DCS31XX

DC Power Supply

User Manual

V1.01

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MICROTEST is committed to providing customers with a variety of instrument information and services. You can check the latest instrument information on the MICROTEST website：

https://www.microtest.com.tw/

Important notes, please read thoroughly：

1.Before using the DC regulated power supply, please read the user manual thoroughly.

2.For more detailed information, please refer to the user manual of the DC regulated power supply.

3.While we have made every effort to ensure the accuracy of the content at the time of writing this manual, if you find any unclear or incorrect information, please contact the sales and marketing department of MICROTEST. We are always ready to assist you.

4.The specifications and content of this manual are subject to change without prior notice.

5.The content of this manual is protected by copyright. Unauthorized copying, reproduction, or modification of the content is prohibited.

Safety Instructions：

For professional use only： This product is designed for use by personnel with professional knowledge and technical training.

According to IEC standards, this product is classified as a Safety Class I device (equipped with a protective earth terminal).

To prevent electric shock, ensure proper grounding of the equipment before use. The product's safety is guaranteed only when it is correctly grounded.

General safety precautions：

At all stages of operation, you must follow these general safety instructions. Failure to operate the instrument in the manner explicitly described in this manual may compromise its protective functions. The customer shall be fully responsible for any consequences resulting from improper use or failure to comply with these instructions.

Important Information storage：

This manual is an integral part of the product and contains essential safety and operating information. Keep this manual in a secure location near the instrument for quick reference. Ensure the manual is well-preserved and accessible before operating the instrument.

Symbols used in this instrument：

	ON (power)
	OFF (power)
	Start (power) status
	Stop (power) status
	Improper operation or use by the user may result in personal injury or damage to the instrument. This symbol appears on the instrument to indicate that the user must refer to the user manual for specific instructions.
	Indicates actions or conditions that may result in serious or fatal injury to the user, and provides preventive measures that can be taken to avoid such hazards.
	Indicates actions or conditions that may result in minor injury, or cause damage to the instrument or user data, and provides preventive measures that can be taken to avoid such issues.
	Electric shock hazard
	Grounding point of the mains system
	Do not dispose of electronic equipment as unsorted municipal waste. Please use designated collection facilities or contact the supplier from whom the equipment was purchased.
	Indicates that the product complies with the regulations specified by applicable EU directives.
NOTE	Contains useful information and tips.

Safety guidelines WARNING

1. To prevent electric shock or fire, be sure to use the designated power cable. The main power plug must be connected to a socket equipped with a ground terminal.

2. Do not operate the instrument in environments where flammable gases or vapors are present. Doing so is extremely dangerous.
3. Do not place any heavy objects on the instrument, and never apply electrostatic discharge to the device.
4. Only use accessories specifically designed for the DCS series. Do not use any accessories that are exposed or damaged.
5. If the instrument malfunctions, return it to the manufacturer for repair by qualified personnel.
6. Always unplug the power cable before handling the power or load connections.
7. When the discharger is set to "OFF", residual voltage may still remain at the output terminals, even if the output or power switch is turned off.
8. Before touching the output terminals, ensure that no residual voltage is present.
9. Do not use extension cables without a protective ground, and do not share the power cable with other devices.
10. Use the correct power supply. Ensure that the input voltage matches the instrument's rated operating voltage, and does not exceed the maximum voltage or current rating of the power cable.
11. In the event of an emergency, you may immediately disconnect the power by unplugging the power cable.

The DCS Series complies with applicable directives and standards：

| Electromagnetic Compatibility (EMC)[1] [2] | Complies with the requirements of the following directives and standards：

EMC Directive 2014/30/EU

EN61326-1（Class A[3]） / EN55011（Class A[3]，Group 1[4]） / EN61000-3-2

EN61000-3-3

Applicable under the following condition, the total length of all wires and cables connected to this product must not exceed 3 meters.

| Safety[1] | Complies with the requirements of the following directives and standards：

Low voltage directive 2014/35/EU[2]

EN61010-1（Class I[5]，pollution degree 2[6]）

1. Not applicable to custom-made or modified products.
2. Applicable only to products bearing the CE mark. Not applicable if the J1 connector cable is not equipped with a ferrite core.
3. This is a Class A equipment, designed for use in industrial environments. Use in residential areas may cause interference. Such use should be avoided unless the user takes specific measures to suppress electromagnetic emissions to prevent interference with radio and television reception.

4. This is a Group 1 equipment. The product does not generate or intentionally use radio frequency energy (including electromagnetic radiation, inductive, or capacitive coupling) for material treatment or inspection/analysis purposes.
5. This is a Class I equipment. Be sure to properly connect the protective earth terminal. Safety is ensured only when the product is correctly grounded.
6. Pollution refers to the presence of solid, liquid, or gaseous contaminants that may reduce dielectric strength or surface resistance. Pollution Degree 2 assumes only non-conductive pollution occurs, except for occasional temporary conductivity caused by condensation.

This product complies with the IEC overvoltage category II standard for instruments (intended for non-portable equipment powered from fixed installations).

The DCS Series is classified as Class A equipment (Industrial Environment), which means it allows for higher levels of electromagnetic interference. It is suitable for use in industrial settings. Use in residential areas may require additional electromagnetic compatibility measures and can't guarantee immunity from or non-interference with other equipment.

The DCS Series is classified as Group 1 equipment (according to EN 55011 / CISPR 11), meaning that during normal operation, the equipment does not generate or use radio-frequency (RF) energy, or only generates RF energy necessary for internal

functions, and such energy is not used for material treatment or analysis.

Indoor use only, Overvoltage Category II (intended for connection to standard wall outlets or general-purpose power loads.)

Ambient Temperature：

1. Location: Indoor, free from direct sunlight and dust, with virtually no conductive pollution, and at an altitude below 2000 meters.
2. Pollution Degree 2： Indicates that solid, liquid, or gaseous contaminants may be present in the working environment, but only non-conductive pollution is expected. Occasional temporary conductivity caused by condensation is excluded.
3. Operating Temperature Range : 0°C ~ +50°C (32°F ~ 122°F)
4. Operating Humidity Range : 20%rh ~ 85%rh (non-condensing)
5. Storage Temperature and Humidity Range：-25 °C ~ +60 °C (-13 °F ~ 140 °F) , up to 90%RH (non-condensing)

Notes on this manual：

- In this manual, the series of products listed on the cover are collectively referred to as the "DCS Series".
- The term "PC" used in this manual refers collectively to personal computers and workstations.

- The screen display examples shown in this manual may differ from the actual display. Illustrations are for reference only.

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Chapter 1 Product Overview of the DCS Series

The DCS series is a programmable power supply capable of delivering a wide range of voltage and current within its rated output power range. It features automatic switching between Constant Voltage (CV) and Constant Current (CC) modes.

The DCS series is available in 4 models based on output capacity, or 4 versions based on output voltage.

Types	400W model	800W model	1200W model	2000W model
A type (40 V)	DCS3104A	DCS3108A	DCS3112A	DCS3120A
B type (80 V)	DCS3104B	DCS3108B	DCS3112B	DCS3120B
C type (240 V)	DCS3104C	DCS3108C	DCS3112C	DCS3120C
D type (650 V)	DCS3104D	DCS3108D	DCS3112D	DCS3120D

Features：

Communication functions：

Equipped with standard RS-232C, USB, and LAN interfaces.

Communication protocols support the IEEE 488.2 (1992 version) standard and SCPI Specification 1999.0.

The LAN interface allows control of up to 31 DCS series units from a single PC via VMBC, enabling the construction of multi-channel test systems.

Single Control Parallel Operation：

Up to three units of the 1200W model or two units of the 2000W model can be connected in parallel to increase total output current.

A single master unit can simultaneously control all slave units, which automatically follow the master's operation settings.

In the event of a fault in either the master or any slave unit, the system will automatically shut down（OFF） the entire output to ensure safety.

Preset Memory Function：

Supports storage of up to three sets of output settings（Parameters such as voltage, current, OVP, OCP, and UVL）.

No need to reconfigure settings during use; simply select the preset group.

Auto output ON setting：

When AC power is restored after an AC failure (AC-FAIL recovery), the output can be set to either automatically turn ON or remain OFF.

Output ON/OFF delay function：

The ON/OFF delay time at the OUTPUT terminal can be set to enable sequential startup or shutdown of multiple units, preventing inrush current.

Voltage/Current setting limit function：

The voltage and current setting ranges can be restricted to prevent operation beyond the allowable limits. This limit function can be individually enabled or disabled.

Over Current Protection (OCP) hold time setting：

The hold time for OCP can be individually set. After the output current exceeds the set limit, this hold time prevents unnecessary protection activation caused by transient current surges.

Ripple voltage function：

The ripple voltage function can be toggled ON or OFF. When turned OFF, the output voltage remains stable despite changes in output current, making it suitable for simulating transient load conditions. When ON, the OCP takes priority.

Soft start / stop function：

When the output voltage or current suddenly rises or falls, causing the load to be unable to respond immediately, or when the Over Voltage Protection (OVP) / Over Current Protection (OCP) circuits activate, the rise and fall times of voltage and current can be set to prevent sudden surges.

Variable internal resistance function：

Easily simulates power sources with internal resistance, such as secondary batteries, solar cells, fuel cells, and more.

By adjusting the internal resistance based on the set values during Constant Voltage (CV) operation, the output current changes accordingly to emulate voltage drop phenomena.

Sequence function：

According to the programmed conditions, the power output operates automatically in sequence.

Programs created on a PC can be uploaded to the device, and can also be executed directly via the device's front panel.

The device can run programs independently without the need for a computer.

Shortcut key function and display for system configuration settings：

Frequently used system configuration settings can be registered to shortcut keys on the front panel to reduce setup and search time, enhancing operational efficiency.

Up to 3 settings can be registered, allowing quick switching between different test conditions and improving experimental efficiency.

Usage precautions：

This product must not be used in an upright position.

The side handles on the 2000W model are intended only for brief upright holding during transportation.

Do not operate or store the unit in an upright position to avoid the risk of tipping over.

Section 1 Calibration Information

To ensure accurate measurement results within the specified accuracy range, it is recommended to perform calibration once a year.

Section 2 Cleaning

⚠ Warning

Risk of electric shock. Before performing any maintenance, be sure to turn the POWER switch OFF, unplug the power cable from the outlet, and set the distribution panel breaker to OFF.

Air filter cleaning：

The air filter is installed behind the louver on the front panel. Please clean it regularly to prevent clogging.

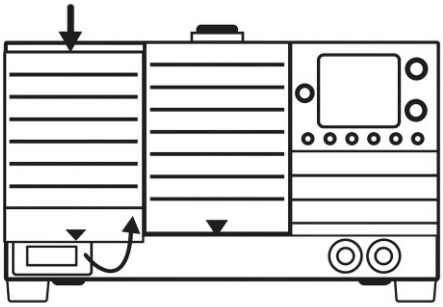
⚠ Cautions

A clogged air filter will reduce the cooling efficiency of this product, which may cause malfunction or shortening the product' lifespan.

During operation, the unit draws in air through the filter for cooling. If moisture is present in the filter, it may increase internal humidity and lead to failure.

Louver air filter cleaning procedure (example: DCS3112A) :

1 Pull forward on the first slot of the lower section of the louver, while simultaneously sliding the entire louver downward to remove it from the panel.

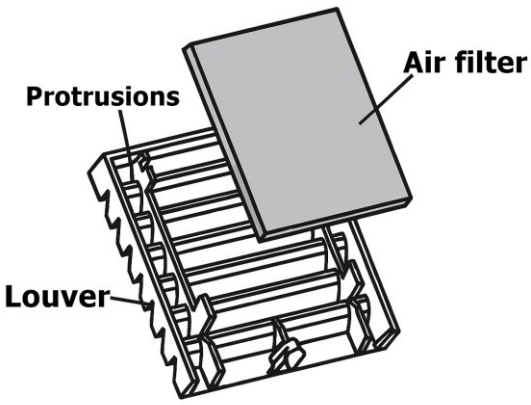


2 Remove the air filter from the inside of the louver and clean it.

Use a vacuum cleaner to remove dust from the filter. If the dust buildup is severe, wash the filter with water diluted with a neutral detergent, and make sure it is completely dry before reinstalling.

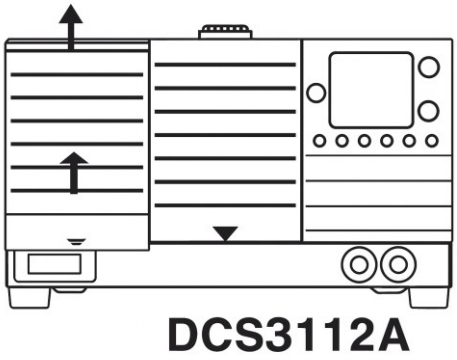
3 Insert the air filter from the top of the louver.

When installing, make sure the filter is properly seated between the protrusions on the left and right sides of the louver.



4 Reinstall the louver onto the panel.

Insert the protrusions on the lower section of the louver into the rear of the unit, then press down at the fourth slot and slide the entire louver upward to secure it onto the panel.



5 The louver below the machine's control section is not removable, please perform cleaning from the top of the louver.

Use a vacuum cleaner or similar tool to remove dust and dirt from the air filter.

Section 3 Maintenance

When the instrument requires repair, please contact MICROTEST for servicing.

Do not attempt to disassemble or replace parts by yourself to avoid any risk of injury.

To ensure the safety of the instrument during transportation, please be sure to follow the precautions below：

Before transportation, please remove all accessories and optional parts from the instrument to prevent damage.

Use the original packaging materials provided at delivery and be sure to perform secondary packaging to ensure additional protection. Please note that we can't be held responsible for damages incurred during transportation.

If you need to send the instrument for repair, clearly describe the fault when submitting it, as this will help us provide better support. Properly maintain your instrument to ensure its safety during transportation and repair.

Chapter 2 Product Specifications

Unless otherwise specified, the specifications of this product apply under the following settings and conditions：

The load is purely resistive.

The warm-up time is 30 minutes.

The specifications apply to the output terminals on the rear panel.

After warming up, the product must be properly calibrated at an ambient temperature of 23 °C ± 5 °C to meet the specified accuracy.

The definitions of the terms used are as follows：

TYP：Representative typical values apply to the product operating at an ambient temperature of 23 °C (73.4 °F). These values do not guarantee product performance.

rating：It refers to the rated value.

reading：It refers to the displayed value.

f.s.：Full scale.

Definition of Rated Load and No Load：

In constant voltage mode (when the output current setting is greater than or equal to the rated current)：

Rated load：It refers to the condition when the rated output voltage is applied to a

resistive load, and the current flowing through reaches 96~100% of the rated current.

No load：Refers to a load with no current flowing at the output, i.e., an open-circuit load.

In constant current mode (when the output voltage setting is greater than or equal to the rated voltage)：

Rated load：It refers to the condition when the rated output current flows through a resistive load, and the output voltage drops to 85~100% of the rated value.

Under conditions including wiring voltage drops, the output voltage of the DCS series shall not be lower than 90% of the rated output voltage.

No load：Refers to the condition when the output voltage drops more than 10% below the rated value or falls below 1 V (whichever is higher) while the rated output current is flowing through the load.

Additional definitions：

Rise time：The time required for the output voltage or current to rise from 10~90% (measured from the moment the output is turned on).

Fall time：The time required for the output voltage or current to fall from 90~10% (measured from the moment the output is turned off).

The DCS series can operate across a wide range of output voltages and currents, provided that the total power does not exceed the rated output power. However,

when the voltage reaches the maximum output, the current will be limited; similarly, when the current reaches the maximum output, the voltage will also be limited.

The maximum current and voltage at full load output are as follows：

Maximum output current = Rated output power / Rated output voltage

Maximum output voltage = Rated output power / Rated output current

Section 1 Specifications for 400W Model

This section provides the specific specifications for the 400W model.

For the common specifications applicable to all models（such as protection features, signal output and input, control functions, other features, operating display, interfaces, and general specifications）, please refer to the "Common Specifications" section.

AC input

		DCS3104A	DCS3104B	DCS3104C	DCS3104D
Rated input voltage		100~240 Vac, 50~60 Hz, single-phase			
Input voltage range		85~265 Vac			
Input frequency range		47~63 Hz			
Current(typical)[1]	100 Vac	5.6 A			
	200 Vac	2.8 A			
Inrush current		Below 25 A			
Maximum power[2]		560 VA			
Power factor (typical)[1]		0.99（input voltage：100 V）, 0.97（input voltage：200 V）			
Efficiency (typical)[1]		75 %			
Output hold-up time[2]		20 ms or more			

*1 Measured under rated output power and current conditions.

*2 Measured at 100 Vac with output power under rated conditions.

Output

			DCS3104A	DCS3104B	DCS3104C	DCS3104D
Rated value	Output voltage[1]		40 V	80 V	240 V	650 V
	Output current[1]		40 A	20 A	5 A	1.85 A
	Output power		400 W			
Voltage	Adjustable maximum voltage[2]		42 V	84 V	252 V	682.5 V
	Setting accuracy		± (0.05% setting value + 0.05% rated value)			
	Resolution		200 mV	400 mV	1000 mV	2500 mV
	Use the FINE function	OFF	10 mV		100 mV	
		ON	1 mV		10 mV	
	Use the communication interface		0.1 mV			
	Dynamic compensation (line)[3]		±6 mV	±10 mV	±26 mV	±67 mV
	Dynamic compensation(load)[4]		±6mV	±10 mV	±26 mV	±67 mV
	Transient response[5]		Below 1 ms	Below 2 ms	Below 2 ms	Below 3 ms
	Ripple noise[6]	p-p[7]	50 mV		100 mV	300 mV
		rms[8]	5 mV		20 mV	50 mV
	Rise time	Full load	Below 50 ms		Below 100 ms	
		No load	Below 50 ms		Below 100 ms	
	Fall time[9]	Full load	Below 50 ms		150 ms	250 ms
		No load	Below 500 ms		1200 ms	2000 ms
	Remote sense compensation voltage (single-wire)		1.5 V	4 V	5 V	
	Temperature coefficient[10]		100 ppm/°C			
Current	Adjustable maximum current[2]		42 A	21 A	5.25 A	1.9425 A
	Setting accuracy[11]		± (0.5% setting value + 0.1% rated value)			
	Resolution		200 mA	100 mA	20 mA	10 mA
	Use the FINE function	OFF	10 mA		1 mA	
		ON	1 mA		0.1 mA	
	Use the communication interface		0.1 mA			

	Dynamic compensation (line)		±6 mA	±4 mA	±2.5 mA	±2.2 mA
	Dynamic compensation (load)		±13 mA	±9 mA	±6 mA	±5.4 mA
	Ripple noise[12]	rms[8]	80mA	40mA	12 mA	6 mA
	Rise time	Full load	50 ms		100 ms	
	Fall time	Full load	50 ms		100 ms	
	Temperature coefficient[10]		100 ppm/°C			
Adjustable maximum internal resistance			1.000 Ω	4.000 Ω	36.00 Ω	263.5 Ω

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

*2 They can be limited to approximately 95% of the OVP (Over Voltage Protection) or OCP (Over Current Protection) set points.

*3 The input voltage ranges from 85~135 Vac, or from 170~265 Vac, with a fixed load.

*4 The variation when the load changes from no load to full load (rated output power ÷ rated output voltage) is measured at the rated output voltage and at the sensing point.

*5 The time required for the output voltage to recover to "rated output voltage ± (0.1% + 10 mV)". The load current varies from 50~100% of the maximum current, and the test is performed at the set voltage.

*6 Measurement is performed using the RC-9131C probe, compliant with JEITA standards, with the current being the rated output current during measurement.

*7 Measurement bandwidth is from 10Hz~20MHz.

*8 Measurement bandwidth is from 10Hz~1MHz.

*9 When the bleeder circuit is set to standard mode.

*10 When the ambient temperature is between 0°C and 50°C.

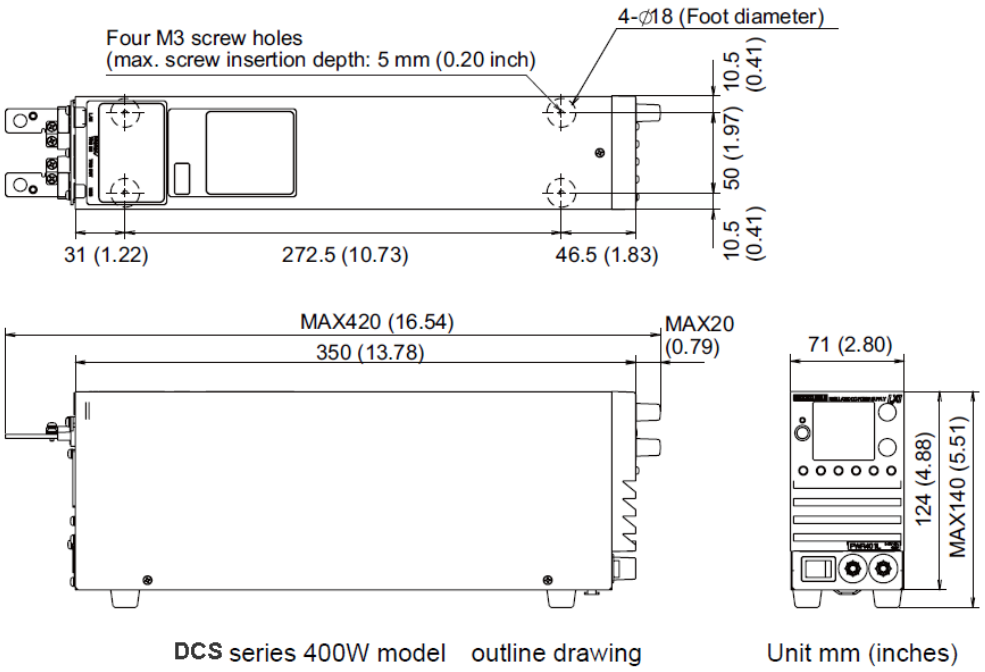
*11 Applicable to the range of 1~100% of rated current. TYP (0.1% of rated value) is applicable to the range of 0~1%.

*12 When the output voltage is between 10% and 100% of the rated value, measurement is taken at the rated output current.

Display function

		DCS3104A	DCS3104B	DCS3104C	DCS3104D
Voltage	Maximum display value	99.99		999.9	
	Display accuracy	± (0.2% of the reading + 5 digits)			
Current	Maximum display value	99.99		9.999	
	Display accuracy	± (0.5% of the reading + 8 digits)			
Power display		PWR DSPL the red LED lights up			
Power	Maximum display value	9999			
	Display accuracy	Displays the product of voltage and current. The display alternates between voltage and current.			

Product image



DCS series 400W model outline drawing

Unit mm (inches)

Section 2 Specifications for 800W Model

This section provides the specifications for the 800W model.

For the common specifications applicable to all models（such as protection features, signal output and input, control functions, other features, operating display, interfaces, and general specifications）, please refer to the "Common Specifications" section.

AC input

		DCS3108A	DCS3108B	DCS3108C	DCS3108D
Rated input voltage		100~240 Vac, 50~60 Hz, single-phase			
Input voltage range		85~265 Vac			
Input frequency range		47~63 Hz			
Current(typical)[1]	100 Vac	11.2 A			
	200 Vac	5.6A			
Inrush current		Below 50 A			
Maximum power[2]		1120 VA			
Power factor (typical)[1]		0.99（input voltage：100 V）, 0.97（input voltage：200 V）			
Efficiency (typical)[1]		75 %			
Output hold-up time[2]		20 ms or more			

*1 Measured under rated output power and current conditions.

*2 Measured at 100 Vac with output power under rated conditions.

Output

			DCS3108A	DCS3108B	DCS3108C	DCS3108D
Rated value	Output voltage[1]		40 V	80 V	240 V	650 V
	Output current[1]		80 A	40 A	10 A	3.70 A
	Output power		800 W			
Voltage	Adjustable maximum voltage[2]		42 V	84 V	252 V	682.5 V
	Setting accuracy		± (0.05% setting value + 0.05% rated value)			
	Resolution		200 mV	400 mV	1000 mV	2500 mV
	Use the FINE function	OFF	10 mV		100 mV	
		ON	1 mV		10 mV	
	Use the communication interface		0.1 mV			
	Dynamic compensation(line)[3]		±6 mV	±10 mV	±26 mV	±67 mV
	Dynamic compensation(load)[4]		±6mV	±10 mV	±26 mV	±67 mV
	Transient response[5]		Below 1 ms	Below 2 ms	Below 2 ms	Below 3 ms
	Ripple noise[6]	p-p[7]	50 mV		100 mV	300 mV
		rms[8]	5 mV		20 mV	50 mV
	Rise time	Full load	Below 50 ms		Below 100 ms	
		No load	Below 50 ms		Below 100 ms	
	Fall time[9]	Full load	Below 50 ms		150 ms	250 ms
		No load	Below 500 ms		1200 ms	2000 ms
	Remote sense compensation voltage(single-wire)		1.5 V	4 V	5 V	
	Temperature coefficient[10]		100 ppm/°C			
Current	Adjustable maximum current[2]		84 A	42 A	10.5 A	3.885 A
	Setting accuracy[11]		± (0.5% setting value + 0.1% rated value)			
	Resolution		400 mA	200 mA	40 mA	20 mA
	Use the FINE function	OFF	10 mA		10 mA	1 mA
		ON	1 mA		1 mA	0.1 mA
	Use the communication interface		0.1 mA			

	Dynamic compensation(line)		±10 mA	±6 mA	±3 mA	±2.4 mA
	Dynamic compensation(load)		±21 mA	±13 mA	±7.0 mA	±5.7 mA
	Ripple noise[12]	rms[8]	160mA	80mA	24 mA	12 mA
	Rise time	Full load	50 ms		100 ms	
	Fall time	Full load	50 ms		100 ms	
	Temperature coefficient[10]		100 ppm/°C			
Adjustable maximum internal resistance			0.500 Ω	2.000 Ω	18.00 Ω	131.8 Ω

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

*2 They can be limited to approximately 95% of the OVP (Over Voltage Protection) or OCP (Over Current Protection) set points.

*3 The input voltage ranges from 85~135 Vac, or from 170~265 Vac, with a fixed load.

*4 The variation when the load changes from no load to full load (rated output power ÷ rated output voltage) is measured at the rated output voltage and at the sensing point.

*5 The time required for the output voltage to recover to "rated output voltage ± (0.1% + 10 mV)". The load current varies from 50~100% of the maximum current, and the test is performed at the set voltage.

*6 Measurement is performed using the RC-9131C probe, compliant with JEITA standards, with the current being the rated output current during measurement.

*7 Measurement bandwidth is from 10Hz~20MHz.

*8 Measurement bandwidth is from 10Hz~1MHz.

*9 When the bleeder circuit is set to standard mode.

*10 When the ambient temperature is between 0°C and 50°C.

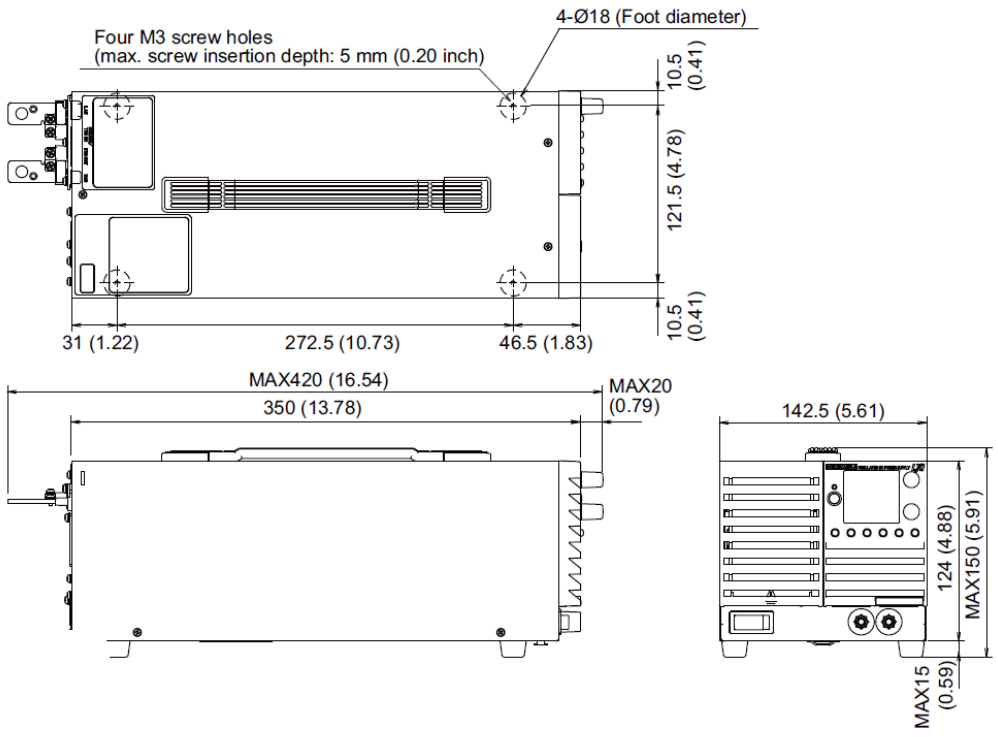
*11 Applicable to the range of 1~100% of rated current. TYP (0.1% of rated value) is applicable to the range of 0~1%.

*12 When the output voltage is between 10% and 100% of the rated value, measurement is taken at the rated output current.

Display function

		DCS3108A	DCS3108B	DCS3108C	DCS3108D
Voltage	Maximum display value	99.99		999.9	
	Display accuracy	± (0.2% of the reading + 5 digits)			
Current	Maximum display value	99.99		9.999	
	Display accuracy	± (0.5% of the reading + 8 digits)			
Power display		PWR DSPL the red LED lights up			
Power	Maximum display value	9999			
	Display accuracy	Displays the product of voltage and current. The display alternates between voltage and current.			

Product image



DCS series 800W model outline drawing Unit mm (inches)

Section 3 Specifications for 1200W Model

This section provides the specifications for the 1200W model.

For the common specifications applicable to all models（such as protection features, signal output and input, control functions, other features, operating display, interfaces, and general specifications）, please refer to the "Common Specifications" section.

AC input

		DCS3112A	DCS3112B	DCS3112C	DCS3112D
Rated input voltage		100~240 Vac, 50~60 Hz, single-phase			
Input voltage range		85~265 Vac			
Input frequency range		47~63 Hz			
Current(typical)[1]	100 Vac	16.8 A			
	200 Vac	8.4 A			
Inrush current		Below 75 A			
Maximum power[2]		1680 VA			
Power factor (typical)[1]		0.99（input voltage：100 V）, 0.97（input voltage：200 V）			
Efficiency (typical)[1]		75 %			
Output hold-up time[2]		20 ms or more			

*1 Measured under rated output power and current conditions.

*2 Measured at 100 Vac with output power under rated conditions.

Output

			DCS3112A	DCS3112B	DCS3112C	DCS3112D
Rated value	Output voltage[1]		40 V	80 V	240 V	650 V
	Output current[1]		120 A	60 A	15.0 A	5.55 A
	Output power		1200 W			
Voltage	Adjustable maximum voltage[2]		42 V	84 V	252 V	682.5 V
	Setting accuracy		± (0.05% setting value + 0.05% rated value)			
	Resolution		200 mV	400 mV	1000 mV	2500 mV
	Use the FINE function	OFF	10 mV		100 mV	
		ON	1 mV		10 mV	
	Use the communication interface		0.1 mV			
	Dynamic compensation(line)[3]		±6 mV	±10 mV	±26 mV	±67 mV
	Dynamic compensation(load)[4]		±6mV	±10 mV	±26 mV	±67 mV
	Transient response[5]		Below 1 ms	Below 2 ms	Below 2 ms	Below 3 ms
	Ripple noise[6]	p-p[7]	50 mV		100 mV	300 mV
		rms[8]	5 mV		20 mV	50 mV
	Rise time	Full load	Below 50 ms		Below 100 ms	
		No load	Below 50 ms		Below 100 ms	
	Fall time[9]	Full load	Below 50 ms		150 ms	250 ms
		No load	Below 500 ms		1200 ms	2000 ms
	Remote sense compensation voltage(single-wire)		1.5 V	4 V	5 V	
	Temperature coefficient[10]		100 ppm/°C			
Current	Adjustable maximum current[2]		126A	63 A	15.75 A	5.8275 A
	Setting accuracy[11]		± (0.5% setting value + 0.1% rated value)			
	Resolution		600 mA	300 mA	60 mA	30 mA
	Use the FINE function	OFF	100 mA	10 mA		1 mA
		ON	10 mA	1 mA		0.1 mA
	Use the communication interface		0.1 mA			

	Dynamic compensation(line)		±14 mA	±8 mA	±3.5 mA	±2.6 mA
	Dynamic compensation(load)		±29 mA	±17 mA	±8.0 mA	±6.1 mA
	Ripple noise[12]	rms[8]	240mA	120mA	36 mA	18 mA
	Rise time	Full load	50ms		100ms	
	Fall time	Full load	50ms		100ms	
	Temperature coefficient[10]		100 ppm/°C			
Adjustable maximum internal resistance			0.333Ω	1.333 Ω	12.00 Ω	87.84 Ω

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

*2 They can be limited to approximately 95% of the OVP (Over Voltage Protection) or OCP (Over Current Protection) set points.

*3 The input voltage ranges from 85~135 Vac, or from 170~265 Vac, with a fixed load.

*4 The variation when the load changes from no load to full load (rated output power ÷ rated output voltage) is measured at the rated output voltage and at the sensing point.

*5 The time required for the output voltage to recover to "rated output voltage ± (0.1% + 10 mV)". The load current varies from 50~100% of the maximum current, and the test is performed at the set voltage.

*6 Measurement is performed using the RC-9131C probe, compliant with JEITA standards, with the current being the rated output current during measurement.

*7 Measurement bandwidth is from 10Hz~20MHz.

*8 Measurement bandwidth is from 10Hz~1MHz.

*9 When the bleeder circuit is set to standard mode.

*10 When the ambient temperature is between 0°C and 50°C.

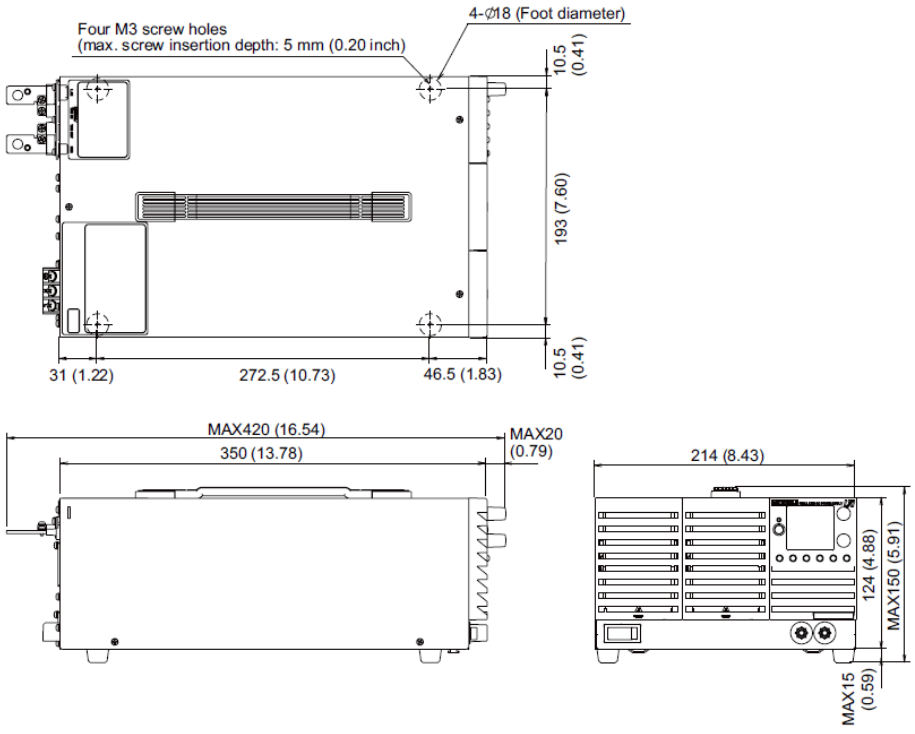
*11 Applicable to the range of 1~100% of rated current. TYP (0.1% of rated value) is applicable to the range of 0~1%.

*12 When the output voltage is between 10% and 100% of the rated value, measurement is taken at the rated output current.

Display function

		DCS3112A	DCS3112B	DCS3112C	DCS3112D
Voltage	Maximum display value	99.99		999.9	
	Display accuracy	± (0.2% of the reading + 5 digits)			
Current	Maximum display value	999.9	99.99		9.999
	Display accuracy	± (0.5% of the reading + 8 digits)			
Power display		PWR DSPL the red LED lights up			
Power	Maximum display value	9999			
	Display accuracy	Displays the product of voltage and current. The display alternates between voltage and current.			

Product image



DCS series 1200W model outline drawing Unit mm (inches)

Section 4 Specifications for 2000W Model

This section describes the specific specifications for the 2000W model.

For the common specifications applicable to all models（such as protection features, signal output and input, control functions, other features, operating display, interfaces, and general specifications）, please refer to the "Common Specifications" section.

AC input

		DCS3120A	DCS3120B	DCS3120C	DCS3120D
Rated input voltage		100~240 Vac, 50~60 Hz, single-phase			
Input voltage range		85~265 Vac			
Input frequency range		47~63 Hz			
Current(typical)[1]	100 Vac	28.0 A			
	200 Vac	14.0A			
Inrush current		Below 125A			
Maximum power[2]		2800 VA			
Power factor (typical)[1]		0.99（input voltage：100 V）, 0.97（input voltage：200 V）			
Efficiency (typical)[1]		75 %			
Output hold-up time[2]		20ms or more			

*1 Measured under rated output power and current conditions.

*2 Measured at 100 Vac with output power under rated conditions.

Output

<table>
<tr><td colspan="3"></td><td>DCS3120A</td><td>DCS3120B</td><td>DCS3120C</td><td>DCS3120D</td></tr>
<tr><td rowspan="3">Rated value</td><td colspan="2">Output voltage[1]</td><td>40 V</td><td>80 V</td><td>240 V</td><td>650 V</td></tr>
<tr><td colspan="2">Output current[1]</td><td>200A</td><td>100 A</td><td>25.0 A</td><td>9.25 A</td></tr>
<tr><td colspan="2">Output power</td><td colspan="4">2000 W</td></tr>
<tr><td rowspan="14">Voltage</td><td colspan="2">Adjustable maximum voltage[2]</td><td>42 V</td><td>84 V</td><td>252 V</td><td>682.5 V</td></tr>
<tr><td colspan="2">Setting accuracy</td><td colspan="4">± (0.05% setting value + 0.05% rated value)</td></tr>
<tr><td colspan="2">Resolution</td><td>200 mV</td><td>400 mV</td><td>1000 mV</td><td>2500 mV</td></tr>
<tr><td rowspan="2">Use the FINE function</td><td>OFF</td><td colspan="2">10 mV</td><td colspan="2">100 mV</td></tr>
<tr><td>ON</td><td colspan="2">1 mV</td><td colspan="2">10 mV</td></tr>
<tr><td colspan="2">Use the communication interface</td><td colspan="4">0.1 mV</td></tr>
<tr><td colspan="2">Dynamic compensation(line)[3]</td><td>±6 mV</td><td>±10 mV</td><td>±26 mV</td><td>±67 mV</td></tr>
<tr><td colspan="2">Dynamic compensation(load)[4]</td><td>±6mV</td><td>±10 mV</td><td>±26 mV</td><td>±67 mV</td></tr>
<tr><td colspan="2">Transient response[5]</td><td>Below 1ms</td><td>Below 2ms</td><td>Below 2ms</td><td>Below 3ms</td></tr>
<tr><td rowspan="2">Ripple noise[6]</td><td>p-p[7]</td><td>50 mV</td><td>70 mV</td><td>120 mV</td><td>350 mV</td></tr>
<tr><td>rms[8]</td><td colspan="2">5 mV</td><td>20 mV</td><td>50 mV</td></tr>
<tr><td rowspan="2">Rise time</td><td>Full load</td><td colspan="2">Below 50 ms</td><td colspan="2">Below 100 ms</td></tr>
<tr><td>No load</td><td colspan="2">Below 50 ms</td><td colspan="2">Below 100 ms</td></tr>
<tr><td rowspan="2">Fall time[9]</td><td>Full load</td><td colspan="2">Below 50 ms</td><td>Below 150 ms</td><td>Below 250 ms</td></tr>
<tr><td>No load</td><td colspan="2">Below 500 ms</td><td>Below 1200 ms</td><td>Below 2000 ms</td></tr>
<tr><td colspan="2">Remote sense compensation voltage(single-wire)</td><td>1.5 V</td><td>4 V</td><td colspan="2">5 V</td></tr>
<tr><td colspan="2">Temperature coefficient[10]</td><td colspan="4">100 ppm/°C</td></tr>
<tr><td rowspan="4">Current</td><td colspan="2">Adjustable maximum current[2]</td><td>210A</td><td>105 A</td><td>26.25 A</td><td>9.7125 A</td></tr>
<tr><td colspan="2">Setting accuracy[11]</td><td colspan="4">± (0.5% setting value + 0.1% rated value)</td></tr>
<tr><td colspan="2">Resolution</td><td>1000 mA</td><td>500 mA</td><td>100 mA</td><td>50 mA</td></tr>
<tr><td rowspan="2">Use the FINE function</td><td>OFF</td><td colspan="2">100 mA</td><td colspan="2">10 mA</td></tr>
<tr><td>ON</td><td colspan="2">10 mA</td><td colspan="2">1 mA</td></tr>
</table>

	Use the communication interface		0.1 mA			
	Dynamic compensation(line)		±22 mA	±12 mA	±4.5 mA	±2.9 mA
	Dynamic compensation(load)		±45 mA	±25 mA	±10.0 mA	±6.9 mA
	Ripple noise[12]	rms[8]	400mA	200mA	60 mA	30 mA
	Rise time	Full load	50ms		100ms	
	Fall time	Full load	50ms		100ms	
	Temperature coefficient[10]		100 ppm/°C			
Adjustable maximum internal resistance			0.200 Ω	0.800 Ω	7.200 Ω	52.70 Ω

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

*2 They can be limited to approximately 95% of the OVP (Over Voltage Protection) or OCP (Over Current Protection) set points.

*3 The input voltage ranges from 85~135 Vac, or from 170~265 Vac, with a fixed load.

*4 The variation when the load changes from no load to full load (rated output power ÷ rated output voltage) is measured at the rated output voltage and at the sensing point.

*5 The time required for the output voltage to recover to "rated output voltage ± (0.1% + 10 mV)". The load current varies from 50~100% of the maximum current, and the test is performed at the set voltage.

*6 Measurement is performed using the RC-9131C probe, compliant with JEITA standards, with the current being the rated output current during measurement.

*7 Measurement bandwidth is from 10Hz~20MHz.

*8 Measurement bandwidth is from 10Hz~1MHz.

*9 When the bleeder circuit is set to standard mode.

*10 When the ambient temperature is between 0°C and 50°C.

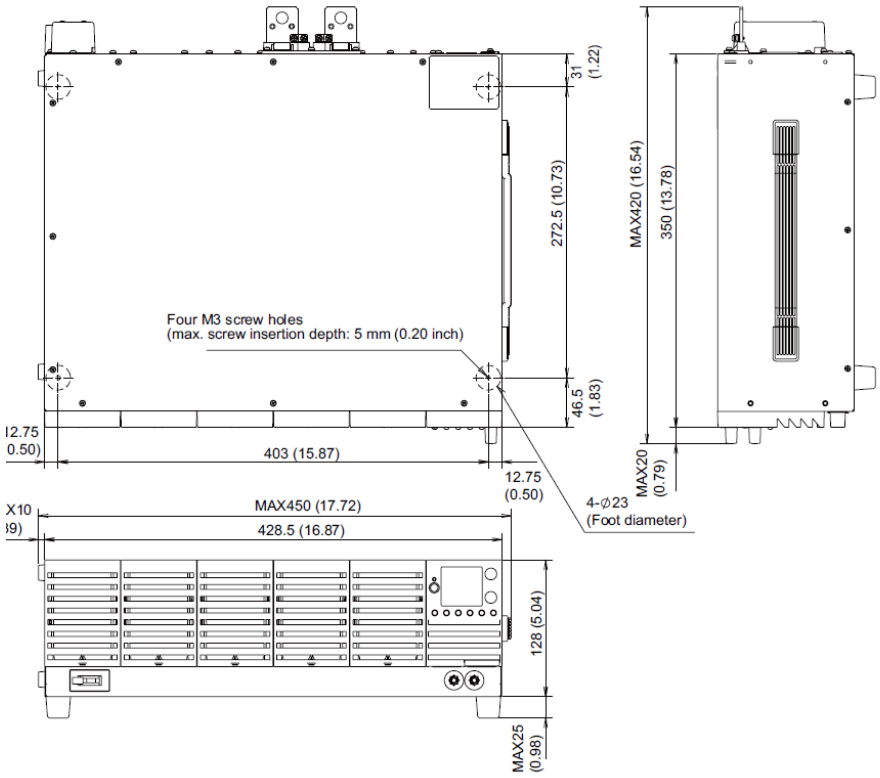
*11 Applicable to the range of 1~100% of rated current. TYP (0.1% of rated value) is applicable to the range of 0~1%.

*12 When the output voltage is between 10% and 100% of the rated value, measurement is taken at the rated output current.

Display function

		DCS3120A	DCS3120B	DCS3120C	DCS3120D
Voltage	Maximum display value	99.99		999.9	
	Display accuracy	± (0.2% of the reading + 5 digits)			
Current	Maximum display value	999.9		99.99	
	Display accuracy	± (0.5% of the reading + 8 digits)			
Power display		PWR DSPL the red LED lights up			
Power	Maximum display value	9999			
	Display accuracy	Displays the product of voltage and current. The display alternates between voltage and current.			

Product image



DCS series 2000W model outline drawing Unit mm (inches)

Section 5 Common Specifications

Protection functions

Function Name	Description (Common)
Over Voltage Protection (OVP)	Closes the output[1], displays OVP, and lights up the ALM indicator.
Setting Range	10 ~ 112% of the rated output voltage.
Setting Accuracy	± (1.5% of the rated value)
Over Current Protection (OCP)[2]	Closes the output[1], displays OCP, and lights up the ALM indicator.
Setting Range	10 ~ 112% of the rated output current.
Setting Accuracy	± (3% of the rated value)
Front Panel Output Terminal Over Current Protection (FOCP)[3]	Closes the output[1], displays FOCP, and lights up the ALM indicator.
Value (fixed)	11 A (typical value)
Under Voltage Limitation (UVL)	Can't be set to less than or equal to the currently set voltage.
Setting Range	0% ~ 105% of the rated output voltage.
Overheat Protection (OHP)	Closes the output, displays OHP, and lights up the ALM indicator.
Incorrect sensing connection protection (SENSE)	Closes the output, displays SENS, and lights up the ALM indicator.
Low AC Input Protection (AC-FAIL)	Closes the output[4], displays AC, and lights up the ALM indicator.
Shut Down (SD)	Closes the output[1], displays SD, and lights up the ALM indicator.
POWER LIMIT	ALM flashes.
Value (fixed)	Approximately 105% of the rated output power.
Communication Monitoring (Watchdog)	Closes the output, displays WDOG, and lights up the ALM indicator.
Master-Slave Parallel Operation Protection (PRL ALM)	Closes the output[1], displays PRL, and lights up the ALM indicator.

*1 On the 2000W model, the output will be turned off or the circuit breaker will trip.

*2 This protection feature does not protect against current peaks released by capacitors during sudden load changes. This current is generated by the output capacitors of the PWR-01 and occurs when there is a drastic load change.

*3 This is only provided on models where the maximum adjustable current is 11A or higher. If the

OCP (Over Current Protection) setting is lower than the FOCP (Front Output Current Protection) setting, the OCP will take precedence.

*4 After the alarm cause is cleared, it is optional whether to automatically restore the output.

Signal output and input

		Common
Monitoring signal output	Voltage Monitor (VMON)	Selectable monitoring voltage range：0~5 V or 0~10 V
	Setting accuracy	2.5% of Full Scale[1]
	Current Monitor (IMON)	Selectable monitoring voltage range：0~5 V or 0~10 V
	Setting accuracy	2.5% of full scale[1]
Status signal output[2]	Output (OUTON) status	Lights up when the output is activated.
	Constant Voltage (CV) status	Lights up when the CV is activated.
	Constant Current (CC) status	Lights up when the CC is activated.
	ALARM STATUS	Lights up when an error alarm occurs.
	POWER ON STATUS	Lights up when the power is turned on.
Trigger signal	Input (TRG IN)	Logic selection：LOW（0~1.5 V）, HIGH（3.5～5 V） input resistant：10kΩ（typical value）
	Output (TRG OUT)	Logic selection：LOW（0～0.6 V）, HIGH（4.2~5 V） Pulse width：100μs（typical value）

*1 f.s.（full scale）refers to the full-scale value of the selected range.

If the 10 V range is selected, the full scale is 10 V.

If the 5 V range is selected, the full scale is 5 V.

*2 Photocoupler open collector output

Maximum voltage： 30 V

Maximum current（sink）：8 mA

Provides electrical isolation between the output and control circuits.

The common ground of the status signal is floating (can withstand voltage ≤ 60 V).

There is no isolation between the various status signals.

Control functions

		Common
External control	Output voltage control (VPGM)	0 ~ 100% of rated output voltage Selectable control voltage range：0 ~ 5 V or 0 ~ 10 V
	Accuracy	5% of the rated value
	Output current control (IPGM)	0 ~ 100% of rated output current Selectable control voltage range：0 ~ 5 V or 0 ~ 10 V
	Accuracy	5% of the rated value
	Output on/ off Control (OUTPUT ON/OFF CONT)	Selectable logic： Set to LOW（0 ~ 0.5 V） or the output is enabled when shorted； Set to HIGH（4.5 V or 5 V）or the output is disabled when opened. Reverse logic is also possible： HIGH（4.5 V or 5 V）or the output is enabled when opened； LOW（0 ~ 0.5 V）or the output is disabled when shorted.
	Output Shutdown Control (SHUT DOWN)	Set to LOW（0 ~ 0.5 V）or the output is disabled when opened.
	Alarm Clear Control (ALM CLR)	Set to LOW（0 ~ 0.5 V）or alarm is cleared when shorted.

Other functions

		400W model	800W model	1200W model	2000W model
Output on/off delay		Setting range：0.0 seconds, 0.5 ~ 99.9 seconds[1] Resolution：0.1 seconds			
Soft start and soft stop		Setting range：0.0 seconds, 0.5 ~ 10.0 seconds[1] Resolution：0.1 seconds			
Over Current Protection (OCP) activation delay		Setting range：0.0 ~ 2.0 seconds[1] Resolution：0.1 seconds			
Default memory		Up to three preset values can be saved, including：voltage setting value, current setting value, OVP, OCP, UVL			
Key lock		Lock all control keys except the OUTPUT key			
CONFIG shortcut		Up to three sets of CONFIG parameters can be registered to the SC1, SC2, and SC3 keys			
Sequence		Number of programs：1 Number of steps：64 Number of repetitions：1 ~ 99998, INFinity Configurable interval loop count：16 Interval loop range：2 ~ 99998 Step time：0.1 ~ 100 seconds（applicable to conversion and slope）			
Synchronized Operation		Synchronous voltage/current setting and execution and recovery of step sequences			
Master-slave parallel operation[2]		Up to three units（same model）including the master unit		Up to two units（same model）including the master unit	
Series operation[3]		2 units（same model）in series operation			
Multichannel（VMCB）	Connection between the main unit and PC	LAN、USB、RS232C			
	Connection with the slave	LAN			

*1 Factory default value is 0.0 seconds.

*2 The current difference between the master and the slave is 5% (typical value).

*3 Not applicable to models D

Operation display

	Common
Output ON/OFF	The output LED lights up green when the output is activated.
Output on/off delay	The "DLY" indicator lights up when set, and blinks when in progress. When output delay is activated, the OUTPUT LED blinks orange. When output delay is deactivated, the OUTPUT LED blinks green.
Soft start and soft stop	The 'SS' indicator lights up when set, and blinks when in progress. When soft start is in progress, the OUTPUT LED lights up green. When soft stop is in progress, the OUTPUT LED blinks green.
Constant Voltage (CV) operation	CV LED turns green.
Constant Current (CC) operation	CC LED turns green.
Alarm operation	When protection function is activated, the ALM LED lights up red. When power limit is activated, the ALM LED blinks red. When protection is activated during output, the OUTPUT LED blinks orange.
Preset memory	When saving or calling preset memory, the PRESET A, B, or C LED lights up green.
Key lock operation	When the LOCK LED lights up green, it indicates that the keys are locked.
Remote operation	When remote control is active, the REMOTE LED lights up green.
LAN operation	Depending on the status, the LAN LED lights up or blinks as follows： No error：Green light stays on Error：Green light blinks Standby：Orange light stays on WEB authentication：Green light blinks
Bleeder Circuit (HB)	When setting the bleeder circuit, the HB LED lights up.

Variable Internal Resistance (VIR)	When setting the VIR, the VIR LED lights up.
Sequence	When executing a sequence, the SEQ LED lights up; when waiting for trigger, the SEQ LED blinks.

Interface

		Common
Common specifications	Software Protocol	IEEE standard 488.2-1992
	Command Language	Compliant with SCPI Standard 1999.0
RS232C	Hardware	Compliant with EIA232D standard（excluding connectors） RJ-45 male connector[1] Baud rate：1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps Data length：8 bits, stop bits: 1 bit, no parity No flow control
	Program Message Terminator	LF for receiving, CR/LF for transmitting
USB	Hardware	Compliant with USB 2.0 standard, data transfer rate：480 Mbps（High Speed） Type B Connector
	Program Message Terminator	LF or EOM for receiving, LF + EOM for transmitting
	Device Class	Compliant with USBTMC-USB488 device class specification
LAN	Hardware	IEEE 802.3 100Base-TX / 10Base-T Ethernet IPv4，RJ-45 connector[2]
	Communication Protocol	VXI-11、SCPI-RAW、HiSLIP
	Program Message Terminator	VXI-11、HiSLIP： LF or END for receiving, for transmitting SCPI-RAW： Both receive and transmit are LF

*1 TL-DS0005 adapter cable is an optional accessory.

*2 Use Category 5 straight cable.

General specification

		400W model	800W model	1200W model	2000W model
Weight（only main unit）		About 3kg (6.61lb)	About 5.5kg (12.13lb)	About 7.5kg (16.53lb)	About 13kg (28.66lb)
Physical Dimensions		Please refer to the product image			
Environmental Conditions	Operating Environment	For indoor use, overvoltage category II			
	Operating Temperature	0~50 °C（32 ~ 122 °F）			
	Operating Humidity	20 ~ 85 %rh（No condensation）			
	Storage Temperature	-25 °C ~ +60 °C（-13 °F ~ +140 °F）			
	Storage Humidity	Below 90 %rh（No condensation）			
	Altitude	Up to 2000 m			
Cooling Method		Forced air cooling with fan			
Grounding Polarity		Can be connected to negative or positive ground			
Insulation Voltage		Type A / B / C：±500 Vmax Type D：±800 Vmax			
With standing voltage	Across the primary circuit and chassis	1500 Vac, no abnormalities for 1 minute			
	Across the primary and secondary circuits	Type A / B / C：1650 Vac Type D：1900 Vac, no abnormalities for 1 minute			
	Across the secondary circuit and chassis	Type A / B / C：2300 Vdc Type D：2640 Vdc, no abnormalities for 1 minute			
Insulation Resistance	Across the primary circuit and chassis	Below 100 MΩ（below 70 %rh）@ 500 Vdc			

	Across the primary and secondary circuits	Type A/B/C：Above 100 MΩ(below 70 %rh)@ 500 Vdc Type D：Above 100 MΩ(below 70 %rh)@ 1000 Vdc
	Across the secondary circuit and chassis	Type A/B/C：Above 40 MΩ(below 70 %rh)@ 500 Vdc Type D：Above 40 MΩ(below 70 %rh)@ 1000 Vdc
Accessories		Please refer to page 48.
Electromagnetic Compatibility（EMC）[1][2]		Compliant with the following directives and standards： EMC directive 2014/30/EU EN61326-1（Class A[3]） EN55011（Class A.[3], Group 1[4]） EN61000-3-2 EN61000-3-3 Under applicable conditions The maximum connection cable length is less than 3 m.
Safety[1]		Compliant with the following directives and standards： Low voltage directive 2014/35/EU[2] EN61010-1（Class I[5], pollution degree 2[6]）

*1 Not applicable to specially customized or modified products.

*2 Only applicable to products with the CE mark. Not applicable if the cable is not connected to the J1 connector using a ferrite core.

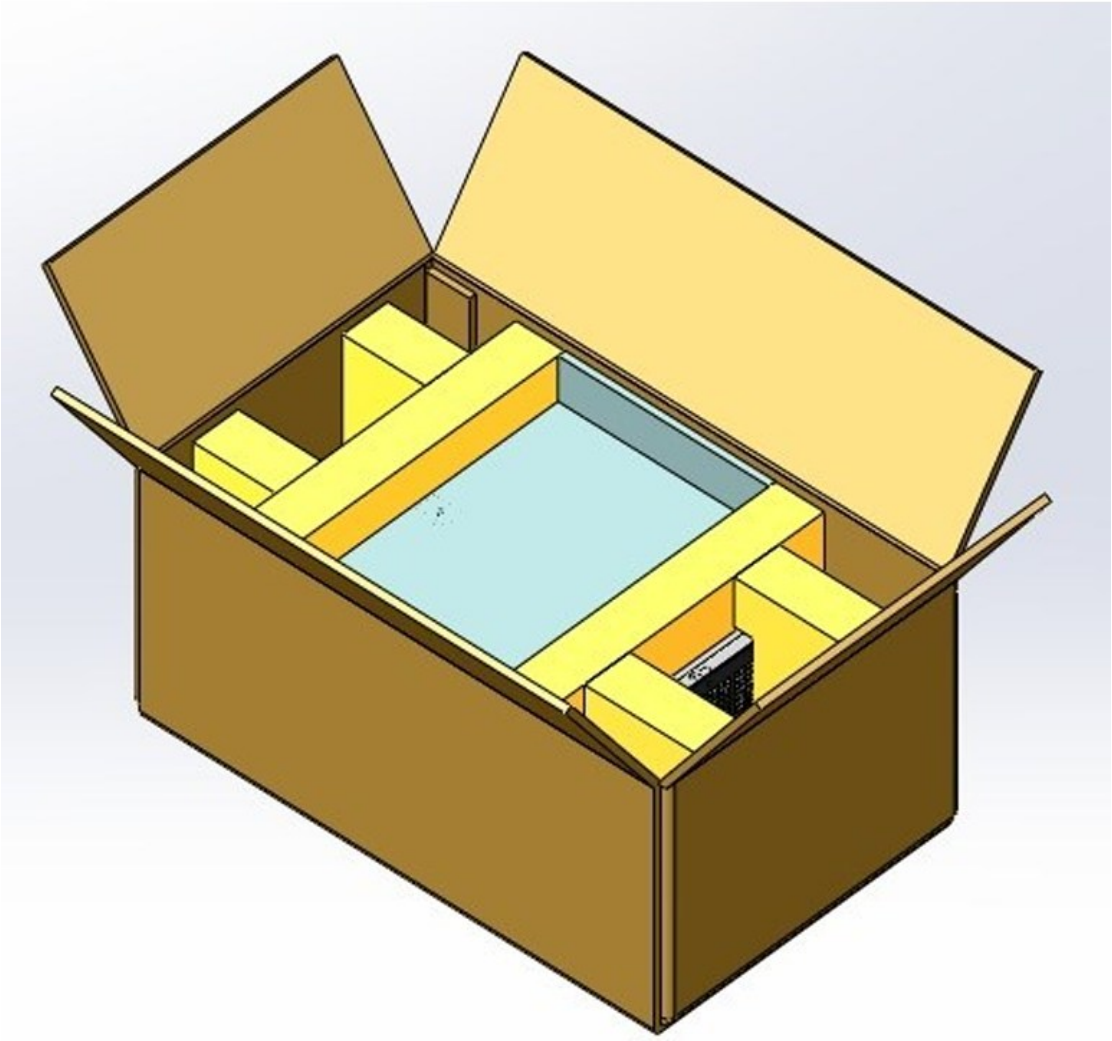
*3 This product is a Class A instrument, designed for industrial environments. If used in residential environments, it may cause interference and measures must be taken to reduce electromagnetic emissions to avoid interference with radio and television reception.

*4 This product is a Group 1 instrument and does not generate or use radio-frequency energy for processing materials or analysis (e.g., induction or capacitive coupling).

*5 This product is a Class I instrument; ensure that the protective earth terminal is grounded. The product's safety is guaranteed only when correctly grounded.

*6 Pollution refers to foreign substances (solid, liquid, or gas) that may cause a decrease in insulation strength or surface resistance. Pollution Degree 2 indicates that only non-conductive pollution is expected, unless occasional condensation causes temporary conductivity.

Section 6 Package Contents and Accessories



Standard Accessories

☐ TL-DS0001 – AC Power Cord (for 400W / 800W models)

☐ AX-DS0001 – Grounding Short Bar (for chassis connection)

☐ AX-DS0002 – M4 Screws for Output Terminals

☐ AX-DS0003 – M8 Screws for Output Terminals

(for 400W / 800W / 1200W – 40V / 80V models)

☐ AX-DS0004 – M10 Screws for Output Terminals (for 2000W model)

☐ AX-DS0005 – Output Terminal Protective Cover (for 400W / 800W / 1200W models)

☐ AX-DS0006 – Output Terminal Protective Cover (for 2000W model)

☐ AX-DS0007 – Input Terminal Protective Cover (for 1200W model)

☐ AX-DS0008 – EMI Suppression Ferrite Core Set (for 1200W model)

Optional Accessories

☐ TL-DS0002 - AC Power Cord (for 1200W model)

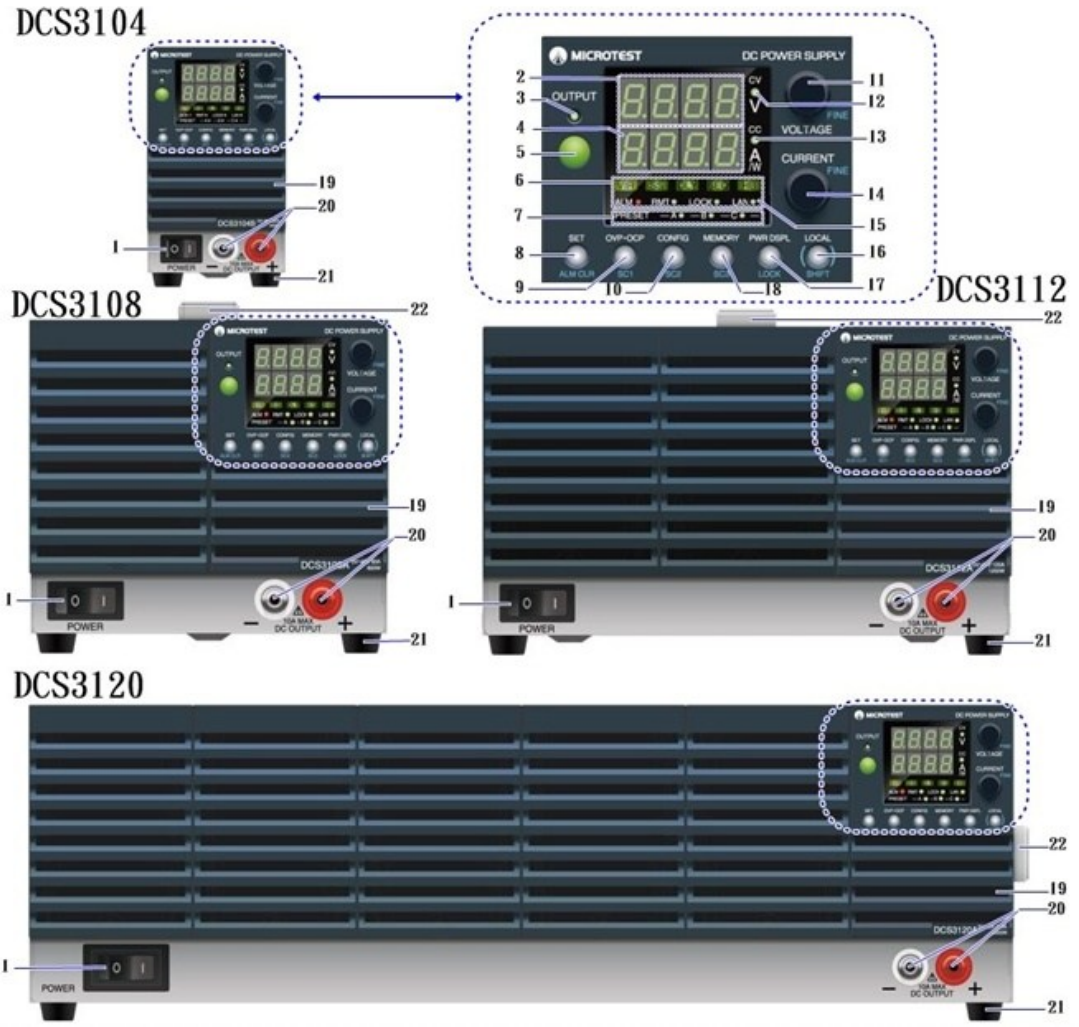
☐ TL-DS0003 - AC Power Cord (for 2000W model)

☐ TL-DS0004 - Parallel Operation Communication Cable

☐ TL-DS0005 - RS-232C Communication Cable | RJ45 8-Pin to D-Sub 9-Pin

☐ AX-DS0009 - Safety Plug | Solder-type Connection

Section 7 Names and Functions of Components



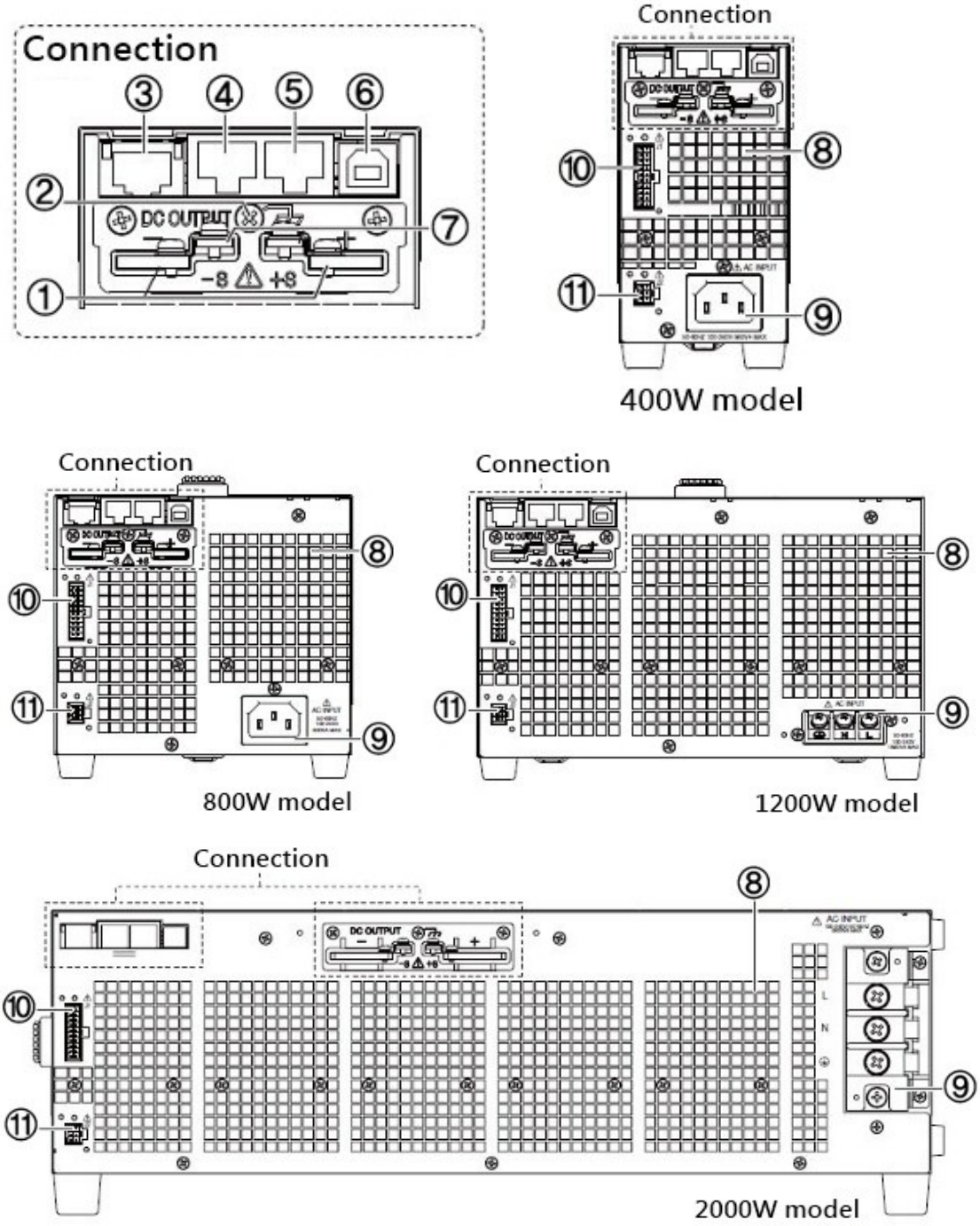
Front panel description

Number	Name	Description
1	Power switch	400W / 800W / 1200W Models: The power is turned ON when the ON/OFF switch is pressed to the (I) side, and OFF when pressed to the (O) side. 2000W Model: The power ON/OFF is controlled by a circuit breaker (rated current: 50 A, single-pole disconnection on the L line). When set to the (I) side, the power is ON; when set to the (O) side, it is OFF.
2	Voltage Display	Display voltage value, alarm display, or system configuration item number.
3	OUTPUT LED	Lights up when output is ON (Green), Turns off (Orange) during output ON delay, Turns off (Green) during output

		OFF delay. Turns off (orange) when output is ON and protection function is activated. Lights up (green) during soft start / turns off (green) during soft stop
4	Current Display	Displays current value, power value, alarm cause, or system configuration settings.
5	OUTPUT key	Output ON/OFF switching.
6	VIR/SS/DLY/SEQ/ HB	VIR: Lights up when the internal variable resistance function is enabled. SS: Lights up when the soft start/soft stop function is enabled. DLY: Lights up when output ON/OFF delay is enabled; turns off during operation. SEQ: Lights up during synchronous operation; turns off during trigger wait. HB: Lights up during fast bleeder using the bleeder circuit.
7	PRESET A/B/C LED	A: Lights up (green) when memory A value is recalled / saved. B: Lights up (green) when memory B value is recalled / saved. C: Lights up (green) when memory C value is recalled / saved.
8	SET key	Setting/confirmation of output voltage / current value (with LED indicator)
	ALM CLR key	Clearing the protection function (alarm) status (with LED indicator).
9	OVP · OCP key	Setting / display of operation points for Overcurrent Protection (OCP), Overvoltage Protection (OVP), and Undervoltage Lockout (UVL) (with LED indicator).
	SC1	Calling up system configuration shortcuts (with LED indicator).
10	CONFIG key	Setting various action-related conditions (system configuration) (with LED indicator).
	SC2	Calling up system configuration shortcuts (with LED indicator).
11	VOLTAGE knob	Setting the voltage value or selecting the system configuration item number.

	FINE	Fine adjustment of voltage setting.
12	CV LED	Indicator light during constant voltage operation (Green).
13	CC LED	Indicator light during constant current operation (Red).
14	CURRENT knob	Setting the current value, modifying system configuration items, or setting the internal resistance value.
	FINE	Fine adjustment of current setting and internal resistance setting
15	ALM LED	The indicator lights up (red) when a protection function is activated. However, it does not light up during Undervoltage Lockout (UVL) operation, and turns off (red) during Power Limit operation.
	RMT LED	The indicator lights up (green) during remote control operation.
	LOCK LED	The indicator lights up (green) when the key lock is active.
	LAN LED	Indicator Status During LAN Interface Operation •No Fault: Green •Fault: Red •Standby: Orange •Identify: Blinking Green
16	LOCAL key	Switch between remote and local operation modes (with LED indicator), and toggle the display of system configuration items.
	SHIFT key	The function is active when a blue indicator appears below the key.
17	PWR DSPL key	Output power display on the front panel (with LED indicator).
	LOCK key	All operations except the OUTPUT key are disabled (key lock) (with LED indicator).
18	MEMORY key	Recall/save of preset memories A, B, and C (with LED indicator).
	SC3	Calling up system configuration shortcuts (with LED indicator).
19	Louver	Intake vent for internal cooling.
20	DC OUTPUT connector	Front output terminal
21	Rubber feet	400W / 800W / 1200W models: 4 locations on the end face 2000W models: 4 locations on the bottom face and 4 locations on the side face

22	Handle	Carrying handle



Rear panel description

Number	Name	Description
1	DC OUTPUT terminal	Output terminals on the rear panel of the machine.
2	Chassis terminal	Terminal for output grounding.
3	LAN connector*1	For LAN cable connection during remote control
4	RS232C/ TRG IN connector*1	RS232C cable connector / trigger signal input connector for remote control; shared terminal connected to chassis.

5	TRG OUT connector*1	Trigger signal output; shared terminal connected to chassis.
6	USB connector*1	For USB cable connection during remote control.
7	Sensor terminal	Connection for sensor terminal.
8	Exhaust vent	Exhaust vent for internal cooling.
9	AC INPUT	400W / 800W models: AC input port 1200W / 2000W models*2: AC input terminal block
10	J1 connector*1	For external control and single-unit parallel operation
11	J2 connector*1	For external control

*1. Connector cover or terminal cover is installed at the factory.

*2. Terminal block cover is installed at the factory (only for 2000W models).

Section 8 Factory Default Settings

Restore Factory Settings（Initial Settings）

This product can restore the settings to the factory state（Initial Settings）:

1️⃣ Press both the SET key and the LOCAL key simultaneously, then turn the POWER switch to the ON position.

2️⃣ Release the LOCAL key and PWR DSPL key when the voltage display on the front panel shows 'in.it'.

When 'in.it' is displayed, if the keys are held down, the key lock mode will be activated (LOCK LED will light up).

If the lock mode is active (LOCK LED is lit), pressing both the LOCAL key and PWR DSPL key again will unlock it.

The factory settings displayed on the screen are as follows.

Basic setting

Basic item	Configuration
Output voltage	0 V
Output current	105% of the rated output current
OVP（Over Voltage Protection）	112% of the rated output voltage
OCP（Over Current Protection）	112% of the rated output current
UVL（Under Voltage Limit）	0 V
Default Value A / B / C	Factory Settings （output voltage, output current, OVP, OCP, UVL）
System Configuration Hot Key SC1、SC2、SC3	System configuration items not logged

System Configuration Settings

Item Number	Display	Description	Configuration
CF01*2	bLE	Settings for bleeder circuit	NORM（Normal State）
CF02	Pr io	Rise status when output is ON	CV（CV priority）
CF03	U ir	Internal resistance value setting（VIR）	OFF（No Internal Resistor Used）
CF04	SS.C.r	Soft start time（CC mode）	0.0（No Soft Start Used）
CF05	SS.C.F	Soft stop time（CC mode）	0.0（No Soft Stop Used）
CF06	SS.U.r	Soft start time（CV mode）	0.0（No Soft Start Used）
CF07	SS.U.F	Soft stop time（CV mode）	0.0（No Soft Stop Used）
CF08	on.d	Output ON delay setting	0.0（No Delay）
CF09	oFF.d	Output OFF delay setting	0.0（No Delay）
CF10	E.CC	CC control using external voltage/external resistance	OFF（No Control）
CF11	E.CU	CV control using external voltage/external resistance	OFF（No Control）
CF12	E.rnG	CC／CV control range	LO（0～5 V）
CF13*2	M.rnG	Output range for voltage/current monitoring	LO（0～5 V）
CF14	E.out	External control for output ON/OFF	OFF（No External Control）
CF15	E.LoG	External control logic for output ON/OFF	LO（0～0.5 V）or ON when shorted
CF16	StS.C	CC status signal polarity	NEG（Negative Terminal）
CF17	StS.U	CV status signal polarity	NEG（Negative Terminal）
CF18	StS.o	Output status signal polarity	NEG（Negative Terminal）
CF19	StS.A	Protection function／alarm status signal polarity	NEG（Negative Terminal）
CF20*2	A.rCU	Status from AC-FAIL operation to recovery	SAFE（Non-automatic Output ON）
CF21	HdoG	Communication monitoring（WATCHDOG）timer	OFF（Timer OFF）
CF22	CC.LA	Current setting limit	ON（Limit）
CF23	CU.LA	Voltage setting limit	ON（Limit）
CF24*2	oC.dL	Output OFF upon OCP detection	0.0 s
CF25*2*3	tr iP	Circuit breaker trip during OVP/OCP/FOCP/SD/PRL ALM activation	ON（No Breaker Trip）
CF30	SC 1	Login of system configuration shortcut keys（SC1）	00（Not Logged）
CF31	SC2	Login of system configuration shortcut keys（SC2）	00（Not Logged）
CF32	Sc3	Login of system configuration shortcut keys（SC3）	00（Not Logged）
CF33	bEEP	Buzzer ON/OFF	ON（Buzzer ON）

CF34*2	br ı	Panel display brightness	7
CF35	ANEr	Local display for single-control parallel operation	OFF（Not Displayed）
CF40	LAn	LAN interface settings	ON（Use）
CF41	usb	USB interface settings	ON（Use）
CF42	232	RS232C interface settings	ON（Use）
CF43	trAc	SCPI communication error display	OFF（Not Displayed）
CF44*2	PArA	Single-control parallel operation	1（Single device）
CF45	Pon	Output status when power is ON	SAFE（Output OFF）
CF60	boot	LAN interface reset/activation	LCI（LAN interface reset）
CF61	Adr	IP address allocation method	110（DHCP：ON，AUTO IP：ON，MANUAL IP：OFF）
CF66	Sub	Subnet Mask of the IP Address	16
CF72	bAud	RS232C communication speed	19.2（kbit/s）
CF80	ProG	Display of user code for the program（execution）	NONE（Not Written）
CF83	trG.ı	Trigger input signal polarity	PTR（Positive Trigger）
CF84	trG.o	Trigger output signal polarity	PTR（Positive Trigger）

*1. It can also be set when used as a slave.

*2. Settings are available only for the 2000W model.

Section 9 Troubleshooting Procedures

This section explains how to diagnose and take appropriate actions when the product is not operating normally.

It lists some representative symptoms. Please check if any of them apply to your situation, as some issues can be resolved with simple methods.

If no applicable symptoms are found, it is recommended to restore the device to its default settings.

If the issue persists after resetting, please contact your point of purchase or your company's sales representative for further assistance.

Power switch not responding

Symptom	Checkpoints	Corresponding Solutions
No response even when the POWER switch is set to ON.	Is the power cable broken ?	Please replace the power cable.
	Is the power cable connected correctly ?	Please check if the power cable is connected correctly.

The switch on the panel is not operational

Symptom	Checkpoints	Corresponding Solutions
The switch on the panel is not operational.	Is the LOCK LED lit?	Please unluck the keypad.
	Is the REMOTE LED lit?	When operating through the panel, press the LOCAL key to set it to local mode.
	Are you using the RS232C, USB, or LAN interface for control?	
Even after pressing the LOCAL key, it can't be set to local mode.	In the communication command, is it set to local lock (llo)?	Please send the communication command SYST:LOC to remove the local lock (llo) status.
Even after pressing the SET key, the set value does not display.	Is external control currently active?	The SET key is disabled during external control.

Unable to set output voltage/current, or OVP/OCP trip points

Symptom	Checkpoints	Corresponding Solutions
Unable to set output voltage or OVP trip point	Is the voltage setting limit function set to ON（CF23：oN）？	- The output voltage setting can't exceed approximately 95% of the OVP trip point. The OVP trip point can't be lower than approximately 105% of the voltage setting. Please check if the setting limit function is OFF (CF23: oFF), and verify the OVP trip point.
		-The output voltage value can't be set lower than the voltage set in UVL. Please check if the setting limit function is OFF (CF23: oFF), and verify the UVL trip point.
Unable to set output current or OCP trip point	Is the current setting limit function set to ON（CF22：oN）？	- The output current setting can't exceed about 95% of the OCP trip point, and the OCP trip point can't be lower than about 105% of the current setting. Please check if the setting limit function is OFF (CF22: oFF), and verify the OCP trip point.

No output

Symptom	Checkpoints	Corresponding Solutions
Set the OUTPUT key to ON, but still no output.	Is the output voltage set to 0 V or the output current set to 0 A ?	Please rotate the knob to set the output voltage and current to the desired values.
	Is external contact used to control output ON/OFF ?	YES →Please ensure the external control terminal is set to ON.
		NO →Set the external control for output ON/OFF to "OFF"（CF14：oFF）.
Even when the output is set to ON, it immediately turns OFF.	Is the Over Voltage Protection (OVP) function activated ?	Please set the OVP value higher than the voltage setpoint.
	Is the Over Heat Protection (OHP) function activated ?	There is a possibility of abnormal internal temperature rise. Please check the operating environment, eliminate the cause, and then turn it ON again.
		The cause may be a blocked air intake (louver), fan failure, or similar issues. Please check and confirm.
	Has a Shut Down (SD) signal been input ?	Please verify if Pin 16 of the J1 connector is set to HIGH (4.5 – 5 V) or open.
After clearing the AC input undervoltage protection (AC FAIL), the output does not turn ON.	Is the status from AC-FAIL operation to recovery (CF20) set to SAFE, or is the output status when the power is ON (CF45) set to SAFE?	Please set the status from AC-FAIL operation to recovery (CF20) to Auto, and set the output status when the power is ON (CF45) to ForcE or Auto.

The output ripple is high

Symptom	Checkpoints	Corresponding Solutions
Sometimes, the ripple may increase.	Is the input voltage range exceeded?	Please use a voltage within the specified input range.
Changing the installation location may cause an increase in ripple.	Is there a strong magnetic field or interference source nearby?	Avoid proximity to interference sources, or address the issue through load wiring solutions.
Increased ripple during external control	Is there significant noise from the external voltage?	Implement filtering or isolation measures.
Ripple increased after replacing load wiring	Are the sensor wires connected?	When remote sensing is not used, please connect the shorting bar for sensing.

Unstable output

Symptom	Checkpoints	Corresponding Solutions
When the output is ON, rotating the VOLTAGE or CURRENT knob may cause output instability.	Is the operation switching from CV→CC or CC→ CV ?	Change the limited value setting (output voltage or output current) to be higher than the current setting. When the setting value is at the maximum, a power supply with an output voltage or current greater than the set value must be used.
The output voltage or output current is fluctuating.	Is single-control parallel operation being performed?	Slightly worse performance compared to running alone.
	Has the sensor wire or the shorting bar used for sensing come loose?	When not using remote sensing, please connect the shorting bar for sensing.
	Are both the CV LED and CC LED lit?	When oscillation occurs during remote sensing, please add a capacitor at the load end.
		Has the circuit malfunctioned? Please stop using this product immediately and request repairs.
	Are the sensor wires and load wires experiencing poor contact or disconnection?	Please switch the POWER switch to OFF and check the wiring.
	Is there a peak in the load current, or is the load current in a pulsed state?	There is a possibility that the peak value exceeds the constant current setting. Please increase the constant current setting or increase the current capacity.
There is a deviation in the output voltage value when the power is turned on.	Has it been more than 30 minutes since the power was turned on?	Please preheat (power on) for more than 30 minutes.
Even when the output is OFF, the output voltage does not drop.	Is the bleeder circuit setting (CF01) set to OFF?	When the bleeder circuit setting is OFF (CF01: d iS), residual voltage may remain even when the output is ON. Please set the bleeder circuit to ON (CF01: norM / HYP).
The output voltage deviates from the set voltage value.	Is the internal resistance setting (CF03) not set to OFF?	Please set the internal resistance setting to OFF (CF03: oFF).
	Are the screws connecting the shorting bar for sensing loose?	Please use the screws on the sensing terminals and the screws on the rear DC OUTPUT terminals to securely connect the shorting bar for sensing.

When the OUTPUT key is ON, ALM LED lights up

Symptom	Checkpoints	Corresponding Solutions
When the OUTPUT key is ON, the ALM LED lights up.	Is the sensing wire or short-circuit sensing bar disconnected ?	When not using the sensing function, please connect the sensing short-circuiting bar.
	Is the polarity of the sensing wire reversed ?	Please check the wiring for the possibility of reversed polarity of the sensing wires or a short circuit at both ends.
	When using remote sensing, is the load wiring too long?	Ensure that the voltage drop across the load wires stays within the device's voltage range.
	During external control, is the control wire disconnected	Please connect correctly.
	During external control, is the external voltage too high	Please input the correct voltage.
	Is the internal temperature abnormally high	Overheat protection has been activated. Please check the operating environment.
		Due to reasons such as blocked air intake (louvres) or duct failure. Please check page 16.
The ALM LED lights up after a load change.	Has a higher voltage been applied externally, such as with a battery load ?	There is a possibility that the overvoltage protection or overcurrent protection function has been activated. Please check. There is a possibility of overload. Please verify the load.
	Is the actual output voltage higher than the set voltage displayed on the panel ?	
	Is there a special load connected ?	

Can't perform remote control

Symptom	Checkpoints	Corresponding Solutions
Remote control is not available via the communication interface.	In the system configuration settings, is the communication interface to be used set to ON?	Please select the remote control communication interface (CF40 / CF41 / CF42).
When using the LAN interface, the IP address can't be assigned via a DHCP server.	Is the LAN LED orange or red?	When the orange light is on, the device is waiting for a response from the DHCP server. If the red light turns on afterward, a timeout may have occurred. Please contact your network administrator.

Can't be used properly

Symptom	Checkpoints	Corresponding Solutions
Bleeder circuit ON/OFF function not operation.	Is the system operating in single-control parallel or series mode?	To ensure proper operation during single-control parallel or series mode, set the bleeder circuit (CF01) to the same value on all connected devices.

The fan speed is high

Symptom	Checkpoints	Corresponding Solutions
When the POWER switch is ON, the fan speed is faster than usual.	Does the bleeder circuit setting enable bleeder at startup（CF01：HYP）？	When the setting at the time of the last POWER switch OFF was hyper bleeder（CF01：HYP）, the fan operated at maximum speed continuously. Please configure the corresponding bleeder circuit setting according to your needs（CF01）.

Chapter 3 Power Cable Connection

This product complies with IEC standards and is classified as Safety Class I equipment（equipped with a protective earth terminal）.

To prevent electric shock, please ensure the device is properly grounded.

400/800W Model Details

⚠ Warning：There is a risk of electric shock.

Please ground this product using the ground wire of the power cable, and ensure that the protective conductor terminal is properly grounded.

⚠ Cautions：

When connecting the AC power, please use the supplied power cord. Due to potential overvoltage or other unpredictable factors, do not use power cords that are not supplied by the manufacturer. It is recommended to use a power cord that is no longer than 3 meters, and that it is selected by qualified technical personnel.

Before powering on the device, ensure that the power switch turns OFF before plugging in the power cord. To avoid any accidents, ensure that the power outlet is easily accessible and close to the operator, with sufficient space around the outlet.

Do not use the dedicated power cord for any devices other than this product.

Wiring Steps：

1️⃣ Verify that the AC power cable being used meets the rated input requirements for this product.

The input voltage range is 100~240 Vac, and the frequency is either 50 Hz or 60 Hz.

2️⃣ Ensure that the POWER switch is in the OFF position.

3️⃣ Plug the power cable into the AC input on the rear of the device.

4️⃣ Insert the power plug into a grounded power outlet.

1200W Model / 2000W Model

⚠ Warning：There is a risk of electric shock.

Turn OFF the circuit breaker of the distribution panel（the switch that cuts off the power supply to the distribution panel）.

When the POWER switch is in the ON position, make sure to install the terminal cover, regardless of whether the AC INPUT terminal is connected or not.

Fire hazard：

When connecting to the distribution panel, ensure that the operation is carried out by a qualified professional.

The circuit breaker of the distribution panel must meet the following conditions to be used.

⚠Cautions：

This product has internal protective circuits configured according to the polarity of the input terminals. Please correctly connect the L, N, and ≒（GND）terminals between the distribution panel and this product.

Notes：

When connecting to an AC power circuit, it is recommended to use a dedicated power cable. If a dedicated power cable is not available, please have a professional technician select a power cable that is no longer than 3 meters.

Make sure to connect the power cable to the outlet.

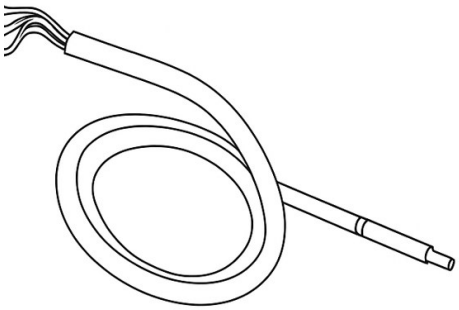
In case of an emergency, disconnect the power supply from the distribution panel（turning off the circuit breaker）.

1200W / 2000W Model Power Cable Instructions

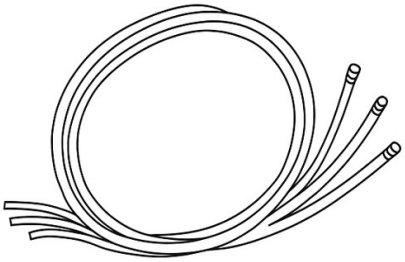
This product (1200W / 2000W model) does not come with a power cable when shipped.

Please use a power cable that meets the rated AC input voltage/current specifications for this product.

When purchasing, you can use a compatible dedicated power cable：



For 1200W Model



For 2000W Model

If the optional power cable is not used, please prepare the following wires according to each model：

Model	**Specifications**
1200W model	- Outer Diameter Finished Size：12.1 mm or below - Rated Voltage：250 V or above - Polyvinyl Chloride Insulated Flexible Cable（VCTF） - Nominal Cross-Sectional Area：5.5 mm², 3 core - Input Terminal Side：Circular terminal 5.5-4（for 5.5 mm², M4）
2000W model	- Nominal Cross-Sectional Area：5.5 mm², single-core, 3 core - Input Terminal Side：Circular terminal 5.5-6（for 5.5 mm², M6）

Tightening Torque for Input Terminal Connection Screws

Screw Specifications	**Tightening Torque [N・m]**
M4	1.33
M6	4.87

Requirements for circuit breakers in the distribution panel：

Rated current：

For safety reasons, do not use circuit breakers with a rated current higher than the following：

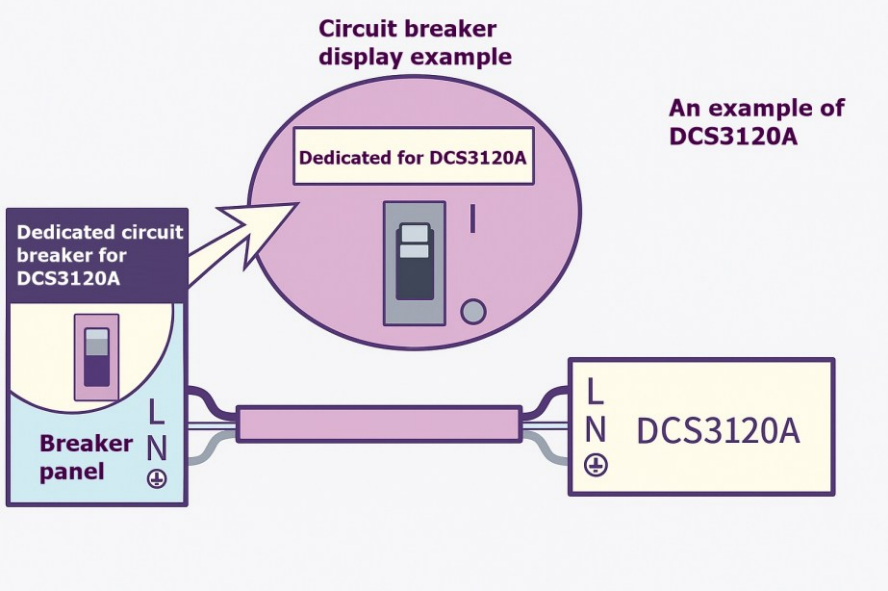
1200W model：30 A（100 V series）, 15 A（200 V series）

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

The circuit breaker should be dedicated for use with this product.

Ensure that the circuit breaker is easily operable under any circumstances.

When used exclusively for this product, the circuit breaker should be labeled as 'Circuit Breaker for Disconnecting AC Power Supply'.



	400W model	800W model	1200W model	2000W model
Protective Conductor Current (At 265 Vac, 60 Hz)	1.5 mA	2.5 mA	4.0 mA	4.7 mA
Inrush Current	25 Amax	50 Amax	75 Amax	125 Amax

Connection Steps for 1200W Model：

1 Verify that the connected AC power cable meets the rated input requirements of this product.

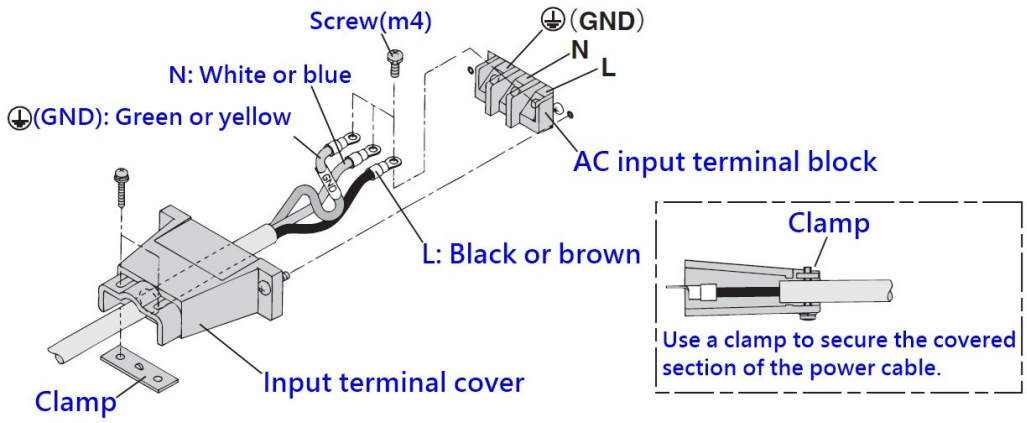
Input voltage range: 100~240 Vac (any rated AC voltage), frequency: 50 Hz or 60 Hz.

2 Ensure that the POWER switch is in the OFF position.

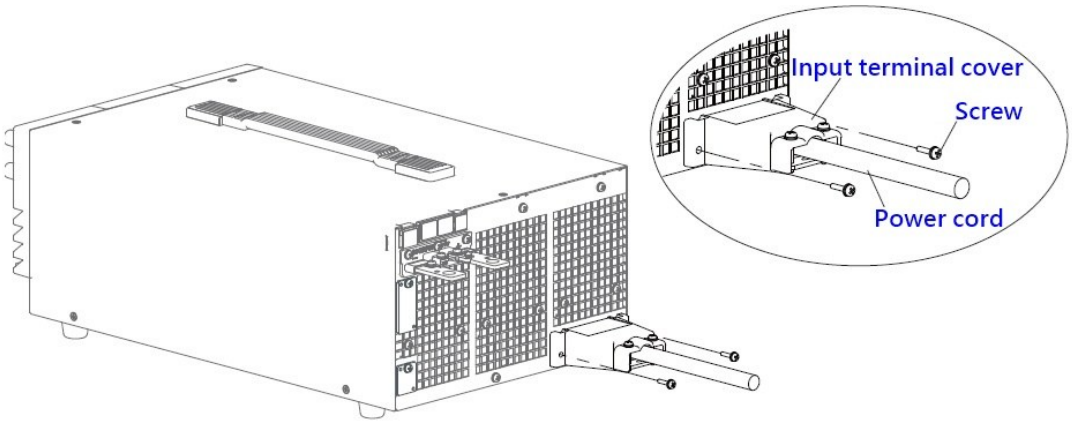
3 Connect the power cable to the AC INPUT terminal on the rear panel.

Insert the power cable into the included INPUT terminal cover and secure it using the clamping fixture and screws.

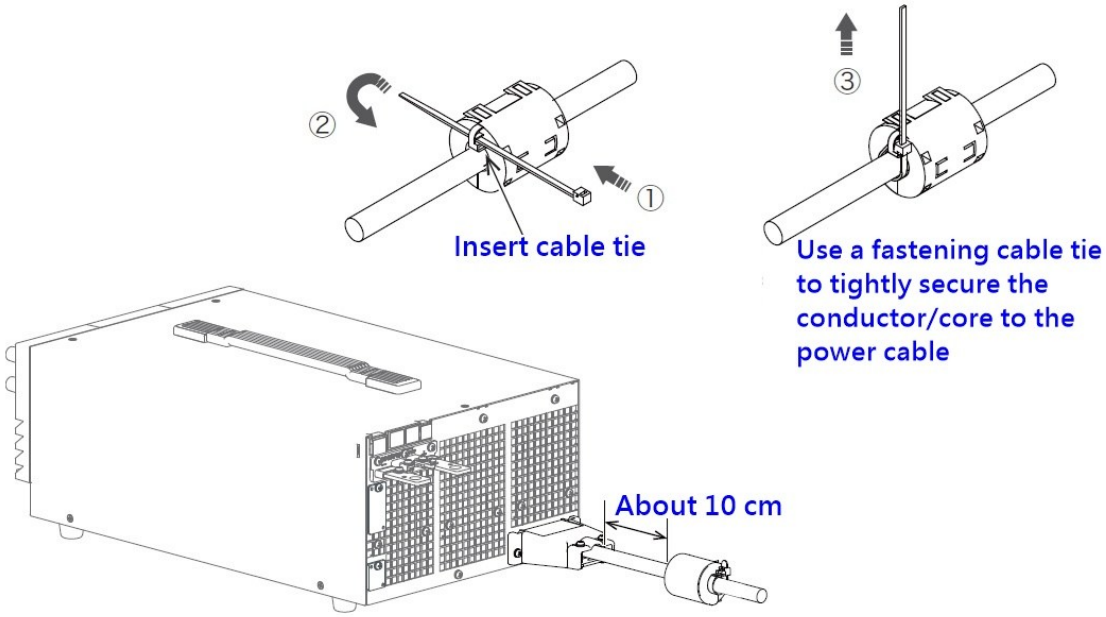
Ensure proper connection of the AC INPUT terminals L, N, and ⏚（GND）.



4 Use the cable provided with the unit to connect the INPUT terminal cover.



5 Install the included ferrite bead onto the power cable.



During installation, please install the ferrite bead as close as possible to the INPUT terminal.

Use a cable tie to secure the ferrite bead onto the power cable, ensuring that the core is properly tightened or fully inserted.

Finally, trim off any excess length of the cable tie.

6️⃣ Install the corresponding crimp terminals at both ends of the power cable and the distribution panel.

7️⃣ Switch the circuit breaker in the distribution panel to the OFF position.

8️⃣ Correctly connect the power cable to the L, N, and ⏚（GND）terminals of the distribution panel.

Connection Steps for 2000W Model

⚠️ AC Power Wiring Precautions

When this product is shipped, the AC INPUT terminal cover is pre-installed. If the terminal cover is damaged or lost, please contact MICROTEST's authorized agent or distributor for replacement.



Please follow the steps below to confirm and perform the wiring operation：

1️⃣ Verify Power Specifications

Confirm that the connected AC power cable meets the rated input specifications of this product.

This product supports an input voltage range of 100~240 Vac, with a frequency of 50 Hz or 60 Hz at any nominal voltage.

Ensure that the POWER is in the OFF position.

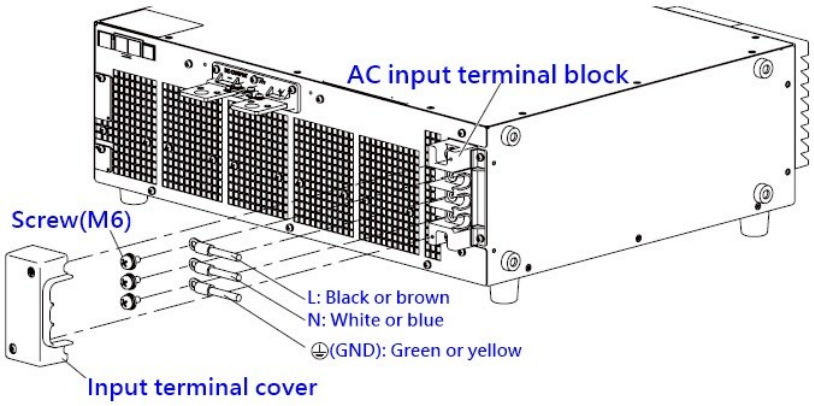
2 Connect the AC INPUT Terminal

Correctly connect the power cable to the AC INPUT terminal on the rear panel.

Make sure to properly connect the L (Live) , N (Neutral) , and ⏚ (GND) terminals.

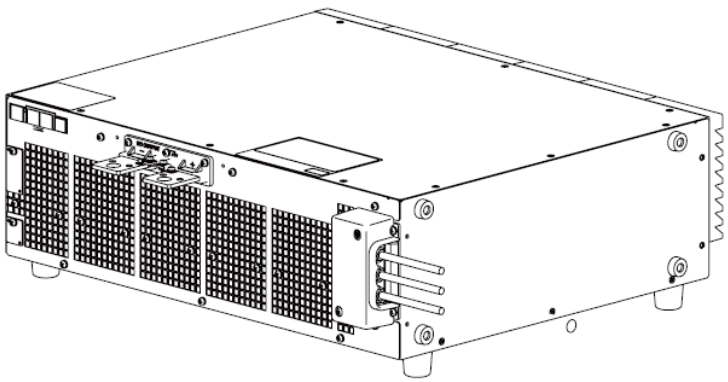
3 Install the Terminal Cover

Using the screws attached to the INPUT terminal cover, securely install the terminal cover back onto the AC INPUT terminal.



4 Power Cable Crimping

When connecting the power cable to the distribution panel, please install the corresponding crimp terminals of the appropriate specification.



5️⃣ Circuit Breaker Setting

Ensure that the circuit breaker in the distribution panel is set to the OFF position.

6️⃣ Connecting to the Distribution Panel

Correctly connect the power cable to the distribution panel's L (Live), N (Neutral), and ⏚ (GND) terminals.

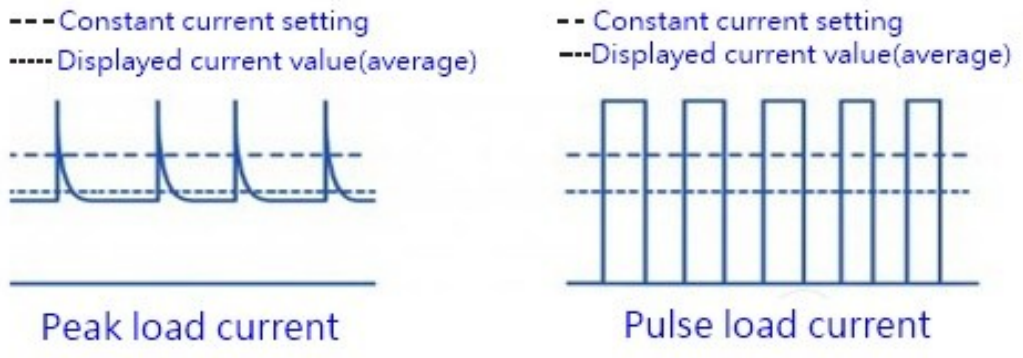
Section 1 Load-Related Instructions

When connecting a load with peak or pulse currents, unstable output may occur, please be especially cautious.

The current displayed by this product represents the average value. Therefore, it is possible that the current shown on the panel is lower than the set value, while the actual peak current may exceed the set value. In such cases, the product will enter an instantaneous constant current mode, causing the output voltage to drop.

For this type of load, the following countermeasures are recommended：

1. Increase the setting value of the constant current.
2. Increase the capacitance of the output capacitor.



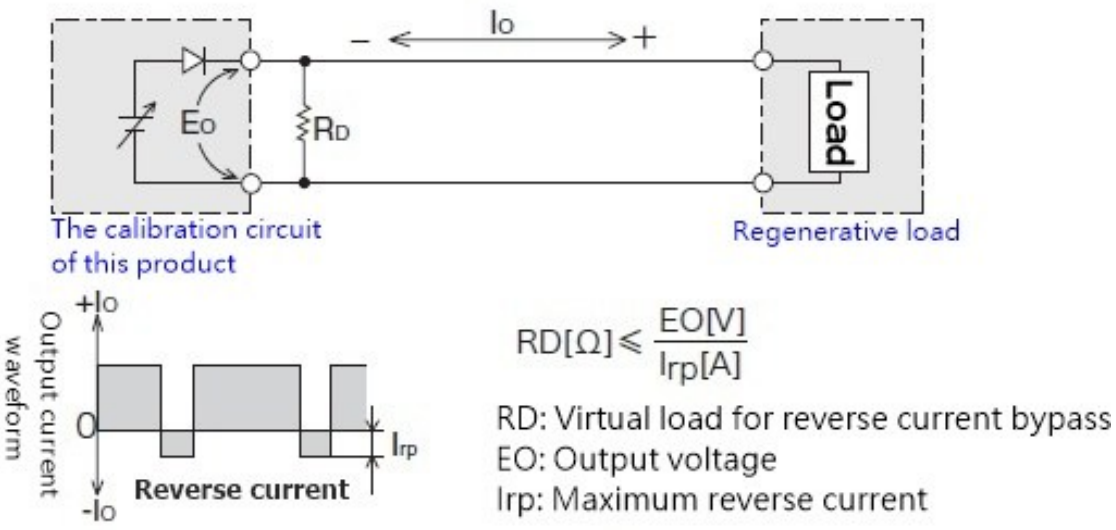
⚠ Regarding loads that generate reverse current

This product can't absorb reverse current from the load. When connecting loads with regenerative power functions（such as inverters, converters, transformers, etc）, reverse current may cause the output voltage to rise, leading to unstable output and

potentially damaging the equipment.

To prevent this situation, for such loads, please connect a parallel resistor (RD) as shown in the diagram below to bypass the reverse current.

Note： After installing the bypass resistor, the current flowing to the load (Irp) will be reduced accordingly.



$$RD[\Omega] \leqslant \frac{EO[V]}{Irp[A]}$$

RD: Virtual load for reverse current bypass
EO: Output voltage
Irp: Maximum reverse current

⚠ Cautions

Please choose a resistor RD with a sufficiently large rated power.

If the rated power of the resistor used is insufficient, it may cause RD to burn out, resulting in equipment damage or danger.

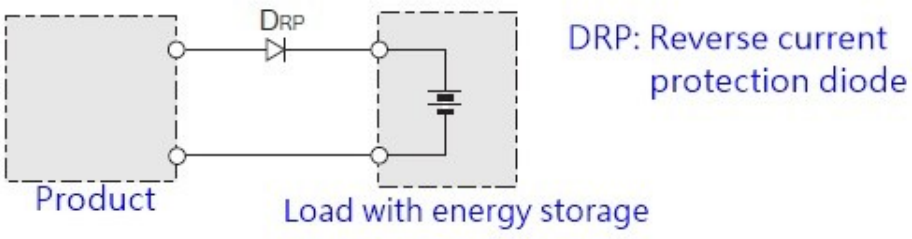
⚠ Precautions for Loads with Energy Storage Function

When connecting loads with energy storage functions (such as supercapacitors, battery modules, etc.), there may be a situation where current flows back from the load into the internal circuit of this product. This not only risks damaging the product

but may also reduce the lifespan of the load itself.

To prevent reverse current, please connect a diode (DRP) in series between the output terminal and the load, as shown in the diagram below, to block the backflow.

⚠ Cautions：Must not be used in conjunction with inductive components, as it may cause instability or damage.



⚠ Cautions（Regarding the Selection of Diode DRP）

To protect the load and this product, please choose a DRP (diode) that meets the following specifications：

Reverse Voltage Rating：It must be at least 2 times the rated output voltage of this product.

Forward Current Capacity：It must be 3 to 10 times the rated output current of this product.

Please choose a component with low power loss.

Be sure to consider the heat generated by the DRP. Insufficient heat dissipation may cause the DRP to burn out.

Section 2 Selection of Load Cables

⚠ Warning：Improper cable selection may cause fire.

Please make sure to follow the guidelines below：Use conductors with sufficient current capacity that can withstand the rated output current of this product for the load wiring. The temperature near the output terminals may increase due to current-induced heating. Ensure that the material of the conductor used has a heat resistance of at least 85°C to avoid the risk of electric shock due to insulation melting. If high-voltage load wiring is required, please choose insulation-rated wiring that meets the rated output voltage of this product. For information regarding the insulation voltage of this product, please refer to the model specifications.

⚠ Cautions

Please choose load wiring with sufficient current capacity, and use cables with flame-retardant and durable outer layers to ensure safety and reliability.

Current Capacity of Load Wiring：

The temperature of the wire is influenced by the following factors：The resistive loss caused by the current, ambient temperature, and external thermal resistance conditions. The following applies to common usage scenarios：When the ambient temperature is 30°C, the wire is mounted horizontally in open air, and the selected plastic wire has a heat resistance of

60°C, the current capacity can be referred to from the table below.

If a wire with lower heat resistance is used, or if the ambient temperature is higher than 30°C, or the wire has poor heat dissipation (e.g., when bundled together or in an enclosed space), the allowable current must be reduced.

Nominal cross-sectional area cm²	AWG (American Wire Gauge area mm²)	Allowable current A(Ta = 30 ℃)	Recommended current by our company 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	1/0（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	—

Noise Mitigation Strategies：

When wiring with conductors of the same heat resistance rating, it is recommended to space the wires as far apart as possible to enhance their heat dissipation capacity, which helps increase the current carrying capacity.

Additionally, placing the + (positive) and – (negative) output wires close

together or bundled can also help reduce noise.

The "Recommended Current" values listed in the chart represent the maximum allowable current based on the assumption of the load at the end of the wiring, and are provided as a reference for conductor selection.

Limitations of the Sensing Function：

Since conductors have resistance, the 'voltage drop' at both ends of the conductor will increase as the wire length or current increases, resulting in a lower actual voltage applied to the load. To compensate for this 'voltage drop', this product is equipped with a 'voltage drop' compensation function (Sense function). If the 'voltage drop' is within the specified range, the system will automatically compensate. If the 'voltage drop' exceeds the compensation capability, please select a thicker wire to reduce the 'voltage drop'.

	Type A	Type B	Type C	Type D
Voltage compensation	approximately 1.5V per direction	approximately 4V per direction	approximately 5V per direction	approximately 5V per direction

Section 3 Insulation of Output Terminals

⚠ **Warning**：There is a risk of electric shock.

Even if the output terminals are grounded, to ensure safety, please verify that the insulation rating of the output terminals (including the sensing terminals) is higher than the product's rated insulation value.

For the rated insulation voltage of each model, please refer to the product specifications.

If the wires used do not meet the rated voltage, be sure to use insulated sleeves with corresponding voltage withstand ratings to ensure the required insulation strength.

⚠ **Cautions**

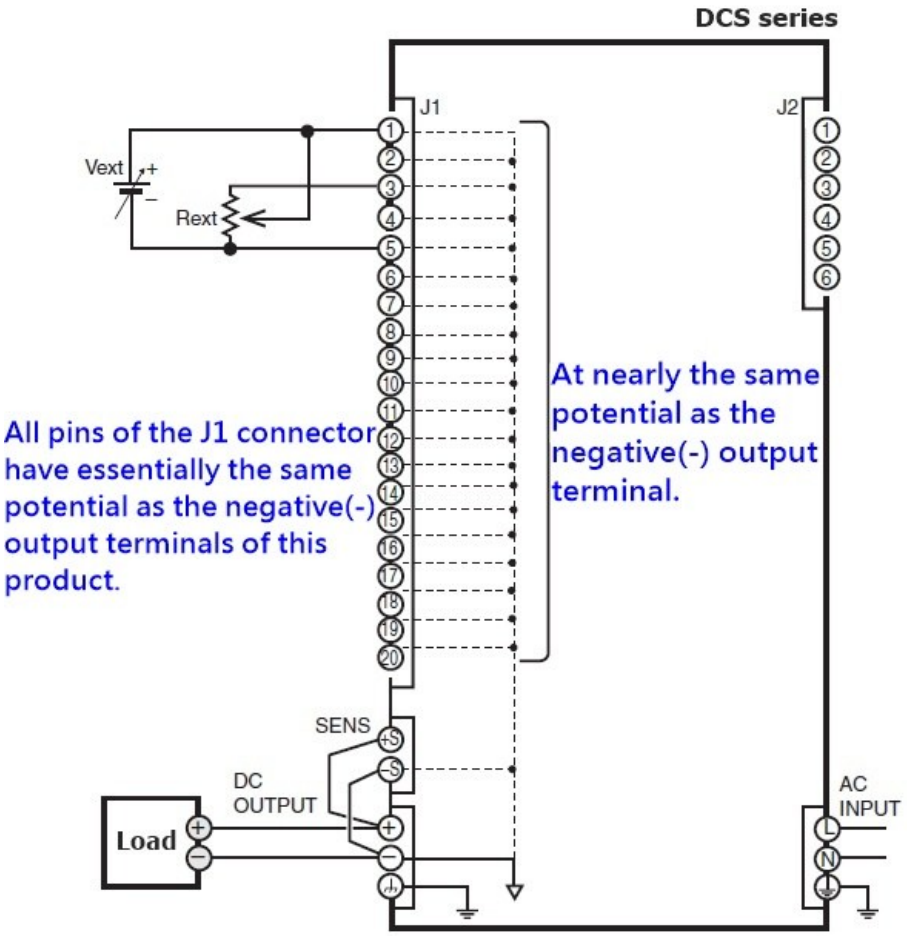
This may cause damage to the internal circuitry. If the product is controlled by an external voltage (V_{ext}), avoid grounding V_{ext}; it should be floating.

The wires connected to the output terminals (including the sensing terminals) and the load must meet the insulation requirements relative to the chassis.

The term "insulation voltage" refers to the maximum permissible voltage difference between the output terminal of the power supply and the grounded chassis terminal (chassis terminal).

When the output terminal is not grounded (floating) :

The output terminals of this product are electrically isolated from the protective ground terminal. When the GND line of the power supply is connected to the ground terminal of the distribution panel, the chassis (enclosure) potential of this product will be equivalent to the ground potential. The potential at the J1 connector on the rear panel is essentially the same as the negative (–) output terminal. The wires and equipment connected to this terminal must also have insulation strength that exceeds the rated insulation voltage of this product.



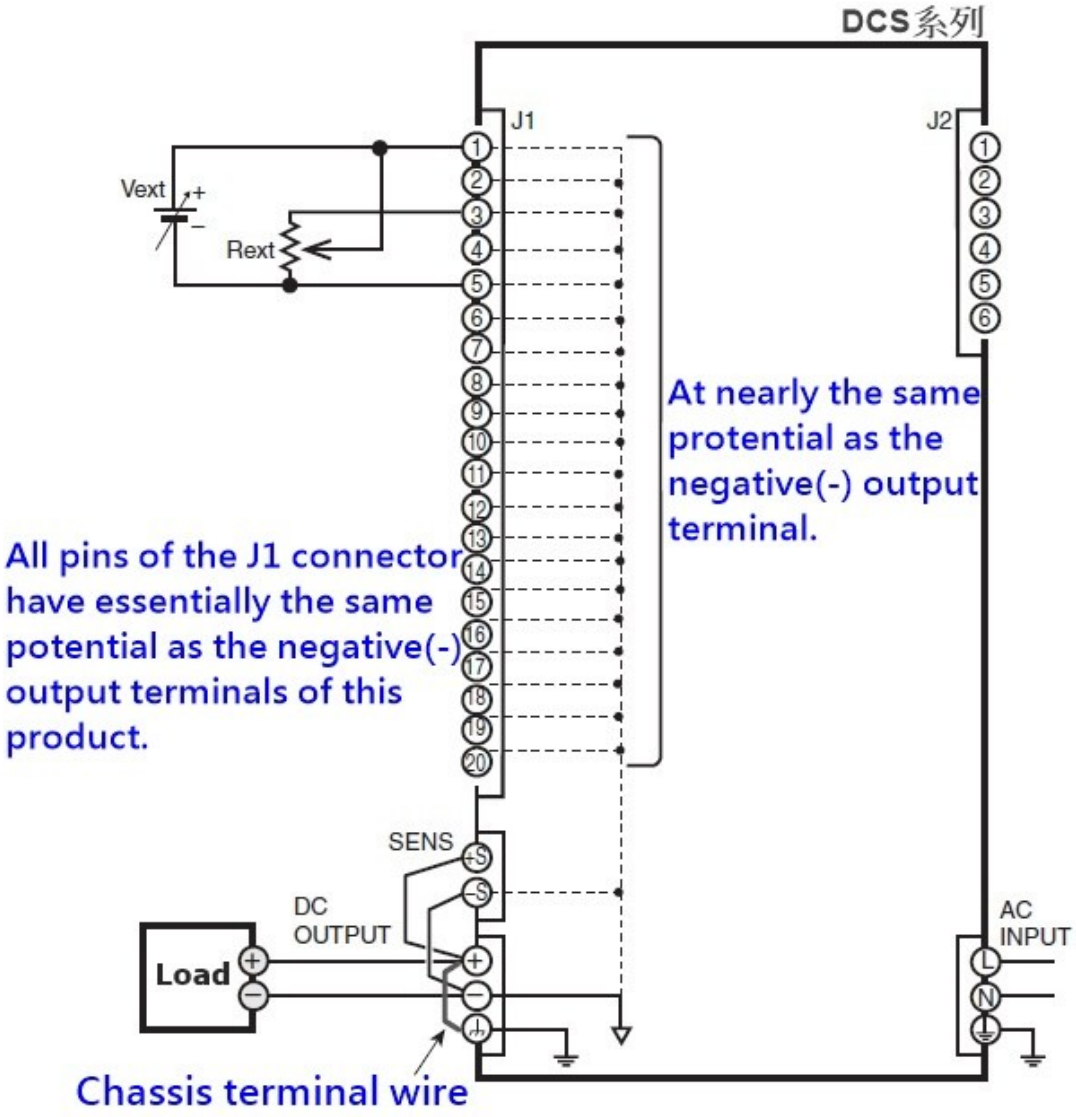
When the output terminal is grounded：

When the positive (+) output terminal is grounded, the potential of the positive (+) output terminal will be equivalent to the ground potential. The insulation strength of the wires connected to the output terminals (including the sensing terminals) and the load must exceed the insulation voltage requirement between this product and the chassis.

When the negative (–) output terminal is grounded, the situation is the same as for the positive terminal. The wires and load must have insulation performance sufficient to withstand the maximum rated voltage of this product.

※ Special Reminder：

If not necessary, please avoid using the output terminals in a floating state. To ensure operational safety, please make sure to connect any output terminal to the chassis ground (chassis terminal).



Connect output terminals：

⚠ Warning：Risk of electric shock.

When it is necessary to touch the output terminals on the rear panel, always turn off the power.

Even if the output is set to OFF, or the power switch is turned off, voltage may still remain on the output terminals if the bleeder circuit is set to OFF (e.g.,

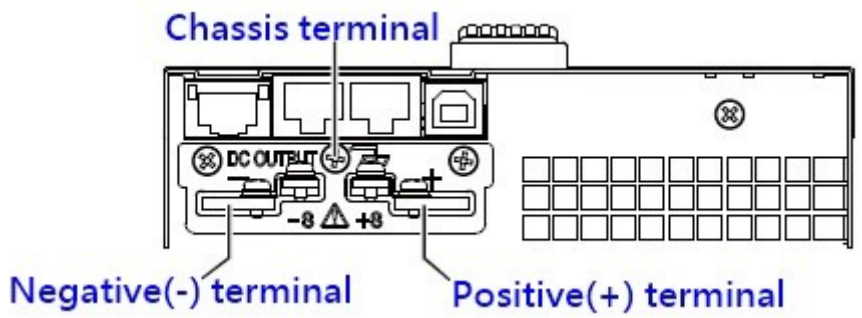
CF01 set to d ıb). To avoid the risk of electric shock, always set the bleeder circuit to ON (e.g., CF01 set to nor Π or HYP) when touching the output terminals.

When the power is ON, regardless of whether the load or wires are connected, always install the OUTPUT terminal cover to ensure safety.

Tightening torque for output terminal connection screws

Screw size	Tightening torque [N · m]
M3	0.58
M4	1.33
M8	11.22
M10	22.47

Connected to the output terminal on the rear panel



The illustration is for the 800W model

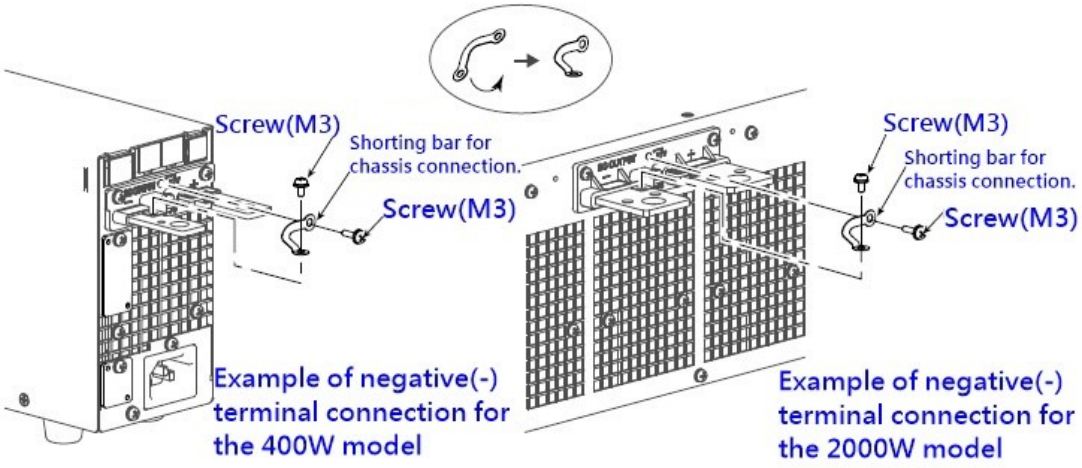
1. Turn off the power first, and ensure there is no residual voltage on the output terminals of the rear panel.
2. Use the included chassis shorting wire to connect one end to the chassis terminal and the other end to either the negative (–) terminal or the positive (+) terminal of the output terminal.

Installation of Chassis Shorting Bar and Wiring Example

When using the chassis shorting bar, fix the bent end of the shorting bar at the terminal position.

For installation at the chassis terminal, use the screws (M3) provided with the unit; for installation at the rear panel output terminal, use the screws (M3) provided on the rear panel.

If the output terminal is in a floating state (not grounded), please refer to the insulation specifications for output terminals when performing the installation.



3. Connect the crimp terminals to the load wires

   Secure the crimp terminal to the hole reserved on the rear panel output terminal for connecting the load wire.

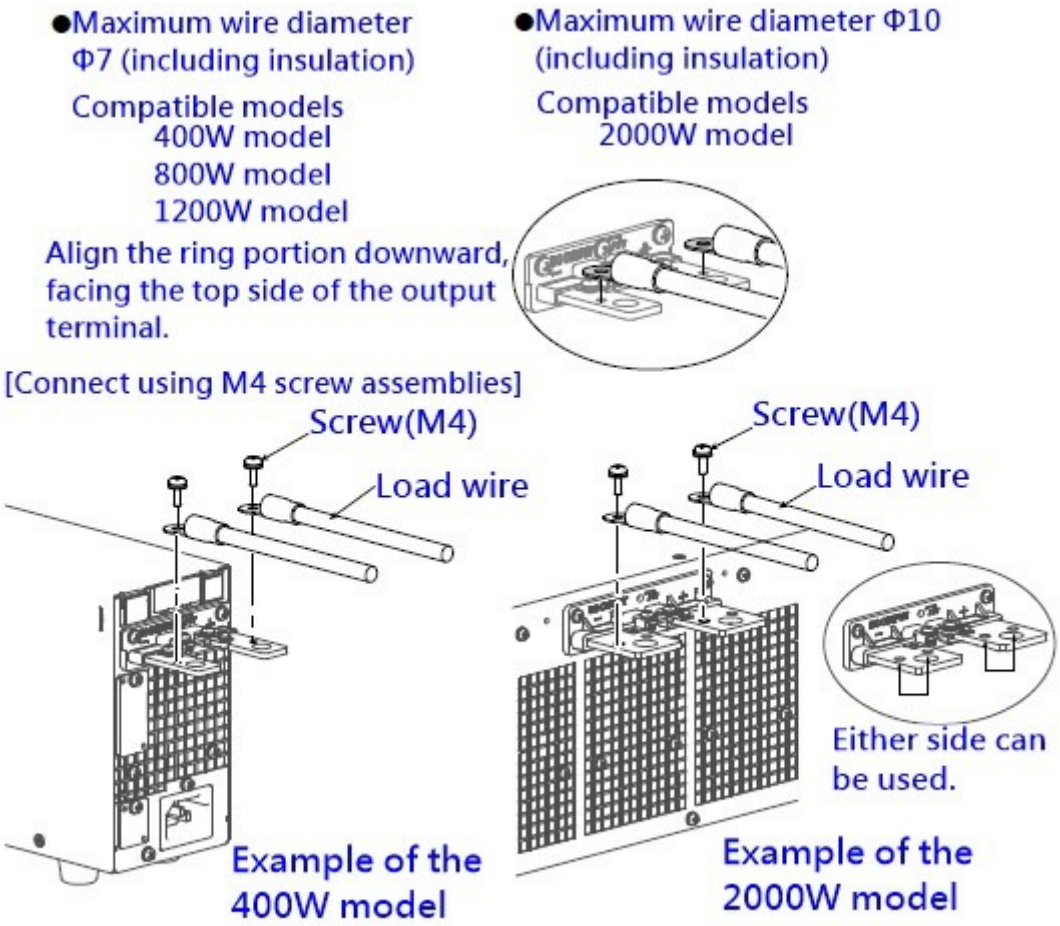
   When installing, use screws that match the size of the crimp terminal.

4. Connect the load wires to the rear panel output terminals

   Use the included screws and washers to secure the wires. To minimize

interference from noise, it is recommended to shorten the wire length as much as possible. If feasible, bundle the positive (+) and negative (–) load wires together to enhance stability and resistance to interference.

Notes：If the direction of the load wires is incorrect, the OUTPUT terminal cover can't be installed.

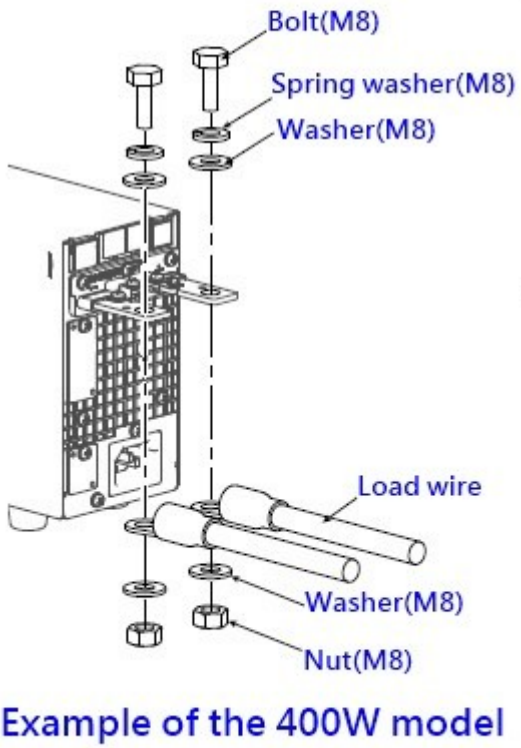


● Wire diameter Φ8~Φ17
(including insulation)

compatible models: A / B type
400W model
800W model
1200W model

Align the ring portion downward, facing the lower side of the output terminal.

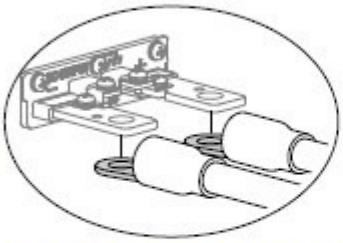
[Connect using M8 screw assemblies]



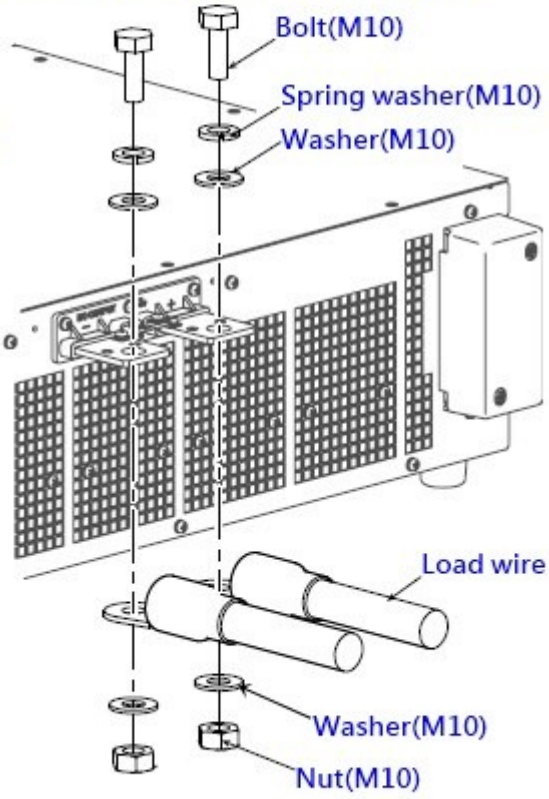
Example of the 400W model

● Wire diameter Φ11~Φ20
(including insulation)

compatible models: A / B type
2000W model



[Connect using M10 screw assemblies]



Example of the 2000W model

Installation of the OUTPUT terminal cover

According to the installation position of the OUTPUT terminal cover adapter, 2 methods can be used to adjust the way the load wires pass through the holes.

Please select the appropriate installation method based on the outer diameter of the load wires (including the insulation layer).

Applicable models：400W / 800W / 1200W

If the outer diameter of the wire (including the insulation layer) is Φ7 or less, use the small diameter wire hole, corresponding to the OUTPUT terminal cover adapter.

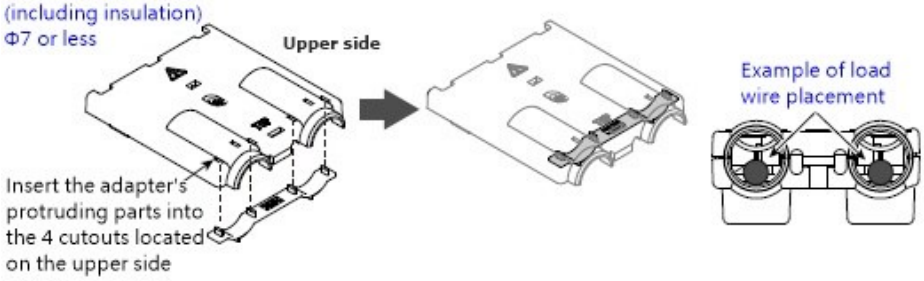
If the outer diameter of the wire (including the insulation layer) is Φ8~Φ17, use the large diameter wire hole, corresponding to the OUTPUT terminal cover adapter.

1. Install the adapter onto the upper side of the OUTPUT terminal cover

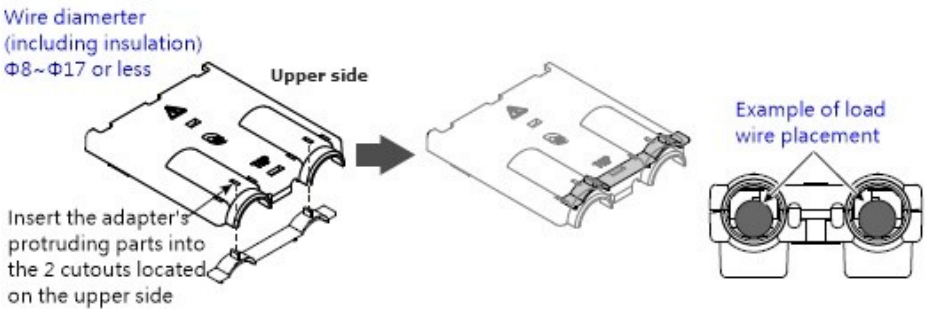
Align the opening on the OUTPUT terminal cover with the positioning protrusion of the inserted adapter.

Notes：The OUTPUT terminal cover can be installed on either the top or bottom side, depending on the wire thickness.

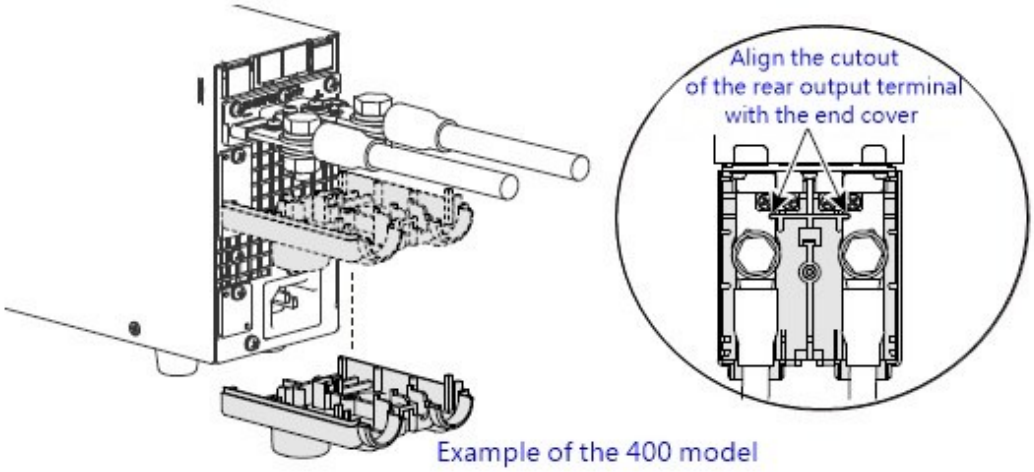
<When using a thinner load wire>



<When using a thicker load wire>



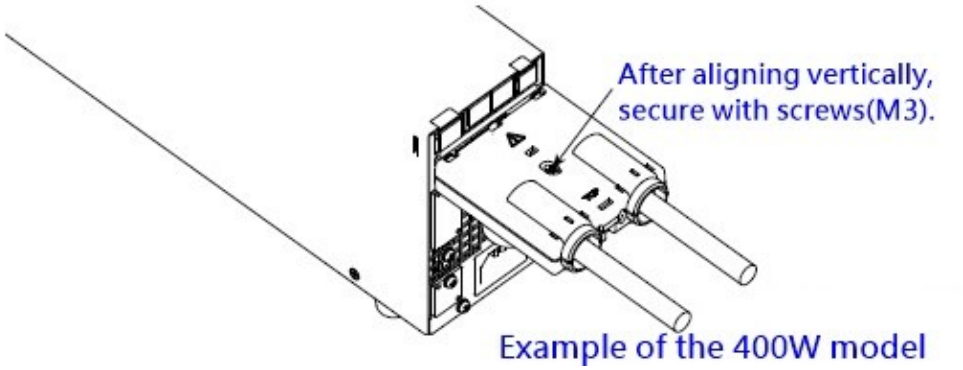
2. Align the bottom side of the OUTPUT terminal cover with the rear panel output terminal.



Example of the 400 model

3. Align the top of the OUTPUT terminal cover with the bottom of the device and secure it using the provided screws.

Make sure the screws are properly tightened to ensure the terminal cover is firmly installed.



Example of the 400W model

Installation of the 2000W model

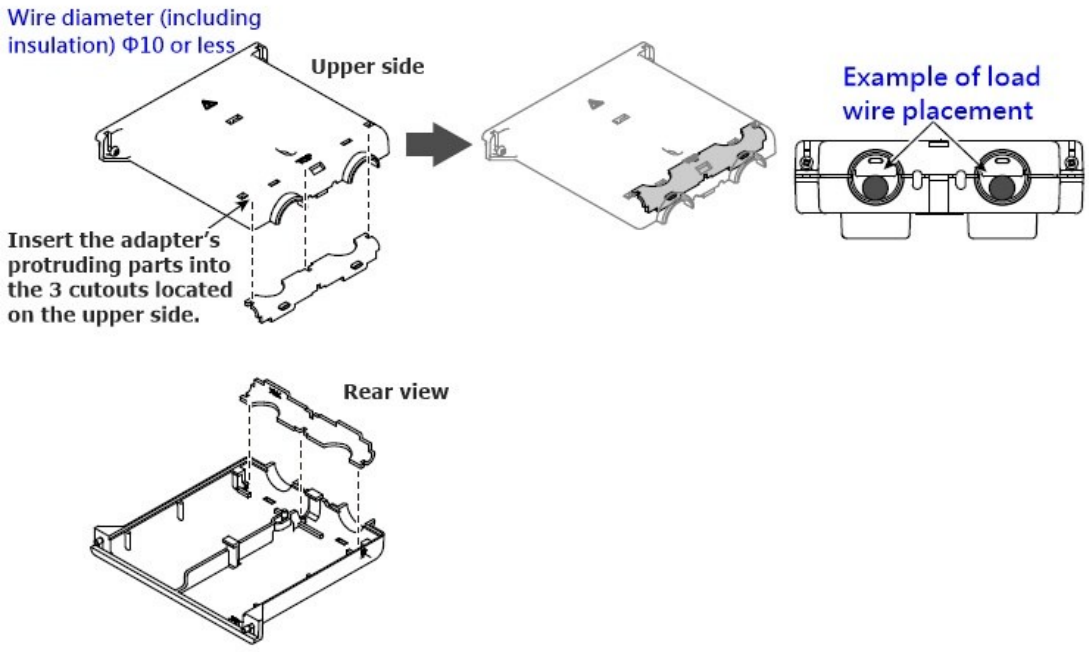
If the outer diameter of the wire (including the insulation layer) is Φ10 or less, use the smaller diameter installation hole to fit the OUTPUT terminal cover adapter.

If the outer diameter of the wire (including the insulation layer) is Φ11 ~ Φ20, use the larger diameter installation hole to fit the OUTPUT terminal cover adapter.

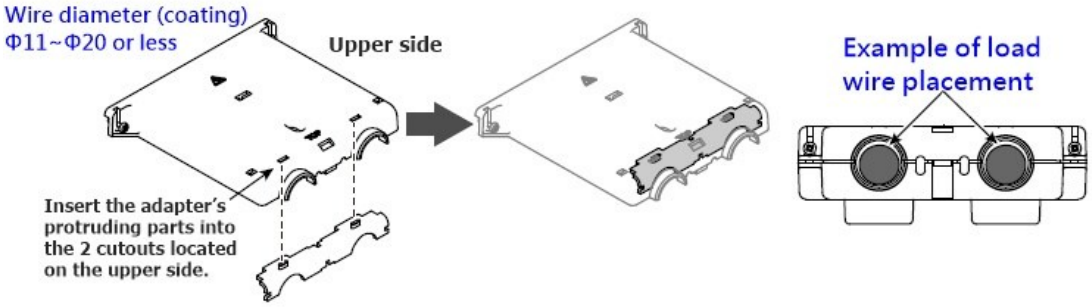
1. Align the top of the OUTPUT terminal cover with the bottom of the device, slightly outward, and then slide it onto the body.

Insert the clips or notches on the OUTPUT terminal cover into the adapter, ensuring that it slides in and locks into place securely.

<When using a thinner load wire>

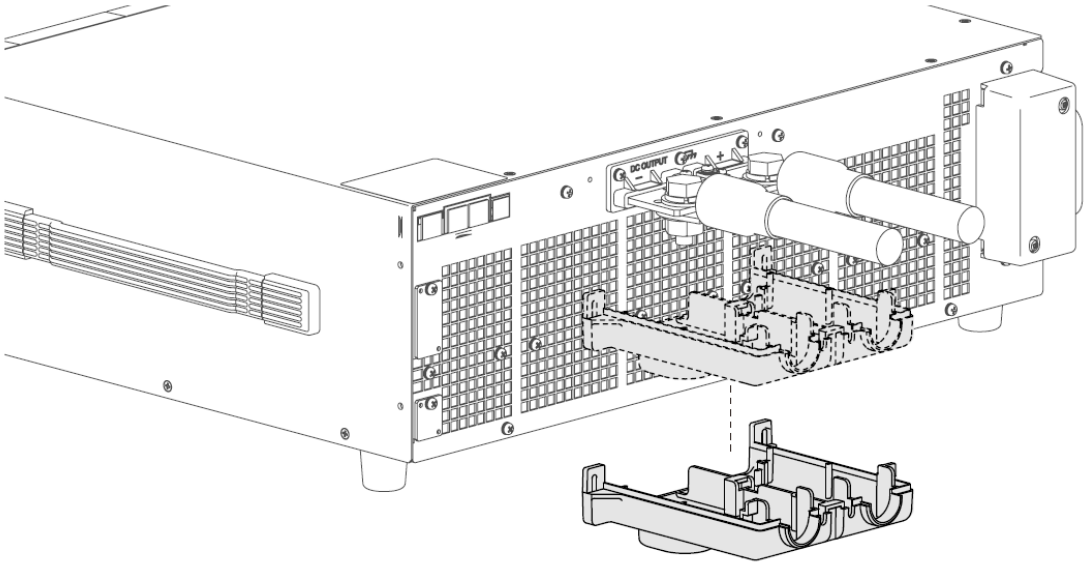


<When using a thicker load wire>



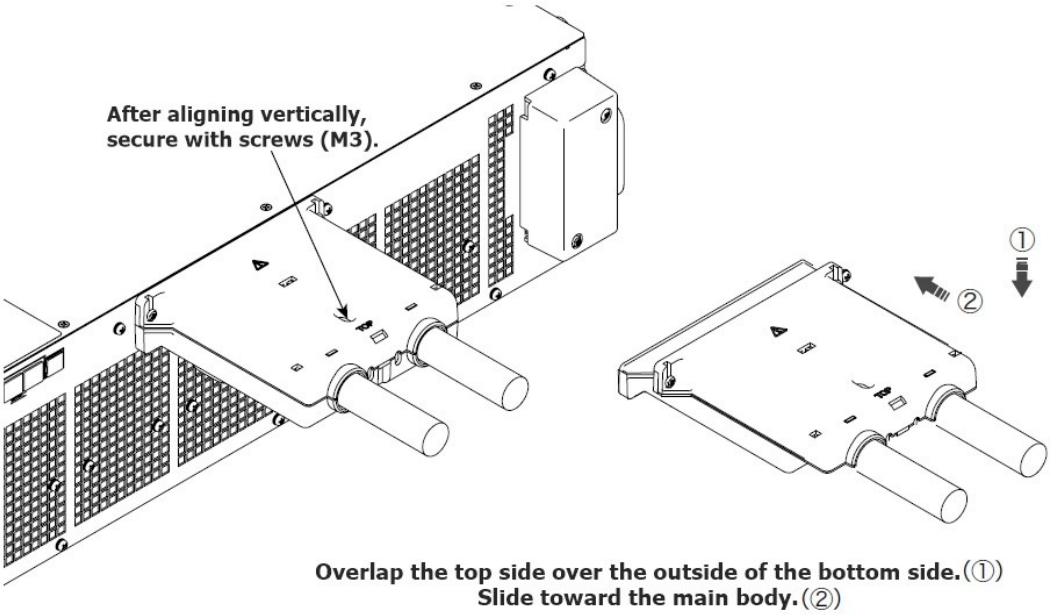
2. Align the bottom side of the OUTPUT terminal cover with the rear panel output terminal.

Ensure that the bottom edge of the terminal cover is properly aligned with the position of the rear panel output terminal, to facilitate subsequent fixing.



3. Align the top of the OUTPUT terminal cover slightly with the outer side of the bottom of the device, then slide and install it onto the body. Afterward, secure it using the provided screws.

Make sure the screws are properly tightened to ensure the terminal cover is securely fastened and will not come loose.



Connect to the front panel output terminal：

The output terminals on the rear panel are marked according to the standard specifications of the product, while the front panel output terminals may not fully comply with the technical specifications in certain cases.

The front panel output terminals do not have a grounding terminal. If grounding is required, connect the chassis terminal on the rear panel to either the – (negative) or

+ (positive) output terminal.

If the output terminal is in an ungrounded (floating) state, please refer to the insulation instructions for the output terminal before use.

When the output current from the front panel output terminal exceeds 10 A (nominal value), the overcurrent protection (FOCP) function for the front panel output terminal will be activated.

⚠ Warning

Risk of electric shock：When using the front panel output terminal, a dedicated safety plug must be used. Do not connect the front panel output terminal with wires that have exposed terminals (such as banana plugs).

Risk of heat or fire：When outputting current from the front panel output terminal, do not exceed 10 A.

Recommended wire and plug（recommend）

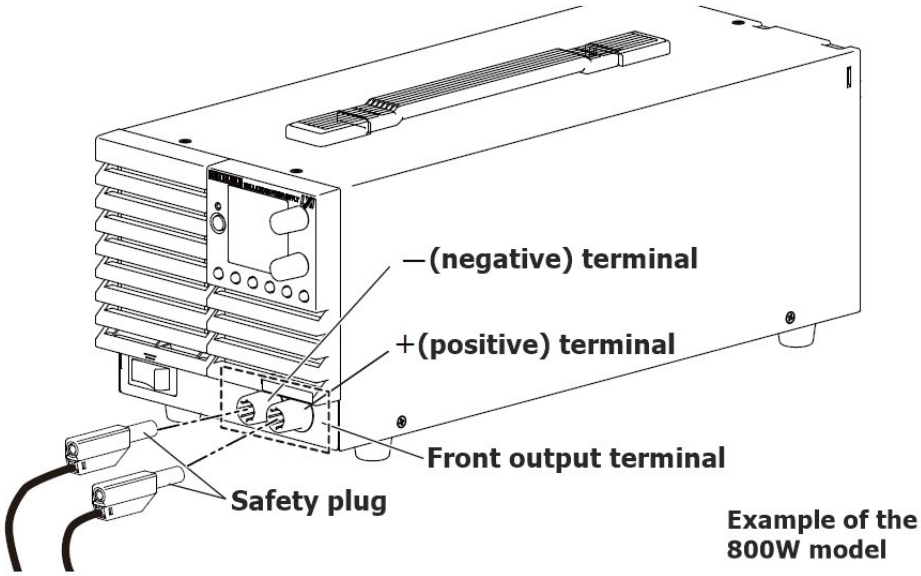
Wire Type：PVC insulated cable cross-sectional area range：0.33 mm²（AWG22）

～ 0.82 mm²（AWG18）

Rated Voltage：1000 V or higher, Recommended Wire Length：3 meters or less,

Output Terminal Plug：Must use plugs with a safety insulation structure.

※ Recommended plug model: safety plug - soldering connection type (AX-DS0009)



1. Install the safety plug onto the load wire. Properly install the safety-type plug at the end of the load wire to ensure a secure connection.

2. Connect the load wire with the safety plug to the front panel output terminal. To minimize the impact of noise on output quality, it is recommended to shorten the length of the wire.

Bundle the + (positive) and – (negative) load wires together. This will enhance the anti-interference effect and improve the neatness of the wiring.

Section 4 Power Supply Activation

Activate the POWER switch（ON）

⚠ Warning

Risk of electric shock：When turning on the POWER switch (ON), whether or not the load wires are connected, always install the OUTPUT terminal cover to ensure safety.

⚠ Cautions

Risk of load damage：

If the system is set to turn ON the output when the POWER switch is turned ON, be sure to set the appropriate OVP (Overvoltage Protection) / OCP (Overcurrent Protection) values before connecting the load.

Initial Startup Instructions

Upon first powering on, the system will start with the output state set to the factory default values.

From the second power-on onwards, the system will start with the output state as it was when the POWER switch was last turned off（unless the output was explicitly set to ON/OFF）.

The output state at power-on can be configured via the system parameter （CF45）.

Power-on Operation Steps

1. Check the Power Cable Connection

Ensure that the power cable is securely plugged in and properly grounded.

2. Verify that the OUTPUT terminal cover has been installed.

The OUTPUT terminal cover is not installed at the factory; make sure it is securely installed before operation.

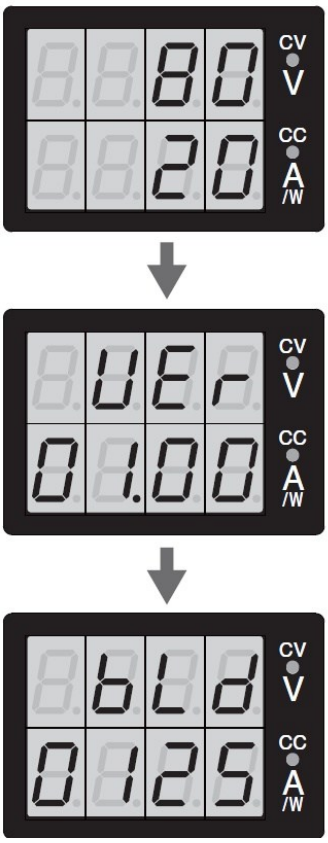
3. Turn on the POWER switch（I）

All indicator lights will turn on, and the voltage and current display areas will show the following information：

[Rated Voltage and Rated Current] → [Firmware Version] → [Internal Version Number]

Each piece of information will be displayed for approximately 1 second.

A few seconds later, the system will enter the standby operation mode（displaying the measured values）.



Displays the rated voltage and rated current values.
(Take DCS3104B as an example)

Display the firmware version
EX：Ver.1.00

Display the internal version number
EX：BLD 0125

Turn off the POWER switch（OFF）

Switch the POWER switch to the OFF（○）position.

If the AC input power is disconnected, the screen will display 'AC-FAIL', and the system model will show 'DCS Series', indicating that the device is powered off.



Power display shows OFF

Power Switch State Memory and Precautions

This product will remember the panel settings prior to turning off the POWER （excluding the ON/OFF output status settings）.

Through system settings（parameter CF45）, you can choose the default output state when the POWER is turned on.

If the power switch is turned off immediately after changing settings, the new settings may not be saved.

⚠ Cautions

When performing the ON/OFF operation of the POWER switch, please wait at least 10 seconds after the panel display turns off before turning the power back on.

Repeatedly switching ON/OFF within a short time may cause surge currents that could damage the current-limiting circuit, leading to damage to the POWER switch and internal fuses, shortening the lifespan or causing malfunction.

Section 5 Remote Sensing Function

The remote sensing function can reduce the voltage drop caused by the load wire resistance, thereby stabilizing the actual output voltage at the load side.

The supported remote sensing compensation range for this product is as follows：

Please select load wires with sufficient current capacity to avoid exceeding the specification range due to excessive voltage drop compensation.

⚠ When using remote sensing control, the voltage at the sensing point（load side）must not exceed the rated output voltage.

Under the maximum output voltage condition, when the remote sensing function is used, the system output will automatically be limited to the maximum output voltage（i.e., 105% of the rated output voltage）.

The sensing point（load side）should be equipped with an electrolytic capacitor to improve stability.

To reduce external noise interference, the following wiring methods are recommended：

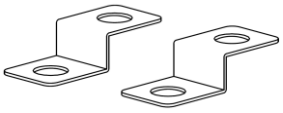
Twisted pair cables or dual-core shielded cables. If using shielded cables, please connect the shielding layer to the device chassis or to the ground point at the load side.

	Type A	Type B	Type C	Type D
Voltage compensation	approximately 1.5V per direction	approximately 4V per direction	approximately 5V per direction	approximately 5V per direction

At the factory, a sense short-circuit bar has been installed between the sensing terminal and the DC output terminal.

If the sensing function is not being used, make sure to install the sense short-circuit bar.

If the short-circuit bar is lost or damaged, please contact MICROTEST authorized agents or distributors to obtain a replacement.



Connection of Remote Sense Wires

⚠ **Warning：** Risk of electric shock and potential internal circuit damage. 當 When the POWER switch is in the ON position, wiring operations on the remote sense terminals are strictly prohibited.

Regarding the remote sense wires, please ensure that insulated wires with a voltage rating higher than the rated insulation voltage of the product are used.

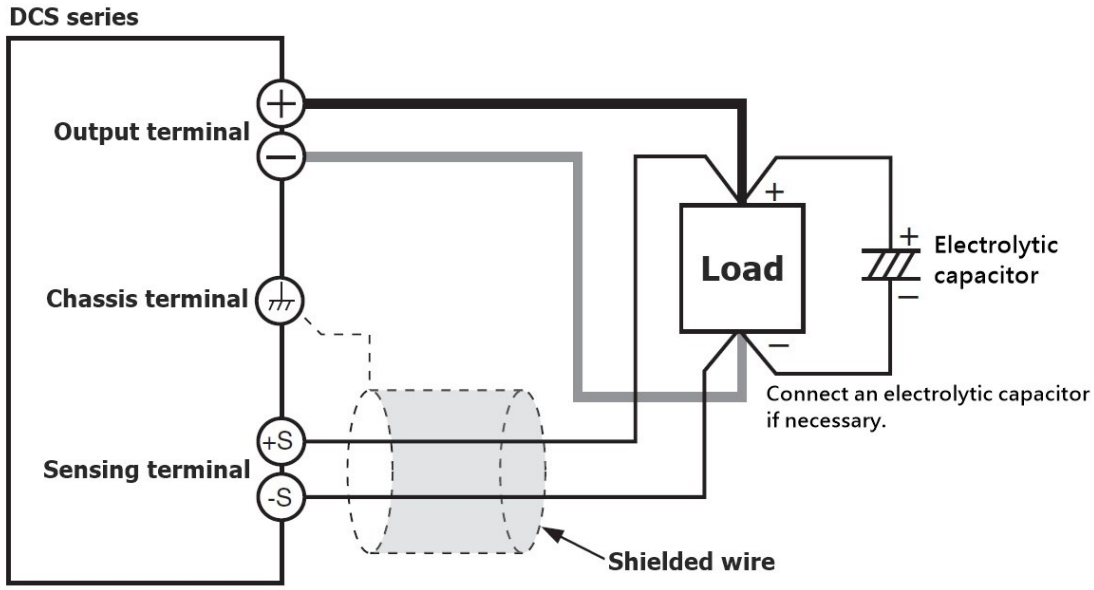
For any exposed shielding parts, protective sleeves or sheaths with a voltage rating higher than the product's rated insulation voltage must be added to provide enhanced protection.

Even if the output is set to OFF or the POWER switch is in the OFF position,

there may still be residual voltage at the output terminal if the bleeder circuit is set to OFF（CFO1：oFF）. When performing operations on the remote sense terminals, please set the bleeder circuit to ON（CFO1：nor / HYP）. When the POWER switch is set to ON, be sure to install the OUTPUT terminal cover.

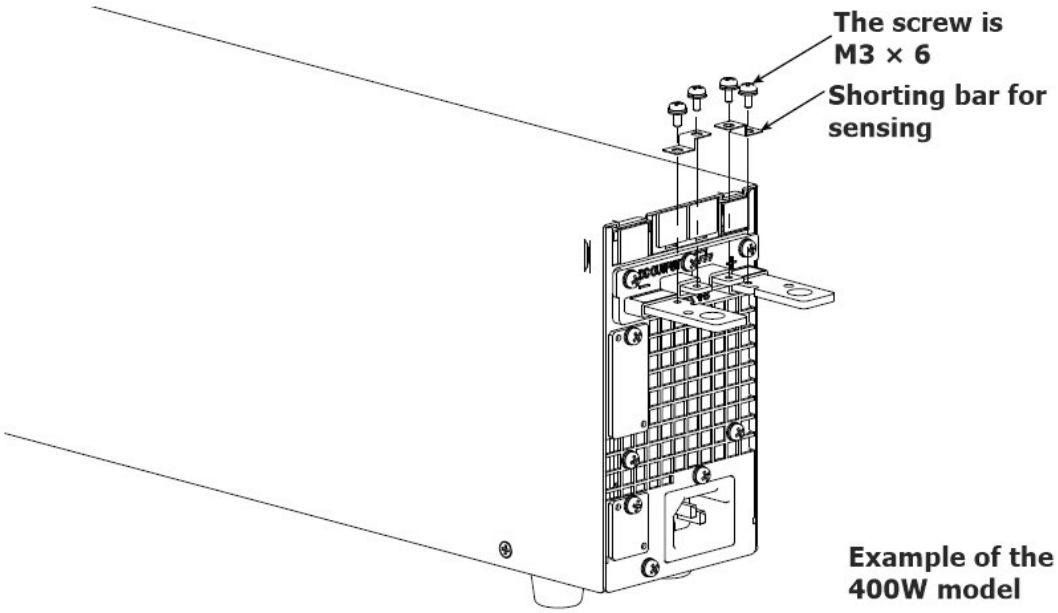
If the remote sense wire becomes disconnected, the output voltage may rise by several volts. To prevent the output voltage from exceeding the set voltage value, please be sure to set the appropriate OVP（Over Voltage Protection）trigger point.

If the remote sense function is no longer in use, make sure to reconnect the sensing short-circuit bar.



1. Turn off the POWER switch（OFF）.

2. Remove the previously connected sense shorting bar between the sense terminal and the DC OUTPUT terminal.



3. Install the crimp terminal onto the sense wire and connect it to the sense terminal and the sense terminal（load side）.

   Use crimp terminals that match the screw size and securely fix all wires.

   If shielded cables can't be used, please twist the + (positive) and − (negative) wires together before use to reduce interference.

Connecting an Electrolytic Capacitor to the Load Side：

When the wiring's inductive reactance is too high, the following phenomena may occur：

Oscillation：If the load wiring is too long, the phase shift between the wiring's inductance and capacitance can cause oscillations in the output.

Output Voltage Fluctuations：When the load current undergoes sudden changes or pulses, the wiring's inductance may lead to significant fluctuations in the output voltage.

If these issues persist after twisting the load wires together, it is recommended to install an appropriate electrolytic capacitor at the load side to mitigate the inductive reactance's effects.

Suggested Electrolytic Capacitor Values

Capacitance：0.1 μF to approximately 100 μF

Voltage Rating：Must be higher than 120% of the rated output voltage of the product.

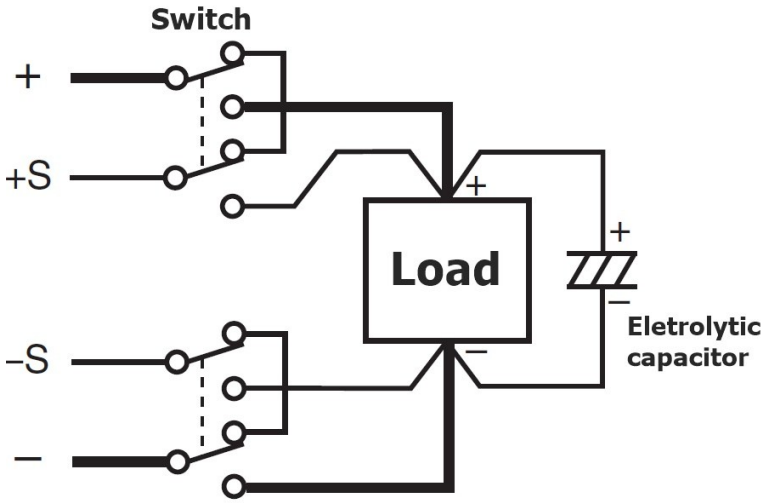
	Type A	Type B	Type C	Type D
Voltage Rating	Above 48V	Above 96V	Above 288V	Above 780V

When using a mechanical switch between this product and the load

When a mechanical switch is used for ON/OFF control between this product and the load, please follow the wiring instructions below：

As shown in the diagram, if a switch is also connected to the sensing wire, make sure to switch both the load wire and sensing wire simultaneously (ON/OFF).

Before switching the load via the mechanical switch, ensure that the OUTPUT key on this device is set to OFF.



Chapter 4 Basic Functions

This section explains the ON/OFF control of the output and the basic operating procedures that can be performed on the front panel.

Section 1 Display of Test Values and Set Values

When displaying current and voltage, there are the following 2 types of display states

· Measurement Value Display

· Set Value Display

In addition to displaying voltage and current, the display also shows power values, OVP, OCP, UVL set values, and system configuration details.

- **Measurement Value Display：**



In this state, the current output voltage and output current are shown on the display. The SET key will be off. Even in the measurement display mode, you can still adjust the output voltage and output current settings.

- **Power Value Display：**



When the test value display is active, pressing the PWR DSPL key will display the output voltage on the voltage display section and the output power on the current display section. The output power is calculated based on the output voltage and output current values.

While displaying the power, the PWR DSPL key will be lit. Pressing the PWR DSPL key again will turn it off and return the display to showing the output current.

- **Setting Value Display：**



Pressing the SET key will light up the key, displaying the current set values for output voltage and output current. Pressing the SET key again will turn it off and revert to displaying the measured values.

When external control is in use, the SET key will be disabled. Even if the SET key is pressed, the set values will not be displayed.

- **Display the settings of OVP / OCP / UVL：**



Press the OVP/OCP key, the key lights up, and the current settings for overcurrent/overvoltage protection will be displayed.

Press the OVP/OCP key again, and the current undervoltage limit value will be displayed.

- **Display system configuration settings**



Press the CONFIG key, the key lights up, and it displays the current system configuration settings.

Section 2 Panel Operation Instructions

- **When displaying test values, set values, and OVP/OCP set values：**



Adjust the voltage value by rotating the VOLTAGE knob, and adjust the current value by rotating the CURRENT knob.

When the output is ON, pressing the SET key will display the set values, allowing you to simultaneously confirm the actual voltage or current set values while adjusting the

- **Fine-tuning（FINE）:**

When the SHIFT key is pressed while rotating the VOLTAGE knob or the CURRENT knob, the adjustment increment will be smaller. When the output is ON, the increment will be even smaller.

Even if the VOLTAGE or CURRENT knob is rotated, there may be cases where the displayed set voltage and set current do not change, as the resolution of the adjustment is finer than that of the display. The display will only change once the adjustment reaches the minimum decimal place of the displayed set voltage or set current.

Section 3 Output Operation Instructions

- **Output control：**



Each time the OUTPUT key is pressed, it toggles the ON/OFF state. When the output is ON, the OUTPUT LED lights up, and when the output is OFF, the OUTPUT LED goes off.

When the output is ON, the current set values are reflected in the output. If the set values are changed while the output is ON, the changes are immediately reflected in the output.

If the output is OFF and the set values are changed, the setting values will be displayed （SET key lit）. Once the settings are made, pressing the OUTPUT key will turn the output ON.

In external control, the ON/OFF state of the output can also be controlled.

- **Setting limit：**

You can set limits on the voltage or current settings.
In the system configuration settings (CF22/CF23), you can set a limit to not exceed approximately 95% of the Over Voltage Protection（OVP）action point/Over Current Protection（OCP）action point, or not be lower than the Low Voltage Limit (UVL action point).
When the output is ON, this prevents accidentally setting the voltage or current above the OVP/OCP action points, which could turn the output OFF, and also prevents setting the voltage or current below the UVL action point.

- **Output ON/OFF when the power is ON：**

In the factory settings, the output state when the power is ON is set to OFF. The output state when the power is ON can be configured in the system settings.

Regarding the 2000W model's breaker settings, the breakers for OVP/ OCP/ FOCP/ SD/PRL ALM actions are set to "trip"(CF25: ⊓). When the OVP action point is set below the output voltage setting, the OVP will trigger each time the POWER switch is turned ON, causing the POWER switch to turn OFF.

Even if the settings remain unchanged in this state, set the external control output ON/OFF setting to OFF. After setting the POWER switch to ON, adjust the OVP action point setting. Alternatively, press both the LOCAL key and PWR DSPL key simultaneously while turning ON the POWER switch to return to the factory settings of the product.

⚠ **Cautions：**

There is a possibility of damaging the load.

If the output is turned on while the power is connected, please set the appropriate OVP/OCP action points for the connected load before disconnecting the POWER switch.

- **Rise State Settings When Output is ON：**

When the output is set to ON, it can be configured to start as a Constant Voltage (CV) power supply or as a Constant Current (CC) power supply.

In the system configuration item for the rising state when output is ON (CF02: CC /CU), select CV priority when starting as a Constant Voltage (CV) power supply (CF02: CU)； select CC priority when starting as a Constant Current (CC) power supply (CF02: CC).

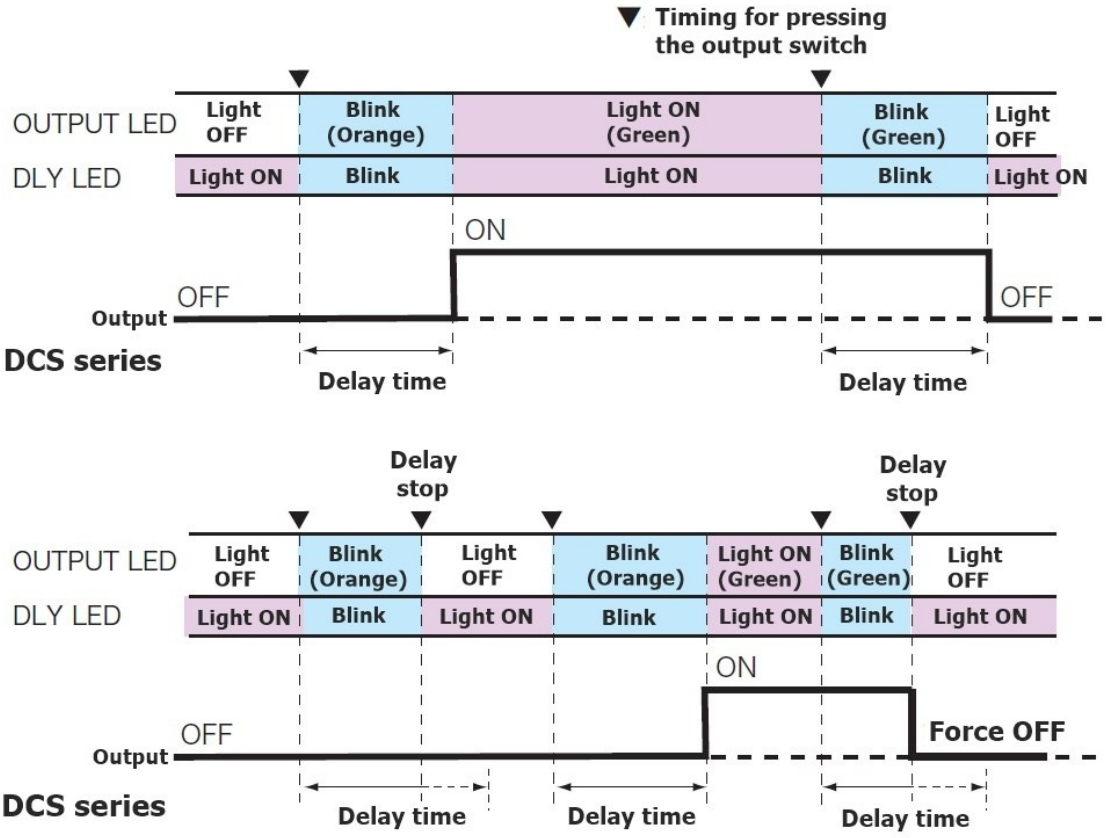
- **Output ON/OFF Delay Setting：**

You can set a delay time from pressing the OUTPUT key to when the actual output is turned ON/OFF. This feature allows you to adjust the response time based on the load characteristics, providing a convenient function when you want to turn the output ON/OFF.

In the system configuration settings, you can set the output ON delay（CF08）and output OFF delay（CF09）. When setting, the DLY LED will light up. During the

output ON/OFF delay, both the DLY and OUTPUT LEDs (ON：orange / OFF：Green) will blink. When the output ON/OFF delay is in progress, pressing the OUTPUT key will cancel the operation, and the output will remain OFF. Pressing the OUTPUT key again will restart the output ON delay.

In the system configuration, the output ON/OFF delay function can be used when controlling the output ON/OFF through external grounding (CF14：Enh).



- **Soft Start / Stop Function：**

You can set the rise/fall time of the output voltage/current.

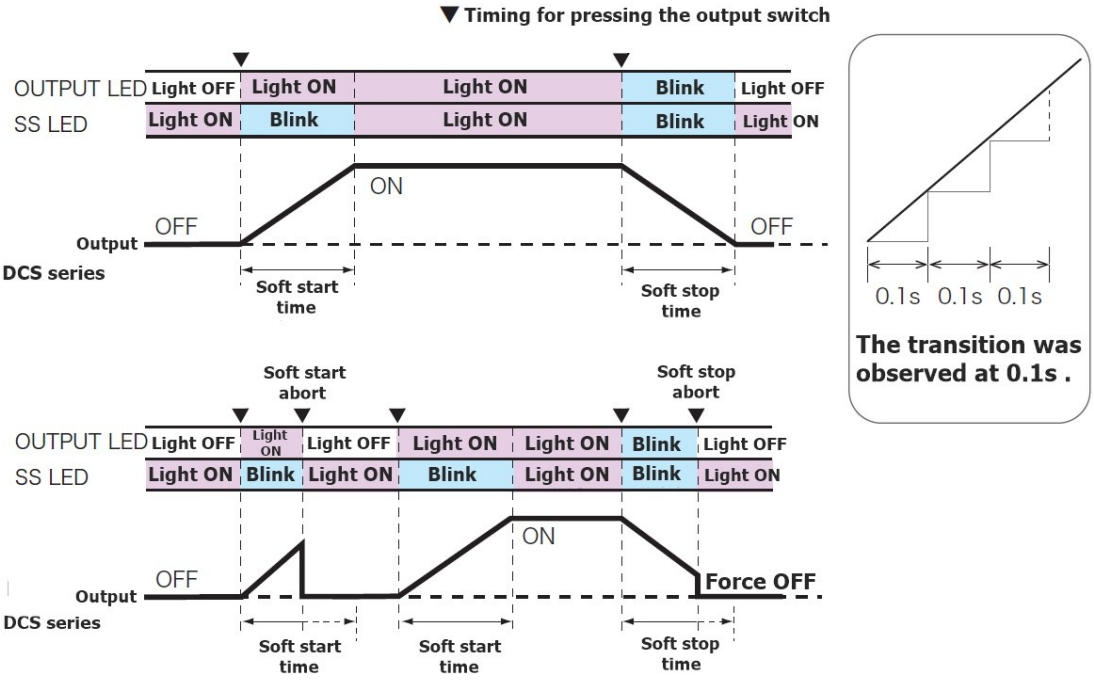
It is effective when preventing false triggering of the over voltage protection

circuit/over current protection circuit during rapid rise/fall of output voltage/current, when the load can't keep up. You can set the soft start time （CF04 / CF06） and soft stop time（CF05 / CF07）for system configuration items. The soft start / stop time applies to the rise state(CF02：CU / CC) when the output is ON and is effective according to the set action mode.

After setting, the SS LED lights up. During soft start operation, the SS LED blinks, and the OUTPUT LED lights up（green）. During soft stop operation, both the SS and OUTPUT LEDs blink（green）. If the OUTPUT key is pressed during the soft start/stop operation, the process will be interrupted, and the output will be OFF. Pressing the OUTPUT key again will restart the soft start.

When the bleeder circuit is set to OFF, even during the soft stop operation, there may be instances where the rise/fall is not smooth.

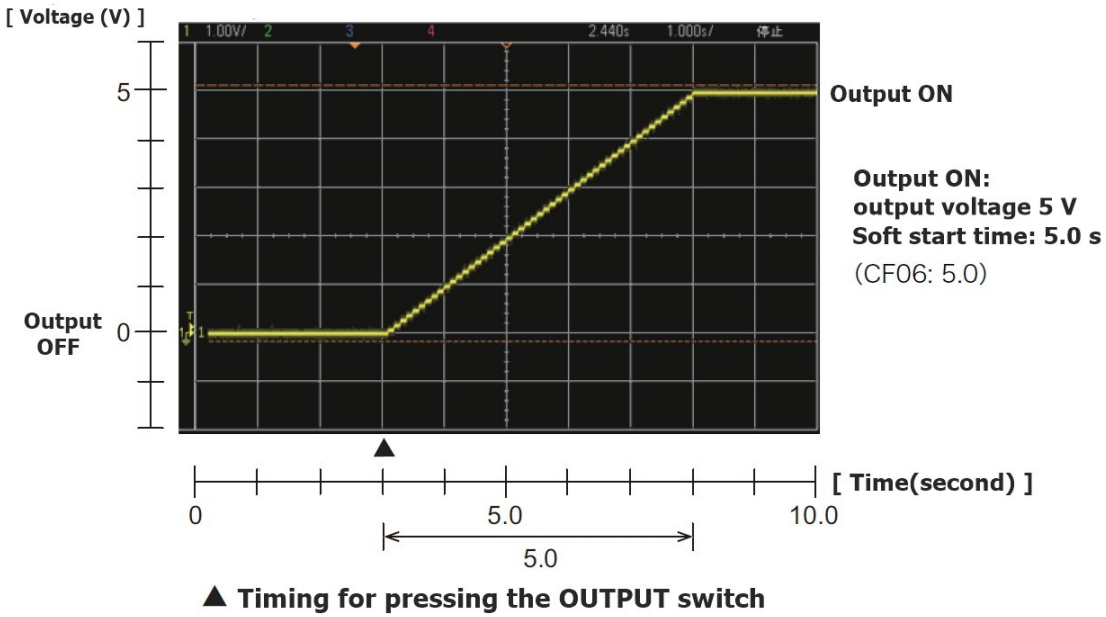
In the system configuration settings, the soft start/stop function can be used when output ON/OFF control is implemented via external grounding（CF14：Enh）.



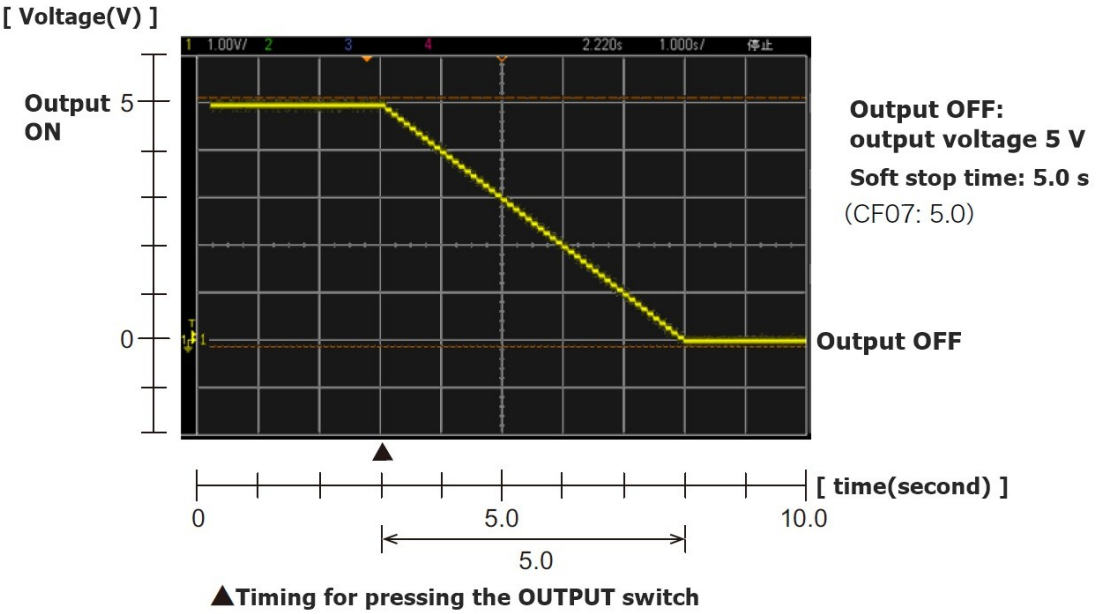
- Soft Start / Stop Waveform

Display the waveform during soft start/soft stop operation.

- The waveform during the soft start operation



- The waveform during the soft stop operation



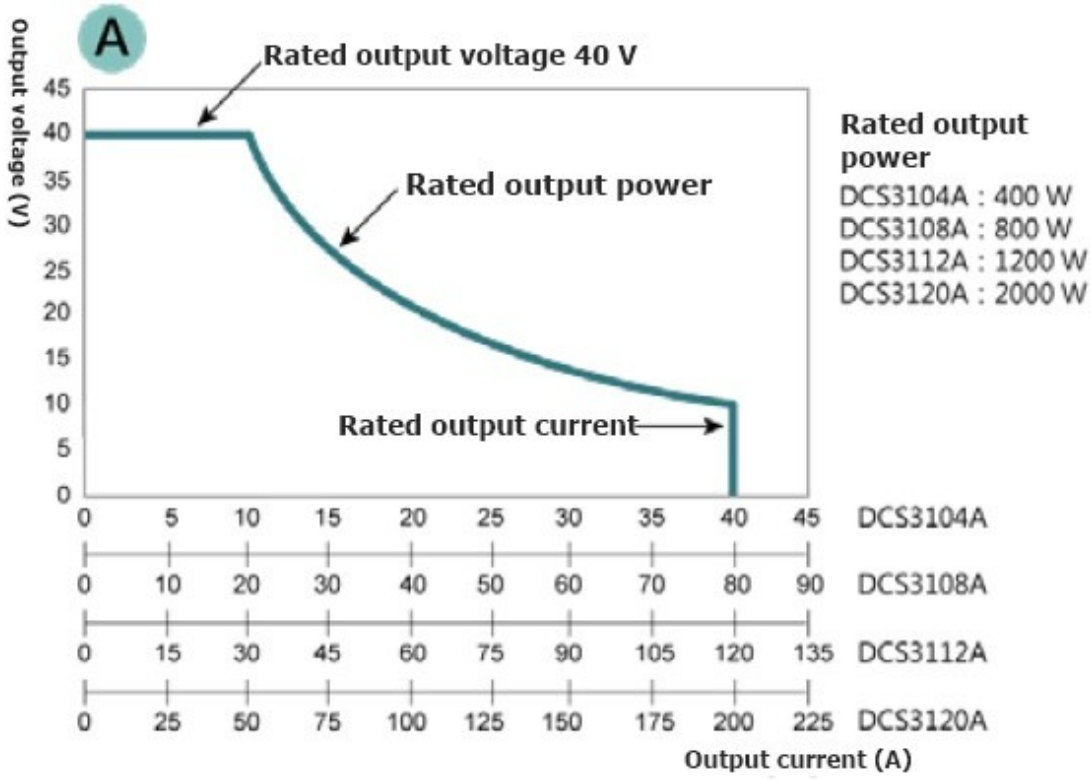
▲Timing for pressing the OUTPUT switch

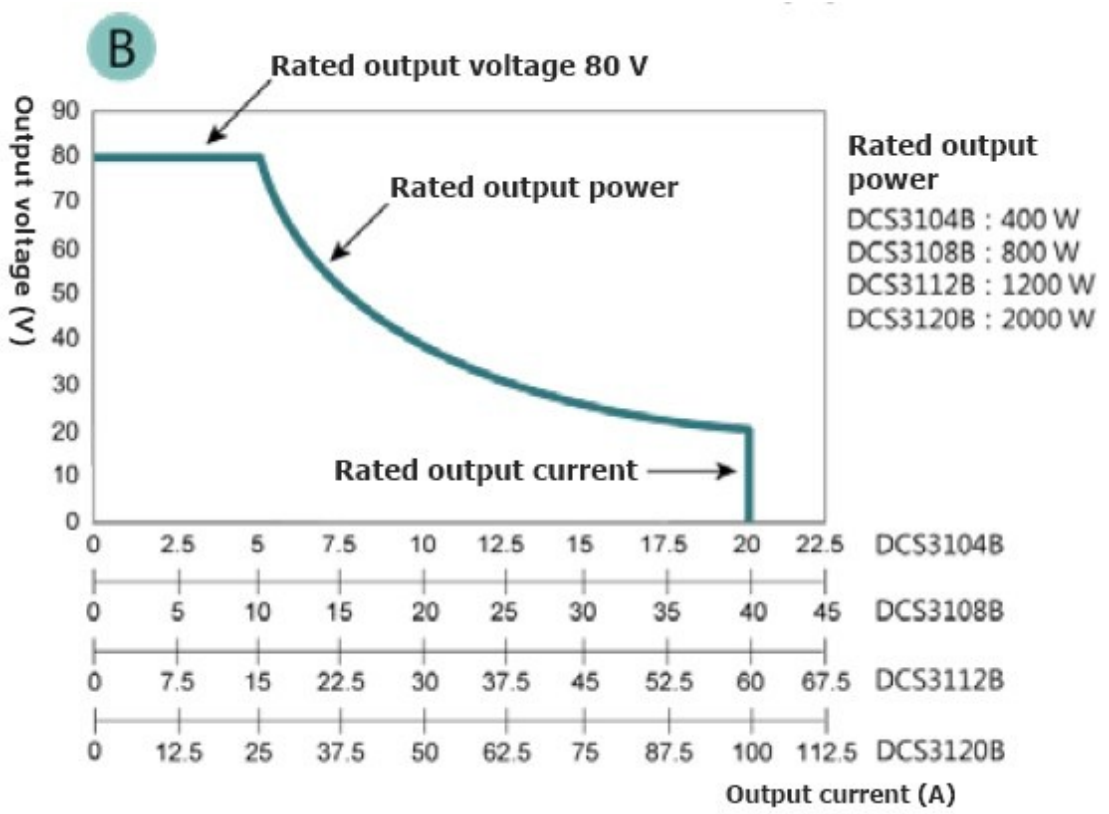
Section 4 Operation Overview

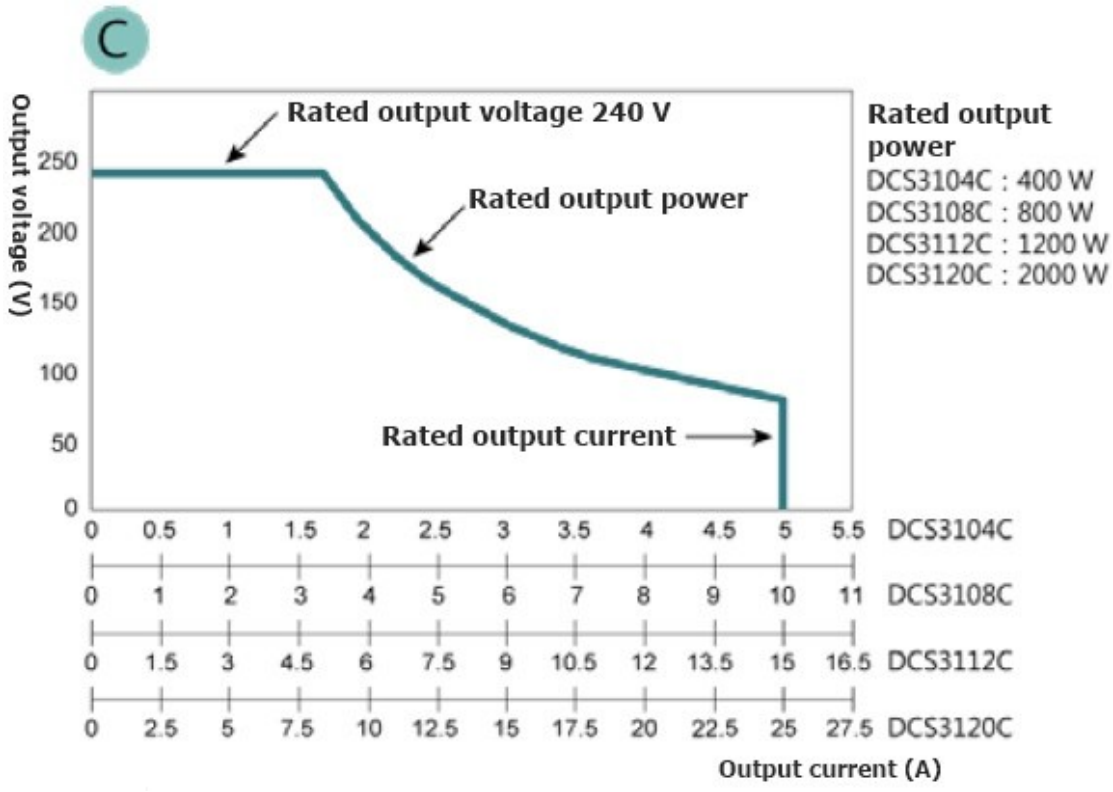
This product is a Constant Voltage（CV）/ Constant Current（CC）DC stabilized power supply device. Within its rated output power, it can provide a wide range of voltage and current outputs.

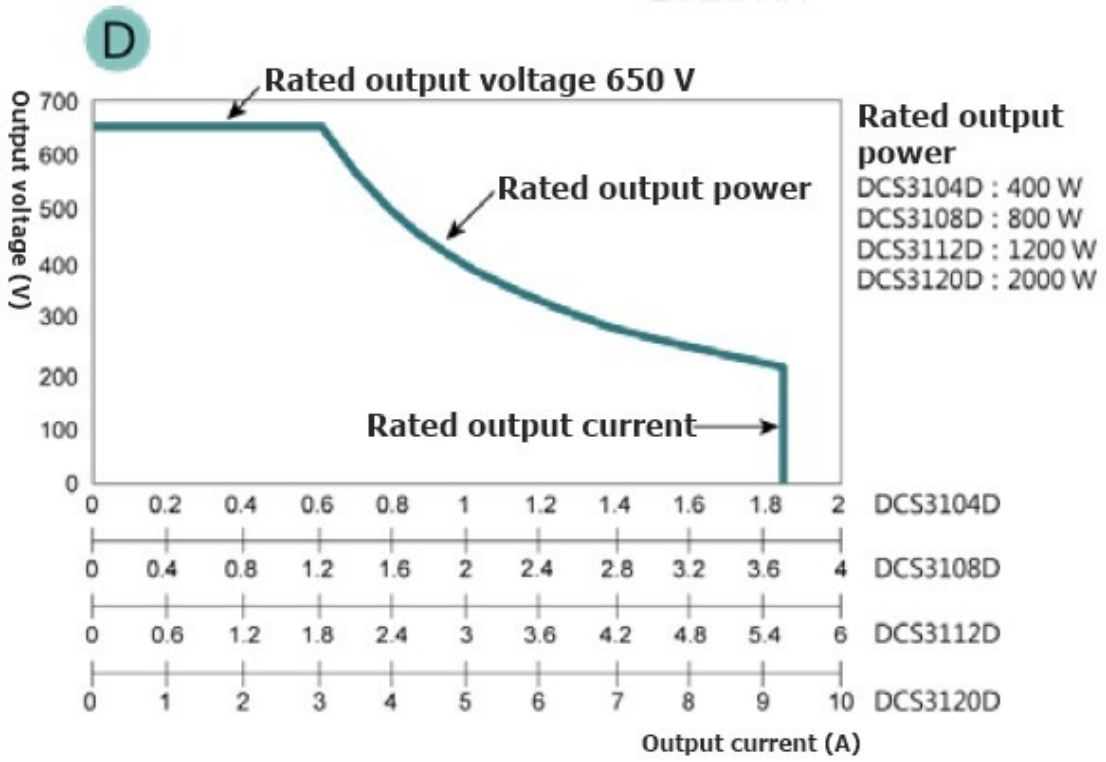
If set to "output voltage x output current" ≦ "rated output power" , it can be used as a standard CV / CC power supply device.

If set to "output voltage x output current > rated output power", the actual output is limited based on the power limit (POWER LIMIT：approximately 105% of the rated output power). The output voltage or current will change depending on the load value.




B
Rated output voltage 80 V
Rated output power
Rated output current
Output voltage (V)
0 10 20 30 40 50 60 70 80 90
Rated output power
DCS3104B : 400 W
DCS3108B : 800 W
DCS3112B : 1200 W
DCS3120B : 2000 W
0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 DCS3104B
0 5 10 15 20 25 30 35 40 45 DCS3108B
0 7.5 15 22.5 30 37.5 45 52.5 60 67.5 DCS3112B
0 12.5 25 37.5 50 62.5 75 87.5 100 112.5 DCS3120B
Output current (A)


C
Rated output voltage 240 V
Rated output power
Rated output current
Output voltage (V)
0 50 100 150 200 250
Rated output power
DCS3104C : 400 W
DCS3108C : 800 W
DCS3112C : 1200 W
DCS3120C : 2000 W
0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 DCS3104C
0 1 2 3 4 5 6 7 8 9 10 11 DCS3108C
0 1.5 3 4.5 6 7.5 9 10.5 12 13.5 15 16.5 DCS3112C
0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25 27.5 DCS3120C
Output current (A)


D
Rated output voltage 650 V
Rated output power
Rated output current
Output voltage (V)
700
600
500
400
300
200
100
0
Rated output power
DCS3104D : 400 W
DCS3108D : 800 W
DCS3112D : 1200 W
DCS3120D : 2000 W
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2 DCS3104D
0 0.4 0.8 1.2 1.6 2 2.4 2.8 3.2 3.6 4 DCS3108D
0 0.6 1.2 1.8 2.4 3 3.6 4.2 4.8 5.4 6 DCS3112D
0 1 2 3 4 5 6 7 8 9 10 DCS3120D
Output current (A)

Section 5 CV Power Supply and CC Power Supply

This product functions as both a constant voltage power supply and a constant current power supply. Even if the load changes, the output voltage and output current remain unchanged. The operating state of the constant voltage power supply is called the Constant Voltage (CV) mode, and the operating state of the constant current power supply is called the Constant Current (CC) mode. The operation mode is determined by the following three parameters：

1. Output voltage setting value（Vs）

2. Output current setting value（Is）

3. Load Resistance value（RL）

The following explanation is provided regarding the above working principle：

The above describes the operating modes of this product. Calculate the resistance value Rc (Rc = Is/Vs, resistance at the intersection point) based on the load resistance RL, current, and voltage setting values. The operating point of the power supply lies within the linear region defined by RL = Rc. Section A is designed to operate in Constant Voltage (CV) mode, while Section B is designed for Constant Current (CC) mode. This line represents the condition where voltage equals current, or equivalently, where the output current equals the set current, indicating a matched load. When the load resistance RL is greater than Rc, the operating point

falls within region A, and the power supply operates in CV mode (point p). At this time, the current setting value Is serves as the current limit.

When operating in CV mode, the output voltage is maintained at the set voltage value. The output current I is determined by I = Vs/RL , which is less than the current limit Is. In this case, the set current value is not reached.

For loads that generate transient peak currents, the current limit should be set high enough not to restrict the peak current.

Conversely, when the load resistance RL is less than Rc, the operating point falls within region B, and the power supply operates in CC mode (point q). In this mode, the voltage setting Vs acts as the voltage limit.

When operating in CC mode, the output current is maintained at the set current value. The output voltage V is determined by V = Is × RL, which is less than the voltage limit Vs. Therefore, the set voltage value is not fully applied.

Crossover point：

The CV / CC mode automatically switches between modes in response to changes in the load. The point at which the mode switches is called the crossover point.

For example, when operating in CV mode, if the load changes such that the output current reaches the current limit, the power supply automatically switches to CC mode to protect the load. Similarly, when operating in CC mode, if the output

voltage reaches the voltage limit, it switches to CV mode.

Examples of operating in CV / CC mode：

As an example, consider a power supply with a rated output voltage of 100 V and a rated output current of 10 A.

Connect an 8 Ω load resistor (RL) to the output terminals of the power supply. Set the output voltage to 30 V and the output current to 5 A. In this case, Rc = 30 V / 5 A = 6 Ω. Since 8 Ω > 6 Ω (i.e., RL > Rc), the power supply operates in CV mode. When increasing the voltage in CV mode, the voltage at the crossover point can be calculated as Vs = Is × RL = 5 A × 8 Ω = 40 V. Therefore, the voltage can be increased up to 40 V. If the voltage is increased beyond this point, the operating point reaches the crossover point, and the mode automatically switches to CC mode. To maintain CV mode operation, increase the current limit value.

Next, connect a 5 Ω load resistor (RL) to the output terminals of the power supply. Set the output voltage to 30 V and the output current limit to 5 A. In this case, Rc = 30 V / 5 A = 6 Ω. Since 5 Ω < 6 Ω (i.e., RL < Rc), the power supply operates in CC mode. When increasing the current in CC mode, the crossover point can be calculated as Vs / RL = 30 V / 5 Ω = 6 A. Therefore, the current can be increased up to 6 A. If the current is increased beyond this value, the operating point reaches the crossover point, and the mode automatically switches to CV mode.

To maintain operation in CC mode, increase the voltage limit setting.

Using as a Constant Voltage（CV）/ Constant Current（CC）Power Supply：

When used as a constant voltage power supply, the current setting serves as the limit for the current flowing into the load.

When used as a constant current power supply, the voltage setting serves as the limit for the voltage applied to the load. When the set limit value is reached, the operating mode automatically switches. When the operating mode changes, the illumination of the CV LED (green) and CC LED (red) on the display changes accordingly to reflect the operation mode.

1. **Press the SET key to display the set values; the SET indicator will light up.**
2. **Turn the VOLTAGE knob to set the voltage value. The voltage setting range is 0~105% of the rated output voltage.**

Series	Output voltage range		Series	Output voltage range
DCS3104A	0~42V		DCS3108A	0~42V
DCS3104B	0~84V		DCS3108B	0~84V
DCS3104C	0~252V		DCS3108C	0~252V
DCS3104D	0~682.5V		DCS3108D	0~682.5V
Series	Output voltage range		Series	Output voltage range
DCS3112A	0~42V		DCS3120A	0~42V
DCS3112B	0~84V		DCS3120B	0~84V
DCS3112C	0~252V		DCS3120C	0~252V
DCS3112D	0~682.5V		DCS3120D	0~682.5V

3. **Turn the CURRENT knob to set the current value. The current setting range is 0~105% of the rated output current.**

Series	Output voltage range		Series	Output voltage range
DCS3104A	0~42A		DCS3108A	0~84A
DCS3104B	0~21A		DCS3108B	0~42A
DCS3104C	0~5.25A		DCS3108C	0~10.5A
DCS3104D	0~1.943A		DCS3108D	0~3.885A
Series	Output voltage range		Series	Output voltage range
DCS3112A	0~126A		DCS3120A	0~210A
DCS3112B	0~63A		DCS3120B	0~105A
DCS3112C	0~15.75A		DCS3120C	0~26.25A
DCS3112D	0~5.828A		DCS3120D	0~9.71A

4. **Press the OUTPUT key to turn the output ON. The SET indicator turns off, and the OUTPUT LED lights up.**

   When operating as a constant voltage power supply, the CV LED (green) lights up. When operating as a constant current power supply, the CC LED (red) lights up.

Even when the output is ON, you can perform settings using Step 2 and Step 3 while monitoring the actual output voltage or output current. You can also set the actual output voltage while checking the power.

In the system configuration settings, you can specify the rise behavior when output is turned ON（CF02: CU/ CC）.

Set the configuration in accordance with the intended operating mode. Select CV priority when using the power supply in constant voltage mode, and CC priority when using it in constant current mode. This helps prevent voltage overshoot when

the output is turned ON.

When used as a slave unit, the system automatically defaults to CC priority. When the output is turned ON, the internal capacitor begins charging. Due to the set current limit, the unit may momentarily switch to CC mode during this process.

Section 6 Protection Features Description

This product features two types of protection functions: output cutoff protection and limit-setting protection.

Output cutoff（alarm triggered）:

Over Current Protection（OVP）	Front output terminal Over Current Protection（FOCP）	Incorrect sensing connection protection（SENSE）
Communication monitoring（WATCHDOG）	Single control parallel operation protection（PRL ALM）	Over Current Protection（OCP）
Over Heat Protection（OHP）	AC input undervoltage protection（AC-FAIL）	Shut Down（SD）

Setting limits：

- Voltage setting limit（limited to approximately 95% of the OVP trigger point）
- Under Voltage limit（UVL）
- Current setting limit（limited to approximately 95% of the OCP trigger point）
- POWER LIMIT

Alarm occurrence and clearance：

An alarm is triggered when the protection function is activated and the output is cut off. The product will be in the following state.

Output OFF：

Regarding the actions of OVP/OCP/FOCP/SD/PRL ALM , the circuit breaker trip can

be selected in the configuration settings（available only for the 2000W model）.

When the ALM LED lights up, it indicates the cause of the alarm：

In the ON output state, if the protection function is triggered, the OUTPUT LED will blink（orange）.

When displaying system configuration items, the cause of the alarm will not be shown.

When the circuit breaker trip is selected for OVP/OCP/FOCP/SD/PRL ALM（CF25: ON）, the front panel will alternately display the alarm cause and AC input undervoltage protection（AC-FAIL）(available only for the 2000W model）.

Alarm Signal Output：

When PRL ALM/SD is triggered, an alarm signal is output from pin 14 of the J1 connector.

When OVP/OCP/FOCP/OHP/SENSE/AC-FAIL/WATCHDOG/SD is triggered, an alarm signal is output from pin 4 of the J2 connector.

Even when set to circuit breaker trip, an ALARM signal is still output（available only for the 2000W model）.

Alarm clearance：

There are two methods to clear the alarm：

- Press the ALM CLR（SHIFT + SET）key, or connect pin 6 of the J1 connector to LOW (0~0.5 V) or short it to clear the alarm status. If the cause of the alarm is not resolved, the alarm will trigger again.
- Press the POWER switch OFF, resolve the cause of the alarm, and then turn the POWER switch ON again.

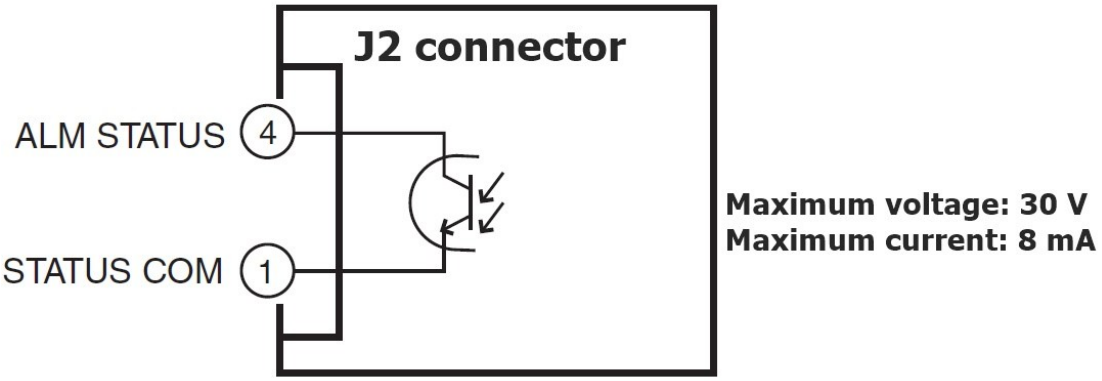
For Shutdown (SD) and Single Control Parallel Operation Protection (PRL ALM), use method 'b.' to clear the alarm.

If the alarm can't be cleared even after the cause has been resolved, a fault may have occurred. Immediately stop using the product and contact the MICROTEST distributor or dealer.

Alarm signal：

When PRL ALM and SD are triggered, an alarm signal is output from pin 14 of the J1 connector. The J1 connector and the -（negative）output terminal share the same basic potential.

When OVP/OCP/FOCP/OHP/SENSE/AC-FAIL/WATCHDOG/SD is triggered, an alarm signal is output from pin 4 of the J2 connector. This output is through a phototransistor with an open-collector type, and the other terminals are insulated.



Output Cutoff（Alarm Triggered）Protection Function

Over Voltage Protection（OVP）:

The Overvoltage Protection（OVP）function is activated when the voltage at the output terminal exceeds the preset voltage value（OVP trigger point）. It is essential to set an appropriate OVP trigger point. After purchase or when changing the load, please set the OVP trigger point according to the load requirements.

If Limit Voltage Setting (CF23：on) is enabled, the OVP trigger point can't be set below the voltage setting value. When the OVP function is triggered, you can choose in the system settings whether to enable circuit breaker trip (CF25：on/oFF)

（available only for the 2000W model）.

OVP Setting the Trigger Point：

OVP refers to the voltage trigger point set for the output terminal. If the protection is intended to activate at the load side, the OVP trigger point should take into account the voltage drop caused by the wiring.

1 Press the OVP · OCP key

When the OVP · OCP key is lit, the current set OVP trigger point will be displayed on the voltage display area. (Diagram：OVP trigger point display position, with the indicator lit)



2 Use the VOLTAGE knob to set the OVP trigger point.

OVP setting range： 10 ~ 112% of the rated output voltage.

	Type A	Type B	Type C	Type D
OVP setting range	4 ~ 44.8 V	8 ~ 89.6 V	24 ~ 268.8 V	65 ~ 728 V

3 Press the OVP · OCP key again to complete the setting

The OVP trigger point will be set, the OVP · OCP key will turn off, and the test value will be displayed.

Notes：Pressing the PWR DSPL key will cancel the confirmation.

OVP Action Confirmation：

When Limit Voltage Setting (CF23：ㅁㄱ) is enabled, you can't set the output voltage above the OVP trigger point, and OVP action can't be confirmed.

1 Confirm that the OUTPUT LED is off.

2 Set the output voltage value below the OVP trigger point.

3 Press the OUTPUT key to turn the output ON, and the OUTPUT LED will light up.

4 Slowly rotate the VOLTAGE knob clockwise before the OVP action occurs.

When the output voltage exceeds the preset OVP trigger point, an alarm will trigger.

The ALM LED will light up, and the OUTPUT LED will turn off.



5 Confirm that the output is OFF or that circuit breaker trip is activated (available only for the 2000W model).

6 When the output is OFF, press the ALM CLR (SHIFT + SET) key to clear the alarm.

If the output voltage is not changed, the OVP will trigger again.

Over Current Protection（OCP）

The Over Current Protection (OCP) function is activated when the output current exceeds the preset current value（OCP trigger point）.

It is essential to set an appropriate OCP trigger point. After purchase or when changing the load, please adjust the OCP trigger point according to the load requirements.

When the Limit Current Setting (CF22：on) is enabled, the OCP trigger point can't be set below the current setting value.

The detection time for the OCP action can also be configured.

When the OCP function is triggered, you can choose in the system settings whether to enable the circuit breaker trip (CF25：on/oFF)（available only for the 2000W model）.

Setting the OCP Trigger Point：

1 Press the OVP・OCP key.

When the OVP・OCP is lit, the current set OCP trigger point will be displayed on the current display area.



2 Use the CURRENT knob to set the OCP trigger point.

OCP setting range：10～112% of the rated output current.

		Type A	Type B	Type C	Type D
OCP setting range	400W	4～44.8A	2～22.4A	0.5～5.6A	0.185～2.072A
	800W	8～89.6A	4～44.8A	1～11.2A	0.37～4.144A
	1200W	12～134.4A	6～67.2A	1.5～16.8A	0.555～6.216A
	2000W	20～224.0A	10～112.0A	2.5～28.0A	0.93～10.36A

3 Press the OVP・OCP key twice to complete the setting.

Once the OCP trigger point is set, the OVP・OCP key will turn off and display the test value.

Notes： Pressing the PWR DSPL key will cancel the confirmation.

Setting the OCP Detection Time：

You can set the time duration for which the output remains OFF when the OCP trigger point is exceeded（The duration of the state when the OCP trigger point is exceeded）(CF24).

This feature is particularly useful for short-term overloads where you may not want the output to turn off immediately.

OCP Action Confirmation

When Current Limiting Mode (CF22: CC) is enable, it is not possible to set the output current above the OCP trigger point, and OCP action can't be confirmed.

The operation steps are as follows：

1. Short-circuit the output terminal.

2. Turn on the POWER switch.

3. Confirm that the OUTPUT LED is off.

4. Ensure the set output current is less than the OCP trigger point.

5. Press the OUTPUT key to set the output to ON.

OUTPUT LED will light up.

6. Slowly rotate the CURRENT knob clockwise before the OCP action occurs.

When the output current exceeds the set OCP trigger point, an alarm will be triggered. The ALM LED will light up, and the OUTPUT LED will turn off.



7 Confirm that the output is OFF or that a circuit breaker trip has occurred.

(available only for the 2000W model) .

8 When the output is OFF, press the ALM CLR (SHIFT + SET) key to clear the alarm.

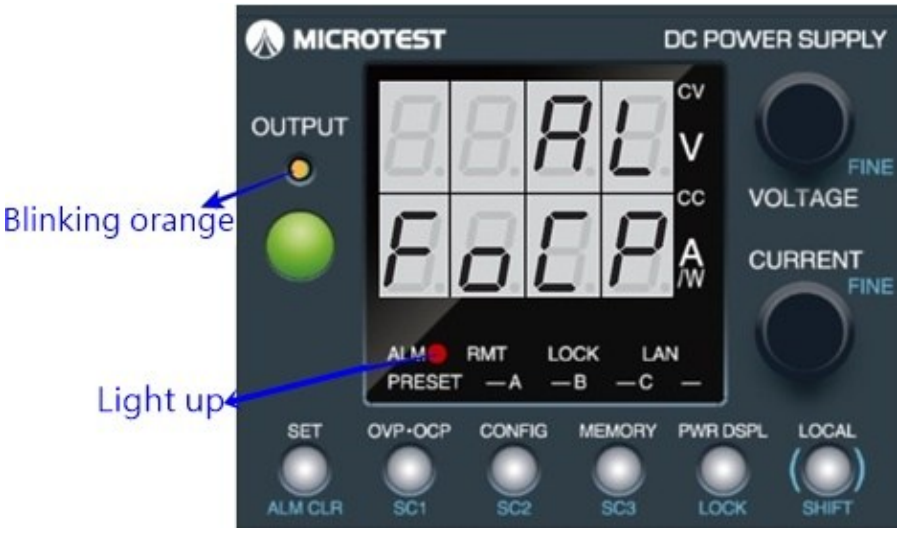
If the output current value is not changed, OCP will trigger again.

Front output terminal Over Current Protection（FOCP）

Front output terminal Over Current Protection（FOCP）refers to the protection that activates when the output current from the front output terminal exceeds 10A（nominal value）. The trigger point is a fixed value.

When the OCP trigger point conflicts with the FOCP trigger point, the OCP will take priority and activate first.

When the FOCP function is triggered, you can select in the system settings whether to enable the circuit breaker trip (CF25: on/oFF)（available only for the 2000W model）.



Over Heat Protection（OHP）

Over Heat Protection（OHP）activates when the internal temperature of the device rises abnormally：

- When the operating environment exceeds the permissible temperature range（0~50°C）.

- When the intake and exhaust ports are blocked or closed.
- When the cooling fan stops working.



Even if the POWER switch is turned back on, if the underlying cause that triggered the OHP is not resolved, the protection function will activate again.

Incorrect sensing connection protection（SENSE）

When the remote sensing +（positive） and –（negative）terminals are incorrectly connected, this protection function will be activated.

This protection will also be triggered if the sensing voltage exceeds the maximum compensation voltage.

For the maximum sensing compensation voltage of this device, please refer to the product specifications.



AC input undervoltage protection（AC-FAIL）

When a low AC input voltage is detected, the AC input undervoltage protection （AC-FAIL）function will be triggered.

When the AC-FAIL is activated, you can choose whether the alarm remains active after the fault is cleared or if it will automatically reset (CF20：SAFE/AUTO). This can be selected through the system settings.



Communication monitoring（WATCHDOG）

This function allows for communication monitoring within a specified interval via SCPI commands.

If no communication is detected within the monitoring period（CF21）, it will be determined as a communication interruption.

This function can be executed in either remote control or local operation（panel operation）modes. If remote control（commands）is not used, set the communication monitoring to OFF（default setting is OFF）.

When an alarm occurs, make sure to set the communication monitoring to OFF before clearing the alarm.



Shut Down（SD）

When an anomaly occurs, an external signal can be input to pin 16 of the J1

connector to turn the output OFF.

To clear the SD action, first turn off the POWER and then reset it to ON.

When the SD action is stopped, you can choose in the system settings whether to enable the circuit breaker trip (CF25：on / oFF)（available only for the 2000W model）.



Single control parallel operation protection（PRL ALM）

When the single control parallel operation protection is activated, if a slave unit experiences an abnormal stop, the master unit will detect the alarm from the slave and turn the entire system's output OFF.

This function prevents the master unit and other slave units from continuing operation, serving as a protective feature（parallel alarm）.

When connecting the master and slave units, use pin 14 of the J1 connector.

To clear the PRL ALM, first turn off the POWER and then reset it to ON.

When the PRL ALM function is activated, you can choose in the system settings whether to enable the circuit breaker trip (CF25：on / oFF)（available only for the 2000W model）.



Protection Function with Set Limits：

Voltage Setting Limit

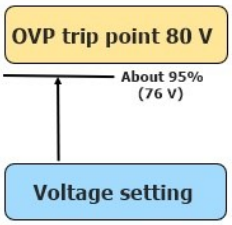
To prevent an OVP activation caused by operational errors, the maximum allowable voltage setting can be limited to approximately 95% below the OVP action point.

The voltage setting limit is enabled by default from the factory (CF23：on).

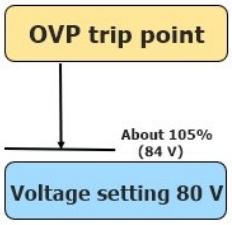
When the set voltage is higher than 95% of the OVP action point, and the voltage setting limit is ON, the configured voltage value can still be retained. However, the OVP action point will automatically adjust to 105% of the set voltage value.

The Voltage Setting Limit（CF23）ON / OFF is also linked to the Under Voltage

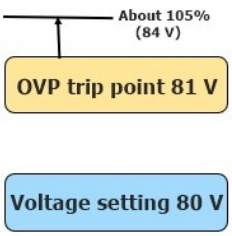
Limit（UVL）.



Example 1： When the Voltage Setting Limit is ON, and the OVP action point is set to 80 V, the set voltage is as follows：
Since the voltage setting limit is set to 95% of the OVP action point, the set voltage must be below 76 V.



Example 2： When the Voltage Setting Limit is ON, and the set voltage is configured to 80 V, the OVP action point is as follows：
Since the OVP action point is limited to 105% of the set voltage, the OVP action point must be at least 84 V.



Example 3： When the Voltage Setting Limit is OFF, and the OVP action point is set to 81 V, and then the limit is switched to ON（with the set voltage around 80 V）：
When the setting limit is switched from OFF to ON, the OVP action point will automatically change to 105% of the set voltage.
Thus, if the set voltage remains at 80 V, the OVP action point will change to 84 V.

Under Voltage Limit（UVL）

Under Voltage Limit（UVL）refers to setting the minimum possible voltage limit at the UVL action point.

The UVL is linked with the Voltage Setting Limit（CF23） ON/OFF setting.

The Voltage Setting Limit is set to its factory default limit (CF23：□ก).

When the set voltage is below the UVL action point and the Voltage Setting Limit is ON, the set voltage remains unchanged. However, the UVL action point will automatically be adjusted to match the set voltage.

UVL setting the action point

1. **Press the OVP・OCP key twice .**

   Display the current UVL action point.



2. **Rotate the VOLTAGE knob to set the UVL action point.**

   UVL setting range：0～105% of the rated output voltage.

	Type A	Type B	Type C	Type D
UVL setting range	0～42 V	0～84 V	0～252 V	0～682.5 V

3. **Press the OVP・OCP key to complete the setting.**

   The UVL action point is now set. The OVP・OCP key will turn off, and the test value will be displayed.

Current Setting Limit：

The maximum possible current is limited to approximately 95% of the OCP action point to prevent an OCP trigger due to operational errors. The current setting limit is set to the factory default (CF22：□□).

When the current setting exceeds 95% of the OCP action point, with the current setting limit ON, even if the current setting value is maintained, the OCP action point will automatically adjust to 105% of the current setting value.

POWER LIMIT：

The output power is limited to approximately 105% of the rated output power. As the load resistance changes, the output voltage or output current will vary. When the power limit is activated, the ALM LED will light up.

	400W	800W	1200W	2000W
Power limit value	420W	840W	1260W	2100W

Section 7 System Configuration Settings

The system configuration of this product can be set through the system settings. In the system configuration settings, you can configure or display the following items：

Impact：

●▲ The reset of the panel settings may be affected.（CF00）

■ ▲The reset of the LAN interface settings (CF60：LC ı / dEF) may be affected

Notes：

○ □Takes effect immediately after setting

△ ▽Takes effect when POWER is set to ON next time

◇◎CF60：Takes effect after APPL is executed

Display Toggle	Number	Mnemonic		Settings & Display	Impact	Notes
Basic	CF00	CF00*1	Reset	Reset of panel settings	—	□
	CF01*2	bLE	Bleeder	Setting of bleeder circuit	—	□
	CF02	Pr ıo	Priority	Rise state when output is ON	—	□
	CF03	U ır	V.I.R	Setting of internal resistance（VIR）	▲	□
	CF04	SS.C.r	S.Start CCrise	Soft start time（CC mode）	▲	□
	CF05	SS.C.F	S.Stop CCfall	Soft stop time（CC mode）	▲	□
	CF06	SS.U.r	S.Start CVrise	Soft start time（CV mode）	▲	□
	CF07	SS.U.F	S.Stop CVfall	Soft stop time（CV mode）	▲	□
	CF08	on.d	On delay	Output ON delay setting	▲	□
	CF09	oFF.d	Off delay	Output OFF delay setting	▲	□
	CF10	E.CC	Ext. CC	Use of external/ internal resistor for CC control	▲	□
	CF11	E.CU	Ext. CV	Use of external/ internal resistor for CV control	▲	□
	CF12	E.rnG	Control range	CC/CV control switching range	—	□

	CF13*2	M.rnG	Monitor range	Output range when switching between voltage/current	—	□
	CF14	E.out	Ext. on/ off	External control for output ON/OFF	▲	□
	CF15	E.LoG	Ext. logic	Polarity of external control for output ON/OFF	—	□
	CF16	StS.C	Stat. CC.pol	CC status signal polarity	—	□
	CF17	StS.U	Stat. CV. pol	CV status signal polarity	—	□
	CF18	StS.o	Stat. Output. pol	Output status signal polarity	—	□
	CF19	StS.A	Stat. Alarm. pol	Protection function／alarm status signal polarity	—	□
Alarm	CF20*2	A.rCU	Alarm recovery	State from AC-FAIL operation to recovery	—	▽
	CF21	WdoG	Watchdog	Communication monitoring timer	—	□
	CF22	CC.LA	CC limit auto	Current setting limit	▲	□
	CF23	CU.LA	CV limit auto	Voltage setting limit	▲	□
	CF24*2	oC.dL	OCP delay	Output OFF upon OCP detection	—	□
	CF25*2*3	tr iP	Breaker trip	Circuit breaker trip during OVP/OCP/FOCP/SD/PRL ALM activation	—	▽
Usability	CF30	SC 1	Short cut 1	Login of system configuration shortcut keys（SC1）	—	□
	CF31	SC2	Short cut 2	Login of system configuration shortcut keys（SC2）	—	□
	CF32	SC3	Short cut 3	System emergency switch fast response log（SC3）	—	□
	CF33	bEEP	Beep	Buzzer ON/OFF	—	□
	CF34*2	br i	Brightness	Panel display brightness	—	□
	CF35	AMEr	Ammeter	Display of measured values on the screen	—	□
System	CF40	LAn	LAN	LAN related settings	★*4	▽
	CF41	usb	USB	USB device settings	—	▽
	CF42	232	RS232C	RS232C settings	—	▽
	CF43	trAt	Trace	SCPI command logging	—	□
	CF44*2	PArA	Parallel	Parallel settings	—	▽
	CF45	Pon	Power on	Output state when power is ON	—	▽

Display Toggle	**Number**	**Mnemonic**		**Settings & Display**	**Impact**	**Notes**
LAN*5	CF50	iP 1	Ip addr. 1	Display IP address（1）	—	—
	CF51	iP2	Ip addr. 2	Display IP address（2）	—	—
	CF52	iP3	Ip addr. 3	Display IP address（3）	—	—
	CF53	iP4	Ip addr. 4	Display IP address（4）	—	—
	CF54	hA 1	HW. addr. 1, 2	MAC address display（1）（2）	—	—
	CF55	hA2	HW. addr. 3, 4	MAC address display（3）（4）	—	—

	CF56	hA3	HW. addr. 5, 6	MAC address display（5）（6）	—	—
	CF60	boot	LAN Reboot	LAN interface settings reset（LCI/DEF）／Activation（APPL）	—	□
	CF61	Adr	Address config	IP address allocation method	★	▽/◎
	CF62	S iP 1	Static IP 1	Manual IP address setting（1）	★	▽/◎
	CF63	S iP2	Static IP 2	Manual IP address setting（2）	★	▽/◎
	CF64	S iP3	Static IP 3	Manual IP address setting（3）	★	▽/◎
	CF65	S iP4	Static IP 4	Manual IP address setting（4）	★	▽/◎
	CF66	Sub	Subnet Mask	Subnet Mask of the IP Address	★	▽/◎
	CF67	doM	VMCB Dom.		★*4	▽
	CF68	Ch	VMCB Ch.	Domain name for multichannel（VMCB）	★*4	▽
USB	CF70	U id	V. ID	Vendor ID（VID）display	—	—
	CF71	P id	P. ID	Manufacturer ID（PID）display	—	—
RS232C	CF72	bAud	Baud rate	RS232C communication baud rate	—	▽
Sequence	CF80	ProG	Program	Display of user code for the program（execution）	—	—
	CF81	rEM.L	Rem. Loop	Display of remaining program repetitions	—	—
	CF82	rEM.t	Rem. Time	Display of remaining program time	—	—
	CF83	trG. i	Trig. In	Trigger input signal polarity	—	□
	CF84	trG.o	Trig. Out	Trigger output signal polarity	—	□

*1. CF00 display does not switch.

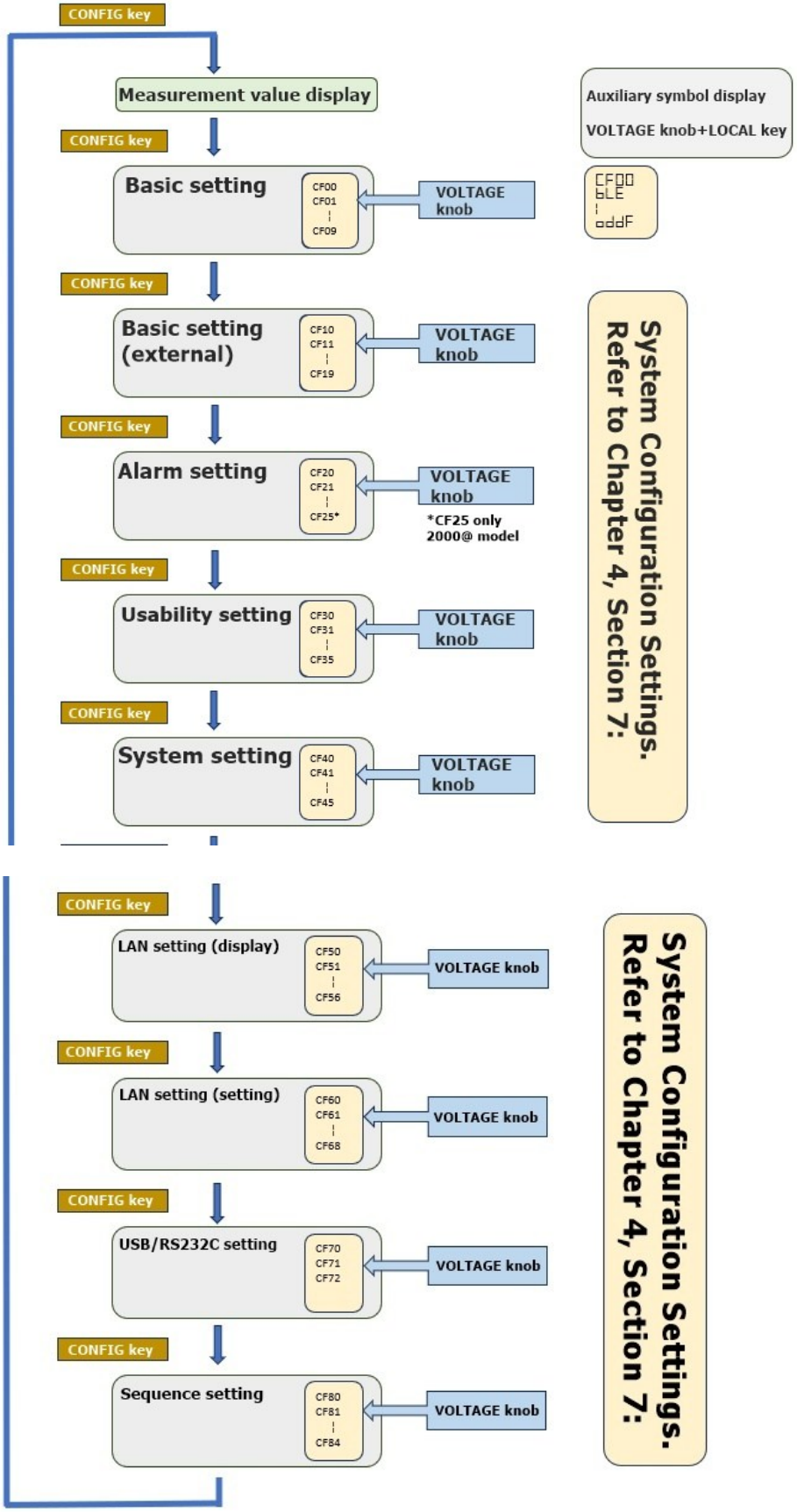
*2. It can still be set even when used as a slave.

*3. Only the 2000W model can be set.

*4. Reset of LAN interface settings only (CF60: dEF) affects certain settings.

*5. For detailed information on LAN interface settings, please refer to the

"Communication Interface User Guide".


CONFIG key
Measurement value display
Auxiliary symbol display
VOLTAGE knob+LOCAL key
CONFIG key
Basic setting
CF00
CF01
CF09
VOLTAGE knob
CF00
bLE
oddF
CONFIG key
Basic setting (external)
CF10
CF11
CF19
VOLTAGE knob
CONFIG key
Alarm setting
CF20
CF21
CF25*
VOLTAGE knob
*CF25 only 2000@ model
CONFIG key
Usability setting
CF30
CF31
CF35
VOLTAGE knob
CONFIG key
System setting
CF40
CF41
CF45
VOLTAGE knob
System Configuration Settings. Refer to Chapter 4, Section 7:
CONFIG key
LAN setting (display)
CF50
CF51
CF56
VOLTAGE knob
CONFIG key
LAN setting (setting)
CF60
CF61
CF68
VOLTAGE knob
CONFIG key
USB/RS232C setting
CF70
CF71
CF72
VOLTAGE knob
CONFIG key
Sequence setting
CF80
CF81
CF84
VOLTAGE knob
System Configuration Settings. Refer to Chapter 4, Section 7:

Display and settings of system configuration items

CF00, CF60, and CF80 are functional execution items.

For execution methods, please refer to the detailed instructions for each system configuration item.



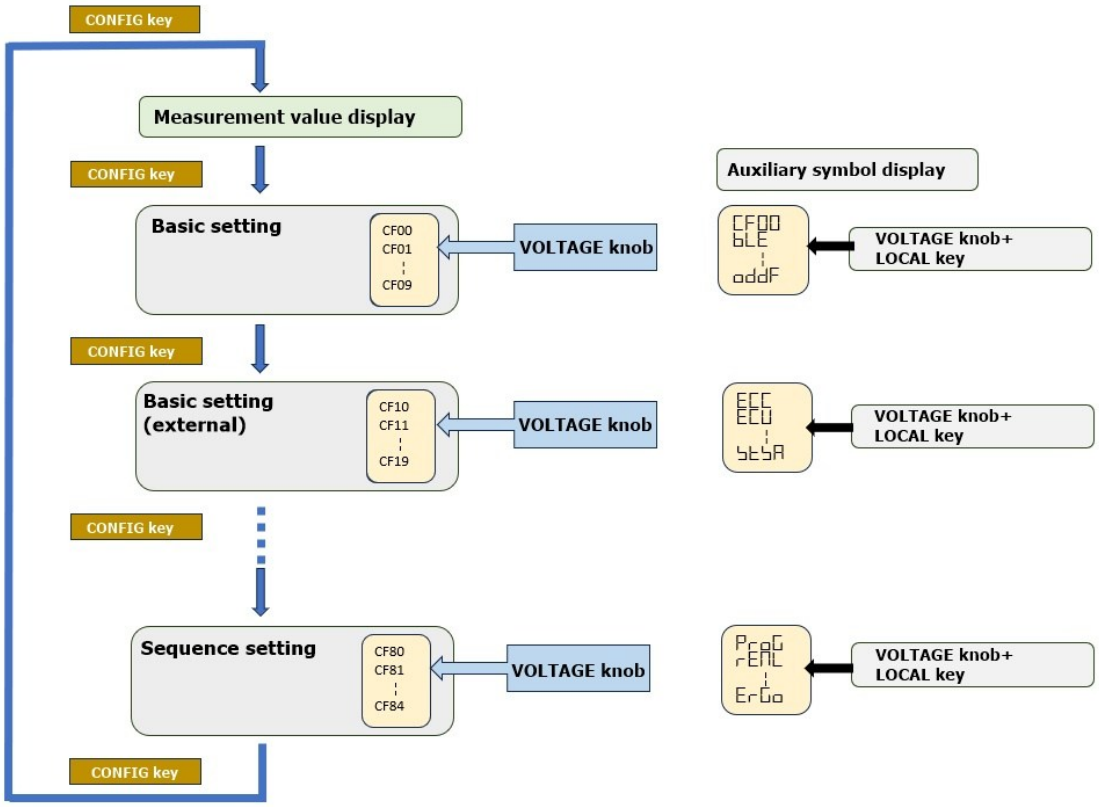
1 Use the CONFIG key and the VOLTAGE knob to select the system configuration item you want to set.

When the CONFIG key is lit, the voltage display area will show the item number, and the current display area will show the setting content.

Press the CONFIG key to toggle the tens digit, and turn the VOLTAGE knob to toggle the ones digit.

Press the LOCAL key to switch the item number display to mnemonic symbols （except for CF00）.

Press the LOCAL key while turning the VOLTAGE knob to select the system configuration item through mnemonic symbols.



2 Rotate the CURRENT knob to change the setting content.

3 To continue setting/displaying other items, repeat steps 1 and 2.

4 Press the CONFIG key until the test value is displayed, or press the PWR DSPL key.

The setting content includes items that take effect immediately, items that take effect only when the power is turned back ON after being OFF, and items that take effect when CF60 executes [APPL].

Detailed Information of System Configuration Items：

The following explains the detailed content of each system configuration item.

CF00〔CF00〕reset of panel settings.

	Mnemonic	Description
Reset	rSt	Reset of panel settings

Select the following items to restore the factory settings. After selecting, press the SET2 key twice to execute the reset.

Output ON/OFF	Over current protection	Output ON/OFF delay（CF08 / CF09）
Output voltage	Under voltage limit	Using external voltage / resistor to control constant current（CF10）
Output current	Internal resistance value（CF03）	Using external voltage / resistor to control constant voltage（CF11）
Over voltage protection	Soft start / stop time（CF04 ~ CF07）	External control of output ON/OFF（CF14）
		Current / Voltage setting limit（CF22 / CF23）

CF01（bLE）Bleeder circuit setting：

	Mnemonic	Description
Disable	dis	Voltage Divider OFF
Normal	norM	Normal Bleeder（Factory Default）
Hyper	HyP	Fast Bleeder

Setting the bleeder circuit. In situations such as battery charging, the internal bleeder circuit is used to prevent reverse current. To achieve this, the voltage divider circuit is set to OFF.

When operating in parallel or series with single control, ensure that all connected devices are set to the same configuration for consistent operation.

The setting can also be applied even when the device is used as a slave.

CF02（Pr io）Rise State When Output is ON

Set the priority action mode when the output is turned ON.

When used as a slave, it is automatically set to CC Priority.

	Mnemonic	Description
CV	CU	CV（Constant Voltage）priority（Factory Default）
CC	CC	CC（Constant Current）priority

CF03（U ir）Internal Resistance Value Setting（VIR）

This setting configures the internal resistance value（R_{int}）. The range of the internal resistance value varies depending on the model.

	Mnemonic	Description
OFF	oFF	Disable Internal Resistance Variable Function（Factory Default）
R_{int} (min) ~ R_{int} (max)		R_{int} (min)Ω ～ R_{int} (max)Ω

CF04（SS.Cr）Soft Start Time（CC mode）

Set the rise time of the output current, allowing the output current to increase gradually.

	Mnemonic	Description
0.0	0.0	Disable Soft Start（Factory Default）
0.5~10.0	0.5 ~ 10.0	Soft Start Time, 0.5～10.0 s

CF05（SS.CF）Soft Stop Time（CC mode）

Set the fall time of the output current, allowing the output current to decrease gradually.

	Mnemonic	Description
0.0	0.0	Disable Soft Stop（Factory Default）
0.5~10.0	0.5～ 10.0	Soft Stop Time, 0.5～10.0 s

CF06（SS.UR）Soft Start Time（CV mode）

Set the rise time of the output voltage, allowing the output voltage to increase gradually.

	Mnemonic	Description
0.0	0.0	Disable Soft Start（Factory Default）
0.5~10.0	0.5～ 10.0	Soft Start Time, 0.5～10.0 s

CF07（SS.UF）Soft Stop Time（CV mode）

Set the fall time of the output voltage, allowing the output voltage to decrease gradually.

	Mnemonic	Description
0.0	0.0	Disable Soft Stop（Factory Default）
0.5~10.0	0.5～ 10.0	Soft Stop Time, 0.5～10.0 s

CF08（ on.d ）Output ON Delay Setting

This allows you to set the delay time from when the OUTPUT key is pressed until the actual output is turned ON.

	Mnemonic	Description
0.0	0.0	No Delay Time（Factory Default）
0.5 ～ 99.9	0.5~99.9	Output ON Delay Time, 0.5～99.9 s

CF09（ oFF.d ）Output OFF Delay Setting

This allows you to set the delay time from when the OUTPUT key is pressed until the actual output is turned OFF.。

	Mnemonic	Description
0.0	0.0	No Delay Time（Factory Default）
0.5 ～ 99.9	0.5~99.9	Output ON Delay Time, 0.5～99.9 s

CF10（ E.CC ）Use External Voltage / Resistor for CC Control

Based on the external voltage or external resistor, this setting determines whether constant current control should be applied.

	Mnemonic	Description
oFF	oFF	No Control（Factory Default）
on	on	Enable Control

CF11（E.CU）Use External Voltage / Resistor for CV Control

Based on the external voltage or external resistor, this setting determines whether constant voltage control should be applied.

	Mnemonic	Description
oFF	oFF	No Control（Factory Default）
on	on	Enable Control

CF12（Er nG）CV / CC Control Range

Set the range for Constant Current/ Constant Voltage Control based on the external voltage or external resistor.

In relation to the range setting, the reference voltage for external control（J1-3 REFOUT）will also be set to 5.25 V（CF12：LO）or 10.5 V（CF12：HI）

	Mnemonic	Description
LOW	Lo	0～5 V（Factory Default）
HIGH	hi	0～10 V

CF13（Mr nG）Voltage / Current Monitoring Output Range

Set the voltage range of the main unit’ s output voltage/current, which can be configured even when used as a slave.

	Mnemonic	Description
LOW	Lo	0～5 V（Factory Default）
HIGH	hi	0～10 V

CF14（E.oUt）External Control of Output ON/OFF

Set whether to use external contacts to control Output ON/OFF.

Use the Output ON/OFF delay function and the Soft Start/Soft Stop functions.

	Mnemonic	Description
OFF	oFF	No Control（Factory Default）
ON	on	Enable Control
Enhanced On	EnH	Enable Control Use the Output ON/OFF delay function and the Soft Start/Soft Stop functions.

CF15（E.LoG）External Control Logic for Output ON/OFF

The logic for controlling the ON/OFF output through external contact settings.

	Mnemonic	Description
LOW	Lo	The output is ON when the input is LOW（0～0.5 V）or short-circuited（Factory Default）.
HIGH	Hi	The output is ON when the input is HIGH（4.5～5 V）or open circuited.

CF16（St5.C）CC status signal polarity

Set the polarity of the status signal when monitoring constant current operation.

	Mnemonic	Description
Negative	nEG	Negative terminal (-) (Factory Setting)
Positive	Pos	Positive terminal (+)

CF17（St5.U）CV status signal polarity

Set the polarity of the status signal when monitoring constant voltage operation.

	Mnemonic	Description
Negative	nEG	Negative terminal (-) (Factory Setting)
Positive	Pos	Positive terminal (+)

CF18（ St5.o ）Output status signal polarity

Set the polarity of the status signal when monitoring output ON.

	Mnemonic	Description
Negative	nEG	Negative terminal (-) (Factory Setting)
Positive	Pos	Positive terminal (+)

CF19（ St5.A ）Protection function / alarm status signal polarity

Set the polarity of the status signal when monitoring protection function / alarm.

	Mnemonic	Description
Negative	nEG	Negative terminal (-) (Factory Setting)
Positive	Pos	positive terminal (+)

CF20（ A.rCU ）State from AC-FAIL operation to recovery

When the AC input undervoltage protection（ AC-FAIL ）is triggered, this setting is used to define the output state after the AC power line returns to normal.

The setting will take effect after the POWER is turned OFF and then turned ON again.

The setting can still be configured even when used as a slave device.

	Mnemonic	Description
Safe	SAFE	Maintain the alarm state even after the cause of the alarm is cleared（Factory Default）.
Auto	Auto	Restore to the state prior to the alarm after the cause of the alarm is cleared（return to the state before the alarm occurred）

CF21(HdoG) Communication monitoring timer（WATCHDOG）

Use SCPI commands to set the communication monitoring interval.

Communication monitoring is a feature that can function in both remote control and local（panel operation）modes of the product.

When communication monitoring（commands）is not used, it must be set to "OFF."

	Mnemonic	Description
OFF	oFF	Communication monitoring timer OFF（Factory Default）
1~3000	1~3000	1s,3s,5s,10s,30s,100s,300s,1000s,3000s

CF22(CCLA) Current setting limit

Set whether to limit the output current to ensure it does not exceed the OCP trip point（OCP trip point is approximately 95%）.

	Mnemonic	Description
oFF	oFF	Unlimited
on	on	Limited（Factory Default）

CF23(CULA) Voltage setting limit

Set whether to limit the output voltage to ensure it does not exceed the OVP trip point（OVP trip point is approximately 95%）or fall below the UVL trip point voltage.

	Mnemonic	Description
oFF	oFF	Unlimited
on	on	Limited（Factory Default）

CF24（oC.dL）Output OFF upon OCP detection

Set the time interval between overcurrent detection and output shutdown to 100ms.

This can be configured even when used as a slave.

	Mnemonic	Description
0.0	0.0	0.0 s（Factory Default）
0.1~2.0	0.1~2.0	0.1～2.0 s

CF25（tr iP）Circuit breaker trip during OVP/OCP/FOCP/SD/PRL ALM activation（available only for the 2000W model）

When OVP, OCP, FOCP, SD, or PRL ALM is triggered, should the circuit breaker be set to trip（POWER OFF）. The settings will take effect when the power is turned ON again after being set to OFF.

This can be configured even when used as a slave.

	Mnemonic	Description
oFF	oFF	No circuit breaker trip is set.
On	on	Circuit breaker trip is set（Factory Default）.

CF30（SC 1）Login of system configuration shortcut keys（SC1）

Log the system configuration settings to the front panel key "SC1".

	Mnemonic	Description
00	0.0	System configuration items not logged（Factory Default）.
01～99	0 1~99	CF01 ～ CF99

CF31（SC2）Login of system configuration shortcut keys（SC2）

Log the system configuration settings to the front panel key "SC2".

	Mnemonic	Description
00	0.0	System configuration items not logged（Factory Default）.
01～99	0 1～99	CF01 ～ CF99

CF32（SC3）Login of system configuration shortcut keys（SC3）

Log the system configuration settings to the front panel key "SC3".

	Mnemonic	Description
00	0.0	System configuration items not logged（Factory Default）.
01～99	0 1～99	CF01 ～ CF99

CF33（bEEP）Buzzer ON/OFF

Set the beep sound on/off.

In the startup settings, the beep will sound when a communication command error occurs, or when the preset memory or sequence program can't be recalled.

	Mnemonic	Description
oFF	oFF	Buzzer OFF
on	on	Buzzer ON（Factory Default）

CF34（bri）Panel display brightness

Set the brightness of the panel display. The higher the value, the brighter the screen.

Even with the same setting value, the brightness may vary depending on the product.

The brightness setting does not represent the actual brightness. This can be

configured even when used as a slave.

	Mnemonic	Description
1～7	1～7	Panel display brightness（The factory default is 7）

CF35（AntEr）The display of the slave unit during single control parallel operation

It is possible to set whether the current or power value of the slave unit is displayed

during single-control parallel operation.

When the slave display setting is disabled, the current display section will show "----".

	Mnemonic	Description
oFF	oFF	Slave display disabled（Factory Default）
on	on	Slave display enabled

CF40（LAn）LAN Interface Settings

Set whether to enable the LAN interface.

If set to "oFF", the LAN interface will be disabled even if a LAN cable is connected.

The setting will only take effect after the POWER is turned OFF and then turned ON again.

	Mnemonic	Description
oFF	oFF	Disable LAN
on	on	Enable LAN（Factory Default）

CF41（usb）USB Interface Settings

Set whether to enable the USB interface.

If set to " oFF ", the USB interface will be disabled even if a USB cable is connected.

The setting will only take effect after the POWER is turned OFF and then turned ON again.

	Mnemonic	Description
oFF	oFF	Disable USB
on	on	Enable USB（Factory Default）

CF42（232）RS232C Interface Settings

Set whether to enable the RS232C interface.

If set to "oFF", the RS232C interface will be disabled even if a RS232C cable is connected.

The setting will only take effect after the POWER is turned OFF and then turned ON again.

	Mnemonic	Description
oFF	oFF	Disable RS232C
on	on	Enable RS232C（Factory Default）

CF43（trAC）SCPI Communication Error Display

Set whether to display communication errors.

	Mnemonic	Description
oFF	oFF	Disable SCPI Communication Error Display Setting（Factory Default）
on	on	SCPI Communication Error Display Setting

CF44（PArA）Single Control Parallel Operation

Set the master/slave for single control parallel operation.

You can set the total number of units to be used as masters. When selected as a slave, the display will show （SLAU）"Slave".

The setting takes effect only after turning the POWER OFF and then ON again.

This setting can be configured even when used as a slave.

	Mnemonic	Description
Slave	SLAU	Used as a slave
1～3[*1]	1～3[*1]	Total number of units including the master (1 unit: single-unit operation, factory default is 1 to a maximum of 3 units).

*1. Up to 2 units for 1200W/2000W models。

CF45（Pon）Output status when power is ON

Set the output status when the POWER switch is set to ON.

When the output is turned OFF by an external contact, this setting is invalid.

The setting takes effect only after turning the power OFF and then ON again.

If set to "Auto（Auto）" or "ForC（Force）", the output status will also be restored after clearing the alarm caused by an AC-FAIL reset.（see CF20: Auto）

	Mnemonic	Description
Safe	SAFE	輸出 OFF（Factory Default）
Auto	Auto	POWER 關閉的 OFF 之前的輸出狀態
Force	ForC	輸出 ON

CF50 ~ CF53 (iP 1~ iP4) IP Address Display

Confirm the configured IP address.

If using a static IP address, please configure it via the panel (CF62–CF65) or the built-in web interface.

For the embedded web interface, please use a DHCP server or conditions that support AUTO IP.

Index Number		Mnemonic	Description
CF50	0～255	0～255	The first octet of the IP address
CF51	0～255	0～255	The second octet of the IP address
CF52	0～255	0～255	The third octet of the IP address
CF53	0～255	0～255	The fourth octet of the IP address

CF54 ~ CF56 (hA 1~hA3) MAC Address Display

Confirm the configured MAC address. B0-CC-CE

The MAC address format is B0.CC.CE.xx.xx.xx (where x is a hexadecimal digit from 0 ~ F) .

Index Number		Description
CF54	BO.CC	The first and second octets of the MAC address
CF55	CE.xx	The third and fourth octets of the MAC address
CF56	xx.xx	The fifth and sixth octets of the MAC address

CF60（boot）Reset（LCI/EF）/ Apply（APPL）LAN Settings

Select whether to reset/apply the LAN interface settings.

After selection, press SET twice to execute the reset/apply operation.

When selecting to reset the LAN interface settings（LCI(LCI)/dEF (Default) , the security password will be cleared, and the unit will no longer be protected by security settings.

If the LAN LED turns red, please reconfigure the settings.

LAN Configuration Initialize	LCI	Reset LAN Interface Settings（Factory Default）
Default	dEF	Reset LAN Interface and Multichannel (VMCB) Settings（Factory Default）
Apply	APPL	Please restart the LAN interface system for the configuration settings to take effect.

CF61(Adr) IP Address Allocation Method

Configure the method for IP address allocation.

Settings for using the DHCP server, AUTO IP function (automatic allocation), and MANUAL IP function (manual allocation) are controlled by ON (1) to enable and OFF (0) to disable.

When both DHCP and AUTO IP are ON, if the DHCP server does not assign an IP address, the AUTO IP function will take over.

If using MANUAL IP, please set both DHCP and AUTO IP to OFF. The IP address assigned by the AUTO IP function is in the range 192.168.x.x（where x is from 1~254）.

The settings will take effect only after turning the POWER OFF and then ON again, or after executing "APPL（Apply）" in CF60.

	Mnemonic	Description
001	001	DHCP：OFF，AUTO IP：OFF，MANUAL IP：ON
010	010	DHCP：OFF，AUTO IP：ON，MANUAL IP：OFF
011	011	DHCP：OFF，AUTO IP：ON，MANUAL IP：ON
100	100	DHCP：ON，AUTO IP：OFF，MANUAL IP：OFF
101	101	DHCP：ON，AUTO IP：OFF，MANUAL IP：ON
110	110	DHCP：ON，AUTO IP：ON，MANUAL IP：OFF（Factory Default）
111	111	DHCP：ON，AUTO IP：ON，MANUAL IP：ON

CF62 ~ CF65(5. IP 1~5. IP4) Manual IP Address Setting

When not using the DHCP server or AUTO IP function, the IP address can be set manually. Before configuring, please set MANUAL IP (CF61) to ON.

The setting will take effect after turning the POWER OFF and then ON again, or after executing "APPL（Apply）" in CF60.

Index Number		Mnemonic	Description
CF62	0～255	0～255	The first octets of the IP address
CF63	0～255	0～255	The second octets of the IP address
CF64	0～255	0～255	The third octets of the IP address
CF65	0～255	0～255	The fourth octets of the IP address

CF66（SUb）Subnet Mask of the IP Address

When setting the IP address manually（MANUAL IP function）, the subnet mask prefix must also be configured. Before configuring, please set MANUAL IP (CF61) to ON.

The setting will take effect after turning the POWER OFF and then ON again, or after executing "APPL（Apply）" in CF60.

	Mnemonic	Description
16～31	16～31	Set the subnet mask prefix of the IP address

Example：

Example display when "16" is selected：255.255.0.0

Example display when "24" is selected：255.255.255.0

Example display when "31" is selected：255.255.255.255

CF67 (doM) Multichannel (UNCb) domain number

Set the Domain number used in multichannel mode. DCS series devices with the same Domain number can operate cooperatively within a multi-channel network.

If the multichannel function is not used, please set the value to "0" (Factory Default) .

The setting will take effect after turning the POWER OFF and then ON again.

	Mnemonic	Description
0	0	Disable multichannel（Factory Default）
1～254	1～254	Domain ID for multichannel operation

CF68 (Ch) Multichannel (UNCb) Channel Number

Set the channel number used for multichannel operation. Do not assign duplicate channel numbers within the same multichannel network. If multi-channel is not used, please set the value to "0" (Factory Default) .

The setting will take effect after turning the POWER OFF and then ON again.

	Mnemonic	Description
0	0	Master used in multichannel operation （Factory Default）
1～30	1～30	Channel number of the slave used in multichannel operation

CF70 (U id) Display Vendor ID (VID)

Display USB vendor ID.

Display		Vendor ID
387C	387C	0x387C

CF71 (P id) Manufacturer ID Display (PID)

Display USB Manufacturer ID.

model	Display		vendor ID
400W	3104	3104	0x3104
800W	3108	3108	0x3108
1200W	3112	3112	0x3112
2000W	3120	3120	0x3120

CF72 (bAud) RS232C Communication Speed

The communication speed of the RS-232C interface can be configured.

The setting will take effect only after turning the POWER OFF and then ON again.

	Mnemonic	Description
1.2	1.2	1200 bps
2.4	2.4	2400 bps
4.8	4.8	4800 bps
9.6	9.6	9600 bps
19.2	19.2	19200 bps（Factory Default）
38.4	38.4	38400 bps
57.6	57.6	57600 bps
115.2	115.2	115200 bps

CF80 (ProG) Display of user code for the program (execution)

To identify the sequence program, the user code will be displayed.

Press the SET2 key twice to execute the sequence program.

	Mnemonic	Description
None	nonE	The sequence program has not been written （Factory Default）
0000～9999	0000～9999	The user code that has been set

CF81（rEnL）Display of remaining program repetitions

Displays the remaining number of repetitions of the sequence program.

	Mnemonic	Description
----	----	Non-executing sequence program
0～9999	0～9999	0～ 9999 times
More	norE	10000～99998 times
Infinity	inF i	Infinity

CF82（rEnt）Display of remaining program time

Display the remaining time of executing sequence program.

	Mnemonic	Description
----	----	Non-executing sequence program
59s ~ 1s	59s ~ 1s	59 seconds to 1 second
59m ~ 1m	59n ~ 1n	999 hours ～ 1 hour
999h ~ 1h	999h ~ 1h	999 hours ～ 1 hour
More	norE	Over 1000 hours
Infinity	inF i	Infinity

CF83（trG.i）Trigger input signal polarity

Set the polarity of the trigger input signal.

The trigger signal is used for step initiation and synchronization of the sequence.

	Mnemonic	Description
Positive Trigger	Ptr	Positive Trigger（Factory Default）
Negative Trigger	ntr	Negative Trigger

Section 8 Default Memory Function

It has a default memory function, capable of storing 3 sets of combinations of voltage, current, OVP, OCP, UVL, and other settings.

Stored settings can be called and used from the default memory when needed.

1. Saving the Settings.

Set the desired values for voltage, current, OVP, OCP, and UVL.

2. Press the MEMORY key and select the preset memory (A, B or C) to save the settings.

The voltage display, current display, PRESET A/B/C LEDs, and SET key LED will turn off.

Each time the MEMORY key is pressed, it will cycle through

A → B → C → Unselected.

If the settings have already been saved to the preset memory, their values will be displayed.

3. Press and hold the SET key.

The selected PRESET LED will light up, and the settings will be saved.

Calling the Stored Settings：

Whether in test value display（SET key off）or setting value display（SET key on）, the stored settings can be called from memory.

When the output is in the ON state, the settings from the preset memory will be immediately reflected at the output when called.

1. **Press the MEMORY key and select the preset memory（A, B or C）to call the settings.**

   The voltage display, current display, PRESET A/B/C LEDs, and SET key LED will turn off.

   The displayed values are the saved settings.

   Each time the MEMORY key is pressed, it will cycle through

   A → B → C → Unselected.

2. **After confirming the settings, press the SET key.**

   The SET key and the selected PRESET LED will light up, displaying the voltage and current values.

⚠ Cautions

When calling the settings, press and hold the SET key to save the current settings to the preset memory.

Section 9 Panel Locking Operation Instructions

(Key Lock)



Equipped with a key lock function to prevent accidental changes to settings.
When in lock mode (LOCK LED is lit), all operations except the OUTPUT key will be disabled.

1 Please complete all necessary settings first, such as output voltage and output current.

2 Press and hold the LOCK key (SHIFT + PWR DSPL) until the LOCK LED lights up.

Once the LOCK LED lights up, the panel lock mode is activated.

To unlock, press and hold the LOCK key (SHIFT + PWR DSPL) again until the LOCK LED turns off.

Section 10 System Configuration Hotkey Function

It features a hotkey function that allows registering up to 3 system configuration items（SC1, SC2, and SC3）for quick access.

Even if the system configuration menu is not open, the registered system configuration items can still be quickly accessed through the SC key.

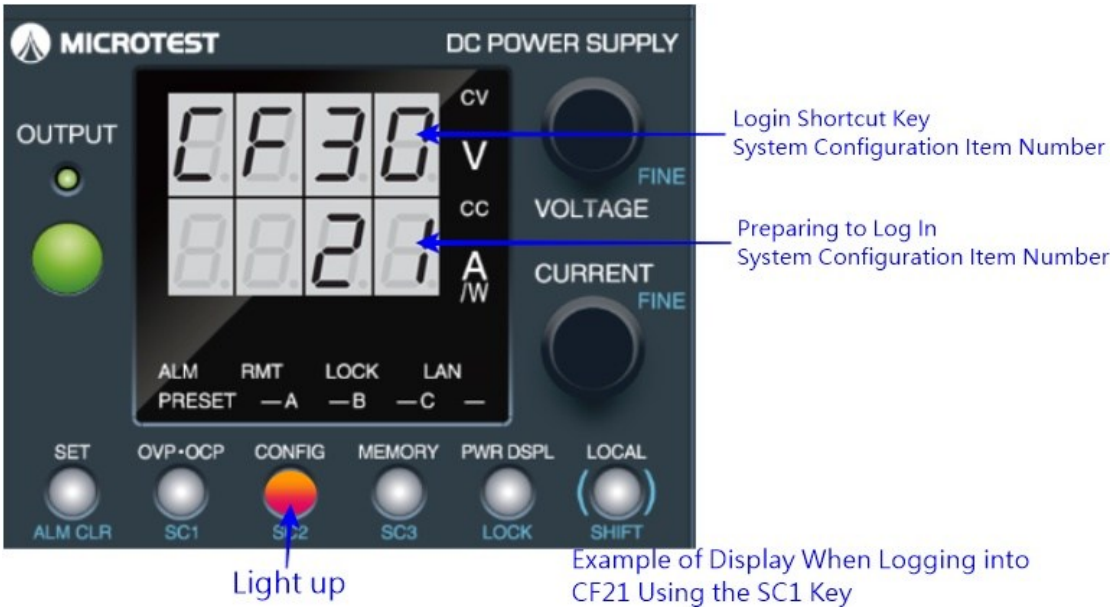
Registration of System Configuration Hotkeys：

1 Press the CONFIG key four times（CF30）.

2 Rotate the VOLTAGE knob to select the system configuration item number to register as a hotkey（CF30, CF31, or CF32）.

CF30 corresponds to the SC1 key, CF31 corresponds to the SC2 key, and CF32 corresponds to the SC3 key.

3 Rotate the CURRENT knob to set the item number of the system configuration to be registered.



4 **Press the CONFIG key until the test values are displayed, or press the PWR DSPL key.**

The settings are immediately reflected.

Calling the System Configuration Item Hotkeys：

1 **To call the registered system configuration item, press the SHIFT + SC1, SC2, or SC3 keys.**

The registered system configuration item will be displayed.



Example of Display When Logging into CF21 Using the SC1 Key

2 Press the CONFIG key until the test values are displayed, or press the PWR DSPL key.

Switch from remote control to local operation：



When in remote control mode, the RMT LED on the display will light up.

Press the LOCAL key to switch from remote control mode to local operation mode（panel operation）.

Chapter 5 Introduction to Application Features

This chapter will explain the usage of application features such as bleeder circuit functionality, adjustable internal resistance, sequence function, and synchronized operation.

Section 1 Guide to the Bleeder Circuit Function

⚠ Warning

There is a risk of electric shock. When touching the output terminal, please be sure to set the bleeder circuit to ON (CF01：nor / HYP). If set to OFF (CF01：oFF), even if the output is set to OFF or the POWER is turned OFF, the voltage from when the output was ON will still remain on the output terminal.

When you do not want the bleeder circuit to absorb external current, you can set the bleeder circuit to OFF.

For example, when connecting a battery, you can set the bleeder circuit to OFF to prevent over-discharge。

In the system configuration, the bleeder circuit status can be set to "OFF / Regular bleeder / Fast bleeder (CF01)".

When powering on/off again, the previously set status will be applied.

Bleeder circuit	Display setting	Description
OFF*1	DIS	Bleeder circuit OFF
Regular bleeder	NORM	Bleeder circuit ON
Fast bleeder	HYP	Bleeder circuit ON • Drive the latest HB light, and maintain the fan's rotation speed at the maximum. • Stronger energy absorption capability (refer to the table below). • The decay time under no load is approximately 70% shorter than that of regular bleeder (this can shorten transition time and cycle time).

*1 When the output terminal is open, even with the output set to OFF and the voltage set to 0 V, the output terminal may still generate a voltage of up to several hundred mV.

When operating in parallel or series, please ensure that all connected devices are set to the same bleeder circuit setting.

This must be configured even when the device is used as a slave.

The absorbed current when connecting to an external power source will vary depending on the bleeder circuit setting.

The absorbed current from the external voltage source corresponding to the bleeder circuit setting（Reference value）.

Series	Bleeder circuit	Absorbed current					
		5Vout	10Vout	15Vout	20Vout	30Vout	40Vout
DCS3104A	OFF	0.000 A	0.000 A	0.001 A	0.001 A	0.002 A	0.003 A
	Regular bleeder	0.381 A	0.347 A	0.312 A	0.277 A	0.208 A	0.139 A
	Fast bleeder	0.583 A	0.546 A	0.512 A	0.477 A	0.409 A	0.339 A
DCS3108A	OFF	0.000 A	0.000 A	0.000 A	0.001 A	0.001 A	0.001 A
	Regular bleeder	0.730 A	0.660 A	0.590 A	0.525 A	0.386 A	0.248 A
	Fast bleeder	1.130 A	1.060 A	1.000 A	0.930 A	0.780 A	0.640 A
DCS3112A	OFF	0.000 A	0.001 A	0.001 A	0.001 A	0.001 A	0.002 A
	Regular bleeder	1.120 A	1.010 A	0.900 A	0.792 A	0.577 A	0.362 A
	Fast bleeder	1.720 A	1.620 A	1.510 A	1.410 A	1.200 A	1.000 A
DCS3120A	OFF	0.001 A	0.001 A	0.001 A	0.001 A	0.002 A	0.002 A
	Regular bleeder	1.850 A	1.680 A	1.510 A	1.330 A	0.983 A	0.632 A
	Fast bleeder	2.840 A	2.670 A	2.490 A	2.320 A	1.970 A	1.630 A

V_{out} = output terminal voltage

Series	Bleeder circuit	Absorbed current					
		$5V_{out}$	$10V_{out}$	$20V_{out}$	$40V_{out}$	$60V_{out}$	$80V_{out}$
DCS3104B	OFF	0.000 A	0.000 A	0.000 A	0.001 A	0.001 A	0.002 A
	Regular bleeder	0.376 A	0.360 A	0.328 A	0.264 A	0.200 A	0.136 A
	Fast bleeder	0.564 A	0.547 A	0.515 A	0.450 A	0.384 A	0.319 A
DCS3108B	OFF	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.001 A
	Regular bleeder	0.754 A	0.721 A	0.656 A	0.526 A	0.395 A	0.265 A
	Fast bleeder	1.128 A	1.096 A	1.029 A	0.901 A	0.769 A	0.640 A
DCS3112B	OFF	0.000 A	0.001 A	0.001 A	0.001 A	0.001 A	0.002 A
	Regular bleeder	1.141 A	1.092 A	0.994 A	0.797 A	0.601 A	0.402 A
	Fast bleeder	1.700 A	1.650 A	1.550 A	1.360 A	1.160 A	0.970 A
DCS3120B	OFF	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A	0.000 A
	Regular bleeder	1.850 A	1.770 A	1.600 A	1.280 A	0.963 A	0.641 A
	Fast bleeder	2.760 A	2.680 A	2.520 A	2.200 A	1.880 A	1.560 A

V_{out} = output terminal voltage

Series	Bleeder circuit	Absorbed current					
		$10V_{out}$	$20V_{out}$	$50V_{out}$	$100V_{out}$	$200V_{out}$	$240V_{out}$
DCS3104C	OFF	0.000 A	0.001 A	0.001 A	0.001 A	0.001 A	0.002 A
	Regular bleeder	0.151 A	0.147 A	0.134 A	0.114 A	0.072 A	0.056 A
	Fast bleeder	0.223 A	0.221 A	0.208 A	0.187 A	0.145 A	0.128 A
DCS3108C	OFF	0.000 A	0.000 A	0.000 A	0.001 A	0.001 A	0.002 A
	Regular bleeder	0.304 A	0.295 A	0.267 A	0.221 A	0.128 A	0.091 A
	Fast bleeder	0.441 A	0.432 A	0.407 A	0.364 A	0.279 A	0.250 A
DCS3112C	OFF	0.000 A	0.000 A	0.000 A	0.001 A	0.001 A	0.002 A
	Regular bleeder	0.442 A	0.429 A	0.392 A	0.331 A	0.208 A	0.159 A
	Fast bleeder	0.661 A	0.648 A	0.610 A	0.546 A	0.409 A	0.370 A
DCS3120C	OFF	0.000 A	0.000 A	0.001 A	0.001 A	0.001 A	0.001 A
	Regular bleeder	0.719 A	0.701 A	0.640 A	0.537 A	0.328 A	0.245 A
	Fast bleeder	1.080 A	1.060 A	0.995 A	0.894 A	0.688 A	0.605 A

V_{out} = output terminal voltage

Series	Bleeder circuit	Absorbed current					
		$25V_{out}$	$50V_{out}$	$100V_{out}$	$200V_{out}$	$500V_{out}$	$650V_{out}$
DCS3104C	OFF	0.000 A	0.001 A	0.001 A	0.002 A	0.004 A	0.005 A
	Regular bleeder	0.067 A	0.065 A	0.063 A	0.057 A	0.041 A	0.033 A
	Fast bleeder	0.081 A	0.080 A	0.077 A	0.072 A	0.057 A	0.049 A
DCS3108C	OFF	0.000 A	0.000 A	0.001 A	0.003 A	0.007 A	0.009 A
	Regular bleeder	0.128 A	0.125 A	0.119 A	0.108 A	0.075 A	0.059 A
	Fast bleeder	0.160 A	0.157 A	0.152 A	0.142 A	0.111 A	0.094 A
DCS3112C	OFF	0.000 A	0.000 A	0.001 A	0.004 A	0.009 A	0.012 A
	Regular bleeder	0.197 A	0.192 A	0.184 A	0.167 A	0.118 A	0.094 A
	Fast bleeder	0.231 A	0.227 A	0.219 A	0.204 A	0.160 A	0.140 A
DCS3120C	OFF	0.001 A	0.001 A	0.001 A	0.001 A	0.008 A	0.010 A
	Regular bleeder	0.306 A	0.293 A	0.280 A	0.253 A	0.185 A	0.150 A
	Fast bleeder	0.381 A	0.359 A	0.347 A	0.320 A	0.251 A	0.217 A

V_{out} = output terminal voltage

Section 2 Guide to the Adjustable Internal Resistance Function

The internal resistance variable function can easily simulate power sources with internal resistance, such as secondary batteries, solar cells, and fuel cells.

According to the internal resistance value set for Constant Voltage (CV) operation, an increase in output current will cause the output voltage to decrease.

This function is only effective in CV operation mode, and allows for setting a variable internal resistance.

In the system configuration（CF03）, the internal resistance value can be set. If this function is not used, please set it to OFF (the factory default is CF03：oFF). Once the function is enabled, the VIR indicator light will turn on.

If the output voltage drops below 3% of the rated voltage, unstable output voltage may occur.

When the internal resistance value set causes a voltage drop that reaches about 20% of the rated voltage, the accuracy of the set resistance value will be reduced.

Additionally, this function is not applicable for operations with instantaneous changes.

Setting range：

V_{rtg}：rated output voltage

I_{rtg}：rated output current

R_{int}：internal resistance value

$0 < R_{int}(min) \leqq R_{int}(max)$

A type, B type：$R_{int}(max) = V_{rtg} / I_{rtg}$

C type, D type：$R_{int}(max) = V_{rtg} / I_{rtg} \times 3/4$

	DCS3104A	DCS3104B	DCS3104C	DCS3104D
Rated output voltage V_{rtg} [V]	40	80	240	650
Rated output current I_{rtg} [A]	40	20	5	1.85
internal resistance value R_{int} [Ω]	0.001～1.000	0.001～4.000	0.01～36.00	0.1～263.5
Resolution*1	0.001	0.001	0.01	0.1

	DCS3108A	DCS3108B	DCS3108C	DCS3108D
Rated output voltage V_{rtg} [V]	40	80	240	650
Rated output current I_{rtg} [A]	80	40	10	3.7
internal resistance value R_{int} [Ω]	0.001～0.050	0.001～2.000	0.01～18.00	0.1～131.8
Resolution*1	0.001	0.001	0.01	0.1

	DCS3112A	DCS3112B	DCS3112C	DCS3112D
Rated output voltage V_{rtg} [V]	40	80	240	650
Rated output current I_{rtg} [A]	120	60	15	5.55
internal resistance value R_{int} [Ω]	0.001～0.333	0.001～1.333	0.01～12.00	0.01～87.84
Resolution*1	0.001	0.001	0.01	0.01

	DCS3120A	DCS3120B	DCS3120C	DCS3120D
Rated output voltage V_{rtg} [V]	40	80	240	650
Rated output current I_{rtg} [A]	200	100	25	9.25
internal resistance value R_{int} [Ω]	0.001～0.200	0.001～0.800	0.01～7.20	0.01～52.70
Resolution*1	0.001	0.001	0.01	0.01

※1 Setting Resolution in FINE Mode

When operating in parallel, the maximum internal resistance setting value is equal to the R_{int} (max) of a single unit divided by the number of parallel units. The resolution is the resolution of a single unit divided by the number of parallel units, resulting in a smaller value.

Section 3 Guide to the Sequence Function

The sequence function refers to the automatic execution of tasks one by one according to predefined settings (program).

Sequence programs can't be set from the panel and must be executed via commands.

Once a sequence program is executed remotely, it is written into the product, and can later be executed via the panel.

After the program is written into the product, it can be executed even without a PC.

Written and executing sequence programs

Only one program can be written into the product at a time. When a different program is executed remotely, the original program will be overwritten. When executing a program from the panel, the trigger source setting will be invalid.

1. **If the program can't be written into the product, please execute the sequence program remotely.**

   After the program is written into the product, it can be executed even without a PC.

2. **When trigger steps are set, please configure the polarity of the trigger input signal（CF83）and the polarity of the output signal（CF84）in the system settings.**

The factory default is a positive trigger signal.

3. **Press the OUTPUT key to set the output ON.**

4. **Press the CONFIG key 9 times to display CF80.**

   When the current display shows the written user code, the SET key light will turn off. To prevent accidental execution of an unverified sequence program, please verify the user code first.



Example of Displaying User Code "1234" in CF80

Notes：If the sequence program has not been written, the current display will show "nonE".

5. **Press the SET key, which has not yet illuminated.**

   When entering standby mode, CF80, the user code, the SET key, and the SEQ display will all turn off.

6. **Press the SET key to execute the program.**

   When the program is running, the SEQ light will turn on.

Section 4 Guide to the synchronized operation

Synchronous operation refers to the function that allows the synchronization of the set values and the sequence program restart through a trigger signal, enabling them to execute simultaneously.

Various models in the DCS series (Example：models such as the DCS400W and DCS800W) can be connected in a mixed configuration. Even when operating in parallel, they can still perform synchronous operation.

Synchronous operation has the following features. When performing synchronous operation, various settings need to be configured remotely using commands. Once configured, synchronous operation can be performed even without a PC.

Synchronization of voltage and current settings (trigger subsystem：TRANsient)

It allows output changes to be synchronized. It is effective when synchronizing with the operation of external instruments. The trigger source must be set to hardware trigger or similar (TRIG:TRAN:SOUR TRIGIN).

Synchronization of sequence program steps (trigger subsystem：PROGram)

In the sequence program, it is possible to synchronize and resume steps that are in a paused state. For each model, it is necessary to set the trigger input for any stage to ON (PROG:STEP<n>:TRIGIN ON).

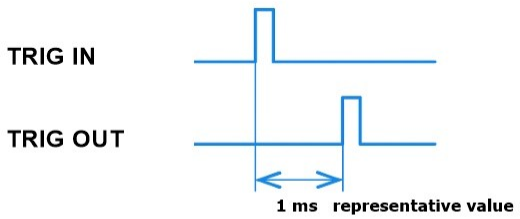
The polarity of the trigger signal is set in the system configuration (CF83：trigger

input signal polarity / CF84：trigger output signal polarity). Please unify the trigger signal polarity for all connected devices. The factory default is a positive trigger signal.

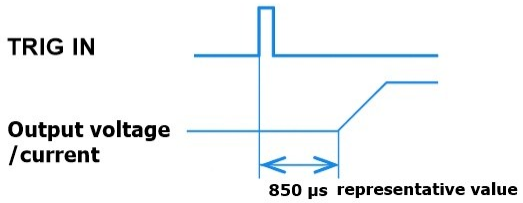
The synchronization pulse is a signal with a width of 100 µs.

The RS232C connector and TRIG IN connector are shared. However, when performing synchronous operation remotely, the RS232C can't be used.

Synchronization operation delay time：



The delay time from receiving the TRIG IN signal to outputting the TRIG OUT signal is 1 ms（representative value）.



The delay time from receiving the TRIG IN signal to the output of voltage/current is 850 µs（representative value）.

In the case of the connection as shown in Example 2, please carefully consider the number of connected devices and the latency.

Connection：

Please use a standard LAN cable（Category 5, straight-through cable）within 30 meters for the connection.

If you need to use a LAN cable longer than 30 meters, please contact a MICROTEST

agent or distributor.

⚠ Warning：There is a risk of electric shock.

Do not touch any communication connectors while the device is powered on.

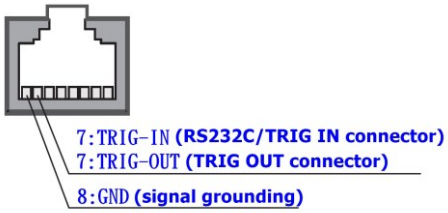
If one end of the LAN cable is already connected to this product, do not leave the other end disconnected.



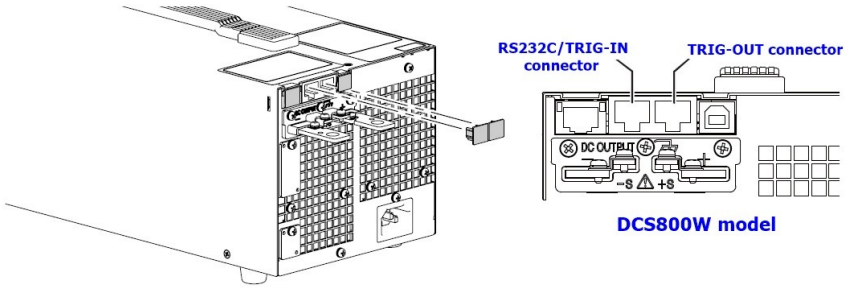


At the time of shipment, each communication connector will be fitted with a connector cover as shown in the image on the left. Please keep the removed connector covers in a safe place. For safety, always attach the connector cover when the connector is not in use. If the cover is damaged or lost, please contact a MICROTEST agent or distributor.

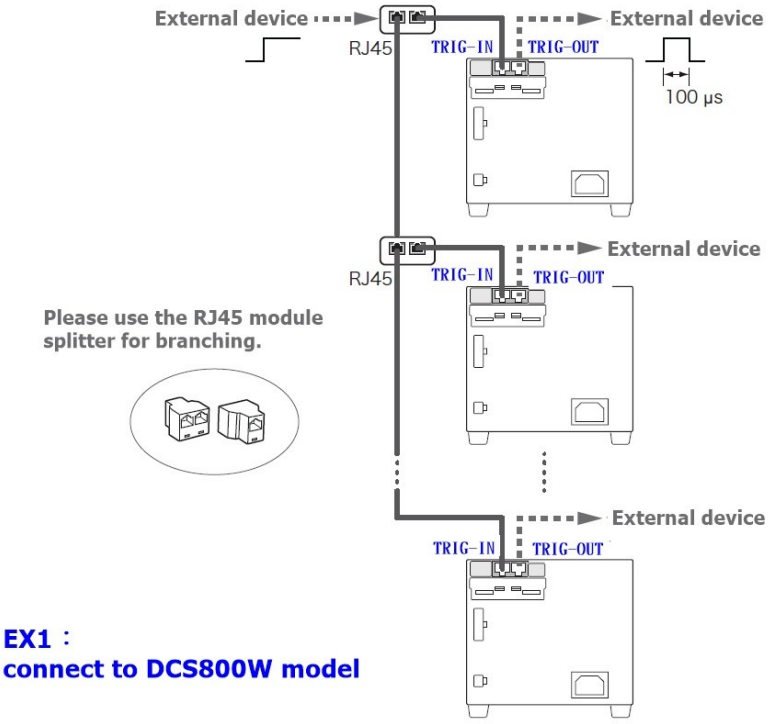
The pinout configuration when viewing the connectors from the rear panel of this product.



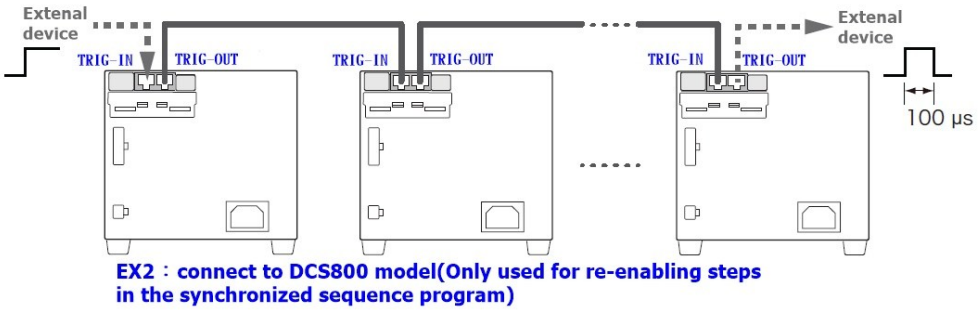
1. **Ensure that all connected DCS series POWER switches are in the OFF position.**
2. **Remove the covers from the RS232C / TRIG-IN connector and TRIG-OUT connector.**



3. Use a LAN cable to connect all the DCS series devices.



When the synchronization sequence program steps are restarted, if a trigger output is set within the step（PROG:STEP<n>:TRIGOUT ON）, the DSC series devices can be cascaded as shown in the diagram below.



Chapter 6 External Control

This chapter describes the external control and monitoring functions when using the J1 and J2 connectors.

Section 1 Summary

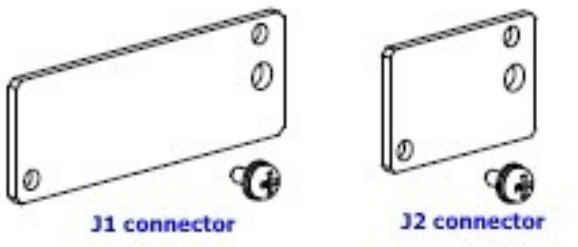
By using the J1 connector or the J2 connector on the rear panel of this product, the following external controls can be performed：

- Control the output voltage using external voltage / external resistance
- Control the output current using external voltage / external resistance
- Control output ON/OFF using external contacts
- Stop output control through external contacts
- Clear the alarm though external contacts
- Monitoring of operation modes

Regarding J1 / J2 connector

At the time of shipment, the J1 and J2 connector are installed with terminal covers.

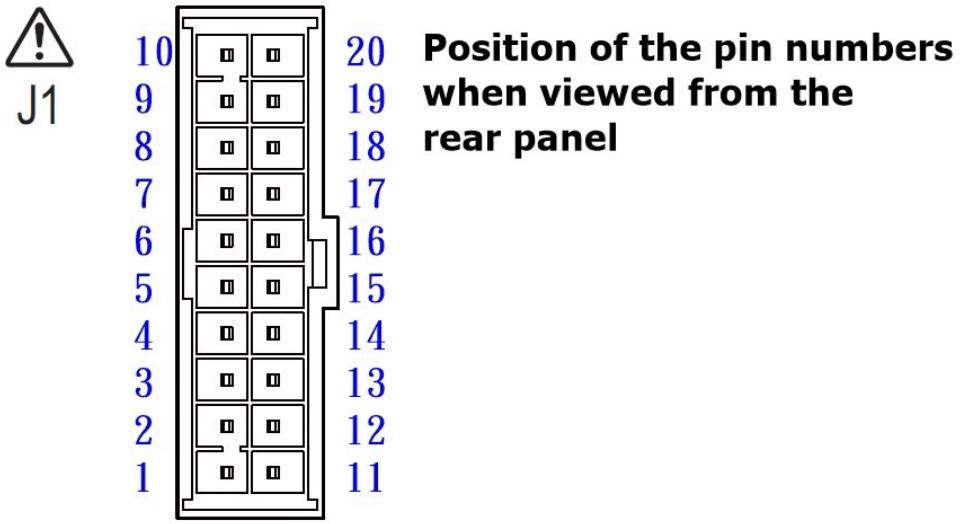
If damaged or lost, please contact MICROTEST's authorized agent or distributor.



⚠Warning

Risk of electric shock. Please install the terminal covers when the J1/J2 connectors are not in use.

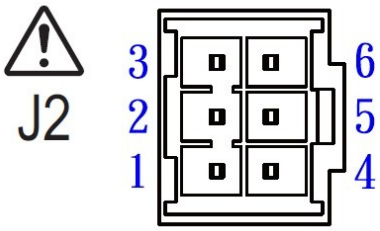
Terminal arrangement of the J1 connector：



J1 pin number	Signal name	Description
1	VPGM	Control the output voltage using external voltage or external resistance. For 0～5 V, the rated output voltage range is 0～100 % (CF12：L□). For 0～10, the rated output voltage range is 0～100 % (CF12：H ı).
2	VMON	Output voltage monitoring The 0～100 % range of the rated output voltage corresponds to output within 0～5 V (CF13：L□) or 0～10 V (CF13：H ı).
3	REF OUT	Reference voltage for external resistance control: 5.25 V (CF12：L□) / 10.5 V (CF12：H ı), with a maximum output current: 2.5 mA
4	PRL ON	When operating in parallel, set the output ON when the output is activated（using an optocoupler open-collector output）.
5	A GND	The COM of the external signals from pin 1 to 3, from pin 6 to 9, pin 11, pin 12, pin 14, and from pin 16 to 20. When remote sensing is not used, the（negative）output terminal and the negative（-S）input terminal of the sensing have the same potential when remote sensing is used.
6	ALMCLEAR	Alarm clear input: LOW（0～0.5 V）or when short-circuited, the alarm will be cleared.
7	I SUM	Current output terminal during parallel operation.

8	PRL OUT	Positive（+） output terminal during parallel operation.
9	PRL COMP IN	Correction signal input terminal during parallel operation.
10	A GND	The COM from pin 1 to 3, from pin 6 to 9, pin 11, pin 12, pin 14, and from pin16 to 20. When remote sensing is not used, the（negative）output terminal and the negative（-S）input terminal of the sensing have the same potential when remote sensing is used.
11	IPGM	Control the output current using external voltage or external resistance. For 0～5 V, the rated output current range is 0～100 % (CF12：L□). For 0～10 V, the rated output current range is 0～100 % (CF12：H ı).
12	IMON	Output current monitoring The 0～100 % range of the rated output current corresponds to output within 0～5 V (CF13：L□) or 0～10 V (CF13：H ı).
13	PRL COM	COM of pin 4
14	PRL ALM	When the protective function operates during parallel operation, or when the output stop signal is input, the output will turn ON.
15	A GND	The COM of the external signals from pin 1 to 3, from pin 6 to 9, pin 11, pin 12, pin 14, and from pin 16 to 20. When remote sensing is not used, the（negative）output terminal and the negative（-S）input terminal of the sensing have the same potential when remote sensing is used.
16	SHUT DOWN	Output off control input When LOW（0～0.5 V）or short circuited, the output will turn OFF.
17	OUTPUT CONT	OUTPUT ON/OFF control ON when LOW（0～0.5 V） or short circuited, OFF when HIGH（4.5～5 V） or open (CF15：L□). ON when HIGH（4.5～5 V） or open, OFF when LOW（0～0.5 V） or short circuited (CF15：H ı).
18	PRL COMP OUT	Correction signal output terminal during parallel operation.
19	PRL IN-	Negative（-） input terminal during parallel operation.
20	PRL IN+	Positive（+） input terminal during parallel operation.

Terminal arrangement of the J2 connector：



Position of the pin numbers when viewed from the rear panel

J2 pin number	Signal name	Description
-1	STATUS COM	COM*1 from pin 2 to 6.
2	OUT ON STATUS	Output when the output is ON（using an optocoupler open-collector output）*2
3	PWR ON STATUS	Output a LOW level signal when the output is ON（using an optocoupler open-collector output）*2
4	ALM STATUS	Output when the protection function（OVP、OCP、FOCP、OHP、SENSE、AC_FAIL、WATCHDOG）is activated or when the output stop signal is input.（using an optocoupler open-collector output）*2
5	CV STATUS	Output when operating in CV mode（using an optocoupler open-collector output）*2
6	CC STATUS	Output when operating in CC mode（using an optocoupler open-collector output）*2

*1 When the status COM is floating（with insulation voltage within 800 V）, please insulate the control circuit.

*2 Open-collector output：Maximum voltage 30 V, maximum current 8 mA.

Section 2 Precautions when Connecting External Voltage（V_{ext}）

Precautions when controlling output with external voltage（V_{ext}）.

A GND terminal

The potential of the A GND（pin5, 10, and 15）of the J1 connector connected to V_{ext} will vary depending on the use of remote sensing.

When remote sensing is not used：it is at the same potential as the "（negative）output terminal".

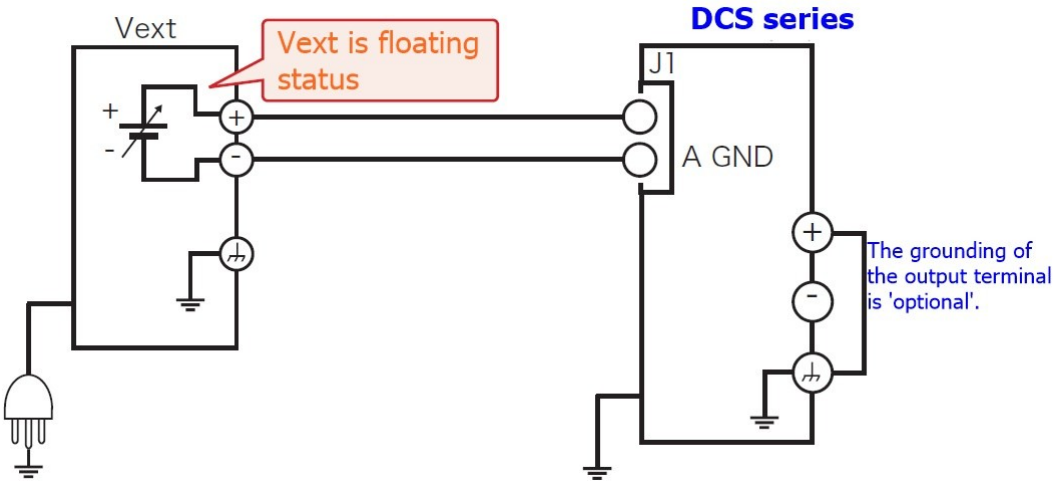
When remote sensing is used：it is at the same potential as the "negative（-S）terminal of the sensing input".

Floating status

⚠ Cautions

When using an externally controlled system, please leave the V_{ext} output floating （floating state） and do not ground it.

Short-circuiting the output of the DCS series may risk damaging the control lines.



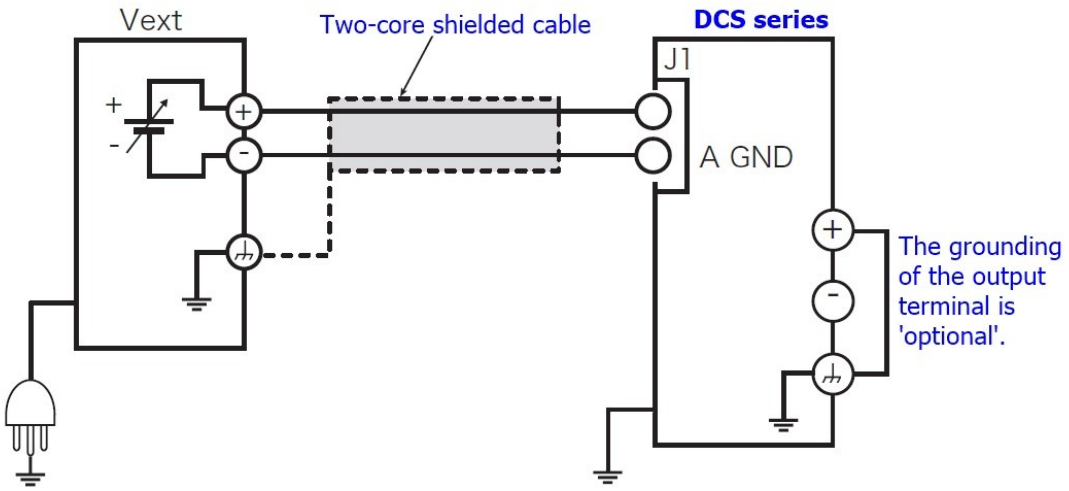
When using shielded cables

⚠ Cautions

Please do not connect the V_{ext} and DCS series shielding together. Short-circuiting the output of the DCS series poses a risk of damaging the control lines.

When using shielded cables, please shield either the V_{ext} or the DCS series during the connection.

The following image shows an example of connecting the shield to the bottom terminal of V_{ext} .



Using multiple V_{ext} to control multiple DCS series systems

⚠ Cautions

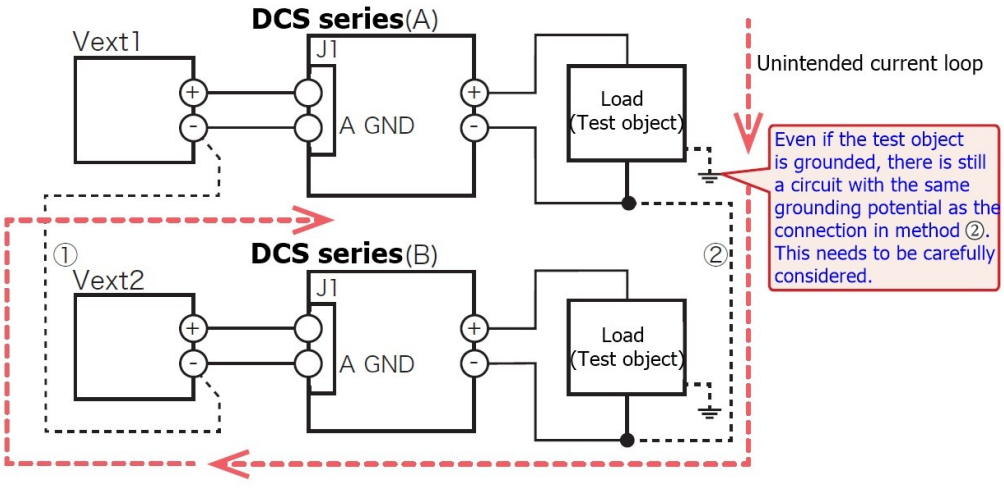
When connecting the GND（negative terminal）between each V_{ext} , do not connect the negative（-）output terminal between the DCS series systems. Otherwise, there is a risk of system malfunction and equipment failure.

If the GND between each V_{ext} is connected（negative terminal）(①), it will form an A GND circuit between the DCS series systems.

If the negative（-）output terminals (②) between the DCS series systems are connected simultaneously, an unintended current loop, as shown in the diagram, will be formed. This current loop may cause system malfunctions and equipment failure.

When using multiple V_{ext} to control multiple DCS series systems, it is recommended to avoid using both connection methods ① and ② simultaneously.

If grounding is required for the system, please choose either connection method ① or ②.

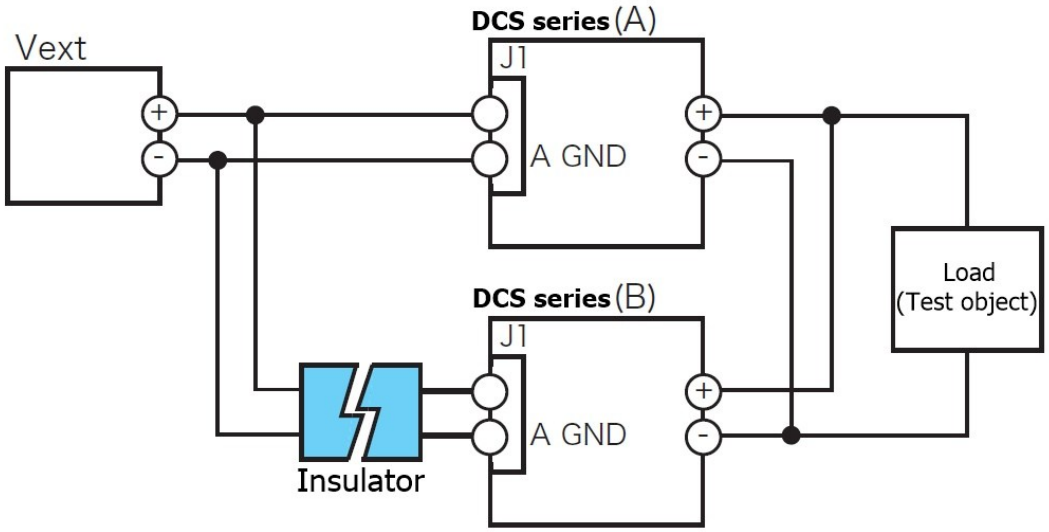


One V_{ext} controls the parallel-connected DCS series system

⚠ Cautions

When using V_{ext} the control lines to directly connect the DCS series, please connect only one unit. There is a risk of system malfunction and equipment failure.

When controlling a system with one V_{ext} and the DCS series connected in parallel, as shown in the diagram, only one DCS series unit can be directly connected to V_{ext} and the control lines. Other DCS series units should be connected via an isolator.



Notes :

When using external nodes such as sequence control to control the output, only one DCS series unit can be directly connected.

Section 3 Explanation of Output Voltage Control

Explanation of the method for controlling the output voltage using external voltage （V_{ext}）or a variable resistor（R_{ext}）of approximately 10 kΩ. In the no-load condition, the decrease in output voltage will take some time to stabilize.

⚠ Warning：There is a risk of electric shock.

When connecting to V_{ext} or R_{ext} , ensure that the insulation of the wires used meets or exceeds the insulation voltage rating of this product. For the insulation voltage of each model, please refer to the product specifications.

When using shielded cables, protect the exposed shielding portion with insulating sleeves or materials that have a withstand voltage rating higher than the insulation voltage of this product.

Using external voltage（V_{ext}）for control：

When controlling the output voltage using V_{ext}, set the system configuration to enable CV control by external voltage / external resistance by turning the CV control setting to ON (CF11：□∩).

When the V_{ext} is between 0 ~ 5 V (CF12：└□), or 0 ~ 10 V (CF12：┢ ı), the output voltage (E_o) varies between 0 and the rated output voltage (E_{rtg}).

External voltage (V_{ext})	Calculation formula for E_o	Calculation formula for V_{ext}
0～5V（CF12:LO）	$E_o = E_{rtg} \times V_{ext} / 5$ [V]	$V_{ext} = 5 \times E_o / E_{rtg}$ [V]
0～10V（CF12:HI）	$E_o = E_{rtg} \times V_{ext} / 10$ [V]	$V_{ext} = 10 \times E_o / E_{rtg}$ [V]

Connection of external voltage（V_{ext}）:

⚠ Cautions：

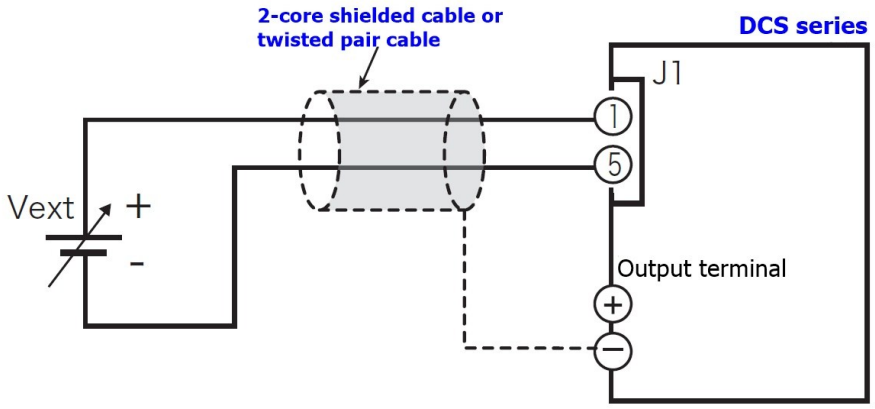
There is a risk of damaging the internal circuit. Please set the output of V_{ext} to floating, and grounding is prohibited. There is a danger of damage.

- Please pay attention to the polarity of V_{ext} .
- Do not apply a voltage higher than 10.5V or reverse voltage between pin 1 and pin 5 of the J1 connector.

At V_{ext} , please use a low-noise regulated power supply.

Amplitude multiplication of V_{ext} noise may occur at the output of this product. Therefore, the product's technical specifications may not fully accommodate outputs with pulsating noise. To reduce the impact of noise on the output, use a 2-core shielded cable or twisted pair for the connection between V_{ext} , and keep the length as short as possible. The longer the wiring, the more susceptible it is to noise interference. Even with noise-resistant cables, proper operation may still be affected. When using shielded cables, connect the negative（ - ）output terminal to the shield. If the shielded cable needs to be connected to the V_{ext} side, please refer to the "Precautions when connecting external voltage（V_{ext}）".

Please use pin 1 and pin 5 of the J1 connector.



Input V_{ext}	COM	Internal resistor
Pin 1	Pin 5	Approximately 1 MΩ

Control using external resistor (R_{ext}) :

By using an R_{ext}, the voltage divider ratio of the reference voltage (REF OUT on pin 3 of J1) can be adjusted, causing the output voltage (E_o) to vary between 0 and 105% of the rated output voltage (E_{rtg}) .

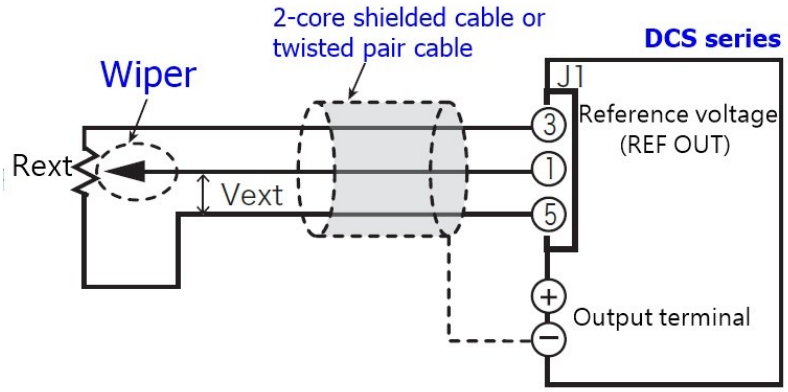
When controlling the output voltage using an R_{ext}, set the system configuration to enable CV control by external voltage / external resistor by turning the CV control setting to ON (CF11 : on) .

In the system configuration settings (CF12), set the V_{ext} level and the reference voltage (REF OUT on pin 3 of J1) . When the V_{ext} is between 0 ~ 5 V (CF12 : Lo) or 0 ~ 10 V (CF12 : Hi) , the E_o varies between 0 and the E_{rtg} .

Reference voltage (REF OUT)	External voltage (V_{ext})	Calculation formula for E_o	Calculation formula for V_{ext}
5.25V	0～5V (CF12:LO)	$E_o = E_{rtg} \times V_{ext} / 5$ [V]	$V_{ext} = 5 \times E_o / E_{rtg}$ [V]
10.5V	0～10V (CF12:HI)	$E_o = E_{rtg} \times V_{ext} / 10$ [V]	$V_{ext} = 10 \times E_o / E_{rtg}$ [V]

Connection of external resistor (R_{ext}) :

When selecting R_{ext} , use a metal film resistor of 10 kΩ with a power rating of 1/2 W or higher, and components with low temperature coefficient and minimal time variation, such as wire-wound resistors. To reduce the impact of noise on the output, use a 2-core shielded cable or twisted pair for the connection between R_{ext} , and keep the wiring as short as possible. The longer the wiring, the more susceptible it is to noise interference. Even with noise-resistant cables, proper operation may still be affected. When using shielded cables, connect the negative (—) output terminal to the shield. Use pins 3, 1, and 5 of the J1 connector.



Output current control：

Explanation of how to control the output current using external voltage（V_{ext}）or a variable resistor（R_{ext}）of approximately 10 kΩ.

⚠Warning：risk of electric shock.

When connecting with V_{ext} or R_{ext} , ensure that the insulation of the wires used exceeds the product's rated insulation voltage. For the insulation voltage of each model, please refer to the product specifications.

When using shielded cables, protect the exposed shielded portions with insulating sleeves or other insulation materials rated for a voltage higher than the product's insulation voltage.

Control using external voltage（V_{ext}）:

When using V_{ext} to control the output current, set the system configuration to enable CC control by turning it ON for controlling with external voltage / external resistor (CF10：□⊓).

When the V_{ext} is between 0 ~ 5 V (CF12：L□), or 0 ~ 10 V (CF12：H), the output current（I_o）varies between 0 and the rated output current（I_{rtg}）.

External voltage (V_{ext})	Calculation formula for I_o	Calculation formula for V_{ext}
0～5V（CF12:LO）	$I_o = I_{rtg} \times V_{ext} / 5$ [A]	$V_{ext} = 5 \times I_o / I_{rtg}$ [A]
0～10V（CF12:HI）	$I_o = I_{rtg} \times V_{ext} / 10$ [A]	$V_{ext} = 10 \times I_o / I_{rtg}$ [A]

Connection of external voltage (V_{ext}) :

⚠ Cautions

There is a possibility of damaging the internal circuitry. Please set the V_{ext} output to floating, and avoid grounding it. There is a risk of damage.

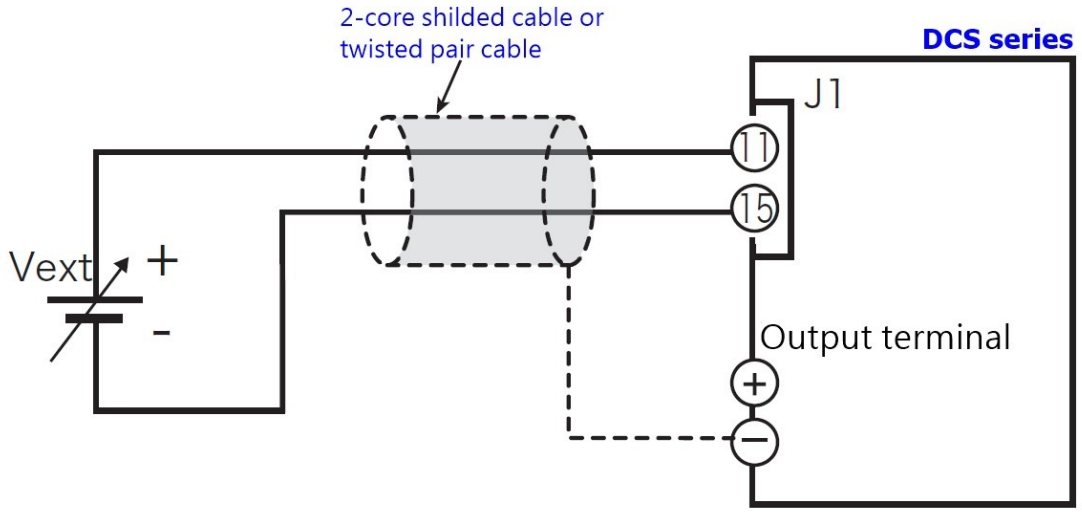
Please pay attention to the polarity of V_{ext} . Do not apply a voltage higher than 10.5V or reverse voltage between pin 11 and pin 15 of the J1 connector.

At V_{ext} , please use a low-noise regulated power supply.

Amplitude multiplication of V_{ext} noise may occur at the output of this product. Therefore, the product's technical specifications may not fully accommodate outputs with pulsating noise. To reduce the impact of noise on the output, use a 2-core shielded cable or twisted pair for the connection between V_{ext} , and keep the length as short as possible. The longer the wiring, the more susceptible it is to noise interference. Even with noise-resistant cables, proper operation may still be affected.

When using shielded cables, connect the negative (-) output terminal to the shield. If the shielded cable needs to be connected to the V_{ext} side, please refer to the "Precautions when connecting external voltage (V_{ext})".

Please use pin 11 and pin 15 of the J1 connector.



Input V_{ext}	COM	Internal resistor
Pin 11	Pin 15	Approximately 1 MΩ

Control using external resistor (R_{ext}) :

By using an R_{ext}, the voltage divider ratio of the reference voltage (REF OUT on pin 3 of J1) can be adjusted, causing the output voltage (E_o) to vary between 0 and 105% of the rated output voltage (E_{rtg}) .

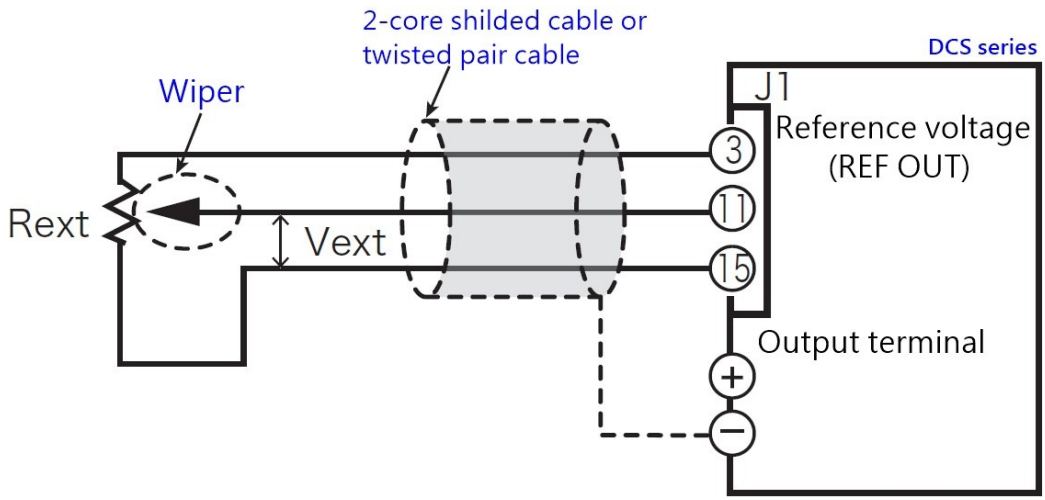
When controlling the output voltage using an R_{ext}, set the system configuration to enable CV control by external voltage / external resistor by turning the CV control setting to ON (CF10 : ▫⌐).

In the system configuration settings (CF12), set the V_{ext} level and the reference voltage (REF OUT on pin 3 of J1) . When the V_{ext} is between 0 ~ 5 V (CF12 : ┗▫) or 0 ~ 10 V (CF12 : ┣ ı), the E_o varies between 0 and the E_{rtg} .

Reference voltage (REF OUT)	External voltage (V_{ext})	Calculation formula for I_o	Calculation formula for V_{ext}
5.25V	0～5V (CF12:LO)	$Io = I_{rtg} \times V_{ext} / 5$ [A]	$V_{ext} = 5 \times I_o / I_{rtg}$ [A]
10.5V	0～10V (CF12:HI)	$Io = I_{rtg} \times V_{ext} / 10$ [A]	$V_{ext} = 10 \times I_o / I_{rtg}$ [A]

Connection of external resistor (R_{ext}) :

When selecting R_{ext} , use a metal film resistor of 10 kΩ with a power rating of 1/2 W or higher, and components with low temperature coefficient and minimal time variation, such as wire-wound resistors. To reduce the impact of noise on the output, use a 2-core shielded cable or twisted pair for the connection between R_{ext} , and keep the wiring as short as possible. The longer the wiring, the more susceptible it is to noise interference. Even with noise-resistant cables, proper operation may still be affected. When using shielded cables, connect the negative (—) output terminal to the shield. Use pins 3, 11, and 15 of the J1 connector.



Section 4 Explanation of Output ON/OFF Control

Explanation of the method for controlling output ON/OFF through external contacts.

⚠Warning：There is a risk of electric shock.

External contact (S) and the insulation of the connecting wires should be ensured to be above the rated insulation voltage of this product. For the insulation voltage of each model, please refer to the product specifications.

When using shielded cables, protect the exposed shielded portions with insulating sleeves or other insulation materials rated for a voltage higher than the product's insulation voltage.

To reduce the impact of noise on the output, use a 2-core shielded cable or twisted pair for the connection between external contacts, and keep the wiring as short as possible. The longer the wiring, the more susceptible it is to noise interference. Even with noise-resistant cables, proper operation may still be affected.

When using shielded cables, connect the negative（ - ）output terminal to the shield of the cable.

When controlling the output ON/OFF via external contacts, set the external control for output ON/OFF in the system configuration (CF14：ON), and choose the logic setting from the following two options.

Output ON on the falling edge of LOW (CF15：LO)

When pin 17 of connector J1 is set to LOW（0～0.5 V）or is shorted, the output will turn ON.

Output ON on the rising edge of HIGH (CF15：HI)

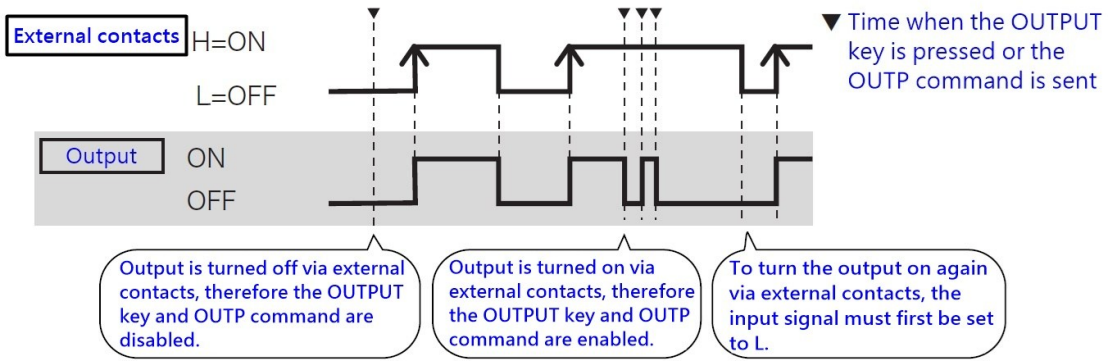
When pin 17 of connector J1 is set to HIGH（4.5～5 V）or is opened, the output will turn ON.

The system configuration settings allow the use of output ON/OFF delay and soft start/soft stop functions (CF14：EnH).

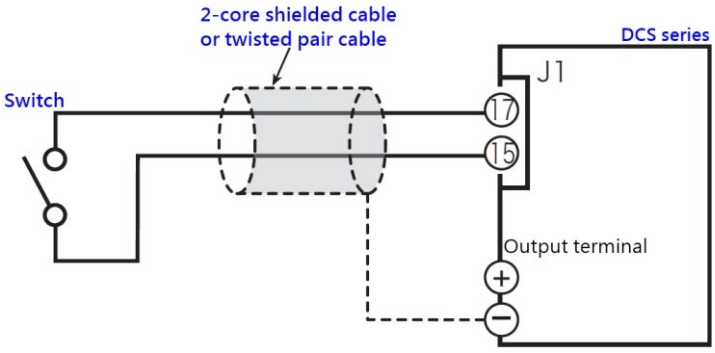
Output ON/OFF control detects the rising or falling edge. Since it does not detect the level, to turn the output ON during activation, an input signal is required to detect the edge.

Output ON/OFF control via external contacts, the panel OUTPUT key, and the OUTP command are all enabled simultaneously.

Output off has priority. Therefore, when the output is turned off via external contacts, the OUTPUT key and OUTP command become ineffective.



Output ON/OFF control (Output is ON when HIGH)



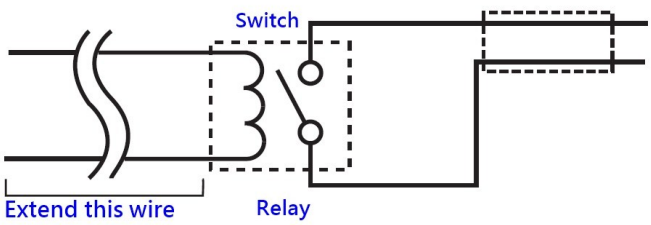
Connection of External Contacts:

Use pins 15 and 17 of connector J1.

The open-circuit voltage between pins 15 and 17 is approximately 5 V, and the short circuit current is approximately 0.5 mA.

For the external contact, please use components with a contact voltage of 5 Vdc and a rated current of at least 0.5 mA.

When using two or more units simultaneously with a floating ground method, and controlling ON/OFF with a single external contact, please use a relay to isolate the signal sent to various devices from the external contact signal.



Long-Distance Connection:

For long-distance wiring using a small relay, please extend the relay coil side.

Section 5 Explanation of Output Stop Control

Explain the method for turning the output OFF via an external contact.

⚠ Warning：There is a risk of electric shock.

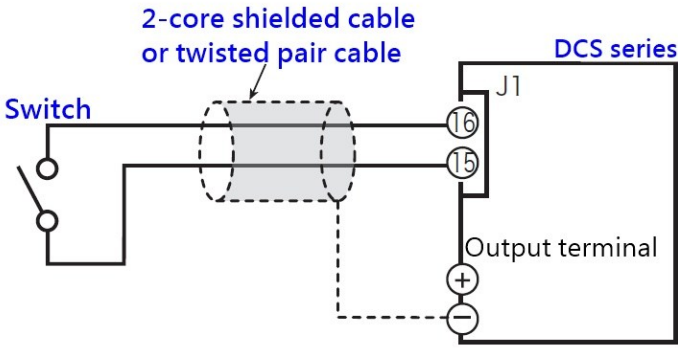
External contact (S) and the insulation of the connecting wires should be ensured to be above the rated insulation voltage of this product. For the insulation voltage of each model, please refer to the product specifications.

When using shielded cables, protect the exposed shielded portions with insulating sleeves or other insulation materials rated for a voltage higher than the product's insulation voltage.

To reduce the impact of noise on the output, use a 2-core shielded cable or twisted pair for the connection between external contacts, and keep the wiring as short as possible. The longer the wiring, the more susceptible it is to noise interference. Even with noise-resistant cables, proper operation may still be affected.

When using shielded cables, connect the negative（ - ）output terminal to the shield of the cable.

When pin 16 of connector J1 is set to LOW（0 ~ 0.5 V）or is shorted, the output will turn ON. When returning, set pin 16 of connector J1 to HIGH（4.5 ~ 5 V）or is opened, then turn POWER off and back on again.



Output Stop Connection:

Use pins 15 and 16 of connector J1. The open-circuit voltage between pins 15 and 16 is approximately 5 V, and the short-circuit current is approximately 0.5 mA.

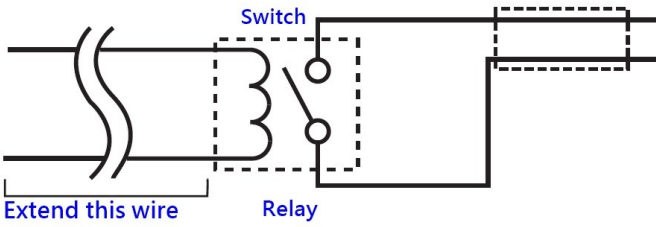
At the external contact, please use components with a rated contact voltage of 5 Vdc and a rated current of at least 0.5 mA.

When using two or more units with a floating ground configuration, and stopping the

When using pin 14 of connector J1, in single-control parallel operation, if a slave unit encounters an abnormal stop, the entire system will stop.

During shutdown, it is possible to select in the configuration settings whether to enable circuit breaker trip. (CF25：on/oFF)(available only for the 2000W model) .

When the output is turned off, the circuit breaker trip is set to "circuit breaker trip" by default at the factory. (CF25：on) .



Long-Distance Connection:

For long-distance wiring using a small relay, please extend the relay coil side.

Section 6 Explanation of Alarm Reset Control

Explain the method for performing alarm reset via an external contact.

⚠ Warning：There is a risk of electric shock.

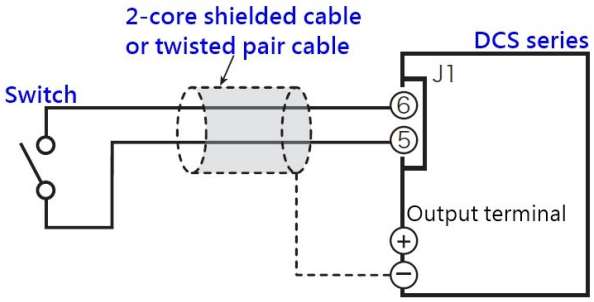
External contact (S) and the insulation of the connecting wires should be ensured to be above the rated insulation voltage of this product. For the insulation voltage of each model, please refer to the product specifications.

When using shielded cables, protect the exposed shielded portions with insulating sleeves or other insulation materials rated for a voltage higher than the product's insulation voltage.

To reduce the impact of noise on the output, use a 2-core shielded cable or twisted pair for the connection between external contacts, and keep the wiring as short as possible. The longer the wiring, the more susceptible it is to noise interference. Even with noise-resistant cables, proper operation may still be affected.

When using shielded cables, connect the negative（ - ）output terminal to the shield of the cable.

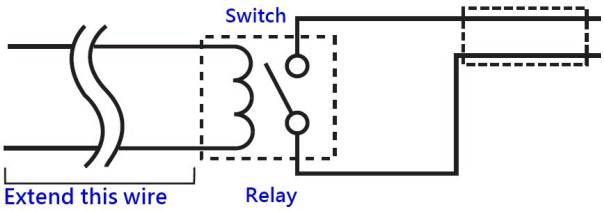
When pin 6 of connector J1 is set to LOW（0～0.5 V）or is shorted, the alarm will clear.



Alarm reset connection:

Use pins 5 and 6 of connector J1. The open-circuit voltage between pins 5 and 6 is approximately 5 V, and the short-circuit current is approximately 0.5 mA. At the external contact, please use components with a rated contact voltage of 5 Vdc and a rated current of at least

When using two or more units with a floating ground configuration, and performing alarm reset from one unit via an external contact, please use a relay to isolate the signal sent to various devices from the external contact signal.



Long-Distance Connection:

For long-distance wiring using a small relay, please extend the relay coil side.

Section 7 Explanation of External Monitoring

External Monitoring of Output Voltage and Output Current

Output voltage and output current can be monitored via connector J1.

The voltage level of the monitoring output can be configured in the system settings

（CF13）.

J1 pin number	Signal name	Description
5 10 15	A GND	Monitoring output COM
2	VMON	Monitoring Output for Output Voltage 0 V to the rated output voltage corresponds to 0 V to approximately 5 V (CF13：Lo), or 0 V to approximately 10 V (CF13：Hi).
12	IMON	Monitoring Output for Output Current 0 V to the rated output current corresponds to 0 V to approximately 5 V (CF13：Lo), or 0 V to approximately 10 V (CF13：Hi).

⚠ Cautions：

Shorting VMON and IMON to A GND can cause a malfunction.

Monitoring Output Ratings：

Output impedance: 1 kΩ or less

Maximum output current: approximately 10 mA

Each monitoring output is a signal representing the monitored DC voltage value

（average value）. It can't accurately monitor the AC components of the actual

output current (such as ripple, transient（response waveforms, etc）.

External monitoring of operation status：

At connector J2, status outputs are available for externally monitoring the operating status of this product. There are five status output items.

Each output is an open-collector output via a photocoupler and is internally isolated within the product.

The status COM is floating, with an isolation voltage of up to 800 V.

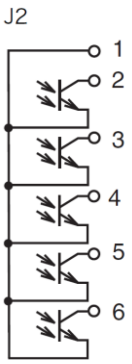
Maximum ratings for each signal terminal：

Maximum voltage：30 V, Maximum current（Sink）: 8 mA

J2 pin number	Signal name	Description
1	STATUS COM	COM of Status Output Photocoupler emitter output
2*1	OUT ON STATUS	Output Level Change When Output is ON. LOW level（CF18：nEG）， HIGH level（CF18：Pos） Open-collector photocoupler output
3	PWR ON STATUS	When the POWER switch is turned ON（PWR ON STATUS）, the signal is at LOW level. Open-collector photocoupler output.
4*1	ALM STATUS	The signal level changes when a protection function（OVP、OCP、FOCP、OHP、SENSE、AC-FAIL）is activated, or when an input/output stop signal（SD） is present. LOW level（CF19：nEG）， HIGH level（CF19：Pos） Open-collector photocoupler output.
5*1	CV STATUS	The signal level changes during constant voltage operation. LOW level（CF17：nEG）， HIGH level（CF17：Pos） Open-collector photocoupler output.
6*1	CC STATUS	The signal level changes during constant current operation. LOW level（CF16：nEG）， HIGH level（CF16：Pos） Open-collector photocoupler output.

*1 When the status output is selected to HIGH level（Pos）, the status output will change to HIGH level within 5 seconds after the POWER switch is turned ON.

J2 Circuit Diagram：



Chapter 7 Parallel / Series Operation Instructions

This chapter explains the various functions, connections, settings, and operations during single control parallel operation and series operation.

Single control parallel operation：

Single control parallel operation is a function where the entire system connected in parallel is controlled through the operation of the master unit. One unit serves as the master, and other identical DCS series models are connected as slaves.

Through single control parallel operation, the output current can be increased (Maximum output current：rated output current of a single unit × number of parallel units).

	400W model	800W model	1200W model	2000W model
Maximum number of parallel units	Including 3 master units	Including 3 master units	Including 2 master units	Including 2 master units

The difference in output voltage and output current between the master and slave units should be within 5% of the rated values.

⚠ Cautions：

When operating individually, or when there are unused DCS series units during parallel operation, please disconnect the parallel operation connection. Otherwise, there may be a risk of malfunction.

Various functions：

The functions of single control parallel operation are as follows.

Voltage and current display：

The output voltage value is displayed on the voltage display section of the master unit. The voltage value last set on the master unit is shown. On the voltage display section of the slave units, "SLAVE" is displayed.

The current display section of the master unit shows the total current value of all devices connected in parallel. Each slave unit can be configured to display its own current value（CF35：oFF / on）.

The maximum current display is 999.9.

The display can be switched to show power values. The current display section of the master unit shows the total power of all units connected in parallel. Each slave unit can be configured to display its own power value（CF35：oFF / on）.



Panel display example during parallel operation

（Example with output current of 20 A, and the slave unit display showing ON）

When the number of parallel units set on the master unit（CF44）does not match the actual number of connected units, the output current value will not be displayed correctly.

External control：

For master unit use only.

External monitoring：

⚠ Cautions

During parallel operation, do not connect the monitoring COM lines of the master and slave units together.

If the connection to the load becomes disconnected, the COM line may be damaged.

- **External monitoring of output voltage（VMON）:**

  Monitoring can be done from the master unit.

- **External monitoring of output current（IMON）:**

  The output current of both the master and slave units can be monitored individually. When monitoring the total output current, please do so from the master unit.

- **Various monitoring statuses：**

  Constant voltage operation (CV STATUS), constant current operation (CC STATUS), output ON, power ON, and alarm status can be monitored separately on both the master and slave units. However, the constant current operation status is always displayed on the slave units.

Remote sensing：

For master unit use only.

Alarm：

The actions taken when various alarms are detected are as follows.

⚠ Cautions

When a slave unit experiences a fault, the entire system output will turn OFF through the single-control parallel operation protection (PRL ALM) function.

When performing single control parallel operation, connect pin 14 of the J1 connector on both the master and slave units.

- **When the master detects an alarm：**

  The output of the slave units will be turned OFF, and the output of the entire system will be turned OFF.

- **When the slave detects an alarm：**

When the master detects an alarm from a slave unit, the output of the entire system is turned OFF.

Alarm clearance：

Press the ALM CLR（SHIFT + SET）key, or set pin 6 of the J1 connector to LOW（0 ~ 0.5 V）or short it to clear the alarm status, then eliminate the cause of the alarm.

When a Shut Down（SD）or Parallel Alarm（PRL ARM）occurs, turn OFF the POWER switches of the master and slave units in sequence.

After resolving the cause of the alarm, turn the POWER switches of the master and slave units ON in sequence.

Remote control：

The master unit can be controlled.

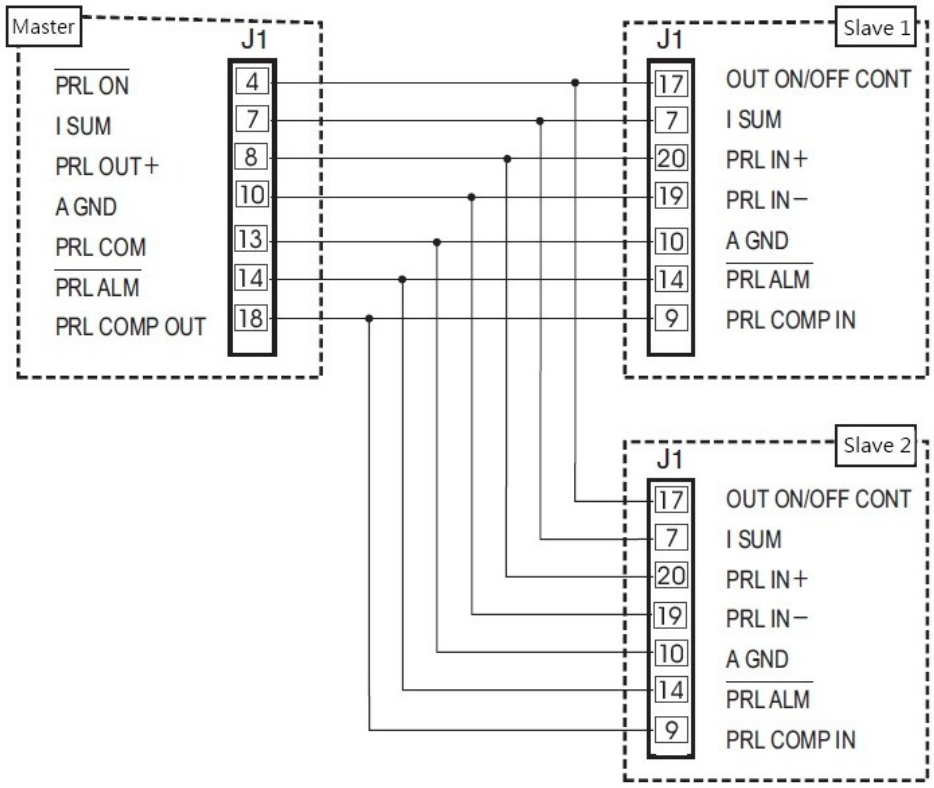
Connection：

Signal wire connection：

Use the J1 connector for connection.

The cable required for the connection is not included. For details, please refer to "Regarding J1 / J2 connector".

This is an example of connecting two slave units.



1. Decide which DCS series unit will be used as the master.
2. Connect the J1 connector of the master unit to the J1 connector of Slave 1.
3. When connecting Slave 2, connect the J1 connector of Slave 1 and J1 connector of Slave 2.

Among the options, there is a cable for connection: TL-DS0004.

Load Connection

⚠Warning：There is a risk of electric shock.

When touching the output terminals, please turn the POWER switch OFF. After completing the load wiring, please install the OUTPUT terminal cover.

⚠Cautions

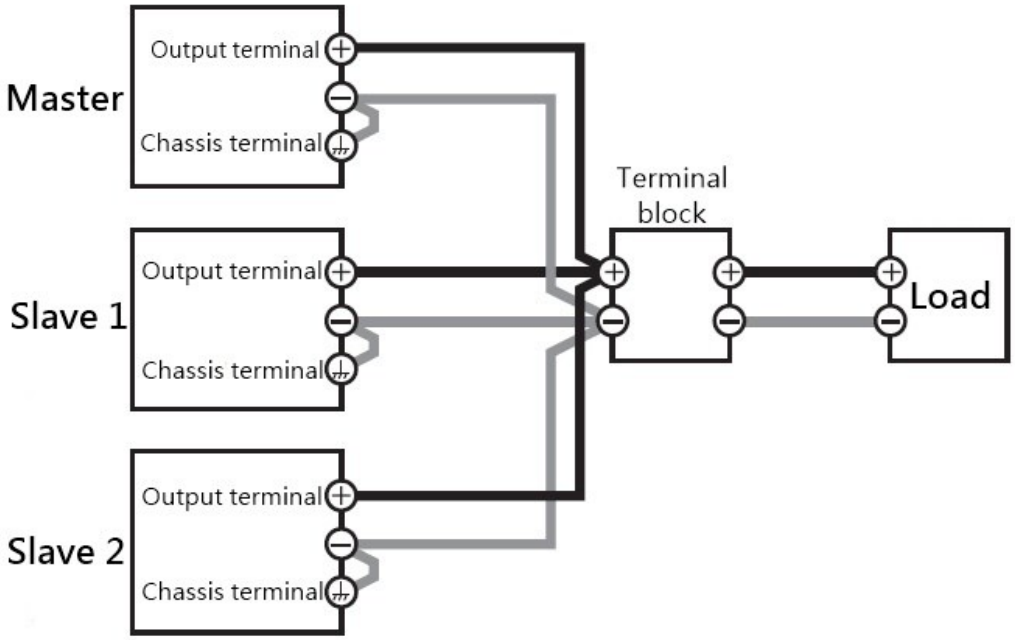
When grounding the output terminals, be sure to connect the same polarity (+ or −) output terminals of the master and slave units to the chassis terminal.

If the output terminals of opposite polarities from the master and slave units are grounded, the GND line in the power cable will be short-circuited. This will not only prevent proper output but also damage the chassis grounding jumper.

To prevent oscillations, connect an electrolytic capacitor of several hundred μF to several tens of thousands μF at the load side as needed. If the wiring is longer, oscillations may occur due to shifts caused by the inductance and capacitance of the wiring.

The voltage rating of the electrolytic capacitor must be at least 120% of the rated output voltage of the DCS series.

When making connections, please bundle the + and − side wiring together and keep the wiring as short as possible. The inductance of the wiring can cause oscillations.



1. Set the POWER switches of all DCS series units connected in parallel to OFF.
2. Remove the OUTPUT terminal cover.
3. Connect the output terminals (+ or –) of both the master and slave units to the chassis terminal.

   Be sure to ground the output terminals of the same polarity on both the master and slave units.

   Do not connect them when using a floating ground configuration.
4. Connect the load wires to the output terminals of both the master and slave units.
5. Connect the load wires from both the master and slave units to the load via an intermediate terminal block.

   Use load wires with sufficient current capacity. For each DCS series unit, use

wires of equal length and cross-sectional area when connecting to the terminal block, and keep the wiring as short as possible (within 50 cm). When connecting from the terminal block to the load, try to keep the wiring lengths as uniform as possible. Route the signal lines from the J1 connector separately from the load wiring as much as possible.

6. Install the OUTPUT terminal cover.

Setting：

Settings for the master unit, slave units, and the number of parallel units (including the master).

When the output is set to OFF, configure the master (CF44：2 ~ 3) and slave units (CF44：SLAU). Set the number of units in parallel operation on the master unit (CF44：2 ~ 3).

The factory default is standalone operation (CF44： 1).

The settings take effect only after turning the POWER switch OFF and then ON again.

When setting the number of units for parallel operation (CF44), be sure to configure it according to the actual number of units connected in parallel. If the set number does not match the actual number, it may cause errors in current values, Over Current Protection (OCP) settings, and incorrect display of the measured current.

Setting Voltage/Current Values：

The voltage and current values are set on the master unit.

The total output current value of the master and slave units.

When the system configuration setting for the number of parallel units (CF44) is made, the maximum output current value (rated output current of a single unit × 105% × number of parallel units) will be set. When the setting value is displayed (SET key lit), the set value will be shown. The last set voltage value will be displayed on the master unit. After maintaining this state, when the OUTPUT is turned ON, the set value will be output. Please set an appropriate value.

Settings for the master unit's Over Voltage Protection (OVP)/Over Current Protection (OCP)

During parallel operation, set the Over Voltage Protection (OVP) and Over Current Protection (OCP) on the master unit.

When setting the number of parallel units (CF44) in the system configuration, the maximum overcurrent protection value will be set as (single unit rated output current × 112% × number of parallel units). When the OVP/OCP setting values are displayed（OVP and OCP indicators lit）, the configured values will be shown. The final configured OVP value will be displayed on the master unit.

Circuit breaker trip during protection function operation （OVP/OCP/FOCP/SD/PRL ALM）（available only for the 2000W model）

During parallel operation, when protection functions（OVP/OCP/FOCP/SD/PRL ALM）are activated, it is possible to enable or disable the circuit breaker trip function (POWER switch OFF) via the setting (CF25: OFF/ON). The factory default is ON.

Settings on the master unit are ineffective; please configure both the master and slave units separately.

Starting single control parallel operation：

Turn the POWER switch ON：

1 Turn the POWER switch of the master unit ON.

2 Turn the POWER switch of the slave units ON.

3 Perform normal operations on the master unit.

Panel operations on the slave units are disabled. Output ON/OFF settings must be operated from the master unit.

⚠ Cautions

When switching the POWER switch ON/OFF, please wait at least 10 seconds after the panel display turns off before operating again.

Repeatedly turning the POWER switch ON/OFF within a short time may cause failure of the surge current limiting circuit, and will also shorten the lifespan of the POWER switch and the internal input fuse.

1 Turn the POWER switch of the slave units OFF.

2 Turn the POWER switch of the master unit OFF.

Series operation：

⚠ Cautions

Series with D（DCS3104D、DCS3108D、DCS3112D、DCS3120D）can't be used for series operation.

Using them in series operation poses a risk of output exceeding the insulation voltage.

For DCS series with output voltage of 650 V or less, up to 2 units can be connected in series. Single control operation is not supported.

The voltage supplied to the load is the sum of the output voltages of the two units.

The voltage setting accuracy is the same as that of a single unit.

Various functions：

The functions during series operation are as follows.

Voltage and current display：

Voltage/current are displayed separately on Machine 1 and Machine 2. The total output voltage equals the sum of the voltages of Machine 1 and Machine 2.

It is possible to switch to power value display. Power values are displayed separately on Machine 1 and Machine 2.



Example of panel display during series operation
(Output current example: 20 A)

External control：Can be used.

External monitoring：

⚠ Warning

During monitoring, please be careful to avoid short circuits and electric shock. When monitoring the output voltage/output current during series operation, note that the COM terminals of the monitoring signals from Machine 1 and Machine 2 may have

different potentials.

- **External monitoring of output voltage（VMON）:**

  The output voltage of each machine can be monitored.

  The total output voltage is equal to the sum of the monitored values from Machine 1 and Machine 2.

- **External monitoring of output current（IMON）:**

  The output current of each machine can be monitored.

- **Various monitoring statuses：**

  Constant Voltage operation (CV status), Constant Current operation (CC status), output ON, power ON, and alarm status can be monitored on each machine.

Remote sensing：

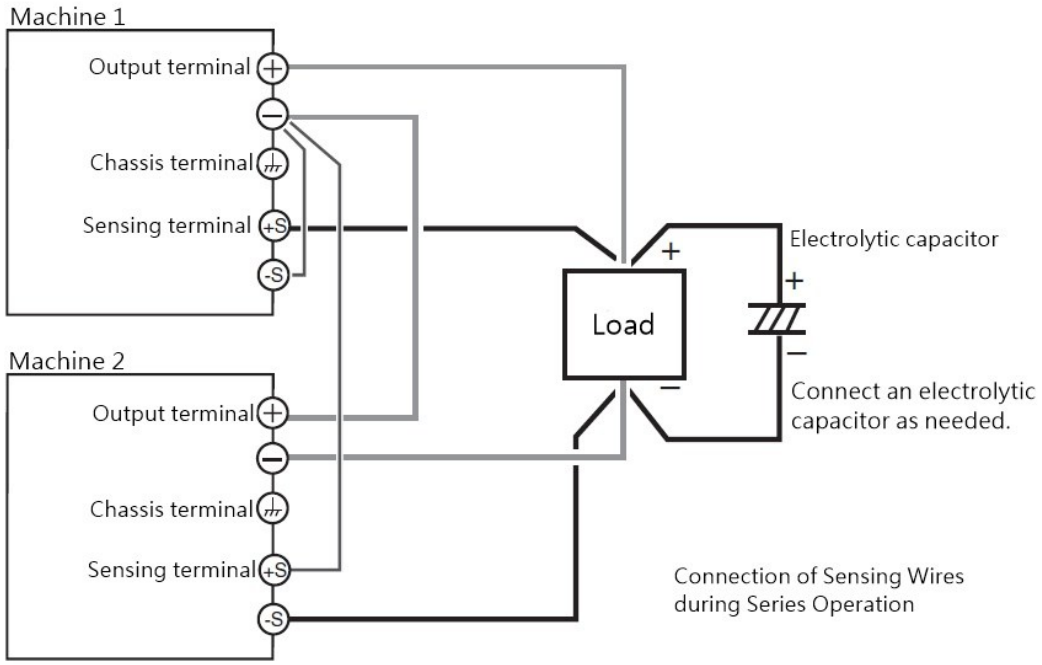
⚠ Cautions

If the sensing wires are connected incorrectly, an excessive voltage may be applied to the load, potentially causing a malfunction.

To prevent oscillations, connect an electrolytic capacitor of several hundred μF to several tens of thousands μF at the load side as needed. If the wiring is longer, oscillations may occur due to shifts caused by the inductance and capacitance of the wiring. The voltage rating of the electrolytic capacitor must be at least 120% of the rated output voltage of the DCS series.

When using electrolytic capacitors, ensure that their voltage rating is at least 120% of the total rated output voltage of all DCS series units connected in series.

When performing remote sensing in series operation, connect the sensing lines of the units as shown below.



Alarm：

All alarms can be detected even during series operation.

In the system configuration settings（CF20：AUto / SAFE）In the system configuration settings, you can choose whether the output automatically turns ON or not after the cause of an alarm is cleared（only for AC-FAIL）.

Alarm clearance：

Press the ALM CLR（SHIFT + SET）key, or connect pin 6 of the J1 connector to LOW（0 ~ 0.5 V）or short it to reset the alarm status. After clearing the alarm, eliminate

the cause of the alarm.

When the machine is Shut Down（SD）or in parallel alarm（PRL ARM）operation , turn OFF the POWER switches of Machine 1 and Machine 2. After resolving the alarm cause, turn ON the POWER switches of both Machine 1 and Machine 2 again.

Connection：

Load Connection

⚠ Warning：There is a risk of electric shock.

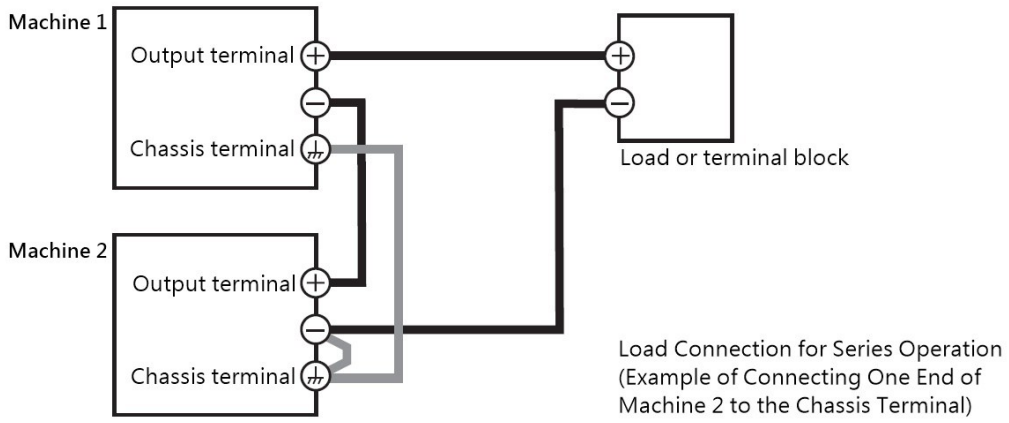
Turn the POWER switch OFF before touching the output terminals. After completing the load wiring, install the OUTPUT terminal cover.

⚠ Cautions

To prevent oscillations, connect an electrolytic capacitor of several hundred μF to several tens of thousands μF at the load side as needed. If the wiring is longer, oscillations may occur due to shifts caused by the inductance and capacitance of the wiring.

The voltage rating of the electrolytic capacitor must be at least 120% of the rated output voltage of the DCS series.

The load connection method
is as follows :



Load Connection for Series Operation
(Example of Connecting One End of
Machine 2 to the Chassis Terminal)

1 Turn OFF the POWER switches of all DCS Series units to be connected in series.

2 Remove the OUTPUT terminal cover.

3 Connect the output terminal (+ or –) of either Machine 1 or Machine 2 to the chassis terminal.

4 Use load wiring to connect Machine 1, Machine 2, the load, and any intermediate terminal blocks. Use wires with sufficient current capacity. Keep the load wiring as short as possible. If the voltage drop in the load wiring increases, the potential difference between each power supply and the load fluctuation will also increase.

5 Connect the output terminals of Machine 1 and Machine 2.

6 Reinstall the OUTPUT terminal cover.

Setting：

Setting Voltage/Current Values：

Set the voltage and current values on each machine. The total output voltage will be the sum of the two units. Set the same current value for both machines.

Setting for the Over Voltage Protection（OVP）/ Over Current Protection（OCP）:

During series operation, OVP and OCP must be configured for each machine. Both machines can be set to the same values.

Starting series operation：

POWER switch ON/OFF

Turn the POWER switches of Machine 1 and Machine 2 ON or OFF.

⚠ Cautions：

When operating the POWER switch ON/OFF, wait at least 10 seconds after the cooling fan has stopped before proceeding.

Repeatedly turning the POWER switch ON/OFF within a short time may cause failure of the surge current limiting circuit, and will also shorten the lifespan of the POWER switch and the internal input fuse.

Output ON/OFF

Set the OUTPUT keys of Machine 1 and Machine 2 to ON or OFF.

Chapter 8 Introduction to Each Connector

Explanation of the connectors on the rear panel of the DCS series.

Section 1 RS232C Connector

■ RS232C connection

The RS232C/TRIG IN connector（RS232C terminal）of this product uses an RJ-45 connector.

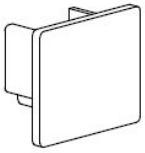
Before making any connections, please ensure that both the DCS series unit and your computer are powered off.

The RS232C port of this product is equipped with a protective dust cover.

Please remove the cover before use and keep it safely so that it can be replaced when not in use.

For safety reasons, always replace the dust cover when the RS232C port is not in use.

If the sensing terminals are not in use, please cover them with their protective dust covers as well.

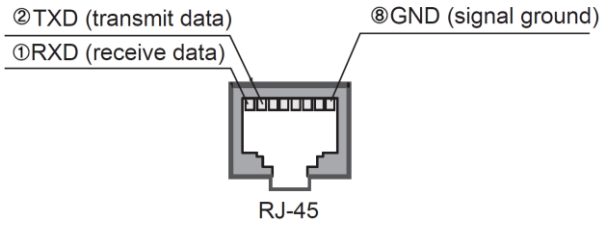


Protective dust cover

The LAN port and the RS232C port on the DCS series have the same physical shape.

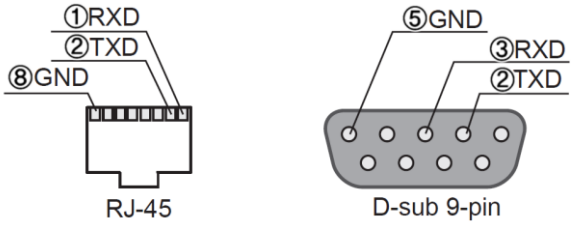
Please refer to the labeling on the rear panel to identify the correct port.

You can use the optional adapter cable (TL-DS0005) to connect the DCS series unit to your computer.



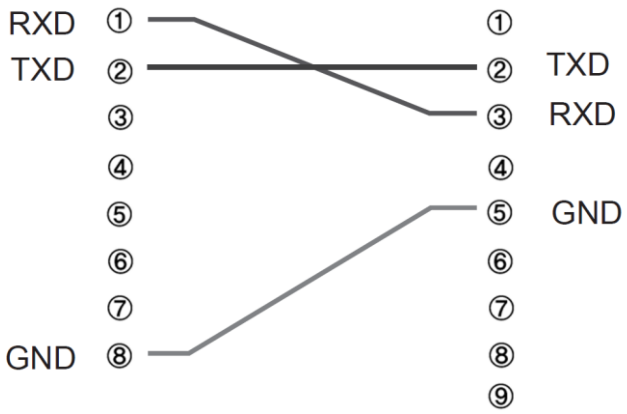
【DCS series】

Pin number orientation when facing the rear panel.



【Adapter cable（TL-DS0005）】

Explanation of pin numbering positions when facing the connector plug.



TRIG-IN is assigned to pin 7 of the RS232C terminal on this product. TRIG-IN is used for synchronous operation.

RS232C Settings：

The factory default setting enables the RS232C function with a transmission rate of 19200 bps.

Setting procedure：

1. Press the CONFIG key repeatedly until CF40 is displayed.
2. Turn the VOLTAGE knob until CF42（RS232C communication interface setting）appears on the screen.
3. Use the CURRENT knob to select ON → enable the RS232C communication function.
4. Press the CONFIG key repeatedly again until CF70 is displayed.
5. Turn the VOLTAGE knob until CF72（RS232C transmission rate setting）is displayed.
6. Use the CURRENT knob to select the desired communication speed（baud rate）.

   → Please refer to the "Protocol" section in the list below for the corresponding settings.
7. Restart the DCS series unit for the settings to take effect.

Communication Protocol：

The table below lists the communication settings that comply with the RS232C protocol. Items underlined indicate factory default values.

Item Settings

Item	Setting
Transmission rate	1200/2400/4800/9600/19200/38400/57600/115200 bps
Data bits	fixed at 8 bits
Stop bits	fixed at 1 bit
Flow control (X-flow control)	fixed to none

RS232C communication：

The DCS series does not support flow control（this setting is fixed）. When sending configuration commands continuously at high speed, it may cause the receive buffer to overflow.

Do not send configuration commands continuously. It is recommended to use query commands with appropriate intervals to read responses, or reduce the command transmission frequency to avoid communication errors.

Break signal：

The function of the Break signal is equivalent to the IEEE488.1 dcl/sdc（Device Clear、Selected Device Clear）message.

Notes：

The RS232C interface requires remote switching via command. Please use the SCPI command：

:SYST:COMM:RLST REM (set the RS232C interface to remote mode).

When performing remote program control, be sure to include this command at the beginning of your program.

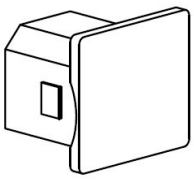
Section 2 USB Connector

To control the DCS series via the USB interface, you need to install a driver that supports the USB T&M class（USBTMC）. The USBTMC driver is automatically installed with the VISA library.

USB connection：

Please use a standard USB cable to connect the DCS series to your computer. The USB port on this product is equipped with a protective dust cover. Remove the cover before use and keep it safely so it can be replaced when not in use to prevent dust ingress.

For safety reasons, always replace the protective dust cover when the USB port is not in use. If the sensing terminals are not in use, please cover them with the terminal protective cover to ensure safe operation.



Protective dust cover

USB setting

The factory default setting has the USB function enabled（USB enabled）.

Setting procedure：

1. Press the CONFIG key repeatedly until CF40 is displayed.

2. Turn the VOLTAGE knob until CF41（USB interface setting）appears on the screen.
3. Use the CURRENT knob to select ON→ enable the USB communication function.
4. Restart the DCS series unit→ the setting will take effect.

Service request：The DCS series is equipped with service request and serial polling capabilities.

USB functions：

Compliant with USB 2.0 specifications, as well as USBTMC 1.0 and USBTMC-USB488 1.0 standards.

Transmission rated：up to 480 Mbps（High speed）.

VID（Vendor ID）: 0x387C

PID（Device ID）:

DCS series 400W model：0x3104

DCS series 800W model：0x3108

DCS series 1200W model：0x3112

DCS series 2000W model：0x3120

Section 3 LAN Connector

To control the DCS series via the LAN interface, the controller must have middleware installed that supports the following communication protocols：

SCPI-Telnet / VXI-11 / HiSLIP / SCPI-RAW

This middleware is automatically installed with the VISA library.

The LAN module of the DCS series features a built-in web browser interface, allowing you to configure LAN settings through your computer's web browser.

For configuring internal network connections (such as IP address, host name, or security settings), please consult your network administrator. If you plan to connect using a host name（Bonjour）, please install Apple Bonjour.

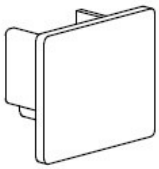
Additionally, the DCS series can communicate via Socket with devices such as PLCs and microcontroller boards that support the Telnet communication protocol.

LAN connection：

Please use a standard LAN cable（Cat 5 , straight-through cable）to connect the DCS series to a network hub or router.

The LAN port of this product is equipped with a protective dust cover. Remove the cover before use and keep it safely so it can be replaced when not in use to protective terminal. For safety reasons, always replace the dust cover when the LAN port is not in use.

If the sensing terminals are not in use, please cover them with the protective dust cover.



Protective dust cover

The RS232C and LAN ports on the DCS series have the same physical shape. Please refer to the labeling on the rear panel to identify the correct port.

LAN setting：

Under normal usage conditions, it is recommended to use the factory default settings.

Setting items	Description (Factory Default)	CONFIG setting
LAN setting	using LAN	CF40: ON
IP address assignment method	DHCP：enabled AUTO IP：enabled MANUAL IP：disabled	CF61: 110

When using a direct connection and automatic IP address acquisition is required, please set the IP address assignment method as follows：

Set DHCP to OFF, Auto-IP to ON, and MANUAL to OFF (CF61: 010).

If manual IP address configuration is required, set the IP address assignment method as follows：

Set DHCP to OFF, Auto-IP to OFF, and MANUAL to ON (CF61: 001), then manually enter the IP address（Configure using CF62 to CF65）.

If you change the interface settings（CF61 to CF66）, be sure to perform one of the

following actions to apply the settings：

Use CF60: APPL to apply the settings, or restart the power supply（DCS series）.

1. Press the CONFIG key repeatedly until CF40（LAN interface setting）is displayed.
2. Turn the CURRENT knob to change the setting to ON.
3. The LAN function is enabled.
4. Press the CONFIG key repeatedly until CF60 is displayed.
5. Turn the VOLTAGE knob until CF61（IP address assignment method）is displayed.
6. Turn the CURRENT knob to set the value to 110.
7. This setting turns ON DHCP and AUTO IP, and turns OFF MANUAL IP.
8. Turn the power of the DCS series OFF and then ON again to apply the setting.

⚠Warning

The device may be at risk of damage or electric shock. The LAN interface can be accessed from anywhere on the network. If necessary, please configure appropriate security measures. You can enhance security by enabling the password protection feature and restricting access to specified IP addresses to limit the range of allowed hosts.

Notes：

The LAN interface must be switched to remote mode via command. Please use the SCPI command "SYST:COMM:RLST REM" SCPI to set the RS232C interface to remote mode. When performing remote program control, make sure to include this command at the beginning of your program.

Service request：

The DCS series supports service request and serial polling functions.

LAN functions：

Supports SCPI-Telnet/ VXI-11/ HiSLIP/ SCPI-RAW communication protocols.

Communication speed：up to 100 Mbps（auto-negotiation）

Supports AUTO MDIX function（automatic crossover detection）

Web browser access is available.

The following operations and information can be accessed via a browser：

- **Instrument information and network status viewing**
- **VISA resource information display**
- **Confirmation of connected DCS series devices**
- **Remote control via browser**
- **Network parameter configuration changes**
- **System status monitoring**

- **License information inquiry**
- **Password setting function**

Restart LAN interface (APPL) :

The LAN interface can be restarted via the CONFIG setting menu (CF60 : APPL) .

Please note that this operation will not change the existing LAN configuration, nor will it affect the DCS series panel settings.

Reset LAN interface (LCI/ DEF) :

The LAN interface can be reset via the CONFIG setting menu (CF60 : LCI / DEF) .

After performing the reset, the LAN network parameters will be changed as follows :

Items marked with "X" will be restored to factory default values.

LCI	DEF	Item	Default value
X	X	IP assignment method	DHCP : enable, Auto-IP : enable, Static : disable
	X	DNS sever assignment	0.0.0.0
	X	WINS sever assignment	0.0.0.0
	X	Specify hostname	<Series name> - < Last 5 digits of serial number >
	X	Specify device description	MICROTEST < Series name > Electronic Load - < Serial number >
X	X	Enable dynamic DNS	Enable
X	X	Enable mDNS	Enable
X	X	Enable NetBIOS Over TCP/IP	Enable
X	X	Password security settings	Not set
	X	VMCB setting	0