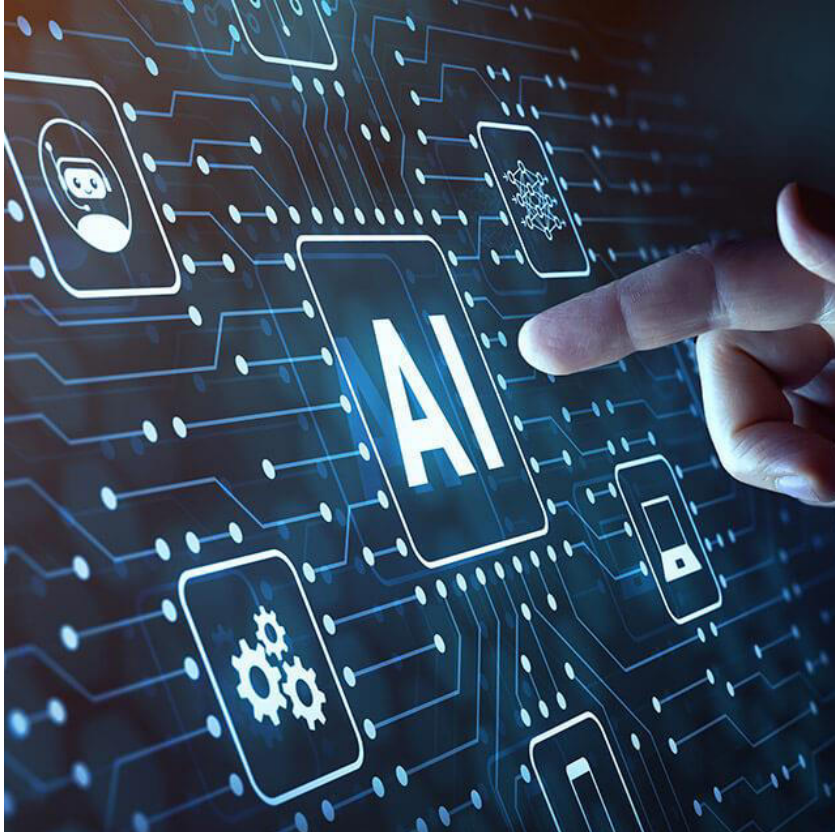


# How to Choose an AI Server Power Supply Unit (PSU)?

## AI Server Power Supply Solutions

With the rapid development and widespread adoption of AI technology, the server market has undergone significant changes in recent years. The launch of OpenAI's ChatGPT has sparked a trend in language models and intelligent chatbots. The computation behind ChatGPT relies on powerful "AI servers," which has brought attention to the AI server market.



# What is an AI server?

An AI server is a specially designed and optimized server that may have one or more high-performance GPUs (Graphics Processing Units) or dedicated AI accelerators, such as Google's Tensor Processing Units (TPU) or NVIDIA's AI accelerator cards, among others. These hardware components provide a significant amount of parallel processing power for AI applications. Software is also a crucial component of AI servers. This may include operating systems optimized for AI and machine learning workloads, as well as libraries and tools that support AI frameworks like TensorFlow, PyTorch, and others.

## Why do we need AI servers? Applications of AI servers

We need AI servers because the computational demands of AI are extremely high. AI servers offer specially optimized hardware and software for storing and processing vast amounts of data, thus supporting the training and execution of AI models. The applications of AI servers are very diverse, including image and voice recognition, natural language processing, predictive analytics, personalized recommendation systems, autonomous driving (image recognition), and the medical field (intelligent diagnosis), among others.

# Differences between AI servers and general servers

The main differences between AI servers and general servers lie in their design and intended use. General servers are primarily used for data storage, running applications, and providing network services. Their design aims for efficiency, high stability, and reliable data storage. They have strong capabilities in data transmission and control, but they have fewer computational units because they operate at slower speeds.

In contrast, AI servers significantly emphasize a higher number of computational units and are specifically designed for running machine learning and deep learning workloads. The ability to parallel process data is crucial for training neural network models and performing rapid matrix multiplications. In summary, AI servers have more powerful computational capabilities and faster data processing speeds compared to general servers. Efficient data processing means there is no latency in data transmission. For applications like AR/VR, even slight delays can greatly affect the user experience. For autonomous driving, any delay in data transmission or insufficient computational speed may raise safety concerns and is not tolerable.

## Advantages and prospects of AI servers

With the demand for emerging technologies such as VR/AR, ultra-high resolution, and autonomous driving, the world is currently in the era of a significant increase in data volume. According to IDC statistics, global cloud data has grown from 4.4ZB in 2013 to over 50ZB by 2023, a growth of more than tenfold. With the rapid growth of global cloud data, AI servers that excel at simultaneously processing large amounts of data and serving as fundamental equipment for storing vast amounts of data are destined to become a battleground for various industries. However, the PSU within AI servers is a crucial component that affects the performance of AI servers. This is because the hardware components inside AI servers have significantly higher power demands compared to regular servers. Therefore, the PSU inside an AI server must supply more power than regular servers to drive these high-performance components, while also ensuring sufficient redundant power to handle load variations and prevent data congestion.

# The importance of AI server power supply (wattage, stability, reliability)

To understand how to select a suitable AI server PSU, one must first grasp its fundamentals. For dependable operation, AI servers rely on robust and stable PSUs. The PSU serves as a vital component responsible for converting alternating current (AC) from the electrical grid into the direct current (DC) necessary for the server's electronic components. In the context of high-performance AI servers, the PSU must deliver both ample and stable power to drive CPUs, GPUs, or AI accelerators. Additionally, PSU efficiency is crucial, as it directly influences overall energy consumption and heat dissipation requirements. A highly efficient PSU can minimize energy waste and reduce the demand for heat dissipation, ensuring server stability during high-load operations. Moreover, an efficient PSU can extend its lifespan and mitigate server downtime resulting from power-related issues.

## How to choose an AI server PSU?

After understanding the importance of an AI server PSU, let's now explore how to select a good PSU. First and foremost, ensure that it provides sufficient power to meet the demands of all hardware components to prevent any power fluctuations or interruptions that could lead to system failures. Secondly, check the PSU's efficiency and stability. Lastly, ensure that the power supply unit has robust protection features such as overcurrent protection (OCP), over temperature protection (OTP), and over voltage protection (OVP). These three protection features are built-in safety measures of the PSU designed to prevent hardware damage and ensure system stability. Among them, OCP shuts down or limits the power supply unit when the output current exceeds limits to prevent hardware damage. OTP automatically shuts down the PSU when the internal temperature becomes excessively high to prevent overheating. OVP functions to shut down or limit the PSU when the output voltage exceeds limits to safeguard hardware from high voltage damage.

# FSP AI server power supply solutions

Considering these requirements, FSP has introduced a series of AI server PSUs, with the most representative being the [FSP3000-20FE](#). This product features extremely low total harmonic distortion (iTHD), an operating temperature range of 0 to 55°C, and is designed to operate at altitudes of up to 5,000 meters, providing a total power capacity of up to 3,000 watts. In other words, even in harsh and extreme environments, this product can continue to perform, showcasing its strong adaptability. Moreover, this product incorporates circuit protection designs, including OCP, OTP, and OVP, along with output short-circuit protection and a resettable power shut-off feature that allows it to communicate with the motherboard, ensuring reliable safety. With these protections in place, concerns about overheating or system failures due to excessive loads are a thing of the past. For AI servers, FSP has also introduced several excellent products, such as the [YSEC1600AM-2A00P10](#) and [YSEC2000AM-2A00P10](#). These are specialized PSUs for AI servers, boasting 80 PLUS® Platinum certification with an efficiency rating of up to 94% and built-in PMBus 1.2 technology. Their advantage lies in their compact size, making them suitable for installation in edge computing devices. Furthermore, due to their high conversion efficiency and excellent heat dissipation performance, they ensure stable operation of both the PSU and edge computing devices during long-term usage.

In the future, with the further development of edge computing and AI technology, the demand for these hardware components will continue to rise. Among them, AI servers and their PSUs will play increasingly important roles in the future. Choosing the right PSU ensures not only the smooth operation of AI servers but also provides assurance for the ongoing development and innovation of AI applications.

## About FSP

FSP Group is one of the global leading power supply manufacturer. Since 1993, FSP Group has followed the management conception “service, profession, and innovation” to fulfill its responsibilities as a green energy resolution supplier.

