

# Application Note

## Water Cooling



**Tektronix**® +



**Elektro-Automatik**

# Introduction

Air cooling and water cooling are two primary methods for regulating temperature in various systems, such as computers, automotive engines and industrial equipment. In today's technologically advanced landscape, efficient thermal management is a critical requirement for maintaining the performance, reliability, and longevity of electronic devices and industrial equipment. Among the various cooling solutions available, water cooling has emerged as a superior alternative to traditional air cooling methods, especially in high-demand applications.

Water-cooled systems leverage the high thermal conductivity of water to dissipate heat more effectively than air-cooled systems. This results in enhanced cooling efficiency, quieter operation, and the ability to handle higher power densities, making water cooling an ideal solution for environments where optimal thermal management is paramount. From ensuring the uninterrupted performance of high-performance systems and industrial machinery to extending the lifespan of critical electronic components in harsh operating conditions, water cooling offers a robust and reliable approach to manage heat.

**By understanding the role of water-cooled devices, stakeholders can make informed decisions to optimize their systems for superior performance and sustainability.**



## Applications and advantages

Industrial environments can be harsh with high ambient temperatures, dust, and other contaminants. In addition, industrial facilities often have to comply with stringent environmental regulations regarding heat and noise emissions. Water-cooled systems can provide stable operation in such conditions, as the cooling efficiency is less affected by the external environment compared to air cooling. Furthermore, water-cooled power supplies can help to meet the standards required by reduced noise levels.

Water cooling has a superior heat dissipation and has a higher thermal conductivity than air, allowing it to absorb and transfer more heat efficiently. This makes water cooling more effective at removing heat from critical components. As water can absorb more heat before it starts to increase in temperature compared to air, a lower and more consistent operating temperature of the device is reached. This helps to extend the lifespan of electronic components as lower temperatures reduce thermal stress and the risk of overheating. Water-cooled power supplies can help prevent overheating and thermal shutdowns, thereby extending the lifespan of the equipment and reducing the frequency of maintenance and replacements.

Water-cooled systems do not emit any heat into the direct environment. This means that surrounding test benches and industrial processes are not affected thermally. There is also no interference or impairment for personal who are working on or with the equipment. Another advantage is that the air conditioning of the building does not have to be designed as extensively, as the heat emitted by the devices can be safely dissipated by the cooling liquid. These systems typically require fewer and slower fans than air cooling systems. This results in a significantly quieter operation, as high-speed fans used in air cooled systems tend to generate more noise.

Systems based on water cooling provide efficient thermal management, ensuring the reliability, performance, and longevity of critical components. Overall, the use of water-cooled power supplies for testing, in production and in industrial environments is driven by the need for efficient and compact thermal management solutions that can handle the demanding conditions typical of these settings.



## Water-cooled solutions

EA Elektro-Automatik offers a wide range of water-cooled devices like bidirectional devices, power supplies and electronic loads that are designed for high-performance and demanding applications. The solutions bring along high efficiency, compact design, programmable output and advanced protection features, ideal for applications requiring high power density and efficient cooling.

The comprehensive range of product series are designed to cater various power electronics applications and to meet the demands of different industries including automotive, renewable energy, electronics manufacturing, research and development and industrial processes.

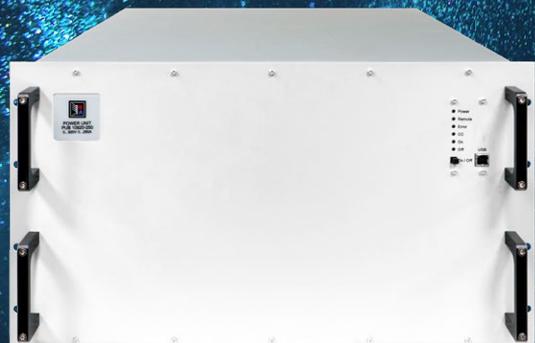
All devices in the 4U and 6U height units are available as water-cooled versions. This includes devices from the EA-10000, EA-10000 Industrial and BT-20000 Battery Tester series.



**EA-10000 4U**



**EA-BT 20000 4U**  
**EA-BT 20000 TRIPLE 4U**

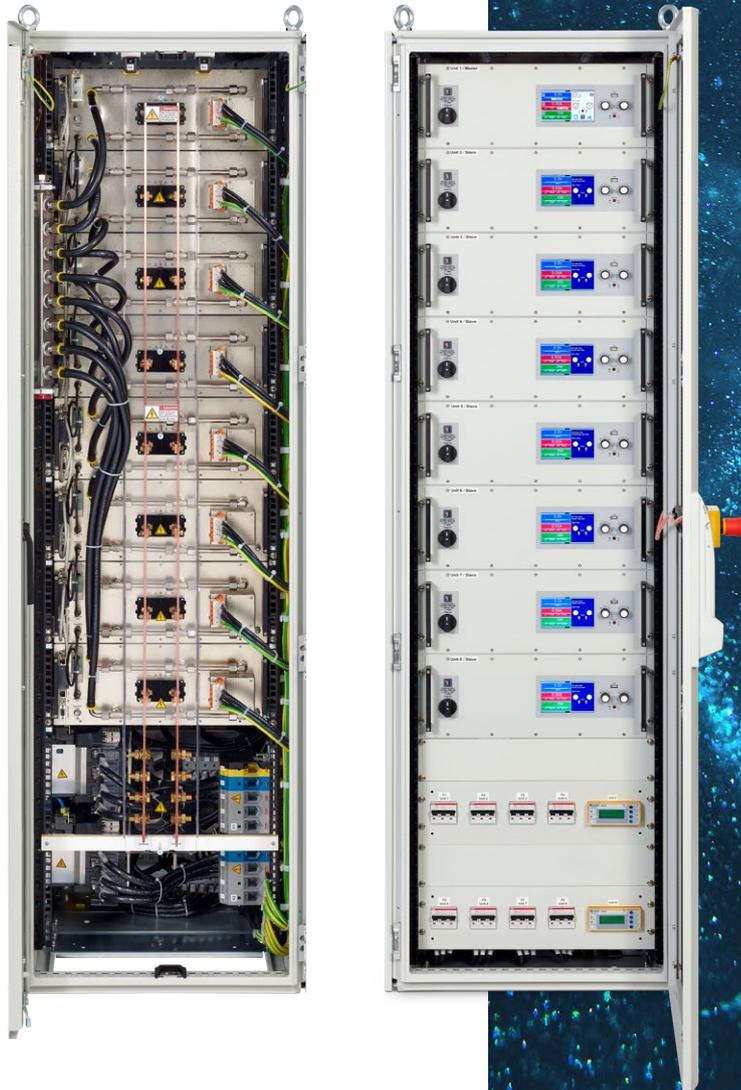


**EA-10000 INDUSTRIAL 6U**

## Water-cooled rack systems

EA Elektro Automatik also offers advanced water-cooled rack systems designed for high-power applications requiring efficient thermal management. These rack systems integrate multiple water-cooled programmable DC power supplies, providing a scalable, robust and compact solution for demanding environments in a variety of industries.

Products from EA Elektro-Automatik are designed to provide reliable performance in harsh environments where conventional air cooling is insufficient or impractical. The water-cooled systems ensure efficient thermal management, allowing the devices to operate at high power levels continuously without overheating.



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## Service for you worldwide

At EA Elektro-Automatik 450 qualified associates, in a facility of 19000m<sup>2</sup>, research, develop, manufacture and market high-tech equipment for laboratory power supply, high power mains adaptors and electronic loads with or without power feedback. The sales and service network includes branches in China, Singapore and USA, offices in Spain and Korea as well as an extensive partner network. Since 2024 EA Elektro-Automatik has been part of the Tektronix Group, which has increased sales and service coverage globally.

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