



**ELECTRIC DRIVES**  
FOR EVERY DEMAND



**Customised  
drive solutions  
for all applications**

Product range of the VEM Group



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.

# Electric drives and systems for all applications

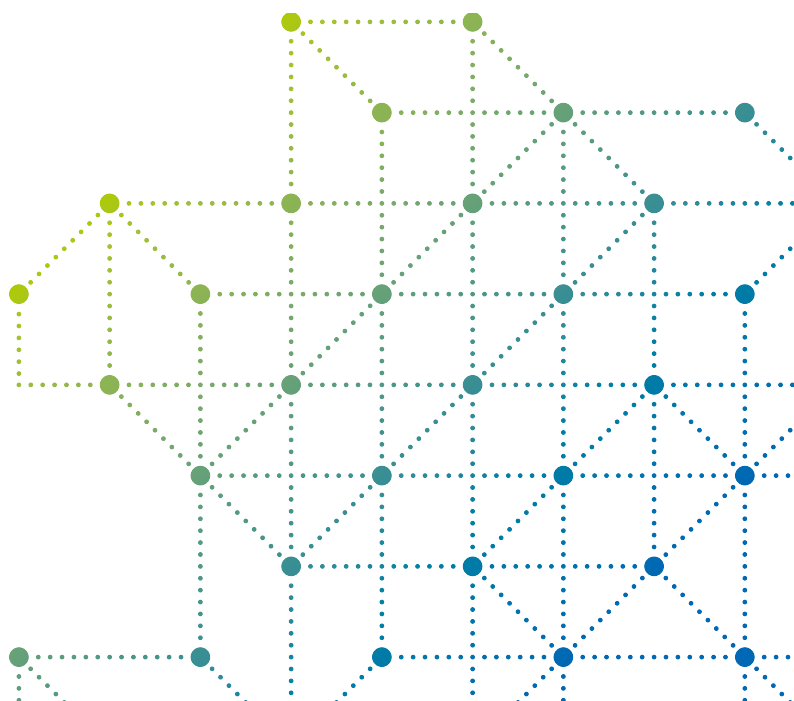
Currently there are 25 to 30 million electric machines with the three letters VEM in use worldwide. The roots of our development go back to the turn of the 20th century as Dresden advanced to the cradle of European electrical engineering. The first standard motor series, the first generator for pumped 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 20<sup>th</sup> 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.



# 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

	<b>Power range</b>
<b>Three-phase compact drives</b> <i>Efficiency class up to IE5</i>	0.55–22 kW
<b>Variable speed three-phase drives with squirrel-cage rotor</b>	0.75–1 000 kW
<b>Three-phase motors for use in mechanical smoke and heat extraction devices (DIN EN 12101-3:2015)</b> for load temperatures of 200 °C, 300 °C and 400 °C <i>Efficiency class up to IE3</i>	1.5–710 kW
<b>Drive solutions for the steel and rolling mill industry</b>	
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
<i>Efficiency class up to IE3</i>	
<b>Permanently excited synchronous motors for converter operation</b>	
Ultra-Premium Efficiency motors	0.12–75 kW
High-power motors	0.18–315 kW
<i>Efficiency class up to IE5</i>	
<b>Three-phase asynchronous generators</b>	5.5–710 kVA
<b>Built-in motors</b>	0.06–710 kW
<b>Single-phase motors</b>	0.06–2.2 kW

#### Modifications

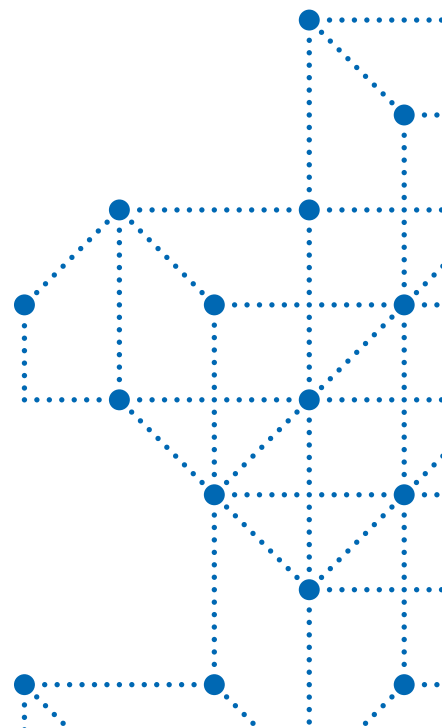
- base and flange design
- attached brake
- attached star-delta switch
- with thermal winding protection
- with external fan
- pole switching
- voltage switching
- memory version (RFID transponder)
- with incremental encoder (IGR) or tachogenerator

#### 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 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.



# 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

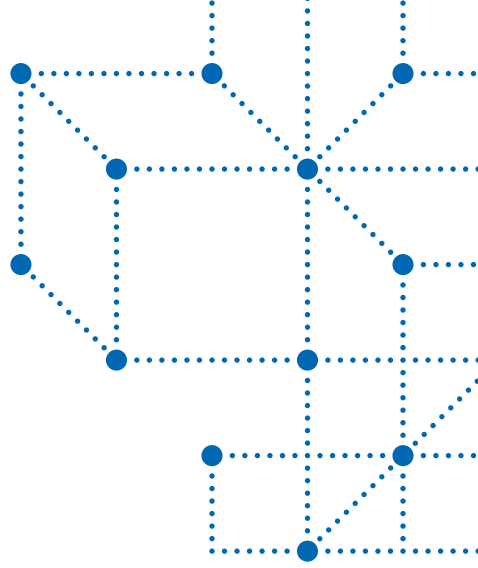
500 – 60 000 kW

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



## 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 24-pole

#### Synchronous motors for propulsion drive

5 000 – 30 000 kW

Voltage range: 690 V to 6 600 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



# 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	<b>Air cooling model VEMoDRIVE</b> 1.5 kW to 315 kW as compact device, 75 kW to 3 000 kW as cabinet device <b>Water cooling</b> 315 kW to 5 600 kW as cabinet device
Design	IGBT converter in ready to connect cabinet design with 6 or 12 pulse switching <b>Mains power converter:</b> 2-quadrant operation (diodes or low harmonic supply) 4-quadrant operation (IGBT supply) <b>Motor power converter:</b> 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	<b>Air cooling</b> 200 kW to 7 000 kW <b>Water cooling</b> 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

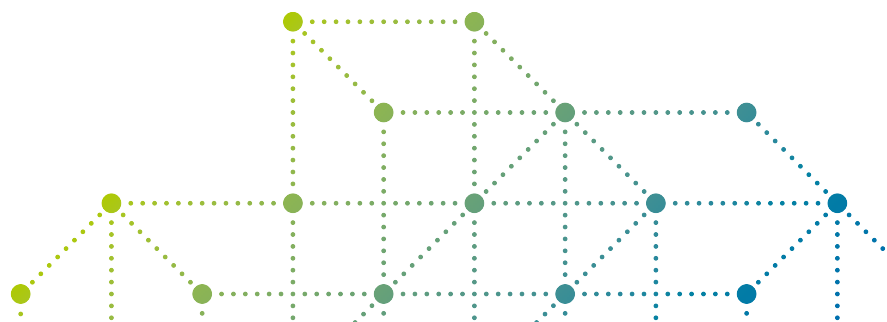
**Principle** static excitation up to 1 200 A  
Auxiliary excitation for brushless synchronous motors

#### Other system components

- power converter transformers as oil or dry transformer
- switchgear, MCCs
- automation systems

#### Other services

- Project engineering
- Service and commissioning
- Spare parts





From the individual component  
to the system solution

# 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 – 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 Piešťany. 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

### **VEM GmbH**

Pirnaer Landstraße 176  
01257 Dresden  
Germany

### **VEM Sales**

Low voltage department  
Fon +49 3943 68-3127  
Fax +49 3943 68-2440  
E-Mail: [low-voltage@vem-group.com](mailto:low-voltage@vem-group.com)

High voltage department  
Fon +49 351 208-3237  
Fax +49 351 208-1108  
E-Mail: [high-voltage@vem-group.com](mailto:high-voltage@vem-group.com)

Drive systems department  
Fon +49 351 208-1154  
Fax +49 351 208-1185  
E-Mail: [drive-systems@vem-group.com](mailto:drive-systems@vem-group.com)

### **VEM Service**

Fon +49 351 208-3237  
Fax +49 351 208-1108  
E-Mail: [service@vem-group.com](mailto:service@vem-group.com)

**[www.vem-group.com](http://www.vem-group.com)**

Photos: René Jungnickel, René Gaens (S. 7, 10)

© 2018 Juniks Marketing GmbH

VEM-HS-NS-2018-05

Printed in Germany. Subject to change.