GRIDCON® active filter
The solution for clean power grids

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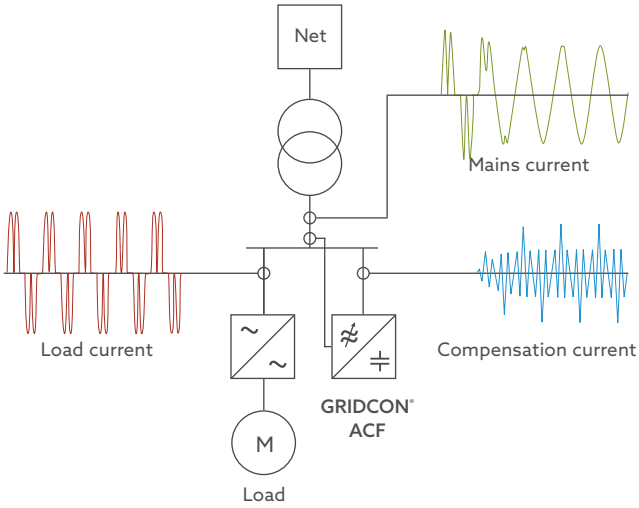
MR active filters keep grids clean



Negative influences on the voltage quality, which can be caused by frequency-controlled drives, welding lines or switching power supplies, for example, can have serious consequences: If a sensitive device, such as an electronic control unit, is damaged by harmonics, this can lead to production downtime. The supply network itself can also be unacceptably disrupted or dangerously overloaded by reactive power, load imbalances, voltage fluctuations (flicker) and high harmonic currents.

Active filters reliably and accurately compensate for this interference. They measure the current and voltage of a grid section and feed in precisely the current that achieves the desired effect.

In the case of harmonics, for example, currents are actively generated in the opposite direction to the interference present in the grid so that the currents cancel each other out. In order to reduce voltage fluctuations (flicker), active filters make use of the effect that inductive reactive power lowers the mains voltage and capacitive reactive power increases it.

Without active filter

With GRIDCON® ACF active filter

The benefits of good voltage quality can be explained with a comparison to road traffic: Just as the components of a car wear out more quickly when driving over cobblestones, a distorted voltage leads to premature ageing and an increased risk of failure of electrical systems.

Applications in diverse industries

GRIDCON® active filters have proven themselves in various applications over the years:

Highly automated manufacturing and production facilities

Regulated pumps and centrifuges for water treatment

Compliance with MV grid connection conditions for H2 electrolysis

Protection of PV systems against interference from industrial loads

Electrical networks up to 690 V in the chemical industry

Protection of sensitive load zones in e.g. marine applications

- 3,000+ GRIDCON® devices in operation
- 500+ MVAR installed capacity
- Plug & Play
- Consistently modular concept
- All functions also available in combination

→ More information

The all-rounder: GRIDCON® active filter XW

Power quality disturbances can take many forms. The X-Wire platform was developed on state-of-the-art hardware and software architecture for a wide range of applications.

The concept offers various advantages

For planners and installers: Easy to integrate

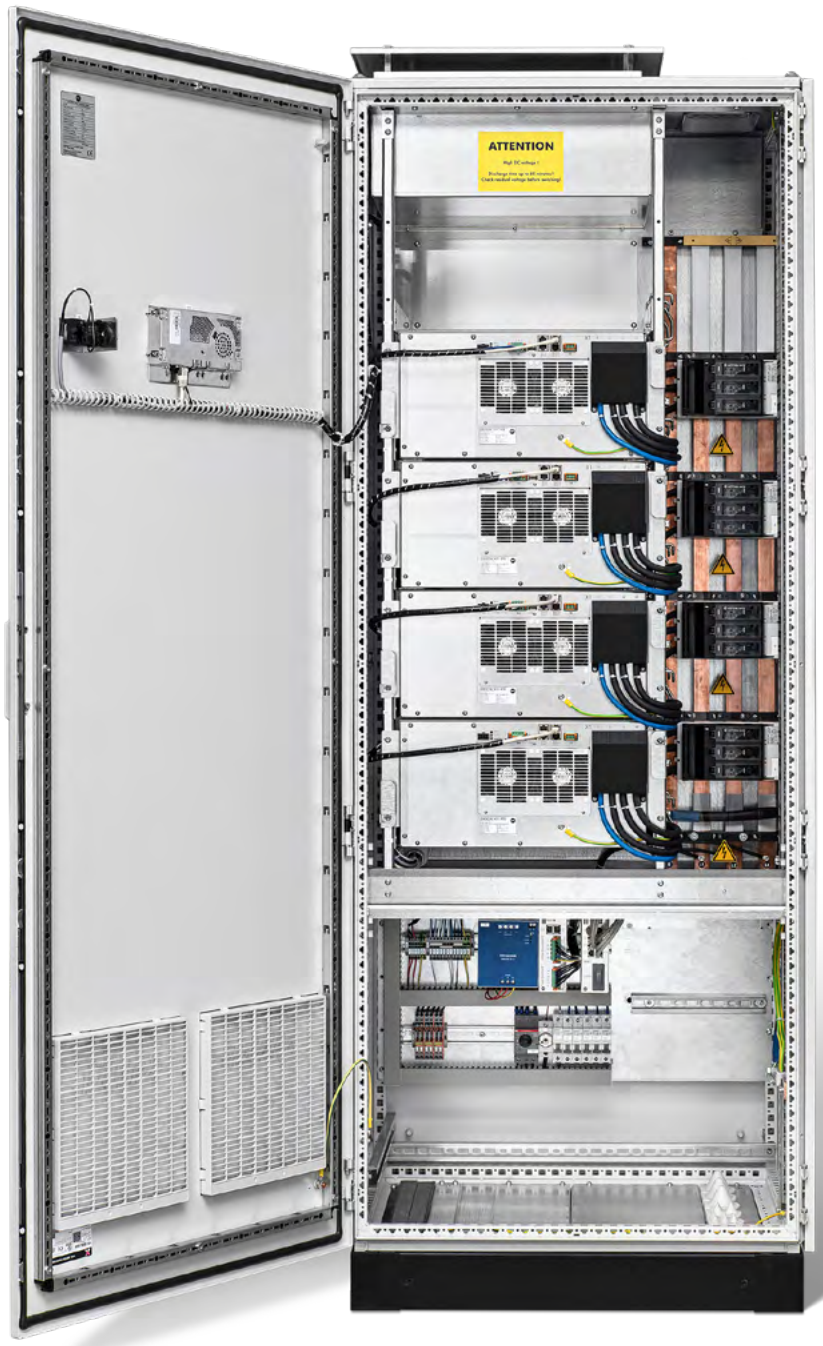
- Standardized 19-inch modules, you can start small and expand as required
- Easily accessible connection compartment and flexible cable entry from below or above
- X-Wire topology (XW) enables connection and operation with or without neutral conductor

For operating personnel and maintenance technicians: Largely autonomous operation

- Intuitive user guidance via touch panel
- Utilization, performance and filter effect can be displayed on touchpanel at any time
- Autonomous fault handling, deactivation of individual modules in the event of a fault
- Simple updates, data backups, remote access
- Modularity facilitates maintenance & service

GRIDCON® Active Filter XW – Maximum flexibility for almost all applications

Power range: 3/4-wire connection, rated current up to 600 A, rated voltage up to 480 V, optionally expandable for DC networks



- Cable entry optionally with flange late from above
- Air box above and behind the power modules for ventilation via the roof, optional protection type up to IP 54 possible
- Touch panel with standardized GRIDCON® ACF operating software
- Modular concept: up to five independent power units (IPUs) per cabinet
- Air supply through the door
- X-Wire IPU (IGBT Power Unit) with autonomous control and self-monitoring
- NH fuse switch-disconnector per X-Wire IPU
- Control Computer (CCUv2) for up to five power modules (IPU XW)
- Mobile measuring unit MIO - central current and voltage measurement as well as digital inputs and outputs
- Wide-range DC power supply allows use in low-voltage networks worldwide
- Spacious connection room

Technical data

TECHNICAL DATA	GRIDCON® ACF XW				
AC rated voltage	Without neutral conductor connection 350 V ... 480 V (± 10%) With a neutral conductor, the maximum AC rated voltage is 400 V + 10%				
Power supply frequency	50 / 60 Hz				
Peak current	2 x rated current				
Cable connection	3-phase, N, PE, a neutral conductor connection is required (grid form: TN, no IT)				
Compensation	3-wire operation: phase conductor symmetrical and asymmetrical (positive- and negative-sequence system)				
Compensation	1st ... 51 harmonic (50/60Hz) All harmonics can be filtered at the same time				
Additional functions	Dynamic reactive power compensation Cos Phi regulation (PFC) Active-reactive power balancing (up to 100% of the nominal current) Voltage stabilization via Q(U) regulation (Vref) Flicker compensation				
AC operating voltage	3-conductor with neutral conductor connection 350 V ... 480 V (± 10%)				
Number of IPU modules	1	2	3	4	5
Rated current	120 A (IPU 1)	240 A (IPU 2)	360 A (IPU 3)	480 A (IPU 4)	600 A (IPU 5)
Neutral conductor current	120	240	360	480	600
Compensation power	83 kvar (IPU 1)	166 kvar (IPU 2)	249 kvar (IPU 3)	332 kvar (IPU 4)	415 kvar (IPU 5)
Weight (approx.)	255 kg	292 kg	330 kg	367 kg	405 kg
Switching frequency	20 kHz (low-loss design)				
Control	Internal control computer with two digital signal processors				
Response time	<< 1 ms				
Interfaces	2x Ethernet (TCP/IP) 1x USB 4x digital in/out to CCU (24 V /≤10 mA > 20 VDC HIGH, > 16 VDC LOW, max 30 VDC) 2x digital in/out to MIO (24 V /≤10 mA > 20 VDC HIGH, > 16 VDC LOW, max 30 VDC) 1x HMS Anybus® insert				
Current transformer	3-phase current measurement, xx/5 A or xx/1 A (configurable) The necessary current transformers are not included, 15 VA, Class 1 or better recommended				
Inverter	3-level IGBT with voltage intermediate circuit (DC film capacitors)				
Coloring	Standard: RAL 7035 light gray (other colors and designs on request)				
Dimensions (approx. W x H x D)	800 x 600 x 2000 mm 800 x 600 x 2200 mm with optional base				
Cooling	Standard: Air cooling with variable-speed fans				
IP degree of protection	Standard: IP20, optional: IP21				

GRIDCON® active filter XW

TECHNICAL DATA	GRIDCON® ACF XW
Ambient conditions	Ambient temperature without power derating: -10 °C ... 40 °C Recommended ambient temperature in permanent operation: < 25 °C Minimum operating temperature: 0 °C, relative humidity: maximum 85% Transport / storage: -10 °C ... 70 °C
Overvoltage category	CAT III, 1000 V
EMC class	Standard: EN 55011, Class A1 (industrial environment)
Standards	EN 50178, EN 61439-1, EN 61439-2, EN 61000-6-2, EN 61000-6-4, EN 55011

The product complies with the following standards and directives:

Standard description	Standards
Electromagnetic compatibility	EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11, EN 61000-6-2, EN 61000-6-4 and EN 55011
Safety requirements	EN 62477-1, EN 60664-1, IEC 60364-6
Low-voltage switchgear and controlgear assemblies	EN 61439-1, EN 61439-2
Electronic equipment for use in power installations	EN 50178
Protection class	IP20 in accordance with EN 60529 (air-cooled)
Approval marks: CE mark	2014/35/EU

The solution for heavy-duty applications: GRIDCON® active filter 3W

The extremely robust GRIDCON® ACF 3-Wire platform was developed for challenging applications. The hardware design in particular design makes it possible to implement projects for which many other products are not suitable.

Examples of heavy-duty applications:

- Voltages higher than 480 V
- Voltage distortion (THDu) beyond 10 %
- Loads with switching frequencies or even commutation notches
- Active filtering in medium-voltage grids (via step-up transformer)
- Difficult ambient conditions such as polluted air

Advantages of the GRIDCON® ACF 3-wire hardware:

- Electrical design of all components for 690 V
- Series-connected film capacitors for extra high DC link voltage
- Optional modules for filtering supra-harmonics
- Fans with extra high air flow rate and sealed air duct
- Possibility of liquid cooling

GRIDCON® Active Filter 3W – For exceptionally demanding tasks and environments

Power range: 3-wire connection for industrial networks, rated current up to 500 A, rated voltage up to 690 V, optionally with liquid cooling

- Modular concept: up to four independent power units (IPUs) per cabinet
- Switchable control transformer in combination with a wide-range DC power supply enables use in low-voltage networks
- Separate fans for cooling the peripheral components, protection class up to IP 54 possible
- IPU 3W (IGBT Power Unit) with autonomous control and self-monitoring
- Touch panel with standardized GRIDCON® ACF operating software
- Control computer (CCU) for up to four power dules (IPU 3W) with slot for Anybus communication module
- Fan drawer for easy replacement of the main fans
- Mobile measuring unit MIO - central current and voltage measurement as well as digital inputs and outputs
- Behind the terminal compartment: sealed ventilation duct without live components for the main cooling of the IGBTs - air is supplied through the base/plinth

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THE POWER BEHIND POWER.