

pH, ORP, Conductivity, Dissolved Oxygen and Ozone

Multiparameter Indicating Transmitter (Mettler-Toledo Thornton M300 Series)

Engineering Specification EN-0106

The indicating transmitter shall be capable of measuring two channels of pH, ORP, conductivity, resistivity, dissolved ozone and dissolved oxygen in any combination selected by the user on site. All measurements shall be made simultaneously, with indication, alarm and output signals available for the primary measurements and for temperature. Comparison of the two measurements shall be available with internal computation, display, alarm and output of percent rejection, ratio, difference, or pH calculated from power plant conductivity measurements.

Instrument security shall be provided by user-set two level security codes. It shall have an illuminated display with space for custom names and readable in direct sunlight or darkness. Menus shall be available in English, French, German, Italian and Spanish.

The transmitter shall be capable of measuring from two- or four-electrode conductivity sensors and shall allow readout in conductivity or percent concentration units for hydrochloric acid, sulfuric acid or sodium hydroxide. Conductivity temperature compensation for pure water shall fully accommodate the non-linear ionization properties of water using the most recent Thornton/Light conductivity data published in Ultrapure Water Journal. In addition, selection shall be available for power plant cation and ammonia/ETA temperature compensation, semiconductor alcohol and glycol compensation and for a user set linear temperature coefficient. Specialized temperature compensation shall also be provided when measuring percent concentrations of acids or sodium hydroxide.

The pH measurement shall be provided with on-line sensor diagnostics for glass membrane and reference junction/diaphragm resistance. pH temperature compensation shall include conventional Nernst electrode temperature compensation and adjustable solution temperature compensation for high purity water measurements, if selected. Dissolved oxygen and ozone temperature compensation shall automatically compensate for both the gas permeation rate through the sensor membrane and for its solubility in water.

Three-mode PID control capability shall be provided with selectable output types of pulse frequency, pulse length and analog for one or two reagents. It shall provide non-linear breakpoints for pH control and have continuous display of % output and auto/manual status.

The same model transmitter shall operate from 90-240 VAC and from 10-30 VDC, 4-wire power. It shall be provided in either a 1/4 DIN case with hardware for NEMA 4X, IP65 sealed panel mounting, or in a 1/2 DIN NEMA 4X, IP65 case (with optional kits) for wall or pipe mounting. Connection to sensors shall be via supplied cables with connector at the sensors for convenient maintenance. The transmitter shall have plug-in terminals. The indicating transmitter shall be provided with six alarm setpoints, assignable to six relays.

Four 0/4-20 mA output signals shall be assignable to any measurements. Output scaling shall be selectable as linear, bi-linear, logarithmic or auto-range (to provide high resolution at the low end of the range yet keep high measurements on-scale during upset, startup or calibration). A USB port shall also be provided for data acquisition and remote configuration.

The instrument shall be ISO9001 factory calibrated to NIST-traceable standards and be provided with a certificate of calibration. An accessory NIST-traceable resistance calibration module, interchangeable with conductivity sensors, shall be available to permit full field calibration of conductivity/resistivity and temperature measurements, including leadwire effects. Conductivity sensor cell constants shall be individually ISO9001 factory calibrated to ASTM traceable standards, with final verification in 18+ Megohm-cm pure water for 0.1 cm⁻¹ sensors. They shall be provided with certificates of calibration.

The indicating transmitter and sensor(s) shall be Mettler-Toledo Thornton model M300 Instrument, with compatible conductivity, pH, ORP, dissolved oxygen and/or dissolved ozone sensors, as specified.

Mettler-Toledo Thornton, Inc.

36 Middlesex Turnpike,
Bedford, MA 01730 USA
Tel. +1-781-301-8600
Fax +1-781-301-8701
Toll Free +1-800-510-PURE
thornton.info@mt.com

Customer/Technical Service

Toll-Free +1-800-642-4418
Fax +1-781-271-0214

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EN0106 Rev.A 2/07

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