

# Innovation



- 6 Innovation highlights**  
ABB's top innovations for 2014
- 13 Light measures current**  
A fiber-optic current sensor integrated into a high-voltage circuit breaker
- 18 Picture of health**  
An integrated approach to asset health management
- 24 Wind of change**  
Design and test of a 7 MW wind turbine drivetrain
- 28 Braking news**  
DC wayside products for energy efficiency in traction
- 34 Need for speed**  
Real-time simulation for power electronics in railway applications and beyond
- 40 Turbo boost**  
ACTUS is ABB's new simulation software for large turbocharged combustion engines
- 45 Model train**  
Combining electromagnetic and mechanical simulations for better drivetrain designs
- 50 Model matrix**  
Modularized simulation concepts for breaker analysis and optimization
- 55 Smart outlets for smart phones**  
Mains outlet with integrated USB connector
- 59 Power player**  
ABB's PCS100 RPC does more than just compensate reactive power
- 65 In harmony**  
Looking back on a fruitful history of co-development of high power rectifiers and semiconductors

# Centenary issue



- 7 100 years of ABB Review**  
Looking back on a century in print
- 21 Editors' picks**  
Treasures from the archives
- 24 Rise of the robot**  
Celebrating 40 years of industrial robotics at ABB
- 33 60 years of HVDC**  
ABB's road from pioneer to market leader
- 42 Pumping efficiency**  
A 100 MW converter for the Grimsele 2 pumped storage plant
- 48 Unit of power**  
Cutting-edge motor design redefines power density
- 54 Multitalented**  
ACS800 power electronics can do more than rotate a motor
- 58 Hot spot**  
A new infrared sensor measures temperature in generator circuit breakers
- 65 At a higher level**  
A medium-voltage-level UPS for complete power protection
- 68 Boundaries of knowledge**  
Knowledge of boundary conditions is crucial for reliable simulations
- 74 Pushing the limits**  
Turbine simulation for next-generation turbochargers

# Mining



- 7 Mine of the future**  
Technology convergence advances mining efficiency and productivity
- 12 Conveying progress**  
ABB delivers reliable and almost maintenance-free gearless conveyor drives for high-power and high-torque applications
- 18 Advanced 3-D windings**  
GMD 3-D windings with just a few clicks
- 25 Bigger is better**  
ABB drive systems enable the mining industry to employ bigger mills
- 31 Industrial evolution**  
Electrical Integration using ABB's Extended Automation System 800xA with IEC 61850
- 35 More efficient operations**  
Extended Automation System 800xA enables collaboration in mining operations
- 37 Seamless communication**  
ABB's private wireless field automation networks advance open-pit mining fleet management
- 42 Raising the issue of mines**  
ABB hoists for mines
- 47 Transforming mining maintenance**  
Advanced service solutions for mining and mineral processing
- 52 Advancing System 800xA**  
Demystifying MPC and how to deploy it with ABB's Extended Automation System 800xA
- 60 Bounding ahead**  
IT maturity takes the mining industry from laggard to leader
- 64 One and done**  
A unified platform approach helps miners overcome the complexities of today's business processes
- 70 Modern cyborgs**  
Going where only science fiction dared to venture
- 76 Clean air in the docks**  
Taxation incentives can improve air quality in ports
- 80 Current account**  
How Modbus enables a new current measurement system
- 84 Semiconductor generations**  
ABB looks back on 60 years of progress in semiconductors

# The digital grid



- 6 Enabling digital substations**  
The smarter grid needs a smarter substation, and it has to be digital
- 11 Forward-looking information**  
Operating the grid closer to its limits by pre-empting problems
- 17 Break free**  
Outages can be reduced by handling faults in an intelligent way
- 23 The balance of power**  
Volt/var management improves grid efficiency
- 29 Smarter distribution**  
How to increase the capacity of distribution grids to host distributed generation
- 34 Active Site**  
ABB's Active Site optimizes the connectivity between microgrids and the macrogrid
- 40 No grid is an island**  
Communication technologies for smarter grids
- 46 Entering a new epoch**  
A brief history of the electric power supply
- 54 Microgrids**  
The mainstreaming of microgrids using ABB technologies
- 61 Resource management**  
An end-to-end architecture for energy storage in the grid
- 66 Plugged in**  
Analyzing the cost efficiency of emissions reduction with shore-to-ship power
- 70 A new era**  
ABB is working with the leading industry initiatives to help usher in a new industrial revolution
- 76 Wheel appeal**  
A robot expert on wheels offers remote support
- 81 Index 2014**  
The year at a glance