



Cupric Ion Sensors



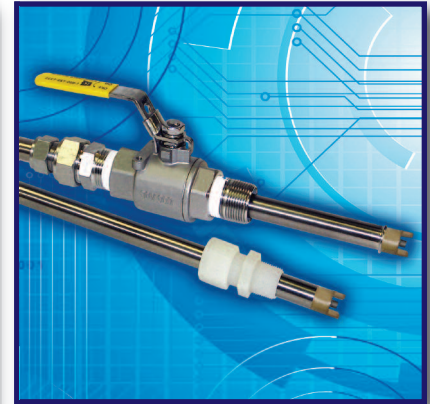
ELECTRO-CHEMICAL DEVICES

Features

- MVS10 or MVS17 Style Sensors
- Multiple materials of construction
- Integral Signal Conditioner
- Replaceable Electrode Cartridge
- Dual Channel Analyzers, pH/pION, pION/pION

Benefits

- Insertion, Immersion or Valve Retractable Service
- 316 Stainless Steel, Titanium, Hastelloy
- Noise free transmission
- Simple and Economical Service
- Mix and Match your choice of measurements



Model MVS10/MVS17
Cupric Ion Sensors

Description

The MVS10 and MVS17 sensors provide a stable and economical platform for the in line measurement of pH, ORP, Specific Ion, Dissolved Oxygen, Conductivity or Resistivity. The MVS10 is an insertion or immersion style sensor for use in pipe Tees or on the end of a Stand Pipe for immersion into a tank or pond. The MVS17 is a valve retractable design allowing insertion or removal of the sensor into a pipe without interrupting the process flow. Both sensor designs use easily replaceable electrode cartridges. ECD offers several ion selective electrode cartridges suitable for continuous online measurement.

The Cupric Ion Electrode is a combination electrode with a copper sulfide (CuS) solid state pressed crystal sensing element and a double junction reference electrode. The Cupric Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of free cupric ions, Cu⁺² not Cu⁺, in the measured solution. The typical output is 25mV to 30mV per decade of change in concentration. The speed of response varies from a few seconds in concentrated solutions

up to a few minutes in the lower ppm ranges. The Cupric Ion sensors are used with either the T23, 4-20 mA Transmitter, or the C22 Controller with its dual channel mix and match capabilities. These analyzers will measure copper ions from 1.0 ppb to 6,300 ppm autoranging the display between the ppb, ppm and ppt (parts per thousand) scales.

The copper ion electrode is poisoned by silver and mercury ions in solution. Silver and mercury must be absent from the measured solution. Chloride and Bromide ions will also react with the membrane if present in high enough concentrations. Polishing the sensor with the supplied polishing strips will restore the function if a mercury amalgam or silver layer forms on the electrode. In basic solutions, copper reacts with hydroxide and precipitates as Cu(OH)₂, cupric hydroxide. This can be avoided by keeping the solutions acidic, pH 6 or lower. The sensor is calibrated using two standard solutions differing in concentration by a factor of 10, i.e. 10 ppm and 100 ppm. The calibration sets the slope of the electrode, mV/decade, and the zero potential for the sensor.

In many cases the process solution's ionic strength, temperature and pH value will differ widely from the calibration solution. These factors will affect the zero potential of the cupric sensor causing an offset, but they will typically not affect the slope. To eliminate the offset perform a standardization, a single point in-line calibration. Once the sensor has stabilized in the process solution take a grab sample from the process and determine the cupric ion concentration. Adjust the analyzer to read this laboratory determined value. It is recommended to verify the readings on a weekly basis.



Model T23 Transmitter



Model C22 Analyzer

Cupric Ion Sensors

Specifications

MVS10 and MVS17 Sensors

Combination electrode cartridge with a copper sulfide measurement cell and a double junction, $\text{KNO}_3/\text{KCl}/\text{AgCl}$, reference electrode, signal conditioner, ATC

Electrode Slope

27 ± 3 mV per decade of concentration change

Measurement Range

Cupric ion: 1.0 ppb to 6,300 ppm (2-6 pH)
 10^{-8} molar to 0.1 molar

Temperature Range

0° C to 80° C (32° F to 176° F)

Pressure Range

0 - 50 psig (0 - 3.5 barg)

Response Time

T90 in 10 seconds

Electrode Life

6 to 12 months

Interfering ions

Silver, Mercury must be absent, Chloride and Bromide

Wetted Materials

Radel, epoxy, CuS, PTFE, 316 SS, Viton O-Ring

Process Connections

MVS10 $\frac{3}{4}$ " MNPT compression fitting

MVS17 1" MNPT Ball Valve

T23 Transmitter

General purpose, $\frac{1}{2}$ DIN, NEMA 4X, 24 VDC 4-20 mA loop powered Transmitter, CE Marking, Auto ranging display, ppb → ppm → ppthousand

C22 Analyzer/Controller

General purpose, $\frac{1}{2}$ DIN, NEMA 4X, 110/220 VAC, CE Marking, single or dual channel, with or without pH compensation, (1) 4-20 mA output and (2) Alarm Relays per channel, Auto ranging display, ppb → ppm → ppthousand

Part No.	Model and Product Description
1418060.3000.Cu	MVS10-C22-CBL-EG-2005058.VIT, Cu^{++} ISE sensor, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 10 ft cable
1414060.3000.Cu	MVS10-T23-CBL-EG-2005058.VIT, Cu^{++} ISE sensor, 316 SS body, $\frac{3}{4}$ " Diameter. x 10" length, 10 ft cable
1419060.3000.Cu	MVS17-C22-CBL-EG-2005058.VIT, Cu^{++} ISE sensor, 316 SS body, $\frac{3}{4}$ " Diameter. x 17" length, 10 ft cable
1415060.3000.Cu	MVS17-T23-CBL-EG-2005058.VIT, Cu^{++} ISE sensor, 316 SS body, $\frac{3}{4}$ " Diameter. x 17" length, 10 ft cable
1900101.0040	Model T23 Cupric Ion transmitter, 24VDC loop powered, Universal Mounting Bracket (UMB)
16B01221.U000	Model C22 Cupric Ion Analyzer, 110/220 VAC, (1) 4-20 mA output, (2) Alarm Relays, UMB
16BB2421.UU00	Model C22 2 Channel Cupric Analyzer, 110/220 VAC, (2) 4-20 mA outputs, (4) Alarm Relays, UMB
16BA2421.U100	Model C22 pH & Cupric Ion Analyzer, 110/220 VAC, (2) 4-20 mA outputs, (4) Alarm Relays, UMB

Part No.	Spare Parts and Accessories Description
2005058.VIT	Cupric Ion Electrode, Radel body, double junction Teflon Ref, 1.0 ppb -6,300 ppm, 0°-80°C
2010463	Cupric Ion Calibration Solution, 10 ppm, 500 ml
2010464	Cupric Ion Calibration Solution, 100 ppm, 500 ml
2000250-1	Polishing Strip Kit, abrasive cleaning strips for Ion electrodes
2005145.VIT	General Purpose pH electrode cartridge, double junction reference, 0-14 pH, 0°-100°C
3600064	MVS10 Compression Gland Fitting, all polypropylene, $\frac{3}{4}$ " MNPT to $\frac{3}{4}$ " tube fitting
2000072	MVS10 Compression Gland Fitting, 316 SS with Teflon ferrule, $\frac{3}{4}$ " MNPT to $\frac{3}{4}$ " tube fitting
2000264	MVS10 Immersion Assembly, 5 ft. x 1" stand pipe, $\frac{3}{4}$ " FNPT fitting and T handle, requires 3600064
2000743	MVS17 Valve Retraction Assembly, polypropylene, 1" ball valve, 1" x $\frac{3}{4}$ " tube fitting and safety lanyard.
2000745	MVS17 Valve Retraction Assembly, 316 SS, 1" ball valve, 1" x $\frac{3}{4}$ " tube fitting and safety lanyard.

Specifications subject to change without notice.

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