

Powering the Most Advanced Military Applications

The defense industry is always changing, with new technology being adopted every now and then. Since electricity is needed to power these new technologies, the demand placed on electrical systems in the military continues to increase. Military equipment now needs more power - delivered more reliably and managed more efficiently.

High performance, reliability, and durability have become baseline requirements for [power conversion solutions](#) in the military. Regardless of the type of power conversion and of whether the solution will be used in military vehicles, aircraft or ships, there are military standards that power supply solutions in defense must conform to.

Such military standards define baseline features that military equipment must meet to ensure ruggedness, reliability, and high performance. The standards also define testing requirements for military electrical equipment. For example, during testing, military equipment must be subjected to conditions that reflect the real environment the equipment will be used in.

In addition to the use of custom military power supply solutions, the defense industry is turning to power management solutions. These are essential in providing a central hub for power management, promoting the efficient use of power, and improving reliability by enabling proactive resolution of power issues.

There's a lot to gain from power management solutions in the defense industry, including tactical advantage in the field. They help ground vehicles lower both their audio and thermal profiles during silent watch time. Normally, to power onboard electrical equipment during silent watch time, engines are allowed to run idle. This uses a lot of fuel, which reduces the total silent watch time possible. With advanced power management, electrical equipment can be powered without running the engine.

Perhaps the biggest advantage of power management systems is that they conveniently tie together power generation, storage, and conversion in a central management system. In so doing, they have helped come up with electrical systems capable of powering even the most demanding applications in the military industry.



However, in addition to advanced power management systems, custom [military power supply solutions](#) have played a huge part in powering the supersonic jets and formidable warships of today.

Applications of Military Power Supply Solutions

There is a wide range of power conversion solutions for the numerous applications in defense. These include DC/AC inverters, DC/DC converters, AC/DC power supplies and battery chargers, active harmonic filters, AC/AC frequency converters, transformers, and electronic loads.

These solutions also have to conform to different standards, according to whether they are for ground applications, shipboards, or aircraft.

QPL transformers are built to withstand the stress of lift-off in rockets and the extremely low temperatures in outer space. They are also used in other aeronautical equipment like spy satellites.

The DC/AC inverters needed in ships, aircraft, and vehicles need to be lightweight but powerful. They have to continue operating even in the harshest conditions. They also typically have protection against overheating, over-voltage, and short-circuiting, in addition to being highly reliable and low-maintenance. Custom inverters come with capabilities such as a wide range of DC inputs, from 12V to 600V.

Power supplies used in ships and on aircraft need to have low total harmonic distortion to reduce interference between systems and should therefore be equipped with power factor correction circuits.

AC/DC military power supplies should work fine under heavy condensation and high-impact shock, all while withstanding high loads.

AC/DC Military Power Supplies

They can be high-voltage or low-voltage and are used in a wide range of applications. A good AC/DC converter should have a wide variety of input voltages and allow for single or multiple outputs according to the specific use. It should also be highly reliable and provide EMI control. In addition, it should continue operating in extreme temperatures; as low as -55 degrees Celsius and as high as 105 degrees Celsius.

It should also have thermal management and supervisory circuits in addition to protection for reverse polarity, overload, and short-circuiting.

Rack-mounted AC/DC power supplies have standard modules, sine-wave or square-wave inverters, or custom multiple DC outputs. They have high power densities and a high input transient tolerance to comply with the MIL-STD-1399. They also have power factor correction and allow for battery backup.

In low-noise applications, linear power supplies are the most appropriate. They can handle low and high-voltage input transients as specified in the MIL-STD-704 standard.

Shipboard power converters have to meet harmonic distortion requirements specified in MIL-STD-1399. Accordingly, they have active power factor correction and have polyphase transformers combined with tuned LC filters.

Conclusion

The requirements placed on electrical systems in the defense industry are demanding. Not only is high reliability essential but the equipment also has to be subjected to harsh environmental conditions. Such equipment also has to meet tough military standards.

To meet all these demands, military electrical equipment such as power supply solutions have become extremely reliable and high-performance. They've also had to be ruggedized.

In addition, power management systems have played a crucial role in enabling the monitoring and central management of power generation, storage, and conversion. Military applications will only continue to grow in complexity, which means the race for perfection in electrical solutions will only intensify.