Process Automation – Measurement Products

BU Measurement Products
Instrumentation for Process Industries

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Lord Kelvin once said "If you can’t measure it, you can’t improve it."

Our goal is to make instrumentation and analyzer technology, selection, purchasing, installation, operation, and ownership easy – so you can focus on your business.
Power and productivity for a better world
ABB’s vision

As one of the world’s leading engineering companies, we help our customers to use electrical power efficiently, to increase industrial productivity and to lower environmental impact in a sustainable way.
Business Unit Measurement Products
Your partner of choice for measurement solutions

- World class instrumentation solutions built on over 100 years of experience
- Built upon the leading names and brands in the automation world:
  - K-Flow
  - Sensycon
  - Schoppe & Faesser
  - Totalflow
  - Fischer & Porter
  - Pressductor
  - TBI-Bailey
  - Kent
  - Taylor
- Unrivalled in its scope and applications expertise
- Solutions certified to international standards
- Worldwide network of sales offices and manufacturing plants
- World class life cycle care via certified service channels

Over $7 Billion installed base worldwide
How ABB is organized
Five global divisions

<table>
<thead>
<tr>
<th>Division</th>
<th>Revenue</th>
<th>Employees</th>
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</thead>
<tbody>
<tr>
<td>Power Products</td>
<td>$10.7 bln</td>
<td>36,000</td>
</tr>
<tr>
<td>Power Systems</td>
<td>$7.9 bln</td>
<td>20,000</td>
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<tr>
<td>Discrete Automation and Motion</td>
<td>$9.4 bln</td>
<td>29,000</td>
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<tr>
<td>Low Voltage Products</td>
<td>$6.6 bln</td>
<td>31,000</td>
</tr>
<tr>
<td>Process Automation</td>
<td>$8.2 bln</td>
<td>28,000</td>
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</tbody>
</table>

(2012 revenues)

ABB’s portfolio covers:

- Electricals, automation, controls and instrumentation for power generation and industrial processes
  - Power transmission
  - Distribution solutions
  - Low-voltage products
- Motors and drives
- Intelligent building systems
- Robots and robot systems
- Services to improve customers productivity and reliability
Who we are...
A dynamic multicultural team of measurement experts that spans the globe, helping our customers succeed and reach their goals. We have a rich heritage that includes many of the leading names in measurement technology.

What we do...
Our portfolio is vast, but the benefits are straightforward. ABB Measurement Products' makes instrumentation and analyzer technology, selection, purchasing, installation, operation, and ownership easy - so you can focus on your business.
Global Factory
Where we design and manufacture
Why we are good at it
Over 100 years of experience

1900-1920
- First automated pasteurizer
- First steam meter
- First venturi gas meter
- First A2 long range venturi recorder

1920-1940
- First "Wafer Style" Magnetic flowmeter
- First X/CD weir recorder
- First battery powered insertion and full-bore magmeters
- First on-line gas chromatograph with menu-driven CRT

1950s
- First SIL2 Pressure Transmitter
- First field-mount videographic recorder
- First stainless steel digital valve positioner
- First thickness gauging system with pulsed eddy current

1960s
- First In-Situ Magmeter Calibration Verification
- First fully digitized on-line multiwave process photometer
- First abrasion-resistant pressure sensor
- First microprocessor based online gas chromatograph

1970s
- First "Wafer Style" Magnetic flowmeter
- First on-line simulated distillation gas chromatograph
- First safety boiler control
- First mass-produced variable area flowmeter

1980s
- First fully digitized on-line multiwave process photometer
- First head-mount temperature transmitter
- First microprocessor based online gas chromatograph
- First electromagnetic flowmeter for short lay lengths

1990s
- First "Wafer Style" Magnetic flowmeter
- First X/CD weir recorder
- First safety boiler control
- First mass-produced variable area flowmeter

2000s
- First SIL2 Pressure Transmitter
- First field-mount videographic recorder
- First Head-mount intrinsically safe temperature transmitter
- First thickness gauging system with pulsed eddy current

2010s
- First SIL2 Pressure Transmitter
- First field-mount videographic recorder
- First Head-mount intrinsically safe temperature transmitter
- First thickness gauging system with pulsed eddy current

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Why we are good at it
Providing Solutions & problems and improving performance

- Managed entire water system upgrade project for City of Detroit
- Provided measurement solutions to largest reverse-osmosis desalination plant
- Helped automate largest chemical cellulose plant
- Upgraded Riyadh’s water system to secure their most precious resource
- Provided measurement solutions to largest reverse-osmosis desalination plant
- Helped automate largest chemical cellulose plant
- Upgraded Riyadh’s water system to secure their most precious resource
- Electric actuator technology saves chemical company $100,000s per year in fuel and maintenance costs
- Measurement solutions as part of the automation of the world’s largest alumina plant
- Key supplier of analytical instruments used in space by the Canadian Space Agency for over 10 years
- Enabled London to significantly reduce water loss from their 100 year old water system
- Solve mining company’s need for pressure sensors that could survive highly abrasive applications
- Provided 90% of Continuous Emission Monitoring Systems in civil incinerators in Italy
- Enabled one of the largest gas processing plants in the world to operate more efficiently
- World’s largest Pressductor roll force load cells installed in a heavy plate steel mill
- Providing solutions to 90% of India’s cement plants to run more efficiently
- Unique rugged pH sensor technology enables mining operator to minimize downtime
- Helped automate largest chemical cellulose plant
- Enabled London to significantly reduce water loss from their 100 year old water system
- Electric actuator technology saves chemical company $100,000s per year in fuel and maintenance costs
Business Unit Measurement Products
We are in space, on the ocean floor and everywhere in between

orbiting the earth and working beneath it

above the waves and on the ocean floor

in production plants and remote locations

generating power and cleaning water
Business Unit Measurement Products
The way we reach our customers
How we are organized
5 Global Product Groups

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<thead>
<tr>
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<tbody>
<tr>
<td>Flatness</td>
<td>Rolling Mill</td>
<td>Electromagnetic</td>
<td>Pressure</td>
<td>Start-up:</td>
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<tr>
<td>Dimension</td>
<td>Web Tension</td>
<td>Variable Area</td>
<td>Level</td>
<td>- Dimensioning</td>
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<tr>
<td>Cylmate</td>
<td>Torque</td>
<td>Vortex</td>
<td>Temperature</td>
<td>- Installation</td>
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<td>Weighing</td>
<td>Tools</td>
<td>Actuators</td>
<td>Valve Positioners</td>
<td>- Commissioning</td>
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<td>Recorders</td>
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<td>Operate and maintain:</td>
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<td></td>
<td>- Maintenance</td>
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<td>- Calibration</td>
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<td>- Spare parts &amp; Repairs</td>
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<td>- Support &amp; Remote Services</td>
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<td>- Training &amp; eLearning</td>
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<td>Rebuild or replace:</td>
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<td></td>
<td></td>
<td>- Retrofits</td>
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<td>- Upgrades, migration planning</td>
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<td></td>
<td>- Replace &amp; recycling</td>
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How we are organized
GPG Force Measurement

Markets served
- Rolling mills & processing lines
- Pulp & paper industries
- Printing, converting, finishing
- Diesel engines for propulsion & power
- Ship owners & shipyards

Market drivers
- Quality improvement
- Productivity improvement
- Pollution reduction

Key deliverables
- Flatness control systems
- Web tension control systems
- Combustion optimization systems
- Thickness gauges
- Roll force measurement systems
- Strip tension control systems
- Weighing systems
GPG Force Measurement
Product Portfolio for Weighing System
How we are organized
GPG Analytical Measurement & Systems

Markets served
- Chemical, petrochemical, refining & LNG; semiconductor; electric utilities; pharmaceutical; metals & minerals; emission monitoring, water and waste water quality

Market drivers
- Health, safety and environment
- Process optimization & productivity

Key deliverables
- Process gas chromatography & photometers
- Reid vapor pressure analyzers
- Continuous gas analyzers
- BTU Analyzers
- Metallurgy quality analyzers
- Continuous emission monitoring systems
- FTIR & FTNIR lab & process analyzers
- Remote sensing & spectra radiometers
- Liquid analytical and monitoring systems
- System integration & fabrication
- Engineering, application & support services
GPG Analytical Measurement & Systems
Liquid Analyzer

- Aluminium Measurement
- Ammonia Measurement
- Chlorine Measurement
- Conductivity Measurement
- Dissolved Organics Measurement
- Dissolved Oxygen Measurement
- Fluoride Measurement
- Hydrazine Measurement
- Iron Measurement
- Manganese Measurement
- Multiwave Photometers Nitrate Measurement
- pH / ORP Measurement
- Phosphate Measurement
- Silica Measurement
- Sodium Measurement
- Turbidity Measurement
GPG Analytical Measurement & Systems
Gas Analyzer

- NDIR
- NDUV
- TCD
- Paramagnetic O2
- Electrochemical O2
- Laser
- Corrosion Resistance Cell

- Gas Filled Calibration Cell
GPG Analytical Measurement & Systems
Gas Chromatograph

- NGC measure up to C6+
- NGC measure up to C9+
- Process GC
ABB Reference
SWAS System

- STEAM AND WATER ANALYSIS SYSTEM (SWAS SYSTEM) Qty 2 Unit
- Project Name: Keramasan Power Plant Expansion Project 80 MW
- Location: Palembang, South Sumatera
- Customer: PT. PLN
- Awarded Year: 2012

- ABB Edge: Provide complete online solution and comprehensive range of Analyzers
ABB Reference
SWAS System

- STEAM AND WATER ANALYSIS SYSTEM (SWAS SYSTEM) Qty: 2 Unit
- Project Name: Boiler Sampling facility for Boiler Unit 8 & 9
- Location: Cikarang, West java
- Customer: ALSTOM
- Awarded Year: 2009

- ABB Edge: Provide complete online solution and comprehensive range of Analyzers
ABB Reference
SWAS System

- STEAM AND WATER ANALYSIS SYSTEM (SWAS SYSTEM) Qty: 2 Unit
- Project Name: PLTU Amurang 2 x 25 MW
- Location: Amurang, North Sulawesi
- Customer: PT. PLN
- Awarded Year: 2008

- ABB Edge: Provide complete online, competitive and comprehensive solution range of Analyzers
How we are organized
GPG Flow Measurement

Markets served
- Power & Steam; Chemical & Petrochemical;
- Water & Wastewater; Oil & Gas, Pulp & Paper;
- Minerals & Mining; Food, Beverage & Pharmaceutical

Market drivers
- Improved productivity
- Energy efficiency
- Health, safety and environment
- Process optimization and productivity

Key deliverables
- Flow metering systems and products
- Flow Computers for custody transfer
- RTUs for low power, programmable I/O needs
- Production enhancement applications
- Engineering, application and support services
GPG Flow Measurement

DP Flow

- Orifice
- Orifice Flange Assemblies
- Venturi Tubes
- Flow Nozzle
- Wedge Meter
- Averaging Pitot Tube

Designed to all the major standards ISO 5167-1:2003, API, R W Miller, AGA and ASME
GPG Flow Measurement
DP Flow – Junior and Senior Orifice

- Compliance with ISO 5167:2003 & API MPMS 14.3.2 (AGA Report No.3)

- Meter Configurations
  - Flange x Flange
  - Flange x Weld - Weld x Weld
  - FF (Flat Face), RF (Raised Face) or RTJ (Ring Type Joint)

- Flanges available in the following formats
  - ANSI 16.5, 16.47
  - Techlok & SPO
  - Grayloc
  - API 6A
  - or to client specification
GPG Flow Measurement
Vortex and Swirl Flow Meter

Straight inlet and outlet sections

FV4000
15 × D  5 × D  25 × D

FS4000
3 × D  1 × D  5 × D  1 × D  3 × D  1.8 × D

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GPG Flow Measurement
Electromagnetic Flow Meter

- AC / DC Powered
- Solar Panel
- Battery
GPG Flow Measurement
Coriolis Flow Meter
GPG Flow Measurement
Variable Area Flow Meter (Rotameter)
GPG Flow Measurement
Thermal Mass Flow Meter for Gas
Torbar Installation
Hot Air to Furnace Flow Measurement (Ispat Panca)
How we are organized
GPG Field Instruments & Devices

Markets served
- Power & Steam; Chemical & Petrochemical; Water & Wastewater; Oil & Gas; Pulp & Paper; Minerals & Mining; Food, Beverage & Pharmaceutical

Market drivers
- Improved productivity
- Energy efficiency
- Health, safety and environment
- Process optimization and productivity

Key deliverables
- Pressure, temperature and level products
- Actuator & positioner products
- Recorders, controllers and data acquisition products
- Engineering, application and support services
GPG Field Instruments & Devices
Pressure Device
GPG Field Instruments & Devices
Temperature Sensor and Transmitter
GPG Field Instruments & Devices
Level Measurement
GPG Field Instruments & Devices
Actuator and Positioner

Electrical Actuators

Pneumatic actuators

I/P Converter

ABB Valve Automation

Smart Positioners

Conventional Positioners
GPG Field Instruments & Devices
Recorder and Controller
GPG Field Instruments & Devices
Device Management, Fieldbus and Wireless

- Asset Vision - Scalable device management
- Productivity enhancement and optimal value at each tier
Example for PROFIBUS and HART

- Controller
- Linking Device
- PROFIBUS Adapter: NDA121-NO
- HART Modem: NHA121-xx
- PS: 24 V DC
- 4 .. 20 mA
GPG Field Instruments & Devices
Device Management, Fieldbus and Wireless
Power and productivity for a better world™