First for Analysis

For power, for water, for process.

ABB Instrumentation
ABB has more expertise in analytical applications and solutions globally than any other supplier. Based on this experience, we have refined and developed the performance of our portfolio of analytical instrumentation products to ensure you get a solution that meets your precise requirements every time.

Getting the best levels of efficiency from your plant and processes calls for reliable, accurate instrumentation. Equally important is being able to count on access to an intelligent, informed support network that can assist you throughout all stages of your process, regardless of your location.

A heritage to be proud of

ABB Instrumentation’s ability to satisfy customers’ needs has never been greater, being built upon the leading names and brands in the automation world:

Industrial IT - Optimizing your instrumentation assets

To help you improve the efficiency of your entire business and production process, ABB is committed globally to Industrial IT. It involves the development of systems and products guaranteed to inter-operate and communicate using the same information standard within a single digital architecture.

Industrial IT and Asset Optimization with ABB instruments provide features and benefits across the full scope of our offering. Intelligent field instruments not only provide highly accurate process measurement data, but process information is available at the click of a mouse for predictive maintenance, advanced trouble shooting, optimized spares handling, hence increased product availability and process security.

A range of fieldbus opportunities

ABB is actively involved in the development of fieldbus policy direction and technical standards and supports the major process automation protocols in widespread use throughout industry. With our wide experience and expertise, we can cater for a broad spectrum of fieldbus options, enabling us to meet your exact requirements. The current generation of ABB fieldbus devices and systems lets you choose both the most suitable devices available and the most appropriate system for your application, including PROFIBUS, FOUNDATION Fieldbus and HART.

Instrumentation Services

Our broad scope of services lay the foundation for end-to-end support for your enterprise. ABB Instrumentation Services delivers the knowledge and global experience required to keep your assets operating at peak reliability and accuracy. ABB provides a full scope of services from start-up and commissioning through lifecycle support.

- Installation and Commissioning
- Preventative Services
- Calibration Services
- Maintenance
- Consulting
- Training
- Migration/Upgrades
- Parts and Repair

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First On Your Analyzer Supplier List

The ABB line of innovative instrumentation has been designed specifically to deliver superior accuracy in the harshest environments. ABB brings more than 60 years experience in problem solving to your assistance.

Working closely with you, ABB can help transform your business and your process.

ABB brings expertise in water and industrial analysis to a wide range of industries and applications:
- Boilers
- Chemicals
- Effluent
- Food
- Metals
- Brewing/dairies
- Mining
- Paper
- Pharmaceuticals
- Power
- Pulp
- Refining
- Scrubbers
- Ultrapure water
- Water treatment
- Sewage treatment
ABB can provide you with the expertise, analyzer products, systems and services for use in a range of water and power applications as well as the whole spectrum of process industries.

**Water Analysis**
- Ammonia
- Chloride
- Conductivity/Resistivity
- Dissolved Oxygen
  - Low Level (ppb)
  - High Level (ppm)
- Fluoride
- Hydrazine
- Nitrate
- pH/Redox (ORP)
- Phosphate
- Silica
- Sodium
- Turbidity
- Dissolved Organics

**Gas Analysis**
- Combustibles
- Hydrogen Purity
- Oxygen

**Packaged Analyzer Systems**

**Key:**
- Power
- Water
- Process Industries
pH/Redox (ORP)

As Diverse as Your Applications:
ABB offers the widest range of pH/Redox (ORP) and Specific Ion sensors and transmitters available from any industrial analytical supplier. From applications expertise to sensor technologies and product flexibility, ABB delivers the ultimate in performance and versatility.

Sensors
ABB sensors offer the most advanced combination of Measuring and Reference Electrode technologies available anywhere.

We can match the best technology to virtually any industrial application. From pure water to pulp mills, from chemical plants to water treatment utilities, ABB provides answers and solutions.

- Temperatures to 140°C and pressures to 100 bar (1,500 psig)
- Flowing junction for maximum stability and accuracy in ultra-pure waters
- Solid-state technology for high poison resistance
- Self-cleaning flat glass electrodes
- Low temperature Blue glass for exposed sites in outdoor or cold applications
- Detachable and fixed cable versions
Sensor Systems

ABB has an unparalleled range of body styles and mounting options. This diversity provides users with unlimited flexibility to match performance with application.

- In-line, dip, submersible and retractable versions
- Rugged, chemical resistance to match almost any process needs
- Stainless steel flow-cells for ultra pure water
- Integral Jet-Wash cleaning

Analyzers/Transmitters

The AX400 and TB82 series of instruments provide flexibility and mounting configurations for any environment. Each package can be used with any of ABB’s sensor technologies.

- Single or dual-input in one analyzer
- AC or DC line power or 24v DC loop-powered
- NEMA 4X/IP66 ingress protection
- ATEX, FM & CSA, hazardous area approvals
- On-line sensor diagnostics
- Panel, wall and pipe mounting configurations
- Up to 4 outputs and 5 relays
- HART®, PROFIBUS DP and PA, FOUNDATION Fieldbus communications
- Integral PID controller
- Sensor Jet-Wash controller

ABB analyzers with PID put more control into the hands of users
Conductivity/Resistivity

ABB offers the widest range of conductivity measurement technology available from any industrial instrumentation supplier. Our sensor family includes 2-electrode, 4-electrode and electrodeless technologies. Whether for high purity water or aggressive chemical applications, ABB has the sensor to meet your requirements.

Sensor Features

Selecting the right sensor technology is critical for optimizing equipment performance. The 2-electrode, 4-electrode and toroidal versions offered by ABB not only provide end users with access to all the major technologies, but offer unmatched levels of performance and flexibility.

Sensor Mounting

Achieving an accurate measurement depends on mounting the sensor in the right location. To complement a wide range of conductivity technologies ABB also offers a complete line of body styles and mounting options, allowing the measurement to be made where it matters.

- Precision 2-electrode cells eliminate need for calibration factors
- Low maintenance 4-electrode cells offer broad measurement range while compensating for coating
- Toroidal design provides wide conductivity range and excellent resistance to chemical attack
- In-line, dip, submersible and retractable versions - ideal for high conductivity measurements in corrosive fluids and applications that coat
- Rugged performance up to 200°C and 20 bar
- Thread, Tri-Clamp, DIN11851 and flow-chamber mounting
- IP68 detachable and fixed cable versions
- Rapid temperature response sensors
- 3-A approved sanitary toroidal conductivity sensors for food and beverage applications
Analyzer/Transmitters

The AX400 and TB82 series of instruments provide users all of the flexibility and mounting configurations needed for any environment. Whatever the need, ABB can provide a solution.

- Single or dual-input in one analyzer, AC or DC line power or 24v DC loop-powered
- NEMA 4X/IP66 ingress protection
- Easy to read LCD display with versatile primary and secondary display options
- ATEX, FM & CSA hazardous area approvals
- On-line sensor diagnostics
- Panel, wall and pipe mounting configurations
- Comprehensive temperature compensations
- Up to 4 outputs and 5 relays
- Acid, alkali and salt concentration modes
- Configurable as TDS, PPM, salinity, % concentration or inferred pH
- HART®, PROFIBUS DP and PA, FOUNDATION Fieldbus communications
- Integral PID controller

ABB’s dual-input analyzers put more power into pure water production
Dissolved Oxygen

ABB offers a complete range of Dissolved Oxygen analyzers for monitoring boiler water, industrial effluent and waste water applications. ABB’s encapsulated cartridge design eliminates the maintenance time required with traditional dissolved oxygen sensors. No more changing and stretching membranes or replenishing electrolyte; simply replace the sensor cartridge in less than a minute.

AX480/9408 High Level Dissolved Oxygen System

Use the AX480 Dissolved Oxygen Analyzer with the 9408 Probe assembly for high level measurements. Improve the efficiency of your aeration process and decrease energy costs with continuous dissolved oxygen measurement and control.

- Single or Dual-input in one analyzer
- Replaceable, low cost sensor capsules
- Floating ball, dip, flow through or submersible probe mountings
- Panel or wall mount analyzer
- Incorporated sensor Jet-Wash control
- Unique diagnostics for sensor operating efficiency and life expectancy
- Cost effective integral PID controller for greater energy savings
Assurance of Reliability

The bargraph display feature assists in determining the expected life of the sensor, makes maintenance easier and enables the user to plan ahead for sensor replacement.
9437 & 9438 Low Level Dissolved Oxygen Systems

These systems are ideally suited for monitoring the efficiency of de-aerator and oxygen scavenging systems. The encapsulated cartridge design is unique in the low-level DO measurement industry. Sensor maintenance has never been easier or less expensive.

9437 Dissolved Oxygen System

- Near zero maintenance with unique low level (ppb) DO cartridge
- Sensor operating efficiency diagnostics
- Cost effective system

9438 Dissolved Oxygen System

- Automatic calibration minimizes maintenance
- Built-in flow regulator provides easy setting of sample flow rate
- Automatic thermal overload divert, protects sensor from damage in the event of cooling system malfunction
- Extensive sensor operating efficiency diagnostics ensures best operation of sensor and indicates replacement time
- Automatic range tracks dissolved oxygen levels when bringing your boiler on or off line
- Bi-linear output
Automatic calibration with the 9438 keeps dissolved oxygen measurement in perfect condition.
Turbidity

With one of the widest ranges of measurement in the industry, ABB’s unique Turbidity systems are ideally suited to demanding applications. LED light sources deliver greater stability and longer life than traditional incandescent light sources. A variety of sensor mounting options allow measurements to be taken throughout, from water quality treatment plant to effluent discharge monitoring.

4670 Turbidity System

ABB’s rugged turbidity systems operate in the most demanding installations. Whether measuring industrial effluent or processes of near perfect clarity, ABB turbidity systems get the job done.

- A variety of measuring technologies: absorption for high levels, or nephelometric scattering for turbidity levels near zero NTU
- Automatic cleaning and minimum maintenance costs
- Reliable, easy to use, dry standards in a broad range of values make calibration a simple, safe, repeatable task
- Stable light source reduces calibration frequency
- Accurate performance at sub 0.1 NTU levels
- Easy set-up and intuitive operation
Fluoride, Ammonia, Nitrate, Low Level Chloride, High Level Chloride

The ABB 8230 Series Analyzers measure a wide range of parameters using selective ion electrodes. Provides continuous, rapid, on-line measurement with automatic calibration, minimal reagent usage and reduced maintenance.

- Continuous temperature control of sample, ensures accurate and reproducible measurement
- Automatic two point calibration
- Comprehensive diagnostics, assist users with maintenance and running of monitors
- Continuous operation ensures fast response times

8231 Fluoride Monitor

The monitor uses a fluoride ion-selective and a reference electrode pair, both manufactured by ABB. The sample is pre-treated with a reagent to adjust the pH, de-complex the fluoride ions in solution and remove the effects of changes in ionic strength of the sample, enabling a true fluoride measurement to be made.

Application:
- Monitoring and/or control of fluoridation of potable drinking water
- Monitoring fluoride levels of semiconductor effluent plants
8232 Ammonia Monitor

The monitor uses an ammonia gas sensing probe to measure free dissolved ammonia gas. An alkali reagent is used to pre-treat the sample and raise its pH, converting the ammonium ions in solution into dissolved ammonia gas, ensuring a total ammonia measurement is possible.

Application:
- Intake protection for potable water treatment
- Pollution monitoring of rivers
- Monitoring nitrification stage of sewage treatment
- Power plant – ammonia dosed boilers
- Industrial effluent monitoring

8234 Low Level Chloride Monitor

The monitor uses a chloride ion selective and reference electrode pair, both manufactured by ABB. The range of measurement is 0 – 5000ppb (min range 0 – 100ppb) as chloride or 0 – 8250ppb as sodium chloride.

Application:
- Power plant – monitoring chloride levels in boiler drum
8235 High Level Chloride Monitor

The monitor uses a well proven ion selective chloride and silver chloride reference electrode. The measurement range is programmable between 2 and 5000ppm.

Application:
- Monitoring of industrial and sewage treatment discharges

8236 Nitrate Monitor

The monitor uses an ABB long life, ion selective nitrate electrode, with a reference electrode. A reagent is used to fix the ionic strength of the sample and to adjust the pH, ensuring accurate results.

Application:
- Sewage treatment – nitrate reduction
- Industrial waste treatment
Silica and Phosphate

With many years of application knowledge and innovative design of online chemical analyzers, ABB has developed a new generation of on-line colorimetric analyzers for measuring silica and phosphate. The Navigator 600 Series offers reliable measurement, simple operation and low operating costs.

Silica Monitor

The Navigator 600 silica analyzer is fast, accurate and reliable, with continuous sample processing and heating for fast response. It incorporates automatic cleaning, calibration and zero for high accuracy, while extensive measurement, electronics and maintenance diagnostics provide high reliability.

The Navigator 600 is designed to meet the requirements of industries using steam and ultra pure water. It is fast, accurate, reliable as well as cost effective and easy to operate. Operating for up to six months on one set of each reagent and requiring only 5 minutes of maintenance a year, the Navigator 600 is very cost effective to operate. With extensive diagnostics and onboard help, as well as easy to use Windows style menus and tabs, Navigator 600 is also easy to operate.

Cost Effective and Easy to Use

- Will operate up to six months on one set of reagents
- Only 5 minutes annual maintenance required
- Easily field upgradeable from one up to six streams
- Familiar Windows style interface with menus and tabs
- Onboard context sensitive help
- Automatic cleaning, calibration and zero
- Range 0 to 5000 ppb

Application:

- Power plants – monitoring silica concentrations in boiler water and saturated steam
- Demineralisation plants – monitoring breakthrough of silica from anion and mixed ion exchange beds.
Phosphate Monitor

The Navigator 600 phosphate analyzer is fast, accurate and reliable, with continuous sample processing and heating for fast response. It incorporates automatic cleaning, calibration and zero for high accuracy, while extensive measurement, electronics and maintenance diagnostics provide high reliability.

Designed to meet the requirements of power plants using phosphate dosing, the Navigator 600 is fast, accurate, reliable as well as cost effective and easy to operate. Operating for up to six months on one set of each reagent and requiring only 5 minutes of maintenance a year, the Navigator 600 is very cost effective to operate. With extensive diagnostics and onboard help, as well as easy to use Windows style menus and tabs, Navigator 600 is also easy to operate.

Cost Effective and Easy to Use:

- Will operate up to six months on one set of reagents
- Only 5 minutes annual maintenance required
- Easily field upgradeable from one up to six streams
- Familiar Windows style interface with menus and tabs
- Onboard context sensitive help
- Automatic cleaning, calibration and zero
- Range 0 to 15 ppm PO₄

Application:

- Power plant – phosphate dosed boilers
From the company that developed the world’s first on-line industrial analyzer, ABB offers a unique solution for measuring sodium in steam raising plants. Many sample points can be monitored: cation bed outlets, mixed bed outlets, condensate pump discharge, boiler feed and boiler drum. With measurement possible down to 0.01ppb, ABB offers the most flexible and user friendly instruments available.

8037 Sodium Analyzer
- Very cost effective measurement
- ‘Pumpless’ liquid handling section ensures low maintenance
- Quick connect sensor cables simplify replacement of electrodes
- Low profile – occupies least panel space

Linear and logarithmic output
- Extensive diagnostics
- Reagent addition without diffusion tubing means no replacement of tubes needed

The 8037’s pump-less reagent dosing feature ensures low maintenance
Hydrazine

One of the properties of hydrazine is that it is an oxygen scavenger. Because of this it is dosed into the boiler system to remove the remaining trace levels of dissolved oxygen. The measurement of hydrazine is essential in the power plant.

7835 Hydrazine Analyzer

The ABB microprocessor based Hydrazine Analyzer enables measurement of hydrazine in boiler feedwater with auto range change. With full calibration available, this instrument enables you to measure expensive hydrazine dosing so there is minimal waste of this costly reagent.

- Auto range switching
- Low volume reagent usage
- Compensation for pH and temperature
- Refurbishable sensor
- Fast response
UV Dissolved Organics & UV Nitrate

The AV400 Series of UV Absorption monitors offers unique benefits across a number of applications for monitoring and controlling the quality of potable drinking water. Features such as automatic cleaning and reagentless operation virtually eliminate manual intervention, keeping cost-of-ownership to an absolute minimum.

AV400 Dissolved Organics Monitoring

The range consists of single input AV410 low range (0 to 20ppm C) modules, or AV420 high range (0 to 100ppm C) monitors. Dual range options are AV411 low range and AV422 high range.

- Reagentless operation – no expensive running costs
- Automatic integral cleaning – minimum maintenance requirements
- Expected lamp life in excess of 10 years
- On line diagnostics
- Configurable display value, color (°H), coagulant dose (mg/l), TOC (mg/l), & user defined

Application:

Many different organic compounds can be found in water used for potable water treatment. AV400 monitors can measure many of the Dissolved Organic compounds present. There are three main applications within the potable water treatment process for which the AV400 has proven particularly successful:
1 **Surrogate Color for Coagulation Control (AV420 or AV422)**

Provides a surrogate color measurement, without the known associated problems of a true color monitor (ie maintaining filtration at 0.45um, cost of reagents and maintenance). Monitoring the raw water provides feed forward control of the coagulant dose. Monitoring after plant sedimentation or filtration stage enables feed forward control to be trimmed, ensuring optimum color removal.

2 **Algal Blooms (AV420 or AV422)**

Problems of taste and odor can occur when algae in rivers, lakes and reservoirs die off, thereby increasing the level of organic substances in the water. Treating for this increased organic level requires activated carbon to be added to the water at the coagulation stage. The organics are absorbed in the carbon and are then removed during the sedimentation stage.

3 **Trihalomethanes, THM’s (AV410 or AV411)**

Some organic compounds can react with chlorine, increasing the possibility of developing THM’s, which are recognised carcinogens, known to cause severe health problems.

Monitoring for organics prior to chlorination, provides an indication whether conditions exist for the formation of THM’s.
UV Dissolved Organics & UV Nitrate

AV400 UV Nitrate Monitoring

The AV400 nitrate monitor, can be either a single or dual input device (AV450 or AV455) - monitoring for 0 to 100 mg/l as NO₃ or 0 to 25 mg/l as N.

Reagentless operation, automatic cleaning and turbidity or organic compensation ensure accurate measurements with minimal running costs.

- Reagentless operation – no expensive running costs
- Automatic integral cleaning – minimum maintenance requirements
- Expected lamp life in excess of 10 years
- On line diagnostics
- Automatic turbidity or dissolved organics compensation – adjustable to suit water characteristics

Application:

For many years the level of nitrate in potable water sources has been increasing due to increased use of fertilizers on the land, sewage and industrial discharges into rivers.

AV450 and AV455 offer a simple and cost effective method of monitoring:

- Drinking water compliance
- Blended water from groundwater sources – to ensure compliance
- In-take protection for potable water treatment plants
- Denitrification plants – monitoring the effectiveness of the nitrate reduction process
Gas Purity Monitoring

To meet the demands of the wide range of industrial applications, ABB can offer an extensive range of Katharometers to cope with highly corrosive gases or flammable gas mixtures under widely varying process conditions of temperature, pressure and humidity.

The glass coated filament assembly that contacts the gas being monitored gives maximum sensitivity and is unaffected by sample gas temperature or sample flow rate.

AK100

Provides a complete system for monitoring hydrogen purity plus the purge gas cycle for hydrogen cooled generators.

Multiple Range Calibration

- Combined hydrogen purity and purge gas system
- Purge gas options - CO₂, N₂ or Ar
- High pressure system up to 10 bar G
- Sealed-in reference gas
- ATEX compliant II (i) G
- EEx ia IIC T4
Combustion Gas Analysis

The ABB range of gas analyzers has been designed to monitor oxygen and combustibles in almost all combustion processes. The extensive range of probe type, certification and transmitter options ensure the right solution for all combustion monitoring applications.

Typical Boiler Plant

1. SMA 90 Smart Analyzer
2. ZFG2 Flue Gas Oxygen Probe
3. ZGP2 General Purpose Oxygen Probe
Combustion Gas Analysis

SMA 90 Smart Analyzer
Close coupled extractive design measures oxygen only or oxygen plus combustibles (carbon monoxide equivalent).
- FM Class I, Division 2, Groups A,B,C,D and Class II, Division 2, Groups F & G
- CSA certified for ordinary non-hazardous locations
- Automatic calibration
- 20ppm resolution – COe
- Process temperature 20°C to 1650°C (68°F to 3000°F)

ZFG2 Flue Gas Oxygen Probe
The ZFG2 measures percentage oxygen in low temperature applications such as flues and boilers. Operates at temperatures from 20°C to 600°C (68°F to 1112°F).
The output from the ZFG2 can be directed to the ZMT or ZDT analyzers for an oxygen percentage readout.
Available in standard lengths of 400mm (16in), 1000mm (40in), 1500mm (60in) and 2000mm (80in), the probe is inserted directly into the flue duct with no need for a separate sampling system.

AZ100 Flue Gas Oxygen Analyzer
The AZ100 is a complete system comprising a zirconia oxygen probe and a wall or panel-mount instrument, exclusively designed for small gas and oil-fired boilers.
- Process temperature range -20°C to 600°C (-4°F to 1118°F)
- No reference air supply required - simplified operation
- Insertion length up to 650mm
ZMT Oxygen Analyzer

The ZMT analyzer accepts inputs from either the ZFG2, EXFG, ZGP2 or EXGP probe and provides a readout of oxygen percentage on an easy-to-read digital display.

- Auto-calibration
- Boiler combustion efficiency calculation
- Up to 17 fuel options

ZGP2 General Purpose Oxygen Probe

The ZGP2 measures percentage oxygen in high temperature applications such as furnace atmospheres and process heaters operating in the range from 600°C to 1400°C (1112°F to 2552°F).

The probe is available in standard lengths of 600, 700, 800, 900, 1000 and 1250mm.

Installation is straightforward, with the probe inserted directly through the furnace wall.

The output from the ZGP2 can be directed to the 4681/4686, ZDT or ZMT analyzer for a percentage oxygen readout.
EXFG & EXGP Zirconia Oxygen Systems for Hazardous Areas

In-situ oxygen measurement in hazardous area applications in the petrochem, oil and gas sectors.

**ExFG**
- ATEX II 2G
- EExd IIB T3
- Interface ATEX II 2G
- EExd IIB T6

**ExGP**
- In-situ probe, simple apparatus, requires no certification
- Interface ATEX II 2G
- EExd IIB T6

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**ZDT Zirconia Oxygen Systems**
- Accepts inputs from either ZFG2 or ZGP2 probes
- NEMA 4X/IP66 protection
- User programmable
- MCERTS certification with ZFG2 probes
Reduce Installation Costs – save time and money

To reduce costs, ABB can offer water analysis and monitoring systems, pre-assembled into a single package, to provide users with all the facilities they need. These packages are designed for simple installation and ease of operation.

If there are a large number of measurement points, a cabin – similar to the one whose interior is shown (right) may be required. Units are supplied pre-wired and fully-piped with all the necessary sample conditioning equipment ready for operation. ABB system assemblies can simply drop into their final location.

Once on site, connections to samples, drains, power supply and signal outputs are all that are required. Each cabin houses a large number of analysis loops, which can be ready for operation within just a few hours from delivery to site.

If the analytical requirements are simpler, a rack or panel mounted system may be the solution.

Capable of handling a small number of loops, or one or two streams (see left), ABB’s self-contained chemical monitoring systems consist of a complete instrumentation package for the measurement of chemical parameters, critical to both power plant and water treatment operations.
Cost Savings, Simplicity and Quality; Packaged Systems offer you real benefits

- More than 25 years experience of building packaged system assemblies
- Flexibility – ABB offers a wide choice of standard designs which can be customized to suit individual applications
- Dramatic reduction in the cost and time of on-site installation and commissioning. Simply prepare the site for raw sample delivery and discharge – ABB’s integrated system takes care of everything in between
- All equipment is tested prior to delivery by ABB and meets all the relevant industry standards
- One total integrated package with all instrumentation sourced from a single manufacturer – ABB
- Housing all the analytical equipment in one location simplifies maintenance and enhances operator efficiency
ABB is a leader in power and automation technologies that enable utility and industry customers to improve performance while lowering environmental impact. The ABB Group of companies operates in around 100 countries and employs about 111,000 people.

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