
# PFR-100M/100L

## Fanless Multi-Range D.C. Power Supply

## FEATURES

- Constant Power Output for 5 Times Multi-range(V&I) Operation
- Natural Convection Cooling Design(Fanless Structure)
- Preset Memory Function
- Output ON/OFF Delay Function
- CV, CC Priority Mode
- Adjustable Slew Rate For Voltage and Current
- Bleeder Circuit Control
- Protection : OVP, OCP, AC FAIL and OTP
- Support Front Panel and Rear Panel Output
- Built-in USB and RS-232/485 Interface Optional LAN+GPIB
- Web Server Monitoring and Control
- External Analog Control and Monitor Function
- Remote Sensing Function

GW INSTEK
Simply Reliable

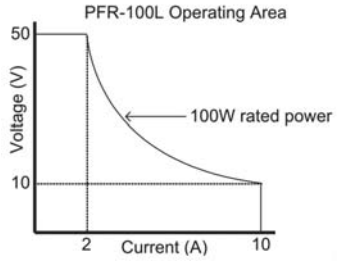
The PFR-100 series, a small and high-performance programmable D.C. power supply, adopts natural convection design to dissipate heat. The fanless structure allows users to focus on their experiments and tests in a quiet environment. Fanless power supply will not suck in dust and foreign objects, therefore, PFR-100 series has a longer life cycle compared with that of power supplies with fan.

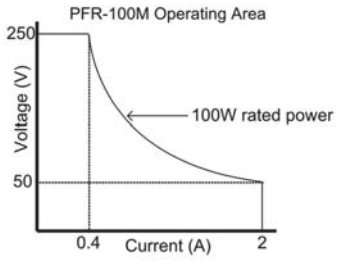
The PFR-100 series is a power supply with a five-fold rated power that allows users to self-define voltage and current under rated power conditions so as to satisfy them with wider voltage and current operational ranges. PFR-100 series, with rated 100W, provides two models: PFR-100L- maximum output voltage of 50V (at 2A) or maximum output current of 10A (at 10V); PFR-100M- maximum output voltage of 250V (at 0.4A) or maximum output current of 2A (at 50V).

The PFR-100 series provides front and rear panel output terminals. The front panel output terminal helps users shorten test lead replacement time while conducting adjustment on front panel's function keys. The rear panel output terminal facilitates an easy wiring operation for rackmount assembly. 3U height, 70mm width and 2.5KG in weight have greatly elevated PFR-100 series portability. Furthermore, the multi-drop mode allows users to control up to 31 PFR-100 series without using switch/Hub that help users save the equipment cost.

The LAN interface for PFR-100 is Ethernet port. PFR-100 also has a built-in web server and intuitive user interface. Users, via general browsers including Internet Explorer, Mozilla Firefox or Android cellular phones, can monitor PFR-100's test and measurement anywhere. Users not only can remotely monitor PFR-100 via internet, but also remotely observe and adjust their operating PFR-100s in the lab from your home. The outputs of PFR-100 series can be monitored including OVP, OCP, UVL; and the system information can be checked such as unit's serial number, firmware edition and internet setting. Users can remotely adjust PFR-100 settings, including output voltage/current, the slew rate for voltage/current, Bleeder circuit control, OCP, delayed time for output voltage and Buzzer settings.

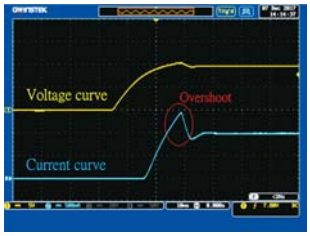
The PFR-100 series provides special functionalities to meet test requirements for different load's characteristics. The CC priority mode can be applied for DUTs with diode characteristics to prevent DUT from being damaged by inrush current. A slow rise time for voltage can also protect DUT from inrush current, especially for tests on capacitive load. When power is off or load is disconnected, the activation of Bleeder circuit control will allow the bleeder resistor to consume filter capacitor's electricity. Without the bleed resistor, power supply's filter capacitor may still have electricity that is a potential hazard. For automatic testing equipment systems, the bleeder resistor allows PFR-100 series to rapidly discharge to prepare itself for the next operation.



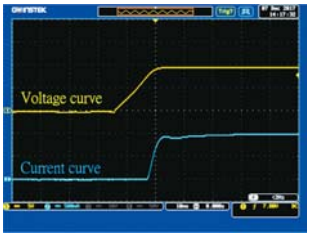

| Model | PFR-100L | PFR-100M |
|---|---|---|
| Output Channel | 1 | 1 |
| Output Voltage | 0~ 50V | 0~ 250V |
| Output Current | 0~ 10A | 0~ 2A |
| Rated Power | 100W | 100W |

## A. C.V/C.C PRIORITY MODE




**Under the conventional C.V mode, inrush current and surge voltage appeared at forward voltage (Vf) of LED**

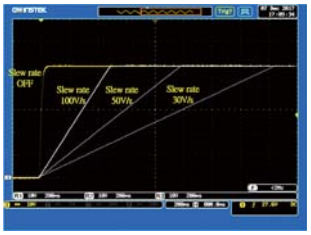
Under the application conditions of diode load, conventional power supplies under the C.V priority mode will produce inrush current and surge voltage at turn-on. The PFR-100 series has



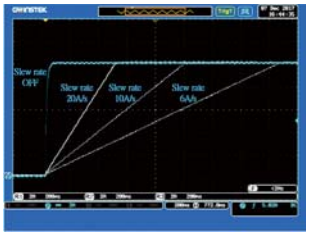

**Under C.C priority mode, inrush and surge voltage are effectively restrained.**

C.V and C.C priority modes. The C.C priority mode can prevent inrush current and surge voltage from occurring at turn-on to protect DUT.

## B ADJUSTABLE SLEW RATE




Adjustable Voltage Slew Rate



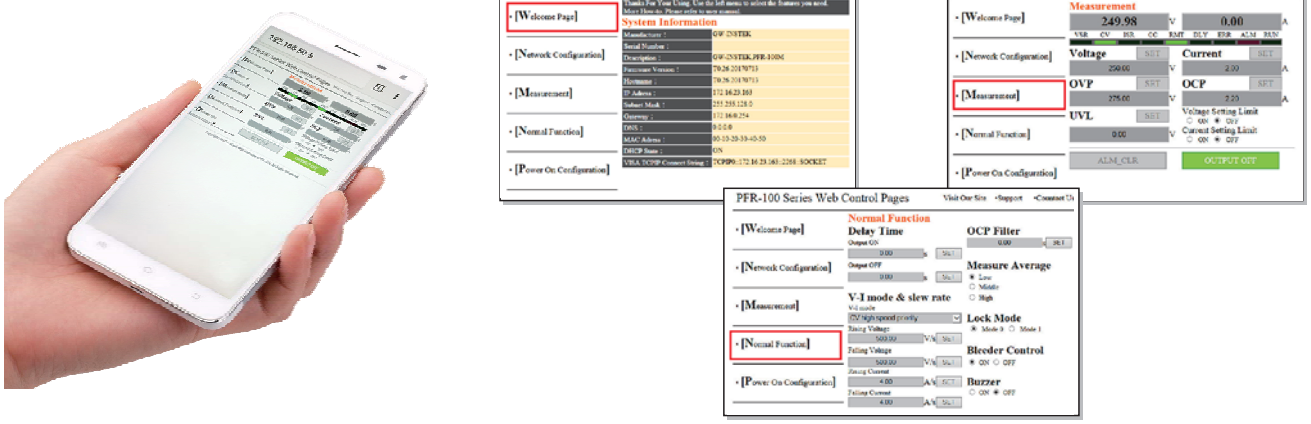

Adjustable Current Slew Rate

**Voltage Slew Rate**
**0.1V~100.0V/sec (PFR-100L)**
**0.1V~500.0V/sec (PFR-100M)**

**Current Slew Rate**
**0.01A~20.00A/sec (PFR-100L)**
**0.001A~4.000A/sec (PFR-100M)**

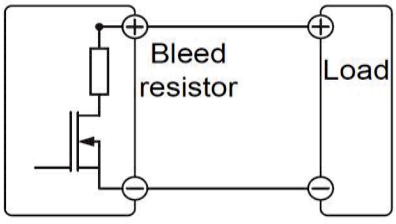
The PFR-100 series can adjust slew rate for current and voltage. Via setting the rise and fall time of voltage and current, users can verify DUT's characteristics during voltage and current variation. Additionally, slew rate adjustment can mitigate voltage shift to effectively prevent DUT from being damaged by inrush current. This function is ideal for tests such as capacitive load and motor.

## C WEB SERVER REMOTE CONTROL FUNCTION




Users, via general browsers including Internet Explorer, Mozilla Firefox or Android cellular phones, can monitor PFR-100's test and measurement anywhere. Users not only can remotely monitor PFR-100 via internet, but also remotely observe and adjust your operating PFR-100 in the lab from your home. The outputs of PFR-100 can be monitored including OVP, OCP, UVL; and system information can be checked such as unit's serial number, firmware edition and internet setting. Users can remotely adjust PFR-100 settings, including output voltage/current, the slew rate for voltage/current, Bleed circuit control, OCP, delayed time for output voltage and Buzzer settings.

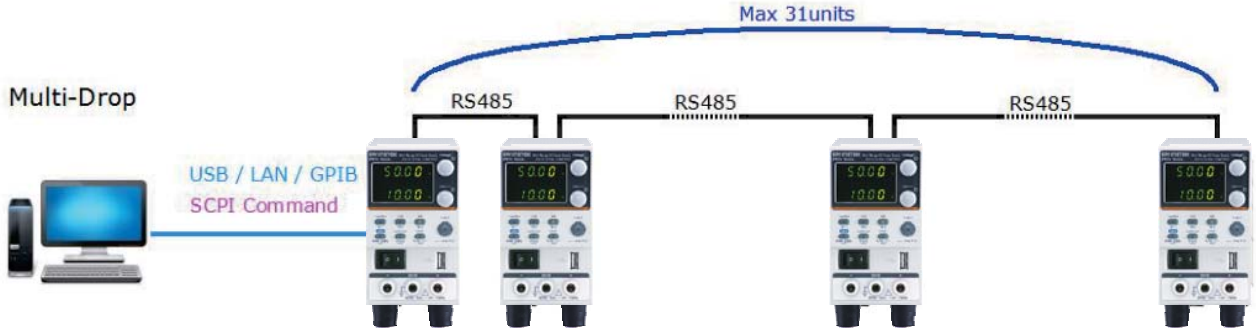
## D BLEEDER CIRCUIT CONTROL




PFR-100 Series Bleeder Circuit

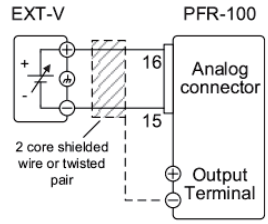
The PFR-100 series power supply has a bleeder circuit control which is in parallel with the output terminal. When power is off or load is disconnected, the bleed resistor will consume electricity from the filter capacitor. Without a bleed resistor, the filter capacitor of power could still be charged with electricity that poses a potential danger. In addition, for ATE system, bleed resistor allows the PFR-100 series to bleed current rapidly so as to prepare itself for the next operation.

## E REMOTE PROGRAM CONTROL (UP TO 31 UNITS CONNECTION)



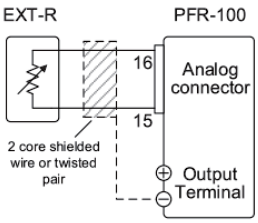

Provide USB, GPIB and LAN for PC to remote control Master PFR-100. RJ-45 connector on the rear panel can connect up to 31 units. LAN or USB remote control and augmenting slave units by using the multi-drop mode will no longer need any switch/hub that can help customers save equipment costs.

## F EXTERNAL ANALOG CONTROL FUNCTION



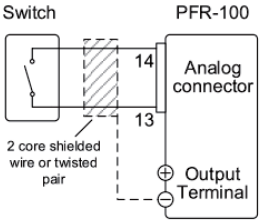

Pin16 → EXT-V (+)
Pin15 → EXT-V (-)
Wire shield → negative (-) output terminal

**External Voltage Controls Voltage Range**




Pin16 → EXT-R
Pin15 → EXT-R
Wire shield → negative (-) output terminal

**External Resistance Controls Voltage Range**



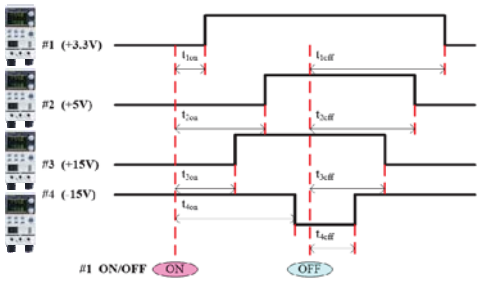

Pin14 → Switch
Pin13 → Switch
Wire shield → negative (-) output terminal

**External ON-OFF To Control Output, ON or OFF**

The rear panel of the PFR-100 series has an analog control terminal. The external analog control interface allows external voltage or resistance to control voltage and current output; and allows power supply to output or to be turned on and off.

The diagram above shows typical connection methods for external control applications. For more detailed connection information please refer to user manual.

## G OUTPUT ON/OFF DELAY




**An Example of Output On/Off Delay Control Among Multiple Outputs of the PFR-100 units**

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. When multiple PFR-100 units are used, the On/Off delay time of each unit can be set respectively referring to fix time points. This multiple-output control can be done through the analog control terminal at rear panel or through the PC programming with standard commands.

## H USING THE RACK MOUNT KIT

**GRA-431-E (EIA) Rack Mount Kit**

**GRA-431-J (JIS) Rack Mount Kit**

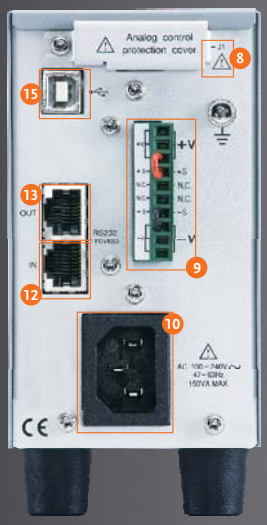
The Rack Mount Kits of the PFR-100 Series support both EIA and JIS standards. A standard rack can accommodate 5 units of PFR-100.

## PANEL INTRODUCTION

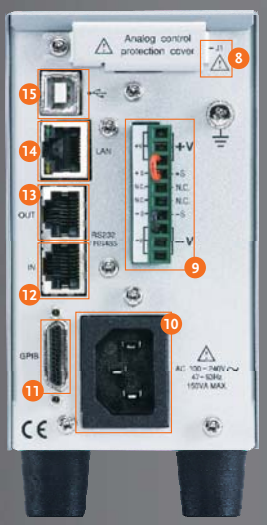
CE | GPIB | USB | RS-232 | Analog Control | LAN | RS-485 | Front/Rear Output

PFR-100L Front Panel

PFR-100M Front Panel



PFR-100L Rear Panel



PFR-100M Rear Panel

1. Voltage Knob
2. Current Knob
3. Output Button
4. USB Type A Connector
5. Front Panel Output Terminal
6. Power Switch
7. Display Area
8. Analog Control Interface
9. Rear Panel Output Terminal
10. AC Input
11. GPIB Connector (Factory Installed Options)
12. Remote Serial In Connector
13. Remote Serial Out Connector
14. LAN Connector (Factory Installed Options)
15. USB Type B Connector

## OPTIONAL ASSESSORIES

**PSU-232**
Rs232 Cable with Db9 connector kit

**GTL-104A**
test lead(for PFR-100L only)

**GTL-258**
GPIB Cable, 2000mm

**GTL-134**
test lead

**PSU-485**
Rs485 Cable with Db9 connector kit

**GTL-105A**
test lead(for PFR-100M only)

**GTL-246**
USB Cable (USB 2.0 Type A-TypeB Cable)

## SPECIFICATIONS

| | Model | | PFR-100L | PFR-100M |
|---|---|---|---|---|
| OUTPUT RATING | Rated Output Voltage<br>Rated Output Current<br>Rated Output Power | | 50V<br>10A<br>100W | 250V<br>2A<br>100W |
| REGULATION(CV) | Load Regulation (*2)<br>Line Regulation (*1) | | 10mV<br>3mV | 33mV<br>5mV |
| REGULATION(CC) | Load Regulation (*9)<br>Line Regulation (*1) | | 10mA<br>8mA | 3.2mA<br>1.2mA |
| RIPPLE & NOISE (*3) | Vp-p (*4)<br>Vr.m.s.(*5)<br>A r.m.s. | | 50mV<br>4mV<br>10mA | 150mV<br>15mV<br>2mA |
| PROGRAMMING ACCURACY | Voltage<br>Current | 0.1% of setting +<br>0.2% of setting + | 40mV<br>20mA | 200mV<br>2mA |
| MEASUREMENT ACCURACY | Voltage<br>Current | 0.1% of reading +<br>0.2% of reading + | 40mV<br>20mA | 200mV<br>2mA |
| RESPONSE TIME | Rise Time (*6)<br>Fall Time (*7)<br><br>Transient Response Time (*8) | Rated load<br>Rated load<br>No load | 50ms<br>100ms<br>500ms<br>1.5ms | 200ms<br>300ms<br>3000ms<br>2ms |
| PROGRAMMING RESOLUTION | Voltage<br>Current | | 2mV<br>1mA | 10mV<br>0.1mA |
| MEASUREMENT RESOLUTION | Voltage<br>Current | | 2mV<br>1mA | 10mV<br>0.1mA |
| PROTECTION FUNCTION | Over Voltage Protection (OVP)<br>Over Current Protection (OCP)<br>Under Voltage Limit (UVL)<br>Over Temperature Protection (OTP)<br>Low AC Input Protection (AC-Fail)<br>Power Limit (Power Limit) | Setting range<br>Setting range<br>Setting range<br>Operation<br>Operation<br>Operation | 5~55V<br>1~11A<br>0~52.5V<br>Turn the output off.<br>Turn the output off.<br>Turn the output off. | 5~275V<br>0.2~2.2A<br>0~262.5V<br>Turn the output off.<br>Turn the output off.<br>Turn the output off. |
| FRONT PANEL DISPLAY ACCURACY, 4 DIGITS | Voltage<br>Current | 0.1% of reading +<br>0.2% of reading + | 40mV<br>20mA | 200mV<br>2mA |
| ENVIRONMENT CONDITION | Operaing Temperature<br>Storage Temperature<br>Operating Humidity<br>Storage Humidity | | 0°C to 40°C<br>-20°C to 70°C<br>20% to 80% RH; No condensation<br>20% to 85% RH; No condensation | |
| READBACK TEMP. COEFFICIENT (After A 30 Minute Warm-up) | Voltage<br>Current | | 100ppm/°C<br>200ppm/°C | |
| OTHER | Analog Control<br>Interface<br>AC Input | | Yes<br>USB, RS-232/RS-485; Factory option: LAN/GPIB<br>85~265VAC, 47~63Hz, single pahse | |
| DIMENSIONS & WEIGHT | 70(W)x124(H)x300(D)mm; Approx. 2.5kg | | | |

Notes:
*1: At 85 ~ 132Vac or 170 ~ 265Vac, constant load.
*2: From No-load to Full-load, constant input voltage. Measured at the sensing point in Remote Sense.
*3: Measure with JEITA RC-9131B (1:1) probe
*4: Measurement frequency bandwidth is 10Hz to 20MHz.
*5: Measurement frequency bandwidth is 5Hz to 1MHz.
*6: From 10%~90% of rated output voltage, with rated resistive load.
*7: From 90%~10% of rated output voltage, with rated resistive load.
*8: Time for output voltage to recover within 0.1% + 10mV of its rated output for a load change from 50 to 100% of its rated output current.
*9: For load voltage change, equal to the unit voltage rating, constant input voltage.

PFR-100 Series Fanless Multi-Range D.C. Power Supply

**PFR-100□ - GL - GTL-258**

**Model:**
L : 0~50V/10A/100W
M : 0~250V/2A/100W

**Cable Options:**
GTL-258 : A GPIB cable including 25 pins Micro-D connector
PSU-232 : An RS-232 cable including RJ-45 connector
PSU-485 : An RS-485 cable including RJ-45 connector
GTL-246 : A USB cable for TypeA-TypeB connectors
_____ : None

**Interface Options:**
□ : USB(Type B)& RS-232/RS-485(RJ-45 connector) as default
GL : LAN & GPIB(25 pins Micro-D connector)

## ORDERING INFORMATION

**PFR-100L** Fanless Multi-Range D.C. Power Supply
**PFR-100M** Fanless Multi-Range D.C. Power Supply

### ACCESSORIES

CD(User Manual, Programming manual) x 1 , Power cord , GTL-134 test lead , Accessory Packages,GTL-104A test lead(for PFR-100L only) , GTL-105A test lead(for PFR-100M only)

## OPTIONAL ASSESSORIES

| | |
|---|---|
| GTL-258 | GPIB Cable, 2000mm |
| PSU-232 | RS-232 Cable with DB9 Connector Kit |
| PSU-485 | RS-485 Cable with DB9 Connector Kit |
| GTL-246 | USB Cable (USB 2.0 Type A-TypeB Cable) |
| GRA-431-J-100/200 | Rack mount adapter(JIS)with AC 100V/200V |
| GRA-431-E-100/200 | Rack mount adapter(EIA)with AC 100V/200V |
| PFR-GL | LAN+GPIB interface |



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