

CONTACT

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on track with ABB

ABB

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Editorial Team

Harmeet S Bawa – *Head, Corporate Communications*

Vikram V Kanth – *Content Editor*

Nandini Naik – *Editorial Services*

Anuj Sharma – *Automation Technologies*

Namita Asnani – *Power Technologies*

Kaushik Pandit – *Building Systems*

ABB Limited, GF-Corporate Communications, India
Khanija Bhavan, 2nd Floor, East Wing, 49, Race Course Road
Bangalore - 560 001.

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Dear Friends,

With the Union Budget behind us and the government's reassurance on the continued path of reforms, India looks in good shape and is gaining recognition as one of the fastest growing economies in the world. We still have a long way to go however, in developing world-class infrastructure to support our growth ambitions. The power sector is clearly one such sector and we certainly hope that the Electricity Act and National Electricity Policy, coupled with the overall focus on reforms at both central and state level and the encouragement of public-private partnership will address this critical area.

Indian Industry across many sectors is clearly in a growth and expansion mode. New capacities are coming on-stream and global aspirations are bringing focus to long neglected though critical aspects such as productivity, efficiency, quality, etc. The construction sector is also buzzing with activity.

Our quest to bring our customers the latest in power and automation technologies for increased competitiveness, continues unabated and we at ABB, remain committed to honouring the confidence and trust that you have always reposed in us. We look forward to your ongoing support and partnership in an era of collaborative commerce as we work together in helping India realise its true potential. In this 'new look' issue of CONTACT, you will read about one of ABB's less talked about strengths and get a glimpse into the technologies we offer to the Railways sector.

Yours sincerely,

Ravi Uppal

Vice Chairman and Managing Director, ABB India

ABB wins India's first major 765 kV equipment order for NTPC Sipat II

National Thermal
Power
Corporation

एनटीपीसी
NTPC

(NTPC), India's leading power generation utility, has entrusted ABB with the country's first major 765 kV equipment order for the new Sipat II power plant, located in the state of Chattisgarh. NTPC, India's biggest power utility, with an installed capacity of around 22,000 MW is ranked as the sixth largest thermal power generator in the world and has been rated as the second most efficient utility in terms of capacity utilisation.

ABB's factory in Ludvika, Sweden will manufacture and supply eight 200 MVA, 21/765 kV generator transformers, seven 333 MVA, 765/400 kV auto transformers and ten 80 MVA, 765 kV shunt reactors for extra high-voltage transformers & reactors. ABB India will provide the local interface, logistics, commissioning and after sales support. The scope of the order includes supply, transportation, erection and commissioning of all 25 units, the delivery schedule is around 22 months.

India's transmission grid presently operates mainly at 400 kV and the country is now developing extra high voltage capabilities at 800 kV levels, in order to strengthen the power network, increase grid reliability, enhance system efficiency and help meet growing power demand.

"Over the past decades, ABB has pioneered many power technologies in India and it is indeed a matter of pride to add this achievement to the list. This order confirms the strong customer confidence that ABB enjoys in India, one of the fastest growing power markets in the world," says Peter Smits, head of ABB's Power Technologies division worldwide. "ABB continues to play an integral part in the development of India's power infrastructure and we are indeed privileged to bring state-of-the-art technologies and contribute to the expansion of India's power transmission capacity and strengthening of the national grid," added Ravi Uppal, Vice Chairman & MD, ABB, India.



ABB has also been chosen by NTPC to provide plant automation solutions for two of their proposed greenfield power generation plants at Kahalgaon (3x500MW) and Sipat (2x500 MW). ABB was selected mainly for its technology strengths, domain expertise and extensive global experience. The plant automation solutions will help support NTPC's quest for improved efficiency and availability as well as greater plant control.

Additionally, ABB will also supply ten single phase 200 MVA 21/420 kV

generator transformers for the Kahalgaon project as well as 3.3 kV & 11 kV Medium Voltage switchgear panels with its well proven SF₆ circuit breakers for Unit and Station Auxiliaries, including the coal & ash handling plants for both projects.

Plant automation – primary scope of supply:

- Control room & field instruments
- Plant DCS
- Steam and water analysis systems
- Flue gas analyzers
- Power supply
- CCTV systems including large video screens

ABB India's export thrust continues with recent Middle East successes

ABB in India continued its success in the Middle East and has recently been awarded turnkey orders for four new 220 / 66 / 20kV outdoor air insulated substations, which will play an important role in developing the power infrastructure and substantially improving power supply to the towns it serves. ABB will design, procure, manufacture and supply equipment for all the substations. Equipment supply will include Power Transformers, Instrument Transformers, Outdoor Circuit Breakers, Medium Voltage Switchgear and Control & Relay Panels from the company's hubs at Vadodara, Nashik and Bangalore.



New

SF₆ insulated RMU's & Compact switchgear with metering capabilities



ABB's recently introduced SF₆ insulated Ring Main Units (RMU) & Compact switchgear with metering capabilities have already found success with customers such as Asahi Glass, Rewari, Dynamic Electricals for Noida Power Corp. Ltd. and HPSEB.

These RMUs come with an optional tariff / energy audit metering system (HV) and are available in ratings up to 24 kV, 630A, 25kA. They can replace air-insulated switchgear and offer the following benefits:

- Highly compact – a 12kV unit will occupy approximately 50% of the space of air-insulated switchgear and a 24kV unit only one third
- All live parts are in SF₆ gas medium ensuring safety and minimal maintenance
- All protection units are self-powered hence there is no need of a separate control supply

NFL chooses advanced HV breakers with polymer insulators

National Fertilizers Ltd. (NFL) has chosen ABB high voltage circuit breakers for their captive power plant in Naya Nangal, Himachal Pradesh. The 72.5kV circuit breakers type EDF SK1-1 will be supplied with technologically advanced composite polymer insulators. These circuit breakers are an ideal choice for high altitude and heavily polluted areas and offer several distinctive advantages:

- High degree of safety: polymer insulators are more resistant to flashovers and since they are non-brittle, risk during transportation and handling is minimised
- Longer life and minimal breakdowns: the absorption of UV wavelengths by silicone is much below the natural wavelengths. This gives polymer insulators higher resistance against breakdowns
- High insulation property: the silicone rubber compound used in polymeric insulators offers the best insulation performance due to unique properties like UV stability, hydrophobicity and Low Molecular Weight (LMW)
- Minimal discharge – the hydrophobic surface of the insulator suppresses leakage currents because water on the surface stays as droplets and does not form a continuous film, thereby ensuring minimal discharge even under severe pollution.



JVSL entrusts ABB with expansion project

Jindal Vijaynagar Steel Ltd (JVSL) has entrusted ABB India with the supply of drives, motors and RTDB (Roller Table Distribution Board) for the de-bottlenecking of their Roughing Mill, part of the steel major's expansion project in Hospet, Karnataka.

ABB will supply its latest range of ACS 800 drives which come with a host of features like Start-up Assistant, Adaptive Programming and DTC, common user and process interface with field-buses and software tools for sizing, commissioning and maintenance. The drives are based on IGBT based line supply units, a far more advanced technology than those based on thyristor technology.

ABB will also supply 130 Roller Table Motors under this project with IP 55 class protected enclosures. The completely 'enclosed' construction of these M3RP Roller Table duty, induction motors make them immune to moisture and dust ingress. Moreover, the power factor of ABB frequency converters is near unity.



TATA Motors has a smoother drive with ABB

ABB has successfully executed an order for TATA Motors at their Pune facility, to help the car maker meet increased production demands. ABB's scope of supply included 37 robots for various applications like spot welding, painting, sealant, stud welding, underbody spray



painting, roller hemming, glass glazing, arc welding and roof ditch sealing for the Indica, Indigo and Marina car models for a new line.

The IRB6600 robots with S4C+ controller come in five versions featuring a load handling capacity of up to 225 kg, a reach of up to 3.2 m, and a wrist torque of up to 1320 Nm. A built-in Service Information System monitors the motion and load of the machine and optimizes service requirements by itself. Load identification and collision detection features allow the Robots to optimize speed and acceleration based on load and in case of any collision, the robot stops immediately and retracts to release the residual forces.

The Spot Welding robots are equipped with Tool changers which allow them to handle multiple end tools. They also have Servo Guns and ABB's unique Dresspack system for cable management on the manipulator. Robots installed in the framing station use grippers to assemble the car.

Applications

- Spot welding
- Painting
- Sealant
- Stud welding
- Underbody spray painting
- Roller Hemming
- Glass glazing
- Arc welding
- Roof ditch sealing

After automatically changing the tool via the tool changer, the robot picks up the spot welding gun and welds the car. The robots communicate with grippers on DeviceNet as the Master concept and at the same time, with the total framing line PLC as a Slave concept. The underbody painting robots are mounted on an ABB linear track motion which allows the robot base to be moved in co-ordination with other axes.

ABB is currently in the process of setting up a dedicated spares, service and training centre in Pune to provide a quicker and more effective response to TATA as well as other customers in the region.

ABB robot controller breaks new ground for BENTELER

ABB will deliver 400 robots and IRC5 controllers for six of Benteler Automotive's European production facilities where it manufactures automotive parts and components for DaimlerChrysler, General Motors, Fiat, Peugeot, and Renault. Benteler Automotive is one of the world's leading suppliers of automotive parts and components, with 47 production facilities in 22 countries.

ABB's IRC5 multi-robot controller breaks new ground in manufacturing flexibility by enabling four robots to work in a single cell, on a single task, from a single controller. For instance, one robot can lift and hold a car door, while a second can pick up a hinge, and a third can weld it into place. Previously this would have required three

robot cells and three robot controllers. Now it can all be carried out in one cell and with one IRC5 controller module. Another unique feature of the IRC5 is the FlexPendant robot interface unit – a robust, easy-to-use, handheld console that enables the operator to program or edit the movements of each robot so that they work in co-ordination, or independently of one another. Changes in programming can be implemented rapidly to facilitate the flexible manufacturing and rapid switchover between products that Benteler and other manufacturers are striving for. ABB's innovative solution ensures a substantial reduction in investment, cycle times, the footprint of the assembly line and of course the total cost per part produced.



On the fast track with Delhi Metro!

You can hardly tell that this is a government organisation, as we know them, when you enter the reception of the DMRC office in New Delhi or walk through the corridors. On entering the office of Mr. Satish Kumar, one is greeted by a prominently positioned electronic numerical day counter that runs in reverse, indicating the number of days left for completion of the current project. This simple tool gives meaning to a phrase I had heard on many occasions – “the clocks at DMRC run in reverse !” Under the vision and leadership of their renowned MD, Mr. E Sreedharan and his top management team, the Delhi Metro has indeed written a new chapter in the annals of the capital’s infrastructure. We met up with Mr. Satish Kumar, Director (Rolling Stock, Electrical and S&T), DMRC who has been involved in selection of various modern technologies & implementation of this mammoth project to a time bound programme.



Satish Kumar
Director (Rolling Stock, Electrical and S&T)
Delhi Metro Rail Corporation

Profile Snapshot

- 1967: Officer of Indian Railway Service of Electrical Engineers; Former chartered engineer of IEE, London
- Officer on Special Duty / Advisor, Indian Railway Board; held various posts including Executive Director
- Served as Joint Secretary (Ordnance Factories) in the Ministry of Defence for over five years
- 1981-82: Worked for the Ring Railway Electrification project before Asiad
- 1998: Joined DMRC as Director in charge of Rolling Stock, Electrical & Mechanical Services, Signaling and Telecommunication, Fare Collection and Operations and Maintenance
- Management Mantra: Everything is possible – always look for solutions with an open mind; Get into the details; Understand the project completely
- Family: One son – engineer & MBA and one daughter – doctor
- Interests include: Yoga, meditation, reading & trekking



What are the origins of the Delhi Metro dream?

When India got independence in 1947, the population of Delhi was a mere 0.6 million – today it is almost 14 million. A comprehensive traffic and transportation study completed in 1990 brought out the urgent need for a rail-based transit system comprising a network of underground, elevated and surface corridors of 198.5 kms, to meet the traffic demand up to 2021. The revised master plan for Delhi Metro has recommended a Metro network of 8 lines and 244 kms, to be implemented in four phases.

For implementation and subsequent operation of the Delhi MRTS, a company under the name Delhi Metro Rail Corporation Ltd. (DMRC) was registered in May 1995 with equal equity participation by the Central Government and Delhi State Government.

Phase I of the Metro Project was originally scheduled to be completed in 10 years i.e. from April 1995 to March 2005, but in view of the initial delay in the formation of the Delhi Metro Rail Corporation the project took off in earnest in 1998. To stay within the original time schedule the time period of completion of the project has been reduced to 7 years by the DMRC.

Construction of the Delhi Metro Project began on 1st October 1998 and the 22.06 kms long Line 1 from Shahdara to Rithala is fully operational. This line was opened in three stages with the first section of 7.92 kms between Shahdara and Tiz-Hazari

being inaugurated by the Prime Minister of India on 24th Dec 2002 followed by the 4.74 kms. Tiz-Hazari Inderlok section on 3rd October 2003. The 9.4 kms Inderlok – Rithala section was opened on 31st March 2004. The 4 km underground line from Vishwavidyalya to Kashmere Gate was opened on 19th Dec 2004.

What were some of the biggest challenges faced by the Delhi Metro project?

If you think about it, the Delhi Metro project is the biggest intervention for public benefit undertaken in the Capital since independence. The sheer scale, timelines, civil works and co-ordination with multiple agencies during the course of the project was a challenge. We also focused on selecting efficient, state-of-the-art and proven technologies to develop a world-class Metro, within the shortest time. Moreover, being in the capital, every action of ours was under the close scrutiny of high-level officials and politicians with added commitment to perform and deliver. We did however enjoy the full cooperation of both the Governments and the public at the time of land acquisition, demolition, civil works, project implementation, operationalisation etc. We on our part worked in a disciplined manner with full regard for public safety, noise level, time disturbances etc. in order to minimise inconvenience to the public. Above all, on the challenge front, we had a point to prove – a government organisation can

perform and deliver world-class standards, on time and with the close co-operation of the public.

How does the Delhi Metro compare with other metros around the world?

We are fortunate in terms of the timing of the Delhi Metro as we could choose from effective, proven and modern technologies for rolling stock, (trains), tracks and traction systems, signaling, fare collections etc. Great attention has been focused on overall optimisation of costs. The Delhi Metro is extremely energy efficient and emphasis is on minimal maintenance costs. On the whole, it can be compared to Singapore, Hong Kong or any other recent international metro. We have the modern and proven technologies in place and due care has been taken for passenger safety and comfort.

What has been the public response and how have you addressed the needs of the people and the city?

Nearly 135000 people use even this small stretch of the Metro every day ! The Metro has changed the way of life of the capital's commuters. People are very proud of their Metro and have been very co-operative on compliance and maintaining high standards of cleanliness and hygiene. Maintenance of cleanliness of the stations is outsourced and closely monitored. We consider safety, punctuality as a critical parameter – in our definition, 60 seconds late is late ! A daily





which enable us to efficiently and seamlessly manage, monitor and control various parameters of the network. ABB has a strong team in place here and have managed their projects well. We have enjoyed good response and support from them. As with other key reputed project partners, we urge greater care when it comes to vendor selection and bought out supplies. Another area we are extremely disciplined about is safety during project execution. We basically believe that “our suppliers are our partners – if they fail, we fail!”. We therefore strive to work closely with them at all times, addressing challenges and making a success of our projects, together, with a common objective !

Do you think the Delhi Metro example can be emulated in other Indian cities?

After seeing the success of Metro Rail several State Governments have approached DMRC for preparing schemes for Metros for their cities. At the behest of the state Government of Karnataka and Andhra Pradesh, DMRC has already prepared Detailed Project Reports (DPRs) for Bangalore and Hyderabad cities. The State Governments of Maharashtra, Gujarat and West Bengal have also approached DMRC for preparing DPRs for Mumbai, Ahmedabad and Kolkatta Metros. Work on the preparation of DPRs for Metros for these cities is currently in progress.

report of about 500 trips on both lines is filed and our record on around 20 to 25 days a month is 100% 'on time' with the rest of the days being around 99%. We also have stringent fire protection and many other safety mechanisms in place. Public comfort is important to us. The underground stations are air conditioned for comfort. All our clocks are GPS linked for time synchronisation. The Metro ensures access to people in wheelchairs as well as the blind. Mobile phones can be used on our underground sections. We have extremely advanced and user-friendly automatic fare collection systems. Heavy duty escalators, specially suited for Indian conditions of dust, temperature etc. with a 'four step flat' section, a saree guard and several other safety features, are other examples of how we have been able to ensure passenger safety and comfort.

It's just what Delhi needed! The first phase will generate substantial benefits to the economy by way of siphoning off the roads 1.5 million commuter trips per day. It will mean:

- 2,600 less buses on the roads
- Increase in average speed of road buses from 0.5 km/hr to 14 km/hr.
- Saving of 2 million man hours per day due to reduced journey time
- Saving in fuel cost worth Rs. 5 billion per year
- More comfortable and safe travel for the commuters
- Reduction in atmospheric pollution by 50%

- Reduction in accident rates
- Improvement in the quality of life

Based on your experience, what are ABB's key strengths and some of the areas you would like more focus on?

ABB has been working well with us as a partner. We have similar thinking on many fronts, for example when it comes to meeting deadlines, 'stretch capabilities' to meet customer requirements', honouring commitments, attention for detail etc. Amongst other state-of-the-art and proven power technologies, ABB has provided us with the modern SCADA systems (Supervisory Control & Data Acquisition)



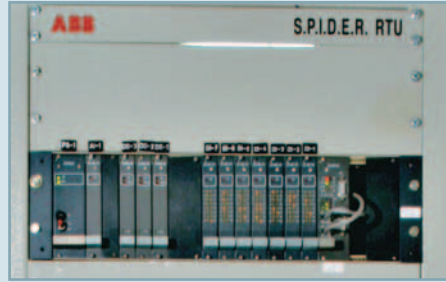
Delhi Metro – ABB scope of engagement

For the first 22 km stretch, Line 1 (Shahadra-Inder Lok – Rithala – 18 stations) ABB along with Best & Crompton have been mainly responsible for power supply & distribution, traction electrification for Shahadra to Inder Lok section (12.66 km, 10 stations) & Shastri Park Depot and SCADA system for entire line.



fire & hydraulics system for 12 Elevated & 1 underground station.

The overall scope of ABB's involvement in the current project for Line-3, includes the supply, installation, testing and commissioning of traction electrification, power supply & distribution and SCADA systems consisting of 2 nos. 66 kV receiving substations, 2 nos. 25 kV traction substations, 2 nos. 33 kV auxiliary main



substations, 22 nos. 33 kV auxiliary substations, 15 kV AC overhead traction electrification of entire line and overall SCADA system including AMS & BMS.



Major equipment supply includes – 66 kV & 25 kV circuit breakers, current transformers, CVTs, 25 kV interrupters, 33 kV indoor switchgear, 66 kV gas insulated substation, 15MVA power transformers and 40MVA traction transformers, SCADA, AMS, BMS system for entire network, 66 / 25 /33 kV cables and OHE equipment & rail based inspection & maintenance vehicles.

On the 32 km stretch Line 3 (Indraprastha – Barakhamba Road – Dwarka Sub City – 31 stations), scope also includes AMS (Asset Management systems) & BMS (Building Management systems). ABB is executing electrical,

Distributing power to the London Underground

With 400 kilometers of track, 275 stations, and 940 million passengers a year, the London Underground is one of the biggest and busiest metros in the world. At peak hours more than

500 trains run at any given time. Everyday the metro transports nearly 3 million passengers along 12 lines and between 275 stations, each of which has its own substation to power the elevators and lighting and provide motive power for the hundreds of trains that traffic the network at any one time.



Controlling and managing the power distribution system of this vast and complex transport network is an ABB Network Manager (formerly SPIDER) energy management system. It went online in August 2004 having replaced no less than five supervisory control and data (SCADA) systems supplied by multiple vendors with the switchover taking place without disrupting train schedules. Installation work was carried out during a short cleaning and maintenance time window each night, with commissioning taking place in phases to ensure that passengers would not be stranded or delayed by shutdowns.

As with all ABB Network Manager solutions, the one for London Underground is designed to integrate future system evolution and migrations. ABB is the world leader in SCADA energy management systems with more than 5,000 installations worldwide.

Powering the railways

ABB has gained a global reputation for being an ideal partner for the railways sector, based on its domain expertise, extensive range of products and systems and professional service backup. ABB's cutting-edge technologies have always been at the forefront of constant product innovation driven by efficiency, reliability, quality and safety.

ABB offers turnkey solutions for the complete electrification of railway networks including receiving, auxiliary and traction substations as well as overhead power systems. ABB's core expertise includes the complete design, supply, erection, testing and commissioning of substation solutions. The sector offering also covers a wide range of products like power and traction transformers, circuit breakers & interrupters, air insulated and gas insulated switchgear, disconnectors, instrument transformers, equipment for power quality improvement, protection and control as well as SCADA (Supervisory Control & Data Acquisition) solutions for power management. Further ABB has the capabilities

to undertake complete electrification of station buildings including supply, installation, testing and commissioning of diesel generator (DG) sets, fire detection and alarm systems, fire fighting systems, hydraulic systems, inert gas flooding systems for fire suppression and control, internal and external lighting systems and dynamic lighting control with dimming systems. Over the years ABB has developed a strong reputation for successful execution of turnkey electrification projects for Metro Railway networks, both underground and at ground level. ABB's offering to the railways sector includes power to the line as well as power to the vehicle.

Some recent successes

■ Delhi Metro Rail Corporation (DMRC) – Lines 1 & 3

Traction electrification; power supply & distribution; SCADA systems; receiving, traction auxiliary & main substations; overhead traction electrification; electrical, fire & hydraulics systems; Asset Management & Building Management systems (AMS & BMS); HV circuit breakers; current transformers; CVTs; interrupters; indoor switchgear, gas insulated substation; power & traction transformers; cables and OHE equipment

■ Mumbai Rail Vikas Corporation (MRVC – Titwala)

Traction substation; traction transformer; range of circuit breakers; instrument transformers, isolators; control relay panels

■ Mumbai Rail Vikas Corporation – Mumbai suburban train system (MRVC – Siemens a/c)

Supply of EMU transformers for upgradation project which involves changing the 1500kV DC power system to 25kV single-phase AC system in line with the railway network power supply across the country

■ Central Railways – Laselgaon and Pimparkhed traction substations, Maharashtra

Dynamic, reactive power compensation; STATCON with HV filter panels for power quality improvement



Power to the line

Railway Power Systems Studies

ABB performs advanced power systems studies related to planning, upgrading and operation of traction power systems as well as power transmission and distribution systems. SIMPOW® is the powerful simulation tool used for load flow calculations, dynamic simulations and short circuit analysis. Studies for load balancing, harmonic distortions and voltage fluctuations can also be performed with SIMPOW®.

Track side Power Transformers

ABB offers single phase power transformers up to 220kV, based on the patented Trafostar concept. These transformers are designed to ensure minimal losses, low noise and overall reduction in life-cycle costs.

Every Trafostar™ transformer is built from standardised, service proven components and modules ensuring flexible, dependable and customised design. These transformers are locally manufactured at ABB's state-of-the-art manufacturing and testing facility in Vadodara.

Wide range of Circuit Breakers and Interrupters

ABB offers widest range of high and medium voltage based on the latest developments in SF6 and Vacuum technologies. ABB's 25kV vacuum circuit breakers and interrupters come with the magnetic actuator drive – the 1st such application in India. These state-of-the-art technology offers various advantages including extremely high reliability due to very few moving parts, minimal maintenance with no settings required and long life. ABB's wide range of circuit breakers offering for such applications includes:

- 25kV vacuum circuit breaker and interrupter with magnetic actuator drive
- 25kV pole mounted SF6 single phase interrupter
- 25kV pole mounted SF6 single phase circuit breaker with polymer insulators
- 25kV SF6 single phase interrupter and circuit breaker
- 132kV two phase and three phase circuit breakers
- 220kV two phase and three phase circuit breakers

Air insulated indoor single phase switchgear

The UniGear R panels available at operating voltages of 17.5 / 27.5kV, house withdrawable vacuum single-phase circuit breakers with magnetic actuators type GSR II. These are specially designed for railway supply and are equipped with a vacuum interrupter, magnetic actuator and electronic controller without auxiliary switches and with sensors, all designed to make the breaker highly reliable and maintenance-free.

Prefabricated outdoor compact module for railway applications

The compact FSK II module, available for 72 / 52kV applications is a factory assembled frame fitted with FSK II vacuum circuit breakers, a motor-operated disconnect function and hand-operated earthing switches. The module is delivered with supporting legs, busbar tubes and busbar supporting frame, ready for installation. Major benefits include minimal site work (mechanical and electrical), space saving and significant reduction of substation engineering and commissioning time.

STATCON for improved power quality

ABB's indigenously developed STATCON is an IGBT based switching converter type reactive power compensator, which generates as well as absorbs reactive power without the use of passive components like capacitors and inductors. This equipment is capable of producing variable shunt impedance and can be

adjusted continuously to meet the reactive power compensation requirements of traction loads making it the ideal solution for step-less & error free compensation of reactive power on a real-time basis. STATCON eliminates the problems associated with conventional compensation schemes such as under and over compensation, voltage transients and inrush current problems associated with capacitor switching and erroneous compensation due to poor response. When used in conjunction with harmonic filter banks in traction substations STATCON is the ideal solution to improve power factor, reduce maximum demand losses and harmonic distortion levels and improve voltage profile. As a standard solution STATCON based Dynamic Reactive Power Compensation solution is available in the 500 -3500 kVAr range, and can be offered in other ranges as well, based on customer needs.

SCADA for traction power control

This SCADA (Supervisory Control & Data Acquisition) automation system provides remote monitoring, control and operation of traction power as well as data acquisition features for traction substations. ABB's Remote Terminal Unit type AC31 is approved by RDSO and installed at various locations.

Railway Power Supply system

- Turnkey Substations
- SCADA system
- Traction supply (OHE)
- Frequency Conversion station
- Station Electricals

Power Quality

- Capacitor Banks
- STATCON
- System studies

Auxiliary Converters

DC Traction Motors

- Silicone Rectifier Cooling Blower (MVSL) Motors
- Traction Motor Cooling Blower (MVM) Motors
- Transformer Oil Cooling Blower (MVRH) Motors
- Main Compressor (MCP) Motors

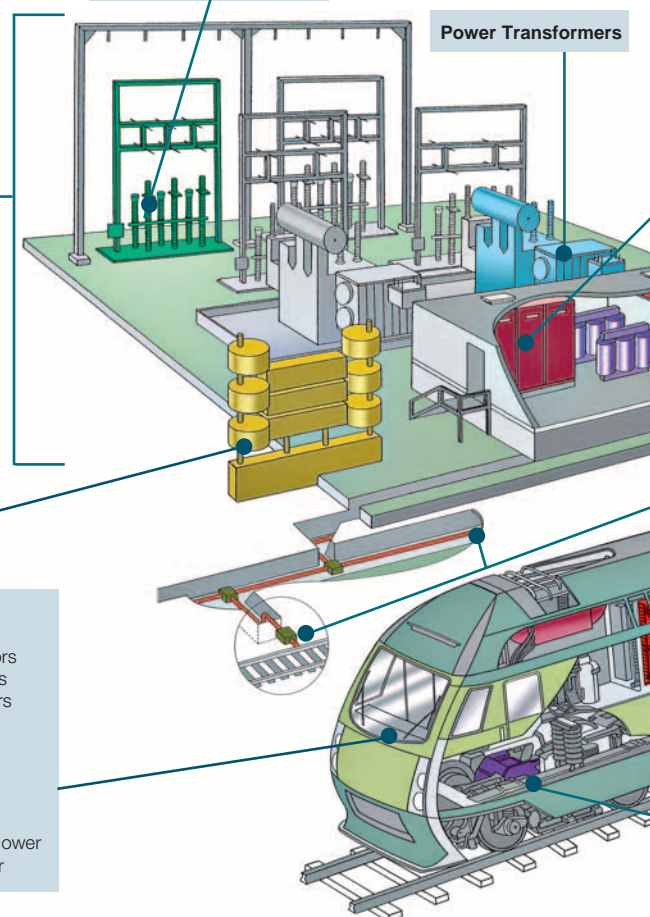
AC Traction Motors

- Machine Room Blower Motors
- Traction Motor Cooling Blower Motors
- Transformer Oil Cooling Blower Motors
- Scavenge Blower Motor for Machine Room Blower
- Scavenge Blower Motor for TM and Oil Cooler

High Voltage Products

- SF6 Circuit Breakers
- Current Transformers
- Voltage Transformers
- Load Break Switches
- Gas Insulated Switchgear

Power Transformers



Protection and Control

REO 517 Protection and Control Terminals for Railway Power Systems offer cost-efficient solutions for protection, control and monitoring of single phase and two phase catenary and overhead lines as well as cables feeding the railway power system. The terminal has integrated metering, control, event logger and disturbance recorder functions in addition to protection functions as well as local and remote monitoring capabilities. It can also be used to control primary equipment such as breakers, disconnectors and earthing switches and offers high availability and security as well as savings in maintenance costs.

Relays for Electric Locomotive – Each locomotive has about 20 auxiliary relays for sequence, signalling and time-lag applications. Being designed for rolling-stock applications, these relays are particularly rated for more stringent electrical, mechanical and environmental requirements as compared to stationery equipment. The robust auxiliary relays type PC8AHX is used for sequence/signalling applications. This is perhaps the only approved relay for regular supply to the Indian Railways for the past 25 years. Recently developed time-lag relays, based on PC8 relays are currently undergoing service trials.

Medium Voltage Products

- Vacuum Circuit breakers
- Vacuum Interrupters
- Load Break switches
- Ring Main Units
- Compact Substations

Protection & Control

- Relays
- Control & Relay panels
- SCADA systems

Communication Systems

Turbochargers for diesel locomotives

Low Voltage Products

- Air Circuit breakers
- MCBS
- MCCBS
- Contactors & over load relays
- Electrical wiring accessories

Traction Transformers

- Loco transformers
- EMU transformers

Motors & Generators

- LT Auxiliary motors for locomotives & AC coaches

Power to the vehicle

Traction Power Transformers

Traction transformers are available for three phase / single phase applications for AC and DC locomotives. The range includes: Type LOT 6500 single phase Loco Transformer for Freight Locomotive type WAG-9 available for ratings of 25kV, 6500kVA. Type LOT 7500 single phase Loco Transformer for passenger Locomotive type WAP-5 available for ratings of 25kV, 6500kVA.

EMU (Electric Multiple Units) Transformers

ABB is the world leader in Locomotive & EMU Transformers (for rolling stock). ABB is manufacturing large locomotive transformers for the Indian Railways for their 3-Phase AC locomotives and is also supplying traction transformers for EMU coaches, from its Vadodara plant. These special light weight, compact transformers are being designed and prototype tested by ABB, Secheron, Switzerland with the bulk quantity being manufactured in India.

Surge arrestors

ABB offers a wide range of surge protection devices, especially designed and tested for rail applications. All ABB railway arresters incorporate the latest metal – oxide technology (both AC and DC) offering the best possible protection margin. The housing of all railway surge arresters is made of specially developed silicone rubber. Excellent pollution and shock resistance, combined with easy handling and elimination of explosion risk results in lower total cost for the rail system operator.

Turbochargers

ABB offers turbochargers for diesel locomotives and has an excellent track record with the Indian Railways. For the past two decades, ABB has been working closely with RDSO, Lucknow (Research Development & Standardization Organisation) and DLW, Varanasi (Diesel Locomotive Works) for the development of high speed diesel locomotives and in association with Indian Railways, ABB has also successfully developed the new generation turbocharger model TPR-61.

Auxiliary Motors

ABB offers a wide range of motors for old locomotives with DC traction as well as the new locomotives with AC Traction, with voltage variation between 290V and 500V (rated voltage 415V) and Class H insulation. These low voltage vibration motors are made of vacuum impregnated windings and imported bearings with C3 clearance and specially epoxy moulded terminal plate. ABB's range of motors includes:

DC Traction Motors

- Silicon Rectifier Cooling Blower (MVSL) Motors
- Traction Motor Cooling Blower (MVMT) Motors
- Transformer Oil Cooling Blower (MVRH) Motors
- Main Compressor (MCP) Motors

AC Traction Motors

- Machine Room Blower Motors
- Traction Motor Cooling Blower Motors
- Transformer Oil Cooling Blower Motors
- Scavenge Blower Motor for Machine Room Blower
- Scavenge Blower Motor for TM and Oil Cooler

Traction Converters

ABB provides several high performance products for use in the demanding "on-board" railway business. All products fulfill stringent requirements related to environmental conditions and vibrations experienced on trains, light rail vehicles, locomotives, wagons and similar applications. Electric drive equipment for railway applications requires many different products. A complete electrical string for these applications consists of transformers, traction converters, control systems, auxiliary power supply converters and battery chargers.

Smaller and smarter the future of AC drives

Technology is making drives smaller, more intelligent and cheaper

– Ilpo Ruohonen

The past 20 years have seen some remarkable advances in AC drives technology. Miniaturization is one of the most striking developments, with a tenfold decrease in volume over the last decade alone.

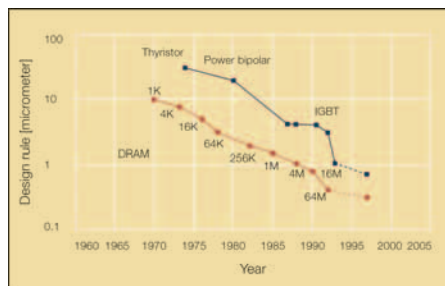
As many technologies continue to evolve, R&D teams continue to work on making drives even smaller and more affordable. But it is not only size that matters. Engineers and scientists are designing drives that are more intelligent, have better communications and are easier to install and control. Such drives will open the door to many new applications and provide ABB with a whole host of new market opportunities.

Smaller and cheaper drives from ABB are already finding new applications as diverse as running machines and small centrifuges used in honey production. These applications would simply not have been feasible or cost-effective a few years ago.

Modern AC drives are impressively smaller than their counterparts from the early 1990s, meaning that installing them is now easier than ever before. For example, control rooms have become more compact and less costly because panel builders are now able to fit more drives into a standard cubicle. Original equipment manufacturers (OEMs) have also benefited in that it is now much easier for them to fit drives into their equipment.

With many R&D teams working to make drives smaller, the question arises as to just how small AC drives can get. ABB believes that there are few restrictions, particularly in the lower power range, and that over the next ten years, drives in this range will shrink by another 60 to 70 percent!

So how is all of this possible? To begin with, there seems to be no end to how small micro-electronics can get, and these developments are rapidly finding their way into the power semiconductor industry¹. In addition, lower losses are being achieved



1. Drives are getting smaller

Moore's Law [1] states that the transistor density on integrated circuits doubles every couple of years. This exponential growth and ever-shrinking transistor size result in increased performance and decreased cost.

from the same area of silicon. These two factors combined not only mean smaller semiconductors, but also the amount of heat generated within the drive is reduced, so smaller heat sinks are now possible. There is one limitation though: The cable terminations have to be big enough to accommodate the power-carrying cables.

Cool!

The development of power semiconductors is an important factor that influences drives miniaturization, but so too is the technology used for cooling. Even though air-cooling is likely to remain the dominant technique, a considerable amount of R&D effort is being invested in developing new cooling techniques as well as in reducing the need for cooling:

- Developments in numerical modeling mean that advanced computer flow modeling techniques are used to design heat-sinks that achieve more effective cooling.
- Scientists are looking at: new materials, integrating the heat-sink with the power module for better cooling performance and improving fan performance with variable-speed control.
- Liquid-cooling is finding increasing use in wind power, transportation and marine.

In addition to the ongoing developments mentioned above, new cooling technologies, such as heat pipes and thermosyphons may be applied over the next few years. Thermosyphons use evaporation followed by condensation to transfer heat directly out of the drive. Even though the principles of these devices are well known, cost and performance issues must be solved before they can be commercially applied.

Another area that holds much promise for the future of AC drives is the 'cool chip'. The cool chip is an early application of nanotechnology that uses electrons to transfer heat from one side of a vacuum diode to the other. It uses the principle of electron tunneling in which a voltage bias is applied to make energetic electrons 'jump' across a tiny gap between two surfaces. These electrons transfer heat energy between the two layers, and because of the gap, the heat cannot be conducted back².

Applied to drives technology, the cool chip principle could be used to carry heat from the semiconductor directly to the heat-sink, thereby vastly improving the heat-sink's efficiency. This would mean smaller active power devices, generating a lot less heat than would be expected for the rated power. To achieve this, relatively large surface areas with a gap of less than 10 nanometers need to be manufactured. In addition, the manufacturers must ensure no contact between the surfaces at any point.

Bringing costs down

Reducing the cost of drives is a goal for all drive manufacturers, and miniaturization contributes enormously in achieving this goal. Smaller and cheaper drives from ABB are finding new applications as diverse as running machines and small centrifuges used in honey production.

In fact, the latest ABB component drive, which was launched in 2003, has opened up a host of new market opportunities for ABB. Not only is it intended for small industrial applications, but also for consumer products such as air conditioners, exercise machines and washing machines.

Component integration also contributes to cheaper drives. ABB predicts that over the next ten years, a combination of tighter semiconductor and mechanical part



The ACS800-02 drive, available in the 90 – 150 kW power range, is only one-sixth the size of comparable drives from other manufacturers. The reduction in size has been achieved using new, advanced electronic components in combination with the latest insulation and cooling technologies.

integration will lead to even fewer parts within a drive. Fewer parts mean fewer interfaces and fewer mechanical fixings, and this means improved reliability.

Another form of integration, that of the drive and motor with the application, will have its place in the future of AC drives. This is already happening in some specialised applications. One OEM, for example, has developed a fully integrated tubular submersible pump. This form of integration is also seen as being important in the field of robots where true mobility will be obtained with a fully integrated drive.

Naturally, software has a big part to play in the future. As software continues to develop, drives can expect to have increased capability with less hardware.

Manufacturers play a major part in the overall cost-reduction process. They do this by looking at ways of improving every aspect of their products. For example, improvements can be made by:

- Using better components
- Ensuring more integration

- Using up-to-date design techniques
- Using sophisticated and efficient manufacturing processes
- Using improved logistics

As the drive market continues to grow, economies of scale in volume production will be needed to cover the substantial investments needed in R&D to maintain the steep decline in prices seen in recent years.

Smarter drives

R&D is responsible for making drives smaller and cheaper, and it is also making them more intelligent. As the area of microelectronics continues to advance in leaps and bounds, so too does the ability of microprocessors and the capacity of memory chips. Drives with increased processing power and memory will change the architecture of industrial control systems, and enable configurations that are better suited to an application³.

Intelligent drives are certain to benefit from the growth of Ethernet communications by becoming an integral part of control, maintenance and monitoring systems. Decentralized control systems will be created in which multiple drives share control functions, with one taking over in the event of a fault or error in another drive. The advantage of this is that reliance on costly PLCs would be greatly reduced and automation reliability would improve dramatically.

ABB thinks that Ethernet-based drives will become a valuable source of data for preventive maintenance programmes. Taking advantage of Ethernet's wide bandwidth, these intelligent drives would be able to communicate greater amounts of monitoring information than would standard web-based systems.

In addition to this type of information, the drive would also collect data that describes the state of the process being controlled. If each drive had its own IP address, it would be easy to gather a log of every drive on a central server via Ethernet, and build up a highly detailed picture of the entire process and its performance. A detailed analysis of this data could be used to adjust the process and improve productivity. It could also be used to increase process availability through proactive fault management and asset optimization. Taking intelligent drives a step further,

they could even have the capability of detecting the cause of a fault and providing a course of action for its resolution.

All of this fits nicely with ABB's IndustrialIT concept, in that a drive with advanced communication capabilities can be seamlessly integrated into larger real-time automation and information systems.

Meeting growing demands

The increase in drive intelligence will meet a growing demand from users for drives that are easier to set up and control. As reliability is now taken for granted, ease of use and ease of commissioning are becoming the most important demands of modern drive users. ABB's ultimate goal is to have a completely self-commissioning drive, requiring no manual setting of parameters. The company believes it is getting closer to this goal with advanced set-up wizards installed in the latest ABB drives.

The ultimate in performance

The dynamic performance of AC drives in general has improved dramatically over the years. But with Direct Torque Control (DTC) technology, ABB believes it has reached the ultimate in control performance. Using DTC, applications that were only feasible with other drive technologies, such as DC drives and servo drives, are now routine for AC drives.

For example, the control of new low-speed permanent magnet motors using new developments in DTC technology is likely to find increasing use in a variety of industries. Used for decades in fast-running applications, the permanent magnet motor has been modified to



provide high accuracy and reliability at low speeds without the use of gearboxes. To control the motor, ABB has adapted the control algorithms in its DTC technology to achieve highly accurate control at low speeds without encoder feedback.

Direct Drive system

Standard induction motors, normally designed to run at 750–3000 rpm, have poor efficiency at low speeds and often cannot deliver sufficiently smooth torque across the speed range. This problem is normally overcome by using a gearbox, but gearboxes are complex and take up valuable space and maintenance resources. ABB's Direct Drive system, using the permanent magnet motor, provides a high torque drive directly coupled to the driven application, thus eliminating the need for a gearbox. This system saves on motor maintenance because the permanent magnet motor is robust, and in maintenance terms, similar to standard AC induction motors.

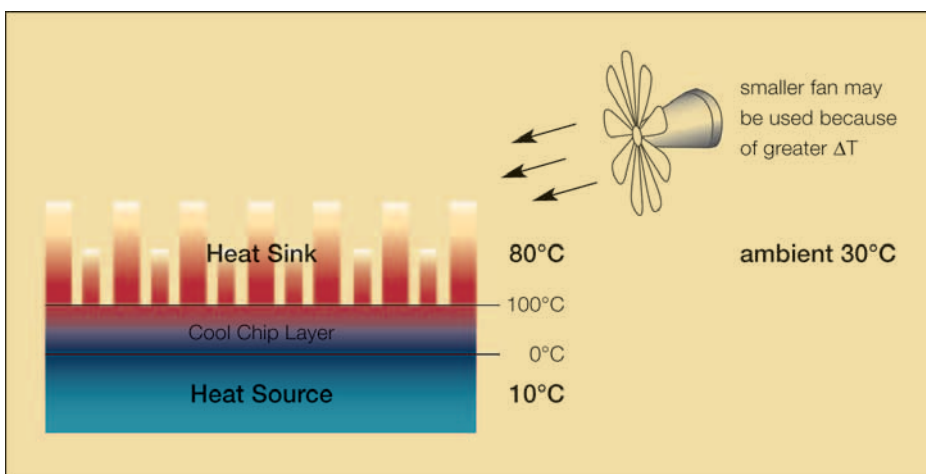
The Direct Drive system has already been applied in the paper industry, as paper machines require large numbers of high-accuracy, low-speed drives. Another application is in ship propulsion systems.



3. Assistant control panel
Allows easy programming of ABB's standard drive, ACS550. The control panel has various assistants and a built-in help function to guide the user.

ABB's Compact Azipod, designed to give ships extreme maneuverability, uses a Direct Drive with a fixed-pitch propeller mounted directly onto the motor shaft. The motor's small size enables the outer diameter of the pod to be reduced, thereby improving hydrodynamic efficiency. The system is well suited to smaller vessels.

Overall, the future looks very good for AC drive users. They will be able to buy drives that are smaller, more intelligent, easier to install and suitable for many applications, particularly at low power and low speed. But the best news of all is that these drives will be cheaper than ever before.



2. The cool chip principle could be used to carry heat from the semiconductor directly to the heat-sink

> Source: ABB Review

ABB to manufacture drives in India

In keeping with ABB's philosophy of global optimisation and moving production closer to the market and customers, a new manufacturing facility has been set up for the new range of ACS 550 drives in Bangalore, as one of four such production hubs globally. Established in just 107 days from project kick-off, with a zero accident record, this plant incorporates the learnings of all the other drive manufacturing facilities across the world, making it the most modern plant to date. This unit will initially manufacture the standard rating range of 0.75 to 355 kW ACS 550 drives as well as the ACH 550 drives used for HVAC applications.

ABB is the first global drives company to set up a local manufacturing plant in India. Indian customers and channel partners will benefit through a significant drop in lead times for delivery, and better handling of their warranty and replacement requirements.

This helps carry the company's 'Made in ABB' philosophy forward and bring to customers the very latest and best that ABB has to offer. The drives



made here will match the quality, reliability and performance of drives made at any ABB factory in the world, and this unit will be a part of the global manufacturing network.

Global Engineering & Operations Centre launched in Bangalore

ABB launched its recently announced global Process Automation Engineering and Operations Centre in Bangalore. This marks another important milestone in the Group's strategic approach to enhance competitiveness by leveraging its vast global presence and optimizing its value chain whereby key business activities are shared across geographic boundaries. This new centre also marks an important move towards better aligning resources with market trends. For ABB in India this is another step towards an enhanced global role.

The new Centre in India will serve ABB's Process Automation businesses in four key areas, including engineering services, global sourcing of selected materials, enabling systems for project collaboration as well as research and development activities. It will be managed by the Group's Indian subsidiary guided by an international team to facilitate exchange of technology between the new centre and other ABB units as well as help foster best practices.

The Centre will initially target a phased build up to around 500 man-years of engineering and systems support to other ABB operations over the next few years. "This decision reflects our strategy and growing commitment towards developing a global



value chain, where key business activities, resources and expertise are shared across geographic boundaries in order to optimise value for our customers," said Dinesh Paliwal, Head of Automation Technologies division worldwide.

DCS for Australia's largest pulp and paper making complex



ABB has completed the commissioning and start-up of a new distributed control system (DCS) for the control of a continuous pulp digester at the Maryvale mill in Victoria, Australia – the largest pulp and paper making complex in Australia, with three pulp mills, five papermaking machines, and a waste paper processing plant.

ABB's solution will help the customer control all the motors and regulatory loops and integrate some of the previous PLC

functions in the process control, thereby enhancing quality and enabling more efficient process control. The new process control system is based on the latest AC800M controllers, S800I/O and Operate IT platforms and involves transferring of the existing I/O and control loops to the new DCS and development of new operator graphics to three autonomous dual screen operator consoles located in the Pine Kraft Mill control room.

Piping natural gas through Poland

ABB is supplying four compressor stations for the Polish section of the 4000 km Yamal-Europe gas pipeline that runs from Siberia to Germany, one of the largest development schemes ever undertaken in Eastern Europe. When the line is completed in 2006 it will carry some 33 billion cubic meters of natural gas a year to a terminal in Berlin and supply 20 percent of Poland's domestic needs.

For each of the 25 MW turbo compressor stations, ABB will supply complete power and automation technologies including turnkey project management, design, procurement, system assembly and commissioning. Compressor stations play a vital role in



keeping large quantities of gas flowing through the transmission system, particularly during periods of high demand. Without them the pressure would drop and the amount of gas piped through the system would fall.

Streamlining power distribution in Vietnam



ABB is implementing a series of projects to help improve the power distribution in Vietnam. This includes installation of a national network control centre in Hanoi, a regional control centre for North Vietnam, and district control centres in various parts of the country including two of its biggest urban areas, Hanoi and Ho Chi Minh City. This is part of a national programme initiated by the country to help meet the rising demand for electricity.

One of the most widely used distribution management systems in the world, the ABB Network Manager will replace most of the presently deployed and outdated methods of monitoring the network. Network Manager is a state-of-the-art distribution monitoring and control system that will give HPC operators access to instant and real-time information on network status and enable them to process historical data, calculate load flow, and perform control operations directly from the control centre. Importantly, the system is also customized to integrate new equipment and application systems.

ABB showcases **building solutions** portfolio



ABB showcased its comprehensive building solutions portfolio at customer events in February recently held in Bangalore and Delhi. ABB's wide range of building solutions includes Heating, Ventilation and Air Conditioning, Electrical Distribution and Energy Management

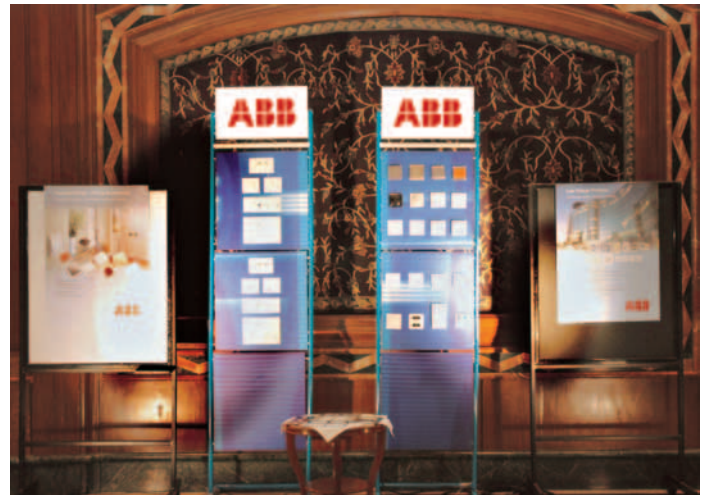
services, Building Automation Systems, and other professional services. The company also announced its strategic alliance with Automated Logic Corporation (ALC), a US based leading technology company, who will partner ABB in supplying Integrated Building Management Solutions. ALC offers intelligent building management products for control of HVAC eg: web enabled DTC controllers such as 'WebCTRL', an integration platform through all the facilities of a building can be monitored and controlled. This unique platform provides extensive integration facilities to Building Management Systems. Each of the events saw an overwhelming response of over 100 people attending the presentation in Bangalore and Delhi. Invitees included architects, consultants, builders and electrical contractors, who expressed their interest in ABB's innovative approach to Integrated Building Management. V. Swamy, Head of Building Systems, ABB India, addressed the audience, taking them through the concept of Integrated Building Systems, and what ABB had to offer in this domain. Mike Gilmore, Manager International Marketing, ALC, and Vijay Kumar, Regional Director – Middle East & India, ALC, then went through some of the details of ABB's partnership with ALC, the products that ALC was bringing to the table and the benefits to the users, including a live demonstration, which captured the imagination of the audience.

ABB's world-class range of **Distribution Electricals** enter new markets



Having launched successfully in the South of India, ABB recently introduced range of household and building Distribution Electricals in Delhi and Mumbai. Dedicated customer events at both locations saw an overwhelming response from architects,

consultants, builders and electrical contractors. The seminars included product presentations and a display of ABB's range of offering for Line Protection devices and Electrical Wiring Accessories including the Classiq Lumina (Indian Range) and the



imported (Alpha bs, Classiq and Classiq exclusive) range of wiring accessories as well as distribution boards, switches, sockets and regulators, MCBs, RCDs and LV Switchgear. ABB EIB i-bus Intelligent Installation Systems drew special interest and attention.

Succour after the storm

On 26th December 2004, a new word entered the lexicon of people all over the world – 'Tsunami' ! Recorded as one of the biggest natural disasters in living memory for most, it will always be remembered for the widespread devastation and huge loss of life it caused.

ABB was quick to respond to the Tsunami tragedy. Members of the local sustainability affairs team, travelled to Nagapatinam in Tamil Nadu, to ascertain the immediate and longer term needs of the local communities. As an immediate response, everyday basics, such as stoves, kerosene, milk, dry food, clothes and medication were

distributed to affected areas and counselling sessions were held. ABB India employees contributed a day's salary which was matched by the company, to form a dedicated corpus for the cause. The ABB Group and other operations around the world were extremely supportive and the company is looking at specific rehabilitation projects to help those most in need get back on their feet.

We will never be able to take away the pain and sorrow of those who have lost so much, but in our own way, we can try and provide a 'ray of hope' to bring some smiles back on the faces of these innocent victims.



Safety first



As part of a Group-wide initiative ABB in India has enhanced its focus on occupational health and safety. A clear safety policy is in place with a dedicated safety organization to implement it in letter and spirit. This organisation comprises a country safety controller supported by safety officers and representatives at all major locations. Most units have been OHSAS 18001 certified and the rest are in the process of obtaining certification. Regular factory and project site reviews are in place. The company has also conducted a number of safety training programmes and demonstrations at various levels and locations. Safety leaflets, manuals and posters have been printed to spread awareness throughout the organization and a number of specific initiatives are being undertaken at locations to spread awareness and enforce safety guidelines. ABB remains highly committed to implementing the highest standards of safety across all its operations, be it at its production locations, offices or project sites and the company is constantly reiterating the same uncompromising stance with its subcontractors and partners.

Digi Drives, Faridabad

Personal Fact File



- Name: Navneet Gill
- Age: 33 years
- Family: Married, 2 sons
- Education: BE (Industrial Electronics)
- Member – IEEE, FSIA, EEPC
- Philosophy: Accepting challenges in life
- Favourite Quote: “It’s not that I am so smart, it’s just that I stay with problems longer.” Albert Einstein
- Business Mantra: “Building success through service”

Can you tell us a little about yourself?

After completing my engineering I took to business in 1993. As a channel partner for ABB and since then I have been dealing in AC/DC Drives, PLC, DCS and LV Capacitors.

Can you share with us your experience of working with ABB?

We have always had a good experience and have seen a significant increase in the product offering in recent years. ABB’s vast range of products are a preferred choice for customers across industries and the ability to offer such a wide range of electrical and automation products under one roof, strengthens our hand when we meet customers as dealing with fewer vendors makes it easier for them to transact and obtain service.

What is your take on technology when it comes to ABB standard products and how do you find ABB’s web portal?

ABB products are IT enabled and support



open communication protocols, which make them a preferred choice to competing products. However, one area where ABB could venture into is CNC and Motion Controllers.

The web portal on the whole is a big boon and the ‘view available stock’ and ‘order on line’ options have really made a big difference and increased our efficiency and speed. We could do with some more specific application training and extended support from ABB.

Can you share some of your most memorable moments?

Commissioning of 2.4 MW Mill Motor for Cold Rolling Mill at ALAF, Tanzania – this was the largest motor order for us. The other moment that we all remember is when we won the third place award for highest channel business in Control & Automation Products in 2004.

Kay Dee Engineers, Amritsar

Can you tell us a little about yourself?

I started as a liaison agent for NGEF in 1968, and then gradually became a dealer for them. Today I deal in a range of products including motors, switchgear and pumps. I am a channel partner for ABB motors and switchgear. 90% of my clientele includes industrial customers from in and around Amritsar and also some rice sellers from Punjab and Haryana.

What is your experience of working with ABB and can you share any suggestions?

ABB’s biggest strength is its cutting-edge technology and consistent quality. It is this technology that provides the competitive edge. As for new areas, given India’s agro-base, we should look for more business in this sector. On the whole ABB is a great company to work with and we enjoy very

good support from the ABB team we interact with in the region. As a suggestion, I feel that performance can improve further with further incentivisation of channel partners.

Can you share with us some of your most memorable business experiences?

A large project we undertook for Khanna Paper Mill, which we started from scratch all the way to paper production. We hired a consultant from Bangalore, finalised various vendors and saw it through to erection and commissioning. Everything went through smoothly and we had a satisfied customer.

Another memorable moment was when we won the All India Best Performer award in 1978 & 1995 from NGEF. Being from a small place, we felt extremely proud of this achievement.

Personal Fact File



- Name: Kailash Dhawan
- Age: 58 yrs
- Family: Married, 2 daughters
- Education: Graduate
- Philosophy of life: Serve your fellow citizens
- Business Mantra: Sincerity to work; honouring commitments; living by your principles

How we protect our customers' prize assets

ABB has the largest installed base of automation products and systems in the world, worth more than US \$ 100 billion. To ensure customers get the most from these important assets, ABB offers 24-hour tools to spot service problems before they occur and keep vital systems running smoothly.



Fast-curing epoxy cuts production time by 20%



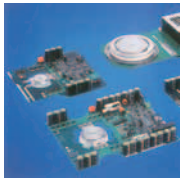
A patented, new ABB formula for epoxy resin used in a variety of power technology products slashes curing time from 15 hours to 3, and cuts the production cycle by as much as 20 percent.

The world's first fully integrated automation system

ABB's Industrial^{IT} Extended Automation System 800xA is the world's first automation system to integrate process control with other automation applications. Launched in January 2004, more than 300 systems have already been ordered by customers worldwide.



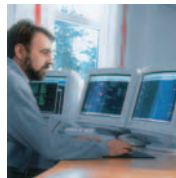
Power(ful) semiconductors



Power semiconductors are electronic switches that turn high current on and off at high voltage levels. They can flip between the two states in microseconds with very low losses, and are extremely compact.

Working faster and better with an integrated grid

ABB has found a way to integrate geographical information and maintenance management systems so that operators can rapidly pinpoint any component in a grid, and quickly access maintenance information. Integration with the grid's SCADA/EMS system is in progress.



UniGear switchgear platform is at home, everywhere



ABB has developed the world's first "one size fits all" platform for medium-voltage switchgear in the 12-24 kilovolt (kV) rating. The new panel is unique, because UniGear ZS1 satisfies detailed specifications of individual local markets, as well as the global customer's demand for standardisation.

Swiss Technology Award

Two projects from ABB Switzerland were shortlisted to win the prestigious Swiss Technology Award this year. One of the nominees – the optical current sensor – reached the finals.

The Swiss Technology Award is the most important technology prize in Switzerland. Announced in Bern last week, the jury panel had 54 projects to choose from this year, submitted from across Switzerland by hopefuls ranging from large-scale enterprises to university start-ups.



Can we have some details on integrated substation automation solutions?

H.P. Singh
General Manager (Technical)
Indian Oil Corporation Ltd.

ABB offers package solutions for substation automation - at the station level, substation automation systems (SAS) and / or substation monitoring systems (SMS). On the bay level they include a range of application specific solutions for control (BCS), automation (BAS), protections (BPS) and monitoring (BMS) of lines, transformers, cable feeders, bus-couplers and bus section couplers for different busbar configurations.



Can you give us some details of Rogowski coil with limitations, if any, to influence EVM 1 Circuit Breaker, its application to metering units?

Narayan Mishra
Sr. General Manager (T & D),
Grid Corporation of Orissa

Rogowski coil is an air core coil embedded in epoxy resin. There is no saturation with this coil and as such there is no limitation for its usage in both metering and protection requirements.

Marketing Material



Recent Media Coverage

"The power sector here needs speedy implementation of reforms"

Prof. K. S. Narayana, ABB Group, is just three weeks into the job, but has already made his first major contribution. He says the power sector needs reforms to be implemented quickly. He also mentions the need for automation equipment and the role of the government in encouraging private sector participation in generation and distribution.

India's FASTEST GROWING LARGE COMPANIES

115	SPIC	1,489	-9
116	ABB	1,468	25
117	NATIONAL MINERAL DEV. CORP.	1,454	20
118	G N F C	1,447	5
119	BRITANNIA INDS.		
120	ARVIND MILLS		
121	JINDAL STEEL & POWER		

ABB: Plug it in

ABB expects strong demand from capital goods, construction sectors and is especially bullish on...
ABB has been the beneficiary of the CAGR...
ABB is planning to invest in...
ABB is planning to invest in...
ABB is planning to invest in...

Electrifying growth

ABB expects strong demand from capital goods, construction sectors and is especially bullish on...
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India to be export hub for ABB

ABB India Managing Director Ravi Uppal, Chairman Gireesh Palwal and Chief Financial Officer K. Rajagopal at a press conference to announce their financial results in Bangalore, Feb 1.

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Power packed

ABB has gone in for restructuring, hiring off large losses and writing off large losses for discontinued businesses last year. Has that paid off? The re-orientation of ABB's...
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ABB India bags turnkey project from West Asia

Our Bureau Bangalore, Jan. 17

ABB India has bagged export orders from West Asia, valued at **Rs 135 crore**. The order included turnkey project for new 220/66/20kV outdoor air-insulated substations.

The scope of the project, scheduled for completion in around 18 months, includes design, procurement, manufacturing and supply of equipment for all the substations.

ABB's multi-product equipment supply will include power transformers, instrument transformers, outdoor circuit breakers, medium voltage switchgear and control & relay panels from its manufacturing facilities at Vadodara, Nashik and Bangalore.

The company has also recently received multiple orders from the West Asia, for the supply of medium voltage 33 kV outdoor circuit breakers from its global sourcing facility in Nashik, reiterating the growing trend for outsourcing from India.

ABB plans more R&D centres

ABB India Managing Director Ravi Uppal, Chairman Gireesh Palwal and Chief Financial Officer K. Rajagopal at a press conference to announce their financial results in Bangalore, Feb 1.

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