



ELECTRIC DRIVES
FOR EVERY DEMAND

VEM-Group Company Presentation



ELECTRIC DRIVES FOR EVERY DEMAND



since

1886

electrical
engineering tradition



8 countries

with manufacturing
facilities and subsidiaries



over

90

countries on the export list



1,500

motivated
employees worldwide



motors 0.06 kW – 60 MW generators up to 90 MVA

range of electrical drive systems,
special motors and special machines



up to **300**

Tonnes in motion



110,000 m²

production space

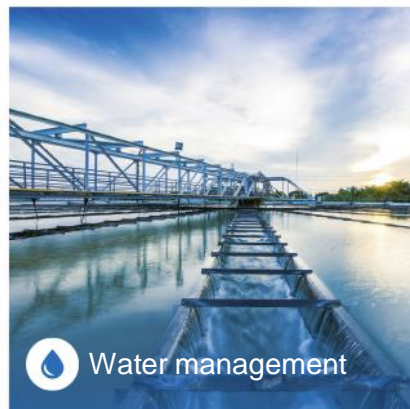
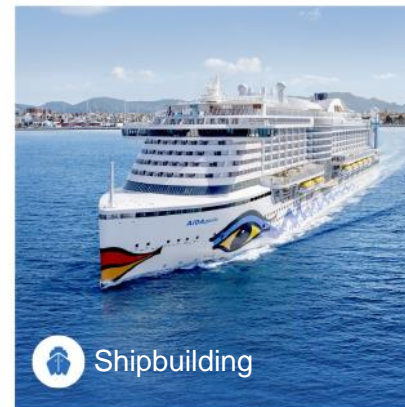


about

200 million

turnover

VEM supplies the branches



VEM-Group Sales and technical support worldwide



VEM has sales and service sites in **North and South America, Europe, Africa and Asia.**

Quality, environmental and energy management

- DIN EN ISO 9001, DIN EN ISO 14001, DIN EN ISO 50001
- IRIS – International Railway Industry Standard

Equipment for use in areas subject to explosion hazard

- Europe: ATEX Directive 2014/34/EU
- China: NEPSI for motors for explosion protection types “n” (non-sparking) to EN 60079-15:2010 and “ec” (increased safety) to EN 60079-7:2015
- Russia (Customs Union): EAC Ex certificate

Approvals of international marine classification societies

- Bureau Veritas (BV)
- Det Norske Veritas·Germanischer Lloyd (DNV·GL)
- Lloyd's Register of Shipping (LRS)
- Russian Maritime Register of Shipping (RMRS)
- China Classification Society (CCS)
- American Bureau of Shipping (ABS)



Product-specific approvals and certificates for selected countries

- EAC declaration for the Russian Customs Union
- UL approval for low-voltage motors
Sizes 56 to 400 for the USA and Canada
- CSA approval for low-voltage motors
Sizes 112 to 315 for Canada and the USA
- CSA approval (EEV) for energy-saving motors
Sizes 112 to 315 (“Energy Verified”)
- DoE approval (CC301B) for energy-saving motors
Sizes 112 to 315
- CCC – China Compulsory Certificate
- CEL – China Energy Label





ELECTRIC DRIVES
FOR EVERY DEMAND

Large Drives

VEM location Dresden

Facts

- Founded in 1903
- Engineering, manufacturing and sales of **motors** and **generators** (synchronous und asynchronous)
- Power range: **60 kW – 60 MW**
- Custom and serial production
- Planning, development and manufacturing of drive systems and components



Synchronous and asynchronous motors

- Steel and rolling mills
- Cement and mining industry
- Engineering and plant construction
- Paper and cellulose industry
- Water management



Asynchronous motor

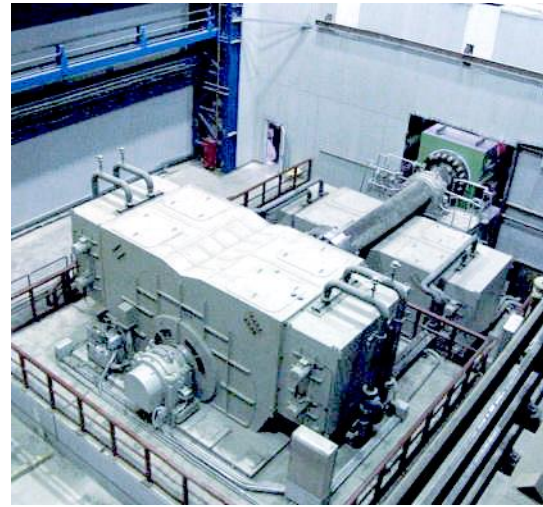


Alstom Power Conversion GmbH, Böhler
Kapfenberg, Austria

Type: DMMYZ 3860-20V

Rolling mill drive

6,000 kW, 2,850 V, 35/100 r.p.m.



SMS Demag AG, MMK5000, Russia

Type: DMMYZ 3867-20V,

Rolling mill drive

12,000 kW, 3,000 V, 60 r.p.m.

References cement and mining industry



FLSmidth A/S, Obajana, Nigeria

Type: DSRAS 8031-6WF
Cement mill drive
3,000 kW, 11,000 V, 994 r.p.m.



FLSmidth A/S, Kokshe, Kazakhstan

Type: DSRCJ 8031-6WF
Mill drive
3,316 kW, 6,000 V, 995 r.p.m.



ОАО Северный Горно-Обогатитель,
Sevgok, Ukraine

Type: DBKAJ 9030-8WF
Fan drive
4,500 kW, 6,000 V, 744 r.p.m.

Synchronous and asynchronous motors, synchronous generators

- Passenger ships
- Service ships
- Megayachts
- Specialist ships
- Ferries
- Cargo ships



Synchronous motor

References cruise liners and yachts



Siemens AG, AIDA Cruises, Hamburg
Germany

Type: DTMSZ 3352-16YS

Propeller drive

12,500 kW, 3,200 V, 131 r.p.m.



Wärtsilä SAM Electronics GmbH,
Lürssen shipyard, Megayacht, Bremen,
Germany

Type: DKMEF 1241-16V

Propeller drive

6,000 kW, 4,160 V, 250 r.p.m.



Wärtsilä SAM Electronics GmbH,
Fincantieri shipyard, Princess Cruises 1,
Italy

Type: DTMSZ 3466-16YS

Propeller drive

18,000 kW, 4,300 V, 133 r.p.m.



Schottel GmbH, „Fjord“, shipyard Norway

Type: DKWUZ 7131-8U

Propeller drive

2,700 kW, 675 V, 800 r.p.m.



Wärtsilä SAM Electronics GmbH, container ship
for Hapag Lloyd HHI shipyard, Korea

Type: DGMUX 1645-16W

Shaft generator

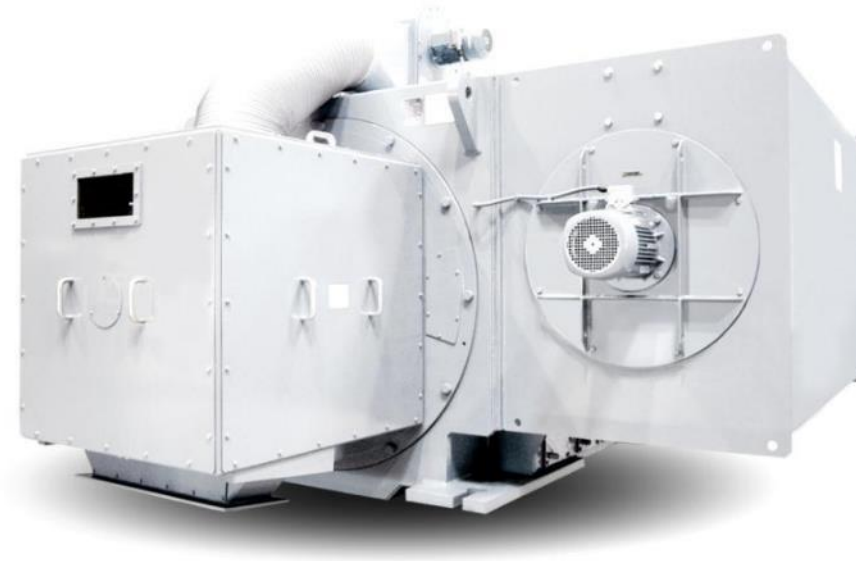
5,000 kVA, 6,400 V, 65 – 94 r.p.m.

Synchronous and asynchronous motors for

- Chemical, oil and gas industry
- Power plant technology

Synchronous and asynchronous generators

- Wind power
- Hydro-electric



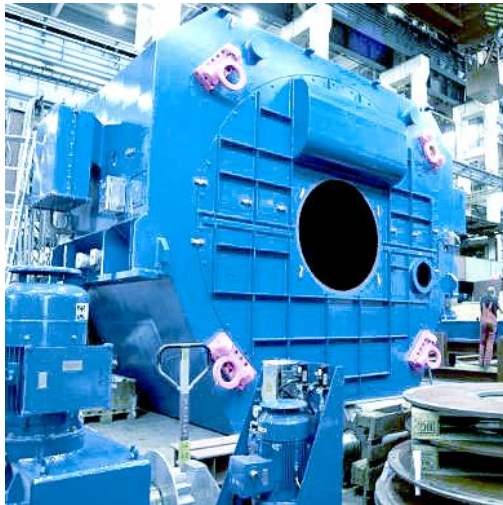
Asynchronous generator



Ignition protection categories

Ex n (Non sparking), Ex e (increased safety)

Ex d (flameproof enclosure), Ex p (pressurised enclosure)



Siemens AG, Tasnee, Saudi-Arabia

Type: DTKVY 4344-36WS
Piston compressor drive (hyper)
27,500 kW, 10,000 V, 200 r.p.m.
Ex p



Salzgitter Anlagenbau GmbH,
„285-LDPE-Anlage“ Basell, France

Type: DTKVY 4937-30W
Piston compressor drive (hyper)
23,500 kW, 11,000 V, 200 r.p.m.
Ex p



Burckhardt Compression, „Reliance“,
LDPE plant in Jamnagar, India

Type: DTKVY 4356-30WS
Compressor drive
30,000 kW, 11,000 V, 200 r.p.m.
Ex p

References power plant technology



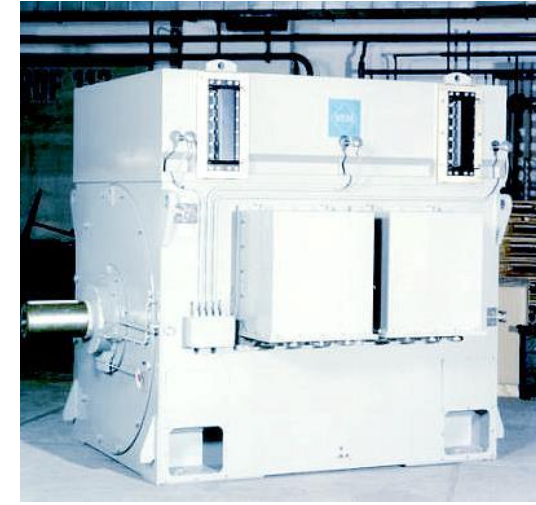
RWE Industrie-Lösungen GmbH,
REA Cottam, U. K.

Type: DKKES 1040-8WE
Induced-draft fan drive
8,000 kW, 11,000 V, 745 r.p.m.



E.ON Kraftwerke GmbH,
Kraftwerk Datteln, Germany

Type: DKKGU 1040-4WE
Feed water pump
14,500 kW, 10,000 V, 1,484 r.p.m.



Cegelec-AEG Berlin,
Power plant Opole, Poland

Type: DKKAB 8033-8U
Induced-draft fan drive
4,500 kW, 2x 800 V, 747 r.p.m.



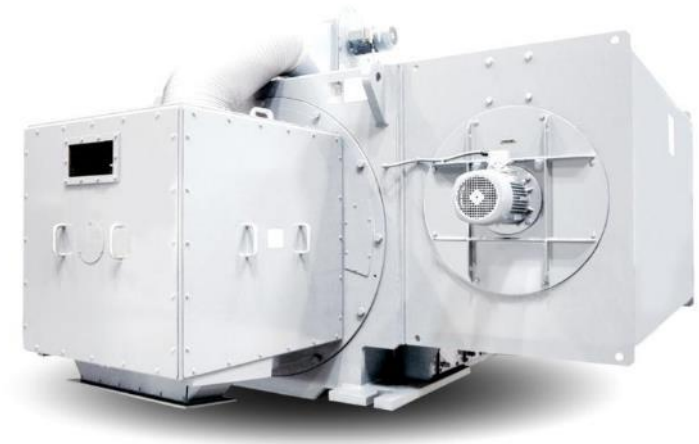
Senvion S. A. (formerly REpower Systems SE)
5M – 5.4 MW

Wind park alpha ventus



Senvion S. A. (formerly REpower Systems SE)
Wind park „Thornton Bank“, North Sea

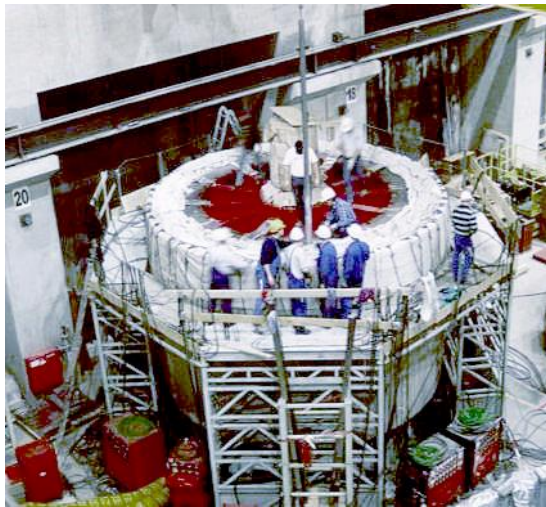
5.4 MW, 950 V, 1,170 r.p.m.



Senvion S. A. (formerly REpower Systems SE)
Wind park „Nordsee Ost“, North Sea

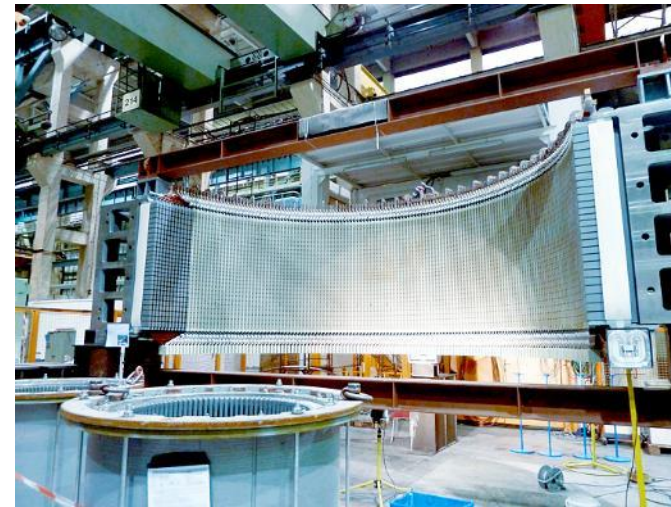
6.5 MW, 6,600 V, 1,170 r.p.m.

References hydro-electric generators



Vattenfall, pumped-storage power station,
Goldisthal, Germany

Power (G)	331 MVA	340.4 MVA
Power (M)	261 MW	300 MW/351.6 MVA
Voltage	18.0 kV	18.0 kV
Speed	333.3 r.p.m.	300.0 – 346.6 r.p.m.

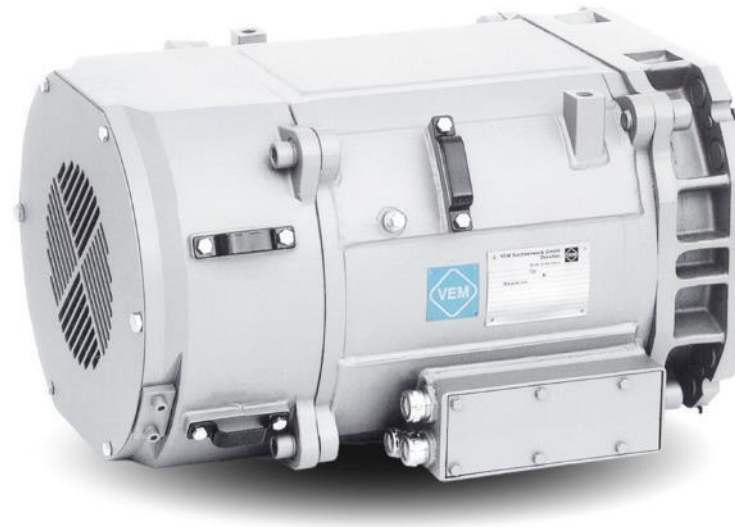


Vattenfall, pumped-storage power station,
Germany

Power (G)	50 MVA
Power (M)	40 MW
Voltage	10.5 kV
Speed	250 r.p.m.

Traction motors as well as main and auxiliary generators

- Mainline and industrial locomotives of all tractions
- Multiple units
- Rapid transit railway
- Trams
- Monorails
- Trolley buses, hybrid buses
- Mining trucks



Traction motor

References suburban trains and trams



Bombardier Transportation, Flexity Swift,
Docklands LRT, London

Type: DKOBZ 0610-4B
AC traction motor
130 kW, 1,781 r.p.m.



PESA Bydgoszcz, Poland, Tram
Swing, Szeged, Hungary

Type: DKCBZ 0211-4FA
AC traction motor
105 kW, 1,777 r.p.m.



ELIN EBG Traction, Austria

Multiple-unit train E-Talent, Rh 4024
Type: DKL BZ 0911-4A
AC traction motor
340 kW, 1,963 r.p.m.



Asynchronous traction motors



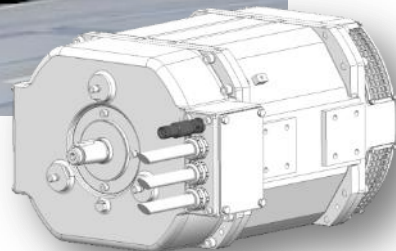
Type: DKCBZ 0211-4FA
AC traction motor
105 kW, 1,777 r.p.m.

References hybrid buses and mining trucks



Vossloh Kiepe, Düsseldorf, Hess Hybridbus,
Dresden/Leipzig

Type: DKL BZ 0309-4
AC traction motor
160 kW, 1,466 r.p.m.



Siemens Energy & Automation, USA,
Komatsu 960E, 3650HP

Type: DRLDZ 5013-8L
Synchronous main alternator
2,506 kVA, 1,800 r.p.m.





ELECTRIC DRIVES
FOR EVERY DEMAND

Controlled Drive Systems

VEM location Dresden

Product range controlled drives systems



	Component	Power
Drive systems for DC and Three-phase installations with	Thyristor converters for DC drives	100 kW – 28 MW
	LV frequency converters 380 V – 690 V	4.5 kW – 4.5 MW
	MV frequency converters 2.3 kV – 6.9 kV	315 kW – 27 MW
	Subsynchronous converter cascades (SCC)	500 kW – 12 MW
	Excitation devices for synchronous machines	
Automation systems	Development of complete automation systems for primary industry (metallurgy/cement)	
	Reconstruction of old systems based on PLC and visualisation systems (SIMATIC S7, SIMATIC TDC, WinCC)	
Other services	Commissioning and support worldwide Certification of explosion-protected drive systems	

References pump drives for drilling test stand



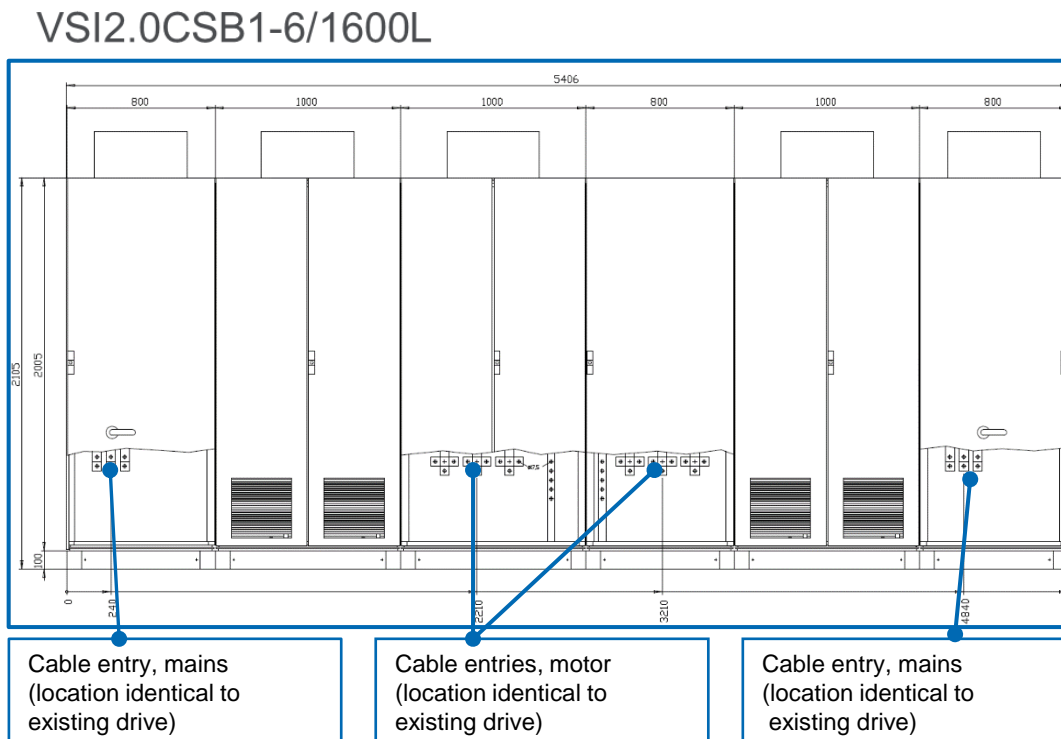
Pump drives for drilling test stand

- 2 AFE frequency converters LC 690 V, 600 kW incl. feeder cubicle 1,200 A
- Installed in a 20-foot marine container, insulated, climate-controlled
- Configuration with sine-wave filter and EMC filter for first environment
- Completion within 9 weeks



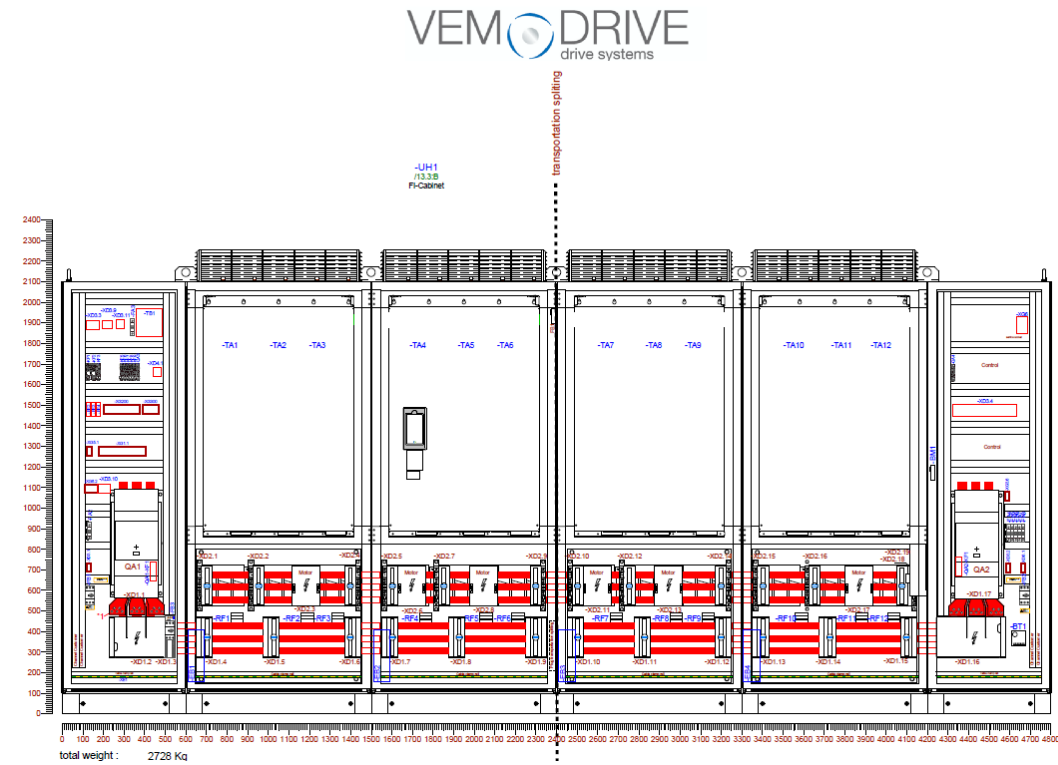
Customer: Abu Dhabi Polymers (BOROUGE)

- Replacement of drive systems and automation while retaining the existing motors, transformers, power cables and operating points: **NEW DRIVE**



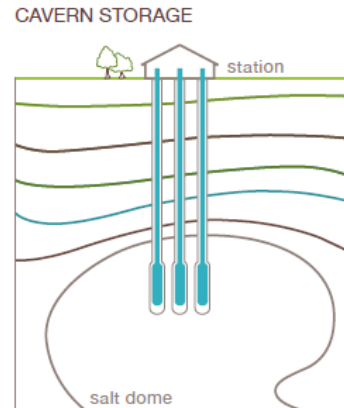
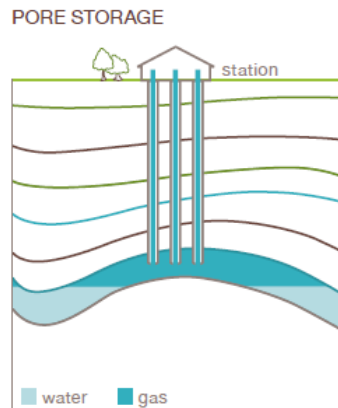
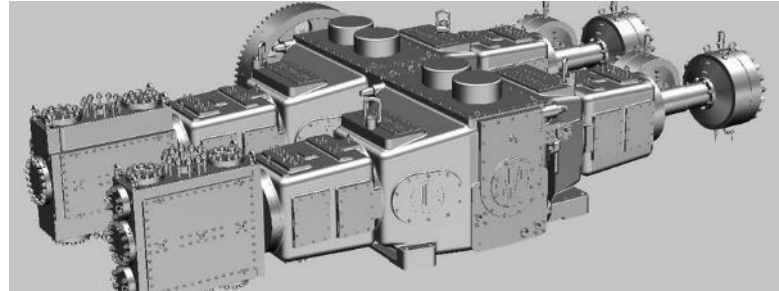
Customer: Kordestan Cement

- Converter-fed drive: 2,400 kW, 690 V, 12-pulse
- Drive for the main fan of the vertical mill

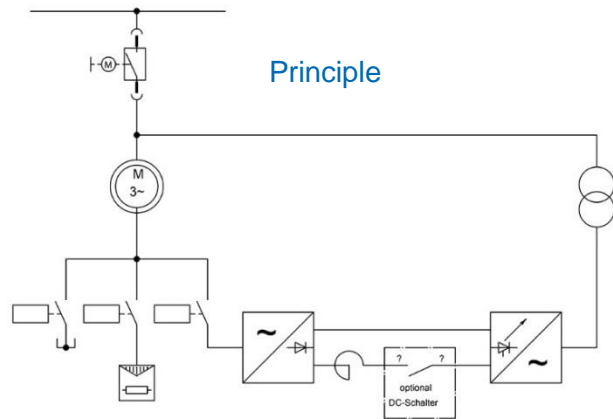


Customer: Storengy – Project: Peckersen natural-gas cavern storage

- Converter-fed drive: 2,800 kW, 690 V, 12-pulse
- Frequency converter for piston compressor motor EEEXE
- Replacement of drive system while retaining the existing motors, transformer
- Power cables and operating points



Subsynchronous converter cascade (SCC)



Principle



Retrofit of water supply, Saudi-Arabia

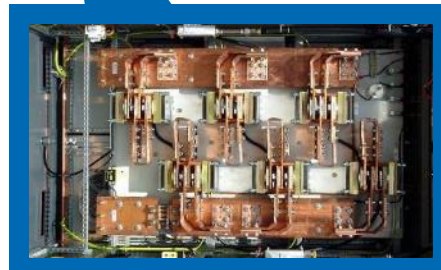


For the speed regulation of asynchronous slip ring motors,
for motor outputs of 500 kW up to 12 MW

Reference Retrofit of water supply in Saudi Arabia, for an output of 11,5 MW

Special feature Design dimensions of SCC as for old system

Power converters for DC roll stand drive



Water-cooled power sections

Reference: Hoesch Spundwand und Profil GmbH
Output: 2 x 2,500 kW

Compressor drive



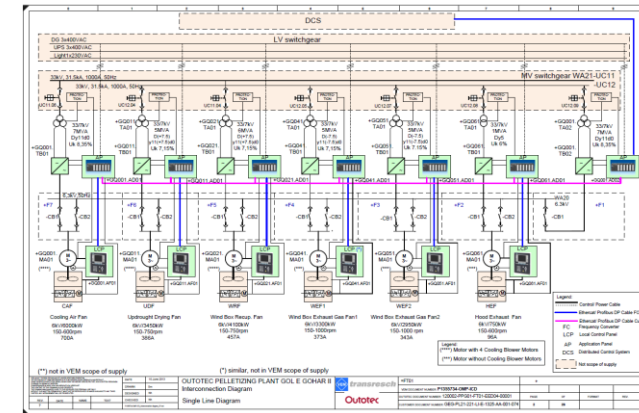
Type: MV converter ACS6000 (ABB)
Natural gas storage Staßfurt
5,200 kW, 3,160 V, 597 r.p.m.

Start up converter



Type: LCI (Load Commutated Inverter)
For polyethylene (LDPE) plant/high-pressure process
For synchronous motor 23,000 kW, 11,000 V, 200 r.p.m.

References Drive application “Pelletizing plant”



Challenge/application

- Outotec Oberursel
- Output: 750 – 6,000 kW, 6 kV
- Motors: Asynchronous motors, SWD
- Integration into existing process automation
- Emergency and local operation
- Operator: Gol-E-Gohar, Iran

Solution/scope of supply

- Frequency converter: CKD 7-level
- Converter – motor – near-drive control
- Stand-by converter with bypass
- Transformers – converter – motor

Customer benefit

- Unambiguous responsibility for the drive system
- Consistent system for all drive tasks
- Prepared for integration into process automation
- Local operation possible
- Unambiguous commissioning assignments/responsibility



ELECTRIC DRIVES

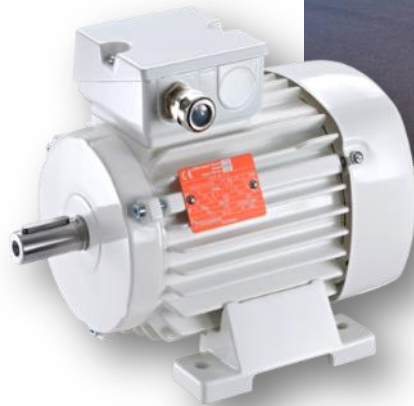
FOR EVERY DEMAND

Low Voltage

VEM locations Zwickau and
Wernigerode

Facts

- **Founded in 1908**
- Manufacturer of **single-phase** and **three-phase asynchronous machines**
- mounting dimension 56 – 132
- 0.06 – 9.0 kW



Facts

- **Founded in 1947**
- Manufacturer of **three-phase asynchronous machines**
- mounting dimension 132 – 450
- 5.5 – 1,000 kW



Series for the field of low voltage

- Energy saving motors
- Permanent-magnet synchronous motors
- Compact drives
- Single-phase motors
- Special motors
- Standard motors in grey cast iron design
- Explosion-protected motors
- Roller table motors
- Brake motors
- Traction motors
- Single-phase motors
- Die-cast aluminium motors
- Circular saw motors
- Extruded aluminium motors
- Reluctance synchronous motors
- Pole-changing motors
- Built-in motors





Chemical parks in Germany

Three-phase motors with squirrel cage rotor,
explosion protected

Type of protection „e“, „n“, Ex „d/de“

About 1,000 motors/year, mounting dimension 63 – 450



Explosion protected motor
in ignition protection type increased safety “e”



Explosion protected motor ExII2G ExIIT4
mounting dimension 100 S

Reference smoke venting motors



BAB 17 – tunnel Dresden-Coschütz, Germany

Delivery of **three-phase motors** with squirrel cage rotor
Type: K10R, 45 kW, 400 V D, 50 Hz
IM B14, 60 pieces



Fan motor

mounting dimension 200
45 kW, 230/400 D/Y,
1,450 r.p.m., IM B5, 50 Hz



Fire gas motor

mounting dimension 90, F400
1.1 kW, 400 V,
1,470/2,940 r.p.m., IM B3, 50 Hz



Type: IE2-W22R 355 M4
300 kW, 415 V,
1,495 r.p.m., IM B3, 50 Hz

Motor after fire gas test in field of SystemAir
(in use there for more than 10 years)



Foto: Heathrow Airports Limited

Airport Heathrow, London, Great Britain

Delivery of **three-phase motors** for lifts,
forced-ventilated design with brake

Types: K21F 160 L4
B21F 250 M4
K21F 180 L4
B21F 280 M4



Brake motor

Type: BU1R 250 M4 B HB IGR PRE PT SL HW;
55 kW, 690 V Y, 1,475 r.p.m.,
IM B3, 50 Hz



Hot rolling mill for wide steel strips EKO Stahl GmbH, Germany

Geared roller table motor

Frame size 225 with “Bauer-Getriebe AG”
39 motors

Geared roller table motor

Frame size 200 with “Bauer-Getriebe AG”
154 motors



Paper machine PM 4, Leipa, Germany

900 pieces **three-phase motors** with squirrel-cage rotor

For frequency converter and mains operations

Output range: 0.55 – 500 kW

Mounting dimension: 80 – 355

Drives for pumps, centrifuges, rollers, fans, drying groups,
dispersers, blowers



Virgin Trains, U. K.

Motors in the **air conditioning unit of high-speed trains.**

Used as bypass fan

Used as condenser fan



High speed train "Frecciarossa 1000",
Trenitalia, Italy

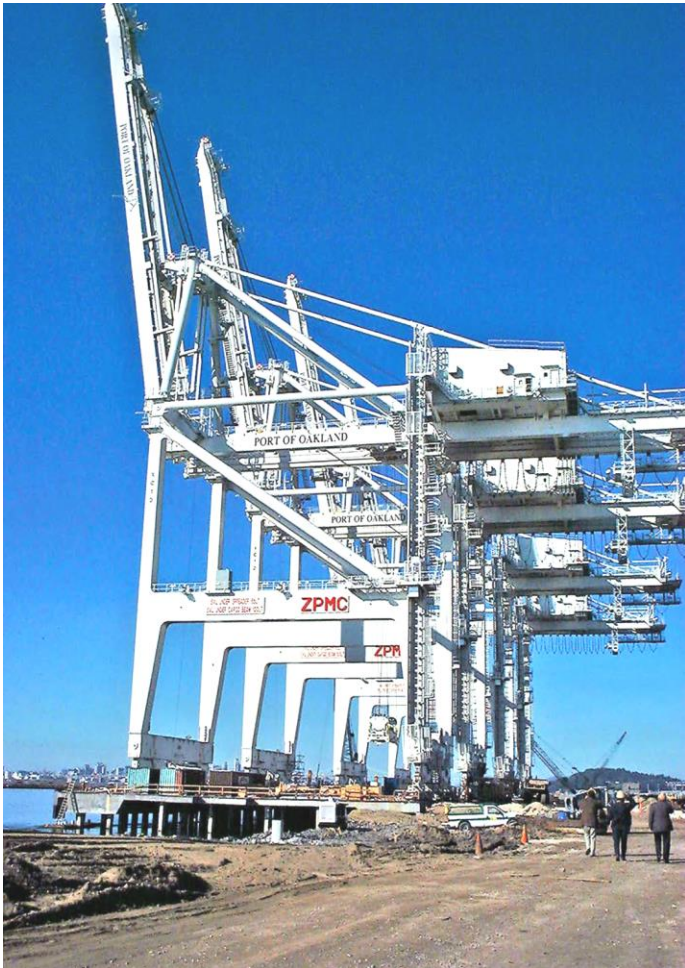
Variable-speed drive system for the cooling
of the traction motor

Customer-tailored VEM applications:

Our VEM product portfolio for the most diverse applications



- drives for main hoists, boom hoists, trolleys and gantrys
- design principle permits add-on mounting of components such as:
 - encoders
 - tachos
 - brakes
 - forced ventilation units to solve customer's individual control tasks
- robust and low-vibration motor design with grey cast iron housing characterized by high mechanical strength
- paint system guarantees very high level of proven corrosion protection
- brand-name products "Made in Germany"
- tradition and experience



Technical data:

- Three-phase asynchronous motors
with squirrel-cage rotor, suitable for mains and converter-fed operation
- Sizes: 63 to 450 acc. to IEC
- Number of poles: 2- to 8-pole (higher pole numbers on request)
- Output range: 0.12 to 1 000 kW
- Frequency: 50/60 Hz
- Voltage: up to 690 V
- Efficiency classes: IE2 to IE4 acc. to IEC/EN 60034-30-1, and IE5
- Type of protection: up to IP 66 acc. to IEC/EN 60034-5
- Type of construction: IM B3, IM B35, IM B5, IM V1 and derived types acc. to IEC/EN 60034-7
- Self-ventilated, forced ventilation and non-ventilated
- Quality, environmental and energy management acc. to
DIN EN ISO 9001, DIN EN ISO 14001 and DIN EN ISO 50001

The proven range of VEM products also includes slip-ring motors in crane and steelworks versions for short-time and intermittent duty S2, S3 and S4.



Three-phase asynchronous motor with electromagnetic spring-set brake and incremental encoder, type of protection IP 55



Three-phase asynchronous motor in non-ventilated version with electromagnetic spring-set brake and incremental encoder, type of protection IP 66



Three-phase asynchronous motor with slip-ring rotor for intermittent duty

IP23



VEM – three-phase asynchronous motors for main hoist applications:

Technical data:

- Three-phase asynchronous motors with squirrel-cage rotor, suitable for converter-fed operation
- Sizes: 355 to 450 acc. to IEC
- Frequency: 50/60 Hz
- Voltage: up to 690 V
- Type of protection: IP 23 acc. to IEC/EN 60034-5

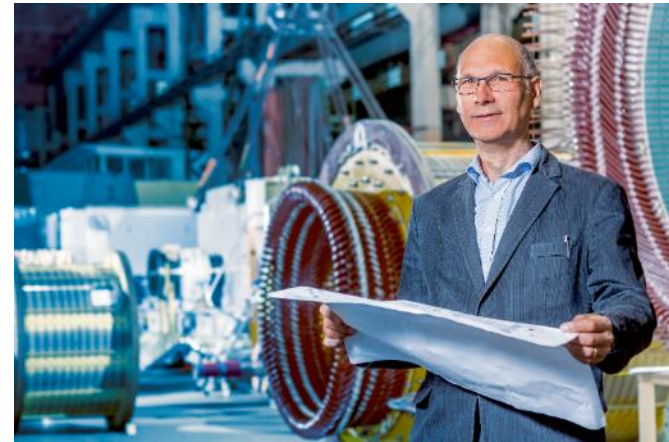
Good reasons to buy from VEM



- Product range from single drive to entire drive systems
- Internal design and development for tailor-made solutions
- Flexibility due to a high level of vertical integration
- Quick response times
- Worldwide customer service
- 24h-delivery service of stock motors (online stock)
- 1,500 highly motivated and qualified employees

Made in Germany

- Durable, robust under extreme conditions
- Environmentally friendly and highly energy efficient
- Low “life cycle costs”



Longstanding customers of VEM



SIEMENS

STÖBER

BASF
We create chemistry

WACKER

LANXESS
Energizing Chemistry

FLSMIDTH

ABB

VOITH



Howden

ArcelorMittal

GFC

voestalpine
EINEN SCHRITT VORAUSS.



SEW EURODRIVE

ThyssenKrupp

RWE

SALZGITTERAG
Stahl und Technologie

Rexroth
Bosch Group



DICKOW PUMPEN

pesa

TROX® TECHNIK
The art of handling air

MEYER WERFT
PAPENBURG 1795

SAM Electronics

VATTENFALL

SENVION
wind energy solutions

vossloh

HITACHI
Inspire the Next

systemair