VEM

ELECTRIC DRIVES

FOR EVERY DEMAND

Customised drive solutions for all applications

Product range

Electric drives and systems for all applications

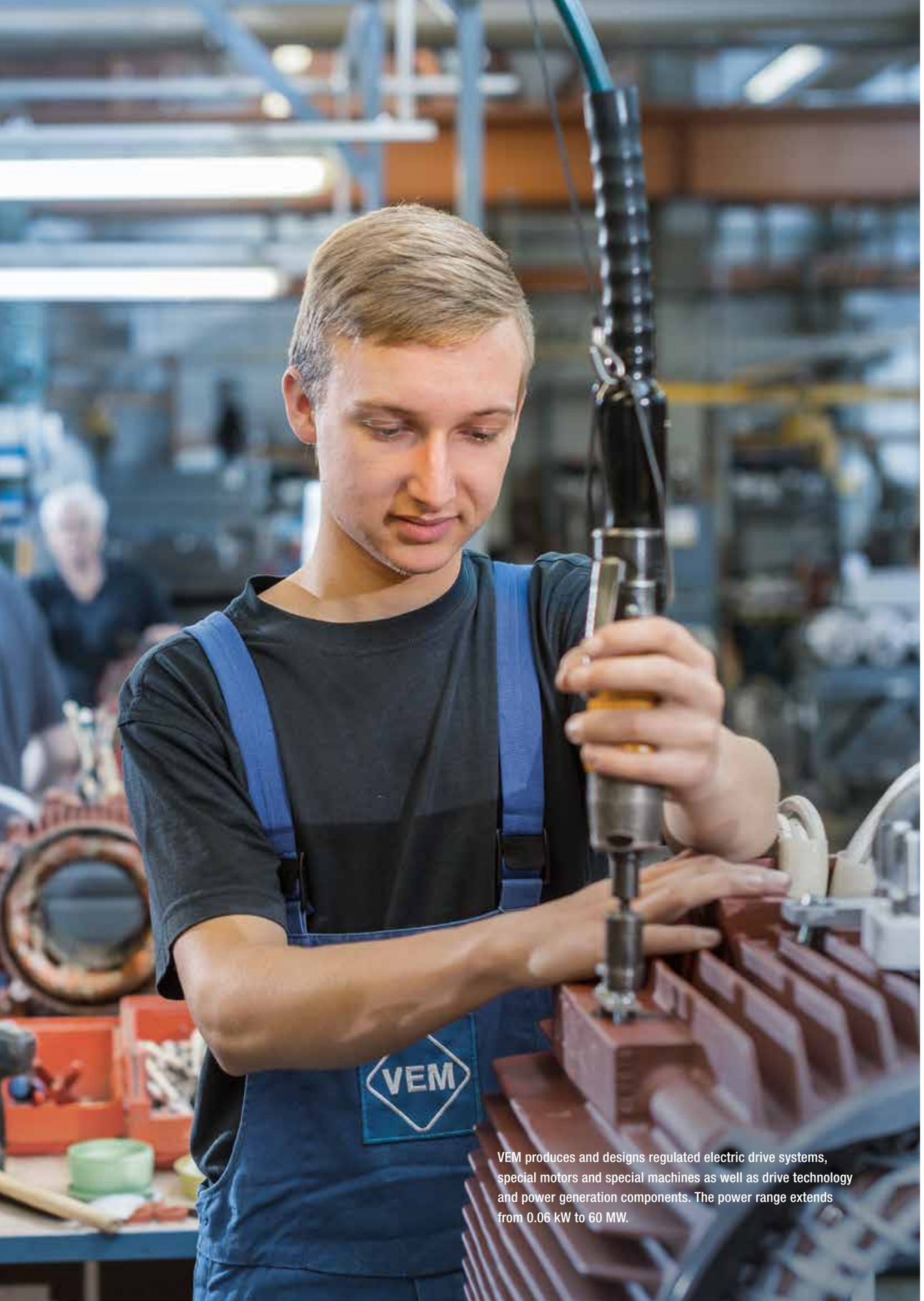
Currently there are 25 to 30 million electric machines with the three letters VEM in use worldwide. The roots of our development go back to the turn of the 20th century as Dresden advanced to the cradle of European electrical engineering. The first standard motor series, the first generator for pumped storage power plants, the most powerful offshore wind power generator worldwide in series production, the first memory motor – we have set all these milestones in past decades.

As one of the first companies in Germany, we started as early as the beginning of the 20th century with qualified vocational training. Today, engineers from renowned universities and colleges use their knowledge for your drive tasks. This transfer, coupled with the latest scientific findings, is the guarantee for innovative and technically advanced low-voltage and high-voltage products under the VEM brand that set standards worldwide.

Due to our creative scientific and technical personnel, we are able to realise the most unusual customer requirements quickly and with high quality standards. The predominant share of our products today is already customer-specific solutions. VEM also takes the responsibility for protecting the environment for ourselves and future generations by using resources sparingly and efficiently.

We focus on energy-efficient drive solutions during our product and system development that ensure the efficient operation of your systems.

As with the 6 MW test facility for large machinery, we continuously invest in the further enhancement of our production facilities. All three sites have well-equipped factory halls with modern CNC machines. They can also meet unusual customer requirements. We guarantee compliance with the high quality level using our quality and environmental management system. Thus, we continue to ensure continuity and reliability to our customers in the whole world.



VEM produces and designs regulated electric drive systems, special motors and special machines as well as drive technology and power generation components. The power range extends from 0.06 kW to 60 MW.

Low-voltage machines

Size 56 … 450

	Power range
IEC standard motors with squirrel-cage rotor	0.06 – 160 kW
Sizes 56 – 315	
Efficiency class up to IE3	
Speeds 3 000, 1 500, 1 000, 750, 600, 500 rpm and pole-changing combinations	
IEC standard motors with squirrel-cage rotor	75 – 90 kW
Size 280	
Efficiency class IE4	
Speeds 3 000, 1 500 rpm	
Transnorm motors with squirrel-cage rotor	200 – 1 000 kW
Sizes 315 – 450	
Efficiency class up to IE3	
Speeds 3 000, 1 500, 1 000, 750, 600, 500 rpm and pole-changing combinations	
Transnorm motors with squirrel-cage rotor	110 – 400 kW
Sizes 315 – 355	
Efficiency class IE4	
Speeds 3 000, 1 500 rpm	
Three-phase motors for ship operation	0.06 – 500 kW
Sizes 56 – 355	
Efficiency class up to IE3	
Speeds 3 000, 1 500, 1 000, 750 rpm	

Sea water protection according to various classification societies
- DNV GL SE (DNV.GL)
- Bureau Veritas (BV)
- Lloyds Register of Shipping (LRS)
- American Bureau of Shipping (ABS)
- Russian Maritime Register of Shipping (RMRS)
- Registro Italiano Navale (RINA)
- Polski Rejestr Statkow (PRS)
- Chinese Classification Society (CCS)

Slip ring rotor motors	2.2 – 250 kW
Sizes 132 – 315, speeds 1 500, 1 000, 750, 600 rpm	

Explosion-protected motors according to 2014/34/EU (ATEX) in the ignition protection types:

Increased Safety “e” (“eb”)	0.12 – 320 kW
Flame-proof Enclosure “d/de” (“db/db eb”)	0.12 – 630 kW
“n” non sparking (increased safety “ec”) Zone 2	0.06 – 710 kW
Protection by Enclosure “tb” Zone 21	0.06 – 710 kW
Protection by Enclosure “tc” Zone 22	0.06 – 710 kW

Efficiency class up to IE3

	Power range
Three-phase compact drives	0.55 – 22 kW
Efficiency class up to IE5	
Variable speed three-phase drives with squirrel-cage rotor	0.75 – 1 000 kW
Three-phase motors for use in mechanical smoke and heat extraction devices (DIN EN 12101-3:2015)	1.5 – 710 kW
for load temperatures of 200 °C, 300 °C and 400 °C	
Efficiency class up to IE3	

Drive solutions for the steel and rolling mill industry

Three-phase roller table motors	0.3 – 290 kW
Three-phase roller table gear motors	0.4 – 450 kW
Three-phase motors for cranes in steel mills	2.3 – 430 kW

Efficiency class up to IE3

Permanently excited synchronous motors for converter operation

Ultra-Premium Efficiency motors	0.12 – 75 kW
High-power motors	0.18 – 315 kW

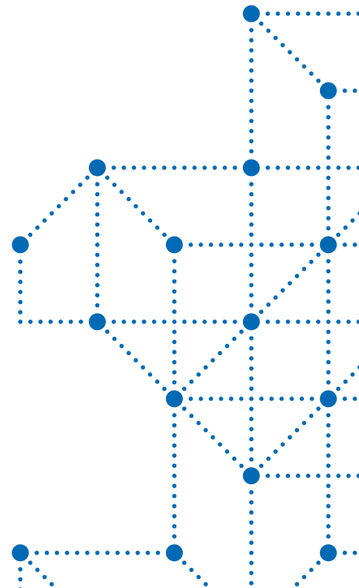
Efficiency class up to IE5

Three-phase asynchronous generators	5.5 – 710 kVA
Built-in motors	0.06 – 710 kW
Single-phase motors	0.06 – 2.2 kW

Modifications
- base and flange design
- attached brake
- attached star-delta switch
- with thermal winding protection
- with external fan
- pole switching
- voltage switching
- memory version (RFID transponder)
- with incremental encoder (IGR) or tachogenerator

Possible cooling types
self-ventilated, IC 411
force-ventilated, IC 416
force-ventilated, IC 418
not ventilated, IC 410
water-cooled, IC 71W (IC 31W)

for mains-powered motors efficiency classes according to IEC/EN 60034-30-1/IEC/EN 60034-2-1
for motors with variable speed efficiency classes according to IEC/EN 60034-30-2/IEC/EN 60034-2-3



Feel presence

We are quick and flexible with our flat structures. The proximity to you is important for us. No matter whether in Europe, in the Near and Far East, in Asia or America – you will find a VEM contact person very close to you. The contact is at your side as partner, supports and accompanies your project until successful completion, reliably, competently and honestly.

We are expanding our sales network to cope with the growing market share of VEM products outside Germany. Expect technically advanced, innovative solutions of your drive project that comply with all current standards and environmental standards.

Secure know-how

As an innovative group of companies, we see ourselves as your partner for system solutions in drive technology. Our specialist departments have many years of experience and high competence for the calculation, layout and design of electric drive systems and individual components. A high vertical integration also guarantees you short delivery times.

Our service does not end with the handover of finished drive systems and individual products. With a range of qualified services, we help you to ensure the productivity and constant availability of your systems. State of the art test facilities at various locations and mobile measuring equipment are available for complex examinations and extensive tests.
This is how we see comprehensive service.

Sophisticated engineering and “Made in Germany” quality work are considered as trademarks of VEM.

Our product range is structured, modularly designed, future-proof and expandable.

High-voltage and special machines

High-voltage transnorm motors
Sizes/type of protection 400 – 450, IP 55
Speeds 3 000, 1 500, 1 000, 750 rpm
Rated voltages 2.2…6.6 kV and 9…11 kV, 50 Hz (60 Hz on request)

Steel and rolling mills

Voltage range: 690 V to 11 kV
Frequencies: converter operation
Cooling types: air-water or air-air heat exchanger, water jacket cooling
Types of construction: IM B3, IM V1 and IM 7115 and modifications
Bearing: rolling or sliding bearing

Asynchronous motors with squirrel-cage rotor
Torque: 5 to 500 kNm
Number of poles: 2-, 4-, 6-, 8- up to 24-pole

Synchronous motors with all-pole & salient pole rotor/with brushless and brush excitation
Torque: 10 to 4 000 kNm
Number of poles: 4-, 6-, 8- up to 36-pole

Chemicals, oil and gas industry

Power range

Explosion-protected motors
Voltage range: 690 V to 13.8 kV
Frequencies: Mains power and converter operation
Cooling types: air-water or air-air heat exchanger
Types of construction: IM B3 and IM 7115 and modifications
Bearing: rolling or sliding bearing

Ignition protection types
“n” (non sparking), increased safety “e”, pressurised enclosure “p”

Asynchronous motors with squirrel-cage rotor 500 – 14 000 kW
Number of poles: 2-, 4-, 6-, 8- up to 16-pole

Synchronous motors with salient pole rotor, brushless 2 000 – 60 000 kW
Number of poles: 4-, 6-, 8- up to 72-pole

Power plants

Power range

Asynchronous motors and synchronous motors with squirrel-cage rotor 200 – 22 000 kW
Number of poles: (2-), 4-, 6-, 8- up to 28-pole
Voltage range: 690 V to 13.8 kV
Frequencies: Mains power and converter operation
Cooling types: air-water or air-air heat exchanger, special design with water jacket cooling
Types of construction: IM B3 and IM V1 and modifications
Bearing: rolling or sliding bearing

Cement and mining industry

Voltage range: 690 V to 13.8 kV
Frequencies: Converter operation
Cooling types: air-water or air-air heat exchanger, water jacket cooling
Types of construction: IM B3, IM V1 and IM 7115 and modifications
Bearing: rolling or sliding bearing

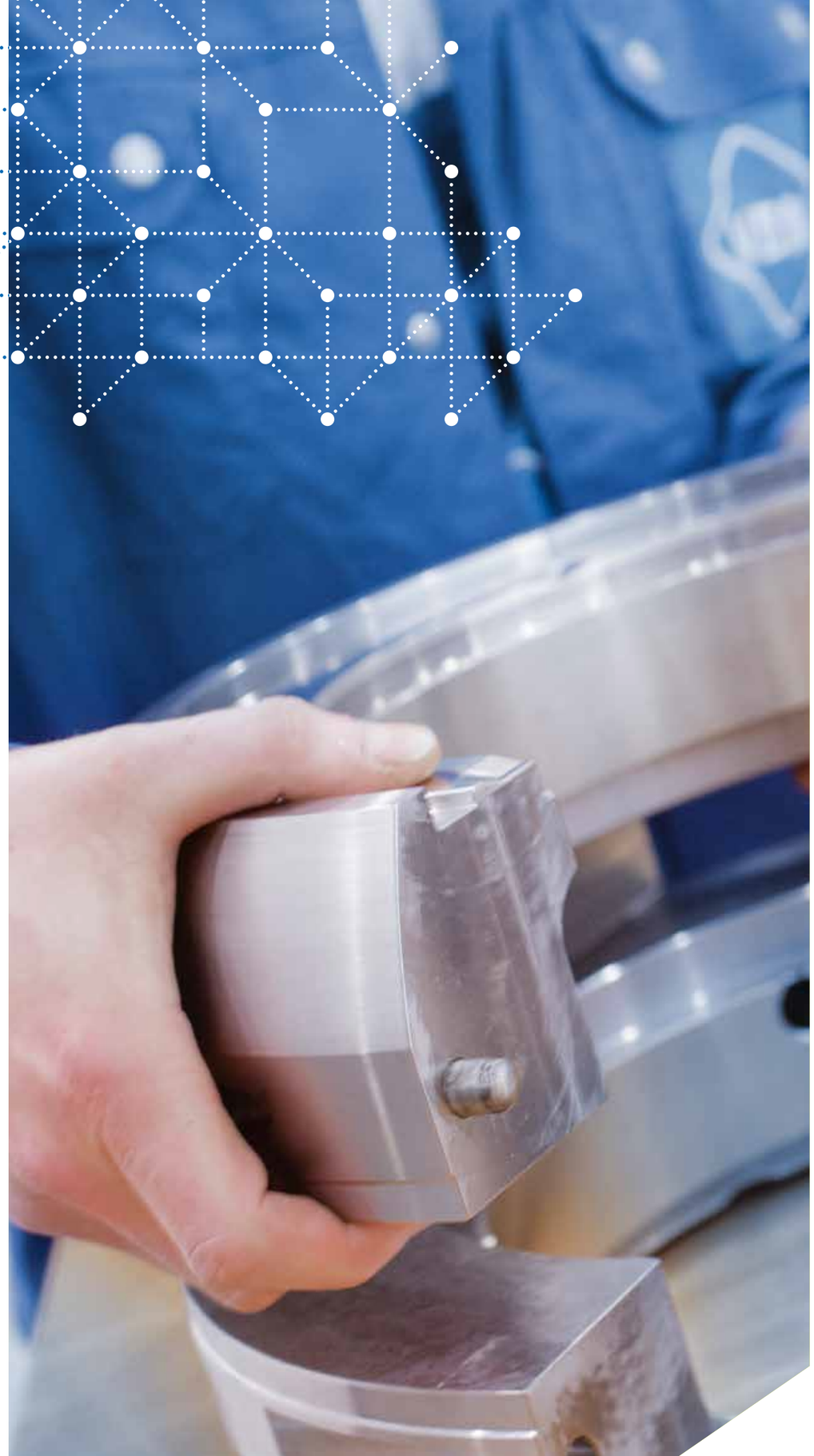
Asynchronous motors with squirrel-cage rotor 200 – 28 000 kW
Number of poles: 4-, 6-, 8- up to 16-pole

Asynchronous motors with slip ring rotor with and without KBAV 250 – 15 000 kW
Number of poles: 4-, 6-, 8- up to 16-pole

Synchronous motors with all-pole & salient pole rotor/with brushless and brush excitation 500 – 60 000 kW
Number of poles: 4-, 6-, 8- up to 72-pole

Permanently excited synchronous motors
Number of poles: 24-, 3-2 up to 36-pole
Torque: 650 kNm

High-voltage machines from VEM are customised exactly to the requirements of the customer. In doing so, we draw on more than 130 years of experience in electrical engineering.



Water technology

Power range

Voltage range: 690 V to 13.8 kV
Frequencies: Mains power and converter operation
Cooling types: air-water or air-air
heat exchanger, water jacket cooling
also continuous ventilation with filter
Types of construction: IM B3 and IM V1 and modifications
Bearing: rolling or sliding bearing

Asynchronous motors with squirrel-cage rotor 200 – 15 000 kW
Number of poles: 2-, 4-, 6-, 8- up to 32-pole

Asynchronous motors with slip ring rotor with and without KBAV 500 – 15 000 kW
(short-circuit and brush lifting device)
Number of poles: 4-, 6-, 8- up to 16-pole

Synchronous motors with all-pole & salient pole rotor/with brushless and brush excitation 500 – 60 000 kW
Number of poles: 4-, 6-, 8- up to 36-pole

Permanently excited synchronous motors
Number of poles: 24-, 32- up to 36-pole
Torque: 650 kNm

Renewable energies

Power range

Wind power
Cooling types: air-water or air-air heat exchanger,
water jacket cooling
Frequencies: 50/60 Hz or for converter operation

Asynchronous generators with squirrel-cage or slip ring rotor (DFIG) 1 500 – 7 000 kVA
Voltage range: 690 V to 6.6 kV

Synchronous generator 1 500 – 7 000 kVA
Voltage range: 690 V to 13.8 kV

Permanently excited synchronous generators 1 500 – 5 000 kVA
Voltage range: 690 V to 10.0 kV

Generators for hydro power plants on request

Shipbuilding

Power range

Asynchronous motors with squirrel-cage rotor for special and auxiliary drives 500 – 5 000 kW
Voltage range: 400 V to 11 000 V
Frequencies: 50/60 Hz or for converter operation
Number of poles: 4-pole to 12-pole
Cooling types: air-water heat exchanger

Synchronous generators with all-pole or salient pole rotor, brushless or with slip ring 500 – 30 000 kVA
Voltage range: 400 V to 11 000 V
Number of poles: 4-pole to 14-pole
Cooling types: air-water heat exchanger

Shaft generators (slow running) 480 – 10 000 kVA/480 – 10 000 kW
Voltage range: 400 V to 6 600 V
Frequencies: 7 Hz …10 Hz …20 Hz (at the converter)
Number of poles: 16-pole (24-pole on request)

Asynchronous motors with squirrel-cage rotor as thruster or lateral thruster drives 500 – 5 000 kW
Voltage range: 400 V to 11 000 V
Frequencies: 50/60 Hz or for converter operation
Number of poles: 4-, 6- or 8-pole

Asynchronous motors with squirrel-cage rotor for propulsion drive 500 – 15 000 kW
Voltage range: 400 V to 11 000 V for direct drive and
500 V to 4 500 V for converter operation
Number of poles: 4-pole to 16-pole

Synchronous motors for propulsion drive 5 000 – 30 000 kW
Voltage range: 690 V to 4 500 V for converter operation
Number of poles: 16-pole (6-pole to 24-pole on request)

Traffic engineering

Power range

Traction drives for rail vehicles, electrically driven buses and special vehicles

Three-phase asynchronous traction motors (monorails)	up to 125 kW
Three-phase asynchronous traction motors (trams)	up to 130 kW
Three-phase asynchronous traction motors (suburban and underground railways)	up to 250 kW
Three-phase asynchronous traction motors (multiple units, electric)	up to 750 kW
Three-phase asynchronous traction motors (locomotives)	up to 1 800 kW
Three-phase asynchronous traction motors (trolley and hybrid buses)	up to 250 kW
Three-phase synchronous traction generators (rail vehicles)	up to 3 000 kVA
Three-phase asynchronous traction motors (rail vehicles)	up to 3 000 kW
Three-phase synchronous PM traction generators (rail vehicles)	up to 3 000 kVA
Three-phase synchronous on-board generators (rail vehicles)	up to 300 kVA
Three-phase synchronous traction generators (mining trucks)	up to 4 000 kVA

VEM DRIVE
drive systems

Power converters for regulated drive systems

in low-voltage and medium-voltage design for the speed regulation of direct current and three-phase motors

Power converter for the speed regulation of direct current motors

Input voltage	3 AC 380 V – 1 000 V
Output voltage	DC 400 V – 1 000 V
Power range	100 kW to 28 000 kW
Design	Adapted to customer requirement, ready to connect cabinet design with armature and field converters, information electronics, monitoring devices, control unit etc. with 6, 12, 18 or 24 pulse switching, as irreversible or reversing drive
Cooling type	Air cooling or water cooling

Converter for the speed regulation of three-phase motors

Low-voltage converter

Input voltage	3 AC 380 V – 690 V
Power range	**Air cooling model VEMoDRIVE** 1.5 kW to 315 kW as compact device, 75 kW to 3 000 kW as cabinet device **Water cooling** 315 kW to 5 600 kW as cabinet device
Design	IGBT converter in ready to connect cabinet design with 6 or 12 pulse switching **Mains power converter:** 2-quadrant operation (diodes or low harmonic supply) 4-quadrant operation (IGBT supply) **Motor power converter:** Single drive Multiple motor drive

Medium-voltage converter

Input voltage	3 AC 2.3/3.3/4/4.16/6/6.6 kV (higher voltages on request)
Power range	**Air cooling** 200 kW to 7 000 kW **Water cooling** 1 800 kW to 27 000 kW
Design	Multilevel IGBT converter in ready-to-connect cabinet design for 2Q or 4Q operation, air-cooled, to control three-phase asynchronous motors Multilevel IGCT converter in ready-to-connect cabinet design for 2Q operation, air- and/or water-cooled, to control three-phase asynchronous and/or synchronous motors

Sub-synchronous power converter cascades for the speed regulation of three-phase slip ring rotor motors
In the case of the sub-synchronous cascade (USK), the slip power of the slip ring rotor motor is fed back into the grid via a rectifier and a grid-cleared inverter.

Design	USK, consisting of uncontrolled rectifier, mains-operated inverter, information part, DC smoothing choke, changeover device, quick action switch or thyristor quenching device (TLE), air or water cooling, with or without regenerative transformer, with or without starter
Power range	500 to 12 000 kW

Power converter for special applications

Start-up converter for synchronous motors (LCI)

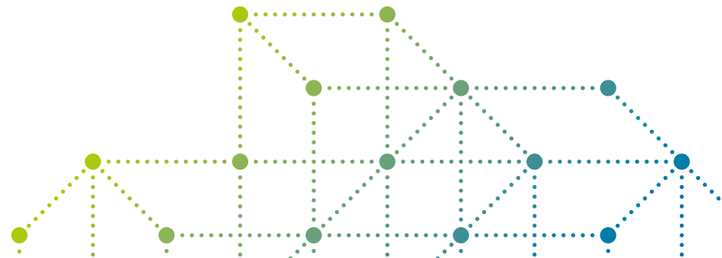
Design	LCI, consisting of rectifier on the mains side, inverter on the machine side, control cabinet, excitation unit, three-phase choke, DC intermediate circuit choke, air cooling
Output voltage	>11 kV due to connection in parallel
Output power	up to 80 MVA

Excitation units for synchronous motors

Design	ready to connect cabinet unit for generation of the excitation current for synchronous motors
Principle	static excitation up to 1 200 A Auxiliary excitation for brushless synchronous motors

Other system components
· power converter transformers as oil or dry transformer
· switchgear, MCCs
· automation systems

Other services
· Project engineering
· Service and commissioning
· Spare parts



Service

With the delivery of your drive, our Customer Service is available as contact for you. The team supports you as operator of high quality machines and systems with a wide range of services.

- Testing house services and contract manufacturing
- Mechanical analyses for condition and error diagnostics
- Installations and commissioning
- Technical services
- On-call service
- Maintenance
- Inspection
- Repair
- Training
- Spare parts supply

From the individual component to the system solution

From the individual component to the system solution – drive machinery of the VEM long-established brand keep things moving in power plants and chemical plants, in explosion-protected areas and in ventilation and pump technology, in the steel industry and in shipbuilding as well as in other industrial sectors. We manufacture a comprehensive product range in the Dresden, Wernigerode and Zwickau sites and the production facilities in Most and Pieštany. This ranges from the smallest compact drive to the high-voltage drive and covers the power range of 0.06 kW to 60 MW.

The customer-specific design of the range of drive machines is a trademark of VEM. This includes energy saving motors in the efficiency classes IE3 to IE5 and efficient system solutions that distinguish VEM as specialist for complex drive solutions. We provide a range of regulated individual drives as compact variant to complex multiple motor drives including planning under the VEMoDRIVE brand. VEMoDRIVE includes regulated drive systems consisting of motors, frequency converters/power converters and transformers for low and medium voltage.

ELECTRIC DRIVES

FOR EVERY DEMAND

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