ABB Conductivity Analyzer and Probe Package
Series AX430 Single Input Analyzer with PID Control

Description and Use

Advanced measuring capabilities
- Conductivity range up to 1,999 mS cm
- Selectable concentration ranges:
  - 0 to 15% NaOH, 0 to 18% HCl, 0 to 20% HSO
  - 0 to 40% HPO, 0 to 20% NaCl and user-defined

Reduced installation cost
- Easy access terminations; reduced panel space

High functionality at minimum cost
- Three alarms and two fully-isolated current outputs
- Direct linear, reverse acting or bi-linear output
- Service logbook providing historical data

Wide range of applicability
- Cooling tower Conductivity control
- Regeneration of ion exchangers
- Municipal water control
- Food & beverage product/water interface detection
- Clean-in-place concentration monitoring

AX430 analyzers incorporate the latest technology to provide highly reliable, flexible, feature-packed devices that satisfy a diverse range of process monitoring and control applications.

AX430 analyzers enable continuous measurements of one or two conductivity points with simultaneous local display and retransmission. AX430 is used with the TB454 providing measurements with exceptional accuracy and performance.

High Functionality as Standard

All versions are supplied with two, fully-isolated current outputs as standard, that can be assigned to the measured parameter, sample temperature or any appropriate calculated variables.
Three programmable relay set points are available which can also be assigned as required. Innovative features such as a power saving display and a diagnostic current output option all contribute to a low cost of ownership.

**AX430 Integral P, PI and PID Control**

The single input AX430 analyzers incorporate three-term PID Control, offering three modes of sophisticated control: analog, pulse length (time proportional) and pulse frequency. These are supplied as standard and can be operated in direct or reverse-acting mode, depending upon the application.

**Current Output Proportional Control**

In this case, the control signal is provided by the 4 to 20mA output of AX430 analyzers rather than using the alarm/control contacts. The magnitude of the current output changes in proportion to the deviation from set point. This method is used generally with motorized valves or when controlling the speed of dosing pumps with a 4 to 20mA proportional input.

**Specifications**

**Conductivity Range**
up to 1,999 mS cm⁻¹

**Display temperature range**
-20 - 300 °C (4 - 572 °F)

**Temperature sensor**
3k Balco

**Temperature coefficient**
Programmable 0 - 9.99%/ °C and fixed temperature compensation curves (programmable) for acids and neutral salt

**Reference temperature**
25 °C (77 °F)

**Display Type**
Dual 5-digit, 7-segment backlit LCD

**Information**
16-character, single line dot-matrix

**Energy-saving function**
Backlit LCD configurable as ON or Auto-Off after 60s

**Logbook**
Electronic record of major process events and calibration data

**Retransmission outputs**
2 (4 optional) fully-isolated standard

**Relay Outputs**
On/Off

**Number of relays**
Three supplied as standard

**Number of set points**
Three supplied as standard

**Set point adjustment**
Configurable as normal or failsafe high/low, bandwidth alarm (composite high/low) or diagnostic alert

**Hysteresis of reading**
Programmable 0 - 5% in 0.1% increments

**Delay**
Programmable 0 - 60s in 1s intervals

**Relay contacts**
Single-pole changeover
Rating 5 A, 115/230 V AC, 5 A DC

**Insulation**
2 kV RMS contacts to earth/ground
**Analog Outputs**

**Number of current outputs (fully isolated)**
Two supplied as standard

**Output range**
0 - 10 mA, 0 - 20 mA or 4 - 20 mA Analog output programmable to any value between 0 and 22 mA to indicate system failure

**Accuracy**
±0.25% FSD, ±0.5% of reading (whichever is the greater)

**Resolution**
0.1% at 10 mA, 0.05% at 20 mA

**Maximum load resistance**
750 ohms @ 20mA

**Configuration**
Can be assigned to either measured variable or either sample temperature

Conductivity Programmable 0.000 - 1999 mS cm⁻¹ (uncompensated)

Concentration 0.000 - 1.999 digits (user configurable)

**Power Supply**

**Voltage requirements**
100 to 240 V AC 50/60 Hz
(90 V Min. to 264 V Max. AC)
12 to 30 V DC

**Power consumption**
10 W

**Insulation**
Mains to earth (line to ground) 2 kV RMS

**Environmental Data**

**Operating temperature limits**
–20 to 55°C (–4 to 131°F)

**Storage temperature limits**
–25 to 75°C (–13 to 167°F)

**Operating humidity limits**
Up to 95% RH non-condensing

**Approvals, Certification and Safety**

**Safety approval**
UL
CE Mark

**CE Mark**
Covers EMC & LV Directives (including latest version EN 61010)

**General safety**
EN61010-1
Overvoltage Class II on inputs and outputs

**Languages Configurable**
- English
- French
- German
- Italian
- Spanish
Overall Dimensions

Dimensions in mm (in.)

Wall-/Pipe-mount Version
Endura TB454 Twist-Lock Conductivity Sensor

Endura TB454 sensors (Fig. 6) combine versatility, easy access, and low cost into one compact package.

The sensor is suitable for either inline or immersion installations. It fits into a 1-inch NPT receptacle and is inserted with a push and 180-degree twist to lock for inline installations. There is also a 316 SS holder with screw cap available. The wide rangeability of this sensor makes it a perfect match for almost all less aggressive conductivity measurements.

Endura TB454 Sensor Specifications

Max. Pressure/Temperature

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Max. Temp.</th>
<th>Max. Pressure</th>
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<tbody>
<tr>
<td>TB454</td>
<td>100</td>
<td>212</td>
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<tr>
<td></td>
<td>689</td>
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</tbody>
</table>

Body:
Ryton (PPS)

Electrodes:
316 stainless steel

Insulator:
Polyether-ether ketone (PEEK)
Internal O-rings: Ethylene propylene
External O-rings: Buna-N

Special Features
Twist lock insertion simplifies access.

Endura 4-Electrode Conductivity Sensors

ABB is the industry leader in advancements resulting in the increased accuracy, dependability, and environmental limits of on-stream conductivity sensors. The conductivity sensor line permits resolutions of 0.001 microsiemens per centimeter, full-scale ranges of one siemens per centimeter, pressure ratings to 2,068 kilopascals (300 psig), and temperature ratings of 200-degrees Celsius (392-degrees Fahrenheit). Group A sensors have a measurement range spanning five decades of conductivity or TDS concentration.

The ABB 4-electrode conductivity system is a patented concept unique in the process industry. It provides ultimate sampling flexibility, sensor reliability, rangeability, and helpful operating and maintenance information. Smart circuitry detects and compensates for the buildup of deposits, and scale and corrosion products on the sensor. It also provides an alarm before the interference becomes so serious as to affect the conductivity signal. The dirty sensor alarm output is a contact closure, a digital signal, or any other easily observed format.

Sensor Groups and Ranges

The rangeability of any sensor is defined by the physical structure of the electrodes and the electronic circuitry of the associated instrument. The physical structure of the electrodes determines the sensor cell constant; however, the concept of sensor cell constants is more applicable to two-electrode sensors. Unlike 4-electrode sensors, as manufactured by ABB, the rangeability of two-electrode sensors is restricted by current density and polarization.
4-electrode sensors are not limited by these factors. The result is a virtual dimensionless sensor constant with wide rangeability.

The actual measurement range is determined by the sensor group and the instrument range or range factor in use. All ABB conductivity instruments are multirange types. This provides numerous application options for any sensor and instrument combination.

ABB TB454 sensors are provided with a cell constant structure in the following manner:

**Group A:**

General purpose for zero to 100 and zero to 2,000,000 uS/cm

**Temperature Compensation**

ABB conductivity sensors are available with temperature compensators either integral to or separate from them.

The type of temperature compensator must be supported by the instrument. AX430 series microprocessor-based instruments accept 3k ohm temperature compensation.

**GE Part Numbers**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
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<tr>
<td>3064313</td>
<td>Analyzer Package with probe and cable</td>
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<tr>
<td>3063660</td>
<td>Probe Only with cable</td>
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<tr>
<td>3063651</td>
<td>Analyzer Only</td>
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