

# **PHU-Series**

Multi-Range High Power DC Source

# 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.V/C.C 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&485 or GPIB or CAN Bus or DeviceNet or Any Bus
- 3 U Height and 19" Rack Mount Size



# Prestige / Harmony / Universal

The PHU Series is a single channel programmable DC power supply with 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 high output and keep the compact size at just 3 U 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 high-power DC power supplies enhances the completeness of the DC power supply product line of GW Instek, and to provide 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 optional functions including Datalogger, MPPT (Maximum Power Point Tracking), Solar Array Simulator, AH/WH Meter 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.

Mediu	m Vo	ltage		Higł		High Current					
Model	۷	Α	w	Model	v	Α	w	Model	v	Α	w
PHU 500-30	500	30	5 kW	PHU 1000-15	1000	15	5 kW	PHU 80-170	80	170	5 kW
PHU 500-60	500	60	10 kW	PHU 1000-30	1000	30	10 kW	PHU 80-340	80	340	10 kW
PHU 500-90	500	90	15 kW	PHU 1000-45	1000	45	15 kW	PHU 80-510	80	510	15 kW
PHU 750-20	750	20	5 kW	PHU 1500-10	1500	10	5 kW	PHU 200-70	200	70	5 kW
PHU 750-40	750	40	10 kW	PHU 1500-20	1500	20	10 kW	PHU 200-140	200	140	10 kW
PHU 750-60	750	60	15 kW	PHU 1500-30	1500	30	15 kW	PHU 200-210	200	210	15 kW

#### A. 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. Simply connect to the LAN port, enter the IP address through any web browser, and you can perform tasks such as device control, parameter settings, and function toggling without needing to install or learn any additional software.

#### B. INDUSTRY INTERFACE



## C. 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.

#### D. 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.

#### E. 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.

# F. CC/CV PRIORITY



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

#### G. 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.

# H. BLEED 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 bleed function can be disabled for specific purposes, such as battery applications.

# I. 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.

## FUNCTION



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.

#### PANEL INTRODUCTION

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SPECIFICATIONS(PHU-5 kW Series)								
Model		РНИ	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 voltage (*1)		•	170	200	30	750	1000	1300
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
	n n (#6)		200	200	250	800	1600	2400
Ripple and noise (*5)	р-р (^6)	mv	200	300	330	800	1600	2400
	r.m.s. (*7)	mV	16	40	/0	200	350	400
Temperature coefficient		ppm/°C	100 ppm/°C fron	n rated output voltag	e, following 30 minute	s warm-up	-	
Remote snese compensation voltage	5 % of Vo_rated	v	4	10	25	37.5	50	75
	Rated load	ms	30	30	30	30	30	30
Rise time (*8)	No load	ms	30	30	30	30	30	30
	Pated load	mc	80	80	80	80	80	80
Fall time (*9)	Nated Ioad	1113	1000	1000	1000	1000	1000	1000
	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 lo rated]		mA	170	70	30	20	15	10
Ripple and noise (*12)	rms(*7)	mΔ	170	50	16	16	8	8
	1.11.3.(7)	1117	100 /00 (			10	0	
		ppm/°C	100 ppm/ C from	n rated output curren	it, following 30 minute	s 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
over tonage protection (OVE)	Setting accuracy	mV	80	200	500	750	1000	1500
-	Setting range	Α	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
Over current protection (OCP)	Setting accuracy	mΔ	340	140	60	40	30	20
	Setting accuracy	1117	100 187 1 5500 187	140	100 100 100 100	100.101.001	100.101.000.00	100.101.05500.101
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	Α	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	Δ	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
		^	Turne the sustaint		0.000 A to 51.500 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					
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				
	Operation		Over power limit					
Power limit (POWER LIMIT)	Value (fixed)		Approx 102 % o	frated output power				
Other Functions	value (lixed)		7.pp10% 102 /0 0	rated output poner				
	1						1	
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
5	Resolution	mV	10	10	100	100	100	100
Comment along mate	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
Current slew rate	Resolution	mA	10	10	1	1	1	1
	Setting range	0	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
Internal resistance	Pecelutian		1	1	10	10	100	100
	Resolution	ms2	1		10	10	100	100
Front Panel	1							
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]	l	w	50	50	50	50	50	50
Voltage resolution		v	0.01	0.01	0.01	01	01	01
Current resolution			0.01	0.01	0.01	0.001	0.007	0.003
Deven 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, Exi	t, Clear, Enter, Lock, (	Current, Shift Output,	Numeric Keypad		
Rotary knob			Turn the knob to	increase or decrease	the value			
USB port			Type A USB conr	nector				
Programming and Measurement (Digital Interface)	•							
Outrust valtage avegramming range	0.0/ 40 105.0/	v	0 to 94	0 to 210	0 40 525	0 to 797 5	0.4++ 1.050	0 to 1575
Curput voltage programming range	0 /0 10 103 /0	· ·	010 84	010210	0 10 323	010787.5	0101030	01013/3
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 [] % of Po_rated]	İ	w	50	50	50	50	50	50
Output voltage programming recelution	1		10	10	10	100	100	100
			10	10		-		
Output current programming resolution		mA	10	10	1	1	<u> </u>	<u> </u>
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 [] % of Po rated]	İ	w	50	50	50	50	50	50
Output voltage measurement resolution			10	10	10	100	100	100
			10	10	10	100	100	100
Output current measurement resolution		mA	10	10	1	1		· ·
Output power measurement resolution	1	W	0.1	0.1	0.1	0.1	0.1	0.1

SPECIFICATIONS(PHU-5 kW Series)			
Input Characteristics for PHU-C Series			
Norminal input rating			Single Phase, 3-Phase, 200 V models: 180 Vac to 265 Vac (Covers 200 Vac / 230 Vac)
Input frequency range			47 Hz to 63 Hz
Maximum input current	200 Vac	А	32 A (L1, L2)
Inrush current	200 Vac	А	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	А	16 A (L1, L2)
Inrush current	400 Vac	А	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 <sub>set</sub> / I <sub>set</sub> = 0 V to 5 V or 0 V to 10 V   V <sub>mon</sub> / I <sub>mon</sub> = 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 <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub>
lout voltage programming			0 % to 100%, 0 V to 5 V Accuracy: ± 1 % of rated I <sub>out</sub> or 0 V to 10 V Accuracy: ± 1 % of rated I <sub>out</sub>
Pout voltage programming			0 % to 100%, 0 V to 5 V Accuracy: ± 1 % of rated P <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated P <sub>out</sub>
Internal resistance voltage programming			0 % to 100%, 0 V to 5 V Accuracy: $\pm$ 1 % of maximum R <sub>int</sub> , or 0 V to 10 V Accuracy: $\pm$ 1 % of maximum R <sub>int</sub>
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 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 21 kg
Dimensions (W×H×D)		mm	442 mm × 130 mm × 675 mm
Cooling			Forced air cooling by internal fan
ЕМС			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 M $\Omega$ or more (DC 500 V)

Notes:

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.

 $\star$ 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(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
Deted output voltage (1)		•	340	140	500	/50	20	1300
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
Pinels and pairs (%E)	р-р (*6)	mV	200	300	350	800	1600	2400
Ripple and hoise (~5)	r.m.s. (*7)	mV	16	40	70	200	350	400
Temperature coefficient		ppm/°C	100 ppm/℃ from	rated output voltage	, following 30 minute	s warm-up.		
Remote snese compensation voltage	5 % of Vo rated	v v	4	10	25	37.5	50	75
······································	Rated load	ms	30	30	30	30	30	30
Rise time (*8)	No.load	me	30	30	30	30	30	30
	Reted load		80	80	80	80	80	80
Fall time (*9)	Rateu Ioau	ms	80	30	30	30	30	1200
	INO IOAD	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	1				I			
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	n rated output current	, following 30 minute	s warm-up.		
Protection Function								
- In	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
Over voltage protection (OVP)	Setting accuracy	mV	80	200	500	750	1000	1500
	Setting range	A	5.00 A to 374 00 A	5.00 A to 154 00 4	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
Over current protection (OCP)	Setting accuracy	mA	680	280	120	80	60	40
	Setting range	11174	200 \¥/ to 11000 \¥/	200 \¥/ +0 11000 \¥/	200 W/ to 11000 W/	200 \¥/ to 11000 \¥/	200 \X/ to 11000 \Y/	200 \¥/ to 11000 \¥/
Over power protection (OPP)	Setting range	W NY	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 o	off.				
Incorrect sensing connection protection (SENSE)	Operation		Turn the output o	off.				
Low AC input protection (AC-FAIL)	Operation		Turn the output o	off.				
Shutdown (SD)	Operation		Turn the output o	off.				
	Operation		Over power limit					
Power limit (POWER LIMIT)	Value (fixed)		Approx. 102 % of	rated output power				
Other Functions								
	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
Voltage Slew Rate	Becolution	mV	10	10	100	100	100	100
	Cetting younge	111V	0.1 to 690.0	0.01 to 280.00	0.01 to 120.00	0.01 to 90.00	0.001 to 60.000	0.001 to 40.000
Current slew rate	Setting range	A/S	0.1 10 680.0	0.01 10 280.00	0.01 18 120.00	0.01 10 80.00	0.001 10 80.000	0.001 18 40.000
	Resolution	mA	100	10	10	10	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. C	urrent, Shift Output.	Numeric Keypad		
Rotary knob			Turn the knob to	increase or decrease	the value	,,		
USB port			Type A USB conn	ector				
Programming and Measurement (Digital Interface)			.)portoob com					
	0.9/ 40 105 9/	v	0 += 94	0 to 210	0 40 525	0 += 797 5	0 to 1050	0 to 1575
	0 % 10 105 %	v	01084	010210	010323	010787.5	0 10 1050	0101373
Output current programming range	0 % to 105 %	A	0 to 357	U to 147	U 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 lo_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

hyper-baseUnit of the second seco	SPECIFICATIONS(PHU-10 kW Series)			
Normal part rangeNormaleNormale 189 Van 60.4 Van (Cover 200 Var / 200 Var)Maximum spica arows200 VacAVac Str. 197 APJ (2, 1)Maximum spica arows200 VacAVac Str. 197 APJ (2, 1)Maximum spica powerRedVac3.05Maximum spica powerRedVac1.05Maximum spica powerRedVac1.05Maximum spica powerRedVac1.05Maximum spica powerRedVac1.05Maximum spica powerRedVac1.05Maximum spica power	Input Characteristics for PHU-C Series			
inpa for agency araginginval47 Price 81 HzMaximum ingar convention260 YeeALess han 100 AMaximum ingar convention260 YeeYeeNoPaser factorRatel PoeorNoNoPoer factorRatel PoeorNoNoRider for HDSeriesNoNoRider factorRatel PoeorNoNoRider factorRatel PoeorNoNoRider factorRatel PoeorNoNoRider factorNoNoNoRider factorNo <t< td=""><td>Norminal input rating</td><td></td><td></td><td>3-Phase, 200 V models: 180 Vac to 265 Vac (Covers 200 Vac / 230 Vac)</td></t<>	Norminal input rating			3-Phase, 200 V models: 180 Vac to 265 Vac (Covers 200 Vac / 230 Vac)
Naming parameter20 Yac9 /a9 /a A (as year) (base)9 /a (as year) (base)Maximum ping poersIess year 1000> >0.05Bidlew poers20 Yac> >0.05Bidlew poers20 Yac> >0.05Bidlew poers20 Yac> >0.05Bidlew poers20 Yac> >0.05Strateging poers20 Yac> >0.05Type form20 Yac> >0.05Strateging poers20 Yac>>0.05Type form20 YacYacType form20 YacYacType form20 YacYacType form20 YacYacType form20 YacYacType form20 YacYacType form20 YacYac <tr<< td=""><td>Input frequency range</td><td></td><td></td><td>47 Hz to 63 Hz</td></tr<<>	Input frequency range			47 Hz to 63 Hz
insub normation200 yearALess Nan 10ANationan Ingue propertiesNateNanoNanoPoore factorNateNanoNanoPoore factorNateNanoNanoRefiscing (Mg)NanoNanoNanoRefiscing (Mg)NanoNanoNanoRefiscing (Mg)NanoNanoNanoRefiscing (Mg)NanoNanoNanoRefiscing (Mg)NanoNanoNanoRefiscing (Mg)NanoNanoNanoRefiscing (Mg)Nano <td< td=""><td>Maximum input current</td><td>200 Vac</td><td>A</td><td>56 A (L1), 32 A (L2, L3)</td></td<>	Maximum input current	200 Vac	A	56 A (L1), 32 A (L2, L3)
Main mippi pageVeVeVeVeRever fourRever-> 0.50-> 0.50Efficiency P1A200 Ve%80 to 9.40Redue fineID row growerImpet four four P1AID row growerImpet four four four four four four four four	Inrush current	200 Vac	A	Less than 100 A
Prove forcianPanel PowerPanel PowerBidensy ChildBite 34Bite 34Hidden printPanel Power PowerHidden prior Intege Characteristics for PHVD-SectorPMPanel Analyzationities for PHVD-SectorPMPMHight Analyzationities for PHVD-SectorPMPMHight Analyzationities for PHVD-SectorPMPMHight Analyzationities for PHVD-SectorPMPMHight Analyzationities for PHVD-SectorPMPMHight Analyzationities for PHVD-SectorPMPMHight Analyzationities for PHVD-SectorPMPMHight Analyzationities for PHVD-SectorPMPMHight Analyzationities for PHVD-SectorPMPMPhone ActorRada PowerPMPMHight Analyzationities for PHVD-SectorPMPMPhone ActorRada PowerPMPMHight Analyzationities for Phylope SectorPMPMHight Analyzationities for Phy	Maximum input power		VA	12000
filteday [Pi]4200 Yes5%8% 10.9Hidday Elion107 as orgatedHigher Elionactarities for PHU-D SeriesWormal algost rating123Phase, 400 y models' 342 Vate to 528 Vate (Covers 330,400,415)/440,4460,440 VadInput Carter400 VacA24 Phate 163 VacAMaximum Input corrent400 VacA24 Phate 163 VacAMaximum Input corrent400 VacA24 Status 0.4Less Nars 0.4Maximum Input corrent400 VacA28 N 19.4Nars 0.4Maximum Input poer600 VacA30 Tas orgatedHidday Elion400 VacA30 Tas orgatedHidday Elion700 Norgeted700 NorgetedHidday Elion700 Norgeted700 NorgetedState Analog700 Norgeted700 NorgetedHidday Elion700 Norgeted700 NorgetedHidday Elion700 Norgeted700 NorgetedState Analog Correl Interface700 Norgeted700 NorgetedState Analog Correl Interface700 Norgeted700 NorgetedPater Orgina700 Norgeted700 Norgeted	Power factor	Rated Power		> 0.95
Had-up (intermine)Ion on growterHourd Layer Landser Landser De PULO SeriesIon on growterNorminal layer rangeIonIon47 He to Site Var Var to Site Var (Covers 180/100/145/440/440/440 Var)Manium inpot current400 VecIon47 He to Site Var Var Var Site Var Var Var Site Var Var Var Var Var Var Var Var Var Var	Efficiency (*14)	200 Vac	%	86 to 94
input Characteristics for PHU-D Series         instrume           input Characteristics for PHU-D Series         Image Series 200 Yes         A Series 200 Yes	Hold-up time			10 ms or greater
Naminal piper tangeImage	Input Characteristics for PHU-D Series			
input forgency rangeinput forgency rangeinput forgency rangeinput forgency rangeinput forgencyMainimu input forgencyinput forgencyinput forgencyinput forgencyMainimu input forgencyRade Powerinput forgencyinput forgencyPower factorRade Powerinput forgencyinput forgencyBifficiency (Yi)400 Vacinput forgencyinput forgencyBifficiency (Yi)input forgencyinput forgency<	Norminal input rating			3-Phase, 400 V models: 342 Vac to 528 Vac (Covers 380/400/415/440/460/480 Vac)
Main input corrent40 VacAZA (11): 16. A (2. 13):Insub current40 VacALess has 50 AMain input powerVA12000Power factorRated Power50.Bildenry (14)40 Vac54.Bildenry (14)40 Vac54.Bildenry (14)40 Vac54.Bildenry (14)10 min or greaterInderka Capabilis10 min or greaterUSBInterface CapabilisState Carrol Interface10 min or greaterUSBInterface CapabilisState Carrol Interface10 min or greaterUSAInterface CapabilisUSAInterface CapabilisUSAInterface CapabilisUSA value programming10 min or greaterUSA value programming10 min or greaterValue programming10 min or greaterValue programming10 min or greaterValue programming10 min or greaterPad value programming10 min or g	Input frequency range			47 Hz to 63 Hz
Insula convent400 YacALess than 90 AMainum input powerRated Power> 0.95Power factorRated Power> 0.95Bower factorRated Power> 0.95Bower factorRated Power> 10 more greaterItelinetry (Y1)400 VacS87 ro.94Itelinetry (Y1)Allo VacS87 ro.94Itelinetry (Y1)Allo VacS87 ro.94Itelinetry (Y1)Allo VacS87 ro.94Itelinetry (Y1)Allo VacS87 ro.94Itelinetry (Y1)Allo VacS87 ro.94Itelinetry (Y1)Allo VacS87 ro.94Itelinetry (Y1)Allo VacS87 ro.94Itelinetry (Y1)Allo VacS87 ro.94Itelinetry (Y1)Allo VacS87 ro.94Itelinetry (Y1)Allo VacS87 ro.94Itelinetry (Y2)Allo VacS87 ro.94Itelinetry (Y2)Allo VacS97 ro.94Itelinetry (Y2)SS100 % ro.95Itelinetry (Y2)SS100 % ro.95	Maximum input current	400 Vac	A	28 A (L1), 16 A (L2, L3)
Maximum input power         VA         12000           Power factor         Read Power         > 0.935           Edicency (*14)         400 Vac         %         87 to 54           Idel or prime         ID ms or greater         Immediate         ID ms or greater           Interface Capabilities         Type A. Host, Type B. Slow, Speed: 1.1/2.0.USB Class. CDC(Communications Derice Class)           USB         ID         Maximum State	Inrush current	400 Vac	A	Less than 50 A
Power factor         Rated Power         > 0 95           Efficiency (Y4)         400 Yuc         %         37 to 54           Hold-up time         10 ms or greater         10 ms or greater           Interface Capabilities         90 Yuc / Yu, / Yu, P A. Hoat, Type B. Slava, Speed: 1.1/2.0. USB Class: CDC (Communications Device Class)           LAN         MAC Address, DNS IP Address, User Passend, Gareava IP Address, Isothered Mask           Land Analog Control Interface         MAC Address, DNS IP Address, User Passend, Gareava IP Address, Stohner Mask           Vari User Over OV to 10 V IV., Jun, / Lun, - 0 V to 5 V or 0 V to 10 V To 0 V Coursey: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun, or 0 V to 10 V Accuracy: 1 % of rated Vun Vun Vun Vun Vun Vun Vun Vun Vun Vun	Maximum input power		VA	12000
Efficiency (*14)     400 Vac     %     87 to 94       Hold-up time     10 ns or greater       Inderface Capabilities     10 ns or greater       USB     Image: Comparison of the stream of the stream of greater       Status     Image: Comparison of the stream of the str	Power factor	Rated Power		> 0.95
Held-up sime       ID mis or greater         interface Capabilities <ul> <li>Tope A: Host, Type B: Slave, Speed: 1.1/2.0, USB Class: CDC (Communications Device Class)</li> <li>MAC Address, DNS IP Address, Liser Password, Cateway IP Address, Subnet Mask</li> <li>MAC Address, DNS IP Address, Liser Password, Cateway IP Address, Subnet Mask</li> <li>Max Caddress, DNS IP Address, Liser Password, Cateway IP Address, Subnet Mask</li> <li>Var, (I, 0 V to S V or V to Io V)</li> <li>Var, (I, ov V to S V or V to Io V)</li> <li>Var voluge programming</li> <li>Verson V to 100 %, OV to S V Accuracy: 1 % of rated V<sub>aut</sub> or 0 V to Io V Accuracy: 1 % of rated V<sub>aut</sub></li> <li>Verson V to S V or V to Io V Accuracy: 1 % of rated V<sub>aut</sub> or 0 V to Io V Accuracy: 1 % of rated V<sub>aut</sub></li> <li>Post to IO %, OV to S V Accuracy: 1 % of rated V<sub>aut</sub> or 0 V to Io V Accuracy: 1 % of rated V<sub>aut</sub></li> <li>Post to Io V Accuracy: 1 % of rated V<sub>aut</sub></li> <li>Post rated P<sub>aut</sub></li> <li>Post to IO %, OV to S V Accuracy: 1 % of rated V<sub>aut</sub> or 0 V to IO V Accuracy: 1 % of rated V<sub>aut</sub></li> <li>Post rated P<sub>aut</sub></li> <li>Pos</li></ul>	Efficiency (*14)	400 Vac	%	87 to 94
Interface Capabilities         Type A: Host; Type B: Slave, Speed: 1.1/2.0, USB Class: CDC(Communications Device Class)           USB         M         Type A: Host; Type B: Slave, Speed: 1.1/2.0, USB Class: CDC(Communications Device Class)           LN         MAC Address, DNS IP Address, LISE Password, Cateway IP Address, Instrument IP Address, Subnet Mask           Value, Juling - O Vio 5 V or O Vio 10 VI Vium, Juling - O Vio 5 V or O Vio 10 VI         Market Address, Or O'B or	Hold-up time			10 ms or greater
USB         Image: Space Spa	Interface Capabilities		I	•
LAN         MAC Adderss, DNS IP Address, User Password, Cateway IP Address, Instrument IP Address, Subnet Mask           isolated Analog Control Interface         Vmr / Imm = 0 V to S V or 0 V to S V or 0 V to S V           isolated Analog Control Interface         Vmr / Imm = 0 V to S V or 0 V to S V or 0 V to S V           isolated Analog Control Interface         Vmr / Imm = 0 V to S V or 0 V to S V or 0 V to IO V Accuracy: 1 % of rated Imm           Vota Voltage programming         0 % to 100 %, 0V to S V Accuracy: 1 % of rated Imm           Not voltage programming         0 % to 100 %, 0V to S V Accuracy: 1 % of rated Imm           Notat Voltage programming         0 % to 100 %, 0V to S V Accuracy: 1 % of rated Imm           Notat Voltage programming         0 % to 100 %, 0V to S V Accuracy: 1 % of rated Imm           Notat Voltage programming         0 % to 100 %, 0V to S V Accuracy: 1 % of rated Imm           Notat Voltage norther         0 % to 100 %, 0V to S V accuracy: 1 % of rated Imm           Output unoltage norther         0 V to S V or 0V to 10 V. Accuracy: 1 % of rated Imm           Output current monitor         0 V to 5 V or 0V to 10 V. Accuracy: 1 % of rated Imm           Reference voltage         0 V to 5 V or 0V to 10 V. Accuracy: 1 %           Output current monitor         0 V to 5 V or 0V to 10 V. Accuracy: 1 %           Output current wonitor         0 V to 5 V or 0V to 10 V. Accuracy: 1 %           Output current wonitor         0 V to 5 V	USB			Type A: Host, Type B: Slave, Speed: 1.1/2.0, USB Class: CDC(Communications Device Class)
totalack Analog Control InterfaceImage: DescriptionImage: Description </td <td>LAN</td> <td></td> <td></td> <td>MAC Address, DNS IP Address, User Password, Gateway IP Address, Instrument IP Address, Subnet Mask</td>	LAN			MAC Address, DNS IP Address, User Password, Gateway IP Address, Instrument IP Address, Subnet Mask
Factory Option         RS-2328,485 or CPIB or CAN Bus or DeviceNet or isolated Digital I/O           Isolated Analog Control Interface         0% to 100 %, 0V to 5 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 0 V to 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> , and V to 0 V CV (C/C/C/AUVE) V OV OV to 0 V V to 0 V V	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
isolated Analog Control Interface         0% to 100%, 0V to 5 V Accuracy: ± 1% of rated V <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated V <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated V <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated V <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated V <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated V <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated V <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated V <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , or 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , the 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , the 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , the 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , the 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , the 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , the 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , the 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , the 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , the 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , the 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , the 0V to 10 V Accuracy: ± 1% of rated P <sub>out</sub> , the 0V to 10 V Accura	Factory Option			RS-232&485 or GPIB or CAN Bus or DeviceNet or Isolated Digital I/O
Valuation         0 % to 100 %, 0V to 5 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated V <sub>out</sub> load voltage programming         0 % to 100 %, 0V to 5 V Accuracy: ± 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated P <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated P <sub>out</sub> .           Pout voltage programming         0 % to 100 %, 0V to 5 V Accuracy: ± 1 % of rated P <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated P <sub>out</sub> .           Pout voltage programming         0 % to 100 %, 0V to 5 V Accuracy: ± 1 % of rated P <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated P <sub>out</sub> .           Chipty voltage regramming         0 % to 100 %, 0V to 5 V Accuracy: ± 1 % of rated P <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated P <sub>out</sub> .           Chipty voltage programming         0 % to 100 %, 0V to 5 V Accuracy: ± 1 % of rated P <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated P <sub>out</sub> .           Chipty voltage programming         0 % to 5 V or 0 V to 10 V, Accuracy: ± 1 % of rated P <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated P <sub>out</sub> .           Chipty voltage programming         0 % to 5 V or 0 V to 10 V, Accuracy: ± 1 % of rated P <sub>out</sub> .           Chipty voltage reference for 0 V to 5 V or 0 V to 10 V         10 V Accuracy: ± 1 % of rated P <sub>out</sub> .           Reference voltage         Voltage reference for 0 V to 5 V or 0 V to 10 V           Alarn Input         Turn of the PHU output with a High (4.5 V to 5 V)           Output on/off control         Clear alarms with a High (4.5 V to 5 V)           Voltage reference for 0 V to 5 V or 5 V or 5 V or 0 V to 10 V, Accu	Isolated Analog Control Interface		1	
Iou voluge programming         Iou % to 100 %, 0 V to 5 V Accuracy: ± 1 % of rated I <sub>unc</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated I <sub>unc</sub> Pout voltage programming         Iou % to 100 %, 0 V to 5 V Accuracy: ± 1 % of rated I <sub>unc</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated I <sub>unc</sub> Internal resistance voltage monitor         Iou % to 100 %, 0 V to 5 V Accuracy: ± 1 % of rated I <sub>unc</sub> , or 0 V to 10 V Accuracy: ± 1 % of maximum R <sub>unt</sub> Output voltage monitor         Iou % to 100 %, 0 V to 5 V Accuracy: ± 1 % of rated I <sub>unc</sub> , or 0 V to 10 V Accuracy: ± 1 % of maximum R <sub>unt</sub> Output voltage monitor         Iou % to 5 V or 0 V to 10 V, Accuracy: ± 1 %           Reference voltage         Iou % to 5 V or 0 V to 10 V, Accuracy: ± 1 %           Atarm Input         Iou % to 5 V or 0 V to 10 V, Accuracy: ± 1 %           Atarm chever voltage         Iou % to 5 V or 0 V to 10 V, Accuracy: ± 1 %           Output voltage reference for 0 V to 5 V or 0 V to 10 V         Iou maximum R <sub>unt</sub> Output voltage reference for 0 V to 5 V or 0 V to 10 V         Iou maximum R <sub>unt</sub> Output voltage reference for 0 V to 5 V or 0 V to 10 V         Iou maximum R <sub>unt</sub> Output voltage reference for 0 V to 5 V or 0 V to 10 V         Iou maximum R <sub>unt</sub> Output voltage reference for 0 V to 5 V or 0 V to 10 V         S V to 5 V or 0 V to 0 V or 0 V to 0 V or 0 V to 0 V or 0 V to 0 V or 0 V to 0 V or 0 V to 0 V or 0 V to 0 V or 0 V or 0 V to 0 V or 0 V to 0 V or 0 V to 0 V or or or or or or or or or or or or or	Vout voltage programming			0 % to 100 %, 0V to 5 V Accuracy: $\pm$ 1 % of rated V <sub>out</sub> , or 0 V to 10 V Accuracy: $\pm$ 1 % of rated V <sub>out</sub>
Pair voltage programming         Image: Constraint of the Philos Accuracy: ± 1% of rated P <sub>aut</sub> , or 0 V to 10 V Accuracy: ± 1% of rated P <sub>aut</sub> Output voltage monitor         0 % to 100 %, 0 V to 5 V Accuracy: ± 1% of rated P <sub>aut</sub> , or 0 V to 10 V Accuracy: ± 1% of maximum R <sub>ine</sub> , or 0 V to 10 V Accuracy: ± 1% of maximum R <sub>ine</sub> , or 0 V to 10 V Accuracy: ± 1% of maximum R <sub>ine</sub> , or 0 V to 10 V Accuracy: ± 1% of maximum R <sub>ine</sub> , or 0 V to 10 V Accuracy: ± 1%           Output voltage monitor         0 V to 5 V or 0 V to 10 V, Accuracy: ± 1%           Output voltage monitor         0 V to 5 V or 0 V to 10 V, Accuracy: ± 1%           Reference voltage         Voltage reference for 0 V to 5 V or 0 V to 10 V           Alarm loat         1         Turn of the PHU output with a High (45 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 LOW (0V to 0.5 V)           Output on/off control         Clear alarms with a High (4.5 V to 5 V)           CV/CC/CP/ALM/PW ON/OUT ON indicator         Photocoupler open collector output; Maximum voltage 30 V, maximum sink current 8 mA           Environmental Conditions         0 °C to 50 °C           Operaing temperature         0 °C to 50 °C           Storage temperature         20 % to 8 % RH; No condensation           Altude         20 % to 8 % RH; No condensation           Altude         0 % RH or less; No condensation           Storage humidity <td>lout voltage programming</td> <td></td> <td></td> <td>0 % to 100 %, 0 V to 5 V Accuracy: ± 1 % of rated I<sub>out</sub>, or 0 V to 10 V Accuracy: ± 1 % of rated I<sub>out</sub></td>	lout voltage programming			0 % to 100 %, 0 V to 5 V Accuracy: ± 1 % of rated I <sub>out</sub> , or 0 V to 10 V Accuracy: ± 1 % of rated I <sub>out</sub>
Internal residence voltage programming         O% to 100 %, 0 V to 5 V Accuracy: ± 1% of maximum R <sub>int</sub> or 0 V to 10 V Accuracy: ± 1% of maximum R <sub>int</sub> Output voltage monitor         I         0 V to 5 V or 0 V to 10 V, Accuracy: ± 1%           Output current monitor         I         0 V to 5 V or 0 V to 10 V, Accuracy: ± 1%           Reference voltage         I         Voltage reference for 0 V to 10 V, Accuracy: ± 1%           Alarn Input         I         Voltage reference for 0 V to 0 V or 0V to 10V           Alarn Input         I         Turn off the PHU output with a High (4.5 V to 5 V)           Output on/off control         I         Possible logic selections: Turr the output on using a LOW (0 V to 0.5 V) or open-circuit, turn the output off using a HIGH (4.5 V to 5 V)           Alarn clear control         I         Clear alarms with a High (4.5 V to 5 V)           CV/CC/CP/ALM/PWR ON/OUT ON indicator         I         Clear alarms with a High (4.5 V to 5 V)           Poraing Itemperature         I         I C Clear alarms with a High (4.5 V to 5 V)           Storage temperature         I         I C Clear alarms with a High (4.5 V to 5 V)           Storage temperature         I         I C Clear alarms with a High (4.5 V to 5 V)           Storage temperature         I         I C Clear Information           Gueral bundity         I         I C Co To <sup>1</sup> C           Storage	Pout voltage programming			0 % to 100 %, 0 V to 5 V Accuracy: ± 1 % of rated P <sub>outh</sub> or 0 V to 10 V Accuracy: ± 1 % of rated P <sub>outh</sub>
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         0 V to 5 V or 0 V to 10 V, Accuracy: ± 1 %           Alarn Input         Voltage reference for 0 V to 5 V or 0 V to 10 V           Alarn 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 HICH (4.5 V to 5 V) or open-circuit           Alarn clear control         Clear alarms with a High (4.5 V to 5 V)           CV/C/C/CP/ALM/PKR ON/OUT ON indicator         Postoccupier open collector output; Maximum voltage 30 V, maximum sink current 8 mA           Environmental Conditions         0 ° C to 50 ° C           Storage temperature         0 ° C to 50 ° C           Storage temperature         -25 ° C to 70 ° C           Operating temperature         0 ° C to 50 ° C           Storage temperature         -25 ° C to 70 ° C           Operating humidity         20 % to 85 % RH; No condensation           Storage temperature         -25 ° C to 70 ° C           Operating humidity         -20 % to 85 % RH; No condensation           Bittude         Maximum 200 m           General Specifications         Maximum 200 m           W	Internal resistance voltage programming			0 % to 100 %, 0 V to 5 V Accuracy: ± 1 % of maximum R <sub>int</sub> , or 0 V to 10 V Accuracy: ± 1 % of maximum R <sub>int</sub>
Output current monitor         Image: Main monitor         Output current monitor           Reference voltage         Image: Main monitor         Voltage reference for V to 5 V or 0 V to 10V           Alarm Input         Image: Main monitor         Turn off the PHU output with a High (4.5 V to 5 V)           Output only off control         Image: Main monitor         Turn the output on using a LOW (0 V to 0.5 V) or owher-circuit, turn the output off using a HIGH (4.5 V to 5 V)           Output only off control         Image: Main monitor         Image: Main monitor           Alarm clear control         Image: Main monitor         Image: Main monitor           Over cycle/CP/LMM/PWR ON/OUT ON indicator         Image: Main monitor         Photocoupler open collector output; Maximum voltage 30 V, maximum sink current 8 mA           Environmental Conditions         Image: Main monitor         Image: Main monitor         Image: Main monitor           Operaing turne/perature         Image: Main monitor         Image: Main monitor         Image: Main monitor           Storage turne/monitor         Image: Main monitor         Image: Main monitor         Image: Main monitor           Storage turne/monitor         Image: Main monitor         Image: Main monitor         Image: Main monitor           Storage turne/monitor         Image: Main monitor         Image: Main monitor         Image: Main monin Main monin Main monitor           St	Output voltage monitor			0 V to 5 V or 0 V to 10 V, Accuracy: ± 1 %
Reference voltage         Image: Month of the PHU output with a High (4.5 V to 5 V)           Alarm Input         Turn of 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 (0V to 0.5 V) or short-circuit, turn the output off using a HICH (4.5 V to 5 V) or open-circuit Turn the output on using a LOW (0V to 0.5 V) or short-circuit, turn the output off using a LOW (0V to 0.5 V) or open-circuit           Alarn clear control         Clear alarms with a High (4.5 V to 5 V)           CV/C/C/CP/ALM/PWR ON/OUT ON indicator         Photocoupler open collector output; Maximum voltage 30 V, maximum sink current 8 mA           Environmental Conditions         0 ° C to 50 °C           Storage temperature         0 ° C to 50 °C           Storage temperature         20 % to 85 % RH; No condensation           Storage temperature         0 % RH or less; No condensation           Storage temperature         90 % RH or less; No condensation           Bittude         0 % Maximum 2000 m           Ceneral Specifications         Waiximum x130 mm × 675 mm           Cooling         Imm A 442 mm × 130 mm × 675 mm           Cooling         Forced air cooling by internal fan           EMC         Complex with the European LOW circuits and AC input; AC input and output terminal; AC 1500 V or DC 2130 V 1 minute           Kithstand voltage         Complies with the European LOW circuits and AC input; AC inpu	Output current monitor			0 V to 5 V or 0 V to 10 V, Accuracy: ± 1 %
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 HGH (4.5 V to 5 V) or open-circuit Turn the output on using a HGH (4.5 V to 5 V) or open-circuit, turn the output off using a LOW (0V to 0.5 V)           Alarm clear control         C         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         0 ° C to 50 ° C           Operaing temperature         0 ° C to 50 ° C           Storage temperature         20 % to 85 % RH; No condensation           Storage temperature         20 % to 85 % RH; No condensation           Storage temperature         90 % RH or less; No condensation           Storage temperature         10 % Rg           Dignations (WxHxD)         10 % Rg           Dimensions (WxHxD)         10 % Rg           Dimensions (WxHxD)         mm           Main unit only         kg           Exercited air cooling by internal fan           Cooling         Forced air cooling by internal fan           EMC         Complies with the European Low Voltage Directive 73/23/EEC for Class A test and measurement products           Safety         Complies with the Eur	Reference voltage			Voltage reference for 0 V to 5V or 0 V to 10V
Output on/off controlPossible logic selections: Tur 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 Turn the output on using a HIGH (4.5 V to 5 V) or short-circuit, turn the output off using a LOW (0V to 0.5 V) or short-circuit Turn the output on using a HIGH (4.5 V to 5 V)Alarm clear controlClear alarm swith a High (4.5 V to 5 V) Photocoupler open collector output; Maximum voltage 30 V, maximum sink current 8 mAEnvironmental Conditions0 °C to 50 °COperating temperature0 °C to 50 °CStorage temperature0 °C to 50 °COperating turnitity0 °C to 50 °COperating turnit	Alarm Input			Turn off the PHU output with a High (4.5 V to 5 V)
Alarn clear controlIndex <th< td=""><td>Output on/off control</td><td></td><td></td><td>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</td></th<>	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
CV/CC/CP/ALM/PWR ON/OUT ON indicatorIndicatorEnvironmental ConditionsPoperaing temperatureIndicatorOperaing temperatureIndicatorStorage temperatureIndicatorStorage temperatureIndicatorOperating humidityIndicatorStorage humidityI	Alarm clear control			Clear alarms with a High (4.5 V to 5 V)
Environmental Conditions         Operaing temperature       Image: I	CV/CC/CP/ALM/PWR ON/OUT ON indicator			Photocoupler open collector output; Maximum voltage 30 V, maximum sink current 8 mA
Operaing temperatureInterfact on the series of	Environmental Conditions			
Storage temperatureInterfact Section 2Section 2 </td <td>Operaing temperature</td> <td></td> <td></td> <td>0 °C to 50 °C</td>	Operaing temperature			0 °C to 50 °C
Operating humidityIncome InstanceIncome InstanceStorage humidityIncome InstanceIncome InstanceAltitudeIncome InstanceIncome InstanceCeneral SpecificationsMain unit onlyMgIncome InstanceWeighMain IntonlyMgIncome InstanceDimensions (WxHxD)Income InstanceIncome InstanceCoolingIncome InstanceForced air cooling by internal fanEMCIncome InstanceComplies with the European EMC directive 89/336/EEC for Class A test and measurement productsSafetyIncome InstanceComplies with the European EMC directive 73/23/EEC and carries the CE-markingWithstand voltageIncome InstanceIncome InstanceInsulation resistanceIncome InstanceIncome Instance	Storage temperature			-25 °C to 70 °C
Storage humidityInformationInformationInformationAltitudeInformationMaximum 2000 mGeneral SpecificationsWeightMain nit onlyMgInformationDimensions (WxHxD)MainMgInformationCoolingInformationMinInformationEMCInformationInformationInformationSafetyInformationInformationComplies with the European EuroPoly Safet Conclusts Atest and measurement productsWithstand voltageInformationInformationInformationInsulation resistanceInformationInformationInformationInsulation resistanceInformationInformationInformationInsulation resistanceInformationInformationInformationInsulation resistanceInformationInformationInformationInsulation resistanceInformationInformationInformationInsulation resistanceInformation	Operating humidity			20 % to 85 % RH; No condensation
Altiade         Image: Maximum 2000 m           General Specifications         Main unit only         Mg         Seas than 30.5 kg           Weight         Main unit only         Mg         Seas than 30.5 kg           Dimensions (WxHxD)         Mm         Add 2 mm x 130 mm x 675 mm           Cooling         Mm         General Specifications         Forecal ariso for cooling by internal fan           Sease         Gomplies with the European EMC directive 89/336/EEC for Class A test and measurement products         Seaset           Safety         Gomplies with the European Low Voltage Directive 73/23/EEC and carries the CE-marking         Complies with the European Low Voltage Directive 73/23/EEC and carries the CE-marking           Nublation resistance         Gomplies         Gomplies with the European Low Voltage Directive 73/24/EEC and carries the CE-marking	Storage humidity			90 % RH or less; No condensation
General Specifications           Weight         Main unit only         kg         Less than 30.5 kg           Dimensions (WxHxD)         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)	Altitude			Maximum 2000 m
Weight         Main unit only         kg         Less than 30.5 kg           Dimensions (WxHxD)         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         Image: Classis and output terminal; chassis and AC input; AC input and output terminal: AC 1500 V or DC 2130 V 1 minute           Insulation resistance         Image: Classis and output terminal; chassis and AC input; AC input and output terminal: 100 MΩ or more (DC 500 V)	General Specifications			
Dimensions (Wx HxD)         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         Image: Classis and output terminal; chassis and AC input; AC input; and output terminal: AC 1500 V or DC 2130 V 1 minute           Insulation resistance         Image: Classis and output terminal; chassis and AC input; AC input; and output terminal: 100 MΩ or more (DC 500 V)	Weight	Main unit only	kg	Less than 30.5 kg
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)	Dimensions (W×H×D)		mm	442 mm × 130 mm × 675 mm
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)	Cooling			Forced air cooling by internal fan
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)	ЕМС			Complies with the European EMC directive 89/336/EEC for Class A test and measurement products
Withstand voltage         Chassis and output terminal; chassis and AC input; 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; AC input and output terminal: 100 MΩ or more (DC 500 V)	Safety			Complies with the European Low Voltage Directive 73/23/EEC and carries the CE-marking
Insulation resistance Chassis and output terminal; chassis and AC input; AC input and output terminal: 100 MΩ or more (DC 500 V)	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 M $\Omega$ or more (DC 500 V)

Notes:

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(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			2.72	2.0		5		,
	1		0	20	FO	75	100	150
Line regulation (*3) [0.01 % of vo_rated]		mv	8	20	30	/3	100	130
Load regulation ("4) [0.02 % of Vo_rated]	(10)	mv	16	40	100	150	200	300
Ripple and noise (*5)	р-р (**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 fron	n rated output voltage	e, following 30 minute	s warm-up.	1	
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 (x9)	Rated load	ms	80	80	80	80	80	80
rai une (*9)	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 lo rated]		mA	510	210	90	60	45	30
Ripple and noise (*12)	rms	mΔ	510	150	48	48	26	26
Temperature coefficient		nnm/°C	100 ppm/°C from	a rated output current	t following 30 minutes	warm-up	1 20	
Protection Function		phu).C	iou pprii/ C fron	r aleu output curren	r, ronowing 30 minute	s warm-up.		
		- v	E 00.1/1 00.00.1/	E 00.141 000 00.14	5 00 V/ 550 00 V/	5 0.14 005 0.14	5 0 1/1 - 1100 0 1/	5 0 V 4 1650 0 V
Over voltage protection (OVP)	Setting range	V	5.00 V to 88.00 V	3.00 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	Α	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
Linder cuttent limit (LICL)	Setting range	Δ	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
	Our ange		Turn the output	0.00 A to 220.50 A	0.00 A to 54.50 A	0.00 A 10 05.00 A	0.000 A to 47.250 A	0.000 A to 51.500 A
Power unit fail (PDF)	Operation			on.				
Incorrect sensing connection protection (SENSE)	Operation		Turn the output	ott.				
Low AC input protection (AC-FAIL)	Operation		Turn the output	off.				
Shutdown (SD)	Operation		Turn the output	off.				
Perver limit (POWER LIMIT)	Operation		Over power limit					
Power limit (POwer Limit)	Value (fixed)		Approx. 102 % of	frated output power				
Other Functions								
	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
Voltage Slew Rate	Resolution	mV	10	10	100	100	100	100
	Setting range	Als	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
Current slew rate	Desclution	~//3	100	10	10	10	10	0.001 10 00.000
	Resolution	mA	100	10	10	10	10	
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		1						
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 Evit	Clear, Enter Lock C	urrent. Shift Output	Yumeric Kevpad		
Potany knob			Turn the leash to	increase or decrease	the value	samene keypau		
			Turn the knob to	increase or decrease	uie value.			
USB port			Type A USB conr	lector				
Programming and Measurement (Digital Interface)		1			1		1	-
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 %	Α	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 lo rated]		mA	1020	420	180	120	90	60
Output nower programming accuracy [1 0/ of Do vot-1			150	150	150	150	150	150
Output power programming accuracy [1 /0 of Po_rated]		w	100	130	100	100	100	100
Output voltage programming resolution		mv	10	10	10	-	- 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
			1	1	1	1	1	1

SPECIFICATIONS(PHU-15 kW Series)			
Input Characteristics for PHU-C Series			
Norminal input rating			3-Phase, 200 V models: 180 Vac to 265 Vac (Covers 200 Vac / 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: $\pm$ 1 % of rated V <sub>out</sub> , or 0~10 V Accuracy: $\pm$ 1 % of rated V <sub>out</sub>
lout voltage programming			0 % to 100 %, 0 V to 5 V Accuracy: $\pm$ 1 % of rated I $_{out}$ or 0 V to 10 V Accuracy: $\pm$ 1 % of rated I $_{out}$
Pout voltage programming			0 % to 100 %, 0 V to 5 V Accuracy: $\pm$ 1 % of rated P <sub>out</sub> , or 0 V to 10 V Accuracy: $\pm$ 1 % of rated P <sub>out</sub>
Internal resistance voltage programming			0 % to 100 %, 0 V to 5 V Accuracy: $\pm$ 1 % of maximum R <sub>int</sub> , or 0 V to 10 V Accuracy: $\pm$ 1 % of maximum R <sub>int</sub>
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 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 × 130 mm × 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 M $\Omega$ 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.

#### **ORDERING INFORMATION**

					_						
	5 kW		5 kW			10 kW			15 kW		
	80 V, 170 A, 5000 W Programmable DC Power Supply			80 V, 340 A, 10,000 W Programmable DC Power Supply	1 [		80 V, 510 A, 15,000 W Programmable DC Power Supply				
PHU 80-170	PHU 80-170-C (Input Voltage 3P3W 200 V)		PHU 80-340	PHU 80-340-C (Input Voltage 3P3W 200 V)		PHU 80-510	PHU 80-510-C (Input Voltage 3P3W 200 V)				
	PHU 80-170-D (Input Voltage 3P4W 380 V)			PHU 80-340-D (Input Voltage 3P4W 380 V)			PHU 80-510-D (Input Voltage 3P4W 380 V)				
	200 V, 70 A, 5000 W Programmable DC Power Supply	I		200 V, 140 A, 10,000 W Programmable DC Power Supply	1		200 V, 210 A, 15,000 W Programmable DC Power Supply				
PHU 200-70	PHU 200-70-C (Input Voltage 3P3W 200 V)		PHU 200-140	PHU 200-140-C (Input Voltage 3P3W 200 V)		PHU 200-210	PHU 200-210-C (Input Voltage 3P3W 200 V)				
	PHU 200-70-D (Input Voltage 3P4W 380 V)			PHU 200-140-D (Input Voltage 3P4W 380 V)			PHU 200-210-D (Input Voltage 3P4W 380 V)				
	500 V, 30 A, 5000 W Programmable DC Power Supply	I		500 V, 60 A, 10,000 W Programmable DC Power Supply	1 [		500 V, 90 A, 15,000 W Programmable DC Power Supply				
PHU 500-30	PHU 500-30-C (Input Voltage 3P3W 200 V)		PHU 500-60	PHU 500-60-C (Input Voltage 3P3W 200 V)		PHU 500-90	PHU 500-90-C (Input Voltage 3P3W 200 V)				
	PHU 500-30-D (Input Voltage 3P4W 380 V)			PHU 500-60-D (Input Voltage 3P4W 380 V)			PHU 500-90-D (Input Voltage 3P4W 380 V)				
	750 V, 20 A, 5000 W Programmable DC Power Supply	I		750 V, 40 A, 10,000 W Programmable DC Power Supply	1		750 V, 60 A, 15,000 W Programmable DC Power Supply				
PHU 750-20	PHU 750-20-C (Input Voltage 3P3W 200 V)		PHU 750-40	PHU 750-40-C (Input Voltage 3P3W 200 V)		PHU 750-60	PHU 750-60-C (Input Voltage 3P3W 200 V)				
	PHU 750-20-D (Input Voltage 3P4W 380 V)			PHU 750-40-D (Input Voltage 3P4W 380 V)			PHU 750-60-D (Input Voltage 3P4W 380 V)				
	1000 V, 15 A, 5000 W Programmable DC Power Supply	I		1000 V, 30 A, 10,000 W Programmable DC Power Supply	1		1000 V, 45 A, 15,000 W Programmable DC Power Supply				
PHU 1000-15	PHU 1000-15-C (Input Voltage 3P3W 200 V)		PHU 1000-30	PHU 1000-30-C (Input Voltage 3P3W 200 V)		PHU 1000-45	PHU 1000-45-C (Input Voltage 3P3W 200 V)				
	PHU 1000-15-D (Input Voltage 3P4W 380 V)			PHU 1000-30-D (Input Voltage 3P4W 380 V)			PHU 1000-45-D (Input Voltage 3P4W 380 V)				
	1500 V, 10 A, 5000 W Programmable DC Power Supply			1500 V, 20 A, 10,000 W Programmable DC Power Supply	1 [		1500 V, 30 A, 15,000 W Programmable DC Power Supply				
PHU 1500-10	PHU 1500-10-C (Input Voltage 3P3W 200 V)		PHU 1500-20	PHU 1500-20-C (Input Voltage 3P3W 200 V)		PHU 1500-30	PHU 1500-30-C (Input Voltage 3P3W 200 V)				
	PHU 1500-10-D (Input Voltage 3P4W 380 V)			PHU 1500-20-D (Input Voltage 3P4W 380 V)			PHU 1500-30-D (Input Voltage 3P4W 380 V)				

#### ACCESSORIES

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

OPTIONAL			
PHU-IF01 PHU-IF02 PHU-IF03 PHU-IF04 PHU-IF05 PHU-IF06	GPIB interface RS-232&RS-485 interface card (RJ45) Isolated Digital interface card CANbus interface card DeviceNet interface card Anybus Riser card		
OPTIONAL	ACCESSORIES		
PHU-PC01 PHU-PC02 PHU-PC03 PHU-PC04 PHU-PC05 PHU-PC06 PHU-PC07 DHU PC07	Parallel operation cable kit for 2 units x 1 Parallel operation cable kit for 3 units x 1 Parallel operation cable kit for 4 units x 1 Parallel operation cable kit for 5 units x 1 Parallel operation cable kit for 6 units x 1 Parallel operation cable kit for 7 units x 1 Parallel operation cable kit for 8 units x 1 Parallel operation cable kit for 8 units x 1	GTL-133 GTL-218 GTL-219 GTL-220 GTL-221 GTL-222 GTL-223	Load cable, 1.5 m, 100 A Load cable, 1.5 m, 200 A Load cable, 3 m, 200 A Load cable, 1.5 m, 300 A Load cable, 3 m, 300 A Load cable, 1.5 m, 400 A Load cable, 3 m, 400 A
PHU-PC08 PHU-PC09 GPW-021	Parallel operation cable kit for 9 units x 1 Parallel operation cable kit for 10 units x 1 Input power cord, 10 AWG/4C, 3 m, UL/CSA (PHU-C-5kW, PHU-D-5kW Input power cord, 6 AWG/4C, 3 m, UL/CSA (PHU-C-10kW, PHU-C-15kW	/, PHU-D-10k	w, PHU-D-15kW)
01 11 1022		** )	

Specifications subject to change without notice. PHU\_E\_BH1-202503



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