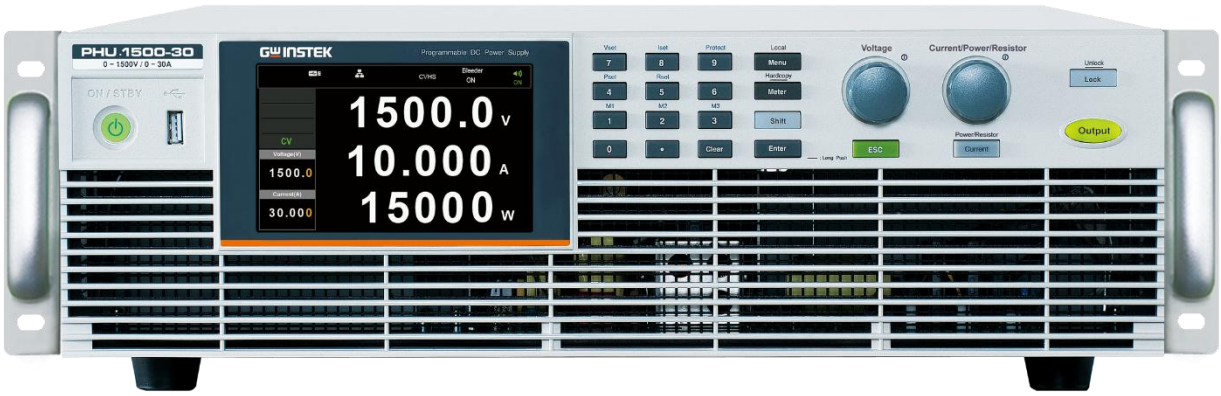
Prestige / Harmony / Universal



GW Instek PHU Series

Multi-Range High Power DC Source

New Product Announcement

This document allows GW Instek's partners to quickly grasp product's main features, FAB and ordering information.

PHU Series Multi-Range High Power DC Power Source

New Product Announcement

The **PHU** Series is a single-channel programmable DC power supply with a multi-range output feature which offers a wide range of voltage and current combinations for greater flexibility. The circuit design adopts **SiC** (silicon carbide) components to achieve high power density characteristics which can generate 15 kW of high output and keep the compact size at just 3U height.

PHU's wide voltage and current range, along with its high-power characteristics, can cover a broader range of testing applications such as **photovoltaic systems**, **electric vehicles (EVs)**, and **automotive electronics**, etc. The launch of PHU multi-range high power DC source enhances the completeness of the DC power supply product line of GW Instek, and provides customers with more comprehensive and integrated solutions.

The **AWS (Advanced Web Server)** function allows the user to operate devices directly through a web browser, without needing to install any complicated software or drivers. This functionality allows users to complete tasks more efficiently, saving time and increasing productivity.

The unique **APC (Adaptive Parallel Connection)** feature offers adaptability in parallel connection, allowing users to make the best choice according to their needs. For instance, users can opt for a 15 kW model and a 10 kW model to combine both to reach a 25 kW capacity within their budget constraints. Up to 10 PHU units can be connected to reach 150 kW without the need for additional power distribution for control.

For industry interface, PHU provides a variety of embedded industrial interface options to meet user needs, eliminating the need for users to prepare additional interfaces. The available ports including **EtherCAT**, **CANopen**, **Modbus**, **Profinet and DeviceNet**, etc. Except the standard built-in programmable sequence function, PHU also offers a variety of optional functions including **Datalogger**, **Capacity/Energy, Solar Array Simulator**, and **Battery Simulation** to meet customer's requirements.

There are a total of 18 models, consisting of 3 power capacities (5 kW/10 kW/15 kW) and 6 voltages (80 V/200 V/500 V/750 V/1000 V/1500 V) to meet all customer needs.

Voltage	5 kW	10 kW	15 kW	Wide Range
80 V	PHU 80-170	PHU 80-340	PHU 80-510	2.72
200 V	PHU 200-70	PHU 200-140	PHU 200-210	2.8
500 V	PHU 500-30	PHU 500-60	PHU 500-90	3
750 V	PHU 750-20	PHU 750-40	PHU 750-60	3
1000 V	PHU 1000-15	PHU 1000-30	PHU 1000-45	3
1500 V	PHU 1500-10	PHU 1500-20	PHU 1500-30	3

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Features

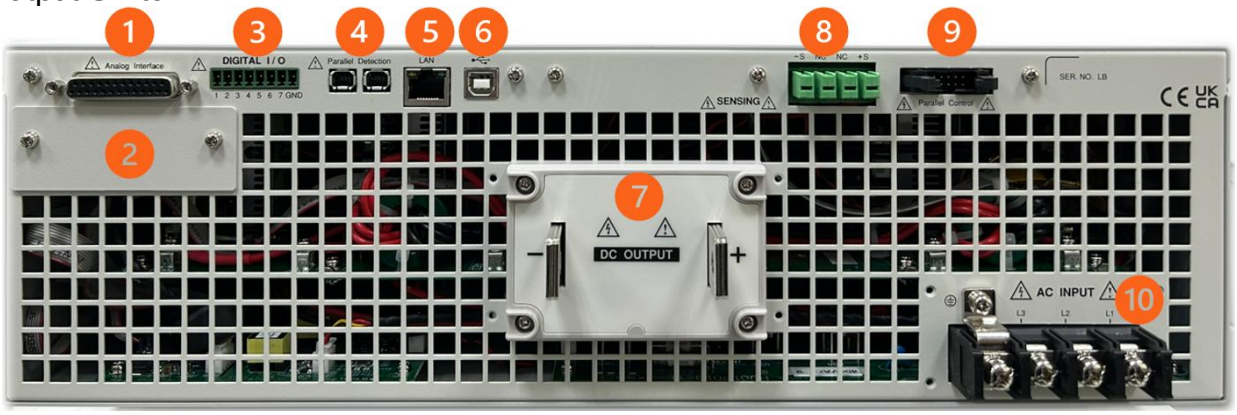
- Voltage output: 80 V/ 200 V/ 500 V/ 750 V/ 1000 V / 1500 V
- Power output: 5 kW/ 10 kW/ 15 kW
- Maximum current output: 510 A
- C.C/ C.V priority mode
- Adjustable voltage/current rise and fall time
- AWS (Advanced Web Control)
- APC (Adaptive Parallel Connection)
- Parallel connection (maximum 10 units)
- High efficiency and high-power density
- Bleeder Control function
- Internal Resistance function
- Panel lock function
- Three sets of Preset Function
- Protection: OVP, OCP, OHP, UVL, AC Fail, FAN Fail
- Standard: USB, LAN, Isolated Analog control
- Option: RS-232 & RS-485 or GPIB or CAN Bus or DeviceNet or Anybus
- 3U height and 19” Rack Mount Size

Customers and Applications

Customers	Applications
Electric Vehicles (EV) / Drone	Onboard Charger / Traction Inverter / DC Motor
Battery / Fuel Cell	Battery charge test
Aerospace engineering	PV Inverter / Optimizer
Semiconductor equipment	Automotive electronics application
PV System	Aerospace device
Automotive electronics	Aging test equipment for components
Component manufacturer	Power supply for communications equipment
IT Communications	
Data Center Server	

Appearance

1. Power Switch
2. USB A Port
3. Display Area
4. Number Button
5. Function Button
6. Voltage Adjust Knob
7. Current/Power/Resistance Adjust Knob
8. Panel Lock
9. Current/Power/Resistance Switch
10. Output Switch



1. Analog Control
2. Anybus Connection
3. Digital I/O
4. Interconnect for Parallel Connection
5. LAN Port
6. USB B Port
7. DC Output Terminal
8. Remote Sense
9. Parallel Control
10. AC Input

Key Dates for Product Announcement

1. NPI release (April 25, 2025)
2. Global announcement (May 25, 2025)
3. Sample order (April 25, 2025)
4. Shipment starting
   - Non-CE (April 25, 2025)
   - CE models (Sep. 30, 2025)

Service Policy

1. PHU Series Multi-Range High Power DC Source carries one year warranty
2. Contact GW Instek Service Department for maintenance information.
   The service instructions in the Service Manual will help distributors repair defective units promptly. Should a board replacement be necessary to fix a defective unit, a board swapping service is provided by Good Will Instrument to facilitate the repairs done at a distribution site.
   GW Instek continues to provide the after sales support through its website. The most updated version of the service manual and Marcom material for PHU series will be posted on the distributor zone of GW Instek Website at https://www.gwinstek.com

ORDERING INFORMATION (5 kW)				
PHU 80-170	80 V, 170 A, 5000 W Programmable DC Power Supply			
	PHU 80-170-C (Input Voltage 3P3W 200 V)			
	Parts No.	01HU801C00GT	EAN Code :	4711458122669
	PHU 80-170-D (Input Voltage 3P4W 380 V)			
	Parts No.	01HU801D00GT	EAN Code :	4711458122676
PHU 200-70	200 V, 70 A, 5000 W Programmable DC Power Supply			
	PHU 200-70-C (Input Voltage 3P3W 200 V)			
	Parts No.	01HU2H7C00GT	EAN Code :	4711458122560
	PHU 200-70-D (Input Voltage 3P4W 380 V)			
	Parts No.	01HU2H7D00GT	EAN Code :	4711458122577
PHU 500-30	500 V, 30 A, 5000 W Programmable DC Power Supply			
	PHU 500-30-C (Input Voltage 3P3W 200 V)			
	Parts No.	01HU5H3C00GT	EAN Code :	4711458122584
	PHU 500-30-D (Input Voltage 3P4W 380 V)			
	Parts No.	01HU5H3D00GT	EAN Code :	4711458122591
PHU 750-20	750 V, 20 A, 5000 W Programmable DC Power Supply			
	PHU 750-20-C (Input Voltage 3P3W 200 V)			
	Parts No.	01HU7H2C00GT	EAN Code :	4711458122621
	PHU 750-20-D (Input Voltage 3P4W 380 V)			
	Parts No.	01HU7H2D00GT	EAN Code :	4711458122638
PHU 1000-15	1000 V, 15 A, 5000 W Programmable DC Power Supply			
	PHU 1000-15-C (Input Voltage 3P3W 200 V)			
	Parts No.	01HU1K1C00GT	EAN Code :	4711458122461
	PHU 1000-15-D (Input Voltage 3P4W 380 V)			
	Parts No.	01HU1K1D00GT	EAN Code :	4711458122478
PHU 1500-10	1500 V, 10 A, 5000 W Programmable DC Power Supply			
	PHU 1500-10-C (Input Voltage 3P3W 200 V)			
	Parts No.	01HU151C00GT	EAN Code :	4711458122409
	PHU 1500-10-D (Input Voltage 3P4W 380 V)			
	Parts No.	01HU151D00GT	EAN Code :	4711458122416

*PHU-C Series input voltage 3P3W 200 V also support single phase 180 Vac to 265 Vac

ORDERING INFORMATION (10 kW)				
PHU 80-340	80 V, 340 A, 10,000 W Programmable DC Power Supply			
	PHU 80-340-C (Input Voltage 3P3W 200 V)			
	Part No.	01HU803C00GT	EAN Code :	4711458122683
	PHU 80-340-D (Input Voltage 3P4W 380 V)			
	Part No.	01HU803D00GT	EAN Code :	4711458122690
PHU 200-140	200 V, 140 A, 10,000 W Programmable DC Power Supply			
	PHU 200-140-C (Input Voltage 3P3W 200 V)			
	Part No.	01HU2H1C00GT	EAN Code :	4711458122522
	PHU 200-140-D (Input Voltage 3P4W 380 V)			
	Part No.	01HU2H1D00GT	EAN Code :	4711458122539
PHU 500-60	500 V, 60 A, 10,000 W Programmable DC Power Supply			
	PHU 500-60-C (Input Voltage 3P3W 200 V)			
	Part No.	01HU5H6C00GT	EAN Code :	4711458122607
	PHU 500-60-D (Input Voltage 3P4W 380 V)			
	Part No.	01HU5H6D00GT	EAN Code :	4711458122614
PHU 750-40	750 V, 40 A, 10,000 W Programmable DC Power Supply			
	PHU 750-40-C (Input Voltage 3P3W 200 V)			
	Part No.	01HU7H4C00GT	EAN Code :	4711458122645
	PHU 750-40-D (Input Voltage 3P4W 380 V)			
	Part No.	01HU7H4D00GT	EAN Code :	4711458122652
PHU 1000-30	1000 V, 30 A, 10,000 W Programmable DC Power Supply			
	PHU 1000-30-C (Input Voltage 3P3W 200 V)			
	Part No.	01HU1K3C00GT	EAN Code :	4711458122485
	PHU 1000-30-D (Input Voltage 3P4W 380 V)			
	Part No.	01HU1K3D00GT	EAN Code :	4711458122492
PHU 1500-20	1500 V, 20 A, 10,000 W Programmable DC Power Supply			
	PHU 1500-20-C (Input Voltage 3P3W 200 V)			
	Part No.	01HU152C00GT	EAN Code :	4711458122423
	PHU 1500-20-D (Input Voltage 3P4W 380 V)			
	Part No.	01HU152D00GT	EAN Code :	4711458122430

ORDERING INFORMATION (15 kW)				
PHU 80-510	80 V, 510 A, 15,000 W Programmable DC Power Supply			
	PHU 80-510-C (Input Voltage 3P3W 200 V)			
	Part No.	01HU805C00GT	EAN Code :	4711458122706
	PHU 80-510-D (Input Voltage 3P4W 380 V)			
	Part No.	01HU805D00GT	EAN Code :	4711458122713
PHU 200-210	200 V, 210 A, 15,000 W Programmable DC Power Supply			
	PHU 200-210-C (Input Voltage 3P3W 200 V)			
	Part No.	01HU2H2C00GT	EAN Code :	4711458122546
	PHU 200-210-D (Input Voltage 3P4W 380 V)			
	Part No.	01HU2H2D00GT	EAN Code :	4711458122553
PHU 500-90	500 V, 90 A, 15,000 W Programmable DC Power Supply			
	PHU 500-90-C (Input Voltage 3P3W 200 V)			
	Part No.	01HU5H9C00GT	EAN Code :	4711458122362
	PHU 500-90-D (Input Voltage 3P4W 380 V)			
	Part No.	01HU5H9D00GT	EAN Code :	4711458122379
PHU 750-60	750 V, 60 A, 15,000 W Programmable DC Power Supply			
	PHU 750-60-C (Input Voltage 3P3W 200 V)			
	Part No.	01HU7H6C00GT	EAN Code :	4711458122386
	PHU 750-60-D (Input Voltage 3P4W 380 V)			
	Part No.	01HU7H6D00GT	EAN Code :	4711458122393
PHU 1000-45	1000 V, 45 A, 15,000 W Programmable DC Power Supply			
	PHU 1000-45-C (Input Voltage 3P3W 200 V)			
	Part No.	01HU1K4C00GT	EAN Code :	4711458122508
	PHU 1000-45-D (Input Voltage 3P4W 380 V)			
	Part No.	01HU1K4D00GT	EAN Code :	4711458122515
PHU 1500-30	1500 V, 30 A, 15,000 W Programmable DC Power Supply			
	PHU 1500-30-C (Input Voltage 3P3W 200 V)			
	Part No.	01HU153C00GT	EAN Code :	4711458122447
	PHU 1500-30-D (Input Voltage 3P4W 380 V)			
	Part No.	01HU153D00GT	EAN Code :	4711458122454

Accessories

AC Input terminal cover x 1, DC Output terminal cover x 1, Handle x 2, Sensing connector x 1, sensing connector cover x 1Digital I/O control connector x 1, Parallel control dummy connector x 1, DC Output terminal screws x 2, Safety Guide

Options (Factory Installed)	
Part number	**Description**
PHU-IF01	GPIB interface
PHU-IF02	RS-232 & RS-485 interface card (RJ45)
PHU-IF03	Isolated Digital interface card
PHU-IF04	CANbus interface card
PHU-IF05	DeviceNet interface card
PHU-IF06	Anybus Riser card

Optional Accessories	
Part number	**Description**
PHU-PC01	Parallel operation cable kit for 2 units x 1
PHU-PC02	Parallel operation cable kit for 3 units x 1
PHU-PC03	Parallel operation cable kit for 4 units x 1
PHU-PC04	Parallel operation cable kit for 5 units x 1
PHU-PC05	Parallel operation cable kit for 6 units x 1
PHU-PC06	Parallel operation cable kit for 7 units x 1
PHU-PC07	Parallel operation cable kit for 8 units x 1
PHU-PC08	Parallel operation cable kit for 9 units x 1
PHU-PC09	Parallel operation cable kit for 10 units x 1
GTL-133	Load cable, 1.5 m, 100 A
GTL-218	Load cable, 1.5 m, 200 A
GTL-219	Load cable, 3 m, 200 A
GTL-220	Load cable, 1.5 m, 300 A
GTL-221	Load cable, 3 m, 300 A
GTL-222	Load cable, 1.5 m, 400 A
GTL-223	Load cable, 3 m, 400 A
GPW-021	Power cord, 10 AWG/4C, 3 m, UL/CSA (PHU-C 5 kW, PHU-D 5 kW, PHU-D 10 kW, PHU-D 15 kW)
GPW-022	Power cord, 6 AWG/4C, 3 m, UL/CSA (PHU-C 10 kW, PHU-C 15 kW)

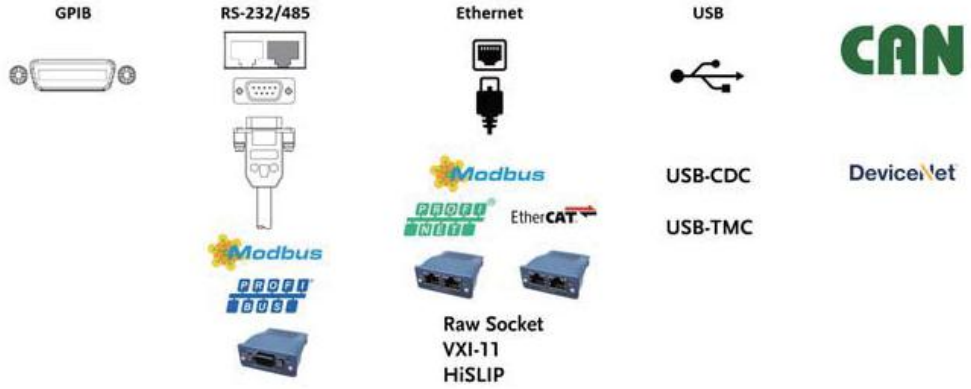
Prestige / Harmony / Universal.

AWS (Advanced Web Server)

AWS is a powerful function that simplifies operations. With AWS, users can operate devices directly through a web browser, without needing to install any complicated software or drivers. This functionality allows users to complete tasks more efficiently, saving time and increasing productivity.

Industry Interface

PHU provides a variety of embedded industrial interface options to meet user needs, eliminating the need for users to prepare additional interfaces.



APC (Adaptive Parallel Connection)

The unique **APC** (Adaptive Parallel Connection) feature offers adaptability in parallel connection, allowing users to make the best choice according to their needs.

For instance, users can opt for a 15 kW model and a 10 kW model to combine both to reach a 25 kW capacity within their budget constraints. Up to 10 PHU units can be connected to reach 150 kW without the need for additional power distribution for control.

Models with the same voltage but different power ratings can be connected in parallel.

500 V **15 kW**
500 V **10 kW**
→ 500 V **25 kW**

Only models of the same voltage and same power rating can be connected in parallel.

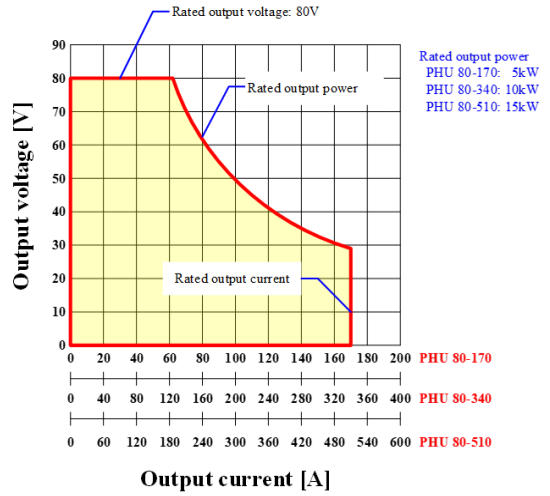
500 V **15 kW**
500 V **10 kW**
→ 500 V **25 kW**

It is easy to set up the master-slave in the parallel connection function.

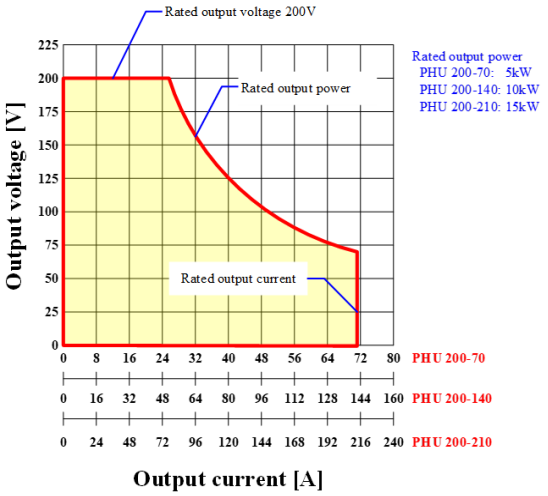
Multi-Range Output

This feature enables the power supply to automatically adapt to higher output voltages when there is a smaller current or handle higher currents when there is a lower voltage. It allows the use of a single source to address multiple voltage and current combinations.

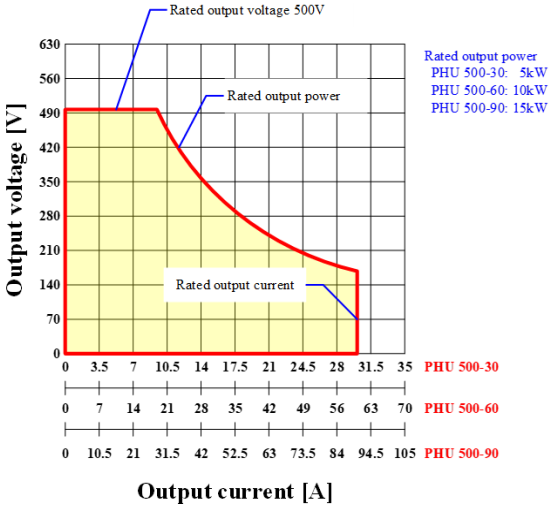
PHU 80



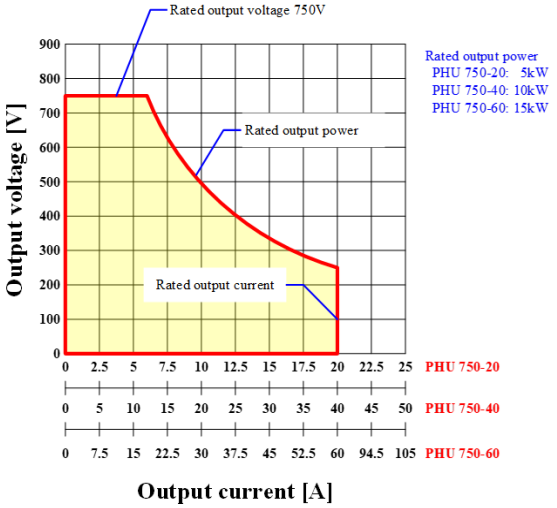
PHU 200



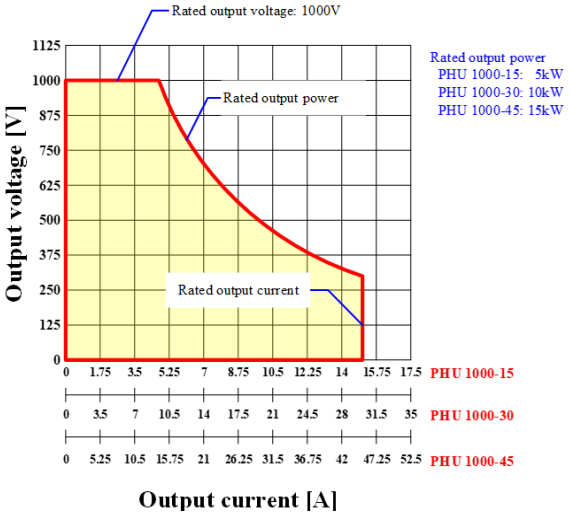
PHU 500



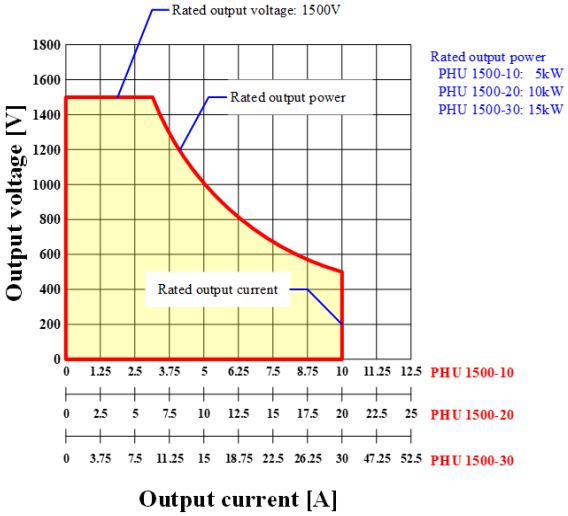
PHU 750



PHU 1000

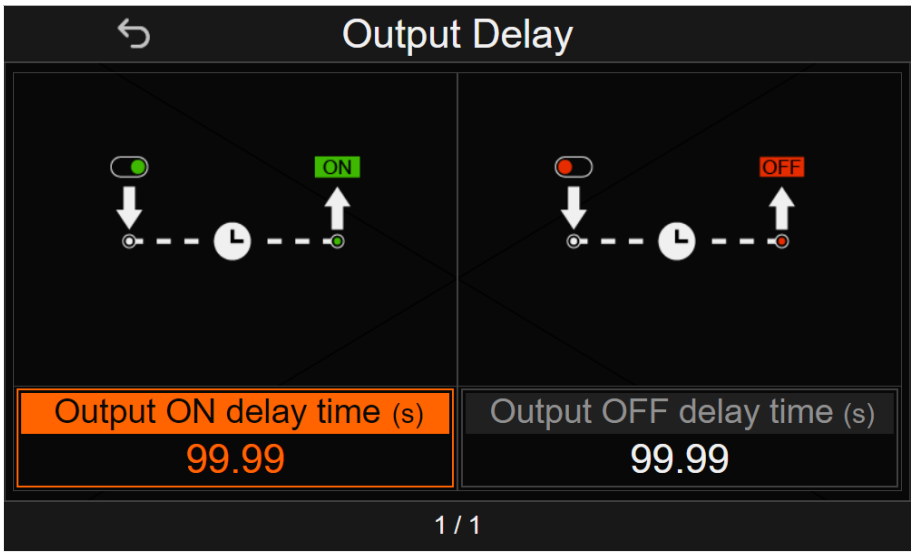


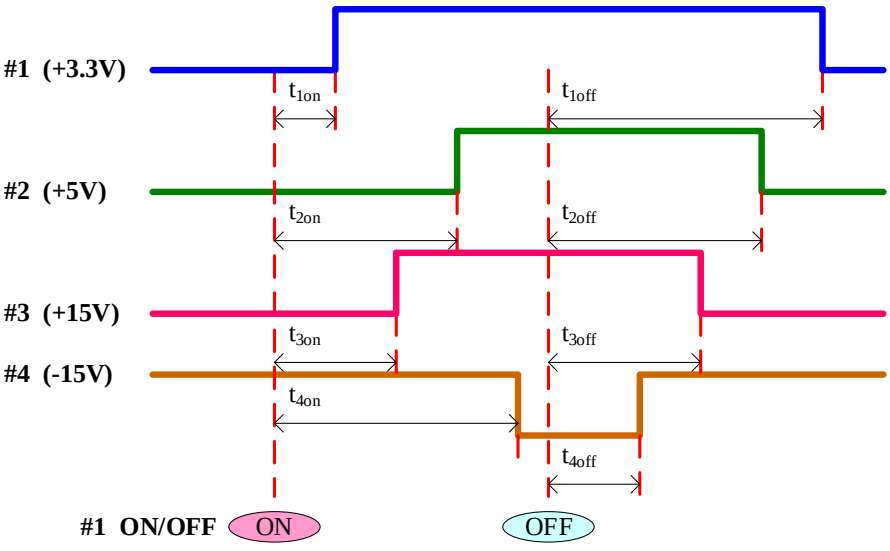
PHU 1500

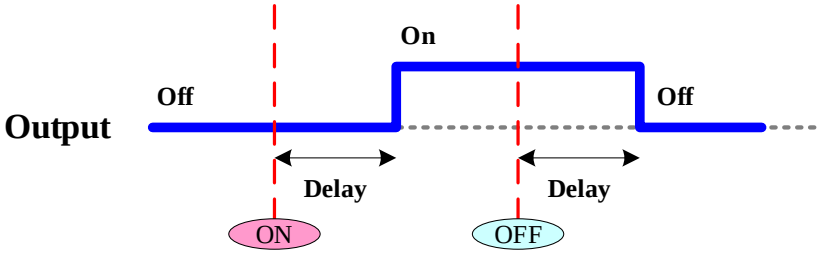


Output ON/OFF Delay

The output ON/OFF delay feature enables the setting of a specific time delay for output on after the power supply output is turned on, and a specific time delay for output off after the power supply output is turned off.

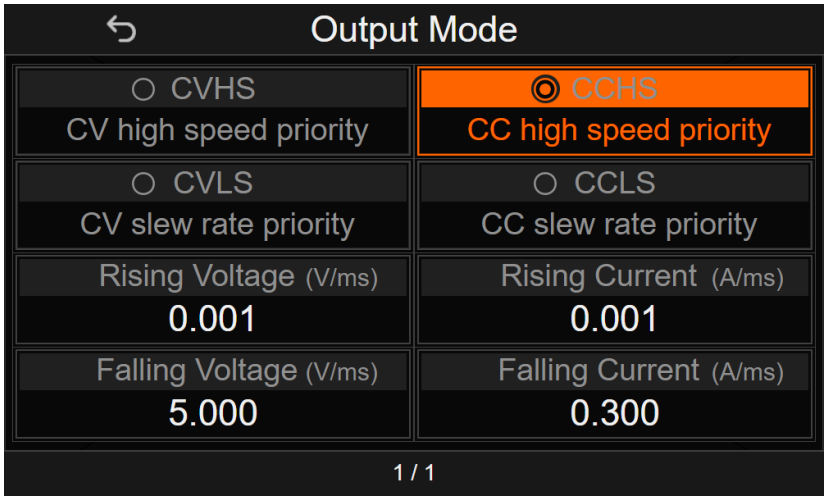


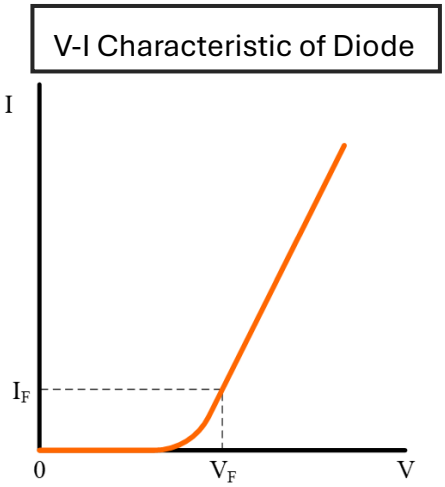




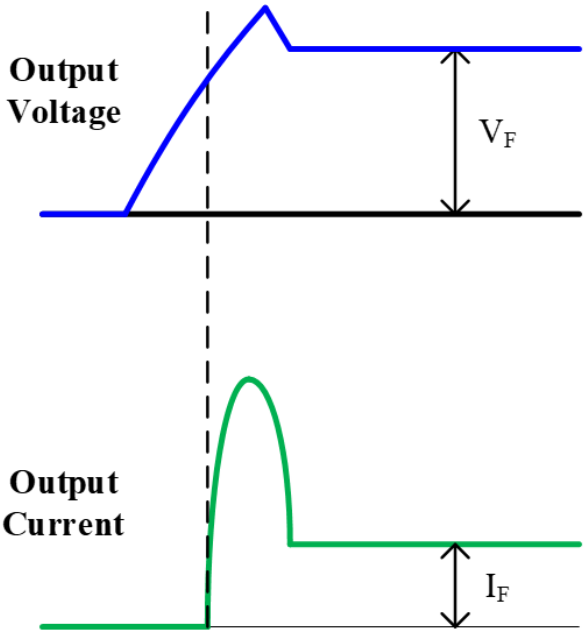
CC/CV Priority

The PHU series has CC and CV priority modes. The CC priority mode can **prevent inrush current** and surge voltage from occurring at turn-on to protect DUT.

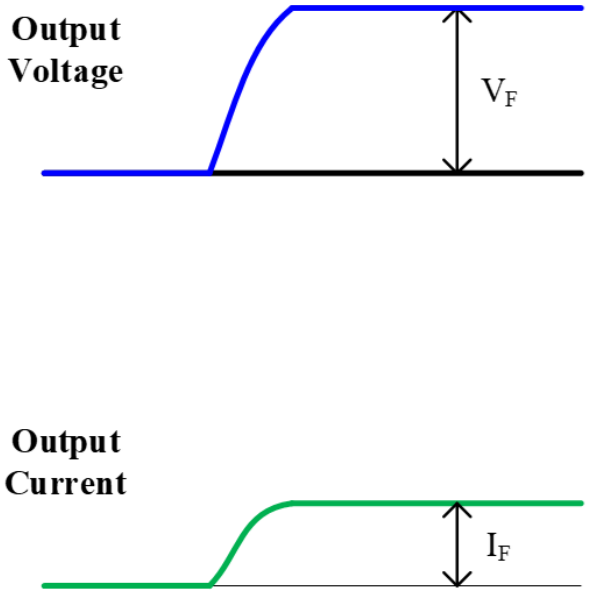




CV Priority Mode



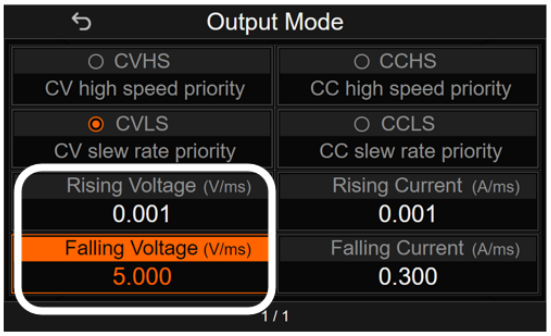
CC Priority Mode

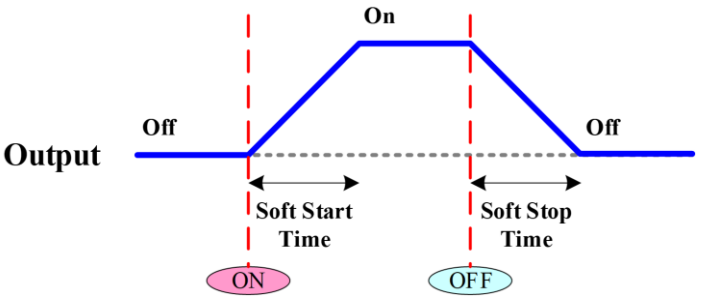


Slew Rate Control (Soft Start/Stop)

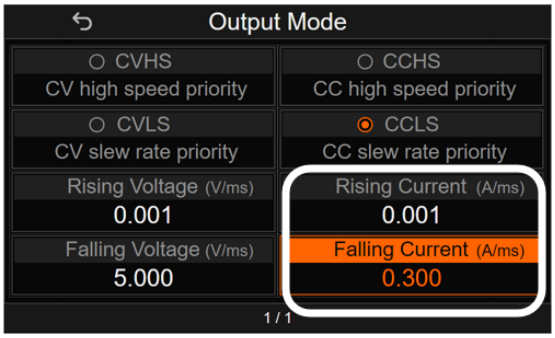
The default voltage (or current) rising speed when starting/stopping the output is set as the highest speed. PHU provides the function for the user to set the speed per their request for applications.

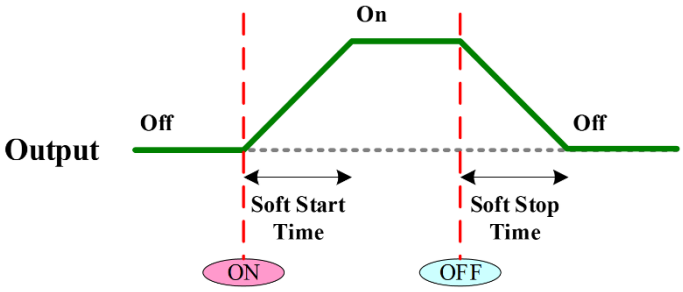
In **CVLS** (Constant **Voltage** Low Speed) mode, the user can set the parameter to control the **voltage rising** when starting the output and the **voltage falling** when stopping the output.





In **CCLS** (Constant **Current** Low Speed) mode, the user can set the parameter to control the **current rising** when starting the output and the **current falling** when stopping the output.

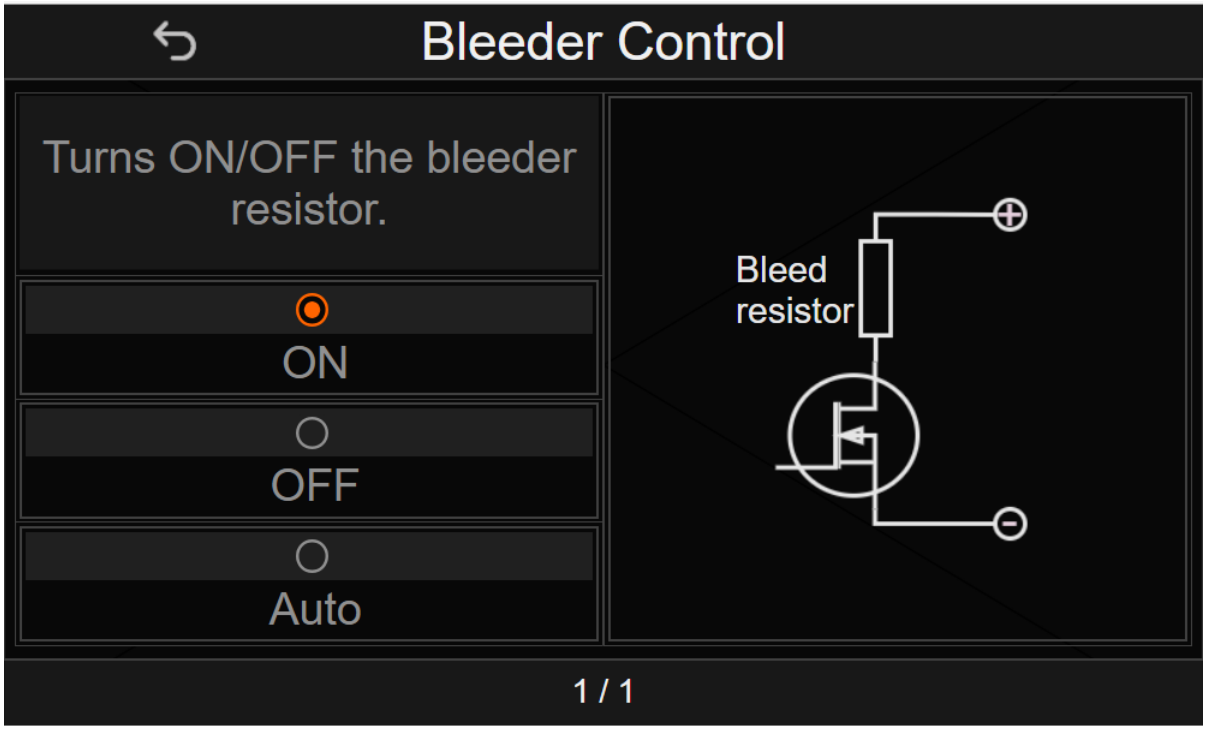


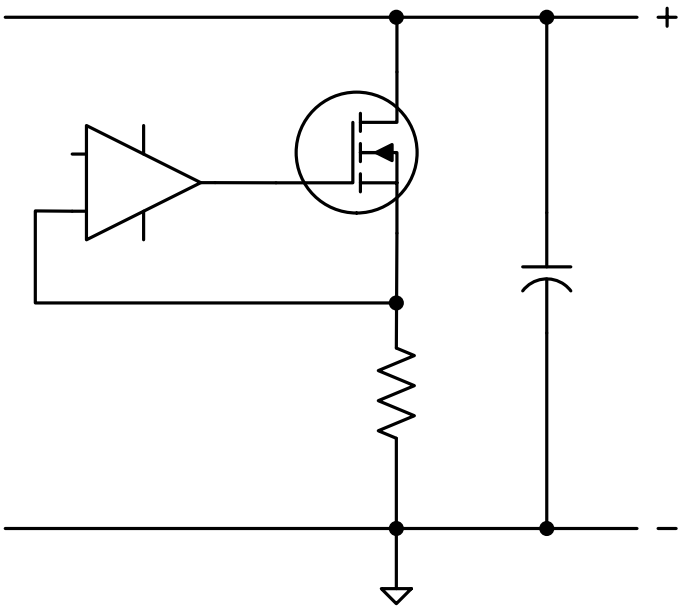


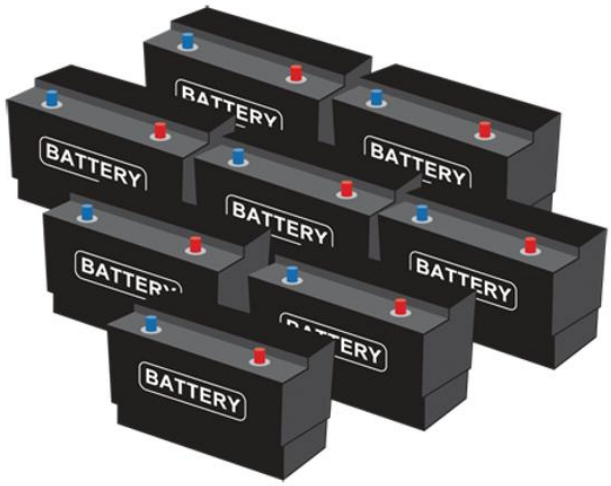
Bleeder Circuit ON/OFF Control

The bleeder circuit is a power supply circuit designed to discharge the electric charge stored in the power supply filter capacitors when the equipment is turned OFF, primarily for safety reasons to protect the DUT.

The bleeder function can be disabled for specific purposes, such as battery applications.

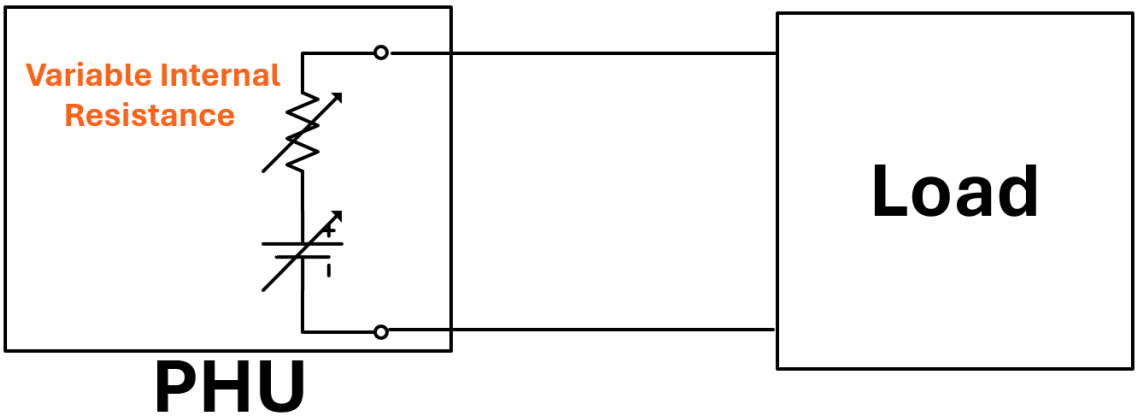


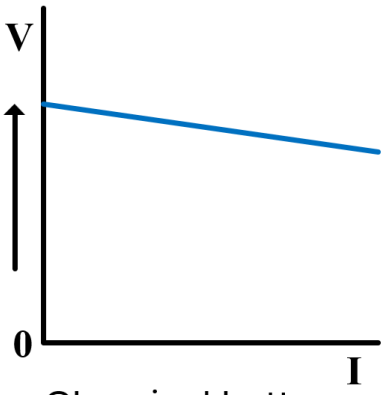


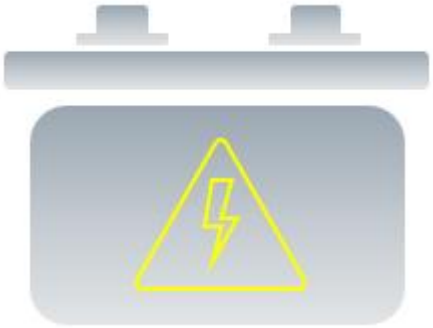


Variable Internal Resistance

The internal resistance of the power supply can be user-defined in software. When the internal resistance is set it can be seen as a resistance in series with the positive output terminal. This allows the power supply to simulate power sources that have internal resistances such as lead acid batteries.





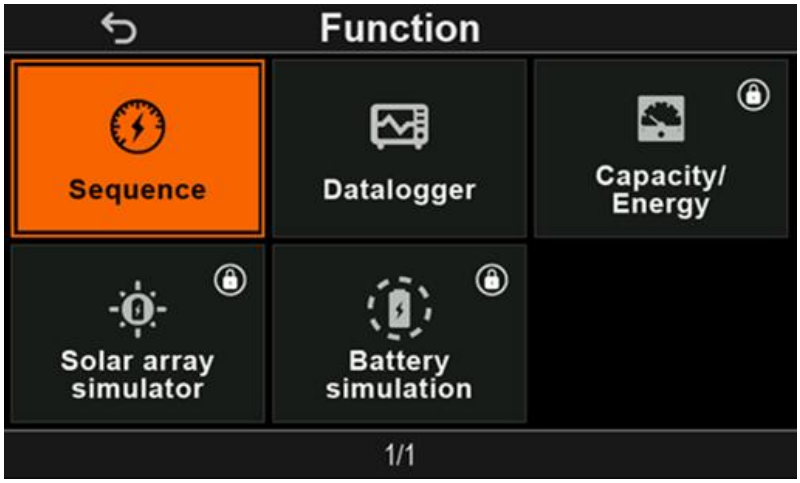


Chemical battery
Solar battery
Fuel cell

Functions

Except the standard built-in programmable sequence function, PHU also offers a variety of optional functions including **Datalogger**, **Capacity/Energy, Solar Array Simulator**, and **Battery Simulation** to meet customer's requirements.

- Capacity/Energy, Solar array simulator, Battery simulation optional functions will release in 2026.



Features, Advantages and Benefits

Feature	Advantage	Benefit
Multi-Range output capability	Outputs can be set in a wide range of voltage and current combinations (approximately 3-fold)	Users can use any combination of voltage and current within the rated power range to meet test verification requirements without having to purchase multiple high-power power supplies.
Capability to connect in parallel with different capacities and the same voltage	Up to 10 units can be connected in parallel, and the host will display the total current	Easy and flexible expansion. After parallel connection, a single group can output large capacity, or it can be split into multiple groups for output.
Internal resistance variable function	Simulates the internal resistance of the battery. Since no external resistor in series connection is required, there is no additional loss.	Simulates solar cells, fuel cells and chemical batteries
Inrush current suppression function (CC priority mode)	Provides voltage priority and current priority mode selection to meet different load application requirements	For loads with nonlinear VI characteristics (such as diodes), the CC priority mode can be selected to avoid damage to the diode caused by power overshoot.
Adjustable output voltage and current slew rate function	Rising and falling slew rates can be set separately	For loads with fast rising speeds that may cause surge voltage or surge current, this can also be solved by setting the rise/fall slew rate.
Complete interface selection	In addition to the standard USB, LAN and RS-232/485, options include GPIB, ISO-Analog, CAN, Profibus, Profinet, Modbus, Devicenet	For users who only need simple program control, there is no need to spend extra money to purchase the interface. Users with special interface requirements can also purchase the required interface to meet their needs.
Bleeder circuit control capability	When the bleeder circuit is on, it is low impedance, which can obtain a faster fall time. When the bleeder circuit is off, it is high impedance, which can reduce the discharge current.	For users who use the DC source for battery charging, there is no need for an external blocking diode, and it can also ensure that the charged battery will not be over-discharged.

Competitors Comparison

Item								
	Country		Taiwan	Taiwan	China	Japan	USA	Germany
	Brand		GW Instek	IDRC	ITECH	Takasago	AMETEK	Elektro-Automatik
	Model		PHU (14+4)	DSP-Wx (32)	IT6000D (15)	HX-S-G (8)	SGX (60)	PSI 9000 WR (20)
								
Output	Max. Voltage	V	1500 V	1950 V	2250 V	1000 V	1000 V	1500 V
	Max. Current	A	510 (15 kW)	540 (15 kW)	360 (15 kW)	400 (12 kW)	1200 (15 kW)	510 (15 kW)
	Power	kW	5 kW/ 10 kW/ 15 kW	5 kW to 18 kW	5 kW to 18 kW	6 kW / 12 kW	5 kW/ 10 kW/ 15 kW	5 kW/ 10 kW/ 15 kW
	Parallel Power	kW	150 kW(10 Units)	1800 kW(100 Units)	1152 kW(64 Units)	120 kW(10 Units)	150 kW(5 Units)	540 kW(36 Units)
	Multi-Range Power	–	2.72 - 3	2.89 - 3	1.92 - 3.33	–	–	2.72 - 3
Input	208/230	VAC	180 Vac to 265 Vac	180 Vac to 460 Vac	198 V ac to 264 Vac (Decrease 50 %)	180 Vac to 242 Vac	187 Vac to 242 Vac	–
	380/400	VAC	342 Vac to 528 Vac	180 Vac to 460 Vac	342 Vac to 528 Vac	342 Vac to 440 Vac	342 Vac to 440 Vac	342 Vac to 528 Vac
	440/480	VAC	342 Vac to 528 Vac	432 Vac to 528 Vac	342 Vac to 528 Vac	–	396 Vac to 528 Vac	342 Vac to 528 Vac
	500	VDC	–	DC 400 V to 600 V	–	–	–	–
Interface	Analog Control	–	V (Opt.)	V (Opt.)	V (Opt.)	V	V	V
	Digital I/O	–	V	V	V	–	V	–
	RS-232	–	V	–	V (Opt.)	V	V	V (Opt.)
	RS-485	–	V	RS-422 & 485 (Opt.)	–	V	–	–
	USB	–	V	V (Opt.)	V	–	–	V
	GPIB	–	V (Opt.)	V (Opt.)	V (Opt.)	–	V (Opt.)	V (Opt.)
	LAN	–	V	V	V	–	V	V (Opt.)
	WAN	–	V	V	–	–	–	–
	CAN	–	V (Opt.)	–	V	–	–	V (Opt.)
	Profibus	–	V (Opt.)	–	–	–	–	V (Opt.)
	Profinet	–	V (Opt.)	–	–	–	–	V (Opt.)
	Modbus	–	V (Opt.)	–	–	–	–	V (Opt.)
	Devicenet	–	V (Opt.)	–	–	–	–	–
Functions	Frunt USB	–	V	V	V	–	–	V
	CP Mode	–	V	V	–	–	V	V
	Slew Rate	–	V	V	V	V (Opt.)	V	–
	Output ON Priority	–	V	V	V	V (Opt.)	–	–
	Internal Resistance	–	V	V	V	V (Opt.)	–	V
Others	Display	–	5" (TFT-LCD)	5" (Touch)	VFD	LED	TFT-LCD (Touch)	TFT-LCD (Touch)
	PV Array	–	V (Opt.)	V (WS, WAs)	–	–	–	V
	Operating Temp.	(°C)	0 °C to 50 °C	0 °C to 50 °C	0 °C to 40 °C	0 °C to 50 °C	0 °C to 50 °C	0 °C to 50 °C
	Power Distribution Unit	–	–	V (Opt.)	–	–	–	–

Specifications

SPECIFICATIONS(PHU-5 kW Series)

Model		PHU	80-170	200-70	500-30	750-20	1000-15	1500-10
Rated output voltage (*1)		V	80	200	500	750	1000	1500
Rated output current (*2)		A	170	70	30	20	15	10
Rated output power		W	5000	5000	5000	5000	5000	5000
Output power ratio		—	2.72	2.8	3	3	3	3
Constant Voltage Mode								
Line regulation (*3) [0.01 % of Vo_rated]		mV	8	20	50	75	100	150
Load regulation (*4) [0.02 % of Vo_rated]		mV	16	40	100	150	200	300
Ripple and noise (*5)	p-p (*6)	mV	200	300	350	800	1600	2400
	r.m.s. (*7)	mV	16	40	70	200	350	400
Temperature coefficient		ppm/°C	100 ppm/°C from rated output voltage, following 30 minutes warm-up.					
Remote snese compensation voltage	5 % of Vo_rated	V	4	10	25	37.5	50	75
Rise time (*8)	Rated load	ms	30	30	30	30	30	30
	No load	ms	30	30	30	30	30	30
Fall time (*9)	Rated load	ms	80	80	80	80	80	80
	No load	ms	1000	1000	1000	1200	1000	1200
Transient response time (*10)		ms	1.5	1.5	1.5	1.5	1.5	1.5
Constant Current Mode								
Line regulation (*3) [0.05 % of Io_rated]		mA	85	35	15	10	7.5	5
Load regulation (*11) [0.1 % of Io_rated]		mA	170	70	30	20	15	10
Ripple and noise (*12)	r.m.s.(*7)	mA	170	50	16	16	8	8
Temperature coefficient		ppm/°C	100 ppm/°C from rated output current, following 30 minutes warm-up.					
Protection Function								
Over voltage protection (OVP)	Setting range	V	5.00 V to 88.00 V	5.00 V to 220.00 V	5.00 V to 550.00 V	5.0 V to 825.0 V	5.0 V to 1100.0 V	5.0 V to 1650.0 V
	Setting accuracy	mV	80	200	500	750	1000	1500
Over current protection (OCP)	Setting range	A	5.00 A to 187.00 A	5.00 A to 77.00 A	3.000 A to 33.000 A	2.000 A to 22.000 A	1.500 A to 16.500 A	1.000 A to 11.000 A
	Setting accuracy	mA	340	140	60	40	30	20
Over power protection (OPP)	Setting range	W	100 W to 5500 W	100 W to 5500 W	100 W to 5500 W	100 W to 5500 W	100 W to 5500 W	100 W to 5500 W
	Setting accuracy	W	50	50	50	50	50	50
Over voltage limit (OVL)	Setting range	V	0.00 V to 84.00 V	0.00 V to 210.00 V	0.00 V to 525.00 V	0.0 V to 787.5 V	0.0 V to 1050.0 V	0.0 V to 1575.0 V
Under voltage limit (UVL)	Setting range	V	0.00 V to 84.00 V	0.00 V to 210.00 V	0.00 V to 525.00 V	0.0 V to 787.5 V	0.0 V to 1050.0 V	0.0 V to 1575.0 V
Over current limit (OCL)	Setting range	A	0.00 A to 178.50 A	0.00 A to 73.50 A	0.000 A to 31.500 A	0.000 A to 21.000 A	0.000 A to 15.750 A	0.000 A to 10.500 A
Under cuttent limit (UCL)	Setting range	A	0.00 A to 178.50 A	0.00 A to 73.50 A	0.000 A to 31.500 A	0.000 A to 21.000 A	0.000 A to 15.750 A	0.000 A to 10.500 A
Power unit fail (PUF)	Operation		Turn the output off.					
Incorrect sensing connection protection (SENSE)	Operation		Turn the output off.					
Low AC input protection (AC-FAIL)	Operation		Turn the output off.					
Shutdown (SD)	Operation		Turn the output off.					
Power limit (POWER LIMIT)	Operation		Over power limit.					
	Value (fixed)		Approx. 102 % of rated output power					
Other Functions								
Voltage Slew Rate	Setting range	V/s	0.01 to 160.00	0.01 to 400.00	0.1 to 1000.0	0.1 to 1500.0	0.1 to 2000.0	0.1 to 3000.0
	Resolution	mV	10	10	100	100	100	100
Current slew rate	Setting range	A/s	0.01 to 340.00	0.01 to 140.00	0.001 to 60.000	0.001 to 40.000	0.001 to 30.000	0.001 to 20.000
	Resolution	mA	10	10	1	1	1	1
Internal resistance	Setting range	Ω	0.000 to 0.471	0.000 to 2.857	0.00 to 16.67	0.00 to 37.50	0.0 to 66.7	0.0 to 150.0
	Resolution	mΩ	1	1	10	10	100	100
Front Panel								
Display			TFT-LCD, 5", 800 pt x 480 pt					
Voltage accuracy [0.1 % of Vo_rated]		mV	80	200	500	750	1000	1500
Current accuracy [0.2 % of Io_rated]		mA	340	140	60	40	30	20
Power accuracy [1 % of Po_rated]		W	50	50	50	50	50	50
Voltage resolution		V	0.01	0.01	0.01	0.1	0.1	0.1
Current resolution		A	0.01	0.01	0.001	0.001	0.001	0.001
Power resolution		W	0.1	0.1	0.1	0.1	0.1	0.1
Buttons			Menu, Local, Exit, Clear, Enter, Lock, Current, Shift Output, Numeric Keypad					
Rotary knob			Turn the knob to increase or decrease the value.					
USB port			Type A USB connector					
Programming and Measurement (Digital Interface)								
Output voltage programming range	0 % to 105 %	V	0 to 84	0 to 210	0 to 525	0 to 787.5	0 to 1050	0 to 1575
Output current programming range	0 % to 105 %	A	0 to 178.5	0 to 73.5	0 to 31.5	0 to 21	0 to 15.75	0 to 10.5
Output power programming range	0 % to 102 %	W	0 to 5100	0 to 5100	0 to 5100	0 to 5100	0 to 5100	0 to 5100
Output voltage programming accuracy [0.1 % of Vo_rated]		mV	80	200	500	750	1000	1500
Output current programming accuracy [0.2 % of Io_rated]		mA	340	140	60	40	30	20
Output power programming accuracy [1 % of Po_rated]		W	50	50	50	50	50	50
Output voltage programming resolution		mV	10	10	10	100	100	100
Output current programming resolution		mA	10	10	1	1	1	1
Output power programming resolution		W	0.1	0.1	0.1	0.1	0.1	0.1
Output voltage measurement accuracy [0.1 % of Vo_rated]		mV	80	200	500	750	1000	1500
Output current measurement accuracy [0.2 % of Io_rated]		mA	340	140	60	40	30	20
Output power measurement accuracy [1 % of Po_rated]		W	50	50	50	50	50	50
Output voltage measurement resolution		mV	10	10	10	100	100	100
Output current measurement resolution		mA	10	10	1	1	1	1
Output power measurement resolution		W	0.1	0.1	0.1	0.1	0.1	0.1

SPECIFICATIONS(PHU-5 kW Series)

Model		PHU	80-170	200-70	500-30	750-20	1000-15	1500-10
Input Characteristics for PHU-C Series								
Norminal input rating			3-Phase, 200 V models: 180 Vac to 265 Vac (Covers 200/230 Vac)					
Input frequency range			47 Hz to 63 Hz					
Maximum input current	200 Vac	A	32 A (L1, L2)					
Inrush current	200 Vac	A	Less than 50 A					
Maximum input power		VA	6000					
Power factor	Rated Power		> 0.95					
Efficiency (*14)	200 Vac	%	86 to 94					
Hold-up time			10 ms or greater					
Input Characteristics for PHU-D Series								
Norminal input rating			3-Phase, 400 V models: 342 Vac to 528 Vac (Covers 380/400/415/440/460/480 Vac)					
Input frequency range			47 Hz to 63 Hz					
Maximum input current	400 Vac	A	16 A (L1, L2)					
Inrush current	400 Vac	A	Less than 25 A					
Maximum input power		VA	6000					
Power factor	Rated Power		> 0.95					
Efficiency (*14)	400 Vac	%	87 to 94					
Hold-up time			10 ms or greater					
Interface Capabilities								
USB			Type A: Host, Type B: Slave, Speed: 1.1/2.0, USB Class: CDC(Communications Device Class)					
LAN			MAC Address, DNS IP Address, User Password, Gateway IP Address, Instrument IP Address, Subnet Mask					
Isolated Analog Control Interface			V_{set} / I_{set} = 0 V to 5 V or 0 V to 10 V | V_{mon} / I_{mon} = 0 V to 5 V or 0 V to 10 V					
Factory Option			RS-232&485 or GPIB or CAN Bus or DeviceNet or Isolated Digital I/O					
Isolated Analog Control Interface								
Vout voltage programming			0 to 100%, 0 V to 5 V Accuracy: ± 1% of rated V_{out}, or 0 V to 10 V Accuracy: ± 1% of rated V_{out}					
Iout voltage programming			0 to 100%, 0 V to 5 V Accuracy: ± 1% of rated I_{out}, or 0 V to 10 V Accuracy: ± 1% of rated I_{out}					
Pout voltage programming			0 to 100%, 0 V to 5 V Accuracy: ± 1% of rated P_{out}, or 0 V to 10 V Accuracy: ± 1% of rated P_{out}					
Internal resistance voltage programming			0 to 100%, 0 V to 5 V Accuracy: ± 1% of maximum R_{int}, or 0 V to 10 V Accuracy: ± 1% of maximum R_{int}					
Output voltage monitor			0 V to 5 V or 0 V to 10 V, Accuracy: ± 1%.					
Output current monitor			0 V to 5 V or 0 V to 10 V, Accuracy: ± 1%.					
Reference voltage			Voltage reference for 0 V to 5V or 0 V to 10V.					
Alarm Input			Turn off the PHU output with a High (4.5 V to 5 V)					
Output on/off control			Possible logic selections: Turn the output on using a LOW (0 V to 0.5 V) or short-circuit, turn the output off using a HIGH (4.5 V to 5 V) or open-circuit. Turn the output on using a HIGH (4.5 V to 5 V) or open-circuit, turn the output off using a LOW (0 V to 0.5 V) or short-circuit.					
Alarm clear control			Clear alarms with a High (4.5 V to 5 V)					
CV/CC/CP/ALM/PWR ON/OUT ON indicator			Photocoupler open collector output; Maximum voltage 30 V, maximum sink current 8 mA					
Environmental Conditions								
Operaing temperature			0 °C to 50 °C					
Storage temperature			-25 °C – 70 °C					
Operating humidity			20% to 85% RH; No condensation					
Storage humidity			90% RH or less; No condensation					
Altitude			Maximum 2000 m					
General Specifications								
Weight	main unit only	kg	Less than 21 kg					
Dimensions (W×H×D)		mm	442 mm x 130 mm x 675 mm					
Cooling			Forced air cooling by internal fan					
EMC			Complies with the European EMC directive 89/336/EEC for Class A test and measurement products					
Safety			Complies with the European Low Voltage Directive 73/23/EEC and carries the CE-marking					
Withstand voltage			Chassis and output terminal; chassis and AC input; AC input and output terminal: AC 1500 V or DC 2130 V 1 minute					
Insulation resistance			Chassis and output terminal; chassis and AC input; AC input and output terminal: 100 MΩ or more (DC 500 V)					

Notes:
***1 Minimum voltage is guaranteed to maximum 0.2% of the rated output voltage.**
***2 Minimum current is guaranteed to maximum 0.4% of the rated output current.**
***3 At 180 Vac to 265 Vac or 342 Vac to 528 Vac, constant load.**
***4 From No-load to Full-load, constant input voltage. Measured at the sensing point in Remote Sense.**
***5 For 80 V, 200 V models: Measure with JEITA RC-9131B (1:1) probe. For 500 V, 750 V, 1000 V and 1500 V models: Measured with (100:1) probe.**
***6 Measurement frequency bandwidth is 10 Hz to 20 MHz.**
***7 Measurement frequency bandwidth is 5 Hz to 1 MHz.**
***8 From 10% to 90% of rated output voltage, with rated resistive load.**
***9 From 90% to 10% of rated output voltage, with rated resistive load.**
***10 Time for output voltage to recover within 1% of its rated output for a load change from 10 to 90% of its rated output current.**
Voltage set point from 10% to 100% of rated output.
***11 For load voltage change, equal to the unit voltage rating, constant input voltage.**
***12 The ripple is measured at 20% to 100% output voltage and full output current.**
***13 For output power change from 10% to 90%, constant input voltage.**
***14 At rated output power.**

Specifications

SPECIFICATIONS(PHU-10 kW Series)

Model		PHU	80-340	200-140	500-60	750-40	1000-30	1500-20
Rated output voltage (*1)		V	80	200	500	750	1000	1500
Rated output current (*2)		A	340	140	60	40	30	20
Rated output power		W	10000	10000	10000	10000	10000	10000
Output power ratio		—	2.72	2.8	3	3	3	3
Constant Voltage Mode								
Line regulation (*3) [0.01 % of Vo_rated]		mV	8	20	50	75	100	150
Load regulation (*4) [0.02 % of Vo_rated]		mV	16	40	100	150	200	300
Ripple and noise (*5)	p-p (*6)	mV	200	300	350	800	1600	2400
	r.m.s. (*7)	mV	16	40	70	200	350	400
Temperature coefficient		ppm/°C	100 ppm/°C from rated output voltage, following 30 minutes warm-up.					
Remote snese compensation voltage	5 % of Vo_rated	V	4	10	25	37.5	50	75
Rise time (*8)	Rated load	ms	30	30	30	30	30	30
	No load	ms	30	30	30	30	30	30
Fall time (*9)	Rated load	ms	80	80	80	80	80	80
	No load	ms	1000	1000	1000	1200	1000	1200
Transient response time (*10)		ms	1.5	1.5	1.5	1.5	1.5	1.5
Constant Current Mode								
Line regulation (*3) [0.05 % of Io_rated]		mA	170	70	30	20	15	10
Load regulation (*11) [0.1 % of Io_rated]		mA	340	140	60	40	30	20
Ripple and noise (*12)	r.m.s. (*7)	mA	340	100	32	32	22	22
Temperature coefficient		ppm/°C	100 ppm/°C from rated output current, following 30 minutes warm-up.					
Protection Function								
Over voltage protection (OVP)	Setting range	V	5.00 V to 88.00 V	5.00 V to 220.00 V	5.00 V to 550.00 V	5.0 V to 825.0 V	5.0 V to 1100.0 V	5.0 V to 1650.0 V
	Setting accuracy	mV	80	200	500	750	1000	1500
Over current protection (OCP)	Setting range	A	5.00 A to 374.00 A	5.00 A to 154.00 A	5.00 A to 66.00 A	4.000 A to 44.000 A	3.000 A to 33.000 A	2.000 A to 22.000 A
	Setting accuracy	mA	680	280	120	80	60	40
Over power protection (OPP)	Setting range	W	200 W to 11000 W	200 W to 11000 W	200 W to 11000 W	200 W to 11000 W	200 W to 11000 W	200 W to 11000 W
	Setting accuracy	W	100	100	100	100	100	100
Over voltage limit (OVL)	Setting range	V	0.00 V to 84.00 V	0.00 V to 210.00 V	0.00 V to 525.00 V	0.0 V to 787.5 V	0.0 V to 1050.0 V	0.0 V to 1575.0 V
Under voltage limit (UVL)	Setting range	V	0.00 V to 84.00 V	0.00 V to 210.00 V	0.00 V to 525.00 V	0.0 V to 787.5 V	0.0 V to 1050.0 V	0.0 V to 1575.0 V
Over current limit (OCL)	Setting range	A	0.00 A to 357.00 A	0.00 A to 147.00 A	0.00 A to 63.00 A	0.000 A to 42.000 A	0.000 A to 31.500 A	0.000 A to 21.000 A
Under cuttent limit (UCL)	Setting range	A	0.00 A to 357.00 A	0.00 A to 147.00 A	0.00 A to 63.00 A	0.000 A to 42.000 A	0.000 A to 31.500 A	0.000 A to 21.000 A
Power unit fail (PUF)	Operation		Turn the output off.					
Incorrect sensing connection protection (SENSE)	Operation		Turn the output off.					
Low AC input protection (AC-FAIL)	Operation		Turn the output off.					
Shutdown (SD)	Operation		Turn the output off.					
Power limit (POWER LIMIT)	Operation		Over power limit.					
	Value (fixed)		Approx. 102 % of rated output power					
Other Functions								
Voltage Slew Rate	Setting range	V/s	0.01 to 160.00	0.01 to 400.00	0.1 to 1000.0	0.1 to 1500.0	0.1 to 2000.0	0.1 to 3000.0
	Resolution	mV	10	10	100	100	100	100
Current slew rate	Setting range	A/s	0.1 to 680.0	0.01 to 280.00	0.01 to 120.00	0.01 to 80.00	0.001 to 60.000	0.001 to 40.000
	Resolution	mA	100	10	10	10	1	1
Internal resistance	Setting range	Ω	0.000 to 0.235	0.000 to 1.428	0.00 to 8.33	0.00 to 18.75	0.00 to 33.33	0.0 to 75.0
	Resolution	mΩ	1	1	10	10	10	100
Front Panel								
Display			TFT-LCD, 5", 800 pt x 480 pt					
Voltage accuracy [0.1 % of Vo_rated]		mV	80	200	500	750	1000	1500
Current accuracy [0.2 % of Io_rated]		mA	680	280	120	80	60	40
Power accuracy [1 % of Po_rated]		W	100	100	100	100	100	100
Voltage resolution		V	0.01	0.01	0.01	0.1	0.1	0.1
Current resolution		A	0.01	0.01	0.001	0.001	0.001	0.001
Power resolution		W	1	1	1	1	1	1
Buttons			Menu, Local, Exit, Clear, Enter, Lock, Current, Shift Output, Numeric Keypad					
Rotary knob			Turn the knob to increase or decrease the value					
USB port			Type A USB connector					
Programming and Measurement (Digital Interface)								
Output voltage programming range	0 % to 105 %	V	0 to 84	0 to 210	0 to 525	0 to 787.5	0 to 1050	0 to 1575
Output current programming range	0 % to 105 %	A	0 to 357	0 to 147	0 to 63	0 to 42	0 to 31.5	0 to 21
Output power programming range	0 % to 102 %	W	0 to 10200	0 to 10200	0 to 10200	0 to 10200	0 to 10200	0 to 10200
Output voltage programming accuracy [0.1 % of Vo_rated]		mV	80	200	500	750	1000	1500
Output current programming accuracy [0.2 % of Io_rated]		mA	680	280	120	80	60	40
Output power programming accuracy [1 % of Po_rated]		W	100	100	100	100	100	100
Output voltage programming resolution		mV	10	10	10	100	100	100
Output current programming resolution		mA	10	10	1	1	1	1
Output power programming resolution		W	1	1	1	1	1	1
Output voltage measurement accuracy [0.1 % of Vo_rated]		mV	80	200	500	750	1000	1500
Output current measurement accuracy [0.2 % of Io_rated]		mA	680	280	120	80	60	40
Output power measurement accuracy [1 % of Po_rated]		W	100	100	100	100	100	100
Output voltage measurement resolution		mV	10	10	10	100	100	100
Output current measurement resolution		mA	10	10	1	1	1	1
Output power measurement resolution		W	1	1	1	1	1	1

SPECIFICATIONS(PHU-10 kW Series)								
Model		**PHU**	**80-340**	**200-140**	**500-60**	**750-40**	**1000-30**	**1500-20**
Input Characteristics for PHU-C Series								
Norminal input rating			3-Phase, 200 V models: 180 Vac to 265 Vac (Covers 200/230 Vac)					
Input frequency range			47 Hz to 63 Hz					
Maximum input current	200 Vac	A	56 A (L1), 32 A (L2, L3)					
Inrush current	200 Vac	A	Less than 100 A					
Maximum input power		VA	12000					
Power factor	Rated Power		> 0.95					
Efficiency (*14)	200 Vac	%	86 to 94					
Hold-up time			10 ms or greater					
Input Characteristics for PHU-D Series								
Norminal input rating			3-Phase, 400 V models: 342 Vac to 528 Vac (Covers 380/400/415/440/460/480 Vac)					
Input frequency range			47 Hz to 63 Hz					
Maximum input current	400 Vac	A	28 A (L1), 16 A (L2, L3)					
Inrush current	400 Vac	A	Less than 50 A					
Maximum input power		VA	12000					
Power factor	Rated Power		> 0.95					
Efficiency (*14)	400 Vac	%	87 to 94					
Hold-up time			10 ms or greater					
Interface Capabilities								
USB			Type A: Host, Type B: Slave, Speed: 1.1/2.0, USB Class: CDC(Communications Device Class)					
LAN			MAC Address, DNS IP Address, User Password, Gateway IP Address, Instrument IP Address, Subnet Mask					
Isolated Analog Control Interface			V_{set} / I_{set} = 0 V to 5 V or 0 V to 10 V | V_{mon} / I_{mon} = 0 V to 5 V or 0 V to 10 V					
Factory Option			RS-232&485 or GPIB or CAN Bus or DeviceNet or Isolated Digital I/O					
Isolated Analog Control Interface								
Vout voltage programming			0 to 100%, 0V to 5 V Accuracy: ± 1% of rated V_{out}, or 0 V to 10 V Accuracy: ± 1% of rated V_{out}					
Iout voltage programming			0 to 100%, 0 V to 5 V Accuracy: ± 1% of rated I_{out}, or 0 V to 10 V Accuracy: ± 1% of rated I_{out}					
Pout voltage programming			0 to 100%, 0 V to 5 V Accuracy: ± 1% of rated P_{out}, or 0 V to 10 V Accuracy: ± 1% of rated P_{out}					
Internal resistance voltage programming			0 to 100%, 0 V to 5 V Accuracy: ± 1% of maximum R_{int}, or 0 V to 10 V Accuracy: ± 1% of maximum R_{int}					
Output voltage monitor			0 V to 5 V or 0 V to 10 V, Accuracy: ± 1%.					
Output current monitor			0 V to 5 V or 0 V to 10 V, Accuracy: ± 1%.					
Reference voltage			Voltage reference for 0 V to 5V or 0 V to 10V.					
Alarm Input			Turn off the PHU output with a High (4.5 V to 5 V)					
Output on/off control			Possible logic selections: Turn the output on using a LOW (0 V to 0.5 V) or short-circuit, turn the output off using a HIGH (4.5 V to 5 V) or open-circuit. Turn the output on using a HIGH (4.5 V to 5 V) or open-circuit, turn the output off using a LOW (0V to 0.5 V) or short-circuit.					
Alarm clear control			Clear alarms with a High (4.5 V to 5 V)					
CV/CC/CP/ALM/PWR ON/OUT ON indicator			Photocoupler open collector output; Maximum voltage 30 V, maximum sink current 8 mA.					
Environmental Conditions								
Operaing temperature			0 ˚C to 50 ˚C					
Storage temperature			-25 ˚C to 70 ˚C					
Operating humidity			20% to 85% RH; No condensation					
Storage humidity			90% RH or less; No condensation					
Altitude			Maximum 2000 m					
General Specifications								
Weight	main unit only	kg	Less than 30.5 kg					
Dimensions (W×H×D)		mm	442 mm x 130 mm x 675 mm					
Cooling			Forced air cooling by internal fan					
EMC			Complies with the European EMC directive 89/336/EEC for Class A test and measurement products					
Safety			Complies with the European Low Voltage Directive 73/23/EEC and carries the CE-marking					
Withstand voltage			Chassis and output terminal; chassis and AC input; AC input and output terminal: AC 1500 V or DC 2130 V 1 minute					
Insulation resistance			Chassis and output terminal; chassis and AC input; AC input and output terminal: 100 MΩ or more (DC 500 V)					

Notes:
***1 Minimum voltage is guaranteed to maximum 0.2% of the rated output voltage.**
***2 Minimum current is guaranteed to maximum 0.4% of the rated output current.**
***3 At 180 Vac to 265 Vac or 342 Vac to 528 Vac, constant load.**
***4 From No-load to Full-load, constant input voltage. Measured at the sensing point in Remote Sense.**
***5 For 80 V, 200 V models: Measure with JEITA RC-9131B (1:1) probe. For 500 V, 750 V, 1000 V and 1500 V models: Measured with (100:1) probe.**
***6 Measurement frequency bandwidth is 10 Hz to 20 MHz.**
***7 Measurement frequency bandwidth is 5 Hz to 1 MHz.**
***8 From 10% to 90% of rated output voltage, with rated resistive load.**
***9 From 90% to 10% of rated output voltage, with rated resistive load.**
***10 Time for output voltage to recover within 1% of its rated output for a load change from 10 to 90% of its rated output current.**
Voltage set point from 10% to 100% of rated output.
***11 For load voltage change, equal to the unit voltage rating, constant input voltage.**
***12 The ripple is measured at 20% to 100% output voltage and full output current.**
***13 For output power change from 10% to 90%, constant input voltage.**
***14 At rated output power.**

Specifications

SPECIFICATIONS(PHU-15 kW Series)

Model		PHU	80-510	200-210	500-90	750-60	1000-45	1500-30
Rated output voltage (*1)		V	80	200	500	750	1000	1500
Rated output current (*2)		A	510	210	90	60	45	30
Rated output power		W	15000	15000	15000	15000	15000	15000
Output power ratio		—	2.72	2.8	3	3	3	3
Constant Voltage Mode								
Line regulation (*3) [0.01 % of Vo_rated]		mV	8	20	50	75	100	150
Load regulation (*4) [0.02 % of Vo_rated]		mV	16	40	100	150	200	300
Ripple and noise (*5)	p-p (*6)	mV	200	300	350	800	1600	2400
	r.m.s. (*7)	mV	16	40	70	200	350	400
Temperature coefficient		ppm/°C	100 ppm/°C from rated output voltage, following 30 minutes warm-up.					
Remote snese compensation voltage	5 % of Vo_rated	V	4	10	25	37.5	50	75
Rise time (*8)	Rated load	ms	30	30	30	30	30	30
	No load	ms	30	30	30	30	30	30
Fall time (*9)	Rated load	ms	80	80	80	80	80	80
	No load	ms	1000	1000	1000	1200	1000	1200
Transient response time (*10)		ms	1.5	1.5	1.5	1.5	1.5	1.5
Constant Current Mode								
Line regulation (*3) [0.05 % of Io_rated]		mA	255	105	45	30	22.5	15
Load regulation (*11) [0.1 % of Io_rated]		mA	510	210	90	60	45	30
Ripple and noise (*12)	r.m.s.	mA	510	150	48	48	26	26
Temperature coefficient		ppm/°C	100 ppm/°C from rated output current, following 30 minutes warm-up.					
Protection Function								
Over voltage protection (OVP)	Setting range	V	5.00 V to 88.00 V	5.00 V to 220.00 V	5.00 V to 550.00 V	5.0 V to 825.0 V	5.0 V to 1100.0 V	5.0 V to 1650.0 V
	Setting accuracy	mV	80	200	500	750	1000	1500
Over current protection (OCP)	Setting range	A	5.00 A to 561.00 A	5.00 A to 231.00 A	5.00 A to 99.00 A	5.00 A to 66.00 A	4.5 A to 49.500 A	3 A to 33.000 A
	Setting accuracy	mA	1020	420	180	120	90	60
Over power protection (OPP)	Setting range	W	300 W to 16500 W	300 W to 16500 W	300 W to 16500 W	300 W to 16500 W	300 W to 16500 W	300 W to 16500 W
	Setting accuracy	W	150	150	150	150	150	150
Over voltage limit (OVL)	Setting range	V	0.00 V to 84.00 V	0.00 V to 210.00 V	0.00 V to 525.00 V	0.0 V to 787.5 V	0.0 V to 1050.0 V	0.0 V to 1575.0 V
Under voltage limit (UVL)	Setting range	V	0.00 V to 84.00 V	0.00 V to 210.00 V	0.00 V to 525.00 V	0.0 V to 787.5 V	0.0 V to 1050.0 V	0.0 V to 1575.0 V
Over current limit (OCL)	Setting range	A	0.00 A to 535.50 A	0.00 A to 220.50 A	0.00 A to 94.50 A	0.00 A to 63.00 A	0.000 A to 47.250 A	0.000 A to 31.500 A
Under cuttent limit (UCL)	Setting range	A	0.00 A to 535.50 A	0.00 A to 220.50 A	0.00 A to 94.50 A	0.00 A to 63.00 A	0.000 A to 47.250 A	0.000 A to 31.500 A
Power unit fail (PUF)	Operation		Turn the output off.					
Incorrect sensing connection protection (SENSE)	Operation		Turn the output off.					
Low AC input protection (AC-FAIL)	Operation		Turn the output off.					
Shutdown (SD)	Operation		Turn the output off.					
Power limit (POWER LIMIT)	Operation		Over power limit.					
	Value (fixed)		Approx. 102 % of rated output power					
Other Functions								
Voltage Slew Rate	Setting range	V/s	0.01 to 160.00	0.01 to 400.00	0.1 to 1000.0	0.1 to 1500.0	0.1 to 2000.0	0.1 to 3000.0
	Resolution	mV	10	10	100	100	100	100
Current slew rate	Setting range	A/s	0.1 to 1020.0	0.01 to 420.00	0.01 to 180.00	0.01 to 120.00	0.01 to 90.00	0.001 to 60.000
	Resolution	mA	100	10	10	10	10	1
Internal resistance	Setting range	Ω	0.000 to 0.157	0.00 to 0.95	0.00 to 5.56	0.00 to 12.50	0.00 to 22.22	0.0 to 50.0
	Resolution	mΩ	1	10	10	10	10	100
Front Panel								
Display			TFT-LCD, 5", 800 pt x 480 pt					
Voltage accuracy [0.1% of Vo_rated]		mV	80	200	500	750	1000	1500
Current accuracy [0.2% of Io_rated]		mA	1020	420	180	120	90	60
Power accuracy [1% of Po_rated]		W	150	150	150	150	150	150
Voltage resolution		V	0.01	0.01	0.01	0.1	0.1	0.1
Current resolution		A	0.01	0.01	0.01	0.001	0.001	0.001
Power resolution		W	1	1	1	1	1	1
Buttons			Menu, Local, Exit, Clear, Enter, Lock, Current, Shift Output, Numeric Keypad					
Rotary knob			Turn the knob to increase or decrease the value.					
USB port			Type A USB connector					
Programming and Measurement (Digital Interface)								
Output voltage programming range	0 % to 105 %	V	0 to 84	0 to 210	0 to 525	0 to 787.5	0 to 1050	0 to 1575
Output current programming range	0 % to 105 %	A	0 to 535.5	0 to 220.5	0 to 94.5	0 to 63	0 to 47.25	0 to 31.5
Output power programming range	0 % to 102 %	W	0 to 15300	0 to 15300	0 to 15300	0 to 15300	0 to 15300	0 to 15300
Output voltage programming accuracy [0.1 % of Vo_rated]		mV	80	200	500	750	1000	1500
Output current programming accuracy [0.2 % of Io_rated]		mA	1020	420	180	120	90	60
Output power programming accuracy [1 % of Po_rated]		W	150	150	150	150	150	150
Output voltage programming resolution		mV	10	10	10	100	100	100
Output current programming resolution		mA	10	10	10	1	1	1
Output power programming resolution		W	1	1	1	1	1	1
Output voltage measurement accuracy [0.1 % of Vo_rated]		mV	80	200	500	750	1000	1500
Output current measurement accuracy [0.2 % of Io_rated]		mA	1020	420	180	120	90	60
Output power measurement accuracy [1 % of Po_rated]		W	150	150	150	150	150	150
Output voltage measurement resolution		mV	10	10	10	100	100	100
Output current measurement resolution		mA	10	10	10	1	1	1
Output power measurement resolution		W	1	1	1	1	1	1

SPECIFICATIONS(PHU-15 kW Series)								
Model		**PHU**	**80-510**	**200-210**	**500-90**	**750-60**	**1000-45**	**1500-30**
Input Characteristics for PHU-C Series								
Norminal input rating			3-Phase, 200 V models: 180 Vac to 265 Vac (Covers 200/230 Vac)					
Input frequency range			47 Hz to 63 Hz					
Maximum input current	200 Vac	A	56 A (L1, L2, L3)					
Inrush current	200 Vac	A	Less than 100 A					
Maximum input power		VA	18000					
Power factor	Rated Power		> 0.95					
Efficiency (*14)	200 Vac	%	86 to 94					
Hold-up time			10 ms or greater					
Input Characteristics for PHU-D Series								
Norminal input rating			3-Phase, 400 V models: 342 Vac to 528 Vac (Covers 380/400/415/440/460/480 Vac)					
Input frequency range			47 Hz to 63 Hz					
Maximum input current	400 Vac	A	28 A (L1, L2, L3)					
Inrush current	400 Vac	A	Less than 50 A					
Maximum input power		VA	18000					
Power factor	Rated Power		> 0.95					
Efficiency (*14)	400 Vac	%	87 to 94					
Hold-up time			10 ms or greater					
Interface Capabilities								
USB			Type A: Host, Type B: Slave, Speed: 1.1/2.0, USB Class: CDC(Communications Device Class)					
LAN			MAC Address, DNS IP Address, User Password, Gateway IP Address, Instrument IP Address, Subnet Mask					
Isolated Analog Control Interface			V_{set} / I_{set} = 0 V to 5 V or 0 V to 10 V | V_{mon} / I_{mon} = 0 V to 5 V or 0 V to 10 V					
Factory Option			RS-232&485 or GPIB or CAN Bus or DeviceNet or Isolated Digital I/O					
Isolated Analog Control Interface								
Vout voltage programming			0 to 100%, 0 V to 5 V Accuracy: ± 1% of rated V_{out}, or 0–10 V Accuracy: ± 1% of rated V_{out}					
Iout voltage programming			0 to 100%, 0 V to 5 V Accuracy: ± 1% of rated I_{out}, or 0 V to 10 V Accuracy: ± 1% of rated I_{out}					
Pout voltage programming			0 to 100%, 0 V to 5 V Accuracy: ± 1% of rated P_{out}, or 0 V to 10 V Accuracy: ± 1% of rated P_{out}					
Internal resistance voltage programming			0 to 100%, 0 V to 5 V Accuracy: ± 1% of maximum R_{int}, or 0 V to 10 V Accuracy: ± 1% of maximum R_{int}					
Output voltage monitor			0 V to 5 V or 0 V to 10 V, Accuracy: ± 1%.					
Output current monitor			0 to 5 V or 0 to 10 V, Accuracy: ± 1%.					
Reference voltage			Voltage reference for 0 V to 5 V or 0 V to 10 V.					
Alarm Input			Turn off the PHU output with a High (4.5 V to 5 V)					
Output on/off control			Possible logic selections: Turn the output on using a LOW (0 V to 0.5 V) or short-circuit, turn the output off using a HIGH (4.5 V to 5 V) or open-circuit. Turn the output on using a HIGH (4.5 V to 5 V) or open-circuit, turn the output off using a LOW (0 V to 0.5 V) or short-circuit.					
Alarm clear control			Clear alarms with a High (4.5V to 5V)					
CV/CC/CP/ALM/PWR ON/OUT ON indicator			Photocoupler open collector output; Maximum voltage 30 V, maximum sink current 8 mA.					
Environmental Conditions								
Operaing temperature			0 ˚C to 50 ˚C					
Storage temperature			-25 ˚C to 70 ˚C					
Operating humidity			20% to 85% RH; No condensation					
Storage humidity			90% RH or less; No condensation					
Altitude			Maximum 2000 m					
General Specifications								
Weight	main unit only	kg	Less than 40 kg					
Dimensions (W×H×D)		mm	442 mm x 130 mm x 675 mm					
Cooling			Forced air cooling by internal fan					
EMC			Complies with the European EMC directive 89/336/EEC for Class A test and measurement products.					
Safety			Complies with the European Low Voltage Directive 73/23/EEC and carries the CE-marking.					
Withstand voltage			Chassis and output terminal; chassis and AC input; AC input and output terminal: AC 1500 V or DC 2130 V 1 minute					
Insulation resistance			Chassis and output terminal; chassis and AC input; AC input and output terminal: 100 MΩ or more (DC 500 V)					

Notes:
***1 Minimum voltage is guaranteed to maximum 0.2% of the rated output voltage.**
***2 Minimum current is guaranteed to maximum 0.4% of the rated output current.**
***3 At 180 Vac to 265 Vac or 342 Vac to 528 Vac, constant load.**
***4 From No-load to Full-load, constant input voltage. Measured at the sensing point in Remote Sense.**
***5 For 80 V, 200 V models: Measure with JEITA RC-9131B (1:1) probe. For 500 V, 750 V, 1000 V and 1500 V models: Measured with (100:1) probe.**
***6 Measurement frequency bandwidth is 10 Hz to 20 MHz.**
***7 Measurement frequency bandwidth is 5 Hz to 1 MHz.**
***8 From 10% to 90% of rated output voltage, with rated resistive load.**
***9 From 90% to 10% of rated output voltage, with rated resistive load.**
***10 Time for output voltage to recover within 1% of its rated output for a load change from 10 to 90% of its rated output current. Voltage set point from 10% to 100% of rated output.**
***11 For load voltage change, equal to the unit voltage rating, constant input voltage.**
***12 The ripple is measured at 20% to 100% output voltage and full output current.**
***13 For output power change from 10% to 90%, constant input voltage.**
***14 At rated output power.**

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