How to Choose a DC Power Supply for Your Application? Five Key Selection Steps

DC power supply is one of the essential instrument for electronic engineers, and this article explains how to select a DC power supply from the application perspective.

Five key steps in selecting a DC power supply:

1. The selection of different DC power supply categories
2. Is there a remote control requirement?
3. How many output channels?
4. In what output ranges?
5. Special function requirements?

Step 1: The selection of DC power supply categories:

DC power supplies have different features based on the design method. The seven most common features are utilized (inclusive size, weight, ripple and noise, response time, efficiency, common mode noise current and cost) to compare the following three design categories. The reason for using features is that when applied appropriately, they serve as advantages, but if applied inappropriately, they can be disadvantages. For example, if your DUT is a battery-powered product, choosing a linear DC power supply with low ripple and noise characteristics would be the optimal choice.

	Linear	Hybrid	Switching
Size	Large	Medium	Small
Weight	Heavy	Medium	Light
Ripple and noise	Low	Medium	High
Response time	Fast	Medium	Slow
Efficiency	Low	Medium	High
Common mode noise current	Low	Medium	High
Cost	Low cost for power below 500W High cost for power above 500W	High	Low cost for high wattage

Table 1: Features of Various Categories of DC Power Supplies

Step 2: Is there a remote control requirement?

Remote control methods

- Analog signal control
- Computer control
- Industrial control

Required connection interfaces for computer control: USB/LAN/RS-232/RS-485/GPIB. Considerations for the interface include:

- Connection speed
- Connection length
- Number of connections
- Cost

Industrial control interfaces: ModBus/ProfiBus/ProfitNet/DeviceNet/CAN

Step 3: How many output channels?

DC power supplies can have either single or multiple outputs.

Step 4: In what output ranges?

The design of the output range of DC power supplies is divided into three types: single range, dual range, and wide range.

In a DC power supply, the most challenging situation is when it encounters limitations in voltage or current that fall short of the requirements. In such cases, a dual-range or wide-range design becomes crucial to maximize the applicability of the power supply.

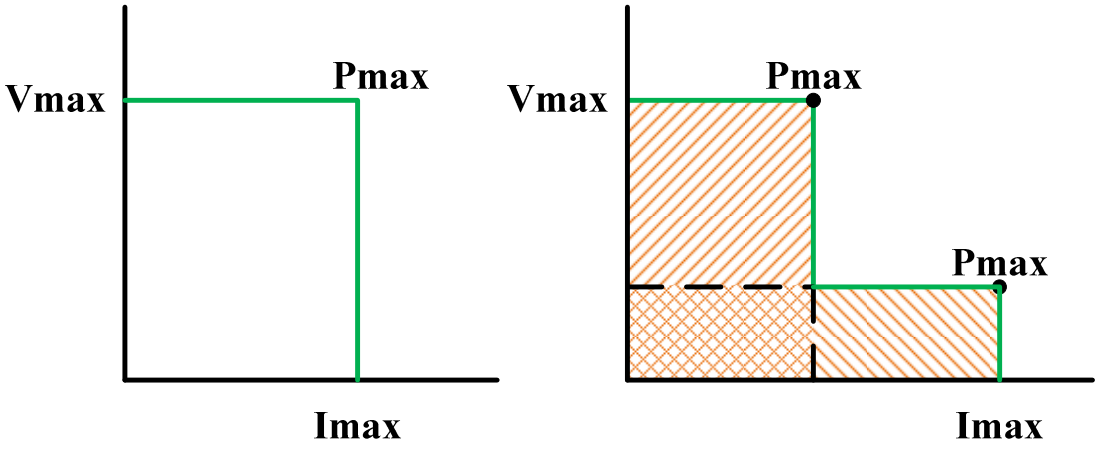

Figure 1 Left: Voltage and current output range illustration for single output range. Figure 1 Right: Voltage and current output range illustration for dual output range (GW Instek PSM, PPH, and SPD series power supplies with dual output range capability).

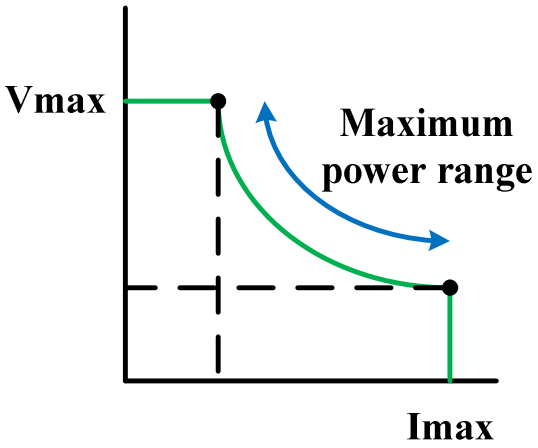

Figure 2: Voltage and current output range illustration for multi output range (GW Instek PSR, PSB, PSW, and PFR series power supplies with multi-range output capability).

Step 5: Special function requirements?

In response to customer application needs, the design of DC power supplies has evolved over time, giving rise to various special features. These features include:

- Adjustable Slew Rate For Voltage and Current
- Bleeder Circuit Control: The PSB-1000 series, PSW series, PSU series, and PFR series are equipped with this function.
- CC Priority：Constant Current Priority Output Mode
- Data Logger
- Digital Voltage Meter (DVM): The PPH-1503 is equipped with this function.
- External Analog Control and Monitor Function
- Internal Resistance Setting (IR Setting): The PSB-1000 series, PSW series, PSU series, and PPH series are equipped with this function.
- Key Lock
- List mode
- Fanless design, low audio noise power supply in a noise-free chamber
- RS-485 Multi-Drop Connection: Through a computer or PLC, connecting to the main control power supply allows easy control of up to 31 units (1+30) of power supplies. The PSU and PFR series are equipped with this function.
- Output off timer
- Output ON/OFF Delay Function
- Preset Memory Function

- Pulse Current Measurement: The PPH-1503 is equipped with this function.
- Remote Sensing Function
- Rising/Falling Adjustable Slew Rate
- Sequential Output via Internal Memory
- Sequential Output via USB Flash Drive
- Trigger output
- Web Server

The above special features will be elaborately explained in individual application articles. The filtering functionality on the GW Instek official website (Figure 3) allows users to easily find the DC power supply that suits their applications by simple clicks.

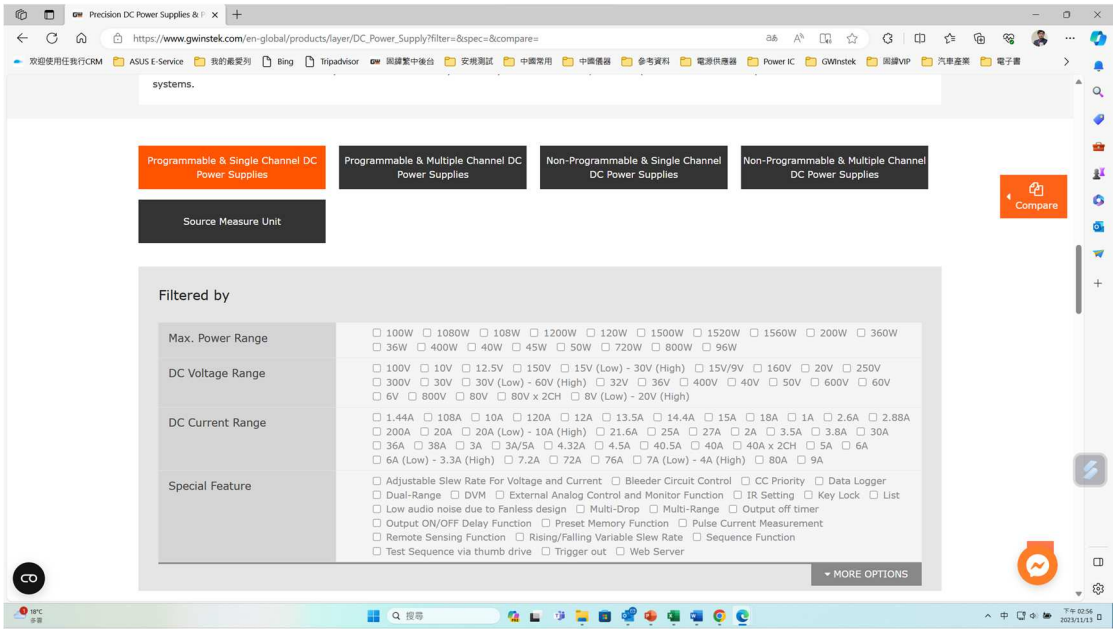

Figure 3: Filtering Functionality on the GW Instek Official Website.

https://www.gwinstek.com/en-global/products/layer/DC_Power_Supply?filter=&spec=&compare=

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