



## REO PowerQuality Solutions

Powerful solutions for trouble-free power

Analysis and neutralisation of Harmonics • Efficient filtering of Harmonics • Control cabinet modules for Power Factor Correction • Analysis and ne



## REO PowerQuality Solutions -

# 3 powerful solutions for trouble-free power



The technical progress in modern power electronics is faster and more extensive. This creates more disturbances in the mains supply, such as harmonics or voltage drops.

To guarantee an optimal current quality, REO has been developing for years PowerQuality and EMC-solutions that ensure a sinusoidal mains current and elimination of distortions.

With a feedback of 'clean' current in the mains supply our products help to reduce costs, CO<sub>2</sub>-emissions and to save energy. Concerted inductive and electronic components enable us to save operating costs and protect valuable resources.

# 1.

## REOWAVE® active – Analysis and Neutralisation of Harmonics

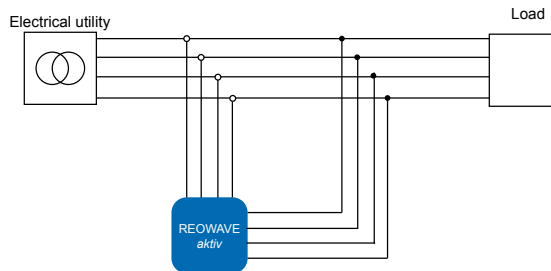
REOWAVE® active filters analyze the harmonics emanating from a load, generate an appropriate counter-waves and thus neutralize the harmonics. Unlike a passive filter, which is designed for a specific application, REOWAVE® active is an active system, which is connected in parallel to the existing network, and automatically adjusts itself to the harmonics. This provides more flexibility for the connection of new loads up to a specified maximum power level.

- Filters effectively harmonics
- Our PowerQuality-Solution for high requirements

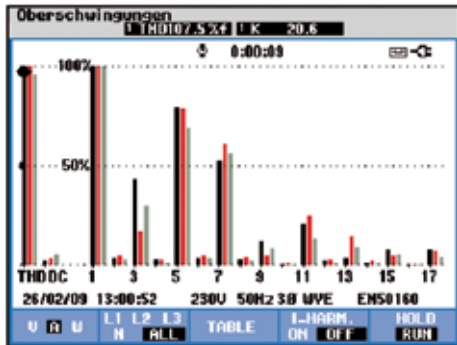


The main features of REOWAVE® active are:

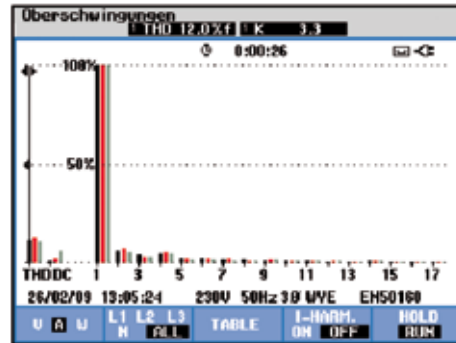
- Compensation of harmonics and reactive power
- Compensation of neutral line
- Enhanced response time
- Overload capability due to current limitation
- Automatic adjustment to disturbance patterns



Measurement without REOWAVE® active



Measurement with REOWAVE® active



### Technical data for REOWAVE® active

Type	REOWAVE® active 040	REOWAVE® active 080	REOWAVE® active 100	REOWAVE® active 200
Mains voltage	3x400 V AC +/- 10%			
Mains frequency	50 / 60 Hz +/- 2%			
Supply configuration	4-conductor (three-phase plus neutral)			
Compensating current	40 A	80 A	100 A	200 A
Compensation	up to the 40th harmonic			
Temperature range	0 – +40 °C			
Cooling	Forced cooling/liquid cooling			

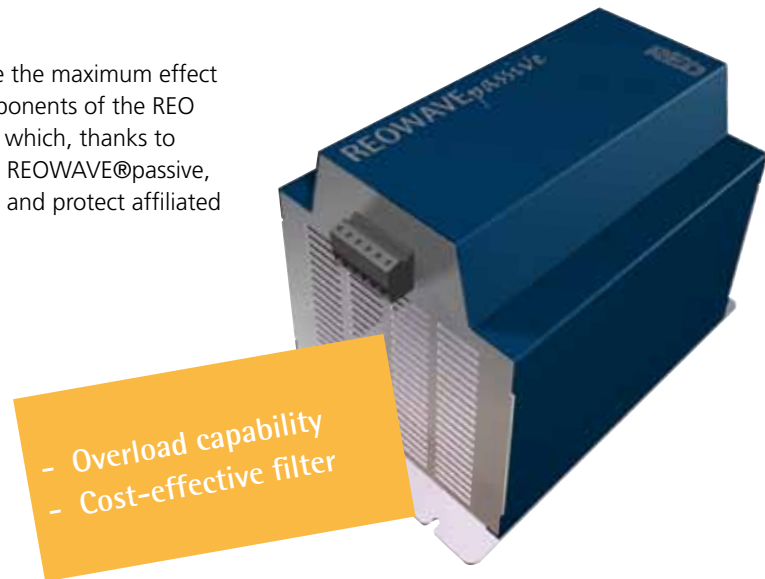
Like all REO solutions REOWAVE® active will be designed according to individual customer's requirements.

## 2. Efficient filtering of Harmonics with REOWAVE®passive

REOWAVE® passive is used where the problems arise – where the maximum effect can be achieved. REOWAVE®passive is based on proven components of the REO CNW family such as REO line filters and REO harmonic filters which, thanks to their excellent characteristics and the special circuit design of REOWAVE®passive, efficiently keep the harmonics away from the mains network and protect affiliated electrical equipment.

Main features of REOWAVE®passive:

- Nearly unlimited filter performance, construction size is given by manufacturing
- Overload capability
- Cost-effective alternative (filter performance not adjustable)



The device has a user-friendly design and is available in four basic variants.

Typ	Rated voltage	Voltage tolerance	Rated current	Cooling	Test voltage	Protection class
REOWAVE®passive 400	3 x 400 V 50 Hz	3 x 360 - 440 V	9 - 450 A	forced cooling, internal*	2500 V AC 1 min	IP 20 at 9 - 110 A IP 54 at > 110 A*
REOWAVE®passive 500	3 x 500 V 50 Hz	3 x 450 - 550 V	9 - 450 A			
REOWAVE®passive 690	3 x 690 V 50 Hz	3 x 620 - 760 V	9 - 400 A			
REOWAVE®passive 480	3 x 480 V 60 Hz	3 x 430 - 530 V	9 - 450 A			

\* in special design

Dimensions:

Voltage	Current (A)	Length mm (L)	Width mm (B)	Height mm (H)	Weight (kg)
400V 50Hz	16	240	220	500	21
	36	380	250	600	41
	70	600	600	1800	158*
	145	600	600	2000	204*
	230	600	600	2000	241*
	330	600	600	2000	267*
	450	860	600	2000	296*

\*Weight by installation in switch cabinet

# 3.

## REO-Q Control cabinet modules for Power Factor Correction

When loads such as electric motors, transformers, power converters or welding equipment are running, some of the power taken from the mains network, is required to energize and maintain electromagnetic fields. This energy, known as reactive power, is constantly transferred between the load and mains supply network and consequently is not converted into useful work.

By applying power factor correction between the mains network and a load, the reactive power is stored in a capacitor bank and returned back to the load when it is required. In this way the only energy that not converted into useful work is that which occurs from the normal component losses.

Hence power factor correction allows better utilization of the electricity network capacity, improves the CO<sub>2</sub> balance of loads and reduces the costs of tariffs which based on power factor. In addition, much smaller distribution transformers can be used and are less expensive to build when there is a good power factor.

Systems used for power factor correction were previously limited to a specified power rating. With REO-Q the reactive power compensation is now modular and this provides the flexibility required for future expansion.

The basic requirements for a power factor correction system, using REO-Q, is a cabinet with a 19" racking system and a REO RP-Controller. The individual REO-Q reactive power compensation units are available in 19" modules, which are inserted in multiples, according to application requirements. The REO-Q-units are currently available with ratings of up to 20 kVAr, with a maximum power capacity of 200 kVAr available within a REO-Q cabinet.

**REO-Q Modules for power factor correction offer the following benefits:**

- simple to expand
- no hard-wiring required
- reduction of mains harmonics using chokes
- thyristor switching reduces stress on capacitor bank
- reduction of resonance between capacitors and inductors by use of chokes
- reduction of power factor tariff costs
- reduced distribution transformer costs

### Technical data for the REO-Q

REO-Q - Type	Voltage [V]	Reactive power [kVAr]	Inductive filtering [%]	Voltage on the capacitor [V]
REO-Q 5	400	5	7	430
REO-Q 10		10		
REO-Q 20		20		

Like all Reo solutions REO-Q can also be built to customer's specifications.

- Modular units  
- Cost saving



Simple installation of the REO-Q modules:



Insertion of the REO-Q modules in the control panel.



Insert the module until it snaps into the adaptor.



Prewired connections for the module.



## PowerQuality Solutions: all from one source

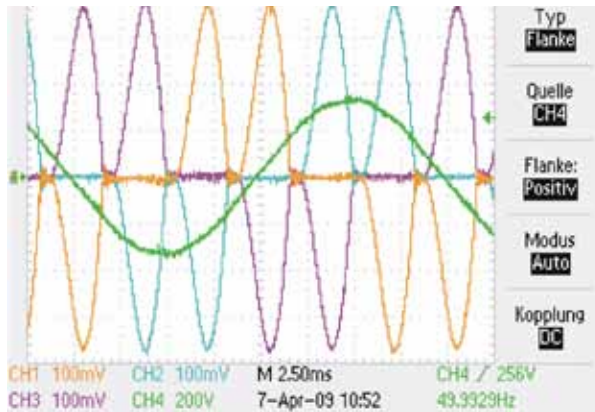
To effectively confine PowerQuality problems such as harmonics, voltage drops or reactive power, the sources of the disturbances have to be analyzed and measurements have to be evaluated.

Via portable or fixed PowerQuality Analyzers RMS-values, frequencies or harmonics can be measured and analyzed cycle-by-cycle. Our qualified technical personnel evaluates the recorded measurements to create a suitable PowerQuality product for the customer.

### Advantages:

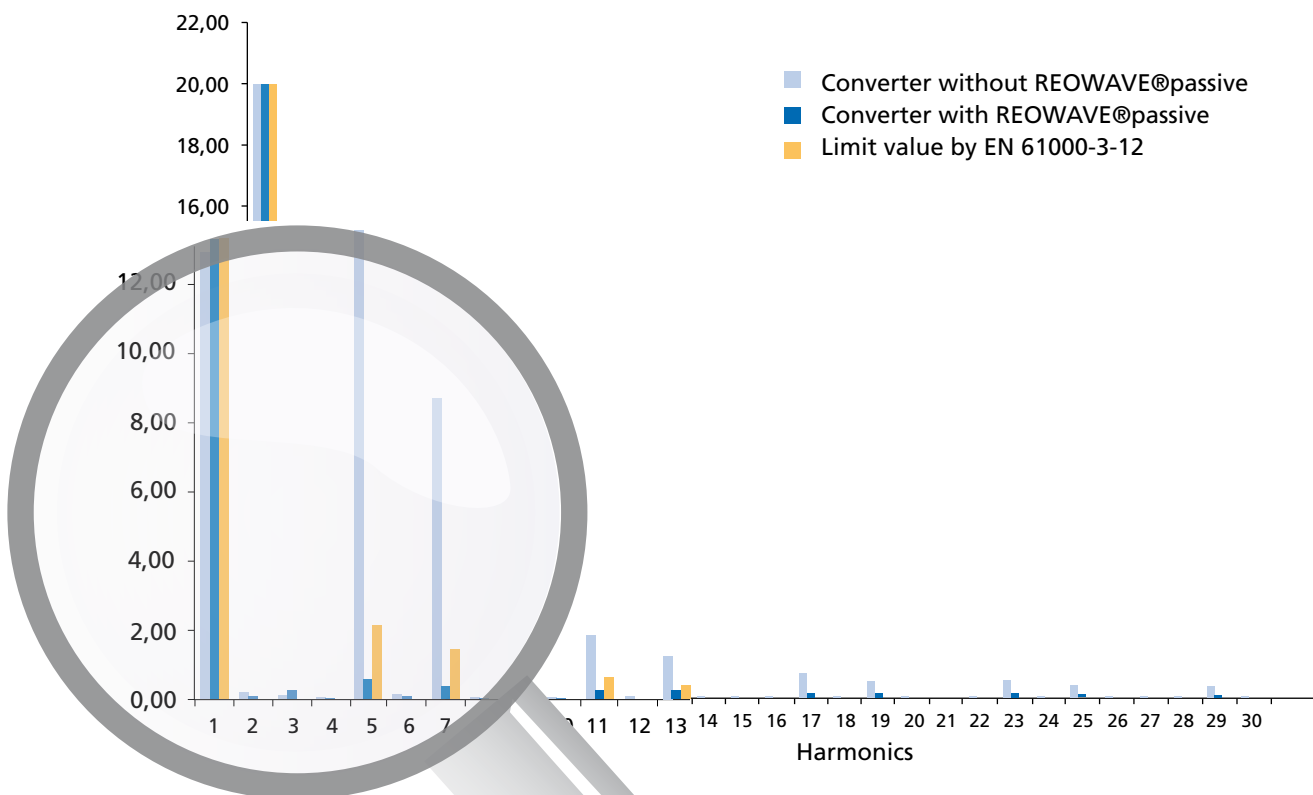
- Direct measurements on the source with a portable or fixed unit
- Continuous record and storage of all network parameters up to one year
- Voltage sampling-rate up to 1024 samples per cycle
- Current sampling-rate up to 256 samples per cycle
- Easy display-evaluation

### Example: Measurement on a converter



Current	25,7 A
I5	67 %
I7	43 %
THDI	81%

I [A] Measurement on a converter with REOWAVE®passive Filter





All REO PowerQuality solutions can be designed to customers' specifications.



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