ALSTOM Power Conversion
Germany
ALSTOM Today

Energy

The global specialist in energy and transport infrastructure

Transport
ALSTOM Today

Key Figures

- Annual sales over 17 billion Euros*
- Order backlog over 27 billion Euros** representing 19 months of sales
- Employs approximately 75,000 people in over 70 countries
- Listed on Paris, London and New York stock exchanges

*Based on Forecast FY 2004
**Q3 FY 2004
An International Dimension

Global Player

- European Union 38%
- Rest of Europe 7%
- North America 23%
- Africa/Middle East 6%
- Central & South America 8%
- Asia-Pacific 18%
ALSTOM Profile

Power Conversion a Business of ALSTOM

- Power Turbo-Systems: 4,0 B€
- Power Service: 3,0 B€
- Power Environment: 3,0 B€
- Transport: 5,0 B€
- Marine: 1,5 B€
- Power Conversion: 0.6 B€
Solution provider for complete automation systems and electrical equipments in the focused markets

- Metals Industry
- Pulp- and Paper
- Material Handling
- Marine & Offshore
- Power Generation
- Test Benches
- Oil & Gas
- Infrastructure

As well as manufacturer of power electronics, drive converters, motors and generators
Country Activities

Business Power Conversion

Activities

- Industry
- Motors & Generators
- Marine & Offshore

ALSTOM Power Conversion GmbH

Germany

Other Countries

ALSTOM Power Conversion GmbH
Our Capabilities

- Consulting, planning, contracting
- Design studies
- Financing
- Project management
- Development & engineering
- Manufacturing & function testing
- Training & integrated system test
- Installation and start-up
- Maintenance & service
- Industrial IT

- e.g. Metals
- e.g. Pulp und Paper
- Renewable Energy
- e.g. Oil&Gas
- Drive Systems
Strategic Focus

Products

Drives package with individual software solutions

Systems solutions

Turn key solutions

Market Demands

ALSTOM Power Conversion GmbH
Typical Drive Systems Configuration

- Network Analysis
- Transformer Design
- Motor Design
- Filter Optimisation
- Inverter Design
- System Analysis

Scope of Supply - e.g. Oil/Gas

MS-Switchgear | Compensation | Inverter System | Compressor / Motor
Drives & Automation Products and Systems

Drives Systems up to 100 MW
- Manufacturer of low- and medium voltage drive products and systems for different applications
- Associated services

Focused Market Segments
- Systems for wind turbines up to 5 MW
- Oil & Gas, e.g. high-speed gas compressors
Drives & Automation Products and Systems

Drive systems for test benches, typical applications include:
- Engines, gearboxes, axles
- Alternators, rolling roads
- Differential gearing and drive trains

Solutions for cranes, e.g.:
- Rail mounted quayside cranes
- Gantry cranes
- Goliath cranes
- Grab type shipunloader
- Slewing cranes
Typical Plant Configuration

- Energy Distribution
- Transformers
- Converters
- Drive Control
- Drives
- Production Control Optimisation
- Technology
- DCS
- Motor-Control
- Valve-Control
- Sensors
Plant solutions for all stages in steel production

- Iron- and Steel making
- Mini Mills
- Section Mills
- Hot Strip Mills
- Cold Rolling Mills
- Processing Lines
Plant Solutions for the Pulp- and Paper Industry

More than 2000 references worldwide

- Pulp-preparation
- Paper machines
- Tissue plants
- Coating machines
- Calander
- Re-winder
- Slitter winder
Products - High Performance Controller

ALSPA C80-HPCi

- high reliability/availability
- optimal maintainability
- few and simple interfaces
- unified open platform
- easy connection to legacy hardware systems
- minimum installation and start-up time
- simple training
- reduced spares
Product Range - Low Voltage Drives

**ALSPA MV500**
- Simple installation and start-up
- Most drive applications covered by just 10 parameters
- Open loop vector control
- Cloning module for rapid accurate parameter transfer

**ALSPA MV1000**
- Modern digital 4-quadrant AC-drives
- Compact design and competitive price
- Accurate and reliable operation
- Easy programming, built-in monitoring
- Ideal for low-power helper drives (runouts etc)

**ALSPA MD2000**
- High performance drive for all applications
- 4-quadrant applications up to active front end inverter
- Frequency, speed and torque control are available
- 3AC or DC bus power supply
Product Range – High Power Drives - Medium Voltage

ALSPA VDM6000
- IGBT module, space-saving, economic, highly reliable
- Medium voltage, high-torque, fast response
- PEC controller for high-precision response
- Suitable to drive standard AC motor
- Ideal for main stand drive
- Alternatively: air- and watercooling

ALSPA VDM7000
- Tree-level Type
- Inverter (NPC)
- Water-cooled
- GTO-technology
ProWind - Drive Converter

Modular and compact drive converter for wind turbines

- Advanced technology deriving from more than 1000 installed systems
- Flexible design thanks to standardised components and modules
- User-friendly construction and high reliability
- Space reduced by 30%
- Power range from 0.5 to 5 MW

Production capacity more than 600 units pro year
ProWind - Drive Converter

Constructional design for **2.5 MW**, doubly-fed generator

- Air cooled power electronics
- Proven controller widely used on ALSTOM drives
ProWind - Drive Converter

Constructional design for 2.5 MW, water-cooled

- Paralleling of cubicles or modules for higher power ratings
- Modular and compact design

Resulting in:
- High cubicle packing density
- Space saving
ALSTOM Power Conversion GmbH

Key Projects

- GD - Goldisthal  
  Pump-Storage Power Station
- GD - General Motors  
  Test Benches for Locomotives
- GD - Multibrid  
  5 MW Offshore Windturbine
- PI – Salzgitter  
  2 Stand Tandem Mill
- PI – Perlen  
  Paper Mill (Reference)
Principle of a pump-storage plant

Goldisthal

- Maximum dam level
- Minimum level

8 h operation time under full load condition

Goldisthal

300 MW Variable Speed Drives:
- 2 x 100 MW Cycloconverter
- 2 x 40 MVA Softstarter
Power Station Goldisthal

Machine Cavern Goldisthal

- Contract value 13 Mio. €
- 1000 thyristors used
- Total cubicle length 44 m

3600 mm
Locomotive Motor Test Bench Drive System

EMD SD70MAC
4,000 Horsepower AC Locomotive

General Motors Corporation

Test Bench for General Motors, USA

Pittsburgh 3.6ME
Berlin 4.1ME

Contract value
7.6 Mio.€
“MULTIBRID” Technology

- Development project for future offshore applications
- Orders directly placed in Berlin for the Drives Converter and in Nancy for the Generator
- Expected commissioning of the Wind Turbine in May 2004

Manufacturer: Pfleiderer Windenergie GmbH
5 MW Windturbine  MULTIBRID

Permanent Magnec Synchrongenerator Manufactured in Nancy
5 MW Windturbine MULTIBRID

Drives Container Manufactured in Berlin

Contract value 1.3 Mio.€
5 MW Drive System

Overview

Grid connected
Switchgear in
Tower

Transformer-Container

Converter-Container

Sea cable

3 ~ 50 Hz
20 kV

5,3 MVA
V_R = 3,0 kV

5 MW Drive System

05/2004

ALSTOM Power Conversion GmbH / Germany - APC_Germany-2_EN_05-2004_HO.ppt
### Technical specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of stands</td>
<td>Four-high stands</td>
</tr>
<tr>
<td>Number of stands</td>
<td>2</td>
</tr>
<tr>
<td>Capacity</td>
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<tr>
<td>Strip thickness</td>
<td>0.3 – 3.5 mm</td>
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<tr>
<td>Strip width</td>
<td>800 – 1,895 mm</td>
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<tr>
<td>Coil diameter</td>
<td>2,100 mm max.</td>
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<tr>
<td>Coil weight</td>
<td>32 t max.</td>
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<tr>
<td>Drive power</td>
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<tr>
<td>- Uncoiler</td>
<td>2 x 1,000 kW</td>
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<tr>
<td>- Entry section bridle</td>
<td>2 x 1,000 kW</td>
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<tr>
<td>- Stand #1</td>
<td>2 x 1,000 kW</td>
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<tr>
<td>- Stand #2</td>
<td>2 x 1,000 kW</td>
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<tr>
<td>5 – 80 kN</td>
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<td>160 kN max.</td>
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<tr>
<td>15 – 1,000 m/min</td>
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<tr>
<td>30 m/min</td>
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<tr>
<td>16 MN max. per stand</td>
<td>± 1,600 kN</td>
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<tr>
<td>80 mm</td>
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<td>580 – 500 mm</td>
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<td>2,030 mm</td>
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<td>1,455 – 1,300 mm</td>
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<tr>
<td>2,074 mm</td>
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<td>0.2 – 2.2%</td>
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Contract value: 11 Mio.€
Perlen / Switzerland - PM4

Reference Paper Industry

- Newsprint & LWC (glazed and matt)
- Production speed: 1,500 m/min
- Working Width: 5,360 mm
- Variable drives: 66 pieces
- Installed power: 11,300 kW

Contract value: 4 Mio.€
Our offerings at a glance

- Planning, Consulting, Contracting
- Design Studies
- Project Management
- Development & Engineering
- Manufacturing & Testing
- Installation & Commissioning
- Maintenance & Service
- Industrial IT