TELEDYNE ANALYTICAL INSTRUMENTS

Liquid Analytics made simple

On line analysis of pH, ORP, PION, DO Conductivity & Resistivity

Advanced, Flexible and Versatile Controllers

Model LXT-220

AC Powered

The LXT-220's unique systems bus architecture design allows for incredibly robust functional flexibility.

Graphics Display

Allows any of the resident parameters (input, output, control, temperature, etc.) to be graphed on the display with the operator selecting both the sensitivity and time base of the graphing function. In addition to the enhanced visualization of the process or control dynamics, the graphics display allows a much more flexible approach to calibration, diagnostic and set-up procedures.

Process Measurements

pH - ORP - CONDUCTIVITY - RESISTIVITY - DO - ISE

Conductivity applications from 1uS through 1S are available with proven contacting or non-contacting sensor technology with **ELECTROLYTE CURVES** for specific conductivity applications pre-programmed into the LXT-220 software to facilitate rapid and precise response. ISE measurements are linearized to read in ppm. Iso-thermal potential settings are matched (for each electrode) to the measured process variable. In all cases, temperature compensation can be tailored to each application requirement.

Process Controller

The multi-bus systems architecture enables TAI to customize as many as four (4) sensor inputs and (6) output functions associated with multiple process variables with the LXT-220. Control output functions: temperature PID, and process variable outputs (pH, ORP, ISE) as a function of multiple inputs. Up to (8) field configurable relay outputs are available to match process needs. The relay outputs are selectable: Solid state relays for AC applications or electromechanical relays for dry contacts for logic levels or DC applications. These features allow complete configuration flexibility in the field.

pre-pHault Diagnostics & Hart Communications

The LXT-220 can be upgraded with pre-fault diagnostics to alert an operator to a pending pH, ORP or ISE electrode failure. This feature can be applied to each of the (2) channel process inputs. Hart systems architecture can also be applied to any of the LXT-220 output functions. Both the pre-fault and Hart upgrades must be requested at the time of purchase.

Model LXT-230 & LXT-280

Loop Powered

Smart Transmitters

The LXT-230 and LXT-280 are microprocessor based, loop powered process transmitters designed to provide liquid measurement and control in its simplest form. The units are provided in watertight NEMA-4X and NEMA-7C (LXT-280 only) configurations which are capable of being panel, universal or hand-rail mounted in the field. Both can be installed, wired, calibrated and ready to use in minutes. The software is intuitive with simple-to-read process menus written in plain English. A fast-action membrane keypad (magnetic influence in the case of the LXT-280) facilitates the single or dual point calibration for all process variables.

Durable / Cost Savings Approach

The LXT-230 diagnostic transmitter accepts two sensor inputs and is also capable of providing (3) x 4-20 mA outputs (two process and one temperature), thereby significantly reducing cost per loop. Modular design allows for rapid circuit board or EE-prom upgrades. EE-prom changes enable the customer to choose from numerous standard or custom process measurement routines.

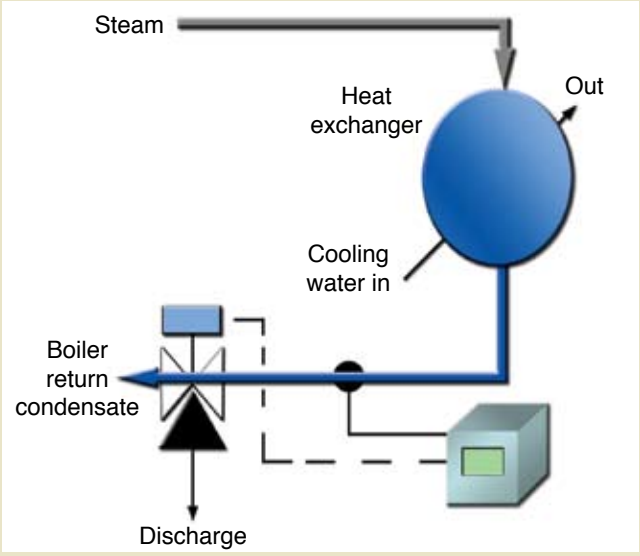
The rugged LXT-230 and LXT-280 enclosures have been selected to maximize their field use and to protect against moisture, dust and chemical resistance. All internal PC boards are coated to resist against possible mold or mildew conditions that may be present in humid, tropical environments. The LXT-280 is machined from a solid block of corrosion resistant stainless steel to ensure integrity in the field (Agency Certified, explosion proof and intrinsically safe).

Conductivity Analysis for Power Plants

Power Industry Applications

The treatment of water utilized in a power plant is critical for reducing boiler failures. As boilers generate steam or water is evaporated by a cooling tower, dissolved minerals accumulate and eventually lead to corrosion of boiler tubes and heat exchanger leaks. To properly control and conserve the chemical additives used to inhibit the costly build-up of deposits, and to determine appropriate boiler blow down schedules, continuous on-line pH and conductivity monitoring of boiler and cooling water is essential.

Conductivity analysis is the amount of ionized salts dissolved in water. These conductive inorganic impurities are a prime indicator of mineral concentration. Conductivity, therefore, is an excellent indicator of boiler feedwater contamination as the condensate typically has a very low conductivity and even very small leaks of process water will significantly cause an upscale reading. The detection of pH levels is also critical. Low pH waters lead to corrosion while high pH can lead to scale formation.



Sensors that offer an Extra Measure of Performance

TAI's state-of-the-art, modular SP-1 insertion/immersion and SP-2 valve-retractable sensors lend adaptability to the entire line of process measurements - including pH, dissolved oxygen (DO), conductivity, resistivity, ORP and Pion - and provide an extra measure of accuracy, dependability, safety and cost efficiency.

SP-2 Retractable and SP-1 Immersion Probe Design

Modular Construction
You never experience downtime with the SP-1 and SP-2 analytical sensors. Low profile, modular construction allows easier installation, field service and factory upgrades. And with fewer, interchangeable spare part components, TAI sensors offer lower life cycle costs. Sensor housings are available in Stainless Steel, Hastelloy, Titanium and Kynar – these along with cartridge and o-ring materials, are carefully selected to successfully withstand the most aggressive wet process applications.

Integral preamplifier
Because sensor pre-amplification belongs at the source of the signal, a high-quality modular pre-amp is built into each SP-1 and SP-2 sensor. This design approach allows an RFI/EMI noise-free signal to be sent directly to any of the LXT Series Controllers.

Temperature Compensation
All sensors feature an integral, full-protected temperature compensation module (RTD or Thermistor) for continuous, accurate measurements over a wide range of temperature conditions.

Ease of Maintenance
Available in a full selection of front-end configurations, the SP-1 and SP-2 sensors offer simple cleaning and convenient replacement of TAI's complete line of electrochemical cartridges. The 0.75 in diameter makes them easy to install in high pressure lines and less subject to fouling. With our unique spray-head clean-in-place (CIP) system, the need for electrode removal is significantly reduced. Modular cartridges eliminate expensive, disposable sensors associated with the tedious time consuming task of re-running cables.

Standardized design with safety in mind
From sure-grip compression fittings, handrail mounts, surface floats and isolation valves, to advanced automatic retraction/insertion and cleaning systems, the SP-1 and SP-2 deliver a versatile array of installation possibilities. In addition, the SP-2's built-in safety stops and lanyards prevent injury from accidental sensor blowouts. Redundant sealing systems in the SP-2 eliminate leakage through both the isolation ball valve and the sensor housing.

The combination of all these unique, process-designed sensor features makes TAI the choice for your entire wet process requirements.

Typical Applications / Industries Served

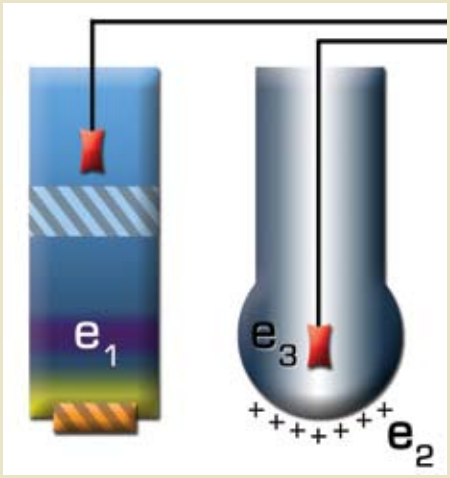
Power Industry - Heat Exchanger Leaks, Condensate Monitoring, Cooling Tower H2O Control, Boiler Feedwater Control

Pulp & Paper Industry - Demineralizer, Digester, Bleach Plant, Recovery & Waste Water

Water Treatment - Influent Monitoring, Reverse Osmosis & Desalinization Plants

Food & Beverage - pH in Fermentation Process, DO in Carbonated Beverages

Pharmaceutical - Clean-in-Place (CIP) Conductivity Monitoring



EION = e1 + e2 - e3
e1 = e3
EION = e2 = pH

pre-pHault Diagnostics* (LXT-220 only)

Electrochemical measurements are made by using an ION specific measuring element, and an inert contact used as a reference standard for the ion specific analysis (the diagram depicts pH but applies to all specific ion measurements). As shown in the diagram, if the potential inside the sealed glass membrane (e3) is equal to the potential of the reference element (e1), the output from the measurement pair of the half cells is dependent only on the outside of the sealed glass, or the pH of the associated process solution. However, a chemical change (in e1 – the only element subject to unwanted contamination) brought on by process intrusion, through the liquid junction, will cause an imbalance in the measurement and the output of the cell is no longer limited to the pH measurement of the solution in which is it immersed.

The Series LXT-220 line predicts this process intrusion as a pre-pHault condition and displays its real time status on the analyzer main process screen as a vertically expanding bar, culminating in a flashing bar. The pre-pHault alert warns the user of a pending chemical alteration of the electrochemical reference half-cell prior to actual measurement error, hence the designation, "pre-pHault."

** patent pending*

Dissolved Oxygen Conductivity pH Oxygen Reduction Potential Specific Ion

Series LXT Smart Transmitter Specifications

	LXT-220	LXT-230	LXT-280
Outputs	4-20 mA Hart; up to 6 analog outputs	4-20 mA expandable; up to 3 outputs	4-20 mA expandable & reversible
Power requirements	24 VDC 0.25A or 115/220 VAC	Recommended 24 VDC, maximum 50 VDC, minimum 15 VDC	
Maximum loop impedance	500 ohms on 4-20 mA outputs with internal 24 VDC	500 ohms on 4-20 mA 24 VDC	
Display	Menu driven Supertwist LCD. Simultaneously displays process ID, Process value in Eng units, percent output and temperature in °C or °F	Menu driven Supertwist LCD. Simultaneously displays process ID, Process value in Eng units, percent output and temperature in °C or °F	Menu driven Supertwist high temp LCD. Rotates 90° for best viewing. Simultaneously displays process ID, Process value, current output and temperature in °C or °F
Enclosure	NEMA-4X, 1/2 DIN (5.67" H x 5.67" W x 6.97" D)	NEMA-4X, 1/2 DIN (5.67" H x 5.67" W x 3.50" D)	300 series stainless steel NEMA 7C Electronics; CSA & FM approved intrinsically safe for use in Class I, II, and III, Groups A through G
Input / Output Isolation	Maximum 300 volts between process input and any 4-20 mA output (single or multiple channel outputs). External inputs must be isolated.	Maximum 300 volts between process input and any 4-20 mA output (single or multiple channel outputs). No isolation between inputs on multiple channel units.	

COMMON SPECIFICATIONS

Measurement range:	Application specific
Accuracy:	±0.10% of full scale
Linearity:	±0.05% of full scale
Sensitivity:	±1.0 mV
Stability:	±0.2% per year @ 0 to 70 °C
Operating temp:	-4 to 158 °F (-20 to 70 °C)
Response time:	90% of step change in 1 second
Repeatability:	±0.1%
Temperature compensation:	Automatic -30 to 140 °C, RTD. Accuracy ±0.1% over a 0-100 °C span 50 / 60 Hz
Noise rejection:	Greater than 70 db

Input / Output isolation: Maximum 300 volts between process and input and nay 4-20 mA output (single and multiple channel outputs). No isolation between inputs on multiple channel units.

Calibration: Auto Buffer Calibration: Allows the definition of two buffer points, saved in memory, during the initial start-up. This will allow subsequent standardize and span buffer calibrations with only 2 keystrokes.

Factory reset calibration: With 2 keystrokes, allows the user to return the transmitter to a zero electrode offset (asymmetrical potential) and an ideal Nernstain slope (1000 mV per unit).

Temperature trim: Allows for compensation for any differences in RTDs by programming the offset into the transmitter.

Temperature display: Temperature can be field configured to display in °C or °F

Display contrast: Fully adjustable for ambient light conditions

SENSOR SPECIFICATIONS

Parameter	Dissolved O2	pH	Conductivity	Specific Ion	ORP
Ranges	0 - 20 ppm (mg/l); 0-100% saturation; ppb option available	0-14 pH (electrode dependent)	Low: 0.1*u*S to 20*u*S High: 50*u*S to 20mS Torrodial: 50mS - 1S	Electrode dependent Ag+, Na+, CN, Ca++, Cl-, S-, Br, K+	(-)2000 to +2000 mv
Operating temp	(-) 5 to 130 °C	(-) 5 to 130 °C	(-) 5 to 100 °C Opt rating to 150 °C	Electrode dependent	(-) 5 to 80 °C
Pressure	65 psig @ 130 °C	100 psig @ 130 °C Opt: 300 psig @ 130 °C	100 psig @ 100 °C Opt: 300 psig @ 150 °C	Electrode dependent	100 psig @ 80 °C Opt: 300 psig @ 80 °C
Sensor Mounting (user preference)	FlowCell, Insertion, or Retractable	FlowCell, Insertion, or Retractable	FlowCell, Insertion, or Retractable	FlowCell, Insertion, or Retractable	FlowCell, Insertion, or Retractable

TELEDYNE ANALYTICAL INSTRUMENTS

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Warranty

Instrument is warranted for 1 year against defects in material or workmanship

NOTE: Specifications and features will vary with application. The above are established and validated during design, but are not to be construed as test criteria for every product. All specifications and features are subject to change without notice.