

## **Merus A-Series - Active Harmonic Filters**

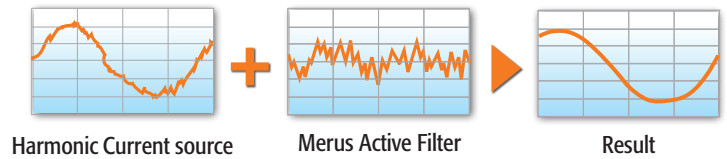
**The MERUS A-Series**  
offers you a new generation of  
dynamic reactive power compensation  
and active filtering technology that  
is reliable, easy to use and makes  
economic sense.

### Active filtering principle

Active filters are power electronic devices connected in parallel with the load to be compensated. The device can be thought of as a controlled current source, which provides any kind of current waveform in real time. The active filter is equipped with energy storage and a control system enabling it to inject the required current to the network. When connected in parallel with the non-linear load, its harmonic currents are compensated and the network is loaded with fundamental current only. The control system monitors the relevant parameters of the network and is capable of detecting and instantaneously reacting to any disturbance in the load current.

Active filters provide a response time which is extremely fast in comparison with the traditional harmonic filters and power factor correction devices made of passive components. In many control modes, the response time is at the real-time level in micro seconds. Even when the harmonics are selected by the control system via Fast Fourier Transformation (FFT), the response time is only 20 ms. Fast response to load changes together with excellent output accuracy gives the MERUS A-Series Active Filters an outstanding harmonic filtration performance and dynamic reactive power response to load changes.

### Active filtering working principle



### Merus A-Series product highlights

- Fast and accurate performance
- Compact size
- Modular cubicle and system design
- Modular Controller Concept (MCC)
- Open and closed loop control
- User friendly touch screen graphical HMI
- Sophisticated communications



### Industry

- Water and waste water treatment
- Lifts, port cranes
- Oil and gas
- Ventilation
- Pulp and paper
- Wind farms and solar power
- Automotive
- Arc welding
- Crushers and shredders...



### Commercial

- Data Centers and IT-facilities
- Offices and buildings
- Traction and Metro stations
- Airports
- Fluorescent or HID lighting
- Hospitals

### Customer benefits

- Quick return on investment
- One solution for harmonics and
- Power factor correction
- Performance meets/exceeds utility criteria
- Redundant and flexible
- Easy to commission and use
- Communicates with others
- Allows remote access



# Merus Power Dynamics

has the solutions for power quality and energy saving, for both industrial and commercial applications. Dynamic reactive power compensation and harmonic filtering solutions form the core of our product offering – everything aimed at saving energy and improving power quality.

## Harmonics and power quality

Power quality is commonly defined as the power grid’s ability to supply a clean and stable power flow as a pure sinusoidal wave form that should remain within specified voltage and frequency tolerances. In today’s electrical networks, deviations from these ideal conditions are frequent due to increasing non-linear and other loads disturbing the grid.

## Merus A-Series

Our engineering teams have combined the benefits of the latest proven technology available and their long experience of reactive power compensation and power quality. Their committed efforts have resulted in a new generation active filtering technology and products that fulfill and exceed the performance requirements of the market at a competitive investment cost.

## Benefits of active harmonic filtering

The consequences of insufficient power quality can inflict serious losses on business and economy. In the worst-case scenario, it may pose a threat to human life in mission critical applications and highly sensitive environments, such as hospitals. Good power quality saves – money, energy, environment and more.

### Typical problems caused by harmonics

- reduced energy efficiency
- reduced available system capacity
- overheating of cables, motors and transformers
- damage to controllers and sensitive equipment
- tripping of circuit breakers
- capacitor overloading and degrading
- excitation of network resonance
- premature aging
- utility requirements for grid connection not achieved



### Direct savings

- Improved energy efficiency
- Reduced power losses in busbars, transformers, switchgear
- Tariff savings in reactive power in most cases.
- Capital expenditure savings via correctly dimensioned equipment

### Indirect savings

- prevents damage and premature aging of equipment
- avoidance of loss of production, data and work.

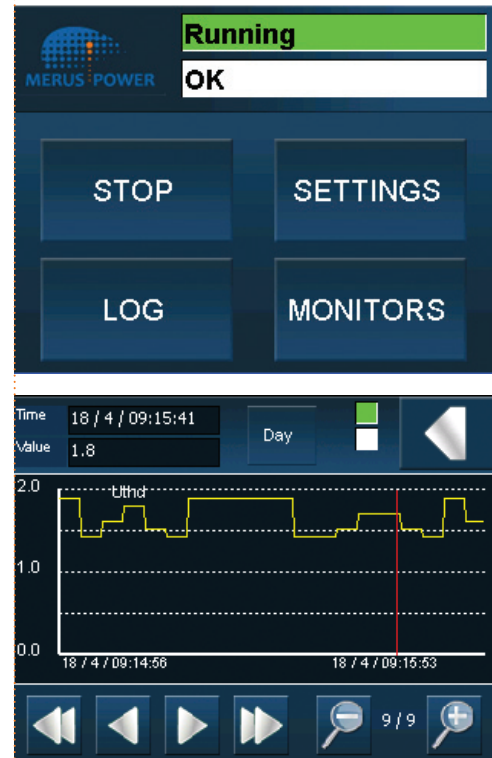
## User interface

The Merus Active filter user interface has been designed for smooth and easy operation of the device. The needs of an operator or engineer working on the device as well as the requirement for remote access and monitoring of the system are all integrated into the design of HMI. It is an efficient tool in the commissioning and setting of parameters and configuration.

Systems with several devices, or even hybrid systems that include active filters and conventional reactive power compensation, can be managed with one HMI. The monitoring and reporting features and optional remote access help the user to get optimal benefits and return on the active filter investment.

## Powerful HMI features

- *Easy to use touch screen*  
One touch navigation in the system enables quick and easy access to essential functions of the system
- *Merus A-Series is equipped with modern 3,5" touch screen display.*  
One touch navigation in the system enables quick and easy access to essential functions of the system
- *Efficient commissioning*  
The menu structure and procedures have been designed to support logical steps of commissioning procedures.
- *Selectable reporting*  
The reporting parameters can be easily customized to those of the greatest interest for each individual customer.
- *Monitoring and analysis*  
Monitoring and analysis tools utilize the graphical interface and enable quick visual monitoring of major operating parameters and access to history data.
- *Remote access*  
The remote access via internet or user preferred connection is available using standard communication protocols. The remote access connection utilizes the same HMI software.
- *Multiple languages*  
HMI comes with multiple languages. English, Chinese, Russian, Spanish and German will be available.

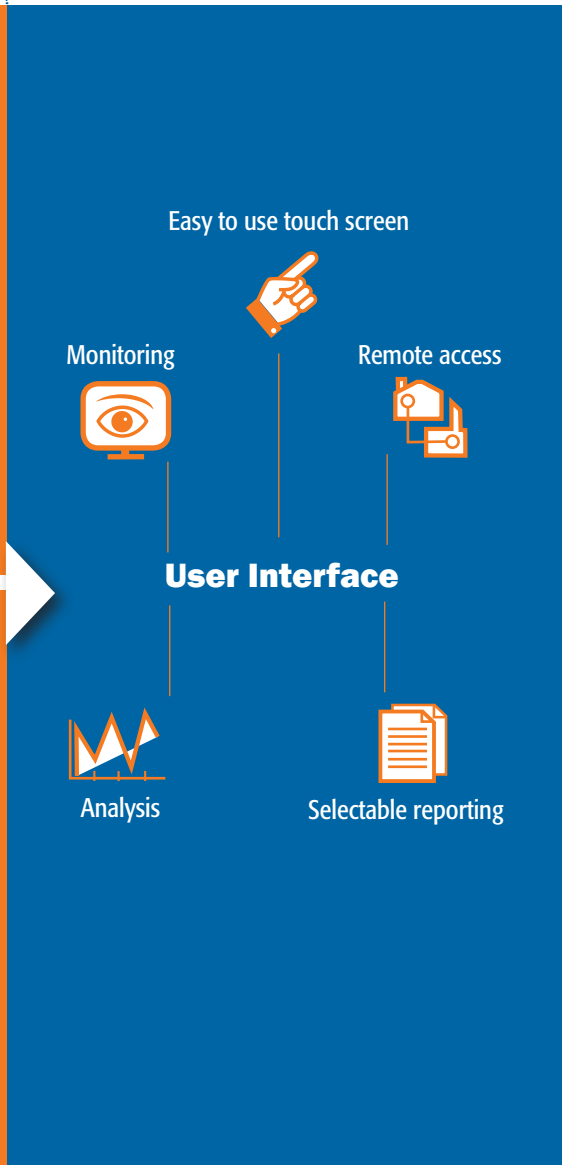


## Industry

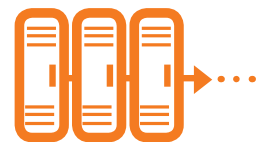
- Three wire connection
- Industrial cabinet design
- 400V supply, others with transformers
- Units from 50A to 400A
- Harmonic performance upto 50th Harmonic
- Advanced HMI

## Commercial

- Four wire connection
- Neutral harmonic correction 3 times unit rating
- Low noise levels
- 400V supply, others with transformers
- Units from 50A to 150A
- Harmonic performance upto 50th Harmonic
- Advanced HMI



## Merus A-Series Filters



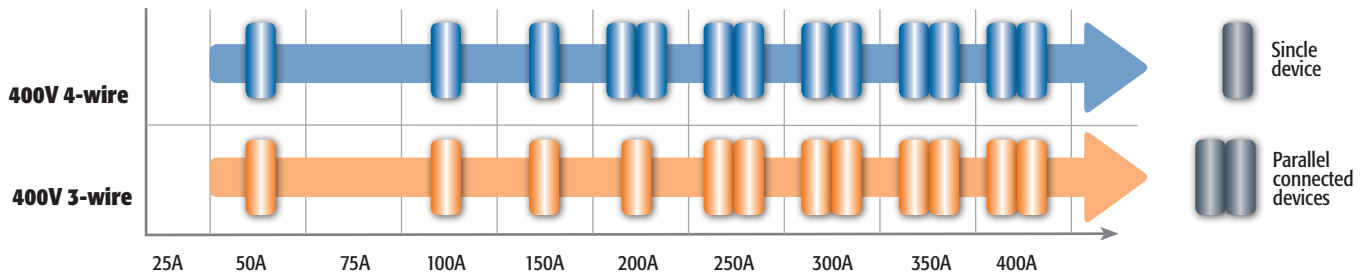
Units scalable to high output systems

## Application area of Merus A-Series

The various non linear loads present in power networks include variable speed drives, uninterruptible power supplies (UPS) and different kinds of rectifiers. They all draw a non-sinusoidal current from the network and can therefore be considered harmonic current sources. The MERUS A-Series active filters can be flexibly applied to harmonic filtering and/or reactive power compensation applications.

The active filtering technology can be applied to industrial or commercial environments where good power quality is essential. The broad product range and long experience help us to design and propose optimal solutions to maximize savings with affordable investment cost.

## Merus A-series product range



## Technical Specification

Current rating and connection	50A, 3-wire	50A, 4-wire	100A, 3-wire	100A, 4-wire	150A, 3-wire	150A, 4-wire	200A, 3-wire
Nominal voltage	Standard 400V $\pm 10\%$ (other voltages on request)						
Performance	up to 50th harmonic, ITHD reduction 95%						
Neutral wire current		150A		300A		450A	
Response time	$\ll 1$ ms / 1 cycle (selective mode)						
Switching frequency	10 kHz						
Controller	Digital controller						
Operation modes	ALL / ALL but no fn / Selective						
HMI Language	En / Ger / Spa / Chn / Ru						
HMI	3,5" touch screen, power quality monitoring and reporting functions						
Communications	Ethernet / RS485, ModBus						
Dimensions*	600 x 600 x 1000	600 x 600 x 1000	600 x 600 x 1000	600 x 600 x 1000	600 x 600x1600	600 x 600x1600	600 x 600x1600
Weight	110 kg	110 kg	130 kg	130	280	280	280
Cooling media	Air	Air	Air	Air	Air	Air	Air
Power losses	< 3 %	< 3 %	< 3 %	< 3 %	< 3 %	< 3 %	< 3 %
Ambient Temperature	40°C, without derating						
Modularity	Parallel operation of any rating combinations up to 7 units per one HMI						
Noise	60 dB	60 dB	66 dB	66 dB	68 dB	68 dB	68 dB
Current transformer*	3 pieces, secondary 5A or 1A, class 0,5 or better						
Protection degree	IP 21, IP 34 as an option						
Altitude	1000 m without derating						
Humidity	Maximum 95% RH; non-condensing						
Color	RAL7035, other colors on request						
Installation*	Wall or floor, cable entry free	Wall or floor, cable entry free	Wall or floor, cable entry free	Wall or floor, cable entry free	Floor, cable entry bottom	Floor, cable entry bottom	Floor, cable entry bottom

\* Measuring current transformer connections; closed loop (current transformers located supply side), open loop (current transformers located load side)

\* 300 mm free space below and above required for air ventilation. Floor mounting with air ventilation rack



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