

## PART 1 GENERAL

- 1.1 Section includes:
  - A. Sodium process analyzer for continuous monitoring of sodium in water.
- 1.2 Measurement Procedures
  - A. The sodium analyzer shall be continuous monitoring 1 channel , using ion selective electrode measurement method after pH conditioning and temperature compensation.
- 1.3 System Description
  - A. Performance Requirements
    1. Measurement Range
      - a. 0.01 to 10'000ppb freely programmable
    2. Detection Limit
      - a. 0.01ppb
    3. Accuracy
      - a. <5% of the reading or  $\leq \pm 0.1$  ppb, whichever is greater
    4. Reproducibility
      - a. <1.5% of reading or  $\leq \pm 0.02$  ppb, whichever is greater within 10°C
    5. Response time at T>90%
      - a. less than 3 minutes for a step change of 0.1ppb to 10ppb
- 1.4 Certifications
  - A. EMC: CE compliant for conducted and radiated emissions CISPR 11 (Class A limits), EMC Immunity EN 61326-1 (Industrial limits), and EN 61010-1
  - B. Safety: General Purpose UL/CSA 61010-1 with cETLus safety mark; CSA C22.2 No 61010-1:2012
  - C. NEMA 4x/IP65 dust and water ingress protection rating (Transmitter)
  - D. IP50 (Panel version)
  - E. IP54 (Enclosure version)
  - F. KC (EN 61326-1: 2006)
- 1.5 Environmental Requirements
  - A. Operational Criteria
    1. Storage Temperature: -20 to 60 °C (-4 to 140 °F)
    2. Operating Temperature: 5 to 45 °C (41 to 113 °F)
    3. Relative Humidity: 10 to 80 %, non-condensing
- 1.6 Warranty
  - A. Warranted from manufacturer defects for two years (Europe) or one year (all other geographies) from date of shipment.
- 1.7 Maintenance and Service
  - A. Scheduled Maintenance
    1. Weekly
      - a. Calibration of the instrument
    2. Every 3 months
      - a. Refill calibration solution
      - b. Refill reactivation solution
      - c. Refill electrolyte solution

- d. Conditioning solution (non-cationic applications)
3. Every 6 months
  - a. Electrodes manual cleaning (with paper/tissue)
4. Annually
  - a. Temperature calibration
  - b. System check up (to be performed by Hach service group)
  - c. External audit (to be performed by Hach service group)
5. Every 2 years
  - a. Solenoid valves change
- B. Unscheduled Maintenance
  1. Depending on sample composition, sample cells, electrodes and valves may need more frequent cleaning

## PART 2 PRODUCTS

### 2.1 Manufacturer

- A. Hach Lange Sàrl, Vézenaz, Switzerland
  1. Polymetron 9245 Sodium Analyzer

### 2.2 Manufactured Unit

- A. The Polymetron Sodium analyzer consists of a microprocessor controlled analyzer designed to continually monitor concentration of Sodium (Na) in a sample stream. The analyzer also has the capability to intake grab samples for internal measurement.

### 2.3 Equipment

- A. Display
  1. The display screen 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.
  2. The main display shall contain:
    - a. sample name , latest concentration of sodium measured and temperature,
    - b. bargraph tracker of the current cycle in progress and time clock,
    - c. sample trend curve over time,
    - d. alarm occurrence.
  3. Auxiliary display shall be available without measurement interruption through a “one button” operation and contains:
    - a. potential and temperature value of the current analysis,
    - b. sample name , concentration and timing of latest concentration measured per channel,
    - c. analyzer status with sample inhibitions, warning messages, alarm status with threshold value.
  4. Built-in data logger shall allow display of measurement values, calibration results and alarm information to over 3'200 data.
  5. The analyzer shall have worded operation menus in five languages (English, French, German, Spanish and Italian).
- B. Calibration
  1. The analyzer shall have calibration by manual introduction of standard solution. For application lower than 10ppb sodium, the analyzer shall propose a fully automated calibration based on known addition principle , using only ppm standard solutions to perform one or two points automatic calibration, because it's easier to prepare and more stable.
  2. The analyzer shall have slope or offset calibration:
    - a. manually or fully automated,

- b. with frequency programmable on a fixed date mode or number of hours.
  3. The analyzer shall self-check new calibration parameter and generates warning or alarm messages if deviation from primary calibration parameter. It shall have a menu for quick comparison of last calibration parameters.
- C. Security
  1. The analyzer shall have three password protected access levels for transmitter calibration, programming and maintenance.
- D. Alarms
  1. The analyzer shall have 2 programmable alarm relays assigned to any of the following:
    - a. concentration limits including direction, delay, hysteresis and normal relay status,
    - b. minimum sample flow rate detection.
  2. The analyzer shall have 2 extra programmable relays allocated to:
    - a. warning messages (reagent level low, small calibration deviation),
    - b. system alarms (no reagents, no sample, no calibration, no power supply)
- E. Outputs
  1. The analyzer shall have 4 of isolated analog outputs to be configured in 0 or 4-20 mA. Three outputs can be assigned to sample concentration, temperature or potential on any channel. The user shall be able to configure any scale in linear, bi-linear mode.
  2. 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".
  3. The transmitter shall have both capabilities of calibration and simulation of the analog output value.
  4. Additional digital outputs Jbus / Modbus, Profibus DP shall be available.
- F. Reagents and Standards
  1. The analyzer shall have reagent and calibration solution with minimum cost of ownership through:
    - a. Constant buffering capacity from a highly absorbent cartridge plunging down to the bottom of the reagent bottle,
    - b. Choices for conditioning reagent including ammonia (NH<sub>3</sub>), monoethylamine (MEA), diethylamine (DEA) , diisopropylamine (DIPA),
    - c. Nonproprietary reagents and fast bottle substitution,
    - d. Reagent autonomy of minimum 50 days,
    - e. No use of forcing gases or permeation tubing or pH electrode,
    - f. No request for manual rejuvenation (HF etching) of electrode,
    - g. Injection of calibration solution with ceramic pulse pumps.

## 2.4 Components

### A. Standard Equipment

1. The analyzer shall provide as a standard:
  - a. sample quick-loop per channel for an immediate fresh sample,
  - b. minimum sample flow detection and associated alarms,
  - c. overflow vessel to allow variations in inlet pressures and for manually introduced sample,
  - d. manually prompted sample shall be followed by an automatic return to on-line measurement,
  - e. pH conditioning using siphon effect of a liquid sample column with pH set-point programmable,
  - f. temperature compensation based on Iso-thermal point,
  - g. regulated conditioning addition across sample pH and temperature changes
  - h. automatic reactivation of sodium electrode by injection of non-hazardous chemical,
  - i. all items mounted on a panel

- B. Dimensions:
  - 1. 850 x 450 x 252.5mm [33.46 x 17.71 x 9.94in]
- C. Weight:
  - 1. 15 - 30 Kg
- D. The analyzer must operate using 110-240VAC, 50/60 Hz power

### 2.5 Optional Accessories

- A. a fully automated calibration based on known addition principle for an utmost accuracy,
- B. an enclosure for better safety of personnel (no tubes or cables hanging loose) and providing visibility for electrodes and main hydraulic segments,
- C. enhanced conditioning type for highly acidic water of samples after cation exchangers. Measuring range amended for a 1 to 200ppm freely programmable.

## PART 3 EXECUTION

### 3.1 Preparation

- 1. Mounting
  - a. Panel
  - b. Wall
- 2. Sample Inlet
  - a. Simple fittings for 6 mm O.D. tubing or ¼" O.D. in PE-low density. ¼" OD in PHED-PTFE-SS as option
- 3. Drain Outlet
  - a. Barbed stem for 12 mm (½" I.D.) hose
- 4. Sample Flow
  - a. 6 to 9 L/hour
- 5. Sample Pressure
  - a. 2 to 87 psi (0.17 to 6 bar)
- 6. Sample Temperature
  - a. 5 to 50 °C (41 to 122 °F)

### 3.2 Installation

- A. Contractor will install the analyzer in strict accordance with the manufacturer's instructions and recommendation.
- B. Manufacturer's representative will include a half-day of start-up service by a factory-trained technician, if requested.
  - 1. Contractor will schedule a date and time for start-up.
  - 2. Contractor will require the following people to be present during the start-up procedure.
    - a. General contractor
    - b. Electrical contractor
    - c. Hach Company factory trained representative
    - d. Owner's personnel
    - e. Engineer

### 3.3 Manufacturer's Service and Start-Up

- A. Contractor will include the manufacturer's services to perform start-up on instrument to include basic operational training and certification of performance of the instrument.

- B. Contractor will include a manufacturer's Service Agreement that covers all the manufacturer's recommended preventative maintenance, regularly scheduled calibration and any necessary repairs beginning from the time of equipment startup through to end user acceptance / plant turnover and the first 12 months of end-user operation post turnover.
- C. Items A and B are to be performed by manufacturer's factory-trained service personnel. Field service and factory repair by personnel not employed by the manufacturer is not allowed.
- D. Use of manufacturer's service parts and reagents is required. Third-party parts and reagents are not approved for use.

END OF SECTION