A revolution in
Analyzers with touch-screen display

PH450G pH and Redox (ORP) analyzer
SC450G Conductivity/Resistivity Analyzer
ISC450G Inductive Conductivity Analyzer
The EXAxt 450 Series analyzer is another fine example of Yokogawa raising the benchmarks of innovation and quality. Yokogawa has refined its expertise in pH and conductivity measurement and control into this new and innovative product. It is packed with features designed to reduce commissioning time, minimize plant down time and simplify operation and maintenance. Its intuitive touch screen operation, presents process parameters and the advanced diagnostics in a clear and unambiguous way.

Features of the EXAxt Series:
- Touchscreen operation
- Unique intuitive HMI menu structure in 8 languages
- Intelligent step by step calibration routines
- Unique problem solving guidance
- Predefined buffer solutions
- Various temperature compensation algorithms
- Full P, PI, PID control on all outputs
- Two mA-outputs and four SPDT relay contacts with display indicators
- Process data trending up to 2 weeks
- Extensive logbooks for event storage

The intuitive touch screen virtually eliminates the need for an instruction manual.

Note: Illustration not actual product.
POWER GENERATION
Regardless of how electricity is generated: water quality is essential.
EXAxt 450 is especially suitable for this industry by the dedicated functionality.
PH450G offers NEN6411 Temperature compensation methods for accurate pH analysis of the boiler feed water, the condensate and the steam quality.
SC450G offers Cation, Morpholine and Ammonia temperature compensation functions for accurate Conductivity measurement of all water streams in the water-steam circuitry.
ISC450G offers the wide range ability and high accuracy of the ISC450G and the corresponding sensors. Notably dedicated algorithms for concentration control of the regeneration chemicals are standard. The efficient use of regeneration chemicals and rinsing water requires the accuracy offered by these analyzers.

PULP AND PAPER
The Pulp and Paper industry requires hassle free measurements. The analyzers must be able to operate trouble free for extended periods in a rough environment with a minimum of maintenance.
PH450G is especially suitable for the many pH and ORP control loops in the pulp and paper processing.
SC450G is the best assurance for reliable monitoring of the condensate lines to protect the steam boilers.
ISC450G is the ideal instrument to monitor the many effluent streams and the concentration control of the various liquor streams.

Model SC450G
Conductivity / Resistivity Analyzer
The EXAxt SC450G is designed to combine the superior functionality of the Yokogawa EXA series with the ease of use offered in pocket computers (PDA). Truly unique is the EXAxt 450 series Human Machine Interface. The high resolution graphical display and the touch screen operation make all information visible to the operator. Configuration with the touch screen is as easy as operating a PDA. Simply choose the language of choice and on screen instructions assure that the best configuration for the application is obtained.

Features:
• Supports 2-electrode and 4-electrode sensors for high accuracy
• Automatic compensation of cable resistance by 4-wire measurement
• Cell condition monitoring eliminates risk of errors by cell fouling
• Advanced temperature compensation techniques for all pure water applications and concentration measurements in standard units
• USP<645> functionality present in all configurations including resistivity mode
• 0.3% of reading accuracy over the full range of 6 decades

PHARMACEUTICAL
The pharmaceutical industry demands high product reliability and stability. Any drift in the electrochemical analysis may indicate a deviation from the strict specifications of reagents or products. Accurate and traceable calibration of the electrochemical sensors and instruments is mandatory.
The combination of Yokogawa instrumentation and Yokogawa/Hamilton sensors meet the expectations of this industry. All Conductivity analyzers meet the requirements that are specified in USP<645> first issued with USP23.

BREWERY
In modern breweries the repeatability of the product is the most important characteristic of quality. Strict process control is mandatory to assure this constant quality.
Protection against contamination by microorganisms is one of the major concerns in the Biotechnological process. This results in clean processing and well-controlled CIP processes. A good control of the CIP (Cleaning in Place) is necessary to combine effective cleaning with effective use of chemicals.
With in-line cleaning there is an inherent risk of contamination of the product by possible malfunctioning of the cleaning processes and therefore accurate process analyzers are a must for quality monitoring.
EXAxt 450 meets all the requirements from this industry for their needs for electrochemical analysis.

Model ISC450G
Inductive Conductivity Analyzer
The new EXAxt ISC450G has been designed to meet the highest market requirements of today’s industry. This analyzer is unique as it will no longer be the uncertainty factor of your quality demands, but instead will bring you to a higher level.
The EXAxt will help you and guide you as the unique Human Machine Interface (HMI) will not only present you reliable process data, but diagnostics, trends, logbooks and step by step calibration routines to become your friend in analytical measurement and help you gaining that higher level of quality. The instrument is easy to set up, very intuitive and can be used without the need of an instruction manual.
DIAGNOSTICS

- Naturally EXAxt 450 features self-diagnostics. The watchdog timer checks continuously the integrity of the signal processing and firmware routines.
- However the reliability and stability of the electronics are still high compared with the sensor characteristics.
- Yokogawa monitors the sensors in-line to prevent process control problems when sensor failure occurs or when sensor fouling might result in measuring errors.

FUNCTIONALITY

- EXAxt 450 comes as a complete electrochemical analyzer with full Indication-Alarm-Controlling capabilities.
- The graphical LCD shows up to three dynamic variables and trend graph of the primary variable.
- The two current outputs can be used to transmit process variables or controller output.
- The four SPDT contacts can be configured as HI/LO contact output, but also as control output to solenoids or metering pumps.
- The output can be pulse length or pulse frequency controlled by the powerful PID control function.

DIAGNOSTICS

INSTRUCTIONS

- The concept of EXAxt 450 is based on the assumption that the user has no time or interest to study Instruction Manuals when servicing the electrochemical analyzers.
- Therefore all information about configuration, calibration, and troubleshooting is shared with the user on-line in plain English.
- This avoids wasting time for the operator or maintenance technician; it also guarantees error-free maintenance and thus better accuracy and reliability of the analysis.
- By the way: In addition to plain English the user can choose German, French, Italian or Spanish.

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FUNCTIONALITY

MAINTENANCE

- EXAxt makes maintenance of the electrochemical analyzer very easy with the on-line instructions and the touchscreen operation.
- How nice would it be to predict the need for maintenance or calibration in the future to allow scheduled maintenance without the risk of downtime by unexpected failure.
- EXAxt stores the calibration result of the last five calibrations to predict when the sensor drift exceeds the selected limits.
- In addition to this, the diagnostic variables are logged, and based on this information a prediction is made as to when the sensor needs maintenance to prevent measuring errors occurring.

FUNCTIONALITY

COMPENSATION

- Electrochemical analysis results are often influenced by other process variables. These uncontrolled variables result in poor process control, especially when the user is unaware of the influence.
- EXAxt 450 delivers accurate compensation of these variables to assure accurate process control.

COMPENSATION

Examples
- Compensation of temperature on pH or ORP values: NEN6411 for strong electrolytes; MATRIX or TC for other applications.
- Compensation of non-linearity on conductivity measurements.
- Matrix compensation of temperature for Conductivity measurement.

MAINTENANCE

HARDWARE

- The electronics are housed in a rugged cast Aluminum housing.
- The environmental protection meets IP66/ NEMA4X and is certified by KEMA.
- Access to the spacy wiring compartment is easy through the hinged front door.
- Touchscreen and Display are well protected by the polycarbonate flexible window.
- The unit is ideally suited for Field and Panel mounting.

HARDWARE
**Communications**

- All dynamic variables are transmitted through HART to the HOST computer or to any PC.
- Configurations can be downloaded or uploaded with the EXAxt Configurator that is supplied free of charge through Internet.
- Remote configuration of the many functions and interrogation of the many diagnostic data can be done through Pactware. Downloaded free of charge by Yokogawa customers.

**Open Architecture**

- Compatibility is the keyword for the EXAxt 450 series.
- All units are compatible with Yokogawa sensors, stocked by customers as spare parts.
- The EXAxt 450 series are also compatible with most commercially available sensors making them suitable as plant standard electrochemical analyzers.
- For example up to 6 different temperature compensation elements are supported: already accurately calibrated.

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**Standard Specification (Common)**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display</td>
<td>Graphical Quarter VGA (320 x 240 pixels) LCD with LED backlit and touchscreen.</td>
</tr>
<tr>
<td>Housing</td>
<td>Cast Aluminum housing with chemically resistant coating.</td>
</tr>
<tr>
<td>Power supply</td>
<td>100-240V AC Acceptable range; 90 to 264V AC</td>
</tr>
<tr>
<td>Environment and operational conditions</td>
<td>Ambient temperature: -20 to +55°C</td>
</tr>
<tr>
<td>Safety, EMC and RoHS conforming standards</td>
<td>EN61010-1, EN 61010-2-030, CAN/CSA C22.2 No.61010-1, CAN/CSA C22.2 No.61010-030, CAN/CSA IEC 61010-2-201, UL 61010-1, UL 61010-2-200, UL 61010-2-01</td>
</tr>
<tr>
<td>Reference temperature</td>
<td>Programmable from 0 to 100 °C</td>
</tr>
</tbody>
</table>

**PH450G Specification**

- Measuring ranges: pH: 2 to 16 pH
- Temperature compensation: Automatic or manual. Compensation to Nernst equation. Process compensation by configurable temperature coefficient, EN6411 for water or strong acids/bases or programmable matrix.
- Calibration: Semi-automatic 1 or 2 point calibration using pre-configured NIST, US, DIN buffer tables 4, 7 & 9, or with user defined buffer tables, with automatic stability check.
- Contact input: Remote wash cycle start.
- Accuracy: pH input: ± 0.01 pH

**SC450G Specification**

- Measuring ranges: Conductivity: 0 μS/cm to 200 mS/cm × C (Max. 1999 mS/cm)
- Temperature: -20 to 140 °C
- Transmission signals: Two isolated outputs of 4-20mA DC. Max. load 600 Ω. Bi-directional HART® digital communication, superimposed on mA1 (4-20mA) signal.
- Contact outputs: Four SPDT relay contacts with display indicators. High/Low process alarms, control function, wash, hold, fail.
- Contact input: Remote range switching.
- Temperature compensation: Automatic or manual, for temperature ranges.
- Accuracy: Conductivity/Resistivity: ± 0.5% of reading ± 0.5 °C (≤ 0.4 °C for Pt100)

**ISC450G Specification**

- Measuring ranges: Conductivity: 0 μS/cm to 1999 mS/cm
- Temperature: -20 to 140 °C
- Transmission signals: Two isolated outputs of 4-20mA DC. Max. load 600 Ω. Bi-directional HART® digital communication, superimposed on mA1 (4-20mA) signal.
- Contact outputs: Four SPDT relay contacts with display indicators. High/Low process alarms, control function, hold, fail.
- Contact input: Remote range switching.
- Temperature compensation: Automatic or manual, for temperature ranges.
- Accuracy: Conductivity: ± 0.5% of reading ± 1.0 μS/cm

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Refer to the GS12D08N05-01E for more details.
<table>
<thead>
<tr>
<th>Model</th>
<th>Suffix Code</th>
<th>Option Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH450G</td>
<td></td>
<td></td>
<td>pH/ORP Converter</td>
</tr>
<tr>
<td>SG450G</td>
<td></td>
<td></td>
<td>Conductivity/Resistivity Converter</td>
</tr>
<tr>
<td>ISC450G</td>
<td></td>
<td></td>
<td>Inductive Conductivity Converter</td>
</tr>
<tr>
<td>Power</td>
<td>A</td>
<td>-D</td>
<td>AC Version [100-240VAC]</td>
</tr>
<tr>
<td></td>
<td>-D</td>
<td></td>
<td>DC Version [12-24VDC]</td>
</tr>
<tr>
<td>Type</td>
<td>-A</td>
<td>-U</td>
<td>General purpose version</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>FM version [*3]</td>
</tr>
<tr>
<td>Mounting Hardware</td>
<td>/UM</td>
<td></td>
<td>Universal mounting kit (panel, pipe, wall)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/U</td>
<td>Pipe and wall mounting hardware [*2]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/PM</td>
<td>Panel mounting hardware [*2]</td>
</tr>
<tr>
<td>Hood</td>
<td>/H5</td>
<td></td>
<td>Awning hood (stainless steel) [*2]</td>
</tr>
<tr>
<td>Conduit adapter</td>
<td>/AFTG</td>
<td>G1/2 [*2]</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>/ANSI</td>
<td>1/2NPT [*2]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/AM20</td>
<td>M20 [*2]</td>
</tr>
<tr>
<td>Tag Plate</td>
<td>/SCT</td>
<td></td>
<td>Stainless steel tag plate [*1]</td>
</tr>
</tbody>
</table>

Notes:
*1 If the tag number is predefined with the purchase, Yokogawa will inscript the tag plate with the specified tag number, and program the tag number in the converter.
*2 Option codes /U, /PM, /H5, /AFTG, /ANSI and /AM20 are not specified for FM version (U).
*3 Nonincendive for FM only.