

Constant Power Envelope on QuadTech's 42000 Series DC Programmable Sources

This application note will discuss the benefits of a DC programmable source with constant power envelope versus a conventional DC programmable source. Since power supplies are priced based on rated power, it would be highly desirable to have a power supply that could achieve rated power output regardless of what voltage or current is programmed. Power supplies with a constant power envelope do just that, as compared with conventional power supplies that only achieve rated power at maximum voltage and current.

Conventional

DC programmable sources are specified by output power, voltage and current. Conventional DC programmable sources have a fixed voltage-current operating region. This means the power supply can operate in constant voltage mode over the full current range specified or in constant current mode over the full voltage range specified. For example a Xantrex XFR 40-30 is a 1200W power supply with a voltage range to 40V and current range to 30A. When you multiply, $40V * 30A$ gives the full rated power of 1200W. This fixed operating region is shown in yellow in Figure 1.

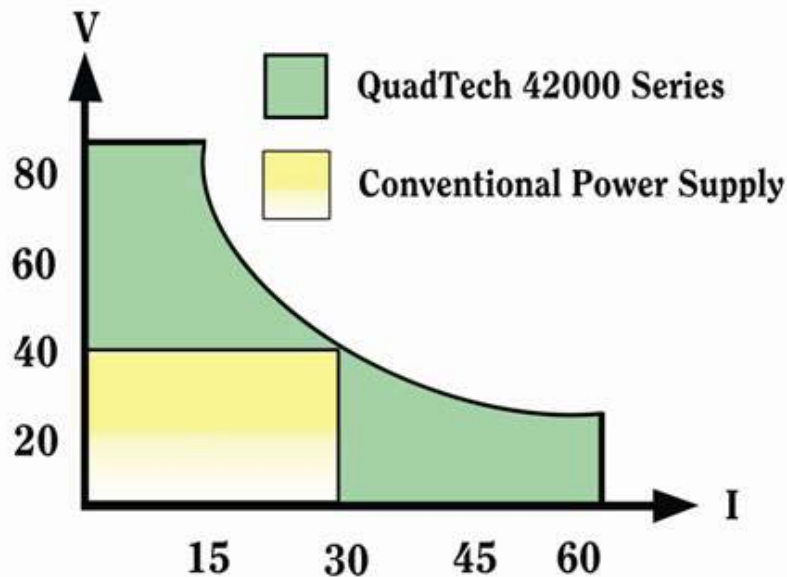


Figure 1. Power Supply Operating Region

A conventional power supply only offers full power at maximum rated voltage and current. If the voltage is reduced to 20V the maximum current is still 30A, so in actuality you have a 600W power supply, $20V * 30A$, even though you purchased a 1200W power supply.

Constant Power Envelope Supplies

QuadTech's 42000 Series DC Programmable Power Supplies feature a constant power envelope. With this feature, regardless of the set voltage, the power supply can output enough current to achieve the full 1200W power rating. Conversely, for any given current the power supply can output enough voltage to get to full power rating. For example, the output specification for the QuadTech model 42012-80-60 is 1200W/80V/60A. The constant power envelope, allows operating flexibly in various combinations of voltage and current, , 0-80V, 0-60A in any combination not to exceed 1200W, shown in dark green in Figure 1.

In the example above the Xantrex XFR 40-30 effectively can supply only half power at 20V. The constant power envelope of the QuadTech 42012-80-60 allows you to still supply 1200W of power while at 20V and 60A.

The power supply allows rated power at lower programmed voltage or current levels. Constant power envelope power supplies also offer a wider range of voltage and current combinations than conventional power supplies. The 42000 Series provides greater flexibility to meet more applications for both low voltage/high current and high voltage/low current DUTs. QuadTech's 42000 Series can achieve more testing requirements using a single supply and avoids the need to purchase multiple supplies or supplies with higher power output, saving both cost and space.