

# GRIDCON® ACF INDUSTRIAL VERSION.

Handling challenging tasks up to 690 V under rough ambient conditions.

Touch panel with uniform GRIDCON® ACF operating software

CCU (Control Computer Unit) for up to six power modules (IPU)

Modular concept: up to four independent power modules (IPUs) per cabinet

Slot for Anybus communication modules

Adjustable control transformer combined with a wide range DC supply allows for use in low-voltage grids worldwide

Mobile measuring unit (MIO) – central current and voltage measurement, digital inputs and outputs

Separate fan for cooling the peripheral components, degree of protection up to IP 54 possible

IPU IGBT power unit with autonomous control and self-monitoring

Extension option for additional 125 A power unit (IPU)

Fan drawer for simple replacement of the main fans

Behind the terminal compartment: isolated ventilation duct without live parts for the IGBT's main cooling – air is supplied through the floor / base



GRIDCON® ACF Industrial version, 375 A, special color

GRIDCON® ACF Industrial version is the number one choice for challenging compensation tasks where reliability and safety are needed, for example, even beyond normal operating voltages and under challenging ambient conditions:

- Operation up to 690 V and higher at full power without derating
- Rated current can be extended in a modular manner from 125 A to 3,000 A, e.g. for STATCOM systems
- High power density and compact design
- Low losses
- Very durable film capacitors
- Overvoltage category III up to 1000 V – even in grids with isolated neutral point (IT network configuration)
- Degree of protection up to IP 54 possible, optional external water cooling for complete encapsulation
- Dynamic compensation of reactive power, harmonics, and flicker, as well as load balancing in one unit

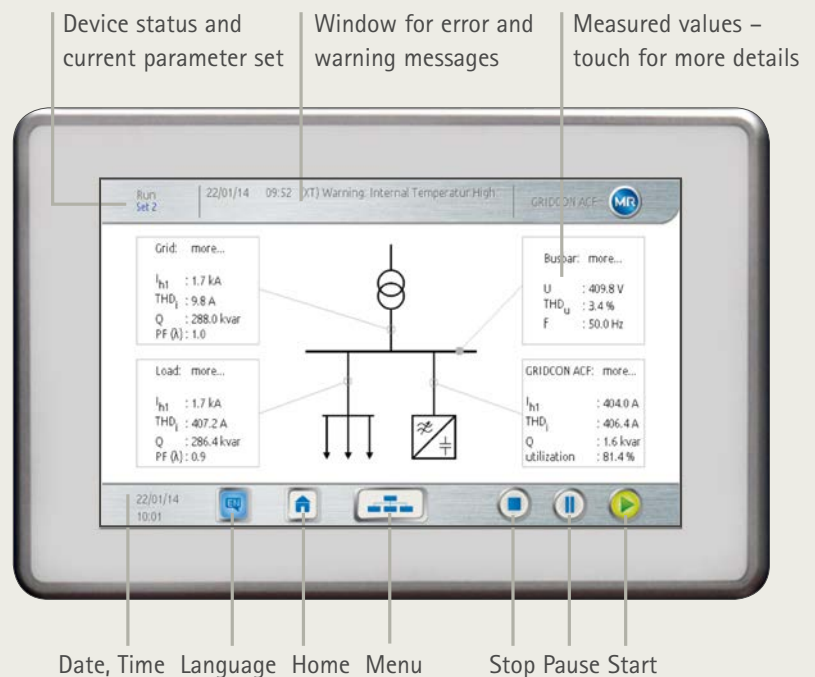
Its very special plus points make GRIDCON® ACF Industrial version the number one choice in many areas:

- Production lines, e.g. automotive
- Mining
- Chemical industry
- Larger printing plants
- Cranes and transport systems
- Offshore platforms and ships
- Oil and gas
- Paper industry
- Steel processing
- Water treatment and pump stations

### Intuitive operation by means of touch panel or PC

The central operating and display element of GRIDCON® ACF is a touch panel. It has a clear menu structure and can display data in both tables and diagrams. The benefits of the touch panel include:

- Simple parameterization of the filter function without additional measuring devices
- Explanations and status messages in plain text
- Intuitive operation and password protection



GRIDCON® ACF can also be operated via the web. Once incorporated into a company network or connected via a mobile phone network, it can be monitored or parameterized remotely using a browser.

# GRIDCON® ACF BUILDING VERSION.

The decentralized way to unload the neutral conductor while meeting stringent EMC requirements.



Touch panel with uniform GRIDCON® ACF operating software

CCU (Control Computer Unit) for up to five power modules (IPU)

Up to five IPUs (IGBT Power Units) with autonomous control and self-monitoring

Power modules controlled by DSC-Distributed Synchronous Control®

Wide range DC supply

Mobile measuring unit (MIO) – central current and voltage measurement, digital inputs and outputs

Extension option for additional 60 A power unit (IPU)

Speed-controlled fan for cooling the power modules and cabinet, degree of protection up to IP 21 possible

Special version available for stringent EMC requirements (emission class B in accordance with EN55011)

Separate fuses for each power module

Phase conductor and neutral conductor connection which can be compensated with up to three times the phase conductor current

GRIDCON® ACF Building version, 240 A, special color

GRIDCON® ACF Building version is a 4-wire device. If necessary, currents in the neutral conductor can be filtered at up to three times the rated current. Moreover, the device is very compact. If requested by the customer, it can also meet very stringent EMC standards for use in residential environments. Outside industrial environments, power quality is often specifically improved in a decentralized manner in the sub-distributions:

- 4-wire device with up to three times the neutral conductor current
- Operation up to 415 V +10% at full power without derating
- Rated current can be extended in a modular manner in small units from 60 A to 300 A

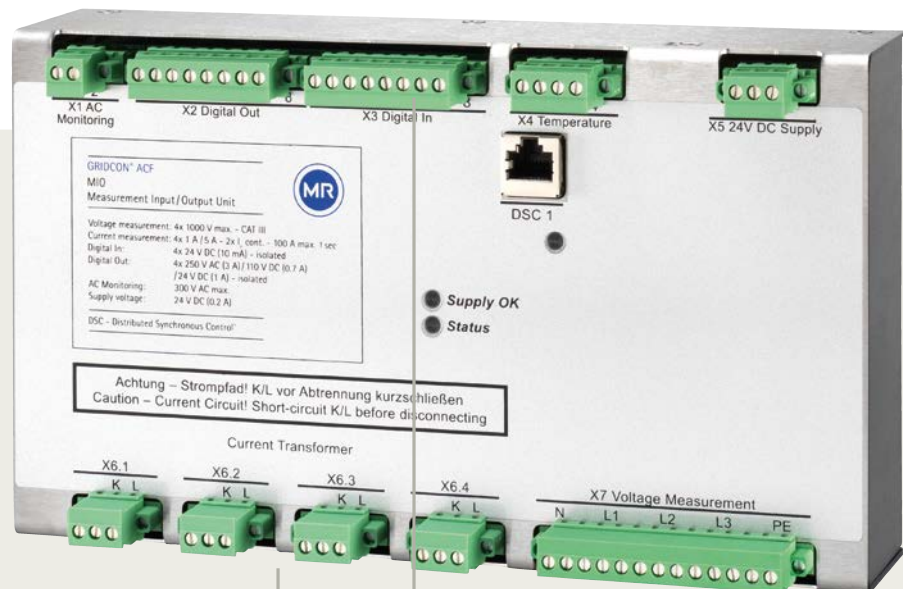
- High power density and extremely compact design
- Low losses
- Degree of protection up to IP 21 possible
- Dynamic compensation of reactive power, harmonics, and flicker, as well as load balancing and neutral conductor relief in one unit

GRIDCON® ACF Building version is particularly at home in these areas:

- Offices and commercial buildings
- Renewable energy
- Data centers
- Hospitals

## MIO mobile measurement unit

Can be used in decentralized manner: The MIO can be positioned near current transformers if necessary. A standard network cable connects to the control computer.



- Four current inputs can be used separately
- Measurement with high-precision A/D converters
  - Can be switched over: 1A / 5A
  - Can be overloaded: up to 100 A for 1 second

Isolated digital inputs and outputs

Measurement voltage up to 1000 V and high overvoltage resistance (CAT III)



# USE IN AN INDUSTRIAL ENVIRONMENT.

## GRIDCON® ACF in the automotive industry.

In the automotive industry in particular, today most of the loads are electronic power consumers. Here production lines are often operated by robots whose inverter drives feed harmonics of different frequencies into the electrical distributions. These harmonics cause warming and therefore premature aging of electrical equipment, potentially leading to the failure of electronic controllers and result in the overloading of transformers and cables. What's more, harmonics increase energy consumption.

The specific use of active filters can reduce voltage distortion over a wide frequency range. This enables the compliance to stipulated limits in standards and relieves the strain on equipment.

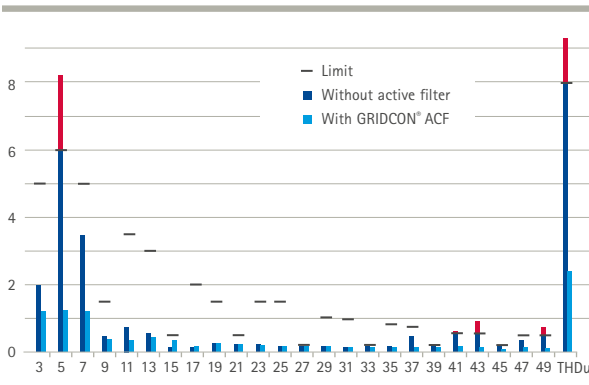
Limit value infringements due to harmonics of the order of 5, 43, and 49 can be seen in the example shown below. Using an active filter not only enables

compliance with all voltage limit values, but also reduces the current load on the transformer by nearly 500 A.

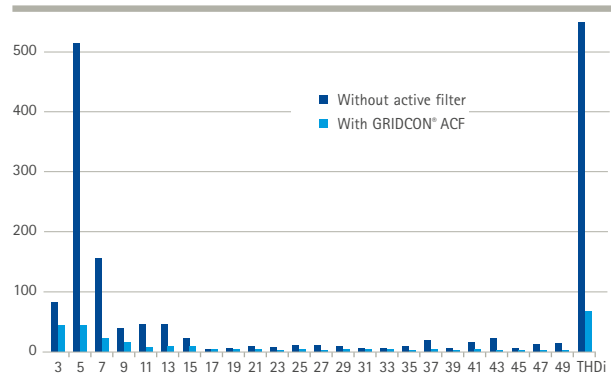
Flexible use and scope for extending equipment is also very important in industrial settings. A larger production line also requires the compensation capacity to be increased. GRIDCON® ACF can „grow“ with production facilities as it allows additional modules to be installed in the existing cabinet.

Despite very different load characteristics, such as those encountered in the body shop and paintshop parts of production, identical versions of GRIDCON® ACF can be used, ensuring low complexity in operation, service, and procurement.

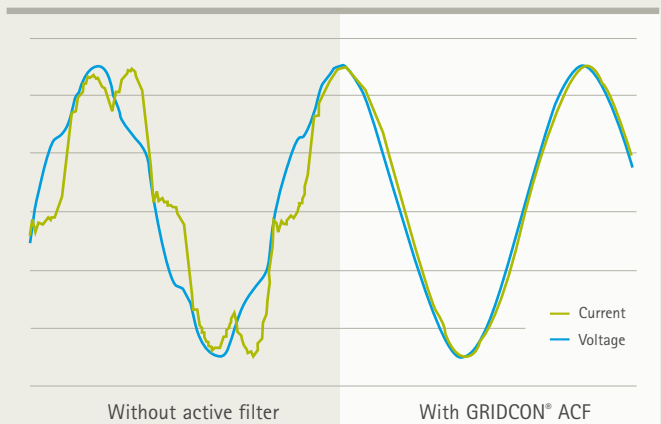
Voltage in % of rated voltage



Current in A



Current and voltage curves



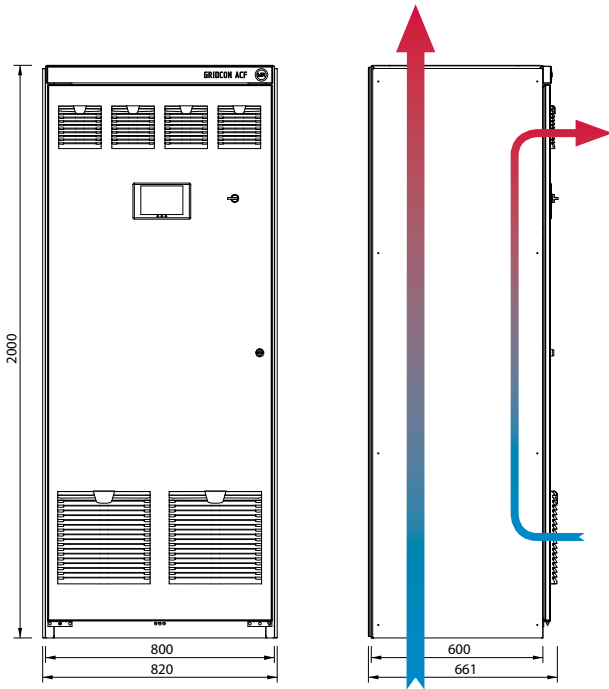
# TECHNICAL DATA.

Technical data	GRIDCON® ACF Industrial version							
Nominal voltage	400 V (maximum 480 V) +10%				690 V (maximum 800 V on request) +10%			
Nominal frequency	50 Hz / 60 Hz							
Peak current	2 x rated current							
Connection	3-phase + PE, neutral conductor connection not required (network topology: TN, TT, IT)							
Compensation	3-wire operation: Outer conductors balanced and unbalanced (positive and negative sequence)							
Filter function harmonics	1 <sup>st</sup> .. 51 <sup>st</sup> harmonic (50 Hz) // 1 <sup>st</sup> .. 41 <sup>st</sup> harmonic (60 Hz) All harmonics can be filtered simultaneously							
Additional functions	Dynamic reactive power compensation Active and reactive power balancing (up to 100% of rated current) Voltage stabilization via Q(U)-control Flicker compensation							
Power losses	< 2,5% of compensation power maximum, < 2,2% in typical operation, < 0,4% when idle, < 100 W in standby				< 2,1% of compensation power maximum, < 1,8% in typical operation < 0,4% when idle, < 100 W in standby			
Switching frequency	10 kHz (low-loss version)							
Control	Internal control computer with two digital signal processors							
Device setup and display	Via touch panel with graphic display or internal web server (TCP/IP) and PC – No additional software required							
Response time	<< 1 ms							
Interfaces	Ethernet (TCP/IP) Various field buses via optional Anybus modules (e.g. Profibus, Modbus) 4 x digital output (isolated, parameterized) for status messages 4 x digital input (24 VDC, parameterized) for external control and parameter set selection							
Current transformer	Either 2-phase or 3-phase current measurement, xx/5 A or xx/1 A (parameterized) Current transformers are not included, 15 VA, class 1 or better recommended							
Inverter	3-Level IGBT with voltage link (DC film capacitors)							
Coloring	Standard: RAL 7035 light grey (other colors and designs on request)							
Dimensions (approx. W x D x H)	800 x 600 x 2000 mm 800 x 600 x 2200 mm with optional base (needed for main air supply from front or back)							
Cooling	Standard: Air cooling with speed-controlled fans Optional: Liquid cooling with connection to external cooling system via heat exchanger unit							
IP protection degree	Standard: IP20, optional: IP21 .. IP54							
Ambient conditions	Maximum ambient temperature without derating: 40° C Recommended ambient temperature for continuous operation: < 25° C Minimum operating temperature: 0° C, relative humidity: maximum 95% Transport / storage: -20° C .. 70° C							
Number of modules	1	2	3	4	1	2	3	4
Compensation power	87 kvar	174 kvar	261 kvar	348 kvar	150 kvar	300 kvar	450 kvar	600 kvar
Rated current	125 A	250 A	375 A	500 A	125 A	250 A	375 A	500 A
Neutral current	–	–	–	–	–	–	–	–
Weight	About 340 kg	About 460 kg	About 580 kg	About 700 kg	About 340 kg	About 460 kg	About 580 kg	About 700 kg
Extendability	Up to a maximum of 5 cabinets (1,7 Mvar, 2,5 kA)				Up to a maximum of 5 cabinets (3 Mvar, 2,5 kA)			
EMC class	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							

# DIMENSIONS.

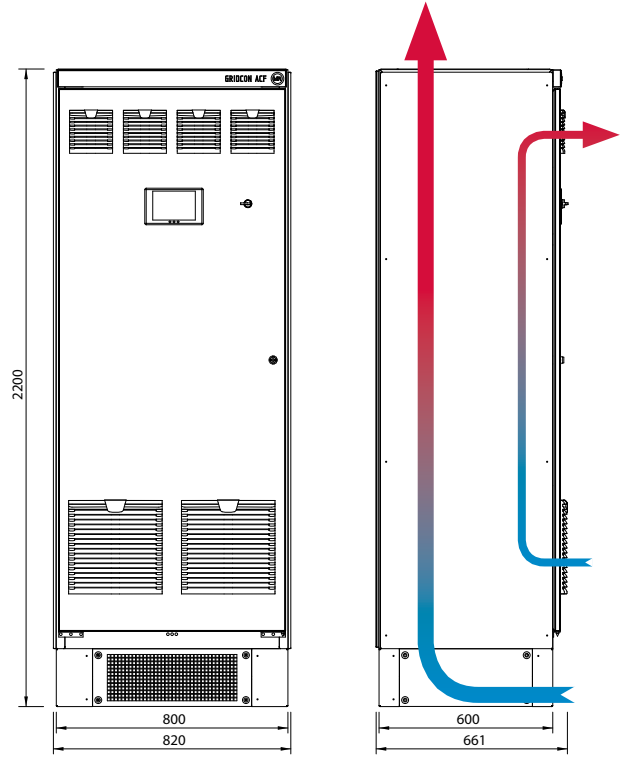
## GRIDCON® ACF Industrial version

Standard version with main air supply through the floor



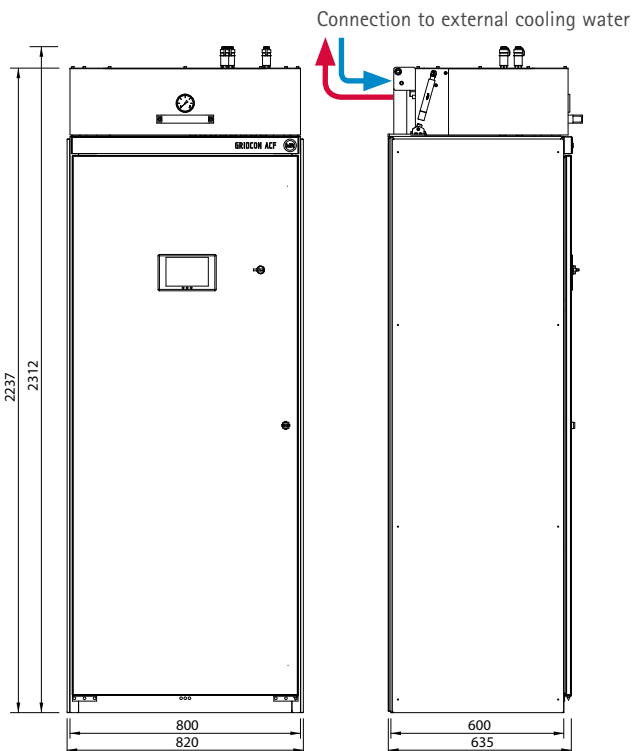
## GRIDCON® ACF Industrial version

Version with optional base for main air supply from front or back



## GRIDCON® ACF Industrial version with liquid cooling

Version with heat exchanger unit on top



## GRIDCON® ACF Building version

