

Series Q46H/83 Potassium Permanganate Monitor

On-line residual permanganate monitors shall be provided to continuously measure permanganate at the _____ (Specify Locations). Each Permanganate Monitor shall consist of a permanganate chemistry module and an electronic monitor housed in a panel mount enclosure (or housed in a NEMA 4X enclosure for surface mounting).

Permanganate monitors shall measure permanganate using the recommended method of reaction of the sample with potassium iodide and measurement of the iodine released by the permanganate in solution. The released iodine shall be measured by air stripping the iodine out of the treated sample and passing the air/iodine gas stream past a special gas phase iodine sensor. This method shall insure that the permanganate concentration can be read continuously without contact between the sensor and the wastewater sample.

The chemistry module component shall provide the sample conditioning and air stripping components required for permanganate measurement. Peristaltic pumps shall provide sample and reagent metering, with quick-load pump heads to facilitate tube changes. Air stripping of the iodine shall occur in a special stripping chamber with air supplied from an internal diaphragm pump. Airflow shall be controlled at a fixed flow rate using a precision metering valve, and an internal rotameter shall provide flow indication. A sample overflow assembly shall be provided on the outside of the chemistry module. This assembly shall allow high sample flow rates (10-20 GPH) to the analyzer to reduce sample transport time to a minimum.

The sensor for the permanganate measurement shall be a special gas phase iodine sensor which plugs into the sensor flow block. Air passes through the stripping chamber and removes the iodine from the water phase and into the gas phase. The iodine-rich air then flow out of the stripping chamber and into the sensor flow block. The iodine diffuses into the sensor where it reacts with sensing electrode. The sensor shall generate a current signal linearly proportional to measured iodine concentration, and a 25-foot sensor cable shall be supplied for connection to the permanganate monitor. The sensor shall have a quick-disconnect plug at the back to facilitate sensor replacement when necessary.

Monitors shall be powered by 90-260 VAC single-phase line power. The monitor shall provide two isolated 4-20 mA outputs as standard, with an option for a third 4-20 mA output. Outputs shall be configurable for permanganate, temperature, or PID control. Analog outputs shall be both ground isolated and isolated from each other. The chemistry module shall be powered by either 115 VAC or 230 VAC.

For alarm purposes, monitors shall contain three SPDT relays. Relay functions shall be programmable for control, alarm, or fail functions, and may be designed for either normal or failsafe operation. For monitors supplied with only 2 analog outputs, monitors shall have the option of an additional 3 low-power relays to allow for additional external alarm functions.

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

1. Provide user selectable display of PPM permanganate, 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. Allow selection of operating ranges of 0-200 PPB, 0-2 PPM, or 0-20 PPM. Display ranges shall be configurable by operators, or the monitor may be configured for Auto-Ranging. The auto-ranging function shall automatically switch to the display range that provides the best resolution for any given operating level.
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3. 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.
4. Provide two isolated 4-20 mA outputs, with output spans programmable by the user for any segment of a display range. An optional third analog output is available, providing separate outputs for permanganate and temperature.
5. Provide output hold and output simulate functions to allow for testing or remote receiving devices or to allow maintenance without disturbing control systems.
6. Provide three 6 amp SPDT relay outputs in standard unit. Software settings for relay control include setpoint, deadband, phase, delay, and failsafe. Provide an optional 3-relay card, for 0-30 V signals, to bring the total to 6 relays. Relays shall be programmable for either control or alarm function, or relays may be assigned to diagnostic functions for use in indicating trouble conditions at a remote location.
7. Provide option for digital communications. These options shall include Profibus-DP, Modbus-RTU, or Ethernet-IP.
8. 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 Permanganate Monitor shall be Series Q46H/83 as manufactured by Analytical Technology, Inc. or approved equal.
