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Data Sheet

UDP5000 Series Programmable DC Power Supplies

REV 2

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Product Overview

Rated Output Voltage: 40 V, 80 V, 160 V, 250 V

Total Models: 16

UDP5000 series power supplies feature a compact design, high performance, versatile functionality, a wide output range, user-friendly operation, and flexible usage. The series includes four rated output voltages (40 V, 80 V, 160 V, 250 V) and four rated output power levels (400 W, 800 W, 1200 W, 2000 W), forming a total of 16 models.

Each model is equipped with:

- USB and LAN communication interfaces
- Output terminals on both the front and rear panels (maximum front panel output current: 10 A)
- Internal variable resistance function
- Discharge circuit control function
- CC/CV mode
- Various protection functions

Product Specifications

Model	Voltage Output	Current Output	Output Power
40 V			
UDP5040-40	0-40 V	0-40 A	400 W
UDP5040-80		0-80 A	800 W
UDP5040-120		0-120 A	1200 W
UDP5040-200		0-200A	2000 W
80 V			
UDP5080-20	0-80 V	0-20 A	400 W
UDP5080-40		0-40 A	800 W
UDP5080-60		0-60 A	1200 W
UDP5080-100		0-100 A	2000 W
160 V			
UDP5160-8	0-160 V	0-8 A	400 W
UDP5160-16		0-16 A	800 W
UDP5160-24		0-24 A	1200 W
UDP5160-40		0-40 A	2000 W
250 V			
UDP5250-6	0-250 V	0-6 A	400 W
UDP5250-12		0-12 A	800 W
UDP5250-18		0-18 A	1200 W
UDP5250-30		0-30 A	2000 W

1. Features

- TFT-LCD Screen

  Provides a richer display with high visibility.

- Intuitive and Concise Interface

  A simple, user-friendly interface allows users to quickly familiarize themselves with the system.

- Wide-Range Output

  A broad variable range of output voltage and current enables various voltage/current combinations.

- Discharge Load Function

  Allows users to set the discharge load state within the power supply based on actual needs.

- List Mode

  Enables presetting multiple sets of output voltages and currents for automatic output.

- Output Terminals on Front and Rear Panels

  Supports output from both the front and rear panels (maximum front panel output current: 10 A).

- Internal Variable Resistance Function

  Allows users to set the internal resistance to simulate a power supply with internal resistance.

- External Analog Voltage Control

  Enables power supply output control using an external circuit.

- USB and LAN (SCPI) Interfaces

  Support communication and remote control with external devices.

- Multi-Unit Series/Parallel Operation

  Allows multiple units to be used together externally to increase output power.

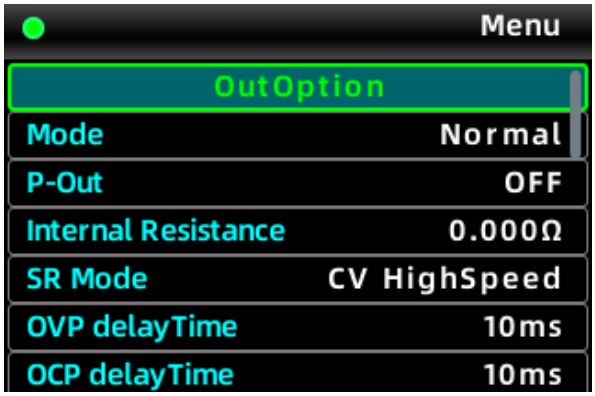
2. Desigh Highlights

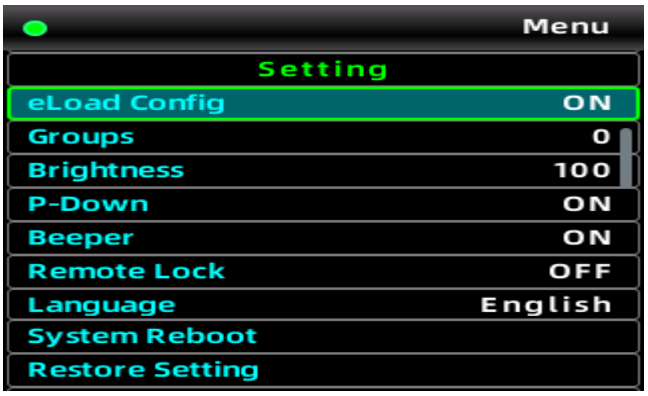
1.1 TFT-LCD, Multifunction Buttons

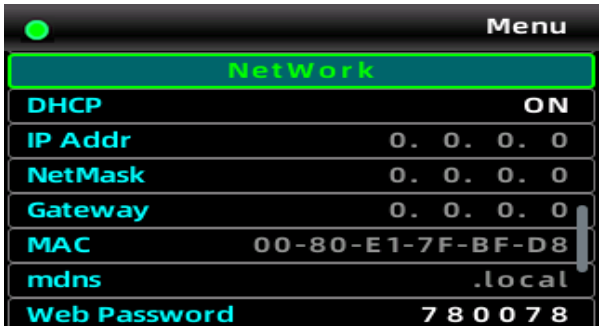
2.4-inch TFT-LCD screen delivers a vibrant color display, offering a comfortable visual experience.

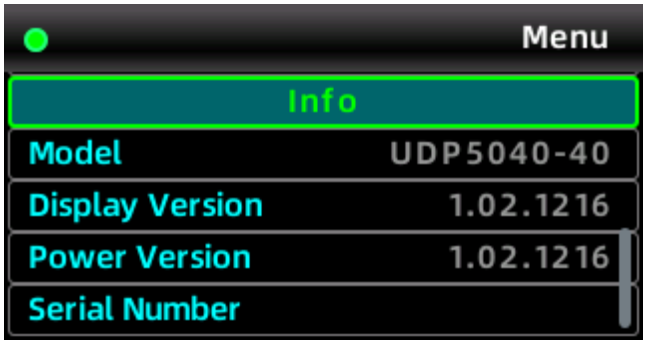
Intuitive multifunction buttons enhance usability, making operation more convenient.

1.2 Intuitive Setting Interface









Press the **Menu** key to configure the output, system, and network settings, or to view product information.

3. Function Highlights

Slope Mode Setting

To prevent overshoot when output is enabled:

Constant voltage (CV) mode: Prioritizes voltage control.

Constant current (CC) mode: Prioritizes current control.

Slope Mode	Description
CV High-Speed Priority (VHS)	Default to high-speed rise and fall rates
CC High-Speed Priority (IHS)	
CV Slope Priority (VSR)	Rise and fall rates can be set as needed
CC Slope Priority (ISR)	

OVP/OCP Settings

Set upper limits for output voltage and current.

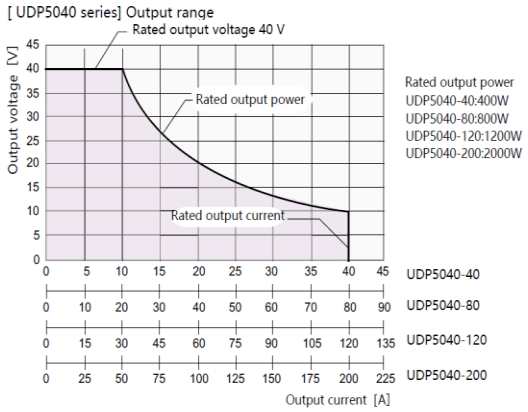
The output set value cannot exceed 95% of the protection value.

The protection value must be at least 105% of the output set value.

Configure a delay time for protection activation, adjustable between 10 ms and 10,000 ms.

Auto Rage Function

UDP5000 series limits output voltage and current based on the rated power. As a result, voltage and current automatically adjust proportionally.



List Mode

Users can configure 128 groups of output voltage, current, and output time data combinations. Additionally, the number of cycles and stop status can be configured.

Up to 32 data sets can be stored in the power supply's local memory or exported to external devices.

Once the list is configured and output is activated, the power supply will automatically execute the programmed combinations.

Discharge Load Function

In the UDP5000 power supplies, a capacitor is connected to the output terminal, and the power supply is equipped with an internal discharge load that discharges the capacitor when the output is turned off.

When the discharge load is disabled, a residual voltage that decreases slowly will remain on the output terminals after the output stops. Conversely, when the discharge load is enabled, the residual voltage will disappear rapidly.

2.1 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.

The internal varaiable resistance can only be set in constant voltage mode.

Power Internal Resistance Settings

	Model	Vrtg[V]	Irtg[A]	Rint[Ω]	Resolution*1	Power
40 V Model	UDP5040-40	40	40	0.000-1.000	0.001	400 W
	UDP5040-80	40	80	0.000-0.500	0.001	800 W
	UDP5040-120	40	120	0.000-0.333	0.001	1200 W
	UDP5040-200	40	200	0.000-0.200	0.001	2000 W
80 V Model	UDP5080-20	80	20	0.000-4.000	0.001	400 W
	UDP5080-40	80	40	0.000-2.000	0.001	800 W
	UDP5080-60	80	60	0.000-1.333	0.001	1200 W
	UDP5080-100	80	100	0.000-0.800	0.001	2000 W
160 V Model	UDP5160-8	160	8	0.000-15.000	0.001	400 W
	UDP5160-16	160	16	0.000-7.500	0.001	800 W
	UDP5160-24	160	24	0.000-5.000	0.001	1200 W
	UDP5160-40	160	40	0.000-3.000	0.001	2000 W
250 V Model	UDP5250-6	250	6	0.000-31.250	0.001	400 W
	UDP5250-12	250	12	0.000-15.625	0.001	800 W
	UDP5250-18	250	18	0.000-10.416	0.001	1200 W
	UDP5250-30	250	30	0.000-6.250	0.001	2000 W

Vrtg[V]: Rated voltage

Irtg[A]: Rated current

Rint[Ω]: Internal resistance

0 < Rint[min]≤ Rint[MAX]

40 V, 80 V model: Rint[Ω]= Vrtg[V]/ Irtg[A]

160 V, 250 V model: Rint[Ω]= Vrtg[V]/ Irtg[A]*0.75

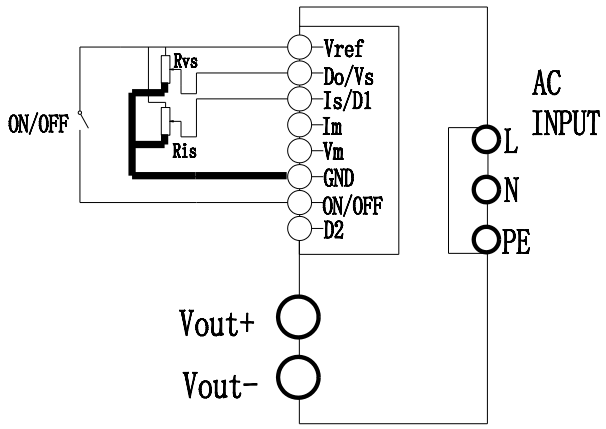
*1. Setting resolution for the power supply's internal resistance.

2.2 External Voltage Control

All UDP5000 series models support external analog control and multi-unit combined operation. When using the external analog interface, ensure that the appropriate cable is used for wiring.

For external voltage control, the power supply's operation mode must be set to **External Voltage Control**.

For detailed instructions, refer to the *UDP5000 Series Programmable DC Power Supply-User Manual*.



Circuit Connection Diagram

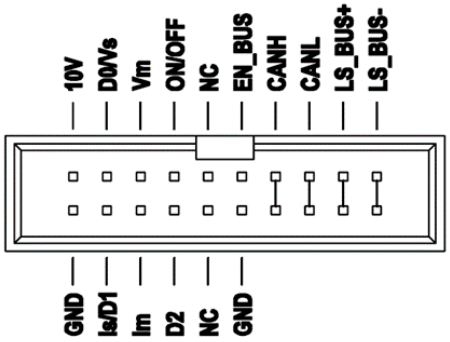
Using an external switch to control power output ON/OFF

By adjusting the ON/OFF state, the power supply output is regulated accordingly.

Adjust an external potentiometer to control the output voltage/current

Adjust Rvs and Ris to regulate the output voltage and current levels.

Rear Panel Analog Interface



Interface	Definition
GND	Ground terminal
VREF_V	The power supply internally provides a 10 V reference voltage for external voltage control output.
Vs/DO	Voltage analog control: Analog voltage setting (0-10 V) corresponds to 0-VoutMax.
Is/D1	Current analog control: Current voltage setting (0-10 V) corresponds to 0-IoutMax.
D2	External digital control
ON/OFF	External Digital/Analog Control for Power Output ON/OFF High level: Enables the output Low level: Disables the output
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	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-	

2.3 Series/Parallel Operation

UDP5000 series power supplies support external multi-unit combined operation with identical models to increase output power. This includes both external multi-unit parallel and external multi-unit series connections.

Before use, select and configure a master unit and slave units, then connect the analog interfaces using the appropriate cables.

Single-control operation refers to setting one instrument as the master unit, while other identical models function as slave units. The entire system can then be controlled through operations on the master unit.

Single-Control Parallel Operation

Single-control parallel operation increases the output current.

Maximum output current (IoutMax) = Rated output current of power supply x Number of parallel-connected unit.

For example, if three UDP5040-40 models are paralleled, the output current can reach 40 A × 3 = 120 A. The difference in output current between the master unit and slave units must remain within approximately 5% of the rated value.

For single-control parallel operation, the maximum number of identical models that can be paralleled (including the master unit) is as shown in the following table:

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

Single-Control Series Operation

Single-control series operation increases the output voltage.

Maximum output voltage (Voutmax)= Rated output voltage of power supply x Number of series-connected unit.

For example, if two UDP5250-6 models are series-connected, the maximum voltage can reach 250 V x 2=500 V.

Maximum Series-Connected Units: 2

The voltage setting accuracy is equivalent to the single-unit accuracy of the master unit. The difference in output voltage between the master unit and slave units must remain within approximately 5% of the rated value.

Model	Maximum Series-Connected Units
400 W	2 Units
800 W	
1200 W	
2000 W	

4. 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 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

3.1 400 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.

3.2 800 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.

3.3 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.

3.4 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.

3.5 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: 0.1s, 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 four 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.

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