



EMZ – MORE THAN ELECTRIC MOTORS
Your partner in drive technology
High-voltage product catalog

Welcome by EMZ!





CONTENTS

ABOUT US	4
OUR PRODUCT RANGE	6
SPECIAL ACCESSORIES, MODIFICATIONS	7
OUR COMPACT SOLUTIONS	8
OUR MODULAR SOLUTIONS	10
OUR SPECIAL SOLUTIONS	12
OUR HEAVY-DUTY RANGE	14
OUR RETROFIT SOLUTIONS	16
OUR STARTER SOLUTIONS	18
OUR VFD SOLUTIONS	20
OUR SERVICE	22
OUR REFERENCES	24
CONTACT US	30



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ABOUT US

EMZ is a German manufacturer with more than 70 years of experience in the field of High-Voltage motors and electrical drive technology. With deep technical know-how and practical side experience we achieved a leading position in the market.

From development to construction, manufacture to operation, we guarantee a high quality standard for our products and services that will convince you of our expertise.

The high quality standards of our products are guaranteed by the certification of our production in accordance with EN ISO 9001 standards.

Based on our experience and the numerous successfully completed projects, we are specialists for an all-round service for interchangeable spare motors.

Our applications

Our high-voltage product range includes compact and modular series, synchronous and special motors, starters and VFD's, and we can serve our customers with complete drive-systems.

Thanks to our diverse knowledge and years of project experience, today we are represented worldwide.

EMZ motors are successful operating in several branches:

- wood & paper,
- steel & recycling,
- cement & mining,
- chemistry,
- power plants
- fans and pumps.

Upon request, we can deliver our motors with ATEX certification.



Our guarantee for quality

EMZ High-Voltage motors and drive-systems are manufactured according to current EN 60034 standards and comply with the following regulations:

- Design & performance DIN/EN 60034-1
- Protection type DIN/EN 60034-5
- Cooling DIN/EN 60034-6
- Construction type DIN/EN 60034-7
- Noise emission DIN/EN 60034-9
- Vibration levels DIN/EN 60034-14
- Electrical insulation DIN/EN 60085
- Soft starters DIN/EN 60947-4-2
- Frequency converters DIN/EN 61800

On request, the EMZ motors can be manufactured in accordance with NEMA MG2 standards and IEEE testing regulations.

Our Headquarter in Recklinghausen is prepared to handle any High-Voltage motor. Constant development is our top-priority and its no different in our testing field too. In the past years we made numerous investments to increase our testing capabilities to adapt better to our customers needs.

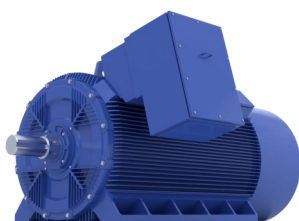
In our test bench, all measurements and examinations are carried out in accordance with the EN 60034 standards.

- No-load test up to 8000 kW
- Load test up to 2000 kW
- Voltages from 400 to 13.200 V
- Frequencies up to 60 Hz

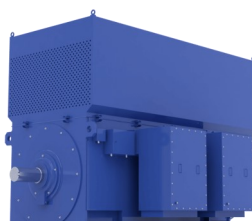


OUR PRODUCT RANGE

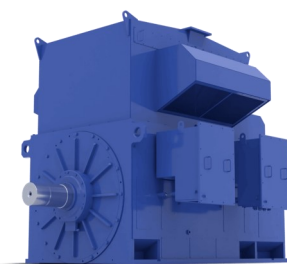
COMPACT SERIES
Squirrel-cage &
Slip-ring motors



MODULAR SERIES
Squirrel-cage &
Slip-ring motors



SPECIAL SERIES
Synchronous &
Special motors

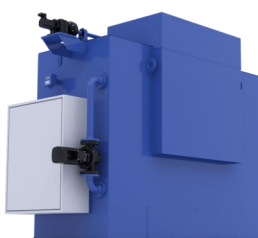


PERFORMANCE	up to 2.000 kW	up to 20.000 kW	up to 20.000 kW
VOLTAGE	up to 13.800 V	up to 13.800 V	up to 13.800 V
FREQUENCY	up to 60 Hz	up to 60 Hz	up to 60 Hz
POLES	2 to 12 poles	2 to 24 poles	2 to 24 poles
COOLING TYPES	IC411, IC416, IC511	IC01/06/11/21/31 IPW24 IC611/616/666 IC81W/86W	IC01/06/11/21/31 IPW24 IC611/616/666 IC81W/86W

ELECTRONIC STARTERS

LIQUID & SOFT STARTERS

VFD'S



PERFORMANCE	100 kW to 16 MW	100 kW to 20 MW	250 kW to 25 MW
VOLTAGE	up to 15.000 V	up to 4 kV rotor voltage	from 2.2 kV to 13.8 kV



SPECIAL ACCESSORIES

For all types of motors

- Pt100 resistance thermometers
- Bentley Nevada vibration monitoring
- Anti-condensation heating elements
- Current transformers for differential protection
- Pressure switch for filter monitoring
- Vibration monitoring 4-20 mA
- Water-leakage monitoring
- Slip-ring compartment lighting
- Contact thermometer
- Tachometer generators
- Star point terminal box
- SPM detectors



MODIFICATIONS

According to customer requirements

- identically interchangeable replicas of existing motors
- customised special construction
- mechanical adaptations to existing foundations with base frame
- terminal box position adapted according to specifications
- rotor constructions for heavy starting and increased starting frequency
- double-cage rotor design for high starting torques and low starting currents
- soundproof designs
- optimised efficiency with high quality materials

OUR COMPACT SOLUTIONS

For Squirrel-cage & Slip-ring motors

The EMZ compact series with our AKR and ASR motors can be used as an all-rounder for almost all standard applications and is characterised by a very high degree of reliability. The selection of high-quality materials and the optimised dimensioning of the active parts and the fans reduce losses and realise high efficiencies. The compact and torsion-resistant design in combination with an efficient cooling system guarantee a long service life.

Depending on the application, the motors of the EMZ compact series with outputs of up to 2.000 kW can be used very flexible on the frequency converter, soft starter or even directly in DOL (Direct On Line) operation.

IC411 cooling system

The rib-cooled EMZ motors with cooling type IC411 are self-cooled and dissipate the heat loss to the outside cooling air via the ribbed motor housing and the end shields. The innovative dual-circuit cooling system with an internal cooling air circuit is independent from the direction of rotation and ensures a consistent temperature distribution inside the motor.





IC416 cooling system

Cooling type IC416 is constructively based on the proven cooling type IC411, but differs in that the forced ventilation unit is mounted on the nondriving side and blows the external air axially over the cooling ribs, independent of the motor speed. This design guarantees a constant cooling capacity independent of the motor speed and is particularly suitable for variable-speed applications in combination with a frequency converter.



IC511 cooling system

EMZ motors with cooling type IC511 are designed with concentric tube cooling, where the cooling tubes are rolled directly into the end walls of the stator housing. The steel-welded construction guarantees a uniform heat transfer from the inner cooling air to the outer cooling air circuit. Due to the compact and rigid design the motors are very robust and torsion-resistant.



OUR MODULAR SOLUTIONS

For Squirrel-cage & Slip-ring motors

The EMZ Modular series is the power pack in the EMZ production portfolio. Based on a welded stator housing design, this robust motor series is designed for the toughest applications in heavy industry. With outputs of up to 20.000 kW and efficient cooling systems, these drives offer an optimal price-performance ratio.

The squirrel cage motors of the Modular series are available for DOL mode and also for speed-controlled operation as complete drive packages with frequency converters. The slip ring motors are designed for special applications where high starting torque and/or low starting current is required.

IC611/616/666 cooling system

Modular EMZ motors with cooling types IC611/616/666 have a top-mounted air/air heat exchanger where the heat loss is transferred from the internal cooling air to the external cooling air via two separate cooling circuits.

IC611—the external fan is mounted directly on the shaft and conveys the cooling air through the cooling tubes of the heat exchanger at motor speed.

IC616—this task is taken over by a forced ventilation unit that works independently of the motor speed and makes the motors suitable for variable speed applications.

IC666—with the use of a further forced ventilation unit for the internal cooling air circuit the motor can be used for a wide speed regulation range.





IC81W/86W cooling system

Motors with the highly efficient cooling types IC81W/86W are designed similarly to drives with cooling types IC611/616/666, but differ from these using a top-mounted air/water heat exchanger. In the heat exchanger, the heat loss from the internal cooling air is transferred via a cooling cassette to an external water cooling system. With an additional forced ventilation unit for the internal cooling air, the IC86W cooling type is also optimally suited for speed-controlled operation via frequency converter.



IC 01/11/21/31 cooling system

EMZ motors with cooling types IC01/11/21/31 are predestined for indoor applications and with clean ambient air. Due to the highly efficient open-circuit ventilation, the heat loss is dissipated directly at the active parts and transported out of the motor interior. With external supply and exhaust air ducts, cooling type IC31 can be implemented so that these powerful drives can also be used in dusty environments.



OUR SPECIAL SOLUTIONS

Based on the design of the EMZ Compact & Modular series, we offer a variety of special solutions for a wide range of applications. We supply synchronous motors and explosion-proof ATEX motors and realise the most diverse special solutions and react flexibly to every customer request.

Synchronous motors

Synchronous machines of the SG series are especially economical because of low maintenance costs, operational safety and high efficiency. Depending on your requirements, we manufacture synchronous machines for indoor and outdoor installation with mounted air/air or air/water heat exchangers.

Performance range

- Performance 250 to 35.000 kVA
- Voltage 2.000 to 13,800 V
- Frequency 50 and 60 Hz
- Number of poles 4 to 40 pole
- Protection type IP 23/54/55
- Cooling type IC 01/31/611/81W
- Design IM B3, IM D5 and IM V1/V10

Applications

- Industrial power plants
- Hydropower plants
- Grinding and mill application
- Compressor drives
- Pump drives





ATEX motors

Explosion proof motors, otherwise referred to as Ex – motors or ATEX motors are a special type of motor are designed to be used in hazardous environments with the risk of an explosion. Both our compact and modular series can be manufactured for use in explosive areas.

Types of ATEX motors

- **Dust explosion protection (Ex tD) – Ex tD** motors used in dusty areas must be designed with a special housing enclosure protection and additional with a limited housing temperature to ensure a safe operation in dusty areas.
- **Increased safety (Ex ec & Ex eb) –** Previously called 'non sparking' motors, these motors do not spark during normal operation or on start up. There are also no hot surfaces within the motor during running or starting.
- **Flameproof (Ex d) –** A spark or flame from a motor can result in an explosion in hazardous environments. Flameproof motors have flame paths built into their shaft and inner bearing covers, joints with long spigots to prevent the flames escaping and are encased with a motor housing developed to withstand internal explosions.



OUR HEAVY-DUTY RANGE

Our business in Shredder applications started with our ASD series. To ensure our continuous success in the industry, today all of our compact and modular series are available for heavy-duty environments.

Main characteristics and special technical features

- Reinforced housing construction, direct derivation of the air-gap torque over the fixing of the stator lamination onto the foot plates
- Reinforced welding seams of the housing construction
- Reinforced radial fixing construction of the stator lamination in the stator housing
- Reinforced shrinking seat of the rotor lamination on the rotor spider shaft
- Enlarged air-gap
- Additional bandages to fix the winding overhang of the stator winding
- Reinforced bandage to fix the winding overhang of the rotor winding
- Reinforced bandage of the rotor winding derivation on the shaft
- Complete design for max. vibrations of 28 mm/s
- Reduction of the shaft deflection by increasing the number of the spiders for the construction of the spider shaft
- Additional fixing on the cooling pipes of the air/air cooler
- Larger antifriction bearings should be executed with solid brass cage
- DE Bearing executed as self-aligning roller bearing
- DE and NDE bearing shields should be additionally reinforced with welded braces
- DE and NDE bearing shield dowelled additionally
- All screws should be fixed with lock washers—tab washers upon requirement
- Reinforced external fan hub – fan rim with additional fixing screws
- Brush holders with increased spring force (350g/cm²)



OUR RETROFIT SOLUTIONS

Many motors for cement mills, crushers and fans have been in use for decades under extreme conditions and have always performed reliably. However after long operation periode the lifetime of the mechanical structure and the electrical insulation is limited.

We have a hugh experience and know-how in the design and production of replacement motors which are mechanically and electrically interchangeable with existing machines. Our specialists are ready to visit your plant and record all necessary information to guarantee a replacement without any modification on side.

Advantages of interchangeable motors

- Very short conversion time
- No changes to the foundation required
- Identical position of the connections for stators and rotors
- Identical electrical data for stator and rotor windings
- Existing rotor starters can be used
- Use of the existing coupling half on the motor side
- Operational safety and higher thermal spare thanks to the modern insulation system (class: F)

Complete drive systems

Energy efficiency becomes more and more important. We are ready to upgrade the existing constant speed drive concept with speed controlled system using a frequency converter in order to increase efficiency.

Advantages of speed-controlled drives

- Increasing efficiency
- Reduction of operating costs
- Variable speed
- Variable production volume
- Better process control
- Wear-free operation
- Several machines can be controlled
- Ready-to-use container solutions available

2x 1250kW Slip-ring motor

Powerful tandem drive with efficient IC611 cooling system, base frame for mechanical adaptation and new tandem liquid starter.



3150kW Slip-ring motor

Fully interchangeable mill drive in which the existing cooling air channels have been adapted.



OUR STARTER SOLUTIONS

In addition to our high-voltage motors, EMZ offers a wide range of technologies for starting motors. This includes resistance starters for slip ring motors, designed as oil or water starters, as well as soft starters for squirrel cage motors for controlled reduction of the inrush current.

Electronic starters

The electronic EMZ soft starters enable a controlled reduction of the inrush current and the starting current during the start-up of squirrel cage induction motors. Soft starters limit the motor voltage during starting and thus reduce the motor current and torque. They can be used in all applications where a reduction of the motor torque during start-up is possible such as fans or pumps. Electronic soft starters also relieve the network by avoiding high starting currents and voltage drops.

Technical Data

- Vacuum contactor
- Vacuum bypass contactor
- Control voltage: 110 V – 220 V AC, 110 V DC
- Motor-protection relay (MSR)
- Current and voltage transformers
- Multifunction display (DMA)
- Soft start and soft stop
- Current limiting
- Pump control programmes
- Adjustable torque and current characteristics
- Dual setting
- Boost start (high starting torque)





Liquid resistance starters

The EMZ liquid starters offer an extremely robust and at the same time economical solution for the controlled starting of slip ring motors in applications with large moments of inertia. There are many such applications in the cement and raw materials processing industries. Special solutions are used for shredder applications, where the rotor resistance is continuously adjusted to the load conditions.



Built in as standard

- Automatic / manual operation
- Level monitoring
- Rmax und Rmin monitoring
- Frequency converter
- Hand crank
- Gear box limit switch
- Short-circuit contactor
- Heater thermostat for cut-off and control
- liquid resistance starters compliant with IP54
- Control panel at least compliant with IP54

Optional accessories

- Automation through Profibus or Ethernet interface
- High speed servo controller
- Brush lifting device
- Brush arc monitoring
- Rotor blocking monitoring
- Torque control
- Speed control
- Agitator
- Circulation pump
- Integrated cooling system rated up to 1.200 kW
- Analogue electrode position sensor 4-20 mA



OUR VFD SOLUTIONS

In addition to the High-Voltage motors, EMZ offers you a wide range of energy-efficient solutions for variable-speed applications. From 400/690V low voltage solutions, to high voltage multilevel frequency converters up to 13.800V, to entire container solutions, EMZ plans the design of your system.

Application

Variable Frequency Drives (VFDs) are used in applications where powerful speed control and a fast dynamic response over a wide range of operating speeds is required. In applications such as pumps or fans they are often a very economical choice because the rotational speed of asynchronous and synchronous machines are optimally adapted to suit the actual flow requirements. Thus, energy consumption is optimised and CO2 emissions are reduced. VFDs also inherently enable superior soft-starting capability.

Frequency converters are used in many areas

- | | |
|----------------------------|--------------------------------|
| → Energy industry | → Metal industry |
| → Water-resources industry | → Building materials' industry |
| → Open-cast mining | → Pulp & Paper |
| → Oil and gas industry | |

Advantages

By using frequency converters the copper content in the connecting leads can be reduced by up to 80%. The space requirement for the supply lines, the installation costs and the power dissipation of the connecting cables used and, ultimately, the cooling costs, will reduce – while efficiency increases. Thanks to substantial energy savings, frequency converters have very short payback periods.



OUR PARTNERS IN VFD SOLUTIONS

CG Drives & Automation



400V, 500V & 690V solutions up to 3.5 MW:

With the powerful Emotron FDU & VFX frequency inverters from CG Drives & Automation, we offer you energy-efficient and reliable speed control for drives up to 3.5 MW. An exemplary application for the use of 400V, 500V & 690V frequency inverters is the operation of fans or pumps, but also crushers and mills.



AuCom MCS



APPLIED
MOTOR
CONTROLS

Medium-voltage solutions up to 13.8 kV and a power of 25 MW:

The MVH2.0 multilevel frequency inverter combines all the requirements of an intelligent and energy-efficient medium-voltage drive, from simple configuration as a starting drive to extremely demanding applications in rolling mills or shredder systems. With countless options such as bus communication, regenerative power supply or circuit breakers, these drives offer no room for compromise. The MVH2.0 provides a very clean output waveform to motors which requires no reinforced motor design or motor derating. Therefore, it is suitable for standard motors and retrofits.

OUR SERVICE

REPAIR & MAINTENANCE

- Repair and rewinding of three-phase motors from various manufacturers
- DC motors: Precise analysis and repair of DC drives
- Repair of defective frequency converters for optimum performance
- Repair of fans to prevent overheating and failures
- Certified repairs for ATEX certified explosion-proof motors
- Entire drive trains: Comprehensive repairs for motors, gearboxes, couplings and more
- Restoring the precision and performance of high-precision servomotors

WORLDWIDE SERVICE & COMMISSIONING

- Our comprehensive services for installation and commissioning ensure the optimum performance of your systems and minimize downtimes.
- Disassembly and reassembly directly on site for minimal downtimes
- On-site bearing and seal replacement for continuous operation and reliability
- Laser-optical alignment after reinstallation of clutch and belt drives
- Worldwide commissioning support using our Augmented Reality system
- Parameterization and commissioning of frequency inverters and soft starters
- Repair & replacement of drives and commissioning of the system





DIAGNOSIS & CONDITION MONITORING

- Laser optical alignment of drive trains: Precise alignment for efficiency and longevity
- Vibration and rolling bearing analyses (condition monitoring): Early detection of problems for preventive measures
- Troubleshooting in systems/motors/controls: Precise identification of faults for effective rectification
- Condition assessment of motors transformers, control systems, switchgear: Early detection of wear and problems
- Transformer diagnostics (measurements, oil samples): Comprehensive diagnosis for early detection of defects
- Rebuilding/retrofitting for maximum performance and increased efficiency

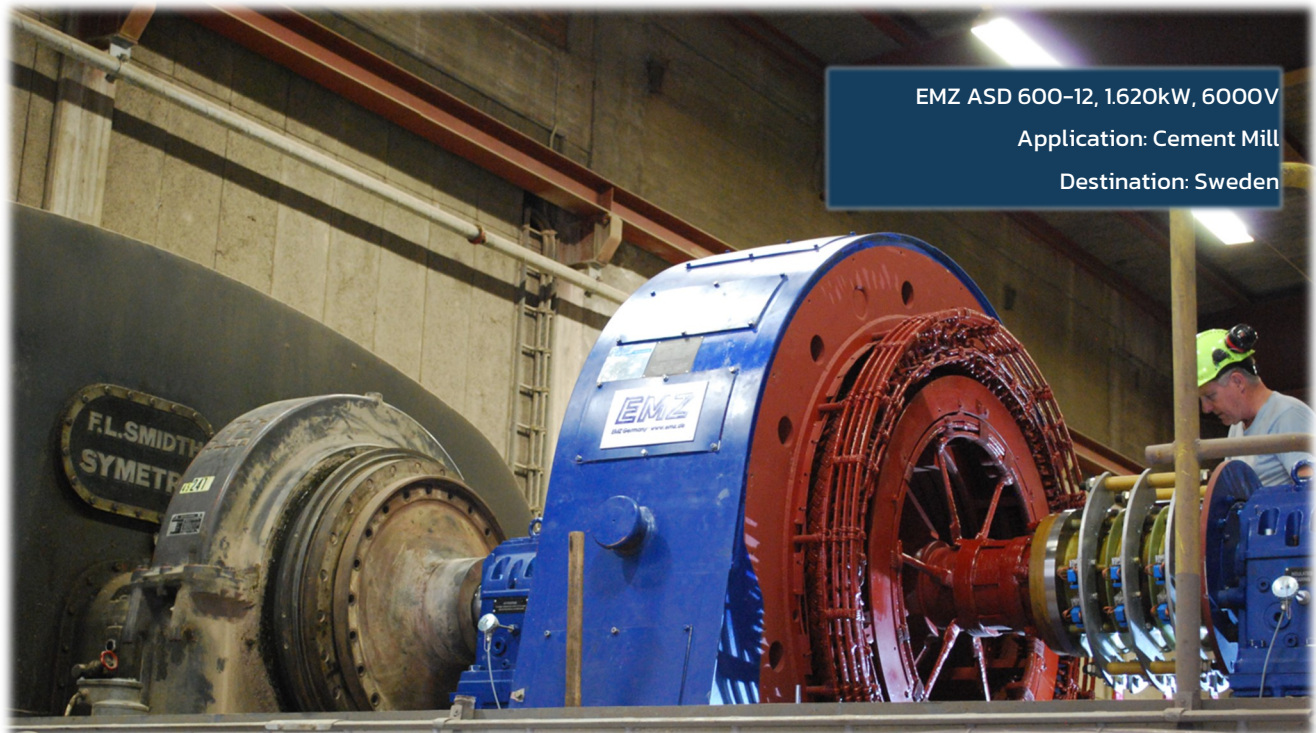


UPGRADING / RETROFIT

- Our know-how for Retrofit solutions brings your systems up to date with the increase of efficiency. We modernize your drive systems and maximize their performance with our rebuild and retrofit services.
- New production of one-to-one interchangeable low-voltage and high-voltage motors with the use of the latest technologies without extensive adaptations.
- Renewal of motors and controls, including control cabinets, frequency converters and operating elements for increased performance and reliability.
- Renewal of medium-voltage switchgear, to improve safety and efficiency.
- Renewal of transformers with state-of-the-art technology integration for optimum performance



OUR REFERENCES





OUR REFERENCES





EMZ ASD 710-10-013, 2942kW, 6000V

Application: Metal Shredder

Destination: Spain



EMZ ASD 710-12-013, 3700kW, 6000V

Application: Metal Shredder

Destination: Belgium

OUR REFERENCES





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