
# PPH-Series

## Programmable High Precision D.C. Power Supply

## 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 of PPH-15xxD)
- OVP, OCP, OTP & Temperature Display for Heat Sink
- Support USB (Device & Host)/GPIB/LAN
- Five Groups of Save/Recall Setting
- External Relay Control

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# Swift Responses with Accurate Measurement

PPH-Series high precision measurement capability 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-Series is 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-15xxD has 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-15xxD 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-15xxD, 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 battery, 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-15xxD, different from general power supplies, has the characteristics of fast transient recovery time. While simulating battery to output pulse current, PPH-15xxD can quickly compensate the voltage drop caused by pulse current. PPH-15xxD's CH1 has 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-15xxD to accurately simulate battery's real behavior pattern so as to conduct product tests.

PPH-15xxD is 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 its sink current capability. The sink current function allows PPH-15xxD to simulate a voltage source with the sink current capability. The maximum sink current of PPH-15xxD's CH1 is 3.5A and for CH2 is 3A. 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-15xxD provides OTP function and shows 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 PPH-15xxD's usability. PPH-Series supports test requirements of Profile1, Profile2 and Profile3 from USB Power Delivery(PD) constructed by USB-IF association.

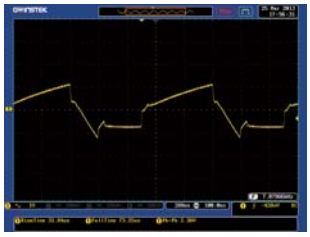
## A. MOBILE COMMUNICATIONS APPLICATIONS


**A Charger-simulating Source and Load Current Test**

The battery simulation function and pulse current measurement function of PPH-15xxD 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 load and the other channel to simulate USB charging device. By so doing, charging and measuring current changes can be achieved at the same time.

## B. FAST RESPONSE TO LOAD AND VOLTAGE CHANGES

PPH-Series



Conventional Power Supply

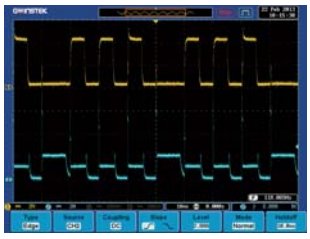
When DUT such as cellular phone switches to idling, receiving or transmitting mode, the current drawn from power supply changes over tenfold. The sudden current change will cause the supplied voltage to drop as well. The conventional power supply is considered a dull device since it will take several milliseconds for the dropped voltage to return to the original level. PPH-15xxD is designed to simulate battery response when a significant voltage drop occurs. Recovery time of 40μs or less is guaranteed when the maximum voltage drop is within 100mV. Moreover, when users change the voltage level and conventional power supply does not have sufficient speed to reach the set level, PPH-15xxD provides a rise time of 0.2 ms and a fall time of 0.3ms, which are hundreds times faster than that of the conventional power supplies.

## C. ACCURATE LOW CURRENT MEASUREMENT


0.1μ A Resolution for PPH-Series

PPH-Series provides 0.2%+1μA readback accuracy and 0.1μA resolution for high precision of current measurement. For example, when portable device works in the sleep or standby mode, the current is drawn at a low level. The low current consumption under standby or sleep mode can be measured accurately.

## D. MEASUREMENTS FOR POWER CONSUMPTION ANALYSIS



Voltage and Current Waveforms of the Receiving Signals of a Cellular Phone

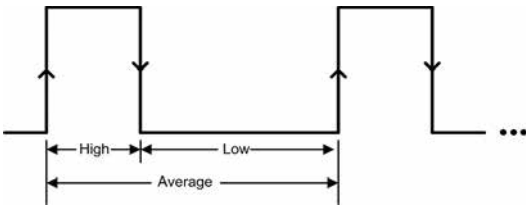
One particular requirement of power consumption for portable wireless communications devices is Pulse Current. Portable devices such as cellular phones must transmit and receive (detect) signal periodically by drawing pulse current instead of constant current from battery to ensure devices' sound connection in network. To analyze the transient power consumption of a DUT, the peak of short pulse current and average current measurements over a long period of time are crucial. PPH-Series provides pulse current and long integration functions, the former can measure the peak value of a pulse, the latter can measure the average value of pulses. PPH-Series provides DUT with pulse current measurement and analyzes the transient power consumption to qualify the device for specified power consumption requirements.

## E. 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 current 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.

## F. PULSE CURRENT MEASUREMENTS




**The Time Specified for the Measurement**


**Pulse Current Measurement**

**PPH-Series DC power supply can perform current measurements for pulsing loads. Its several built-in measurement modes include :**

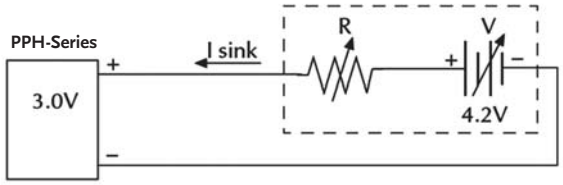
- High Measured Current–measure the peak current of the pulse train.
- Low Measured Current–measure the low current of the pulse train.
- Average Transmit Current–measure the average current of the pulse train.

The high, low, and average measurements of a pulse are illustrated as above :

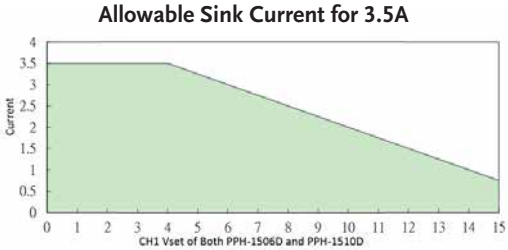
To avoid false pulse detection, users can use a trigger level of up to 5A(CH1). All pulses, noise or other transients that are less than set trigger level will be ignored. The manual integration time range setting is 33µs to 833,333µs. Pulse current measurement can measure transient current consumption to provide the information for the allocation of power supply system for products' preliminary design, i.e. power supply circuits, battery selections for clients' product analyses. Portable communications products, i.e. RF modules and designs based upon blue tooth system can better use pulse current measurement function.

## G. SINK CURRENT FUNCTION

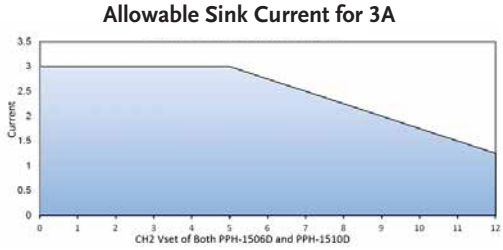
**PPH-Series and an Electrical Potential Circuit**




**Allowable Sink Current for 3.5A**

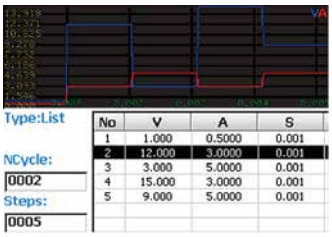



**Allowable Sink Current for 3A**




When connecting with an electric potential circuit and the output voltage of the tested electric potential circuit is greater than that of PPH-Series by approximately 0.3V to 2.5V, PPH-Series 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-Series can be regarded as the CV setting of an electronic load. A single PPH-Series can be used to charge battery and to simulate battery's load to consume power without extra instruments. PPH-Series is ideal for tests on battery and portable charger.

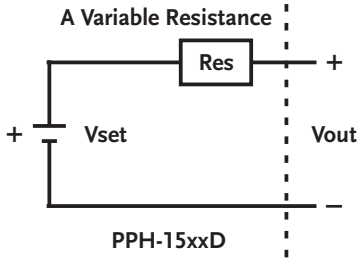
## H. SEQUENCE FUNCTION




**Functional Setting Page for Sequence Function**

For the practical usage, PPH-15xxD 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).

## I. BATTERY SIMULATION FUNCTION




**Battery Equivalent Model**

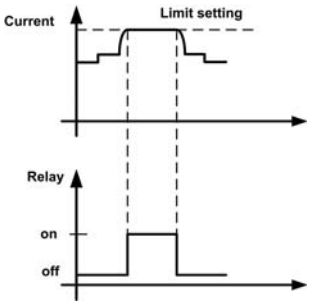
PPH-15xxD's battery simulation function is equivalent to a variable resistance circuit internally connected in series to simulate battery's output impedance. The function can also be regarded as a power supply with a variable internal resistor. The variable internal resistance range is from 0.000Ω to 1.000Ω and the resolution is 1mΩ. PPH-15xxD can be utilized as a battery or an ideal voltage source Vset to be connected with variable resistance Res in series. The following diagram shows battery simulation to produce output voltage Vout.

## J. BUILT-IN DIGITAL VOLTMETER

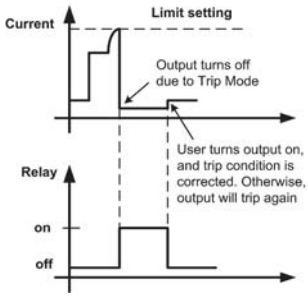

**DVM Input for PPH-15xxD**

The built-in Digital Volt-Meter (DVM) of PPH-Series has a dedicated input terminal located on the front panel. With the DC voltage measurement range from 0 to +20VDC, PPH-Series not only provides power supply for DUT but also measures 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.

## K. EXTERNAL RELAY CONTROL

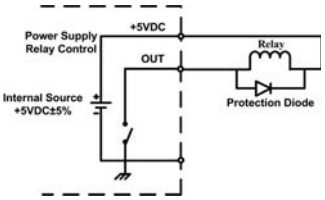



Limit Relay



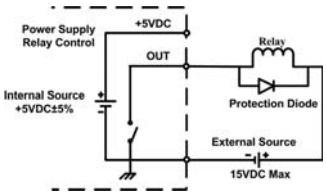

Trip Relay

**Relay Can be Driven by Using Internal +5V or External Power Source :**




**+5VDC Relay Output**

Using the +5VDC relay output to drive an external relay. Ensure the current does not exceed 150mA.




**External Power Source**

Using an external power source to drive the external relay. The voltage of the source can not exceed 15V and the current can not exceed 150mA.

PPH-Series provides Limit relay and Trip relay modes and is equipped with corresponding output ports, in which output signals control external relay. Under Limit relay mode and the current limit is reached, PPH-Series will switch from Constant Voltage to Constant Current automatically. Under "Trip relay" mode and the current limit is reached, PPH-Series will turn output off. Furthermore, External Relay control can be used if users simultaneously use other devices for test system. When "Limit Relay" mode is selected and the current limit is reached, External Relay control signal will go high and will return back to the low level when the current level goes back below the constant current setting. When "Trip Relay" mode is selected and the current limit is reached, the relay control signal will go high and the output is disabled. When the output goes back on and the current is less than the current setting, the relay control signal will back to the low level. Users can use relay control signal to control other devices for test system.

## SELECTION GUIDE

| Model | | PPH-1503 | PPH-1503D | PPH-1506D | PPH-1510D |
|---|---|---|---|---|---|
| Channel | | 1 | 2 | 2 | 2 |
| Dual Range Output | Channel 1 | 0 ~ 15V/0 ~ 3A or<br>0 ~ 9V/0 ~ 5A | 0 ~ 15V/0 ~ 3A or<br>0 ~ 9V/0 ~ 5A | 0 ~ 15V/0 ~ 3A or<br>0 ~ 9V/0 ~ 5A | 0~15V/0~3A or 0~9V/0~5A<br>Rear Terminal: 0~10A(0~ 4.5V) |
| | Channel 2 | NA | 0 ~ 12V/0 ~ 1.5A | 0 ~ 12V/0 ~ 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) |
| CV&CC | | ✓ | ✓ | ✓ | ✓ |
| Built-in DVM Measurement Function | | ✓ | ✓ (CH2) | ✓ (CH2) | ✓ (CH2) |
| Pulse Current Measurement | | ✓ | ✓ | ✓ | ✓ |
| Long integration Current Measment | | ✓ | ✓ | ✓ | ✓ |
| Battery Simulation | | NA | ✓ (CH1) | ✓ (CH1) | ✓ (CH1) |
| Automated Sequential Ouput | | ✓ | ✓ (CH1) | ✓ (CH1) | ✓ (CH1) |
| High Measurement Resolution | | ✓ (1mV/0.1 μA) | ✓ (1mV/0.1 μA) | ✓ (1mV/0.1 μA) | ✓ (1mV/0.1 μA) |
| Sink Current Capability | | ✓ (Max : 2A) | ✓ (Max : 3.5A) | ✓ (Max : 3.5A) | ✓ (Max : 3.5A) |
| Selectable Output From Front or Rear Panel | | ✓ | ✓ | ✓ | ✓ |
| Relay Output Control | | ✓ | ✓ | ✓ | ✓ |
| Memory | | 5 Sets | 5 Sets | 5 Sets | 5 Sets |
| Sample Rate | | 60K | 64K | 64K | 64K |
| Lock Function | | ✓ | ✓ | ✓ | ✓ |
| Protection Function | | OVP / OTP / OCP | OVP / OTP / OCP | OVP / OTP / OCP | OVP / OTP / OCP |
| Four Wire Output Open Circuit Protection | | NA | ✓ | ✓ | ✓ |
| Temperature Display for Heat Sink | | NA | ✓ | ✓ | ✓ |
| Standard Interface:<br>LAN, USB, Analog Control<br>Interface | GPIB<br>USB<br>LAN | ✓<br>✓ (CDC)<br>✓ | ✓<br>✓ (TMC)<br>✓ | ✓<br>✓ (TMC)<br>✓ | ✓<br>✓ (TMC)<br>✓ |

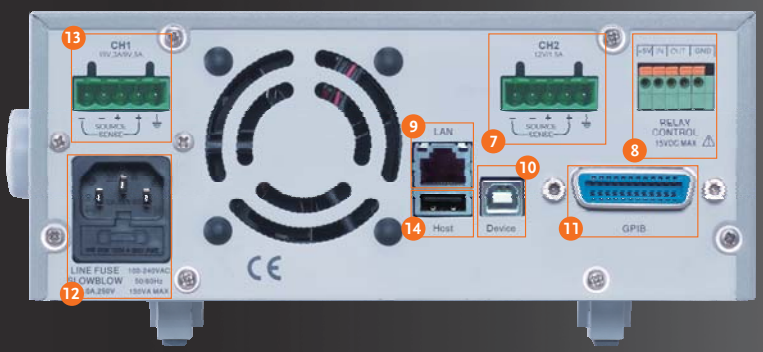
## PANEL INTRODUCTION



CE | USB Device | PC Software | Front Output | LAN | GPIB | LabVIEW Driver | Rear Output

### PPH-1503

1. LCD Display
2. Operation Keys
3. Voltmeter Terminals (DVM)
4. Function Keys
5. Output Terminals (SOURCE and SENSE)
6. Power On/Off Switch
7. Rear Panel Outputs and DVM Inputs
8. External Relay Control Port
9. LAN Port
10. USB Port
11. GPIB Port
12. AC Power Socket and Fuse


CE | USB Host | USB Device | Front Output | PC Software | LAN | GPIB | LabVIEW Driver | Rear Output

### PPH-1503D/1506D/1510D

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

## SPECIFICATIONS

| Model | | PPH-1503 | PPH-1503D | | PPH-1506D | | PPH-1510D | |
|---|---|---|---|---|---|---|---|---|
| OUTPUT RATING | Number of Output Channel | 1 | 2 | | 2 | | 2 | |
| | Channel No. | Ch 1 | Ch 1 | Ch 2 | Ch 1 | Ch 2 | Ch 1 | Ch 2 |
| | Power | 45W | 45W | 18W | 45W | 36W | 45W | 36W |
| | Voltage | 0 ~ 15V or 0 ~ 9V | 0 ~ 15V or 0 ~ 9V | 0 ~ 12V | 0 ~ 15V or 0 ~ 9V | 0 ~ 12V | 0 ~ 15V or 0 ~ 9V | 0 ~ 12V |
| | Current | 0 ~ 3A or 0 ~ 5A | 0 ~ 3A or 0 ~ 5A | 0 ~ 1.5A | 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 | 0.15ms (10% ~ 90%) | 0.20ms (10% ~ 90%) | | 0.20ms (10% ~ 90%) | | 0.20ms (10% ~ 90%) | |
| | Output Voltage Falling Time | 0.65ms (90% ~ 10%) | 0.30ms (90% ~ 10%) | | 0.30ms (90% ~ 10%) | | 0.30ms (90% ~ 10%) | |
| STABILITY | Voltage | 0.01%+0.5mV | 0.01%+3.0mV | | 0.01%+3.0mV | | 0.01%+3.0mV | |
| | Current | 0.01%+50 μA | — | | — | | — | |
| REGULATION (CV) | Load | 0.01%+2mV | 0.01%+2mV | | 0.01%+2mV | | 0.01%+2mV | |
| | Line | 0.5mV | 0.5mV | | 0.5mV | | 0.5mV | |
| REGULATION (CC) | Load | 0.01%+1mA | 0.01%+1mA | | 0.01%+1mA | | 0.01%+1mA | |
| | Line | 0.5mA | 0.5mA | | 0.5mA | | 0.5mA | |
| RIPPLE & NOISE (20Hz~20MHz) | CV p-p | 8mV | ≦5A : 8mVp-p(20Hz~ 20MHz) | | ≦5A : 8mVp-p(20Hz~ 20MHz) | | ≦5A : 8mVp-p(20Hz~ 20MHz)<br>＞5A : 12mVp-p(20Hz~20MHz) | |
| | CV rms | 1mV | 3mV(0~1MHz) | | 3mV(0~1MHz) | | 3mV(0~1MHz) | |
| | CC rms | — | — | | — | | — | |
| PROGRAMMING ACCURACY | Voltage | 0.05%+10mV | 0.05%+10mV | | 0.05%+10mV | | 0.05%+10mV | |
| | Current (Ch1:5A,10A/CH2:1.5A,3A) | 0.16%+5mA | 0.16%+5mA(5A/1.5A) | | 0.16%+5mA(5A/3A) | | 0.16%+5mA(5A/3A) | |
| | Current (500mA) | — | 0.16%+0.5mA | — | 0.16%+0.5mA | — | 0.16%+0.5mA | — |
| | Current (5mA ) | | 0.16%+5μA | | 0.16%+5μA | | 0.16%+5μA | |
| READBACK ACCURACY | Voltage | 0.05%+3mV | 0.05%+3mV | 0.05%+3mV | 0.05%+3mV | 0.05%+3mV | 0.05%+3mV | 0.05%+3mV |
| | Current (Ch1:5A,10A/CH2:1.5A,3A) | 0.2%+400μA(5A) | 0.2%+400μA(5A) | 0.2%+400μA | 0.2%+400μA(5A) | 0.2%+400μA | 0.2%+400μA(5A) | 0.2%+400μA |
| | Current (500mA) | — | 0.2%+100μA | — | 0.2%+100μA | — | 0.2%+100μA | — |
| | Current (5mA ) | 0.2%+1μA | 0.2%+1μA | 0.2%+1μA | 0.2%+1μA | 0.2%+1μA | 0.2%+1μA | 0.2%+1μA |
| RESPONSE TIME | Transient Recovery Time (Response to 1000% Load Change) | <40μS(within 100mV)<br><80μS(within 20mV) | <40μS(within 100mV, Rear)<br><50μS(within 100mV,Front)<br><80μS(within 20mV) | | <40μS(within 100mV, Rear)<br><50μS(within 100mV,Front)<br><80μS(within 20mV) | | <40μS(within 100mV, Rear)<br><50μS(within 100mV,Front)<br><80μS(within 20mV) | |
| PROGRAMMING RESOLUTION | Voltage | 2.5mV | 2.5mV | 2.5mV | 2.5mV | 2.5mV | 2.5mV | 2.5mV |
| | Current (5A range) | 1.25mA | 1.25mA(5A) | 1.25mA | 1.25mA(5A) | 1.25mA | 1.25mA(5A) | 1.25mA |
| | Current (500mA range) | — | 0.125mA | — | 0.125mA | — | 0.125mA | — |
| | Current (5mA range) | | 1.25μA | | 1.25μA | | 1.25μA | |
| READBACK RESOLUTION | Voltage | 1mV | 1mV | 1mV | 1mV | 1mV | 1mV | 1mV |
| | Current (5A range) | 0.1mA | 0.1mA(5A) | 0.1mA(1.5A) | 0.1mA(5A) | 0.1mA(3A) | 0.1mA(5A) | 0.1mA(3A) |
| | Current (500mA range) | — | 0.01mA | — | 0.01mA | — | 0.01mA | — |
| | Current (5mA range) | 0.1μA | 0.1μA | 0.1μA | 0.1μA | 0.1μA | 0.1μA | 0.1μA |
| PROTECTION FUNCTION | OVP Accuracy | 50mV | Ch1: 0.8V | Ch2: 50mV | Ch1: 0.8V | Ch2: 50mV | Ch1: 0.8V | Ch2: 50mV |
| | OVP Resolution | 10mV | 10mV | 10mV | 10mV | 10mV | 10mV | 10mV |
| DVM | DC Readback Accuracy(23℃± 5℃) | ±0.05%+3mV | — | ±0.05%+3mV | — | ±0.05%+3mV | — | ±0.05%+3mV |
| | Readbck Resolution | 1mV | | 1mV | | 1mV | | 1mV |
| | Input Voltage Range | 0 ~ 20VDC | | 0 ~ 20VDC | | 0 ~ 20VDC | | 0 ~ 20VDC |
| | Maximum Input Voltage | — | | -3V, +22V | | -3V, +22V | | -3V, +22V |
| | Input Resistance and Capacitance | 100000MΩ | | 20MΩ | | 20MΩ | | 20MΩ |
| PROGRAMMABLE OUTPUT RESISTANCE | Range | — | 0.001Ω ~ 1.000 Ω | — | 0.001Ω ~ 1.000 Ω | — | 0.001Ω ~ 1.000 Ω | — |
| | Programming Accuracy | | 0.5% + 10 mΩ | | 0.5% + 10 mΩ | | 0.5% + 10 mΩ | |
| | Resolution | | 1mΩ | | 1mΩ | | 1mΩ | |
| PULSE CURRENT MEASUREMENT | Trigger Level | 5mA ~ 5A, 5mA/Step | 5mA ~ 5A, 5mA/Step | | 5mA ~ 5A, 5mA/Step | | 5mA ~ 5A, 5mA/Step | |
| | High Time/low Time/ Average Time | 33.3μs ~ 833ms, 33.3μs/Step | 33.3μs ~ 833ms, 33.3μs/Step | | 33.3μs ~ 833ms, 33.3μs/Step | | 33.3μs ~ 833ms, 33.3μs/Step | |
| | Trigger Delay | 0 ~ 100ms,10μs/Steps | 0 ~ 100ms,10 μs/Steps | | 0 ~ 100ms,10 μs/Steps | | 0 ~ 100ms,10μs/Steps | |
| | Average Readings | 1 ~ 100 | 1 ~ 100 | | 1 ~ 100 | | 1 ~ 100 | |
| | Long Integration Pulse Time | 1S ~ 63S | 1S ~ 63S | | 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) | | 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 | | Rising, Falling, Neither | | Rising, Falling, Neither | |
| OTHERS | Output Terminal | Front/Rear Panel | Front/Rear Panel | Rear Panel | Front/Rear Panel | Rear Panel | Front/Rear Panel | Rear Panel |
| | DVM Input | Front/Rear Panel | — | Front Panel | — | Front Panel | — | Front Panel |
| | Relay Control Connector | 150mA/15V, 5V output, 100mA | 150mA/15V, 5V output, 100mA | | 150mA/15V, 5V output, 100mA | | 150mA/15V, 5V output, 100mA | |
| | Operation Temperature | 0 ~ 40°C | 0 ~ 40°C | | 0 ~ 40°C | | 0 ~ 40°C | |
| | Operation Humidity | ≤ 80% | ≤ 80% | | ≤ 80% | | ≤ 80% | |
| | Storage Temperature | -20°C ~ 70°C | -20°C ~ 70°C | | -20°C ~ 70°C | | -20°C ~ 70°C | |
| | Storage Humidity | < 80% | < 80% | | < 80% | | < 80% | |
| PC REMOTE INTERFACES | Standard | GPIB/USB/LAN | GPIB/USB/LAN | | GPIB/USB/LAN | | GPIB/USB/LAN | |
| CURRENT SINK CAPACITY | Sink Current Rating | 2A(Vout≦5V); 2A-0.1*(Vout-5) (Vout>5V) | Ch1:0~4V:3.5A; 4~15V:3.5A-(0.25A/V) *(Vset-4V) | Ch2: 0~5V:2A; 5~12V:2A-(0.1A/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) | 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 | | 5 Sets | | 5 Sets | |
| POWER | Input Power | 90 ~ 264VAC ; 50/60Hz | 90 ~ 264VAC ; 50/60Hz | | 90 ~ 264VAC ; 50/60Hz | | 90 ~ 264VAC ; 50/60Hz | |
| | Power Consumption | 150W | 160W | | 160W | | 160W | |
| DIMENSIONS & WEIGHT | | 222(W)x86(H)x363(D) mm; Approx 4.2kg | 222(W)x86(H)x363(D) mm; Approx 4.5kg | | 222(W)x86(H)x363(D) mm; Approx 4.5kg | | 222(W)x86(H)x363(D) mm; Approx 4.5kg | |

Specifications subject to change without notice. PH-1503/15XXDGD2BH_2018.11_2000

## ORDERING INFORMATION

**PPH-1503** (0~15V/0~3A or 0~9V/0~5A)**High Precision DC Power Supply**
**PPH-1503D** (CH1:0~15V/0~3A or 0~9V/0~5A;CH2:0~12V/0~1.5A)**High Precision Dual Channel Output DC Power Supply**
**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**

## ACCESSORIES

CD (User manual x1, Quick start manual x1), Power cord (Region dependent), Test lead GTL-207A x 1, GTL-203A x 1, GTL-204A x 1

## OPTIONAL ASSESSORIES

**GTL-246** USB Cable (USB 2.0, A-B Type)

GW INSTEK
Simply Reliable