

Active filters for the highest reliability and cost savings in power quality

An end to harmonic oscillations, voltage dips, flicker and unnecessary cost for reactive energy



BLUEWAVE

- Active harmonic filter
- Ultra-fast
- 30 A to 300 A



Quality problems can be found in many customer power networks

Reliability and efficiency are assessed as being important to business operation. This covers reliable operation of machines, production systems, and office facilities. Nevertheless, this is frequently not the case and often there is no clear reason for this, despite the use of UPSs and emergency generators.

- **Distribution lines and networks cannot be fully utilized**
- **High percentage of energy losses in the networks**
- **Increased wear and limited system availability**
- **Downtimes for units and systems**

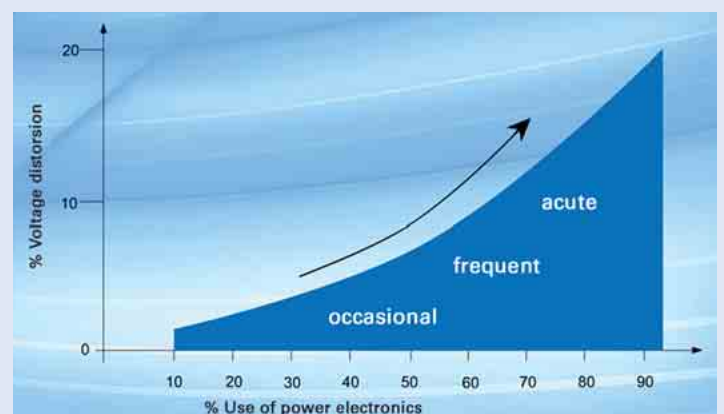
Power quality problems in the internal power network are often the reason for this. Measurements and network analyses can often detect the sources of the underlying problem.

BLUEWAVE eliminates harmonic oscillations and eliminates cost for reactive energy

Whether for presses, welding devices, variable-frequency drives, or electric motors: Almost all non-linear consumers in industrial environments can cause voltage distortion substantial.

Harmonic currents up to the 50th harmonic and cost-intensive reactive energy: BLUEWAVE eliminates disruptions directly and reliably. This ensures power quality and reduces cost.

Savings in reactive power can be easily calculated. However, cost reduction due to less wear on equipment, less troubleshooting, or even prevented production downtime are more difficult to quantify. Studies show that this amounts to billions in damages each year. BLUEWAVE is thus a good investment for all areas with network feedback problems.



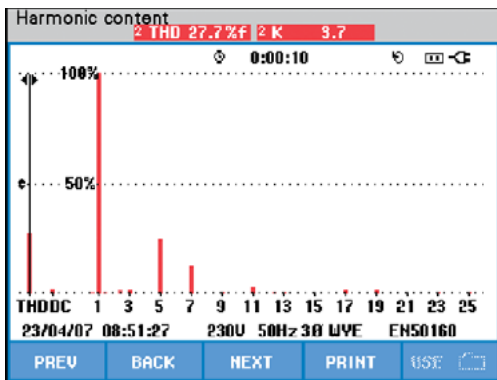
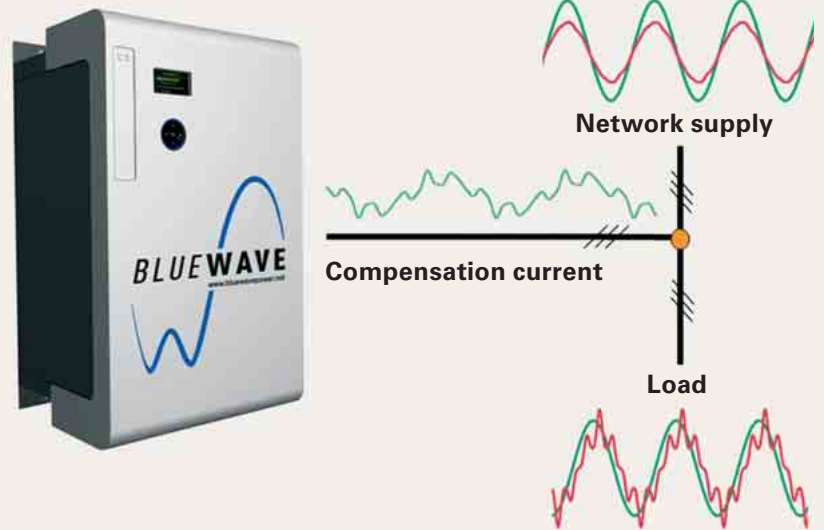
A clear global tendency: Voltage distortion increases along with the growing use of power electronics.

Without BLUEWAVE:

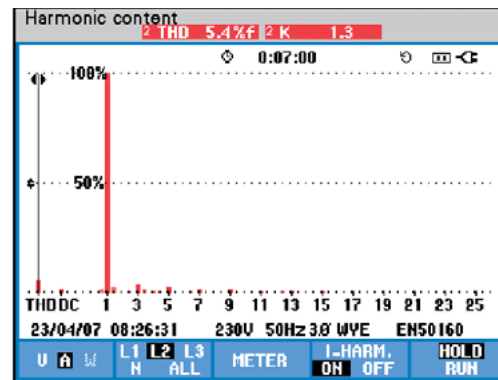
Harmonic oscillations and reactive power stress the network and lead to problems.

With BLUEWAVE:

Reactive power and harmonic oscillations are actively compensated, thus ensuring power quality.



Harmonic content without filter



Harmonic content with filter

Harmonic disturbances caused by non-linear loads are reliably compensated for with BLUEWAVE and the THD is reduced.

As a digital generation of filters, BLUEWAVE provides clear advantages

As the latest generation of active harmonic filters BLUEWAVE offers numerous additional advantages compared to common technology. Faster, smaller, and more powerful. All this makes power quality even easier.

- ✔ **Ultra-fast:** BLUEWAVE responds to disturbances in less than 300 μ s and eliminates them before they can cause damage.
- ✔ **Super-compact:** Our smallest 30 A filter is handy, small, and easy to install, and the 300 A cabinet unit also provides the highest performance in the tightest spaces.
- ✔ **Optimized for maintenance:** Thanks to its design, the central modules in the 200 - 300 A industry models can be removed in less than 15 minutes (MTTR).
- ✔ **Suitable for industrial use:** With the IP54 protection class BLUEWAVE is resistant to dust and other environmental influences.
- ✔ **Numerous options:** The BLUEWAVE range covers everything from 30 to 300 A and 400 to 480 volts in either 3 or 4-wire technology.
- ✔ **Adaptable:** BLUEWAVE compensates for individual disturbance patterns in a targeted manner and automatically adapts to changed network topologies.



BLUEWAVE 30 A/50 A

The easy-to-install compact filter

The smallest BLUEWAVE version is ideal for reliably compensating for oscillations up to the 50th harmonic, as well as reactive power, in a targeted manner. Thanks to its small dimensions and low weight, this filter can be easily installed in any environment. For protection class requirements up to IP54 both wall and cabinet installation are possible. Not only space-saving, it is also economical in terms of power loss with 1300 W. With a response time of under 300 μ s in ultra-fast mode, it is also possible to optimally compensate for dynamic consumers.

This compact filter has convincing technical features and an excellent housing design. A higher power level can be attained by cascading up to 5 units.

BLUEWAVE 100 A

The standard for 3 and 4-wire technology is almost always a perfect fit

Slightly larger and heavier than its little brother, the 100 A unit can deal with twice the current. It is the perfect solution for those who need this performance right from the start and want a central coupling to their consumers.

In the 4-wire unit, compensation is possible in all three phases, as well as on the neutral conductor.



BLUEWAVE 200 A/250 A/300 A

The industry model is a real bundle of energy

With up to 300 A, this BLUEWAVE filter remains fully capable for the highest demands and in large production facilities, such as those found in the automotive industry.

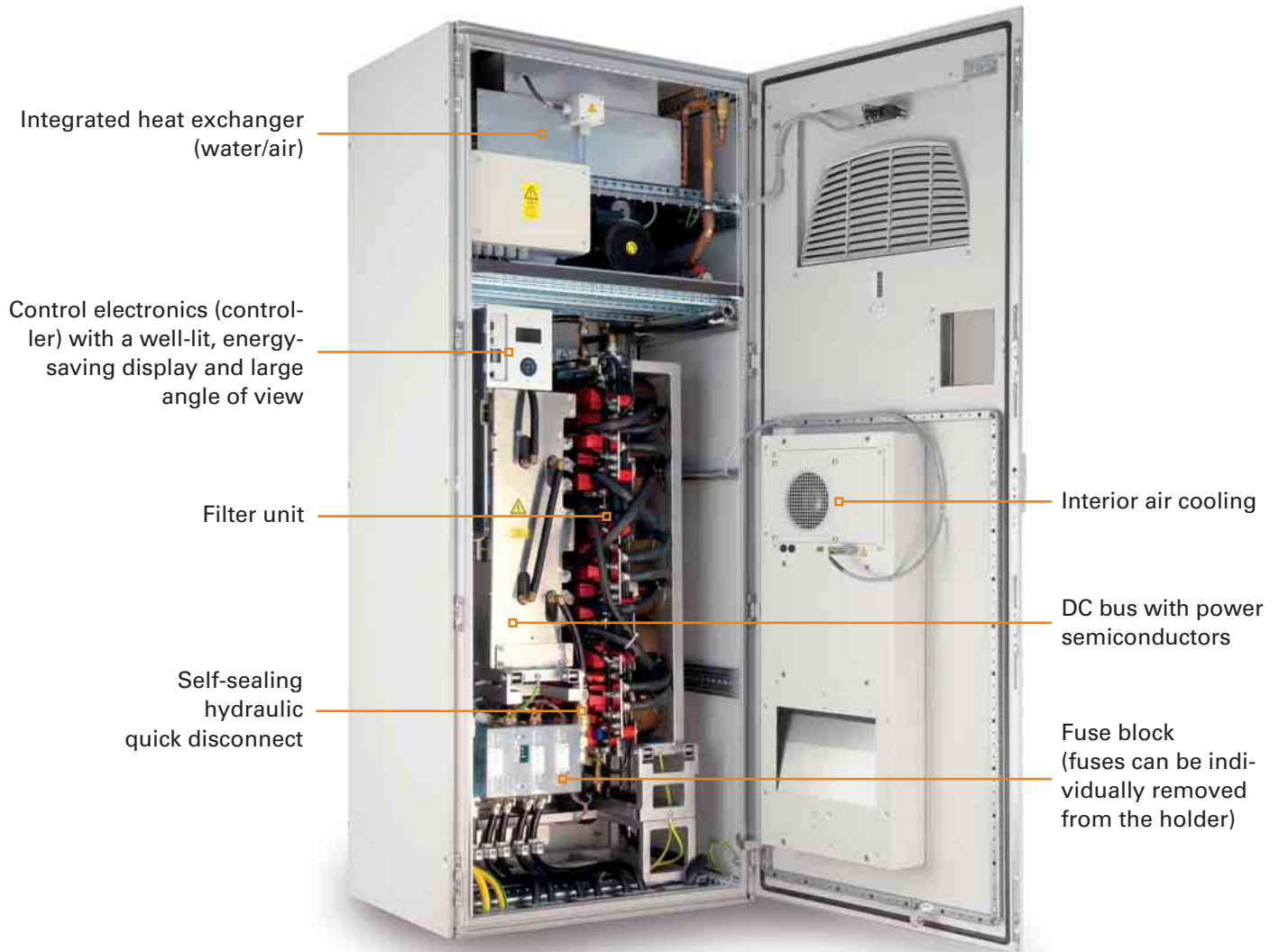
The cabinet version comes with interior air cooling, as well as internal liquid cooling for the power electronics with an integrated water/air heat exchanger. This is the highest level of technology in compact spaces.



Minimal time-to-repair thanks to a modular design (MTTR < 15 minutes)

The ready-for-connection industrial cabinet unit with its modular design and IP54 protection class is especially advantageous and convenient. The individual modules can be easily removed from the front of the cabinet.

An MTTR value of < 15 minutes with an MTBF value of > 100,000 hours provides for the fastest service times and long maintenance intervals.



1. Control electronics are easy to remove.



2. Modules (filter unit and power element) can be released from the front with just a few screw/plug connections.



3. Liquid cooling can be disconnected quickly and without any spilling using quick couplings.



4. Modules can be popped out towards the front.



BLUEWAVE offers an intelligent solution for every sector

There is a wide range of companies and institutions that can clearly improve the network quality of manufacturing systems or office facilities using BLUEWAVE. On one hand, this filter can be factored-in during planning and implementing new systems. On the other hand, BLUEWAVE is also an intelligent solution for existing systems and facilities with power quality problems.



- Elevators
- Automotive industry
- Computer centers
- Variable-frequency drives
- Building control
- Machines and drives
- Oil and gas transport systems
- Paper industry
- Ship engines
- Welding systems
- Steel industry
- Tunnel ventilation
- Uninterruptible power supplies (UPSs)
- Water treatment systems
- Wind power stations
- Cement industry
- And many more

BLUEWAVE – the best prescription for critical values

Most countries already have strict standards and limit values for harmonic feedback. Companies and facilities that consume energy are forced to monitor their internal network and ensure compliance with these limits. In criti-

cal cases, the energy provider may cut the power! Using BLUEWAVE, you can reduce detected deviations and ensure that the value is within the tolerance again. This provides you with security.

- The following standards specify limit values for harmonic oscillations in networks/units: **EN61000-2-2, EN61000-2-4, EN61000-3-2, EN61000-3-12, EN61000-3-3** as well as **EN50160, TOR D2** and **IEEE 519-1992**.
- According to **§ 19** of the **new German Low Voltage Access Directive (NAV)**, grid subscribers must operate their units in a manner that rules out disruptions for other grid subscribers. According to **§ 24**, the network operator is allowed to cut off connections without prior warning to prevent disrupting feedbacks in their systems or those of other subscribers.

BLUEWAVE technical data*

Rated compensation current	30 A 3-wire	50 A 3-wire	100 A 3-wire*	200 A 3-wire*	250 A 3-wire*	300 A 3-wire*
			100/300 A 4-wire*)	200/600 A 4-wire*)	250/750 A 4-wire*)	300/750 A 4-wire*)
Switching frequency	16 kHz					
Overload capability	75 A for 10 ms	125 A for 10 ms	250 A for 10 ms	500 A for 10 ms	625 A for 10 ms	750 A for 10 ms
Cooling type	Air cooling			Air cooling (internal liquid cooling)		
Ambient temperature	40° C, derating up to 55° C, 2 %/K					
Parallel operation	Parallel operation of 5 units					
Interfaces	Ethernet, RS485, ModBus					
Power loss	< 900 W	< 1300 W	< 2200 W	< 5000 W	< 5900 W	< 7500 W
Cooling air requirement, speed-controlled fan	< 350 m³/h	< 550 m³/h	< 1400 m³/h	< 2600 m³/h	< 3100 m³/h	< 3600 m³/h
Noise level (1 m)	60 dBA	60 dBA	68 dBA	70 dBA	70 dBA	70 dBA
Filter performance	Up to the 50th order					
Altitude	1,000 m / derating up to 4,000 m, 1 %/100 m					
Mains voltage	400 V ±10 %, 480 V ±10 %					
Mains frequency	47 to 63 Hz					
Response time	300 microseconds					
Controller topology	Digital with FFT analysis					
Current limitation	Nominal current					
Current transformer	100:5 to 5000:5					
Dimensions (W x H x D)	360 x 590 x 290 mm	360 x 590 x 290 mm	460 x 720 x 365 mm	800 x 2000 x 600 mm	800 x 2000 x 600 mm	800 x 2000 x 600 mm
Weight	47 kg	47 kg	80 kg	395 kg	395 kg	395 kg
Protection class	Standard IP20, optional IP54			IP54		
Approval	CE, UL		CE, UL (pending)			

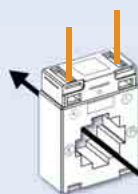
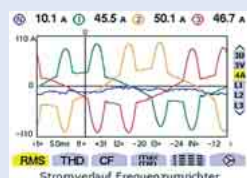
* Subject to modifications.) 1 400 V ±10 %

BLUEWAVE is fully digital and thinks ahead

Its flexibility is obvious, as it can be connected to the power network on the load or network side with numerous current transformer-ratios. Once configured with just a few clicks, the present mains current will then be constantly measured and all developing harmonic oscillations

and phase displacements actively compensated. To do this, BLUEWAVE calculates the appropriate compensation currents in microseconds, which are then generated and fed into the network. Fully digital control and a fast, high-performance computing makes all this possible.

Plug & play: 3 steps to better power quality



Measure

Install

Configure

The true performance of BLUEWAVE is seen in practice

You can rely on BLUEWAVE in daily use. A 24-month warranty from the German manufacturer Betec Engineering provides you with additional security.

BLUETRACE supports BLUEWAVE monitoring via a PC

Commissioning, as well as selection and setting of individual parameters, are extremely user-friendly in all BLUEWAVE versions thanks to a multi-language, menu-controlled control panel and display. Installation and maintenance can also be conveniently performed via a PC-connection using the BLUETRACE software-package. The current network status can be optionally called up online and adjustments made in remote operation via Ethernet and the TCP/IP interface.



Your individual system from the right partner

Our competent BLUEWAVE system partners are available to assist you in finding the most intelligent solution for excellent network quality in your company and facilities: For all phases from consultation via network analysis and planning, right up to implementation and support after you make your purchase.



BLUEWAVE is:

- **Reliable:**
Eliminates all relevant disturbance patterns in the network
- **Cost-saving:**
Avoids/reduces wear on electrical loads and overheating of cables and transformers
- **Effective:**
Prevents losses due to production downtimes
- **Flexible:**
Constantly adapts to the disturbance pattern
- **Fast:**
Compensates disturbances before they can cause damage
- **Economical:**
Lowers energy cost through reduced reactive power
- **Compact:**
Requires very little space
- **Rugged:**
Resistant to dust and splash water in acc. with IP54
- **Ecological:**
Protects the environment
- **Plug & play:**
Simple installation and intuitive operation



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