Engineering Specifications

Silica analyzer

General

The silica analyzer shall be an all integrated and continuous monitoring from 1 to 6 channels, using the silicomolybdate blue method for colorimetric measurement at a wavelength of 820 nm.

The analyzer shall have:

- measurement range of 0.00 to 5'000 µg/L (parts per billion) as reactive silica (SiO_2),
- lowest detection limit lower than 0.5 µg/L,
- precision in the 0 to 1'000 µg/L range of ±0.5 µg/L or ±2% of reading, whichever is greater,
- precision in the 0 to 5'000 µg/L range of ±2 µg/L or ±2% of reading, whichever is greater.

The analyzer shall provide as a standard:

- a rinsing phase of the reactor vessel to eliminate carry over, using fresh sample with no-added reagent,
- a measurement cycle time of 9.5 minutes from 5 to 50°C (41-122°F),
- one logic input per channel to control sample availability in process conditions.

The analyzer shall be available in panel or wall-mount version, manufactured per ISO 9001-2000, and comply with CE and UL regulations. The transmitter shall be NEMA4X / IP65 certified, with enclosure in aluminum.

Display

The analyzer shall be freely programmable in range with a graphical dot matrix 128 x 128 pixels display of 75 x 75 mm (2.95 x 2.95 in) and LED backlighting.

Display information

Main display shall contain:

- name and concentration of the last measured sample,
- bar graph tracker with steps of the current analysis in progress,
- dates and hour of the last slope or zero calibration, plus alarms status.

Auxiliary display shall be available without measurement interruption through a "one button" operation and contain:

- complete view of latest concentration for each sample,
- analyzer status,
- each sample trend curve over the last 24h.

User interface

The analyzer shall have worded operation menus in five languages (English, French, German, Spanish and Italian).

Calibration modes

The analyzer shall dynamically zero prior to each sample measurement (by an automatic feed-back control of the quantity of light).

The analyzer shall have a zeroing of the background silica in reagent:

- manually or fully automated,
- through chemical zero cycles without the need of ion-exchange resin or silica-free reagents.

The analyzer shall have slope calibration,

- manually or fully automated,
- with frequency programmable on a fixed date mode or number of hours.

Calibration data

The analyzer shall self-check new calibration parameter and generates warning or alarm message if deviation from primary calibration parameter.

It shall have a menu for quick comparison of default, primary, and last calibration parameters with date and absolute value of Zero and Slope.

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Security

The analyzer shall have three password protected access levels for transmitter calibration, programming and maintenance.

Alarms

The analyzer shall have 6 programmable alarm relays allocated over any of the 6 samples and assigned to any of the following:

- concentration limits including direction, delay, hysteresis and normal relay status,
- occurrence of the measurement cycle for a channel,
- minimum flow detection for a channel.

The analyzer shall have 2 extra programmable relays allocated to:

- warning messages (reagent level low, minimum sample flow, small calibration deviation),
- system alarms (no reagents, no sample, no calibration, no power supply).

Outputs

The analyzer shall have 7 sets of isolated analog outputs to be configured in 0 or 4-20 mA.

Six outputs can be assigned to sample concentration on any channel. The user shall be able to configure any scale in linear or bi-linear mode.

An extra output shall be configurable to report events like calibration occurrence, warning messages, system alarms, within the three possibilities of “live", "last", or "preset".

The transmitter shall have both capabilities of calibration and simulation of the analog output value.

Additional digital outputs Jbus / Modbus, Profibus DP shall be available.

Diagnostic tools

The analyzer shall have diagnostic functions:

- data logger of 3’200 lines,
- worded warning or alarm messages for concentration, reagent , calibration, minimum sample flow,
- guided menu for typical maintenance procedure (start-up, reagent refill, long-term stop),
- independently turn on and off each electrical component,
- retrieve raw signal values during calibrations,
- default values loadable,
- software version.

Sample conditioning and hydraulic assembly

The analyzer shall have reagent and calibration solution with minimum cost of ownership through:

- non proprietary reagent,
- reagent addition with ceramic pulse pumps,
- replenishment of 3 x 2L canisters after minimum 45 days.

The analyzer shall have a sequential constant head system with:

- minimum flow detection per sample,
- manual introduction of off-line sample,
- required volumes for grab sample no greater than 250mL.

Warranty

The analyzer shall be warranted for one full year against defects in materials and workmanship and shall include a 45-days supply of dry reagents.

Model identification

The instrument shall be Hach Ultra Polymetron 9210 Silica analyzer.