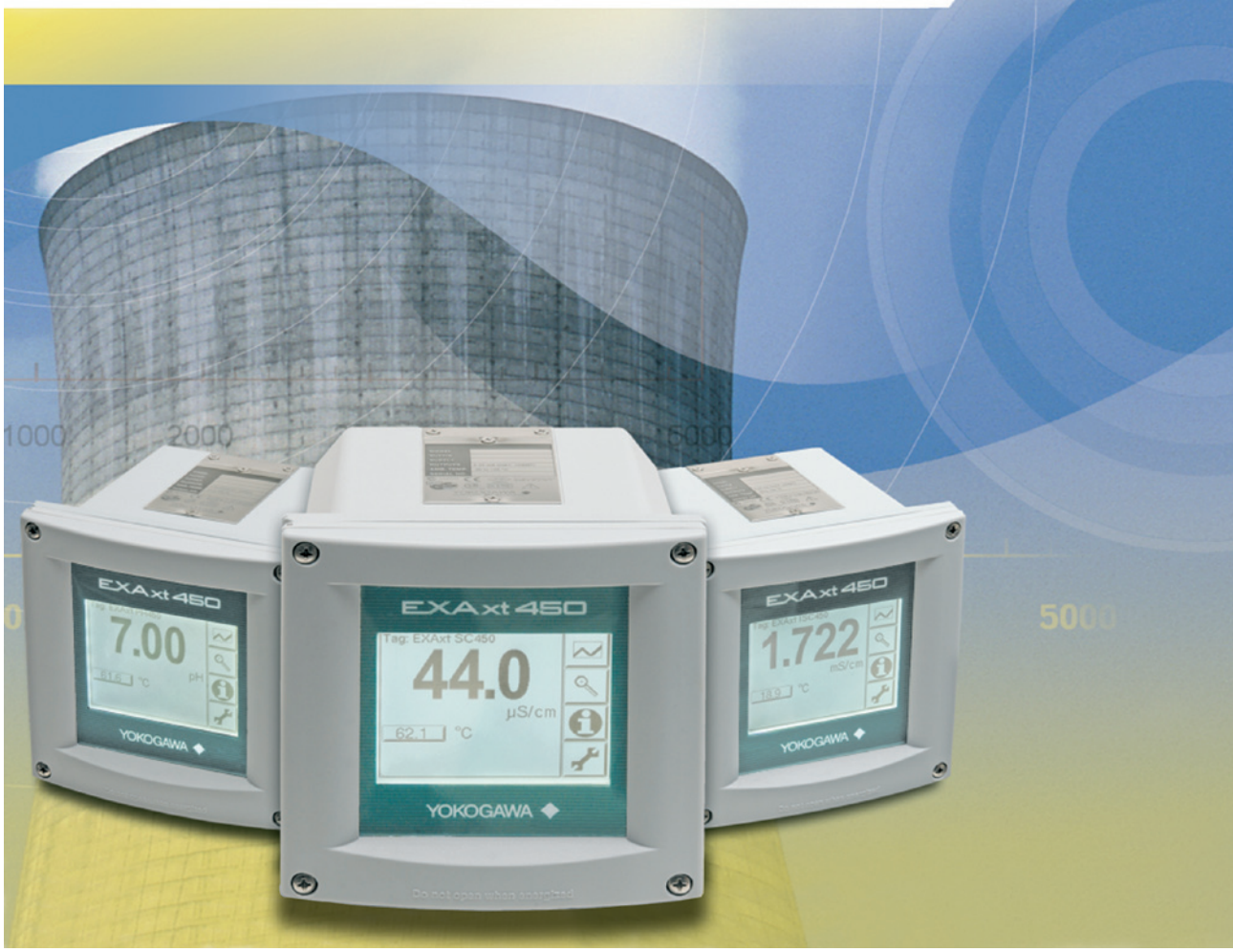
A revolution in
Analyzers with touch-screen display



EXAxt 450

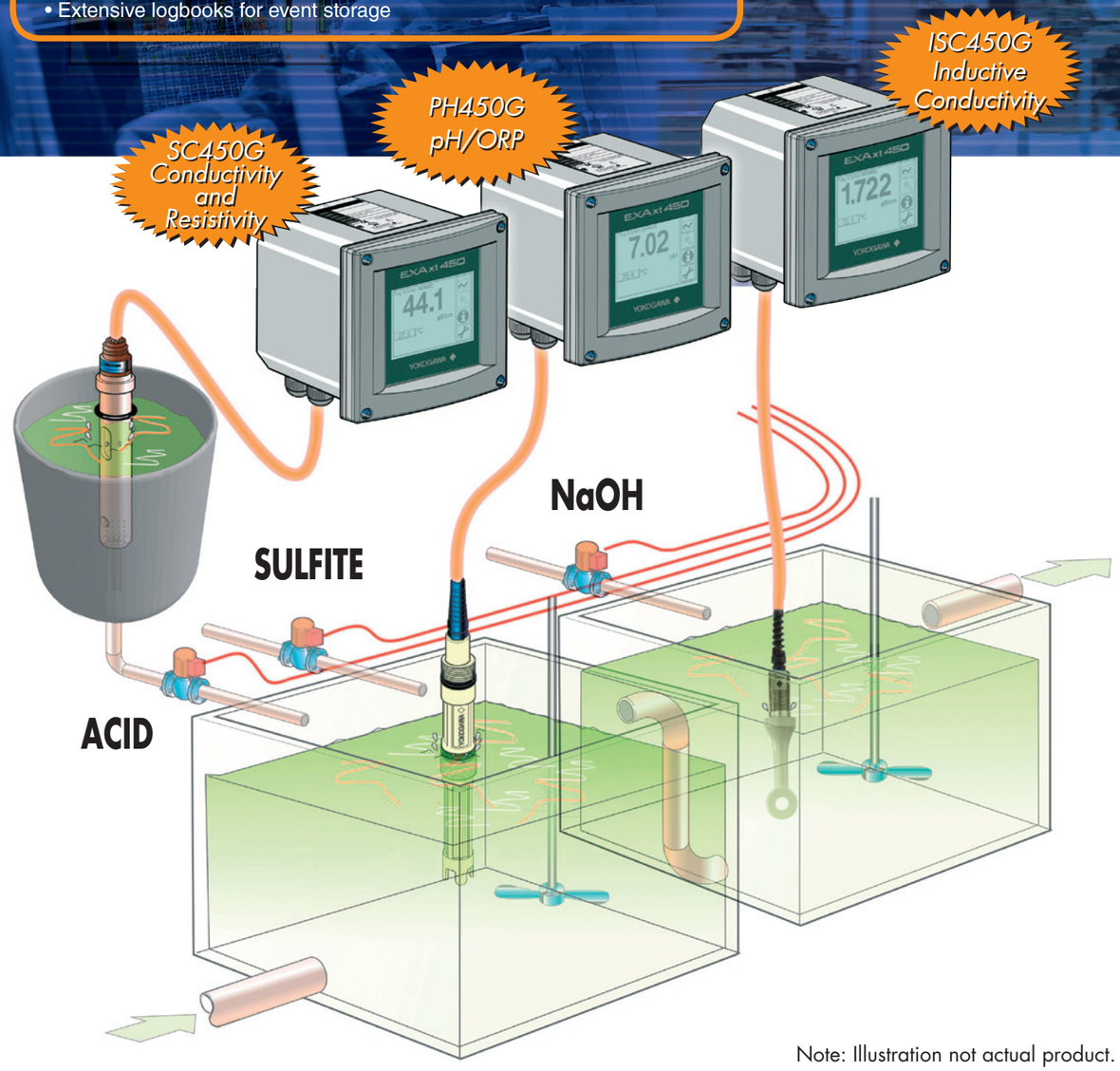
PH450G pH and Redox (ORP) analyzer
SC450G Conductivity/Resistivity Analyzer
ISC450G Inductive Conductivity Analyzer

Bulletin 12A01A01-01E

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 anad maintenance. It's intuitive touch screen operation, presents process parameters and the advanced diagnostics in a clear and unambiguous way.

Features of the EXAxt Series:

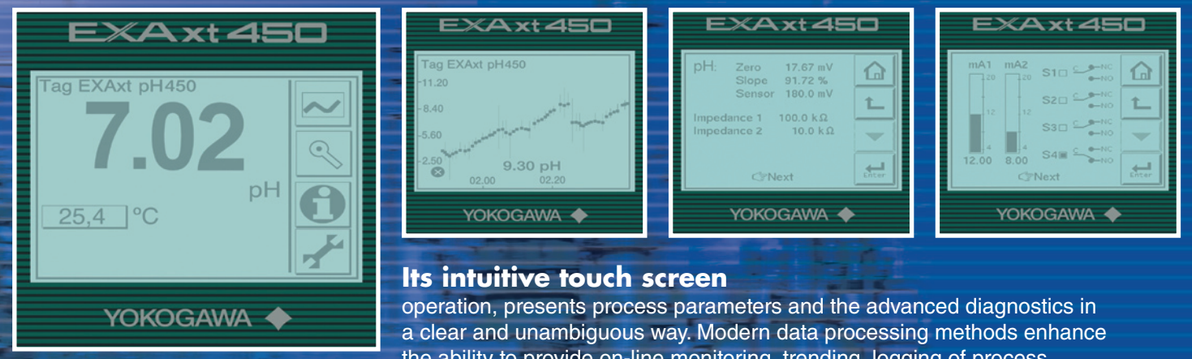
- Touchscreen operation
- Unique intuitive HMI menu structure in 8 languages
- Intelligent step by step calibration routines
- Unique problem solving guidance
- Predefined buffer solutions
- Various temperature compensation algorithms
- Full P, PI, PID control on all outputs
- Two mA-outputs and four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



Note: Illustration not actual product.

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

The trend graph helps diagnose problems and view sensor performance over time.



Its intuitive touch screen
operation, presents process parameters and the advanced diagnostics in a clear and unambiguous way. Modern data processing methods enhance the ability to provide on-line monitoring, trending, logging of process events, and controlling to allow for rapid intervention in demand and changes in the process dynamics.

Model PH450G
pH and Redox (ORP) analyzer

The PH450G offers the best accuracy in the industry by combining the pH measurement with advanced temperature compensation functionality, preloaded calibration standards and stability checks.
The PH450G is a true multivariable analyzer that combines pH with Temperature and ORP (Redox) measurement and all these measurements can be utilised through the different output functions: two mA current outputs, four independent SPDT contact outputs and HART. Both DD and DTM files are available for direct connection to HART Handheld terminal, HIM monitor and Pactware PC configurator.

Features:

- Advanced Temperature compensation methods include NEN6411 algorithm as best fit for ultra pure water analysis
- Three preloaded sets of buffer tables cover most commonly used pH calibration practices
- Capable of analyzing pH, ORP or rH and Temperature measurements at the same time with the same sensor
- Full PID control possible for both acid and alkaline addition simultaneously
- Supports many temperature compensation elements and sensor types

Single and combination pH / ORP electrodes

POWER GENERATION

Regardless on 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. Naturally 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.

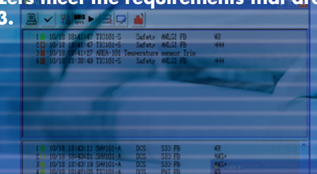
SC450G is the best assurance for reliable monitoring of the condensate lines to protect the steam boilers.

ISC450G is the ideal instrument to monitor the many effluent streams and the concentration control of the various liquor streams.

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 microorganism 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 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
- 0.5% of reading accuracy over the full range of 6 decades

2-electrode and 4-electrode conductivity sensors

Model ISC450G
Inductive Conductivity Analyzer

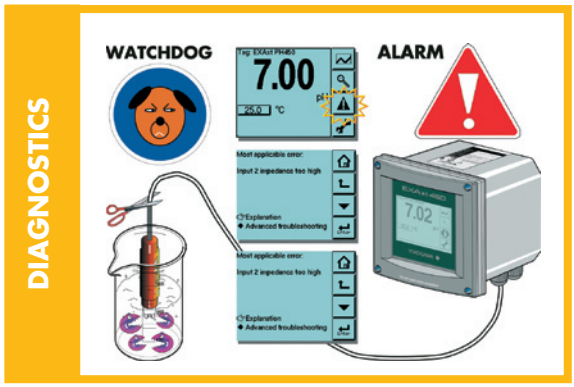
The new EXAxt ISC450G has been designed to meet the highest market requirements of today's industry.
This analyzer is unique as it will no longer be the uncertainty factor of your quality demands, but instead will bring you to a higher level.
The EXAxt will help you and guide you as the unique Human 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.

Features:
- Preloaded calibration methods according to OIML recommendations
- Preloaded matrices for most common electrolytes
- Accuracy of 0.5% plus 1 µS/cm from 0 to 2000 mS/cm with one cell constant
- Two ranges with two temperature compensation methods can be used for different fluids measured with the same sensor.

ISC40 Inductive Conductivity sensors

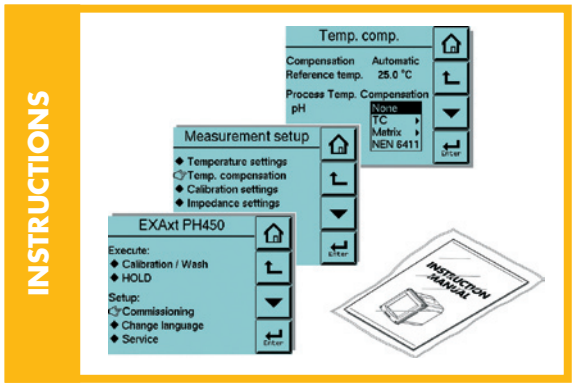
DIAGNOSTICS

- 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



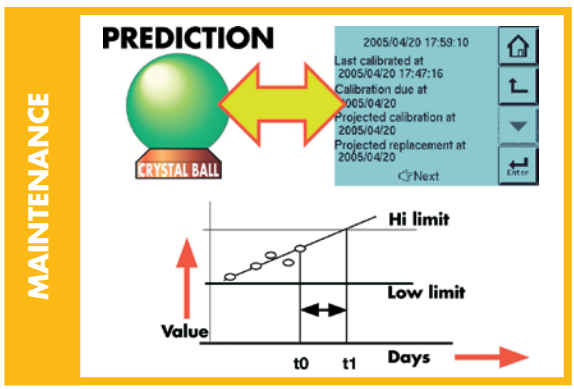
INSTRUCTIONS

- 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



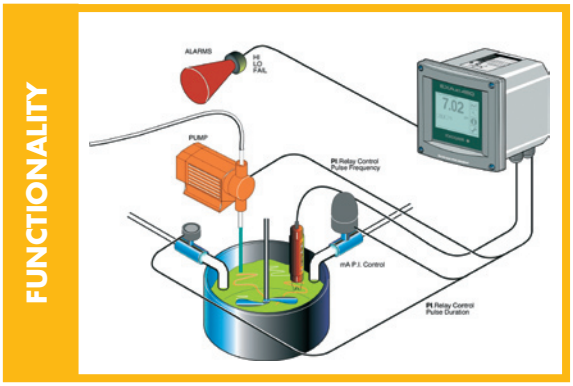
MAINTENANCE

- 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 occuring



FUNCTIONALITY

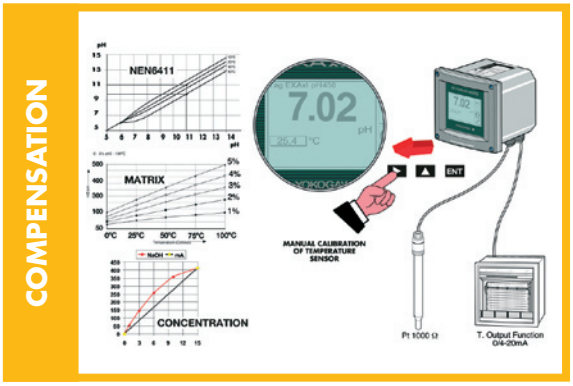
- EXAxt 450 comes as a complete electrochemical analyzer with full Indication-Alarm-Controlling capabilities
- The graphical LCD shows up to three dynamic variables and trend graph of the primary variable
- The two current outputs can be used to transmit process variables or controller output
- The four 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



COMPENSATION

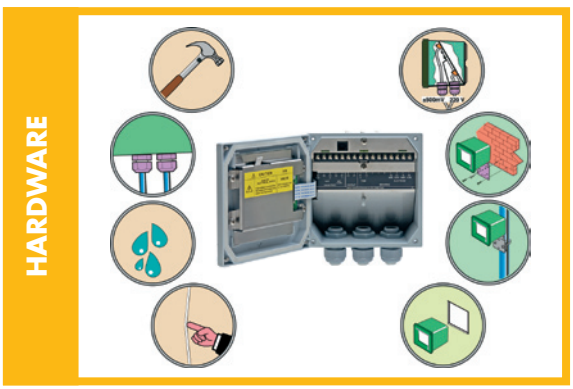
- Electrochemical analysis results are often influenced by other process variables. These uncontrolled variables result in poor process control, especially when the user is unaware of the influence
- EXAxt 450 delivers accurate compensation of these variables to assure accurate process control

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



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

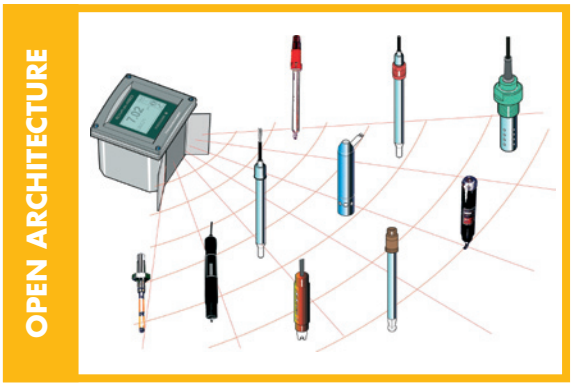


COMMUNICATIONS

- 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



STANDARD SPECIFICATION (Common)

Display	Graphical Quarter VGA (320 × 240 pixels) LCD with LED backlight and touchscreen.
Housing	Case: Cast Aluminum housing with chemically resistant coating Cover, Window: Polycarbonate Protection: IP66 / NEMA 4X / CSA Type 3S Color: Silver grey Mounting hardware: Pipe, Panel or Wall mounting
Dimension	144(W) × 144(H) × Approx.144(D) mm
Power supply	Ratings: 100-240V AC Acceptable range; 90 to 264V AC Ratings: 50/60 Hz Acceptable range; 50 Hz ±5%, 60 Hz ±5% Ratings: 12-24V DC Acceptable range; 10.8 to 26.4V DC
Environment and operational conditions	Ambient temperature: -20 to +55°C Storage temperature: -30 to +70°C Humidity: 10 to 90% RH at 40°C (100 °F) (non-condensing)
Safety, EMC and RoHS conforming standards	Safety: EN 61010-1, EN 61010-2-030, EN 61010-2-201, CAN/CSA C22.2 No.61010-1, CAN/CSA C22.2 No.61010-2-030, CAN/CSA IEC 61010-2-201, UL 61010-1, UL 61010-2-030, UL 61010-2-201
	EMC: EN 61326-1 Class A, Table 2, EN 61326-2-3, EN 61000-3-2 Class A, EN 61000-3-3, RCM: EN61326-1 Class A, Korea Electromagnetic Conformity Standard
	RoHS: EN 50581

PH450G SPECIFICATION

Measuring rages	pH; -2 to 16 pH ORP; -1500 to 1500 mV rH; 0 to 100 rH
Transmission signals	Two isolated outputs of 4-20 mA DC. Max. load 600 Ω. Bi-directional HART® digital communication, superimposed on mA1 (4-20mA) signal. Selectable from pH, temperature, ORP or rH.
Contact outputs	Four SPDT relay contacts with display indicators. High/Low process alarms, control function, wash, hold, fail.
Contact input	Remote wash cycle start.
Temperature compensation	Automatic or manual. Compensation to Nernst equation. Process compensation by configurable temperature coefficient, NEN6411 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. Manual adjustment to grab sample.
Accuracy	pH input; ≤ 0.01 pH ORP input; ≤ 1 mV Temperature; ≤ 0.3°C (≤ 0.4°C for Pt100) Step response; ≤ 4 sec for 90% (pH 7 - pH 4)

Refer to the GS12B07C05-01E for more details.

SC450G SPECIFICATION

Measuring ranges	Conductivity: 0 µS/cm to 200 mS/cm × C (Max. 1999 mS/cm) Resistivity: 0.05 kΩ/C to 999 MΩ × cm Temperature: Pt1000: -20 to 250°C, Pt100 & Ni100: -20 to 200°C, NTC 8k55: -10 to 120°C, Pb36(JIS NTC 6k) -20 to 120°C
Transmission signals	Two isolated outputs of 4-20 mA DC. Max. load 600 Ω. Bi-directional HART® digital communication, superimposed on mA1 (4-20mA) signal. Selectable from conductivity, resistivity, concentration and temperature.
Contact outputs	Four SPDT relay contacts with display indicators. High/Low process alarms, USP, control function, hold, fail
Contact input	Remote range switching.
Temperature compensation	Automatic or manual, for temperature ranges. Reference temperature can be programmable from 0 to 100 °C.
Calibration	Semi-automatic calibration using pre-configured OIML(KCl) buffer. Manual adjustment to grab sample
Accuracy	Conductivity/resistivity; ≤ 0.5 % of reading Temperature; ≤ 0.3°C (≤ 0.4°C for Pt100) Step response; ≤ 4 sec for 90% (for a 2 decade step)

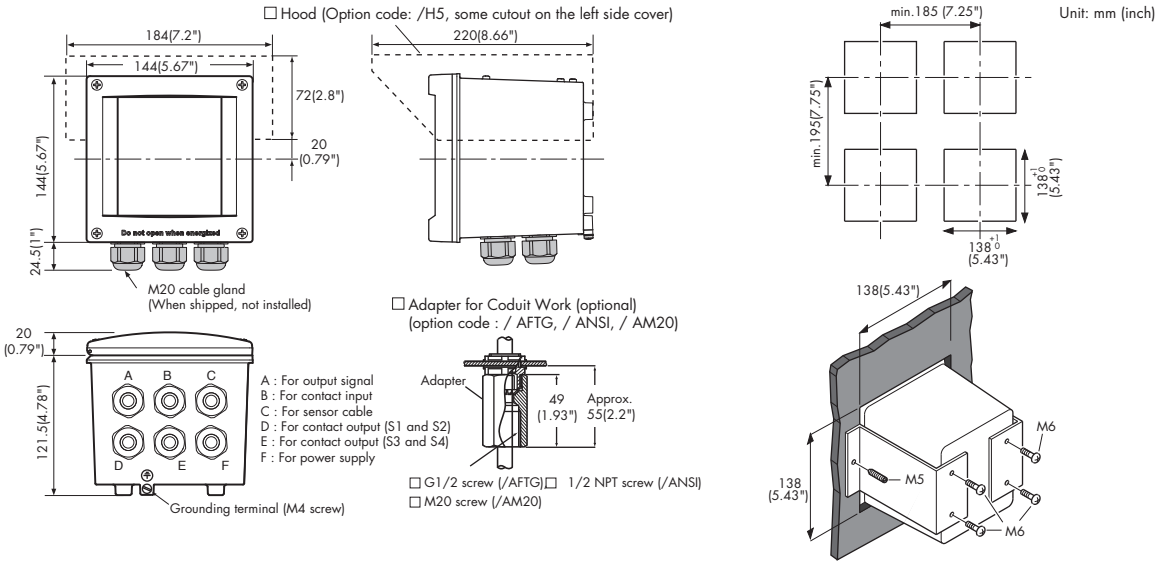
Refer to the GS12D08N05-01E for more details.

ISC450G SPECIFICATION

Measuring ranges	Conductivity: 0 µS/cm to 1999 mS/cm Temperature: -20 to 140°C
Transmission signals	Two isolated outputs of 4-20 mA DC. Max. load 600 Ω. Bi-directional HART® digital communication, superimposed on mA1 (4-20mA) signal. Selectable from conductivity, concentration and temperature.
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. Reference temperature can be programmable from 0 to 100 °C.
Calibration	Semi-automatic calibration using pre-configured OIML(KCl) buffer. Manual adjustment to grab sample.
Accuracy	Conductivity; ≤ 0.5 % of reading ± 1.0 µS/cm Temperature; ≤ 0.3°C Temp. compensation; ≤1 % for NaCl, ≤1 %, for matrix Step response; ≤ 4 sec for 90% (for a 2 decade step)

Refer to the GS12D06D05-01E for more details.

Dimensions



Model and Suffix Codes

[Style: S2]

Model	Suffix Code	Option Code	Description
PH450G	———	———	pH/ORP Converter
SG450G	———	———	Conductivity/Resistivity Converter
ISC450G	———	———	Inductive Conductivity Converter
Power	-A	———	AC Version (100-240VAC)
	-D	———	DC Version (12-24VDC)
Type	-A	———	General purpose version
	-U	———	FM version (*3)
Mounting Hardware		/UM	Universal mounting kit (panel, pipe, wall)
		/U	Pipe and wall mounting hardware (*2)
		/PM	Panel mounting hardware (*2)
Hood		/H5	Awning hood (stainless steel) (*2)
Conduit adapter		/AFTG	G1/2 (*2)
		/ANSI	1/2NPT (*2)
		/AM20	M20 (*2)
Tag Plate		/SCT	Stainless steel tag plate (*1)

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.

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