient*8		100 ppm/°C			
Maximum Adjustable Internal Resistance			0.20 Ω	0.800 Ω	3.00 Ω	6.250 Ω

*1. The maximum output voltage and maximum output current are constrained by the maximum output power.

*2. OVP and OCP limits are set at approximately 95%.

*3. Applies to a 1% to 100% range of the rated voltage.

*4. For input voltages of 90 VAC to 121 VAC or 198 VAC to 242 VAC under constant load.

*5. When the power supply outputs the rated voltage and operates from no-load to rated load (i.e., outputs the rated current), voltage regulation is calculated as: Output Voltage Regulation= (Load Voltage at No-Load Current - Load Voltage at Rated Load Current) ÷ Load Voltage at Full Load Current ×100%

*6. In constant voltage mode, with the power supply delivering the rated current at rated power, measure the ripple and noise at the output using an oscilloscope

*7. Measurement bandwidth: 20 MHz.

*8. Ambient temperature range: 0°C to 50°C.

*9. Applies to a 1% to 100% range of the rated current. For 0% to 1%, values are typical (Typ.)

Display Characteristics

Specification/Model		UDP5040-200	UDP5080100	UDP5160-40	UDP5250-30
Voltage Display	Maximum Display	99.999	99.999	999.99	999.99
	Minimum Display*1	0.100	0.100	0.50	0.50
	Display Accuracy	1 mV	1 mV	1 mV (<100 V) 10 mV (≥100 V)	1 mV (<100 V) 10 mV (≥100 V)
Current Display	Maximum Display	999.99	999.99	99.999	99.999
	Display Accuracy	1 mA (<100 A) 10 mA (≥100 A)	1 mA (<100 A) 10 mA (≥100 A)	1 mA	1 mA
Power Display	Maximum Display	999.99			
	Display Accuracy	1 mW (<100 W), 10 mW (≥100 W)			

*1. For the 5040 and 5080 models, the output voltage is 0.1 V, while for the 5160 and 5250 models, the output voltage is 0.5 V.

9.5 Common Specifications

Protection Function

Specification/Model		400 W Model	800 W Model	1200 W Model	2000 W Model
Protection Function					
Over-Voltage Protection (OVP)		Automatically turns off*1 when triggered, and a window display: "OVP is triggered, the output will be turned off."			
	Setting Range	0% to 105% of the rated output voltage.			
	Setting Accuracy	1 mV (for single-unit rated values < 100 V) 10 mV (for single-unit rated values ≥ 100 V)			
Over-Current Protection (OCP)*2		Automatically turns off*1 when triggered, and a window display: "OCP is triggered, the output will be turned off."			
	Adjustable Range	0% to 105% of the rated output current.			
	Adjustable Accuracy	1 mA (for single-unit rated values < 100 A) 10 mA (for single-unit rated values ≥ 100 A			
Front Output Terminal Over-Current Protection (FOCP)*3		Automatically turns off*1 when triggered, and a window display: "FOCP is triggered, the output will be turned off."			
	Value (fixed)	> 10A (Typ.)			
Over-Temperature Protection (OTP)		Automatically turns off*1 when triggered, and a window display: "OTP is triggered, the output will be turned off."			
Shutdown (SD)		Turn off the power supply			
Power Limit		Automatically turns off*1 when triggered, and a window display: "Power limit is triggered, the output will be turned			

		off."
	Value (fixed)	Close to 105% of the rated output power.
Communication Monitoring (Watchdog)		Restarts automatically, and a window display: "The watchdog failed. It will automatically restart."
Single-Control Series/Parallel Operation Protection (PRL ALM)		Automatically turns off the output, and a window display: "Master/slave failed, the output will be turned off."

*1. For 2000 W models, this may result in output disconnection or circuit breaker tripping.

*2. This does not prevent peak discharge currents in the internal capacitors of the UDP5000 power supply's output section during sudden load changes.

*3. The front-panel output current is limited to a maximum of 10 A. Values exceeding 10 A will trigger protection. If the OCP (Over-Current Protection) threshold is lower than the FOCP (Fast Over-Current Protection) threshold, OCP takes precedence.

Signal Input/Output

Specification/Model		400 W Model	800 W Model	1200 W Model	2000 W Model
Signal Input/Output					
Monitoring Signal Output	Voltage Monitor (VMON)	Voltage Monitor Range: 0 V to 10 V			
	Current Monitor (IMON)*1	Voltage Monitor Range: 0 V to 10 V			
State Output	Output State	This function is enabled when the power supply output is active.			
	CV Mode	This function is enabled when the power supply operates in constant voltage (CV) mode.			
	CC Mode	This function is enabled when the power supply operates in constant current (CC) mode.			
	Alarm State	This function is enabled when an alarm is triggered.			
	Power State	Power State: The power is on when the switch is turned on.			
Trigger Signal	Input (Trigger Input)	Logic: Low level (0 V to 1.5 V), high level (3.5 V to 5 V) Input resistance: 10 kΩ (Typ.)			
	Output (Trigger Output)	Logic: Low level (0 V to 0.6 V), high level (4.2 V to 5 V) Pulse Width: 100 μs (Typ.)			

*1. Control the voltage on the current sampling path to regulate the output current.

Control Function

Specification/Model			400 W Model	800 W Model	1200 W Model	2000 W Model
Control Functions						
External Voltage Control	Output Voltage Control (VPGM)		0 % to 100 % of the rated output voltage Voltage Control Range: 0 V to 10 V			
		Accuracy	±5%			
	Output Current Control (IPGM)		0 % to 100 % of the rated output voltage Voltage Control Range: 0 V to 10 V			

		Accuracy	±5%
	Output ON/OFF Control		When the switch is closed, a high-level signal enables the output. When the switch is open, a low-level signal disables the output.

Other Functions

Specification/Model		400 W Model	800 W Model	1200 W Model	2000 W Model
Other Functions					
Output ON/OFF Delayer		Setting Range: 0.1 s to 9999.9 s [*1] Resolution: 0.1 s, 1 s, 10 s, 100 s, 1000 s, 10000 s			
OVP/OCP Enable Delayer [*2]		Setting Range: 10 ms to 10000 ms Resolution: 10 ms, 100 ms			
Preset Value		Group Number: 32*3 groups			
Keypad Lock		Unlocks all keys except the Output key			
List Mode		Setting Group: 0 to 128 groups Cycle Count: 1 to 9,999, infinite [*3] Step Time: 0.1 s to 99,999.9 s			
Synchronous Operation Mode		Synchronizes voltage and current settings, recovery steps, and sequence execution in a P-sequence program.			
Multi-Unit External Parallel Operation Mode [*4]		Supports up to three parallel-connected units (same model), including the master unit.			Supports up to two parallel-connected units (same model), including the master unit.
Multi-Unit External Series Mode		Supports up to two series-connected units (same model).			
Multi-Communication (VMCB)	Master Connects to PC	Ethernet, USB			
	Master Connects to Slave	CAN			

*1. Factory default setting is 0.1 s.

*2. Factory default setting is 10 ms.

*3. Set it to 0 for infinite loop.

*4. The difference between the master and slave is 5% (Typ.)

Operation Display

Specification/Model	400 W Model	800 W Model	1200 W Model	2000 W Model
Operation Display				
Output ON/OFF	The Output button lights up green when the output is active.			
CV Operation	The display shows "CV" in green when in constant voltage mode.			
CC Operation	The display shows "CC" in red when in constant current mode.			
Alarm	When a protective function is activated, a window displays detailed error information and automatically turns off the output			
Key Lock	The Lock button lights up green when locked.			
Remote Control	The operation mode is displayed as "External Control."			

Interface

Specification/Model	400 W Model	800 W Model	1200 W Model	2000 W Model
Interface				

General Specification	Software Protocol	IEEE Std 488.2-1992
	Command	SCPI Specification 1999.0
USB	Hardware	USB 2.0 Data Rate: 480 Mbps (high speed)
		B-type outlet
	Program Message Terminator	Receiving: The program message terminator is LF (Line Feed) or EOM. Sending: The program message terminator is LF and +EOM.
	Device Category	USBTMC-USB48
LAN	Hardware	IEEE 802.3 100Base-TX/ 10Base-T LXI 2011 Ver.1.4 LXI HiSLIP Rev.1.01
		IPv4, RJ-45 connector
	Communication Protocol	VXI-11, SCPI-RAW, HiSLIP
	Program Message Terminator	For VXI-11 and HiSLIP: When receiving, the message terminator can be LF or END. For SCPI-RAW: When receiving, the terminator is a low-level signal. When transmitting, the terminator is also a low-level signal.

General Specifications

Specification/Model		400 W Model	800 W Model	1200 W Model	2000 W Model
Weight (Main Unit Only)		Approx. 3 kg	Approx. 5.5 kg	Approx. 7.5 kg	Approx.13 kg
Dimensions		Refer to the outline dimension drawing.			
Environmental Conditions	Operating Environment	Indoor use, Overvoltage Category II			
	Operating Temperature	0°C to +50°C			
	Operating Humidity	20% R.H to 85% R.H (non-condensing)			
	Storage Temperature	-20°C to +60°C			
	Storage Humidity	90% R.H or below (non-condensing)			
	Altitude	Below 2000 meters			
Cooling Method		Fan-forced air cooling			
Grounding Polarity		Both positive ground and negative ground			
Grounding Voltage		Applicable models: UDP5040, UDP5080, UDP5160, and UDP5250 Maximum: ±500 Vmax			
Voltage Withstand	Through Main Circuit and Chassis	1500 VAC applied for 1 minute with no abnormalities.			
	Through Main Circuit and Secondary Circuit	UDP5040, UDP5080, UDP5160, and UDP5250 models: 1650 VAC applied for 1 minute with no abnormalities.			
Insulation Resistance	Through Main Circuit and Chassis	100 MΩ or more (at ≤70% R.H), measured at 500 VDC.			
	Through Main Circuit and Secondary Circuit	UDP5040, UDP5080, UDP5160, and UDP5250 models:100 MΩ or more (at ≤70% R.H), measured at 500 VDC.			
	Across Secondary Circuit and Chassis	UDP5040, UDP5080, UDP5160, and UDP5250 models: 40 MΩ or more (at ≤70% R.H), measured at 500 VDC.			
Electro Magnetic Compatibility (EMC)[*1][*2]		EMC 2014/30/EU EN61326-1(Class A[*3]) EN55011(Class A[*3], Group I) EN61000-3-2 EN61000-3-3 Applicable Conditions: Cables and wires connected to this product must be ≤3 meters in length.			
Safety[*1]		Low Voltage Directive 2014/35/EU[*2] EN61010-1(Class I[*4], Pollution degree 2[*5])			

*1. Not applicable to customized or modified products.

*2. Applies only to products with the CE marking.

*3. Class A device: Designed for industrial environments. Operation in residential areas may cause interference. To prevent radio/TV signal disruption, users should implement measures to reduce electromagnetic emissions if necessary.

*4.Class I device: Requires proper grounding of the protective earth terminal. Proper grounding is essential for safety compliance.

*5. Pollution Degree 2: Defined as non-conductive pollution (e.g., dust, oil mist) that may temporarily become conductive due to condensation, reducing insulation withstand capacity and surface resistivity.

Limited Warranty and Liability

UNI-T guarantees that the Instrument product is free from any defect in material and workmanship within three years from the purchase date. This warranty does not apply to damages caused by accident, negligence, misuse, modification, contamination, or improper handling. If you need a warranty service within the warranty period, please contact your seller directly. UNI-T will not be responsible for any special, indirect, incidental, or subsequent damage or loss caused by using this device. For the probes and accessories, the warranty period is one year. Visit instrument.uni-trend.com for full warranty information.

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