



**We Keep the World in Motion.**

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



Lignite Power Plant  
Neurath (BoA 2&3), Germany



ID Fan Motor  
Schwarze Pumpe Power Plant, Germany

# Why have leading companies in the power plant business been using our products?

- 120 years market presence → decades of experience in the power plant market → visionary
- Selected motor partner in more than 40 % of European hard coal or lignite fired power plants
- VGB certified company
- Optimisation of drive concepts with planners, utilities, contractors and OEM
- Leading role in the implementation of „Transmission Code“ requirements / consequences into the motor design



# How can we support you with planning, processing and life-cycle topics of your plant?

Customer specific engineering of the drive solution with regard to the process and the driven machine means:

- Process coordination and integration of the drive chain design in the planning stage
- Clarification of driven machine interfaces relevant for the motor
- Link between mechanical and electrical engineering, if necessary also on site - recognition and realisation of specification requirements for both areas
- Form of contract orientated on practical experience
- After planning stage relaxed project start for the customer - fast submission of project docs due to many references
- Low maintenance due to coordinated life-cycle management
  - Commissioning
  - Storage concept
  - Revision
  - Strategic spare parts
- High-powered, modern testing facility



Testing facility of ELIN Motoren



# Which advantages are generated by our drive solution?

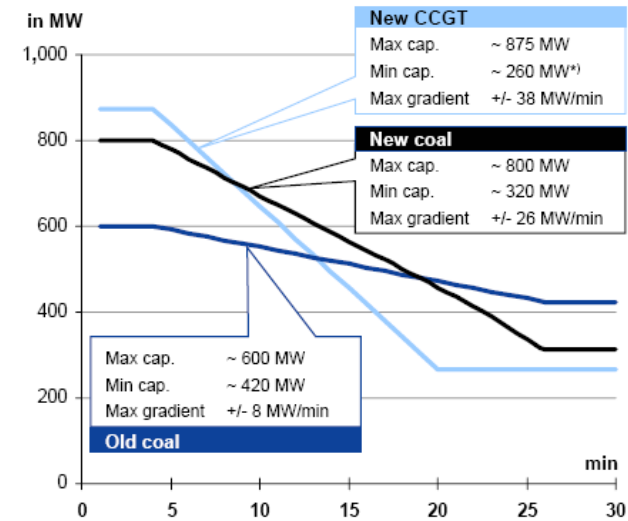
- Mechanically and electrically optimised according to the specification for highest availability and operational safety
  - Starting current ratio
  - minimal start-up current
  - start-up against closed valve
  - no breakdown during momentary voltage drops
  - etc.
- Highest efficiencies
- Isolation system for demanding solutions up to 15 kV (Higher voltages on request)
- Optimal drive chain integration due to minimal vibration emissions
- Western European quality product - developed, designed and manufactured in Austria



# Why are utilities strongly considering variable-speed drive systems?

- Quick plant controllability and better block dynamic
- Controllability of coal fired power plants gets more important as they are not strictly used for base load anymore
- Optimal operating efficiency because the power plant can be adapted ideally to fuel mix and operating conditions
- Optimisation of efficiency and flexible block dynamic in CCPP

**Comparison of ramp capacities  
(new CCGT unit and old coal unit)**



<sup>\*)</sup> One turbine gets turned off.

Source: RWE Facts & Figures

# Which advantages do variable-speed systems offer for the drive chain?

- Shock-free mechanical start-up of the drive chain
- Lower load of the station supply due to start-up with nominal current (Under considerations of transmission code requirements!)
- Savings through indirect returns (lower load in the station supply network, station supply transformer, ...)
- Quick amortisation of motors with quadratic resisting moment
- High system efficiencies in all control ranges
- Availability requirements according to specification as variable-drive systems are used in power plants for years in stable operation



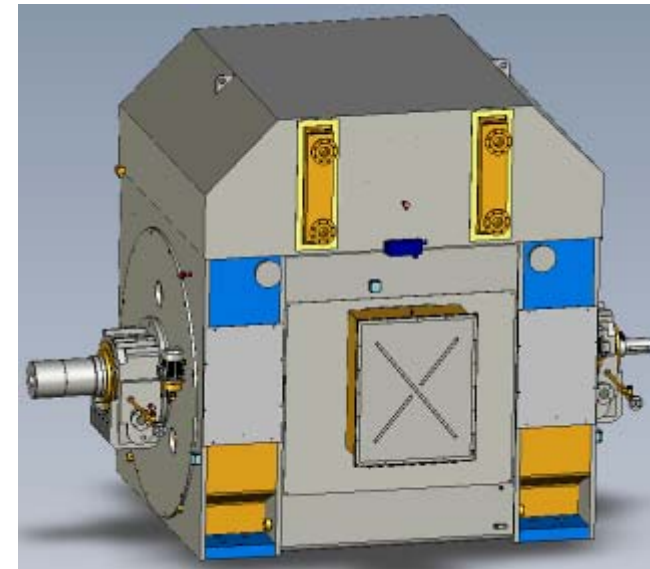
Main cooling water pump motor with tilting device



Variable-speed regulated boiler feed water pump motor / Termoli power plant, Italy

# Which philosophy do we apply when handling variable-speed projects?

- Leading the way and focusing on power plant motors / Quickly recognising and adapting markets trends
- Coordination with the customer if electrical or mechanical speed regulation is preferred
- Fans and pumps with hydraulic adjustable blades or impeller blades are subject to special physical conditions



Variable-speed regulated asynch. motor / 22 MW, 1800 min<sup>-1</sup> / boiler feed water pump motor for 900 MW hard coal block



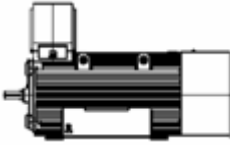
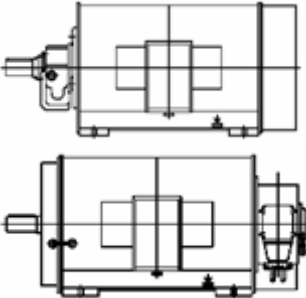
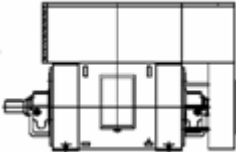
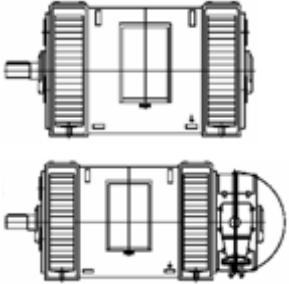
# Which philosophy do we apply when handling variable-speed projects?

- 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



Mechanically controlled ELIN motor

# Motor types & cooling methods – air cooled

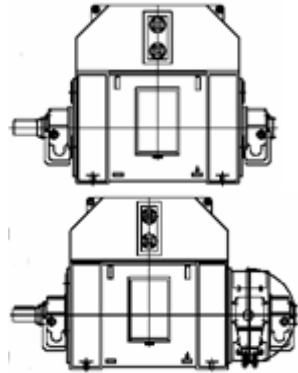
Cooling method	IC411	IC511	IC611	IC01 (IP23)	in addition *
Motor type					e.g. forced cooling / tube connections for air inlet and outlet
Short circuit	HKG	HKR/ HRR	HKL/ HRL	HKJ/ HRJ	HK_ HR_
Slip ring					
Power rating (based on 4-poles)					
Short circuit	2.2 MW	8.0 MW	12.0 MW	30.0 MW	30.0 MW
Slip ring					
Voltage					
Short circuit	0.4 – 11.0 kV	0.4 - 15 kV	0.4 - 15 kV	0.4 - 15 kV	0.4 - 15 kV
Slip ring					

\* The examples shown above are just a general overview of our scope of supply. Other solutions will be gladly offered after request

# Motor types & cooling methods - water cooled

Cooling method

IC81W  
(ICW37A81)



Motor type

Short circuit

HKM/

Slip ring

HRM

Power rating (based on 4-poles)

Short circuit

30.0 MW

Slip ring

15.0 MW

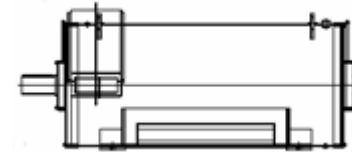
Voltage

Short circuit

0.4 -15 kV

Slip ring

Water jacket cooled  
(IC3A0W7)



Motor type

Low voltage

MKH/

High voltage

HCZ

Power rating (based on 4-poles)

Short circuit

2.5 MW

Slip ring

1.5 MW

Voltage

Short circuit

0.4 -11,0 kV

Slip ring

# Selected Projects



**BoA 2&3, Neurath**



**Boxberg, Block R**



**Westfalen**



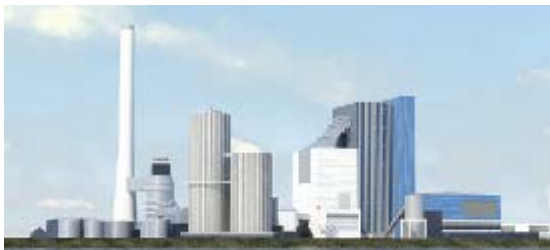
**Moorburg**



**Großkraftwerk Mannheim**



**Eemshaven**



**Wilhelmshaven**



**Walsum, Block 10**

**Countless other projects can be found in our motor reference list**

# Project: Lippendorf – Main Cooling Water Pump

Location: Lippendorf, Germany

Year: 1996



- Type: HKL-110 Z18
- Power: 3700 kW
- Voltage: 10 kV
- Frequency: 50 Hz
- Speed: 330 rpm
- Cooling: Air/air cooled
- Quantity: 4 pieces
  
- Application: Main Cooling Water Pump
  
- Highlight: Biggest manufactured motor in vertical design / low noise: 80 dB(A) at load



# Project: BoA 2&3, Neurath Power Plant – BFWP

Location: Grevenbroich, Germany

Year: 2007



- Type: HKM-110 D04
- Power: 13500 kW
- Voltage: 10 kV
- Frequency: 50 Hz
- Speed: 1478 rpm
- Cooling: Air/water cooled
- Quantity: 4 pieces
  
- Application: Boiler feed water pump
  
- Highlight: Reduced starting current 4.8x w/o tolerance / suitable for start-up at 75 % rated voltage during full resisting moment

Used in the world's most modern twin-block lignite power plant!

Project: **Boxberg Block R - ID Fan**

Location: Boxberg, Germany

Year: 2009



- Type: HKM111Z10
- Power: 13500 kW
- Voltage: 10 kV
- Frequency: 50 Hz
- Speed: 590 rpm
- Cooling: Air/water cooled
- Quantity: 1 piece

• Application: ID Fan

- Highlight: Reduced starting current 5.0x w/o tolerance / suitable for start-up at 75 % rated voltage during full resisting moment

Weight: 42 tons

Nom. Torque: 218 kNm

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

Location: Grevenbroich, Germany

Year: 2007



- Type: HKM-110 Z18
- Power: 3500 kW
- Voltage: 10 kV
- Frequency: 50 Hz
- Speed: 329 rpm
- Cooling: Air/water cooled
- Quantity: 5 pieces
  
- Application: Main Cooling Water Pump
  
- Highlight: Low noise: 80 dB(A) at load / start-up current 4.6 (without tolerance)



# Project: Termoli Power Plant – VFD motor

Location: Italy  
Year: 2005



- Type: HKM156Z02
- Power: 2400 kW
- Voltage: 3.3 kV
- Frequency: 60 Hz
- Speed: 3578 rpm
- Cooling: Air-Water cooled
- Quantity: 4 pieces
  
- Application: Boiler Feed Water Pump
  
- Highlight: Frequency inverter driven / speed control range 350 - 3600 rpm / sound pressure level 82 dB(A) w/o tolerance

Project: **Fiddler's Ferry & Ferrybridge Power Plants**

Location: England  
Year: 2007



- Type: HKR-111 Z08
- Power: 5200 kW
- Voltage: 11 kV
- Frequency: 50 Hz
- Speed: 745 rpm
- Cooling: Tube cooled
- Quantity: 6 pieces
  
- Application: ID-Fan
  
- Highlight: Heavy start-up at 80% UN / design with sleeve bearings



Project: **Schwedt Power Plant – Induced Draught**

Location: Germany  
Year: 2006



- Type: HKM-180 D06
- Power: 5700 kW
- Voltage: 6 kV
- Frequency: 50 Hz
- Speed: 995 rpm
- Cooling: Air/water cooled
- Quantity: 3 pieces
  
- Application: ID-Fan
  
- Highlight: 80 dB at load without tolerance

Project: **Aboño2 Power Plant**

Location: Spain  
Year: 2005



- Type: HKM-110 D08
  - Power: 8,100 kW
  - Voltage: 6 kV
  - Frequency: 50 Hz
  - Speed: 747 rpm
  - Cooling: Air/water cooled
  - Quantity: 2 pieces
  - Weight: Appr. 32,500 kg
- 
- Application: ID Fan
- 
- Highlight: Efficiency 97.9 % / Heavy starting duty of an induced draught with a moment of inertia of 15,357 kgm<sup>2</sup>

## Selected Contacts



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