GW Instek

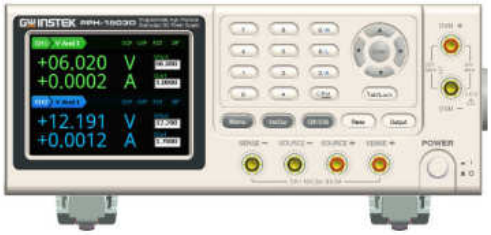
PPH-1506D/PPH-1510D Programmable High Precision DC Power Supply

New Product Announcement

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

GW INSTEK
Simply Reliable

GW Instek introduces PPH-1506D/1510D programmable high precision dual-channel DC power supply. Both CH1s of PPH-1506D and PPH-1510D have the same total power output of 45W and provide dual operational ranges from 0 to 15V/ 0 to 3A or 0 to 9V/ 0 to 5A. Both CH2s provide 0 to 12V/ 0 to 3A with the power output of 36W. It's worth noticing that PPH-1510D provides 10A current output capacity in rear terminals if the CH1 output voltage operates from 0V to 4.5V.



The high precision measurement capability of both PPH-1506D and PPH-1510D achieves the maximum resolution of 1mV/0.1μA and the smallest pulse current width of 33μs that satisfy customers' measurement application requirements of high resolution and pulse current. Fast load current variation will result in voltage sag for general power supplies that will have an impact on DUT' s internal circuit operation. PPH-1506D and PPH-1510D are equipped with the excellent transient recovery time, which can, in less than 40μs, recover the output voltage to within 100mV of the previous voltage output when the current level changes from 10% to 100% of the full scale. Furthermore, conventional power supplies do not have sufficient response speed to promptly respond to set voltage value once the set voltage is changed. PPH-1506D and PPH-1510D have a rise time of 0.2ms and a fall time of 0.3ms, which are 100 times faster than that of conventional power supplies. Therefore, PPH-1506D and PPH-1510D can provide DUT with a stable output voltage even when DUT is operating under large transient current output. The internal high-speed sampling circuit design of PPH-1506D and PPH-1510D, with the sample rate of 64K, can conduct pulse current measurement without using a current probe and oscilloscope. The current read back accuracy is 0.2%+1μA (equals to 11μA) at 5mA range, and the read back resolution is 0.1μA that allow DUT to be measured with a high accuracy level. Unlike batteries, general power supplies, which do not have the characteristics of fast transient recovery time, can not maintain a stable power supply for cellular phone, wireless device, and wearable device which produce large transient pulse current load for hundreds of μs to dozens of ms when in use. PPH-1506D and PPH-1510D, different from general power supplies, have the characteristics of fast transient recovery time. While simulating battery to output pulse current, PPH-1506D and PPH-1510D can quickly compensate the voltage drop caused by pulse current. Both of the CH1 have the built-in battery simulation function, which can define output impedance settings so as to accurately simulate battery' s impedance characteristics during battery discharge. Fast transient recovery time and built-in battery simulation function together facilitate PPH-1506D and PPH-1510D to accurately simulate battery' s real behavior pattern so as to conduct product tests.

PPH-1506D and PPH-1510D are not only suitable for simulating battery, charger and supplying power to DUT, but also ideal for simulating an electronic load to conduct discharge tests with their sink current capability. The sink current function allows PPH-1506D and PPH-1510D to simulate a voltage source with the sink current capability. For PPH-1506D and PPH-1510D, the maximum sink current for both CH1s is 3.5A, whilst it' s 3A for both CH2s. Long integration current measurement can be utilized to conduct average current measurement for periodical pulse current in a long period of time that is applied to analyze power consumption for a period of time. One of the applications is to measure the average power consumption of a cellular phone in use so as to conduct the internal RF module parameter analysis. The maximum pulse current measurement range of CH1 is 5A and for CH2 is 3A. The built-in sequence function of CH1 provides users with 1000 steps to edit sequential outputs, including voltage, current and execution time. The built-in DVM function of CH2 has a voltage range from 0 to +20VDC that saves users the cost of purchasing an additional voltage meter.

PPH-1506D and PPH-1510D provide OTP function and show heat sink temperature on the upper right corner of the display screen. Other than that, features such as five sets of system setting values for the SAVE/RECALL function, 10 sets of Power On Setup Settings, Key-Lock function to prevent unauthorized inputs, temperature-controlled fan to reduce noise, hardcopy to save screen information, and external relay control device together augment usability of both PPH-1506D and PPH-1510D. PPH-1506D and PPH-1510D support test requirements of Profile1, Profile2 and Profile3 from USB Power Delivery(PD) constructed by USB-IF association.

Features

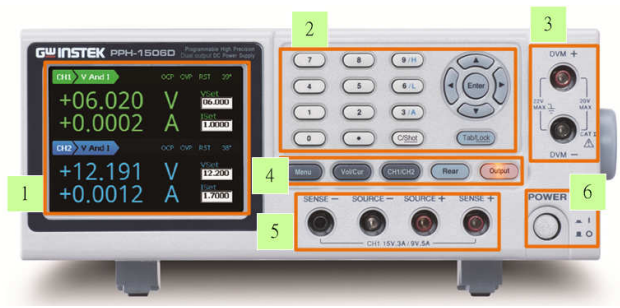
- 3.5" TFT LCD Display
- High Measurement Resolution: 1mV / 0.1μA for 5mA range.
- Transient Recovery Time: ≦40μS within 100mV; <80μs within 20mV
- Current Sink Function
- Pulse Current Measurement(Pulse width min.: 33μs)
- Long Integration Current Measurement
- Built-in DVM Measurement Function
- Sequence Function(Sequence Power Output)
- Built-in Battery Simulation Function(CH1)
- OVP, OCP, OTP & Temperature Display for Heat Sink
- Support USB(Device & Host)/ GPIB/ LAN
- Five Groups of Save/ Recall Setting
- External Relay Control

Customers and Applications

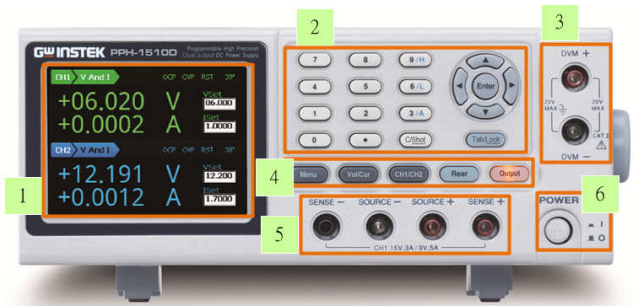
Customers	Applications
Mobile communications device industry Semiconductor industry Consumer electronics industry Energy storage device industry	● Pulse current measurement and battery simulation function for blue tooth, wearable device and mobile communications device. ● High precision low power consumption component applications (eg. Laser Diode, IC) ● Charge and discharge applications for battery, mobile power pack. ● 3C electronic product test

Appearance

Front panel

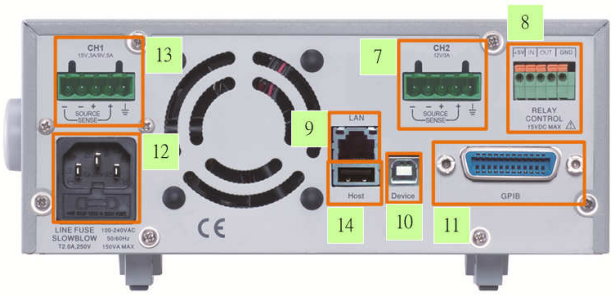


PPH-1506D

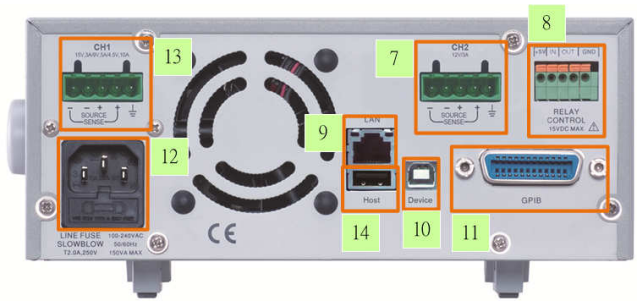


PPH-1510D

Rear panel



PPH-1506D



PPH-1510D

Front panel	Rear panel
1. LCD Display	7. CH2 Output
2. Operation Keys	8. External Relay Control Port
3. Voltmeter Terminals(DVM)	9. LAN Port
4. Function Keys	10. USB Port(Device)
5. Output Terminals(Source and Sense)	11. GPIB Port
6. Power On/Off Switch	12. AC Power Socket and Fuse
	13. CH1 Output
	14. USB Port(Host)

Important Information of Product Ordering

Key Dates for Product Announcement

NPI release and Global Market Announcement (Nov 5, 2018)

Service Policy

1. PPH-1506D/ PPH-1510D High Precision Programmable DC Power Supplies carry one year warranty.
2. Contact GW Instek Service Department for maintenance information.

Ordering Information

- PPH-1506D (CH1: 0~15V/0~3A or 0~9V/0~5A; CH2: 0~12V/0~3A) High Precision Dual Channel Output DC Power Supply
- PPH-1510D (CH1: 0~15V/0~3A or 0~9V/0~5A, 0~4.5V/0~10A(Rear terminal); CH2: 0~12V/0~3A) High Precision Dual Channel Output DC Power Supply

Standard Accessories

CD (User Manua), Quick Start manual x1

Power cord(Region dependent)

Test lead GTL-207A x1,
GTL-203A x1,
GTL-204A x1

Optional Accessories

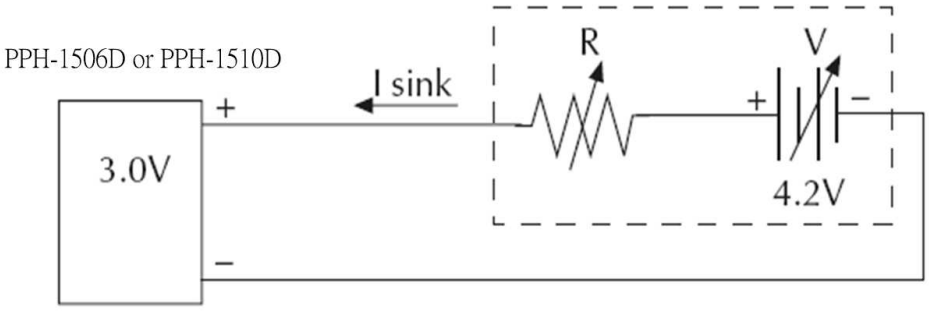
USB Cable GTL-246 USB 2.0 A-B type

Detailed Product Information

Detailed Descriptions for Features

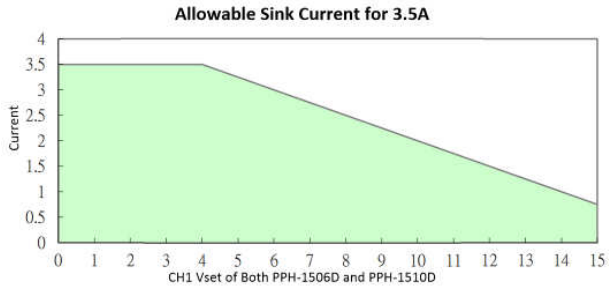
Sink Current Function

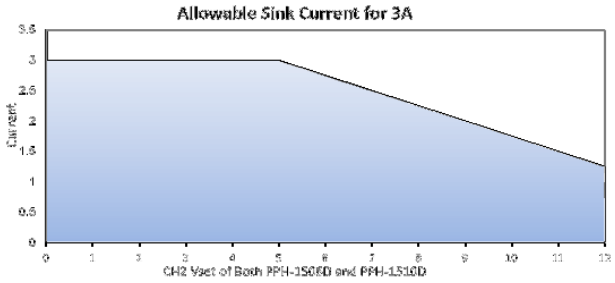
When connecting with an electric potential circuit and the output voltage of the tested electric potential circuit is greater than that of PPH-1506D or PPH-1510D by approximately 0.3V to 2.5V, PPH-1506D or PPH-1510D will automatically convert its power supply role to the sink current role acting as a load of voltage source. At this time, the voltage setting of PPH-1506D or PPH-1510D can be regarded as the CV setting of an electronic load. A single PPH-1506D or PPH-1510D can be used to charge battery and to simulate battery' s load to consume power without extra instruments. They are ideal for tests on battery and portable charger.



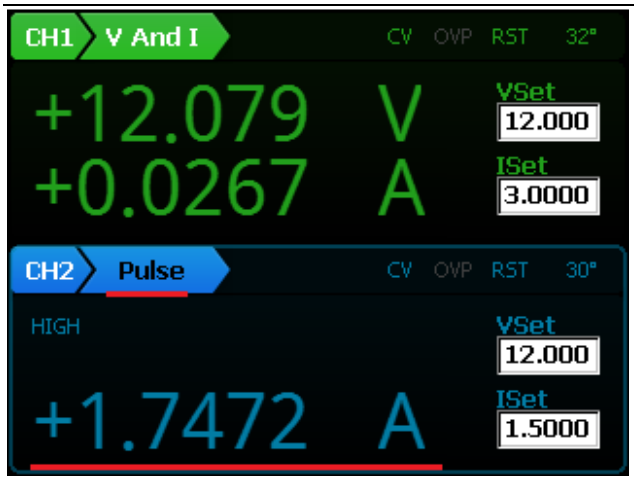
Connection diagram for either PPH-1506D or PPH-1510D and an electrical potential circuit

The following diagrams show voltage setting values and allowable sink current for CH1 and CH2 of PPH-1506D or PPH-1510D:





Pulse Current Measurement



Pulse Current Measurement

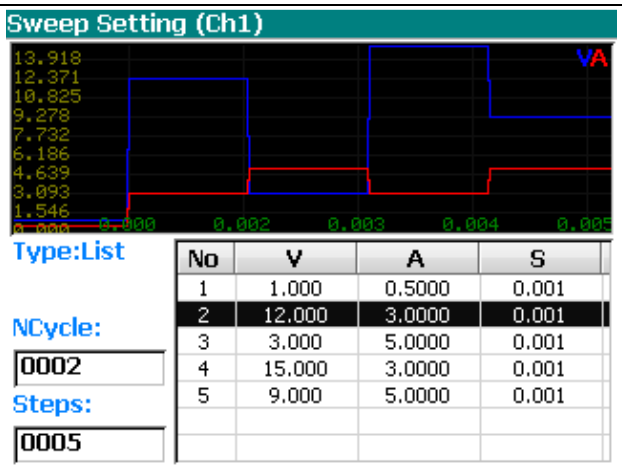
While measuring pulse current, users can set trigger levels to avoid measuring noise. Trigger level setting range is from 0.005A to 5A(CH1). Signals, noises, transients below trigger levels will be ignored during measurement processes. The appropriate measurement integration time can be set by system or manual setting from 33.3μs to 833ms. Pulse current measurements facilitate designers to decide the required power supply allocation for DUT at the preliminary stage. Applications include batteries for portable RF module, blue tooth and cellular phone.

Long Integration Current Measurement

Long Integration Current Measurement

Long integration current measurement is to measure the average current of periodical pulse current in a long period of time. The measured pulse must be a complete periodical waveform or multiple complete periodical waveforms. The total measurement time is up to 60 seconds. Measurements can be taken from pulse' s positive edge trigger or negative edge trigger. Users can also take measurements from the beginning of power output. Long integration current measurement is to analyze power consumption for a period of time. For instance, users can measure the average power consumption of a cellular phone in use to analyze its internal RF module parameters.

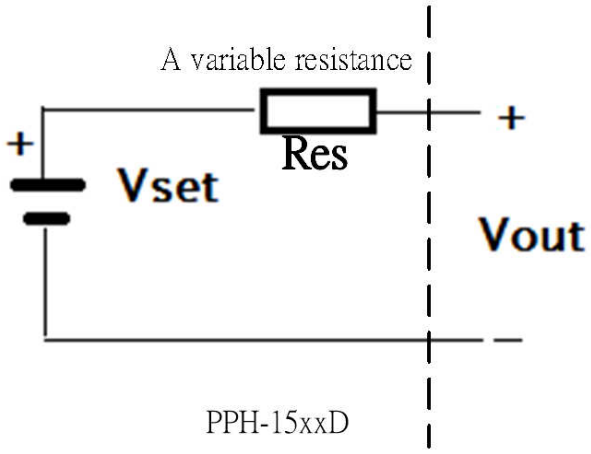
Sequence Function



Functional Setting Page for Sequence Function

For the practical usage, PPH-1506D and PPH-1510D can be programmed to output a sequential voltage variation according to the requirements. There are 1000 steps for users to edit output voltage, current and execution time. Programmable execution time range is from 0.001 second to 3600 seconds and the resolution is 0.001 second. Programmable recurring frequency is from 1 to 9999 or it can be set to infinite execution (set recurring frequency to 0).

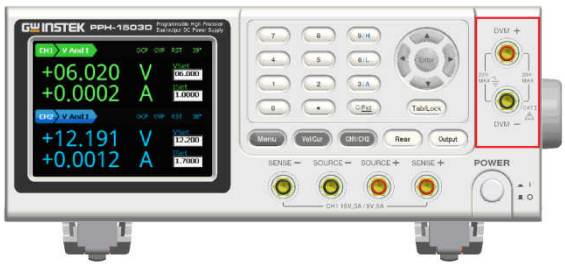
Battery Simulation Function



Battery Equivalent Model

The battery simulation function of both PPH-1506D and PPH-1510D is equivalent to a variable resistance circuit internally connected in series to simulate battery' s output impedance. The function can also be regarded as a power supply with a variable internal resistor. The variable internal resistance range is from 0.000Ω to 1.000Ω and the resolution is 1mΩ. PPH-1506D and PPH-1510D can be utilized as a battery or an ideal voltage source Vset to be connected with variable resistance Res in series. The left diagram shows the battery simulation to produce output voltage Vout.

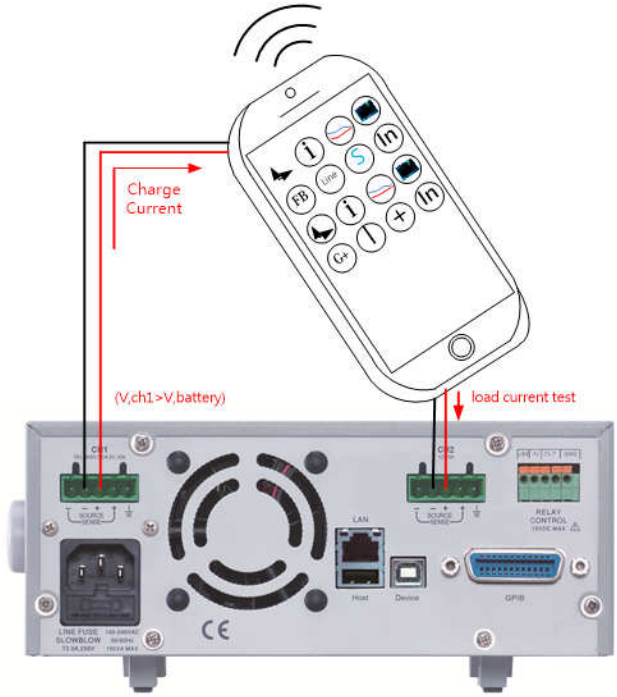
Built-in Digital Voltmeter



DVM Input Terminal

Both built-in Digital Volt-Meters(DVM) of PPH-1506D and PPH-1510D have a dedicated input terminal located on the front panel. With the DC voltage measurement range from 0 to +20VDC, PPH-1506D and PPH-1510D not only provide power supply for DUT but also measure the voltage on DUT. The read back accuracy reaches ±(0.05%+3mV) and read back resolution is 1mV. Users are able to save the cost of purchasing an extra voltage meter. Furthermore, DVM measurements can be remotely controlled by SCPI commands via a PC.

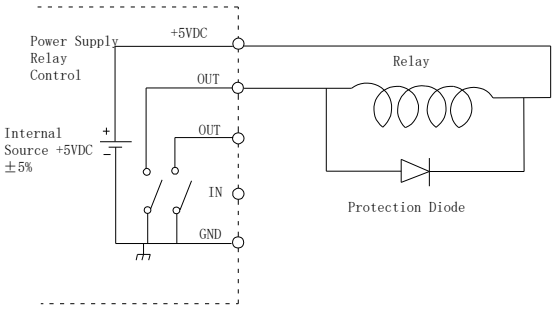
Mobile Communications Applications



A Charger-simulating Source and Load Current Test

The battery simulation function and pulse current measurement function of PPH-1506D and PPH-1510D are ideal for mobile communications measurements, including tests of cellular phone, wireless, blue tooth peripheral and wearable device. Monitoring pulse current of cellular phone in use is a very important test, which can be done by using one channel to simulate battery and the other channel to simulate USB charging device. By so doing, charging and measuring current changes can be achieved at the same time.

External Relay Control



The External Control Diagram for Using A PPH-15xxD' s +5Vdc Power

PPH-1506D and PPH-1510D provide four control modes, including Limit, Trip, Limit Relay and Trip Relay. Limit mode is to maintain CC output when output current reaches CC value. Trip mode is to turn off power output when output current reaches CC value. When output current reaches CC value, Limit Relay will maintain CC output and execute simultaneous Relay operation to control external device. When output current reaches CC value, Trip Relay mode will turn off power output and execute simultaneous Relay operation to control external device.

Comparisons

Features, Advantages and Benefits

Features	Advantages	Benefits
CH1 provides dual operational ranges for voltage and current	Flexible voltage/current ranges to expand application ranges	Cover wide voltage/current ranges without purchasing an additional power supply.
There are three levels of current measurement settings. The smallest 5mA current level provides 0.1μA read back resolution.	Provide high precision/resolution current measurements	Accurately measure DUT's standby power and power consumption at low current levels to help designers evaluate DUT.
Sink current function	Provide dual channel sink current capability	It can be regarded as a voltage source with sink current capability.
Pulse current measurement to the smallest of 33.3μs.	Analyze power consumption of pulse current	Measure pulse current without using an oscilloscope and a current probe
Long integration current measurement	Conduct average current measurements	Satisfy the measurement requirements of communications devices' average current
Sequence Function	The built-in sequence function can program a series of sequential voltage variation power output without using a PC.	1000 sequential steps of voltage, current output, and each execution time can be self-defined.
Built-in battery simulation function	Simulate battery output behavior.	Allow PPH-1506D and PPH-1510D to genuinely simulate portable devices' battery output characteristics.
Built-in DVM function	Provide voltage measurement function	Do not have to purchase an additional DVM.
Four Wire Output Open Protection	Trigger protection will be activated to shut down the output of both PPH-1506D and PPH-1510D when output is disconnected with DUT.	Avoid measurements under incorrect conditions and protect DUT.

Front/rear panel output terminal	Selectable front panel output or rear panel output	Front panel is suitable for bench top and rear panel is ideal for production line, ATE system allocation.

Features Comparison

Brand	GWInstek	ITECH	Keithley	Keysight
FEATURES	**PPH-1506/10D**	**IT6412**	**2306**	**66319B/D**
Dual Range Output	**V 0~15V/ 0~3A 0~9V / 0~5A**	**V 0~15V/ 0~3A 0~9V / 0~5A**	**X**	**X**
Maximum Output Current	**PPH-1506D: 5A PPH-1510D: 10A**	**±5A**	**5A**	**3A**
Display	**3.5 Inch TFT LCD**	**LCD**	**2-line × 16-character VFD**	**VFD**
CC & CV operation	**V**	**V**	**V**	**V**
Built-in DVM measurement function	**V**	**V**	**V**	**D: V B: X**
Pulse current measurement	**V**	**X**	**V**	**V**
Long integration current measment	**V(60s)**	**X**	**V(60s)**	**X**
Battery Simulation	**V**	**V**	**V**	**V**
Automated sequential ouptut	**V(SEQUENCE)**	**V(List)**	**V/I(SEQUENCE)**	**X**
High Measurement Resolution(0.1μA)	**V**	**V**	**V**	**V(0.6μA)**
Sink Current Capability	**V (Max : 3.5A)**	**V (Max : 5A)**	**V(MAX: 3A)**	**V(MAX: 2A)**
Selectable Output from Front or Rear Panel	**V**	**NA**	**X(Rear panel only)**	**X(Rear panel only)**
Relay output control	**V**	**V**	**V**	**V**
Memory	**5 Sets**	**NA**	**5 Sets**	**4 Sets**

High Speed Transient Recovery Time		**V <40 μS**	**V <50 μS**	**V <40 μS**	**V <20 μS**
Lock function		**V**	**V**	**X**	**X**
Protection Function		**OVP / OTP / OCP**	**OVP / OTP / OCP**	**OVP**	**OVP/OCP/OTP**
Open sense lead detection		**V**	**V**	**V**	**V**
LabView Driver and PC Remote Control Software		**V**	**NA**	**NA**	**NA**
Standard Interface: LAN, USB, Analog Control Interface	GPIB	**V**	**V**	**V**	**V**
	USB	**V**	**V**	**X**	**X**
	LAN	**V**	**V**	**NA**	**X**

V: Excellent/ X: No support

PPH-series Comparison

Brand		GWInstek			
Model		PPH-1503	PPH-1503D	PPH-1506D	PPH-1510D
Channel		1	2	2	2
Dual Range Output	ch1	0 to 15V/ 0 to 3A or 0 to 9V/ 0 to 5A	0 to 15V/ 0 to 3A or 0 to 9V/ 0 to 5A	0 to 15V/ 0 to 3A or 0 to 9V/ 0 to 5A	0 to 15V/ 0 to 3A or 0 to 9V/ 0 to 5A Rear Terminal: 0~10A(0~ 4.5V)
	Ch2	NA	0 to 12V/ 0 to 1.5A	0 to 12V/ 0 to 3.0A	0 to 12V/ 0 to 3.0A
Display		3.5 Inch TFT LCD	3.5 Inch TFT LCD	3.5 Inch TFT LCD	3.5 Inch TFT LCD
Current Measurement Range		5A/ 5mA	5A/ 500mA/ 5mA(CH1)	5A/ 500mA/ 5mA(CH1)	10A/ 500mA/ 5mA(CH1)
CC & CV operation		V	V	V	V

Built-in DVM measurement function		V	V(CH2)	V(CH2)	V(CH2)
Pulse current measment		V	V	V	V
Long integration current measment		V	V	V	V
Battery Simulation		NA	V(CH1)	V(CH1)	V(CH1)
Automated sequential ouptut		V	V(CH1)	V(CH1)	V(CH1)
High Measurement Resolution		V(1mV/0.1μA)	V(1mV/0.1μA)	V(1mV/0.1μA)	V(1mV/0.1μA)
Sink Current Capability		V (Max : 2A)	V (Max : 3.5A)	V (Max : 3.5A)	V (Max : 3.5A)
Selectable Output from Front or Rear Panel		V	V	V	V
Relay output control		V	V	V	V
Memory		5 Sets	5 Sets	5 Sets	5 Sets
Sample rate		60K	64K	64K	64K
Lock function		V	V	V	V
Protection Function		OVP / OTP / OCP	OVP / OTP / OCP	OVP / OTP / OCP	OVP / OTP / OCP
Four Wire Output Open Circuit Protection		NA	V	V	V
Temperature display for Heat Sink		NA	V	V	V
Standard Interface: LAN, USB, Analog Control Interface	GPIB	V	V	V	V
	USB	V(CDC)	V(TMC)	V(TMC)	V(TMC)
	LAN	V	V	V	V

Specifications

Brand	GWInstek		GWInstek	
Model	PPH-1506D		PPH-1510D	
OUTPUT RATING				
Number of output channel	2		2	
Channel No.	Ch1	Ch2	Ch1	Ch2
Power	45W	36W	45W	36W
Voltage	0 ~ 15V or 0 ~ 9V	0 ~ 12V	0 ~ 15V or 0 ~ 9V	0 ~ 12V
Current	0 ~ 3A or 0 ~ 5A	0~ 3.0A	0 ~ 3A or 0 ~ 5A; Rear: 0~10A(under 0~ 4.5V)	0~ 3.0A
Output Voltage Rising Time	0.20ms (10% ~ 90%)		0.20ms (10% ~ 90%)	
Output Voltage Falling Time	0.30ms (90% ~ 10%)		0.30ms (90% ~ 10%)	
STABILITY				
Voltage	0.01%+3.0mV		0.01%+3.0mV	
Current	NA		NA	
REGULATION (CV)				
Load	0.01%+2mV		0.01%+2mV	
Line	0.5mV		0.5mV	
REGULATION (CC)				
Load	0.01%+1mA		0.01%+1mA	
Line	0.5mA		0.5mA	
RIPPLE & NOISE (20Hz ~ 20MHz)				
CV p-p	≦5A:8mVp-p(20Hz~ 20MHz)		≦5A:8mVp-p(20Hz~ 20MHz) > 5A: 12mVp-p(20Hz~20MHz)	
CV rms	3mV(0~1MHz)		3mV(0~1MHz)	
CC rms	NA	NA	NA	NA
PROGRAMMING ACCURACY				
Voltage	0.05%+10mV		0.05%+10mV	
Current (CH1: 5A,10A/CH2: 3A)	0.16%+5mA(5A/3A)		0.16%+5mA(5A/3A)	
Current (500mA)	0.16%+0.5mA	NA	0.16%+0.5mA	NA
Current (5mA)	0.16%+5μA		0.16%+5μA	
READBACK ACCURACY				
Voltage	0.05%+3mV		0.05%+3mV	

Current (CH1: 5A,10A/CH2:1.5A,3A)	0.2%+400μA(5A range)	0.2%+400μA	0.2%+400μA(5A range)	0.2%+400μA
Current (500mA)	0.2%+100μA(500mA range)	NA	0.2%+100μA(500mA range)	NA
Current (5mA)	0.2%+1μA(5mA range)	0.2%+1μA	0.2%+1μA(5mA range)	0.2%+1μA
RESPONSE TIME				
Transient Response Time (Response to 1000% Load Chang)	< 40μS (within 100mV, Rear) < 50μS (within 100mV, Front) < 80μS (within 20mV)		< 40μS (within 100mV, Rear) < 50μS (within 100mV, Front) < 80μS (within 20mV)	
PROGRAMMING RESOLUTION				
Voltage	2.5mV		2.5mV	
Current	1.25mA(5A range)	1.25mA	1.25mA(5A range)	1.25mA
Current	0.125mA(500mA range)	NA	0.125mA(500mA range)	NA
Current	1.25μA(5mA range)		1.25μA(5mA range)	
READBACK RESOLUTION				
Voltage	1mV		1mV	
Current	0.1mA(5A Range)	0.1mA(3A Range)	0.1mA(5A Range)	0.1mA(3ARange)
Current	0.01mA (500mA Range)	NA	0.01mA (500mA Range)	NA
Current	0.1μA(5mA Range)	0.1μA(5mA Range)	0.1μA(5mA Range)	0.1μA(5mA Range)
PROTECTION FUNCTION				
OVP Accuracy	CH1: 0.8V	CH2:50mV	CH1: 0.8V	CH2:50mV
OVP Resolution	10mV	10mV	10mV	10mV
DVM				
DC Readback Accuracy (23℃± 5 ℃)	NA	0.05%+3mV	NA	0.05%+3mV
Readbck Resolution		1mV		1mV
Input Voltage range		0 ~ 20VDC		0 ~ 20VDC
Maximum Input Voltage		-3V, +22V		-3V, +22V
Input Resistance and Capacitance		20MΩ		20MΩ
Programmable output resistance				
Range	0.001Ω to 1.000 Ω	NA	0.001Ω to 1.000 Ω	NA
Programming accuracy	0.5% + 10 mΩ		0.5% + 10 mΩ	
Resolution	1mΩ		1mΩ	
PULSE CURRENT MEASUREMENT				

TRIGGER LEVEL	5mA ~ 5A, 5mA/step	5mA ~ 3A, 5mA/step	5mA ~ 5A, 5mA/step	5mA ~ 3A, 5mA/step
HIGH TIME/LOW TIME/AVERAGE TIME	33.3µs to 833ms, 33.3µs/step		33.3µs to 833ms, 33.3µs/step	
TRIGGER DELAY	0 ~ 100ms,10µs/steps		0 ~ 100ms,10µs/steps	
AVERAGE READINGS	1 ~ 100		1 ~ 100	
LONG INTEGRATION PULSE TIMEOUT	1S ~ 63S		1S ~ 63S	
LONG INTEGRATION MEASUREMENT TIME	850ms(60Hz)/840ms(50Hz) ~ 60s,or AUTO time 16.7ms/steps(60Hz), 20ms/steps(50Hz)		850ms(60Hz)/840ms(50Hz) ~ 60s,or AUTO time 16.7ms/steps(60Hz), 20ms/steps(50Hz)	
LONG INTEGRATION TRIGGER MODE	Rising, Falling, Neither		Rising, Falling, Neither	
OTHERS				
Output Terminal	Front / Rear Panel	Rear Panel	Front / Rear Panel	Rear Panel
DVM Input	NA	Front Panel	NA	Front Panel
RELAY CONTROL CONNECTOR	150mA/15V ‧ 5Voutput, 100mA		150mA/15V ‧ 5Voutput, 100mA	
Operation temperature	0 ~ 40°C		0 ~ 40°C	
Operation Humidity	≤ 80%		≤ 80%	
Storage Temperature	-20˚C ~ 70˚C		-20˚C ~ 70˚C	
Storage Humidity	< 80%		< 80%	
PC REMOTE INTERFACES				
(Standard)	GPIB / USB / LAN		GPIB / USB / LAN	
CURRENT SINK CAPACITY				
Sink Current Rating	CH1：0~4V: 3.5A 4~15V: 3.5A-(0.25A/V)*(Vset-4V)	CH2: 0~ 5V: 3A 5~12V: 3A-(0.25A/V)*(Vset-5V)	CH1：0~4V: 3.5A 4~15V: 3.5A-(0.25A/V)*(Vset-4V)	CH2: 0~ 5V: 3A 5~12V: 3A-(0.25A/V)*(Vset-5V)
Memory				
Save / Recall	5 Sets		5 Sets	
Power				
Input Power	90-264VAC ; 50/60Hz		90-264VAC ; 50/60Hz	
POWER CONSUMPTION	160W		160W	
DIMENSIONS & WEIGHT				
Dimensions	222(W) x 86(H) x 363(D) mm		222(W) x 86(H) x 363(D) mm	
Weight	Approx 4.5Kg		Approx 4.5Kg	

Should you have any questions on the PPH-1506D and PPH-1510D announcement, please don’ t hesitate to contact us.

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