



Merus[®] A2

Active Harmonic Filter



MERUS POWER



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**“Good power quality
is perfect compatibility
between the electrical
network and
electrical devices.”**



A technology company mitigating power quality issues

Merus Power is a global technology company headquartered in the city of Ylöjärvi, Finland where we design and manufacture Finnish innovative battery energy storage systems and power quality solutions. Scalable and modular power electronics, intelligent software technologies and electrical engineering expertise are the base of our business.

Power quality is becoming a critical issue in electrical environments as industry, automation and machinery are constantly increasing. Every day, more and more Variable Frequency Drives (VFD) and other non-linear loads are being connected to electrical networks. They get increasingly sensitive to poor power quality issues that they often generate themselves. Poor power quality can appear in many shapes and forms, and it can cause heavy economic and technical issues if not properly mitigated. For example, the cost of power quality problems can be directly related to increased energy consumption or penalties, but also to hidden costs such as increased downtime, loss of production, equipment damage or data loss.

Our Merus® Power Quality solutions reduce and mitigate such disruptions, improving the profitability and energy efficiency of customers' operations and achieving significant energy and costs savings for them. In addition, by enabling better power quality in industrial and commercial applications, we contribute to the reduction of CO₂ emissions and help customers achieve their sustainability goals.

15+ years of experience

in power quality

The fruit of our operating experience of over 15 years and continuous product development is an extensive and specialized product portfolio that meets the increased demand of megatrends. Our solutions are based on scalable technology, which enables the use of our products and services in a wide range of different application needs.

We hold a profound local and global presence as well as a strong industrial order backlog in power quality solutions. Over the years, we have delivered solutions to over 70 countries around the world to various customers and successfully mitigated all sorts of power quality issues.

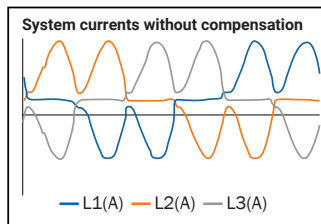
Our customers benefit from improved power quality in terms of energy efficiency, operational excellence, and compliance with technical and usage regulations. In addition, we help reduce wasted energy and CO₂ emissions and enable a sustainable and more energy-efficient future.

Merus® A2-Active Harmonic Filter **A scalable, versatile and durable solution.**

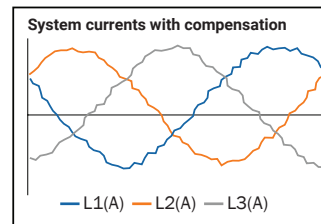
Merus® A2-Active Harmonic Filters have been successfully helping customers tackle power quality problems all over the world. Merus® A2 is a versatile solution that can be easily tailored to a variety of applications and can meet small and large-scale customer needs with their modular structures. Their compact size and scalable design allow simple and cost-effective integration into variable frequency drives, capacitor bank cubicles and numerous other electrical systems.



Merus® A2-Active Harmonic Filters are connected in parallel with the loads to be compensated. They measure the current of the non-linear load and inject the same harmonics, but with the opposite phase angle. The current of the active harmonic filter thus cancels out the harmonic currents of the load, and only the fundamental frequency current component is left to be supplied from the power system.



Before

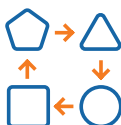


After

With just a single robust device, achieving higher productivity, decreasing production downtime, extending the lifetime of devices and components, reducing service and maintenance costs as well as saving energy and money has never been easier.



Modular scalability: By adding Merus® A2-modules in parallel, higher harmonic compensation capacity can be achieved without any technical limitations. This offers flexibility when more loads are added to an electrical system.



Endless versatility: Merus® A2 is one device capable of delivering multiple innovative solutions. Customizable functionality and several built-in operation modes make Merus® A2 an extremely versatile device.



Dependable durability: Merus® A2 can operate in different demanding environments, even including harsh and heavy industrial ones without its performance and response time being negatively affected.

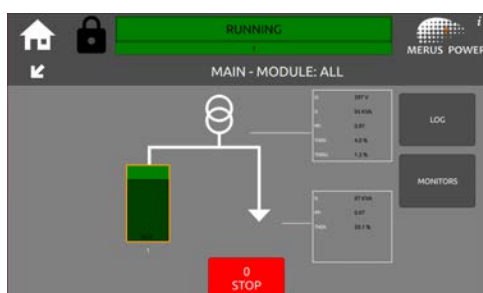
Merus® A2-Active Harmonic Filter

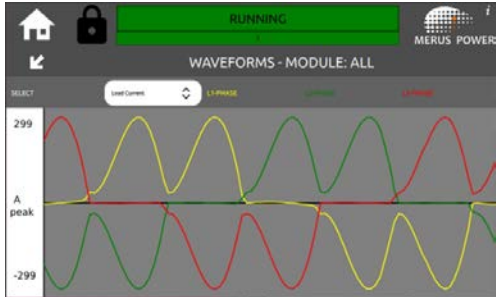
features and benefits

- **Active harmonic filtering:** Merus® A2 senses the harmonic distortions created by non-linear loads in the network and provides an effective and real-time response to cancel them. Merus® A2 ensures a guaranteed compliance with harmonic distortion limits specified in IEEE 519, G5/4, EN 50160 and also other power quality standards and recommendations. Merus® A2 can be installed to cancel harmonics of an individual large load or group of loads.
- **Dynamic reactive power:** Merus® A2 provides dynamic reactive power compensation, which is used for power factor correction, voltage variation and flicker mitigation. This improves electrical efficiency in the electrical system as well as achieves money savings.
- **Load balancing:** Phase-to-phase connected equipment can burden only two of the three lines and create voltage unbalance between the phases. Merus® A2 offers dynamic load balancing that distributes the burdens more evenly between all three phases, which prevents overloading of the electrical system.

- **Efficiency with economical and quiet technology**
Merus® A2 is a robust and fast-reacting solution for those who need quality. Fast response is essential to many applications, like welding processes. Merus® A2 uses well-established 3-level IGBT topology which enables lower power losses, a smaller footprint and lower noise levels. Our solution emits one of the lowest possible audible noises among all active filters.
- **Smart and advanced HMI without complicated cryptic codes**
Merus® A2 are equipped with advanced 7" Human Machine Interfaces (HMI) that come with advanced and user-friendly monitoring and reporting features. They enable before-and-after analysis by providing harmonic distortion data from both the supply and load sides. Merus® HMI are multilingual with over 5 languages, support USB connectivity and provide clear error and trip messages without cryptic codes.

DATE	TIME	MODULE	STATE	TYPE
2020-03-18	09:29:13	ALL	STATES	RUNNING
2020-03-18	09:29:12	ALL	STATES	IGBTS READY
2020-03-18	09:29:12	1	STATES	RUNNING
2020-03-18	09:29:11	1	STATES	IGBTS READY
2020-03-18	09:29:06	ALL	STATES	PRECHARGING
2020-03-18	09:29:05	1	STATES	PRECHARGING





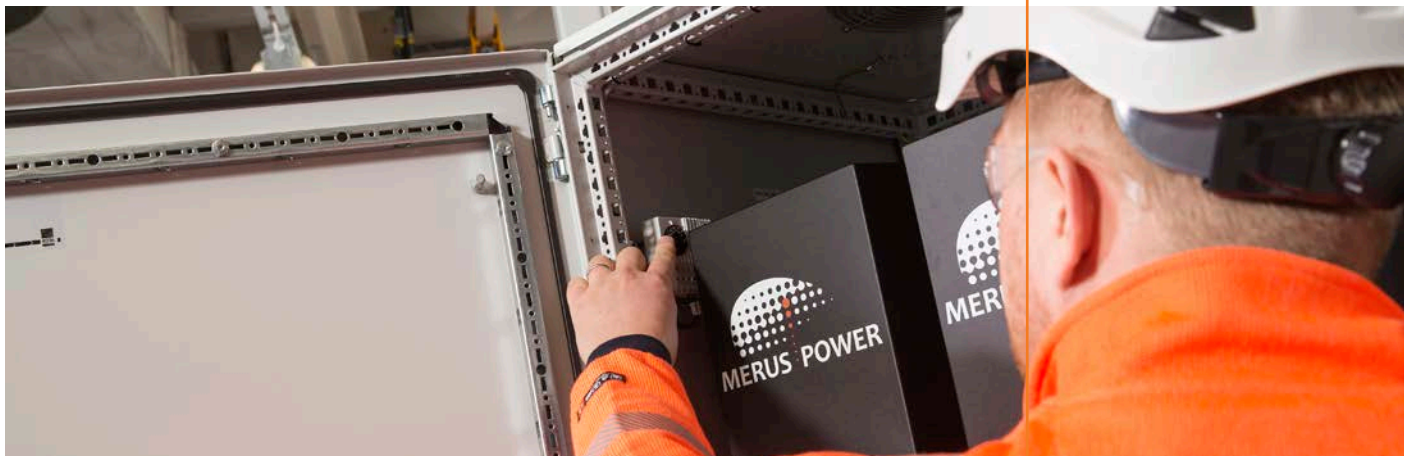
Before



After

- **Convenient and reliable remote monitoring**

In order to make monitoring, management, reporting and servicing available at all times, Merus® A2-Active Harmonic Filters are also equipped with Merus® Remote Access and Monitoring Software. Gather comprehensive data securely and reliably and make sure things are running smoothly in your electrical system without visiting on-site.



- **Size up a solution for your needs with our Merus® Calculators!**

Our skillful Merus® Engineers developed two smart calculators to help you detect power quality issues easily. While Merus® Harmonic Calculator estimates the total harmonic current, Merus® Unbalance Calculator estimates the effect of load unbalance in the electrical system. Both calculators then calculate the number of corrective measures needed to reach the desired levels.

Test our Merus® Calculators today!

meruspower.com/harmoniccalc

meruspower.com/unbalancecalc

Merus® A2-Active Harmonic Filter

and its many applications



- **Renewable energy**

- wind farms, solar power plants, hydropower stations, microgrids and more

The recent rapid growth and increased usage of renewable energy sources are causing technical issues in electrical systems, such as flicker and harmonic distortions. Harmonics can cause many problems, such as overheating of electrical components, tripping of the protection and control devices as well as voltage distortion. These can all lead to significant energy losses and over time become rather expensive problems, for example as increased service and maintenance costs.

Renewable energy applications benefit from improved power quality in terms of more profitable operations, compliance with demanding grid code criteria, increased power generation and enhanced grid stability.



- **Infrastructure and utilities**

- water and wastewater treatment plants, transmission, and distribution utilities and more

Our daily lives and the functioning of modern society are all dependent on electricity. We need high-quality electricity in order to take care of our everyday affairs without any problems and interruptions. For example, an ill-functioning water treatment plant can have catastrophic consequences on our everyday lives.

Infrastructure and utility applications profit from enhanced power quality in terms of smooth operation, lower energy losses, reduced maintenance costs, longer lifespan of plant equipment, and compliance with demanding grid codes and other power quality standards.



- **Commercial buildings**

- data and IT centers, shopping centers and malls, airports, hospitals and more

Modern society also cannot function efficiently without relevant and reliable data, therefore it is crucial to enable safe storage of it and minimize data losses as much as possible. Large data centers are prone to power quality issues such as harmonics that can result in disastrous events if not mitigated properly.

Shopping centers, airports, hospitals and other commercial buildings can also suffer from poor power quality. These establishments ensure the continuity of operations, traveling and life altogether. It is extremely important to make sure that all equipment and devices work as they are supposed to in order to protect people from malfunctions and life-threatening situations.

Better power quality in commercial buildings improves their efficiency, ensures the continuity of critical operations, enables smooth operation of machines, reduces service and maintenance costs, extends the lifespan of devices and components, and provides compliance with demanding grid codes and other power quality standards as well as recommendations.

- **Light industry**

- fast fluctuating loads, critical process industry, manufacturing industry and more

Variable frequency drives (VFD) and other fast fluctuating loads require efficient and high-quality electricity in order to work properly. Devices like these are very sensitive to poor power quality, and as automation grows in industry they further aggravate the system by generating more poor power quality issues for themselves. High harmonic distortion, flicker and other power quality problems cause energy and heat losses and many other issues.

Improved power quality in light industry means smooth, continuous operations, reduced energy losses, lower maintenance costs, longer lifespan of plant equipment, and compliance with demanding grid codes and other power quality standards.



- **Heavy industry**

- mining, iron and steel industry, oil and gas industry, and more

Heavy industry is a vastly energy-intensive sector. Processes like mining, steel manufacturing, cement production or shipbuilding consume a lot of energy and generate all kinds of power quality problems from flicker to low power factor. These issues can stall production, weaken efficiency and even decrease the capacity of factories. In addition, poor power quality can cause expensive penalties for not complying with grid codes.

Heavy industry benefits from improved power quality in terms of increased production efficiency, operational optimization, enhanced factory capacity, reduced maintenance costs, longer lifespan of plant equipment and compliance with demanding grid code criteria and other power quality standards.



How the needed energy is produced and how efficiently it is used is also directly linked to how productive and ecological such high-energy manufacturing processes are. We help heavy industry customers achieve their sustainability goals by eliminating energy losses, thus reducing CO₂ emissions.





Visible global handprint of Merus Power

CLIMATE ACTION



We work committedly for the UN Sustainable Development Goals, and we also help our customers achieve their own sustainable development goals. We monitor the implementation of responsibility with key figures such as green energy capacity, the share of electricity storage capacity and CO₂ emission reductions.

INDUSTRY, INNOVATION AND INFRASTRUCTURE



We contribute to the sustainable and energy-efficient development of the economy and society globally. Our solutions that enable better power quality in industrial and commercial applications contribute to the reduction of CO₂ emissions and improve the process efficiency of our customers' companies.

AFFORDABLE AND CLEAN ENERGY



Our quality system is certified with the ISO 9001 quality standard and our environmental system with the ISO 14001 standard. Our solutions comply with IEEE 519, G5/4 and EN 50160 standards and other power quality recommendations.



At Merus Power, we are fully convinced that technology has a significant role in creating a more sustainable future.

We keep track of our positive environmental impact through three different parameters: the amount of renewable energy we helped to connect to the grid, our share of the operating reserve in the Finnish electricity market, and the amount of CO₂ emission reductions we achieved by installing our different solutions around the world.



Renewable energy

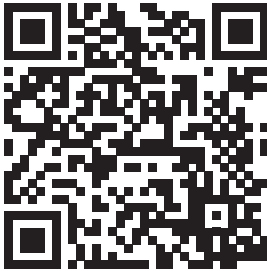


Finnish electricity market



CO₂ emission reductions

Read the QR code to see what our current numbers look like on our website.



Merus Power

Electrify your Future

Merus Power is a global technology company headquartered in the city of Ylöjärvi, Finland where we design and manufacture Finnish innovative battery energy storage systems and power quality solutions. Scalable and modular power electronics, intelligent software technologies and electrical engineering expertise are the base of our business.

Merus® Solutions can be easily tailored to a variety of applications and can meet small and large-scale customer needs with their modular structures. Their compact size, design, and scalability allow simple and cost-effective integration into many electrical systems.

Over the years we have worked with various customers in industry, utility, infrastructure, and renewable energy applications in over 70 different countries.



Send us an email to sales@meruspowers.com.
One of our sales reps will be in touch with you as soon as possible.

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