

## ORP Monitoring System

ORP Monitors shall be supplied for continuous monitoring of ORP in     (Specify Application and Location)    . The ORP monitoring system shall consist of an electronic monitor housed in a NEMA 4X enclosure suitable for wall, pipe, or panel mounting, a differential-style ORP sensor, and accessories listed below. The ORP Monitoring System shall be ATI Series Q45R/Q25R as described below.

The ORP sensor shall be a 1" NPT, dual-electrode design. The reference electrode shall be fully sealed in a glass to prevent contamination of the reference element. The reference chamber of the sensor shall be fully serviceable by removal of the saltbridge and replacement of the reference chamber solution.

The sensor shall be constructed of molded PEEK (poly-ether-ether-keytone) components. These components include the saltbridge, body, all rear seal components, and all internal components. The body shall be hex shaped to facilitate quick connection to standard 1" NPT fittings.

The sensor shall include a titanium ground electrode to improve signal stability and enable electrode breakage diagnostic functions to be performed. The sensor shall include a Pt1000 RTD for high accuracy temperature measurements. The sensor shall include an integral preamplifier to provide a low impedance signal output capable of being driven 3000 feet with standard sensor cabling. The sensor preamplifier shall contain features to monitor for sensor seal failure. The integral electronics shall be encapsulated into the sensor.

The sensor shall include a highly chemical resistant, cross-linked polyethylene jacketed cable. The sensor cable shall contain two foil shields for optimum electrical performance.

The sensor saltbridge shall be a high capacity, dual-junction, high capacity device. The saltbridge shall be completely replaceable.

The ORP Monitor electronic assembly shall be: **(select one version below)**

- A. A loop-powered 2-wire instrument providing an isolated 4-20 mA output proportional to ORP into a maximum load of 500 ohms.
- B. A battery operated data logging monitor capable of operating from an internal battery. The monitor shall provide two 0-2.5 VDC outputs suitable for use by a data logger. The monitor shall operate for up to 4 days continuously on an alkaline battery and up to 10 days on a lithium battery.

The ORP monitor electronic assembly shall provide a variety of functions as follows.

- 1. Provide user selectable display of ORP, process temperature, or PID % output on the main display. Main display variable shall be indicated with a minimum character height of 0.75" to allow easy readability up to 20 feet away.
  - 2. Provide the ability to use the 4-20 mA output for PID control. Proportional, Integral, and Derivative functions shall be user adjustable, and also provide for output hold when needed.
  - 3. The transmitter shall allow the 4-20 mA output to be set to any two points within the measuring span of -1000 - +2000 mV, as long as the points are at least 30 mV away from each other. The points may also be reversed. The transmitter shall allow the user to place a delay on the reaction time of the output and display.
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4. Provide output hold and output simulate functions to allow for testing or remote receiving devices or to allow maintenance without disturbing control systems.
5. The transmitter shall contain calibration functions for 1-point (sample or buffer) and 2-point calibration for ORP. Calibration stability monitors shall be provided to hold calibration status until stable buffer conditions have occurred.
6. Diagnostic functions shall be incorporated into the transmitter. The 4-20 mA output shall be capable of being assigned to safely rise to 20 mA, fall to 4 mA, or be left alone, during diagnostic failures. Diagnostic error messages shall be displayed in clear language; no confusing error codes shall be displayed.

**The complete ORP Monitor shall be an Analytical Technology Inc. Model Q45R/Q25R, or approved equivalent.**

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