We Keep the World in Motion.

Power Plants
www.ELINmotoren.at
Your motor will be manufactured in...

**AUSTRIA** … in one of Europe’s most modern motor- and generator manufacturing sites! A certified quality production!

- Founded in 1892
- Headquarter in Weiz/Preding/Austria
- Yearly turnover > 100 Million Euro
- Employs around 700 people
- Service Worldwide
A Global Player for Electrical Drives…

• Generators for wind energy and decentralized energy systems
• Motors for industrial plant applications, marine, oil & gas, power plants, plastics & tunneling

ELIN Motors Bosnia d.o.o. (Živinice, BiH)
ELIN Metal Kft. (Bátontyterenye, Ungarn)

Suzlon Generators Ltd. (Pune, India)

Medha Traction Equipment Ltd. (Hyderabad, India)

Traktionssysteme Austria GmbH

ELIN Motoren A Trasys Company

TRASYS Beteiligungs- und Management GmbH

Tsatron Systems Inc. (Somerville, NJ / USA)

Traktionssysteme Bosnia d.o.o. (Tuzla, BiH)

• AC traction motors air and liquid cooled
• Traction drives (motor and gear)
• Traction generators, synchronous and asynchronous
Profit from our experience in the following sectors:

**Industrial Plant Applications**
Asynchronous motors with squirrel cage and slip ring rotor, motors IP68 and motors for operation with frequency converters for cement plants, opencast mining, steel plants, chemical plants, water & environment, seawater desalination plants, pulp & paper, test rig motors, applications for industrial plants

**Decentralized Energy Systems**
Synchronous generators for steam turbines (industrial turbines)
Hydro power (small and medium power), gas turbines, gas motors
Asynchronous generators for Hydro power (small power)

**Power Plants**
Three-phase short circuit motors for operation on mains as well as operation on mechanically or electrically speed regulated drive systems for all forms of large thermal power plants.
Profit from our experience in the following sectors:

**Plastics & Tunneling**
Water jacket cooled low voltage motors for tunnel boring, vertical and shaft drill units, underground mining, extruder and compounding equipment, mixer and kneader, injection moulding machines, roller mills, metallurgy, pumps and presses.

**Marine, Oil & Gas**
Asynchronous and slip ring motors for up-, mid- & downstream solutions, petrochemistry, air separation, compressors and pumps as well as explosion proof applications (Ex n, e, p). Certified solutions for marine applications requirements (ABS, Bureau Veritas, DNV, KR, LR,…)

**Wind Energy**
Asynchronous and synchronous generators (conventional, DFIG’s, PMG’s), On- und offshore.
### Power Ranges

<table>
<thead>
<tr>
<th>kW / kVA</th>
<th>200</th>
<th>500</th>
<th>750</th>
<th>1,000</th>
<th>2,000</th>
<th>2,500</th>
<th>5,000</th>
<th>10,000</th>
<th>20,000</th>
<th>35,000</th>
<th>65,000</th>
</tr>
</thead>
</table>

#### Wind Energy
- Three-Phase Squirrel Cage and Slip Ring Generators

#### Plastics
- Tubing
- Tunneling
- Mining
- Three-Phase Squirrel Cage Motors

#### Compressor Drives
- Industrial Plant Applications
- Three-Phase Squirrel Cage and Slip Ring Motors
- Power Plants

#### Decentralized Energy Systems

#### Synchronous & Asynchronous Generators
Focus on Power Plants

Which kind of power plants and applications are our motors used for?

ELIN Motoren offers drive solutions for selected applications in all forms of thermal power plants:

- **Pumps**
  - Boiler feed water pumps
  - Main cooling water pumps
  - Absorber pumps
  - Condensate pumps
  - Circulation pumps
  - District heating pumps
  - Misc. auxiliary pumps
  - …

- **Fans / Compressors**
  - ID Fan
  - FD Fan
  - PA Fan
  - Oxi Compressor
  - Applications for CCS
  - …

- **Mills**
Why have leading companies in the power plant business been using our products?

• More than 125 years of experience

• ELIN provides very high quality motors:
  - Customized to comply with your requirements
  - Designed 100% in Austria
  - Very long lifetime and reliability
  - Robust design against external stresses and lower life cycle costs
  - High standard for documentation and testing
The development and manufacturing center is among the most modern worldwide and possesses one of the most advanced testing laboratories.
Which advantages do our solutions for drive systems offer?

- ELIN Motoren – complete drive systems supplier
  Motors with frequency converter

- Customized solutions mechanically and electrically optimized

- Development of the system solution in Austria

- Low maintenance due to coordinated life-cycle management
  - Commissioning
  - Storage concept
  - Revision
  - Strategic spare parts
Which philosophy do we apply when handling variable-speed projects?

- Cooperation with all leading manufacturers of frequency inverters - ELIN Motoren integrates your preferred equipment into the drive system
- Determination of operating-efficiency together with the customer
- Flexible and quick customer support during the project planning
- Solution of mechanical and electrical topics in one hand - providing a „carefree“ package for the customer
State-of-the-Art Design Tools & Calculations

- Our Designers are experienced specialists in usage of state-of-the-art design tools
- We are able to perform all necessary seismic- and strength calculations of MV- and LV-Motors
- The whole range of critical parts calculation can be covered by our company
- State-of-the-art commercial tools, enable us to perform a wide range of calculations and thus project the behaviour of our machines during their life cycle as well as potential technical irregularities well in advance.
Impulse Voltage Test for the MV Insulation System

An impulse voltage test for medium voltage insulation systems has been performed at one of the reliable partner companies of ELIN.

A proven insulation technology ensures overcompliance with the requirements resulting out of the relevant standards and therefore offers best possible security for our customers.

Example values for 4 kV system (single conductor insulation):
- 14 kV necessary acc. to EN-60034-15
- Insulation breakdown at 112 kV
The reinforced stator design of ELIN products enables DOL quickstarts and offers protection against electrical accidents during switch overs with residual voltage.

Winding overhang supports and stator-housing connections are designed to guarantee best-possible avoidance of exciting frequencies, which could cause potential harm. In addition, bump tests can be performed on request.

The specific know-how leadership of ELIN concerning this topic results from vast experience and countless references for machines being operated in state-of-the-art thermal power plants and under today’s grid-conditions.
Motor Types & Cooling Methods

**Air cooled Motors**
- Surface cooled IC411
  - 200 – 2500 kW
- Tube cooled IC511
  - 200 – 8000 kW
- Air cooled IC611
  - 500 – 12000 kW

**Water cooled Motors**
- Water jacket cooled IC 7A0W7
  - 50 – 2500 kW
- Water cooled + heat exchanger IC81W
  - 600 – 30000 kW
Why to use ELIN Motoren?

Flexible Order Processing
Low Life Cycle Cost
SUSTAINABLE Development
Modern Test Field
Skilled Technical Staff

High RELIABILITY

High EFFICIENCIES

High QUALITY

ISO 9001 Certification
ATEX Certification
Extensive POWER PLANT References
Worldwide Services
Global Player

Over 125 Years of Experience
Continuous INNOVATION
CUSTOMER focused

SUSTAINABLE Development

High RELIABILITY

High EFFICIENCIES

High QUALITY

ISO 9001 Certification
ATEX Certification
Extensive POWER PLANT References
Worldwide Services
Global Player

Flexible Order Processing
Low Life Cycle Cost
SUSTAINABLE Development
Modern Test Field
Skilled Technical Staff

Over 125 Years of Experience
Continuous INNOVATION
CUSTOMER focused
Reputable Companies of the Power Industry Rely on Products Manufactured by ELIN
Project: Boxberg Power Plant Block R - BFP

Location: Germany
Year: 2009

- Type: HKM110D04
- Power: 13500 kW
- Voltage: 10 kV
- Frequency: 50 Hz
- Speed: 1478 rpm
- Cooling: Air / water cooled
- Quantity: 1 piece

- Application: Pump

- Highlight: Start-up at 75 % of the nominal voltage against full resisting moment of the pump.
  
  Best efficiency (>97 %) at 75 % of the nominal power (usual operation point of this application)
Project: Zeran - District Heating

Location: Poland
Year: 2018

- Type: HKM150D06
- Power: 1700 kW
- Voltage: 6.3 kV
- Frequency: 61,3 Hz
- Speed: 1219 rpm
- Cooling: Air / water cooled
- Quantity: 3 pieces
- Application: District Heating Pump
Project: CHP Vilnius – BFW - Pump

Location: Lithuania
Year: 2018

- Type: HCZ545Z02
- Power: 1000 kW
- Voltage: 10.5 kV
- Frequency: 58,5 Hz
- Speed: 3500 rpm
- Cooling: water jacket cooled
- Quantity: 4 pieces
- Application: Boiler Feed Water Pump
Project: Sostanj Block 6 - BFP

Location: Sostanj, Slovenia
Year: 2012

- Type: HKM110D04
- Power: 15500 kW
- Voltage: 10.5 kV
- Frequency: 50 Hz
- Speed: 1490 rpm
- Cooling: Air / water cooled
- Quantity: 1 piece
- Application: Pump
- Highlight: Efficiency at 75 % load = 97.93 %

Sound pressure level at no-load = 77.9 dB(A)

Drive chain length = almost 18 m

Run-out after voltage drop against open valve is possible
Project: Ptolemais Power Plant – Absorber Pump

Location: Greece
Year: 2017

- Type: HKL163F12
- Power: 1360 kW
- Voltage: 10 kV
- Frequency: 50 Hz
- Speed: 495 rpm
- Cooling: Air / Air cooled
- Quantity: 5 pieces
- Application: Absorber Pump
Project: Ptolemais Power Plant – Coal Mills

Location: Greece
Year: 2017

- Type: HKM180E12
- Power: 2200 kW
- Voltage: 3.3 kV
- Frequency: 42.5 Hz
- Speed: 420 rpm
- Cooling: Air / water cooled
- Quantity: 8 pieces
- Application: Coal Mill
Project: Gebze Adapazari Power Plant – Replica Motor
Location: Turkey
Year: 2016

- Type: HKL171D14
- Power: 1600 kW
- Voltage: 6 kV
- Frequency: 50 Hz
- Speed: 423 rpm
- Cooling: Air-air cooled
- Quantity: 1 piece
- Application: Pump
Project: Ptolemais Power Plant – FD-Fan

Location: Greece
Year: 2016

- Type: HKM180E06
- Power: 4200 kW
- Voltage: 15 kV
- Frequency: 50 Hz
- Speed: 989 rpm
- Cooling: Air / water cooled
- Quantity: 2 pieces
- Application: FD - Fan
Project: Talkha Power Plant – BFW-Pump

Location: Egypt
Year: 2016

- Type: HKM171C02
- Power: 3700 kW
- Voltage: 6 kV
- Frequency: 50 Hz
- Speed: 2982 rpm
- Cooling: Air / water cooled
- Quantity: 2 pieces
- Application: Boiler Feed Water Pump
Project: Turow Power Plant – BFP

Location: Poland
Year: 2016

- **Type:** HKM180E04
- **Power:** 6850 kW
- **Voltage:** 10 kV
- **Frequency:** 50 Hz
- **Speed:** 1488 rpm
- **Cooling:** Air / water cooled
- **Quantity:** 3 pieces
- **Application:** Boiler Feed Water Pump
Project: Boxberg – Coal Mill

Location: Berlin, Germany
Year: 2015

- Type: HKR190D12
- Power: 1830 kW
- Voltage: 0.85 kV
- Frequency: 50 Hz
- Speed: 495 rpm
- Cooling: Tube cooled
- Quantity: 1 piece
- Application: Coal Mill
### Project: Kozienice Power Plant – CWP

Location: Kozienice, Poland  
Year: 2014

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>HKM111R18</td>
</tr>
<tr>
<td>Power</td>
<td>5000 kW</td>
</tr>
<tr>
<td>Voltage</td>
<td>10 kV</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Speed</td>
<td>330 rpm</td>
</tr>
<tr>
<td>Cooling</td>
<td>Air/water cooled</td>
</tr>
<tr>
<td>Quantity</td>
<td>2 pieces</td>
</tr>
<tr>
<td>Application</td>
<td>Pump</td>
</tr>
<tr>
<td>Highlight</td>
<td>IM3011 with flange adapter (mass~8000 kg)</td>
</tr>
</tbody>
</table>

- Motor mass: 52 tons
- Start against open discharge valve of the pump
- Start up voltage 75 % Un
- Starting current max. 5.9 x FLC
Project: Attaka Power Plant - FD-Fan

Location: Egypt
Year: 2013

- Type: HKM063C04
- Power: 2000 kW
- Voltage: 6 kV
- Frequency: 50 Hz
- Speed: 1484 rpm
- Cooling: Air / water cooled
- Quantity: 2 pieces
- Application: FD-Fan
Project: Wai Gao Qiao – ID-Fan output extension

Location: Shanghai, China
Year: 2012

- **Type:** HKM190D08
- **Power:** 7600 kW
- **Voltage:** 10 kV
- **Frequency:** 50 Hz
- **Speed:** 745 rpm
- **Cooling:** Air / water cooled
- **Quantity:** 5 pieces
- **Application:** Fan

- **Highlight:** The driven fan has a high moment of inertia (7824 kgm²). Max. permissible start-up time 20 seconds at 77 % rated voltage.
Project: Wilhelmshaven – FD-Fan

Location: Wilhelmshaven, Germany
Year: 2012

- Type: HKM110D08
- Power: 4700 kW
- Voltage: 15 kV
- Frequency: 50 Hz
- Speed: 742 rpm
- Cooling: Air / water cooled
- Quantity: 1 piece
- Application: ID - Fan
Project: WaiGaoQiao Power Plant – ID-Fan

Location: Shanghai, China
Year: 2012

- Type: HKM190D08
- Power: 7600 kW
- Voltage: 10 kV
- Frequency: 50 Hz
- Speed: 745 rpm
- Cooling: Air/water cooled
- Quantity: 5 pieces
- Application: Fan

- Highlight: Efficiency:
  4/4: 97.3 %
  3/4: 97.55 %
  2/4: 97.4 %
(Customer requirement: Best efficiency at 3/4 load)

Starting current 5.5x FLC without positive tolerance

Fan load moment of inertia = 7824 kgm²
Project: Wilhelmshaven - BFP

Location: Wilhelmshaven, Germany
Year: 2012

- **Type:** HKM111Z04
- **Power:** 15800 kW
- **Voltage:** 15 kV
- **Frequency:** 50 Hz
- **Speed:** 1488 rpm
- **Cooling:** Air / water cooled
- **Quantity:** 2 pieces
- **Application:** Pump
- **Highlight:** 15 kV design
Project: Altbach – FD-Fan

Location: Stuttgart, Germany
Year: 2011

- Type: HKM180Z99
- Power: 3100 / 3800 kW
- Voltage: 10 / 2.5 kV
- Frequency: 50 / 60 Hz
- Speed: 993 / 1191 rpm
- Cooling: Air / water cooled
- Quantity: 1 piece

- Application: FD-Fan

- Highlight: Design with 2 windings:
  
  Winding 1 = Operation on mains with 10 kV & 50 Hz
  
  Winding 2 = Operation with frequency inverter with 2.5 kV & 60 Hz
### Project: Schwarze Pumpe Power Plant – Coal Mill

- **Location:** Germany  
- **Year:** 2009

<table>
<thead>
<tr>
<th>Metric</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td>HKR190D12</td>
</tr>
<tr>
<td><strong>Power</strong></td>
<td>1830 kW</td>
</tr>
<tr>
<td><strong>Voltage</strong></td>
<td>10 kV</td>
</tr>
<tr>
<td><strong>Frequency</strong></td>
<td>50 Hz</td>
</tr>
<tr>
<td><strong>Speed</strong></td>
<td>495 rpm</td>
</tr>
<tr>
<td><strong>Cooling</strong></td>
<td>Tube cooled</td>
</tr>
<tr>
<td><strong>Quantity</strong></td>
<td>8 pieces</td>
</tr>
</tbody>
</table>

**Application:** Coal Mill
Project: Boxberg Block R – Absorber Pumps

Location: Germany
Year: 2009

- Type: HKR110B14
- Power: 1300 kW
- Voltage: 10 kV
- Frequency: 50 Hz
- Speed: 422 rpm
- Cooling: Tube cooled
- Quantity: 5 pieces
- Application: Absorber Pump
Project: Walsum Block 10 - BFP

Location: Germany
Year: 2009

- Type: HKM111Z04
- Power: 15500 kW
- Voltage: 15 kV
- Frequency: 50 Hz
- Speed: 1490 rpm
- Cooling: Air / water cooled
- Quantity: 2 pieces
- Application: Pump
- Highlight: 15 kV ± 10 % / start-up current 4.4x without tolerance / sound pressure level 82 dB(A) at load without tolerance
Location: Grevenbroich, Germany
Year: 2007

- Type: HKR110B14
- Power: 1400 kW
- Voltage: 10 kV
- Frequency: 50 Hz
- Speed: 424 rpm
- Cooling: Tube cooled
- Quantity: 13 pieces
- Application: Pump
- Highlight: Design according to power plant standard / noise level 77 dB(A) without tolerance at load

Project: BoA2&3, Neurath Power Plant - Absorber
Project: BoA 2&3, Neurath Power Plant - MCWP

Location: Grevenbroich Germany
Year: 2007

- Type: HKM110Z18
- Power: 3500 kW
- Voltage: 10 kV
- Frequency: 50 Hz
- Speed: 329 rpm
- Cooling: Air / water cooled
- Quantity: 5 pieces
- Application: Pump
- Highlight: Low noise: 80 dB(A) at load / start-up current 4.8 (without tolerance)
Project: Schwedt Power Plant – ID-Fan

Location: Germany
Year: 2006

- Type: HKM180D06
- Power: 5700 kW
- Voltage: 6 kV
- Frequency: 50 Hz
- Speed: 995 rpm
- Cooling: Air / water cooled
- Quantity: 3 pieces
- Application: Fan
- Highlight: 80 dB at load without tolerance
Project: Termoli Power Plant – MCWP

Location: Italy
Year: 2005

• Type: HKR110D12
• Power: 1850 kW
• Voltage: 6.6 kV
• Frequency: 50 Hz
• Speed: 495 rpm
• Cooling: Tube cooled
• Quantity: 2 pieces
• Application: Pump
• Highlight: Design with double casing for noise reduction
All our efforts aim at our customers' success.
Selected Contacts

**Christian FAULAND**

**Director Business Unit Power Plants**

Phone.:  +43 (0) 3172 / 90 606 - 2801  
Fax:  +43 (0) 3172 / 90 606 - 1504  
Mobile:  +43 (0) 664 / 80 838 - 2801  
christian.fauland@elinmotoren.at

**Florian BAUER**

**Business Unit Power Plants Technology & Sales**

Phone.:  +43 (0) 3172 / 90 606 - 2797  
Fax:  +43 (0) 3172 / 90 606 - 1504  
Mobile:  +43 (0) 664 / 80 838 - 2797  
florian.bauer@elinmotoren.at