PLR-Series
Low Noise D.C. Power Supply

FEATURES

- Output Voltage Rating: 20V/36V/60V
- Output Power: 360W/720W
- Low Ripple and Noise (0.5mVrms/10mArms)
- Fast Transition Recovery Time (100μs)
- Equipped Power Factor Correction Circuit for AC-input 100~240VAC
- Maximum 2 units in Series Connections or 3 units in Parallel Connections
- Select the Setting Digits for Voltage and Current (Coarse/Fine Volume Control)
- Panel Lock Function/3 set of Preset Function
- Output Off Timer Function (Range: 1 min to 1000 hours & 59 mins)
- CC Priority Function (Prevent Overshoot & Inrush Current)
- Sequence Function of PC Editing (Max.: 1000 steps/Min. step Period: 50ms)
- Protection: OVP, UVP, OCP, Remote Sensing (Terminal Open)
- External Analog Control Function
- PC Remote Interface Standard: RS-232
- PC Remote Interface Optional: LAN/USB, GPIB/USB, External Analog Control
GW Instek launches the new generation PLR-series programmable switching D.C. power supply. The single power output ranges are 360W and 720W. The series comprises 6 models and the voltage ranges are 20V, 36V and 60V. The PLR-series is a hybrid circuit design which incorporates front stage switching and rear stage linear architectures. The unique advantages of this design benefit from the combination of both switching and linear structures. The front stage switching structure can effectively reduce size and weight, and the rear stage linear structure can maintain lower ripple voltage, lower ripple current, and faster transient response.

The PLR-series features many functions, including three sets of user-defined Preset function; programmable automatic Output off timer function; programmable Sequence function; CV, CC priority activation functions (prevent overshoot and inrush current while output is turned on); External voltage and current output control and OVP, OCP and UVP functions. The above functions are built-in. Users do not have to pay for any extra costs.

The flexible allocation is one of the advantages of the PLR-series. For users require large output power, the PLR-series allows maximum 3 same model units in parallel connection to obtain larger output current, and maximum 2 same model units in series connection to obtain larger output voltage.

The PLR-series takes the consideration of the integration between its rack and other systems. Hence, the heat dissipation design adopts front air inlet and rear air outlet (there is no air outlet on the top, bottom, and on the both sides). The optional dedicated rack mount adapter (GRA-427) is for PLR-series to be rack mounted. Other equipment can be directly placed on top or under PLR-series to save rack space.

The PLR-series is equipped with RS-232 interface and also provides optional GPIB&USB (PLR-GU) and USB&LAN (PLR-LU). The program control of maximum 32 units can be realized by Local Bus no matter which interface is utilized. Additionally, the PLR-ARC interface not only provides external voltage and external resistance control but also meets the requirement of PLC control.

The PLR-series genuinely meets users’ requirements of the new generation DC power supplies. The series, completely simplifying and expediting system development processes, is suitable for the R&D, design verification, and manufacturing of the semi-conductor equipment, automobile, component and communications industries.

There are 6 models of the PLR-series. Model number, output voltage, output current and output power are as follows:

<table>
<thead>
<tr>
<th>Function</th>
<th>Model</th>
<th>PLR 20-18</th>
<th>PLR 20-36</th>
<th>PLR 36-10</th>
<th>PLR 36-20</th>
<th>PLR 60-6</th>
<th>PLR 60-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Channel</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Output Voltage</td>
<td>0 ~ 20V</td>
<td>0 ~ 20V</td>
<td>0 ~ 36V</td>
<td>0 ~ 36V</td>
<td>0 ~ 60V</td>
<td>0 ~ 60V</td>
<td>0 ~ 60V</td>
</tr>
<tr>
<td>Output Current</td>
<td>0 ~ 18A</td>
<td>0 ~ 36A</td>
<td>0 ~ 10A</td>
<td>0 ~ 20A</td>
<td>0 ~ 6A</td>
<td>0 ~ 12A</td>
<td></td>
</tr>
<tr>
<td>Output Power</td>
<td>360W</td>
<td>720W</td>
<td>360W</td>
<td>720W</td>
<td>360W</td>
<td>360W</td>
<td>720W</td>
</tr>
</tbody>
</table>

A. SERIES AND PARALLEL CONNECTIONS (Voltage and Current Allocation Chart for Series and Parallel Operation)

Series Connection Diagram

To bring up the overall output power, the PLR-series supports same model units to be arranged in series operation for the maximum 2 units or in parallel operation for maximum 3 units.

Parallel Connection Diagram

The series is very suitable for the power supply applications on D.C. power supply modules, electronic parts and components, and wafer plating equipment.
### B. SEQUENCE FUNCTION

Before applying the sequence function, a series of different voltage, current, and duration steps must be edited by a PC to make a sequence. CSV format, through RS-232C, LAN/USB (option) or GPIB/USB (option) interface, is transmitted to the memory of the PLR-series to sequentially execute steps consisting of voltage, current, and duration settings of the sequence. The shortest time for each step is 50ms and the maximum steps are 1000. The sequence function is to test DUT’s response to the fast changing power supply that is one of the crucial verification items for electronic products’ reliability tests.

### Example for the Sequence Operation

- **Step 1**: Voltage 10V, Current 1A, Duration 100ms
- **Step 2**: Voltage 20V, Current 2A, Duration 200ms
- **Step 3**: Voltage 30V, Current 3A, Duration 300ms

### C. OUTPUT OFF TIMER FUNCTION

The output off timer function is to set the PLR-series to automatically turn off its output after a certain period of time. The shortest time setting is 1 minute. The setting range is from 1 minute to the maximum 1000 hours and 59 minutes. This function can only be activated when power supply output is being turned on.

### D. OVP, OCP AND UVP FUNCTIONS

- **OVP**: Over Voltage Protection
- **UVP**: Under Voltage Protection
- **OCP**: Over Current Protection

When the voltage and current outputs exceed the preset conditions of OVP and OCP, the PLR-series will be shut down so as to prevent DUT from any damages.

- **OCP**: the setting range is 5%–110% of the rated output
- **OVP**: the setting range is 10%–110% of the rated output
- **UVP**: the setting range is 1V – 110% of the rated output

### E. PRESET FUNCTION

The PLR-series provides three parameter preset function keys on the front panel and each preset memory consists of parameters of output voltage and output current settings. Users via storing frequently used voltage and current parameters from the front panel to quickly save and recall parameters.
The rear panel of the PLR-series features analog control terminal which controls output voltage and current values through external voltage or resistance. The on and off of power supply output or main power disconnection can also be executed via external analog control interface. The above diagrams show the typical external analog control connection methods. For more connection information, please refer to the user manual.

### Comparisons on Transient Recovery Time Characteristics

<table>
<thead>
<tr>
<th>Structure</th>
<th>Ripple Voltage</th>
<th>Ripple Current</th>
<th>Weight</th>
<th>Rating Power Output</th>
<th>Bandwidth: 1MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linear/200W</td>
<td>0.35mVrms</td>
<td>2mAms</td>
<td>10kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PLR 20-18(Hybrid)/360W</td>
<td>0.5mVrms</td>
<td>5mAms</td>
<td>5.2kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switching/360W</td>
<td>7mVrms</td>
<td>72mAms</td>
<td>7kg</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The PLR-series has a fast transient recovery capability, which is ideal for applications of large load current changes. The above diagrams show the actual comparative results of transient response time under different techniques.
1. Operation Panel
2. Rotary Encoder
3. Power Switch
4. Front Output Terminals
5. Grill
6. Std.: RS-232C
   Opt.: PLR-GU/PLR-LU/
   PLR-ARC
7. Remote Sensing Terminals
8. Output Terminals
9. J1 Connector
10. J2 Connector
11. AC Inlet

H. FEATURE COMPARISONS

<table>
<thead>
<tr>
<th>Operation</th>
<th>Linear Type Power Supply</th>
<th>PLR-series (Hybrid)</th>
<th>Switching Type Power Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ripple &amp; Noise for CV</td>
<td>0.35mVRms (Typ.)</td>
<td>≤ 0.5mVRms</td>
<td>7mVRms (Typ.)</td>
</tr>
<tr>
<td>Ripple &amp; Noise for CC</td>
<td>&lt; 2mArms (Typ.)</td>
<td>≤ 5mAms</td>
<td>72mAms (Typ.)</td>
</tr>
<tr>
<td>Recovery Time</td>
<td>&lt; 50μs (Typ.)</td>
<td>≤ 100μs</td>
<td>1ms (Typ.)</td>
</tr>
<tr>
<td>Series &amp; Parallel Operation</td>
<td>—</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>External Analog Control Interface</td>
<td>Std.: RS-232/GPIB</td>
<td>Opt.</td>
<td>Std.</td>
</tr>
<tr>
<td></td>
<td>200W</td>
<td>360W</td>
<td>Std.: USB/LAN</td>
</tr>
<tr>
<td></td>
<td>230(W) × 140(H) × 380(D)</td>
<td>140(W) × 124(H) × 364(D)</td>
<td>Opt.: USB to GPIB, USB to RS-232</td>
</tr>
<tr>
<td></td>
<td>10 kg</td>
<td>5.2 kg</td>
<td>71(W) × 124(H) × 350(D)</td>
</tr>
<tr>
<td></td>
<td>△</td>
<td>△</td>
<td>△</td>
</tr>
<tr>
<td></td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
</tr>
</tbody>
</table>

◎◎ : Excellent □ : Good △ : Bad
### SPECIFICATIONS

#### PLR 20-18
- **Output Rating:** 10V-20V, 1mA, 10mA, 100mA
- **Voltage:** 0-18V, 0-20V, 0-36V, 0-60V
- **Current:** 1mA, 10mA, 100mA, 1000mA
- **Power Consumption:** 500VA, 1100VA, 520VA, 1050VA, 510VA
- **READ BACK TEMP. COEFFICIENT:** 1.0% (0.1% RDG + 0.001% FS)
- **RESPONSE TIME:** 50ms, 150ms
- **SERIES AND PARALLEL CAPABILITY:** Up to 2 units
- **MEASUREMENT RESOLUTION:** 1% (SET + 1% FS)
- **ORIENTATION INFORMATION:**
  - **GPIB-USB-HS (High-Speed) Interface Card**
  - **USB Cable (1.2m)**
  - **Series Connection Signal Cable**
  - **Parallel Connection Signal Cable (2~3 units)**

#### PLR 20-36
- **Output Rating:** 10V-36V, 1mA, 10mA, 100mA
- **Voltage:** 0-36V, 0-60V, 0-10A, 0-20A
- **Current:** 1mA, 10mA, 100mA, 1000mA
- **Power Consumption:** 500VA, 1100VA, 520VA, 1050VA, 510VA
- **READ BACK TEMP. COEFFICIENT:** 1.0% (0.1% RDG + 0.001% FS)
- **RESPONSE TIME:** 50ms, 150ms
- **SERIES AND PARALLEL CAPABILITY:** Up to 2 units
- **MEASUREMENT RESOLUTION:** 1% (SET + 1% FS)
- **ORIENTATION INFORMATION:**
  - **GPIB-USB-HS (High-Speed) Interface Card**
  - **USB Cable (1.2m)**
  - **Series Connection Signal Cable**
  - **Parallel Connection Signal Cable (2~3 units)**

#### PLR 36-10
- **Output Rating:** 10V-36V, 1mA, 10mA, 100mA
- **Voltage:** 0-36V, 0-60V, 0-10A, 0-20A
- **Current:** 1mA, 10mA, 100mA, 1000mA
- **Power Consumption:** 500VA, 1100VA, 520VA, 1050VA, 510VA
- **READ BACK TEMP. COEFFICIENT:** 1.0% (0.1% RDG + 0.001% FS)
- **RESPONSE TIME:** 50ms, 150ms
- **SERIES AND PARALLEL CAPABILITY:** Up to 2 units
- **MEASUREMENT RESOLUTION:** 1% (SET + 1% FS)
- **ORIENTATION INFORMATION:**
  - **GPIB-USB-HS (High-Speed) Interface Card**
  - **USB Cable (1.2m)**
  - **Series Connection Signal Cable**
  - **Parallel Connection Signal Cable (2~3 units)**

#### PLR 36-20
- **Output Rating:** 20V-36V, 1mA, 10mA, 100mA
- **Voltage:** 0-36V, 0-60V, 0-10A, 0-20A
- **Current:** 1mA, 10mA, 100mA, 1000mA
- **Power Consumption:** 500VA, 1100VA, 520VA, 1050VA, 510VA
- **READ BACK TEMP. COEFFICIENT:** 1.0% (0.1% RDG + 0.001% FS)
- **RESPONSE TIME:** 50ms, 150ms
- **SERIES AND PARALLEL CAPABILITY:** Up to 2 units
- **MEASUREMENT RESOLUTION:** 1% (SET + 1% FS)
- **ORIENTATION INFORMATION:**
  - **GPIB-USB-HS (High-Speed) Interface Card**
  - **USB Cable (1.2m)**
  - **Series Connection Signal Cable**
  - **Parallel Connection Signal Cable (2~3 units)**

#### PLR 60-6
- **Output Rating:** 6V-60V, 1mA, 10mA, 100mA
- **Voltage:** 0-60V, 0-120V, 0-20A, 0-360W
- **Current:** 1mA, 10mA, 100mA, 1000mA
- **Power Consumption:** 500VA, 1100VA, 520VA, 1050VA, 510VA
- **READ BACK TEMP. COEFFICIENT:** 1.0% (0.1% RDG + 0.001% FS)
- **RESPONSE TIME:** 50ms, 150ms
- **SERIES AND PARALLEL CAPABILITY:** Up to 2 units
- **MEASUREMENT RESOLUTION:** 1% (SET + 1% FS)
- **ORIENTATION INFORMATION:**
  - **GPIB-USB-HS (High-Speed) Interface Card**
  - **USB Cable (1.2m)**
  - **Series Connection Signal Cable**
  - **Parallel Connection Signal Cable (2~3 units)**

#### PLR 60-12
- **Output Rating:** 12V-60V, 1mA, 10mA, 100mA
- **Voltage:** 0-60V, 0-120V, 0-20A, 0-360W
- **Current:** 1mA, 10mA, 100mA, 1000mA
- **Power Consumption:** 500VA, 1100VA, 520VA, 1050VA, 510VA
- **READ BACK TEMP. COEFFICIENT:** 1.0% (0.1% RDG + 0.001% FS)
- **RESPONSE TIME:** 50ms, 150ms
- **SERIES AND PARALLEL CAPABILITY:** Up to 2 units
- **MEASUREMENT RESOLUTION:** 1% (SET + 1% FS)
- **ORIENTATION INFORMATION:**
  - **GPIB-USB-HS (High-Speed) Interface Card**
  - **USB Cable (1.2m)**
  - **Series Connection Signal Cable**
  - **Parallel Connection Signal Cable (2~3 units)**

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### ACCESSORIES

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLR-CPB</td>
<td>GPIB Interface Card</td>
</tr>
<tr>
<td>PLR-LU</td>
<td>LAN/USB Interface Card</td>
</tr>
<tr>
<td>PLR-ARC</td>
<td>External Analog Control Interface Card</td>
</tr>
<tr>
<td>PLR-001</td>
<td>Parallel Connection Signal Cable (2~3 units)</td>
</tr>
<tr>
<td>PLR-002</td>
<td>Series Connection Signal Cable</td>
</tr>
<tr>
<td>CR-427</td>
<td>Rack Mount Adapter (EIA-355)</td>
</tr>
<tr>
<td>CR-428</td>
<td>GPIB Interface Card (2.0m)</td>
</tr>
<tr>
<td>CR-429</td>
<td>GPIB-USB-HS (High-Speed)</td>
</tr>
</tbody>
</table>

**Specifications subject to change without notice.**