GRIDCON®
MODULES AND STATIONS

VARIABLE MODULES AND STATIONS FOR REACTIVE POWER COMPENSATION.

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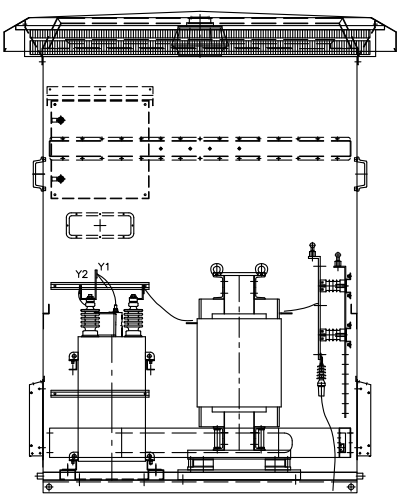
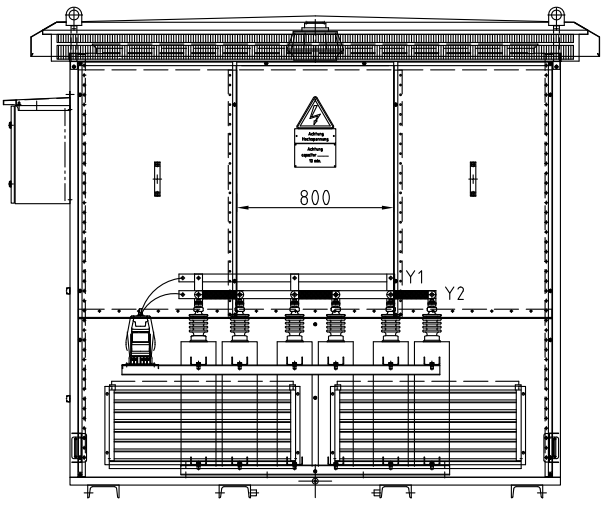
FLEXIBLE SOLUTIONS FOR INDIVIDUAL CUSTOMER NEEDS.





GRIDCON® MODULE AND GRIDCON® STATION – VARIABLE MODULES AND STATIONS.

There is a growing demand for reactive power compensation and power quality solutions that are quick and easy to install. Clients from both industry and the public sector are increasingly requesting systems ready for connection. In response, the Power Quality division of Maschinenfabrik Reinhausen has designed a wide range of compensation and filter circuit systems. Regardless of the technical requirements or ambient conditions of your location – we deliver the right solution for you.

Perfectly tailoring your compensation system to your application involves finding the right housing. This is the kind of flexibility that MR offers for its modules and stations. The compensation and filter circuit steps we have designed are available in a huge variety of housings and stations – to suit the technical job at hand and the ambient conditions on the ground.

All compensation systems in the GRIDCON® family are fully tested before delivery to minimize the time needed for assembly and commissioning. On request, we deploy comprehensive protection and control concepts and test them in the factory with the relevant drives.

MR modules can therefore be installed with little effort, making them the perfect solution for industry or public spaces.

Type	Number of steps	Design
GRIDCON® MODULE FIX	Single-step	Compensation module encapsulated in steel sheet metal for indoor and outdoor installation
GRIDCON® MODULE MULTIPLE	Multi-step	Compensation module encapsulated in steel sheet metal for indoor and outdoor installation
GRIDCON® STATION CONCRETE	Single- and multi-step	Fully equipped concrete station for compensation systems and local network stations
GRIDCON® STATION E-HOUSE	Multi-step	Fully equipped distribution station container encapsulated in steel sheet metal or skid-mounted systems

GRIDCON® MODULE FIX – SMALL, COMPACT AND FLEXIBLE.

Used indoors or in the open, the modular housing variants from MR allow you to adapt the performance of your compensation system perfectly to your applications. This makes the GRIDCON® MODULE FIX particularly well suited for a direct compensation of reactive power at motors or group compensation in the primary industry sectors.

Low- to medium-performance single-step compensation systems can be fitted in the GRIDCON® MODULE FIX. The equipment is flexible and oriented towards the application. If networks contain harmonic components, as it is frequently the case in the industry, reactors can be fitted in the systems or they can be produced as direct filter circuits.

Depending on what is needed, several single-step modules can also be combined using cable couplings to form one multi-step system.

The degree of protection always takes account of the relevant ambient conditions, allowing special solutions for extreme heat or strong winds to be implemented. MR's modules are supplied ready for connection, guaranteeing rapid assembly and short commissioning times.

Technical features	
Application	Compensation / filter (capacitive) Capacitor bank Filter/inrush current reactor
Design	Single-step
Nominal voltage	3-24 kV
Rated frequency	50 / 60 Hz
Step capacity	up to 8 Mvar
Degree of protection	IP23 interior IP43 outdoors
Additional equipment	▌High-voltage fuses ▌Switchgear ▌Temperature monitoring ▌Ventilation ▌Anti-condensation heating ▌Sunshields ▌Disconnector/earthing switch

GRIDCON® MODULE MULTIPLE – TRULY MULTI-TALENTED.

Multi-step compensation or filter circuit systems take up a lot of space. The housing variants of MR's GRIDCON® MODULE MULTIPLE can also be installed outdoors.

Many industrial applications require multi-step compensation systems or filter circuits. The GRIDCON® MODULE MULTIPLE is the perfect solution. It is designed for medium to high compensation levels and can be installed both in- and outdoors. It goes without saying that we take into account all technical equipment requirements and ambient conditions on site. The variety of available MR systems is evidence of this flexibility.

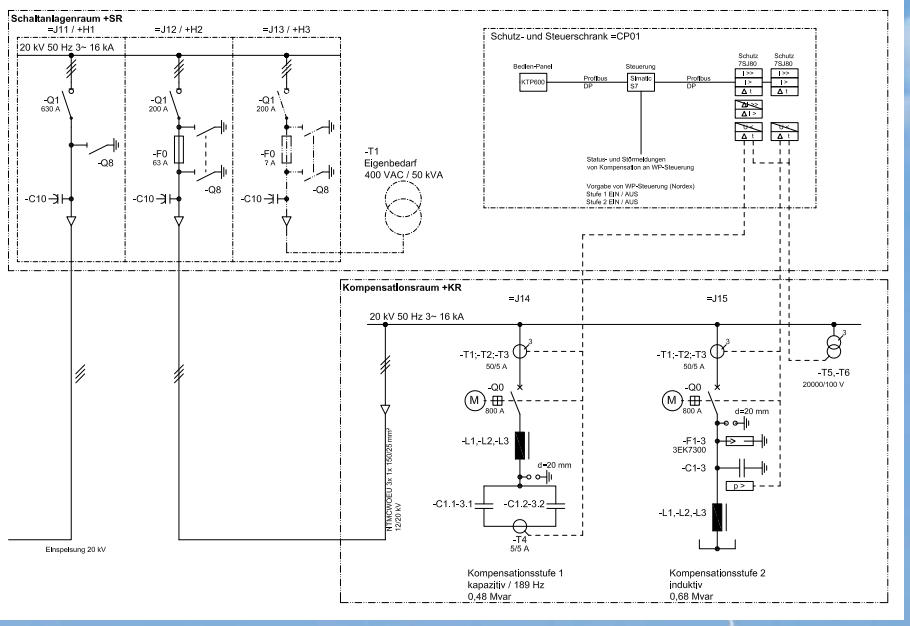
We construct the housing so that it does not require any special form of transport. If all the structural requirements are met, the system can also be erected in one piece, greatly reducing assembly costs.

The powder-coated paintwork can withstand the worst of weathers. On request, special paint for very high levels of corrosion resistance is possible.

Vacuum circuit breakers or contactors can be used to switch the individual steps.

Technical features	
Application	Compensation / filter (capacitive / inductive) Capacitor bank Filter reactor Shunt reactor High-pass resistor
Design	up to 4 steps
Nominal voltage	6-20 kV
Rated frequency	50 / 60 Hz
Step capacity	up to 4 Mvar
Degree of protection	IP23 interior IP43 outdoors
Additional equipment	❙ Switchgear ❙ Temperature monitoring ❙ Ventilation ❙ Anti-condensation heating ❙ Sunshields ❙ Disconnector/earthing switch ❙ Air conditioning for control cubicle

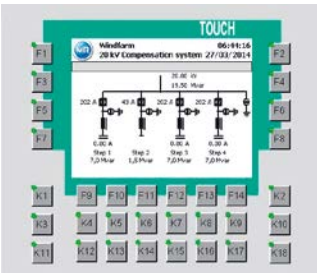
THE SOLUTION FOR EVER-INCREASING DEMANDS.



GRIDCON® STATION CONCRETE – PERFECT FOR PUBLIC SPACES.

GRIDCON® STATION CONCRETE is extremely weather resistant and durable. It is frequently fitted with switchgear for connecting PV arrays or wind farms.

For compensation systems and local network stations used in public spaces, MR has developed concrete stations which are fully equipped in the factory and can therefore be connected instantly on site. The robust buildings are designed to be resistant to fault arcs, thereby offering the system operator maximum protection.



To ensure a sensible transport weight, two buildings are often produced for three- to four-step systems. GRIDCON® STATION CONCRETE usually manage the reactive power compensation for wind farms or solar parks if the generating systems are not able to do so themselves. Another increasingly common application is compensation of reactive cable power in public networks. The steps are connected by busbars and separate circuit breakers with a high switching frequency. A kit for limiting overvoltage is available for inductive compensation steps with shunt reactors. A module for supplying auxiliary power is also available.

GRIDCON® STATION CONCRETE is equipped with a control cabinet for all protective and operative functions and for communication with the site's control room. The operating data of the stations (most of which are unmanned) can therefore be accessed with ease.

Technical features	
Application	Compensation / filter (capacitive / inductive) Capacitor bank Filter circuit reactor Shunt reactor Regulated transformer
Design	up to 5 steps
Nominal voltage	6-30 kV
Rated frequency	50 Hz
Step capacity	up to 5 Mvar, capacitive up to 2.5 Mvar, inductive
Degree of protection	IP23D IP44
Additional equipment	▌Circuit breaker ▌Switchgear ▌Ventilation ▌Air conditioning ▌Auxiliary power transformer

SOLUTIONS FOR HIGH-QUALITY ENERGY SUPPLY.

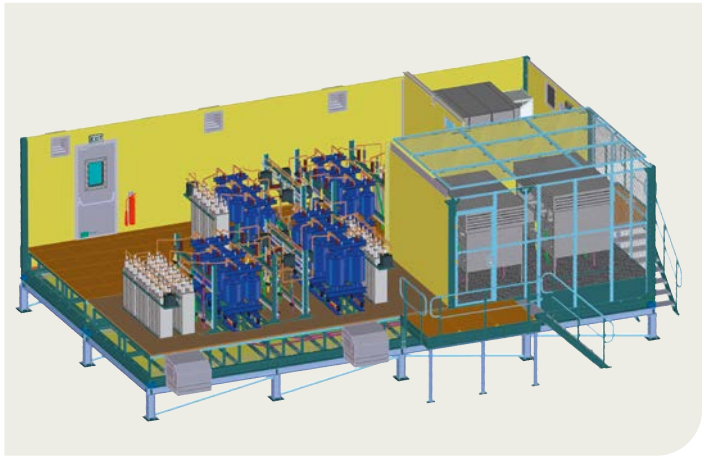
GRIDCON® STATION E-HOUSE – ABLE TO COPE WITH EXTREMES.

Total protection for high-quality filter circuit components. MR GRIDCON® STATION E-HOUSE fully screens off the system from climatic influences and can be fitted with a flexible choice of equipment.

The powerful converter drives used in mining or in the oil and gas industry need high-performance passive filter circuit systems. They are installed outdoors and are therefore subject to extreme ambient conditions.

If necessary, the transportable stations of the GRIDCON® STATION E-HOUSE series can house not just the installed passive filter circuit steps with high-pass resistors but switchgear as well. These modules can be accessed from both outside and inside and are fitted with flexible partitions and crane runways for maintaining and replacing components.

The ventilation and air conditioning systems are designed redundantly. Because of the filter components' freestanding design the station offers extra protection from fault arc errors. Devices for limiting inrush currents and pre-magnetization round off the equipment features.



Technical features	
Application	Compensation / filter (capacitive / inductive) Capacitor bank Filter circuit reactor Shunt reactor High-pass resistor
Design	up to 5 steps
Nominal voltage	6-35 kV
Rated frequency	50 / 60 Hz
Step capacity	up to 15 Mvar
Degree of protection	IP54, IP55 distribution station IP00 skid
Additional equipment	▌Control cabinets ▌Switchgear ▌Ventilation and/or air conditioning ▌Fire alarm and fire extinguishing system

FILTER CIRCUITS IN THE BUILDING – HIGHEST LEVEL FOR INDUSTRIAL SOLUTIONS.

High-performance filter and compensation systems are often equipped with air-core reactors. Due to their size and minimum magnetic clearance, such systems can no longer fit in modules or stations of the factory-assembled GRIDCON® families. MR installs these filter circuit systems in specifically adapted or provided buildings.

Safely managing voltages between 30 and 150 kV requires special structural conditions, such as buildings for compensation systems. A series of special factors must be taken into account, for example, the magnetic clearance, power loss, and noise from the filter circuit system under alternating loads. These buildings are therefore individually designed for every application.

MR provides such buildings as totally customized turnkey solutions or is actively involved in the design of special compensation buildings.

Technical features	
Application	Compensation / filter (capacitive / inductive) Capacitor bank Filter circuit reactor High-pass resistor Shunt reactor
Design	according to customer requirements
Nominal voltage	30 - 150 kV
Rated frequency	50 / 60 Hz
Degree of protection	IP23D or IP44
Additional equipment	❙ Fence and access systems ❙ Switchgear ❙ Ventilation and/or air conditioning ❙ Fire alarm and fire extinguishing system

MORE POWER – MORE VALUE.

Flexibly equipped modules and stations from MR's GRIDCON® family are the answer to your highly varied applications.

Literally no installation work (plug & operate)

- All modules and stations are tested before delivery to save time during installation, connection and commissioning
- The compact station design allows a joint factory testing of a complex drive together with its filter circuit system
- Suited for the use in the industrial and public sector – extensive number of possible adaptations for customer-specific requirements

Solutions for every climate zone

- Complete shielding of the components fitted from all weather experienced on site: cold, heat and storms
- Ventilation or air conditioning as required

Maximum safety

- The complex protection concept keeps the operator safe
- Extensive protection of high-quality components through use of passive and active sensors
- Special protection for people in public spaces by using fault arc protected switchgear and stations

Reliable operation and simple maintenance

- Costs of commissioning are minimized by extensive advance testing
- Automatic response to critical system parameters
- Development of a maintenance concept for the entire system
- Innovative applications simplify maintenance

Everything from one source

- MR provides switchable, capacitive and inductive compensation steps, central or decentralized filter circuit systems and local network stations
- Combinations with dynamic and partially dynamic compensation systems are possible
- MR helps you every step of the way, from the system concept - including measurements, studies and sizing – manufacture and delivery to assembly and commissioning

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THE POWER BEHIND POWER.