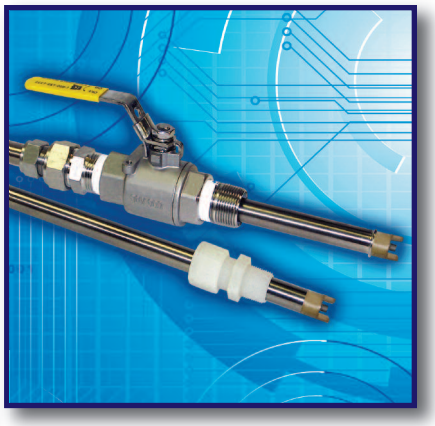
Calcium Ion Sensors

Electro-Chemical Devices

Features	Benefits
• MVS10 or MVS17 Style Sensors	• Insertion, Immersion or Valve Retractable Service
• Multiple materials of construction	• 316 Stainless Steel, Titanium, Hastelloy
• Integral Signal Conditioner	• Noise free transmission
• Replaceable Electrode Cartridge	• Simple and Economical Service
• Dual Channel Analyzers, pH/pION, pION/pION	• Mix and Match your choice of measurements



Model MVS10/MVS17
Calcium 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 Calcium Ion Electrode is a combination electrode with a sensing element made of a PVC membrane containing an ion exchanger and a double junction reference electrode. The Calcium Ion Selective Electrode cartridge develops a millivolt potential proportional to the concentration of calcium ions in the measured solution. The typical output is 25mV to 30 mV 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 Calcium 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 calcium from 20 ppb to 40,000 ppm autoranging the display between the ppb, ppm and ppt (parts per thousand) scales.

Model T23 Transmitter

Model C22 Analyzer

The calcium ion electrode is an ion exchange sensor that is selective for calcium ions but many anions also interact with the sensing membrane. Lead ions strongly interfere with the measurement, 2 Lead ions = 1 Calcium ion. Mercury, iron (II), Copper (II), nickel (II) and ammonium interfere at 1000 - 3000:1. The pH also interferes with low level measurements, keep the pH >4 for concentrations < 1ppm Ca^{++}. Hydroxide, carbonates, fluorides, phosphates, sulfates all complex with calcium ions. Adjusting the pH <7 eliminates carbonate and hydroxide issues. 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 calcium 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 calcium ion concentration. Adjust the analyzer to read this laboratory determined value. It is recommended to verify the readings on a weekly basis.

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Specifications

MVS10 and MVS17 Sensors
Combination electrode cartridge with a PVC / ion exchange membrane and a double junction, KNO_3/KCl /AgCl, reference electrode, signal conditioner, ATC

Electrode Slope
26 ± 3 mV per decade of concentration change

Measurement Range
Calcium: 20 ppb to 40,000 ppm (3-11 pH)
5×10^{-7} molar to 1.0 molar

Temperature Range
0° C to 40° C (32° F to 104° F)

Pressure Range
0 - 50 psig (0 - 3.5 barg)

Response Time
T90 in 10 seconds

Electrode Life
6 to 12 months

Interfering ions
Lead (II), Mercury (II), Iron (II), Ammonium

Wetted Materials
Radel, epoxy, PVC, PTFE, 316 SS, Viton O-Ring

Process Connections
MVS10 ¾" MNPT compression fitting
MVS17 1" MNPT Ball Valve

T23 Transmitter
General purpose, ½ DIN, NEMA 4X, 24 VDC 4-20 mA loop powered Transmitter, CE Marking, Auto ranging display, ppb → ppm → ppthousand

C22 Analyzer/Controller
General purpose, ½ 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.Ca	MVS10-C22-CBL-EG-2005143.VIT, Ca^+ ISE sensor, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable
1414060.3000.Ca	MVS10-T23-CBL-EG-2005143.VIT, Ca^+ ISE sensor, 316 SS body, ¾" Diameter. x 10" length, 10 ft cable
1419060.3000.Ca	MVS17-C22-CBL-EG-2005143.VIT, Ca^+ ISE sensor, 316 SS body, ¾" Diameter. x 17" length, 10 ft cable
1415060.3000.Ca	MVS17-T23-CBL-EG-2005143.VIT, Ca^+ ISE sensor, 316 SS body, ¾" Diameter. x 17" length, 10 ft cable
1900101.0026	Model T23 Calcium Ion transmitter, 24VDC loop powered, Universal Mounting Bracket (UMB)
16B01221.A000	Model C22 Calcium Ion Analyzer, 110/220 VAC, (1) 4-20 mA output, (2) Alarm Relays, UMB
16BB2421.AA00	Model C22 2 Channel Calcium Analyzer, 110/220 VAC, (2) 4-20 mA outputs, (4) Alarm Relays, UMB
16BA2421.A100	Model C22 pH & Calcium Ion Analyzer, 110/220 VAC, (2) 4-20 mA outputs, (4) Alarm Relays, UMB

Part No.	Spare Parts and Accessories Description
2005143.VIT	Calcium Ion Electrode, Radel body, double junction Teflon Ref, 20 ppb -40,000 ppm, 0°-40°C
2010408	Calcium Ion Calibration Solution, 1 ppm
2010407	Calcium Ion Calibration Solution, 10 ppm
2010421	Calcium Ion Calibration Solution, 100 ppm
2005145.VIT	General Purpose pH electrode cartridge, double junction reference, 0-14 pH, 0°-100°C
3600064	MVS10 Compression Gland Fitting, all polypropylene, ¾" MNPT to ¾" tube fitting
2000072	MVS10 Compression Gland Fitting, 316 SS with Teflon ferrule, ¾" MNPT to ¾" tube fitting
2000264	MVS10 Immersion Assembly, 5 ft. x 1" stand pipe, ¾" FNPT fitting and T handle, requires 3600064
2000743	MVS17 Valve Retraction Assembly, polypropylene, 1" ball valve, 1" x ¾" tube fitting and safety lanyard.
2000745	MVS17 Valve Retraction Assembly, 316 SS, 1" ball valve, 1" x ¾" tube fitting and safety lanyard.

Specifications subject to change without notice.

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CERTIFIED ISO9001 QUALITY SYSTEM